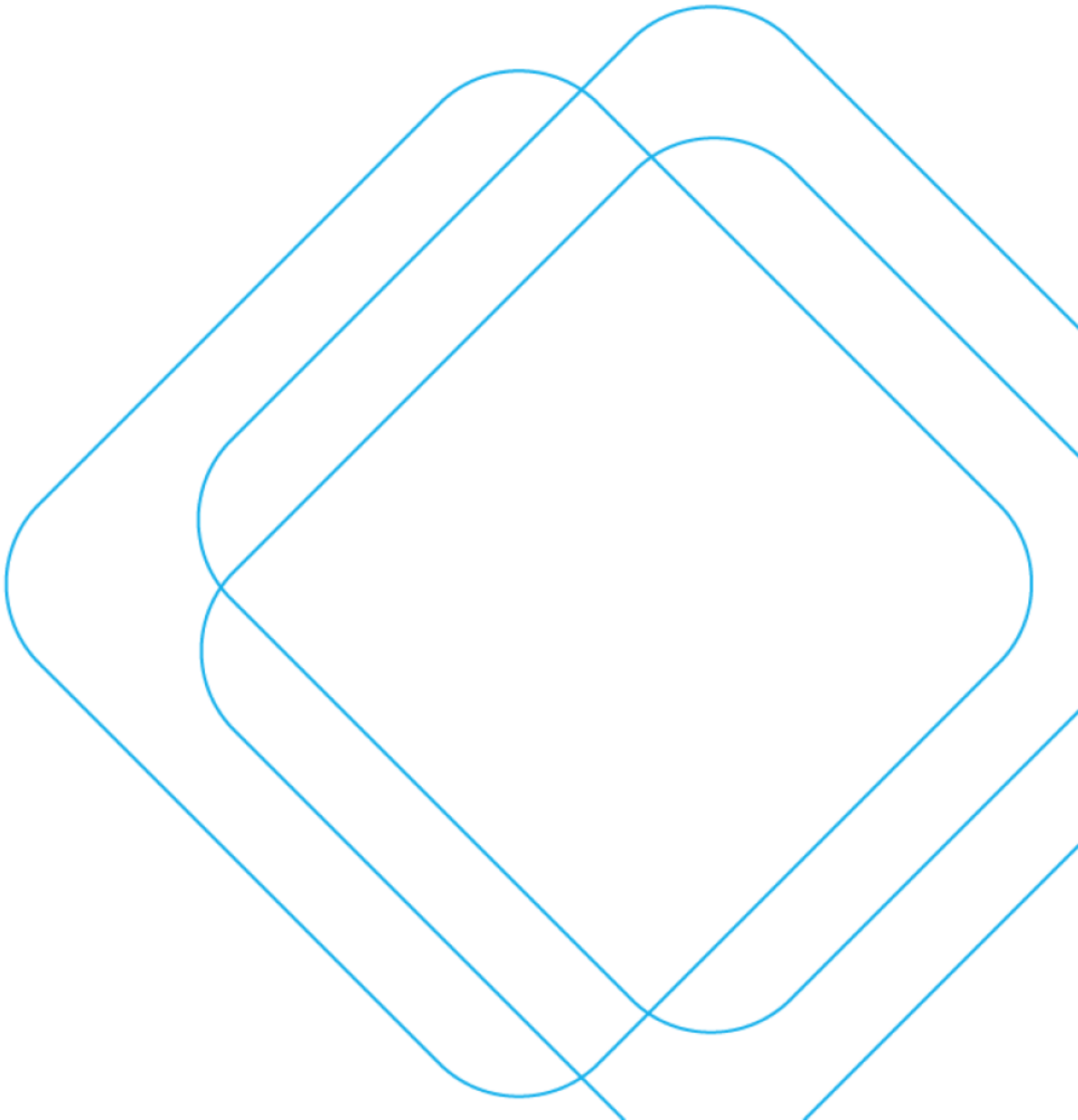
SCT Consulting

EXPLORER STREET TRANSPORT IMPACT ASSESSMENT

Final Report

21 AUGUST 2023

SCT Consulting acknowledges the traditional owners of the lands on which we work.
We pay our respects to Elders past, present and emerging.



Quality Assurance

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Executive Summary

Purpose of study

The Department of Planning and Environment (DPE) has prepared an Urban Design Study and Master Plan as a rezoning package for Explorer Street in South Eveleigh. This builds upon work previously undertaken by the Land and Housing Corporation (LAHC), which then considered a potential land use uplift comprising 432 dwellings, as documented in the LAHC EXPLORER STREET, SOUTH EVELEIGH Traffic and Transport Assessment (SCT Consulting, 1 June 2021).

The updated illustrative concept masterplan is a redevelopment replacing the current 46 social housing dwellings that could comprise 32,669 m^2 of gross floor area, which will include approximately 394 residential one, two and three-bedroom apartments. SCT Consulting has been engaged by the DPE to prepare an updated Transport Impact Assessment, to support the recent state led re-zoning at Explorer Street, South Eveleigh. The site is in the City of Sydney LGA and is bounded by Eveleigh rail yards to the north, Station Place to the east, Sydney Trains works site to the west and Henderson Road to the south.

The site is controlled by the *State Environmental Planning Policy (Planning Systems) 2021 Redfern-Waterloo Authority Sites*. The proposed use is permissible under the SEPP, but the proposed heights and FSRs are not permissible, due to several controls. At the time of writing, assessment requirements have not been defined. Typical transport requirements for a state led re-zoning are defined under the *Environmental Planning and Assessment Act (1979) (NSW)*, p 3 d 3.4. The state led re-zoning would amend the relevant controls to make the development permissible.

Existing conditions

The 2016 Method of Travel to Work data was analysed to determine current travel behaviour and patterns to and from the South Eveleigh site during peak travel periods. For the Sydney Greater Metropolitan Area (GMA), a total of 57 per cent, 16 per cent and four per cent used a private vehicle, train and walk respectively to get to work. By comparison, the public transport mode share for Eveleigh was 45 per cent, followed by 14 per cent active transport share. Private car use was approximately half of the Greater Sydney level, indicating less car dependence and high usage of public transport in the local area given a well-developed transit network and low parking availability in the Eveleigh area.

Due to the prime location for jobs, retail and social activities of the study area, the average travel distance of South Eveleigh by different travel modes and by trip purpose was 48 per cent shorter than overall Sydney. This also supports active transport as an important mode of travel and tallies with the fact of lower car use compared to Sydney's average level.

The site is around 800m away from Redfern Station, one of the largest and busiest rail stations in New South Wales and 500m from Erskineville Station. Footpath networks are of various quality around the site, offering connectivity to a wide variety of local and regional facilities. There are high-quality cycling options that provide access to Redfern Station.

SIDRA analysis of the performance of the intersections in the proximity of the site indicates that the road network currently operates at an acceptable Level of Service.

Impacts of proposed land use

The updated illustrative concept masterplan is a redevelopment replacing the current 46 social housing dwellings that could comprise approximately 32,669 m^2 of gross floor area, which will include approximately 394 residential one, two and three-bedroom apartments. This equates to a net increase of 23 and 18 vehicles per hour in the AM and PM peak hours respectively, which has little impact on the surrounding road network, due to the low traffic generation volume. The traffic generated is expected to be based on the constrained amount of parking provided by the proposed development. Because the site provides a restricted number of parking spaces, the amount of traffic generated is not expected to be capacity-driven, which will minimise the impact on the surrounding road network.

To confirm the impact on the intersections in the proximity of the site, SIDRA analysis was undertaken to determine the performance of the intersections, with the development trips. The analysis showed that the nearby intersections will continue to perform satisfactorily with the development trips added to the network.

A review of the impact on the public transport network indicates that there is sufficient spare capacity due to the site's exceptional location and availability of major public transport infrastructure. For the footpath network, there could be an additional 195 (AM peak) and 166 (PM peak) person trips on the network (including active transport and public transport walking trips). The footpaths are generally wide and able to accommodate this additional volume.

Proposed transport solutions

The existing road network and public and active transport infrastructure network surrounding the site is adequate to be able to cater for the increased number of trips as a result of the proposed development, for all transport modes. No infrastructure upgrades to the road network are therefore proposed because of the proposed development.

Proposed transport solutions related to strategic policy for the development include:

– Apply City of Sydney Category A maximum parking rates to the site. These are defined in the City of Sydney LEP as 0.1 / 0.3 / 0.7 / 1.0 parking spaces per studio / one- / two- / three-bedroom dwelling respectively (reflecting good accessibility to public and active transport networks).

– Ensure travel plans, which have the potential to further educate the individuals who currently drive to work (from a nearby location) on alternate modes of travel to their destinations, are effectively delivered by development proponents.

1.0 Introduction

1.1 Background

The Department of Planning and Environment (DPE) is overseeing the preparation of an Urban Design Study and Master Plan as a rezoning package for Explorer Street in South Eveleigh. This builds upon work previously undertaken by the Land and Housing Corporation (LAHC), which then considered a potential land use uplift comprising 432 dwellings, as documented in the LAHC Explorer Street, South Eveleigh Traffic and Transport Assessment (SCT Consulting, 1 June 2021).

The updated illustrative concept masterplan is a redevelopment replacing the current 46 social housing dwellings that could comprise approximately 32,669 m^2 of gross floor area (GFA) which will include approximately 394 residential one, two and three-bedroom apartments. SCT Consulting has been engaged by the DPE to prepare an updated Transport Impact Assessment, to support the recent state led re-zoning at Explorer Street, South Eveleigh (the site).

The site is located in the City of Sydney local government area (LGA) and is bounded by Eveleigh rail yards to the north, Station Place to the east, Sydney Trains works site to the west and Henderson Road to the south, as shown in **Figure 1-1**.

Figure 1-1 The site location

Source: The Explorer Street, Eveleigh Design Report (2023)

1.2 Purpose of report

The purpose of this Transport Impact Assessment is to support the state led re-zoning for the proposed Masterplan at Explorer Street, South Eveleigh.

The Transport Impact Assessment report has assessed the impact of the illustrative development concept in terms of the net increase in trips generated, connectivity and access to the surrounding road network, car parking and servicing requirements, public and active transport requirements and any potential mitigation measures required because of the implementation of the proposed development.

The Transport Impact Assessment includes:

- A review of relevant background documents and information including relevant state, regional and local planning policies, transport planning documents and parking development control plan and standards
- Existing travel pattern data including Census, Journey-to-work data, to understand existing travel patterns of residents currently living at the site location
- A desktop review of existing traffic and transport conditions, including traffic generation of existing development
- Future traffic generation based on the Roads and Maritime Services *Guide to Traffic Generating Developments (2002)* and subsequent technical direction as well as likely parking provision given the context of proximity to excellent public transport provision
- Person trip generation based on Roads and Maritime Services *Guide to Traffic Generating Developments (2002)* and subsequent technical direction
- The net increase in the trip generation of the proposed development (based on the agreed development yield)
- Distribution of the net trip generation to the surrounding road network based on existing residents' travel patterns
- Key active transport and public transport routes to / from the development, in connection with current and planned cycle routes by the City of Sydney (the City)
- The public and active transport measures and sustainable travel initiatives for the development, as well as the likely required parking provision
- A qualitative review of any proposed transport infrastructure in the proximity of the site
- An assessment of the impact on the surrounding road network as a result of the Masterplan, for all modes of transport
- A qualitative review of the construction impacts of the proposed development.

1.3 Report Structure

This report has been structured into the following sections:

- **Section 2.0** considers the transport planning context for the site
- **Section 3.0** describes the existing transport conditions for all modes of transport
- **Section 4.0** considers future transport infrastructure in the vicinity of the site
- **Section 5.0** describes the illustrative development concept and its access strategy
- **Section 6.0** estimates the likely trip generation and parking requirements as a result of the illustrative development concept
- **Section 7.0** describes the likely impacts for all transport modes and parking impacts as a result of the illustrative development concept
- **Section 8.0** provides a qualitative review of the likely construction activities and potential impacts
- **Section 9.0** proposes traffic and transport solutions based on the potential traffic impact
- **Section 10.0** summarises the report content and presents the conclusions.

2.0 Strategic Planning Context

2.1 The Future Transport Strategy – Our vision for transport in NSW

The Future Transport Strategy sets out the NSW Government's vision for transport in a growing and changing state. The Strategy will guide the community on strategic directions for future planning, investment, delivery and operations and has been developed in consultation across the NSW Government. It also sets the strategic direction for Transport to achieve world-leading mobility for customers, communities, businesses, and our people.

In summary, the Transport Strategy aims to:

- **Improve transport solutions for the customer** – this involves stronger investment in public transport, walking and cycling networks, offering convenient alternatives to driving and building a sustainable transport system.
- **Moving towards net zero emissions** – this involves encouraging the uptake of electric buses, cars, trucks and trains – and eventually ships and planes – and considering climate change impacts in all decision-making.
- **Enhancing liveability for customers and communities** – this involves working with local communities to create safer, greener and more liveable 15-minute neighbourhoods across NSW, where wider footpaths, cycle lanes, street trees, pedestrian crossings and lower speeds will improve access to nearby shops and services.
- **Releasing the potential of our infrastructure** – this involves reallocating road space to more efficient modes of transport like buses, walking, cycling and micro-mobility devices.
- **Building for resilience and economic growth** – A resilient and reliable transport system will support freight and passenger journeys and successful places. Transport networks will contribute to the overall resilience of our places and communities.

The Strategy specifically outlines actions about network planning and master planning. It states that Transport NSW will work closely across the government on guidelines to facilitate better network planning and master planning, with an emphasis on improving design quality and promoting public and active transport in new neighbourhoods. Specific actions relevant to the site include:

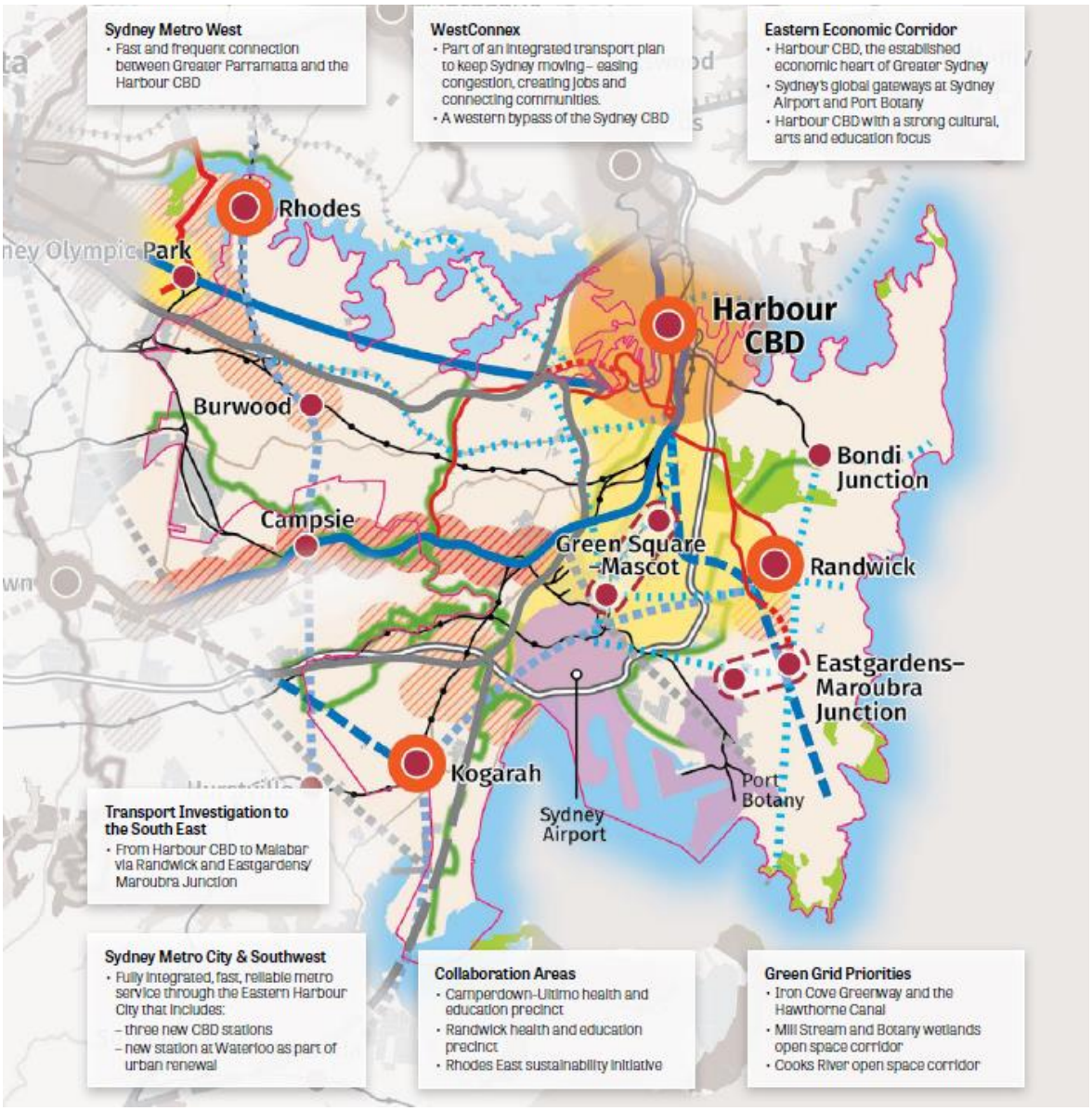
- Explore reforms to policies leading to public transport networks being in place at the time of settlement of new areas of housing and / or jobs
- Prepare best practice guidelines for network planning for new areas
- Prioritise regular, timetabled bus services in preference to site-specific shuttle bus services.

Implication for Explorer Street: The Strategy emphasises the importance of planning and providing active and public transport for new developments and bringing this in as part of any master planning process.

2.2 The Eastern City District Plan

The *Eastern City District Plan* (March 2018) (the District Plan) provides a vision for the Eastern City District (as presented in **Figure 2-1**) to become more innovative and globally competitive. It looks to enhance the district's lifestyle and environmental assets. This will in part be achieved by aligning growth with infrastructure, including transport, and delivering sustainable and adaptable solutions. The District Plan projects a population growth of 325,000 people and demands an additional 157,500 dwellings in the next 20 years.

Figure 2-1 Eastern City District Plan



Source: Eastern City District Plan (Greater Sydney Commission), 2018

The District Plan informs local strategic planning statements and local environmental plans, the assessment of Planning Proposals as well as community strategic plans and policies. The District Plan also assists councils to plan for and support growth and change and align their local planning strategies to place-based outcomes. It guides the decisions of State agencies and informs the private sector and the wider community of approaches to manage growth and change. Community engagement in the District Plan has contributed to a plan for growth that reflects local values and aspirations, in a way that balances regional and local considerations.

The vision for Greater Sydney is one where people can access jobs and services in their nearest metropolitan and strategic centre. The 30-minute city is a long-term aspiration that will guide decision-making on locations for new transport, housing, jobs, tertiary education, hospitals, and other amenities. It means that they will be planned for

metropolitan and strategic centres and more people will have public transport access to their closest metropolitan or strategic centre within 30 minutes. This will enable more efficient access to workplaces, services and community facilities.

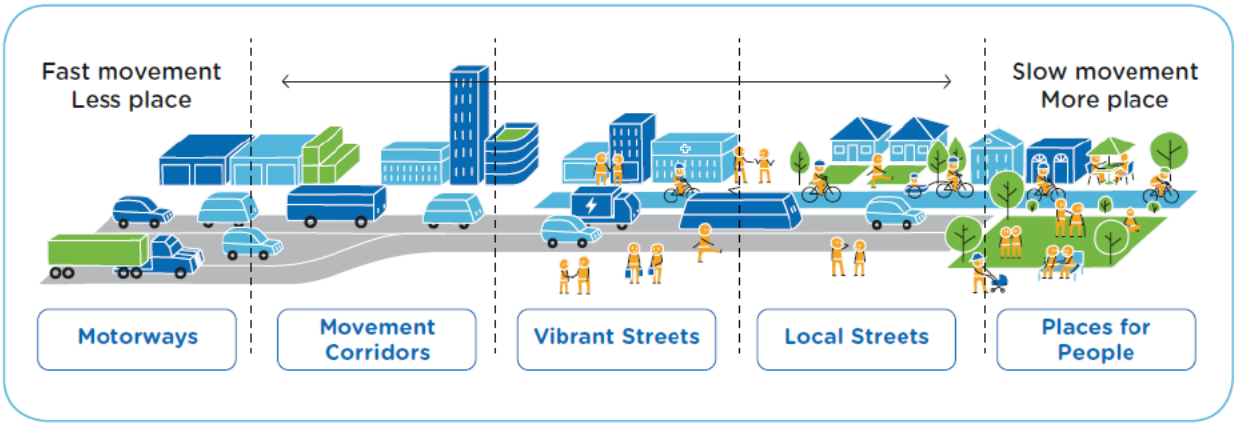
Implication for Explorer Street: The site has an exceptional geographical advantage as it is located at the Redfern to Eveleigh Precinct, on the Harbour CBD Innovation corridor. Precincts along this corridor has been identified as having high levels of amenity and walkability, with good transport connections. The site is also within walking distance of the existing train service at Redfern and the future Sydney Metro City Waterloo Station.

2.3 Greater Sydney Services Infrastructure Plan

The *Greater Sydney Services and Infrastructure Plan* is a 40-year plan for transport in Sydney. It is designed to support the land use vision for Sydney. Building on the state-wide transport outcomes identified in the *Future Transport Strategy 2056*, the Plan establishes the specific outcomes transport customers in Greater Sydney can expect and identifies the policy, service and infrastructure initiatives to achieve these.

To support the liveability, productivity and sustainability of places for the transport network, a Movement and Place Framework was developed, as presented in **Figure 2-2**. The Framework acknowledges that transport networks have different functions and roles and serve as both a destination and to move people and goods. The Movement and Place Framework will enable us to plan, design and operate the transport network to meet these different needs by providing greater transparency, and supporting collaboration between those responsible for land use, transport and roads while also encouraging input from the community. Through the framework, we will be able to design a future network that is better used and supports the safe, efficient, and reliable movement of goods and the need for the liveability of places along with it.

Figure 2-2 Different movement environments under the Movement and Place Framework



Source: Greater Sydney Services Infrastructure Plan, 2018

2.3.1 Future Transport Network

The future transport network vision, as presented in the *Greater Sydney Services Infrastructure Plan* (shown in **Figure 2-3** and **Figure 2-4**), and the implications and the implementation of these visions would have for the site and surroundings, are described in the following sections.

City-shaping network

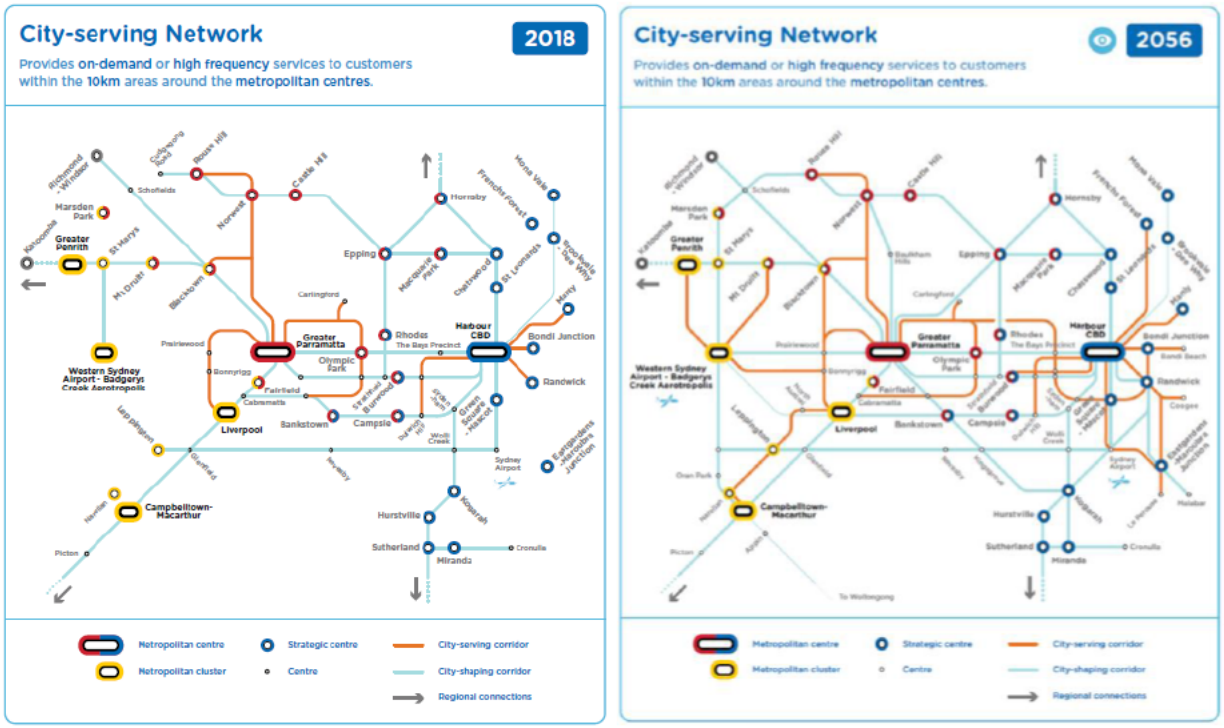
The city-shaping network includes higher speed and volume linkages between future cities and centres. The function of this network is to enable people living in any of the three cities to access their nearest metropolitan centre within 30 minutes and to be able to travel efficiently between these metropolitan centres.

