Appendix 7:
Transport Impact Assessment

St John of God Murdoch Redevelopment

Transport Impact Assessment

CW1181000

Prepared for
St John of God

17 February 2023

ST JOHN OF GOD
Murdoch Hospital

Stantec

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1 Introduction

1.1 Background

Stantec has been commissioned by St John of God ('the Client') to prepare a Transport Impact Assessment (TIA) for the proposed development of the St John of God Murdoch Hospital, Murdoch, within the City of Melville (the "Site").

This report aims to assess the impacts of the proposed redevelopment upon the adjacent transport network, with a focus on traffic operations, circulations, and car parking requirements.

This report has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016)*.

To support this TIA, Stantec has undertaken detailed analysis related to the impact of the proposed development on traffic and parking (included at **Appendix A**), in addition to a Parking Management Plan (**Appendix B**) and Green Travel Plan (**Appendix C**).

Revision B of the TIA has been updated to address a requirement from the Development Assessment Forum to undertake traffic modelling based on the Department of Transport's STEM (Strategic Transport Evaluation Model). This has been completed in the form of two further scenarios:

- Scenario 4: a nominal 2031 full-development build-out scenario as defined by STEM; and
- Scenario 5: the above, plus the additional traffic generated by the proposed redevelopment.

2 Existing Site Context

2.1 Site Location

The Site is located near the Murdoch Train Station bounded by South Street to the north, Murdoch Drive to the west, Barry Marshall Road Parade to the south and Fiona Wood Road to the east. **Figure 2-1** shows the location of the Site.

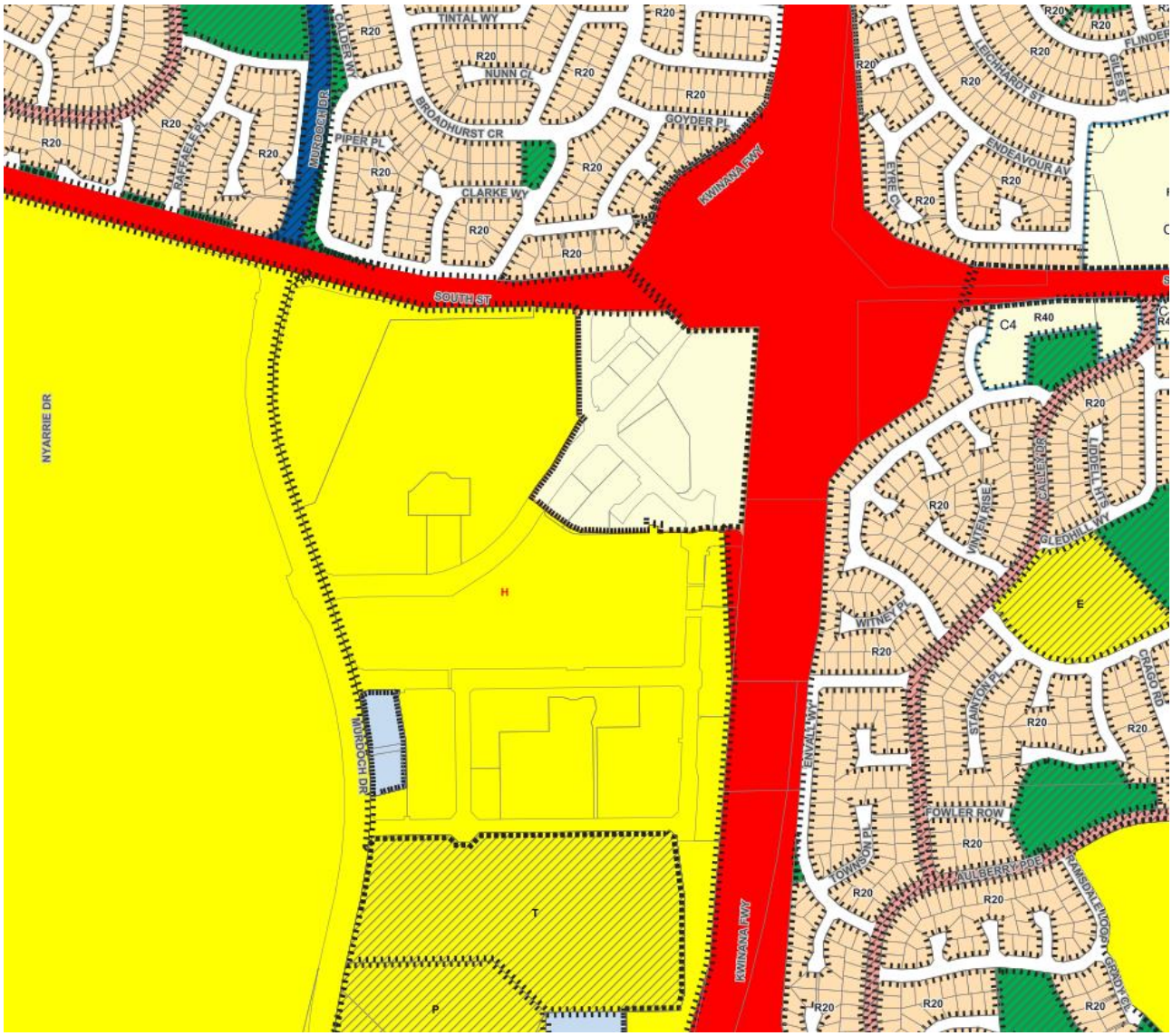
Figure 2-1 Site Location

Source: Metromap

2.2 Surrounding Land Uses

In the City of Melville *Local Planning Scheme No. 6*, the Site is zoned as “Hospital”. The adjacent land uses consist of Fiona Stanley Hospital to the south, Murdoch University to the west, Murdoch Train Station to the east and residential dwellings to the north. **Figure 2-2** shows the land use zones surrounding the Site.

Figure 2-2 Zoning Map



Source: Local Planning Scheme No.6

2.3 Existing Road Network

Road classifications are defined in the Main Roads Functional Hierarchy as follows:

- **Primary Distributors (light blue):** Form the regional and inter-regional grid of MRWA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes, and all are National or State roads. They are managed by Main Roads WA.
- **Regional Distributors (red):** Roads that are not Primary Distributors, but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by Local Government.
- **District Distributor A (green):** These carry traffic between industrial, commercial and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.
- **District Distributor B (dark blue):** Perform a similar function to District Distributor A but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These

are often older roads with traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and not through them, forming a grid that would ideally be around 1.5 kilometres apart. They are managed by Local Government.

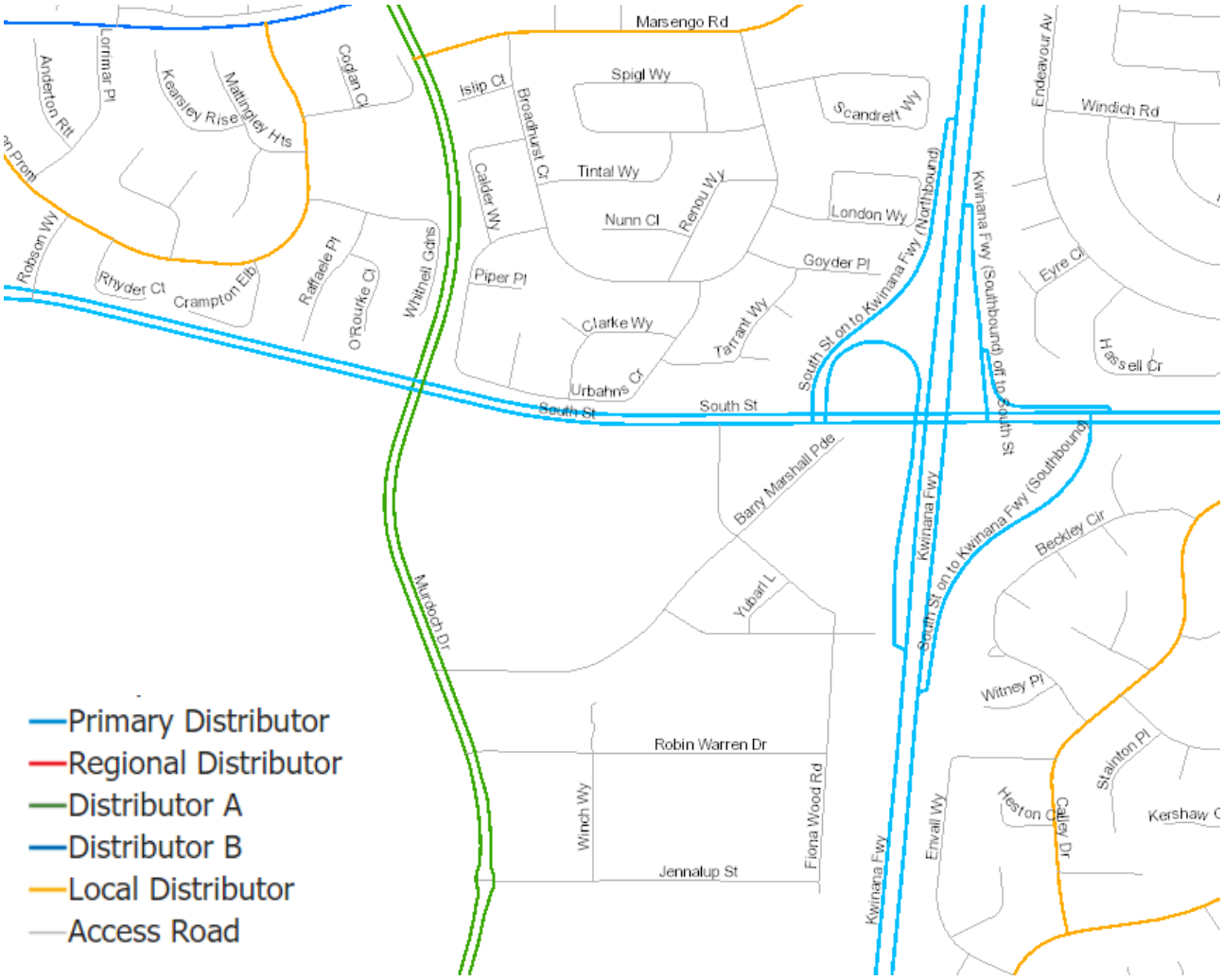
- **Local Distributors (orange):** Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local Government.
- **Access Roads (grey):** Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local Government.

The surrounding road network is further described in **Table 2-1** and shows the hierarchy as per the Main Roads WA Road Information Mapping System, whilst **Figure 2-3** shows the road hierarchy.

Table 2-1 Road Network Classification

Road Name	Road Hierarchy	Jurisdiction	No. of Lanes	No. of Footpaths	Road Width (m)	Posted Speed (km/h)
South Street	Primary Distributor	Main Roads WA	6	2	29.6	70
Murdoch Drive	Distributor A	Local Government	2	2	24.5	70
Barry Marshall Parade	Access Road	Local Government	2	2	20	50
Fiona Wood Road	Access Road	Local Government	2	2	15.2	40

Figure 2-3 Road Hierarchy



Source: Main Roads WA Road Information Mapping

2.4 Existing Traffic Volumes

The most recent traffic volumes for the roads in the vicinity of the Site were obtained from the Main Roads WA via TrafficMap and are summarised in **Table 2-2**.

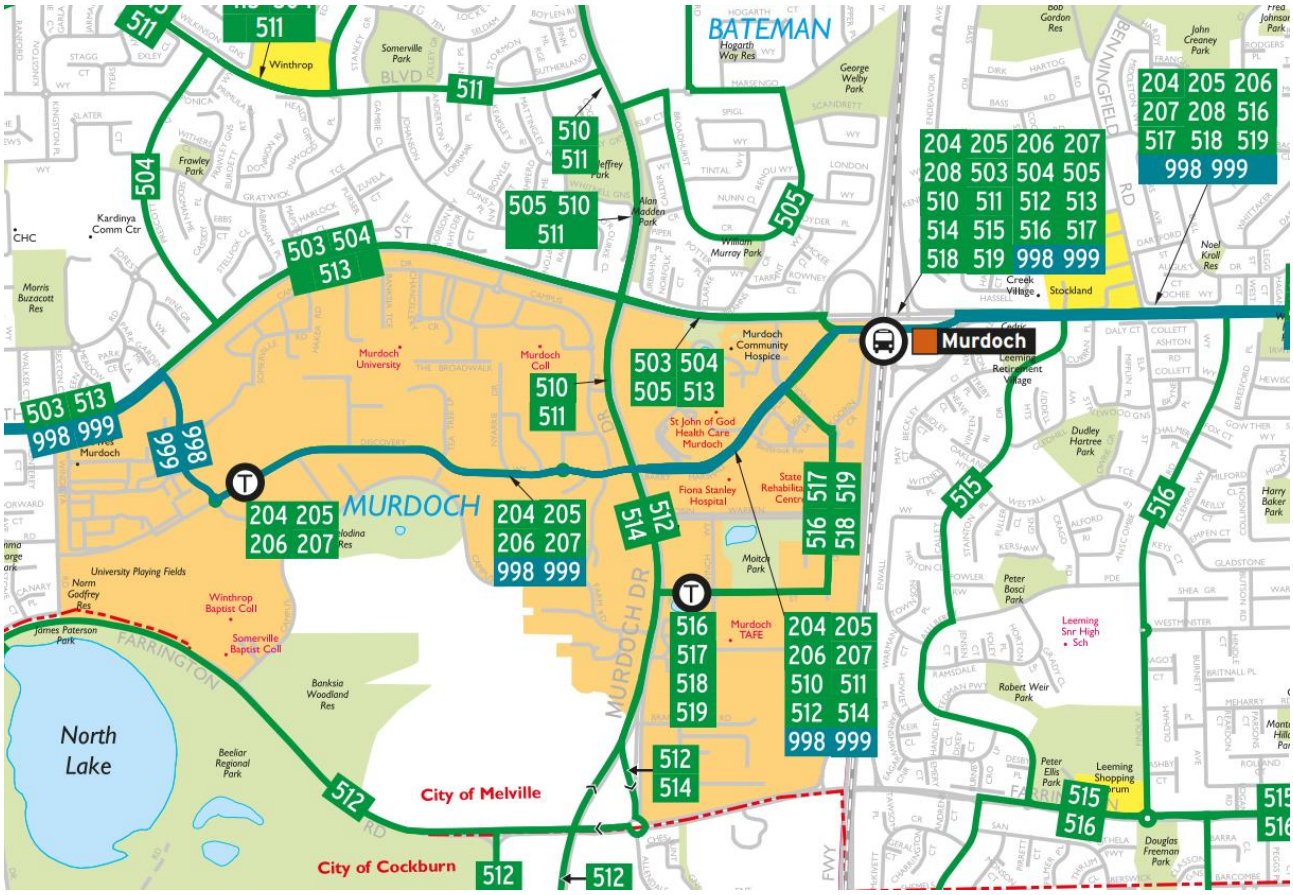
Table 2-2 Traffic Volumes

Road Name	Date	Average Two-way Daily Traffic Volume	Average Two-way AM Peak Traffic Volume (Weekday)	Average Two-way PM Peak Traffic Volume (Weekday)	Heavy Vehicles (%)
South Street (west of Murdoch Dr)	2020/21	43,072	2,180	3,430	8.1
South Street (west of Kwinana Fwy)	2021/22	45,306	3,214	3,801	6.9
Murdoch Drive	2021/22	27,505	2,731	2,396	6.1

2.5 Existing Public Transport Facilities

The Site has excellent access to public transport with a number of bus stops located on major road corridors such as South Street and Murdoch Drive. The availability of bus stops along Barry Marshall Drive results in easy access to high frequency bus services that feed into Murdoch Train Station. **Figure 2-4** below illustrates the large number of bus routes that serve SJGM Hospital, and the close proximity of Murdoch Station to the Site.

Figure 2-4 Transperth Network Map



Source: Transperth

2.5.2 Bus

Buses travel along Barry Marshall Parade from Murdoch train station every 5 to 10 minutes and stop at the Wexford Medical Centre. Bus services operate between 6:00am and 11:30pm. **Table 2-3** through to **Table 2-6** shows the average frequency of bus services for each bus service surrounding the Site.

