

PROPOSED MCDONALD'S FOOD AND DRINK OUTLET: GRAF DRIVE, CALOUNDRA SOUTH

TRAFFIC IMPACT ASSESSMENT

For McDonald's Australia Ltd

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2021/1209

Date: 21-Oct-2021



LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS

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	03/08/2021	DRAFT	DN	SW	
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1. INTRODUCTION

Lambert & Rehbein (SEQ) Pty Ltd has been commissioned by McDonald's Australia Pty Ltd for the proposed development of a food and drink outlet at the intersection of Aura Boulevard and Graf Drive, Baringa (Caloundra South), described as Lot 345 on SP308153 (Future Lot 9000 and Lot 1) and hereon will be referred as the 'development site'.

The development site consists of a Greenfield site, located at the intersection of Aura Boulevard and Graf Drive. The site will gain access to the wider road network, via one (1) crossover on Graf Drive.

The site sits within the Caloundra South PDA Scheme that covers 2,310 hectares of land and sits between the Bruce Highway to the west and Bells Creek Road to the south. The site is subject to an existing approval known as the "Business Park: (EDQ Reference: DEV2013/439).

The proposed site layout, prepared by PA Architects, has been included in **Appendix A**.

This traffic impact assessment report has been undertaken to assess the car park provisions, access requirements and the impact on the external road network of the proposed development.

The report has been compiled in a clear and concise manner and is set out as follows:

Section 2 provides an assessment of the development context including the existing land use and traffic arrangements.

Section 3 provides details of the proposed development including car parking requirements, access and internal manoeuvring arrangements.

Section 4 contains a high level assessment of the potential traffic impacts of the development on the external road.

Section 5 summarises the key outcomes of the traffic impact assessment.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between Lambert & Rehbein and the Client. Lambert & Rehbein accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

2. CONTEXT OF THE DEVELOPMENT SITE

This section of the report describes the context of the proposed development and includes a description of the existing road network, adjacent land uses, and existing public transport facilities servicing the site.

2.1 DEVELOPMENT SITE

The development site is located at the corner of Aura Boulevard / Graf Drive, Baringa (Caloundra South) and will be constructed as Stage 1 on the south-eastern corner of “Superlot” 5A and is labelled as Lot 5B. The area for Lot 5B, the proposed McDonald’s site (Stage 1) is 2,183m², with the remainder of the lot to be developed in a future stage. The site currently forms part of the approved Business Park of Aura, being developed by Stockland.

The development site currently forms part of the ‘Industry and Business Zone’ as per the aforementioned Development Scheme but is primarily identified within the existing Business Park Plan of Development as being within the Showroom land use area. The development site is generally surrounded by undeveloped lots, however the road, pedestrian and cycle infrastructure has largely been constructed, albeit we understand not to its “ultimate” form.

The development site in context of the surrounding road network is shown in **Figure 2-1**.

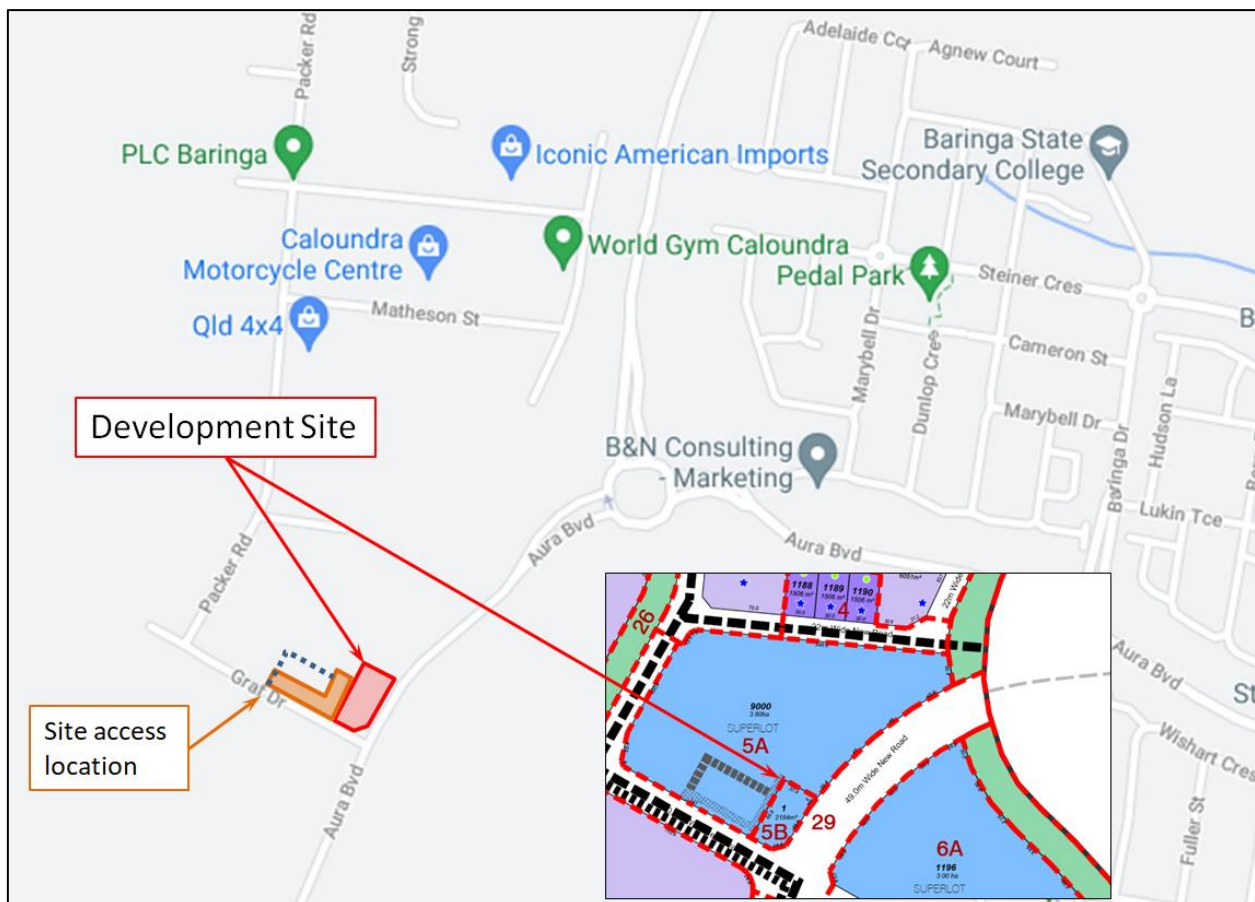


Figure 2-1 Development Site (Source: Google)

2.2 EXISTING ROAD NETWORK

Inspection of the land use, road condition, intersection characteristics, public transport facilities, pedestrian access, and cyclist provisions surrounding the proposed development site have been undertaken as a desktop investigation in preparation of this assessment. This was completed to collect information about the road network operation, safety characteristics, public transport network and specific network / land-use

factors potentially of influence to the proposed development. The immediate surrounding road network is shown in **Figure 2-2**.



Figure 2-2 Adjacent Road Network (Aerial image: Nearmap)

2.2.1 GRAF DRIVE

Graf Drive runs along the south-western frontage of the development site and is classified as a Trunk Connector-Sub Arterial in the approved Plan of Development.

The existing general form of Graf Drive can be seen in **Figure 2-3** and was observed to have the following characteristics at the site frontage:

- Single carriageway with two lane, two way road;
- Full kerb and channel provided on both sides of road;
- Roadway width, approx. 8.0m wide;
- Paved pedestrian footpaths provided along both sides of road;
- 3.0 m wide contraflow cycle lane along the southern verge;
- On street parking available on both sides of the road;
- No on-street cycle lanes;
- No posted speed limit - assumed 50km/hr; and
- 30m road reserve to cater for a 2nd carriageway and a median (as per the road classification).

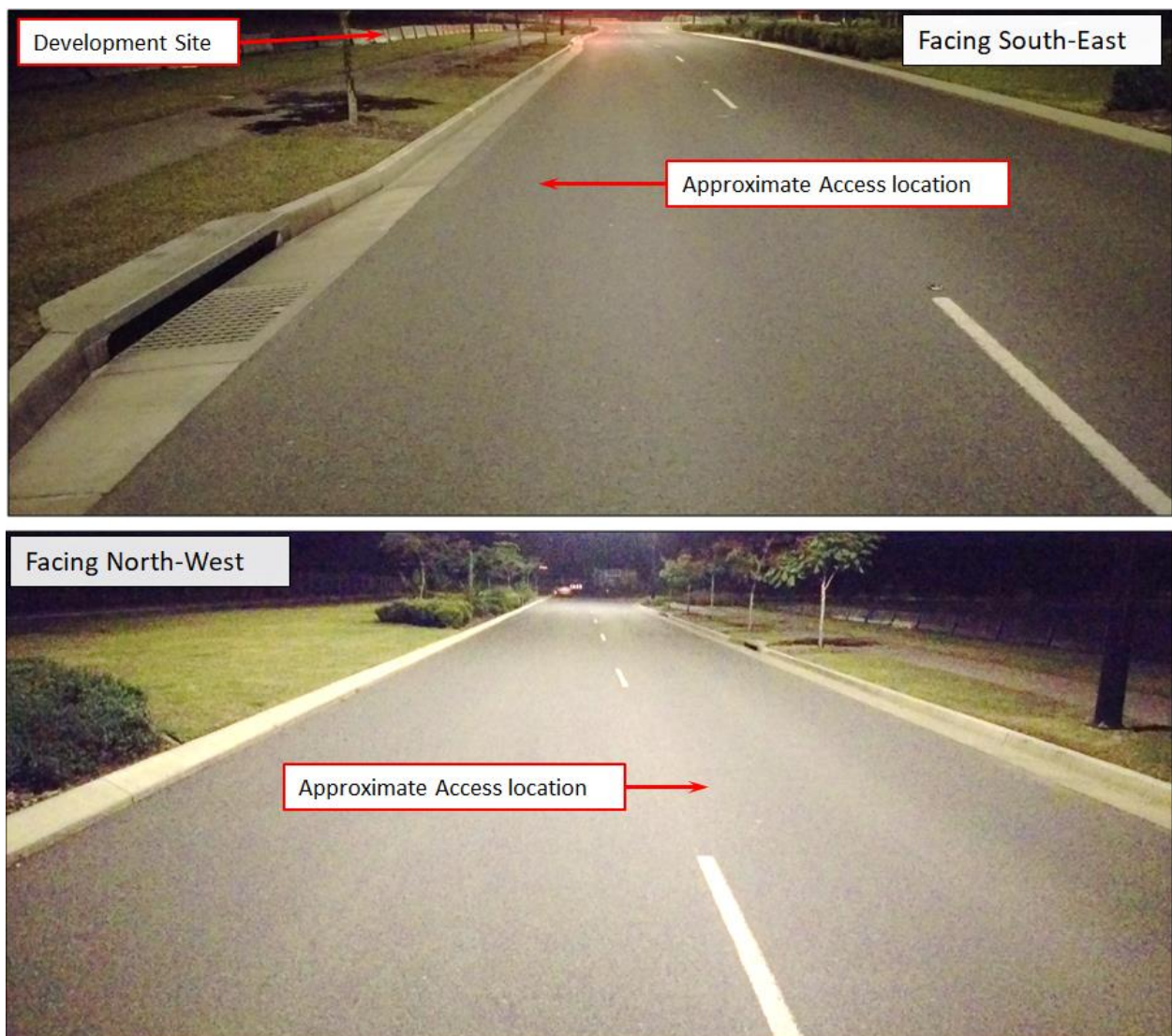


Figure 2-3 Graf Drive at the Site Frontage (Top: Facing South-East. Bottom: Facing North-West)

2.2.2 AURA BOULEVARD

Aura Boulevard runs along the south-eastern frontage of the development site and is classified as a Sub-Arterial in the approved Plan of Development. The general form of Aura Boulevard can be seen in **Figure 2-4** and was observed to have the following characteristics at the site frontage:

- Single carriageway, two lane, two-way road;
- Kerb and channel provided on the south-eastern side of road;
- Kerb to kerb width of approximately 10.5m;
- Paved pedestrian footpath provided along the south-eastern side of the road;
- No on street parking available, supplemented by 'No Standing' signage along the southern kerb;
- No on-street cycle lanes, however a contraflow cycle lane provided on the south-eastern verge;
- Posted speed limit of 60km/hr;
- Indented bus stop with slab along the north-western verge; and
- 49m road reserve with provision for a 2nd carriageway and median when the interchange is constructed.



Figure 2-4 Aura Boulevard (Source : Nearmap)

2.3 ACTIVE TRANSPORT

The site is serviced by existing active transport facilities, as seen in **Figure 2-5**, with:

- Pedestrian paths running along both sides of Graf Drive;
- Contraflow off-street cycle path on the southern verge of Graf Drive;
- Pedestrian paths on both sides of Aura Boulevard;
- Contraflow off-street cycle path on the eastern side of Aura Boulevard;
- Signalised pedestrian crossings across Graf Drive and across Aura Boulevard; and
- Uncontrolled crossing across Packer Road.



Figure 2-5 Surrounding Active Transport (Aerial image: Nearmap)

2.4 PUBLIC TRANSPORT SERVICES

The development site is within a 400m walking catchment to two (2) Translink bus stops on Aura Boulevard as seen in **Figure 2-6**. The routes that service these bus stops are summarised in **Table 2-1** below.

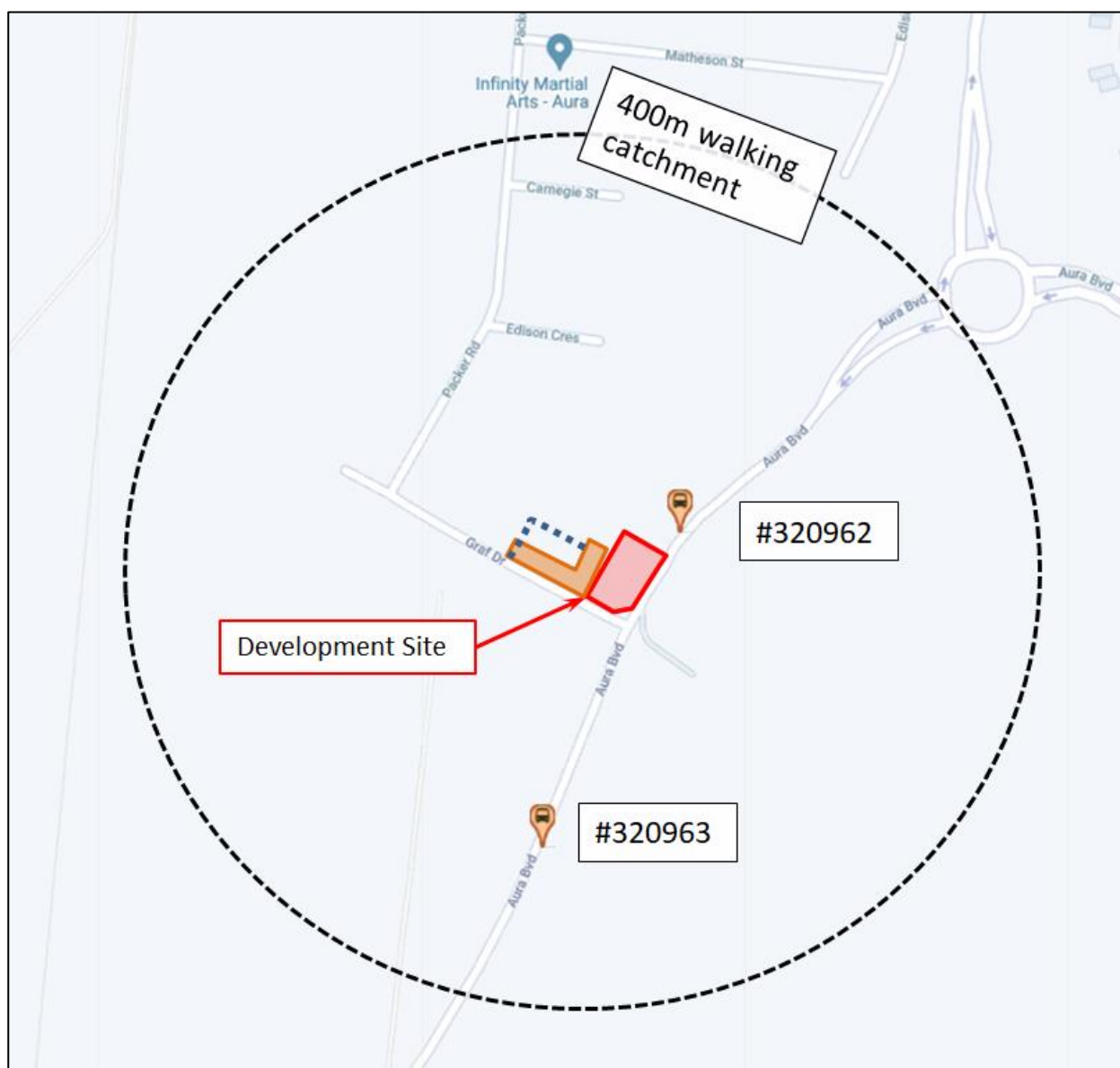


Figure 2-6 Surrounding Public Transport (Source: Translink)

Table 2-1 Public Transport – Bus Routes

TRANSLINK STOP NUMBER	ROUTE CODE	ROUTE NAME AND DIRECTION
#320962	Not listed	No service listed at time of writing the report
#320963	Not listed	No service listed at time of writing the report

2.5 LOCAL GOVERNMENT INFRASTRUCTURE PLAN

Review of SCC's Local Government Infrastructure Plan (LGIP) did not result in any future infrastructure items in a radius of 600m of the proposed development and it is noted that the road network is currently part of ongoing new construction works. The surrounding road network, in terms of function and design, is included in the document: "Caloundra South Northern Locality - Business and Industry Area: Plan of Development – Precinct 3, 4,5 and Part 6", amended on 14 July, 2021.

3. DETAILS OF THE PROPOSED DEVELOPMENT

This section of the report describes the nature of the proposed development, the proposed access arrangements, servicing arrangements and on-site manoeuvrability.

