METRONET YANCHEP RAIL EXTENSION

Alkimos Station Phase 2

Prepared for
NEWEST ALLIANCE
August 2021

URBIS

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Project Code	P0022083
Report Number	Rev 1

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INTRODUCTION

Urbis acts as the planning consultant on behalf of the NEWest Alliance, the appointed contractor to deliver the METRONET Yanchep Rail Extension on behalf of the Public Transport Authority (the delivery agency for the METRONET program). The following development application seeks approval for the 'ultimate' design of the Alkimos train station, being one of three new train stations proposed as part of the METRONET Yanchep Rail Extension project.

This development application (herein referred to as the 'Phase 2' development application) will 'replace' the development approval issued for the Alkimos Station in January 2021 ,however, noting that approval will remain valid in full until superseded.

The need for the second development application for the Alkimos Station is due to confirmation of DevelopmentWA's funding of developer bridges, being Brindabella Parkway Bridge and Tuart Drive Bridge, after the original Alkimos Station DA being submitted and assessed. The inclusion of the bridge works within the delivery phase of the YRE project allows for the construction of the ultimate Station Precinct on both west and east of the rail for day 1 operation of the rail. This outcome avoids the need for the staged delivery of the Alkimos Station, which is a better outcome for the operation of the rail infrastructure and development of the future Alkimos Central town centre.

For the purpose of long-term simplicity (i.e. to avoid the need to manage two approvals moving forward), this application seeks re-approval for the entire Alkimos Station. The scope of the application includes all station works and associated means of pedestrian and vehicle access. Specifically, this includes:

- Main station building, including at-grade station entrance and platform concourse below.
- Bus interchange immediately north of the station building, with a weather protection provided between the station and bus interchange.
- Short term kiss-and-ride parking area adjacent to the station, and long term park-and-ride on the periphery of the station precinct.

However, the focus of the content of this development application report will be those aspects which are modified or new to the 'Phase 2' development application, being:

- Relocation of the kiss-and-ride to the east of the station, with two additional bus and standard vehicle access points provided to the east.
- New park-and-ride area north of Brindabella Parkway.
- Brindabella Parkway Bridge;
- Tuart Drive Bridge; and
- Capping Structure.
- Supporting technical reporting, including revised transport analysis and improve bushfire management outcomes.

The delivery of the 'ultimate' Alkimos Station footprint via the YRE project is the preferred outcome for the YRE project, Alkimos activity centre, and the Alkimos Station precinct – which was planned and approved by the State Parliament to be both on the west and east of the rail corridor. In implementing this ultimate design, a key focus and challenge for the design has been ensuring the station infrastructure facilitates future development within the Alkimos town centre, whilst also achieving the necessary safety and design standards for the rail operation.

1. PROJECT BACKGROUND

1.1. SCOPE OF WORKS AND TECHNICAL CRITERIA (SWTC)

The funding for the METRONET program of works including Alkimos Station has been allocated by the State and Federal Governments, with the scope of the project being approved by Parliament of WA in the form of a Project Definition Plan. The scope of the project is captured within the contractual arrangements, including the METRONET specified Scope of Work and Technical Criteria (**SWTC**). This SWTC also sets the design criteria, standards and guidelines for the station design.

This SWTC is intended to set the basic building blocks for the delivery of a highly functional and contemporary multi-modal train station. The role of the NEWest Alliance is to interpret these requirements and apply them to the detailed station design, as proposed through this development application.

Of relevance to this Phase 2 development application, the following requirements have been set through the project SWTC for the Alkimos Station design:

> *Station car parking must include two long-term car parks, both north of the station, with one on the west side of the rail line and one on the east side of the rail line.*
>
> *The bus interchange is to be accessible in a two way direction from the east / west roads located south and north of the station.*

The station development envelope is also strictly defined by a number of factors, including landowner negotiations and environmental constraints, such as the clearing of significant vegetation and associated environmental offsets.

In terms of the development approvals process, this essentially means that there are some fixed aspects to the project, and as a result there are limitations on the ability to make fundamental changes to the design scope and requirements. However, the opportunity to make pragmatic changes which remain within the scope of the SWTC and environmental approvals may still be considered.

1.2. ALKIMOS STATION PHASE 1 DEVELOPMENT APPROVAL

The Alkimos Station precinct was planned and approved by State Parliament to be on both the west and east of the railway corridor, generally consistent with the layout proposed through this development application. However, this ultimate configuration is reliant on the construction of a number of funding arrangements for additional scope of works, which were required to be funded by the landowner / developer (being DevelopmentWA). Specifically, these developer works comprised the following:

- Brindabella Bridge;
- Tuart Drive Bridge; and
- Capping Structure.

At the time of preparing and lodging the initial ‘Phase 1’ development application, funding for these works had not been confirmed. As the YRE project as a whole was required to progress regardless of the funding being confirmed, the scope of the ‘Phase 1’ development application had to be limited to confirmed funded works. As Alkimos Station and the rail through Alkimos Central is located in a cut, all station precinct items located east of the rail which required vehicle access were planned for Day 1 in a temporary location west of the railway corridor.

It is widely agreed amongst key stakeholders and PTA as the asset owner that the ultimate design is the preferred layout, primarily as it allows vehicle intensive activities to be accessed east of the railway line, separated from the future planned Alkimos Activity Centre main street, and allows delivery of the ultimate layout for day 1 operation of the station avoiding costly staging of construction.

Funding for these items was confirmed by DevelopmentWA in November 2020, at which time detailed design of the additional structures could commence. It was recognised that these designs would not be completed in time for approval of the ‘Phase 1’ determination, without causing major delays to this approval.

1.3. PROCEDURAL CONSIDERATIONS

Development approval for the construction of the Alkimos Station was considered at the WAPC meeting In December 2020, and issued by the WAPC on 7 January 2021. Refer to **Appendix A -** Alkimos Phase 1 Development Approval.

As there is no scope to amend an approval granted under the Metropolitan Region Scheme, the refinements to the design of the Alkimos Station requires a new ('fresh') development application. The approach to seeking this further approval was discussed at a meeting between the applicant and DPLH in March 2021, where the following procedural approach was agreed:

- The 'Phase 2' development application would seek re-approval for the entire ultimate design of the Alkimos Station, including those aspects previously approved through the 'Phase 1' development approval scope.
- The 'Phase 1' development application will remain active until the 'Phase 2' approval is issued. This is critical to ensure some forward and early works could occur on site in line with the parts of the approval that are not changing.

As the proponent is current acting on the Phase 1 development approval, it is essential that the approved aspects of the Phase 1 approval (such as the eastern bus access, station building and bus interchange) are not modified by this Phase 2 development application process. As a result, whilst the 'Phase 2' development application does include the full scope of works, it critical that the scope of assessment will be limited to the areas that are being modified.

1.4. SUPPORTING PLANNING APPROVALS

The scope of this development application does not include the construction of the local road network required for day 1 operation of the Station precinct. The relevant mechanism for achieving planning approval of the supporting road network is a subdivision application, and therefore including the road network within the scope of the development application would be a duplication of process.

The delivery of the local road network within Alkimos Central is funded and delivered as stage 1 of the Alkimos Central development by Development WA as the developer and landowner. It is understood that this subdivision application has now been approved by DPLH, with construction of these supporting roads expected to be completed for day 1 operation of Alkimos Station.

Given road access is an essential component of the station operation, the project team would accept the following condition being placed on the Phase 2 development approval:

> *The station shall be provided with a minimum of one public road access from the surrounding local road network prior to the commencement of operation, to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo.*

Supplemented with the following advice note:

> *With regard to condition x, it is acknowledged that DevelopmentWA is the responsible party for delivering the surrounding local road network, and the proponent is encouraged to continue to work closely with DevelopmentWA in completing these works.*

2. SITE DETAILS

The legal details of the lots directly affected by works the Alkimos Station and requiring development approval are detailed in Table 1.

Certificates of Title are enclosed within this application at **Appendix B**.

Table 1 Affected Lots (Alkimos Station)

Lot	Street Address	Plan	Vol/Folio	Proprietor
2000	N/A (rail corridor)	DP409771	2914 / 420	Western Australian Planning Commission
2	2570 Marmion Av	DP419385	2985 / 162	Western Australian Land Authority (trading as Development WA)

The traditional custodians of the land subject to this application are the Wajuk people of the Noongar Nation.

3. PROPOSED WORKS

Technically, this development application seeks approval for all aspects of the Alkimos Station, including station building, bus interchange area and supporting parking infrastructure.

Specifically, this Phase 2 development application scope includes the following:

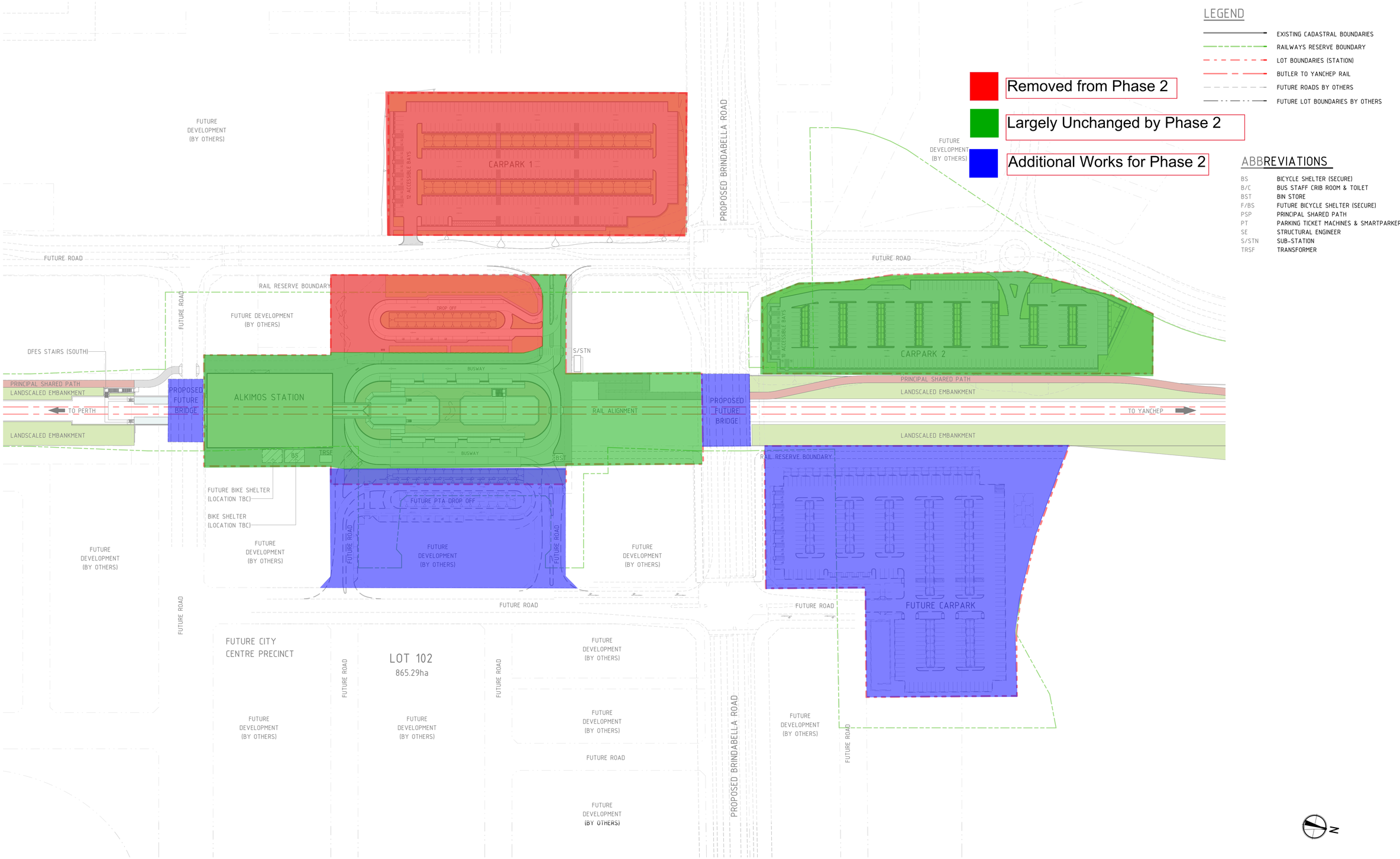
- The station building, with station entrances provided to all facades of the building. This is consistent with the previous approval.
- A bus interchange with 8 active bus stands and 4 layover bays. The interchange itself remains unchanged, but additional access points to the east of the station are proposed through this application.
- Two station platforms of 150m length, which are unchanged from the previous approval.
- Two secured bicycle shelters, with capacity for up to 96 bicycle bays each. U-Rails will also be provided adjacent to the station entrance, designed for short-term use.
- 'Kiss-and-ride' pick-up and drop-off area to the east of the railway alignment containing 28 bays.
- Long term 'park-and-ride' parking areas west and north west of the station, containing a total of 686 bays.
- Minor change to the design of the station building to remove the valance, in order to deliver a simplified design.

A compiled package of the Phase 2 development plans is provided at **Appendix C** of this report.

However, as the majority of these works were previously assessed and remain unchanged by the 'Phase 2' development application, the scope of the assessment for this application should be limited to the modified works. Table 2 below provides a detailed summary of the scope of modifications from the Phase 1 to the Phase 2 development application. A markup of the **approved layout** indicating the modifications proposed by this development application is provided at Figure 1 below.

Table 2 Matrix of development application scope

Works and brief summary	**Phase 1 DA**	**Phase 2 DA**
Station building, platforms and forecourt area	Approved	Minor change only
Central busway and shelters	Approved	Unchanged
Vehicle access from west	Approved	Unchanged
Vehicle access from east	Not part of scope	Within scope
Car Park 1	Approved	Removed from scope
Car Park 2	Approved	Minor change only
'Future Car Park'	Not part of scope	Within scope, but redesigned
Kiss 'and' ride area	Approved west of railway line	Modified to east of railway line and redesigned
Brindabella Parkway Bridge	Not part of scope	Within scope
Tuart Drive Bridge	Not part of scope	Within scope
Capping Structure	Not part of scope	Within scope
Rail Principle Shared Path	Within scope	Removed from scope



OVERALL SITE PLAN

SCALE 1 : 1000

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B	21.08.20	CARPARK 2 UPDATED	BP	BL	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

NEWest Alliance

TCY-CAP-YSA-AR-DRG-02

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

–

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE

–

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE –

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
SITE PLAN

PTA Drawing No:

REV: B

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

3.1. CAR PARKING AND VEHICLE ACCESS

The car parking outcomes under this Phase 2 DA are largely consistent with the previous development approval. A direct comparison is provided in **Table 3** below.

Table 3 - Car Parking Comparison

Parking Area	Phase 1 DA	Phase 2 DA
West drop-off (removed)	25 bays	0 bays
East drop-off (proposed)	0 bays	28 bays
TOTAL SHORT-TERM BAYS	**25 BAYS**	**28 BAYS**
Car Park 1 (removed)	352 bays	0 bays
Car Park 2 (minor modifications)	284 bays	283 bays
New Car Park 1 (proposed)	0 bays	403 bays
Total Long-Term Bays	**636 bays**	**686 bays**
TOTAL	**661 BAYS**	**714 BAYS**

As noted in earlier sections of this report, the ‘Car Park 2’ design will remain largely unchanged by this Phase 2 development application. The only change of note to this car parking is the design of the access point to the car park.

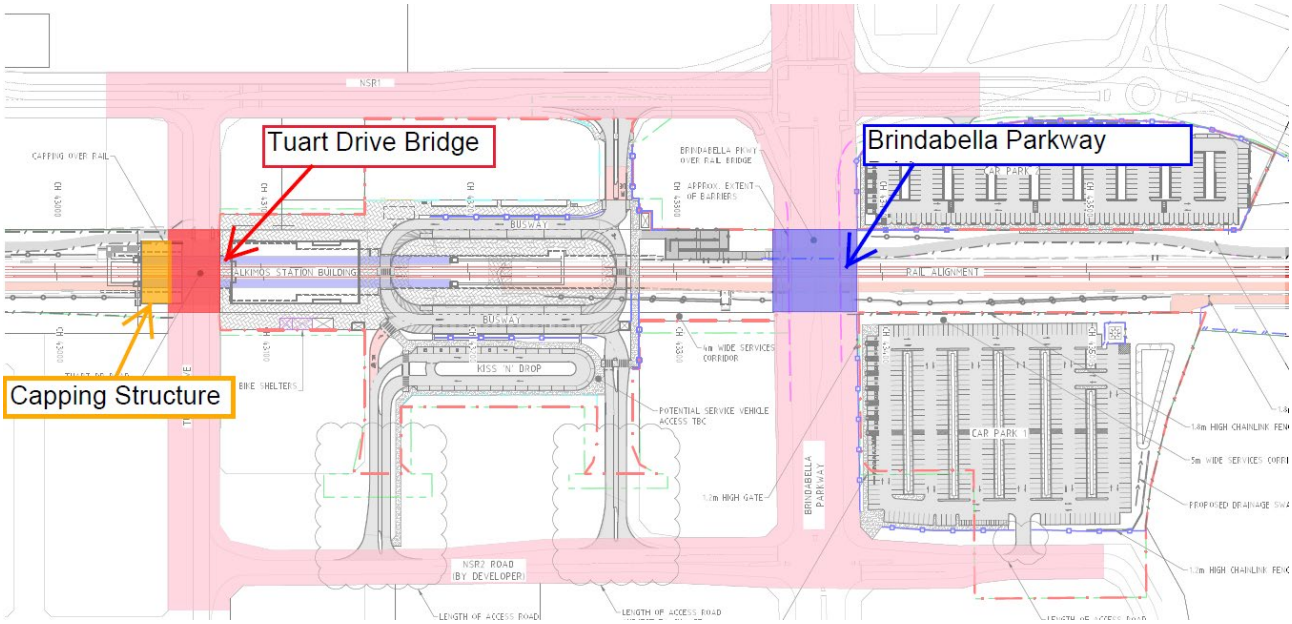
3.2. DEVELOPER BRIDGES AND CAPPING

The scope of the Phase 2 development application includes the completion of some works and infrastructure, which are funded by DevelopmentWA but completed as part of the NEWest Alliance delivery of the Yanchep Rail Extension project scope of works. Specifically, these include:

- Brindabella ‘road over rail’ bridge’
- Tuart Drive ‘road over rail’ bridge’; and
- An extension of the capping structure south of the future Tuart Drive bridge. This capping structure will ultimately be created as a developable lot, but the scope of the NEWest works are limited to construction of the structure only.

Refer to Figure 2 for layout of these structures.

Figure 2 - Locational plan of bridges and capping



The Alkimos Station Phase 1 development application was not able to include these items within the proposal as funding for the developer funded bridges was not confirmed at the time of submission (September 2021).This funding is now confirmed, allowing these structures to be incorporated in the scope of the Phase 2 DA.

Table 4 - Summary of Developer Bridges and Capping

WORKS	DETAILS
Brindabella Parkway and 'road over rail' bridge	Bridabella Parkway will form a higher order road within the activity centre road network, potentially forming an 'Integrator A' road. This hierarchy is reflected in the road design, which is intended to accommodate Brindabella Parkway will include two lanes each way with right turn pockets and 2.5m median, with a 2m shoulder cycle lane each way and 3m shared path each side. As Brindabella Bridge is a higher order capacity road network, these separated facilities are warranted.
Tuart Drive 'road over rail' bridge	Tuart Drive is designed as a lower order road connection within the activity centre road hierarchy, potentially forming a neighbourhood connector (subject to DevelopmentWA's revised activity centre plan). Tuart Drive has also been earmarked as a potential 'green link' for the revised activity centre plan. As a result, subject to an agreed maintenance strategy with the City of Wanneroo, the bridge will contain planter boxes on either side of the road carriageway. Specifications of the bridge are as follows: • 17.5m overall width. • 18.1m clear span. The road configuration for Tuart Drive will be a single 4m lane each way with no median (8.0m total), with 6.0m wide southern verge and 3.5m wide northern verge.

WORKS	DETAILS
Capping Structure of Station	The intent of the capping structure is to provide a structure to accommodate future development adjacent to Tuart Drive. The capping structure also provides an important precinct design outcome through encapsulating the station precinct, and reducing the perception of a 'drop-down' from the bridge. The capping will comprise an overall width of 20m, and designed as structurally capable of accommodating a 3 storey building (subject to loading provisions). The scope of this development application is limited to the physical construction of the capping structure. All subsequent development will be subject to a separate development application. The formal creation of this site as a three-dimensional lot will be subject to a separate subdivision process, after which the title will be issued. The structural limitations of this title are expected to form an notification or encumbrance on the certificate of title to ensure these load limitations are clearly articulated to all future owners of the site.

3.3. BUS ROUTE PLANNING

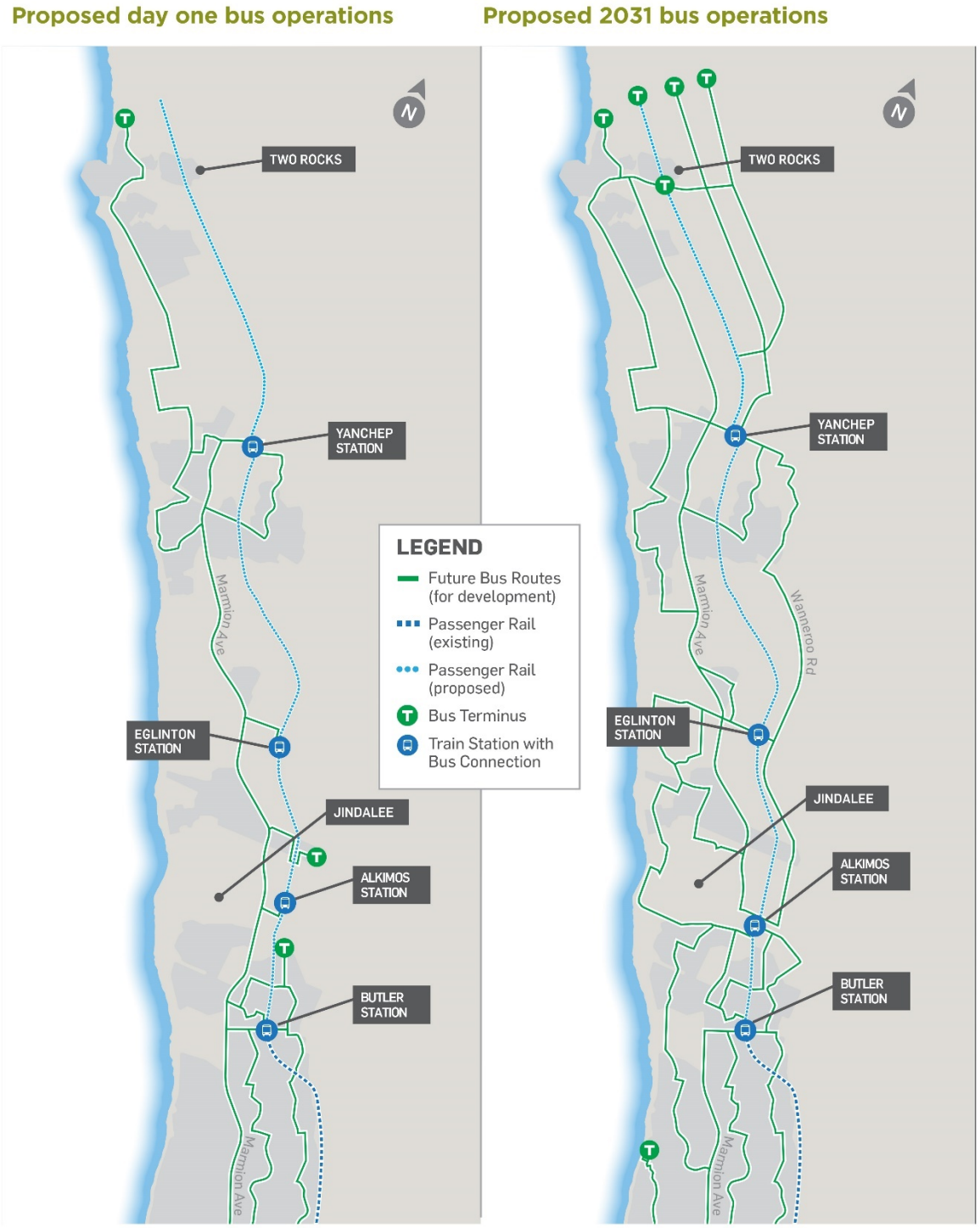
All new stations delivered as part of YRE are designed as multi-modal stations meaning the train station will be delivered in conjunction with supporting transport infrastructure including bus interchange, pedestrian and cyclists' pathways. Figure 3 below outlines the planned bus network to be implemented in conjunction with the YRE line, noting that the network is ultimately dependent on supporting local road construction by parties other than the PTA, and may be subject to change subject to funding.

To deliver an integrated transport solution which connects the key activity areas within the rail extension area, a comprehensive and supportive feeder bus network will be delivered. A number of future bus routes have been identified for further development that typically loop between the new stations and service the suburbs in between.

The ultimate bus network (by 2031) includes new routes for Alkimos operating under the standard 'station-to-station loops' model, drawing from the success of the Joondalup and Mandurah lines model. Existing bus services will be extended from Butler Station to Alkimos Station and new routes introduced to link Alkimos Station with Eglinton Station, then with Yanchep Station.

The bus services will increase the number of passengers arriving at Alkimos stations via public transport and reduce demand for station car parking. Final service specifications of the day one and ultimate scenarios will be subject to detailed planning, allocation of funding, and community consultation, which is ongoing.

Figure 3 - Indicative YRE Bus Route Planning



Source: METRONET YRE Project Definition Plan

3.4. VEHICLE MOVEMENT AND ROAD LAYOUT

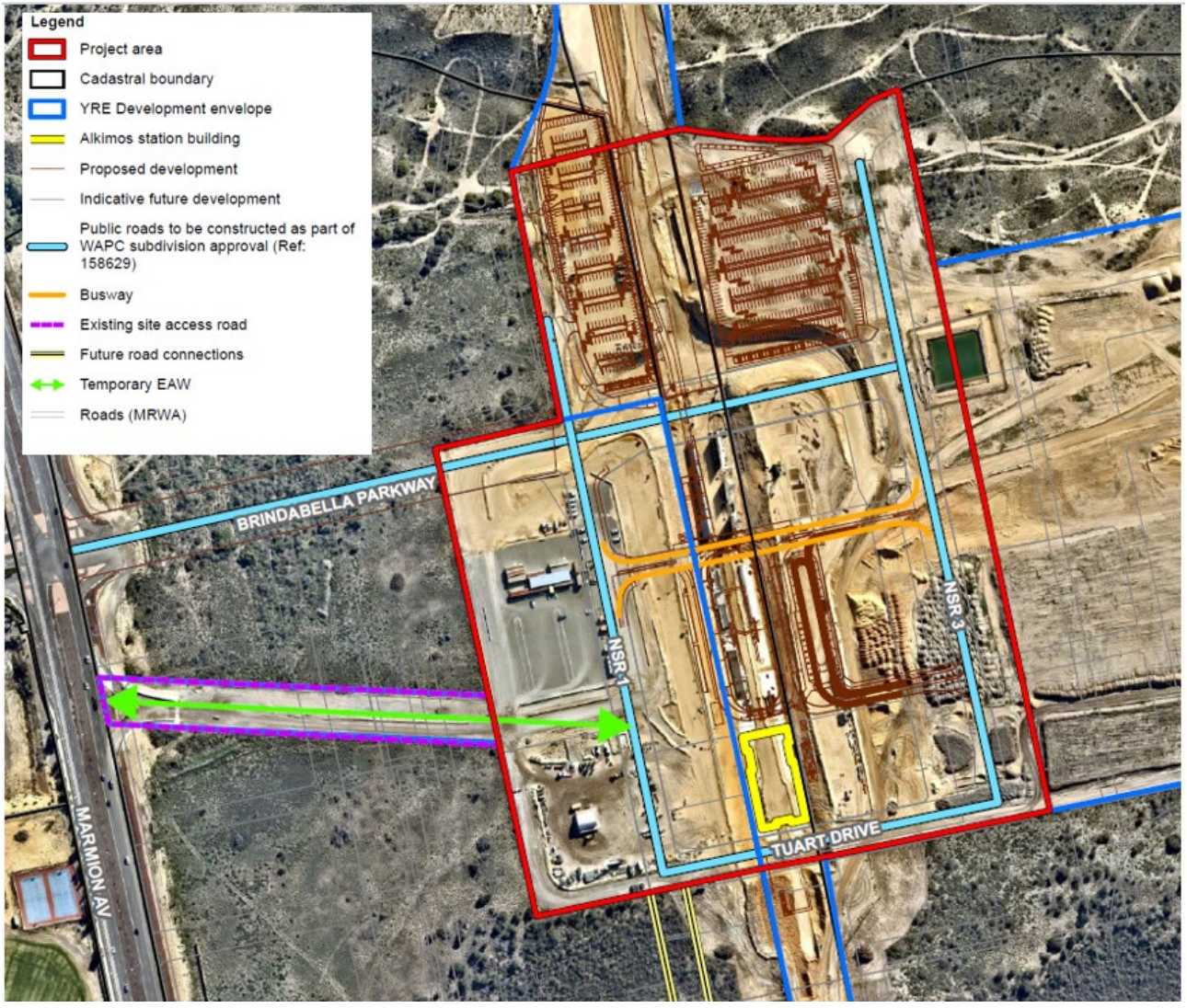
As discussed in Section 1.4 of this report, the road layout supporting the station is subject to a separate subdivision process, and is not within the scope of this development application. However for contextual purposes, the following sections explain the anticipated road network for day one operation, and the future road network as anticipated for 2031.

This revised transport network is supported by a comprehensive review of the traffic modelling, with an updated transport impact statement being provided at **Appendix D,** and summarised at **Section 5.2** of this report.

3.4.1. Day 1 Operation

Day 1 operation of the Alkimos Station under this Phase 2 development application will provide for the partial construction of Brindabella Parkway (north) , NSR1 (west of the station) and NSR3 (east of the station), and Tuart Drive (south of the station). This will provide a functional road link around the station, as demonstrated in **Figure 4** below.

Figure 4 - Day 1 Road Network



The most notable modification from the day one operation assumptions of the Phase 1 development application is the construction of NSR3. This has also allowed an increase in the number of vehicle access points from a single access point for all vehicle from NSR1, to three separate access points, functioning as follows:

- The NSR1 vehicle access point is maintained, but will be dedicated to bus movements only, together with provision of access to adjacent development lots. This is widely agreed to be an improvement to the design, as it significantly reduces the number of vehicles travelling along the NSR1 main street.
- The two vehicle access points from NSR3, which will accommodate the majority of bus movements, as well as passenger vehicles manoeuvring through the short-term kiss-and-ride area.

3.4.2. Future Road Layout

The future road layout configuration remains largely unchanged by this development application. Previous technical reporting prepared for the 'Phase 1' development application modelled a 2031 growth rate. The Phase 2 development application does not fundamentally alter these outcomes.

3.5. MODE SHARE AND PEDESTRIAN AND CYCLING NETWORKS

The Alkimos Station remains a multi-modal station, providing for all modes of connecting transport including bus, private vehicle, walking and cycling.

In terms of regional pedestrian and cycling networks, the Alkimos Station will tie into the existing and planned transport infrastructure projects currently being delivered to Perth's northern suburbs, which include the delivery of regional pedestrian and cyclist networks. Recent infrastructure works relevant to the Alkimos Station are detailed in the following table.

Table 5 Summary of Supporting Regional Pathways

Project	**Summary of Pedestrian / Cyclists Infrastructure**
Mitchell Freeway Extension – From Hester Avenue to Romeo Road (Refer **Figure 5**) Status: Under Construction	The Mitchell Freeway extension will deliver a 5.6km extension of the freeway to Romeo Road, Alkimos (immediately south of the Alkimos Station). The project also includes construction of a east / west dual carriageway on Romeo Road from Wanneroo Road to Marmion Avenue. This will include the following pathway infrastructure: ▪ A north / south Principal Shared Path connection from Hester Avenue to Romeo Road, aligned with the Mitchell Freeway Extension ▪ A east / west Shared Path connection between Marmion Avenue to Wanneroo Road, intersecting with the Mitchell Freeway. Construction on the Michell Freeway Extension project is scheduled to be completed Mid-2023.
Marmion Avenue Dual Carriageway to Yanchep Status: Completed July 2020	The Marmion Avenue dualling will deliver 11.5km of dual carriageway of Marmion Avenue road from Butler to Yanchep. The scope of works have included the delivery of a 3m wide shared path network separated from the road carriageway.

These regional networks will also be supported by the finer grain delivery of local and neighbourhood infrastructure delivered through the incremental build out of the Alkimos Activity Centre Structure Plan.

To ensure the Alkimos Station is appropriately designed to accommodate all mode shares, mode share forecasts have been undertaken by the project traffic engineer, based on future catchment for the area and existing PTA stations in a similar context. Table 6 below outlines the findings of these mode share forecasts.

Relevant factors which have underpinned the mode share assumptions are as follows:

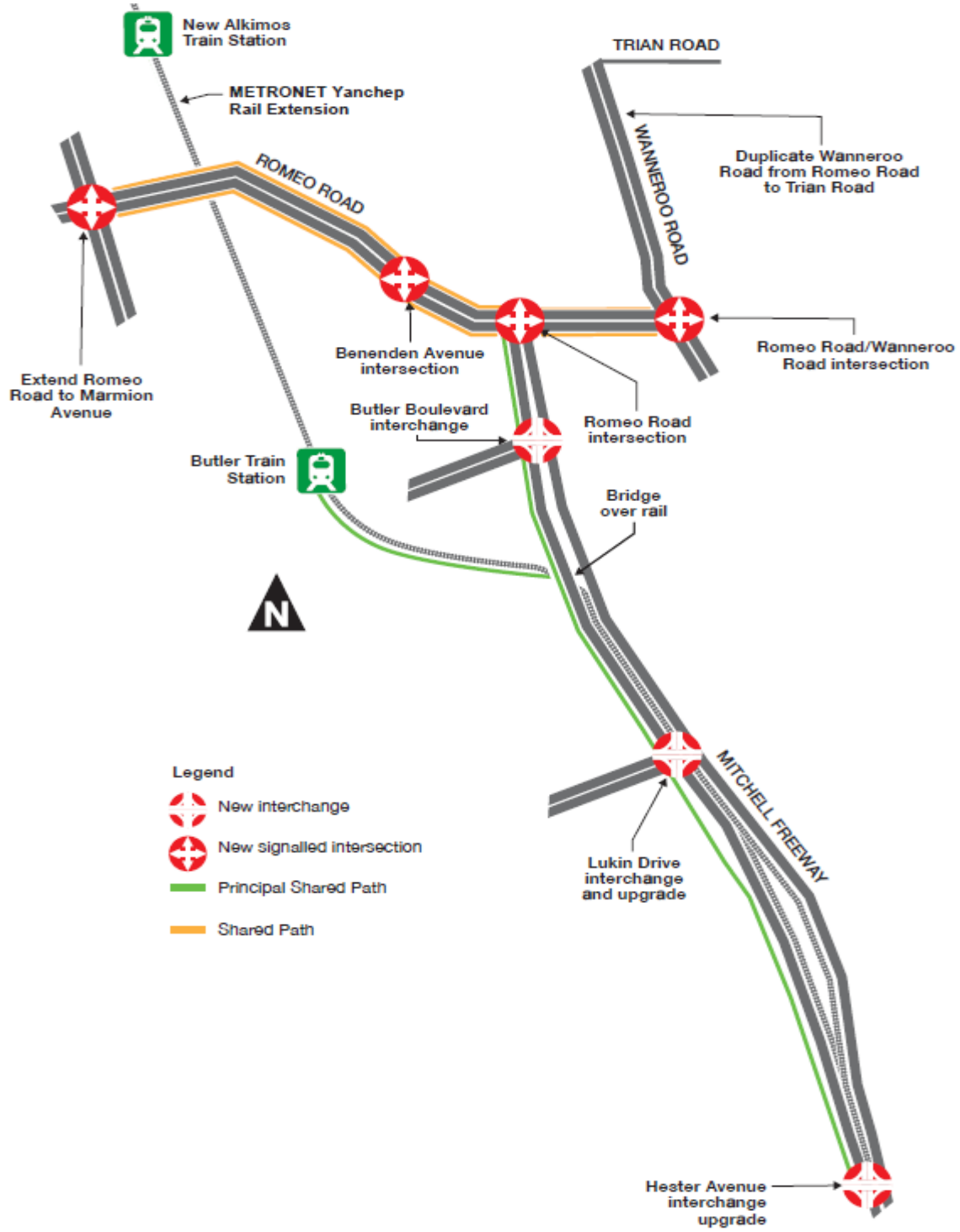
- Given the greenfield setting of the Alkimos Station, the surrounding area including cycling and pedestrian networks is expected to be incrementally developed, with supporting local transport infrastructure delivered in accordance with the Alkimos Activity Centre Structure Plan.
- The uptake of walking for the station opening year is limited, which is attributed to the limited walking connectivity from existing residential areas. This results in most passengers accessing the station by car. A notable increase occurs at the 10 year scenario when surrounding development progresses and local infrastructure is delivered
- Walking connectivity for the opening year is most challenged in existing residential areas south of Alkimos Station and Romeo Road. Due to natural human travel patterns which drive a preference to travel towards the designation, this is expected to result in existing residents continuing to use Butler Station in the short term.
- The analysis of the park-and-ride patronage indicates a modest shortfall in the number of bays demanded on site for the station opening year. This shortfall is based on conservative assumptions, where the forecast patronage is fully realised. It is also recognised that the availability of car parking will drive transport choices, with park-and-ride capacity pressures encouraging the use of alternative modes of transport. The delivery of additional bays to address this shortfall would therefore be contradictory to best practice transport planning, where it is widely recognised that restrictive parking provision is the desired approach for activity centres.

Table 6 Mode Share Demand Forecasts

Mode	**Opening Year**	**10 Year Scenario**
Park-and-Ride	975 (45%)	864 (32%)
Bus	607 (28%)	837 (31%)
Kiss-and-Ride	433 (20%)	405 (15%)
Cycling	108 (5%)	216 (8%)
Walking	43 (2%)	378 (14%)

As a separate task outside of this development application, the PTA and NEWest Alliance are investigating opportunities to tie in the new YRE stations into these regional pathway networks. Importantly, the YRE stations will be provided with regional pedestrian and cycling connections for Day 1 operation of the station.

Figure 5 - Mitchell Freeway Extension Summary of Works



Source: Main Roads (modified by Urbis)

4. SUMMARY OF DESIGN PROGRESSION

4.1. DETAILED DESIGN OF EASTERN PRECINCT

The focus of this Phase 2 development application is achieving the most suitable outcome for station infrastructure which has now been located east of the railway line, which primarily includes the kiss-and-ride and long-term parking area. This aspect of the development been formulated with input from DevelopmentWA, in recognition that DevelopmentWA will coordinate the majority of future development adjoining the station.

As a result, the design of the station infrastructure to the east of the station has changed significantly to the indicative design detailed in the Phase 1 development plans. The following figures and tables explain the key aspects of this design evolution.

Figure 6 - Phase 1 DA indicative kiss-and-ride design

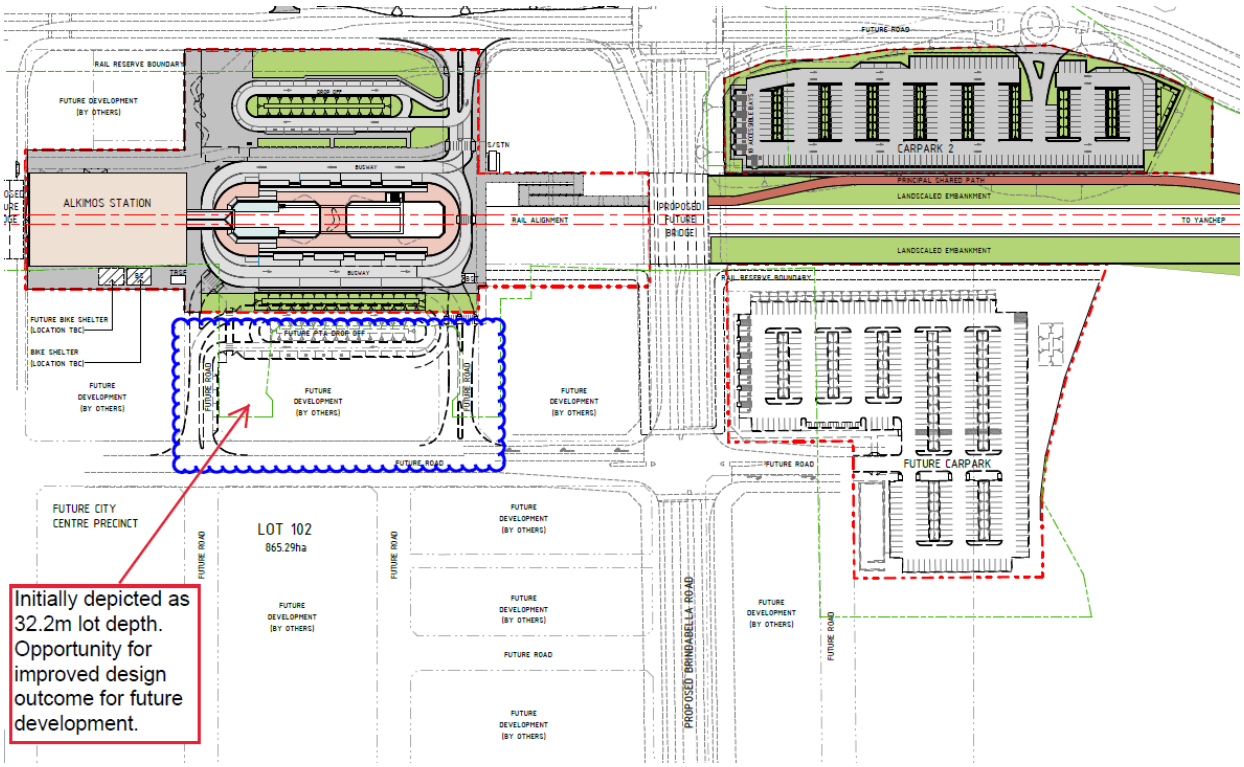


Figure 7 - Summary of N/S Road and Carpark Changes

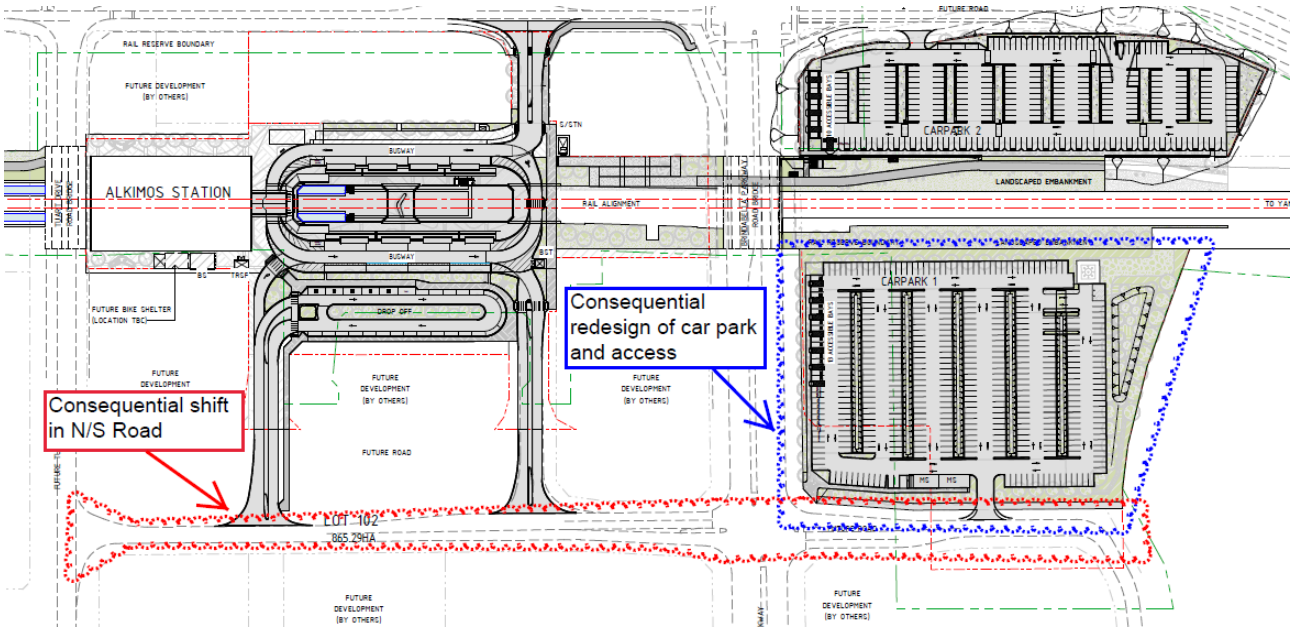


Figure 8 - Pedestrian Movement Summary

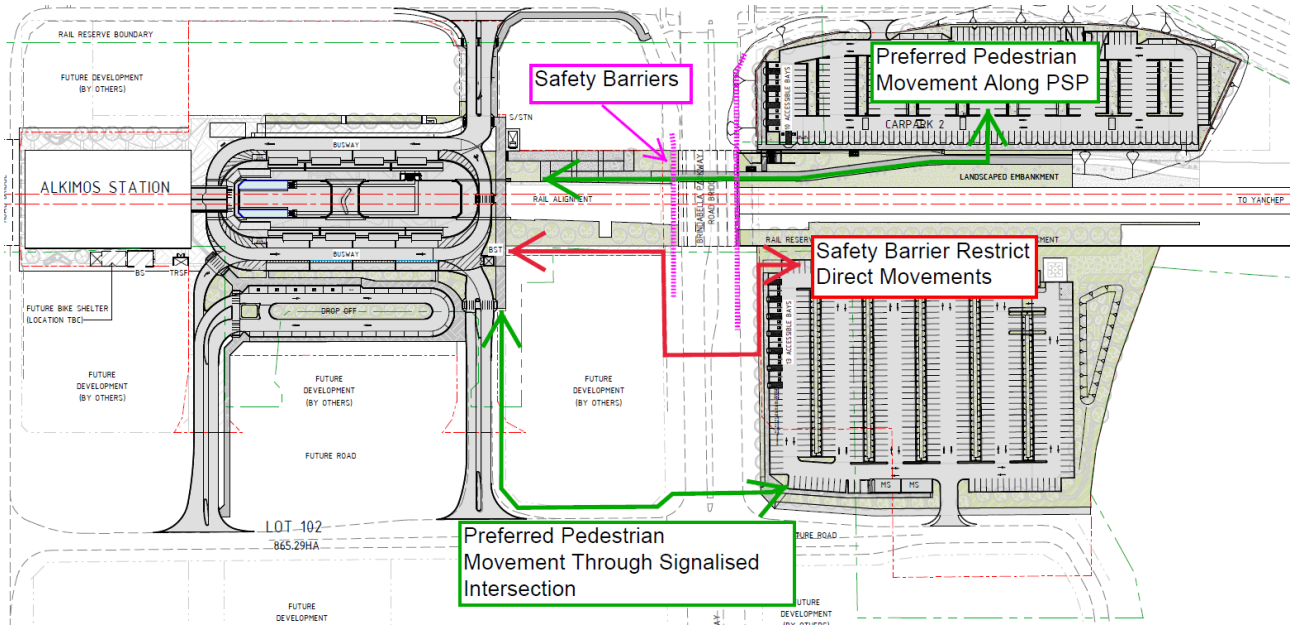


Table 7 Summary of Layout Improvements

Design Change	Rationale for Change
Increasing depth of 'Future Development' lot depth from 32.2m to 71m	The indicative design of the 'future development' lot immediately east of the station was shown at a depth of approximately 32.2m within the Phase 1 development application. Following further design work by DevelopmentWA, it was recognised that this lot depth would present a challenge in delivering a quality built form outcome for future development in this lot. Servicing and access to this future lot was also identified as a challenge. The desired outcome for this lot is to achieve a dual primary activated frontage to the east and west. The 71m lot depth would also improve service access to this lot, as it opens the opportunity for an internal service lane. The PTA project team have recognised the urban design outcomes for the station would be improved through this change, and the DevelopmentWA suggestions have been adopted into the Phase 2 station layout.
Consequential movement of N/S road and redesign of car park	The increase in lot depth has resulted in a consequential shift in the connection north / south road, which ultimately alters access in the new Car Park 1. This is recognised as a preferrable design which produces a more direct and functional road network, both for the PTA car park and surrounding future development cells. The YRE project can only deliver road that has been approved within the YRE scope, with any additional scope resulting from the shift of NS3, to be funded and delivered by the developer.
Realignment of pedestrian movements	The initial layout intended to provide a pedestrian connection pedestrian connection from the Car Park 1 adjacent to the railway line, and connecting to the station. With detailed design of the bridges progressing, safety structures have limited the ability to achieve this as a direct movement. It is recognised that working around these safety barriers and would require a counter-intuitive detour of pedestrian movement, as demonstrated in **Figure 8** above. The alternative and preferred pedestrian connection is via a access point in the south west corner of Car Park 1. Whilst pedestrian movements are slightly longer, this is the preferred outcome as it encourages pedestrians to travel safely through the signalised intersection at the Brindabella Parkway and N/S road, and ultimately provides more opportunities for commuters to engage with the future town centre. The western Car Park 2 will continue to be provided with a direct pedestrian connection to the station via a shared path that travels beneath the Brindabella Parkway bridge. The project team is also

Design Change	Rationale for Change
	investigating the ability to install an additional staircase connection between the car park and shared path connection, providing multiple access point options. East / West pedestrian accessibility into the wider pedestrian network will also be provided via Brindabella Bridge, which includes a footpath on both sides of the carriageway.

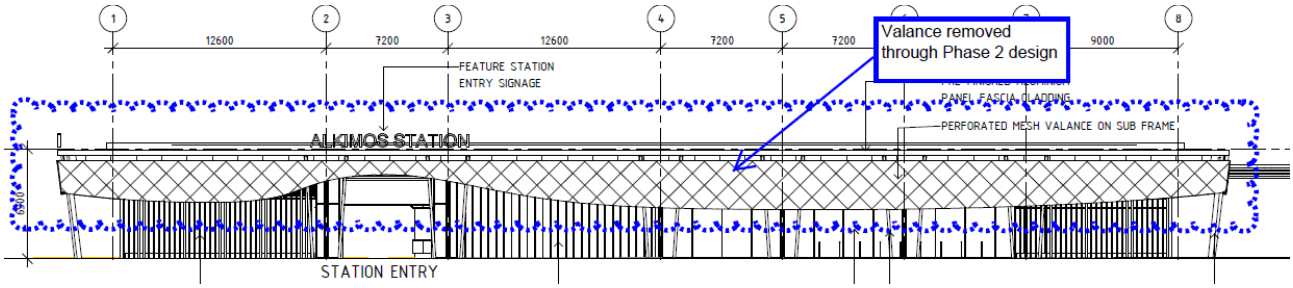
4.2. STATION BUILDING MODIFICATIONS

The only notable change to the architectural design of the Alkimos Station building is the removal of the valance. This valance was a 1.5m deep mesh valance supported by exposed steel framing. **Figure 9** below outlines the general design of the valance, as approved through the Phase 1 design.

A number of factors have driven the removal of this valance from the design, including:

- Removal of the valance is more in line with the desired aesthetic outcomes and architect design intent. Specifically, removing the valance provided a simplified, lighter and less busy structure that will not attract and hold dirt and dust or encourage insects to habitat within the framing.
- Alkimos Station valance was removed after a passenger impact assessment was undertaken. Alkimos Station is extremely permeable with entrances on all four facades mitigating circulation around the Station by providing direct access into the station from any direction. This means patron's amenity is not compromised by the removal of the valance.
- The intent of the valance was to act as a canvas for the public art however on assessment of the Public Art submissions it was deemed that the art work would be more suitably placed in other locations.

Figure 9 - Alkimos Phase 1 Valance Design



4.3. STATE DESIGN REVIEW PANEL (SDRP) COMMENTS

The development application was presented to a second SDRP session in October 2020, during the assessment of the Alkimos Station. A copy of the SDRP2 comments are provided at **Appendix E** of this report.

Whilst the majority of the comments relate to the Phase 1 development application, a number of the comments still relate to the Phase 2 works. The SDRP comments which are considered to be applicable to the scope of the Phase 2 works are addressed in Table 6 below.

Table 8 SDRP 2 Comments

SDRP2 COMMENT	RESPONSE
Principle 1: Context and Character	
Issues of integration with the Town Centre remain unresolved at this stage. Confirming the two Development WA-funded bridges should be prioritised. This would allow the preferred (permanent) proposal to be documented and submitted for DA. The current submission is based on the less desirable interim arrangement, which delivers a substandard outcome for the Town Centre.	It is agreed that the ultimate arrangement is a preferred outcome for the Alkimos town centre, as it facilitates the relocation of the majority of vehicle movement away from the NS1 main street.
Principle 4: Functionality and Build Quality	
The Panel recommends avoiding the dominance of the Town Centre by bus routes, particularly for NS1 Main St.	The Phase 2 layout will significantly reduce the number of bus movements along NS1, redistributing these to NS3 east of the railway. Whilst some movements will still occur via NS1, this route will only be used to avoid the circumstance where the buses travel 'three sides of the square'.
The Panel also recommends that the current three access points for the Bus Port be limited to two, ideally located on the east so as to avoid negative impacts on Main St and the higher profile areas of public realm.	The development proposal maintains the three access points to the bus interchange. This is recognised as an essential operational requirement. The extension of the connecting access roads means that these two additional access points essentially form part of the local road network, rather than simply providing access to the station. Two access points is thereby important in providing a functional road network for the future development.
Should the temporary Kiss n Ride be progressed, previous design review advice should be considered, particularly with respect to the extent of this infrastructure (considered excessive at 32 bays). Consideration should be given to street	28 kiss-and-ride bays are proposed for the ultimate design, providing a small reduction from the previous design.

SDRP2 COMMENT	RESPONSE
drop-off alternatives, as successfully demonstrated in other station projects and more applicable for a strategic Town Centre.	The SWTC for the project initially required 32 kiss-and-ride parking bays, so the current design is below the SWTC standards.

5. OTHER TECHNICAL CONSIDERATIONS

5.1. TRANSPORT IMPACT ASSESSMENT

As identified in earlier sections of this report, the Phase 2 development application has occurred as a result of the securing of funding for a number of supporting road networks surrounding the Alkimos Station. In light of these additional road connections, a comprehensive review of the transport modelling outcomes has been completed, with an updated Transport Impact Assessment (TIA) provided at **Appendix D**.

The assumed road network for opening year and 10 year scenario for the purpose of this assessment is outlined in **Figures 10 and 11** below.

The TIA concludes that the vehicle access to and from the station for all vehicles (car and bus) will operate satisfactorily for the entire assessment period. This is a logical outcome given the Phase 2 layout for Alkimos Station will provide a number of additional road networks, providing for a more event distribution of the stations traffic.

Figure 10 - Assumed Road Network - Opening Year

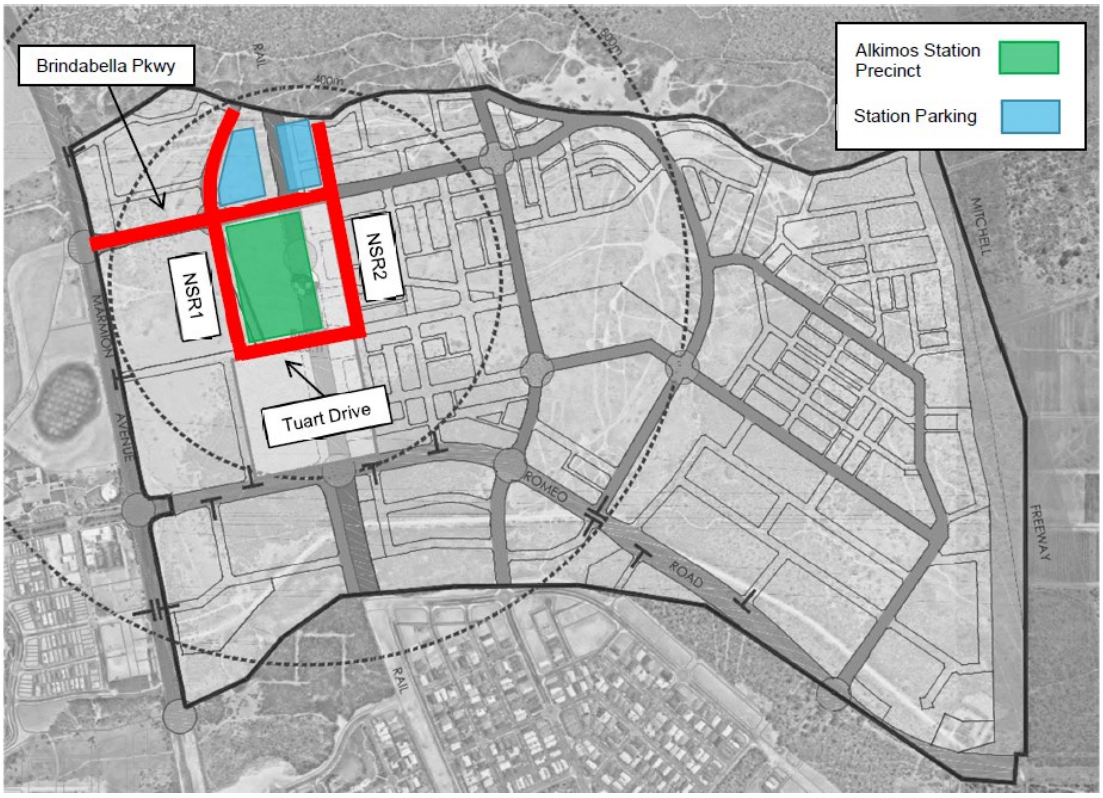
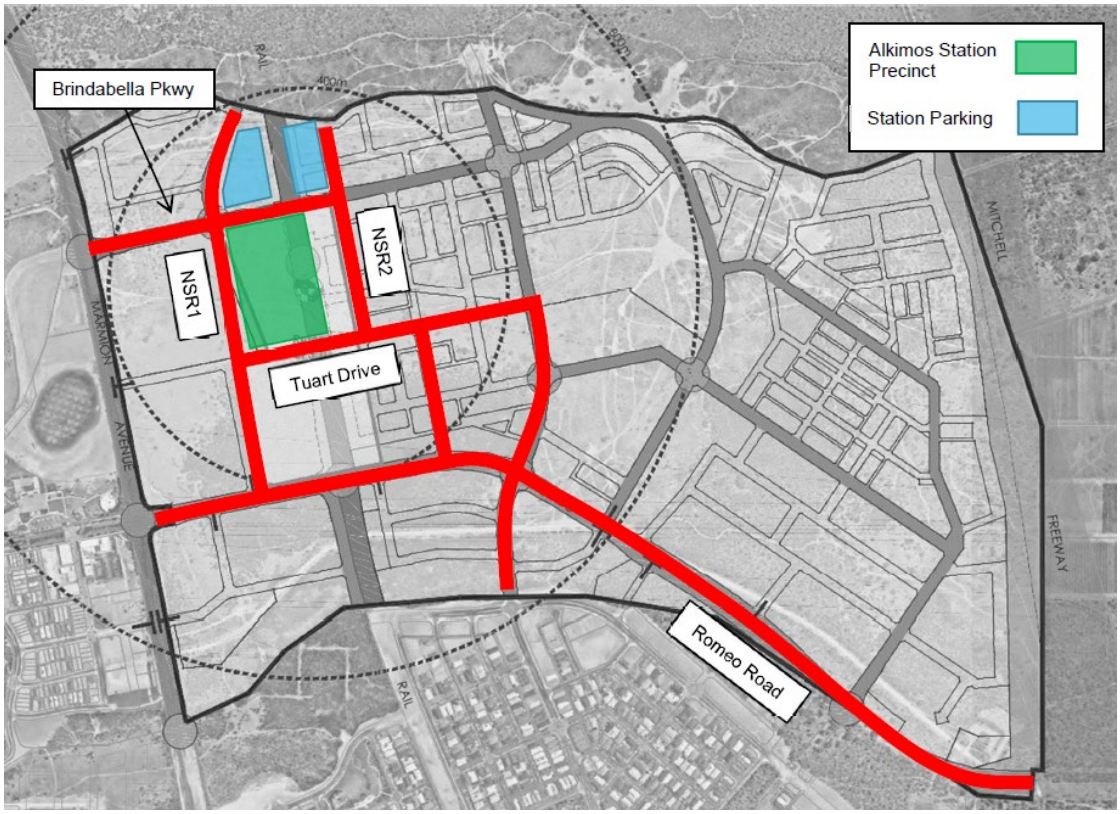


Figure 11 - Assumed Road Network - Future Year



5.2. BUSHFIRE MANAGEMENT

The only change which will be of relevance to the bushfire management outcomes will be the alterations to the supporting road network. Given the proposal will increase the number of accessibility and movement options around the station, this is expected to improve the bushfire management outcomes.

Condition 6 of the Phase 1 development approval outlined a number of bushfire management measures which were to be addressed through an updated Bushfire Management Plan. These comments have largely been addressed by the project team, with an updated Bushfire Management Plan (BMP) being provided at **Appendix F** of this report.

The bushfire management measures for the Alkimos station have been coordinated with the bushfire management measures which DevelopmentWA will be implementing as part of the Stage 1A subdivision application. This coordinated approach ensures appropriate management measures will be in place for adjoining land, and reduce the bushfire risk level within the site.

The following table outlines how this updated BMP addresses the requirements of Condition 6.

Table 9 Response to Condition 6

Condition Requirement	Response
Authored by a Level 3 Accreditation of Bushfire consultant.	The revised BMP has now been authorised by a Level 3 accredited consultant.
Bushfire Emergency Evacuation Plan	This document will provide details on the emergency evacuation for the station operation, and will be provided at a later stage of the project.

Condition Requirement	Response
Two vehicle access routes that connect to the public road network;	The station will be provided with a primary connection to Marmion Avenue via Brindabella Parkway, and a second access via an EAW to Marmion Avenue.
Vegetation classification;	Further information on the management measures for the 'low threat' areas and proposed landscaping is provided in the BMP.
Measures to reduce the bushfire hazard;	Bushfire hazard has been effectively reduced for the Alkimos station through the coordination of bushfire management outcomes with the DevelopmentWA Stage 1A subdivision.
Emergency services access to both side of the train station.	The construction of Brindabella Drive, Tuart Drive and connecting north / south roads will provide access to both sides of the station.

5.3. STORMWATER DRAINAGE DESIGN

The stormwater systems for the ultimate design of Alkimos Station adopt similar principles to the Phase 1 development application, summarised as follows:

- Stormwater runoff from the precinct is captured, conveyed and discharged within four sub-catchments. Each of the sub-catchments aims to detain the 10% AEP storm event while providing an overland flow route for storms exceeding the volume of the design storm. All calculations have used a permeability rate of 2 m/day and a deep water table model.
- The Perth Groundwater Atlas indicates that historical groundwater maximums are approximately 2-3 m AHD, at least 30 m below the lowest point of the precinct. Gross pollutant traps are provided upstream of all underground tanks and drainage basins to collect debris prior to the tank. Water sensitive urban design principles suggest that 2% of the development area should be allocated to biofiltration. As the precinct area is 4.2 ha, a total of 840 m2 of biofiltration area is required, which can be accommodated within the swales provided. All pits are typically either grated gully pits or manholes as per Main Roads standard details with 1200 mm diameter liners.
- Runoff from the Eastern portion of the Station Building and Bus Interchange is captured in traditional pit and pipe networks and conveyed to an underground tank located to the west of the Bus Interchange. Two manholes to accommodate hydraulic connections are provided on the eastern side of the station building. Runoff from the paved are immediately east of the station building is captured in a strip drain located on the property boundary which is also discharged into these manholes. The drainage tank has been located to fall within the area between the future PTA boundary and the busway. During large storm events the tank is expected to surcharge via the northernmost pits with stormwater flowing easterward to the NSR2 road reserve. Future design will seek to discharge runoff from the station building to the rail corridor.
- The central space within the kiss-and-ride area has been utilised as a swale. The kiss-and-ride and surrounding areas are graded towards the swale. Threshold drainage on the boundary to the east of the kiss-and-ride is provided by grated trench drains located on the boundary, which is also discharged to the kiss-and-ride swale via a pit and pipe network. This swale is sized to store the 10% AEP storm with approximately 300 mm ponded depth. Drain blocks are required at regular intervals to maximise storage and infiltration within the swale. During large storm events the swale is expected to surcharge within the kiss-and-ride area, before overflowing to the adjacent road reserve via the kiss-and-ride access road.
- The drainage strategy for the Station Building and Bus Interchange is mostly mirrored on the western side of the rail corridor. Runoff from the western side of the station building is captured in a grated trench drain located on the station boundary. Runoff from the Bus Interchange is captured in traditional pit and pipe networks. Hydraulic connections are also provided on the western side of the station building. Pipe networks on the western side of the station all discharge into an underground tank located west of the Bus Way. This tank is also sized to accommodate runoff from the future bus interchange access roads.

- The geometric constraints have limited the ability to accommodate swales in the north-western carpark (Carpark 2). Aggregate trenches are therefore proposed as an alternative, between the rows of parking bays. These aggregate trenches are 1 m wide to fit between the wheel stops of abutting parking bays. Analysis of the size of these trenches using PC Sump has indicated that a depth of approximately 1m would be required to accommodate the 63.2% AEP 1hr storm event. A grated pit located at the end of the trench is used to convey flows larger than the design storm event into the wider piped drainage system. Future design should seek to rationalise the depth of the aggregate trenches where possible and optimise for trees and lighting. The western aisle of the carpark is drained by a traditional pit and pipe network, which discharged to a conventional basin located at the northern extent of the carpark. Storm events larger than the 10% AEP will overtop the basin and stormwater will flow into the adjacent road reserve to the west.
- The majority of runoff from the other carpark (Carpark 1) to the north-east of the station is captured in swales, which infiltrate some of the 10% AEP storm volume. Catchpits are provided to convey ponded water depths of more than 300 mm to the basin located in the south-east corner of the carpark. During large storm events the basin is expected to surcharge via the northern swales to pond within the carpark. Ponding is limited to 200mm before stormwater is discharged out of the carpark via a kerb opening in the north-eastern corner. A smaller basin is provided to the north of the carpark to accommodate flows from a small piped network. During large storm events the basin is expected to overtop and runoff will flow north into the adjacent bushland.

A preliminary drainage catchment plan outlining these arrangements is provided at **Appendix G** of this report. It is expected that further detailed design of the drainage system will be delivered through a condition of approval, similar to Condition 12 of the Phase1 approval which required:

> *A Drainage Management Plan shall be prepared to the satisfaction of the Western Australian Planning Commission on the advice of the Department of Water and Environmental Regulation and the City of Wanneroo, prior to the commencement of relevant building works. Once approved, the plan is to be implemented in its entirety.*

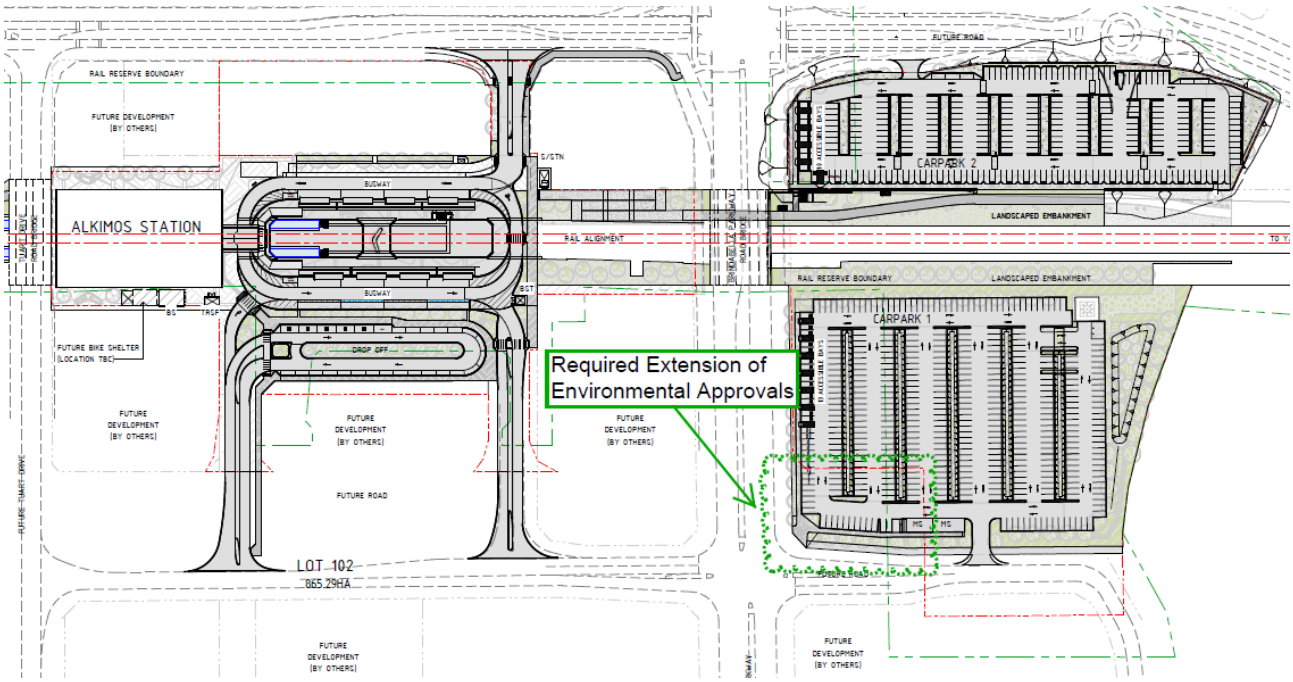
5.4. ENVIRONMENTAL APPROVALS

As outlined in the Phase 1 development application report, the creating and disturbance of vegetation associated with the construction works for Butler to Eglinton (including the Alkimos Station) have been granted approval under Ministerial Statement 1100, and is also covered under the Federal environmental approval via an EPBC deed between PTA and Lendlease as the EPBC Approval holder for the Alkimos Central landholding.