Table 2-3 Bus Service Frequency – Barry Marshall Drive

Road Route	Destination	Frequency
204	Murdoch University – Maddington Station	Every 30 minutes
205	Murdoch University – Maddington Station	Every 33 minutes
206	Murdoch University – Cannington Station	Every 19 minutes
207	Murdoch University – Cannington Station	Every 24 minutes
510	Murdoch Station – Booragoon Bus Station	Every 15 minutes (peak)
511	Murdoch Station – Fremantle Station	Every 30 minutes
512	Murdoch Station – Spearwood Ave	Every 30 minutes
514	Murdoch Station – Cockburn Central Station	Every 30 minutes (peak)

Table 2-4 Bus Service Frequency – Murdoch Station

Road Route	Destination	Frequency
998	Curtin University Bus Station – Fremantle Station	Every 15 minutes
999	Fremantle Station – Fremantle Station	Every 15 minutes

Table 2-5 Bus Service Frequency – South Street

Road Route	Destination	Frequency
503	Bull Creek Station – Murdoch Station	Every 35 minutes
504	Bull Creek Station – Murdoch Station	Every 31 minutes
505	Bull Creek Station – Murdoch Station	Every 20 minutes (peak)
513	Fremantle Station – Murdoch Station	Every 30 minutes

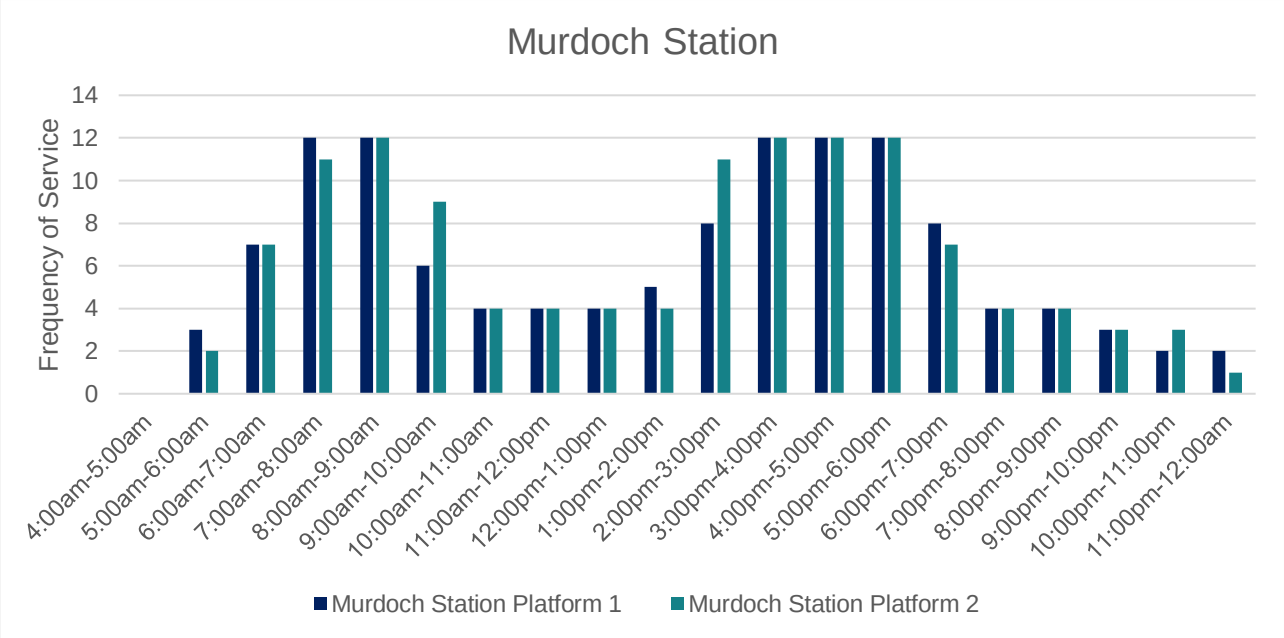
Table 2-6 Bus Service Frequency – Fiona Wood Road

Road Route	Destination	Frequency
516	Jandakot - Willetton	Every hour
517	Thornlie Station – Murdoch Station	Every hour
518	Murdoch Station – Cockburn Central	Every 20 minutes (evening peak)
519	Murdoch Station – Cockburn Central Station	Every 30 minutes (evening peak)

2.5.3 Train

The train station services the Mandurah line, connecting Mandurah to Perth Underground Station and beyond. The frequency of services is shown in **Figure 2-5**.

Figure 2-5 Frequency of Services for Murdoch Station



This chart above shows a higher number of services corresponds with the peak morning hours of 7-10am, and an extended afternoon peak between 2pm-7pm.

2.6 Existing Pedestrian/Cycle Network Facilities

2.6.1 Pedestrian Paths

The Site is surrounded by numerous high-quality walking facilities. The Site is accessible on foot, having facilities such as:

- Pedestrian walkways permeating the Site providing accessibility to hospital facilities;
- Pedestrian priority on internal roads; and
- Access from South Street between Fiona Wood Road and Murdoch Drive.

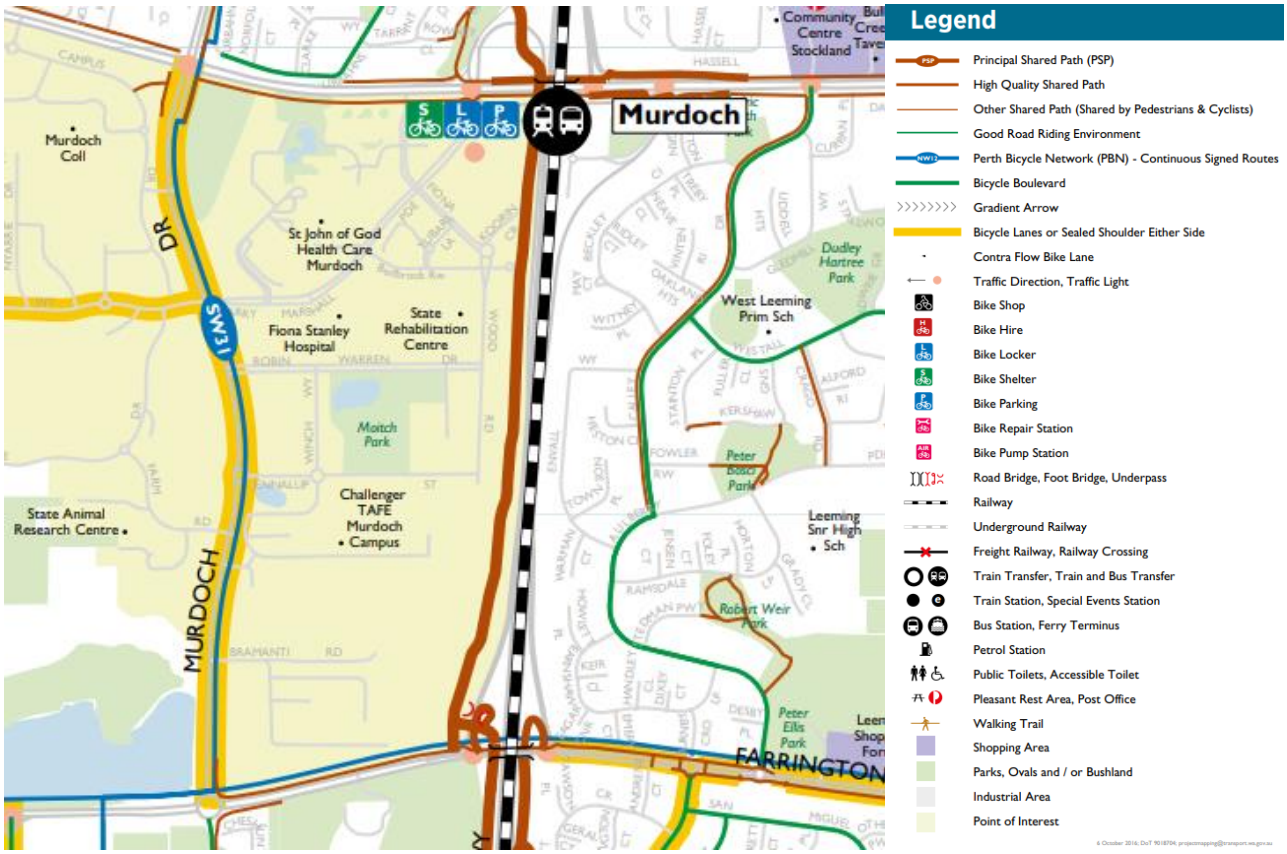
With a maximum walk speed of 5km/hr, pedestrians are able to access the majority of SJGM facilities within 10 minutes of walking, generally in a pleasant walking environment, though some locations require attention

to shade and shelter. Pedestrians are able to access all the bus stops along South Street, Murdoch Drive and Barry Marshall Parade within 10 minutes, increasing the potential for public transport use.

2.6.2 Cycling Network

The Site is surrounded by numerous high-quality cycling facilities as shown in **Figure 2-6**.

Figure 2-6 Cycling Network



Source: Department of Transport

2.6.3 End-of-Trip Facilities

An audit of St John of God Murdoch Hospital End-of-Trip cycling facilities was completed in August 2021. It reviewed the condition of the existing bike infrastructure and information regarding its usage. Below are the key findings obtained from the audit:

- Total of 216 bike rack locations across the Site:
  - 126 spaces in the end of trip facilities
  - 16 spaces in Carpark P3 and 14 spaces outside main entrance
  - 48 spaces at Wexford Medical Clinic
  - 26 spaces at Murdoch Medical Clinic
- 126 secure bike parking spaces
- 5 male and 6 female showers including:
  - 2 male / 2 female showers in Wexford Medical Centre
  - No showers in Murdoch Medical Clinic
- 92 male and 92 female lockers available with more than half being used
- 42% bike parking is open rack and 58% is secured parking.

End of Trip facilities play an important role in increasing the usage of transportation by bicycles, as they provide a safe location to store bikes and associated equipment, as well as the opportunity for riders to freshen up following rides.

Based on the information obtained from the audit, it suggests that there is an under-utilisation of existing bike infrastructure. Better promotion of the facilities may result in greater use, and an increase in the cycling mode share.

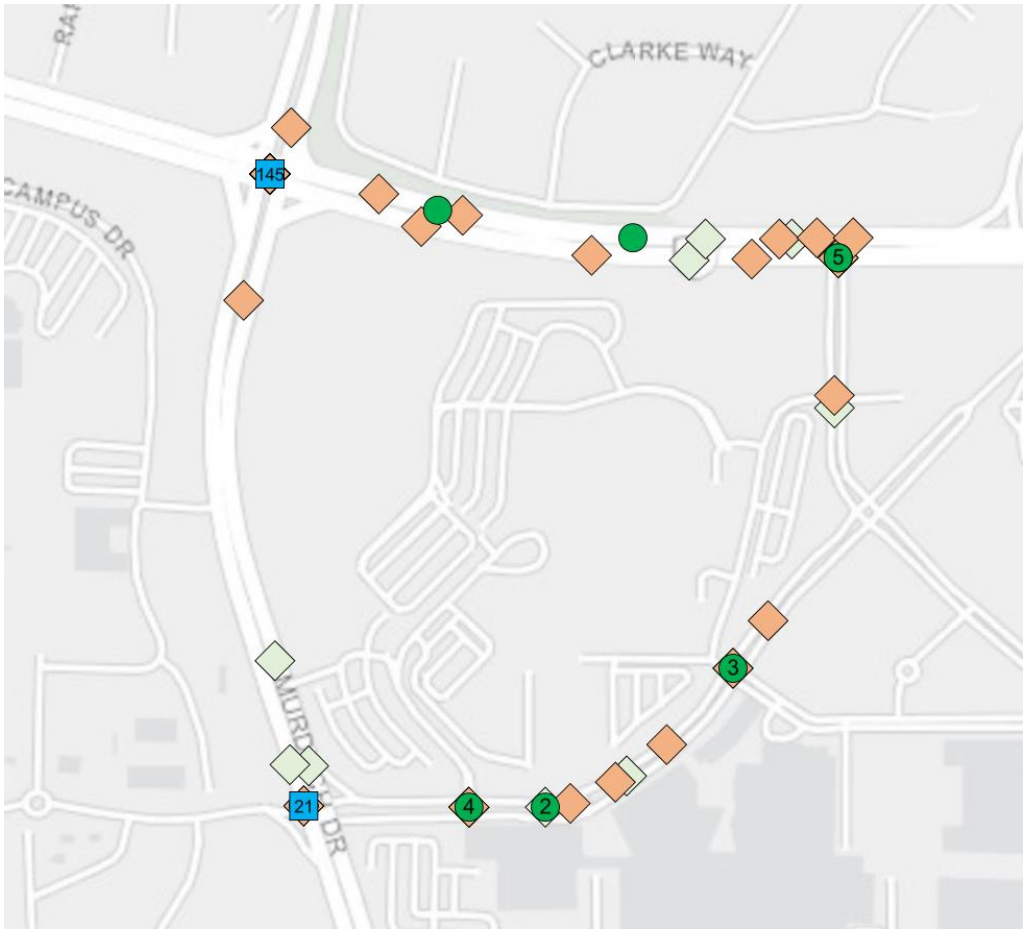
2.7 Existing Crash Data

A search of the *Main Roads WA Reporting Centre* for crash data was undertaken for all recorded traffic accidents between 1 January 2016 and 31 December 2020 within the surrounding area of the subject Site at the following roads and intersections:

- South Street/Murdoch Drive intersection
- Murdock Drive/Barry Marshall Parade intersection
- Barry Marshall Parade/Fiona Wood Road intersection (no crashes)
- South Street/Fiona Wood Road intersection
- South Street midblock (between Murdoch Drive and Fiona Wood Road)
- Murdoch Drive midblock (between South Street and Barry Marshall Parade)
- Barry Marshall Parade midblock (between Murdoch Drive and Fiona Wood Road)
- Fiona Wood Road midblock (between South Street and Barry Marshall Parade)

Figure 2-7 shows the recorded crashes located near the Site and **Table 2-7** through to **Table 2-13** provides a summary of the crash nature and type at the listed mid-block and intersection locations.

Figure 2-7 Crash Map



Source: Main Road WA Crash Map

Table 2-7 South Street/Murdoch Drive Intersection Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Rear End	-	2	21	49	46	118
Right Angle	-	-	1	3	3	7
Sideswipe Same Direction	-	-	-	6	5	11
Right Turn Thru	-	1	1	3	-	5
Non-Collision	-	1	-	-	-	1
Hit Pedestrian	-	-	-	-	1	1
Unspecified	-	-	-	-	2	2
Total	**0**	**4**	**23**	**61**	**57**	**145**

Table 2-8 Murdock Drive/Barry Marshall Parade Intersection Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Rear End	-	1	3	6	4	14
Right Angle	-	-	1	3	1	5
Sideswipe Same Direction	-	-	-	-	1	1
Right Turn Thru	-	-	-	1	-	1
Total	**0**	**1**	**4**	**10**	**6**	**21**

Table 2-9 South Street/Fiona Wood Road Intersection Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Rear End	-	-	2	2	1	5
Total	**0**	**0**	**2**	**2**	**1**	**5**

Table 2-10 South Street Midblock (between Murdoch Drive and Fiona Wood Road) Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Rear End	-	-	1	5	-	6
Sideswipe Same Direction	-	-	1	2	2	5
Hit Animal	-	-	-	-	1	1
Total	**0**	**0**	**2**	**7**	**3**	**12**

Table 2-11 Murdoch Drive Midblock (between South Street and Barry Marshall Parade) Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Sideswipe Same Direction	-	-	-	1	1	2
Rear End	-	-	-	-	1	1
Unspecified	-	-	-	-	1	1
Total	**0**	**0**	**0**	**1**	**3**	**4**

Table 2-12 Barry Marshall Parade Midblock (between Murdoch Drive and Fiona Wood Road) Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Rear End	-	-	2	3	-	5
Right Angle	-	-	-	3	-	3
Unspecified	-	-	-	1	2	3
Total	**0**	**0**	**2**	**7**	**2**	**11**

Table 2-13 Fiona Wood Road Midblock (between South Street and Barry Marshall Parade) Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Right Angle	-	-	-	1	1	2
Total	**0**	**0**	**0**	**1**	**1**	**2**

A summary of the crashes is provided below:

- The crash records show that there are a significant number of crashes at the South Street / Murdoch Drive intersection. Within the City of Melville, this intersection has the highest number of crashes ranking 1st in the Prequalified locations for Federal Black Spot Program (for the Melville LGA area).