As Greater Sydney transitions to a metropolis of three cities, the city-shaping network will need to expand to provide improved access to and between each metropolitan city/centre, particularly Greater Parramatta and centres in the metropolitan cluster in Western Parkland City.

City-serving network

The city-serving network will provide high-frequency services within a ~10 km radius of the three metropolitan cities/centres. This will support access within some of the densest land use in Greater Sydney where travel demand is most concentrated. As these inner urban areas in each of the three cities develop and become denser, the government will investigate the prioritisation of on-street public transport services and invest in higher frequency services.

Figure 2-3 Greater Sydney and 2056 transport network vision



Source: Greater Sydney Services Infrastructure Plan, 2018

Implication for Explorer Street: the site enjoys a key location between the Harbour CBD and the western Metropolitan Centre of Greater Parramatta and is close to the city-shaping and city-serving corridors that bring the site into the reach of Greater Sydney and all three cities by high frequency and high-capacity public transport links.

Bicycle Network

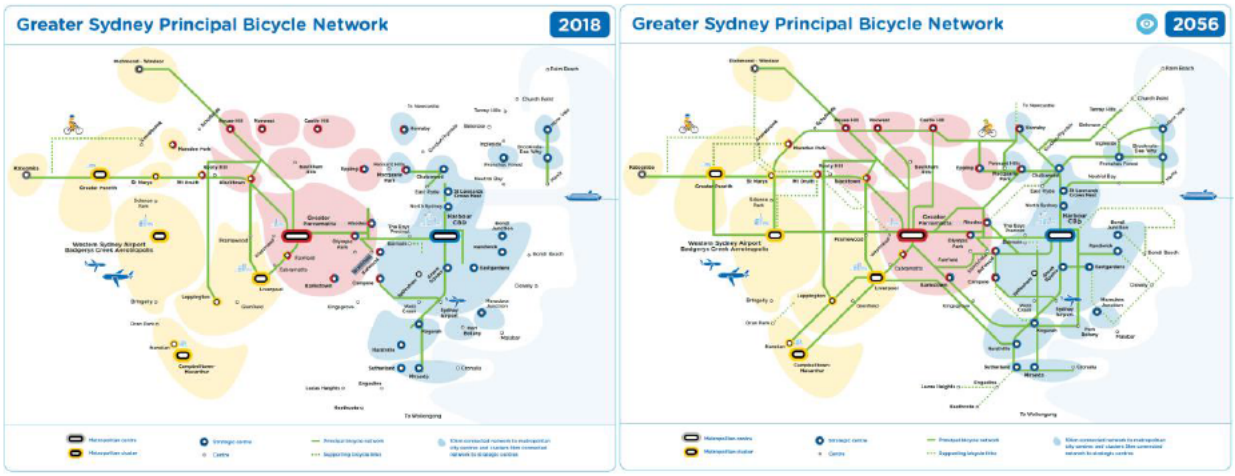
Building on the existing network, the immediate focus for future bicycle transport links is to work with local councils to deliver committed Priority Cycleway projects, to address key missing links around the Harbour CBD, Greater Parramatta, Greater Penrith, Blacktown, and Liverpool (such as the Nepean River Green Bridge and Inner West Greenway). Council partnership programs are delivering local bicycle infrastructure, and bicycle parking is also being rolled out at interchanges.

By 2056:

- Walking and cycling network coverage will be improved by using state-held corridors for public transport, pipelines, waterways, crown land and service easements for bicycle network infrastructure.
- All strategic centres will have connected walking and cycling networks, including strategic centres across Western Parkland City.

Further investment in connections to strategic centres and the Principal Bicycle Network will support walking or cycling as the most convenient option for short trips, improving health outcomes, safety and convenience for customers as well as boosting the productivity, liveability, and sustainability of Greater Sydney. **Figure 2-4** shows the current / committed Greater Sydney Bicycle Network alongside the envisioned 2056 Bicycle Network.

Figure 2-4 Current/committed and 2056 Greater Sydney Principal Bicycle Network



Source: Greater Sydney Services Infrastructure Plan, 2018

Implication for Explorer Street: The bicycle network around the site should support connectivity to the Greater Sydney Principal Bicycle Network. Connected walking and cycle network will encourage the site residents to travel with a more sustainable transport mode.

2.4 The City of Sydney Sustainable Sydney 2030 – 2050 Strategy (Continuing the Vision)

The Sustainable Sydney 2030 Strategy is a blueprint for a city that is environmentally, economically, socially and culturally sustainable and has been updated as circumstances changed. The updated Strategy *Sustainable Sydney 2030 – 2050 (Continuing the Vision)* now looks forward to as late as 2050 and is a combination of incremental and significant steps required to achieve targets for 2030 - 2050 and make the City more sustainable.

Targets in this Strategy directly related to transport and new developments include:

- By 2035 we will achieve **net zero emissions** in the City of Sydney local area.
- By 2036 there will be at least 156,000 private dwellings and 17,500 non-private dwellings that include boarding houses and student accommodation. Of the private dwellings, 7.5% will be social housing and 7.5% will be affordable housing with this proportion maintained into the future.
- By 2050 people will **use public transport, walk or cycle to travel to and from work**. This includes 9 out of 10 people working in the city centre and 2 out of 3 people working in the rest of the local area.
- By 2030 every resident will be around a **10-minute walk to what they need** for daily life.

The Strategy also sets out 10 strategic directions which focus on relevant issues that the community has identified as important as well as findings from background research to the strategy. Those directions related to transport and new developments include:

- Design excellence and sustainable development – Our communities live in **walkable, well-serviced neighbourhoods that are supported by public transport**.
- **A city for walking, cycling and public transport** – Our City has more public transport and zero-carbon vehicles and **more people choose to walk and ride bikes**. The City is greener and calmer with more space for people on the streets.
- **Housing for all** – Social, affordable, and supported housing is available for those who need it. High-quality housing is available for everyone.

The Strategy also outlines ten transformative project ideas for the City that respond to the vision of a city where Aboriginal and Torres Strait Islander people and their cultures are visible. These ideas will help make the City become a greener city that is regenerative and innovative with thriving arts and culture. Those projects in proximity to the site include:

- Design excellence and sustainable development – Our communities live in **walkable, well-serviced neighbourhoods that are supported by public transport**.

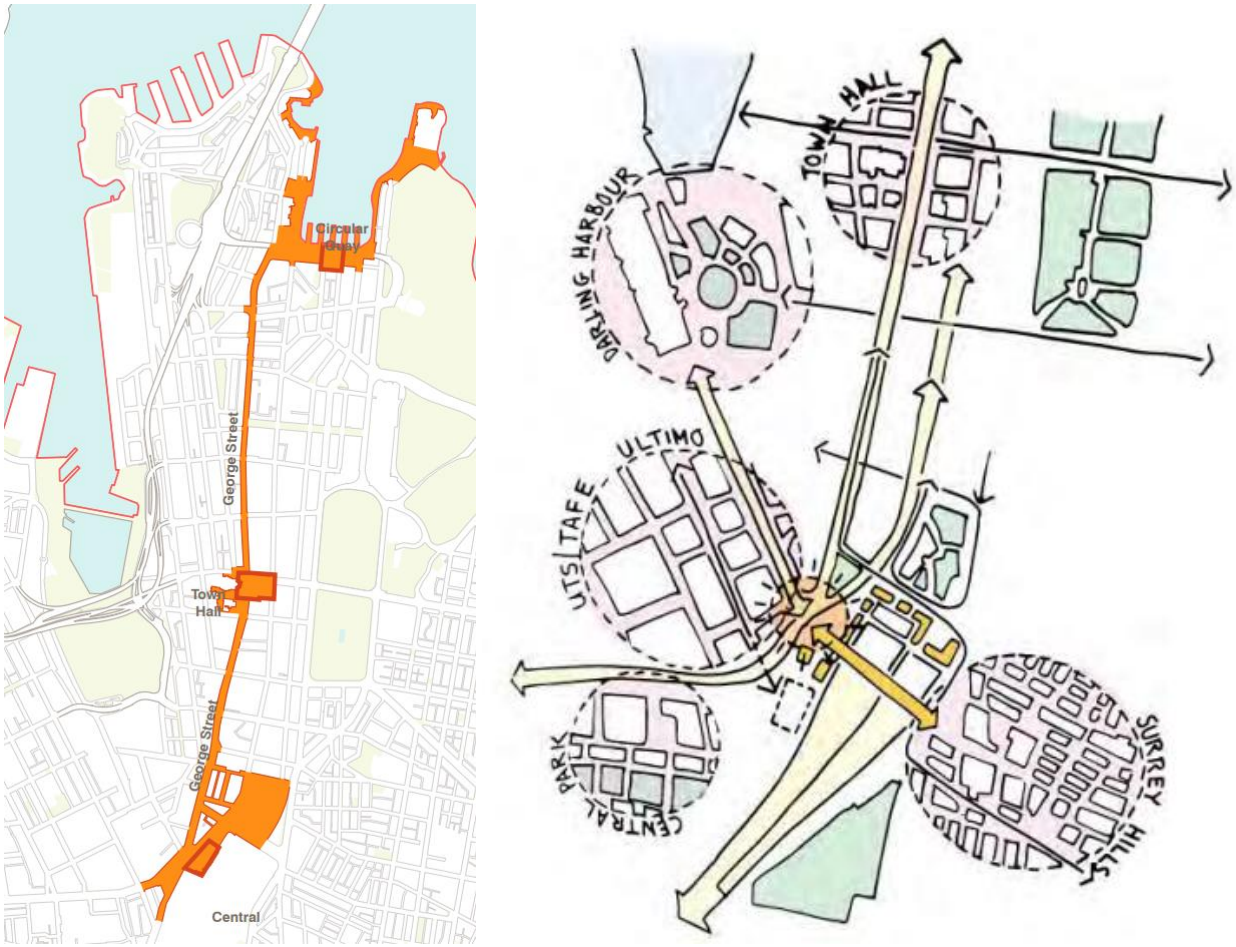
– **The three linked city squares project**: Three city squares will be linked by the new pedestrian boulevard on George Street to provide more space for public life in the heart of our city. The squares (**Figure 2-5**) at Circular Quay, Town Hall and Central Station (north of the site) are part of a city that provides welcoming civic spaces. It will connect the harbour and cultural assets at Circular Quay to the historic Sydney Town Hall and the innovation and technology hub near Central Station.

  With the scale of development planned at the southern end of the city, the square will provide a more natural environment for people to relax. Greening the area will help the city remain liveable and resilient. The City of Sydney will continue to work with the NSW Government to shape this key civic space.

– **The Green City project**: Three ideas for continuing to make Sydney greener are more green avenues, the laneway commons and expanding Sydney's lungs at Moore Park. They illustrate what the city streets and open spaces could look like in the future, enabled by the NSW Government's significant investment and plans for new public transport. The site is in proximity to the key green avenues City Road and Botany Road as well as several laneways, as seen in **Figure 2-6**.

– **The Metro as a catalyst project**: Metro connections to Zetland in Green Square and Randwick are planned for 2041 but given the current transport capacity constraints and planned growth across the area, the City of Sydney wants the NSW Government to bring the Metro South West extension forward to 2031. The extension would provide Sydney with a more comprehensive, reliable, and better-connected public transport network. The NSW Government has announced a rapid busway network for Sydney's south and southeast (**Figure 2-7**) as an interim solution until the metro extension is in place. To ensure the resilience of the public transport network, these connections could however remain after the Metro West extension opens.

Figure 2-5 The three linked city squares project

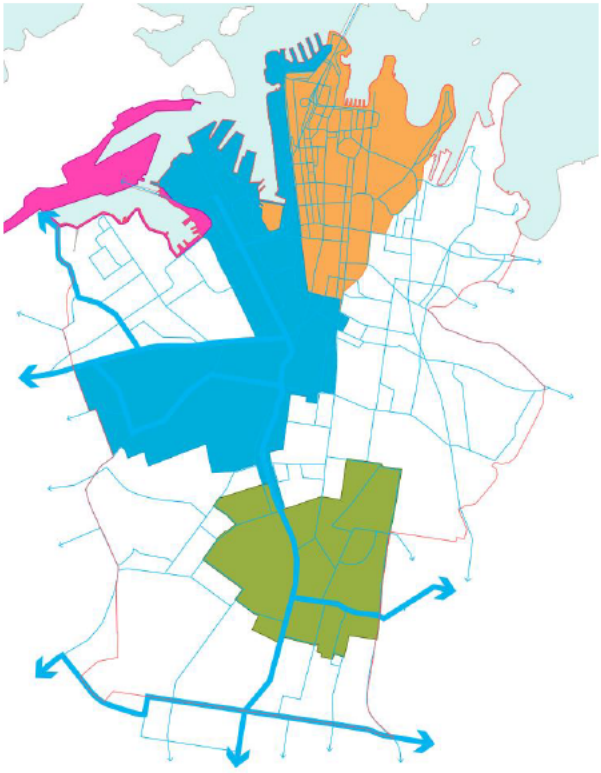


Source: Sustainable Sydney 2030 – 2050 (Continuing the Vision)

Figure 2-6 Green avenues and laneways as part of the Green City project

Source: Sustainable Sydney 2030 – 2050 (Continuing the Vision)

Figure 2-7 Interim bus improvement measures until the metro extension is in place



Source: Sustainable Sydney 2030 – 2050 (Continuing the Vision)

Implication for Explorer Street: Targets and directions in the Strategy emphasised improved future active and public transport targets and initiatives. The Strategy lists projects directly relevant to the site, including the Three linked city squares project, the Green City project, and the Metro as a catalyst project. The implementation of these would significantly improve access for residents of the site to active and public transport, and in the future, to the Metro, and will encourage the use of more use sustainable transport modes for travelling around the City.

2.5 The City of Sydney Plan 2036 – Local Strategic Planning Statement

The City of Sydney's *Local Strategic Planning Statement* (LSPS) reinforces the links between the NSW Government's strategic plans and the City's community strategic plan, Sustainable Sydney 2030, and the planning controls that guide development in the City of Sydney over the next 20 years. The city area is forecast to continue to attract residents, reaching a population of up to 340,000 by 2036. The area will also see a growth of 200,000 jobs by 2036.

The site is located within the Redfern Street village of the City. The Redfern Street village includes city fringe suburbs south of Central Sydney and a creative, education, high technology, and research industry cluster, as well as historical residential areas and high-density residential and retail developments. The future delivery of a metro station is set to rapidly transform parts of the Redfern Street village.

The LSPS states that Planning Proposals for additional development capacity through 'spot rezoning' must have strategic merit and site-specific merit and meet several strategic principles for growth. Site-specific principles for proposed growth, particularly relevant to the site include that proposal must:

– Locate development within reasonable walking distance of public transport that has the capacity (assuming development capacity will be delivered) and is frequent and reliable

– Include an amount and type of non-residential floor space appropriate to the site's strategic location and proximity to or location within a centre or activity street

– Be supported by an infrastructure assessment and demonstrate any demand for infrastructure it generates can be satisfied, assuming existing development capacity in the area will be delivered

– Make a positive contribution to the built environment and result in an overall better urban design outcome than existing planning controls.

The LSPS sets out several actions for the future city, under five planning priorities. Under the 'Infrastructure' priority, actions relevant to the future transport and movement of the city are listed, with an emphasis on 'creating walkable neighbourhoods' and a 'connected city', without relying on private vehicles. It states that planned public transport projects, including the Sydney Metro and the expanded light rail network, as well as active transport improvements and a range of other transport initiatives (such as the managed growth of bus, ferry, and light rail corridors), will help address the city's congestion challenges and future growth.

Relevant to the site, the NSW Government's *Future Transport Strategy* also identifies a new transport corridor for The Bays Precinct to Randwick via Green Square. This cross-district link would reduce the public transport interchange crowding at Central Station and connect existing rail and light rail lines with interchanges at Kensington, Zetland, Green Square, Eveleigh or Waterloo, Camperdown and The Bays Precinct, as seen in **Figure 2-8**.

Specific actions relevant to the site include:

– Building owners and businesses to encourage walking and cycling through active workplace strategies and provision of end-of-trip facilities

– Working with the NSW and Australian Governments to promote the economic and employment growth benefits and test the feasibility of increasing transport connections across the City and district, including an east-west transport connection between Kensington, Green Square, Camperdown and The Bays

– Continuing to implement, review and update the car parking policies and controls to support the transition to a net-zero carbon and energy-efficient transport system by 2030, continue promoting more efficient modes of transport including walking, cycling and public transport and manage congestion

– Working with landowners, institutions and government to increase public walking, cycling and transport connections across the City and district.

Figure 2-8 The proposed east-west investigation corridor

Source: The City of Sydney LSPS, 2020

Implication for Explorer Street: The LSPS highlights the aim for the City to create walkable neighbourhoods and a connected city, without relying on private vehicles in the future. The site's location is in line with the principle of future rezoned sites being within a reasonable walking distance of public transport, as well as being located near an active transport network. The proposed east-west investigation corridor will also improve transport to and from the site, through the Metro in particular. The proposed development of the site will also aid with the City's future population, employment and dwelling targets set for 2030.

2.6 The City of Sydney Cycling Strategy and Action Plan

The City of Sydney supports cycling as a mode of transport to meet the environmental, economic and social objectives set in *Sustainable Sydney 2030 – 2050 (Continuing our Vision) and Connecting Our City* documents. The *Our Sustainable Sydney 2030 – 2050* report sets a target that by 2050 9 out of 10 people working in the city centre and 2 out of 3 people working in the rest of the local area will use public transport, walk or cycle to travel to and from work.

The Strategy and Action plan states that the City is building a safe bike network connecting people and destinations, suitable for all ages and abilities, within 250m of all residents. The future bicycle network aims to serve workers, students, residents and visitors travelling in, to or through the City.

The City's future cycling infrastructure will consist of local and regional routes that will link the inner city, homes, schools, businesses and other destinations. The regional routes are the main corridors, which bring larger flows of people into the City from across the inner Sydney area, while the local routes are the connections, bringing people closer to the doors of homes and businesses.

The four key priorities to increase cycling in the City are:

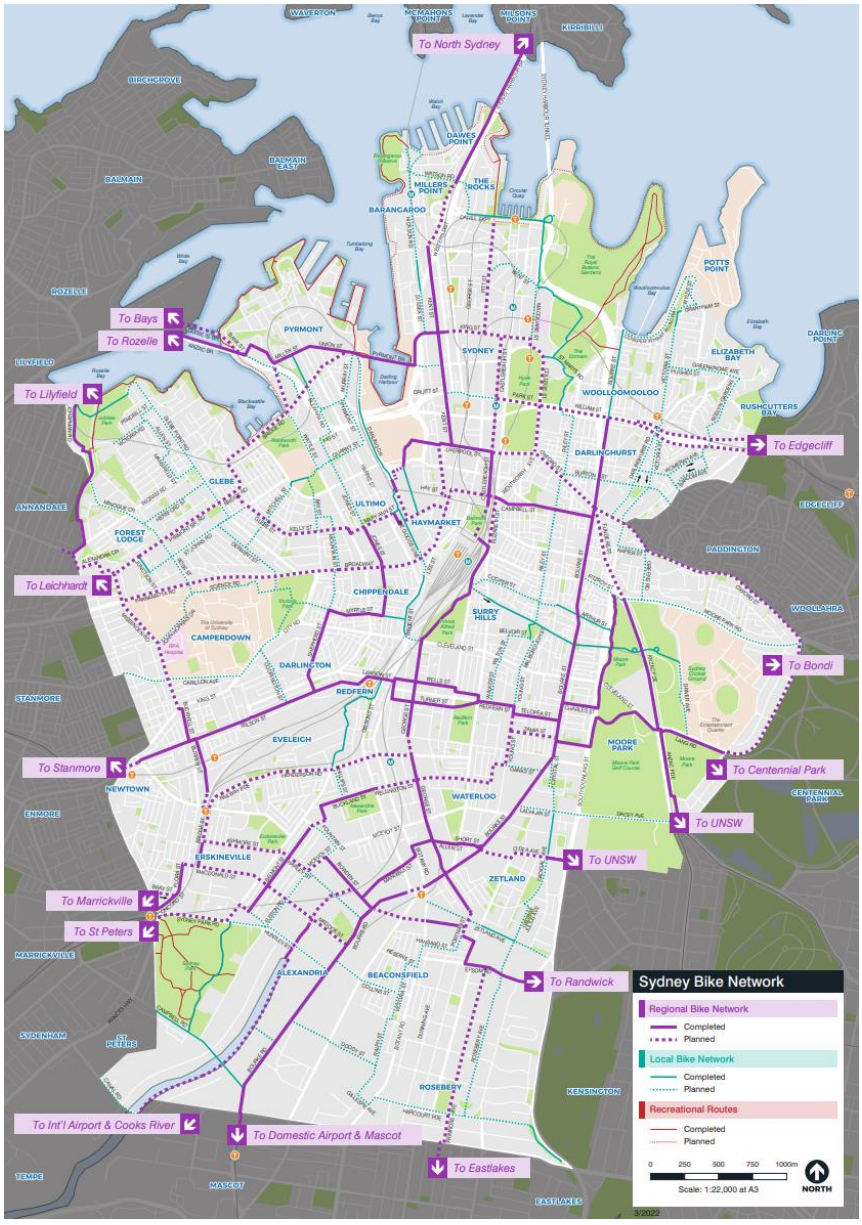
– **Connecting the network** by creating a bike network to make it safer for people to ride (as seen in **Figure 2-9**)

– **Supporting people to ride** by understanding and addressing barriers and helping people to start and continue riding

– **Supporting business** by partnering with workplaces to encourage staff to ride

– **Leading by example** by sharing expertise and being a positive influence on cycling improvements.

Figure 2-9 Existing and planned bicycle infrastructure in the City of Sydney (2022 map)



Source: https://www.cityofsydney.nsw.gov.au/strategies-action-plans/cycling-strategy-and-action-plan (2023)
Note: The Henderson Street off-street cycleway has been implemented since the last version of this map was produced.

Implication for Explorer Street: The site is located south of Wilson Street and east of Burren Street, which with its existing off-road shared path and cycle route, has been identified as future regional cycle routes in the plan. They will connect the site with the inner city as well as other nearby suburbs such as Stanmore, Marrickville, and Centennial Park. The recently implemented local route along Railway Parade / Henderson Road and the planned route along Phillips Street will also improve connections from the site to the Redfern and Erskineville Stations and the future Metro station at Waterloo. This could encourage a mode shift towards cycling and public transport, away from cars, for future residents and employees of the site.

2.7 The City of Sydney Walking Strategy and Action Plan

The City of Sydney supports walking as a mode of transport to meet the environmental, economic and social objectives set in *Sustainable Sydney 2030 – 2050 (Continuing our Vision)and Connecting Our City*. The *Our Sustainable Sydney 2030 – 2050* report sets a target that by 2050 9 out of 10 people working in the city centre and 2 out of 3 people working in the rest of the local area will use public transport, walk or cycle to travel to and from work.

The overarching priorities for walking are to:

- Make walking quick, convenient, and easy
- Make walking inviting and interesting
- Make walking safe and comfortable
- Create a strong walking culture.

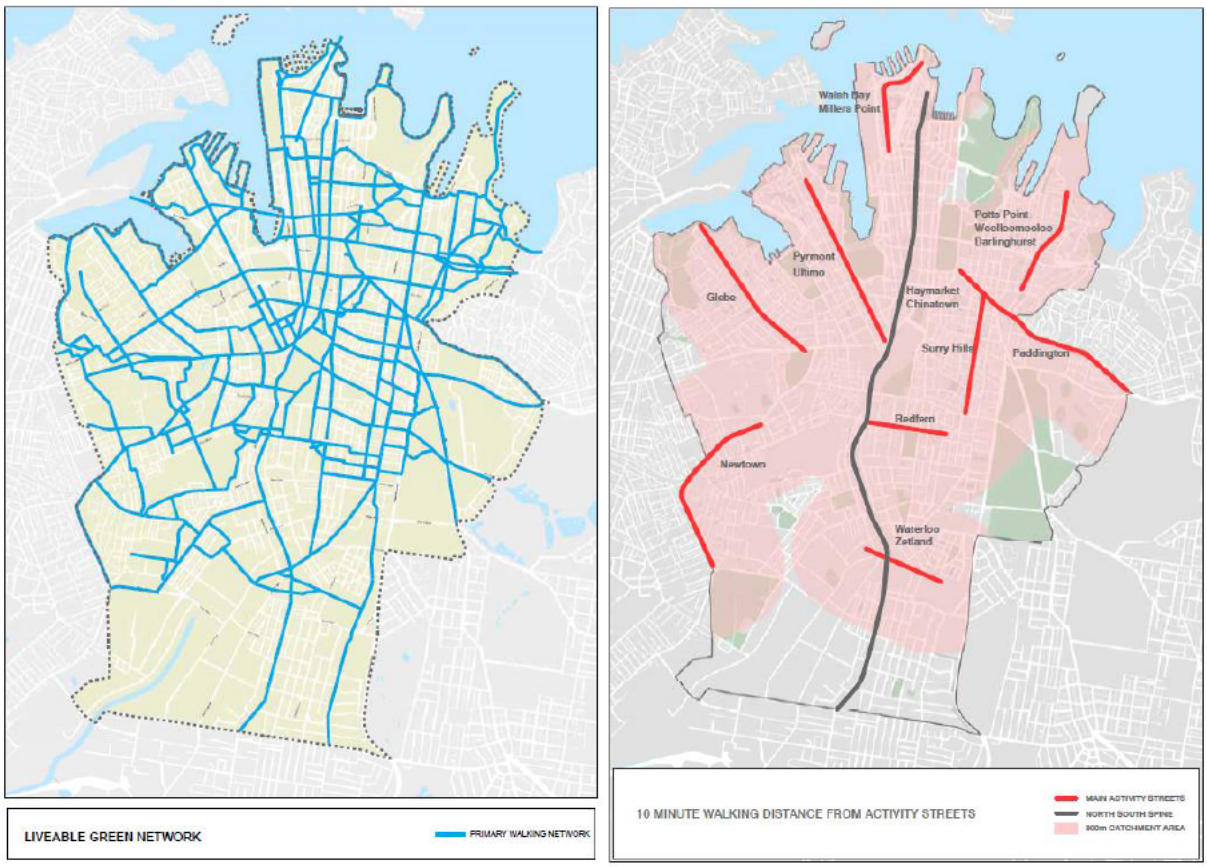
Walking in the City of Sydney is expected to become even more popular with the number of people walking forecast to double between 2006 and 2030. It is vital to accommodate this growth and make it quicker to walk, provide more space for walking, create new connections through large street blocks and make it easier and more comfortable for walking.

