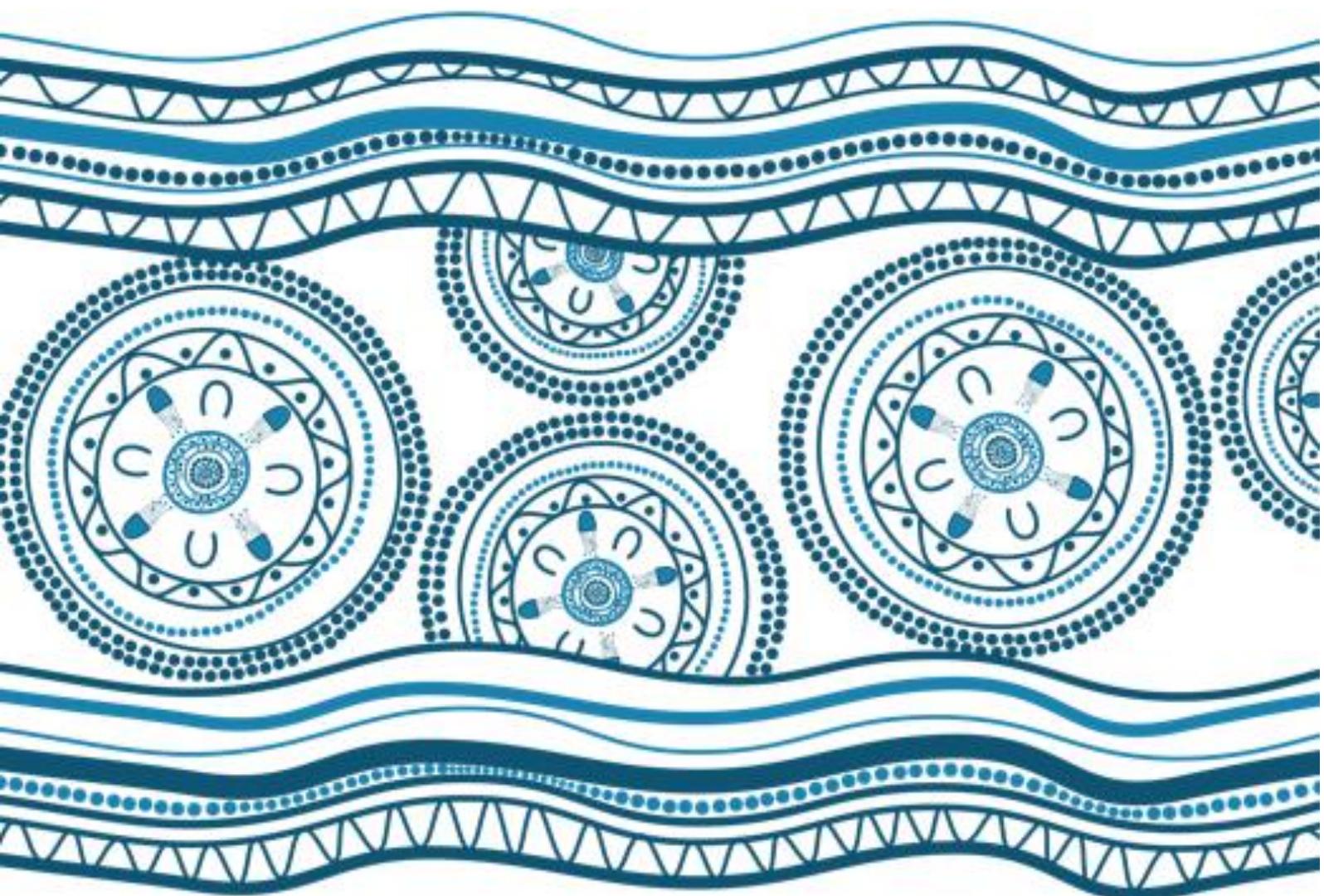


Appendix K

Landside Traffic and Transport Assessment Report



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Transport for NSW
Kamay Ferry Wharves Project
Landside Traffic and Transport
Assessment

KFW01-ARUP-BPW-EN-RPT-000010

Final | 11 June 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 273023-00

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Executive Summary

La Perouse and the Kurnell Peninsula lies approximately 14 kilometres to the south of the Sydney CBD and are the headlands to Botany Bay. The Federal Government announced funding in 2018 to support Stage 1 of Kamay Botany Bay National Park Master Plan that includes the re-establishment of ferry wharves.

Consequently, this has led to the Kamay Ferry Wharves Project (the Project). The scope of this Project includes the design and planning associated with the proposed ferry wharves.

This report documents the Landside Transport Assessment conducted for the project. This assessment was completed to support the Environmental Impact Statement (EIS).

Strategic Transport Context

A review of the transport context highlights a range of strategic documents and adjacent projects that may impact the proposed study area. This includes documents and plans that directly relate to this project, such as the Feasibility Study for Ferry Wharves at La Perouse and Kurnell that was previously undertaken by Transport for NSW in 2016, the Kamay Botany Bay National Park Master Plan (NSW National Parks and Wildlife Service, 2019) and the findings of the Final Business Case supporting this project.

On a wider strategic context, a review of the Randwick Bicycle Plan (Randwick City Council, 2015), Sutherland Bicycle Plan (Sutherland Shire Council, 2015), and the South East Sydney Transport Strategy (Transport for NSW, 2020) provides useful insights into the future transport vision for this area. Furthermore, consultation with relevant local government authorities has identified underlying transport issues in the area and opportunities for further investigation. This included potential synergies with the current master planning work being undertaken for the upgrade of La Perouse Museum.

Existing Transport Conditions

A range of transport surveys were undertaken in 2020 to understand the underlying transport conditions. This included intersection surveys, tube counts, pedestrian counts, parking surveys and licence plate recognition surveys. The surveys showed the usage of both La Perouse and Kurnell to be seasonal and with peak activity to typically occur on a Sunday rather than other times during the week.

Investigations outlined an underlying traffic issue associated with La Perouse, where congestion along access roads and a shortage in parking was noted. Kurnell on the other hand did not exhibit similar transport issues, however consultation feedback has outlined that during busy summer days, there are congestion and parking issues at Kurnell as well. While the primary mode of travel to both these sites was via private vehicle, the Project has the opportunity to promote a more balanced utilisation between private and sustainable transport modes that will improve the amenity and user experience in the area.

Proposed Transport Provisions

The proposed landside transport provisions include parking bays, kiss-and-ride spaces and bicycle provisions. These are summarised for both sites in Table 1. In addition, line marking delineation is proposed along the Anzac Parade parking loop road to help mitigate the existing congestion arising from the one-way loop arrangement.

All transport provisions associated with the Project at Kurnell will be provided within the Kamay Botany Bay National Park as part of the NPWS's Kamay Botany Bay National Park Kurnell Master Plan scope of works.

Table 1: End user provisions summary

	La Perouse	Kurnell
Parking bays	13 additional standard bays + 2 additional accessible bays	30 additional standard bays + 2 additional accessible bays
Kiss-and-ride spaces	2 additional	2 additional
Bicycle rails	10 (capacity for 20 bicycles)	N/A*

Installation of bicycle rails will be included as part of the Kamay Botany Bay National Park Master Plan scope of works.

Operational Transport Assessment

The assessment undertaken for this Project indicated a forecast annual ferry demand of 149,600 passengers for 2036. Of the National Park visitor component of this forecast, less than 10% will be associated with new visitors, while the remainder are associated with existing visitors utilising the ferry. This indicates a minimal relative impact on landside access.

The assessment has taken a conservative approach and adopted the current travel behaviours of visitors to both La Perouse and Kurnell, who have a high reliance (over 90%) on private vehicle use. Consequently, the impact assessment and associated mitigation measures focus on this. Given the underlying traffic and parking issues currently at La Perouse, this Project does not aim to address this in its entirety but will add measures to help alleviate some of these impacts.

Under this assessment approach, the projected increase in walking, cycling and public transport use is minimal and won't have a significant impact to current bus services/ infrastructure. However, further investigations were undertaken as part of a transport strategy (also within this report) to explore the propensity for visitors to shift to more sustainable travel modes and reduce the demand of private vehicle use in the respective study areas.

Construction Transport Principles

Construction is anticipated to begin in 2022 for up to 13 months. Construction will be across three stages at both La Perouse and Kurnell, as summarised in Table 2.

Table 2: Construction stages

Stage	Activities
Stage 1: Site establishment	Security and fencing Setting up compound and laydown areas Setting up site offices and access Forming temporary access roads Forming crane and rig platforms at La Perouse Demolishing of the existing Kurnell viewing platform Establishing the temporary causeway at Kurnell
Stage 2: Main construction	Piling Wharf construction Car parking reconfiguration and footpaths at La Perouse Installing utilities Installing wharf furniture Landscaping
Stage 3: Site demobilisation	Removal of temporary work areas and site offices

The preparation of a Construction Traffic Management Plan will be required by the contractor during subsequent stages of the Project. This will require consultation with relevant stakeholders, alignment with the Construction Management Plan and detailed assessment of construction traffic impacts and traffic management measures.

As a general principal, construction of the proposed works will be staged to minimise impacts on traffic and other modes of transport. Furthermore, mitigation measures will be implemented during the construction phase to maintain access for all road users and minimise impacts on current users, businesses and residents within the Project study areas at La Perouse and Kurnell.

1 Introduction

1.1 Background

La Perouse and the Kurnell Peninsula are located at the northern and southern sides of the ocean entrance to Botany Bay respectively, which lies approximately 14 km south of the Sydney CBD. Both sides have a diverse variety of land uses including residential, commercial and industrial precincts, as well as the Kamay Botany Bay National Park.

The two peninsulas form the entrance to Botany Bay and contain a rich array of historical, cultural and environmental value. They are places of historical and cultural importance for all Australians, with Aboriginal cultural sites dating back thousands of years. The Kurnell side of the National Park is the meeting place between Aboriginal peoples and the crew of the *Endeavour* in 1770.

A passenger ferry service between La Perouse and Kurnell had previously operated intermittently between 1890 and 1974 when services ceased following severe damage to both wharves after a major storm event. As a result, the wharves were decommissioned.

In 2016, Transport for NSW completed a Feasibility Study which investigated the viability of reinstating the wharves. The study concluded that reinstating the wharves would provide numerous indirect social, economic, cultural and tourism benefits for La Perouse, Kurnell and the wider Sydney area.

Subsequently, in 2018 the Office of Environment and Heritage (now the Department of Planning, Industry and Environment) completed the Kamay Botany Bay National Park, Kurnell Precinct Master Plan (Master Plan) which looks to deliver on the vision to make the 'Kurnell Precinct' of Kamay Botany Bay National Park 'a place of significance to all Australians that contributes to their sense of identity as Australians.'

On 28 April 2018, the Prime Minister and Federal Treasurer announced \$50 million in funding towards Stage 1 of the Master Plan with contributions coming from both the Commonwealth (\$25 million) and NSW (\$25 million) Governments. Stage 1 of the Master Plan includes the re-establishment of the wharves at La Perouse and Kurnell.

Transport for NSW has established a project team to undertake the planning, design, business case development, environmental impact assessment, procurement and delivery of the reinstatement of the La Perouse and Kurnell wharves and associated infrastructure (the project). The proposed site locations are shown in Figure 1.

Further details on the project including the development and location are discussed in section 5.

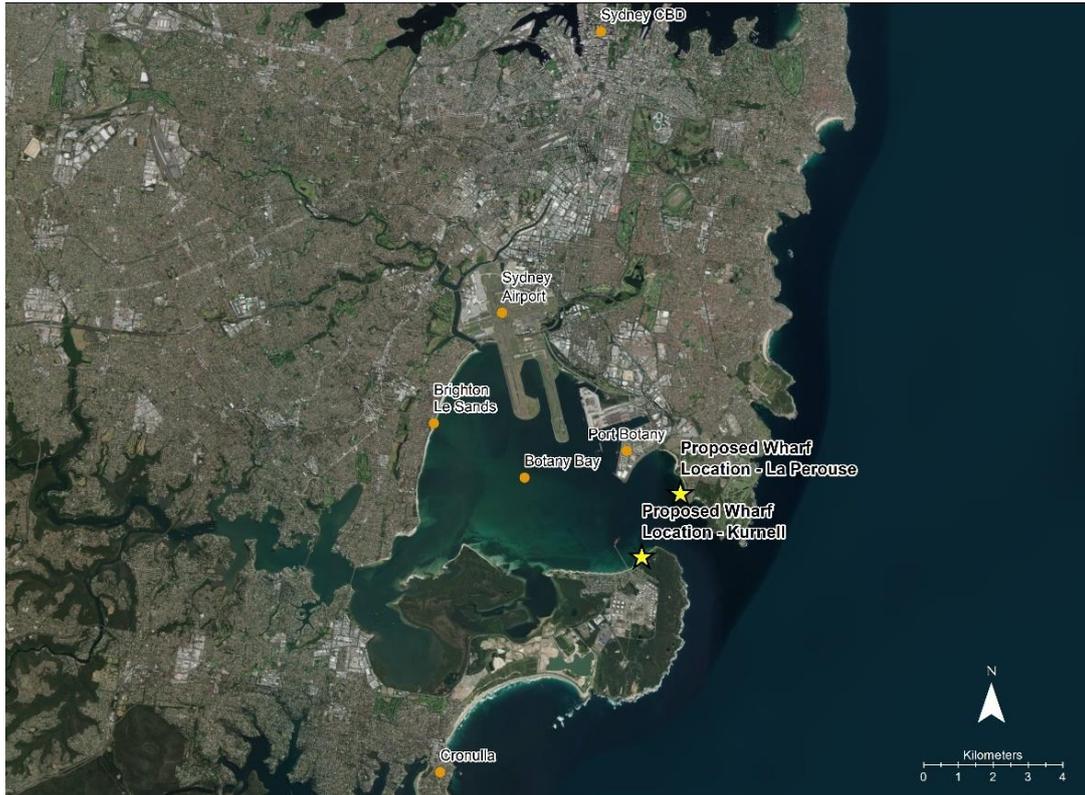


Figure 1: Kamay Ferry Wharves proposed site locations and surrounding context

1.2 Purpose of report

This report documents the Landside Traffic and Transport Assessment conducted for the Project. This assessment was completed to support the Environmental Impact Statement (EIS) and address the relevant Secretary’s Environmental Agency Requirements (SEARs) as they relate to landside transport (Table 3).

Table 3: SEARs for landside transport

SEARs relevant to this technical report	Where addressed in this technical report
Assessment of Key Issues	
1. The level of assessment of likely impacts must be proportionate to the significance of, or degree of impact on, the issue, within the context of the project location and the surrounding environment. The level of assessment must be commensurate to the degree of impact and sufficient to ensure that the Department and other government agencies are able to understand and assess impacts.	Noted. The level of assessment within this Transport Assessment is commensurate to the degree of impacts.
2. For each key issue the Proponent must: (a) describe the biophysical, social and economic environment, as far as it is relevant to that issue, including baseline data that is reflective of current guidelines where relevant;	Section 4
(b) describe the legislative and policy context, as far as it is relevant to the issue;	Section 2
(c) identify, describe and quantify (if possible) the impacts associated with the issue, including the likelihood and consequence (including worst case scenario) of the impact (comprehensive risk assessment), the impact (comprehensive risk assessment), the impacts of concurrent activities within the project and cumulative impacts;	Section 6.2
(d) demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies);	Section 6.2, 7
(e) detail how likely impacts that have not been avoided through design will be minimised, and the predicted effectiveness of these measures (against performance criteria where relevant); and detail how any residual impacts will be managed or offset, and the approach and effectiveness of these measures.	Section 7.11
3. Where multiple reasonable and feasible options to avoid or minimise impacts are available, they must be identified and considered, and the proposed measure justified taking into account the public interest.	Section 6.2, 7.10
<p>10. Transport and Traffic</p> <p>The safety and efficiency of the transport system (including parking) in the vicinity of the project are managed to minimise impacts.</p> <p>The safety of transport system customers is maintained.</p> <p>Impacts on network capacity and the level of service are effectively managed.</p>	

SEARs relevant to this technical report	Where addressed in this technical report
1. Construction transport and traffic (maritime vessels, pedestrian and cyclists) impacts, including, but not necessarily limited to: (a) the indicative number, frequency and size of construction related vehicles (light and heavy vehicles) and maritime vessels;	Section 7
(b) the nature of existing parking, and traffic on construction access routes;	Section 7
(c) access constraints and impacts on public transport, pedestrians and cyclists;	Section 7
(d) the need to close, divert or otherwise reconfigure elements of roads, car parking and pedestrian and cycle networks associated with the construction of the project and the duration of these changes;	Impacts to the road network: Section 7.5 Impacts to parking: Section 7.6 Impacts to public transport Section 7.7 Impacts to cycling: Section 7.8 Impacts to pedestrians: Section 7.9
(e) temporary and permanent impacts on access and parking, including to residents and businesses, and employees and visitors to the Kamay Botany Bay National Park;	Section 7
(f) construction worker parking; and	Section 7.4.2
(g) temporary and/or permanent relocation of swing moorings at La Perouse within Frenchmans Bay.	Addressed in the EIS Chapter 12, Traffic and transport
2. The Proponent must undertake land-based and maritime-based assessments of operational transport and traffic (maritime vessels, pedestrian and cyclists) impacts, including, but not necessarily limited to: (a) traffic generated by the operation of the project;	Section 6.1 (Subsections 6.1.1 – 6.1.5) outlines all the assumptions used to estimate the traffic generated from the project.
(b) volume and type of vessels (commercial, recreational) expected to use the infrastructure on weekdays, weekends and public holidays;	Chapter 12, Traffic and transport
(c) hours of operation;	Chapter 12, Traffic and transport
(d) car parking (including property and business access and on-street parking) and cyclists parking requirements; and	Car and cyclist parking requirements: Section 6.1.4. Transport assessment and strategy: Section 6.2.