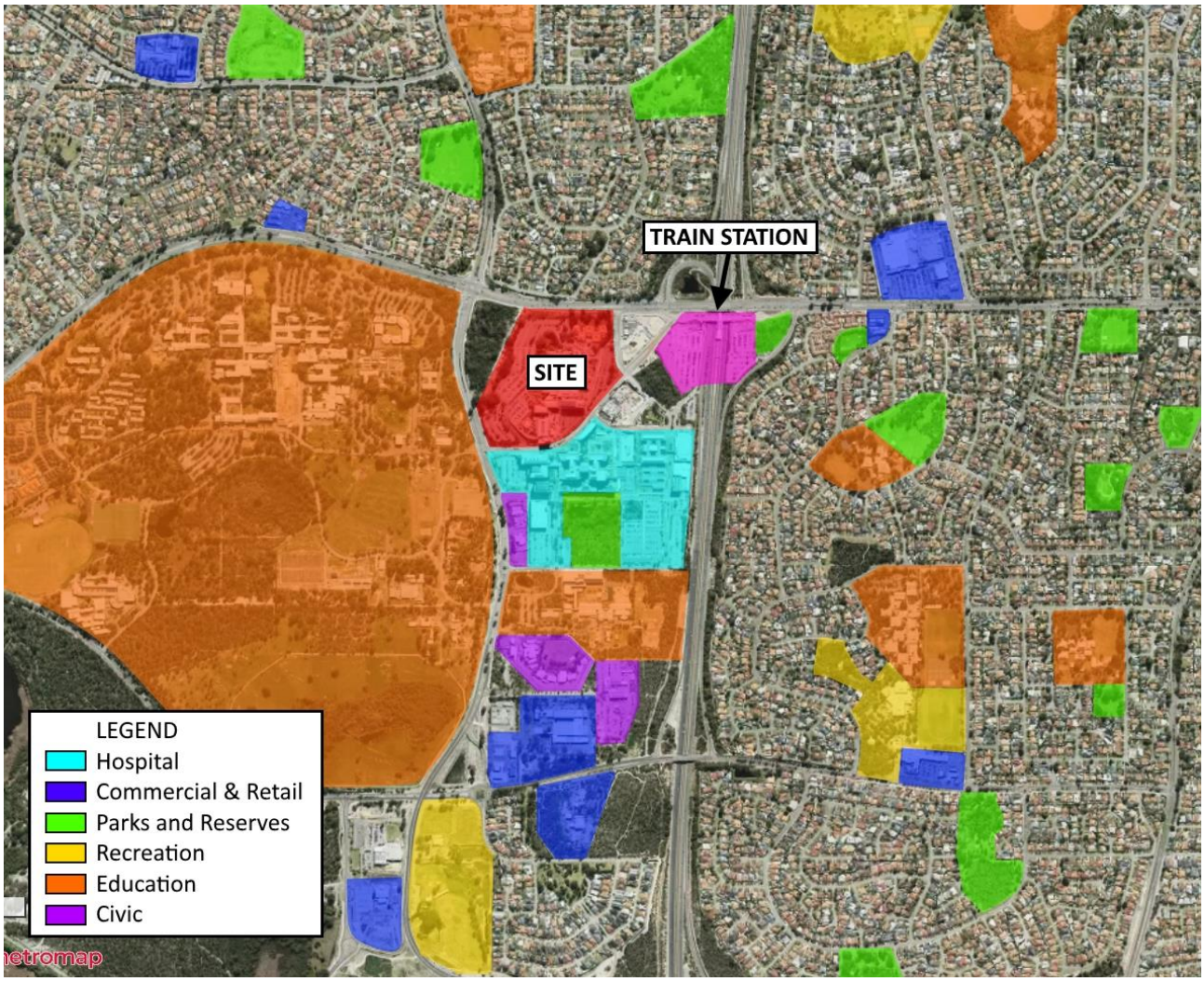
  These crashes are not related directly to SJGMH, as they occur at the confluence of two Primary Distributor Roads.
- No significant pattern of crashes was identified along the SJGMH frontage roads and access points.
- 5 crashes resulted in hospitalisation and 33 crashes required medical attention with the majority of these crashes occurring at the South Street / Murdoch Drive intersection.
- A review of crash history in the vicinity of the Site indicates significant concerns only at the interface with the Primary Road network and arising from its primary function. In particular, the South Street / Murdoch Drive intersection has been identified as a black spot by Main Roads WA. The proposed development results in relatively low levels of additional traffic at these points; well within the capacity of key intersections. As such, no additional road safety improvements will be triggered by the proposed redevelopment.

3 Integration with Surrounding Area

The surrounding attractors/generators within close proximity to the Site are shown below in **Figure 3-1**. Key attractors/generators include the following:

- Murdoch University
- Murdoch Station
- Fiona Stanley Hospital
- South Metropolitan TAFE
- Various parks and recreational facilities
- Various commercial/retail
- Various primary and secondary schools

Figure 3-1 Key Attractors/Generators within the Surrounding Area



4 Changes to the Surrounding Transport Network

4.1 Road Network

Based on the information provided on Main Roads WA's and City of Melville's website regarding major projects and roadworks, there does not appear to be any road infrastructure projects proposed within the vicinity of the Site.

4.2 Pedestrian/Cycle Networks

4.2.1 City of Melville Bike Plan 2012

The City of Melville Bike Plan details and evaluates the existing bike infrastructure within the Melville LGA and aims to expand the cycling network to create an interconnected and safe cycling route for all cyclists. Within the plan, there are several proposed infrastructure upgrades that are within the vicinity of the Hospital which include the following:

- Proposed PSP path along the eastern side of Kwinana Freeway
- Proposed bicycle infrastructure along South Street
- Proposed shared path along Murdoch Drive

4.3 Public Transport Networks

4.3.1 Metronet – Thornlie-Cockburn Link

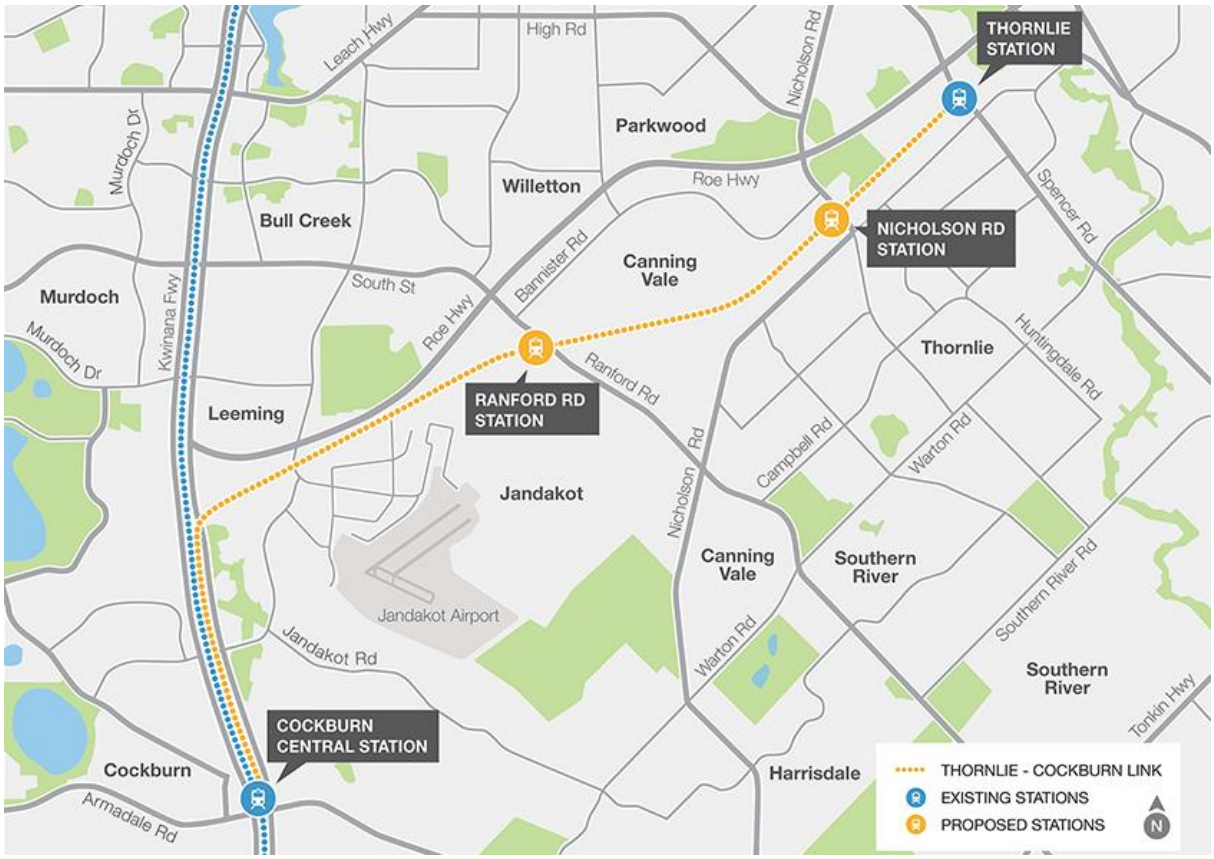
The Thornlie-Cockburn Link is a proposed rail connection between Thornlie Station and Cockburn Station. In addition to the rail connection, two new stations (Ranford Road and Nicholson Road Stations) are proposed including modifications to the existing Cockburn and Thornlie Stations to accommodate the new rail link.

The benefits of this rail link include:

- Providing a transport alternative;
- Addresses gaps within the public transport network; and
- Alleviates current and future capacity pressures.

Figure 4-1 shows the proposed rail alignment.

Figure 4-1 Thornlie-Cockburn Link Proposed Alignment



Source: Metronet

4.3.2 Public Transport Authority (PTA)

The Public Transport Authority (PTA) have advised that there are currently no planned service changes near the SJGMH. In the future, there may be an increase in frequency to existing services within the surrounding area though this is not guaranteed as there is no funding allocated to this.

5 Existing Parking Supply and Demand

5.1 Parking Supply

The current form of allocation provides dedicated parking to individual groups, with staff, doctor and public parking maintained in separate areas.

A summary of existing parking allocation is given below, **Table 5-1**.

Table 5-1 Current parking allocation

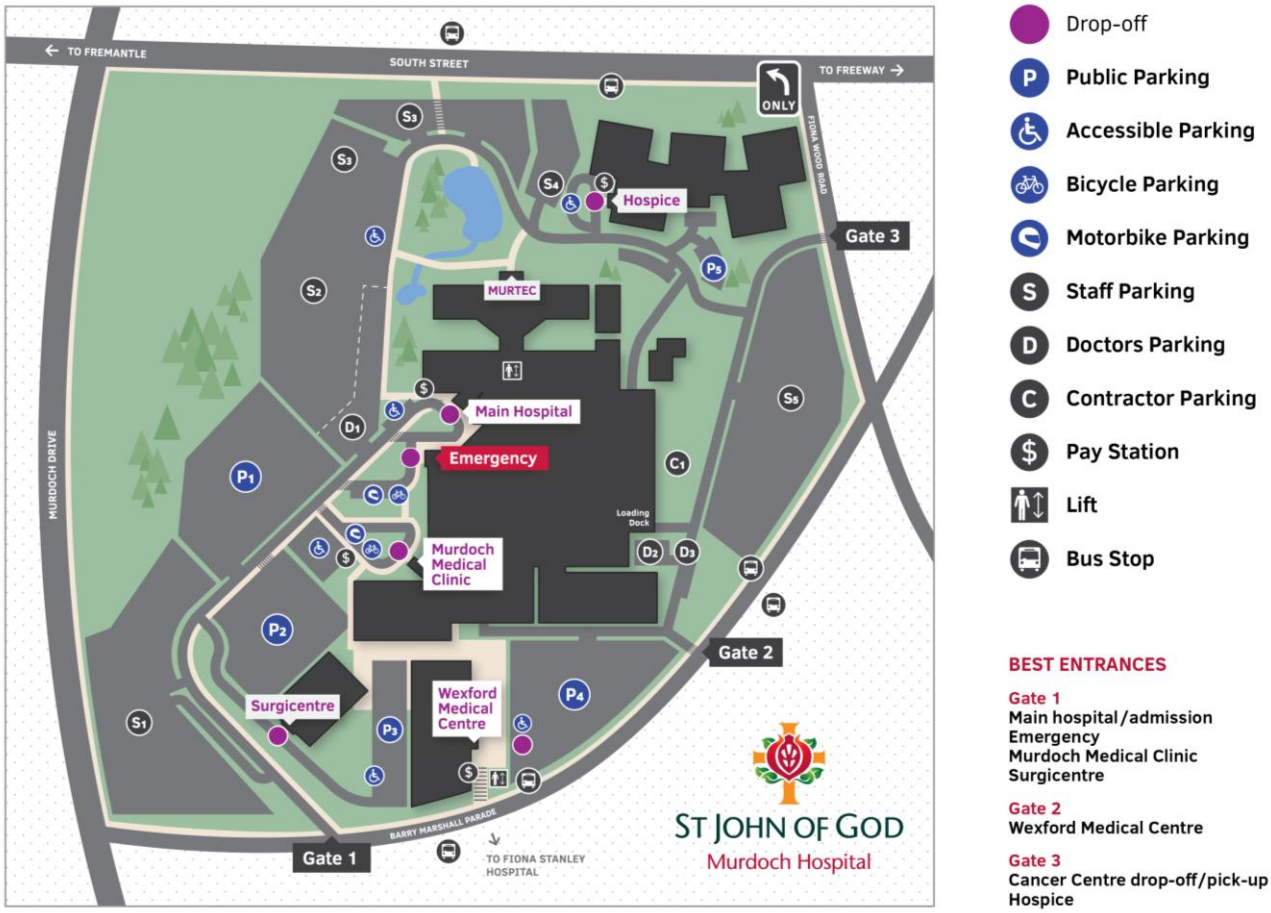
Group	Allocation
General Staff Parking	
S1	224
S2, S3 & S4	518
S5	203
Medical Clinic	48
Wexford Clinic	89
South Wing	53
Contractor Bays	*14*
Staff Parking Total	**1,149**
Doctor Parking	
D1	75
D2 & D3	40
Doctor Parking Total	**115**
Patient/Visitor Parking	
P1	258
P2	127
P3	56
P4	134
P5	53
Patient/Visitor Parking Total	**628**
Hospital Parking Total	**1,892**

In addition to these parking bays, the hospital provides a number of specialty bays which fall outside of the parking cap, including:

- 33 disabled parking bays
- 9 emergency vehicle bays
- 11 pick-up/drop-off bays
- 22 motorcycle/scooter bays
- 4 loading bays

Figure 5-1 shows the location of this parking across the SJGMH campus.

Figure 5-1 Parking location map



5.2 Parking Management

The existing parking management regime provides gated access control via a ticket system for visitors and swipe card access for staff.

All parking is paid across the site, with visitors paying $3.00/hour (long-stay passes are available at a reduced rate) and staff paying $3.60/day.

5.3 Parking Demand

Parking access data was analysed to identify existing parking usage, across all staff and visitor car parks. Information was provided for all visitor entry/exit data and staff entry data for the one-month period between Saturday 1 May 2021 and Monday 31 May 2021. This data included time, location, visitor ticket number, Staff ID, access profile and more.

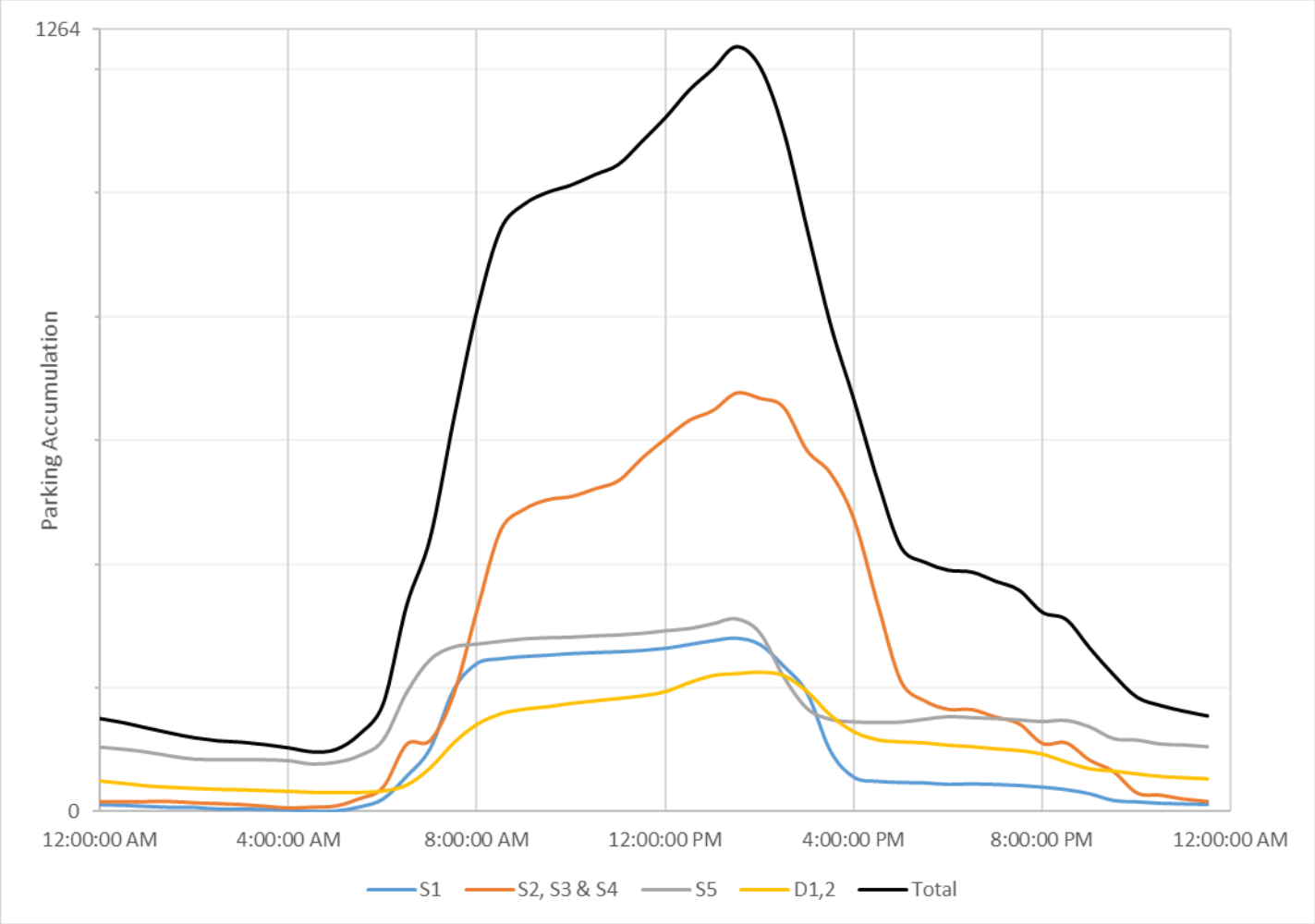
The density of information allows for a fine-grained understanding of the existing parking needs of the campus, and has been related to both the service provision, staffing level and parking supply to allow for future impact assessment.

