Hobart City Deal Southern Projects Sub-Project 3: Kingborough Park and Ride

Concept Design Report

Department of State Growth

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EXECUTIVE SUMMARY

The Greater Hobart region's population and employment growth are putting increased pressure on its transport network. The growth of residential areas in Kingborough and the Huon Valley creates commuter pressures on the Southern Corridor (comprising Kingston, the Southern Outlet, and the Macquarie/Davey Street couplet) between Kingston and Hobart.

The Hobart City Deal Southern Projects seeks to encourage modal shift in favour of public transport to address congestion and accessibility issues along the Southern Corridor. The Project is comprised of five sub-projects that together provide a comprehensive, multi-faceted approach.

The subject of this report is Sub-project 3(SP3) the Kingborough Park and Ride – Concept design for Park and Ride facilities at two locations in the Kingborough municipality. The scope of work includes selecting two locations and developing any specific attributes of the facilities in collaboration with stakeholders. Two sites have been selected at Browns Road, Firthside and Huntingfield terminus.

The scope of this phase of the project includes planning investigations comprising desktop assessments of environmental & heritage, traffic investigation, and geotechnical issues, development of concept design drawings and development of P50 / P90 cost estimates.

All concept options described within this report were developed with the following design standards:

- Austroads Guide to Road Design Part 5 2013: Drainage General and Hydrology Considerations
- Austroads Guide to Road Design Part 5A 2013: Drainage Road Surface, Networks, Basins and Subsurface
- Austroads Guide to Road Design Part 5B 2013: Drainage Open Channels, Culverts and Floodways
- Local Government Association of Tasmania (LGAT) Standard Drawings
- Australian Standard AS2890.1-2004 Parking Facilities - Off-Street Carparking (User Class 1: All-day parking for commuters)

- Australian Standard AS2890.6-2009 Parking Facilities – Off-Street Carparking for People with Disabilities (User Class 4: DDA Parking)
- AS1742-2014 Manual of Uniform Traffic Control Devices
- Department of State Growth Standard Specification for Professional Services
- Vicroads Traffic Engineering Manual Volume 3 Part 219 Accessibility DDA Guidelines

One carpark option was developed for the Browns Road site with several options considered for the bus stops.

Three carpark layout options were considered for the Huntingfield Park and Ride

The preferred arrangement for the Browns Road Park and Ride is Option 1A comprising an inbound stop located on the onramp to Southern Outlet and an outbound stop approximately 200 m south of the site on Browns Road.

The preferred option for the Huntingfield Park and Ride site is Option 3 which provides both left and right turn exit for buses, with cars and buses sharing the circulating road.

The P50 P90 cost estimates for the preferred options are summarised below:

Browns Road Park and Ride

Base Estimate	P50 Total Outturn Cost	P90 Total Outturn Cost
$1,336,241	$1,631,241	$1,743,241

Huntingfield Park and Ride

Base Estimate	P50 Total Outturn Cost	P90 Total Outturn Cost
$5,143,250	$6,283,250	$6,733,250

1. Introduction

1.1 Background

The Greater Hobart region's population and employment growth are putting increased pressure on its transport network. The growth of residential areas in Kingborough and the Huon Valley creates commuter pressures on the Southern Corridor (comprising Kingston, the Southern Outlet, and the Macquarie/Davey St couplet) between Kingston and Hobart.

The Hobart City Deal Southern Projects seeks to encourage modal shift in favour of public transport to address congestion and accessibility issues along the Southern Corridor. The Southern Projects are comprised of five sub-projects that together provide a comprehensive, multi-faceted approach:

- **Sub-project 1: Southern Outlet Transit Lane** – Concept design for a northbound Transit lane on the Southern Outlet between Olinda Grove and Hobart/Macquarie Street. The lane will operate as a T3 lane for use by buses, private vehicles carrying three or more occupants, taxis, and emergency service vehicles.
- **Sub-project 2: Macquarie/Davey Bus Priority** – Concept design for bus priority measures on Macquarie and Davey streets that considers how to optimise bus operations while managing impacts.
- **Sub-project 3: Kingborough Park and Ride** – Concept design for Park and Ride facilities at two locations in the Kingborough municipality. The scope of work includes selecting two locations and developing any specific attributes of the facilities in collaboration with stakeholders.
- **Sub-project 4: Bus service plan for Southern Corridor** – Developing a Park and Ride bus service model to support the two Kingborough Park and Ride facilities (sub-project 3), the Southern Outlet transit lane (sub-project 1), and the bus priority measures proposed for Macquarie and Davey Streets (sub-project 2). The bus service model will be focused on encouraging modal shift to public transport with the potential for new buses, bus routes, and stops.
- **Sub-project 5: Southern Outlet Transit Lane – T3 Enforcement** – Concept design and a concept of operations plan for the proposed T3 lane on the Southern Outlet (sub-project 1), including the recommended locations of enforcement devices, as well as technological and legal considerations.

This Concept Design Report is in relation to Sub-project 3 of the Hobart City Deal Southern Projects, which is the provision of two new Park and Ride facilities in the Kingborough municipality.

1.2 Location

Two Park and Ride facilities are proposed. These are referred to as the northern and southern Park and Ride facilities.

The northern Park and Ride facility is comprised of two sites located at Browns Road, near the Southern Outlet's northern entrance to Kingston, as shown in Figure 1 below. This proposal would include formalisation of the existing gravel car parking area and possible pedestrian connections to bus stop facilities on the western side of the outlet and further south on Browns Road.

The southern Park and Ride facility would be located at an informal parking area at Huntingfield, opposite the Huntingfield Business Park and north of Huntingfield Estate, as shown in Figure 1 below.

Figure 1 - Park and Ride Locality Plan

1.3 Objectives and Constraints

1.3.1 Project Objectives

The overall objectives of the Hobart Transport Vision – Southern Projects project are to:

- Achieve modal shift for commuters using the Southern Outlet
- Improve public transport travel reliability along the Southern Outlet corridor
- Encourage multiple occupancy of private vehicles during peak periods of travel
- Improve public transport and passenger experience for Kingborough and Huon residents.

The key anticipated project benefits include:

- Improved public transport passenger experience for Kingborough and Huon residents
- Improved public transport travel reliability along the Southern Outlet and Macquarie/Davey streets
- Improved bus operations along Macquarie and Davey streets
- Better utilisation of transport infrastructure to address congestion
- Increased capacity along the Southern Outlet corridor
- Providing long-term solutions to meet future demand and address road safety related issues.

1.3.2 Report Objectives

This report aims to document the design options considered in developing the functional designs of the two Park and Ride facilities and present a recommended Concept Design for the State's consideration. The objectives of this report are to:

- Describe the recommended preferred Park and Ride option.
- Describe the Park and Ride design options that have been investigated.
- Describe the advantages and constraints of the project.
- Make reference to other investigations and activities which have been conducted as part of this project.

1.3.3 Project Constraints

The project objectives are to be delivered within the following constraints:

- Compliance with all relevant environmental, heritage and planning legislation.
- Community and local government acceptance.
- Deliver within the project budget.
- Deliver within the project timeframe.

1.4 The Existing Road and Roadside Environment

1.4.1 Huntingfield Site

The Huntingfield Park and Ride site is located south-west of the Algona Road/Channel Highway roundabout. The proposed Park and Ride site is currently used as an informal parking area. The access roads are sealed however, the vacant area north of the road that is also used for parking is unsealed. After heavy rainfall, accessibility to this part of the car park can be affected. The total number of car parking spaces currently able to be accommodated on-site is not specified as the area is unsealed with no line marking to designate the parking spaces.

Figure 2 - Huntingfield Locality Plan

1.4.2 Browns Road Site

The Browns Road Park and Ride site is located adjacent to the Groningen Road overpass of the Southern Outlet in Firthside.

The proposed Park and Ride site is currently used as an informal parking area. Site observations and aerial photography indicates it is currently able to accommodate circa 30–35 car parking spaces. However, the site is unsealed, and after a heavy rainfall accessibility to the car park and availability of car parking spaces can be affected.

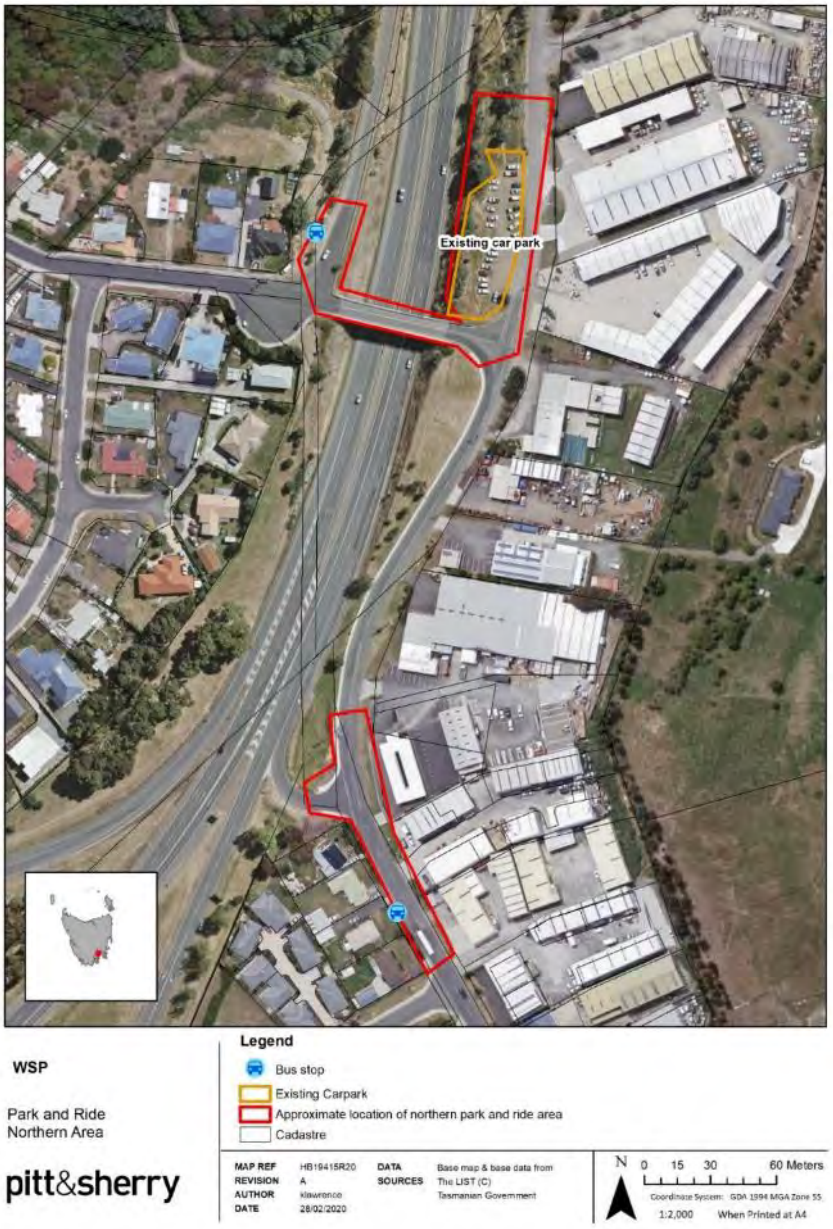


Figure 3 - Browns Road Locality Plan

1.5 Project Scope

The scope of this project includes:

- The development of two Concept Designs for Park and Ride facilities in the Kingborough Municipality for the two selected locations.
- The Concept Designs and Concept Design Reports will include the attributes of the Park and Ride (including Bike and Ride / Kiss and Ride capacity), size, DDA compliance, gated access, enforcement of parking and pricing.
- The Concept Design Reports will describe how consideration of traffic impact including bus ingress and egress, road safety issues, land tenure/acquisition, stakeholder engagement, environmental, heritage, planning and geotechnical requirements and constraints, engineering survey including utility services location, any road upgrade requirements and cost estimates – both capex and opex - informed the Concept Designs.

2. Strategic Context

2.1 General

The Tasmanian Government has made a commitment to addressing growth through the Greater Hobart Traffic Solution (2018–2023) and Hobart City Deal (2019–2029). The Hobart City Deal is a shared 10-year vision between the Australian and Tasmanian governments and local councils, including Hobart and Kingborough councils, to guide and encourage investment to build a vibrant, liveable and connected global city.

The Hobart City Deal reflect the Tasmanian Government commitment to address the current network challenges. The Project is part of a funded program of projects including:

- $20 million for Kingborough transport infrastructure, including creating new park and ride(s) and improvements to the Kingborough bus interchange
- $35 million for a Southern Outlet transit lane
- $16 million for Macquarie and Davey Street bus priority.

The Tasmanian Government's Hobart Transport Vision (the "Vision") is a holistic plan that seeks to prioritise active and public transport modes to provide a reliable and cost-effective alternative transport system with a focus on prioritised rapid passenger transport as a competitive alternative to private car travel. The sub-projects are consistent with the Vision. They are also an opportunity to create synergies between Kingborough Council, the City of Hobart, the Department of State Growth, and the Royal Automobile Club of Tasmania (RACT), among other stakeholders, on a future vision for transport in Greater Hobart.

2.2 Planning Studies

The need for park and rides in Kingborough was established in the Hobart Transport Vision and Hobart City Deal, as described above. The Southern Outlet Park and Ride Site Identification and Assessment Technical Note (Barry Watkins & Associates, 2019) identified and assessed multiple potential park and ride locations throughout Kingborough. Two sites, the Huntingfield Terminus and Browns Road, were selected in consultation with Kingborough Council and are presented in this report.

3. Design Inputs

3.1 Standards and Guidelines

3.1.1 Carpark and Drainage

The concept design options are developed in accordance with the current guidelines and standards listed below.

Austroads

- Austroads Guide to Road Design Part 5 2013: Drainage General and Hydrology Considerations
- Austroads Guide to Road Design Part 5A 2013: Drainage Road Surface, Networks, Basins and Subsurface
- Austroads Guide to Road Design Part 5B 2013: Drainage Open Channels, Culverts and Floodways

Local Government Association of Tasmania (LGAT)

- Standard Drawings

Standards Australia

- Australian Standard AS2890.1-2004 Parking Facilities - Off-Street Carparking (User Class 1: All-day parking for commuters)
- Australian Standard AS2890.6-2009 Parking Facilities – Off-Street Carparking for People with Disabilities (User Class 4: DDA Parking)
- AS1742-2014 Manual of Uniform Traffic Control Devices

State Growth

- Standard Specification for Professional Services

VicRoads

- Vicroads Traffic Engineering Manual Volume 3 Part 219 Accessibility DDA Guidelines

3.1.2 Lighting

The following technical standards have been used in the preparation of the car park lighting design:

Standards Australia

- AS/NZS 1158.3.1:2020 Lighting for roads and public spaces – Pedestrian area (Category P)

TasNetworks Standards

- Distribution Design Standard Public Lighting, Version 1.0, February 2016 (*)
- Standard Construction Drawings Public Lighting, Version 2.0, September 2016

(*) TasNetworks have advised that they have made HPS street lamps obsolete and have moved to LED light fittings for Category-P street lighting. Their preferred supplier is Aldridge Traffic Systems. This advice from TasNetworks is yet to be incorporated into their "Distribution Design Standard Public Lighting" documentation. The TasNetworks design standards do not include LED luminaire fittings applicable for car-park lighting and an alternative fixture from Thorn Lighting has been used for the Preliminary Design.

3.2 Traffic Volumes

Huntingfield Park and Ride

A Traffic Impact Assessment was prepared for the Huntingfield Park and Ride facility and is attached at Appendix D. Table 1 below details the traffic volumes, heavy vehicle percentages and the annual growth on Southern Outlet, Huon Highway and Channel Highway, which were obtained from RoadTas traffic statistics website. The Southern Outlet and Channel Highway (south of Algona Road) have similar volumes, as do the Channel Highway north of Algona Road and Algona Road. The other two approaches have high growth, indicative of a growing area and indicating that delays on these approaches could increase in the future:

Table 1Huntingfield site traffic volume

Road name and location	Survey period	Average Daily Traffic (vehicles per day)	Heavy vehicle %	Annual Growth (since year)
Southern Outlet, Kingston	May 2019	Weekday: 18,357 Saturday: 14,028	7.9%	1.0% (2017)
North of Algona Road				
Channel Highway, Huntingfield	May 2019	Weekday: 17,828 Saturday: 14,787	7.9%	1.4% (2016)
South of Algona Road				
Channel Highway, Kingston	May 2019	Weekday: 11,804 Saturday: 9,937	6.0%	3.5% (2012)
North of Algona Road				
Algona Road, Huntingfield	October 2018	Weekday: 11,847 Saturday: 9,189	5.5%	3.1% (2013)
East of Channel Highway				

Browns Road Park and Ride

A Traffic Impact Assessment was prepared for the Huntingfield Park and Ride facility and is attached at Appendix D. The traffic volumes, heavy vehicle percentage and the annual growth on Southern Outlet, Huon Highway and Channel Highway are shown in Table 2 below. Annual growth of traffic is around 3%.

Table 2 Browns Road site traffic volumes

Road name and location	Survey period	Average Daily Traffic (vehicles per day)	Heavy vehicle %	Annual Growth (since year)
Southern Outlet, Kingston South of Huon Highway	May 2019	Weekday: 22,040 Saturday: 16,888	8.35%	2.3% (2017)
Huon Highway, Kingston West of Southern Outlet	May 2019	Weekday: 12,580 Saturday: 10,268	7.7%	3.5% (2016)
Channel Highway, Kingston East of Browns Road	May 2019	Weekday: 4,405 Saturday: 4,147	8.3%	3.6% (2016)

3.2.1 Bus Volumes and Servicing Plan

Huntingfield Park and Ride

Please refer the Park and Ride Bus Service Model Report for details of bus volumes and future servicing plans in Appendix E. In summary:

At Huntingfield Park and Ride site, one bus space would be adequate for the service level required to support a 200-space car park. At least one additional space would be required to accommodate existing bus services at the site, as well as the potential for other proposed express services to call at the Park and Ride (this is not proposed in this report). One layover space would be adequate for the level of service envisaged – a total of 2-3 bus spaces, plus at least one layover space should be provided.

Potential future bus routes mean that busses must have the ability to turn right and left out of the facility.

Browns Road Park and Ride

At Browns Road Park and Ride site, the two existing bus stop locations are being retained.

3.2.2 Car Park

Car parking space has been maximised within the available space to allow for future growth.

3.3 Design Vehicle

The following design and check vehicles have been adopted for these projects:

- The Design Vehicle within the carpark and kiss and ride area is a 5.2m Passenger Vehicle
- The Check Vehicle within the kiss and ride area is an 8.8m Service Vehicle
- The Design Vehicle within the bus area is a 14.5m Long Rigid Bus
- The Check Vehicle within the bus area is a 19m Articulated Bus

3.4 Geotechnical and Pavement

A geotechnical investigation has not been conducted at these two Park and Ride locations. There are no known geological constraints associated with either Park and Ride site.

For the development of Concept Design cost estimates typical light duty and heavy-duty pavements were adopted.

4. Huntingfield Concept Design Options

Various layout options were considered in determining the preferred Concept Design layout. The options were developed in 2D to determine the preferred general layout for the entrances/exits and general car park layout. Detailed items such as bicycle facilities, drainage etc. were added to the concept design once the preferred layout was identified. Other design components not included in this section of the report are included in Section 6 of this report.

The proposed Park and Ride site is currently used as an informal parking area with no line marking to designate the parking spaces. The access roads are sealed however there is an unsealed vacant area north of the road that is also used for parking. Various options were considered in the development of the Park and Ride design layouts to best utilise this space for all users.

Figure 4 - Huntingfield Site

The three options considered in the following sections were:

- Option 1 – Separation of buses and cars
- Option 2 – Formalising the existing layout
- Option 3 – Formalising the existing layout with the addition of a Kiss and Ride facility

4.1 Option 1 – Separation of Buses and Cars

4.1.1 Description

Under current conditions, the buses and cars share the same road space within the facility. Buses and cars utilise the existing access roads in a clockwise direction with the unsealed carparking to the north. Option 1 provides for separation of buses and cars within the facility by dividing the site into a bus area and a carpark area. Each area has separate entrances/exits thereby eliminating conflict between the two modes.

The key benefit of separation is that bus volumes and frequencies can be increased without impact to bus movements due to car park congestion. This is important for maintain bus reliability.

An additional benefit of this layout at this site is that the single large car park area allows for a higher density of car parks compared with the other Options. It also allows for a Kiss and Ride facility with a large 3m footpath behind the bus bays. This option achieves approximately 240 to 250 car spaces and 3 bus bays.

Two different layouts were considered for Option 1 (Option 1A and1B). Option 1A is shown in Figure 5 which lays out the bus stops in a north-south alignment. Option 1B is shown in Figure 6 which lays out the bus stops in an east-west alignment. Option 1B was developed to allow for the bus to turn right on exit without having to negotiate the roundabout.

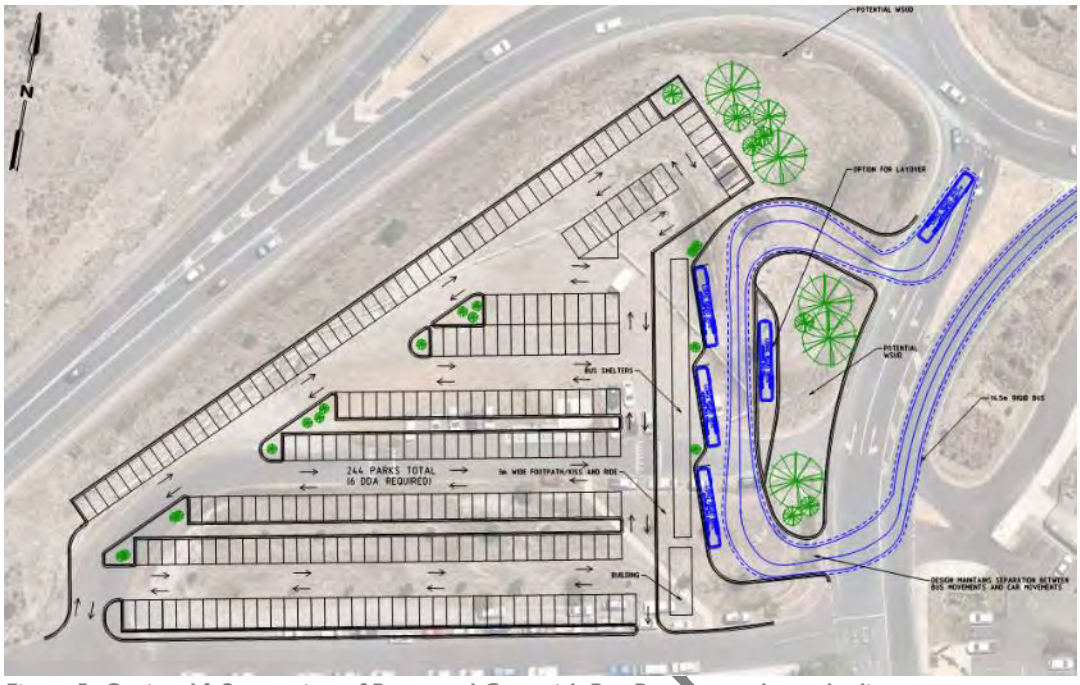


Figure 5- Option 1A Separation of Buses and Cars with Bus Bays in north-south alignment

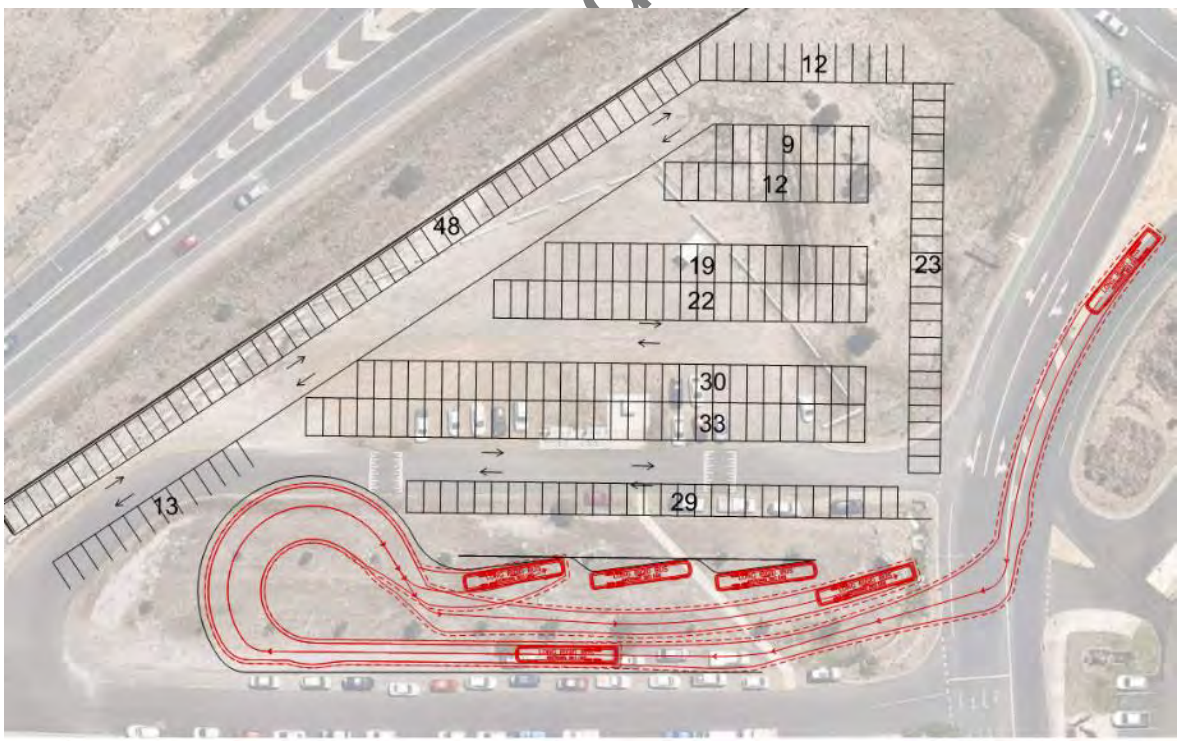


Figure 6- Option 1B Separation of Buses and Cars with bus bays in East-West (Draft Sketch)

4.1.2 Advantages and Disadvantages

The advantages and disadvantages of this layout are detailed below and in Section 4.4 of this report where all the options are compared.

Advantages

- Highest number of car spaces with 244 general parking and 6 DDA parking spots.
- Separation of the Bus and Car movements thus no delays for buses in peak times
- One entry/exit and One exit only easing congestion during peak hours within the car park.
- Allows quick pick-up and drop-offs (kiss and ride) near the bus shelter.
- Pedestrians do not cross road to access the bus stops. Internal paths within the car park (between kerbs) can be provided.
- Future ready, the separate operation of buses and cars and the single large car park means this layout can be expanded into a major hub
- Allows for future expansion of the parking facility, and increased frequency of peak hour bus movements
- Three new bus bays with shelters.
- One optional layover area in the median
- Room for onsite coms-room, toilet facilities and other amenities.
- Maximizing the site condition, and land use.
- Existing pavement can be rehabilitated within the car park area
- New landscaping areas which allows for additional Water Sensitive Urban design treatments.

Disadvantages

- Buses must use roundabout to turn right in Option 1A. In Option 1B buses can turn left and right however the proximity of intersections I closer which may have safety implications for buses, cars and bicycles entering/exiting the site.
- Most expensive option due to the extent of pavement although it could be delivered in stages
- Re-working existing site. removing the existing road, and bus shelters, levelling of bus exit point to meet the road surface level.
- No room to add additional bus bays
- Initial construction works required for change in bus operation

While separating the two modes has a number of advantages, it was determined in the Traffic Impact Assessment that the separation of buses and cars is not necessary for satisfactory operation at current or predicted future usage levels; while it is critical for bus operations that busses can turn both left and right out of the facility in the future.

A right turn out of the facility was not achievable in Option 1A due to proximity to the roundabout and median island. In this configuration, buses with a destination to the right must negotiate the roundabout. Discussions with key stakeholders indicated that this is a critical flaw due to congestion at the roundabout.

The iterative Option 1B provided for both movements for buses however it results in a large intersection footprint which leads to potential for vehicle conflict between buses, cars and cyclists. The potential for conflict is worsened by the hardware access directly across the road which further increases the number of conflicting turning movements. This resulting large intersection and number of possible movements is an unacceptable outcome for bicycles travelling north along Huntingfield Avenue from a safety perspective.

Given that right turn bus operations are critical, and that car/bus separation is not required for a car park of this size, both Option 1A and Option 1B were determined to be not preferred.

4.2 Option 2 – Formalising the Existing Layout

4.2.1 Description

Under current conditions, the buses and cars share the same road space within the facility. Buses and cars utilise the existing access roads in a clockwise direction with the unsealed carparking to the north. Option 2 is maintaining this operation by formalising the existing layout car park with the construction new sealed pavement, linemarking and all other associated infrastructure. The internal roadway alignment is retained with sealed car parks to the north and between the access roads.

Option 2 does not achieve as many car park spaces as Option 1 because the internal road alignment divides the car park into two areas. As detailed in the previous Section 4.1, Option 1 has a single large car park area and a higher density of car parks is achievable compared with Option 2.

The concept shown below does not include a Kiss and Ride area.

Option 2 achieves approximately 185 car spaces and 3 bus bays (not indented).

Figure 7 - Option 1 Formalising Existing Layout

4.2.2 Advantages and Disadvantages

A significant advantage of this layout compared with Option 1 is the interface with Huntingfield Avenue. With buses and cars combined, the number of intersections with Huntingfield Avenue is reduced to two and buses now have the ability to turn right out of the facility which is of critical importance. This reduction in intersections and increased separation of movements improves both the safety and functionality when entering/exiting the facility.

The advantages and disadvantages of this layout are detailed below and in Section 4.4 of this report.

Advantages

- Three new bus bays with shelters with potential for future expansion to four bus bays
- Accommodates both left out and right out turning movements for buses
- Reduces the number of intersections to two
- Car park build can be staged, with additional parking provided as required
- Maximises landscaping
- Room for onsite communications-room, toilet facilities and other amenities.
- Existing alignment retained so pavement can be rehabilitated
- New plantation areas, Water Sensitive Urban design.

Disadvantages

- Least optimised for space with 190 car parks (including DDA)
- Buses and cars are not separated potentially leading to congestion and conflict during peak hours
- Only a single entry and exit points available providing no reduncdancy in the case of breakdown
- Pedestrians using car park to south must cross a road to access the bus stops
- Mulitple potential conflict points between any of the modes: buses, cars and pedestrians
- Limited option for future expansion or development into multi-story car park.

While this design essentially formalises the existing layout, it was determined that the existing layout is not optimised for the area available. This layout, with the current access road alignment dividing the site into two car parks, results in nonoptimal use of space and significant areas that do not have the required dimensions to construct car parks. These unusable areas will either be landscaped or concrete hardstand, and while additional landscaped area may be considered as beneficial, there is sufficient space in the other options to provide green space and Water Sensitive Urban Design treatments.

4.3 Option 3 – Formalising Existing with Kiss and Ride

4.3.1 Description

Option 3 divides the existing facility into two areas and does not completely separate bus and car movements within the facility. However, improvements have been made to the existing arrangement. The north section of the access road (eastbound) has been relocated to the south to create additional space for a Kiss and Ride lane and increase the number of car park spaces.

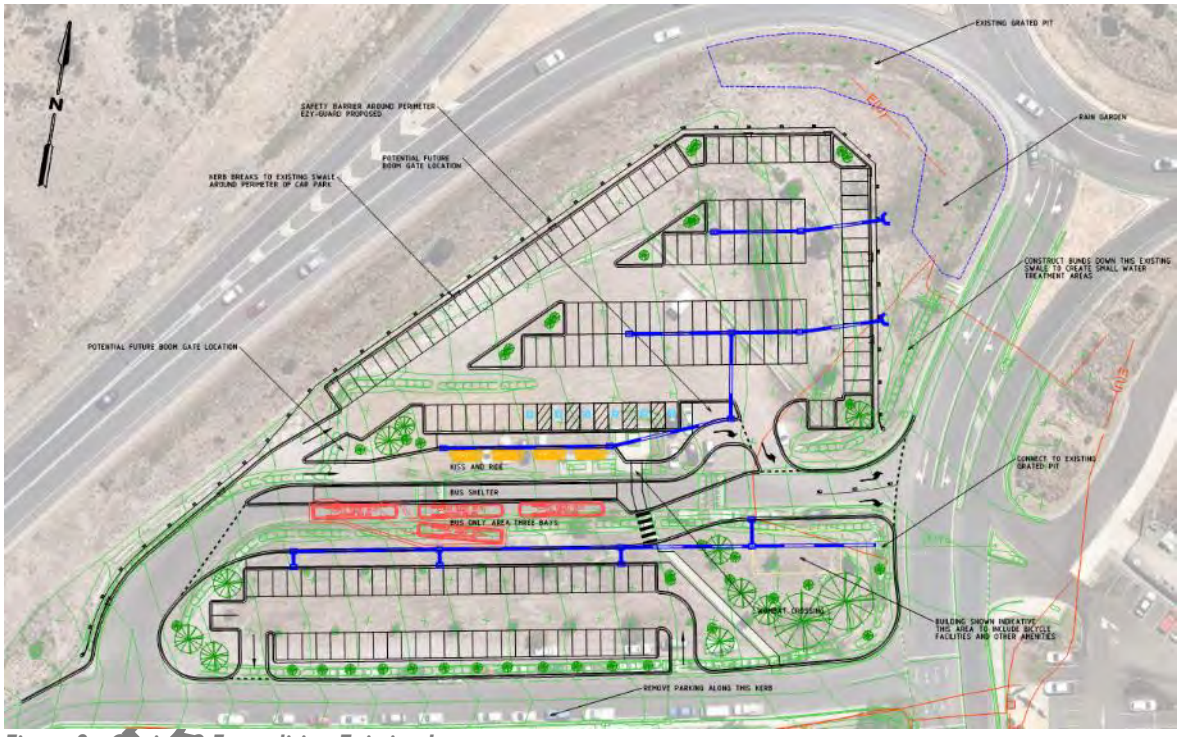


Figure 8 - Option 3 Formalising Existing Layout

4.3.2 Advantages and Disadvantages

Option 3 was determined to be the preferred layout for the Concept Design. Option 3 was developed by making a number of improvements to the Option 2 layout, including:

- Provision of a Kiss and Ride lane
- Amending the car park layout to increase the number of car park spaces
- Reducing the amount of unusable space while maintaining soft landscaped areas.
- Widening the bus lane for improved bus operation for large 15m rigid buses. This was determined from turning path movements.

- Provision of DDA Parking as close as possible to the bus bays, utilising the Kiss and Ride facility footpath for safe travel between the DDA car parks and the shelter.
- Widening the north intersection with Huntingfield Avenue for left-out and right-out turning movements
- A safer layout between the buses and cars.
- Changing kerbs to improve sight distance for pedestrians and slow the operating speed of vehicles.
- A raised wombat crossing to improve pedestrian safety and slow the operating speed of cars using the facility.
- Utilising existing swales and kerb outlets (rather than pit and pipe) and creating Water Sensitive Urban Design treatments around the perimeter.

The advantages and disadvantages of this layout are detailed below and in Section 4.4 of this report.

Advantages

- Three new bus bays with shelters.
- Formalised Kiss and Ride drop off lane
- Accommodates both left/right out turning movements for buses
- Car park build can be staged, with additional parking provided as required.
- Room for landscaping
- Room for onsite communications room, toilet facilities and other amenities.
- Existing alignment retained so pavement can be rehabilitated
- New plantation areas, Water Sensitive Urban design.

Disadvantages

- Buses and cars are not separated potentially leading to congestion and conflict during peak hours
- Only a single entry and exit points available providing no redundancy in the case of breakdown
- Pedestrians using car park to south must cross a road to access the bus stops
- Multiple potential conflict points between any of the modes: buses, cars and pedestrians
- Limited option for future expansion or development into multi-story car park.

4.4 Comparison and Recommendation

Following a review of the options against the desirable attributes, Option 3 was determined to be the preferred option for the Huntingfield Park and Ride. The below table summarises the key items in the previous section.

Table 3 - Huntingfield Comparison of Options

Attribute	Option 1	Option 2	Option 3
Number of parks	244	190	195
Number of bays	3	3	3
Separated vehicle movements	Yes	No	No
Separated pedestrian movements	Yes	No	No
Kiss and Ride	Yes	No	Yes
Right turn bus	1A:No (Roundabout) 1B: Yes	Yes	Yes
Bicycle Access Friendly	Option 1A: Yes Option 1B: No	Yes	Yes
Bicycle Facilities	Yes	Yes	Yes
Other Amenities	Yes	Yes	Yes
High potential for conflict of intersections	Yes	No	No

Safety and bus operations were determined to be the key attributes based on feedback from the client team so the ability for the buses to turn right out of the facility and reduce conflicting movements at intersections was a determining factor.

Option 3 provides the best amenity for all Park and Ride users (bus, car, bicycle and pedestrian) as detailed in the previous sections of this report.

4.4.1 Recommendation

The preferred Concept Design is Option 3 and is detailed in Appendix A of this report and is the following drawing:

- HB19415-S-CIV-DRG-41001

5. Browns Road Concept Design Options

Various layout options were considered in determining the preferred Concept Design layout. The options were developed in 2D to determine the preferable general layout for the entrances/exits and general car park layout. Please note the options do not show detailed items which would be provided such as bicycle facilities, drainage etc. These details were added to the preferred concept once the preferred layout was determined. Other design components not included in this section of the report are included in Section 6 of this report.

Figure 9 - Browns Road Site

The Browns Road site is comprised of a car park located on the east side of Southern Outlet with bus stops located on the northbound onramp and. Pedestrian connectivity

between the car park and bus stops was a key consideration when developing the Browns Road Park and Ride concepts.

The closest two bus stop locations for inbound (to Hobart CBD) and outbound (from Hobart CBD) are at different locations. The inbound bus stop is located West of Groningen Bridge on the on ramp to the Southern Outlet.

The outbound bus stop is located approximately 300m to the south of the proposed car park. Two design options were considered for each stop location and are outlined below.

While the overall site is spread out, the available space for the Park and Ride Facility at Browns Road is constrained. While various options were considered for the pedestrian connectivity to the bus stops, there is little opportunity to further optimise the layout of the carpark. The car park layout provides the following benefits:

- Optimised for space with 61 car spaces (including three DDA spaces) including the 48 off-street carpark spaces, 7 adjacent kerbside spaces on Browns Road, and 6 spaces on Groningen Road near the outbound bus stop.
- Bicycle storage facilities
- Improves northbound left turn to Browns Road turn for B-Doubles
- Water Sensitive Urban Design with kerb breaks, channel drains and rain gardens
- Utilises existing footpaths as much as possible with construction of new footpath where necessary
- Space for potential future boom gates
- Design sits within existing batter hinge on west side
- Upgrade to inbound bus stop with new hardstand and shelter
- Upgrade to outbound bus stop with new hardstand

Since the car park layout is set, the main consideration during the development of the Browns Road concept is pedestrian connectivity between the car park and bus stops. The following options are detailed in the following sections below:

- Option 1 – Improving pedestrian connectivity to existing inbound bus stop
- Option 2 – Constructing new inbound bus stop at alternative location
- Option A/B – Footpath connectivity options to outbound bus stop

5.1 Inbound Stop Option 1:

5.1.1 Description

The inbound bus stop is located West of Groningen Bridge on the on ramp to the Southern Outlet. This option upgrades the existing bus stop location however requires works to Groningen Road/On Ramp intersection.

The general site layout is as follows:

- The proposed car park is located on the east end of Groningen Bridge and the bus stop is on the west end. Therefore, pedestrians must cross the bridge to access the bus stop from the car park.
- The proposed car park is located north of Groningen Bridge and there is an existing footpath on the southern side of the bridge. Therefore, pedestrians to access the footpath on the bridge they must cross Groningen Road prior to crossing the bridge.
- Once pedestrians have crossed the bridge to the west end, the bus stop is then on the north side of Groningen Road. Therefore, pedestrians must cross Groningen Road to access the bus stop.

The current footpath network and traffic controls are unsuitable for the three pedestrian movements identified above, particularly at the Groningen Road/Onramp intersection. New footpaths must be constructed across the site to provide connections between the carpark and bus stop. Significant works at the Groningen Road/Onramp intersection are required because the current layout does not allow for a safe pedestrian crossing.

This intersection where pedestrians must cross from the footpath on the south of the road to the bus stop on the north of the road has a number of components associated with it:

- Groningen Road/Onramp Intersection
- Private access adjacent to the onramp
- Turning bowl to the south
- Footpath on the north of Groningen Road connecting Firthside Residents with the bus stop. Note footpath ends prior to private access location

These components are illustrated in the following figure as well as the pedestrian desire lines under current conditions.

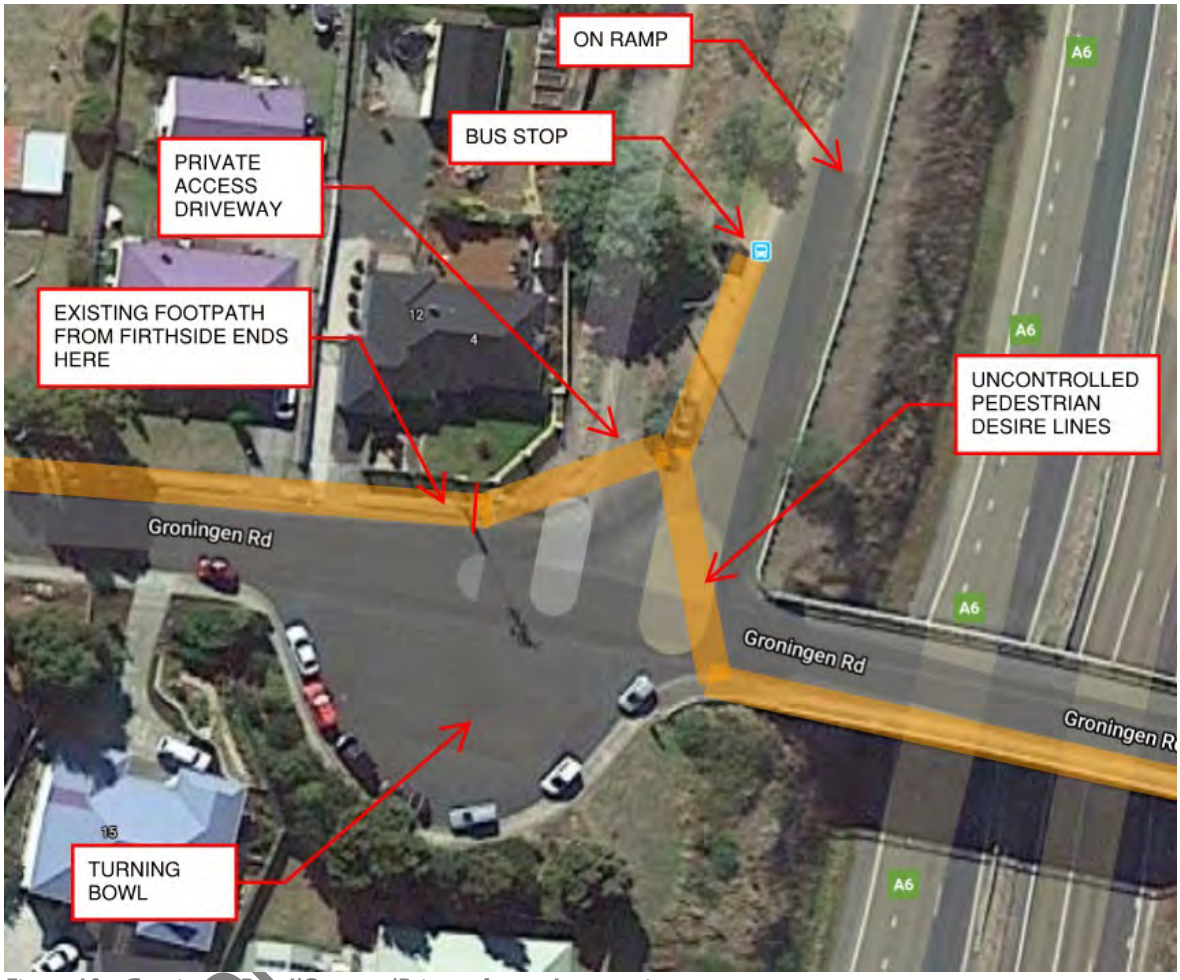


Figure 10 - Groningen Road/Onramp/Private Access Intersection

A preferred layout at this intersection was determined and is detailed in the subsequent section, however various alternatives for Option 1 were also considered but not progressed. These are summarised below:

- Realign the driveway to the northeast and construct diagonal pedestrian crossing
    - This restricts the driveway access to left-out only because the on-ramp is one-way only. This promotes unsafe right turn movements out of the driveway which is unacceptable.
    - The pedestrian crossing is 17m length unsignalized which is undesirable

    - Does not improve footpath connectivity from the west (currently aligned into pole) which is undesirable
- Realign the driveway to the west and construct diagonal pedestrian crossing
    - Impacts powerpole and stay to the west which would need to be relocated
    - The pedestrian crossing is 17m length unsignalized which is undesirable
    - Does not improve footpath connectivity from the west (currently aligned into pole) which is undesirable
- Construct new footpath on east side of on-ramp
    - Increase the number of required crossings to three (rather than two) which is undesirable
    - Kerb would be required to provide separation of pedestrians on footpath. This will raise the guardrail and will therefore impact the bridge barrier. Therefore unfeasible.

The preferred layout was determined and is detailed below and in Figure 11:

- Provide a safe crossing from the car park to the footpath on the south side of the bridge, without impacting existing bridge barriers thereby maintaining like-for-like conditions for bridge protection.
- Pedestrians cross the bridge using the existing footpath, no works to the existing bridge are proposed.
- Due to the presence of the bowl area on the west end of the bridge, if no works are proposed pedestrians must cross diagonally from the south side of Groningen Road to the north side into the driveway. This is an undesirable outcome and the best solution was determined to be the construction an island at the turning bowl area. Pedestrians cross from the existing footpath to the island, and then from the island to the north side of Groningen Road. The island Design Vehicle is 8.8m Service Vehicle and the Check Vehicle is 12.5m Single Unit Truck.
- Construct the island and modify the kerbs so that pedestrians are crossing at right angles to the road to reduce pedestrian crossing length and refuge.
- Change kerb on north side of Groningen Road by building out to provide connectivity to existing footpath, avoid works to power pole and stay, reduce crossing distance and improve sight distance.
- This option maintains the existing driveway alignment

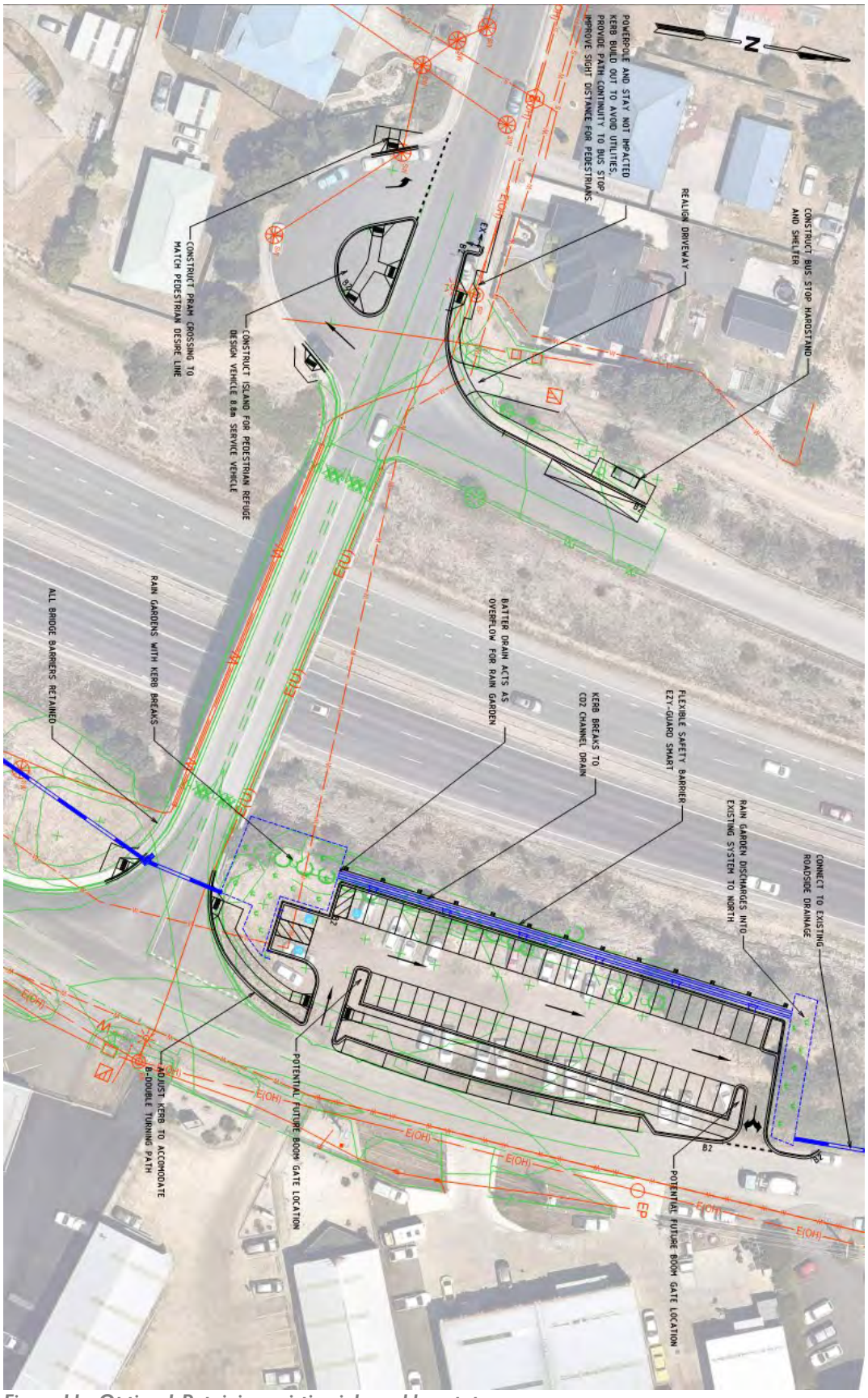


Figure 11 - Option 1 Retaining existing inbound bus stop

5.1.2 Advantages and Disadvantages

The main advantage of upgrading the existing inbound bus stop rather than relocating it elsewhere, is that this bus stop is primarily used by Firthside residents (the residential area to the west) and this will likely be the case into the future since the Park and Ride facility accommodates only 61 spaces. Therefore, upgrading the existing stop will ultimately serve the most bus customers.

Advantages

- Upgrade existing bus stop used mainly by Firthside residents
- Improve connectivity between Firthside and bus stop
- Provide safer crossing locations for pedestrians
- Reduces impact to utilities by modifying kerbs on Groningen Road.

Disadvantages

- Three crossing locations
- Works to Groningen Road west of bridge

Option 1 was determined to be the preferred layout for the Concept Design.

This option improves pedestrian connectivity to the inbound bus stop by the construction of new paths and islands west of the bridge. These works reduce crossing distances, provide pedestrian refuge, connect existing footpaths to the bus stop and improve sight distance. However, three crossing locations are required to access the bus stop which is a number that can be reduced if the bus stop is relocated. Option 2 below looks at reducing the number of pedestrian crossings.

5.2 Inbound Bus Stop Option 2:

5.2.1 Description

This option has the same car park layout as Option 1 but changes the pedestrian connectivity to between the car park and bus stop by an additional new bus stop on Browns Road, south of Groningen Road bridge.

The purpose of the new proposed bus stop in this option is to limit the number of pedestrian crossings and move the inbound bus stop closer to the parking facility. As detailed in Option 1, three pedestrian crossings are required for a pedestrian to travel between the car park and the inbound bus stop, whereas in Option 2 one crossing is required. This is an improvement in pedestrian connectivity between the car park and inbound bus stop as it reduces the potential conflict with vehicles.

This layout is as follows:

- Construct a new bus stop to the south which results in one pedestrian crossing point (rather than three crossing points in Option 1) and provides a bus stop closer to the Park and Ride facility.
- Retain the existing bus stop however this option does not require works to the Groningen Road/On Ramp intersection.

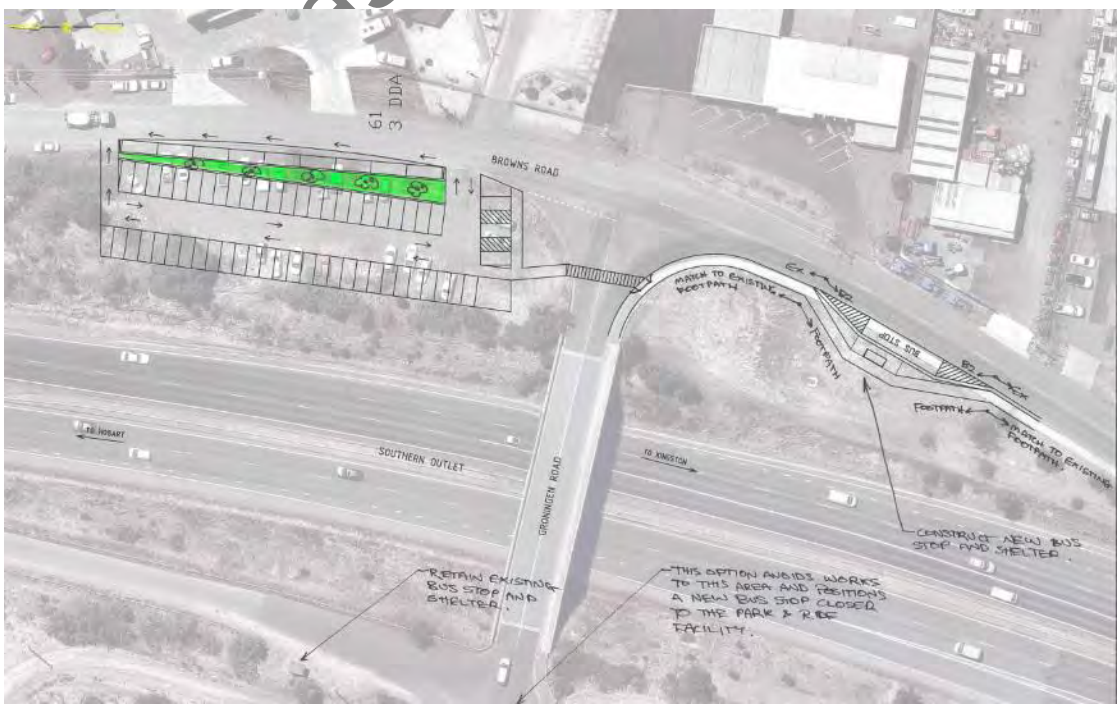


Figure 12 - Option 2 Additional Bus stop for Park and Ride

5.2.2 Advantages and Disadvantages

In this option a new bus stop is proposed and the existing bus stop is retained but not upgraded. Whilst this improves pedestrian connectivity between the car park and inbound bus stop the key disadvantage is the lack of improvement to the most used existing bus stop.

This option also creates a new bus stop on the network near the existing bus stop which will marginally slow the service.

Advantages

- One crossing location to car park
- Provide a safe crossing location for pedestrians using the car park facilities and bus stop
- No works to Groningen Road

Disadvantages

- The existing bus stop is expected to have higher usage by Firthside residents than the new bus stop and is not being upgraded as part of this proposal. Option 2 does not improve the amenities of this existing bus stop.
- An additional bus stop required, in close proximity to the existing bus stop, slowing the bus service times.

Option 2 was not determined to be the preferred layout for the Concept Design.

5.3 Outbound Bus Stop Option A and B

5.3.1 Description

This section considers the pedestrian connectivity to the outbound bus stop.

The outbound bus stop is located approximately 300m to the south of proposed car park. It is expected that the majority use of this stop will be for passengers disembarking from a trip from Hobart CBD and therefore a shelter is not proposed. There is an existing 1.5m footpath on the west side of Browns Road connecting the car park with the outbound bus stop on the east side of the road. This footpath is proposed to be utilised in the design with pedestrians needing to cross the road at some point along Browns Road from east to the west side of the road when travelling to the car park. This crossing point is a key consideration in the design and two locations for this pedestrian crossing were considered.

Option A provides the east-west crossing of Browns road, north of the off-ramp intersection and achieves this by constructing a new footpath on the east side of Browns Road north of the off-ramp intersection. This crossing arrangement provides a safe crossing option for pedestrians as it is located a desirable distance from both the off-ramp intersection and the Groningen Road intersection with Browns Road. The location provides pedestrians with adequate sight distance to pick a gap to cross the road and provides vehicles with sight distance to the pedestrians. This was determined to be the best outcome for safe access to the existing outbound bus stop.

On review of this alignment, it was determined that the proposed footpath on the west side does cross through an area with various services as notes on the drawings and shown in Figure 13 below.

Figure 13 - High density of utilities: East side of Browns Road, North of the Inbound bustop

While this can be resolved in Detailed Design, an alternative option was considered where the Browns Road crossing occurs to the south of the utilities to determine if there is a safe alternative without impact.

Option B considers these impacted services as a constraint and provides two alternative crossing points: one at the off-ramp and the other south of the bridge. This is much less desirable from a safety perspective because pedestrians must cross the off-ramp where vehicles are decelerating from a high speed and must cross in front of the bus. The designers consider these safety implications to be an unacceptable outcome and Option B is not recommended.

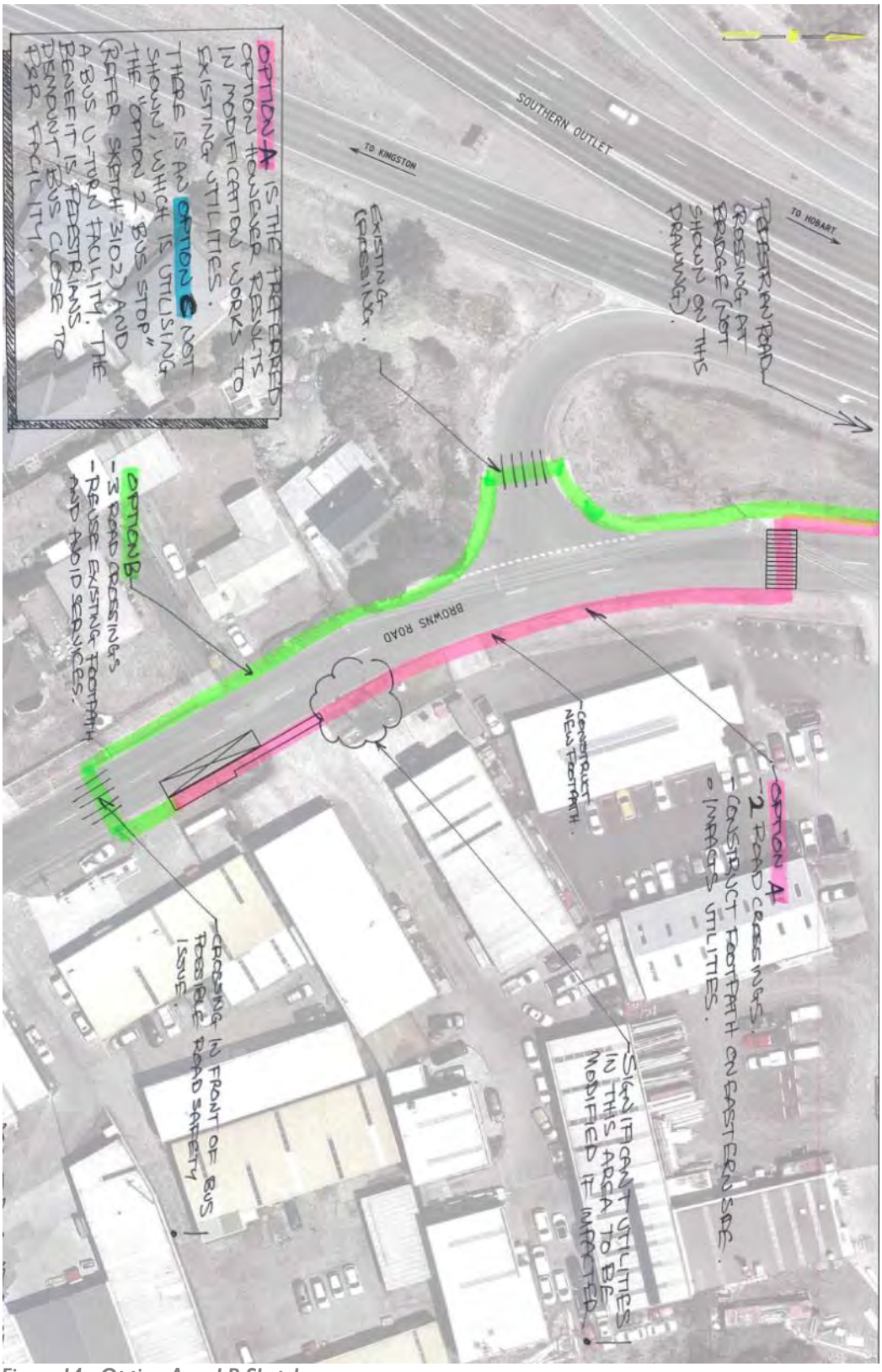


Figure 14 - Option A and B Sketch

5.3.2 Advantages and Disadvantages

Option A is a much safer solution for pedestrians and is clearly the most desirable outcome. The purpose of Option B is to avoid an area with a high number of utilities, however, has a number of safety issues:

- Crossing in front of the bus
- Poor sight distance if crossing in front of parked bus
- A crossing at the off-ramp where vehicles are decelerating from a high speed outside the line of sight of pedestrians.
- Utilities may not be a significant constraint; a design may be reached at this location which reduces or eliminates impact to these utilities.

We recommend that Option A is adopted and the utility impact is resolved in Detailed Design.

5.4 Comparison and Recommendation

As described in the previous sections, the Browns Road site is spread out and not contained in one large area. The wider site layout of the Browns Road site results in car park location separate to the bus stop locations and therefore the main consideration during the development of the Browns Road concept is pedestrian connectivity between the car park and bus stops.

5.4.1 Inbound bus stop

The inbound bus stop is located West of Groningen Bridge on the on ramp to the Southern Outlet. This is the bus stop used for travelling into Hobart CBD. Two designs were considered for this bus stop and are detailed in Option 1 and 2.

Option 1 improves pedestrian connectivity to the existing bus stop and Option 2 is the construction of a new bus stop at a closer location to the Park and Ride facility. Although Option 2 does provide some benefits to the Park and Ride users by providing an additional closer bus stop and fewer pedestrian crossing points, Option 1 is recommended as the preferred option for the following reason: this bus stop is primarily used by Firthside residents (the residential area to the west) and this will likely be the case into the future since the Park and Ride accommodates only 48 off-street spaces.

Therefore, upgrading the existing stop will ultimately serve the most bus customers. Option 1 does still provide safe access to the bus stop by construction of an island in the turning bowl area as discussed in previous sections of this report.

5.4.2 Outbound bus stop

The second bus stop is located approximately 300m to the south of proposed car park. This is the bus stop used for travelling from Hobart CBD. Two designs were considered for this bus stop and are detailed in Option A and B below.

Option A is clearly a superior option to Option B in terms of pedestrian safety as it reduces the number of crossings and provides crossing points at better locations. The only downside of Option B is potential impact to services on the East side of Browns Road at the location identified on the drawings. However, impact to these services may potentially be reduced in Detailed Design by localised width reduction of the footpath or alignment changes to the footpath. We do not believe the impact to utilities in this location is sufficient to make Option B the preferred option as it is less safe for pedestrians.

5.4.3 Recommendation

The preferred Concept Design is Option 1 and Option A and is detailed in Appendix A of this report and is the following drawings:

- HB19415-S-CIV-DRG-31001
- HB19415-S-CIV-DRG-31002
- HB19415-S-CIV-DRG-31003
- HB19415-S-CIV-DRG-31004

6. Design Implications

6.1 Land Use Planning

A Planning and Environment Report was undertaken for both sites and included a review of land ownership and planning requirements. This reported is located in Appendix F of this report and summarised below.

While theLIST does not have details of landowners, most of the lots are owned by the Crown and variously managed by the State Government and Kingsborough Council.

6.1.1 Browns Road Park and Ride Facility

The property details for the Browns Road Park and Ride facility are shown in Table 4 below.

Table 4 Ownership details for the Browns Road Park and Ride area

Property Address	Property ID	Title Reference	Authority	Owners Name
No address, all on one lot	None	205706/1	Acquired road	The Crown
No address, northernmost lot	None	151186/1	Acquired road	The Crown
No address, northern lot on traffic island	None	None	Road (type unknown)	None
No address, easternmost lot	None	32842/1	Acquired Road	The Crown
No address, main lot along Browns Road	None	None	Road (type unknown)	None
No address, roadside verge east of Browns Road	None	s 36 [redacted]	Subdivision Road	s 36 [redacted]

6.1.2 Huntingfield Park and Ride Facility

The property details for the southern Park and Ride facility are shown in Table 5 below.

Table 5 Ownership details for the Huntingfield Park and Ride area

Property Address	Property ID	Title Reference	Authority	Owners Name
No address, northernmost lot	None	21014/2	Acquired road	The Crown
No address, northern middle lot	None	252331/1	Acquired Road	The Crown
No address, southern middle lot	None	23717/1	Acquired Road	The Crown
No address, southern lot	None	None	Road (type unknown)	None
No address, southern lot	None	None	Road (type unknown)	None

6.2 Local Road and Private Access

6.2.1 Browns Road Park and Ride Facility

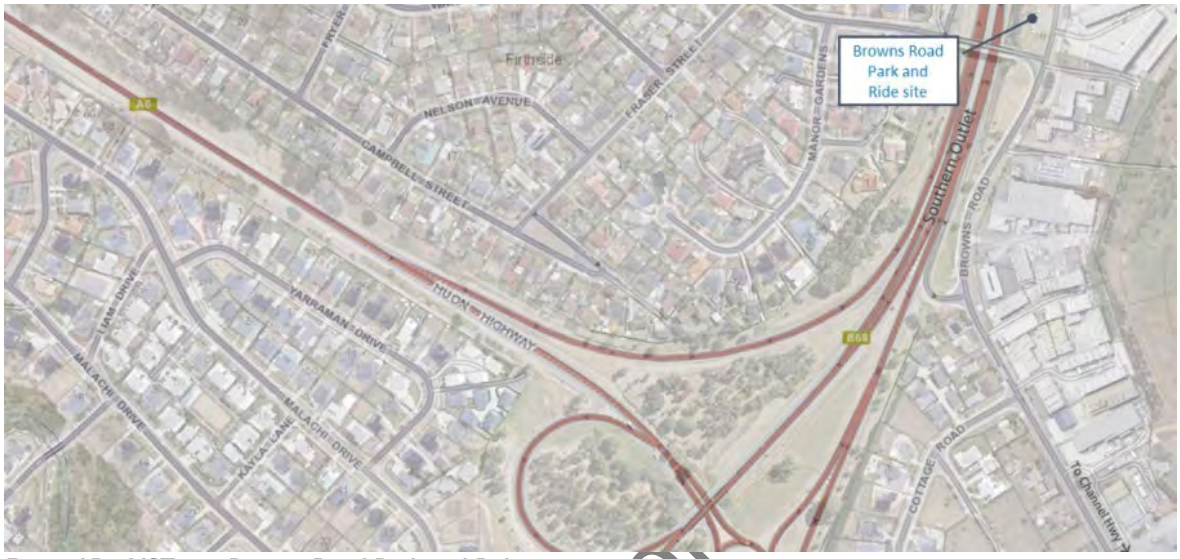


Figure 15 – LISTmap Browns Road Park and Ride

Key elements of the surrounding road network according to the State Road Hierarchy (State Growth, visited in March 2020) are described below:

- The Southern Outlet is a Category 1 State Road, which functions as a primary freight and passenger road connecting key land uses and are important to the effective functioning of industry, commerce and the community. The Southern Outlet runs north-south between Channel Highway in Kingston and Macquarie Street in the Hobart CBD. Designed as a freeway, Southern Outlet has separated carriageways with two lanes in each direction, on-ramp/off-ramp facilities. It has a posted speed limit of 100 km/h except in built up areas, where the speed limit is 80 km/h. An additional bus lane occupies the breakdown lane in the northbound direction between Reynolds Crescent up to approximately 300 metres south of Davey Street. The road is an approved B-double route throughout and an approved Higher Mass Limit (HML) route north of Huon Highway.
- Huon Highway is a Category 2 Road (a major regional road linking major production catchments to the Category 1 roads). Huon Highway runs east-west in the project area and connects to the town of Southport approximately 95 kilometres south of Hobart. In the project area, Huon Highway is an undivided road with one lane in each direction. It has a speed limit of 100 km/h except in built up areas where it reduces to 80 km/h. The road is an approved B-double and approved HML route.
- Browns Road is a local road that runs north-south between Channel Highway and Proctors Road that provides access to the Kingston industrial area. Its width is approximately nine metres across, which contains an undivided two-way road. It has a

sign-posted speed limit of 50 km/h. It is an approved B-double and HML route. 220 metres south of Groningen Road it connects to the Southern Outlet southbound carriageway off-ramp.

- Groningen Road is a local road that runs west from Browns Road to provide direct access to a residential area of Firthside. Groningen Road is an undivided two-way road with a width of approximately eight metres and a speed limit of 50 km/h. On-street parking is largely unrestricted on both sides of the road. B-double and HML vehicles are allowed across the existing Southern Outlet overpass bridge up to the northbound on-ramp to enter Southern Outlet.

6.2.2 Huntingfield Park and Ride

Figure 16 - LIST map Huntingfield Park and Ride

Source: Land Information System Tasmania (https://maps.thelist.tas.gov.au/listmap/app/list/map, accessed March 2020)

Key elements of the surrounding road network according to the State Road Hierarchy (State Growth, visited in March 2020) are described below:

- The Southern Outlet is a Category 1 State Road, which functions as a primary freight and passenger road connecting key land uses and are important to the effective functioning of industry, commerce and the community. The Southern Outlet runs north-south between Channel Highway in Kingston to Macquarie Street in Hobart CBD. Designed as a freeway, Southern Outlet has separated carriageways with two lanes in each direction, on-ramp/off-ramp facilities. It has a posted speed limit of 100 km/h except in built up areas, where the speed limit is 80 km/h. An additional bus lane occupies the breakdown lane in the northbound direction between Reynolds

Crescent up to approximately 300 metres south of Davey Street. The road is an approved B-double route throughout and an approved Higher Mass Limit (HML) route north of Huon Highway.

- Channel Highway to the south-west of Southern Outlet is Category 3 Road which have a strategic importance to regional and local communities and economies. Channel Highway is an undivided road with one lane in each direction. For most part the speed limit of Channel Highway is 90 km/h however reduced to 80 km/h approaching the built-up area and 60 km/h in the built-up area. The road is an approved B-double route, however HML vehicles are not permitted.
- Algona Road is Category 4 Road providing access to Blackmans Bay catchment area. Algona Road is an undivided road with one lane in each direction. For most part the speed limit of Algona Road is 100 km/h however reduced to 80 km/h in the built-up area. The road is not approved for restricted heavy vehicle accesses.
- Huntingfield Avenue is a local collector road which provide access to the suburb of Huntingfield. It is an undivided road with one lane in each direction. The posted speed limit of Huntingfield Avenue is 50 km/h. The road is not approved for restricted heavy vehicle accesses.

6.3 Lighting

6.3.1 Design Criteria

In accordance with the principal project requirements, the lighting design has been developed in accordance with the following criteria:

- Lighting design for the car-park in accordance with AS/NZS 1158.3.1:2020
- Lighting sub-category to be applied is PC3.
- Lighting sub-category is based on “Night time vehicle and/or pedestrian movements” and “Fear of Crime” being “Low”. Refer to Figure 17 below:
- Lighting sub-category for designated disabled parking bays is PCD, in accordance with the standard.

TABLE 2.5

LIGHTING SUBCATEGORIES FOR OUTDOOR CAR PARKS
(INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4
Type of area	Selection criteria[a,c]		
	Night time vehicle and/or pedestrian movements	Fear of crime	Applicable lighting subcategory[b]
Parking spaces, aisles and circulation roadways	High	High	PC1
	Medium	Medium	PC2
	Low	Low	PC3
Designated parking spaces specifically intended for people with disabilities	N/A	N/A	PCD
For any designated areas for pedestrians to cross	N/A	N/A	PCX

[a] The selection criteria of Columns 2 to 4 should be separately evaluated. The highest level of any of the selection criteria that is deemed appropriate for the area type will determine the applicable lighting subcategory.

[b] Providing a lighting scheme that meets the requirements of more than one subcategory by the use of switching is permitted.

[c] Consider the use of adaptive lighting controls for variable night time utilization.

Figure 17 - Lighting Sub-categories for Outdoor Car-Parks.

Measurements for the modelling and assumptions made by pitt&sherry are as follows:

- Modelling Software used by **pitt&sherry** - AGi32 Version 19.10
- Luminaire photometric files (*.ies), obtained from Thorn Lighting.
- Luminaire: Thorn CiviTEQ, 72W, 10,000 Lumens, 3000K, Part No: 966643211, Mounting Height = 6m, with Outreach = 0.2m (typical).

TABLE 3.7

VALUES OF LIGHT TECHNICAL PARAMETERS FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{Pv}) lx
PC1	14	3	8	3
PC2	7	1.5	8	1
PC3	3.5	0.7	8	—
PCD[d]	—	≥14 and ≥ ($\bar{E}_h$)[e]	—	—
PCX[e]	21	5	8	—

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] E_{Ph} shall be determined for each PCD area in the car park and, in each case, it shall be greater than the value stated and greater than the average for the overall car park.

[e] This level shall be used for any marked areas for pedestrians to cross.

Figure 18 - Values of Light Technical Parameters for Outdoor Car-Parks

6.3.2 Browns Road Park and Ride Car-Park

The site plan for the Browns Road car-park was imported into AGi32 for modelling and the lighting 'design area' was determined. Preliminary illuminance calculations were performed to ensure compliance with AS/NZS 1158.3.1. As a guide to the reader of this report, illuminance is a measure of the amount of light arriving at the road surface i.e. what is shining down onto the road. The modelling software was used to place the lighting at points around the car-park, with five (5) lights required to meet with the values of light technical parameters for Category PC3 lighting. To comply with Category PC3 of the standard the average horizontal illuminance (EPh) must be > 3.5 lux and the minimum point horizontal illuminance (EPh) must be ≥ 0.7 lux. Lighting was placed directly adjacent to the disabled parking bays, to ensure light levels were >14-lux.

A new TasNetworks Standard Aldridge Traffic Systems 14W PLED light fixture has also been placed at the new bus shelter at the start of the Southern Outlet on-ramp. The light fixture is to be mounted to the existing TasNetworks power pole, located adjacent to the bus shelter.

6.3.3 Huntingfield Park and Ride Car-Park

Similarly, the site plan for the Huntingfield Road car-park was imported into AGi32 for modelling and the lighting 'design areas' were determined. Preliminary illuminance calculations were performed to ensure compliance with AS/NZS 1158.3.1 and nineteen (19) lights were required to meet with the values of light technical parameters for Category PC3 lighting. Again, lighting was placed directly adjacent to the disabled parking bays to ensure light levels were >14-lux.

A row of 'double' light fixtures, i.e. fixtures mounted back to back, has been placed along the edge of the southern-most car-park to cover both the car-park and the adjacent 'bus-only' area. This has provided a high level of lighting (well above Cat-PC3 requirements) for the bus shelter area, where night-time vehicle movements may be considered as either "Medium" or "High".

6.3.4 Lighting Power Supply

The power supply for the street lighting is to be designed by TasNetworks in consultation with pitt&sherry. It is expected that TasNetworks will provide a nominated 'point of supply', which is typically the closest power pole to the redevelopment.

The lighting power supply for the Browns Road Car-Park is less than 10 Amps (single-phase). Similarly, the power supply required for the lighting at the Huntingfield Road car-park is also less than 10 Amps (single-phase). However, due to the potential future bus driver amenities, a 50A power supply (single phase service fuse) is to be nominated for the design. This is equivalent to a small single residence or unit.

It should be noted that no provision has been made for Electrical Vehicle Charging Stations at either car-park.

6.3.5 Light Poles

The light poles are based on 6.0m DB Rigid Poles with Decorative Bottom entry, similar to the TasNetworks Distribution Design Standard drawing PL-340. These are standard galvanised 'pipe' poles of approximately 76mm diameter. Alternative light poles may be preferred to match with the structural elements or features within the car-park and these may also be coloured, with matching coloured light fittings i.e. powder coated black or anodised aluminium.

6.4 Stormwater

Stormwater Concept Design was conducted at both Browns Road and Huntingfield Park and Ride sites and is detailed in following sections.

6.4.1 Hydraulic conditions

At the Browns Road site, there exists no formal drainage in the parking area for this Park and Ride. The changes proposed include line marking for pedestrian crossing and an additional island to assist with pedestrian access. These changes will not increase pervious areas but likely require additional inlets to ensure pedestrian safety at road crossings.

At the Huntingfield Avenue facility, there are existing swales around much of the proposed Park and Ride facility which is currently a formalized parking area with gravel/crushed rock base drained by a grated pit. The other areas which will form part of this upgrade currently consist of a road reserve and road which is drained by Side entry pit on the southern side kerb and one pit in the grassed road reserve. It is unclear if the area to the north and the road reserve act as a quasi-basins. As this project will fill in much of the area in the road reserve and may reduce the detention area to the north of the Park and Ride facilities, there will be a need to assess the impact of these changes during Detailed Design.

6.4.2 Hydrology

Catchment Description

At both Park and Ride sites there is an increase to the impervious area. There is sufficient available land for treatment and detention of this flow. There is no existing cross drainages flow paths which are affected by the works.

6.4.3 Drainage scheme

No models were made available during Concept Design. Further assessment and approvals will be required during Detailed Design Development.

Both the northern and southern Park and Ride sites are located in the Brown's River Catchment and the Hobart Stormwater catchment. There are no watercourses impacting either site.

6.4.4 New impervious area

The following are the existing and proposed pervious areas of each area of the project.

Table 6: SP03 Browns Road existing and new pervious ratio

Existing		Proposed	
Impervious (m^2)	Pervious (m^2)	Impervious (m^2)	Pervious (m^2)
0.071	0.163	0.152	0.083
Pervious Ratio = 2.3		Pervious Ratio = 0.54	

Table 7: SP03 Huntingfield Avenue existing and new pervious ratio

Existing		Proposed	
Impervious (m^2)	Pervious (m^2)	Impervious (m^2)	Pervious (m^2)
0.476	0.860	0.855	0.494
Pervious Ratio = 1.81		Pervious Ratio = 0.58	

6.4.5 Water Sensitive Urban Design

Water Sensitive Road Design has been completed considering the principles outlined in *WSUD procedures for stormwater management* (Derwent Estuary Program), which are identical to State Stormwater Strategy 2010, as detailed in Table E7.1 of the Hobart City Council & Kingborough Council Interim Planning Schemes.

The requirements are to achieve the following stormwater management targets:

- 80 per cent reduction in the annual average load of total suspended solids
- 45 per cent reduction in the annual average load of total phosphorus
- 45 per cent reduction in the annual average load of total nitrogen

Browns Road Park and Ride Facility

The Browns Road Park and Ride Facility has a large increase to the impervious area due to the new sealed formalised parking. There is a crest on Browns Road located approximately halfway along the car park. The suggested treatment and detention of flows for this location is the addition of a rain garden to the south to treat half of the car park and swale to capture and treat the northern half of the car park prior to discharging to existing drainage infrastructure, see screen capture and table below for model and results.

