

Technical Memo

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| Prepared for | Cross River Rail Delivery Authority Purpose: IPBR | Attention to | Daniel Gallagher |
| Attachments | Attachment A – PDA Reference Design Plan Attachment B – Collated Norman Creek Stormwater Network Plan Attachment C – Currently Planned Stormwater Infrastructure Attachment D – BCC Flood Overlay – Overland Flow Attachment E – Proposed Stormwater Relocation (CRR) Attachment F – Trunk Stormwater Cost Estimate Attachment G – Flood Planning Map | | |

1 Executive Summary

This Technical Memo addresses the impact of the anticipated future development within the Boggo Road Priority Development Area (PDA) as part of the Cross River Rail (CRR) project, prepared for Cross River Rail Delivery Authority (CRRDA). The current scope of analysis will inform the the Boggo Road CRR PDA Development Scheme and associated Development Charges & Offset Plan (DCOP). This Technical Memo provides high level advice and recommendations to be adopted within the PDA.

The anticipated development (based on the indicative Reference Design prepared for planning purposes) will result in changes to the existing built form, both from the construction of new buildings and re-development of existing buildings. As result of those alterations, the total number of persons working and living within the Boggo Road CRR PDA is expected to increase considerably. The imperviousness of the site is also expected to increase by approximately 16% from the existing scenario.

In meetings held with Brisbane City Council (BCC), Officers advised that the existing downstream stormwater infrastructure in the major catchment is currently under capacity and no upgrades are proposed in the foreseeable future. BCC representatives also advised that given the projected increase in resident and employee population anticipated in the PDA, an improved stormwater network level of service is recommended to be applied in the PDA, to align with the Brisbane City Plan 2014 standards.

SMEC has undertaken a preliminary assessment of the existing stormwater infrastructure within the PDA and concluded that extensive works would be required to achieve a Desired Standard of Service (DSS) of 10% Annual Exceedance Probability (AEP) for the underground drainage network system. Furthermore, upgrades to

stormwater infrastructure within the PDA would increase flows to the already constrained external drainage system, potentially increasing the risk of flooding for downstream properties.

A separate assessment was prepared by others, as part of the CRR Tunnels, Stations and Development (TSD) scope of works, including the new Boggo Road CRR Station, to understand the potential flooding impacts of that scope of works. Following a review of that above material, it was identified that some of the land where new proposed buildings/civil works will be located is currently affected by flooding. Those works will therefore trigger a requirement for a more detailed Flood Impact Assessment which will identify impacts of future proposed development and the proposed mitigation measures. Building/civil works outside the flood affected areas will trigger stormwater assessment of the discharge increase generated by the works and control measures such as detention tanks.

As a result of the assessment, the following approach options were considered for adoption within the PDA in relation to the stormwater/flooding constraints:

- Accept a lower DSS across some areas of the CRR PDA. This may result in emergency evacuation plans and/or other restrictions to be adopted.
- Undertake additional flood and stormwater studies to identify potential mitigation measures to achieve the DSS required and identify whether the DSS can be achieved at different locations across the PDA, therefore directing the accepted type of development at each location.
- Undertake all augmentations necessary to the regional catchment (Norman Creek) stormwater infrastructure to achieve the DSS required. This will include works within the PDA and external works. It is understood that those works may be very extensive and could potentially be not feasible.

2 Introduction

2.1 Background

The Cross River Rail Delivery Authority (CRRDA) has prepared a Development Scheme for the Boggo Road Cross River Rail (CRR) Priority Development Area (PDA) to support the Queensland Government's Precincts Delivery Strategy (PDS) Boggo Road Precinct Vision.

The Boggo Road CRR PDA was declared on 2 October 2020 and covers approximately 39 hectares. It is generally bounded by Burke Street to the north, Cornwall Street to the south, Annerley Road to the west, and Ipswich Road to the east (refer Figure 2-1).

The vision for the Boggo Road CRR PDA is for a "World class innovation precinct, specialising in health, science and education jobs of the future".

This is to be achieved through enhancing the already established world-class health and research facilities with a focus on health, science and education services. The PDA will reinforce and maximise the precinct's role as a regionally significant economic cluster and enhance its reputation as a globally significant innovation precinct, facilitating skilled employment.

The Minister for Economic Development Queensland (MEDQ) has delegated certain functions and powers under the Economic Development Act 2012 to the CRRDA including those to plan, carry out, promote or coordinate activities to facilitate economic development and development for community purposes. The CRRDA has prepared a Development Scheme for the Boggo Road CRR PDA which regulates development on land within the boundaries of the Boggo Road CRR PDA.

Refer Attachment A for the proposed PDA Reference Scheme.



Figure 2-1: Boggo Road CRR PDA Boundary

2.2 Objective

This Technical Memo provides an overview of the stormwater assessment undertaken for the Boggo Road CRR PDA, primarily focussed on the Kent Street and Joe Baker Street sections of the PDA where the main stormwater and flooding issues have previously been identified.

In order to facilitate development in the PDA, it was necessary to understand the capacity of the existing and planned stormwater infrastructure in the area, and to ascertain its reliability to convey flow away from the site and mitigate flood nuisance. An assessment of flood risk and potential mitigation measures related to future development opportunities is also provided.

2.3 Service Provider Engagement

The primary external stormwater network service provider is Brisbane City Council (BCC). Metro South Health (MSH) currently owns and operates some of the land affected by flooding within the Boggo Road CRR PDA.

Additional engagement may be required following the completion of this technical note.

3 Development Scenarios

3.1 Existing Scenario

Existing buildings within the Boggo Road CRR PDA are shown in more detail in Attachment B and described in Table 3-1 Existing / Previous Buildings in PDA. The status of the existing buildings is defined as follows:

- Removed (TSD): buildings within the precinct that were removed in 2019/20 as part of the CRR TSD early works
- Future removal: buildings that remain in place at the time of this investigation, however may be removed / replaced as part of a future development scenario
- No Change: buildings that will not be removed or replaced under the future development scenarios investigated

Table 3-1 Existing / Previous Buildings in PDA

| Map Reference | Name | Plan Area (m ²) | Current / Potential Future Status |
|---------------|---|-----------------------------|-----------------------------------|
| EX-101 | Existing Ecoscience Precinct | 8,699 | No Changes |
| EX-103 | Existing Dutton Park Police Station | 837 | Future Removal |
| EX-104 | Existing Boggo Road Sales Office | 379 | Future Removal |
| EX-105 | Existing Boggo Road Gaol | 1,880 | No Changes |
| EX-201 | Existing PACE Building | 5,333 | No Changes |
| EX-202 | Existing PAH Building 39 | 317 | Future Removal |
| EX-203 | Existing PAH Building 37 | 508 | Future Removal |
| EX-204 | Existing PAH Building 35 | 529 | Future Removal |
| EX-205 | Existing PAH Building 33 | 521 | Future Removal |
| EX-206 | Existing PAH Building 31 | 745 | Future Removal |
| EX-207 | Existing PAH Building 07 (GARU) | 5826 | Future Removal |
| EX-208 | Existing Pantheon Biologics Building | 1929 | No Changes |
| EX-209 | Existing TRI Building | 6376 | No Changes |
| EX-210 | Existing PAH Building 63 | 1610 | No Changes |
| EX-211 | Existing PAH Building 61 (General Support Services) | 2078 | Future Removal |
| EX-212 | Existing PAH Building 62 | 331 | No Changes |

| Map Reference | Name | Plan Area (m ²) | Current / Potential Future Status |
|---------------|--|-----------------------------|-----------------------------------|
| EX-213 | Existing PAH Building 57 (Central Energy Unit) | 1881 | No Changes |
| EX-214 | Existing PAH Building 59 | 397 | No Changes |
| EX-215 | Existing PAH Building 05 (Diamantina Health Care Museum) | 228 | No Changes |
| EX-216 | Existing PAH Building 11 (Loading Dock) | 1483 | No Changes |
| EX-217 | Existing PAH Building 13 (Aquatic Physiotherapy Pool) | 300 | No Changes |
| EX-218 | Existing PAH Building 19 (Mental Health Services) | 3,229 | No Changes |
| EX-219 | Existing PAH Building 15 (Executive Building) | 1,929 | No Changes |
| EX-220 | Existing PAH Building 17 (Spinal Injuries Unit) | 1,679 | Future Removal |
| EX-221 | Existing PAH Main Hospital | 2,1775 | No Changes |
| EX-301 | Existing PAH Building 55 (Laundry) | 4,759 | Future Removal |
| EX-302 | Existing PAH Carpark | 9,588 | No Changes |

3.2 Development Projects & Scenarios

The potential future developments and staging for the PDA are shown in Figure 3-1 Boggo Road PDA Existing Buildings and Potential Developments (Reference Scheme) be low and further detailed in Attachment B.

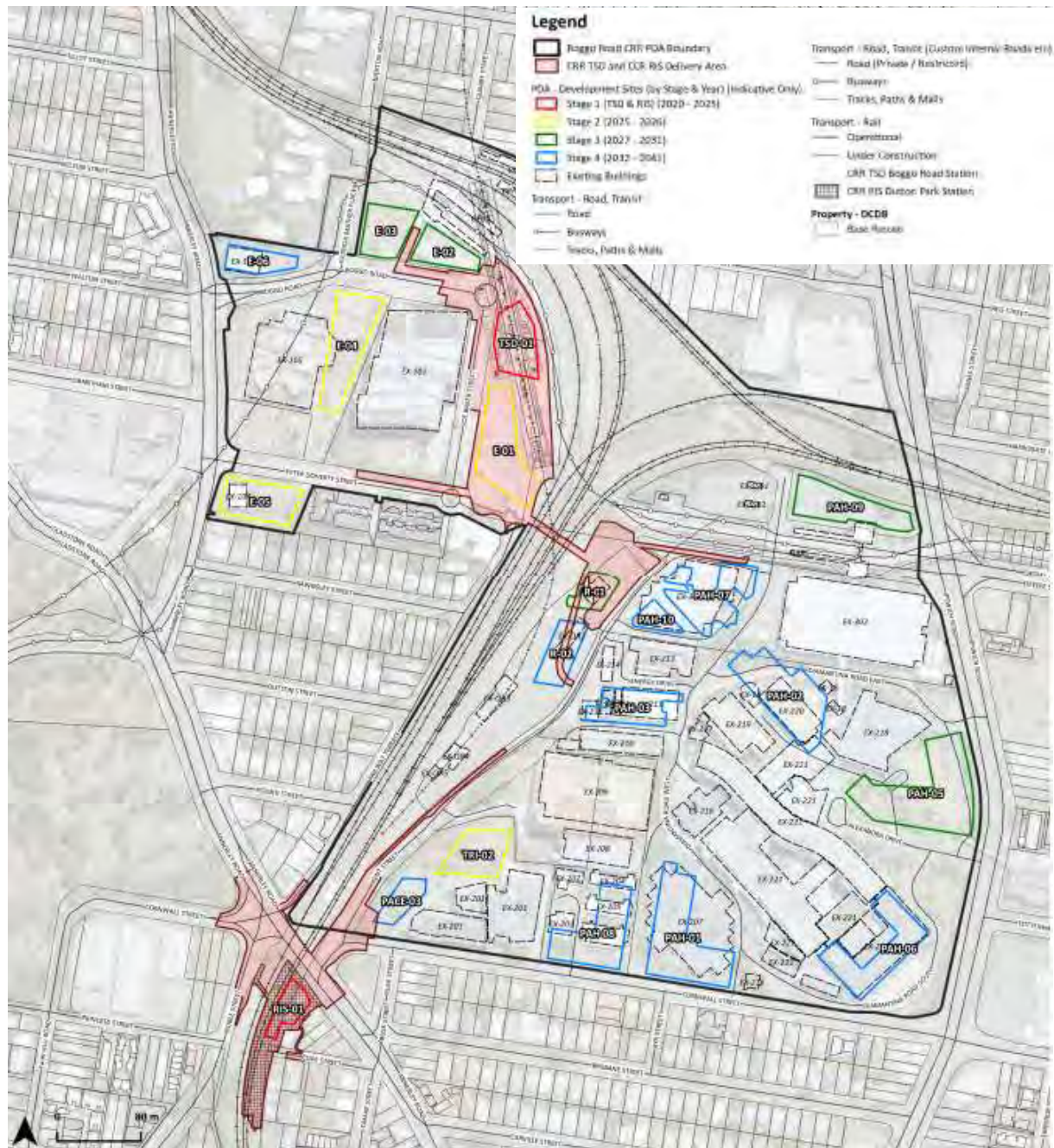


Figure 3-1 Boggo Road PDA Existing Buildings and Potential Developments

Note: Future PDA potential development opportunity sites and staging are conceptual and indicative only for infrastructure network analysis purposes.

The potential future developments are divided into four (4) stages, which are summarised in Table 3-2 Development Stages.

Table 3-2 Development Stages

| Stage | Timing (Approx.) | Description |
|-------|------------------|--|
| 1 | 2020 - 2025 | TSD Works (Station, Station Services) |
| 2 | 2025 - 2026 | Residential, commercial/retail building developments under BCC Planning Scheme (E4 & E5), TRI2 under Ministerial Infrastructure Designation (MID), and CRRDA Precinct Development Partner (E1) |
| 3 | 2027-2031 | Mixed office, allied health and health buildings, and CRRDA Precinct Development Partner (R1 and E2 & E3) |
| 4 | 2032-2041 | Mixed office, allied health and health buildings, and CRRDA Precinct Development Partner (R2) |

The Reference Scheme includes the construction of 18 new buildings, some of which will replace existing buildings, whilst others will occupy vacant land. The majority of new buildings are intended to be office/research or health related uses, with a few for commercial / retail use (E4) and residential use (E5).

As a result of the proposed works, there will be a significant increase in the Gross Floor Area (GFA) and subsequently an increase in the population projected for the CRR PDA, mostly future employees. The characterisation of the land within the BCC Planning Scheme as a Special Centre with higher density land uses aligns with a Desired Standard of Service (DSS) for the drainage system to have a minor drainage system design standard of a minimum desired 10% Annual Exceedance Probability (AEP) (minimum design standard established in BCC's Planning Scheme – Infrastructure Design Planning Scheme Policy).

The individual development projects / buildings within each stage are described in Table 3-3 Development Projects / Buildings in PDA below.

Table 3-3 Development Projects / Buildings in PDA

| Scope Owner | Stage | Building Reference | Development Type | Site Cover (m ²) |
|--|---------|--------------------|------------------|------------------------------|
| CRR TSD | Stage 1 | CRR Station | Rail Station | |
| CRR Development Partner | Stage 2 | E1 | Office | 4,040 |
| Stockwell | Stage 2 | E4 | Retail | 3,861 |
| Stockwell | Stage 2 | E5 | Residential | 2,740 |
| Translational Research Institute (TRI) | Stage 2 | TRI 2.0 | Office | 2,406 |
| CRR Development Partner | Stage 3 | E2 | Office | 1,734 |

| Scope Owner | Stage | Building Reference | Development Type | Site Cover (m ²) |
|-------------------------|---------|--------------------|------------------|------------------------------|
| CRR Development Partner | Stage 3 | E3 | Office | 2,242 |
| MSH | Stage 3 | PAH-09 | Office | 3,322 |
| CRR Development Partner | Stage 3 | R1 | Health | 1,354 |
| MSH | Stage 3 | PAH-05A | Hospital | 6,569 |
| CRR Development Partner | Stage 4 | R2 | Research | 1,938 |
| CRR Development Partner | Stage 4 | E6 | Police Station | 1,503 |
| University of Qld | Stage 4 | PACE3 | Office | 1,291 |
| MSH | Stage 4 | PAH-01 | Hospital | 5,444 |
| MSH | Stage 4 | PAH-02 | Hospital | 4,649 |
| MSH | Stage 4 | PAH-3A and 3B | Hospital | 2,484 |
| MSH | Stage 4 | PAH-06 | Hospital | 3,800 |
| MSH | Stage 4 | PAH-07 | Health | 3,641 |
| MSH | Stage 4 | PAH-08 | Hospital | 3,840 |
| MSH | Stage 4 | PAH-10 | Health | 936 |

3.3 Impervious Area Analysis

An impervious area assessment was performed to determine the impact on impervious area, and potential runoff, resulting from the potential future development in the Boggo Road CRR PDA.

This analysis was undertaken using a GIS union / overlay analysis of the existing and developed scenario base. Assumed imperviousness fractions were adopted as shown in Table 3-4.

Catchment Condition

The scenario prior to the commencement of any CRR related works was adopted as the as shown in Attachment B (existing buildings) and described in Table 3-1 of this report. The scenario for the Reference Design was adopted as per Figure 3-1 and Table 3-3.

Refer Table 3-4 Imperviousness Area Calculation below for the total imperviousness of the site at the existing case and for the Reference Design.

Table 3-4 Imperviousness Area Calculation

| Land Use | Road | Park | Roof | Exposed Soil | Total |
|---------------------------------|--------|--------|---------|--------------|---------|
| Fraction Impervious | 90% | 5% | 100% | 55% | |
| Total Area | | | | | |
| Existing (m2) | 27,649 | 25,331 | 85,146 | 249,770 | 387,896 |
| Reference Design (m2) | 31,927 | 21,317 | 127,312 | 207,340 | 387,896 |
| Impervious Area | | | | | |
| Existing | 24,884 | 1,267 | 85,146 | 137,373 | 248,670 |
| Reference Design (m2) | 28,734 | 1,066 | 127,312 | 114,037 | 271,149 |
| Existing Imperviousness | | | | | 64% |
| Reference Design Imperviousness | | | | | 70% |

As shown in Table 3-4 Imperviousness Area Calculation, at ultimate development (2041) the total imperviousness of the Boggo Road CRR PDA is anticipated to increase by 16%. Proposed future development projects with the highest impact to the impervious area are:

- E-02
- E-03
- E-04
- PAH-05
- PACE-03
- TRI-02

The Boggo Road CRR PDA is currently well developed, and whilst the increase in the imperviousness will result in some minor increase in the total runoff generated by the site, this can be accommodated as part of the building design in the form of on-site detention systems.

3.4 Existing and Currently Planned Infrastructure

SMEC has undertaken a data gathering exercise to understand all the available stormwater information for the Boggo Road CRR PDA. This data was added into a GIS workspace along with the BCC Stormwater data to identify the accuracy of the BCC dataset and to determine which features could be used to extract attributes from. Figure 3-2 Existing Internal Main Stormwater Network (Boggo Road PDA), and Attachment C shows the known existing stormwater network.

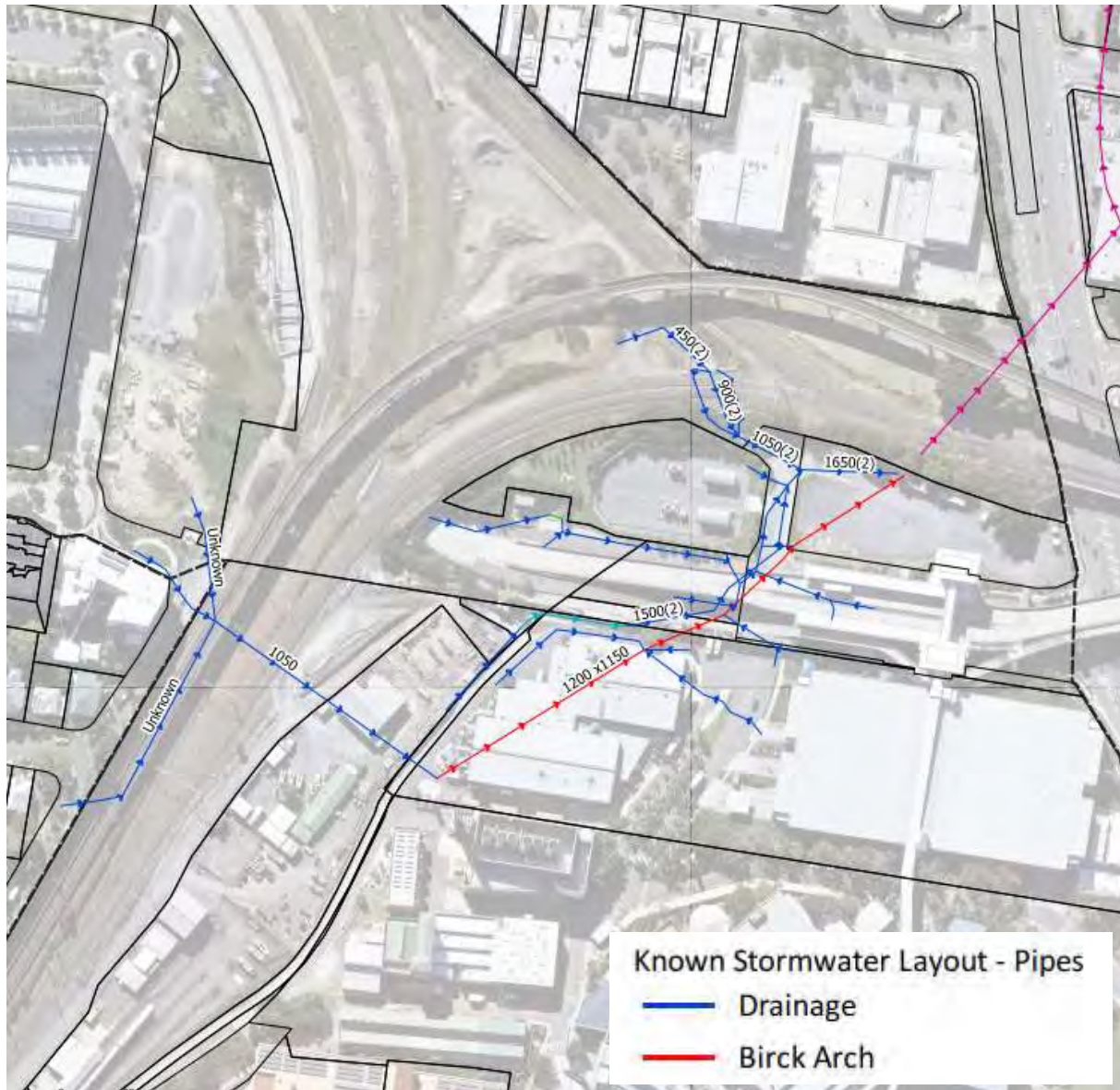


Figure 3-2 Existing Internal Main Stormwater Network (Boggo Road PDA)

BCC's Local Government Infrastructure Plan (LGIP) indicates future pipe relief works within the Norman Creek catchments, downstream of the PDA. The LGIP indicates those works are due to occur between 2021-2026, however Council has indicated in a meeting held in March 2021 that there are no currently planned infrastructure upgrades proposed for the catchment in the foreseeable future. Refer Attachment D for the currently LGIP stormwater plans for the area.

Some flooding mitigation works, including construction of detention basins are proposed as part of the CRR TSD works. The currently planned stormwater infrastructure as part of the TSD works is shown in Figure 3-3 Currently Planned Stormwater Infrastructure and Attachment D

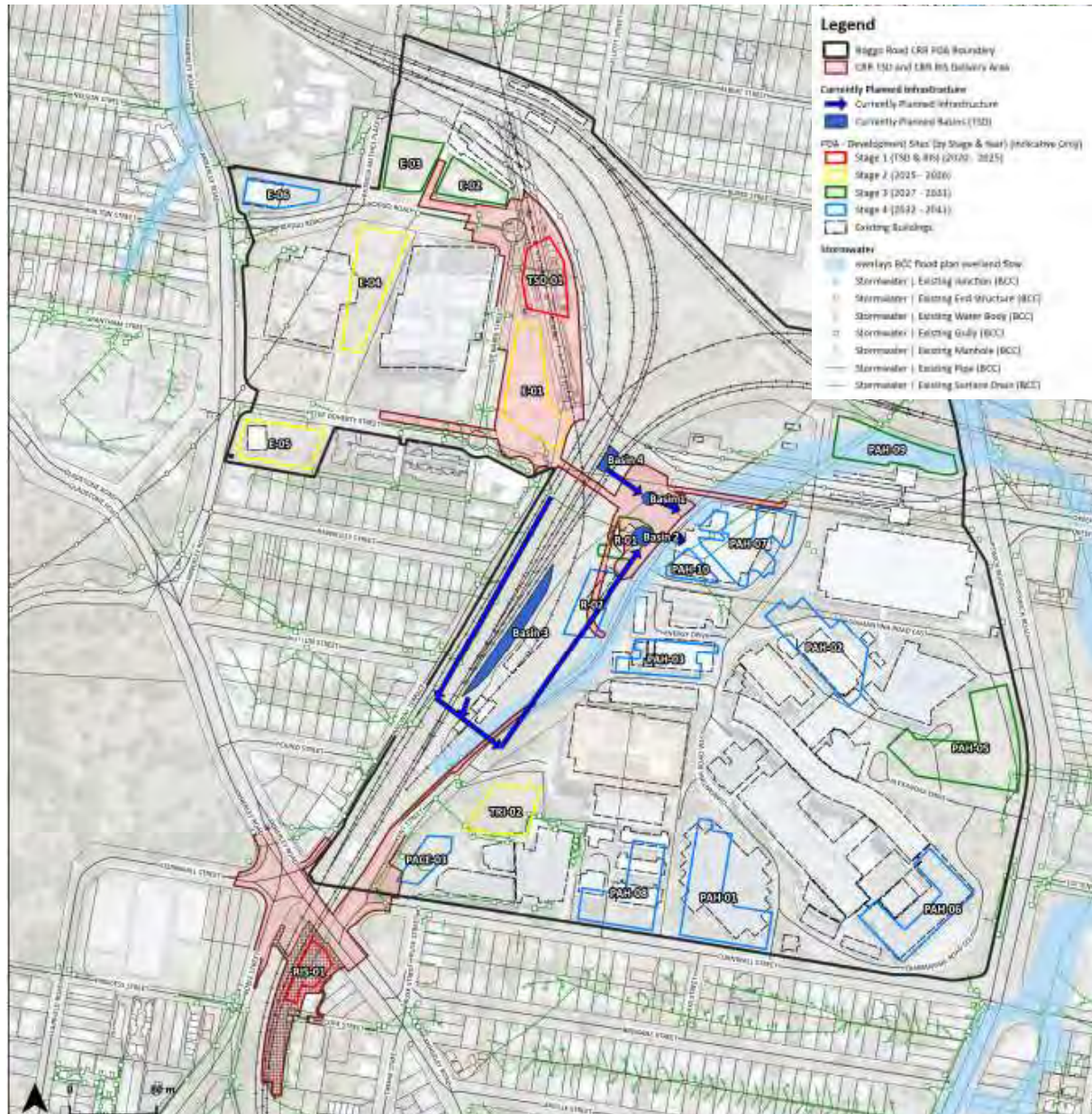


Figure 3-3 Currently Planned Stormwater Infrastructure

Note: Future PDA potential development opportunity sites and staging are conceptual and indicative only for infrastructure network analysis purposes.