The following charts are a synthesis of the data available from the parking control system.

5.3.1 Staff Parking Occupancy

The demand for staff parking is highest during the weekdays, dropping off substantially on Saturday and Sunday. **Figure 5-2** shows the profile for staff parking demand at the SJGMH campus.

Figure 5-2 Staff parking accumulation – average weekday



This profile is fairly typical of a large hospital. It is characterised by a relatively slow arrival period, which is the effect of morning and day shift times, levelling off through the midday.

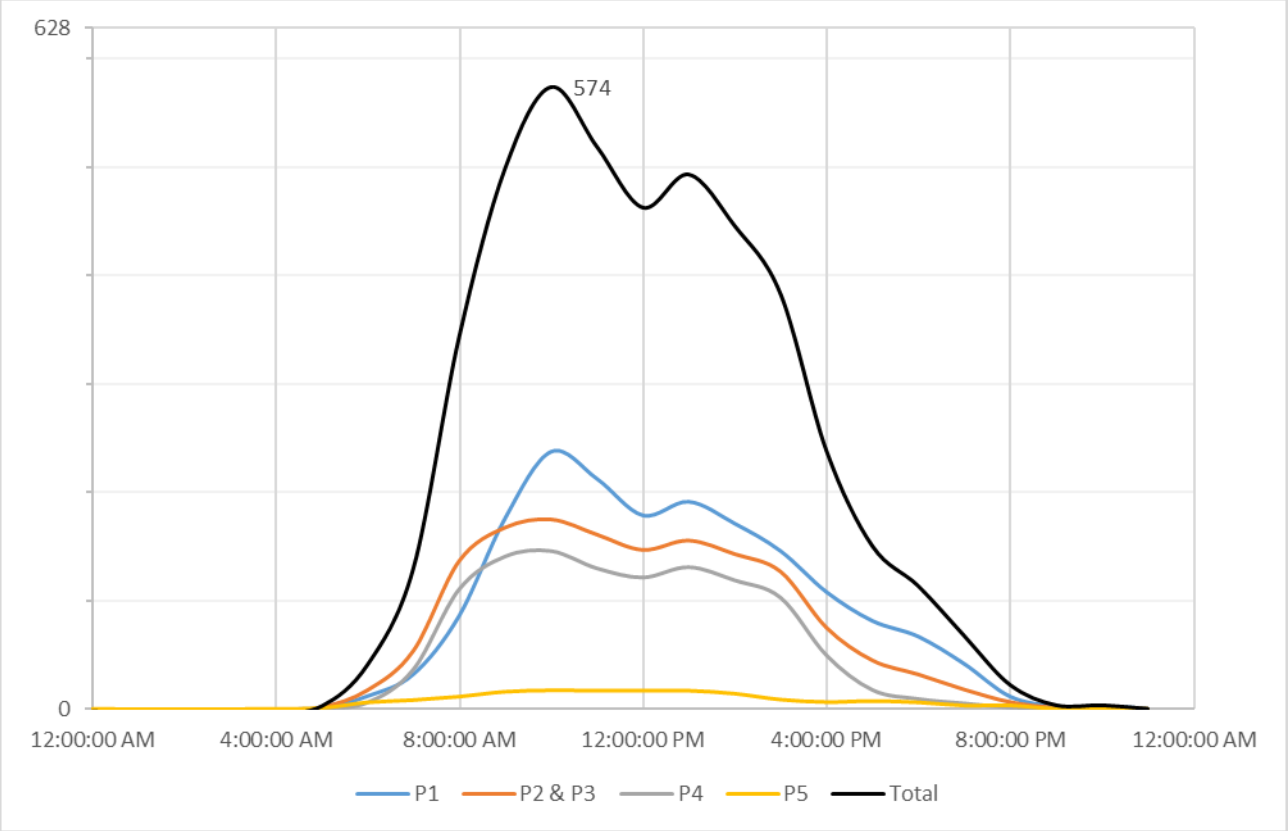
A distinct afternoon peak demand is also evident, which corresponds to the overlap period between the start of the afternoon shift and the end of the morning shift. This overlap period is vital for safe and effective handover, as well as a number of critical hospital functions. However, there is a significant impact on the efficiency of staff parking. As shown above, approximately 200 additional spaces are necessary to accommodate the shift overlap.

Most relevant to the operation of the on-site parking, the *average* peak parking demand across the Site is shown to approach the total parking supply. Some individual days clearly indicate demand exceeding available supply, requiring staff to queue and wait to start work.

5.3.2 Visitor parking occupancy

Visitor parking demand tends to be distributed fairly evenly throughout the day, with the greatest demand occurring in the mid-morning, as shown below in **Figure 5-3**.

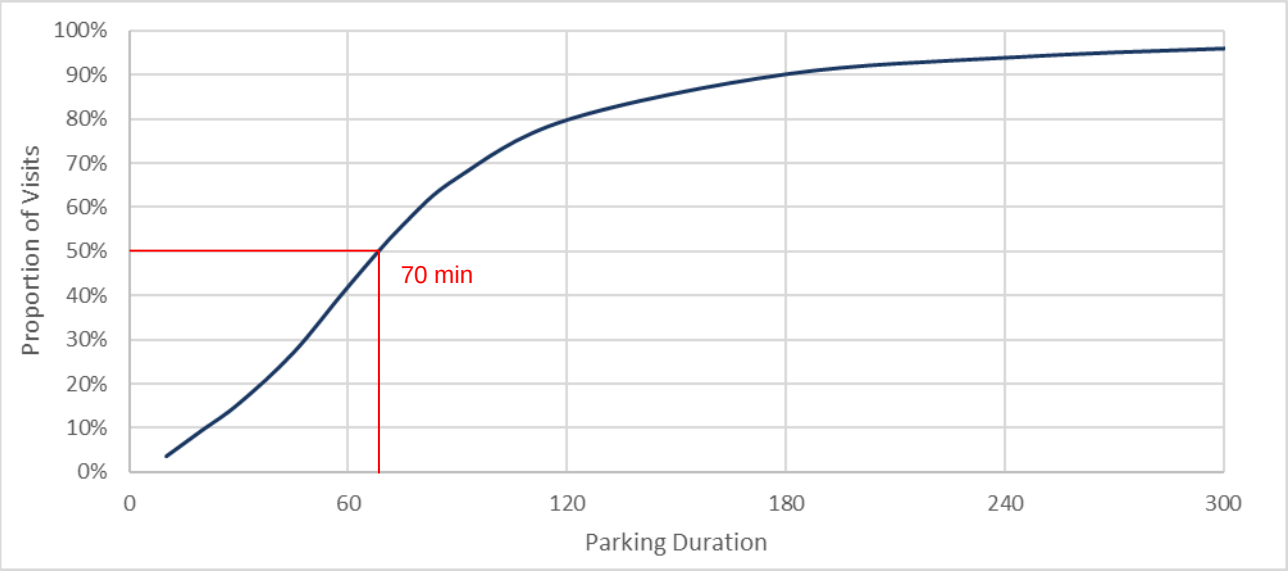
Figure 5-3 Visitor parking accumulation – average weekday



The current demand for parking is effectively sitting at practical capacity, being approximately 90% of the total visitor parking supply during the average day.

Visitor duration of stay is generally fairly short, with a median stay of about 70 minutes (as shown in **Figure 5-4**). This allows the SJGMH car park to support visitation by approximately 3,500 visitors access the campus each day.

Figure 5-4 Visitor parking duration of stay



The current arrangement of car parking, which comprises 5 distinct parking areas, is not as efficient as a single combined car park. The consequence of this is that connections between parking and hospital destinations are closer, but individual car parks may experience considerable stress even while parking remains available in other locations on the campus. The proposed SJGMH redevelopment would address this inefficiency by improving connection through the campus by opening up the internal 'ring road' and by consolidating visitor parking.

One noticeable feature of the parking accumulation chart above: afternoon parking requirements are markedly lower than the mid-morning peak. This occurs at the same time as the afternoon overlap shown in the staff parking profile.

Unfortunately, there are no mechanisms that can be used to effectively and consistently share parking between afternoon shift and visitors. As such, a segregated supply remains the appropriate allocation of parking across the site, despite the inherent inefficiencies. This should also be considered in the context of the potential trip generation for parking; an increase in parking supply does not necessarily result in an increase in trips (for example, if that parking is provided for exclusive use by afternoon shift staff, no peak period trips are generated).

Further information regarding parking within the SJGMH is provided in the Parking Management Plan.

6 Existing SJGMH Traffic Generation

6.1 Alternative Travel

There are four distinct user groups for the hospital:

- hospital staff (inc. nurses, doctors, clerical, cleaning, catering) and visiting medical specialists;
- patients (in-patients and out-patients);
- patient visitors; and
- other visitors (via Emergency Vehicles, Delivery Vehicles, and Taxis)

Each of these groups have their own needs that affect travel choices. An understanding of the travel patterns of these different groups can therefore help with supporting mode change.

SJGMH operates a number of initiatives to support sustainable transport objectives and is continuing to modify and improve their systems. As part of this, an updated Green Travel Plan has been developed to incentivise staff and visitors to use alternative modes where available.

This Plan identifies the following objectives:

1. To manage and reduce the demand for parking at SJGM Hospital;
2. To ensure high levels of accessibility to and from the site for all, and
3. To support physical and mental health and wellbeing through the promotion of active transport modes.

To achieve these objectives, SJGMH has a range of actions already in place, including:

- Paid staff and visitor parking
- A Green Travel Allowance: which gives staff a financial bonus if they do not drive to the SJGMH campus
- High quality end-of-trip facilities
- Carpooling initiatives
- Transport focus at orientation and annual competency training

These efforts have been expanded in the updated Green Travel Plan, to focus on areas that are lacking, and to improve the awareness and culture of sustainable transport for staff and visitors.

Based on the existing mode share for the Hospital, the following future mode share targets for 2026 (**Table 6-1**) have been developed for employees and visitors. This is based on the availability of sustainable transport modes and the continuation and improvement of on-campus initiatives detailed in the 2021 Green Travel Plan.

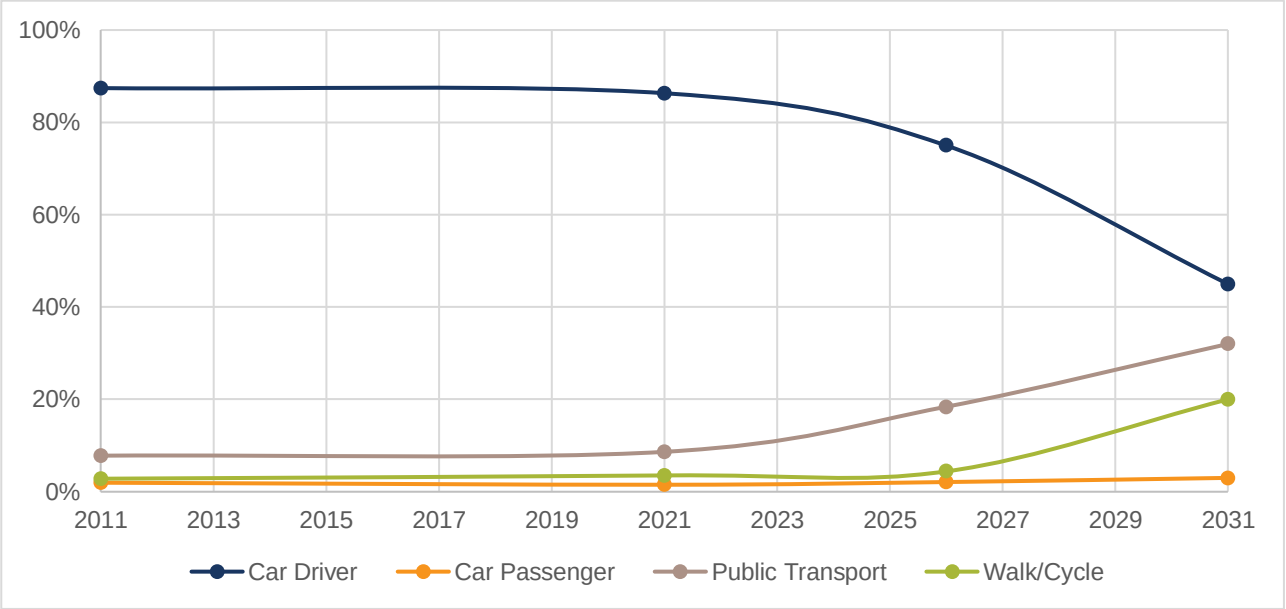
The mode share targets combined employee visitors as the measure used in the MAC Structure Plan considers a holistic mode share across all destination trips. Since the interventions included in the Green Travel Plan focus on the staff group, it is expected that the target mode share will be reached by employees before visitors. However, improved public transport and active transport infrastructure would benefit both hospital staff and visitors.

These targets have been selected to align with the MAC Structure Plan, but they ***cannot*** be achieved without supporting public transport and land use infrastructure.

Table 6-1 Mode Share Targets

Mode	2021 (Existing)	2026 (Target)	2031 (Target)
Car Driver	86.3%	75.0%	45.0%
Car Passenger	1.5%	2.1%	3.0%
Public Transport	8.6%	18.4%	32.0%
Walk/Cycle	3.5%	4.4%	20.0%

Figure 6-1 Potential Mode Share Change



A copy of the 2021 Green Travel Plan has been included as **Appendix C**. There are four distinct user groups for the hospital:

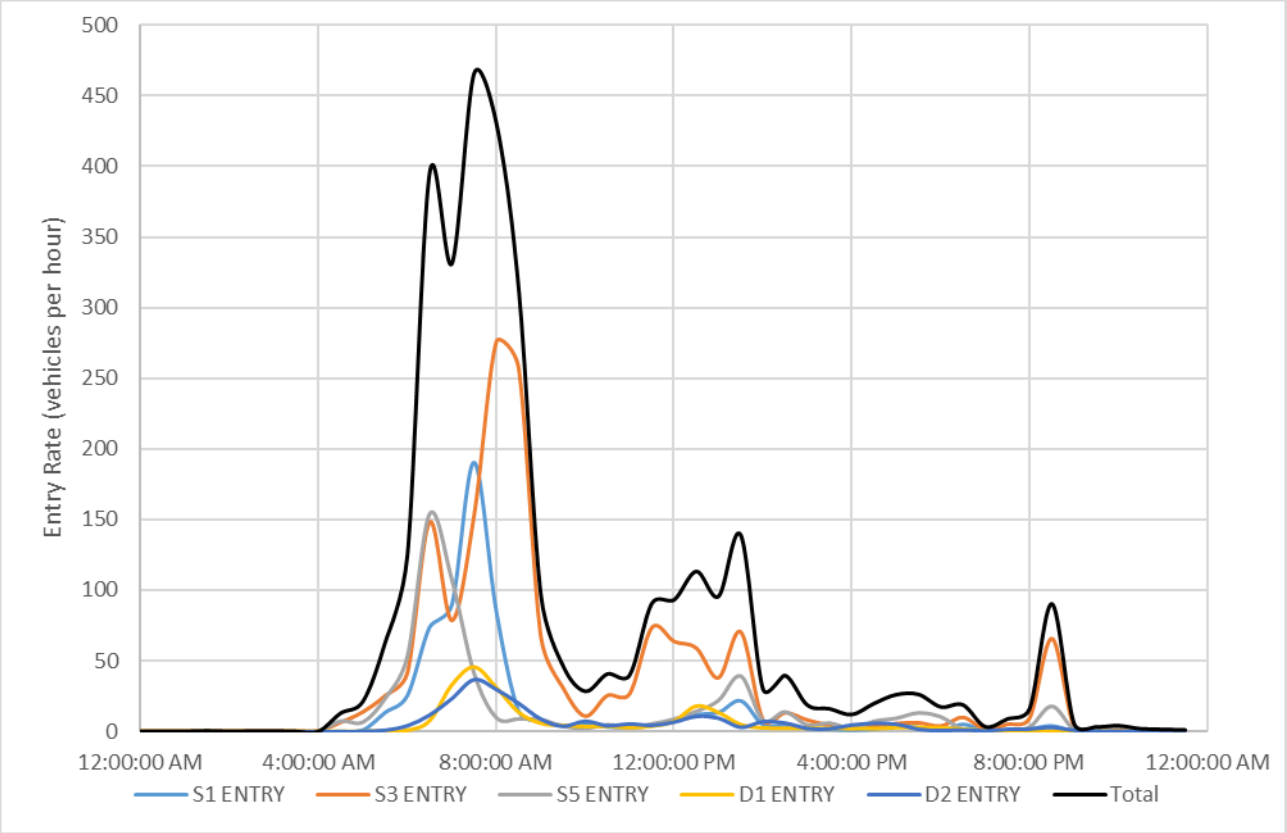
- hospital staff (inc. nurses, doctors, clerical, cleaning, catering) and visiting medical specialists;
- patients (in-patients and out-patients);
- patient visitors; and
- other visitors (via Emergency Vehicles, Delivery Vehicles, and Taxis)

Each of these groups have their own needs that affect travel choices. An understanding of the travel patterns of these different groups can therefore help with supporting mode change.