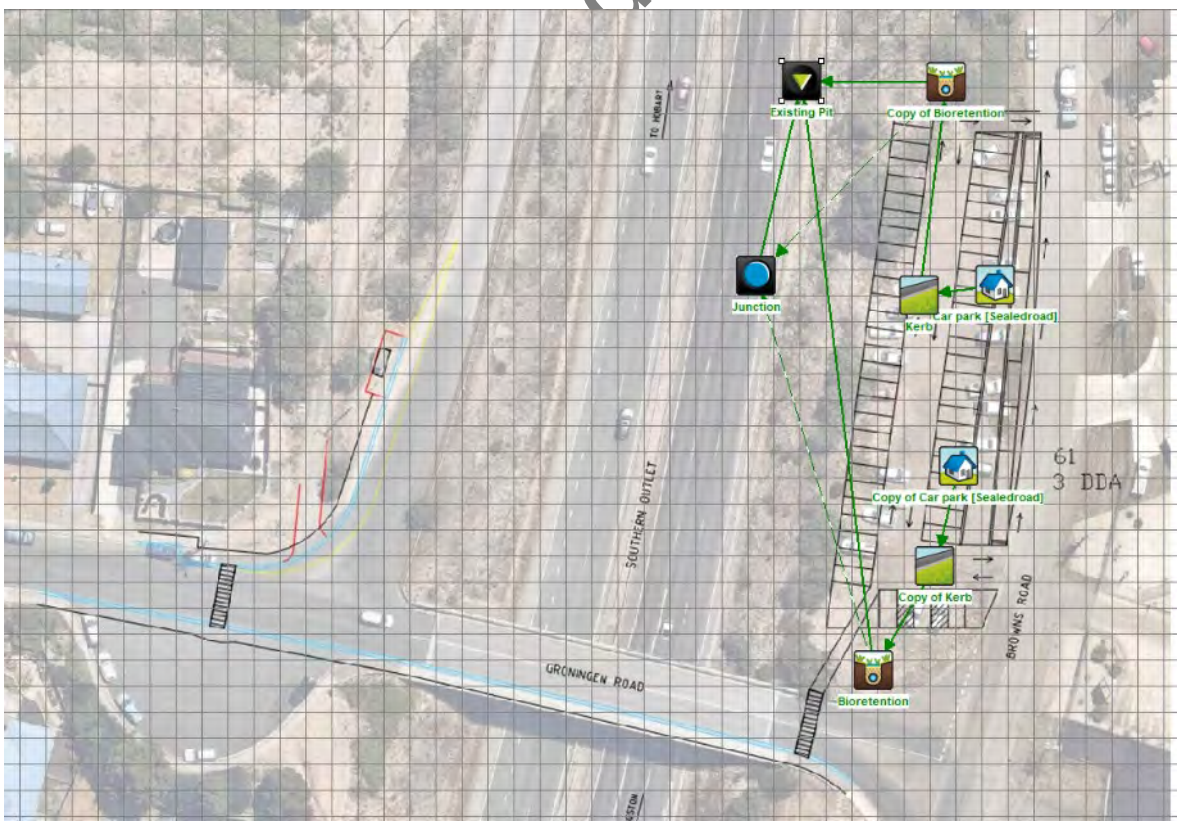


Figure 19 - Browns Road WSUD

Table 8:SP03-1 Browns Road Stormwater Treatment Train Effectiveness

	Sources	Residual Load	% Reduction	Minimum Requirement
Flow (ML/yr)	0.614	0.463	24.7	
Total Suspended Solids (kg/yr)	213	1.34	99.4	80
Total Phosphorus (kg/yr)	0.370	58.6E-3	84.2	45
Total Nitrogen (kg/yr)	1.49	0.297	80.1	45
Gross Pollutants (kg/yr)	23.6	0.00	100.0	

This WSUD treatment far exceeds the minimum stormwater management targets outlined above, thereby providing a highly sustainable water management solution.

Huntingfield Avenue Park and Ride Facility

There is a large increase to the impervious area at this location due to additional fomalised parking and kiss and ride. The suggested treatment options to meet the requirements for water quality and reduce outflow to pre development levels utilize the existing swale along the western side between the Southern Outlet and the proposed carpark. The existing swale will drain into a proposed bioretention basin or raingarden at the northside of the car park that also collects all the flow for the northern side of the parking facilities. This new bioretention basin is built over an existing grated pit with an additional pit built in the existing network to allow for bypass in the event of blockages. The southern car park drains to grated pits which are connected directly to the existing drainage network so no secondary treatment is proposed for part of the car park. This design does not achieve requirements for % reduction of Suspended solids, see screen capture and table below for model and results.

Figure 20 – Huntingfield WSUD

Table 9:SP03-2 Huntingfield Road Stormwater Treatment Train Effectiveness

	Sources	Residual Load	% Reduction	Minimum Requirement
Flow (ML/yr)	3.39	1.77	48	
Total Suspended Solids (kg/yr)	1140	303	73.5	80
Total Phosphorus (kg/yr)	1.91	0.661	65.4	45
Total Nitrogen (kg/yr)	7.84	3.1	60.4	45
Gross Pollutants (kg/yr)	123	53.1	56.7	

This WSUD treatment far exceeds two of three stormwater management targets outlined above. The Total Suspended Solids is marginally below the minimum requirement and will need to be addressed through Detailed Design.

6.4.6 Further information required

The following information is required to be addressed in Detailed Design

- As built drawings and reports for road drainage
- Tail water information
- Drainage scheme requirements, Hobart CC & Kingborough Council

6.5 Utilities

A Dial Before You Dig request was conducted and the data was digitised into a CAD format and shown on the drawings. A preliminary assessment of utility impact was carried out.

6.5.1 Browns Road Park and Ride Car Park

Water

There is a DN200 ductile iron cement lined water main that runs along Browns Road and then through the site, across the Southern Outlet and along Groningen Road. This service is owned and maintained by TasWater.

Provided minimum cover requirements are maintained, there is no statutory requirement to relocate the DN200 ductile iron cement lined water main that runs through the site.

TasWater will require an easement for unrestricted access to the pipe at all times. Given the pipe is located under the rain water garden, it is likely that minimum cover requirements will be compromised and, on this basis, relocation of the pipe is recommended.

The current proposed development does not require any specific water supply connection. If a small potable tap and some landscaping irrigation is proposed, then this could be provided from either of the 200 mm asbestos cement pipes. This would be a 20 or 25 mm diameter metered connection supplied and installed by TasWater at the developer's cost.

There is no statutory requirement for sprinklers, hydrants or hose reels for open car park, although insurance requirements may impose their own standards. A fire hydrant connection could be achieved from the 200 mm diameter asbestos cement main.

Sewer

There are no TasWater sewer services in the vicinity of the proposed development. The current development, as proposed, does not require a sewer connection. If one was required in the future, then the nearest point is either a DN150 concrete gravity sewer to the south near 82 Browns Road or a DN150 clay sewer near the intersection of Browns Road and Proctors Road. Neither connection point would be straight forward and would require a private pump station and rising main.

Power

At this stage no power services identified are identified as being impacted by the Park and Ride design. This should be confirmed in future stages.

Gas

There are no gas services in the vicinity of this proposed development and it is unlikely that any connection would be required in the future.

Telecommunications

There are no telecommunications services that were identified as impacted by this proposed development.

Table 10: Public Utilities within Project Site

Utility	Description of Assets	Estimate of Works Required
Taswater	Taswater Water Main travelling East-West under Huntingfield Park and Ride site Car Park	Relocate
Taswater	Taswater Water Main at south end of Browns Road Car Park	Relocate

The location of existing utilities has not been identified on drawings and new locations will need to be determined at the preliminary design stage.

6.5.2 Huntingfield Park and Ride Car Park

Water

There are a number of water services in the vicinity of the proposed development:

- A DN63 polyethylene watermain (50 mm nominal bore) that runs through the site itself
- A second DN63 polyethylene water main in Huntingfield Avenue
- A DN200 asbestos main in Huntingfield Avenue

All these services are owned and maintained by TasWater.

Provided minimum cover requirements are maintained, there is no statutory requirement to relocate the DN63 polyethylene main that runs through the site. TasWater will require an easement for unrestricted access to the pipe at all times. On this basis relocation of the pipe as part of the initial development is recommended.

The current proposed development does not require any specific water supply connection. If a small potable tap and some landscaping irrigation is proposed, then this

could be provided via a connection from either of the DN63 polyethylene pipes. This would be a 20 or 25 mm diameter metered connection supplied and installed by TasWater at the developer's cost.

There is no statutory requirement for sprinklers, hydrants or hose reels for open car park, although insurance requirements may impose their own standards. Any fire hydrant connection would have to come from the 200 mm diameter asbestos cement main and this main would then also be used for any potable and gardening water connection.

Sewer

There are no TasWater sewer services in the vicinity of the proposed development. The current development, as proposed, does not require a sewer connection. If one was required in the future, then the nearest point is a DN150 PVC pipe crossing Algona Road and running along Coffee Court. Such a connection would require a private pump station and rising main to a new public sewer in Algona Road.

Power

There is an underground electricity asset across the eastern side of the north carpark which will need to be located correctly. Proposed additional fill over this asset is likely to require additional approvals however it is not expected that relocation works will be required.

Gas

There are no gas services in the vicinity of this proposed development and it is unlikely that any connection would be required in the future.

6.6 Geotechnical Issues

There are no known geological constraints associated with either Park and Ride site.

6.7 Property Acquisition

No property acquisition is anticipated at either Park and Ride sites.

6.8 Stakeholder Implications

Initial stakeholder consultation for the park and ride sites has been conducted as part of the overarching engagement for the Hobart City Deal Southern Projects.

On 6 November 2019, the Department of State Growth held a Focus Group with key external stakeholders in Kingborough to discuss local issues and obtain feedback to contribute to the planning and design processes of the Hobart City Deal. During the Focus Group, stakeholders expressed support for park and ride facilities. Key discussion points included:

- The site needs to be close to the main corridors, because if the diversion is too great, passengers could drive straight into Hobart in a similar time.
- The current Huntingfield location has advantages due to its proximity to local schools, allowing parents to drop off children and then transfer onto a CBD bus service.

Throughout the concept design process, the Department consulted regularly with Kingston Council through the Kingborough Congestion Working Group and provided feedback on the draft concept designs that has been incorporated into the final concept design.

6.9 Environmental Issues

6.9.1 Environment - Flora and Fauna

The Planning and Environment Report is included in Appendix F of this report.

As both Park and Ride facilities are to be located in cleared, urban areas adjacent the Southern Outlet and the established road network, the potential for impacts on natural values is low. There are no known Commonwealth or State protected values or declared weeds.

A detailed Natural Values Assessment for planning and approvals phase has not yet been conducted at the time of writing this report however we anticipate that this will be carried out in the future. A methodology and quote for these works has been provided separately.

6.9.2 Historic Heritage

A Heritage Management Strategy was prepared by Praxis which investigated potential heritage issues arising from the proposed Hobart Transport Vision projects, including the Park and Ride facilities. The only heritage property near the proposed Park and Ride sites is Huntingfield Estate which is listed on the Tasmanian Heritage Register. The strategy concluded that provided no works are proposed on the 'Huntingfield' property, then there is no conceivable heritage impact arising from any works to those proposed areas.

6.9.3 Aboriginal Heritage

Aboriginal cultural heritage is managed by Aboriginal Heritage Tasmania (AHT) under the Aboriginal Heritage Act 1975. A search of the Aboriginal Heritage Register should be undertaken to identify any sites of concern. Given the extent of disturbance within the proposed Park and Ride sites, the potential for sites may have been reduced.

6.9.4 Noise

Under the Light Industrial and Utilities zones the noise requirements are the same and are set out in sub-clauses 23.3.2 and 28.3.2 respectively, as shown in the table below.

Noise	
Objective: To ensure that noise emissions do not cause environmental harm and do not have unreasonable impact on residential amenity on land within a residential zone.	
Acceptable Solutions	**Performance Criteria**
A1 - Noise emissions measured at the boundary of a residential zone must not exceed the following: • 55dB(A) (LAeq) between 7am and 7pm; • 5dB(A) above the background (LA90) level or 40dB(A) (LAeq), whichever is the lower, between 7pm and 7am; • 65dB(A) (LAmax) at any time. Measurement of noise levels must be in accordance with the methods in the Tasmanian Noise Measurement Procedures Manual, issued by the Director of Environmental Management, including adjustment of noise levels for tonality and impulsiveness. Noise levels are to be averaged over a 15-minute time interval.	P1 - Noise emissions measured at the boundary of a residential zone must not cause environmental harm within the residential zone.

In order to demonstrate compliance, a Noise Assessment by a suitably qualified person must be prepared with recommended mitigation measures, if required. Given the location of the proposed Park and Ride facilities, adjacent busy roads, and the fact that some of these areas are currently used for informal parking, noise impacts are unlikely to be a significant matter.

6.9.5 Development Application (DA)

It is expected that a Development Application will be required for this project. Items to be addressed within the application are listed below

- No Commonwealth or State listed threatened native vegetation communities and species have been recorded on the northern site – no natural values assessment is considered necessary.
- The status of Juncus amabilis (gentle rush) will require confirmation prior to works
- The Park and Ride facilities are all traversed by water mains, and potentially other utilities, which will have to be considered at design stage.
- Council may determine the land use to be either Transport Depot and Distribution or Vehicle Parking, which are both Discretionary uses in the Utilities Zone and the Light Industrial Zone. As such, the development applications would have to be advertised for a period of 14 days.
- A Traffic Impact Assessment will be required to address the requirements of the Road and Railway Assets Code.
- An assessment is required of layout and landscaping in accordance with the Parking and Access Code.
- The planning permit applications will require a stormwater assessment, prepared by a suitably qualified person, which demonstrates the management and disposal of stormwater complies with the state policy requirements.
- In the event that any proposed works impact the 'Huntingfield' property, then a heritage impact assessment will be required to accompany any applications for development (Council and Tasmanian Heritage Council).

7. Cost Estimates

7.1 General

WT Partnerships were engaged as a sub-consultant to carry out a Concept cost estimate for the two Park and Ride projects and these are included in Appendix B.

The basis for the estimate was a set of the Concept Design Drawings, Estimate Advice Notice, and risk register prepared by pitt&sherry.

The summary of the cost estimate is provided in subsequent sections.

7.2 Base Estimate

7.2.1 Browns Road Park and Ride

The total base estimate for construction cost is $1,337,000. s 38 [redacted]

7.2.2 Huntingfield Park and Ride

The total base estimate for construction cost is $5,144,000. s 38 [redacted]

7.3 Contingency

Contingent risks have been included in the cost estimates for the two park and ride locations based on the risk register in Appendix C.

7.3.1 Browns Road Park and Ride

Based on the probabilistic cost estimate, there is a 50 per cent chance that the final project cost will be below $1,632,000 and a 90 per cent chance that the final project cost will be below $1,743,000.

	P50 ($m AUD)	P90 ($m AUD)
Base Cost Estimate	1.34	1.34
Contingency	0.29	0.40
Total Project Cost Estimate	1.63	1.74

7.3.2 Huntingfield Park and Ride

Based on the probabilistic cost estimate, there is a 50 per cent chance that the final project cost will be below $6,284,000 and a 90 per cent chance that the final project cost will be below $6,733,000.

	P50 ($m AUD)	P90 ($m AUD)
Base Cost Estimate	5.14	5.14
Contingency	1.14	1.59
Total Project Cost Estimate	6.28	6.73

7.4 Cost Escalation

Cost escalation has been excluded from this cost estimate.

7.5 Cost Summary

Refer to Appendix B for a detailed breakdown of costs and contingencies.

8. Risk Assessment

8.1 General

A risk register has been developed for the project and is included in Appendix C. The register was developed and updated throughout the concept design process and included input from the Design Workshop with the Department's Internal Working Group on 3 February 2020. The risks included in the register have been used to inform the inherent and contingent risk components of the cost estimate.

Figure 21: Risk Likelihood Evaluation Criteria

Risk Likelihood Evaluation Criteria

The likelihood that a risk event will occur is based on the following contributing factors:

- Complexity – evaluated in the context of the complexity of a process or activity
- Susceptibility – evaluated in the context of people, processes, stakeholders involved or the rate of change within industry.
- History – evaluated in the context of the history of previous incidents directly within the organisation, industry or more broadly.

Some events happen once in a lifetime. Other cans happen almost every day. Analysing risk requires an assessment of their frequency of occurrence. This following table provides broad descriptions used to support likelihood ratings. The occurrence will be evaluated without reference to known management practices since these are at a later stage of the risk assessment process.

RISK ASSESSMENT MATRIX		LIKELIHOOD (Refer to Definitions right)				
		A. Rare	B. Unlikely	C. Possible	D. Likely	E. Almost Certain
CONSEQUENCES (Refer to Definitions Overleaf)	5 - Catastrophic	M	H	H	VH	VH
	4 – Major	M	M	H	H	VH
	3 – Moderate	L	M	M	H	H
	2 – Minor	L	L	M	M	H
	1 - Notable	L	L	L	M	M

	Risk Action Levels
VH - Very High	▪ Minister/Secretary decision/direction may be required ▪ Provide memorandum to Manager Project Services ▪ Include in Project Monthly Report
H – High	▪ Take immediate action to further control the risk ▪ Include in Project Monthly Report ▪ Consider providing supplementary advice to Manager Project Services
M – Medium	▪ Proactively manage risks ▪ Report to Project Steering Committee through risk register ▪ Review for improvement opportunities
L – Low	▪ Monitor risk, reduce if practicable

Likelihood Definitions
What is the likelihood of the selected consequences occurring?

Likelihood Rating	Description
5 - Almost Certain	▪ Over 90% probability; or ▪ "Happens Often"; or ▪ "Unlikely that it won't happen"
4 - Likely	▪ Greater than 50% probability; or ▪ "Could easily happen"
3 - Possible	▪ Greater than 10% probability; or ▪ "Could happen, has occurred before".
2 - Unlikely	▪ Greater than 1% probability; or ▪ "Hasn't happened yet but could".
1 - Rare	▪ Less than 1% probability; or ▪ Conceivable, but only as a result of combination of unusual events.

Figure 22: Risk Consequence Evaluation Criteria

Risk Consequence Evaluation Criteria

In the context of the risk assessment, risks are assessed in terms of their impact on the achievement of business strategies and operational outcomes. Risk evaluation criteria may be based on operational, technical, financial, legal, social, environmental or other criteria. Each consequence can be rated, in terms of its severity, from notable to catastrophic as follows:

Consequence Definitions What is the likely consequences in the event of a failure?

Rating	Community	Environment & Heritage	Legal & Compliance	Reputation	Management Impact	Financial Impact	Program Impact
5 – Catastrophic	• Complete loss of trust by affected community leading to social unrest & outrage.	• Unacceptable impact on environmental values with high significance. • Unacceptable impact on heritage values with high significance.	• Major litigation with significant damages costs • Potential Prosecution by authorities. • Court or Non-Government Organisation (NGO) imposed fine	• Reputation and standing of DIER affected locally, national and internationally • Catastrophic loss of confidence by key stakeholders.	• Requires management at Ministerial Level • Requires new or amended legislation	• Project unable to proceed • Loss of Federal funding • Election commitment projects cancelled or deferred to balance budget	• Project is never able to proceed
4 – Major	• Prolonged community outrage	• Serious long term environmental impact • Partial loss of significant heritage values	• Major Litigation • Class action • Possibility of custodial sentence for Senior Management	• Major embarrassment for DIER locally and nationally. • Significant loss of confidence of key stakeholders	• Critical event that requires considerable Secretarial and General Manager time to manage over many months	• Additional Federal Government funding required at project level • Additional State funding required to program budget	• Project is delayed indefinitely
3 – Moderate	• Sustained community disruption leading to actions requiring continual management attention	• Moderate impact but not affecting ecosystem function • Moderate impact on heritage values	• Major breach of regulation with punitive fine • Significant litigation involving many weeks of senior management time	• Community and stakeholder concern on a number of issues suggesting an inability to deliver results.	• Significant event that can be managed with careful management attention • Will take some branch-level Management time over several weeks	• Other projects cancelled or deferred (internal budget reallocation) • Scope reduced on other projects in the program	• Critical timeframe for delivery cannot be met
2 – Minor	• Short-term community outrage or sustained but localised community disruption	• Minor impacts on environmental values • Minor impact on heritage values	• Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible	• Issues raised by community and stakeholders • Negative perception of DIER in parts of the community or with key stakeholders.	• Will require Group Manager attention over several days	• Scope reduced on other projects in program • Internal budget reallocation	• Moderate delay against non-critical timeframe for delivery
1 – Notable	• Insignificant localised community disruption	• No impact values	• Minor breach of regulation	• Some isolated impact on DIER reputation at any level.	• Impact of event absorbed in normal management activity.	• Use of contingency funds is required	• Minor delay to program

8.2 Options

As described in Chapters 4 and 5 of this report, various configuration options were considered for each of the park and ride sites, which were assessed against project objectives and risks.

8.3 Discussion and Analysis

8.3.1 Risk Implications and Mitigation Factors.

Throughout the concept design process and during the design workshop, risks associated with the following criteria were discussed and recorded:

- Implementation
- Scope
- Communication
- Design
- Approvals
- Construction

The likelihood and consequence of the risks identified for the above criteria was discussed taking into account general project management treatments, with a resultant risk level identified. The same procedure was again undertaken taking into account project specific treatment that can be introduced to reduce the identified risk level to a more manageable or acceptable level. The residual risk of no items remains high following this process; however, the medium risks are identified in Table 11.

Table 11 – Medium Risk Level Residual Risks

Risk Category	Risk
Scope	• Scope change due to political direction results in delay to commencement of construction • Service alteration costs exceed estimate
Approvals	• Development Application appealed resulting in delay to commencement of construction
Stakeholder	• Dissatisfied stakeholders results in media attention

8.3.2 Environmental and Statutory Risks.

A few project risks were identified by the project team that have the potential to dictate aspects of the final design and project delivery timeframe, such as environmental, heritage, stakeholder and statutory risks. Investigation of the potential impacts of these constraints was not included in the project scope.

Table 12 – Environmental & Statutory Risks

Environmental and Statutory Risks	Mitigation
Impact to rare species Juncus Amabilis	Presence to be determined in Natural Values Assessment
Impact to Huntingfield Estate, a heritage listed property near the proposed park and ride site	All works to be north of southern access road to provide buffer to Huntingfield Estate. A heritage impact assessment will be conducted if the proposed works impact the Huntingfield property however is impact is unlikely at this stage.

8.4 Summary

A preliminary risk assessment has been undertaken and has identified major risks to the project. Several risks were identified with the likelihood and consequence of these risks determined and outlined in the Risk Register (Appendix C). A few of these risks remain in the medium risk category following consideration of perceived project management and project specific treatment. It is recommended that these medium category risks are quantified further in the delivery phase of the project, with mitigation measures introduced in the detailed design phase to continue to reduce these risks.

9. Program – Development and Delivery Phases

9.1 General

The project program is developed for each stage of the project, including scoping, development and delivery phase.

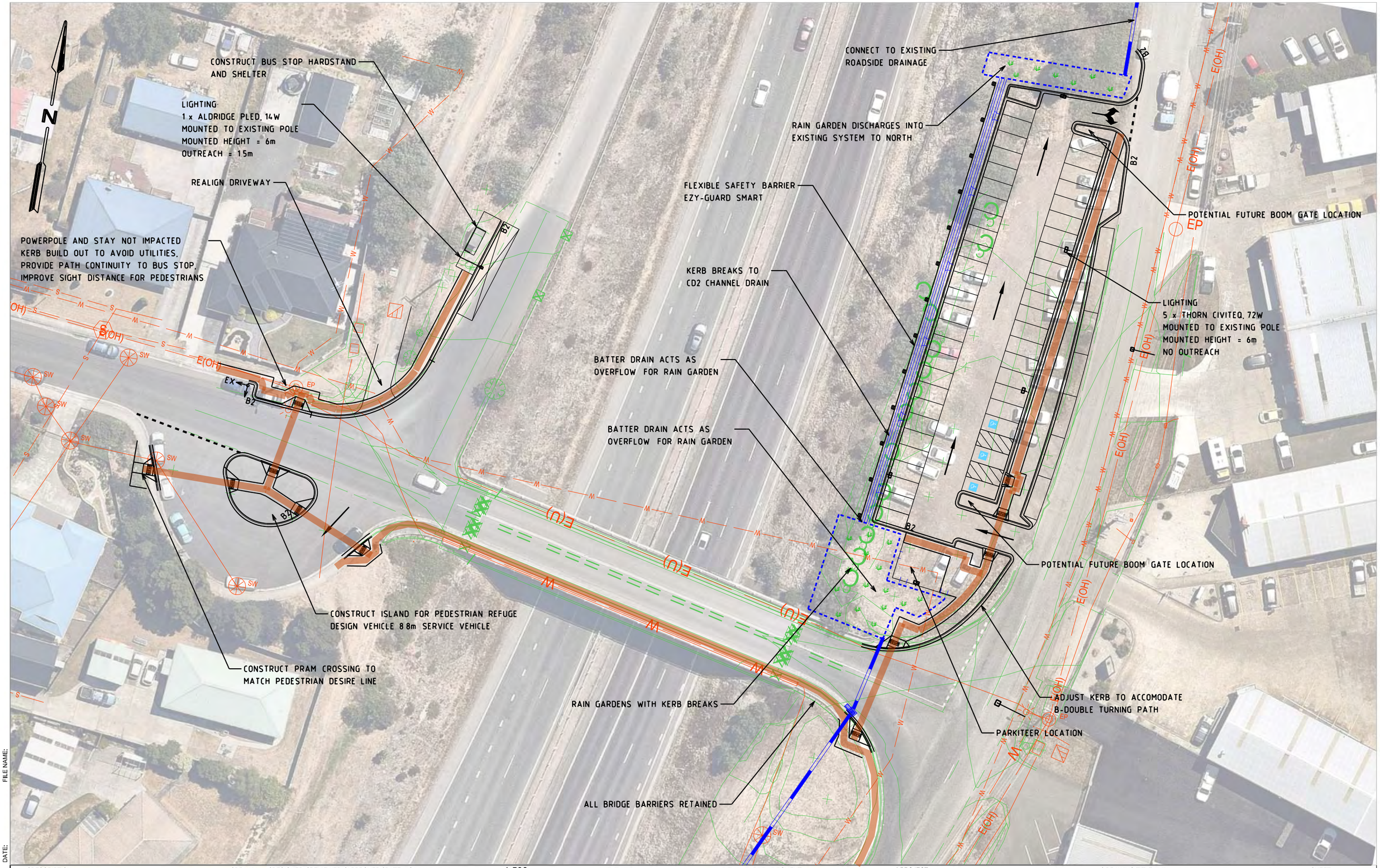
9.2 Program

A summary of the overarching project timeframes is shown in Table 13 below.

Table 13 Proposed timeframe

Complete concept designs for both Park and Ride sites	July 2020
Detailed designs for Huntingfield Park and Ride **Commence construction of Firthside Park and Ride**	October - November 2020
Commence construction of Huntingfield park and ride	December 2020-March 2021

Appendix A Concept Design Drawings



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A	DRAFT CONCEPT DESIGN	[redacted]	[redacted]	[redacted]		27/03/20

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pitt&sherry

pittsh.com.au Phone 1300 748 874 ABN 67 140 184 309

CLIENT
WSP

PROJECT
HOBART SOUTHERN PROJECTS
SP03

STATUS
DRAFT CONCEPT

DRAWING TITLE
HOBART SOUTHERN PROJECTS
PARK AND RIDE BROWNS ROAD
SHEET 1

SHEET
01

DRAWING No.
HB19415-S-CIV-DRG-3001

REV
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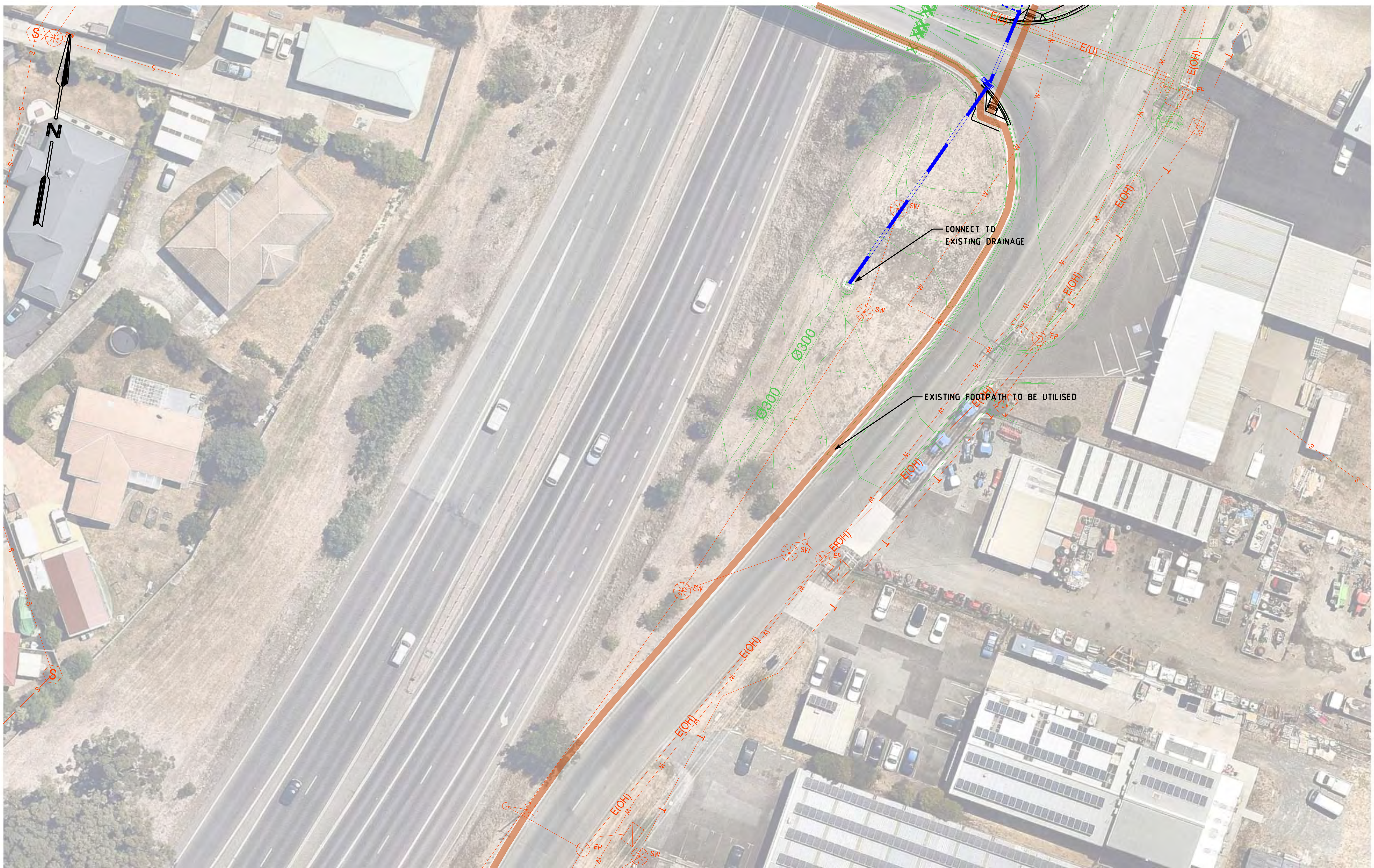

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pittsh.com.au Phone 1300 748 874 ABN 67 140 184 309

CLIENT: WSP

PROJECT	DRAWING TITLE	SHEET
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STATUS: **DRAFT CONCEPT**	DRAWING No.: HB19415-S-CIV-DRG-3002	REV: B

EXISTING FOOTPATH TO BE UTILISED

RETAIN EXISTING PRAM RAMP

RETAIN EXISTING KERB
CONSTRUCT NEW FOOTPATH

EXISTING SERVICES
TREATMENT TO BE DETERMINED

N

FILE NAME:

DATE:

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SCALE AT A3 1:500

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CLIENT
WSP

PROJECT
HOBART SOUTHERN PROJECTS
SP03

STATUS
DRAFT CONCEPT

DRAWING TITLE
HOBART SOUTHERN PROJECTS
PARK AND RIDE BROWNS ROAD
SHEET 3

SHEET
03

DRAWING No.
HB19415-S-CIV-DRG-3003

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CLIENT
WSP

PROJECT
HOBART SOUTHERN PROJECTS
SP03

STATUS
DRAFT CONCEPT

DRAWING TITLE
HOBART SOUTHERN PROJECTS
PARK AND RIDE BROWNS ROAD
SHEET 4

SHEET
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HB19415-S-CIV-DRG-3004

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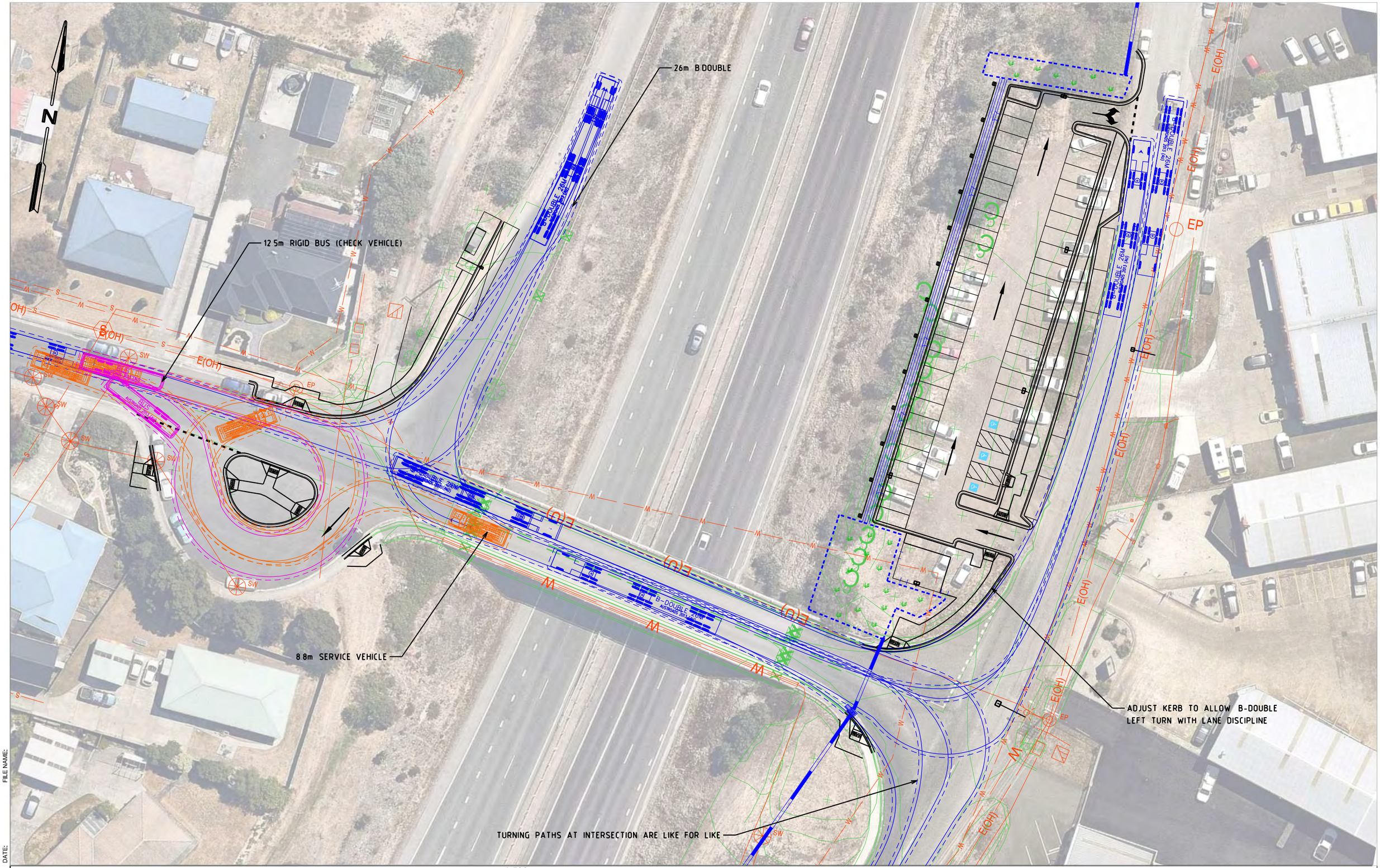

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CLIENT WSP

PROJECT HOBART SOUTHERN PROJECTS SP03

STATUS **DRAFT CONCEPT**

DRAWING TITLE HOBART SOUTHERN PROJECTS PARK AND RIDE BROWNS ROAD TURNING PATHS

SHEET 01

DRAWING No. HB19415-S-CIV-DRG-3001

REV A

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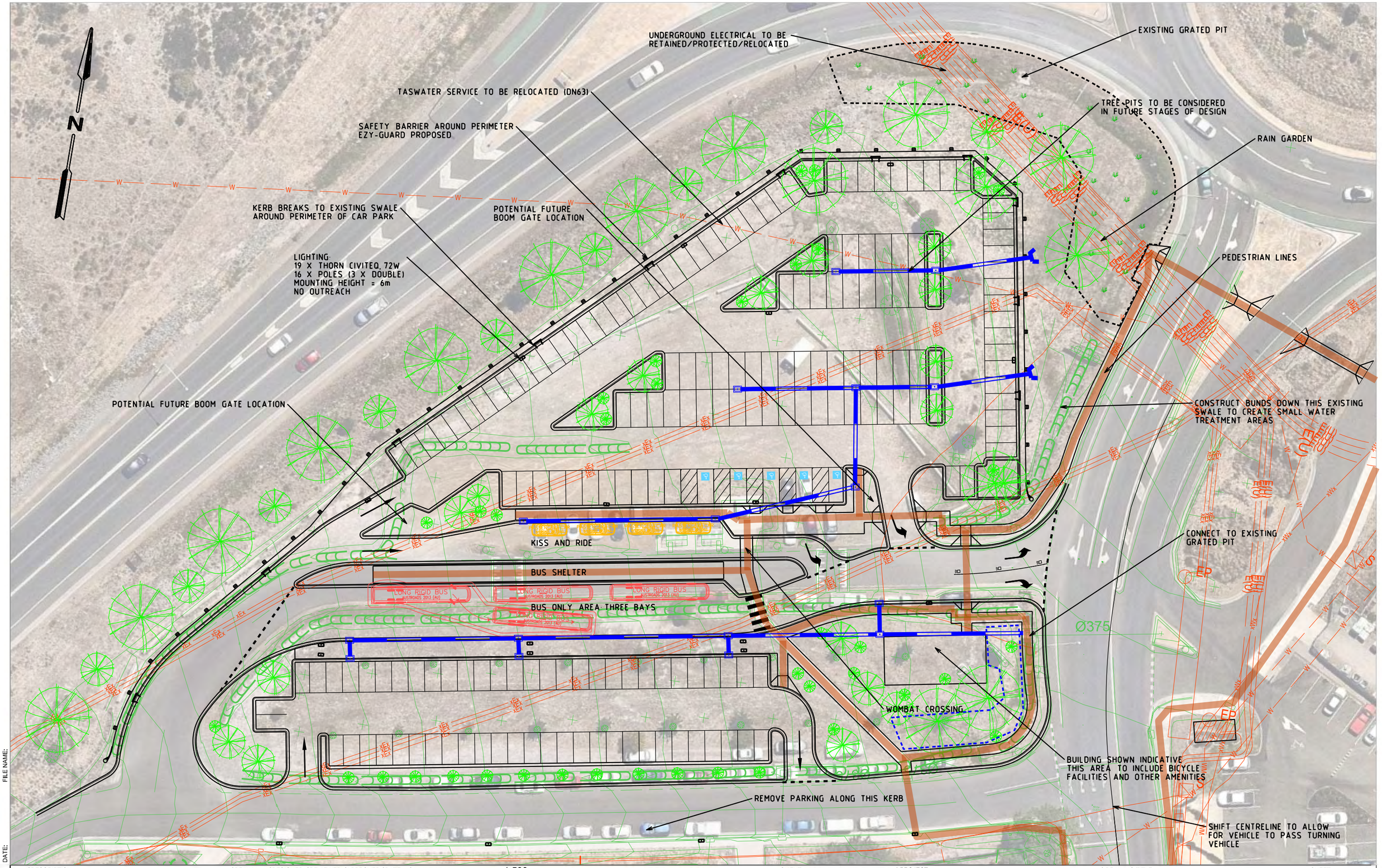

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pitt&sherry

pittsh.com.au Phone 1300 748 874 ABN 67 140 184 309

CLIENT: WSP

PROJECT: HOBART SOUTHERN PROJECTS SP03

STATUS: **PRELIMINARY**

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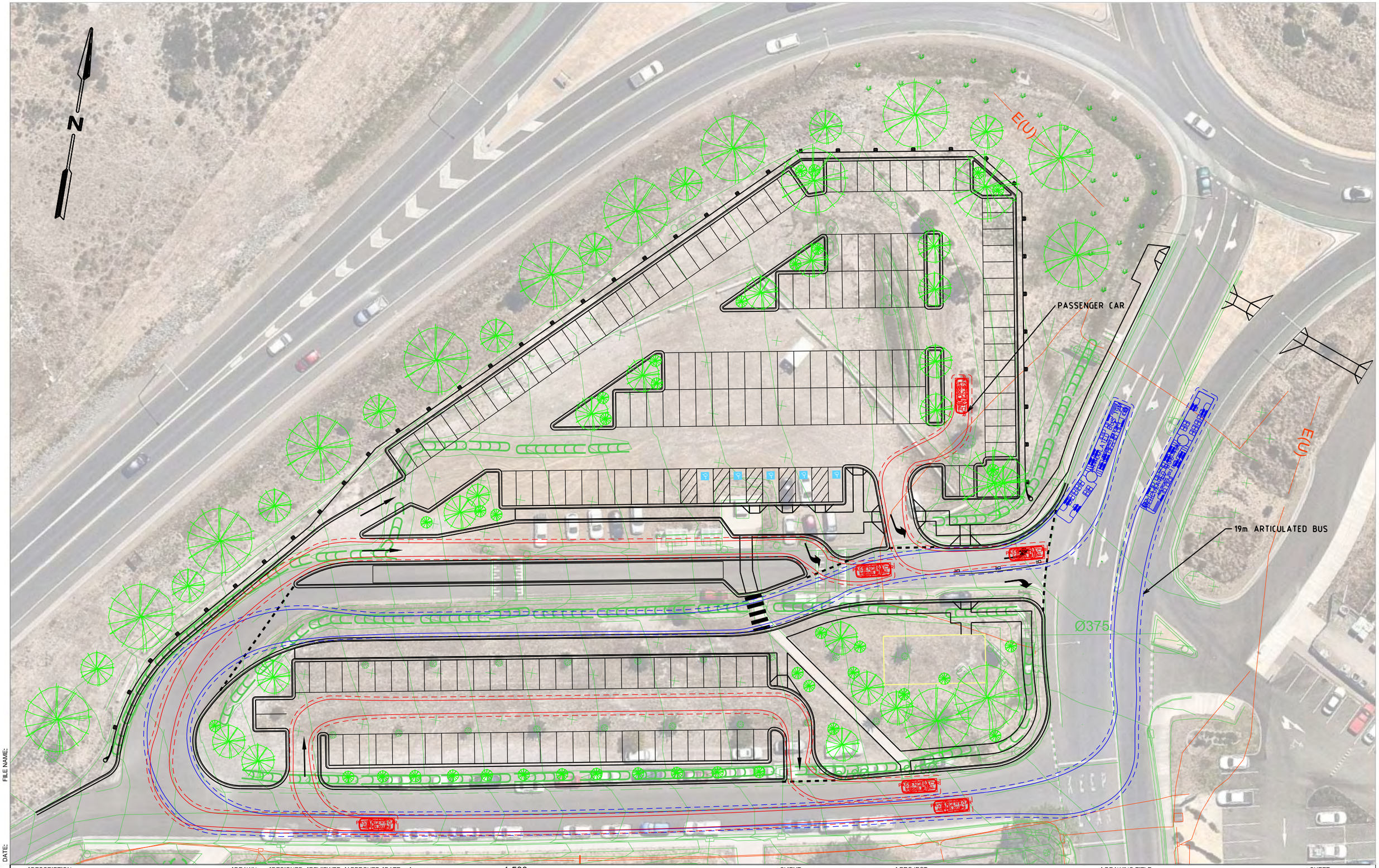
SHEET: 01

DRAWING No.: HB19415-S-CIV-DRG-41001

REV: B



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SCALE AT A3 1:500

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pitt&sherry

pittsh.com.au Phone 1300 748 874 ABN 67 140 184 309

CLIENT
WSP

PROJECT
HOBART SOUTHERN PROJECTS
SP03

STATUS
PRELIMINARY

DRAWING TITLE
HOBART SOUTHERN PROJECTS
PARK & RIDE HUNTINGFIELD RD
TURNING PATHS

SHEET
01

DRAWING No.
HB19415-S-CIV-DRG-41001

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A

Appendix B Cost Estimate

s 38

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s 38

199189 - Southern Outlet Bus Transit

SP03 Park & Ride - Browns Rd Site

Probabilistic Cost Estimate

Version 19/06/2020

Estimates

Total Base Estimate	1,337,000

P-value	*Chance of final project cost being below $-value (in words)*	*Probabilistic Estimate Value ($)*
P50	50 in 100	1,632,000
P90	90 in 100	1,744,000
P95	95 in 100	1,775,000
P99	99 in 100	1,831,000

Contingency

P-value	*Chance of exceeding contingency $-value (in words)*	*Contingency Value ($)*	*Contingency Value (%)*
P50	50 in 100	295,000	22.1%
P90	10 in 100	407,000	30.4%
P95	5 in 100	438,000	32.8%
P99	1 in 100	494,000	36.9%

s 38

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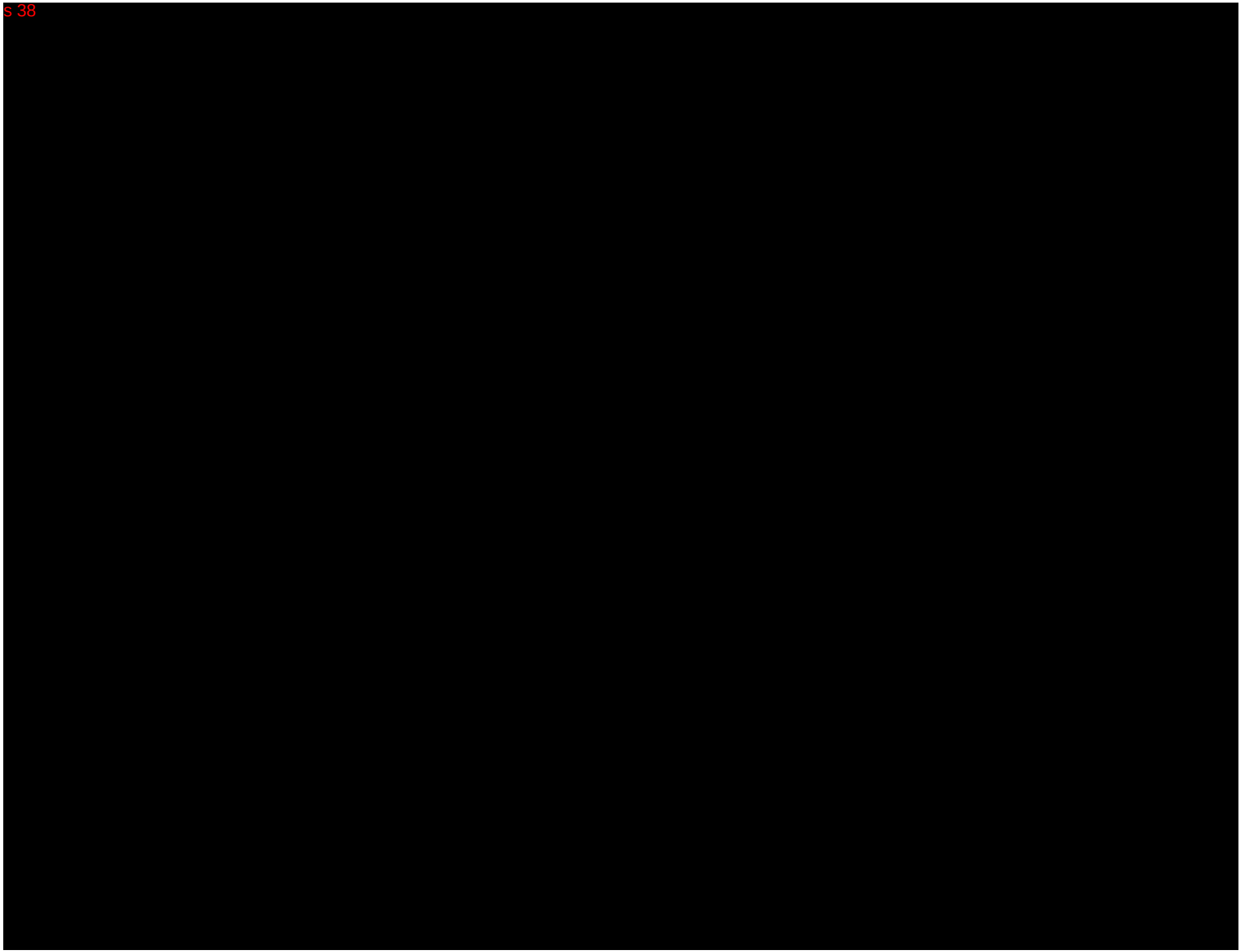

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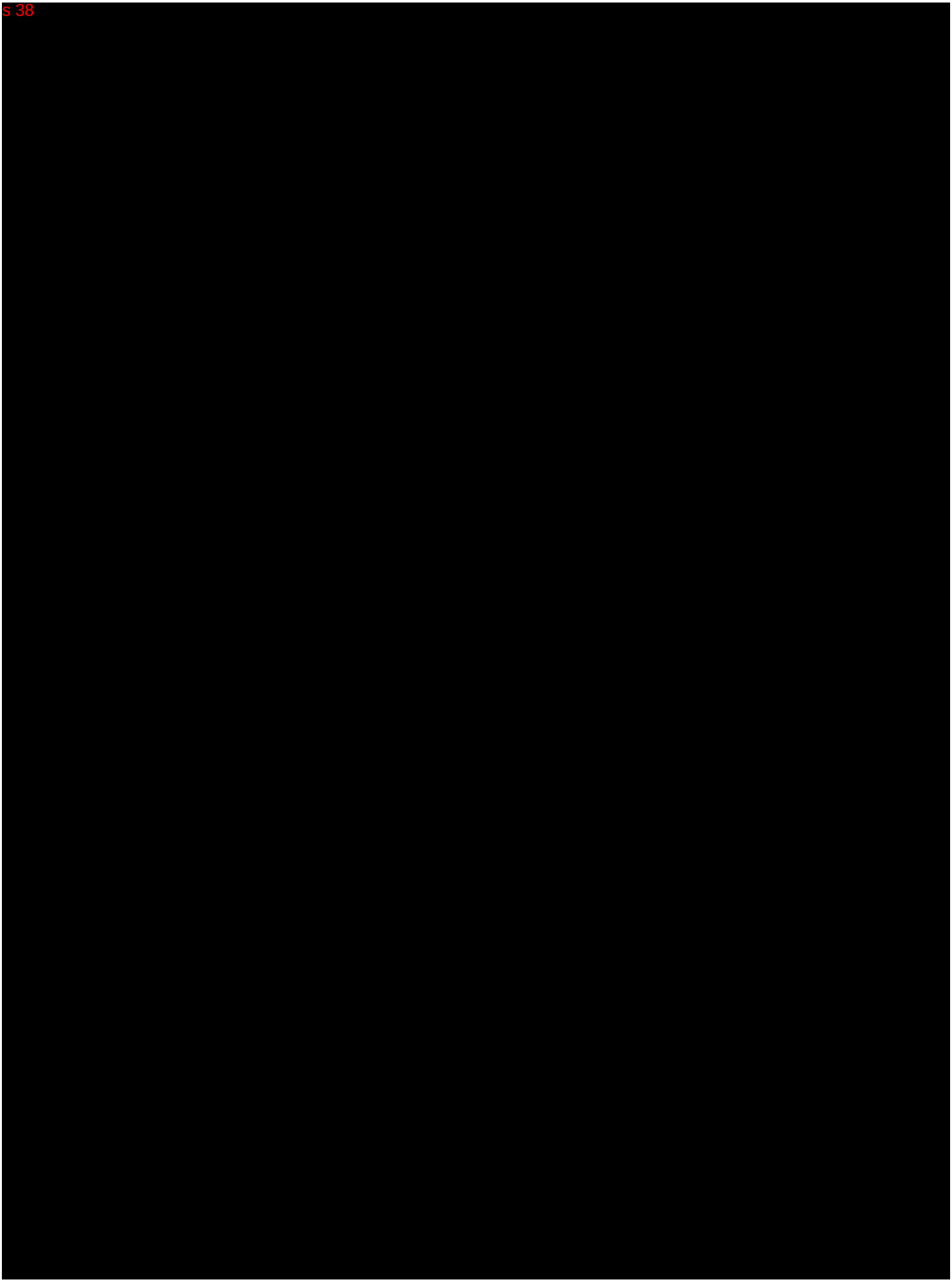

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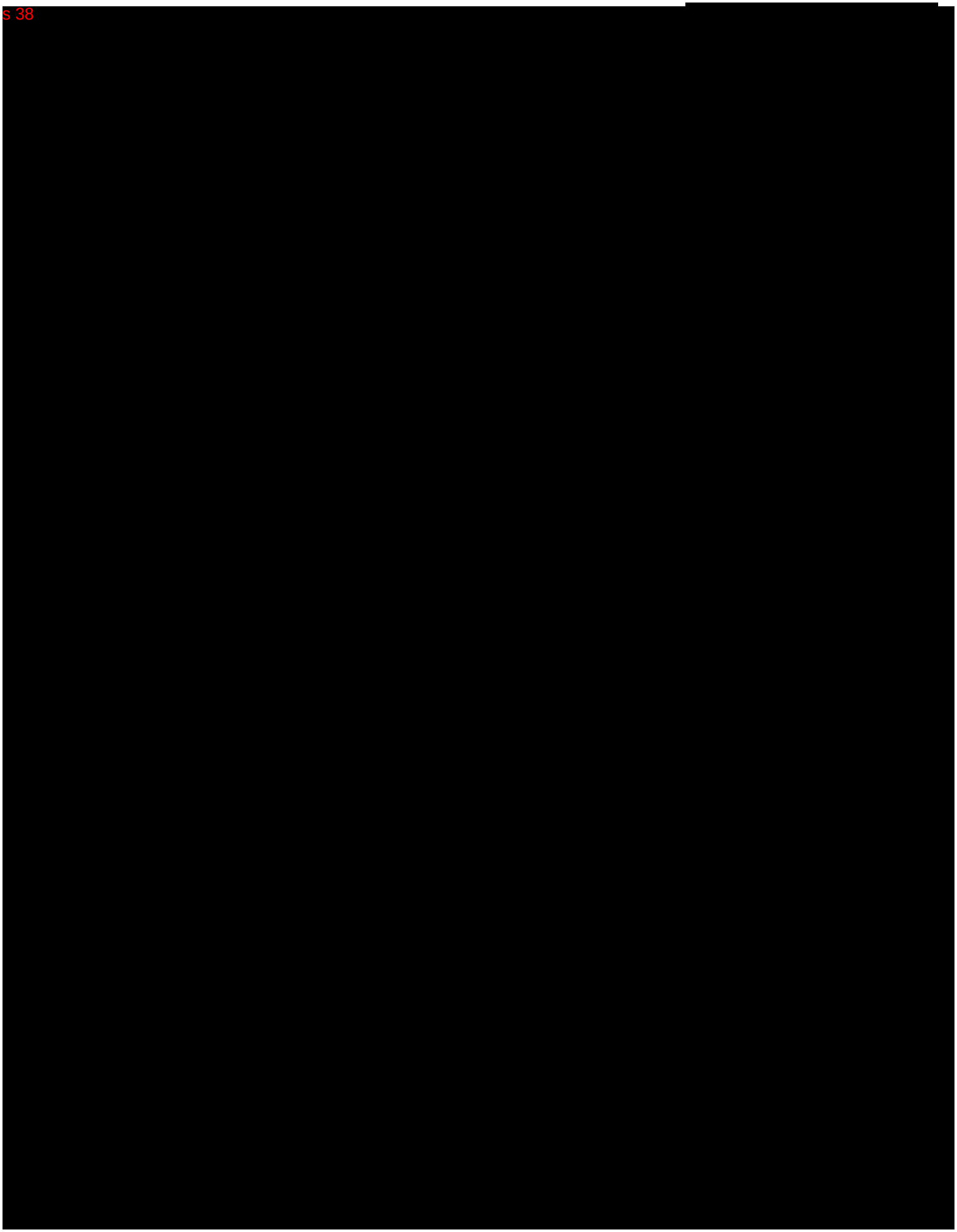

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199189 - Southern Outlet Bus Transit

SP03 Park & Ride - Huntingfield site

Probabilistic Cost Estimate

Version 19/06/2020

Estimates

Total Base Estimate	5,144,000

P-value	*Chance of final project cost being below $-value (in words)*	*Probabilistic Estimate Value ($)*
P50	50 in 100	6,284,000
P90	90 in 100	6,734,000
P95	95 in 100	6,856,000
P99	99 in 100	7,094,000

Contingency

P-value	*Chance of exceeding contingency $-value (in words)*	*Contingency Value ($)*	*Contingency Value (%)*
P50	50 in 100	1,140,000	22.2%
P90	10 in 100	1,590,000	30.9%
P95	5 in 100	1,712,000	33.3%
P99	1 in 100	1,950,000	37.9%

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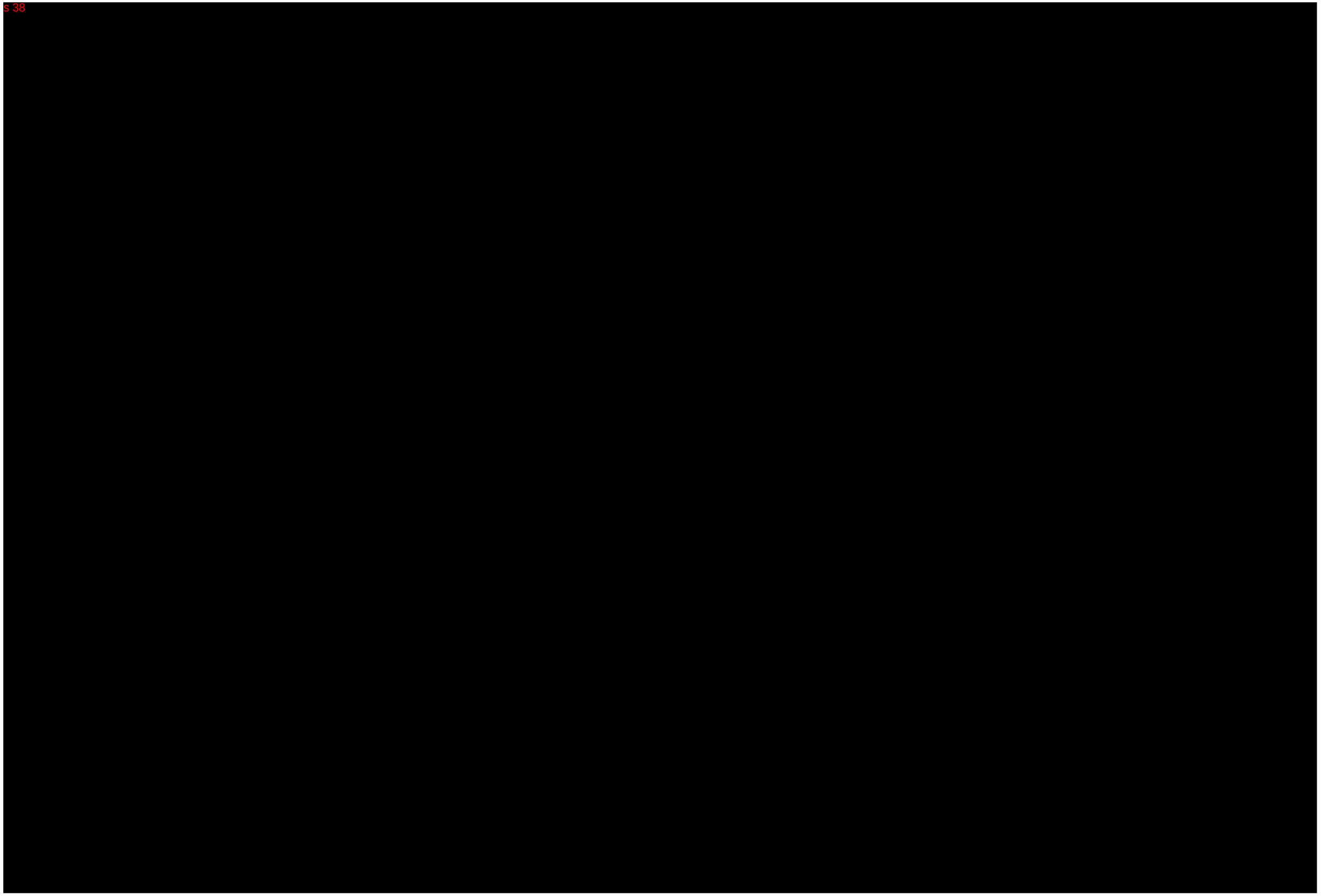

Appendix C Risk Register

Activity ID	Category	Potential Hazard / Impact	Initial Risk Rating Without Controls			Controls (Eliminate so far as is reasonably practicable)	Highest Control Type	Residual Risk Rating			Responsible Person	Residual Risk Management Plan			
			C	P	Risk			C	P	Risk		Monitoring / Improvement Actions	Who	Date	Status
APPLICABLE TO BOTH HUNTINGFIELD AND BROWNS ROAD SITES															
	3 - Stakeholder	Project is poorly received by the community. Negative press.	3	Moderate	Medium	Utilise stakeholder experts with local knowledge to develop engagement plan early.	Admin Control	3	Unlikely	Low					
	2 - Scope	Delay to engineering survey or poor quality survey information causes delay to design deliverables	3	Moderate	Medium	Survey obtained in Concept Design. For any additional survey required, ensure clear brief. Gain input from design team into survey brief. Mobilise survey team early. Ensure adequate resources available.	Admin Control	2	Unlikely	Low					
	4 - Design	Developed solution does not sufficiently enhance or consider the passenger experience	4	Moderate	High	Ensure to communicate importance of customer experience to all working on project. Include within design reviews. Include within monthly reporting.	Training	2	Unlikely	Low					
	3 - Stakeholder	Stakeholders and public not engaged in project	3	Moderate	Medium	Implement locate stakeholder lead. Develop engagement plan early	Admin Control	3	Unlikely	Low					
	4 - Design	Developed solution is too expensive or unable to be delivered effectively	4	Unlikely	Medium	Utilise challenge team early to guide design solutions	Admin Control	3	Rare	Low					
	4 - Design	Designed solution fails to achieve planned traffic operations	3	Unlikely	Low	Utilise traffic modelling information and engage challenge team.	Admin Control	3	Rare	Low					
	2 - Scope	Preferred park and ride location(s) yet to be confirmed. Design being undertaken at risk	3	Moderate	Medium	Include as priority in stakeholder engagement plan. Only design one site.	Admin Control	2	Moderate	Low					
	3 - Stakeholder	Unable to get meeting with councils at required time leading to project delays	4	Moderate	High	Anticipate and schedule meetings early. Gain visibility of council meeting schedule upfront.	Admin Control	2	Unlikely	Low					
	3 - Stakeholder	Agreement on design not reached between key stakeholders	4	Moderate	High	Liase with key stakeholders early in the process (Concept Design)	Admin Control	2	Unlikely	Low					
	5 - Approvals	Impact to unforseen Aboriginal Heritage	4	Unlikely	Medium	A search of the Aboriginal Heritage Register must be conducted	Admin Control	2	Unlikely	Low					
	7 - Other	Design input from public utility authorities causes delay to other design activities	3	Moderate	Medium	Seek early meeting with potentially effected utility owners to ensure they are onboard with delivery timeframes and to avoid requests for additional information	Admin Control	2	Unlikely	Low					
	6 - Construction	Extent of soft foundations result in costs exceeding budget	3	Moderate	Medium	A desktop geotechnical assessment has been carried out and determined to be unlikely.	Admin Control	3	Unlikely	Low					
	2 - Scope	Scope change due to political direction results in delay to commencement of construction	4	Moderate	High	Minister to be kept updated regarding stakeholder matters and design development progress to align with project direction	Admin Control	4	Unlikely	Medium					
	2 - Scope	Timeliness of decision making leads to delays in design development resulting in delay to commencement of construction	3	Moderate	Medium	Protocol for steering committee to be developed and integrated in Project Management Plan	Admin Control	3	Unlikely	Low					
	3 - Stakeholder	Dissatisfied stakeholders results in media attention	4	Moderate	High	Justification for decisions regarding preferred option to be conveyed to all stakeholders Stakeholder Engagement Plan to be reviewed and updated on a regular basis	Admin Control	4	Unlikely	Medium					
	5 - Approvals	Development Application appealed resulting in delay to commencement of construction	4	Moderate	High	Justification for decisions regarding preferred option to be conveyed to all stakeholders Stakeholder Engagement Plan to be reviewed and updated on a regular basis	Admin Control	4	Unlikely	Medium					
	2 - Scope	Service alteration costs exceed estimate	3	Moderate	Medium	Review when authority estimates have been received	Admin Control	3	Moderate	Medium					
	6 - Construction	Contract claim during construction	3	Moderate	Medium	Quality and completeness of documentation, comprehensive investigations, performance requirements in the specification, clarification of risk allocations between Contractor and Principal	Admin Control	2	Moderate	Low					
	2 - Scope	Scope change due to political direction results in delay to commencement of construction	4	Moderate	High	Minister to be kept updated regarding stakeholder matters and design development progress to align with project direction	Admin Control	3	Unlikely	Low					
	2 - Scope	Timeliness of decision making leads to delays in design development resulting in delay to commencement of construction	3	Moderate	Medium	Protocol for steering committee to be developed and integrated in Project Management Plan	Admin Control	3	Unlikely	Low					
	4 - Design	Satisfying Council and potentially Federal water quality requirements results in complex drainage systems being required resulting in higher than anticipated costs	3	Moderate	Medium	Water quality requirements to be established during concept development	Admin Control	2	Moderate	Low					
	3 - Stakeholder	Dissatisfied stakeholders results in media attention	4	Moderate	High	Justification for decisions regarding preferred option to be conveyed to all stakeholders Stakeholder Engagement Plan to be reviewed and updated on a regular basis	Admin Control	2	Unlikely	Low					
	7 - Other	Design input from public utility authorities causes delay to other design activities	3	Moderate	Medium	Seek early meeting with potentially effected utility owners to ensure they are onboard with delivery timeframes and to avoid requests for additional information	Admin Control	2	Unlikely	Low					
	5 - Approvals	COVID19 results in project delays	4	Moderate	High	Utilise stakeholder experts with knowledge to develop engagement plan early.	Admin Control	2	Moderate	Low					
										#N/A					
										#N/A					
HUNTINGFIELD SITE										#N/A					

	3 - Stakeholder	Removal of on street parking on south side of Huntingfield access road	2	Moderate	Low	Liaise with key stakeholders. The small southern car park is not currently expected to have boom gate and therefore there is a net increase in parks for these properties.	Admin Control	2	Unlikely	Low					
	2 - Scope	Signalised intersection required at Huntingfield Ave intersection with Huntingfield access road.	3	Unlikely	Low	Utilise traffic modelling information	Admin Control	2	Unlikely	Low					
	2 - Scope	Impact to Mitre 10 access due to new right turn leading to modifications to their access	2	Moderate	Low	Utilise traffic modelling information and liaise with stakeholders	Admin Control	1	Unlikely	Low					
	2 - Scope	Alternative option is progressed in Detailed Design due to change in requirements. Resulting in more pavement area	3	Moderate	Medium	Liaise with key stakeholders during Concept Design and determine preferred solution.	Admin Control	2	Unlikely	Low					
	5 - Approvals	Impact to rare species Juncus Amabilis	3	Unlikely	Low	Presence to be determined in Natural Values Assessment	Admin Control	1	Rare	Low					
	5 - Approvals	Impact to Huntingfield Estate, a heritage listed property near the proposed park and ride site	4	Rare	Low	All works to be north of southern access road to provide buffer to Huntingfield Estate. A heritage impact assessment will be conducted if the proposed works impact the Huntingfield property however is impact is unlikely at this stage.	Admin Control	2	Rare	Low					
	2 - Scope	WSUD levels not achieved in Concept Design resulting in significant changes to design	2	Moderate	Low	Design small treatment ponds on swale to increase treatment. Opportunity to change reticulation drainage at car park to include bioretention swales/rain gardens.	Admin Control	2	Unlikely	Low					
					#N/A					#N/A					
BROWNS ROAD SITE					#N/A					#N/A					
	3 - Stakeholder	Approval of private access works	2	Moderate	Low	Stakeholder engagement during Concept Design phase	Admin Control	1	Unlikely	Low					
	3 - Stakeholder	Removal of on street parking to build kerb extension to connect footpath from Firthside and improve crossing safety	2	Moderate	Low	Stakeholder engagement during Concept Design phase	Admin Control	1	Unlikely	Low					
	4 - Design	Unknown legal point of discharge to north of site leads to additional cost of materials and approvals	2	Likely	Medium	Liaise with council in Preliminary Design to determine requirements	Admin Control	1	Unlikely	Low					
	2 - Scope	Proposed footpath on east side of road significantly impacts services considered to be resolved in Detailed Design	3	Moderate	Medium	Carry out Survey in Concept Design and space prove concept design in 2D.	Admin Control	2	Unlikely	Low					
	2 - Scope	Footpath width increase to 1.8m beyond the desirable 1.5m from social distancing requirements resulting in increase in materials	2	Moderate	Low	Provide 1.5m footpath inline with current footpath and provide design criteria in design report.	Admin Control	2	Unlikely	Low					
	2 - Scope	Existing footpath to be utilised is substandard and must be replaced	2	Moderate	Low	Carry out visual inspection in Concept Design	Admin Control	2	Unlikely	Low					

Appendix D Traffic Impact Assessment Reports

TASMANIAN DEPARTMENT OF STATE GROWTH

JULY 2020

Hobart City Deal Southern Projects Sub-Project 3 - Browns Road Park-and-Ride

Traffic Impact Assessment

Question today
Imagine tomorrow
Create for the future

Hobart City Deal Southern Projects
Sub-Project 3 - Browns Road Park-and-Ride
Traffic Impact Assessment

Tasmanian Department of State Growth

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wsp.com

REV	DATE	DETAILS
A	31/03/2020	Draft
B	13/07/2020	Final – address DSG comments

	NAME	DATE	SIGNATURE
Prepared by:	s 36 [redacted]	13/07/2020	s 36 [redacted]
Reviewed by:		13/07/2020	
Approved by:		13/07/2020	

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GLOSSARY

AS2890.1:2004	Australian Standard Parking Facilities Part 1: Off-street car parking, AS2890.1:2004
Bus priority	A facility to assist buses bypass traffic congestion by providing a separate space or through the use of technology to reduce bus delays, resulting in a more reliable and efficient service
Driveway	That part of the vehicular access on a road lying between the edge of the carriageway and the abutting property boundary
Metro Green Card	Tasmania's smart transport card to allow contactless fare payment system which removes the need for cash transaction when boarding a public transport service
Park-and-ride	Location where people car park their vehicle and then complete their journey using public transport
T3 (transit) lane	A traffic lane restricted to use by vehicles containing more than three people, as well as buses, taxis, hire cars, motorcycles, bicycles and emergency service vehicles

ABBREVIATIONS

B-double	A truck and trailer combination consisting of a prime mover coupled with two trailers
CBD	Central business district
DDA	Disability Discrimination Act
HML	Higher Mass Limit
km/h	kilometres per hour
RACT	Royal Automobile Club of Tasmania

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Greater Hobart region's population and employment growth are putting increased pressure on its transport network. The growth of residential areas in Kingborough and the Huon Valley creates commuter pressures on the Southern Corridor (comprising Kingston, the Southern Outlet, and the Macquarie/Davey Street couplet) between Kingston and Hobart.

The Hobart City Deal Southern Projects (the Project) seeks to encourage modal shift in favour of public transport to address congestion and accessibility issues along the Southern Corridor. The Project is comprised of five sub-projects that together provide a comprehensive, multi-faceted approach:

- Sub-project 1: Southern Outlet Transit Lane – Concept design for a northbound transit lane on the Southern Outlet between Olinda Grove and Hobart/Macquarie Street. The lane will operate as a T3 lane for use by buses, private vehicles carrying three or more occupants, taxis, and emergency service vehicles.
- Sub-project 2: Macquarie/Davey Bus Priority – Concept design for bus priority measures on Macquarie and Davey streets that considers how to optimise bus operations while managing impacts.
- Sub-project 3: Kingborough Park-and-Ride – Concept design for park-and-ride facilities at two locations in the Kingborough municipality. The scope of work includes selecting two locations and developing any specific attributes of the facilities in collaboration with stakeholders. At the time of this report, two sites had been chosen – Browns Road, Firthside and Huntingfield terminus.
- Sub-project 4: Bus service plan for Southern Corridor – Developing a park-and-ride bus service model to support the two Kingborough park-and-ride facilities (sub-project 3), the Southern Outlet transit lane (sub-project 1), and the bus priority measures proposed for Macquarie and Davey Streets (sub-project 2). The bus service model will be focused on encouraging modal shift to public transport with the potential for new buses, bus routes, and stops.
- Sub-project 5: Southern Outlet Transit Lane – T3 Enforcement – Concept design and a concept of operations plan for the proposed T3 lane on the Southern Outlet (sub-project 1), including the recommended locations of enforcement devices, as well as technological and legal considerations.

The project objectives are to:

- Achieve modal shift for commuters using the Southern Outlet
- Improve public transport travel reliability along the Southern Outlet corridor
- Encourage multiple occupancy of private vehicles during peak periods of travel
- Improve public transport and passenger experience for Kingborough and Huon residents.

The key anticipated project benefits include:

- Improved public transport passenger experience for Kingborough and Huon residents
- Improved public transport travel reliability along the Southern Outlet and Macquarie/Davey streets
- Improved bus operations along Macquarie and Davey streets
- Better utilisation of transport infrastructure to address congestion
- Increased capacity along the Southern Outlet corridor
- Providing long-term solutions to meet future demand and address road safety related issues.

1.2 SUB-PROJECT 3 – PARK-AND-RIDE

Two Park-and-Ride locations have been identified by State Growth and Kingsborough Council for the project:

- **Browns Road Park-and-Ride**: vacant lot alongside the Southern Outlet located at north-western corner of Browns Road/Groningen Road in Firthside.
- **Huntingfield Park-and-Ride**: vacant lot located south-west of the Southern Outlet/Huntingfield Avenue/ Channel Highway/Algona Road roundabout in Huntingfield.

This report details the Traffic Impact Assessment of **Browns Road Park-and-Ride** site in **Firthside**.

1.3 THIS REPORT

This report aims to assess the potential traffic and transport impacts from the Project to support the design of the Browns Road Park-and-Ride facilities. Specifically, this report has the following objectives:

- Describes the existing conditions for all modes of transport in the study area including general access vehicles, freight, public transport (bus services and point-to-point transport) and active transport (bicycles and pedestrians).
- Describes the existing environment (road function, classification and operation) in the study area that will be affected by the construction and operation of the project.
- Describe the project in terms of its design element, capacity, and intended use.
- Assesses the impacts of the park-and-ride facilities to the surrounding road network.
- Inform functional requirements for the park-and-ride site (feed design) in terms of accessibility, safety and design.
- Provide mitigation measure advice to manage identified traffic and transport impacts of the project and collaborate with the road designers on the measures adoptable in the design.

The report is structured as follows:

Section 1 Introduction: Describes the context of the site in terms of how it fits into the overarching Hobart City Deal Southern Projects.

Section 2 Existing Conditions: Describes the existing condition of the road network, transport services and abutting developments affected by the proposed Sub-Project 3 park-and ride-facility.

Section 3 Proposed Works: Describes the proposed park-and-ride facility in terms of form, functionality and considerations made to achieve high-quality customer outcome.

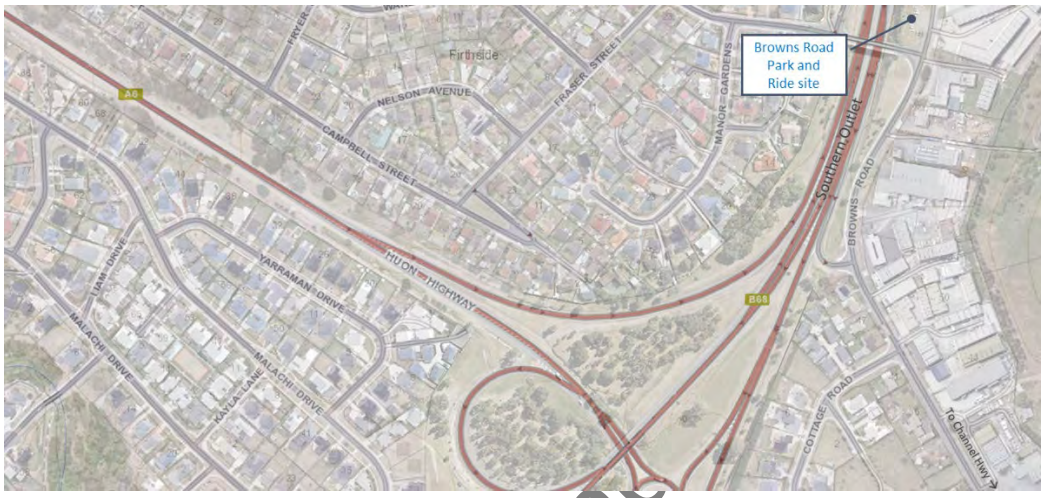
Section 4 Impact Assessment: Provides an in-depth analysis of the Project's impacts during construction and during operation.

Section 5 Conclusions: Conclusion remarks on the assessment and recommended mitigation measures.

2 EXISTING CONDITIONS

The Browns Road park-and-ride site is located adjacent to the Groningen Road overpass of the Southern Outlet in Firthside, as shown in Figure 2.1. This section describes the surrounding road network and intersections, including current traffic volumes, parking conditions, existing bus service, and the pedestrian and cycle facilities in the area.

2.1 ROAD NETWORK



Source: LISTmap (Land Information System Tasmania, visited in March 2020)

Figure 2.1 Road network surrounding the proposed Browns Road Park-and-Ride site

Key elements of the surrounding road network according to the State Road Hierarchy (State Growth, visited in March 2020) are described below:

- **The Southern Outlet** is a Category 1 State Road, which functions as a primary freight and passenger road connecting key land uses and are important to the effective functioning of industry, commerce and the community. The Southern Outlet runs north-south between Channel Highway in Kingston and Macquarie Street in the Hobart CBD. Designed as a freeway, Southern Outlet has separated carriageways with two lanes in each direction, on-ramp/off-ramp facilities. It has a posted speed limit of 100 km/h except in built up areas, where the speed limit is 80 km/h. An additional bus lane occupies the breakdown lane in the northbound direction between Reynolds Crescent up to approximately 300 metres south of Davey Street. The road is an approved B-double route throughout and an approved Higher Mass Limit (HML) route north of Huon Highway.
- **Huon Highway** is a Category 2 Road (a major regional road linking major production catchments to the Category 1 roads). Huon Highway runs east-west in the project area and connects to the town of Southport approximately 95 kilometres south of Hobart. In the project area, Huon Highway is an undivided road with one lane in each direction. It has a speed limit of 100 km/h except in built up areas where it reduces to 80 km/h. The road is an approved B-double and approved HML route.
- **Browns Road** is a local road that runs north-south between Channel Highway and Proctors Road that provides access to the Kingston industrial area. Its width is approximately nine metres across, which contains an undivided two-way road. It has a sign-posted speed limit of 50 km/h. It is an approved B-double and HML route. 220 metres south of Groningen Road it connects to the Southern Outlet southbound carriageway off-ramp.
- **Groningen Road** is a local road that runs west from Browns Road to provide direct access to a residential area of Firthside. Groningen Road is an undivided two-way road with a width of approximately eight metres and a speed limit of 50 km/h. On-street parking is largely unrestricted on both sides of the road. B-double and HML vehicles are allowed across the existing Southern Outlet overpass bridge up to the northbound on-ramp to enter Southern Outlet.

2.2 INTERSECTION LAYOUT AND OPERATIONS

Groningen Road/Browns Road is a priority-controlled T-intersection that prioritises traffic movements on Browns Road in the north-south direction.