4 Stormwater Assessment

4.1 Summary of Assessment

Further, BCC Planning Scheme (City Plan 2014) mapping identifies Kent Street and under the Eastern Busway as known locations for flooding nuisance with an overland flow path (BCC Flood Overlay) defined in this area (refer Figure 4-1 and Attachment E).

The trunk stormwater network was determined based on the available data and the catchments to the trunk network. The total catchment is 45 ha and includes the Ecosciences Precinct and nearby residential housing, Queensland Rail corridor, Princess Alexandra Hospital and Eastern Busway station.

The existing stormwater network was modelled using DRAINS software for the existing infrastructure located within and in the vicinity of the PDA, to identify existing constraints in the trunk network prior to the Boggo Road CRR PDA future development opportunities being realised. The major trunk network which begins in the suburb of Annerley, collects flow from the Boggo Road CRR PDA (Dutton Park) along Ipswich Road and continues through the suburbs of Woolloongabba and East Brisbane, collecting flow from auxiliary networks before discharging to Norman Creek near the Moorhen Flats Recreational Area along Lerna Street.

The tailwater for the network was chosen to be 9.5 m AHD, which is the approximate surface level of the stormwater infrastructure immediately downstream of the PDA. This was chosen as discussions with BCC during stakeholder meetings indicated that the network was known to be undersized and regularly flows full. Further, BCC advised that during the 10% AEP storm events, it is expected that the underground drainage network will be surcharging at that location.

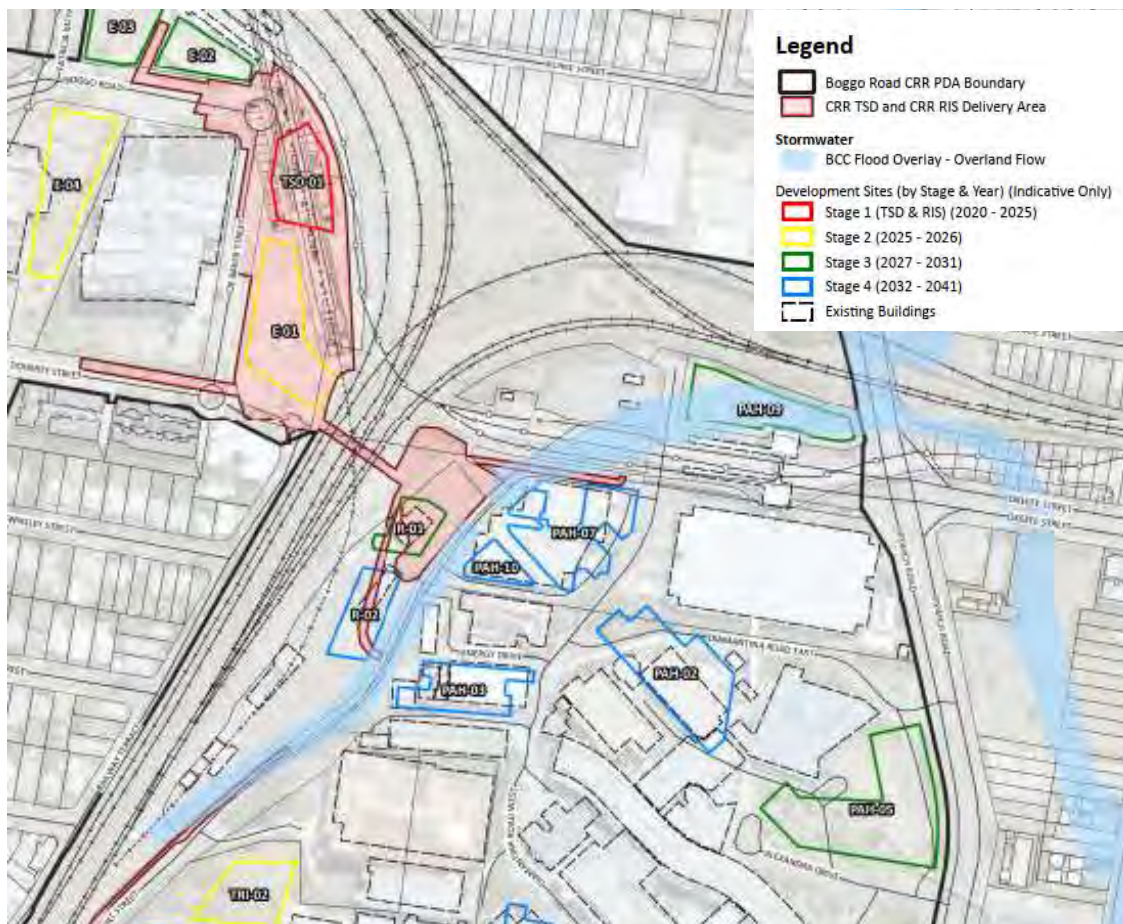


Figure 4-1 BCC Overland Flow Map for Boggo Road PDA

Note: Future PDA potential development opportunity sites and staging are conceptual and indicative only for infrastructure network analysis purposes.

4.2 Outcomes of Assessment

Initial DRAINS modelling undertaken by SMEC confirmed the trunk stormwater network was significantly undersized as suggested in the overland flow mapping (BCC City Plan, 2014) and stakeholder engagement meetings. Results showed that the trunk network could not convey the 10% Annual Exceedance Probably (AEP) event which is a desired level of service under the BCC City Plan 2014 for the planned future land uses. Multiple scenarios were modelled to determine the magnitude of the upgrades required to solve the stormwater conveyance issue. Outcomes were deemed unfeasible as the existing network, which is constructed underneath buildings, would require multiple parallel pipes to convey flow. Increasing the capacity of the

network in the Boggo Road CRR PDA would also increase pressures in already constrained, downstream pipes and would cause worsening in other areas. To fully understand the impact on the larger network, more detailed modelling would be required and potentially more upgrades beyond the PDA.

5 Preliminary Flooding Assessment of PDA

The flood report prepared for CRR TSD by Hatch dated February 2021 addresses the flooding conditions for part of the CRR PDA, following the completion of the CRR TSD works (scheduled for 2024/25). This provides an indication of the opportunities and constraints that will be presented for future development within the PDA.

5.1 External Constraints

A map of the existing Norman Creek catchment drainage infrastructure has been provided in Attachment C and shows the extent of the Norman Creek trunk network which is the greatest constraint of any potential infrastructure upgrades. As previously mentioned, upgrades to the stormwater network within the PDA may have impacts on the greater network that must be considered when determining the best option for stormwater mitigation within the PDA. Upgrades to the existing Norman Creek drainage infrastructure outside the PDA is not currently planned and is potentially unfeasible therefore has been considered as unchanged in all flood models completed to date.

5.2 Existing Flood Model

A flood model for the flood affected area of the CRR PDA area was prepared as part of the CRR TSD works.

The model completed analysed both scenarios, pre and post CRR TSD proposed works. It doesn't address however the additional impacts and mitigation required for the PDA development. As part of the CRR TSD works a number of mitigation measures, including augmentation of parts of the internal drainage network and the construction of on-site detention systems are proposed to mitigate the flooding impacts of the TSD works.

5.2.1 Outcomes of the Flood Model

As noted earlier, the CRR TSD works include a number of flood mitigation measures that will influence the further development of the PDA. The outcomes of the flood model identified the areas within the PDA that will remain affected by overland flooding after the TSD works, albeit in reduced scale that currently. This data has been used to define the planning controls for the development as described in the next sections.

6 Proposed Infrastructure Projects

As part of the CRR PDA development some further works may be required beyond the currently planned stormwater infrastructure. This includes:

- Relocation of TSD basin (item BGO-STW-01 as shown in attachment E).
- Relocation of the existing infrastructure located under future building PAH 09 (item BGO-SW-02 as shown in Attachment E).
- Relocation of the existing infrastructure located under future buildings PAH 07 and 10 (item BGO-STW-03 as shown in Attachment E)
- Flood mitigation measures around Kent Street at location of future buildings PAH-07, 09 and 10 (trunk infrastructure) – item BGO-STW-04.

The extent of proposed infrastructure projects is shown in Attachment E. Costs estimates for the trunk infrastructure project BGO-STW-04 is included in Attachment F, provided by PIE solutions.

Mitigation of flooding around Kent Street, PAH 07, 09 and 10 is required to achieve the DSS for stormwater and flooding within the PDA. To mitigate flooding within the PDA, one of the main opportunities is to safely store

the excess stormwater volumes in dedicated areas that would not affect the nominated future development sites. Since the required flood storage volume may be very large, there is an opportunity for stormwater harvesting and/or total water cycle management plan to be implemented in the PDA by introducing the volume of water stored back into the PDA for water reuse. This will reduce the flooding issues within and possibly outside the PDA as well as introducing additional sustainability outcomes. Further water balancing modelling is required to confirm the adequacy of this opportunity.

Stormwater Harvesting is normally associated:

- Rainwater tanks
- Greywater treatment plans
- Alternative water substitution measures

When worked in a building by building case it can have little impact in mitigating flooding and a total water cycle management plan may be considered instead. This is a more in-depth study involving:

- Developing a water cycle strategy
- Undertake detailed planning
- Preparing an implementation plan

The total water cycle management plan is more effective when applied over a larger Precinct rather than individual building.

It is recommended that Stormwater Harvesting and/or Total Water Cycle Management infrastructure solutions adopted within the PDA, specifically BGO-STW-04, embody best practice outcomes informed by relevant guidelines as listed below, which may be updated or replaced from time to time:

- Stormwater Harvesting Guidelines (2009), Water by Design, Health Waterways
- Total Water Cycle Management Planning Guideline for South east Queensland (2010), Water by Design, Healthy Waterways

7 Conclusion and Recommendations

SMEC's preliminary assessment of the trunk stormwater network has confirmed that the existing stormwater infrastructure does not have enough capacity to safely convey the stormwater runoff generated within the site to meet the nominated DSS for the PDA (10% AEP). It has also been determined that the constraints to the existing stormwater infrastructure network extend much further beyond the PDA.

A flood study prepared for the CRR TSD works has identified the flooding characteristics for the PDA, and identified some mitigation measures to be included as part of the CRR TSD works. Whilst this alleviates some of the flooding and drainage issues, it doesn't address all flooding constraints within the PDA.

There are a number of flooding constraints that need to be addressed as part of future works to achieve the nominated DSS for the PDA. The additional works may include a combination of additional stormwater detention measures to be incorporated to the PDA, improvements to the overland flow paths throughout the PDA, and augmentation of the existing underground drainage network. Any works adopted, however, cannot cause any worsening to surrounding properties, roads and rail transport infrastructure (both surface and underground). Thus, augmentation works may be required to be undertaken in areas downstream of the PDA.

The detailed options for the mitigation works, their feasibility, and practicality can only be determined once further studies are undertaken for the area. Based on the outcomes of the flooding study for CRR TSD, the following measures are recommended to be adopted as mitigation works and future assessment requirements:

- All future developments within the PDA are to provide an internal detention system.
- Development applications lodged within the Boggo Road CRR PDA are to include:
 - a Site-Specific Stormwater Assessment (SSSA) for future development of land mapped as "Discharge Control" on Figure 7-1 for the proposed development sites and buildings which are to provide mitigation measures as needed.

- a Detailed Flood Modelling Assessment (DFMA) for future development of land mapped as or gaining access from land mapped as “Flood Impact Assessment” on Figure 7-1 for the proposed development sites and buildings which are to provide mitigation measures as needed.

It is noted that this may result in reduced developable areas for some development sites.

- Future developments are to include a Flood Emergency Evacuation plan to mitigate risks due to limited accessibility during more intense storms.
- Residential uses to be avoided in areas affected by flooding (including those with limited accessibility), or land mapped as or gaining access from land mapped as “Flood Impact Assessment” on Figure 7-1.
- Future use of flood affected areas is to be in accordance with Brisbane City Plan (2014) Flood Overlay Code.
- Areas of ponding depth greater than 300mm to be protected from access by the public.
- PDA roads and open areas to be designed to ensure safe access is provided and unobstructed overland flow with safe depth vs velocity achieved.
- Unobstructed overland flow paths are incorporated into future PDA development and infrastructure designs, together with the relocation of pipes under existing buildings, to minimize the flooding hazard within the site.

The above items are to ensure the safety of both users and materials, assuming the DSS is not achieved for development sites within the PDA (due to existing and future stormwater/flooding issues). Some of the above will not be necessary if the drainage network (both underground and overland flow) is augmented in order to achieve the nominated DSS. It is anticipated however that this will require extensive works within and outside the PDA and may not be feasible. Refer to Attachment C for the catchment drainage system.

Some of the measures abovementioned may only be applicable to certain cases and not in all areas within the PDA. The main criteria that indicate what measures are relevant is the flooding impacts at the location of the proposed works. Areas within the PDA that are not flood prone do not require detailed flood modelling to be undertaken. For those areas, runoff discharge control measures should be in place (such as onsite detention systems) to ensure there is no increase in peak flow runoff from the site or obstruction of flows from upstream catchment.

For development within flood affected areas, a flood impact assessment (supported by detailed flood modelling) is recommended to understand the impacts of the development and identify appropriate mitigation measures that may be incorporated into the development. This flood impact assessment is best undertaken using 2d flooding modelling, such as the most commonly used in Australia TufLOW, Mike Flood, Hec-Ras 2D. There is an opportunity for the Implementation of stormwater harvesting and/or total water cycle management as part of the flood mitigation measures.

The current BCC Overland Flow map indicates areas that are affected by overland flow type of flooding. However, the flood model prepared by Hatch provides a more accurate representation of the flooding within the site, due to the use of more site-specific data. It is recommended therefore that the information from the Hatch flood model be used to determine what level of assessment is required for each site. This is represented in Figure 7-1 Flooding Planning control below and in more detail in Attachment H.





BOGGO ROAD CRR PDA STORMWATER ANALYSIS
Cross River Rail
Prepared for Cross River Rail Delivery Authority





Appendix A PDA Potential Development Scenario Staging Plan

Boggo Road Cross River Rail Priority Development Area Baseline Potential Development Scenario Staging Plan - Reference Scheme

Legend

-  Boggo Road CRR PDA Boundary
 CRR TSD and CRR RIS Delivery Area





PDA - Development Sites (by Stage & Year) (Indicative Only)

-  Stage 1 (TSD & RIS) (2020 - 2025)
-  Stage 2 (2025 - 2026)
-  Stage 3 (2027 - 2031)
-  Stage 4 (2032 - 2041)

Transport - Road, Transit

- Road
○— Busways
..... Tracks, Paths & Malls

Transport - Rail

-  Operational
 Under Construction
 CRR TSD Boggo Road Station
 CRR RIS Dutton Park Station

Property - DCDB

- Base Parcels

NOTE:

Future PDA potential development opportunity sites and staging are conceptual and indicative only for infrastructure network analysis purposes.

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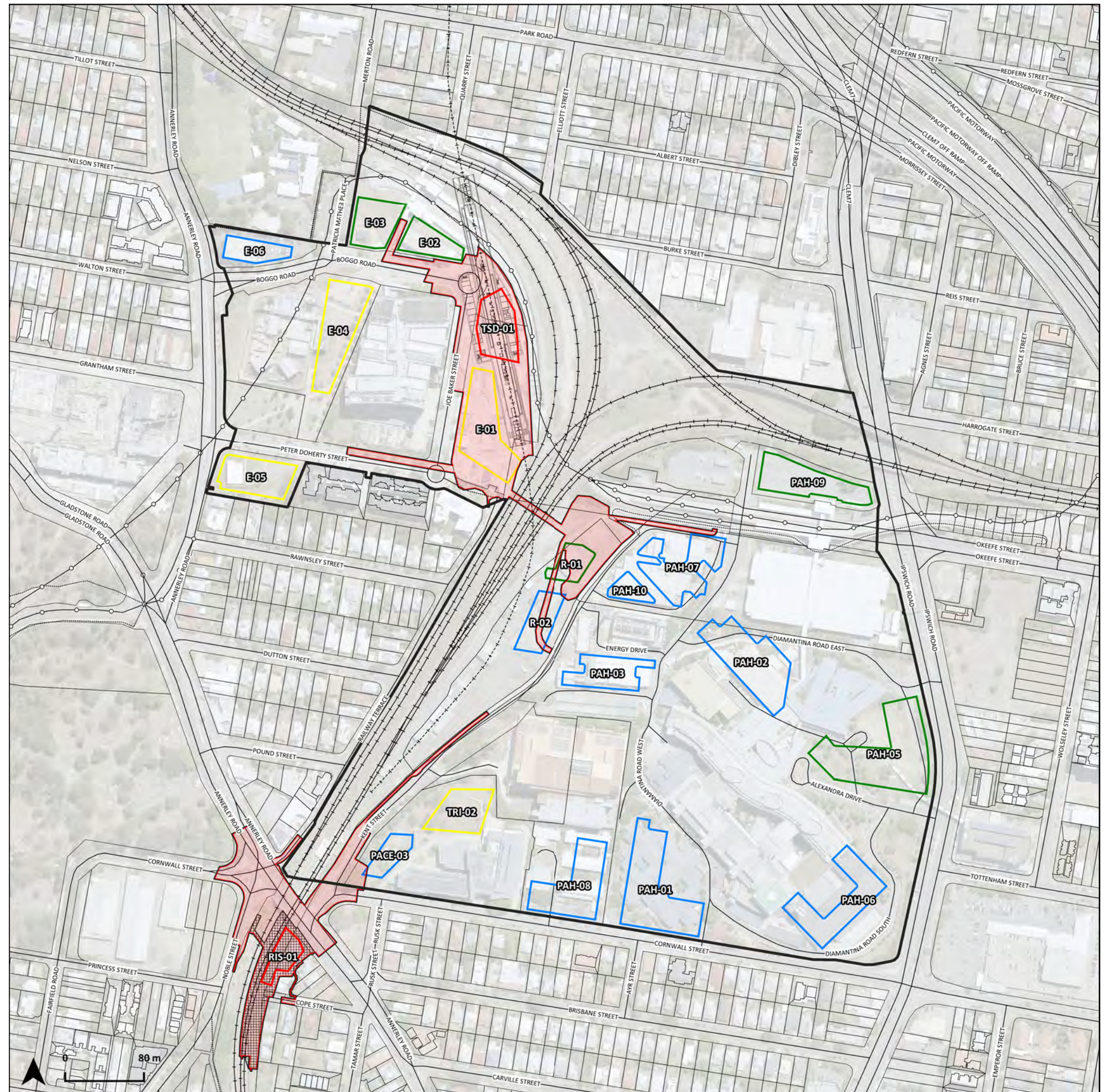
QLD Government 2021, Brisbane City Council 2021, Urban Utilities 2020

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Appendix B Collated Norman Creek Stormwater Network Plan

Boggo Road Cross River Rail Priority Development Area

Stormwater

Collated Norman Creek Stormwater Network Plan

Legend

- PDA
Boggo Road CRR PDA Boundary
- Buildings
- Development Sites (by Stage & Year) (Indicative Only)
Existing Buildings
- Stormwater
- Stormwater | Existing Junction (BCC)
 - Stormwater | Existing End Structure (BCC)
 - Stormwater | Existing Water Body (BCC)
 - Stormwater | Existing Quality Improvement Device (BCC)
 - Stormwater | Existing Gully (BCC)
 - Stormwater | Existing Manhole (BCC)
 - Stormwater | Existing Pipe (BCC)
 - Stormwater | Existing Surface Drain (BCC)
- Roads & Public Transport
- Existing Rail
- CRR Alignment
 - CRR TSD Boggo Road Station
- Base
- Base Parcels

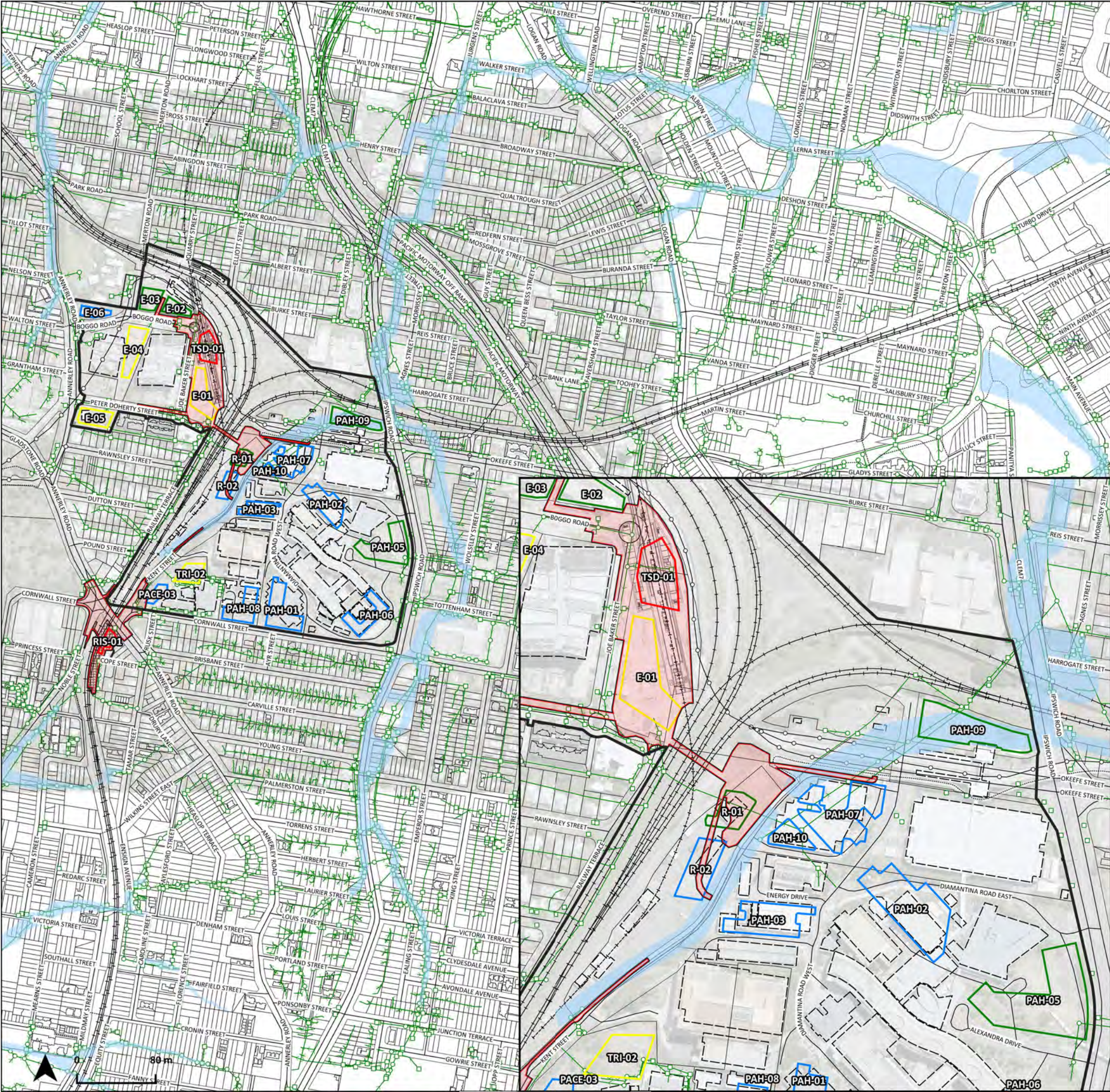
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Appendix C Currently Planned Stormwater Infrastructure

Boggo Road Cross River Rail Priority Development Area

Currently Planned Stormwater Infrastructure

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Currently Planned Infrastructure

- Currently Planned Infrastructure
- Currently Planned Basins (TSD)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Stormwater

- overlays BCC flood plan overland flow
- Stormwater | Existing Junction (BCC)
- Stormwater | Existing End Structure (BCC)
- Stormwater | Existing Water Body (BCC)
- Stormwater | Existing Gully (BCC)
- Stormwater | Existing Manhole (BCC)
- Stormwater | Existing Pipe (BCC)
- Stormwater | Existing Surface Drain (BCC)

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Transport - Rail

- Operational
- Under Construction
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Parcels

NOTE:

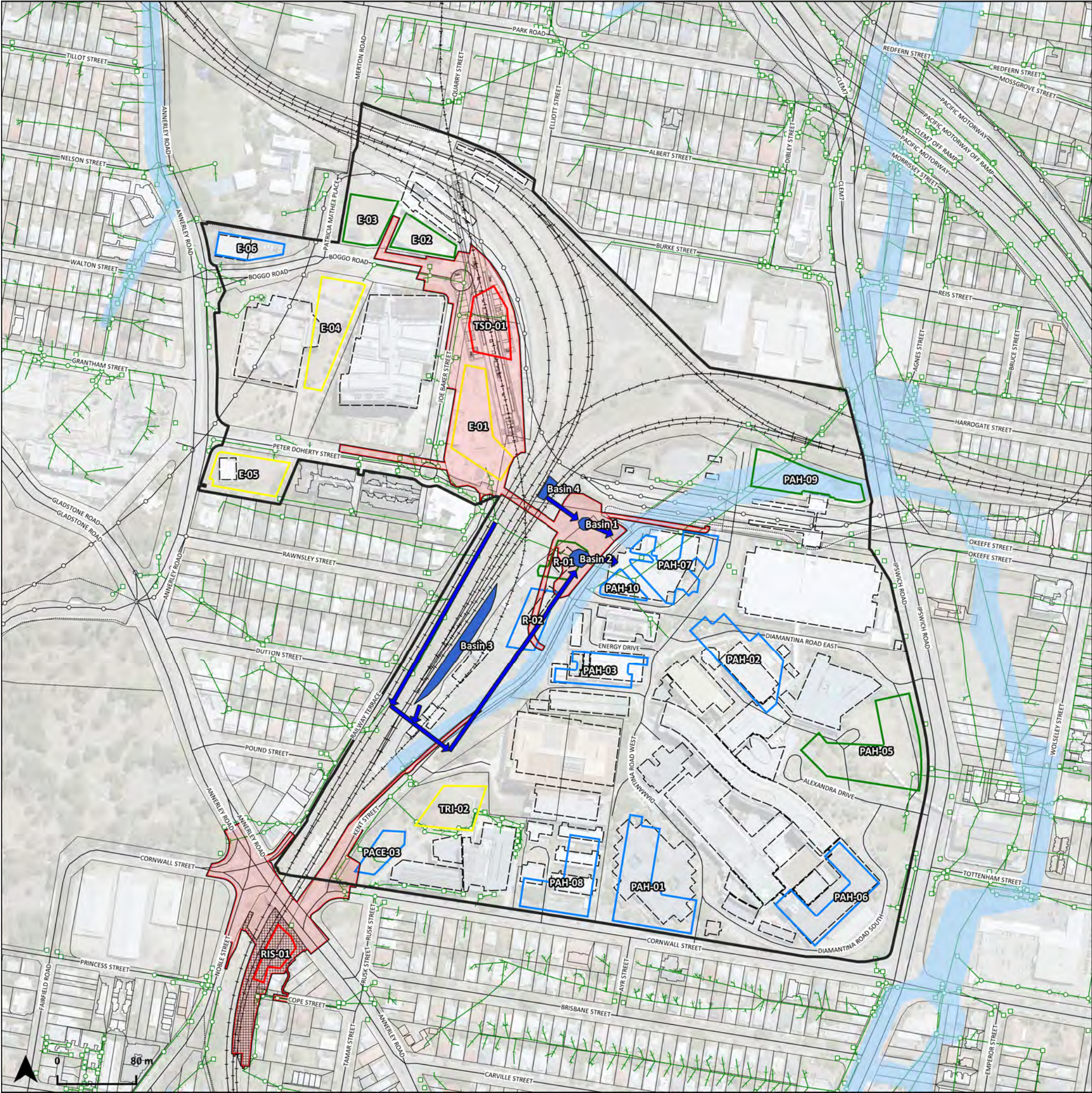
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Future infrastructure

- Backflow prevention device
- Wetland
- Pipe - new
- Pipe - relief
- Natural channel
- Bioretention swale
- Culvert
- SQID
- Concrete lined channel
- Land acquisition - waterway corridor
- Natural channel
- Rehabilitation

Existing infrastructure

- Pipe
- Culvert
- SQID
- Natural channel
- Land acquisition
- Natural channel
- Rehabilitation
- SQID

Boundaries

- Suburb boundaries
- Priority infrastructure area
- Stormwater service catchments
- Property boundaries
- Individual network map boundaries
- Waterways

NOTES

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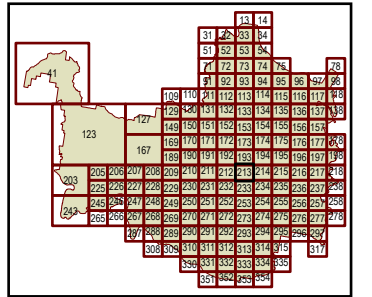
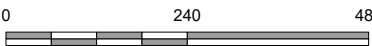
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Projection: Map Grid of Australia, Zone 56
Horizontal Datum: Geocentric Datum of Australia 1994

Approximate Scale @ A3 1:10,000



Plans for Trunk Infrastructure
Stormwater Network
Map SW213



Appendix D BCC Flood Overlay – Overland Flow

Boggo Road Cross River Rail Priority Development Area

BCC Overland Flow

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Stormwater

- BCC Flood Overlay - Overland Flow

Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Transport - Rail

- Operational
- Under Construction
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Parcels

NOTE:
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Appendix E Proposed Stormwater Relocation (CRR)

Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Stormwater Infrastructure

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area
- PDA - Development Sites (by Stage & Year) (Indicative Only)
- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Stormwater Projects (All Stages)
- Stormwater Project Location
- Stormwater Project Alignment
- Transport - Road, Transit
- Road
- Busways
- Tracks, Paths & Malls
- Transport - Rail
- Operational
- Under Construction
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station
- Property - DCDB
- Base Parcels

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Appendix F Trunk Stormwater Cost Estimate

Detailed Infrastructure Schedule of Works – DCOP Trunk Infrastructure

Table 1: Schedule of future trunk infrastructure works – Stormwater

| DCOP ID | Map no. | Infrastructure type | Infrastructure description | Pipe diameter (mm) | Pipe length (m) | Estimated timing | Land cost | Works base cost | Works on-costs | Works contingency | Total works cost | Trunk establishment cost |
|-----------|---------|-----------------------|---|--------------------|-----------------|------------------|-----------|-----------------|----------------|-------------------|------------------|--------------------------|
| BGO-SW-04 | 2 | Stormwater Harvesting | Stormwater harvesting and water balancing with wider catchment benefits | N/A | N/A | 2032-2041 | \$0 | \$1,000,000 | \$170,000 | \$175,500 | \$ 1,345,500 | \$ 1,345,500 |

Notes:


1 – Location of proposed stormwater harvesting solution yet to be determined

2 –All costs are expressed in current cost terms as at the base date (FY 2021/22).