The City has developed targets for walking efficiency, capacity, amenity and safety which are ambitious but achievable. They are based on a review of trends and forecasts and will enable the City to track progress towards the achievements. The walking targets for 2030 include:

- Walking to make up one-third of the commuter trips by City of Sydney residents.
- Walking to account for 60 per cent of the local trips by City of Sydney residents by 2030.
- Reducing delay in walking times by 10 per cent across key walking routes.
- Improving walking amenity by 10 per cent on main activity streets through planned upgrades.
- All residents to be within a 10-minute walk (800 m) of commercial/retail space suitable for essential daily needs.
- Every resident to be within a three-minute walk (250 m) of the Liveable Green Network.
- Reducing traffic-related crashes involving people walking by 50 per cent.
- Walking to make up 50 per cent of the trips to and from late-night precincts.
- 90 per cent of the residents' feeling safe walking in the day and night.

The primary walking network and main activity street within the City of Sydney LGA are shown in **Figure 2-10**.

Figure 2-10 The Walking Strategy and Action Plan Routes 2015–2030



Source: Walking Strategy and Action Plan 2015–2030

Implication for Explorer Street: The site is ideally located on Henderson Road, which has been identified as part of the Liveable Green Network. It is also within the 800 m catchment area of the local main activity street, Princes Highway. The redevelopment has an opportunity to improve the walking environment and enhance the connection to the rest of the footpath network. Consequently, car trips are expected to significantly decrease, and the site may adopt very low parking rates.

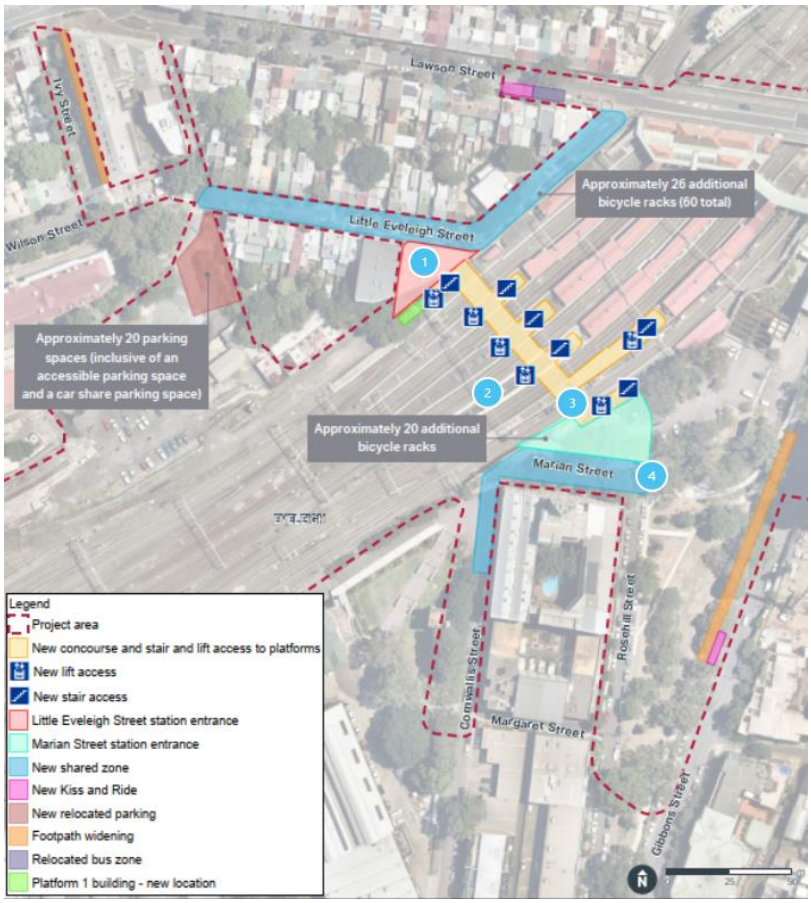
2.8 Redfern Station upgrade – New Southern Concourse

The NSW Government is improving accessibility at Redfern Station (**Figure 2-11**) as part of the Transport Access Program. The project aims to provide a station precinct that is accessible to those with a disability, limited mobility, parents / carers with prams and customers with luggage. Upgrading Redfern Station will make it easier for all customers to access, as well as improve connections between the station and key destinations in the area. The upgrade includes a new concourse at the southern end of the station. Key benefits of the upgrade include:

– Easy access to platforms 1 to 10 with six new stairs and lifts

– Better connectivity with the surrounding areas including key destinations such as South Eveleigh (formerly known as Australian Technology Park), and education centres.

Figure 2-11 Design option in progress for Redfern Station upgrade



Source: https://www.transport.nsw.gov.au/projects/current-projects/redfern-station-upgrade-new-southern-concourse, 2021

The new southern concourse would improve accessibility from the site to the station, with customers having to walk a shorter distance to reach platforms 1 through 9. The southern concourse will also reduce crowding on platforms 1 through 9 and improve the attractiveness of the rail network from the site.

2.9 State Environmental Planning Policy (SEPP) Housing 2021

Development of residential development by Land and Housing Corporation (p2 d6) may be carried out without consent, in the case of a development application made by a social housing provider for development on land in an accessible area, with the following parking rates:

– At least 0.4 parking spaces are provided for each dwelling containing one bedroom.

– At least 0.5 parking spaces are provided for each dwelling containing two bedrooms.

– At least one parking space is provided for each dwelling containing three or more bedrooms.

Lower levels of parking provision are permissible for the affordable housing component, but the result would likely be that the site would require consent. As the site already requires Local Environmental Plan amendments for the intended use, this is not perceived as an issue.

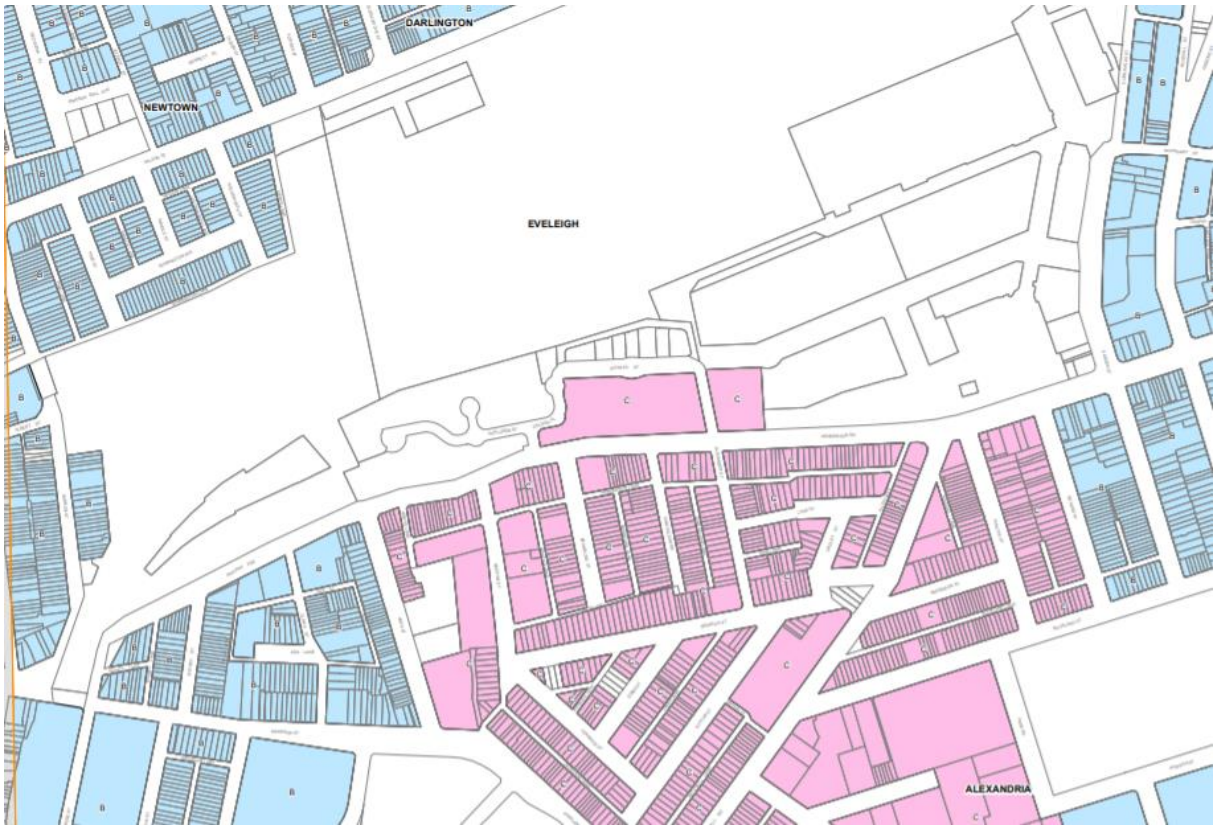
2.10 State Environmental Planning Policy (Planning Systems) 2021 Redfern - Waterloo Authority Sites

The site is controlled by the *State Environmental Planning Policy (Planning Systems) 2021 Redfern- Waterloo Authority Sites*. The proposed use is not permissible under the SEPP due to several controls (e.g. land zoning and height). At the time of writing, assessment requirements have not been defined. Typical transport requirements for an fsr are defined under the *Environmental Planning and Assessment Act (1979) (NSW)*, p3 d3.4. The state led re-zoning would amend the relevant controls to make the development permissible.

2.11 City of Sydney LEP 2012

The site is currently not zoned with a parking category as the site sits within the State Environmental Planning Policy 2021 Redfern- Waterloo Authority Sites. The surrounding land uses are generally a mix of Category C with some Category B within South Eveleigh, as seen in **Figure 2-12**.

Figure 2-12 Parking category – City of Sydney LEP



Source: Department of Planning, Industry and Environment, accessed 2023.

In Part 7.3 of the Sydney Local Environmental Plan 2012, it is identified that if the maximum number of car parking spaces under this Division is not a whole number, the number is to be rounded to the nearest whole number. The maximum parking rate for residential flat buildings, dual occupancies, and multi-dwelling housing for land in Category A, B and C is summarised in **Table 2-1**.

Table 2-1 Parking rates in Category A, B and C of the City of Sydney LEP 2012

Type of dwelling	Category A	Category B	Category C
Studio	0.1	0.2	0.4
1 bedroom	0.3	0.4	0.5
2 bedroom	0.7	0.8	1.0
3. bedroom	1.0	1.1	1.2
Visitor	Nil	<30 units, 0.167 30-70, 0.1 >70, 0.05	<30 units, 0.2 30-70, 0.125 >70, 0.067

Source: The City of Sydney LEP, accessed 2023

2.12 City of Sydney Development Control Plan (DCP) 2012

The City of Sydney can be a reference for the site, though the site is excluded from the document. The DCP is to supplement the Sydney Local Environmental Plan (LEP) 2012 and provide more detailed provisions to guide development. The key objectives of the DCP are to:

- Establish requirements for car share schemes for the benefit of people living and/or working within a development
- Ensure that bike parking is considered in all development and provided in appropriately scaled developments with facilities such as change rooms, showers, and secure areas for bike parking
- Design vehicle access and basement layouts and levels to maximise pedestrian safety and create high-quality ground-level relationships between the building and the public domain
- Provide accessible car parking.

Car share parking spaces are to be provided in addition to the maximum number of car parking spaces permitted in the development. The minimum number of on-site parking spaces to be made available for car share scheme vehicles is to be provided according to one per 60 car spaces for residential development.

All car share parking spaces are to be:

- Publicly accessible 24 hours a day seven days a week
- Located together and near and with access from a public road and integrated with the streetscape through appropriate landscaping where the space is external
- Designated by signs as being for car share scheme use.

On-site bicycle parking rates for residential accommodation should be one per dwelling for residents and one per 10 dwellings for visitors.

Separate parking spaces for service vehicles are to be provided per *Schedule 7 Transport, parking and access* and are not to be shared with parking provided for any other purpose for residential buildings and serviced apartments:

- One space for the first 50 dwellings or serviced apartments
- 0.5 spaces for every 50 dwellings/serviced apartments or part thereafter.

In all buildings that provide onsite parking, one motorcycle parking space for every 12 car parking spaces is to be provided as separate parking for motorcycles. Each motorcycle parking space is to be designated and located so that parked motorcycles are not vulnerable to being struck by a manoeuvring vehicle.

One accessible car parking space is to be provided for every adaptable residential unit. One space for every 20 car parking spaces or part thereof is to be allocated as accessible visitor parking.

2.13 Guide to Traffic Generating Developments

The Roads and Maritime *Guide to Traffic Generating Developments (2002)* sets out traffic generation rates based on survey data collected in New South Wales for a range of land uses. This guide is referred to in the Austroads Guide which is used by Roads and Maritime Services and is generally regarded as the standard for metropolitan development characteristics.

Over the past few years, however, many surveys have been undertaken to update trip generation and parking information outlined in the Guide. The Technical Direction: TDT 2013 / 04a provides a summary of this updated information. This updated Technical Direction will be used to provide input to the likely number of person trips generated by the proposed development.

The traffic generated by the Masterplan will be based on the constrained amount of parking provided by the proposed development. Because the site provides a restricted number of parking spaces, the amount of traffic generated is not expected to be capacity-driven, so the trip rates used to determine the traffic generation in the AM and PM peak have been based on parking trip rates outlined updated Technical Direction for high density residential flat buildings:

– 0.15 trips / parking space in the weekday AM peak
– 0.12 trips / parking space in the weekday PM peak.

3.0 Existing Conditions

3.1 The site

The site is located approximately 2.5 km southwest of the Sydney CBD and is bounded by Eveleigh rail yards to the north, Station Place to the east, Sydney Trains works site to the west and Henderson Road to the south. The regional context of the site is shown in **Figure 3-1**.

The existing buildings on the site comprise 46 social housing dwellings of one to three storeys in height. South Sydney Rotary Park is located along the Henderson Road / Railway Parade, which is a well-used route for pedestrians moving to and from Erskineville Station and South Eveleigh.

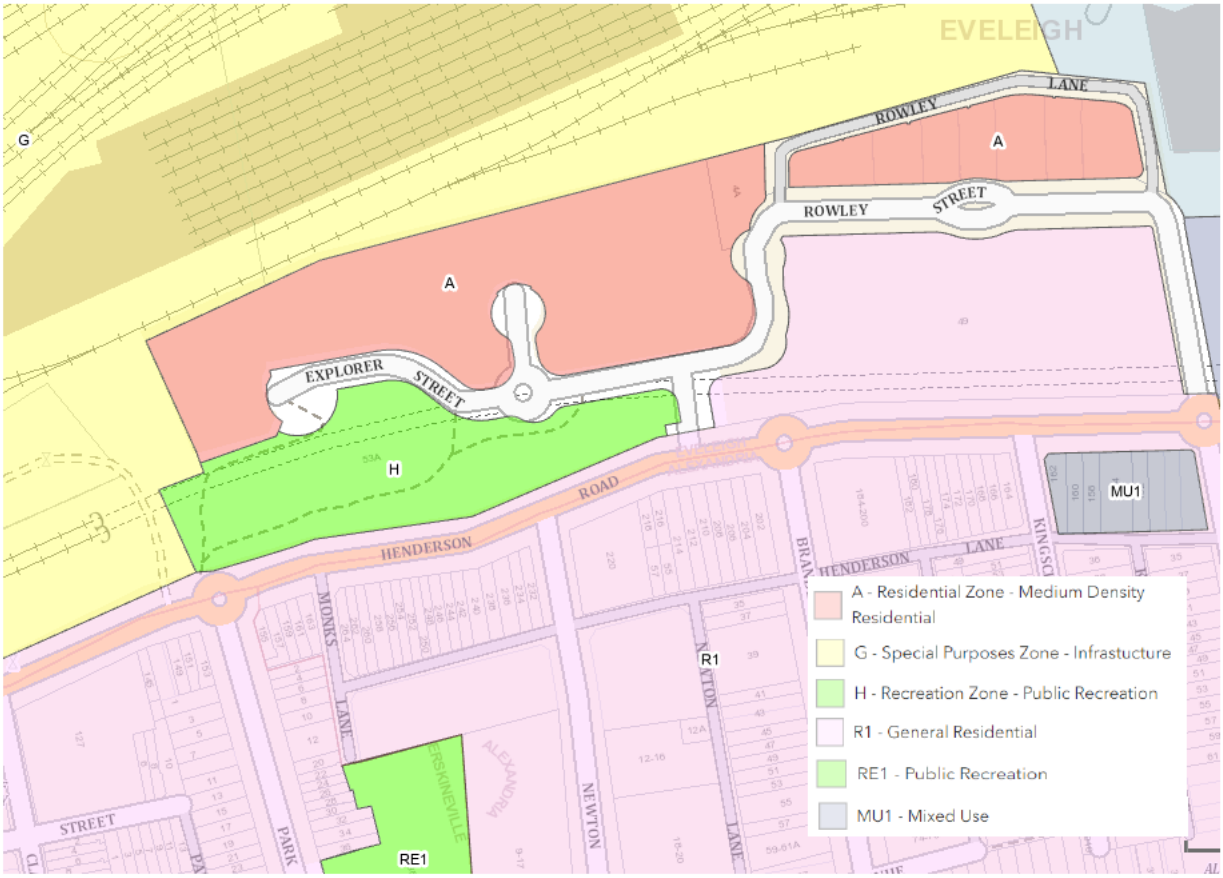
The current housing estate is supported by approximately 65 car parking spaces, with an additional 30 on-street unrestricted parking spaces along Station Place and Explorer Street.

Figure 3-1 The site in a regional context

Source: SCT Consul ing; May 2023

The existing zoning of the site is shown in **Figure 3-2**. The site is part of the 'A - Residential Zone - Medium Density Residential zone' land use zoning which covers an extensive area between Redfern and Macdonaldtown train stations. The surrounding land uses include G - Special Purposes Zone Infrastructure to the north and west, R1 - General Residential to the south and MU1 - Mixed Use to the east.

Figure 3-2 The site's current zoning



Source: https://www.planningportal.nsw.gov.au/spatialviewer, June 2023

The site has excellent access to employment, education / health and open spaces. South Eveleigh located east of the site is one of Sydney's most significant inner-city redevelopments, bringing approximately 18,000 new workers to the precinct. The activated retail and public spaces make it a community hub to attract people in the vicinity.

Sydney University, Alexandria Park Community School, Erskineville Public School, Newtown Performing Arts High School, and Royal Prince Alfred Hospital are walkable education and health organizations around the site with a walking time varying from 10 to 20 minutes.

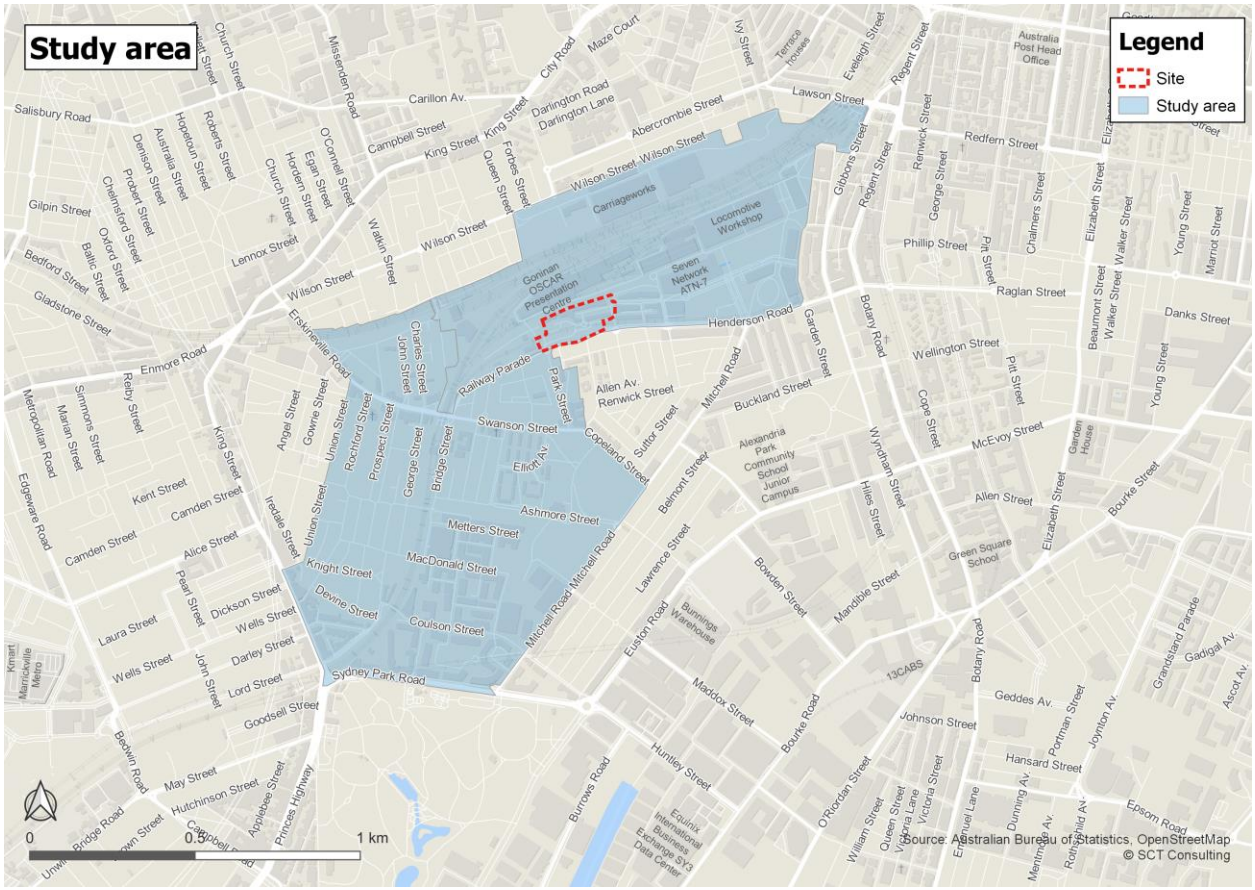
The South Sydney Rotary Park is located within the site. The park is approximately 6,800 m^2 and has undulating topography, particularly on the western edge. There are a few other district and local open spaces within a short walk from the site such as Harry Noble Reserve, Erskineville Oval, Alexandria Park and South Eveleigh playground. Sydney Park, a regional open space, is 1.4 km away from the site, which takes about 20 minutes to walk.

3.2 Travel behaviour

3.2.1 Method of Travel to Work Data

The 2016 Method of travel to work data from Erskineville-Eveleigh was analysed to determine the travel behaviour of the existing residents in the vicinity of the site, as shown in **Figure 3-3**.

Figure 3-3 Study area for the travel behaviour reference for Erskineville – Eveleigh

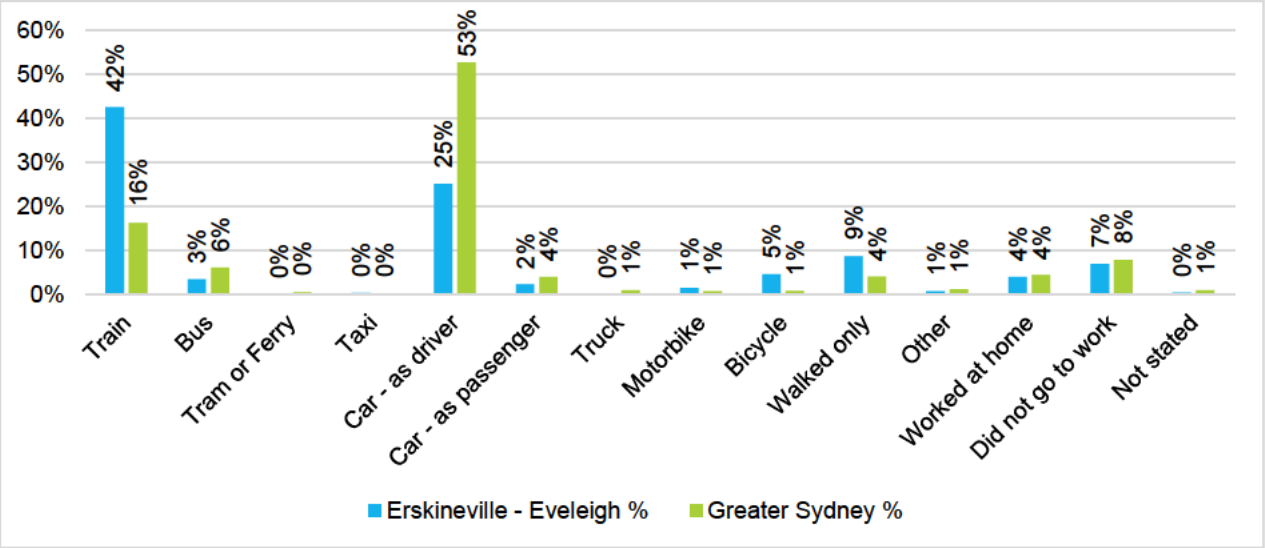


Source: SCT Consul ing, May 2023

At the time of the journey-to-work (JTW) data being collected in 2016, approximately 5,662 trip samples were included in the survey for the area. According to the Australian Bureau of Statistics, a person in employment is one of working age who, during a short reference period, was engaged in any activity to produce goods or provide services for pay or profit.