3.1 PROPOSED DEVELOPMENT

The proposed development site is for a McDonald's Restaurant with a total GFA of 458m² with associated car parking and a dual lane drive through facility. The proposed site layout is presented in **Figure 3-1**. Further detailed site layout plans prepared by the project architects PA Architects are shown in **Appendix A**.

3.2 PROPOSED ACCESS ARRANGEMENTS

The proposed development will gain access to the external road network via a single all-movements crossover on Graf Drive at the site's south-western frontage. The proposed access arrangement is shown in **Figure 3-1**.

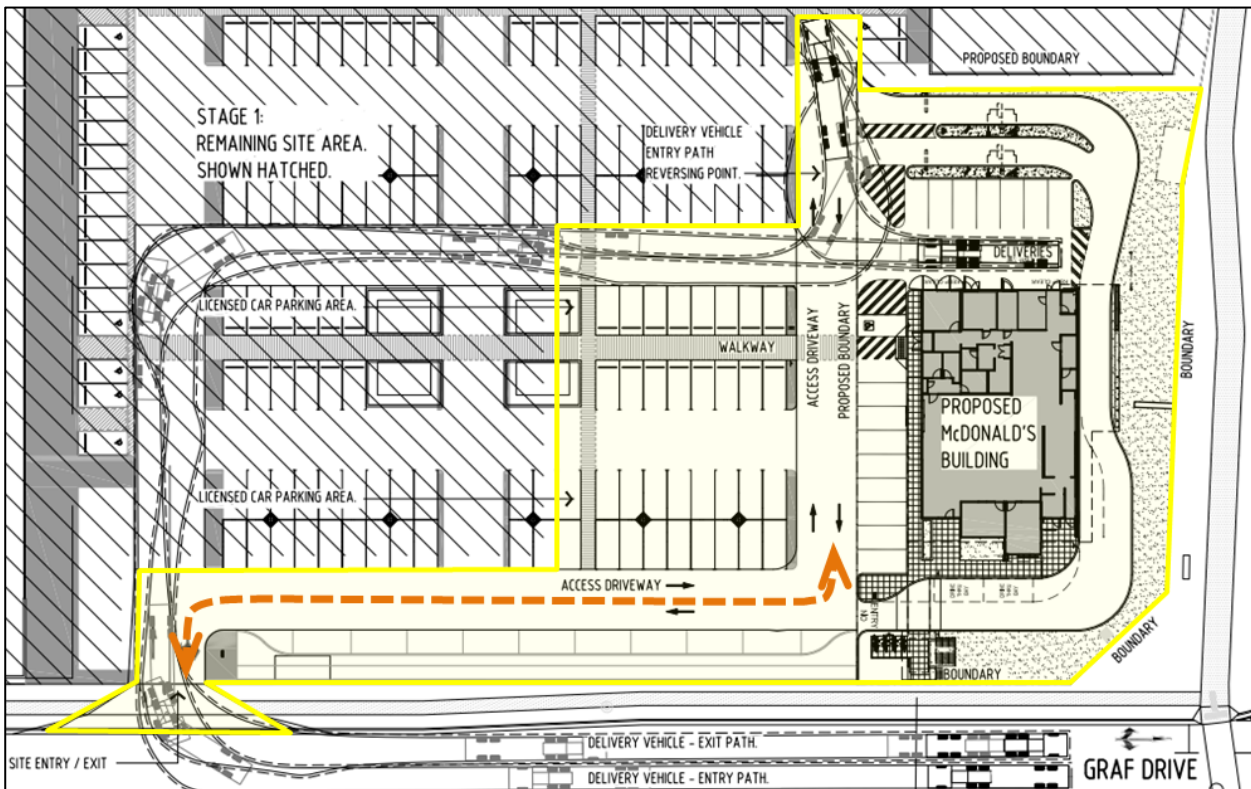


Figure 3-1: Proposed Access Arrangements

The proposed Graf Drive crossover is located approximately 111 m north-west of the Aura Boulevard intersection stop line and exceeds the minimum access driveway location requirement in AS2890.1 (Section 3.2.3). The proposed crossover has been designed as a modified General Wide Flared (previously Type B) crossover, generally in accordance with IPWEAQ Standard Drawing RS-051 as per the Caloundra South Northern Locality – Business and Industry Area Plan of Development – Precinct 3,4,5 and Part 6". Prior to construction of the ultimate parking area, it is understood that the area highlighted in yellow (indicative only) will be constructed and customers to the McDonald's development will be provided with access along the southern boundary shown via the orange arrow in **Figure 3-1**.

3.3 QUEUING REQUIREMENTS

The proposed access at Graf Drive has sufficient queuing capacity to accommodate three (3) queued vehicles within the existing property boundary which meets the queuing requirements outlined in AS2890.1. The dual drive-through facility of the proposed McDonald's food and drink outlet will also provide provision for 15 vehicles to queue from the servery, one window for coffee pickup and two (2) waiting bays beyond the

server, as illustrated in the drawing attached in **Appendix B**, generally in accordance with the Caloundra South Plan of Development Design Criteria (Section 3.5).

3.4 CAR AND MOTORCYCLE PARKING REQUIREMENTS

The Caloundra South Northern Locality – Business and Industry Area Plan of Development – Precinct 3, 4, 5 and Part 6, Appendix K specifies the car parking requirements for various uses. The car parking rates and requirements for a Food and Drink Premises is shown in **Table 3-1**.

Table 3-1: Parking Requirements

USE	PARKING RATE REQUIRED	YEILD (GFA)	MIN PARKING REQUIRED	PROVIDED (TOTAL)
Food and Drink Outlet	Cars: 1 space per 15m ² GFA (Gross Floor Area)	458m ²	31	17 + 34 = 51 (Incl. 1 x PWD)
	Parking cross utilisation as per Caloundra South POD, Sect3.2.3, Element DS3.1.		-6 (-20%)	
	Bicycles: 1 employee space + 1 customer space / 100m ² GFA	458 m ²	6	8
Total Minimum Parking Requirement & Provided			31-6=25: Car plus 8: Bicycle	51: Car (Incl. 1xPWD) 8: Bicycle

The minimum parking requirement for the proposed development is 31 car parking spaces, however as conditioned in the approved Plan of Development, Section 3.2.3: Access, a reduction of 20% can be applied where shared parking arrangements enable greater efficiency in parking utilisation. The development therefore has a parking requirement of 25 parking spaces. The proposed development will initially provide 51 parking spaces within the first phase of construction, including 1 PWD parking space, which equates to a surplus of 26 parking spaces against the approved Plan of Development requirements. The proposed development provides eight (8) dedicated bicycle parking spaces along the southern boundary of the site which meets the approved Plan of Development for access distance supply rate.

3.5 INTERNAL CAR PARKING DESIGN

As per the approved Plan of Development, the proposed carpark, as shown in **Appendix A**, has been designed generally in accordance with requirements of AS2890.1. **Table 3-2** compares the proposed car park provisions with these requirements and states if compliance has been achieved.

Table 3-2: Carpark Design

DESIGN ASPECT	PROPOSED PROVISION	AS2890.1 REQUIREMENTS	COMPLIANCE
Parking Bay Length - Standard Bay	5.4m	5.4m	AS2890.1 Compliant
Parking Bay Width - Standard Bay	2.6m	2.6m	AS2890.1 Compliant
Parking Bay Length - PWD Bay	5.4m	5.4m	AS2890.1 Compliant
Parking Bay Width - PWD Bay	2.4m + 2.4m shared zone	2.4m + 2.4m shared zone	AS2890.1 Compliant
Parking Aisle Width	6.6m	6.6m	AS2890.1 Compliant

As illustrated in **Table 3-2** the proposed carpark provisions as listed above, have generally been designed in accordance with the minimum requirements of AS2890.1. It is recommended that the seven (7) parking bays adjacent the service yard and delivery area be assigned to staff car parking.

3.6 SERVICING REQUIREMENTS

As shown in **Figure 3-2** via the blue shaded area, a temporary access for service vehicles will be provided for deliveries and for service vehicles to the site as part of the McDonald's development. The remainder of the parking area will be constructed during the next phase of retail/commercial development.

The site shows an off-street bin area indicated by a service yard, highlighted in orange in **Figure 3-2**.

A swept path assessment has been undertaken to demonstrate the successful manoeuvrability of the largest design vehicle, a 14 Pallet Articulated Vehicle (AV). In addition, a swept path assessment of a JJ Richards Rear Loading Waste Collection (10.2m x 2.5m) heavy rigid vehicle (HRV) has also been undertaken for the purpose of refuse collection. The Graf Drive crossover will be utilised by the AV as right turn-in movement and left-out movement. The WCV can use the crossover as an all-movement access and both service vehicles will access and exit the site in forward gear via the Graf Drive crossover as illustrated in **Appendix C**.

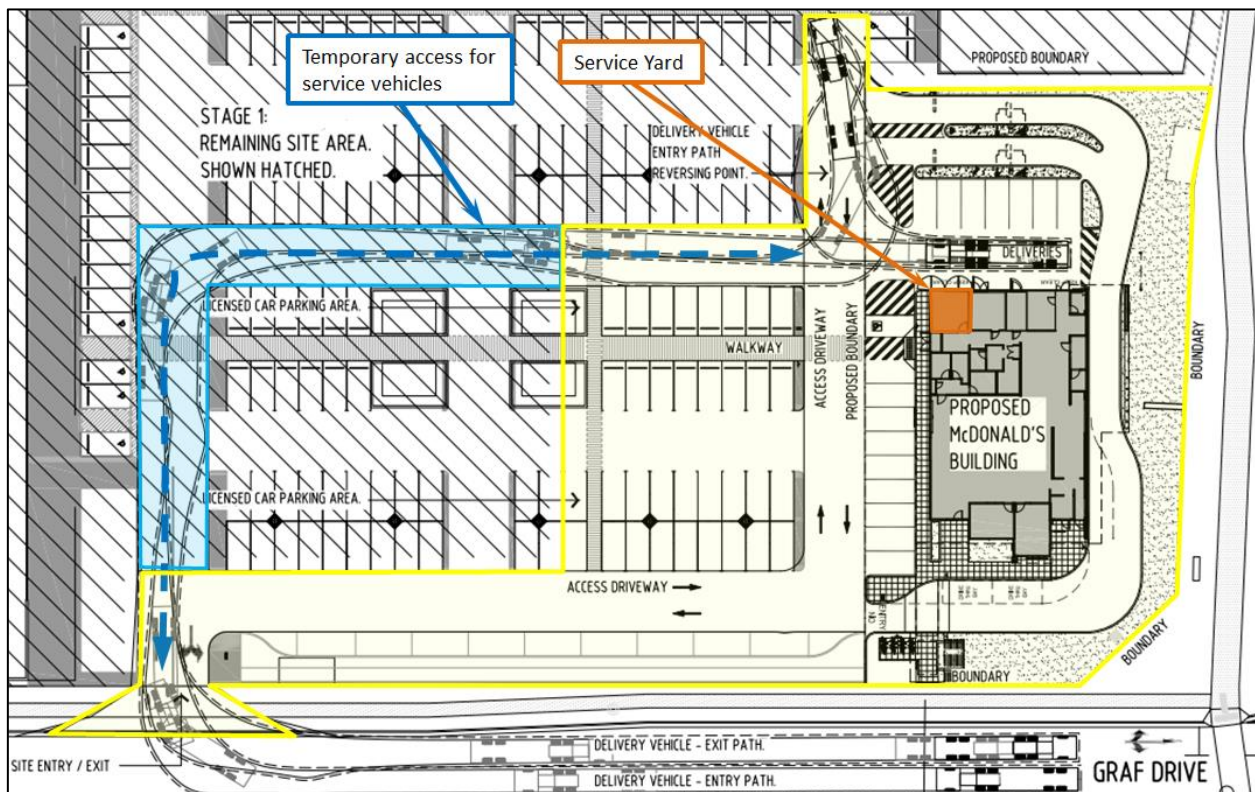


Figure 3-2 Service Access Location

4. TRAFFIC IMPACT ASSESSMENT

This section of the report provides details of the potential impact that the development generated traffic volumes could have on the operation of adjacent intersections and the surrounding road network during typical peak trading peak periods.

4.1 BACKGROUND TRAFFIC

The project involves the development of a McDonald's Restaurant within the approved Aura Business Park. The site is understood to form part of a larger retail development site which will share the same Graf Drive access. Current traffic volumes are minimal as the area is currently largely undeveloped. We assume that the overall approval for the development contemplates retail/commercial land and food & drink outlets uses on the subject site and as such the traffic assessment is not required to contemplate any analysis of the external intersections. **Figure 4-1** shows the site in context of the ongoing development of the road network, surrounding retail/commercial and nearby residential sites. The approved Plan of Development land use mapping is included (see insert from drawing POD Rev:Q) has been included in **Appendix D**.

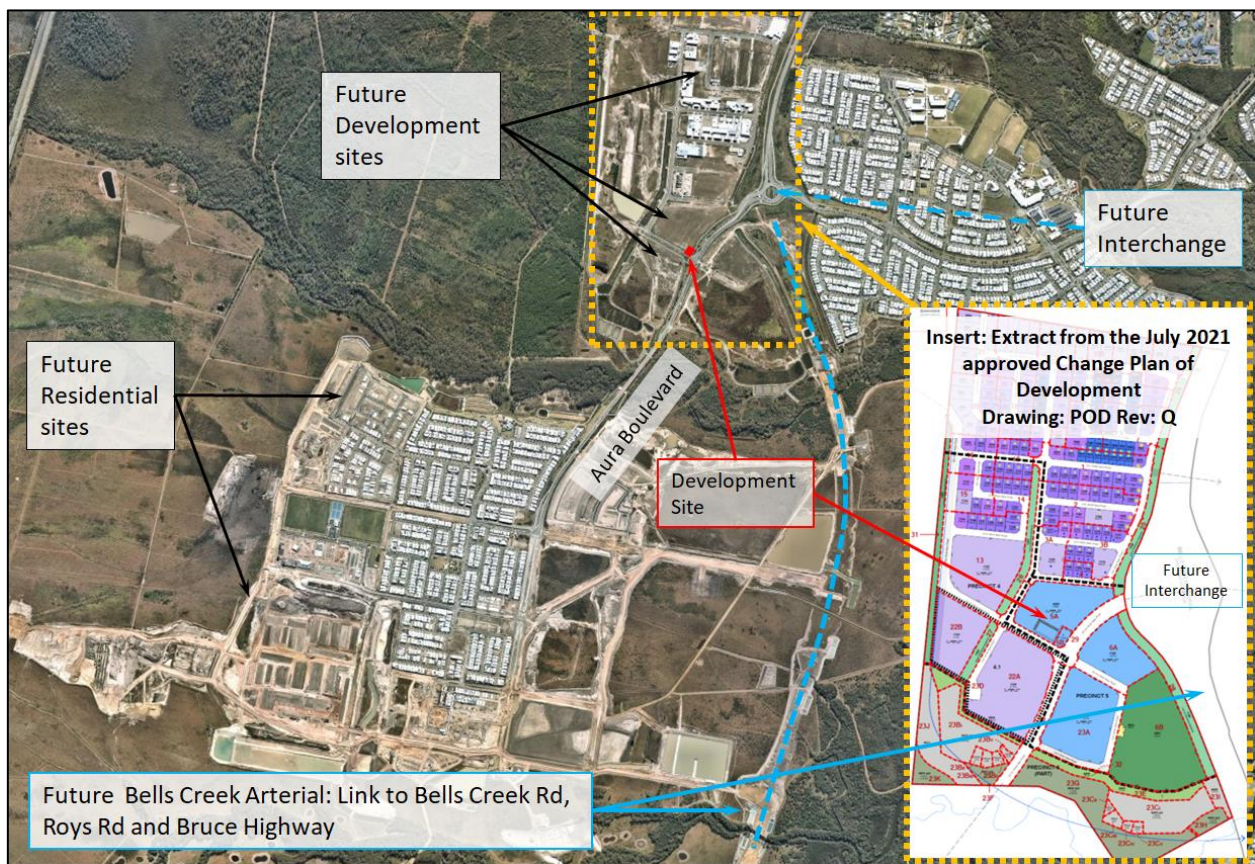


Figure 4-1 Surrounding future development sites + residential sites (Nearmap: June 2021)

4.2 TRIP GENERATION

Additional traffic associated with the proposed development has been forecasted using the RMS (formally RTA) Guide to Traffic Generating Developments for the development land uses. A Tier 1 'take-away food and drink premises' traffic generation of 180 peak hour trips have been adopted in both peak hours for this analysis.

The traffic generation rates and in/out directionality of movements adopted for the analysis within this report is documented in **Table 4-1**.

Table 4-1 Generation and Directionality Rates

LAND USE	GENERATION RATE		DIRECTIONALITY (% IN / % OUT)	
	AM Peak	PM Peak	AM Peak	PM Peak
Take Away Food and Drink Premises	180 trips	180 trips	50% In / 50% Out	50% In / 50% Out

The proposed food and drink outlet land use is expected to result in a mix of “new trips” and “undiverted drop in trips”, given its convenience nature. Based on the proportions outlined in GARID, we have estimated the proportion of new and undiverted trip generation below.

Table 4-2 Development Traffic Generation – New Trips

LAND USE	NEW TRIPS	AM PEAK (IN)	AM PEAK (OUT)	PM PEAK (IN)	PM PEAK (OUT)
Take Away Food and Drink Premises	40%	36	36	36	36

The estimated drop-in trips generated by the proposed development have been split into diverted and undiverted drop in trips in-line with GARID, and are documented in **Table 4-3**.

Table 4-3 Development Traffic Generation – Drop-In Trips

LAND USE	DROP-IN TRIPS	AM PEAK (IN)	AM PEAK (OUT)	PM PEAK (IN)	PM PEAK (OUT)
Take Away Food and Drink Premises	Diverted 25%	23	23	23	23
	Undiverted 35%	31	31	31	31
Total		54	54	54	54

As outlined in **Table 4-3** above, the proposed development will generate 108 drop-in vehicle trips (combined in and out) during both peak periods. It is considered likely that the adjacent intersection of Aura Boulevard and Graf Drive is designed to accommodate significant growth in the precinct and is likely to include an interim and ultimate form which would adequately cater for the proposed development traffic associated with this development as well as the fully developed sites in precinct 3, 4 and 5. As such, further analysis of the adjacent Aura Boulevard / Graf Drive signalised intersection is considered unnecessary.