Appendix G Flood Planning Map


Boggo Road CRR PDA
Stormwater
Map 30032260-BOG-STO-MAP-0003
BCC Overland Flow and Flood Impact


Legend

 Boggo Road CRR PDA Boundary

PDA | TSD Delivery Area


Development Sites (by Stage & Year) (Indicative Only)


 Existing Buildings


 Base Parcels

PDA - Development Sites (by Stage & Year) (Indicative Only)


 Stage 1 (TSD & RIS) (2020 - 2025)

 Stage 2 (2025 - 2026)

 Stage 3 (2027 - 2031)

 Stage 4 (2032 - 2041)

Flood Planning Control

 Discharge Control

 Flood Impact Assessment

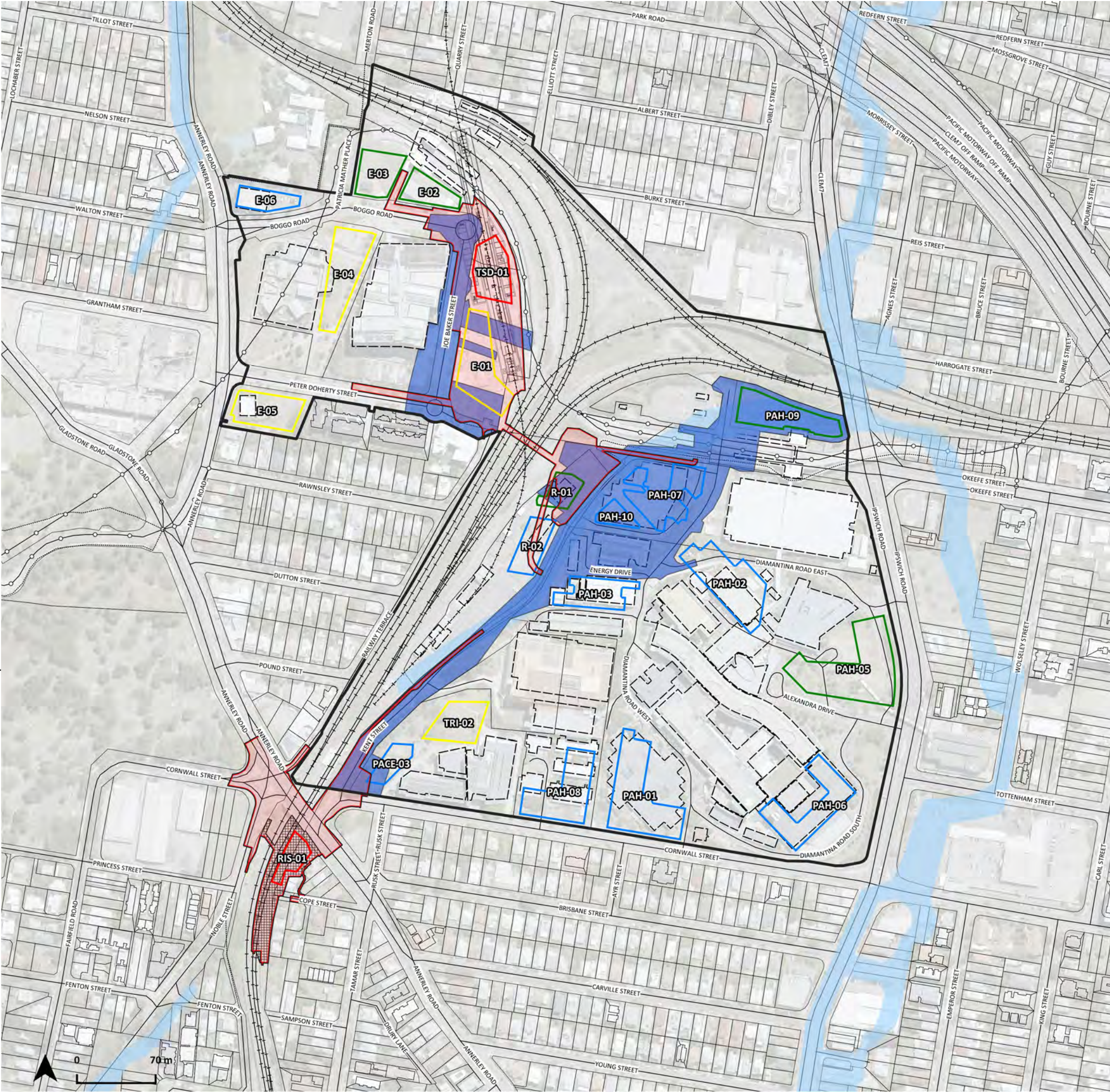
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Data Sources
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Boggo Road Cross River Rail Priority Development Area
Stormwater
Map 01 | Flood Planning Map

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

- Flood Planning Control
- Discharge Control
 - Flood Impact Assessment

Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

- Transport - Road, Transit
- Road
 - Busways
 - Tracks, Paths & Malls

- Transport - Rail
- Operational
 - Under Construction
 - CRR TSD Boggo Road Station
 - CRR RIS Dutton Park Station

- Property - DCDB
- Base Parcels

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SMEC INTERNAL REF. 30032260

**Boggo Road CRR PDA Planning – Transport
Summary Report**

Cross River Rail Delivery Authority – Transport Summary - Infrastructure Plan Background Report

Client Reference No. CRRDA_219_8

Prepared for Cross River Rail Delivery Authority

9 June 2022

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Appendix A Roads and Public Transport Infrastructure Elements Plans

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1 Introduction

1.1 Background

This transport network summary report provides an assessment of the existing roads, public transport (PT) and active transport (AT) (pedestrians and cyclists) infrastructure supporting the Boggo Road Cross River Rail (CRR) Priority Development Area (PDA) and opportunities to enhance provision to ensure:

- Access to/from the new Boggo Road CRR Station
- Access to/from and between future Boggo Road CRR PDA developments
- Access within the wider network
- Increased AT and PT mode share as a result of both the above.

The Queensland Government's CRR Precincts Delivery Strategy (The Strategy) sets a vision for each CRR Station Precinct that is aligned to the Government's policy priorities. The Strategy sets out a vision for the Boggo Road Precinct to become a world class innovation precinct, specialising in health, science and education jobs of the future.

This is to be achieved through enhancing the already established world-class health and research facilities with a focus on health, science, and education services. The Boggo Road CRR PDA will reinforce and maximise the precinct's role as a regionally significant economic cluster and enhance its reputation as a globally significant innovation precinct, facilitating skilled employment.

To support the vision for the precinct, the Boggo Road CRR PDA was declared by the Minister for Economic Development Queensland (MEDQ) on 2 October 2020 and an Interim Land Use Plan (ILUP) given effect. The Boggo Road CRR PDA was also declared to assist with the delivery of the CRR Project's broader objectives.

Significant existing facilities and government land holdings are located within the Boggo Road CRR PDA which will support the continued focus and investment in health, science, innovation, research and education services. These facilities and land holdings include the Boggo Road Knowledge and Innovation Precinct (which includes the Ecosciences Precinct, Dutton Park Police Station and the heritage listed Boggo Road Gaol), the Pharmacy Australia Centre of Excellence (PACE), the Translational Research Institute (TRI) and the PAH.

The Boggo Road CRR PDA is generally bounded by Burke Street to the north, Cornwall Street to the south, Annerley Road to the west, and Ipswich Road to the east. The Boggo Road CRR PDA does not include Dutton Park State Primary School or the new Brisbane South State Secondary College (BSSSC) although these facilities have an important relationship to the health, science, innovation, research and education focus of the Boggo Road CRR PDA.

The MEDQ has delegated certain functions and powers under the Economic Development Act 2012 to the Cross River Rail Delivery Authority (CRRDA) including to plan, carry out, promote or coordinate activities to facilitate economic development and development for community purposes. The CRRDA has prepared a Development Scheme for the Boggo Road CRR PDA which regulates development on land within the boundaries of the Boggo Road CRR PDA. From the date of approval, the development scheme replaces the Boggo Road CRR PDA ILUP.

1.2 Study Area

The Boggo Road CRR PDA, identified in Figure 1-1, is approximately 39 hectares. It is a transit rich environment that includes a significant public transport interchange incorporating the new underground Boggo Road CRR station and tunnels (CRR Tunnels, Station and Development – CRR TSD), existing Park Road surface rail station and the new CRR Rail Integration and Systems (CRR RIS) delivered Dutton Park Station (providing improved access to the PAH), and rail lines (Beenleigh/Gold Coast and Cleveland lines), and existing Eastern Busway stations (Princess Alexandra Hospital (PAH) and Boggo Road) and tunnels. The Boggo Road CRR PDA also

includes significant existing and planned AT infrastructure including the PAH cycleway and the new Central Active Transport Connection Bridge (Central Bridge) which is being delivered as part of the CRR project. Figure 1-1 shows the Boggo Road CRR PDA Boundary as declared in October 2020.



Figure 1-1: Boggo Road CRR PDA Boundary – Prepared by CRRDA (Map 1)

1.3 Objectives

This report provides a summary assessment of roads, PT and AT network infrastructure and identifies potential upgrades required to service future proposed development within the Boggo Road CRR PDA and the surrounding network. The outcomes of this report have assisted in informing infrastructure plans for the Boggo Road CRR PDA Development Scheme and its supporting material, including a Development Charges and Offsets Plan (DCOP). This report sets out key transport infrastructure required to:

- Provide access and movement for all transport modes, with safety and convenience for walking and cycling prioritised over private and service vehicles
- Not impact on the efficiency or safety of surrounding transport networks
- Provide carparking and servicing to meet the functional requirements of the Boggo Road CRR PDA.

1.4 Assessment Methodology

This assessment was undertaken via onsite inspections, a desktop review of relevant documents research, and applying this to assess the proposed transport infrastructure. A range of relevant literature was reviewed, including:

- Brisbane City Council (BCC) City Plan 2014
- BCC Active Transport Strategy 2012-2026
- BCC Road Planning Notes

- Department of Transport and Main Roads (TMR): South East Queensland Principal Cycle Network Plan (SEQPCNP)
- TMR: Guideline, Selection and design of cycle tracks
- TMR: Queensland Walking Strategy 2019-2029
- TMR: Queensland Cycling Strategy 2017-2027
- Metro South Heath (MSH) PAH Masterplanning and technical reports
- Approved BCC development applications (DAs)
- Approved Ministerial Infrastructure Designation (MID) schemes
- Queensland Education Brisbane South State Secondary College (BSSSC) Masterplanning and technical reports.

The data, tools and research applied to undertake a desktop review of the proposed transport infrastructure include:

- Austraffic Classified Turn Counts 2021
- TTM Classified Turn Counts 2021 (Provided by MSH)
- TMR Open Data – Annual Cyclist Counts
- TransLink Ticketing Data 2019
- Brisbane Central Area Saturn Model (BCASM)
- Brisbane Strategic Transport Model (BSTM)
- Level of Service for Metrics (for Network Operations Planning) by Austroads (AP-R47515), Jan 2015
- SIDRA 9 to calculate intersection operation and performance
- Strava Global Heatmaps.

1.5 Desired Level of Service

In planning for future infrastructure provision and determining appropriate upgrades, it is noted that BCC's transport network Desired Standard of Service (DSS) contained in Part 4 – Local Government Infrastructure Plan (LGIP) of BCC's City Plan 2014 sets the following benchmarks:

- LGIP DSS Section 4.4.2.1 (d) – Road Networks:
 - (i) The off-peak operation of the road network provides a Level of Service (LoS) C
 - (ii) The peak period operation of the road network provides a LoS C, except where the road network is highly constrained and the use of alternative modes of transport in these areas is anticipated in the mode share targets stated in Map C3 Transport Network DSS Mode Share Targets.
- LGIP DSS Section 4.4.2.2 – Pathway Network:
 - (a) Provide a safe, attractive and convenient pedestrian and cycle pathway network that links residential areas to employment areas, major activity nodes, education facilities and PT interchanges, thereby encouraging walking and cycling as acceptable travel alternatives
 - (b) Plan, design and deliver the pathway network and associated infrastructure to comply with the following:

- (i) The pathway network classification (as identified on the Bicycle network overlay map), connectivity, safety and access in accordance with the Infrastructure design planning scheme policy and the Bicycle network overlay code
- (ii) Infrastructure design planning scheme policy (Chapters 1 and 4)
- (iii) Bicycle network overlay code
- (iv) Pathways are planned to provide for future demand needs in accordance with the Bicycle network overlay map and the Bicycle network overlay code.

It is noted that the Pathway Network does not apply a LoS, however, LoS C has been considered for typical commuter peaks noting a better LoS may be appropriate within and surrounding the PAH. Whilst future proofing for the use of micro-transport within the Boggo Road CRR PDA could encourage greater integration between Precinct 1 and Precinct 3 as described in section 2.1.

Future upgrades to or new AT infrastructure are recommended as options for consideration and discussion. These options have considered the feasibility of connections to the existing AT infrastructure internal and external to the Boggo Road CRR PDA.

For roads and PT, given the Boggo Road CRR PDA is within an existing concentrated urban environment which includes built-up land-uses along surrounding arterials and existing network congestion, there are limited opportunities to upgrade existing infrastructure. The assessment criteria of no net worsening of the physical condition or operating performance of state transport infrastructure and the associated transport network has been applied to this assessment. BCC road planning notes have been provided which are not committed works but identify the intention to plan for future network visions and provisioning of corridors for all transport modes.

Due to numerous constraints along Kent Street, the final form and tenure of this part of the PDA's movement network will be determined at development application stage. To facilitate the development of the R01 and R02 development sites prior to the PAH, interim upgrades to Kent Street will be required in addition to ultimate upgrades, enabled by the redevelopment of the PAH.

1.6 Exclusions and Limitations

This report is not providing detailed design of proposed future transport infrastructure or built form details such as carparking and service requirements. This report has assessed a Baseline Potential Development Scenario with potential land use yields and staging.

Further, the final land-use proportions are unknown, and the values outlined within this report are indicative for planning purposes. Finally, whilst the PAH campus is within the Boggo Road CRR PDA and assumptions have been made to accommodate this assessment at the time of writing, it is noted that PAH Masterplanning is being revised, and includes a transport assessment and a car parking management strategy which in turn requires a traffic impact assessment (TIA), and if necessary, any mitigation measures.

2 Boggo Road CRR PDA

2.1 Overview

2.1.1 Transport Vision and Connectivity by Precinct

The Boggo Road CRR PDA created the opportunity to reinforce the Precinct as a key southern city destination and transport interchange with direct connections to the CRR rail network and Brisbane Metro services.

New and enhanced high-quality, sub-tropical, public realm will provide improved connectivity for pedestrians and cyclists between rail, bus and major institutional facilities within and surrounding the precinct. New civic spaces will be vibrant, open, and green, and revitalisation of landmarks such as the Boggo Road Gaol will celebrate the precinct's unique history and identity and contribute to its distinct character.

The Boggo Road CRR PDA Development Scheme refers to the Boggo Road CRR PDA being made up of three (3) precincts, each having its own precinct intent and preferred uses. Figure 2-1 shows the Boggo Road CRR PDA boundary and the three (3) distinct precincts.

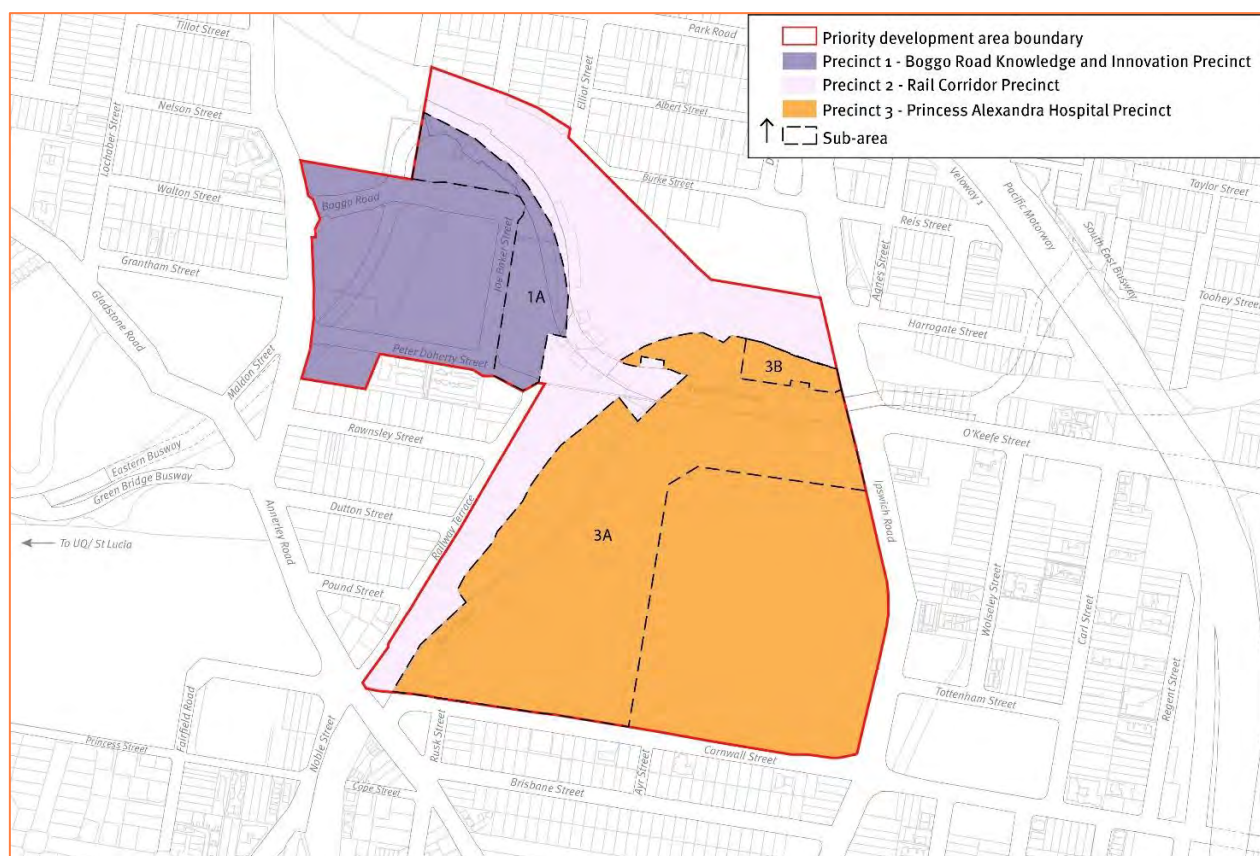


Figure 2-1: Boggo Road CRR PDA Development Scheme – Precinct Boundary Map – Prepared by Place Design Group

2.1.1.1 Precinct 1 – Boggo Road Knowledge and Innovation Precinct (Boggo Road Precinct) – Precinct Intent

This is a vibrant mixed-use precinct, with concentration on knowledge, research and innovation activities integrated with high-quality public realm. The precinct will be a high frequency transit destination and thriving hub of activity, providing a memorable and engaging experience for commuters, workers, visitors, students, and local community. The precinct is not intended to accommodate additional residential development, however, a site has an existing development approval (granted by Brisbane City Council (BCC) in March 2021) for 82 units.

2.1.1.2 Precinct 2 – Rail Corridor Precinct – Precinct Intent

This precinct is intended to maintain the primary function of accommodating key state transport corridors, including the heavy railway and busway corridors that traverse the Boggo Road CRR PDA. Through the delivery of the Central Bridge, the precinct will serve an important role in resolving a complex physical barrier between Boggo Road and PAH Precincts by improving AT functionality and access.

The rail corridor precinct:

- Will maintain appropriate interfaces to development and infrastructure both within the precinct, and as it interfaces with the Boggo Road Knowledge and Innovation precinct and PAH precinct
- May provide opportunities for innovative approaches for the provision of additional areas of open space, movement or new land uses that complement the PDA.

2.1.1.3 Precinct 3 – Princess Alexandra Hospital (PAH) Precinct – Precinct Intent

This precinct is anchored by the PAH, a national leading tertiary health care centre and associated world-class academic and research institutions, the TRI and PACE. The continued growth and advancement of these major health and knowledge facilities will drive renewal and redevelopment across the precinct.

The precinct will accommodate new hospital and research related development and facilities that respond to the changing community health needs, optimised clinical operations and renewal of ageing buildings or non-essential uses. Through staged renewal and redevelopment, the precinct will provide new and enhanced public spaces, improved wayfinding, and support complementary uses and improved amenity for patients, employees, and visitors. Development within Sub-Area 3A will accommodate clinical uses and a greater intensity of research, innovation, and allied commercial activity, situated along the rail corridor, and leveraging off the improved AT functionality of the Central Bridge.

2.2 Land Use Scenario and Indicative Strategy

The land use mix for the Boggo Road CRR PDA is anticipated to be predominantly office, Hospital/health, research, and education, with a minor amount of residential, retail and commercial uses. The Baseline Potential Development Scenario – Reference Scheme and the potential land uses are as listed in Table 2-1 noting it is a reference scheme and subject to change both in scale and timing. Whilst Appendix C includes the potential development yields and indicative staging plans for Boggo Road CRR PDA planning, there are three (3) potential development stages and associated sites being investigated, as illustrated below in Figure 2-2.