The travel mode split is shown in **Figure 3-4** to compare the primary departure mode split for residents travelling to work within Erskineville - Eveleigh and the Sydney Greater Metropolitan Area (GMA).

Figure 3-4 Travel modes for JTW in Erskineville - Eveleigh and Greater Sydney



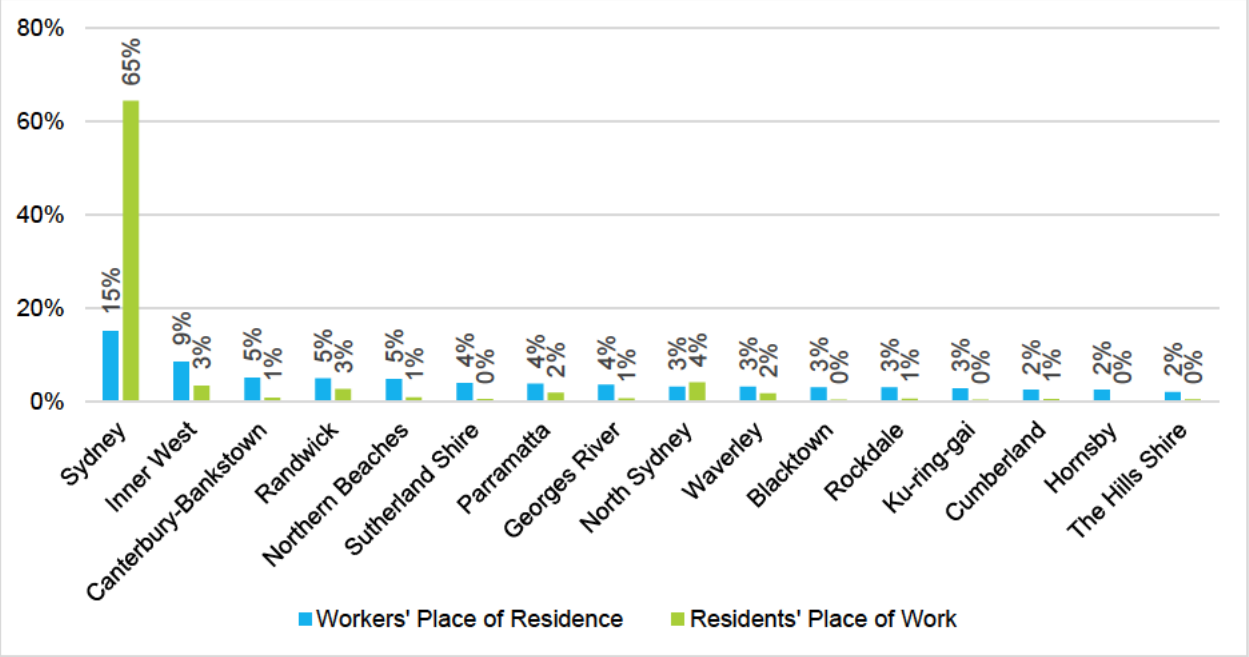
Source: https://profile.id.com au/sydney/travel-to-work?WebID=170&BMID=20, 2019

The vehicle driver was only half of the Greater Sydney level, being 25 per cent. Public transport including train and bus accounted for 45 per cent of all trips, which doubled overall Sydney, indicating less car dependence and high use of public transport in the local area given the well-developed transit network and expensive parking cost in the City.

The use of active transport modes such as cycling (five per cent) and walking (nine per cent) also showed significantly higher levels in Erskineville and Eveleigh than the Sydney average (five per cent in total) due to its location close to employment and good accessibility.

Figure 3-5 illustrates the JTW 2016 origins and destinations for arrivals at / departures from Sydney by LGA as there is no available origin / destination data of JTW for smaller statistical areas.

Figure 3-5 Major origin/ destination LGAs for workers commuting from and to Sydney LGA



Source: https://profile.id.com au/the-hills/workers?WebID=150, 2019

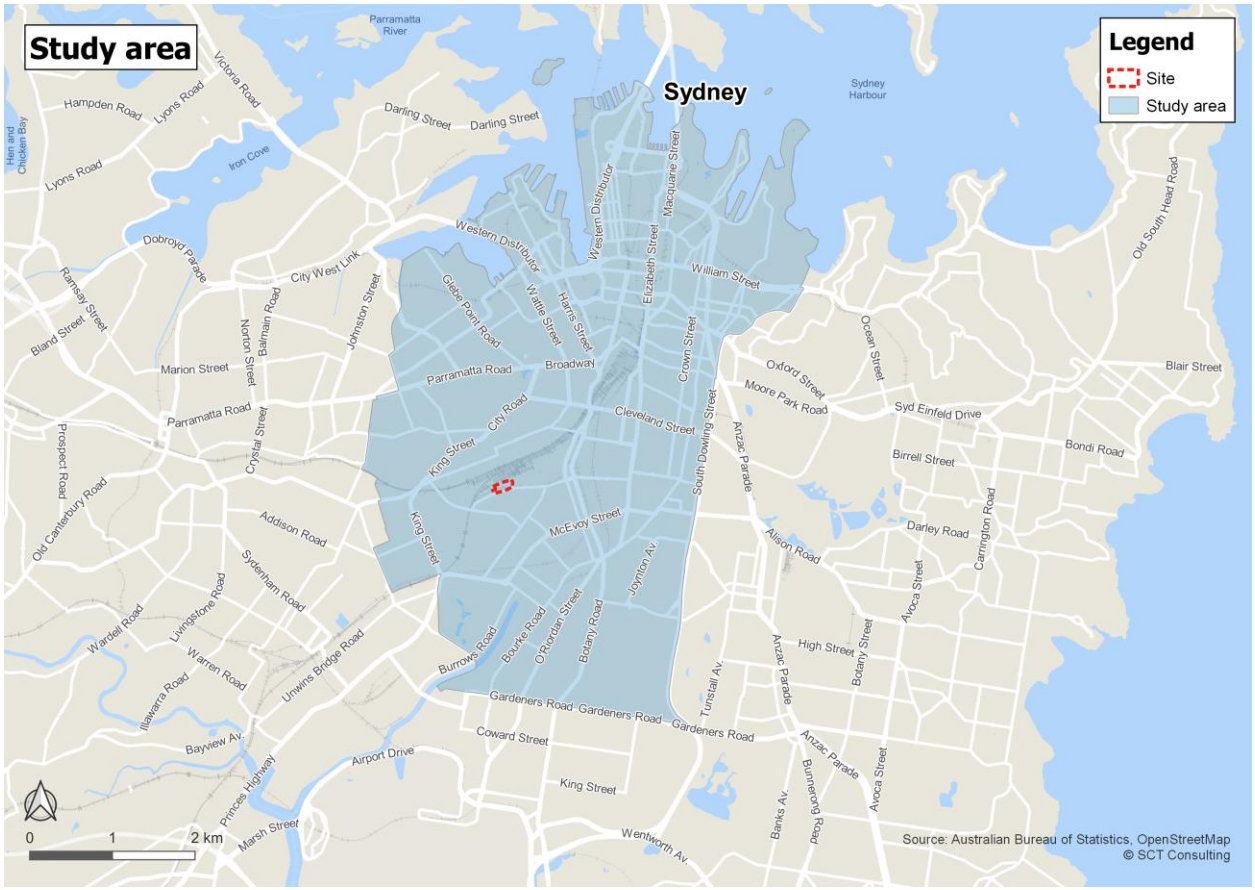
Around 15 per cent of the City workers lived in Sydney, making it possible for more short-distance commuting by walking and cycling. Inner West generates 8.5 per cent of the total work-related trips to Sydney, followed by Canterbury-Bankstown (5.1 per cent) and Randwick (five per cent), which generally require less than 40 minutes of commuting. Other origins fragmented across the Greater Sydney region and were all below five per cent per origin.

For job destinations, nearly two-thirds of the residents in the City worked in the same LGA, while other working destinations of the residents widely spread over the Sydney GMA with a fragmented proportion from 4.1 per cent in North Sydney to 1.8 per cent in Waverley. The remainder were widely distributed and produced less than one per cent of work trips per destination.

3.2.2 Household Travel Survey

The site sits within the statistical area 'Sydney Inner City' as defined by the Australian Bureau of Statistics, 2017 / 2018 Household Travel Survey (HTS) as shown in **Figure 3-6**. For analysis, it has been assumed that JTW data provides a suitable reflection of the travel characteristics during AM and PM peak hour periods on an average weekday, due to the high proportion of trips during this timeframe associated with the journey to work trips.

Figure 3-6 Study area for the travel behaviour reference for Glebe, Sydney Inner City



Source: SCT Consul ing; 2020

Table 3-1 and **Table 3-2** provide a summary of the overall mode choice and purpose of travel by residents of Sydney Inner City against the Sydney average together. The average travel distance for each category was also listed.

Table 3-1 Household travel survey – residents within Sydney Inner City, travel by mode

Mode of travel	Sydney Inner City		Greater Sydney	
	Proportion of total trips	Average distance	Proportion of total trips	Average distance
Vehicle drive	20%	11 km	48%	10 km
Vehicle passenger	6%	5 km	21%	8 km
Train	8%	9 km	6%	17 km
Bus	7%	4 km	5%	7 km
Walk only	55%	1 km	17%	1 km
Other	5%	4 km	2%	6 km
Total	**100%**	-	**100%**	-

Source: https://www.transport.nsw.gov.au/performance-and-analytics/passenger-travel/surveys/household-travel-survey

Table 3-2 Household travel survey – residents within Sydney Inner City, travel by purpose

Trip purpose	Sydney Inner City		Greater Sydney	
	Proportion of total trips	Average distance	Proportion of total trips	Average distance
Commute	17%	6 km	13%	12 km
Work-related business	4%	13 km	6%	15 km
Education / childcare	4%	2 km	8%	4 km
Shopping	14%	1 km	14%	5 km
Personal business	4%	3 km	5%	6 km
Change mode of travel	16%	7 km	14%	12 km
Social / recreation	29%	3 km	22%	7 km
Serve passenger	6%	4 km	17%	6 km
Other	4%	2 km	2%	3 km
Total	**100%**	-	**100%**	-

Source: https://www.transport.nsw.gov.au/performance-and-analytics/passenger-travel/surveys/household-travel-survey

Due to the prime location for jobs, retail and social activities of the study area, the mode share for the Sydney Inner City indicated apparent contrast with Greater Sydney for less car use and more walking trips. The main trip purpose of Sydney Inner City was social / recreation (29 per cent), seven per cent higher than Greater Sydney. Commuting trips in Sydney Inner City contributed 17 per cent of the total trips, four per cent higher than the Sydney average level. Other key trip purposes included shopping and changing modes of travel where the proportions were similar to all the Sydney trips.

The average travel distance of Sydney Inner City by different travel modes and by trip purpose was 48 per cent shorter than overall Sydney.

Travel distances by various modes of transport were generally shorter for Sydney Inner City residents given the high-density development and the availability of multiple destinations within a short distance in the Sydney LGA. The slightly longer trips of vehicle drive were more likely to be outbound trips to suburbs given there is less need to drive within the City.

Trip purposes such as social / recreation, education / childcare, personal business and shopping were all within a three km travel distance, reflecting excellent access to the local activities and a high probability of trips on foot or by

cycle. The relatively short commuting length for workers travelling within the Sydney LGA also supports active transport as an important mode of travel and tallies with the fact of lower car use compared to Sydney's average level.

3.3 Road network

3.3.1 Road classification

The site is bounded by Eveleigh rail yards to the north, Station Place to the east, Sydney Trains works site to the west and Henderson Road / Railway Parade to the south. Other roads in the vicinity include Explorer Street, Park Street, Progress Road, Rowley Street / Station Place, Erskineville Road / Swanson Street / Copeland Street and Mitchell Road. The road network surrounding the site is shown in **Figure 3-7**.

Figure 3-7 Road network around the site

Source: SCT Consulting, 2023

The characteristics of the key road network surrounding the subject site are:

– **Henderson Road** is a local road between the intersection of Park Street to the west and Botany Road to the east. It extends to the west as Railway Parade and the east as Raglan Street. In the vicinity of the site, the road contains one lane in each direction, but west of the site (between Sydney Lane and Swanson Street), Railway Parade becomes a one-way street in a southbound direction. This prohibits cars from entering into Railway Parade from Swanson Street in a northbound direction. In proximity to the site, 2P-restricted parking (except for residence permit holders) is provided on the south side of the road, while the northern side provides unrestricted parking. The sign-posted speed limit in this section of the road is 40 km/hr.

  Footpaths are present along both sides of Henderson Road, with tree coverage including many shaded areas. An off-street two-way cycleway runs along the northern side of the road, parallel to the footpath between Mitchell Road and Sydney Lane. The implementation of this cycleway has resulted in recent configuration

changes to the roundabouts between Henderson Road and Alexander Street, Brandling Street and Park Street respectively, to become give way intersections. The introduction of this cycleway has turned Henderson Road into a calmer traffic environment, and together with gaps in traffic and parked cars, provides informal crossing opportunities for pedestrians in proximity to the site.

– **Explorer Street** is a local road mainly serving the residences within the site. The 7m wide two-way street runs in an east-west direction with an access road named Progress Road connecting to Henderson Road in the southeast of the site. 2P restricted parking (except for residence permit holders) is provided on both sides of the road. The street is a cul-de-sac at the western end and connects to Station Place in the east. No sign-posted speed limit is established on the street. There is a footpath on the northern side of the street whilst the southern side faces South Sydney Park where there are links to the Henderson Road / Park Street intersection.
– **Park Street** provides the link to southern Swanson Street from the Henderson Road / Railway Parade intersection in a north-south direction. 2P restricted parking (except for residence permit holders) is provided on both sides of the road. With the introduction of the southbound-only movement along Railway Parade west of Sydney Lane, vehicles accessing Henderson Road / Railway Parade from the west are expected to do so via Park Street and then a right turn movement into Henderson Road.
– **Progress Road** is a short (around 25m length) two-lane road that runs in a north-south direction and connects Henderson Road and Explorer Street. It is expected to be the key access point for vehicles travelling from Henderson Street to the site. No footpaths are provided on either side of Progress Road.
– **Rowley Street / Station Place** is an 11m wide street in the northeast of the site extending from Explorer Street to Station Place in an east-west direction. 2P parallel parking (except for resident parking holders) is provided on both sides. There is significant overshadowing in winter with footpaths provided on both sides of the street.
– **Erskineville Road / Swanson Street / Copeland Street** in the south is a major state road that runs in an east-west direction, connecting Michell Road and King Street. On-street parallel parking is provided on both sides of the road with one traffic lane in each direction. The sign-posted speed limit on this section of the road is 50 km/hr.
– **Mitchell Road** in the vicinity of the site sees a mixed classification of state road and regional road with the split at Fountain Street. On-street parallel car parking is generally provided with some occasional presence of non-stopping and bus zones. Mitchell Street has generally one lane provided in each direction. The sign-posted speed limit is 50 km/hr.

3.3.2 Traffic volumes

Traffic count surveys were undertaken during the AM (7:30 – 9:30) and PM (3:00 – 06:00) peak periods on 11 May 2023 to determine the existing traffic volumes in the proximity of the site, at the following intersections:

– Henderson Road / Park Street
– Henderson Road / Progress Road
– Henderson Road / Brandling Street.

The common peak hour for all intersections was found to be from 8.15 to 9.15am in the morning and between 5 to 6pm in the afternoon. The mid-block traffic volumes at these times on the surrounding road network are summarised in **Table 3-3**.

Table 3-3 Existing mid-block traffic volumes at key roads surrounding the site

Location	Direction	Traffic volumes (vehicles per hour)	
		Weekday AM Peak Hour	Weekday PM Peak Hour
Henderson Road, west of Park Street	EB	37	26
	WB	183	251
Henderson Road, east of Park Street	EB	253	104
	WB	168	246
Henderson Road, west of Brandling Street	EB	264	100
	WB	179	234
Explorer Street, west of Progress Road	NB	56	33
	SB	50	44
Station Place, west of Rowley Lane	NB	31	8
	SB	39	15

Source: Trans Traffic Survey Counts undertaken 11 May 2023

The traffic volumes along Explorer Street and Station Place are currently minor in the AM and PM peak hours, with volumes of less than 60 vehicles per hour in either direction, at any time. The traffic volumes along Henderson Street are significantly higher in the westbound direction than the eastbound, which is in line with the current restriction of westbound / southbound movements along Railway Parade, north of Swanson Street. The eastbound traffic volumes are however significantly higher east of Park Street than west of Park Street. This suggests that a high number of drivers would access Henderson Street via Park Street from Swanson Street because of the no-left turn movement into Railway Parade from Swanson Street, and then turn right into Henderson Street from Park Street.

3.3.3 Road network performance

To understand the operational performance of key intersections surrounding the site, the traffic counts commissioned in the AM and PM peak hours in May 2023 were used to assess the performance of the existing road network surrounding the site, for the following intersections:

- Henderson Road / Park Street
- Henderson Road / Progress Road
- Henderson Road / Brandling Street.

Operational performance is typically measured through an assessment of the throughput of vehicles across a traffic network, with the average delay per vehicle used to assess the performance of an individual intersection. The average delay per vehicle measure is linked to a Level of Service (LoS) index which characterises the intersection's operational performance. **Table 3-4** provides a summary of the LoS performance bands.

Table 3-4 Level of Service Index

Level of Service	Average delay per vehicle (sec/h)	Performance explanation
A	Less than 14.5	Good operation
B	14.5 to 28.4	Good with acceptable delays and spare capacity
C	28.5 to 42.4	Satisfactory
D	42.5 to 56.4	Operating near capacity
E	56.5 to 70.4	At capacity, at signals incidents will cause excessive delays. Roundabouts require other control method.
F	70.5 or greater	At capacity, at signals incidents will cause excessive delays. Roundabouts require other control method.

Source: Guide to Traffic Generating Developments; RMS; 2002

The weekday AM and PM peak hour traffic volumes and the performance of the analysed key intersections are summarised in **Table 3-5**, with the detailed results of the analysis presented in **Appendix A**. The intersections surrounding the development perform well with minimal delays under current conditions. The intersection of Rowley Street / Rowley Lane / Station Place was not included for analysis given its low traffic volumes and because it is not priority controlled for any movements other than vehicles turning right onto Rowley Lane which had a volume of 0 during the peak period.

Henderson Road has a two-way bike path that extends from Railway Parade to Mitchell Road. Hourly peak cycling data that aligned with the traffic peak periods and was collected on Henderson Road in March 2023[1], was incorporated into the model, to understand the cumulative impact of all possible existing conditions.

Table 3-5 Existing intersection performance

Intersection	Weekday AM peak hour			Weekday PM peak hour		
	Volume	Delay	LoS	Volume	Delay	LoS
Henderson Road / Park Street	469	7.8	A	410	7.9	A
Henderson Road / Progress Road	482	9.3	A	373	14.3	A
Henderson Road / Brandling Street	460	10.9	A	348	8.2	A

Source: SCT Consul ing, 2023

3.4 Public Transport

3.4.1 Train

The site is approximately 800m away from Redfern Station in the northeast and 500m from Erskineville Station to the southwest.

Redfern station is an approximately 10-minute walk from the site and is a major station with connections to Sydney Trains and NSW Train Link networks. Accommodating 12 platforms, it is one of the busiest railway stations in the Sydney area including six Sydney train services. There is a frequency of nearly three services per minute during the weekday AM and PM peak periods in two directions of travel. Even during the weekend peak, there are approximately fifty train services per hour. The train service at Redfern Station covers a wide range of the metropolitan Sydney area including Berowra, Emu Plains, Macarthur and Waterfall. Access to the Redfern Station from the site mainly follows Rowley Street and Central Avenue running through South Eveleigh, where good footpaths and shared zones are provided.

[1] City of Sydney Council, 2023

Erskineville station is approximately 500m from the site or a 7-minute walk. It is on the T3 Bankstown line providing a connection between the City Circle and Lidcombe or Liverpool via Bankstown. The service frequency during a typical weekday AM and PM peak is around nine to ten services per hour whereas that for weekend peak slightly drops to eight services.

Footpaths are provided between the site and the station along Railway Parade with varied quality and width. Some sections are not Disability Discrimination Act (DDA) compliant.

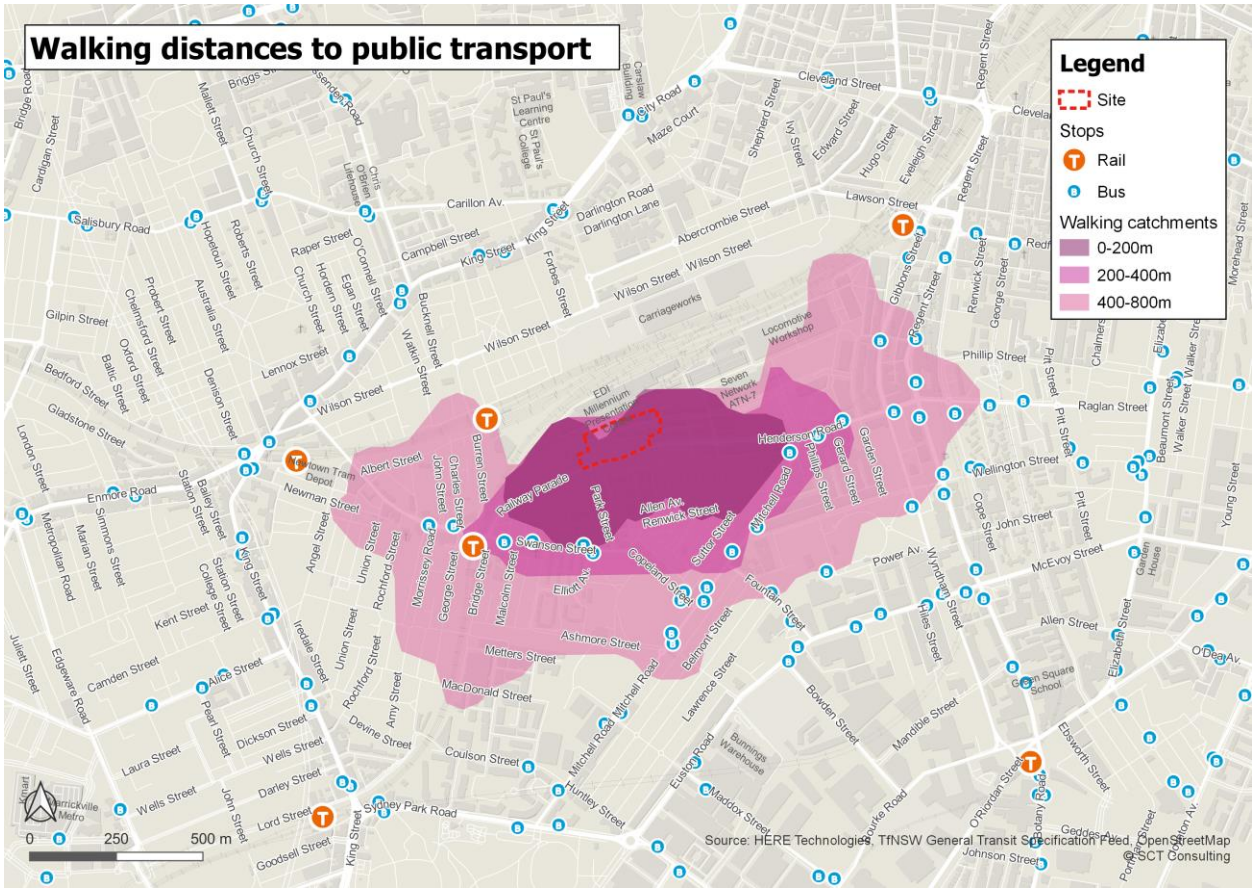
3.5 Public Transport

3.5.1 Bus

Limited bus services are within a short walk from the site. Bus stops are located on Swanson Street, around 300m from the site and on Mitchell Road, around 500m, as seen in **Figure 3-8**.

Table 3-6 shows the frequency of bus services in the vicinity of the site. The bus routes cover key destinations such as Bondi Junction, Marrickville, Leichhardt and Coogee. Given the availability of substantial train lines around the site, there is no major capacity issue with public transport for potential residents of the site.

