



Traffic Engineering

Proposed Residential Subdivision

Lot 2 DP1287077 Wolumla

Bega Valley Shire

Traffic Impact Assessment



1 Introduction and Scope

Junor Investments Pty Limited proposes a staged residential subdivision of 519 mostly standard density residential lots (areas above 450 square metres) plus 9 larger lots which will allow up to 86 medium density (MD) dwellings to be developed (the Junor development). The overall proposal includes 136 lots (including a site for future retail/commercial development and 5 MD sites) in Stage 1 for which a DA is currently sought, 255 lots (including 4 MD sites) in Stages 2-10 which will be the subject of a future DA, and up to 137 lots within an area (Stage 11) not currently zoned to allow residential development.

TTM Consulting (Vic) Pty Ltd was engaged to prepare a traffic impact assessment in respect of the proposed subdivision and implied development.

This report provides an overall analysis of development potential within Wolumla, accounting for traffic generation from the Junor development proposal, existing undeveloped subdivided land and the currently under development 45 lot subdivision surrounded by the Junor development proposal and further residential development opportunities on undeveloped R2 zoned land located north of the existing township development east of Candelo Wolumla Road (Scott Street). Allowances for infill development are also included.

Drawing No. 12089100 shows the location of the Junor proposal in the context of the surrounding development of Wolumla including the further potential residential development.

Section 5 of this report provides a traffic impact assessment in respect of the sought planning approval for development of the first stage of the Junor proposal. Completion of Stage 1 will most likely precede the development of the retail/commercial service hub proposed within the Junor development, which, along with development of the MD sites, will also be subject to a future DA.

2 Existing Street and Road Infrastructure and Utilization

2.1 Wolumla

Data from the 2021 Census, for the Wolumla Census District) includes:

- Wolumla had a population of 762 people (up from 702 in the 2016 Census,
- There were 298 occupied dwellings (up from 250 in the 2016 Census)
- Average household occupancy was 2.5 persons per dwelling,
- There were 346 people identifying as workers (up from 321 in the 2016 Census) with around 50% being full time,
- 290 people went to work on Census day, and
- 72% of workers travelled to work by car as driver.

Other possibly relevant data includes that the Wolumla Primary School has approximately 100 students and about 12 staff, and that the local services and facilities include a pub, general store and hairdresser.

Wolumla township currently has around 175 residential property connections to the sewerage system so a reasonable estimate of township population is around 440 people, with the remaining population being located in nearby rural residential, farming or similar accommodation.

Record

No.	Author	Description	Checked	Date
1.	J. Higgs	First Draft for Shire and TfNSW review	D. Hancox	27/08/2023
2.	J. Higgs	Version for submission	D. Hancox	3/11/2023
3.	J. Higgs	Responses to TfNSW and BVSC	D. Hancox	14/04/2025

2.2 Traffic Counts

2.2.1 Princes Highway

An automatic tube count was carried out by AusTraffic between and including Thursday 20 and Sunday 30 April 2023. The dates surveyed included normal working weekday, Anzac Day, weekend and school holiday periods. The location of the counter was between the intersections of Scott Street and Bega Street with the Princes Highway. A copy of the AusTraffic report is provided separately, with summary data and extracted information being:

The highest daily volumes were on a Friday, with Thursday just a little less. That applied both in the school holiday period and in the non-holiday week. Peak daily totals in school holidays were little different from those in the non-holiday week.

In the non-holiday week the volumes were “peakier”, with peak period flows by direction noticeably higher than during the school holiday period. Weekend volumes were well down on weekday volumes, and Anzac Day volume was the lowest daily total recorded.

The volumes of most relevance to intersection requirements and performance were the Friday non-holiday volumes as follows:

- AM Northbound 184 vph (8:00-9:00) PM Northbound 256 vph (15:00-16:00)
- AM Southbound 281 vph (8:00-9:00) PM Southbound 194 vph (15:00-16:00)

It should be noted that the recorded volumes included southerly movements associated with the intersection at Bega Street and northerly movements associated with the intersection at Scott Street.

2.2.2 Princes Highway Intersections

On Thursday 18 May 2023 TTM Consulting (Vic) Pty Ltd arranged a manual count of turning movements at the intersection of the Princes Highway with Bega Street and Scott Street. The AM peak hour was identified as 8:00 - 9:00, with turning movements recorded shown in Figure 1.

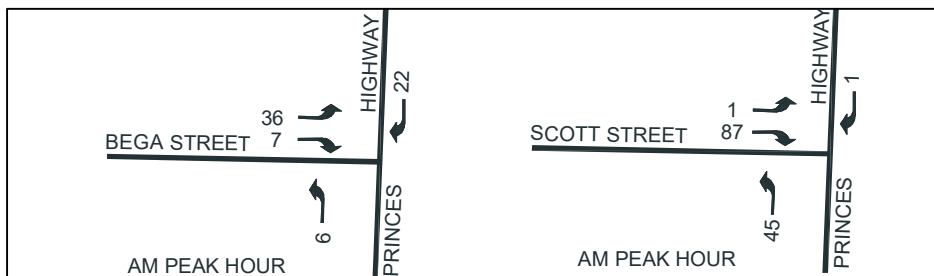


FIGURE 1: AM PEAK HOUR TURNING MOVEMENTS 18 MAY 2023

Assuming the PM turning movements would be the AM peak hour volumes reversed and making the appropriate allowances for movements included in the Princes Highway tube counts, Figure 2 shows a derivation of peak period vehicle movements in the subject strip of the Princes Highway.

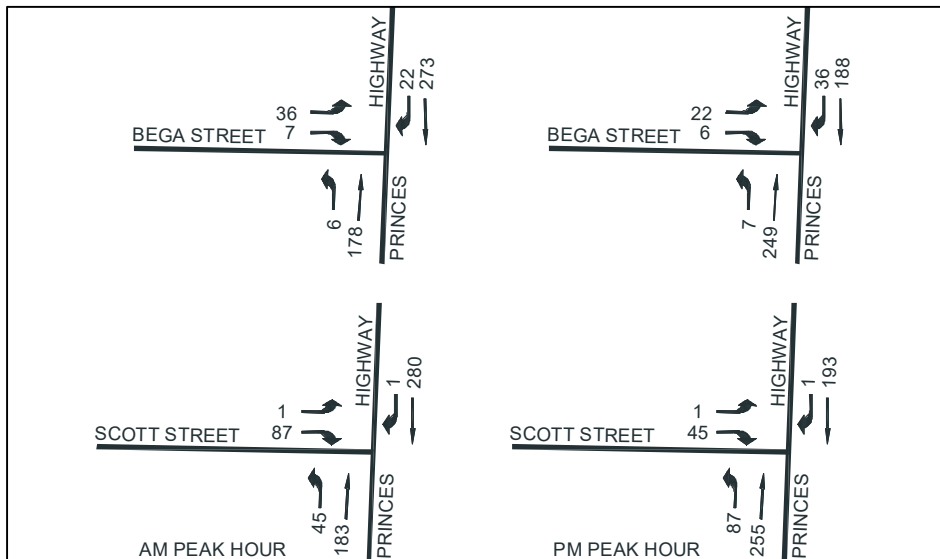


FIGURE 2: CURRENT PEAK HOUR TURNING MOVEMENTS (PM TURNING MOVEMENTS ESTIMATED)

2.3 Household Traffic Generation and Data Interpretation

2.3.1 Road and Maritime Services Traffic Data and Count Reconciliation

The RMS Technical Direction Update 2013 states regional area surveys of residential areas generating average AM peak hour trips at a rate of 0.71 per dwelling (0.85 max.) and average daily generation at 7.4 trips (vpd) per dwelling. Flat traffic generation in regional areas averages 4.6 vpd. Rates of 8 vpd for standard housing and 5 vpd for medium density dwellings will be applied in the ensuing analysis, with peak hourly rates at 10% of daily.

Based on the above analysis peak period vehicle movements at the Scott Street and Bega Street intersections at Princes Highway as would be comprised of:

- Non-locally generated traffic from Candelo-Wolumla Road (10% of 300 vpd = 30 vph),
- Traffic from 230 dwellings in Wolumla and areas to the north-west (0.7 vph per dwelling = (160 vph), and
- Traffic from north-east of Wolumla (15 vph)

Those estimates generate a total of 205 vph equal to the total volumes measured. That is an adequate calibration of the methodology.

2.3.2 Current Location of Dwellings in Wolumla

There are around 48 dwellings located in the Wolumla Census district east of the Princes Highway with access to the Princes Highway via Coral Park Road, Old Mill Road and some minor driveways. About 18 dwellings are located along Cherry Lane, with access to the Princes Highway via Cherry Lane.

With 175 dwellings in the township that leaves about 60 occupied dwellings located in the north-western part of the district with access to the Princes Highway via Candelo-Wolumla Road (Scott Street). Some of those dwellings are associated with properties large enough to contain farming activities and such that minimal peak period traffic generation is likely.

2.3.3 Traffic at Princes Highway

The total counted traffic movements in Bega Street and Scott Street at the Princes Highway connections in the AM peak hour are 131 vph out (64% of total) and 73 vph in (36% of total). Because of the higher than typical counter-peak direction volume we expect that there is a proportion of return traffic travelling between Wolumla and schools in Merimbula / Pambula, and from the rural residential areas to and from the Wolumla School. It is also likely that there is traffic with origin or destination beyond the Wolumla district, that is on Candelo-Wolumla Road.

With around 235 occupied dwellings located in Wolumla West (township plus west of Cherry Lane developments) we expect total traffic generation at around $0.8 \times 235 = 188$ vph. Of that we estimate that around 40 vph can be expected to be to and from Wolumla township including the Wolumla school, or internal, equally distributed between inbound and outbound. Of that 40 vph about $60/235 = 10$ vph (60 dwellings located outside of the township) will occur on Candelo-Wolumla Road west of Ferndale Lane. The balance of 145 vph can be expected to be about 70% outbound (105 vph) and 30% inbound (50 vph) mostly to and from the Princes Highway.

Traffic generated from the approximately 66 dwellings located north Wolumla township around Cherry Lane and east of the Princes Highway can be expected to be around 50 vph, with around 15 vph being to and from Wolumla township (as estimated above) and the balance being Princes Highway traffic only.

2.3.4 Traffic on Candelo-Wolumla Road North of Ferndale Lane

The above analysis indicates total outbound traffic to Princes Highway at Bega Street and Scott Street at 130 vph and inbound at 60 vph. Correlation with the counted traffic indicates a further outbound volume of 15 vph and inbound volume also of around 15 vph, related to origin or destination outside of the Wolumla District. The above analysis suggests a current daily volume of around 400 vpd on Candelo-Wolumla Road north of Ferndale Lane.

2.4 Local Street Network

Traffic generated by the implied development of the lots within the subdivision will primarily use the roads and streets listed in Table 1. Table 1 also lists the current form and daily traffic volumes as either estimated (*) or obtained from Bega Valley Shire Council (BVSC).

TABLE 1 : LOCAL STREET NETWORK FORM AND TRAFFIC LOADING

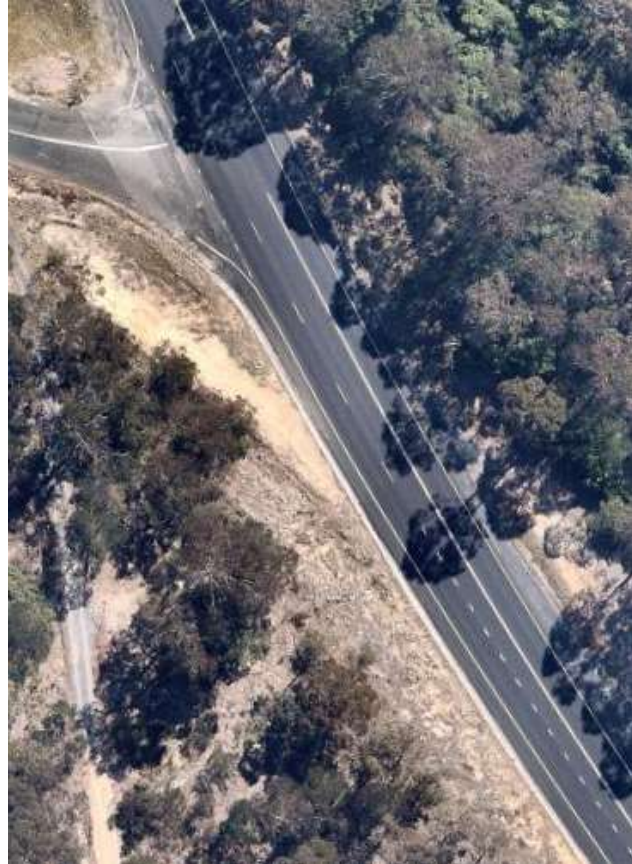
Street or Road	Land Use	AADT	Form and Comments
Phillip Street	Residential	200*	Seal c. 5m wide, no kerb
Scott Street South near Princes Hwy	Residential	1300	2 lane / two way, sealed pavement c. 6.6 m wide
Scott Street Central (near Bega Street)	Mixed	1100	2 lane / two way, sealed pavement c. 6.6 m wide
Scott Street west (Candelo-Wolumla Rd)	Mixed	400*	2 lane / two way, sealed pavement 6.6 m + wide
Momsen Street south of Phillip Street	Vacant	20*	Unsealed
Momsen Street north of Phillip Street	Residential	200*	Seal c. 5m wide, no kerb
Ferndale Lane	Open	50*	Unsealed
Bega Street near Princes Highway	Residential	680	2 lane / two way, sealed pavement c. 6.6 m wide

2.5 Princes Highway Intersections at Bega Street and Scott Street

Nearmap images of the existing conditions at the intersections of the Princes Highway with Bega Street and Scott Street are provided at Figure 3.



FIGURE 3: EXISTING PRINCES HIGHWAY at BEGA ST



EXISTING PRINCES HIGHWAY at SCOTT ST

At Bega Street there is a right turn lane in Princes Highway with length of about 70 metres, and no auxiliary left turn lane.

At Scott Street there is a single southbound lane with a wide (3 m approx.) sealed shoulder. Northbound there are 2 through lanes commencing about 60 metres south of the Scott Street intersection, with the transition from a single northbound lane occurring over 120 metres. The outside lane functions as a left turn lane although the line marking is not conventional for that purpose and is not consistent with current standards. A driver following a left turner can merge to the right to be entering the right northbound lane well before the intersection, and therefore use a *de facto* through lane going past a *de facto* left turn lane.

Posted speed limit in the vicinity of Wolumla is 100 kph.

2.6 An Assessment Horizon for Princes Highway Traffic

In 2007 a count on Princes Highway near Yellow Pinch Dam indicated daily two-way volume at 4,818 vehicle movements per day (vpd). The counts from April 2023 show 5,200 vpd, but do not include the traffic entering and leaving the highway at Scott Street (1,300 vpd). That increase is 2% per year.

Applying a further 2% per year to current counts for 10 years will provide the TfNSW requested 10 year volume scenario for the analysis. Peak period volumes on the Princes Highway will be factored up accordingly in the following analysis.

3 A Broad Future Wolumla Traffic Scenario

An eventual possible development scenario for Wolumla is set out in Table 2 with the subject sites shown in the diagram copied to Figure 4.

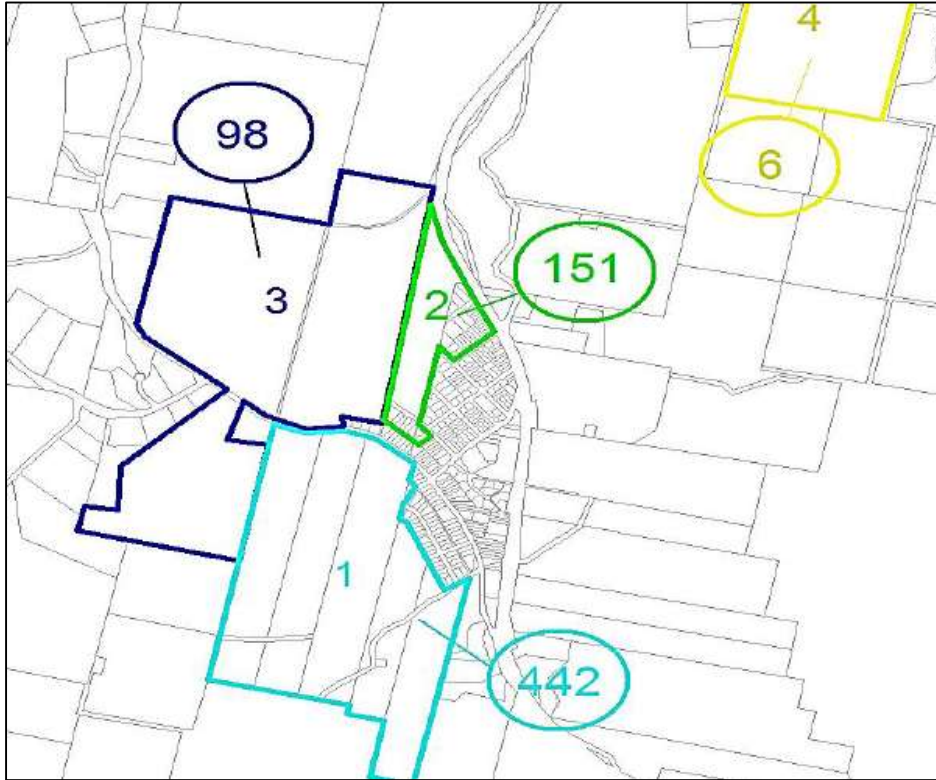


FIGURE 4: PLAN SHOWING DEVELOPMENT POTENTIAL IN WOLUMLA (FROM BVSC PLANNING REPORT 2018)

TABLE 2 : EXISTING AND POTENTIAL LOT YIELDS

Location / Project	Existing Dwellings		Potential Additional Dwellings	
	Standard	Density	Standard Density	Medium Density
Wolumla Township	175		25	20
R2 land Property 2 (plan appended)			141	20
R2 land Property 3 (BVSC estimate)			90	16
Junor*			449	226
Woodstock**			40	10
North & East of PHway	48		10	0
North & West of PHway (Cherry Lane)	18		5	0
Northwest around C-W Road	60		20	0
Totals	301		780	292
				1373

* the Junor development proposes 519 standard density lots plus sites for 86 medium density units. A maximum of about 1 in 8 or (say) 70 of the standard sites may possibly have dual occupancy.

** the Woodstock development proposes 45 standard density lots. About 5 of the standard sites may possibly have dual occupancy.

At current growth rates such a scenario is most likely at least 30 years away, a most unrealistic planning horizon. Nonetheless if traffic generation and movement patterns remain similar to the current circumstances the likely traffic volume on the local street network will be the distribution of around $1,081 \times 8 + 292 \times 5 = 10,108$ daily vehicle movements plus Candelo district sourced traffic. An increase in traffic with Candelo area origin or destination is also possible and thus the existing volume not sourced from Wolumla northwest, estimated at 200 vpd, is increased to 300 vpd in the ensuing analysis and the total volume to be distributed is 10,408 vpd.

At a population nearing 4,000 people it is reasonable to expect that there will be a significant increase in local services and facilities, with typical examples indicating a demand for around 4,000 square metres of retail plus some associated commercial space. Community facilities, an expanded primary school, local childcare, medical, entertainment and local recreational facilities are all likely components of a town of that size. Localization of various trades is also highly likely provided adequately zoned land is available.

It is noted that the Junor proposal allows for around 1,525 square metres of retail floor area. Additional retail and commercial floor space may be developed along Scott Street on the northern side where there are several lots that are opportunities for future retail and/or commercial development.

Those services and facilities will provide some local jobs and localise some vehicular traffic movements. A localisation factor of 20% will be accounted in the ensuing analysis of “full development” traffic impacts. A total of 80% of 10,408 vpd = 8,326 vpd is estimated on the above basis to connect with the Princes Highway at Bega Street and Scott Street intersections.

Future Traffic Generation and Directional Distribution

The key distribution parameters derived from the intersection counts are:

- At the Bega Street intersection 71 vph or 35% of total peak hour Princes Highway related movements was recorded. Of those movements exit volume in the AM peak hour was 61% of the total peak hour movements. If 8 vph in and 8 vph out are attributed to school related traffic the exiting proportion of the balance is 64%.
- At Scott Street 134 vph or 65% of total peak hour Princes Highway related movements was recorded. Of those movements exit volume in the AM peak hour was 66% of the total peak hour movements.

Proximity of the northern undeveloped R2 zoned land to Bega Street and the focus of potential development intensity to the northern part of Property 2 indicates that around 70% of all Princes Highway related traffic associated with the potential 250 dwellings in that area will use the Bega Street intersection. Total external traffic associated with those dwellings (220 standard density and 30 medium density) is estimated at $0.8 \times (220 \times 8 + 30 \times 5) = 1528$ vpd. 70% is 1070 vpd. That will re-balance the distribution between the Bega Street and Scott Street intersections, with around 3,850 vpd occurring at Bega Street and around 4,500 vpd occurring at Scott Street.

Traffic generation from south of Scott Street is estimated at:

- | | | |
|---|----------------------------|--------------------|
| • Future standard dwellings | $489 \times 8 = 3,912$ vpd | (519 + 45 – 75 DO) |
| • Future Dual Occupancy Allowance | $150 \times 5 = 750$ vpd | |
| • Future medium density sites | $86 \times 5 = 1,180$ vpd | |
| • Existing dwellings (around 30 in Phillip Street). | $30 \times 8 = 240$ vpd | Total = 6,082 vpd |

The retail land use in the Junor proposal is likely to provide convenience service and facilities for residents of the expanded Wolumla township and some passers-by with traffic impacts primarily on Scott Street and the retail access intersection on Scott Street. That retail development will also contribute to the localization of vehicle trips when the Wolumla expansion is sufficient to warrant the provision of those services and facilities. The retail development will be subject to a separate DA at the appropriate time.

Figure 5 provides a diagrammatic representation of likely daily traffic movements on the local street network, assuming no additional connections to the Princes Highway at full development of Wolumla as described above.

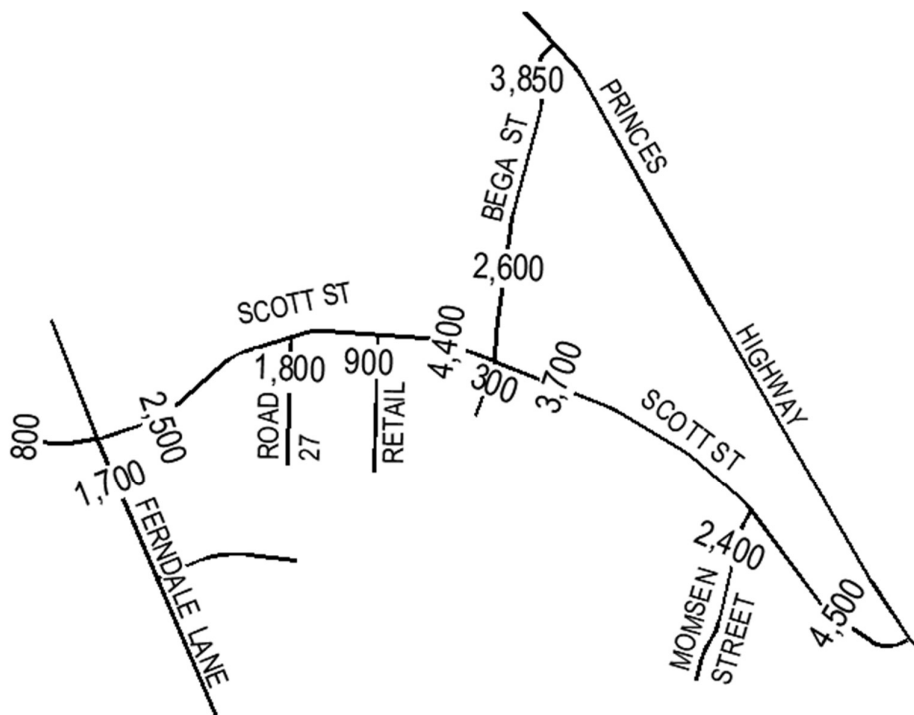


FIGURE 5: ESTIMATED DAILY VEHICLE MOVEMENTS ON KEY STREETS AT “FULL” DEVELOPMENT

4 Impacts of Future Traffic on Key Network Elements

4.1 General Conditions in Roads and Streets Mid-Block

None of the estimated vehicle volumes are high enough to consider any more than a single traffic lane for each direction of travel. It would be reasonable to expect that over the next 30 years or so the Shire will have either provided or otherwise negotiated the provision by others of parking lanes, footpaths, pavement reconstruction or resurfacing as needed, and minor intersection upgrades as warranted.

Examples of such outcomes may include:

- The development of the Junor land will impact on Momsen Street and thus warrant an upgrade to “Collector Street” standard, as depicted in Drawing No. 12089215, with funding by the development generating the impact.
- Ferndale Lane will require construction to a standard suitable for bus route application, with funding provided by the Junor development.
- Development of the vacant R2 land north of Scott Street will have impacts on Scott Street, warranting kerb and channel, footpath and road shoulder widening, and on streets leading to Bega Street. A volume of up to around 1,500 vpd will need to be accommodated in the street network east of the undeveloped land leading to Bega Street, Princes Highway, school and town centre.
- “Town Centre” retail and redevelopment projects that are likely consequent to major population expansion will warrant similar upgrades to Scott Street with on-street car parking to at least partially service the developments.

4.2 Traffic on Streets Connecting with Scott Street

Given current conditions in Momsen Street, Bega Street west and Ferndale Lane these streets are candidates for total reconstruction to suitable standards. Road 27 in the Junor development and a new street to link the currently vacant R2 land to Scott Street will also need appropriate design standards.