There is a footpath on the south-western corner consisting of a 1.5-metre-wide path. There are no pedestrian crossing facilities at the intersection.

B-doubles and HML vehicles are permitted at this intersection resulting in its large radius corners.

Browns Road and Groningen Road generally have low traffic volumes and congestion. The intersection was observed to operate satisfactorily with minimal traffic queueing.

Groningen Road/Southern Outlet Northbound On-Ramp is a priority-controlled T-intersection. It prioritises traffic movements on Groningen Road in the east-west direction.

The on-ramp is a one-way northbound road. A bus stop (ID: 3736) is located on the western kerbside of the on-ramp, which is further described in section 2.5.

Footpaths are available on the southern side of Groningen Road. Apart from this, there is no other pedestrian infrastructure that would provide a safe crossing to the bus stop.

B-doubles and HML vehicles are permitted on Groningen Road between Browns Road and the on-ramp.

The intersection typically has low traffic volumes. It was observed to operate satisfactorily with minimal traffic queueing.

Browns Road/Southern Outlet Southbound Off-Ramp is a priority-controlled T-intersection that prioritises traffic on Browns Road in the north-south direction.

The off-ramp is a one-way southbound road. A bus stop (ID: 3812) exists on the eastern side of the Browns Road. Outward passengers would alight at this stop to return to the park-and-ride facility. As it is mainly an alighting stop, boarding data is unlikely to reflect the stop usage.

Footpaths are available on the western side of Browns Road. Apart from this, there is no other walking infrastructure at the intersection.

B-doubles and HML vehicles are permitted on Browns Road between north of the off-ramp up to 60 m south of Proctors Road to allow heavy vehicle access in the industrial area.

The intersection typically experiences relatively low-traffic demand and was observed to operate satisfactorily with minimal traffic queueing.

2.3 TRAFFIC VOLUMES

Table 2.1 below details the traffic volumes, heavy vehicle percentage and the annual growth on Southern Outlet, Huon Highway and Channel Highway. It shows the relative magnitudes of traffic on the Southern Outlet (busiest), Huon Highway and Channel Highway. The annual growth of around 3 per cent indicates that traffic is increasing strongly.

Table 2.1 Traffic volume data

Road name and location	Survey period	Average Daily Traffic (vehicles per day)	Heavy vehicle %	Annual growth (Since Year)
Southern Outlet, Kingston South of Huon Highway	May 2019	Weekday: 22,040 Saturday: 16,888	8.3%	2.3% (2017)
Huon Highway, Kingston West of Southern Outlet	May 2019	Weekday: 12,580 Saturday: 10,268	7.7%	3.5% (2016)
Channel Highway, Kingston East of Browns Road	May 2019	Weekday: 4,405 Saturday: 4,147	8.3%	3.6% (2016)

Source: RoadTas Traffic Stats (http://geocounts.com/traffic/au/stategrowth, viewed in 2020)

2.4 PARKING

The proposed park-and-ride site is currently used as an informal parking area. Site observations and aerial photography indicates it is currently able to accommodate circa 30–35 car parking spaces. However, the site is unsealed, and after a heavy rainfall accessibility to the car park and availability of car parking spaces can be affected.

On-street parking was observed to be well used at the following locations:

- On Browns Road, north of the informal off-street parking area. This section of Browns Road currently has unsealed road shoulders which are used for parking.
- Groningen Road indented kerb area south of the on-ramp to Southern Outlet which can accommodate approximately eight car parking spaces parked parallel to the kerb.

The on-street parking on Browns Road and Groningen Road is generally unrestricted. However due to the relatively narrow road width (approximately seven–nine metres), on-street parking activities can impact the accessibility of the roads which in some part are designated as heavy vehicle routes.

The Department of State Growth undertook a site observation on 19 February 2020 from 6.30 am to 9.00 am to determine the parking demand and identify the number of park-and-ride activities currently experienced. The counts observed the car parking demand near the bus stop and if the vehicle occupant walks to the bus stop or elsewhere. The findings are summarised in Table 2.2. It was found that a higher proportion of cars parked in the public roads and road related areas were utilised by local workers. Park-and-ride demand makes up approximately 20 per cent of the current existing demand at this location.

Table 2.2 Browns Road current parking demand

Item	Car parking demand
Park-and-Ride	8
Other uses (including on-street parking by local business employees)	28

Source: Department of State Growth site observations on 19 February 2020

2.5 PUBLIC TRANSPORT

Existing bus routes serving the Browns Road/Groningen Road area include routes operating between Hobart and:

- The Kingston and Blackmans Bay area (Metro services 407, 408, 409, 411 and 50)
- The Channel Highway (Metro services 412, 413, 415, 416 and 417)
- The Huon Valley (Tassielink services 710, 712, 714, 716, 718, 719).

There is a combined 10-minute frequency in peak periods, supplemented by some additional Tassielink services from the Huon Valley. The bus routes, service area and frequency during the AM and PM peak periods are detailed in Table 2.3.

Table 2.3 Existing bus service level at the Browns Road Park-and-Ride site

Route	Area/Corridor	AM peak inbound (arr. Hobart 6.00–9.00 am)	PM peak outbound (dep. Hobart 4.00–7.00 pm)
407	Blackmans Bay	7:22, 7:34, 7:58, 8:13, 8:34	4:17, 4:57, 5:22, 5:42, 6:21
408	Blackmans Bay	7:13, 8:46	4:37, 5:37, 6:46
409	Blackmans Bay	7:26, 7:47, 8:18, 8.55	4:29, 5:29, 6:28
411	Kingston Beach	7:54	5:52
412	Channel Highway	6:31, 7:59, 8:18	4:51, 5:26, 6:38
413	Channel Highway	7:52	5:42
415	Chanel Highway	7:27, 8:04	4:33, 6:10
416	Channel Highway	7:08, 8:05	4:38
417	Channel Highway	–	5:12
500	Blackmans Bay	7:29, 7:45, 8:05, 8:25	5:07, 6:07
710, 712, 714, 716, 718, 719 (Tassielink)	Huon Valley	7:22, 7:52, 8:18, 8:22, 8:37	4:26, 5:26, 5:40, 5:57, 6:53
Combined frequency		**~ 10 mins**	**~ 10 to 20 mins**

The scheduled arrival for the AM peak (6.00–9.00 am) and PM peak (4.00–7.00 pm) are depicted in Figure 2.2 and Figure 2.3 respectively.

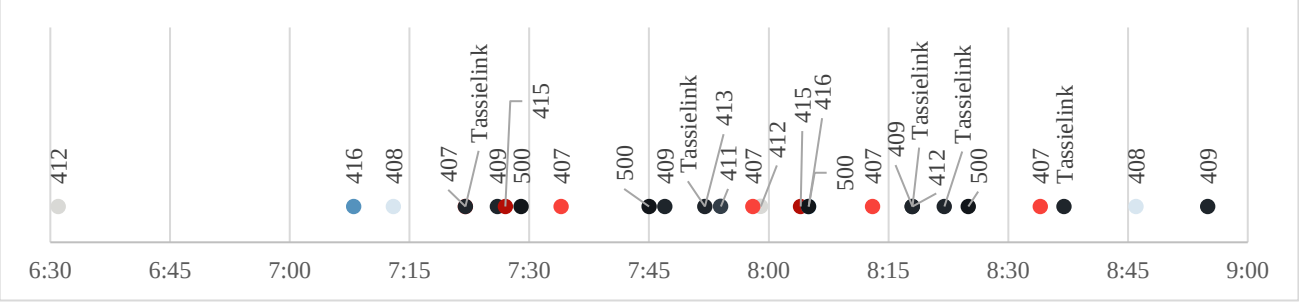


Figure 2.2 AM peak bus arrival at Browns Road

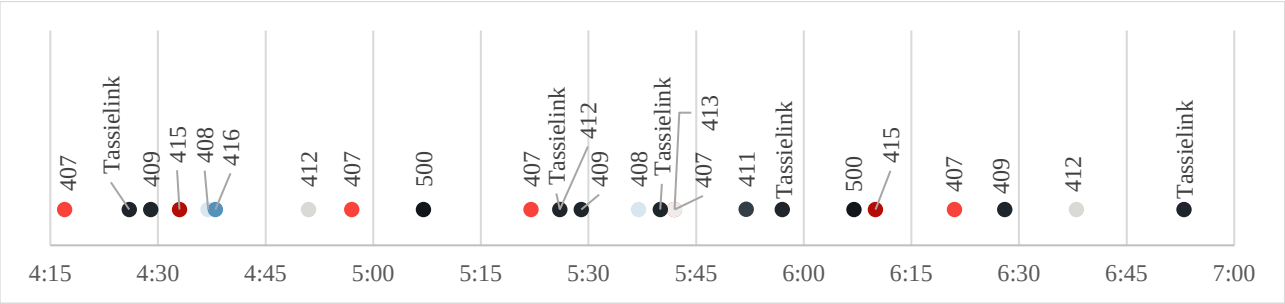


Figure 2.3 PM peak bus arrival at Browns Road

Based on daily average data collected from Metro Green Card (capturing passenger boarding only) in November 2019, the following number of passengers use the existing bus stop on Groningen Road before the Southern Outlet (ID: 3736):

- Twenty six passengers in AM peak (7.30 am–9.30 am)
- Two passengers in PM peak (4.30 pm–6.30 pm)
- Three passengers in Saturday peak (mid-day–2.00 pm).

The Metro Green Card boarding data is consistent with the survey data collected by State Growth on 19 February 2020 from 6.30 am to 9.00 am on the number of passengers boarding during this period. A summary of the observed mode choice by bus passengers is provided in Table 2.4. It shows that a significant number of passengers walk to the bus stop.

Table 2.4 Browns Road current bus passenger demand and methods of travel to bus stop

Methods of travel to bus stop	Demand
Bus passengers park-and-ride	8 (19%)
Bus passengers walked to the site	31 (72%)
Bus passengers kiss-and-ride	4 (9%)

Source: Department of State Growth site observation on 19 February 2020

2.6 ACTIVE TRANSPORT

Currently, footpaths are available at the following locations near the project site:

- Along the western kerbside of Browns Road between Groningen Road and Channel Highway (approximately 1.2–1.5 metres wide)
- Along the southern kerbside of Groningen Road throughout its entire length.

There are currently no footpaths to the bus stop at the Southern Outlet on-ramp or any designated bicycle facilities on-road or at the bus stop.

The pedestrian demand at the area is generally low. However as indicated in Table 2.4, there is currently a high proportion of bus passengers that walk to the bus stop.

3 PROPOSED WORKS

Park-and-Ride facilities are proposed at the vacant lot located north-west of the intersection of Browns Road and Groningen Road. This public land is currently reserved for road-related purposes. Land-ownership details of the lot are further discussed in the Planning and Environmental Report for the site.

The site is currently used for informal off-street parking facilities, which was observed to be primarily used by local workers in the area. The design of the proposed park-and-ride facility is shown in Figure 3.1 overleaf.

The Browns Road Park-and-Ride facility consists of the following features:

- Sixty two car parking spaces including three spaces designed to be compliant to Disability Discrimination Act (DDA) requirements. The design aimed to maximise the number of car parking spaces based on the land available for the project. This total includes:
  - Six parking spaces in the turn-around area near the intersection of Groningen Road and the Southern Outlet entry-ramp. This would be reduced from the existing supply of eight spaces due to the installation of kerb ramp to improve pedestrian access to the bus stop at the on-ramp.
  - Forty-eight off-street spaces in the Browns Road Park-and-Ride, including three designated accessible spaces.
  - Seven kerbside spaces along the western side of Browns Road between the entry and exit.
- Separate entry and exit driveways to Browns Road with a one-way loop (clockwise) circulation of vehicles through the car park:
  - Access to the car park is via the driveway immediately north of Groningen Road and egress from the car park is via the driveway located at the northernmost boundary of the project site.
  - The exit driveway is located away from the intersection of Browns Road and Groningen Road to improve traffic safety by increasing the separation between the exit movement and the intersection turn movements.
- Provision of space for possible future controlled access gates, if required at a later date.
- Installation of a traffic island and marked on-street parking spaces at the turn-around area near the intersection of Groningen Road and the Southern Outlet entry ramp. The area will include an indented kerb area to maintain its function as a park-and-ride facility while providing a refuge for a pedestrian path to the bus stop that has good sight-distance for drivers and pedestrians.
- Provision of kerb-ramps at Groningen Road to provide a pedestrian crossing facility to link the park-and-ride site to the bus stop.
- Installation of associated signs and line-marking to support functionality of the park-and-ride facility.
- Maintain the location of the existing bus stop on the western kerbside of Southern-Outlet on-ramp north of Groningen Road.
- Upgrade the existing bus stop to include a shelter, lighting, firm landing and footpath to ensure its connectivity to the surrounding footpath network and Park-and-Ride facility.

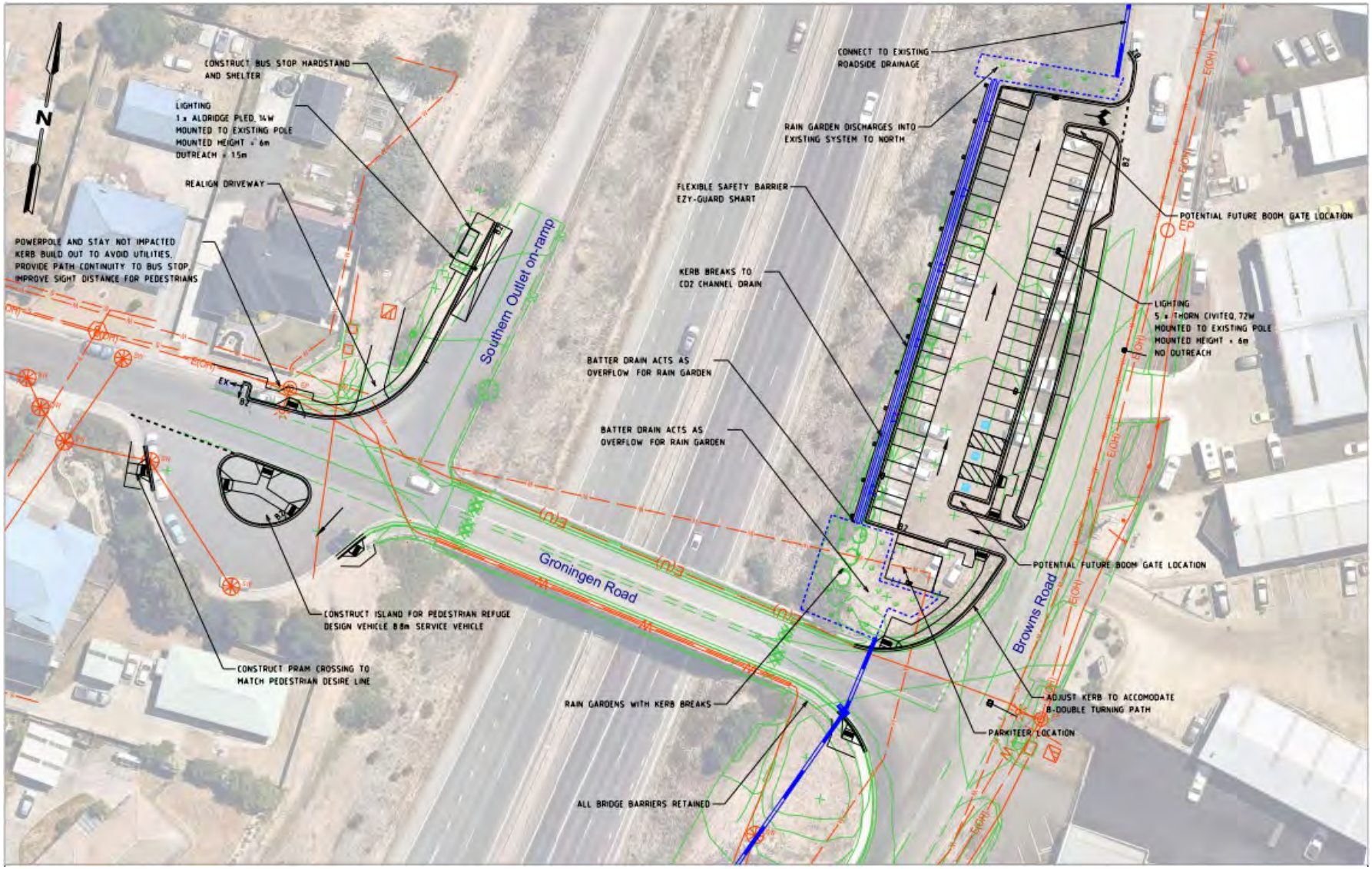


Figure 3.1 Proposed Browns Road park-and-ride layout

4 IMPACT ASSESSMENT

4.1 PARKING IMPACTS

The proposed Browns Road park-and-ride facility will provide 48 off-street car parking spaces (including three DDA compliant spaces), formalise seven on-street parking spaces adjacent to the off-street car park, and formalised six on-street parking availability at the indented turn-around area on Groningen Road (reduced from eight due to the installation of kerb ramps for improved pedestrian access).

The Browns Road park-and-ride services the catchment of Kingston, Kingston Beach and Blackmans Bay.

Currently, it is estimated that there are less than 10 bus customers using the park-and-ride facility at Browns Road. This forms approximately 20 per cent of the current total bus passenger demand at this bus stop.

Future forecast demand at this facility is unknown, however the facility has been designed to supplement the proposed larger-sized park-and-ride facility at Huntingfield, which is more accessible to the catchment areas to the south and surrounding road network.

In its proposed format, it is considered that there will be no adverse impact to parking supply resulting from the project due to the following:

- The proposed car park will effectively add the supply of off-street car parking spaces.
- The current park-and-ride demand at this location is low (<10 cars parked). The proposed car park will provide effectively up to six to seven times the current demand.
- Browns Road facility has been designed to maximise the number of car parking spaces that can be made available within the project boundary.

In addition to the above, it was observed the on-street parking demand currently experienced within the vicinity of the proposed site are generated from local businesses which also have off-street parking in their properties.

4.1.1 MAXIMISING INVESTMENT

The provision of additional car parking spaces however may induce demand from the residents/businesses. To maximise State Growth's investment of the car park for transport customers and further restrict non-park-and-ride related parking activities several actions may need to be considered in the future:

- Monitor the demand of car parking demand in public spaces within the vicinity of Browns Road park-and-ride site with a view to distinguish the demand between park-and-ride customers and non-commuter related parking activities.
- Collaborate with businesses to utilise available off-street parking supply within the private properties. Thus, minimising the reliance on public parking (off-street or on-street).
- Provide formalised park-and-ride signs to indicate the use of the facility as such.
- If required, implement a permit-based system or access-controlled gate operated by scanning the Metro Green Card.

If the access to the parking within the Browns Road park-and-ride facility is restricted, the seven formal spaces on Browns Road would remain available for local employee parking. As described in section 2.4, with 28 non-park-and-ride vehicles, this would result in a net amount of 20 displaced parked vehicles. Alternative locations for these vehicles include parking further north on the side of Browns Road or parking within the property boundary of their respective local business.

4.2 ROAD NETWORK IMPACT

The proposed Browns Road park-and-ride facility will provide a total of 61 car parking spaces (including three DDA compliant spaces). The car park has been designed to satisfy the specification of User Class 1 as per the Australian Standard for Off-Street Parking, AS2890.1:2004, which is suitable to accommodate commuter parking (all-day parking).

The proposed car park design will provide approximately 25–30 car parking spaces additional to the existing and informal facility, thus the project could attract up to an additional 25–30 two-way traffic movements per day. The entry movement for commuters currently occurs from 6.30 am, based on site observations, up to when the car park is fully occupied. This is before the weekday AM peak traffic periods.

Assuming a conservative arrival pattern of 30 vehicles in one hour, this constitutes an arrival of one vehicle every two minutes, which is low and below usual daily fluctuations in traffic. The impact of this increase is also expected to be low and therefore can be readily accommodated in the road network.

Heavy vehicle access in the road network will not be impacted by the Project. The project does not seek to reduce the current road geometry.

4.3 PROPERTY ACCESS

Access to the car park will be via Browns Road and will be provided via a separated ingress/egress driveways. This exceeds the minimum standard specified in the Australian Standard for Off-Street Parking, AS2890.1:2004, which requires commuter car park with <100 car parking spaces to consist of combined access driveway.

The access driveway is proposed immediately north of Groningen Road and the egress driveway is proposed along the northernmost boundary of the site to further minimise conflict to the road network.

The proposed design will not impact accessibility to any of the abutting properties. The access driveway to property number 2 Groningen Road, Kingston will be formalised to clearly identify the location of the access driveway and its interaction with the proposed footpath to the bus stop on Southern Outlet on-ramp.

4.3.1 WAYFINDING

To provide customers with guidance to the park-and-ride site, it is recommended that the wayfinding signs below should be installed at the facility and at the intersections of Browns Road with Groningen Road and the Southern Outlet exit ramp.

Source: AS 1742.11:2016

Figure 4.1 Examples of fixed parking direction signs

The use of wayfinding signs at the car park would also inform other users to the car park of the purpose of the facility to discourage its use for other than a park-and-ride facility.

4.3.2 CONTROLLED ACCESS PROVISION

The design of the car park aims to future proof the provision of controlled access (i.e. boom-gate) at the entry and exit of the car park which consists of 48 spaces including three DDA compliant parking spaces for people with disability.

Based on the number of car parking spaces proposed, Australian Standards for off-street parking facilities (AS2890.1) requires the provision of 3 per cent of queueing space of the total car park capacity. This results in a requirement of 1.4 car length queuing space (i.e. up to two space) at the control point so as not to affect the flow on the frontage road. A queueing space of 10 metres has been provided at the access point to the car park located on Browns Road immediately north of Groningen Road. This queuing space is considered sufficient to minimise the likelihood of queueing from the access gate to Browns Road.

4.4 ACTIVE TRANSPORT ACCESS

It is noted that a large proportion of existing bus customers walk to the bus stop at the Southern-Outlet on-ramp north of Groningen Road. This demand is likely to be maintained or increase with better provision of public transport facility.

Additional footpaths are proposed to connect the park-and-ride facility to the inbound and outbound bus stops on the Southern Outlet on-ramp and Browns Road, respectively. Kerb ramps will also be installed along the footpath network to provide improved accessibility to/from the bus stop.

Overall, the project will have positive impact on the existing active transport infrastructure and connectivity in its nearby road network.

4.5 CUMULATIVE IMPACT

The proposed Kingston Park development, shown below, is ongoing and is envisaged to be completed in 10 years. The Kingston Park development is a triangular site bounded by Huon Highway to the east, Channel Highway to the south and Southern Outlet to the west. The development will comprise of approximately 350 residential dwellings, 50 independent aged care units, mix commercial and retail.

Source: Kingston Park Implementation Report (Kingsborough Council, 2020)

Figure 4.2 Kingston Park proposed site layout

The impact of this development to the Browns Road park-and-ride facilities is minimal as the site is highly accessible to the surrounding highways and is serviced by the bus routes passing through the Brown Road park-and-ride site. The bus routes include 407, 408, 413, 415, 429, 710 and 716 which provides direct services from Kingston Park to Hobart CBD via Channel Highway, Browns Road and the Southern Outlet.

5 CONCLUSIONS

WSP Australia Pty Ltd has assessed the traffic and transport impact of the proposed Browns Road Park-and-Ride facility on behalf of the Department of State Growth. This proposed facility is a part of Sub-Project 3 of the Hobart City Deal Southern Projects.

The Browns Road park-and-ride facility is located at the north-western corner of the intersection of Browns Road and Groningen Road. The area is currently used as an informal off-street parking facility accommodating approximately 30 to 35 car parking spaces in an un-sealed area. The location is well serviced by the existing bus network with services arriving approximately every 10 minutes in the morning peak and every 10–20 minutes in the afternoon peak.

The proposed off-street car park and formalised on-street parking will accommodate 61 car parking spaces, which is an additional 25–30 car parking spaces than the current condition. The facility could generate up to an additional 25–30 traffic movements when fully occupied. This is considered to have a low impact on the operation of the surrounding road network. Additionally, the arrivals of park-and-ride customers typically occur outside of the traffic peak period, as the service forms part of the journey-to-work.

The project overall is considered to have positive benefits to the immediate surroundings of the park-and-ride facility due to the following:

- The proposed car park will provide effectively up to six–seven times the current park-and-ride demand and increase the supply of car parking spaces available within the area.
- The design incorporates improvements to the footpath network to support the current demand of bus customers walking to the bus stop.
- It promotes the use of public transport to further reduce the reliance on private transport on the Southern Outlet.

The provision of additional car parking spaces however may induce demand from the residents/businesses. For the Department of State Growth to maximise its investment for the park-and-ride facility, it is recommended that local businesses be informed of the car park's intended use, the Department undertakes regular monitoring of the car parking demand, and if required, implement the appropriate parking control/restrictions. This could displace up to 20 parked vehicles; however, there is space further north on Browns Road or within the property boundary of local businesses that can accommodate the displaced vehicles.

TASMANIAN DEPARTMENT OF STATE GROWTH

JULY 2020

Hobart City Deal Southern Projects
Sub-Project 3 Huntingfield Park-and-Ride

Traffic Impact Assessment

Question today
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Sub-Project 3 Huntingfield Park-and-Ride
Traffic Impact Assessment

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REV	DATE	DETAILS
A	06/04/2020	Draft
B	13/07/2020	Final – address DSG comments

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Reviewed by:		13/07/2020	
Approved by:		13/07/2020	

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GLOSSARY

AS2890.1:2004	Australian Standard Parking Facilities Part 1: Off-street car parking, AS2890.1:2004
bus priority	A facility to assist buses bypass traffic congestion by providing a separate space or through the use of technology to reduce bus delays, resulting in a more reliable and efficient service
Driveway	That part of the vehicular access on a road lying between the edge of the carriageway and the abutting property boundary
Metro Green Card	Tasmania's smart transport card to allow contactless fare payment system which removes the need for cash transaction when boarding a public transport service
Park-and-ride	Location where people car park their vehicle and then complete their journey using public transport
T3 (transit) lane	A traffic lane restricted to use by vehicles containing more than three people, as well as buses, taxis, hire cars, motorcycles, bicycles and emergency service vehicles

ABBREVIATIONS

B-double	A truck and trailer combination consisting of a prime mover coupled with two trailers
CBD	central business district
DDA	Disability Discrimination Act
DoS	Degree of Saturation
HML	Higher Mass Limit
km/h	kilometres per hour
LoS	Level of Service
RACT	Royal Automobile Club of Tasmania
TGSI	tactile ground surface indicators

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Greater Hobart region's population and employment growth are putting increased pressure on its transport network. The growth of residential areas in Kingborough and the Huon Valley creates commuter pressures on the Southern Corridor (comprising Kingston, the Southern Outlet, and the Macquarie/Davey Street couplet) between Kingston and Hobart.

The Hobart City Deal Southern Projects (the Project) seeks to encourage modal shift in favour of public transport to address congestion and accessibility issues along the Southern Corridor. The Project is comprised of five sub-projects that together provide a comprehensive, multi-faceted approach:

- Sub-project 1: Southern Outlet Transit Lane – Concept design for a northbound transit lane on the Southern Outlet between Olinda Grove and Hobart/Macquarie Street. The lane will operate as a T3 lane for use by buses, private vehicles carrying three or more occupants, taxis, and emergency service vehicles.
- Sub-project 2: Macquarie/Davey Bus Priority – Concept design for bus priority measures on Macquarie and Davey streets that considers how to optimise bus operations while managing impacts.
- Sub-project 3: Kingborough Park-and-Ride – Concept design for park-and-ride facilities at two locations in the Kingborough municipality. The scope of work includes selecting two locations and developing any specific attributes of the facilities in collaboration with stakeholders. At the time of this report, two sites had been chosen – Browns Road, Firthside and Huntingfield bus stop.
- Sub-project 4: Bus service plan for Southern Corridor – Developing a park-and-ride bus service model to support the two Kingborough park-and-ride facilities (sub-project 3), the Southern Outlet transit lane (sub-project 1), and the bus priority measures proposed for Macquarie and Davey streets (sub-project 2). The bus service model will be focused on encouraging modal shift to public transport with the potential for new buses, bus routes, and stops.
- Sub-project 5: Southern Outlet Transit Lane – T3 Enforcement – Concept design and a concept of operations plan for the proposed T3 lane on the Southern Outlet (sub-project 1), including the recommended locations of enforcement devices, as well as technological and legal considerations.

The project objectives are to:

- Achieve modal shift for commuters using the Southern Outlet
- Improve public transport travel reliability along the Southern Outlet corridor
- Encourage multiple occupancy of private vehicles during peak periods of travel
- Improve public transport and passenger experience for Kingborough and Huon residents.

The key anticipated project benefits include:

- Improved public transport passenger experience for Kingborough and Huon residents
- Improved public transport travel reliability along the Southern Outlet and Macquarie/Davey streets
- Improved bus operations along Macquarie and Davey streets
- Better utilisation of transport infrastructure to address congestion
- Increased capacity along the Southern Outlet corridor
- Providing long-term solutions to meet future demand and address road safety related issues.

1.2 SUB-PROJECT 3 – PARK-AND-RIDE

Two park-and-ride locations have been identified for the project:

- **Browns Road park-and-ride**: vacant lot alongside the Southern Outlet located at north-western corner of Browns Road/Groningen Road in Firthside.
- **Huntingfield park-and-ride**: vacant lot located south-west of the Southern Outlet/Huntingfield Avenue/ Channel Highway/Algona Road roundabout in Huntingfield.

This report details the Traffic Impact Assessment of **Huntingfield park-and-ride** site in **Huntingfield**.

1.3 THIS REPORT

This report aims to assess the potential traffic and transport impacts from the Project to support the design of the park-and-ride facilities. Specifically, this report has the following objectives:

- Describes the existing conditions for all modes of transport in the study area including general access vehicles, freight, public transport (bus services and point-to-point transport) and active transport (bicycles and pedestrians).
- Describes the existing environment (road function, classification and operation) in the study area that will be affected by the project at its opening.
- Assesses the impacts of the park-and-ride facilities to the surrounding road network.
- Inform functional requirements for park-and-ride sites (feed design) in terms of accessibility, safety and design.
- Provide mitigation measure advice to manage identified traffic and transport impacts of the project and collaborate with the road designers on the measures adoptable in the design.

The report is structured as follows:

Section 1 Introduction: Describes the context of the Project in terms of how it fits into the state-wide planning proposed by Department of State Growth, locality, objectives and benefits.

Section 2 Existing Conditions: Describes the existing condition of the road network, transport services and abutting developments affected by the proposed Sub-Project 3 park-and-ride facilities.

Section 3 Proposed Works: Describes the proposed park-and-ride facilities in terms of form, functionality and considerations made to achieve high-quality customer outcome.

Section 4 Impact Assessment: Provides an in-depth analysis of the Project's operational impact.

Section 5 Conclusions: Conclusion remarks on the assessment and recommended mitigation measures.

2 EXISTING CONDITIONS

The park-and-ride site is located south-west of the Algona Road/Channel Highway roundabout as shown in Figure 2.1. This section described the surrounding road network and intersections, including current traffic volumes, parking conditions near the site, the existing bus service and the pedestrian and cycle facilities in the area.

2.1 ROAD NETWORK

Source: Land Information System Tasmania (https://maps.thelist.tas.gov.au/listmap/app/list/map, accessed March 2020)

Figure 2.1 Road network surrounding the proposed Huntingfield park-and-ride site

Key elements of the surrounding road network according to the State Road Hierarchy (State Growth, visited in March 2020) are described below:

- **The Southern Outlet** is a Category 1 State Road, which functions as a primary freight and passenger road connecting key land uses and are important to the effective functioning of industry, commerce and the community. The Southern Outlet runs north-south between Channel Highway in Kingston to Macquarie Street in Hobart CBD. Designed as a freeway, Southern Outlet has separated carriageways with two lanes in each direction, on-ramp/off-ramp facilities. It has a posted speed limit of 100 km/h except in built up areas, where the speed limit is 80 km/h. An additional bus lane occupies the breakdown lane in the northbound direction between Reynolds Crescent up to approximately 300 metres south of Davey Street. The road is an approved B-double route throughout and an approved Higher Mass Limit (HML) route north of Huon Highway.
- **Channel Highway** to the south-west of Southern Outlet is Category 3 Road which have a strategic importance to regional and local communities and economies. Channel Highway is an undivided road with one lane in each direction. For most part the speed limit of Channel Highway is 90 km/h. However, this reduces to 80 km/h approaching the built-up area and 60 km/h in the built-up area. The road is an approved B-double route, however HML vehicles are not permitted.
- **Algona Road** is Category 4 Road providing access to Blackmans Bay catchment area. Algona Road is an undivided road with one lane in each direction. For most part the speed limit of Algona Road is 100 km/h. However, this reduces to 80 km/h in the built-up area. The road is not approved for restricted heavy vehicle accesses.
- **Huntingfield Avenue** is a local collector road which provide access to the suburb of Huntingfield. It is an undivided road with one lane in each direction. The posted speed limit of Huntingfield Avenue is 50 km/h. The road is not approved for restricted heavy vehicle accesses.

2.2 INTERSECTION LAYOUT AND OPERATIONS

2.2.1 ASSESSMENT CRITERIA

The performance of intersections is measured by four key parameters, namely the Level of Service (LoS), Degree of Saturation (DoS), average vehicle delay and queue length. These parameters are explained as follows.

2.2.1.1 LEVEL OF SERVICE

Level of Service is a basic performance parameter used to describe the operation of an intersection. Levels of Service range from A (indicating good intersection operation) to F (indicating over-saturated conditions with long delays and queues). At signalised intersections, the LoS criteria are related to average intersection delay (seconds per vehicle). At priority controlled (give-way and stop controlled) and roundabout intersections, the LoS is based on the modelled delay (seconds per vehicle) for the most delayed movement. The Austroads' LoS criteria for intersections which has been referenced from the Highway Capacity Manual (HCM) 2010 guide is shown in Table 2.1.

Table 2.1 Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (d) in seconds (seconds/vehicle)		
	Signalised Intersections	Roundabouts	Unsignalised Intersections
A	d ≤ 10	d ≤ 10	d ≤ 10
B	10 < d ≤ 20	10 < d ≤ 20	10 < d ≤ 15
C	20 < d ≤ 35	20 < d ≤ 35	15 < d ≤ 25
D	35 < d ≤ 55	35 < d ≤ 50	25 < d ≤ 35
E	55 < d ≤ 80	50 < d ≤ 70	35 < d ≤ 50
F	80 < d	70 < d	50 < d

Source: Austroads Guide to Traffic Management Part 3, 2017

2.2.1.2 DEGREE OF SATURATION

The Degree of Saturation is the ratio of demand flow to capacity, and therefore has no unit. As it approaches 1.0, extensive queues and delays could be expected. For a satisfactory situation, DoS should be less than the nominated practical degree of saturation, usually 0.9. The intersection DoS is based on the movement with the highest value.

According to Austroads, in practice, the target degrees of saturation (known as practical degree of saturation) for signal, roundabout and priority-controlled intersections are 0.90, 0.85 and 0.80 respectively.

2.2.1.3 AVERAGE VEHICLE DELAY

This is the difference between interrupted and uninterrupted travel times through the intersection and is measured in seconds per vehicle. At signalised intersections, the average intersection delay is usually reported. At roundabouts and priority-controlled intersections, the average delay for the most delayed movement is usually reported.

2.2.1.4 QUEUE LENGTH

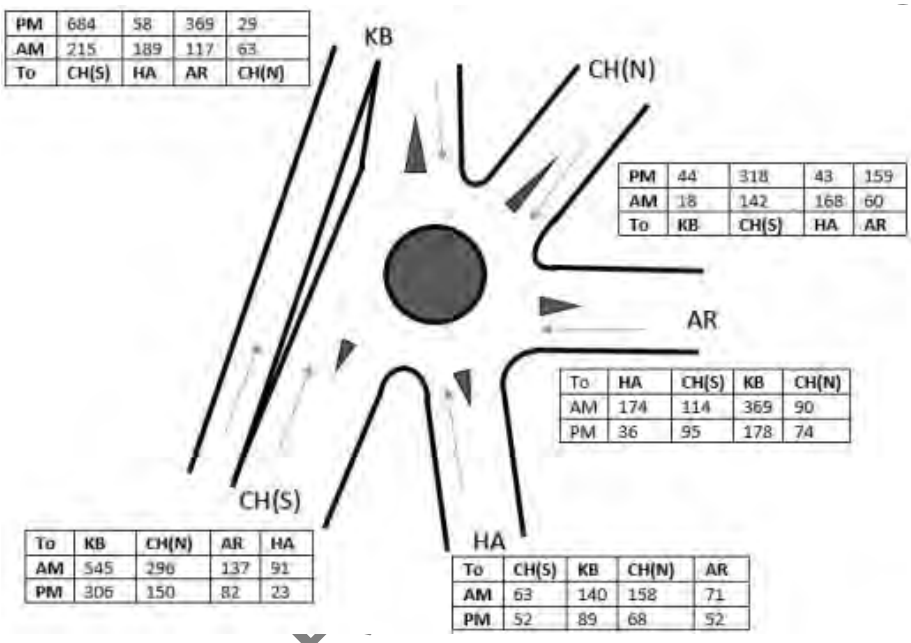
Queue length is measured in metres reflecting the number of vehicles waiting at the stop line and is usually quoted as the 95th percentile back of queue, which is the value below which 95 per cent of all observed queue lengths fall. It reflects the number of vehicles per traffic lane at the start of the green period, when traffic starts moving again after a red signal. The intersection queue length is usually taken from the movement with the longest queue length.

2.2.2 ALGONA ROAD/CHANNEL HIGHWAY ROUNDABOUT

Algona Road/Channel Highway/Southern Outlet/Huntingfield Avenue is a five-way roundabout located north-east of the proposed Huntingfield park-and-ride site and will provide a key access to the park-and-ride facility. As shown in Figure 2.1, the roundabout in some part has two circulating lanes. Each approach to the roundabout consists of two lanes except for the south-west Channel Highway approach. A northbound only bypass lane exists from Channel Highway (south-west approach) to the Southern Outlet (northern approach) to allow vehicles travelling in this direction to continue uninterrupted without entering the roundabout. Dedicated cycle lanes currently exist at all approaches to the roundabout.

A corridor study of Channel Highway was undertaken for the Department of State Growth in December 2019 which assessed current and future performance of the highway, provide improvement and prioritisation of the options for future funding considerations.

As part of the Channel Highway corridor study, an intersection traffic volume count at Algona Road/Channel Highway roundabout was undertaken on 28 February 2019. The AM and PM peak periods at the intersection were identified as 8.00 am–9.00 am and 4.45 pm–5.45 pm, respectively. The turning counts at the roundabout are depicted in Figure 2.2. It was found that the north-south movement between Southern Outlet and Channel Highway south-west experiences significantly higher volumes than other movements.



Source: Channel Highway Corridor Study (State Growth, 2019)

Figure 2.2 Algona Road/Channel Highway roundabout intersection counts

The current layout of the roundabout requires all southbound traffic between the Southern Outlet and Channel Highway (south-west approach) to travel via the roundabout, which was found to have adverse impact on the roundabout performance particularly in the PM peak due to predominantly homebound traffic.

WSP modelled the performance of the intersection in SIDRA, an industry recognised intersection modelling program to determine the Level of Service currently experienced at the intersection. The roundabout model has been developed based on aerial photography, site inspection, and traffic volume input shown in Figure 2.2 obtained from the Channel Highway corridor study. This study also assesses a number of options at the intersection to separate the dominant movement between Channel Highway (south) and Southern Outlet.

The morning and afternoon peak period performance of the intersection are summarised in Table 2.2 below.

Table 2.2 Intersection performance summary from SIDRA – Algona Road/Channel Highway Roundabout

Scenario	Total vehicles	Movement with longest delay	Movement with longest queue length
AM peak	3,220	Right turn from Algona Road Degree of Saturation: 0.40 **Average Delay: 20.9 sec/veh (LoS C)** 95th Percentile Queue: 22.8 m	Left turn from Algona Road Degree of Saturation: 0.40 Average Delay: 9.2 sec/veh (LoS A) **95th Percentile Queue: 27.8 m**
PM peak	2,909	Right turn from Algona Road Degree of Saturation: 0.31 **Average Delay: 27.4 sec/veh (LoS C)** 95th Percentile Queue: 18.8 m	Southern Outlet (all movements) Degree of Saturation: 0.50 Average Delay: 13.6 sec/veh (LoS B) **95th Percentile Queue: 31.4 m**

As shown in the summary table above, the longest delay is experienced for the right turn movement exiting Algona Road (east) approach, with an average delay of 20.9 seconds per vehicle (LoS C) and 27.4 seconds per vehicle (LoS C) observed in the AM and PM peak respectively. The movement with the longest queue are observed as the left turn from Algona Road (27.8 metres) and Southern Outlet (31.4 metres) for the respective AM and PM peak periods.

Although there is generally less traffic in the PM peak, longer delays are observed during this period on the Algona Road (east) approach as the peak southbound traffic from the Southern Outlet to Channel Highway (south-west approach) has to travel via the roundabout. This reduces the available gaps in traffic for those entering from Algona Road (east) approach. Results of the intersection modelling detailing the performance for each movement are included in Appendix B1.

2.2.3 HUNTINGFIELD AVENUE/NORTHERN ACCESS ROAD

Huntingfield Avenue/Northern Access Road is a four-way non-signalised intersection, located directly south of the Algona Road/Channel Highway roundabout.

- Huntingfield Avenue is the major road travelling in the north-south direction. The road has two lanes in the northbound direction and one lane in the southbound direction.
- The western approach is the exit of the bus facility and the proposed Huntingfield park-and-ride site. It is a one-lane, left-turn only exit road that gives way to northbound movement along Huntingfield Avenue.
- The eastern approach is an entry/exit to the car park of a bulky goods development. All movements are permitted into and out of the access driveway.

The performance of the intersection was modelled in SIDRA. The morning and afternoon peak period performance of the intersection are summarised in Table 2.3 below. Refer to Appendix A1 for the traffic volumes during the AM peak and Appendix A2 for the traffic volumes during the PM peak.

Table 2.3 SIDRA Intersection performance summary – Huntingfield Avenue/Northern Access

SCENARIO	TOTAL VEHICLES	MOVEMENT WITH LONGEST DELAY	MOVEMENT WITH LONGEST QUEUE LENGTH
AM peak	1,081	Right turn out of bulky goods development Degree of Saturation: 0.01 **Average Delay: 18.5 sec/veh (LoS C)** 95th Percentile Queue: 0 m	Left turn from Park-and-Ride facility Degree of Saturation: <0.01 Average Delay: 1.5 sec/veh (LoS A) **95th Percentile Queue: 0.2 m**
PM peak	428	Left turn Huntingfield Avenue North Degree of Saturation: 0.09 **Average Delay: 5.4 sec/veh (LoS A)** 95th Percentile Queue: 0 m	Left turn from Park-and-Ride facility Degree of Saturation: <0.01 Average Delay: 0.4 sec/veh (LoS A) **95th Percentile Queue: 0.6 m**

The intersection operates satisfactorily in the AM and PM peak with minimal queueing observed (average of less than one vehicle length). In the morning peak, the longest delay is experienced for traffic turning right out of the bulky goods development access, with an average delay of 18.5 seconds per vehicle (LOS C). In the PM peak, the longest delay is experienced for traffic turning left from Huntingfield Avenue (north approach) with an average delay of 5.4 seconds per vehicle (LoS A). Results of the intersection modelling detailing the performance for each movement are included in Appendix B2.

2.2.4 HUNTINGFIELD AVENUE/SOUTHERN ACCESS ROAD

Huntingfield Avenue/Southern Access Road is an unsignalised T-intersection currently used as an ingress into the Huntingfield bus stop and as an access road to adjoining properties.

- Huntingfield Avenue travels in the north-south direction. At the intersection, the road diverges into two lanes in the northbound direction and has one lane in the southbound direction.
- The west leg is the Southern Access to the existing bus facility, on-street parking spaces and the proposed Huntingfield park-and-ride site. It has one lane in each direction. All movements are permitted into and out of the Southern Access road.

The performance of the intersection was modelled in SIDRA. The morning and afternoon peak period performance of the intersection are summarised in Table 2.4 below. Refer to Appendix A1 for the traffic volumes during the AM peak and Appendix A2 for the traffic volumes during the PM peak.

Table 2.4 SIDRA Intersection performance summary – Huntingfield Avenue/Southern Access

SCENARIO	TOTAL VEHICLES	MOVEMENT WITH LONGEST DELAY	MOVEMENT WITH LONGEST QUEUE LENGTH
AM peak	1,028	Right turn out of Huntingfield bus stop access Degree of Saturation: <0.01 **Average Delay: 6.9 sec/veh (LoS A)** 95th Percentile Queue: <0 m	Right turn on Huntingfield Avenue (north) Degree of Saturation: 0.32 Average Delay: 6.4 sec/veh (LoS A) **95th Percentile Queue: 3.8 m**
PM peak	411	Left turn from Huntingfield Avenue (south) Degree of Saturation: 0.06 **Average Delay: 6.5 sec/veh (LoS A)** 95th Percentile Queue: 0 m	Right turn on Huntingfield Avenue (north) Degree of Saturation: 0.1 Average Delay: 5.8 sec/veh (LoS A) **95th Percentile Queue: 0.9 m**

As shown above, the intersection currently operates satisfactorily at LoS A with minimal queueing in both peak periods. Results of the intersection modelling detailing the performance for each movement are included in Appendix B3.

2.3 TRAFFIC VOLUMES

Table 2.5 below details the traffic volumes, heavy vehicle percentage, and the annual growth on Southern Outlet, Huon Highway and Channel Highway, which were obtained from RoadTas traffic statistics website. The Southern Outlet and Channel Highway (south of Algona Road) have similar volumes, as do the Channel Highway north of Algona Road and Algona Road. However, the other two approaches also have high growth, indicative of a growing area and indicating that delays on these approaches could increase in the future.

Table 2.5 Traffic volume data

Road name and location	Survey period	Average Daily Traffic (vehicles per day)	Heavy vehicle %	Annual Growth (since year)
Southern Outlet, Kingston North of Algona Road	May 2019	Weekday: 18,357 Saturday: 14,028	7.9%	1.0% (2017)
Channel Highway, Huntingfield South of Algona Road	May 2019	Weekday: 17,828 Saturday: 14,787	7.9%	1.4% (2016)
Channel Highway, Kingston North of Algona Road	May 2019	Weekday: 11,804 Saturday: 9,937	6.0%	3.5% (2012)
Algona Road, Huntingfield East of Channel Highway	October 2018	Weekday: 11,847 Saturday: 9,189	5.5%	3.1% (2013)

Source: RoadTas Traffic Stats (http://geocounts.com/traffic/au/stategrowth, viewed in 2020)

2.4 PARKING

The proposed park-and-ride site is currently used as an informal parking area. The access roads are sealed however, the vacant area north of the road that is also used for parking is unsealed. After heavy rainfall, accessibility to this part of the car park can be affected. The total number of car parking spaces currently able to be accommodated on-site is not specified as the area is unsealed with no line marking to designate/mark out the parking spaces.

The Department of State Growth undertook a site observation on 13 February 2020 from 6.30 am to approximately 8.30 am to determine the parking demand on-site and identify the number of park-and-ride activities currently experienced. The parking demand at the Huntingfield bus stop access road is shown in Figure 2.3.

Figure 2.3 On-street parking demand along the southern access road at Huntingfield bus stop

The counts observed the car parking demand near the bus stop and if the vehicle occupant walks to the bus stop or elsewhere. The findings are summarised in Table 2.6. It was found that a higher proportion of cars parked in the public roads and road related areas were utilised by workers at local businesses. Park-and-ride demand make up approximately 12 per cent of the current demand at this location.

Table 2.6 Huntingfield bus stop current parking demand

Item	Car parking demand
Park-and-ride	5
Other uses (including on-street parking by businesses)	37

Source: Department of State Growth site observation on 13 February 2020

2.5 PUBLIC TRANSPORT

Existing bus routes serving the Huntingfield site include the 412, 413, 415, 416 and 417 which operate to various points along the Channel Highway corridor. The Huntingfield Terminus has a combined 20-minute frequency in peak periods. The bus routes, service area and frequency during the AM and PM peak periods are detailed in Table 2.7.

Table 2.7 Existing bus service level at the Huntingfield park-and-ride site

Route	Area/Corridor	AM peak inbound (Arr. Hobart 6.00–9.00 am)	PM peak outbound (Dep. Hobart 4.00–7.00 pm)
412	Channel Highway	6:31, 7:59, 8:18	4:51, 5:26, 6:38
413	Channel Highway	7:52	5:42
415	Chanel Highway	7:27, 8:04	4:33, 6:10
416	Channel Highway	7:08, 8:05	4:38
417	Channel Highway	–	5:12
Combined frequency		~ 20 to 30 mins	~ 20 mins

The scheduled arrival for the AM peak (6.00-9.00am) and PM peak (4.00-7.00pm) are depicted in Figure 2.4 and Figure 2.5 respectively.

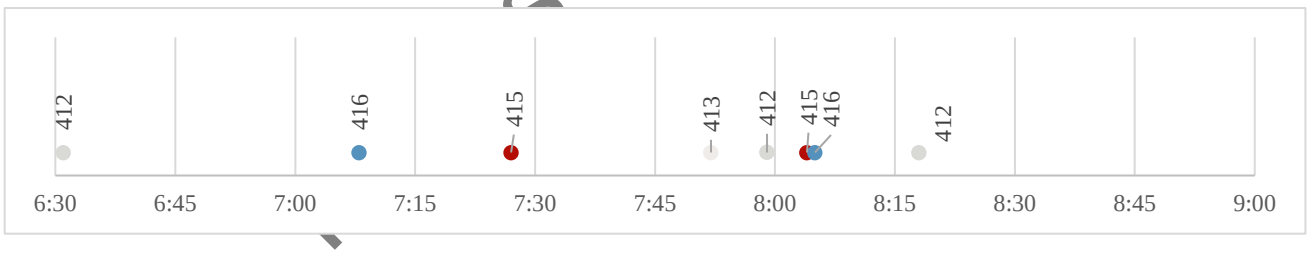


Figure 2.4 AM peak bus arrival at Huntingfield park-and-ride site

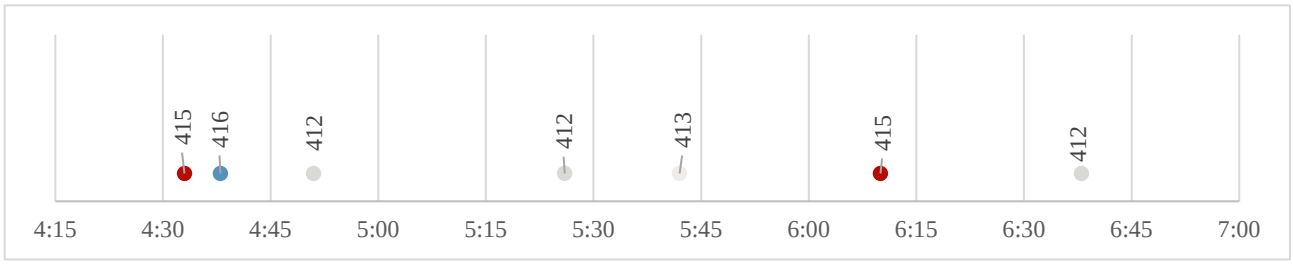


Figure 2.5 PM peak bus arrival at Huntingfield park-and-ride site

Based on daily average data collected from Metro Green Card (capturing passenger boarding only) in November 2019, the following number of passengers use the existing bus stop on Huntingfield Avenue bus station (ID: 4379):

- Thirteen passengers in AM peak (7.30 am–9.30 am)
- Three passengers in PM peak (4.30 pm–6.30 pm)
- One passenger in Saturday peak (mid-day–2.00 pm).

The Metro Green Card boarding data is generally consistent with the survey data collected by Department of State Growth on 13 February 2020 from 6.30 am to 8.30 am on the number of passengers boarding during this period. Although the total number varies, the recorded demand is generally observed to be low. The summary of the site visit observing the mode choice by bus passengers are detailed in Table 2.8 which shows a significant proportion of passengers walking to the bus stop.

Table 2.8 Huntingfield current bus passenger demand and methods of travel to bus stop

Methods of travel to bus stop	Demand
Bus passengers park-and-ride	5
Bus passengers walked to the site	22
Bus passengers kiss-and-ride	5

Source: Department of State Growth site observation on 13 February 2020

The existing bus stop in Huntingfield currently consists of two bus shelters, bus flag, timetable, firm landing with tactile ground surface indicators (TGSI) and a bicycle storage facility. The existing bus stop is shown in Figure 2.6.

Figure 2.6 Existing bus shelters at Huntingfield bus stop

2.6 ACTIVE TRANSPORT

Currently, active transport facilities are available at the following locations near the project site:

- Continuous footpath on the eastern kerbside along the entire length of Huntingfield Avenue between Nautilus Grove and Algona Road. The footpath measures approximately 1.2 to 1.5 metres wide and provides connection to the local bulky goods retail area, Institute of Mine Seismology office, residential developments and the St Aloysius Catholic College.
- Shared path along Channel Highway north of Algona Road to connect to the Huntingfield/Kingston industrial and retail area and to the Huntingfield Avenue bus stop area.
- A mix of footpath and trails along Algona Road which provides access to Kingston and Blackmans Bay residential area east of the Algona Road/Channel Highway roundabout.
- A pedestrian refuge on Huntingfield Avenue located immediately south of the access road into the Huntingfield Avenue bus stop area.
- Footpath along the southern access road to the Huntingfield Avenue bus stop area and footpath in the median island located between the southern and northern access road to connect to the existing bus stop location.
- A bicycle storage box shown in Figure 2.7 has been installed at the Huntingfield bus stop to provide a secure place to park for cyclists.

Figure 2.7 Bicycle storage area in Huntingfield bus stop

The pedestrian demand at the area is generally low, however as indicated in Table 2.8 above, there is currently a high proportion of bus passengers that walked to the bus stop.

3 PROPOSED WORKS

A park-and-ride facility is proposed on the vacant lot located south of Algona Road/Channel Highway roundabout, including the existing bus access road and bus stops. This public land is currently reserved for road related purposes. Land-ownership details of the lot are further discussed in the Planning and Environmental Report for the site.

The site is currently used for informal on and off-street parking. The design of the proposed park-and-ride facility is shown in Figure 3.1.

The Huntingfield park-and-ride facility consists of the following features:

- Generally maintain the location of the existing bus stop on the northern access road of the Huntingfield Avenue bus stop area. The operation of the access loop road (i.e. two way on the southern access road and exit only on the northern access road) is to remain. However, a right turn out of the northern access road is to be provided to improve the accessibility of the proposed park-and-ride facility.
- Upgrade the facilities at the bus stop to still include a shelter, lighting and firm landing, amenity building as well as a footpath with improved connectivity to the surrounding footpath network and park-and-ride facility.
- A kiss-and-ride facility to support the continued demand and provide a suitable direct and convenient connection to the proposed bus stop.
- Provision for a sheltered and secure bicycle parking facility.
- One hundred and eighty off-street car parking spaces including five spaces compliant to Disability Discrimination Act (DDA) requirements. The car park is separated into two locations as follows:
  - Northern car park: 122 car parking spaces including five DDA compliant spaces
  - Southern car park: 58 spaces.

  The design aimed to maximise the number of car parking spaces based on the land available for the project while not significantly disturbing the area and existing infrastructure services to support the operation of Algona Road/ Channel Highway roundabout.
- Adequate travel lane width for turning buses.
- Provision of landscaping and water sensitive urban design within the facility
- Restricting the existing on-street parking along the southern kerbside of the south access road.
- Separate entry and exit driveways of the car park to the access roads suitably designed to provide future access control gate if required.
- Installation of associated signs, wayfinding and line-marking to support functionality of the park-and-ride facility.

The design of the car park can be constructed in stages if required to maintain the operation of bus services through the Huntingfield bus stop facility. Building the southern car park first will ensure off-street car parking spaces will be available to accommodate the current use.

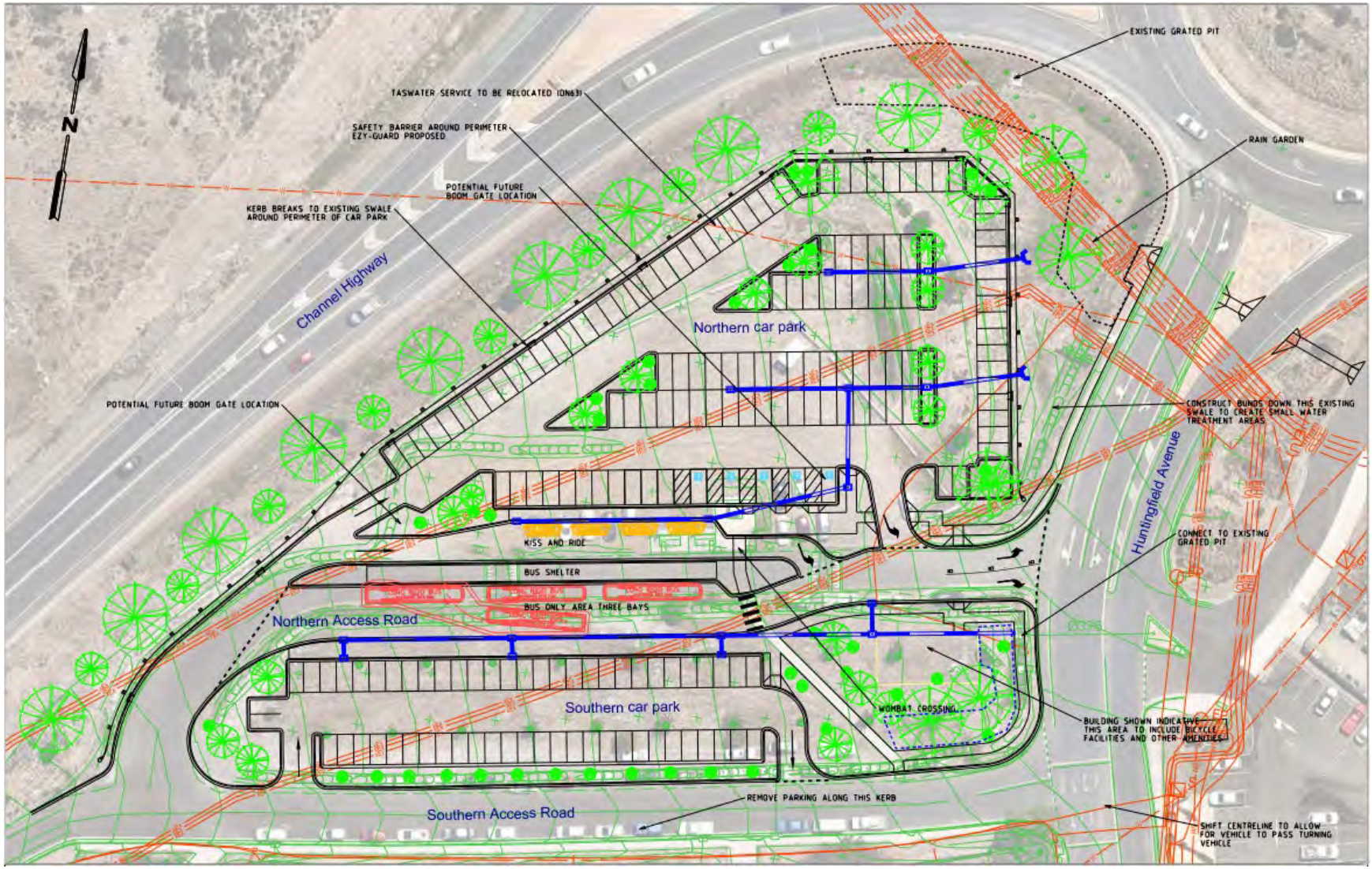


Figure 3.1 Proposed Huntingfield park-and-ride facilities

4 IMPACT ASSESSMENT

4.1 PARKING IMPACTS

The proposed Huntingfield park-and-ride facility will provide 180 off-street car parking spaces (including five DDA compliant spaces), replacing the existing informal parking. The Huntingfield park-and-ride services the catchment of Margate, Electrona, Snug, Kettering, Woodbridge, Middleton and Gordon.

Currently there is in the order of magnitude of five bus customers using the park-and-ride facility at Huntingfield. This forms approximately 15 per cent of the current total bus passenger demand at this bus stop.

The Huntingfield park-and-ride facility is considered to have a potentially positive impact to the parking supply in the area due to the following:

- The proposed car park will effectively add the supply of off-street car parking spaces. As such, the park-and-ride parking demand can be provided in addition to the current demand on-site. However, the continuation of parking for non-park-and-ride related activities may need to be reconsidered subject to future uptake of park-and-ride program with applicable mitigation actions discussed in section 4.1.1.
- The Huntingfield facility has been designed to maximise the number of car parking spaces that can be made available within the project boundary.
- The facility has been designed with construction staging consideration to minimise its impact during construction.

In addition to the above, it was observed the on-street parking demand currently experienced within the vicinity of the proposed site are generated from local businesses which also have off-street parking in their properties.

4.1.1 MAXIMISING INVESTMENT

The provision of additional car parking spaces may induce demand from the residents/businesses. To maximise State Growth's investment of the car park to transport customers and further restrict non-park-and-ride related parking activities several actions may need to be considered in the future:

- Monitor the demand of car parking demand in public spaces within the vicinity of Huntingfield park-and-ride site with a view to distinguish the demand between park-and-ride customers and non-commuter related parking activities.
- Collaborate with businesses to utilise available off-street parking supply within the private properties. Thus, minimising the reliance on public parking (off-street or on-street).
- Provide formalised park-and-ride signs to indicate the use of the facility as such.
- Where required, implement a permit-based system or access controlled gate operated by scanning the Metro Green Card.

If the access to the parking within Huntingfield park-and-ride facility is restricted, the displacement of 42 non-park-and-ride vehicles may be accommodated in the southern car park area, which will provide 58 car parking spaces, or on the southern side of the access road.

4.2 NETWORK AND INTERSECTION PERFORMANCE

4.2.1 TRAFFIC GENERATION

The proposed Huntingfield park-and-ride facility will provide 180 car parking spaces (including five DDA compliant spaces). The car park has been designed to satisfy the specification of User Class 1 as per AS2890.1:2004, which is suitable to accommodate commuter parking (all-day parking).

The facility will include a location for kiss-and-ride, with a capacity for four vehicles at a time. For this assessment, it has been assumed that the demand of kiss-and-ride will triple in the future (i.e. increase up to 15 kiss-and-ride activities and 30 combined traffic movements).

The proposed car park design will provide approximately 140 car parking spaces in excess of the existing informal facility. The additional car parking spaces could attract up to 140 traffic movements from the time when commuters will start arriving (currently observed at 6.30 am and outside of the traffic peak periods) up to when the car park is fully occupied.

A conservative scenario of all of the total park-and-ride (140 car movements) and all of kiss-and-ride (30 car movements) during the traffic peak period was quantitatively assessed. This scenario is considered conservative as arrival and departure of park-and-ride customers typically spread and disperse across a few hours respectively. In addition, most of the traffic movements associated with a park-and-ride facility typically occurs outside of the road network peak, as parking is on a first-come first served basis and because the park-and-ride component forms the first part of the journey-to-work.

The level of service at the roundabout of Algona Road/Channel Highway and at the intersections of Huntingfield bus stop loop road with Huntingfield Avenue are summarised in the sections below.

4.2.2 ALGONA ROAD/CHANNEL HIGHWAY ROUNDABOUT

The layout of the Algona Road/Channel Highway Roundabout intersection will remain the same with the proposed Huntingfield park-and-ride facility, as described in section 2.2.2 however, the traffic demand will increase due to the proposed facility as described in section 4.2.1 above. In terms of traffic distribution, it is assumed that the following apply, corresponding to the current demand at this intersection:

- Channel Highway (north-east) – 15 per cent
- Algona Road (east) – 35 per cent
- Channel Highway (south-west) – 50 per cent
- Southern Outlet – zero per cent.

For the purpose of a conservative assessment, the additional traffic using the park-and-ride facility has been added on top of the existing traffic volumes. No adjustment to the background traffic was made to consider growth in the corridor or mode-shift adjustments. The performance of this intersection taking into account future growth in the region has been further analysed in the Channel Highway corridor study. The corridor study also assesses a number of options at the intersection to separate the dominant movement between Channel Highway (south) and Southern Outlet.

The performance of the intersection was modelled in SIDRA and are summarised Table 4.1 below. Refer to Appendix A3 for the traffic volumes during the AM peak and Appendix A4 for the traffic volumes during the PM peak.

Table 4.1 SIDRA Intersection performance summary – Algona Road/Channel Highway

SCENARIO	TOTAL VEHICLES	MOVEMENT WITH LONGEST DELAY	MOVEMENT WITH LONGEST QUEUE LENGTH
AM peak	3,394	Right turn from Algona Road Degree of Saturation: 0.46 **Average Delay: 23.9 sec/veh (LoS C)** 95th Percentile Queue: 30.7 m	Right turn from Algona Road to Southern Outlet Degree of Saturation: 0.46 Average Delay: 20.9 sec/veh (LoS C) **95th Percentile Queue: 34.6 m**
PM peak	3,083	Right turn from Algona Road Degree of Saturation: 0.34 **Average Delay: 28.4 sec/veh (LoS C)** 95th Percentile Queue: 20.8 m	Southern Outlet (all movements) Degree of Saturation: 0.53 Average Delay: 14.2 sec/veh (LoS B) **95th Percentile Queue: 35.7 m**

As shown in the summary table above, the longest delay in the AM peak is experienced for the right turn from Algona Road with average delay of 23.9 seconds (LoS C). This is an increase of 3.0 seconds from the existing conditions, reflecting a minor impact to the performance of the intersection. Similarly, this movement is the most delayed performing in the PM peak, with an average delay of 28.4 seconds per vehicle (LoS C), an increase of 1.0 second from existing conditions. The increase in queue length is also minimal, with approximate increase of one car length at location with the 95 percentile queue length.

The increase in queue length and average delay due to the additional traffic generated by the park-and-ride facility is minimal, with the Level of Service at the intersection maintained. The impact of the park-and-ride facility on the intersection operation is therefore considered to be minimal in both the AM and PM peak periods. Results of the intersection modelling detailing the performance for each movement are included in Appendix C1.

4.2.3 HUNTINGFIELD AVENUE/NORTHERN ACCESS ROAD

The Huntingfield Avenue/Northern Access Road intersection layout will remain the same, as described in section 2.2.3, after the addition of the proposed Huntingfield park-and-ride facility, except for the introduction of a right turn lane on the west leg at the Northern Access Road.

The performance of the intersection with the park-and-ride traffic was modelled in SIDRA. The performance of the intersection is detailed in Table 4.2 below. Refer to Appendix A3 for the traffic volumes during the AM peak and Appendix A4 for the traffic volumes during the PM peak.

Table 4.2 SIDRA Intersection performance summary– Huntingfield Avenue/Northern Access

SCENARIO	TOTAL VEHICLES	MOVEMENT WITH LONGEST DELAY	MOVEMENT WITH LONGEST QUEUE LENGTH
AM peak	1,255	Right turn out of park-and-ride site Degree of Saturation: 0.06 **Average Delay: 32.6 sec/veh (LoS D)** 95th Percentile Queue: 1.2 m	Right turn out of park-and-ride site Degree of Saturation: 0.06 Average Delay: 32.6 sec/veh (LoS D) **95th Percentile Queue: 1.2 m**
PM peak	631	Right turn out of park-and-ride site Degree of Saturation: 0.05 **Average Delay: 9.7 sec/veh (LoS A)** 95th Percentile Queue: 1.3 m	Left turn out of park-and-ride site Degree of Saturation: 0.1 Average Delay: 5.6 sec/veh (LoS A) **95th Percentile Queue: 3 m**

As shown in the summary table above, the longest delay is experienced for traffic exiting out of the park-and-ride facility, with an average delay of 32.6 seconds per vehicle (LoS D) in the AM peak and 9.7 seconds per vehicle (LoS A) in the PM peak. However, it is noted that the number of vehicles making this movement is small. The intersection is considered to operate satisfactorily in both peak periods with minimal queueing observed for all approaches.

In comparison to the existing condition, this is approximately an 80 per cent increase from the longest delay reported at the intersection. In the AM peak, 18.5 seconds per vehicle (LoS C) was found for the right turn movement out of the bulky goods development. In the PM peak, 5.4 seconds per vehicle (LoS A) were found for the left turn movement into the bulky goods development. Results of the intersection modelling detailing the performance for each movement are included in Appendix C2.

4.2.4 HUNTINGFIELD AVENUE/SOUTHERN ACCESS ROAD

The Huntingfield Avenue/Southern Access Road intersection will retain the existing layout, as described in section 2.2.4.

The performance of the intersection with the park-and-ride traffic was modelled in SIDRA. The performance of the intersection is detailed in Table 4.3 below. Refer to Appendix A3 for the traffic volumes during the AM peak and Appendix A4 for the traffic volumes during the PM peak.

Table 4.3 SIDRA Intersection performance summary – Huntingfield Avenue/Southern Access

Scenario	Total vehicles	Movement with longest delay	Movement with longest queue length
AM peak	1,205	Right turn out of park-and-ride site Degree of Saturation: 0.004 **Average Delay: 10 sec/veh (LoS A)** 95th Percentile Queue: 0.1 m	Right turn on Huntingfield Avenue (north) Degree of Saturation: 0.46 Average Delay: 6.7 sec/veh (LoS A) **95th Percentile Queue: 23.7 m**
PM peak	490	Right turn out of park-and-ride site Degree of Saturation: 0.05 **Average Delay: 6.6 sec/veh (LoS A)** 95th Percentile Queue: 1.4 m	Right turn on Huntingfield Avenue (north) Degree of Saturation: 0.12 Average Delay: 4.4 sec/veh (LoS A) **95th Percentile Queue: 3.3 m**

As shown above, the intersection will continue to operate satisfactorily at LoS A with minimal queueing in any of the approaches. In comparison the existing condition, this is an increase of approximately three seconds delay in the morning and an increase of less than one second delay in the afternoon. The reported delay is applicable to the worst movement at the intersection.

While it is not likely to be an issue in the future, there is merit in widening the southbound lane on Huntingfield Avenue (through linemarking works only) which would allow adequate room for vehicles travelling southbound on Huntingfield Avenue to overtake any vehicles turning right into the proposed park-and-ride facility. This would impact the on-street provision of bicycle lane, requiring the northbound bicycle lane to be removed from the section between the northern and southern access road to the park-and-ride facility. The right turn movement into the park-and-ride facility has been assessed to operate at a satisfactory LoS A with an average of 6.7 seconds per vehicle delay.

Given the simplicity of the work required and the minor impact to the performance of the intersection, the works to widen the southbound lane as described above should be considered subject to monitoring its future operation.

Results of the intersection modelling detailing the performance for each movement are included in Appendix C3.

4.3 IMPACT TO HEAVY VEHICLE NETWORK

Heavy vehicle access in the road network will not be impacted by the Project. The project does not seek to alter the current road geometry of the roundabout or Huntingfield Avenue.

4.4 PROPERTY ACCESS

Access to the car park will be via Huntingfield Avenue access road. Both the northern and southern car park area will have separated ingress/egress driveways. This exceeds the minimum standard specified in Australian Standard for Off-Street Parking, AS2890.1:2004, which requires commuter car park with <300 car parking spaces to consist of a 6.0 metres–9.0 metres combined access driveway.

The access and egress driveways of the northern car park are proposed off the northern access road. The access and egress driveways of the southern car park are proposed off the southern access road. Both car parks are not directly accessible to Huntingfield Avenue.

The proposed design will not impact accessibility to any of the adjacent properties or those that currently access the southern access road.

4.4.1 WAYFINDING

To provide customers with guidance to the park-and-ride site, it is recommended that the wayfinding signs below should be installed at the facility and at the intersections of Algona Road/Channel Highway roundabout and at the entry to the park-and-ride facility.

Source: AS 1742.11:2016

Figure 4.1 Examples of fixed parking direction signs

The use of wayfinding signs at the car park would also inform other users to the car park of the purpose of the facility to discourage its use for other than a park-and-ride facility.

4.4.2 CONTROLLED ACCESS PROVISION

The design of the car park aims to future proof the provision of controlled access (i.e. boom-gate) at the entry and exit of the northern car park which consists of 122 spaces including five DDA compliant parking spaces for people with disability.

Based on the number of car parking spaces proposed, Australian Standards for off-street parking facilities (AS2890.1) requires the provision of 3 per cent of queueing space capacity for the first 100 cars and 2 per cent of queueing space capacity for the second 100 cars (i.e. 3 per cent*100 + 2 per cent*22). This results in a requirement up to four queueing space at the control point so as not to affect the flow on the frontage road. This has been provided in the design with the entry point of the northern car park located away from Huntingfield Avenue.

4.5 BUS STOP ACCESS

Bus access to the facility will be largely unchanged from the current layout, except for the introduction of a right turn lane out of the northern access road to Huntingfield Avenue to allow some bus routes to continue its services to St Aloysius. As per the current arrangement, access to the bus stop will be via the southern access road. Buses will use the loop internal access road to the bus stop located along the norther kerbside of the northern access road, to which it can continue its journey turning either left or right on Huntingfield Avenue.

4.6 ACTIVE TRANSPORT ACCESS

Additional footpaths are proposed internally within the park-and-ride facility to provide adequate connectivity to the bus stop, and within the immediate surround to the facility including improved connectivity to the Algona Road/Huntingfield Avenue roundabout. Kerb ramps will also be installed at the designated crossing points as appropriate.

It is noted that a large proportion of existing bus customers walk to the Huntingfield bus stop area. This demand is likely to be maintained or increased with better provision of public transport facility and growth in jobs and population in nearby developments. The design of improved pedestrian access at the facility aims to address this.

In terms of pedestrian crossing facilities in the internal access roads, the volume of pedestrians and traffic are not expected to warrant the introduction of a pedestrian crossing on the southern access road. A crossing is proposed across the bus road to encourage safe pedestrian behaviour in an area where pedestrian movements are likely to be concentrated.

Overall, the project will have positive impact on the existing active transport infrastructure and connectivity in its nearby road network.

4.7 CUMULATIVE IMPACT

4.7.1 KINGSTON PARK DEVELOPMENT

The proposed Kingston Park development shown in Figure 4.2 below is ongoing and is envisaged to be completed in 2030. The Kingston Park development is a triangular site bounded by Huon Highway to the east, Channel Highway to the south and Southern Outlet to the west. The development will comprise of approximately 350 residential dwellings, 50 independent aged care units, mix commercial and retail.

Source: Kingston Park Implementation Report (Kingsborough Council, 2020)

Figure 4.2 Kingston Park proposed site layout

The impact of this development to the Huntingfield park-and-ride facilities is minimal as the site is highly accessible to the surrounding highways and is serviced by the bus routes passing through the Huntingfield park-and-ride site. The bus routes include 407, 408, 413, 415, 429, 710 and 716 which provides direct services from Kingston Park to Hobart CBD via Channel Highway, Browns Road and the Southern Outlet.

4.7.2 HUNTINGFIELD STAGE 2 PROJECT

A development south of Huntingfield is in planning consideration as an outcome of the Tasmania's Affordable Housing Action Plan 2019-2023 (Department of Communities, 2019). This project has been considered in detail as part of the Channel Highway corridor study, which analyse the regional growth impact to the road network in Huntingfield, with particular attention to the Channel Highway.

The Huntingfield Stage 2 Project is envisaged to consist of 51 low density, 145 medium density, 118 high density and 156 townhouse lots.

The development is estimated to generate 333 peak hour trips with primary access via Channel Highway, which would absorb the larger proportion of access needs to the proposed development. A secondary access via Huntingfield Avenue would service the existing northbound traffic to the Algona Road/Channel Highway roundabout.

The Channel Highway Corridor Study has assessed and identified a need for an upgrade to the Algona Road/Channel Highway roundabout due to developments proposed in the region with access via the Channel Highway, which includes Huntingfield Stage 2 Project development.

The Park-and-Ride facility could encourage modal shift to public transport and essentially reduce the reliance of trips made on private transport.

4.7.3 ST ALOYSIUS EXPANSION

St Aloysius College is located on Nautilus Grove in Huntingfield and is primarily accessed through Huntingfield Avenue. The college currently caters for students from Grades 7 to 10 and considers an expansion to include Grade 11 and 12.

The proposed expansion is noted, however details of the expansion and studies to analyse the associated trips generated due to the upgrade were not available at the time of writing.

5 CONCLUSIONS

WSP Australia Pty Ltd has assessed the traffic and transport impact of the proposed Huntingfield park-and-ride facility on behalf of State Growth. This proposed facility is a part of Sub-Project 3 of the Hobart City Deal Southern Projects.

The facility, as selected by State Growth and Kingborough Council, is located south of Algona Road/Channel Highway roundabout with direct access to the Southern Outlet. The area is currently used as an informal off-street parking facility which currently experiences a demand of approximately 40 cars. It is estimated that 88 per cent of this demand are predominantly generated from the surrounding businesses and the remaining are associated with commuting (park-and-ride) purposes.

The site is well serviced by the existing bus network with services arriving approximately every 20 minutes in both the morning and afternoon peak periods. The proposed car park will accommodate 180 car parking spaces including five DDA compliant parking spaces.

In terms of the traffic generated by the facility, if fully utilised, it will result in an additional 170 traffic movements associated with the kiss-and-ride and park-and-ride facilities. A conservative scenario of all forecasted traffic movements to occur in the road network peak period was modelled in SIDRA intersections to quantify the impact of the facility. This scenario is conservative as arrival and departure of park-and-ride customers typically spread and disperse across a few hours respectively and the majority of traffic movements are expected to occur outside of the road network peak period.

The average delay and corresponding level of service at the roundabout of Algona Road/Channel Highway and at the intersections of Huntingfield bus stop loop road with Huntingfield Avenue are summarised in Table 5.1. The impact of the proposed park-and-ride facility to the intersection operation is expected to be negligible.