4.3 ULTIMATE DEVELOPMENT AND SURROUNDING ROAD NETWORK

As outlined in **Section 4.1**, it should also be noted that due to:

- Ongoing residential and commercial expansion of Aura (Caloundra South);
- Ultimate construction of the Bells Creek Arterial / Aura Boulevard interchange; and
- Bells Creek Arterial link to the Bruce Highway at the Roys Road interchange.

Current traffic volumes and travel patterns would not accurately represent future traffic distributions throughout the surrounding road network and, as such, the collection of traffic count data and more detailed analysis would not reasonably represent movements expected upon completion of this development site.

The development site is located within Precinct 5 of the approved Plan of Development, as described in the “Aura Staged Model Data Request” memo from PricewaterhouseCoopers, dated 8 October 2018. The memo is attached in **Appendix E** and an extract of the study area is shown in **Figure 4-2**.

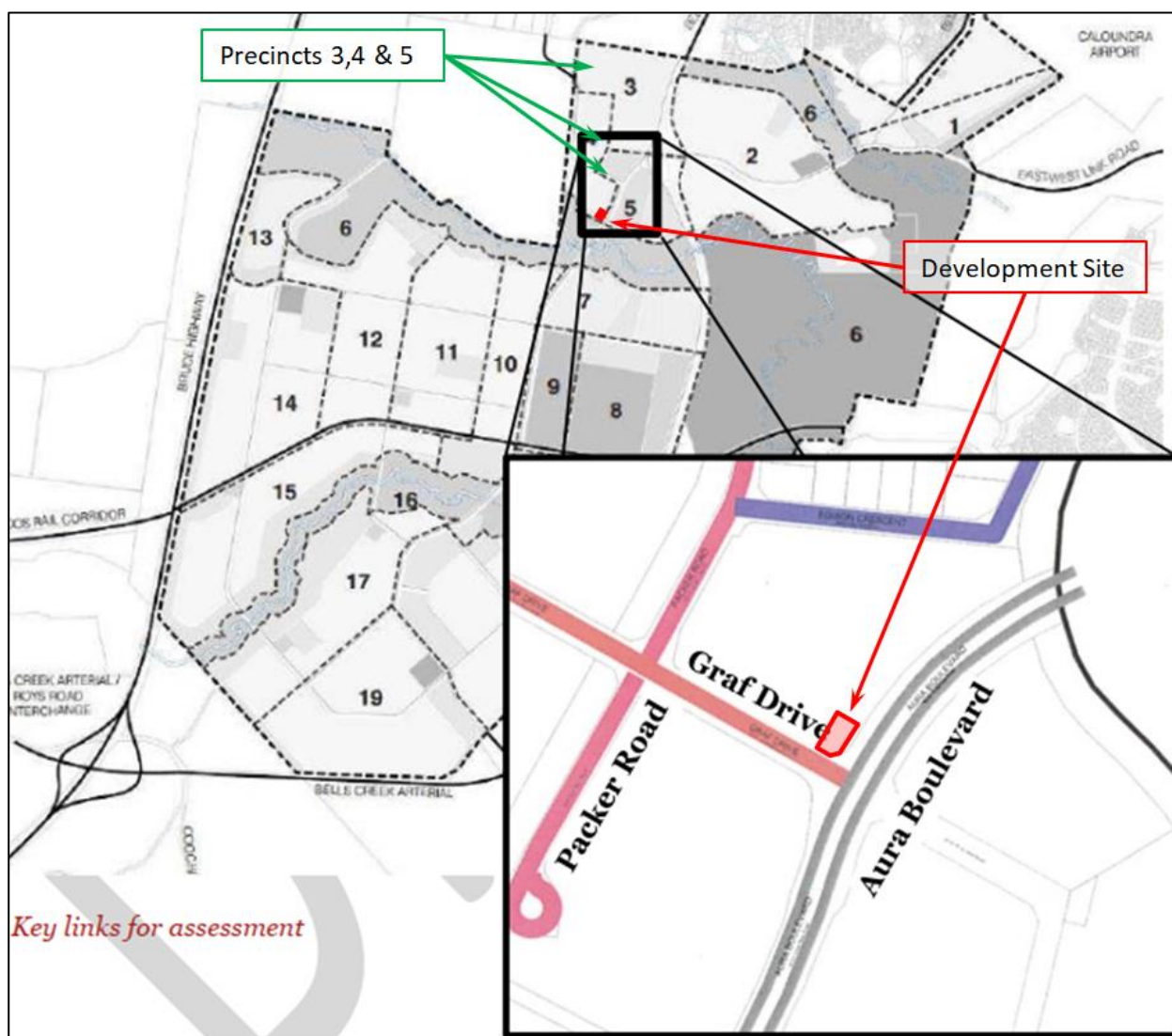


Figure 4-2 Caloundra South Priority Development Area. Source: PricewaterhouseCoopers

The memo presents assumptions on the “Proportion Build by Year” and shows that the sum for precincts, 3, 4 & 5 to be an estimated 35.4% constructed by 2021.

Precinct	Landuse	NDA (ha)	Proportion Build by Year				Full build year
			By 2020	2021	2022	2023	
3	Industry and business (non-residential)	26	47%	60%	72%	84%	2025
4	Industry and business (non-residential)	19	0%	0%	0%	0%	2026
5	Showroom (non-residential)	20	25%	38%	51%	63%	2026
3 - 5	All	65	26.6%	35.4%	44.2%	53.1%	2026

Figure 4-3 Proportion Build Year. Source: PricewaterhouseCoopers

The memo further discusses the approved Plan of Development and states the following:

The “Ultimate Caloundra South Transport Model (UCSTM)” was developed by MWH Australia (MWH) on behalf of Stockland and approved in November 2013 by Transport and Main Roads (TMR), Sunshine Coast Regional Council (SCRC) and Economic Development Queensland (EDQ). The UCSTM assumed full development of Aura. Following the UCSTM development, MWH developed staged models to assist Stockland in its interim planning tasks. These were developed to forecast traffic demand in 2016, 2018, 2022 and 2031”.

“Updated Road Volumes” are discussed and a “summary of the adjusted 2021 link volumes and “Annual Average Weekday Traffic (AAWT)” is presented in a table.

The table, shown in **Figure 4-4** estimates an anticipated weekday traffic volume of 5,978 vpd, however due to the low development density as can be seen in **Figure 4-1** we believe that the estimated traffic volumes for 2021 have not yet been achieved.

Road	Direction	Period	Volume
Graf Drive	Eastbound	AM Peak Hour	155
		PM Peak Hour	401
	Westbound	AM Peak Hour	439
		PM Peak Hour	200
	Two Way	AAWT	5,978
Aura Boulevard (North of Graf Dr)	Northbound	AM Peak Hour	278
		PM Peak Hour	737
	Southbound	AM Peak Hour	818
		PM Peak Hour	354
	Two Way	AAWT	10,935
Aura Boulevard (South of Graf Dr)	Northbound	AM Peak Hour	131
		PM Peak Hour	314
	Southbound	AM Peak Hour	345
		PM Peak Hour	162
	Two Way	AAWT	4,757

Figure 4-4 Estimated 2020/21 Traffic volumes. Source: PricewaterhouseCoopers

The PDA anticipates full development in 2026 and the road network has been designed to accommodate the 2021 and ultimate 2026 development traffic, as such no additional analysis of the road network is required.

5. SUMMARY

Lambert & Rehbein (SEQ) Pty Ltd has been commissioned by McDonald's Australia Pty Ltd for the proposed development of a food and drink outlet at the intersection of Aura Boulevard and Graf Drive, Baringa (Caloundra South), described as Lot 345 on SP308153 (Future Lot 9000 and Lot 1) - referred as the 'development site'.

The development site consists of a Greenfield site located at the intersection of Aura Boulevard and Graf Drive. The site will gain access to the wider road network, via one (1) crossover on Graf Drive.

The proposed site layout, prepared by PA Architects, has been included in **Appendix A**.

The dual drive-through facility of the proposed McDonald's food and drink outlet will also provide provision for 15 vehicles to queue from the server, one window for coffee pickup and two (2) waiting bays beyond the server, as illustrated in the drawing attached in **Appendix B**, generally in accordance with the approved Plan of Development Design Criteria Section 3.5.

The minimum parking requirement for the proposed development is 25 parking spaces. The proposed development provides 51 parking spaces, including 1 PWD parking space, which equates to a surplus of 26 parking spaces against the approved Plan of Development, Section 3.2.3 requirements.

A swept path assessment has been undertaken to demonstrate the successful manoeuvrability of the largest design vehicle, a 14 Pallet Articulated Vehicle (AV). In addition a swept path assessment of a JJ Richards rear loading waste collection vehicle has also been undertaken for the purpose of refuse collection. Both vehicles will access and exit the site in forward gear via right turn movements at the Graf Drive crossover as illustrated in **Appendix C**.

Additional traffic associated with the proposed development has been forecasted using the RMS (formally RTA) Guide to Traffic Generating Developments for the development land uses. The development was found to generate a total of 180 trips during each peak hour.

As outlined in **Section 4.1** & **Section 4.3**, it should also be noted that due to:

- Ongoing residential and commercial expansion of Aura (Baringa);
- Ultimate construction of the Bells Creek Arterial / Aura Boulevard interchange; and
- Bells Creek Arterial link to the Bruce Highway at the Roys Road interchange.

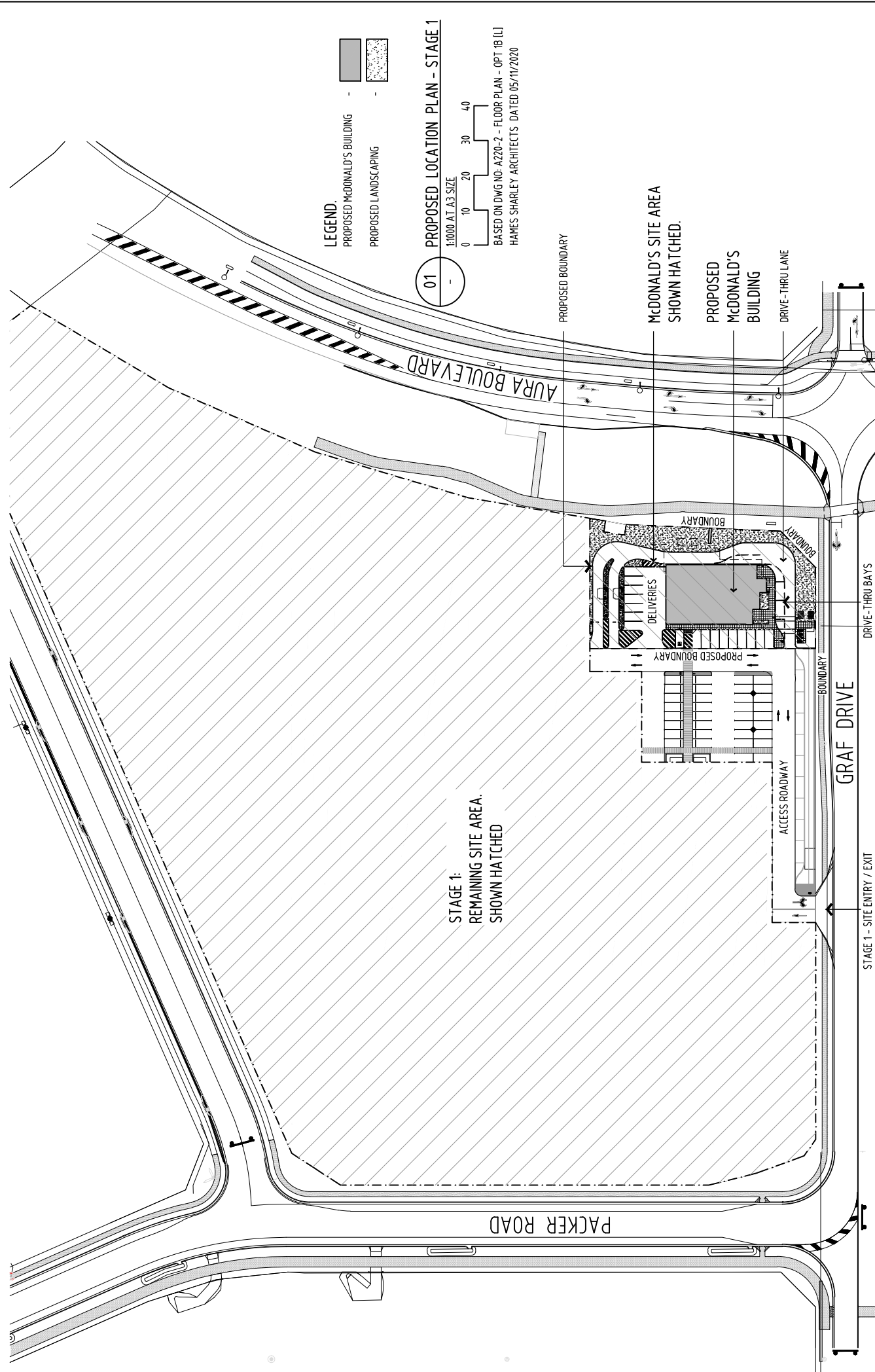
Current traffic volumes and travel patterns would not accurately represent future traffic distributions throughout the surrounding road network and, as such, the collection of traffic count data and more detailed analysis would not reasonably represent movements expected upon completion of this development site.

As discussed in **Section 4.3**, the table shown in **Figure 4-4** shows an anticipated weekday traffic volume of 5,978vpd, however due to the low development density as can be seen in **Figure 4 1**, we believe that the estimated traffic volumes for 2021 have not yet been achieved.

The modelling presented by PricewaterhouseCoopers anticipates a "Full build year" in 2026 and the road network has been designed to accommodate the 2021 and ultimate 2026 development traffic, as such no additional analysis of the road network is required.

We do not believe that any traffic and transport engineering matters have been identified that should preclude approval of the proposed development.

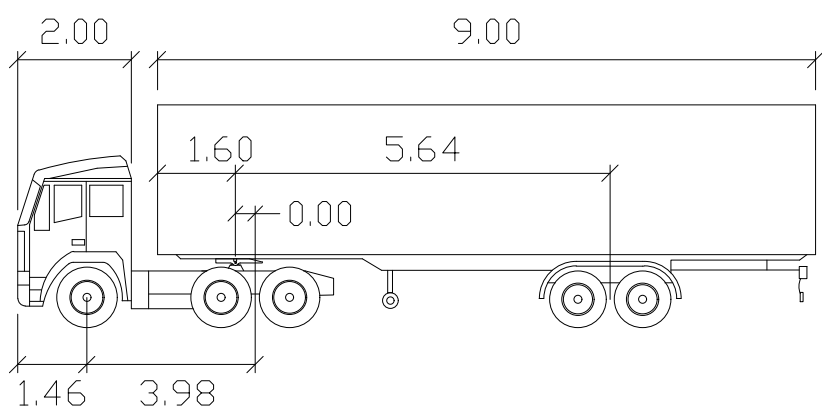
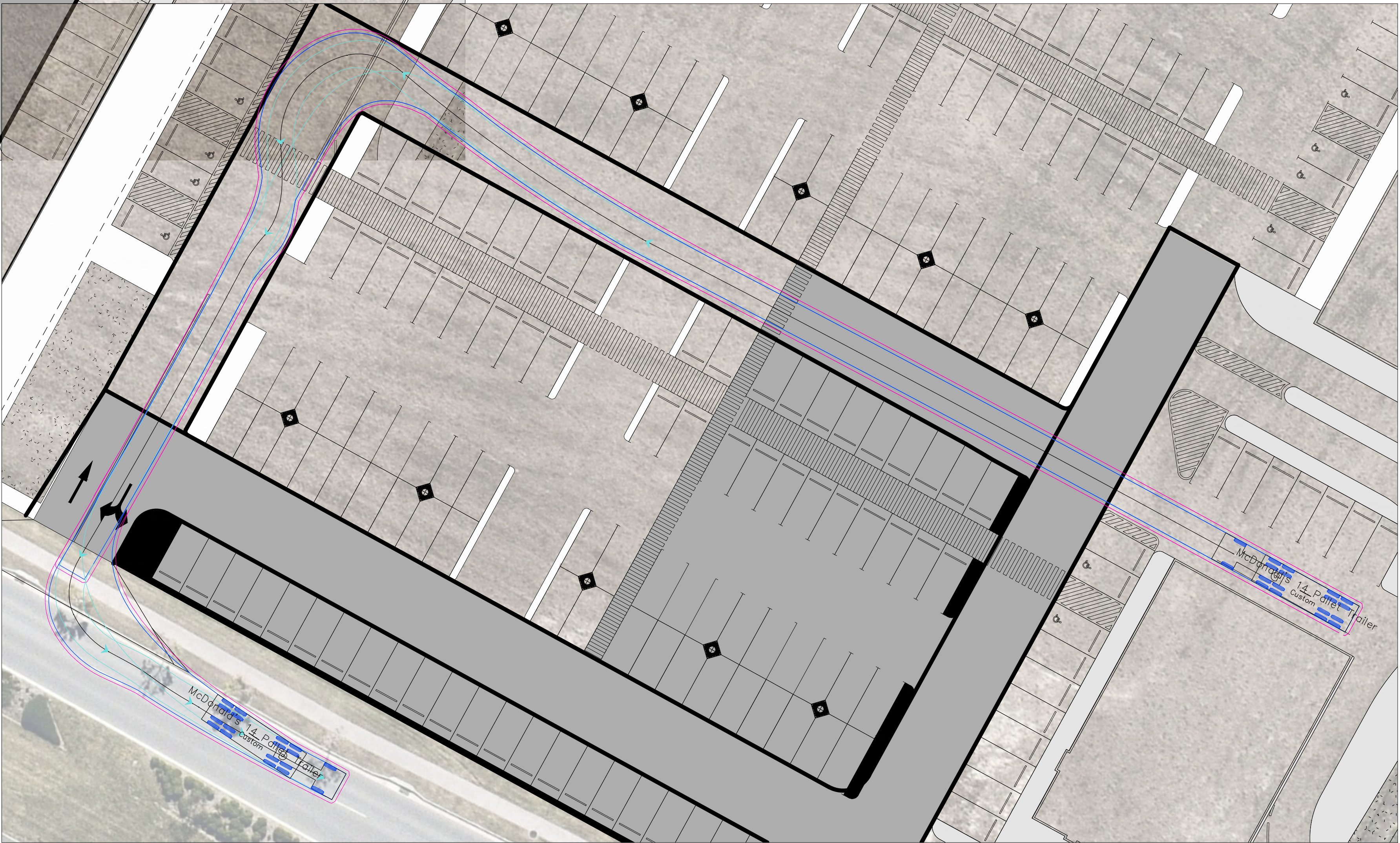
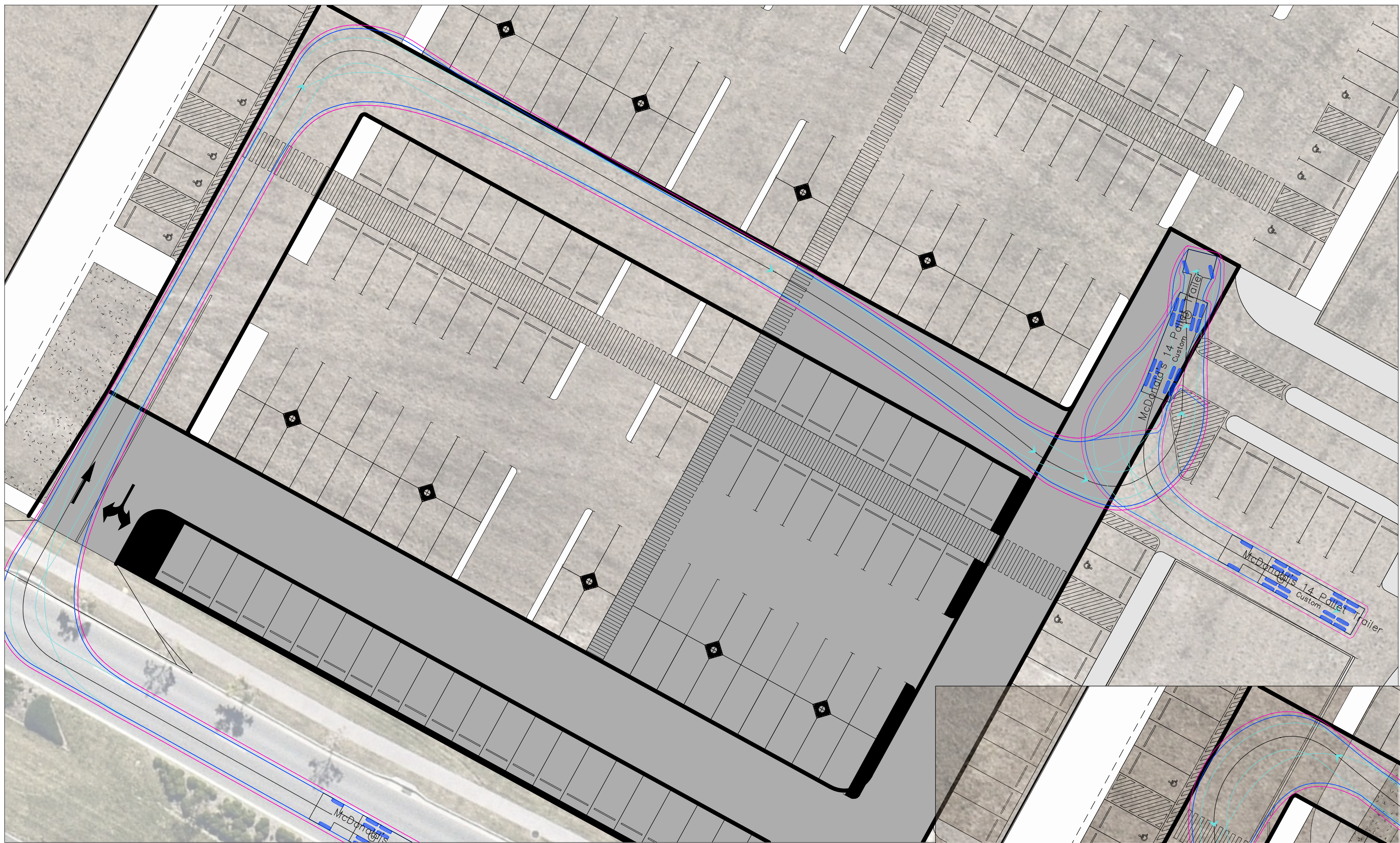
APPENDIX A – SITE LAYOUT