With the redesign of the North East Carpark to accommodate the realignment of NSR3, the footprint for the Alkimos Station extends slightly beyond the YRE Ministerial Statement 1100 approval boundary, requiring a formal submission to the EPA to amendment the boundary via the Section 45c process (Refer to **Figure 12**). Given the relatively small size of the additional area, and that the area was previously cleared under the Alkimos stockpile DA approval, the amendment is considered administrative and it is anticipated the S45c will be approved.. Regardless, the project team is aware that it cannot commence clearing in this part of land until the amended clearing approval has been granted.

Ultimately, the car park infrastructure is due to commence late in the construction program, so this additional procedural requirement is not expected to delay the project.

Figure 12 - Extension of Environmental Approval



6. STATUTORY PLANNING ASSESSMENT

The statutory planning outcomes remain largely unchanged by the modifications proposed through the Phase 2 development application. Regardless, a summary of the key planning framework is presented in the following table.

Table 10 Statutory Planning Assessment

DOCUMENT	SUMMARY
Railway (METRONET) Act 2018	The *Railway (METRONET) Act 2018 (***METRONET Act**) is the enabling legislation applicable to the construction of the METRONET railway extensions. Section 3 specifically provides the authority to construct the Yanchep Rail Extension. The legislation constitutes a special Act for the purposes of the *Public Works Act 1902*. From a planning approvals perspective, this enabling legislation introduced a number of exemptions from planning approval beyond what is provided for within the PD Act and Metropolitan Region Scheme. Specifically, Section 6 of the METRONET Act provides the following exemption applicable to this application: *Despite anything in the Metropolitan Region Scheme, the following development may be commenced or carried out without the approval of the Planning Commission —* *…* *(B) METRONET works on non-railway land.* This clause will provide an exemption from planning approval for the majority of METRONET works. Importantly, for the construction or alteration of a railway station, or any related car parks, public transport interchange facilities or associated means of pedestrian or vehicular access, the requirements under the Metropolitan region Scheme will apply. As this development application fundamentally involves the construction of a railway station, a development application is required. However, some works ancillary to the station will continue to be exempt from approval under this clause. These exemptions have been documented through an ‘Exemptions Report’ which covered the entire Yanchep Rail Extension line, which has been provided as a separate document to the DPLH.
Planning and Development Act 2005	Section 6 of the PD Act states provides exemption for the requirement to obtain planning approval under the relevant local planning scheme for ‘public works’ or the taking of land associated with that public work. The Alkimos Station works will thereby meet the Section 6 exemption, and does not require approval under the City’s local planning scheme.
Metropolitan Region Scheme (MRS)	The proposed Alkimos Station is located within the ‘Railways’ Reservation and ‘Central City Area’ zone under the MRS. The development of a multi-modal railway station is consistent with these zones and reservations, as it delivers an ‘infrastructure first’ model of urban development, which provides genuine opportunities for supporting transport orientated development in the Alkimos Activity Centre.

Planning Control Area No. 132 (PCA 132)	The proposed Alkimos Train Station works are wholly located within PCA132, which has been established for the purpose of facilitating the development of the land for the purpose of railways and related public purposes. Under Section 130 of the PD Act, the PCA provisions prevail over every other provision of the PD Act, including any region planning scheme or local planning scheme. However, this alone does not negate the requirement to obtain approval under the region planning scheme or local planning scheme, where applicable.
Alkimos Activity Centre Plan (as adopted)	SPP4.2 identifies Alkimos as an 'Secondary Centre' in accordance with the activity centre hierarchy, and requires an activity centre plan prior to development occurring. The Alkimos ACP was prepared in 2018 on behalf of the then LandCorp (now DevelopmentWA) to guide development within the Alkimos Secondary Centre. This Alkimos ACP provided limited design guidance for the land immediately surrounding the Alkimos Station, which is understood to be the result of the then pending announcement of the METRONET YRE project.
Draft Alkimos Activity Centre Plan	At the time of writing this report, DevelopmentWA was in the progress of completing an amendment to the Alkimos Activity Centre Plan to substantially modify the approve structure plan. This amendment has yet to be lodged for assessment, and is therefore not a 'seriously entertained' document and does not technically form part of the assessment framework. Regardless, the project team has been in regular discussion with DevelopmentWA to seek the greatest alignment between the station design and surrounding development. Further discussion on the design outcomes which have resulted from negotiations with DevelopmentWA are summarised in Section 4.1 of this report.

7. CONCLUSION

The METRONET Yanchep Rail Extension from Butler Station to Yanchep set out to implement best practice urban design and transport planning principles to the emerging north west corridor of Perth. The Phase 2 Alkimos Station continues to adopt this approach, which by placing the Alkimos multi-modal station within the planned Alkimos Secondary Centre creates the foundations for successfully achieving transport orientated development, and embedding opportunities for urban development without creating sole reliance on the private vehicle.

The Phase 2 Alkimos Station design continues to adopt the essential pillars of a contemporary station, including:

- A pedestrian first approach to the station building design. Specifically, the 'cut and cover' design of the Alkimos Station creates an 'at-grade' entrance experience to the station concourse, and enables the station building and adjacent forecourt to form a seamless link across the railway line.
- The co-location of the bus interchange and station building reduces the total journey time for multi-modal trips, making bus-to-train transport a more practical and feasible option for patrons. This bus interchange is also located above the railway line for Alkimos, which results in a large station forecourt with highly permeable movement over the railway line.
- Recognising the need for park-and-ride facilities for a train station in an emerging urban centre, but deliberately locating these facilities beyond the immediate station precinct.
- Co-location of the station with the future town square, and opportunities for green links and public open space network connections to improve the travel experience from the surrounding future residential areas. These opportunities have been further enhanced by the inclusion of Brindabella Parkway and Tuart Drive bridges, which improve permeability over the railway line and accessibility into the station.

However, the Phase 2 development application has improved on the interim design that was previously approved by the WAPC, through the following key layout enhancements:

- The construction of Brindabella Bridge and Tuart Drive, and supporting connecting road network, enables the kiss-and-ride parking and the majority of bus movements to be focussed to the east of the railway line. This measure will reduce the quantity of vehicles travelling align the envisioned western main street.
- The eastern station precinct has been redesigned with input from DevelopmentWA, with the intent to improve the future built form outcomes in this area. Most notably, this has included an extension to the eastern vehicle access points, to ultimately allow for improved interface with the adjoining kiss-and-ride area.
- Minor improvements to the station building design, which most notably includes removal of the valance.

As the Alkimos Station was ultimately intended to provide infrastructure on both sides of the station, the Phase 2 development application will enable the ultimate design to be constructed day one, and avoids a costly staged delivery.

Whilst the development application is for 'public works' and has limited statutory assessment controls, this has in no way resulted in a compromised design outcome for the Alkimos Station. Importantly, the Alkimos Station will remain a catalyst for further high-quality transport oriented development within the Alkimos Activity Centre.

DISCLAIMER

This report is dated May 2021 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd **(Urbis)** opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of NEWest Alliance **(Instructing Party)** for the purpose of Development Application **(Purpose)** and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

In preparing this report, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

In preparing this report, Urbis may rely on or refer to documents in a language other than English, which Urbis may arrange to be translated. Urbis is not responsible for the accuracy or completeness of such translations and disclaims any liability for any statement or opinion made in this report being inaccurate or incomplete arising from such translations.

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

APPENDIX A ALKIMOS PHASE 1 DEVELOPMENT APPROVAL

Western Australian Planning Commission

Our Ref : 30-50419-1
Your Ref :
Enquiries : David Sands (Ph 6551 9270)

Urbis
Level 14, 1 William Street
PERTH WA 6000

Application for Approval to Commence Development plans dated 15 September 2020 received 15 September 2020.

Lot Number	:	2 & 2000
Location	:	-
Plan / Diagram	:	409771, 419385
Volume/Folio	:	2914/420, 2985/162
Locality	:	2570 Marmion Avenue, Alkimos
Owner	:	City Of South Perth 199 Thelma Street COMO WA 6152; Western Australian Planning Commission Locked Bag 2506 PERTH WA 6000

Under the provisions of the *Planning and Development Act 2005* this application has been referred for determination by the Western Australian Planning Commission.

The application has now been considered by the Commission and the formal notice setting out the terms of the decision is attached.

A copy of this decision has been forwarded to the Local Government for information.

Where the Commission refuses approval to commence development in a planning control area, or grants permission subject to conditions that are unacceptable to the applicant, the owner may claim compensation for such injurious affection in accordance with the provisions of Section 186 of the *Planning and Development Act 2005.*

Should the applicant be aggrieved by this decision there is a right to apply for a review pursuant to the provisions of Section 250 of the *Planning and Development Act 2005*. Such an application for review must be submitted to the State Administrative Tribunal, Level 6, State Administrative Tribunal Building, 565 Hay Street, PERTH WA 6000 in accordance with Part 14 of the *Planning and Development Act 2005*.

140 William Street, Perth, Western Australia 6000, Locked Bag 2506 Perth, 6001
Tel: (08) 6551 8002; Fax: (08) 6551 9001; Infoline: 1800 626 477
e-mail: info@dplh.wa.gov.au; web address http://www. dplh.wa.gov.au
ABN 35 482 341 493

It is recommended that you contact the State Administrative Tribunal for further details (telephone 9219 3111) or go to its website: http://www.sat.justice.wa.gov.au.

Ms Sam Fagan
Secretary
Western Australian Planning Commission
7 January 2021

140 William Street, Perth, Western Australia 6000, Locked Bag 2506 Perth, 6001
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e-mail: info@dplh.wa.gov.au; web address http://www. dplh.wa.gov.au
ABN 35 482 341 493

Our Ref : 30-50419-1
Your Ref :
Enquiries : David Sands (Ph 6551 9270)

PLANNING AND DEVELOPMENT ACT 2005

City of Wanneroo

APPROVAL TO COMMENCE DEVELOPMENT

Name and Address of Owner and Land on which Development Proposed:

Owner	:	City Of South Perth 199 Thelma Street COMO WA 6152; Western Australian Planning Commission Locked Bag 2506 PERTH WA 6000
Lot Number	:	2 & 2000
Location	:	-
Plan / Diagram	:	409771, 419385
Volume/Folio	:	2914/420, 2985/162
Locality	:	2570 Marmion Avenue, Alkimos
Application Date	:	15 September 2020
Application Receipt	:	15 September 2020
Development Description	:	Yanchep Rail Extension - Alkimos Train Station

That the Western Australian Planning Commission resolves to approve the application for works to, and associated with the upgrade of the Alkimos Train Station and within Planning Control Area No.132 subject to the following conditions and advice:

CONDITIONS:

1. This approval relates to the development of Alkimos Train Station as depicted on the attached plans date stamped 16 September 2020 by the Department of Planning, Lands and Heritage on behalf of the Western Australian Planning Commission. This decision constitutes development approval only and is valid for a period of two years from the date of approval. If the subject development is not substantially commenced within two years, the approval shall lapse and be of no further effect.

140 William Street, Perth, Western Australia 6000, Locked Bag 2506 Perth, 6001
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e-mail: info@dplh.wa.gov.au; web address http://www. dplh.wa.gov.au
ABN 35 482 341 493

Prior to the commencement of site works

2. A Construction Management Plan shall be submitted and approved by the Western Australian Planning Commission, on the advice of the City of Wanneroo, prior to the commencement of site works. Once approved, the Construction Management Plan is to be implemented in its entirety.

3. Traffic Management Plan for construction shall be submitted and approved by the Western Australian Planning Commission, on the advice of the City of Wanneroo, prior to the commencement of site works. Once approved, the Traffic Management Plan is to be implemented in its entirety.

4. An Earthworks Plan shall be submitted and approved by the Western Australian Planning Commission, on the advice of the City of Wanneroo, prior to the commencement of site works. The plan is to show existing ground levels, extent of fill and drainage and finished ground levels which match or otherwise coordinate with the existing and/or proposed finished ground levels of the abutting land. Once approved, the plan is to be implemented in its entirety.

5. Bushfire Emergency Evacuation Plan for construction shall be submitted and approved by the Western Australian Planning Commission, on the advice of the City of Wanneroo and Department of Fire and Emergency Services, prior to the commencement of site works for the area included within this development.

Prior to the commencement of relevant building works

6. The Bushfire Management Plan submitted with this application shall be updated to address the following:

    - Authored by a Level 3 Accreditation of Bushfire consultant;
    - Bushfire Emergency Evacuation Plan;
    - Two vehicle access routes that connect to the public road network;
    - Vegetation classification;
    - Measures to reduce the bushfire hazard; and
    - Emergency services access to both side of the train station.

    The updated Bushfire Management Plan is to be submitted and approved by the Western Australian Planning Commission, on advice of the City of Wanneroo and the Department of Fire and Emergency Services and implemented in its entirety.

7. Architectural design plans and a Schedule of Materials and Finishes showing the architectural features and design treatments being applied to the station shall be submitted and approved by the Western Australian Planning Commission, on the advice of the City of Wanneroo, prior to the commencement of relevant building works. Once approved, the plan is to be implemented in its entirety.

8. A Lighting Plan to highlight architectural detailing and public areas and promote safety, visual interest and activation shall be submitted and approved to the

140 William Street, Perth, Western Australia 6000, Locked Bag 2506 Perth, 6001
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e-mail: info@dplh.wa.gov.au; web address http://www. dplh.wa.gov.au
ABN 35 482 341 493

satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo, prior to commencement of relevant building works. Once approved, the plan is to be implemented in its entirety thereafter.

9. Detailed Landscape Plan shall be submitted and approved by the Western Australian Planning Commission, on the advice of the City of Wanneroo, prior to the commencement of relevant building works. Once approved, the Landscape Plan is to be implemented in its entirety.

10. Road Safety Audits shall be submitted and approved by the Western Australian Planning Commission, to the specification of the Department of Transport and on the advice of the City of Wanneroo, for all permanent road connections (including all new or modified road connections and intersections) prior to commencement of road works.

11. A detailed Movement Network Plan shall be submitted and approved by the Western Australian Planning Commission, on the advice of the City of Wanneroo and the Department of Transport, prior to the commencement of relevant building works. Once approved, the plan is to be implemented in its entirety.

12. A Drainage Management Plan shall be prepared to the satisfaction of the Western Australian Planning Commission on the advice of the Department of Water and Environmental Regulation and the City of Wanneroo, prior to the commencement of relevant building works. Once approved, the plan is to be implemented in its entirety.

13. An Environmental Noise Assessment shall be prepared by a qualified acoustic consultant and submitted and approved to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo, prior to commencement of works. This assessment is to include the location of mechanical service plant, bus interchange and car parking. All noise attenuation measures, identified by the report shall be implemented prior to operation of the Train Station.

14. A Public Art Strategy being submitted and approved to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo. Once approved, the strategy shall be implemented in its entirety.

<u>Prior to the commencement of station operations</u>

15. A Signage and Way-finding Plan shall be submitted and approved to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo. Once approved, the plan is to be implemented in its entirety prior to the commencement of station operations, and maintained thereafter by the proponent.

16. The station shall be provided with a minimum of one public road access from the surrounding road network prior to the commencement of operation, to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo.

General

17 All structures which are the subject of this application are to be applied with an anti-graffiti coating immediately upon completion to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo. Any graffiti shall be removed as soon as possible by the management authority.

18. Any damage or removal of vegetation located outside the development area that does not form part of permanent infrastructure and incurred during the construction process shall be replaced or repaired at the cost of the landowner/applicant, to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo.

19. All storage areas, external fixtures and building plant, including air conditioning units shall be located so as to minimise any visual and noise impacts, and shall be screened from view from streets, civic spaces and adjacent properties to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Wanneroo.

20. The approval of Car Park 1 is temporary and time limited until a permant car park area is constructed (additional to Car Park 2). Upon completion of the additional car park area, Car Park 1 shall be removed and land shall be reinstated at the cost of the applicant to the satisfaction of the Western Australian Planning Commission, on advice of the City of Wanneroo.

ADVICE NOTES

1. The applicant is advised that this is a development approval under the Metropolitan Region Scheme. It is not an approval to commence or carry out development under any other law. It is the responsibility of the applicant to obtain any other necessary approvals, consents, permits and licences required under any other law, and to commence and carry out development in accordance with all the relevant laws. All requirements under Ministerial Statement 1129 under Section 45 of the Environmental Protection Act 1986 are still a requirement of the Office of the Environmental Protection Authority.

2. All development should comply with the provisions of the Building Code of Australia, Health Regulations, Public Building Regulations and all other relevant Acts, Regulations and Local Laws, including obtaining any relevant permits and licences. Additional approvals/licences may be required to ensure compliance with State Government environmental legislation.

3. In relation to Condition 2, the Construction Management Plan is expected to include the site-specific management, mitigation and monitoring measures to manage the issues of surface water, groundwater, vegetation and flora, geotechnical conditions, acid sulfate soils, aboriginal heritage, noise, vibration, dust and lighting or other matters as agreed by the environmental authorities and/or in consultation with the City of Wanneroo and the WAPC.

140 William Street, Perth, Western Australia 6000, Locked Bag 2506 Perth, 6001
Tel: (08) 6551 8002; Fax: (08) 6551 9001; Infoline: 1800 626 477
e-mail: info@dplh.wa.gov.au; web address http://www. dplh.wa.gov.au
ABN 35 482 341 493

In addition, the Construction Management Plan is to address, but not be limited to, the following site specific matters:

a. A staging plan;
b. Storage of materials and equipment;
c. Delivery of materials or equipment to the site;
d. Parking arrangements for contractors and subcontractors;
e. Waste management;
f. Emergency evacuation plan;
g. Dust management;
h. Hours of operation, timeframes and responsibility for tasks identified;
i. Consultation and communication strategy; and
j. Any other matters likely to impact on surrounding properties and public areas

Construction Management Plans may be provided for separate works packages (i.e. forward works) prior to their commencement, provided each management plan contains an overview of staging and the relationship between works packages.

4. In relation to Condition 3, the Traffic Management Plan is to address:

a. Traffic volumes from proposed work/activities;
b. Construction activities;
c. Maintenance of access to adjacent private properties;
d. Arrangements for general traffic detours;
e. Process for modifying haulage routes or agreed management arrangements, including any departure outside of approved haulage operations timeframes; and
f. Communications with landowners and the wider community.

5. In relation to Condition 4, the Earthworks Plan should include the following:

g. existing and proposed ground levels; and
h. engineering drawings and detailed cross sections of the entire application area.

6. In relation to Condition 7, the Architectural Design Plan is to show the architectural features and design treatments and is to address:

i. Station buildings, entrances and façade (including glazing);
j. The screening of storage areas, external fixtures and building plant, including air condition units.
k. All service areas are to be designed as an integral component of the development or screened from public view, to minimise impacts on the architectural quality of the station buildings and public realm; and
l. Sustainability measures and associated design features included in the station design.

7. In relation to Condition 9, the Landscape Plan is to address:

   m. Landscaping layout and design;
   n. Detailed plans illustrating responses to grade differences and transitions;
   o. Detail of treatments adjacent to the Principle Share Path including the transition through the station forecourt;
   p. Additional trees to be incorporated for shade canopy;
   q. Deep soil locations for shading trees;
   r. Planting specifications to include a plant legend including botanical and common names, and the quantity of each species;
   s. Cross-sections for car park drainage swales to include drainage function, plant species, and kerbing;
   t. Furniture specification and locations;
   u. Fencing specification and location;
   v. Maintenance of landscape areas; and
   w. Reticulation systems.

8. In relation to Condition 11, the detailed Movement Network Plan is to include cross-sections and engineering drawings to address:

   x. all new and modified road connections and intersections;
   y. access points and internal driveways;
   z. car parking areas;
   aa. bus interchange;
   bb. location and design of dedicated pedestrian paths and crossings facilities through the park and ride and bus interchange facility;
   cc. the location of the Principle Share Path including any 180 degree turns (switch-backs), access through the station forecourt and crossing points of roads and pedestrian pathways; and
   dd. design of cycling facilities, including paths and bicycle storage.

   The movement network plan should respond to the findings of the road safety audit where appropriate.

9. In relation to Condition 12, the Drainage Management Plan is to address:

   a. Water sensitive urban design initiatives;
   b. Management of groundwater levels and any proposed dewatering;
   c. Final surface and groundwater levels;
   d. Detailed design and construction of new stormwater drainage systems to deal with 1 in 1; 1 in 5 and 1 in 100 year ARI events;
   e. Storm water is to be contained on-site (to the maximum extent possible), or appropriately treated and connected to the local drainage system.
   f. Water quality management approaches;
   g. Detailed engineering drawings and specifications; and
   h. Management, maintenance and funding arrangements.

140 William Street, Perth, Western Australia 6000, Locked Bag 2506 Perth, 6001
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ABN 35 482 341 493

10. In relation to Condition 14, the public art strategy should demonstrate best practice (procurement, stakeholder engagement, design direction and integration within the development), and include details of:
    i. the type and location of artworks;
    j. how artworks respond to any identified public art themes;
    k. design intent and purpose;
    l. processes to design documentation;
    m. detailed plans of the artwork;
    n. cost calculations;
    o. public liability insurance (as applicable); and
    p. maintenance details.

    The applicant should liaise with the Department of Planning Lands and Heritage and METRONET to determine the public art contribution.

11. In relation to Condition 15, the Signage and Wayfinding Plan is to address:

    a. The design, dimensions and locations of any signage relevant to the station and its immediate environs;
    b. Signage required for the wider precinct to inform route choice in accessing the station and associated infrastructure; and
    c. Signage as required for the Principle Share Path to address the intersection with pedestrian and vehicle access routes.

12. The landowner/applicant is advised to investigate whether approval is required pursuant to the Aboriginal Heritage Act 1972. The landowner/applicant should conduct a search of the Register of Aboriginal Sites to determine if any aboriginal sites have been recorded in the vicinity of their application, and this heritage information should be submitted to the Department of Planning Lands and Heritage (Indigenous Affairs) with a request for advice.

13. The proponent is advised to liaise with the Water Corporation's Project Manager, Metronet Project Team (Tel. 94203332) for advice In relation to the protection and/or relocation of assets and to ensure the detailed engineering designs for station works and particularly the road bridge crossings make adequate provisions for planned water and sewerage pipe crossings.

14. This property is on a site where records confirm there is a history of military activities that have resulted in residual UXO. A possibility exists that dangerous items of UXO may still be found on this site. Contact police if a suspicious item that may be UXO is found. Visit www.defence.gov.au/uxo for further information.

15. Main Roads WA advises that the installation of traffic signals requires their approval, and must be evaluated with reference to the Main Roads' Roundabouts and Traffic Signals Guidelines for the Selection of Intersection Control (November 2015) and Main Roads Traffic Signal Approval Process.

If the development the subject of this approval is not substantially commenced within a period of two years from the date of this letter, the approval shall lapse and be of no further effect. Where an approval has so lapsed, no development shall be carried out without the further approval of the responsible authority having first been sought and obtained.

Ms Sam Fagan
Secretary
Western Australian Planning Commission
7 January 2021

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e-mail: info@dplh.wa.gov.au; web address http://www. dplh.wa.gov.au
ABN 35 482 341 493

SERVICE LEGEND

DRAINAGE	
COMBO PIT	
GRATE	
SIDE ENTRY PIT	
STORM WATER MANHOLE	

ELECTRICITY	
CABLE MANHOLE	
CABLE PIT / BOX	ECP ECB
CABLE DOME	
CONSUMER POLE	CP
LIGHT POLE	LP
POWER POLE	PP
STAY POLE	SP
STAY WIRE ANCHOR	SWA
O/H POWER LINE	

GAS	
GAS MANHOLE	
GAS MARKER	G
GAS METER	GM
GAS VALVE	GV

SEWERAGE	
SEWER MANHOLE	
PROPERTY CONNECTION	PC
SEWER LINE	

TELECOMMUNICATION	
TEL / COMMS MANHOLE	
TEL / COMMS MARKER	T C
TEL / COMMS PIT	TEL COM

WATER	
FLUSH POINT	FP
HYDRANT	HY
STOP VALVE	SV
TAP	TAP
WATER MARKER	W
WATER METER	M
WATER LINE	

SURVEY	
DATUM	
PEG FOUND	PF

OTHER	
AWNING / EAVES	
ROOF RIDGE	
FLOOR RL	
WINDOW / DOOR	1ST
BANK - BOTTOM	
BANK - TOP	

SERVICE RECORD

SERVICE \ STATUS	LOCATED	AVAILABLE	NO SERVICE	CONFIRM
WATER		✓		
SEWERAGE		✓		
GAS				✓
TEL / COMM				✓
POWER U/G				✓
POWER O/H				✓

SERVICES MARKED CONFIRM REQUIRE BUILDER / CLIENT TO CONFIRM POSITION AND / OR AVAILABILITY ON SITE.

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

NOTE:
AHD LEVEL DERIVED BY OTHERS.

NOTE:
PLAN PRODUCED FOR DEVELOPMENT APPROVAL PURPOSES ONLY
NOT INTENDED FOR DESIGN.

WARNING!
BOUNDARY RE-ESTABLISHMENT SURVEY REQUIRED TO CONFIRM LOT BOUNDARY POSITION AND DIMENSIONS.

BOUNDARY INFORMATION SOURCED FROM WATER CORP.

REV	DESCRIPTION	DRN	DATE	APP
A	ISSUED TO CLIENT	CB	10/08/2020	JM

LOT : ALKIMOS STATION
SUBURB : ALKIMOS
AUTHORITY : CITY OF WANNEROO
C/T :

BUILDERS / CLIENTS: SITE SURVEY only. The information shown on this plan is current at the time of survey. Verify boundary information, easements etc. from the Certificate of Title, Plan / Diagram or a Boundary Repeg. Boundary position approximate only. Location of boundary pegs or fences in relation to the boundary lines are not guaranteed. Sewer / water may vary from schematic presentation, clearances to be checked on site. Confirm service information with relevant Authorities. Refer to "Dial Before You Dig" for underground service confirmation. Consult Land Surveys on any anomaly before design and construction.

SCALE : 1:1250 @ A0 Landscape
25 0 12.5 25 50 75

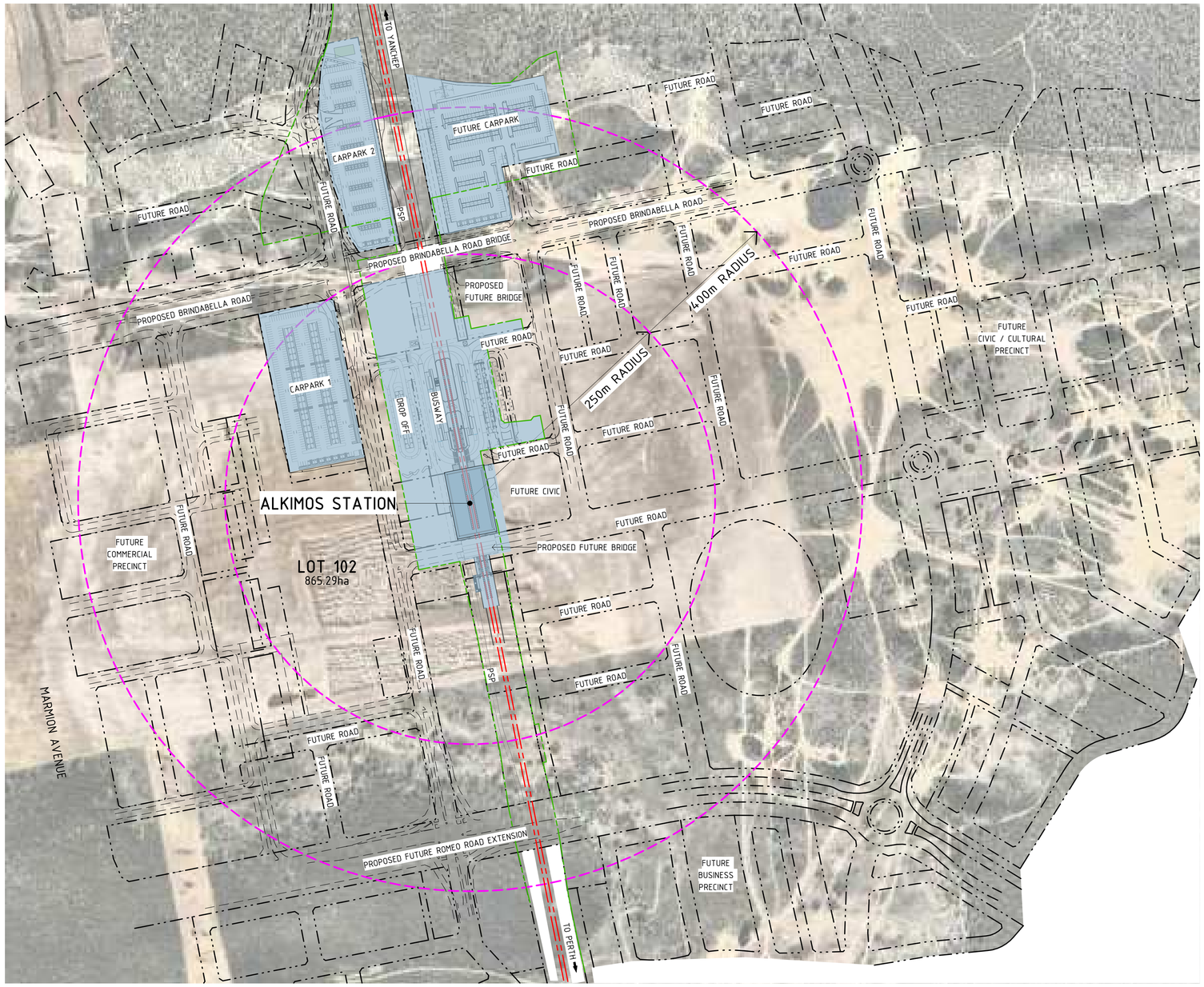
CLIENT : NEWEST ALLIANCE
SURVEYED ON : -
SURVEYOR : -
DRAFTER : CB

Land Surveys
19 Brennan Way
BELMONT WA 6104
Telephone (08) 9477 4477
Fax (08) 9477 4499
admin@landsurveys.net.au

JOB No : 2000591 - PLAN: FS - DRG: 004 - REV. A SHEET 1 OF 1

C:\Users\cbilson\Land Surveys\NEWest Alliance TCL & YRE - Documents\07 Drafting\073 Feature\0731 Feature Plans\Alkimos Station\1000563-FS-004-A Alkimos Station.dwg

LS F 220



SITE ANALYSIS AND CONTEXT PLAN OVERALL LAYOUT

SCALE 1 : 2500

NOTES

1. ALL FUTURE ROADS AND BRIDGES ARE SHOWN FOR INFORMATION PURPOSES ONLY.
2. PROPOSED ROAD RESERVE BOUNDARY IS SUBJECT TO CHANGE BASED ON FURTHER DESIGN AND INVESTIGATION.

LEGEND

- EXISTING CADASTRAL BOUNDARIES
- RAILWAYS RESERVE BOUNDARY
- LOT BOUNDARIES (STATION)
- BUTLER TO YANCHEP RAIL
- FUTURE ROADS BY OTHERS
- FUTURE LOT BOUNDARIES BY OTHERS
- PROPOSED ALKIMOS STATION

N

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B	21.08.20	CARPARK 2 UPDATED	BP	BL	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

NEWest Alliance

TCY-CAP-YSA-AR-DRG-01

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

–

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE

–

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE –

Government of Western Australia Public Transport Authority

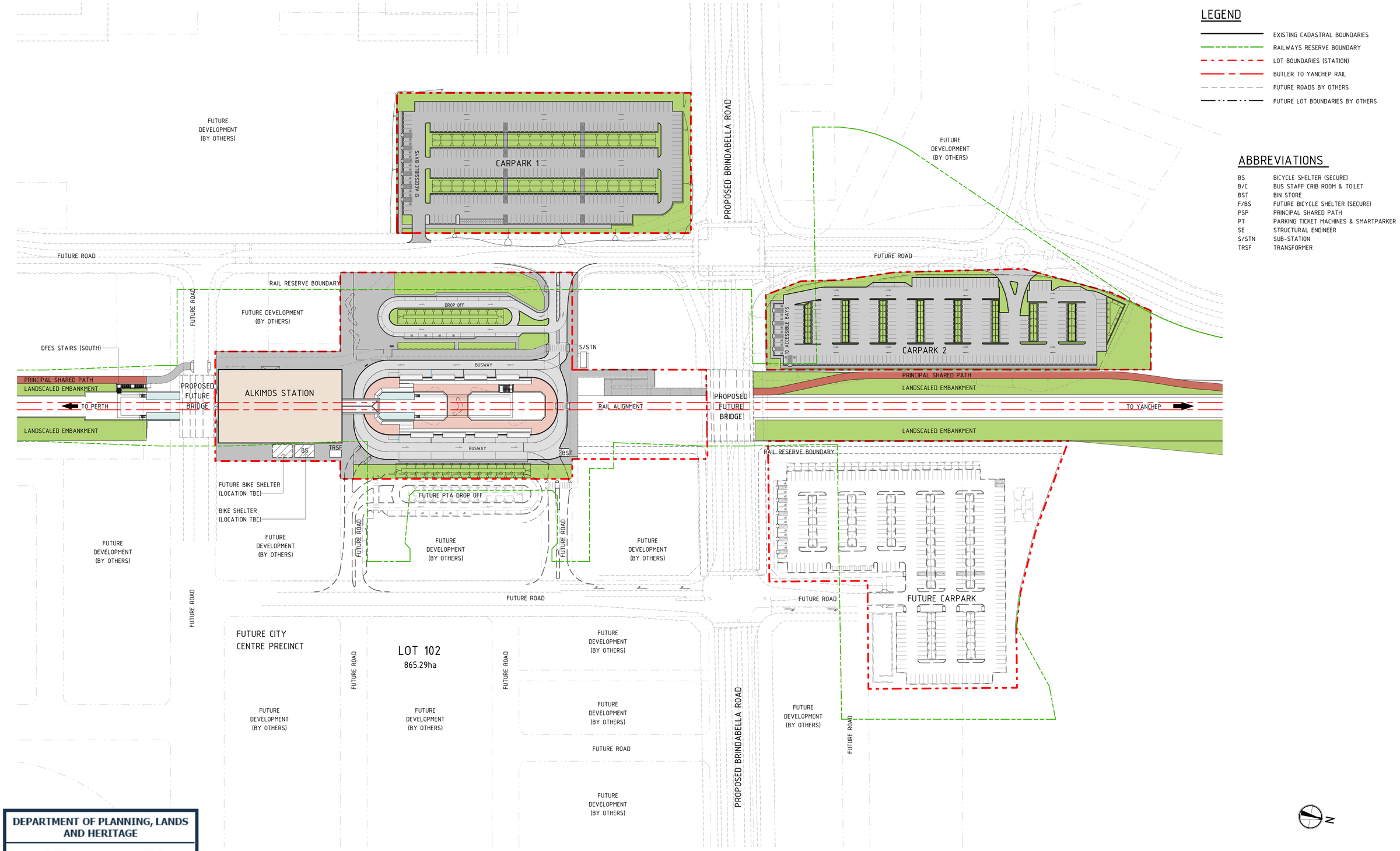
YANCHEP RAIL EXTENSION

ALKIMOS STATION
SITE ANALYSIS AND CONTEXT PLAN OVERALL LAYOUT

PTA Drawing No:

REV: B

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt



DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE 16-Sep-2020 FILE 30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B	21.08.20	CARPARK 2 UPDATED	BP	BL	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

NEWest Alliance

TCY-CAP-YSA-AR-DRG-02

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP –

DESIGNED B. PRIEST
DRAWN B. LADYMAN
CHECKED A. WHEELER

APPROVED FOR ISSUE –
EXECUTIVE DIRECTOR PTA Division / External Company
DATE –

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
SITE PLAN

PTA Drawing No: REV: B

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

LEGEND

- EXISTING CADASTRAL BOUNDARIES
- RAILWAYS RESERVE BOUNDARY
- LOT BOUNDARIES (STATION)
- BUTLER TO YANCHEP RAIL
- FUTURE ROADS BY OTHERS
- FUTURE LOT BOUNDARIES BY OTHERS
- STATION PLATFORMS
- STATION BUILDINGS
- BUTLER TO YANCHEP RAIL RESERVE
- LAND REQUIRED BY PTA FOR THE PURPOSE OF STATION

CARPARK 1

FUTURE DEVELOPMENT (BY OTHERS)

CARPARK 2

DROP OFF

BUSWAY

RAIL RESERVE BOUNDARY

PROPOSED FUTURE BRIDGE

ALKIMOS STATION

TO PERTH

RAIL ALIGNMENT

PROPOSED FUTURE BRIDGE

TO YANCHEP

BUSWAY

RAIL RESERVE BOUNDARY

FUTURE DROP OFF

FUTURE DEVELOPMENT (BY OTHERS)

CARPARK 3 (FUTURE)

FUTURE CITY CENTRE PRECINCT

LOT 102
865.29ha

PROPOSED BRINDABELLA ROAD

N

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

ORMATION PLAN

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B	21.08.20	CARPARK 2 UPDATED	BP	BL	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-03

REFERENCES

SCALE : As indicated (@ A1)

DATUM :
HORIZONTAL: PCG20
VERTICAL: AHD71

PTA ACCEPTANCE STAMP
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DESIGNED B. PRIEST
DRAWN B. LADYMAN
CHECKED A. WHEELER

APPROVED FOR ISSUE
-
EXECUTIVE DIRECTOR
PTA Division / External Company
DATE -

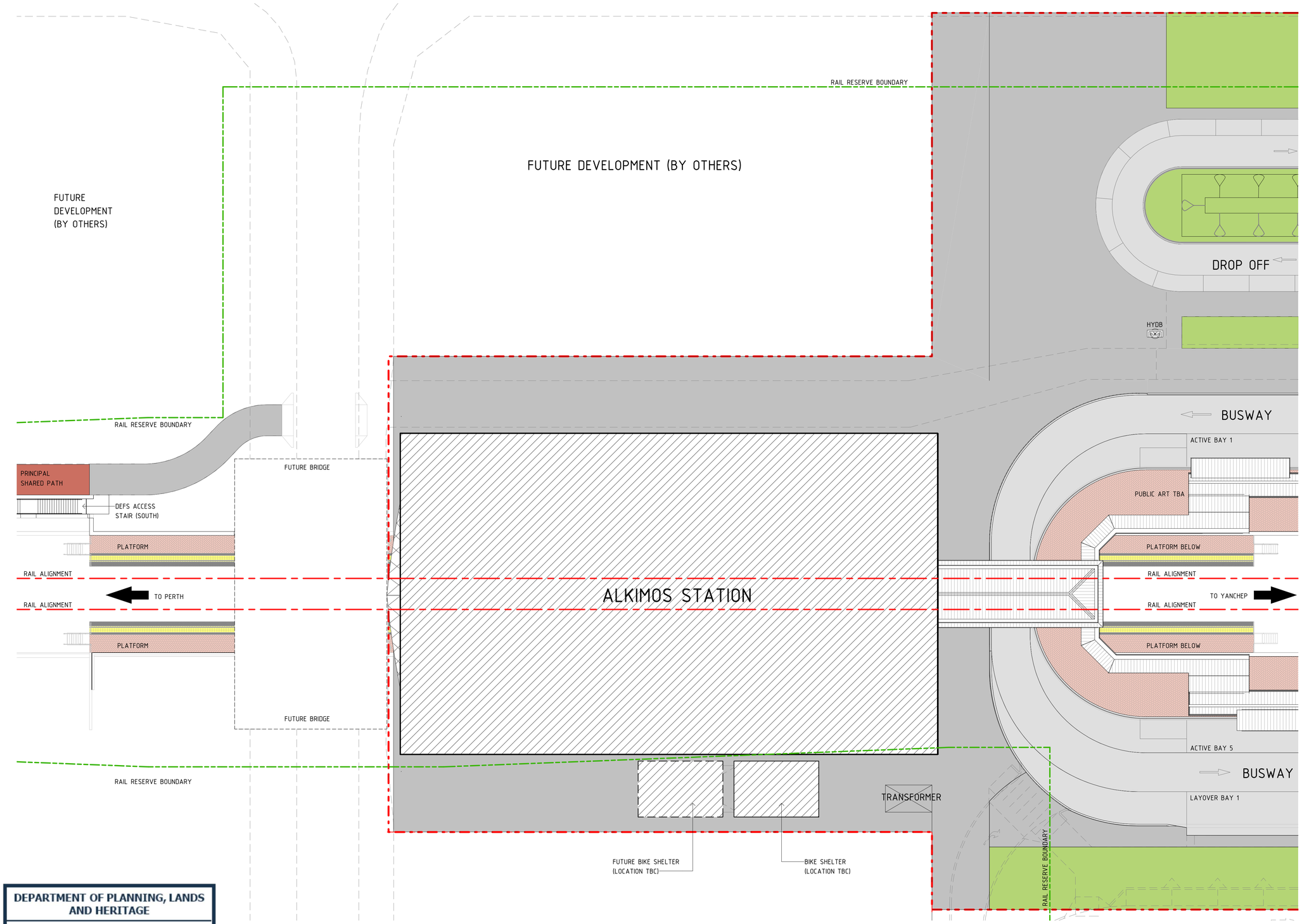
Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
LAND REQUIREMENTS & SITE INFORMATION PLAN

PTA Drawing No:

REV: B



DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

SCALE 1 : 250

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-04

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP –

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE –

EXECUTIVE DIRECTOR PTA Division / External Company

DATE –

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

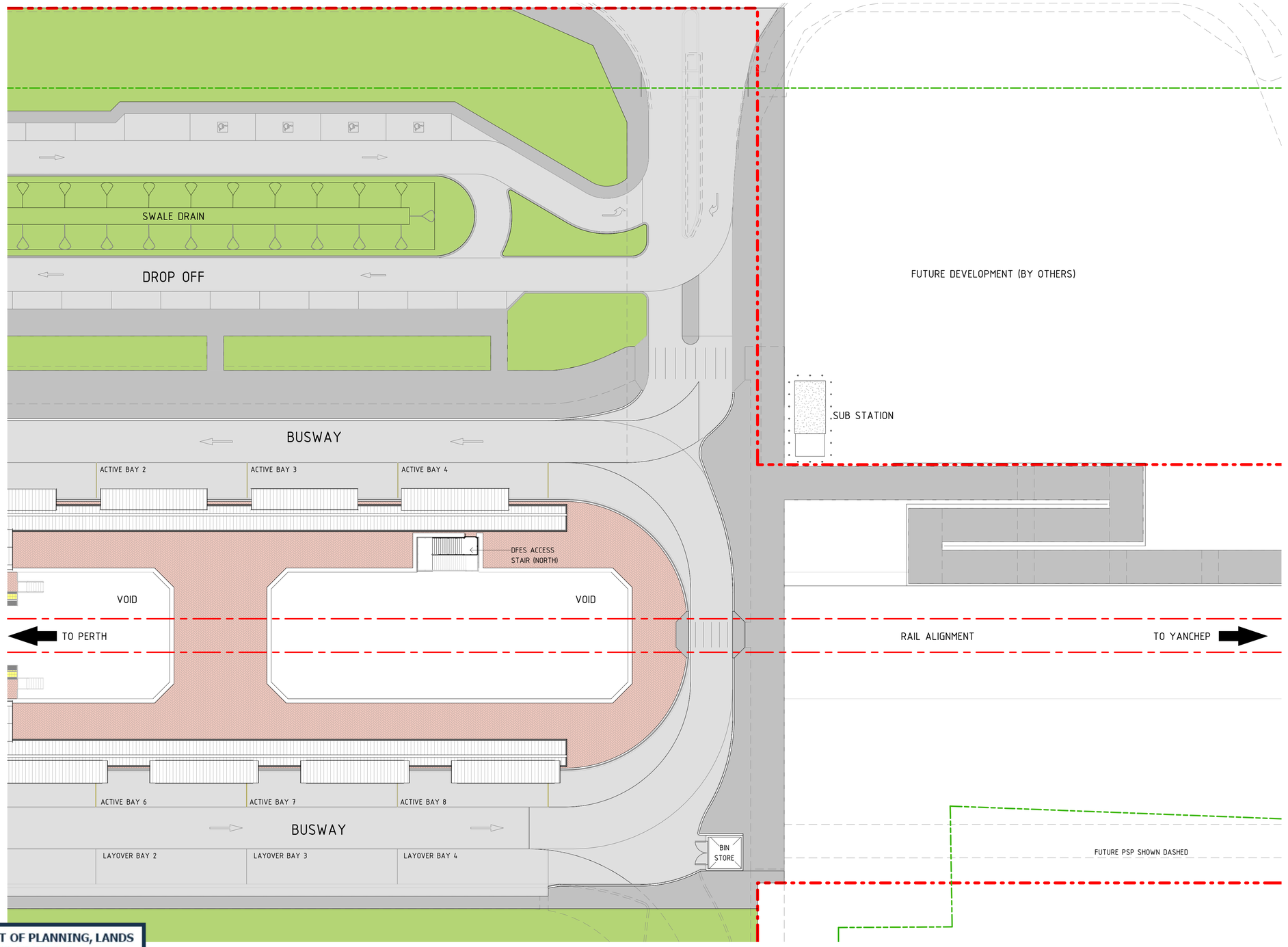
ALKIMOS STATION

PART SITE PLAN (PART 1 OF 2)

PTA Drawing No:

REV: A

FOR CONTINUATION REFER DRAWING TCY-CAP-YSA-AR-DRG-SKT003



LEGEND

- EXISTING CADASTRAL BOUNDARIES
- RAILWAYS RESERVE BOUNDARY
- LOT BOUNDARIES (STATION)
- BUTLER TO YANCHEP RAIL
- FUTURE ROADS BY OTHERS
- FUTURE LOT BOUNDARIES BY OTHERS

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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NEWest Alliance

TCY-CAP-YSA-AR-DRG-05

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

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CHECKED A. WHEELER
APPROVED FOR ISSUE
-
EXECUTIVE DIRECTOR PTA Division / External Company
DATE -

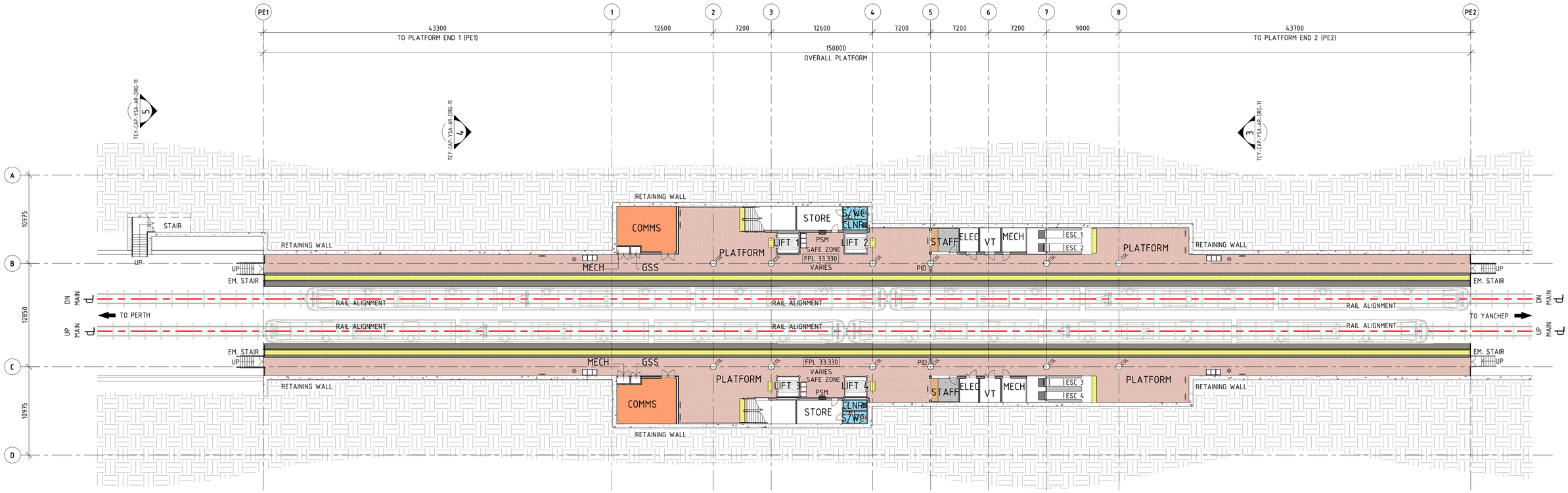
Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
PART SITE PLAN (PART 2 OF 2)

PTA Drawing No:

REV: A



PLATFORM PLAN - OVERALL

SCALE 1 : 250

FLOOR FINISHES

9650.02	VINYL TYPE 2 ANTI STATIC	2780.08	MASONRY PAVERS TO PTA's STANDARDS
9650.02	VINYL TYPE 2 ON SCREED	9650.10	TILE - PLATFORM EDGE
9300.03	CERAMIC TILES ON SCREED	9650.06	TILE - TACTILE - WARNING - 300X300

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE 16-Sep-2020 FILE 30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-06

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP -

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE -

EXECUTIVE DIRECTOR PTA Division / External Company

DATE -

Government of Western Australia Public Transport Authority

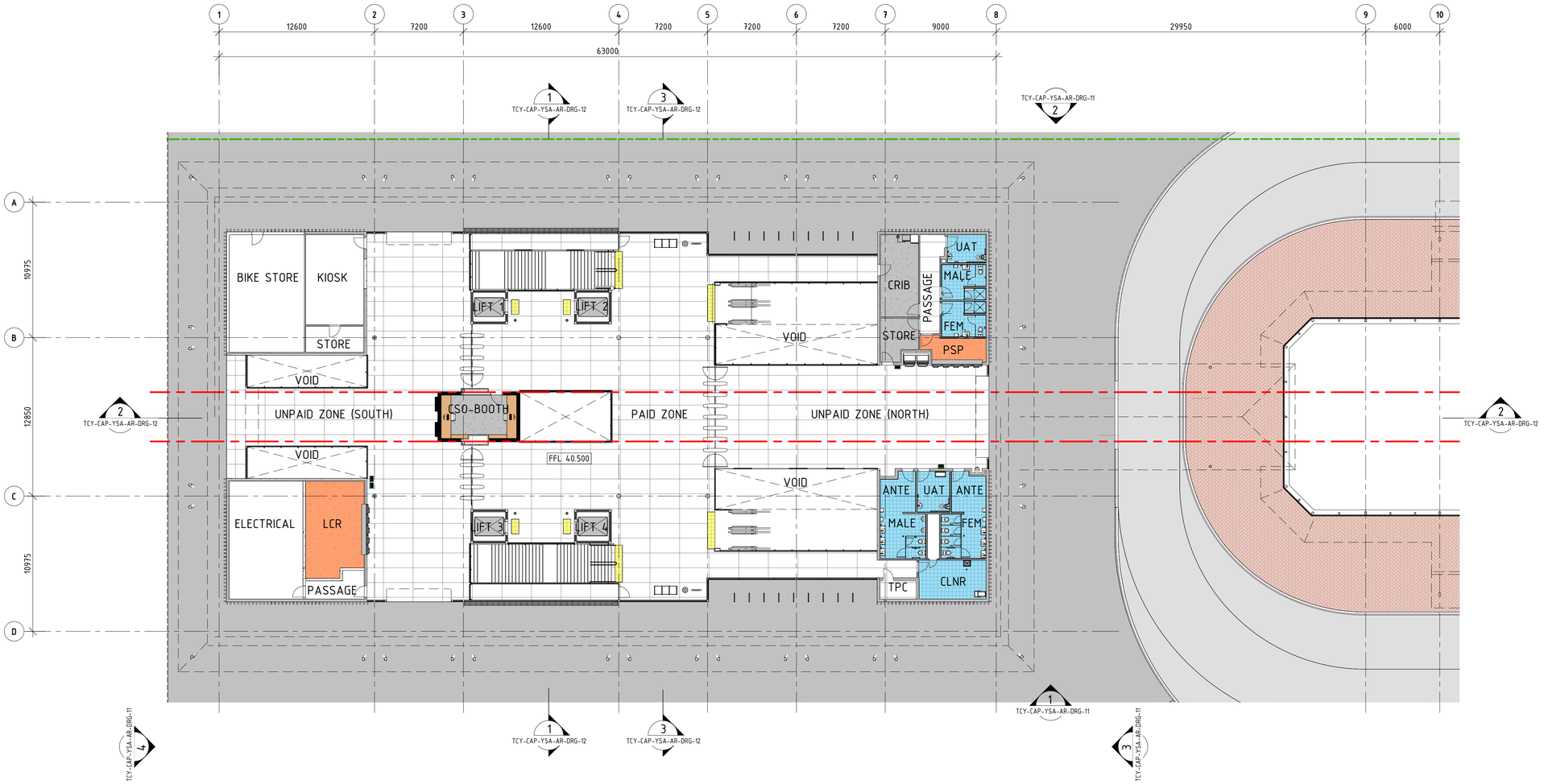
YANCHEP RAIL EXTENSION

ALKIMOS STATION

PLATFORM LEVEL PLAN

PTA Drawing No:

REV: A



CONCOURSE PLAN

SCALE 1 : 200

FLOOR FINISHES

9650.02	VINYL TYPE 2 ANTI STATIC	2780.08	MASONRY PAVERS TO PTA's STANDARDS
9650.02	VINYL TYPE 2 ON SCREED	9650.10	TILE - PLATFORM EDGE
9300.03	CERAMIC TILES ON SCREED	2780.13	MASONRY PAVERS TO PTA's STANDARDS
9650.07	TILE - TACTILE - WARNING - 300X300	9300.01	MASONRY PAVERS TO PTA's STANDARDS

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE 16-Sep-2020 FILE 30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-07

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE

-

EXECUTIVE DIRECTOR PTA Division / External Company

DATE -

Government of Western Australia Public Transport Authority

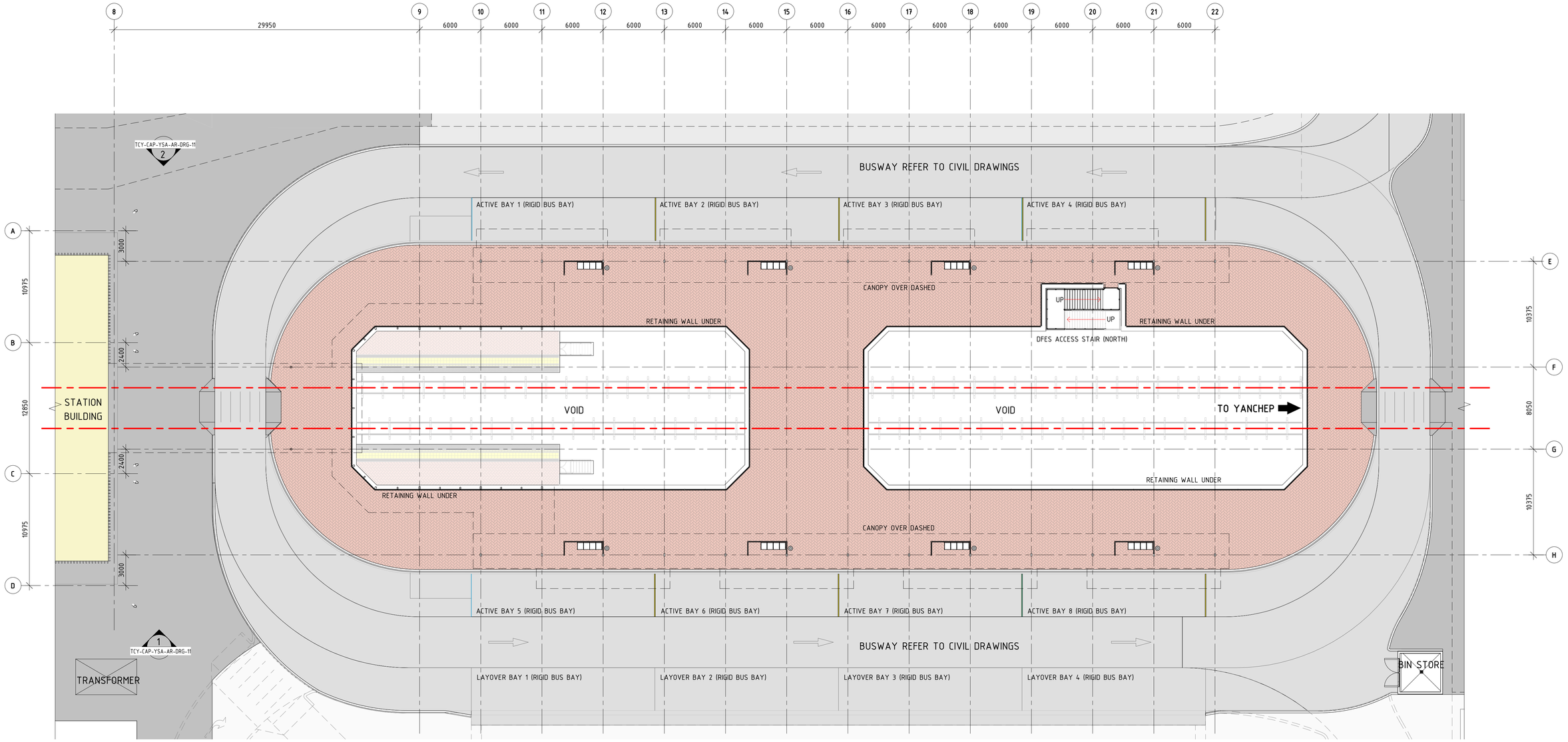
YANCHEP RAIL EXTENSION

ALKIMOS STATION

CONCOURSE LEVEL PLAN

PTA Drawing No:

REV: A



BUS INTERCHANGE OVERALL

SCALE 1 : 200

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-08

REFERENCES

SCALE : 1 : 200 (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

–

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE

–

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE –

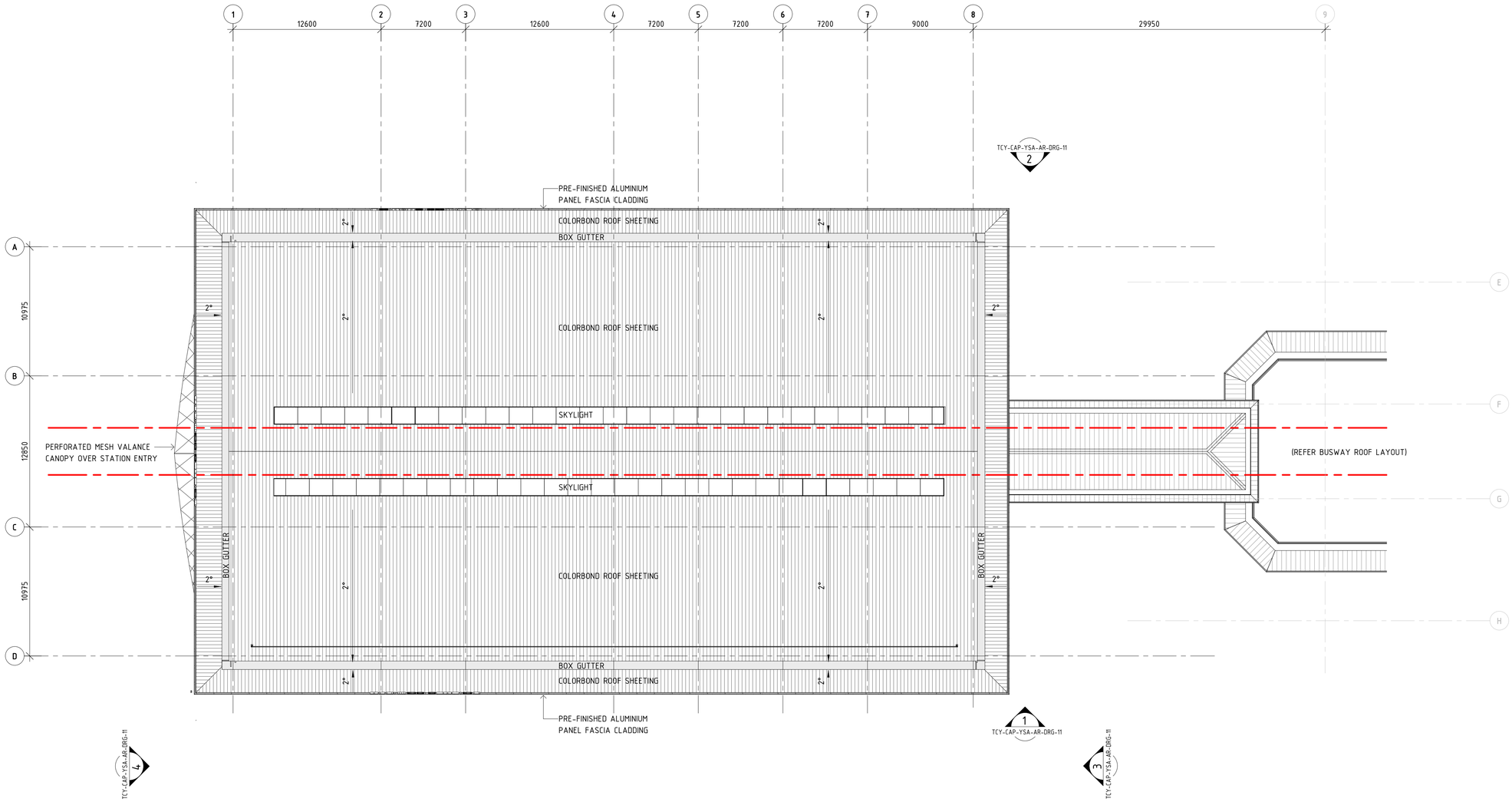
Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
BUS INTERCHANGE PLAN

PTA Drawing No:

REV: A



CONCOURSE ROOF PLAN

SCALE 1 : 200

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

N

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

NEWest Alliance

TCY-CAP-YSA-AR-DRG-09

REFERENCES

SCALE : 1 : 200 (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

–

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE

–

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE –

Government of Western Australia Public Transport Authority

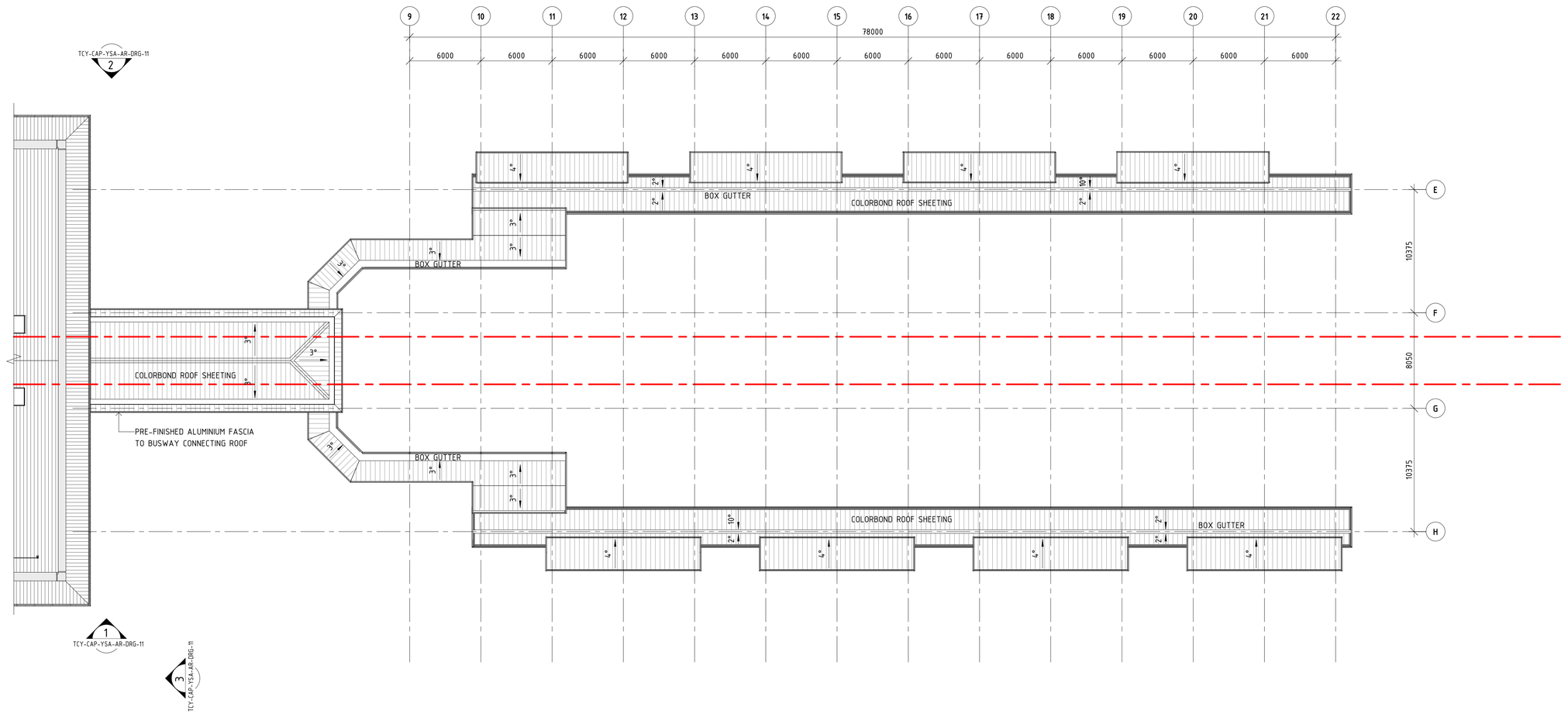
YANCHEP RAIL EXTENSION

ALKIMOS STATION
CONCOURSE ROOF PLAN

PTA Drawing No:

REV: A

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt



BUS INTERCHANGE ROOF PLAN

SCALE 1 : 200

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

N

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	BP	BL	AW
			DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION				

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

NEWest Alliance

TCY-CAP-YSA-AR-DRG-10

REFERENCES

SCALE : 1 : 200 (@ A1)

DATUM :
HORIZONTAL: PCG20
VERTICAL: AHD71

PTA ACCEPTANCE STAMP
–

DESIGNED B. PRIEST
DRAWN B. LADYMAN
CHECKED A. WHEELER

APPROVED FOR ISSUE
–
EXECUTIVE DIRECTOR
PTA Division / External Company
DATE –

Government of Western Australia Public Transport Authority

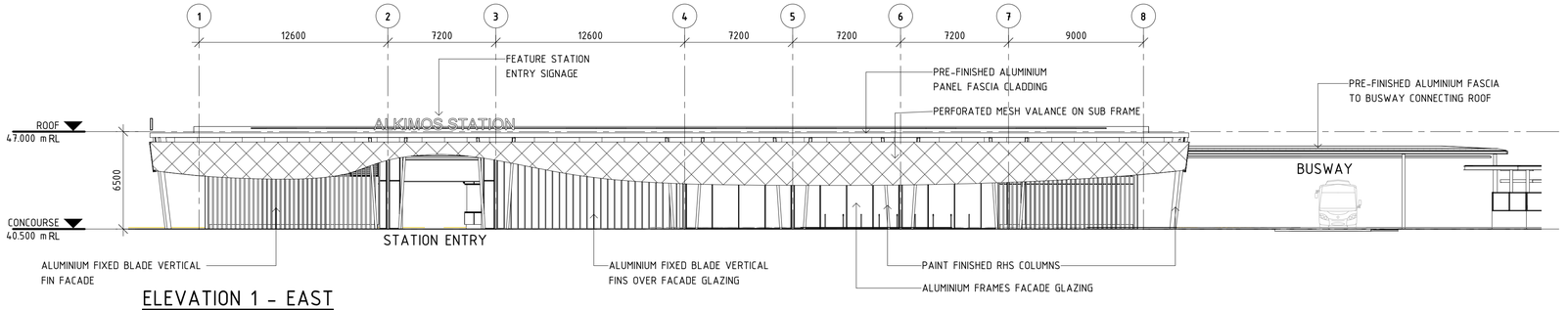
YANCHEP RAIL EXTENSION

ALKIMOS STATION
BUS INTERCHANGE ROOF PLAN

PTA Drawing No:

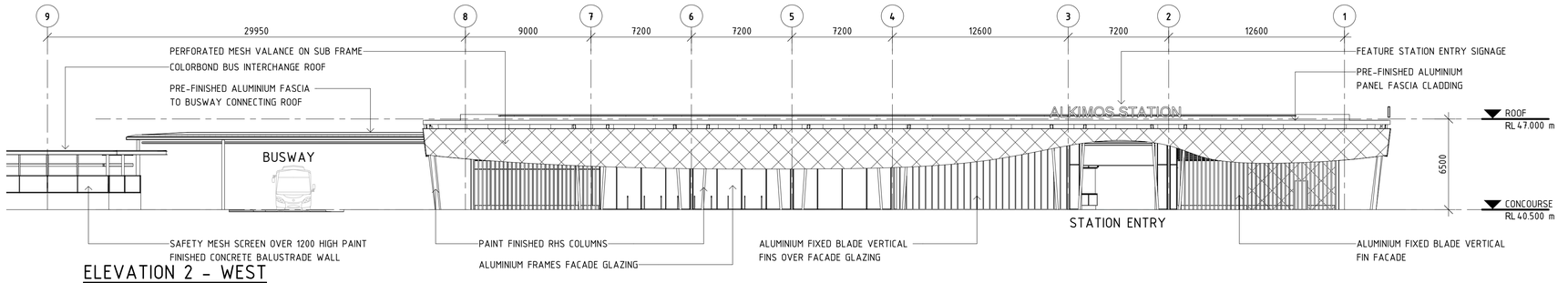
REV: A

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt



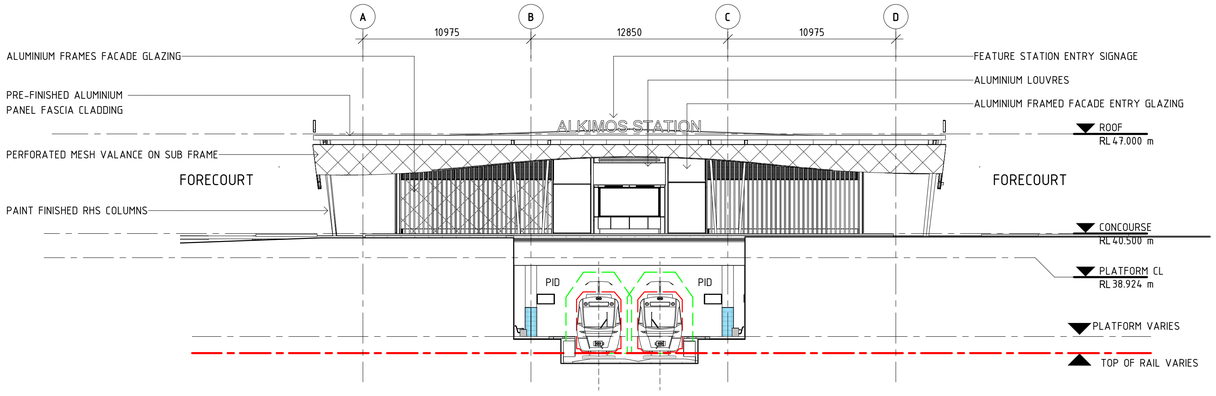
ELEVATION 1 - EAST

SCALE 1 : 200



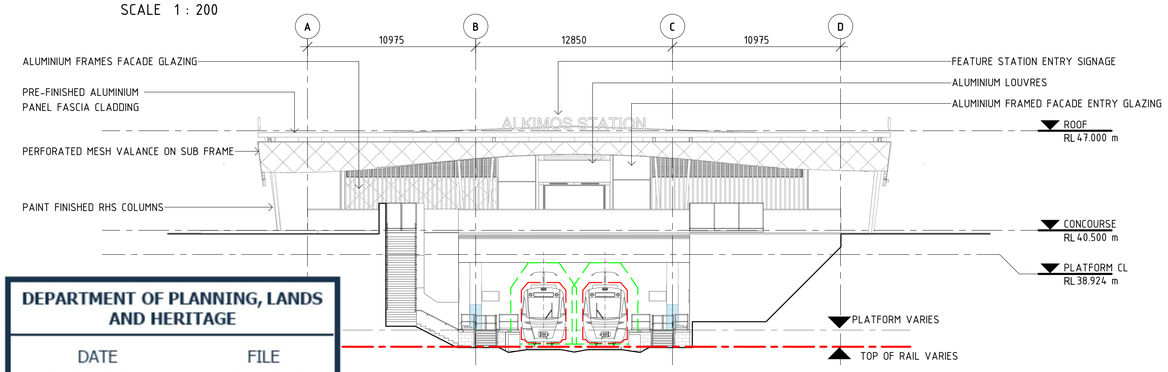
ELEVATION 2 - WEST

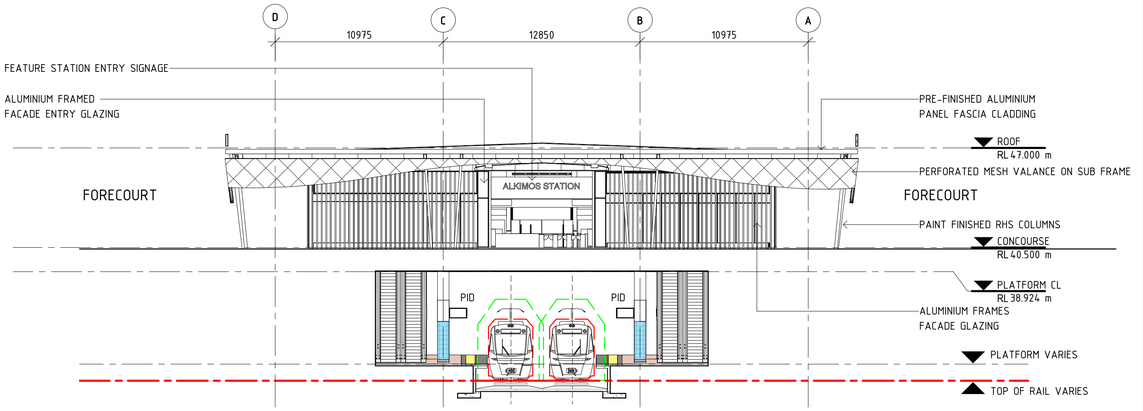
SCALE 1 : 200



ELEVATION 4 - SOUTH

SCALE 1 : 200





ELEVATION 3 - NORTH

SCALE 1 : 200

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-11

REFERENCES

SCALE : 1 : 200 (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE

-

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE -

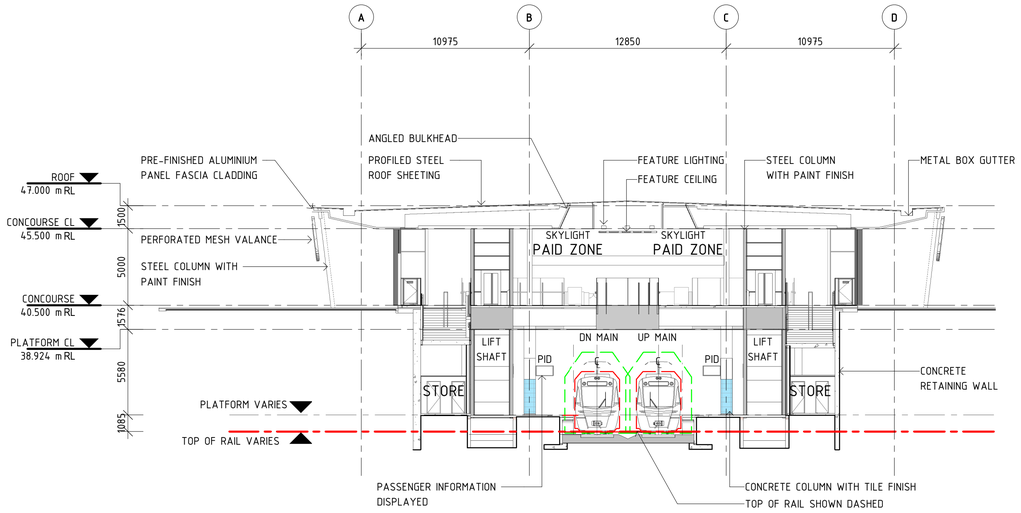
Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

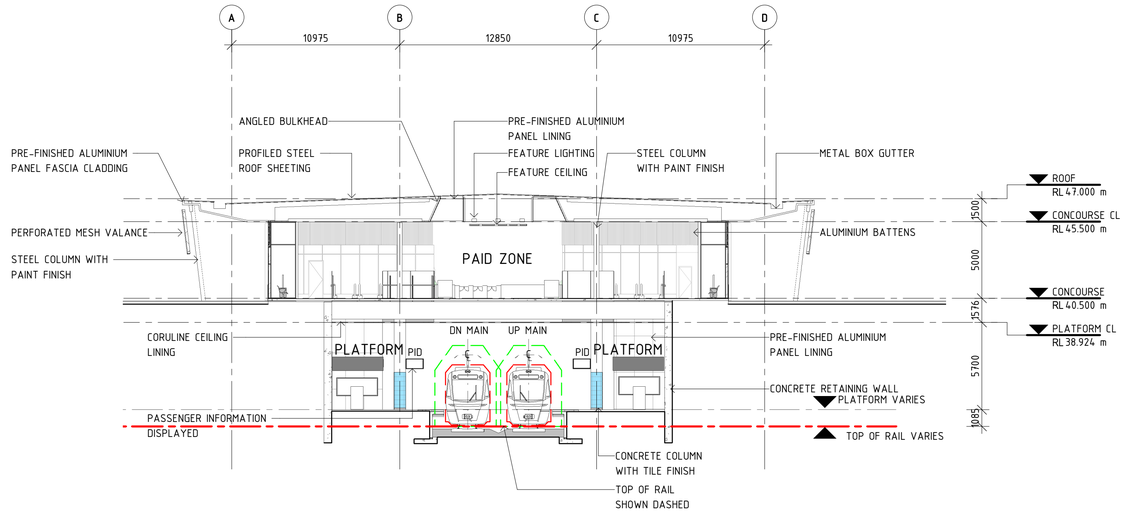
ALKIMOS STATION
ELEVATIONS

PTA Drawing No:

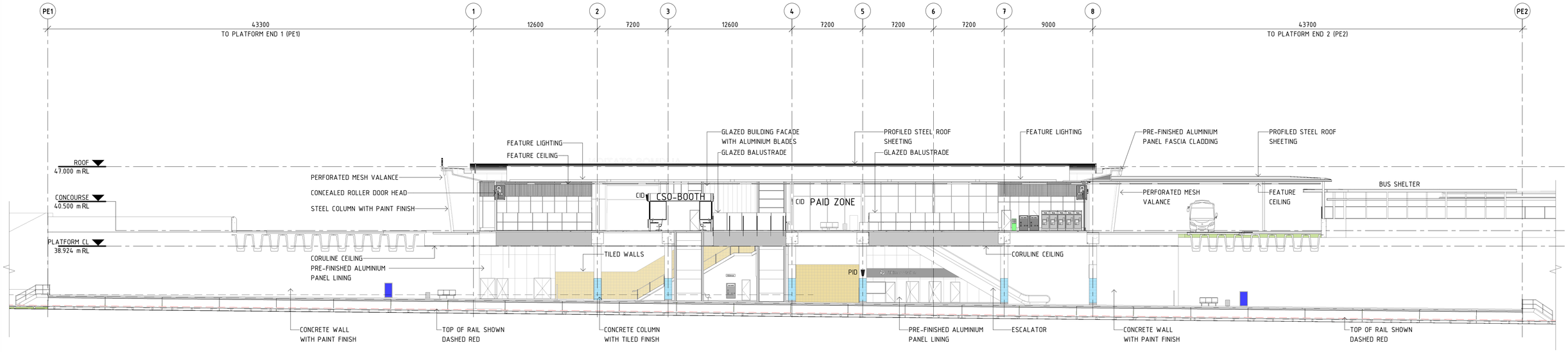
REV: A



SECTION B
SCALE 1 : 200



SECTION C
SCALE 1 : 200



SECTION A
SCALE 1 : 200

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
16-Sep-2020	30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	BP	BL	AW
			DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION				

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-12

REFERENCES

SCALE : 1 : 200 (@ A1)

DATUM :
HORIZONTAL: PCG20
VERTICAL: AHD71

PTA ACCEPTANCE STAMP
-

DESIGNED B. PRIEST
DRAWN B. LADYMAN
CHECKED A. WHEELER

APPROVED FOR ISSUE
-
EXECUTIVE DIRECTOR
PTA Division / External Company
DATE -

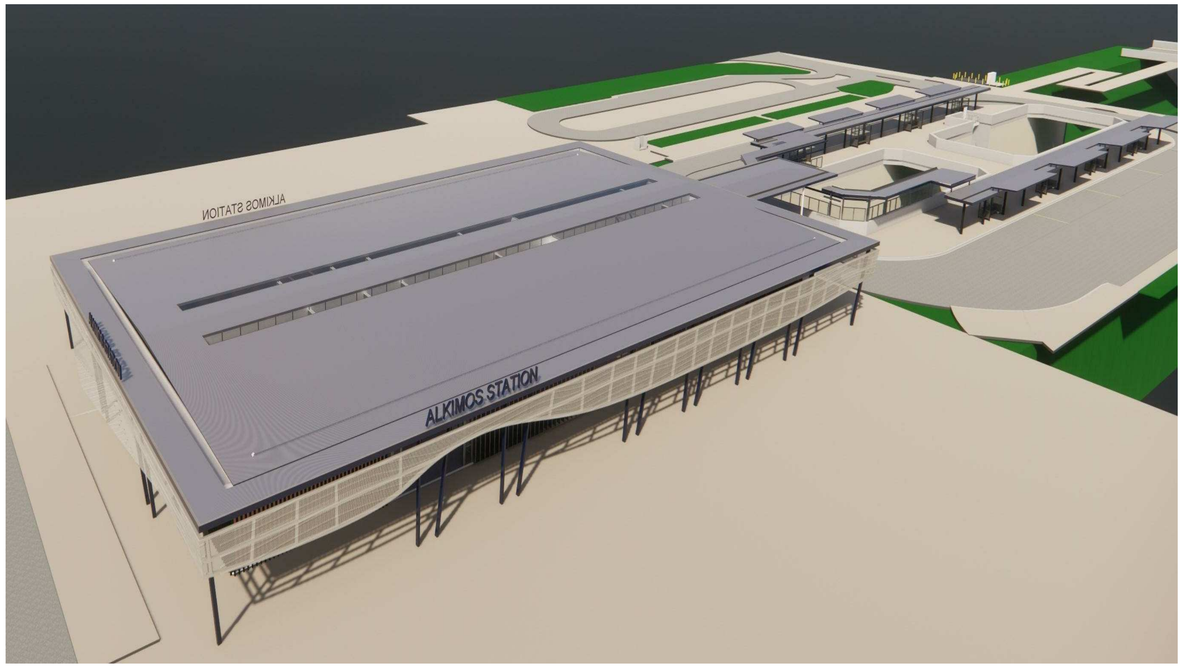
Government of Western Australia
Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
SECTIONS

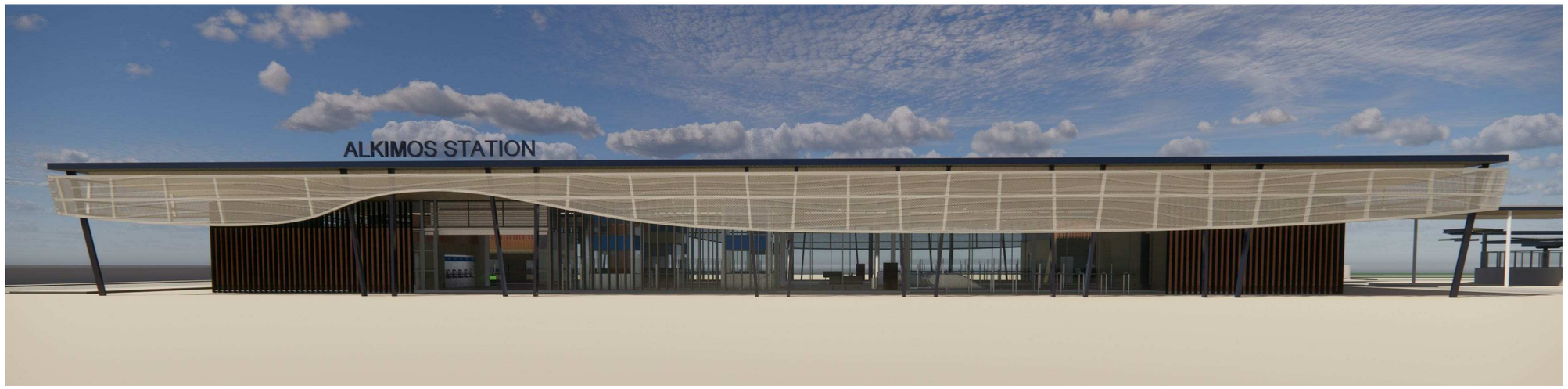
PTA Drawing No:

REV: A



EXTERNAL PERSPECTIVE 1 - AERIAL VIEW - SOUTH-EAST

EXTERNAL PERSPECTIVE 2 - NORTH ENTRY VIEW



EXTERNAL PERSPECTIVE - EAST FACING VIEW

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE 16-Sep-2020

FILE 30-50419-1

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\TCY-CAP-YSA-AR-MOD-0001_ALKIMOS STATION_DEVELOPMENT APPLICATION_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-13

REFERENCES

SCALE : NTS (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B. PRIEST

DRAWN B. LADYMAN

CHECKED A. WHEELER

APPROVED FOR ISSUE

-

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE -

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
INDICATIVE IMAGES

PTA Drawing No:

REV: A

APPENDIX B CERTIFICATES OF TITLE

WESTERN AUSTRALIA

REGISTER NUMBER	
2000/DP409771	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	**N/A**

VOLUME **2914** FOLIO **420**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 2000 ON DEPOSITED PLAN 409771

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

WESTERN AUSTRALIAN PLANNING COMMISSION OF 140 WILLIAM STREET PERTH WA 6000
(T N475343) REGISTERED 3/11/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. *EXCEPT AND RESERVING METALS, MINERALS, GEMS AND MINERAL OIL SPECIFIED IN TRANSFER 7033/1940.
2. *L342687 EASEMENT BURDEN FOR ACCESSWAY PURPOSES TO ELECTRICITY NETWORKS CORPORATION - SEE SKETCH ON DEPOSITED PLAN 409771 REGISTERED 11/6/2010.
3. *L390876 EASEMENT TO WATER CORPORATION WATER CORPORATION FOR PIPELINE PURPOSES - SEE SKETCH ON DEPOSITED PLAN 409771 REGISTERED 3/8/2010.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP409771
PREVIOUS TITLE:	2819-691, 2819-692
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	CITY OF WANNEROO
RESPONSIBLE AGENCY:	WESTERN AUSTRALIAN PLANNING COMMISSION

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING N475324

WESTERN AUSTRALIA

REGISTER NUMBER	
2/DP419385	
DUPLICATE EDITION **N/A**	DATE DUPLICATE ISSUED **N/A**

VOLUME **2985** FOLIO **162**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 2 ON DEPOSITED PLAN 419385

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

WESTERN AUSTRALIAN LAND AUTHORITY OF LEVEL 2 40 THE ESPLANADE PERTH WA 6000
(AF O438265) REGISTERED 30/6/2020

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. *EXCEPT AND RESERVING METALS, MINERALS, GEMS AND MINERAL OIL SPECIFIED IN TRANSFER 7033/1940.
2. *L342687 EASEMENT TO ELECTRICITY NETWORKS CORPORATION FOR ACCESSWAY PURPOSES - SEE DEPOSITED PLAN 419385 REGISTERED 11/6/2010.
3. *L390876 EASEMENT TO WATER CORPORATION FOR PIPELINE PURPOSES - SEE DEPOSITED PLAN 419385 REGISTERED 3/8/2010.
4. *EASEMENT BURDEN CREATED UNDER SECTION 167 P. & D. ACT FOR WATER PURPOSES TO WATER CORPORATION - SEE DEPOSITED PLAN 419385 AS CREATED ON DEPOSITED PLAN 400279
5. *N223106 EASEMENT TO WATER CORPORATION FOR PIPELINE PURPOSES - SEE DEPOSITED PLAN 419385 REGISTERED 11/1/2016.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

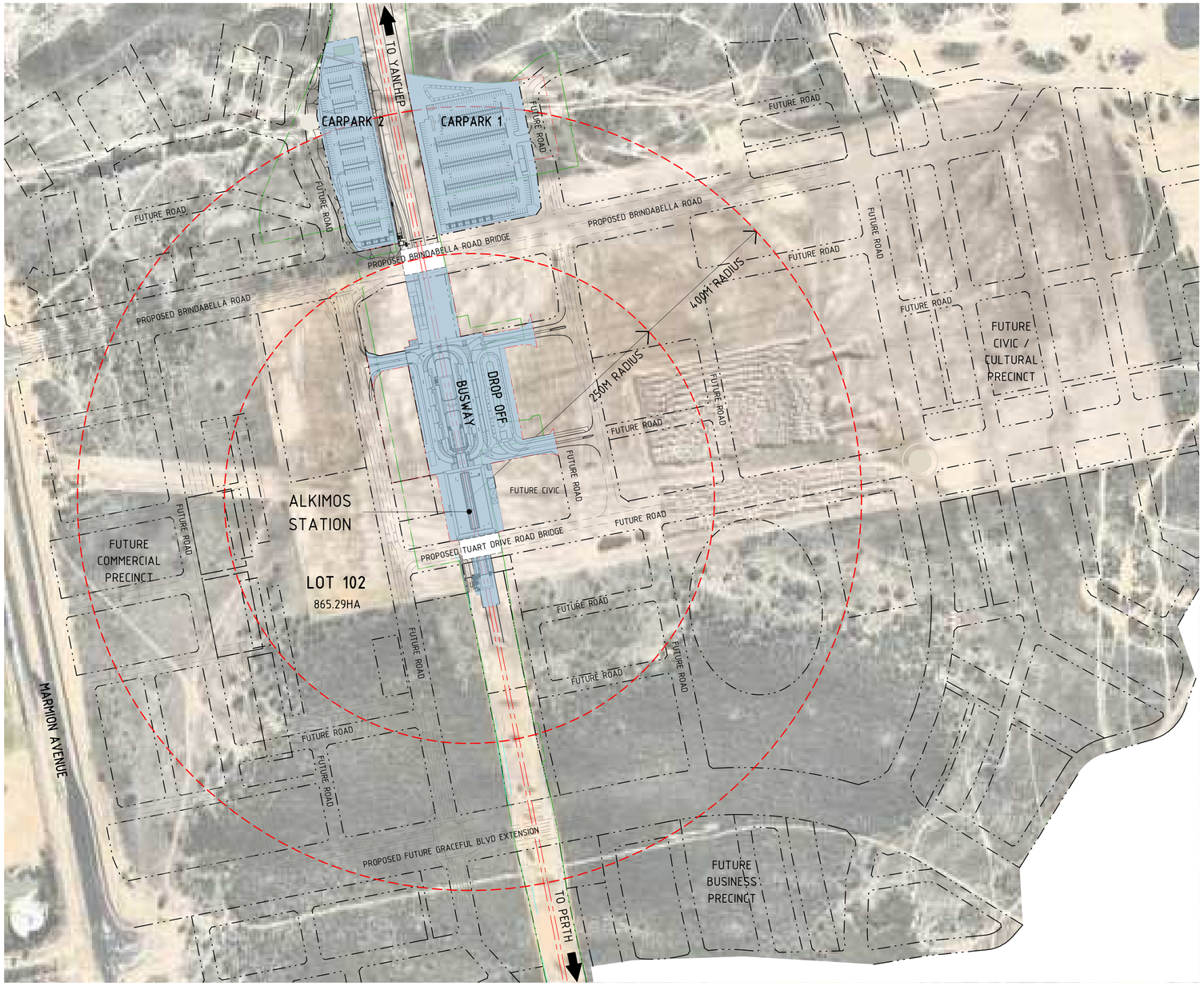
STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP419385
PREVIOUS TITLE:	2976-573
PROPERTY STREET ADDRESS:	2570 MARMION AV, ALKIMOS.
LOCAL GOVERNMENT AUTHORITY:	CITY OF WANNEROO
RESPONSIBLE AGENCY:	WESTERN AUSTRALIAN LAND AUTHORITY

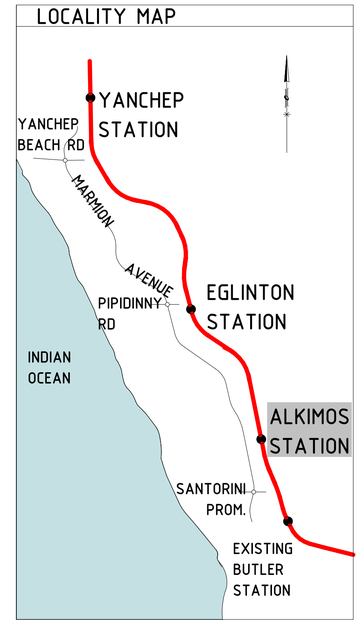
END OF PAGE 1 - CONTINUED OVER

APPENDIX C PHASE 2 DEVELOPMENT PLAN PACKAGE



SITE ANALYSIS AND CONTEXT PLAN OVERALL LAYOUT

SCALE 1 : 2500



NOTES

1. ALL FUTURE ROADS AND BRIDGES ARE SHOWN FOR INFORMATION PURPOSES ONLY.
2. PROPOSED ROAD RESERVE BOUNDARY IS SUBJECT TO CHANGE BASED ON FURTHER DESIGN AND INVESTIGATION..

LEGEND

- EXISTING CADASTRAL BOUNDARIES
- RAIL RESERVE BOUNDARY
- LOT BOUNDARIES (STATION)
- BUTLER TO YANCHEP RAIL
- FUTURE ROADS BY OTHERS
- PROPOSED ALKIMOS STATION

N

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
D	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	JS	AW	
C	12.05.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	SB	AW	
B	21.08.20	CARPARK 2 UPDATED	BP	BL	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

NEWest Alliance

TCY-CAP-YSA-AR-DRG-01

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B.PRIEST

DRAWN J.SOLDATIC

CHECKED A.WHEELER

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

Government of Western Australia Public Transport Authority

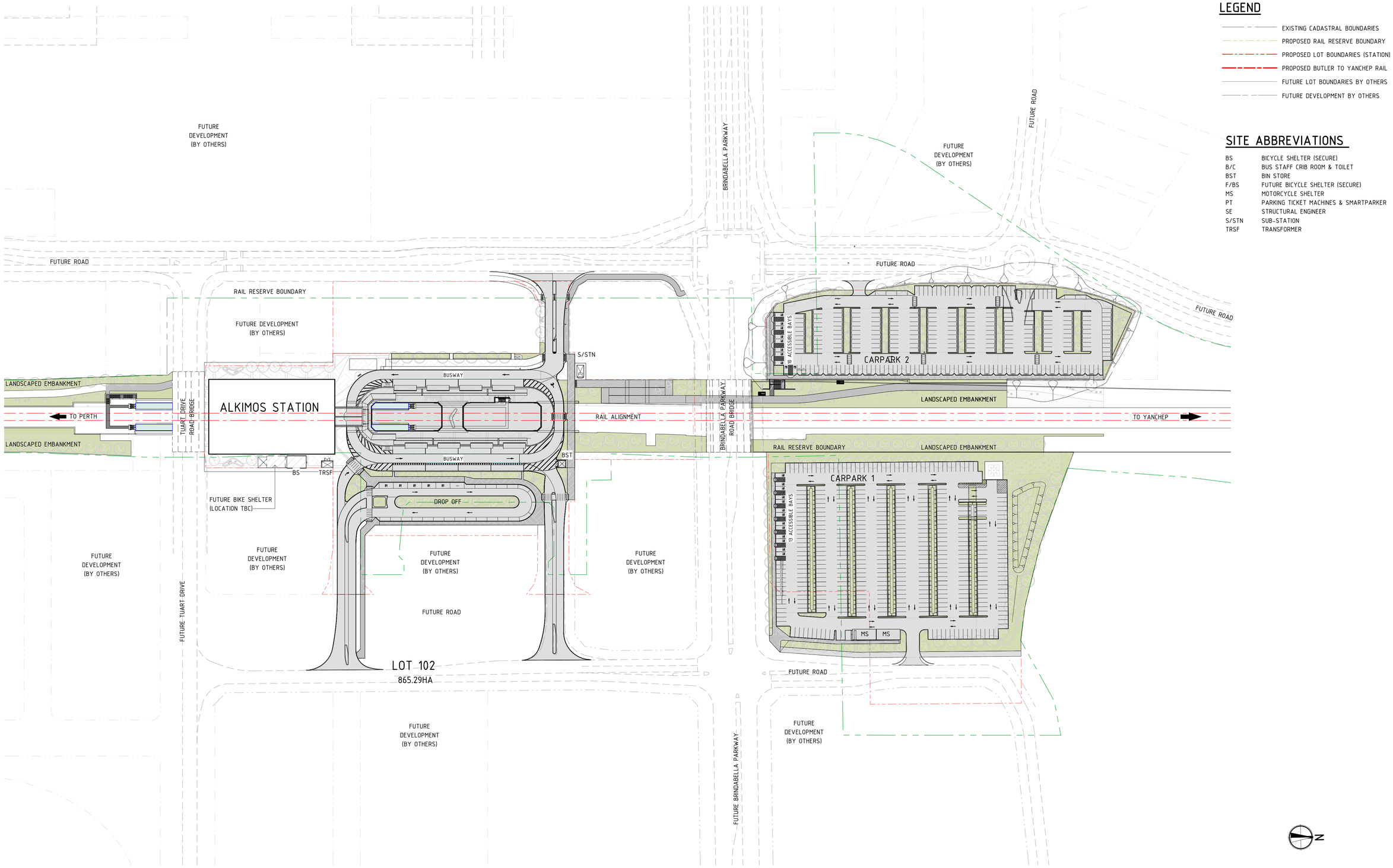
YANCHEP RAIL EXTENSION

ALKIMOS STATION
SITE ANALYSIS AND CONTEXT PLAN OVERALL LAYOUT

PTA Drawing No:

REV: D

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\Alkimos_jean-lucs.rvt



LEGEND

- EXISTING CADASTRAL BOUNDARIES
- PROPOSED RAIL RESERVE BOUNDARY
- PROPOSED LOT BOUNDARIES (STATION)
- PROPOSED BUTLER TO YANCHEP RAIL
- FUTURE LOT BOUNDARIES BY OTHERS
- FUTURE DEVELOPMENT BY OTHERS

SITE ABBREVIATIONS

BS	BICYCLE SHELTER (SECURE)
B/C	BUS STAFF CRIB ROOM & TOILET
BST	BIN STORE
F/BS	FUTURE BICYCLE SHELTER (SECURE)
MS	MOTORCYCLE SHELTER
PT	PARKING TICKET MACHINES & SMARTPARKER
SE	STRUCTURAL ENGINEER
S/STN	SUB-STATION
TRSF	TRANSFORMER

OVERALL SITE PLAN

SCALE 1 : 1000

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
D	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	JS	AW	
C	12.05.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	SB	AW	
B	21.08.20	CARPARK 2 UPDATED	BP	BL	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\Alkimos_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-02

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B.PRIEST

DRAWN J.SOLDATIC

CHECKED A.WHEELER

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

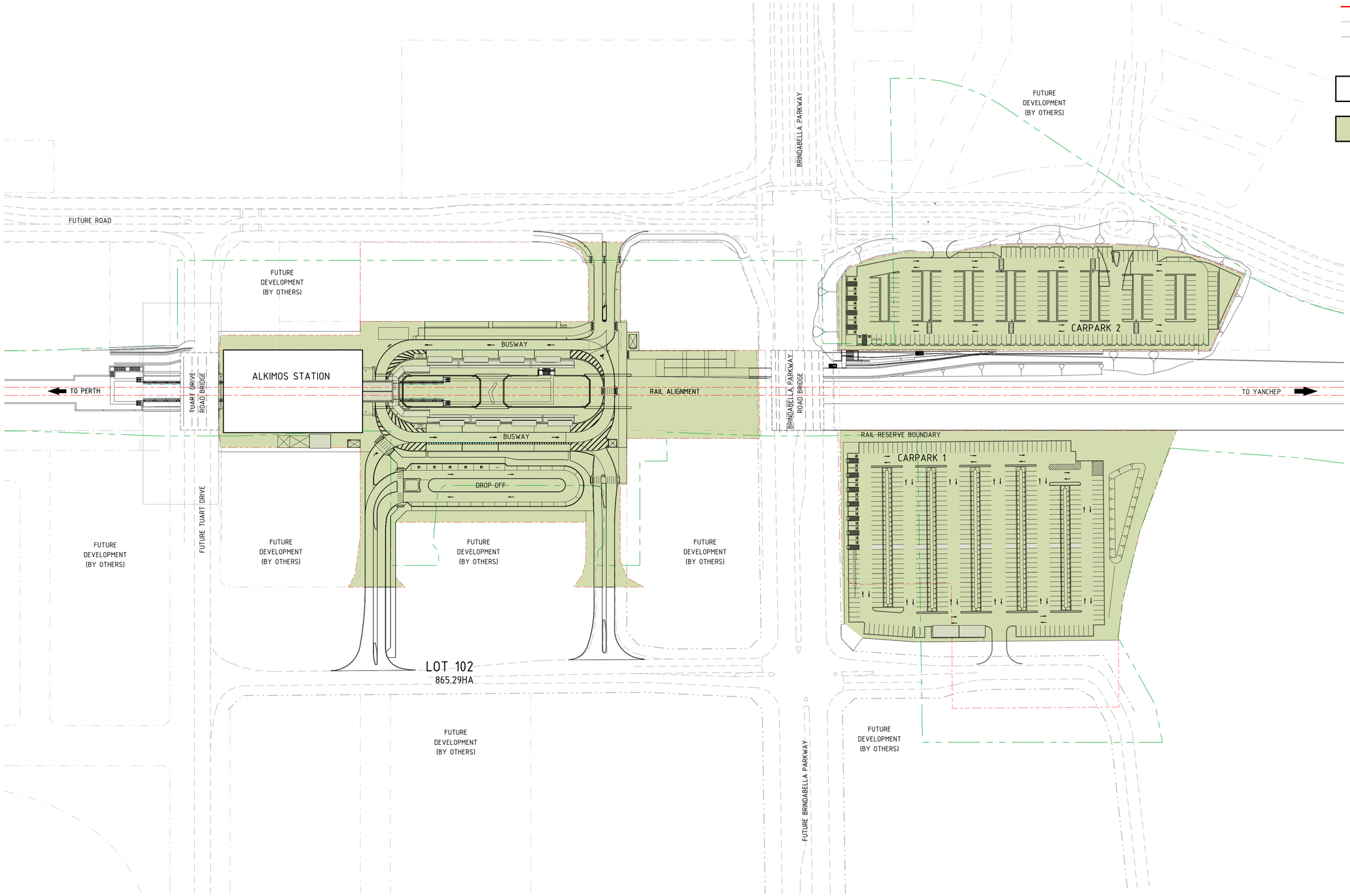
ALKIMOS STATION
SITE PLAN

PTA Drawing No:

REV: D

LEGEND

- EXISTING CADASTRAL BOUNDARIES
- PROPOSED RAIL RESERVE BOUNDARY
- PROPOSED LOT BOUNDARIES (STATION)
- PROPOSED BUTLER TO YANCHEP RAIL
- FUTURE LOT BOUNDARIES BY OTHERS
- FUTURE DEVELOPMENT BY OTHERS
- STATION BUILDINGS
- LAND REQUIRED BY PTA FOR THE PURPOSE OF STATION



LAND REQUIREMENTS & SITE INFORMATION PLAN

SCALE 1 : 1000

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
D	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	JS	AW	
C	12.05.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	SB	AW	
B	21.08.20	CARPARK 2 UPDATED	BP	BL	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\Alkimos_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-03

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B.PRIEST

DRAWN J.SOLDATIC

CHECKED A.WHEELER

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

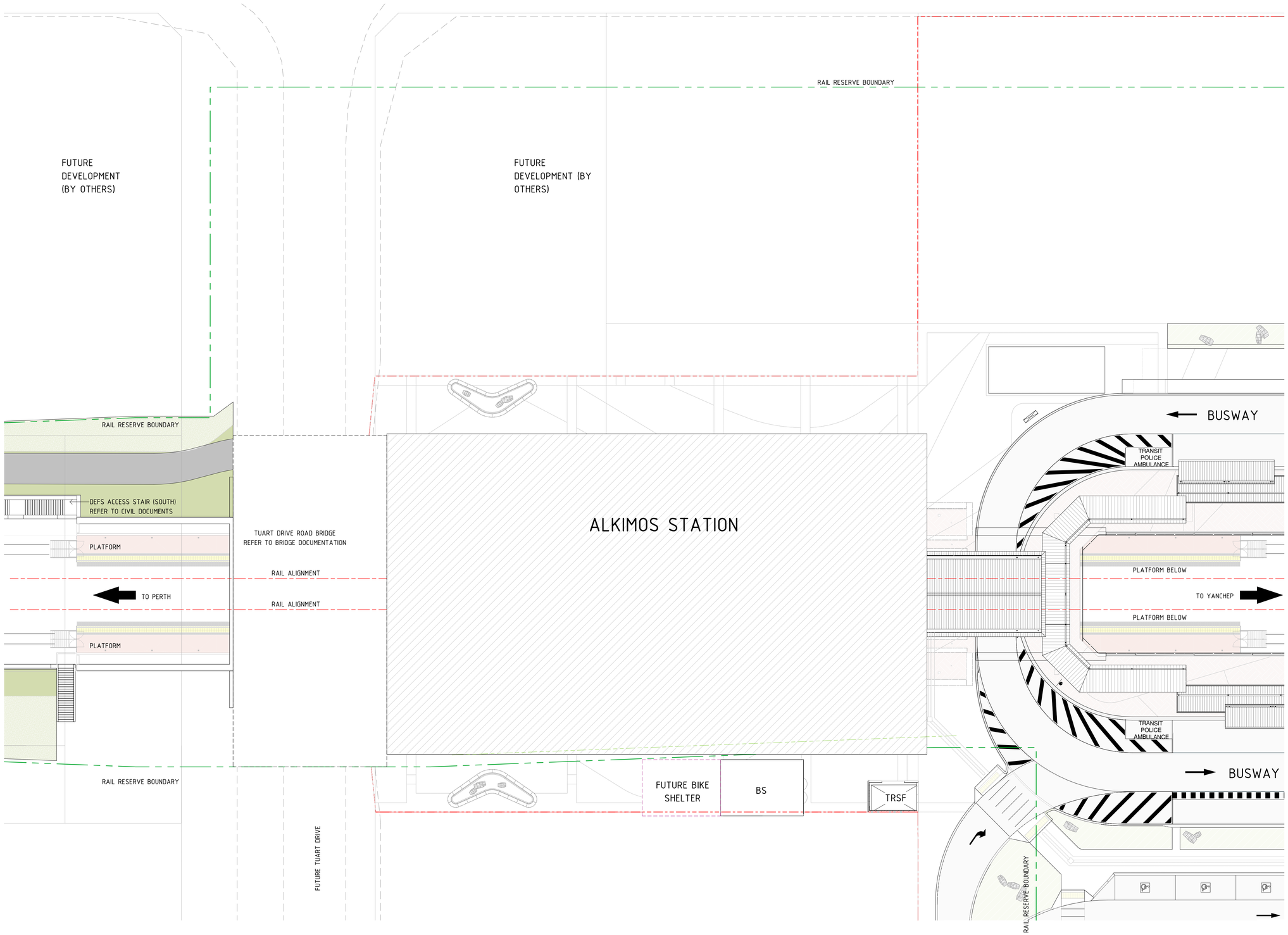
Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
LAND REQUIREMENTS & SITE INFORMATION

PTA Drawing No:

REV: D



FOR CONTINUATION REFER DRAWING TCY-CAP-YSA-AR-DRG-05

PART SITE PLAN (PART 1 OF 2)

SCALE 1 : 250

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	JS	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\Alkimos_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-04

REFERENCES

SCALE : 1 : 250 (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B.PRIEST

DRAWN J.SOLDATIC

CHECKED A.WHEELER

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR PTA Division / External Company

DATE

Government of Western Australia Public Transport Authority

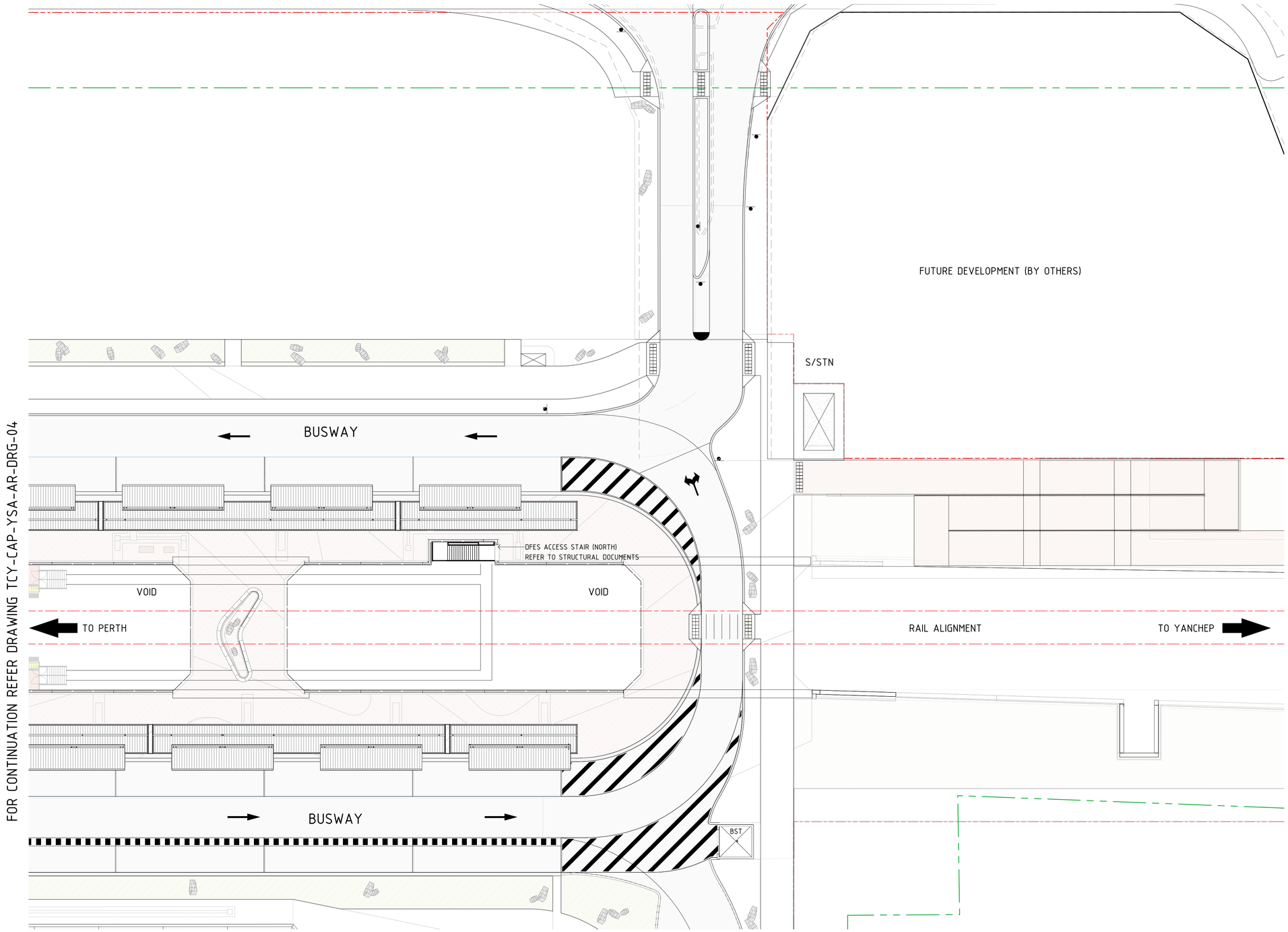
YANCHEP RAIL EXTENSION

ALKIMOS STATION

PART SITE PLAN (SHEET 1 OF 2)

PTA Drawing No:

REV: B



FOR CONTINUATION REFER DRAWING TCY-CAP-YSA-AR-DRG-04

PART SITE PLAN (PART 2 OF 2)

SCALE 1 : 250

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	JS	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\Alkimos_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-05

REFERENCES

SCALE : 1 : 250 (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B.PRIEST

DRAWN J.SOLDATIC

CHECKED A.WHEELER

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

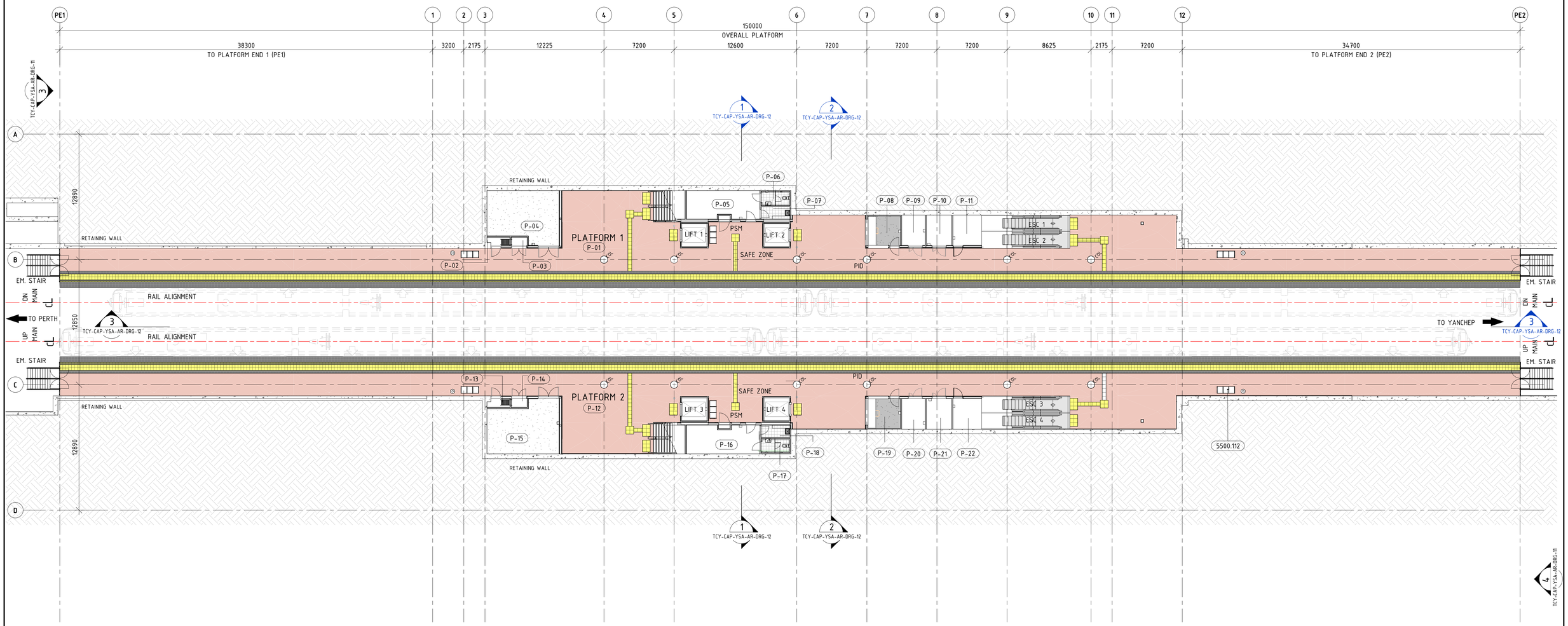
Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
PART SITE PLAN (SHEET 2 OF 2)

PTA Drawing No:

REV: B



PLATFORM PLAN - OVERALL

SCALE 1 : 200

PLATFORM ROOM SCHEDULE

P-01	PLATFORM 1	771.87 m²
P-02	MECH ACCESS	3.20 m²
P-03	GSS	2.32 m²
P-04	PLATFORM COMMS	40.63 m²
P-05	STORE	22.39 m²
P-06	STAFF WC	4.98 m²
P-07	CLNR	4.49 m²
P-08	STAFF OFFICE	10.13 m²
P-09	ELECTRICAL	7.52 m²
P-10	VT CONTROL	8.15 m²
P-11	MECH PLANT	17.41 m²

PLATFORM ROOM SCHEDULE

P-12	PLATFORM 2	772.33 m²
P-13	MECH ACCESS	3.02 m²
P-14	GSS	2.20 m²
P-15	PLATFORM COMMS	40.94 m²
P-16	STORE	22.66 m²
P-17	STAFF WC	4.97 m²
P-18	CLNR	3.90 m²
P-19	STAFF OFFICE	10.13 m²
P-20	ELECTRICAL	7.52 m²
P-21	VT CONTROL	8.15 m²
P-22	MECH PLANT	16.48 m²

DEVELOPMENT APPLICATION

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A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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NEWest Alliance

TCY-CAP-YSA-AR-DRG-06

REFERENCES

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DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

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CHECKED A.WHEELER

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DATE

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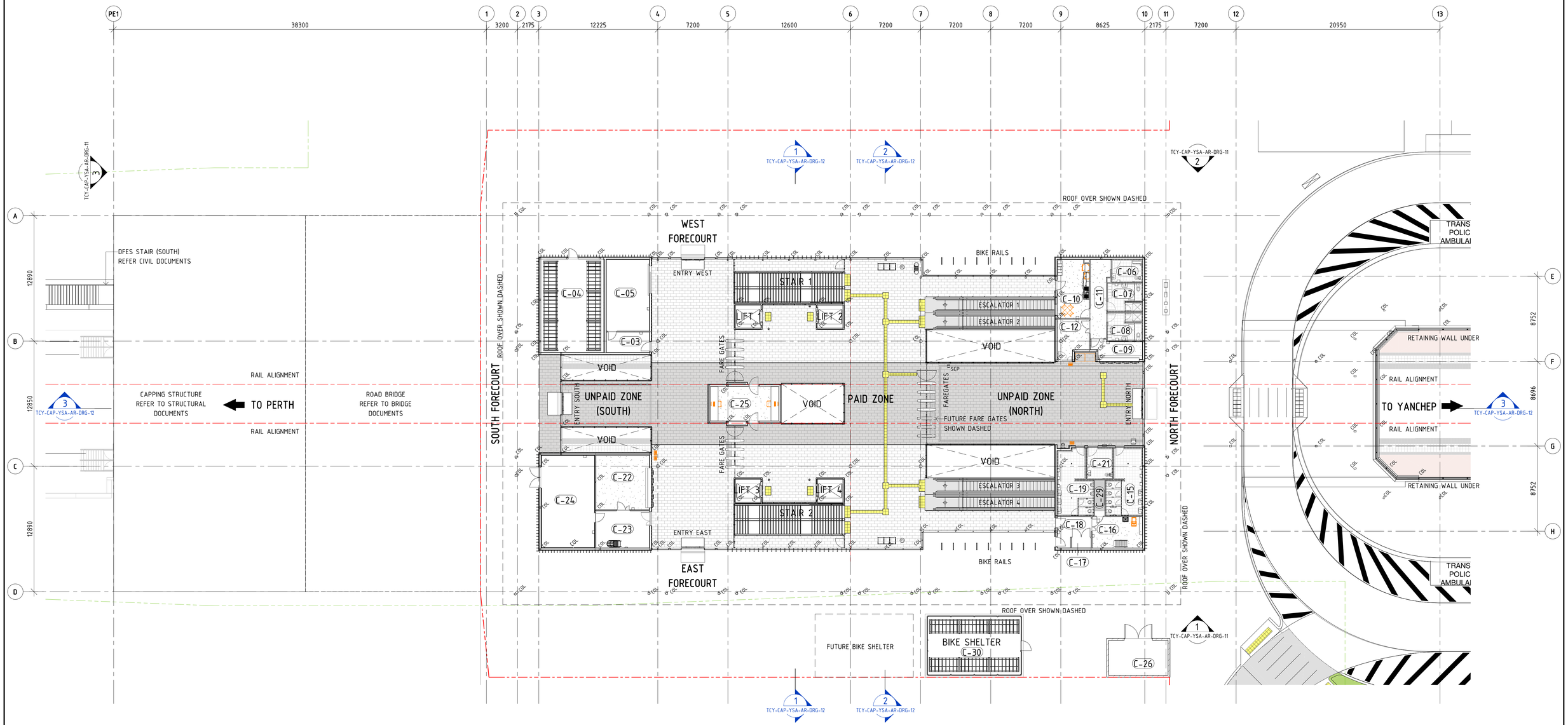
YANCHEP RAIL EXTENSION

ALKIMOS STATION
PLATFORM PLAN

PTA Drawing No:

REV: B



CONCOURSE PLAN - OVERALL

SCALE 1 : 200

CONCOURSE ROOM SCHEDULE

C-01	UNPAID ZONE (SOUTH)	262.95 m²
C-02	PAID ZONE	460.02 m²
C-03	KIOSK STORE	9.13 m²
C-04	BIKE STORE	61.74 m²
C-05	KIOSK	32.21 m²
C-06	STAFF UAT	7.34 m²
C-07	STAFF MALE	10.13 m²
C-08	STAFF FEMALE	10.01 m²
C-09	PSP ROOM	10.35 m²
C-10	STAFF CRIB	19.67 m²
C-11	STAFF CORRIDOR	14.11 m²
C-12	STORE	11.78 m²
C-13	UNPAID ZONE (NORTH)	189.31 m²

CONCOURSE ROOM SCHEDULE

C-15	PUBLIC FEMALE	23.22 m²
C-16	CLEANERS	16.51 m²
C-17	TPC	2.00 m²
C-18	PASSAGE	8.67 m²
C-19	PUBLIC MALE	22.66 m²
C-21	PUBLIC UAT	8.52 m²
C-22	LOBBY COMMUNICATIONS	31.40 m²
C-23	PASSAGE / GSS	20.71 m²
C-24	ELECTRICAL	51.36 m²
C-25	CSO-BOOTH	24.68 m²
C-26	TRANSFORMER	21.81 m²
C-27	BIN ENCLOSURE	14.68 m²
C-30	BIKE SHELTER	59.12 m²

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REFERENCES

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YANCHEP RAIL EXTENSION

ALKIMOS STATION
CONCOURSE PLAN

PTA Drawing No:

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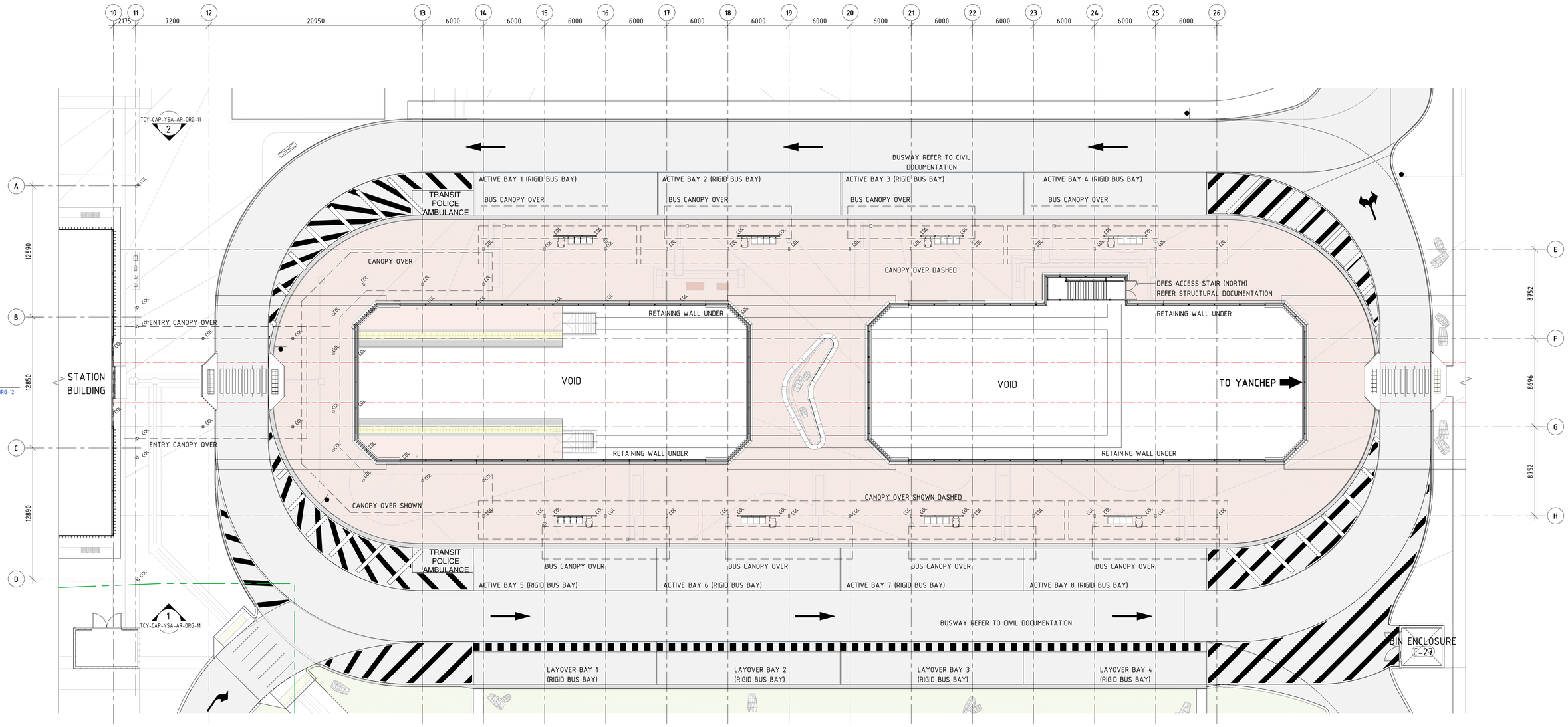

BUS INTERCHANGE OVERALL

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DEVELOPMENT APPLICATION

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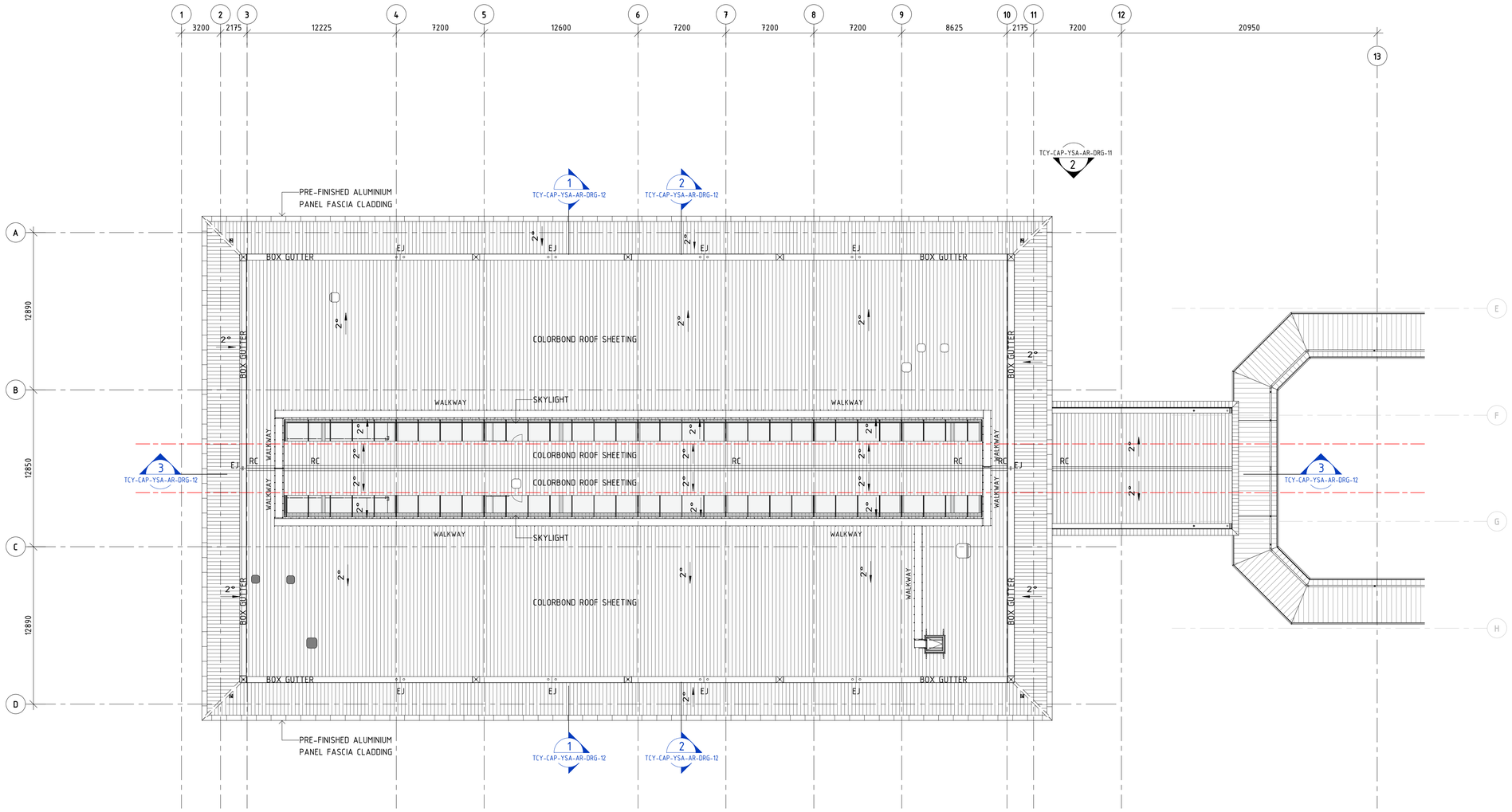
YANCHEP RAIL EXTENSION

ALKIMOS STATION
BUS INTERCHANGE OVERALL

PTA Drawing No:

REV: B



CONCOURSE ROOF PLAN - OVERALL

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NEWest Alliance

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REFERENCES

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YANCHEP RAIL EXTENSION

ALKIMOS STATION

CONCOURSE ROOF PLAN

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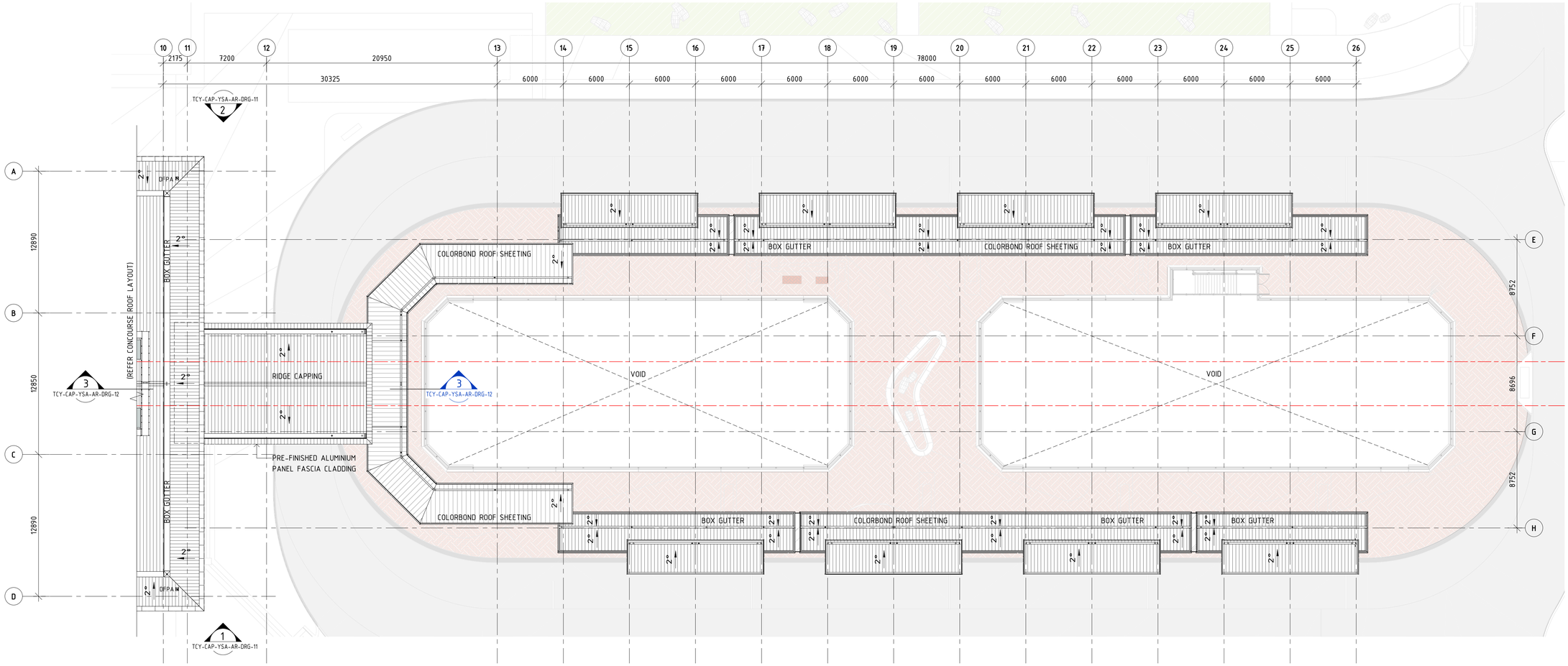

BUS INTERCHANGE ROOF PLAN - OVERALL

SCALE 1 : 200

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DEVELOPMENT APPLICATION

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NEWest Alliance

TCY-CAP-YSA-AR-DRG-10

REFERENCES

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YANCHEP RAIL EXTENSION

ALKIMOS STATION

BUS INTERCHANGE ROOF PLAN

PTA Drawing No:

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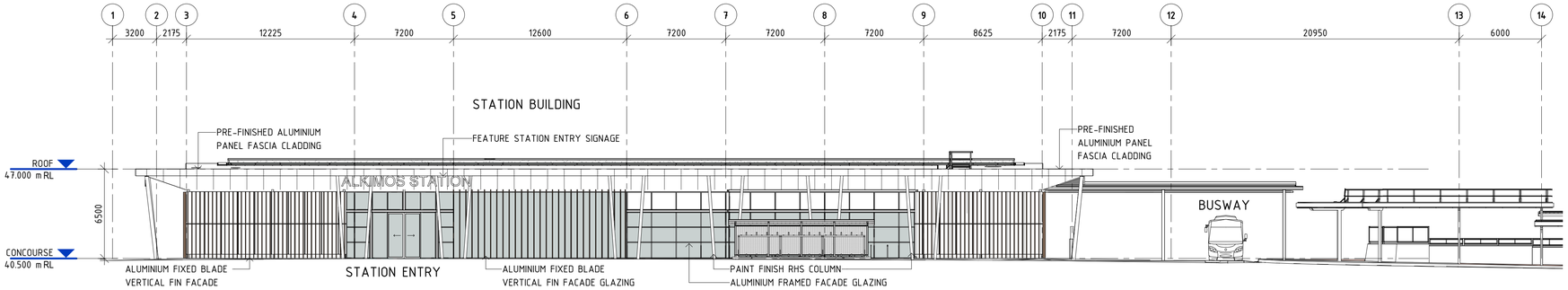

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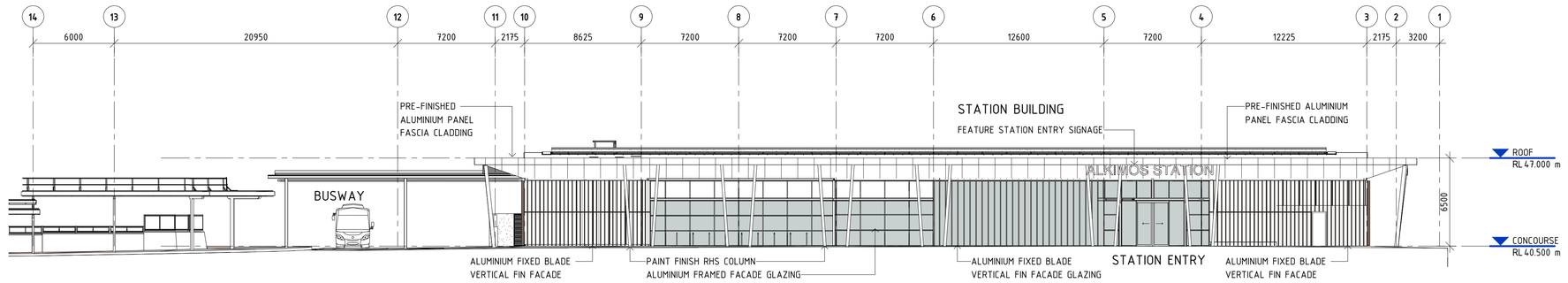

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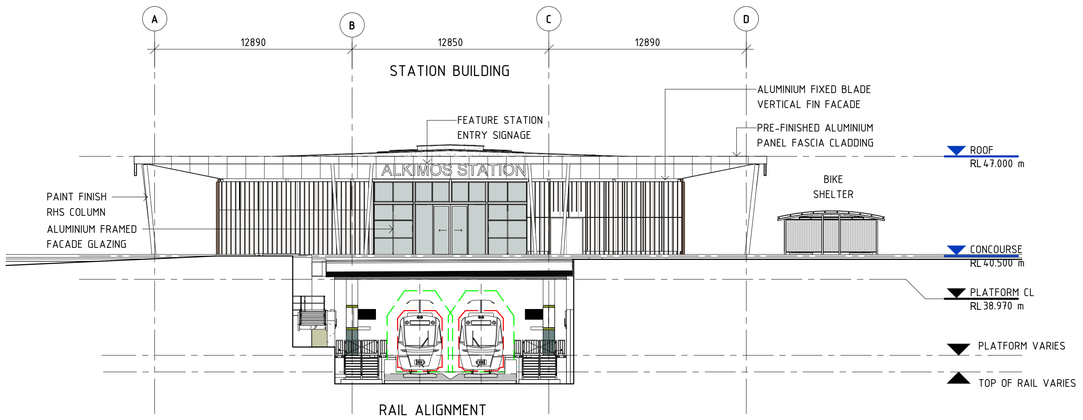

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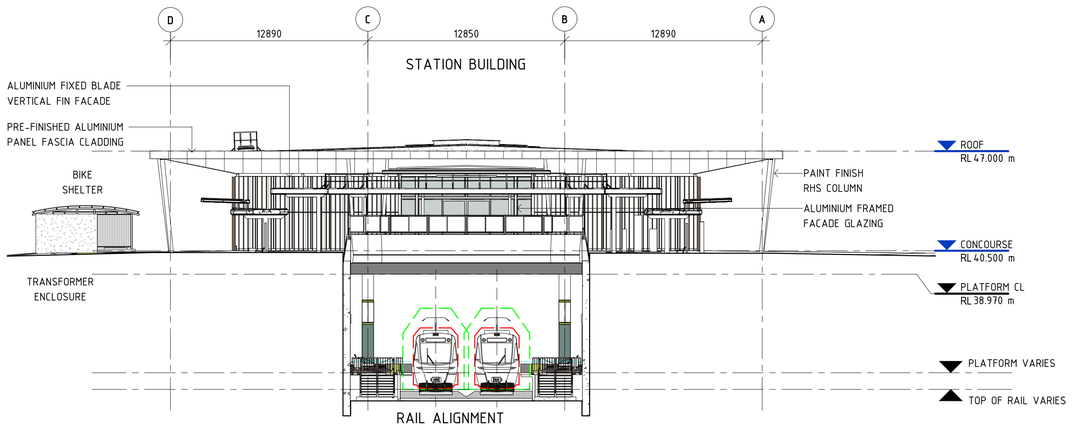

NORTH ELEVATION

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A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

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AT ORIGINAL PLOT SIZE

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NEWest Alliance

TCY-CAP-YSA-AR-DRG-11

REFERENCES

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YANCHEP RAIL EXTENSION

ALKIMOS STATION ELEVATIONS

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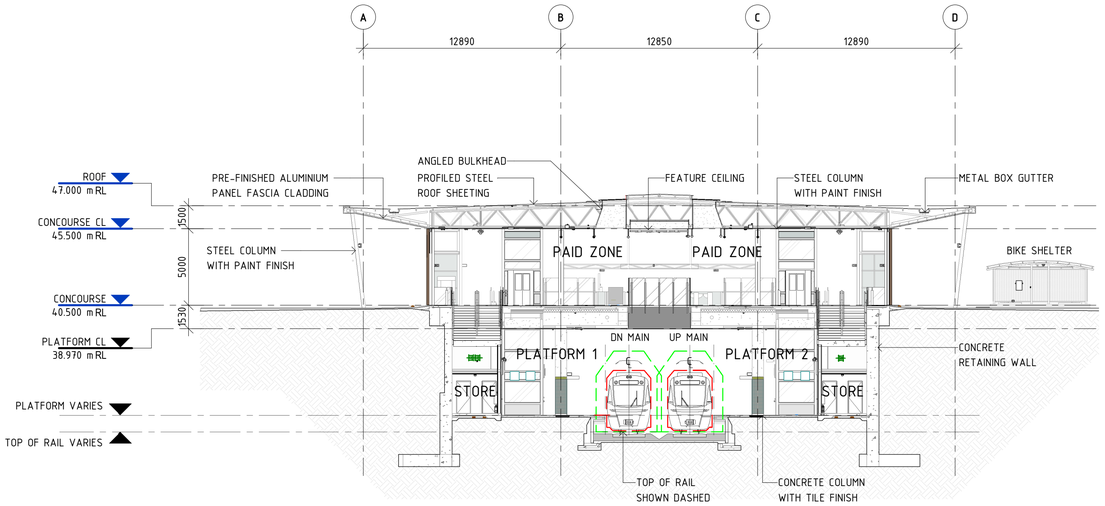

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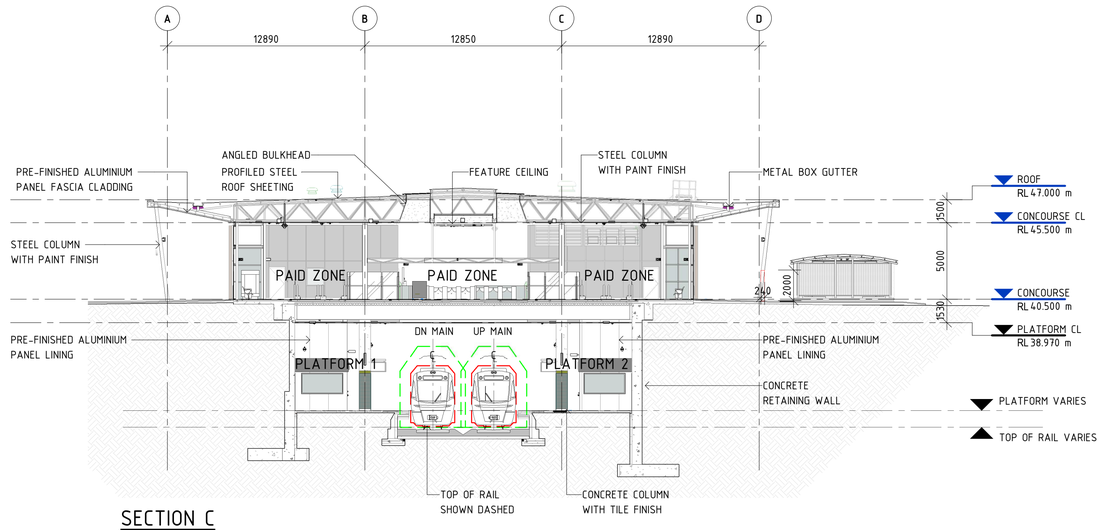

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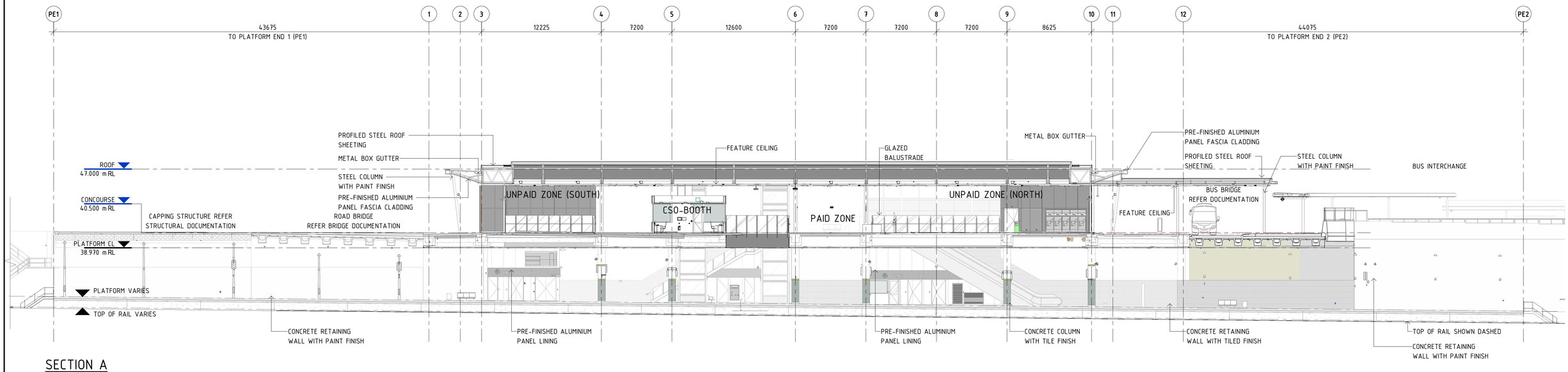

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DEVELOPMENT APPLICATION

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A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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NEWest Alliance

TCY-CAP-YSA-AR-DRG-12

REFERENCES

SCALE : 1 : 200 (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

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PTA Division / External Company

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YANCHEP RAIL EXTENSION

ALKIMOS STATION
SECTIONS

PTA Drawing No:

REV: B

EXTERNAL PERSPECTIVE 1 - AERIAL VIEW - SOUTH WEST

EXTERNAL PERSPECTIVE 2 - NORTH ENTRY VIEW

EXTERNAL PERSPECTIVE 1 - EAST FACING VIEW

DEVELOPMENT APPLICATION

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AT ORIGINAL PLOT SIZE

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TCY-CAP-YSA-AR-DRG-13

REFERENCES

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YANCHEP RAIL EXTENSION

ALKIMOS STATION
INDICATIVE IMAGES

PTA Drawing No:

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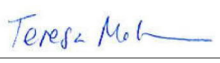
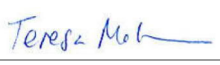
APPENDIX D TRANSPORT IMPACT ASSESSMENT

NEWest Alliance

Alkimos Station: Transport Impact Assessment

METRONET Stage 1 Initiatives: Yanchep Railway Extension and Thornlie-Cockburn Link

Document Approval

Rev	Date	Prepared by	Reviewed By	Approved by
A	15-Jul-2020	Ronan Tyrie-Phillips, Ryan Townsend	Teresa Matassa	Chris Deshon
Signature:				
B	16-Jul-2021	Ronan Tyrie-Phillips, Ryan Townsend	Teresa Matassa	Chris Deshon
Signature:				
C	12-Aug-2021	Ronan Tyrie-Phillips, Ryan Townsend	Teresa Matassa	Chris Deshon
Signature:				
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Document Details

PTA Project:	180093 – METRONET Stage 1 Initiatives: Yanchep Railway Extension and Thornlie-Cockburn Link
PTA Document number:	
NEWest Document number:	TCY-DJV-YSA-TM-RPT-0004 Rev C
Revision date:	12-Aug-2021
Revision:	C

DETAILS OF REVISION AMENDMENTS AND PLAN TERMINOLOGY

Document Control

The Transport Engineer is responsible for updating this plan to reflect changes as required.