6.2 Staff Entry

A profile for staff entry has been calculated from this weekday data (**Figure 6-2**) to provide an understanding of the impact this particular demand has on the network. This is expressed in vehicles per hour for each 30-minute time step across the day.

Figure 6-2 Staff entry times – average weekday



The chart clearly shows the effect of the different shift on the travel behaviour of staff. Through the day this can be categorised as follows:

- 6:00-7:30am: Morning Shift starts. This group constitutes a wide variety of caretakers and support staff. Approximately 425 staff arriving during this 90-minute period.
- 7:30-9:00am: Day Shift starts. This group consists both of caretakers and administration staff, with another 600 staff arriving during this time.
- 12:00-2:00pm: Afternoon Shift starts. Approximately 220 staff members arrive during this period, primarily carers and support services.
- 8:00-9:00pm: Night Shift starts: The parking requirements for the night shift are relatively low, in the order of 100 trips.

In addition to these distinct entry times, there is a continual flow of access by staff to the campus as a result of attending physicians, allied health services and specialists accessing the site.

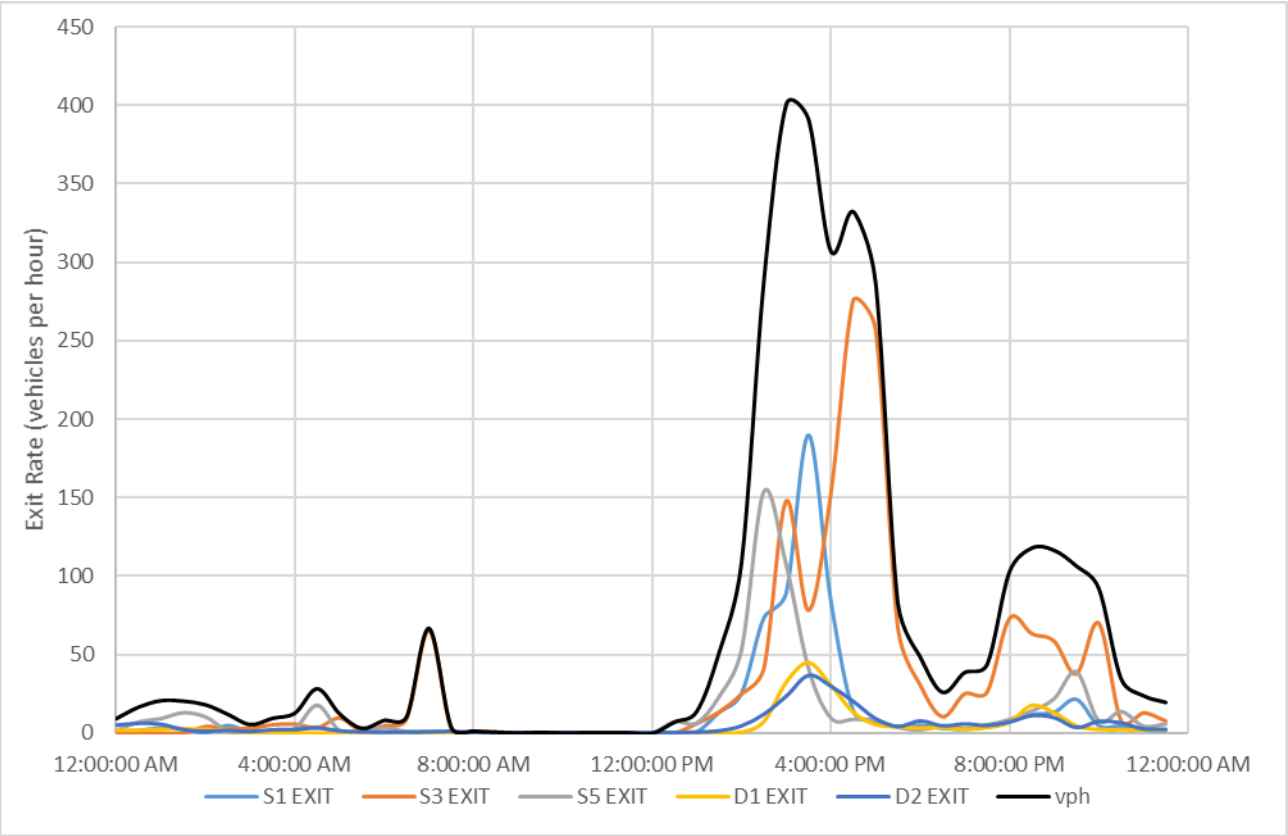
In the context of establishing a metric for peak period trip generation, current evidence shows that staff generate a maximum of approximately 445 trips during the busiest 1-hour period (7:30am-8:30am). It is noted that this tends to overlap with the morning roadway peak period.

6.3 Staff Egress

The SJGMH parking system does not currently log egress times for staff across the campus. As such, these have been estimated using standard shift rosters to provide an indication of the intensity and duration of egress movements.

The travel behaviour of staff is mirrored in the egress profiles, as shown in **Figure 6-3** below.

Figure 6-3 Staff exit times – average weekday



This suggests a prolonged and distributed outbound movement that starts at 2pm and extends through to 5:30pm. The trip generation for the afternoon peak is therefore less intense than the morning peak, in the order of 400 trips per hour (3:00pm-4:00pm). This lies outside of the network peak hour (4:00-5:00pm).

An indicative staff trip generation rate could therefore be expressed as:

- 0.316vph per staff parking space (PM peak hour of generator)
- 0.253vph per staff parking space (PM network peak)

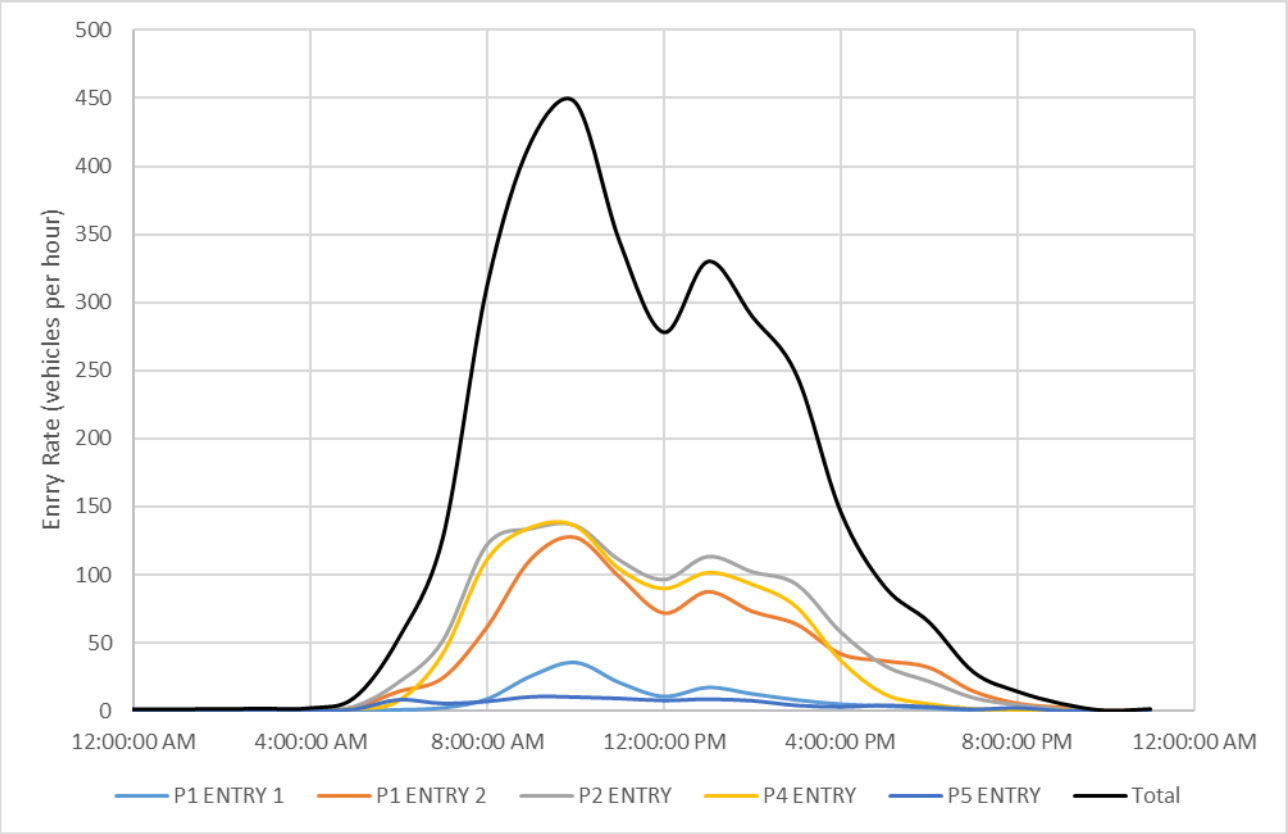
Key to understanding the importance and effect of parking is identifying the proportion of staff members who operate outside of ‘core hours’, nominally 7am-6pm. For the SJGMH campus, this includes upwards of 44% of staff, who can be considered to have a reduced access to alternative transport.

While the local public transport connection to Murdoch Station and along the Mandurah Line exhibits reasonable frequency outside of core hours, this is not consistent across the wider network.

6.4 Visitor Entry

All visitor entry and egress for the month-long survey was captured by the access control system. The average weekday flow rate for entry to the SJGMH campus by visitors is shown in **Figure 6-4** below.

Figure 6-4 Visitor entry times – average weekday

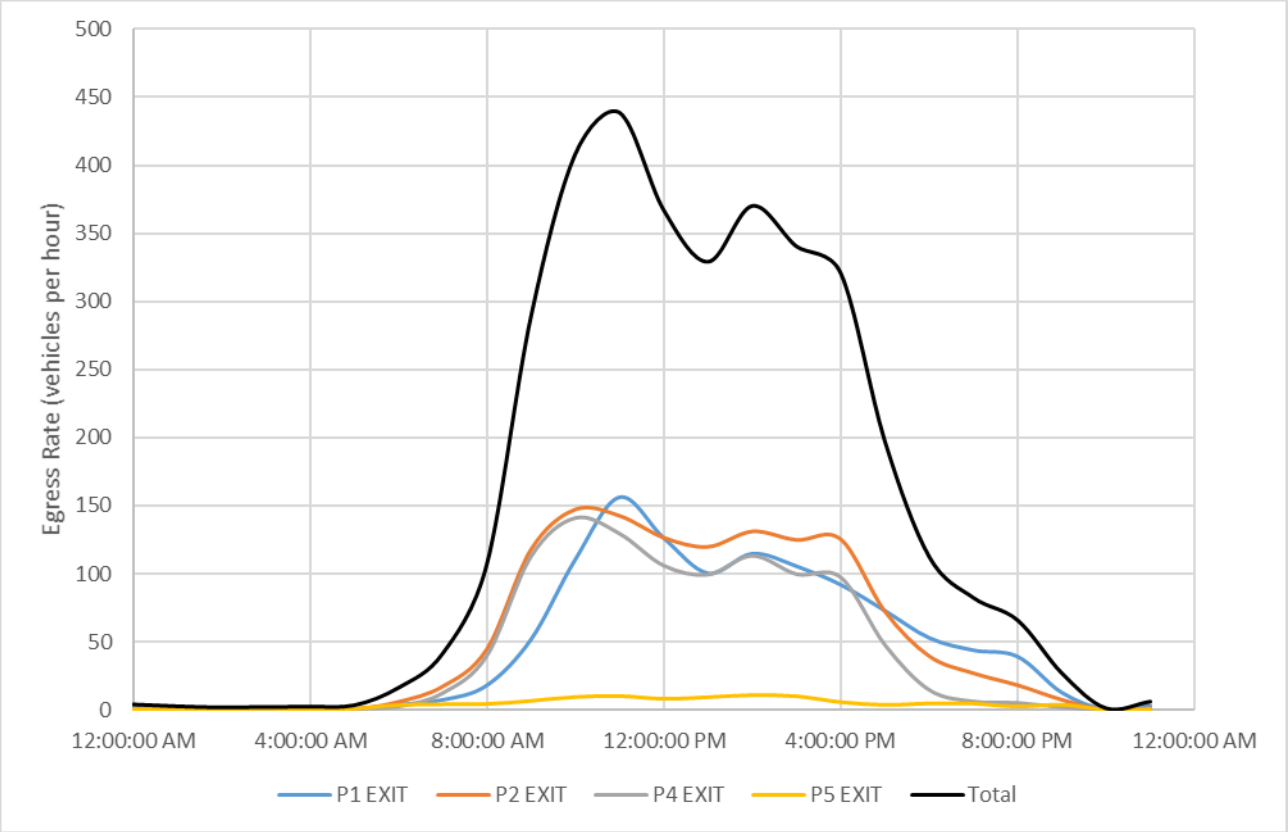


This shows that the peak period for vehicle entry is between 9:00am and 11:00am, well after the staff peak period.

6.5 Visitor egress

The corresponding egress movements by visitors are shown in **Figure 6-5**, with a peak demand period of between 10:00am and noon.

Figure 6-5 Visitor egress times – average weekday



The impact of staff and visitor access and egress movements has been assessed in the context of the boundary road network, with the results shown in **Section 7** below.

Using the same methodology as above, an indicative visitor trip generation rate can therefore be expressed as:

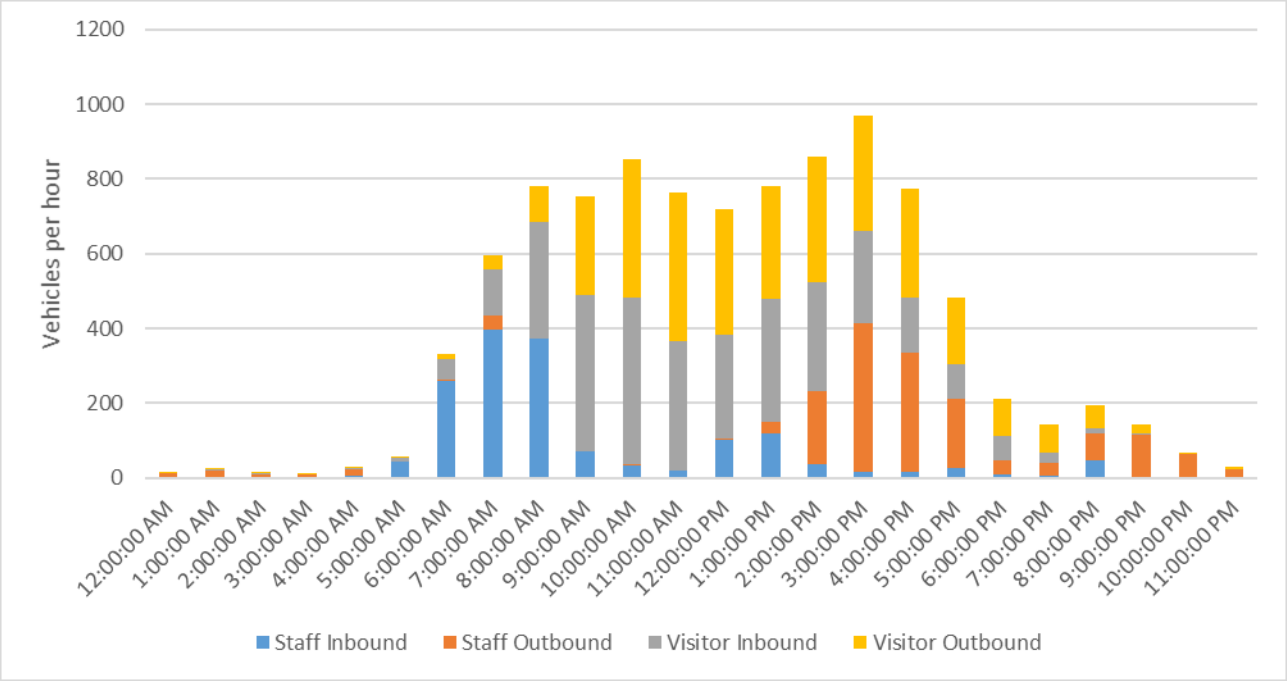
- 1.361vph per visitor parking space (AM peak hour of generator)
- 1.051vph per staff parking space (PM peak hour of generator)

Noting that neither of these peak periods coincides with network peaks.

6.6 Combined traffic generation

The two user groups (visitors and staff) generate traffic at different times of day, as described in **Figure 6-6**. As a result, the Hospital generates ***considerably*** fewer trips in the peak periods than the equivalent number of parking bays at a retail or office development.

Figure 6-6 Traffic Volume Summary for the SJGM Hospital



The combined traffic generation for the hospital can be used to estimate future development impacts, in the form of trips generated per parking bay (**Table 6-2**). This has been determined for the roadway peak hour, to provide input into operational modelling.