Table 2-1: Boggo Road CRR PDA Potential Land Uses (GFA) and Units – Reference Scheme (Indicative Only)

| Stage (Timing) | Building Name | Land Use | GFA/Dwelling | Units |
|--------------------------|---------------|-------------|--------------|-----------|
| Stage 2 (2025 – 2026) | E-01 | Office | 32,910 | GFA |
| | E-04 | Retail | 1,935 | GFA |
| | | Commercial | 2,550 | GFA |
| | E-05 | Residential | 82 | Dwellings |
| Stage 3 (2027 – 2031) | TRI2.0 | Office | 6,616 | GFA |
| | E-02 | Office | 23,968 | GFA |
| | E-03 | Office | 22,526 | GFA |
| | PAH-9 | Office | 60,060 | GFA |
| | R-01 | Health | 14,550 | GFA |
| Stage 4 (2032 – 2041) | PAH-05 | Hospital | 39,220 | GFA |
| | R-02 | Research | 19,730 | GFA |
| | PACE3 | Office | 8,500 | GFA |
| | PAH-2 | Hospital | 32,724 | GFA |
| | PAH-1 | Hospital | 22,620 | GFA |

| Stage (Timing) | Building Name | Land Use | GFA/Dwelling | Units |
|----------------|---------------|----------|--------------|-------|
| | PAH-6 | Hospital | 14,288 | GFA |
| | PAH-8 | Hospital | 26,040 | GFA |
| | PAH-7 | Health | 26,505 | GFA |
| | PAH-10 | Health | 9,495 | GFA |
| | PAH-3A | Hospital | 7,000 | GFA |
| | PAH-3B | Hospital | 18,000 | GFA |
| | E-06 | Office | 10,800 | GFA |

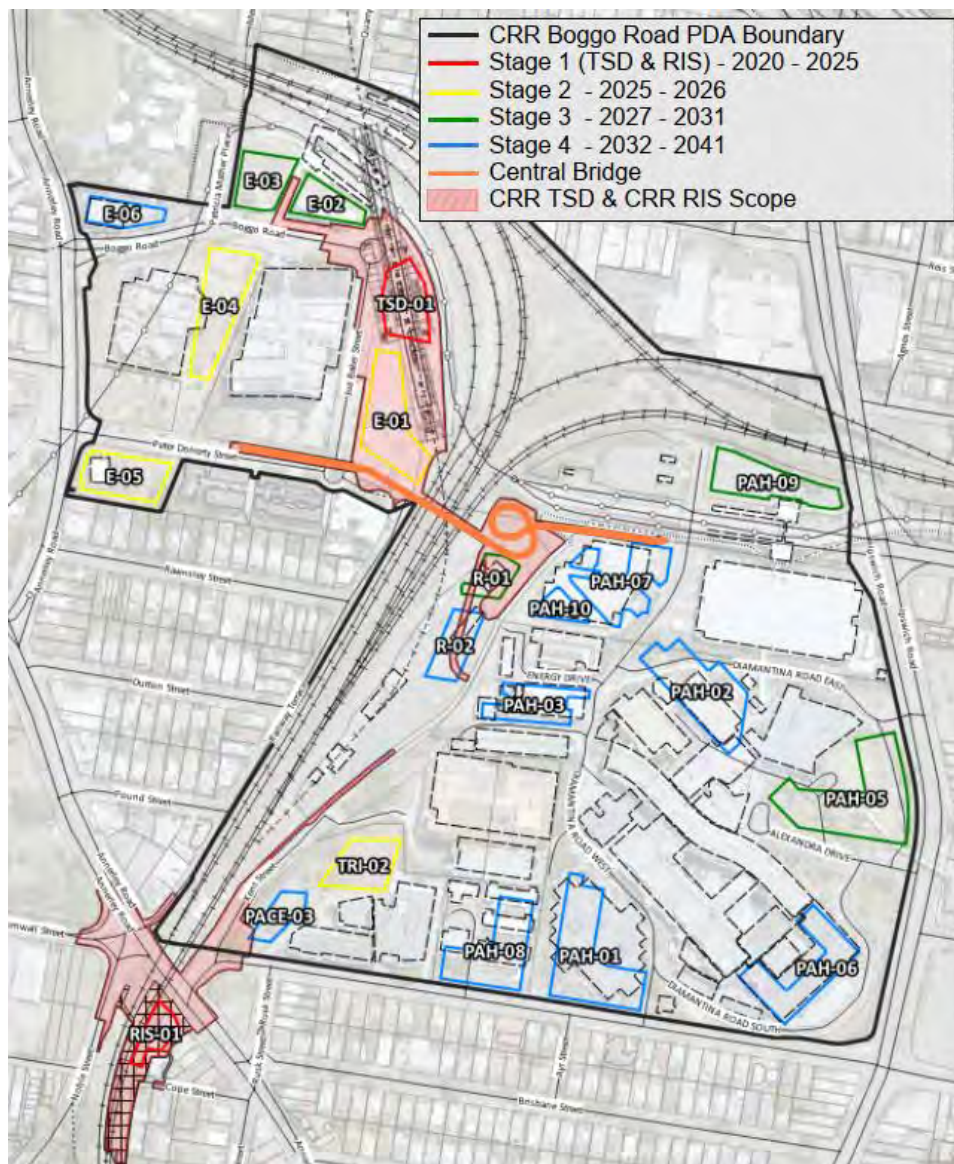


Figure 2-2: Boggo Road CRR PDA Potential Future Development Sites – Reference Scheme

Note, future PDA potential development opportunity sites and staging are conceptual and indicative only for infrastructure network analysis purposes.

Each of these land uses will generate some traffic demand, however, given the Boggo Road CRR PDA has access to excellent PT accessibility with three (3) existing major PT stations and AT infrastructure, it is expected that a significant proportion of the travel demand will be satisfied by non-private vehicle mode share. Further, the future re-development will be replacing some previous land uses where the traffic generated will be offset against the new developments.

Note, the final land-use proportions are unknown, and these values are for planning purposes only, making the list above indicative only. It should be noted that splits between certain land uses, particularly commercial and office, are not known at this stage. Reasonable assumptions and sensitivity analysis have been applied where possible for the assessment.

2.3 Trip Rate Development

The assessments outlined in this report are based on a traffic model developed to determine the impacts (if any) on existing roads, PT and AT transport infrastructure by the ultimate development year (2032 – 2041). Trip generation rates were developed by:

- Determining the potential land uses of the Boggo Road CRR PDA
- Sourcing acceptable traffic generation rates for each of the land-uses, while considering PT and AT mode shares
- Applying the traffic demand to the traffic model to distribute according to existing travel patterns
- Using the assigned traffic demands to determine the impacts on the infrastructure.

2.3.1 Mode Share

CRR Station trip modelling assisted in evaluating the future mode share forecasts for this precinct. Whilst individual precincts may have localised mode shares (e.g. PAH is more car focused than the Boggo Road CRR PDA overall due to the nature of its land use), the overall mode share forecasts anticipate a reduction in car usage in favour of PT by the ultimate development year, aligning with the vision for the Boggo Road CRR PDA Development Scheme.

2.3.2 Broad Study Assumptions

The following assumptions were applied to the trip generation calculations:

- Current trip rates have an amount of mode share (i.e. non-vehicle trips). Rates were pro-rated to account for current mode share to proposed mode share for future long-term stages
- Hospital trip rates were based off existing boom gate data provided by MSH for the PAH's existing multistorey carpark facility. It is acknowledged as a limitation of the current assessment that future trip rates will be revised by MSH as part of the revised PAH Masterplan.
- Given the forecasted mode share shift to PT, and PT focus of the Boggo Road CRR PDA, high mode share shifts are applicable for the associated trip generation rates
- The proportions of trips to and from the Boggo Road CRR PDA for each trip purpose and peak period assume the current in/out splits of the existing road network.

2.4 Trip Generation

It is assumed that the minor retail land uses do not contribute to additional trips as they most likely consist of smaller scale stores that people visit as part of other trip or work purposes. A range of trip generation rates were used to assess different rates of PT and AT take-up. Based on the typical industry standard peak hour trip generation rates, Table 2-2 provides trips for the AM and PM peak periods for the high mode share scenario.

Table 2-2: Boggo Road CRR PDA – AM and PM Trip Generation by Typical Rates (Vehicles Per Hour)

| Stage | Precinct 1 | | | | Precinct 3 | | | | Total | | | |
|---------|------------|-----|----|-----|------------|-----|----|-----|-------|-----|----|-----|
| | AM | | PM | | AM | | PM | | AM | | PM | |
| | IN | OUT | IN | OUT | IN | OUT | IN | OUT | IN | OUT | IN | OUT |
| Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stage 2 | 123 | 30 | 38 | 102 | 18 | 2 | 3 | 13 | 123 | 30 | 38 | 102 |
| Stage 3 | 127 | 17 | 23 | 93 | 226 | 33 | 40 | 174 | 127 | 17 | 23 | 93 |
| Stage 4 | 29 | 4 | 5 | 22 | 168 | 32 | 25 | 156 | 29 | 4 | 5 | 22 |
| TOTAL | 279 | 52 | 66 | 217 | 413 | 67 | 68 | 343 | 279 | 52 | 66 | 217 |

2.5 Carparking Rates

The purpose of this section is to identify maximum proposed parking spaces for existing GFA/land uses for sites within the Boggo Road CRR PDA for which parking will be available. It has been noted that future proposed developments E-04 and E-05 have BCC approved development permits, whilst TRI2.0 has an approved Ministerial Infrastructure Designation (MID), with PACE3 anticipated to be approved in the near future (at the time of writing). It is also noted that MSH are undertaking a carparking management strategy of the PAH which could feed into this assessment at a later stage. Car parking rates applicable to the Boggo Road CRR PDA Development Scheme have been adapted from BCC City Plan 2014 as per Table 2-3.

Table 2-3: Recommended Carparking Rates

| Use | Carparking Rates – Maximum number of spaces |
|--|---|
| Uses other than multiple dwelling, parking station, rooming accommodation and short-term accommodation (which are separately identified below) | Boggo Road knowledge and innovation Precinct 1: <ul style="list-style-type: none"> 1 space per 100m² gross floor area (GFA). |
| | Princess Alexandra Hospital Precinct 3 – Area A (refer Figure 2-3): <ul style="list-style-type: none"> 1 space per 300m² gross floor area (GFA) |
| | Princess Alexandra Hospital Precinct 3 – Area B (refer Figure 2-3): <ul style="list-style-type: none"> 0.5 spaces per bed plus 0.8 spaces per staff for Hospital 1 space per 200m² gross floor area (GFA) for uses other than Hospital. |
| Multiple dwelling | <ul style="list-style-type: none"> 0.5 space per 1-bedroom dwelling 1 space per 2-bedroom dwelling 1.5 spaces per 3-bedroom dwelling 2 spaces per 4 and above bedroom dwelling 1 visitor space for every 20 dwelling units Parking may be provided in tandem spaces where 2 spaces are provided for 1 dwelling At least 50% of visitor parking is provided in communal areas, and not in tandem with resident parking. |
| Rooming accommodation, and Short-term accommodation | <ul style="list-style-type: none"> 0.25 spaces per room. |

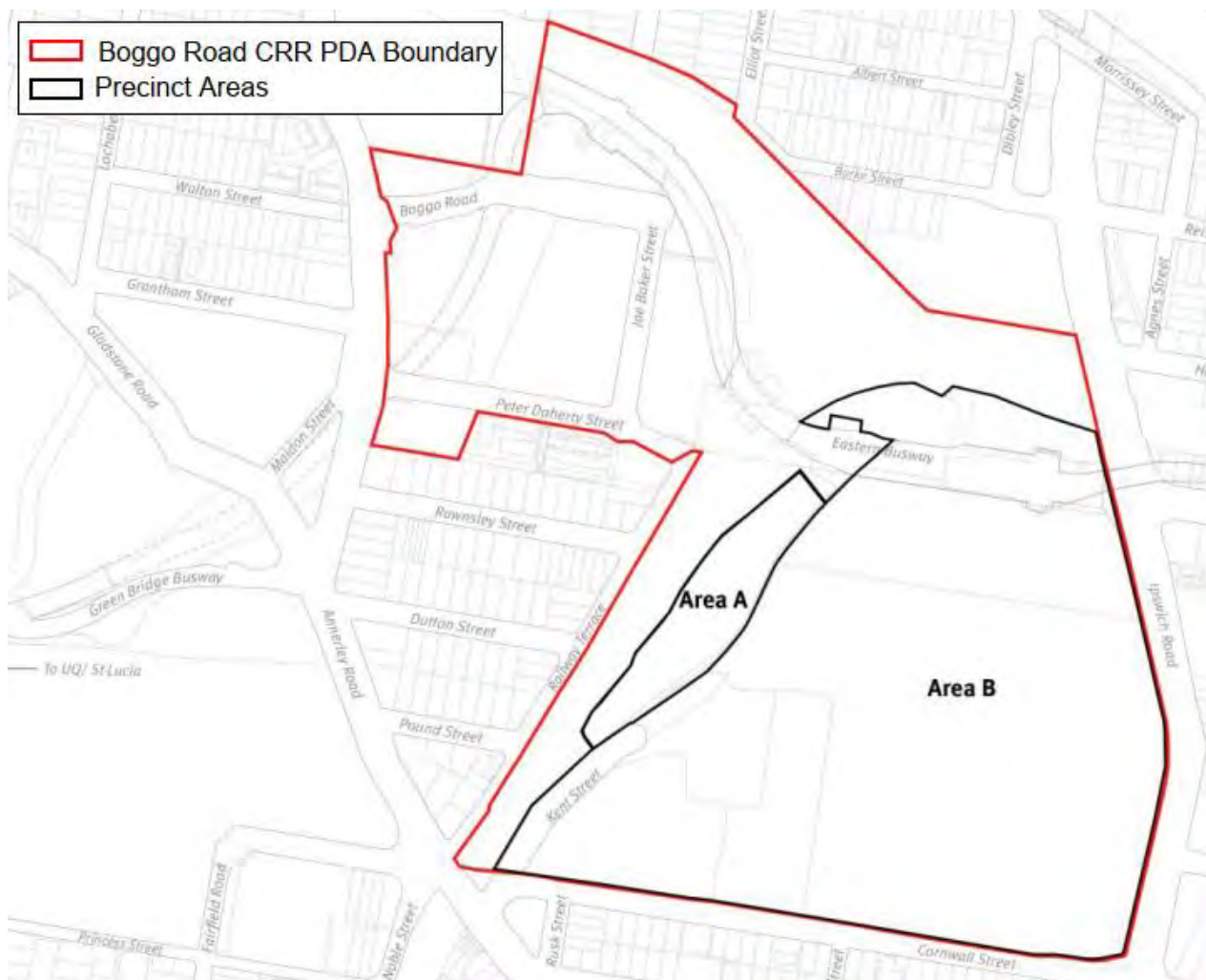


Figure 2-3: Boggo Road CRR PDA Parking Precinct Areas (Source: Boggo Road CRR PDA Development Scheme Map 13)

3 Existing Network Provisions

3.1 Key Features

The key features, prior to any CRR TSD works, of the Boggo Road CRR PDA include:

- PAH campus which includes TRI, and PACE
- Ecosciences Building
- Boggo Road Gaol
- Eastern Busway including PAH Busway Station and Boggo Road Station connecting through to University of Queensland (UQ)
- Cleveland and Gold Coast Rail Lines including:
 - Park Road Station
 - Dutton Park Station
 - Dutton Park to Fisherman's Island Dual Gauge (Freight) Rail Line.

3.2 Active Transport

3.2.1 Pedestrians

At present the study area has a footpath network of standard widths on all roads with typical street furniture such as trees, bike parking, benches, mailboxes and bus shelters creating pinch points, and pedestrian crossings as illustrated in Figure 3-1. Due to the high-capacity road network around the Boggo Road CRR PDA, it is necessary for pedestrian crossings to utilise pedestrian refuges and islands when navigating intersections. Often the segments between the islands and the footpaths have no signage or furniture to indicate a crossing, which is undesirable from a road safety perspective. Moreover, this staged approach is often undesirable for disabled pedestrians, which is an issue in this precinct given the proximity to the PAH. Overall, the Boggo Road CRR PDA has opportunities yet to be realised in terms of safe and efficient pedestrian movements. There may be opportunities to improve pedestrian amenities by adding in pedestrian crossings on the missing legs, and revising the free left slip turns specifically.

There is poor pedestrian permeability between Precinct 1 and Precinct 3 as the rail corridor (Precinct 2) forms a significant barrier to all forms of transport. The CRR TSD delivered Central Bridge for pedestrians and cyclists will shorten the journey between the landing points of the bridge from over 1 km to approximately 100 m, making the pedestrian journey far more attractive. Major rail stations surrounding the study area are at present poorly integrated with the local major employers (such as the PAH) and require pedestrians to walk long distances (over 1 km) through poorly sign posted areas with low levels of passive surveillance.

The previous PAH Masterplan (currently being updated) notes that there will be high pedestrian and/or cyclist volumes:

- Precinct 1 and Precinct 3 of the Boggo Road CRR PDA via the Central Bridge
- The Dutton Park Rail station, along Kent Street through to the eastern landing point of the Central Bridge
- The centre point of Kent Street, through the centre of the PAH campus through to Ipswich Road.

Lower volume paths are noted through the centre of the PAH campus between O'Keefe Street and Cornwall Street.

Major pedestrian desire lines outside the PDA include T.J. Doyle Memorial Drive and Sir William MacGregor Drive, being popular recreational routes and also by students to/from UQ St Lucia Campus. Further, Kent Street, Annerley Road, Gladstone Road and Cornwall Street form the remainder of the large pedestrian desire lines. It is noted that the future Central Bridge will also accommodate pedestrians and thus, it is expected that Kent Street desire will be shifted to this bridge once constructed, leaving Kent Street as an access road to End of Trip Facilities (EOTF) at the PAH and the future stages development sites. Local trips not directly to the Boggo Road CRR PDA developments sites may occur but they are expected to be low in quantity.



Figure 3-1: Pedestrian signalised crossings within and surrounding the Boggo Road CRR PDA

3.2.2 Pedestrian Infrastructure Provision

Pedestrian access to the Boggo Road CRR PDA is currently provided as indicated via staged, signalised crossings at:

- O'Keefe Street/Ipswich Road
- Ipswich Road/Diamantina Road East
- Ipswich Road/Alexandra Drive (the main PA Hospital entrance (Gate 3))
- Cornwall Street/Ipswich Road
- Cornwall Street/the QML Pathology Collection Centre
- Cornwall Street/Kent Street

- Annerley Road/Rusk Street/Tamar Street intersection
- Annerley Road/Cornwall Street/Noble Street/Railway Terrace
- Annerley Road/Gladstone Road
- Annerley Road/Peter Doherty Street
- Annerley Road/Boggo Road.

3.3 Cycling

At present there is a strong desire line for cyclists to travel between the UQ via the Eleanor Schonell Bridge in the west, the Veloway 1 (V1)/O'Keefe Street in the east and the CBD via the Woolloongabba Bikeway on Annerley Road. However, under existing conditions, the railway lines create a barrier in achieving east-west connectivity of the Boggo Road CRR PDA. The future introduction of the Central Bridge is fundamental to achieving accessibility outcomes, unlocking cycle network connectivity for commuters in and beyond the Boggo Road CRR PDA.

3.3.1 Cycling Infrastructure Provision

Cycling access to the Boggo Road CRR PDA is currently via:

- V1 via the Eastern Veloway (parallel to the Boggo Road Busway)
- A 3.6 m shared path along Kent Street
- Narrow footpaths/busy road along Annerley Road between Kent Street/Annerley Road and Gladstone Road/Annerley Road intersection
- Separated bike paths along Annerley Road, Gladstone Road and the Eleanor Schonell Green Bridge
- Narrow footpaths along Ipswich Road.

3.4 Road Network

Given its central location relative to the CBD, the Boggo Road CRR PDA is a hub for transport of all modes. As illustrated below in Figure 3-2, the key features of the existing Roads and PT network are:

- Major Arterial roads bounding the Boggo Road CRR PDA:
 - Ipswich Road
 - Annerley Road
 - Cornwall Street
- Neighbourhood roads within the Boggo Road CRR PDA:
 - Boggo Road
 - Joe Baker Street
 - Peter Doherty Street
 - Kent Street (partial - southern end)
- Private roads within the PAH campus. Of note in this assessment, Kent Street is partially a BCC managed neighbourhood road and Kent Street /Laundry Drive
 - On-street bus services and the Eastern Busway (mixture of medium to high frequency services to/from The UQ)

- Gold Coast and Cleveland passenger rail lines
- Dutton Park to Fisherman's Island dual gauge (Freight) rail line.

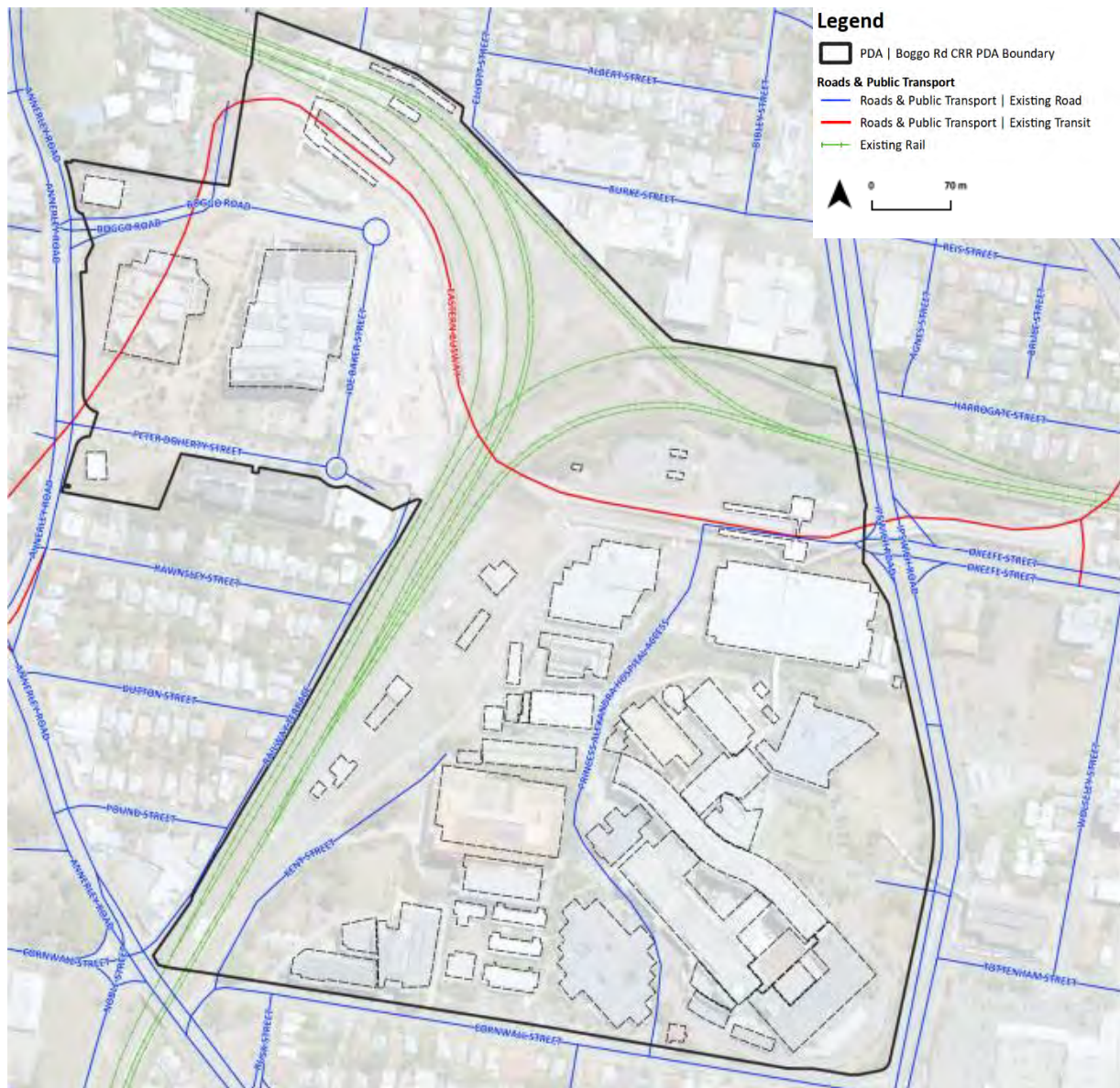


Figure 3-2: Existing Roads and PT within and surrounding the Boggo Road CRR PDA

3.5 Existing Public Transport Patronage

PT journeys involve pedestrian legs either between stops or to origins or destinations and are therefore an important component of the AT assessment. Within the existing context of the Boggo Road CRR PDA, a significant number of transfers occur between Boggo Road Busway and Park Road Rail Station, as well as trips to and from the PAH and Ecosciences Building from either Park Road or Dutton Park Rail Stations and Boggo Road and PAH Busway Stations. As detailed in Table 3-1 below, transfers between Park Road and Boggo Road total more than 10,000 passengers over a typical day, cementing the Boggo Road CRR PDA as a transport hub. Refer to Attachment F for detailed information.

Table 3-1: Existing PT Transfers (Source: TransLink Ticketing Data 2019)

| PT Station | Daily Totals | | |
|---------------------------|--------------|-----------|-----------|
| | Boarding | Alighting | Transfers |
| Park Road Rail Station | 15,702 | 18,686 | 11,298 |
| Boggo Road Busway Station | 12,926 | 13,289 | 10,661 |
| PAH Busway Station | 6,760 | 6,910 | 394 |
| Dutton Park Rail Station | 4,283 | 3,692 | 79 |

4 Network Upgrades

4.1 Modelling Methodology

The future year trips for the Boggo Road CRR PDA were applied to a future year (2041) SIDRA Network models for Annerley Road and Ipswich Road separately. The modelling process has assessed the roads, PT & AT network connections and internal road network layout, in order to inform the longer-term infrastructure requirements necessary to support the anticipated future development in the Boggo Road CRR PDA. The following approach was presented to and agreed in principle by stakeholders (BCC/TMR/MSH/PAH) and summarised as follows:

- Gather data from existing resources and stakeholders including both planning reports and roads, PT & AT existing and future demands
- Identify gaps and risks for the gathered data
- Identify constraints (gaps/deficiencies) and opportunities for the roads, PT & AT existing and planned network including proposed designs
- Calculation of background traffic growth factors to be applied to future year (2041) scenarios
- Calculation of the potential new trips generated by the proposed development scenarios by stages, for the AM and PM peak periods
- Apply the delta (positive or negative differences) of the trips from the development scenarios, compared to the future year (2041)
- Modelling the development scenarios in SIDRA, allowing the distribution of development vehicle trips onto the road network by utilising existing (2021) AM and PM demand patterns. This included applying the BCC Road Planning Note long term recommended upgrades as the assumed future year (2041) base upgrades.
- Assess the impact, if any, of queues and delays at intersections and apply upgrades as appropriate, noting Council's DSS contained in Part 4 – LGIP of BCC's City Plan 2014 sets the following benchmark:
 - (iv) the off-peak operation of the road network provides a Level of Service (LoS) C
 - (v) the peak period operation of the road network provides a LoS C, except where the road network is highly constrained and the use of alternative modes of transport in these areas is anticipated in the mode share targets stated in Map C3 Transport Network DSS Mode Share Targets
- The modelling of pedestrians and cyclists is focussed around pedestrian crossings at key intersections using SIDRA. A pathway LoS assessment using a target of LoS C for typical commuter peaks was completed.

4.2 Potential Future Internal Network and Cross Sections

Kent Street/Laundry Drive is the primary internal road infrastructure that has been identified as requiring upgrades as part of the Boggo Road CRR PDA to service future development sites and improve active transport connectivity. Kent Street currently functions as the public access road to the TRI and PACE building carparks, becoming a private road (within the PAH) from a boom gate which currently facilitates back-of-house servicing for PAH. These services and servicing arrangements, buildings, land tenures, and geometry restrictions form the basis of constraints on Kent Street/Laundry Drive.

At the time of writing, the Kent Street boom gate has been removed to allow one-way northbound circulation of general traffic to accommodate CRR TSD construction activities.

In future, Kent Street will be required to support proposed future development sites R-01 and R-02 as well as potential future PAH Buildings TRI2.0, PACE3, PAH-07, and PAH-03, with potential demolition of the existing Laundry (Building 55) and support services Buildings 61 and 62. Therefore, the design principles for Kent Street

are that a two-way cross-section to be achieved up to Laundry Drive in the interim with minimal land take in order to service R-01/R-02 development sites, with opportunities to expand to ultimate cross sections in Stage 4 with the removal of existing buildings which are constraining this outcome from being achieved earlier.