REV	AMENDMENT	DATE	INT	NOTES
				4. FIGURE DIMENSIONS ARE TO BE USED 5. THE DRAWING SHOWS DESIGN INTENT ONLY. CONTACT ARCHITECT FOR CLARIFICATION IF DIMENSIONS ARE NOT CLEAR. 6. ALL DISCREPANCIES AND OMISSIONS ON PRIOR TO CONSTRUCTION OR PRODUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MANUFACTURER. 7. THIS IS A COMPUTER GENERATED DRAWING. APPROVAL PRIOR TO COMMENCING WORK. 8. ALL DIMENSIONS ARE IN MILLIMETERS.
A	AMENDED PARKING LAYOUT	10-02-2021	MM	
B	AMENDED PARKING LAYOUT	10-02-2021	MM	
C	IMPROVED SITE PLAN UPDATED	08-07-2021	GB	
D	REMOVE LINEMARKING	15-07-2021	GB	
E	UPDATED DA ISSUE	21-07-2021	GB	

APPENDIX B – VEHICLE QUEUING

APPENDIX C – SWEPT PATH ASSESSMENT



McDonald's 14 Pallet Trailer

	Tractor Width	Trailer Width	Tractor Track	Trailer Track	Lock to Lock Time	Steering Angle	Articulating Angle
metres	: 2.50	: 2.50	: 2.50	: 2.50	: 6.0	: 34.7	: 70.0

CONCEPT ONLY

29 July 2021

0 2 4 6 8 10m

SCALE 1:250 (A1)

Project:
PROPOSED MCDONALD'S - CALOUNDRA SOUTH

Client:
McDonald's Australia Limited

Title:
14 PALLET ARTICULATED VEHICLE
SWEEP PATH ASSESSMENT

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The Association of
Consulting Engineers
Australia

Drawn: FM
Checked: DN
Approved:

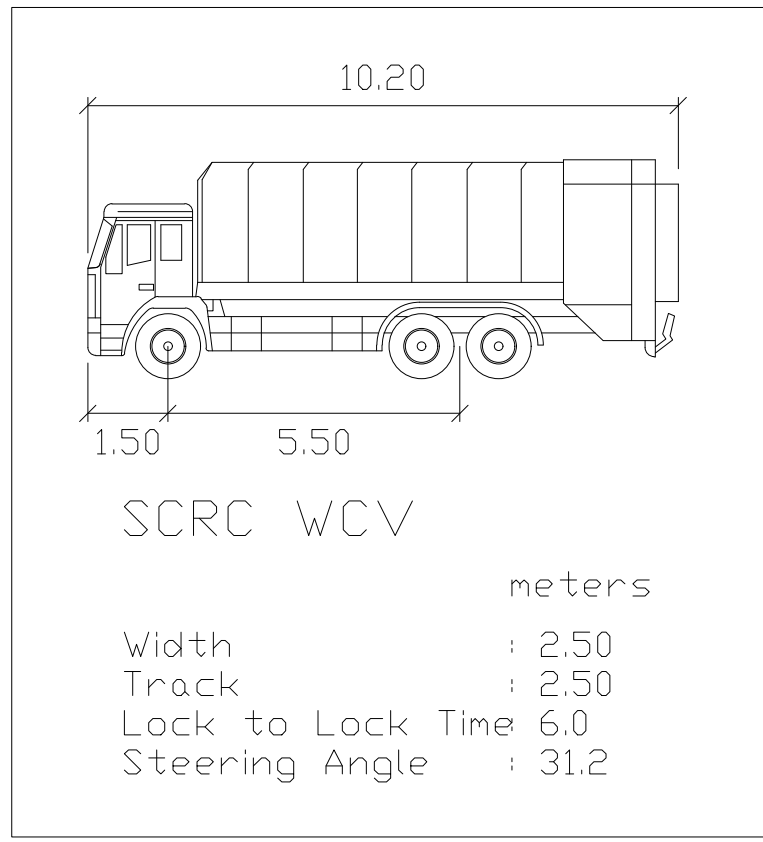
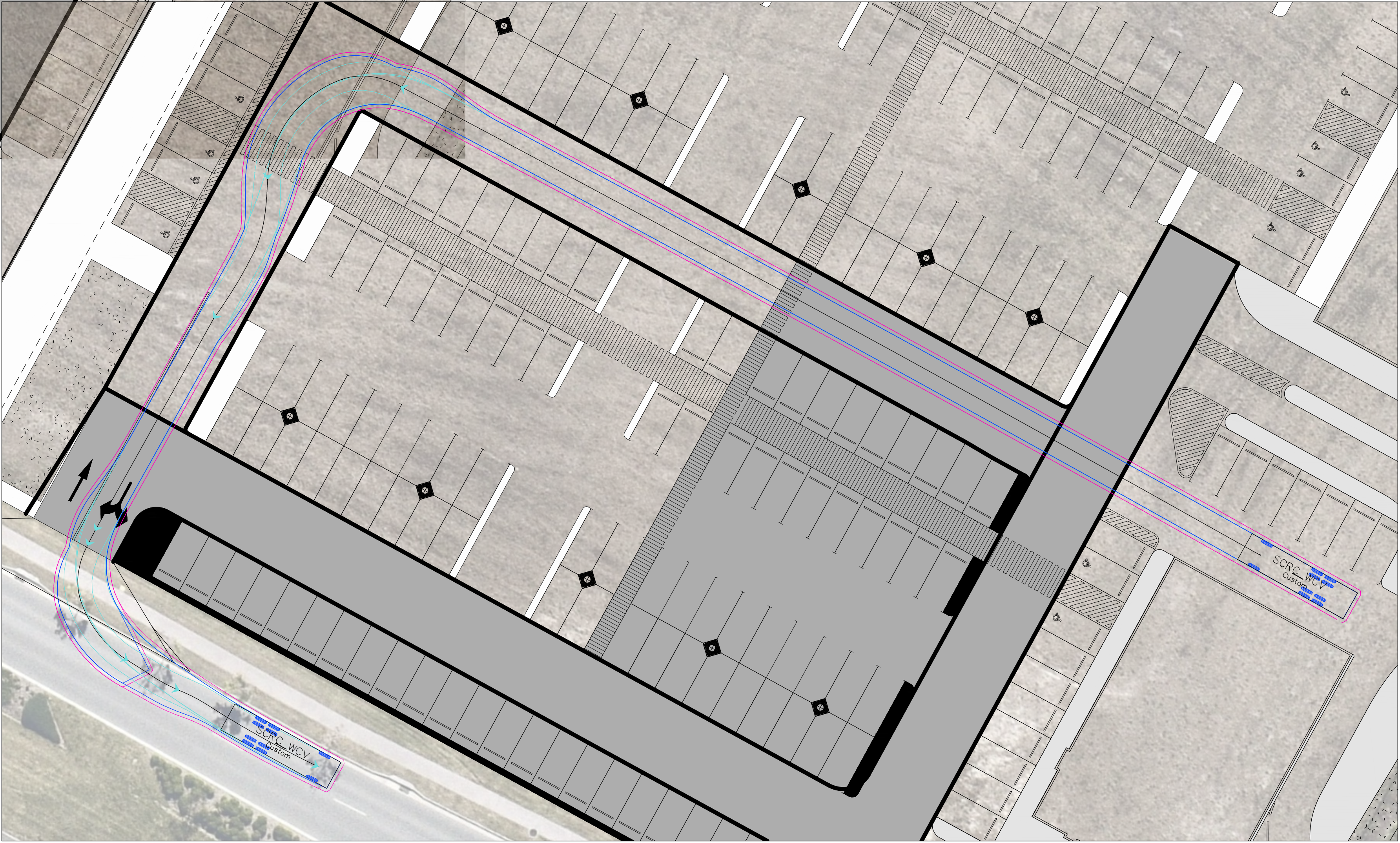
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Rev. Date
A 29/07/21

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Size
A1



Width : 2.50
Track : 2.50
Lock to Lock Time : 6.0
Steering Angle : 31.2

meters

CONCEPT ONLY

29 July 2021

0 2 4 6 8 10m

SCALE 1:250 (A1)

Project:
PROPOSED MCDONALD'S - CALOUNDRA SOUTH

Client:
McDonald's Australia Limited

Title:
SCRC REAR LOADING WASTE COLLECTION VEHICLE (WCV)
SWEEP PATH ASSESSMENT

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS

CBD HOUSE
LEVEL 3, 120 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
P.O. BOX 112 FORTITUDE VALLEY QLD 4006

TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL: info@l-r.net.au
A.C.N. 010 451 902

The Association of
Consulting Engineers
Australia

Drawn: FM

Checked: DN

Approved:

Rev.

