



North Head Sanctuary Master Plan

Transport Strategy

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Table of Contents

1	Introduction	4
1.1	<i>Background</i>	4
1.2	<i>Document purpose</i>	5
1.3	<i>Site context</i>	6
2	Existing Conditions	7
2.1	<i>Visitor travel behaviours</i>	7
2.2	<i>Staff travel behaviours</i>	8
2.3	<i>Internal road network</i>	8
2.4	<i>Traffic volumes</i>	11
2.5	<i>Car parking</i>	13
2.6	<i>Public transport network</i>	14
2.7	<i>Pedestrian and cycling infrastructure</i>	17
3	Transport Considerations - North Fort	19
3.1	<i>Current constraints</i>	19
3.2	<i>Potential measures</i>	21
4	Transport Considerations – Barracks Precinct	23
4.1	<i>Current constraints</i>	23
4.2	<i>Potential measures</i>	26
5	Integrated Transport Strategy	29

Figures

Figure 1	Draft concept – Artillery Barracks precinct.....	4
Figure 2	Draft concept – North Fort precinct.....	5
Figure 3	Site context.....	6
Figure 4	Existing travel behaviours – visitors to North Head	7
Figure 5	Existing mode share for workers travelling to North Head.....	8
Figure 6	North Head Scenic Drive.....	9
Figure 7	North Fort Road.....	9
Figure 8	Road network map	10
Figure 9	Summary of traffic counts on internal roads	11
Figure 10	Daily traffic profile – North Head Scenic Drive	11
Figure 11	Results of car parking surveys	13
Figure 12	Existing 161 bus service route	14
Figure 13	Bus stop locations	15
Figure 14	Bus stop – North Head Scenic Drive near North Fort.....	16
Figure 15	Bus stop – North Head Scenic Drive near Q Station	16
Figure 16	Pedestrian infrastructure adjacent to North Fort.....	17
Figure 17	Pedestrians walking on North Head Scenic Drive	17
Figure 18	Existing and proposed cycling network.....	18
Figure 19	Existing vehicle access into North Fort precinct	19
Figure 20	Existing constraints for bus passengers at North Fort.....	20
Figure 22	Potential transport measures – North Fort.....	22
Figure 23	Existing vehicle and pedestrian access to Barracks Precinct.....	23
Figure 24	Existing path on North Head Scenic Drive	23
Figure 25	North Fort Road in the Barracks Precinct	24
Figure 26	Roadway approaching Gatehouse.....	24
Figure 27	Bus stop serving Barracks Precinct	25
Figure 29	Existing car parking outside of Gatehouse	27
Figure 30	Potential transport measures – Barracks Precinct.....	28

Tables

Table 1	Operating period – 161 bus route	14
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1 Introduction

1.1 Background

JMT Consulting was engaged to prepare a transport strategy to inform the development of the North Head Sanctuary (NHS) Master Plan. A draft concept plan was prepared in 2021 for the North Head Sanctuary site - providing an initial framework for redevelopment and enabling public consultation. The Concept Plan outcome is currently being reviewed as part of the Master Plan process.

The principal vision of the Master Plan is to:

- Activate the North Fort and Barracks precincts through adaptive reuse of built assets complemented with sensitive new assets supporting public and commercial uses;
- Bring the past to life, and telling the truth of the site through interpretation of First Nations to recent military history;
- Develop environmental and cultural education, focused on First Nations land management and lessons from thousands of years of custodianship
- Restore and activate major historic military buildings, such as the Other Ranks' Mess (Building One), through commercial partnerships to see these buildings in active use once again;
- Protect and enhance the native landscape, flora as well as fauna.

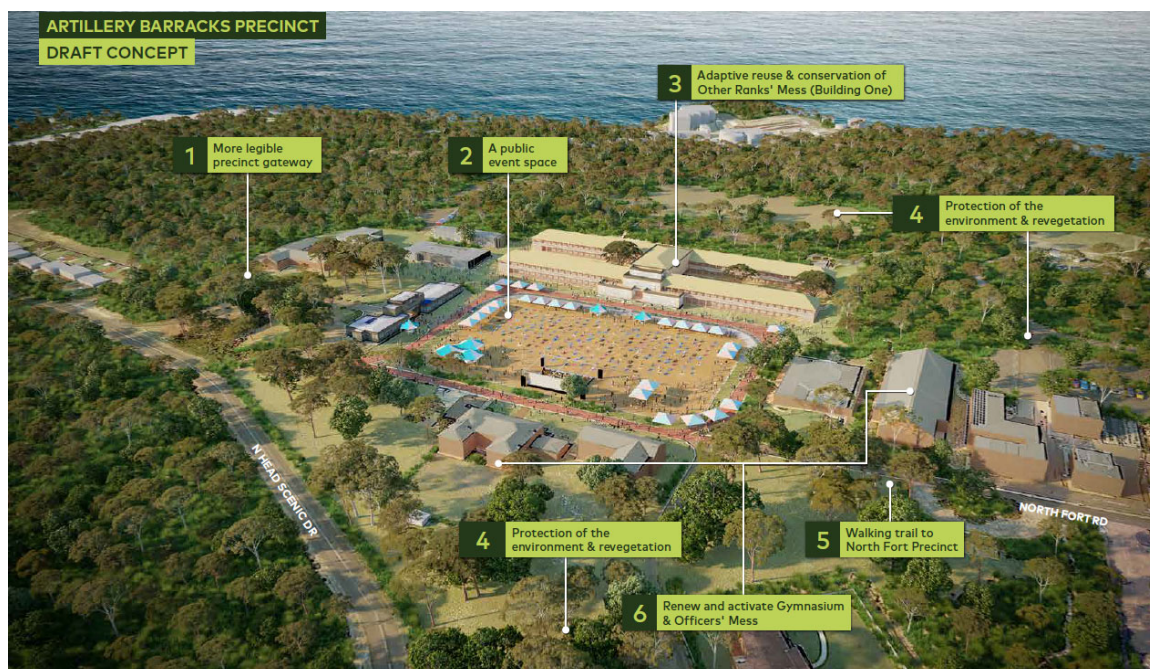


Figure 1 Draft concept – Artillery Barracks precinct

Source: North Head Sanctuary Draft Concept Plan (2021)