SEARs relevant to this technical report	Where addressed in this technical report
	<p>The Kurnell landside transport provisions associated to the Project will be provided within the Kamay Botany Bay National Park as part of the NWPS’s Master Plan.</p> <p>Further details are provided in Chapter 4, Project development and alternatives of the EIS and Chapter 12, Traffic and Transport</p>
(e) temporary and permanent changes to bus stop locations.	<p>Permanent changes detailed in Section 6.2.2. Temporary changes considered in Section 7.7.</p>
Agency comments	
Additional Environment Energy and Science (EES) recommendations	
<p>In addition to the requirements in the draft SEARs and EES’ previous submission, EES also recommends the EIS include:</p>	
<ol style="list-style-type: none"> 1. A strategy for traffic management to ensure that the National Parks and Wildlife Service retains access to its land and is not prevented from performing its statutory and management responsibilities 2. A strategy to manage public safety during the construction process. 	<p>Section 7</p>
NSW Ports	
<p>The Traffic Impact Assessment (TIA) submitted with the proposal should assess any traffic and car parking impacts the proposal may have on the Port Botany Precinct.</p>	<p>Section 6.2</p>
Randwick City Council	
<p>The scoping report and future EIS should include the following traffic and transport considerations:</p>	
<ul style="list-style-type: none"> • A collective review and confirmation of the existing La Perouse precinct traffic and parking issues and constraints. Any assessment of the traffic and parking in the area should recognise that peak times are seasonal and weather dependent. Furthermore, specific reference should be made to the car parking demand of events and land uses that generate that demand including the Blakmarkets on Bare Island and typical weekend visits that already place demand pressures on on-street parking. 	<p>Section 4</p>

SEARs relevant to this technical report	Where addressed in this technical report
<ul style="list-style-type: none"> All parking and accessibility improvement needs for the Kamay Ferry Wharf project should be integrated into any future traffic and parking changes in discussions with Randwick City Council. 	Section 3
<ul style="list-style-type: none"> A strategy for suitable travel demand management measures should be included in the transport and accessibility assessment of the project to ensure that there is adequate mitigation and management of any parking shortfall 	Section 6.2
<ul style="list-style-type: none"> Vehicle movements, existing and future public transport, pedestrian access and cycle infrastructure within the vicinity of the site and the adequacy of these transport modes to cater for the proposal. In this regard, the transport strategy for the project should consider the existing limited additional parking, and the feasibility of increased reliance on public transport and additional bicycle parking facilities. Accordingly, the proposed ferry network should also provide for better integration with existing and future public transport bus services. 	Section 6.2
<ul style="list-style-type: none"> Measures to promote active transport, (i.e. walking and cycling) should be supported in the context of the long term shared cycle-walkway along the Anzac Parade median that is currently a Green Grid action under the Randwick Council Local Strategic Planning Statement (LSPS) , Walking and cycling opportunities should also be augmented by reference to the SSROC Botany Bay Trail Master Plan which provides for a long-term shared, largely continuous high quality, pathway mostly along the foreshore of Botany Bay from Phillip Bay/La Perouse in the north to Kurnell in the south that could be enjoyed by a wide mix of people including families, people with mobility challenges, and the wider community. This would place the existing shared path in La Perouse and Kurnell in a wider meaningful context linked by the proposed ferry service. 	Section 2 Section 3
<ul style="list-style-type: none"> The relationship of any future bus stop location to the proposed La Perouse wharf (indicative location shown in Figure 4-6 of the Scoping Report) should also consider the potential for the bus stop to serve the La Perouse Museum. In this regard, consideration should be given to the (re)location of any future bus stop close to both the Museum and the ferry wharf (ideally along the road between the two existing roundabouts). Similarly, any on-street accessible parking spaces should be considered in the road corridor between the two existing roundabouts. 	The relocation of the existing bus stop on Anzac Parade to a location that further integrates with the proposed La Perouse Museum and the new ferry wharf was reviewed at a high level and considered as part the Project’s Concept Design phase. However, this intervention was indicated to be beyond the scope of this project and was outlined as an intervention for consideration in future stages or other projects.
<ul style="list-style-type: none"> An assessment on the impact of local traffic including details of any traffic management and diversions. 	Section 5.3 and 6.2.1

SEARs relevant to this technical report	Where addressed in this technical report
<ul style="list-style-type: none"> A methodology to address the potential problem of buses ‘clumping’ in this highly valued heritage area especially during peak (bus and visitor) demand periods should be considered in the EIS for this project. By way of explanation, a poor “clumping” outcome would be, for example, to regularly see 12 buses lined up on the loop road waiting for the arrival of a ferry. To avoid this highly likely situation, consideration should be given in this project to “storage” elsewhere. 	<p>The project is aimed at improving the visitor experience to the National Park. The increase in new visitors, especially at La Perouse, is not anticipated to be high relative to current demand. This is unlikely to contribute to a significant uplift in private coach access. However, the management of private coach operations will need to be reviewed as the ferry operations (separate to the scope of this EIS) are further understood.</p>

1.3 Reference Documents

A range of reference documents have been referred to throughout this report. Table 4 lists the references of these documents and where they are referred to within the report. Further detail on the relevance of these documents to the Project has been outlined in further detail in the respective report sections.

Table 4: List of reference documents

Document Title	Source	Sections referenced
Ferry Wharves at La Perouse and Kurnell Final Feasibility Study Report	Transport for NSW (2016)	1.1, 2.1
Randwick Bicycle Plan	Randwick City Council (2015)	2.5, 6.2.4
The Kamay Botany Bay National Park Kurnell Master Plan	NSW National Parks and Wildlife Service (2019)	1.1, 2.2, 1
Future Transport 2056	Transport for NSW (2018)	2.3, 2.4
South East Sydney Transport Strategy	Transport for NSW (2020)	2.4, 1
Sutherland Shire Bicycle Network Map	Sutherland Shire Council (2015)	2.6, 6.2.4
Kamay Ferry Wharves Business Case Demand Analysis Methodology	Arup (2020)	4.1, 6.1

2 Strategic context

2.1 Feasibility Study

Arup previously prepared a Feasibility Study for Ferry Wharves at La Perouse and Kurnell for Transport for NSW in 2016. The study provided indicative landside ground transport infrastructure requirements supporting the proposed ferry wharves.

The car parking requirements approximated for the La Perouse site was based on demand driven from anticipated tourism uptake. A high-level assessment was undertaken using an upper limiting demand generated by the ferry service for a busy weekend and used an indicative daily profile for tourist demand. The assessment found that an additional 86 car parking spaces are required at La Perouse.

Kurnell car parking requirements were developed based on likely commuter demand and was informed by latest census data available at the time. Data from the 2011 Census indicated 4% of employed Kurnell residents work in the eastern suburbs and Sydney CBD, while the majority worked in the Cronulla – Sutherland area. With an assumed 10% mode shift from private vehicle to public transport, approximately 65 commuters would travel during the morning peak from Kurnell to La Perouse. An additional 70 people may come from within the greater Kurnell area who may use the ferry service and then travel on public transport into the CBD and eastern suburbs. In total, 135 commuters may travel from Kurnell to La Perouse in a typical morning peak period. Considering some who may walk or are dropped off at the wharf and for the existing weekday parking occupancy, it was estimated that there is an approximate demand for an additional 35 car parking spaces. This demand assessment has since been superseded by a more detailed assessment using the most up to date data. This assessment is further discussed in section 6.1.

2.2 Kamay Botany Bay National Park Kurnell Master Plan

The Kamay Botany Bay National Park Kurnell Master Plan was published in 2019, following a period of public exhibition (between April 2018 to August 2018). This plan provides conceptual ideas and looks to deliver the vision to make the Kurnell Precinct of Kamay Botany Bay National Park ‘a place of significance to all Australians that contributes to their sense of identity as Australians.’

The Master Plan aims to improve visitor access and facilities. This includes the addition of vehicles and bicycle parking spaces and consideration of flexible bus set down areas. The landside end user requirements for the Kurnell ferry wharf was guided by this Master Plan.

2.3 Future Transport 2056

The Future Transport 2056 Strategy “sets the 40-year vision, directions and outcomes framework for customer mobility in NSW, which will guide transport investment over the longer term”.

The Greater Sydney Initiatives for Investigation (0-10 years) is shown in Figure 2. The strategy lists a “Green Square to La Perouse Rapid Bus Link” (initiative 1). Furthermore, the strategy highlights a commitment to improve access to ferry wharves via the Transport Access Program.



Figure 2: Future Transport 2056 Strategy - Greater Sydney Initiatives for Investigation (0-10 years)

2.4 South East Sydney Transport Strategy

The South East Sydney Transport Strategy was developed as a more detailed place-based plan that was guided by Future Transport 2056. This strategy sets the medium and long term plans for changing the way people travel to, within and through South East Sydney in 2026-56.

The South East Sydney area (as shown in Figure 3) encompasses the Eastern Suburbs, bounded by Bondi Junction and Central Station to the north, the T4 Illawarra rail line to the west and includes Rockdale and Brighton Le Sands to the south.

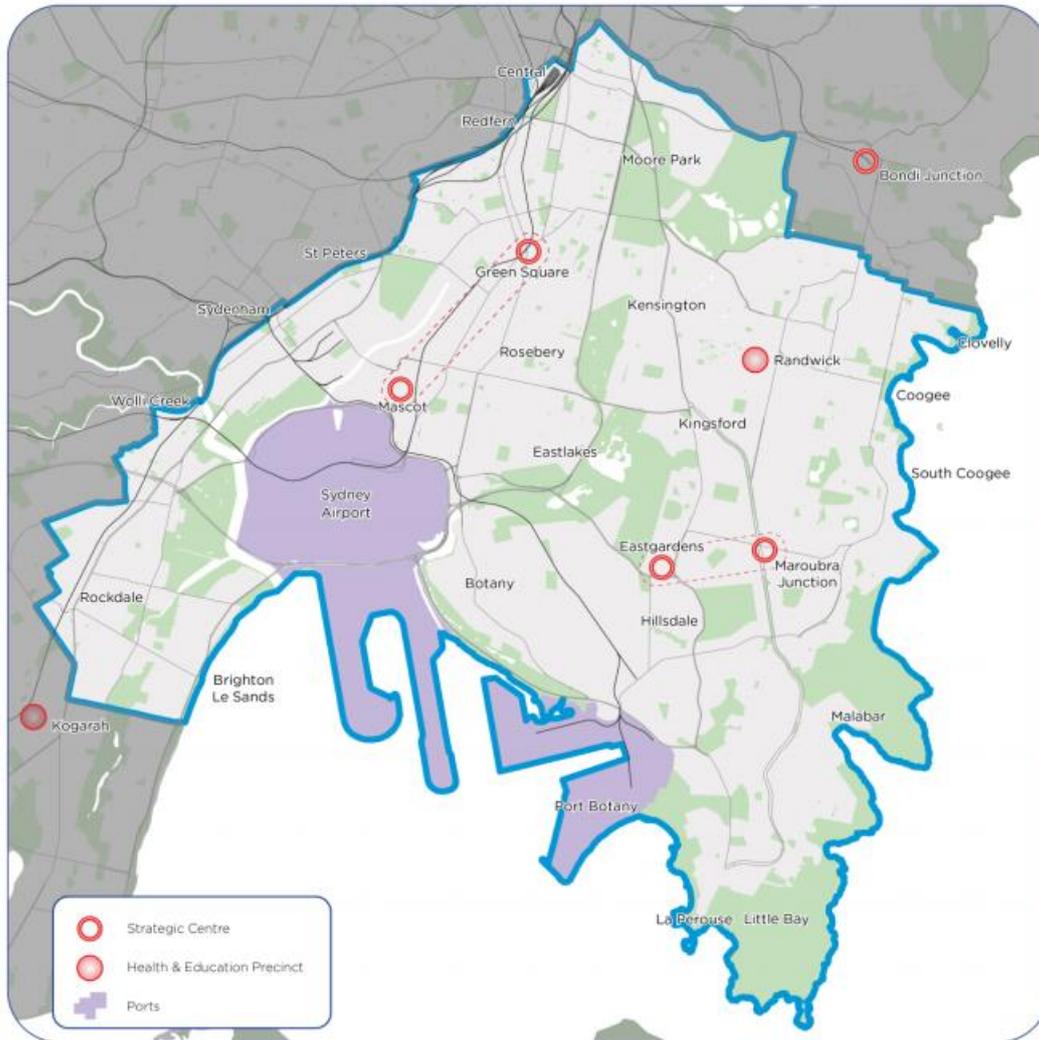


Figure 3: South East Sydney Transport Strategy study area

Source: South East Sydney Transport Study (Transport for NSW, 2020)

The proposed infrastructure in the preferred option of the Transport Strategy is shown in Figure 4. The key proposals within or affects the study area includes:

- A ferry connection between La Perouse and Kurnell (this project)
- A cruise terminal under investigation in Port Botany
- Rapid bus routes between La Perouse and the Airport to the west, Coogee and Bondi to the east, and CBD to the north
- A Metro line connecting the CBD to La Perouse via Randwick proposed for 2041.

The proposed cruise terminal at Port Botany is under investigation by the State Government and is currently on hold until further notice. Any potential landside impacts from the cruise terminal on the Project will need to be considered in more detail during subsequent design stages when additional information is made available.

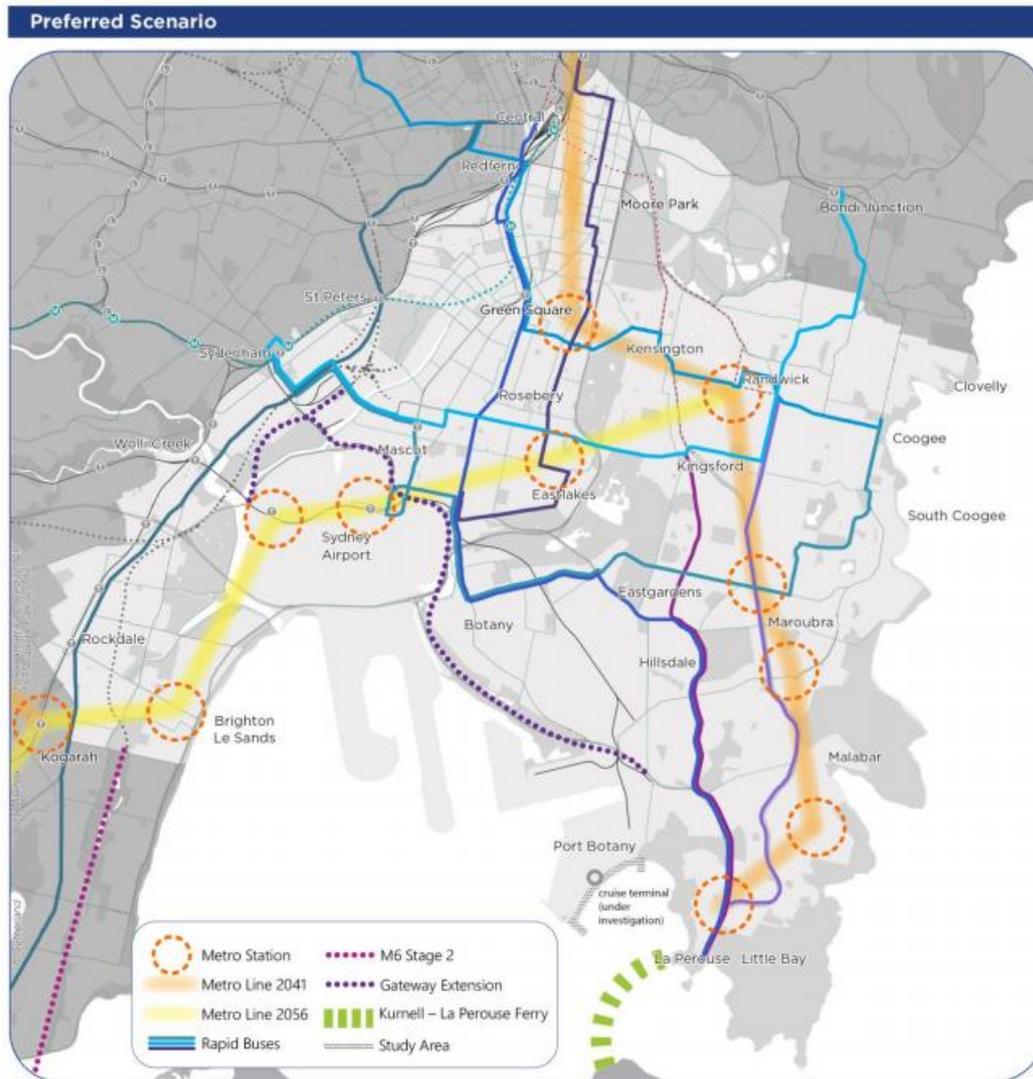


Figure 4: The proposed transport infrastructure in the preferred scenario

Source: South East Sydney Transport Study (Transport for NSW, 2020)

2.5 Randwick Bicycle Plan

The Randwick Bicycle Plan developed in 1998 and most recently reviewed in 2015 highlighted a priority list of cycling infrastructure following consultation with the community. The list includes the provision of cycling infrastructure to connect La Perouse to Kingsford and Randwick via Anzac Parade. The 2015 priority list is illustrated in Figure 5.



Figure 5: Randwick City Council Bike Plan Priority List

Source: Randwick City Council, 2015

2.6 Sutherland Bicycle Plan

Sutherland Shire Council’s Bicycle Network Map (2015) is illustrated in Figure 6. The map highlights the proposed cycling infrastructure and opportunities to connect Kurnell to the wider bicycle network.

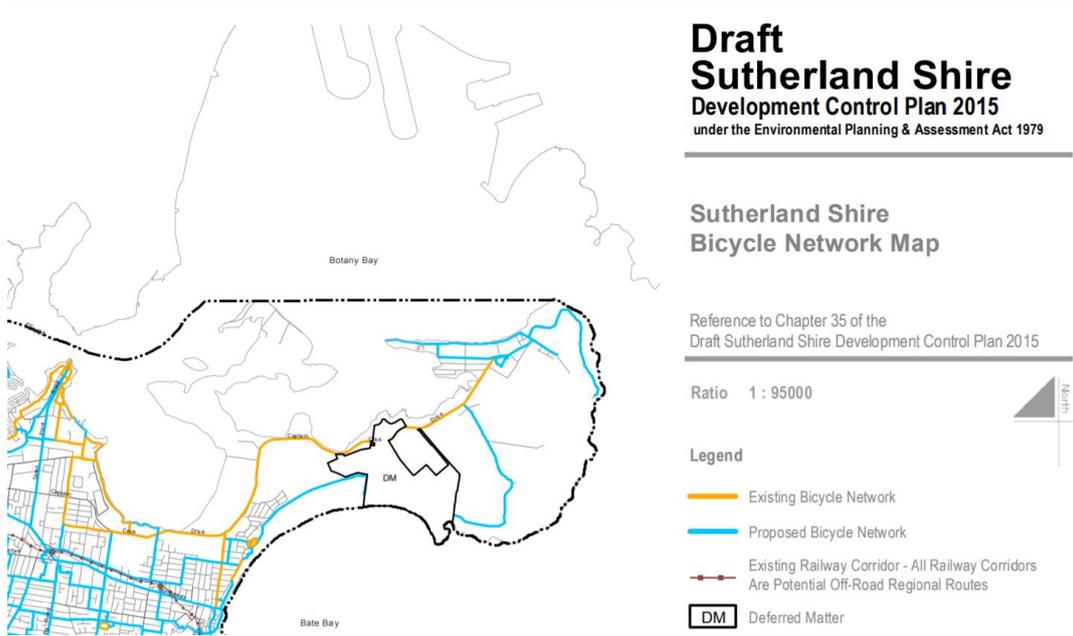


Figure 6: Sutherland Shire Council Bicycle Network Map

Source: Sutherland Shire Council, 2015

2.7 La Perouse Museum upgrade

The proposed La Perouse Museum upgrade is currently in Master Plan phase and is being investigated by Randwick City Council (RCC). The location of the museum is in close proximity to the proposed ferry wharf and presents an opportunity for the Project team to collaborate with RCC to provide a consolidated transport strategy for this area. Further details on the consultations with Council are included in section 3.

3 Stakeholder Consultation

Consultation with a range of stakeholders was undertaken for the development of this report and for the wider Project. The consultation process was aimed to understand underlying transport issues and impacts of any adjacent projects currently under consideration by the respective local and state government authorities.

Randwick City Council (RCC)

Consultation with RCC was undertaken in 2020 and 2021 to understand underlying transport issues and to discuss the methodology and analysis proposed as part of this Project to address landside impacts.

As part of this consultation process, RCC outlined their current work on the La Perouse Museum Master Plan; a project that is adjacent to the Project and presents opportunities to consider a holistic transport solution that is mutually beneficial. Some key considerations resulting from this consultation are as follows:

- Opportunity to relocate the current bus stop along Anzac Parade (currently located approximately 100m north of the loop road entry) to opposite the retail strip along Anzac Parade. The bus stop will be closer to the proposed wharf location to support the current retail strip and the La Perouse Museum.
- Opportunity to integrate with the proposed La Perouse Museum upgrades. An example includes using the proposed Disability Discrimination Act (DDA) compliant footpath network to connect the potential bus stop location to the proposed wharf.
- RCC identified that there may be an increased bicycle demand for the proposed ferry wharf.