Table 5.1 Intersection performance comparison

Intersection	Existing		With Project	
	AM peak	PM peak	AM peak	PM peak
Algona Road/Channel Highway roundabout	LoS C (20.9 seconds) Right turn from Algona Road (east approach)	LoS C (27.4 seconds) Right turn from Algona Road (east approach)	LoS C (23.9 seconds) Right turn from Algona Road (east approach)	LoS C (28.4 seconds) Right turn from Algona Road (east approach)
Huntingfield Avenue northern access road	LoS C (18.5 seconds) Right turn from Bulky goods entrance (east approach)	LoS A (5.4 seconds) Left turn from Huntingfield Avenue North	LoS D (32.6 seconds) Right turn from park-and-ride site	LoS A (9.7 seconds) Right turn from park-and-ride site
Huntingfield Avenue southern access road	LoS A (6.9 seconds) Right turn from park-and-ride entrance (west approach)	LoS A (6.5 seconds) Left turn from Huntingfield Avenue (north approach)	LoS A (10 seconds) Right turn from park-and-ride entrance (west approach)	LoS A (6.6 seconds) Right turn from park-and-ride entrance (west approach)

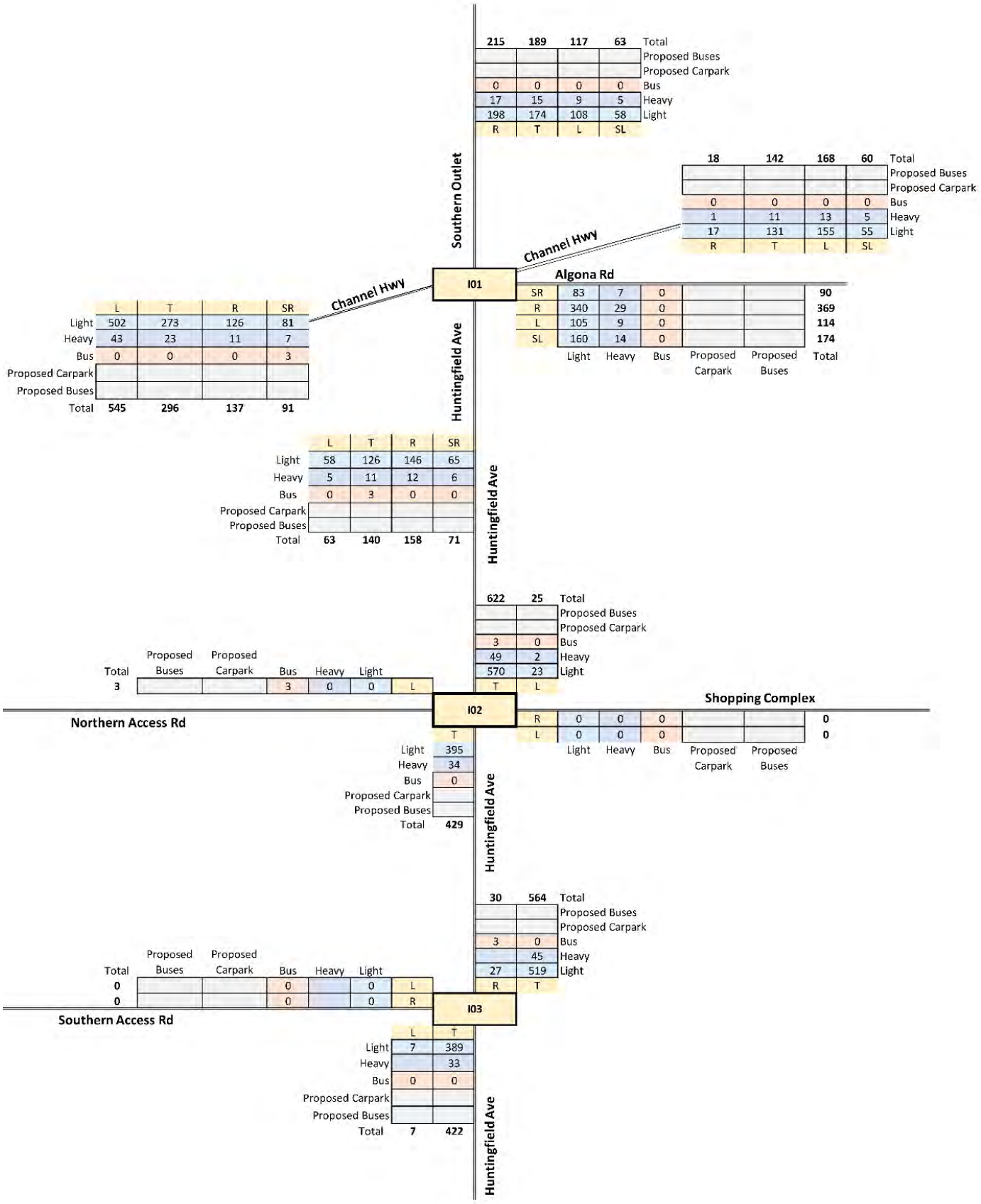
The project overall is considered to have positive benefits to the immediate surroundings because it will effectively add the supply of off-street car parking spaces, improve footpath network to support the current demand of bus customers walking to the bus stop, and promote the use of public transport to further reduce the reliance on private transport on the Southern Outlet.

The provision of additional car parking spaces however may induce demand from the residents/businesses. For the Department of State Growth to maximise its investment for the park-and-ride facility, it is recommended that local businesses be informed of the car park's intended use, plan regular monitoring of the car parking demand and where required, implement the appropriate parking control/restrictions.

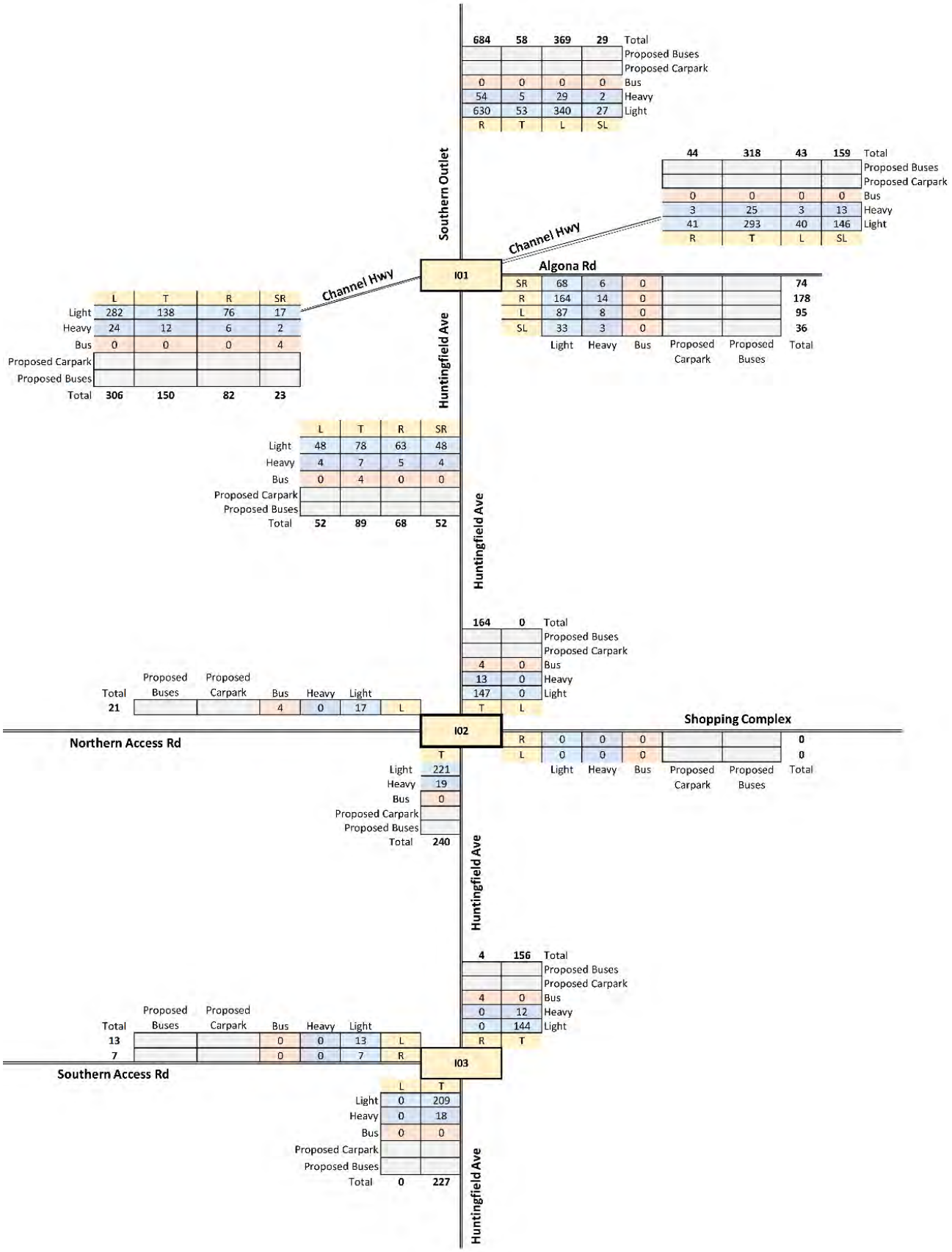
APPENDIX A

SIDRA VOLUMES

A1 AM – EXISTING (2019) VOLUMES

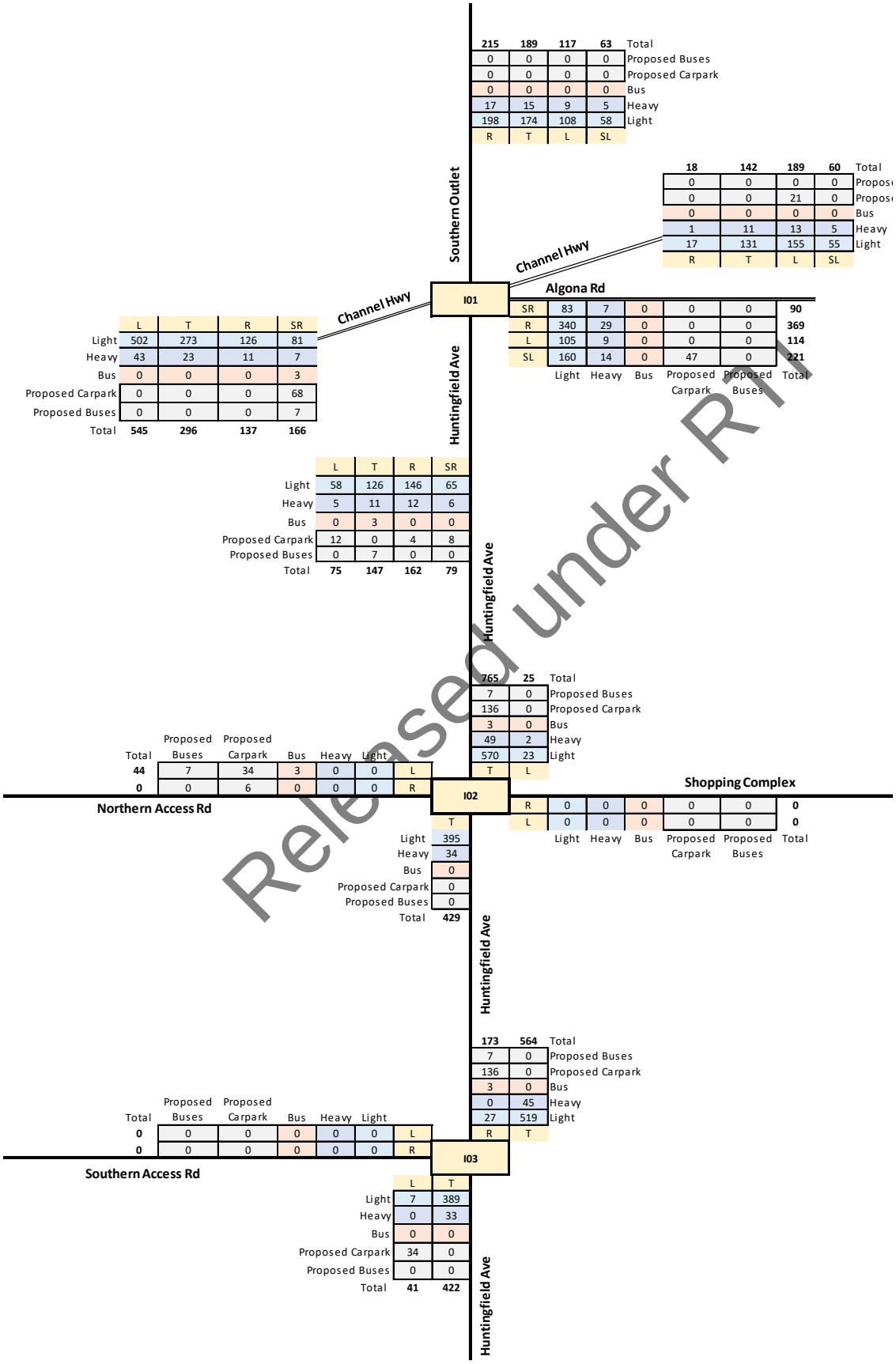


A2 PM – EXISTING (2019) VOLUMES

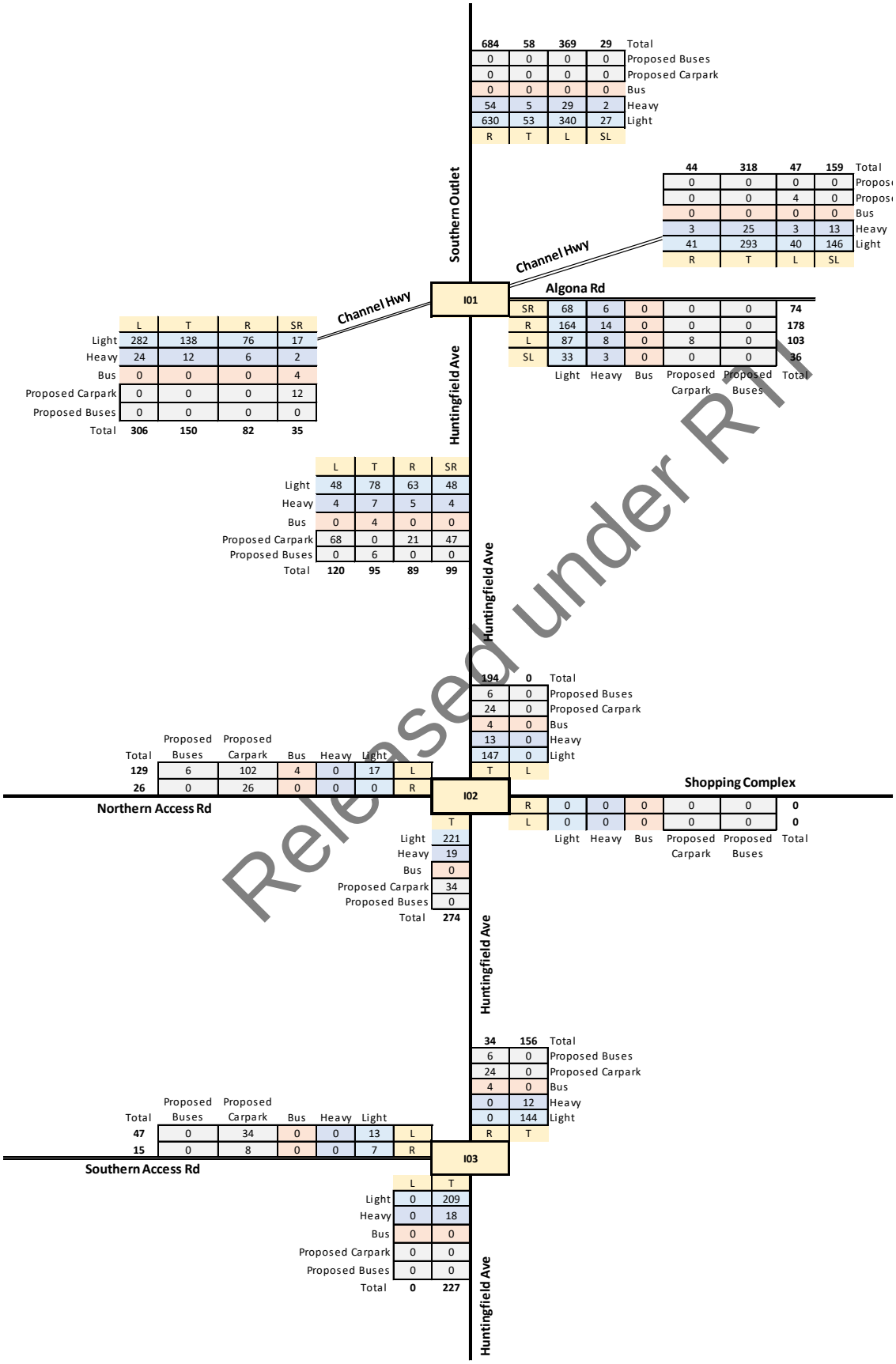


Project No PS117730
Hobart City Deal Southern Projects
Sub-Project 3 Huntingfield Park-and-Ride
Traffic Impact Assessment
Tasmanian Department of State Growth

A3 AM PEAK – WITH PROJECT



A4 PM PEAK – WITH PROJECT



APPENDIX B

EXISTING CONDITIONS SIDRA MOVEMENT SUMMARY

B1 ALGONA ROAD/CHANNEL HIGHWAY

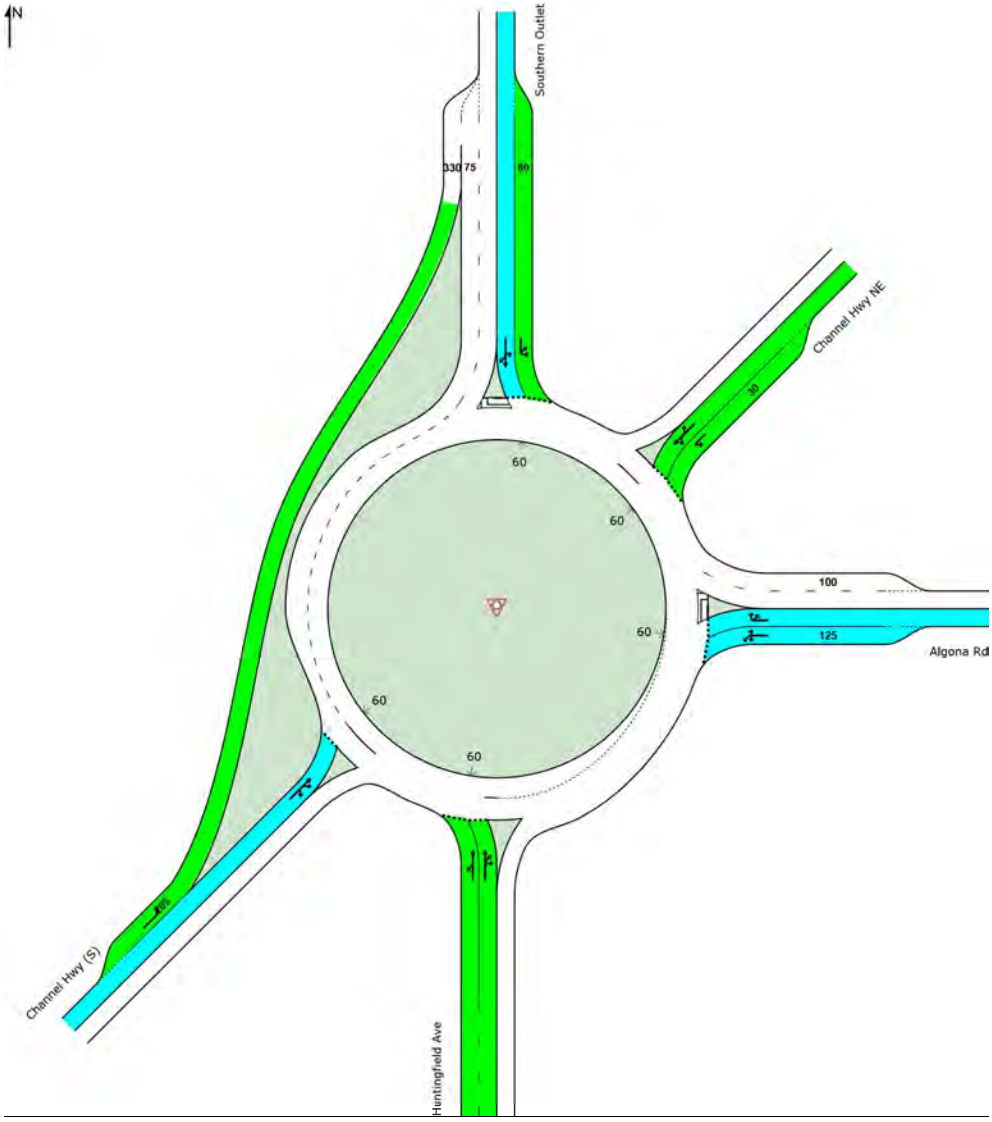
LANE LEVEL OF SERVICE

Lane Level of Service

Site: I01 [I01-Algona Rd/Channel Hwy-AM] Network: N101 [AM Existing]

New Site
Site Category: (None)
Roundabout

	Approaches					Intersection
	South	East	Northeast	North	Southwest	
LOS	A	B	A	B	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM

LOS rule).
Roundabout Level of Service Method: Same as Signalised Intersections
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I01 [I01-Algona Rd/Channel Hwy-AM]

Network: N101 [AM Existing]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Ave														
1b	L3	63	7.9	63	7.9	0.212	4.4	LOS A	1.1	7.9	0.69	0.60	0.69	56.8
2	T1	140	10.0	140	10.0	0.274	3.2	LOS A	1.6	11.7	0.70	0.64	0.70	60.5
3a	R1	158	7.6	158	7.6	0.274	7.8	LOS A	1.6	11.7	0.71	0.73	0.71	52.8
3	R2	71	8.5	71	8.5	0.274	8.9	LOS A	1.6	11.7	0.71	0.73	0.71	59.3
Approach		432	8.6	432	8.6	0.274	6.0	LOS A	1.6	11.7	0.70	0.68	0.70	56.7
East: Algona Rd														
4	L2	174	8.0	174	8.0	0.397	9.1	LOS A	3.7	27.8	0.92	0.80	0.92	53.3
4a	L1	114	7.9	114	7.9	0.397	9.2	LOS A	3.7	27.8	0.92	0.80	0.92	62.9
6	R2	369	7.9	369	7.9	0.397	18.5	LOS B	3.7	27.8	0.91	0.85	0.91	61.1
6b	R3	90	7.8	90	7.8	0.397	20.9	LOS C	3.1	22.8	0.90	0.90	0.90	58.3
Approach		747	7.9	747	7.9	0.397	15.2	LOS B	3.7	27.8	0.91	0.84	0.91	59.8
NorthEast: Channel Hwy NE														
24b	L3	60	8.3	60	8.3	0.083	5.9	LOS A	0.4	3.0	0.65	0.70	0.65	59.9
24a	L1	168	7.7	168	7.7	0.317	4.6	LOS A	2.0	14.8	0.73	0.51	0.73	48.9
25	T1	142	7.7	142	7.7	0.317	4.9	LOS A	2.0	14.8	0.73	0.51	0.73	60.3
26b	R3	18	5.6	18	5.6	0.317	13.6	LOS B	2.0	14.8	0.73	0.51	0.73	62.5
Approach		388	7.7	388	7.7	0.317	5.3	LOS A	2.0	14.8	0.71	0.54	0.71	56.5
North: Southern Outlet														
7b	L3	63	7.9	63	7.9	0.226	9.9	LOS A	1.7	12.7	0.85	0.80	0.85	58.0
7	L2	117	7.7	117	7.7	0.226	9.9	LOS A	1.7	12.7	0.85	0.80	0.85	65.5
8	T1	189	7.9	189	7.9	0.365	9.9	LOS A	3.4	25.4	0.92	0.78	0.92	52.1
9a	R1	215	7.9	215	7.9	0.365	16.0	LOS B	3.4	25.4	0.92	0.78	0.92	61.9
Approach		584	7.9	584	7.9	0.365	12.2	LOS B	3.4	25.4	0.90	0.79	0.90	59.8
SouthWest: Channel Hwy (S)														
30a	L1	545	7.9	545	7.9	0.290	4.9	LOS A	0.0	0.0	0.00	0.40	0.00	72.3
31	T1	296	7.8	296	7.8	0.476	8.4	LOS A	3.1	23.5	0.73	0.78	0.80	60.6
32a	R1	137	8.0	137	8.0	0.476	14.4	LOS B	3.1	23.5	0.73	0.78	0.80	64.6
32b	R3	91	11.0	91	11.0	0.476	18.1	LOS B	3.1	23.5	0.73	0.78	0.80	54.0
Approach		1069	8.1	1069	8.1	0.476	8.2	LOS A	3.1	23.5	0.36	0.58	0.39	66.4
All Vehicles		3220	8.0	3220	8.0	0.476	9.9	LOS A	3.7	27.8	0.67	0.69	0.69	61.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

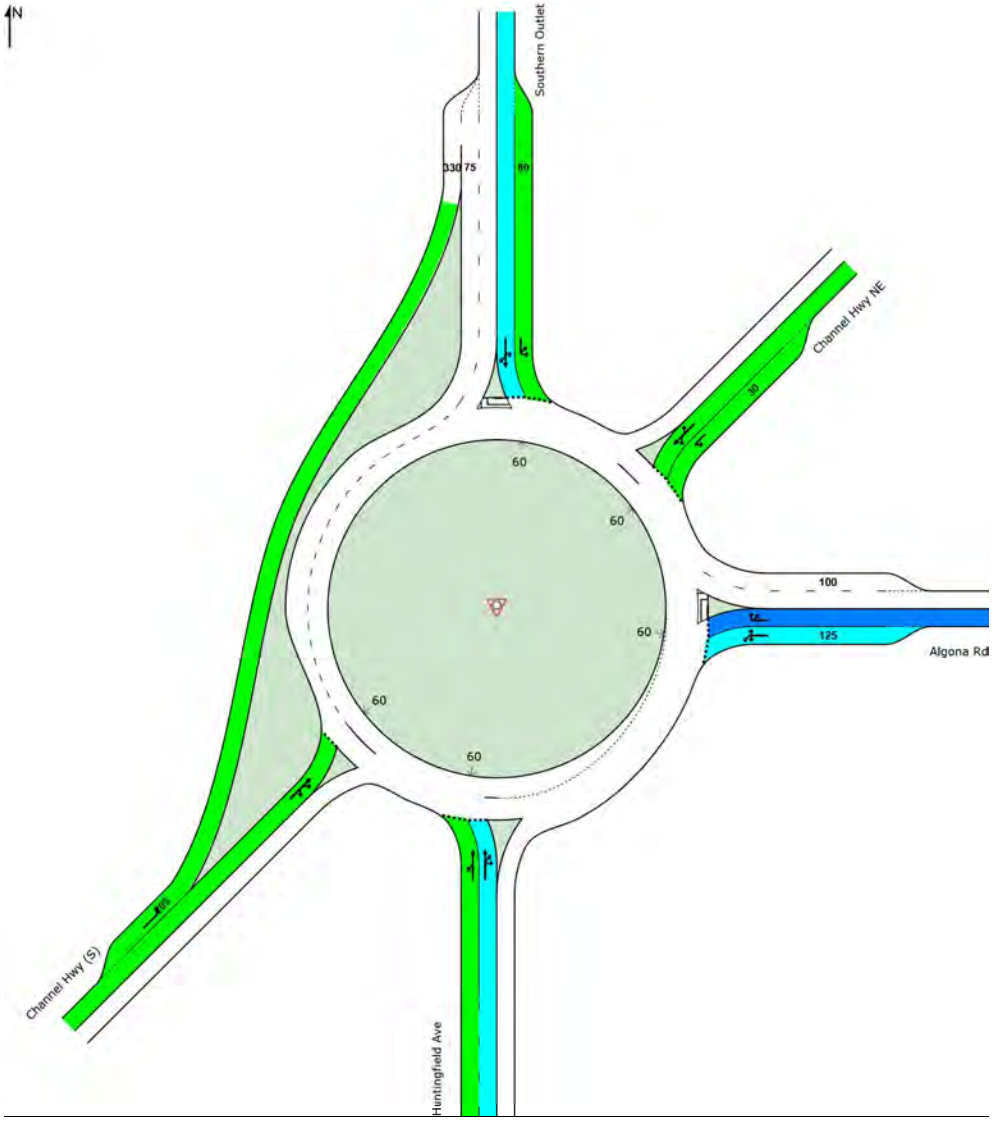
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 1 [I01-Algona Rd/Channel Hwy-PM] Network: N101 [PM Existing]

New Site
Site Category: (None)
Roundabout

	Approaches					Intersection
	South	East	Northeast	North	Southwest	
LOS	B	C	A	B	A	B



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM

LOS rule).
Roundabout Level of Service Method: Same as Signalised Intersections
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: 1 [I01-Algona Rd/Channel Hwy-PM]

Network: N101 [PM Existing]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Ave														
1b	L3	52	7.7	52	7.7	0.186	9.8	LOS A	1.1	8.1	0.85	0.87	0.85	50.7
2	T1	89	12.4	89	12.4	0.240	8.1	LOS A	1.7	12.6	0.88	0.88	0.88	53.2
3a	R1	68	7.4	68	7.4	0.240	12.4	LOS B	1.7	12.6	0.90	0.89	0.90	49.4
3	R2	52	7.7	52	7.7	0.240	13.5	LOS B	1.7	12.6	0.90	0.89	0.90	55.4
Approach		261	9.2	261	9.2	0.240	10.7	LOS B	1.7	12.6	0.88	0.88	0.88	52.1
East: Algona Rd														
4	L2	36	8.3	36	8.3	0.312	14.3	LOS B	3.2	24.3	1.00	0.84	1.00	47.6
4a	L1	95	8.4	95	8.4	0.312	14.5	LOS B	3.2	24.3	1.00	0.84	1.00	58.1
6	R2	178	7.9	178	7.9	0.312	24.0	LOS C	3.2	24.3	1.00	0.88	1.00	56.9
6b	R3	74	8.1	74	8.1	0.312	27.4	LOS C	2.5	18.8	1.00	0.95	1.00	53.2
Approach		383	8.1	383	8.1	0.312	21.4	LOS C	3.2	24.3	1.00	0.88	1.00	55.8
NorthEast: Channel Hwy NE														
24b	L3	159	8.2	159	8.2	0.266	7.7	LOS A	1.4	10.9	0.80	0.88	0.80	58.2
24a	L1	43	7.0	43	7.0	0.488	7.4	LOS A	3.7	27.7	0.89	0.86	1.04	47.0
25	T1	318	7.9	318	7.9	0.488	7.8	LOS A	3.7	27.7	0.89	0.86	1.04	58.6
26b	R3	44	6.8	44	6.8	0.488	16.4	LOS B	3.7	27.7	0.89	0.86	1.04	60.3
Approach		564	7.8	564	7.8	0.488	8.4	LOS A	3.7	27.7	0.86	0.87	0.97	58.0
North: Southern Outlet														
7b	L3	29	6.9	29	6.9	0.316	7.1	LOS A	2.1	15.6	0.63	0.66	0.63	59.7
7	L2	369	7.9	369	7.9	0.504	7.0	LOS A	4.2	31.4	0.63	0.67	0.63	66.9
8	T1	58	8.6	58	8.6	0.504	7.6	LOS A	4.2	31.4	0.68	0.71	0.68	52.2
9a	R1	684	7.9	684	7.9	0.504	13.6	LOS B	4.2	31.4	0.68	0.71	0.68	61.9
Approach		1140	7.9	1140	7.9	0.504	11.0	LOS B	4.2	31.4	0.66	0.70	0.66	63.0
SouthWest: Channel Hwy (S)														
30a	L1	306	7.8	306	7.8	0.163	4.9	LOS A	0.0	0.0	0.00	0.40	0.00	72.4
31	T1	150	8.0	150	8.0	0.203	6.7	LOS A	1.0	7.5	0.50	0.61	0.50	62.4
32a	R1	82	7.3	82	7.3	0.203	12.8	LOS B	1.0	7.5	0.50	0.61	0.50	66.9
32b	R3	23	26.1	23	26.1	0.203	16.8	LOS B	1.0	7.5	0.50	0.61	0.50	56.5
Approach		561	8.6	561	8.6	0.203	7.0	LOS A	1.0	7.5	0.23	0.50	0.23	68.1
All Vehicles		2909	8.1	2909	8.1	0.504	11.1	LOS B	4.2	31.4	0.68	0.73	0.70	61.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

B2 HUNTINGFIELD AVENUE/NORTHERN ACCESS

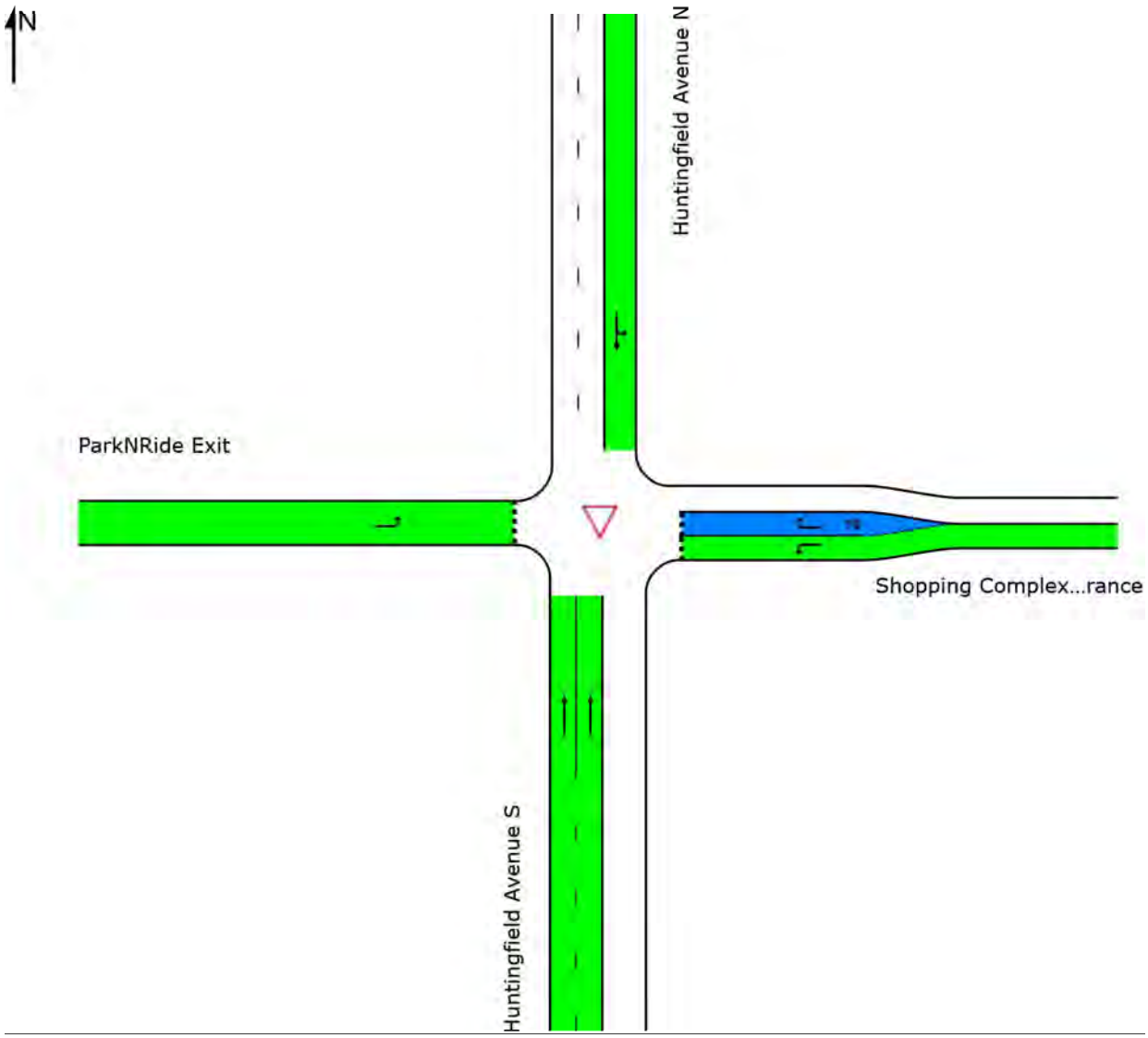
LANE LEVEL OF SERVICE

Lane Level of Service

Site: I02 [I02-HuntingfieldAve/ParkNRideExit-AM] Network: N101 [AM Existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches				Intersection
	South	East	North	West	
LOS	NA	B	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM

LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I02 [I02-HuntingfieldAve/ParkNRideExit-AM]

Network: N101 [AM Existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Avenue S														
2	T1	429	7.9	429	7.9	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		429	7.9	429	7.9	0.116	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Shopping Complex Entrance														
4	L2	1	0.0	1	0.0	0.001	2.6	LOS A	0.0	0.0	0.50	0.30	0.50	11.1
6	R2	1	0.0	1	0.0	0.006	18.5	LOS C	0.0	0.1	0.83	0.75	0.83	3.8
Approach		2	0.0	2	0.0	0.006	10.6	LOS B	0.0	0.1	0.67	0.52	0.67	5.9
North: Huntingfield Avenue N														
7	L2	25	8.0	25	8.0	0.338	5.2	LOS A	0.0	0.0	0.00	0.03	0.00	30.8
8	T1	622	8.4	622	8.4	0.338	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	47.8
Approach		647	8.3	647	8.3	0.338	0.2	NA	0.0	0.0	0.00	0.03	0.00	46.6
West: ParkNRide Exit														
10	L2	3	100.0	3	100.0	0.004	1.5	LOS A	0.0	0.2	0.37	0.18	0.37	14.4
Approach		3	100.0	3	100.0	0.004	1.5	LOS A	0.0	0.2	0.37	0.18	0.37	14.4
All Vehicles		1081	8.4	1081	8.4	0.338	0.1	NA	0.0	0.2	0.00	0.02	0.00	46.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

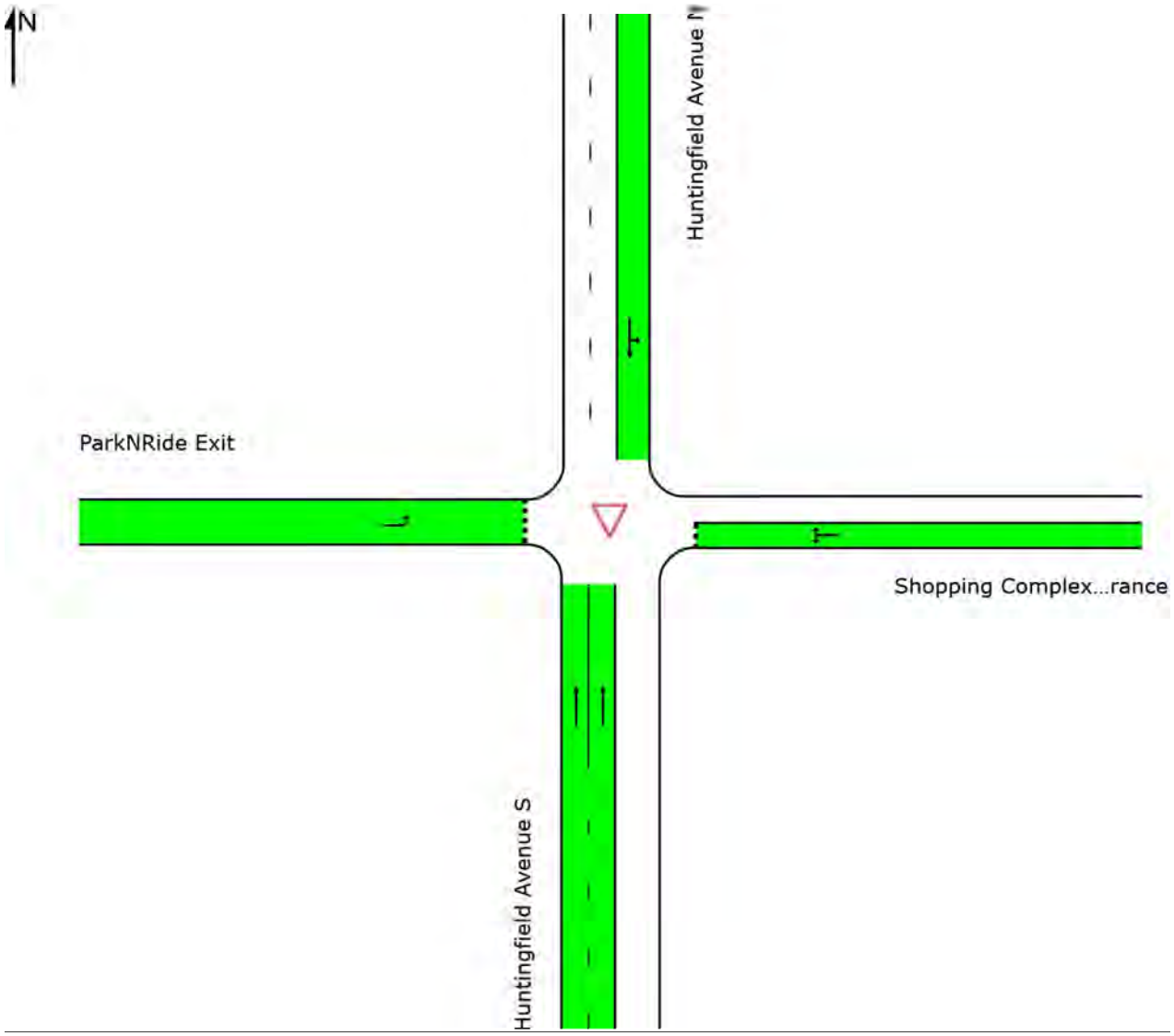
LANE LEVEL OF SERVICE

Lane Level of Service

Site: I02 [I02-HuntingfieldAve/ParkNRideExit-PM] Network: N101 [PM Existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches				Intersection
	South	East	North	West	
LOS	NA	A	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM

LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I02 [I02-HuntingfieldAve/ParkNRideExit-PM]

Network: N101 [PM Existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Avenue S														
2	T1	240	7.9	240	7.9	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		240	7.9	240	7.9	0.065	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Shopping Complex Entrance														
4	L2	1	0.0	1	0.0	0.002	0.5	LOS A	0.0	0.1	0.27	0.13	0.27	11.7
6	R2	1	0.0	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.27	0.13	0.27	11.7
Approach		2	0.0	2	0.0	0.002	1.9	LOS A	0.0	0.1	0.27	0.13	0.27	11.7
North: Huntingfield Avenue N														
7	L2	1	0.0	1	0.0	0.087	5.2	LOS A	0.0	0.0	0.00	0.00	0.00	31.1
8	T1	164	10.4	164	10.4	0.087	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.6
Approach		165	10.3	165	10.3	0.087	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.4
West: ParkNRide Exit														
10	L2	23	26.1	23	26.1	0.018	0.4	LOS A	0.1	0.6	0.23	0.09	0.23	14.7
Approach		23	26.1	23	26.1	0.018	0.4	LOS A	0.1	0.6	0.23	0.09	0.23	14.7
All Vehicles		430	9.8	430	9.8	0.087	0.0	NA	0.1	0.6	0.01	0.01	0.01	35.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

B3 HUNTINGFIELD AVENUE/SOUTHERN ACCESS

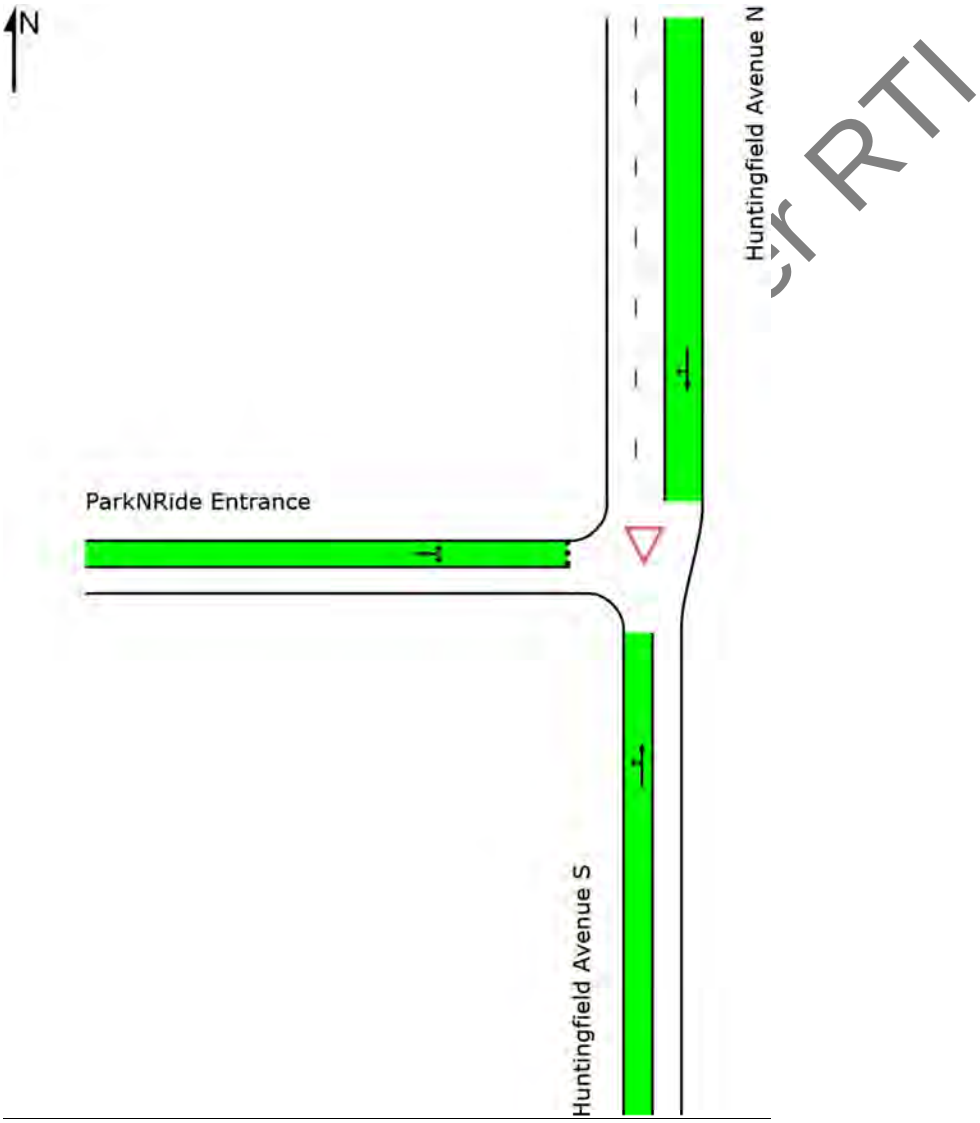
LANE LEVEL OF SERVICE

Lane Level of Service

Site: I03 [I03-HuntingfieldAve/ParkNRideEntrance-AM] Network: N101 [AM Existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM

LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I03 [I03-HuntingfieldAve/ParkNRideEntrance-AM]

Network: N101 [AM Existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Avenue S														
1	L2	8	12.5	8	12.5	0.232	6.1	LOS A	0.0	0.0	0.00	0.01	0.00	45.9
2	T1	422	7.8	422	7.8	0.232	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.7
Approach		430	7.9	430	7.9	0.232	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.6
North: Huntingfield Avenue N														
8	T1	564	8.0	564	8.0	0.322	0.3	LOS A	0.5	3.8	0.09	0.04	0.10	48.5
9	R2	32	15.6	32	15.6	0.322	6.4	LOS A	0.5	3.8	0.09	0.04	0.10	17.5
Approach		596	8.4	596	8.4	0.322	0.6	NA	0.5	3.8	0.09	0.04	0.10	45.9
West: ParkNRide Entrance														
10	L2	1	0.0	1	0.0	0.004	1.5	LOS A	0.0	0.1	0.53	0.37	0.53	13.3
12	R2	1	0.0	1	0.0	0.004	6.9	LOS A	0.0	0.1	0.53	0.37	0.53	24.2
Approach		2	0.0	2	0.0	0.004	4.2	LOS A	0.0	0.1	0.53	0.37	0.53	19.8
All Vehicles		1028	8.2	1028	8.2	0.322	0.4	NA	0.5	3.8	0.05	0.03	0.06	47.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

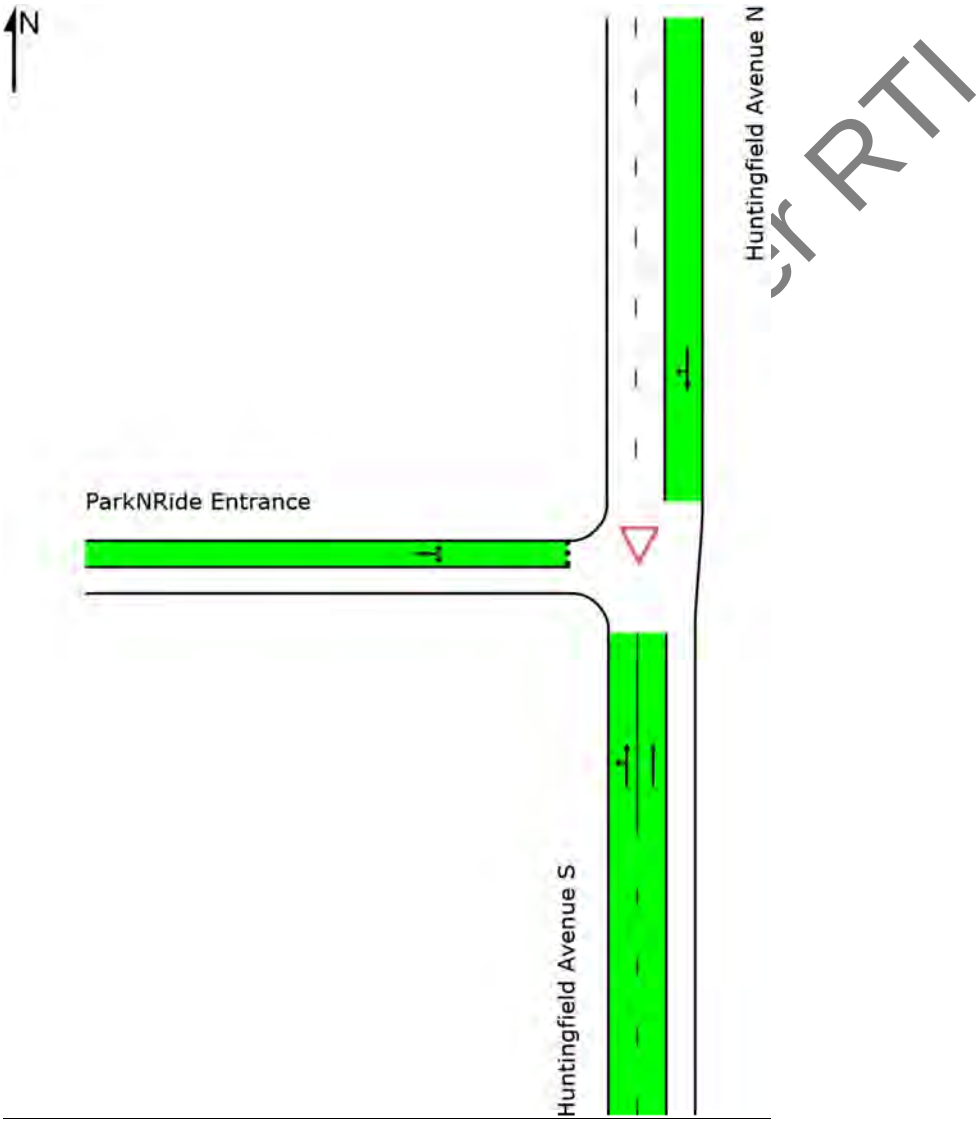
LANE LEVEL OF SERVICE

Lane Level of Service

Site: I03 [I03-HuntingfieldAve/ParkNRideEntrance-PM] Network: N101 [PM Existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM

LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I03 [I03-HuntingfieldAve/ParkNRideEntrance-PM]

Network: N101 [PM Existing]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Avenue S														
1	L2	2	50.0	2	50.0	0.062	6.5	LOS A	0.0	0.0	0.00	0.01	0.00	42.1
2	T1	227	7.9	227	7.9	0.062	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		229	8.3	229	8.3	0.062	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.8
North: Huntingfield Avenue N														
8	T1	156	7.7	156	7.7	0.091	0.2	LOS A	0.1	0.9	0.05	0.04	0.05	48.9
9	R2	6	100.0	6	100.0	0.091	5.8	LOS A	0.1	0.9	0.05	0.04	0.05	17.6
Approach		162	11.1	162	11.1	0.091	0.5	NA	0.1	0.9	0.05	0.04	0.05	47.1
West: ParkNRide Entrance														
10	L2	13	0.0	13	0.0	0.018	0.3	LOS A	0.1	0.5	0.24	0.12	0.24	14.5
12	R2	7	0.0	7	0.0	0.018	2.4	LOS A	0.1	0.5	0.24	0.12	0.24	25.7
Approach		20	0.0	20	0.0	0.018	1.0	LOS A	0.1	0.5	0.24	0.12	0.24	19.6
All Vehicles		411	9.0	411	9.0	0.091	0.2	NA	0.1	0.9	0.03	0.03	0.03	45.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C

WITH PROJECT SIDRA MOVEMENT SUMMARY

C1 ALGONA ROAD/CHANNEL HIGHWAY

LANE LEVEL OF SERVICE

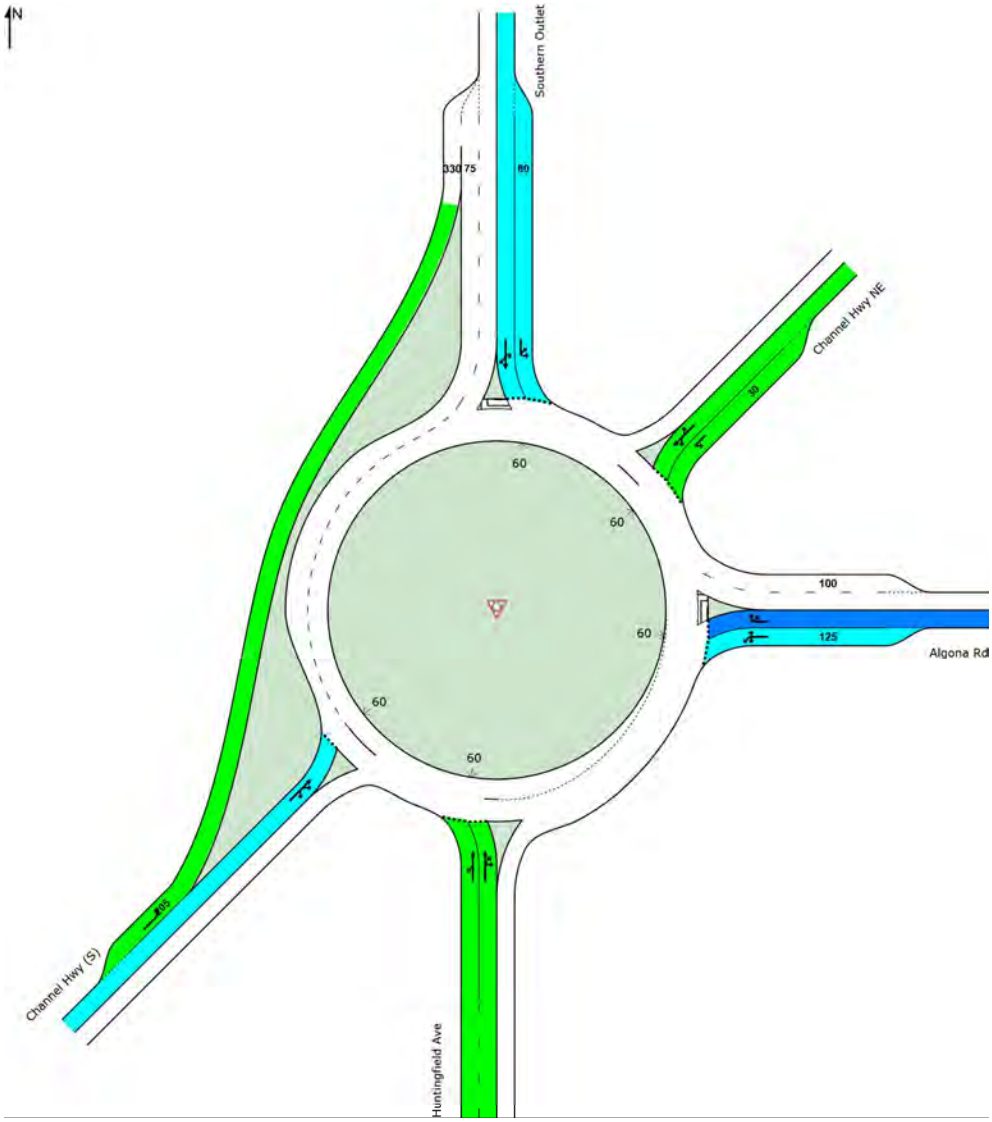
Lane Level of Service

Site: I01 [I01-Algona Rd/Channel Hwy-AM-Prop]

Network: N101 [AM Proposed]

New Site
Site Category: (None)
Roundabout

	Approaches					Intersection
	South	East	Northeast	North	Southwest	
LOS	A	B	A	B	A	B



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Signalised Intersections
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I01 [I01-Algona Rd/Channel Hwy-AM-Prop]

Network: N101 [AM Proposed]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Ave														
1b	L3	75	6.7	75	6.7	0.232	4.4	LOS A	1.2	8.8	0.70	0.63	0.70	56.3
2	T1	147	14.3	147	14.3	0.298	3.3	LOS A	1.7	13.0	0.71	0.67	0.71	62.9
3a	R1	162	7.4	162	7.4	0.298	7.9	LOS A	1.7	13.0	0.72	0.74	0.72	52.9
3	R2	79	7.6	79	7.6	0.298	9.1	LOS A	1.7	13.0	0.72	0.74	0.72	59.2
Approach		463	9.5	463	9.5	0.298	6.1	LOS A	1.7	13.0	0.72	0.70	0.72	57.3
East: Algona Rd														
4	L2	221	6.3	221	6.3	0.464	9.9	LOS A	4.7	34.6	1.00	0.86	1.01	52.1
4a	L1	114	7.9	114	7.9	0.464	10.5	LOS B	4.7	34.6	1.00	0.86	1.01	62.0
6	R2	369	7.9	369	7.9	0.464	20.9	LOS C	4.7	34.6	0.98	0.93	1.06	58.9
6b	R3	90	7.8	90	7.8	0.464	23.9	LOS C	4.1	30.7	0.96	0.99	1.09	55.9
Approach		794	7.4	794	7.4	0.464	16.7	LOS B	4.7	34.6	0.98	0.91	1.04	57.7
NorthEast: Channel Hwy NE														
24b	L3	60	8.3	60	8.3	0.087	6.3	LOS A	0.4	3.3	0.69	0.73	0.69	59.5
24a	L1	189	6.9	189	6.9	0.358	5.1	LOS A	2.4	17.5	0.78	0.56	0.78	48.4
25	T1	142	7.7	142	7.7	0.358	5.4	LOS A	2.4	17.5	0.78	0.56	0.78	60.0
26b	R3	18	5.6	18	5.6	0.358	14.1	LOS B	2.4	17.5	0.78	0.56	0.78	62.1
Approach		409	7.3	409	7.3	0.358	5.8	LOS A	2.4	17.5	0.77	0.59	0.77	55.8
North: Southern Outlet														
7b	L3	63	7.9	63	7.9	0.254	11.1	LOS B	2.0	15.0	0.92	0.85	0.92	56.9
7	L2	117	7.7	117	7.7	0.254	11.1	LOS B	2.0	15.0	0.92	0.85	0.92	64.1
8	T1	189	7.9	189	7.9	0.407	11.0	LOS B	4.0	30.3	1.00	0.84	1.00	51.0
9a	R1	215	7.9	215	7.9	0.407	17.1	LOS B	4.0	30.3	1.00	0.84	1.00	61.1
Approach		584	7.9	584	7.9	0.407	13.3	LOS B	4.0	30.3	0.97	0.84	0.97	58.8
SouthWest: Channel Hwy (S)														
30a	L1	545	7.9	545	7.9	0.290	4.9	LOS A	0.0	0.0	0.00	0.40	0.00	72.3
31	T1	296	7.8	296	7.8	0.557	9.2	LOS A	4.2	31.7	0.78	0.86	0.92	59.1
32a	R1	137	8.0	137	8.0	0.557	15.3	LOS B	4.2	31.7	0.78	0.86	0.92	62.9
32b	R3	166	10.2	166	10.2	0.557	17.3	LOS B	4.2	31.7	0.78	0.86	0.92	51.8
Approach		1144	8.2	1144	8.2	0.557	9.1	LOS A	4.2	31.7	0.41	0.64	0.48	64.7
All Vehicles		3394	8.0	3394	8.0	0.557	10.8	LOS B	4.7	34.6	0.73	0.74	0.76	60.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE LEVEL OF SERVICE

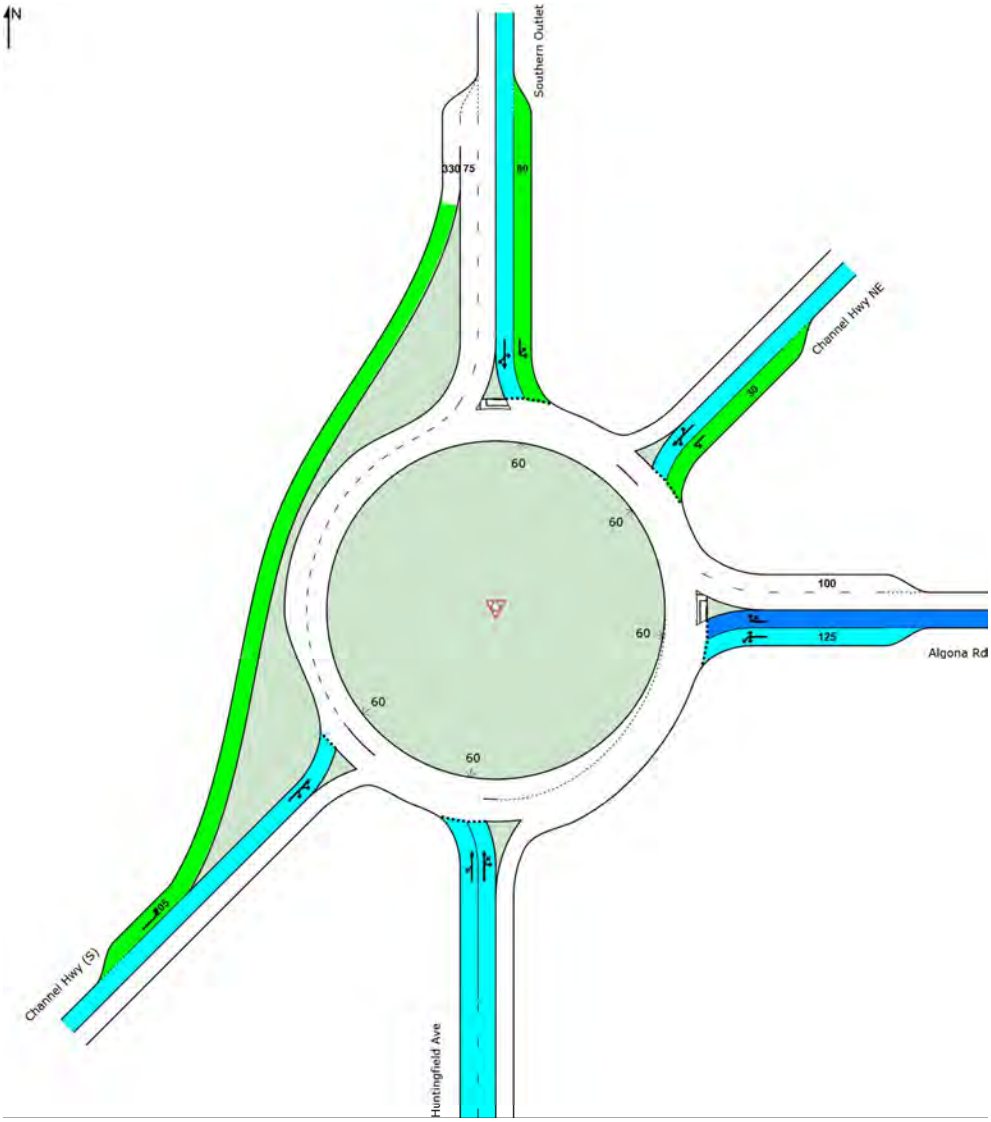
Lane Level of Service

Site: 1 [I01-Algona Rd/Channel Hwy-PM-Prop]

Network: N101 [PM Proposed]

New Site
Site Category: (None)
Roundabout

	Approaches					Intersection
	South	East	Northeast	North	Southwest	
LOS	B	C	A	B	A	B



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Signalised Intersections
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: 1 [I01-Algona Rd/Channel Hwy-PM-Prop]

Network: N101 [PM Proposed]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Ave														
1b	L3	120	3.3	120	3.3	0.292	10.2	LOS B	1.8	12.9	0.88	0.92	0.88	48.1
2	T1	96	18.8	96	18.8	0.376	8.7	LOS A	2.8	20.9	0.93	0.95	0.95	54.3
3a	R1	89	5.6	89	5.6	0.376	13.4	LOS B	2.8	20.9	0.94	0.96	0.97	48.8
3	R2	99	4.0	99	4.0	0.376	15.0	LOS B	2.8	20.9	0.94	0.96	0.97	53.2
Approach		404	7.7	404	7.7	0.376	11.7	LOS B	2.8	20.9	0.92	0.95	0.94	50.9
East: Algona Rd														
4	L2	44	6.8	44	6.8	0.340	14.7	LOS B	3.6	27.0	1.00	0.85	1.00	46.7
4a	L1	95	8.4	95	8.4	0.340	15.2	LOS B	3.6	27.0	1.00	0.85	1.00	57.5
6	R2	178	7.9	178	7.9	0.340	24.9	LOS C	3.6	27.0	1.00	0.89	1.00	56.1
6b	R3	74	8.1	74	8.1	0.340	28.4	LOS C	2.8	20.8	1.00	0.96	1.00	52.6
Approach		391	7.9	391	7.9	0.340	22.1	LOS C	3.6	27.0	1.00	0.89	1.00	55.0
NorthEast: Channel Hwy NE														
24b	L3	159	8.2	159	8.2	0.287	8.3	LOS A	1.6	12.2	0.84	0.90	0.84	57.6
24a	L1	47	6.4	47	6.4	0.532	8.8	LOS A	4.4	32.7	0.93	1.01	1.15	46.5
25	T1	318	7.9	318	7.9	0.532	9.1	LOS A	4.4	32.7	0.93	1.01	1.15	58.2
26b	R3	44	6.8	44	6.8	0.532	17.8	LOS B	4.4	32.7	0.93	1.01	1.15	59.9
Approach		568	7.7	568	7.7	0.532	9.6	LOS A	4.4	32.7	0.91	0.98	1.06	57.5
North: Southern Outlet														
7b	L3	29	6.9	29	6.9	0.336	7.6	LOS A	2.3	17.3	0.69	0.71	0.69	59.4
7	L2	369	7.9	369	7.9	0.535	7.6	LOS A	4.8	35.7	0.70	0.72	0.70	66.4
8	T1	58	8.6	58	8.6	0.535	8.2	LOS A	4.8	35.7	0.76	0.75	0.77	51.6
9a	R1	684	7.9	684	7.9	0.535	14.2	LOS B	4.8	35.7	0.76	0.75	0.77	61.5
Approach		1140	7.9	1140	7.9	0.535	11.6	LOS B	4.8	35.7	0.74	0.74	0.75	62.6
SouthWest: Channel Hwy (S)														
30a	L1	306	7.8	306	7.8	0.163	4.9	LOS A	0.0	0.0	0.00	0.40	0.00	72.4
31	T1	150	8.0	150	8.0	0.228	7.0	LOS A	1.2	8.9	0.54	0.64	0.54	61.7
32a	R1	82	7.3	82	7.3	0.228	13.0	LOS B	1.2	8.9	0.54	0.64	0.54	66.1
32b	R3	42	31.0	42	31.0	0.228	15.5	LOS B	1.2	8.9	0.54	0.64	0.54	55.4
Approach		580	9.5	580	9.5	0.228	7.4	LOS A	1.2	8.9	0.26	0.51	0.26	67.4
All Vehicles		3083	8.1	3083	8.1	0.535	11.8	LOS B	4.8	35.7	0.74	0.79	0.77	60.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

C2 HUNTINGFIELD AVENUE/NORTHERN ACCESS

LANE LEVEL OF SERVICE

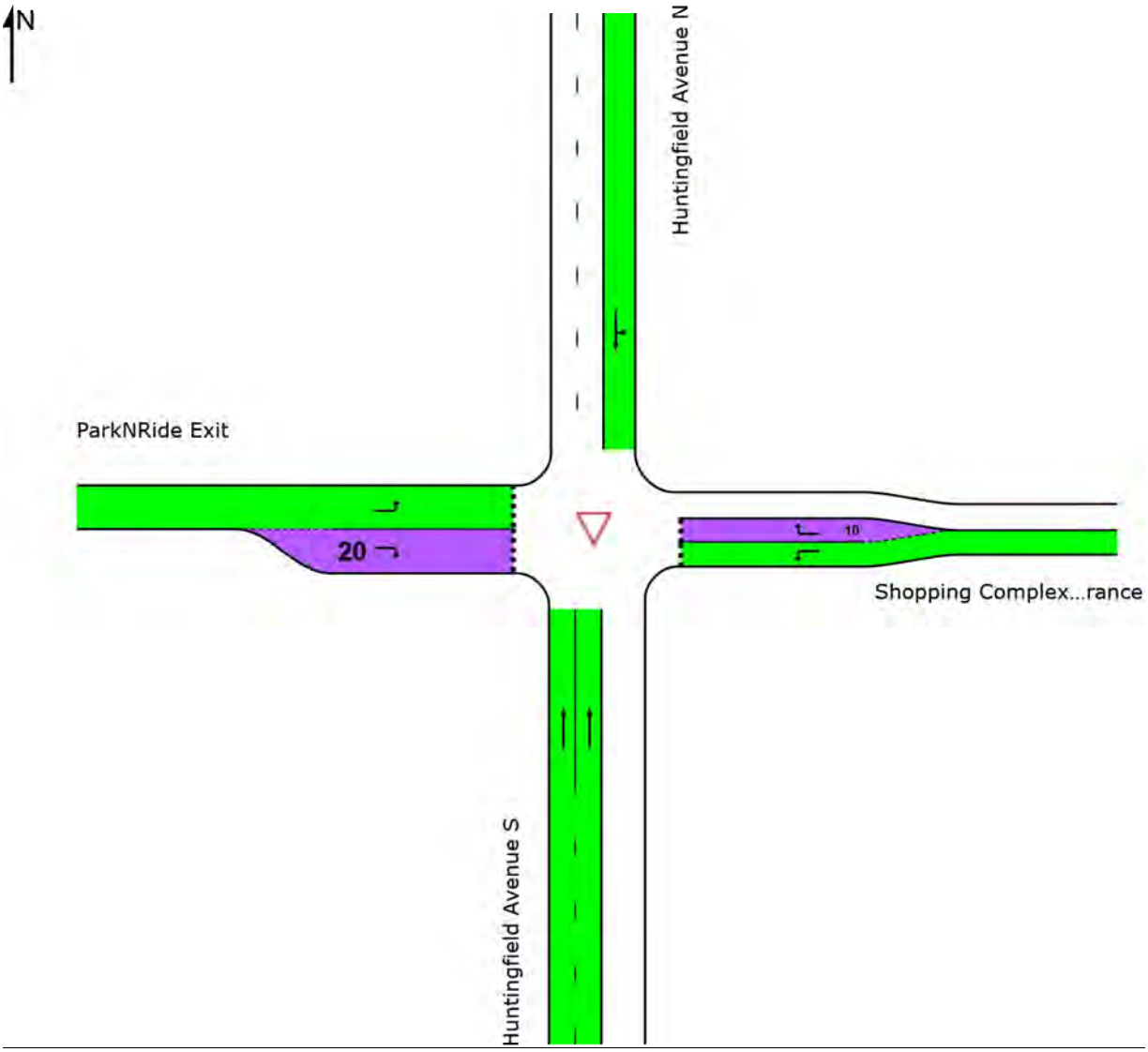
Lane Level of Service

Site: I02 [I02-HuntingfieldAve/ParkNRideExit-AM-Prop]

Network: N101 [AM Proposed]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches				Intersection
	South	East	North	West	
LOS	NA	C	NA	B	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I02 [I02-HuntingfieldAve/ParkNRideExit-AM-Prop]

Network: N101 [AM Proposed]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Huntingfield Avenue S														
2	T1	429	7.9	429	7.9	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		429	7.9	429	7.9	0.116	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Shopping Complex Entrance														
4	L2	1	0.0	1	0.0	0.002	3.8	LOS A	0.0	0.0	0.60	0.40	0.60	9.9
6	R2	1	0.0	1	0.0	0.009	28.9	LOS D	0.0	0.2	0.89	0.87	0.89	2.7
Approach		2	0.0	2	0.0	0.009	16.4	LOS C	0.0	0.2	0.75	0.64	0.75	4.4
North: Huntingfield Avenue N														
7	L2	25	8.0	25	8.0	0.426	5.2	LOS A	0.0	0.0	0.00	0.03	0.00	37.5
8	T1	765	7.7	765	7.7	0.426	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.9
Approach		790	7.7	790	7.7	0.426	0.2	NA	0.0	0.0	0.00	0.03	0.00	49.2
West: ParkNRide Exit														
10	L2	27	11.1	27	11.1	0.021	6.1	LOS A	0.1	0.6	0.31	0.55	0.31	34.2
12	R2	7	0.0	7	0.0	0.057	32.6	LOS D	0.2	1.2	0.89	0.95	0.89	13.6
Approach		34	8.8	34	8.8	0.057	11.5	LOS B	0.2	1.2	0.43	0.63	0.43	26.1
All Vehicles		1255	7.8	1255	7.8	0.426	0.5	NA	0.2	1.2	0.01	0.03	0.01	46.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE LEVEL OF SERVICE

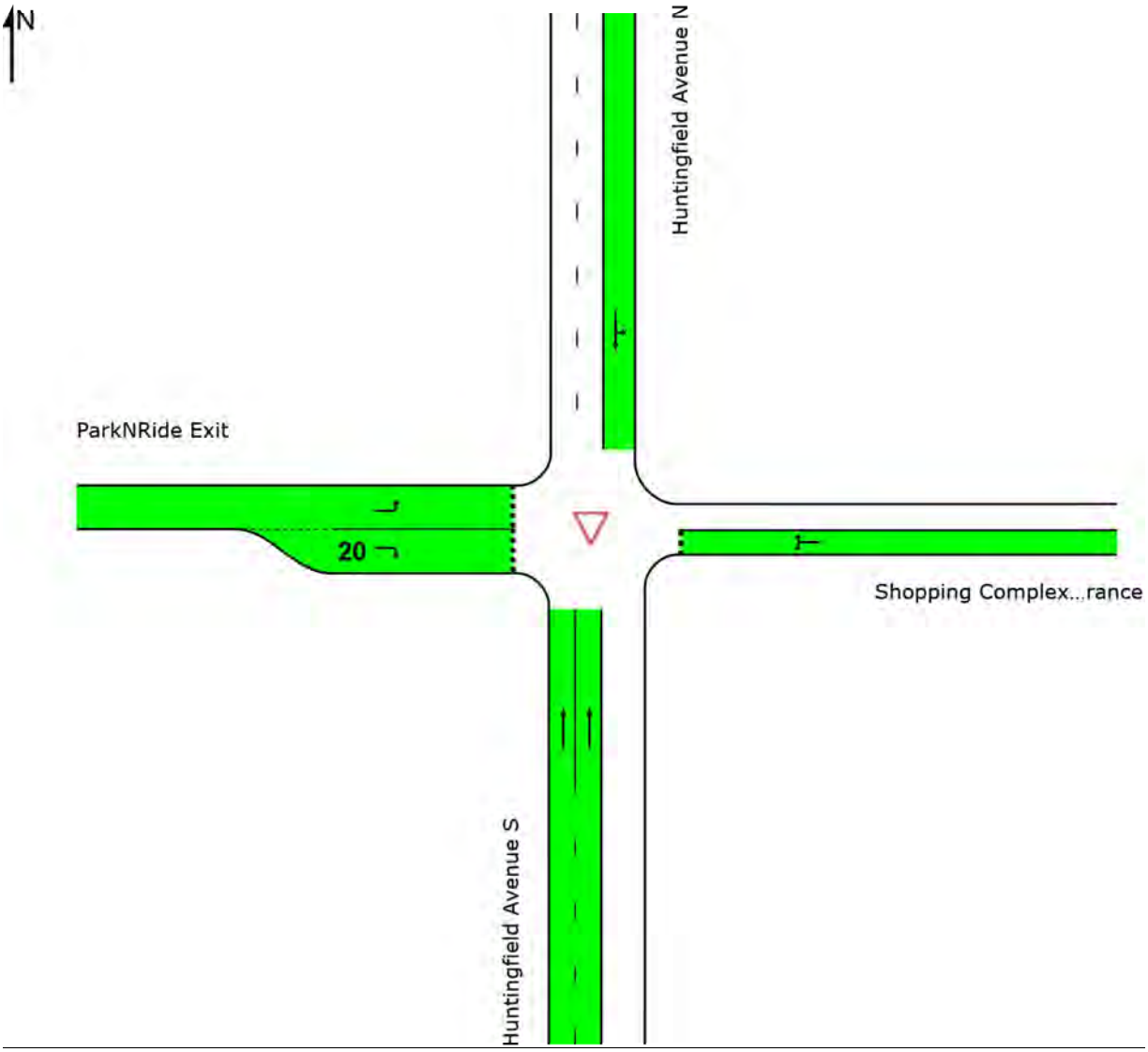
Lane Level of Service

Site: I02 [I02-HuntingfieldAve/ParkNRideExit-PM-Prop]

Network: N101 [PM Proposed]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches				Intersection
	South	East	North	West	
LOS	NA	A	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I02 [I02-HuntingfieldAve/ParkNRideExit-PM-Prop]

Network: N101 [PM Proposed]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Huntingfield Avenue S														
2	T1	274	6.9	274	6.9	0.073	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	51.2
Approach		274	6.9	274	6.9	0.073	0.0	NA	0.0	0.0	0.00	0.00	0.00	51.2
East: Shopping Complex Entrance														
4	L2	1	0.0	1	0.0	0.003	0.6	LOS A	0.0	0.1	0.35	0.19	0.35	10.3
6	R2	1	0.0	1	0.0	0.003	5.6	LOS A	0.0	0.1	0.35	0.19	0.35	10.3
Approach		2	0.0	2	0.0	0.003	3.1	LOS A	0.0	0.1	0.35	0.19	0.35	10.3
North: Huntingfield Avenue N														
7	L2	1	0.0	1	0.0	0.105	5.2	LOS A	0.0	0.0	0.00	0.01	0.00	32.4
8	T1	195	12.3	195	12.3	0.105	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	51.1
Approach		196	12.2	196	12.2	0.105	0.0	NA	0.0	0.0	0.00	0.01	0.00	50.9
West: ParkNRide Exit														
10	L2	132	9.8	132	9.8	0.096	5.6	LOS A	0.4	3.0	0.25	0.53	0.25	33.8
12	R2	27	0.0	27	0.0	0.049	9.7	LOS A	0.2	1.3	0.53	0.72	0.53	29.7
Approach		159	8.2	159	8.2	0.096	6.3	LOS A	0.4	3.0	0.30	0.57	0.30	33.1
All Vehicles		631	8.9	631	8.9	0.105	1.6	NA	0.4	3.0	0.08	0.15	0.08	39.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

C3 HUNTINGFIELD AVENUE/SOUTHERN ACCESS

LANE LEVEL OF SERVICE

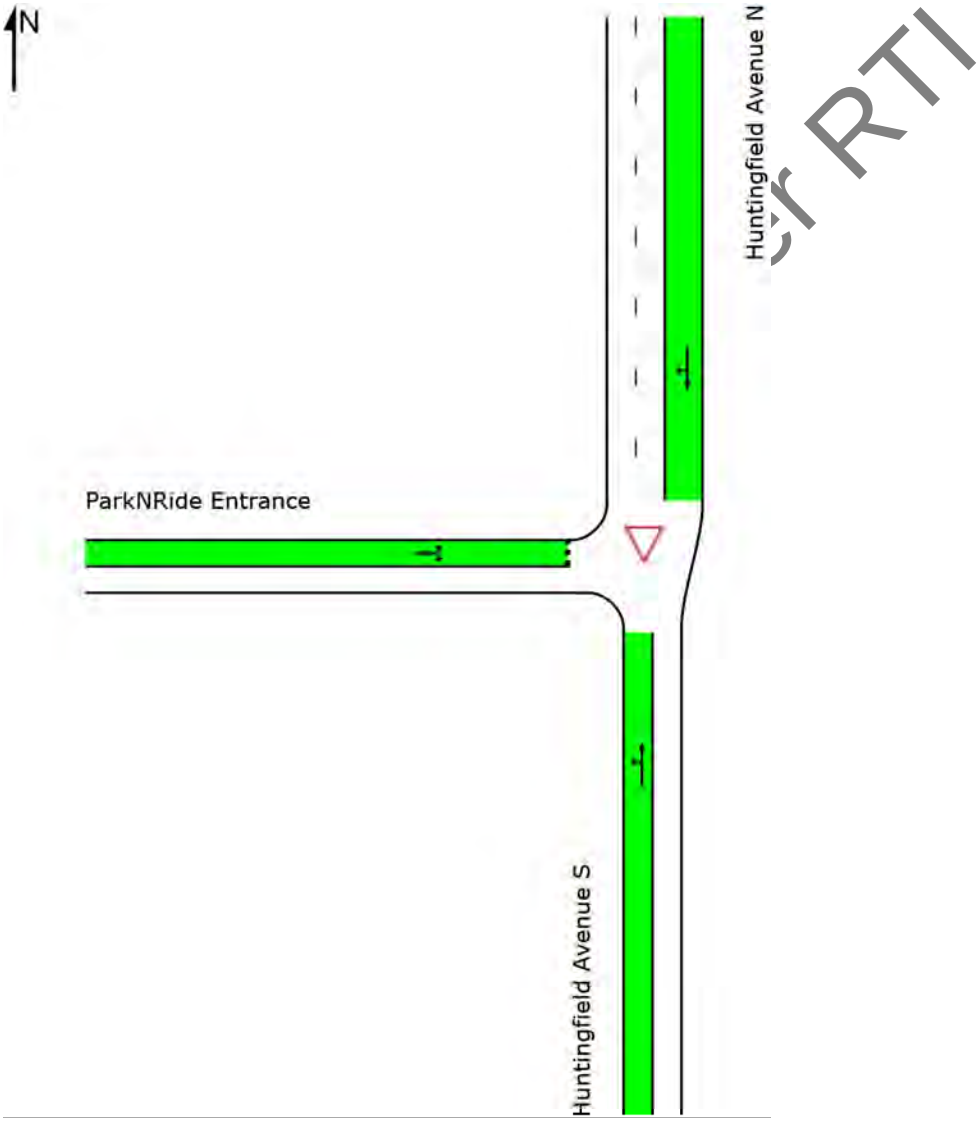
Lane Level of Service

Site: I03 [I03-HuntingfieldAve/ParkNRideEntrance-AM-Prop]

Network: N101 [AM Proposed]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I03 [I03-HuntingfieldAve/ParkNRideEntrance-AM-Prop]

Network: N101 [AM Proposed]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Avenue S														
1	L2	42	2.4	42	2.4	0.250	4.9	LOS A	0.0	0.0	0.00	0.07	0.00	47.7
2	T1	422	7.8	422	7.8	0.250	0.1	LOS A	0.0	0.0	0.00	0.07	0.00	49.2
Approach		464	7.3	464	7.3	0.250	0.5	NA	0.0	0.0	0.00	0.07	0.00	49.0
North: Huntingfield Avenue N														
8	T1	564	8.0	564	8.0	0.459	1.8	LOS A	3.2	23.7	0.40	0.18	0.54	43.5
9	R2	175	6.9	175	6.9	0.459	6.7	LOS A	3.2	23.7	0.40	0.18	0.54	36.7
Approach		739	7.7	739	7.7	0.459	3.0	NA	3.2	23.7	0.40	0.18	0.54	42.3
West: ParkNRide Entrance														
10	L2	1	0.0	1	0.0	0.004	1.5	LOS A	0.0	0.1	0.59	0.43	0.59	12.7
12	R2	1	0.0	1	0.0	0.004	10.0	LOS A	0.0	0.1	0.59	0.43	0.59	23.5
Approach		2	0.0	2	0.0	0.004	5.7	LOS A	0.0	0.1	0.59	0.43	0.59	19.2
All Vehicles		1205	7.6	1205	7.6	0.459	2.0	NA	3.2	23.7	0.25	0.14	0.33	44.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE LEVEL OF SERVICE

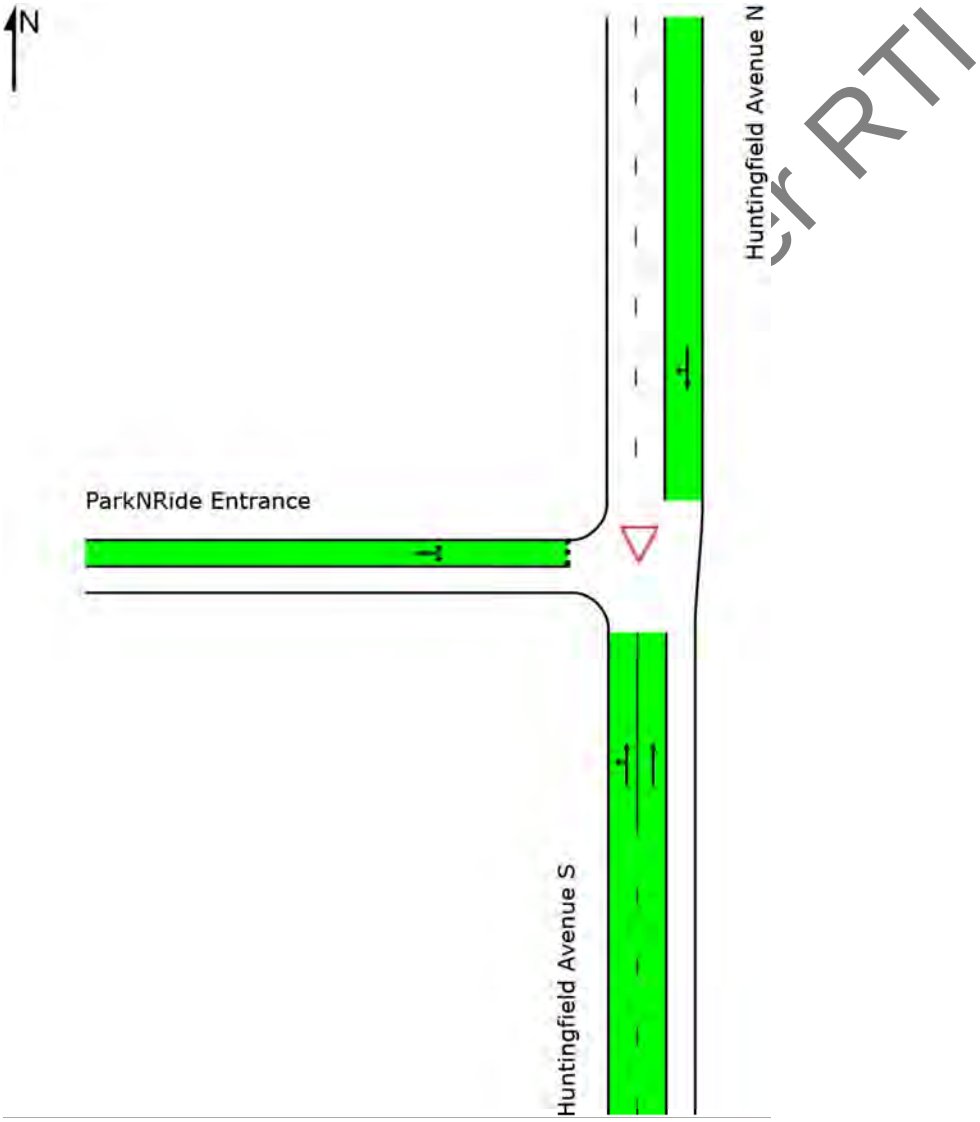
Lane Level of Service

Site: I03 [I03-HuntingfieldAve/ParkNRideEntrance-PM-Prop]

Network: N101 [PM Proposed]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: I03 [I03-HuntingfieldAve/ParkNRideEntrance-PM-Prop]

Network: N101 [PM Proposed]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Huntingfield Avenue S														
1	L2	8	12.5	8	12.5	0.064	5.1	LOS A	0.0	0.0	0.00	0.05	0.00	46.6
2	T1	227	7.9	227	7.9	0.064	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.7
Approach		235	8.1	235	8.1	0.064	0.2	NA	0.0	0.0	0.00	0.03	0.00	49.6
North: Huntingfield Avenue N														
8	T1	156	7.7	156	7.7	0.124	0.5	LOS A	0.4	3.3	0.19	0.10	0.19	47.4
9	R2	37	35.1	37	35.1	0.124	4.4	LOS A	0.4	3.3	0.19	0.10	0.19	40.5
Approach		193	13.0	193	13.0	0.124	1.3	NA	0.4	3.3	0.19	0.10	0.19	46.4
West: ParkNRide Entrance														
10	L2	47	0.0	47	0.0	0.053	5.0	LOS A	0.2	1.4	0.23	0.52	0.23	30.1
12	R2	15	0.0	15	0.0	0.053	6.6	LOS A	0.2	1.4	0.23	0.52	0.23	40.1
Approach		62	0.0	62	0.0	0.053	5.4	LOS A	0.2	1.4	0.23	0.52	0.23	34.1
All Vehicles		490	9.0	490	9.0	0.124	1.3	NA	0.4	3.3	0.10	0.12	0.10	46.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E Bus Service Model Report

DEPARTMENT OF STATE GROWTH

CONFIDENTIAL

Hobart City Deal: Southern Projects

Park and Ride Bus Service Model Report

Question today
Imagine tomorrow
Create for the future

Hobart City Deal: Southern Projects
Park and Ride Bus Service Model Report

Department of State Growth

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REV	DATE	DETAILS
A	10/03/2020	Draft
B	12/05/2020	Final

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Prepared by:	s 36 [redacted]	21/04/2020	s 36 [redacted]
Reviewed by:	[redacted]	11/05/2020	[redacted]
Approved by:	[redacted]	12/05/2020	[redacted]

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EXECUTIVE SUMMARY

OVERVIEW

The Hobart City Deal Southern Projects seeks to encourage modal shift in favour of public transport to address congestion and accessibility issues along the Southern Corridor. The Project is comprised of five sub-projects that together provide a comprehensive, multi-faceted approach.