Ferndale Lane is predicted to ultimately carry around 1,700 vpd, and to be part of a local bus route. An intermediate condition, prior to the Junor provision of a connection to Momsen Street, is such that traffic volume will be higher. The Junor development proposes connection to Momsen Street with Stage 9. Stages 1-8 propose a total of 326 standard lots plus 9 medium density sites allowing up to 86 medium density dwellings.

At completion and occupation of Junor Stage 8, with the Woodstock 45-lot subdivision complete, Ferndale Lane and Road 27 will need to accommodate the traffic from 371 standard lots (of which 1 in 8 or (say) 50 may have dual occupancy) and 86 medium density lots, estimated at $321 \times 8 + 186 \times 5 = 3,498$ vpd. Ferndale Lane will thus need to accommodate up to around 1,800 vpd and Road 27 will have around 1,700 vpd at that point, ignoring any contribution that Bega Street may provide.

At full development south of Scott Street the total traffic generation from south of Scott Street of 5, estimated at 6,082 vpd, will need to be distributed between Ferndale Lane, Road 27, Bega Street and Momsen Street, as shown in Figure 5.

4.3 Intersections Generally

The key intersections where upgrades will be warranted include:

- Momsen Street and Scott Street
- Bega Street and Scott Street
- Ferndale Lane and Scott Street
- Princes Highway and Bega Street
- Princes Highway and Scott Street

New intersections to service development will include:

- Junor development Road 27 and Scott Street,
- Junor retail site access from Scott Street, and
- Vacant Northern R2 land and Scott Street, possibly at Ferndale Lane.

A cost sharing arrangement between developments and agencies may be an appropriate method of funding warranted works at those intersections not directly impacted by development.

It is reasonably expected that the Junor development will be assigned responsibility for intersections of Scott Street at Ferndale Lane, Road 27 and Momsen Street, and that development of the currently vacant R2 land will need to fund an upgrade to the Junor provided Ferndale Lane intersection or a new intersection nearby.

The retail site development will be required to fund the access intersection arrangement on Scott Street.

4.4 Peak Period Vehicle Movements at Intersections

Based on the continuation of current movement patterns with the allowances and generation rates described above the diagrams at Figure 6 and Figure 7 provide estimated peak period vehicle movements per hour at key intersections around Wolumla for the “full development” scenario. The movements on Princes Highway are those calculated for the 10-year horizon as requested by TfNSW and are thus likely underestimated for the likely longer timeframe for full development to be reached.

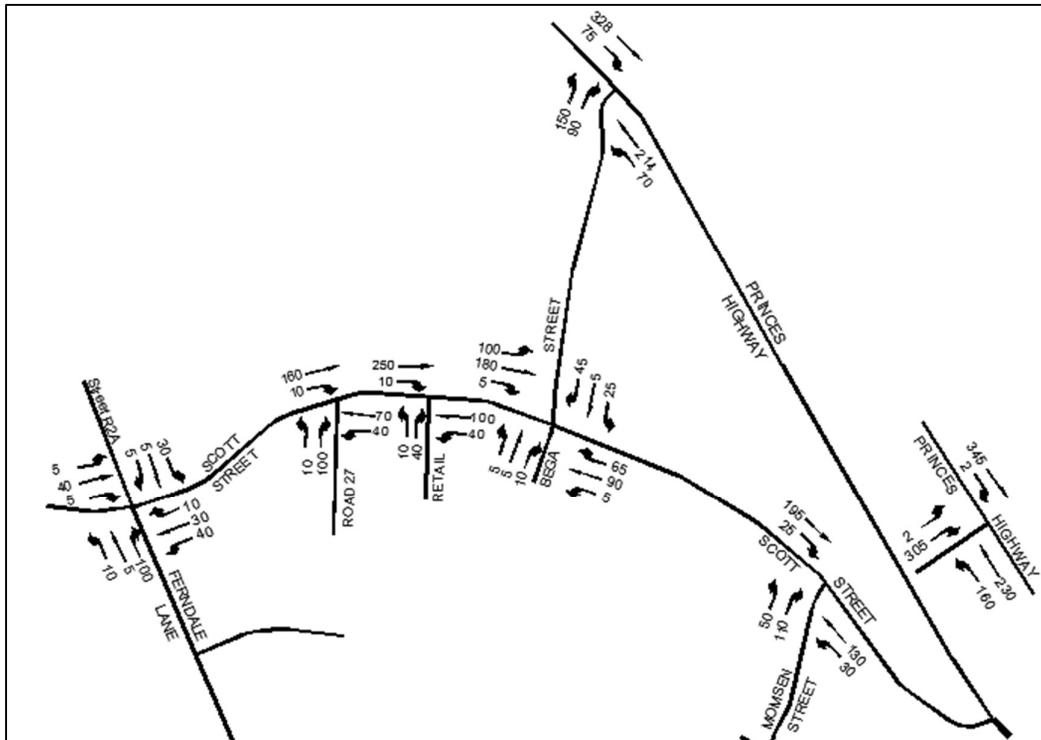


FIGURE 6: ESTIMATED AM PEAK HOUR VEHICLE MOVEMENTS AT KEY JUNCTIONS AT "FULL" DEVELOPMENT

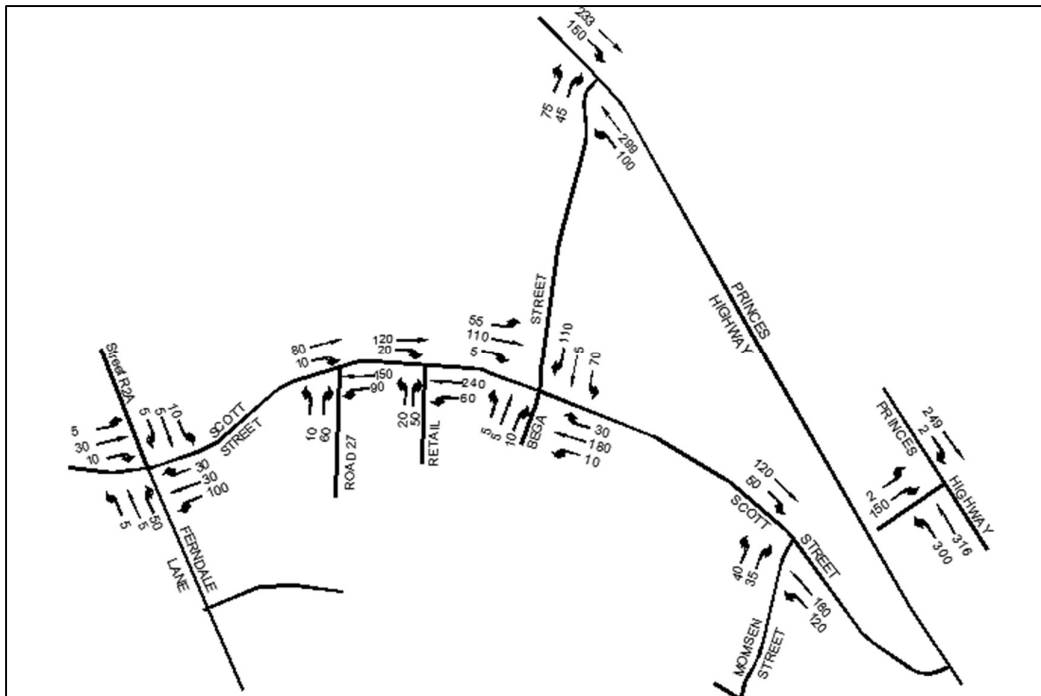


FIGURE 7: ESTIMATED PM PEAK HOUR VEHICLE MOVEMENTS AT KEY JUNCTIONS AT "FULL" DEVELOPMENT

The traffic generation allowance for the retail site, which is proposed to have its own access, is indicative only with a separate DA needing to be made for the development. A feasibility assessment is provided for information only at this stage, as set out in Drawing No. 12089515, to provide Council with an indication of possible outcomes.

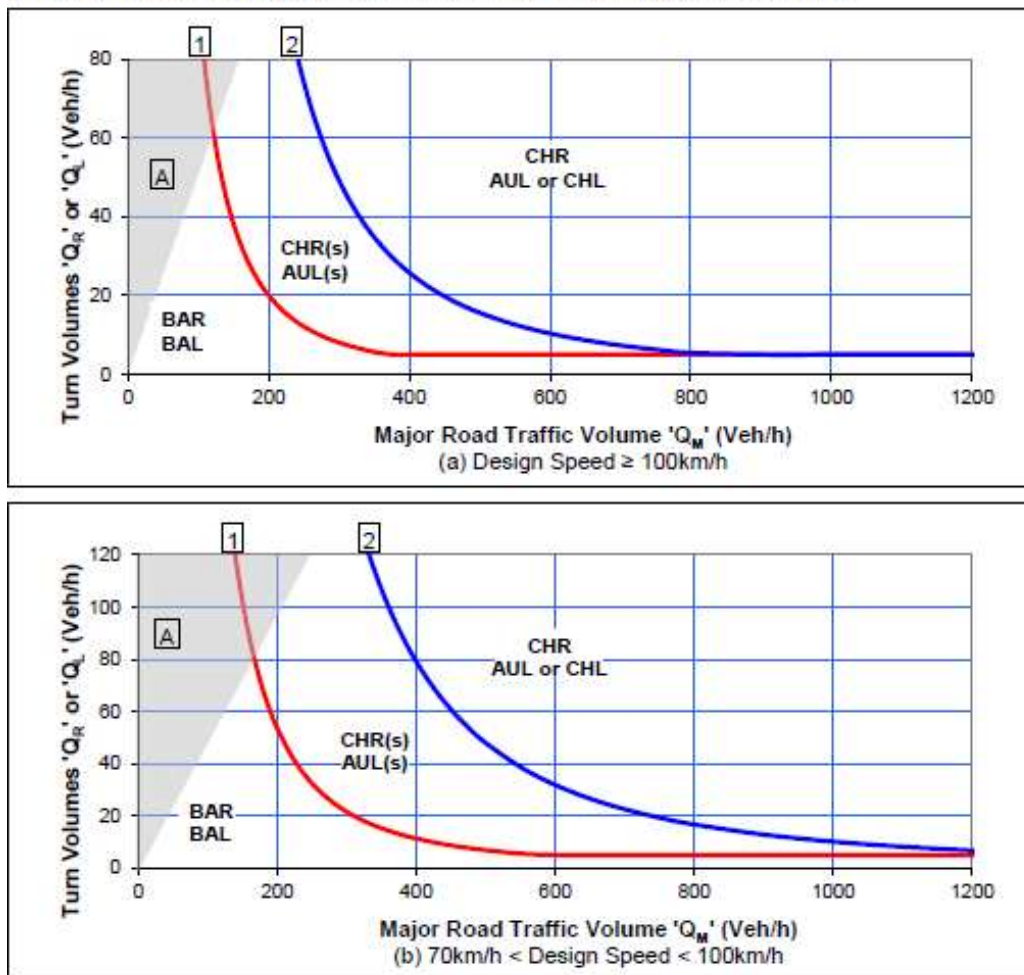
4.5 Turn Lane Warrants and Performance of Princes Highway Intersections

AustRoads Guide to Traffic Management Part 6 (AGTM6) provides warrants for turn treatments on major roads, as set out in the copy of Figure 2.25 from AGTM6. The various intersection turn lane treatments described in AGTM6 are:

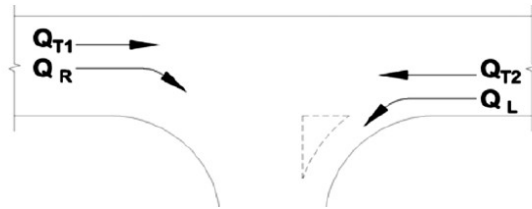
- BAR and BAL meaning “Basic Left turn treatment (BAL) and “Basic Right turn treatment (BAR). These treatments are effectively road shoulder widenings which will allow turning vehicles to be passed by vehicles travelling through the intersection.
- AUL meaning Auxiliary Left run treatment which provides a deceleration and left turn lane separate from the through lane so that left turning vehicles can decelerate without hindering the flow of traffic in the through lane. CHL is AUL with an added splitter island at the junction such that left turning vehicles need to give way to vehicles entering the junction by right turn.
- CHR meaning Channelized Right turn treatment which provides a deceleration and right turn lane separate from the through lane so that right turning vehicles can decelerate without hindering the flow of traffic in the through lane.

AUL(S) CHR(S) are AUL and CHR with shortened deceleration lanes, applicable to lower traffic volume scenarios than AUL and CHR. The shorter deceleration and turn lanes may have some turn movements requiring through vehicles to slow to about 80% of normal operating speed.

Figure 3.25: Warrants for turn treatments on major roads at unsignalised intersections



The values of Q_M are determined from Figure 3.27, copied below.



Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	$= Q_{T1} + Q_{T2} + Q_L$
		Yes	$= Q_{T1} + Q_{T2}$
	Left	Yes or no	$= Q_{T2}$

In this case the relevant values and intersects are:

- At Bega Street for right turn in from the north in the AM peak hour : $Q_M = 612$
and in the PM peak hour : $Q_M = 632$
- At Bega Street for left turn in from the south in the AM peak hour : $Q_M = 214$
and in the PM peak hour : $Q_M = 299$

The warrants indicated are AUL and CHR for Design Speed 100 kph (V100) or more and the same for V80.

Under current volumes the Q_M values are:

- At Bega Street for right turn in from the north in the PM peak hour : $Q_M = 457$
- At Bega Street for left turn in from the south in the PM peak hour : $Q_M = 249$

The warrants indicated are BAL and CHR.

- At Scott Street for right turn in from the north in the AM peak hour : $Q_M = 730$
and in the PM peak hour : $Q_M = 865$
- At Scott Street for left turn in from the south in the AM peak hour : $Q_M = 230$
and in the PM peak hour : $Q_M = 316$

The warrants indicated are AUL and BAR for Design Speed 100 kph (V100) or more and the same for V80.

Under current volumes the Q_M values are:

- At Scott Street for right turn in from the north in the PM peak hour : $Q_M = 535$
- At Scott Street for left turn in from the south in the PM peak hour : $Q_M = 255$

The warrants indicated are AUL and BAR.

The only changes in warrants are at Bega Street where currently there is no left turn lane in place and CHR(S) is the existing right turn entry provision. It appears reasonable that development contributions are applied to upgrading of turn lanes at the Bega Street intersection. Extension of the existing CHR(S) lane to CHR format may be a "solution" that is worse than the "problem" due to traffic and environmental disruptions necessary to complete the works. SIDRA analysis indicates a long term 95th percentile queue of one vehicle in the right turn lane.

At Scott Street there is an opportunity to reconfigure the line marking on the carriageway to provide a conventional left turn lane in AUL format. Drawing No. 12089420 shows a concept whereby the climbing lane is shortened, commencing just north of the intersection. The existing line marking for the diverge and commencement of the climbing lane would need to be removed to facilitate the implementation.

Intersection Performance

The peak period vehicle movement scenarios described above are modelled using the “Signalized and Unsignalized Intersection Design Research Aid” (SIDRA). SIDRA is a modelling tool which is accepted across all states of Australia as a suitable method for analysis of intersection performance.

SIDRA outputs include a “Lane Summary” table which sets out the key input parameters and outputs including Average Delay, queue lengths, Degree of Saturation (the extent to which the capacity of a lane is used by the demand flows) and “Level of Service” (LOS).

Level of Service is calculated by SIDRA based on delays calculated for each movement. Typically, Level of Service D is acceptable during peak periods, as is a Degree of Saturation of below 0.85 for priority-controlled intersections. The table below contains the relationship between LOS and Delay as adopted by Sidra and the brief explanation of conditions relevant to each LOS as defined by AustRoads.

LOS	Average Control Delay/Vehicle	Operating Conditions
A	$D < 14$	Virtually free flow conditions
B	$14.4 < d < 28.5$	Stable flows with minor restriction on driver movements
C	$28.5 > d > 42.5$	Stable flow, most drivers restricted to some extent but with acceptable delays.
D	$42.5 > d > 56.5$	Close to the limit of stable flow
E	$56.5 > d > 70.5.5$	Volumes at or near capacity
F	$70.5 < d$	Forced traffic flows

Lane Summary tables for the peak period conditions at each of the Princes Highway intersections are provided below.

LANE SUMMARY Site: 101 [Bega Street at Princes Highway AM Full]

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Princes Highway													
Lane 1	299	7.5	1836	0.163	100	1.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	299	7.5		0.163		1.4	NA	0.0	0.0				
North: Princes Highway													
Lane 1	345	9.0	1827	0.189	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	79	3.0	1319	0.060	100	6.6	LOS A	0.3	1.9	Short	60	0.0	NA
Approach	424	7.9		0.189		1.2	NA	0.3	1.9				
West: Bega Street													
Lane 1	253	0.0	925	0.273	100	7.7	LOS A	1.1	7.4	Full	500	0.0	0.0
Approach	253	0.0		0.273		7.7	LOS A	1.1	7.4				
Intersection	976	5.7		0.273		2.9	NA	1.1	7.4				

LANE SUMMARY Site: 101 [Bega Street at Princes Highway PM Full]

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Princes Highway													
Lane 1	420	7.5	1836	0.229	100	1.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	420	7.5		0.229		1.4	NA	0.0	0.0				
North: Princes Highway													
Lane 1	245	9.0	1831	0.134	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	158	3.0	1144	0.138	100	7.3	LOS A	0.6	4.4	Short	60	0.0	NA
Approach	403	6.7		0.138		2.9	NA	0.6	4.4				
West: Bega Street													
Lane 1	126	0.0	844	0.150	100	7.9	LOS A	0.5	3.7	Full	500	0.0	0.0
Approach	126	0.0		0.150		7.9	LOS A	0.5	3.7				
Intersection	949	6.1		0.229		2.9	NA	0.6	4.4				

LANE SUMMARY Site: 101 [Scott Street at Princes Highway AM Full]

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Princes Highway													
Lane 1	203	4.0	1822	0.111	100	4.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	205	9.0	1842	0.111	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	408	6.5		0.111		2.3	NA	0.0	0.0				
North: Princes Highway													
Lane 1	365	9.0	1832	0.199	100	0.1	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	365	9.0		0.199		0.1	NA	0.0	0.2				
West: Scott Street													
Lane 1	323	0.0	489	0.661	100	18.3	LOS C	4.8	33.9	Full	500	0.0	0.0
Approach	323	0.0		0.661		18.3	LOS C	4.8	33.9				
Intersection	1097	5.4		0.661		6.3	NA	4.8	33.9				

LANE SUMMARY Site: 101 [Scott Street at Princes Highway PM Full]

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Princes Highway													
Lane 1	322	3.1	1819	0.177	100	5.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	326	9.0	1842	0.177	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	648	6.1		0.177		2.7	NA	0.0	0.0				
North: Princes Highway													
Lane 1	264	9.0	1818	0.145	100	0.2	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	264	9.0		0.145		0.2	NA	0.0	0.3				
West: Scott Street													
Lane 1	160	0.0	454	0.353	100	14.2	LOS B	1.6	11.4	Full	500	0.0	0.0
Approach	160	0.0		0.353		14.2	LOS B	1.6	11.4				
Intersection	1073	5.9		0.353		3.8	NA	1.6	11.4				

The outputs indicate LOS A on all movements except for the right turn out of Scott Street, which is LOS C in the AM peak hour. The outputs are all typically acceptable.

Despite the analysis indicating adequate capacity it is our view TfNSW should carefully monitor the Wolumla Princes Highway intersections due the potential severity of any crashes. As demand for right turn exit increases, particularly at Candelo-Wolumla Road (Scott Street), the potential for risk taking will also increase. Measures including permanently reduced speed limit for the segment of the Princes Highway through the Wolumla intersections, or side road activated speed limits, could be considered.

Section 7 of this report sets out a proposal for funding of identified road infrastructure upgrades in the manner set out at Section 7.8.2 in the Bega Valley Development Control Plan 2013.

4.6 Scott Street Intersections: Turn Lane Warrants and Performance

At Ferndale Lane the final intersection form is unknown. A cross junction controlled by priority signs in favour of Scott Street is one possibility which provides a connection to the north, as is a roundabout. Alternatively the northern connection may be offset to the southeast of Ferndale Lane. Determination of the most appropriate form will be influenced by the street network planning within the currently undeveloped R2 land.

Clearly traffic volumes will be at low levels such that SIDRA analysis is unnecessary other than at the Scott Street / Bega Street intersection. Each intersection is assessed as follows against AustRoads (AGTM06) guides for turn lane warrants.

At Ferndale Lane under the Junor development proposal at either full development or at the intermediate stage prior to the connection to Momsen Street the warrants are BAR and BAL, taken from the AGTM06 parameters set out at Section 4.5 for the <70 kph Design Speed scenario.

At Road 27 the warrants are BAR and BAL although a future DA for the retail development may affect those warrants.

At Bega Street the right turn from the south into Bega Street shows a warrant for CHR(S), with other turns warranting BAL or BAR. SIDRA analysis is summarized in the Lane Summary tables copied below.

LANE SUMMARY Site: 101 [Scott Street at Bega Street AM Full Development]

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %	veh/h	v/c	%	sec							
South: Bega Street													
Lane 1	16	3.0	1077	0.015	100	6.3	LOS A	0.0	0.4	Full	500	0.0	0.0
Approach	16	3.0		0.015		6.3	LOS A	0.0	0.4				
East: Scott Street													
Lane 1	189	0.0	1648	0.115	100	3.0	LOS A	0.5	3.4	Full	500	0.0	0.0
Approach	189	0.0		0.115		3.0	NA	0.5	3.4				
North: Bega Street													
Lane 1	121	3.0	1223	0.099	100	6.4	LOS A	0.3	2.2	Full	500	0.0	0.0
Approach	121	3.0		0.099		6.4	LOS A	0.3	2.2				
West: Scott Street													
Lane 1	300	20.8	1664	0.180	100	2.3	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	300	20.8		0.180		2.3	NA	0.1	0.4				
Intersection	626	10.6		0.180		3.4	NA	0.5	3.4				

LANE SUMMARY Site: 101 [Scott Street at Bega Street PM Full Development]

Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Bega Street													
Lane 1	16	3.0	1106	0.014	100	6.2	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	16	3.0		0.014		6.2	LOS A	0.0	0.3				
East: Scott Street													
Lane 1	253	0.0	1829	0.138	100	1.7	LOS A	0.4	2.7	Full	500	0.0	0.0
Approach	253	0.0		0.138		1.7	NA	0.4	2.7				
North: Bega Street													
Lane 1	184	3.0	1308	0.141	100	6.2	LOS A	0.5	3.4	Full	500	0.0	0.0
Approach	184	3.0		0.141		6.2	LOS A	0.5	3.4				
West: Scott Street													
Lane 1	168	17.7	1695	0.099	100	2.0	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	168	17.7		0.099		2.0	NA	0.1	0.4				
Intersection	621	5.8		0.141		3.2	NA	0.5	3.4				

The SIDRA analysis has been carried out applying a lane configuration without turn lanes and is thus very conservative but still indicates satisfactory performance. The full AGTM06 warrants may not be viable due to property constraints but short right turning “pockets” could be added without significant loss of parking in the important heart of the Wolumla commercial area, as shown in the concept plan at Figure 7.



FIGURE 7: CONCEPT FOR SHORT TURN POCKETS IN BEGA STREET AT SCOTT STREET

BVSC should consider the benefits of disrupted traffic flows to a town centre environment before opting for separate left turn facilities at the Bega Street intersection with Scott Street. It is understood that the 45 lot subdivision currently under construction has a requirement to connect Bega Street west with Scott Street.

At Momsen Street the warrants are CHR(s) and BAL but we consider that the urban nature of the surrounds should be respected and that no separate turn lanes should be provided.

5 Junor Stage 1 Traffic Impacts and Design Proposals

5.1 Full Development Proposal and Context of Stage 1

Drawing No. 12089105 shows the proposed Junor Stage 1 development proposal in the context of the overall Junor and surrounding development and street network. Also shown is the proposed bus route within the development, with stops and walkable catchments for each stop.

5.2 Traffic Generation and Distribution to Street Network

Internal traffic generation is estimated based on the rates set out at Section 2.3.1. Drawing No. 12089106 provides the estimated volumes on the Junor street network at full development of all 11 Stages assuming that the rezoning to allow the additional Stage 11 of 137 lots is achieved.

Stage 1 will contain 131 standard density lots (of which about 1 in 8 or 16 lots may accommodate dual occupancies) and 5 no. medium density sites able to accommodate up to 47 dwelling units. Traffic generation from Stage 1 is estimated at $115 \times 8 + 63 \times 5 = 1,235$ vpd. Assuming the Woodstock development is complete and occupied by that time traffic generation from Junor Stage 1 and Woodstock is estimated at:

- Standard dwellings $154 \times 8 = 1,232$ vpd (131 + 45 – 22 DO)
- Dual Occupancy Allowance $44 \times 5 = 220$ vpd
- Medium density sites $47 \times 5 = 235$ vpd
- Total = 1,687 vpd

That will need to be accommodated by Road 27 and Ferndale Lane, with some traffic generated directly to Scott Street and possibly a minor volume to Bega Street. These volumes are well below the volumes applied in the design of the relevant streets.

Peak hour traffic generation is likely to be around 120 vph.