Sutherland Shire Council (SSC)

Consultation with SSC was undertaken in 2020 and 2021 to understand underlying transport issues and potential opportunities. Some key considerations resulting from this consultation are as follows:

- SSC has recently completed the Silver Beach Promenade, a 1.5km shared path that traverses along Silver Beach. This path stretches from Bonna Point Reserve to Kamay National Park. SSC highlighted the future desire to connect this path into the wider bicycle network via an off-road cycle way along the segment of Captain Cook Drive that abuts the Kamay Botany Bay National Park. This would contribute to a high quality cycle link that connects users from La Perouse to Kurnell around Botany Bay. Feasibility of this connection is currently under investigation by SSC and preferably not be precluded by any proposed upgrades for the Project.
- SSC is supportive of opportunities to improve cycle network to and around the Kurnell area in general.
- SSC is supportive of the proposed Project to provide amenities including bicycle parking.

- SSC is supportive of opportunities to facilitate greater public transport connectivity including the improvement of bus service connecting Cronulla to the Kurnell area.
- SSC have indicated that they are not supportive of parking proposed on Captain Cook Drive in Kurnell. Through further engagement, Council and NSW National Parks and Wildlife Service (NPWS) have agreed to provide the additional required car parking spaces for the Project within the National Park. These works will be undertaken by NPWS as part of the Master Plan for Kamay Botany Bay National Park.

Transport for NSW

Consultation was undertaken with Transport for NSW Metro, Bus and Ferry Planning and Development in April 2020. Some key considerations resulting from this consultation are as follows:

- Potential for rapid bus services to La Perouse. This is currently outlined in the South East Sydney Transport Strategy (refer to section 2.4).
- Transport for NSW were supportive of the relocation of the bus stop at La Perouse but will need to carefully consider bus layover requirements. These requirements may also change with the future introduction of rapid bus services. A review is required based on alignment to the South East Sydney Transport Strategy.
- Transport for NSW outlined a state government commitment to increase bus services to Kurnell. This is anticipated to improve the bus service 987 (Kurnell to Cronulla) by:
 - Increasing weekday off peak and weekend daytime frequencies
 - Extending service hours on weeknights and Saturdays.

4 Existing conditions

This section documents the existing transport conditions at La Perouse and Kurnell sites for each key mode. This includes the understanding of the type, use and application of various data sources to support and inform these findings and observations.

4.1 Data sources

4.1.1 Survey data

To understand the existing traffic and transport conditions at La Perouse and Kurnell, a review of historical tube count data was conducted to understand variability. Figure 7 shows the daily variability along the La Perouse loop road in April 2014. Figure 8 illustrates the daily variability along Captain Cook Drive (between Sir Joseph Banks Road and Polo Street) for a week in June/July in 2018.

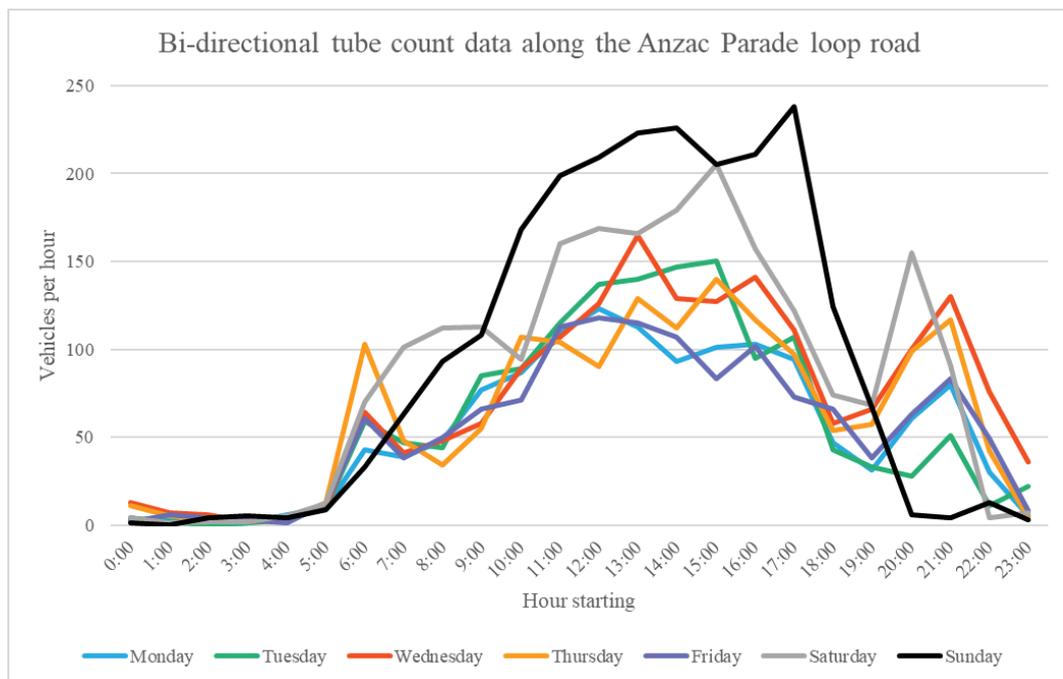


Figure 7: Bidirectional tube count surveys in April 2014 on the La Perouse Loop Road

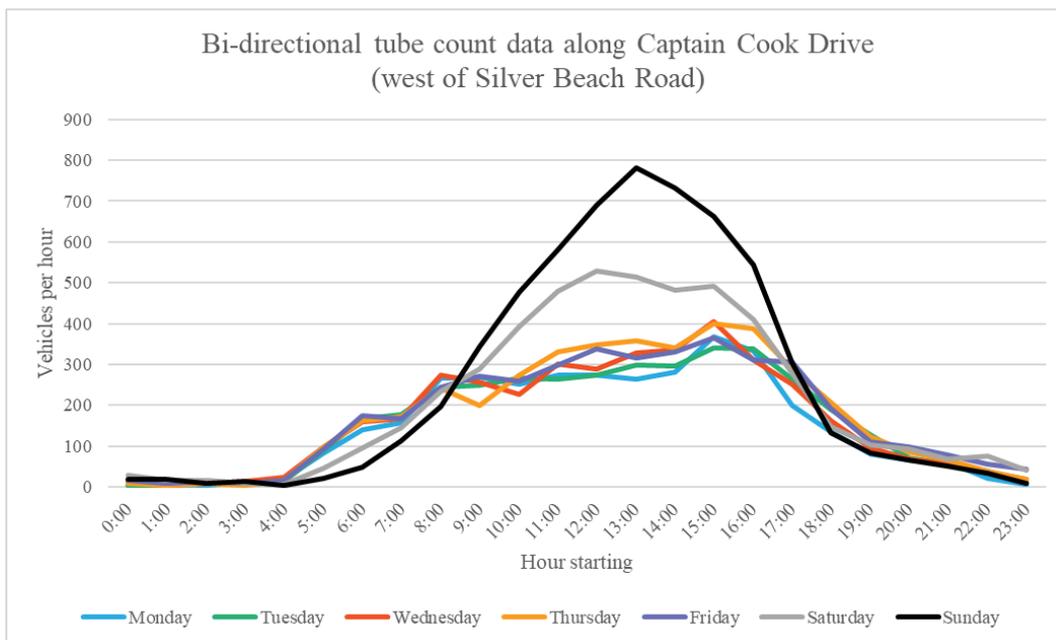


Figure 8: Bidirectional tube count surveys along Captain Cook Drive between 29th June - 5th July 2018

The data shows that for both sites, Sunday was the busiest day of the week. Consequently, a range of surveys were commissioned on Sunday 2nd February 2020 between 11:00am and 5:00pm. The day was chosen to represent a typical busy day during the peak summer months and did not capture event conditions (i.e. market days, etc.). The surveys (illustrated in Figure 9 for La Perouse and Figure 10 for Kurnell) included the following:

- Intersection movement counts of vehicles (light vehicles, heavy vehicles and buses), cyclists and pedestrians at:
 - La Perouse: Anzac Parade / Anzac Parade (loop)
 - La Perouse: Anzac Parade / Endeavour Avenue
 - Kurnell: Captain Cook Drive / Cape Solander Drive
 - Kurnell: Captain Cook Drive / Polo Street
- Pedestrian counts along Monument Track (northbound and southbound)
- Parking occupancy data for car spaces at La Perouse and Kurnell. At Kurnell, a traditional parking occupancy survey was undertaken that recorded the number of vehicles parked in bays at a moment in time compared to the capacity of the bays. At La Perouse, underlying congestion along the loop road was identified as an issue. Consequently, license plate recognition surveys were used to understand the suppressed demand (i.e. how many vehicles unsuccessfully found a parking spot) and how long vehicles were parking for
- License plate recognition surveys at La Perouse for northbound (entering) and southbound (exiting) vehicles at Anzac Parade / Goorawahl Avenue.

Additional license plate recognition surveys were conducted at Kurnell on Sunday 16th August 2020 along Prince Charles Parade and Captain Cook Drive. The

surveys were commissioned to further understand the opportunity for mode shift in the area by investigating the existing catchment of visitors driving to the site. This is further discussed in section 4.6.3.

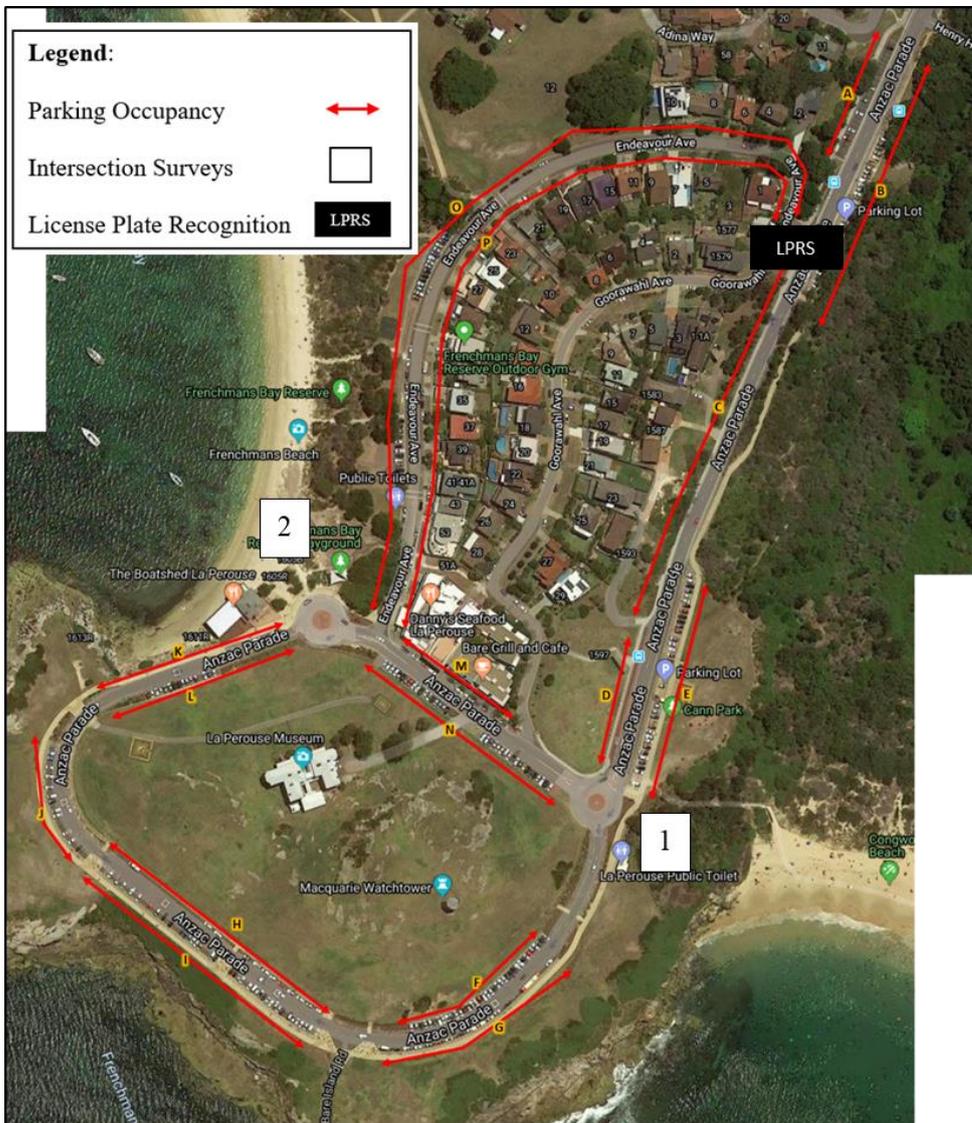


Figure 9: Survey data commissioned at La Perouse



Figure 10: Survey data commissioned at Kurnell

4.1.2 Opal data

Transport for NSW Transport Performance and Analytics (TPA) department provided Opal data for January 2020. The data included origin-destination data between a series of bus stops in La Perouse and Kurnell for typical weekday and weekends in school holiday and non-school holiday periods from each quarter of 2019. This data was used to understand the public transport usage at La Perouse and Kurnell.

It is noted that the low granularity of the data meant that only 5-day weekday and 2-day weekend values were received to maintain customer privacy. However, given the low mode share of public transport use to both La Perouse and Kurnell, higher granularity in the data will have minimal impacts on the end-user requirements.

4.1.3 Crash data

Crash data was requested from Transport for NSW for a completed five-year period between 1st October 2014 and 30th September 2019. The data provided insight on the details of the crashes within and near the study area to help identify any trends.

4.2 Weekday methodology

As discussed in section 4.1, the historical tube count at La Perouse and Kurnell in 2013 and 2018 indicated that Sunday was the busiest day of the week. As surveys were commissioned for a weekend peak, the conditions and performance of La Perouse and Kurnell on a weekday was assessed by factoring down the weekend surveys. A weekday factor was calculated using the peak weekday count as a percentage of the Sunday count, as summarised in Table 5.

Table 5: Weekday factors based on tube counts

	Weekday 24-hour count	Sunday 24-hour count	Weekday factor
La Perouse	1,714 (Wednesday)	2,216	77%
Kurnell	4,187 (Thursday)	5,937	71%

The weekday factor was applied to the intersection count data to provide a high-level understanding of the weekday conditions of the sites.

4.3 Public transport

4.3.1 La Perouse

Visitation to La Perouse by public transport is primarily by bus which service the following routes:

- 391 between Central Station and La Perouse
- 394 between Circular Quay and La Perouse
- L94 between Circular Quay and La Perouse
- X94 between Museum Station and La Perouse.

The list excludes school services (614E to Sydney Girls High School, 658E to Brigidine College Kensington and 736E to South Sydney High School), as they are limited to operate during school pick up and drop off only and are dedicated services to school children only.

Buses are frequent with services every 15 mins on weekends. Opal data indicate that the bus services are well used, with high patronage throughout the year. Figure 11 illustrates an average weekend (1-day) bus usage at La Perouse throughout the year. The data shows 433 customers alighting at La Perouse on a Saturday/Sunday in the busiest month in January.

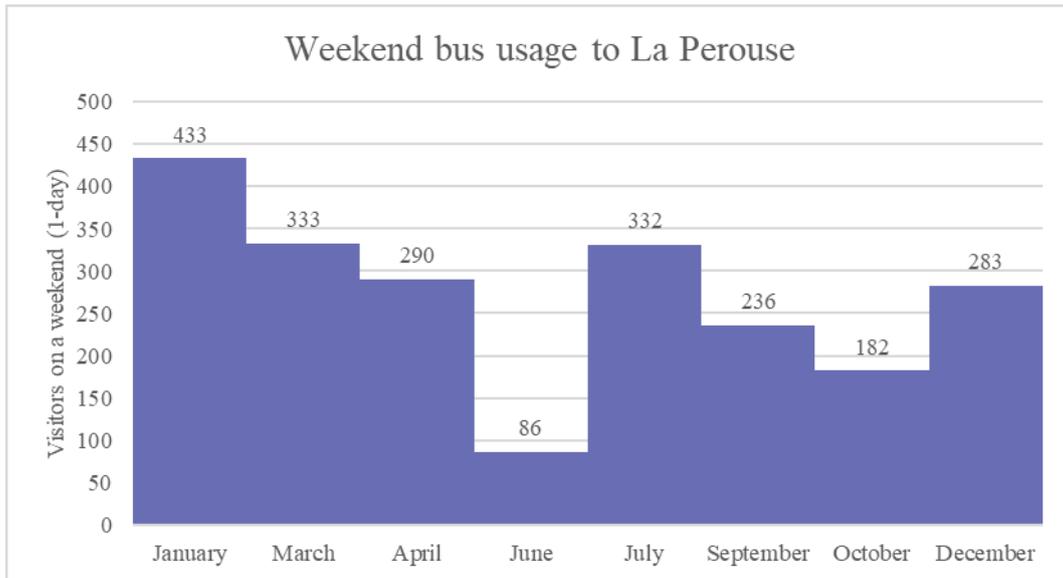


Figure 11: 1-day average weekend bus visitors to La Perouse

Average weekday bus usage to La Perouse is illustrated in Figure 12. The Opal data shows that there are up to 307 trips to La Perouse by bus on an average weekday in April. It is expected that the majority of trips are by visitors with visitation fluctuating throughout the year. The months of January, July and October are high aligning with visitors during school holidays. While lower trips ranging between 50-100 trips are likely to predominantly consist of staff and locals.

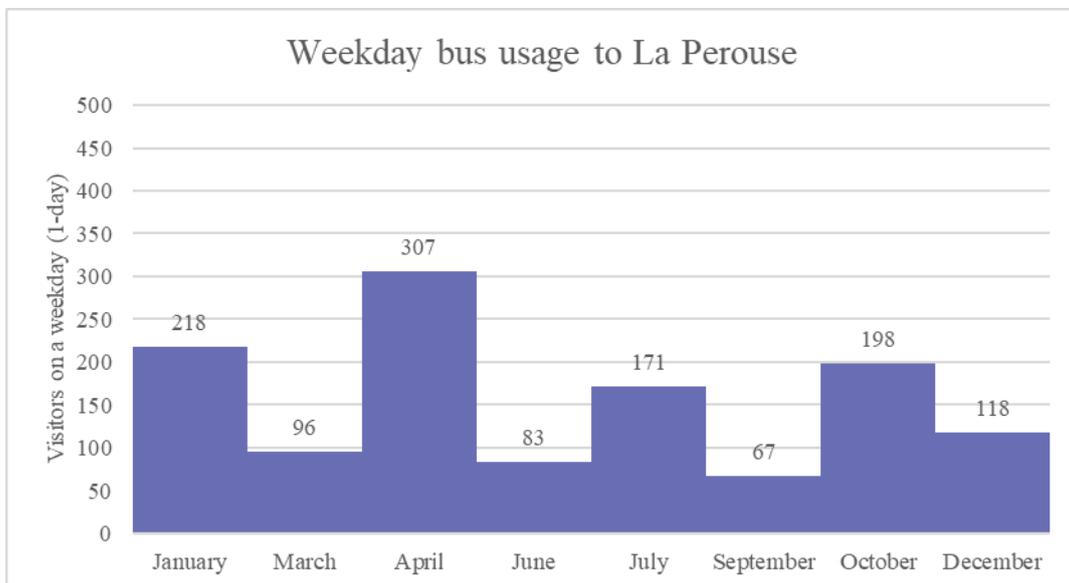


Figure 12: 1-day average weekday bus visitors to La Perouse

4.3.2 Kurnell

Kurnell is accessible by public transport with the bus service 987 which loops between Kurnell and Cronulla. The service runs every 1-2 hours on Saturday and only 4 services are active on Sunday and public holidays. However, available

Opal data suggests that patronage is low throughout the year as shown in Figure 13. The data available identified that 20-30 customers travel to Kurnell by bus on a weekend in the months of April, July and September.