This report is for sub-project 4 – preparation of a park and ride bus service model to support the two identified Kingborough park and ride facilities at Huntingfield and Browns Road, Firthside (sub-project 3). During the study, it was decided that no changes to bus routes would be made to improve servicing of the Browns Road, Firthside site, given the existing high level of service and challenges in providing sufficient parking capacity and additional operational benefits there; thus, the proposed bus service plan focuses on service improvements to the Huntingfield site.

The recommended park and ride bus service model is aimed at providing a fast and attractive bus service to Hobart city centre to attract a shift to bus from private vehicle drivers on the Southern Outlet. The bus service model would comprise an all-day express park and ride service from Huntingfield via the Southern Outlet, supported by additional peak period express bus services on the Huon Highway and Channel Highway and from Blackman's Bay for existing bus riders to reduce the risk of customers switching from bus-only trips to park and ride.

Existing bus services that use the Southern Outlet operate to the Hobart CBD via Kingston Central. This, combined with the low frequency of existing bus routes in Kingborough, makes park and ride relatively unattractive (though there is some informal park and ride at Huntingfield, Browns Road and elsewhere in Kingston, surveys have suggested this demand is small). Bus service improvements that substantially reduce travel times to the Hobart CBD and improve directness would be required to attract private vehicle commuters. Services should be frequent, especially in peak times.

The proposed park and ride bus service from Huntingfield, making use of planned bus priority measures on the Southern Outlet, and Macquarie and Davey Streets in the city, would provide comparable travel times to private car and would have capacity for around 100 passengers per hour, potentially providing a noticeable reduction in traffic congestion on the Southern Outlet at peak times, should the service be well-used by private vehicle drivers. By making use of planned bus priority measures on the Southern Outlet, this service would provide a saving of some 22 minutes on the current bus travel time to Hobart city centre. The proposed bus priority measures would also provide travel time benefits to existing bus services, as well as the proposed new peak period express buses on the Huon Highway, Channel Highway and Blackmans Bay.

There are three main customer groups for park and ride in Kingborough: the Channel Highway communities south of Huntingfield and commuters from the Blackmans Bay area (served by the Huntingfield park and ride site), as well as the private vehicle commuters in the Huon Valley (served by the Browns Road, Firthside park and ride site) . The Huntingfield park and ride site is not well-located to serve commuters from communities along the Huon Valley because of the limitations of the road network.

In any park and ride program there is a risk that current bus commuters will shift to park and ride instead of catching the bus at their nearest stop if it offers benefits (travel time, frequency, quality, cheaper fare) over existing bus services. This can potentially reduce bus network revenue, increase car travel, and require additional investment in park and ride facilities. This risk can be reduced by ensuring that park and ride customers are not the only ones to receive benefits. Accordingly, the recommended park and ride bus service model includes new peak period express bus services on the Huon Highway, the Channel Highway, and from Blackmans Bay. These services would substantially reduce travel times for Hobart-bound bus commuters by operating direct via the Southern Outlet instead of via Kingston Central and may and attract new bus commuters as well as improving the experience for Hobart bus customers. We recommend that these express services be introduced prior to the park and ride service so that existing bus customers are less inclined to shift to park and ride.

RECOMMENDED BUS SERVICE MODEL

The figure below shows the recommended park and ride bus service model comprising:

- A new express park and ride bus route commencing at Huntingfield park and ride and operating direct via the Southern Outlet to Hobart city centre and return. The service would operate all day, with peak period frequency being 2 buses per hour. During the interpeak period, the route could be modified to operate via Kingston Central, at the cost of 5-minute longer travel time. The service should operate all-day to provide customers with flexibility;
- A weekday peak period only express variant of Tassielink services on the Huon Highway, providing one bus per hour between Huonville and Hobart city centre direct via the Southern Outlet. The service would operate in the peak direction only (ie to Hobart in the morning peak and to Huonville in the afternoon);
- A weekday peak period only express variant of Metro urban fringe services on the Channel Highway (commencing at Snug) providing 2 buses per hour between Snug and Hobart city centre direct via the Southern Outlet. The service would operate in the peak direction only (i.e. to Hobart in the morning peak and to Snug in the afternoon);
- A weekday peak period only express variant of Metro services from Blackmans Bay to Hobart city centre via Algona Road and the Southern Outlet, providing 2 buses per hour between Blackmans Bay and Hobart city centre. The service would operate in the peak direction only (i.e. to Hobart in the morning peak and to Blackmans Bay in the afternoon);

The recommended park and ride and supporting bus services would be integrated with the rest of the southern bus network, operating as new routes or route variants.

Figure ES.1 Recommended Park and ride and peak period only express services.

OPERATIONAL CONSIDERATIONS

The following key operational considerations and improvements have been identified to support the recommended bus service model:

- A bus stop, with space for up to 2 buses at a time, would be required at Huntingfield park and ride to accommodate the new park and ride bus service as well as existing Huntingfield terminal routes. A bus layover space would also be required at Huntingfield, as the park and ride route would terminate at Huntingfield.
- In Hobart city centre, the central city bus station has limited capacity, and the Department of State Growth has recently commissioned a study on the feasibility of an expanded bus station on the site. Bus layover space (where buses are parked empty between trips) is particularly constrained.
- While space in Hobart city centre bus station is constrained, there is sufficient space to accommodate park and ride and related bus improvements within the bus station.
- The southern corridor park and ride bus route can set down passengers at Stop M in Macquarie Street, west of Elizabeth Street (the stop can be extended to the west if required).
- This route (and the additional Huon Highway and Channel Highway peak-only express services) can operate from Stop P in Macquarie Street at Franklin Square (the stop has space for 3 buses at a time). It may be necessary to make some use of Stop N, which is used by South Hobart services.
- Impacts on layover parking can be minimised by reducing city-end recovery time, with more layover time at the outer termini.

INDICATIVE BUS SCHEDULES AND COSTS

Indicative bus schedules have been prepared to demonstrate how the proposed park and ride bus service model can be integrated with the existing Metro and Tassielink bus network. These indicative schedules were used in the Remix bus costing mode (using Department of State Growth operating cost rates) to identify potential operating costs for the recommended services. It should be noted that this assessment has not been able to take into account interlining of recommended services with existing services (interlining optimises the fleet and crew required to operate services in a network) so in practice, operating costs may be substantially less when costed as part of the whole network.

Operating cost estimates are shown in the table below. Using Remix, the recommended bus park and ride service from Huntingfield would require 2 buses to operate and would have an estimated annual operating cost of some $523,000.

The supplementary peak period express services from Blackmans Bay, Snug and Huonville would require up to another 7 buses to operate (though this could be reduced through interlining) and estimated annual operating costs of some $358,000 (Huonville), $373,000 (Blackmans Bay) and $492,000 (Snug).

Table ES.1 Summary of operating costs for proposed routes

	Huntingfield Park and ride		**Blackmans Bay Express**		**Snug Express**		**Huonville Express**	
	Peak	**Off-peak**	**Service**	**Special**	**Service**	**Special**	**Service**	**Special**
Fixed costs (annual)	**$118,823.78**		**$118,823.78**		**$178,235.67**		**$118,823.78**	
Fixed cost per bus	*$59,411.89*		*$59,411.89*		*$59,411.89*		*$59,411.89*	
No. buses required	*2*		*2*		*3*		*2*	
Distance costs (daily)	**$455.36**	**$344.74**	**$356.33**	**$234.36**	**$462.17**	**$242.42**	**$384.05**	**$191.77**
Cost per kilometre	*$1.26*	*$1.26*	*$1.26*	*$1.26*	*$1.26*	*$1.26*	*$1.26*	*$1.26*
Route kilometres (daily)	*361.4*	*273.6*	*282.8*	*186.0*	*366.8*	*192.4*	*304.8*	*152.2*

	Huntingfield Park and ride		Blackmans Bay Express		Snug Express		Huonville Express	
	Peak	**Off-peak**	**Service**	**Special**	**Service**	**Special**	**Service**	**Special**
Route length (inbound)	*13.8*	*15.4*	*20.3*	*18.8*	*26.2*	*24.3*	*38*	*38.3*
Route length (outbound)	*14*	*15*	*20.1*	*18.4*	*26.2*	*23.8*	*38.2*	*37.8*
Trips (inbound)	*13*	*9*	*7*	*5*	*7*	*4*	*4*	*2*
Trips (outbound)	*13*	*9*	*7*	*5*	*7*	*4*	*4*	*2*
Route km (inbound)	*179.4*	*138.6*	*142.1*	*94*	*183.4*	*97.2*	*152*	*76.6*
Route km (outbound)	*182*	*135*	*140.7*	*92*	*183.4*	*95.2*	*152.8*	*75.6*
Time costs (daily)	**$785.83**		**$404.45**		**$527.60**		**$360.89**	
Wage cost (6am to 7pm)	*$33.35*		*$33.35*		*$33.35*		*$33.35*	
Wage cost (other times)	*$37.35*		*$37.35*		*$37.35*		*$37.35*	
Bus hours (6am to 7pm)	*19:05*		*11:15*		*14:42*		*10:00*	
Bus hours (other times)	*4:00*		*0:47*		*1:00*		*0:44*	
Operating cost (daily)	**$2,051.91**		**$1,461.11**		**$1,931.16**		**$1,402.69**	
Operating cost (weekly)	**$10,259.53**		**$7,305.57**		**$9,655.78**		**$7,013.43**	
Operating cost (annual)	**$523,235.93**		**$372,583.97**		**$492,444.63**		**$357,684.83**	

1 INTRODUCTION

1.1 PROJECT OVERVIEW AND OBJECTIVES

The Greater Hobart region's population and employment growth are putting increased pressure on its transport network. The growth of residential areas in Kingborough and the Huon Valley creates commuter pressures on the Southern Corridor (comprising Kingston, the Southern Outlet, and the Macquarie/Davey Street couplet) between Kingston and Hobart.

The Hobart City Deal Southern Projects (the Project) seeks to encourage modal shift in favour of public transport to address congestion and accessibility issues along the Southern Corridor. The Project is comprised of five sub-projects that together provide a comprehensive, multi-faceted approach:

- Sub-project 1: Southern Outlet Transit Lane – Concept design for a northbound transit lane on the Southern Outlet between Olinda Grove and Hobart/Macquarie Street. The lane will operate as a T3 lane for use by buses, private vehicles carrying three or more occupants, taxis, and emergency service vehicles.
- Sub-project 2: Macquarie/Davey Bus Priority – Concept design for bus priority measures on Macquarie and Davey streets that considers how to optimise bus operations while managing impacts.
- Sub-project 3: Kingborough park and ride – Concept design for park and ride facilities at two locations in the Kingborough municipality. The scope of work includes selecting two locations and developing any specific attributes of the facilities in collaboration with stakeholders. At the time of this report, two sites had been chosen – Browns Road, Firthside and Huntingfield terminus.
- Sub-project 4: Bus service plan for Southern Corridor – Developing a park and ride bus service model to support the two Kingborough park and ride facilities (sub-project 3), the Southern Outlet transit lane (sub-project 1), and the bus priority measures proposed for Macquarie and Davey streets (sub-project 2). The bus service model will be focused on encouraging modal shift to public transport with the potential for new buses, bus routes, and stops.
- Sub-project 5: Southern Outlet Transit Lane – T3 Enforcement – Concept design and a concept of operations plan for the proposed T3 lane on the Southern Outlet (sub-project 1), including the recommended locations of enforcement devices, as well as technological and legal considerations.

The project objectives are to:

- Achieve modal shift for commuters using the Southern Outlet
- Improve public transport travel reliability along the Southern Outlet corridor
- Encourage multiple occupancy of private vehicles during peak periods of travel
- Improve public transport and passenger experience for Kingborough and Huon residents.

Objectives of the park and ride Bus Service Model are to:

- Support identified park and ride sites
- Inform functional requirements for park and ride sites (feed design)
- Provide park and ride customers with a fast, frequent bus service
- Ensure bus network and service changes for park and ride minimise potential impacts on access to centres other than Hobart CBD (i.e. Kingston)
- Minimise changes to bus network and services outside of Project 2018 implementation (i.e. avoid major changes)
- Minimise increased car use by existing bus customers.

1.2 POLICY CONTEXT AND FUNDING

The Tasmanian Government has made a commitment to addressing growth through the Greater Hobart Traffic Solution (2018–2023) and Hobart City Deal (2019–2029). The Hobart City Deal is a shared 10-year vision between the Australian and Tasmanian governments and local councils, including Hobart and Kingborough councils, to guide and encourage investment to build a vibrant, liveable and connected global city.

The Hobart City Deal and Greater Hobart Traffic Solution reflect the Tasmanian Government commitment to address the current network challenges. The Project is part of a funded program of projects that include:

- $20 million for Kingborough transport infrastructure, including creating new park and ride(s) and improvements to the Kingborough bus interchange
- $35 million for a Southern Outlet transit lane
- $16 million for Macquarie and Davey Street bus priority.

The Tasmanian Government's Hobart Transport Vision (the "Vision") is a holistic plan that seeks to prioritise active and public transport modes to provide a reliable and cost-effective alternative transport system with a focus on prioritised rapid passenger transport as a competitive alternative to private car travel. The sub-projects are consistent with the Vision. They are also an opportunity to create synergies between Kingborough Council, the City of Hobart, the Department of State Growth, and the Royal Automobile Club of Tasmania (RACT), among other stakeholders, on a future vision for transport in Greater Hobart.

1.3 PROJECT BENEFITS

The key anticipated project benefits include:

- Improved public transport passenger experience for Kingborough and Huon residents
- Improved public transport travel reliability along the Southern Outlet and Macquarie/Davey streets
- Improved bus operations along Macquarie and Davey streets
- Better utilisation of transport infrastructure to address congestion
- Increased capacity along the Southern Outlet corridor
- Providing long-term solutions to meet future demand and address road safety related issues.

1.4 PROJECT LOCATION

The project is in the Kingborough municipality, Hobart City Council and Kingborough Council electorate and includes the suburbs/localities of Hobart and Kingston.

The Southern Outlet (sub-projects 1 and 5) is the primary connection between the CBD, Kingston and the southern communities in the Channel and Huon Valley. It is a dual-carriage highway that operates with effective capacity most of the day, but with regular congestion experienced in the morning peak. There is also irregular, but severe, congestion when incidents occur on the network.

The Macquarie and Davey Street couplet (sub-project 2) traverses the city, providing important access to the CBD and the waterfront, and connecting the Southern Outlet to the Domain Highway. The role of these streets, and hence their design objectives for bus passengers, changes along the corridor. The Southern Outlet and Macquarie Street near the Southern Outlet (from Antill Street to Molle Street) is primarily a movement corridor; whilst the eastern end of Macquarie Street from Molle Street to the termination of the route at Elizabeth Street has a significant number of passengers disembarking to access city destinations and interacts with existing city street activities. The reverse occurs on the outward journey – the role of Davey Street between Franklin Square and Regent Street is for passengers to be able to get on the bus from city destinations, while the top end of Davey Street through to the Southern Outlet has less placemaking activity and operates more as a movement corridor.

The park and ride facilities (sub-project 3) will be located at the southern end of the Southern Outlet near Kingston. StateGrowth undertook a site identification and evaluation process that identified two sites.

The first site is in Huntingfield, located adjacent to the roundabout interchange of the Channel Highway, Southern Outlet, Algona Road, and Huntingfield Avenue. The second site is in Firthside, located on Browns Road north of the Groningen Road overpass and on-ramp to the Southern Outlet.

Figure 1.1 displays a map of the local area showing the specific project locations.

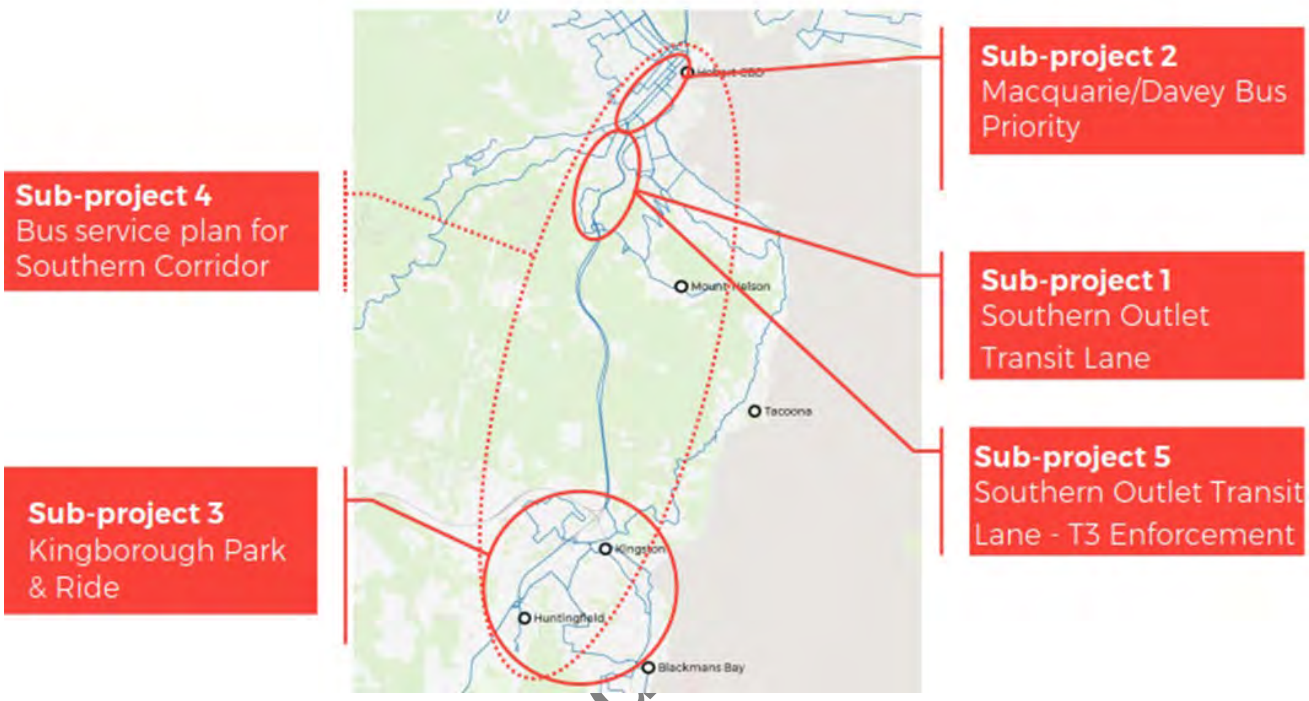

Figure 1.1 Location of sub-projects 1 to 5 within the Hobart Transport Vision

2 EXISTING CONDITIONS

2.1 STUDY AREA

The study area for the Bus Service Model extends from Hobart City Interchange to Kingston and Kingborough via Macquarie/Davey streets and the Southern Outlet. The study area also considers the Hobart Metro bus network serving Kingston, Blackmans Bay and the Channel Highway, and the Tassielink urban fringe bus network serving the Huon Valley and Summerleas.

2.2 CURRENT BUS SERVICE STRUCTURE

2.2.1 BUS NETWORK

A simplified schematic diagram of the Kingborough bus network using the Southern Outlet is shown in Figure 2.1 below. Kingston is a key hub where bus routes on the Southern Outlet corridor disperse to serve communities to the south and west. There are two key bus corridors south and west of Kingston:

- The Channel Highway serves communities to the south, including Huntingfield (and its nearby urban development areas), Margate, Snug and Woodbridge, with services operated by Metro
- The Huon Highway serves communities in the Huon Valley including Huonville, Ranelagh, and Geeveston. Bus services are operated by Tassielink.

In addition, suburbs south of Kingston on the isthmus towards Blackman's Bay are served by Metro routes that use Kingston as a hub.

All the bus routes on the southern corridor use bus stops in Kingston town centre before operating to Hobart city centre via the Southern Outlet or the Channel Highway via Taroona.

Kingston and Kingborough

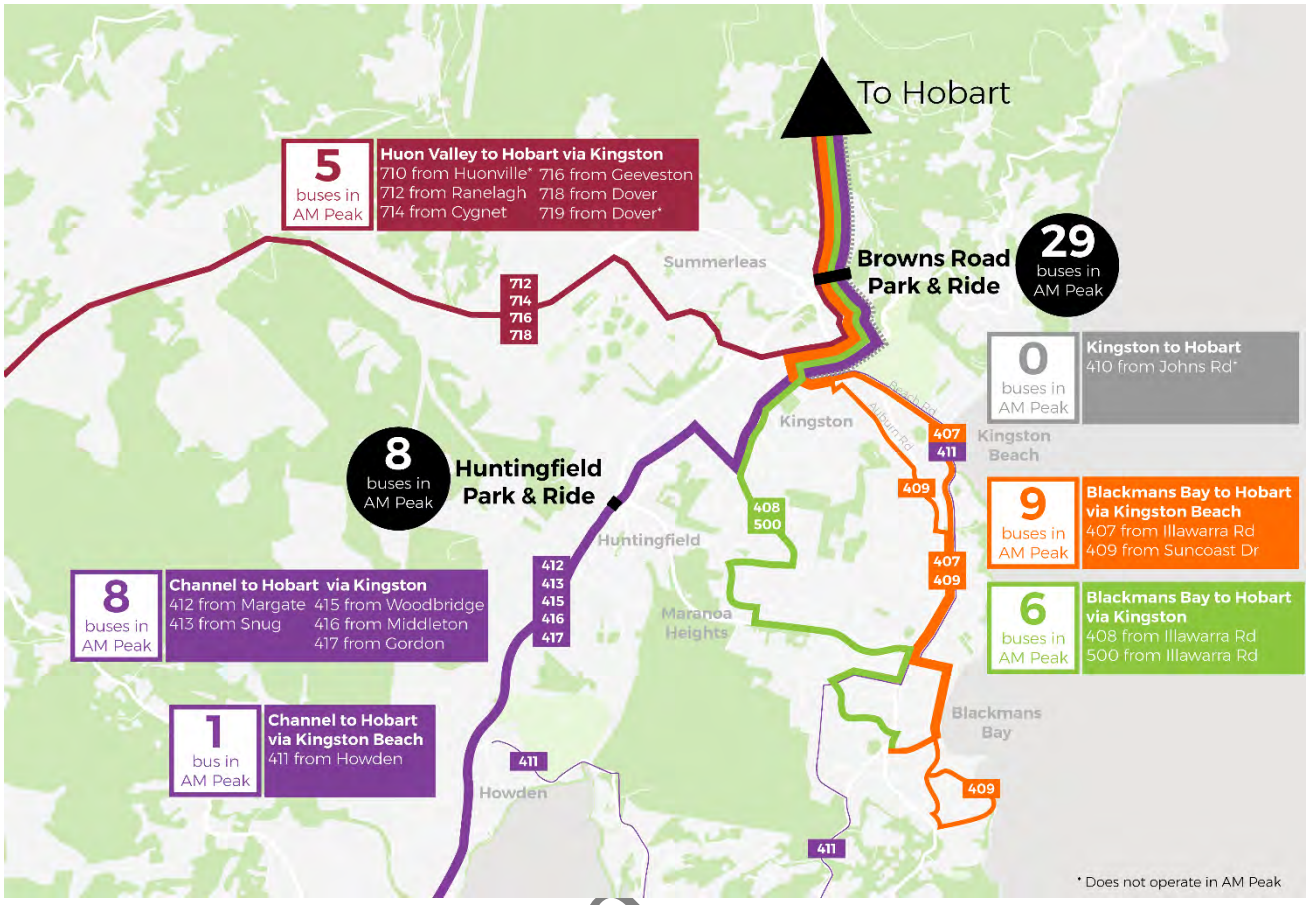

Figure 2.1 Existing bus network and inbound peak service levels in Kingston (towards Kingston/Hobart)

Table 2.1 below summarises weekday peak period frequency for bus services on the Channel Highway, the Huon Highway and in Kingston/Blackman's Bay, that operate via the Southern Outlet. In general, bus services are infrequent, with Huon Valley and Channel Highway bus services less frequent than routes serving Kingston and Blackman's Bay.

Once buses join the Southern Outlet, there are no bus stops between the Hobart city centre and Kingston's northern outskirts (though some routes divert to Hobart College during school terms).

Table 2.1 Bus routes using the Southern Outlet corridor

Corridor	Routes	AM peak inbound (arr. Hobart 6.00–9.00 am)	PM peak outbound (dep. Hobart 4.00–7.00 pm)
Kingston and Blackmans Bay	407, 408, 409, 410, 411, 500	16	14
Channel Highway	412, 413, 415, 416, 417	8	8
Huon Valley	710, 712, 714, 716, 718, 719	5	5

Macquarie and Davey streets

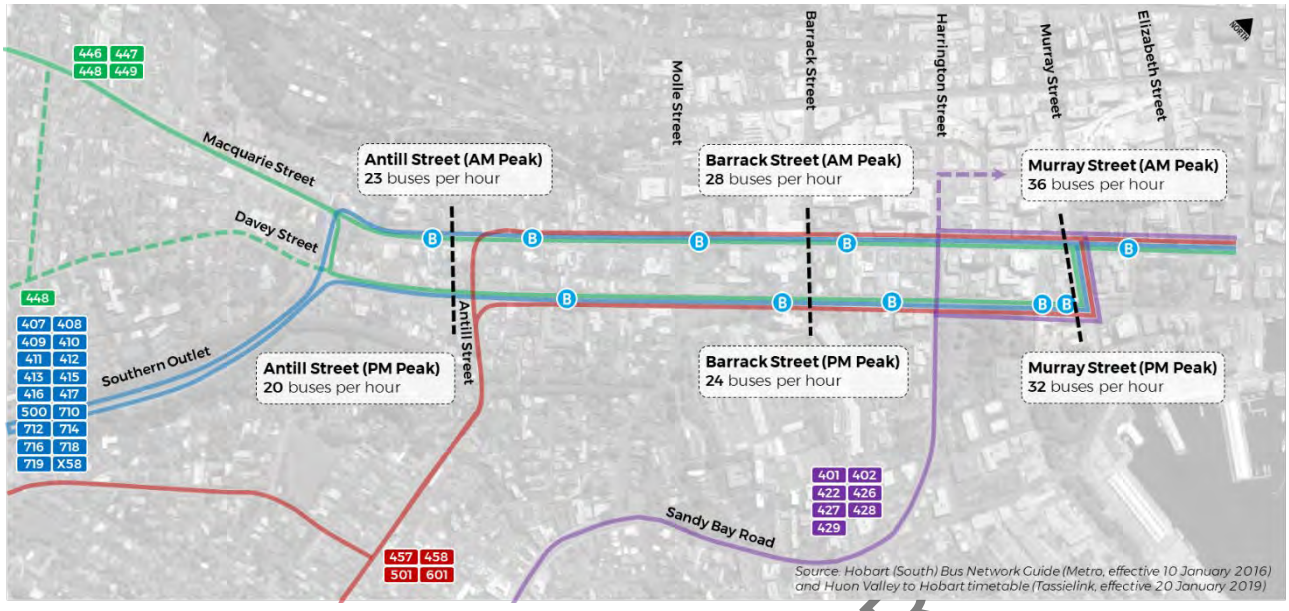

Figure 2.2 Existing bus network on Macquarie and Davey streets

Macquarie and Davey streets operate as a one-way pair between the Southern Outlet and the Hobart city centre bus station in Elizabeth and Macquarie streets, with inbound (to city) southern routes using Macquarie Street and outbound (from city) operating on Davey Street. In addition to bus routes operating on the Southern Outlet, the Macquarie/Davey Street pair is also used by South Hobart and Fern Tree services (routes 446, 447, 449 and 449) which operate west of the Southern Outlet, Sandy Bay and Mount Nelson services (routes 457, 458, 501 and 601) which join the corridor at Antill Street; and Sandy Bay Road services (routes 401, 402, 422, 426, 427, 428, 429) which join the Macquarie/Davey corridor at Sandy Bay Road. Table 2.2 breaks down the bus flows by the different route groups.

Figure 2.2 shows peak period bus flows on different sections of Macquarie and Davey streets. Highest bus flows are closer to the city as routes join the corridor. The figure also shows the current bus stop locations on Macquarie and Davey streets.

Table 2.2 Bus routes using Macquarie and Davey streets

Corridor	Routes	AM peak services (7.30–8.30 am)	PM peak services (4.30–5.30 pm)
Cascade Road	446, 447, 448, 449	5	4
Southern Outlet	407, 408, 409, 410, 411, 412, 413, 416, 416, 417, 500, 710, 712, 714, 716, 718, 719, X58	18	16
Antill Street	457, 458, 501, 601	5	4
Sandy Bay Road	401, 402, 422, 426, 427, 428, 429	8	8

Table 2.3 Existing bus volumes at various screenlines along Macquarie and Davey streets

Screenline	Corridors	AM peak services (7.30–8.30 am)	PM peak services (4.30–5.30 pm)
Murray Street	Cascade Road, Southern Outlet, Antill Street and Sandy Bay Road	36	32
Barrack Street	Cascade Road, Southern Outlet and Antill Street	28	24
Antill Street	Cascade Road and Southern Outlet	23	20

2.2.2 BUS STOPS AND INFRASTRUCTURE

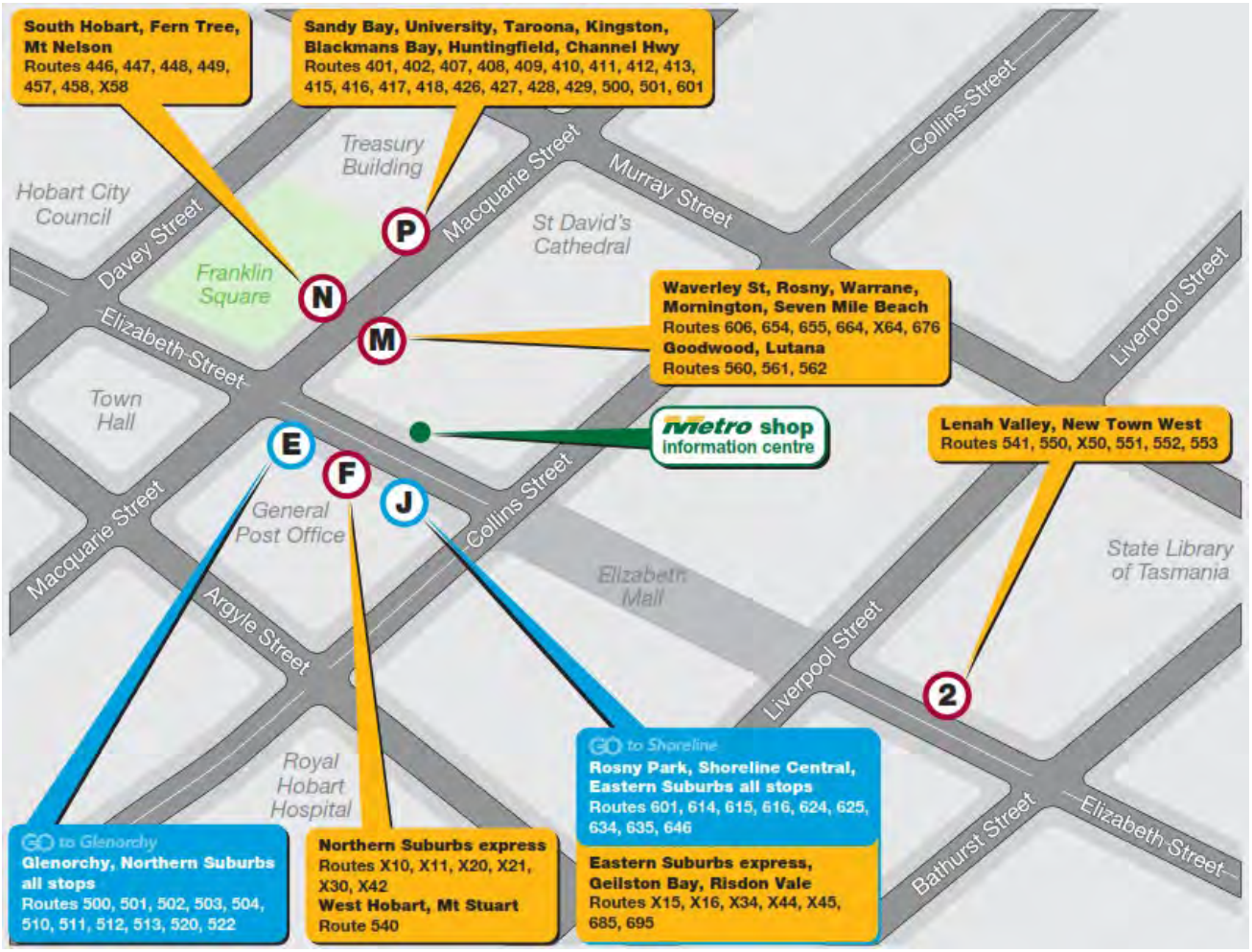

Figure 2.3 Hobart City Centre bus platforms (Metro Tasmania)

The Hobart city centre bus station is a set of on-street bus stops in Macquarie Street and Elizabeth Street. The current layout is shown in Figure 2.3. Southern bus routes via the Southern Outlet use Stop P in Macquarie Street adjacent to Franklin Square.

The Tasmanian government is investigating the feasibility of a future below-ground or surface bus station in the vicinity of the present bus station, with sufficient capacity to accommodate future bus services to 2035, including park and ride bus services from the south. Levels of passenger activity are discussed in section 2.3.

2.2.3 FORMAL AND INFORMAL PARK AND RIDE

Kingston park and ride is a designated bus park and ride facility on Denison Street Kingston, opposite the Christian Reformed Church. The park and ride can accommodate approximately 75 cars and the nearby bus stop provides access to bus routes 408, 412, 413, 415, 416, 417, 422, 428, 500, 711 and 716 to Hobart city centre.

In addition, large supplies of free car parking in Kingston Central are believed to generate informal bus park and ride at the Kingston Central bus stops.

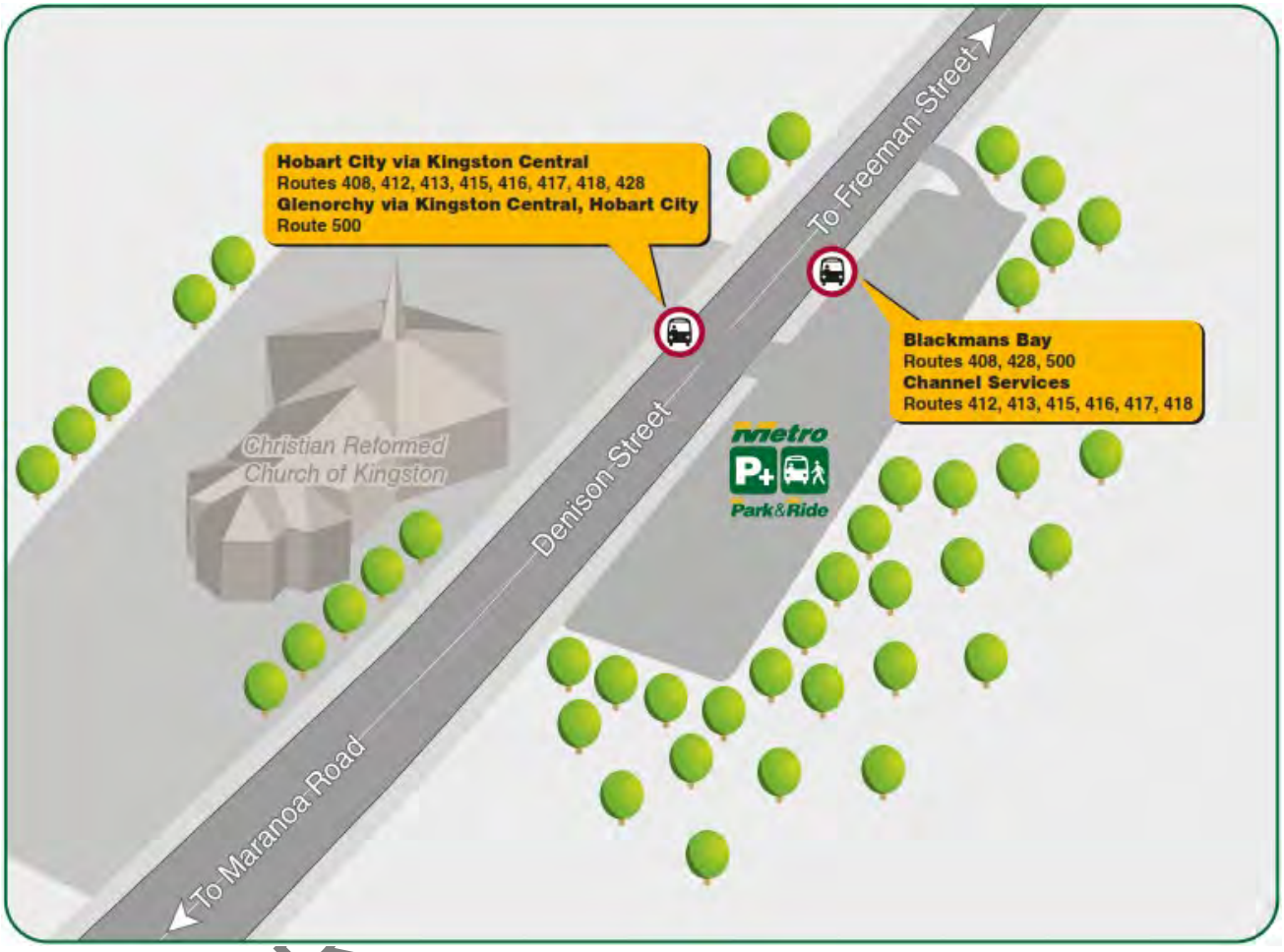

Figure 2.4 The Denison Street park and ride in Kingston (Metro Tasmania)

Informal parking is present at both the Browns Road Firthside bus stop and the Huntingfield Terminus (this site no longer operates as a terminus), shown in Figure 2.5. The Huntingfield site is off Huntingfield Avenue, on the north side of a residential area south of the Algona Road roundabout intersection with the Channel Highway and Southern Outlet, and adjacent to the Kingborough industrial area. A large Mitre 10 hardware store is located opposite the Huntingfield terminus on the east side of Huntingfield Avenue.

At Huntingfield Terminus, cars park along the unnamed loop road off Huntingfield Avenue and on vacant land between the loop road and the Channel Highway.

A survey by State Growth found that 42 cars were parked around the Huntingfield Terminus on a weekday in February 2020. The majority of parked vehicles (90 per cent) were associated with nearby businesses and residences, while just five cars parked were park and ride customers (each car carrying one bus passenger).

Park and ride customers were outnumbered by bus passengers walking from nearby residences (22) or being dropped off by car (5). There was a small but fairly steady flow of bus customers getting on buses at Huntingfield Terminus between 6.30 am and when the survey ended at 8.20 am. The day of the survey was rainy, and this may have deterred some park and ride demand.

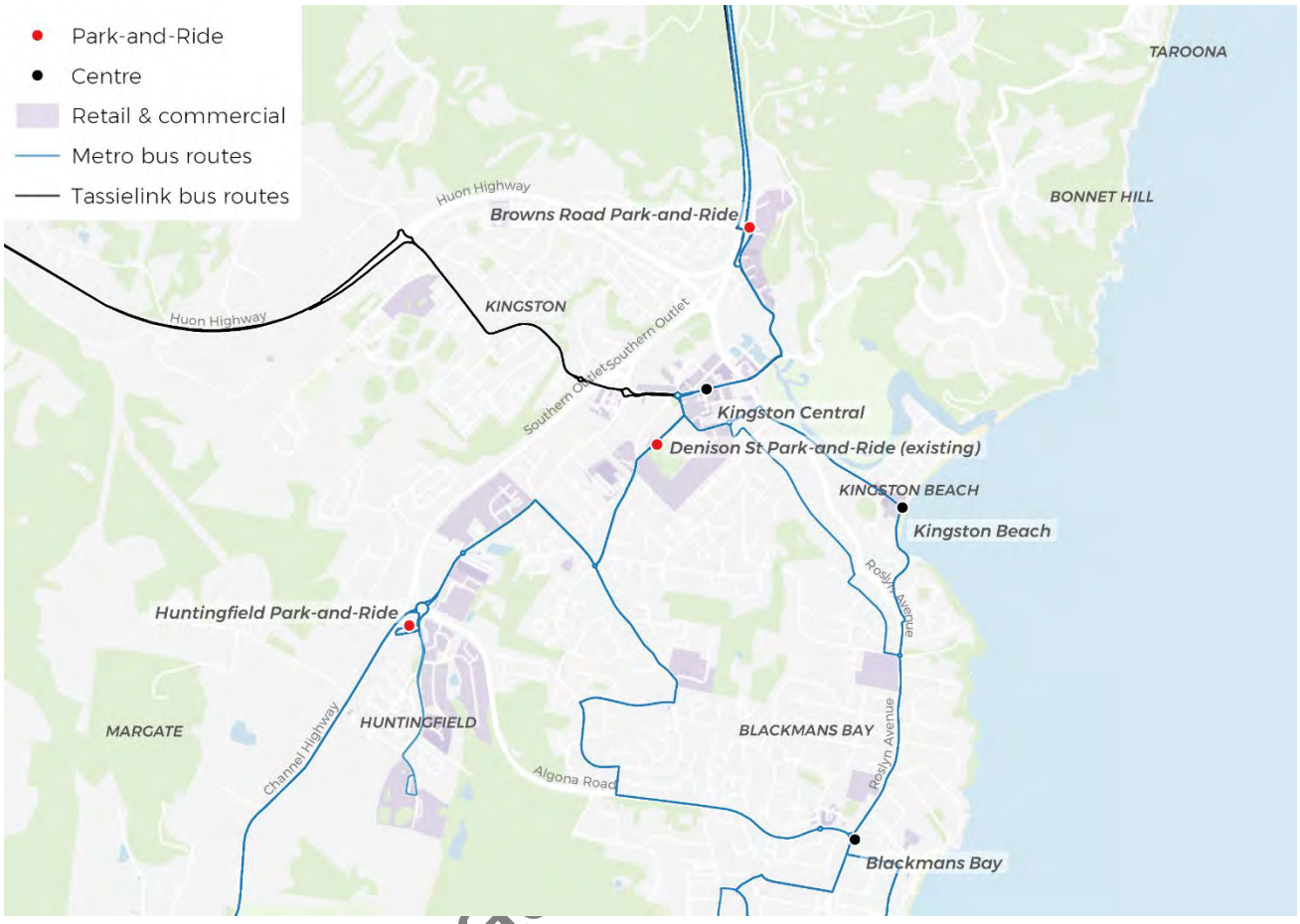

Figure 2.5 Location of the existing Denison Street park and ride and informal Huntingfield/Browns Road sites

The Browns Road Firthside site comprises on-street car parking on the west side of the Southern Outlet, generally along Groningen Road, and off-street parking on vacant land on the east side of the Southern Outlet. Some 8 vehicles typically park on the west side of the Southern Outlet, and more than 40 typically park on the land on the east side of the Southern Outlet. This car parking area is opposite the Browns Road Firthside industrial area, with a mix of small businesses operating smash repairs, vehicle repairs and machinery sales.

The inbound (to city) bus stop is off Groningen Road on the Southern Outlet on-ramp, while the corresponding outbound bus stop is on Browns Road, some 300 metres to the south (this stop location is due to the Browns Road exit from the Southern Outlet being south of Groningen Road bridge).

A survey by State Growth on a weekday in February 2020 found that, as with the Huntingfield Terminus, most cars parked there were not associated with bus park and ride. Eight cars were parked for park and ride between 6.30 am and 9.00 am, while 28 car park users were associated with adjacent businesses. As with Huntingfield Terminus, the total of bus passengers who walked to the bus stop (31) as well as those dropped by car (4) outnumbered bus park and ride customers.

Figure 2.6 Informal parking at Browns Road (left) and Huntingfield Terminus (right)

2.3 CUSTOMER TRAVEL PATTERNS

2.3.1 METRO TASMANIA

As the Metro Green Card smart card ticket records passenger boardings only, our understanding of customer origins and destinations is constrained. By looking at morning peak and afternoon peak period boardings at bus stops, we can build up a picture of the scale of demand for trips to and from destinations on the southern corridor. This information is presented in Figures Figure 2.7 to Figure 2.10 below.

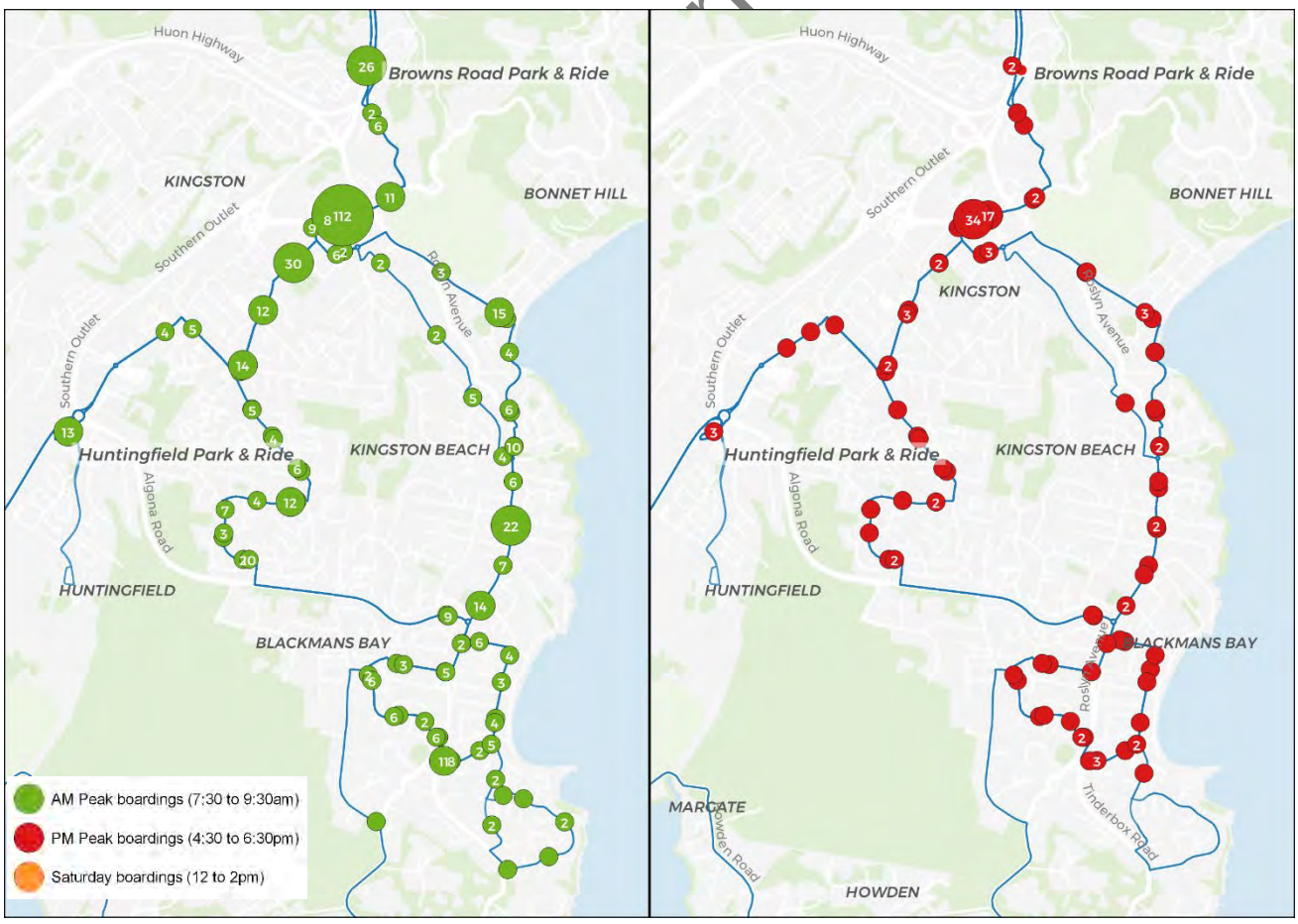

Figure 2.7 Metro Tasmania boardings in the Kingston/Blackmans Bay area (November 2019, daily average)

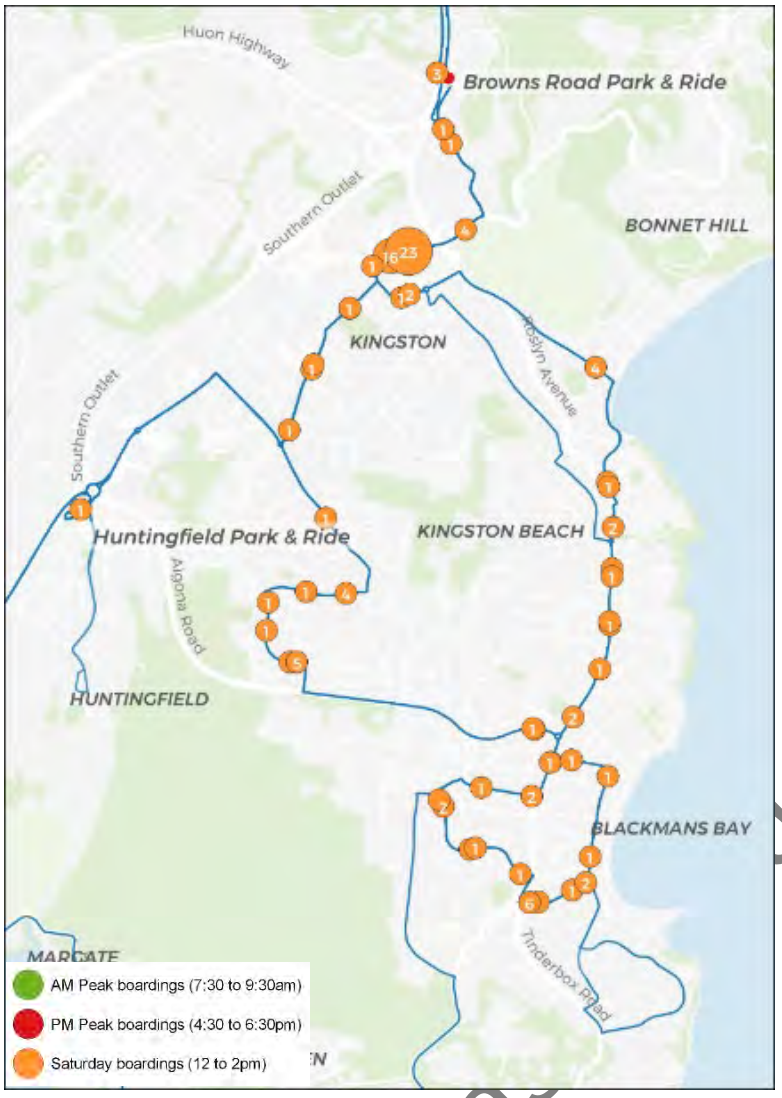

Figure 2.8 Metro Tasmania boardings in the Kingston/Blackmans Bay area (November 2019, daily average)

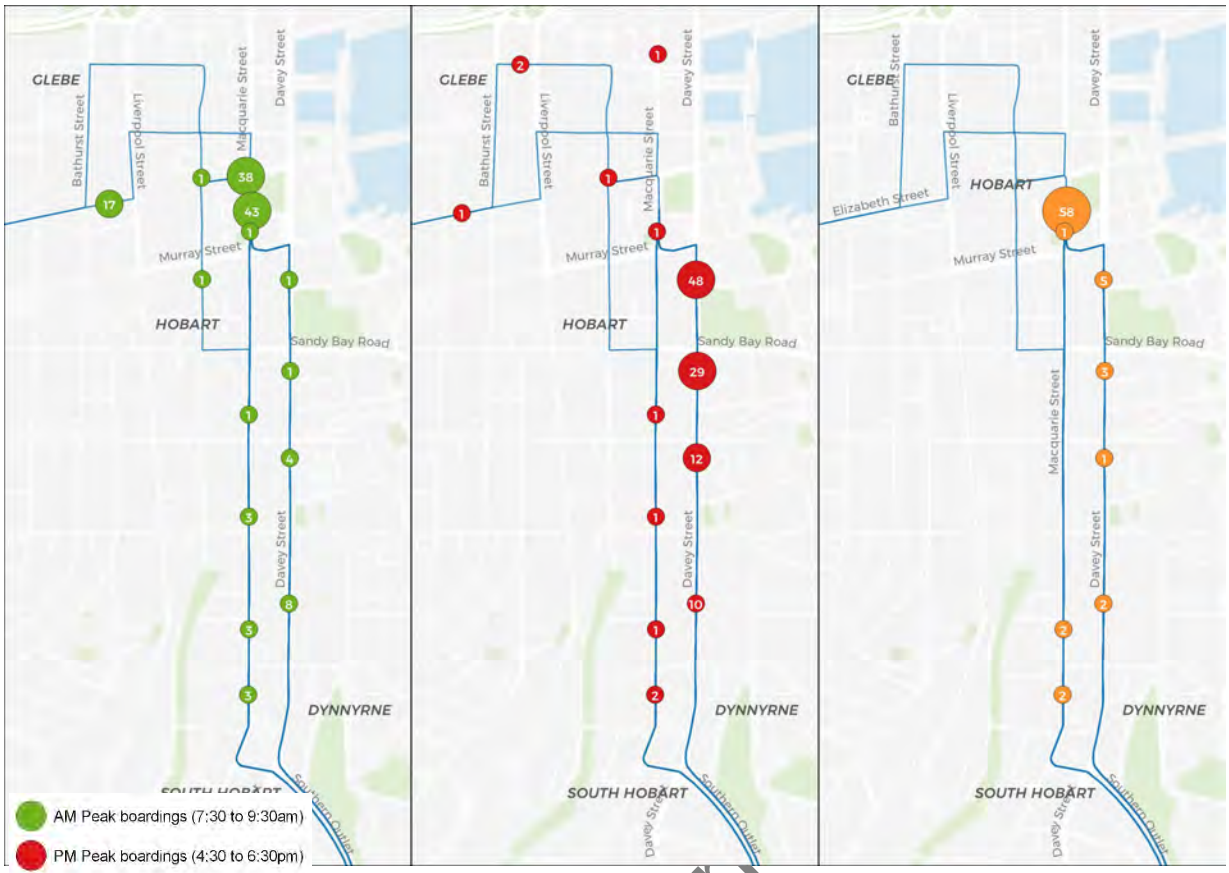

Figure 2.10 Metro Tasmania boardings on the Macquarie/Davey streets corridor (November 2019, daily average)

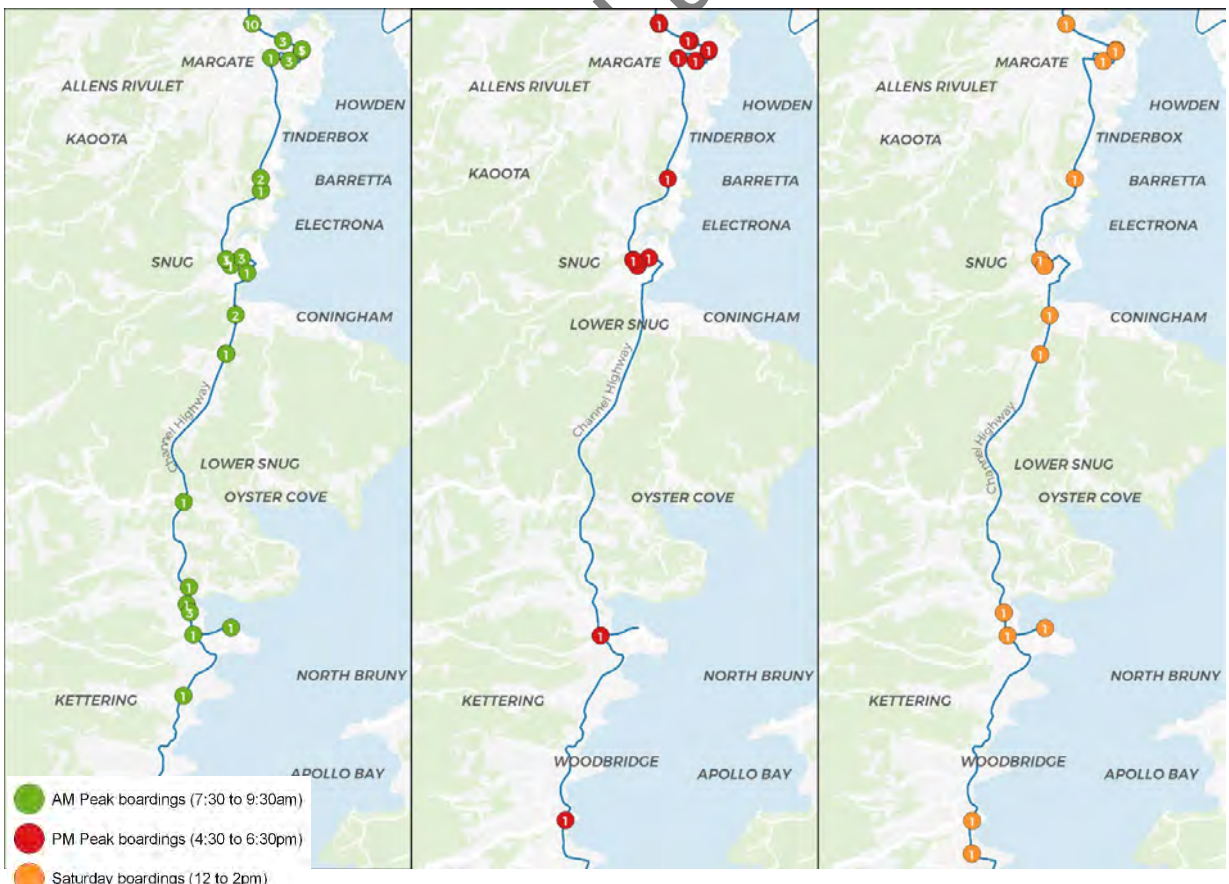

Figure 2.10 Metro Tasmania boardings on the Channel Highway corridor (November 2019, daily average)

The following conclusions can be drawn from Metro Green Card data:

- Kingston town centre is both a major origin for bus trips in the weekday morning peak period, and a destination. We can presume that morning peak boardings at Kingston primarily represent trips heading towards the Hobart CBD (and including some park and ride commuters likely using free parking in the centre), and that afternoon peak boardings at Kingston are primarily passengers who work or have visited Kingston and are travelling south.
- The level of demand for boardings at Hobart city centre bus station in the weekday afternoon peak likely reflects a strong demand for customers alighting in the city centre in the morning peak period.
- In general, the number of boardings at individual bus stops south of Kingston is low where the busiest stops are located in Blackman's Bay, Kingston Beach, Hawthorn, Huntingfield and Browns Road.
- For bus stops on Macquarie and Davey streets, customer boardings in Davey Street in the weekday afternoon peak can be used to represent likely customer alighting stops in the morning peak period. Bus stops closer to the city centre (particularly those around Sandy Bay Road) are substantially busier in peak times than bus stops closer to the Southern Outlet.

2.3.2 TASSIELINK

Tassielink data was provided for the same period of November 2019, containing all passenger boardings and including stated destinations for some (but not all) trips. Tassielink data was also not provided at the stop level, so figures are aggregated to each town or place. Destination information was also used to determine direction of travel. The Huon Valley has different peak periods of customer demand compared to Kingston or Hobart. This is due to the longer travel time to Hobart, and separate peak periods for trips towards Hobart, Kingston and Huonville for work or school. This boarding data helps to complete the picture of customer behaviour in the Kingston area as Tassielink services form an important part of the urban fringe bus network for residents in the Huon Valley and Summerleas neighbourhood of Kingston.

Figure 2.11 to Figure 2.16 outline inbound and outbound boardings for two-hour periods in the AM and PM weekday peaks and on Saturday. Several peak periods are shown to account for both the unique demand in the Huon Valley and to align with the peak periods in Kingston.

The following conclusions can be drawn from Tassielink data:

- Tassielink services have distinct peak periods for trips to Huonville, Kingston and Hobart based on the travel time to each destination and trip purpose for work or school.
- The AM peak is early in the Huon Valley for trips to Hobart (6.30 to 8.30 am), however there are slightly more boardings in Kingston during the later peak of 7.30 to 9.30 am, showing that Tassielink services supplement Metro Tasmania services in Kingston and Summerleas.
- Demand in the evening is split across three distinct peak periods for travel from Hobart, Kingston and Huonville.
- Huonville has a large number of inbound and outbound trips between 3.00 and 5.00 pm, mostly due to school students travelling to Huonville from the Huon Valley and Kingston.
- Inbound and outbound demand from Kingston is also highest between 3.00 and 5.00 pm suggesting larger numbers of school students, and moderate in the later peak periods.
- Outbound demand from Hobart is highest between 4.00 and 6.00 pm but moderate demand continues until 6.30 pm.