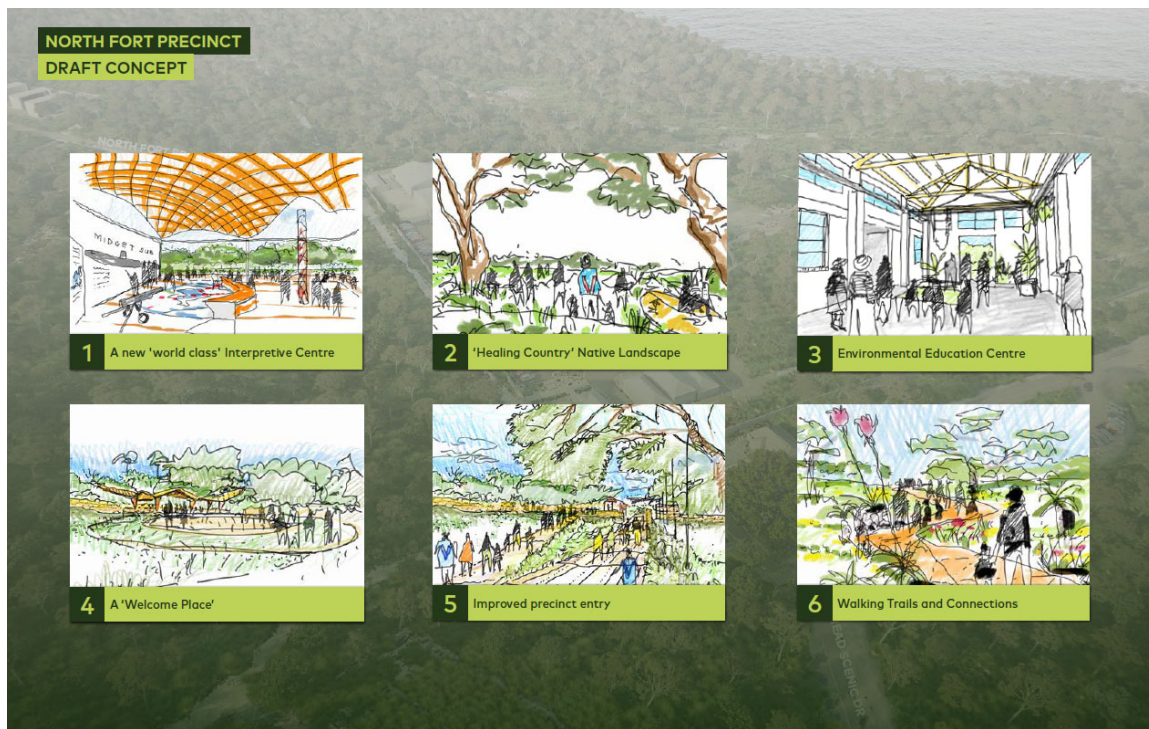


Figure 2 Draft concept – North Fort precinct

Source: North Head Sanctuary Draft Concept Plan (2021)

1.2 Document purpose

The purpose of this document is, building upon the key principles of the draft concept, provide technical transport analysis in relation to the following items:

- Suitability of current car parking arrangements and potential need for modification or enhancement to these facilities
- Ability of the surrounding road network to support the uses envisaged under the masterplan – noting one of the key constraints of the precinct is that North Head Scenic Drive / Darley Road and Bluefish Drive forms the only access route into and out of the area
- Ability of the transport network to support a bushfire evacuation scenario
- Measures to support access by public transport to reduce pressure on car parking in the precinct

1.3 Site context

North Head Sanctuary is an area of approximately seventy-four hectares resting on the natural ridge of North Head. The site is bound by North Head Scenic Drive to the south and west and Blue Fish Road and the Sydney Harbour National Park to the north and east. Darley Road provides the only vehicular access to North Head via the Manly town centre.

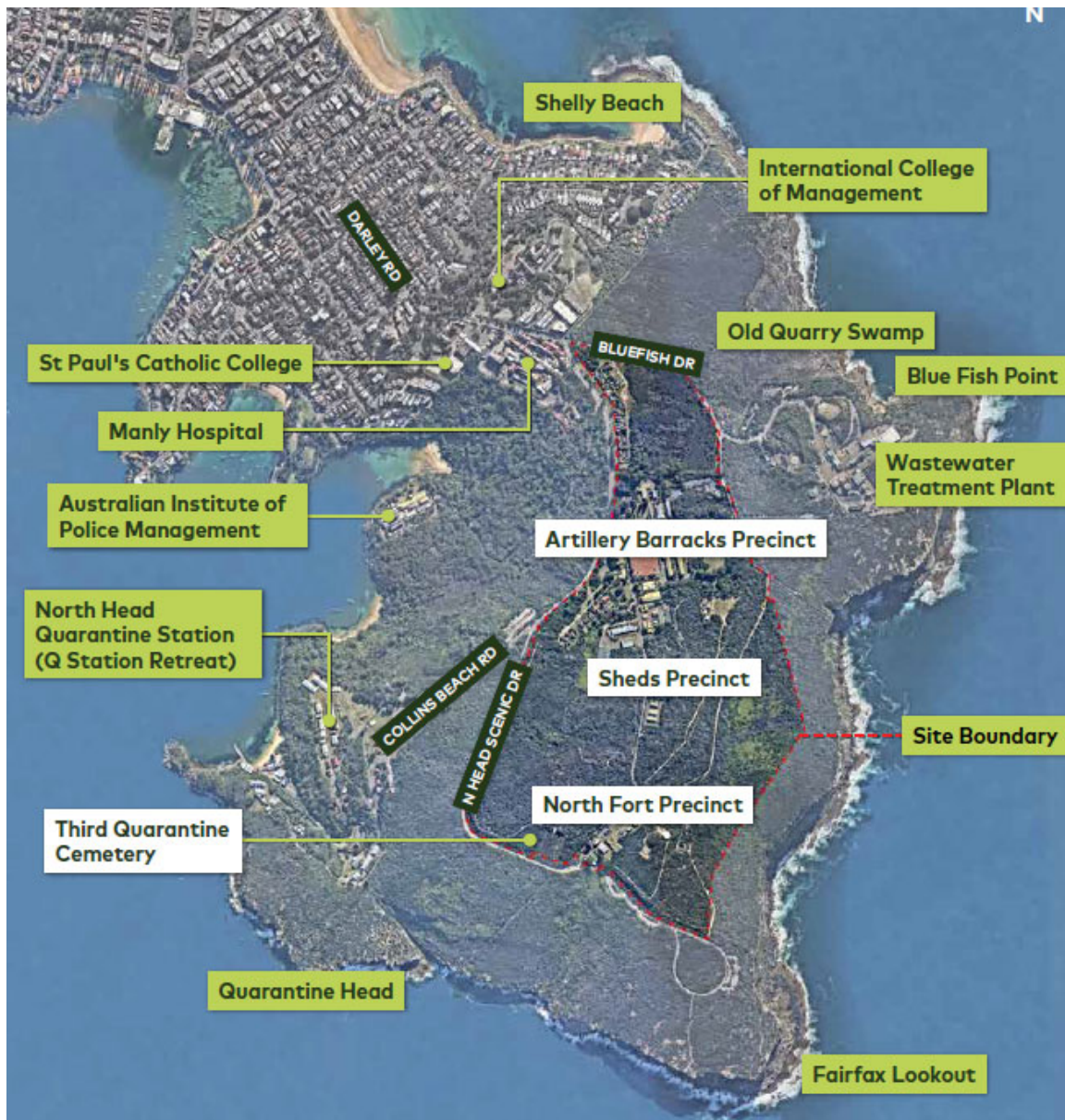


Figure 3 Site context

2 Existing Conditions

2.1 Visitor travel behaviours

Surveys undertaken by the Harbour Trust in 2019 provide insights into how visitors travel to the North Head Sanctuary. As summarised in Figure 4 nearly half of visitors arrive by walking from the surrounding area, taking into consideration those who arrive from the ferry as well as walking from the surrounding area. Car travel accounts for approximately 40% of visitor travel to the area, while a small proportion of visitors arrive by bus or bicycle.