Amendments

Any revisions or amendments must be approved by the Transport Engineer and/or NEWest before being distributed or implemented.

Revision Details

Revision	Details
B	Issued for 85% Design

Terms and Definitions

Term	Meaning
DoS – Degree of Saturation	The DoS is a measure of available capacity at a road intersection, and is the ratio of the demand to capacity. The reported figure is this report reflects the maximum forecast DoS at the intersection: - A DoS less than 90 percent indicates that a vehicle movement / intersection is able to operate within the practical capacity, and is less likely to experience significant movement delays. - A DoS over 90 percent indicates a vehicle movement / intersection has exceeded practical capacity and is more likely to experience some delay or congestion, with mitigation measures likely to be required to ensure adequate capacity for priority movements at peak periods. A DoS of 100 percent or more indicates an intersection has exceeded practical capacity which would likely result in delay for vehicle movements, and be generally considered an undesirable outcome.
LoS – Level of Service	The LoS is a measure of the forecast delay for vehicle movements at a road intersection. The LoS measure ranges from A to F, and provides an indicator of the performance of the network or individual movement based on the average delay per passenger car unit (pcu). For the YRE Station Accesses: - LoS D is considered acceptable at peak times LoS E or F for a priority movement reflects unacceptable delay and /or queuing at an intersection. For minor movements, this may be acceptable if queuing does not result in safety issues or impact other movements.
Aimsun	Transport network modelling software
SIDRA	Intersection analysis software used to analysis intersection performance

Abbreviations and Acronyms

Abbreviation/Acronym	Definition
DoS	Degree of Saturation
LoS	Level of Service
PSP	Principal Shared Path
PTA	Public Transport Authority
ROM24	Regional Operations Model 24– Main Roads strategic transport network model used for forecast road demand
WAPC	Western Australian Planning Commission
YRE	Yanchep Rail Extension

CONTENTS

Tables

Figures

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1.0 INTRODUCTION AND BACKGROUND

1.1 METRONET YANCHEP RAIL EXTENSION BACKGROUND

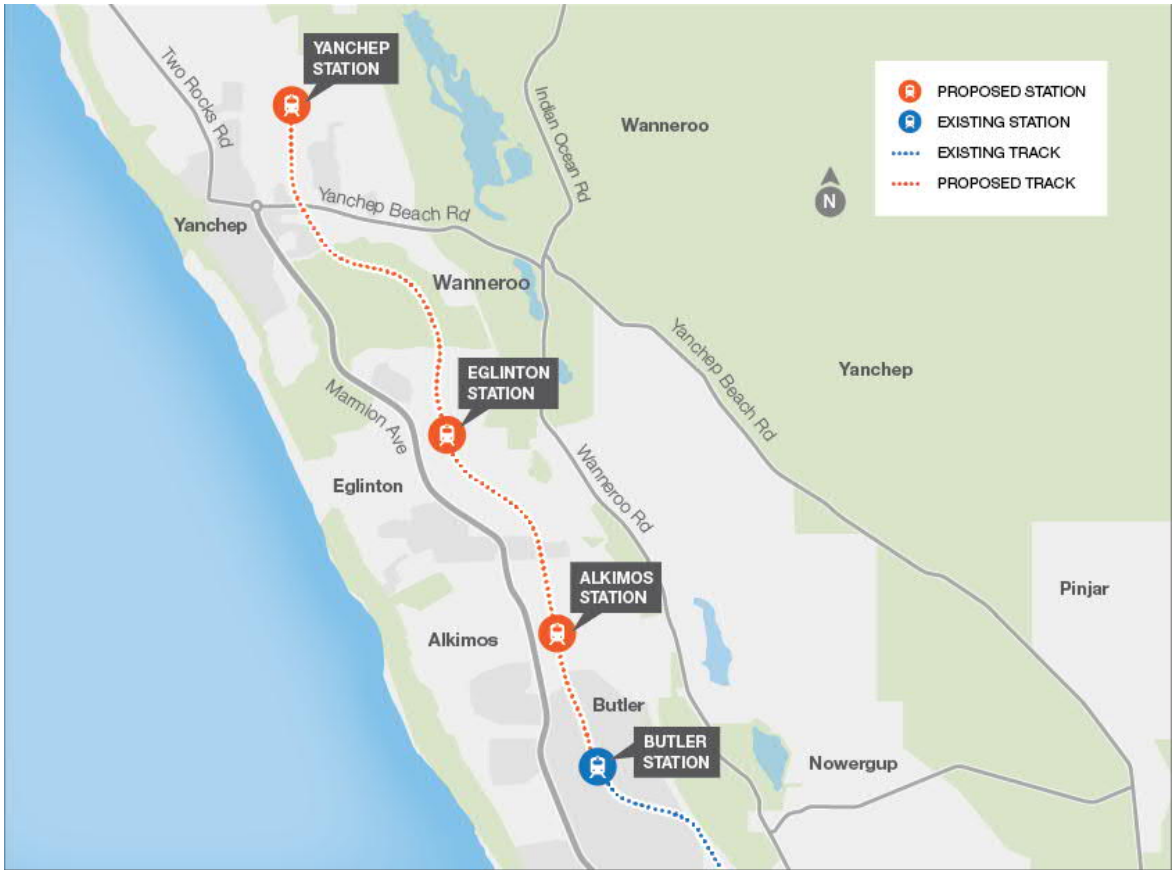
The proposed Alkimos Station forms part of the wider METRONET Yanchep Rail Extension (YRE) project to deliver an extension of the existing rail line, north of the current terminus station at Butler. The project aims to deliver a 14.5km rail extension between Butler and Yanchep to support the ongoing growth in the region and alleviate traffic congestion along key routes by providing a wider reaching public transport service to the outer regions of Perth.

The YRE project is to be delivered by the NEWest Alliance, on behalf of the Public Transport Authority (PTA).

Yanchep has been identified as an emerging Strategic Metropolitan Centre by State Planning Policy 4.2 – Activity Centres for Perth and Peel (2010), the Yanchep Two-Rocks District Structure Plan (2010) and the Yanchep City Local Structure Plan No. 68 (2011). The City Centre will provide the economic core for the region accommodating a projected working population of 23,500 by the year 2031.

The primary components of the YRE project include the construction of three new train stations at the key locations of Alkimos, Eglinton and Yanchep. Each of the proposed new train stations will also include a bus station for public transport connectivity, Park & Ride, Kiss & Ride plus infrastructure for other active modes including walking and cycling.

Figure 1. YRE Project Overview



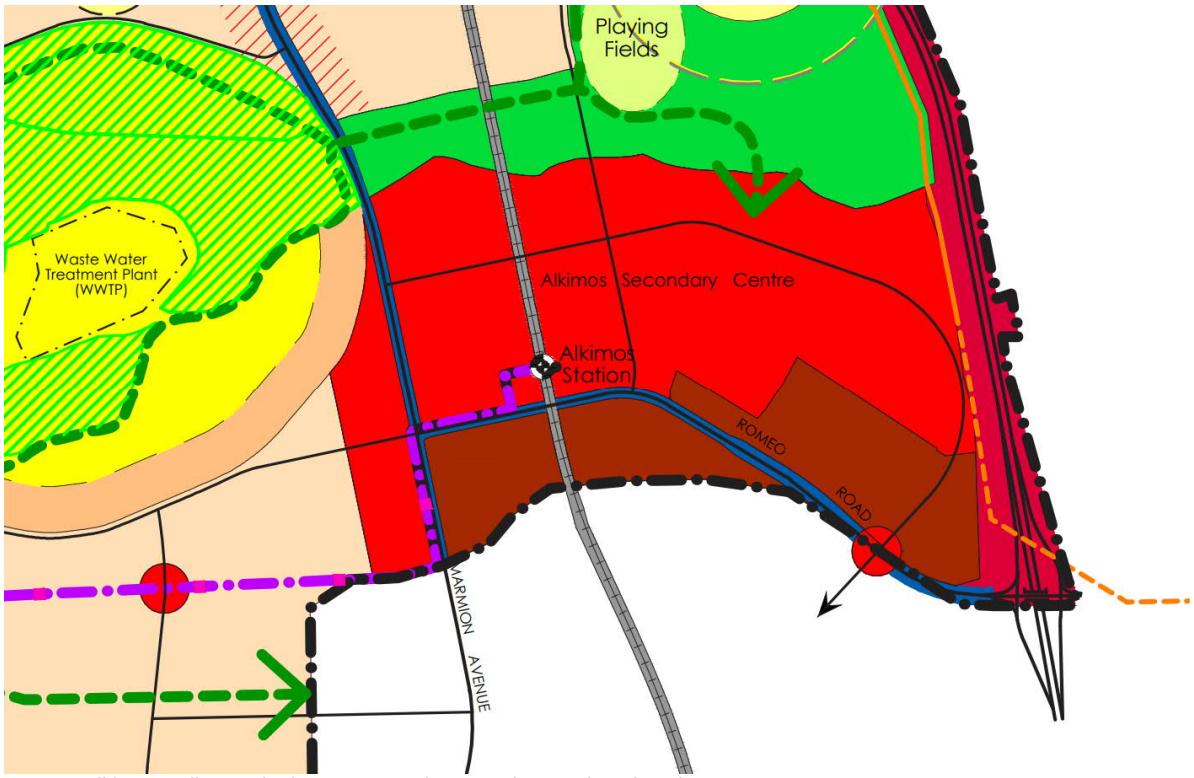
Source: METRONET

1.2 PROPOSED ALKIMOS STATION BACKGROUND

The proposed Alkimos Station is located on the Yanchep Rail Extension line, approximately 45km north of Perth. The proposed station site is to be located east of Marmion Avenue and north of the future Romeo Road alignment. Wanneroo Road is also located approximately 2km east of the station location, with road connectivity being provided by Romeo Road. Connectivity to a future Mitchell Freeway extension is also anticipated east of the station, again via Romeo Road

As per the Alkimos Eglinton District Structure Plan, the Alkimos Secondary Centre in relation to the proposed train station, is shown in Figure 2.

Figure 2. Alkimos Secondary Centre



Source: Alkimos Eglinton District Structure Plan, March 2016 (Landcorp)

Alkimos Station will be the first of the new stations along the Yanchep Rail Extension line, extending north from the existing Butler train station. The Alkimos Station will allow for improved public transport access and connectivity from surrounding areas and reduce the distance required to be travelled for those living near Alkimos where Butler Station is currently their closest train station.

1.3 PURPOSE OF THIS DOCUMENT

This Transport Impact Assessment (TIA) has been prepared to support the development application of the proposed Alkimos Station and seeks to outline the existing and proposed transport elements associated with Alkimos Station, due to be constructed as part of the wider METRONET YRE project.

As per the Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines for Individual Developments (Volume 4), it is anticipated that the station will generate in excess of 100 vehicle trips within the development peak hour – resulting in what is considered to be a 'high' level of impact. Therefore, a transport impact assessment level of investigation is deemed to be appropriate for this development. As such, this document has been prepared in accordance with the framework established within the WAPC guidelines.

1.4 EXISTING SITUATION

1.4.1 PROJECT SITE

The site of the proposed Alkimos Station is located approximately 400m east of the existing intersection of Marmion Avenue and Brindabella Parkway. A future access point east of Brindabella Parkway is anticipated to serve as the main access between Marmion Avenue and the future station. Additional road connectivity to a future Mitchell Freeway extension east of the site is also expected to be provided via the nearby Romeo Road upgrade, to be completed over time as part of the wider road network upgrades in the area.

The proposed station is to be located on a currently unoccupied greenfield parcel of land. The approximate site boundary is shown in Figure 3.

Figure 3. Proposed Alkimos Station Location

Source: Google Maps

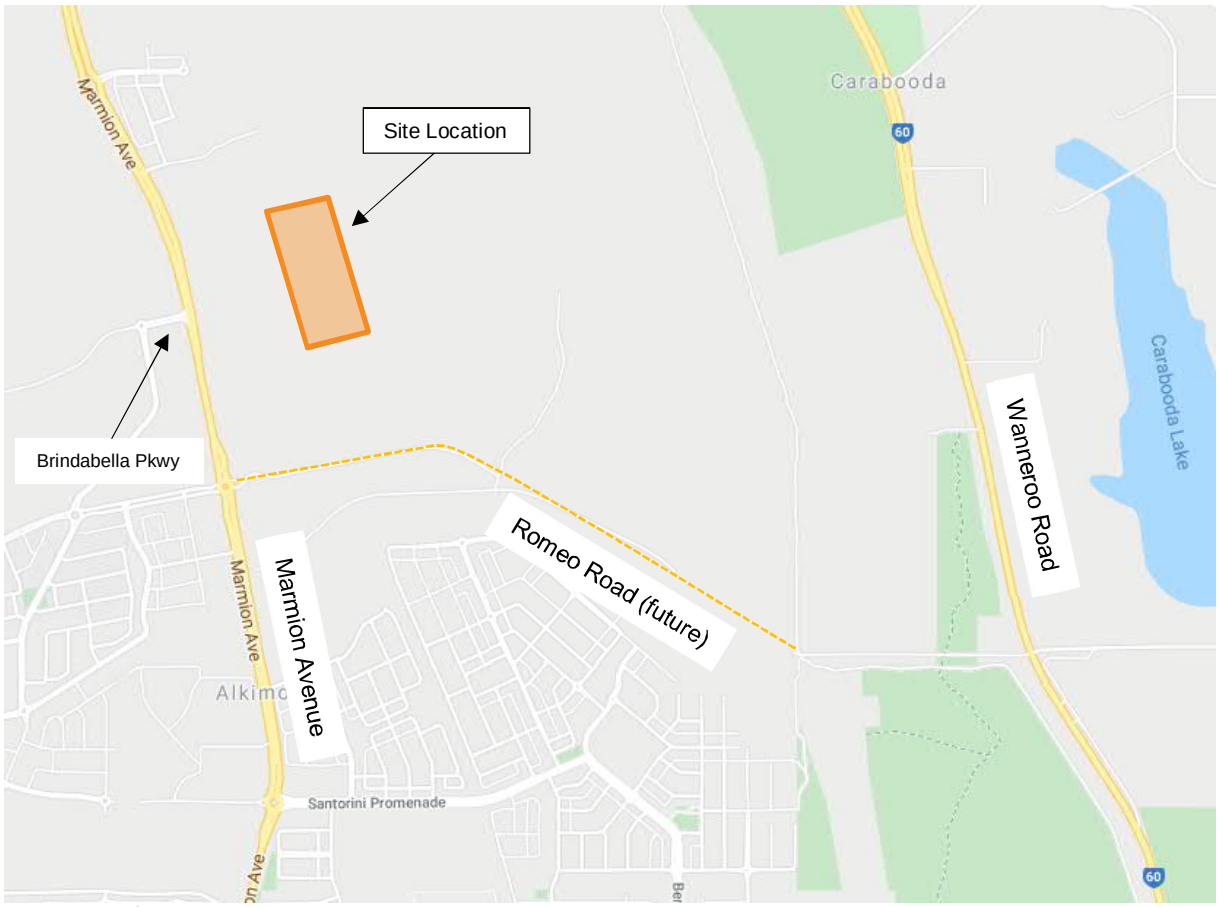
As the site is currently unoccupied, there are no existing land uses or traffic generation associated with site usage in or adjacent to the proposed Alkimos Station boundary.

1.5 SURROUNDING ROAD NETWORK

1.5.1 LOCAL ROAD NETWORK

The road network in the area surrounding the proposed Alkimos Station site is shown in Figure 4.

Figure 4. Alkimos Station Surrounding Road Network



Source: Google Maps

The Alkimos Station site is expected to be primarily accessed from a new connector road at the intersection with Marmion Avenue (via an extension of the existing Brindabella Parkway east of Marmion Avenue). An upgraded intersection treatment at the existing Marmion Avenue / Brindabella Parkway junction will be required to accommodate the additional approach from the new station connection road. This access is expected to be constructed by others, in coordination with NEWest. The new connector will form part of the new internal road network surrounding the station and the developing area within the Alkimos Secondary Centre.

Marmion Avenue is the nearest major road running adjacent to the site and will serve as the major north-south distributor road for vehicles seeking to access the proposed station. Marmion Avenue provides key regional connectivity along the western coast of Perth from the West Coast Highway / Karrinyup Road intersection through to Yanchep Beach Road in the north.

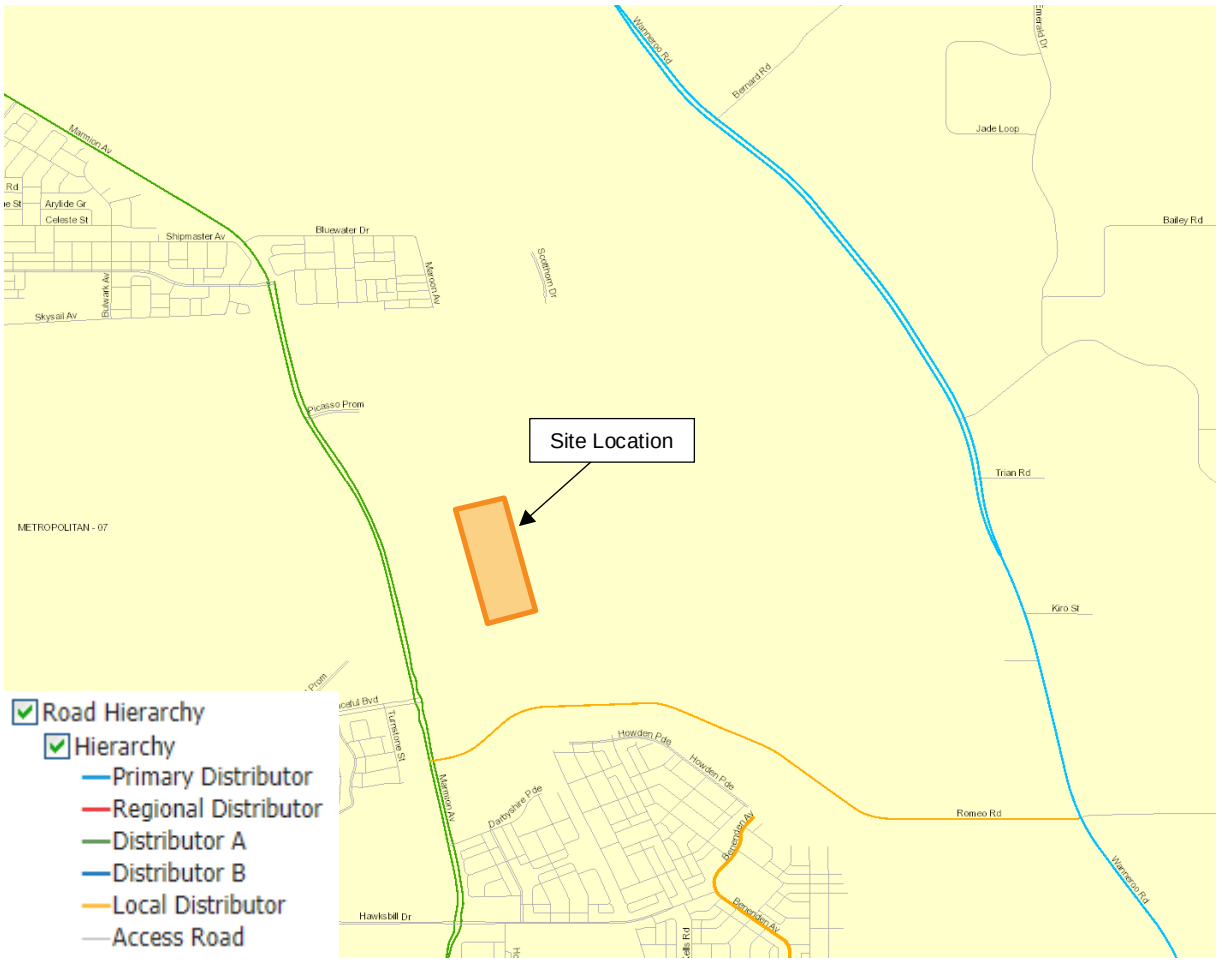
The City of Wanneroo recently completed the construction of a dual carriageway upgrade along Marmion Avenue from Reflection Boulevard in Brighton, through to Yanchep Beach Road. Marmion Avenue currently has a speed limit of 80km/h in the vicinity of the proposed Alkimos Station. Future site connectivity is expected to be via the intersection of Brindabella Parkway and Marmion Avenue, with these works discussed further in Section 2.2 (new signals to be delivered by others).

Wanneroo Road, located east of the proposed station location, provides additional north-south distributor access through the region with future connectivity to the station area via the Romeo Road extension. Wanneroo Road is a one lane per direction single carriageway at the location of the existing intersection with Romeo Road. The current speed limit in this vicinity of Wanneroo Road is 90km/h.

1.5.2 MAIN ROADS WA ROAD HIERARCHY

The road hierarchy system of the surrounding network, as per the Main Roads WA Road Information Mapping System, is shown in Figure 5.

Figure 5. Local Road Hierarchy



Source: Main Roads WA Road Information Mapping System (https://mrwebapps.mainroads.wa.gov.au/publicmaps/rim)

As per the above functional road hierarchy in the vicinity of the proposed site location, Marmion Avenue is classified as a District Distributor A, indicating that this route is managed by the local government, City of Wanneroo. While City of Wanneroo currently manages Marmion Avenue, it is understood that control of this corridor will be handed over to Main Roads WA in the near future.

Wanneroo Road is classified as a Primary Distributor and is therefore managed by Main Roads WA.

Finally, Romeo Road is classified as a Local Distributor road and would be managed by local government, City of Wanneroo. However, as part of the wider Alkimos City Centre Structure Plan works (outlined in further detail in Section 2.2), Romeo Road is expected to be significantly upgraded and realigned in the coming years to function as a major distributor road for the region.

1.6 EXISTING TRAFFIC FLOW INFORMATION

1.6.1 MARMION AVENUE

Marmion Avenue traffic flow information was sourced from the Main Roads WA Traffic Map. The nearest segment of road to the project area with recent traffic data is from the tube count detector located south of the Graceful Boulevard intersection in Alkimos (located approximately 600 metres south of the future station access point on Marmion Avenue). Latest data available for this segment of Marmion Avenue is from the 2017/18 period.

The recorded AM peak and PM peak counts for Marmion Avenue are summarised in Table 1 and Table 2, respectively.

Table 1. Marmion Avenue 2017/18 AM Peak Counts

Marmion Avenue	2017/18 AM Peak (08:00 – 09:00)	
	Northbound	Southbound
Light Vehicles	739	1,121
Heavy Vehicles	54	34
Total	793	1,155

Table 2. Marmion Avenue 2017/18 PM Peak Counts

Marmion Avenue	2017/18 PM Peak (15:00 – 16:00)	
	Northbound	Southbound
Light Vehicles	1,040	816
Heavy Vehicles	55	27
Total	1,095	843

1.6.2 WANNEROO ROAD

Traffic data for Wanneroo Road was also sourced from the Main Roads WA Traffic Map. Information was obtained from the tube count detector located approximately 300 metres north of the Romeo Road intersection for the 2017/18 period.

The recorded AM peak and PM peak counts for Wanneroo Road are summarised in Table 3 and Table 4, respectively.

Table 3. Wanneroo Road 2017/18 AM Peak Counts

Wanneroo Road	2017/18 AM Peak (08:00 – 09:00)	
	Northbound	Southbound
Light Vehicles	274	559
Heavy Vehicles	57	68
Total	331	627

Table 4. Wanneroo Road 2017/18 PM Peak Counts

Wanneroo Road	2017/18 PM Peak (15:00 – 16:00)	
	Northbound	Southbound
Light Vehicles	563	388
Heavy Vehicles	65	55
Total	628	443

1.7 EXISTING BUS ROUTES

Current Transperth bus route information for the area surrounding the Alkimos Station site has been sourced from Transperth timetables and network mapping.

The bus routes which currently operate in the vicinity are shown in Figure 6.

Figure 6. Existing Transperth Bus Route Map

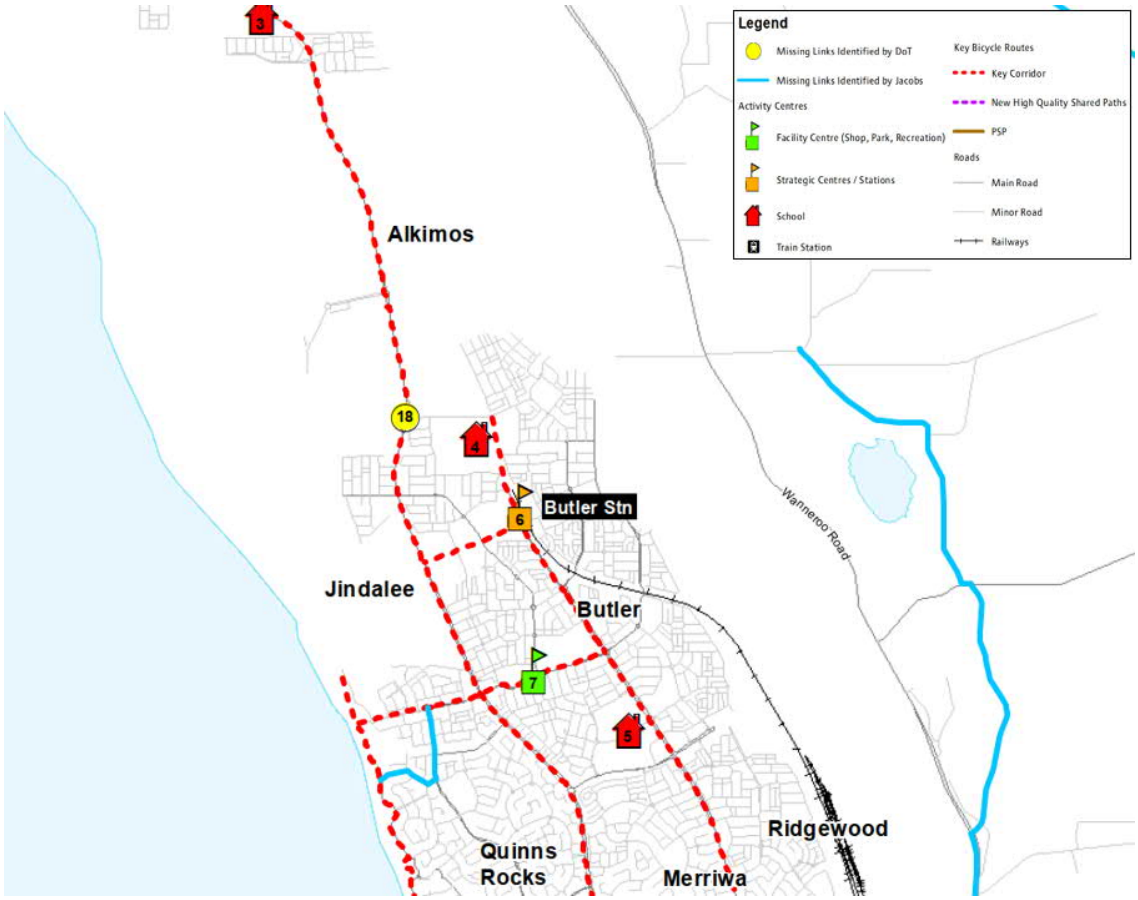
Source: Transperth Network Maps (https://www.transperth.wa.gov.au/journey-planner/network-maps)

From the Transperth network map, there are presently two bus routes which travel past the project site along Marmion Avenue, which connect Butler Station to both Yanchep (Routes 490. 491) and Two Rocks (Route 490). Currently, neither of these bus routes access east of Marmion Avenue where the future Alkimos Station access is expected to be located.

1.8 EXISTING PEDESTRIAN AND CYCLING NETWORK

The vicinity of the proposed Alkimos Station is not currently covered by the Department of Transport Joondalup and Stirling bike map, as this presently extends only as far as Butler. The existing pedestrian and cycle network (as documented within the City of Wanneroo Bicycle Plan) is shown in Figure 7.

Figure 7. Alkimos Existing Pedestrian and Cycle Network

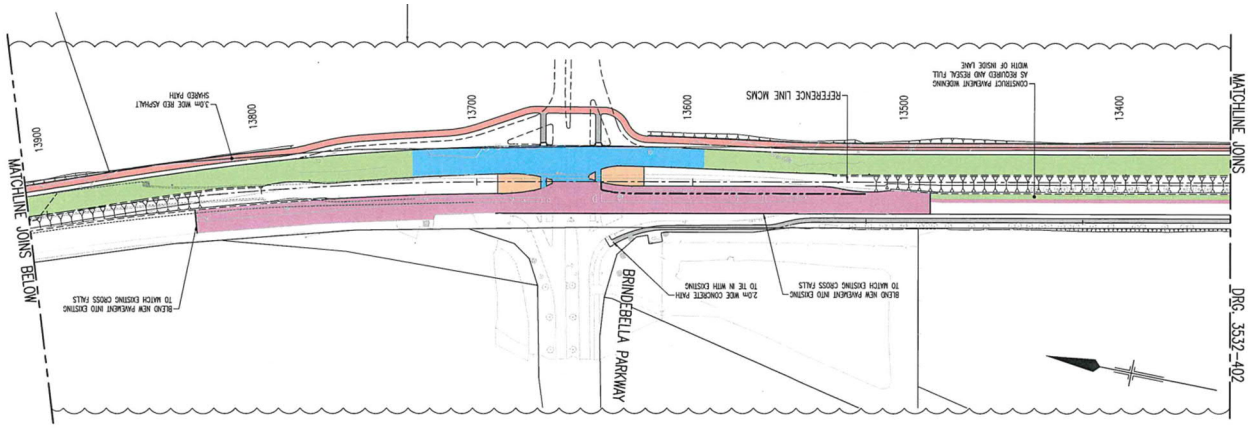


Source: City of Wanneroo (https://www.wanneroo.wa.gov.au/downloads/download/323/city_of_wanneroo_bicycle_plan)

As part of the duplication of Marmion Avenue between Yanchep Beach Road and Brighton that has now been completed by the City of Wanneroo, improved shared path connections are available along the eastern side of the Marmion Avenue road reserve.

Plans obtained from the City of Wanneroo information page on the Marmion Avenue dualling indicate that a new 3.0 metre wide shared path is provided along the eastern side of the roadway, between Santorini Promenade and Yanchep Beach Road. An excerpt of these plans in the area adjacent to Brindabella Parkway is shown in Figure 8.

Figure 8. Marmion Avenue Duplication Plans (near Brindabella Parkway)



Source: City of Wanneroo (https://www.wanneroo.wa.gov.au/directory_record/424/marmion_avenue_dualling_to_yanchep)

As a result of these works, it is expected that the provision of the new shared path will improve cycle and pedestrian connectivity along the Marmion Avenue corridor and allow for future connection via the new east-west extension of Brindabella Parkway, to the proposed Alkimos Station.

As the planned Romeo Road connection is not yet established, there is currently no formal cycle or pedestrian provision along this roadway. Planning for the pedestrian and cycle provision along Romeo Road are underway as part of the DevelopmentWA development planning for Alkimos Activity Centre, and have still being finalised.

2.0 DEVELOPMENT PROPOSAL

2.1 STATION LAYOUT

The proposed Alkimos Station seeks to provide a two platform train station along the Yanchep rail line, along with supporting infrastructure including a total 686 bay parking facility (split between two long-term parking areas), drop-off parking zone, and a bus interchange.

The general site layout for the Alkimos Station precinct is illustrated in Figure 9. Note that some of the new road network illustrated below is to be delivered by DevelopmentWA as the land development agency, including Brindabella Parkway up to the rail corridor (including the intersections of Brindabella Parkway with NS1 and NS2). PTA has liaised with DevelopmentWA to ensure the PTA delivered sections of the road network tie in with the road connections, and the assumed intersection treatments and road layouts included in this TIA are based on the current information supplied to the NEWest project team.

Initial planning discussions for the construction of the Alkimos Station precinct saw the area being developed across two distinct phases, as the area to the east of the rail line became accessible via the planned Brindabella Parkway and Tuart Drive bridge structures.

Through subsequent planning and discussions with developers, it was concluded that the NEWest Alliance would deliver both the Brindabella Parkway and Tuart Drive bridge structures as part of the opening year scenario, thereby allowing access to the area east of the rail line. With access to the eastern side of the rail line now viable, the delivery of the Alkimos Station precinct was consolidated in to a single phase that would deliver the ultimate Station parking and access configuration from opening.

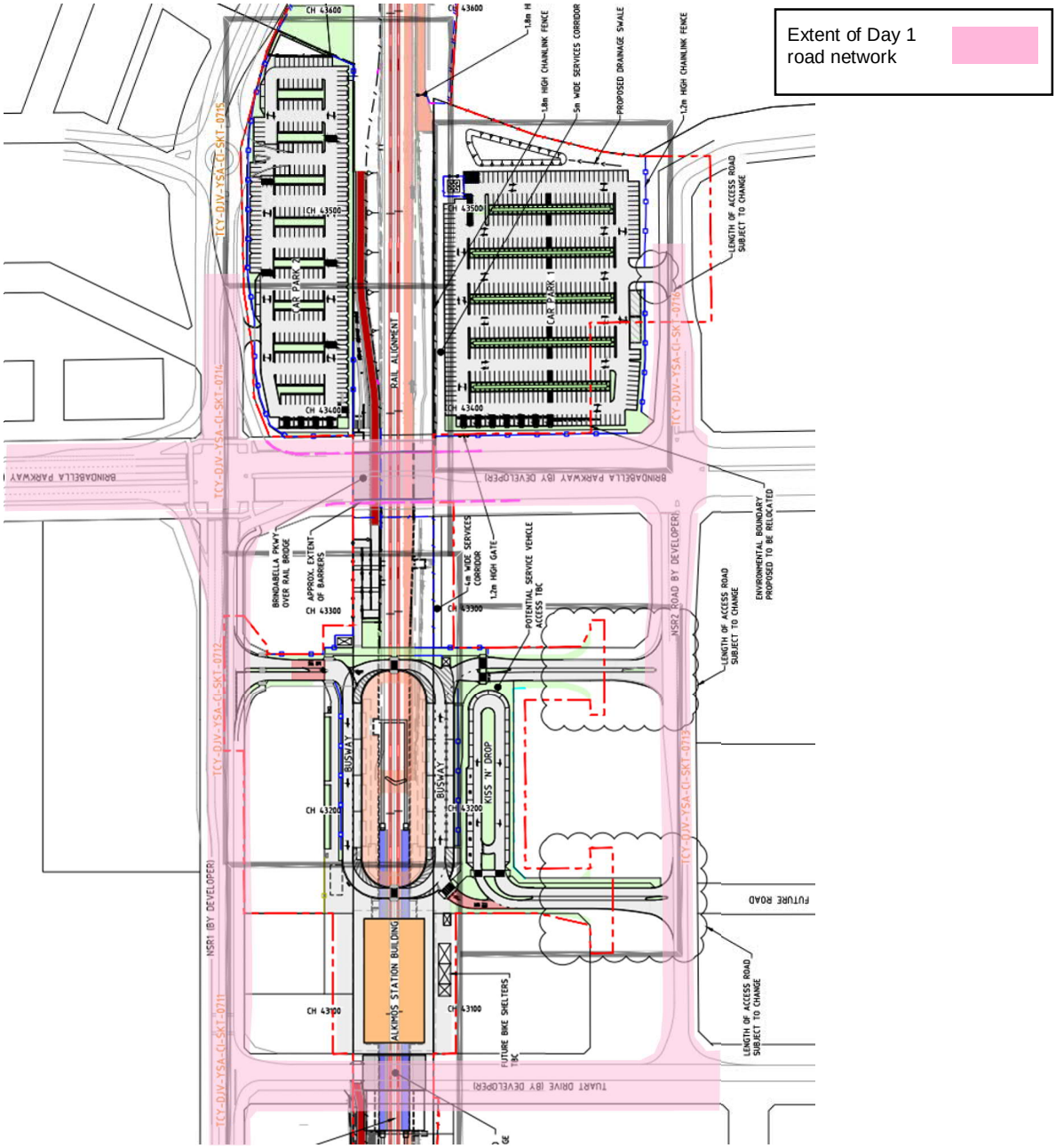
The Alkimos Station precinct will provide two main Park & Ride areas to the north-west and north-east of the station, supplying a total of 686 parking bays (including public bays, accessible bays and PTA staff / transit police bays).

Further to this, a Kiss & Ride drop-off area is provided on the eastern side of the rail line, with access provided by the NSR2 developer roadway. The Kiss & Ride facility will provide a total of 22 standard drop-off bays, 5 accessible drop-off bays, a one taxi bay.

The design also provides for a north-south shared path route through the station site, that in the opening year terminates immediately south of Tuart Drive, and north of the station passes beneath Brindabella Parkway bridge before terminating at Car Park #2. This allows for the connection of future shared path infrastructure north and south of the site to be delivered by others, thereby allowing for regional walking / cycling connectivity.

Finally, located within the centre of the precinct shall be the Alkimos bus station, which will supply a total of 12 bus bays (including active and lay-by bays). The layout of the bus station allows for re-circulation of Transperth buses within the site, and access to and from the station is provided via both NSR1 (west) and NSR2 (east) to allow for future flexibility with bus routes in the area.

Figure 9. Alkimos Station Overall Site Plan



2.2 CHANGES TO SURROUNDING TRANSPORT NETWORKS

As part of the wider Alkimos City Centre structure plan development, DevelopmentWA will be constructing new roads which will provide vehicle connectivity to the precinct including the proposed Alkimos Station.

Within the opening year scenario, the extent of the road network which will be constructed to provide connectivity to Alkimos Station precinct is highlighted within Figure 9.

This includes the following roadways which will be delivered by DevelopmentWA and will provide connectivity to the Alkimos Station precinct site:

- Brindabella Parkway from Marmion Avenue to NS2 Road (PTA / NEWest delivering the rail bridge structures).
- NSR1 Road from Tuart Drive to Car Park #2 access.
- NSR2 Road from Tuart Drive to Car Park #1 access.
- Tuart Drive from NSR1 to NSR2 roads (PTA / NEWest delivering the rail bridge structures).

As part of the DevelopmentWA works outlined above, the NEWest team has been provided drawings which include traffic signal intersection treatments for Brindabella Parkway / NSR1 and Brindabella Parkway / NSR2 intersections which have been used in good faith as the basis for the intersection analysis in Section 3.0. Give-way accesses will be constructed to allow entry and exit to the long-term car parks, drop-off area and bus interchange along NSR1 and NSR2 roads as required.

Beyond the access roadways which are expected to be constructed by NEWest Alliance for the Alkimos Station project, there are additional wider changes to the transport network in the surrounding area planned in future phases as part of the overarching *Alkimos City Centre Structure Plan No. 89 (August 2018)* that are separate to the Alkimos Station works. This local structure plan is the prevailing masterplan for the Alkimos area and is compliant with the wider Alkimos Eglinton District Structure Plan.

The anticipated construction of Romeo Road to the south of the Alkimos City Centre will be a major catalyst for vehicle movement in the region, as this will form a key new east-west arterial road that will ultimately connect to the planned future Mitchell Freeway extension. This is a key state project and will be delivered separately by others, however it is assumed that Romeo Road is not likely to be constructed by the opening year of the Alkimos Station based on current understanding (current information suggests Romeo Road will be open by 2023, shortly after Station opening). The alignment of Romeo Road is likely to change from the alignment indicated in the current *Alkimos Activity Centre Structure Plan No. 89,* but this will not change the analysis included in this Transport Impact Assessment.

These future network modifications that are part of the latest Alkimos Masterplan are discussed in further detail within Section 2.4: Committed Developments and Other Transport Proposals, and it is noted these are still in planning phase and subject to change.

2.3 INTEGRATION WITH SURROUNDING AREA

The proposed Alkimos Station is to be located on an area of land east of Marmion Avenue which is currently unoccupied and has no existing land use. Similarly, the area surrounding the proposed station site is undeveloped. Therefore, the integration of the proposed station with the surrounding area, based on the existing land use, is neither positive nor negative.

However, Alkimos Station is expected to become one of the key features of the future Alkimos City Centre Structure Plan and the future residential / retail development associated with this local region.

Therefore, the presence of the proposed Alkimos Station is expected to become a focal point for the future development of the local area and act as a catalyst for the development of the future city centre via the provision of a transit hub to support the surrounding precinct.

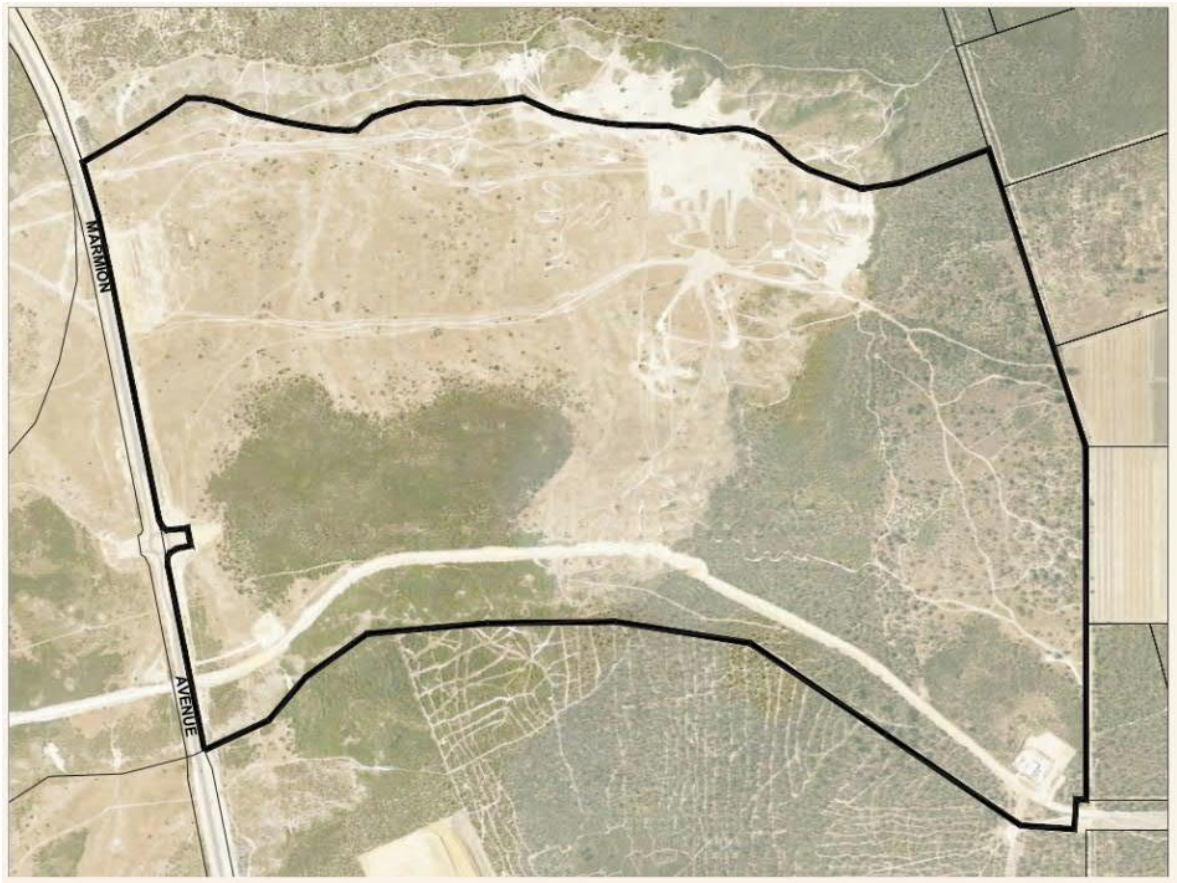
2.4 COMMITTED DEVELOPMENTS AND OTHER TRANSPORT PROPOSALS

As noted above, the *Alkimos City Centre Structure Plan No. 89 (August 2018)* is the primary planning document which underpins the surrounding Alkimos area, of which the proposed Alkimos Station forms a critical component.

It is understood that a major review of the *Alkimos City Centre Activity Centre Plan* is currently being undertaken by DevelopmentWA. Importantly, it is understood the revised Alkimos City Centre primary road networks and connections will still generally align with the 2018 layout referred to in this Transport Impact Assessment. Therefore a similar level of road network will be delivered compared to the indicative layouts shown in this report.

As per the masterplan, the current Alkimos City Centre area is bounded by Marmion Avenue to the west and the future Mitchell Freeway extension to the east. The future extension of Romeo Road also forms the southern boundary to the site. The site area for the Alkimos City Centre is illustrated in Figure 10.

Figure 10. Alkimos City Centre Site Boundary



Included within the wider Alkimos City Centre Structure Plan is a region allocated for the Alkimos Station, indicated within the Masterplan as the 'Station Precinct'. Other aspects of the Masterplan allow for various areas including residential, commercial, mixed use and civic land uses.

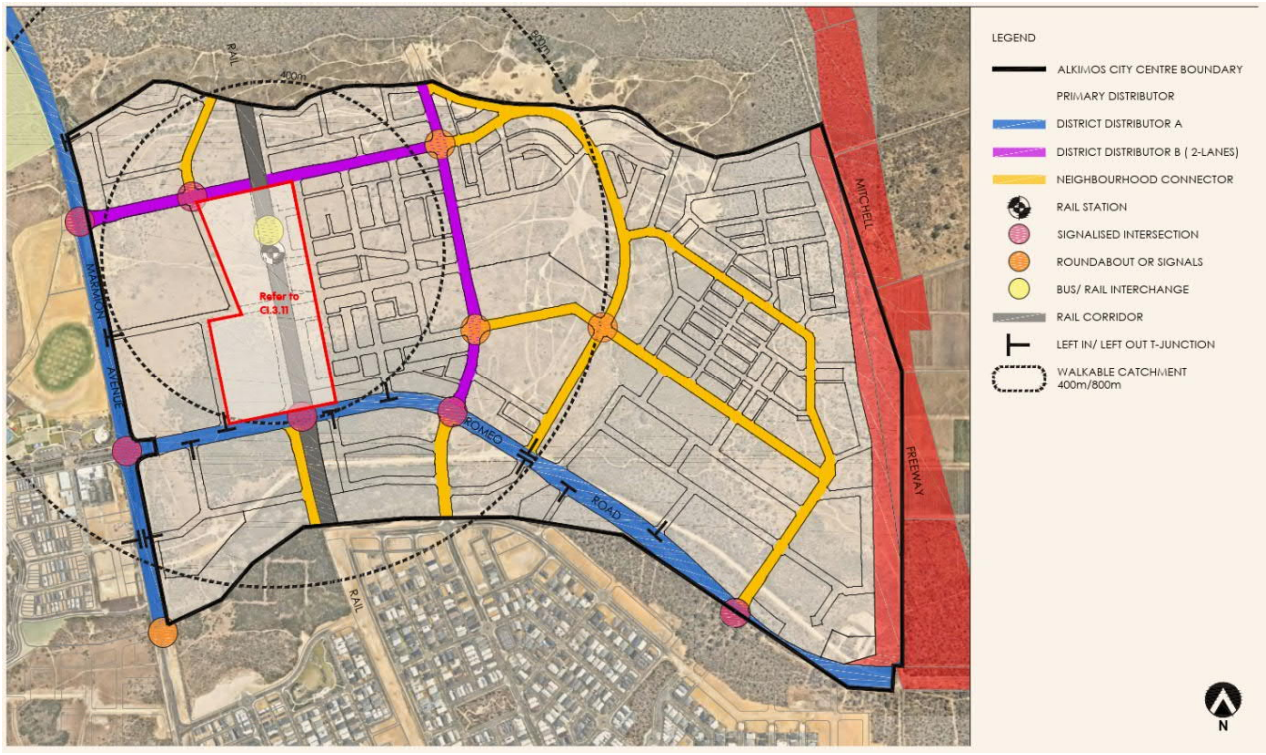
In regard to the Station Precinct, the Alkimos City Centre Structure Plan states the following:

> *"The northern rail extension to Yanchep, including the construction of a rail station in the activity centre plan area, is proposed to occur by 2021. The final design of the rail station and associated bus interchange is yet to be finalised by METRONET and the landowner. It has therefore been agreed to specifically identify the transit station site and surrounding area as the "Station Precinct" and for this precinct to have detailed subdivision and development provisions.*
>
> *Once the rail station and bus interchange design has been finalised the detailed subdivision and development provisions for the Station Precinct are required to be provided and approved by the Western Australian Planning Commission in accordance with Clause 40 of the Deemed Provisions of the Planning and Development (Local Planning Schemes) Regulations 2015."*

Therefore, as part of the Alkimos Station development, it will be necessary to ensure that proposed road network changes as part of the station project are compatible with the proposed movement network included within the Alkimos City Centre Structure Plan.

The Structure Plan outlines a proposed ultimate movement network for the city centre that will be implemented over time. The proposed movement network as defined within the Alkimos City Centre Structure Plan is illustrated in Figure 11.

Figure 11. Alkimos City Centre Structure Plan: Proposed Movement Network



Key future changes to the movement network in the area surrounding the Station Precinct include the extension of Romeo Road (indicated as a District Distributor A), which is expected to bound the

southern edge of the station site and provide further regional accessibility, particularly in the east-west direction.

The movement network also indicates that Romeo Road will provide connectivity via a future interchange with the next stage of the Mitchell Freeway extension, which bounds the eastern edge of the Alkimos City Centre. Several other future district distributor type roadways also surround the Station Precinct, providing further local connectivity to the various future land uses surrounding the Alkimos Station.

The proposed movement network also indicates that several intersections within the surrounding area may potentially require signalised intersection treatment, including the primary site access point east of the existing Brindabella Parkway intersection. It is again noted that while the signalised upgrade to the Marmion Avenue / Brindabella Parkway intersection is expected to be delivered by the opening of Alkimos Station, this intersection is not covered by this study and will instead be addressed in a separate study on behalf of the developers that are building this local road infrastructure.

Furthermore, the Structure Plan also outlines both the proposed bus network and the indicative pedestrian and cycle network for the ultimate structure plan layout. Note that the bus route plan may be modified following future consultation with Transperth and the community. These networks as shown in the Alkimos City Centre Structure Plan are illustrated in Figure 12 and Figure 13, respectively.

Figure 12. Alkimos City Centre Structure Plan: Proposed Public Transport Routes

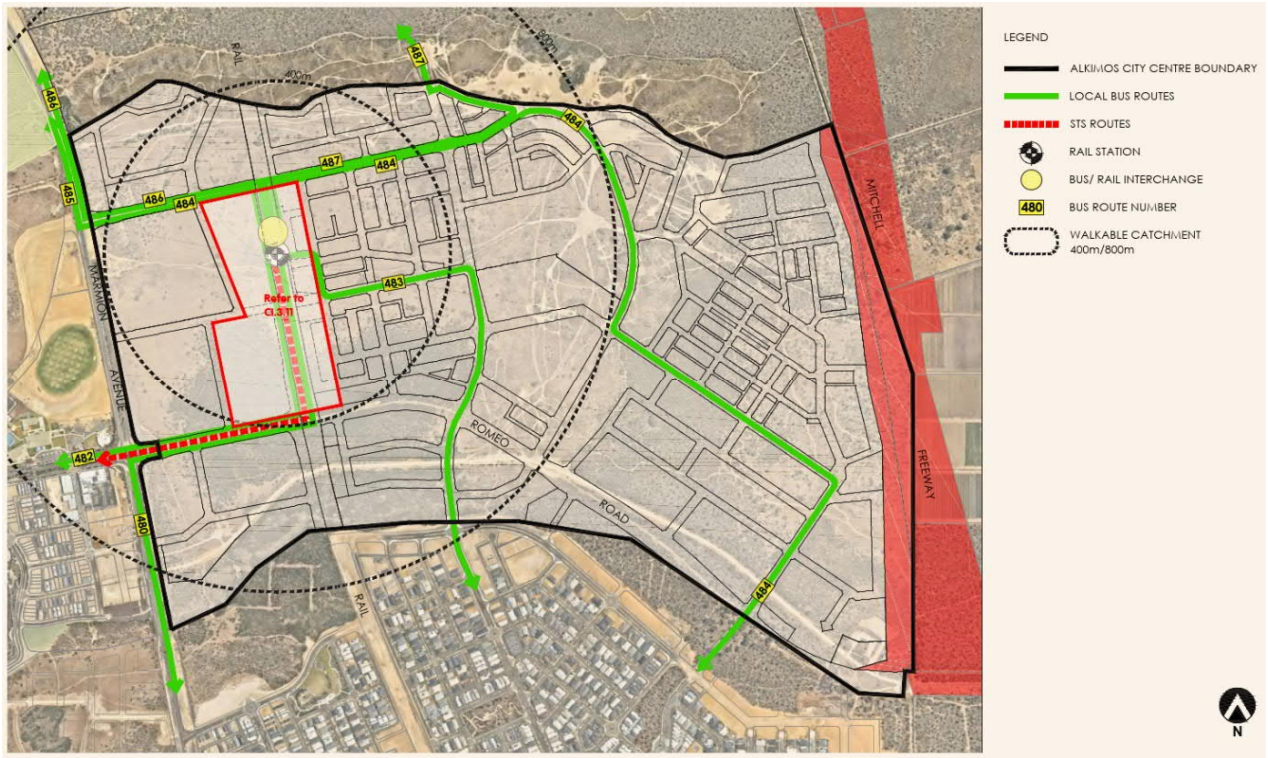
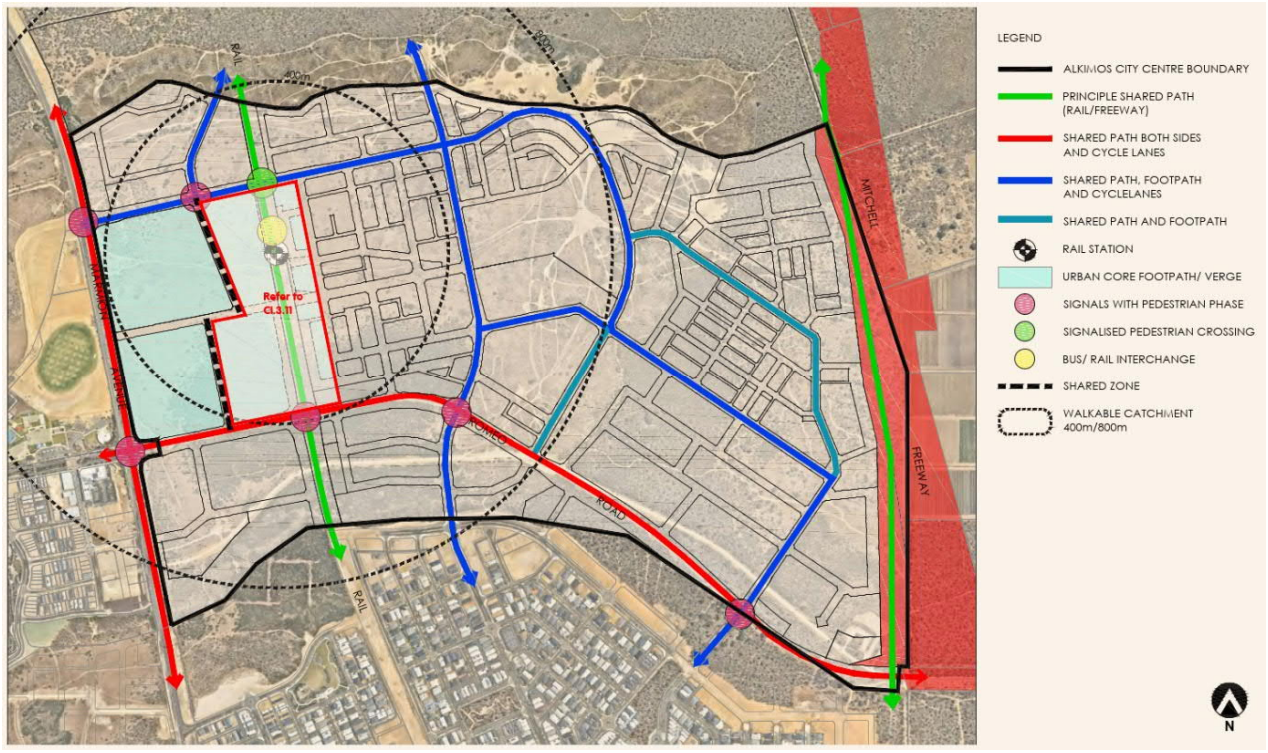


Figure 13. Alkimos City Centre Structure Plan: Proposed Pedestrian & Cycle Networks



Currently, the implementation of the Alkimos City Centre Structure Plan is in the early stages as the vast majority of the land identified in the scheme is still currently undeveloped and much of the supporting transport network has not yet been implemented. However, the presence of the proposed Alkimos Station is a critical element of the overall structure plan and a major catalyst for the future development of the region.

Therefore, while the proposed Alkimos Station development does not include construction of the adjacent movement network as part of the project, the surrounding local district is prepared for the future expansion and development of the Station Precinct, as demonstrated by the planning included in the Alkimos City Centre Structure Plan.

3.0 ANALYSIS OF TRANSPORT NETWORKS

3.1 BACKGROUND AND APPROACH

The traffic assessment of the network surrounding the proposed Alkimos Station development is detailed within this section of the report. The goal of this assessment is to demonstrate that the transport infrastructure provided as part of the project is suitable for use and is capable of adequately accommodating the forecast transport demands associated with the future station.

3.1.1 ASSESSMENT YEARS / TIME PERIODS

For the Alkimos Station transport infrastructure assessment, the study focuses on the proposed opening year of 2022, and a post-opening year of 2032 to account for the medium term development in the area and presence of nearby major infrastructure changes, particularly the surrounding development of the Alkimos City Centre which includes the major elements of transport infrastructure and land use associated with that plan.

As the station is largely expected to accommodate work related trips to / from the Perth CBD, the assessment will focus primarily on the AM and PM peak periods. While weekend traffic is anticipated, both the station patronage and background traffic flows during the weekend are expected to be significantly lower than the respective weekday peaks.

The peak period intervals are primarily based on the typical arrival profiles for train stations located on the outer edges of the Perth metropolitan passenger rail network, and demonstrates that the AM peak hour is likely to occur from 07:00 to 08:00 and the PM peak hour from 17:00 to 18:00.

3.1.2 ASSUMED ROAD NETWORK

The Alkimos Station Transport Impact Assessment focuses on the opening year (2022) and future year (2032) scenarios, and is consistent with the Alkimos City Centre Structure Plan which is the key planning framework guiding new development over this timeframe. The road network connections which are assumed to be delivered within these timeframes are critical to understanding the distribution of flows to and from the Alkimos Station site.

Based on the Alkimos City Centre Structure Plan information, plus liaison with private developers of the local road connections and GTA / Stantec Consultants (currently working on behalf of DevelopmentWA), an assumed staging for the road network plan has been prepared for the opening scenario and future year scenario (opening year +10) that is formed on the best understanding of the information currently available.

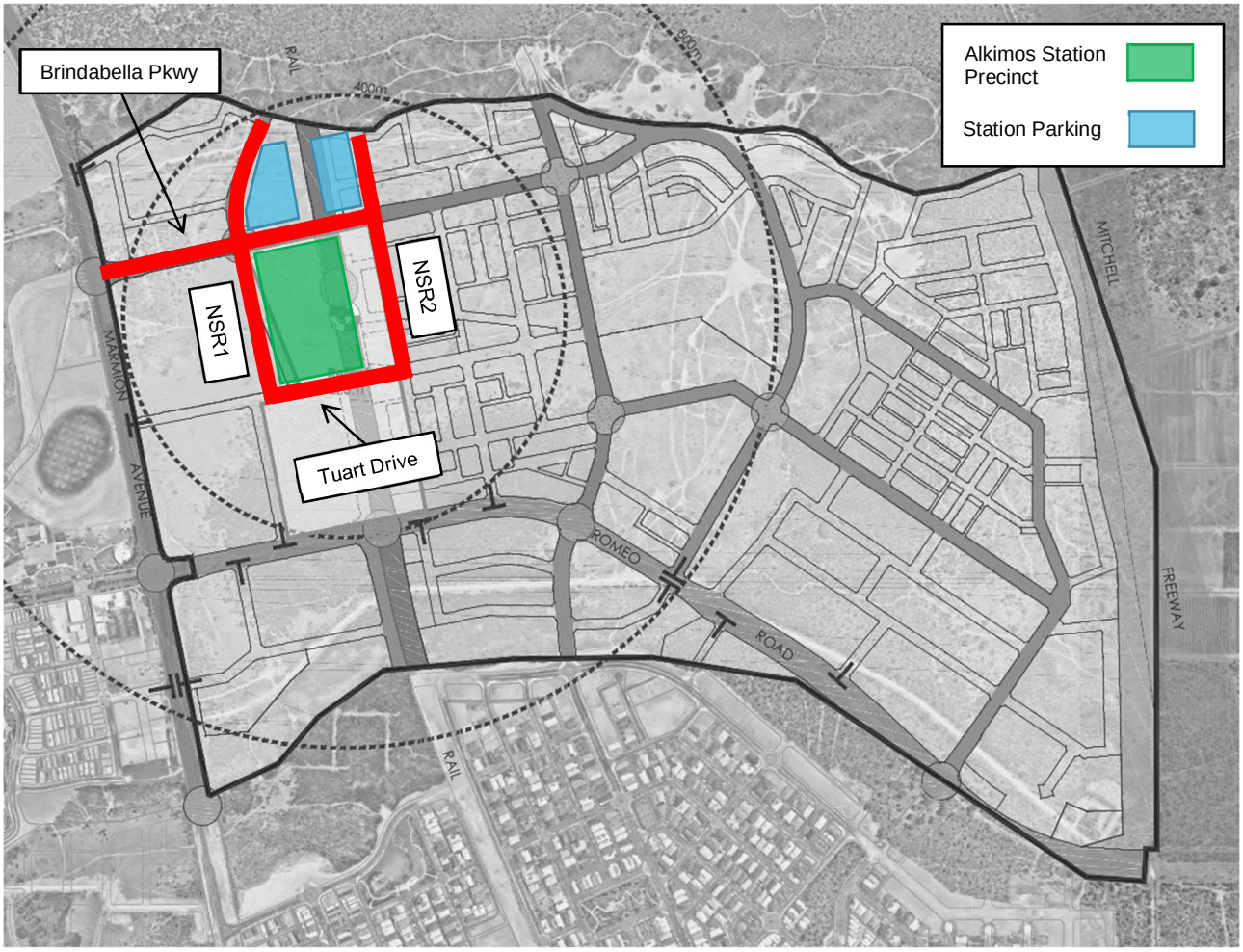
The assumed road network and connectivity for each assessed stage of the Alkimos Station Transport Impact Assessment is shown in Figure 14 and Figure 15 for the opening year scenario and future year scenario, respectively.

Note that the assumed road network represents the minimum road infrastructure that is expected to be constructed by these timeframes. Additional road connectivity may be in place in these scenarios depending on individual developer schedules and the progress of independent land development.

The road network in the Alkimos Station opening year scenario of 2022 primarily consists of the minimum road connections required to access the station, car parking areas and the bus interchange. This includes the construction of Brindabella Parkway and bridge structure (up to the NSR2 roadway), and the Tuart Drive bridge (between NSR1 and NSR2).