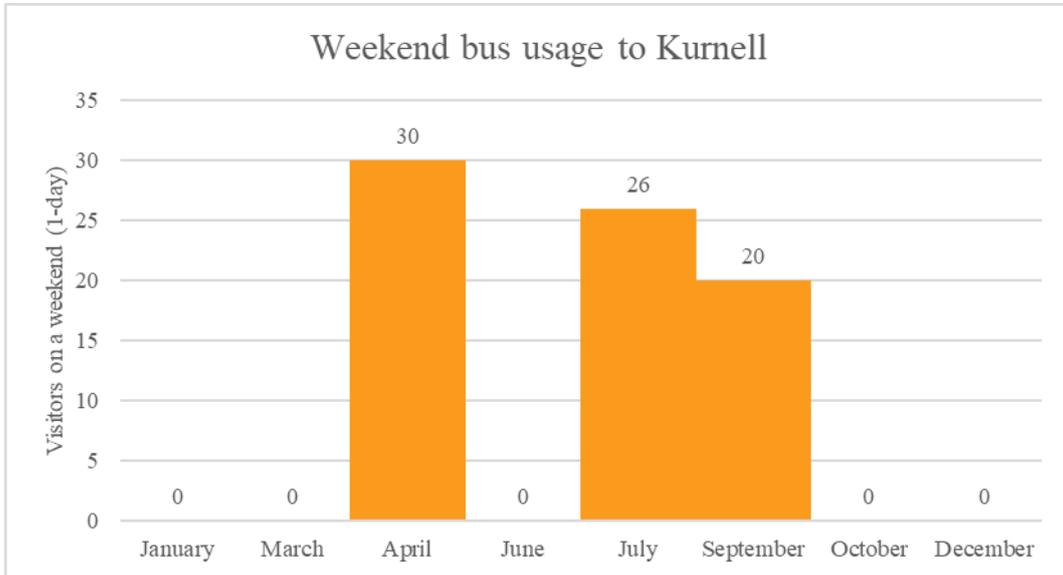


Figure 13: 1-day average weekend bus visitors to Kurnell

The bus service runs on a weekday generally every hour between 6am and 6pm. Figure 14 illustrates the bus usage at Kurnell on an average weekday. Similar to at La Perouse, customers during a weekday are much fewer than on a weekend, ranging between 4-8 trips a day.

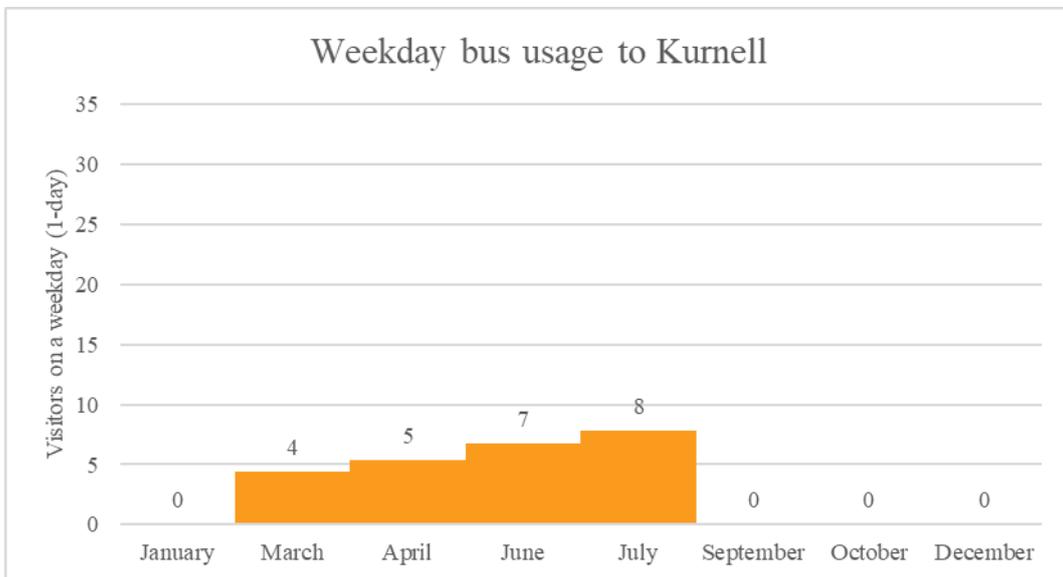


Figure 14: 1-day average weekday bus visitors to Kurnell

4.4 Cycling

4.4.1 La Perouse

Recreational cycling at La Perouse is most popular on weekends. High cycling activity at La Perouse was raised during the consultation with Randwick City Council, who advised that ferry services would likely encourage current riders to use the ferry.

La Perouse is a popular cycling route for the Sydney Cycling Club which holds a 41km route between Bondi Beach and La Perouse every Saturday morning and a 27km loop every Thursday morning. The two routes are shown in Figure 15.

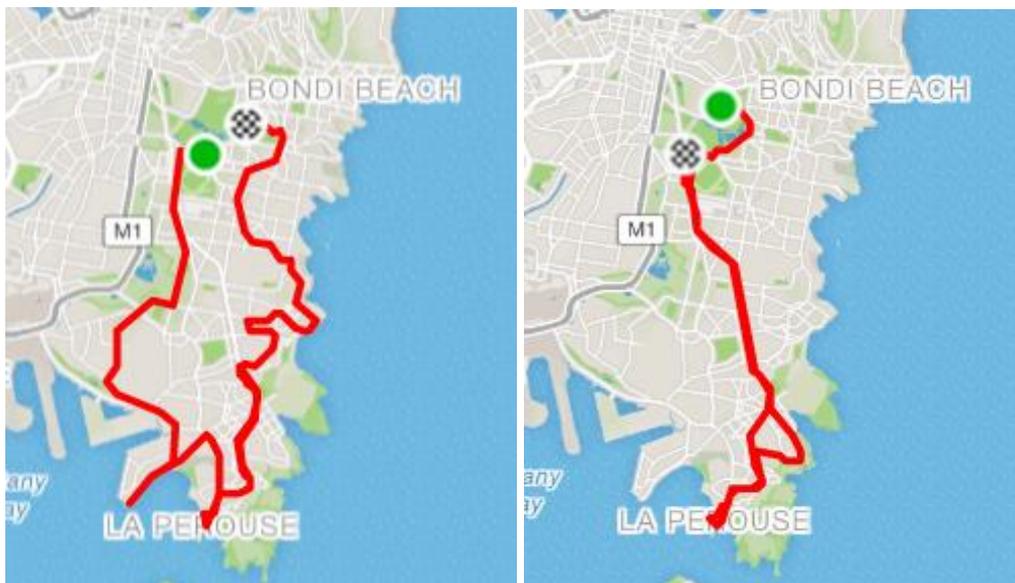


Figure 15: Sydney Cycling Club routes between Bondi Beach and La Perouse

Source: Sydney Cycling Club, 2020

Cycling infrastructure at La Perouse comprises of a shared path along Anzac Parade, connecting to Military Road at Chifley, as shown in Figure 16. There are also bicycle rails adjacent to the La Perouse Boatshed as shown in Figure 17.

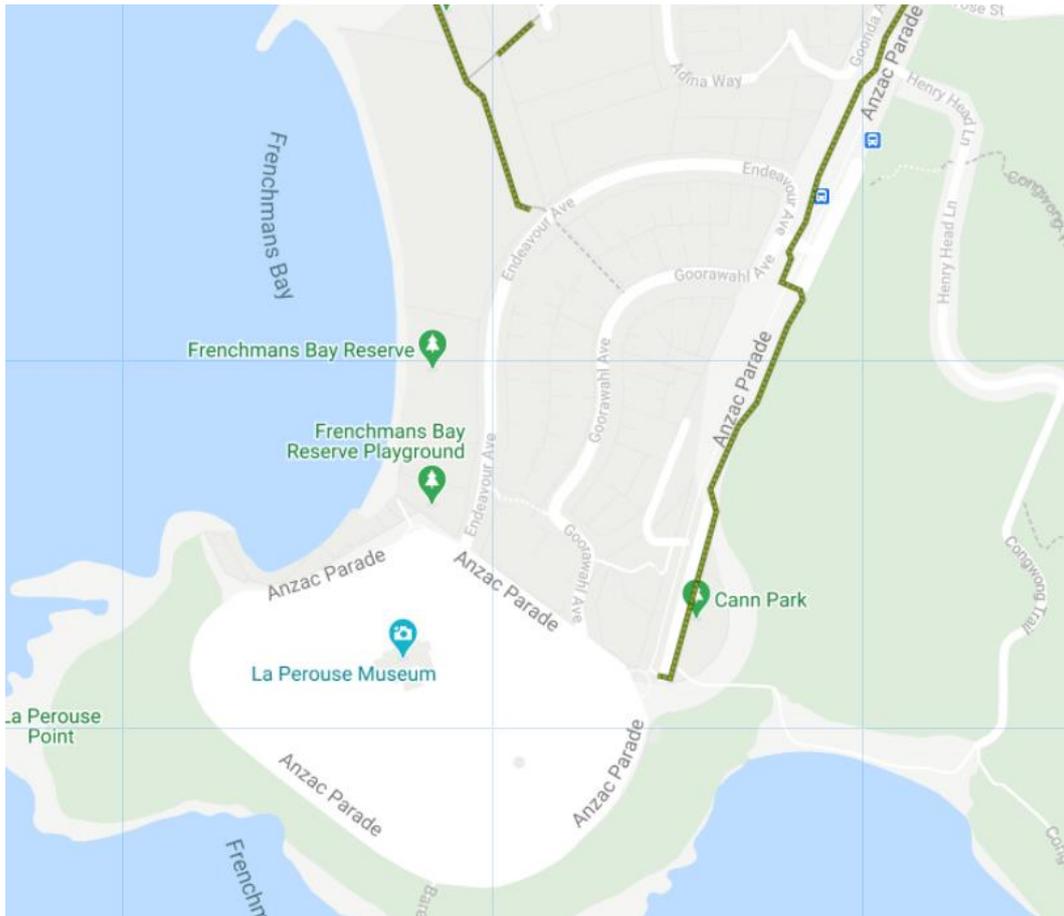


Figure 16: La Perouse cycling infrastructure

Source: Transport for NSW Cycleway Finder, 2020



Figure 17: Bicycle rails adjacent to La Perouse Boatshed

Survey data of cycling trips through the intersections at La Perouse identified in section 4.1 is summarised in Figure 18. The data shows the busiest cycling activity to occur in the morning at 11am. The time aligns with the popular cycling routes to La Perouse on Saturday mornings.

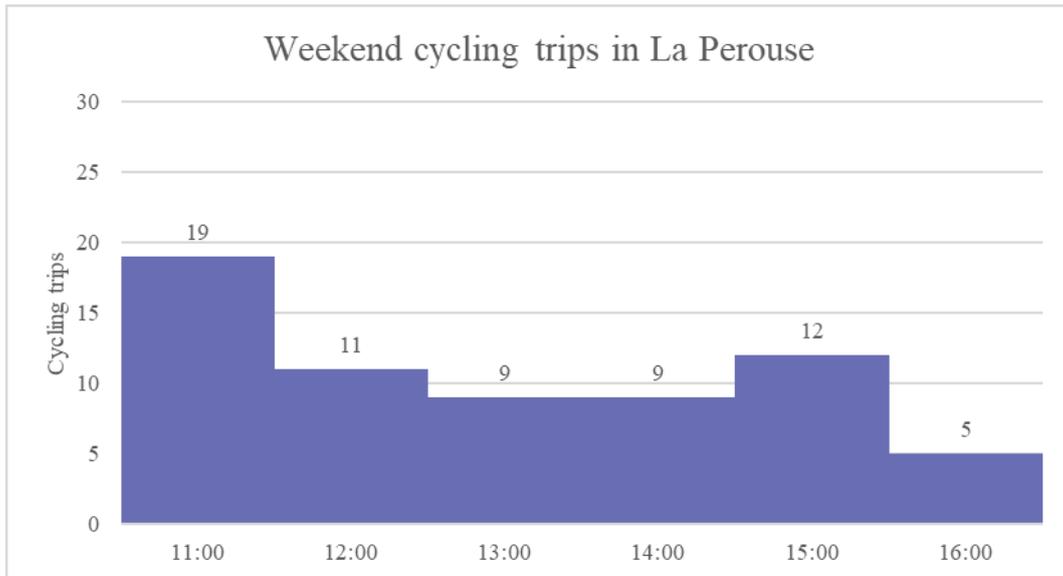


Figure 18: Weekend cycling trips in La Perouse across the day

4.4.2 Kurnell

Cycling infrastructure in Kurnell has recently been upgraded to include a shared path along Silver Beach. An on-road cycle lane is provided along Captain Cook Drive between Gannons Road and Torres Street (Figure 19). There are also paths within the Kamay Botany National Park for cyclists. It is noted however that there are no bicycle rails within the study area along Princes Charles Parade and Captain Cook Drive.

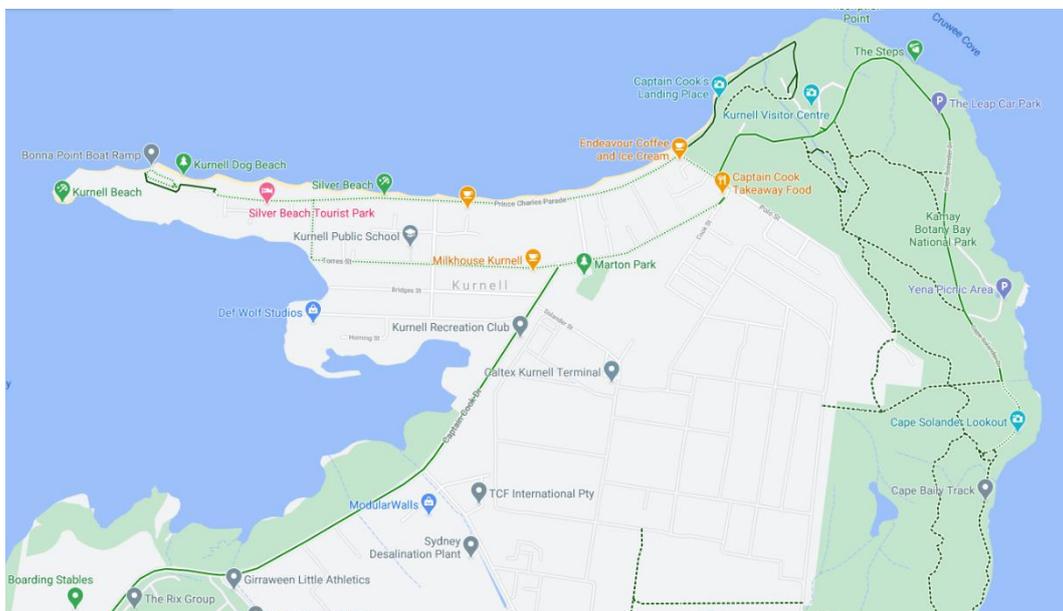


Figure 19: Kurnell cycling infrastructure (Google, 2020)

Cycling trips through the surveyed intersections at Kurnell are summarised in Figure 20. There is a high volume of cycling trips in the morning up until 1pm, which are likely to be recreational cyclists going to Kamay National Park.

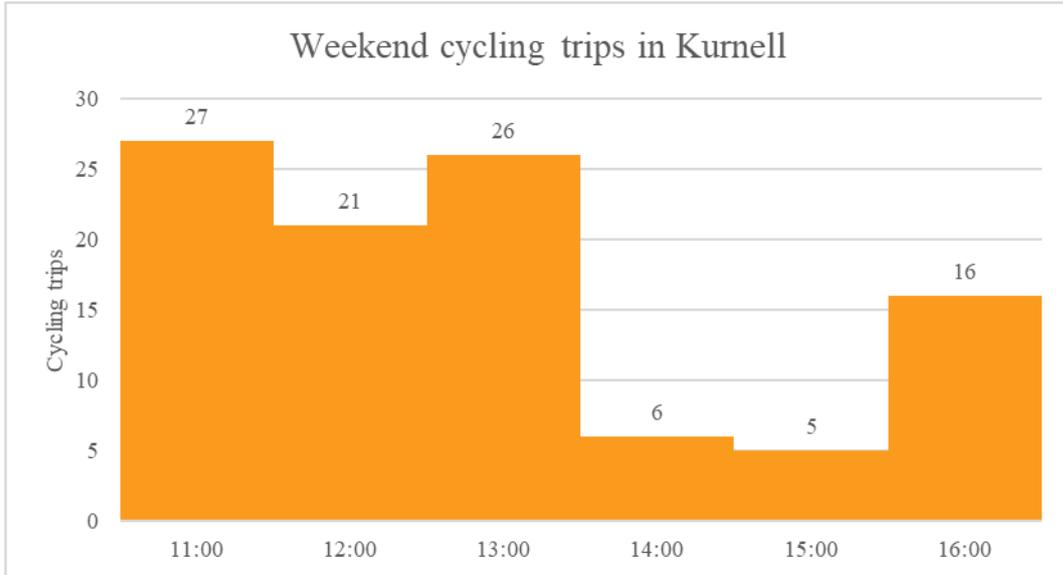


Figure 20: Weekend cycling trips in Kurnell across the day

4.5 Walking

4.5.1 La Perouse

With the high volume of visitors at La Perouse, footpaths are provided along most key walking areas, as shown in Figure 21. Footpaths are located around the full outer edge of the Anzac Parade loop road, along the retail frontage of Anzac Parade, and along both the eastern and western sides of Endeavour Avenue.

There are walking trails nearby including Congwong Trail off Henry Head Lane, connecting to Congwong Beach and Little Congwong Beach. The Anzac Parade loop road also has a pedestrian limited access to a Bare Island Bridge which is a popular tourist location. The bridge connects to Bare Island to the south.

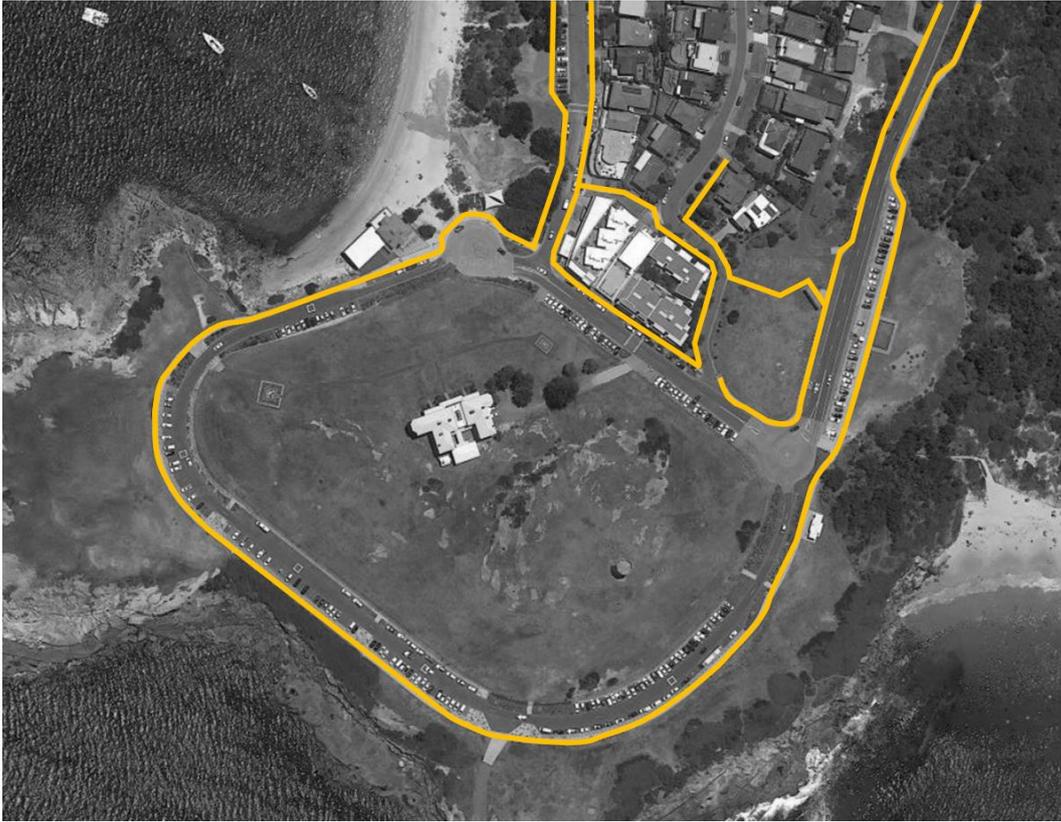


Figure 21: Footpaths at La Perouse (Google, 2020)

Pedestrian activity captured in the intersection survey data at La Perouse is summarised in Figure 22. The data shows that there is a high volume of pedestrians in the area. These trips are likely to be visitors to La Perouse that are walking between the landmarks and the food retail/ land uses. However, these visitors may have reached La Perouse via other modes (i.e. buses, private vehicle, etc.). To summarise, the data shows that the area facilitates walking locally but does not represent walking as a method of travel to La Perouse.