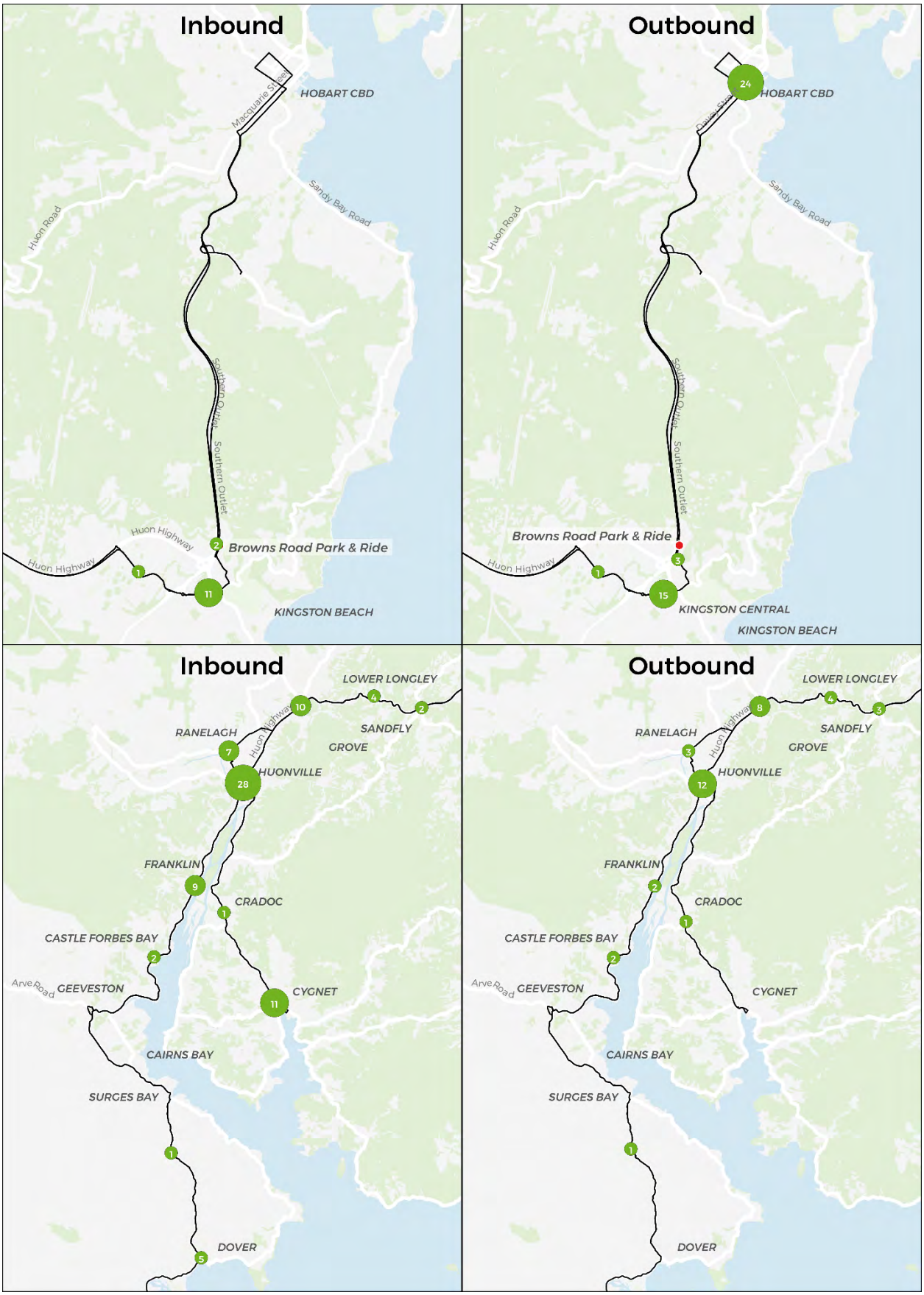

Figure 2.11 Tassielink boardings in the AM peak – 6.30 to 8.30 am (November 2019, daily average)

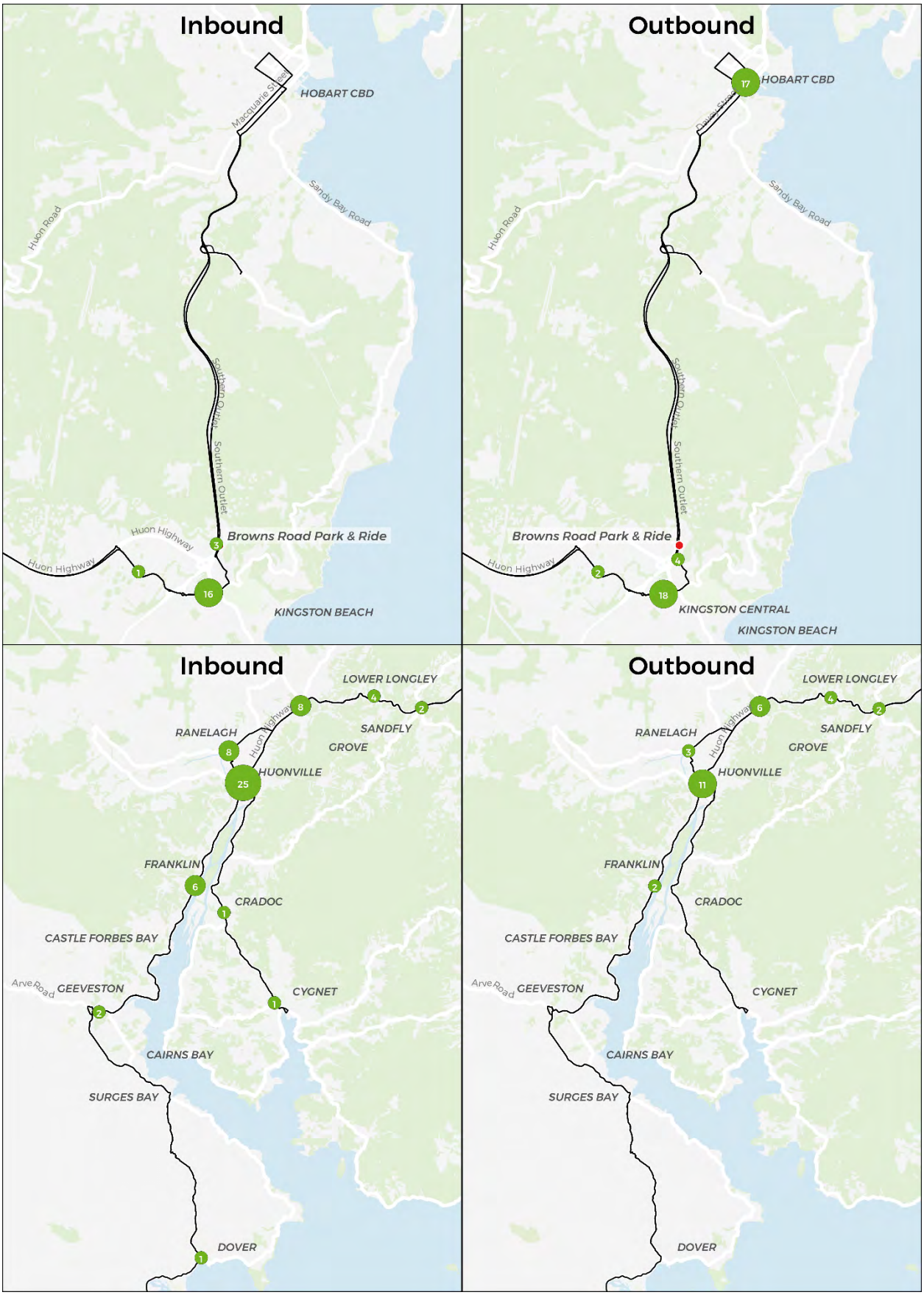

Figure 2.12 Tassielink boardings in the AM peak – 7.30 to 9.30 am (November 2019, daily average)

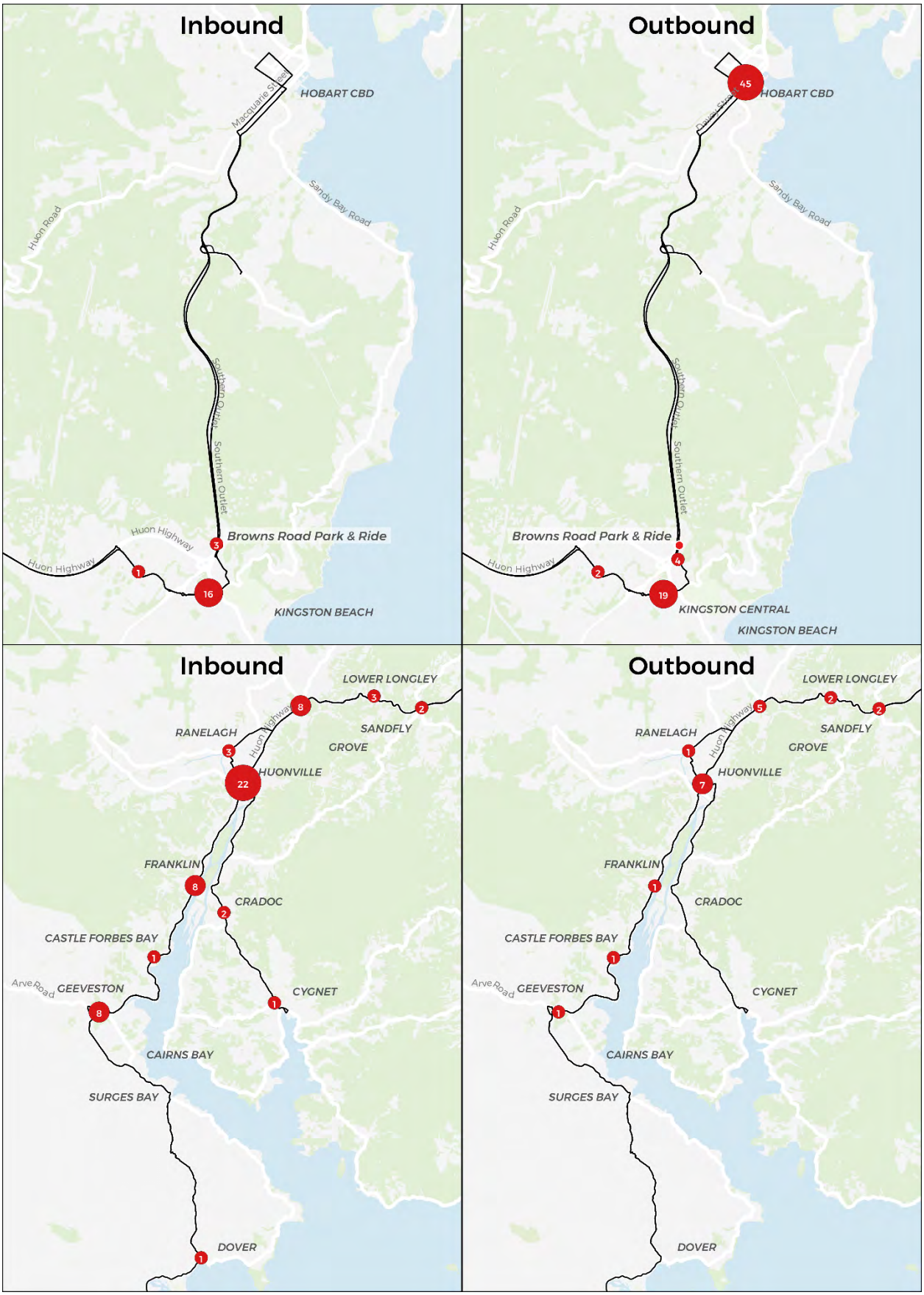

Figure 2.13 Tassielink boardings in the PM peak – 3.00 to 5.00 pm (November 2019, daily average)

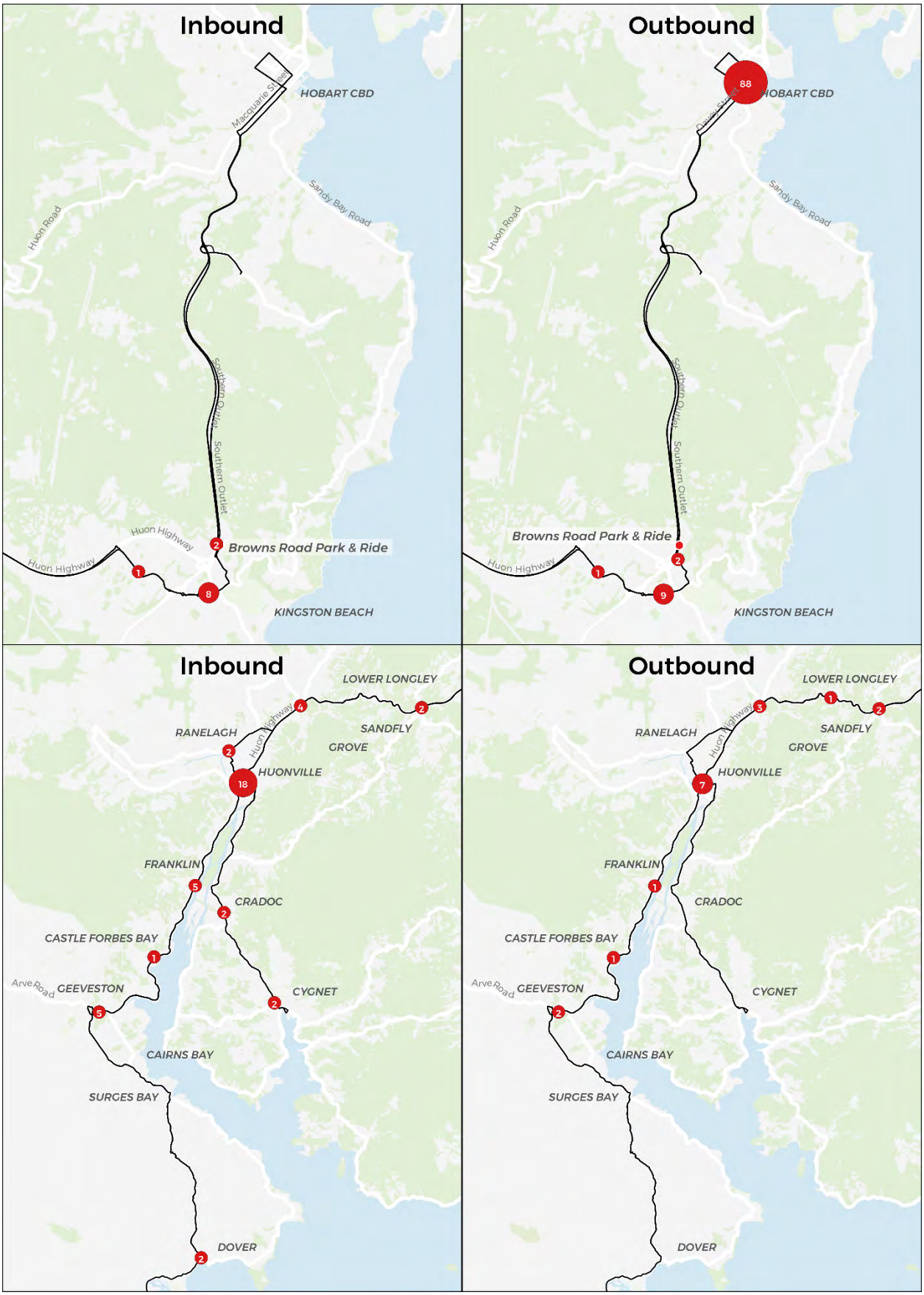

Figure 2.14 Tassielink boardings in the PM peak – 4.00 to 6.00 pm (November 2019, daily average)

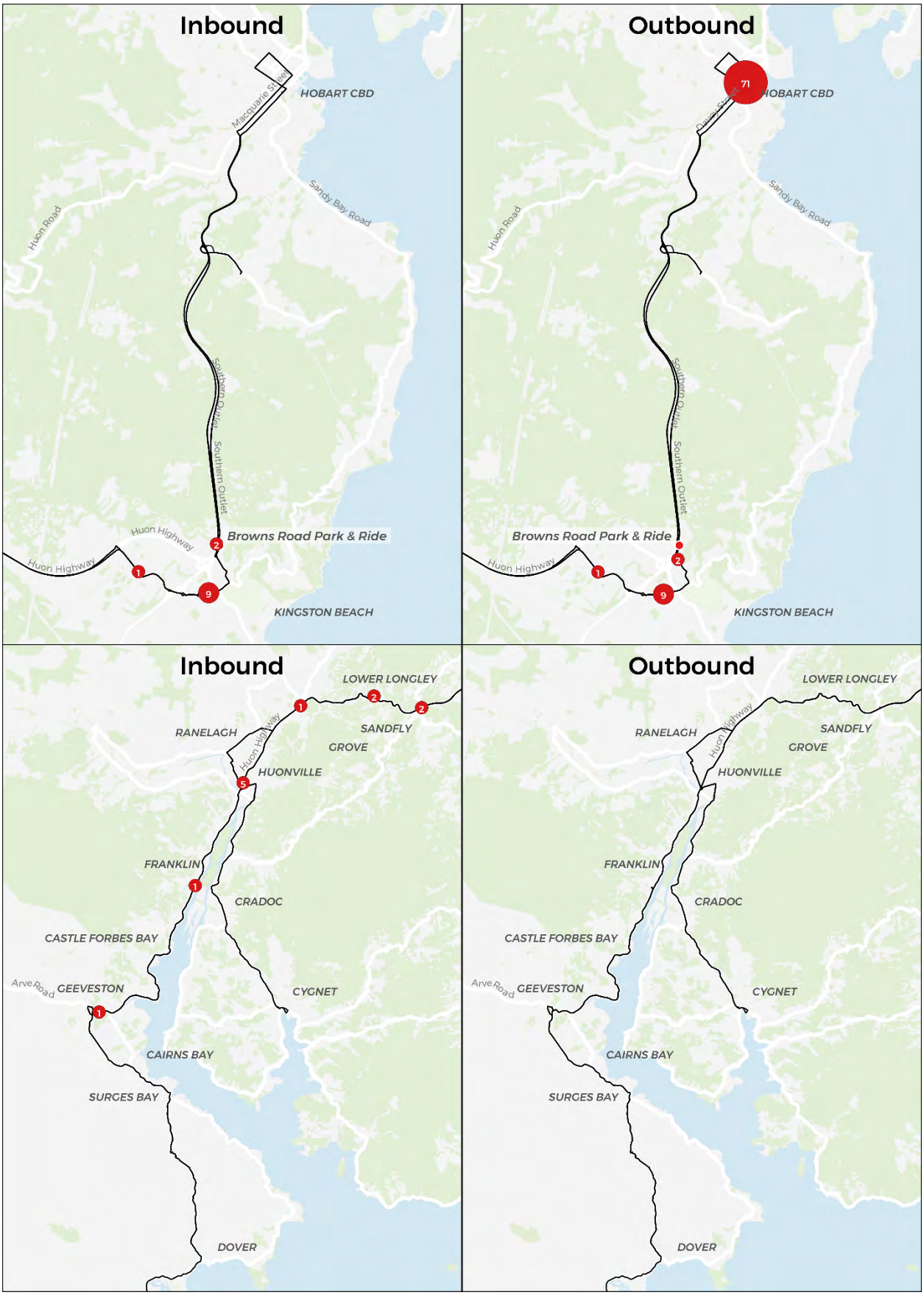

Figure 2.15 Tassielink boardings in the PM peak – 4.30 to 6.30 pm (November 2019, daily average)

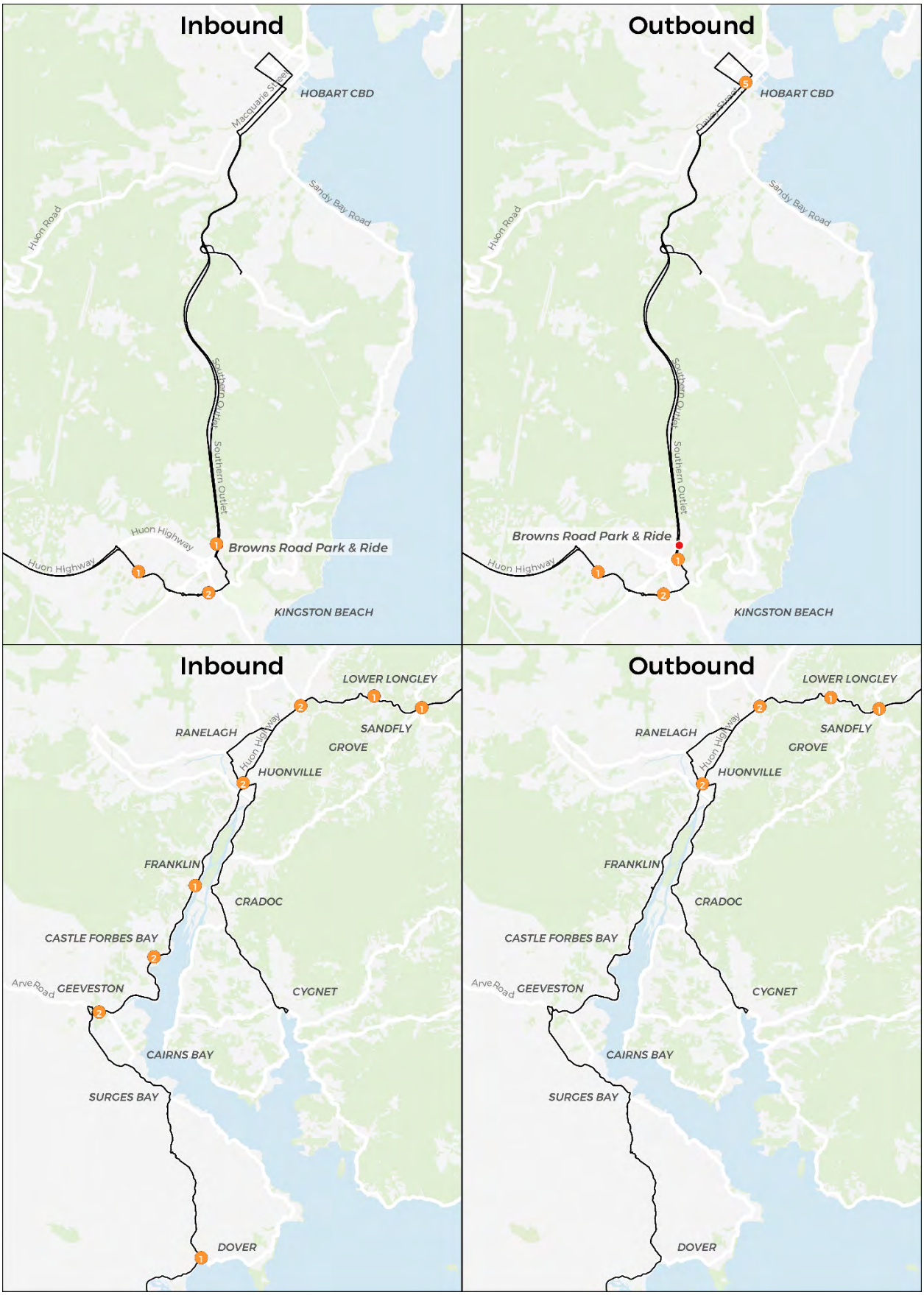

Figure 2.16 Tassielink boardings on Saturday – 12.00 to 2.00 pm (November 2019, daily average)

2.3.3 CUSTOMER APPRECIATION

It is clear from analysis of Metro and Tassielink Green Card data that there are two main weekday peak period for bus customer groups in the southern corridor:

- Customers bound for Hobart city centre from Kingston, the Channel Highway and Huon Highway corridors
- Customers bound for Kingston (primarily using the Kingston town centre bus stops).

At present, all citybound commuters on bus services serving Kingston, Channel Highway and Huon Highway communities are taken via Kingston town centre. For Channel Highway residents south of Huntingfield, Metro bus routes divert from the Channel Highway at Redwood Road on their way to Kingston. Huon Highway Tassielink bus routes leave the highway at Summerleas Road to access Kingston town centre and return to the Southern Outlet at Firthside.

While these routes maximise access to Kingston town centre, they provide an indirect route and additional travel time for bus customers travelling to the Hobart city centre.

There is modest demand for bus customer access to other destinations in the Kingston area, including businesses along the Channel Highway south of Kingston Town Centre and around Browns Road.

Another key customer group is private vehicle commuters to Hobart city centre, who travel via the Southern Outlet. Achieving the object of the overall project to reduce traffic congestion on the Southern Corridor relies on encouraging these customers to switch to bus park and ride, so the bus service model needs to be designed to meet their needs as much as possible.

At present, private vehicle commuters, especially on the Huon Highway corridor and Channel Highway corridor south of Huntingfield, have direct and relatively fast access to Hobart city centre via the Southern Outlet. For private vehicle users in Kingston/Blackman's Bay, Algona Road, Redwood Road, Summerleas Road, Groningen Road and Roslyn Avenue provide reasonably direct access to the Channel Highway and Southern Outlet.

To attract private vehicle users to bus park and ride, the service should be:

- Direct to the Hobart city centre
- Fast
- Frequent and reliable
- Safe and comfortable
- Legible and with supporting infrastructure and information
- Relative cost to park and ride compared with city centre parking.

In addition, private vehicle access to the park and ride sites should be as direct as possible, minimising delays or unnecessary circulation. Prospective park and ride users will be using a private vehicle and are likely to make decisions on whether or not to park and ride based on convenience relative to driving to the city. These decisions may be made daily depending on actual and perceived road conditions, as well as the park and ride service offer. Park and ride customers will be conscious of access, waiting and in-vehicle time in making this decision, so these factors are key parts of the park and ride offer.

Existing bus customers are also prospective park and ride users, particularly if they perceive that the park and ride offer is superior to the bus-only offer in travel time, directness or cost. It is better for the viability of Hobart's bus network that bus customers don't shift to park and ride.

Therefore, there is a risk that if the park and ride offer is attractive enough to encourage private vehicle users to shift to park and ride, it could also shift bus-only customers to using park and ride, potentially increasing rather than reducing car travel in the southern corridor. A bus customer who has shifted to park and ride may also potentially be lost to the public transport network through the same actual or perceived comparative convenience of car versus bus-only or park and ride (since they will be using a private vehicle for part of their journey).

Data is not available on non-user attitudes to Hobart bus services, or on the access to private vehicles of existing southern corridor bus customers, that could help us better understand their propensity to shift to park and ride. However, the 2018 Tasmanian Travel and Physical Activity Study undertaken by the Menzies Institute for Medical Research, University of Tasmania, has some useful data on bus customers and non-users. These include:

- Overall bus use in Hobart is low, at around 4 per cent of all trips. 10 per cent of bus users find the network challenging to use primarily because of unreliability of the services and a lack of information about performance of the network. Satisfaction with Metro bus services is relatively low compared to other Australian capital cities at 76 per cent.
- Kingborough residents generally live further from a bus stop than Hobart residents.
- Kingborough respondents to the surveys underpinning the Tasmanian Travel and Physical Activity Study had a low frequency of bus use, particularly on the weekends.
- Kingborough residents who used buses did so mostly for work, study, social reasons and to go shopping.
- The highest proportions of bus use are among young people (18–24) and the unemployed, while the lowest use was among employed people and those living in households with children.
- Kingborough residents have high car use compared with the rest of Greater Hobart.

The study identified the following barriers to public transport use, as identified by users and non-users:

- Bus frequency and scheduling
- Bus services not catering for complicated trips
- Preferences for other modes
- Long travel times by bus
- Accessibility issues
- On-time running
- Lack of bus services
- Network and Metro Greencard legibility issues.

The study also ranked initiatives that users and non-users considered would best encourage greater bus use. These were:

1. Real-time bus information
2. Bus priority on key corridors
3. Employer incentives for bus commuting
4. Free travel periods
5. Loyalty schemes.

3 PARK AND RIDE BUS SERVICE MODEL

3.1 KEY PRINCIPLES, SUCCESS FACTORS AND RISKS

The park and ride offer needs to be considered as a whole journey customer service, including:

- Information and trust
- Access, egress to car park
- Waiting for the bus
- On the bus
- Safety and security at car park
- Span of hours
- Frequency, directness, travel time
- Importance of brand, product and quality
- Addressing Metro's customer dissatisfaction: the frequency of the service, customer service, operating hours.

3.1.1 NATIONAL AND INTERNATIONAL BEST PRACTICE

The key objectives for park and ride as part of an integrated public transport network are:

- Extending the reach and accessibility of the public transport network, particularly into areas not well served by public transport, by allowing customers to drive a private vehicle part of the way on their journey (System Metrics Group, 2013, TfNSW, 2012, Translink, 2012, Translink, 2011, Hamer, 2010, City of Edmonton, 2009, Ginn, 2009, Department of Transport Victoria, 2008, Eddington, 2008, Dublin Transportation Office, 2005, TCRP, 2004).
- Increasing the attractiveness and use of public transport, and increasing public transport ridership by improving accessibility and offering a wider range of access options for customers (Wiseman et al, 2012, TfNSW, 2012, Translink, 2011, Ginn, 2009).
- Helping to transfer car parking demand from the central city, where costs are high and congestion impacts can be severe, to suburban locations. In the UK, some park and ride programs initially emerged as a way to overcome high parking demands in town centres, with peripheral car parks served by buses shuttling visitors to the centre, but most commuter park and ride facilities around the world aim to intercept car trips as far as possible from travellers' final destination to reduce vehicle kilometres travelled and maximise the travel time benefits of rapid transit (Eddington, 2008, Translink, 2012, Department of Transport WA, 2011, Ginn, 2009, Land Transport New Zealand, 2007, City of Edmonton, 2009).
- Easing congestion on roads by reducing vehicle trips and helping to give effect to transport plans, strategies and programs, such as emissions reduction, meeting public transport mode share targets, and supporting transport infrastructure investments, (System Metrics Group, 2013, Virginia Department of Transportation, 2013, Wiseman et al, 2012, Hamer, 2010, RPS, 2009, Marsden, 2006, Turnbull et al, 2004).
- Provision of park and ride services could also allow for land use changes within the city centre to take place. High value land which was previously used for car parking could potentially be realised for other land uses. This would not only release its potential capital gain but provide social and regeneration opportunities within the city centre (Mills et al., 2018).

In the Hobart Southern Transport Vision, a key objective, related to the third objective above, is to help relieve traffic congestion on the Southern Outlet by encouraging a mode shift from private vehicles to buses. Many cities expect park and ride investment to help shift private vehicle users to public transport users for at least part of their journey. However, this is not always achieved – investment in park and ride facilities can also replace bus, walking and cycling trips to stations and stops (Hamer 2010, Semler and Hale 2010, Transport Scotland, 2012).

Park and ride use by private vehicle users can provide substantial savings for commuters. Wang (2013) calculated that a car driver replacing a car trip to the Sydney CBD with a public transport trip (while retaining the car) can save an average of $8,141 per annum (based on an average cost of $13,026 per annum to drive to the city). The savings are greatest for those commuters who drive further, with the average Australian car commuter who lives 25 km from the CBD spending $14,639 per annum, compared with $7,432 for commuters 5 km from the CBD.

In addition, review of national and international best practice highlighted some supplementary roles and objectives. Park and ride policy work undertaken for Ridetta in the USA (Anon, 2003, p1-2) suggested that a "well- implemented park and ride program can be an effective transition strategy that introduces travellers to the benefits of transit and builds a market for future transit extensions" (Anon, 2003, p1-2); and a New Zealand national government park and ride review pointed to potential benefits for public transport service cost-effectiveness from park and ride programs, by helping to concentrate passenger demand on rapid transit routes, reducing the need for public transport servicing of lower-density areas (Land Transport New Zealand, 2007).

Park and ride are a part of most cities' public transport offers, and park and ride is often given a high degree of prominence in many cities' public transport strategies and capital works programs.

Most transport authorities establish modal hierarchies (or priority access modes) to encourage more sustainable modes like walking, cycling, bus and train. Car access modes (kiss-and-ride and park and ride) are generally at the bottom of the hierarchy of access modes. However, large investments are made in park and ride facilities at railway stations and bus stations, with costs per space ranging from some $20,000 to over $100,000 depending on whether the facilities are on the surface or in a multi-storey structure; and whether land needs to be purchased. This means that return on investment for park and ride is low, especially if use of the car park is free, as it is in most Australian cities.

Despite this, park and ride remains, in most cities, a minor access mode. In Greater Sydney for example, on average park and ride are used as an access mode to train stations by around one in five peak period customers (TfNSW, 2019). In bus networks, park and ride can be a small proportion of customer access. In Sydney this was estimated at some 2 per cent (Daniels and Mulley, 2011) but this reflects the lack of provision of formal park and ride facilities or promotion as a mode in most conventional bus networks. In cities with bus rapid transit services where park and ride is often provided as part of the service offer, such as Auckland, Brisbane, Adelaide and Sydney, park and ride use as an access mode can be higher, but is still a minority access mode. On Sydney's Northern Beaches B-Line, with 900 formal park and ride spaces, park and ride use is some 10 per cent of boardings (TfNSW, 2019). In Auckland's Northern Busway, with 1,500 spaces, park and ride is estimated at 13 per cent of boardings (Auckland Transport, 2019). On Brisbane's busways, some 12 per cent of boarding customers used park and ride (TMR, 2019).

One outcome of increasing park and ride supply can be the abstraction from other more efficient access modes. DPTI in Adelaide acknowledges that increases in park and ride supply at Adelaide O-Bahn stations did not increase O-Bahn patronage, despite the expanded car parks being fully utilised. It is likely that new park and ride users previously walked, cycled, were dropped off or caught feeder buses to the busway stations.

Effective bus park and ride services feature:

- Interception of private vehicle trips as far as possible from the city centre to reduce VKTs
- Have fast, direct, frequent and high quality services
- Have high legibility (often provided through branded services, special fleet or livery) and good transport information
- Have high quality passenger facilities
- Have secure car parks, but efficient access and egress
- Accommodate access by other modes.

Figure 3.1 Sydney Northern Beaches B-Line showing high quality passenger stops with real-time information

3.1.2 CUSTOMER NEEDS

The park and ride facilities will be used by many different customer groups, each with their own unique needs.

Existing park and ride users

Some bus customers are already using informal parking facilities at Browns Road and Huntingfield to access Kingston Town Centre and the Hobart CBD for work and other activities. Their needs include:

- Maintained access to parking facilities
- Maintained bus service coverage to existing destinations including Kingston Town Centre and Hobart CBD (particularly for Huntingfield).

Existing bus customers from Kingston/Blackmans Bay, the Huon Valley and the Channel Highway

This customer group includes those who use the existing bus network to travel from the Kingston/Blackmans Bay area to Hobart CBD. Customers using the existing bus network need:

- Fast and direct service to Hobart CBD
- Travel times that are competitive with using park and ride (to discourage them from becoming park and ride users).

Non-bus users

Non-bus users are potential park and ride customers who currently commute to Hobart by private vehicles. To attract these customers to park and ride we need:

- Direct and convenient access to the parking facilities (with minimal queueing and circulation)
- A bus trip that is fast, convenient and competitive with driving times
- A secure carpark while cars are parked and unattended for long periods of time
- Relative cost to park and ride compared with city centre parking.

Kiss-and-Ride

In addition to customers who park at the facility, there are expected to be many "kiss-and-ride" customers who are dropped off and picked up from the facility. These customers need:

- Direct and convenient access for cars in and out of the facility, avoiding delays from parking cars including having to enter/circulate around the car park itself.

Active transport users

Both Browns Road and Huntingfield serve a pedestrian/cycling catchment and will continue to do so once upgraded. The needs of active transport customers include:

- High quality paths and crossing facilities at and leading up to the site
- Safety and security such as lighting, emergency call buttons and safe separation from vehicles
- Direct access leading to bus stops, avoiding long crossing times and circuitous delays around car or bus infrastructure
- End of trip facilities for bicycles such as secure lockers to encourage cycling and reduce the risk of theft.

Bus operators

Bus operators have a key interest in protecting the patronage and operational efficiency of their services. Their needs include:

- Strategies to reduce the risk of patronage decline on existing bus routes
- Fleet, scheduling and operational costs.

Local businesses

Site visits confirmed that many existing users of the informal parking sites are patrons or employees of surrounding local businesses. The key need for this group is to maintain parking supply and access for these uses to avoid impact to businesses or inconvenience to the local community.

3.1.3 RISKS

The key risk of upgraded park and ride facilities and express services is that citybound customers will abandon existing services that take a slower, less direct route, decreasing the viability of existing bus services and not achieving the mode shift objective that would help reduce congestion in the corridor.

The current low level of park and ride use also means that investment in upgrading and formalising car parks at Browns Road, Firthside and Huntingfield may primarily benefit non-bus users including local residents and visitors and employees of nearby businesses – this is particularly the case if bus services are not also improved to encourage park and ride use.

Huntingfield is inside a fare boundary between urban and non-urban fares. Existing bus customers from settlements along the Channel Highway and Huon Highways south of Huntingfield who drive to the suburb may perceive a substantial cost saving over catching buses at their local stop. This may encourage a shift to park and ride among some existing bus customers with access to a private vehicle.

3.2 PROPOSED PARK AND RIDE SITES

Barry Watkins and Associates for the Department of State Growth identified and assessed a long list of seven sites for their potential as park and ride locations in the Kingston and Kingborough area using a Multi Criteria Analysis (MCA) process. These included two sites near Browns Road, several sites near Huntingfield and the Kingborough Sports Centre. The Huntingfield Terminus site scored most favourably due its current informal use for commuter parking, zoning and ownership, among other factors. Huntingfield received a lower score for travel time competitiveness. The Browns Road area scored highly for existing bus service provisions and travel time competitiveness however low for planning, community support and ownership constraints. The Department of State Growth decide to progress two sites for further investigation, as shown in Figure 3.2 and described below.

The **Browns Road park and ride** site is located at the intersection of Browns Road and Groningen Road in Firthside. The site is directly adjacent to the Southern Outlet interchange, providing direct and convenient access to the Hobart City Interchange. The travel time to the Hobart City Interchange is roughly 18 minutes by bus or 13 minutes by car via the Southern Outlet and Macquarie/Davey streets.

The **Huntingfield park and ride** site is located at the junction of the Channel Highway, Southern Outlet and Algona Road. The site is directly adjacent to the Southern Outlet interchange, providing direct and convenient access to the Hobart City Interchange. The travel time to Hobart City Interchange is roughly 27 minutes by bus or 16 minutes by car via Kingston Central. A faster travel time could be achieved by implementing a direct park and ride service via the Southern Outlet, bypassing Kingston Central and Browns Road.

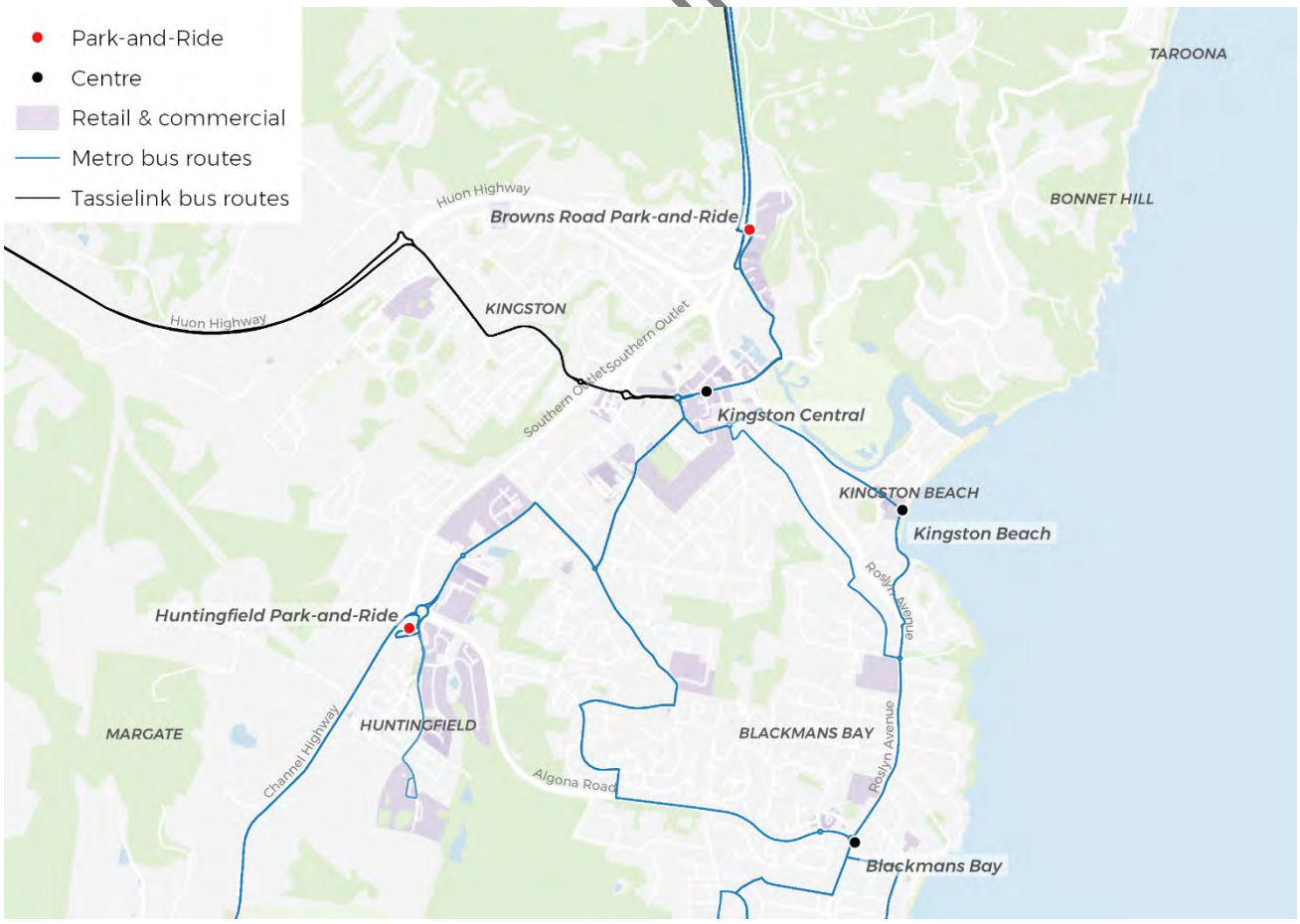

Figure 3.2 Location of the proposed park and ride sites in Kingston

3.2.1 BUS SERVICING

Existing bus routes serving the Browns Road site include the 407, 408, 409, 411 and 500 to the Kingston and Blackmans Bay area, and routes 412, 413, 415, 416 and 417 along the Channel Highway, and Tassielink services to the Huon Valley. There is a combined 10-minute frequency in peak periods, supplemented by some additional Tassielink services from the Huon Valley.

Table 3.1 Existing bus service level at the Browns Road park and ride site

Route	Area/Corridor	AM peak inbound (Arr. Hobart 6.00–9.00 am)	PM peak outbound (Dep. Hobart 4.00–7.00 pm)
407	Blackmans Bay	7:22, 7:34, 7:58, 8:13, 8:34	4:17, 4:57, 5:22, 5:42, 6:21
408	Blackmans Bay	7:13, 8:46	4:37, 5:37, 6:46
409	Blackmans Bay	7:26, 7:47, 8:18, 8.55	4:29, 5:29, 6:28
411	Kingston Beach	7:54	5:52
412	Channel Highway	6:31, 7:59, 8:18	4:51, 5:26, 6:38
413	Channel Highway	7:52	5:42
415	Chanel Highway	7:27, 8:04	4:33, 6:10
416	Channel Highway	7:08, 8:05	4:38
417	Channel Highway	–	5:12
500	Blackmans Bay	7:29, 7:45, 8:05, 8:25	5:07, 6:07
710, 712, 714, 716, 718, 719 (Tassielink)	Huon Valley	7:22, 7:52, 8:18, 8:22, 8:37	4:26, 5:26, 5:40, 5:57, 6:53
Combined headway		~ 10 mins	~ 10 to 20 mins

The Huntingfield site is served by fewer routes, including the 412, 413, 415, 416 and 417 which operate to various points along the Channel Highway corridor. The Huntingfield Terminus has a combined 20-minute frequency in peak periods.

Table 3.2 Existing bus service level at the Huntingfield park and ride site

Route	Area/Corridor	AM peak inbound (Arr. Hobart 6.00–9.00 am)	PM peak outbound (Dep. Hobart 4.00–7.00 pm)
412	Channel Highway	6:31, 7:59, 8:18	4:51, 5:26, 6:38
413	Channel Highway	7:52	5:42
415	Chanel Highway	7:27, 8:04	4:33, 6:10
416	Channel Highway	7:08, 8:05	4:38
417	Channel Highway	–	5:12
Combined headway		~ 20 to 30 mins	~ 20 mins

3.2.2 ACCESS AND TRAVEL TIME

Access to the park and ride sites

The Browns Road park and ride serve the catchments of Kingston, Kingston Beach and Blackmans Bay. Bus routes serve various corridors before converging at Kingston Central and continuing along Browns Road and the Southern Outlet towards Hobart City Interchange. The Channel Highway bus routes also serve Browns Road, however commuters in this catchment are more likely to use the Huntingfield site as its access is more direct.

Table 3.3 compares travel times by bus and car from key locations in the Kingston/Blackmans Bay area to the park and ride site. Locations in Blackmans Bay have a travel time saving of roughly 50 per cent by car compared to bus services, however bus travel times are more competitive for locations in Kingston and Kingston Beach.

Table 3.3 Comparison of bus and car travel times to Browns Road from bus stops in the Kingston area

Map ref	Bus stop name	Inbound (mins)			Outbound (mins)		
		Bus	Car	Dif.	Bus	Car	Dif.
L	Kingston Central, Channel Highway	2	2	**0**	2	2	**0**
K	Maranoa Road/Redwood Road	7	7	**0**	5	5	**0**
J	Hawthorn Drive, Kingston Fire Station	10	10	**0**	8	8	**0**
I	Algona Road/Opal Drive	16	10	**6**	13	9	**4**
H	Woodlands Drive/Edison Avenue	19	12	**7**	16	12	**4**
G	Auburn Road/Heath Court	12	5	**7**	8	6	**2**
F	Kingston Beach, Beach Road	10	6	**4**	8	6	**2**
E	Roslyn Ave/Algona Rd	17	9	**8**	13	8	**5**
D	Blackmans Bay, Illawarra Road	20	12	**8**	19	10	**9**
C	Wells Parade/Kulgoa Place	21	12	**9**	16	12	**4**
A/B	Wells Parade/Clearwater Court/Suncoast Drive	24	12	**12**	21	12	**9**

The Browns Road Firthside park and ride also serves the Huon Valley catchment to the south and west of Kingston. Tassielink services follow Summerleas Road to Kingston Central and continue along Browns Road and the Southern Outlet to the Hobart City Centre.

Table 3.4 compares travel times by bus and car from key locations in the Huon Valley to the park and ride site. Locations in Huon Valley have a travel time saving of roughly 30 per cent by car compared to bus routes to access the Browns Road site, however bus travel times are more competitive for locations closer to Kingston such as Sandfly and Lower Longley.

Table 3.4 Comparison of bus and car travel times to Browns Road from bus stops in the Huon Valley

Map ref	Bus stop name	Inbound (mins)			Outbound (mins)		
		Bus	Car	Dif.	Bus	Car	Dif.
M	Kingston Central, Channel Highway	3	3	**0**	3	3	**0**
J	Sandfly, Huon Highway/Sandfly Road	23	14	**7**	14	10	**4**
I	Lower Longley, Huon Highway/Huon Road	28	16	**12**	19	12	**7**
H	Grove, Huon Highway/Mountain River Road	35	20	**15**	25	16	**9**

Map ref	Bus stop name	Inbound (mins)			Outbound (mins)		
		Bus	Car	Dif.	Bus	Car	Dif.
G	Huonville, Bus Station, Skinner Drive	43	28	**15**	33	24	**9**
F	Ranelagh, Marguerite Street	46	26	**20**	38	22	**16**
E	Franklin, Huon Highway near Old Road	59	35	**24**	41	28	**13**
D	Geeveston, Honeywood Lane	73	50	**23**	55	40	**15**
C	Dover, Huon Highway near Station Road	94	65	**29**	80	55	**25**
B	Cradoc, Channel Highway/Cradoc Park	50	40	**10**	43	30	**13**
A	Cygnet, Esplanade Road/Channel Highway	61	45	**16**	53	40	**13**

The Huntingfield park and ride site serves the catchment south along the Channel Highway, including the towns of Margate, Electrona, Snug, Kettering, Woodbridge, Middleton and Gordon. The bus routes along this corridor share a common route, however, terminate at various points along the Highway giving a higher service level for locations closer to Kingston and Hobart.

Table 3.5 compares travel times by bus and car from key locations along the Channel Highway to the park and ride site. Stops closer to the site such as Margate and Snug have a minimal decrease, while stops further afield including Kettering, Woodbridge, Middleton and Gordon have a travel time saving of 10 to 20 minutes which equates to a 30 per cent reduction in travel time by car compared with bus.

Bus customers from these areas may be more likely to use the park and ride due to the travel time saving compared with their existing bus services and their less frequent bus service compared with locations closer to Kingston and Hobart.

Table 3.5 Comparison of bus and car travel times to Huntingfield from bus stops along the Channel Highway

Map ref	Bus stop name	Inbound (mins)			Outbound (mins)		
		Bus	Car	Dif.	Bus	Car	Dif.
I	Margate Central, Channel Highway	10	9	**1**	6	6	**0**
H	Margate, Incana Road/Brigalow Street	13	12	**1**	10	9	**1**
G	Snug Central, Channel Highway	19	16	**3**	15	12	**3**
F	Snug, Charlton Street/Cutana Parade	23	16	**7**	18	14	**4**
E	Kettering Cemetery, Channel Highway	33	22	**11**	26	18	**8**
D	Kettering, Ferry Terminal	36	24	**12**	28	20	**8**
C	Woodbridge, Channel Highway/Thomas Road	44	28	**12**	36	24	**12**
B	Middleton, Channel Highway/Beach Road	52	35	**17**	44	35	**9**
A	Gordon, Channel Highway	57	40	**17**	49	40	**9**

The Browns Road and Huntingfield park and ride sites are located off the Southern Outlet, meaning that potential park and ride customers would be required to make a detour from their journey to park at the site and board a bus when compared to an end-to-end car journey to Hobart CBD. Current users of private vehicles for travel to Hobart city centre will be conscious of the potential disadvantages of park and ride compared with an end-to-end private vehicle journey, particularly in terms of the time taken to access the car park.

Figure 3.3 and Figure 3.4 demonstrate the distance that can be travelled directly by car in the same amount of time that it takes to access the park and ride from various corridors.

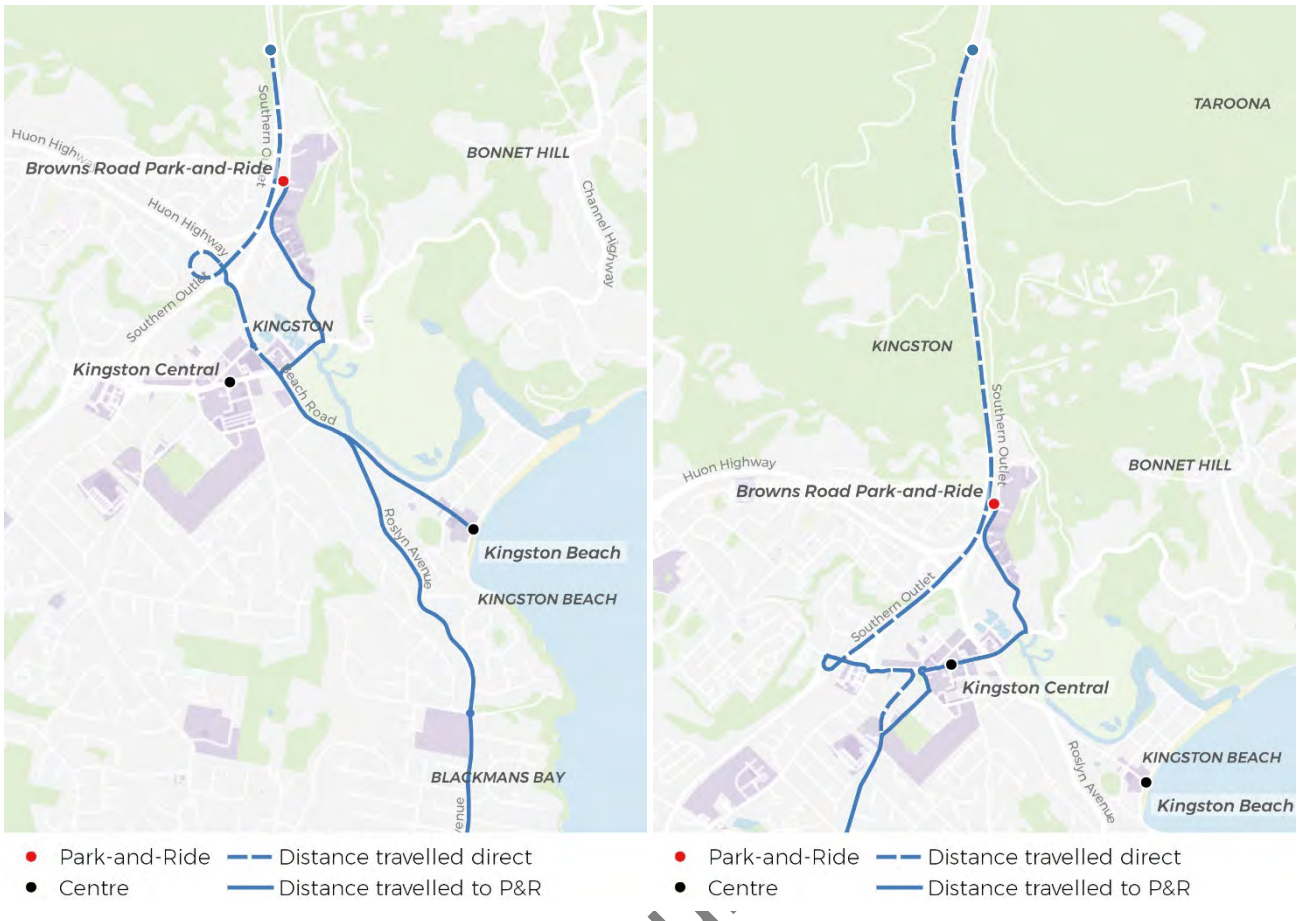

Figure 3.3 Distance covered by car vs bus in the same travel time from Kingston Beach to Browns Road (left) and from the Huon Highway to Browns Road (right)

The Browns Road site has the largest access penalty as there are no south-facing ramps at the interchange. Customers are required to drive through Kingston Central to access the site from all directions. When approaching from Rosslyn Avenue, a direct car journey reaches just a few hundred metres along the Southern Outlet when compared to the park and ride site (Figure 3.3). Customers from Maranoa Road can travel roughly 3 km further along the Southern Outlet (Figure 3.4) in the time taken to drive to the site. Customers approaching from the Huon Highway have the highest travel time penalty, and can reach Tolmans Hill by car in the time taken to access the park and ride site via Kingston Central (Figure 3.4). This highlights the potential disadvantages in encouraging private vehicle users to switch to park and ride.

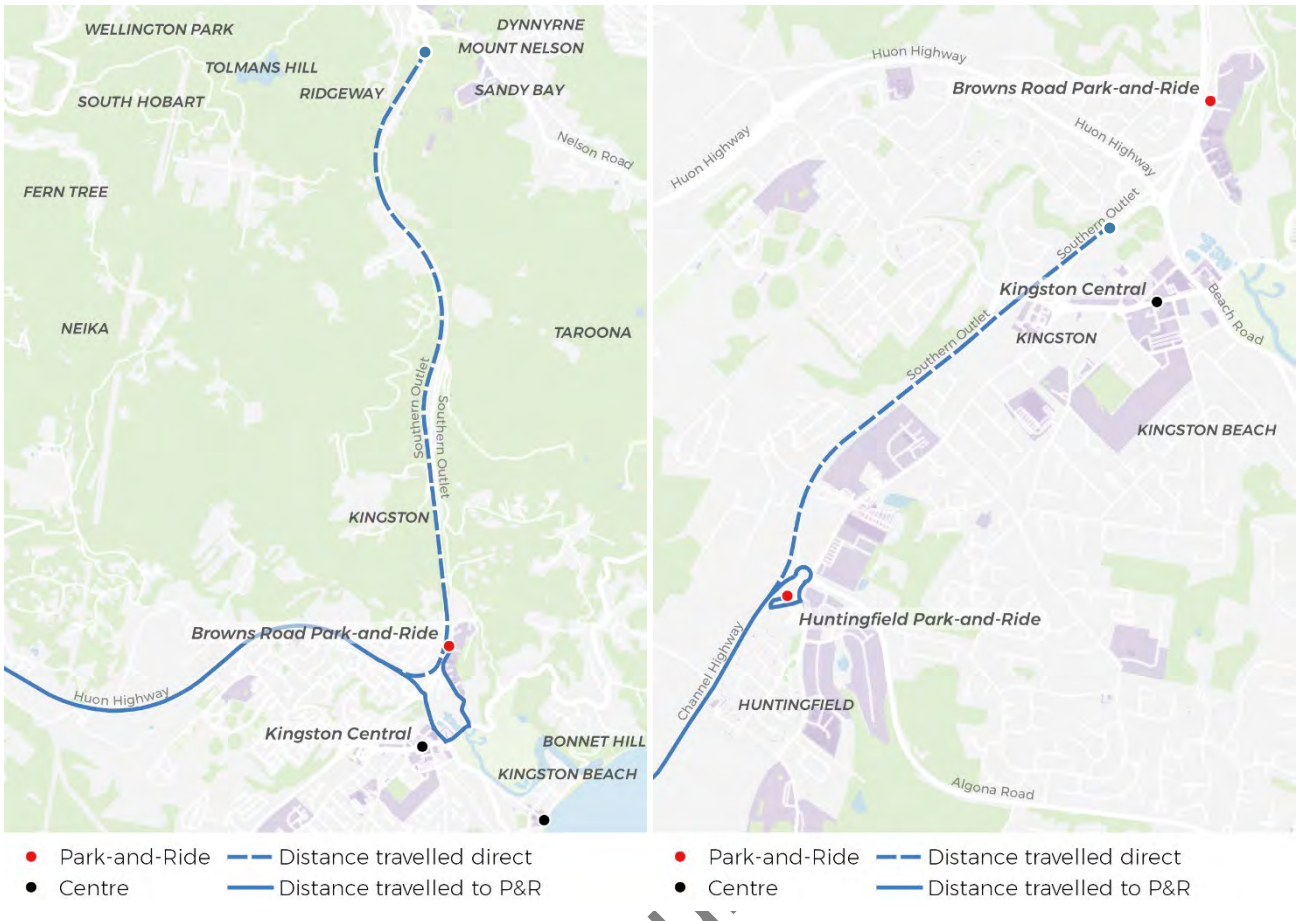

Figure 3.4 Distance covered by car vs bus in the same travel time from Maranoa Road to Browns Road (left) and from the Channel Highway to Huntingfield (right)

The Huntingfield park and ride site is more conveniently located adjacent to the Southern Outlet and Channel Highway. There is a travel time penalty to exit the highway, with a direct car journey reaching the interchange of the Southern Outlet and Huon Highway in the time taken to access the park and ride (Figure 3.4).

End-to-end travel time

Although there is a travel time penalty in accessing the proposed sites when compared with a direct car journey, end-to-end travel times using park and rides would be competitive with existing direct bus journeys and may approach direct car journey travel times with bus priority improvements along the Southern Outlet and Macquarie and Davey streets (though it is noted that these priority measures will benefit existing bus users as well). The figures and tables below compare expected travel times of park and ride journeys with and without bus priority measures to existing direct bus and car journeys to the CBD. It is assumed that there would be a 5-minute transfer time at the park and rides to park and then walk to the bus stop, however average wait times are not included.

Park and ride travel times without bus priority are similar to direct bus journeys for the Kingston and Blackmans Bay area due to the relatively short distance between the origin stops and the Browns Road site. For stops closer to Kingston Central, the overall travel time could be longer when accounting for the time needed to park and transfer.

The example of Blackmans Bay is shown in Figure 3.5. The park and ride travel time for the Browns Road site is competitive with a direct car journeys to Hobart CBD when bus priority measures are taken into account. This suggests that there is minimal benefit for existing bus customers to use the park and ride facility as the time taken to transfer would outweigh the travel time saved by driving to the Browns Road stop. End-to-end travel times for all key bus stops in the Kingston and Blackmans Bay area are shown in Appendix A, Table A.1.

Figure 3.5 Travel time comparison from Blackmans Bay to Hobart CBD by bus, car and park and ride

Travel times from the Huon Valley to Hobart CBD vary more greatly between bus and car due to the longer distances travelled. Nearer locations such as Sandfly have bus travel times roughly 15 minutes longer than driving, while for further locations such as Dover the difference is as much as 40 minutes.

The example of Huonville is shown in Figure 3.6. The park and ride travel time is 8 minutes faster than the bus under existing conditions, and 14 minutes faster with bus priority. The park and ride travel time with bus priority is just four minutes slower than a direct car journey of 45 minutes to the Hobart CBD. End-to-end travel times for all key bus stops in the Kingston and Blackmans Bay area are shown in Appendix A.

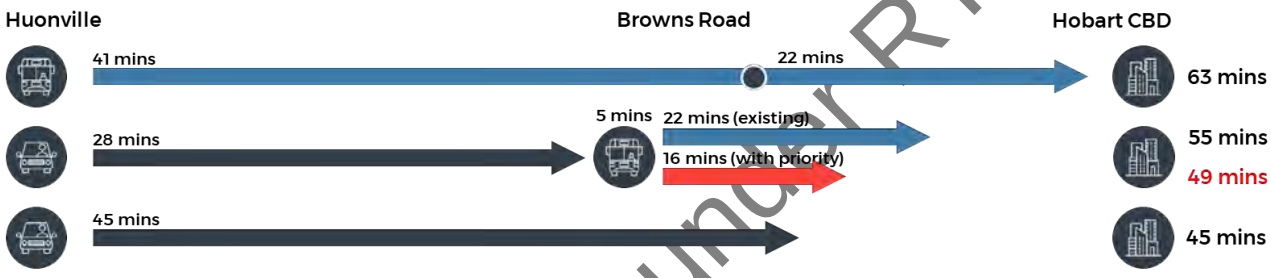

Figure 3.6 Travel time comparison from Huonville to Hobart CBD by bus, car and park and ride

This table also includes two bus service scenarios: the existing route via Kingston Central and Browns Road, and a potential express route that bypasses Kingston Central via the Southern Outlet. Bus journeys take roughly 30 per cent longer than car journeys for most stops along the corridor. Park and ride travel times are similar to existing bus journeys under existing conditions, however, are closer to car journey times when express routes and bus priority are considered.

The example of Snug is shown in Figure 3.7. The park and ride travel time is 4 minutes slower than the bus under existing conditions, but nearly the same as a direct car journey with an express route and bus priority. End-to-end travel times for all key bus stops along the Channel Highway corridor are shown in Appendix A.

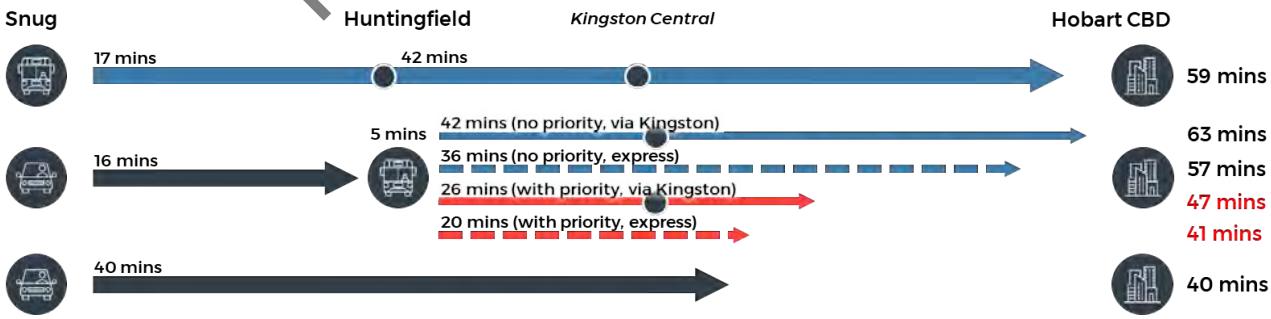

Figure 3.7 Travel time comparison from Snug to Hobart CBD by bus, car and park and ride

The two park and ride sites will offer park and ride customers competitive travel times compared with private car, assuming direct express bus services and the provision of effective bus priority on the Southern Outlet. This suggests that park and ride supported by quality bus services and infrastructure, may be an attractive option for private vehicle users. However, park and ride, particularly with express bus services, will also offer substantial travel time savings compared to existing bus services, highlighting the potential for existing bus customers to be attracted to park and ride.

The Browns Road park and ride site has less direct access by car than the Huntingfield site for most customers south of Kingston.

3.2.3 SITE OPPORTUNITIES AND CONSTRAINTS

Car access to the Browns Road park and ride site is difficult and not likely to be improved. It should also be noted that many users of existing parking opportunities off Browns Road appear to be staff and visitors of nearby businesses. For Kingborough and Huon Valley residents, park and ride from this site offers some travel time benefit over bus-only journeys. Priority improvements on the Southern Outlet and Macquarie/Davey streets will benefit all bus users. The bus frequency serving the park and ride is reasonably good which may be a factor in attracting park and ride among existing bus customers.

However, existing outbound bus routes discourage park and ride; and pedestrian access to stops is poor, because the closest outbound bus stop is some 300 metres south of the car park site. Pedestrian improvements would be required to provide safe access from this stop; and to the inbound bus stop. The best option for encouraging park and ride at the Browns Road site would be the introduction of an additional park and ride bus service that could reduce transfer time between car and bus by having inbound and outbound bus stops located at the car park. Diverting all outbound buses closer to the park and ride would disadvantage other bus customers and is undesirable. Two outbound buses per hour could initially be diverted to the stop, providing capacity for around 100 park and ride customers per hour.

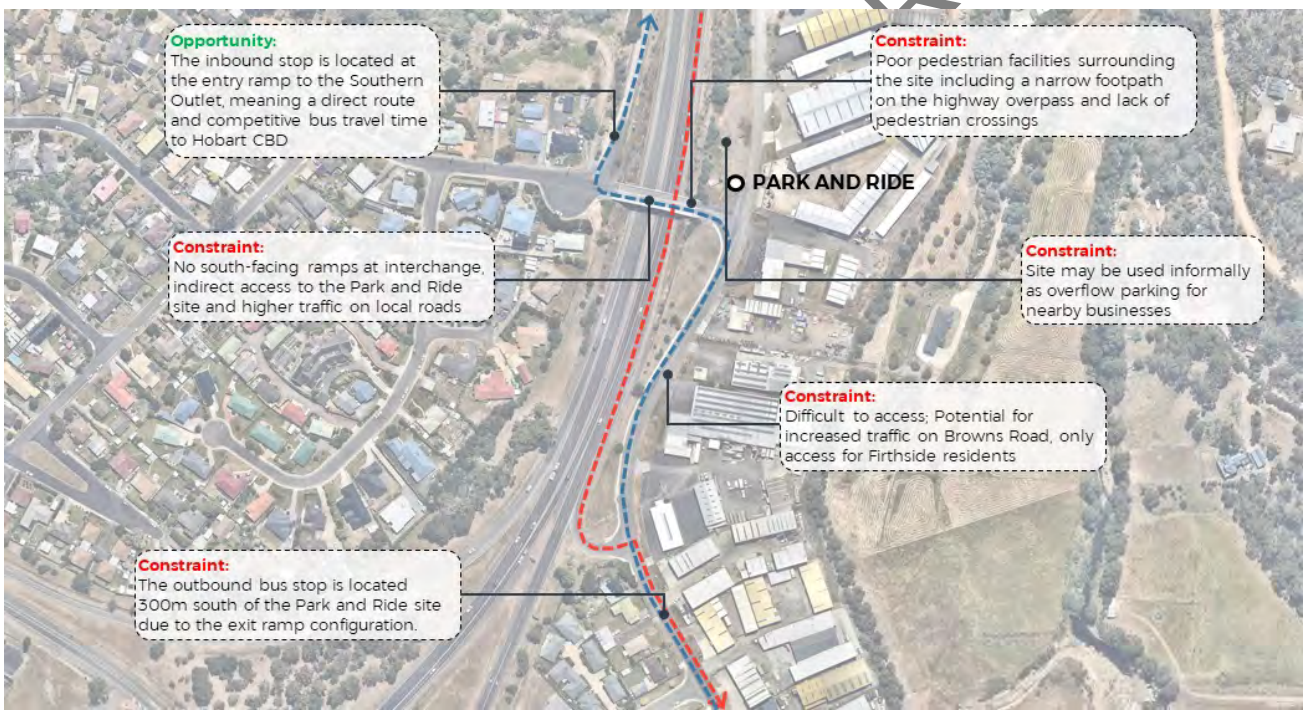

Figure 3.8 Opportunities and constraints – Browns Road park and ride site

The Huntingfield park and ride is most accessible for residents to the south of the site as it has reasonably direct access to and from the Channel Highway, with the potential for express bus services to Hobart CBD via the Southern Outlet from this site, rather than operating via Kingston town centre. Existing inbound and outbound bus routes discourage park and ride as all services run through Kingston Central and Browns Road, offering a less attractive journey time than private vehicles which can use the Southern Outlet directly. Park and ride could offer substantial travel time benefits over a bus-only journey if services were to use the Southern Outlet from Huntingfield. Priority measures on the Southern Outlet and Macquarie/Davey streets would also improve travel times and benefit all bus users in Kingborough. The focus of the bus service model for Huntingfield should be on improving frequency, directness and reducing bus travel times to the city centre.

There is however a risk of shifting demand from other bus services that operate via Kingston Central if only park and ride buses benefit from improved travel times – there may be a need to consider express bus services from the south to deter existing bus users from changing to park and ride. There is also a need to consider the impact on access to Kingston Central and Browns Road if services are diverted via the Southern Outlet – it would not be desirable to reroute all buses away from Kingston Central. Bus frequency at the Huntingfield stop is poor and should be supplemented to provide an attractive travel time and frequency for park and ride customers. There is also potential for an active transport connection from new development to the west of the site.

It was also observed that the existing informal parking at Huntingfield likely has some private vehicle ridesharing and use by local businesses.

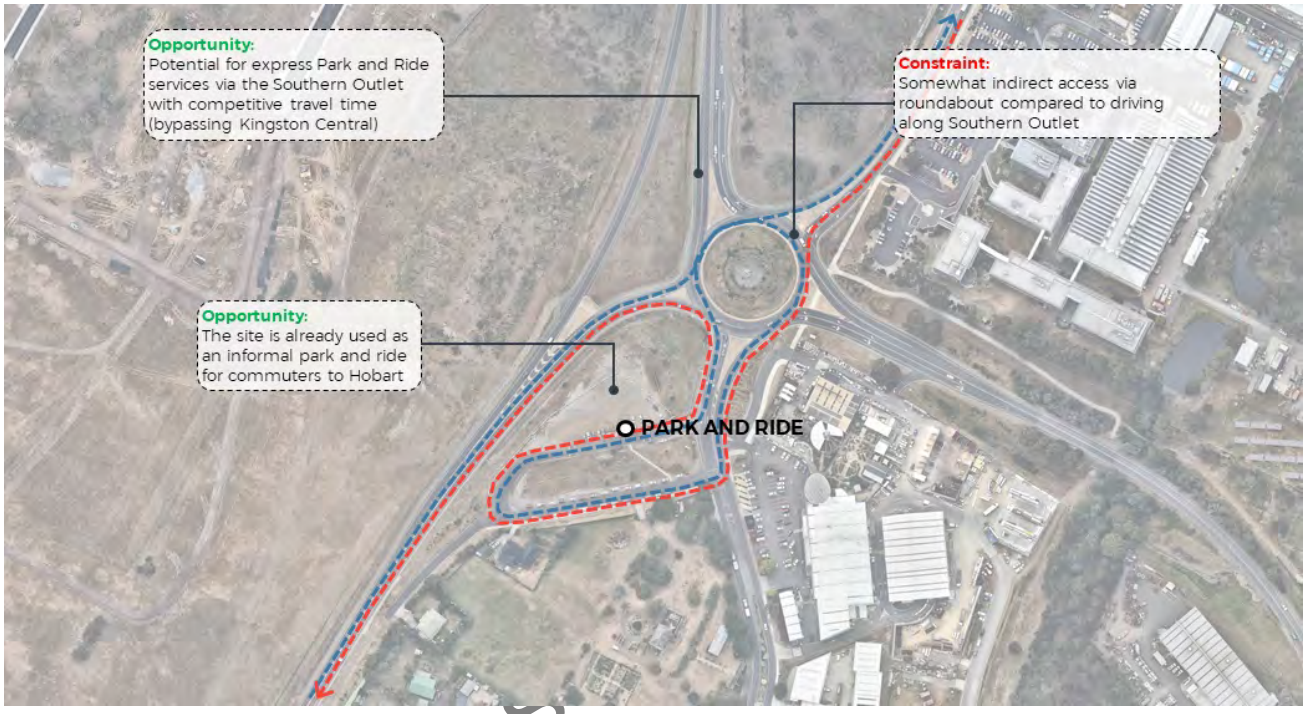

Figure 3.9 Opportunities and constraints – Huntingfield park and ride site

3.3 BUS SERVICING OPTIONS

There are three key bus servicing options for the park and ride sites, each with different characteristics:

- Serving park and ride sites with existing bus services
- Introducing a separate bus service, differentiated from the rest of the bus network (similar to a Skybus style operation)
- Integrating supplementary park and ride bus services with the existing bus network.

Table 3.6 Bus servicing options and characteristics

Existing bus network	Stand-alone park and ride	Integrated park and ride
— Existing bus routes serve both sites, with varying levels of service frequency and accessibility. — Promote park and ride and improve bus stop infrastructure. — Build on informal park and ride with formal park and ride facilities.	— Dedicated fleet, livery. — Tailored park and ride infrastructure. — Designated stops. — Real-time information. — Separate tickets/fares. **Examples:** — Orbiter-style branded product, separate to city bus network (Christchurch, NZ). — Numerous examples in major cities in the UK such as Cambridge, Oxford and York. — SkyBus (not park and ride focused but has dedicated fleet and livery).	— Park and ride integral to overall service offer (provided as an additional way to access Hobart bus services). — Standard bus fleet, may have different livery for park and ride routes; or services differentiated by route number (i.e. like Auckland's NX routes). — Services commencing from park and ride or nearby to provide capacity; and operating more direct routes or more frequent services. — Other bus network improvements to supplement park and ride. — Park and ride access with metro card. **Examples:** — Northern Busway (Auckland, NZ). — Northern Beaches B-Line (Sydney, NSW). — Doncaster Area Rapid Transit (DART) (Melbourne, VIC).

3.3.1 BROWNS ROAD

The three bus servicing options for the Browns Road park and ride site are shown in Figure 3.10 to Figure 3.12.

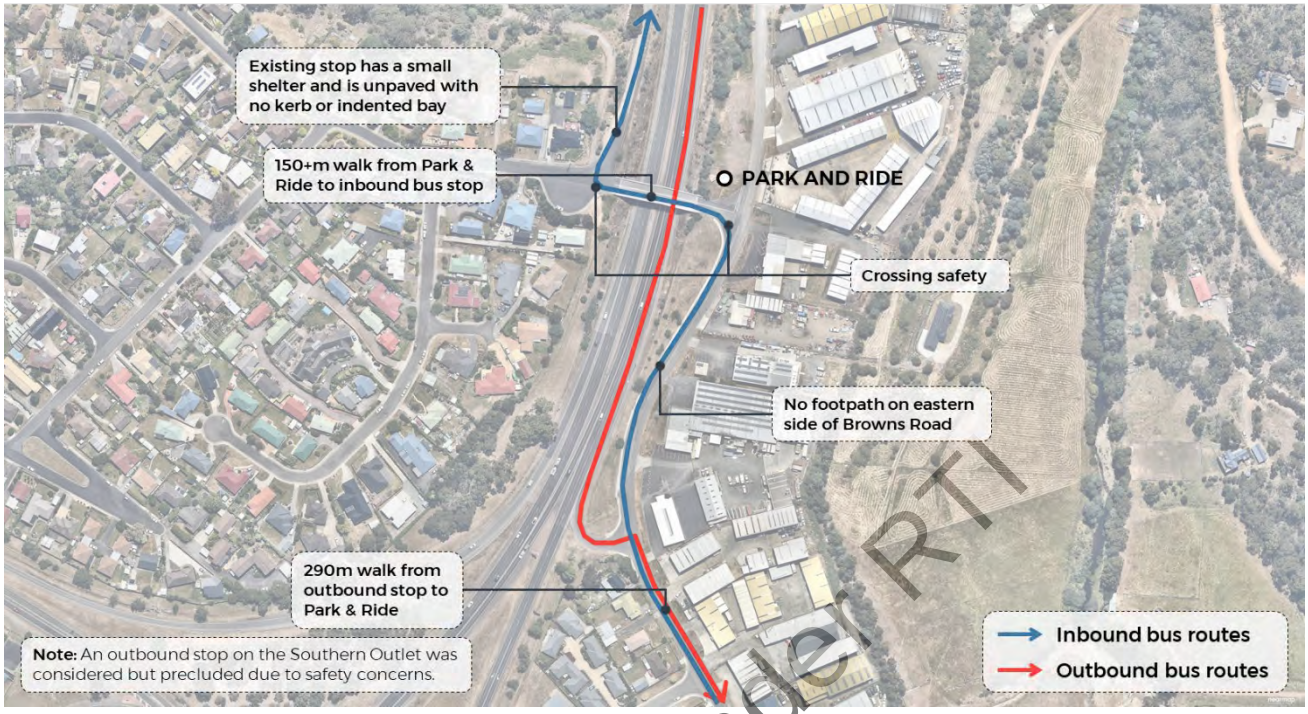

Figure 3.10 Browns Road – Option 1 (existing service)

Figure 3.11 Browns Road – Option 2 (dedicated service)

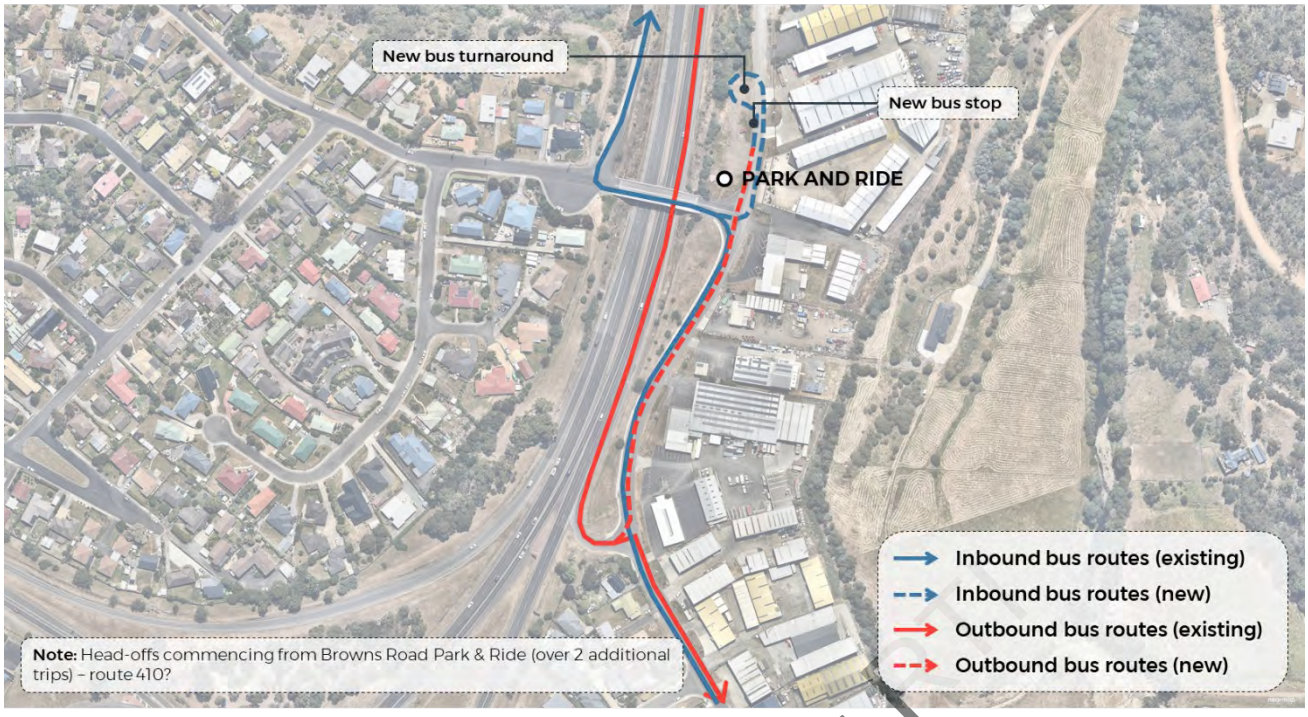

Figure 3.12 Browns Road – Option 3 (integrated service)

In the existing bus network option, the frequency of buses passing the site is reasonable, though we understand capacity on peak period buses varies and there may not be sufficient capacity at peak times to accommodate a higher park and ride demand.

While the inbound bus stop is relatively close to the car park site, the outbound bus stop is some 300 metres south, because of the location of the Browns Road exit of the Southern Outlet. While park and ride users would have relatively direct access to the inbound bus stop, the outbound stop would require an almost 5-minute walk back to the car park. Existing bus services don't offer an attractive park and ride experience; and diversion of bus routes to better serve the park and ride site would increase travel time for other bus customers.

These factors likely explain the low use of the site by park and ride users. In addition, park and ride facilities are informal, footpaths are incomplete, and park and ride users would need to negotiate numerous conflict points with vehicles.

In the stand-alone park and ride service option, a new bus route would be introduced commencing from the park and ride site and operating direct to and from the Southern Outlet. This would require a new bus stop and layover at the car park, as well as a facility for buses to turn around. In addition, it is not clear if the park and ride site has sufficient capacity to support a stand-alone bus service.

The integrated park and ride service option would operate in a similar way to the stand-alone option and have similar infrastructure requirements. Services would be provided by variations to an existing bus route (say by introducing supplementary services) or diversion of an existing route. The relative infrequency of services on bus routes serving the site means it would be impractical to serve the site by diverting one bus route. It is likely supplementary services would need to be introduced as part of the existing bus network.

3.3.2 HUNTINGFIELD

The three bus servicing options for the Huntingfield park and ride site are shown in Figure 3.13 to Figure 3.15.

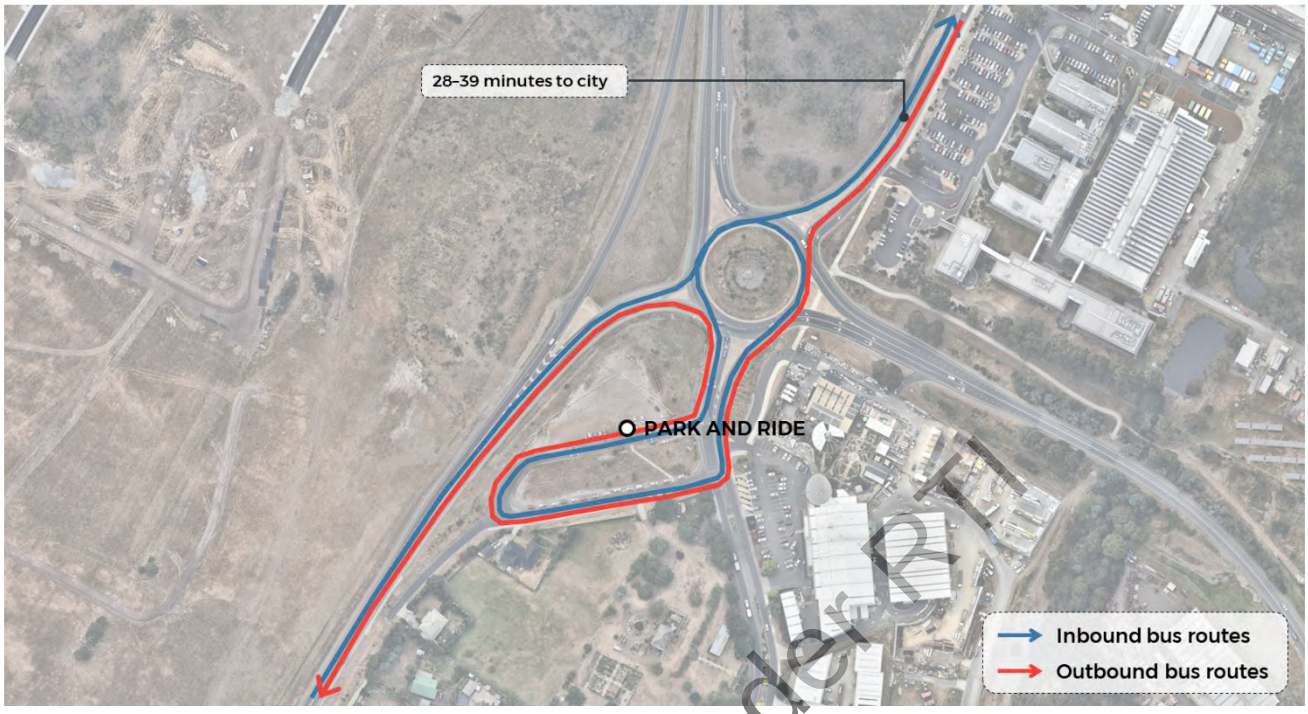

Figure 3.13 Huntingfield – Option 1 (existing service)

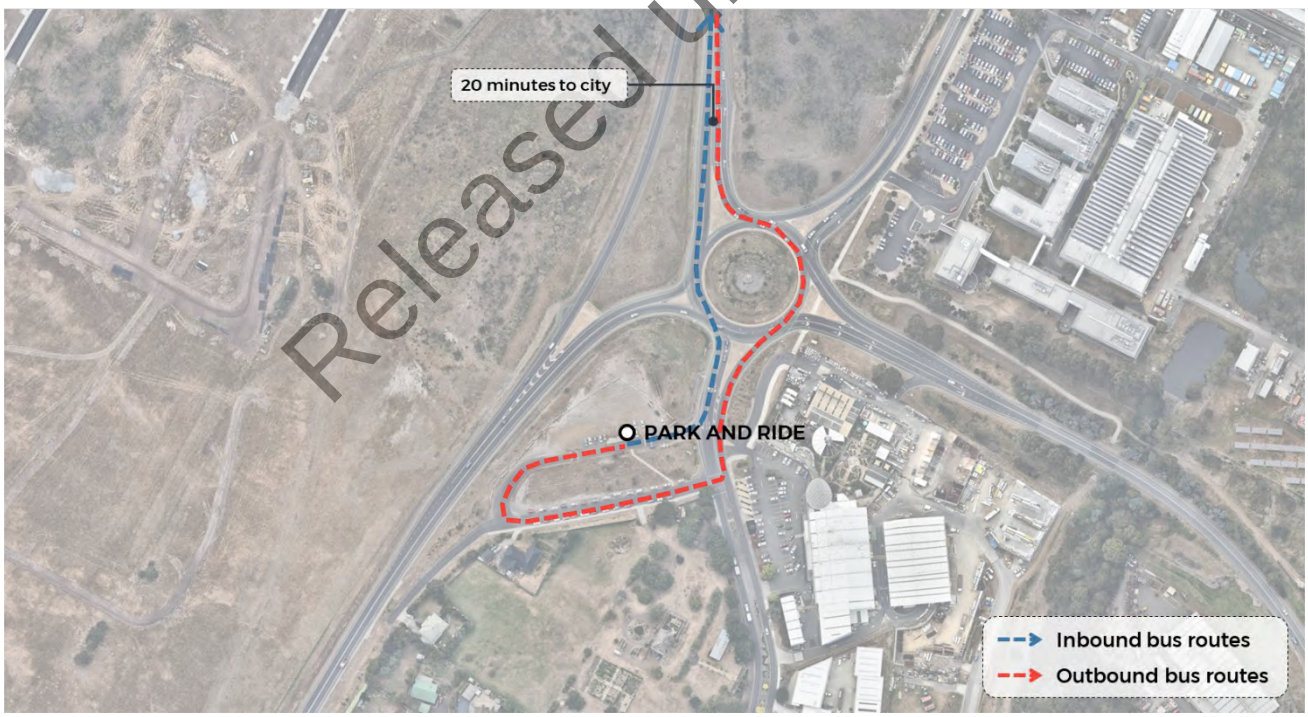

Figure 3.14 Huntingfield – Option 2 (dedicated service)

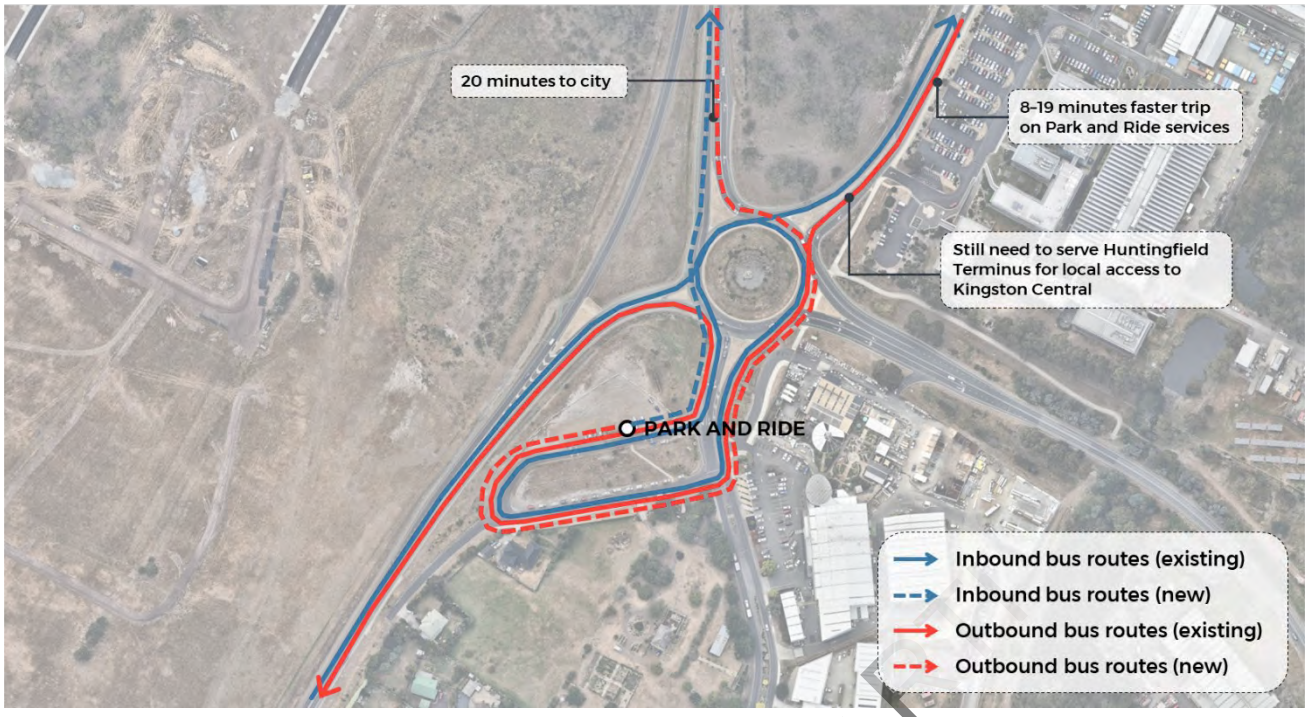

Figure 3.15 Huntingfield – Option 3 (integrated service)

In the existing service option, the park and ride at Huntingfield would be formalised and continue to be served by existing Channel Highway bus routes as part of their normal route. However, these services are infrequent, with only eight bus departures in 3 hours during the morning peak period. In addition, existing bus services operate via Kingston town centre, increasing travel time compared to more direct routes on the Southern Outlet by private vehicle.