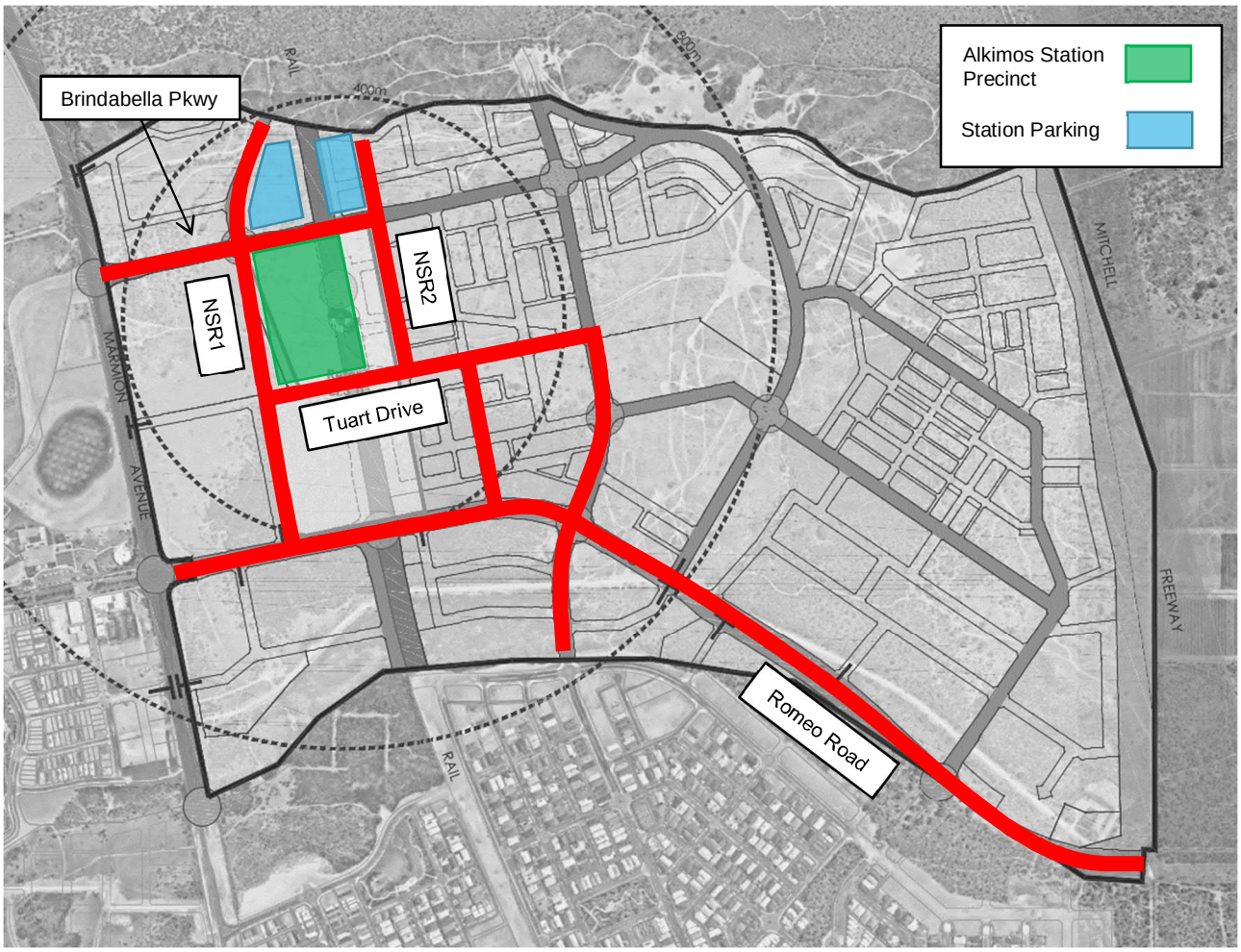
The roadways used to access the station and parking areas (NSR1 and NSR2) are expected to be constructed no further than Tuart Drive, as no connection to the south is expected in the opening year. Currently, it is understood that the future Romeo Road connection is likely to be open by the year 2023 (shortly following station opening), with connections to developer roads occurring after this period.

Figure 14. Alkimos City Centre Assumed Road Network: 2022 Opening Year Scenario



The road network in the Alkimos Station future year scenario of 2032 includes the further completion of multiple internal road connections within the Alkimos City Centre as further land use is developed. In particular, it is expected that the developer roads NSR1 and other key sections will provide connectivity to and from Romeo Road, allowing access to the future Mitchell Freeway extension.

Figure 15. Alkimos City Centre Assumed Road Network: 2032 Future Year Scenario



3.1.3 INTERSECTIONS TO BE ASSESSED

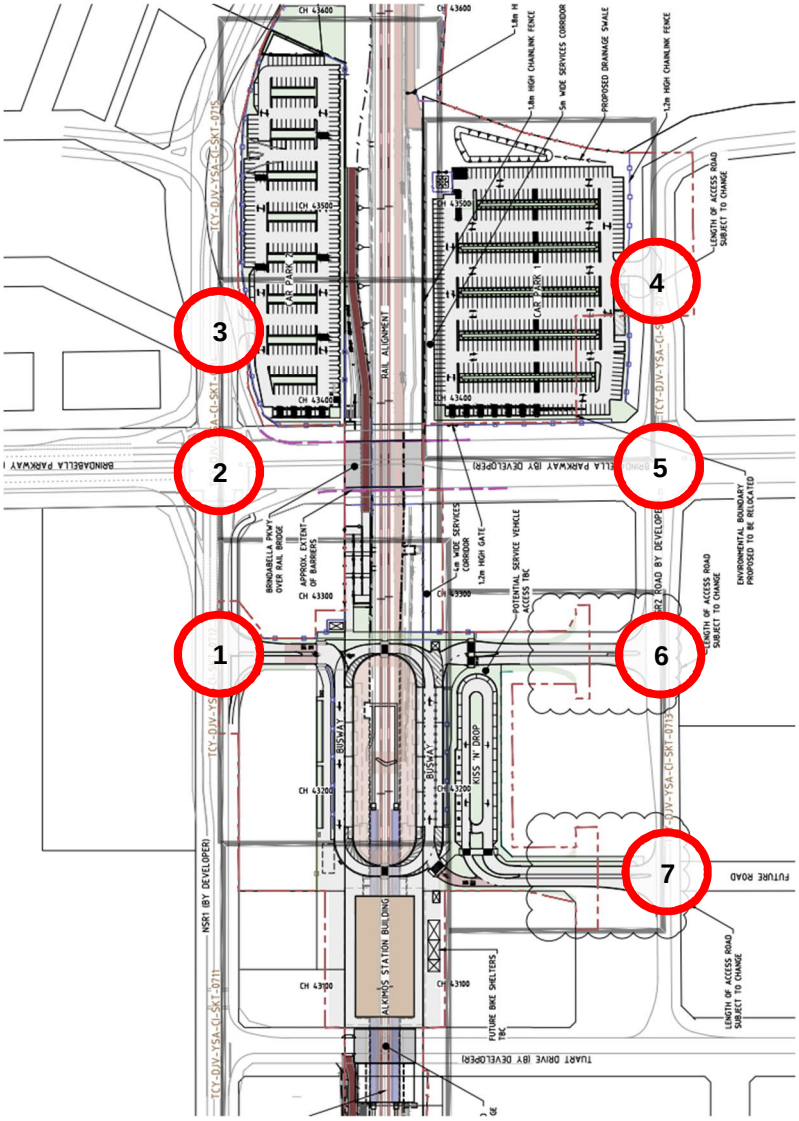
In both opening year and future year scenarios, it is expected that the access arrangement to and from all Alkimos Station parking, drop-off and bus station areas will remain unchanged. Therefore, the intersections to be assessed as part of this study shall be the same in both scenarios, with the differences in each scenario relating to the amount of traffic on the network, driven by station patronage forecasts, land use and extended network connectivity.

The intersections included in this study are as follows:

1. NSR1 / Bus Interchange Access
2. NSR1 / Brindabella Parkway
3. NSR1 / Car Park #2 Access
4. NSR2 / Car Park #1 Access
5. NSR2 / Brindabella Parkway
6. NSR2 / Bus Interchange Access
7. NSR2 / Kiss & Ride Access

The above intersections are highlighted on the overall station layout plan in Figure 16. Note that the above numbers correspond to the numbers shown on the layout plan, for consistency.

Figure 16. Intersections to be Assessed



3.1.4 METHODOLOGY AND APPROACH

The overall approach to the transport assessment undertaken in this report is largely in line with the previous *Yanchep Rail Extension Transport Assessment (May 2019)* undertaken by WSP as part of the preliminary works leading up to the current engagement. However, some adjustments to this methodology have been made for this assessment.

As each of the roads being assessed as part of this study do not currently exist, background traffic flows along these connections are unable to be extracted from existing datasets. Additionally, given that the land usage and forecasting within the Alkimos City Centre is a complex task, NEWest has worked in liaison with GTA Consultants who are currently partnered with DevelopmentWA to prepare a mesoscopic traffic generation model of the Alkimos City Centre area.

To assist with the traffic analysis works undertaken as part of this assessment, and to ensure that both the Alkimos Station and the wider DevelopmentWA works are compatible with one another, GTA Consultants have supplied NEWest with preliminary peak hour traffic generation estimates from their modelling on the future road connections in both the 2022 and 2032 timeframes.

These forecasts estimate the background peak period traffic along the future road network based on several factors including land use forecasts, background traffic growth, available road connectivity and daily trip generation profiles. The background traffic estimates from the GTA modelling represent the total estimated background flow on the new road connections *excluding* the Alkimos Station traffic (including car parking, bus interchange). Modelling outputs provided to NEWest by GTA Consultants are included within Appendix A.

Note that in the 2022 Opening Year period, no background traffic along the internal road network has been forecast as there is no forecast land use data for this time period. Therefore, to assume a minimum level of background traffic along the network it is assumed that at least 50 vehicles per hour per direction will be present along the roadways. Traffic generated by the Alkimos Station activity would then be over and above this assumed minimum background demand. For consistency in the future year 2032 analysis, roads with fewer than 50 vehicles per hour in background demand have also been increased to this level.

Peak period traffic flows generated by the station development (including both Park & Ride areas, Drop-Off area, as well as bus interchange) were then added to the background traffic estimates supplied to NEWest, based on the forecast station patronage for that time period. The methodology used to estimate the traffic generated by the Alkimos Station activity is outlined in Section 3.2.

3.1.5 PERFORMANCE METRICS AND LEVEL OF SERVICE TARGETS

The network results of the analysis summarised in this report are presented in terms of:

- Delay – The average delay experienced per passenger car unit (measured in seconds).
- Level of Service (LoS) – The LoS (ranging from A to F) provides an indicator of the performance of the network or individual movement based on the average delay per passenger car unit (pcu).
- Degree of Saturation (DoS) – The DoS is a ratio of the demand to capacity, with DoS over 90 percent indicating a congested intersection, and DoS of 100 percent indicating an intersection at capacity and DOS over 100 percent indicating oversaturated conditions. The DoS provided represents the maximum DoS at the intersection.
- Queue – The length of the average maximum back of queue (measured in number of passenger car units) on the approach measured over a number of cycles.

- As per the "*8803-000-005 Specification - Station Building and Civil Works*", the level of service requirements for intersection performance specified by the Scope of Work and Technical Criteria (SWTC) are as follows:

  3.3 Level of Service for Intersections
  The overall level of service (LOS) for intersections during peak periods (as defined in Transportation Research Board's Highway Capacity Manual - Special Report 209) shall be Level D or higher, with no individual major movement having a LOS lower than Level D and no individual minor movement having a LOS lower than Level E.

3.2 DEVELOPMENT TRIP GENERATION AND DISTRIBUTION

This section outlines the key methodology and figures / assumptions utilised in order to determine the forecast trip generation and distribution profile associated with the proposed Alkimos Station.

3.2.1 TRIP GENERATION

One of the major factors in calculating the trip generation associated with the site is the number of estimated daily station boardings. The agreed daily boardings have been developed through the Department of Transport STEM model and have been sourced from the Project Definition Report to remain consistent with previous assessments.

The forecast daily boardings for the Alkimos Station are shown in Table 5.

Table 5. Alkimos Station Daily Boardings Forecast

Year	2021	2031
Daily Boardings (passengers / day)	2,167	2,700

The Alkimos Station access mode share has been developed based on an updated assessment of the potential catchment mapping of the surrounding area and the available transport network, undertaken by NEWest as part of the Alkimos Station Access Strategy report, in July 2021. The Alkimos Station Access Strategy report considers the access opportunities and constraints for the Station opening year and longer term (2031). The anticipated development and road and path network for the Station opening is expected to limit the walking catchment for Alkimos Station, with the majority of passengers anticipated to arrive by car (Kiss n Ride and Park n Ride) in the short term until more development occurs around the Station. The Alkimos Station carpark is anticipated to be operating close to capacity from Station opening, however the proximity of Butler Station and the existing travel patterns for passengers living in the catchment will likely result in some passengers continuing to travel to Butler Station to access parking, if Alkimos Station parking reaches capacity. This may reduce the total Alkimos Station boardings in the short term, rather than cause excess parking demand at Alkimos Station.

When calculating the Park & Ride parking accumulation, to reflect this assumption that passengers would use available parking at Butler Station if the Park n Ride facility is at capacity at Alkimos Station, the Park & Ride mode share adopted for this assessment was capped to match the parking supply. The adopted mode share at Alkimos Station for the opening year of 2022 is shown in Table 6.

Table 6. Adopted 2022 Alkimos Station Mode Share

Access Mode	Mode Share (2022)
Walking	2%
Cycling	5%
Bus	31%
Kiss & Ride	20%
Park & Ride	42% (cap)
Total	100%

The distribution of the mode share is based on Murdoch Station surveys undertaken by PTA in 2012, and has also been adjusted based on the forecast daily boardings and a Park & Ride occupancy of 1.2 persons per vehicle.

Based on the above mode share figures, this translates to a maximum parking accumulation of 686 vehicles in the year 2022. The current proposed long term parking provision at the Alkimos Station is 686 bays, including 661 standard bays plus 23 accessible (ACROD) bays and 2 electric car bays. Therefore, this parking accumulation equates to approximately 100% parking occupancy in the opening year scenario.

As the forecast daily boardings increase through to the year 2031 (by approximately 24%), it would be expected that the associated vehicle trip generation would also increase. However, as the Alkimos Station has a parking cap of 686 total long term parking bays (including standard and accessible), the proportion of the mode share utilising the Park & Ride facility is also capped accordingly.

Therefore, the mode share for the future scenario of 2032 has also been adjusted to account for this Park & Ride cap (assuming Park & Ride remains 100% utilised by 2032), while also accommodating the overall increase in patronage in the other transport modes, particularly via walking/cycling. The growth in the walking and cycling mode shares in the medium and long term reflects the anticipated development closer to Alkimos Station. The final mode share for this assessment at Alkimos Station for 2032 is shown in Table 7.

Table 7. Adopted 2032 Alkimos Station Mode Share

Access Mode	Mode Share (2032)
Walking	14%
Cycling	8%
Bus	29%
Kiss & Ride	15%
Park & Ride	34% (cap)
Total	100%

Lastly, the arrival and departure profile of vehicles is a critical element of the station trip generation. As per the methodology adopted in the earlier previous Yanchep Rail Extension Transport Assessment (WSP, May 2019), the daily profile of boardings at Alkimos Station has been assumed to be comparable to the existing Clarkson Station due to the similar journey time to the Perth CBD.

Based on data collected at the Clarkson Station, the inbound and outbound trip distribution for both Park & Ride and Kiss & Ride modes assumed for the Alkimos Station is summarised in Table 8.

Table 8. Adopted daily passenger Boarding / Alighting trip generation profile

Time (Hour Beginning)	Vehicle Trips (Train Passenger Boardings)		Vehicle Trips (Train Passenger Alightings)	
	Park & Ride	Kiss & Ride	Park & Ride	Kiss & Ride
5:00	10%	6%	0%	0%
6:00	24%	14%	0%	0%
7:00	44%	31%	0%	1%
8:00	7%	11%	0%	1%
9:00	5%	6%	0%	2%
10:00	1%	5%	0%	1%
11:00	1%	3%	1%	2%
12:00	0%	3%	2%	2%
13:00	1%	2%	4%	2%
14:00	1%	2%	6%	5%
15:00	0%	3%	8%	8%
16:00	2%	2%	19%	16%
17:00	1%	5%	31%	13%
18:00	2%	3%	19%	13%
19:00	1%	2%	5%	11%
20:00	0%	1%	2%	11%
21:00	0%	0%	1%	9%
Total	100%	99%	98%	97%

- Note: Some figures do not add up to 100% as the data does not cover a full 24 hour period.
- Note: Kiss & Ride Inbound and outbound vehicle trips for each passenger boarding and alighting are accounted for and are equal (i.e. inbound vehicle trips and outbound vehicle trips are equal for a given time period).

3.2.2 DIRECTIONAL DISTRIBUTION OF TRAFFIC FLOWS

The directional distribution adopted for this assessment has largely utilised the same methodology employed in the previous *Yanchep Rail Extension Transport Assessment* by WSP. The approach / departure behaviour and distribution of vehicles accessing the Alkimos Station parking facility assumes the following factors:

i. Within the assessment timeframe (opening year and +10 year scenario) the majority of Park & Ride traffic is assumed to arrive / depart from Brindabella Parkway (primarily via Marmion Avenue). The remainder of the traffic is expected to arrive / depart via Romeo Road to the south (utilising NS1 and NS2 connections in the future year scenario), and to the area north via NSR1 in the future year scenario.

ii. Kiss & Ride traffic distribution is assumed to be largely similar to the Park & Ride distribution above.

iii. Internal traffic distribution to the separate parking areas within the Alkimos Station precinct is based on a proportional split of the number of bays contained in each parking lot.

Directional distribution diagrams have been prepared based on the proposed access arrangements for both Park & Ride and Kiss & Ride transport modes. Given that the long term parking and drop-off parking locations shift between the 2022 opening year and the 2032 future year, separate directional flow diagrams have been prepared for each scenario.

Diagrams for the 2022 opening year peak period directional distribution are shown in Figure 17 and Figure 18. Equivalent diagrams for the 2032 future year peak period directional distribution are shown in Figure 19 and Figure 20. These proportions have been adopted for the purposes of calculating the anticipated traffic impact detailed within Section 3.3: Road Network Impact Analysis.

Figure 17. 2022 Opening Year Scenario – Park & Ride Directional Distribution

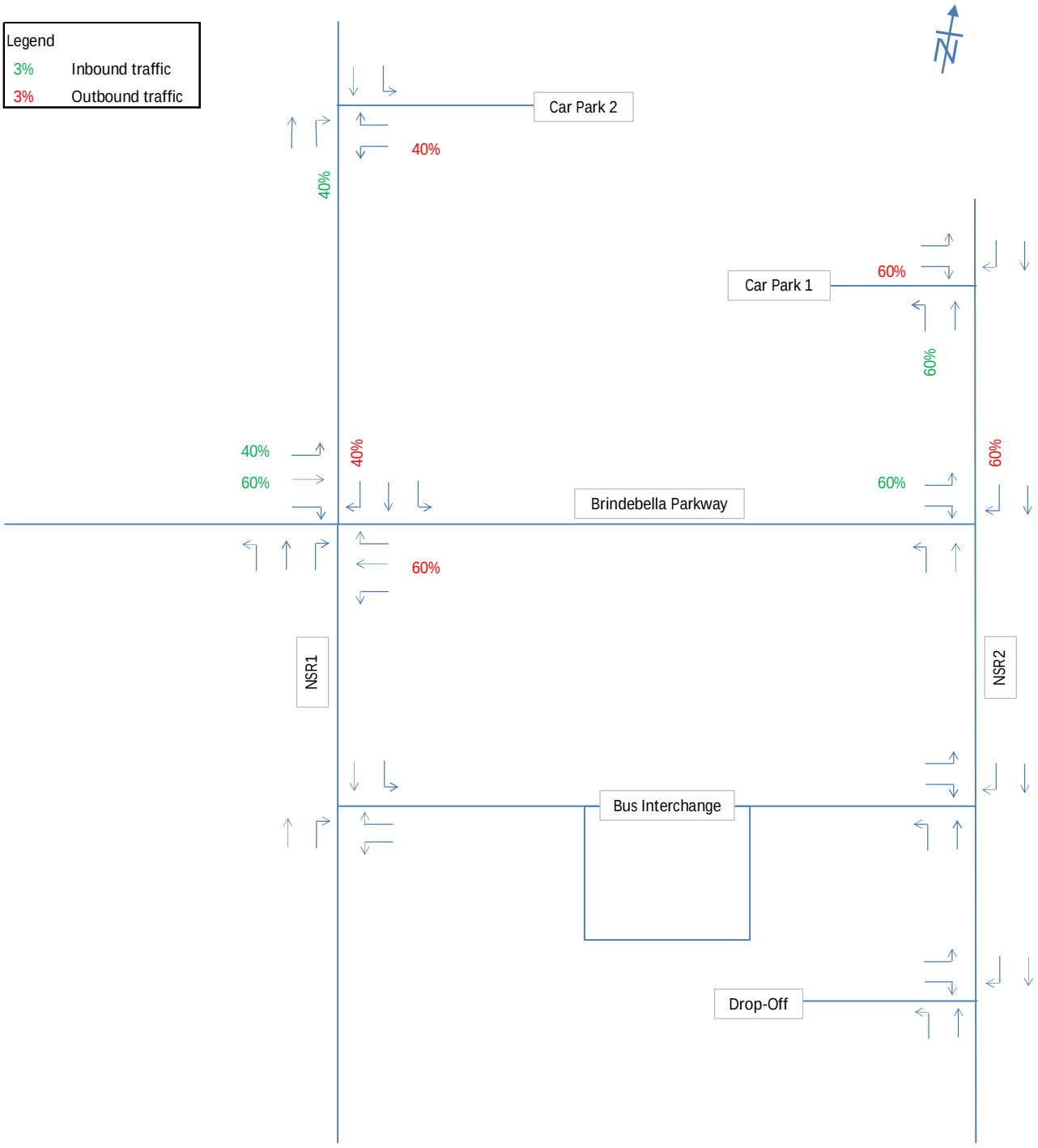


Figure 18. 2022 Opening Year Scenario – Kiss & Ride Directional Distribution

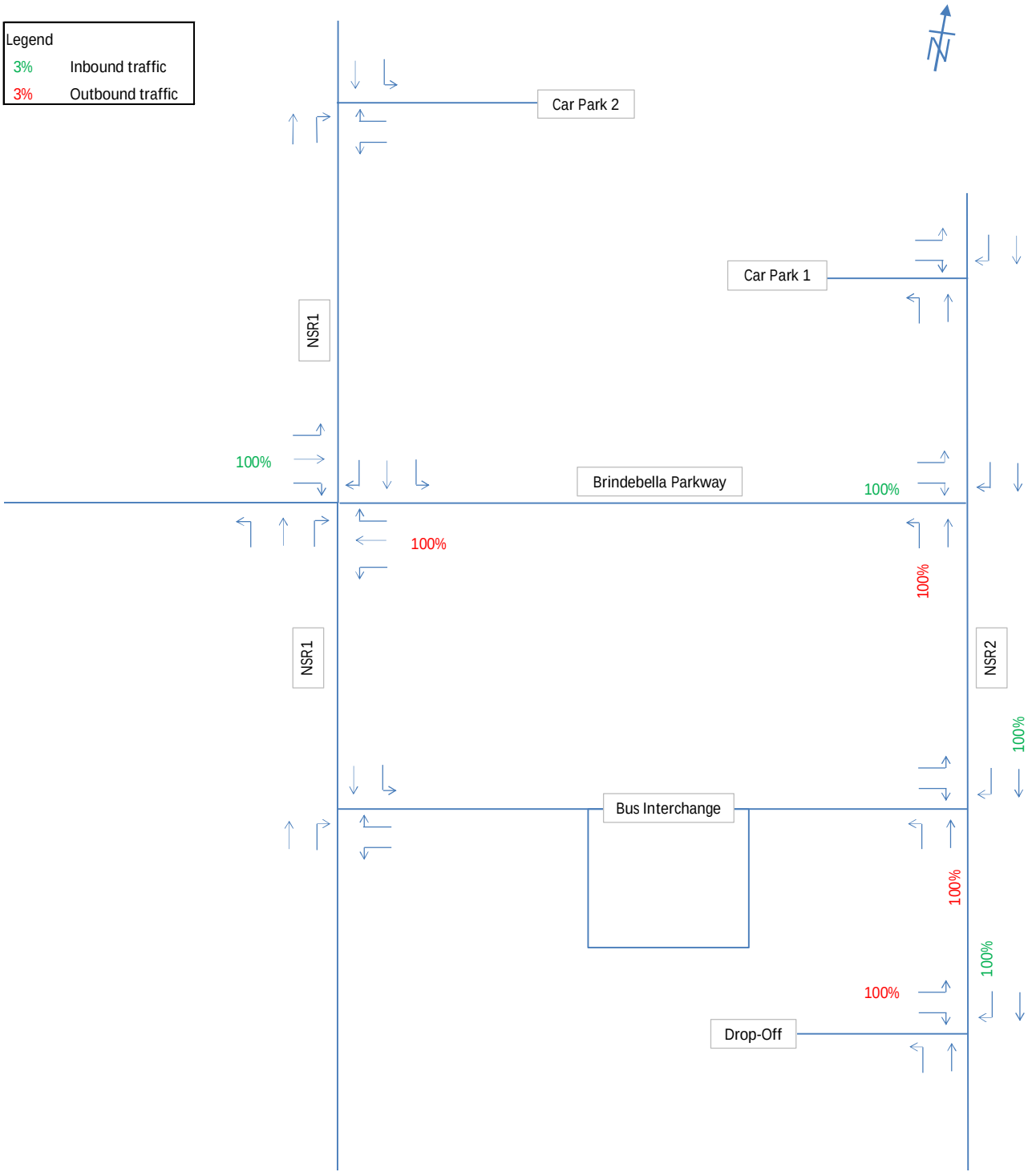


Figure 19. 2032 Future Year Scenario – Park & Ride Directional Distribution

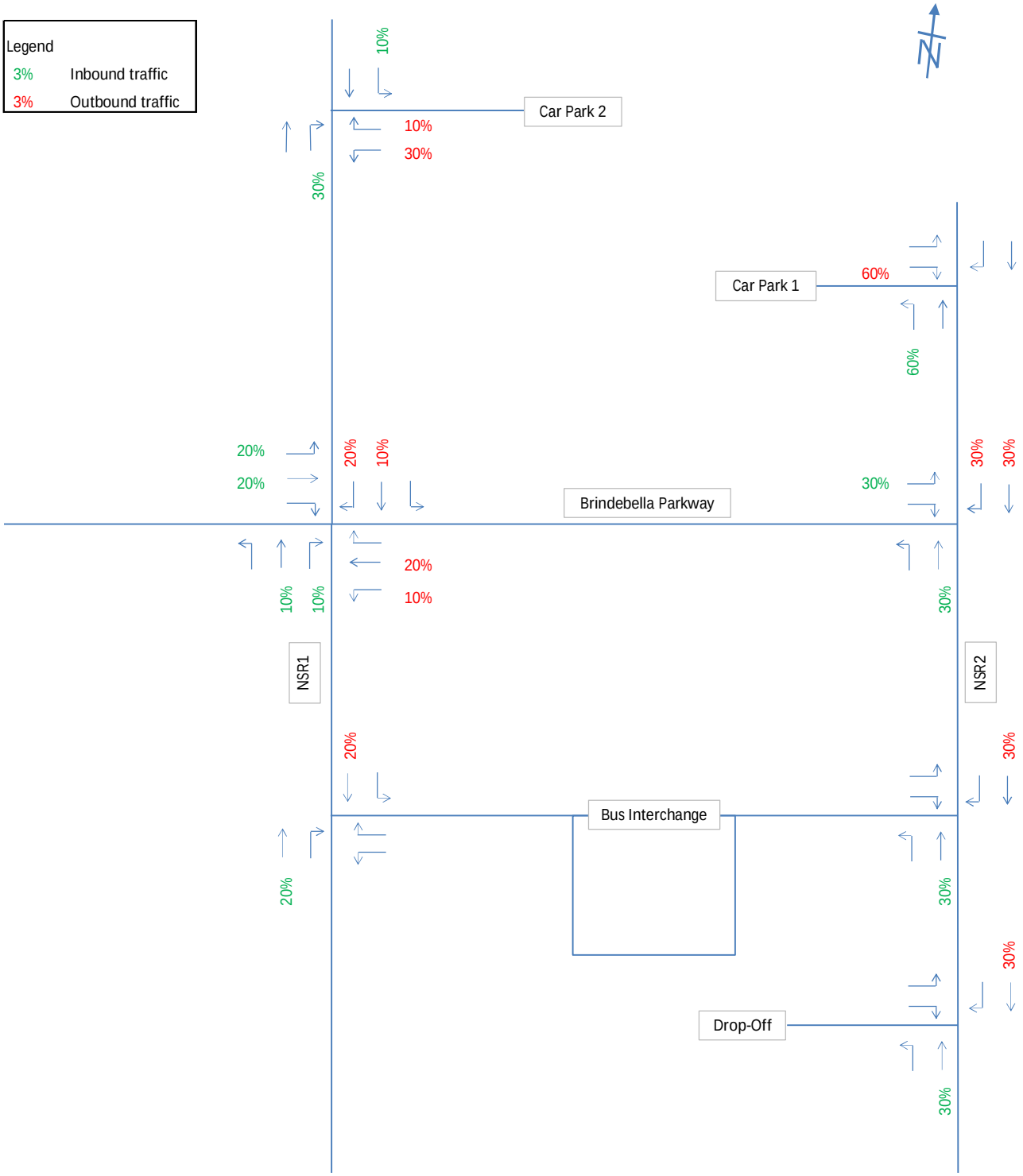
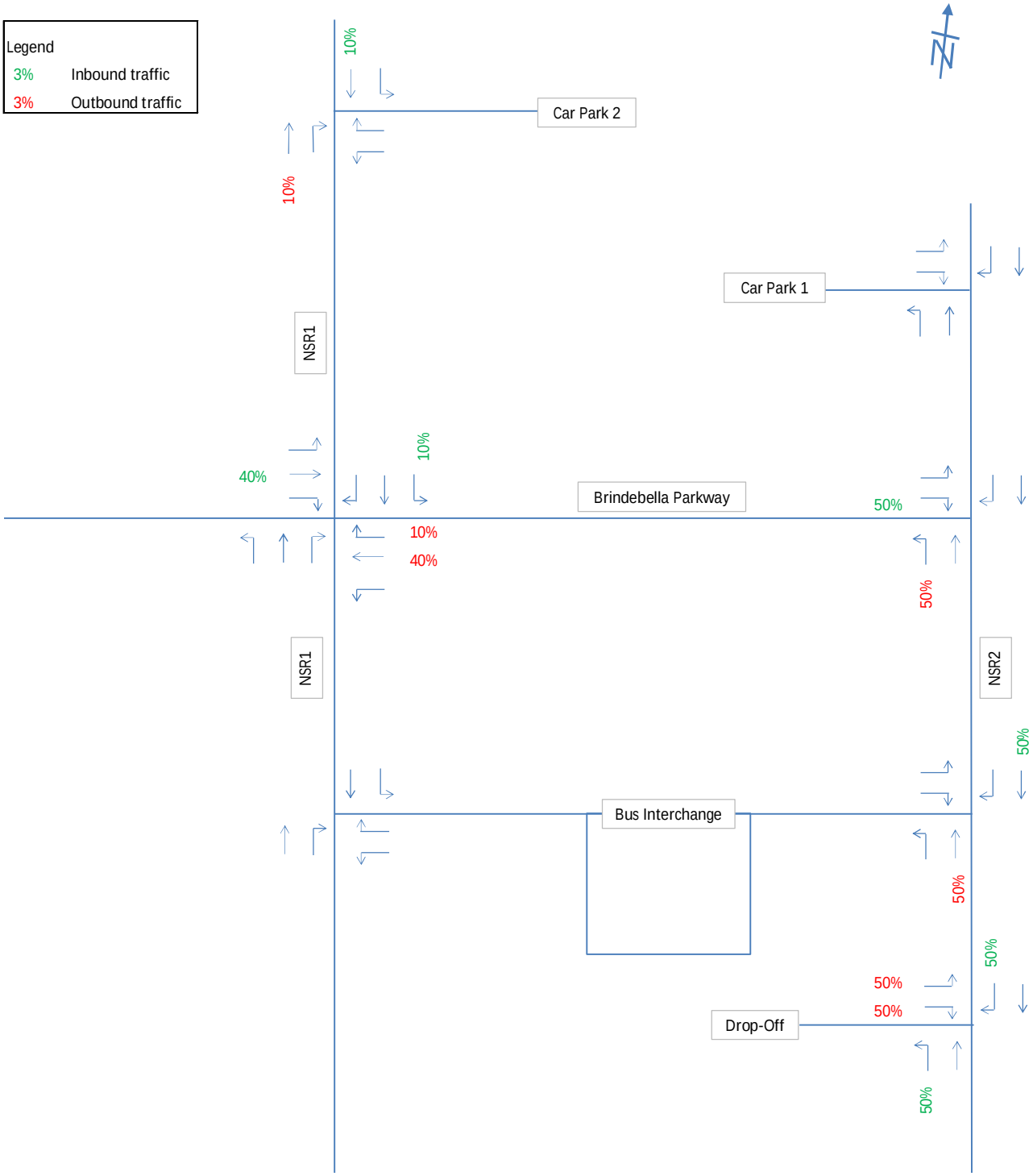


Figure 20. 2032 Future Year Scenario – Kiss & Ride Directional Distribution



3.2.3 FINAL DEVELOPMENT TRAFFIC FLOWS

Based on a combination of the previously discussed passenger daily boardings, mode share assumptions and arrival / departure profiles, the final development traffic flows for the Alkimos Station site have been developed.

Note that these flows include both the peak hour background traffic as forecast from the GTA Consultants modelling outputs, plus the peak hour traffic generated by the development car park and bus interchange.

The final 2022 ‘opening year’ AM and PM peak traffic flows are shown in Figure 21 and Figure 22, respectively. The final 2032 ‘future year’ development flows for AM and PM peak periods are shown in Figure 23 and Figure 24, respectively.

Figure 21. 2022 AM Peak Development Traffic Flows (07:00 – 08:00)

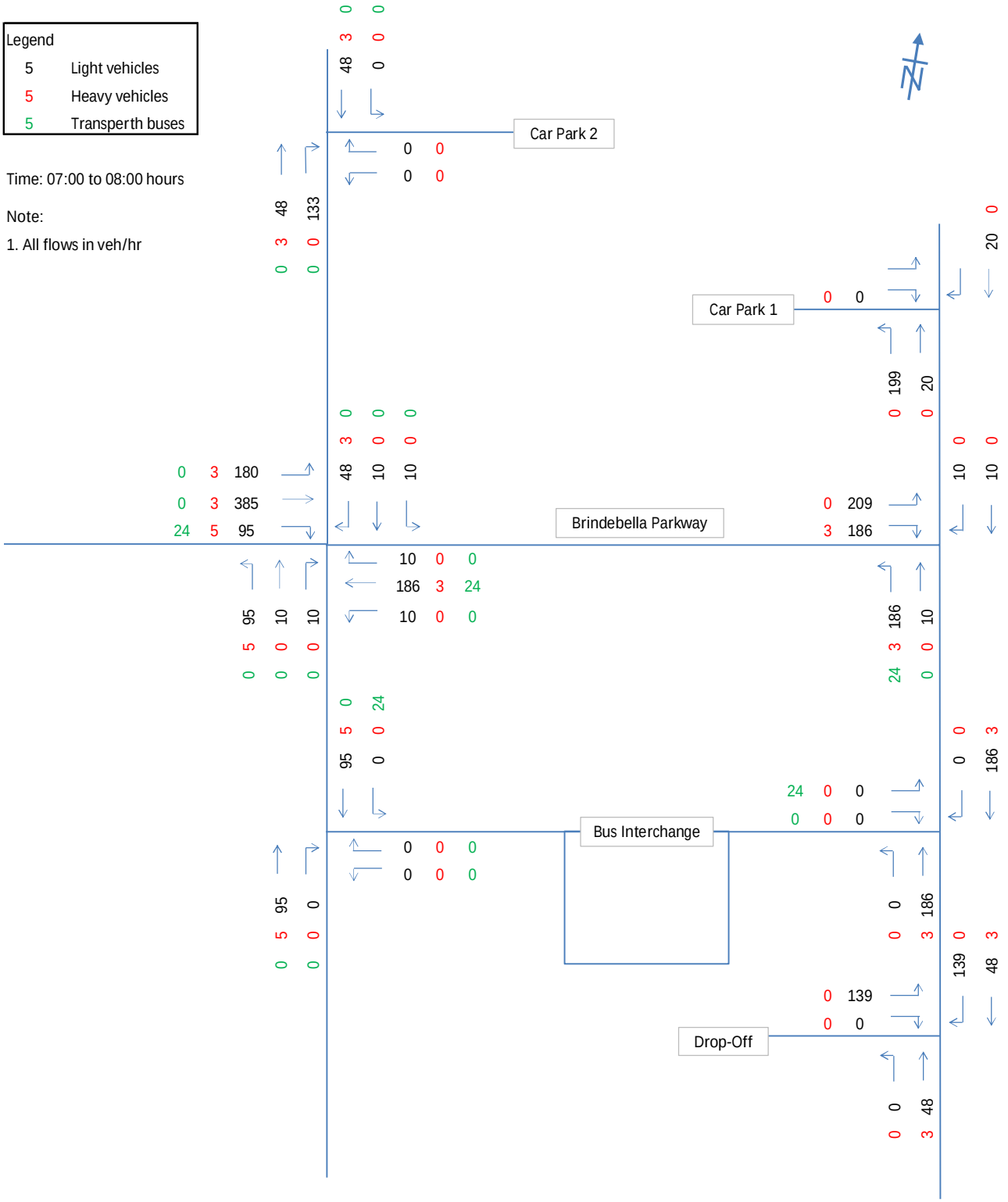


Figure 22. 2022 PM Peak Development Traffic Flows (17:00 – 18:00)

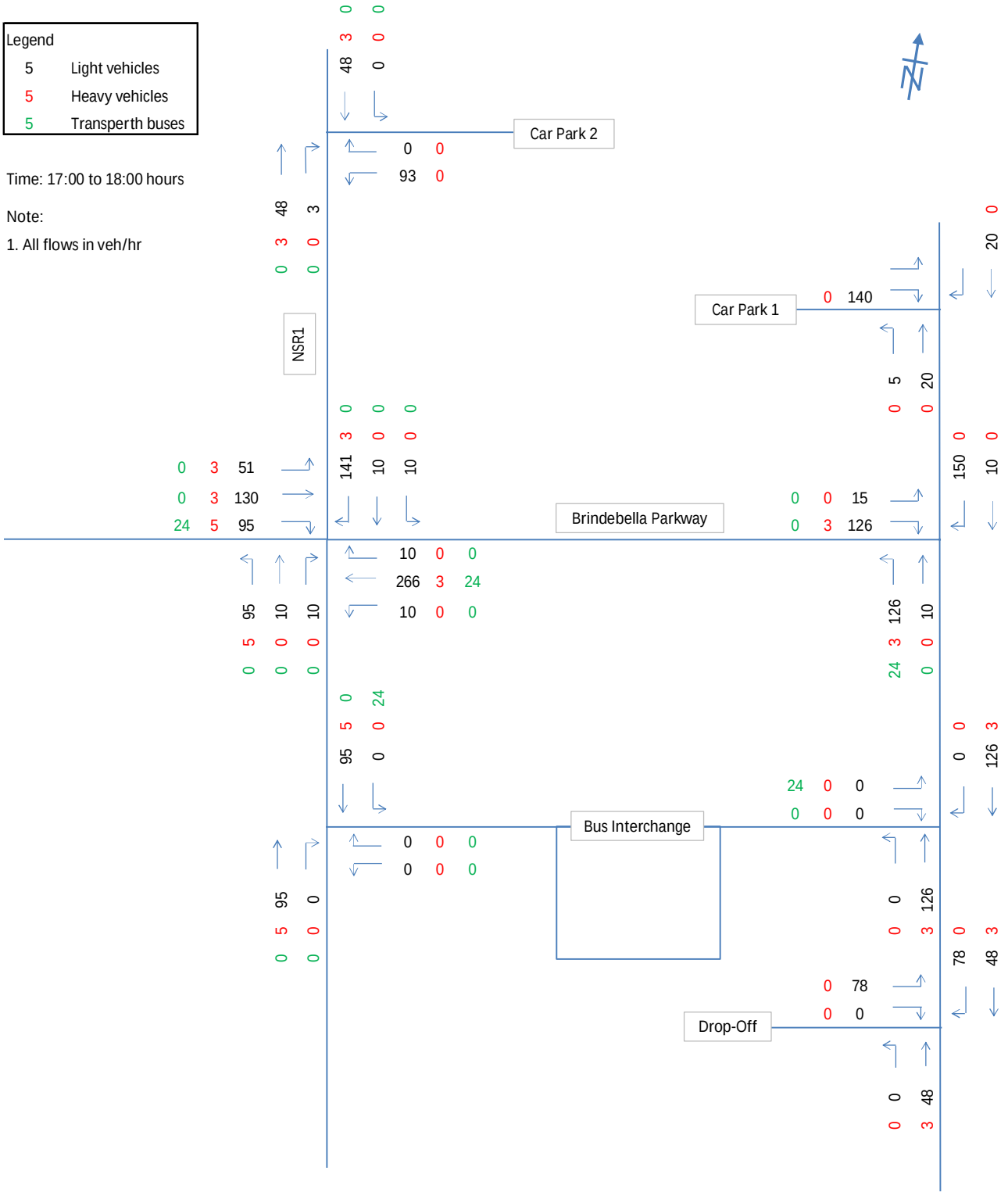


Figure 23. 2032 AM Peak Development Traffic Flows (07:00 – 08:00)

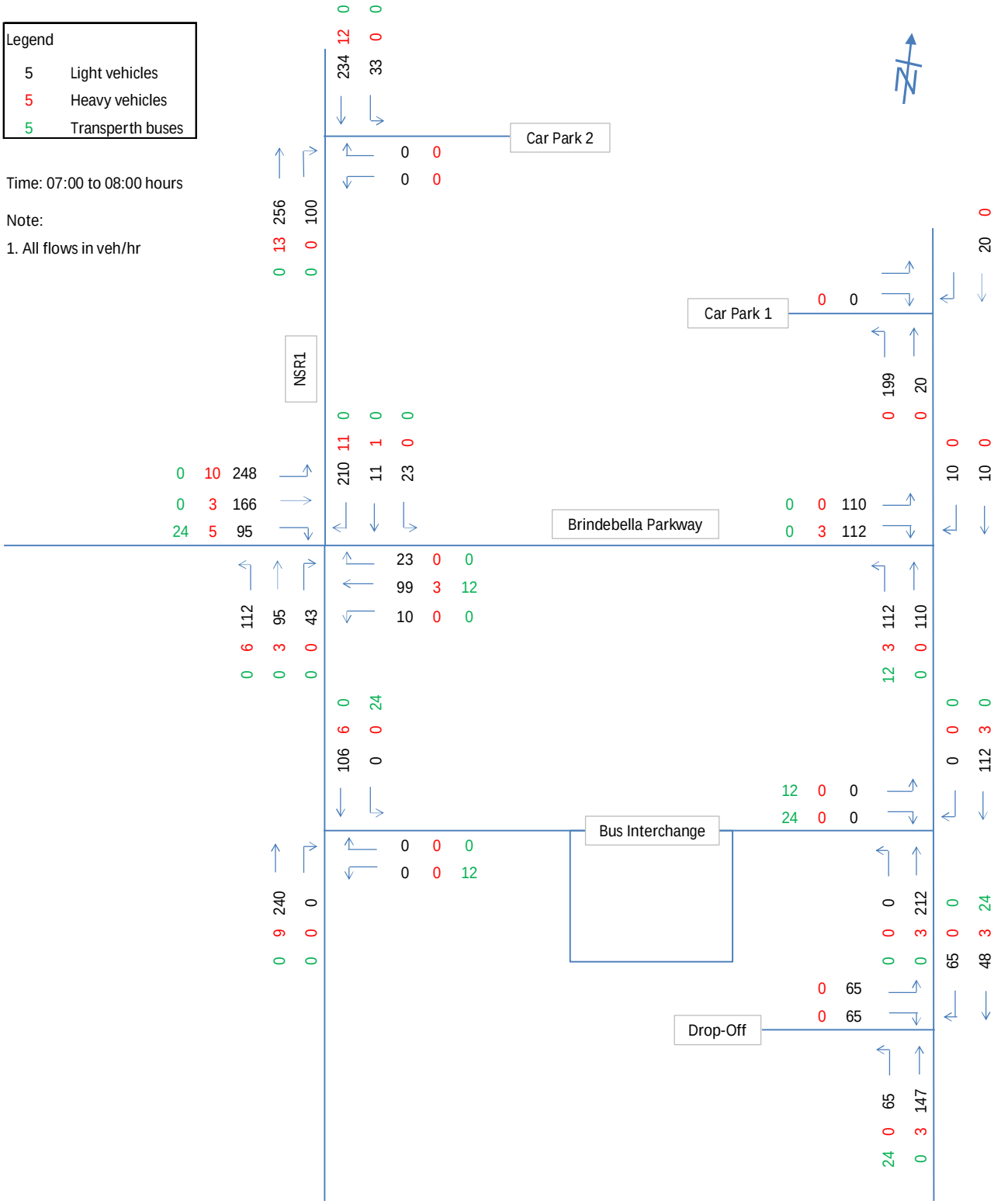
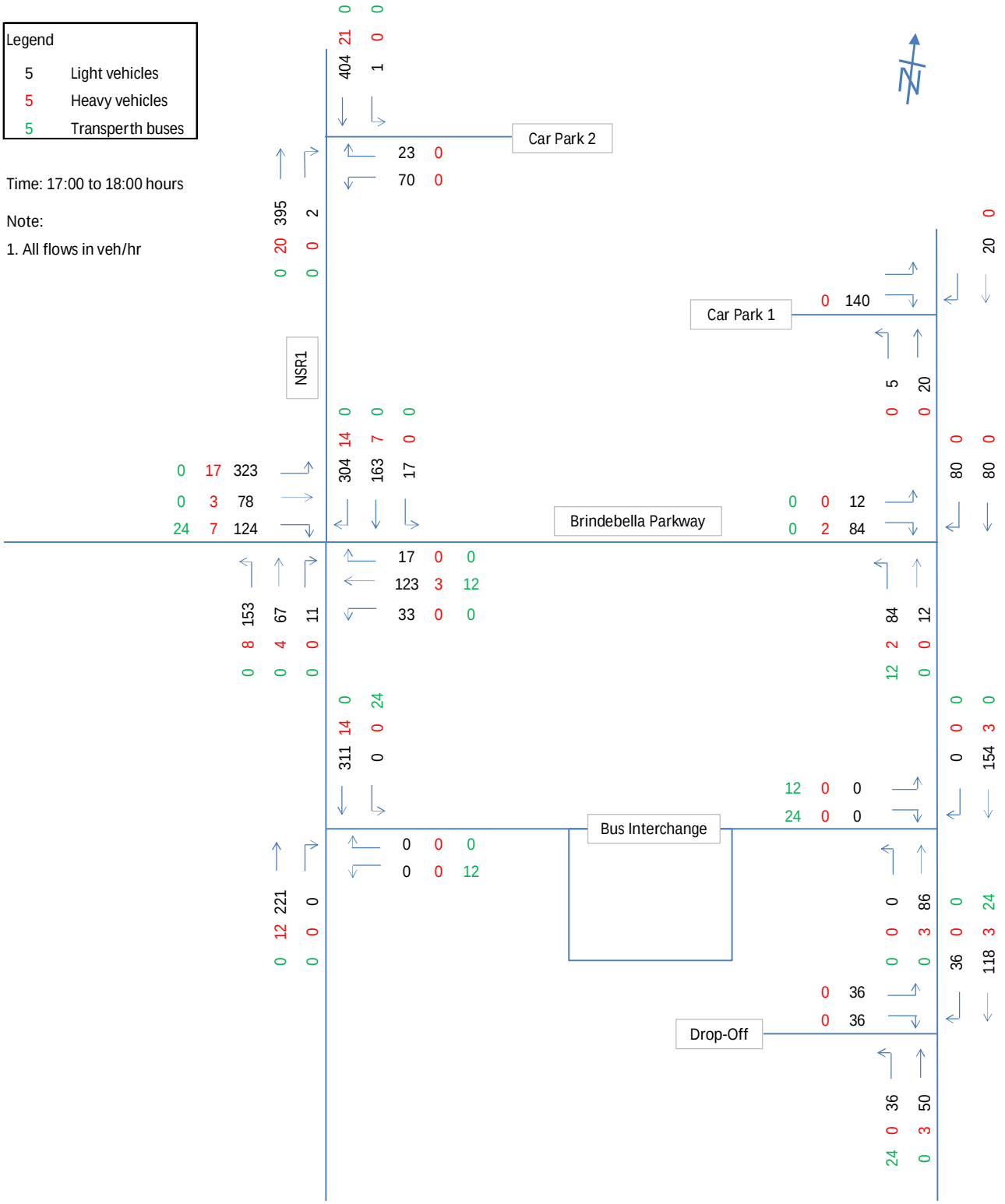


Figure 24. 2032 PM Peak Development Traffic Flows (17:00 – 18:00)



3.3 ROAD NETWORK IMPACT ANALYSIS

The results of the network impact analysis using SIDRA Intersection analysis software for each of the Alkimos Station access points are outlined in the following sections.

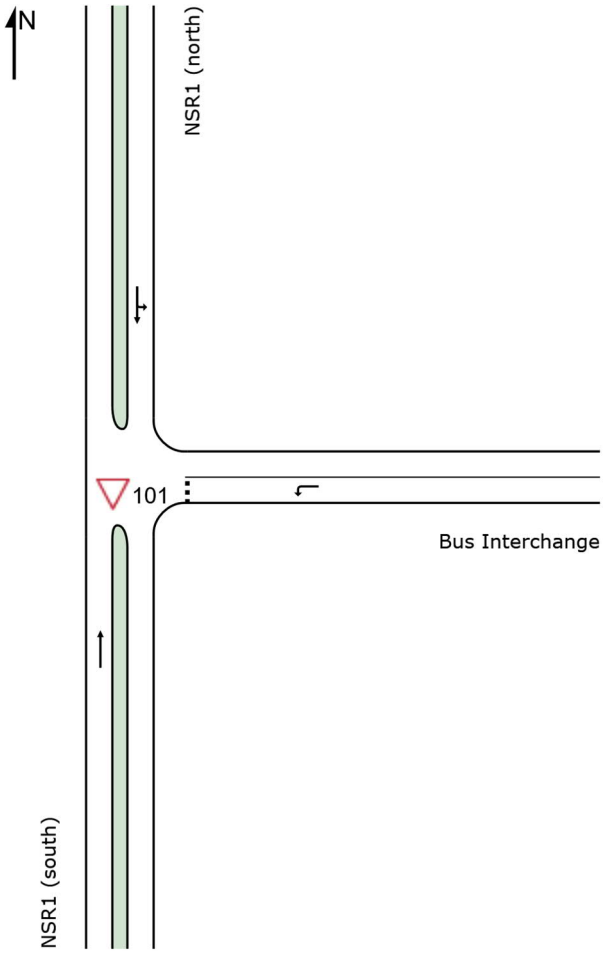
3.3.1 NSR1 / BUS INTERCHANGE ACCESS

In the opening year scenario, all buses are expected to approach the bus interchange via Brindabella Parkway, turning right at the intersection with NSR1. When exiting, buses shall exit via the accessway on NSR2, before joining back on Brindabella Parkway.

The intersection with NSR1 is expected to operate as a basic give-way along a two-way, dual-lane road with divided carriageway, allowing left in / left out turns only to the bus interchange.

For the purposes of this Transport Assessment, an equivalent to this layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods. The SIDRA layout of the NSR1 and Bus Interchange Access intersection is shown in Figure 25.

Figure 25. NSR1 / Bus Interchange Access Intersection Layout



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance.

3.3.1.1 2022 Opening Year Scenario

The SIDRA Intersection analysis results for the 2022 morning and afternoon peaks are summarised in Figure 26 and Figure 27.

Figure 26. NSR1 / Bus Interchange Access – 2022 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
5	T1	100	5.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		100	5.0	0.053	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Bus Interchange												
7	L2	1	0.0	0.001	0.3	LOS A	0.0	0.0	0.19	0.05	0.19	25.1
Approach		1	0.0	0.001	0.3	LOS A	0.0	0.0	0.19	0.05	0.19	25.1
North: NSR1 (north)												
10	L2	24	100.0	0.093	4.7	LOS A	0.0	0.0	0.00	0.17	0.00	26.9
11	T1	100	5.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	46.1
Approach		124	23.4	0.093	1.5	NA	0.0	0.0	0.00	0.17	0.00	41.0
All Vehicles		225	15.1	0.093	0.5	NA	0.0	0.0	0.00	0.09	0.00	44.5

Figure 27. NSR1 / Bus Interchange Access – 2022 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
5	T1	100	5.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		100	5.0	0.053	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Bus Interchange												
7	L2	1	0.0	0.001	0.3	LOS A	0.0	0.0	0.19	0.05	0.19	25.1
Approach		1	0.0	0.001	0.3	LOS A	0.0	0.0	0.19	0.05	0.19	25.1
North: NSR1 (north)												
10	L2	24	100.0	0.093	4.7	LOS A	0.0	0.0	0.00	0.17	0.00	26.9
11	T1	100	5.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	46.1
Approach		124	23.4	0.093	1.5	NA	0.0	0.0	0.00	0.17	0.00	41.0
All Vehicles		225	15.1	0.093	0.5	NA	0.0	0.0	0.00	0.09	0.00	44.5

The intersection analysis results for Car Park #1 via NSR1 indicate that the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets for the opening year scenario during both AM and PM peaks.

3.3.1.2 2032 Future Year Scenario

The SIDRA Intersection analysis results for the 2032 morning and afternoon peaks are summarised in Figure 28 and Figure 29.

Figure 28. NSR1 / Bus Interchange Access – 2032 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
5	T1	249	3.6	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		249	3.6	0.131	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Bus Interchange												
7	L2	12	100.0	0.013	4.6	LOS A	0.0	0.6	0.25	0.51	0.25	30.9
Approach		12	100.0	0.013	4.6	LOS A	0.0	0.6	0.25	0.51	0.25	30.9
North: NSR1 (north)												
10	L2	24	100.0	0.100	4.7	LOS A	0.0	0.0	0.00	0.16	0.00	27.0
11	T1	112	5.4	0.100	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	46.4
Approach		136	22.1	0.100	1.4	NA	0.0	0.0	0.00	0.16	0.00	41.7
All Vehicles		397	12.8	0.131	0.4	NA	0.0	0.6	0.01	0.07	0.01	46.1

Figure 29. NSR1 / Bus Interchange Access – 2032 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
5	T1	233	5.2	0.124	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		233	5.2	0.124	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Bus Interchange												
7	L2	12	100.0	0.018	6.5	LOS A	0.1	0.9	0.46	0.60	0.46	27.7
Approach		12	100.0	0.018	6.5	LOS A	0.1	0.9	0.46	0.60	0.46	27.7
North: NSR1 (north)												
10	L2	24	100.0	0.212	4.7	LOS A	0.0	0.0	0.00	0.07	0.00	27.7
11	T1	325	4.3	0.212	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	48.5
Approach		349	10.9	0.212	0.6	NA	0.0	0.0	0.00	0.07	0.00	46.4
All Vehicles		594	10.4	0.212	0.3	NA	0.1	0.9	0.01	0.05	0.01	47.2

Results for the 2032 scenario analysis show that the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets for both AM and PM peaks. Although background traffic along NSR1 has increased in this scenario, left in / left out arrangement means that delays for buses exiting the interchange via NSR1 are likely to remain low.

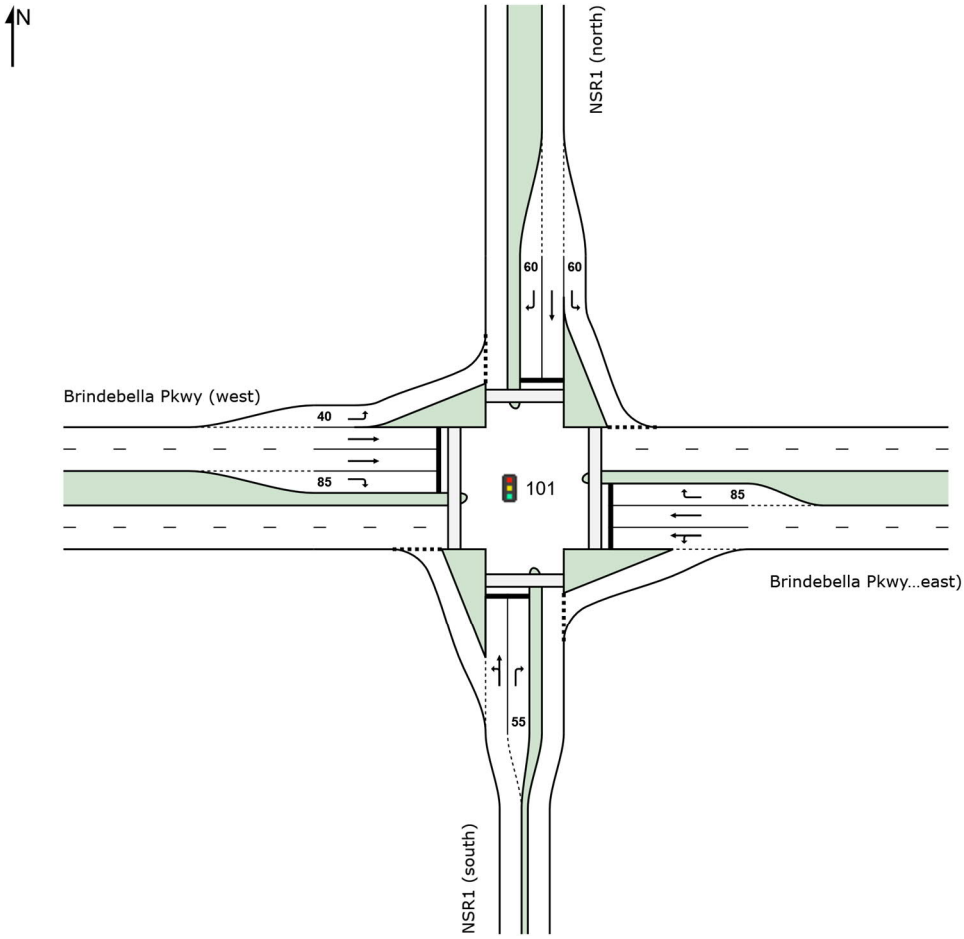
3.3.2 NSR1 / BRINDABELLA PARKWAY INTERSECTION

The intersection of NSR1 and Brindabella Parkway will be a key signalised junction that will facilitate access to the Alkimos Station and the wider Alkimos City Centre area from the main access via Marmion Avenue. In the opening year, with limited surrounding roadways and no other external network connection, it is anticipated that all traffic accessing Alkimos Station will pass through the NSR1 / Brindabella Parkway intersection. Therefore, the operation of this intersection is important to station accessibility from day one.

Note that this signalised infrastructure is not understood to be delivered by PTA as part of the station works, but instead it is understood to form part of the wider Alkimos City Centre movement network being delivered by DevelopmentWA. However, as this intersection is critical to the access of Alkimos Station facilities, the forecast performance at this site has been assessed based on a preliminary layout of the future signalised infrastructure. For the purposes of this assessment, a simple four phase movement sequence has been assumed.

For the purposes of this Transport Impact Assessment, the layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods. The SIDRA layout of the NSR1 / Brindabella Parkway intersection is shown in Figure 30.

Figure 30. NSR1 / Brindabella Parkway Intersection Layout



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance.

3.3.2.1 2022 Opening Year Scenario

The SIDRA Intersection analysis results for the 2022 morning and afternoon peaks are summarised in Figure 31 and Figure 32.

Figure 31. NSR1 / Brindabella Parkway – 2022 AM Peak Results (90s Cycle)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
1	L2	100	5.0	0.128	11.3	LOS B	1.5	11.6	0.56	0.65	0.56	34.6
2	T1	10	0.0	0.128	6.7	LOS A	1.5	11.6	0.56	0.65	0.56	31.2
3	R2	10	0.0	0.032	38.6	LOS D	0.4	2.7	0.86	0.66	0.86	27.6
Approach		120	4.2	0.128	13.2	LOS B	1.5	11.6	0.59	0.65	0.59	33.1
East: Brindebella Pkwy (east)												
4	L2	10	0.0	0.274	34.5	LOS C	4.0	32.0	0.87	0.71	0.98	30.7
5	T1	213	12.7	0.274	30.9	LOS C	4.1	33.4	0.87	0.70	0.92	30.5
6	R2	10	0.0	0.030	37.6	LOS D	0.4	2.7	0.85	0.66	0.85	26.1
Approach		233	11.6	0.274	31.4	LOS C	4.1	33.4	0.87	0.70	0.92	30.3
North: NSR1 (north)												
7	L2	10	0.0	0.007	5.7	LOS A	0.1	0.5	0.22	0.54	0.22	44.3
8	T1	10	0.0	0.030	34.0	LOS C	0.4	2.7	0.86	0.59	0.86	17.3
9	R2	51	5.9	0.170	40.0	LOS D	2.0	15.4	0.89	0.73	0.89	15.7
Approach		71	4.2	0.170	34.3	LOS C	2.0	15.4	0.79	0.68	0.79	19.4
West: Brindebella Pkwy (west)												
10	L2	183	1.6	0.159	9.8	LOS A	2.8	21.0	0.43	0.64	0.43	31.0
11	T1	388	0.8	0.445	33.1	LOS C	7.5	55.9	0.91	0.75	0.91	29.8
12	R2	124	23.4	0.434	41.5	LOS D	5.0	44.2	0.94	0.78	0.94	17.9
Approach		695	5.0	0.445	28.5	LOS C	7.5	55.9	0.79	0.73	0.79	27.8
All Vehicles		1119	6.3	0.445	27.8	LOS C	7.5	55.9	0.78	0.71	0.80	28.3

Figure 32. NSR1 / Brindabella Parkway – 2022 PM Peak Results (90s Cycle)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
1	L2	100	5.0	0.130	11.3	LOS B	1.6	12.6	0.55	0.64	0.55	34.6
2	T1	10	0.0	0.130	6.7	LOS A	1.6	12.6	0.55	0.64	0.55	31.2
3	R2	10	0.0	0.032	38.6	LOS D	0.4	2.7	0.86	0.66	0.86	27.6
Approach		120	4.2	0.130	13.2	LOS B	1.6	12.6	0.58	0.65	0.58	33.1
East: Brindebella Pkwy (east)												
4	L2	10	0.0	0.430	39.5	LOS D	5.9	46.8	0.93	0.76	1.05	28.9
5	T1	293	9.2	0.430	35.3	LOS D	6.0	47.6	0.93	0.76	0.99	29.0
6	R2	10	0.0	0.028	36.7	LOS D	0.4	2.7	0.84	0.66	0.84	26.4
Approach		313	8.6	0.430	35.5	LOS D	6.0	47.6	0.93	0.75	0.99	28.9
North: NSR1 (north)												
7	L2	10	0.0	0.007	5.1	LOS A	0.0	0.3	0.16	0.53	0.16	44.8
8	T1	10	0.0	0.027	32.1	LOS C	0.4	2.7	0.84	0.58	0.84	17.9
9	R2	144	2.1	0.412	40.0	LOS D	5.7	43.2	0.93	0.78	0.93	15.7
Approach		164	1.8	0.412	37.4	LOS D	5.7	43.2	0.87	0.76	0.87	17.3
West: Brindebella Pkwy (west)												
10	L2	54	5.6	0.048	9.4	LOS A	0.8	5.9	0.40	0.60	0.40	31.5
11	T1	133	2.3	0.181	33.5	LOS C	2.5	18.9	0.88	0.67	0.88	29.6
12	R2	124	23.4	0.408	40.4	LOS D	4.9	43.5	0.92	0.78	0.92	18.2
Approach		311	11.3	0.408	32.1	LOS C	4.9	43.5	0.81	0.70	0.81	25.3
All Vehicles		908	7.7	0.430	31.7	LOS C	6.0	47.6	0.83	0.72	0.85	26.2

The intersection analysis results for the proposed signalised intersection at NSR1 and Brindabella Parkway indicate that the proposed intersection arrangement is expected to perform at LoS C and achieve satisfactory performance targets for the opening year during both AM and PM peaks.

Average delays through the intersection appear to be approximately 30 seconds during both peaks, which is reasonable during a peak period. Additionally, the analysis indicates that the degree of saturation is less than 50%, indicating that the intersection is likely to have a moderate amount of spare capacity to accommodate potential future increases in traffic demand.

3.3.2.2 2032 Future Year Scenario

The SIDRA Intersection analysis results for the 2032 morning and afternoon peaks are summarised in Figure 33 and Figure 34.

Figure 33. NSR1 / Brindabella Parkway – 2032 AM Peak Results (90s Cycle)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
1	L2	118	5.1	0.441	27.8	LOS C	5.9	45.2	0.87	0.81	1.05	24.2
2	T1	98	3.1	0.441	23.3	LOS C	5.9	45.2	0.87	0.81	1.05	20.5
3	R2	43	0.0	0.109	35.7	LOS D	1.5	11.4	0.84	0.71	0.84	28.5
Approach		259	3.5	0.441	27.4	LOS C	5.9	45.2	0.87	0.79	1.02	24.2
East: Brindebella Pkwy (east)												
4	L2	10	0.0	0.274	36.1	LOS D	2.3	18.3	0.94	0.72	0.97	30.0
5	T1	114	13.2	0.274	36.2	LOS D	2.5	20.7	0.94	0.72	0.96	28.6
6	R2	23	0.0	0.079	40.1	LOS D	0.9	6.5	0.89	0.70	0.89	25.3
Approach		147	10.2	0.274	36.8	LOS D	2.5	20.7	0.94	0.72	0.95	28.2
North: NSR1 (north)												
7	L2	23	0.0	0.016	5.4	LOS A	0.1	0.9	0.20	0.54	0.20	44.5
8	T1	12	8.3	0.026	27.7	LOS C	0.4	3.2	0.79	0.55	0.79	19.7
9	R2	221	5.0	0.499	36.6	LOS D	8.5	66.2	0.91	0.80	0.91	16.7
Approach		256	4.7	0.499	33.4	LOS C	8.5	66.2	0.84	0.77	0.84	19.0
West: Brindebella Pkwy (west)												
10	L2	258	3.9	0.181	5.4	LOS A	1.4	10.5	0.21	0.57	0.21	36.4
11	T1	169	1.8	0.355	40.6	LOS D	3.5	26.7	0.96	0.74	0.96	27.3
12	R2	124	23.4	0.496	43.8	LOS D	5.2	45.7	0.96	0.79	0.96	17.3
Approach		551	7.6	0.496	24.8	LOS C	5.2	45.7	0.61	0.67	0.61	26.5
All Vehicles		1213	6.4	0.499	28.6	LOS C	8.5	66.2	0.75	0.72	0.79	24.9

Figure 34. NSR1 / Brindabella Parkway – 2032 PM Peak Results (90s Cycle)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
1	L2	161	5.0	0.480	24.6	LOS C	5.7	44.2	0.88	0.81	0.99	25.5
2	T1	71	5.6	0.480	20.1	LOS C	5.7	44.2	0.88	0.81	0.99	21.8
3	R2	11	0.0	0.035	38.7	LOS D	0.4	3.0	0.86	0.67	0.86	27.5
Approach		243	4.9	0.480	24.0	LOS C	5.7	44.2	0.88	0.81	0.98	24.7
East: Brindebella Pkwy (east)												
4	L2	33	0.0	0.360	29.3	LOS C	2.7	21.5	0.95	0.74	0.95	32.3
5	T1	138	10.9	0.360	34.1	LOS C	3.4	27.5	0.95	0.74	0.95	29.2
6	R2	17	0.0	0.058	39.9	LOS D	0.6	4.8	0.88	0.68	0.88	25.4
Approach		188	8.0	0.360	33.8	LOS C	3.4	27.5	0.95	0.74	0.95	29.3
North: NSR1 (north)												
7	L2	17	0.0	0.011	5.0	LOS A	0.1	0.4	0.15	0.53	0.15	44.8
8	T1	170	4.1	0.307	27.1	LOS C	5.9	45.3	0.82	0.68	0.82	19.9
9	R2	318	4.4	0.605	34.7	LOS C	12.2	94.5	0.92	0.82	0.92	17.3
Approach		505	4.2	0.605	31.1	LOS C	12.2	94.5	0.86	0.76	0.86	19.0
West: Brindebella Pkwy (west)												
10	L2	340	5.0	0.235	5.3	LOS A	1.7	13.3	0.21	0.57	0.21	36.4
11	T1	81	3.7	0.172	39.4	LOS D	1.6	12.7	0.93	0.69	0.93	27.7
12	R2	155	20.0	0.607	44.8	LOS D	6.7	57.4	0.98	0.81	1.00	17.1
Approach		576	8.9	0.607	20.7	LOS C	6.7	57.4	0.52	0.65	0.52	26.3
All Vehicles		1512	6.5	0.607	26.3	LOS C	12.2	94.5	0.74	0.72	0.76	24.3

By the future year scenario of 2032, the results indicate that the NSR1 / Brindabella Parkway intersection is to continue operating at a forecast LoS C during the morning and afternoon peak periods. While the degree of saturation forecast in the AM peak is increased by approximately 5%, the saturation in the PM peak is expected to increase to approximately 60% (up from 43% in the opening year). Despite the increases, there still remains a reasonable amount of spare capacity to accommodate future growth.

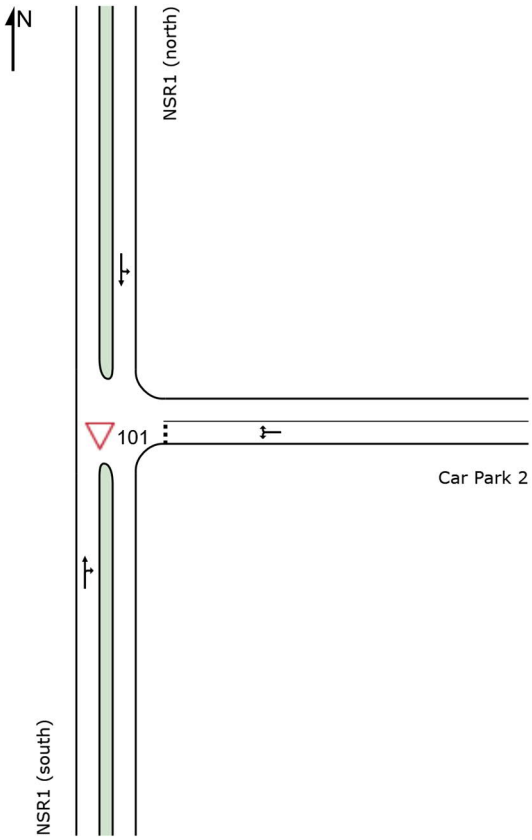
Although Alkimos Station patronage is expected to increase by the future year and background traffic demands will be higher due to increased development and land usage, the number of access points and network connectivity to and from the Alkimos City Centre is also anticipated to increase by this time (including southern connectivity via Romeo Road). Therefore, the total amount of traffic passing through the NSR1 / Brindabella Parkway intersection may not be expected to increase to significantly higher levels than those seen in the opening year scenario.