5.3 Proposed Street Form

5.3.1 Overview

We are aware of BVSC preferred typical sections for streets as follows:

Road Type	Maximum Traffic Volume (vpd) See note 1	Maximum Speed (km/h) See note 2	Carriageway Width (m)	Parking Provisions Within Road Reserve	Kerbing	Footpath Requirement See note 3	Verge Width (each side)	Minimum Road reserve width (m)
Access Street See note 4 See note 6	150	25	6.0 See note 7	Carriageway	Layback	1.2m wide footpath on one side	4.5 m	15.0
			6.0 See note 7	Carriageway	Flush with grassed swale drains	1.2m wide footpath on one side	Minimum 4.5 m See note 5	20.0
Local Street not bus route See note 6	1,000	40	8.0 See note 7	Carriageway	Layback	1.2m wide footpath on one side	3.5 m	15.0
			8.0 See note 7	Carriageway	Flush with grassed swale drains	1.2m wide footpath on one side	Minimum 4.5 m See note 5	20.0
Collector Street or bus route	3,000 (with access to residential allotments)	50	9.0	Carriageway	Layback or barrier	1.2m wide footpath on one side	3.5 m	16.0
Local Sub-Arterial Road	6,000 (no access to single dwelling residential allotments)	60	11.0	Carriageway	Barrier	1.2m wide footpath on one side	4.5 m	20.0

Use of a carriageway width of 8.0 m for residential streets provides no trafficable advantage over a carriageway width of 7.3 m, which allows for cars to be parked on both sides of the street (opposite each other) and for a truck to pass between at a sensible speed. With one car parked a two-way condition allows a car and truck to pass with appropriate care at appropriate speed, as does a carriageway width of 8.0 m.

With 8.0 m of carriageway width rather than 7.3 m the following outcomes arise:

- Higher vehicle speeds,
- Increased area of pavement to construct,
- Increased area of pavement to maintain,
- Increased area of pavement functioning as heat bank,
- Increased area of pavement to drain, and
- Decreased permeability.

None of those outcomes is beneficial to any part of the community, and thus we strongly recommend the application of 7.3 m carriageway widths for all streets except the bus route Road 11B.

Our recommendations for street design are based on the Victorian Planning Schemes, which have recommended 7-7.5 metres of carriageway width for the equivalent street form, albeit with traffic volume up to 3,000 vpd. Western Australia and Queensland have recommended carriageway widths in the same range for similar traffic loading and car parking conditions. The snip below is taken from the State level provisions of the Planning Schemes for a street form described as “Access Street Level 1”. In Victoria the Fire services agency requires a minimum of 7.3 metres of carriageway width where car parking is allowed on both sides (5.4 m for single sided parking), so that is adopted in most municipalities in Victoria.

A street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are facilitated.

▪ Traffic volume ¹	2000vpd to 3000vpd
▪ Target speed ²	40kph
▪ Carriageway width ³ & parking provision within street reservation	7m-7.5m wide with parking on both sides of carriageway
▪ Verge width ⁴	4.5m minimum each side
▪ Kerbing ⁵	Semi-mountable rollover or flush and swale or other water sensitive urban design treatment area.

A carriageway width of 9 metres is not best practice for a bus route if there is significant demand for on-street car parking. A suitable alternative that will ensure that 2 clear travel lanes are available regardless of parking is 6.6 metres of clear carriageway with indented car parking to allow tree outstands and reduced pavement area. On Ferndale Lane the parking indents would be needed only on the eastern side. The large lots fronting the bus route are such that on-street car parking demand is not likely to be high and traffic volumes along the bus route will also be quite low for a typical bus route. Either alternative will be acceptable.

The only places we as designers recommend the use of streets with carriageway width at 5.5 metres (6.0 metres is similar but provides no trafficable advantage over 5.5 metres) is alongside open space with low traffic volume (<300 vpd) and with primarily locally generated traffic. Only Road 11B in the Stage 1 plan meets those criteria.

Drawing No. 12089215 shows our recommended street typical sections for each street type relevant to the Junor development. Drawing No. 12089110 shows the proposed locations of those typical sections.

5.3.2 Responses to Concerns Raised by BVSC

BVSC has raised some issues around the proposed street sections, with our responses, as follows:

Car Parking on Proposed 5.5 m wide carriageways.

Car parking on both sides of the carriageway at any given location is not legal in NSW because 3m clearance is required under the traffic regulations. This is generally reinforced in residential areas by controlling parking to only one side of the carriageway through the use of signage and/or yellow line along the kerb lip. A less restrictive method employed in some places is advisory signage as shown below.



In this case we recommend the parking ban on one side which will not be significantly restrictive because it is only proposed in the short length of Road 11B which has only 2 lots directly fronting. The parking should be allowed on the northern side of the street.

BVSC has requested a swept path of garbage truck in conjunction with B85 car utilizing the 5.5 metres wide carriageway proposed, provided herewith in Drawing No. 12089431.

Crest Sight Distance on Scott Street Near Ferndale Lane Intersection.

OCRE has provided an assessment as set out in Drawing No. 2109-P31SD, copy appended. It should be noted that the driveway for proposed Lot 155 is now shown on Road 1.

Turn Lanes Not Provided at Momsen Street Intersection on Scott Street.

In a town centre or urban environment it is not usual practice to provide turn lanes at minor intersections. Turn lanes increase walk distance across junctions and do not have a platooning effect on traffic streams which would be beneficial to pedestrian safety and amenity. However, this is no longer relevant to the now current DA which does not include a connection to Momsen Street.

“BVSC does envisage single lane, 2-way, 2 parking lanes with pedestrian path along Scott Street”

The ultimate form of Scott Street intended in the proposal is for 2 lanes, 2-way, 2 parking lanes. The provision within Stage 1 is for the parking and frontage treatments including footpath to be provided along the southern side whilst retaining 2 travel lanes. North side works will be the responsibility of others. Drawings Nos. 12089505-507 show the ultimate concept for Scott Street along part of the Junor land frontage and extending through the intersection of Scott Street and Bega Street. A copy of Drawing No. 12089507 with AutoTrack generated paths of truck turn movements at the Bega Street intersection is also included.

The southern side of the balance of the frontage (not shown) to the Ferndale Lane intersection will be constructed in a similar manner to that shown in the drawings.

Bega Street / Scott Street Intersection Dimensions of Turn “Pockets”

Drawing No. 12089507 provides a dimensioned concept plan which includes allowance for a footpath connection to the frontage of the Junor land future retail / commercial development site (Lot 161). It should be noted that the Junor subdivision proposes to allocate land in the south - easternmost part for widening of the Scott Street road reserve to allow for footpath and services to be constructed across the “pinch-point” in the existing road reserve. It is assumed the BVSC will need to acquire the corresponding “sliver” from the adjacent Lot 1 SEC 1 DP3808 fronting Scott Street.

Consideration of Roundabout in Scott Street at Ferndale Lane

At Ferndale Lane a roundabout could be provided but a conventional design would have the circulation path centred on the through alignment of Scott Street. To provide such a roundabout there would be a need for land acquisition from the property on the northern side of Scott Street and a minor splay from the property on the south-western quadrant of the intersection. The northern property may be developed for residential use in future and the warrant or feasibility of a roundabout can be considered at the appropriate time. Our intersection performance analysis, based on full development of the potential residential land shown in Table 2, demonstrates the adequacy of the current priority-controlled junction.

Drawing No. 12089405 shows a concept plan for a roundabout at Ferndale Lane on Scott Street. This plan demonstrates the necessity of land take from the northern side of Scott Street and the desirability of land from west of Ferndale Lane. The concept plan shows a proposed boundary splay for proposed Lot 155 such that a roundabout can be accommodated without further land resumption from proposed Lot 155.

Consideration of Roundabout in Scott Street at Bega Street

At Bega Street the opportunities for adequate land resumption are not available without major disruption and cost, including impacts on existing buildings if a conventional design is to be applied.

Roundabouts take the gaps out of traffic streams which negatively impacts on pedestrian amenity and safety. At Bega Street the existing boundaries and buildings are not conducive to a roundabout design that would be anywhere near AustRoads compliance. Please see Drawing No. 12089406. A roundabout comprising a fully mountable island could be provided but deflection standards would not be met.

Speed Limit Along Scott Street

Approaching Wolumla from the west the 50 kph speed limit should commence west of Ferndale Lane given that house lots with direct driveways to Scott Street will be present on both sides of the street. It is understood that Council staff will put this to the Traffic Committee.

Traffic Calming Measures

The concept plan for Scott Street includes wombat crossings at strategic locations, in particular on the anticipated major pedestrian route between the Junor development and the Primary School. The issue of roundabouts is addressed above.

Existing Crest and Property Access around Ferndale Lane Intersection.

This was previously addressed in the TIA by way of sight distance assessment, but further detail is provided in OCRE Drawing No. 2109-P31SD, copy appended.

Momsen Street Intersection at Scott Street

The current DA for Stage 1 does not provide for development connection to Momsen Street. The details around the intersection will be addressed as part of DA for Stage 9.

NSW Rural Fire Service Issue

The Stage 1 arrangement now includes a connection to the Woodstock 45-lot subdivision street network, thus providing the additional connection.

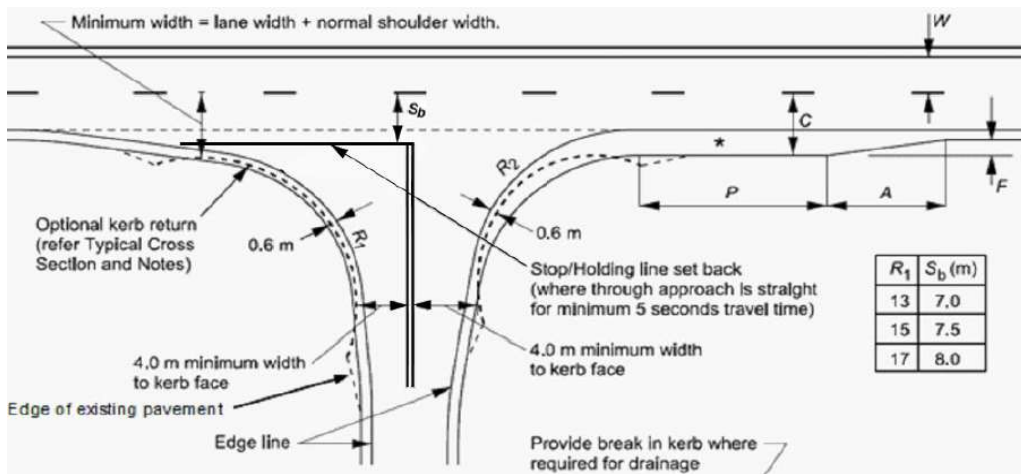
5.4 Traffic Impacts of Stage 1

5.4.1 At Scott Street Intersection with Ferndale Lane

At Ferndale Lane the warranted treatment for a simple T-junction is BAR and BAL, which should be provided in conjunction with Stage 1. Speed limit will be reduced to 50 kph.

At Road 27 the warrants are BAR and BAL. Because Stage 1 includes lots fronting Scott Street it will be appropriate that the Junior development provide shoulder widening with kerb and channel and footpath along the frontage of Stage 1.

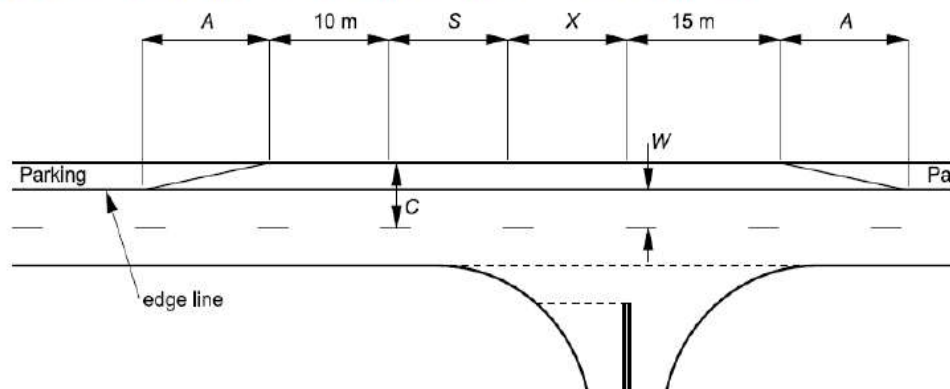
The layout for BAL is provided in AustRoads Guide to Road Design Part 4A (AGRD04A) as follows:



$$A = 3 \times 0.5 \times 50 / 3.6 = 21 \text{ for V50 and } P = 15.$$

The layout for BAR is provided in AustRoads Guide to Road Design Part 4A (AGRD04A) as follows:

Figure 7.6: Basic right-turn treatment (BAR) for a two-lane urban road



The values of A, Sand X are:

$$A = 3.25 \times 40 / 3.6 = 36 \text{ (80 kph is to be used as V when the design vehicle is a 19 metre semi-trailer).}$$

$$S = 12.5, X = 10$$

Those parameters are such that the Scott Street taper should commence 70 metres northwest of the Ferndale Lane centreline and extend for 51 metres downstream of the intersection centreline.

Some of the standard AustRoads layouts are likely to require amendments consequent to provisions for reticulated services and existing right of way boundaries.

5.4.2 At Scott Street Intersection with Road 27

At Road 27 the application of decent urban design principles with a wider focus on pedestrian amenity and streetscape, omitting turn lanes, is proposed. Benefits of omitting turn lanes will include:

- Shorter walk distances across streets at intersections,
- Less pavement and more landscape opportunity,
- Greater footpath amenity due to more separation from vehicular traffic,
- Lower traffic speeds,
- Platooning of vehicle flows due to beneficial disruptions caused by turning vehicles, creating gaps for safer pedestrian crossings and turning vehicles at nearby intersections.

5.4.3 At Princes Highway Intersections

Assuming continuation of current movement patterns the estimated peak period traffic generation from Junor Stage 1 will be around 130 vph. At Stage 1 it is not appropriate to account for significant localization of traffic due to increase local facilities and services, so 90% is allowed at the Princes Highway intersections. The impacts, based on the recent counts, are estimated at:

At Bega Street	AM peak hour	outbound	15 vph to north, 10 vph to south
		Inbound	10 vph from north, 5 vph from south
	PM peak hour	outbound	10 vph to north, 5 vph to south
		Inbound	15 vph from north, 10 vph from south
At Scott Street	AM peak hour	outbound to south	65 vph
		Inbound from south	20 vph
	PM peak hour	outbound to south	25 vph
		Inbound from south	60 vph

Referring to the analysis of the full Wolumla development scenario at Section 4.5 it can be seen that there is no change from the current warrants for turn treatments. Further, the full development capacity analysis demonstrates adequate capacity and therefore that condition will apply under Stage 1 of the Junor development.

6 Safe Intersection Sight Distances

OCRE has assessed sight distances at each relevant intersection and has presented the analysis in drawings as appended to this report. The only new intersection proposed is at Road 27 and Scott Street.

7 Road Infrastructure Upgrades

The analysis set out in this report has identified that at some future time subject to development within and around Wolumla it will be desirable that road infrastructure upgrades are implemented. The upgrades potentially warranted consequent to the current DA for Junor Stage 1 so identified are set out in Table 3, provided in response to Section 7.8 of the Bega Valley DCP 2013.

TABLE 3 : ROAD INFRASTRUCTURE UPGRADES IDENTIFIED

Project	Warrants	Commentary
Intersection Princes Highway at Scott Street – Provision of left turn lane (AUL)	Project required consequent to additional development in Wolumla	Already warranted, existing conditions not unsafe noting that the same warrants would have existed at the time of construction the existing infrastructure. Refer to separate
Intersection Princes Highway at Scott Street – Possible need to widen eastern shoulder to achieve BAR	Subject to proper survey and analysis, if required consequent to TfNSW Princes Highway project inadequacy.	Not relevant - no nexus with developments in Wolumla. TfNSW may choose to undertake detailed analysis and possible correction if warranted.
Intersection Princes Highway at Bega Street - Provision of left turn lane (AUL)	Project required consequent to additional development in Wolumla	Early stages of Junor development will have minimal impact on traffic loading on left turn entry at Bega Street. R2 land development north of Scott Street will be primary generator of additional traffic loading.
Intersection Princes Highway at Bega Street - Provision of right turn lane CHR upgrade from CHR(S)	Project warranted under AustRoads Guide to Traffic Management consequent to additional development	Currently warranted but safety related risks of non-provision considered low. Consider additional signage as an interim measure and review to assess need vs. impacts of construction works.
Intersection Scott Street at Bega Street	Additional development in Wolumla but may be a requirement on Woodstock	Suggested as a Council funded project if considered necessary and not required under Woodstock approval.
Intersection Scott Street at Ferndale Lane BAR/BAL, 50kph limit	Consequent to Junor development	No nexus with developments other than Junor – to be funded by Junor development. Note land allowance for possible future roundabout.
Intersection Scott Street at or near Ferndale Lane to service Development of R2 land north of Scott Street	Consequent to development of R2 land north of Scott Street	No nexus with developments other than R2 north of Scott Street – to be funded by R2 development. Refer above.
Intersection Scott Street at proposed Road 27	Consequent to Junor development	No nexus with developments other than Junor – to be funded by Junor development
Underground electricity supply in Scott Street	Community and safety project	Suggested as a Council funded project with Junor contribution. Benefits to northern side of Scott Street.
Local widening for parking and path in Scott Street	Consequent to development of abutting land	No nexus with developments other than Junor – to be funded by Junor development

Appended are Drawing Nos. 12089420-424 showing proposals for treatments on the Princes Highway at the intersections with Bega Street and Scott Street.

Also appended is a Draft paper providing the basis of a possible VPA to fund or construct the works on the Princes Highway.

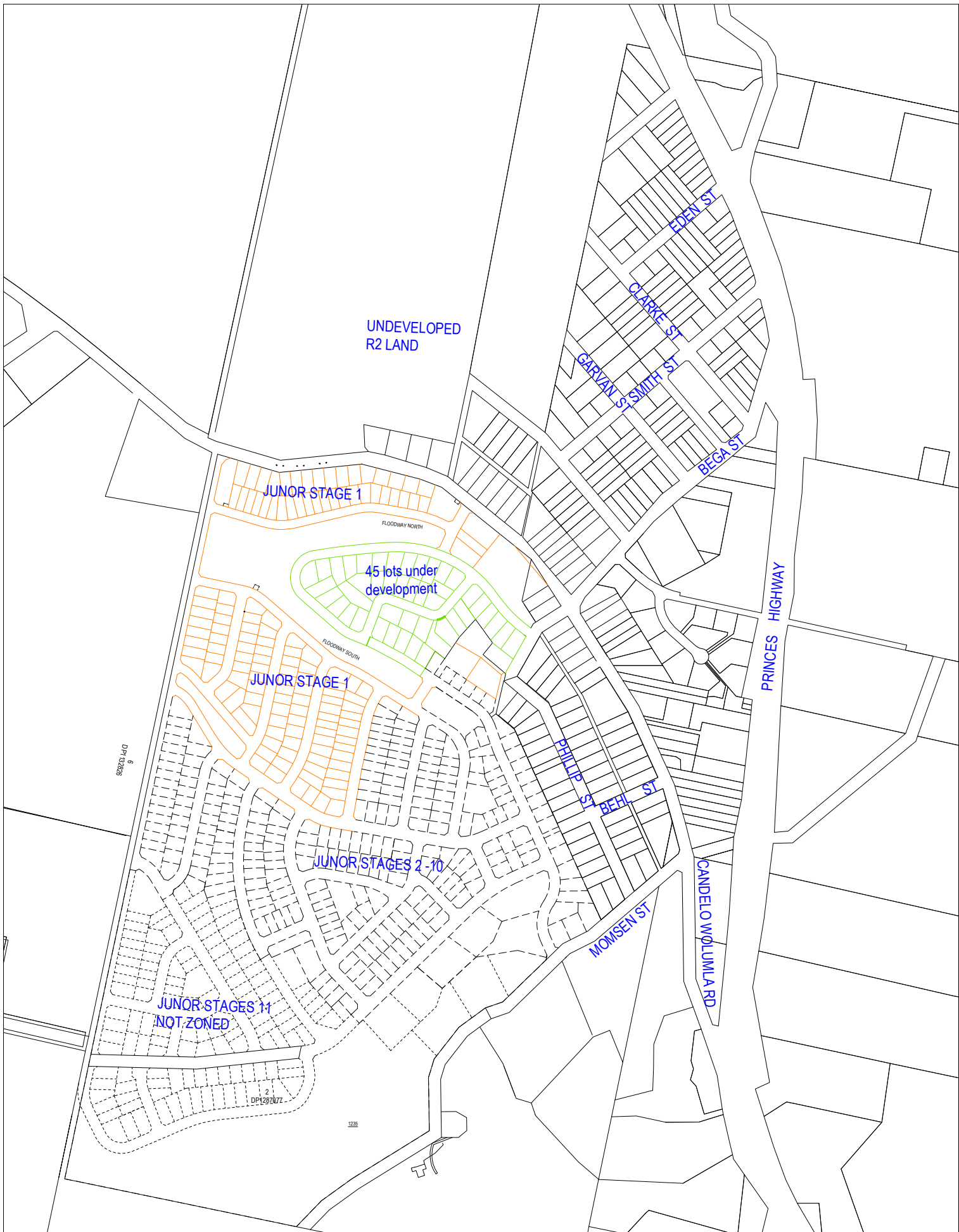
8 Summary and Conclusions

Subject to acceptance of the design concepts and details presented in this report, there are no traffic engineering or transport related reasons for refusal of the planning approvals that are sought by the subject application.

TTM Consulting (Vic) Pty Ltd



J. D. Higgs



A	JH	04/04/25	Original Issue
Issue/Appd	Date	Comments	



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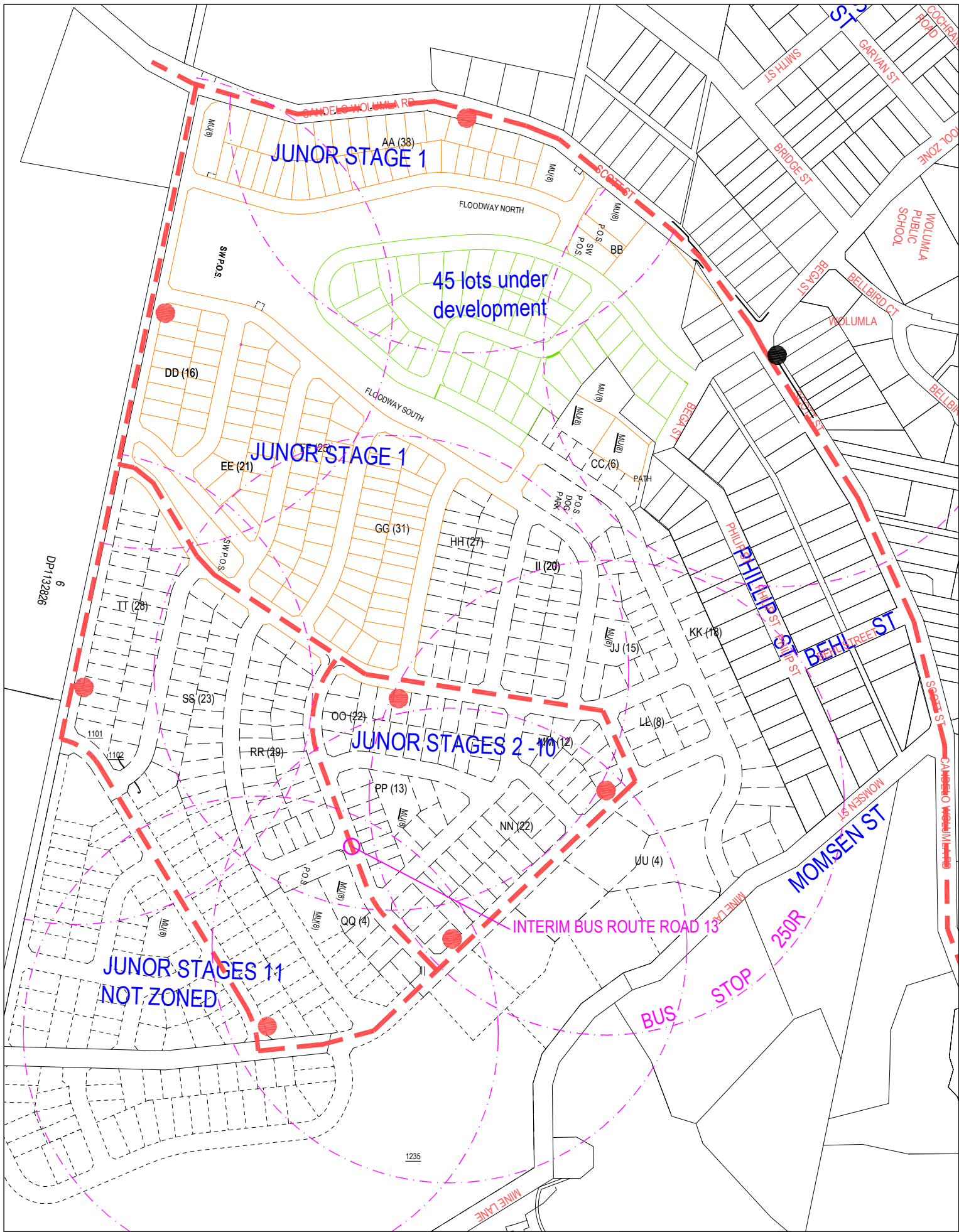
W : www.ttmgroup.com.au