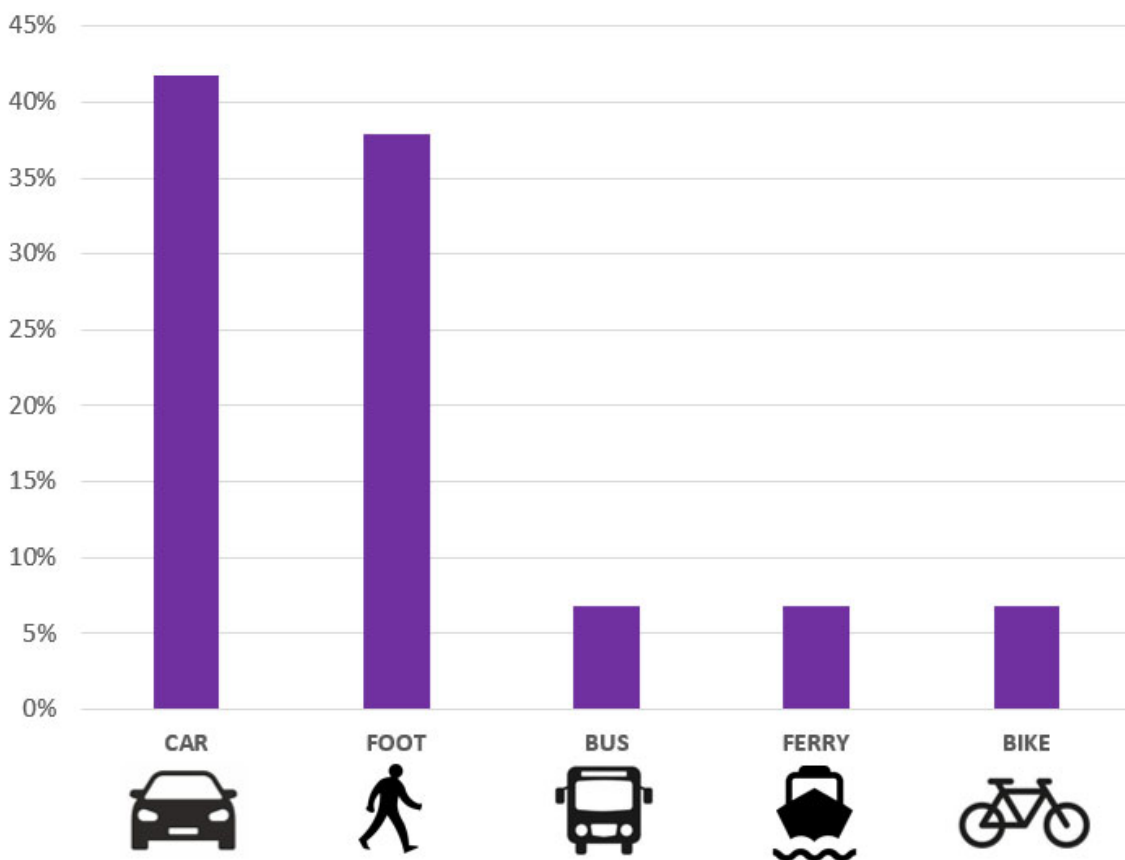


Figure 4 Existing travel behaviours – visitors to North Head

Source: Sydney Harbour Federation Trust

2.2 Staff travel behaviours

A review of recent Journey to Work Census data was undertaken to understand how people travel to the area surrounding the site. The area considered as part of the analysis takes in the former Manly Hospital site as well as surrounding areas up to North Head. The results of the analysis are illustrated in Figure 5 and indicates the majority of staff currently drive to the site due to the availability of on-site parking and the limited nature of public transport services.

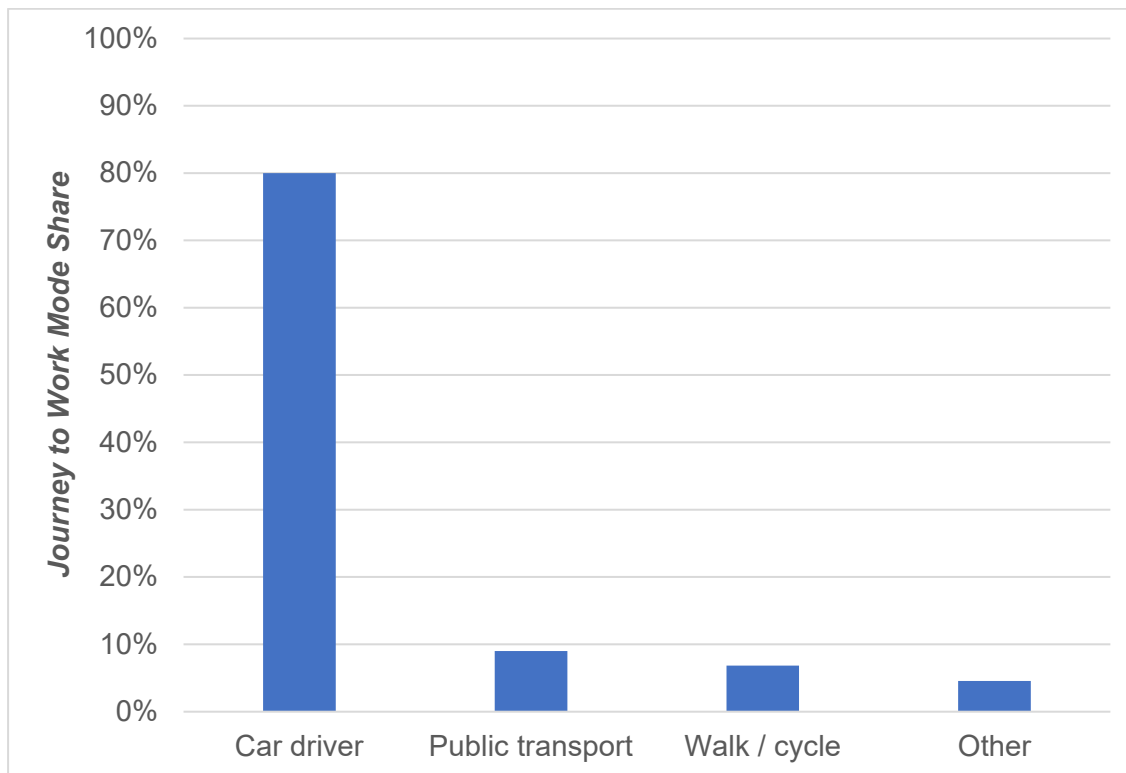


Figure 5 Existing mode share for workers travelling to North Head

2.3 Internal road network

North Head and the broader Sydney Harbour National Park is serviced by an existing road network which includes both sealed and unsealed roads – although unsealed roads are only open to the general public for walking and cycling. The roads are relatively narrow, with some sections only providing one-way traffic flow. North Head Scenic Drive provides the main roadway into and out of the site, providing a connection through to Darley Road. The road provides for traffic flow in both directions with a centre-line to delineate traffic movements. North Head Scenic Drive provides access to both North Fort and the Artillery Barracks Precinct via Darley Road. Blue Fish Drive provides an alternate access point to the Barracks Precinct via Darley Road into the Gunner Road car parking area.

North Fort Road is an internal roadway through the site connecting the Barracks Precinct and North Fort however is not publicly accessible south of the Barracks Precinct – with only authorised vehicles permitted to use this internal roadway. While North Fort Road is not publicly accessible for motor vehicles it remains available for use by people walking and cycling.



Figure 6 North Head Scenic Drive



Figure 7 North Fort Road

A map of the existing road network serving the area is provided on the following page of this document.



Figure 8 Road network map

2.4 Traffic volumes

Traffic counts were undertaken in early December 2022 to understand the existing level of traffic movements in different areas within North Head. These traffic volumes are summarised in Figure 9 below, with detailed hour by hour analysis provided in Figure 10.