3.3.3 NSR1 / CAR PARK #2 ACCESS

The access point to Car Park #2 is proposed to be located on the eastern side of NSR1, approximately 250 metres north of Alkimos Station. From the year of opening, NSR1 will function as the primary road servicing Car Park #2. Adjacent to Car Park #2, NSR1 operates as a two-way, two-lane road with divided carriageway. The access point to / from Car Park #2 is expected to be via a basic priority control intersection.

For the purposes of this Transport Impact Assessment, an equivalent to this layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods. The SIDRA layout of the NSR1 and Car Park #2 intersection is shown in Figure 35.

Figure 35. NSR1 / Car Park #2 Access Intersection Layout



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance.

3.3.3.1 2022 Opening Year Scenario

The SIDRA Intersection analysis results for the 2022 morning and afternoon peaks are summarised in Figure 36 and Figure 37.

Figure 36. NSR1 / Car Park #2 Access – 2022 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
5	T1	51	5.9	0.105	0.2	LOS A	0.5	3.8	0.15	0.38	0.15	36.8
6	R2	133	0.0	0.105	4.7	LOS A	0.5	3.8	0.15	0.38	0.15	28.1
Approach		184	1.6	0.105	3.5	NA	0.5	3.8	0.15	0.38	0.15	30.3
East: Car Park 2												
7	L2	1	0.0	0.001	0.1	LOS A	0.0	0.0	0.11	0.09	0.11	25.3
9	R2	1	0.0	0.001	0.8	LOS A	0.0	0.0	0.11	0.09	0.11	24.9
Approach		2	0.0	0.001	0.5	LOS A	0.0	0.0	0.11	0.09	0.11	25.1
North: NSR1 (north)												
10	L2	1	0.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	28.7
11	T1	51	5.9	0.028	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.6
Approach		52	5.8	0.028	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.0
All Vehicles		238	2.5	0.105	2.7	NA	0.5	3.8	0.11	0.30	0.11	33.2

Figure 37. NSR1 / Car Park #2 Access – 2022 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
5	T1	51	5.9	0.029	0.0	LOS A	0.0	0.1	0.02	0.03	0.02	48.5
6	R2	3	0.0	0.029	4.7	LOS A	0.0	0.1	0.02	0.03	0.02	35.6
Approach		54	5.6	0.029	0.3	NA	0.0	0.1	0.02	0.03	0.02	47.6
East: Car Park 2												
7	L2	93	0.0	0.060	0.1	LOS A	0.2	1.8	0.13	0.04	0.13	25.4
9	R2	1	0.0	0.060	0.7	LOS A	0.2	1.8	0.13	0.04	0.13	25.0
Approach		94	0.0	0.060	0.2	LOS A	0.2	1.8	0.13	0.04	0.13	25.4
North: NSR1 (north)												
10	L2	1	0.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	28.7
11	T1	51	5.9	0.028	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.6
Approach		52	5.8	0.028	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.0
All Vehicles		200	3.0	0.060	0.2	NA	0.2	1.8	0.07	0.03	0.07	34.4

The intersection analysis results for Car Park #2 access via NSR1 indicates the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets in the opening year scenario during peak periods. The results show that the average delay to enter Car Park #2 from NSR1 is expected to be less than 5 seconds during peak periods.

Overall, the background traffic demand along this section of NSR1 is expected to be low in the opening year scenario, as the northern extension of NSR1 is not anticipated to be completed until a later date. Therefore, this section of NSR1 will carry traffic related to Car Park #2 almost exclusively until further network connections and adjacent developments are completed.

3.3.3.2 2032 Future Year Scenario

The SIDRA Intersection analysis results for the 2032 morning and afternoon peaks are summarised in Figure 38 and Figure 39.

Figure 38. NSR1 / Car Park #2 Access – 2032 AM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
5	T1	269	4.8	0.216	0.5	LOS A	0.8	6.1	0.25	0.16	0.25	41.3
6	R2	100	0.0	0.216	5.7	LOS A	0.8	6.1	0.25	0.16	0.25	31.0
Approach		369	3.5	0.216	1.9	NA	0.8	6.1	0.25	0.16	0.25	38.2
East: Car Park 2												
7	L2	1	0.0	0.002	0.7	LOS A	0.0	0.0	0.29	0.19	0.29	24.4
9	R2	1	0.0	0.002	1.6	LOS A	0.0	0.0	0.29	0.19	0.29	24.0
Approach		2	0.0	0.002	1.1	LOS A	0.0	0.0	0.29	0.19	0.29	24.2
North: NSR1 (north)												
10	L2	33	0.0	0.149	4.6	LOS A	0.0	0.0	0.00	0.07	0.00	27.9
11	T1	246	4.9	0.149	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	47.5
Approach		279	4.3	0.149	0.5	NA	0.0	0.0	0.00	0.07	0.00	44.3
All Vehicles		650	3.8	0.216	1.3	NA	0.8	6.1	0.14	0.12	0.14	40.6

Figure 39. NSR1 / Car Park #2 Access – 2032 PM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR1 (south)												
5	T1	415	4.8	0.222	0.0	LOS A	0.0	0.2	0.01	0.00	0.01	49.8
6	R2	2	0.0	0.222	6.7	LOS A	0.0	0.2	0.01	0.00	0.01	36.4
Approach		417	4.8	0.222	0.0	NA	0.0	0.2	0.01	0.00	0.01	49.7
East: Car Park 2												
7	L2	70	0.0	0.089	1.7	LOS A	0.3	2.3	0.43	0.37	0.43	23.8
9	R2	23	0.0	0.089	2.3	LOS A	0.3	2.3	0.43	0.37	0.43	23.4
Approach		93	0.0	0.089	1.8	LOS A	0.3	2.3	0.43	0.37	0.43	23.7
North: NSR1 (north)												
10	L2	1	0.0	0.227	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	28.8
11	T1	425	4.9	0.227	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		426	4.9	0.227	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.8
All Vehicles		936	4.4	0.227	0.2	NA	0.3	2.3	0.05	0.04	0.05	45.3

In the future year scenario of 2032, it is seen that the background traffic demands along the NSR1 roadway are noticeably higher due to the future land use to the north and the extension of NSR1 itself. However, despite these increases in background traffic demand along the road network, the results show that the performance of the Car Park #2 access remain at an overall LoS A during the peak periods. Based on these results, no access issues are expected for the NSR1 / Car Park #2 access point by 2032.

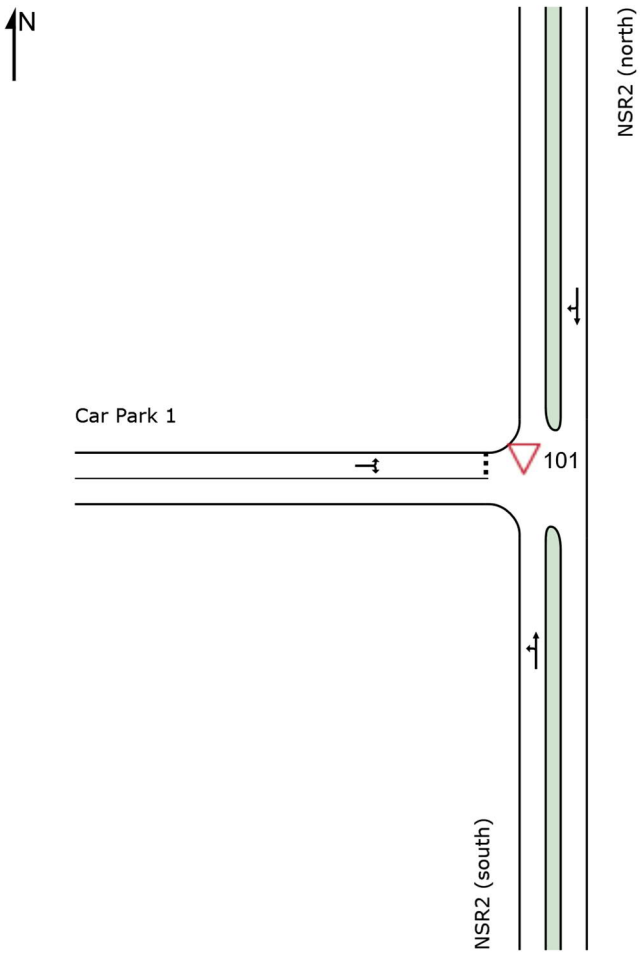
3.3.4 NSR2 / CAR PARK #1 ACCESS

The access point to Car Park #1 is proposed to be located on the western side of the NSR2 access road, north-east of the Alkimos Station grounds. NSR2 is to operate as the primary distributor road on the eastern side of the rail reserve which provides access to Car Park #1, the Kiss & Ride drop-off facility and additional access / egress for the bus interchange.

NSR2 shall operate as a two-way, one-lane per direction road. The access point to / from Car Park #1 is expected to be via a basic priority control intersection.

For the purposes of this Transport Impact Assessment, an equivalent to this layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods. The SIDRA layout of the NSR1 and Car Park #1 intersection is shown in Figure 40.

Figure 40. NSR2 / Car Park #1 Access Intersection Layout



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance.

3.3.4.1 2022 Opening Year Scenario

The SIDRA Intersection analysis results for the 2022 morning and afternoon peaks are summarised in Figure 41 and Figure 42.

Figure 41. NSR2 / Car Park #1 Access – 2022 AM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
10	L2	199	0.0	0.116	4.6	LOS A	0.0	0.0	0.00	0.49	0.00	21.0
11	T1	20	0.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	36.4
Approach		219	0.0	0.116	4.2	NA	0.0	0.0	0.00	0.49	0.00	22.2
North: NSR2 (north)												
5	T1	20	0.0	0.011	0.0	LOS A	0.0	0.1	0.04	0.03	0.04	48.4
6	R2	1	0.0	0.011	5.2	LOS A	0.0	0.1	0.04	0.03	0.04	46.3
Approach		21	0.0	0.011	0.3	NA	0.0	0.1	0.04	0.03	0.04	48.3
West: Car Park 1												
7	L2	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.06	0.07	0.06	27.8
9	R2	1	0.0	0.001	0.7	LOS A	0.0	0.0	0.06	0.07	0.06	27.2
Approach		2	0.0	0.001	0.4	LOS A	0.0	0.0	0.06	0.07	0.06	27.5
All Vehicles		242	0.0	0.116	3.8	NA	0.0	0.1	0.00	0.44	0.00	23.7

Figure 42. NSR2 / Car Park #1 Access – 2022 PM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
10	L2	5	0.0	0.013	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	25.1
11	T1	20	0.0	0.013	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	46.1
Approach		25	0.0	0.013	0.9	NA	0.0	0.0	0.00	0.11	0.00	41.2
North: NSR2 (north)												
5	T1	20	0.0	0.011	0.0	LOS A	0.0	0.0	0.01	0.03	0.01	48.8
6	R2	1	0.0	0.011	4.6	LOS A	0.0	0.0	0.01	0.03	0.01	46.9
Approach		21	0.0	0.011	0.2	NA	0.0	0.0	0.01	0.03	0.01	48.8
West: Car Park 1												
7	L2	1	0.0	0.092	0.1	LOS A	0.2	1.6	0.07	0.14	0.07	27.5
9	R2	140	0.0	0.092	0.6	LOS A	0.2	1.6	0.07	0.14	0.07	26.9
Approach		141	0.0	0.092	0.6	LOS A	0.2	1.6	0.07	0.14	0.07	26.9
All Vehicles		187	0.0	0.092	0.6	NA	0.2	1.6	0.05	0.12	0.05	30.7

The intersection analysis results for Car Park #1 access via NSR2 indicates the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets in the opening year scenario during peak periods. The results show that the average delay to enter Car Park #1 from NSR2 is expected to be less than 5 seconds during peak periods.

Much like the access to Car Park #2, the background traffic along NSR2 is anticipated to be low in the opening year scenario before surrounding land use and road connections are completed in future years.

3.3.4.2 2032 Future Year Scenario

The SIDRA Intersection analysis results for the 2032 morning and afternoon peaks are summarised in Figure 55 and Figure 56.

Figure 43. NSR2 / Car Park #1 Access – 2032 AM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
10	L2	199	0.0	0.116	4.6	LOS A	0.0	0.0	0.00	0.49	0.00	21.0
11	T1	20	0.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	36.4
Approach		219	0.0	0.116	4.2	NA	0.0	0.0	0.00	0.49	0.00	22.2
North: NSR2 (north)												
5	T1	20	0.0	0.011	0.0	LOS A	0.0	0.1	0.04	0.03	0.04	48.4
6	R2	1	0.0	0.011	5.2	LOS A	0.0	0.1	0.04	0.03	0.04	46.3
Approach		21	0.0	0.011	0.3	NA	0.0	0.1	0.04	0.03	0.04	48.3
West: Car Park 1												
7	L2	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.06	0.07	0.06	27.8
9	R2	1	0.0	0.001	0.7	LOS A	0.0	0.0	0.06	0.07	0.06	27.2
Approach		2	0.0	0.001	0.4	LOS A	0.0	0.0	0.06	0.07	0.06	27.5
All Vehicles		242	0.0	0.116	3.8	NA	0.0	0.1	0.00	0.44	0.00	23.7

Figure 44. NSR2 / Car Park #1 Access – 2032 PM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
10	L2	5	0.0	0.013	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	25.1
11	T1	20	0.0	0.013	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	46.1
Approach		25	0.0	0.013	0.9	NA	0.0	0.0	0.00	0.11	0.00	41.2
North: NSR2 (north)												
5	T1	20	0.0	0.011	0.0	LOS A	0.0	0.0	0.01	0.03	0.01	48.8
6	R2	1	0.0	0.011	4.6	LOS A	0.0	0.0	0.01	0.03	0.01	46.9
Approach		21	0.0	0.011	0.2	NA	0.0	0.0	0.01	0.03	0.01	48.8
West: Car Park 1												
7	L2	1	0.0	0.092	0.1	LOS A	0.2	1.6	0.07	0.14	0.07	27.5
9	R2	140	0.0	0.092	0.6	LOS A	0.2	1.6	0.07	0.14	0.07	26.9
Approach		141	0.0	0.092	0.6	LOS A	0.2	1.6	0.07	0.14	0.07	26.9
All Vehicles		187	0.0	0.092	0.6	NA	0.2	1.6	0.05	0.12	0.05	30.7

By the future year scenario of 2032, it is not expected that the background traffic operating along the northern part of NSR2 (adjacent to Car Park #1) will change significantly as further development to that area of the Alkimos City Centre is not anticipated until beyond this timeframe (as per the background network traffic plots supplied by GTA). Therefore, the operation of the access to Car Park #1 is not likely to change by the future year and is expected to continue operating at a forecast LoS A in the peak periods.

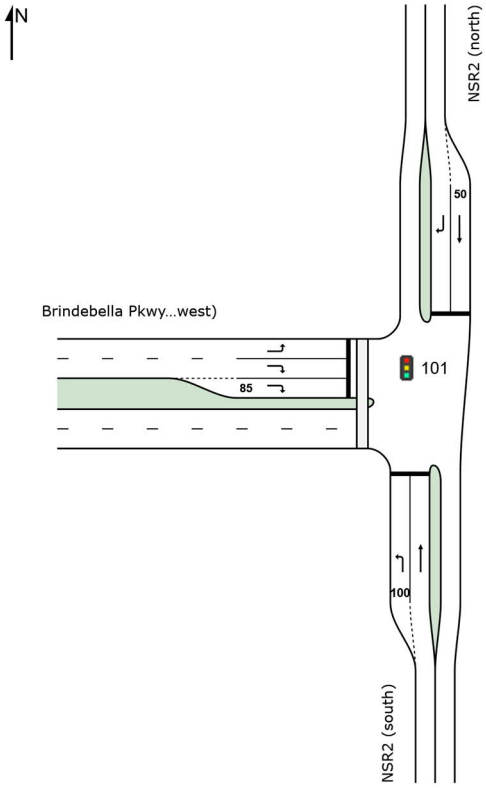
3.3.5 NSR2 / BRINDABELLA PARKWAY INTERSECTION

The intersection of NSR2 and Brindabella Parkway will be another key signalised junction that will facilitate access to the Alkimos Station and the wider Alkimos City Centre area. In the opening year scenario, this intersection will be used primarily for access to and from Car Park #1, the Alkimos Station Park & Ride drop-off, and the bus interchange access / egress east of the rail reserve.

While the ultimate network plans for the Alkimos City Centre indicate that the NSR2 / Brindabella Parkway intersection will eventually become a four-way junction, it is understood that within the 2022 and 2032 scenarios, this junction will be limited to a three-way configuration. An eastern approach is expected to be added at a later date when Alkimos development further to the east of the Station is unlocked.

Note that this signalised infrastructure is not understood to be delivered by PTA as part of the station works, but instead it is understood to form part of the wider Alkimos City Centre movement network being delivered by DevelopmentWA. However, as this intersection is critical to the access of Alkimos Station facilities, the forecast performance at this site has been assessed based on a preliminary layout of the future signalised infrastructure. For the purposes of this assessment, a simple three phase movement sequence has been assumed. The SIDRA layout of the NSR2 / Brindabella Parkway intersection is shown in Figure 57.

Figure 45. NSR2 / Brindabella Parkway Intersection Layout



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance.

3.3.5.1 2022 Opening Year Scenario

The SIDRA Intersection analysis results for the 2022 morning and afternoon peaks are summarised in Figure 46 and Figure 47.

Figure 46. NSR2 / Brindabella Parkway – 2022 AM Peak Results (60s Cycle)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	213	12.7	0.391	22.4	LOS C	5.0	40.7	0.82	0.78	0.82	25.2
2	T1	10	0.0	0.016	15.1	LOS B	0.2	1.5	0.71	0.49	0.71	27.0
Approach		223	12.1	0.391	22.0	LOS C	5.0	40.7	0.82	0.76	0.82	25.3
North: NSR2 (north)												
8	T1	10	0.0	0.051	27.6	LOS C	0.3	2.1	0.93	0.62	0.93	19.5
9	R2	10	0.0	0.053	32.3	LOS C	0.3	2.1	0.93	0.66	0.93	17.8
Approach		20	0.0	0.053	29.9	LOS C	0.3	2.1	0.93	0.64	0.93	18.6
West: Brindebella Pkwy (west)												
10	L2	209	0.0	0.393	23.8	LOS C	5.1	37.6	0.85	0.78	0.85	20.7
12	R2	189	1.6	0.300	22.9	LOS C	3.7	27.9	0.81	0.75	0.81	24.9
Approach		398	0.8	0.393	23.4	LOS C	5.1	37.6	0.83	0.76	0.83	22.8
All Vehicles		641	4.7	0.393	23.1	LOS C	5.1	40.7	0.83	0.76	0.83	23.5

Figure 47. NSR2 / Brindabella Parkway – 2022 PM Peak Results (60s Cycle)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	153	17.6	0.324	23.6	LOS C	3.7	30.8	0.83	0.76	0.83	24.6
2	T1	10	0.0	0.018	16.7	LOS B	0.2	1.6	0.74	0.51	0.74	25.7
Approach		163	16.6	0.324	23.1	LOS C	3.7	30.8	0.83	0.75	0.83	24.6
North: NSR2 (north)												
8	T1	10	0.0	0.022	19.2	LOS B	0.2	1.7	0.79	0.54	0.79	24.0
9	R2	150	0.0	0.343	25.9	LOS C	3.8	28.1	0.88	0.77	0.88	20.4
Approach		160	0.0	0.343	25.5	LOS C	3.8	28.1	0.87	0.76	0.87	20.6
West: Brindebella Pkwy (west)												
10	L2	15	0.0	0.044	26.8	LOS C	0.4	2.7	0.85	0.67	0.85	19.3
12	R2	129	2.3	0.318	28.3	LOS C	2.9	21.6	0.90	0.75	0.90	22.4
Approach		144	2.1	0.318	28.1	LOS C	2.9	21.6	0.89	0.74	0.89	22.1
All Vehicles		467	6.4	0.343	25.5	LOS C	3.8	30.8	0.86	0.75	0.86	22.5

Results for the proposed signalised intersection at NSR2 and Brindabella Parkway indicate that the proposed intersection arrangement is expected to perform at LoS C and achieve satisfactory performance targets for the opening year during both AM and PM peaks. Average delays through of less than 30 seconds during both peaks are observed. The results also show that the degree of saturation is less than 40%, indicating that the intersection is likely to have a moderate amount of spare capacity to accommodate potential future increases in traffic demand.

3.3.5.2 2032 Future Year Scenario

The SIDRA Intersection analysis results for the 2032 morning and afternoon peaks are summarised in Figure 48 and Figure 49.

Figure 48. NSR2 / Brindabella Parkway – 2032 AM Peak Results (60s Cycle)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	127	11.8	0.220	20.5	LOS C	2.7	22.2	0.76	0.74	0.76	26.3
2	T1	110	0.0	0.167	15.4	LOS B	2.3	17.0	0.74	0.59	0.74	26.7
Approach		237	6.3	0.220	18.1	LOS B	2.7	22.2	0.75	0.67	0.75	26.4
North: NSR2 (north)												
8	T1	10	0.0	0.051	27.6	LOS C	0.3	2.1	0.93	0.62	0.93	19.5
9	R2	10	0.0	0.053	32.3	LOS C	0.3	2.1	0.93	0.66	0.93	17.8
Approach		20	0.0	0.053	29.9	LOS C	0.3	2.1	0.93	0.64	0.93	18.6
West: Brindebella Pkwy (west)												
10	L2	110	0.0	0.220	23.5	LOS C	2.6	19.0	0.82	0.74	0.82	20.8
12	R2	115	2.6	0.195	23.2	LOS C	2.2	16.9	0.80	0.73	0.80	24.7
Approach		225	1.3	0.220	23.3	LOS C	2.6	19.0	0.81	0.73	0.81	22.9
All Vehicles		482	3.7	0.220	21.0	LOS C	2.7	22.2	0.79	0.70	0.79	24.3

Figure 49. NSR1 / Brindabella Parkway – 2032 PM Peak Results (60s Cycle)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	98	14.3	0.203	22.8	LOS C	2.2	18.5	0.80	0.74	0.80	25.0
2	T1	12	0.0	0.021	16.7	LOS B	0.3	1.9	0.74	0.52	0.74	25.7
Approach		110	12.7	0.203	22.1	LOS C	2.2	18.5	0.79	0.71	0.79	25.0
North: NSR2 (north)												
8	T1	80	0.0	0.187	21.3	LOS C	2.0	14.6	0.85	0.66	0.85	22.7
9	R2	80	0.0	0.197	25.9	LOS C	2.0	14.7	0.86	0.74	0.86	20.4
Approach		160	0.0	0.197	23.6	LOS C	2.0	14.7	0.85	0.70	0.85	21.5
West: Brindebella Pkwy (west)												
10	L2	12	0.0	0.032	25.8	LOS C	0.3	2.1	0.83	0.66	0.83	19.8
12	R2	86	2.3	0.194	26.7	LOS C	1.8	13.7	0.86	0.72	0.86	23.0
Approach		98	2.0	0.194	26.6	LOS C	1.8	13.7	0.86	0.72	0.86	22.7
All Vehicles		368	4.3	0.203	24.0	LOS C	2.2	18.5	0.84	0.71	0.84	22.9

With the introduction of other access routes to and from the Alkimos Station site in the future year scenario (particularly future connectivity via Romeo Road to the south), it is expected that there will be more station associated traffic that arrives and departs via the south. This results in a forecast net reduction in traffic passing through the NSR2 / Brindabella Parkway during peak periods.

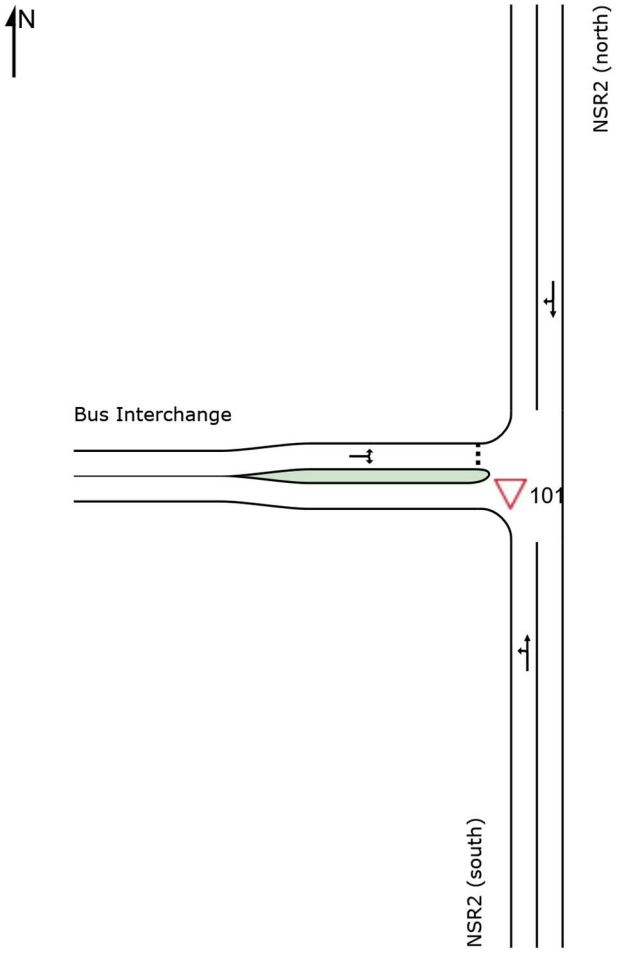
As a result of this expected behaviour in traffic distribution, forecast intersection performance is expected to improve slightly with overall level of service remaining at LoS C in the 2032 scenario.

3.3.6 NSR2 / BUS INTERCHANGE ACCESS

The eastern access point to the Alkimos Station bus interchange is to be via NSR2, east of the rail reserve. This access is to be for the exclusive use of Transperth buses both entering and exiting the bus interchange. Again, NSR2 shall operate as a two-way, one-lane per direction road. The access point to / from the bus interchange is expected to be via a basic priority control intersection.

For the purposes of this Transport Impact Assessment, an equivalent to this layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods. The SIDRA layout of the NSR2 and Bus Interchange access intersection is shown in Figure 50.

Figure 50. NSR2 / Bus Interchange Access Intersection Layout



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance.

3.3.6.1 2022 Opening Year Scenario

The SIDRA Intersection analysis results for the 2022 morning and afternoon peaks are summarised in Figure 51 and Figure 52.

Figure 51. NSR2 / Bus Interchange Access – 2022 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	1	100.0	0.099	5.1	LOS A	0.0	0.0	0.00	0.01	0.00	34.4
2	T1	189	1.6	0.099	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		190	2.1	0.099	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.8
North: NSR2 (north)												
8	T1	189	1.6	0.100	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.8
9	R2	1	100.0	0.100	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	37.7
Approach		190	2.1	0.100	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.8
West: Bus Interchange												
10	L2	24	100.0	0.030	1.3	LOS A	0.1	2.4	0.34	0.20	0.34	18.2
12	R2	1	100.0	0.030	1.9	LOS A	0.1	2.4	0.34	0.20	0.34	25.3
Approach		25	100.0	0.030	1.4	LOS A	0.1	2.4	0.34	0.20	0.34	18.5
All Vehicles		405	8.1	0.100	0.1	NA	0.1	2.4	0.02	0.02	0.02	46.7

Figure 52. NSR2 / Bus Interchange Access – 2022 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	1	100.0	0.069	5.1	LOS A	0.0	0.0	0.00	0.01	0.00	34.4
2	T1	129	2.3	0.069	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach		130	3.1	0.069	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.6
North: NSR2 (north)												
8	T1	129	2.3	0.069	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.8
9	R2	1	100.0	0.069	4.0	LOS A	0.0	0.1	0.01	0.01	0.01	37.7
Approach		130	3.1	0.069	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.7
West: Bus Interchange												
10	L2	24	100.0	0.027	0.9	LOS A	0.1	2.2	0.27	0.14	0.27	18.5
12	R2	1	100.0	0.027	1.4	LOS A	0.1	2.2	0.27	0.14	0.27	25.6
Approach		25	100.0	0.027	0.9	LOS A	0.1	2.2	0.27	0.14	0.27	18.8
All Vehicles		285	11.6	0.069	0.1	NA	0.1	2.2	0.03	0.02	0.03	45.6

The analysis results for the bus interchange access via NSR2 indicates the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets in the opening year scenario during peak periods. Given that the background traffic along NSR2 is expected to be low during the opening year scenario (as a result of limited network connectivity and surrounding land use), no access issues are anticipated for Transperth buses via the eastern interchange access.

3.3.6.2 2032 Future Year Scenario

The SIDRA Intersection analysis results for the 2032 morning and afternoon peaks are summarised in Figure 53 and Figure 54.

Figure 53. NSR2 / Bus Interchange Access – 2032 AM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	1	100.0	0.112	5.1	LOS A	0.0	0.0	0.00	0.00	0.00	34.4
2	T1	215	1.4	0.112	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		216	1.9	0.112	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.8
North: NSR2 (north)												
8	T1	115	2.6	0.062	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.7
9	R2	1	100.0	0.062	4.8	LOS A	0.0	0.1	0.01	0.01	0.01	37.5
Approach		116	3.4	0.062	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.6
West: Bus Interchange												
10	L2	12	100.0	0.045	1.6	LOS A	0.1	2.7	0.31	0.28	0.31	17.8
12	R2	24	100.0	0.045	1.8	LOS A	0.1	2.7	0.31	0.28	0.31	25.0
Approach		36	100.0	0.045	1.7	LOS A	0.1	2.7	0.31	0.28	0.31	23.0
All Vehicles		368	12.0	0.112	0.2	NA	0.1	2.7	0.03	0.03	0.03	45.2

Figure 54. NSR2 / Bus Interchange Access – 2032 PM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	1	100.0	0.048	5.1	LOS A	0.0	0.0	0.00	0.01	0.00	34.3
2	T1	89	3.4	0.048	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.7
Approach		90	4.4	0.048	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.5
North: NSR2 (north)												
8	T1	157	1.9	0.083	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	49.8
9	R2	1	100.0	0.083	3.8	LOS A	0.0	0.1	0.00	0.01	0.00	37.7
Approach		158	2.5	0.083	0.1	NA	0.0	0.1	0.00	0.01	0.00	49.8
West: Bus Interchange												
10	L2	12	100.0	0.040	0.6	LOS A	0.1	2.4	0.21	0.19	0.21	18.4
12	R2	24	100.0	0.040	1.4	LOS A	0.1	2.4	0.21	0.19	0.21	25.7
Approach		36	100.0	0.040	1.1	LOS A	0.1	2.4	0.21	0.19	0.21	23.6
All Vehicles		284	15.5	0.083	0.2	NA	0.1	2.4	0.03	0.03	0.03	44.2

With the redistribution of traffic approaching the Alkimos Station facilities as a result of the future year connectivity via Romeo Road, the overall traffic demand passing through the NSR2 / Bus Interchange access intersection is expected to remain largely similar in 2032. As per the background traffic modelling provided by GTA, background traffic along NSR2 is not expected to be significant in 2032. Therefore, the forecast performance of the bus interchange access intersection remains at LoS A in the future year scenario.

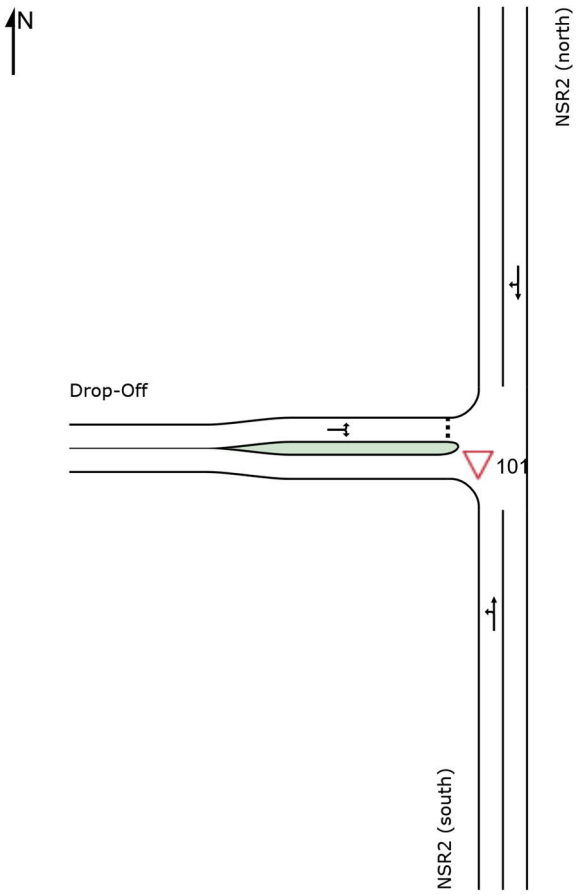
3.3.7 NSR2 / KISS & RIDE ACCESS

With the proposed Alkimos Station Kiss & Ride facility being located on the eastern side of the rail reserve, access and egress to this drop-off area is to be via the NSR2 access road. Integrated within the Kiss & Ride accessway, is a separate minor connection to the bus interchange allowing for buses to enter only (exit to be via the bus interchange access to the north).

While in the opening year no buses are expected to access the interchange via this approach from the south (as the southern part of NSR2 and the remaining road network connections will not occur until a later date), it is anticipated that more buses will use this entry when Romeo Road and the internal Alkimos City Centre connections are completed (likely closer to the 2032 scenario).

Again, NSR2 shall operate as a two-way, one-lane per direction road. The access point to / from the bus interchange is expected to be via a basic priority control intersection. For the purposes of this Transport Impact Assessment, an equivalent to this layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods. The SIDRA layout of the NSR2 and Bus Interchange access intersection is shown in Figure 55.

Figure 55. NSR2 / Kiss & Ride Access Intersection Layout



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance.

3.3.7.1 2022 Opening Year Scenario

The SIDRA Intersection analysis results for the 2022 morning and afternoon peaks are summarised in Figure 56 and Figure 57.

Figure 56. NSR2 / Kiss & Ride Access – 2022 AM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	1	0.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	35.5
2	T1	51	5.9	0.028	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.6
Approach		52	5.8	0.028	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.2
North: NSR2 (north)												
8	T1	51	5.9	0.108	0.2	LOS A	0.5	4.0	0.15	0.37	0.15	39.7
9	R2	139	0.0	0.108	3.3	LOS A	0.5	4.0	0.15	0.37	0.15	28.0
Approach		190	1.6	0.108	2.5	NA	0.5	4.0	0.15	0.37	0.15	31.7
West: Drop-Off												
10	L2	139	0.0	0.089	0.2	LOS A	0.4	2.8	0.13	0.04	0.13	19.5
12	R2	1	0.0	0.089	0.9	LOS A	0.4	2.8	0.13	0.04	0.13	29.8
Approach		140	0.0	0.089	0.2	LOS A	0.4	2.8	0.13	0.04	0.13	19.6
All Vehicles		382	1.6	0.108	1.3	NA	0.5	4.0	0.12	0.20	0.12	28.2

Figure 57. NSR2 / Kiss & Ride Access – 2022 PM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	1	0.0	0.028	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	35.5
2	T1	51	5.9	0.028	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.6
Approach		52	5.8	0.028	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.2
North: NSR2 (north)												
8	T1	51	5.9	0.073	0.1	LOS A	0.3	2.5	0.14	0.31	0.14	41.0
9	R2	78	0.0	0.073	3.3	LOS A	0.3	2.5	0.14	0.31	0.14	29.2
Approach		129	2.3	0.073	2.0	NA	0.3	2.5	0.14	0.31	0.14	34.6
West: Drop-Off												
10	L2	78	0.0	0.050	0.1	LOS A	0.2	1.5	0.13	0.04	0.13	19.6
12	R2	1	0.0	0.050	0.8	LOS A	0.2	1.5	0.13	0.04	0.13	29.8
Approach		79	0.0	0.050	0.2	LOS A	0.2	1.5	0.13	0.04	0.13	19.7
All Vehicles		260	2.3	0.073	1.1	NA	0.3	2.5	0.11	0.17	0.11	31.3

Results for Kiss & Ride access assessment indicate the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets in the opening year scenario during peak periods. Due to low traffic demands, no access issues are anticipated.

3.3.7.2 2032 Future Year Scenario

The SIDRA Intersection analysis results for the 2032 morning and afternoon peaks are summarised in Figure 58 and Figure 59.

Figure 58. NSR2 / Kiss & Ride Access – 2032 AM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	89	27.0	0.152	4.8	LOS A	0.0	0.0	0.00	0.20	0.00	32.3
2	T1	150	2.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.20	0.00	44.1
Approach		239	11.3	0.152	1.8	NA	0.0	0.0	0.00	0.20	0.00	38.8
North: NSR2 (north)												
8	T1	75	36.0	0.098	0.5	LOS A	0.4	3.5	0.29	0.28	0.29	40.2
9	R2	65	0.0	0.098	4.0	LOS A	0.4	3.5	0.29	0.28	0.29	28.4
Approach		140	19.3	0.098	2.1	NA	0.4	3.5	0.29	0.28	0.29	35.4
West: Drop-Off												
10	L2	65	0.0	0.095	0.5	LOS A	0.3	2.3	0.23	0.18	0.23	18.8
12	R2	65	0.0	0.095	1.1	LOS A	0.3	2.3	0.23	0.18	0.23	29.0
Approach		130	0.0	0.095	0.8	LOS A	0.3	2.3	0.23	0.18	0.23	24.3
All Vehicles		509	10.6	0.152	1.6	NA	0.4	3.5	0.14	0.22	0.14	33.5

Figure 59. NSR2 / Kiss & Ride Access – 2032 PM Peak Results

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: NSR2 (south)												
1	L2	60	40.0	0.087	5.0	LOS A	0.0	0.0	0.00	0.28	0.00	31.2
2	T1	53	5.7	0.087	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	42.3
Approach		113	23.9	0.087	2.6	NA	0.0	0.0	0.00	0.28	0.00	35.6
North: NSR2 (north)												
8	T1	145	18.6	0.117	0.1	LOS A	0.2	2.0	0.10	0.11	0.10	45.7
9	R2	36	0.0	0.117	3.5	LOS A	0.2	2.0	0.10	0.11	0.10	33.6
Approach		181	14.9	0.117	0.8	NA	0.2	2.0	0.10	0.11	0.10	43.8
West: Drop-Off												
10	L2	36	0.0	0.050	0.2	LOS A	0.2	1.1	0.11	0.11	0.11	19.3
12	R2	36	0.0	0.050	1.0	LOS A	0.2	1.1	0.11	0.11	0.11	29.7
Approach		72	0.0	0.050	0.6	LOS A	0.2	1.1	0.11	0.11	0.11	24.9
All Vehicles		366	14.8	0.117	1.3	NA	0.2	2.0	0.07	0.16	0.07	36.2

Although there are anticipated to be some slight increases to traffic demand passing through the Kiss & Ride access intersection in the 2032 future year scenario, the results of the SIDRA analysis demonstrate that overall performance is expected to remain largely unchanged and a forecast LoS A is anticipated in peak periods. Forecast delays are expected to remain low in the future year scenario, owing to the relatively low levels of background traffic expected along NSR2.

3.4 PUBLIC TRANSPORT ROUTES AND SERVICING

With the introduction of the new Yanchep Rail Extension and the associated bus interchanges at each of the stations along the route, adjustments to existing bus routes and the introduction of new services are expected.

The future Transperth bus network proposed to service the Alkimos Station bus interchange is outlined in Table 9. This information has been supplied by PTA / Transperth and it is important to note that this information is subject to changes or adjustments pending future planning and community consultation.

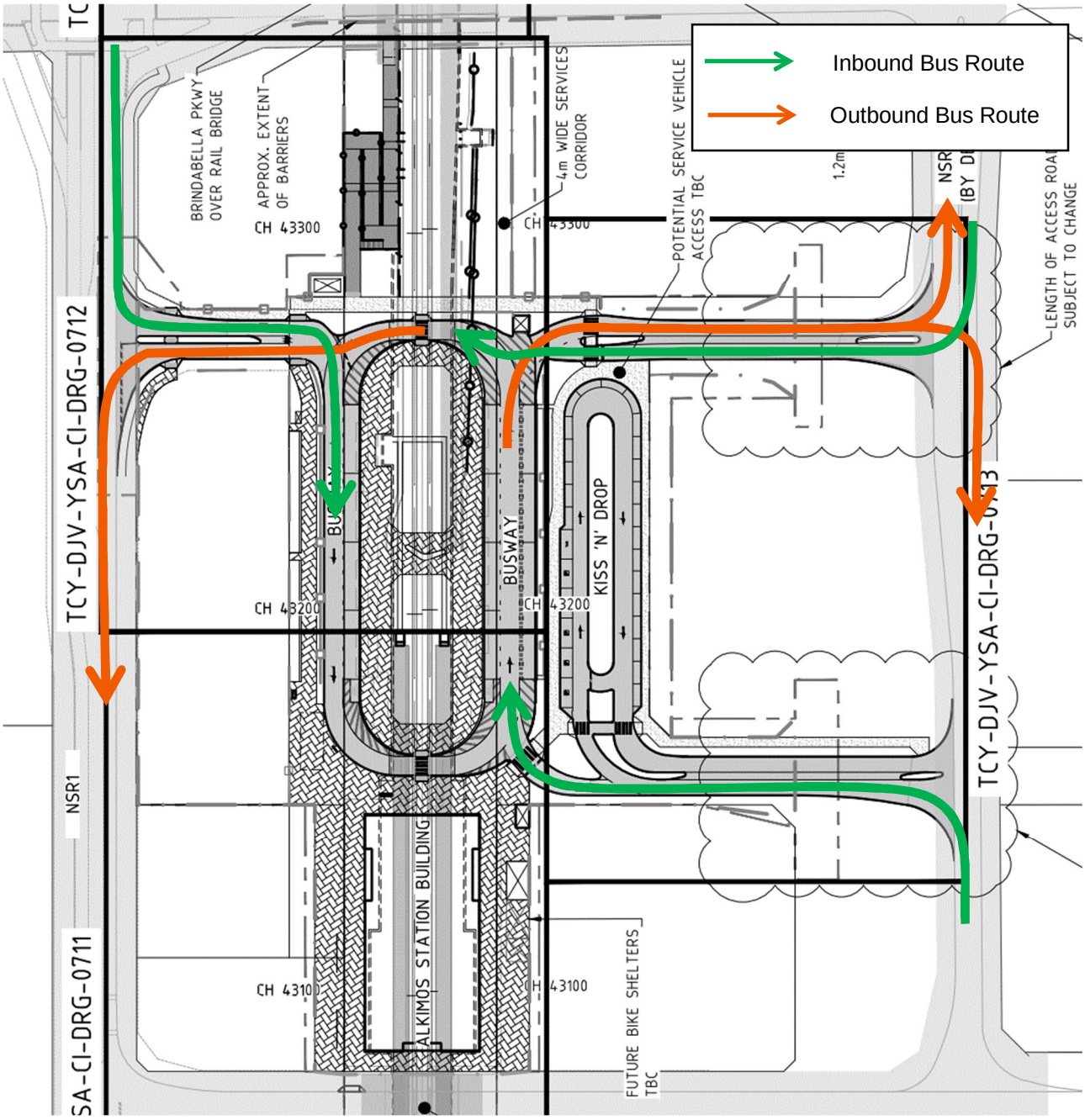
Table 9. Alkimos Station – Planned Bus Services

Route	Headway (mins)		Notes
	Peak	Inter-Peak / Off-Peak	
480 via Marmion (South)	10	30	Route 480 & 482 are operating on a temporary alignment awaiting connection of NSR1 to Romeo Road.
482 via Marmion (south)	20	30	
485 via Marmion (north)	10	30	
Route 486 via Marmion (north)	10	30	

- Route 483 & 484 will not serve Alkimos Station upon opening due to incomplete road network. Staging-wise, they are expected to operate once NSR1 connects to Romeo, and then be rerouted once development occurs to the east of the Station.
- Route 487 will not operate upon opening.

The extent of the potential Alkimos Station bus routes and potential entry / exit paths are illustrated in Figure 60.

Figure 60. Alkimos Station – Potential Bus Routing



3.5 BUS INTERCHANGE

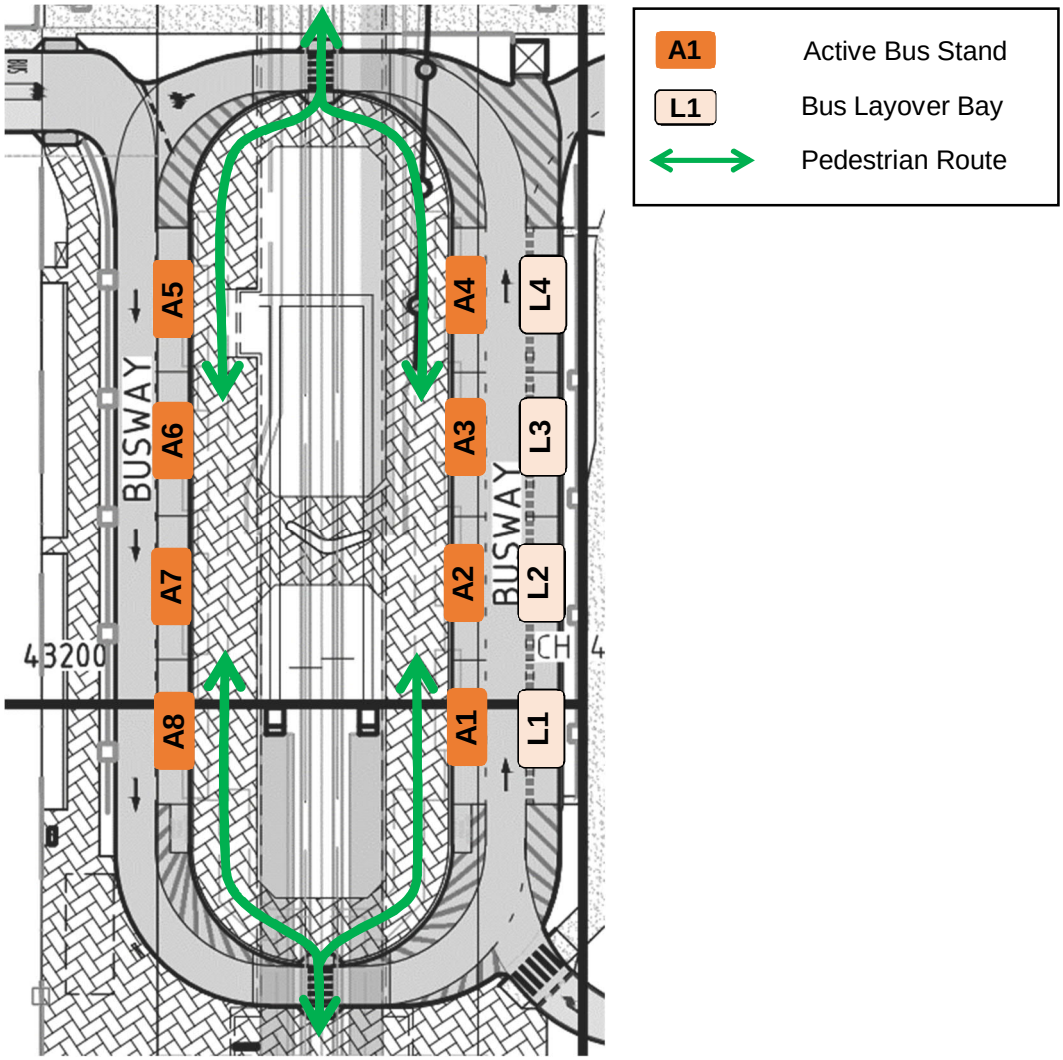
The proposed Alkimos Station design provides for an integrated bus interchange which will be located to the north of the main station building. The active and layover bays will be split on both the eastern and the western sides of the rail corridor, allowing counter-clockwise re-circulation of buses and for all required movements to be made within the interchange.

Upon opening, buses will be able to access the interchange from both the western and eastern sides of the rail reserve via NSR1 and NSR2 roadways, respectively. Given that in the opening year the primary connection to the external road network shall be via Marmion Avenue, all buses are expected to enter and exit via the western access (located on NSR1).

In the future year scenario once the construction of Romeo Road is completed and the remainder of the Alkimos City Centre internal roads are connected, access to the bus interchange from the south (via Romeo Road) is expected to be possible. This access configuration allows for future flexibility with Transperth routing, allowing buses to enter and exit in the most direct route possible.

The Schedule of Accommodation requires the bus interchange to include a minimum of 8 active bays and 4 layover bays, which the proposed design satisfies. Figure 61 illustrates the arrangement of active / layover bays, and shows the intended pedestrian access routes within the bus interchange.

Figure 61. Alkimos Station – Bus Interchange Layout



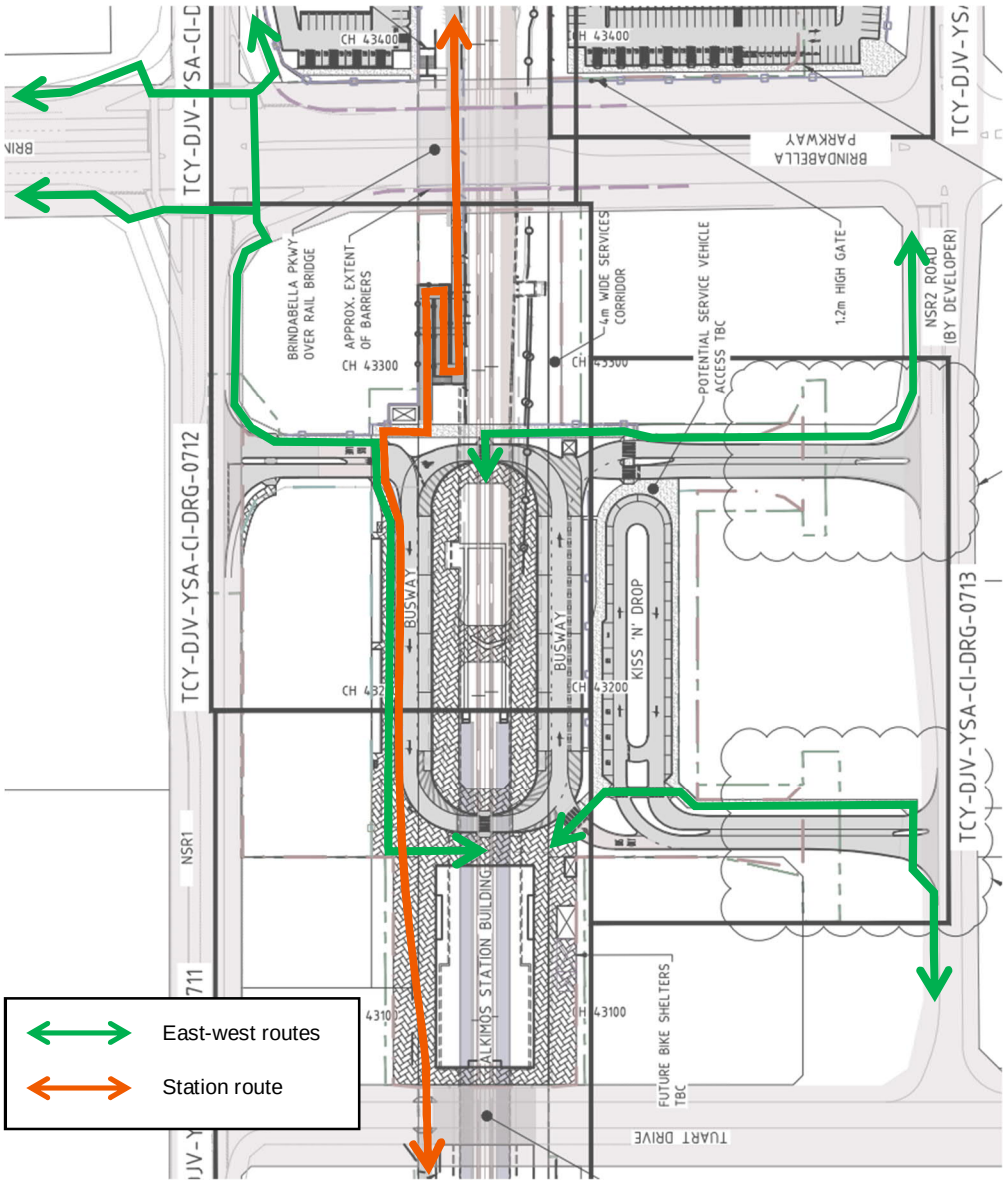
3.6 PEDESTRIAN & CYCLE ACCESS

3.6.1 ACCESS TO ALKIMOS STATION

The pedestrian and cycle access to Alkimos Station is to be via the surrounding road and path network, with access points to the Station facilities distributed around the external boundary of the site, including along NSR1, NSR2 and Tuart Drive. The proposed access arrangement, including connectivity to the adjacent external network, is illustrated in Figure 62. Several pedestrian routes are provided to the surrounding local footpaths for access to parking and other parts of the local network. The design also includes allowance for a shared path route to run north-south through the station, passing beneath Brindabella Parkway via a grade separation. In the opening scenario, this pathway will connect to and terminate at Car Park #2. However, it is anticipated that this connection can be extended by others in future to allow for regional shared path access to / from the site.

In the opening year scenario, the majority of pedestrian / cycle traffic will be via Brindabella Parkway, while in the future year scenarios when Romeo Road and other southern connections are completed, more extensive access to and from the south via NSR1 and NSR2 will be available.

Figure 62. Alkimos Station – Pedestrian and Cycle Access Arrangement

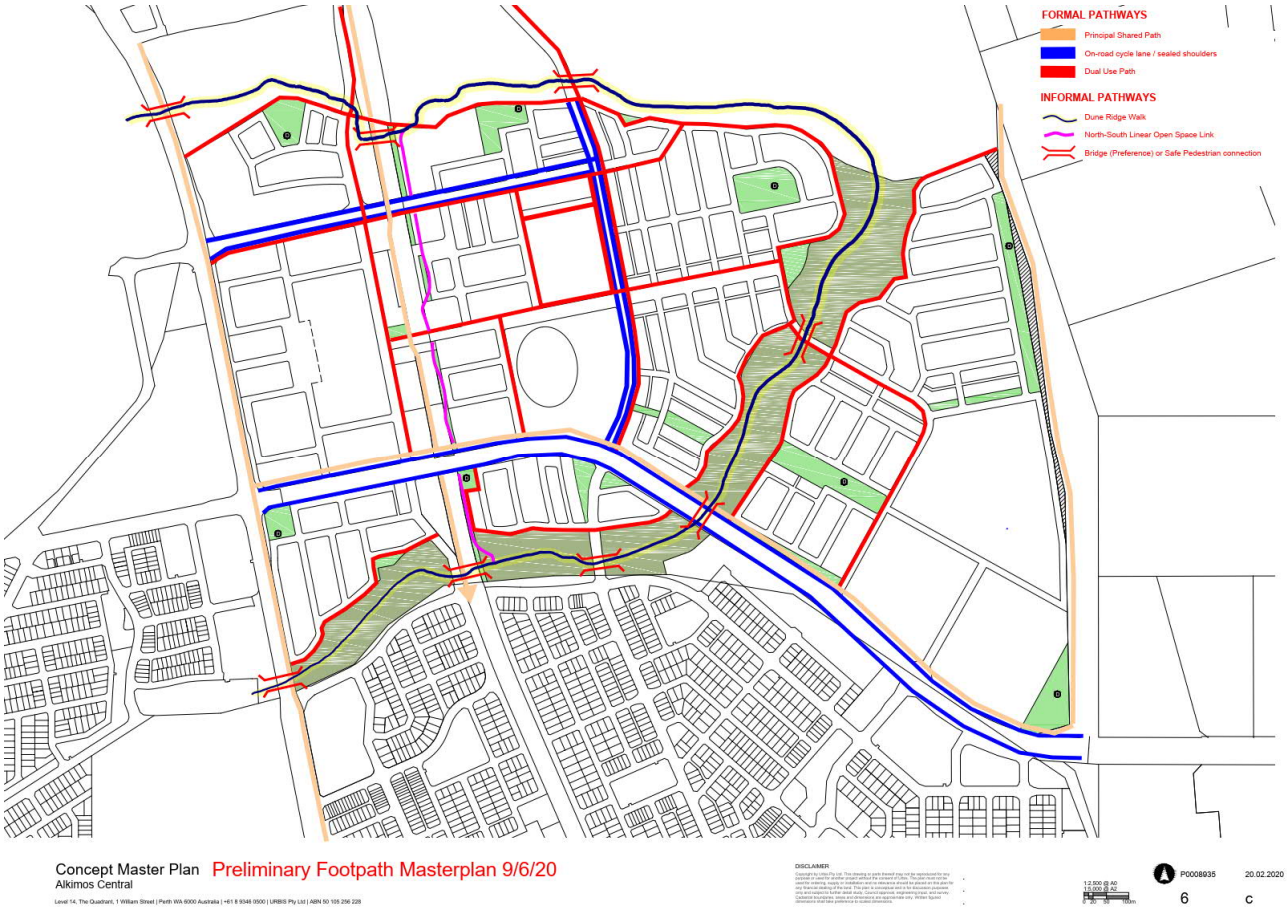


3.6.2 ADDITIONAL CONNECTIVITY

In addition to the immediate access to the Station precinct provided by the surrounding roadways and site access points, multiple future pedestrian and cycling connections are included within the Alkimos City Centre area as part of the wider masterplan currently being progressed by DevelopmentWA. These future connections will ultimately seek to connect several of the existing and proposed residential areas in the surrounding region to the Alkimos City Centre and the Alkimos Station.

DevelopmentWA provided NEWest with a preliminary concept for the footpath Masterplan within the Alkimos City Centre area. The Preliminary Footpath Masterplan is shown in Figure 63.

Figure 63. Alkimos City Centre – Preliminary Footpath Masterplan (DevelopmentWA)



Source: DevelopmentWA

The Preliminary Masterplan shows that both Brindabella Parkway, NSR1 and Tuart Drive are anticipated to become key pedestrian and cycle connections that will service the station precinct and connect to the wider area, through to Marmion Avenue to the west, and the future Romeo Road connection to the south. Romeo Road is also anticipated to provide a key east-west connection for cycle access that is expected to provide access to the future PSP along the planned Mitchell Freeway extension to the east.

While many of these individual connections are unlikely to be available in the opening year scenario, it is expected that the wider pedestrian and cycle infrastructure will be developed over the medium-term timeframe between 2022 and 2032 (as per the assumed road network staging outlined in Section 3.1.2).

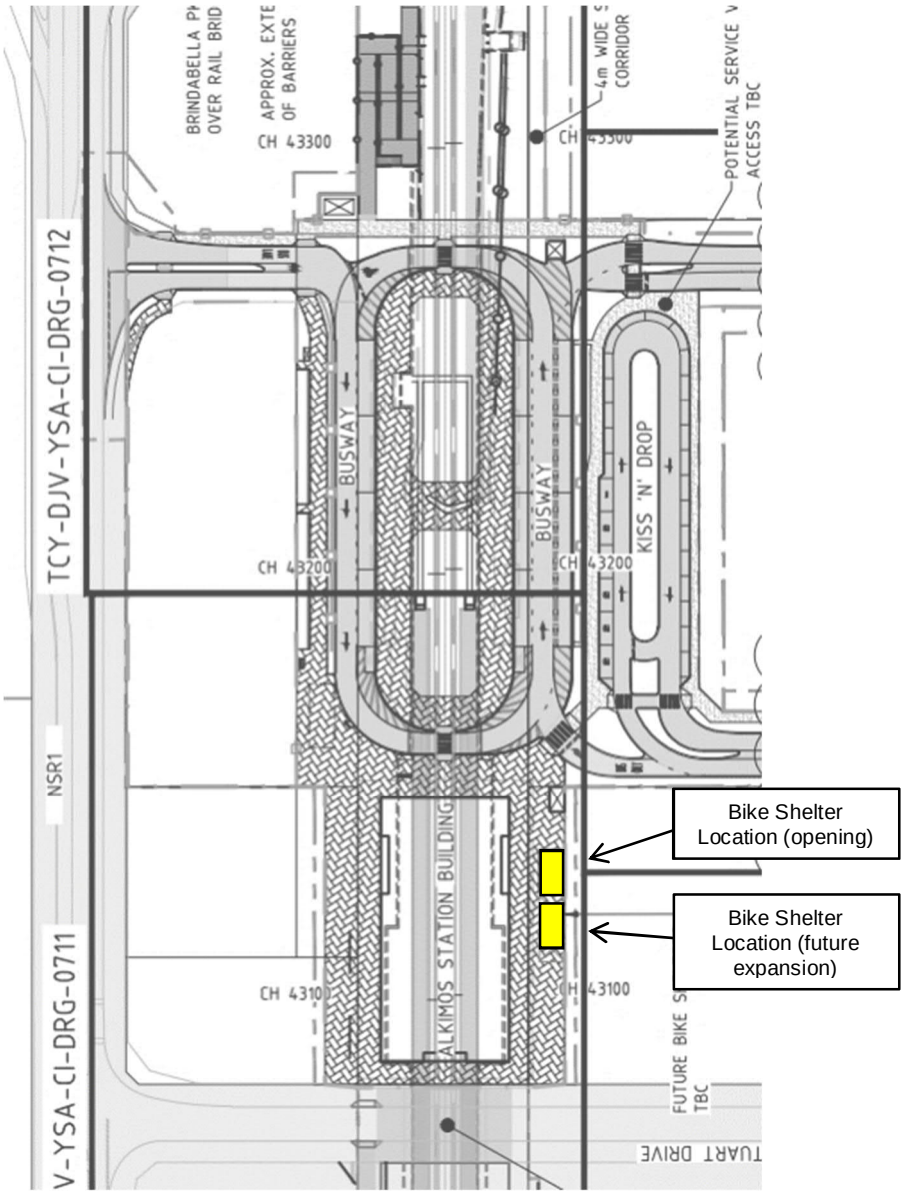
3.6.3 BICYCLE PARKING AND END OF TRIP FACILITIES

As per the Schedule of Accommodation for Alkimos Station referenced in the Yanchep Rail Extension and Thornlie Cockburn Link Scope of Work and Technical Criteria document, the bicycle parking provision within the Alkimos Station concept design is summarised below:

- 10 bicycle U-rails.
- 2x 96 bicycle capacity secure parking shelters (PTA standard 00-A-09-0159-TYPE B Module Arrangement).
- Bicycle storage to accommodate a minimum of 2.6% of expected patronage (calculated up to 4 years in advance), with the proposed supply equivalent to 7% of the 2031 forecast patronage.

Note that no showers or change rooms are required to be provided as part of the Schedule of Accommodation for Alkimos Station. Similarly, secure locker facilities are not required to be provided. The proposed bike shelter location is highlighted in Figure 64.

Figure 64. Alkimos Station – Bicycle Shelter Location



3.7 VEHICLE PARKING

The vehicle parking provision within the Alkimos Station 85% design is summarised in Table 10.

Table 10. Alkimos Station Parking Provision

Type		Provision
Total Long Term car parking bays		**686**
Long Term Parking	Standard parking bays	661
	Accessible bays (ACROD)	23
	Electric car charging bays	2
	Motorcycle bays (over and above car parking bays)	20
Short Term Parking	Drop-off bays (Kiss & Ride)	22
	Accessible bays (ACROD)	5
	Taxi bay (ACROD)	1

In addition to the above parking supply, the following service bays are provided for use by PTA staff and other emergency services for the safe and ongoing operation of the station (in accordance with Schedule of Accommodation requirements).

- 1 fire response vehicle bay (in accordance with DFES requirements).
- 2 emergency service bays (ambulance and state transit guards).
- 4 PTA Staff parking bays.
- 2 PTA Servicing bays.
- 2 Kiosk tenant bays.

3.8 EMERGENCY VEHICLE ACCESS

The Alkimos Station concept design will include allowance for one emergency fire response vehicle bay within close proximity to the main station building area. The location of the bay is also required to be within a suitable distance to the fire booster cabinet, to allow connection to the fire services infrastructure. The current proposed location of the DFES bay is to be within the circulating busway of the bus interchange.

The proposed location of the Department of Fire and Emergency Services (DFES) hardstand area is currently being finalised through the development of the Alkimos Station Fire Engineering documentation, which will enable NEWest to enter consultation with DFES to confirm the requirements.

3.9 ROAD SAFETY

A pre-opening road safety audit will be required as a final check to ensure that the new roads have been adequately designed to meet relevant local design standards and to identify any safety issues which may require additional modification prior to 100% design. It is expected that all new roads will be assessed in detail, along with any new connections to the existing road network (e.g. Marmion Avenue). At this stage it would be anticipated that any issues raised in the road safety audit can be rectified with minor modifications as part of the review process, however this will likely be dependent on the specifics of the audit process.

4.0 SUMMARY AND CONCLUSION

NEWest has prepared this Transport Impact Assessment in order to document the Station access elements and support the Development Application submission for the proposed Alkimos Station development, as part of the wider METRONET Yanchep Rail Extension project.

This study examines the function and operation of access to and from the new Alkimos Station site, for all modes of transport. As the Alkimos Station is expected to become one of the key features of the future Alkimos City Centre, robust and accessible routes for users to connect to the site are important for the long-term success of the station and the growth of the surrounding region.

The Alkimos Station includes a 686 total bay Park & Ride facility, allowing for long term parking for patrons when using nearby public transport. The total long term parking is spread across two separate parking areas, located to the north of the Station site (one parking facility on either side of the rail reserve) In addition to the long term parking, a 22 bay drop-off parking facility (plus 5 accessible bays plus one accessible taxi bay) is also included within the station design to facilitate Kiss & Ride trips for patrons.

To accommodate the vehicle traffic forecast to be generated by these elements of the station, vehicle trips to and from the station precinct will occur along a new internal road network to be constructed as part of the Alkimos City Centre structure plan by DevelopmentWA as part of the land development works. A new signalised intersection at Marmion Avenue / Brindabella Parkway will also be provided as part of these works. Note that these local infrastructure works are not to be delivered by NEWest / PTA as part of this scope of works, but instead this will be delivered by others as part of the wider Alkimos structure plan.

In the opening year scenario, the constructed road network will be limited to the roads and accessways required to service the Alkimos Station facility (including the construction of both Brindabella Parkway and Tuart Drive bridge structures).

By the future year scenario of 2032, it is anticipated that much of the Alkimos City Centre plan will have progressed with multiple new local road connections constructed by others in line with the overall Structure Plan. This is assumed to include extension of the NSR1 roadway to the north and to the south, providing a future connection via the planned Romeo Road link. Additional local roads are also expected east of the rail reserve, providing further connectivity to Romeo Road and surrounding development areas.

Demand forecast and traffic analysis has been conducted for both 2022 (‘opening year’ scenario) and 2032 (‘future year’ scenario) timeframes to assess the anticipated performance of the individual site access points around the station precinct. This analysis has been based on background traffic flow data provided to NEWest by GTA / Stantec Consultants, who are currently preparing a mesoscopic traffic distribution model on behalf of DevelopmentWA. SIDRA Intersection analysis was undertaken for both morning and afternoon peak periods for the above scenarios, the results of which showed that each of the proposed site access arrangements are anticipated to operate at a satisfactory level of service with acceptable average movement delays, through to the forecast horizon of the year 2032.

The proposed Alkimos Station layout also provides for an integrated bus interchange within the station precinct, to be located immediately north of the main Alkimos Station building. The interchange provides for a total of 8 active bus bays and 4 layover bus bays. Access points to and from the bus interchange are provided on both the western and eastern sides of the rail reserve, via NSR1 and NSR2 roadways, respectively.

To facilitate access for local and regional walking / cycling trips to Alkimos Station, the provided infrastructure includes a north-south ‘shared path’ walking and cycling route that passes through the Alkimos Station site. In the opening year scenario, this shared path passes beneath the Brindabella

Parkway bridge and terminates at Car Park #2. It is expected that by the medium to long term, as road and path network is extended through new development areas, this connection through the station site will provide a continuous walking and cycling route connecting the station from Butler (in the south) through to Eglinton (in the north). Allowance for secure bicycle parking facilities are located on the east of the main station building.

The station forecourt layout also provides connectivity for future walking / cycling connections along much of the internal Alkimos City Centre road infrastructure, primarily along Brindabella Parkway, NSR1 and NSR2. These connections, in addition to other planned local connections, are anticipated to become key pedestrian and cycle routes that will service the station precinct and connect to the wider area, particularly along Marmion Avenue to the west and the future Romeo Road connection to the south.

Overall, the proposed Alkimos Station development is found to satisfy the project requirements as set out by the METRONET Yanchep Rail Extension strategy. Vehicle (including bus) access to and from the station has been demonstrated to operate satisfactorily from the opening year scenario through to the future year scenario of 2032. Pedestrian and cycling connectivity to the existing residential areas north-west and south-west of the station and future development within Alkimos Activity Centre are dependent on the east-west routes and new local roads being delivered by the relevant organisations as part of the implementation of the Alkimos City Centre structure plan. The station will then form a central part of this future activity centre and become a catalyst for the growth and development of the surrounding region and communities.