Table 6-2 Parking-based trip generation

User Group	AM Peak (8:00-9:00am)		PM Peak (4:00-5:00pm)	
	In	**Out**	**In**	**Out**
Staff	*372 trips / 1264 bays = 0.294vph*	*10trips / 1264 bays = 0.008vph*	*15trips / 1264 bays = 0.012vph*	*320 trips / 1264 bays = 0.253vph*
Visitors	*311 trips / 628 bays = 0.495vph*	*107 trips / 628 bays = 0.170vph*	*146 trips / 628 bays = 0.232vph*	*321 trips / 628 bays = 0.511vph*

These calculations likely overestimate the actual impact of additional parking, since the existing Site operates in excess of practical capacity. That is, best-practice parking operates at approximately 85-90% occupancy during peak periods. This allows parkers to quickly navigate to available bays without excessive search times or delays.

The difference between this optimal behaviour and current function would result in a lower trip generation rate per space. The above rate is therefore considered to be conservative. Further discussion and analysis of this effect is included in the future development forecast, **Section 7.6.**

6.7 Comparison of Existing Traffic and Parking Cap Peak Traffic

As part of the Structure Plan Transport Assessment, a 2-hour peak period trip generation for the associated Precincts was determined and related to the identified parking cap (the use of 2-hour peak periods reflects the strategic nature of development and network analysis). The results of this assessment have been extracted and provided below in **Figure 6-7** for reference.

Note that the identified 2-hour peak periods are coincident with the assumed roadway peaks: 7:00-9:00am and 3:00-5:00pm.

Figure 6-7 Parking Constraints and Peak Hour Car Trips

Precinct	Parking Cap	AM Peak Car Trips		PM Peak Car Trips	
		Inbound	Outbound	Inbound	Outbound
Murdoch University	3,075	2,387	235	568	1,630
Eastern Precinct	2,000	1,402	542	1,033	2,078
St John of God	2,074	1,134	246	459	1,263
Mixed Used Precinct	1,190	843	783	876	939
Fiona Stanley Hospital	4,845	1,978	467	840	2,217

Source: MAC Transport Assessment, AECOM (2016)

To assess the accuracy of these prediction, access gate data was interrogated to determine the actual generation by SJGMH and shown below (**Table 6-3)**. A full breakdown of the constituent traffic demands across the day are shown in **Figure 6-6**.

Table 6-3 Peak Hour Car Trips (2-hour period)

Land Use	AM Peak (7am-9am)		PM Peak (3pm-5pm)	
	In	**Out**	**In**	**Out**
MAC Transport Assessment	1,134	246	459	1,263
Observed Entry and Exit	1,208	170	426	1,318
Difference	**74**	**-76**	**-33**	**55**

This comparison shows that the projected 2031 trip generation for SJGMH was remarkably close to current operation, based on a future land use assumption of 3,000 employees. While the total supply of existing parking (1,893 bays) is less than the full parking cap, it is related to a service provision that has already reached the planned build-out horizon.

7 Analysis of Transport Network

7.1 Background Traffic

7.1.1 Road Network

Table 7-1 provides a summary of the surrounding area roads characteristics.

Table 7-1 Surrounding Road Network

Road	Characteristics
South Street	▪ Classified as a Primary Distributor Road according to the MRWA Metropolitan Functional Road Hierarchy ▪ Posted speed limit of 60km/h ▪ Four-lane dual carriageway
Murdoch Drive	▪ Classified as a Distributor A according to the MRWA Metropolitan Functional Road Hierarchy ▪ Posted speed limit of 70km/h ▪ Four-lane dual carriageway with on-road painted cycling lanes
Barry Marshall Parade	▪ Classified as an Access Road according to the MRWA Metropolitan Functional Road Hierarchy ▪ Priority bus lanes/cycle lane ▪ Single lane carriageway with limited on-street parking ▪ Posted speed limit of 40km/h ▪ Act as an activity centre connector, providing public transport/cycling/pedestrian function with an emphasis on creating a vibrant thoroughfare and movement corridor through the urban core.
Fiona Wood Road	▪ Classified as an Access Road according to the MRWA Metropolitan Functional Road Hierarchy ▪ Priority bus lanes/cycle lane ▪ Posted speed limit of 40km/h

7.1.2 Intersections

The following intersections are located within the immediate locality of the site:

> Murdoch Drive/Discovery Way/Barry Marshall Parade

> South Street/Fiona Wood Road

> Barry Marshall Parade/Fiona Wood Road

> South Street/Murdoch Drive

7.1.3 Traffic Volumes

Traffic volumes were obtained from Main Roads Traffic Map for roads in the vicinity of the site. The AM peak hour period occurred between 8-9am and the PM peak period occurred between 4-5pm.

Table 7-2 Traffic Volumes

Road	Weekday Daily Volume	AM Peak (8-9am)	PM Peak (4-5pm)
Fiona Wood Rd	5,031	515	371
Barry Marshall Pde	2,099	229	140
Murdoch Dr	26,241	2,063	1,560
South St	48,780	3,311	4,002

Source: Main Roads Traffic Map

7.2 Assessment Years and Time Period

The weekday peak times selected are 8:00am-9:00am and 4:00pm-5:00pm respectively for the morning and afternoon peak periods, as identified from the traffic volumes sourced from Main Traffic Map.

The following model scenarios have therefore been analysed as part of this assessment:

- Scenario 1 – 2021 existing traffic operation
- Scenario 2 – 2031 planning horizon for the full build-out of the MAC
- Scenario 3 – 2031 including SJGMH redevelopment
- Scenario 4 – 2031 with STEM growth
- Scenario 5 – 2031 with STEM growth and SJGMH redevelopment

7.3 Intersection Analysis

Analysis of the traffic impacts of the proposed development has been carried out for the following intersections:

- South Street/Murdoch Drive
- Murdoch Drive/Discovery Way/Barry Marshall Parade
- Barry Marshall Parade/Fiona Wood Road
- South Street/Fiona Wood Road

The identified intersections have been analysed using the SIDRA analysis program. This program calculates the performance of intersections based on input parameters, including geometry and traffic volumes. As an output SIDRA provides values for the Degree of Saturation (DOS), queue lengths, delays, level of service, and 95th Percentile Queue. These parameters are defined as follows:

- Degree of Saturation (DOS): is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The theoretical intersection capacity is exceeded for an un-signalized intersection where DOS > 0.80;
- 95% Queue: is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- Average Delay: is the average of all travel time delays for vehicles through the intersection. An unsignalised intersection can be considered to be operating at capacity where the average delay exceeds 40 seconds for any movement; and
- Level of Service (LOS): is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The different levels of service can generally be described as shown in **Table 7-3**.

Table 7-3 Level of Service (LoS) Performance Criteria

LOS	Description	Signalised Intersection	Unsignalised Intersection
A	Free-flow operations (best condition)	≤10 sec	≤10 sec
B	Reasonable free-flow operations	10-20 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	25-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

A LOS exceeding these values indicates that the road section is exceeding its practical capacity. Above these values, users of the intersection are likely to experience unsatisfactory queueing and delays during the peak hour periods.

7.4 Scenario 1 - 2021 Existing Traffic

7.4.1 South Street/Murdoch Drive

Figure 7-1 SIDRA Layout for South Street/Murdoch Drive Intersection

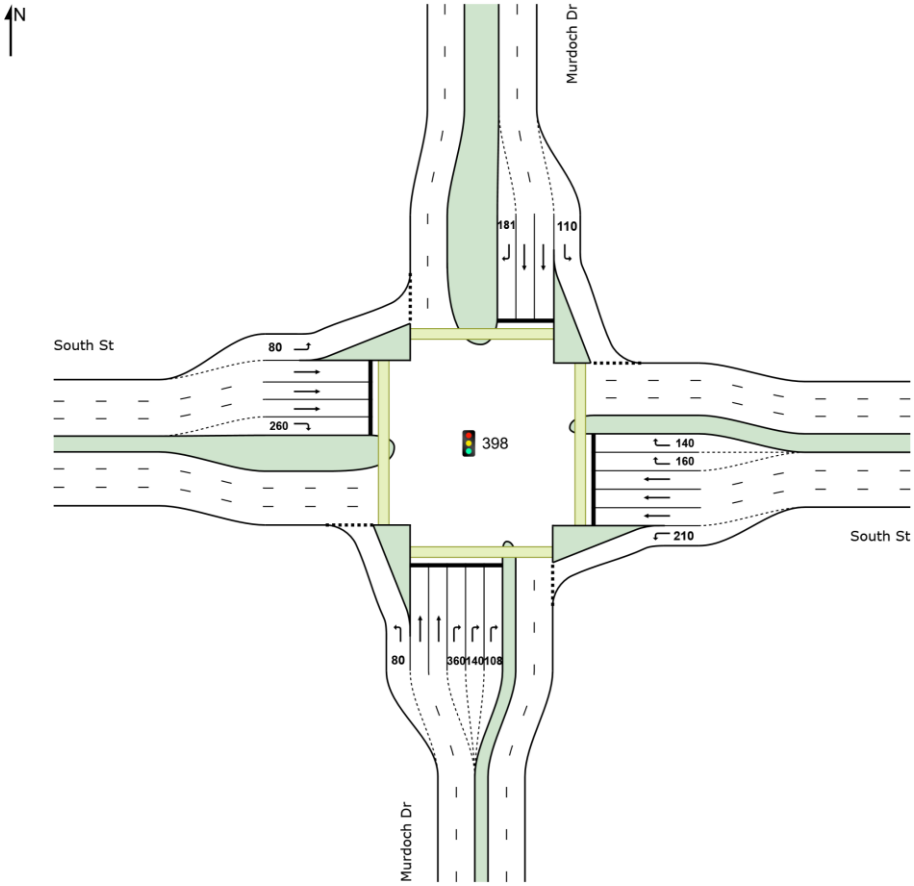


Table 7-4 SIDRA Results for South Street/Murdoch Drive Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr (S)	L	0.521	21.6	C	120.2	0.442	19.6	B	111.9
	T	0.916	74.5	E	201	0.599	70.8	E	109.2
	R	0.764	63	E	77.8	0.904	72.5	E	204.6
South St (E)	L	0.471	25.8	C	143.7	0.201	15.9	B	47.5
	T	0.899	69	E	260.2	0.925	72.5	E	282
	R	0.343	55.8	E	71.4	0.496	69	E	73.9
Murdoch Dr (N)	L	0.271	14.6	B	65.8	0.337	26.3	C	101.9
	T	0.762	63.6	E	144.7	0.681	62.3	E	120.1
	R	0.922	96.4	F	115.2	0.383	62	E	68.9
South St (W)	L	0.159	14.6	B	34	0.088	11.4	B	16
	T	0.648	52.8	D	148.7	0.891	61	E	233.3
	R	0.902	79.3	E	256.3	0.927	93.9	F	175.6
All Vehicle		0.922	54.4	D	260.2	0.927	59	E	282

**Movements related to SJGMH travel are highlighted, for reference*

7.4.2 Murdoch Drive/Discovery Way/Barry Marshall Parade

Figure 7-2 SIDRA Layout for Murdoch Drive/Discovery Way/Barry Marshall Parade Intersection

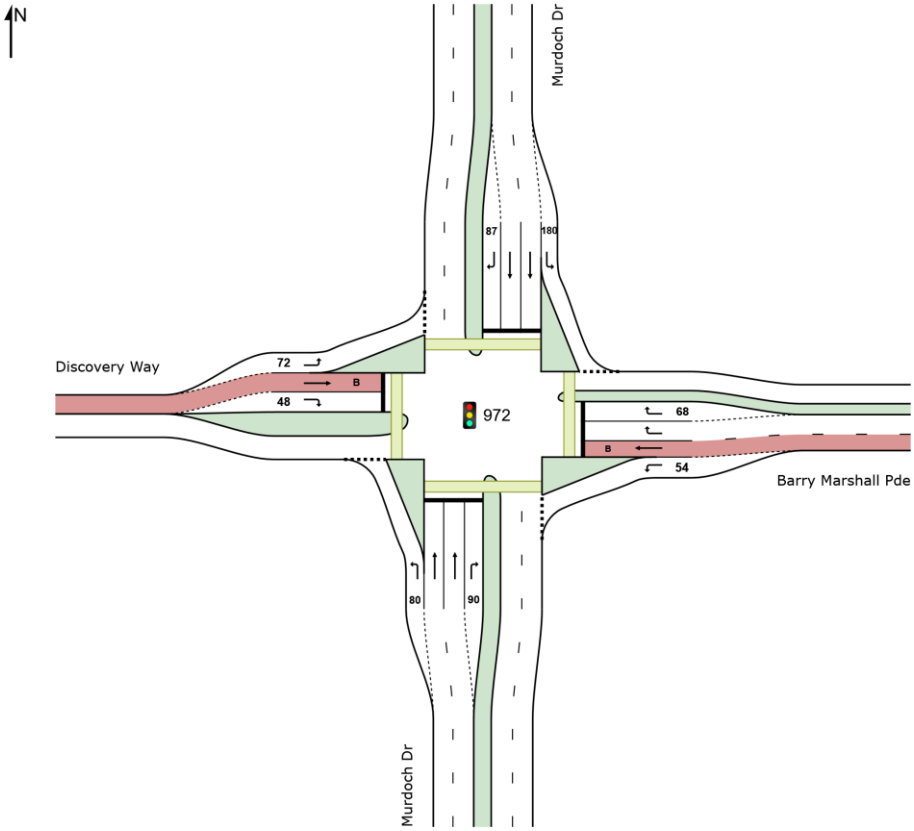


Table 7-5 SIDRA Results for Murdoch Drive/Discovery Way/Barry Marshall Parade Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr (S)	L	0.112	10	A	17.7	0.025	8	A	2.5
	T	1.036	89.4	F	651.2	0.678	36.5	D	228
	R	1.010	129	F	158.5	0.669	81.7	F	59.2
Barry Marshall Pde (E)	L	0.086	6.3	A	7.9	0.206	8.9	A	36.2
	T	0.206	71.5	E	27.4	0.122	64.1	E	22
	R	0.453	69.6	E	56.9	0.665	64.7	E	115.3
Murdoch Dr (N)	L	0.343	9.2	A	39.5	0.147	7.9	A	11.4
	T	0.539	32.1	C	175.1	0.505	33.9	C	162.3
	R	0.99	113.1	F	142.8	0.543	84.6	F	48.1
Discovery Way (W)	L	0.134	28.2	C	28.6	0.201	16.7	B	36.5
	T	0.168	65.4	E	21.4	0.168	65.4	E	21.4
	R	0.217	67.4	E	25.5	0.472	70	E	57.7
All Vehicles		1.036	61	E	651.2	0.678	38.7	D	228

**Movements related to SJGMH travel are highlighted, for reference*

7.4.3 Barry Marshall Parade/Fiona Wood Road

Figure 7-3 SIDRA Layout for Barry Marshall Parade/Fiona Wood Road Intersection

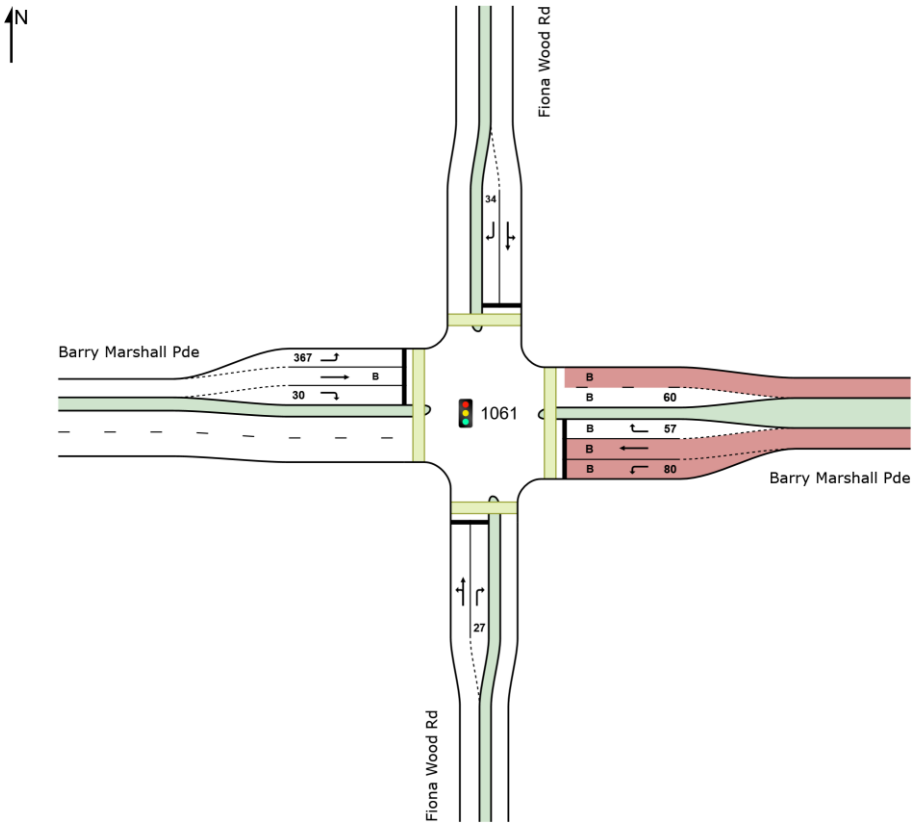


Table 7-6 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Fiona Wood Road (S)	L	0.25	64.1	E	34.4	0.221	64.7	E	29.3
	T	0.250	60.6	E	34.4	0.221	61.3	E	29.3
	R	0.017	63.5	E	1.9	0.029	64.3	E	3.8
Barry Marshall Pde (E)	L	0.036	50.7	D	6.7	0.042	58.9	E	6.4
	T	0.127	47.8	D	26.8	0.157	56.3	E	27.3
	R	0.024	82.9	F	1.1	0.042	81.9	F	2.2
Fiona Wood Road (N)	L	0.315	21.6	C	80.7	0.086	16.1	B	22.2
	T	0.315	17.4	B	80.7	0.086	11.9	B	22.2
	R	0.226	38.1	D	55.3	0.230	32.2	C	59.5
Barry Marshall Parade (W)	L	0.320	63.5	E	73.4	0.224	67.8	E	39.5
	T	0.067	28.6	C	8.4	0.066	33.9	C	7
	R	0.298	84.4	F	14.6	0.222	82.9	F	12.2
All Vehicles		0.32	39.3	D	80.7	0.23	42	D	59.5

While the configuration of the SJGMH internal road network requires that vehicles accessing the Main Hospital use the Barry Marshall Parade entrance. The proposed improvements, including reconfiguration of the ‘ring road’ will allow visitors and staff to access most destinations on the campus from either Fiona Wood Road or Barry Marshall Road. This will greatly reduce the volume of SJGMH traffic that uses the Barry Marshall Parade / Fiona Wood Road intersection.