Figure 3-8 Walking distances to public transport



Source: TfNSW, Bus operator maps, 2020

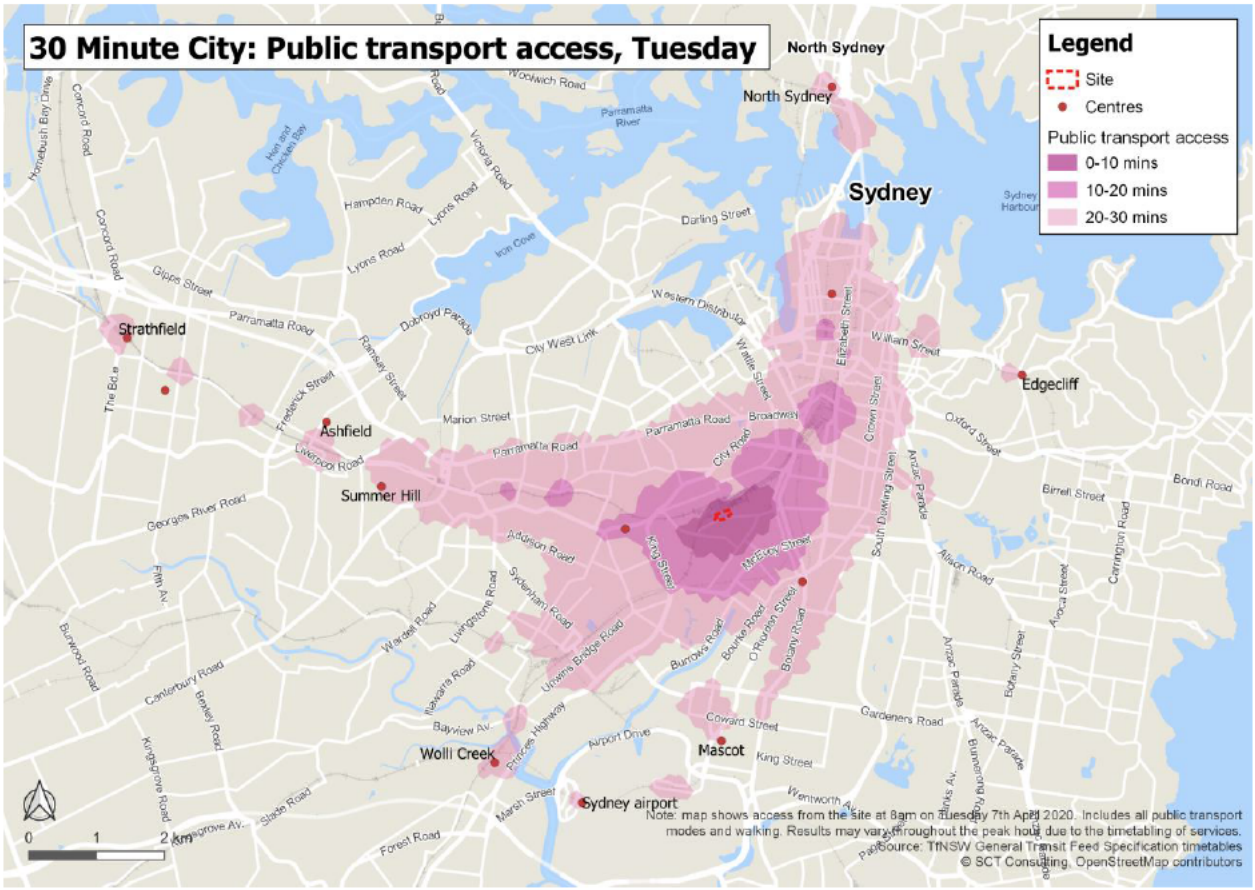
Table 3-6 Bus route details for the site

Route	Corridor	To	From	Average number of services (per hour, both directions)			
				Weekday		Weekend	
				AM (6-9am)	PM (3-7pm)	Sat (6-9pm)	Sun (6-9pm)
370	Swanson Street	Leichhardt Marketplace	Coogee	7	7	5	5
370		Coogee	Leichhardt Marketplace	7	7	5	5
308	Mitchell Road	Central Eddy Av	Marrickville Metro	8	10	3	2
355		Bondi Junction	Marrickville Metro	3	3	3	3
355		Marrickville Metro	Bondi Junction	3	3	3	3
Total				**28**	**30**	**19**	**18**

Source: Opal data, 2019

A thirty-minute public transport coverage area is shown in **Figure 3-9** indicating that by using public transport, the residents of the site can reach the majority of the Sydney CBD and eastern part of Sydney's Inner West. The easternmost and southernmost local centres people can reach are Edgecliff and Sydney Airport, respectively. Other key areas within 30 minutes include Milsons Point in the north.

Figure 3-9 Thirty-minute public transport catchment area



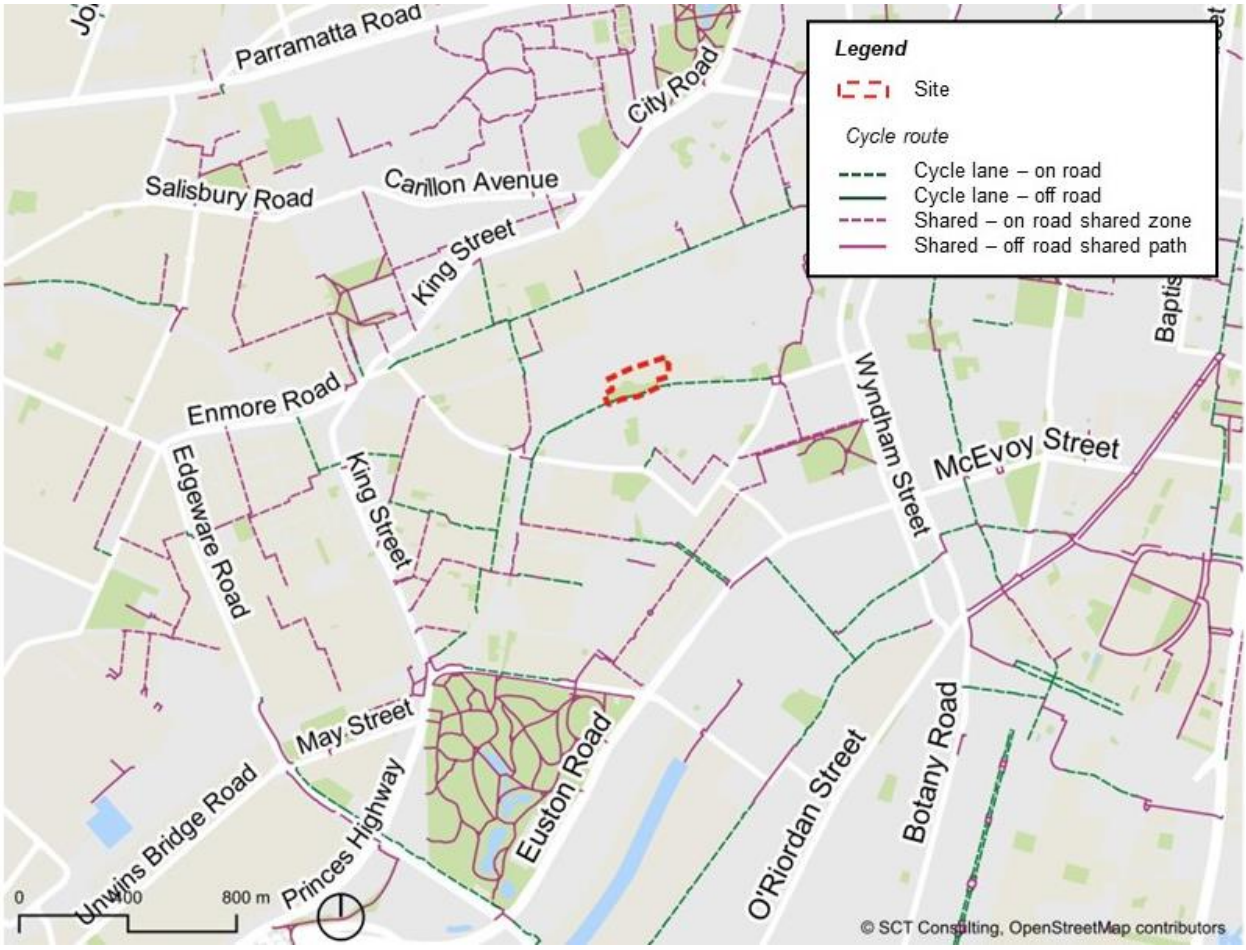
Source: SCT Consul ing, 2020

3.6 Active transport

3.6.1 Cycling

The existing cycle network in the proximity of the site is presented in **Figure 3-10**. Being generally flat and along with existing on-street parking acting as a buffer, the recently implemented two-way off-road cycle path along the northern side of Henderson Road is classified as low difficulty on-road environment. It links to a dedicated infrastructure in the eastern Southern Eveleigh Playground, further connecting Redfern and Erskineville station in the southwest. Cycling is a competitive option in the proximity of the site, especially with the introduction of the recent off-road cycleway along the northern side of Henderson Road.

Figure 3-10 Cycle pathway around the site



Source: RMS Cycleway Finder, 2023

3.6.2 Walking

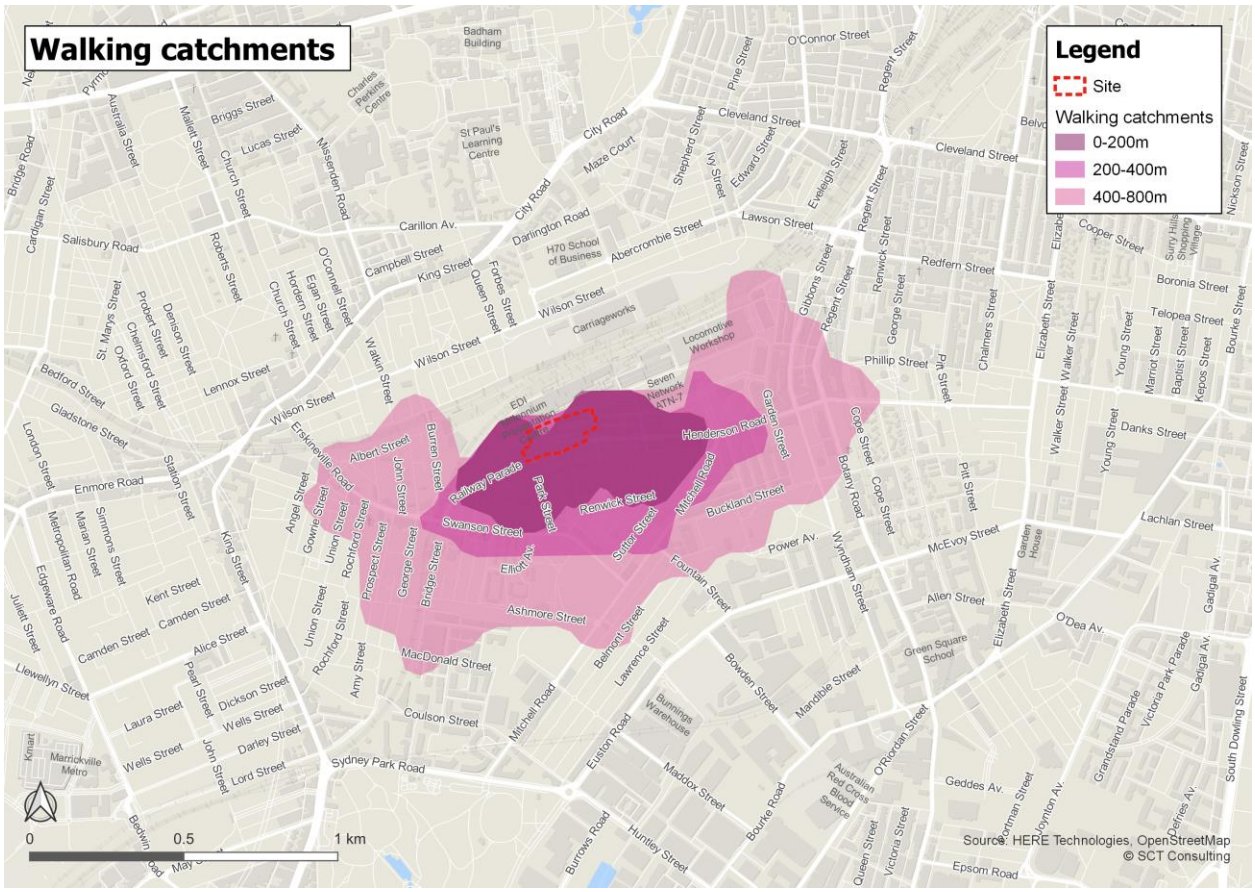
The walking environment around the site is generally pleasant. Streets connecting the site to train stations are low in traffic volumes and have buffers such as parking. Footpaths are in good condition with a tree canopy and adjacent open space.

There are no footpaths along Progress Road but pedestrian access from Henderson Road to Explorer Street is available through South Sydney Rotary Park via two access paths. From the east, pedestrians can gain access to the site via the footpaths along Rowley Street / Station Place.

A pedestrian refuge for pedestrians crossing Henderson Road is provided at Alexander Street east of the site. Footpaths are present along both sides of Henderson Road, with tree coverage including many shaded areas. An off-street two-way cycleway runs along the northern side of the road, parallel to the footpath between Mitchell Road and Sydney Lane. The introduction of this cycleway has turned Henderson Road into a calmer traffic environment, and together with gaps in traffic and parked cars, provides informal crossing opportunities for pedestrians in proximity to the site.

Given the completion of South Eveleigh, there is a well-established footpath and shared zone on the pedestrian route to Redfern Station. Shops and café make it friendly for pedestrians. `A walking catchment map is shown in **Figure 3-11**.

Figure 3-11 Walking catchment map



Source: SCT Consul ing, 2020

3.7 Car share

Car share decreases the need for some people to own a car and can reduce parking demand and traffic generation. It differs from traditional car hire companies in that cars can be hired in half-hour increments and are located near where people live or work. The benefits realisation of car share schemes, with respect to the City of Sydney LGA, is documented within the Committee for Sydney document *'Carsharing: Sydney Snapshot'* as follows:

– Each car share vehicle replaces indicatively 10 private vehicles parking spaces, which could be considered in the application of ratios for car spaces within new dwellings.

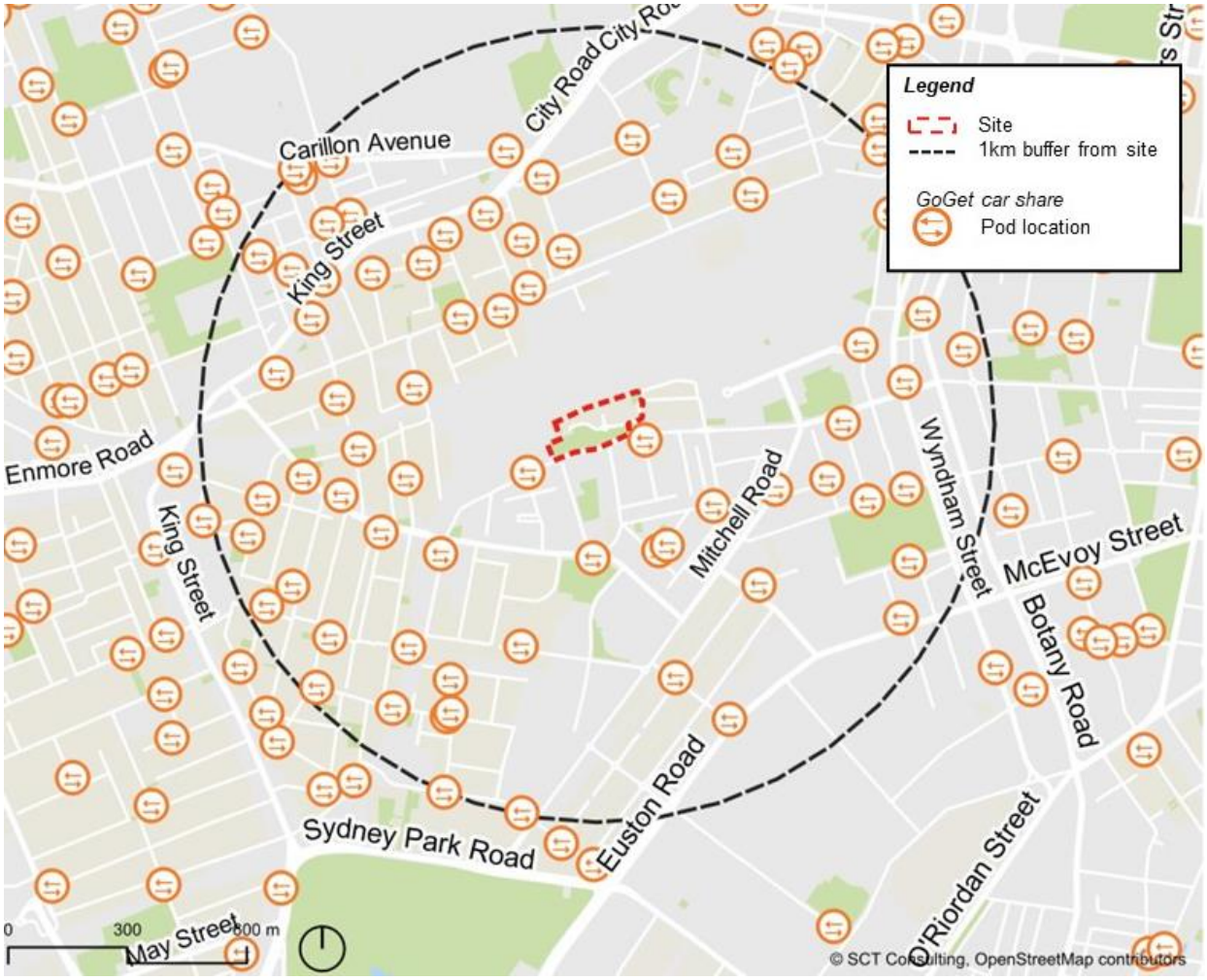
– A reduction in vehicle kilometres travelled by approximately 2,000 km per year for each user with corresponding increases in walking, cycling or using public transport. This has flow-on impacts on the health of residents.

– Each car space in a multi-storey car park can cost between $30,000 - $70,000 to construct with apartment prices increasing in cost by $50,000 - $140,000 when a car space is provided. These cost savings are passed on to developers and unit owners.

– The current benefit that each car share vehicle provides is estimated at $59,673. This takes into consideration factors such as congestion, environmental factors such as emissions, the opportunity cost of not owning a car space, management fees and the community value of space.

These statistics support the notion of using car share schemes, to achieve reductions in private vehicle ownership. They also allow for action to be taken regarding parking provisions and a review of existing parking controls. A map of the GoGet parking locations is shown in **Figure 3-12**, indicating numerous Go Get cars near the site.

Figure 3-12 Go Get pods around the site



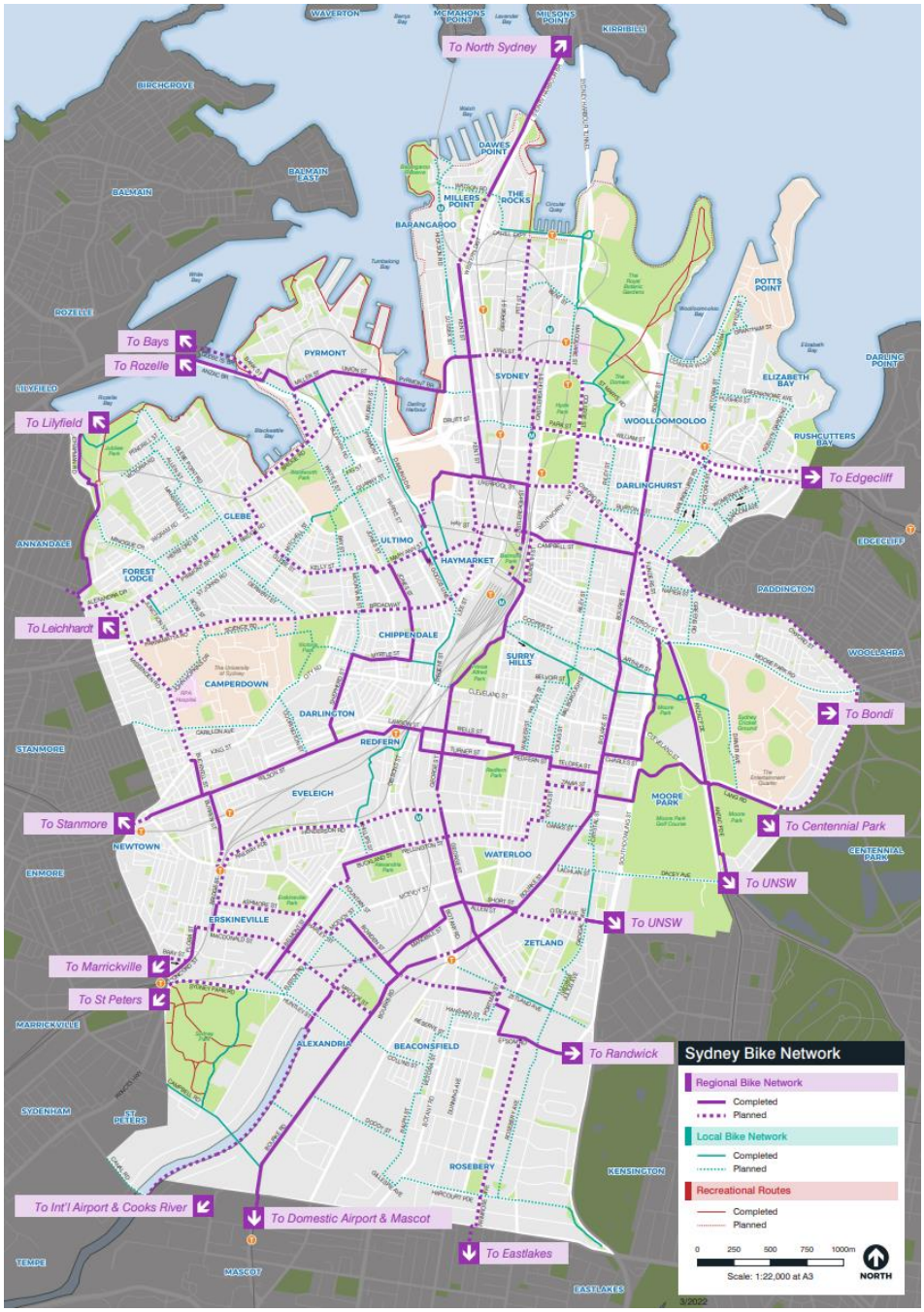
Source: https://www.goget.com.au/find-cars/, 2023

4.0 Future transport infrastructure upgrades

4.1 Cycling infrastructure upgrades

As described in the City of Sydney's Cycling Strategy 2018-2030 (presented in **Section 2.6**), the off-road shared path and cycle routes along Wilson Street and Burren Street north and west of the site, have been identified as future regional cycles routes (**Figure 4-1**) in the Strategy and will connect the site with the inner city as well as other nearby suburbs such as Stanmore, Marrickville and Centennial Park. A future local route along Phillips Street will also improve connections from the site to the Redfern and Erskineville Stations and the future Metro station at Waterloo.

Figure 4-1 Existing and planned bicycle infrastructure in the City of Sydney (2022 map)



Source: https://www.cityofsydney.nsw.gov.au/strategies-action-plans/cycling-strategy-and-action-plan (2023)
Note: The Henderson Street off-street cycleway has been implemented since the last version of this map was produced.

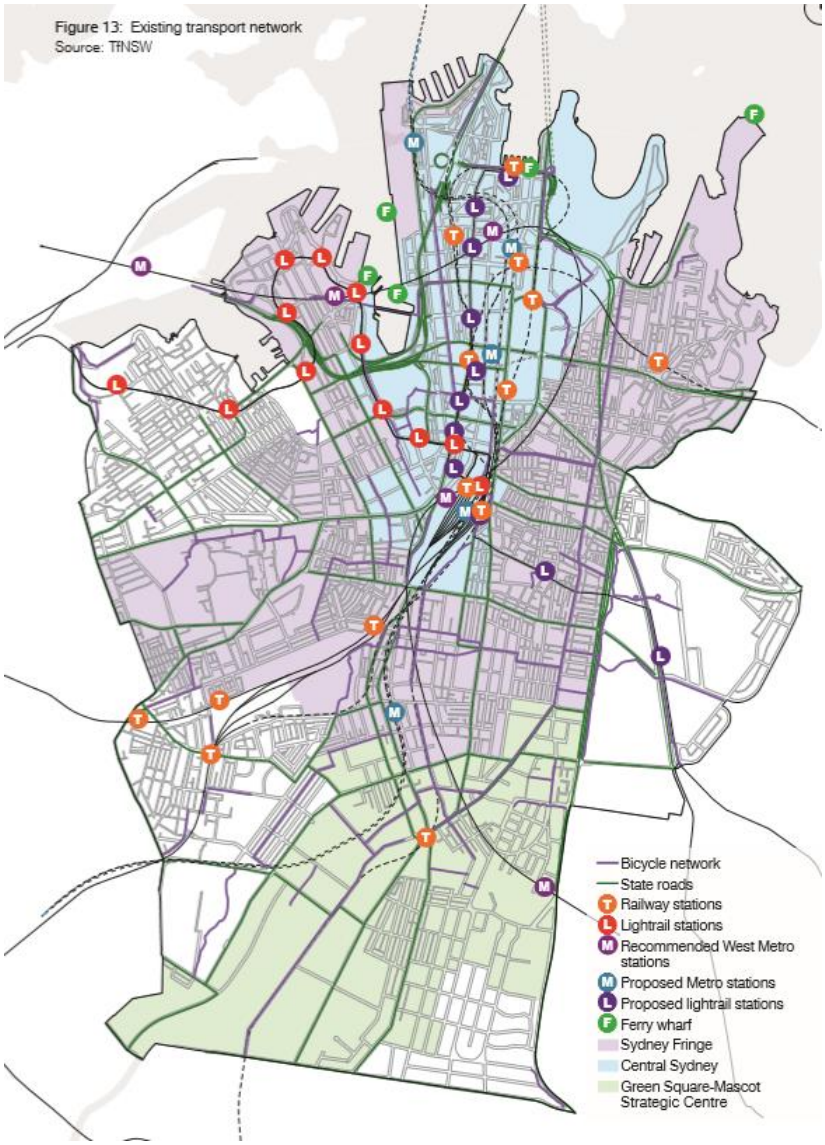
4.2 Sydney Metro

The Sydney Metro City and Southwest will be a new 30-km Metro line extending metro rail from the end of Sydney Metro Northwest at Chatswood under Sydney Harbour, through new CBD district stations, and southwest to Bankstown. This Metro line is due to open in 2024, with the capacity to run a Metro train every two minutes each way through the centre of Sydney.