Appendices

Table 11: Appendix List

Appendix Reference	Appendix Title
Appendix A	Alkimos City Centre Background Flow Modelling Information

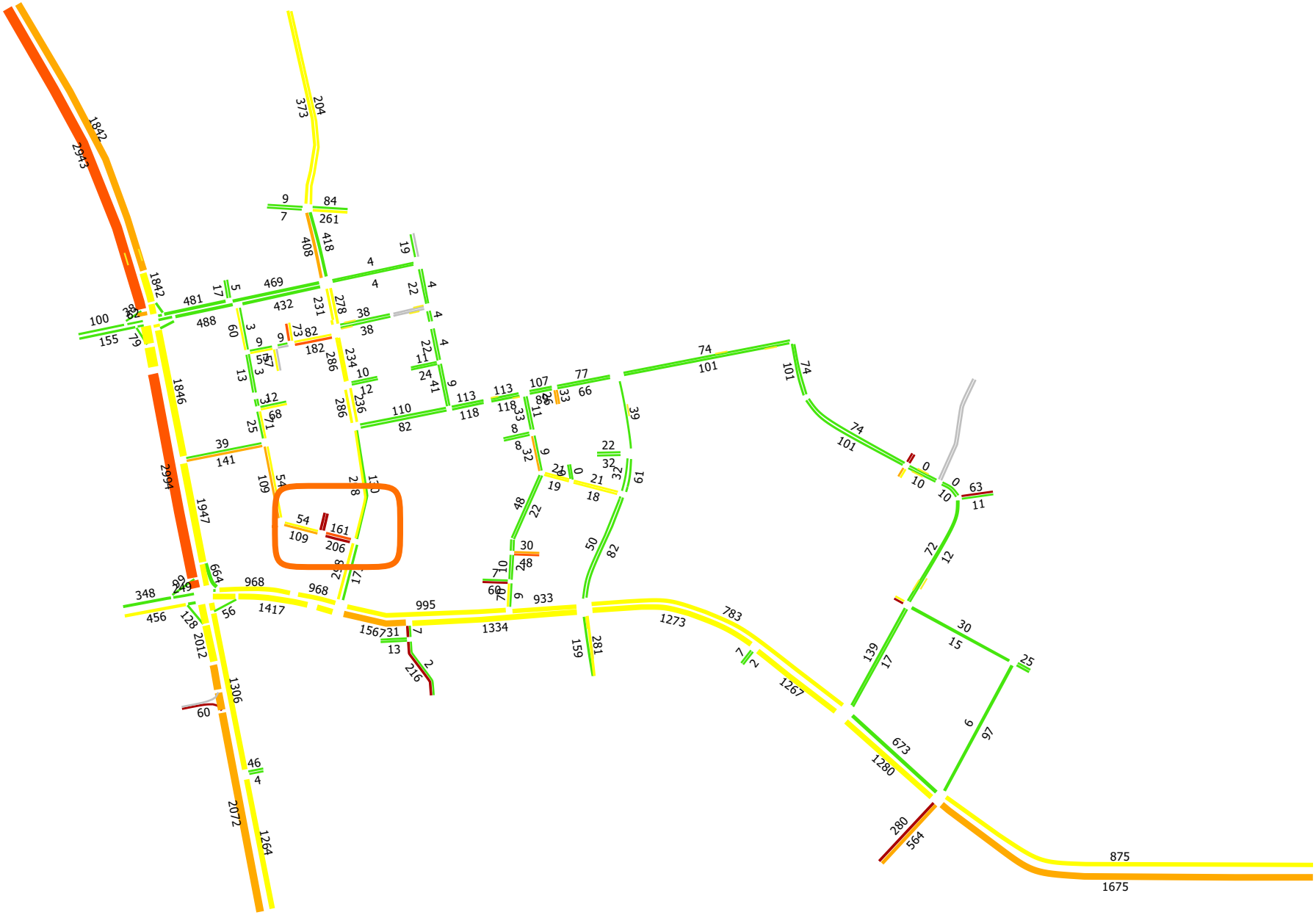
Appendix A: Alkimos City Centre Background Flow Modelling Information

Stage 1 - 2022 - AM

Stage 1 - 2022 - PM

Stage 1 - 2032 - AM

Stage 1 - 2032 - PM



APPENDIX E SDRP COMMENTS ON PHASE 1 DA

GOVERNMENT OF
WESTERN AUSTRALIA

Department of **Planning Lands and Heritage**
Office of the Government Architect

State Design Review Panel Report
Alkimos Station DR2

For PTA

October 2020

Review attendance

Subject	**Alkimos Station DR2**	
Date	13 October 2020	
Time	12:45 – 3:45	
Location	140 William Street Perth	
Design Reviewers	Melinda Payne	Associate to Government Architect (Chair)
	Marion Fredriksson	Panel Member (Urban Design)
	Karen Hyde	Panel Member (Planning)
	David Karotkin	Panel Member (Architecture)
	Alasdair MacKerron	Panel Member (Engineering)
	Damien Pericles	Panel Member (Landscape Architecture)
Proponent Team	Marco Bense	Delivery Manager, PTA
	Rob Forbes	Project Manager, PTA
	Christopher Deshon	Stations Design Lead, NEWest Alliance
	Brett Priest	Station Architect, NEWest Alliance
	Faron Mengler	Landscape Architect, NEWest Alliance
	Thor Farnworth	NEWest Alliance
	Ray Haeren	Urbis
Planning Authority	David Sands	Senior Planning Officer, DPLH
Stakeholders	Phil Slater	Senior Development Manager, DevelopmentWA
	Damien Giudici	Development Manager, DevelopmentWA
	Emille van Heyningen	Manager Strategic Land Use Planning & Environment, City of Wanneroo (Video Conference)
Panel Support	Barbara Gdowski	Manager SDRP, Office of the Government Architect
	Meagan Wells	Program Assistant SDRP, Office of the Government Architect
Declarations	Karen Hyde declared a proximity to the project that has been deemed to not represent a conflict of interest.	

Briefings

Design Team	Marco Bense	PTA Overview
	Rob Forbes	
	Brett Priest	Design Presentation
	Faron Mengler	

Design Review Report endorsement

Chair signature

Melinda Payne, Associate to the Government Architect

Executive Summary

Overall The proposal is not supported by the Panel

Further review A follow up review of this project is not recommended. The Panel is keen to see the scope of the DA amended to reflect the preferred urban design outcome for the Alkimos Town Centre, which will be possible with the imminent Development WA decision regards bridge funding.

Summary comment:

The Panel thanks the project team for engaging with the design review process. Whilst some elements of the advice from DR1 have been addressed, the majority remain outstanding. A key concern is the extent of transport infrastructure on the Main Street. The Panel strongly recommends that further work be undertaken by the project team to ensure the preferred Town Centre masterplan outcome is the basis for an approved DA. Having the two developer-funded bridges in place will allow enable better cross-rail connectivity of the transport network and improve the functionality for the Town Centre by allowing bus movements to be kept east of the Station. Relocation of the Kiss n Ride and the temporary carpark off Main Street will allow better opportunities for retail and other activating uses and a superior urban design outcome to be delivered from day 1.

Whilst the proposed Station building is generally legible, functional and economical, it will be the foundation project for the development of the new Alkimos Town Centre, and as such it should set a suitable benchmark or reference point for future development. The design currently presented for DA appears preliminary and unresolved and does not yet establish a clear and compelling identity for the Station. Whilst the team has attempted to respond to previous review comments which supported the intent to individualize each of the YRE line stations, the current architectural proposal has somewhat regressed from what was seen in previous review.

Summary review	**DR1**	**DR2**	**DR3**
Principle 1 - **Context and character**			
Principle 2 - **Landscape quality**			
Principle 3 - **Built form and scale**			
Principle 4 - **Functionality and build quality**			
Principle 5 - **Sustainability**			
Principle 6 - **Amenity**			
Principle 7 - **Legibility**			
Principle 8 - **Safety**			
Principle 9 - **Community**			
Principle 10 - **Aesthetics**			

Supported

Pending further attention

Not yet supported

Yet to be addressed

Design quality evaluation

Principle 1: Context and character *Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*

1. The Station will be the first building in the new Alkimos Town Centre and should set a suitable benchmark for future development.
2. Issues of integration with the Town Centre remain unresolved at this stage. Confirming the two Development WA-funded bridges should be prioritised. This would allow the preferred (permanent) proposal to be documented and submitted for DA. The current submission is based on the less desirable interim arrangement, which delivers a substandard outcome for the Town Centre.
3. The temporary arrangements incorporate an in-built level of redundancy in the infrastructure and imply considerable abortive work which will waste tax-payer money and should be avoided.
4. The response to local character has been advanced since the last review, however the integration of landscape, public art and architecture and references to the distinctive features of the place remain unconvincing. The preliminary themes based on the parabolic dunes, the pinnacles and the local melaleuca have been interpreted with little design sophistication and there is inadequate indication of how the concepts will be applied to wayfinding, materials, colours, public art, landscape planting etc. These place themes should be consistently articulated through the building and public realm to tell a cohesive story.
5. The landscape architect, architect and public artist should work together to develop the Alkimos narrative and ensure a coherent design interpretation across the various components of the project.

Principle 2: Landscape quality *Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context*

1. Discrepancies between 3D renders and the landscape plans remain problematic. Ensure consistency across all drawn information in the DA submission.
2. To contribute positively to the desired landscape character of Alkimos Town Centre, mature trees should form part of the landscape strategy. Increase the number of trees around the Station and within the public realm wherever possible, to improve context responsiveness and assist with mitigating urban heat island effects.
3. Further detail is required on proposed urban furniture, including location of planters. This is particularly important for the western edge of the Tuart Drive bridge.
4. The proposed place narrative of the limestone pinnacles and parabolic dunes as the basis of the landscape concept has potential but remains unconvincing in the current proposal and is yet to inform planting, paving and urban furniture.
5. There is no evidence yet of integration of the landscape approach and the green linkages within the broader Town Centre, as is proposed by the Structure Plan and recommended in previous design reviews.
6. Within the car park, can the grid be relaxed to allow for a greater landscape contribution and tree canopy?
7. The Bus Port area is extensive and stark given the areas of hard paving, so landscape approach is critical. What is the treatment at the perimeter of the voids? Planting on structure will limit tree size and canopy opportunity. A well-considered approach to mitigate this constraint and deliver a positive contribution to shade and amenity should be considered.

Principle 3: Built form and scale *Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*

1. The approach to massing and scale is acceptable for this typology and location, however the new design approach to built form, particularly the draping canopy/valance is not as successful as the previous two design reiterations.

Principle 4: Functionality and build quality *Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.*

1. The Panel recommends avoiding the dominance of the Town Centre by bus routes, particularly for NS1 Main St.
2. The Panel also recommends that the current three access points for the Bus Port be limited to two, ideally located on the east so as to avoid negative impacts on Main St and the higher profile areas of public realm.
3. Should the temporary Kiss n Ride be progressed, previous design review advice should be considered, particularly with respect to the extent of this infrastructure (considered excessive at 32 bays). Consideration should be given to

street drop-off alternatives, as successfully demonstrated in other station projects and more applicable for a strategic Town Centre.

4. The Station building skylights and voids to allow daylight to the platforms are supported.
5. The relocation of the kiosk is positive. The project would benefit from it more strongly addressing the plaza. Ideally the Station would have incorporated other opportunities for activation, as the four corners of the building are currently anchored by utility functions that present as blank to the elevations.
6. Reconsider the southern façade design to provide greater activation to the streetscape, which is an important secondary Town Centre street.
7. The incorporation of peripheral service elements and bike racks into the Station building is positive.
8. The Panel supports the PSP refinements, which improve pedestrian and bike network integration.

Principle 5: Sustainability *Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*

1. Aside from the sustainability benefit inherent in a public transport project, there remains little detail regarding sustainability initiatives, as required by the METRONET Sustainability Strategy.
2. Reduce large areas of paving and consider permeable paving wherever possible.
3. Whilst some reference is made to WSUD in the landscape proposal, further detail is required.
4. The Panel was concerned at the claim that the number of trees in the landscape will be limited due to bush fire risk. Provide further information with respect to removal of any existing trees and how shade will be managed in areas where there is no tree canopy.

Principle 6: Amenity *Good design optimises internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.*

1. Pedestrian experience should be an integral consideration for this project, given Town Centre context. In previous reviews, the Panel has requested information on the journey experience of various users. Clearly identifying the movement networks would enable consideration of amenity and comfort. These are important aspects of the successful integration between the Town Centre, Station building, Bus Port, Kiss and Ride, footpaths, crossovers etc.

Principle 7: Legibility *Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*

1. While there is good visual connectivity between the Station and Main St, spatial hierarchy and way-finding remain key challenges for his project, particularly if the temporary design proposal is progressed.
2. The capping of the rail tunnel, allowing east-west movement through the Station is acknowledged as positive, however legibility would be further assisted by a clearer spatial hierarchy for the public realm (between the Station Forecourt and northern plaza, for example) as noted in previous reviews.
3. Broader pedestrian linkages, integration with green corridors and cycle networks should have been demonstrated in the drawing package, as requested in previous reviews.
4. More information is required with respect to fencing, including design and location, as this will impact the quality of the public domain. As the large carparks will be fenced, their design and integration with landscape will be critical to ensure a fortified / defensive outcome does not result.
5. The approach to paving is not clear, due to inconsistencies between renders and plans. Ensure the pavement design and/or materiality extends into the Station, including the unpaid zones, to integrate with the public realm.
6. Internal Station planning is clear and efficient, with good legibility enhanced by skylights and voids.

Principle 8: Safety *Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.*

1. The Panel seeks clarity on management of vehicle access, including location of bollards or other devices.
2. Provide information with respect to lighting strategy/concept.
3. Ensure a CPTED report is included in the DA package.

Principle 9: Community *Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction*

1. Whilst precedent imagery within the review package indicates recognition of opportunities to interpret indigenous history, application of the METRONET Gnarla Biddi Strategy is not convincing or resolved.
2. Implementation of the METRONET Public Art Strategy should have been evident in the DA submission. Public art will now be a discrete late addition to the project, rather than integral. Seeking coherence between future public art, landscape and architecture is recommended.
3. Improve opportunities to support community activity within and around the Station, through pop-up commercial activation, family-friendly play opportunities, free WIFI, meeting spaces, interactive lighting etc.

Principle 10: Aesthetics *Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*

1. The Panel is concerned the architectural design has regressed from the concept last reviewed. Previous SDRP reporting has requested greater responsiveness to the Alkimos context, and the intent for a distinctive identity is supported, however the adoption of a draping canopy / valance is less successful to previous roof design iterations.
2. Clearer alignment of design intent between architecture and landscape (and public art in due course) would assist with a more cohesive and compelling design identity. (The geometry of the curves used by the landscape architect is different to the geometry used in the building canopy / valance, for example).
3. The Panel suggests reconsidering the inclined columns within the Station building.
4. The design of the Bus Port canopies continues to appear inconsistent with architectural language of the Station. Greater consistency in expression is recommended to ensure a cohesive design outcome for the various components of the project.

APPENDIX F BUSHFIRE MANAGEMENT PLAN

FPA AUSTRALIA | Fire Protection Association Australia | Life. Property. Environment.

BPAD Bushfire Planning & Design

Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Alkimos Station (Yanchep Rail Extension)

Suburb: Alkimos **State:** WA **P/code:** 6038

Local government area: City of Wanneroo

Description of the planning proposal: Development Application (conditionally approved)

BMP Plan / Reference Number: 59400 **Version:** R11 Rev 1 **Date of Issue:** 18/08/2021

Client / Business Name: NEWest Alliance

Reason for referral to DFES	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	☐	☒
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?	☐	☒
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	☐	☒
Strategic planning proposal (including rezoning applications)	☐	☒
Minor development (in BAL-40 or BAL-FZ)	☐	☒
High risk land-use	☐	☒
Vulnerable land-use	☒	☐

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

The train station is considered a Vulnerable Land Use.

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Louisa Robertson	Level 3	BPAD 36748	28/02/2022
Company		**Contact No.**	
Strategen-JBS&G		08 9792 4797	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner LM Robertson Date 18/08/2021

NEWest Alliance

Bushfire Management Plan (Development Application)

Yanchep Rail Extension – Alkimos Station

18 August 2021

59400/132,466 (Rev 1)

JBS&G Australia Pty Ltd T/A Strategen-JBS&G

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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Appendices

1. Proposal details

1.1 Background

NEWest Alliance has been granted conditional approval in relation to a Development Application (DA) for proposed development of Alkimos Station, which forms part of the Yanchep Rail Extension (YRE) to the Joondalup line, which also includes Eglinton and Yanchep Stations. Alkimos Station will be situated within Development WA's Alkimos Central precinct at Lot 2570 Marmion Avenue, Alkimos (the project area), located in the City of Wanneroo.

The Site Plan (Figure 1; NEWest Alliance 2021) identifies that the proposed Alkimos Station development will comprise the following elements:

- train station building (habitable building)
- canopy and platform (non-habitable structures)
- busway and canopy
- drop off area
- landscaping/drainage
- public roads, including Brindabella Parkway and Tuart Drive rail over bridges
- rail alignment
- footpaths
- carparking areas.

The proposed train station building and precinct are further depicted on the Elevations Plan and Indicative Imagery Plan at Appendix A and Appendix B respectively.

1.2 Site description

The project area is delineated in Figure 2 and equates broadly with the Alkimos Central town square, in which the station will be located. Construction works have commenced within the project area, which has now been fully cleared. Clearing has also been carried out within the eastern portion of the Central Precinct, to the east of the designated project area.

Clearing of the Alkimos Central Precinct is the first stage of clearing that is occurring within the local area of the station, which means that the project area is currently bordered by temporary vegetation hazards to the northeast, west/northwest and south. The majority of vegetation surrounding the project area will be progressively cleared as Alkimos Central is further developed. In this regard, the station will eventually be located in an area where the bushfire risk will be minimal.

The land surrounding the project area is shown in Figure 2, which depicts:

- intact areas of coastal scrub to the north, which will be retained within the designated Regional Open Space (ROS)
- Alkimos Vista Estate (residential area) to the north of the ROS, which is currently undergoing staged construction
- remnant coastal scrub vegetation to the south, which will eventually be cleared to facilitate future residential development
- Trinity Estate (residential area) further to the south which is currently undergoing staged construction

- grassland and patches of coastal scrub to the north, east and west, which will also be cleared to facilitate future residential development
- land cleared to facilitate development of Alkimos Central residential area to the east.

1.3 Proposed access routes

1.3.1 Ultimate access

Alkimos Station and the Alkimos Central precinct will ultimately be serviced by Brindabella Parkway in the north and Romeo Road in the south. Both roads will enable direct access west to Marmion Avenue, which is a major arterial road linking townsites along the northern suburbs coast. Romeo Road will also facilitate access to the southeast, to connect with the future Mitchell Freeway extension. The Station will ultimately be provided with access to the surrounding suburbs of Trinity Estate (to the south) and Alkimos Vista Estate (to the north) and beyond, through construction of future neighbourhood connector roads. The future access routes are depicted on the Alkimos City Centre Activity Centre Plan (RobertsDay 2018) in Plate 1.

It is understood that a major review of the Alkimos City Centre Activity Centre Plan is being undertaken by DevelopmentWA. Importantly, the primary road network and connections (e.g. to Marmion Avenue and St Andrews Drive) will still generally align with the 2018 layout. Therefore, the same level of public road accessibility and similar road frontages fully encompassing the station precinct will be delivered by day one operations of the station.

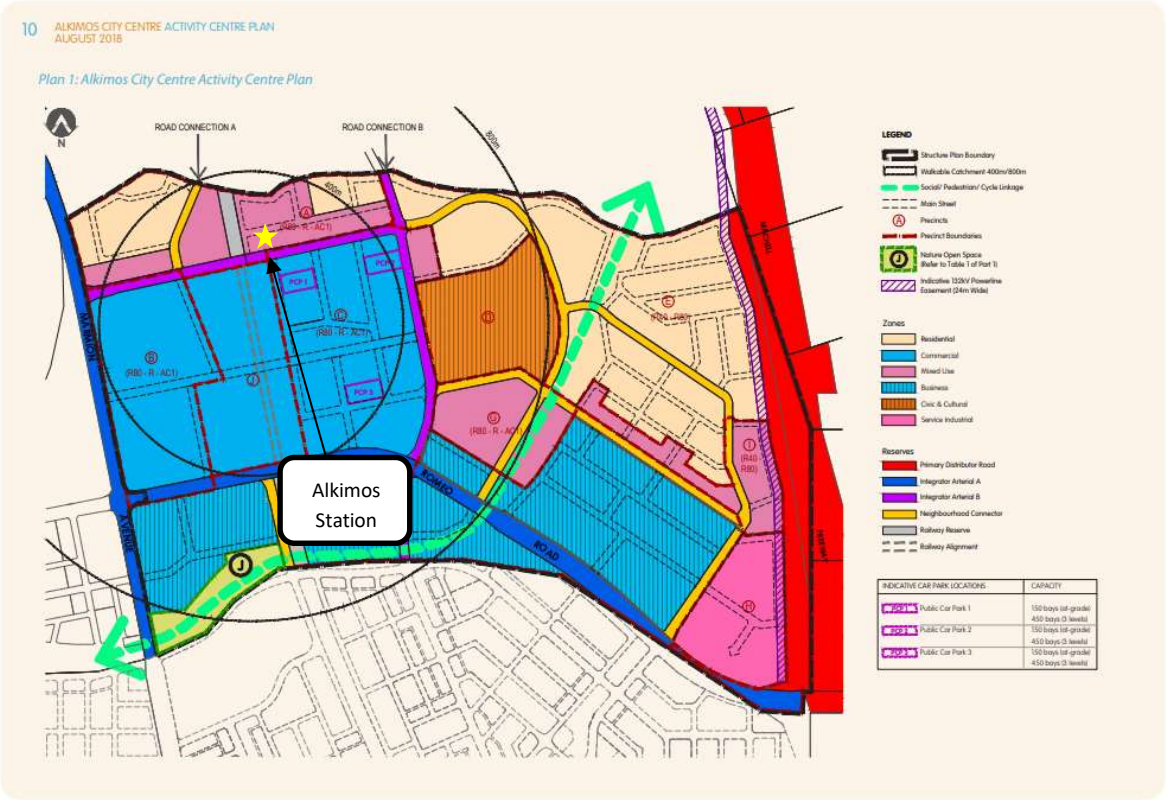


Plate 1: Ultimate access routes (Roberts Day 2018)

1.3.2 Approved subdivision access

The proposed station and Alkimos Central town square are located within Stage 1A Alkimos Central. The Bushfire Management Plan (BMP) prepared to support subdivision of Stage 1A and 1B (Emerge Associates 2020) was approved on the basis of a temporary Emergency Access Way (EAW) being provided between North South Road (NSR1)/Tuart Drive to Marmion Avenue, with the primary access being from Brindabella Parkway in the north (Appendix C; Urbis 2020). This access arrangement will ensure that the Station is provided with two access routes until Romeo Road is constructed to the south and NSR1 is extended to provide this linkage. Figure 3 depicts the access routes which will be delivered by DevelopmentWA as part of the approved subdivision.

1.3.3 Minimum Day 1 access

Minimum Day 1 public roads and emergency vehicular access routes are displayed in Figure 3. The primary access route will be Brindabella Parkway, in the north of the project area, which will provide access/egress to Marmion Avenue to the northwest.

Development WA is responsible for funding and delivering Tuart Drive. The associated rail bridge (just south of the station building) will be constructed by NEWest Alliance. It is understood that this will occur prior to Day 1 operations.

As discussed previously, Development WA is also responsible for constructing a temporary EAW from NSR1 to Marmion Avenue to the southwest as part of the approved Stage 1A Alkimos Central subdivision works, however, it is uncertain whether this will be completed prior to Day 1 operations.

In the event that Development WA has not constructed the temporary EAW for Day 1 operations, an interim EAW will be established within the existing site access road to provide an alternative access route to Marmion Avenue. This interim EAW would be extinguished once Development WA has constructed the abovementioned EAW as per the endorsed subdivision plan (Appendix C).

1.4 Purpose

1.4.1 Development application

This BMP has been prepared as a condition of development approval in response to the proposed station building being located within a designated bushfire prone area (refer to the Map of Bush Fire Prone Areas at Plate 2).

The proposed development is required to comply with Policy Measure 6.5 of *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP3.7; WAPC 2015) and Section 5.4 of the associated *Guidelines for Planning in Bushfire Prone Areas* (the Guidelines; WAPC 2017).

1.4.2 Bushfire emergency planning

The proposed train station is considered to be a vulnerable land use due to potential evacuation challenges associated with the station and platform design, provision of alternative transportation for passengers and potential for occupants to have mobility and/or cognitive impairment. This triggers additional requirements under Policy Measure 6.6 of SPP 3.7, including preparation of a Bushfire Emergency Evacuation Plan (BEEP).

PTA is required to develop an Australian Standards-based Emergency Evacuation Plan (i.e. compliant with *AS3745-2010 – Planning for emergencies in facilities*) for all of its stations, which are public buildings. As such, an Emergency Evacuation Plan for each train station building is a precondition for obtaining an Occupancy Permit prior to operation.

Consequently, as part of developing appropriate procedures to ensure the safe movement of employees and occupants during an evacuation, including in the event of a bushfire, PTA will be required to prepare the BEEP component in accordance with the requirements outlined in the Western Australian Planning Commission's *A Guide to developing a Bushfire Emergency Evacuation Plan'* (WAPC 2019).

PTA has an existing Emergency Management Manual (EMM) in place for its railway stations and rolling stock operations; however, this document does not specifically address evacuation during bushfire emergencies. In general, the course of action for most types of emergencies at railway stations (e.g. structural fire) is to cease train movements, evacuate the building and direct or move passengers out and away from the precinct altogether via all appropriate and available means (i.e. leaving the area by buses and personal vehicles, etc.).

It is proposed that overarching bushfire emergency management procedures will be incorporated into the EMM document rather than relying on a site-specific BEEP being prepared in isolation for each for the three stations proposed as part of the YRE. This will ensure that a consistent approach to bushfire evacuation is adopted for all three YRE stations, as well as existing metropolitan train stations that are subject to potential bushfire exposure. Preparation of a bushfire evacuation strategy and the production of a station BEEP will need to ensure not only consistency across PTA's own EMM, but also integration, where necessary with the local government's Local Emergency Management Arrangements (LEMA), including referral to DFES (local fire service) in order to assist in pre-incident planning, prior to the commencement of station operations.

The bushfire emergency strategies are to be incorporated into PTA's EMM and adopted for use prior to commencement of station operations.

Plate 2: Map of Bush Fire Prone Areas (DFES 2019)

1.5 Other plans/reports

1.5.1 Bushfire Management Plans

Previous version of this BMP

This report is the second version of the BMP prepared to support Alkimos Station and has been prepared to address comments provided by Department of Fire and Emergency Services (DFES) in December 2020 on the previous version of the BMP (Rev 0). This current BMP has been authored by a Level 3 BPAD accredited practitioner and considers an amended station design and also provides detailed consideration of:

- existing extent of vegetation classifications and exclusions
- proposed on-site landscaping
- provision of two access routes connecting to the public road network during all stages of development.

Alkimos Central Subdivision stage BMP

A BMP was prepared in October 2020 (Emerge Associates) to support subdivision of Stages 1A and 1B Alkimos Central. The proposed Station is within the Stage 1A area. The BMP documents bushfire management measures which are of relevance to Alkimos Station, including:

- provision of a temporary Emergency Access Way (EAW) from NSR1/Tuart Drive to Marmion Avenue to provide two access routes until NSR1 is constructed south to join Romeo Road
- the requirement for existing cleared areas within Stage 1A to be maintained in a low threat state by the developer, and following handover, the property owner/occupier.

1.5.2 Emergency Management documents/reports

The following internal Emergency Management documents/reports are relevant to the proposed development:

- Emergency Management Manual 4th Edition (Public Transport Authority, No date):
  - Emergency Management procedures for PTA operations
- Bushfire Management Strategy (Public Transport Authority, 2018):
  - Procedures relating to bushfire risk reduction across PTA land
- Emergency Management Plan (EMP) – MetroNet Stage 1 Initiatives: Yanchep Rail Extension (NEWest Alliance, 2020):
  - Emergency Management Sub-Plan in regard to the YRE construction stage
  - Emergency Response Information in relation to implementing the EMP during construction of Alkimos Station
- Yanchep Rail Extension Part 2 Bushfire Risk Management Plan (Eco Logical Australia, 2019):
  - Bushfire Risk Management Plan in relation to construction of Eglinton and Yanchep Stations.

1.5.3 Environmental reports

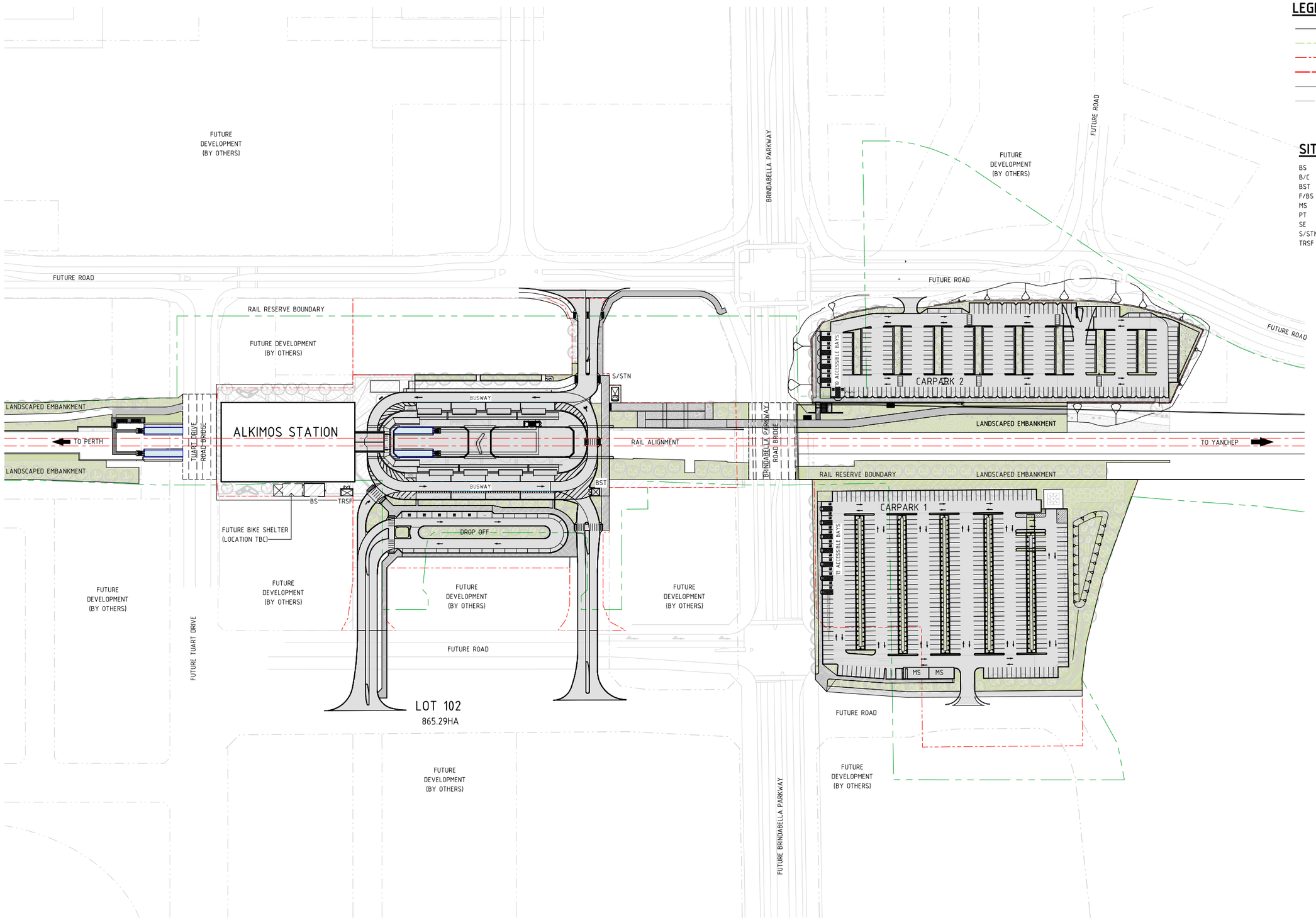
Environmental reports that have previously been prepared for the project area include:

- Level 2 flora and vegetation survey to support the MRS Amendment for the subject land (ATA Environmental 2015)

- Flora and vegetation assessment (Emerge Associates (2012).

1.5.4 Landscaping Plans

- Alkimos Station Landscape Strategy (NEWest Alliance 2021)
- Alkimos Station Landscape MasterPlan (NEWest Alliance 2021).



LEGEND

- EXISTING CADASTRAL BOUNDARIES
- PROPOSED RAIL RESERVE BOUNDARY
- PROPOSED LOT BOUNDARIES (STATION)
- PROPOSED BUTLER TO YANCHEP RAIL
- FUTURE LOT BOUNDARIES BY OTHERS
- FUTURE DEVELOPMENT BY OTHERS

SITE ABBREVIATIONS

BS	BICYCLE SHELTER (SECURE)
B/C	BUS STAFF CRIB ROOM & TOILET
BST	BIN STORE
F/BS	FUTURE BICYCLE SHELTER (SECURE)
MS	MOTORCYCLE SHELTER
PT	PARKING TICKET MACHINES & SMARTPARKER
SE	STRUCTURAL ENGINEER
S/STN	SUB-STATION
TRSF	TRANSFORMER

OVERALL SITE PLAN

SCALE 1 : 1000

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
D	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	JS	AW	
C	12.05.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	SB	AW	
B	21.08.20	CARPARK 2 UPDATED	BP	BL	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\Alkimos_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-02

REFERENCES

SCALE : As indicated (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B.PRIEST

DRAWN J.SOLDATIC

CHECKED A.WHEELER

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR PTA Division / External Company

DATE

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
SITE PLAN

PTA Drawing No:

REV: D

Legend

- Project area
- Cadastral boundary
- YRE Development envelope
- Future Regional Open Space (Alkimos-Eglinton District Structure Plan)
- Roads (MRWA)

strategen JBS&G

0 200 metres

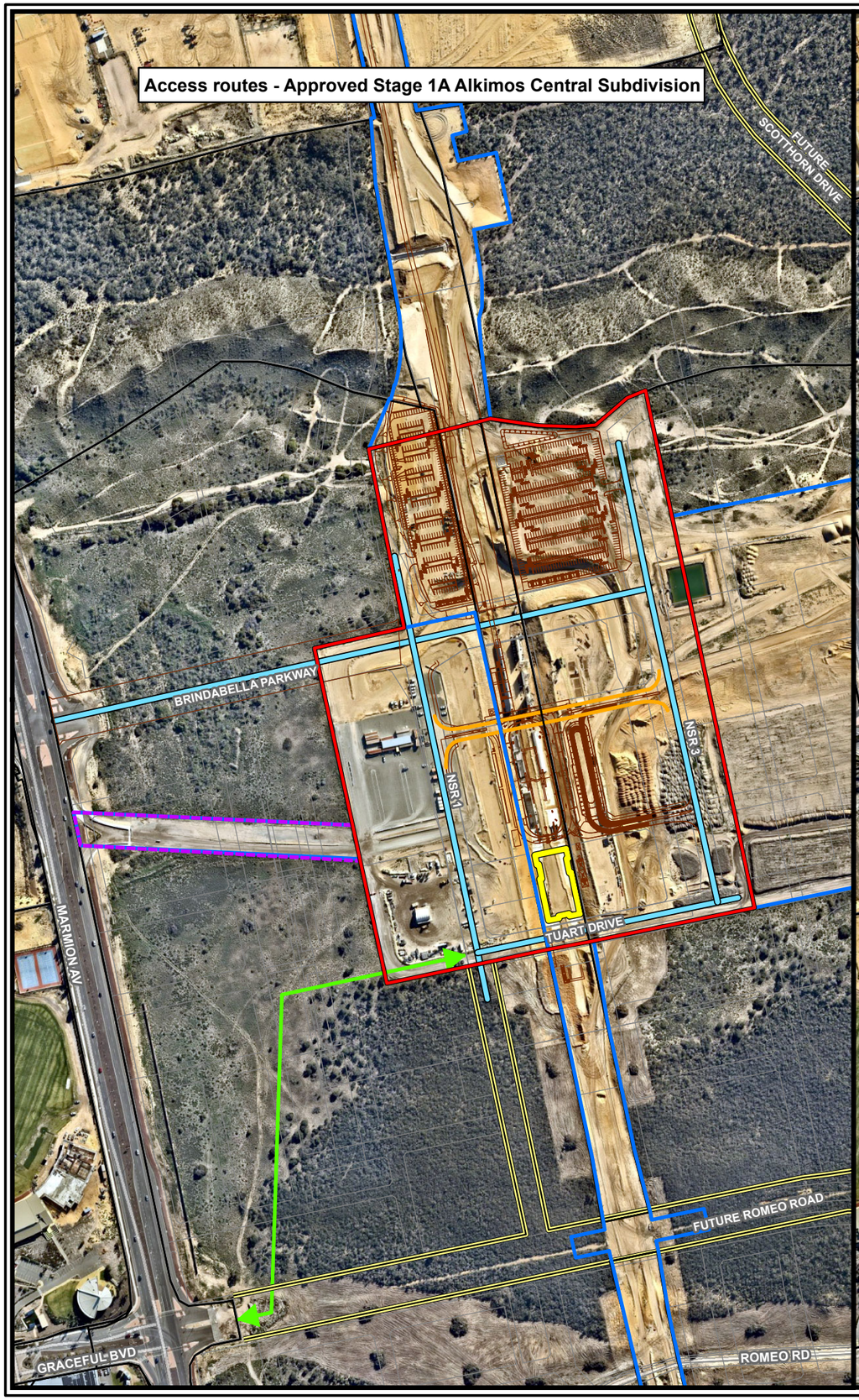
2570 Marmion Av, Alkimos, City of Wanneroo, WA

SITE OVERVIEW ALKIMOS STATION

Job No: 59400		Scale 1:6,000 at A3		
Client: NEWest Alliance		Coord. Sys. GDA 1994 MGA Zone 50		
Drawn By: jcrute	Checked By: CT	Version: A	Date: 28-Jul-2021	**FIGURE: 2**

Document Path: W:\Projects\1)Open\NEWest Alliance\59400 Yanchep Rail and Thornlie Link Bushfire Services\GIS\Maps\R011_Rev_A\59400_02_A3_SiteOverview_AlkimosStation.mxd

Image Reference: www.nearmap.com© - Imagery Date: 23. June 2021.



Legend

- Project area
- Cadastral boundary
- YRE Development envelope
- Alkimos station building
- Proposed development
- Indicative future development
- Public roads to be constructed as part of WAPC subdivision approval (Ref: 158629)
- Busway
- Existing site access road
- Future road connections
- Temporary EAW
- Roads (MRWA)

strategen JBS&G

Job No: 59400

Client: NEWest Alliance

Version: Rev A	Date: 28-Jul-2021
Drawn By: jcrute	Checked By: CT

Scale at A3 1:4,800

0 100 200
Meters

Coor. Sys. GDA 1994 MGA Zone 50

2570 Marmion Av, Alkimos, City of Wanneroo, WA

ACCESS ROUTES ALKIMOS STATION

FIGURE 3

Document Path: W:\Projects\1)Open\NEWest Alliance\59400 Yanchep Rail and Thornlie Link Bushfire Services\GIS\Maps\R011_Rev_A\59400_03_A3_AccessRoutes_AlkimosStation.mxd
Image Reference: www.nearmap.com© - Imagery Date: 23. June 2021.

2. Environmental considerations

2.1 Native vegetation – modification and clearing

The project area is fully cleared and it is understood that all environmental/clearing approvals have been considered at previous planning stages. Table 1 provides a summary of a search of publicly available environmental values within the project area and surrounding land.

Table 1: Summary of environmental values

Environmental value	Mapped as occurring within or adjacent to the project area		Description
	Within	Adjacent	
Environmentally Sensitive Area	✓	✓	An Environmentally Sensitive Area is mapped as occurring within and adjacent to the project area.
Swan Bioplan Regionally Significant Natural Area	✗	✗	N/A.
Ecological linkages	✗	✗	N/A.
Wetlands	✗	✗	N/A.
Waterways	✗	✗	N/A.
Threatened Ecological Communities listed under the EPBC Act	✓	✓	The Endangered Banksia Woodlands of the Swan Coastal Plain TEC is mapped as possibly occurring within and adjacent to the project area.
Threatened and priority flora			Mapping layer not available at the time of report preparation.
Fauna habitat listed under the EPBC Act	✓	✓	Potential Quenda habitat is mapped as occurring adjacent to the project area. With respect to Carnaby's Black Cockatoo, the project area and adjacent areas are mapped as containing confirmed breeding areas and unconfirmed roosting areas. Adjacent areas contain potential feeding areas.
Threatened and priority fauna	Potentially	✓	IUCN category P4 invertebrate within 4 km of the project area.
Bush Forever Site	✗	✗	N/A.
DBCA managed lands and waters (includes legislated lands and waters and lands of interest)	✗	✗	N/A.
Conservation covenants	✗	✗	N/A.

2.2 Revegetation / Landscape Plans

The Landscape Masterplan and Landscape Strategy for the Alkimos Station precinct are included in Appendix D and Appendix E respectively. Landscaping and revegetation proposed within these plans is summarised in Table 2.

Table 2: Landscaping treatments and AS 3959 classifications

Area	Treatments	AS 3959 classification
Carparking areas	Low threat landscaping including canopy trees, shrubs and groundcover plantings, which will be maintained on an ongoing basis. Irrigation during establishment only.	Low threat vegetation – Exclusion Clause 2.2.3.2 (f)
Forecourt, Station Entrance, Bus Way and Kiss N' Drop area	These central areas will be subject to formal landscaping with a native vegetation mix including groundcovers, low and medium sized shrubs, grasses, feature plants and sparse trees. These garden beds will be installed with semi-permanent irrigation and will be maintained on an ongoing basis.	Low threat vegetation – Exclusion Clause 2.2.3.2 (f)
Rail reserve – 150 m from each end of the station platform	Vegetation will have a 'revegetation style' finish with predominantly groundcovers and low growing shrubs consistent with locally occurring species. Irrigation will occur during establishment only.	Class D Scrub
Rail reserve – outside of station boundaries	Vegetation will have a 'revegetation style' finish comprising mass planting of local native species. Irrigation will occur during establishment only.	Class D Scrub
Drainage areas	A drainage basin/swale is located to the northeast of the station building and will have a 'revegetation style' finish but is designed to remain low-maintenance and accessible for periodic drainage system maintenance.	Exclusion Clause 2.2.3.2 (d)

The Landscape Strategy states that ongoing maintenance of the landscaped areas (not including the portion of the rail corridor beyond 150 m of the station platform) will include:

- maintenance of trees and overall vegetation, without allowing for overgrowth of medium and large shrubs
- watering of trees and shrubs during establishment (carparking, drainage, rail reserve), or provided with semi-permanent irrigation (central garden areas)
- fertilising of trees and shrubs
- weeding of garden beds
- slashing of non-irrigated dry grass areas
- topping up and making good of mulch to garden bed areas
- pruning
- pest and disease control of trees and shrubs
- removal of rubbish and debris in garden areas
- maintaining paving and other hard finishes free of leaves/litter
- preventative maintenance activities
- removal of leaf litter, dead branches from vegetated areas prior to summer bushfire season, to reduce possible fuel.

3. Bushfire assessment results

3.1 Assessment inputs

3.1.1 Vegetation classification

3.1.1.1 Methodology

Strategen-JBS&G assessed classified vegetation and exclusions within the 150 m assessment area through on-ground verification on 31 July 2020 in accordance with *AS 3959—2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016).

Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix F and depicted in Figure 4. Due to on-ground construction works that were taking place during the site inspection, access was not able to be achieved to the full assessment area. For these areas, satellite imagery has instead been provided to support the classifications, and exclusions. This is considered to be appropriate given that a precautionary approach has been adopted to classify the surrounding vegetation as Class D Scrub, which is considered to be the worst-case vegetation classification for locally occurring flora species within the Quindalup complex (refer to Section 3.1.1.2 for further information). Strategen-JBS&G can confirm that vegetation classification has not substantially changed since the July 2020 inspection was carried out and any newly cleared areas have been captured through examination of recent aerial imagery.

3.1.1.2 Results

Vegetation survey

Regional vegetation surveys and mapping of the Swan Coastal Plain indicates the project area and adjoining 150 m assessment area is located within the Quindalup Complex. This vegetation complexes is described as:

- Coastal dune complex consisting mainly of two alliances – the strand and fore dune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of Rottnest teatree (*Melaleuca lanceolata*) – Rottnest Island pine (*Callitris preissii*) and the closed scrub of summer-scented wattle (*Acacia rostellifera*).

Indicator species of the Quindalup complex were identified within plots of classified vegetation adjacent to the project area.

Vegetation classifications

The vegetation classifications within this BMP have adopted a precautionary approach to classify the majority of vegetation surrounding the project area as Class D Scrub, although it is acknowledged that there are areas within the assessment area that would be more fitting of a Class G Grassland or Class C Shrubland classification. A precautionary approach to classification has been adopted to provide for a worst-case measure of potential bushfire impact in response to the potentially vulnerable nature of the development and to consider the mature state of vegetation (although it is acknowledged that the surrounding vegetation will eventually be cleared and is unlikely to reach a mature state if this is not already achieved).

Land to the east of the project area has been classified precautionarily as Class G Grassland as any grasses and weeds growing on the stockpile to the east are unlikely to be able to be slashed to a low threat state (<100 mm height). The aerial imagery shows, however, that much of this land is currently undergoing earthworks by Development WA and is likely to be developed imminently.

Rail alignment

The rail alignment landscaping (and entirety of rail alignment where this information is not available) has been classified precautionarily as Class D Scrub. This is based on proposed revegetation within the rail corridor and contiguity with Class D Scrub hazards in the surrounding landscape. Where these temporary vegetation hazards remain in proximity to the rail alignment, there is a risk that a bushfire occurring within the surrounding vegetation could spread within the rail corridor and travel towards the station precinct. Once the surrounding land has been cleared, it is likely that the project area will no longer be within a bushfire prone area as the bushfire risks from vegetation within the rail alignment will be negligible due to isolation from any substantial areas of bushfire prone vegetation. Ongoing management within the rail corridor will further act to reduce bushfire hazards associated with this vegetation in the future as follows:

- removal of all dead vegetation
- uplift of any trees
- brush cut/mow grass/weeds between fences and road verges
- removal of any vegetation inside the rail reserve that is a hazard or the potential to become one within 6 m of the closest rail
- maintenance of a 3 m wide firebreak, with an additional horizontal clearance of 0.5 m on both sides of the rail corridor and a vertical clearance of 4 m established within the rail reserve against the reserve fencing.

Exclusions

Existing areas excluded from classification within the 150 m assessment area include mineral earth tracks and large areas already cleared within the project area and broader YRE envelope which are excluded under Clauses 2.2.3.2 (e) and (f) of AS 3959. Further modification of vegetation will be required as part of the proposed development to construct Brindabella Parkway out to Marmion Avenue, as well as the EAW to the southwest (to be carried out by Development WA as part of the greater Alkimos Central development).

The proposed drainage basin/swale to the northeast of the station building has been excluded under Clause 2.2.3.2 (d) of AS 3959, being vegetation less than 20 m in width and not within 20 m of the station building or other areas of classified vegetation.

Several small and isolated portions of rail reserve landscaping to the north of the busway has been excluded under Clause 2.2.3.2 (c) of AS 3959 as these areas of revegetation are less than 0.25 ha in area and not within 20 m of the train station building, each other, or any other areas of classified vegetation.

3.1.2 Effective slope

Strategen-JBS&G assessed effective slope under classified vegetation within the 150 m assessment area through on-ground verification on 31 July 2020 in accordance with AS 3959. Results were cross-referenced with DPIRD 2m contour data and are depicted in Figure 4.

Site observations indicate that the project area and surrounding 150 m of land are situated on undulating dunal terrain, with variation in slope beneath classified vegetation ranging from flat/upslope to the east and south/southwest to downslope >0-5° to the west. In the north, a steep incline exists with a >15-20° downslope in relation to the project area.

The rail corridor alignment will have batters with a maximum slope of 18°. However, a bushfire spreading along the batters toward the station building is more likely to be travelling perpendicular to the building on a flat effective slope. The effective slope of the rail corridor vegetation has been categorised as >0–5° to build in a factor of safety.

3.1.3 Summary of inputs

Figure 4 illustrates the anticipated post-development vegetation classifications and exclusions following completion of subdivision works and implementation of low threat landscaping throughout the project area and adjacent 150 m. The post-development vegetation classifications/exclusions and effective slope are summarised in Table 3.

Table 3: Summary of post-development vegetation classifications, exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class D Scrub	Flat/upslope (0°)	Intact scrub vegetation to the south of the project area. Previously cleared land with potential to revegetate to Class D Scrub to the north-west and north-east of the project area.
2	Class D Scrub	Downslope >0–5°	Previously cleared land with potential to revegetate to Class D Scrub to the west of the project area.
3	Class D Scrub	Downslope >0–5°	Revegetation areas within the rail alignment, which present a temporary bushfire hazard until the surrounding vegetation is cleared for future development.
4	Class D Scrub	Downslope >15–20°	Revegetating coastal scrub on a steep dune to the north of the project area.
5	Class G Grassland	Flat/upslope (0°)	Cleared land and stockpiles to the east of the project area. Classified as a precautionary measure.
6	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	The project area, rail alignment and site access road to Marmion Avenue have been previously cleared and are being managed in a low threat state.
7	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	The extension of Brindabella Parkway to Marmion Avenue will involve clearing of existing scrub vegetation.
8	Excluded – Clause 2.2.3.2 [d]	N/A	Proposed drainage basin/swale to the northeast of the station building. Strip of vegetation <20 m and not within 20 m of the station building or other plots of classified vegetation.
9	Excluded – Clause 2.2.3.2 [c]	N/A	Fragmented rail alignment vegetation to the north of the busway. Two plots of vegetation <0.25 ha in area and not within 20 m of each other or the station building.

Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- YRE Development envelope
- Proposed development
- Alkimos station building
- Public roads to be constructed as part of WAPC subdivision approval (Ref: 158629)
- Photo point directions

Vegetation classification

- Class D Scrub
- Class G Grassland
- Excluded under Clause 2.2.3.2 (c)
- Excluded under Clause 2.2.3.2 (d)
- Excluded under Clauses 2.2.3.2 (e) & (f)
- Area to be modified to a non-vegetated or low threat state
- Topographic contours (mAHD)
- Indicative future development
- Roads (MRWA)

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0 100 metres

2570 Marmion Av, Alkimos, City of Wanneroo, WA

POST-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE ALKIMOS STATION

Job No: 59400		Scale 1:2,800 at A3	
Client: NEWest Alliance		Coord. Sys. GDA 1994 MGA Zone 50	
Drawn By: jcrute	Checked By: CT	Version: A	Date: 28-Jul-2021

FIGURE: 4

Document Path: W:\Projects\1)Open\NEWest Alliance\59400 Yanchep Rail and Thornlie Link Bushfire Services\GIS\Maps\R011_Rev_A\59400_04_A3_VegClass_AlkimosStation.mxd

Image Reference: www.nearmap.com© - Imagery Date: 23. June 2021.

3.2 Assessment outputs

3.2.1 Bushfire Attack Level (BAL) contour assessment

Strategen-JBS&G has undertaken a BAL contour assessment in accordance with Method 1 of AS 3959 for the project area.

The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed habitable development and subsequently informs the appropriate siting of the building (i.e. within an area subject to BAL-29 or lower) and standards of building construction required for proposed habitable development to potentially withstand such impacts (as applicable).

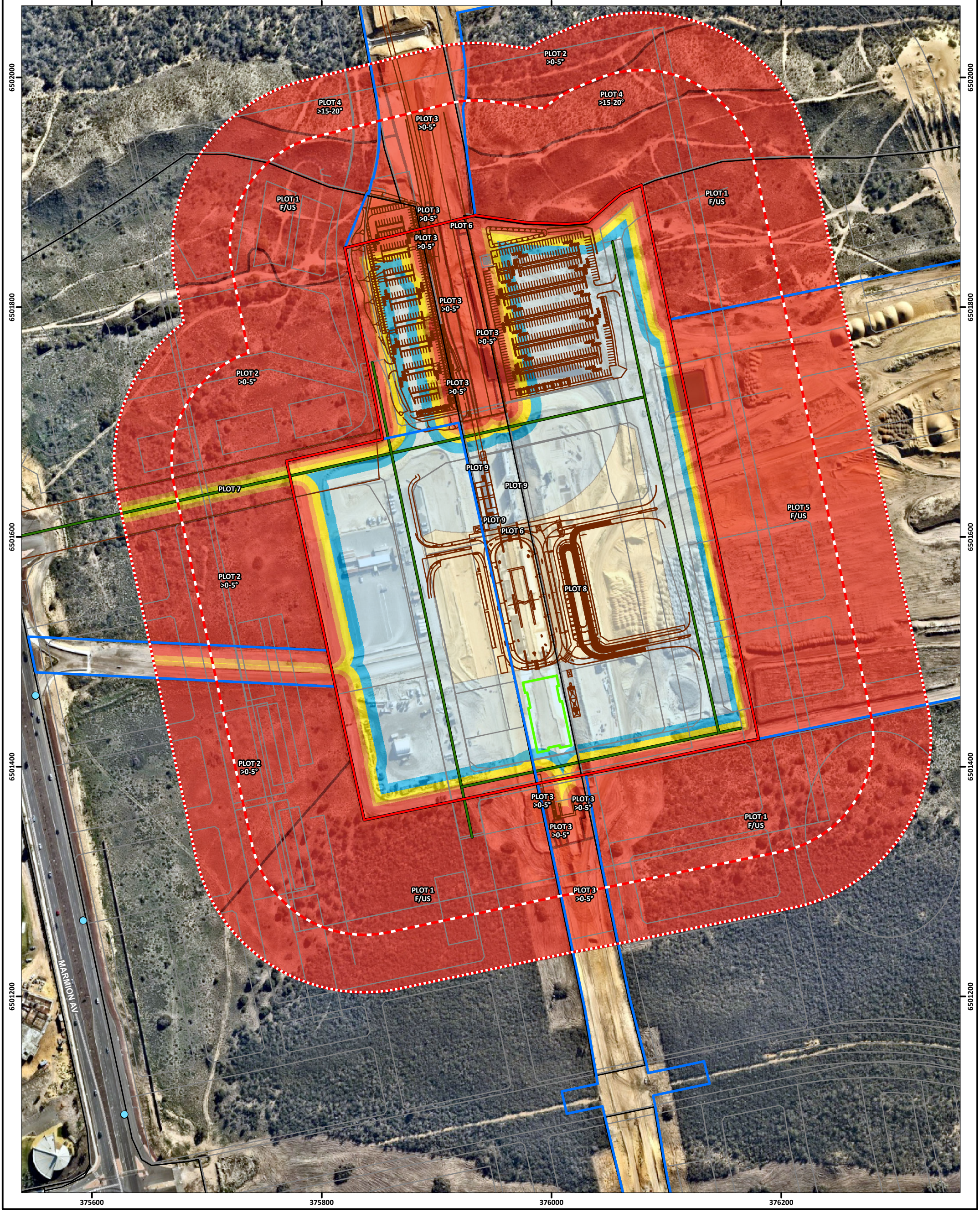
The BAL contours are based on:

- the vegetation classifications, effective slope and exclusions observed at the time of inspection as well as consideration of future proposed clearing to construct Brindabella Parkway and future revegetation works within the rail alignment
- separation distances between the station building and vegetation classified vegetation in line with the Site Plan and Landscape Masterplan
- management of low threat/non-vegetated portions of the project area in a low threat state in accordance with Clauses 2.2.3.2 (e) and (f), driven through compliance with the ongoing management commitments outlined in the subdivision stage BMP for Alkimos Central (Emerge 2020).

Results of the BAL contour assessment in relation to the proposed station building are detailed in Table 4 and illustrated in Figure 5**Error! Reference source not found.**. The building will be subject to a maximum rating of BAL-19. These BAL impacts are expected to be temporary in nature due to future clearing of vegetation surrounding the Alkimos Central precinct and rail corridor and resultant exclusion of revegetation within the alignment, due to isolation from any substantial areas of bushfire prone vegetation.

Table 4: BAL contour assessment results

Method 1 BAL determination – Alkimos Station building				
Plot	**Vegetation classification**	**Effective slope**	**Separation distance to project area boundary**	**Highest BAL to project area boundary**
1	Class D Scrub	Flat/upslope (0°)	27 m	BAL–12.5
2	Class D Scrub	Downslope >0–5°	>100 m	BAL–Low
3	Class D Scrub	Downslope >0–5°	27 m	BAL–19
4	Class D Scrub	Downslope >15–20°	>100 m	BAL–Low
5	Class G Grassland	Flat/upslope (0°)	>50 m	BAL–Low
6	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
7	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
8	Excluded – Clause 2.2.3.2 [d]	N/A	N/A	N/A
9	Excluded – Clause 2.2.3.2 [c]	N/A	N/A	N/A
			Highest BAL	**BAL-19**



Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- YRE Development envelope
- Classified vegetation
- Alkimos station building

BAL contours

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low
- Proposed development
- Indicative future development
- Public roads to be constructed as part of WAPC subdivision approval (Ref: 158629)
- Roads (MRWA)
- Water hydrant

strategen JBS&G

0 100 metres

Job No: 59400		Scale 1:3,000 at A3	
Client: NEWest Alliance		Coord. Sys. GDA 1994 MGA Zone 50	
Drawn By: jcrute	Checked By: CT	Version: A	Date: 28-Jul-2021

2570 Marmion Av, Alkimos, City of Wanneroo, WA

BAL CONTOUR MAP ALKIMOS STATION

FIGURE: 5

Document Path: W:\Projects\1)Open\NEWest Alliance\59400 Yanchep Rail and Thornlie Link Bushfire Services\GIS\Maps\R011_Rev_A\59400_05_A3_BALContours_AlkimosStation.mxd

Image Reference: www.nearmap.com© - Imagery Date: 23. June 2021.

4. Identification of bushfire hazard issues

4.1 Bushfire context

The project area is located at the outer edge of a developing residential area within an evolving landscape that currently consists of remnant scrub, shrubland and grassland that will be progressively cleared to facilitate future urban growth. In this regard, the vegetation hazards surrounding the project area are considered to pose a temporary bushfire threat to the proposed station.

Despite the temporary nature of the hazards, the train station will be constructed and operational for a period while these hazards remain intact; therefore, potential bushfire impacts need to be considered for the early stages of the Alkimos Central development.

The project area currently has a high level of bushfire risk due to the proximity of bushfire prone vegetation and potential ignition sources. Potential ignition sources in the landscape may include:

- roadside car fire along Marmion Avenue
- vehicle arson along recreational tracks, south around Trinity Estate or north around Alkimos Vista Estate
- ignition around rural residential properties to the east in Carabooda from sources such as hot-works (i.e. welding, grinding, etc), burn piles and other activities associated with semi-rural living and 'lifestyle' lots
- littering of cigarette butts or car crashes along Wanneroo Road to the east, directly adjacent to forest vegetation
- natural causes such as lightning
- spotting from other major fires (e.g. from Neerabup Nature Reserve to the east, or within the ROS to the north).

4.1.1 Potential bushfire scenarios

There is a temporary landscape scale bushfire risk to the project area given the intact areas of bushland in all directions which will ultimately be reduced following future urban development within and around the Alkimos Central precinct.

Evaluation of bushfire risk to the proposed station building has identified potential bushfire run scenarios which are listed in the sub-sections below.

In addition to compliance with Guideline requirements, the context of the development needs to be considered when evaluating the potential bushfire risk to the proposed development, including:

- consideration of the design of the development with carparks and driveways/roads at the high-risk interfaces to facilitate access to vegetation hazards as well as provision of buffers to habitable development
- consideration of the location of cleared corridors extending north, south and west in the form of Marmion Avenue and future road connections which act to reduce bushfire impacts on the site, as well as enhancing access options
- consideration that a bushfire suppression response to a bushfire threatening major infrastructure such as a train station will likely be significant
- consideration of future residential and commercial development to the west, south and southeast of the project area, along with the future Mitchell Freeway extension to the east, which will ultimately see much of the vegetation removed and fragmented in these areas.

4.1.1.1 Scenario 1: Bushfire approaching from the southwest

A bushfire approaching from the southwest through intact scrub vegetation is one of the most likely scenarios due to the predominant summer south-westerly afternoon winds that have potential to direct a bushfire toward the station, which is currently located in proximity to the vegetation interface.

Fire run potential is up to 800 m, which could support steady state bushfire, however, there will be limited potential for a bushfire to spread within the project area due to extensive areas of cleared land and low threat landscaping.

Ultimately, vegetation to the southwest presents only a temporary hazard given future development proposed to the south and west of the project area.

4.1.1.2 Scenario 2: Bushfire approaching from the east/southeast

Land to the east of the project area which has been cleared to facilitate development of the Alkimos Central precinct will provide a significant buffer to a bushfire approaching the site under predominant summer morning easterly winds.

Intact shrubland/scrub vegetation to the southeast has the potential to support fire runs of up to 10 km or more through Neerabup Nature Reserve and other areas of remnant native vegetation within the Neerabup and Wanneroo areas. In this regard, a fire approaching from the southeast could be of a landscape scale, but behaviour is expected to be moderated by the fragmented scrub fuels and grassland in proximity to the project area. Notwithstanding, the proposed station building is in direct proximity to vegetation hazards to the southeast, which will remain a risk to the development until this vegetation is cleared to facilitate future development to the south and east.

4.1.1.3 Scenario 3: Bushfire approaching from the northeast

Intact shrubland/scrub vegetation to the northeast presents a lower risk to the station building than a bushfire approaching from the southwest or southeast as the north-eastern portion of the site will comprise car parking bays and roads which will provide a substantial buffer between the habitable development and potentially landscape scale bushfire behaviour from this direction. Ember attack is the most likely form of bushfire impact from this direction.

This vegetation is a permanent bushfire hazard as the land is designated as ROS under the Alkimos Eglinton District Structure Plan and is not proposed to be cleared as part of future development. This vegetation currently has the potential to support fire runs of over 2 km through scrub, shrubland and grassland vegetation under less common, but potentially adverse northerly wind conditions.

4.2 Bushfire hazard issues

Examination of the environmental values, bushfire assessment and potential bushfire scenarios has identified the following bushfire hazard issues:

1. The proposed station building is located within an area subject to BAL-19, which has potential to exhibit moderate levels of radiant heat impact as well as ember attack on the building and its occupants. This hazard is considered to be predominantly temporary in nature as the revegetation within the rail corridor will not support steady state fire behaviour once clearing to the south of the station building results in isolation of the rail corridor from external vegetation hazards.
2. The BAL contours depicted in Figure 5 rely on the entirety of the project area (excluding the rail alignment) being managed in a low threat state, including slashing of grassland and weeds to less than 100 mm height. Enforcement of this management measure will be driven through compliance with the subdivision stage BMP (Emerge 2020), which requires that Lots 1–6 of Stage 1A (portions of which are all located within the project area) are maintained in a low threat

standard to reduce bushfire hazards to adjoining lots by the developer, and following transfer of land, by the property owner/occupier. The north-eastern carpark is located outside of the Stage 1A application area, and is not covered by the same management measure. This current BMP provides the enforcement mechanism for this land to be managed in a low threat state by the developer and property owner/occupier.

3. The proposed development is to be provided with two access routes. The train station and Alkimos Central precinct will be serviced by Brindabella Parkway as the primary access route. Until Romeo Road is constructed to the south, the second access route will be provided by way of an EAW to Marmion Avenue to the southwest of the train station. This management measure aligns with the subdivision stage BMP prepared for the project area (Emerge 2020). In the event that the EAW is not constructed prior to Day 1 operations, the second access route will be provided by way of an interim EAW to Marmion Avenue within the existing site access road to the west.
4. The proposed train station requires an on-site permanent firefighting water supply, which will be provided by on-site reticulated hydrants.
5. The proposed development is considered to be a Vulnerable Land use due to the nature of occupants who may be unfamiliar with the area; potential for occupants to be ability/mobility impaired, elderly or very young; and due to the design of the train station building and platforms. This will be addressed through development of MetroNet-wide bushfire evacuation procedures prior to station operations as part of a co-ordinated approach bushfire evacuation across the MetroNet rail network.

It is considered that the bushfire risk to the proposed development posed by the abovementioned hazards can be managed through application of acceptable solutions under the Guidelines, as well as through a direct bushfire suppression response if required. Bushfire mitigation strategies and compliance applicable to the proposed development are addressed in Section 5 of this BMP.

5. Assessment against the bushfire protection criteria

5.1 Compliance table

An acceptable solutions assessment against the bushfire protection criteria is provided in Table 5.

Table 5: Compliance with the bushfire protection criteria of the Guidelines

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies	Compliance achieved
Element 1: Location	A1.1 Development location	The BAL contour map (Figure 5) indicates that the proposed train station building will be located within an area subject to BAL-19. BAL impacts on the station building are temporary in nature as future clearing within the land to the south will isolate revegetation within the rail corridor from any significant vegetation hazards, which will essentially remove any bushfire threat from the south.	✓
Element 2: Siting and design	A2.1 Asset Protection Zone	The proposed station building will be located within an area subject to BAL-19 without the need for a separate, formal Asset Protection Zone (APZ). Maintenance of the currently cleared areas surrounding the station building in a low threat/non-vegetated state is driven through the management measures set out in the subdivision stage BMP (Emerge 2020), which states that existing cleared areas within the Stage 1A area are to be managed in a low threat state by the developer, and following handover, the property owner/occupier.	**N/A**
Element 3: Vehicular access	A3.1 Two access routes	The proposed train station will be provided with at least two access routes during all stages of development of the wider Alkimos Central precinct, as follows: • Primary access will be provided from the north, through the extension of Brindabella Parkway into the project area. Marmion Avenue is a major arterial road (State Route 71), which facilitates access to destinations to the north and south of the project area. • Secondary public road access will ultimately be provided south from the train station to connect with Romeo Road, which will enable access to Marmion Avenue in the south-west, as well as Wanneroo Road in the southeast. • Until such time that the abovementioned secondary access route is provided as part of future urban development within the wider area, the required second access route will be provided via a temporary, approximately 500 m long EAW connecting the southern portion of the loop road around the station building southwest to Marmion Avenue. This management measure aligns with the subdivision stage BMP prepared for Alkimos Central (Emerge 2020). • In the event that the abovementioned EAW is not constructed prior to Day 1 operations, the required second access route will be provided by way of an interim EAW to Marmion Avenue within the existing site access road to the west (refer to Figure 3 for indicative location). The EAW is to meet all technical requirements of the Guidelines (refer to Appendix G) and will be less than 600 m in length.	✓

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies	Compliance achieved
	A3.2 Public road	The Site Plan (Figure 1) depicts the public roads that will be in constructed to facilitate operation of the train station. As discussed in Section 1.3, minimum Day 1 operations will include Brindabella Parkway, Tuart Drive, NSR1 and NSR3 (with secondary access to Marmion Avenue being provided via a temporary EAW). All public roads constructed within the project area are to comply with technical requirements of the Guidelines, including provision of a compliant turnaround area for any temporary dead-end roads (refer to Appendix G).	✓
	A3.3 Cul-de-sac (including a dead-end-road)	The proposed development does not include any permanent dead-end roads. Construction of the Brindabella Parkway and Tuart Drive overbridges will create a compliant internal loop road network with two access options to Marmion Avenue. Where the public roads terminate in a carpark at the northern end of the project area, cul-de-sac heads are not considered to be required as the internal carpark access roads would provide the necessary means for emergency and other vehicles to turn around.	**N/A**
	A3.4 Battle-axe	No battle-axes are proposed as part of the development and the project area is not serviced by an existing battle-axe.	**N/A**
	A3.5 Private driveway longer than 50 m	Internal access roads (e.g. train station access road, car parking access roads) are to meet the minimum requirements for private driveways (see Appendix G), including turn-around areas within 50 m of a building, passing bays if driveways are longer than 200 m and additional turn-around areas for fire appliances every 500 m. It is expected that all private internal roads associated with the train station will meet public road standards, rather than private driveway standards (e.g. 6 m wide minimum trafficable surface).	✓
	A3.6 Emergency access way	A temporary Emergency Access Way (EAW) will be provided to extend from North South Road 1 (NSR1)/Tuart Drive to Marmion Avenue to provide the required second access route for the project area until such a time that Romeo Road and other road connections are constructed to the south. This access arrangement has been approved as part of the subdivision approval for Stages 1A and 1B Alkimos Central precinct (refer to the Emerge Associates 2020 BMP). An interim EAW may be required between NSR1 and Marmion Avenue within the site access road (as discussed above). All temporary/interim EAWs will meet all technical requirements of the Guidelines, including being less than 600 m length (refer to Appendix G).	✓
	A3.7 Fire service access routes (perimeter roads)	The proposed development does not require fire service access routes (FSARs) to achieve access within and around the perimeter of the project area. The proposed public road network will provide the necessary perimeter access to the adjoining vegetation hazards.	**N/A**
	A3.8 Firebreak width	The development footprint will comprise built form, hardscaping, and low threat landscaping with perimeter roads sufficient to serve the purpose of perimeter firebreaks.	**N/A**

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies	Compliance achieved
Element 4: Water	A4.1 Reticulated areas	The proposed development will be connected to reticulated water supply via extension of services from surrounding urban development in accordance with Water Corporations Design Standard 63 requirements (refer to Appendix H). Existing water hydrants are currently located at approximately 200 m intervals along Marmion Avenue.	✓
	A4.2 Non-reticulated areas	The proposed development is located within an existing reticulated area; A4.2 applies.	**N/A**
	A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively)	The proposed development is located within an existing reticulated area; A4.2 applies.	**N/A**

5.2 Discsussion of bushfire management measures

The following specific and additional bushfire management measures are to be adopted as part of this BMP.

5.2.1 Road verge fuel management

Existing and proposed road verges that have been excluded as low threat are to be managed to ensure the understorey and surface fuels remain in a low threat, minimal fuel condition in accordance with Clause 2.2.3.2 (f) of AS 3959. Ongoing road verge management is the responsibility of the City and requires continuation of the current maitenance regime.

5.2.2 Building construction standards

Bushfire construction provisions of the National Construction Code require that Class 1, 2, 3 and associated 10a buildings comply with the AS 3959 construction requirements, in accordance with the assessed BAL under AS 3959.

The propsed train station is not a Class 1, 2 or 3 residential building and as such, there is no statutory requirement to meet the construction requirements of AS 3959. Notwithstanding, given the vulnerable land-use designation of the proposed development, and like all buildings, potential vulnerability to ember attack, Strategen-JBS&G recommends that compliance with the AS 3959 construction requirements are achieved wherever practicable.

The train station building is identified as being in a location subject to potential BAL-19 impacts, which corresponds to a risk of ember attack and burning debris ignited by windborne embers, as well as low to moderate levels of radiant heat impact. Due to the design of the station being an open structure, the proponent has advised that full compliance with the construction measures of BAL-19 or BAL-12.5 would not be able to be adopted. However, where practicable the ember protection measures of BAL-12.5 will be adopted. This is considered to be an appropriate response given the non-mandatory nature of BAL-rated construction for the proposed building and temporary nature of the bushfire risk.