7.4.4 South Street/Fiona Wood Road

Figure 7-4 SIDRA Layout for South Street/Fiona Wood Road Intersection

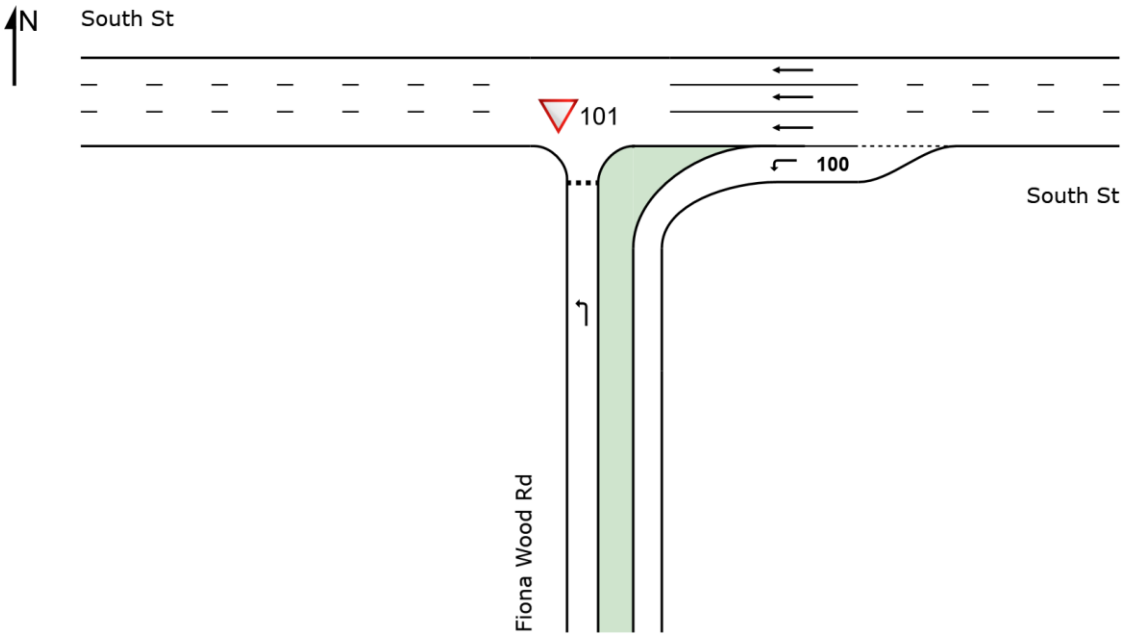


Table 7-7 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Fiona Wood Road (S)	L	0.065	6.8	A	1.6	0.057	6.1	A	1.4
South St (E)	L	0.293	6.8	A	0	0.052	6.7	A	0
	T	0.347	0.1	A	0	0.3	0.1	A	0
All Vehicles		0.347	1.7	A	1.6	0.3	0.6	A	1.4

7.5 Scenario 2 – Anticipated 2031 Traffic Generation (MAC)

The following SIDRA intersection assessment outcomes have been extracted from the MAC Transport Assessment for comparison. They describe the results of intersection operation analysis for the full build-out of the MAC, as well as regional traffic demand growth through to the 2031 horizon.

This traffic environment is critical to the impact assessment for the SJGMH redevelopment proposal, as it is this level of traffic that is envisaged by the MAC Transport Assessment, and has been used to define the parking cap. However, it should be recognised that the road network on which this cap was based as fundamentally changed, and so the traffic volumes projected in this work are no longer representative.

7.5.1 South Street/Murdoch Drive

Table 7-8 SIDRA Results for South Street/Murdoch Drive Intersection (2031 at MAC full build-out)

AM Peak

Intersection	Approach	Base Case			With Proposed Modification		
		LoS	Delay	Volume	LoS	Delay	Volume
Murdoch Dr / South St	South St WB	E	59	2089	E	62	2229
	Murdoch Dr NB	D	52	729	E	56	735
	Murdoch Dr SB	F	85	1314	F	85	1312
	South St EB	E	61	1338	E	57	1327
	All	**E**	65		**E**	66	

PM Peak

Intersection	Approach	Base Case			With Proposed Modification		
		LoS	Delay	Volume	LoS	Delay	Volume
Murdoch Dr / South St	South St WB	E	66	1755	E	56	1793
	Murdoch Dr NB	D	47	1550	D	53	1566
	Murdoch Dr SB	F	89	1267	F	86	1262
	South St EB	F	108	1788	F	93	1788
	All	**E**	78		**E**	72	

The total traffic volume identified through the Murdoch Drive / South Street intersection at the 2031 horizon is shown to be 5,470vph and 6,360vph respectively, for the base case.

7.5.2 Murdoch Drive/Discovery Way/Barry Marshall Parade

Table 7-9 SIDRA Results for Murdoch Drive/Discovery Way/Barry Marshall Parade Intersection

Intersection	Approach	Base Case			With Proposed Modification		
		LoS	Delay	Volume	LoS	Delay	Volume
Murdoch Dr / Discovery Way	Murdoch Dr NB	D	52	1155	D	41	1203
	Murdoch Dr SB	E	59	1647	E	61	1748
	Discovery Way	D	41	340	D	43	343
	Barry M WB	D	42	255	D	39	266
	All	**D**	53		**D**	51	

7.5.3 Barry Marshall Parade/Fiona Wood Road

Table 7-10 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection	Approach	Base Case			With Proposed Modification		
		LoS	Delay	Volume	LoS	Delay	Volume
Barry Marshall Pde / Fiona Wood Rd	Barry M EB	E	59	258	E	68	269
	Barry M WB	D	54	138	D	50	97
	Fiona Wood NB	D	47	183	D	54	191
	Fiona Wood SB	C	29	687	C	32	707
	All	**D**	41		**D**	45	

7.6 Scenario 3 – 2031 MAC plus SJGMH Redevelopment

7.6.1 Development Extent

There are extensive plans to redevelop the SJGMH campus, including the following works:

- Construction of the Mental Health facility
- Expansion of the endoscopy unit and recovery;
- Fitting out a 30 bed shelled ward (St Juliana's);
- 2 new operating theatres;
- New radiation oncology service;
- New renal dialysis service and
- Refurbishment of the emergency department.

While the majority of these improvements involve modifications within the existing structure of SJGMH, construction of the Mental Health Unit requires a considerable footprint, taking up land currently occupied by at-grade parking. This parking, and the additional growth in demand related to the redevelopment works, can be provided within a purpose-built multi-deck car park.

The spatial orientation of the proposed redevelopment is shown below, **Figure 7-5**.

Figure 7-5 SJGMH Redevelopment Plan

7.6.2 Effect on Parking Supply

These developments would generate an additional requirement for 472 parking spaces, based on the following **Table 7-11**. The additional visitor and staff parking supply requirement associated with each component of works has been determined based on current behaviour and including reasonable best-practice operational efficiencies.

Table 7-11 Parking Supply Growth

Expansion works	Visitor Parking Requirement	Staff Parking Requirement
Renal Dialysis	25 bays	19 bays
Mental Health	96 bays	130 bays
Endoscopy	20 bays	17 bays
Wards & Theatre Expansion	34 bays	58 bays
Radiation Oncology	42 bays	30 bays
Total	**217 bays**	**255 bays**

The addition of these parking bays would take the total supply on-site to **2,365 bays**, allocated approximately as follows:

- 1,450 general staff parking bays
  - Including 250 bays dedicated for afternoon shift parking
- 165 doctors/specialist parking bays
- 750 visitor parking bays

This represents an increase in staff parking of 28% and an increase in visitor parking of 20%. This is intended to support both the increased need for parking and support better on-site efficiency. As a result, the peak occupancy rate for both visitors and staff is expected to drop from 95% to 85-90%. This has a significant effect on the assumptions for traffic generation, as described below.

A detailed Parking Management Plan has been completed to determine how these would be allocated and attached as **Appendix B**.

7.6.3 Traffic Generation

Trip generation has been calculated for the proposed development utilising trip generation rates from the *Institute of Transportation Engineers (ITE) "Trip Generation" 10th Ed*. The following tables provide a benchmark for directional distribution and total trip generation as a result of the proposed redevelopment. This has been compared against observed trip generation rates for SJGMH, which include the effect of on-site clinics and services beyond the main hospital.

Table 7-12 provides the trip generation rate during the AM and PM peak hours, **Table 7-13** outlines the directional distribution acquired from ITE for the proposed development and **Table 7-14** states the theoretical trip generation for the redevelopment component, which is equivalent to an additional 118 beds.

Table 7-12 Trip Generation Rate – Peak Hour Generator

Land Use	ITE Code/Source	AM Peak	PM Peak
Hospital (118 beds)	610	1.89 trips per bed	2.09 trips per bed

Table 7-13 Directional Distribution

Land Use	AM Peak		PM Peak	
	In	Out	In	Out
Hospital (118 beds)	71%	29%	30%	70%

Table 7-14 Redevelopment Trip Generation

Land Use	AM Peak		PM Peak	
	In	Out	In	Out
Hospital Expansion	197	26	74	173
Total	**223**		**247**	

The proposed development represents a trip generation of approximately 223 vehicles during the AM peak hour and 247 vehicles during the PM peak hour, according to standard trip generation rates.

An alternative assessment can be determined based on the proposed increase in parking supply. Applying the generation rates derived from the parking supply and traffic survey data yields the following estimates, **Table 7-15.**

Table 7-15 Redevelopment Trip Generation (per parking bay)

User Group	AM Peak (8:00-9:00am)		PM Peak (4:00-5:00pm)	
	In	Out	In	Out
Staff (255 bays)	*0.294vph x 255 bays* 75 trips	*0.008vph x 255 bays* 2 trips	*0.012vph x 255 bays* 3 trips	*0.253vph x 255 bays* 65 trips
Visitors (217 bays)	*0.495vph x 217 bays* 107 trips	*0.170vph x 217 bays* 37 trips	*0.232vph x 217 bays* 50 trips	*0.511vph x 217 bays* 111 trips
Total	**221**		**229**	

It is noted that parking provided surplus to demand generates no trips, and that a portion of the proposed additional supply is required to reach a target efficiency rate of 90% for visitors and staff.

The following table describes the increase in trip generation by considering only the trip generation per occupied bay, rather than all parking bays. This acknowledges the fact that empty parking bays generate no parking.

The trip generation rates (vehicle trips per bay) are derived directly from observations from entry points and compared to maximum parking demand; 1,216 staff bays occupied at peak and 574 visitor bays occupied at peak.

Table 7-16 Trip Generation Rate (per occupied bay)

User Group	AM Peak (8:00-9:00am)		PM Peak (4:00-5:00pm)	
	In	Out	In	Out
Staff	*372 trips / 1216 bays = 0.306vph*	*10 trips / 1216 bays = 0.008vph*	*15 trips / 1216 bays = 0.012vph*	*320 trips / 1216 bays = 0.263vph*
Visitors	*311 trips / 574 bays = 0.542vph*	*107 trips / 574 bays = 0.186vph*	*146 trips / 574 bays = 0.254vph*	*321 trips / 574 bays = 0.559vph*

The additional parking on-site is designed to max out at 90% occupancy.

Parking allocation is therefore given as follows:

- Staff Parking: 1615 bays (1454 peak occupancy) – 238 addition bays occupied at peak
- Visitor/Patient Parking: 750 bays (675 peak occupancy) – 101 additional bays occupied at peak

The resulting increase in trips is shown below, **Table 7-17.**

Table 7-17 Redevelopment Trip Generation (per occupied bay)

User Group	AM Peak (8:00-9:00am)		PM Peak (4:00-5:00pm)	
	In	**Out**	**In**	**Out**
Staff (255 bays)	*0.306vph x 238 bays* 73 trips	*0.008vph x 238 bays* 2 trips	*0.012vph x 238 bays* 3 trips	*0.263vph x 238 bays* 63 trips
Visitors (217 bays)	*0.542vph x 101 bays* 55 trips	*0.186vph x 101 bays* 19 trips	*0.254vph x 101 bays* 26 trips	*0.559vph x 101 bays* 56 trips
Total	**148**		**148**	

Accounting for the improved function of parking on-site results in a trip generation increase of 19.5% for staff and 17.5% for visitors.

7.6.4 Distribution to the Network

The distribution of traffic for the MAC, as expressed in the *MAC Transport Assessment* (2016) report has been used as the basis of understanding for the increase in traffic to the network. This has been assessed at the key intersections to identify the magnitude of change associated with the redevelopment scenario.

The changes to the strategic road network can be expected to have an impact on the assignment of trips but are unlikely to have a significant effect on the broad distribution of traffic to and from home location.

These trip distribution assumptions are shown below for reference, in **Figure 7-6**. The 24% internal trip capture is not considered relevant for the purpose of traffic impact and has therefore been excluded in the following assessment.

Figure 7-6 Assumed All-day Trip Distribution

Source: MAC Transport Assessment (2016)

One of the major changes to the SJGMH campus is the establishment of the internal ‘ring road’, which allows effective access to all destinations within the Site from either Murdoch Drive or South Street. This change supports more effective and efficient access, and a reduced impact on the local network.

Figure 7-7 Proposed Ring Road and Access Arrangement

Based on this, and the orientation and access limitations in the local road network, a traffic assignment model has been developed; shown below in **Figure 7-8**. In this case the colours have been chosen to be consistent with the distribution diagram.

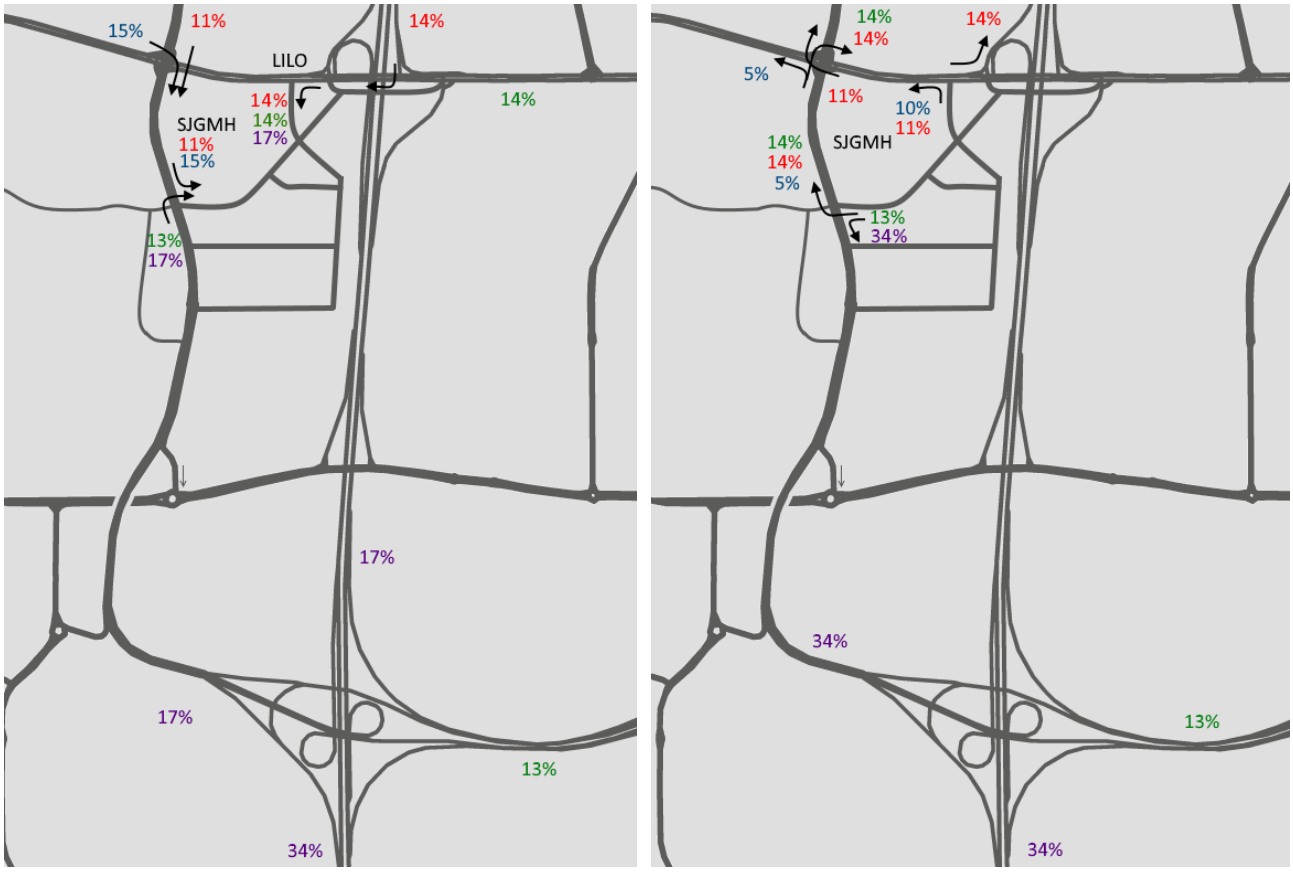
The results suggest that the traffic is well distributed and tend to assign to movements that do not experience significant congestion and delay, particularly left-turn entry and egress movements assisted by the operation of upstream signals.