Date

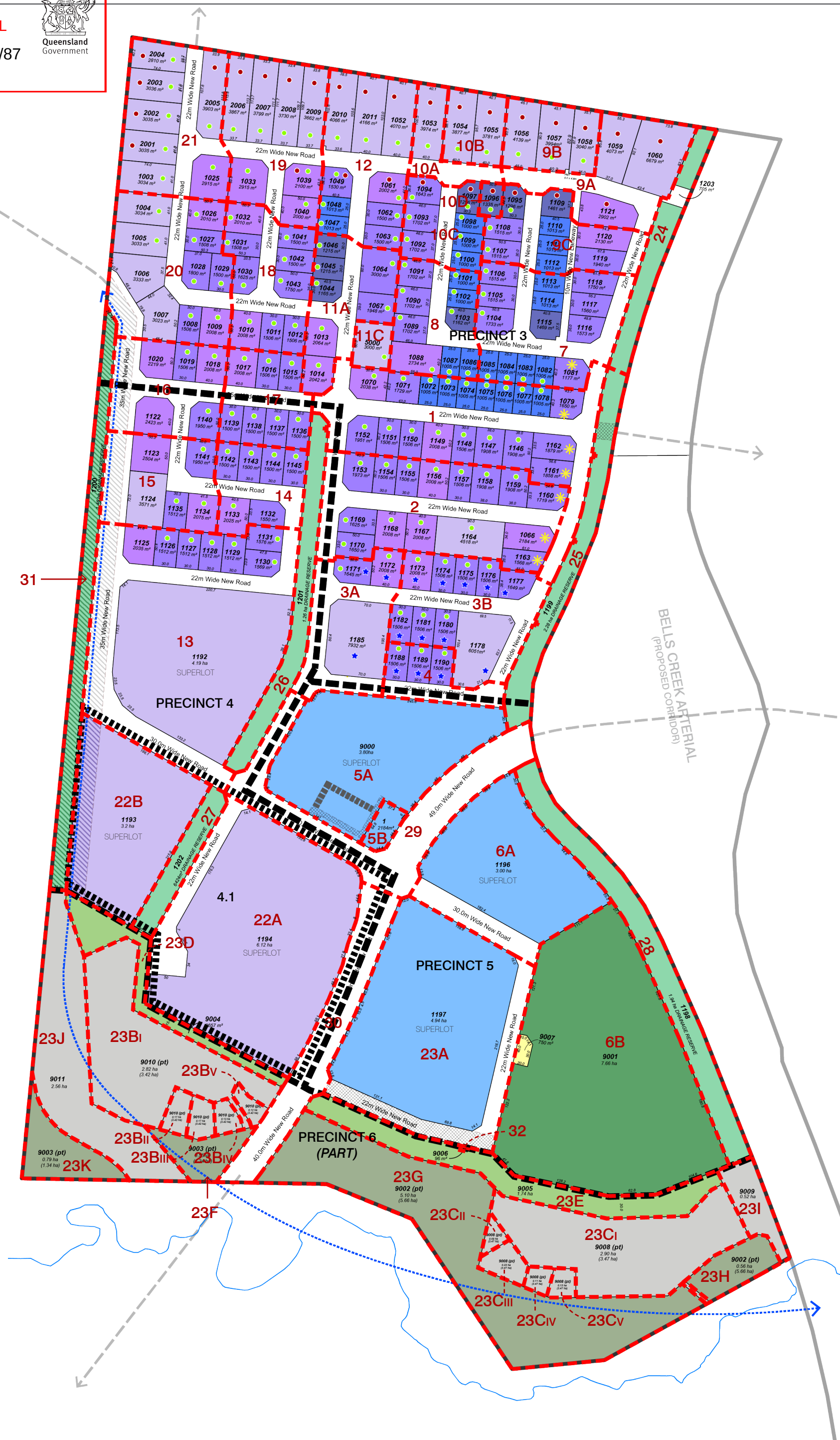
Figure No:
B21310-SK-002

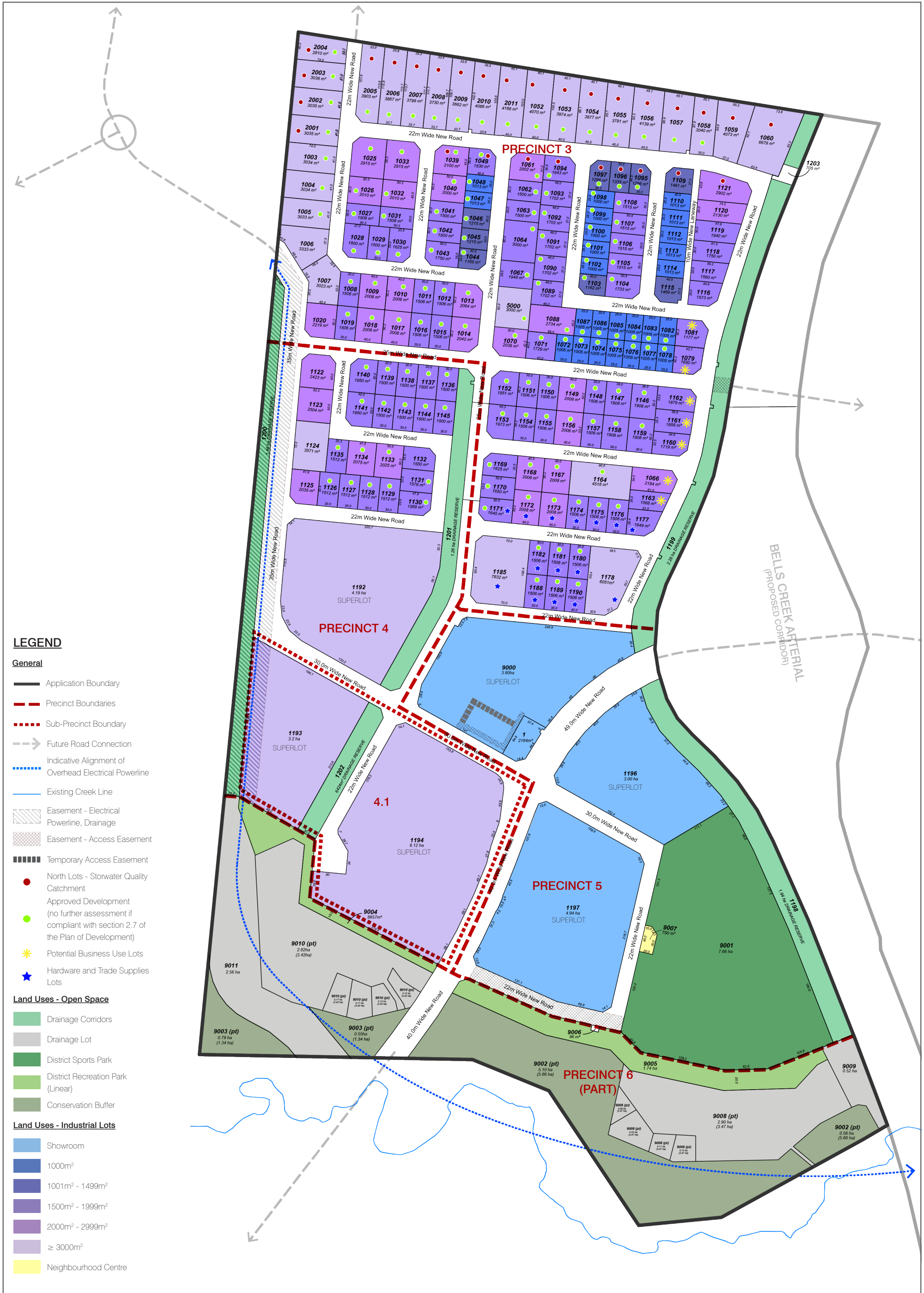
Scale: AS SHOWN

File Ref: SEE BELOW

A1
Sheet
Size

APPENDIX D – APPROVED PLAN OF DEVELOPMENT MAPS





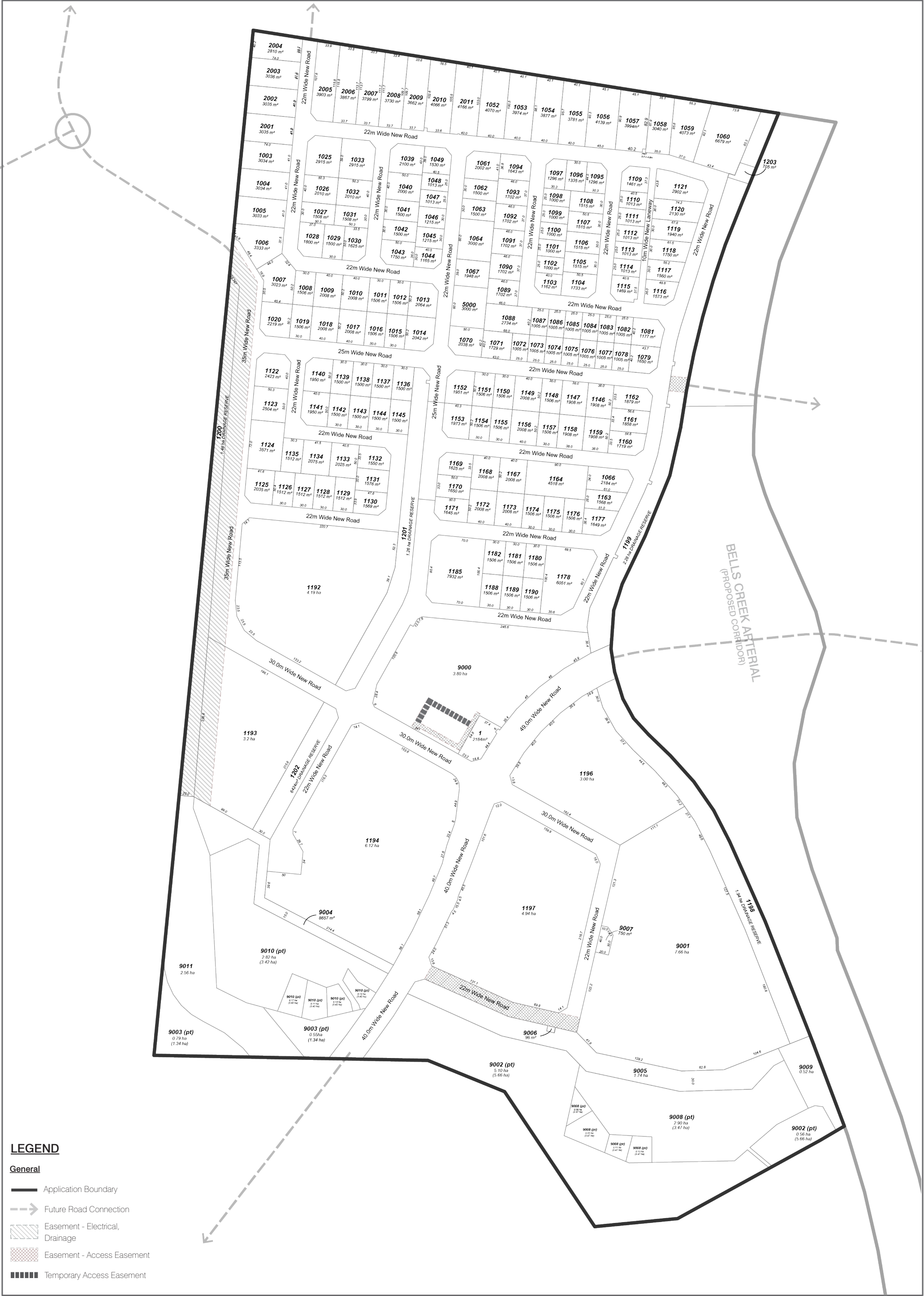
LEGEND

- General**
- Application Boundary
 - Precinct Boundaries
 - Sub-Precinct Boundary
 - Future Road Connection
 - Indicative Alignment of Overhead Electrical Powerline
 - Existing Creek Line
 - Easement - Electrical Powerline, Drainage
 - Easement - Access Easement
 - Temporary Access Easement
 - North Lots - Stowater Quality Catchment
 - Approved Development (no further assessment if compliant with section 2.7 of the Plan of Development)
 - Potential Business Use Lots
 - Hardware and Trade Supplies Lots

- Land Uses - Open Space**
- Drainage Corridors
 - Drainage Lot
 - District Sports Park
 - District Recreation Park (Linear)
 - Conservation Buffer

- Land Uses - Industrial Lots**
- Showroom
 - 1000m²
 - 1001m² - 1499m²
 - 1500m² - 1999m²
 - 2000m² - 2999m²
 - ≥ 3000m²
 - Neighbourhood Centre





LEGEND

- General**
- Application Boundary
 - Future Road Connection
 - Easement - Electrical, Drainage
 - Easement - Access Easement
 - Temporary Access Easement



CALOUNDRA SOUTH - PRECINCTS 3-6

Reconfiguration of a Lot Plan

SCALE: 1:5000 @ A3

0 50 100 150 200 250

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PROJECT NO: BD0348

DATE: 05.07.2021

DRAWING NO: POD

REV: ZJ



LEGEND

- General**
- Application Boundary
 - Indicative Alignment of Overhead Electrical Powerline
 - Future Road Connection (by others)
 - Easement - Electrical, Drainage
 - Easement - Access Easement
 - Temporary Access Easement
- Land Uses**
- Drainage Corridors
 - Drainage Lot
 - District Sports Park
 - District Recreation Park (Linear)
 - Conservation Buffer

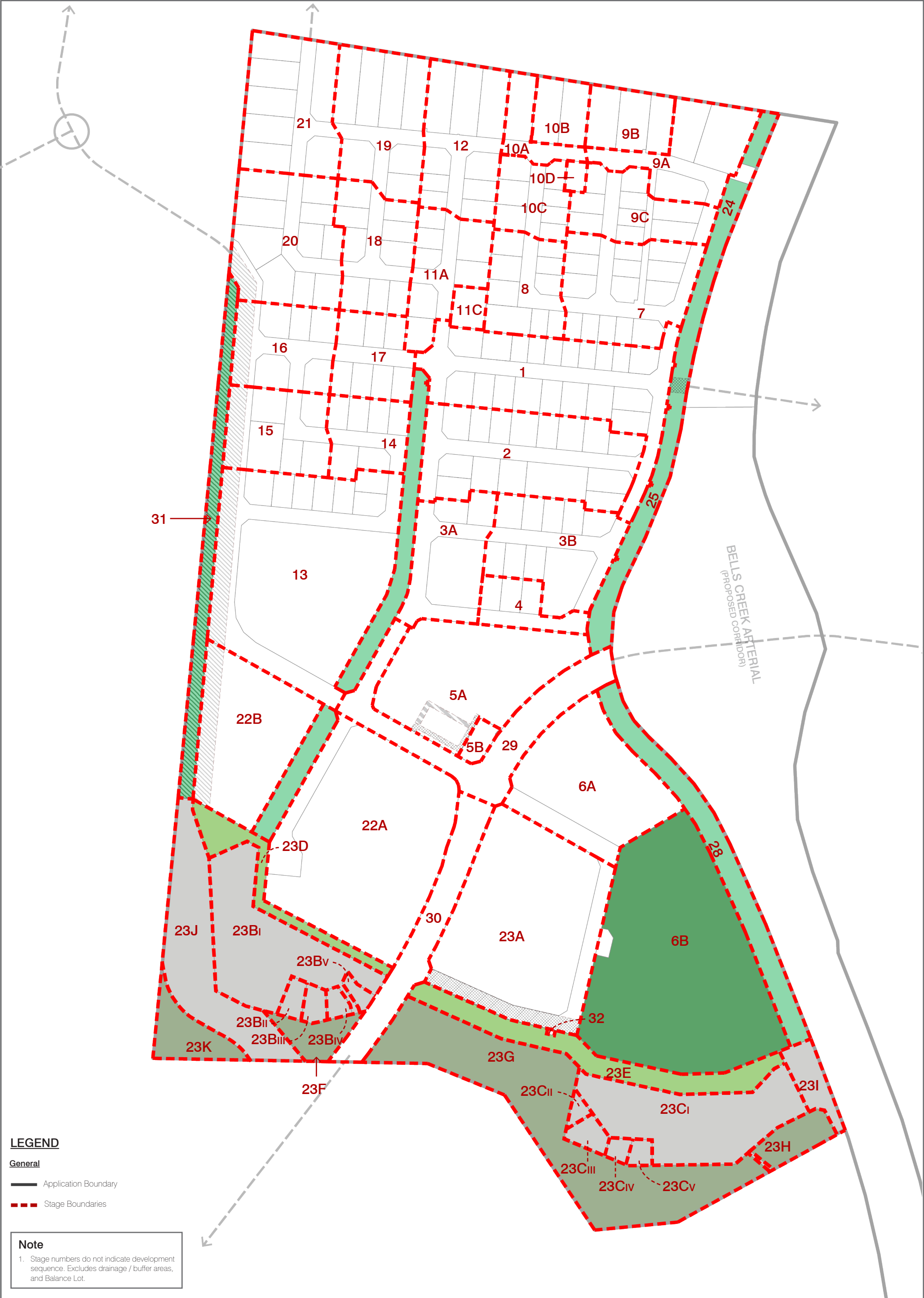


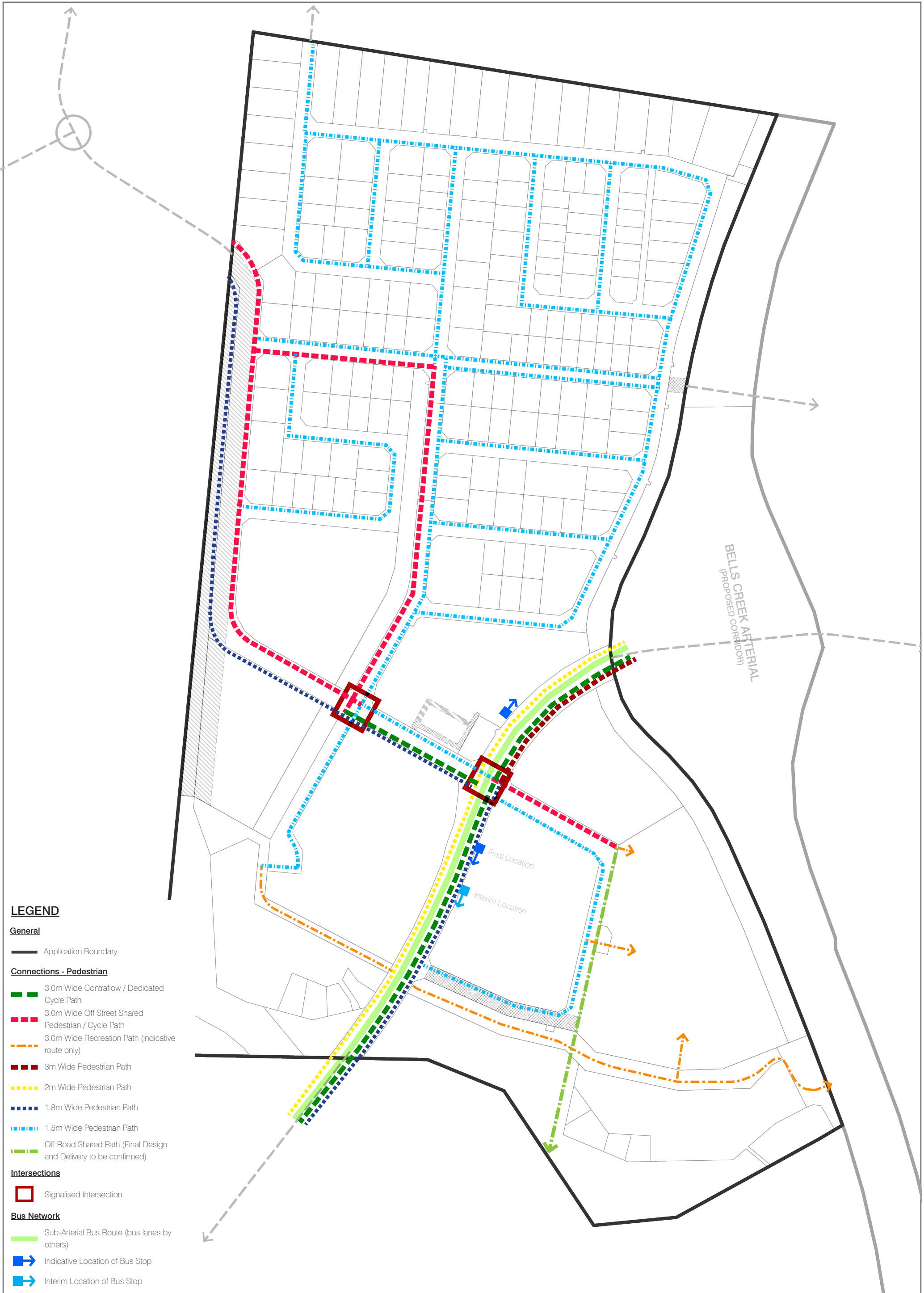
CALOUNDRA SOUTH - PRECINCTS 3-6
Subdivision - Fixed Elements

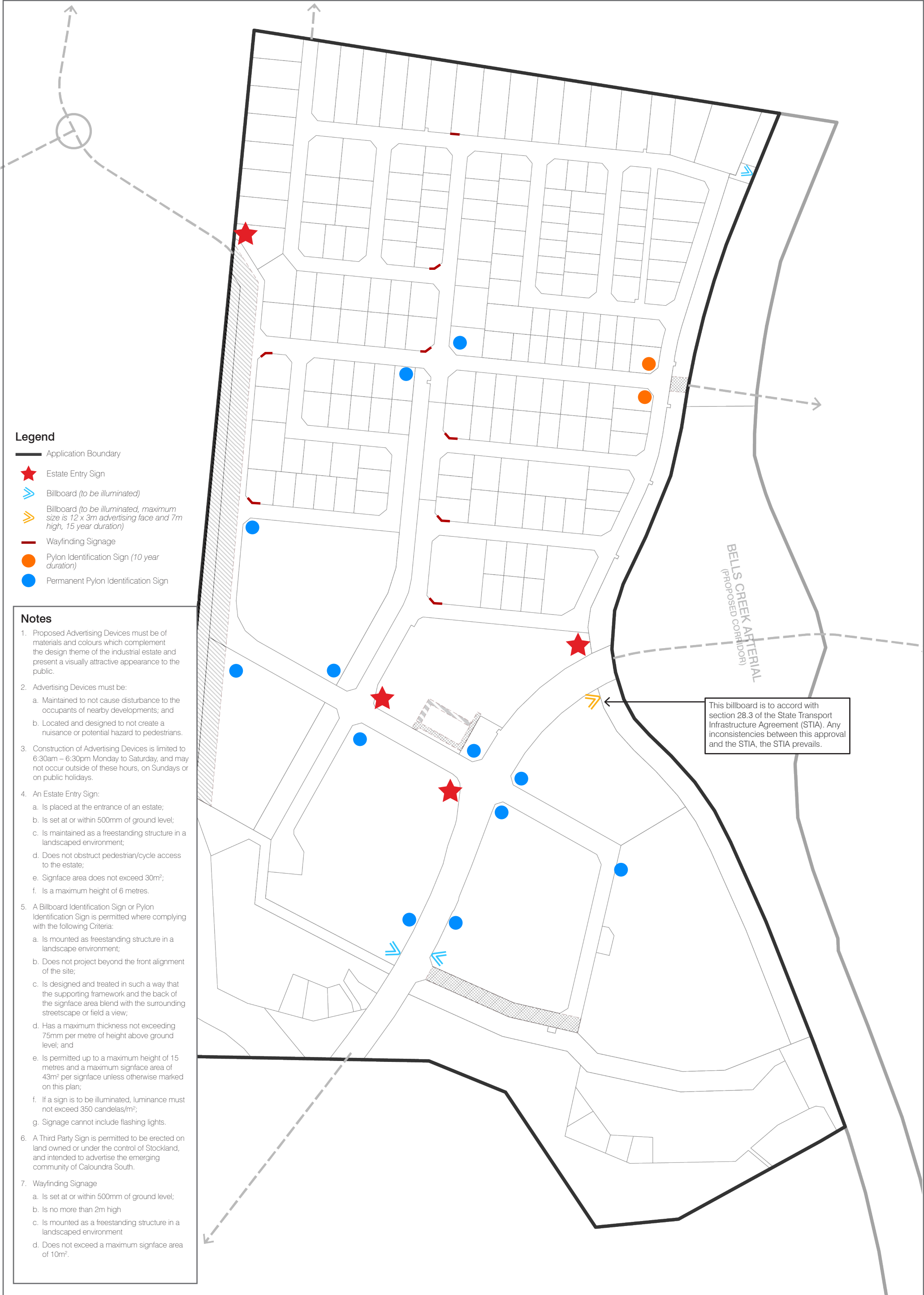
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PROJECT NO: BD0348
DATE: 05.07.2021
DRAWING NO: POD
REV: V