5.2.3 Vulnerable land uses

The proposed development constitutes a vulnerable land use under Policy Measure 6.6 of SPP 3.7. As dicussed previously, bushfire emergency management procedures will be developed and incorporated into PTAs existing EMM to provide overarching procedures for MetroNet station operations. These procedures will be adopted prior to Day 1 operations at Alkimos Station and any site-specific evacuation considerations will also be provided to the relevant decision-making authority.

5.2.4 Landscaping plans

The BAL contour assessment is reliant on all landscaping within the Station precinct being established and maintained as low threat vegetation in accordance with the specifications set out in the Landscape Masterplan (Appendix D) and Landscape Strategy (Appendix E). Responsibility for establishment and maintenance of low threat landscaping is discussed in Section 6.

5.2.5 Compliance with Alkimos Central subdivision stage BMP

The Alkimos Central Stage 1A and 1B subdivision BMP (Emerge 2020) sets out commitments of the developers of the subject land (Development WA), property owners/occupiers (which includes PTA), the City of Wanneroo and Water Corporation. Management measures that are relevant to the Alkimos Station Development Application are included in Table 6 (Section 6).

5.2.6 Compliance with annual firebreak notice

The developer and land manager are to comply with the current City of Wanneroo annual firebreak notice as amended (refer to Appendix I).

6. Responsibilities for implementation and management of the bushfire measures

Implementation of the BMP applies to the developer, subsequent owners/occupiers and the City to ensure bushfire management measures are adopted and implemented on an ongoing basis. A bushfire responsibilities table is provided in Table 6 to drive implementation of all bushfire management works associated with this BMP.

Table 6: Responsibilities for implementation and management of the bushfire measures

Implementation/management table	
Developer – prior to Day 1 operations (prior to occupation of buildings)	
No.	Implementation action
1	Construct the public roads required for Day 1 operations, as documented within this BMP.
2	In lieu of DevelopmentWA constructing the temporary EAW to the southwest as per requirements of the Alkimos Central Stages 1A & 1B subdivision BMP (Emerge 2020), construct the interim EAW over the site access road to Marmion Avenue to enable two access routes to be achieved for Day 1 operations, as documented within this BMP.
3	Ensure the project area (aside from the revegetation works within the rail alignment and the drainage swale) is established in a non-vegetated or low threat state in accordance with AS 3959 Clauses 2.2.3.2 (e) & (f) as documented within this BMP.
4	If landscaping is implemented prior to Day 1 operations, ensure that this is established in accordance with the Landscape Masterplan and Landscape Strategy.
5	Construct any internal private roads to the standards stated in this BMP.
6	Construct the reticulated water supply and network of hydrants to the standards stated in this BMP.
7	Adopt bushfire construction measures in accordance with AS 3959 BAL-12.5 where practicable.
8	Comply with relevant requirements of the Local Government firebreak notice as amended.
9	Undertake BMP compliance reporting to confirm all necessary management actions have been implemented to achieve the outcomes intended under this BMP.
Public Transport Authority – prior to Day 1 operations (prior to occupation of buildings)	
No.	Implementation action
1	Develop bushfire emergency procedures and incorporate into PTA's overarching Emergency Management Plan.
Public Transport Authority – ongoing management	
No.	Implementation action
1	If required, maintain the interim EAW over the site access road to the standards stated in this BMP until Development WA has constructed the formal temporary EAW to the southwest.
2	Maintain the internal private roads to the standards stated in this BMP.
3	Maintain all land under management by PTA (aside from the revegetation areas within the rail alignment and the drainage swale) in a non-vegetated or low threat state in accordance with AS 3959 Clauses 2.2.3.2 (e) & (f) as documented within this BMP.
4	Where applied as part of building construction, maintain the relevant components of the station building to a BAL-12.5 standard under AS 3959 .
5	Maintain compliance with relevant requirements of the Local Government firebreak notice as amended.
Development WA – as applicable (prior to Day 1 operations or at a later stage)	
No.	Implementation action
1	Construct the temporary EAW from NSRI to Marmion Avenue as per commitments of the Alkimos Central Stages 1A & 1B subdivision approval.
Development WA – ongoing management	
No.	Implementation action
1	Maintain the temporary EAW from NSRI to Marmion Avenue endorsed under the subdivision approval for Alkimos Central Stages 1A & 1B in accordance with provisions set out in the relevant Bushfire Management Plan (Emerge Associates 2020) until formal secondary public road access is provided.
2	Maintain any land within the project area under their management in a low threat/non-vegetated state in accordance with commitments of the endorsed Alkimos Central Stages 1A & 1B Bushfire Management Plan (Emerge Associates 2020).
Landowner/occupier or remainder of project area – ongoing management	
No.	Implementation action
1	Maintain land in a low threat/non-vegetated state in accordance with commitments of the endorsed Alkimos Central Stages 1A & 1B Bushfire Management Plan (Emerge Associates 2020).
City of Wanneroo – ongoing management following handover	
No.	Implementation action

Implementation/management table	
1	Maintain all relevant areas of landscaping under their management and public road verges in a low threat state as per Clause 2.2.3.2 (f) of AS 3959 as appropriate.
2	Maintain public roads to the standards stated in this BMP.
Water Corporation WA – ongoing management	
No.	Implementation action
1	Maintain and attend to ongoing repair of hydrants.

7. References

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8. Limitations

Scope of services

This report ("the report") has been prepared by Strategen-JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen-JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, Strategen-JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen-JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen-JBS&G has also not attempted to determine whether any material matter has been omitted from the data. Strategen-JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen-JBS&G. The making of any assumption does not imply that Strategen-JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen-JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

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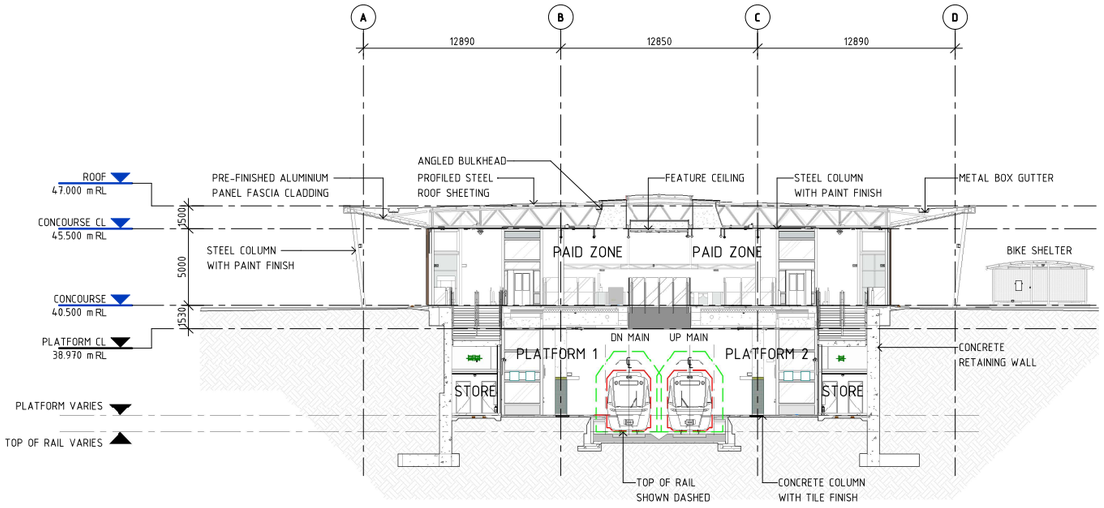
Appendix A Elevations Plan



SECTION B

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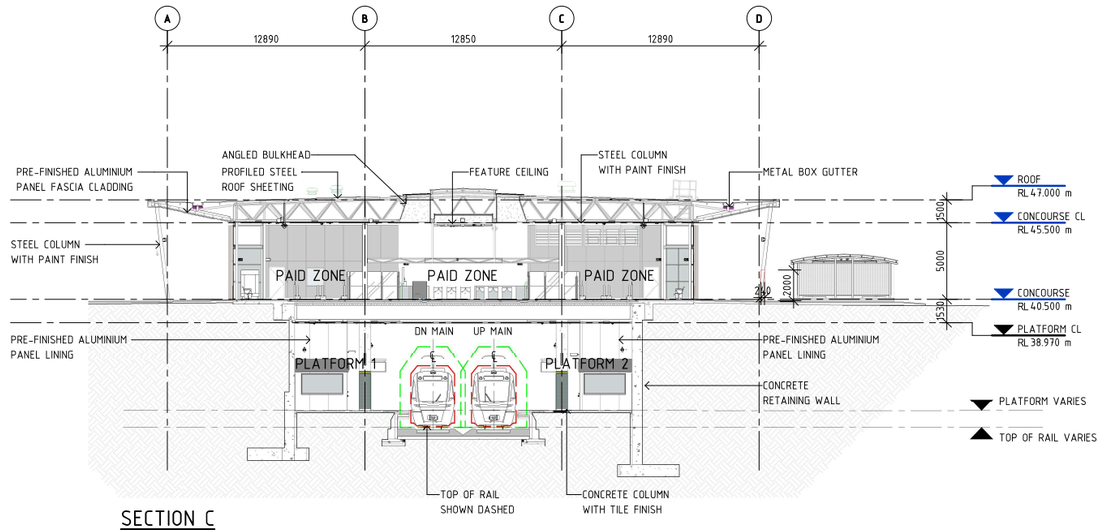
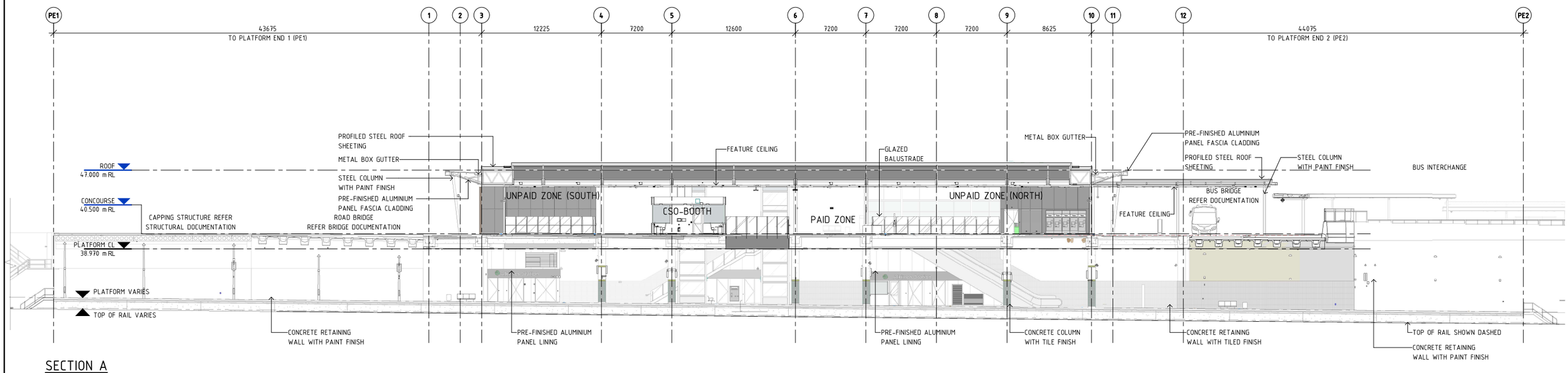


SECTION C

SCALE 1 : 200



SECTION A

SCALE 1 : 200

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	JS	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

CAD DRAWING PATHNAME C:\Users\Jean-luc\Documents\Alkimos_jean-lucs.rvt

NEWest Alliance

TCY-CAP-YSA-AR-DRG-12

REFERENCES

SCALE : 1 : 200 (@ A1)

DATUM :
HORIZONTAL: PCG20
VERTICAL: AHD71

PTA ACCEPTANCE STAMP

-

DESIGNED B.PRIEST
DRAWN J.SOLDATIC
CHECKED A.WHEELER
APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company
DATE

Government of Western Australia
Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
SECTIONS

PTA Drawing No:

REV: B

Appendix B Indicative Images Plan

EXTERNAL PERSPECTIVE 1 - AERIAL VIEW - SOUTH WEST

EXTERNAL PERSPECTIVE 2 - NORTH ENTRY VIEW

EXTERNAL PERSPECTIVE 1 - EAST FACING VIEW

DEVELOPMENT APPLICATION

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL	BP	JS	AW	
A	30.07.20	DEVELOPMENT APPLICATION	BP	BL	AW	

ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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NEWest Alliance

TCY-CAP-YSA-AR-DRG-13

REFERENCES

SCALE : (@ A1)

DATUM :
HORIZONTAL: PCG20
VERTICAL: AHD71

PTA ACCEPTANCE STAMP
-

DESIGNED B.PRIEST
DRAWN J.SOLDATIC
CHECKED A.WHEELER
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR
PTA Division / External Company
DATE

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

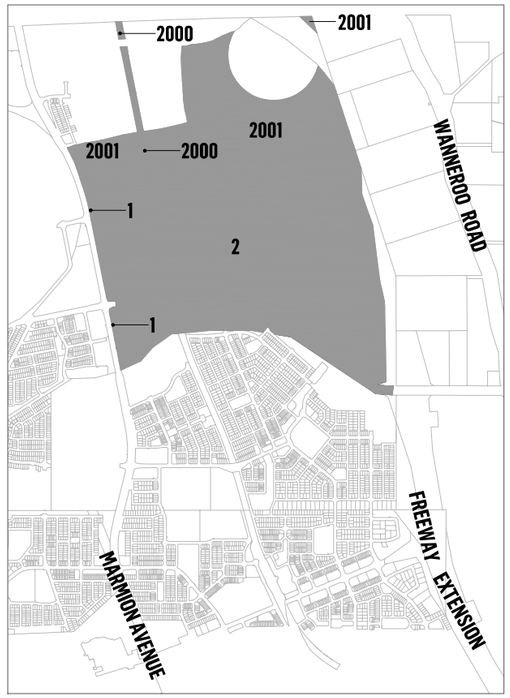
ALKIMOS STATION
INDICATIVE IMAGES

PTA Drawing No:

REV: B

Appendix C Stage 1A Alkimos Central Subdivision Plan

LOCATION PLAN



LEGEND

- APPLICATION AREA
- PROPOSED LOTS
- EMERGENCY ACCESS WAY
- EXISTING ELECTRICITY EASEMENT
- EXISTING WATER EASEMENT

APPLICATION AREA:	297.92HA
LOT 1:	1.01HA
LOT 2:	197.98HA
LOT 2000:	8.67HA
LOT 2001:	90.26HA

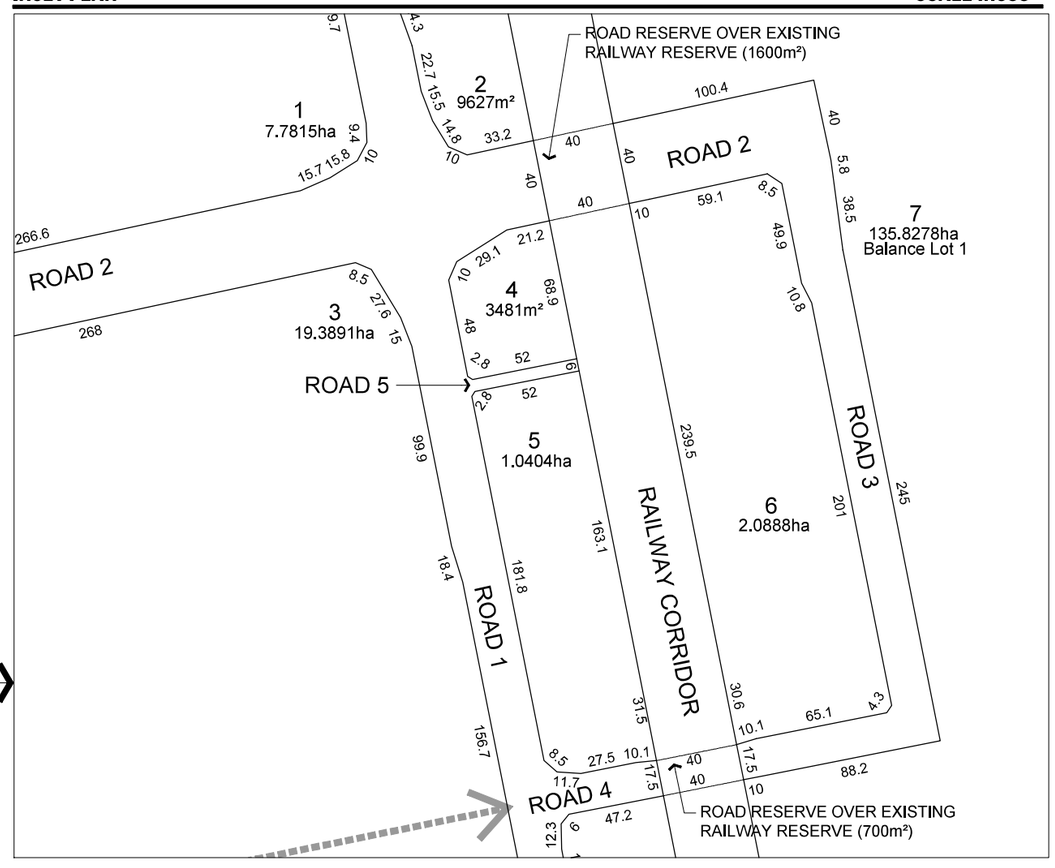
AREA FOLLOWING SUBDIVISION	
LOTS (6 LOTS):	31.61HA
BALANCE LOT (4 LOTS):	252.66HA
ROAD RESERVE:	4.98HA
RAILWAY RESERVE:	8.67HA
ROAD OVER RAILWAY RESERVE:	2300m²

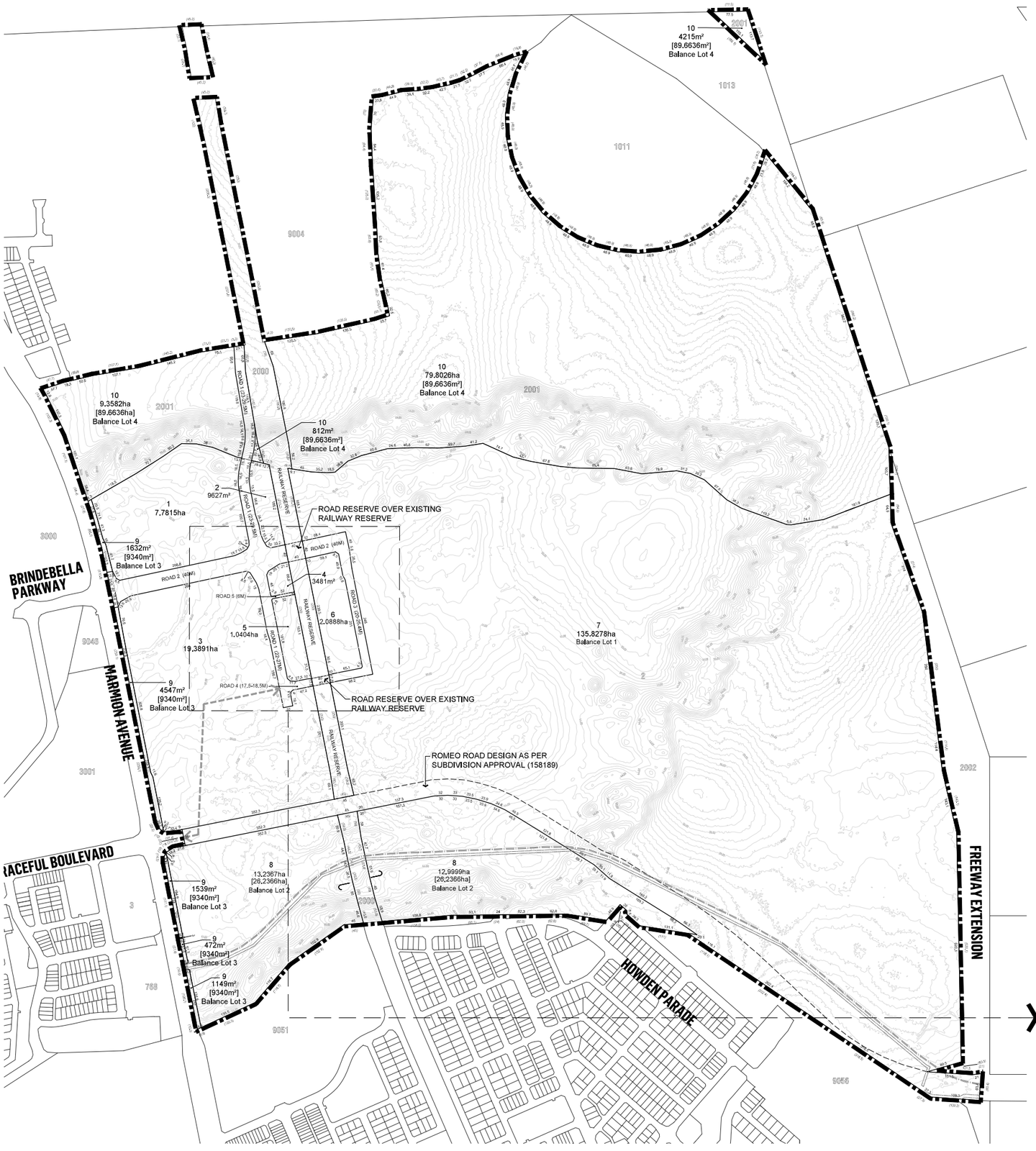
LOT YIELD SUMMARY

Lot Size	Number of Lots
3000 - 3999m²	1
5000 - 9999m²	2
1- 2 HA	1
2 - 5 HA	1
5 - 10 HA	1
10 - 25HA	1
Over 25 HA	3
Total	10

INSET PLAN

SCALE 1:1500





URBIS

Plan of Subdivision

Lot 1, 2 & 2000 Marmion Avenue, Alkimos

Level 14, The Quadrant, 1 William Street | Perth WA 6000 Australia | +61 8 9346 0500 | URBIS Pty Ltd | ABN 50 105 256 228

DATA SOURCE
Whelans (Veris)

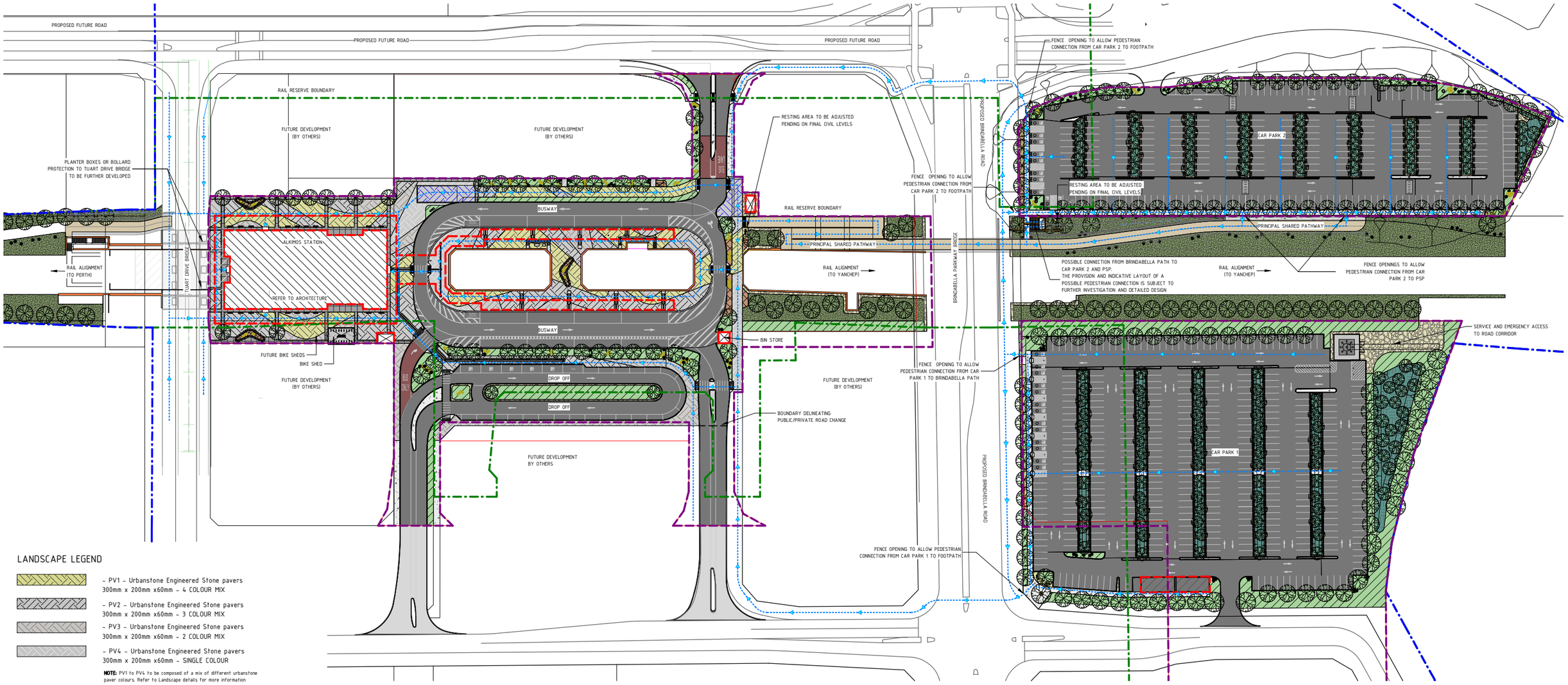
PROJECTION
PCG94

CLIENT
Development WA

1:5000 @ A1 | 1:10000 @ A3
50 100 150 200 250m

PROJECT NO. P0008935
DATE 04.09.2020
DRAWING NO. 10
REVISION E

Appendix D Landscape Masterplan



LANDSCAPE LEGEND

- PV1 - Urbanstone Engineered Stone pavers 300mm x 200mm x60mm - 4 COLOUR MIX
- PV2 - Urbanstone Engineered Stone pavers 300mm x 200mm x60mm - 3 COLOUR MIX
- PV3 - Urbanstone Engineered Stone pavers 300mm x 200mm x60mm - 2 COLOUR MIX
- PV4 - Urbanstone Engineered Stone pavers 300mm x 200mm x60mm - SINGLE COLOUR

NOTE: PV1 to PV4 to be composed of a mix of different urbanstone paver colours. Refer to Landscape details for more information

- PV6 - Urbanstone Engineered Stone 400 Series **(Colour code 2090, Milled Finish)** - 600mm x 400mm x 60mm
- PV7 - Urbanstone Engineered Stone pavers (HARDSTAND) 300mm x 200mm x 70mm **(COLOUR CODE 100 - SHOTBLAST FINISH)**
- TPi1 - 300mm x 300mm x 60mm (Indicators)
- TPi2 - 400mm x 400mm x 60mm (Indicators)
- TPd1 - 300mm x 300mm x 60mm (Directionals)
- TPd2 - 400mm x 400mm x 60mm (Directionals) All tactile pavers to be Urbanstone **(Colour Code 2565)**
- CP - Standard Grey Brushed Insitu Concrete Paths
- EP - tree Wells with Epoxy-Bonded Agreegates
- MU - Mulched Areas Only
- GV - Gravel Areas Only
- GB - Garden Beds (Overall Areas)
- SM - Garden Beds (Basin /Swale Plant Mix)
- GC - Garden Beds (Station Corridor Mix)
- New Trees

- Alkimos Station **REFER TO ARCHITECTURAL & STRUCTURAL DOCUMENTATION PACKAGE**
- Architectural Shade Structures **REFER TO ARCHITECTURAL & STRUCTURAL DOCUMENTATION PACKAGE**
- Other Structural Elements **REFER TO ARCHITECTURAL & STRUCTURAL DOCUMENTATION PACKAGE**
- Principal Shared Path **REFER TO CIVIL & RAIL DOCUMENTATION PACKAGE**
- Rail Maintenance Tracks **REFER TO CIVIL & RAIL DOCUMENTATION PACKAGE**
- Station Plaform / Bridges and other structures **REFER TO SCTRUCTURAL, ARCHITECTURAL AND BRIDGES DOCUMENTATION PACKAGE**
- DEVELOPMENT ENVELOPE BOUNDARY
- RAIL RESERVE BOUNDARY
- CIVIL BOUNDARY
- PREFERRED PEDESTRIAN MOVEMENT FROM CAR PARKS & PSP TO ALKIMOS STATION
- Feature Landscape Dune Shaped Seating Element **REFER TO LA-DRG-0060/61 SHEET FOR FEATURE DETAILS**

LA ALKIMOS ST Masterplan 1/750

SCALE 1 : 750

NOTES:

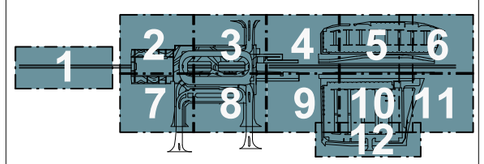
- ALL DIMENSIONS IN MILIMITRES UNLESS NOTED OTHERWISE.
- OVERALL LAYOUTS, SHEETS AND MODELS ARE STILL TO BE TAKEN AS WORK IN PROGRESS

DISCLAIMER:

- THESE DESIGNS AND PLANS ARE OWNED BY NEWest ALLIANCE AND CANNOT BE REPRODUCED WITHOUT WRITTEN PERMISSION.
- DO NOT SCALE OFF THESE DRAWINGS.
- ALL FENCING AND DRAINAGE SHOWN ON CIVIL DRAWING SET.

Keynote (Full Site)

SCALE 1 : 5000



N

0 7500 15000 22500 30000 37500 75000

SCALE (mm) 1:750 (A1) ; 1:1500 (A3)

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
BC	20.07.21	RE-ISSUED FOR DEVELOPMENT APPROVAL (DA2) - CAR PARK 1 & PSP REMOVAL	PF	PF	FM_PF	
BB	13.05.21	RE-ISSUED FOR DEVELOPMENT APPROVAL - CAR PARK 1 & KISS N' DROP REVISED	PF	PF	FM_PF	
BA	23.02.21	85% DESIGN ISSUE (UPDATE TO PAVER CODES & FINISHES)	EV	EV_PF	FM_PF	
B	03.11.20	ISSUED FOR 85% DESIGN	EV	EV_PF	FM_PF	
A	03.07.20	15% DESIGN ISSUE	PB_TL	PB_TL	FM_PF	
A1	13.05.20	REFERENCE DESIGN ISSUE	TL	TL_PF	FM	

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

NEWest Alliance

TCY-DJV-YSA-LA-DRG-0011

REFERENCES

SCALE : 1 : 750 (@ A1)

DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71

PTA ACCEPTANCE STAMP

DESIGNED PB_TL

DRAWN PB_TL

CHECKED FM_PF

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR PTA Division / External Company

DATE

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION
LANDSCAPE MASTERPLAN
OVERALL PLAN

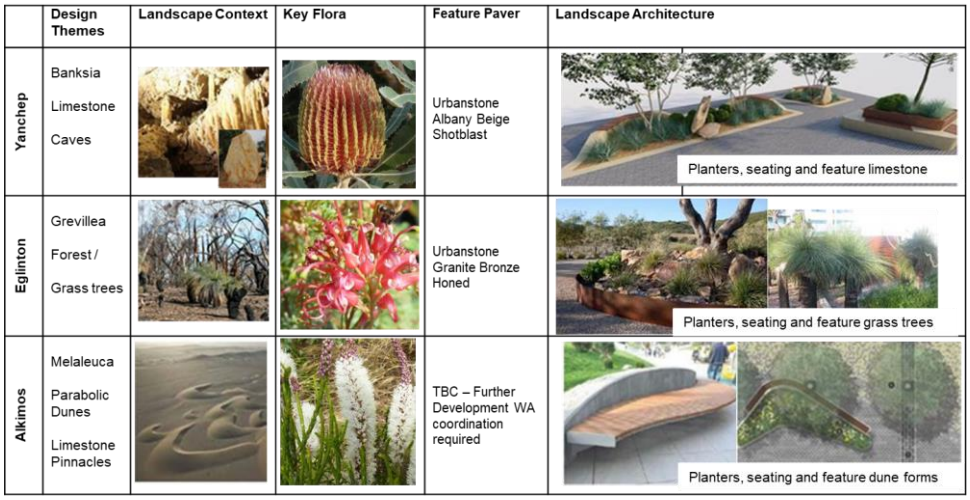
PTA Drawing No: 03-A-190-LA0004 REV: BC

CAD DRAWING PATHNAME BIM 360://Metronet - TCY/TCY-DJV-YSA-LA-MOD-0001_ALKIMOS STATION.rvt

Appendix E Landscape Strategy

Alkimos Station – Landscape Strategy

Subject	Alkimos Station – Landscape Strategy (Rev02)
Date	21-Apr-2021

Item	Subject	Description
0.	Purpose	**To inform the Development Application (DA) for Alkimos Station**
1.	Intent	NEWest Alliance is delivering Landscape Works as part of the Stations Deliverables Package for the new station at Alkimos, on the Yanchep Rail Extension (YRE). The work is being delivered on behalf of the Public Transport Authority (PTA). This note outlines the broad Landscape Strategies Considerations and Responsibilities associated with the Landscape Works at the Station and surrounding Precinct. Plans showing the Landscape Design at 85% level of maturity are available – Revised version with adjusted Kiss N' Drop area and new Car Park 1 (refer to document TCY-DJV-YSA-LA-DRG-0011 revBB)
2.	Cultural Context and Place Theme	All places in Australia have an Aboriginal history, with stories, people and ceremony linked to all. When we make places, we can learn from and tell the latent histories of sites and to embrace them in built form and landscape. With reference to the METRONET Noongar Cultural Context Yanchep (Mooroo) Rail Extension Project and the METRONET Gnarla Biddi reports, the cultural context of Alkimos was identified: Alkimos – Limestone Pinnacles – near Romeo Road were "like signs or wayfinding in the landscape to help travelers orientate themselves in Noongar Country". This cultural reference was endorsed by the Noongar Reference Group during a meeting held on 26th June 2020.
3.	Landscape Character	Each station precinct on the YRE line has its own place character. The Place Character contributes to the line-wide identity. The Place Character for each station and the unique landscape architecture that is being derived from this is indicated in the figure below:  Images in table above were part of the original concept only.
4.	Landscape Areas	The station and station precincts' landscape works includes all hard and soft landscaping generally outside the rail reserve. This involves:

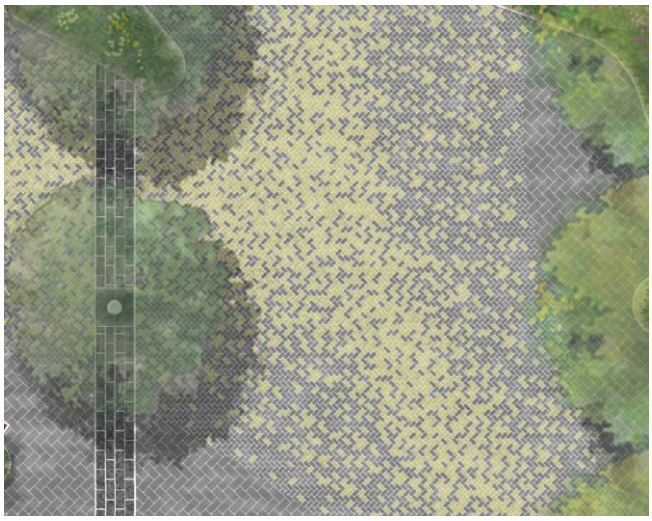
Item	Subject	Description
0.	Purpose	**To inform the Development Application (DA) for Alkimos Station**
		• Station forecourts, entrances plazas and public domain areas. • Rail reserves within the station precinct and service facility areas. • Streetscapes adjoining the station precinct. • Principal Shared Path (PShP) and shared pathway access ways to the station. • Parking facilities. • Drainage basins and swales.
5.	PTA's Landscape Design Style	The Landscape Design Style has been developed to have a high level of aesthetics with pattern, texture and colour variation while also being a low-maintenance landscape requiring low amounts of water (apart from natural rainfall) once established. Within the concept of the "Gnarla Biddi', all YRE stations share a design language that refers to the overall coastal landscapes with Alkimos being reinforced by the "Coastal plains/ Sand Dune". The overall language shared throughout the stations is reflected in the selection of paving mixes that is maintained in all 3 stations. This selection of paving mixes is intended as a reference to coastal sand (split into its different material grains and colours). By using a mix of paver with different textures and tones, the hardscape design is committed to provide, though different patterns pending on station character, a way-finding solution to allow pedestrians to find their way towards the station main entrances. All paving mixes are to be laid in a fading pattern from mix to mix, allowing for a deeper and richer set of colours and textures the closer we get to the main station and fading into one single pattern, when further from the central station. Reinforcing the connection to "Coastal Plains and Sand Dunes" concept, the main paving mix (PV1) with its signature colour (Yellow) is arranged into Dune shapes throughout the forecourts and main perimeter of the Station Building, Bus way and the revise Kiss n' Drop areas. This theme is then transported into feature seating elements strategically located near the main entrances and on the pedestrian bridge in the Bus Way. Species selected from the Site's remnant vegetation complexes are utilized both for revegetation of the rail reserve, as well as within the Station Precinct. This helps to ensure the suitability of vegetation to site. Turf is not used. Clear-stem trees and groundcovers are used in all situations to ensure sightlines are maximized and CPTED issues are managed. Bushy shrubs are only used (where they do not cause CPTED issues) for screening to mitigate visual impact issues. Following up on the concept described above, all plant species and soil nutrient requirements utilised in the design of garden beds and landscape areas are equivalent to those within endemic, local native plant ecosystems. The maintenance of the garden beds and landscape areas assumes that the following management and periodic maintenance activities will be carried out by the PTA. **Refer to images at the end of this document for more detail.**
6.	Forecourt, Station Entrance, Bus Way and Kiss N' Drop Area.	The forecourt landscape is a highly aesthetic public realm complete with pattern, texture and colour variation within paved areas. Custom made seating elements are in-situ and integrated with the architectural and urban design of the forecourt. All seating/furniture is accessible and inclusive, providing varied opportunities within the landscape for people with disabilities. Walls are designed to discourage skateboarding where they are next to paved areas and where required, skate deterrents will be used. The forecourt includes

Item	Subject	Description
0.	Purpose	**To inform the Development Application (DA) for Alkimos Station**
		bollards and other barriers to limit vehicle access. Mature and semi-mature tree planting is used in the forecourt areas, with an arrangement of semi-mature, feature trees being included within the forecourt planting scheme. All tree plantings will be located to have suitable soil zones for healthy tree growth. Finishes within the precinct include quality unit paving, raised planters, urban furniture, feature tree planting and 'Wildflower Capital Initiative' planting. The location of this station within the Alkimos Town Centre has meant its design has included ongoing liaison with Development WA to resolve developer interfaces and provide integrated and shared public spaces. Paving materials include high quality, unit paving around the forecourt, throughout the Busway and withing the Kiss n' drop area to signify the importance of these arrival zones. Service pit lids will be recessed with inserts to match the surrounding pavement. Quality, patterned, PTA standard paving is used in secondary areas to maintain a good quality but low maintenance public realm. Adjacent areas such as the periphery areas of car parks are paved in long-life, broom finished concrete to maximise design life. All planting within the Main Precinct area will follow a more formal layout using a vegetation mix based on natives, but with a selection of breeds that are more resistant and adapted to heavy pedestrian urban spaces. Refer to diagram of plants on page 7. This selection is comprised of ground covers, low and medium sizes shrubs, grasses, feature plants and trees. This unit of landscape to have semi-permanent irrigation. Refer to item 13.
7.	Car Park Landscape	This landscape will soften the car park areas adding green elements to reduce the glare and heat effects of the hard surfaces in this zone. Buffer plantings will be established to assist screening for adjacent land owners. The car park landscape design prioritises accessible and inclusive environments that provide rich and varied opportunities within the landscape for all people including those with disabilities. The hard landscape is integrated with civil designs for road pavements and includes bollard placement to limit vehicle access. Canopy trees, shrub and groundcover planting are utilised to reduce the build-up of heat from the carpark, improving thermal comfort levels. Tree planting is optimised to maximise the population of trees within car park islands, diamonds and half diamonds, with an emphasis placed on local, Western Australian native, slow-growing trees. Non-slip tree grates are indicated used where trees are planted in areas of hard materials or adjacent to access paths where there is potential for an increased trip hazard to be created and tree species will be selected that are not known to cause root problems to limit root damage to adjacent hard materials. All planting within the car park areas, to still use the same plant mix as the Station precinct, with a focus on Low-growing shrubs and groundcovers with a maximum height of 500/600 millimeters, are proposed within garden bed areas, which have had proven success within PTA landscapes. Larger shrubs (1000/1200mm) are used only for screening where this is required. Screened pine bark mulch with a low combustibility will be used in all garden bed or mulch only areas and screened stone mulch will be used to line the bases of all swale or water infiltration areas. Car park areas to be only be irrigation until vegetation is established. Refer to item 13.

Item	Subject	Description
0.	Purpose	**To inform the Development Application (DA) for Alkimos Station**
8.	Rail Reserve and Landscaping Adjacent to PShPs within the 150metres from each end of the station Platform	NOTE: Rail Reserve mentioned in this memo, only refers to the section of rail reserve that is adjacent to the Station precinct, for an extent of 150 metres from both ends of the station platform. This will be considered a buffer zone between the station landscape and the rail reserve, named "Station Corridor Mix" as per Alkimos Landscape Masterplan. Within this 'buffer', all plants will still be based on the station mix as per page 7 below, with only the ground covers and low growing shrubs being used along the reserve. This unit of landscape to have irrigation until establishment of the vegetation only. Refer to item 13. Outside the Station boundaries, the rail reserve **(separate deliverable design package, not accounted for within this landscape strategy memo)** will have a 'revegetation style' finish and will comprise of mass planting of local native species suited to the coastal hinterland conditions and shallow soils over limestone which favour plants that are tolerant of alkaline conditions. The landscape design for the rail reserve and areas adjacent to PShPs will be integrated with civil designs for the rail reserve and the PShPs and share the design themes reflecting the surrounding area. No Irrigation will be required for the overall rail reserve, outside the station precinct.
9.	Drainage Areas	Drainage areas has a 'revegetation style' finish but is designed to remain low-maintenance and accessible for periodic drainage system maintenance. The planting will be non-irrigated and comprise species suited to summer drought and winter inundation. The species are selected to provide some pollutant removal and nutrient-stripping capacity.
10.	Site Specific Considerations	Site specific considerations being addressed in the Landscape Works include the provision of transplanted grass trees and limestone boulders salvaged from the site and the minimization of clearing of the native bushland.
11.	Existing Topsoil and Mulch Salvage	Where weed-free topsoil exists on site it will be stripped and stockpiled for later use within revegetation areas. Weed infested topsoil will be disposed offsite. Mulch that is dieback free is being salvaged for reuse.
12.	PTA's Landscape Management Activities	All PTA's managed areas will be maintained using standard horticultural practices, including, the following items: • Maintenance of trees and overall vegetation, without allowing for overgrowth of medium and large shrubs. • Watering of trees and shrubs (during establishment only) • Fertilising of trees and shrubs • Weeding of garden beds • Slashing of non-irrigated dry grass areas • Topping up and making good of mulch to garden bed areas • Pruning • Pest and disease control of trees and shrubs • Removal of rubbish and debris in garden areas • Maintaining paving and other hard finishes free of leaves/litter • Preventative maintenance activities. • Removal of leaf litter, dead branches from vegetated areas prior to summer bushfire season, to reduce possible fuel.

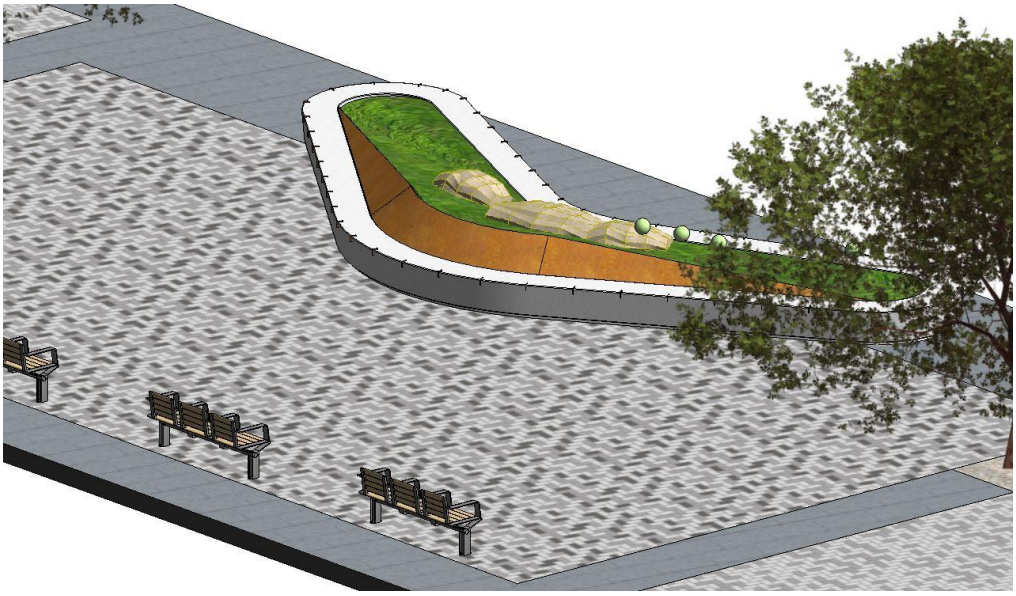
Item	Subject	Description
0.	Purpose	**To inform the Development Application (DA) for Alkimos Station**
13.	Irrigation	Irrigation will differ pending on the area of the station. All main areas of the precinct, kiss n' drop area and busway will have semi-permanent irrigation that would be still be maintain after establishment (formal landscape area). All car park areas and the rail reserve within 150metres from the station platform, irrigation to allow for the establishment of the vegetation only. All other areas outside the ones previously described, the overall Rail Reserve and adjacent streetscapes are not irrigated and are designed to a Revegetation Style of finish.
14.	Water Sensitive Urban Design	Water Sensitive Urban Design (WSUD) treatments are being progressed to: maximise the absorption of rainfall and surface water flows on the site; to incorporate WSUD principles into the engineering: and to maximise flush kerbs and drainage swale areas.
15.	Tree Canopy	Trees within the car parks are designed to form a canopy, reducing the heat island effect. In an attempt to reduce heat (specially in Summer) within highly paved areas like the car park, a minimum rate of one tree per every three car bays was established.
16.	Anti-vehicle	An anti-vehicle (hostile threat) strategy is being developed for each YRE Station. Mature / semi-mature trees, kerbs, raised planters, furniture, bins, columns and bollards are all arranged within the station forecourt areas to deter unwanted vehicles from entering spaces where patrons gather. The strategy will be further refined during the 85% design stage to maintain safe operations.
17.	Shared Zone	A shared zone is located along the western side of the station. This space will be shared safely be pedestrians and cyclists. Cyclists must give way to pedestrians at all times and this will be indicated with signage. The maximum speed limit is 10 km/h in keeping with the Safe System approach to road safety (10 km/h is close to the walking speed for most pedestrians).

Alkimos Selection of Paving Mixes

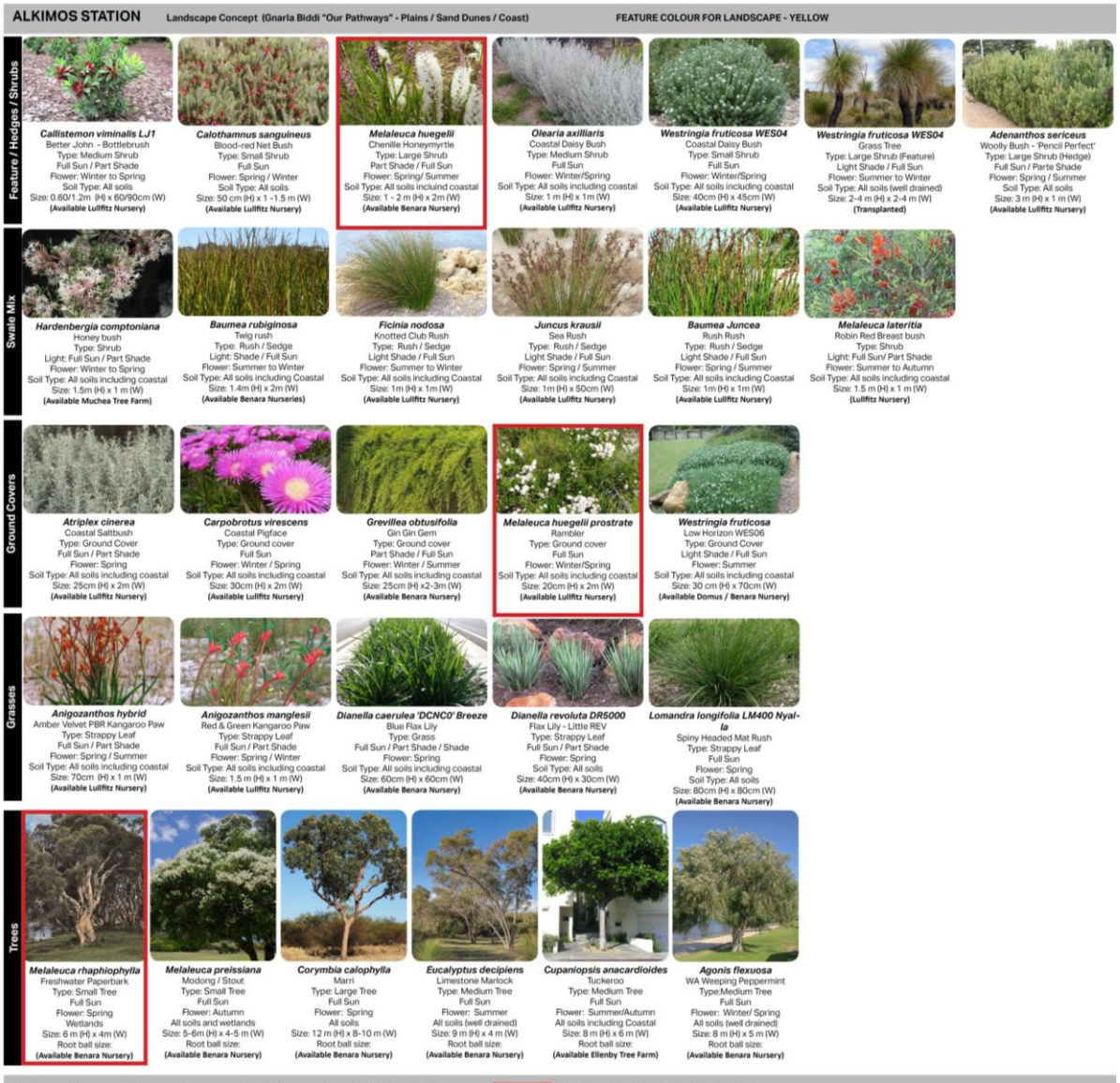


Alkimos Paving Patterns (Fading between different mixes) Sand Dune Theme to be used to reinforce the importance of the different arrival areas and as a wayfinding feature within the station precinct, bus way and kiss n' drop area, fading into one colour when connecting to the surrounding areas.

Feature Landscape Seating Elements
(Conceptual Theme transfered to the seating elements)



Planting Selection



Appendix F Vegetation plot photos and description

Plot number		Plot 1
Vegetation classification	**Pre-development**	Class D Scrub
	Post-development	Class D Scrub

Description / justification

Plot 1 comprises intact scrub vegetation on flat/upslope land to the south and north of the project area and previously cleared land with potential to revegetate to Class D Scrub to the northwest and northeast of the project area. Vegetation is predominantly low shrubland/coastal heath with taller vegetation (1–6 m) being present in the intact areas to the south. A precautionary approach has been adopted to classify all low shrub as Class D Scrub. The cleared land adjacent to the external southern portion of the rail alignment has been classified as Class D Scrub as this land is outside of the YRE development envelope and maintenance of this land is unable to be enforced.

Photo ID: 1a

Photo ID: 1b

Photo ID: 1c

Photo ID: 1d

Photo ID: 1e

Photo ID: 1f

Photo ID: 1g

Photo ID: 1h

Plot number		Plot 2
Vegetation classification	**Pre-development**	Class D Scrub
	Post-development	Class D Scrub

Description / justification

Plot 2 includes previously cleared land with potential to revegetate to Class D Scrub to the west/northwest of the project area (Downslope >0-5°). This vegetation is predominantly low shrubland/coastal heath (<2m) but has been classified as Class D Scrub as a precautionary measure. Plot 2 also includes an area of intact vegetation to the northeast which has been classified as Class D Scrub on the basis of the predominant vegetation for this area given access was not available during the inspection.

Photo ID: 2a

Photo ID: 2b

Photo ID: 2c

Photo ID: 2d

Plot number		Plot 3
Vegetation classification	**Pre-development**	Exclusion 2.2.3.2 (e) non-vegetated areas
	Post-development	Class D Scrub
Description / justification		

Plot 3 comprises the revegetation areas proposed within the rail alignment, which present only a temporary bushfire hazard until the surrounding vegetation is cleared for future development. The Landscape Strategy describes the vegetation within the rail reserve as having a 'revegetation style' finish within groundcovers and low growing shrubs consistent with the local area (within 150 m from each end of the station platform) and comprising mass planting of local native species (beyond the station boundaries). This planting is considered to constitute Class D Scrub at maturity, based on the locally occurring coastal shrub vegetation.

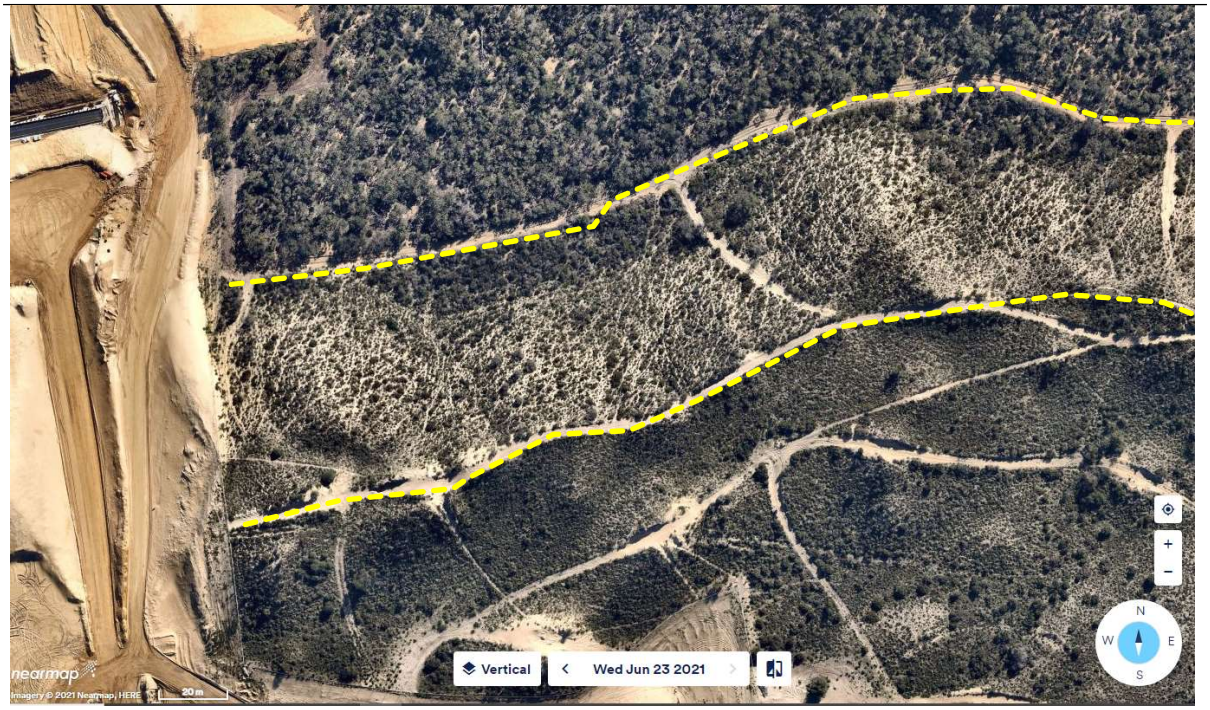
Satellite imagery showing the extent of the cleared rail corridor which will be planted along the embankments with locally occurring plant species.

Source: NearMap (23 June 2021)

Plot number		Plot 4
Vegetation classification	**Pre-development**	Class D Scrub
	Post-development	Class D Scrub
Description / justification		

Plot 4 comprises revegetating coastal scrub on a steep dune to the north of the project area. Access was not available to this plot; however, the vegetation is considered consistent with predominant scrub vegetation within the local area. Satellite images are provided to depict the vegetation below. Regardless, this vegetation is not within 100 m of the proposed Station building and does not influence the BALs for habitable development.

Source: GoogleEarth



Source: Nearmap (23 June 2021)

Plot number		Plot 5
Vegetation classification	**Pre-development**	Class G Grassland/Exclusion 2.2.3.2 (e) non-vegetated areas
	Post-development	Class G Grassland
Description / justification		

Plot 5 consists of the cleared land and stockpiles to the east of the project area due to potential establishment of weeds and grasses. This vegetation is not within 50 m of the proposed habitable development and therefore has no influence on the BALs. As access was not available to this portion of the project area, satellite imagery has been provided below.

Source: Nearmap (23 June 2021)

Plot number		Plot 6
Vegetation classification	**Pre-development**	Exclusions 2.2.3.2 (e) & (f)
	Post-development	Exclusions 2.2.3.2 (e) & (f)

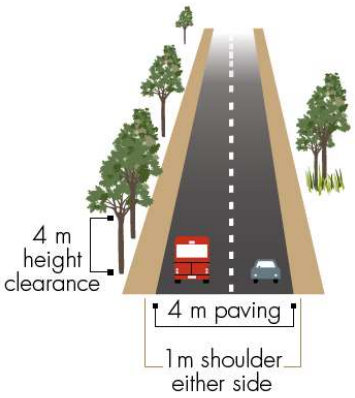
Description / justification

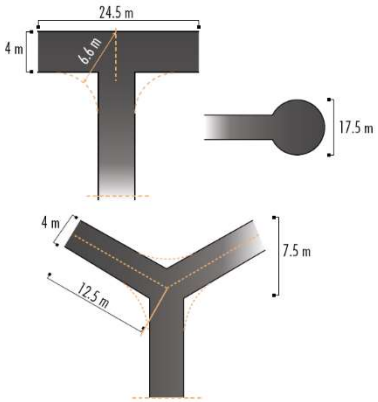
Plot 6 comprises the project area, non-vegetated portions of the rail alignment (within the project area) and site access road to Marmion Avenue which have been previously cleared and are being managed in a low threat state.

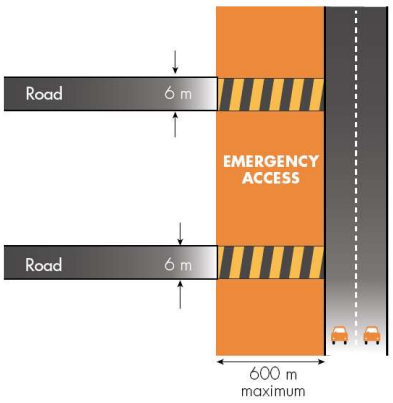
Photo ID: 6a

Photo ID: 6b

Appendix G Vehicular access technical standards of the Guidelines

Public roads	
Acceptable solution A3.2	A public road is to meet the requirements in Table 1, Column 1.
Explanatory note E3.2	Trafficable surface: Widths quoted for access routes refer to the width of the trafficable surface. A six metre trafficable surface does not necessarily mean paving width. It could, for example, include four metre wide paving one metre wide constructed road shoulders. In special circumstances, where eight lots or less are being serviced, a public road with a minimum trafficable surface of four metres for a maximum distance of 90 metres may be provided subject to the approval of both the local government and Department of Fire and Emergency Services. Public road design: All roads should allow for two-way traffic to allow conventional two-wheel drive vehicles and fire appliances to travel safely on them. 

Private driveway longer than 50 metres	
Acceptable solution A3.5	A private driveway is to meet all of the following requirements: • Requirements in Table 1, Column 3 • Required where a house site is more than 50 metres from a public road • Passing bays: every 200 metres with a minimum length of 20 metres and a minimum width of two metres (i.e. the combined width of the passing bay and constructed private driveway to be a minimum six metres) • Turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 metres (i.e. kerb to kerb 17.5 metres) and within 50 metres of a house • Any bridges or culverts are able to support a minimum weight capacity of 15 tonnes • All-weather surface (i.e. compacted gravel, limestone or sealed).
Explanatory note E3.5	For a driveway shorter than 50 metres, fire appliances typically operate from the street frontage however where the distance exceeds 50 metres, then fire appliances will need to gain access along the driveway in order to defend the property during a bushfire. Where house sites are more than 50 metres from a public road, access to individual houses and turnaround areas should be available for both conventional two-wheel drive vehicles of residents and type 3.4 fire appliances. Turn-around areas should be located within 50 metres of a house. Passing bays should be available where driveways are longer than 200 metres and turn-around areas in driveways that are longer than 500 metres. Circular and loop driveway designs may also be considered. These criteria should be addressed through subdivision design. Passing bays should be provided at 200 metre intervals along private driveways to allow two-way traffic. The passing bays should be a minimum length of 20 metres, with the combined width of the passing bay and the access being a minimum of six metres. Turn-around areas should allow type 3.4 fire appliances to turn around safely (i.e. kerb to kerb 17.5 metres) and should be available at the house sites and at 500 metre intervals along the driveway. 

Emergency access way	
Acceptable solution A3.6	An access way that does not provide through access to a public road is to be avoided in bushfire prone areas. Where no alternative exists (this will need to be demonstrated by the proponent), an emergency access way is to be provided as an alternative link to a public road during emergencies. An emergency access way is to meet all of the following requirements: • Requirements in Table 1, Column 4 • No further than 600 metres from a public road • Provided as right of way or public access easement in gross to ensure accessibility to the public and fire services during an emergency • Must be signposted.
Explanatory note E3.6	An emergency access way is not a preferred option however may be used to link up with roads to allow alternative access and egress during emergencies where traffic flow designs do not allow for two-way access. Such access should be provided as a right-of-way or easement in gross to ensure accessibility to the public and fire emergency services during an emergency. The access should comply with minimum standards for a public road and should be signposted. Where gates are used to control traffic flow during non-emergency periods, these must not be locked. Emergency access ways are to be no longer than 600 metres and must be adequately signposted where they adjoin public roads. Where an emergency access way is constructed on private land, a right of way or easement in gross is to be established. 

Technical requirement	1	2	3	4	5
	Public road	Cul-de-sac	Private driveway longer than 50 m	Emergency access way	Fire service access routes
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal distance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	8.5	8.5	8.5	8.5	8.5
* Refer to E3.2 Public roads: Trafficable surface					

Appendix H Water technical standards of the Guidelines

Reticulated areas	
Acceptable solution A4.1	The subdivision, development or land use is provided with a reticulated water supply in accordance with the specifications of the relevant water supply authority and Department of Fire and Emergency Services.
Explanatory note E4.1	Water supply authorities in Western Australia include the Water Corporation, Aqwest and the Busselton Water Board. The Water Corporation's 'No. 63 Water Reticulation Standard' is deemed to be the baseline criterion for developments and should be applied unless local water supply authorities' conditions apply.

Appendix I City of Wanneroo firebreak notice (2020/21)

Document Status

Report version	Rev No.	Purpose	Author	Reviewed and Approved for Issue	
				Name	Date
Draft Report	Rev A	For client review	Brodie Mastrangelo (BPAD 45985, Level 1)	Zac Cockerill (BPAD 37803, Level 2)	11 September 2020
Final Report	Rev 0	Issued for use: To accompany Development Application	Brodie Mastrangelo (BPAD 45985, Level 1)	Linden Wears (BPAD 19809, Level 3)	16 September 2020
Draft Report	Rev B	Amended post-DFES referral – For client review	Louisa Robertson (BPAD 36748, Level 3)	Louisa Robertson (BPAD 36748, Level 3)	28 July 2021
Final Report	**Rev 1**	**Issued for use**	**Louisa Robertson (BPAD 36748, Level 3)**	**Zac Cockerill (BPAD 37803, Level 2)**	**18 August 2021**

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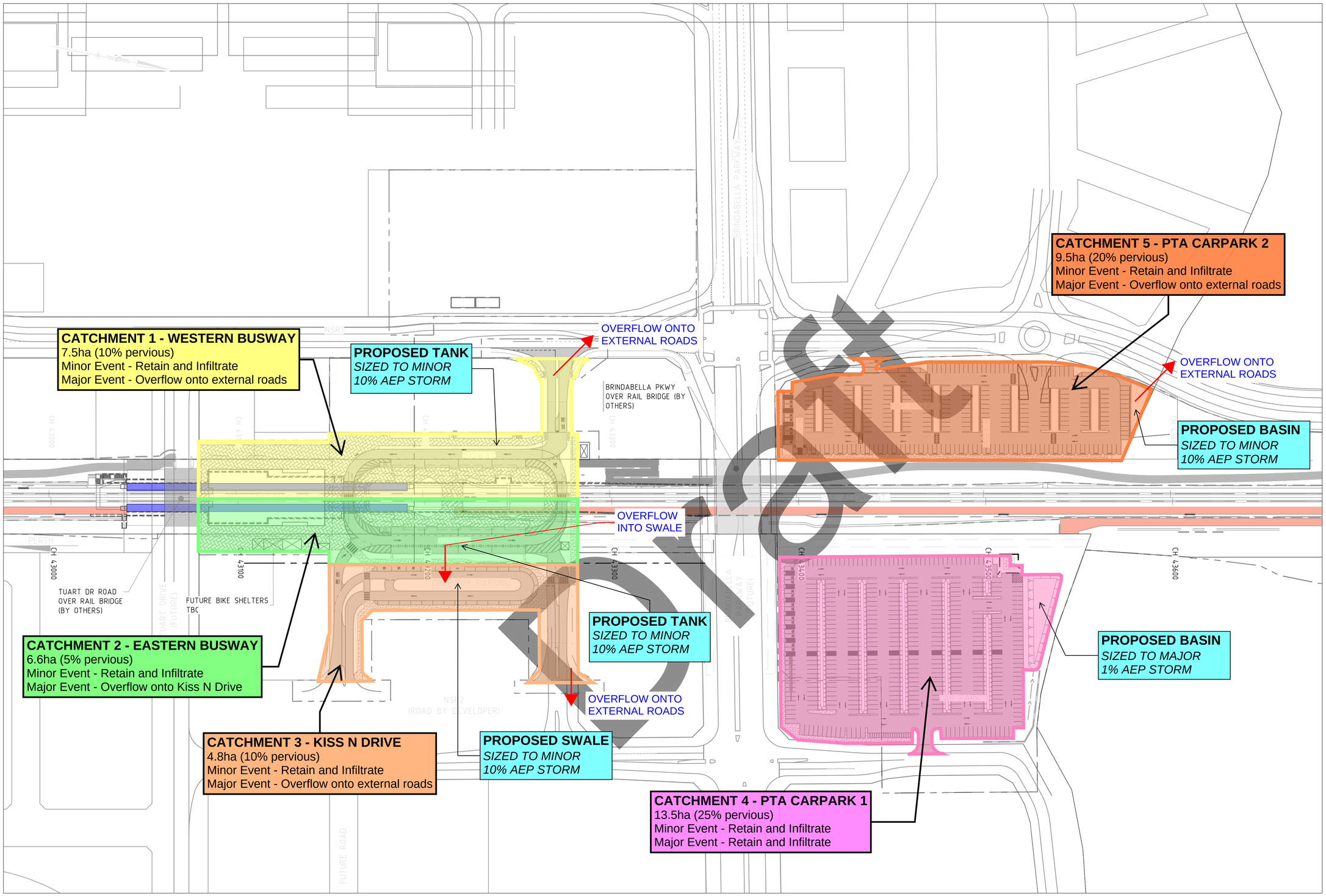
APPENDIX G

PRELIMINARY DRAINAGE CATCHMENT PLAN



PLAN
SCALE 1:1000

0 10 20 30 40 50 100
SCALE (m) 1:1000 (A1) ; 1:2000 (A3)

NOTES

1. DRAWING TO BE PRINTED IN COLOUR.
2. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.

LEGEND

- PERMANENT WORKS BOUNDARY
- PROPOSED STATION BOUNDARY
- FUTURE STATION BOUNDARY
- RETAINING WALL
- PShP
- STATION PLATFORM
- VEHICLE ACCESS TRACK
- FUTURE PTA WORKS
- NARROW GUAGE PASSENGER MAIN
- RADIO MONOPOLE

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
B3	30.03.21	ISSUED FOR DEVELOPMENT APPLICATION V2	AN	AN	DBA	
B2	07.08.20	ISSUED FOR DEVELOPMENT APPLICATION	DTH	GV	DTH	
B1	30.07.20	REISSUED FOR 15% DESIGN	DM	EM	DTH	
A	02.07.20	ISSUED FOR 15% DESIGN	GG	EM	TB	
A1	13.05.20	REFERENCE DESIGN ISSUE	GG	EM	TB	

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

NEWest Alliance

TCY-DJV-YSA-CI-DRG-0010-AN

REFERENCES

TCY-DJV-YSA-CI-REF-0001_ROAD
TCY-DJV-YSA-CI-REF-0001_CAD
TCY-DJV-YLG-CI-REF-0001_DES-MONO
TCY-DJV-YLC-TR-REF-0001_BSW-PL-CAD-PCG20
TCY-DJV-YLC-TR-REF-0001_TRACKWORK-PCG20
TCY-DJV-YLC-TR-REF-0001_DRA-PL-BASINS-CAD-PCG20
TCY-DJV-YLC-TR-REF-0001_EWK-PL-CAD-PCG20
TCY-DJV-YLC-TR-REF-0001_PLATFORMS-PCG20
TCY-DJV-YSA-CI-REF-0001_DES-BOUNDARIES
TCY-DJV-YSA-CI-REF-0001_PAV
TCY-DJV-YLA-CI-REF-0001_WALLS
TCY-DJV-YSA-AR-REF-0001_ALKIMOS STATION OUTLINE

SCALE : 1:1000 (@ A1)
DATUM : HORIZONTAL: PCG20 VERTICAL: AHD71
PTA ACCEPTANCE STAMP

DESIGNED AN
DRAWN AN
CHECKED DBA
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR
PTA Division / External Company
DATE

DETAILED DESIGN

Government of Western Australia Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION & PRECINCT
DRAINAGE CATCHMENT PLAN

PTA Drawing No: REV :

CAD DRAWING PATHNAME C:\Users\an59151\ARCADIS\2008 AKN - 10037567 Metronet TCL YRE - Documents\2 - Stations + Client Issue\2A - CAD\TCY-DJV-YSA-CI-DRG-0010 AN 2 - Catchment Plan 210330.dwg