**WOLUMLA VILLAGE
BEGA VALLEY SHIRE
JUNIOR SUBDIVISION
PROPOSAL AND POTENTIAL
R2 DEVELOPMENT AREAS**

Scale 1:8,000 @ A4

Drawing No : 12089100

Sheet No : 1 Issue : A



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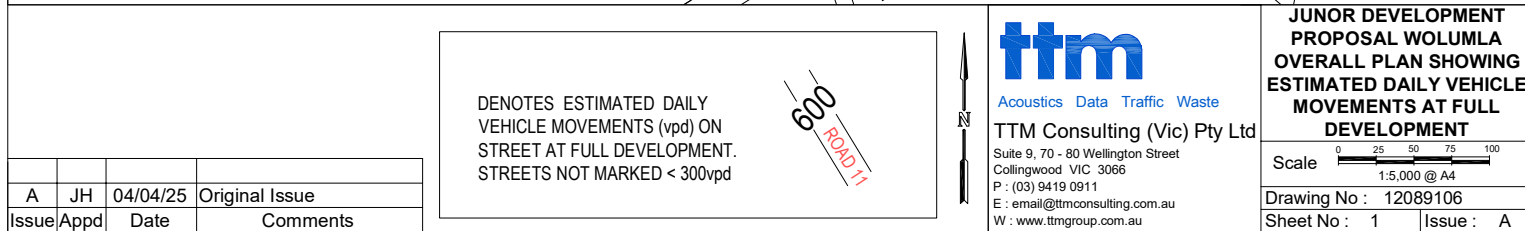
W : www.ttmgroup.com.au

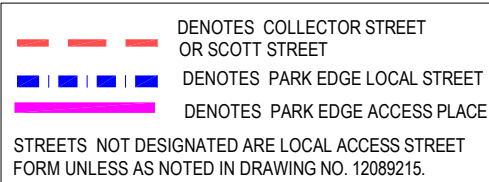
**JUNOR DEVELOPMENT
PROPOSAL WOLLUMLA
OVERALL PLAN SHOWING
BUS ROUTE AND STOPS**

Scale
0 25 50 75 100
1:5,000 @ A4

Drawing No : 12089105

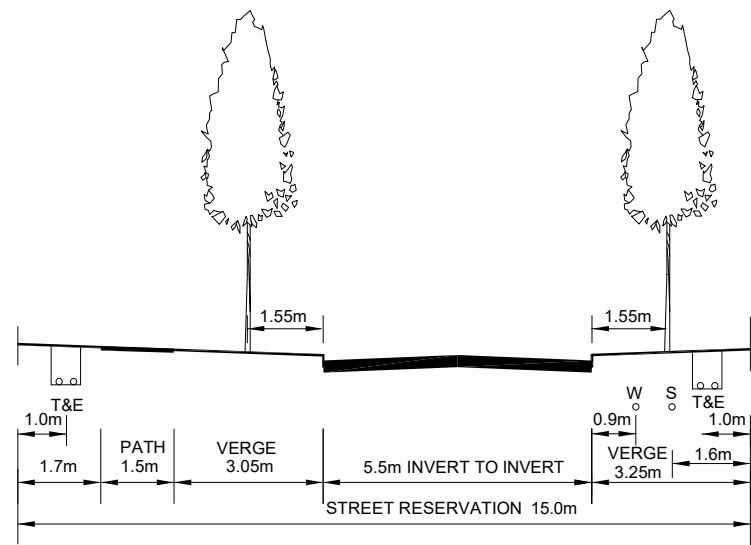
Sheet No : 1 Issue : A



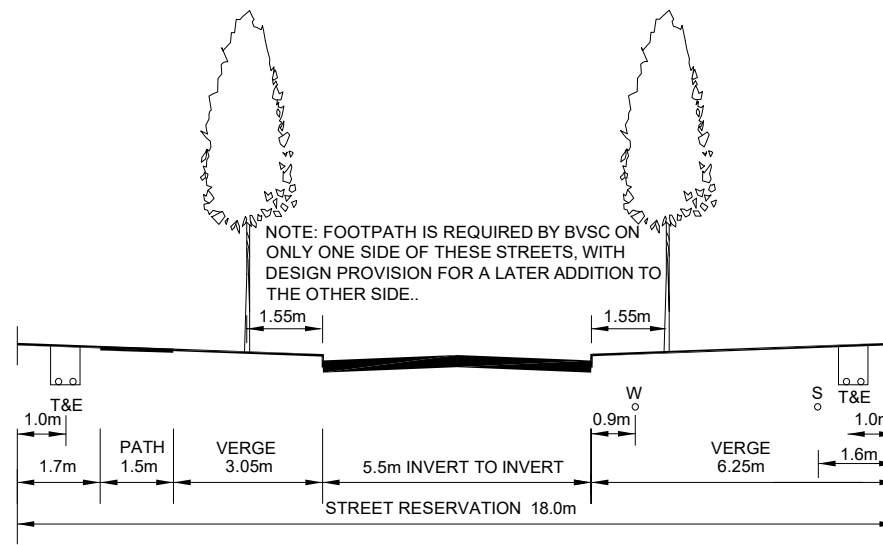


Drawing No : 12089110	
Sheet No : 1	Issue : A

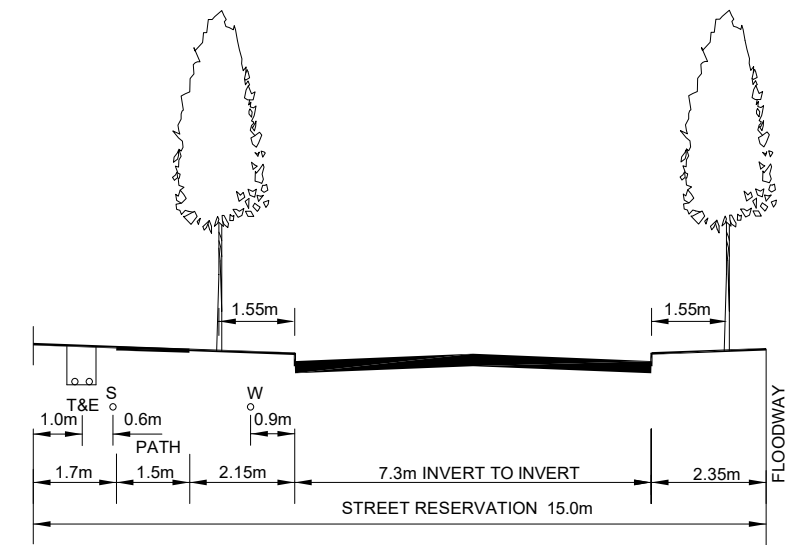
A	JH	04/04/25	Original Issue
Issue	Appd	Date	Comments



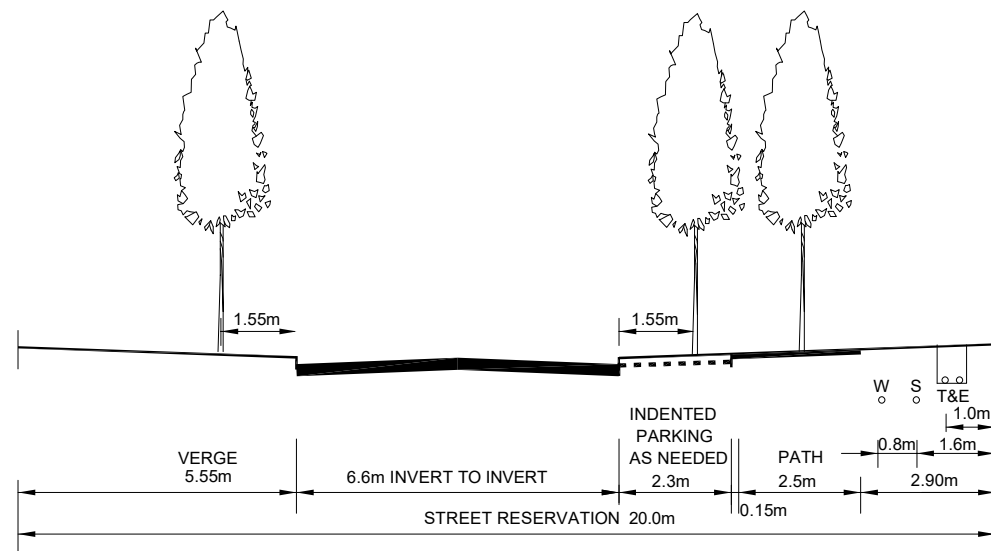
PARK EDGE ACCESS STREET



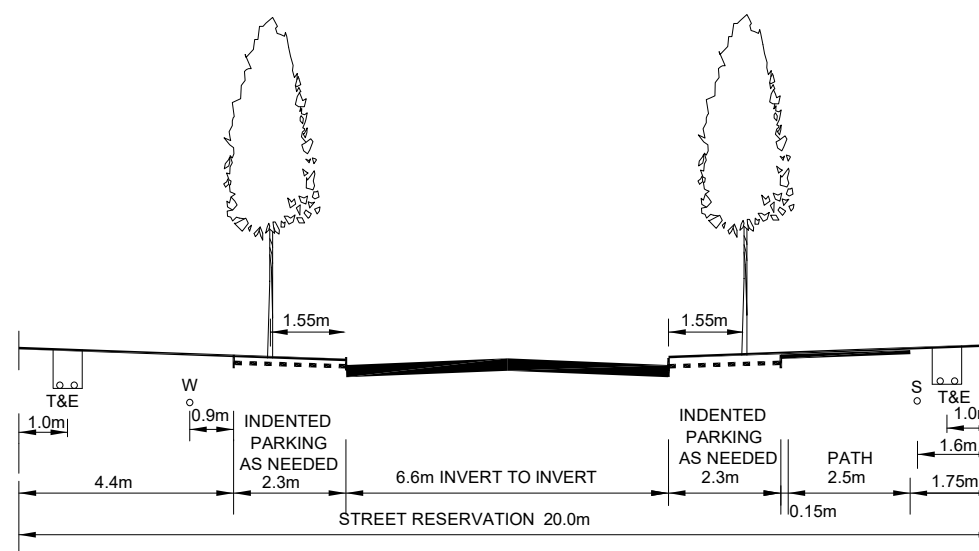
ACCESS STREET



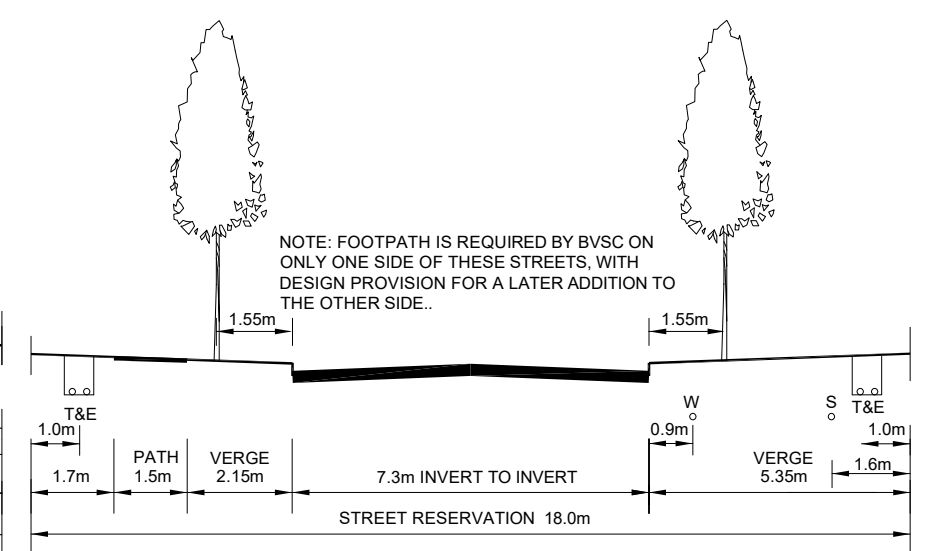
PARK EDGE LOCAL STREET



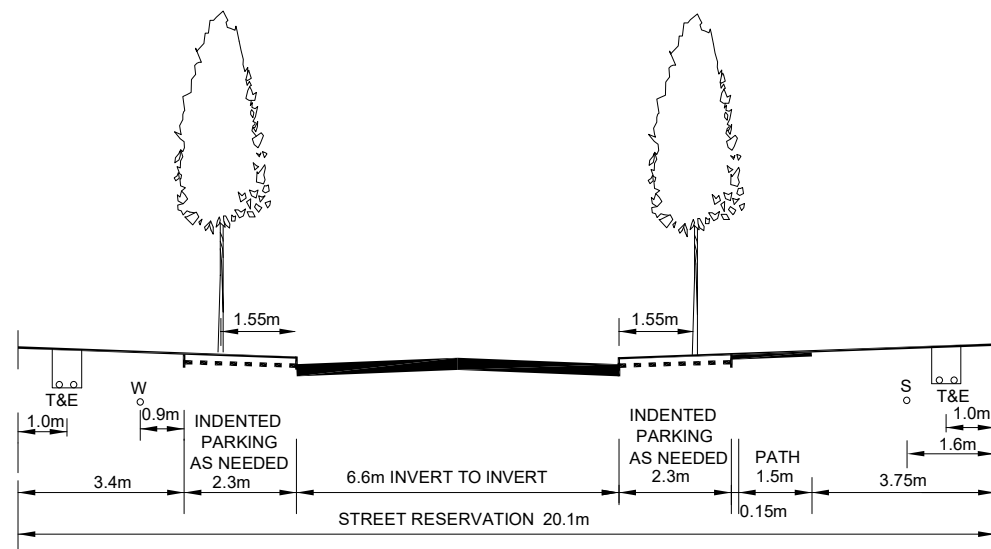
FERNDALE LANE AS BUS ROUTE NORTH OF ROAD 18



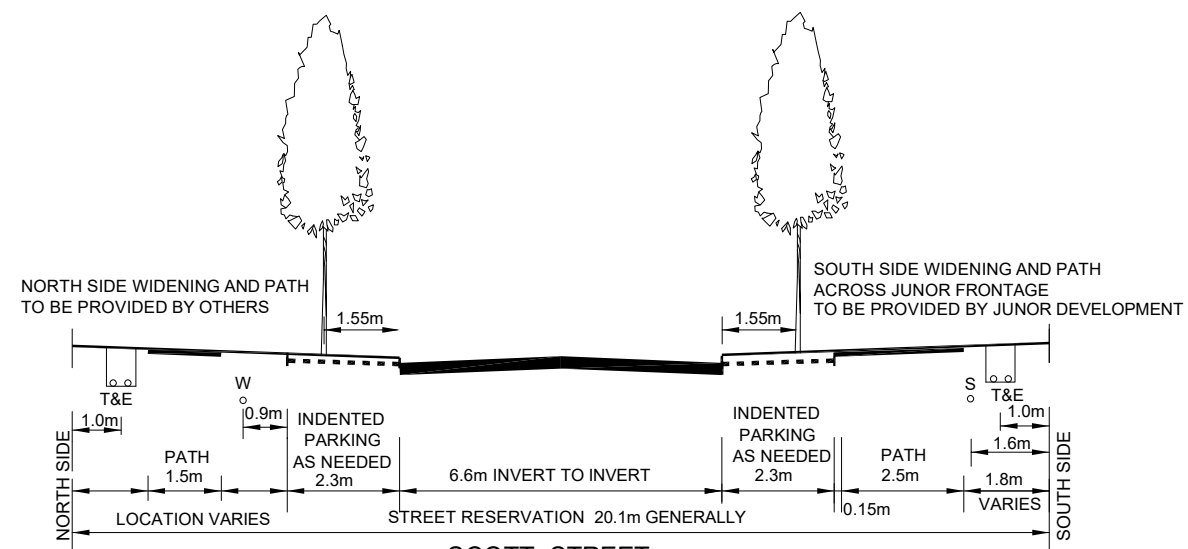
BUS ROUTE GENERALLY



LOCAL STREET



MOMSEN STREET



SCOTT STREET

A	JH	06/04/25	Original Issue
Issue/Appd	Date	Comments	



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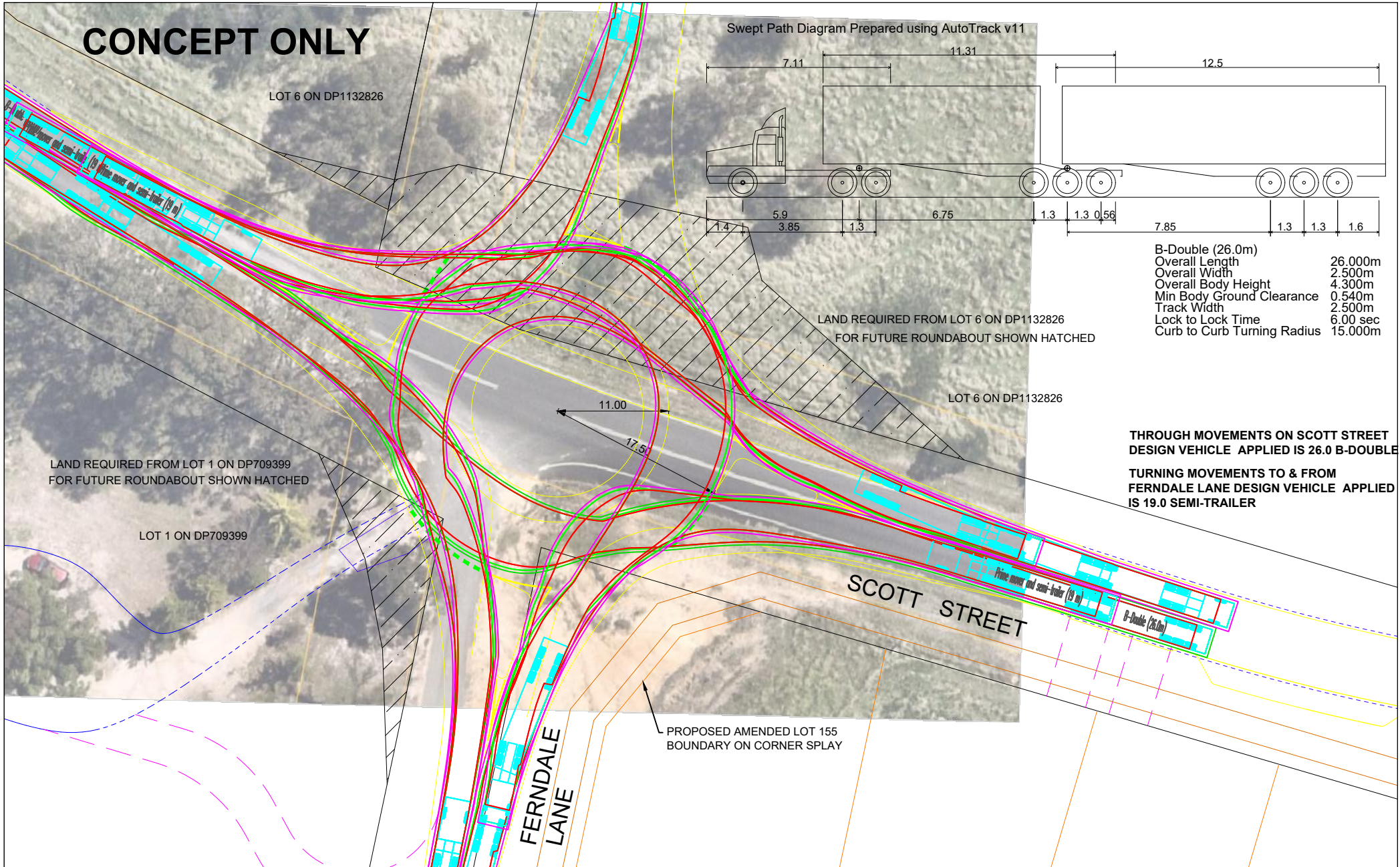
PROPOSED JUNIOR
DEVELOPMENT
WOLUMLA
TYPICAL SECTIONS FOR
STREETS

Scale NTS

Drawing No : 12089215

Sheet No : 1 Issue : A

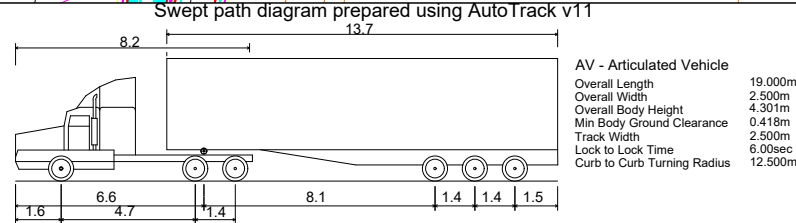
CONCEPT ONLY



**THROUGH MOVEMENTS ON SCOTT STREET
DESIGN VEHICLE APPLIED IS 26.0 B-DOUBLE**

**TURNING MOVEMENTS TO & FROM
FERNDALE LANE DESIGN VEHICLE APPLIED
IS 19.0 SEMI-TRAILER**

Wheel path Vehicle Overhang Vehicle Overhang + 300mm Clearance			
A	JH	04/04/25	Original Issue
Issue/Appd	Date	Comments	



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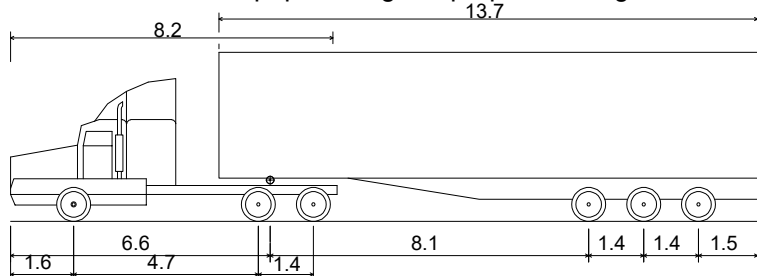
**WOLUMLA VILLAGE
BEGA VALLEY SHIRE
JUNIOR SUBDIVISION
ROUNDABOUT CONCEPT PLAN
SCOTT STREET / FERNDALE LANE**

Scale 1:500 @ A4

Drawing No : 12089405

Sheet No : 1 Issue : A

Swept path diagram prepared using AutoTrack v11

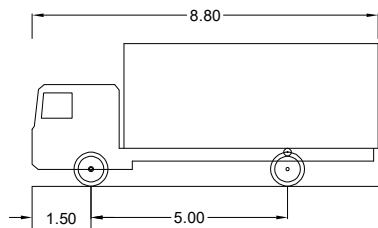


AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock to Lock Time	6.00sec
Curb to Curb Turning Radius	12.500m

**DESIGN VEHICLE FOR
THROUGH MOVEMENTS ON
SCOTT STREET & TURNS TO
AND FROM BEGA STREET EAST**

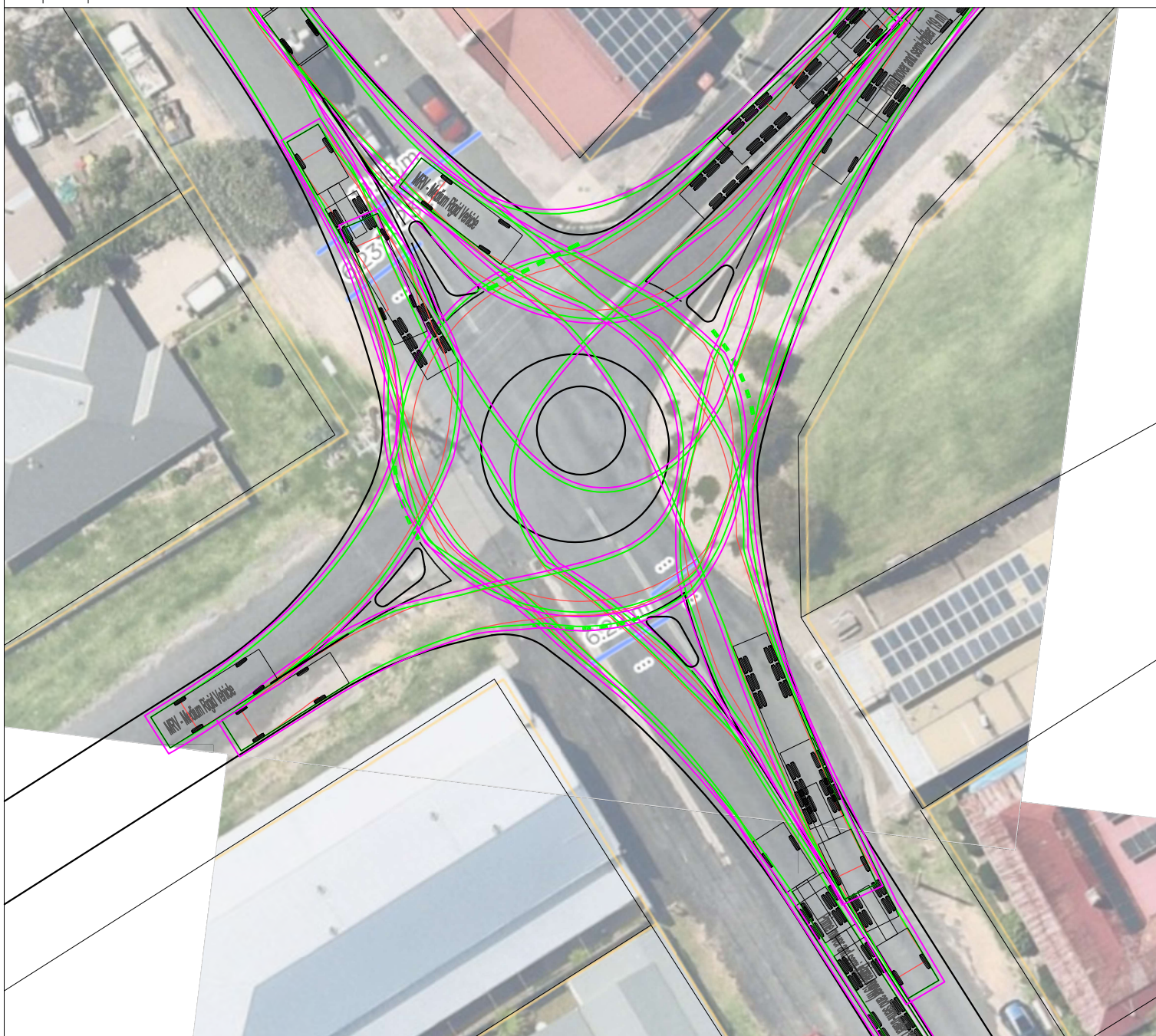
Swept Path Diagram Prepared using AutoTrack v11