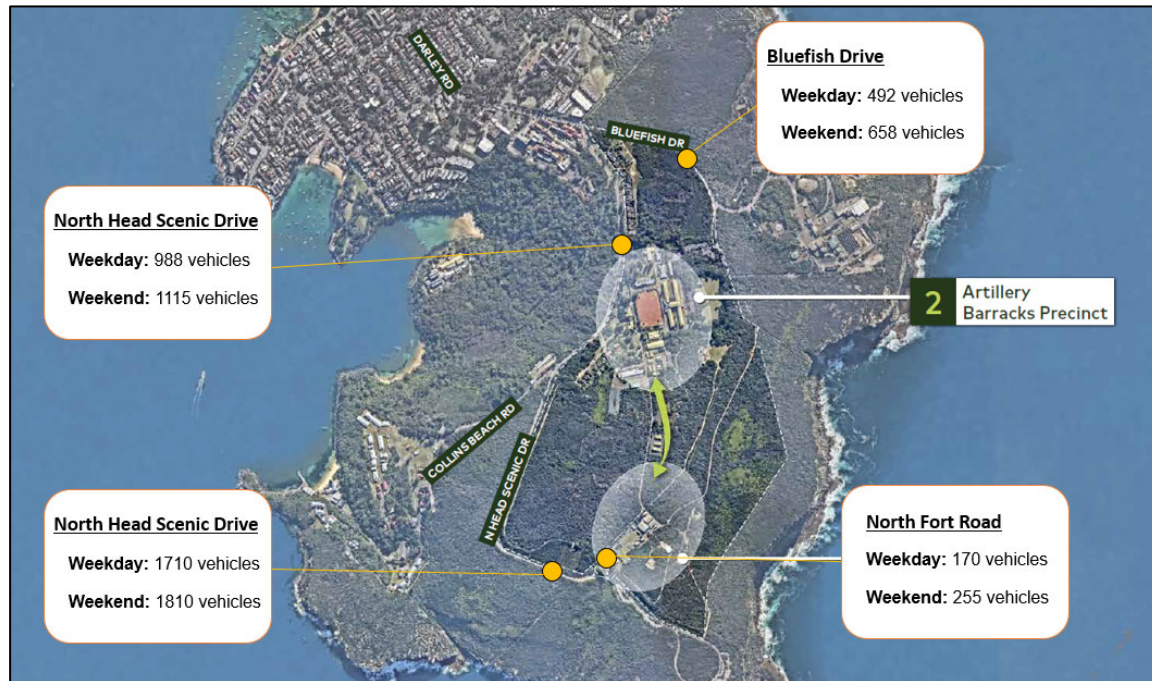


Figure 9 Summary of traffic counts on internal roads

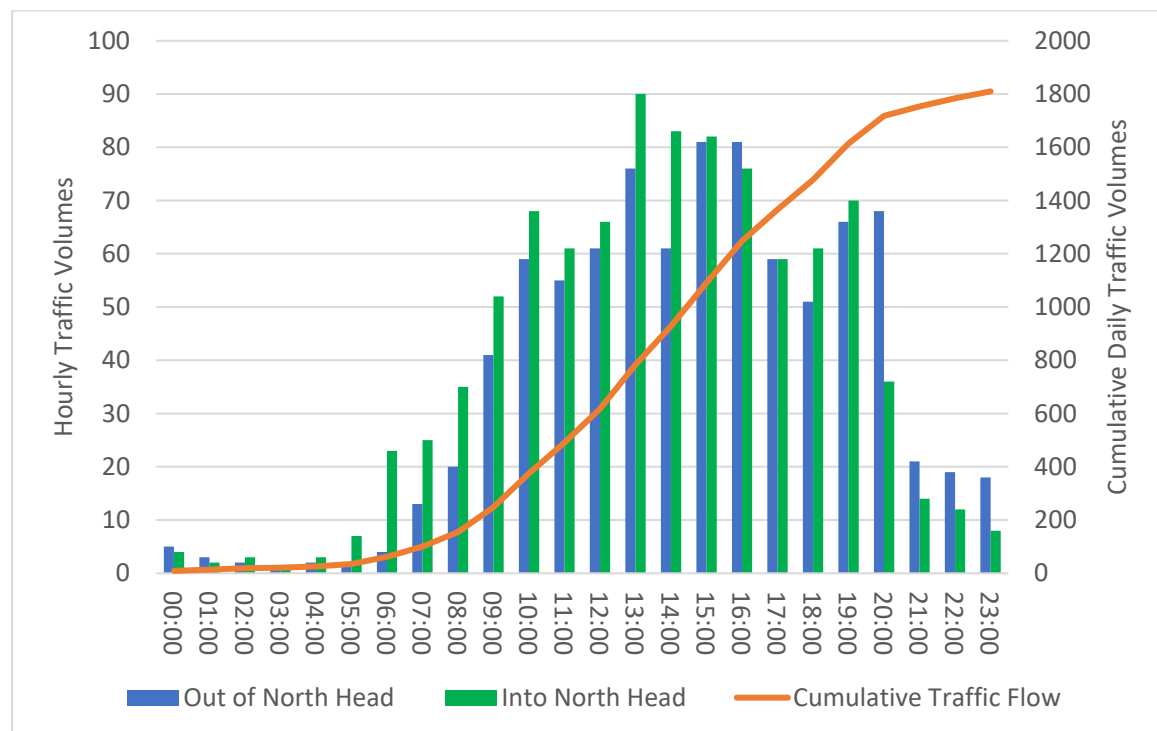


Figure 10 Daily traffic profile – North Head Scenic Drive

A review of previous traffic count data collected in 2013 indicates that traffic flows on North Head Scenic Drive have not changed significantly over the past decade. This previous traffic data indicated North Head Scenic Drive (south of the turnoff to Q-Station) carried 1,100 vehicles per weekday and 1,880 per weekend day in 2013, with this figure now sitting at 1,170 and 1,810 vehicles per day respectively.

While roads within the Sydney Harbour National Park have no formal classification in respect to a state or local government road hierarchy plan, an assessment has been undertaken based on Transport for NSW established guidelines for the functional classification of roadways. This functional classification is based on the role roads perform and the volume of traffic they should carry, with guidelines based on the following criteria:

Arterial Road typically a State Road which carry more than 15,000 vehicles per day (over 1,500 veh/h) and perform the role of major inter-regional links

Sub-Arterial Road typically Regional Road defined as secondary inter-regional links which carry volumes between 5,000 and 20,000 vehicles per day (500 veh/h to 2,000 veh/h)

Collector Road provides links between local areas and regional roads and typically carries between 2,000 and 10,000 vehicles per day (200 - 1,000 veh/h)

Local Road provide access to individual allotments and carry low volumes, desirably less than 2,000 vehicles per day (200 veh/h) with a recommended maximum of 300 veh/h proceeding at a speed of about 40 km/h.

On this basis it is concluded that North Head Scenic Drive and North Fort Road are consistent with a road under a 'local' classification with traffic volumes well below the desirable 2,000 vehicles per day. Observed traffic flows on Bluefish Drive are lower than those on North Head Scenic Drive and this would also fall well within the bounds of a 'local' road function.

2.5 Car parking

In conjunction with the traffic counts undertaken in December 2022, parking occupancy surveys were undertaken on a Sunday between 7am and 7pm. Weather conditions were fine and sunny at the time of the survey, with no special events occurring.

The findings are summarised in Figure 11 and generally show all car parking areas had spare capacity throughout the day – particularly those serving the Barracks Precinct. The car parks close to North Fort were observed to be busier however were still recorded to contain approximately 40% spare capacity at the busiest time of the day. These survey results indicate that existing parking facilities may be utilised to accommodate potential growth in visitation to North Head and/or occupation of existing building by tenants rather than relying upon the need for new or upgraded parking facilities.