Whilst the ultimate form and tenure of Kent Street is still to be resolved, the Boggo Road CRR PDA outcome recommended for the internal streets are for shared, slow speed street environments promoting calmer, people focused streets while allowing circulation within the Boggo Road CRR PDA to the major PT station (Dutton Park Station) for drop off/pick up, and access to the PAH and future developments. The urban design treatment of this street should utilise best practice e.g., continuous footpaths where pedestrians have the natural priority, and the surface treatment is more footpath than it is road. Opportunities for shading and weather protection for pedestrians and cyclists should also be incorporated into the design through elements such as but not limited to shade trees and building facades.

To assist with the future design of Kent Street, the Kent Street Movement Corridor Guideline (the guideline) has been prepared to support PDA development requirements of the Boggo Road CRR PDA Development Scheme by providing guidance for necessary upgrades to Kent Street. The designs expressed in the guideline are conceptual only, illustrating ultimate upgrades envisaged by the Development Scheme. Additionally, the guideline identifies interim design criteria to enable the development of the R01 and R02 development sites, should these sites develop prior to the PAH. The interim upgrades design criteria are reproduced below.

4.2.1 Interim Upgrades Design Criteria

In the event that the R01 and R02 development sites develop prior to the PAH, interim upgrades to the Kent Street Movement Corridor will be required. Proposed interim upgrades will be assessed at PDA development application stage and, at a minimum, should comply with the following performance-based design criteria:

- Ensure the service level of existing pedestrian and cycling infrastructure, including separation between distinct travel modes, are maintained both during and post construction
- Provide a lawful point of vehicular access and fit-for-purpose servicing arrangements
- Ensure maintenance of access for existing service vehicles currently using the Kent Street Movement Corridor
- Provide street trees, together with soft and hard landscape treatments to afford active transport users (i.e. cyclists and pedestrians) a high level of safety, amenity and comfort
- Provide for effective wayfinding and legibility through the incorporation of treatments such as signage and line marking which highlight key destinations
- Ensure alignment with and not compromise the ultimate upgrades detailed in Section 3 of the guideline, avoiding the introduction of infrastructure that would become redundant
- Demonstrate consistency with the Crime Prevention Through Environmental Design Principles
- Demonstrate how active transport modes are prioritised and compliance with the following design standards will be achieved.

4.2.2 Design Standards

Both ultimate and interim upgrades to the Kent Street Movement Corridor shall be designed to the relevant design standards and guidelines such as, but not limited to the following:

- Traffic and Road Use Management particularly Volume 1 –Guide to Traffic Management (2016) Part 8: Local area traffic management
- TMR Guideline - Coloured surface treatments for bicycle lanes
- TN128 Selection and Design of Cycle Tracks

- Austroads: Guide to Road Design Part 6A: Pedestrian and Cyclist Paths
- Relevant Council Standard Designs
- Queensland Urban Drainage Manual
- Australian Standard: AS/NZS 1158 - Lighting for roads and public spaces set
- Crime Prevention Through Environmental Design - Guidelines for Queensland.

4.3 Future Network Opportunities and Treatments

4.3.1 Roads and Public Transport

The proposed Roads and PT Network Plan (RPTNP) for the Boggo Road CRR PDA are delivered via a staged approach as appended in Appendix A.

The following are of key interest from a Roads and PT infrastructure perspective noting dimensions are typical and will be confirmed through the PDA development application process and detailed design to the relevant design standards (refer Section 4.2.2):

- Stage 1 (2020 - 2025):
 - BGO-RD-01 – Kerbside allocation and carriageway width modification on Boggo Road and Joe Baker Street (Delivery by CRR TSD)
 - BGO-RD-02 – Kerbside allocation and carriageway width modification on Peter Doherty Street (Potential delivery by others)
 - BGO-RD-03 – Two-way vehicle lanes noting kerbside allocations to be resolved by BCC and RIS (Delivery by CRR RIS)
 - BGO-INT-06 – Intersection of Peter Doherty Road and Annerley Road – Provision of separated bicycle crossings on all legs of signalised intersection and tie into BGO-AT-03 works which is linked to BGO-AT-03 under the Active Transport Network Plan (Potential delivery by others).
- Stage 2 (2025 – 2026):
 - No Roads or PT upgrades are proposed as part of this stage.
- Stage 3 (2027 – 2031):
 - BGO-RD-04a – Interim upgrade to two-way for vehicles with pedestrian and cyclist provisions to meet the interim upgrade design criteria (Potential delivery by R-01 & R-02 developers – with R-01 & R-02).
- Stage 4 (2032 – 2041):
 - BGO-RD-04b – Two-way 3.3 m vehicle lanes (Potential delivery by others – with PAH-07 & PAH-10)
 - BGO-RD-04c – Two-way 3.3 m vehicle lanes (Potential delivery by others – with PAH-07 & PAH-10)
 - BGO-RD-05a – Two-way 3.3 m vehicle lanes (Potential delivery by others – with PAH-07 & PAH-10)
 - BGO-RD-05b – Two-way 3.3 m vehicle lanes (Potential delivery by others – with PAH-07 & PAH-10)
 - BGO-INT-01 – Intersection of Annerley Road and Noble Street (Potential Delivery by others):
 - New right turn lane from Annerley Road to Railway Terrace
 - Widening on both directions for provision of on-road cycle lanes
 - BGO-INT-02 – Intersection of Cornwall Street and Ipswich Road (Potential Delivery by BCC - Road Planning Notes / LGIP):

- Widening of the northbound carriageway of Ipswich Road near Cornwall Street to three (3) lanes and provision of on-road cycle lanes
- Widening of the eastbound carriageway of Cornwall Street near Ipswich Road to three (3) lanes and provision of on-road cycle lanes
- A second right turn from Ipswich Road to Cornwall Street introduced
- A short right turn lane from Cornwall Street to Ipswich Road introduced
- Potential closure of the westbound bus jump lane across Ipswich Road along Cornwall Street
- BGO-INT-03 – Intersection of Alexandra Drive and Ipswich Road (Potential Delivery by others):
 - Lengthening of existing right turn lane from Ipswich Road to Alexandra Drive (PAH)
 - A new left turn lane from Ipswich Road to Alexandra Drive (PAH)
 - Widening on both directions of Ipswich Road for provision of on-road cycle lanes
- BGO-INT-04 – Intersection of O’Keefe Street and Ipswich Road (Potential Delivery by others):
 - A second right turn from Ipswich Road to O’Keefe Street introduced
 - Widening on both directions for provision of on-road cycle lanes
- BGO-INT-05 – Intersection of Diamantina Road East and Ipswich Road (Potential Delivery others):
 - Widening in both directions of Ipswich Road for provision of on-road cycle lanes
 - Additional short right turn lane southbound on Ipswich Road into Diamantina Road East
 - Provision of pedestrian crossing on southern leg of signalised intersection.

4.3.2 Active Transport

The proposed AT Network Plan (ATNP) for the Boggo Road CRR PDA are delivered via a staged approach as appended in Appendix B.

- The following are of key interest from an AT infrastructure perspective noting dimensions are typical and will be confirmed through the PDA development application process and detailed design to the relevant design standards (refer Section 4.2.2):Stage 1 (2020 – 2025):
 - BGO-AT-01 – Central Bridge, between Peter Doherty Street and the Eastern Veloway (Delivery by CRR TSD)
 - BGO-AT-02 – At grade footpath (and zebra crossing at Kent Street) from BGO-VT-02 to Kent Street (Delivery by CRR TSD)
 - BGO-AT-03 – Dedicated on-road 3.0 m cycle track, between the Central Bridge and the intersection of Peter Doherty Street / Annerley Road (Potential delivery by others) which is linked to BGO-INT-06 under the Roads and PT Network Plan
 - BGO-AT-04 – Retention of existing conditions on eastern side of Kent Street, and shared path on western side up to the bicycle storage facility at Dutton Park Station, noting the shared zone arrangement and exact dimensions are to be resolved between BCC and CRR RIS (Delivery by CRR RIS)
 - BGO-AT-16 – Interstation footpath between CRR Boggo Road Station and existing Boggo Road Busway/Park Road Rail Stations (Delivery by CRR TSD)
 - BGO-VT-01 – Vertical Transport Lift and Stairs near Joe Baker Street (Delivery by CRR TSD)
 - BGO-VT-02 – Vertical Transport Lift and Stairs near R-01 (Delivery by CRR TSD)

- Stage 2 (2025 – 2026):
 - BGO-AT-10 – Pedestrian Arcade Transition connecting the Central Bridge to Joe Baker Street through future development site E-01 (Potential delivery by E-01 developers – with E-01)
 - BGO-AT-12 – Off road separated 2.5 m cycle track and footpath at minimum of 2.5 m adjacent potential outside dining and retail (Potential delivery by E-04 developers – with E-04)
- Stage 3 (2027 – 2031):
 - BGO-AT-05a – Interim upgrade ensuring pedestrian and cyclist provisions to meet the interim upgrade design criteria between BGO-AT-04 and BGO-AT-06a which includes BCC Land Tenure. The northern end includes a new turning head and boom gate to allow only service vehicles onto AT-06a which is strictly back-of-house servicing in the interim (Potential delivery by R-01 & R-02 developers – with R-01 & R-02).
 - BGO-AT-06a – Delivery of ultimate AT form to western side of this Laundry Drive segment - Off road separated 2.5 m cycle track, 0.5 m buffer, 2.5 m pedestrian path (Potential delivery by R-01 & R-02 developers – with R-01 & R-02)
 - BGO-AT-07a – Elevated podium level walkway through future development sites R-01 and R-02, between BGO-VT-02 and BGO-AT-07b. Opportunity to deliver in 2031 if R-01 and R-02 buildings are co-timed. Alternative access arrangements are Kent Street via VT-02 during construction. (Potential delivery by R-01 & R-02 developers – with R-01 & R-02)
 - BGO-AT-07b – Elevated bridge connection between future development site R-02 and VT-03. Opportunity to deliver in 2031 if R-01 and R-02 buildings are co-timed. Alternative access arrangements are Kent Street via VT-02 during construction. (Potential delivery by R-01 & R-02 developers – with R-01 & R-02)
 - BGO-AT-08 – Potential elevated passenger interchange and pedestrian connection between the Boggo Road CRR and Busway Stations, Park Road Station and Elliot Street. (Potential delivery by others, timing to be determined)
 - BGO-VT-03 – Vertical Transport Lift and Stairs near TRI building (Potential delivery by others)
- Stage 4 (2032 – 2041):
 - BGO-AT-05b – Off road separated 2.5 m cycle track, 0.5 m buffer, 2.0 m pedestrian path on the western side, 2.0 m pedestrian path on the eastern side, along the BCC Land Tenure between BGO-AT-04 and BGO-AT-05c (Potential delivery by others – with PAH-07 & PAH-10)
 - BGO-AT-05c – Off road separated 2.5 m cycle track, 0.5 m buffer, 2.5 m pedestrian path on the western side, pedestrian path to the eastern side (width to be resolved based on future PAH service requirements), between BGO-AT-05b and BGO-AT-06b. (Potential delivery by others – with PAH-07 & PAH-10)
 - BGO-AT-06b – Delivery of ultimate AT form to eastern side of Laundry Drive section – Typical 4.25 m pedestrian path between BGO-AT-05b and BGO-AT-06b. (Potential delivery by others – with PAH-07 & PAH-10)
 - BGO-AT-06c – Typical 4.25 m pedestrian paths to both sides. (Potential delivery by others – with PAH-07 & PAH-10)
 - BGO-AT-09 – Potential elevated link between VT-02 and PAH Main Building, connection and feasibility to be resolved (Potential delivery by others – with PAH-02, PAH-07 & PAH-10)
 - BGO-AT-11a – Potential uplift of existing shared path (Potential delivery by others, timing to be determined)

- BGO-AT-11b – Potential uplift of existing rail overpass to shared facility (Potential delivery by others, timing to be determined)
- BGO-AT-13 – Pedestrian path enhancements (Potential delivery by others – With PAH-01 & PAH-08)
- BGO-AT-14 – Pedestrian path enhancements (Potential delivery by others – With PAH-02, PAH-03 & PAH-07)
- BGO-AT-15 – Pedestrian path enhancements (Potential delivery by others – With PAH-03)
- BGO-AT-17 – Pedestrian path enhancements to shared facility (Potential delivery by others – With E-06).

5 Conclusions and Recommendations

There are existing constraints for pedestrian and cyclist movement within the Boggo Road CRR PDA including:

- The existing Rail Corridor (Precinct 2) creates a barrier for AT permeability
- PAH and CRRDA planning interfaces including permeability to the new CRR Station
- Accessibility, connections and entrances to the Boggo Road CRR PDA from Annerley Road and Dutton Park Station.

BCC, TMR and PAH/MSH have identified the opportunity for a number of these issues to be addressed with the redevelopment of the developable land in the Boggo Road CRR PDA.

Overall, the proposed ATNP offers many opportunities to ameliorate the existing issues for pedestrian and cyclist connectivity. Whilst constraints such as the Kent Street back-of-house services may constrain the network in the medium term, the overarching goals for the AT network within the Boggo Road CRR PDA over the course of its development are to provide:

- Central Bridge to fill the missing link in the PCN
- A safe and efficient connection between the new CRR Station and existing Boggo Road Busway and Park Road Rail Station
- Resolution to the desire lines within and surrounding the PAH providing a more permeable Boggo Road CRR PDA
- Activation of underutilised streetscapes, and development of internal precinct streetscapes to enhance liveability and connectivity.

To address the existing road challenges, it is recommended that road upgrades proposed are as follows:

- Kerbside allocation and carriageway width modification as per CRR TSD Scope
- Kerbside allocation and carriageway width modification as per CRR RIS Scope
- Peter Doherty Street kerbside allocation and carriageway width modification to accommodate potential on-road cycle track tracks
- Interim and ultimate cross section modifications to Kent Street are informed by the guideline
- Ultimate cross section of Laundry Drive following the future redevelopment of Building 55
- Short right turn lane from Annerley Road to Railway Terrace introduced
- Lengthening of existing right turn lane from Ipswich Road to Alexandra Drive (PAH)
- A short left turn lane from Ipswich Road to Alexandra Drive (PAH) introduced
- Widening of the northbound carriageway of Ipswich Road near Cornwall Street to three (3) lanes
- Widening of the eastbound carriageway of Cornwall Street near Ipswich Road to three (3) lanes
- A second right turn from Ipswich Road to Cornwall Street introduced
- A short right turn lane from Cornwall Street to Ipswich Road introduced
- Closure of the westbound bus jump lane across Ipswich Road along Cornwall Street
- A second right turn from Ipswich Road to O'Keefe Street introduced.

In terms of the above proposed upgrades, the dimensions of the various elements will be confirmed through the PDA development application process and detailed design to the relevant design standards.

Lastly, carparking rates recommended for are as follows to promote higher AT and PT mode share as per Table 5-1.

Table 5-1: Adopted Carparking Rates

| Use | Carparking Rates – Maximum number of spaces |
|--|---|
| Uses other than multiple dwelling, parking station, rooming accommodation and short-term accommodation (which are separately identified below) | Boggo Road knowledge and innovation Precinct 1: |
| | <ul style="list-style-type: none"> 1 space per 100m² gross floor area (GFA). |
| | Princess Alexandra Hospital Precinct 3 – Area A (refer Figure 2-3): <ul style="list-style-type: none"> 1 space per 300m² gross floor area (GFA). Princess Alexandra Hospital Precinct 3 – Area B (refer Figure 2-3): <ul style="list-style-type: none"> 0.5 spaces per bed plus 0.8 spaces per staff for Hospital 1 space per 200m² gross floor area (GFA) for uses other than Hospital. |
| Multiple dwelling | <ul style="list-style-type: none"> 0.5 space per 1-bedroom dwelling 1 space per 2-bedroom dwelling 1.5 spaces per 3-bedroom dwelling 2 spaces per 4 and above bedroom dwelling 1 visitor space for every 20 dwelling units Parking may be provided in tandem spaces where 2 spaces are provided for 1 dwelling At least 50% of visitor parking is provided in communal areas, and not in tandem with resident parking. |
| Rooming accommodation, and Short-term accommodation | <ul style="list-style-type: none"> 0.25 spaces per room. |

Appendix A Roads and Public Transport Infrastructure Elements Plans

Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Roads and Public Transport - Stage 1 (2025) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Road Projects (Stage 1)

- Road Intersection Upgrade (Stage 1)
- Road Corridor (Stage 1)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

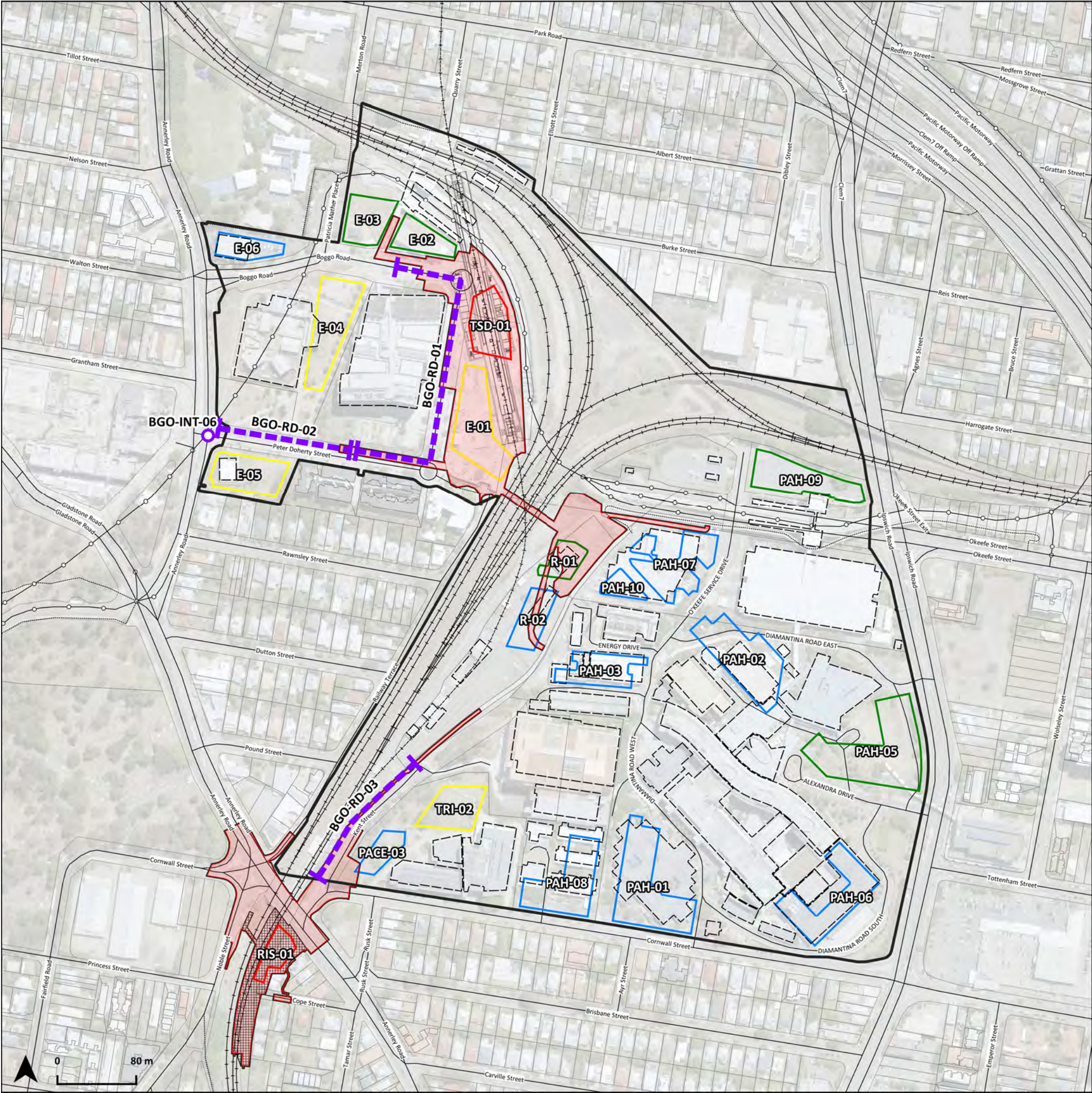
NOTE:
Future PDA potential development opportunity sites and staging are conceptual and indicative only for infrastructure network analysis purposes.

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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Roads and Public Transport - Stage 2 (2025 - 2026)
(Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Roads and Public Transport - Stage 3 (2027 - 2031)
(Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Road Projects (Stage 3)

- Road Corridor (Stage 3)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

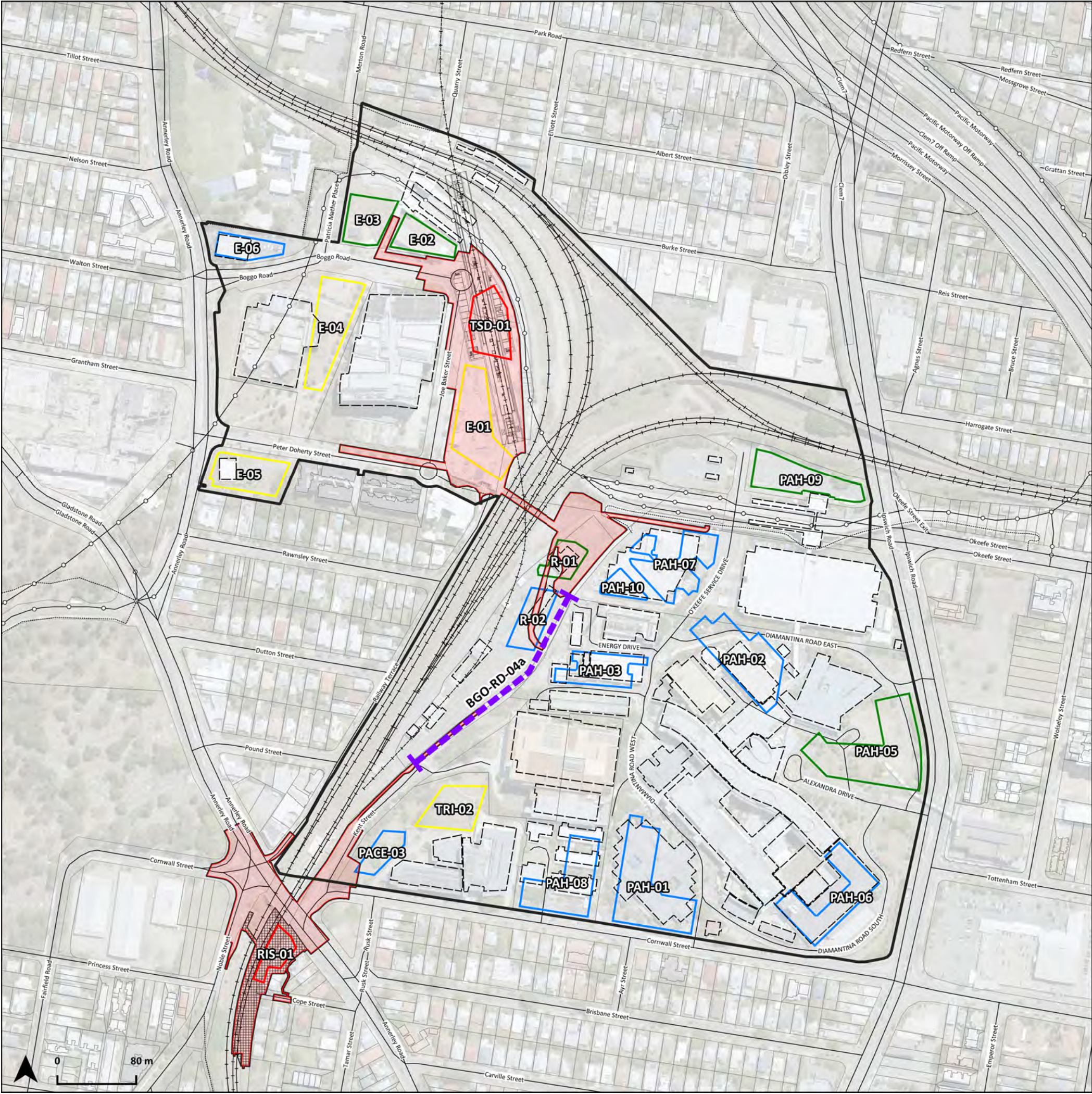
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Roads and Public Transport - Stage 4 (2032 - 2041 /
Ultimate) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Road Projects (Stage 4)

- Road Intersection Upgrade (Stage 4)
- Road Corridor (Stage 4)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

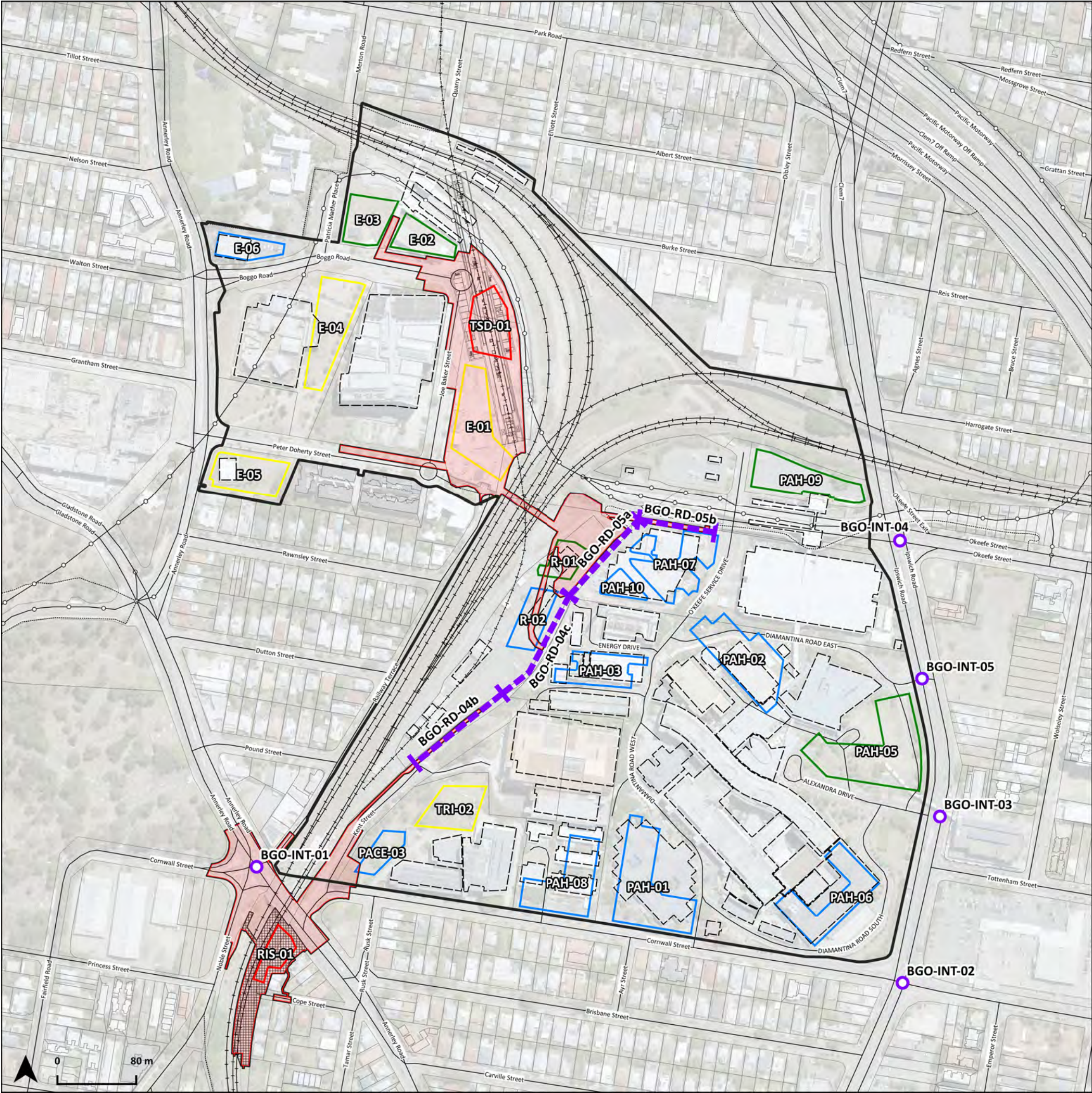
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Appendix B **Active Transport Infrastructure Elements Plans**

Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Active Transport - Stage 1 (2020 - 2025) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Active Transport Projects (Stage 1)

- Vertical Transport Upgrade (Stage 1)
- Active Transport Link (Stage 1)
- Active Transport Link (TSD)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

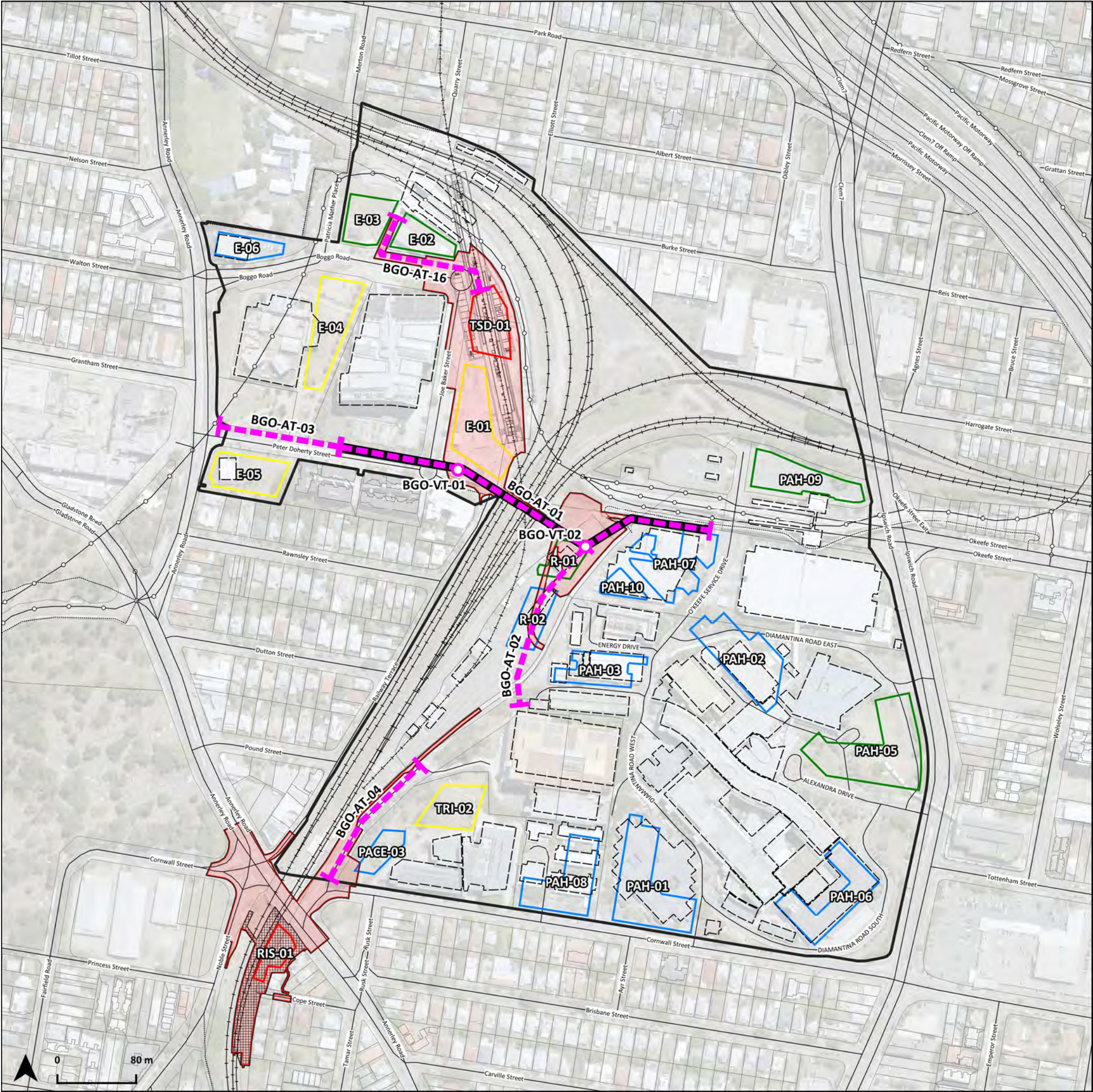
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Active Transport - Stage 2 (2025 - 2026) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

- Active Transport Projects (Stage 2)
- Active Transport Link (Stage 2)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

- Transport - Road, Transit
- Road
- Busways
- Tracks, Paths & Malls

- Existing Rail
- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

- Property - DCDB
- Base Lot

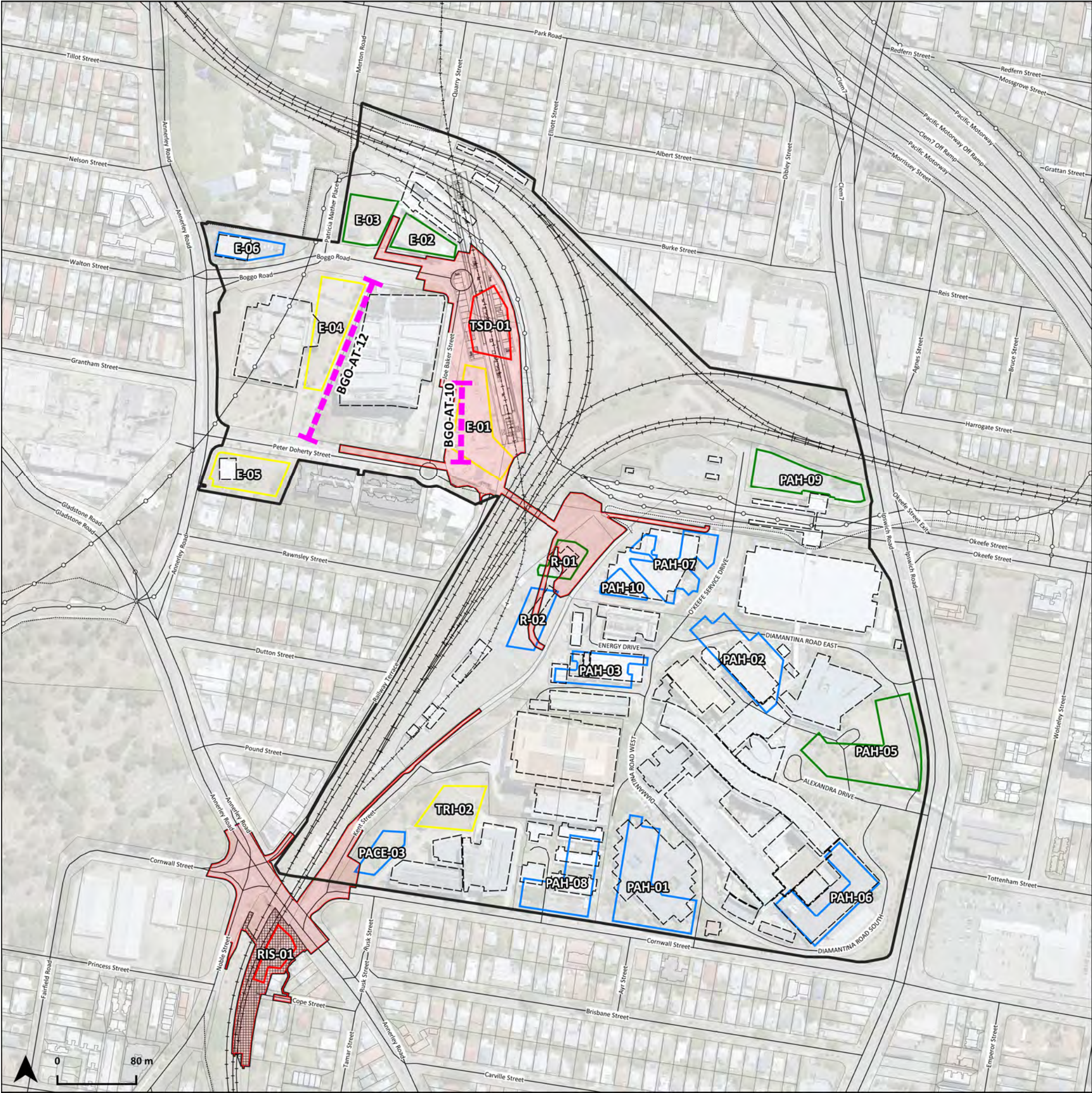
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Active Transport - Stage 3 (2027 - 2031) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Active Transport Projects (Stage 3)

- Vertical Transport Upgrade (Stage 3)
- Active Transport Link (Stage 3)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

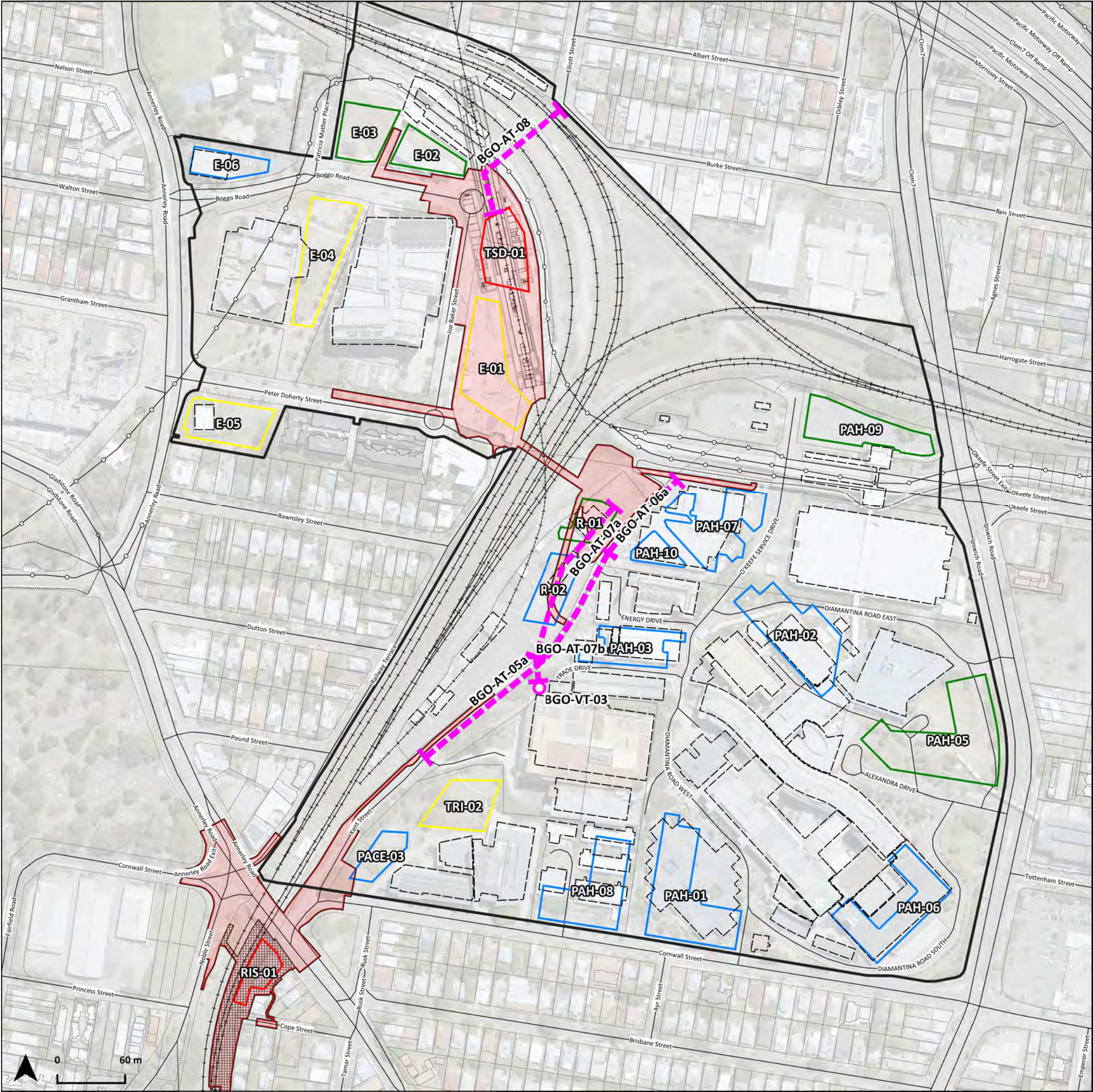
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Active Transport - Stage 4 (2032 - 2041 / Ultimate)
(Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

- Active Transport Projects (Stage 4)
- Active Transport Link (Stage 4)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

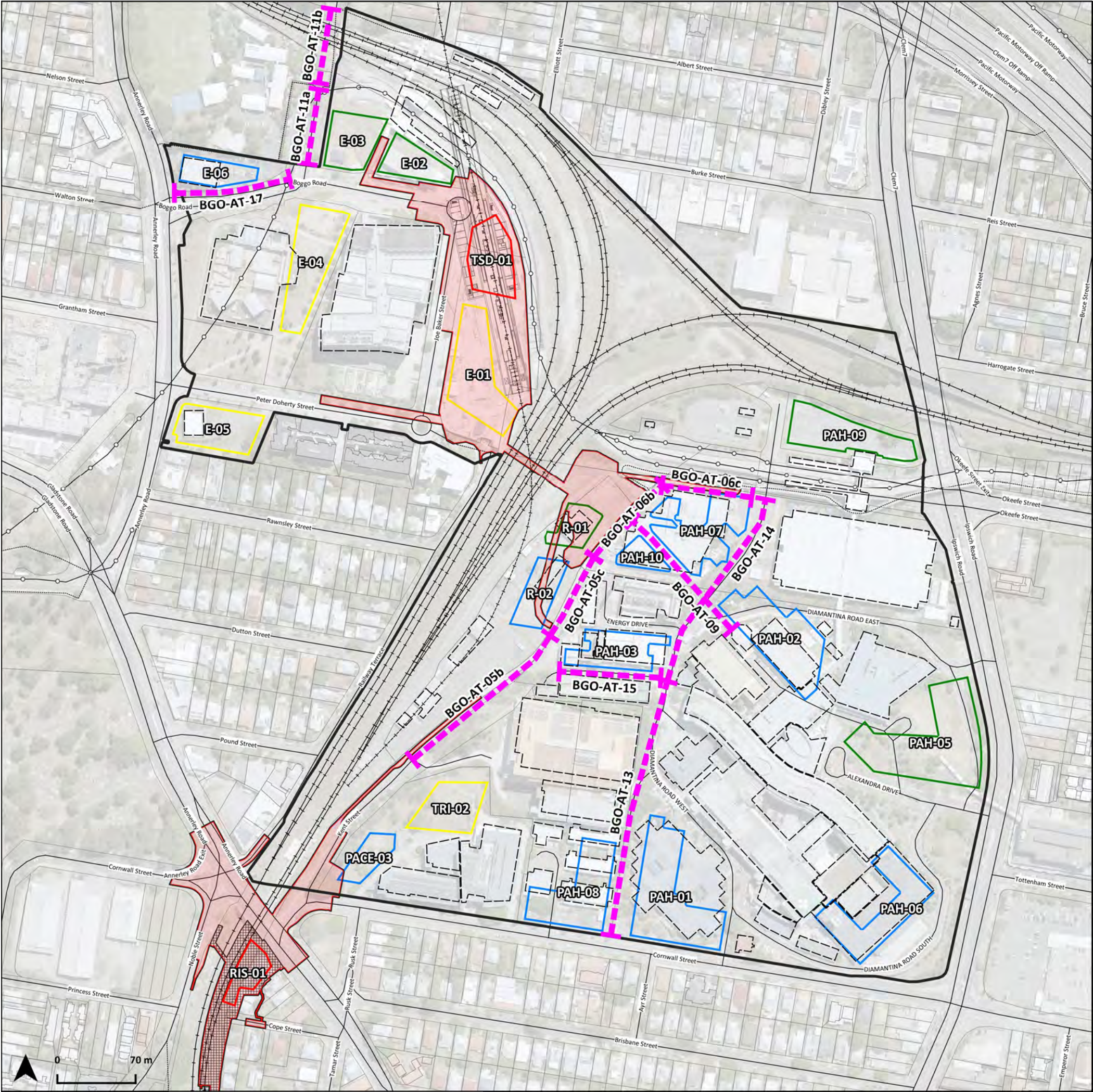
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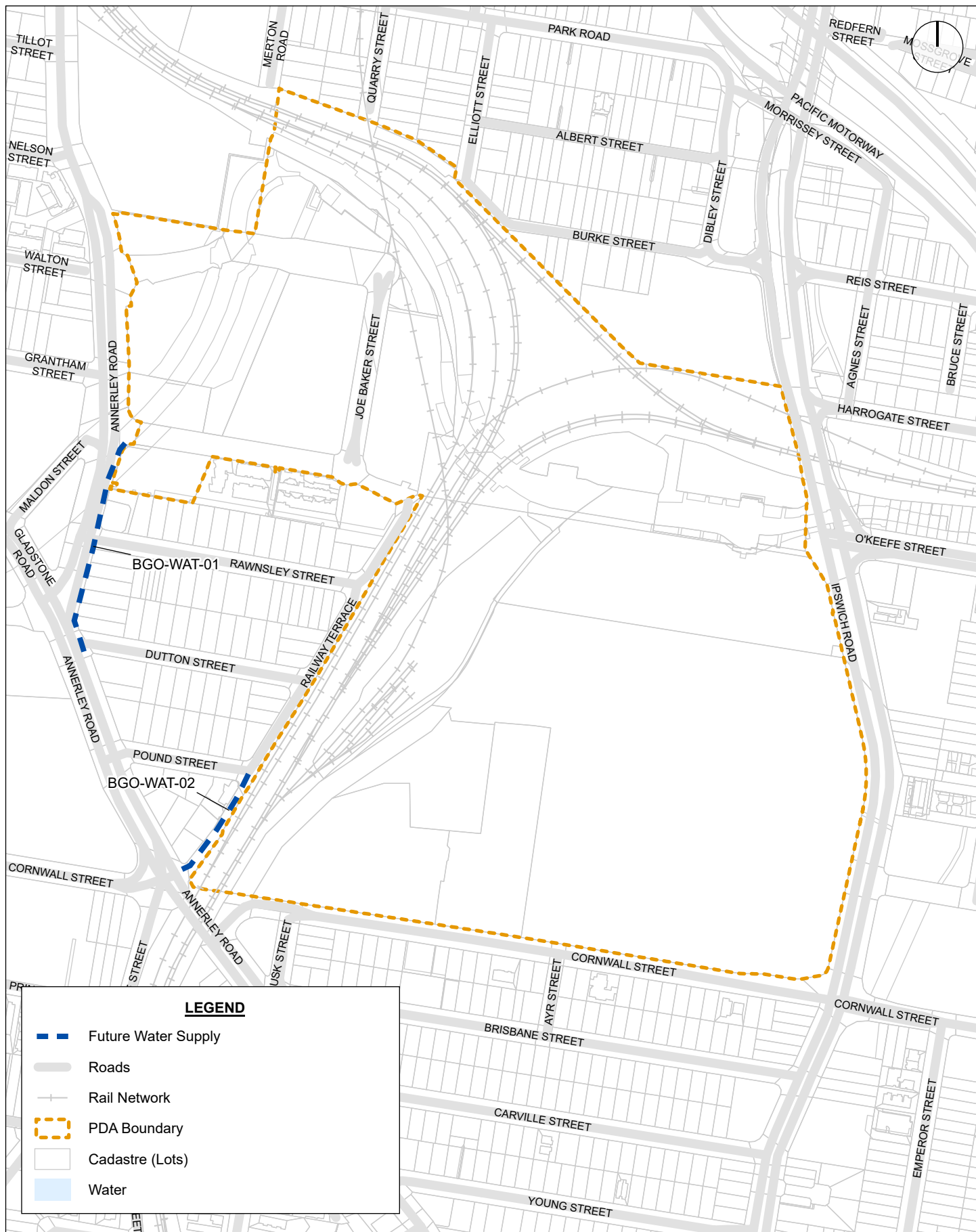


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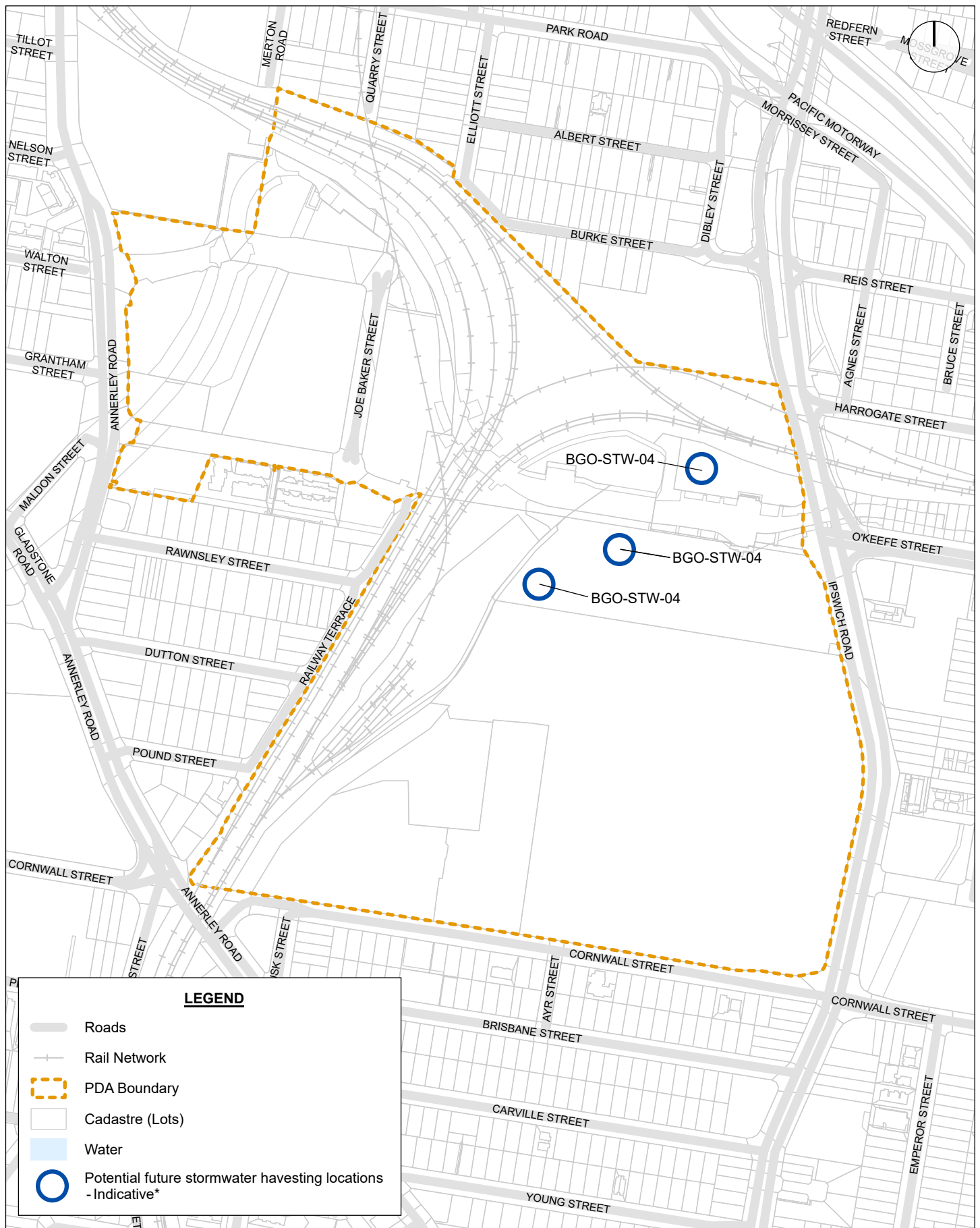
Appendix F Future Trunk Infrastructure Plans