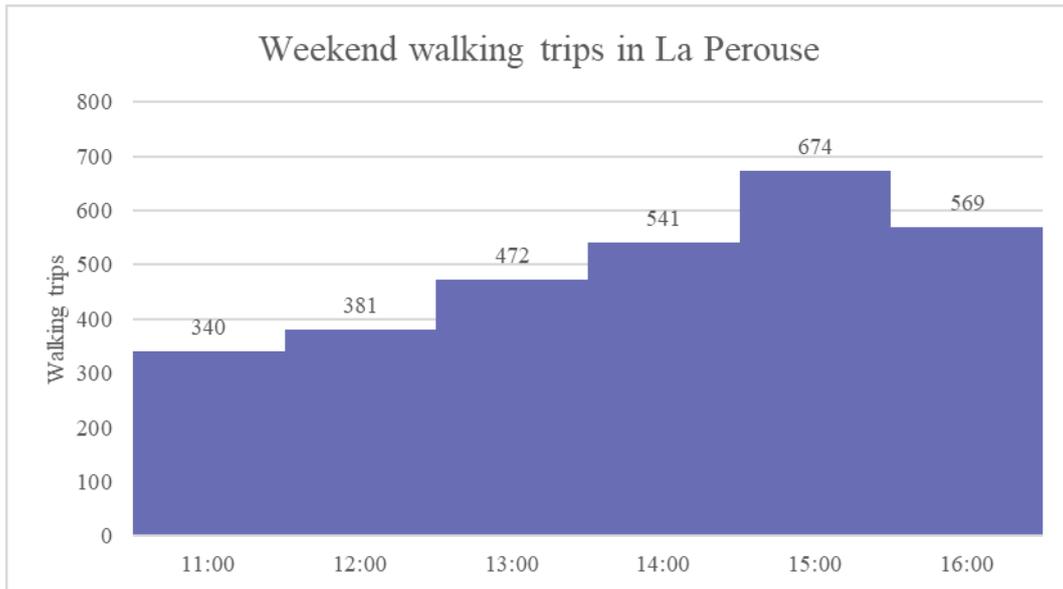


Figure 22: Weekend walking trips in La Perouse across the day

4.5.2 Kurnell

The footpaths around Kurnell are shown in Figure 23. Footpaths are along the northern and southern sections of Prince Charles Parade, along the southern of Captain Cook Drive between Prince Charles Parade and Polo Street, and along the northern side of Princes Charles Parade between Polo Street and Torres Street. The northern footpath along Princes Charles Parade connects onto Monument Track in the Kamay Botany Bay National Park to the northeast. Monument Track connects to the Visitor Centre in the National Park, and to other walking trails including Muru Trail, Yena Trail and Cape Bailey Track.



Figure 23: Footpaths at Kurnell (Google, 2020)

Figure 24 illustrates the walking trips at Kurnell based on surveys taken at Monument Track. Similar to La Perouse, this data represents pedestrian activity in the area rather than identifying the mode of travel they utilised reach the Kurnell

area. The activity is generally higher during the midday with 70-90 movements per hour between 11:00am-1:00pm.

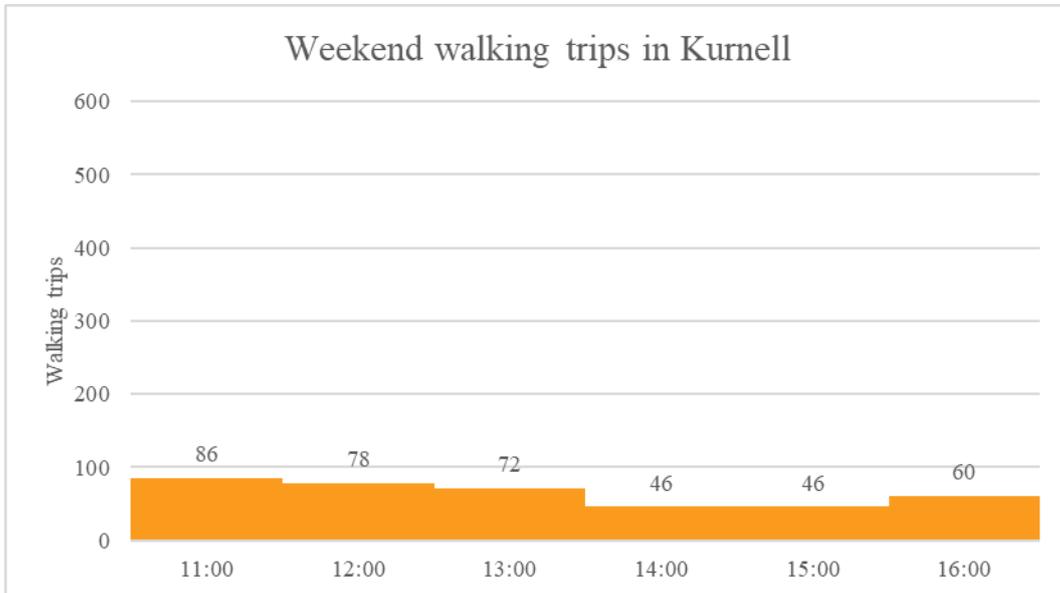


Figure 24: Weekend walking trips along Monument Track in Kurnell across the day

4.6 Private vehicles

4.6.1 Parking

4.6.1.1 La Perouse

Parking and traffic data gathered at La Perouse shows the peak number of trips coming in/out of the study area occurs on a weekend. The La Perouse study area is shown in Figure 9. Figure 25 summarises the number of vehicles entering and exiting the area per hour between the peak periods of 11am to 5pm. It is shown that there is a relatively higher number of vehicles entering and exiting between 11am to 3pm. After 3pm, less vehicles are shown to enter the site, but they continue to exit the site.

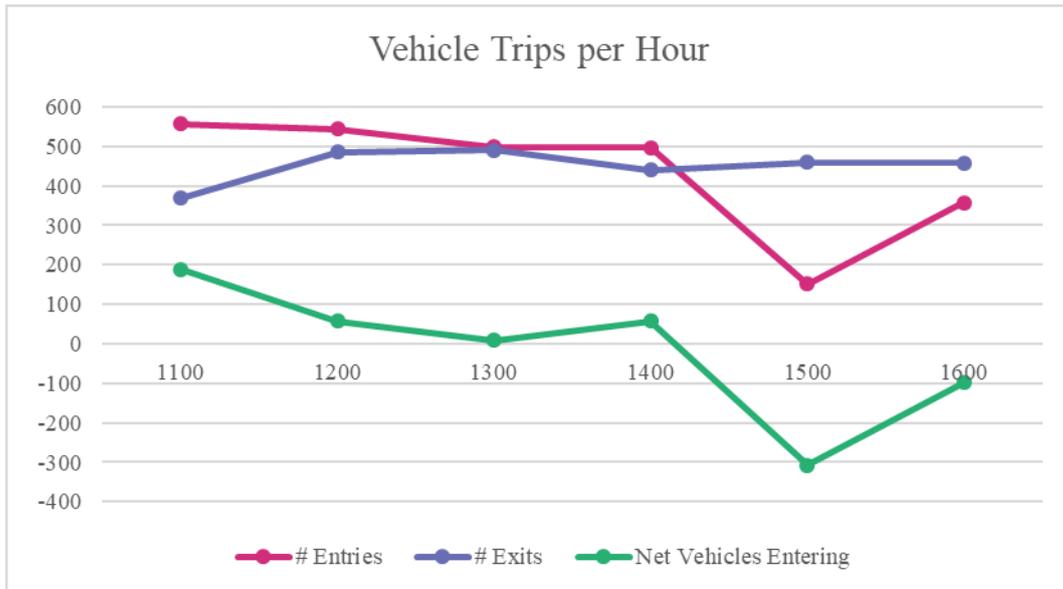


Figure 25: Net vehicles accessing La Perouse

Car parking occupancy is shown in Figure 26, where surveys captured a total supply of 433 parking bays. The surveys indicated that all parking bays are full from the start of the surveys at 11am until 3pm.

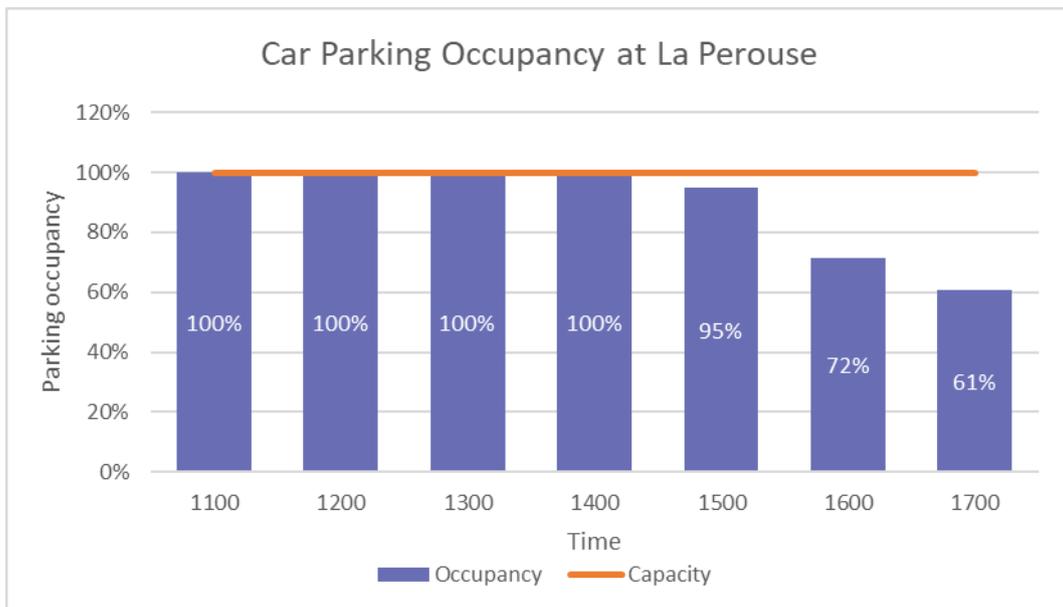


Figure 26: Car parking occupancy at La Perouse

The data for car parking duration of stay is summarised in Figure 27. It is noted that there are no timed parking restrictions in the La Perouse study area, except for a 3-hour parking restriction for event parking (not relevant on the day of surveys) and signage to deter visitors from parking overnight.

The data shows that the majority (70%) of cars are short term visitors staying less than an hour, where 62% are staying between 30 and 60 minutes. While the remaining 8% of vehicles stay less than 30 minutes and are likely vehicles

dropping off passengers or those who were unable to find parking and left. This indicates that there is likely a suppressed parking demand.

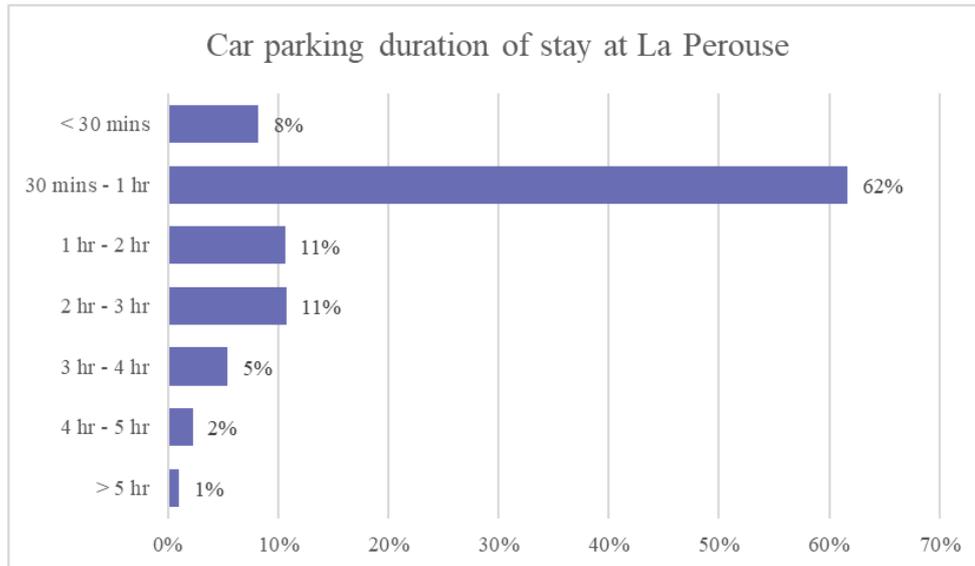


Figure 27: Car parking duration of stay at La Perouse

The high turnover of vehicles is shown to cause congestion due to the one-way loop arrangement (Figure 28). Vehicles are also observed to stop throughout the loop waiting for parking spaces, in turn blocking upstream vehicles. With the high car parking turnover, it has been identified that capacity is likely not an issue, but rather that the design of the one-way loop is exacerbating the issue.



Figure 28: Congestions observed on the loop road during the survey period

4.6.1.2 Kurnell

The car parking occupancy surveyed at Kurnell is summarised in Figure 29. The study area for the surveys at Kurnell is shown in Figure 10. The surveyed area does not include areas within the National Park, where paid parking is provided. The data shows that the peak occupancy of car spaces is 91% at 1pm and drops down to 78% by 2pm. The data suggests that Kurnell is popular during lunch time

on a weekend, but there is sufficient car parking capacity even during the peak hour.

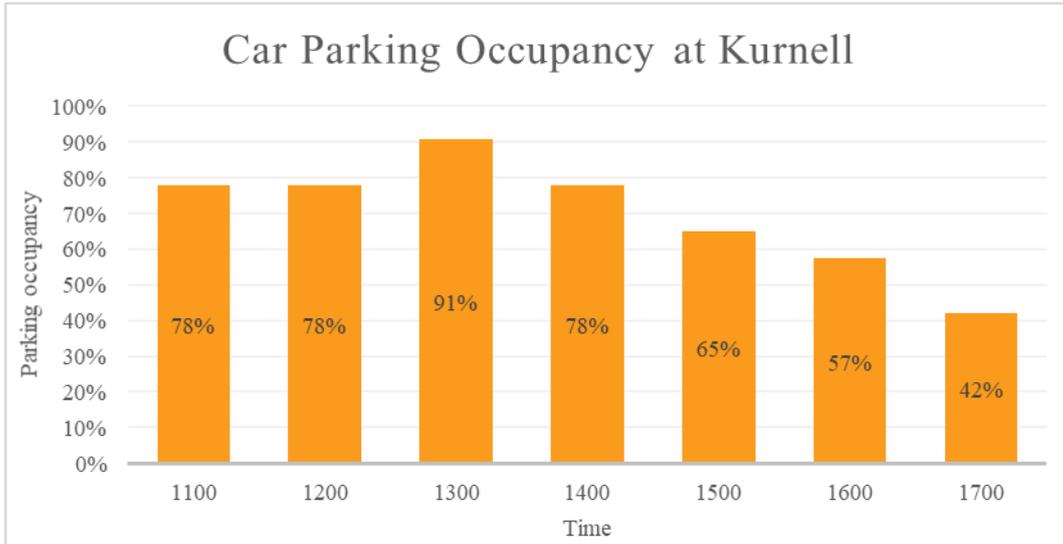


Figure 29: Car parking occupancy data at Kurnell

4.6.2 Intersection capacity

The key intersections at La Perouse and Kurnell were modelled to understand the capacity and performance of the current conditions on a weekday and weekend. The potential impacts of the additional trips generated as result of the proposed wharf developments are discussed further in section 6.2.1.

The performance of each intersection has been analysed in isolation, where impact to/from adjacent intersections and downstream impacts (e.g. on-street parking) have not been considered.

The key intersections are shown in Figure 30 and Figure 31, and include:

1. La Perouse: Anzac Parade / Anzac Parade (loop)
2. La Perouse: Anzac Parade / Endeavour Avenue
3. Kurnell: Captain Cook Drive / Cape Solander Drive
4. Kurnell: Captain Cook Drive / Polo Street.



Figure 30: Intersection locations at La Perouse



Figure 31: Intersection locations at Kurnell

Traffic performance is typically quantified in terms of the Level of Service (LoS) which is an index of the operational performance of traffic at an intersection and

is based on the average delay per vehicle. LoS ranges from A = very good to F = highly congested travel conditions, as shown in Table 6. The Degree of Saturation (DoS) provides an overall measure of the capability of the intersection to accommodate additional traffic. A DoS of 1.0 indicates that an intersection is operating at capacity. The desirable maximum degree of saturation for a priority intersection and roundabout is 0.8 and 0.85, respectively.

Table 6: Level of Service Definitions

Description	Level of Service	Average delay per vehicle (s)
Very good	A	< 14.5
Good	B	14.5 ≤ 28.6
Satisfactory	C	28.5 ≤ 42.5
Near Capacity	D	42.5 ≤ 56.5
At Capacity	E	56.5 ≤ 70.5
Over capacity	F	> 70.5

The intersection modelling results are summarised in Table 7 for the weekday peak hour and Table 8 for the weekend peak hour. The summary of results identifies that there are currently no capacity issues at the modelled intersections. However, observations at La Perouse indicate that downstream impacts associated with on-street parking results in notable traffic queues extending through the Anzac Parade intersections.

Table 7: Weekday intersection modelling results

Intersection	Intersection demand (vehicles/hr)	LoS	DoS	95%tile queue (m)
La Perouse				
Endeavour Avenue / Anzac Parade	642	A	0.22	1
Anzac Parade Loop	728	A	0.31	13
Kurnell				
Captain Cook Drive / Cape Solander Drive	286	A	0.07	2
Captain Cook Drive / Polo Street	248	A	0.07	0

Table 8: Weekend intersection modelling results

Intersection	Intersection demand (vehicles/hr)	LoS	DoS	95%tile queue (m)
La Perouse				
Endeavour Avenue / Anzac Parade	832	A	0.29	2
Anzac Parade Loop	940	A	0.42	20
Kurnell				
Captain Cook Drive / Cape Solander Drive	367	A	0.09	3
Captain Cook Drive / Polo Street	321	A	0.09	0

4.6.3 Visitor catchment

4.6.3.1 La Perouse

License plate recognition data was obtained at La Perouse to understand the vehicle origins, duration of stay and turnover of visitors on a weekend. Figure 32 illustrates the vehicle origin by Local Government Areas (LGA) for those travelling to La Perouse on the 2nd February 2020. It is noted that the anonymised data was collected on a Sunday and it is expected that the volume of visitors on a weekday will be lower. However, the spread of where the visitors are coming from will likely be similar.

The data shows that the majority of visitors live within the local area, with approximately 30% coming from within 8km of La Perouse. The wide spread of visitors from across Sydney spans 276 LGAs. The M5 corridor supports a major east-west connection to La Perouse from Sydney's western suburbs. The data shows approximately 11% of visitors originate from the 11 LGAs located directly adjacent to this corridor.