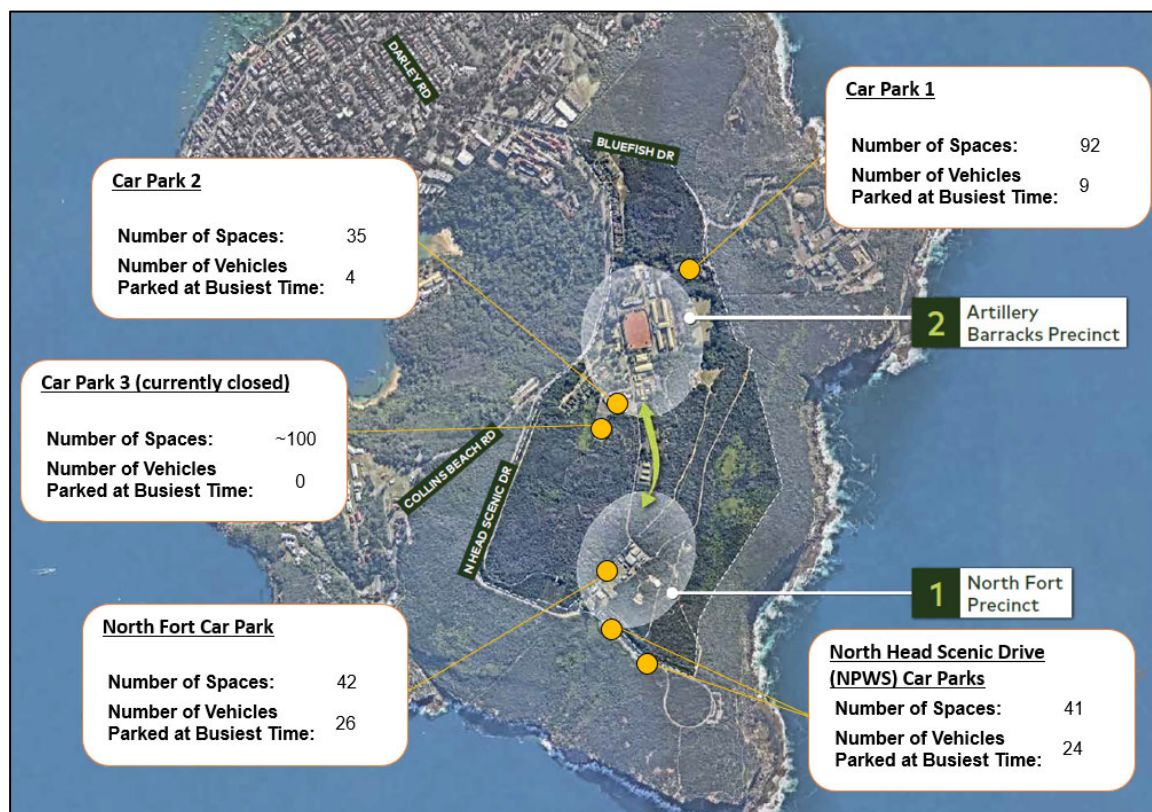


Figure 11 Results of car parking surveys

2.6 Public transport network

The North Head Sanctuary is serviced by a single bus route – that being the 161 service which operates as a loop between Manly Wharf and North Fort precinct. This existing bus route is shown in Figure 12.

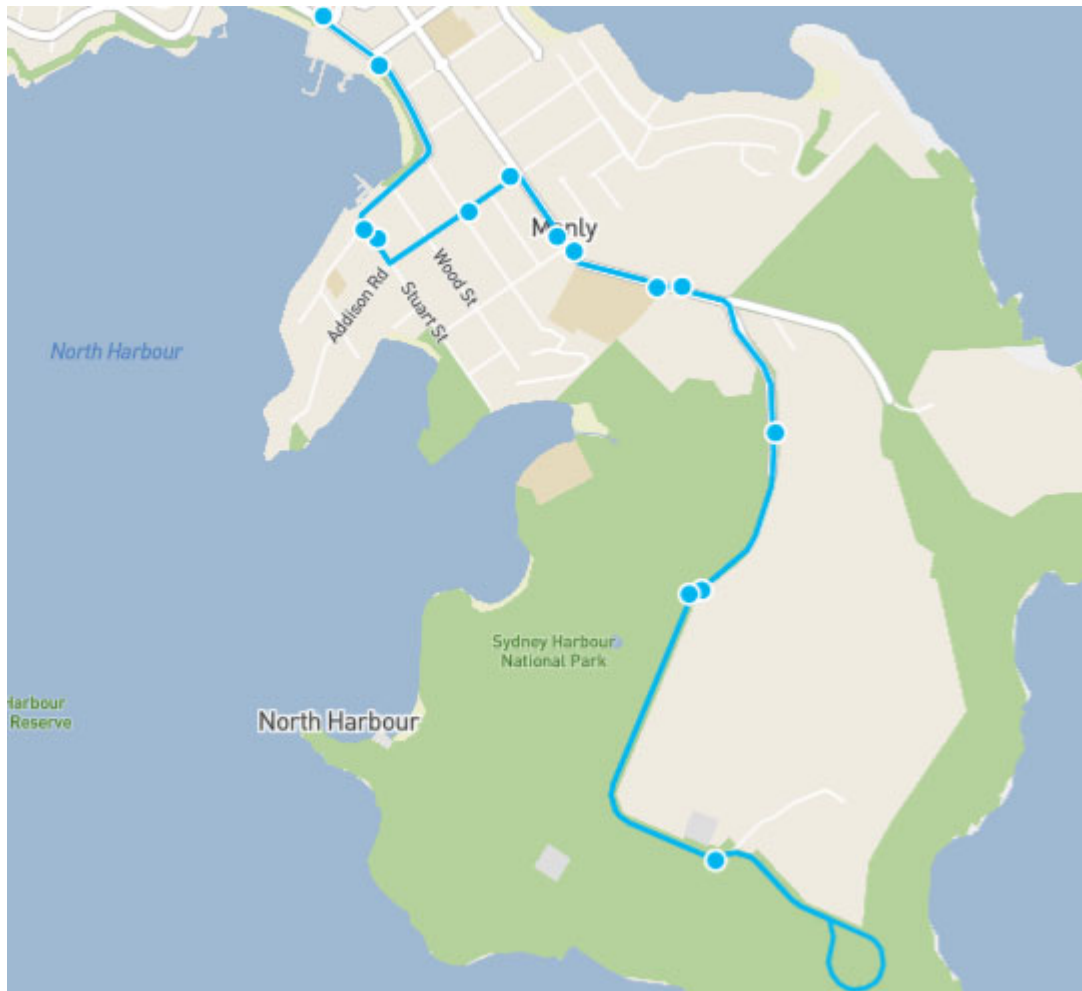


Figure 12 Existing 161 bus service route

The operating hours and frequencies for the 161 services (as of 10 April 2023) are summarised in Table 1 below. The low service frequencies of up to one hour, particularly on weekends where visitation to North Head is generally highest, limits the ability for users to utilise public transport services and increases reliance on private vehicles to access the precinct.

Table 1 Operating period – 161 bus route

Period	Times of Operation	Service Frequency	
		Peak	Off-Peak
Weekdays	6.38am – 8.15pm	Every 20 minutes	Every Hour
Weekends	7.51am – 7.55pm	Every Hour	

It should also be noted that many of the existing 161 services terminate on North Head Scenic Drive opposite Q-Station and do not continue through to North Fort – further limiting public transport access. This is particular an issue on weekends when no services continue through to North Fort past 5pm in the evenings.

A further issue (in addition to lack of frequent services) constraining public transport accessibility is the limited number of bus stops and infrastructure along the 161 bus route. Bus stops are only provided on one side of the road at both North Fort and Barracks Precinct – requiring pedestrians to travel well past their intended destination and cross North Head Scenic Drive to access the bus stop.