Under the stand-alone service option, a new park and ride bus service would be introduced commencing at the park and ride site and operating direct to Hobart city centre via the Southern Outlet, bypassing Kingston town centre.

In the integrated service option, while existing bus services would continue to serve the site (operating to Kingston and Hobart city centre) additional supplementary services would commence at the site, operating via the Southern Outlet direct to Hobart city centre.

As with the stand-alone option this service approach would provide a high quality service for park and ride customers, with travel times substantially shorter than existing bus services and would be likely to see existing bus users attracted to park and ride, or kiss-and-ride, depending on their access to a private vehicle.

This service option would likely need to include improvements to existing bus services to reduce travel times, to avoid abstraction to park and ride from bus customers south of Kingston and along the Channel Highway.

3.3.3 PREFERRED OPTION

WSP consulted with State Growth about the bus service options, recommending that the integrated service option would best balance provision of a park and ride offer with promotion of public transport in Hobart more generally.

Following a review of the bus service plan and the opportunities and constraints of both sites for provision of car parking and supporting infrastructure, the Department of State Growth determined that the park and ride bus service model would focus on the Huntingfield site. While improvements would be made to customer facilities at the Browns Road Firthside site, no bus service changes would be made for that site to encourage park and ride use there. The integrated bus service model was adopted as offering the most flexible arrangements for implementation and operation.

3.4 PROPOSED BUS SERVICING PLAN

The proposed bus servicing plan includes a new park and ride route from Huntingfield to Hobart CBD express via the Southern Outlet. This route would be supplemented by three peak-only express routes from Blackmans Bay, Snug and Huonville to ensure that park and ride customers are not the only beneficiaries of improved travel time and directness (given the low frequency of bus services, particularly south of Huntingfield, and customer demand for destinations between Huntingfield and Kingston, it is not feasible to divert existing routes to operate only on the Southern Outlet). These proposed routes are shown in Figure 3.17 and detailed in Table 3.7. Some minor adjustments and potential on-demand services are also proposed to existing routes in the Kingston area.

Figure 3.16 Proposed bus routes included in the Bus Service Model

Table 3.7 Proposed park and ride and express routes

Route	Destination	Operating hours	Peak frequency (6.00–9.00 am, 4.00–7.00 pm)	Counter-peak frequency	Off-peak frequency
Park and ride Route	Huntingfield Terminus *(Kingston Central)*	6.00 am to 9.00 pm	30 mins	30 mins	60 mins
Express Route 1	Blackmans Bay	Peak-only	30 mins	-	–
Express Route 2	Snug	Peak-only	30 mins	-	–
Express Route 3	Huonville	Peak-only	60 mins	-	–

Figure 3.17 shows the proposed routes overlayed over the existing bus network.

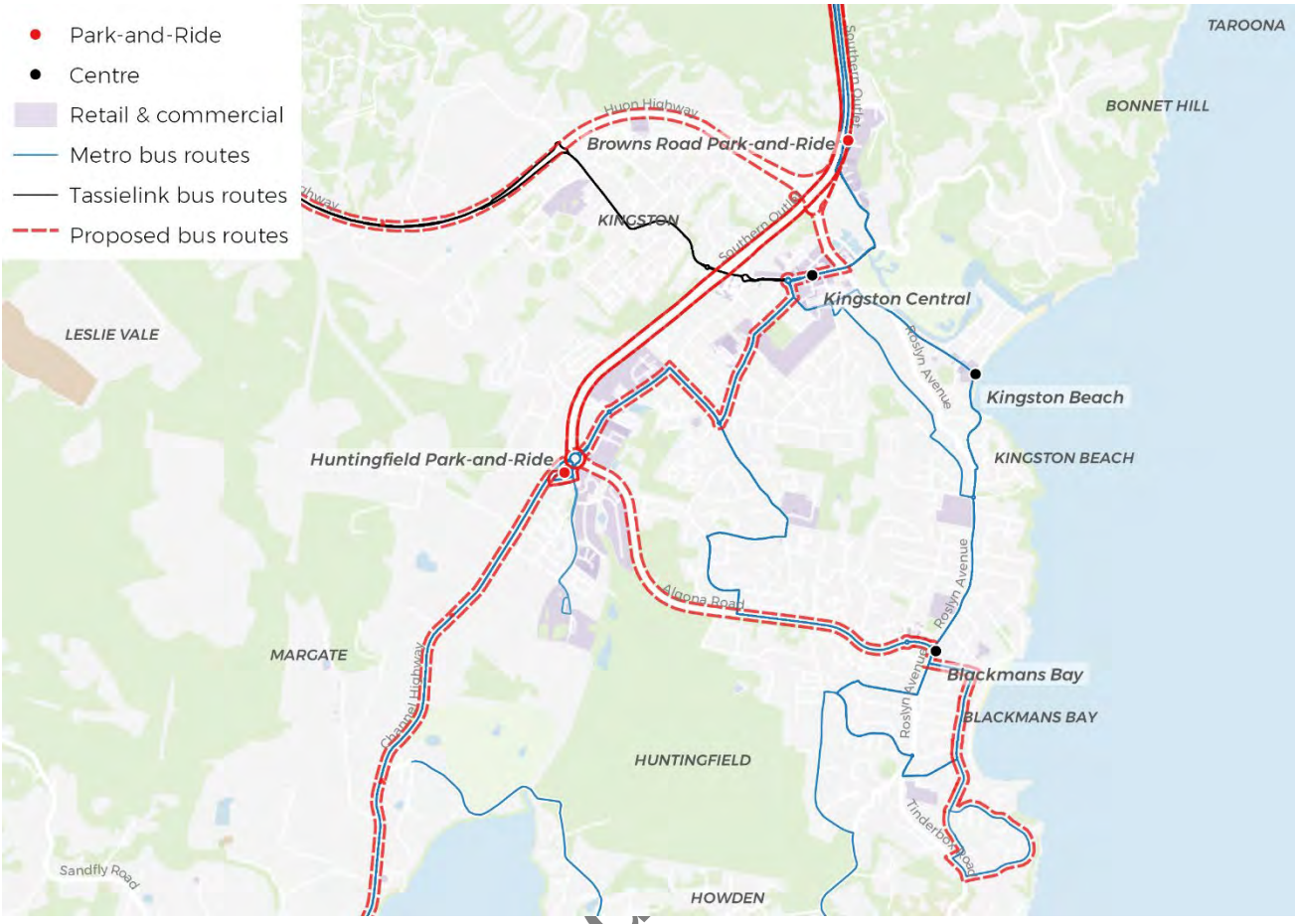

Figure 3.17 Proposed bus routes included in the Bus Service Model overlayed on the existing network

3.4.1 PARK AND RIDE ROUTES

A new route is proposed to commence at the Huntingfield park and ride site, running express to Hobart CBD via the Southern Outlet and bypassing Kingston Central. This route is proposed to operate Monday to Friday, every 30 minutes in peak hours and every 60 minutes off-peak. This would provide relatively frequent services, with fast and direct access to Hobart city centre, with travel times approaching car-only travel times from Huntingfield. The proposed service level would have capacity for around 100 people per hour, potentially providing a substantial reduction in private vehicles on the Southern Outlet, assuming use by existing private vehicle users.

It will be important that the park and ride service operates at peak and off-peak periods on weekdays at least, to allow for park and ride users who may need to travel or retrieve their vehicle outside peak periods.

The park and ride route should have a different route number to differentiate it from other routes, and to aid in promotion.

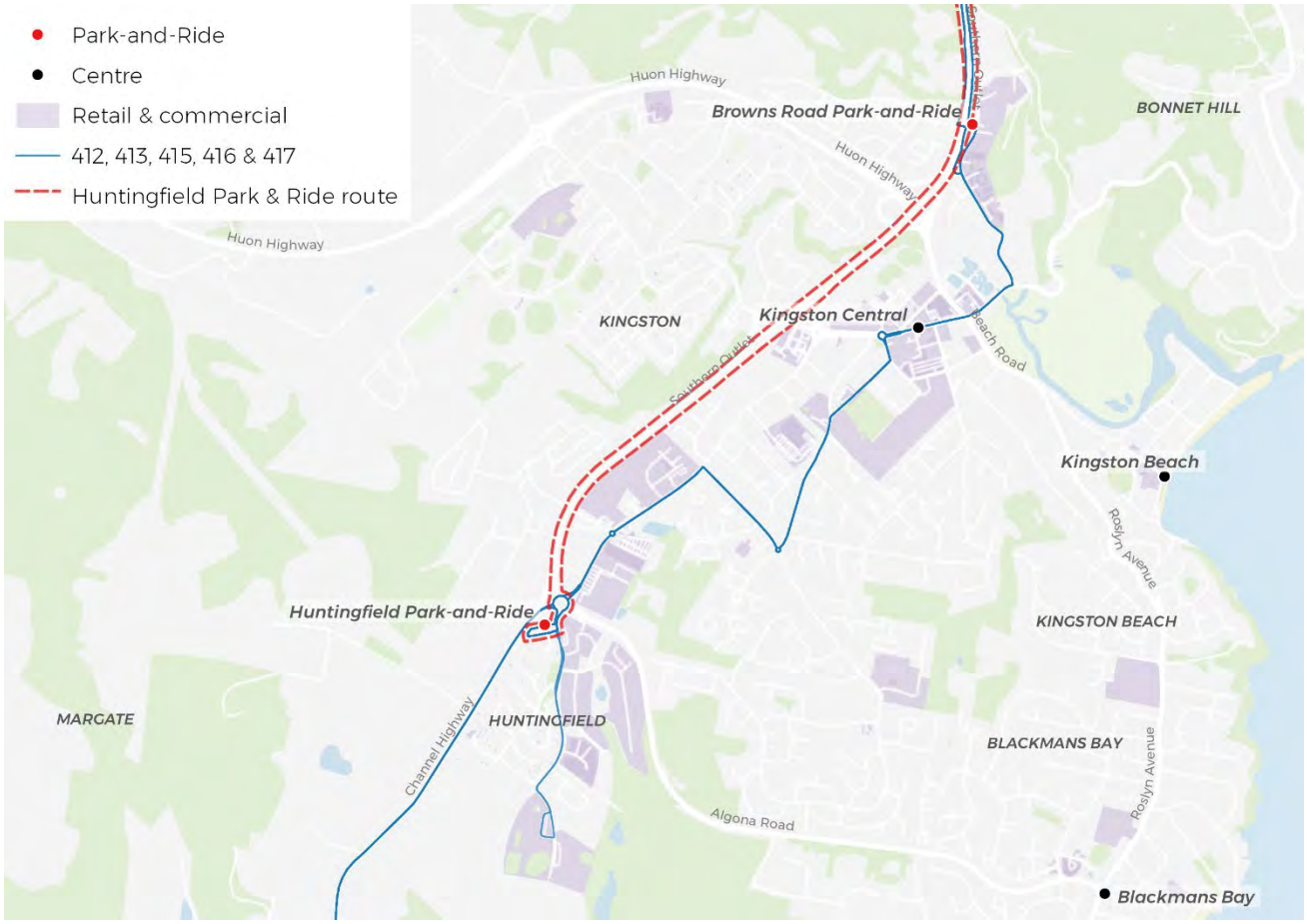

Figure 3.18 Proposed peak Huntingfield park and ride route running express along the Southern Outlet, bypassing Kingston Central and Browns Road

A route variant option for the inter-peak and evening off-peak periods could be to operate limited stops via Kingston Central instead of direct via the Southern Outlet. This could increase patronage on the route outside of commuting hours and provide a service uplift for residents along the Redwood Road and Maranoa Road, while preserving express travel times for commuters during the peaks.

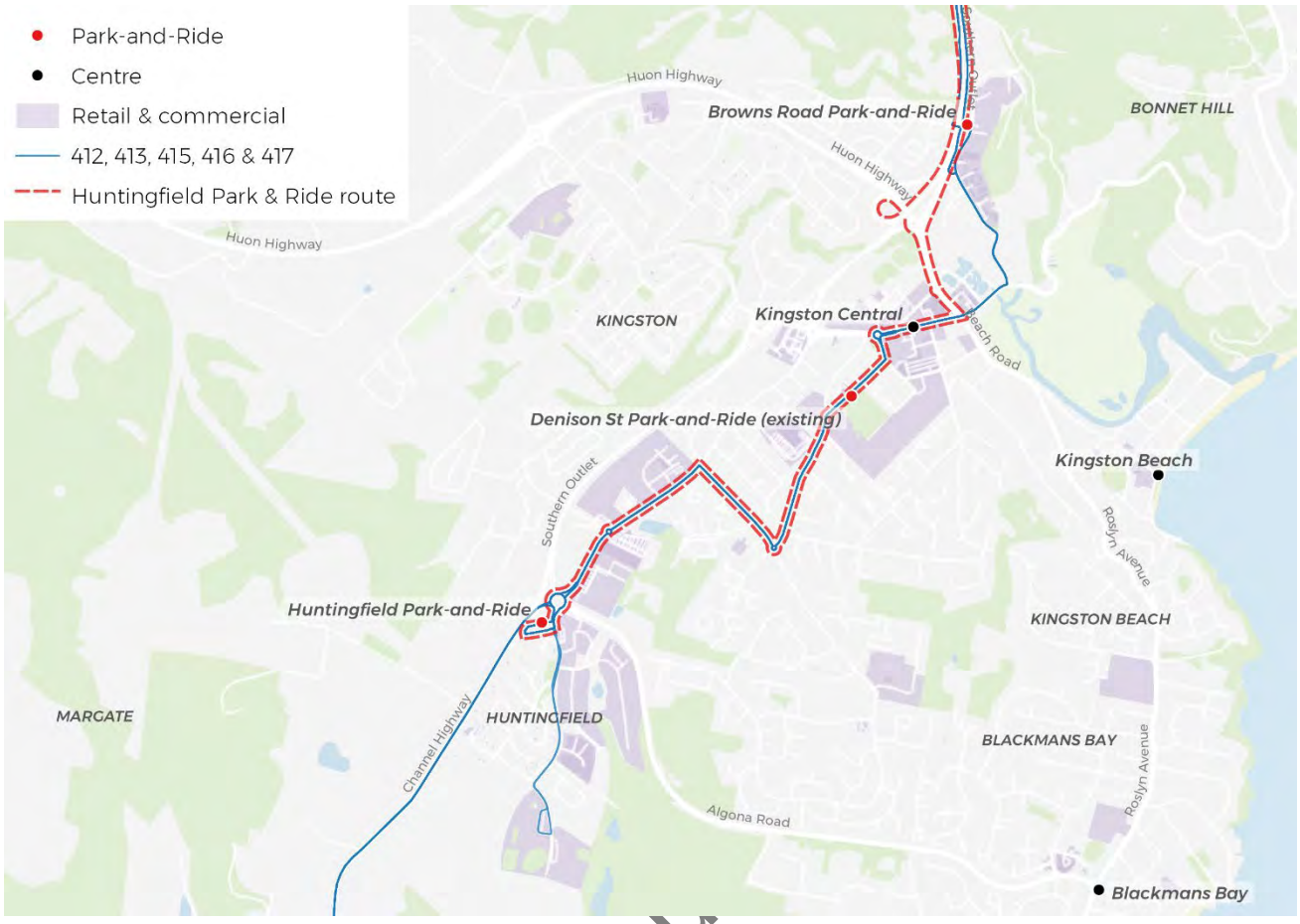

Figure 3.19 Optional inter-peak and off-peak Huntingfield park and ride route running via Redwood Road to Kingston Central, bypassing Browns Road

No dedicated park and ride route is proposed for the Browns Road site as there is a high existing service level and no reductions are proposed to other services.

3.4.2 SUPPLEMENTARY EXPRESS ROUTES

Three additional express bus routes are proposed to supplement the park and ride route and its dedicated service. These services would be able to deliver improved travel times to Hobart city centre for existing bus users from areas such as Blackmans Bay, the Channel Highway and Huon Valley, to reduce the potential for existing bus customers shifting from existing bus services to use park and ride facilities. These services would be provided in addition to existing bus services and may generate some additional uplift in bus patronage due to the shorter travel time they would provide for Hobart city centre bound commuters. The proposed supplementary routes are described below.

Blackmans Bay express route

The bus network in Blackmans Bay connects to Kingston Central via two corridors – routes 408 and 500 via Redwood Road, and routes 407, 409 and 411 via Roslyn Avenue. The Huntingfield Terminus is currently only served by the Channel Highway corridor, and there are no bus routes that provide an east-west connection between Blackmans Bay and the Huntingfield park and ride. When the park and ride is implemented, it can be expected that existing and prospective bus customers in this area would be attracted to drive the short distance to Huntingfield on Algona Road and use the new express park and ride service.

To mitigate this potential shift, a peak-only express service, as suggested by the Department of State Growth bus planners, is proposed to operate from Blackmans Bay to Hobart CBD via Algona Road and the Southern Outlet but not stopping at the park and ride site. This service would operate every 30 minutes in the peak direction only to supplement the existing network. This service can be expected to help alleviate parking demand at Huntingfield and provide a faster alternative route to the city for the Blackmans Bay catchment, encouraging new and existing customers to stay on buses. The proposed route and existing network are show in Figure 3.20. This route should have an express (X) designation to differentiate it from other services.

Figure 3.20 Proposed Blackmans Bay peak-only express service via Algona Road and the Southern Outlet (does not stop at Huntingfield or Browns Road park and ride sites)

Snug express route

All bus services from the Channel Highway corridor currently operate via Kingston Central and Browns Road, adding a travel time penalty compared with using the Southern Outlet only. Customers from the Channel Highway are expected to be a large proportion of potential park and ride users due to the travel time savings park and ride would provide for areas further south. Ideally, we want park and ride users to be those commuters presently driving all the way to the city centre, not people who are already catching the bus. Offer existing bus users a faster trip would reduce the potential for existing bus customers to start driving to the park and ride.

A peak-only express service is proposed to operate from Snug to Hobart CBD express via the Southern Outlet, not stopping at the Huntingfield park and ride site. This service would operate every 30 minutes in the peak direction only, supplementing existing services in the peak hours and providing a faster alternative for bus customers in the Snug and Margate areas. There is also some informal commuter parking available in the Snug area which could further reduce parking demand in Huntingfield. The route of the proposed service in the Kingston area is shown in Figure 3.21. This route should have an express (X) designation to differentiate it from other services.

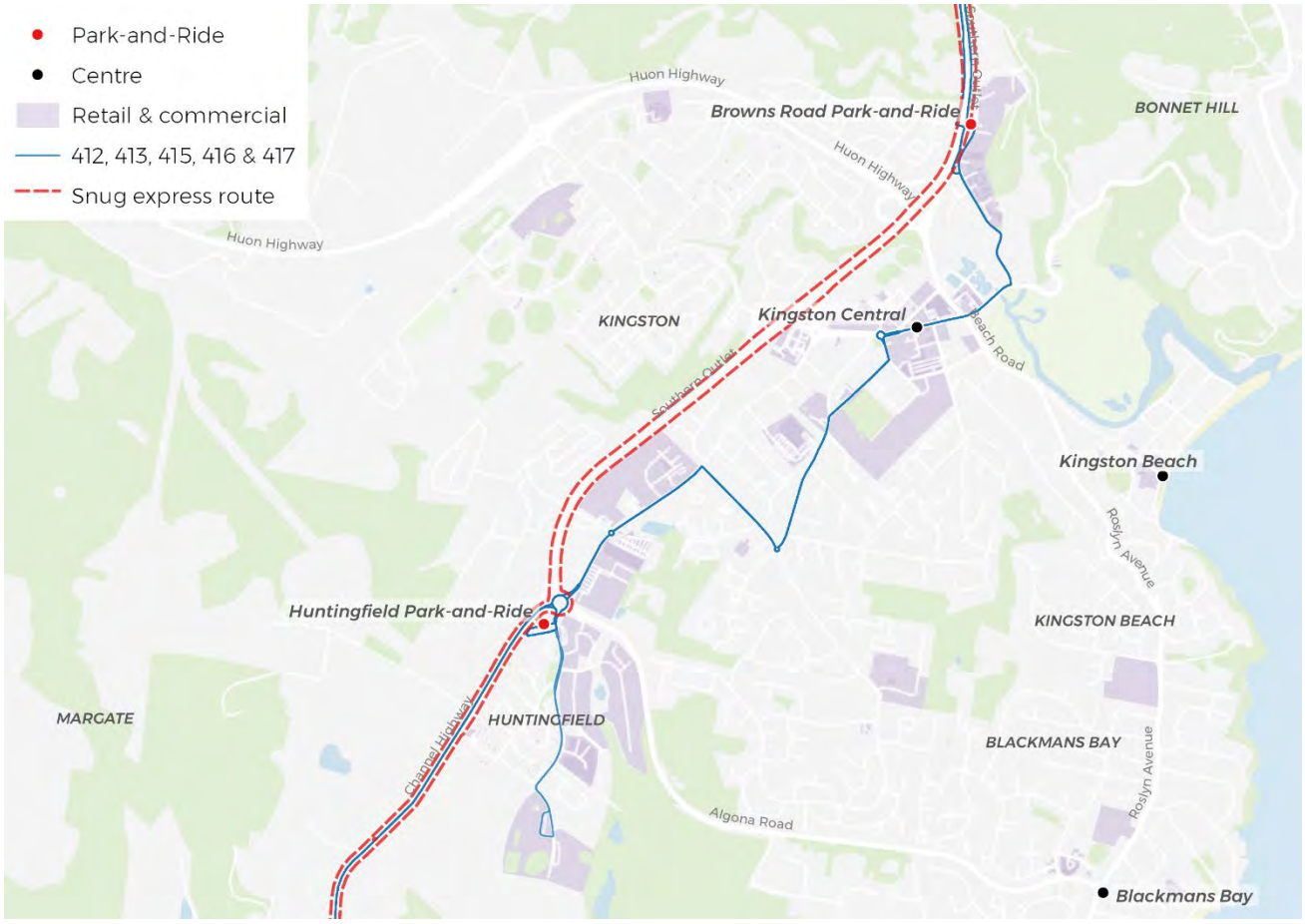

Figure 3.21 Proposed Snug peak-only express route running via the Southern Outlet, bypassing Kingston Central and Browns Road (does not stop at Huntingfield or Browns Road park and ride sites)

Huonville express route

Tassielink bus services in the Huon Valley have the largest travel time penalty compared to driving to Hobart city centre. All Tassielink bus routes currently run via Summerleas Road, Kingston Central and Browns Road. A peak-only express service is proposed to operate from Huonville to Hobart CBD express via the Huon Highway and Southern Outlet, bypassing Kingston. This service would operate every 60 minutes in the peak direction only, supplementing existing services and providing a faster alternative for bus customers from the Huon Valley. There is parking available at the Skinners Drive car park in Huonville. The route of the proposed service in the Kingston area is shown in Figure 3.22. This route should have an express (X) designation to differentiate it from other services.

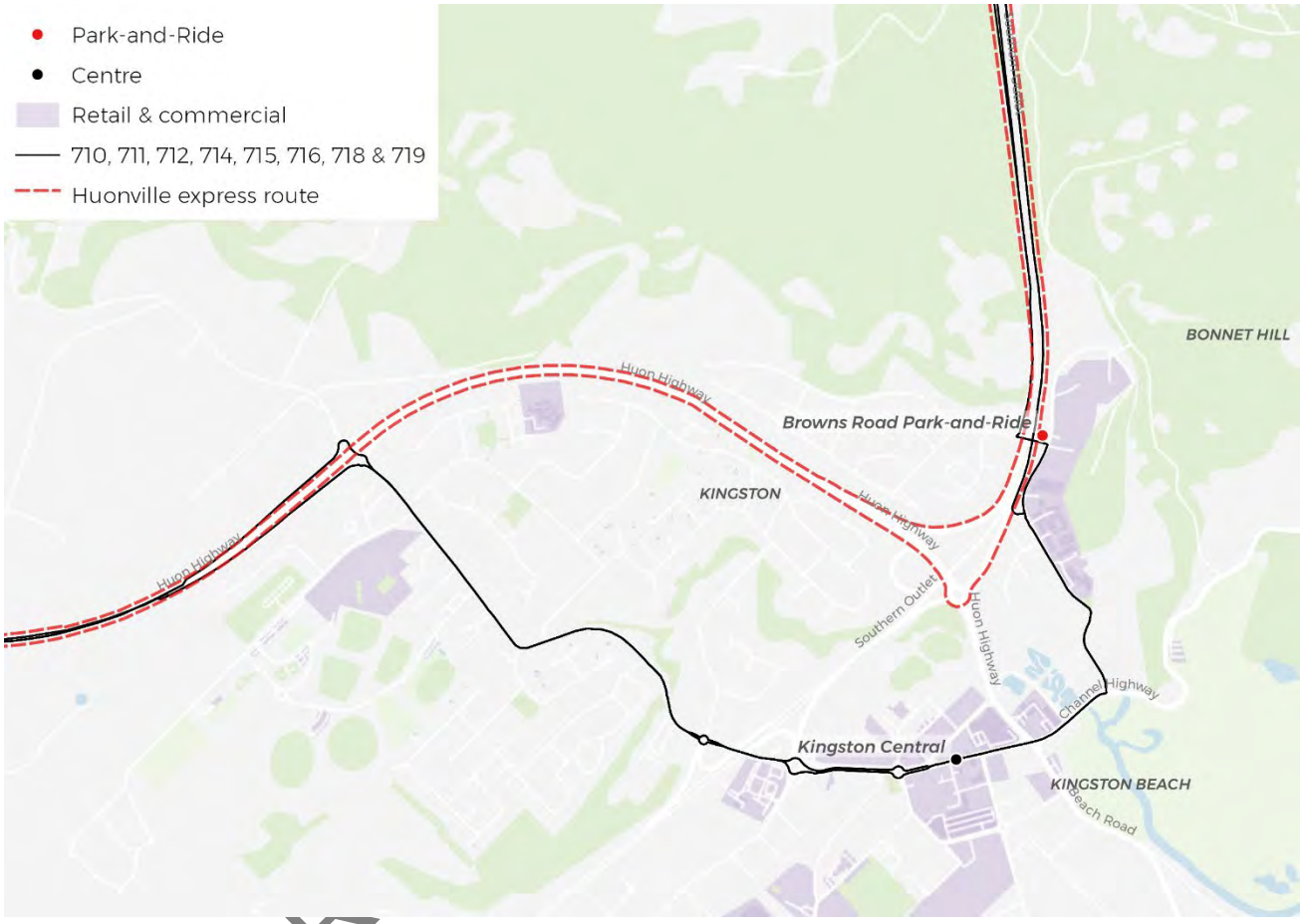

Figure 3.22 Proposed Huonville peak-only express route running via the Southern Outlet, bypassing Summerleas, Kingston Central and Browns Road (does not stop at Browns Road park and ride)

3.4.3 OTHER POTENTIAL NETWORK CHANGES

The bus network between Kingston and Blackmans Bay has limited coverage in some areas, with services concentrated on Roslyn Avenue (407, 409 and 411) and Redwood Road (408 and 500). There are limited opportunities to expand the coverage of the bus network in this area due to the curvilinear suburban street network with cul-de-sacs and poor permeability. There is also a large hill that influences the street network, with steep grades on some suburban streets that are not appropriate for bus routes. These changes are not required for the park and ride bus service model but may increase the coverage of the bus network for all users.

Routes 408 and 500

Routes 408 and 500 share a common route between Kingston and Blackmans Bay following Redwood Road and Hawthorn Drive. The catchment could be increased by diverting route 500 at Redwood Drive thereby increasing the residential catchment (Figure 3.23). Route 408 operates at roughly an hourly frequency throughout the day however route 500 operates during peak periods only to Blackmans Bay.

Routes 407, 409 and 411

Routes 407, 409 and 411 operate on the Roslyn Avenue corridor. Route 407 and 411 operate via Kingston Beach, while route 409 run along Auburn Road to serve the residential catchment to the west of Roslyn Avenue. There are no parallel routes for the full length of Roslyn Avenue, however route 407 could be diverted via Opal Drive and Tingira Road to increase the catchment towards the west of Roslyn Avenue (Figure 3.23). Routes 407 and 409 operate at similar frequencies, however the 411 has fewer services.

Figure 3.23 Potential changes to existing Metro bus routes

3.4.4 ON DEMAND SERVICES

Topographical and street network constraints on the effectiveness of Metro and Tassielink bus services around Kingston can potentially be reduced by providing supplementary on-demand bus services. On demand bus services don't operate with fixed routes or timetables, but instead can be booked by customers by an app or phone call to coincide with a scheduled bus service. These services are flexible and would have the benefit of providing greater accessibility to public transport for residential areas that cannot easily be served by buses. Figure 3.24 shows potential boundaries for two On Demand areas based on natural boundaries in the street network. The Kingston On Demand area encompasses the Summerleas area, Kingston Central and Kingston Beach. The Blackmans Bay On Demand area is larger, stretching from the new housing area near Huntingfield across to Blackmans Bay. On Demand services would pick up customers from near their house, and serve destinations including park and ride sites, key bus stops and centres such as Kingston Central and Blackmans Bay. On Demand services are not envisaged as being a key part of the feeder network in the bus service model, however they may have a role in providing first and last mile access to the Huntingfield park and ride site, say by operating as semi-scheduled services on semi-fixed routes during weekday peak periods.

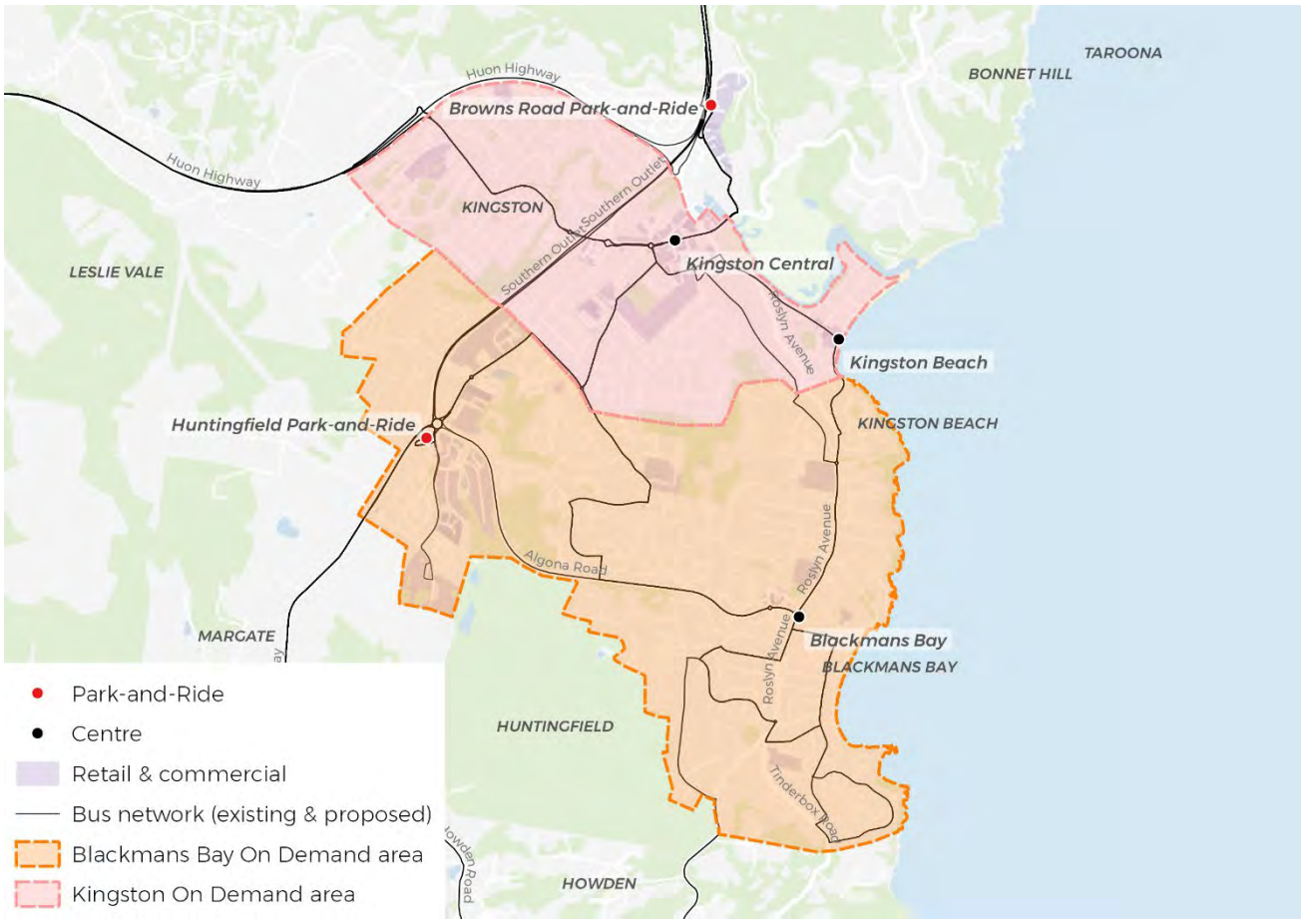

Figure 3.24 Potential On Demand service areas for Kingston and Blackmans Bay

3.5 INDICATIVE BUS SCHEDULES

Indicative schedules for each of the proposed routes are included in Table 3.8 to Table 3.14, reflecting the projected travel times, frequencies and spans discussed in previous sections of this report. Travel times assume implementation of bus priority measures on Macquarie/Davey streets and the Southern Outlet.

The Huntingfield park and ride route would require two buses to operate, with a travel time of 20 minutes (25 minutes off-peak) in each direction, also allowing 5-minutes for set-down, layover and recovery in Hobart and 15-minutes in Huntingfield. The indicative schedule assumes that buses would operate via Kingston Central in the interpeak period.

Table 3.8 Indicative weekday schedule for the proposed Huntingfield park and ride route (off-peak periods in blue)

	H1	H2	H1	H2	H1	H2	H1	H1	H1	H1	H1
Huntingfield	**6:00**	**6:30**	**7:00**	**7:30**	**8:00**	**8:30**	**9:00**	**10:00**	**11:00**	**12:00**	**13:00**
Travel time	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:05*	*0:05*	*0:05*	*0:05*
Kingston								**10:05**	**11:05**	**12:05**	**13:05**
Travel time								*0:20*	*0:20*	*0:20*	*0:20*
Hobart	**6:20**	**6:50**	**7:20**	**7:50**	**8:20**	**8:50**	**9:20**	**10:25**	**11:25**	**12:25**	**13:25**
Layover	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*
Hobart	**6:25**	**6:55**	**7:25**	**7:55**	**8:25**	**8:55**	**9:25**	**10:30**	**11:30**	**12:30**	**13:30**
Travel time	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*
Kingston							**9:45**	**10:50**	**11:50**	**12:50**	**13:50**
Travel time							*0:05*	*0:05*	*0:05*	*0:05*	*0:05*
Huntingfield	**6:45**	**7:15**	**7:45**	**8:15**	**8:45**	**9:15**	**9:50**	**10:55**	**11:55**	**12:55**	**13:55**
Layover	*0:15*	*0:15*	*0:15*	*0:15*	*0:15*	*Depot*	*0:10*	*0:05*	*0:05*	*0:05*	*0:05*

	H1	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
Huntingfield	**14:00**	**15:00**	**15:40**	**16:15**	**16:45**	**17:15**	**17:45**	**18:15**	**18:45**	**19:20**	**20:20**
Travel time	*0:05*	*0:05*	*0:05*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*
Kingston	**14:05**	**15:05**	**15:45**							**19:40**	**20:40**
Travel time	*0:20*	*0:20*	*0:20*							*0:20*	*0:20*
Hobart	**14:25**	**15:25**	**16:05**	**16:35**	**17:05**	**17:35**	**18:05**	**18:35**	**19:05**	**20:00**	**21:00**
Layover	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*
Hobart	**14:30**	**15:30**	**16:10**	**16:40**	**17:10**	**17:40**	**18:10**	**18:40**	**19:10**	**20:05**	**21:05**
Travel time	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*
Kingston	**14:50**	**15:50**								**20:25**	**21:25**
Travel time	*0:05*	*0:05*								*0:05*	*0:05*
Huntingfield	**14:55**	**15:55**	**16:30**	**17:00**	**17:30**	**18:00**	**18:30**	**19:00**	**19:30**	**20:30**	**21:30**
Layover	*0:05*	*0:20*	*0:15*	*0:15*	*0:15*	*0:15*	*0:15*	*0:20*	*0:50*	*Depot*	*Depot*

The Blackmans Bay express route has an expected travel time of 30 minutes, including 10 minutes through Blackmans Bay and along Algona Road and 20 minutes via the Southern Outlet to Hobart. The route would not stop at Huntingfield. The schedule requires two buses to operate and allows for a 3-minute set-down and recovery period in the Hobart CBD and 9-minute layover and positioning period in Blackmans Bay.

Table 3.9 Indicative AM peak schedule for the proposed Blackmans Bay express route

	B1	B2	B1	B2	B1	B2	B1
Blackmans Bay	**5:55**	**6:25**	**6:55**	**7:25**	**7:55**	**8:25**	**8:55**
Travel time	*0:10*	*0:10*	*0:10*	*0:10*	*0:10*	*0:10*	*0:10*
(Huntingfield)	*6:05*	*6:35*	*7:05*	*7:35*	*8:05*	*8:35*	*9:05*
Travel time	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*
Hobart	**6:25**	**6:55**	**7:25**	**7:55**	**8:25**	**8:55**	**9:25**
Set-down/layover	*0:02*	*0:02*	*0:02*	*0:02*	*0:02*	*Depot*	*Depot*
(Hobart)	*6:27*	*6:57*	*7:27*	*7:57*	*8:27*		
Special	*0:22*	*0:22*	*0:22*	*0:22*	*0:22*		
(Blackmans Bay)	*6:49*	*7:19*	*7:49*	*8:19*	*8:49*		
Layover/positioning	*0:06*	*0:06*	*0:06*	*0:06*	*0:06*		

Table 3.10 Indicative PM peak schedule for the proposed Blackmans Bay express route

	B1	B2	B1	B2	B1	B2	B1
Hobart	**16:05**	**16:35**	**17:05**	**17:35**	**18:05**	**18:35**	**19:05**
Travel time	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*
(Huntingfield)	*16:25*	*16:55*	*17:25*	*17:55*	*18:25*	*18:55*	*19:25*
Travel time	*0:11*	*0:11*	*0:11*	*0:11*	*0:11*	*0:11*	*0:11*
Blackmans Bay	**16:36**	**17:06**	**17:36**	**18:06**	**18:36**	**19:06**	**19:36**
Set-down/layover	*0:05*	*0:05*	*0:05*	*0:05*	*0:05*	*Depot*	*Depot*
(Blackmans Bay)	*16:41*	*17:11*	*17:41*	*18:11*	*18:41*		
Special	*0:22*	*0:22*	*0:22*	*0:22*	*0:22*		
(Hobart)	*17:03*	*17:33*	*18:03*	*18:33*	*19:03*		
Layover/positioning	*0:02*	*0:02*	*0:02*	*0:02*	*0:02*		

The Snug express route has an expected travel time of 37 minutes, including 17 minutes from Snug to Huntingfield and 20 minutes to Hobart via the Southern Outlet. The route does not stop at Huntingfield. This route would require three buses to operate, allowing a 3-minute period for set-down, layover and positioning in the Hobart CBD and 20-minute period in Snug.

Table 3.11 Indicative AM peak schedule for the proposed Snug express route

	S1	S2	S3	S1	S2	S3	S1
Snug	**6:15**	**6:45**	**7:15**	**7:45**	**8:15**	**8:45**	**9:15**
Travel time	*0:17*	*0:17*	*0:17*	*0:17*	*0:17*	*0:17*	*0:17*
(Huntingfield)	*6:32*	*7:02*	*7:32*	*8:02*	*8:32*	*9:02*	*9:32*
Travel time	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*
Hobart	**6:52**	**7:22**	**7:52**	**8:22**	**8:52**	**9:22**	**9:52**
Set-down/layover	*0:03*	*0:03*	*0:03*	*0:03*	*Depot*	*Depot*	*Depot*
(Hobart)	*6:55*	*7:25*	*7:55*	*8:25*			
Special	*0:30*	*0:30*	*0:30*	*0:30*			
(Snug)	*7:25*	*7:55*	*8:25*	*8:55*			
Layover/positioning	*0:20*	*0:20*	*0:20*	*0:20*			

Table 3.12 Indicative PM peak schedule for the proposed Snug express route

	S1	S2	S3	S1	S2	S3	S1
Hobart	**16:08**	**16:38**	**17:08**	**17:38**	**18:08**	**18:38**	**19:08**
Travel time	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*	*0:20*
(Huntingfield)	*16:28*	*16:58*	*17:28*	*17:58*	*18:28*	*18:58*	*19:28*
Travel time	*0:17*	*0:17*	*0:17*	*0:17*	*0:17*	*0:17*	*0:17*
Snug	**16:45**	**17:15**	**17:45**	**18:15**	**18:45**	**19:15**	**19:45**
Set-down/layover	*0:20*	*0:20*	*0:20*	*0:20*	*Depot*	*Depot*	*Depot*
(Snug)	*17:05*	*17:35*	*18:05*	*18:35*			
Special	*0:30*	*0:30*	*0:30*	*0:30*			
(Hobart)	*17:35*	*18:05*	*18:35*	*19:05*			
Layover/positioning	*0:03*	*0:03*	*0:03*	*0:03*			

The Huonville express route has an expected travel time of 41 minutes and does not travel via Kingston Town Centre or Browns Road. The route would require two buses to operate at a 60-minute frequency, allowing a 3-minute period for set-down, layover and recovery in Hobart and a 36-minute period in Huonville (this may be reduced through interlining).

Table 3.13 Indicative AM peak schedule for the proposed Huonville express route

	H1	H2	H1	H2
Huonville	**6:16**	**7:16**	**8:16**	**9:16**
Travel time	*0:25*	*0:25*	*0:25*	*0:25*
(Browns Road)	*6:41*	*7:41*	*8:41*	*9:41*
Travel time	*0:16*	*0:16*	*0:16*	*0:16*
Hobart	**6:57**	**7:57**	**8:57**	**9:57**
Set-down/layover	*0:03*	*0:03*	*Depot*	*Depot*
(Hobart)	*7:00*	*8:00*		
Special	*0:40*	*0:40*		
(Huonville)	*7:40*	*8:40*		
Layover/positioning	*0:36*	*0:36*		

Table 3.14 Indicative PM peak schedule for the proposed Huonville express route

	H1	H2	H1	H2
Hobart	**16:03**	**17:03**	**18:03**	**19:03**
Travel time	*0:16*	*0:16*	*0:16*	*0:16*
(Browns Road)	*16:19*	*17:19*	*18:19*	*19:19*
Travel time	*0:25*	*0:25*	*0:25*	*0:25*
Huonville	**16:44**	**17:44**	**18:44**	**19:44**
Set-down/layover	*0:36*	*0:36*	*Depot*	*Depot*
(Huonville)	*17:20*	*18:20*		
Special	*0:40*	*0:40*		
(Hobart)	*18:00*	*19:00*		
Layover/positioning	*0:03*	*0:03*		

These schedules are indicative and represent the proposed frequencies of each route and resources required to operate them. The timetables reflect arrival in Hobart CBD 3-10 minutes before each half hour to allow for walking time to customers' destinations or for transfer to other bus routes for onward travel. Further planning by bus operators or State Growth would be needed to integrate services' stopping times at the Hobart Bus interchange and determine potential savings by interlining proposed services with the existing network to reduce layover times. Services should be introduced with a relatively high frequency to encourage uptake by passengers but could be reviewed and adjusted after the first few months of operations if patronage remains low.

3.6 PARK AND RIDE SITE AND TERMINAL FUNCTIONAL NEEDS

In the Hobart city centre, the central city bus station has limited capacity, and the Department of State Growth has recently commissioned a study on the feasibility of an expanded bus station on the site. Bus layover space (where buses are parked empty between trips) is particularly constrained.

While space in the Hobart city centre bus station is constrained, there is sufficient space to accommodate park and ride and related bus improvements within the bus station.

The southern corridor park and ride bus route can set down passengers at Stop M in Macquarie Street, west of Elizabeth Street (the stop can be extended to the west if required).

This route (and the additional Huon Highway and Channel Highway peak-only express services) can operate from Stop P in Macquarie Street at Franklin Square (the stop has space for three buses at a time). It may be necessary to make some use of Stop N, which is used by South Hobart services.

Impacts on layover parking can be minimised by reducing city-end recovery time, with more layover time at the outer termini.

At the Huntingfield park and ride site, one bus space would be adequate for the service level required to support a 200-space car park. At least one additional space would be required to accommodate existing bus services at the site, as well as the potential for other proposed express services to call at the park and ride (this is not proposed in this report). One layover space would be adequate for the level of service envisaged – a total of two–three bus spaces, plus at least one layover space should be provided.

4 COST ESTIMATES

4.1 FLEET COSTS

Based on the indicative schedules outlined above, the park and ride and supplementary services proposed here, the Huntingfield park and ride service would require two buses to operate at peak times.

The other proposed express services would require an additional seven buses to operate (though there may be some scope for schedule interworking to reduce this fleet requirement).

4.2 OPERATIONAL COSTS

Table 4.1 summarises the expected operating costs of the four proposed routes with cost rates for fixed operating costs, per kilometre costs and wage costs based on the general access funding model developed by the Department of State Growth. Service hours include all in-service, special running and layover time from each vehicle's first trip to the final trip before returning to depot. Hours and kilometres to and from depot and meal breaks are not included in these calculations. The calculations also assume a dedicated bus fleet for the proposed routes and cost savings could be realised if interlining of schedules is introduced with other Metro Tasmania and Tassielink routes.

Table 4.1 Summary of operating costs for proposed routes

	Huntingfield park and ride		Blackmans Bay Express		Snug Express		Huonville Express	
	Peak	**Off-peak**	**Service**	**Special**	**Service**	**Special**	**Service**	**Special**
Fixed costs (annual)	**$118,823.78**		**$118,823.78**		**$178,235.67**		**$118,823.78**	
Fixed cost per bus	*$59,411.89*		*$59,411.89*		*$59,411.89*		*$59,411.89*	
No. buses required	*2*		*2*		*3*		*2*	
Distance costs (daily)	**$455.36**	**$344.74**	**$356.33**	**$234.36**	**$462.17**	**$242.42**	**$384.05**	**$191.77**
Cost per kilometre	*$1.26*	*$1.26*	*$1.26*	*$1.26*	*$1.26*	*$1.26*	*$1.26*	*$1.26*
Route kilometres (daily)	*361.4*	*273.6*	*282.8*	*186.0*	*366.8*	*192.4*	*304.8*	*152.2*
Route length (inbound)	*13.8*	*15.4*	*20.3*	*18.8*	*26.2*	*24.3*	*38*	*38.3*
Route length (outbound)	*14*	*15*	*20.1*	*18.4*	*26.2*	*23.8*	*38.2*	*37.8*
Trips (inbound)	*13*	*9*	*7*	*5*	*7*	*4*	*4*	*2*
Trips (outbound)	*13*	*9*	*7*	*5*	*7*	*4*	*4*	*2*
Route km (inbound)	*179.4*	*138.6*	*142.1*	*94*	*183.4*	*97.2*	*152*	*76.6*
Route km (outbound)	*182*	*135*	*140.7*	*92*	*183.4*	*95.2*	*152.8*	*75.6*
Time costs (daily)	**$785.83**		**$404.45**		**$527.60**		**$360.89**	
Wage cost (6.00 am to 7.00 pm)	*$33.35*		*$33.35*		*$33.35*		*$33.35*	
Wage cost (other times)	*$37.35*		*$37.35*		*$37.35*		*$37.35*	
Bus hours (6.00 am to 7.00 pm)	*19:05*		*11:15*		*14:42*		*10:00*	
Bus hours (other times)	*4:00*		*0:47*		*1:00*		*0:44*	
Operating cost (daily)	**$2,051.91**		**$1,461.11**		**$1,931.16**		**$1,402.69**	
Operating cost (weekly)	**$10,259.53**		**$7,305.57**		**$9,655.78**		**$7,013.43**	
Operating cost (annual)	**$523,235.93**		**$372,583.97**		**$492,444.63**		**$357,684.83**	

5 CONCLUSION AND NEXT STEPS

The Bus Service Plan is a critical element of the Southern Transport vision, supporting planned investment in park and ride to help reduce congestion on the Southern Outlet.

Key markets for bus park and ride in the south include residents of communities along the Huon Highway and Channel Highway, as well as in the Kingston/Blackman's Bay area. Bus services on the Channel Highway and Huon Highway south of Huntingfield are urban fringe services and operate at low frequency. Bus services at Huntingfield and to the north (including Blackman's Bay, Kingston etc.) are urban services and operate with more frequent services.

While existing bus routes serve the identified park and ride sites for the project – Browns Road Firthside and Huntingfield – low bus service frequency, the location of outbound bus stops at Browns Road and long and indirect bus routes at Huntingfield, act as constraints to park and ride use.

While the focus of the Southern Transport Vision is to improve bus links to Hobart city centre to encourage a shift from private vehicles to buses on the Southern Outlet, analysis of customer boardings at bus stops shows that there is strong demand from bus passengers for access to Kingston, as well as Hobart city centre.

In addition, surveys of the use of the Browns Road Firthside and Huntingfield park and ride sites found that the number of customers who walked to the stops, or were dropped off, exceeded the number of park and ride customers.

In addition to ensuring the bus service plan improves bus access to the Hobart city centre, the plan should also recognise the need to continue to offer bus links from the south (both Channel Highway and Huon Highway) to Kingston town centre. As well, facilities at the park and ride sites should also accommodate demand for walking, cycle and kiss-and-ride access.

The park and ride bus service plan should aim to intercept private vehicle trips as far as possible. To attract existing private vehicle users to shift to park and ride for trips to the Hobart city centre, there should be improvements to bus services that:

- Provide bus services direct to the Hobart city centre on the Channel Highway, Huon Highway and the Kingston/ Blackman's Bay urban area
- Reduce bus travel times to the Hobart city centre
- Are more frequent and reliable
- Are safe and comfortable
- Are easy to understand and are supported by quality infrastructure and information
- Relative cost to park and ride compared with city centre parking.

To avoid attracting existing bus users to use park and ride (reducing patronage on urban fringe services and potentially increasing car travel in the south), there should be improvements to bus links to Hobart CBD on the Channel Highway, Huon Highway, and around Blackman's Bay.

Following a review of the two candidate park and ride sites, it was agreed with StateGrowth that the bus service plan would focus on providing improved bus services to the Huntingfield park and ride site; and that improvements at Browns Road Firthside would focus on formalising the car park, improving pedestrian access to existing bus stops and improving customer facilities.

The recommended park and ride bus service plan is for:

- A new dedicated park and ride bus service, operating as part of the Metro bus network, with two buses per hour commencing from the Huntingfield site and operating direct to Hobart city centre via the Southern Outlet. By making use of planned bus priority measures on the Southern Outlet, this service would provide attractive travel time to Hobart CBD – a saving of some 22 minutes on the current bus travel time via Kingston town centre and approaching travel times by private car. This service would provide capacity for some 100 trips per hour at peak times, delivering a noticeable reduction in private vehicle flows on the Southern Outlet, assuming all users shift from private vehicles and additional capacity is not taken up by new private vehicle commuters. The new park and ride bus service would operate all day on weekdays to allow for varying customer access needs.
- The introduction of Hobart city centre express bus services from:
  - Blackmans Bay (via Algona Road and Southern Outlet at Huntingfield)
  - Snug via Southern Outlet
  - Huonville via Southern Outlet.
- These bus services would provide similar travel time savings for existing bus customers, reducing the potential for improved park and ride bus services to attract existing bus customers, but would operate at peak times only.

These proposed new routes would require an additional seven buses to operate at peak times, at an estimated annual cost of some $1,745,949.36, assuming weekday services only. These costs exclude capital costs of buses required to operate them. There may be some opportunities for schedule rationalisation and interworking to reduce bus capital and operating costs.

In addition to the identified park and ride bus service and supporting improved bus routes, we have identified some opportunities for improving bus services in the established urban areas of Kingston/Blackman's Bay area (generally to the east of the Southern Outlet), comprising some minor route diversions and establishment of some demand-responsive bus areas, to improve public transport access to Kingston town centre and reinforce its establishment as a transit hub.

We recommend that the proposed supplementary express bus services from Blackmans Bay, Snug and Huonville be introduced before the park and ride bus service to lock in improvements for existing bus customers, to reduce the potential for the park and ride project to attract existing bus users.

APPENDIX A

END-TO-END TRAVEL TIME COMPARISONS

A1 END-TO-END TRAVEL TIME COMPARISONS

Table A.1 End-to-end travel time from bus stops in the Kingston/Blackmans Bay area to Hobart CBD by bus, car and park and ride

#	Name	Inbound (mins)				Outbound (mins)			
		Bus	Car	Park and Ride existing	Park and Ride priority	Bus	Car	Park and Ride existing	Park and Ride priority
L	Kingston Central, Channel Highway	24	28	29	23	19	28	22	20
K	Maranoa Road/Redwood Road	29	30	34	28	22	30	24	22
J	Hawthorn Drive, Kingston Fire Station	32	35	37	31	25	35	27	25
I	Algona Road/Opal Drive	38	35	37	31	30	35	30	28
H	Woodlands Drive/Edison Avenue	40	35	39	33	33	35	31	29
G	Auburn Road/Heath Court	31	30	32	26	25	30	34	32
F	Kingston Beach, Beach Road	29	30	33	27	24	30	28	26
E	Roslyn Avenue/Algona Road	36	35	36	30	30	35	28	26
D	Blackmans Bay, Illawarra Road	42	35	39	33	36	35	30	28
C	Wells Parade/Kulgoa Place	40	35	39	33	33	35	32	30
A/B	Wells Parade/Clearwater Court/Suncoast Drive	43	35	39	33	38	35	34	32

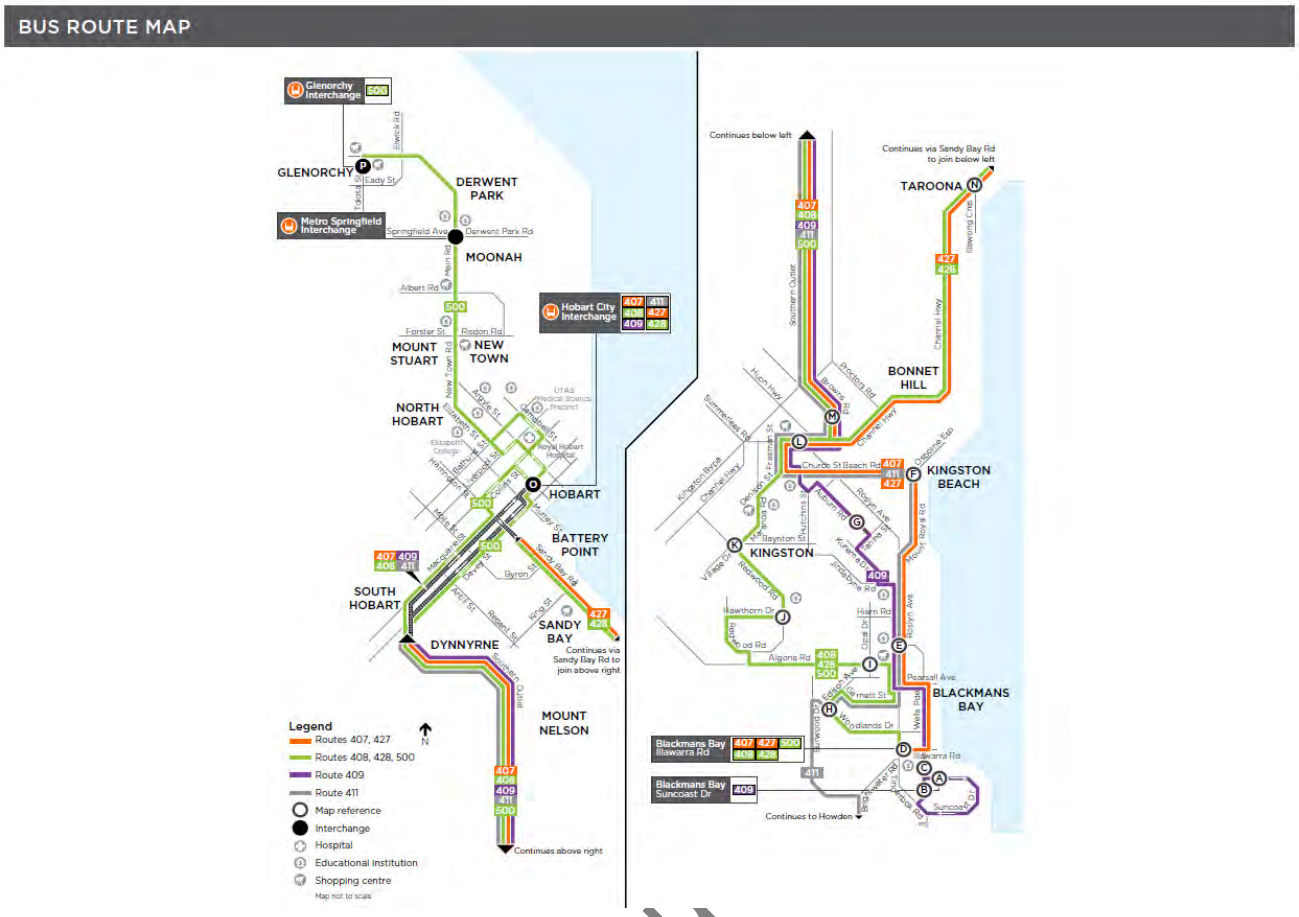

Figure A.1 Bus network map with stop references for the Kingston/Blackmans Bay area

Table A.2 End-to-end travel time from bus stops in the Huon Valley to Hobart CBD by bus, car and park and ride

#	Name	Inbound (mins)				Outbound (mins)			
		Bus	Car	Park and Ride Existing	Park and Ride Priority	Bus	Car	Park and Ride Existing	Park and Ride Priority
M	Kingston Central, Channel Highway	29	28	30	24	25	28	25	23
J	Sandfly, Huon Highway/Sandfly Road	43	28	41	35	36	35	36	34
I	Lower Longley, Huon Highway/Huon Road	48	30	43	37	41	40	40	38
H	Grove, Huon Highway/Mountain River Road	55	35	47	41	47	45	44	42
G	Huonville, Bus Station, Skinner Drive	63	45	55	49	55	50	52	50
F	Ranelagh, Marguerite Street	64	40	53	47	54	50	48	46
E	Franklin, Huon Highway near Old Road	79	50	62	56	63	60	57	55
D	Geeveston, Honeywood Lane	93	65	77	71	77	70	72	70
C	Dover, Huon Highway near Station Road	120	80	92	86	102	85	87	85
B	Cradoc, Channel Highway/Cradoc Park	68	55	67	61	59	60	62	60
A	Cygnet, Esplanade Road/Channel Highway	79	60	72	66	69	65	62	60

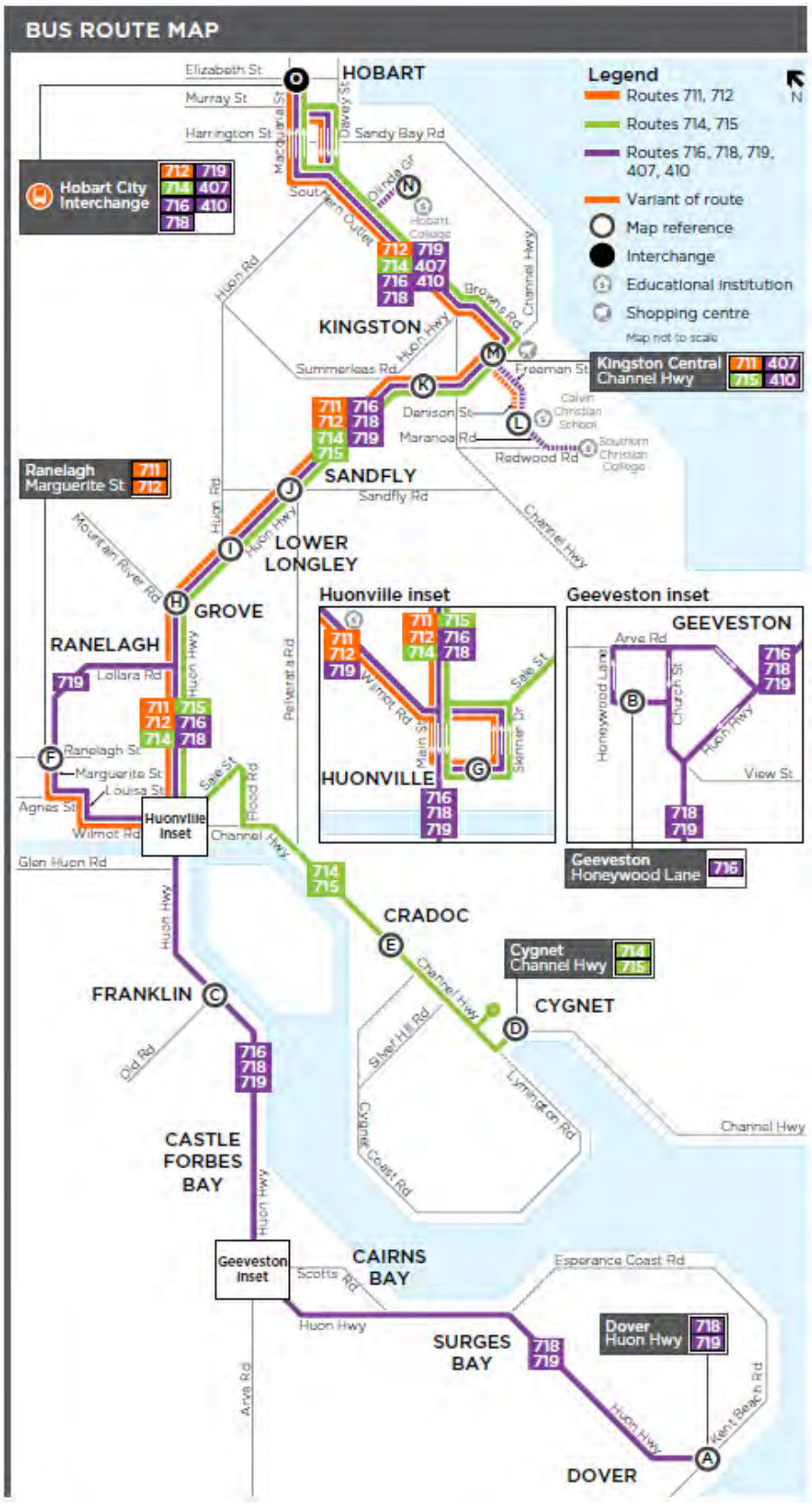

Figure A.2 Bus network map with stop references for the Huon Valley

Table A.3 End-to-end travel time from bus stops along the Channel Highway to Hobart CBD by bus, car and park and ride

Map ref	Bus stop name	Inbound (mins)						Outbound (mins)					
		Bus	Car	Park and Ride via Kingston (No Priority)	Park and Ride via Kingston (With Priority)	Park and Ride express (No Priority)	Park and Ride express (With Priority)	Bus	Car	Park and Ride via Kingston (No Priority)	Park and Ride via Kingston (With Priority)	Park and Ride express (No Priority)	Park and Ride express (With Priority)
I	Margate Central, Channel Highway	50	35	56	50	40	34	39	35	44	42	34	32
H	Margate, Incana Road/ Brigalow Street	54	35	59	53	43	37	42	35	47	45	37	35
G	Snug Central, Channel Highway	59	40	63	57	47	41	48	40	50	48	40	38
F	Snug, Charlton Street/ Cutana Parade	63	40	63	57	47	41	51	40	52	50	42	40
E	Kettering Cemetery, Channel Highway	73	45	69	63	53	47	59	45	56	54	46	44
D	Kettering, Ferry Terminal	76	50	71	65	55	49	61	50	58	56	48	46
C	Woodbridge, Channel Highway/ Thomas Road	84	55	75	69	59	53	69	55	62	60	52	50
B	Middleton, Channel Highway/ Beach Road	94	60	82	76	66	60	77	60	73	71	63	61
A	Gordon, Channel Highway	99	65	87	81	71	65	76	65	78	76	68	66

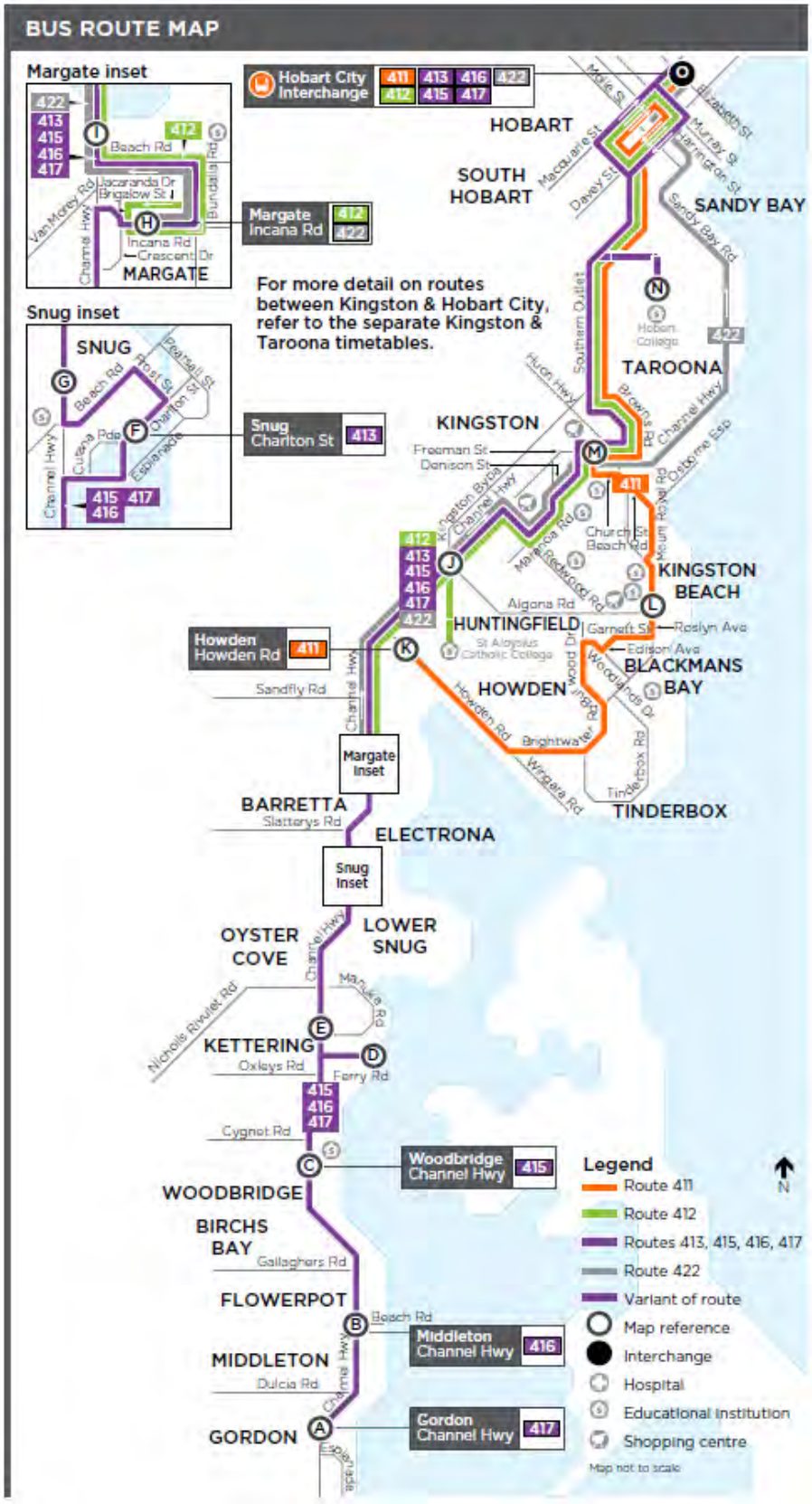

Figure A.3 Bus network map with stop references for the Huon Valley

Appendix F Planning and Environment Report

pitt&sherry

Hobart Transport Vision - Park and Ride facilities at Kingston and Huntingfield

Planning and Environment Report

Prepared for

WSP

Client representative

s 36

Date

2 June 2020

Rev 00

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Prepared by — s 36 [redacted]	s 36 [redacted]	**Date —28/02/2020**
Reviewed by — s 36 [redacted]		**Date — 01/06/2020**
Authorised by — s 36 [redacted]		**Date — 01/06/2020**

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1. Background

The Hobart Transport Vision – Southern Projects aims to achieve a modal shift to public transport for commuters using the Southern Outlet to access the central business district (CBD). In particular, the following are proposed:

- Design a 5th lane inbound to the CBD on the Southern Outlet catering for T3 traffic (incident response, buses, taxis, and cars with three or more occupants).
- Provision of two new park and ride facilities in the Kingborough municipality.
- Establishment of a bus lane in Macquarie Street and a T3 lane in Davey Street.

A Park and Ride Service model is also to be developed and measures for enforcement of transit lane operations are also included in the scope of works.

pitt&sherry have been commissioned by WSP who have been engaged by the Department of State Growth (State Growth) to undertake the necessary modelling, design and investigations for these components.

The purpose of this report is to present a preliminary assessment of the potential environmental and planning constraints to the proposed components. Specifically, this report focuses on the proposed Park and Ride facilities in Kingston and Huntingfield. Given that the proposals relate to the formalisation of existing facilities in an established urban area, the potential for impacts is considered low, as detailed in this report.

A heritage assessment has been prepared by prepared by Praxis (Appendix A).

2. Park and Ride Facilities

Two park and ride facilities are proposed. These are referred to as the northern and southern park and ride facilities.

The northern park and ride facility is comprised of two sites located at Browns Road, near the Southern Outlet's northern entrance to Kingston, as shown in Figure 1 below. This proposal would include formalisation of the existing gravel car parking area and possible pedestrian connections to bus stop facilities on the western side of the outlet and further south on Browns Road.

The southern park and ride facility would be located at an informal parking area at Huntingfield, opposite the Huntingfield Business Park and north of Huntingfield Estate, as shown in Figure 2 below.

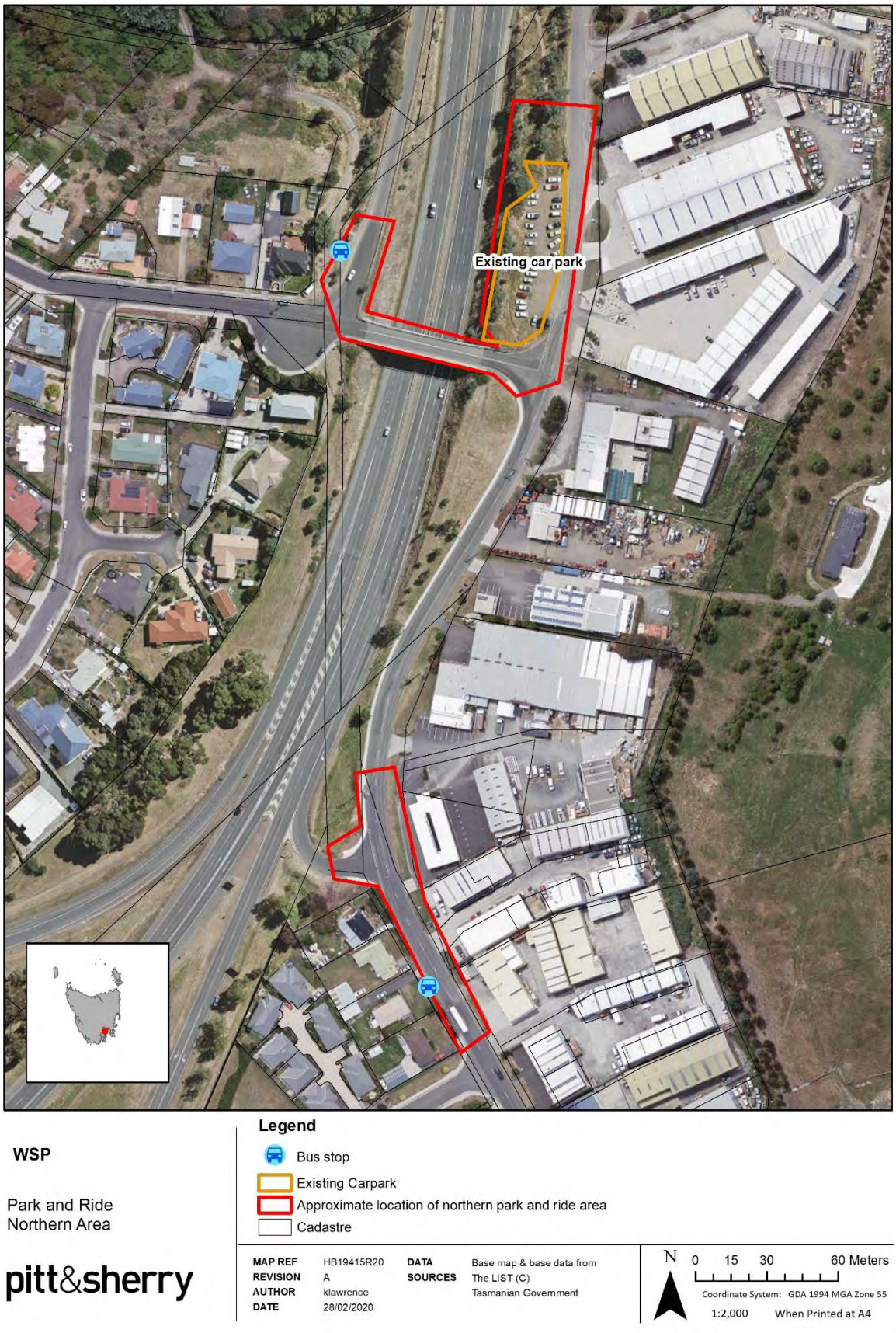

Figure 1 Northern park and ride facility at Kingston

Figure 2 Southern park and ride facility at Huntingfield

3. Land ownership

While theLIST does not have details of landowners, most of the lots are owned by the Crown and variously managed by the State Government and Kingsborough Council.

The property details for the northern park and ride facility are shown in Table 1 below.

Table 1 Ownership details for the northern park and ride area

Property Address	Property ID	Title Reference	Authority	Owners Name
No address, all on one lot	None	205706/1	Acquired road	The Crown
No address, northernmost lot	None	151186/1	Acquired road	The Crown
No address, northern lot on traffic island	None	None	Road (type unknown)	None
No address, easternmost lot	None	32842/1	Acquired Road	The Crown
No address, main lot along Browns Road	None	None	Road (type unknown)	None
No address, roadside verge east of Browns Road	None	s 36	Subdivision Road	s 36

The property details for the southern park and ride facility are shown in Table 2 below.

Table 2 Ownership details for the southern park and ride area

Property Address	Property ID	Title Reference	Authority	Owners Name
No address, northernmost lot	None	21014/2	Acquired road	The Crown
No address, northern middle lot	None	252331/1	Acquired Road	The Crown
No address, southern middle lot	None	23717/1	Acquired Road	The Crown
No address, southern lot	None	None	Road (type unknown)	None
No address, southern lot	None	None	Road (type unknown)	None

4. Relevant legislation

The *Land Use Planning and Approvals Act 1993* (LUPAA) identifies the objectives of the Resource Management and Planning System of Tasmania. These are to be furthered, through the operation of the act, through sustainable development, resource management and orderly development. Community involvement and a sharing of responsibility across all levels of government is to be promoted. These objectives are mirrored in the *Environmental Management and Pollution Control Act 1994* (EMPCA), the key environmental legislation in Tasmania.

The LUPAA establishes the process for approval of state and local planning scheme provisions and for the assessment of applications for development. EMPCA identifies those uses or developments likely to have a significant impact on the environment and outlines the process for assessment of those proposals. This act also establishes procedures for pollution prevention and control and enforcement provisions.

The legislation in force which is relevant to development in Tasmania is outlined in Table 3 below.

Table 3 Legislation relevant to development in Tasmania

Statute	Relevance
Commonwealth	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	This act aims to protect and manage those matters considered to be of National Environmental Significance (MNES). These include threatened plant and animal species, ecological communities, heritage sites and reserves. It also applies to particular actions which have the potential for impacts of national significance. The areas impacted by the proposed facilities are already disturbed and used informally for car parking. There is no potential for any MNES to be present on site and no specific consideration is included at this stage.
State	
Aboriginal Heritage Act 1975	This act relates to the protection of Aboriginal cultural heritage. The Aboriginal Heritage Register (AHR) is maintained by Aboriginal Heritage Tasmania (AHT) and a search can be requested to identify any known sites of significance which may impact the proposed alignment. Given that the proposals relate to the formalisation of existing facilities in an established urban area, the potential for impacts is considered to be low. This act is addressed further in this report.
Climate Change State Action Act 2008	This Act relates to the State's response to climate change and greenhouse gas emissions. The provision of a transit lane and commuter parking areas has the potential to reduce vehicle numbers and have a positive impact on greenhouse emissions. No specific consideration is required under this Act.
Environmental Management and Pollution Control Act 1994	The proposed park and ride areas are road works and utilities and not a use or development that warrants consideration under this act.
Historic Cultural Heritage Act 1995	This Act relates to the protection of European and other cultural heritage. Given that the proposals relate to the formalisation of existing facilities in an established urban area, the potential for impacts is considered low. This act is addressed in the report prepared by Praxis.
Nature Conservation Act 2002	This act identifies and regulates threatened native vegetation communities. Given that the proposals relate to the formalisation of existing facilities in an established urban area, the potential for impacts is considered low. No specific consideration is included at this stage.
Threatened Species Protection Act 1995	This act lists threatened species and regulates activities that may result in their disturbance. Given that the proposals relate to the formalisation of existing facilities in an established urban area, the potential for impacts is considered low. No specific consideration is included at this stage.
Weed Management Act 1999	This act declares certain plants as weeds and outlines measures for their control, including land owner obligations. This act is addressed further in this report.

Statute	Relevance
State Policies	The *State Policies and Projects Act 1993* act established the process to put in place State policies under the RMPS of Tasmania. The State Policy on Water Quality Management 1997 is relevant. Water quality (impacted by stormwater) is considered during the design and approvals processes. Design parameters established under this policy are addressed further in this report.
Tasmanian State Road Traffic Noise Management Guidelines (developed under the State Road Noise Strategy 2011)	These guidelines are used by the Department of State Growth to manage traffic noise on State roads. They are intended to assist with management of traffic noise and seek to reduce traffic noise to below accepted limits to the extent reasonable, practical and cost effective. These guidelines outline procedures to assess the need for noise mitigation and are separate to any requirements to assess noise impacts under local planning scheme provisions. These are addressed further in this report.
Tasmanian Planning Scheme	The LUPAA was amended in 2015 to provide for a single planning scheme for Tasmania, known as the Tasmanian Planning Scheme (TPS). State Planning Provisions came into effect on 2 March 2017 as part of the Tasmanian Planning Scheme, however, they will have no practical effect until a Local Provisions Schedule (LPS) is in effect in the relevant council area. Kingborough Council does not have an approved LPS and the TSP is not relevant at this stage.
Local	
Kingborough Interim Planning Scheme 2015	This planning scheme contains zone provisions, overlay codes and development codes which include use and development standards to be achieved. It also contains a Significant trees code which nominates certain trees for protection in addition to those considered to have conservation values under legislation above. Council also has a number of by-laws which contain various restrictions on the removal of vegetation from private and Council owned land. These are addressed further in this report.