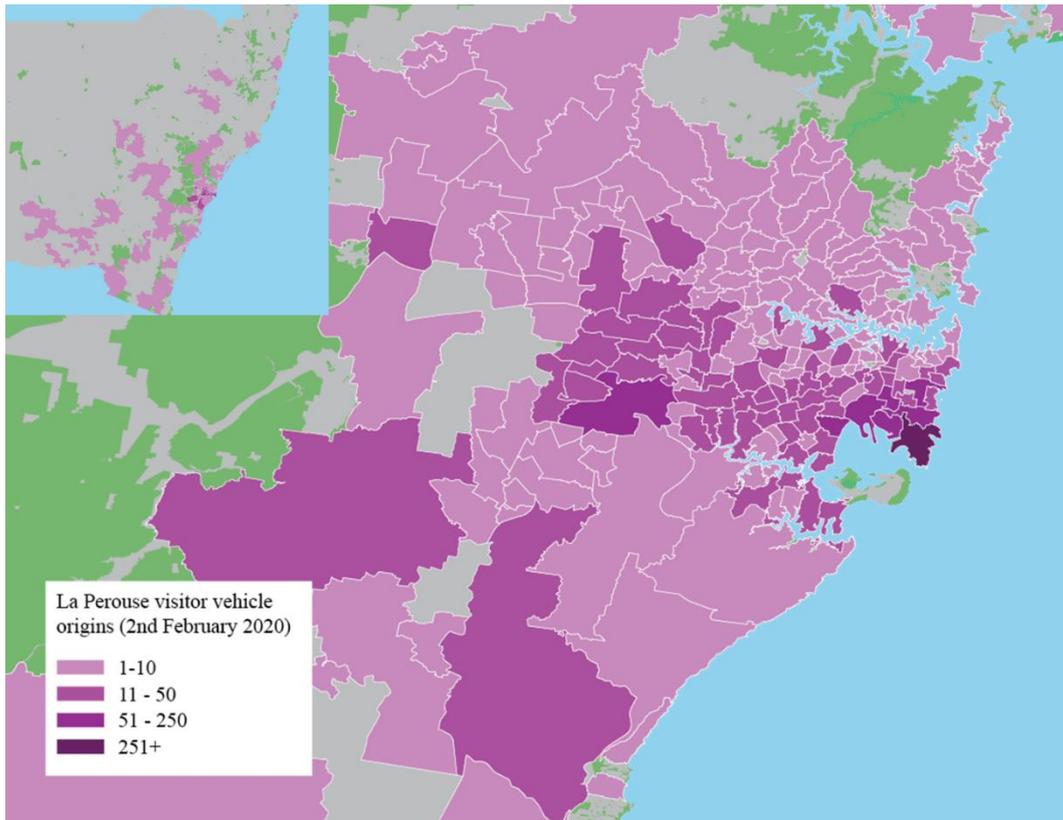


Figure 32: Vehicle postcode origins for vehicles travelling to La Perouse using license plate recognition data

4.6.3.2 Kurnell

License plate recognition data was also obtained for visitors to Kurnell. Figure 33 illustrates the vehicle registration location by postcodes for those travelling to Kurnell. The spread of visitors to Kurnell is across 234 postcodes in NSW. Approximately 48% of all visitors to the site live nearby within the adjacent postcodes, spanning from Kurnell to Lucas Heights.

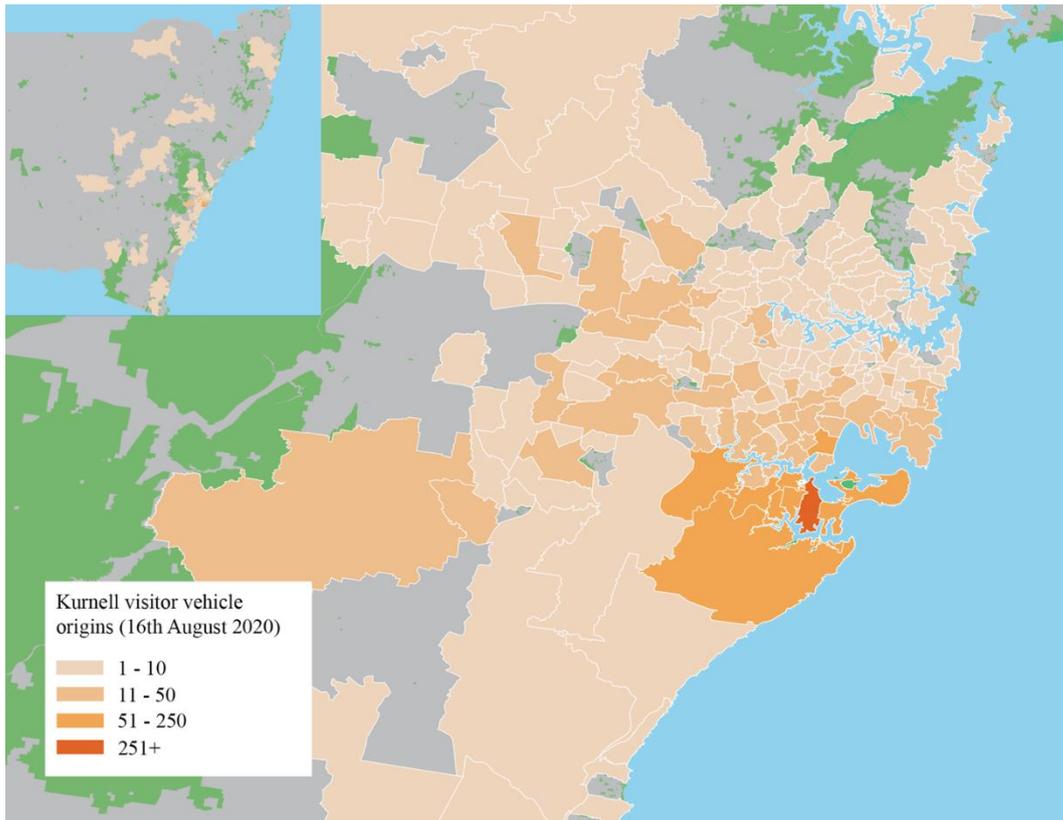


Figure 33: Vehicle postcode origins for vehicles travelling to Kurnell using license plate recognition data

4.6.4 Road safety

Crash data around the La Perouse and Kurnell sites is available for a five-year period between 1st October 2014 and 30th September 2019. Figure 34 and Figure 35 illustrate the location of crashes in La Perouse and Kurnell respectively.

4.6.4.1 La Perouse



Figure 34: Crash data at La Perouse

As shown in Figure 34, a total of five crashes were recorded within the La Perouse area, one crash in each year. It is noted that the crash history of one crash per year is a low incident rate and relative to other areas, La Perouse is not considered a hotspot for crashes.

The five crashes all incurred an injury, and there were no fatalities. Table 9 summarises the crash types of the five crashes, three of which were of vehicles in the same direction, one involving manoeuvring and one off-path collision.

Table 9: Crash types at La Perouse

Crash type	Number of crashes
Vehicles in the same direction	3
Manoeuvring	1
Off path, on straight	1

The key trends that were identified from the crash data at La Perouse are:

- Two crashes were related to parking manoeuvring
- Two crashes involving a cyclist
- One crash involving a motorcyclist.

4.6.4.2 Kurnell



Figure 35: Crash data at Kurnell

Three crash were recorded in Kurnell in the five-year period as detailed in Figure 35. Of which two occurred in 2016 and one in 2017. Similarly to La Perouse, the crash history at Kurnell indicates a low incident rate. Compared to other areas, Kurnell would also not be considered a hotspot for crashes.

The three crashes all incurred injuries, however there were no fatalities. Table 10 lists the crash types where one crash involved vehicles in the same direction, one on-path and one off-path collision.

Table 10: Crash types at La Perouse

Crash type	Number of crashes
Vehicles in the same direction	1
On path	1
Off path, on straight	1

The key trends that were identified from the crash data at Kurnell are:

- Two crashes were related to parking manoeuvring
- Two crashes involving at least one cyclist (where one crash involved a vehicle and two cyclists)
- One crash involving a motorcyclist.

5 Proposed development

5.1 Project overview

Transport for New South Wales (Transport for NSW) is seeking approval to reinstate the ferry wharves at La Perouse and Kurnell in Botany Bay (the project) under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as State significant infrastructure. The project would allow for an alternative connection between La Perouse and Kurnell rather than by road. The primary purpose of this infrastructure would be to operate a public ferry service to service visitors to the area and by the local community for cultural and recreational purposes. It would also provide supplementary temporary mooring for tourism-related commercial vessels and recreational boating.

The project provides opportunities for significant cultural and economic benefits to the local Aboriginal community by providing improved access to culturally significant sites. It is also expected to deliver benefits and opportunities to wider communities on either side of Botany Bay such as investment opportunities in a ferry service and other new visitor/tourist experiences.

Key features of the project include:

- Two new wharves, one at La Perouse and one at Kurnell that would include:
 - Berth for ferries (to accommodate vessels up to 40m long)
 - Berth for recreational and commercial vessels (to accommodate vessels up to 20m long)
 - Sheltered waiting areas and associated furniture
 - Additional space within waiting areas to accommodate other users such as fishing and those using recreational vessels
 - Signage and lighting
 - Landside paving, access ramps, seating and landscaping at the entrance to the wharves
 - Reconfiguration of existing car parking areas at La Perouse to increase the number of spaces (including provision of accessible parking and kiss-and-ride bays)
 - Reconfiguration of footpaths around the new car parking areas at La Perouse
 - Provision for bike racks at La Perouse
 - Installation of utilities to service the wharves.

The total construction period is anticipated to take up to 13 months, starting in early 2022. The construction of the two wharves will occur at the same time with landside and waterside works occurring simultaneously.

A concept design has been developed for the project, which forms the basis of this assessment. This traffic and transport assessment supports the Environmental Impact Statement (EIS) prepared for the project.



Figure 36: Project overview

5.2 Wharf location

The study area defined for the transport assessment encompasses both La Perouse and Kurnell in Sydney's southeast. The intersections included within the transport assessment are shown in Figure 30 and Figure 31, and include:

1. La Perouse: Anzac Parade / Anzac Parade (loop)
2. La Perouse: Anzac Parade / Endeavour Avenue
3. Kurnell: Captain Cook Drive / Cape Solander Drive
4. Kurnell: Captain Cook Drive / Polo Street.

5.2.1 La Perouse

As shown in Figure 36, the proposed wharf at La Perouse is located west of The Boatshed (Café). The wharf has direct access to the footpath around the Anzac Parade loop which provides a good connection between the wharf and the surrounding area. The area is surrounded by high frequented landmarks including the La Perouse Museum, La Perouse Point, Bare Island and Bare Island Bridge, Frenchmans Beach, and Congwong Beach.

5.2.2 Kurnell

The study area and proposed ferry wharf at Kurnell is shown in Figure 36. The re-establishment of the wharf at Kurnell will be located at the previous wharf site. The wharf is approximately 350 m north-east of Princes Charles Parade, along the Monument Track path. The proposed development is surrounded by the Kamay Botany Bay National Park, which is a key destination for the Kurnell surrounding area.

5.3 Proposed transport provisions

The proposed landside transport provisions include parking bays, kiss-and-ride spaces and bicycle provision. These are summarised in Table 11.

The proposed areas for the landside transport provisions at La Perouse are illustrated in Figure 37. This includes reconfiguring the existing parallel parking bays to 90 degree parking bays. The transport provisions at Kurnell are to be provided within the Kamay Botany Bay National Park as part of the NWPS's Master Plan scope of works.

Table 11: End user provisions summary

	La Perouse	Kurnell
Parking bays	13 additional standard bays 2 additional accessible bays	30 additional standard bays 2 additional accessible bays
Kiss-and-ride spaces	2 spaces	2 spaces
Bicycle rails	10 (capacity for 20 bicycles)	N/A*

*Installation of bicycle rails will be included as part of the Kamay Botany Bay National Park Master Plan scope of works.

La Perouse

In addition to the reconfiguration of carparking spaces, line marking delineation is recommended along the Anzac Parade parking loop. As discussed in section 4.6.1, vehicles are currently observed to stop throughout the one-way loop arrangement in search for or waiting for an available parking bay. As a result, upstream vehicles are blocked from overtaking and congestion has been observed to occur up to the adjacent roundabout.

The line delineation is proposed in locations to allow for overtaking, supported by formal marking and signage. The proposed line delineation is shown in Figure 37, and are proposed at locations away from pedestrian kerb extensions and around corners due to safety.

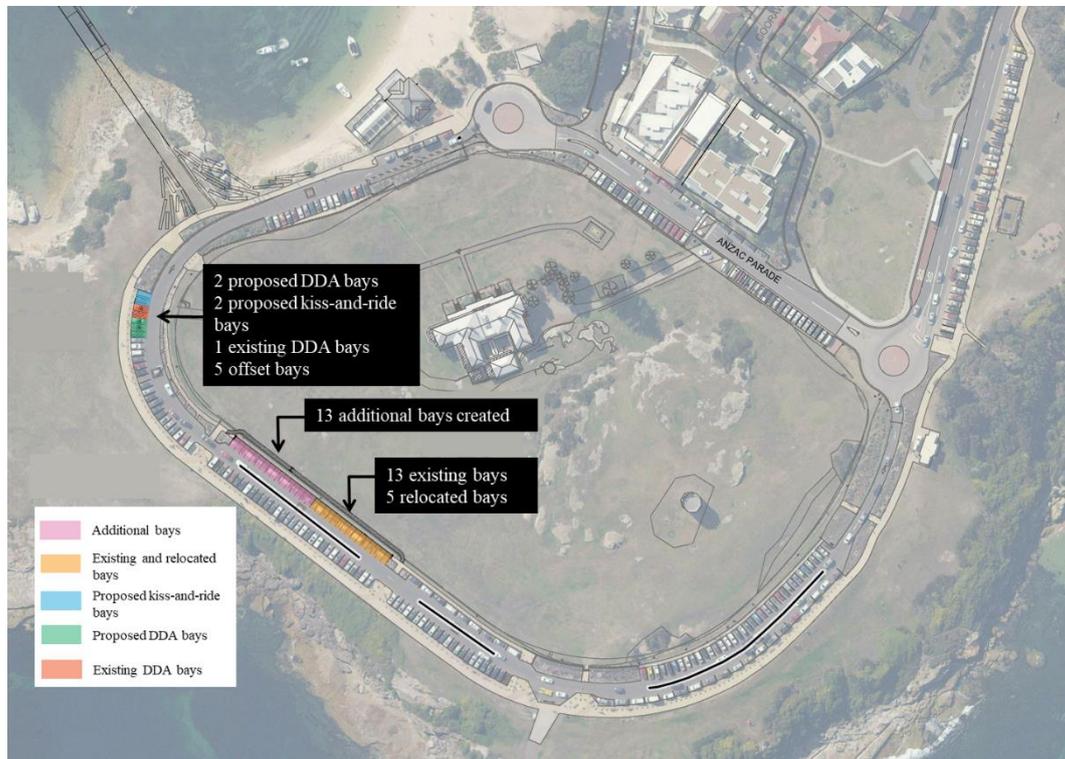


Figure 37: Proposed transport provisions at La Perouse

Kurnell

The concept design proposed the Kurnell provisions along Captain Cook Drive, aligned with what is shown in the Kamay Botany Bay National Park Master Plan. However, consultation with Sutherland Shire Council indicated that they were unsupportive of the location.

Through further engagement, NPWS will provide the additional required car parking spaces for the Project within the National Park as part of the National Parks scope of works. Further details are provided in Chapter 4 of the EIS (Project development and alternatives).

These works will be undertaken by NPWS as part of the Master Plan for Kamay Botany Bay National Park. The current parking charges that apply within the National Park will also apply to these new parking spaces.

The car parking to be provided within the National Park will be available for use prior to completion of the ferry wharves Project. There will be pedestrian access from the National Park parking to the wharf that is DDA compliant.

6 Operational Transport Assessment

6.1 Demand summary

The intent of this section is to outline the first principles process used to derive landside demands. It will also provide a summary of the demands that have been used to inform this transport strategy and impact assessment.

6.1.1 Final Business Case

The ferry demand assessment undertaken to inform the Final Business Case (FBC) was used to quantify the demands used to inform the transport strategy and impact assessment associated to the proposed ferry wharves. The analysis forecasted 149,600 ferry passengers for the design year of 2036. The demand analysis was split into the following user types for La Perouse and Kurnell:

- Non-visitors (i.e. commuters)
- Diverted National Park visitors. This represents existing visitors who are predicted to shift modes to use the ferry e.g. someone previously driving from Kurnell to La Perouse who may now drive to Kurnell instead, park and catch the ferry to La Perouse
- Non-diverted National Park visitors. This represents existing visitors who are now opportunistically using the ferry for a round trip
- Induced new National Park visitors. This represents new visitors who are visiting due to the increase in amenity and accessibility from the Project.

The proportional split of the 149,600 annual ferry passengers by the above user types in summarised in Table 12.

Table 12: Proportional split of forecast annual ferry passengers (2036)

Average annual ferry trips		
Location	La Perouse	Kurnell
Non-visitor trips	30,650 (20%)	30,650 (20%)
Diverted	37,600 (25%)	25,800 (17%)
Non-diverted	13,900 (9%)	2,300 (2%)
Induced	7,500 (5%)	1,200 (1%)
Total	89,650 (60%)	59,950 (40%)
	149,600 (100%)	

The methodology of converting the FBC outputs to the design demands are summarised in Table 13.

Table 13: Methodology of deriving design demands

	Methodology:	Source / assumptions:
1	Obtain the average daily ferry trips	FBC outputs
2	Split trips based on user type	FBC outputs
3	Adjust for seasonality	Monthly visitation data from Kamay Botany Bay National Park (excluding school groups)
4	Apply mode share for people travelling to and from La Perouse and Kurnell	Survey data and Opal card data

6.1.2 User type assumptions

The assumptions for user types were adopted for the concept design phase of the Project and adopted for this assessment.

The user type assumptions for a weekend include:

- All induced new visitors
- The net difference of diverted existing visitors.

Non-visitor passengers (e.g. people travelling to/from work, education, retail etc. have not been included in the demand inputs. Non-visitor passengers are assumed to reside locally relative to each ferry wharf. The FBC demand analysis developed a discrete choice model that estimated daily non-visitor ferry demand between origins and destinations. Given the time “penalties” associated with changing between multiple transport modes, this analysis showed the majority of non-visitor ferry passengers will likely reside within a walking/cycling catchment of the ferry wharves. As a result, these passengers are likely to walk/cycle rather than drive and park.

The user type assumptions for a weekday include:

- Induced new visitors with a reduction factor of 23% and 29% for La Perouse and Kurnell respectively
- The net difference of diverted existing visitors with a reduction factor of 23% and 29% for La Perouse and Kurnell respectively.

A proportion of diverted and new visitors may travel on a weekday. As a result, the weekday proportions (reductions of 23% at La Perouse and 29% at Kurnell) were applied for these visitors to consider those who may travel on a weekday.

6.1.3 Mode share

The mode share of visitors to La Perouse and Kurnell are summarised in Table 14. A combination of the 2020 intersection survey data and Opal card data was used to identify that the majority of visitors are visiting La Perouse and Kurnell by private vehicle.

It is noted that walking mode share has been excluded. For this study, pedestrians were surveyed as part of the intersections counts. However, it was not possible to differentiate between those walking to the study area or those walking from other transport modes (i.e. bus, parked private vehicle etc.). As a result, it is assumed that most visitors did not walk to La Perouse and Kurnell, and they are likely to have arrived by private vehicle or public transport.