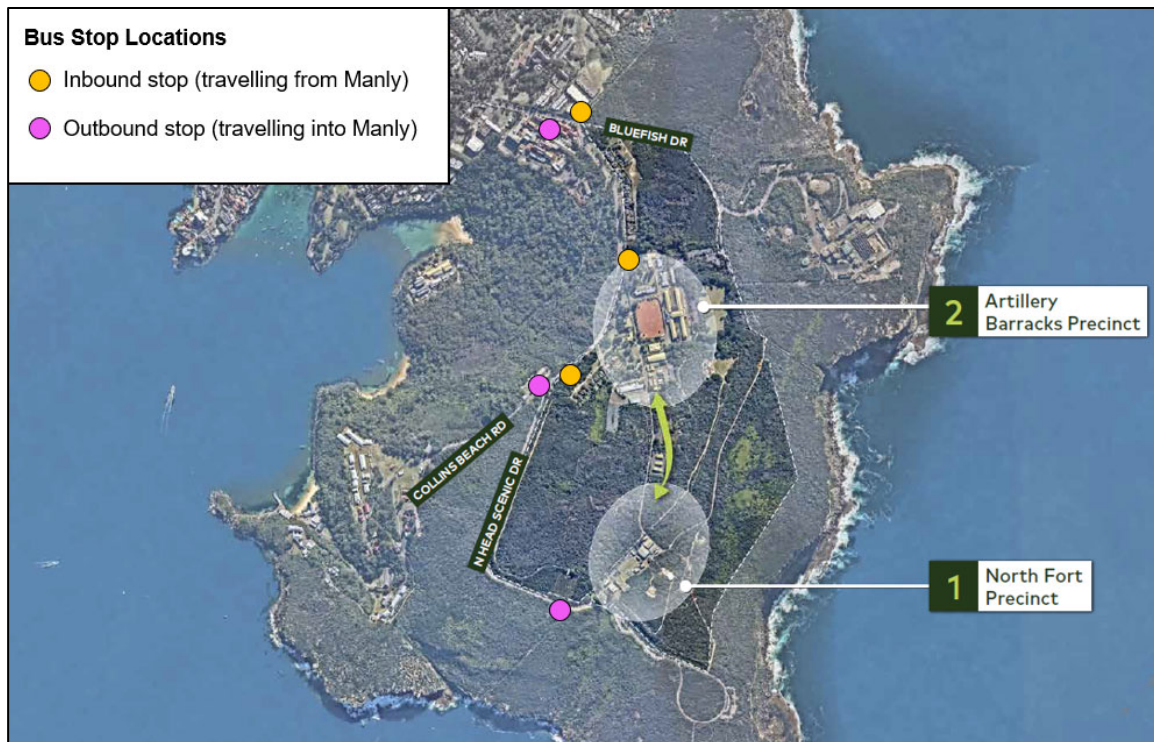


Figure 13 Bus stop locations

Infrastructure is also limited with most stops not containing basic facilities such as shelter or seating – with an example shown in Figure 15 which is the stop adjacent to Q Station.



Figure 14 Bus stop – North Head Scenic Drive near North Fort



Figure 15 Bus stop – North Head Scenic Drive near Q Station

Many visitors walk from Manly Ferry wharf however the walking times to the site, along with steep gradients on Darley Road, are prohibitive for many users. The walk from Manly Wharf to the Barracks Precinct and North Fort is approximately 30 minutes and 45 minutes respectively.

2.7 Pedestrian and cycling infrastructure

Pedestrians generally share the internal road network with vehicles, with limited formal pedestrian pathways. Some infrastructure is available around North Fort and the Barracks precinct (see Figure 16) but this is generally limited to one side of the roadway only. For much of North Head Scenic Drive (which is managed by National Parks and Wildlife Services) no footpaths are available which results in pedestrians walking along the roadway, with an example illustrated in Figure 17.



Figure 16 Pedestrian infrastructure adjacent to North Fort



Figure 17 Pedestrians walking on North Head Scenic Drive

Cycling is a popular mode of travel to North Head Sanctuary however limited infrastructure is provided. No bike lanes exist on North Head Scenic Drive, with infrastructure limited to a less than five bicycle parking rails near the entry to North Fort on land owned by NPWS. No bicycle parking facilities are currently available in the vicinity of the Barracks Precinct.

North Head Scenic Drive is a popular recreational cycle route and is identified as a 'Tier 2 – District Route' in the Northern Beaches Council bicycle map. This route provides connectivity to Darley Road, the Manly town centre as well as East Esplanade.



Figure 18 Existing and proposed cycling network

3 Transport Considerations - North Fort

3.1 Current constraints

3.1.1 Site access

The existing access point to the North Fort precinct is relatively narrow – approximately 4m in width which does not provide the ability for two cars to pass one another at the same time. While this has the benefit of reducing vehicle speeds it can also create points of conflict when vehicles are attempting to enter and exit the at the same time. Exacerbating this issue is the reliance on this same access point by pedestrians – with an example of these conflicting users illustrated in Figure 19.



Figure 19 Existing vehicle access into North Fort precinct

3.1.2 Road environment

There is currently no visual indicator at the North Fort access point that drivers are entering a different road/speed environment from the external road network. The road looks and feels very much like a car dominated environment with asphalt paving and no change in pavement material / colour.

The style of pavement provided and road surface is consistent with the external roadways, giving no indication to drivers that they are entering an environment with high levels of pedestrian activity. This compares to other parkland environments (e.g. Centennial Parklands) where 'gateway' treatments are provided at the key entry points to provide visual cues to drivers to slow down and look out for other road users.

3.1.3 Public transport access

As previously noted in Section 2.6 access to the North Fort precinct by bus or coach is limited to a single bus stop located on the southern side of North Head Scenic Drive. This requires passengers to travel past the site entry point and loop around the eastern end of Scenic Drive before accessing the single bus stop. The newly installed pedestrian crossing, while offering an improved level of pedestrian safety, does not align with the bus stop and requires a short detour for pedestrians to access to the site entry. These existing constraints are illustrated in Figure 20.

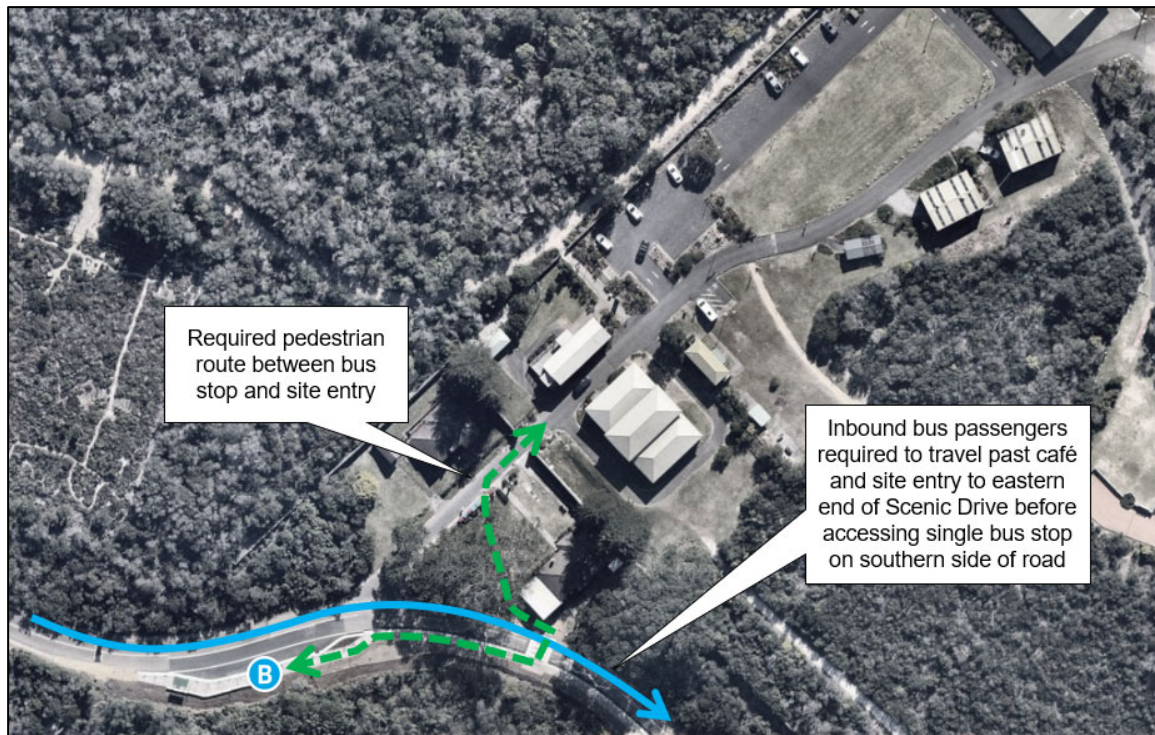


Figure 20 Existing constraints for bus passengers at North Fort

3.1.4 Car parking

Car parking within North Fort is currently free for use by the general public while parking on Scenic Drive (controlled by National Park and Wildlife Services) is subject to parking fees of \$5 per day. This inconsistency results in many visitors parking within North Fort and using other parts of North Head – occupying parking spaces for visitors wanting to experience North Fort itself.