5. Natural Values

5.1 Flora and fauna

Given that the northern and southern park and ride facilities are to be located in cleared, urban areas adjacent the Southern Outlet and the established road network, the potential for impacts on natural values is low.

The northern site contains no records of threatened or non-threatened flora but is impacted by weeds on its northern extent.

The southern site is also largely cleared but there are records of *Juncus amabilis* (gentle rush) from 2015 which is listed as rare under the *Threatened Species Protection Act 1995*. This species is found in moist situations, often in areas of seepage alongside roadsides, which is where it was recorded on site. This species is pending delisting. The status of this species will require confirmation prior to works and if still listed, survey undertaken to determine the presence of any individuals. No threatened fauna has been recorded on site.

5.2 Hydrology

Both the northern and southern park and ride sites are located in the Brown's River Catchment and the Hobart Stormwater catchment. There are no watercourses impacting either site.

5.3 Geology

There are no known geological constraints associated with either park and ride site.

5.4 Landscape/scenic

The sites are not located in areas protected for landscape or scenic values. The Browns Rd site is elevated above the Southern Outlet atop a steep cutting and will not be visible to passing traffic. It will be visible from adjacent light industrial areas and lesser traffic flows on Browns Rd.

The Huntingfield site is more prominent with high levels of passing traffic. It is located adjacent the Algona Rd roundabout which is a major access road to Blackmans Bay. This is discussed further in Section 6.1.

5.5 Weeds

The northern site is largely cleared of vegetation but is impacted by weeds. There are no records on the Natural Values Atlas but there is evidence in Google Street View images of blackberry and other possible weeds within the site. There are numerous records of *Echium plantagineum* (Patersons curse) further north on Browns Rd.

No weed species have been recorded on the Huntingfield site.

Appropriate weed management actions and timeframes for implementation during construction will be required.

6. Socio-economic considerations

6.1 Built environment

As seen in Figure 1 above, the northern site is located adjacent established light industrial and commercial buildings in the Light Industrial zoned land to the east of the Southern Outlet and Browns Road. Land further to the east, to the south and to the west (across the Southern Outlet) is zoned for various densities of residential development.

As seen in Figure 2 above, to the east of the southern site is a mix of some reasonably large-scale commercial and light industrial developments, on Light Industrial zoned land. To the south is Huntingfield estate which is permanently listed on the Tasmanian Heritage Register. Land further south and to the west (beyond the highway extent) is zoned General Residential.

6.2 Utilities

There are a number of utilities within the proposed park and ride areas that will require consideration and/or relocation to allow construction. This will be subject to further assessment when design is more advanced.

6.3 Aboriginal Heritage

Aboriginal cultural heritage is managed by Aboriginal Heritage Tasmania (AHT) under the *Aboriginal Heritage Act 1975*. A search of the Aboriginal Heritage Register should be undertaken to identify any sites of concern. Given the extent of disturbance within the Southern Outlet Corridor the potential for sites may have been reduced.

6.4 Historic Heritage

A Heritage Management Strategy (Appendix A) was prepared by Praxis which identified potential heritage issues arising from the proposed Hobart Transport Vision projects, including the park and ride facilities. Heritage listed properties near the proposed park and ride sites include Huntingfield Estate and the Australian Antarctic Division Headquarters near the southern site, which are listed on the Tasmanian Heritage Register. The strategy concluded that provided no works are proposed on the 'Huntingfield' property, then there is no conceivable heritage impact arising from any works to those proposed areas.

6.5 Land productivity

Undeveloped land adjoining the Southern Outlet is predominantly owned by the Crown with some adjacent areas owned by local government. It is not currently used for any agricultural production and is not managed by Sustainable Timbers Tasmania for forestry. The light industrial and residential areas adjacent the northern and southern sites are privately owned.

7. Development considerations

7.1 Kingborough Interim Planning Scheme 2015

The land is in the Kingborough Council local government area, where the Kingborough Interim Planning Scheme 2015 applies.

7.1.1 Applicable exemptions

Under Clause 5 of the Planning Scheme, General Exemptions, there are no applicable exemptions for the proposed park and ride facilities.

Under Clause 6, Limited Exemptions, there are some exemptions for Minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:

(a) minor widening or narrowing of existing carriageways; or
(b) making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices and markings, street lighting and landscaping.

These exemptions are limited though and are not available where:

(a) a code in this planning scheme lists a heritage place or precinct and requires a permit for the use or development that is to be undertaken; or
(b) the removal of any threatened vegetation is required.

While no heritage places are located in the proposed park and ride facility areas, and no threatened vegetation is required to be removed, the proposed works are not considered to be consistent with the minor nature of works listed. It is likely that the Council will require a permit for the proposed park and ride areas. Minor alterations to bus stops are considered likely to benefit from the exemptions and not require a permit.

7.2 Zoning

Figure 3 and Figure 4 below show that:

- The Northern Area is partially located in the Utilities and Light Industrial zones with a narrow strip of footpath being located in the General residential zone; and
- The Southern Area is located wholly in the Utilities Zone.

7.2.1 Land use

Some local governments classify ‘park and ride facilities’ as Transport Depot and Distribution and some classify them as Vehicle Parking.

- Transport Depot and Distribution means use of land for distributing goods or passengers, or to park or garage vehicles associated with those activities, other than Port and shipping. Examples include an airport, bus terminal, council depot, heliport, mail centre, railway station, road or rail freight terminal and taxi depot.
- Vehicle Parking means use of land for the parking of motor vehicles. Examples include single and multi-storey car parks.

Both uses are Discretionary in the Utilities and the Light Industrial zones. Kingborough Council should be contacted to find out which classification they consider applies to the proposed park and ride facilities.

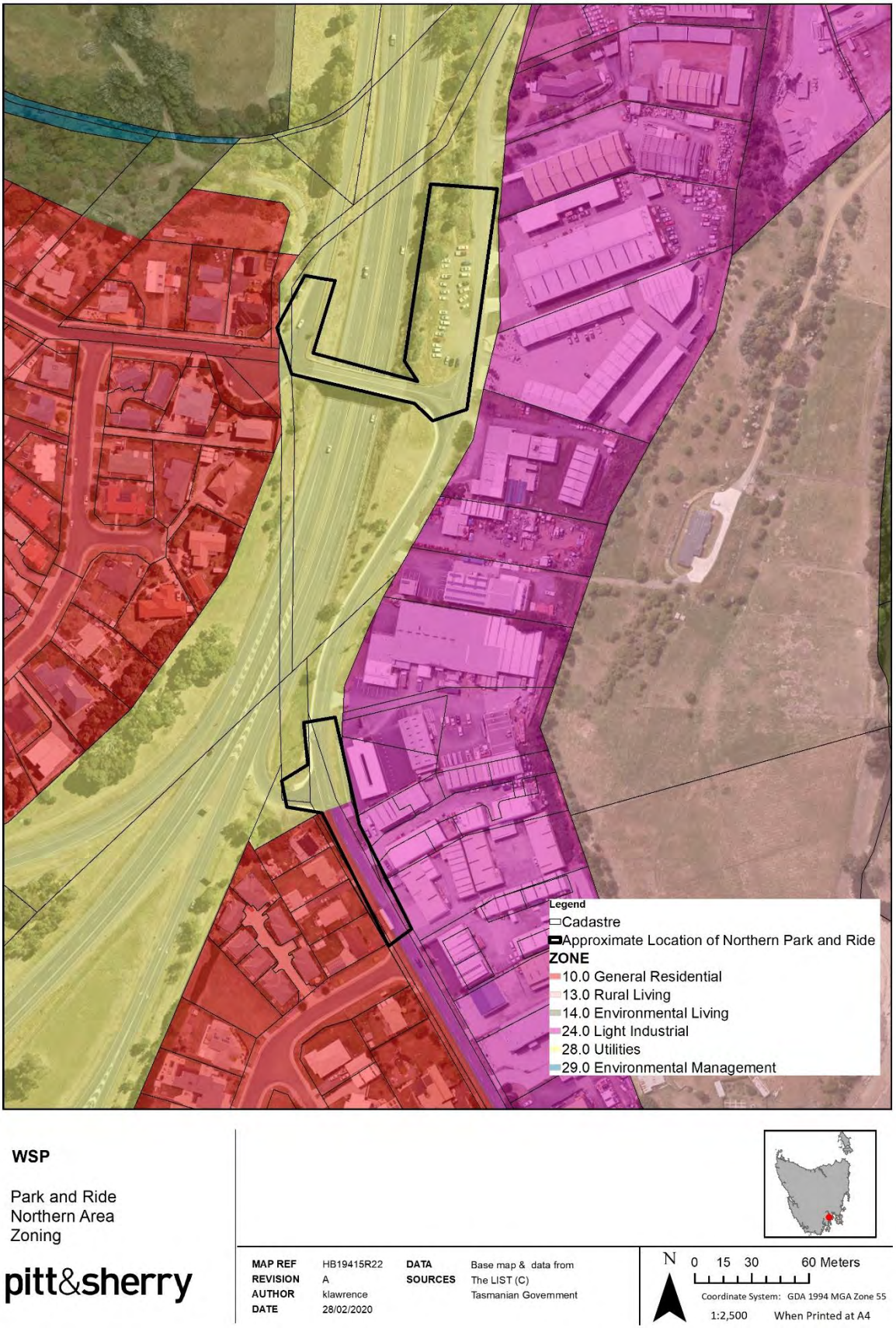

Figure 3 Zoning under Kingborough Interim Planning Scheme 2015

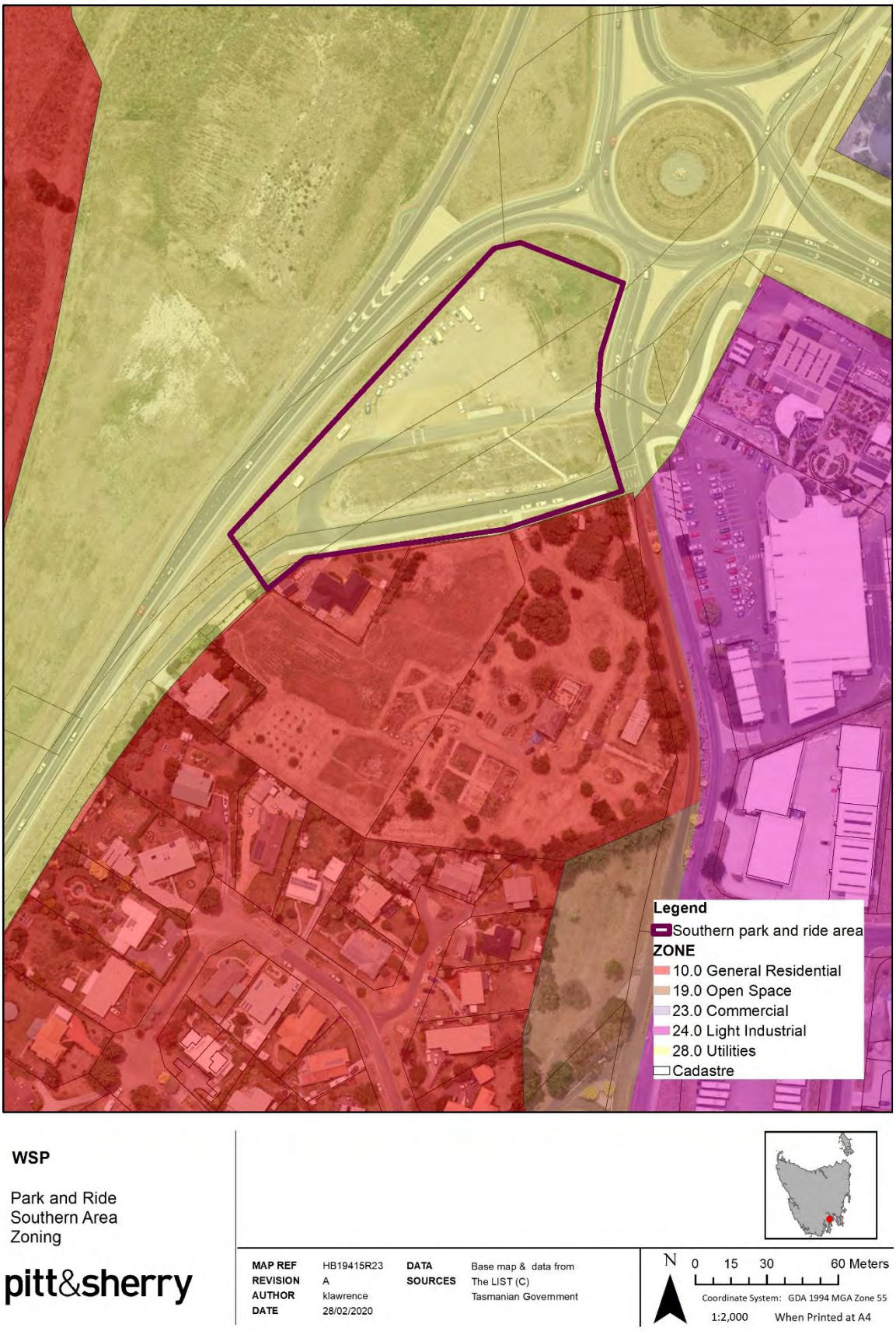

Figure 4 Zoning under Kingborough Interim Planning Scheme 2015

7.2.2 Overlays

The overlays which affect the park and ride facility sites are identified in the table below.

Park and ride facility	Overlay	Comments
Northern site	**Attenuation Area** - Browns Road Industrial. Buffer distance: 100m - Noise, odours **Bushfire Prone Areas**	This overlay requires consideration of E.9.0 the Attenuation Code, which applies to 'sensitive uses' (e.g. residential). As the potential land uses are Transport Depot and Distribution or Vehicle Parking, which are not sensitive uses, the Attenuation Code does not apply. As the proposed park and ride facility is not a hazardous or vulnerable use, E1.0 the Bushfire-Prone Areas Code does not apply.
Southern site	**Attenuation Area** - Industrial activity. Buffer distance: 100m - Noise, odours, dust **Bushfire Prone Areas**	The Attenuation Code does not apply, as the potential land uses are Transport Depot and Distribution or Vehicle Parking, which are not sensitive uses. As the proposed park and ride facility is not a hazardous or vulnerable use, E1.0 the Bushfire-Prone Areas Code does not apply.

7.2.3 Noise

Under the Light Industrial and Utilities zones the noise requirements are the same and are set out in sub-clauses 23.3.2 and 28.3.2 respectively. These are shown in the table below.

Noise	
Objective: To ensure that noise emissions do not cause environmental harm and do not have unreasonable impact on residential amenity on land within a residential zone.	
Acceptable Solutions	**Performance Criteria**
A1 Noise emissions measured at the boundary of a residential zone must not exceed the following: • 55dB(A) (LAeq) between the hours of 7.00 am to 7.00 pm; • 5dB(A) above the background (LA90) level or 40dB(A) (LAeq), whichever is the lower, between the hours of 7.00 pm to 7.00 am; • 65dB(A) (LAmax) at any time. Measurement of noise levels must be in accordance with the methods in the Tasmanian Noise Measurement Procedures Manual, issued by the Director of Environmental Management, including adjustment of noise levels for tonality and impulsiveness. Noise levels are to be averaged over a 15 minute time interval.	P1 Noise emissions measured at the boundary of a residential zone must not cause environmental harm within the residential zone.

In order to demonstrate compliance, a Noise Assessment by a suitably qualified person must be prepared with recommended mitigation measures, if required. Given the location of the proposed park and ride facilities, adjacent busy roads, and the fact that some of these areas are currently used for informal parking, noise impacts are unlikely to be a significant matter.

7.2.4 Stormwater

E7.0 the Stormwater Management Code applies to all development requiring the management of stormwater. In addition to any other application requirements, the planning authority may require the applicant to provide any of the following information if considered necessary to determine compliance with performance criteria, as specified:

a. a report from a suitably qualified person advising of the suitability of private and public stormwater systems for a proposed development or use;

b. a report from a suitably qualified person on the suitability of a site for an on-site stormwater disposal system.

The acceptable stormwater targets for new development are set out in the table below.

80% reduction in the average annual load of total suspended solids (TSS) based on typical urban stormwater TSS concentrations.
45% reduction in the average annual load of total phosphorus (TP) based on typical urban stormwater TP concentrations.
45% reduction in the average annual load of total nitrogen (TN) based on typical urban stormwater TN concentrations.
Stormwater quantity requirements must always comply with requirements of the local authority including catchment-specific standards. All stormwater flow management estimates should be prepared according to methodologies described in Australian Rainfall and Runoff (Engineering Australia 2004) or through catchment modelling completed by a suitably qualified person.

7.2.5 Traffic

A Traffic Impact Assessment will be required to address the requirements of the Road and Railways Assets Code, particularly as they relate to impacts on road safety and efficiency. An assessment of the car parking layout will also be required to address the requirements of the Parking and Access Code. The requirements of this code related to landscaping of parking and circulation areas will also need to be addressed.

8. Summary of preliminary review of constraints

The review of available information has identified the following:

- No Commonwealth or State listed threatened native vegetation communities and species have been recorded on the northern site – no natural values assessment is considered necessary.
- The status of *Juncus amabilis* (gentle rush) will require confirmation prior to works and if still listed, survey undertaken of the southern site to determine the presence of any individuals.
- The park and ride facilities are all traversed by water mains, and potentially other utilities, which will have to be considered at design stage.
- Council may determine the land use to be either Transport Depot and Distribution or Vehicle Parking, which are both Discretionary uses in the Utilities Zone and the Light Industrial Zone. As such, the development applications would have to be advertised for a period of 14 days.
- A Traffic Impact Assessment will be required to address the requirements of the Road and Railway Assets Code.
- An assessment is required of layout and landscaping in accordance with the Parking and Access Code.
- The planning permit applications will require a stormwater assessment, prepared by a suitably qualified person, which demonstrates the management and disposal of stormwater complies with the state policy requirements.
- In the event that any proposed works impact the 'Huntingfield' property, then a heritage impact assessment will be required to accompany any applications for development (Council and Tasmanian Heritage Council).

Heritage Management Strategy

Appendix A

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heritage

planning

archaeology

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Heritage Management Strategy

Hobart Transport Vision Southern Projects

HOBART TASMANIA

s 36 — Heritage Consultant and Historical Archaeologist

For WSP Australia

February 2020

This document was written by s 36 (BA.Hons Archaeology, MA Cultural Heritage Management, G.Dip. Environmental Management) Director – Praxis Synergy Pty. Ltd. Incorporating Praxis Environment.

Unless otherwise stated, the north point (or approximate) of aerial photographs, maps and plans is to the top of the page.

Cadastral information depicted in this document must not be relied upon without verification by a Surveyor. Rectified aerial imagery has not been used; therefore, the actual location as depicted in aerial images may differ to that of actual survey. Unless expressly stated, measurements are only indicative.

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Contents

1. INTRODUCTION

This document has been commissioned by WSP Australia as part of the Hobart Transport Vision Southern Projects – Macquarie/Davey Upgrades and Fifth Lane Southern Outlet to consider the possible heritage impacts arising from a range of proposed upgrades including widening/reconfiguration of the Southern Outlet, possible reconfigurations of Davey and Macquarie Street and two 'park and ride' parking areas at Kingston/Huntingfield.

The background and brief for this project is drawn from the *Request for Tender, by Department of State Growth, for Supply of Consultant Service for Hobart Transport Vision Southern Projects* (RFT Number 3112), issued 31/8/2019. The response to the brief included the following project proposal and understanding of task:

Ahead of the design phase:

1. Review of the Tasmanian Government provided historic heritage assessment and any consequent statutory heritage requirements arising from such [included here as Attachment A].
2. Familiarisation survey of any identified heritage sites.
3. Provision of conservation policy to address any statutory heritage requirements as identified in (1).

During the design phase:

4. Liaison with the project design team and any other relevant stakeholders during the design place.
5. Preliminary review of design concept(s) to assess likely compliance with any statutory heritage requirements and conservation policy.

Post design

6. Undertake a historic heritage impact assessment of the preferred design against any statutory heritage requirements and the conservation policies. If required, formulate mitigation strategies/recommendations to manage any identified heritage impacts.

The 'survey corridor' as defined here is the road reserve of Davey Street and Macquarie Streets Hobart, from Elizabeth Street to the Southern Outlet, as well as the Southern Outlet and near environs from the intersection of Davey/Macquarie Streets to the Olinda Grove intersection at the top of the outlet, as per Figure 1.1. A 'buffer' each side of the road to a distance of 10 metres has been proposed here in order to identify heritage features in the 'near environs' in order to consider the possibility of proximal impact of any part of the proposal.

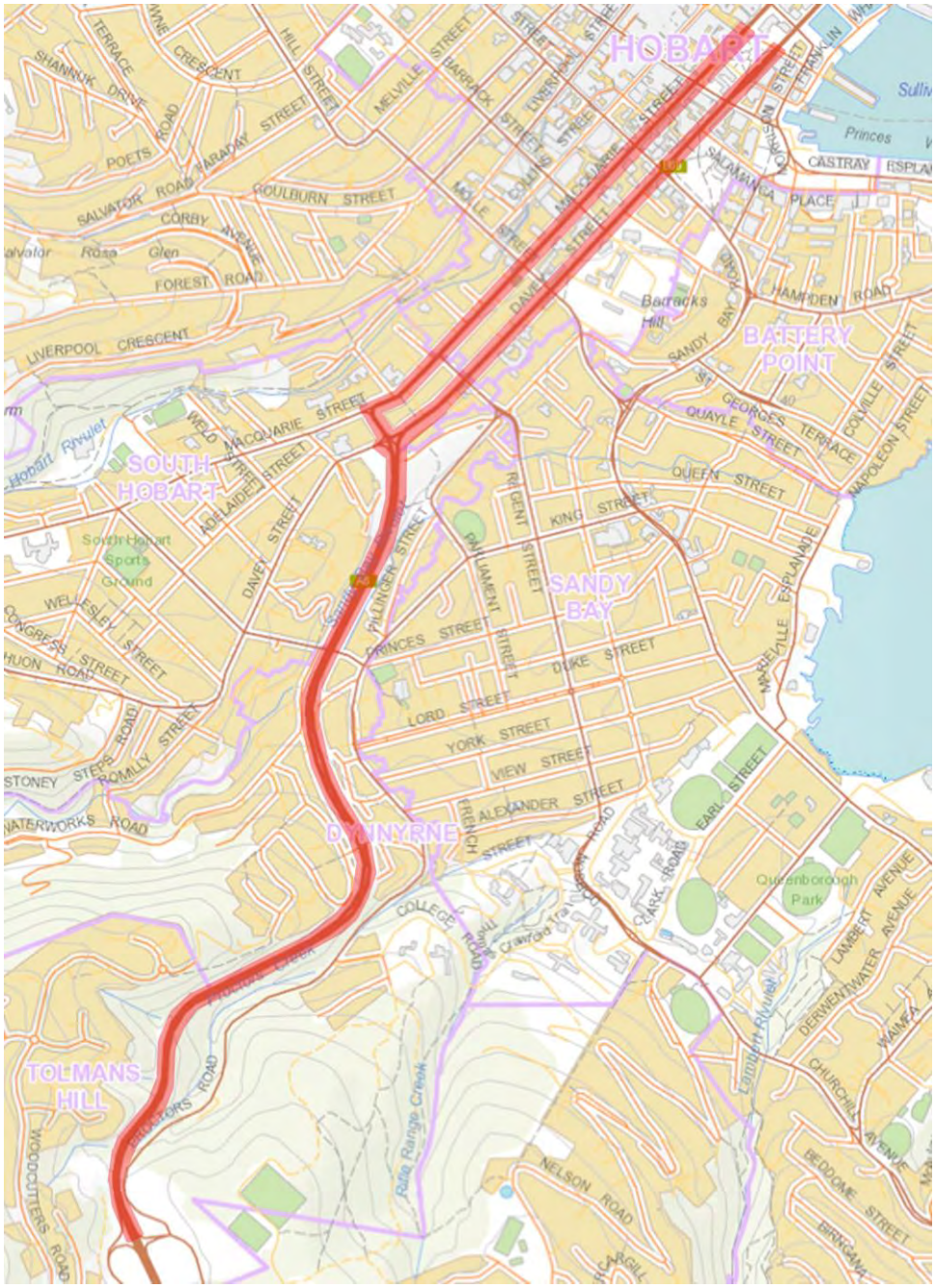


Figure 1.1 – The 'survey corridor' as defined above. Adapted from www.thelist.tas.gov.au

Further, the brief seeks input into two 'park and ride' areas near Kingston, as defined in Figures 1.2-1.3:

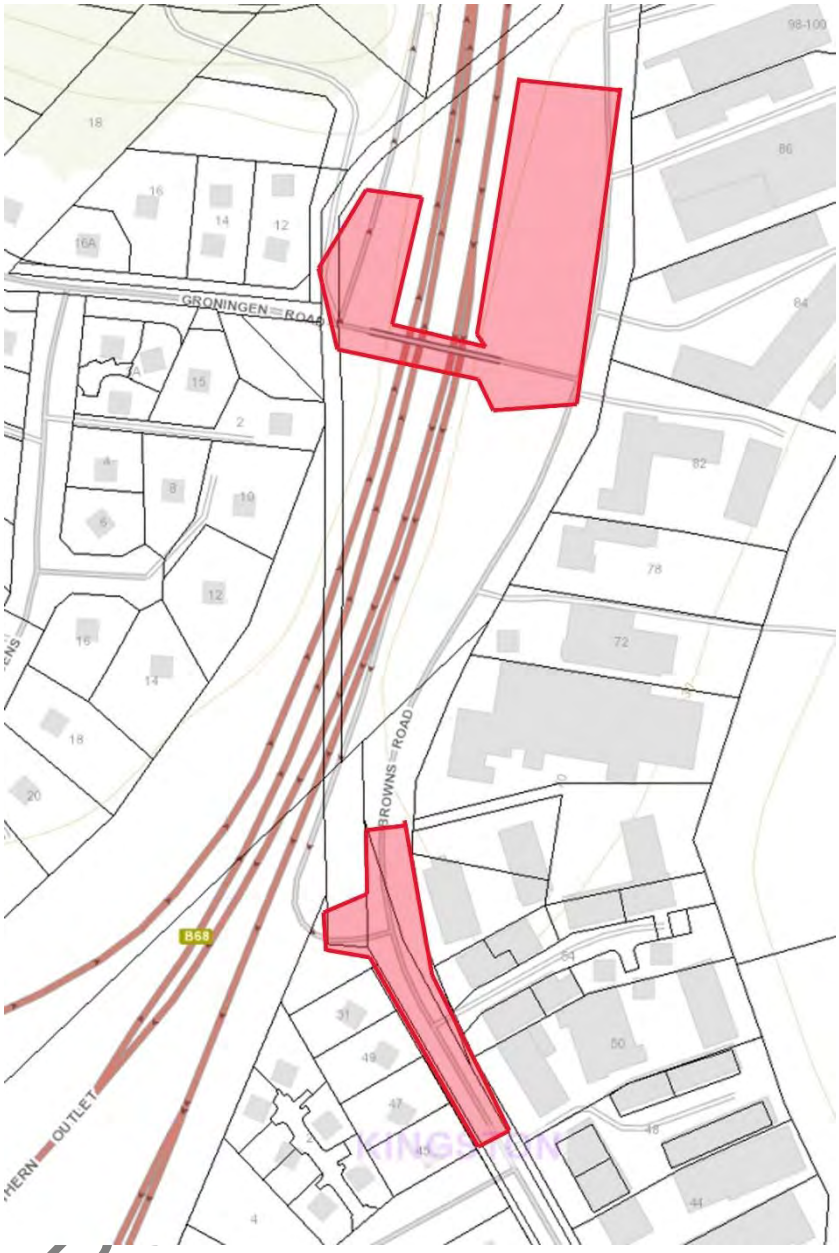


Figure 1.2 – the Northern Park and Ride area (north of Kingston). Adapted from www.thelist.tas.gov.au

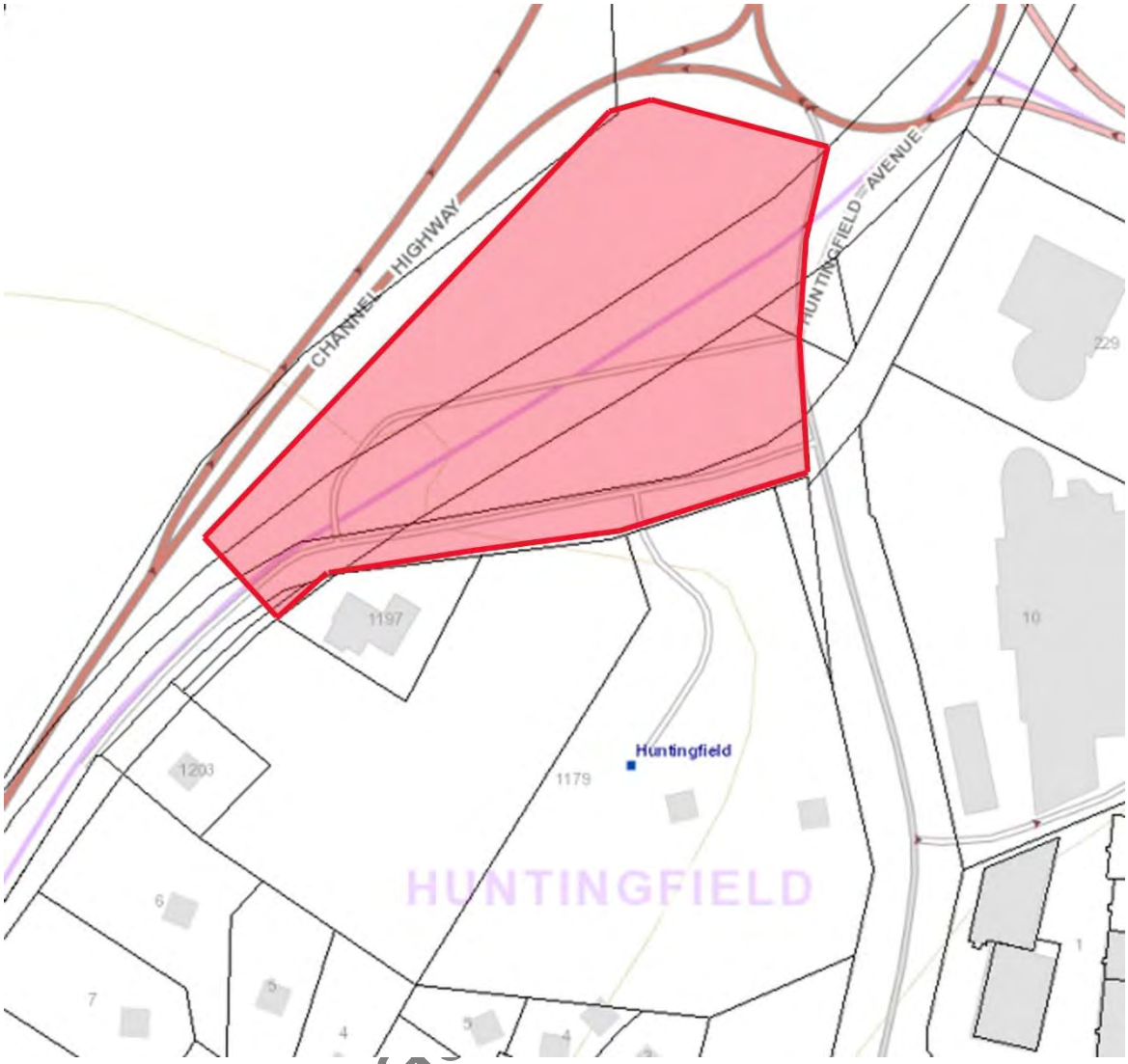


Figure 1.3 – the Southern Park and Ride area (near Huntingfield). Adapted from www.thelist.tas.gov.au

This document has been formulated in-line with the heritage management processes espoused by the ICOMOS Australia Burra Charter, which is illustrated in the following process chart and which provides the basis for the general structure of the approach to understanding the significance of the place and obligations arising from such. The statutory provisions and consequent responsibilities as outlined in Section 2 have also been considered in formulating this document.

Figure 1.4 – The Burra Charter Process[1].

Whilst this document does not intend to be a conservation management plan, it takes the basic principles of conservation planning, as outlined in J.S. Kerr's *The Conservation Plan*[2]*,* in order to develop the policies upon which the conservation of the place (and assessment of development impact) is based (but explored in more detail where necessary). Further, this document has been formulated with regard to Heritage Tasmania's *Pre-Development Assessment Guidelines – Proactively Managing Historic Heritage.*[3]

[1] ICOMOS AUSTRALIA (2013): *The Burra Charter.* Australia ICOMOS Inc. p10.
[2] KERR, J. (2000): *The Conservation Plan.* National Trust of NSW, Sydney.
[3] https://heritage.tas.gov.au/Documents/Pre-Development%20Assessment%20Guidelines.pdf

2. STATUTORY HERITAGE LISTINGS

The statutory heritage requirements which may be applicable to any particular portion of the survey corridor and buffer zone as considered here are:

Hobart Interim Planning Scheme 2015 (HIPS) and Kingborough Interim Planning Scheme 2015 (KIPS)

- Heritage Place, as included in Table E.13.1.
- Heritage Precinct, as included in Table E.13.2
- Cultural Landscape Precinct, as included in Table E.13.3 (note that no part of the survey corridor is within, or in close proximity to any Cultural Landscape Precinct under the HIPS and no precincts are included in the KIPS).
- Place of Archaeological Potential, as included in Table E.13.4
- Significant Trees List, as included in Table E24.1.

Sullivans Cove Planning Scheme 1997 (SCPS)

- Schedule 1 – Conservation of Cultural Heritage Values.

Historic Cultural Heritage Act 1995

- Tasmanian Heritage Register

Environment Protection and Biodiversity Conservation Act 1999

- Commonwealth Heritage List
- National Heritage List
- World Heritage List (and buffer zones).

For the sake of clarity, the survey area has been broken into several segments here, with each applicable listing depicted graphically (or noted where no listings exist on that particular segment). Note that these have been depicted here as a 'point' on each particular place – which does not necessarily reflect the *extent* of that listing. For example:

- The Hobart/Kingborough Interim Planning Schemes generally relates to an address, however can also include/exclude specific titles that comprise that address and can also (via Figures E.13.1.1-13) define any particular area within those titles/addresses.
- The Tasmanian Heritage Register includes a title reference as the 'registered place' but can also include/exclude any part of that title via a plan registered in the Central Plan Registry.
    - In both cases, neither Table E.13.1 nor the Tasmanian Heritage Register automatically update title references (e.g. when a property transaction has occurred), therefore 'legacy titles' may still apply.

Whilst precisely defining *all* affected places within the survey corridor/buffer zone would be onerous (and unwarranted) in the current case, should part of any proposal be within a place affected by these listings, further definition of the precise affected area may need to be undertaken.

The following tables depict sections of the survey corridor and buffer zone and discuss each applicable statutory heritage requirement which may be applicable:

Davey/Macquarie Streets, eastern section, Elizabeth to Harrington Streets.		
	**Hobart Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	There is a high density of places included on the Heritage Places schedule of the scheme along both Macquarie and Davey Streets immediately adjacent to the survey corridor and within the buffer zone. These include prominent buildings such as the former St Marys Hospital, St Davids Cathedral and a number of (former) residential buildings and St Davids Park.	Although the survey corridor does not include any listed place, should any works be required in those nearby places, as per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of any of the heritage places, Part E.13.7 (Development Standards for Heritage Places) may be applicable.

	**Hobart Interim Planning Scheme Table E.13.2 (Heritage Precincts).**	**Likely planning requirements.**
	Part of the survey corridor is included in Heritage Precinct H1, as defined by Map E.13.3. Refer to Table E.13.3 for statements of significance.	As per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *(l) minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of the heritage precinct (e.g. the road reserve between Murray and Harrington Streets and Salamanca Place and Harrington Street), Part E.13.8 (Development Standards for Heritage Precincts) may be applicable.

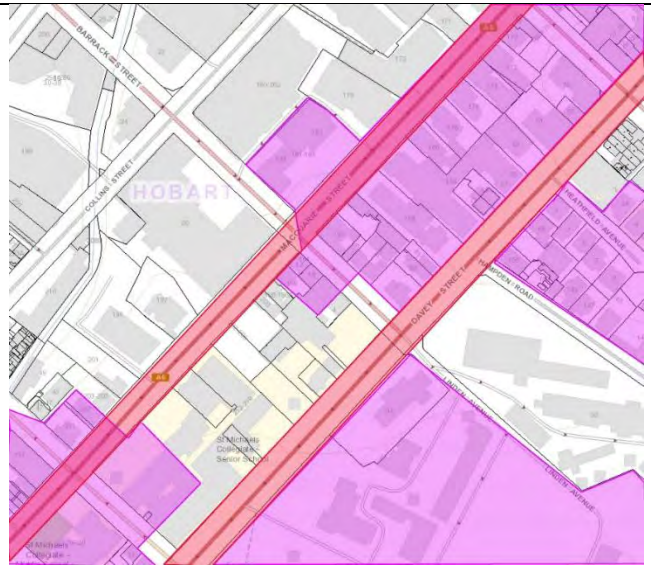
	**Hobart Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).**	**Likely planning requirements.**
	The section of the survey corridor within the road reserve of Macquarie Street from Elizabeth to Harrington Streets and within Davey Street from Murray to Harrington Streets is within the area defined by Table E.13.4 as a Place of Archaeological Potential.	Under the General exemptions for E.13.0 (Historic Heritage Code) excavation in a Place of Archaeological Potential is exempt if: *(y) maintenance and repair by or on behalf of the State Government, a Council, a statutory authority, or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines, where like for like materials and finishes are used for reinstatement;* There are certain other exemptions for excavation in a Place of Archaeological Potential that would need to be considered in the event that any excavation beyond that listed above were proposed or an application may be required to address Part E.13.10 (Development Standards for Places of Archaeological Potential). This may require an archaeological impact assessment provided by a suitably qualified person demonstrating that the nature of the development will not result in disturbance of ground considered to be of archaeological sensitivity.

	Hobart Interim Planning Scheme Table E.24.1 (Significant Trees List).	**Likely planning requirements.**
	No listings	Although note the inclusion of St Davids Park (including trees) on the HIPS Table E.13.1 and Franklin Square (including trees) on the SCPS Part 22 Table 1) therefore these trees are a heritage consideration if works were in close proximity to the edges of these parks.
	**Sullivans Cove Planning Scheme Part 22, Table 1 (Places of Cultural Significance).**	**Likely planning requirements.**
	No part of the survey corridor is within a Place of Cultural Significance, however there are several Places of Cultural Significance adjacent to the road reserve, including Franklin Square, the Treasury Buildings, Treasury Chambers and former St Marys Hospital.	Part 22 of the scheme would not be applicable provided all works are outside the boundaries of the particular Places of Cultural Significance. 'Building or Works' (i.e. carrying out of building construction, alteration or decoration or works) on a place not included as a Place of Cultural Significance that is 'adjacent' to such a place may require consideration by the planning authority (for possible impact upon that adjacent place). Part 16.2 of Activity Area 2.0 (the survey corridor is within that area) requires that *Use and development on road reserves, public parks and other public spaces within the activity area shall only be 'permitted' where they do not detract from the space's amenity or heritage value*.

	**Sullivans Cove Planning Scheme Part 22, Table 2 (Places of Archaeological Sensitivity).**	**Likely planning requirements.**
	One Place of Archaeological Sensitivity is included in the survey corridor - Davey Street steps/cove escarpment. Note that Franklin Square and the Treasury buildings as well as a portion of Elizabeth Street (the site of First Government House and likely to have a high level of archaeological significance) are immediately adjacent to the survey corridor.	Should any excavation be required within the portion of Davey Street defined as a Place of Archaeological Sensitivity (i.e. the central retaining wall between Elizabeth and Murray Streets), or which may affect the nearby steps (down to Brooke Street) then the provisions of Part 22.6 of the scheme will need to be addressed. There are no provisions for adjacency in that Part, therefore if no excavation is proposed outside the road reserve (with the exception of the above) then assessment against Part 22.6 would not be required.
	**Tasmanian Heritage Register**	**Likely planning requirements.**
	There is a high density of places included on the Tasmanian Heritage Register along both Macquarie and Davey Streets immediately adjacent to the survey corridor and within the buffer zone. These include prominent buildings such as the Treasury buildings, former St Marys Hospital, St Davids Cathedral and other sites such as St Davids Park.	Provided that no works are proposed within any title included on the Tasmanian Heritage Register (i.e. outside the road reserve) then the provisions of the Historic Cultural Heritage Act would not be applicable.

	Commonwealth, National or World Heritage List	Likely planning requirements.
	No listings.	Not applicable.

Davey/Macquarie Streets, central section, Harrington to Molle Streets.		
	**Hobart Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	There is a high density of places included on the Heritage Places schedule of the scheme along both Macquarie and Davey Streets immediately adjacent to the survey corridor and within the buffer zone. These include prominent buildings such as the Anglesea Barracks complex, former Collegiate School and a number of residential buildings.	Although the survey corridor does not include any listed place, should any works be required in those nearby places, as per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of any of the heritage places, Part E.13.7 (Development Standards for Heritage Places) may be applicable.

	**Hobart Interim Planning Scheme Table E.13.2 (Heritage Precincts).**	**Likely planning requirements.**
	Part of the survey corridor is included in Heritage Precinct H1 (Macquarie Street from Harrington to Molle Streets) and part is within Heritage Precinct H4 (west of 205 Macquarie Street) as defined by Map E.13.3. Refer to Table E.13.2 for statements of significance. Note also that Heritage Precincts H2 (Heathfield Avenue) and H3 (Anglesea Barracks) are immediately adjacent to the road reserve to the south of Davey Street.	As per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *(l) minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of the heritage precinct (e.g. Macquarie Street between Harrington and Barrack Streets and west of 205 Macquarie Street), Part E.13.8 (Development Standards for Heritage Precincts) may be applicable.

	**Hobart Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).**	**Likely planning requirements.**
	All of this section of the survey corridor is within the area defined by Table E.13.4 as a Place of Archaeological Potential.	Under the General exemptions for E.13.0 (Historic Heritage Code) excavation in a Place of Archaeological Potential is exempt if: *(y) maintenance and repair by or on behalf of the State Government, a Council, a statutory authority, or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines, where like for like materials and finishes are used for reinstatement;* There are certain other exemptions for excavation in a Place of Archaeological Potential that would need to be considered in the event that any excavation beyond that listed above were proposed or an application may be required to address Part E.13.10 (Development Standards for Places of Archaeological Potential). This may require an archaeological impact assessment provided by a suitably qualified person demonstrating that the nature of the development will not result in disturbance of ground considered to be of archaeological sensitivity.

	**Hobart Interim Planning Scheme Table E.24.1 (Significant Trees List).**	**Likely planning requirements.**
	There are five listings for trees on properties adjacent to the survey corridor (including an avenue of trees within the Anglesea Barracks complex). Only one tree is within the nominated 10-metre buffer (Chinese Elm at Collegiate, 212-218 Macquarie Street).	These trees are all distant to the road reserve, however if any works are proposed which may impact these, then the provisions of E.24.6 will need to be addressed.
	**Tasmanian Heritage Register**	**Likely planning requirements.**
	There is a high density of places included on the Tasmanian Heritage Register along both Macquarie and Davey Streets immediately adjacent to the survey corridor and within the buffer zone. These include prominent buildings such as the Anglesea Barracks complex, former Collegiate School and a number of residential buildings.	Provided that no works are proposed within any title included on the Tasmanian Heritage Register (i.e. outside the road reserve) then the provisions of the Historic Cultural Heritage Act would not be applicable.

	**Commonwealth, National or World Heritage List**	**Likely planning requirements.**
	Anglesea Barracks is adjacent to the survey corridor and is included on the Commonwealth Heritage List.	In the event that any proposed works affect the site of Anglesea Barracks would either need to be consistent with an endorsed management plan for the site under the provisions of the EPBC Act or be referred to the Commonwealth Minister for the Environment for determination.

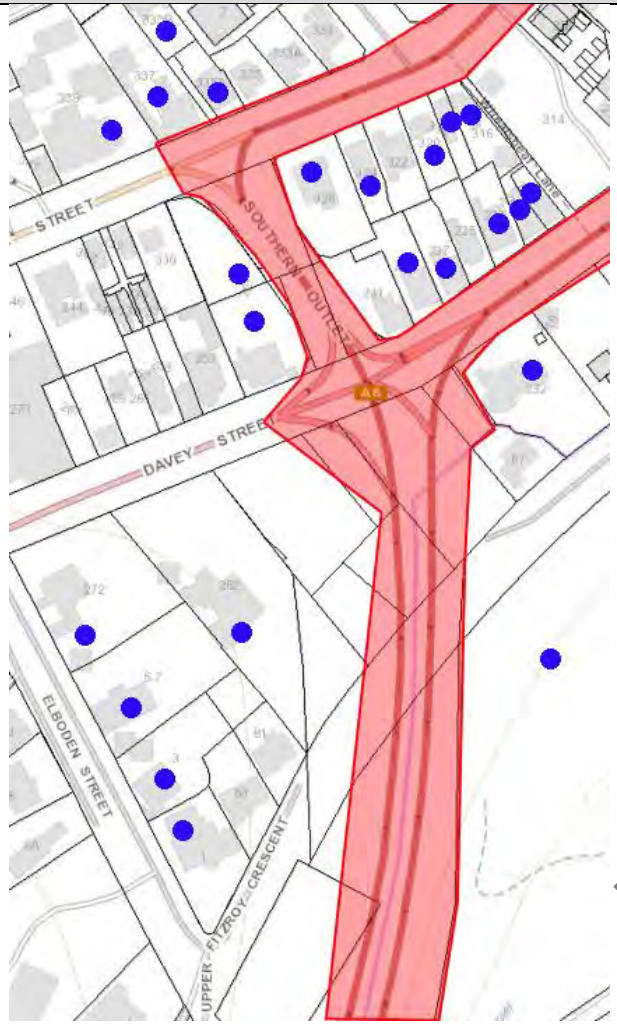
Davey/Macquarie Streets, central section, Molle Street to the Southern Outlet.		
	**Hobart Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	There is a high density of places included on the Heritage Places schedule of the scheme along both Macquarie and Davey Streets immediately adjacent to the survey corridor and within the buffer zone. These include prominent buildings such as the Anglesea Barracks complex, former Collegiate School and a number of residential buildings.	Although the survey corridor does not include any listed place, should any works be required in those nearby places, as per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of any of the heritage places, Part E.13.7 (Development Standards for Heritage Places) may be applicable.

	**Hobart Interim Planning Scheme Table E.13.2 (Heritage Precincts).**	**Likely planning requirements.**
	Practically the entire course of the survey corridor is bounded by heritage precincts in this section, with part of the survey corridor contained within those precincts (i.e. Macquarie Street from Molle Street to Antill Street and Davey Street from Molle Street to 173 Davey Street and from Antill Street to the Southern Outlet).	As per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *(l) minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of the heritage precinct (e.g. Macquarie Street between Harrington and Barrack Streets and west of 205 Macquarie Street), Part E.13.8 (Development Standards for Heritage Precincts) may be applicable.

	**Hobart Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).**	**Likely planning requirements.**
	Part of this section of the survey corridor is within the area defined by Table E.13.4 as a Place of Archaeological Potential, namely Macquarie Street from Antill Street to the eastern edge of 319 Macquarie Street, the southern lane of Macquarie Street further on to Wheatsheaf Lane and all of the Davey Street section.	Under the General exemptions for E.13.0 (Historic Heritage Code) excavation in a Place of Archaeological Potential is exempt if: *(y) maintenance and repair by or on behalf of the State Government, a Council, a statutory authority, or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines, where like for like materials and finishes are used for reinstatement;* There are certain other exemptions for excavation in a Place of Archaeological Potential that would need to be considered in the event that any excavation beyond that listed above were proposed or an application may be required to address Part E.13.10 (Development Standards for Places of Archaeological Potential). This may require an archaeological impact assessment provided by a suitably qualified person demonstrating that the nature of the development will not result in disturbance of ground considered to be of archaeological sensitivity.

	**Hobart Interim Planning Scheme Table E.24.1 (Significant Trees List).**	**Likely planning requirements.**
	There are two listings for trees on properties adjacent to the survey corridor, most notably a row of seven English Oak trees in front of 142 Davey Street (St Ann's aged care) which are close to the streetfront.	If any works are proposed which may impact these trees (noting proximity to the road reserve of those in front of 142 Davey Street), then the provisions of E.24.6 will need to be addressed.
	**Tasmanian Heritage Register**	**Likely planning requirements.**
	There is a high density of places included on the Tasmanian Heritage Register along both Macquarie and Davey Streets immediately adjacent to the survey corridor and within the buffer zone. These include a large number of residential properties.	Provided that no works are proposed within any title included on the Tasmanian Heritage Register (i.e. outside the road reserve) then the provisions of the Historic Cultural Heritage Act would not be applicable.

	Commonwealth, National or World Heritage List	Likely planning requirements.
	No listings.	Not applicable.

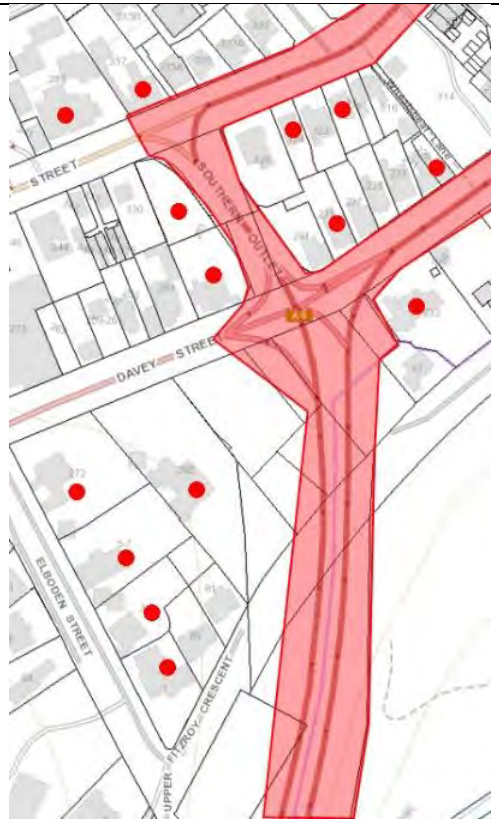
Southern Outlet, City end		
	**Hobart Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	There is a high density of places included on the Heritage Places schedule of the scheme along both Macquarie and Davey Streets immediately adjacent to the survey corridor and within the buffer zone. These include prominent buildings such as The Hermitage, 325 Macquarie Street and 241 Davey Street – all of which are adjacent to the intersection of Davey/Macquarie Streets and the Southern Outlet. Fitzroy Gardens borders the outlet and is also included on the schedule.	Although the survey corridor does not include any listed place, should any works be required in those nearby places, as per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of any of the heritage places, Part E.13.7 (Development Standards for Heritage Places) may be applicable.

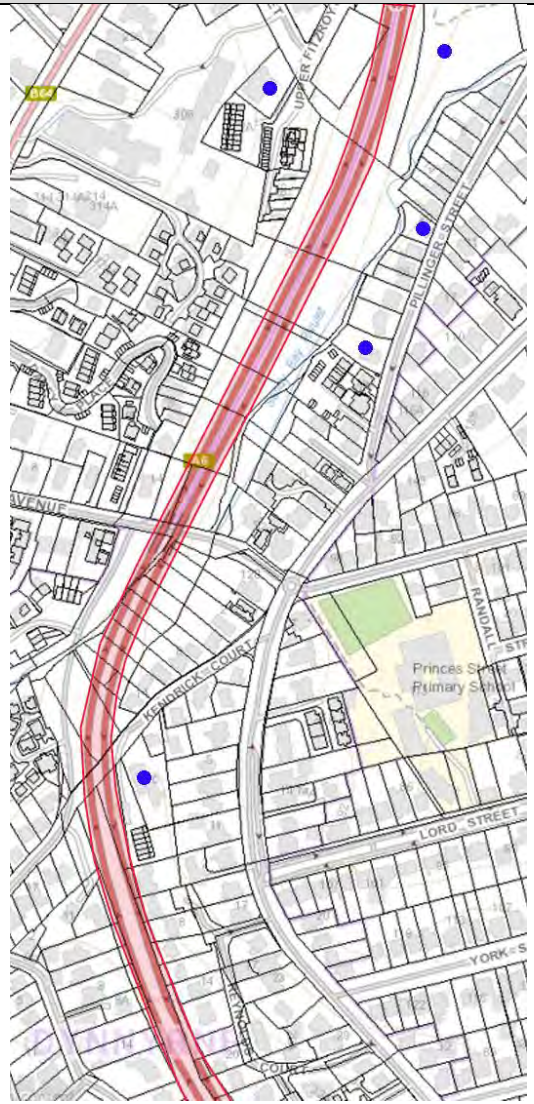
	**Hobart Interim Planning Scheme Table E.13.2 (Heritage Precincts).**	**Likely planning requirements.**
	Part of the survey corridor is included in Heritage Precinct H4 (Davey Street from Antill Street to the Southern Outlet) and a portion of the acquired road reserve on the entrance from Davey Street to the Southern Outlet is also in that precinct. The survey corridor is also adjacent to Heritage Precinct SH2 (from 353 -357 Macquarie Street) - as defined by Map E.13.3. Refer to Table E.13.2 for statements of significance.	As per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *(l) minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of the heritage precinct (e.g. Davey Street between Antill Street and the Southern Outlet), Part E.13.8 (Development Standards for Heritage Precincts) may be applicable.

	**Hobart Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).**	**Likely planning requirements.**
	Part of this section of the survey corridor is within the area defined by Table E.13.4 as a Place of Archaeological Potential, namely the southern lane of Davey Street from Wheatsheaf Lane to the outlet interchange and a portion of the acquired road reserves between Fitzroy Gardens and Davey Street.	Under the General exemptions for E.13.0 (Historic Heritage Code) excavation in a Place of Archaeological Potential is exempt if: *(y) maintenance and repair by or on behalf of the State Government, a Council, a statutory authority, or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines, where like for like materials and finishes are used for reinstatement;* There are certain other exemptions for excavation in a Place of Archaeological Potential that would need to be considered in the event that any excavation beyond that listed above were proposed or an application may be required to address Part E.13.10 (Development Standards for Places of Archaeological Potential). This may require an archaeological impact assessment provided by a suitably qualified person demonstrating that the nature of the development will not result in disturbance of ground considered to be of archaeological sensitivity.

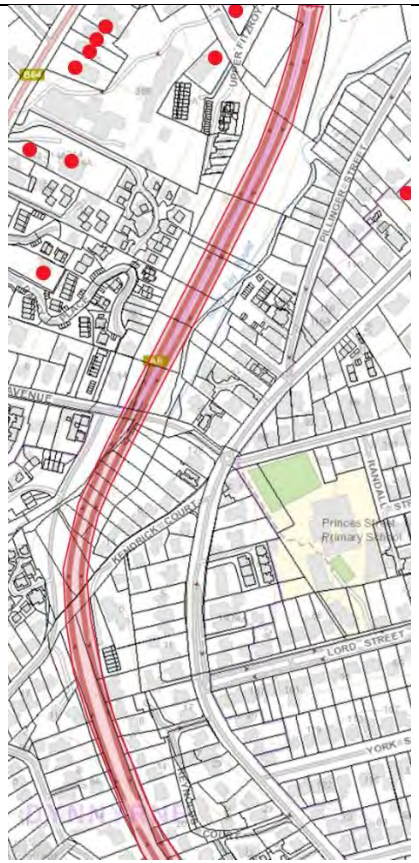
	**Hobart Interim Planning Scheme Table E.24.1 (Significant Trees List).**	**Likely planning requirements.**
	There are two listings for trees on properties adjacent to the survey corridor, most notably an English Oak at The Hermitage (251 Davey Street – Macquarie Street edge of that property) and a Common Lime at 326 Macquarie Street. The Southern Outlet skirts the edge of Fitzroy Gardens, which includes listings for 46 Plane trees, 4 Variegated Elms and 4 English Oaks. As per above, Fitzroy Gardens is included on Table E.13.1 of the Hobart Interim Planning Scheme as a Heritage Place. Whilst 50+ individual trees are listed, the values of the gardens would include wider landscape and setting values. No management plan for the gardens nor any detailed historic heritage assessment was found in the research for the current project, although a brief heritage datasheet is available as part of the South Hobart Heritage Review (Hobart City Council)[4].	If any works are proposed which may impact these trees (noting proximity to the road reserve of those in front of 142 Davey Street), then the provisions of E.24.6 will need to be addressed.

[4] Available at https://www.hobartcity.com.au/Development/Planning/Planning-schemes/Reports-and-studies

	**Tasmanian Heritage Register**	**Likely planning requirements.**
	There is a high density of places included on the Heritage Places schedule of the scheme along both Macquarie and Davey Streets immediately adjacent to the survey corridor and within the buffer zone. These include prominent buildings such as The Hermitage and 232 Davey Street which are adjacent to the intersection of Davey/Macquarie Streets and the Southern Outlet.	Provided that no works are proposed within any title included on the Tasmanian Heritage Register (i.e. outside the road reserve) then the provisions of the Historic Cultural Heritage Act would not be applicable.
	Commonwealth, National or World Heritage List	**Likely planning requirements.**
	No listings.	Not applicable.

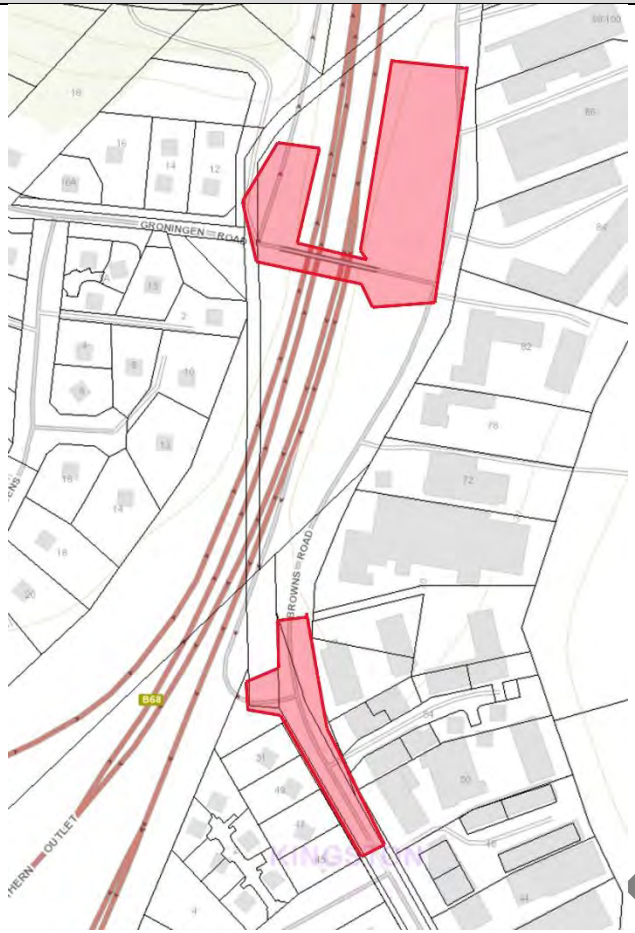
Southern Outlet, Fitzroy Crescent to the bend.		
	**Hobart Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	There are few listed places within close proximity to the survey corridor in this section, notable Fitzroy Gardens (as discussed above). There is a wide separation to places in Pillinger Street (further separated by the natural topography). The closest place being 5 Kendrick Court which is separated from the survey corridor by one title.	Although the survey corridor does not include any listed place, should any works be required in those nearby places, as per Part E.13.4, within a Heritage Place, Heritage Precinct or Cultural Landscape Precinct, no permit is required for *minor upgrades by or on behalf of the State government, a Council, or a statutory authority or a corporation all the shares of which are held by or on behalf of the State or by a statutory authority, of infrastructure such as roads, rail lines, footpaths, cycle paths, drains, sewers, power lines and pipelines including:* *) minor widening or narrowing of existing carriageways; or making, placing or upgrading kerbs, gutters, footpaths, roadsides, traffic control devices; and* *markings, street lighting and landscaping, except where any of those elements are specifically part of the General Description column in Table E13.1;* If any major works (i.e. not included above) were required within the boundary of any of the heritage places, Part E.13.7 (Development Standards for Heritage Places) may be applicable.

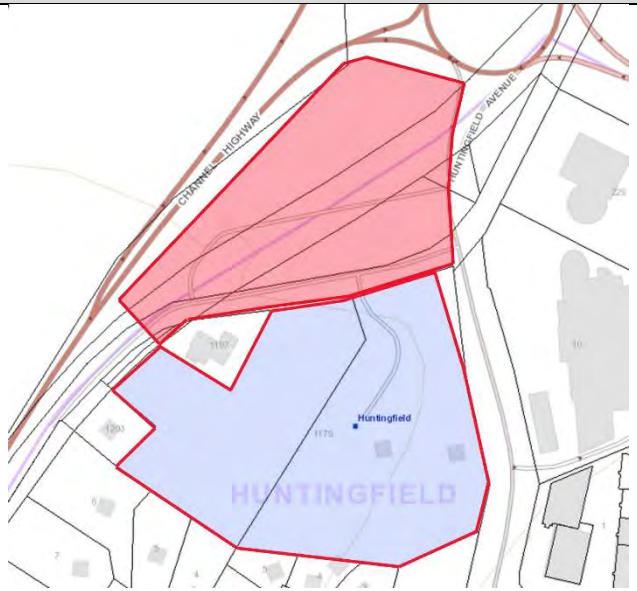
	**Hobart Interim Planning Scheme Table E.13.2 (Heritage Precincts).**	**Likely planning requirements.**
	No part of the survey corridor is within any Heritage Precinct as defined by Table E.13.2. The SH7 and SB3 Precincts are nearby but in all cases have at least one full title between the survey corridor and the nearest portion of the precincts – that separation is further physically separated by the topography.	None likely.
	Hobart Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).	**Likely planning requirements.**
	No listings.	Not applicable.

	Hobart Interim Planning Scheme Table E.24.1 (Significant Trees List).	**Likely planning requirements.**
	No listings.	Not applicable.
	**Tasmanian Heritage Register**	**Likely planning requirements.**
	There are no places listed on the Tasmanian Heritage Register in particularly close proximity to the survey corridor.	Not applicable.
	Commonwealth, National or World Heritage List	**Likely planning requirements.**
	No listings.	Not applicable.

Southern Outlet, area of the bend.		
	**Hobart Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	No listings.	Not applicable.
	Hobart Interim Planning Scheme Table E.13.2 (Heritage Precincts).	**Likely planning requirements.**
	No listings.	Not applicable.
	Hobart Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).	**Likely planning requirements.**
	No listings.	Not applicable.
	Hobart Interim Planning Scheme Table E.24.1 (Significant Trees List).	**Likely planning requirements.**
	No listings.	Not applicable.
	Tasmanian Heritage Register	**Likely planning requirements.**
	No listings.	Not applicable.
	Commonwealth, National or World Heritage List	**Likely planning requirements.**
	No listings.	Not applicable.

Southern Outlet, the bend to Olinda Grove		
	**Hobart Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	No listings.	Not applicable.
	Hobart Interim Planning Scheme Table E.13.2 (Heritage Precincts).	**Likely planning requirements.**
	No listings.	Not applicable.
	Hobart Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).	**Likely planning requirements.**
	No listings.	Not applicable.
	Hobart Interim Planning Scheme Table E.24.1 (Significant Trees List).	**Likely planning requirements.**
	No listings.	Not applicable.
	Tasmanian Heritage Register	**Likely planning requirements.**
	No listings.	Not applicable.
	Commonwealth, National or World Heritage List	**Likely planning requirements.**
	No listings.	Not applicable.

Park and ride (north)		
	**Kingborough Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	No listings. Note that Table E.13.1 includes a listing for a 'Row of poplars on eastern side of the road' with location 'Southern Outlet north of overpass, Kingston). These are approx. 130m north of the site.	Not applicable.
	Kingborough Interim Planning Scheme Table E.13.2 (Heritage Precincts).	**Likely planning requirements.**
	No listings.	Not applicable.
	Kingborough Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).	**Likely planning requirements.**
	No listings.	Not applicable.
	Kingborough Interim Planning Scheme Table E.24.1 (Significant Trees List).	**Likely planning requirements.**
	No listings.	Not applicable.
	Tasmanian Heritage Register	**Likely planning requirements.**
	No listings.	Not applicable.
	Commonwealth, National or World Heritage List	**Likely planning requirements.**
	No listings.	Not applicable.

Park and ride (south)		
	**Kingborough Interim Planning Scheme Table E.13.1 (Heritage Places).**	**Likely planning requirements.**
	The southern park and ride area is immediately adjacent to 'Huntingfield', which is included as a heritage place on Table E.13.1 of the Kingborough Interim Planning Scheme.	If any works are proposed within the boundary of Huntingfield, then consideration of heritage impacts will need to be given. As the park and ride facility comprises of a carpark, rather than a road per-se, the exemptions under Part E.13.4 are probably not applicable. If any works were required within the boundary of the heritage place, Part E.13.7 (Development Standards for Heritage Places) may be applicable.
	Kingborough Interim Planning Scheme Table E.13.2 (Heritage Precincts).	**Likely planning requirements.**
	No listings.	Not applicable.
	Kingborough Interim Planning Scheme Table E.13.4 (Places of Archaeological Potential).	**Likely planning requirements.**
	No listings.	Not applicable.
	Kingborough Interim Planning Scheme Table E.24.1 (Significant Trees List).	**Likely planning requirements.**
	No listings.	Not applicable.

	Tasmanian Heritage Register	**Likely planning requirements.**
	No listings. The southern park and ride area is immediately adjacent to 'Huntingfield', which is included on the Tasmanian Heritage Register.	If any works are proposed within the boundary of Huntingfield, then consideration of heritage impacts will need to be given. Given that Huntingfield homestead is distant to the area of the proposed park and ride, it is likely that minor works would accord with Heritage Tasmania's definition of exempt works, however any major works may require a works application.
	Commonwealth, National or World Heritage List	**Likely planning requirements.**
	No listings.	Not applicable.

3. ANALYSIS OF LIKELY HISTORIC HERITAGE PROCESS

Section 2 has provided detail as to the statutory heritage provisions that are likely to apply to the survey corridor and buffer zone to assist in understanding the likely scope of further heritage input that may be required for any proposed works in those areas. The following points summarise the likely consequences of those requirements in the preliminary conceptualisation of the task.

This discussion assumes:

- That there is no work proposed outside of the road reserve, i.e. no work is proposed in any private property which may be a listed place - including work within the 'sensitive' zones as per Figure 3.1. The possibility of widening Macquarie or Davey Street beyond the road reserve is not a tenable consideration.
- That the proposal does not involve any 'structures' beyond ordinary road construction (e.g. includes road surfacing, kerbing, footpaths, road markings/signage). Structure however is considered on the park and ride sites in the event that shelters (etc.) are required.
- That the proposal does not involve the removal or prospective damage to any significant tree/planting.
- That excavation and works in the road reserve in Heritage Precincts and the Place of Archaeological Potential are likely.

Figures 3.1 and 3.2 depict the likely 'sensitive' zones that could arise from the type of works foreshadowed in the brief and may be used in the design process in the assessment of 'constraints' that are to be considered in that process. This includes specific areas of known archaeological potential, significant trees/plantings that are in close proximity to the survey corridor and heritage structures that are in close proximity to areas that are likely to be critical in the consideration of road reconfiguration at key points (e.g. the confluence of Davey and Macquarie Streets and the Southern Outlet).

Note that wider archaeological issues (as per Table E.13.4 of the HIPS) are not included here as they apply to practically all Davey and Macquarie Streets and are not seen as an insurmountable obstacle that would require any critical influence in the design process (i.e. archaeological management will be responsive to works requirements). Issues surrounding portions of road within Heritage Precincts are not depicted here, as if these do not involve major works/structures then these are likely to be exempt under Part E.13.4 of the HIPS.

Note that there are not considered to be any critical heritage issues on the portion of the survey corridor from Fitzroy Gardens to Olinda Grove, nor at either or the two park and ride locations (noting the general recommendations in Section 4).

Figure 3.1 – Davey and Macquarie Streets from Elizabeth Street to Antill Street. The yellow area representing a known area of archaeological sensitivity and the green areas representing significant trees adjacent to the survey corridor.

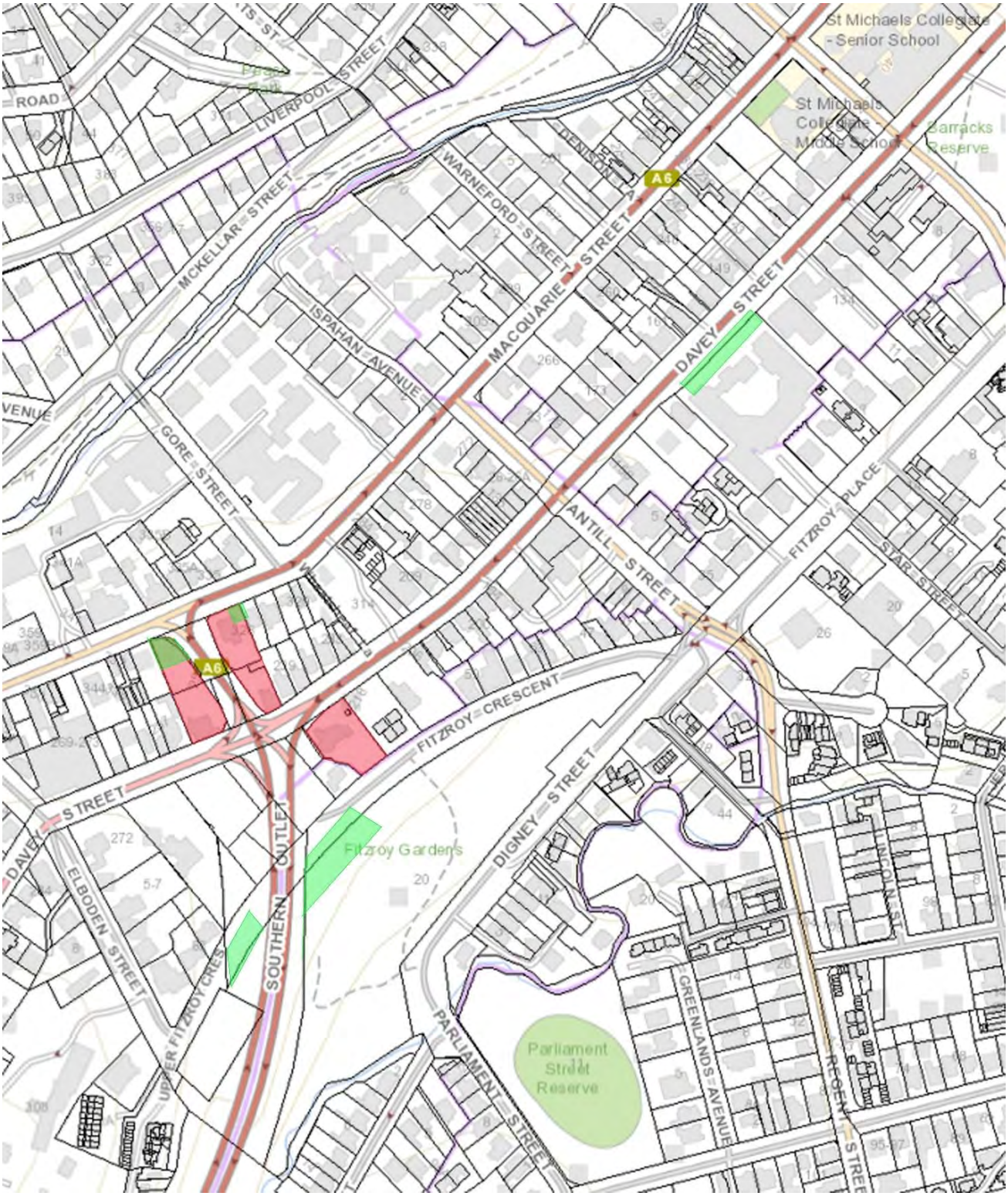


Figure 3.2 – Davey and Macquarie Streets, from Antill Street to the Southern Outlet and the Southern Outlet, as well as the city-end of the outlet. Green areas depict significant trees/plantings in close proximity to the survey corridor and red areas depict listed structures at likely critical points of road convergence.

The following commentary summarises how the relevant statutory heritage provisions may be approached in the planning process:

Hobart and Kingborough Interim Planning Schemes 2015 – Heritage Place.

- Provided that no works are proposed within any addresses/titles included on Table E.13.1 (Historic Heritage Places) of either the Hobart Interim Planning Scheme 2015 or the Kingborough Interim Planning Scheme 2015, then the provisions of parts E.13.7 of each scheme will not be applicable. No areas of road reserves in the survey corridor are included on the schedule, however there are numerous places immediately adjacent (particularly on either side of Macquarie and Davey Streets).
    - Works wholly in the road reserve will not require consideration against Part E.13.7.
    - If any works are proposed within any of those titles/addresses, then these will need to be considered against the Exemptions (i.e. Part E.13.4) of each scheme, and if not exempt then a discretionary development application will be required for assessment against Part E.13.7.

Hobart Interim Planning Scheme 2015 – Heritage Precinct.

- There are portions of the survey corridor that are within Heritage Precincts as defined by Table E.13.2 of the Hobart Interim Planning Scheme 2015. These areas are namely (road reserves):
    - Davey Street from:
        - Salamanca Place to Harrington Street.
        - Barrack Street to 173 Davey Street.
        - Antill Street to 239 Davey Street.
    - Macquarie Street from:
        - Harrington Street to Barrack Street.
        - 207 Macquarie Street to Antill Street.
    - City end of the Southern Outlet
        - A portion of C/Ts 147545/4, 151157/1 (reserved/unknown roads).

        - It is likely that works in these areas relating to 'minor upgrades' by or on behalf of a 'State government' of infrastructure such as roads, footpaths (including widening, making or placing or kerbs, gutters, footpaths, traffic control devices etc.) would be exempt from requiring planning approval by virtue of Part E.13.4 of the scheme. Any major works (e.g. structures) are likely to require an application for assessment against Part E.13.8 to consider impact against the Performance Criteria of that Part and in relation to the statements of significance for the precinct.
        - The above provisions would also be applicable in the event that works were proposed in any property considered here in the buffer zone of the survey corridor.

Hobart Interim Planning Scheme 2015 – Place of Archaeological Potential

- There are portions of the survey corridor that are within a Place of Archaeological Potential as defined on Table E.13.4 of the Hobart Interim Planning Scheme. Namely:
    - Davey Street from:
        - Salamanca Place to the Southern Outlet.
    - Macquarie Street from
        - Elizabeth Street to Gore Street (note that only the northern side of the road between Elizabeth and Murray Streets, and the southern side of the road from 274 Macquarie Street to Gore Street is included in those sections).

            - Excavations for works in these areas may be exempt from planning approval if an archaeological impact assessment is provided by a suitably qualified person demonstrating that the nature of the development will not result in disturbance of ground considered to be of archaeological sensitivity. For shallow excavations associated with roadworks, kerbing (etc.) it is likely that a case may be made for exemption based on previous disturbance from such works.

Hobart Interim Planning Scheme 2015 – Significant Trees

- There are no significant trees within the survey corridor, however there are several in close proximity, where consideration may need to be given to indirect impacts of works or in the event that works are proposed outside the road reserve. Namely:
    - Oak tree at 'The Hermitage' (251 Davey Street – Macquarie Street frontage)
    - Oak trees in front of St Ann's aged care facility (142-146 Davey Street)
    - Lime Tree in front of the LGAT offices (326 Macquarie Street)
    - Trees and the wider landscape values of Fitzroy Gardens
    - In addition to the above, there is a row of trees (6 no.) on Upper Fitzroy Crescent that are within the road reserve and once formed part of the avenue of Plane trees along the northern edge of Fitzroy Gardens – cut through by the construction of the Southern Outlet. Whilst these have no statutory heritage protection, they have landscape values that should be considered if any works are proposed to affect these trees. Note that the topography places these distinctly higher than the level of the Southern Outlet.

        - If any part of the proposal is likely to impact any of these trees, then an assessment against the Performance Criteria of Part 24.5 of the scheme would be required (if not exempt by definitions in Part 24.4).

Historic Cultural Heritage Act

- Provided that no works are proposed within any titles that are included on the Tasmanian Heritage Register, the provisions of the *Historic Cultural Heritage Act 1995* will not be applicable to the project. No area of road reserves in the survey corridor are included on the register.

    - If any works are proposed within an title included on the Tasmanian Heritage Register (or CPR defined area) then either a Certificate of Exempt Works from Heritage Tasmania, or an application to the Tasmanian Heritage Council under Part 6 of the Historic Cultural Heritage Act will be required.

Sullivans Cove Planning Scheme 1997

- The section of Davey Street from Elizabeth Street to Salamanca Place, and the section of Macquarie Street from Elizabeth Street to Murray Street is adjacent to several Places of Cultural Significance listed on Part 22 Table 1 of the scheme.

    - Any major works adjacent to those places would require an assessment of possible impact upon those adjacent places. This may be particularly pertinent if any proposal affects the existing bus stop infrastructure adjacent to Franklin Square.

- The retaining walls dividing the centre of Davey Street between Elizabeth and Murray Streets, and the adjacent stairs to Brooke Street are defined of Areas of Archaeological Sensitivity by Part 22 Table 2 of the scheme.

    - Any works that affect those structures will require a detailed archaeological assessment.

Environment Protection and Biodiversity Conservation Act

- Anglesea Barracks is on the Commonwealth Heritage List and is adjacent to the survey corridor. Assuming that no works will be within the boundary of that place, then the historic heritage Provisions of the EPBC Act will not apply.

    - Any works within that place would require a complex planning and approvals process under the Act that would need to align with the management plan for that place.

4. RECOMMENDATIONS

Given the statutory heritage provisions applicable to the survey corridor and adjacent buffer zone, the following recommendations are made, which are to be considered in the design phase of the project:

1. Places included on Table E.13.1 (Heritage Places) of the Hobart/Kingborough Interim Planning Scheme and the Tasmanian Heritage Register adjacent to the survey corridor.
It is recommended that no works be undertaken within any place listed on the above heritage lists unless there is no prudent or feasible alternative. In the event that any works are required in those places, a rigorous heritage impact assessment must be undertaken which assesses prudent/feasible alternatives.
2. Places in the survey corridor within Heritage Precincts (as defined by Table E.13.2 of the HIPS) or adjacent to Places of Cultural Significance (as defined in the SCPS97).
Works within the survey corridor within heritage precincts are likely to be acceptable provided that these maintain the general tenor of the existing road/footpath infrastructure. Any new 'structures' (e.g. shelters) within heritage precincts or adjacent to Places of Cultural Significance are likely to be acceptable subject to heritage input into the design process.
3. Places of Archaeological Sensitivity (as defined by Part 22 Table 2 of the SCPS97).
Works to places of archaeological sensitivity are to be avoided unless there are no prudent or feasible alternatives. If works are proposed, a detailed statement of archaeological potential, archaeological impact assessment and if necessary, an archaeological method statement is to precede the works.
4. Portions of the survey corridor within the Place of Archaeological Potential (as defined by Table E.14.4 of the HIPS)
Works beyond resurfacing or lane reconfiguration (e.g. like-for-like works) within this area are to be preceded by a statement of archaeological potential, and if necessary, an archaeological impact assessment and archaeological method statement. Any archaeological impact will need to be mitigated in the works process commensurate with the identified significance. Note that it is expected that any shallow excavations will be unlikely to have any major impact.
5. Works in proximity to significant trees (as defined by Table E.24.1 of the HIPS).
Works should seek to avoid impact upon significant trees/plantings. If any impact is proposed, then a rigorous assessment of prudent and feasible alternatives must demonstrate that there are no such alternatives to that impact.
6. Park and ride areas
Provided that no works are proposed on the 'Huntingfield' property, then there is no conceivable heritage impact arising from any works to those proposed areas.

In the event that any works are proposed on the 'Huntingfield' property, then a heritage impact assessment will be required to accompany statutory applications for such (noting that the heritage feature itself, i.e. Huntingfield homestead is distant to that area.

pitt&sherry

Hobart Transport Vision - Park and Ride facilities at Kingston and Huntingfield

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