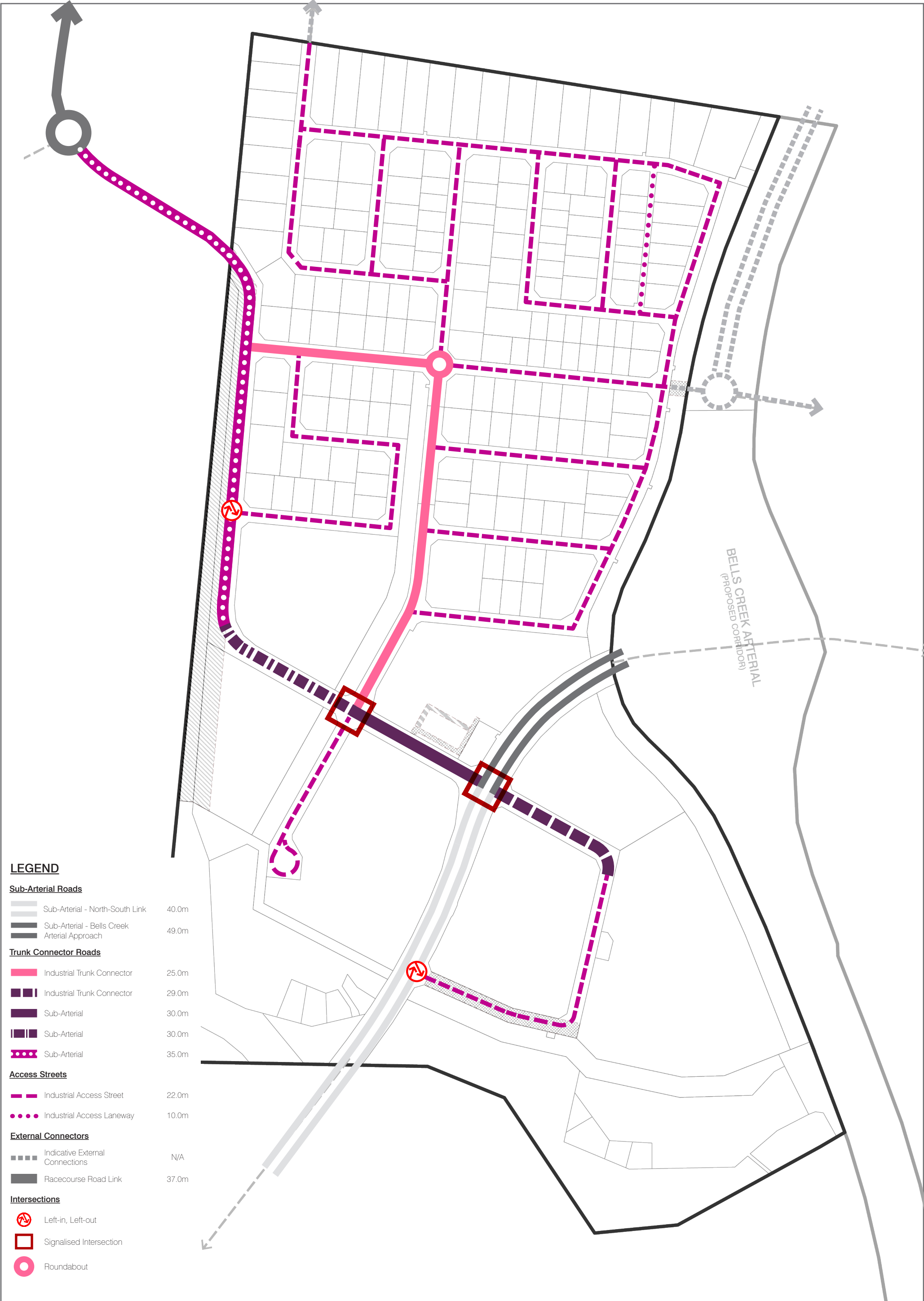
Legend

- Application Boundary
- Estate Entry Sign
- Billboard (to be illuminated)
- Billboard (to be illuminated, maximum size is 12 x 3m advertising face and 7m high, 15 year duration)
- Wayfinding Signage
- Pylon Identification Sign (10 year duration)
- Permanent Pylon Identification Sign

Notes

- Proposed Advertising Devices must be of materials and colours which complement the design theme of the industrial estate and present a visually attractive appearance to the public.
- Advertising Devices must be:
 - Maintained to not cause disturbance to the occupants of nearby developments; and
 - Located and designed to not create a nuisance or potential hazard to pedestrians.
- Construction of Advertising Devices is limited to 6:30am – 6:30pm Monday to Saturday, and may not occur outside of these hours, on Sundays or on public holidays.
- An Estate Entry Sign:
 - Is placed at the entrance of an estate;
 - Is set at or within 500mm of ground level;
 - Is maintained as a freestanding structure in a landscaped environment;
 - Does not obstruct pedestrian/cycle access to the estate;
 - Signface area does not exceed 30m²;
 - Is a maximum height of 6 metres.
- A Billboard Identification Sign or Pylon Identification Sign is permitted where complying with the following Criteria:
 - Is mounted as freestanding structure in a landscape environment;
 - Does not project beyond the front alignment of the site;
 - Is designed and treated in such a way that the supporting framework and the back of the signface area blend with the surrounding streetscape or field a view;
 - Has a maximum thickness not exceeding 75mm per metre of height above ground level; and
 - Is permitted up to a maximum height of 15 metres and a maximum signface area of 43m² per signface unless otherwise marked on this plan;
 - If a sign is to be illuminated, luminance must not exceed 350 candelas/m²;
 - Signage cannot include flashing lights.
- A Third Party Sign is permitted to be erected on land owned or under the control of Stockland, and intended to advertise the emerging community of Caloundra South.
- Wayfinding Signage
 - Is set at or within 500mm of ground level;
 - Is no more than 2m high
 - Is mounted as a freestanding structure in a landscaped environment
 - Does not exceed a maximum signface area of 10m².

This billboard is to accord with section 28.3 of the State Transport Infrastructure Agreement (STIA). Any inconsistencies between this approval and the STIA, the STIA prevails.



LEGEND

Sub-Arterial Roads

	Sub-Arterial - North-South Link	40.0m
	Sub-Arterial - Bells Creek	49.0m
	Arterial Approach	

Trunk Connector Roads

	Industrial Trunk Connector	25.0m
	Industrial Trunk Connector	29.0m
	Sub-Arterial	30.0m
	Sub-Arterial	30.0m
	Sub-Arterial	35.0m

Access Streets

	Industrial Access Street	22.0m
	Industrial Access Laneway	10.0m

External Connectors

	Indicative External Connections	N/A
	Racecourse Road Link	37.0m

Intersections

	Left-in, Left-out
	Signalised Intersection
	Roundabout



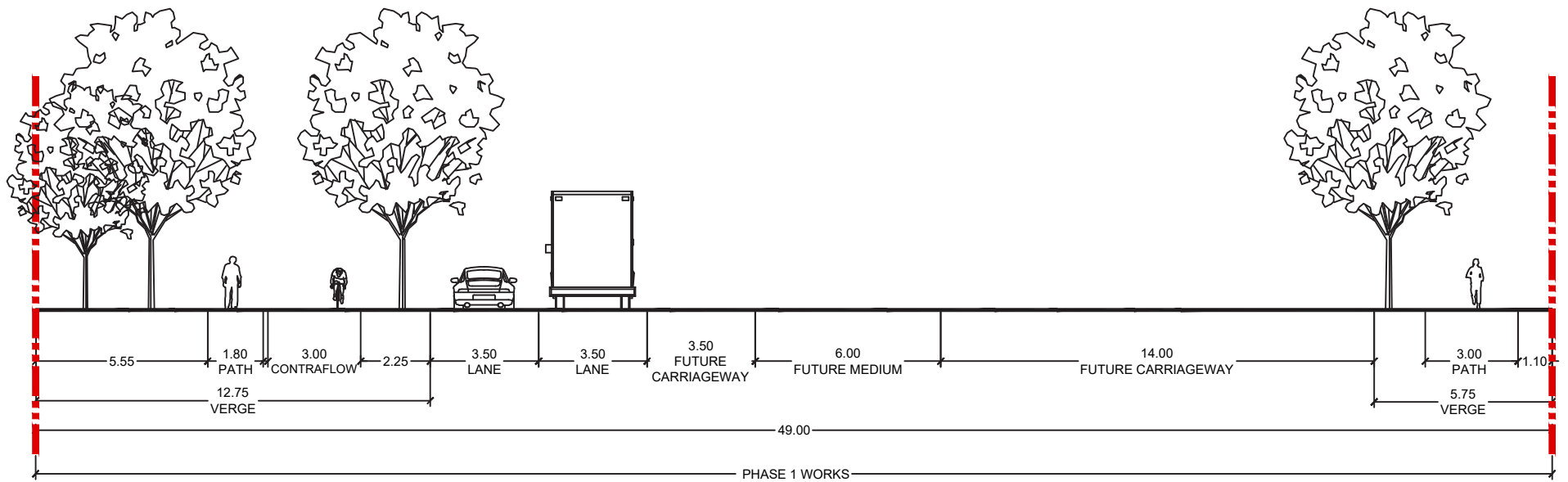
CALOUNDRA SOUTH - PRECINCTS 3-6

Road Hierarchy

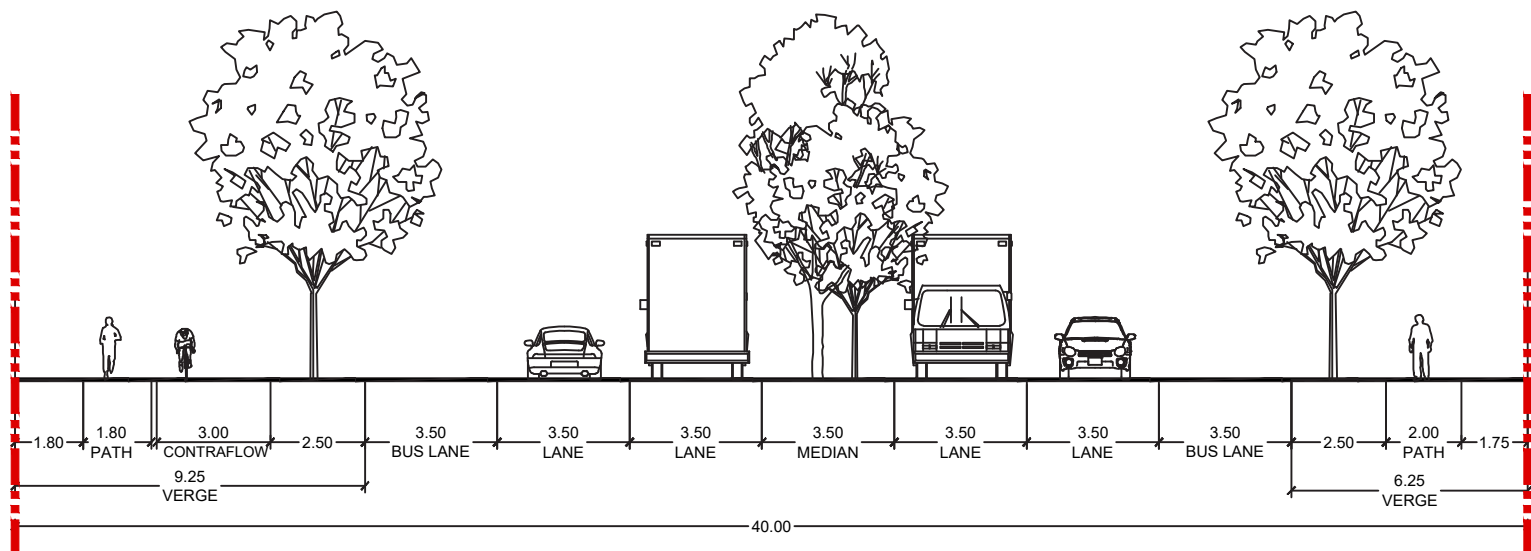
SCALE: 1:5000 @ A3
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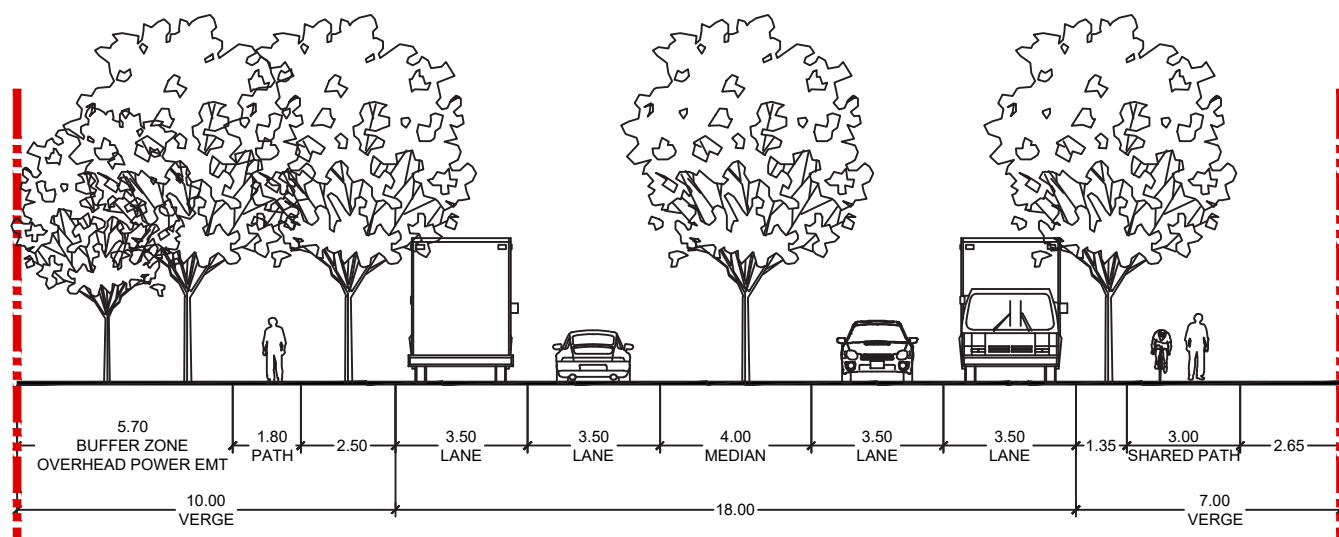
PROJECT NO: BD0348
DATE: 05.07.2021
DRAWING NO: POD
REV: ZH



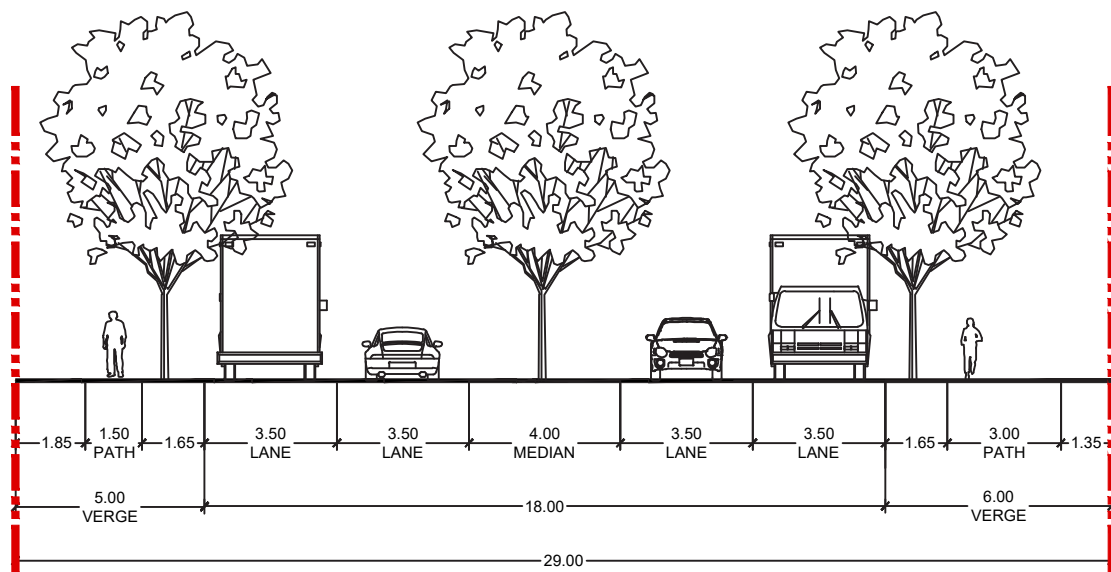
SUB-ARTERIAL - BELLS CREEK ARTERIAL APPROACH
(MEDIAN AND VERGE WIDTH VARIES)