3.2 Potential measures

To improve access to and within the North Fort precinct the following measures are suggested for further investigation as part of the Master Plan:

- Introduction of a 10km/h shared zone at the entry to North Fort, including altered pavement surface, colour and texture. The traffic counts undertaken for this study indicated traffic flows on this road to be less than 300 vehicles per day, well within the 1,000 vehicles per day which is the threshold for shared zones. The shared zone would have the effect of both slowing vehicles down as well as providing a broader indicator to drivers that they have entered a reduced speed environment. It will also provide an improved level of access and safety to pedestrians – formalising the existing situation where pedestrians and vehicles must share the roadway given the narrow access point.
- Realignment of the access road into a reconfigured car parking area within North Fort. The access road would be realigned to travel to the south of the Visitor Centre which in turn allows for the area from the Visitor Centre onwards to be completely pedestrianised. Minor changes would be required to the on-site car parking area, with the intent to maintain the existing number of car parking spaces on the site. This will be further explored at a later stage once the on-site uses are better defined and the expected parking demand can be determined.
- Consideration may, depending on parking demands, need to be given to aligning the parking fee structure within North Fort to that of the spaces on North Head Scenic Drive under the control of National Park and Wildlife Services.
- Introduction of additional bicycle parking and complementary facilities (e.g. bubblers) given the popularity of North Head Scenic Drive as a recreational cycle route. This would also recognise the growing popularity of e-bikes as a form of transport and encourage cycling as a form of access to North Head Sanctuary.

The provision of these measures, which are subject to further detailed investigations, would support a significantly improved environment for pedestrians and cyclists within the site. The potential measures are presented graphically in Figure 21 on the following page of this document.

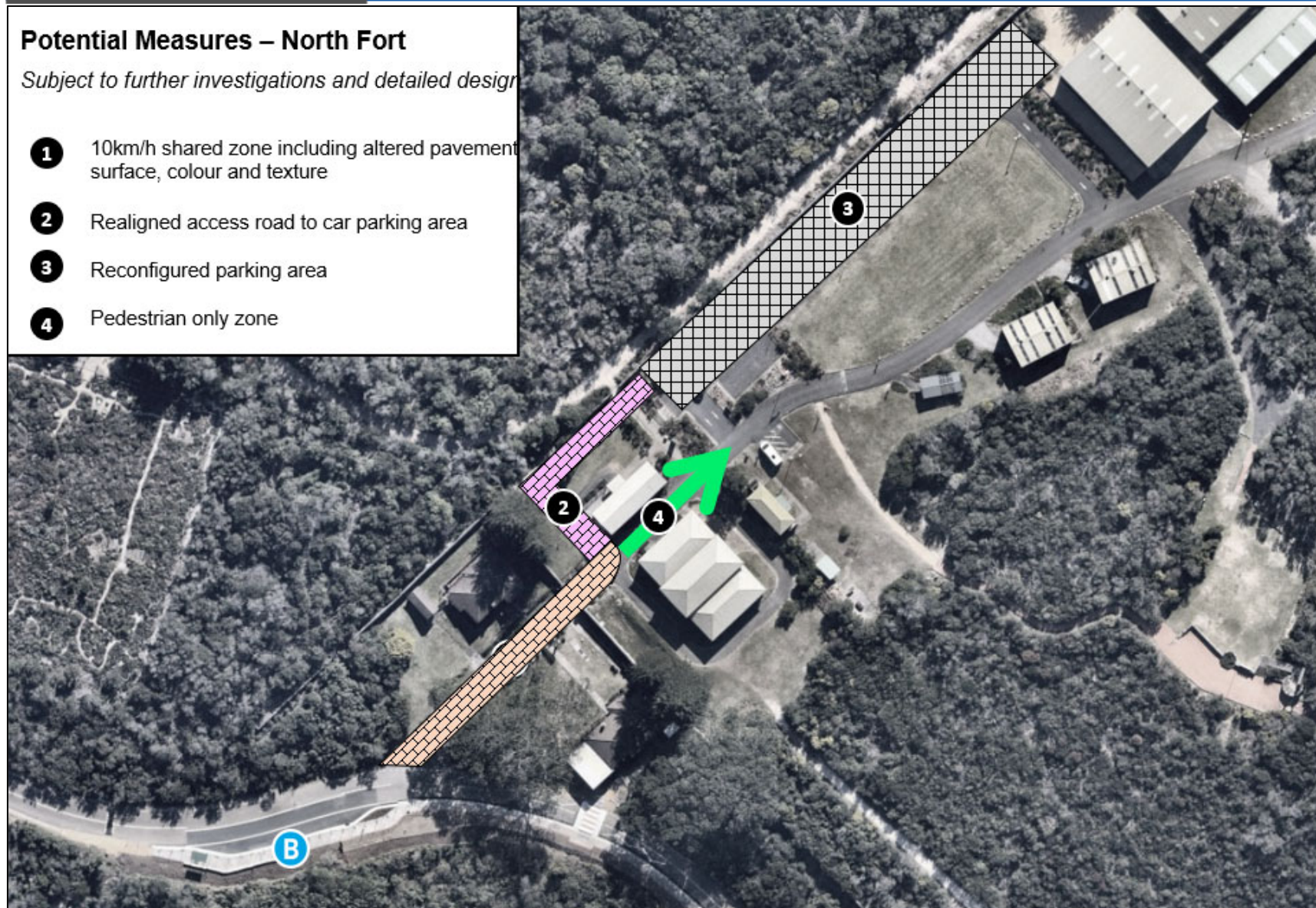


Figure 21 Potential transport measures – North Fort

4 Transport Considerations – Barracks Precinct

4.1 Current constraints

4.1.1 Site access

Pedestrian access to the Barracks Precinct via North Head Scenic Drive is poor, best summarised as a vehicle dominated environment lacking in connectivity. The southernmost access point (Figure 22) is a paved roadway without any formal pedestrian facility, with the existing footpath terminating at the vehicle driveway with no supporting pram/kerb ramp. Figure 23 illustrates the pedestrian environment north of this access point, with pedestrians forced to walk along a narrow strip of landscape towards the second entry point to the precinct.



Figure 22 Existing vehicle and pedestrian access to Barracks Precinct



Figure 23 Existing path on North Head Scenic Drive

4.1.2 Pedestrian legibility

Currently the overwhelming majority of pedestrians walking up from Manly and travelling to North Fort / Fairfax lookout make the conscious decision to continue along North Head Scenic Drive, rather than travel through the North Head Sanctuary. The key decision point is at the entry to the Barracks Precinct (see Figure 22) which is not currently inviting for pedestrians.

4.1.3 Internal pedestrian circulation

North Fort Road offers an important connection between the Barracks Precinct and North Fort to the south. As shown in Figure 24 North Fort Road is vehicle dominated, with car parking scattered around the area with no pedestrian facilities. Similarly the roadway serving the Gatehouse and parade ground (Figure 25) provides no sense of pedestrian priority.



Figure 24 North Fort Road in the Barracks Precinct



Figure 25 Roadway approaching Gatehouse

4.1.4 Public transport access

Similar to North Fort access by bus to the Barracks Precinct is limited to a single bus stop located on the eastern side of North Head Scenic Drive – see Figure 26. No stop is provided on the western side of the roadway. This requires bus passengers leaving the site wanting to travel back towards Manly to first travel south past Q Station and North Fort before then returning back down North Head Scenic Drive.



Figure 26 Bus stop serving Barracks Precinct

4.1.5 Car parking

A number of streets within the Barracks Precinct contains on-street car parking provided in an ad-hoc / informal manner. Scattered around the precinct this informal car parking attracts traffic movements and detracts from the overall visitor experience.