MRV - Medium Rigid Vehicle

Overall Length	8.800m
Overall Width	2.500m
Overall Body Height	3.632m
Min Body Ground Clearance	0.150m
Track Width	2.500m
Lock to Lock Time	4.00sec
Curb to Curb Turning Radius	10.000m

**DESIGN VEHICLE FOR
THROUGH MOVEMENTS &
TURNS TO AND FROM BEGA
STREET WEST**



NOTES

THIS CONCEPT IS NOT RECOMMENDED BECAUSE OF THE FOLLOWING DESIGN DEFICIENCIES:

- SIGNIFICANTLY INADEQUATE DEFLECTION ON SOUTHEAST TO NORTHWEST MOVEMENT
- CLEARANCE FROM GENERAL STORE BUILDING CORNER <2.0m
- CLEARANCE FROM PUBLIC HALL BUILDING CORNER <3.0m
- REQUIREMENT FOR FULLY MOUNTABLE CENTRAL ISLAND PAVEMENT EXCEPT FOR 1.5m RADIUS CIRCLE.
- MINIMAL ISLAND DIMENSIONS FOR APPROACH SIGN LOCATIONS & POOR PEDESTRIAN REFUGES



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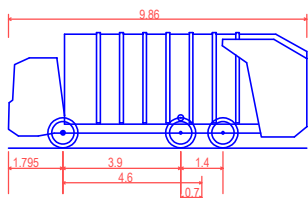
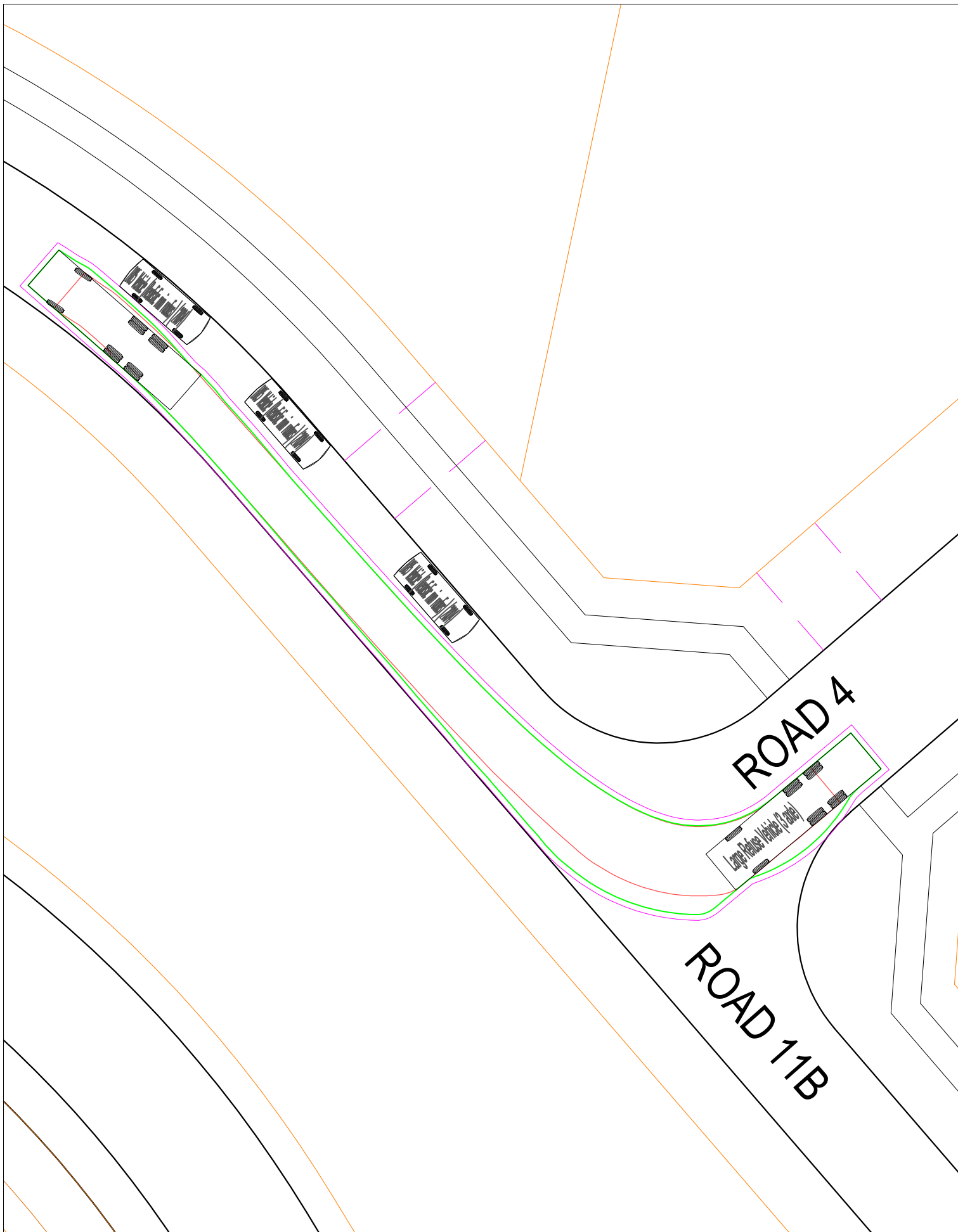
**WOLUMLA VILLAGE
BEGA VALLEY SHIRE
JUNIOR SUBDIVISION
ROUNDABOUT CONCEPT PLAN
BEGA ST AT SCOTT ST**

Scale 1:400 @ A4

Drawing No : 12089406

Sheet No : 1 Issue : A

A	JH	04/04/25	Original Issue
Issue	Appd	Date	Comments



Large Refuse Vehicle (3 axle)
 Overall Length 9.860m
 Overall Width 2.450m
 Overall Body Height 3.814m
 Min Body Ground Clearance 0.366m
 Track Width 2.450m
 Lock-to-lock time 4.00s
 Curb to curb Turning Radius 9.500m



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**WOLUMLA VILLAGE
 BEGA VALLEY SHIRE
 JUNIOR SUBDIVISION
 LARGE GARBAGE TRUCK
 AND B85 CAR PARKED ON
 5.5 CARRIAGEWAY**

Scale 0 1 2 3 4 5
 1:250 @ A4

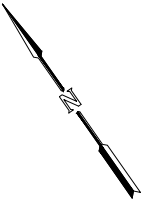
Drawing No : 12089431

Sheet No : 1 Issue : A

Issue	Appd	Date	Comments
A	JH	04/04/25	Original Issue



NOTE
NORTH/EASTERN SIDE OF EXISTING SCOTT STREET PAVEMENT WORKS INCLUDING PARKING INDENTS AND FOOTPATH ARE SHOWN NOTIONALLY ONLY AND ARE NOT TO BE PROVIDED BY JUNIOR DEVELOPMENT. JUNIOR DEVELOPMENT TO BE RESPONSIBLE FOR WORKS ON SOUTHERN/ WESTERN SIDE OF SCOTT STREET ALONG SITE FRONTAGE.



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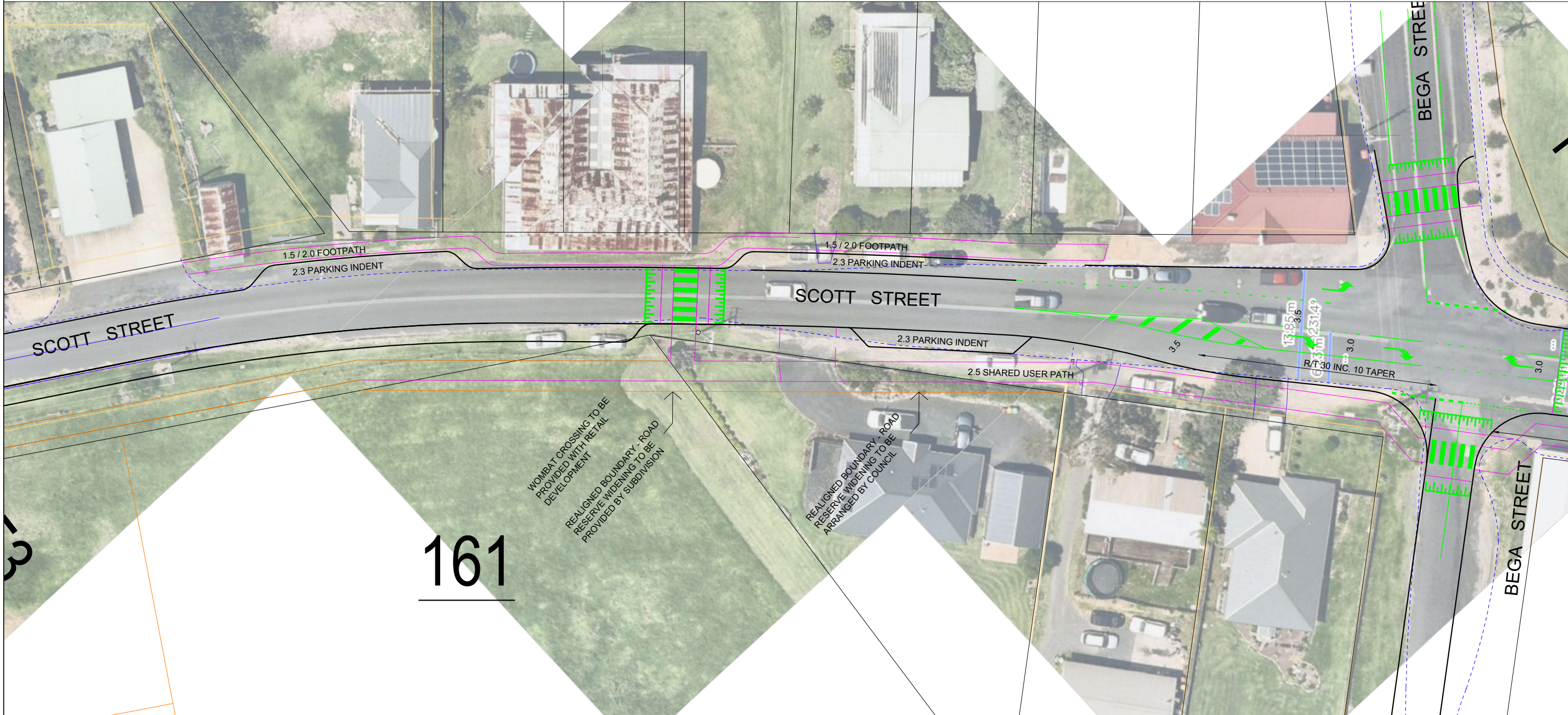
PROPOSED JUNIOR
DEVELOPMENT
WOLUMLA
POSSIBLE REALIGNMENT OF
ROAD 27 & SCOTT STREET
FRONTAGE TREATMENT

Scale
0 5 10
1:500 @ A3

Drawing No : 12089505

Sheet No : 1 Issue : A

A	JH	16/09/24	Original Issue
Issue	Appd	Date	Comments



NOTE
NORTH/EASTERN SIDE OF EXISTING SCOTT STREET PAVEMENT WORKS
INCLUDING PARKING INDENTS AND FOOTPATH ARE SHOWN NOTIONALLY
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SIDE OF SCOTT STREET ALONG SITE FRONTAGE.



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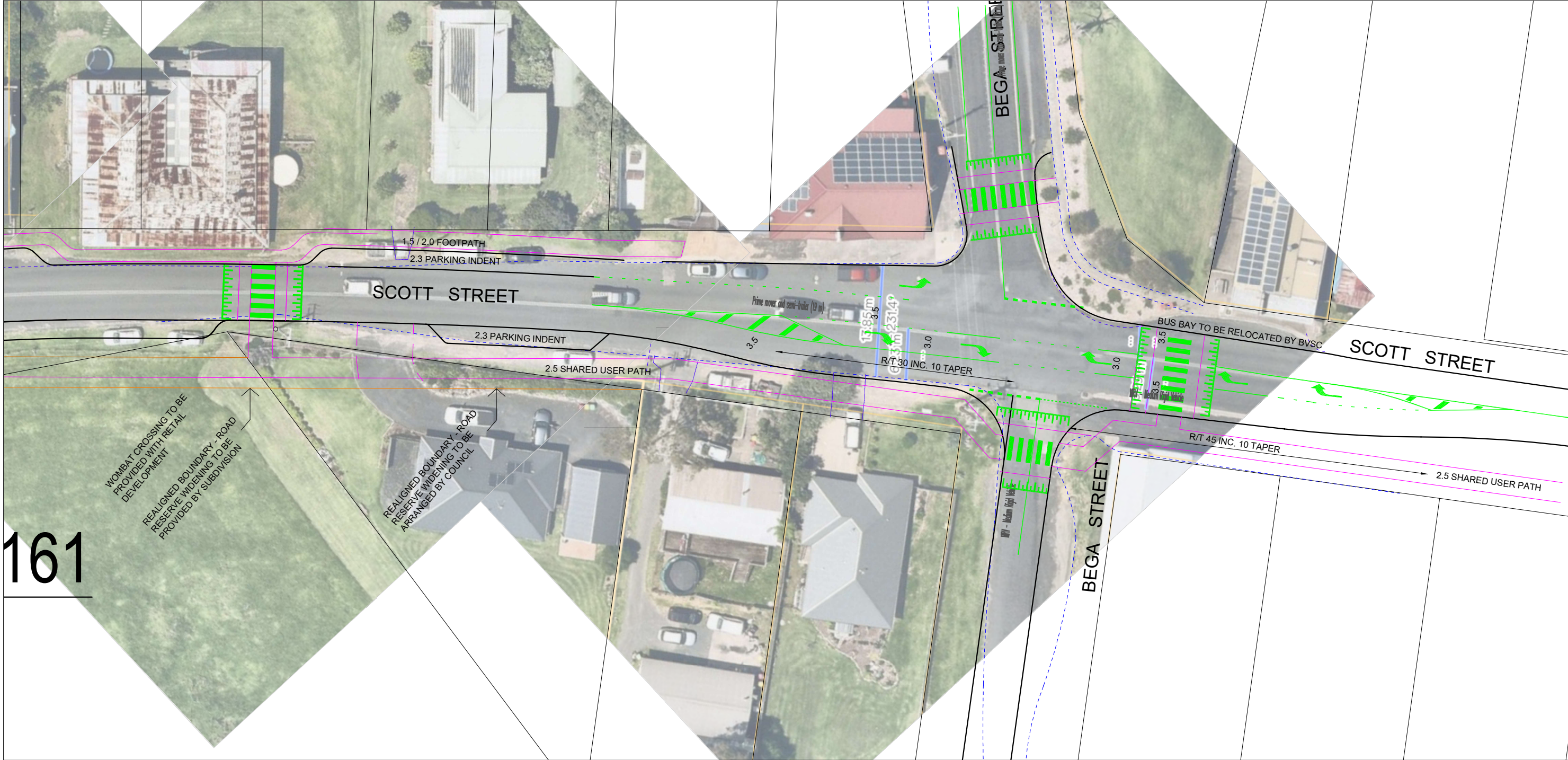
PROPOSED JUNIOR
DEVELOPMENT
WOLUMLA
POSSIBLE REALIGNMENT OF
ROAD 27 & SCOTT STREET
FRONTAGE TREATMENT

Scale
1:500 @ A3

Drawing No : 12089506

Sheet No : 1 Issue : A

Issue	Appd	Date	Comments
A	JH	16/09/24	Original Issue



161

NOTE
NORTH/EASTERN SIDE OF EXISTING SCOTT STREET PAVEMENT WORKS INCLUDING PARKING INDENTS AND FOOTPATH ARE SHOWN NOTIONALLY ONLY AND ARE NOT TO BE PROVIDED BY JUNOR DEVELOPMENT. JUNOR DEVELOPMENT TO BE RESPONSIBLE FOR WORKS ON SOUTHERN/ WESTERN SIDE OF SCOTT STREET ALONG SITE FRONTAGE.



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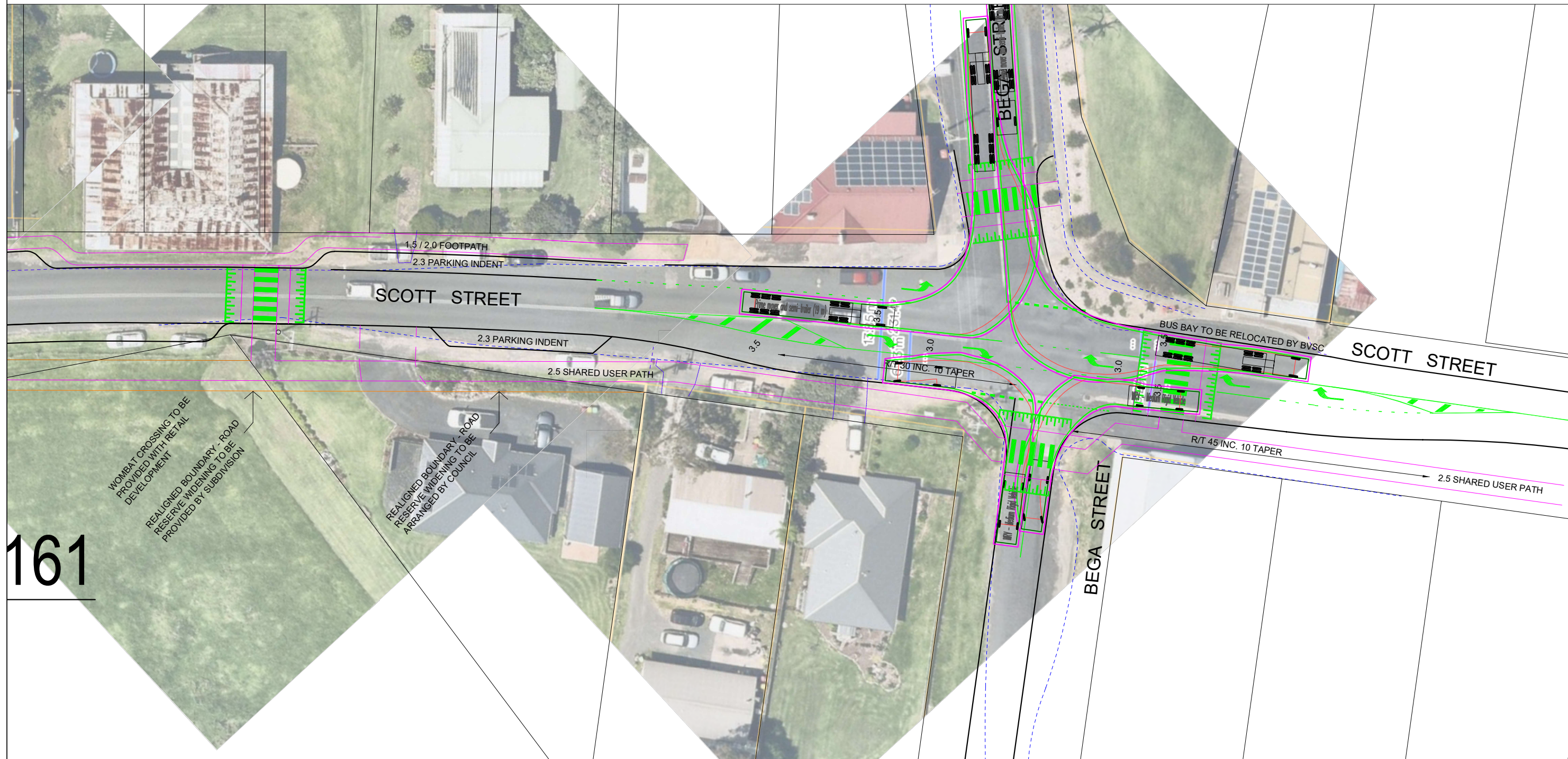
PROPOSED JUNIOR
DEVELOPMENT
WOLUMLA
POSSIBLE REALIGNMENT OF
ROAD 27 & SCOTT STREET
FRONTAGE TREATMENT

Scale
0 5 10
1:500 @ A3

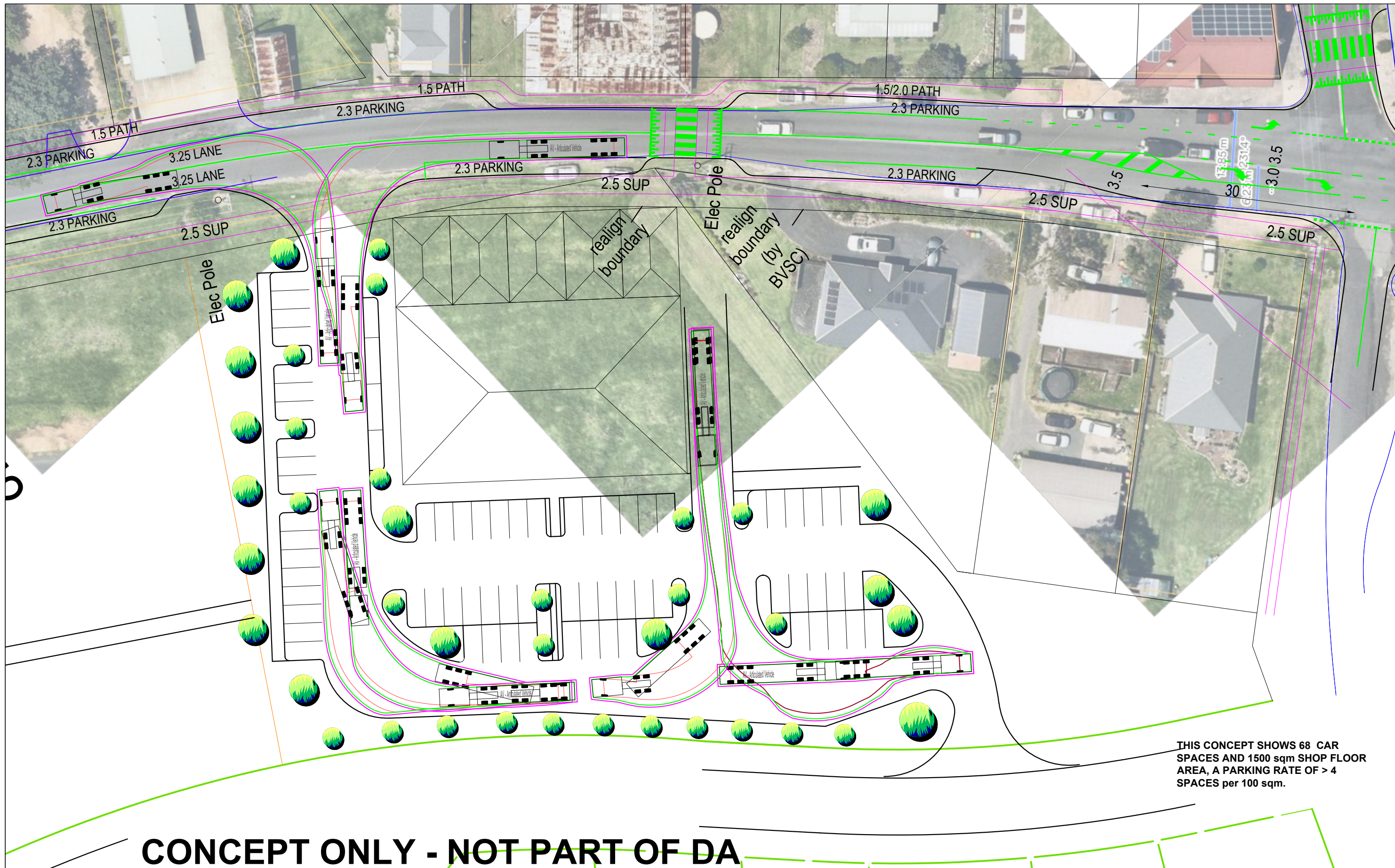
Drawing No : 12089507

Sheet No : 1 Issue : A

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Issue	Appd	Date	Comments

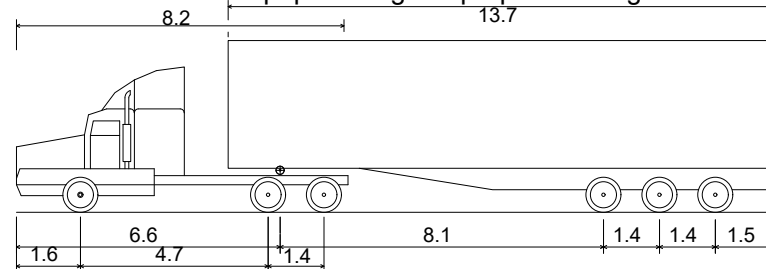


A	JH	16/09/24	Original Issue
Issue	Appd	Date	Comments

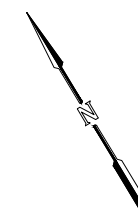


CONCEPT ONLY - NOT PART OF DA

Swept path diagram prepared using AutoTrack v11



AV - Articulated Vehicle
Overall Length 19.000m
Overall Width 2.500m
Overall Body Height 4.301m
Min Body Ground Clearance 0.418m
Track Width 2.500m
Lock to Lock Time 6.00sec
Curb to Curb Turning Radius 12.500m



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PROPOSED JUNIOR
DEVELOPMENT
WOLUMLA
FEASIBILITY OF RETAIL SITE
ASSESSMENT
NOT PART OF APPLICATION