The future Metro station closest to the site will be Waterloo Station, approximately 900m east of the site, as seen in **Figure 4-2**. The Metro is expected to increase the rail network capacity by 60 per cent and support forecast growth in rail patronage from 168,000 to 288,000 trips per hour. Waterloo Station will revitalise the Waterloo precinct, and support the extension of the CBD. It will also take pressure off Redfern and Green Square stations, and provide a new fast, safe and reliable metro rail link to key employment areas in the Sydney central business district, North Sydney and Barangaroo.

The Metro will provide the site with an excellent alternative transport mode, in addition to bus and train. Although the nearest Metro station will be located 900m from the site, the proposed local and regional cycle network improvements as listed in the City of Sydney's Cycling Strategy 2018-2030 (**Section 2.6**) will significantly improve bicycle access from the site to the Waterloo Metro Station in the future. These include the recently implemented cycle link along Henderson Road and future routes along Phillips Street, Buckland Street and Wellington Street between the site and the Waterloo Metro Station.

Figure 4-2 Planned City Metro and West Metro stations in proximity to the site



Source: The City of Sydney Draft LSPS, 2020

5.0 Proposed Development

5.1 Design strategy principles

The following principles were used to frame the development of the concept design of the indicative master plan:

1. Net increase of affordable and social housing
2. Indistinguishable market and social development
3. Feasible development
4. No loss of public open space and minimal overshadowing
5. Address noise impacts from the rail corridor
6. Create engaging visual and physical connections between the site and the surrounding street network
7. Improve usability of public open space for the local community and enhance biodiversity
8. Environmentally sustainable, country-centred development

The site's design strategy principles, its potential developable areas and its access to the surrounding area are illustrated in **Figure 5-1**. The strategy for the site includes:

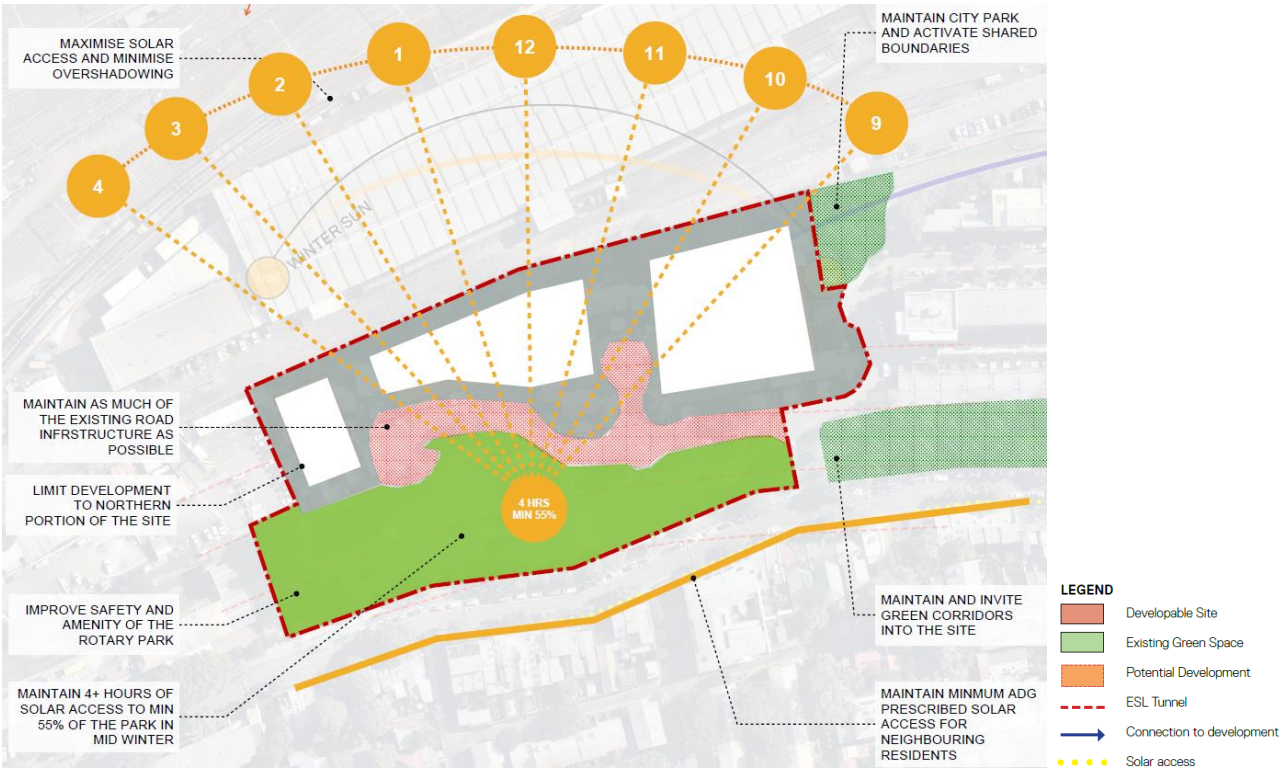
– Significant structure located North-West of the site to act as a focal point for surrounding viewpoints

– Opportunity to link pedestrian circulation through the back and sides of the site and connect to future developments

– Positioning and size of the site have been configured to maximise solar access to the park and south residential

– Celebrate and enhance the existing green canopy/corridor, connecting the site to surrounding development and linking circulation through the site.

Figure 5-1 The site's design strategy principles



Source: The Explorer Street, Eveleigh Design Report (2023)

5.2 Indicative master plan

The preferred Masterplan option is the result of design testing and evolution that encapsulates the study objectives and design principles outlined in **Section 5.1**. The preferred Masterplan will maintain the existing green space extent and location of South Sydney Rotary Park between Henderson Road and Explorer Street and the existing City of Sydney Park at Rowley Street.

The indicative Masterplan will also maintain the road layout in proximity to the site, except for modifications to the cross sections of Explorer Street and Aurora Place. Parking for the development will be provided over two basement levels and will be accessed from Aurora Place. The proposed Masterplan layout is shown in **Figure 5-2**.

Figure 5-2 The proposed Masterplan (site plan)

Source: The Explorer Street, Eveleigh Design Report (2023)

5.3 Development yield

The total potential yield for the preferred development option is outlined in **Table 5-1**, which provides a summary of the current, future, and additional floor space and dwelling yield, and changes to parking provision compared to the existing scenario.

The proposed Masterplan will increase the amount dwellings on site by 348 and increase the number of parking spaces by 150 compared to the existing situation.

Table 5-1 Potential yield under preferred development option

Development	Item	Yield
Existing	**Total dwellings**	**46 dwellings**
	Parking spaces	**95 spaces**
Proposed	1 Bed	128
	2 Bed	200
	3 Bed	66
	Total dwellings	**394 dwellings**
	Parking spaces	**245 spaces**
Increase	**Dwellings**	**+ 348 dwellings**
	Parking spaces	**+ 150 spaces**

Source: Source: The Explorer Street, Eveleigh Design Report (2023)

5.4 Proposed access arrangements

Proposed vehicular and pedestrian access to the site is illustrated in **Figure 5-3**.

5.4.1 Vehicle access

The nearest access from the surrounding road network and the main road Henderson Road from the south is via Progress Road, which provides access to the car park entrance at Aurora Place via Explorer Street. The site can also be accessed from Henderson Road further east, via Alexander Street and Rowley Street which connects to Station Place. Except for amendments to the northern access point at Aurora Place and changes to the cross section of Explorer Street, no change is proposed to the existing road network, for vehicles to access the site.

5.4.2 Walking and cycling access

The existing South Sydney Rotary Park and the looped walking path connecting the footpath along Henderson Road to the proposed development are retained in the proposed Masterplan. This facilitates access to the site from the proposed pedestrian entries along Henderson Road, as seen in **Figure 5-3**. Footpaths are also currently provided along the northern side of Explorer Street and along both sides of Rowley Street / Station Place, which will aid pedestrian access to the site.

The recently implemented off-road cycle lane along Henderson Street provides direct access to the site from the surrounding cycle network via a short section of on-road cycling along Progress Road and Explorer Street.

The nearest pedestrian crossing at Henderson Road is via a pedestrian refuge located approximately 250m east of the site. Most walking trips are however expected to access the site from the north, so this pedestrian crossing at Henderson Road is considered to be adequate for walking trips from the south. The recent implementation of the off-road cycleway along Henderson Road has also turned this road into a calmer traffic environment, and together with gaps in traffic and parked cars, provides informal crossing opportunities for pedestrians in proximity to the site.

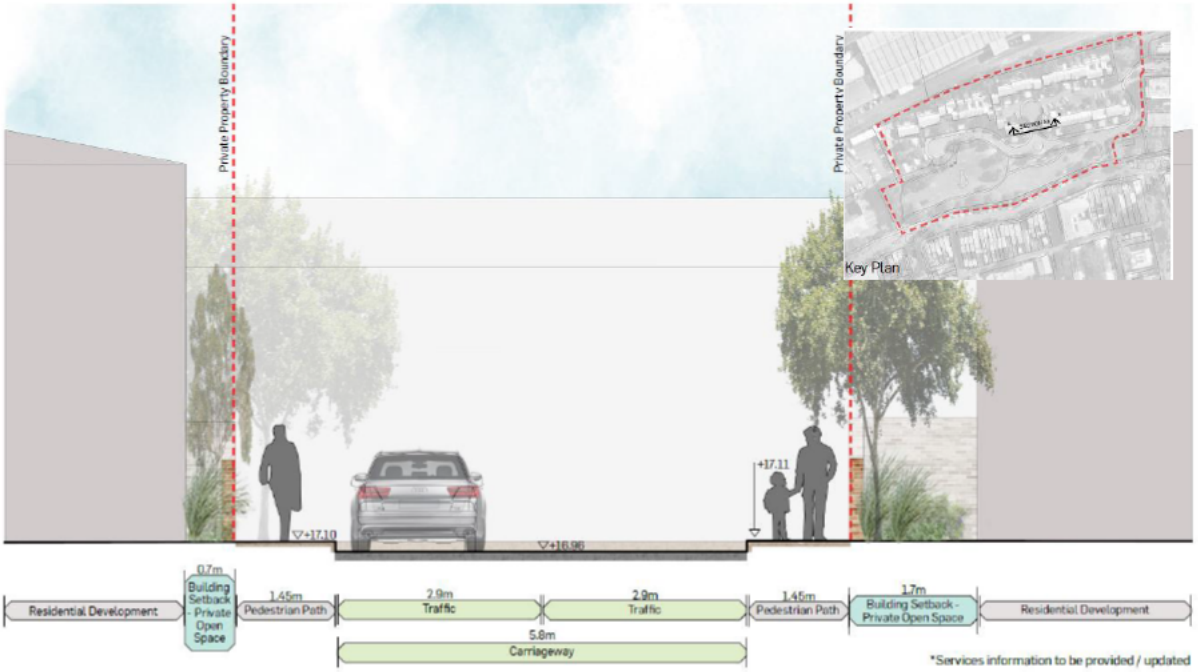
Figure 5-3 Proposed vehicle and walking access to the site

Source: The Explorer Street, Eveleigh Design Report (2023)

5.4.3 Road cross sections

The existing cross section of Aurora Place is shown in **Figure 5-4**. For the proposed development, it is however proposed that this cross section be amended to cater for traffic only within kerb-to-kerb for vehicles accessing the basement. Consideration also needs to be given to cyclists entering the basement. Cycling could be mixed with traffic on the approach to the access, but for the ramp going into the basement, a cycle lane on the ramp should be considered.

Figure 5-4 Existing cross section of Aurora Place

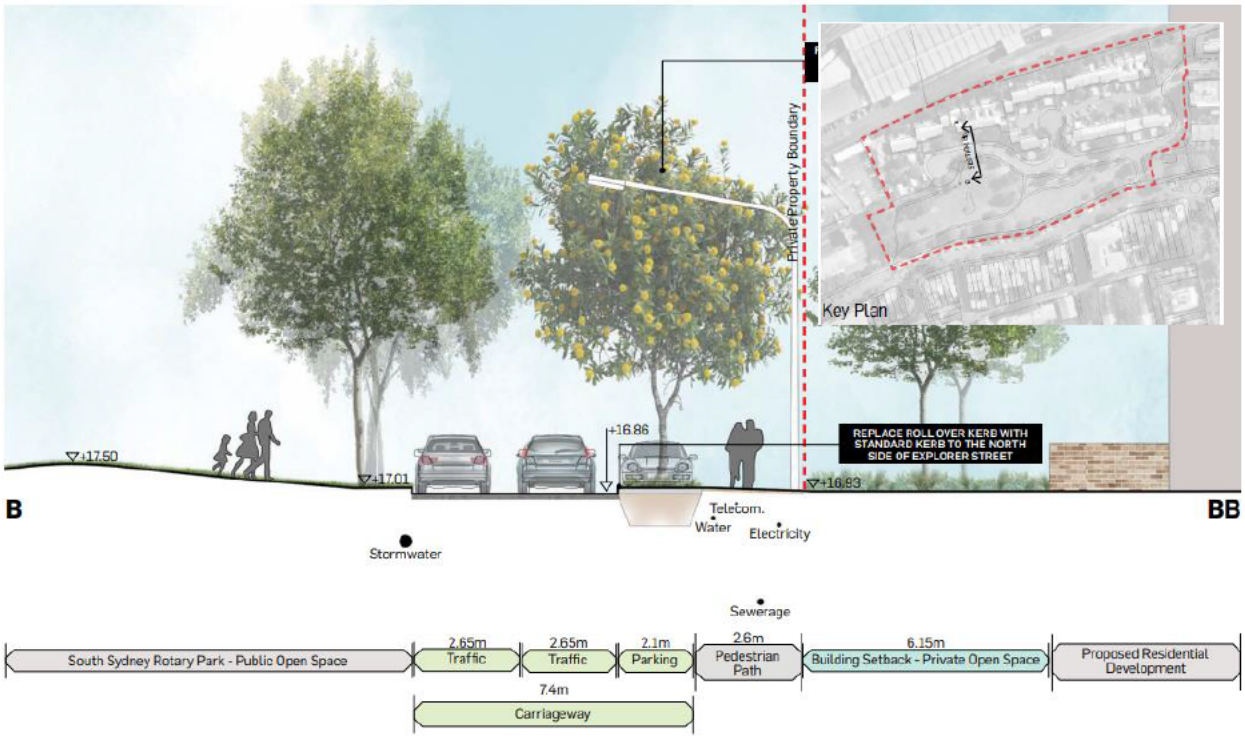


Source: The Explorer Street, Eveleigh Design Report (2023)

The proposed cross section of Explorer Street is shown in **Figure 5-5**. The cross section shows that two traffic lanes and one parking lane (along the northern side of Explorer Street) is proposed along Explorer Street as part of the proposed development.

This will result in the removal of on-street parking on the southern side of Explorer Street and hence result in reduced on-street parking provision. The existing roll over kerb on the northern side is proposed to be replaced with a standard kerb.

Figure 5-5 Proposed cross section of Explorer Street



Source: The Explorer Street, Eveleigh Design Report (2023)

5.5 Parking requirements and provision

5.5.1 Car parking requirements

Residential development by Land and Housing Corporation (p2 d6) may be carried out without consent, in the case of a development application made by a social housing provider for development on land in an accessible area, with the following parking rates:

- At least 0.4 parking spaces are provided for each dwelling containing one bedroom
- At least 0.5 parking spaces are provided for each dwelling containing two bedrooms
- At least one parking space is provided for each dwelling containing three or more bedrooms.

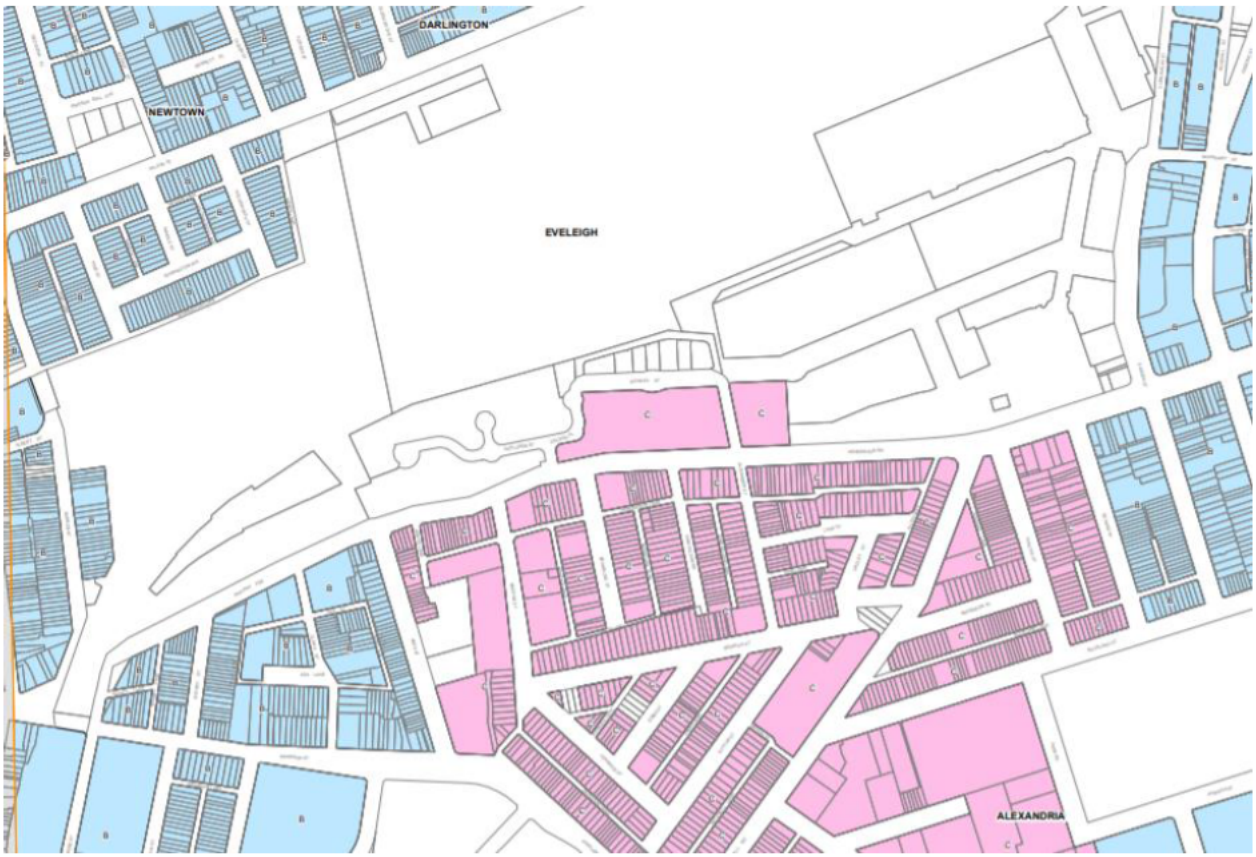
Guidance on parking rates in other relevant state and local planning frameworks could however be applied to estimate likely parking provision for the site. New developments such as the site are encouraged to minimise car parking provision and demonstrate the inclusion of transport alternatives or strategies to discourage private motor vehicle use.

The City of Sydney LEP 2012 specifies parking rates required for different categories depending on where the site is located, as seen in **Figure 5-6**. The site is currently not zoned with a parking category as it sits within the State Environmental Planning Policy 2021 Redfern - Waterloo Authority Sites. As seen in **Figure 5-6**, the land uses surrounding the site are however generally a mix of Category C, with some Category B within South Eveleigh.

For the Masterplan, it is however proposed that the site adopts **Category A** parking rates as one of the means to reduce traffic impacts of the proposal on the road network and support sustainable travel behaviours. The use of this

parking category is also supported by the fact that the site is in proximity to the rail line, frequent bus services, a recently implemented off-road dedicated cycle lane along Henderson Street and the future Metro line.

Figure 5-6 Parking category – City of Sydney LEP



Source: The City of Sydney LEP 2012

The parking rates (based on Category A) for the proposed development are presented in **Table 5-2**, which shows that the required number of parking spaces for the Masterplan is **245 spaces**.

Table 5-2 Car parking requirements for residential developments (based on Category A rates)

Dwelling type	Proposed number of dwellings	Proposed parking rates (Category A)	Number of parking spaces required
Studio	-	0.1 spaces / dwelling	-
1 Bed	128 dwellings	0.3 spaces / dwelling	38.4 spaces
2 Bed	200 dwellings	0.7 spaces / dwelling	140.0 spaces
3 Bed	66 dwellings	1.0 spaces / dwelling	66.0 spaces
Visitor	-	Nil	-
Total	**394 dwellings**	**-**	**245 spaces**

Source: Department of Planning, Industry and Environment, accessed 2023

5.5.2 Other parking requirements

Based on the development scale described in the preferred option and the requirements from the City of Sydney DCP, parking requirements for bicycle parking, service parking, motorcycle parking and accessible parking are summarised in **Table 5-3**.

Table 5-3 Other parking requirements for the site

Type of parking	City of Sydney DCP 2012 requirement	Required spaces
Bicycle parking	– One space per dwelling for residents; and – One per 10 dwellings for visitor	433*
Service parking	– One space for the first 50 dwellings; plus – 0.5 spaces for every 50 dwellings thereafter	5
Motorcycle parking	– One motorcycle parking space for every 12 car parking spaces	20
Accessible parking	– One accessible car parking space is to be provided for every adaptable residential unit; – One space for every 20 car parking spaces or part thereof is to be allocated as accessible visitor parking	12
Shared vehicle parking	– One space for every 60 car parking spaces	4

Source: City of Sydney DCP 2012
** If an apartment in a residential building has a basement storage area on title that is large enough to accommodate a bike and is no smaller than a Class 1 bike locker, then additional bike parking for that apartment is not required.*

5.5.3 Car parking provision

Parking will be provided over two levels of basement parking and will be accessed from Aurora Street, as shown in **Figure 5-7**. As outlined in **Section 5.5.1**, the estimated number of parking spaces to be provided should be no more than 245 spaces, based on the City of Sydney's Category A parking rate for residential land uses. In summary, the following parking provisions are proposed:

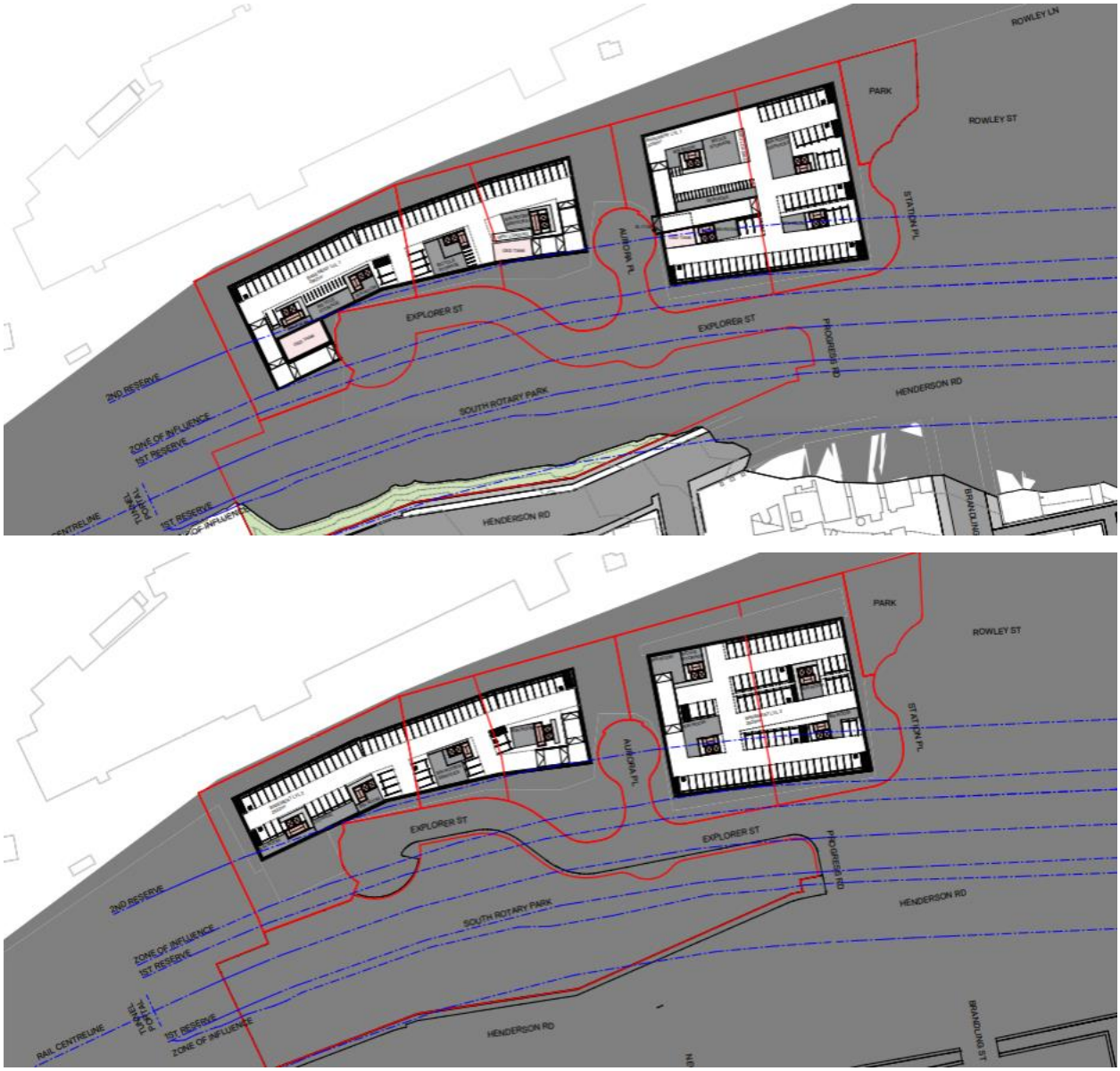
- Vehicle parking spaces: 245 spaces (based on Category A parking rates)
- Bicycle parking: 436 parking spaces
- Motorcycle parking: 36 parking spaces

These provisions all comply with the Sydney LEP Category A parking rates and other parking requirements for the site (in accordance with the City of Sydney DCP).