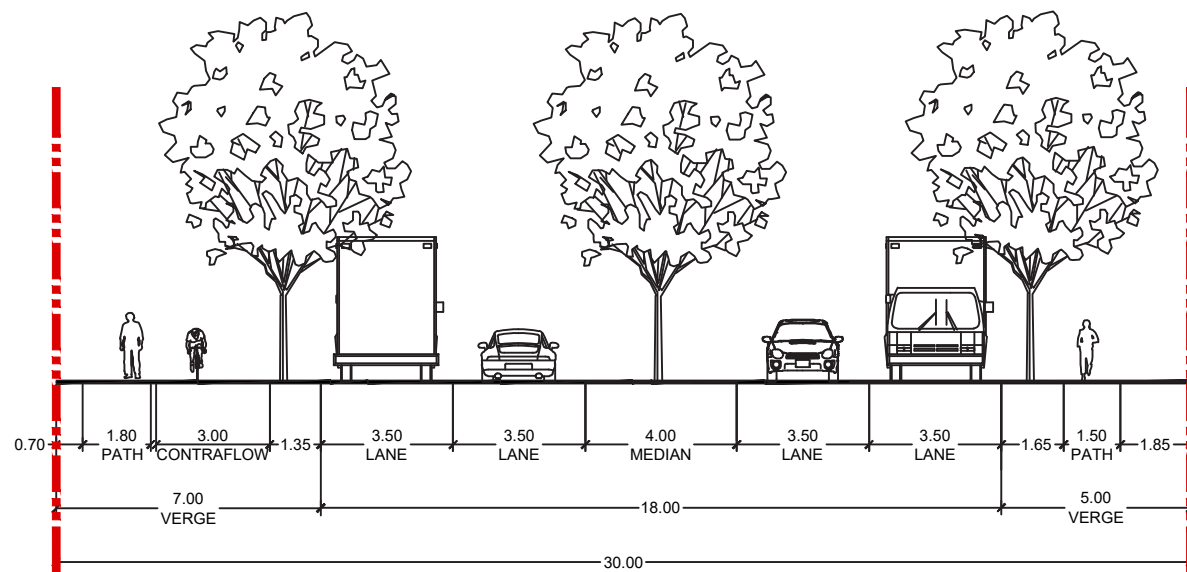
SUB-ARTERIAL - NORTH-SOUTH LINK (40m WIDE)



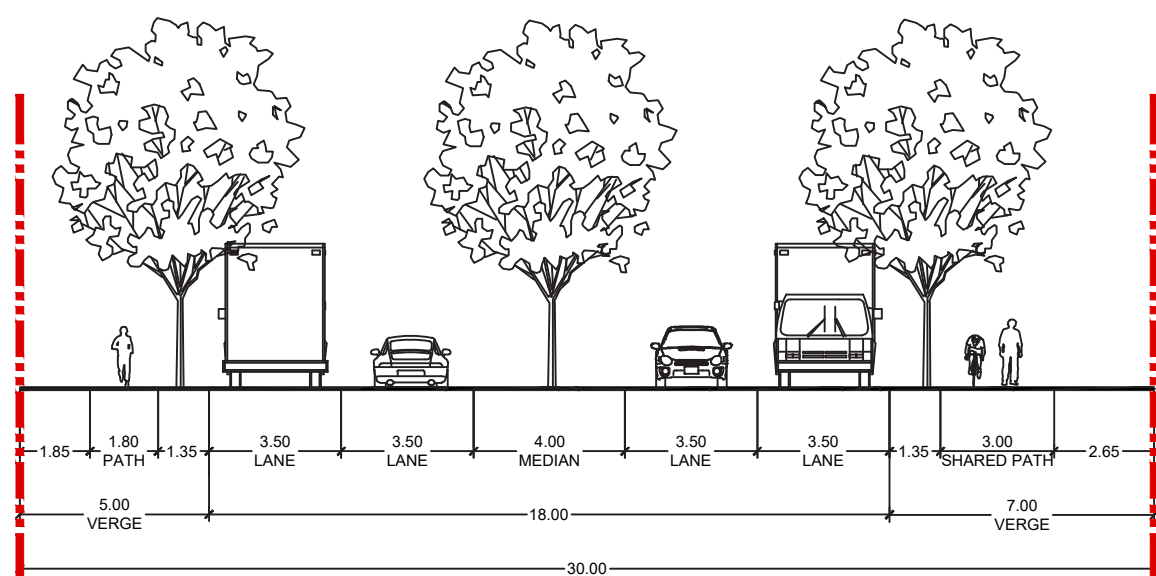
SUB-ARTERIAL (35m WIDE)



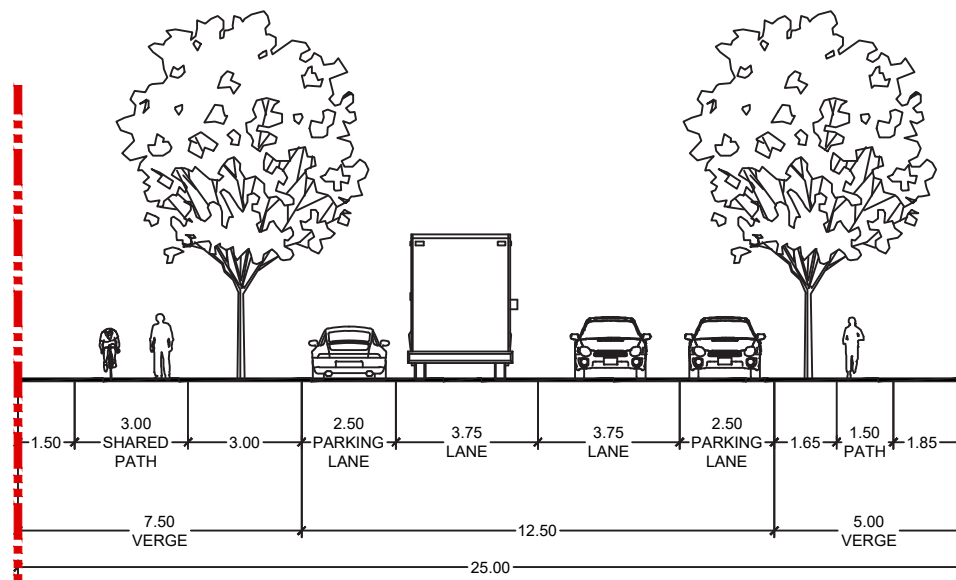
■■■ INDUSTRIAL TRUNK CONNECTOR (29m WIDE)



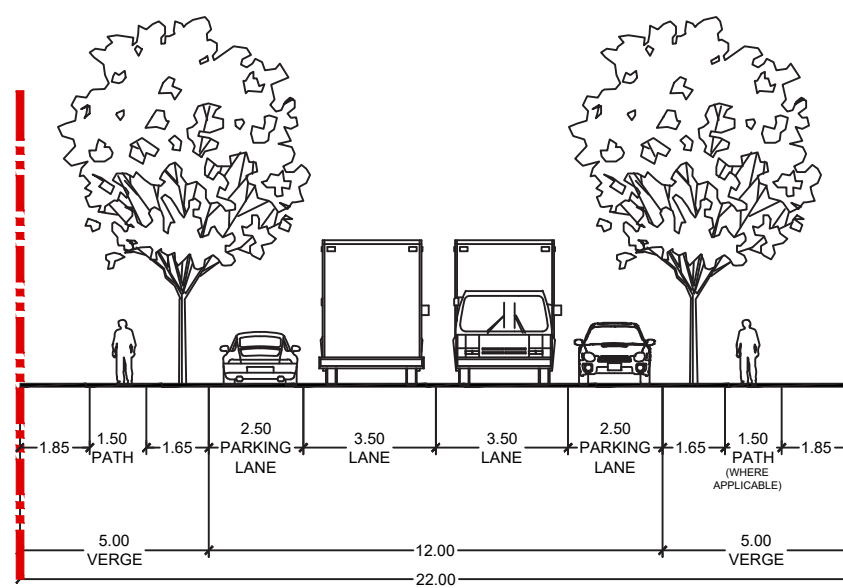
■■■■ SUB-ARTERIAL (30m WIDE)



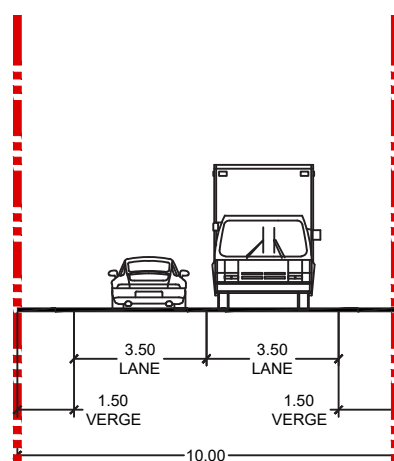
■■■■ SUB-ARTERIAL (30m WIDE)



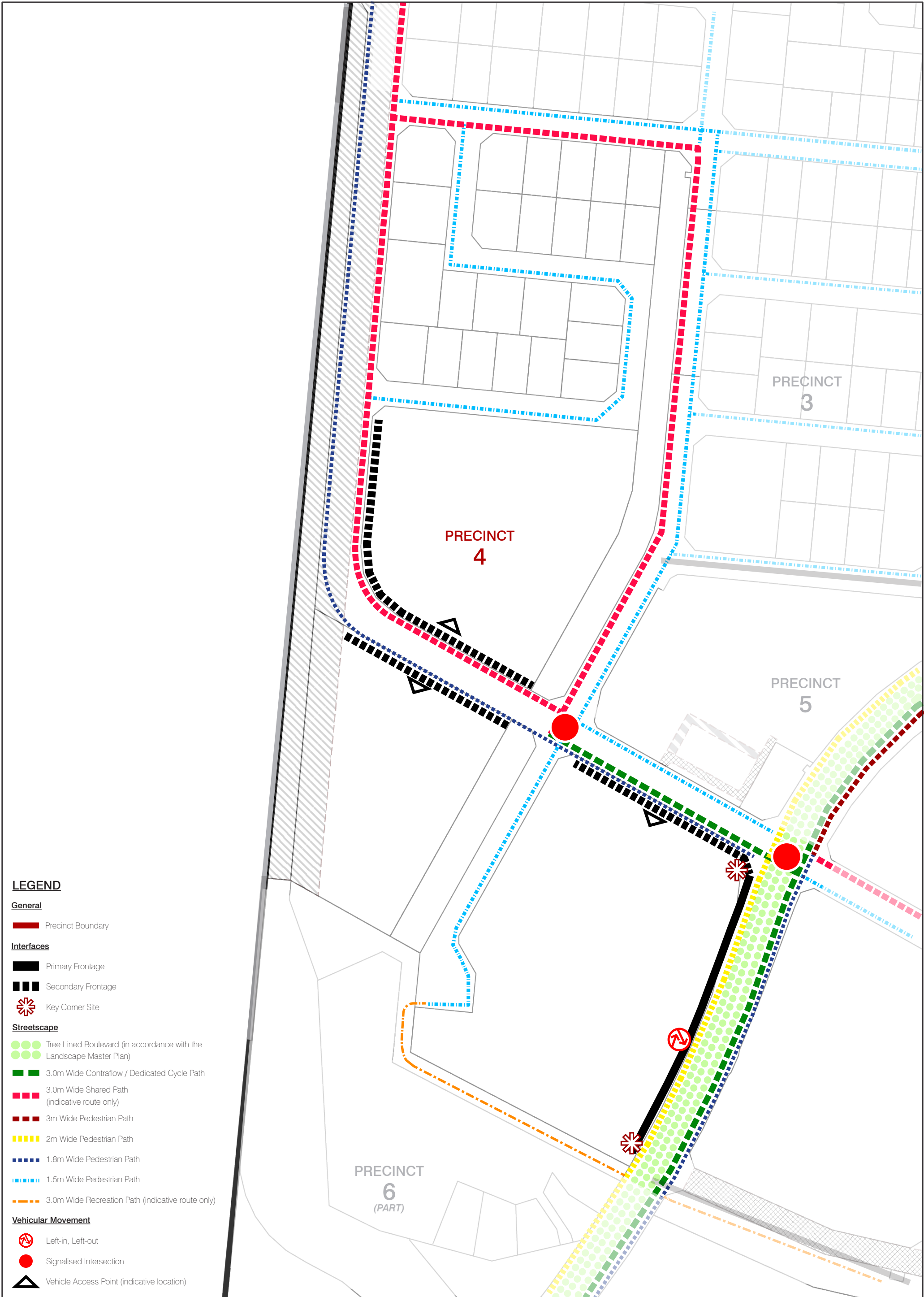
INDUSTRIAL TRUNK CONNECTOR (25m WIDE)

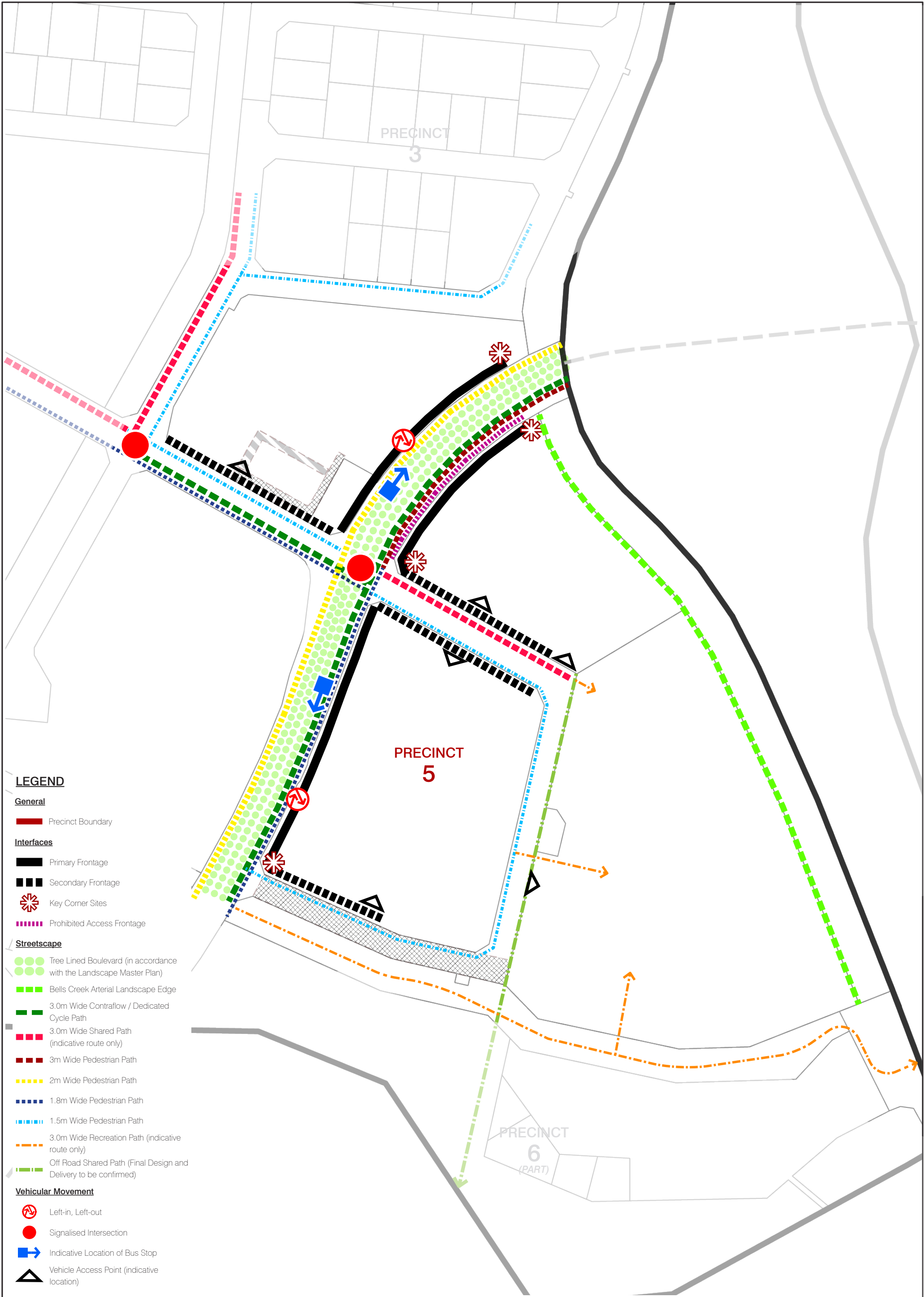


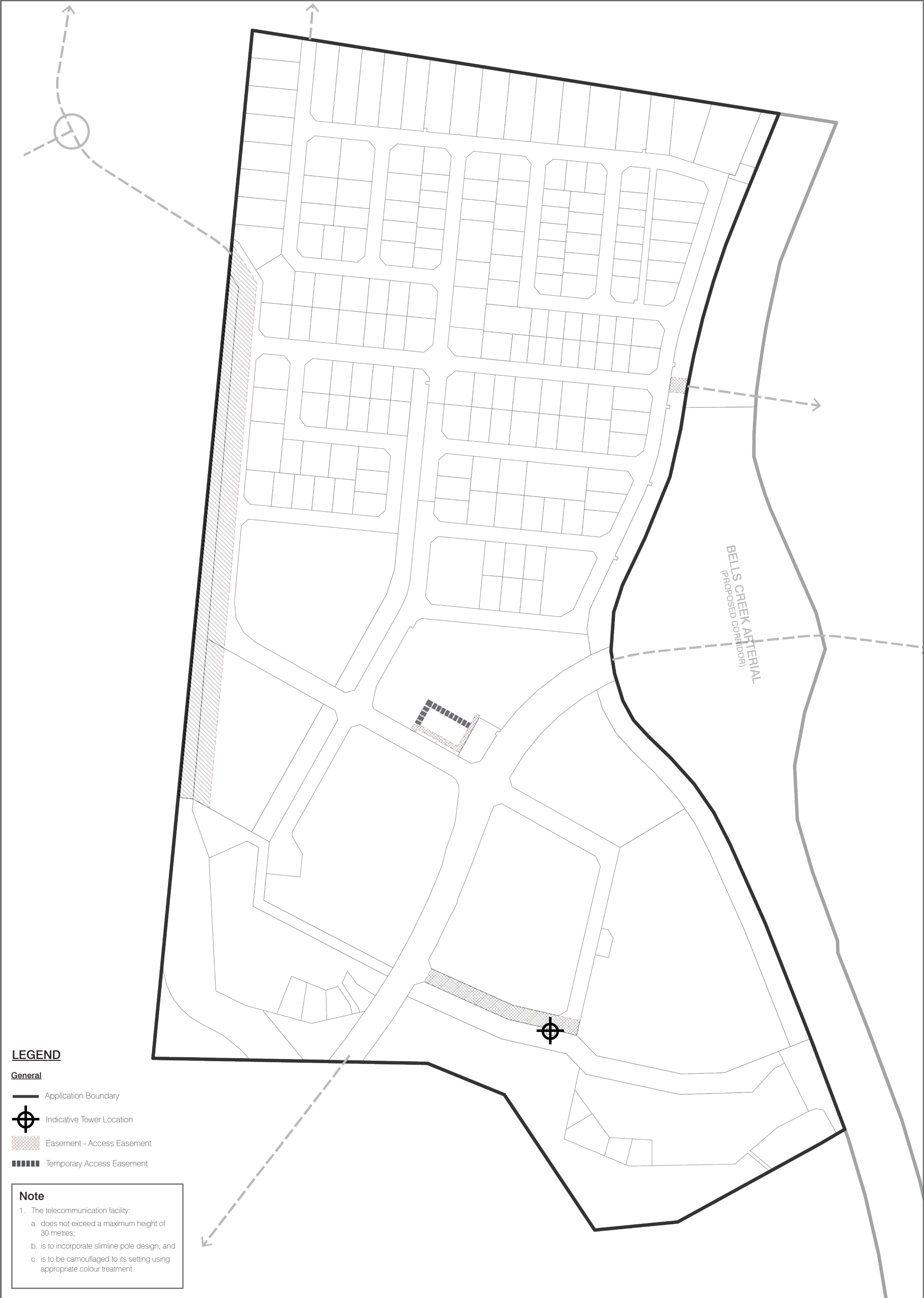
INDUSTRIAL ACCESS STREET (22.0m WIDE)