Scale
0 5 10
1:500 @ A3

Drawing No : 12089515

Sheet No : 2 Issue : A

Issue	Appd	Date	Comments
A	JH	05/04/25	Original Issue



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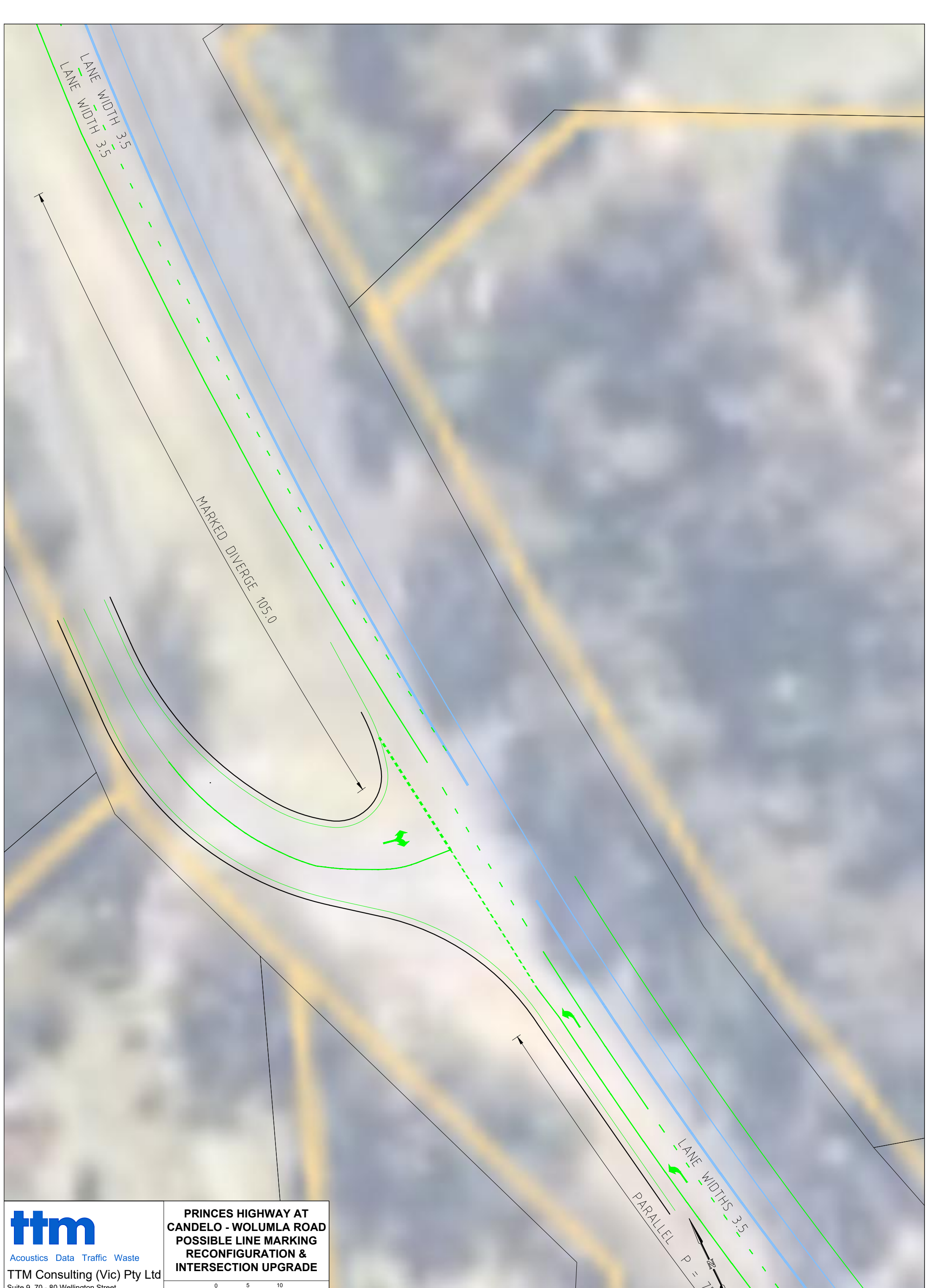
PRINCES HIGHWAY AT
CANDELO - WOLUMLA ROAD
POSSIBLE LINE MARKING
RECONFIGURATION &
INTERSECTION UPGRADE

Scale 0 5 10
1:500 @ A3

Drawing No : 12089420

Sheet No : 1 Issue : A

B	JH	31/09/24	Part EDD left turn, diverge markings added
A	JH	31/10/23	Original Issue
Issue/Appd	Date	Comments	



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**PRINCES HIGHWAY AT
CANDELO - WOLUMLA ROAD
POSSIBLE LINE MARKING
RECONFIGURATION &
INTERSECTION UPGRADE**

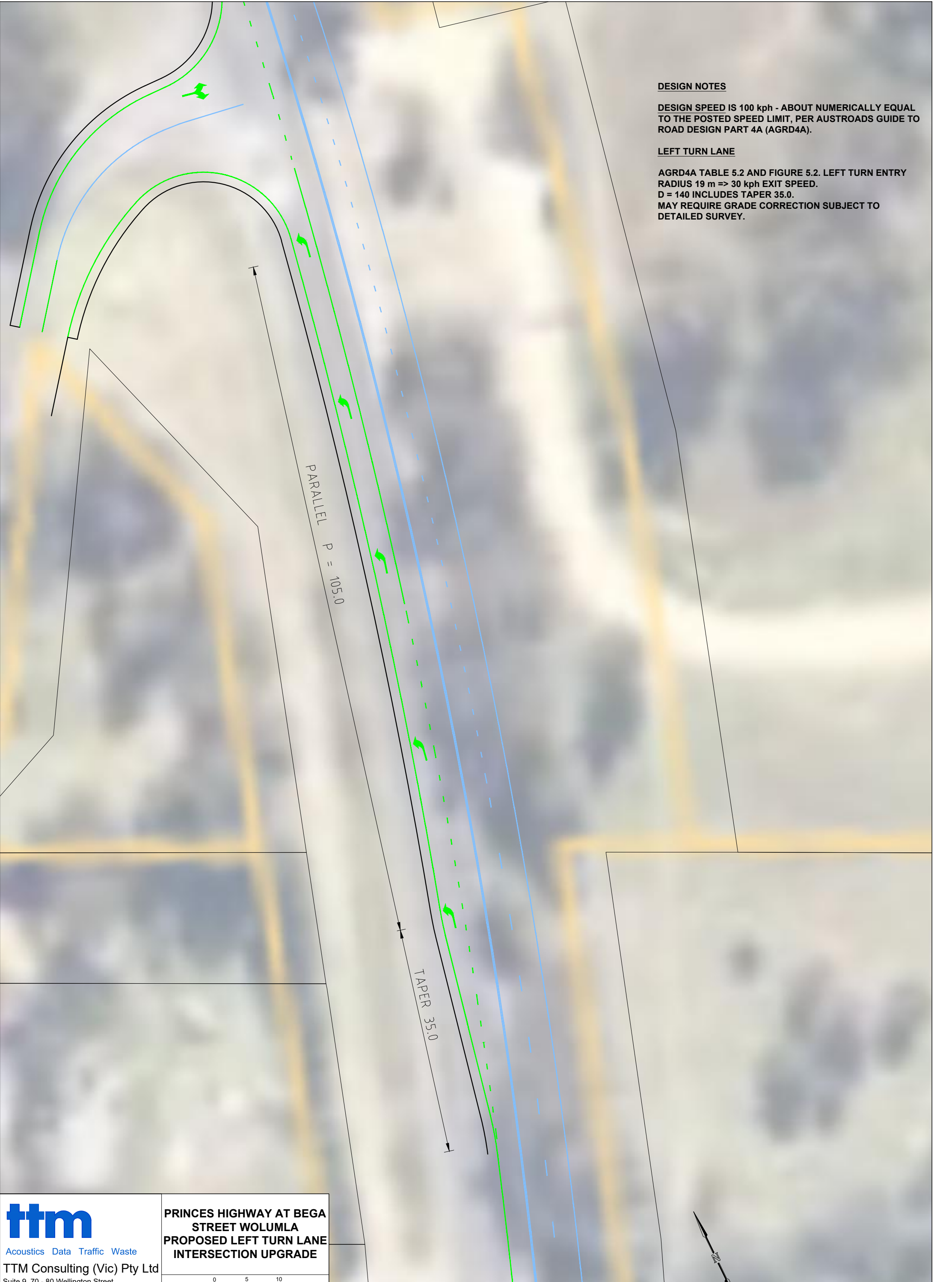
Scale 0 5 10
1:500 @ A3

Drawing No : 12089421

Sheet No : 1 Issue : A

B	JH	31/09/24	Part EDD left turn, diverge markings added
A	JH	31/10/23	Original Issue
Issue	Appd	Date	Comments

DRAWING NO. 12089420 CONTINUES



DESIGN NOTES

DESIGN SPEED IS 100 kph - ABOUT NUMERICALLY EQUAL TO THE POSTED SPEED LIMIT, PER AUSTRROADS GUIDE TO ROAD DESIGN PART 4A (AGRD4A).

LEFT TURN LANE

AGRD4A TABLE 5.2 AND FIGURE 5.2. LEFT TURN ENTRY RADIUS 19 m => 30 kph EXIT SPEED.
D = 140 INCLUDES TAPER 35.0.
MAY REQUIRE GRADE CORRECTION SUBJECT TO DETAILED SURVEY.



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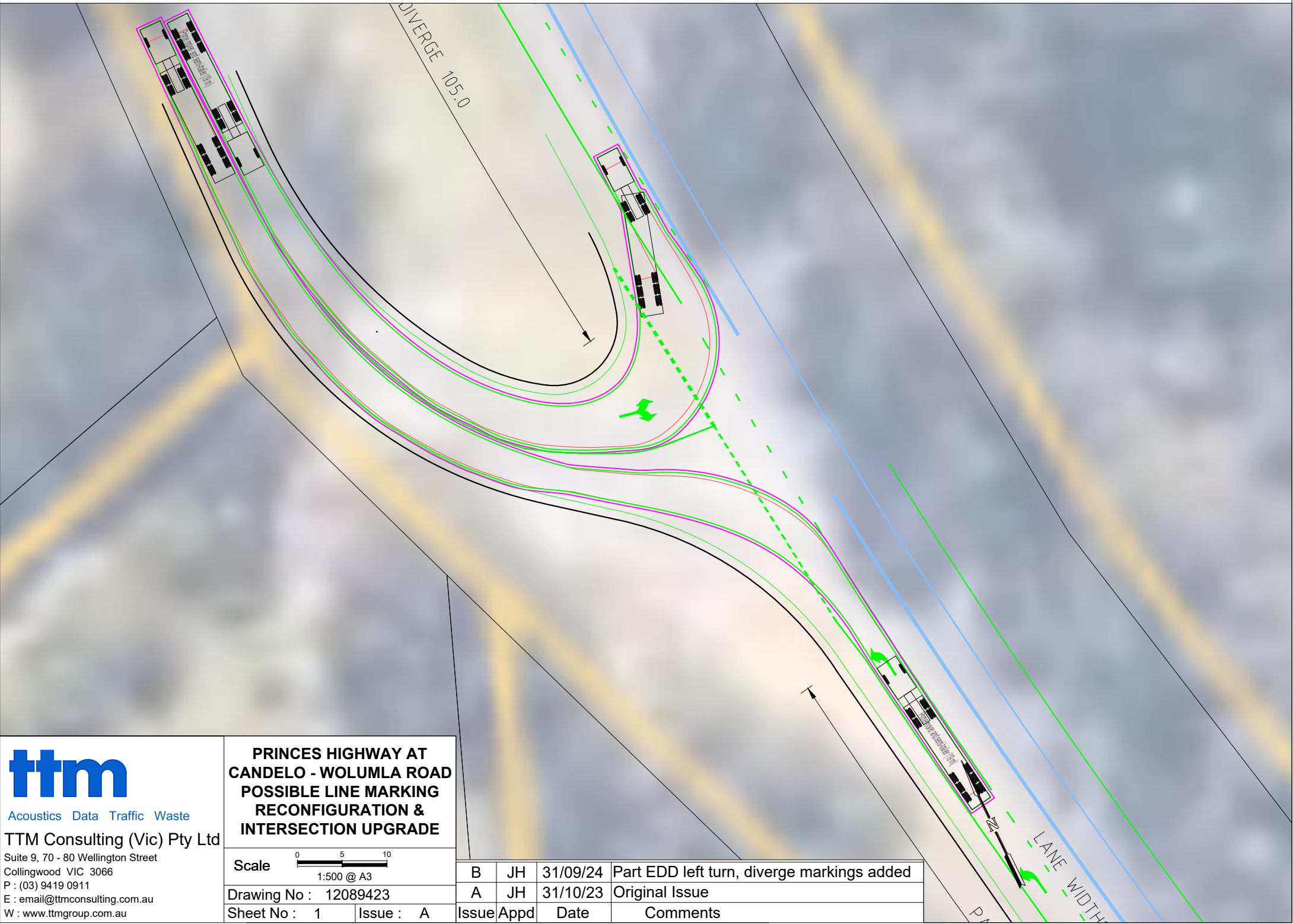
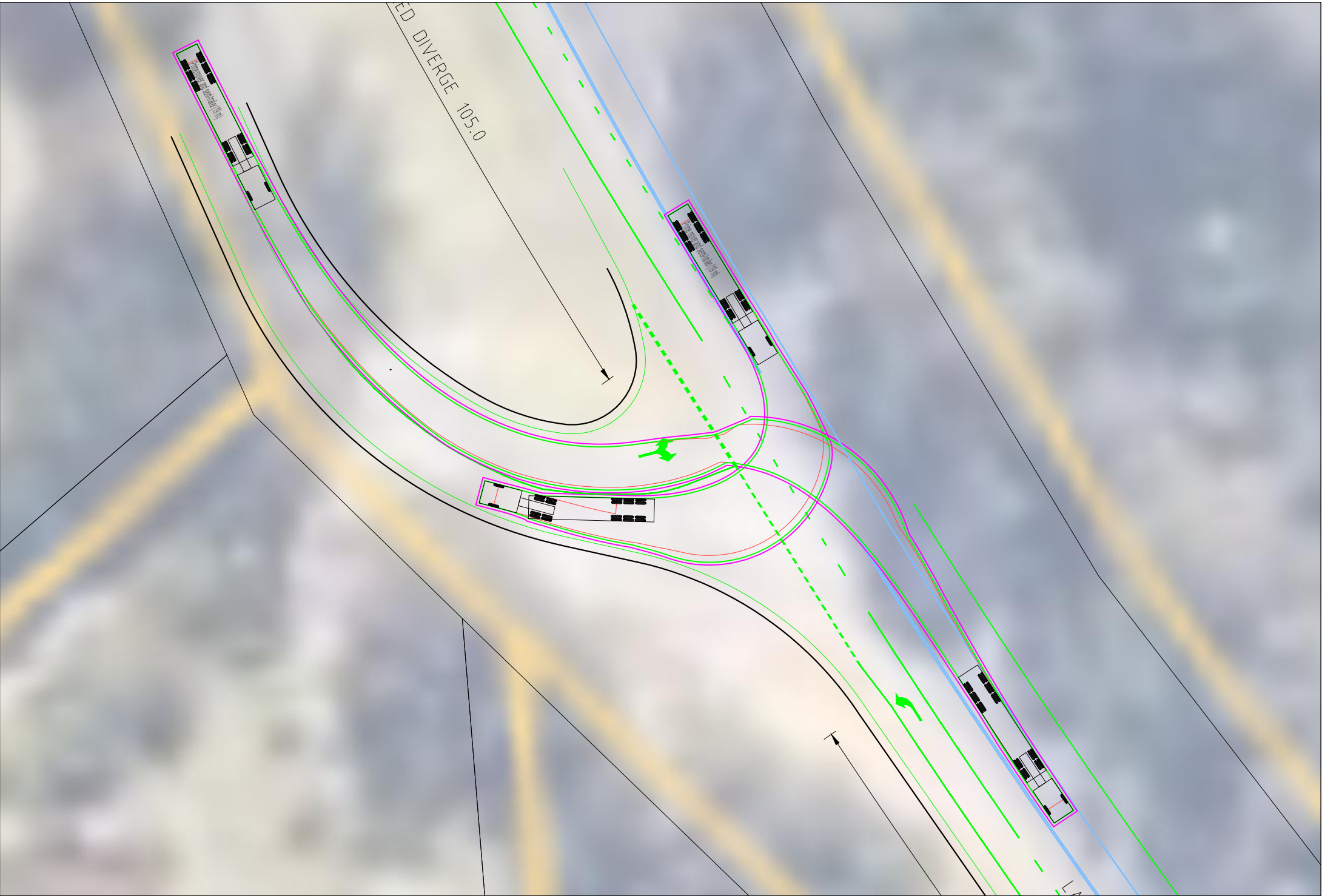
**PRINCES HIGHWAY AT BEGA STREET WOLUMLA
PROPOSED LEFT TURN LANE
INTERSECTION UPGRADE**

Scale 0 5 10
1:500 @ A3

Drawing No : 12089422

Sheet No : 1 Issue : A

A	JH	31/08/24	Original Issue
Issue	Appd	Date	Comments





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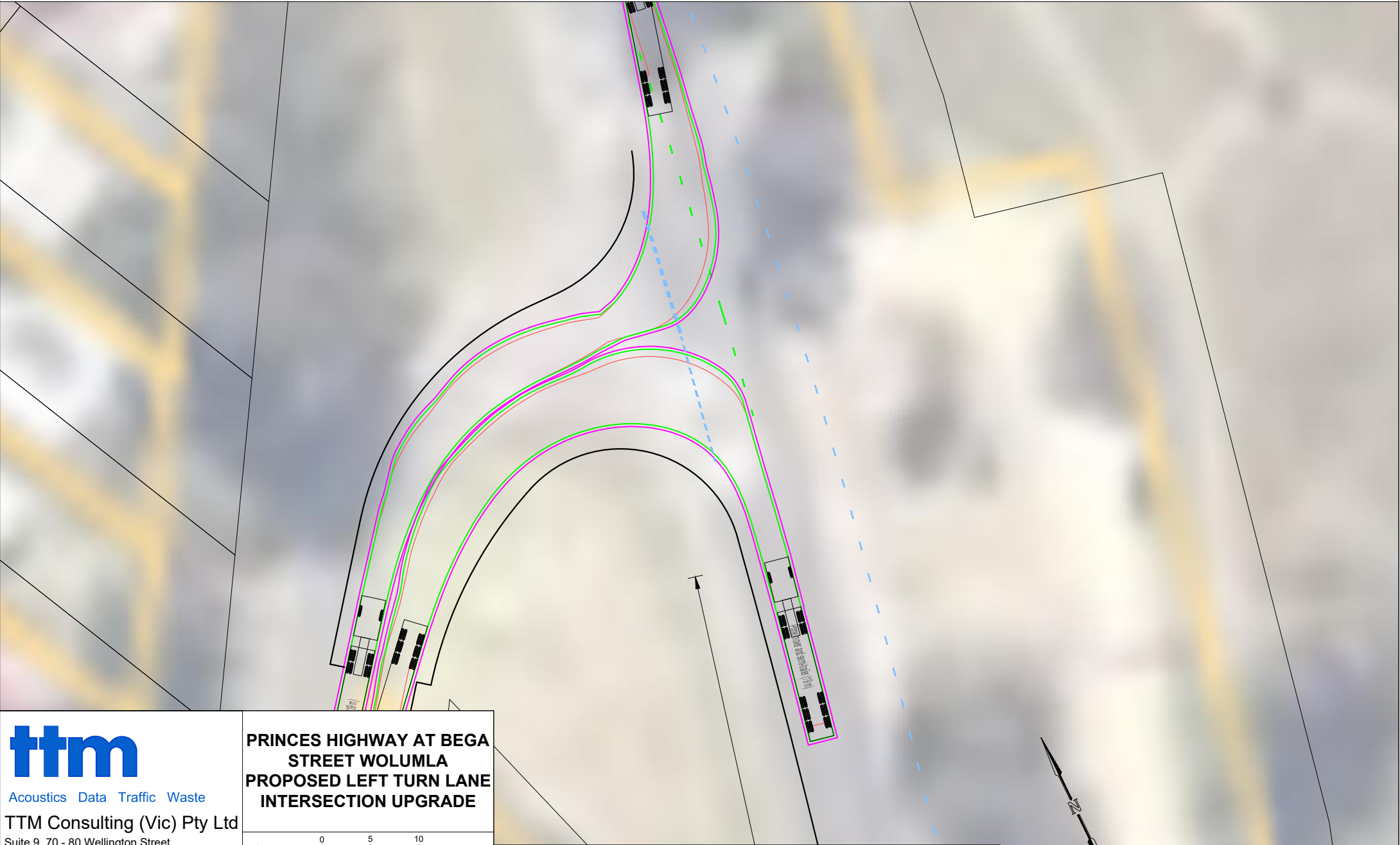
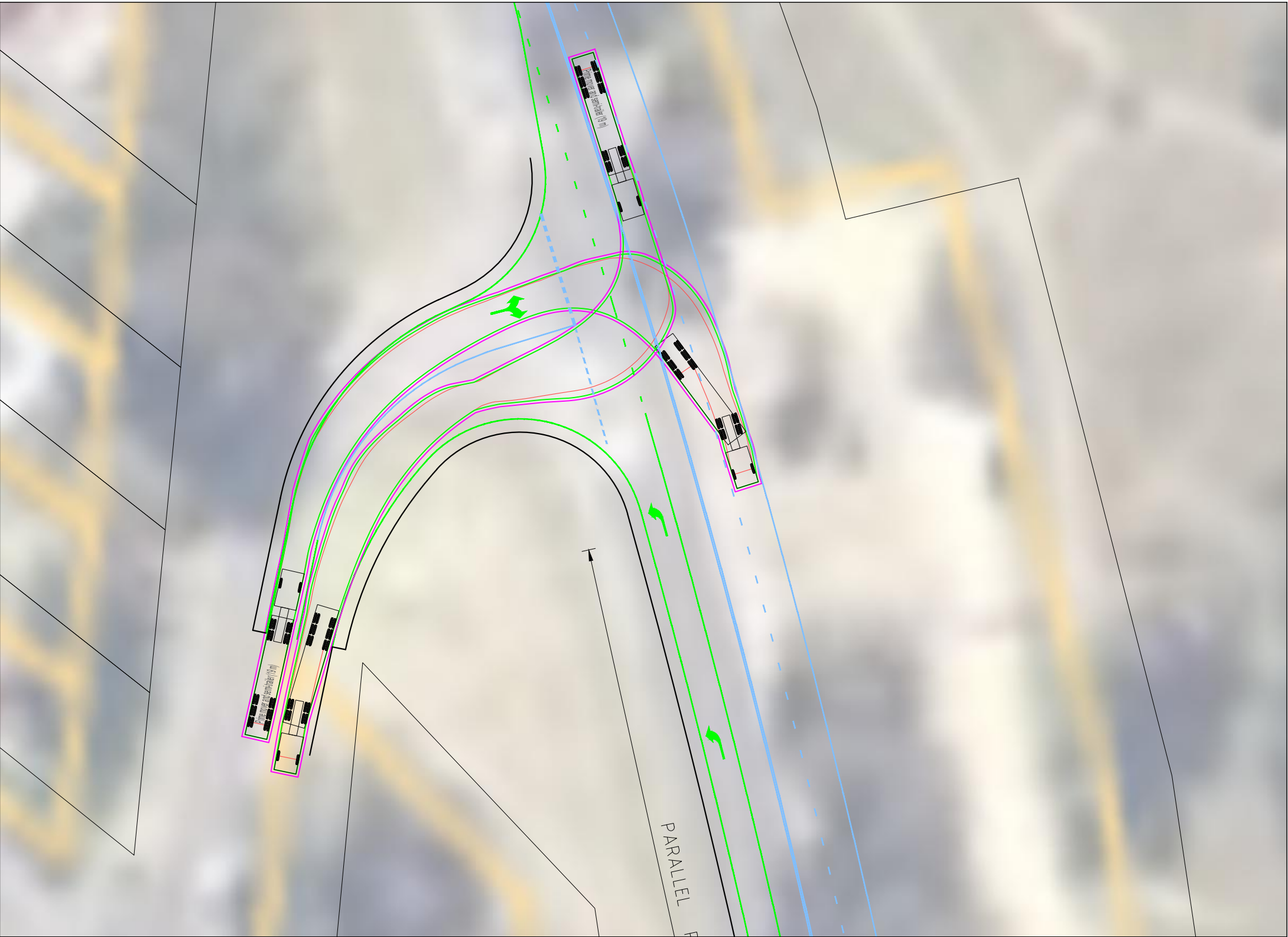
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**PRINCES HIGHWAY AT
CANDELO - WOLUMLA ROAD
POSSIBLE LINE MARKING
RECONFIGURATION &
INTERSECTION UPGRADE**

Scale 0 5 10
1:500 @ A3

Drawing No :	12089423
Sheet No :	1
Issue :	A

B	JH	31/09/24	Part EDD left turn, diverge markings added
A	JH	31/10/23	Original Issue
Issue	Appd	Date	Comments



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**PRINCES HIGHWAY AT BEGA
STREET WOLUMLA
PROPOSED LEFT TURN LANE
INTERSECTION UPGRADE**