The reduced car parking provision would encourage a balance between meeting car parking demand whilst encouraging sustainable and active transport by residents. The car parking needs of future residents can still be met through several flexible and sustainable parking management measures/options such as:

- Decoupled parking, and shared vehicles parking to accommodate the parking needs of all residents
- No dedicated parking space for small (one-bedroom) apartments to increase housing affordability. Car travel needs can be addressed via carpooling and/or using shared vehicles
- Parking spaces dedicated to electric vehicles, with charging stations
- Parking spaces dedicated to car share schemes and community car-share vehicles, both on-street and incorporated in easily accessed public car parks.

Figure 5-7 Basement Levels 1 and 2 of the proposed development



Source: The Explorer Street, Eveleigh Design Report (2023)

6.0 Trip Generation and Distribution

6.1 Vehicle trip generation

A trip generation review has been undertaken based on the proposed different land uses and indicative yield to:

– Understand likely weekday peak hours (AM and PM) and weekday vehicular and person trip generation

– Understand likely impacts on the surrounding road network (compared to the existing situation).

6.1.1 General residential trip rates

The location of the proposed increase in residential uses is within a short walk of the extensive public transport which will help minimise car use to get to and from the site. The traffic generated by the Masterplan is expected to be based on the constrained amount of parking provided by the proposed development. Because the site provides a restricted number of parking spaces, the amount of traffic generated is not expected to be capacity-driven, which will minimise the impact on the surrounding road network.

The trip rates used to determine the traffic generated by the proposed development in the AM and PM weekday peak hours are provided in the *Technical Direction 2013/04a, Guide to Traffic Generating Developments* (TDT 2013 / 04a), for high-density residential flat buildings. These are:

– 0.15 trips / parking space in the weekday AM peak

– 0.12 trips / parking space in the weekday PM peak

– 1.5 trips / parking space per weekday.

Based on these rates, the proposed residential yield of 394 dwellings (and 245 parking spaces) would be expected to generate:

– 37 weekday AM peak hour trips

– 29 weekday PM peak hour trips

– 368 weekday trips.

However, the existing site (with 95 parking spaces) is currently generating traffic and the **net increase in trips** generated by the proposed development is therefore based on **150 parking spaces** (245 spaces – 95 spaces = 150 spaces):

– 23 weekday AM peak hour trips

– 18 weekday PM peak hour trips

– 225 weekday trips.

6.1.2 Traffic distribution

The future pattern of drivers accessing and leaving the site is expected to be similar to the current distribution of trips because the current land use is also residential. Therefore, the existing traffic surveys were used to inform the traffic distribution of trips to and from the external road network. Henderson Road is a key east / west local road that intersects with state roads such as Botany Road, Wyndham Street and Erskineville Road. As such, east / west movement along Henderson Road was the dominant direction of travel, surrounding the site. During the AM peak, a 61 / 39 per cent split between east / west travel was determined for vehicles turning from Progress Street onto Henderson Road. During the AM peak, 58 per cent of vehicles parked around or within the current development were found to travel south to join Henderson Road whilst 42 per cent travelled north via Rowley Street.

During the PM peak, an east / west travel direction split of 36 / 64 per cent was observed, with 80 per cent of vehicles distributed north to the development via Progress Road and 20 per cent via Rowley Street.

Because the site's use is residential, a 90 / 10 per cent split of trips out / in of the development during the AM peak hour was assumed. This was reversed during the PM peak hour. Based on this, the assumptions made on the likely future traffic distribution to and from the site are presented in **Table 6-1**.

Table 6-1 Traffic distribution for vehicles exiting and entering the site during AM and PM peak hours

Direction of travel	AM Peak Hour		PM Peak Hour	
	To the site (at entrance)	From the site (at exit)	To the site (at entrance)	From the site (at exit)
North	100%	61%	80%	46%
South		39%	20%	54%
	To the site (at Henderson Rd)	From the site (at Henderson Rd)	To the site (at Henderson Rd)	From the site (at Henderson Rd)
East	39%	61%	64%	36%
West	61%	39%	36%	64%

Source: SCT Consul ing based on Trans Traffic Survey Counts undertaken 11 May 2023

6.2 Person trip generation

Surveys at several locations were chosen from the TDT 2013 / 04a for person trip generation estimation. The average peak hour person trip rates were estimated to be 0.64 and 0.54 trips per unit during the AM and PM network peak hours respectively for similar high-density residential areas (such as St Leonards). The daily person trip generation will see a trip rate of up to 3.49 per unit.

The person trip generation for the development was estimated based on the peak hour trip generation rates established previously and are shown in **Table 6-2**.

Table 6-2 Net peak hour person trip generation

Proposed activity	Yield	Person trip rates^		
		AM Peak	PM Peak	Daily
Residential	+348 units	0.64	0.54	3.49
Total	**+348 units**	**223 trips**	**188 trips**	**1,215 trips**
Less people in cars		*-28 trips*	*-22 trips*	*-270 trips*
Total non-car trips		**195 trips**	**166 trips**	**945 trips**

Source: SCT Consul ing, 2023
^Assuming the car occupancy for the vehicle trip generation is 1.2 person / vehicles. Weekday AM Peak trip generation = 23*1.2 = 28 persons and PM Peak trip generation = 18*1.2 = 22 persons. Weekday trip generation= 225*1.2 = 270 persons.

Given the site's location directly adjacent to public transport and peak hour travel purposes, most of the non-car trips will be using surrounding public transport services, some will be to other businesses and some would be walking or cycling from trip origins. Hence, it is estimated the preferred development option is forecast to generate approximately **195 and 166 trips during the AM and PM peak hours** respectively, of which the majority will be associated with train and bus access. A further proportion would be walking / cycling to or from the origins of their trips.

6.3 Public and active transport demand

The Journey to Work data (2016) presented in **Section 3.2.1** indicates that public transport trips undertaken in the Erskineville-Eveleigh area currently account for approximately 45 per cent (42 per cent train and three per cent bus) of all trips undertaken. This is already significantly higher than the Sydney average of 22 per cent of public transport trips, so no further increase in, or mode shift towards public transport trips is expected from future residents of the site. It is however expected that, when the new Metro line stops at Waterloo Station by 2024, it will attract a large number of people from the existing public transport network (most likely the train), which is why the future public transport demand combines train and Metro trips.

The existing number of walk-only and cycling trips as listed in the 2016 JTW data is nine and five per cent respectively, which is higher than for the Greater Sydney area, with one and four per cent. The site is however located south of Wilson Street and east of Burren Street, which both have been identified as future regional cycle routes in the City's Cycling Strategy, as well as just north of Henderson Road which has a recently implemented off-road cycle route. This could encourage a mode shift towards cycling away from cars, for future residents and employees of the site. Therefore, a mode share target of **six per cent** has been set for the site for cycling (from five per cent). A higher mode share target for cycling also aligns with the City of Sydney's future target of 10 per cent of all trips being made by cycle in the future.

Given the Council's aim for the City to create a walkable neighbourhood and a connected City without relying on private vehicles in the future, it can be argued that the current walk-only mode shift for the site could be increased to a target of **10 per cent** (from the existing nine per cent).

The assumed mode shift towards active transport would result in a two per cent reduction in car trips, from the existing 27 per cent to 25 per cent for future residents and employees of the site. As described in **Section 6.2**, it is estimated that the preferred development option is forecast to generate an additional 195, 166 and 945 person trips during the AM and PM peak hours and weekdays respectively. Based on the 2016 JTW data and the assumed future mode share target, **144** (AM peak) and **121** (PM peak) of these trips would be associated with **train / Metro and bus trips** (as a 'worst case scenario' of the peak hours). Based on the walk-only and cycling proportion of the 2016 data (10 and six per cent), **51** (AM peak) and **45** (PM peak) **walking-only / cycling trips** (as a 'worst case scenario' of the peak hours) would be generated by the proposed development.

7.0 Transport and Traffic Impact Assessment

7.1 Public transport impacts

As described in **Section 3.4**, the site is located within a short walking distance of two major train stations – Redfern and Erskineville stations, as well as the future Waterloo Metro station. While the number of bus stops within a short walking distance is limited, the large coverage of destinations including employment that is available from the site will drive public transport as the primary means of travel for employment. As per the Method of Travel to Work data, public transport mode share of 45 per cent surpassed private vehicle, 27 per cent, which is rarely seen in Sydney. With a further appropriate suite of infrastructure, services and policy, the preference for public transport will maintain strong.

As described in **Section 6.2**, the peak hour person trip generation of the proposed development is expected to generate approximately 195, 165 and 945 person trips during the AM, PM peak hours and weekdays respectively. Based on the 2016 JTW data, **144 and 121 of these trips** would be associated with **train / Metro and bus trips** (as a 'worst case scenario' of the peak hours). With an existing approximate 50 and 30 services per hour (during AM and PM peak for train and bus respectively), this would mean **an extra three and one passenger (for train and bus)** per service during peak hours.

The existing public transport network is expected to be able to cope with these additional trips generated by the proposed development, especially with the introduction of Metro in 2024 and the Transport for NSW's Redfern station upgrade project. The Redfern Station upgrade will deliver a new southern concourse and reduce crowding in the station, making public transport in the proximity of the site even more frequent.

7.2 Parking impacts

The Masterplan will provide **245 off-street parking spaces**, which is an increase of 150 parking spaces from the existing scenario. The provision of 245 spaces is based on the lowest of the City of Sydney's car parking rates (Category A), which already considers the site's proximity to public and active transport options. Based on this, parking demands are also largely able to be satisfied by alternative options for transport. Rather than driving to Sydney, people will likely walk, cycle or use public transport.

As per Method of Travel to Work data and Household Travel Survey, the use of the private car in the study area only halved the Sydney average level. The provision of onsite parking can be minimised given the less need for private cars and widely distributed car share spots and their availability. The provision of the on-site parking spaces will however also reduce the need for drivers to park on the road and hence minimise the impact of parking on the surrounding local road network.

Car share spaces can also further mitigate any parking issues by providing an alternative to car ownership. Research by the City of Sydney suggests that car share can offset ownership of ten private vehicles.

Recommendation: Adopt maximum car parking rates (of Category A) for the site to mitigate vehicular transport impacts, with the provision of additional on-site car-share spaces to ensure flexibility of the mode choice (further specified in **Section 9.0**).

7.3 Active transport impacts

Based on the non-car generation of the preferred development option (as described in **Section 6.2**) and the increased mode shift target towards active transport, an additional 195 (AM peak) and 166 (PM peak) person trips would be added to the network. Of these, 19 (AM peak hour) and 17 (PM peak hour) trips would be cycling trips. These are relatively small figures and at a level able to be accommodated by the existing and proposed footpath and cycle route network.

The walk-only trips are approximately 30 trips per AM and PM peak hour respectively, but walking trips to the site will also include trips generated by public transport, which means an **additional 176 and 149 walking trips per AM and PM peak hour respectively to the site**. The majority of these are expected to come from the train stations northeast and northwest of the site, along routes that predominantly have footpaths. The pedestrian network is therefore expected to be able to cope with the additional walking trips generated by the proposed development.

7.4 Road network impacts

As outlined in **Section 6.1**, the proposed development will generate a **net increase in trips** compared to the existing situation of:

- **23 trips** per weekday AM peak hour
- **18 trips** per weekday PM peak hour
- **225 trips** per weekday trips.

To understand the impact on the surrounding road network because of these additional trips, an impact assessment compared to the existing road network (as presented in **Section 3.3**) was undertaken.

7.4.1 Traffic volume increase

The traffic volume increase at mid-block locations and proportional increase on the surrounding road network as a result of the proposed development is shown in **Table 7-1**.

Table 7-1 Existing and With development mid-block traffic volumes at roads surrounding the site

Location	Scenario	Traffic volumes (two-way vph)		Increase (%)	
		Weekday AM Peak Hour	Weekday PM Peak Hour	Weekday AM Peak Hour	Weekday PM Peak Hour
Henderson Road, west of Park Street	Existing	220	277	-	-
	With development	224	278	1.7%	0.2%
Henderson Road, east of Park Street	Existing	421	350	-	-
	With development	426	356	1.2%	1.7%
Henderson Road, west of Brandling Street	Existing	443	334	-	-
	With development	451	341	1.8%	2.0%
Progress Road, north of Henderson Road	Existing	106	77	-	-
	With development	119	90	12.2%	16.7%
Station Place, west of Rowley Lane	Existing	70	23	-	-
	With development	80	27	13.9%	16.0%

Source: Trans Traffic Survey Counts undertaken 11 May 2023

The impact on the surrounding road network's mid-block locations is negligible on Henderson Road, with an increase of less than two per cent at all locations. As expected, there is a higher proportional increase in mid-block traffic volumes on Progress Road and Station Place, but this increase is also negligible because the existing traffic volumes are low. The scale of additional vehicle trips in the network is less than 100 vehicles per hour in peak periods, which is insignificant in terms of the general traffic variance of the network. The roads surrounding the site are therefore expected to be able to cater for the additional mid-block traffic volumes generated by the proposed development.

7.4.2 Road network performance

To understand the impact on the surrounding road network's intersections as a result of the proposed development, the operational performance (as shown in **Table 7-2** and **Appendix A**) with the additional development trips was assessed using SIDRA, at the following intersections:

- Henderson Road / Park Street
- Henderson Road / Progress Road
- Henderson Road / Brandling Street.

The additional vehicles from the proposed development have minimal impact on intersection performance, with a maximum increase in delay of 0.3 seconds. This indicates that the traffic generated will not impact the current road network surrounding the development site.

Table 7-2 Existing and 'With development' intersection AM and PM peak hour performance

Intersection	Weekday AM Peak Hour			Weekday PM Peak Hour		
	Volume	Delay (seconds)	LoS	Volume	Delay (seconds)	LoS
Henderson Road / Park Street (Existing)	469	7.8	A	410	7.9	A
Henderson Road / Park Street (With Dev)	475	7.9	A	416	7.9	A
Henderson Road / Progress Road (Existing)	482	9.3	A	373	14.3	A
Henderson Road / Progress Road (With Dev)	495	9.3	A	389	14.5	A
Henderson Road / Brandling Street (Existing)	460	10.9	A	348	8.2	A
Henderson Road / Brandling Street (With Dev)	468	11.2	A	355	8.3	A

Source: SCT Consul ing based on Trans Traffic Survey Counts undertaken 11 May 2023

8.0 Construction Activity and Potential Impacts

8.1 Construction activity and access routes

There are no specific restrictions on truck weight on the surrounding road network, except Park Street, where vehicles of 3-tonne and over and not permitted. Higher mass limit classified vehicles (B-doubles and short combination trucks) however are only permitted along Botany Road / Regent Street / Wyndham Street / Gibbons Street east of the site in a north-south direction and on Cleveland Street north of the site (except for between 6am and 10am and 3pm and 6pm), in an east-west direction. Short combination trucks are also permitted along Erskineville Road / Swanson Street / Fountain Street south of the site and the Princes Highway north of the site.

Because the western end of Railway Parade (west of Park Street) only permits southbound movement and 3-tonne vehicles are prohibited along Park Street, it is expected that construction vehicles would gain access to the site via Mitchell Road and Henderson Road from Swanson Street / Copeland Street and Fountain Street in the south. From the east, heavy vehicles would access Henderson Road from Botany Road.

A construction compound is expected to be set up within the existing site, where contractor and trade vehicles could be parked in the secure compound. There are currently timed parking restrictions in place along the southern side of Henderson Road, while the northern side (along the site boundary) is unrestricted. On Station Place east of the site, No Parking restrictions are in place along the site boundary (western side), while there is unrestricted parking along the eastern side of the street.

Any parking of construction vehicles along Henderson Street or Station Place would require consideration and approval by the City of Sydney Council, especially along the current 'No Parking' restrictions on the western side of Station Place. Any parking for construction vehicles along these roads may be subject to a work zone permit issued by Council.

8.2 Construction impacts

8.2.1 Active transport impacts

A formal off-street cycle route is provided along Henderson Street south of the site. A shared pedestrian / cycle path is also provided along Henderson Street east of Mitchell Road / Davy Road and Botany Road and Gibbons Street east of the site. However, the impact on the cycle network as a result of the construction is expected to be minimal because the cycle route along Henderson Street is off-road and not mixing with traffic. Signage is also already in place along Henderson Street south of the site, to alert drivers of cyclists being present.

To reduce the impact on the pedestrian network, pedestrians along Henderson Road, between Park Street and Progress Road, could be diverted (via signage) to the footpath along the southern side of the road only, if required throughout construction. The pedestrian refuge at the intersection with Alexander Street will help accommodate safe crossing for pedestrians across Henderson Street east of the site. Safe access for residents and visitors of the residential development east of the site, at Station Place, will also need to be considered throughout construction.

8.2.2 Public transport impacts

There are no bus routes provided along the roads near the site, so the construction traffic impact on the public transport network is expected to be minor. Buses currently run along Swanson Street and Mitchell Road, but these roads are all expected to be able to accommodate any additional construction vehicles generated by the site, without impacting the public transport services.

8.2.3 Road network and parking impacts

At this stage, the number of workers or traffic movements associated with the construction of the site is not known, so a detailed assessment of the likely impact is not possible. Given the excellent access of the site to public transport as well as the restrictive nature of on-street parking in a CBD context, construction workers will be highly encouraged to use public transport to access the site and hence the traffic and parking impacts as a result of construction workers will be minimal.

Construction vehicles are expected to enter the site from Swanson Street in the south / west and Botany Road in the east. Access to the site from these roads should be able to be accommodated within the existing road network.

Temporary removal of on-street parking, for construction vehicle parking, may be required along the northern side of Henderson Street and the western side of Station Place. This may be subject to the approval of a work zone, by Council.

The details of the construction impacts would be further considered and confirmed in a Construction Traffic Management Plan (CTMP), described in **Section 8.3**.

8.3 Preparation of a Construction Management Plan

A detailed Construction Traffic Management Plan (CTMP), which will include a construction traffic control plan will be prepared, separate from this report at a later stage. This will be done before the commencement of construction and per the *Traffic Control at Work Sites Technical Manual* (2010).

The CTMP will address the overall traffic management of the site during the construction phase, including provision for vehicular and pedestrian access, parking for construction vehicles and appropriate wayfinding. The vehicular movements and expected routes to and from the site will also be further quantified and defined.

9.0 Proposed Traffic and Transport Solutions

9.1 Infrastructure upgrades

As described in **Section 7.4**, the existing road network and public and active transport infrastructure network surrounding the site are adequate to be able to cater for the increased number of trips as a result of the proposed development, for all transport modes. No infrastructure upgrades to the road network are therefore required to be implemented because of the proposed development.

9.2 Strategic policy

9.2.1 Reduce existing parking controls

Current maximum parking provision rates within the State Environmental Planning Policy (SEPP) Housing 2021 and the City of Sydney LEP 2012 should be considered to reduce parking requirements. Given the proximity of the site to excellent public transport options and a short distance to major activities, there is room to further reduce the maximum rates set out in the LEP, in particular for social housing and affordable housing components.

The site is currently not zoned with a parking category as it sits within the State Environmental Planning Policy 2021 Redfern - Waterloo Authority Sites. The surrounding land uses are generally a mix of Category C with some Category B within the South Eveleigh.

For the site, it is however proposed that **Category A** parking rates are adopted as one of the means to reduce traffic impacts of the proposal on the road network and support sustainable travel behaviours. The use of this parking category is also supported by the fact that the site is in proximity to the rail line, frequent bus services, a recently implemented off-road dedicated cycle lane along Henderson Street and the future Metro line. The adoption of a Category A rate would result in parking rates of 0.1 / 0.3 / 0.7 / 1.0 parking spaces per studio / one- / two- / three-bedroom dwelling respectively. The reduction in parking rates may result in further vehicle trips on the road network in the peak periods because the traffic generated by the Masterplan is expected to be based on the constrained amount of parking provided. This means that the generated traffic is not expected to be capacity-driven, which is likely to minimise the impact on the surrounding road network.

9.2.2 Introduce a travel plan program

As shown in **Section 3.2**, two-thirds of the residents work in the same LGA of Sydney city (which has excellent public transport links and restricted parking options). This suggests that the majority of residents could use either public transport or active transport options to travel to work. Although the data also shows that most employees already use public transport to travel to work, a Travel Plan program has the potential to further educate the individuals who currently drive to work (from a nearby location) on alternate modes of travel to their destination. It could also encourage greater flexibility in working hours to spread the demand placed on the arterial and local road network.

This would be achieved by ensuring that travel plans are completed as part of the development application process and have follow-up evaluation post-occupancy.

Recommendation: Ensure travel plans are effectively delivered by development proponents.

10.0 Summary and Conclusion

10.1 Summary

10.1.1 Background

The Department of Planning and Environment (DPE) has prepared an Urban Design Study and Master Plan as a rezoning package for Explorer Street in South Eveleigh. The concept masterplan is a redevelopment replacing the current 46 social housing dwellings with approximately 32,669m^2 of gross floor area, which will include approximately 394 residential one, two and three-bedroom apartments. SCT Consulting has been engaged to prepare an updated Transport Impact Assessment, to support the recent state led re-zoning at Explorer Street.

10.1.2 Existing conditions

The site is around 800m away from Redfern Station, one of the largest and busiest rail stations in New South Wales and 500m from Erskineville Station. Footpath networks are of various quality around the site, offering connectivity to a wide variety of local and regional facilities. There are high-quality cycling options to Redfern Station.

SIDRA analysis of the performance of intersections in the proximity of the site indicates that the road network currently operates at an acceptable Level of Service.

10.1.3 Impacts of potential development

The proposed development will generate a net increase of 23 and 18 vehicles per hour in the AM and PM peak hours respectively, which has little impact on the surrounding road network, due to the low traffic generation volume. The traffic generated is expected to be based on the constrained amount of parking provided by the proposed development. Because the site provides a restricted number of parking spaces, the amount of traffic generated is not expected to be capacity-driven, which will minimise the impact on the surrounding road network.

SIDRA analysis of the nearby intersections, with the development trips, determined that the performance of the intersections will continue to be satisfactory once the proposed development is in place.

A review of the impact on the public transport network indicates that there is sufficient spare capacity due to the site's exceptional location and availability of major public transport infrastructure. For the footpath network, there could be an additional 195 (AM peak) and 166 (PM peak) person trips on the network (including active transport and public transport walking trips). The footpaths are generally wide and able to accommodate this additional volume.

10.2 Conclusion

The existing road network and public and active transport infrastructure network surrounding the site is adequate to be able to cater for the increased number of trips because of the proposed development, for all transport modes. No infrastructure upgrades to the road network are therefore proposed.

The land use change would facilitate development which would promote sustainable transport by reducing the amount of residential parking, reflecting the higher level of public transport services. The best approach to facilitate / influence reduced car use and to minimise additional congestion to the surrounding road network is to restrain parking provision. The proposed maximum of 245 car parking spaces is determined based on 0.3 spaces per one-bed, 0.7 spaces per two-bed and 1.0 spaces for three-bed dwellings.

In summary, the proposed transport solutions related to strategic policy for the development include:

– Decrease the maximum parking rates for the site to Category A rates as defined in the City of Sydney LEP, to 0.1 / 0.3 / 0.7 / 1.0 parking spaces per studio / one- / two- / three-bedroom dwelling respectively (reflecting good accessibility to public and active transport networks).

– Ensure travel plans, which have the potential to further educate the individuals who currently drive to work (from a nearby location) on alternate modes of travel to their destinations, are effectively delivered by development proponents.