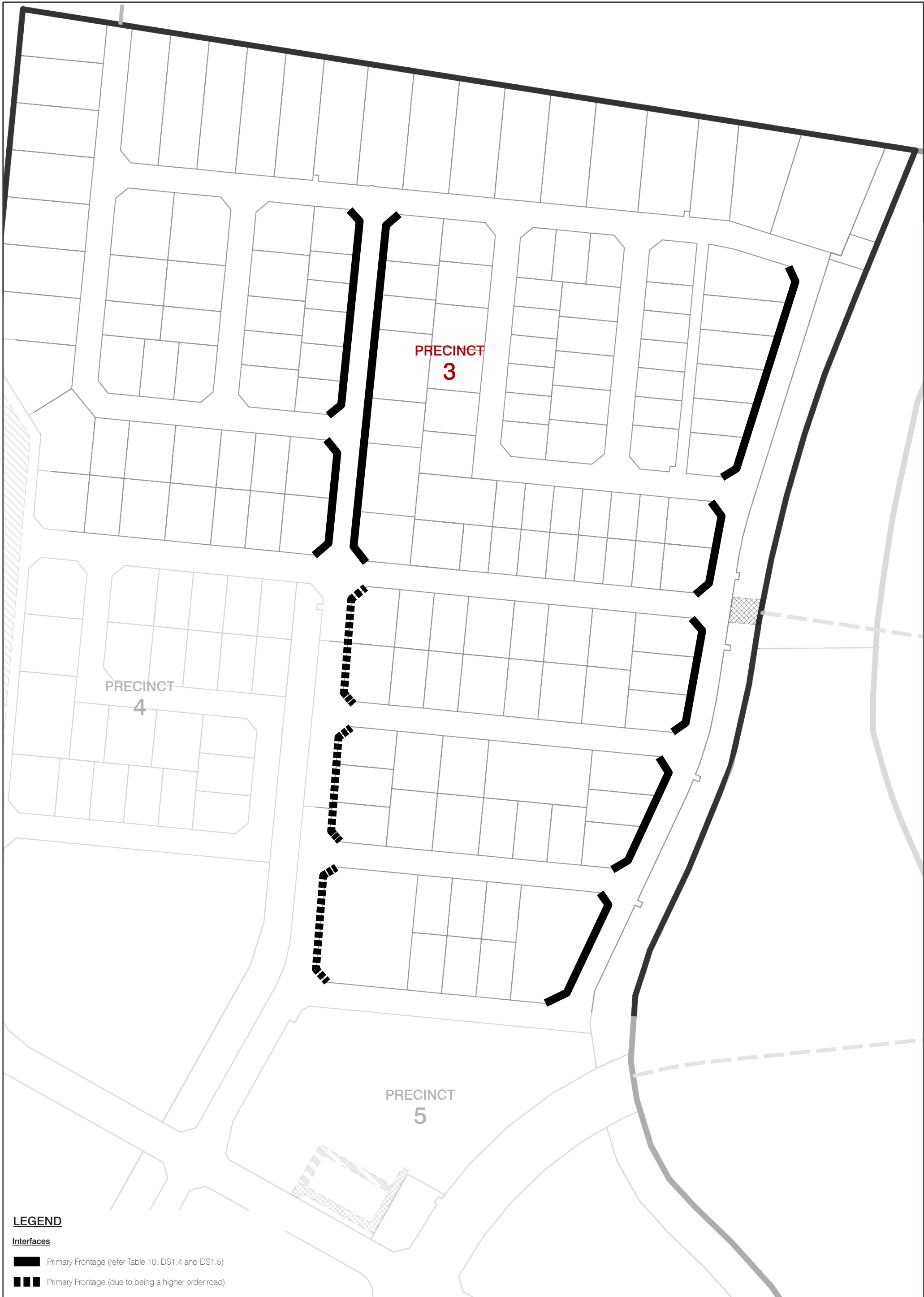


INDUSTRIAL ACCESS LANEWAY (10m WIDE)









LEGEND

Interfaces

Primary Frontage (refer Table 10, DS1.4 and DS1.5)

Primary Frontage (due to being a higher order road)



CALOUNDRA SOUTH - PRECINCTS 3-6

Plan of Development - Precinct 3

SCALE: 1:3000 @ A3

0 25 50 75 100 125 150



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PROJECT NO: BD0348

DATE: 05.07.2021

DRAWING NO: POD

REV: ZH

APPENDIX E – PRICEWATERHOUSECOOPERS MEMO

Memo

To: / Location: Paul McDonald / Stockland

From: / Location: David Leahy / PwC

Date: 8 October 2018

Subject: Aura Staged Model Data Request

Introduction

The Caloundra South Priority Development Area (PDA) is one of the largest mixed use precincts in Australia, set to house a population of approximately 50,000 persons and provide 20,000 dwellings over the next 30 years. Known as Aura, the site is located to the south of the Caloundra Urban Area on the Sunshine Coast. The Caloundra South PDA has 19 precincts with a broad range of land uses including residential dwellings, retail developments, commercial/showroom precincts, an industrial precinct, integrated sports uses, schools and numerous active transport pathways.

To assess the traffic demand from the development, the Ultimate Caloundra South Transport Model (UCSTM) was developed by MWH Australia (MWH) on behalf of Stockland and approved in November 2013 by Transport and Main Roads (TMR), Sunshine Coast Regional Council (SCRC) and Economic Development Queensland (EDQ). The UCSTM assumed full development of Aura.

Following the UCSTM development, MWH developed staged models to assist Stockland in its interim planning tasks. These were developed to forecast traffic demand in 2016, 2018, 2022 and 2031.

In early 2016 MWH updated the UCSTM in consultation with EDQ, TMR and SCRC and it was subsequently reviewed and approved. The UCSTM was updated to account for the proposed Aura Town Centre as well as changes in Stockland's planning assumptions over time, the updated model is referred to as the Aura Visum Model. This update was only for the ultimate development horizon and did not include changes to the staged models.

This note responds to Stockland's request in regards to forecasted traffic volumes on key links in Precincts 4 and 5 in a forecast year of 2021.

Study Area

Stockland's request specifically focuses on forecast traffic volumes on three key links in 2021 in Precinct 4 and 5; Aura Boulevard, Packer Road and Graf Drive. A summary of these links are shown below in Figure 1.

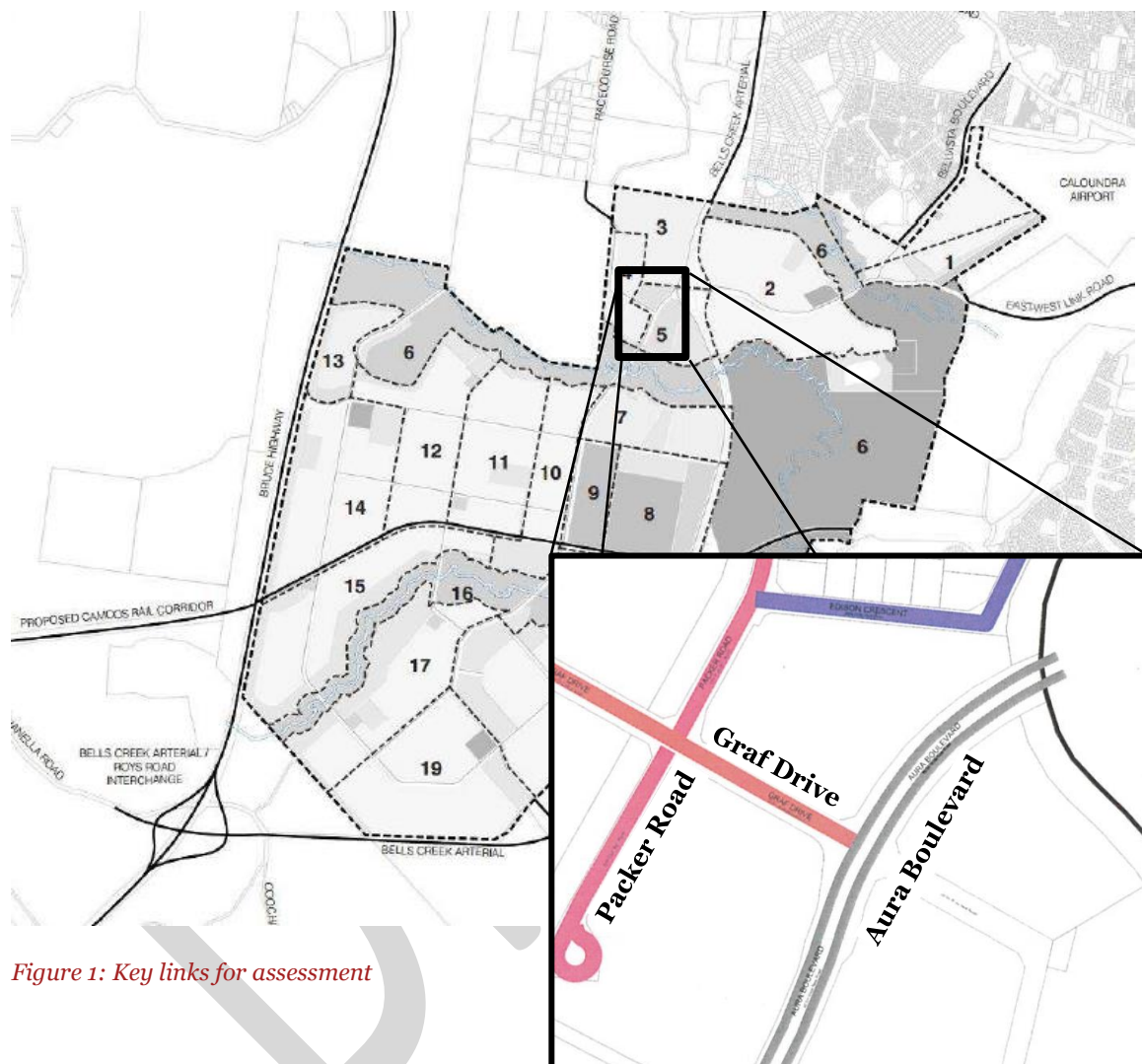


Figure 1: Key links for assessment

Assessment approach and assumptions

Due to the timeframes of this assessment, out of model adjustments will be made to the 2013 staged models to provide updated traffic forecasts. As such the resulting traffic forecasts are indicative only, further confidence in modelling outputs could be achieved through an update to the staged model.

The approach to update the traffic forecasts from the 2022 staged model to provide 2021 road volumes is outlined below:

1. Review of staged model infrastructure assumptions
2. Review landuse assumptions
3. Extract staged model link volumes
4. Adjust road volumes

Each step is further detailed below, including model inputs, assumptions and key link volumes.

Note: Packer Road was not explicitly modelled within the 2022 staged model and therefore has not been included in this analysis.

Staged model infrastructure assumptions

A review of the MWH staged models road infrastructure assumptions was undertaken to ensure they reflect the latest Stockland planning. Through discussions with Stockland the infrastructure assumptions outlined in Table 1 have been assumed for the 2021 assessment year.

Table 1: 2021 Staged Model Infrastructure Assumptions

Included	Excluded
Aura Boulevard between Aura Town Centre and Caloundra Road	- Bells Creek Arterial (Caloundra Road to Bruce Highway) - Bruce Highway connection at Aura Town Centre - Bruce Highway connection at Bells Creek Arterial

Source: Stockland

The key assumed infrastructure assumptions within the 2021 staged model has been summarised in Figure 2.



Figure 2: Staged Model Infrastructure Assumptions

Landuse assumptions

The 2022 staged model assumes a sequence of development across the whole Aura site. Precinct 3, 4 and 5 are designed as predominately industry/business/showroom precincts, the key landuse assumptions within the staged model have been summarised in Table 2.

Table 2: Staged model landuse assumptions

Precinct	Landuse	NDA (ha)	Proportion Build by Year				Full build year
			By 2020	2021	2022	2023	
3	Industry and business (non-residential)	26	47%	60%	72%	84%	2025
4	Industry and business (non-residential)	19	0%	0%	0%	0%	2026
5	Showroom (non- residential)	20	25%	38%	51%	63%	2026
3 - 5	All	65	26.6%	35.4%	44.2%	53.1%	2026
Incremental (Yearly) Change in NDA			-	5.73 (33.2%)	5.73 (24.9%)	5.73 (19.9%)	

Source: Aura Staged Model Landuse Inputs

Table 2 shows that the net developable area (NDA) increases by 5.73 hectares (24.9%) from 2021 (data request year) to 2022 (staged model year) within Precincts 3 to 5.

2022 staged model link volumes

Based on the 2022 staged models (using the 2021 road infrastructure), road volumes have been extracted from the AM and PM peak period staged models. The 2022 modelled volumes and calculated Annual Average Weekday Traffic (AAWT)¹ have been provided in Table 3.

Table 3: 2022 Key link volumes

Road	Direction	Period	Volume
Graf Drive	Eastbound	AM Peak Hour	207
		PM Peak Hour	534
	Westbound	AM Peak Hour	585
		PM Peak Hour	266
	Two Way	AAWT	7,960
Aura Boulevard (North of Graf Dr)	Northbound	AM Peak Hour	325
		PM Peak Hour	864
	Southbound	AM Peak Hour	958
		PM Peak Hour	414
	Two Way	AAWT	12,805
Aura Boulevard (South of Graf Dr)	Northbound	AM Peak Hour	135
		PM Peak Hour	318

¹ TMR February 2011, *Cost-benefit Analysis Manual*, Table 3 – Capacity Factor = 10

Southbound	AM Peak Hour	348
	PM Peak Hour	167
Two Way	AAWT	4,840

The results in Table 3 confirm that Graf Drive is used to access industrial/business land use types (as in P3-5), this is suggested from the higher road volumes:

- Heading towards P3-5 in the AM Peak Hour (Westbound)
- Heading from P3-5 in the PM Peak Hour (Eastbound)

The volumes along Aura Boulevard are much greater north of Graf Drive where vehicles are looking to access the broader network and Bruce Highway. Volumes are lower to the South of Graf Drive where vehicles are predominately accessing local parts of Aura, including the Town Centre.

Updated road volumes

To ensure the 2022 staged model outputs best represent the desired output year (2021), adjustments have been made to the 2022 staged model outputs. Based on a review of the landuse assumptions, the following adjustments to the 2022 staged model outputs:

- **Graf Drive:** Volumes reduced by 24.9% (in line with difference in NDA between 2021 and 2022)
- **Aura Boulevard:** Adjust volumes in line with the reduction in vehicles on Graf Drive, assuming modelled trip distribution (i.e. north v south split)

Note: This method represents a simplified approach to forecasting road volumes and the following key limitations should be noted:

- *Does not reflect the latest Stockland planning and yield assumptions (landuse as per 2013)*
- *Does not consider changes to other Precincts between 2021 and 2022 that may affect volumes on Aura Boulevard*

Due to the timeframes of this assessment, a complete assessment of the above limitations could not be undertaken and as such the resulting traffic forecasts are indicative only.

A summary of the adjusted 2021 link volumes and AAWT is provided in Table 4.

Table 4: 2021 adjusted Graf Drive volumes

Road	Direction	Period	Volume
Graf Drive	Eastbound	AM Peak Hour	155
		PM Peak Hour	401
	Westbound	AM Peak Hour	439
		PM Peak Hour	200
	Two Way	AAWT	5,978
Aura Boulevard (North of Graf Dr)	Northbound	AM Peak Hour	278
		PM Peak Hour	737
	Southbound	AM Peak Hour	818
		PM Peak Hour	354
	Two Way	AAWT	10,935
Aura Boulevard (South of Graf Dr)	Northbound	AM Peak Hour	131
		PM Peak Hour	314
	Southbound	AM Peak Hour	345
		PM Peak Hour	162
	Two Way	AAWT	4,757

Source: PwC Analysis

Summary

The 2022 staged model (as developed by MWH in 2013) was used as the base for this assessment of key links. Updates to infrastructure assumptions within the model were made to align with the latest Stockland planning assumptions. Following this, out of model adjustments updated the 2022 staged model to produce 2021 outputs as requested by Stockland. The modelling suggests that the 2021 Two Way AAWT road volumes are forecast to be approximately:

- 6,000 on Graf Drive
- 11,000 on Aura Boulevard North of Graf Drive
- 5,000 on Aura Boulevard South of Graf Drive

Due to the timeframes of this assessment, out of model adjustments were made to the 2013 staged models to provide updated traffic forecasts. As such the resulting traffic forecasts are indicative only, further confidence in modelling outputs could be achieved through an update to the staged model.