Scale 0 5 10
1:500 @ A3

Drawing No : 12089424
Sheet No : 1 Issue : A

A	JH	31/08/24	Original Issue
Issue	Appd	Date	Comments

NOTES:
1. REFER TO DWG 2109-P02NTS FOR NOTES AND LEGEND



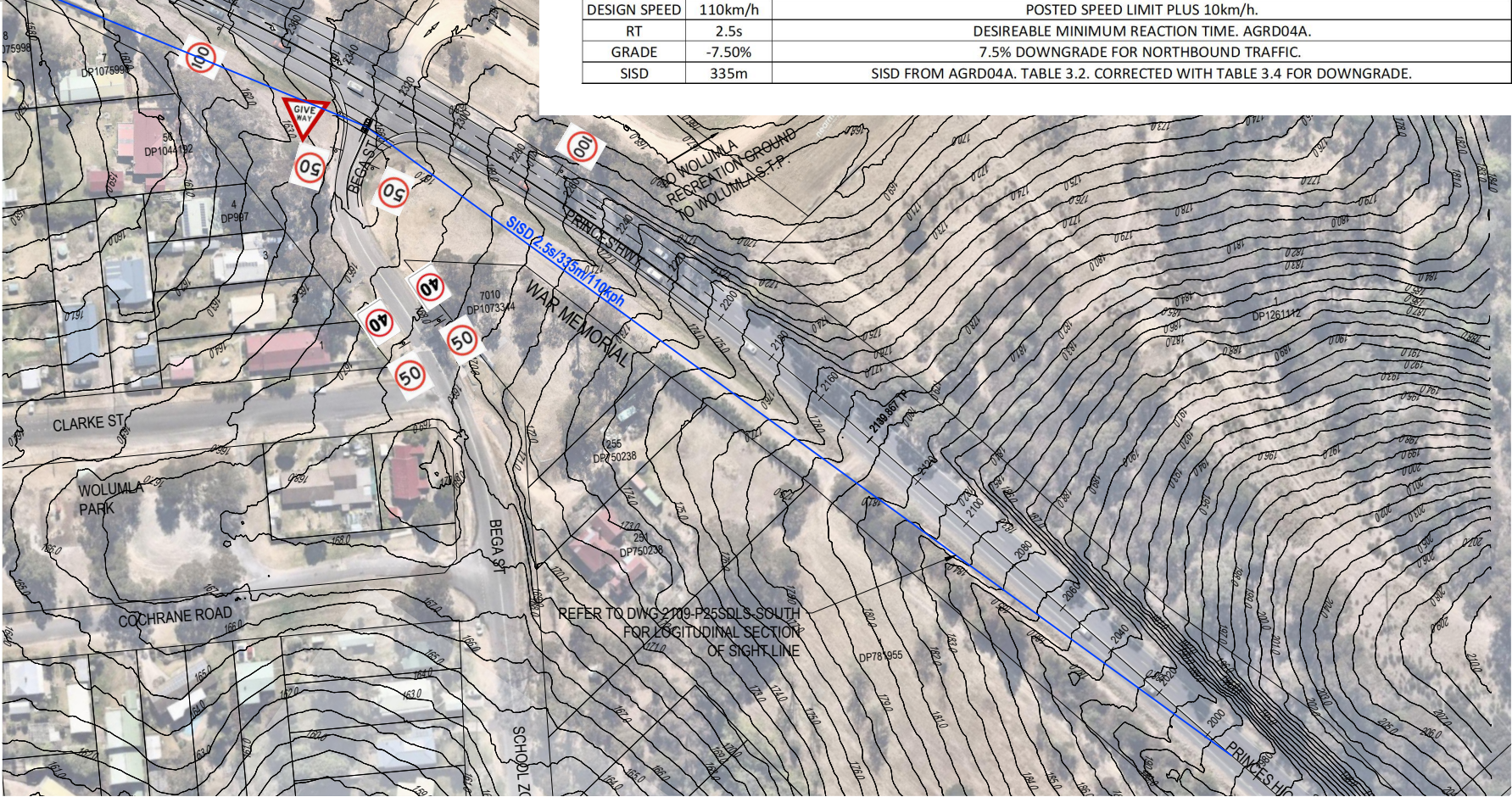
VIEW TO SOUTH
BEGA ST > PRINCES H'WAY

SAFE INTERSECTION SIGHT DISTANCE (SISD) PARAMETERS NORTH			
POSTED SPEED	100km/h	POSTED SPEED LIMIT PLUS 10km/h.	
DESIGN SPEED	110km/h	DESIREABLE MINIMUM REACTION TIME. AGRD04A.	
RT	2.5s	2% UPGRADE FOR SOUTHBOUND TRAFFIC.	
GRADE	2.00%	SISD FROM AGRD04A. TABLE 3.2. NOT CORRECTED FOR UPGRADE.	
SISD	300m		

SAFE INTERSECTION SIGHT DISTANCE (SISD) PARAMETERS SOUTH			
POSTED SPEED	100km/h	POSTED SPEED LIMIT PLUS 10km/h.	
DESIGN SPEED	110km/h	DESIREABLE MINIMUM REACTION TIME. AGRD04A.	
RT	2.5s	7.5% DOWNGRADE FOR NORTHBOUND TRAFFIC.	
GRADE	-7.50%	SISD FROM AGRD04A. TABLE 3.2. CORRECTED WITH TABLE 3.4 FOR DOWNGRADE.	
SISD	335m		



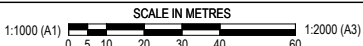
VIEW TO NORTH
BEGA ST > PRINCES H'WAY



No.	REVISION	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
D						
C						
B						
A						
-	INITIAL ISSUE	AG	AG	VAO	VAO	02/05/2023

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Survey source: NEAR MAPS
Survey datum: ???
Survey source: SPATIAL COLLABORATION PORTAL NSW GOVT
Survey datum: ???

Date: 5/08/2021
Coordinate system: GDA2020 MGA55
Date: 10/08/2021
Coordinate system: GDA2020 MGA55

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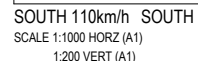
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m 0408 361 612

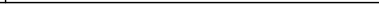
CLIENT JUNOR INVESTMENTS PTY LTD
PROJECT LOT 633 DP1259105 WOLUMLA - RESIDENTIAL SUBDIVISION
TITLE PRINCES HWY/BEGA ST
SISD SIGHT LINES

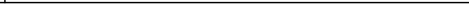
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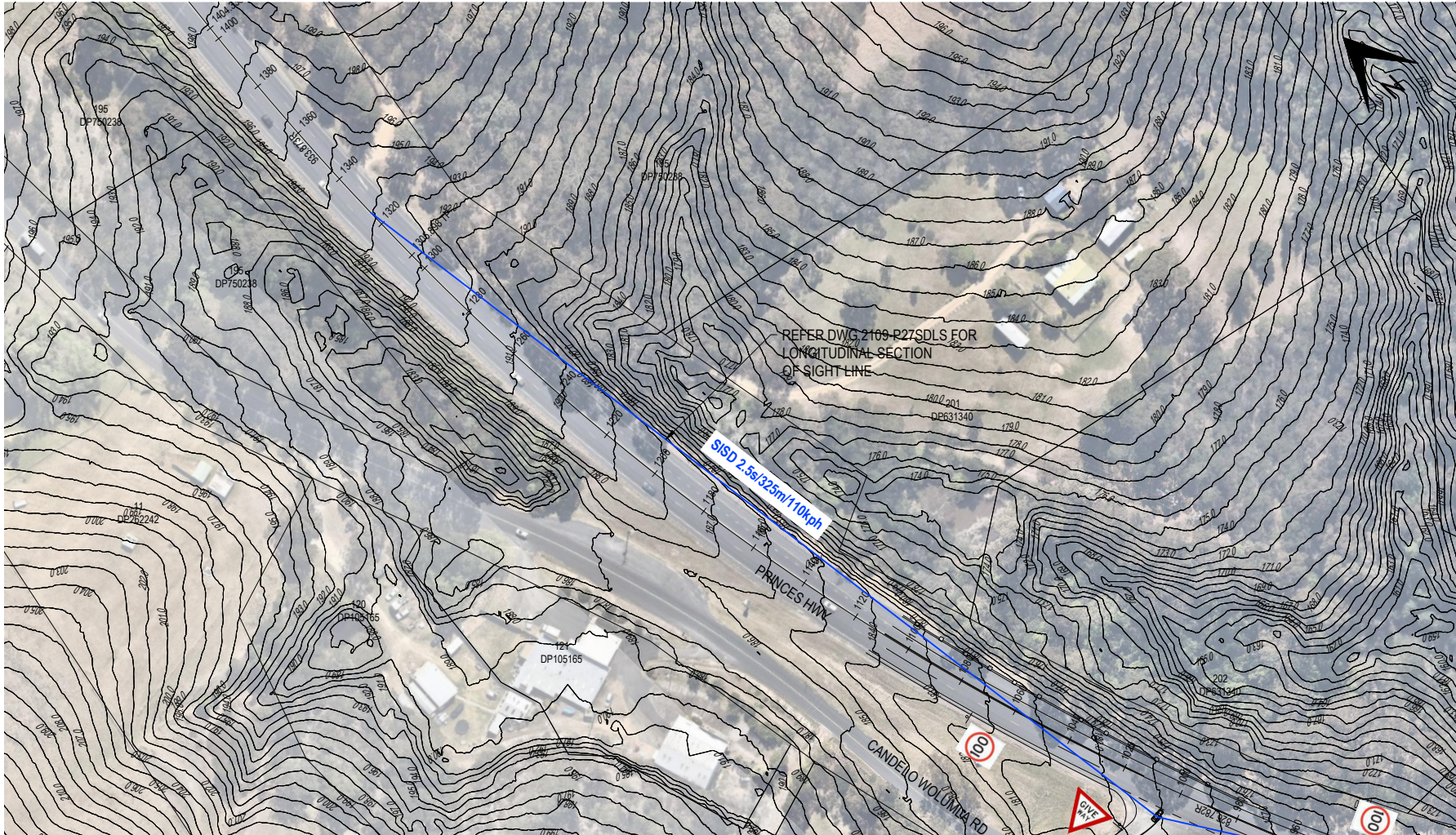
AMENDMENT:



Date: Tuesday, 2 May 2023 11:44:39 AM User: AG File: H:\2021\2109_Wolumia\1099_2109Sync\061_dwgs\Sync\2109-P25_27_29SDLS.dwg







SAFE INTERSECTION SIGHT DISTANCE (SISD) PARAMETERS SOUTH		
POSTED SPEED	100km/h	
DESIGN SPEED	110km/h	POSTED SPEED LIMIT PLUS 10km/h.
RT	2.5s	DESIREABLE MINIMUM REACTION TIME. AGRD04A.
GRADE	5.00%	5% UPGRADE FOR NORTHBOUND TRAFFIC.
SISD	285m	SISD FROM AGRD04A. TABLE 3.2. NOT CORRECTED FOR UPGRADE.



VIEW TO SOUTH
CANDELO WOLUMLA RD > PRINCES H'WAY



VIEW TO NORTH
CANDELO WOLUMLA RD > PRINCES H'WAY



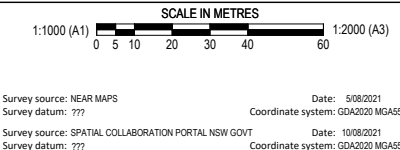
SAFE INTERSECTION SIGHT DISTANCE (SISD) PARAMETERS NORTH		
POSTED SPEED	100km/h	
DESIGN SPEED	110km/h	POSTED SPEED LIMIT PLUS 10km/h.
RT	2.5s	DESIREABLE MINIMUM REACTION TIME. AGRD04A.
GRADE	-5.00%	5% DOWNGRADE FOR SOUTHBOUND TRAFFIC.
SISD	325m	SISD FROM AGRD04A. TABLE 3.2.CORRECTED FOR DOWNGRADE.

NOTES:
1. REFER TO DWG 2109-P02NTS FOR NOTES AND LEGEND

D					
C					
B					
A					
-	INITIAL ISSUE	AG	AG	VAO	VAO 02/05/2023
No.	REVISION	DESIGNED	DRAWN	CHECKED	APPROVED DATE

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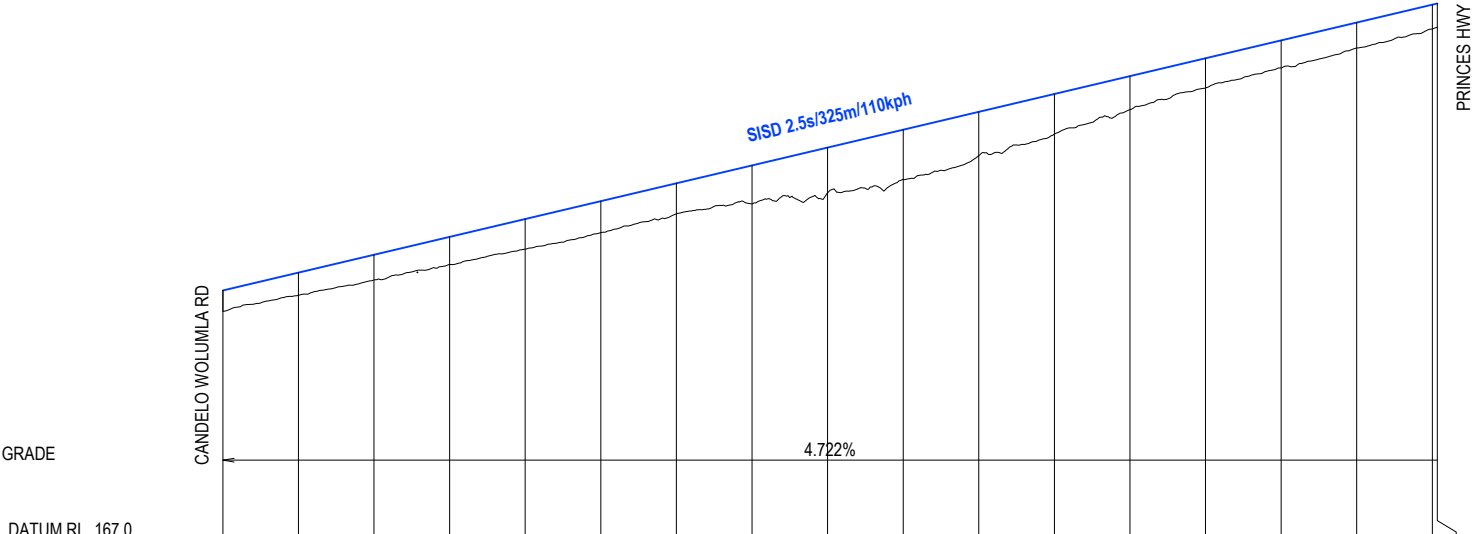


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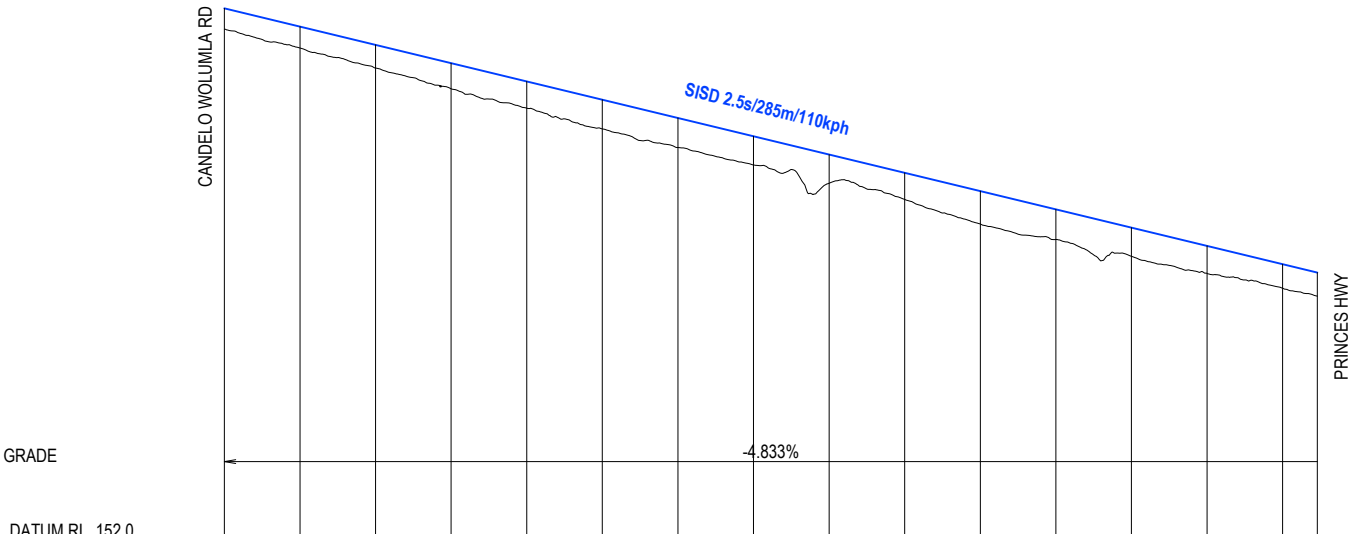
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p 02 6494 0239
m 0408 361 612

CLIENT	JUNOR INVESTMENTS PTY LTD
PROJECT	LOT 633 DP1259105 WOLUMLA - RESIDENTIAL SUBDIVISION
TITLE	PRINCES HWY/CANDELO WOLUMLA RD SISD SIGHT LINES
DRAWING NUMBER	2109-P26SD
AMENDMENT:	



DESIGN SURFACE	180.175	181.125	182.070	183.014	183.959	184.903	185.848	186.792	187.737	188.681	189.626	190.570	191.514	192.459	193.403	194.348	195.292	195.364
EXISTING SURFACE	179.075	179.92	180.728	181.55	182.362	183.238	184.232	184.761	185.339	186.048	187.306	188.448	189.743	190.894	191.953	193.004	194.008	194.104
DIFFERENCE FROM EXISTING	1.100	1.205	1.342	1.465	1.597	1.665	1.616	2.031	2.397	2.633	2.319	2.122	1.771	1.564	1.450	1.344	1.284	1.250
CHAINAGES	0.000	20.000	40.000	60.000	80.000	100.000	120.000	140.000	160.000	180.000	200.000	220.000	240.000	260.000	280.000	300.000	320.000	321.305

NORTH 110km/h
SCALE 1:1000 HORZ (A1)
1:200 VERT (A1)



DESIGN SURFACE	180.175	179.208	178.241	177.275	176.308	175.342	174.375	173.408	172.442	171.475	170.509	169.542	168.575	167.609	166.642	166.199
EXISTING SURFACE	179.075	178.077	177.017	175.921	174.895	173.795	172.814	171.891	170.924	170.066	168.766	167.947	167.057	166.15	165.375	164.949
DIFFERENCE FROM EXISTING	1.100	1.131	1.224	1.353	1.413	1.547	1.561	1.518	1.518	1.409	1.742	1.595	1.518	1.458	1.267	1.250
CHAINAGES	0.000	20.000	40.000	60.000	80.000	100.000	120.000	140.000	160.000	180.000	200.000	220.000	240.000	260.000	280.000	289.171

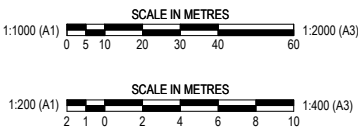
SOUTH 110km/h
SCALE 1:1000 HORZ (A1)
1:200 VERT (A1)

D					
C					
B					
A					
-	INITIAL ISSUE	AG	AG	VAO	VAO
02/05/2023					
No.	REVISION	DESIGNED	DRAWN	CHECKED	APPROVED
					DATE

Date: Tuesday, 2 May 2023 11:47:13 AM User: AG File: H:\2021\2109_Wolumla\099_2109Sync\051_dwgSync\2109-P25_27_29SDLS.dwg

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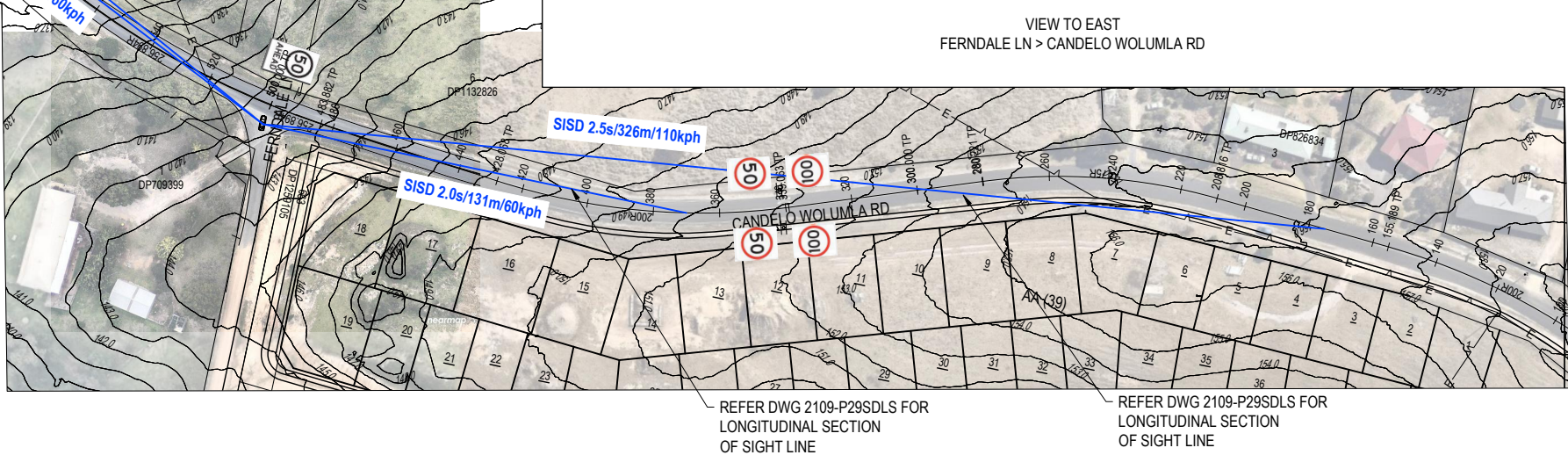


Survey source: NEAR MAPS
Survey datum: ???
Date: 5/08/2021
Coordinate system: GDA2020 MGA55
Survey source: SPATIAL COLLABORATION PORTAL NSW GOVT
Survey datum: ???
Date: 10/08/2021
Coordinate system: GDA2020 MGA55

osgood civil resource engineering

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CLIENT	JUNOR INVESTMENTS PTY LTD
PROJECT	LOT 633 DP1259105 WOLUMLA - RESIDENTIAL SUBDIVISION
TITLE	PRINCES HWY/CANDELO WOLUMLA RD SISD SIGHT LINE LONGITUDINAL SECTION
DRAWING NUMBER	2109-P27SDLS
AMENDMENT:	



VIEW TO EAST
FERNDAL LN > CANDELO WOLUMLA RD

SAFE INTERSECTION SIGHT DISTANCE (SISD) PARAMETERS WEST 110km/h		
POSTED SPEED	100km/h	
DESIGN SPEED	110km/h	POSTED SPEED LIMIT PLUS 10km/h.
RT	2.5s	DESIREABLE MINIMUM REACTION TIME FOR DESIGN SPEED.
GRADE	3.00%	3% UPGRADE FOR EASTBOUND TRAFFIC.
SISD	290	SISD FROM AGRD04A, TABLE 3.2.CORRECTED FOR UPGRADE WITH TABLE 3.4.

SAFE INTERSECTION SIGHT DISTANCE (SISD) PARAMETERS WEST 60km/h		
POSTED SPEED	50km/h	
DESIGN SPEED	60km/h	POSTED SPEED LIMIT PLUS 10km/h.
RT	2.0s	DESIREABLE MINIMUM REACTION TIME FOR DESIGN SPEED.
GRADE	3.00%	3% UPGRADE FOR EASTBOUND TRAFFIC.
SISD	120m	SISD FROM AGRD04A, TABLE 3.2. CORRECTED FOR UPGRADE WITH TABLE 3.4.