Table 14: Mode share based on existing conditions

	La Perouse	Kurnell
Private vehicle	98%	97%
Public transport	1%	0%
Cycling	1%	3%

The current mode shares show the majority of visitors access the wharves by private vehicle. Consequently, the demands associated with non-private vehicle modes are unlikely to have any significant impact on existing walking, cycling or public transport infrastructure.

Furthermore, emphasis has thus been applied to understand the traffic and parking impacts associated with the relative increase in vehicle trips as a result of the Project. It should also be noted that the current mode share data shows an opportunity to improve access to the proposed wharves by more sustainable transport modes. This is explored further within in the Transport Strategy outlined in section 6.2.

6.1.4 Private vehicle demand and parking requirements

The existing intersection data at La Perouse and Kurnell provides a breakdown of vehicle volumes for each 15-minute period between 11:00am and 5:00pm. The profiles are shown in Figure 38. The following assumptions were then applied to generate the number of wharf related trips entering and exiting the site in the peak hour:

- Average dwell time: 3 hour
- Vehicle occupancy: 2 people/vehicle.

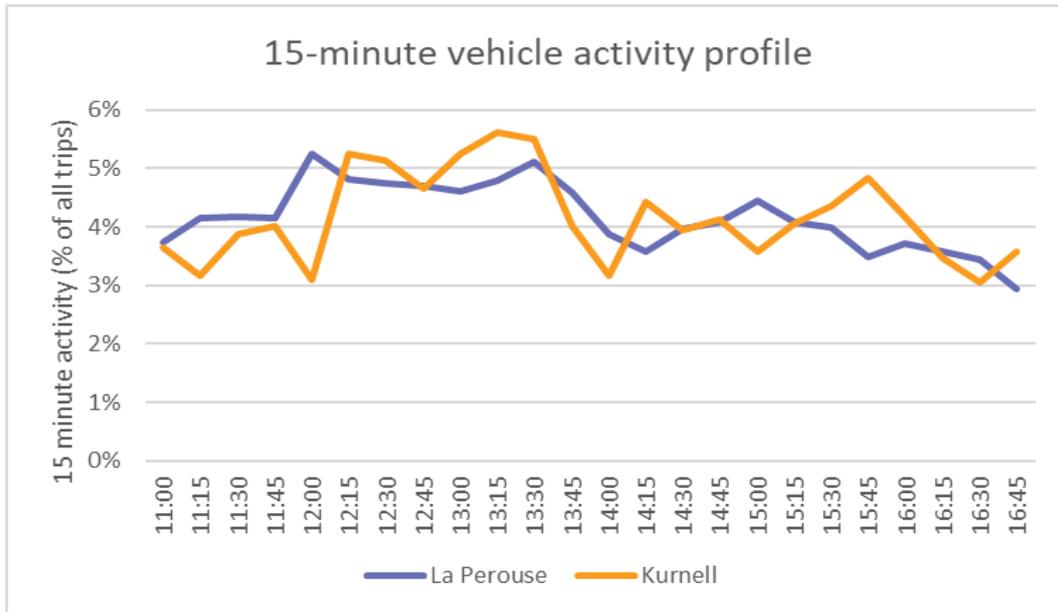


Figure 38: 15-minute profile of activity at La Perouse and Kurnell

Table 15 summarises the additional wharf related vehicle trips travelling in/out of La Perouse and Kurnell during the weekday and weekend peak hour.

Table 15: Additional wharf related vehicle trips in/out of La Perouse and Kurnell during the peak hour

	Weekend		Weekday	
	Inbound	Outbound	Inbound	Outbound
La Perouse	0	0	0	0
Kurnell	31	10	23	2

Table 16 summarises the landside end user requirements and Table 17 summarises the landside end-user provisions during the peak hour for the project at La Perouse and Kurnell.

Table 16: End user requirements summary

	La Perouse	Kurnell
Parking bays	0 additional standard bays 2 additional accessible bays	30 additional standard bays 2 additional accessible bays
Kiss-and-ride spaces	2	2
Bicycle rails	10 (capacity for 20 bicycles)	N/A

Table 17: End user provisions summary

	La Perouse	Kurnell
Parking bays	13 additional standard bays 2 additional accessible bays	30 additional standard bays 2 additional accessible bays
Kiss-and-ride spaces	2	2
Bicycle rails	10 (capacity for 20 bicycles)	N/A

At La Perouse, the project will provide 13 additional standard bays. The demand analysis did not require any additional bays; however the bays are provided as it was intuitive in terms of design.

Whilst at Kurnell, the project will provide 30 additional parking bays to meet the requirements. The additional parking bays will be provided within the National Park as part of the Master Plan upgrade works.

6.1.5 Background growth

To consider background growth around La Perouse and Kurnell from the current conditions in 2020 to the future (opening year of 2024 and design year of 2036), a background growth rate was assumed.

The FBC demand assessment used growth of 1.1% per annum in visitor demand based on Destination NSW 10-year Average Annual Growth Rates projects for domestic visitors between 2018 and 2028.

A review of data received for visitation to the Kamay Botany Bay National Park shows that the average annual growth between 2017-2019 was 1.3%. It was considered reasonable given the growth assumption adopted during the FBC was similar. A conservative assumption was made to adopt the higher 1.3% growth.

6.2 Transport strategy

The assessment of the current behaviours of visitors to La Perouse and Kurnell was undertaken to make sure there are sufficient allowances to account for current demand. The assessment identifies that the current visitors to the sites have a high reliance on private vehicle use. The transport strategy for this project aims to encourage a mode shift to active modes and public transport use.

The following sections provides an evidence-based approach to identifying the propensity for visitors to shift modes to walking, cycling or to public transport.

6.2.1 Private vehicles

As part of the assessment of the existing conditions at La Perouse and Kurnell, it has been identified that visitors are heavily dependent on private vehicles. The Project aims to identify and prioritise the opportunities that can encourage mode shift to walking, cycling and public transport use at both sites.

An assessment of the capacity and performance of key intersections at La Perouse and Kurnell was undertaken for the current conditions on a weekday and weekend, as well as the potential impacts of the additional trips generated as result of the proposed wharf developments. The following scenarios were assessed:

- Current year (2020) base
- Forecasted design year (2036) base (with no wharf related traffic)
- Forecasted design year (2036) with wharf related traffic.

The intersection modelling results are summarised in Table 18 for the weekday peak hour and Table 19 for the weekend peak hour. The summary of results identifies that there are currently no issues and there is sufficient capacity at the assessed intersections in the current base year (2020), in the future (2036) and in the future with wharf related trips (2036).

Table 18: Weekday intersection modelling results

Intersection	Intersection demand (vehicles/hr)	LoS	DoS	95%tile queue (m)
2020 base				
Endeavour Avenue / Anzac Parade	642	A	0.22	1
Anzac Parade Loop	728	A	0.31	13
Captain Cook Drive / Cape Solander Drive	286	A	0.07	2
Captain Cook Drive / Polo Street	248	A	0.07	0
2036 base				
Endeavour Avenue / Anzac Parade	794	A	0.27	2
Anzac Parade Loop	900	A	0.40	18
Captain Cook Drive / Cape Solander Drive	353	A	0.08	2
Captain Cook Drive / Polo Street	308	A	0.08	0
2036 with proposed wharf traffic				
Endeavour Avenue / Anzac Parade	794	A	0.27	2
Anzac Parade Loop	900	A	0.40	18
Captain Cook Drive / Cape Solander Drive	396	A	0.10	3
Captain Cook Drive / Polo Street	352	A	0.10	0

Table 19: Weekend intersection modelling results

Intersection	Intersection demand (vehicles/hr)	LoS	DoS	95%tile queue (m)
2020 base				
Endeavour Avenue / Anzac Parade	832	A	0.29	2
Anzac Parade Loop	940	A	0.42	20
Captain Cook Drive / Cape Solander Drive	367	A	0.09	3
Captain Cook Drive / Polo Street	321	A	0.09	0
2036 base				
Endeavour Avenue / Anzac Parade	1024	A	0.35	3
Anzac Parade Loop	1156	A	0.53	29
Captain Cook Drive / Cape Solander Drive	454	A	0.11	3
Captain Cook Drive / Polo Street	396	A	0.10	0
2036 with proposed wharf traffic				
Endeavour Avenue / Anzac Parade	1024	A	0.35	3
Anzac Parade Loop	1156	A	0.53	29
Captain Cook Drive / Cape Solander Drive	480	A	0.12	3
Captain Cook Drive / Polo Street	422	A	0.12	1

6.2.2 Public transport

The data on the current visitation to La Perouse and Kurnell show very low public transport use (approximately 1% and La Perouse less than 1% at Kurnell). Visitation to both sites is primarily by private vehicle. As part of the Project design, there are no changes to public transport infrastructure (such as bus stop locations) or services. The Project seeks to encourage mode shift to more sustainable means including public transport. The key opportunities include proposed public transport infrastructure upgrades and services.

6.2.2.1 La Perouse

As discussed in section 2.4, the South East Sydney Transport Study has listed proposed infrastructure within or affecting the Project study area, including:

- Rapid bus routes between La Perouse and the Airport to the west, Coogee and Bondi to the east, and CBD to the north
- A Metro line connecting the CBD to La Perouse via Randwick proposed for 2041.

The public transport infrastructure improvements will provide a significant opportunity in connecting La Perouse to the wider network by more sustainable means than private vehicle. The increase in public transport use to the site will help ease parking congestion around the loop road and reduce or mitigate potential crashes around the site between parking vehicles and pedestrians and cyclists.

A travel time comparison assessment was undertaken to compare the time it takes for existing visitors to La Perouse to travel from their residence using public transport compared to using a private vehicle. The assessment is based on the licence plate recognition data obtained for visitors at La Perouse with a database of the postcodes in which the vehicle was registered in. The 10 postcodes in which the greatest number of visitors were registered from, were assessed based on the average Google travel time for a weekday and weekend peak hour.

The key assumptions that were included as part of the travel time comparison are:

- The travel time was taken between the proposed wharf locations to the centroid of each postcode
- The Google travel time was taken for public transport and vehicle trips on Monday 17th August for the weekday and Sunday 16th August for weekend
- The average travel time was taken for public transport trips (for all trips originating anytime between 1:00-2:00PM)
- For private vehicle trips, 10 minutes was added to consider time for parking.

Figure 39 and Figure 40 illustrate the weekday and weekend comparisons respectively. The figures show the 10 postcodes, and a comparison factor where:

- A value near 1.0 indicates travel time that is comparable
- A value lower than 1.0 indicates that it is faster to travel via public transport

- A value higher than 1.0 indicates that it is faster to travel via private vehicle.

The assessment shows that travel time to La Perouse is generally faster via private vehicle, where it is 4.2 times longer to travel by public transport from Liverpool to La Perouse on a weekday peak. However, for the south-eastern suburbs around La Perouse, (suburbs surrounding Chifley) the travel time is comparable. The postcode consists of up to 295 surveyed visitors (11% of all visitors) to La Perouse.

With increased bus services and new public transport infrastructure to La Perouse, there is an opportunity for nearby residents to shift modes away from private vehicle.

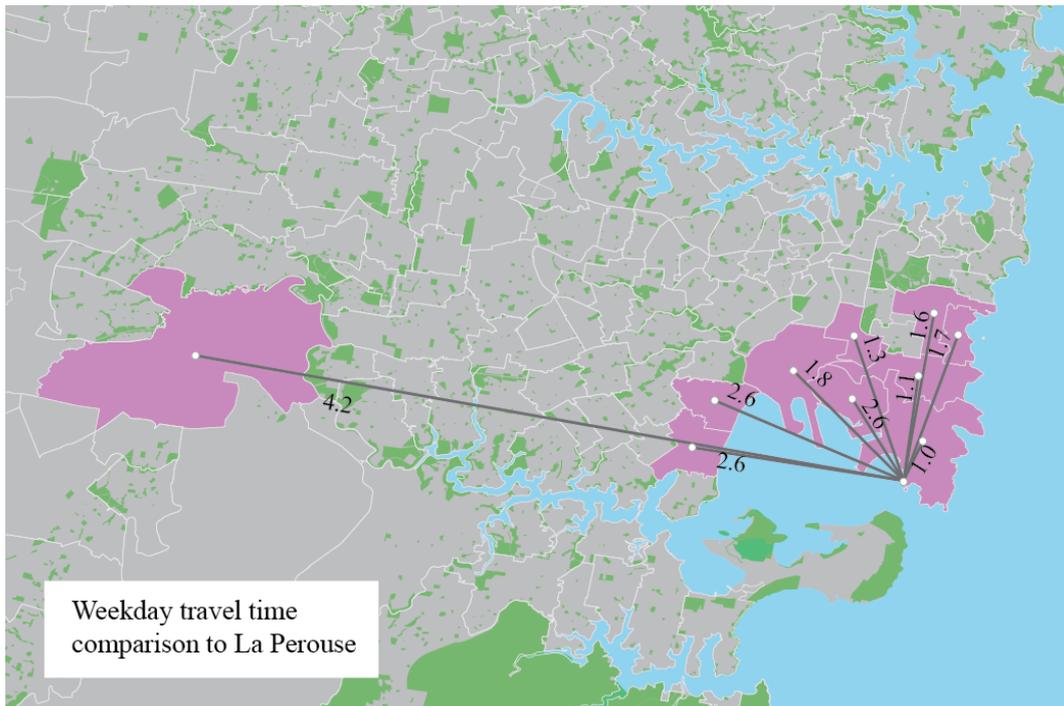


Figure 39: Public transport and private vehicle travel time comparison on a weekday peak hour to La Perouse

Kurnell on a weekend peak. As described previously, the 2.8 factor assumes that the visitor can depart at any time for a bus service. If the visitor wanted to depart between the peak hour (1:00PM-2:00PM) but the service did not arrive until 3:00PM, the comparison indicates that it is up to 3.4 times slower to travel by public transport than by private vehicle.

However, the postcode surrounding Kurnell shows that travel time via public transport can be quicker than private vehicle. The postcode consists of 225 surveyed visitors (8% of all visitors) to Kurnell. With increased bus services to Kurnell, there is an opportunity for nearby residents to shift modes away from private vehicle.

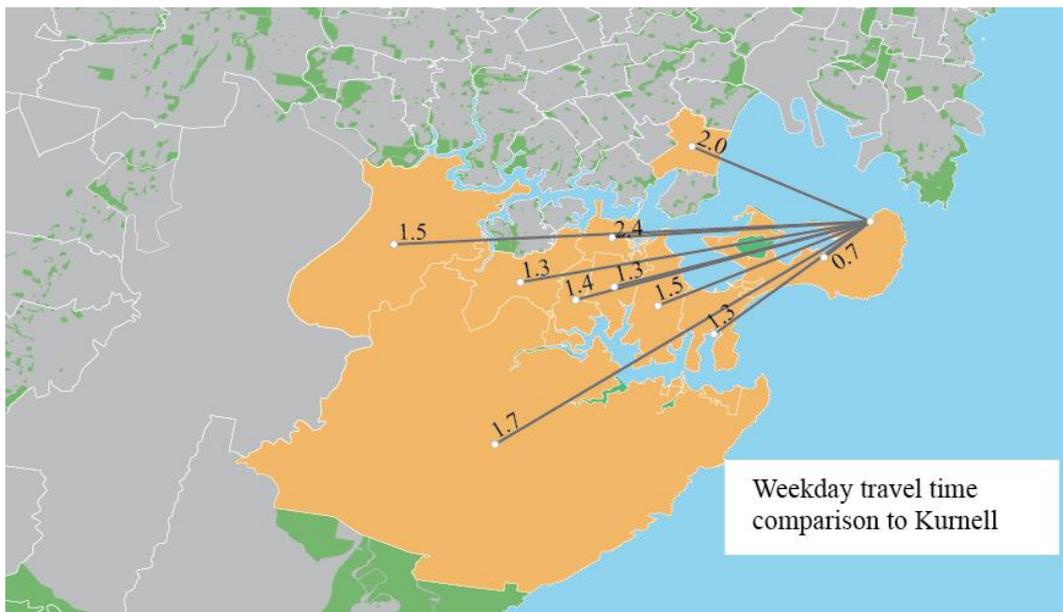


Figure 41: Public transport and private vehicle travel time comparison on a weekday peak hour to Kurnell

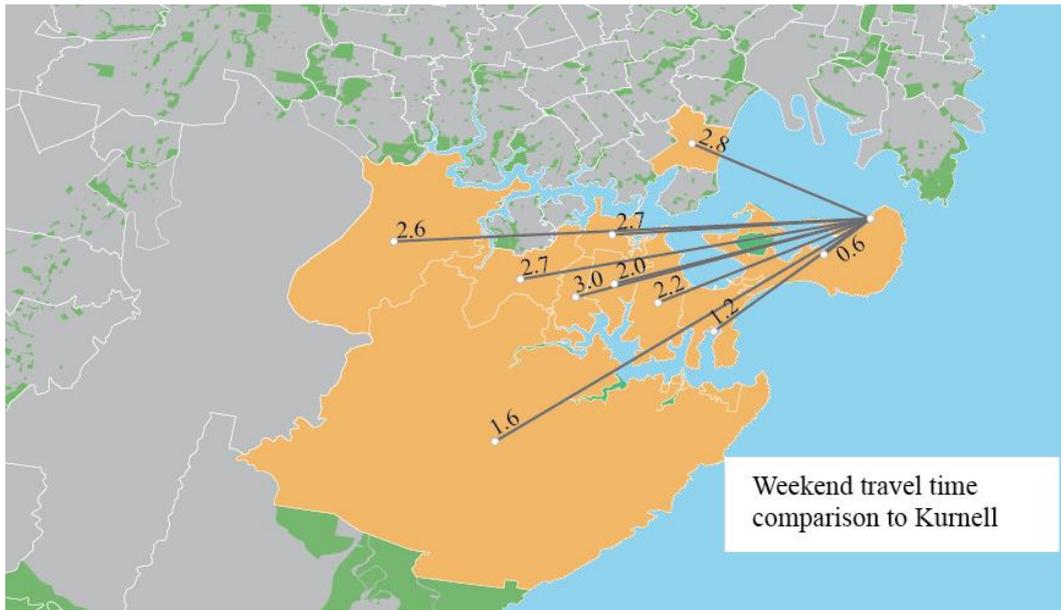


Figure 42: Public transport and private vehicle travel time comparison on a weekend peak hour to Kurnell

6.2.3 Walking

From surveys and recent observations during site surveys in February 2020, both La Perouse and Kurnell are popular locations for visitors. This is due to La Perouse and Kurnell being popular recreational locations with historical sites, beaches and National Parks within walking distance.

The Project has raised opportunities for visitors to La Perouse and Kurnell to switch to more sustainable modes by providing a ferry service to reduce private vehicle reliance and incorporating cycle parking in the design. A walking accessibility study was undertaken to understand the walking catchment at La Perouse and Kurnell. The study will identify the catchment in which nearby residents may consider walking to the sites with improved walking connectivity and amenity.

6.2.3.1 La Perouse

Figure 43 illustrates a 20 minute walking (assuming an average walking speed of 5km/hr) catchment from the proposed wharf location at La Perouse.

Supplemented by the postcode catchment data of visitors driving to La Perouse in the area. The study identifies a catchment of approximately 21 nearby residents (approximately 1% of surveyed visitors to La Perouse) who would walk to the proposed ferry wharf at La Perouse.



Figure 43: La Perouse 20 minute walking catchment (5km/hr)

6.2.3.2 Kurnell

Similarly, the study was undertaken for the walking catchment around Kurnell. A proportion of the catchment shows walking through the National Park. However, the remaining areas show that nearby residents who are likely to walk to the proposed ferry wharf at Kurnell.