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Map 01 - Water Supply

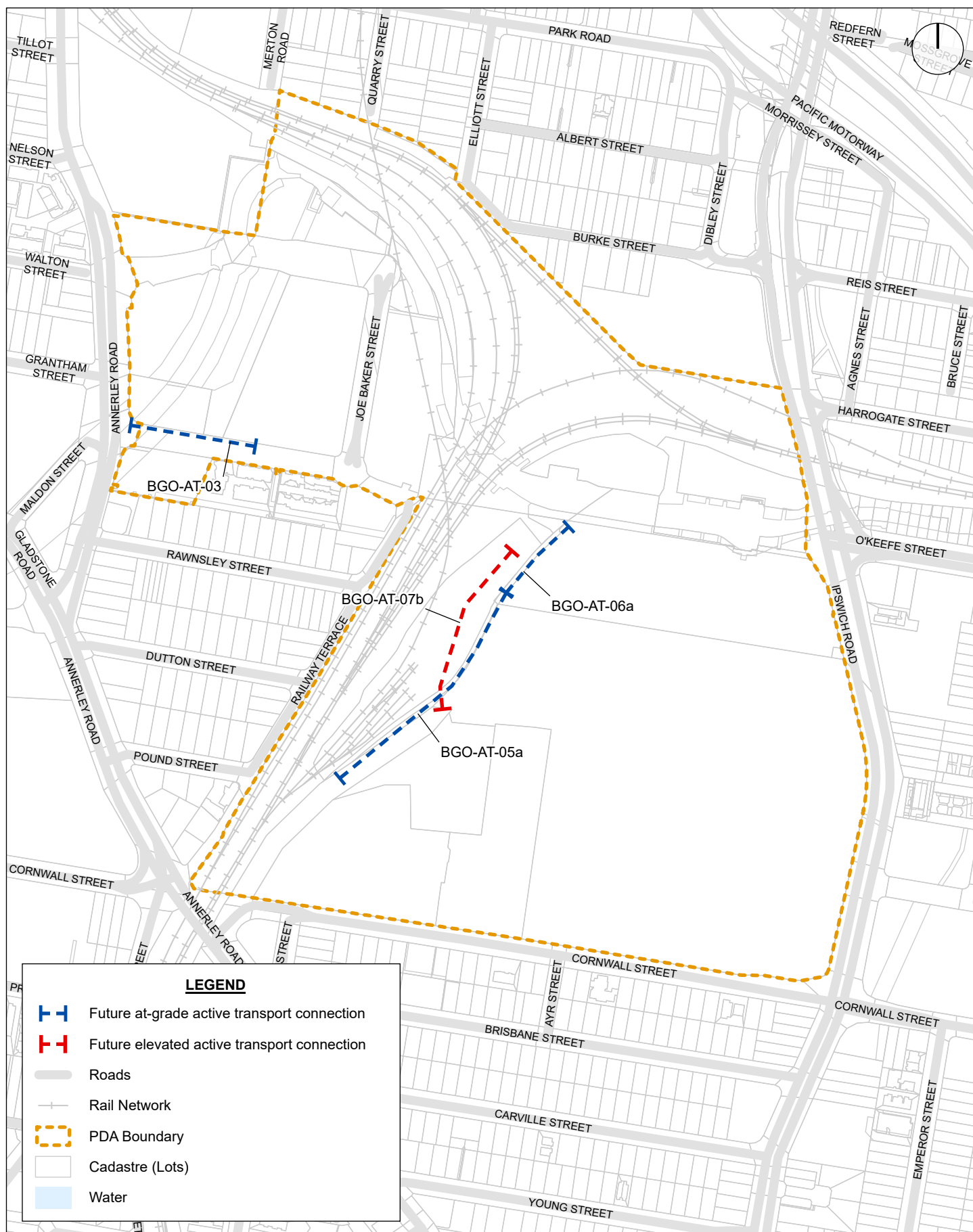
Future DCOP Trunk Infrastructure Plan



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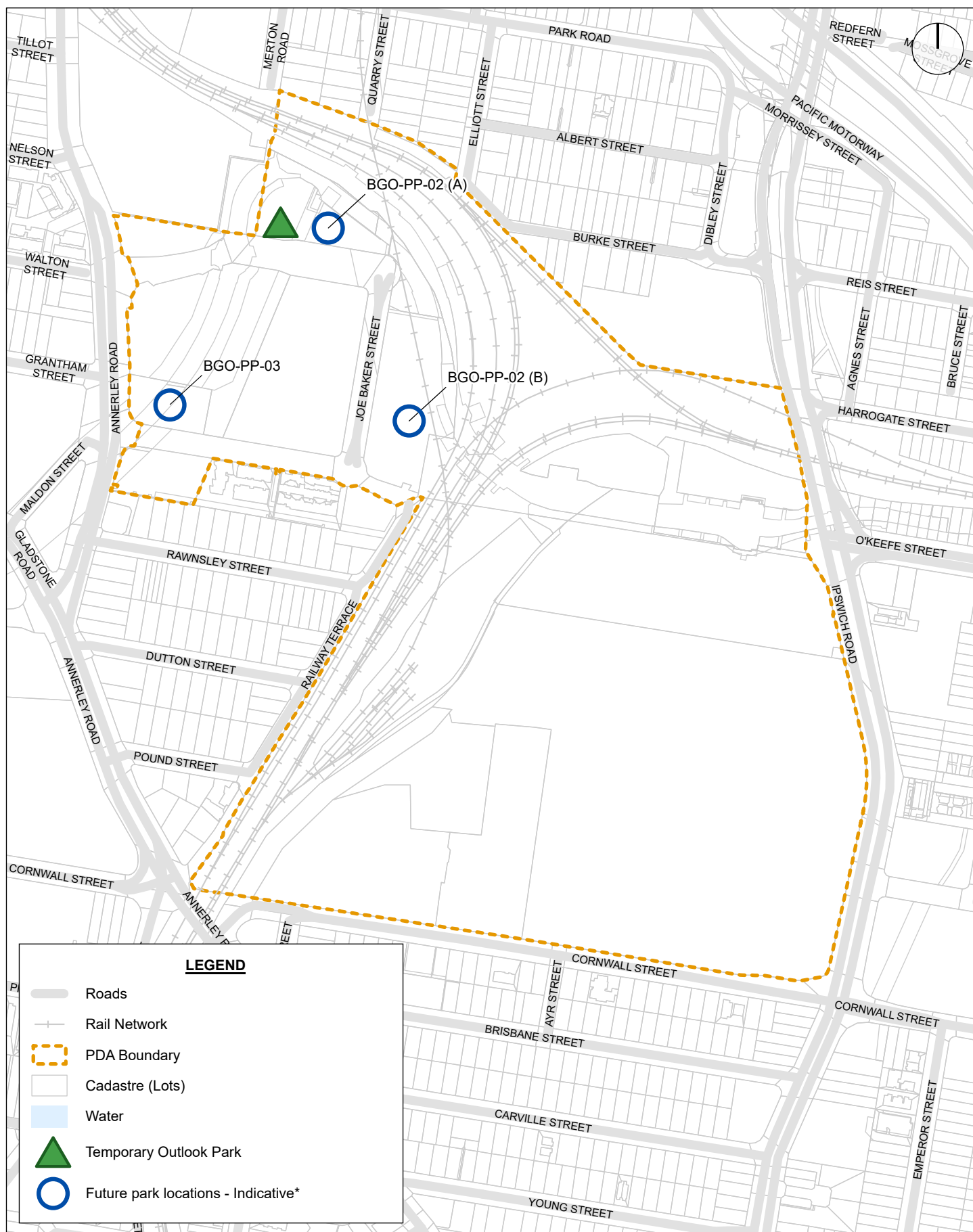
Map 02 - Stormwater Future DCOP Trunk Infrastructure Plan

*Note: BGO-STW-04 represent indicative location for one (1) stormwater harvesting device to be provided.



Map 03 - Transport (Active)

Future DCOP Trunk Infrastructure Plan



*Note: BGO-PP-02 (A) and BGO-PP-02 (B) represent indicative locations for one (1) replacement park to be provided. Section 2.6.1 Connectivity, access and public realm provision 10 of the Boggo Road CRR PDA Development Scheme requires the first stage of development within the Outlook Park opportunity area to provide a new permanent Outlook Park.

Appendix G – Future Trunk Infrastructure Cost Schedules

Detailed Infrastructure Schedule of Works – DCOP Trunk Infrastructure

Table 1: Schedule of future trunk infrastructure works – Water Supply

| DCOP ID | Map no. | Infrastructure type | Infrastructure description | Pipe diameter (mm) | Pipe length (m) | Estimated timing | Land cost | Works base cost | Works on-costs | Works contingency | Total works cost | Trunk establishment cost |
|------------|---------|---------------------|---|--------------------|-----------------|------------------|-----------|-----------------|----------------|-------------------|------------------|--------------------------|
| BGO-WAT-01 | 1 | Water Main | Annerley Rd Water Main Upgrade - 215m of DN250mm Water Main replacing existing DN150mm Water Main | 215 | 250 | 2026-2031 | \$0 | \$704,593 | \$407,539 | \$194,028 | \$1,306,160 | \$1,306,160 |
| BGO-WAT-02 | 1 | Water Main | Railway Tce Water Main Upgrade - 112m of DN180mm Water Main replacing existing 100mm Water Main | 112 | 180 | 2026-2031 | \$0 | \$276,910 | \$160,672 | \$76,258 | \$513,840 | \$513,840 |

Notes:

1 – All costs are expressed in current cost terms as at the base date (FY 2021/22).

Table 2: Schedule of future trunk infrastructure works – Stormwater

| DCOP ID | Map no. | Infrastructure type | Infrastructure description | Pipe diameter (mm) | Pipe length (m) | Estimated timing | Land cost | Works base cost | Works on-costs | Works contingency | Total works cost | Trunk establishment cost |
|------------|---------|-----------------------|---|--------------------|-----------------|------------------|-----------|-----------------|----------------|-------------------|------------------|--------------------------|
| BGO-STW-04 | 2 | Stormwater Harvesting | Stormwater harvesting and water balancing with wider catchment benefits | N/A | N/A | 2032-2041 | \$0 | \$1,000,000 | \$170,000 | \$175,500 | \$ 1,345,500 | \$ 1,345,500 |

Notes:

1 – Location of proposed stormwater harvesting solution yet to be determined

2 –All costs are expressed in current cost terms as at the base date (FY 2021/22).

Table 3: Schedule of future trunk infrastructure works – Active Transport

| DCOP ID | Map no. | Infrastructure type | Infrastructure description | Length (m) Qty (ea) | Width (m) | Area (m ²) | Estimated timing | Land cost | Works base cost | Works on-costs | Works contingency | Total works cost | Trunk establishment cost |
|------------|---------|--------------------------------|---|------------------------|-----------|------------------------|------------------|-----------|-----------------|----------------|-------------------|------------------|--------------------------|
| BGO-AT-03 | 3 | Separated Path | Peter Doherty Street separated path | 110 | N/A | N/A | 2020-2025 | \$0 | \$162,175 | \$27,570 | \$28,462 | \$218,206 | \$218,206 |
| BGO-AT-05a | 3 | Separated Path | Kent Street interim active transport improvements | TBC | N/A | N/A | 2027-2031 | \$0 | TBC | TBC | TBC | TBC | TBC |
| BGO-AT-06a | 3 | Separated Path | Laundry Drive ultimate separated path improvements | 100 | N/A | N/A | 2027-2031 | \$0 | \$133,500 | \$22,695 | \$23,429 | \$179,624 | \$179,624 |
| BGO-AT-07b | 3 | Elevated Pedestrian Connection | Elevated pedestrian connection over Kent Street (extended option) | 110 | N/A | N/A | 2027-2031 | \$0 | \$3,485,000 | \$592,450 | \$611,618 | \$4,689,067 | \$4,689,067 |

Notes:

1 – TBC – To be confirmed

2 – All costs are expressed in current cost terms as at the base date (FY 2021/22).

Table 4: Schedule of future trunk infrastructure works - Parks and community facilities

| DCOP ID | Map no. | Infrastructure type | Infrastructure description | Area (m ²) | Estimated timing | Land cost | Works base cost | Works on-costs | Works contingency | Total works cost | Trunk establishment cost |
|-------------------------------|---------|-----------------------|---------------------------------------|------------------------|------------------|-----------|-----------------|----------------|-------------------|------------------|--------------------------|
| BGO-PP-02 (A) / BGO-PP-02 (B) | 4 | Local Recreation Park | Embellishment of Outlook Park | N/A | 2025-2026 | \$0 | \$747,000 | \$126,990 | \$218,497 | \$1,092,487 | \$1,092,487 |
| BGO-PP-03 | 4 | Local Recreation Park | Embellishment of Boggo Road Gaol Park | N/A | 2025-2026 | \$0 | \$1,919,185 | \$326,261 | \$561,362 | \$2,806,808 | \$2,806,808 |

Notes:

1 – All costs are expressed in current cost terms as at the base date (FY 2021/22).

Appendix H Future Infrastructure Network Plans

Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Wastewater Infrastructure

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Wastewater Projects

Wastewater Projects (All Stages)

Wastewater Project Alignment

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Buildings | Existing Buildings

Wastewater

- Wastewater | Existing Manhole (Urban Utilities)
- Wastewater | Existing Gravity Main (Urban Utilities)

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Transport - Rail

- Operational
- Under Construction
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Parcels

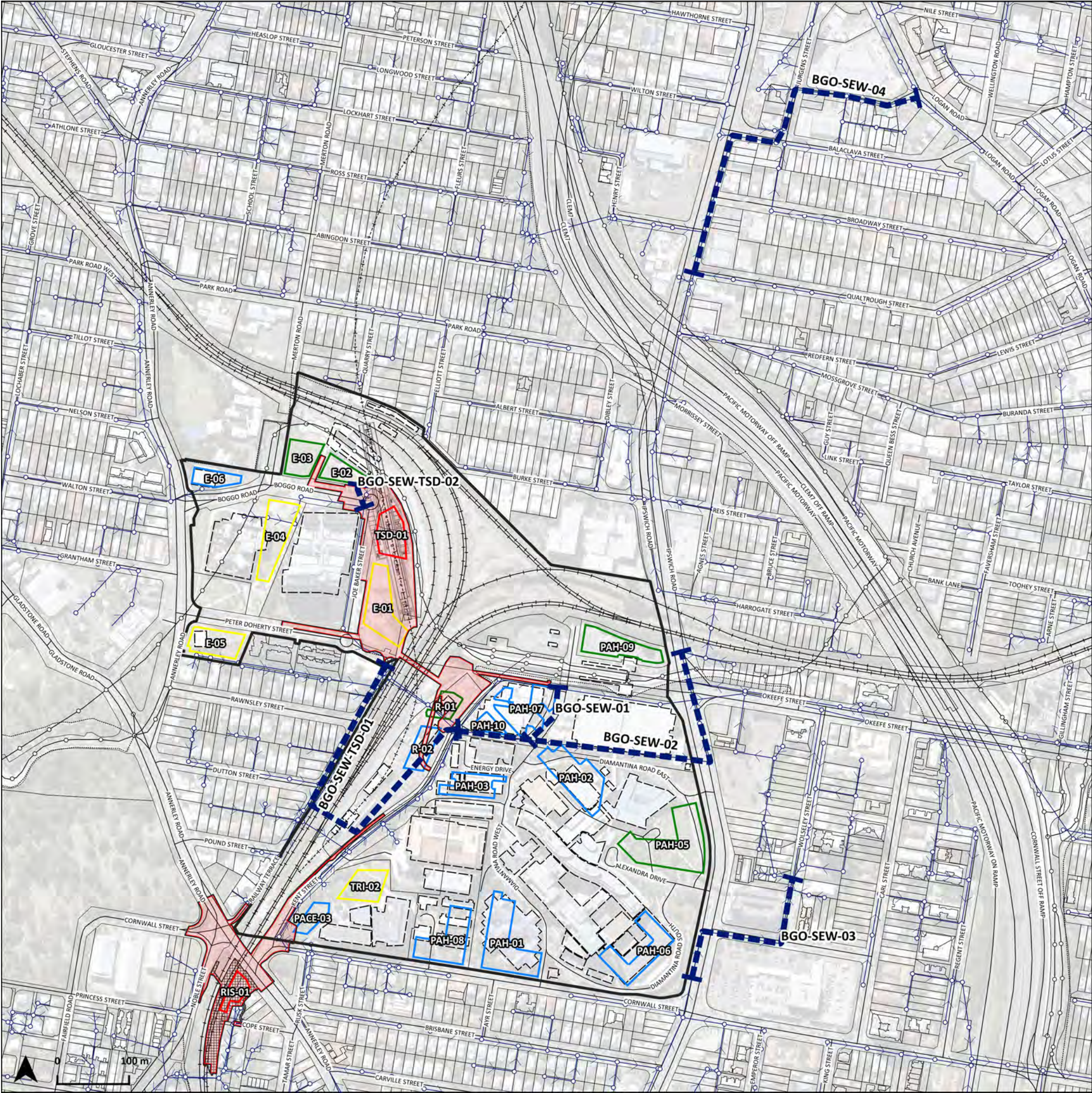
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DOCUMENT CONTROL
Document: 30032260-BOG-WAT-MAP-0007
Revision: 04
Export Date & Time: 22/11/2021 16:26

Data Sources
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Water Supply Infrastructure

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Water Projects

Water Projects (All Stages)

- Water Project Alignment

Water Supply | Existing Node (Urban Utilities)

- Meter
- Valve
- Hydrant
- Water Supply | Existing Pressure Main (Urban Utilities)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Transport - Rail

- Operational
- Under Construction
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Parcels

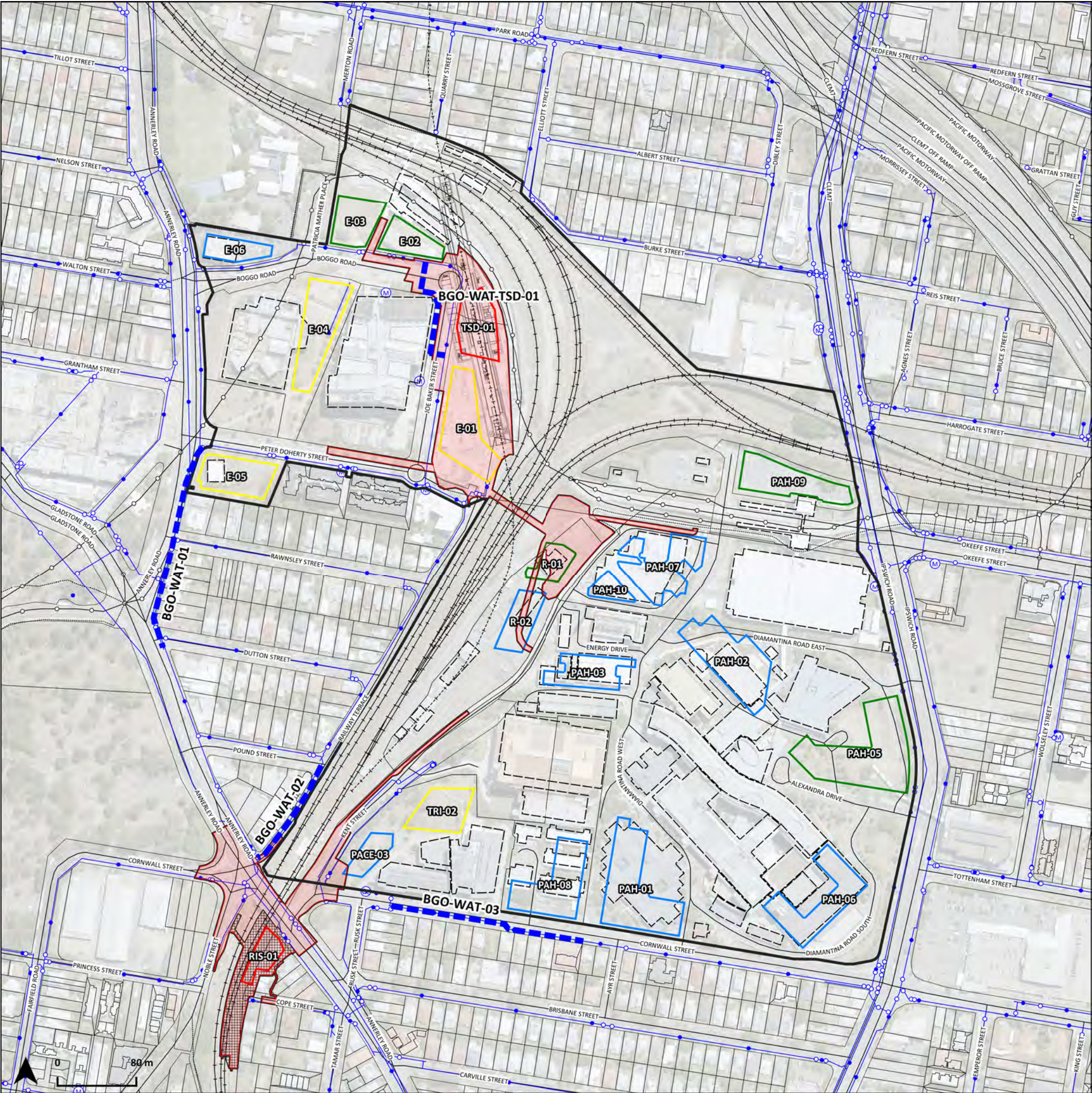
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Document: 30032260-BOG-WAT-MAP-0008
Revision: 03
Export Date & Time: 22/11/2021 16:33

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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Parks & Community Infrastructure

Legend

Boggo Road CRR PDA Boundary

CRR TSD and CRR RIS Delivery Area

Infrastructure - Project Location

Parks & Community Infrastructure

Temporary Outlook Park

PDA - Development Sites (by Stage & Year) (Indicative Only)

Stage 1 (TSD & RIS) (2020 - 2025)

Stage 2 (2025 - 2026)

Stage 3 (2027 - 2031)

Stage 4 (2032 - 2041)

Infrastructure - Parks - Existing Parks (by Trunk Type)

Recreation (urban) - District / Metropolitan

Existing Park - embellishment enhancements

Recreation (urban) - Local

Transport - Road, Transit

Road

Busways

Tracks, Paths & Malls

Transport - Rail

Operational

Under Construction

CRR TSD Boggo Road Station

CRR RIS Dutton Park Station

Property - DCDB

Base Lot

Easements etc

| Key | Project No | Description |
|-----|---------------|---|
| 1 | BGO-PP-01 | Potential New Urban Commons within PAH (Location Indicative) |
| 2 | BGO-CF-01 | Potential repurposing of Boggo Road Gaol for community uses |
| 3 | BGO-PL-01 | Boggo Road CRR Station Plaza (by CRR TSD) |
| 4a | BGO-PP-02 (A) | Potential Outlook Park Opportunity Area (approx. 2100m² (26.6% land area) of 7876m² will be required for delivery) OR |
| 4b | BGO-PP-02 (B) | Potential Outlook Park Opportunity Area (approx. 2100m² (18.3% land area) of 11460m² will be required for delivery) |
| 5 | BGO-PP-03 | Existing Boggo Road Gaol Park, only future embellishments proposed |
| 6 | BGO-PP-04 | Landscape Amenity Area (Non-Trunk) (by CRR TSD) |

BGO-PP-02 (A) and BGO-PP-02 (B) represent indicative locations for one (1) replacement park to be provided. Section 2.6.1 Connectivity, access and public realm provision 10 of the Boggo Road Development Scheme requires the first stage of development within the Outlook Park opportunity area to provide a new permanent Outlook Park.

NOTE:
Future PDA potential development opportunity sites and staging are conceptual and indicative only for infrastructure network analysis purposes.

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Document: 30032260-BOG-COM-MAP-0003
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This map illustrates the Boggo Road Cross River Rail Priority Development Area (PDA) and its surrounding urban context. The map features a network of roads, including Tilgot Street, Nelson Street, Walton Street, Grantham Street, Gladstone Road, Annerey Road, Peter Doherty Street, Rawnsley Street, Dutton Street, Pound Street, Cornwall Street, Princess Street, Noble Street, Rusk Street, Tamar Street, Carville Street, Park Road, Quarry Street, Elliott Street, Albert Street, Burke Street, Dibley Street, Clem7, Redfern Street, Moss Grove Street, Grattan Street, Glyn Street, Agnes Street, Bruce Street, Harrogate Street, O'Keefe Street, Jawsich Road, Diamantina Road East, Diamantina Road West, Diamantina Road South, Tottenham Street, King Street, Empress Street, and Fairfield Road. The map also shows the CRR TSD and CRR RIS Delivery Areas, which are outlined in red. Various development sites are indicated by colored polygons: Stage 1 (red), Stage 2 (yellow), Stage 3 (green), and Stage 4 (blue). Specific sites are labeled with codes such as BGO-PP-01, BGO-PP-02 (A), BGO-PP-02 (B), BGO-PP-03, BGO-PP-04, BGO-CF-01, BGO-PL-01, TSD-01, E-01, E-02, E-03, E-04, E-05, E-06, PAH-01, PAH-02, PAH-03, PAH-04, PAH-05, PAH-06, PAH-07, PAH-08, PAH-09, PAH-10, R-01, R-02, TRI-02, PAGE-03, and RIS-01. The map also shows existing parks, including Gair Park, and various infrastructure elements like roads, busways, and tracks. A north arrow is located in the bottom left corner, and a disclaimer states: 'This map is for illustration purposes and is not to scale'.

Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Stormwater Infrastructure

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)

Stormwater Projects (All Stages)

- Stormwater Project Location
- Stormwater Project Alignment

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Transport - Rail

- Operational
- Under Construction
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Parcels

NOTE:
Future PDA potential development opportunity sites and staging are conceptual and indicative only for infrastructure network analysis purposes.