VIEW TO WEST
FERNDAL LN > CANDELO WOLUMLA RD

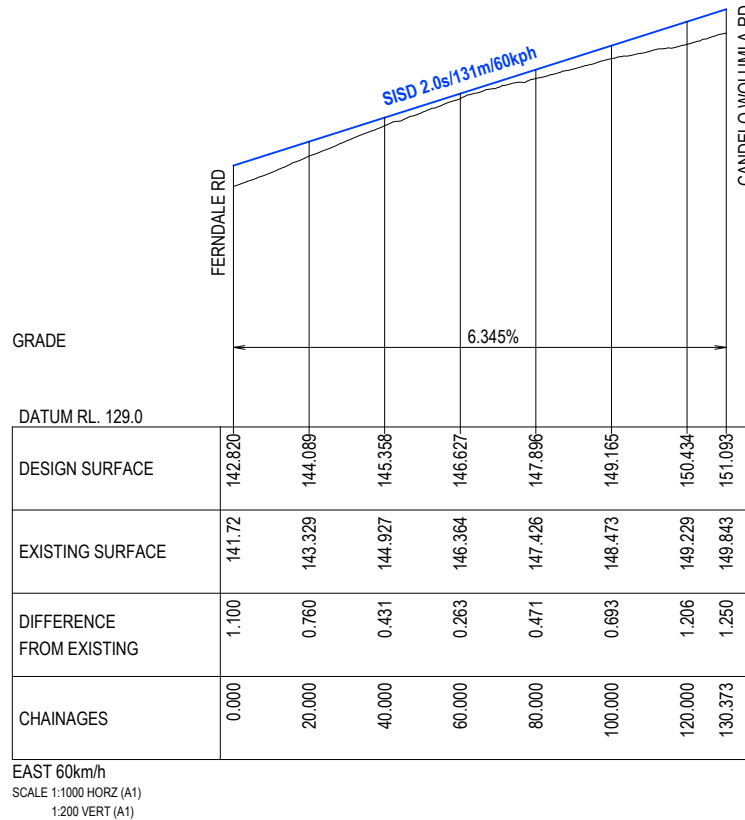
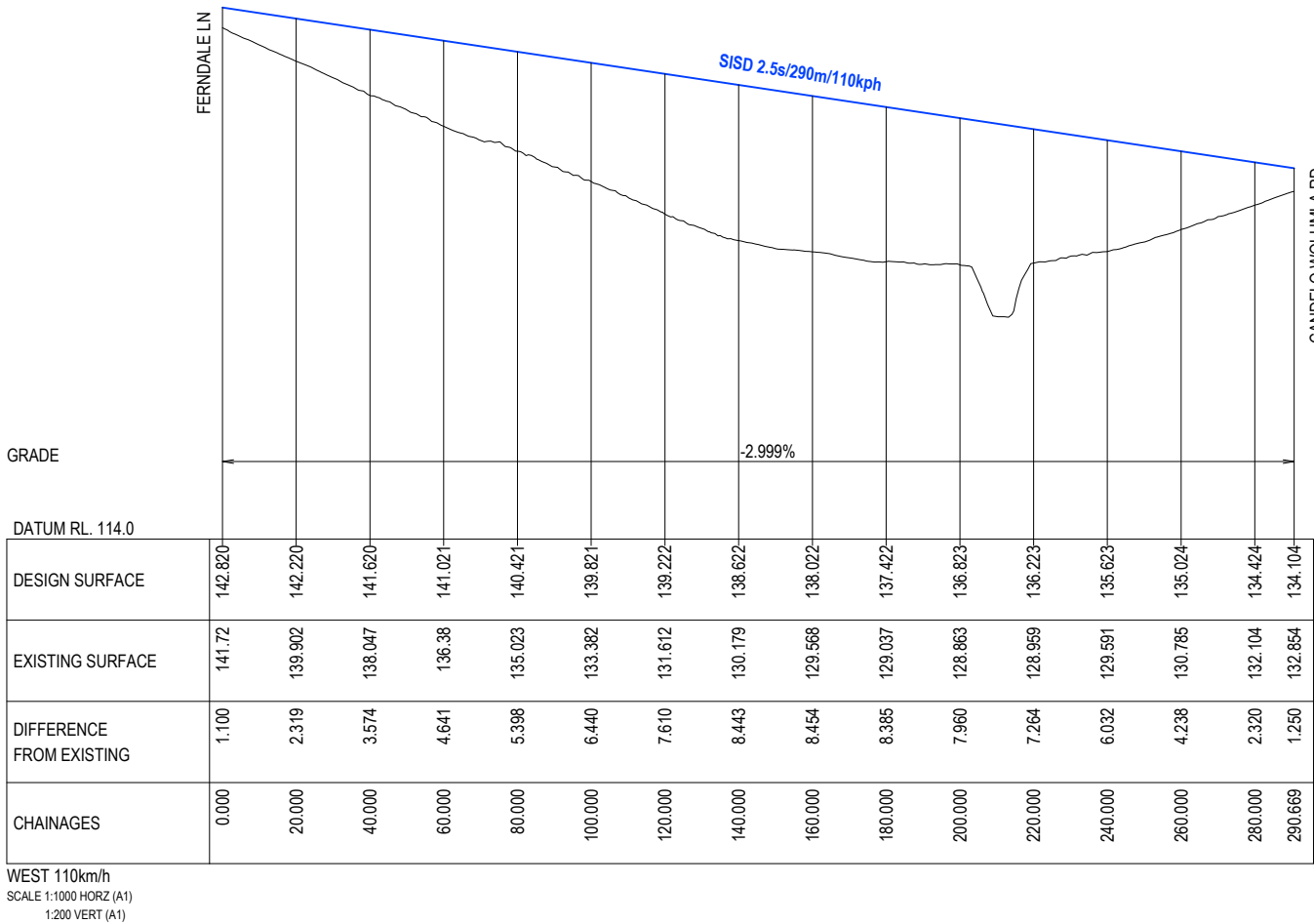
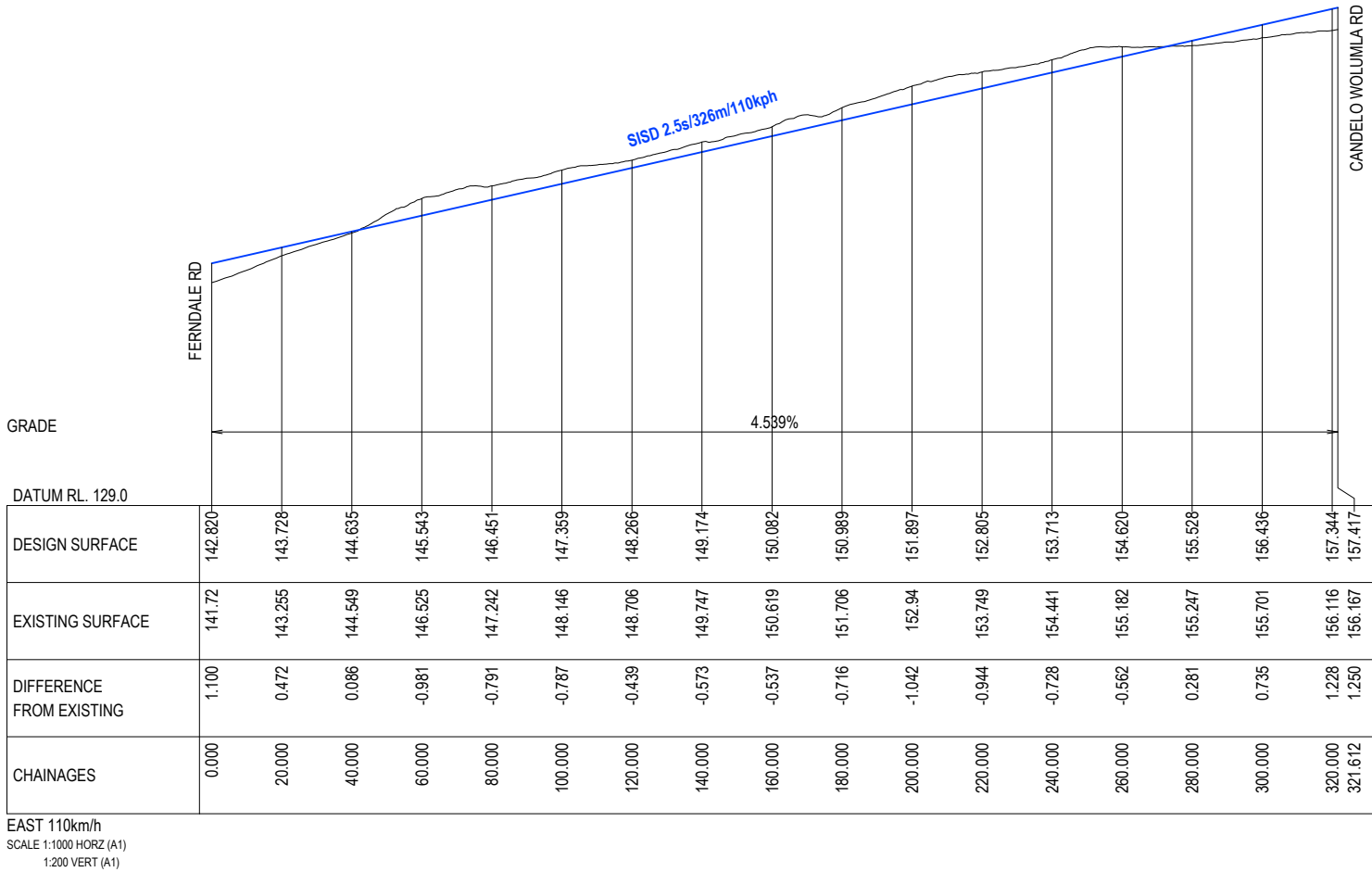
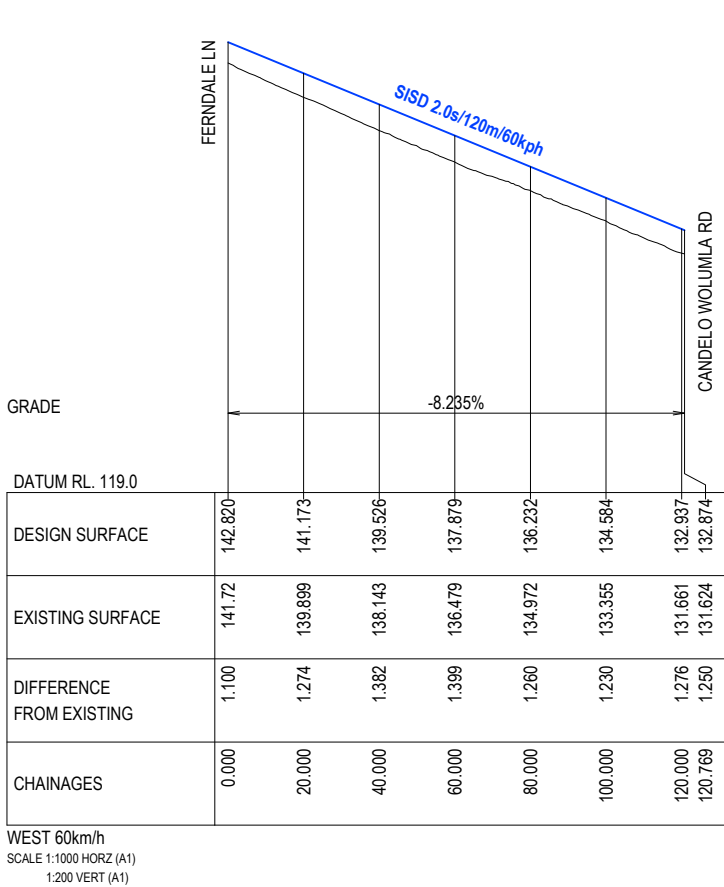
SAFE INTERSECTION SIGHT DISTANCE (SISD) PARAMETERS EAST 110km/h		
POSTED SPEED	100km/h	POSTED SPEED LIMIT PLUS 10km/h.
DESIGN SPEED	110km/h	
RT	2.5s	DESIREABLE MINIMUM REACTION TIME. AGRD04A.
GRADE	-6.00%	6% DOWNGRADE FOR WESTBOUND TRAFFIC.
SISD	326m	SISD FROM AGRD04A. TABLE 3.2. CORRECTED FOR DOWNGRADE WITH TABLE 3.4.

SAFE INTERSECTION SIGHT DISTANCE (SISD) PARAMETERS EAST 60km/h		
POSTED SPEED	50km/h	POSTED SPEED LIMIT PLUS 10km/h. DESIREABLE MINIMUM REACTION TIME FOR DESIGN SPEED. 6% DOWNGRADE FOR WESTBOUND TRAFFIC. SISD FROM AGRD04A, TABLE 3.2. CORRECTED FOR DOWNGRADE WITH TABLE 3.4.
DESIGN SPEED	60km/h	
RT	2.0s	
GRADE	-6.00%	
SISD	131m	

NOTES:

1. REFER TO DWG 2109-P02NTS FOR NOTES AND LEGEND

[illegible]



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-	INITIAL ISSUE	AG	AG	VAO	VAO
No.	REVISION	DESIGNED	DRAWN	CHECKED	APPROVED
					DATE

Date: Tuesday, 2 May 2023 11:48:18 AM

User: AG

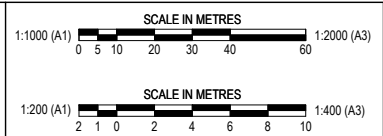
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Survey datum: ???
Survey source: SPATIAL COLLABORATION PORTAL NSW GOVT
Survey datum: ???

Date: 5/08/2021
Coordinate system: GDA2020 MGAS55

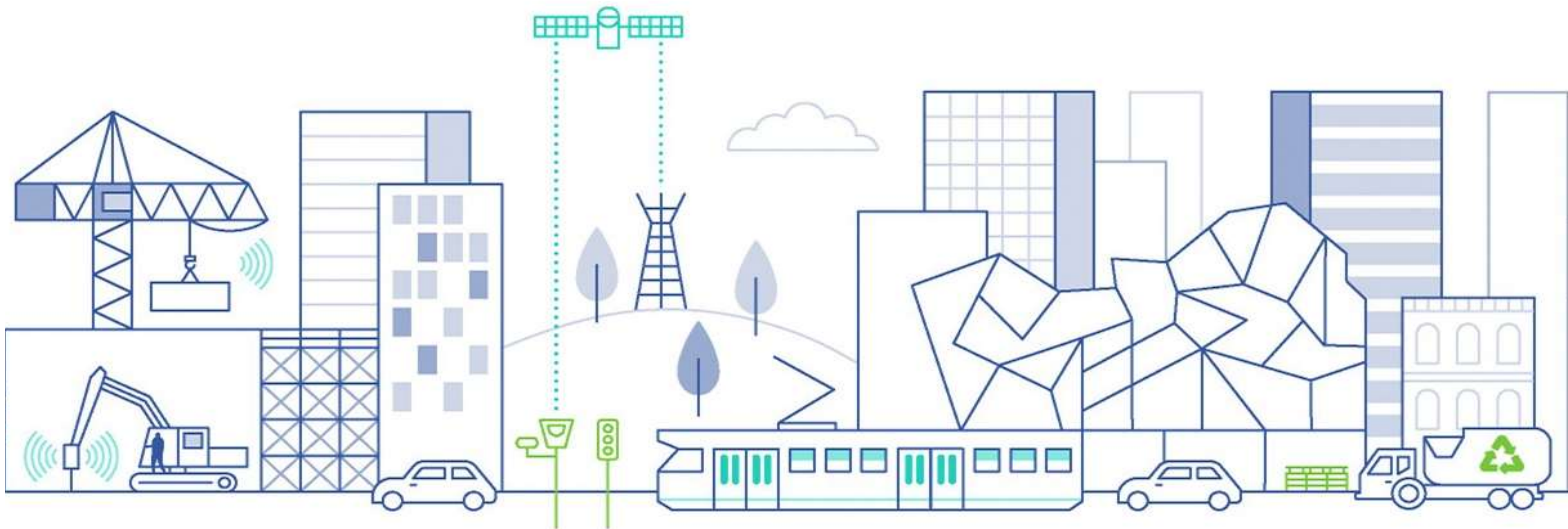
Date: 10/08/2021
Coordinate system: GDA2020 MGAS55



CLIENT	JUNOR INVESTMENTS PTY LTD
PROJECT	LOT 633 DP1259105 WOLUMLA - RESIDENTIAL SUBDIVISION
TITLE	CANDELO WOLUMLA RD/ FERDALE LN SISD SIGHT LINE LONGITUDINAL SECTION
DRAWING NUMBER	2109-P29SDLS
AMENDMENT:	



Proposed Land Development in Wolumla
Princess Highway Intersection Projects
A Possible Planning and Funding Agreement
Developers, Bega Valley Shire & Transport for NSW
Response to Section 7.8 of Bega Valley DCP 2013



1 Introduction and Scope

Junor Investments Pty Limited proposes a staged residential subdivision of 536 mostly standard density residential lots (areas above 450 square metres) plus 9 larger lots which will allow up to 72 medium density (MD) dwellings to be developed (the Junor development). The overall proposal includes 136 lots (including a site for future retail/commercial development and 4 MD sites) in Stage 1 for which a DA is currently sought, 255 lots (including 4 MD sites) in Stages 2-10 which will be the subject of a future DA, and 137 lots within an area (Stage 11) not currently zoned to allow residential development.

The Development Application has triggered a requirement for a response to Clause 7.8 in the Bega Valley Shire Development Control Plan 2013 (BVSDCP), which states, *inter alia*, that

- “Where road infrastructure upgrades are identified, strategic designs and costings must be developed and details of the proposed planning mechanisms to fund and deliver the required road network upgrades provided.”

and

- “Strategic designs for any identified road infrastructure should detail the scope of the works and demonstrate that the works can be constructed within the road reserve”.

This report provides a response to Section 7.8 of the BVSDCP.

2 Development Potential for Wolumla

The existing and potential development of residential land in Wolumla is set out in Table 1. The Woodstock development is currently under construction and the Junor development proposal is the subject of a DA at present. The remaining possible development shown in Table 1 is estimated from available sources including shire records and schematic development concepts.

TABLE 2 : EXISTING AND POTENTIAL LOT YIELDS

Location / Project	Existing Dwellings		Potential Additional Dwellings		Totals
	Standard	Density	Standard Density	Medium Density	
Wolumla Township	175		25	20	220
R2 land Property 2 (plan appended)			141	20	161
R2 land Property 3 (BVSC estimate)			90	16	106
Junor*			449	226	675
Woodstock**			40	10	50
North & East of PHway	48		10	0	58
North & West of PHway (Cherry Lane)	18		5	0	23
Northwest around C-W Road	60		20	0	80
Totals	301		780	292	1373

* the Junor development proposes 519 standard density lots plus sites for 86 medium density units. A maximum of about 1 in 8 or (say) 70 of the standard sites may possibly have dual occupancy.

** the Woodstock development proposes 45 standard density lots. About 5 of the standard sites may possibly have dual occupancy.

Record

No.	Author	Reviewed/Approved	Description	Date
1.	J. Higgs		Paper to Inform a Possible VPA	04/04/2025

3 Road Infrastructure Upgrades Identified

The Traffic Impact Assessment Report by TTM Consulting (Vic) Pty Ltd sets out several “road infrastructure upgrades” that are or may be warranted consequent to existing traffic loadings and additional traffic loadings generated from the development of the land as set out in Table 1. Table 2 provides a summary of those projects and includes some commentary about the generated need and warrants for each project.

TABLE 2 : ROAD INFRASTRUCTURE UPGRADES IDENTIFIED

Project	Warrants	Commentary
Intersection Princes Highway at Scott Street – Provision of left turn lane (AUL)	Project required consequent to additional development in Wolumla	Already warranted, existing conditions not unsafe noting that the same warrants would have existed at the time of construction the existing infrastructure. Refer to separate
Intersection Princes Highway at Scott Street – Possible need to widen eastern shoulder to achieve BAR	Subject to proper survey and analysis, if required consequent to TfNSW Princes Highway project inadequacy.	Not relevant - no nexus with developments in Wolumla. TfNSW may choose to undertake detailed analysis and possible correction if warranted.
Intersection Princes Highway at Bega Street - Provision of left turn lane (AUL)	Project required consequent to additional development in Wolumla	Early stages of Junor development will have minimal impact on traffic loading on left turn entry at Bega Street. R2 land development north of Scott Street will be primary generator of additional traffic loading.
Intersection Princes Highway at Bega Street - Provision of right turn lane CHR upgrade from CHR(S)	Project warranted under AustRoads Guide to Traffic Management consequent to additional development	Currently warranted but safety related risks of non-provision considered low. Consider additional signage as an interim measure and review to assess need vs. impacts of construction works.
Intersection Scott Street at Bega Street	Additional development in Wolumla but may be a requirement on Woodstock	Suggested as a Council funded project if considered necessary and not required under Woodstock approval.
Intersection Scott Street at Ferndale Lane BAR/BAL, 50kph limit	Consequent to Junor development	No nexus with developments other than Junor – to be funded by Junor development. Note land allowance for possible future roundabout.
Intersection Scott Street at or near Ferndale Lane to service Development of R2 land north of Scott Street	Consequent to development of R2 land north of Scott Street	No nexus with developments other than R2 north of Scott Street – to be funded by R2 development. Refer above.
Intersection Scott Street at proposed Road 27	Consequent to Junor development	No nexus with developments other than Junor – to be funded by Junor development
Underground electricity supply in Scott Street	Community and safety project	Suggested as a Council funded project with Junor contribution. Benefits to northern side of Scott Street.
Local widening for parking and path in Scott Street	Consequent to development of abutting land	No nexus with developments other than Junor – to be funded by Junor development

4 Upgrades Warranted by Overall Development

Upgrades that have been identified as being warranted consequent to general development rather than to support specific site developments, together with estimated 2024 costs, are set out in Table 3. Funding for these projects is proposed via a planning agreement between developers, BVSC and Transport for NSW.

TABLE 3 : OUTLINE COST ESTIMATES FOR GENERAL ROAD INFRASTRUCTURE UPGRADES IDENTIFIED

PROJECT	Estimate
Intersection Princes Highway at Scott Street – Provision of left turn lane (AUL)	\$550,000
Intersection Princes Highway at Bega Street - Provision of left turn lane (AUL)	\$750,000
Intersection Princes Highway at Bega Street - Provision of right turn lane CHR upgrade from CHR(S)	\$300,000
Intersection Scott Street at Bega Street	\$250,000
TOTAL	\$1,850,000

5 Programming of Projects and Funding

None of the projects proposed to be funded by development generally are such that changes in the usually applied warrants are triggered by early development in Wolumla. Further, the left turn lanes on Princes Highway are already warranted and would have been warranted under AustRoads Guides at the time of the last upgrade to the Princes Highway through those intersections.

We re-iterate the position that extension of the southbound right turn lane at Bega Street should not be done because of the disruptions that would be consequent. Accordingly, a total fund of \$1.55 M is proposed as the basis of an agreement to provide funds for the works to be funded from developments generally. It is arguable that the Shire should be contributing in respect of existing development and the Woodstock development that has been permitted without a requirement for a contribution to “general” road upgrades.

6 A Possible Contributions Scenario

Given the generally applied traffic generation estimating basis that medium density developments generate less traffic per dwelling than standard density developments, with 5 vehicle movements per day and 8 vehicle movements per day respectively applied in the Wolumla report. On that basis a medium density lot would be equivalent to five eights of a standard lot.

If contributions are only to be sought from “additional development” as listed in Table 1 there will be $780 + 5/8 * 292 = 963$ lot equivalents from which to draw. At a total of \$1.55 M the rate would be \$1,610.00 per lot equivalent.

To implement the “general” projects on the Princes Highway would require contributions from at least $\$550,000/\$1,610 = 342$ lot equivalents for the work at Scott Street or $\$750,000/\$1,610 = 466$ lot equivalents for the left turn lane and intersection works at Bega Street.

Given that the Junor development will not have a major impact on left turning traffic from Princes Highway into Bega Street it makes sense for Junor Stage 1 to fund the works at Scott Street rather than at Bega Street. If developed lots contributed at \$3,000 per lot equivalent within the current DA there would be $131 + 5/8 * 32 = 151$ lot equivalents contributing \$453,000, adequate to complete the Scott Street intersection project. Contributions beyond the first DA would then not be required.

TTM Consulting (Vic) Pty Ltd



J D Higgs

APPENDIX

SCOTT STREET INTERSECTION AT PRINCES HIGHWAY				
Description	Unit	Rate	Qty	Amount
Pavement Overlay or rehabilitation	sqm	\$ 100.00	770	\$ 77,000.00
New pavement including earthworks	sqm	\$ 300.00	180	\$ 54,000.00
Kerb and Channel with Ags & F/O risers	m	\$ 230.00	120	\$ 27,600.00
Misc. Concrete	sqm	\$ 175.00	50	\$ 8,750.00
Drainage	m	\$ 400.00	100	\$ 40,000.00
Line marking including removals	item	\$ 20,000.00	1	\$ 20,000.00
Signage	item	\$ 8,000.00	1	\$ 8,000.00
Landscaping	item	\$ 15,000.00	1	\$ 15,000.00
Intersection Lighting Upgrade	item	\$ 75,000.00	1	\$ 75,000.00
Traffic Management	days	\$ 2,400.00	30	\$ 72,000.00
Sub Total				\$ 397,350.00
Survey Design and Project management			12.5%	\$ 49,668.75
Contingencies			20%	\$ 79,470.00
Supervision and checking Fees			4%	\$ 15,894.00
TOTAL				\$ 542,382.75
BEGA STREET LEFT TURN LANE AT PRINCES HIGHWAY				
Description	Unit	Rate	Qty	Amount
Pavement Overlay or rehabilitation	sqm	\$ 100.00	660	\$ 66,000.00
New pavement including earthworks	sqm	\$ 300.00	560	\$ 168,000.00
Kerb and Channel with Ags & F/O risers	m	\$ 230.00	245	\$ 56,350.00
Misc. Concrete	sqm	\$ 175.00	50	\$ 8,750.00
Drainage	m	\$ 400.00	100	\$ 40,000.00
Line marking	item	\$ 8,000.00	1	\$ 8,000.00
Signage	item	\$ 8,000.00	1	\$ 8,000.00
Landscaping	item	\$ 15,000.00	1	\$ 15,000.00
Intersection Lighting Upgrade	item	\$ 82,000.00	1	\$ 82,000.00
Traffic Management	days	\$ 2,400.00	30	\$ 72,000.00
Sub Total				\$ 524,100.00
Survey Design and Project management			12.5%	\$ 65,512.50
Contingencies			20%	\$ 104,820.00
Supervision and checking Fees			4%	\$ 20,964.00
TOTAL				\$ 715,396.50

Right Turn Lane Extension Princes Highway					
New pavement including earthworks		sqm	\$ 300.00	200	\$ 60,000.00
Pavement Overlay		sqm	\$ 100.00	320	\$ 32,000.00
Kerb & Channel		m	\$ 230.00	90	\$ 20,700.00
Drainage		m	\$ 200.00	90	\$ 18,000.00
Princes Highway Line Marking		item	\$ 10,000.00	1	\$ 10,000.00
Signage		item	\$ 6,000.00	1	\$ 6,000.00
Landscaping		item	\$ 5,000.00	1	\$ 5,000.00
Traffic Management		days	\$ 2,400.00	20	\$ 48,000.00
Sub Total					\$ 199,700.00
Survey Design and Project management				12.5%	\$ 24,962.50
Contingencies				20%	\$ 39,940.00
Supervision and checking Fees				4%	\$ 7,988.00
TOTAL					\$ 272,590.50