4.2 Potential measures

Potential transport measures to be investigated as part of the Master Planning process (and subsequent design phases) include the following:

- Similar to the North Fort precinct, the strategy for the Barracks Precinct is to remove the vast majority of vehicular traffic from within the area and rationalise car parking to a small number of discrete areas away from key pedestrian desire lines. This, in conjunction with the measures proposed at North Fort (see Section 3.2), will facilitate a seamless and connected pedestrian experience within North Head Sanctuary.
- The potential to design additional car parks on the east of Building 1 for visitors and users of the site. This zone can be utilised for service vehicles and temporary parking.
- In the design phase further examine the number of car parking spaces to be provided within the Barracks Precinct that responds to the anticipated parking demand generated by the future uses within the precinct.
- Limited vehicle access permitted south of the periphery car parking, with authorised service / maintenance vehicles only. This will provide for a significantly improved pedestrian experience and eliminate the vast majority of existing conflicts.
- The existing roadway into the Barracks Precinct (see Figure 22) is to be realigned to facilitate access to the periphery car parking. In the design phase the potential for a one-way loop to be introduced will be considered which takes vehicles from North Head Scenic Drive and back out to Bluefish Drive – reducing the extent of two-way traffic movements in the area.
- Threshold / gateway treatment to be introduced to slow vehicle speeds and provide for pedestrian priority at the primary access point into The Barracks precinct.
- Pedestrian access to be significantly improved – with a focus to be on providing clear direction that the primary pedestrian route through to North Fort / Fairfax lookout is via The Barracks precinct. An inviting environment to be created which establishes the primary walking route as being through The Barracks precinct and onwards towards North Fort. Further planning of the site is to investigate the most suitable alignment for the pedestrian pathway given the topography of the area.
- Relocation of the existing car parking outside of the Gatehouse (see Figure 27) to Gunner Road car park. This measure will enable the creation of a pedestrian only connection between North Head Scenic Drive and the Gatehouse.



Figure 27 Existing car parking outside of Gatehouse

- In the design phase investigate the potential to introduce a bus stop on the western side of North Head Scenic Drive to provide improved public transport access out of the precinct back towards Manly. This bus bay is on land owned by National Parks and Wildlife Services and would therefore be subject to their approval.
- Relocate existing southbound bus stop closer to the main pedestrian access point to the precinct.
- Bicycle parking and complementary facilities to be provided for staff and visitors, particularly given no facilities are currently available in the Barracks Precinct.

The potential measures for the Barracks Precinct are presented graphically in Figure 28 on the following page of this document.

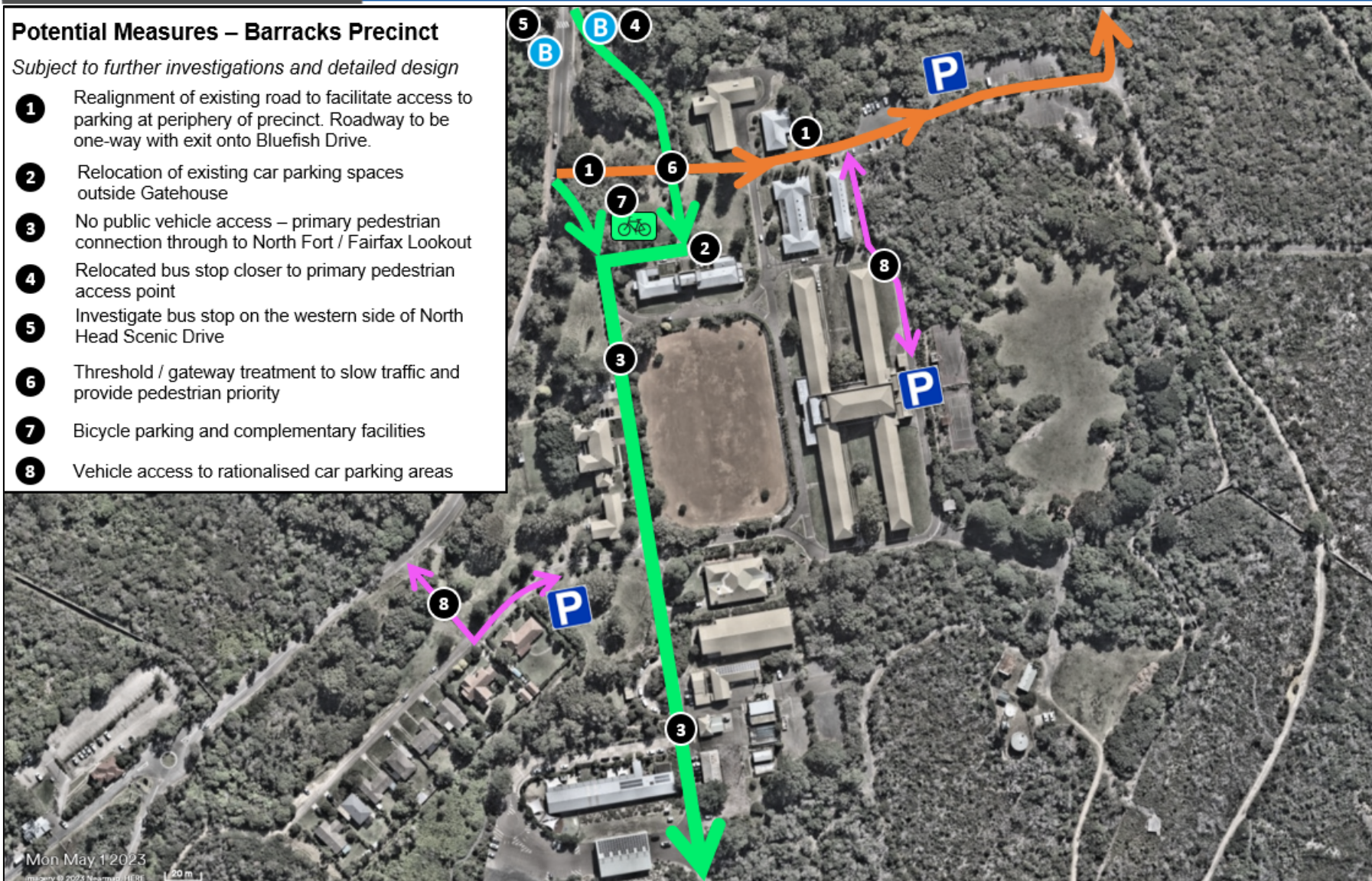


Figure 28 Potential transport measures – Barracks Precinct

5 Integrated Transport Strategy

Traditionally planning (including traffic/transport planning) for the North Head Sanctuary has considered the North Fort and Barracks Precincts in an isolated manner given how they currently operate independently of another. This masterplan considers the needs of North Head Sanctuary in a wholistic manner including the development of an integrated transport. While measures specific to North Fort and The Barracks precinct are identified in Section 3 and 4 respectively of this document, the integrated transport strategy presents the overall approach to traffic/transport as part of the masterplan. Key features of this integrated approach are as follows:

- Rationalisation of public car parking / vehicle access within the North Head Sanctuary, with car parking generally relocated to the perimeter of the precinct. The removal of much of the informal or ad-hoc car parking within North Head Sanctuary will reduce the extent of traffic circulation currently experienced and provide for a more pedestrian friendly environment.
- This strategy of rationalising parking facilitates the introduction of a ‘calmed heart’ – providing the opportunity for a seamless and connected pedestrian experience within North Head Sanctuary including uninterrupted travel between the Gatehouse and North Fort visitor centre.
- The final quantum of car parking to be provided within the site will be confirmed at subsequent design stages. The overall parking provision will respond to the site uses, with the location of these parking spaces limiting points of conflicts with pedestrians within the site.
- For larger events held in North Head, for example ‘Night at the Barracks’, there is the opportunity to direct visitors to park their vehicles in Manly or surrounding areas and run shuttle buses to and from the site. There are over 1,000 public car parking spaces in the Manly centre and these can be utilised when required to accommodate higher than normal parking demands.
- Creation of new central spine within the precinct, generally following the alignment of North Fort Road, that provides a connection between The Gatehouse, North Fort visitor centre and a new cultural and educational landmark within the precinct. Pedestrian connections would also be provided through to Fairfax walking track / lookout.