DOCUMENT CONTROL
Document: 30032260-BOG-STO-MAP-0001
Revision: 04
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Active Transport - Stage 1 (2020 - 2025) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Active Transport Projects (Stage 1)

- Vertical Transport Upgrade (Stage 1)
- Active Transport Link (Stage 1)
- Active Transport Link (TSD)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

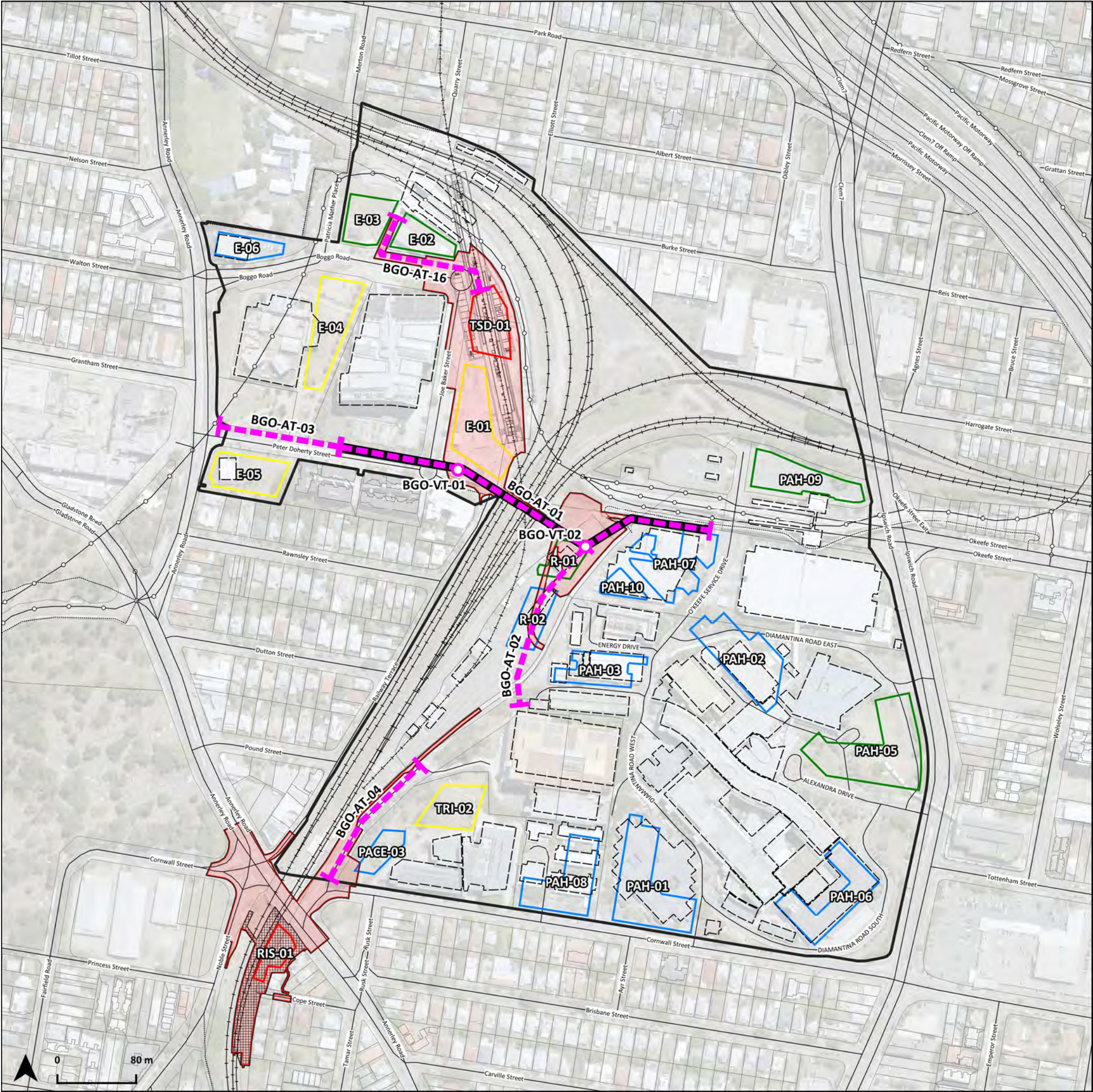
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Revision: 03
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Active Transport - Stage 2 (2025 - 2026) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

- Active Transport Projects (Stage 2)
- Active Transport Link (Stage 2)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

- Transport - Road, Transit
- Road
- Busways
- Tracks, Paths & Malls

- Existing Rail
- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

- Property - DCDB
- Base Lot

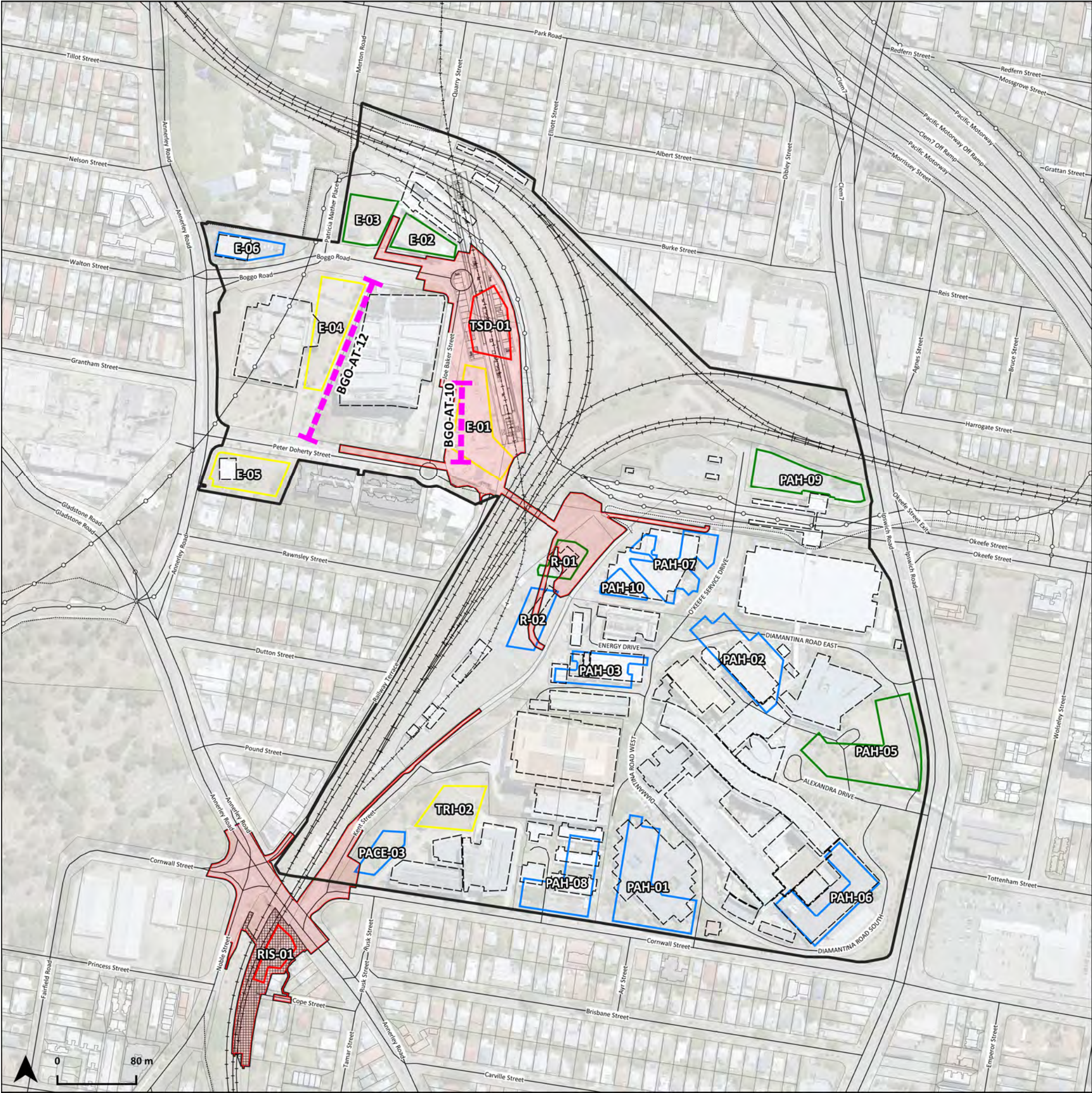
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Revision: 03
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Active Transport - Stage 3 (2027 - 2031) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Active Transport Projects (Stage 3)

- Vertical Transport Upgrade (Stage 3)
- Active Transport Link (Stage 3)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

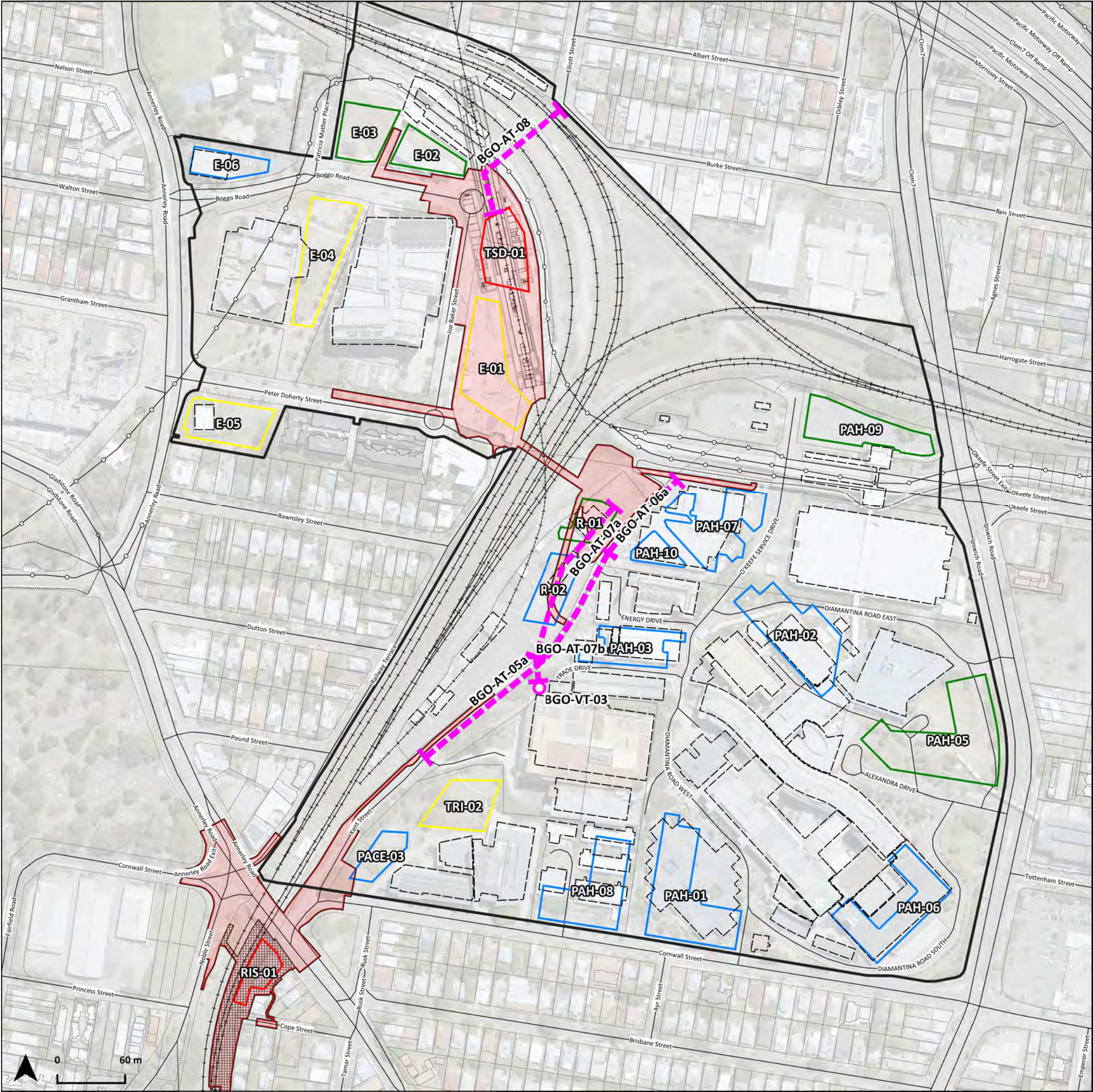
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Revision: 03
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Active Transport - Stage 4 (2032 - 2041 / Ultimate)
(Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

- Active Transport Projects (Stage 4)
- Active Transport Link (Stage 4)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

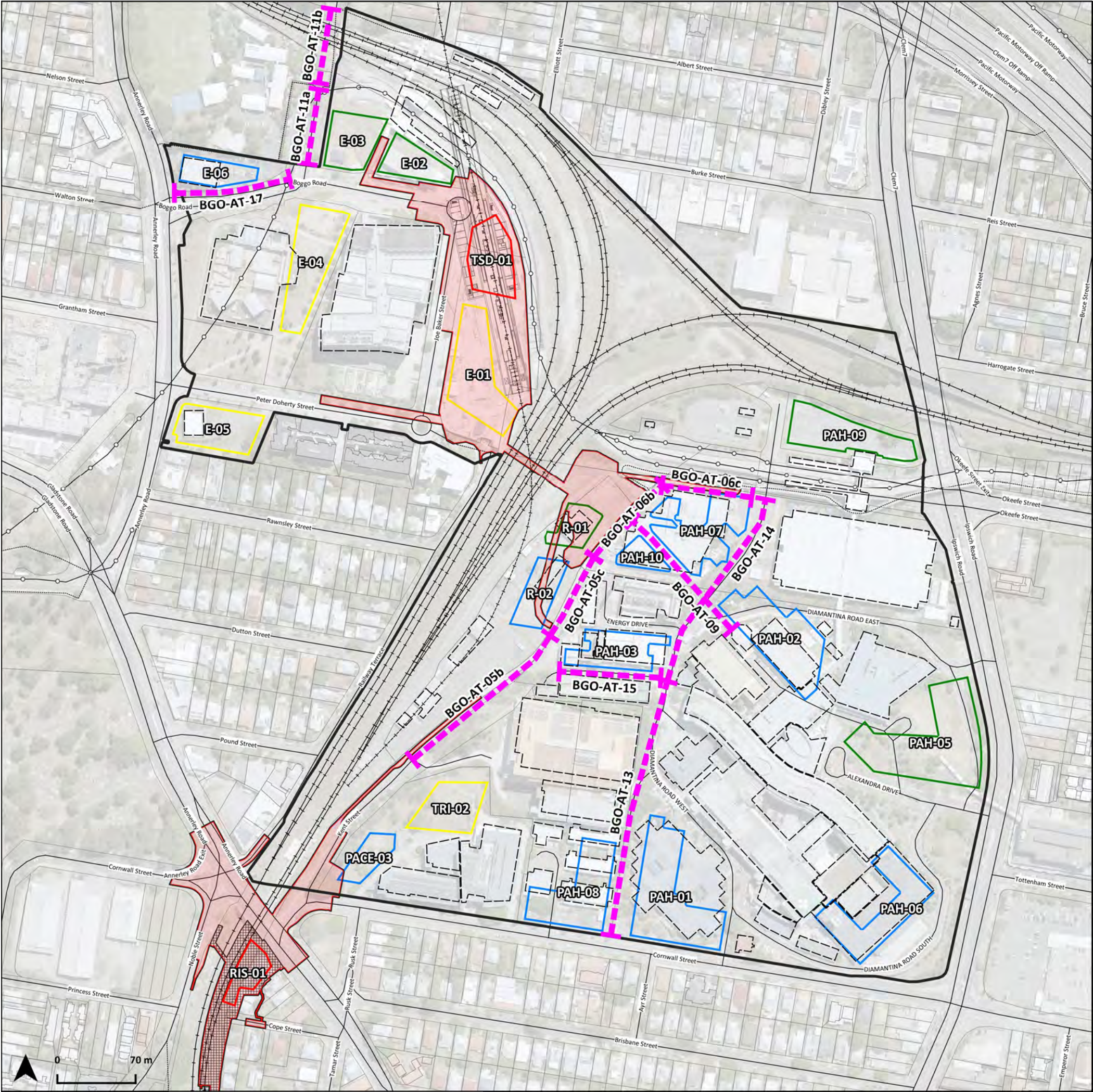
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Roads and Public Transport - Stage 1 (2025) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Road Projects (Stage 1)

- Road Intersection Upgrade (Stage 1)
- Road Corridor (Stage 1)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

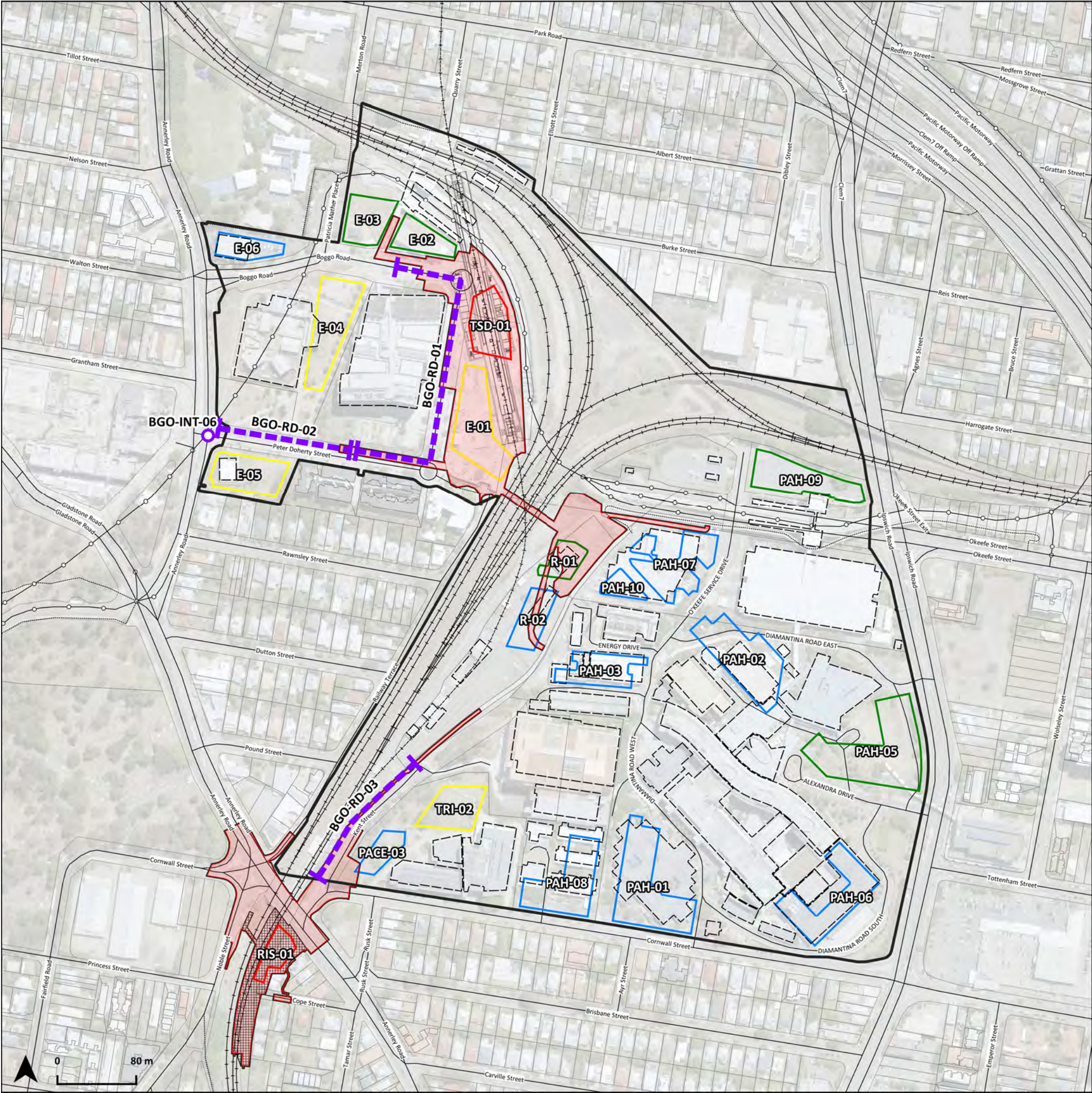
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Revision: 03
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**Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Roads and Public Transport - Stage 2 (2025 - 2026)
(Indicative)**

Legend

-  Boggo Road CRR PDA Boundary
 CRR TSD and CRR RIS Delivery Area





PDA - Development Sites (by Stage & Year) (Indicative Only)

-  Stage 1 (TSD & RIS) (2020 - 2025)
-  Stage 2 (2025 - 2026)
-  Stage 3 (2027 - 2031)
-  Stage 4 (2032 - 2041)
-  Existing Buildings

Transport - Road, Transit

- Road
○— Busways
..... Tracks, Paths & Malls

Existing Rail

-  Operational
 CRR Alignment
 CRR TSD Boggo Road Station
 CRR RIS Dutton Park Station

Property - DCDB

- ☐ Base Lot

NOTE:

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DOCUMENT CONTROL

Document: 30032260-BOG-TRA-MAP-0002

Revision: 03

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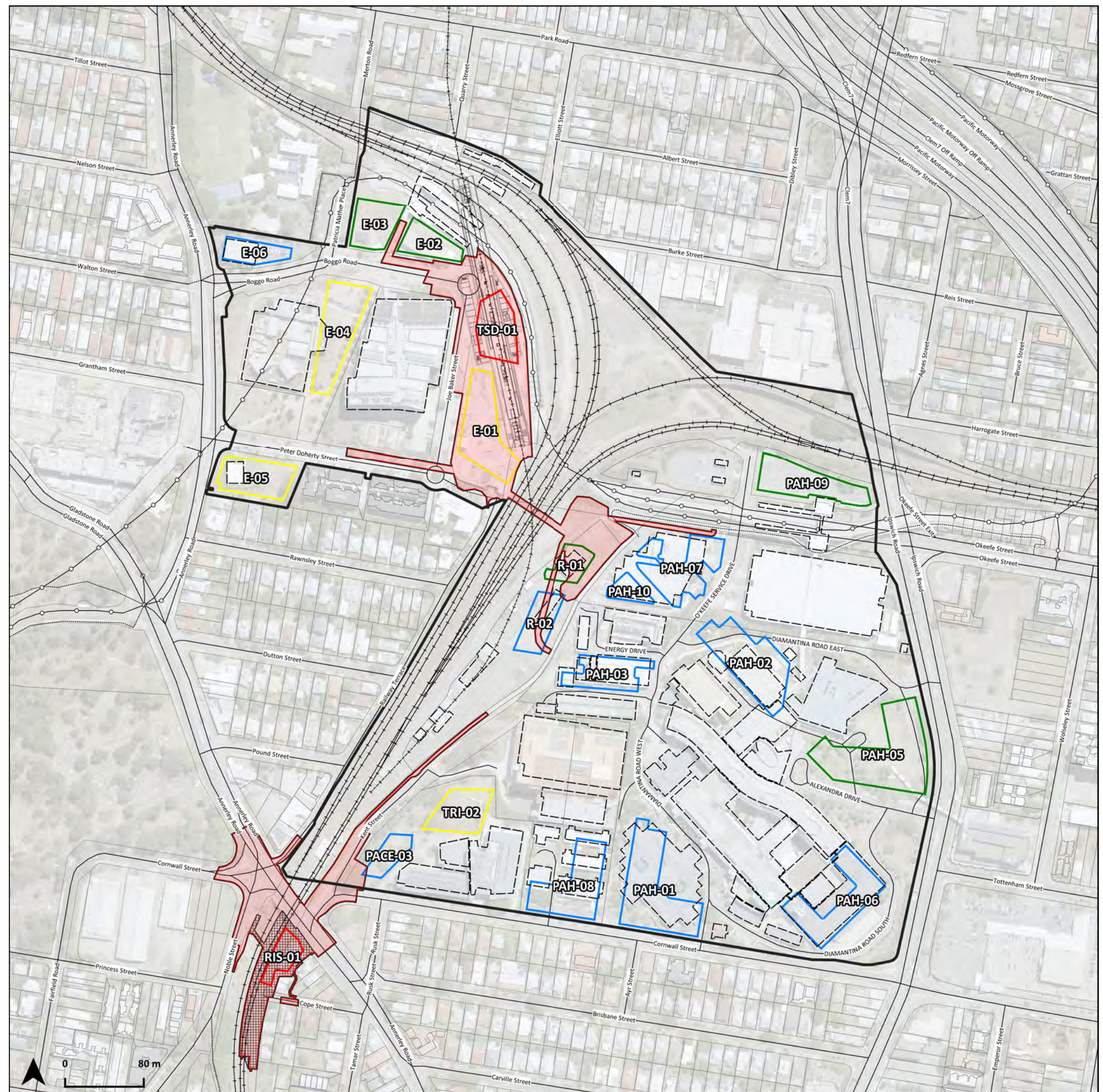
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Roads and Public Transport - Stage 3 (2027 - 2031)
(Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Road Projects (Stage 3)

- Road Corridor (Stage 3)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

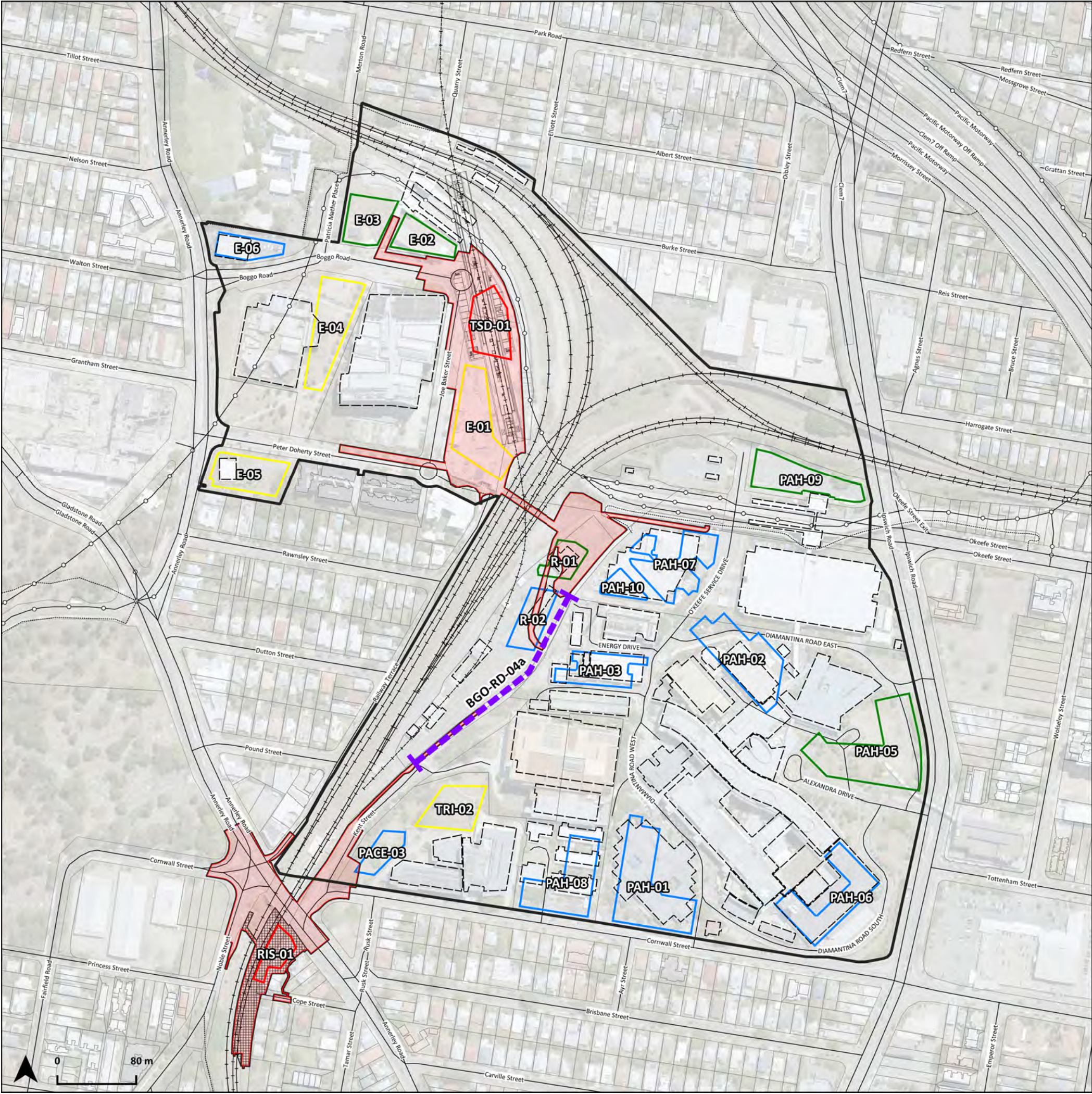
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Revision: 02
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Boggo Road Cross River Rail Priority Development Area
Future Infrastructure Network Plan
Roads and Public Transport - Stage 4 (2032 - 2041 /
Ultimate) (Indicative)

Legend

- Boggo Road CRR PDA Boundary
- CRR TSD and CRR RIS Delivery Area

Road Projects (Stage 4)

- Road Intersection Upgrade (Stage 4)
- Road Corridor (Stage 4)

PDA - Development Sites (by Stage & Year) (Indicative Only)

- Stage 1 (TSD & RIS) (2020 - 2025)
- Stage 2 (2025 - 2026)
- Stage 3 (2027 - 2031)
- Stage 4 (2032 - 2041)
- Existing Buildings

Transport - Road, Transit

- Road
- Busways
- Tracks, Paths & Malls

Existing Rail

- Operational
- CRR Alignment
- CRR TSD Boggo Road Station
- CRR RIS Dutton Park Station

Property - DCDB

- Base Lot

NOTE:
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Document: 30032260-BOG-TRA-MAP-0002
Revision: 02
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