APPENDIX A

SIDRA ANALYSIS RESULTS

MOVEMENT SUMMARY

Site: 1AM [RAI_PAR_23_BY_AM (Site Folder: AM Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [AM Base (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Park Street															
1	L2	All MCs	39	0.0	39	0.0	0.333	6.4	LOS A	0.6	4.5	0.45	0.65	0.45	48.9
3	R2	All MCs	239	1.3	239	1.3	0.333	7.8	LOS A	0.6	4.5	0.45	0.65	0.45	40.0
Approach			278	1.1	278	1.1	0.333	7.6	LOS A	0.6	4.5	0.45	0.65	0.45	42.5
East: Henderson Road															
4	L2	All MCs	23	4.5	23	4.5	0.096	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	52.0
5	T1	All MCs	183	2.9	183	2.9	0.096	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	51.0
Approach			206	3.1	206	3.1	0.096	0.6	NA	0.0	0.0	0.00	0.07	0.00	51.1
West: Railway Parade															
11	T1	All MCs	72	1.5	72	1.5	0.025	0.0	LOS A	0.0	0.2	0.07	0.09	0.07	36.4
12	R2	All MCs	12	0.0	12	0.0	0.025	7.0	LOS A	0.0	0.2	0.20	0.24	0.20	53.6
Approach			83	1.3	83	1.3	0.025	1.0	NA	0.0	0.2	0.09	0.11	0.09	38.8
All Vehicles			567	1.9	567	1.9	0.333	4.1	NA	0.6	4.5	0.23	0.36	0.23	45.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AM [HEN_PRO_23_BY_AM (Site Folder: AM Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [AM Base (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Henderson Road															
5	T1	All MCs	183	4.0	183	4.0	0.118	0.0	LOS A	0.1	0.9	0.15	0.17	0.15	38.6
6	R2	All MCs	32	0.0	32	0.0	0.118	6.0	LOS A	0.1	0.9	0.18	0.21	0.18	34.2
6u	U	All MCs	3	0.0	3	0.0	0.118	9.3	LOS A	0.1	0.9	0.18	0.21	0.18	40.9
Approach			218	3.4	218	3.4	0.118	1.0	NA	0.1	0.9	0.16	0.18	0.16	37.7
North: Progress Road															
7	L2	All MCs	36	0.0	36	0.0	0.067	2.9	LOS A	0.1	0.7	0.15	0.49	0.15	20.3
9	R2	All MCs	23	0.0	23	0.0	0.067	6.7	LOS A	0.1	0.7	0.15	0.49	0.15	20.3
Approach			59	0.0	59	0.0	0.067	4.4	LOS A	0.1	0.7	0.15	0.49	0.15	20.3
West: Henderson Road															
10	L2	All MCs	21	0.0	21	0.0	0.140	5.5	LOS A	0.0	0.0	0.00	0.05	0.00	46.4
11	T1	All MCs	283	1.5	283	1.5	0.140	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	50.5
Approach			304	1.4	304	1.4	0.140	0.4	NA	0.0	0.0	0.00	0.04	0.00	50.1
All Vehicles			581	2.0	581	2.0	0.140	1.0	NA	0.1	0.9	0.07	0.14	0.07	46.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 5AM [HEN_BRA_23_BY_AM (Site Folder: AM Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [AM Base (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Brandling Street															
1	L2	All MCs	3	0.0	3	0.0	0.014	6.2	LOS A	0.0	0.1	0.46	0.61	0.46	33.3
3	R2	All MCs	6	0.0	6	0.0	0.014	9.6	LOS A	0.0	0.1	0.46	0.61	0.46	44.6
Approach			9	0.0	9	0.0	0.014	8.5	LOS A	0.0	0.1	0.46	0.61	0.46	42.6
East: Henderson Road															
4	L2	All MCs	12	0.0	12	0.0	0.109	5.5	LOS A	0.0	0.1	0.01	0.04	0.01	54.8
5	T1	All MCs	215	3.4	215	3.4	0.109	0.0	LOS A	0.0	0.1	0.01	0.04	0.01	52.0
6u	U	All MCs	1	0.0	1	0.0	0.109	10.9	LOS A	0.0	0.1	0.01	0.04	0.01	55.5
Approach			227	3.2	227	3.2	0.109	0.3	NA	0.0	0.1	0.01	0.04	0.01	52.2
West: Henderson Road															
11	T1	All MCs	312	1.4	312	1.4	0.152	0.0	LOS A	0.0	0.3	0.03	0.03	0.03	52.2
12	R2	All MCs	11	0.0	11	0.0	0.152	5.2	LOS A	0.0	0.3	0.03	0.04	0.03	48.1
Approach			322	1.3	322	1.3	0.152	0.2	NA	0.0	0.3	0.03	0.04	0.03	52.2
All Vehicles			559	2.1	559	2.1	0.152	0.4	NA	0.0	0.3	0.03	0.05	0.03	52.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1AM [RAI_PAR_23_DEV_AM (Site Folder: AM Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [AM Dev (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Park Street															
1	L2	All MCs	39	0.0	39	0.0	0.337	6.4	LOS A	0.6	4.6	0.46	0.65	0.46	48.9
3	R2	All MCs	240	1.3	240	1.3	0.337	7.9	LOS A	0.6	4.6	0.46	0.65	0.46	39.9
Approach			279	1.1	279	1.1	0.337	7.6	LOS A	0.6	4.6	0.46	0.65	0.46	42.4
East: Henderson Road															
4	L2	All MCs	24	4.3	24	4.3	0.099	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	52.1
5	T1	All MCs	187	2.8	187	2.8	0.099	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	51.2
Approach			212	3.0	212	3.0	0.099	0.6	NA	0.0	0.0	0.00	0.07	0.00	51.2
West: Railway Parade															
11	T1	All MCs	72	1.5	72	1.5	0.025	0.0	LOS A	0.0	0.2	0.08	0.09	0.08	36.4
12	R2	All MCs	12	0.0	12	0.0	0.025	7.1	LOS A	0.0	0.2	0.20	0.24	0.20	53.5
Approach			83	1.3	83	1.3	0.025	1.0	NA	0.0	0.2	0.09	0.11	0.09	38.8
All Vehicles			574	1.8	574	1.8	0.337	4.1	NA	0.6	4.6	0.24	0.36	0.24	45.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AM [HEN_PRO_23_DEV_AM (Site Folder: AM Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [AM Dev (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Henderson Road															
5	T1	All MCs	183	4.0	183	4.0	0.119	0.0	LOS A	0.1	1.0	0.16	0.18	0.16	38.4
6	R2	All MCs	33	0.0	33	0.0	0.119	6.0	LOS A	0.1	1.0	0.19	0.21	0.19	34.0
6u	U	All MCs	3	0.0	3	0.0	0.119	9.3	LOS A	0.1	1.0	0.19	0.21	0.19	40.6
Approach			219	3.4	219	3.4	0.119	1.0	NA	0.1	1.0	0.16	0.18	0.16	37.4
North: Progress Road															
7	L2	All MCs	43	0.0	43	0.0	0.080	2.9	LOS A	0.1	0.9	0.15	0.49	0.15	20.2
9	R2	All MCs	27	0.0	27	0.0	0.080	6.8	LOS A	0.1	0.9	0.15	0.49	0.15	20.2
Approach			71	0.0	71	0.0	0.080	4.4	LOS A	0.1	0.9	0.15	0.49	0.15	20.2
West: Henderson Road															
10	L2	All MCs	22	0.0	22	0.0	0.140	5.5	LOS A	0.0	0.0	0.00	0.05	0.00	46.4
11	T1	All MCs	283	1.5	283	1.5	0.140	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	50.4
Approach			305	1.4	305	1.4	0.140	0.4	NA	0.0	0.0	0.00	0.04	0.00	50.1
All Vehicles			595	1.9	595	1.9	0.140	1.1	NA	0.1	1.0	0.08	0.15	0.08	45.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 5AM [HEN_BRA_23_DEV_AM (Site Folder: AM Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [AM Dev (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Brandling Street															
1	L2	All MCs	3	0.0	3	0.0	0.014	6.2	LOS A	0.0	0.1	0.46	0.61	0.46	33.1
3	R2	All MCs	6	0.0	6	0.0	0.014	9.7	LOS A	0.0	0.1	0.46	0.61	0.46	44.5
Approach			9	0.0	9	0.0	0.014	8.5	LOS A	0.0	0.1	0.46	0.61	0.46	42.5
East: Henderson Road															
4	L2	All MCs	12	0.0	12	0.0	0.109	5.5	LOS A	0.0	0.1	0.01	0.04	0.01	54.8
5	T1	All MCs	216	3.4	216	3.4	0.109	0.0	LOS A	0.0	0.1	0.01	0.04	0.01	52.1
6u	U	All MCs	1	0.0	1	0.0	0.109	11.2	LOS A	0.0	0.1	0.01	0.04	0.01	55.5
Approach			228	3.2	228	3.2	0.109	0.3	NA	0.0	0.1	0.01	0.04	0.01	52.3
West: Henderson Road															
11	T1	All MCs	319	1.3	319	1.3	0.156	0.0	LOS A	0.0	0.3	0.03	0.03	0.03	52.4
12	R2	All MCs	11	0.0	11	0.0	0.156	5.1	LOS A	0.0	0.3	0.03	0.04	0.03	48.1
Approach			329	1.3	329	1.3	0.156	0.2	NA	0.0	0.3	0.03	0.03	0.03	52.3
All Vehicles			567	2.0	567	2.0	0.156	0.4	NA	0.0	0.3	0.03	0.05	0.03	52.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1AM [RAI_PAR_23_BY_PM (Site Folder: PM Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [PM Base (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Park Street															
1	L2	All MCs	45	0.0	45	0.0	0.175	6.5	LOS A	0.3	2.0	0.42	0.65	0.42	49.0
3	R2	All MCs	100	0.0	100	0.0	0.175	7.9	LOS A	0.3	2.0	0.42	0.65	0.42	40.2
Approach			145	0.0	145	0.0	0.175	7.5	LOS A	0.3	2.0	0.42	0.65	0.42	44.8
East: Henderson Road															
4	L2	All MCs	40	0.0	40	0.0	0.138	5.5	LOS A	0.0	0.0	0.00	0.09	0.00	53.0
5	T1	All MCs	259	0.0	259	0.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	51.2
Approach			299	0.0	299	0.0	0.138	0.8	NA	0.0	0.0	0.00	0.08	0.00	51.3
West: Railway Parade															
11	T1	All MCs	26	0.0	26	0.0	0.022	0.0	LOS A	0.0	0.3	0.13	0.16	0.13	35.3
12	R2	All MCs	18	0.0	18	0.0	0.022	7.1	LOS A	0.0	0.3	0.36	0.46	0.36	51.1
Approach			44	0.0	44	0.0	0.022	2.9	NA	0.0	0.3	0.22	0.28	0.22	41.8
All Vehicles			488	0.0	488	0.0	0.175	2.9	NA	0.3	2.0	0.14	0.27	0.14	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AM [HEN_PRO_23_BY_PM (Site Folder: PM Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [PM Base (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Henderson Road															
5	T1	All MCs	264	0.0	264	0.0	0.136	0.0	LOS A	0.1	0.5	0.04	0.06	0.04	47.0
6	R2	All MCs	22	0.0	22	0.0	0.136	4.1	LOS A	0.1	0.5	0.05	0.07	0.05	38.8
Approach			286	0.0	286	0.0	0.136	0.3	NA	0.1	0.5	0.05	0.06	0.05	45.9
North: Progress Road															
7	L2	All MCs	18	0.0	18	0.0	0.056	2.8	LOS A	0.1	0.6	0.12	0.49	0.12	19.7
9	R2	All MCs	28	0.0	28	0.0	0.056	5.5	LOS A	0.1	0.6	0.12	0.49	0.12	19.7
Approach			46	0.0	46	0.0	0.056	4.5	LOS A	0.1	0.6	0.12	0.49	0.12	19.7
West: Henderson Road															
10	L2	All MCs	13	0.0	13	0.0	0.058	5.5	LOS A	0.0	0.2	0.06	0.12	0.06	44.7
11	T1	All MCs	104	0.0	104	0.0	0.058	0.0	LOS A	0.0	0.2	0.05	0.10	0.05	48.4
12u	U	All MCs	3	0.0	3	0.0	0.058	14.3	LOS A	0.0	0.2	0.06	0.12	0.06	54.8
Approach			120	0.0	120	0.0	0.058	1.0	NA	0.0	0.2	0.05	0.11	0.05	48.0
All Vehicles			453	0.0	453	0.0	0.136	0.9	NA	0.1	0.6	0.05	0.12	0.05	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 5AM [HEN_BRA_23_BY_PM (Site Folder: PM Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [PM Base (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Brandling Street															
1	L2	All MCs	5	0.0	5	0.0	0.016	6.5	LOS A	0.0	0.2	0.41	0.60	0.41	35.1
3	R2	All MCs	7	0.0	7	0.0	0.016	8.2	LOS A	0.0	0.2	0.41	0.60	0.41	45.6
Approach			13	0.0	13	0.0	0.016	7.5	LOS A	0.0	0.2	0.41	0.60	0.41	43.2
East: Henderson Road															
4	L2	All MCs	7	0.0	7	0.0	0.132	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	55.2
5	T1	All MCs	281	0.0	281	0.0	0.132	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	52.2
Approach			288	0.0	288	0.0	0.132	0.2	NA	0.0	0.0	0.00	0.02	0.00	52.3
West: Henderson Road															
11	T1	All MCs	116	0.0	116	0.0	0.058	0.0	LOS A	0.0	0.2	0.05	0.06	0.05	51.8
12	R2	All MCs	6	0.0	6	0.0	0.058	5.8	LOS A	0.0	0.2	0.06	0.07	0.06	47.6
Approach			122	0.0	122	0.0	0.058	0.3	NA	0.0	0.2	0.05	0.06	0.05	51.7
All Vehicles			423	0.0	423	0.0	0.132	0.4	NA	0.0	0.2	0.03	0.04	0.03	51.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1AM [RAI_PAR_23_DEV_PM (Site Folder: PM Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [PM Dev (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Park Street															
1	L2	All MCs	45	0.0	45	0.0	0.182	6.5	LOS A	0.3	2.1	0.42	0.66	0.42	49.0
3	R2	All MCs	105	0.0	105	0.0	0.182	7.9	LOS A	0.3	2.1	0.42	0.66	0.42	40.1
Approach			151	0.0	151	0.0	0.182	7.5	LOS A	0.3	2.1	0.42	0.66	0.42	44.7
East: Henderson Road															
4	L2	All MCs	40	0.0	40	0.0	0.139	5.5	LOS A	0.0	0.0	0.00	0.09	0.00	53.0
5	T1	All MCs	260	0.0	260	0.0	0.139	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	51.2
Approach			300	0.0	300	0.0	0.139	0.7	NA	0.0	0.0	0.00	0.08	0.00	51.4
West: Railway Parade															
11	T1	All MCs	26	0.0	26	0.0	0.022	0.0	LOS A	0.0	0.3	0.13	0.16	0.13	35.3
12	R2	All MCs	18	0.0	18	0.0	0.022	7.1	LOS A	0.0	0.3	0.36	0.46	0.36	51.1
Approach			44	0.0	44	0.0	0.022	2.9	NA	0.0	0.3	0.22	0.28	0.22	41.8
All Vehicles			495	0.0	495	0.0	0.182	3.0	NA	0.3	2.1	0.15	0.27	0.15	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AM [HEN_PRO_23_DEV_PM (Site Folder: PM Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [PM Dev (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Henderson Road															
5	T1	All MCs	264	0.0	264	0.0	0.142	0.0	LOS A	0.1	0.6	0.06	0.08	0.06	45.7
6	R2	All MCs	29	0.0	29	0.0	0.142	4.1	LOS A	0.1	0.6	0.07	0.09	0.07	38.1
Approach			294	0.0	294	0.0	0.142	0.4	NA	0.1	0.6	0.06	0.08	0.06	44.4
North: Progress Road															
7	L2	All MCs	18	0.0	18	0.0	0.058	2.8	LOS A	0.1	0.6	0.12	0.49	0.12	19.4
9	R2	All MCs	29	0.0	29	0.0	0.058	5.6	LOS A	0.1	0.6	0.12	0.49	0.12	19.4
Approach			47	0.0	47	0.0	0.058	4.6	LOS A	0.1	0.6	0.12	0.49	0.12	19.4
West: Henderson Road															
10	L2	All MCs	18	0.0	18	0.0	0.061	5.5	LOS A	0.0	0.2	0.06	0.15	0.06	44.2
11	T1	All MCs	104	0.0	104	0.0	0.061	0.0	LOS A	0.0	0.2	0.05	0.12	0.05	47.8
12u	U	All MCs	3	0.0	3	0.0	0.061	14.5	LOS A	0.0	0.2	0.06	0.15	0.06	53.9
Approach			125	0.0	125	0.0	0.061	1.2	NA	0.0	0.2	0.05	0.13	0.05	47.3
All Vehicles			466	0.0	466	0.0	0.142	1.0	NA	0.1	0.6	0.06	0.13	0.06	43.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 5AM [HEN_BRA_23_DEV_PM (Site Folder: PM Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [PM Dev (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Brandling Street															
1	L2	All MCs	5	0.0	5	0.0	0.016	6.5	LOS A	0.0	0.2	0.41	0.60	0.41	35.0
3	R2	All MCs	7	0.0	7	0.0	0.016	8.3	LOS A	0.0	0.2	0.41	0.60	0.41	45.5
Approach			13	0.0	13	0.0	0.016	7.5	LOS A	0.0	0.2	0.41	0.60	0.41	43.1
East: Henderson Road															
4	L2	All MCs	7	0.0	7	0.0	0.136	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	55.2
5	T1	All MCs	288	0.0	288	0.0	0.136	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	52.4
Approach			296	0.0	296	0.0	0.136	0.2	NA	0.0	0.0	0.00	0.01	0.00	52.5
West: Henderson Road															
11	T1	All MCs	116	0.0	116	0.0	0.058	0.0	LOS A	0.0	0.2	0.05	0.06	0.05	51.8
12	R2	All MCs	6	0.0	6	0.0	0.058	5.9	LOS A	0.0	0.2	0.06	0.07	0.06	47.6
Approach			122	0.0	122	0.0	0.058	0.3	NA	0.0	0.2	0.05	0.06	0.05	51.7
All Vehicles			431	0.0	431	0.0	0.136	0.4	NA	0.0	0.2	0.03	0.04	0.03	51.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

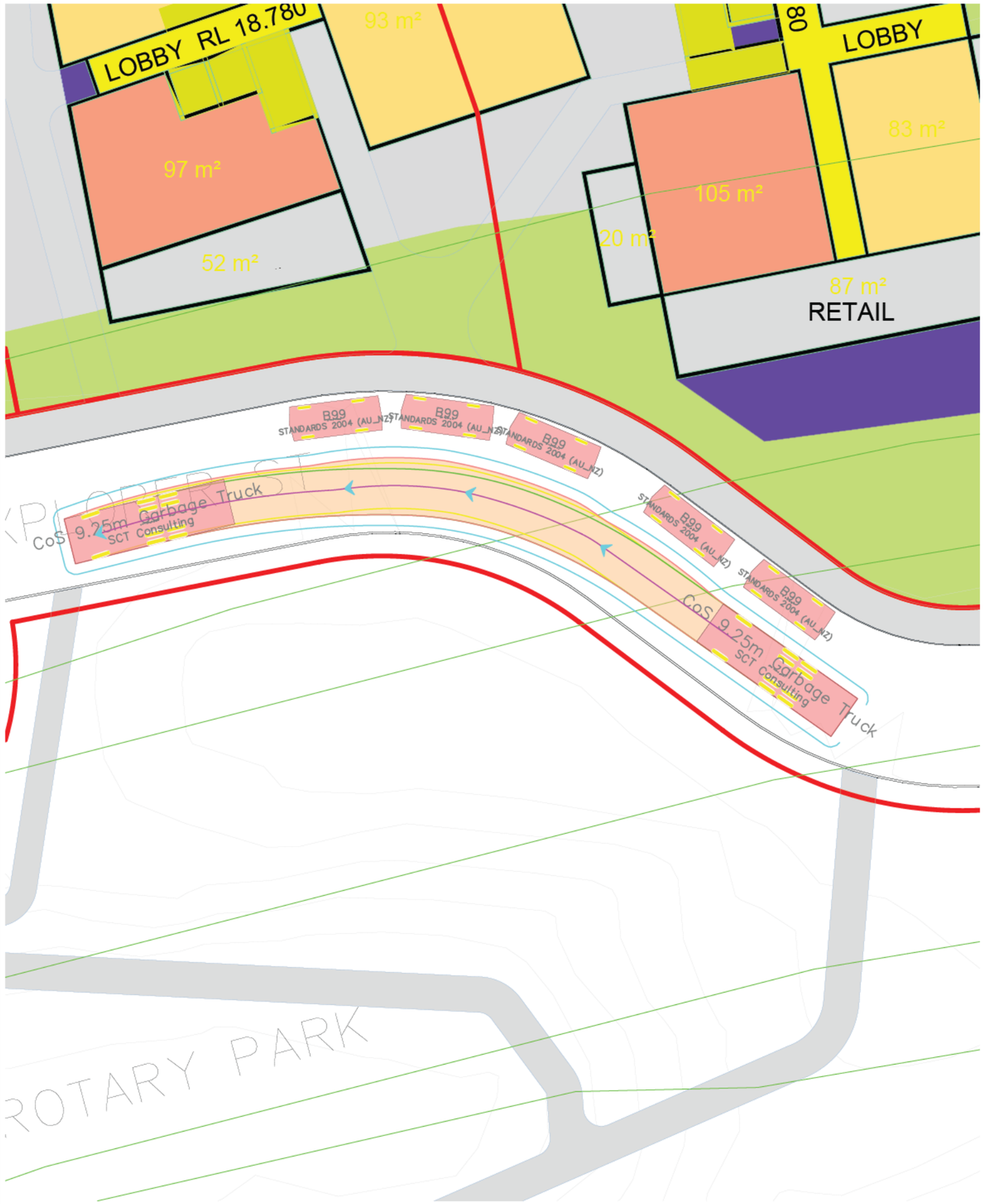
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

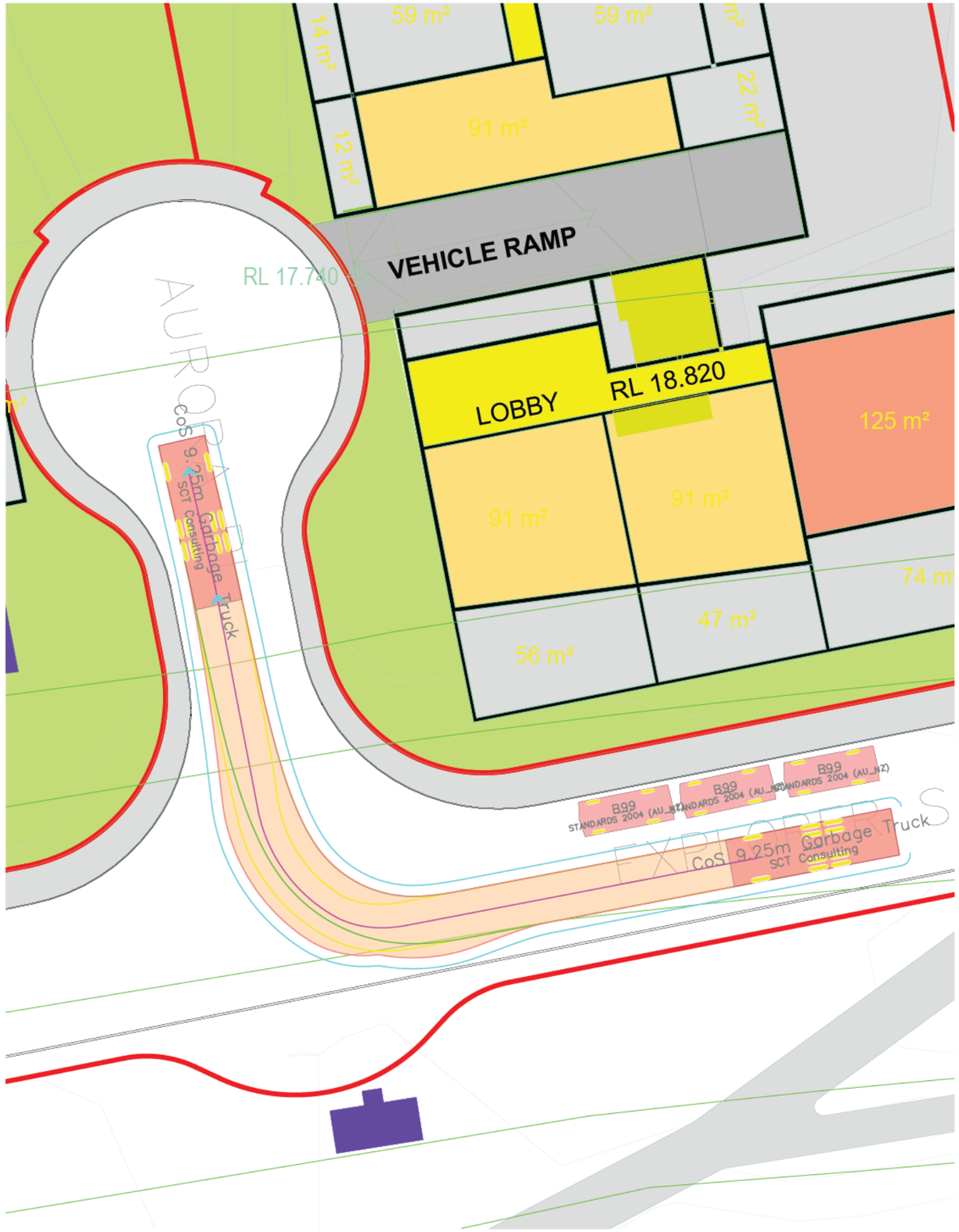
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

APPENDIX B

SWEPT PATH ASSESSMENT





REV	DESCRIPTION	DATE
A	PRELIM NARY DRAFT	14/07/2023

PREPARED FOR

NSW GOVERNMENT Planning, Industry & Environment

QUALITY INFORMATION	
DATE	07/23
PREPARED	N B
REVIEWED	J.B
AUTHORISED	J.B

SCALE @ A3

0 10 20

SCALE - 1:250

PROJECT

Explorer Street Rezoning
Transport and Traffic Impact Assessment

TITLE

City of Sydney Waste Vehicle - Explorer Street and Aurora Place

DRAWING NUMBER

PROJECTNO-SCT-405

SHEET 01 OF 01

A3

Thoughtful Transport Solutions

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