Figure 44 illustrates the 20 minutes walking catchment from the proposed wharf location at Kurnell. Similarly, the assessment overlaid the catchment data with the postcode data of visitors driving to Kurnell. The assessment identified that 5% of the surveyed visitors to Kurnell currently drive to the area are within a reasonable 20 minute walk.

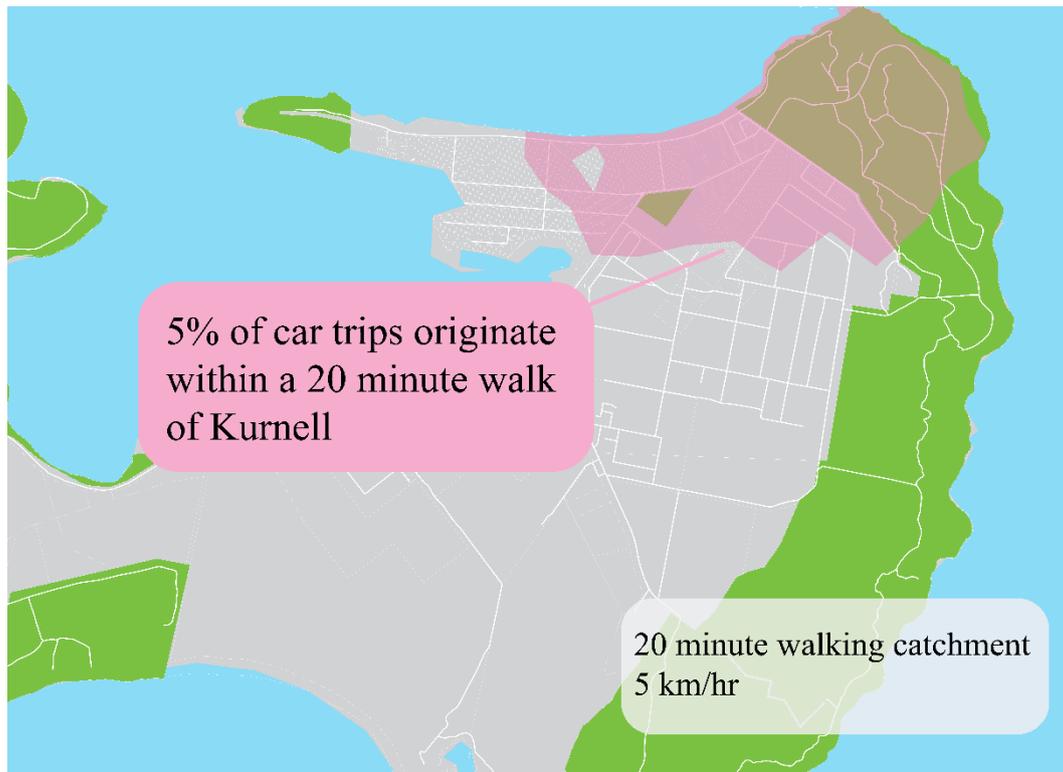


Figure 44: Kurnell 20 minute walking catchment (5km/hr)

6.2.4 Cycling

As discussed in section 4.4, recreational cycling at La Perouse and Kurnell is frequent on weekends. Randwick City Council has raised that high cycling activity at La Perouse would likely encourage current riders to use the ferry.

The Project aims to encourage a mode shift of visitors from the dependence on private vehicle to more sustainable means including cycling. Both Randwick City Council and Sutherland Shire Council have bicycle network plans that aims to improve connections and infrastructure to La Perouse and Kurnell.

A cycling accessibility study was undertaken for La Perouse and Kurnell to identify the number of residents who may consider switching modes to cycling. The study is based on a 20 minute cycle time, with an average speed of 15 km/hr.

6.2.4.1 La Perouse

Figure 45 illustrates the 20 minute cycling catchment from La Perouse, overlaid with the nearby postcode catchments. The study is able to show that a 20 minute cycling catchment is able to reach the majority of the nearby postcode (2036). From the licence plate recognition data of visitors to the site, the postcode accounts for the highest number of residents visiting La Perouse by private vehicle. As a result, the walking catchment covers approximately 280 residents and accounts for 10% of all visitors to the site. As a result, there is an opportunity to encourage current drivers to cycle if there is sufficient infrastructure supporting

this mode of transit. This includes a connected and safe cycle network (something that is already under consideration by RCC and SSC) as well bicycle parking facilities.

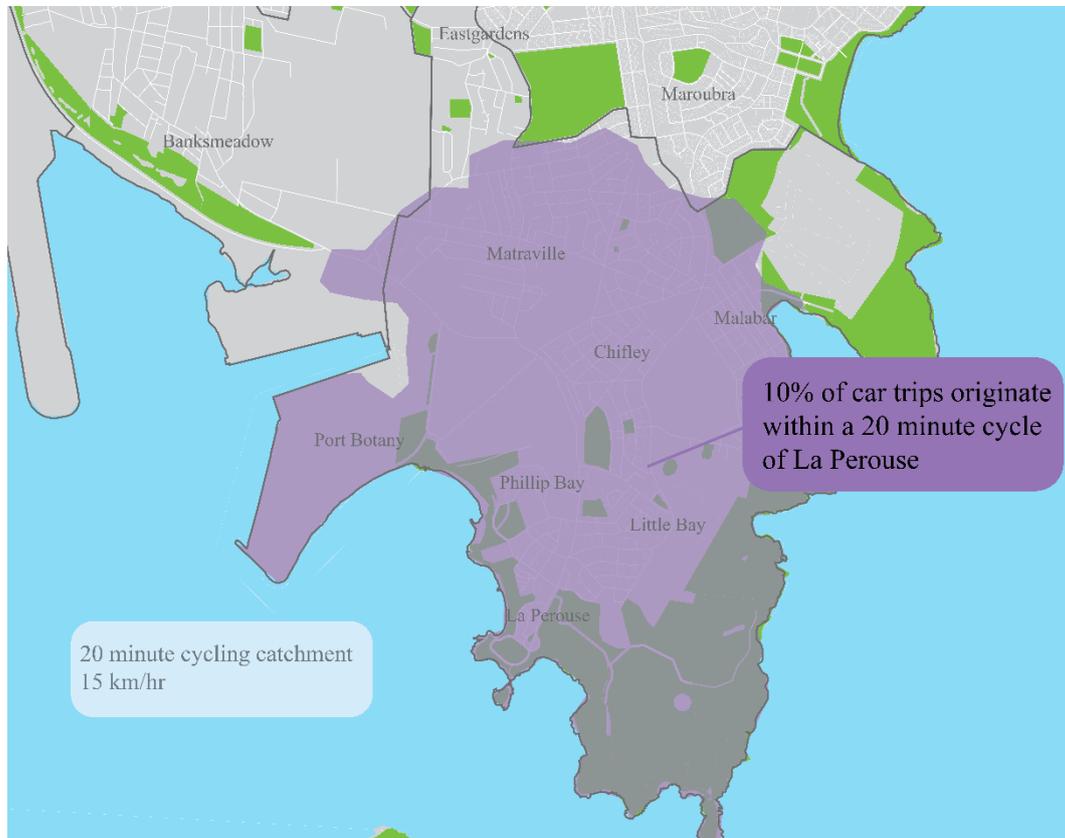


Figure 45: La Perouse 20 minute cycling catchment (15km/hr)

6.2.4.2 Kurnell

As shown in Figure 46, the cycling assessment was undertaken for Kurnell. The 20 minute cycling catchment is able to extend throughout the National Park and also all of the residential areas in Kurnell. An assessment was also undertaken by overlaying the cycling catchment from the proposed ferry wharves at Kurnell with the postcode data. The assessment shows that approximately 8% of all visitors to Kurnell, are within a 20 minute cycle from the ferry wharves. The assessment supports the opportunity that supporting and improving the cycle infrastructure and connections nearby can encourage a proportion of current drivers to the site by more sustainable and active modes.

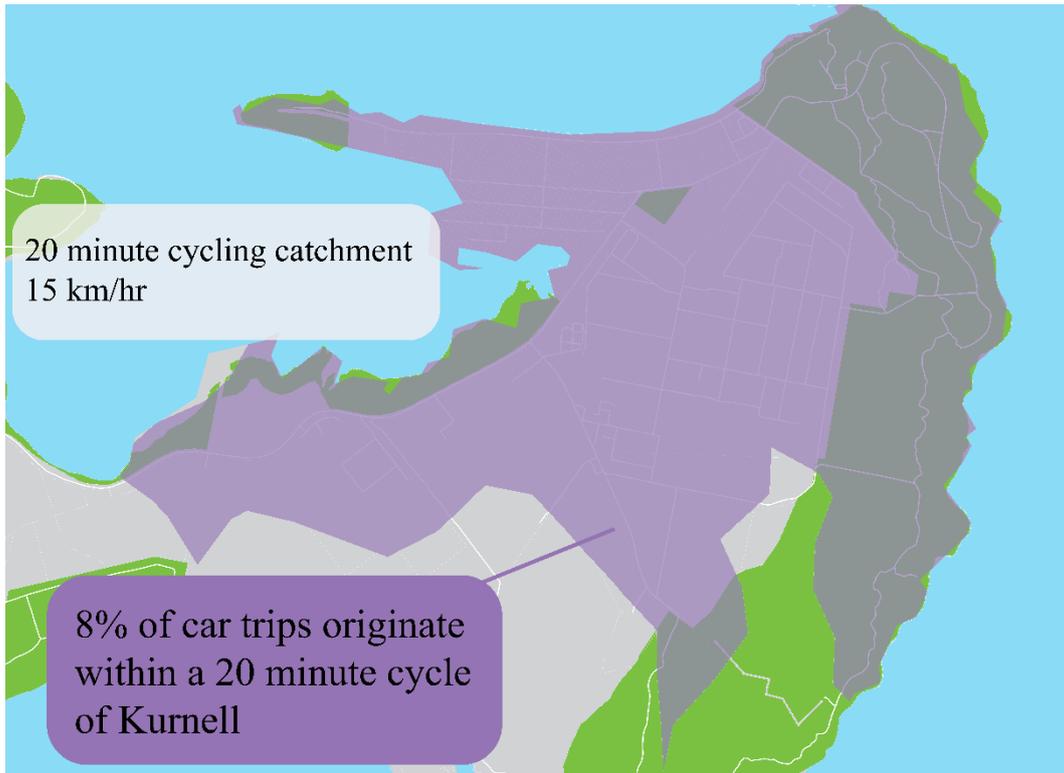


Figure 46: Kurnell 20 minute cycling catchment (15km/hr)

7 Construction Transport Principles

This section highlights the preliminary construction traffic principles, including construction areas, haulage routes, constriction traffic generation, impacts on other road users and potential mitigation measures. The preparation of a Construction Traffic Management Plan will be required by the contractor during subsequent stages of design. This will require consultation with relevant stakeholders, alignment with the Construction Management Plan and detailed assessment of construction traffic impacts and traffic management measures.

7.1 Description of proposed works

The construction period is anticipated to take up to 13 months, starting in early 2022. The construction of the two wharves will occur at the same time with landside and waterside works occurring simultaneously. Table 20 summarises the four construction stages outlined in the construction report.

Construction works would occur during the following hours:

- Monday to Friday 7am – 6pm
- Saturday 8am – 1pm.

For typical construction activities, there will be no work on Sundays or public holidays. Some out of hours work may be required for large deliveries or specialist equipment.

Table 20: Construction stages

Stage	Activities
Stage 1: Site establishment	Security and fencing Setting up compound and laydown areas Setting up site offices and access Forming temporary access roads Forming crane and rig platforms at La Perouse Demolishing of the existing Kurnell viewing platform Establishing the temporary causeway at Kurnell
Stage 2: Main construction	Piling Wharf construction Car parking reconfiguration and footpaths at La Perouse Installing utilities Installing wharf furniture Landscaping
Stage 3: Site demobilisation	Removal of temporary work areas and site offices

Figure 47 and Figure 48 illustrate for La Perouse and Kurnell respectively, the designated areas for site fences, crane platforms, plant access and laydown area, plant access road and site offices and amenities.



Figure 47: Stage 1 construction areas at La Perouse



Figure 48: Stage 1 construction areas at Kurnell

7.2 Truck routes and controls

All landside traffic will access the construction sites at La Perouse and Kurnell using the existing roads. The haulage route for La Perouse is shown in Figure 49 where primary access to the area is via Anzac Parade. All vehicles will enter the Anzac Parade loop road via Anzac Parade and minimise impact to local access roads. Similarly, Figure 50 illustrates the haulage route at Kurnell where all vehicles will approach from Captain Cook Drive.

The Construction Traffic Management Plan will be required to include the controls to minimise and manage impact of truck routes during construction.



Figure 49: Haulage routes at La Perouse



Figure 50: Haulage routes at Kurnell

7.3 Extent of construction disturbance

Figure 51 and Figure 52 illustrate the extent of disturbance to the land at La Perouse and Kurnell respectively during construction. At La Perouse, the areas include the proposed wharf location, the northern footpath between the wharf location and the La Perouse Boatshed, and at the proposed parking bay locations within the Anzac Parade loop road. At Kurnell, the disturbance is limited to works associated with the utilities trench and wharf tie-in and landscaping areas.



Figure 51: Extent of construction disturbance at La Perouse



Figure 52: Extent of construction disturbance at Kurnell

7.4 Construction traffic

7.4.1 Construction vehicle traffic

Across the construction period across both sites, it is anticipated that there will be an average of 12 and 20 construction vehicles entering and leaving the site every day at La Perouse and Kurnell respectively. During the early works period, it is expected that the maximum number reaches 40 and 50 vehicles entering and leaving the site every day at La Perouse and Kurnell respectively.

Table 21: Average and maximum daily construction vehicle traffic

	Average daily vehicles	Maximum daily vehicles
La Perouse	12	40
Kurnell	20	50

7.4.2 Construction worker traffic

The average number of construction workers on site each day will be 25 workers, with the peak expected to be 38 workers during the main construction stage. It is recommended that the Construction Management Plan (CMP) prepare and implement a green travel plan to encourage construction workers to minimise private car trips, promote carpooling and use of public and active transport modes.

Parking is currently constrained or approaching capacity at both La Perouse and Kurnell during peak periods (weekends). However, there is available parking during off peak periods (weekdays). Construction activity is expected to occur between Monday – Saturday, with the majority of construction activity ending at

1pm on Saturdays. Consequently, construction worker access is not expected to coincide with typical busy periods at both sites.

Contractor parking, especially along the loop road at La Perouse should be restricted during peak periods (weekends). Consideration of a temporary parking facility should be considered within the CMP where contractor parking during peak periods cannot be avoided.

In addition, a Construction Traffic Management Plan will be required to further document and outline the specific mitigation measures required to manage contractor parking and access.

7.5 Road network impacts

The majority of construction works will occur away from the public road network and parking areas. As a result, it is anticipated that the impacts on access and parking will be minimal at the La Perouse and Kurnell sites. However, it should be noted that access to the La Perouse construction compound will need to be via the Anzac Parade loop road. As outlined in section 4, traffic capacity along this loop road during peak periods (especially on weekends) is limited. Where possible, vehicle access to this loop road should be minimised during these peak periods.

Traffic management will be required for specific activities during the construction period. Traffic management may be required at Stage 2 (main construction) during:

- Modification of the existing car parking areas to provide additional car parking proposed at La Perouse
- Deliveries and collection of large construction equipment such as cranes or piling rigs.

Any works along the road network and parking areas will need to maintain availability of parking supply where possible and maintain traffic flow. Any road closures are to be conducted outside of peak period and construction traffic should be separated from general traffic where possible. Further assessment of the construction traffic impacts will be conducted as part of the development of the Traffic Management Plan (TMP). This will need to be done in consultation with the Sydney Coordination Office, Randwick City Council, Sutherland Shire Council and any other key stakeholders.

7.6 Impacts on parking

During the construction of parking bays at La Perouse, there will be a temporary loss of parking during the construction period, estimated to take 2 months. The parking areas are shown in Figure 51. These works will likely impact 20 bays at La Perouse which consists of approximately 6% of total parking in the Anzac Parade loop road area. There are no anticipated impacts on parking at Kurnell.

The duration and scope of these works are likely to not provide significant impact on parking. The TMP will be required to include the mitigation plan to minimise and manage impact to parking during construction.

7.7 Impacts on public transport

It is not anticipated that there will be any impacts on public transport (primarily buses) at La Perouse, with the majority of impact contained within the Anzac Parade loop road. Similarly at Kurnell, there are no anticipated impacts on bus stops or routes along Captain Cook Drive.

7.8 Impacts on cyclists

There will be temporary impacts on cyclists at La Perouse from an increase in heavy vehicles using the Anzac Parade loop to access the construction site. At Kurnell, Monument Track between Princes Charles Parade and the proposed wharf location will be closed during construction.

The contractor will make sure alternative connections are provided or maintained during the construction phase. Interaction between cyclists and construction related vehicles will need to be managed. The impact to cyclists and the proposed alternative pathways will be captured within the TMP.

7.9 Impacts on pedestrians

At La Perouse, visitors will not be able to access La Perouse Point during the construction period. Whilst at Kurnell, access to Monument Track from Prince Charles Parade will be closed up to the proposed ferry location.

Alternative pedestrian pathway connections will need to be provided. Any temporary closure of pedestrian routes should be consulted with the key stakeholders including Randwick City Council, Sutherland Shire Council and National Parks and Wildlife Services. The TMP will need to outline any alternative pedestrian routes and appropriate signage at key locations.

During all construction phases, the interaction between construction vehicles and pedestrians should be managed and outlined in the TMP. Any construction vehicles entering and exiting the compound will be required to give way to pedestrians at all times.

7.10 Construction traffic management principles

The Contractor will be required to prepare a TMP for approval by Transport for NSW, National Parks and Wildlife Service, Randwick City Council and Sutherland Shire Council to the commencement of works.

As a general principle, construction of the proposed works will be staged to minimise impacts on traffic and other modes of transport. The overall principles for traffic management during construction of the proposed works will include:

- Maintain access to any properties located in the vicinity of the site at all times
- Manage and control construction traffic movements on the adjacent road networks and vehicles movements to and from the construction site
- Limit the interaction of construction traffic with general traffic where possible, especially heavy vehicle and light vehicle conflicts
- Trucks to enter and exit the site in a forward direction
- Maintain traffic capacity at intersections and mid-block in the vicinity of the site
- Restrict construction vehicle activity to designated truck routes in the area
- Construction access driveways and on-street work zones to be managed and controlled by site personnel
- Provide an appropriate environment for pedestrians at all times
- Maintain convenient access and circulation for public transport
- Pedestrian movements adjacent to construction activity, across construction access driveways and to/from public transport facilities, will be managed and controlled by an authorised and qualified traffic controller
- Pedestrian warning signs and construction safety signs/devices to be utilised in the vicinity of the site and to be provided in accordance with WorkCover and any applicable legislative requirements
- Construction activity is to be carried out in accordance with approved hours of work.

7.11 Mitigation measures

Mitigation measures would be adopted during the construction phase to make sure traffic movements have minimal impact on surrounding land uses and the community. A Traffic Management Plan would be prepared and implemented under the Construction Environmental Management Plan (CMEP). The TMP would include the following measures:

- Truck loads would be covered during transportation off-site
- Establishment and enforcement of appropriate on-site vehicle speed limits (20km/h), which would be reviewed depending on weather conditions or safety requirements
- Neighbouring properties would be notified of construction works and timing. Any comments would be recorded and taken into consideration when planning construction activities
- All activities, including the delivery of materials would not impede traffic flow along local roads
- Materials would be delivered and spoil removed during standard construction hours
- Avoid idling trucks alongside sensitive receivers
- Deliveries would be planned to ensure a consistent and minimal number of trucks arriving at site at any one time.