Interactions with critical intersections are therefore limited to the following, **Table 7-18**.

Table 7-18 Increase in Turning Movement Volumes as a Result of Redevelopment

Intersection	Approach	Inbound Traffic			Outbound Traffic		
		% of total	AM Trips	PM Trips	% of total	AM Trips	PM Trips
Murdoch Dr / South St	South St (E)	-	-	-	11%	4	19
	Murdoch Dr (S)	-	-	-	33%	13	58
	Murdoch Dr (N)	11%	20	2	-	-	-
	South St (W)	15%	27	8	-	-	-
Murdoch Dr / Barry Marshall Pde	Murdoch Dr (S)	30%	55	17	-	-	-
	Murdoch Dr (N)	26%	47	14	-	-	-
	Barry Marshall Pde (E)	-	-	-	79%	31	139
South St / Fiona Wood Rd	South St (E)	45%	82	37	-	-	-
	Fiona Wood Rd (S)	-			11%	4	19

Figure 7-8 SJGMH Traffic Assignment



The relative magnitude of this additional traffic is described in the context of Scenario 1 and Scenario 2. That is, with respect to current traffic volumes (including the influence of the capacity increase in the regional network) and compared with the original modelling for the MAC and surrounds. This comparison is shown below, **Table 7-19**.

Table 7-19 Comparison of Critical Intersection Traffic Volumes (Scenarios 1, 2 and 3)

Intersection	Approach	AM Peak			PM Peak		
		Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Murdoch Dr / South St	South St (E)	1942	2229	1946	1693	1793	1712
	Murdoch Dr (S)	1428	735	1441	1470	1566	1528
	Murdoch Dr (N)	957	1312	977	841	1262	843
	South St (W)	1303	1327	1330	1289	1788	1297
	Total	**5630**	**5603**	**5694** (+1.1%)	**5293**	**6409**	**5380** (+1.6%)
Murdoch Dr / Barry Marshall Pde	Murdoch Dr (S)	1517	1155	1572	993	935	1010
	Murdoch Dr (N)	1345	1647	1392	881	956	895
	Discovery Wy (W)	161	340	161	278	763	278
	Barry Marshall Pde (E)	323	255	354	637	694	776
	Total	**3346**	**3397**	**3479** (+4.0%)	**2789**	**3348**	**2959** (+6.1%)

This comparison shows that the current function of the network is similar in scale to that of the projected 2031 scenario (this reflects a range of factors including the strategic function of boundary roads, the intensity of key uses within the MAC reaching their 2031 horizon threshold and the high impact of the PTA park and ride facility on peak period traffic). However, the traffic growth and impact resulting from the proposed SJGMH redevelopment is comparatively minor and concentrated particularly at the left-turn egress from Barry Marshall Way onto Murdoch Drive, a movement which does not contribute to network congestion.

This is exemplified in the results of SIDRA analysis for the with and without scenarios, a summary of which is shown below in **Figure 7-9** and **Figure 7-10**. This shows a minor impact on two intersection approaches during the AM peak (South Street eastbound and Fiona Wood Road), and no change in the PM peak.

Figure 7-9 AM Peak Comparison – Without Redevelopment (left) and With Redevelopment (right)

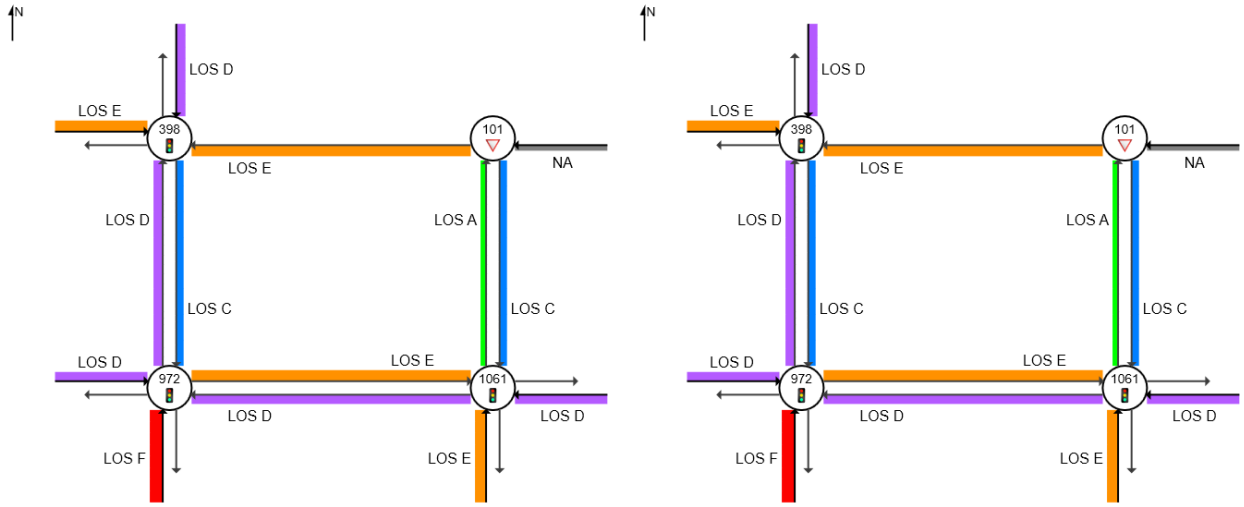
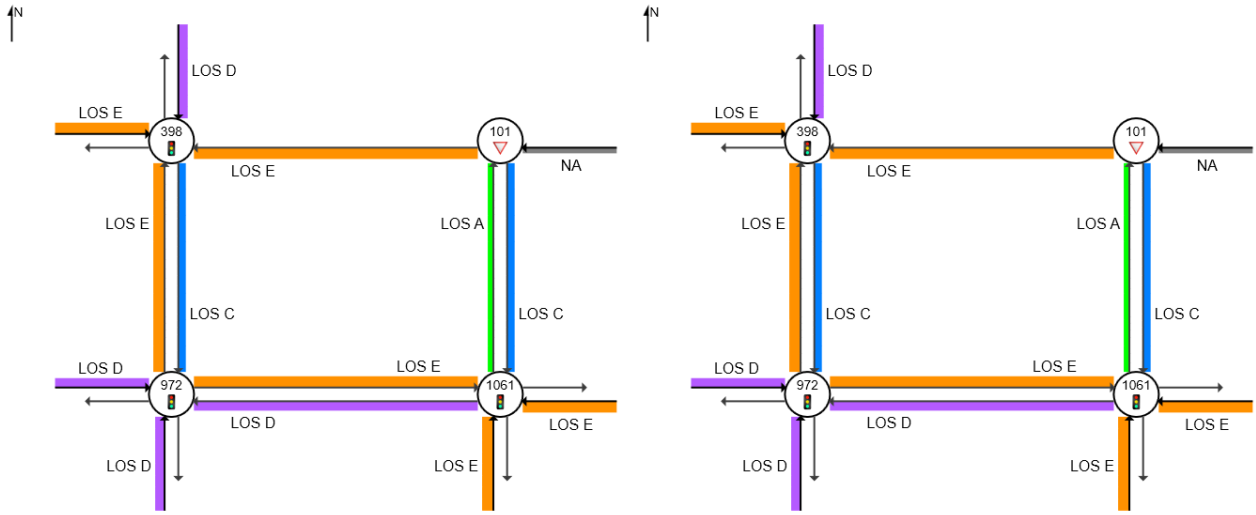


Figure 7-10 PM Peak Comparison – Without Redevelopment (left) and With Redevelopment (right)



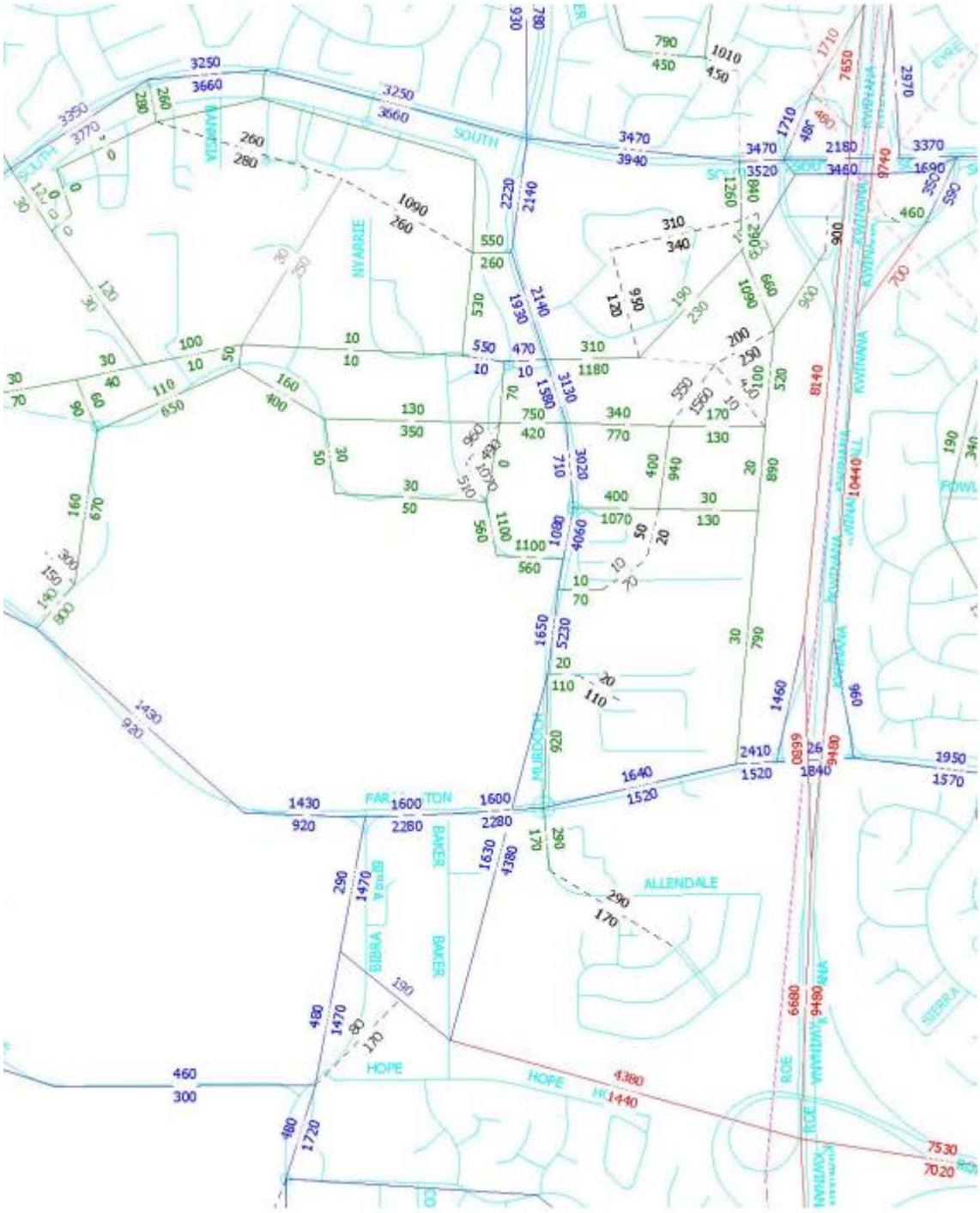
7.7 Scenario 4 – 2031 with STEM Growth

Scenario 4 involves an alternate future assessment based on the 2031 development horizon as defined by STEM model outputs provided by the Department of Transport. This scenario includes full development of the MAC, in addition to growth across the Perth Metropolitan Area.

Excerpts from model outputs used for this assessment are provided below for reference (**Figure 7-11** and **Figure 7-12**).

Figure 7-11 Modified STEM Model outputs – AM Peak (2031)

Figure 7-12 Modified STEM Model outputs – PM Peak (2031)



This model is fundamentally inconsistent with the traffic assessment completed for the MAC and described in Scenario 2 above (**Section 7.5**), resulting in traffic volumes at the 2031 horizon that substantially exceed the carrying capacity of existing and proposed intersections. As such, the modelled outputs are not considered to represent any kind of network function, and instead merely describe the extent of latent demand along key routes through the Precinct.

This model was undertaken in prior to the modifications to the network in 2019 (in particular, the Murdoch Drive extension) and is not reflective of observed directional flows. To reconcile this difference, existing turning and prevailing flow proportions have been applied to each intersection leg, and growthed to achieve the projected 2-way volumes.

The results of this theoretical baseline assessment for the 2031 model are described in the following Sections.

7.7.2 South Street/Murdoch Drive

Table 7-20 SIDRA Results for South Street/Murdoch Drive Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr (S)	L	0.506	25.3	C	124	0.632	37.3	D	177.7
	T	0.911	61.9	E	177	0.734	63.5	E	127.9
	R	0.652	65.8	E	73.2	1.714	423.1	F	783.3
South St (E)	L	0.896	57.6	E	352.5	0.43	27.9	C	120.3
	T	1.654	609.9	F	685.4	1.448	425.7	F	685.4
	R	0.494	55.1	E	115.9	0.738	68.6	E	138.9
Murdoch Dr (N)	L	0.557	23.1	C	169.6	0.682	38.7	D	203.8
	T	1.665	509.8	F	1032.8	1.396	297.7	F	703.6
	R	1.681	677.4	F	683.4	1.208	272.2	F	343.8
South St (W)	L	0.327	18.3	B	86.4	0.218	15.8	B	53.2
	T	1.514	328.4	F	899.9	1.731	462.3	F	1653.5
	R	1.619	623.8	F	1449.5	1.714	707.2	F	1147.8
All Vehicle		1.681	332.6	F	1449.5	1.731	321.8	F	1653.5

**Movements related to SJGMH travel are highlighted, for reference*

The modelled outputs from the 2031 STEM model shows excessive delays and poor level of service for key movements, including through traffic in most directions. The projected peak period traffic volumes are almost twice the observed 2022 values, a level of traffic demand that cannot be sustained by the intersection in its current form. This confirms that the model has not adequately acknowledged the capacity constraints in the network and thereby exaggerates the traffic impacts in the future network.

7.7.3 Murdoch Drive/Discovery Way/Barry Marshall Parade

Table 7-21 SIDRA Results for Murdoch Drive/Discovery Way/Barry Marshall Parade Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr (S)	L	0.287	11.1	B	56.3	0.062	8.5	A	7.4
	T	2.450	1098.5	F	4967.9	1.877	708.2	F	3339
	R	2.408	1321.6	F	1260.7	1.764	749.9	F	497.4
Barry Marshall Pde (E)	L	0.115	6.7	A	7.2	0.357	15.4	B	99.5
	T	0.222	74.3	E	30.5	0.25	65.5	E	33.7
	R	0.492	70	E	60.1	1.771	554.2	F	564
Murdoch Dr (N)	L	0.548	11.7	B	127.6	0.21	8	A	14.4
	T	0.964	61.1	E	446.7	0.613	32.3	C	224
	R	1.44	467.8	F	486.1	0.808	79	E	66.1
Discovery Way (W)	L	0.148	27.9	C	31.4	0.447	43.4	D	74.3
	T	0.184	65.6	E	23.5	0.192	65.7	E	24.6
	R	0.239	67.6	E	28.1	0.542	70.8	E	67
All Vehicles		2.45	645.7	F	4967.9	1.877	415	F	3339

**Movements related to SJGMH travel are highlighted, for reference*

As described above, the excessive traffic along Murdoch Drive creates artificial limitations on traffic movements through the Barry Marshall Parade intersection, with volumes substantially exceeding the capacity of the 2-lane through movements. This has consequences for the available green time for other movements, resulting in a lack of capacity for turning movements at Barry Marshall Parade.

7.7.4 Barry Marshall Parade/Fiona Wood Road

Table 7-22 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Fiona Wood Road (S)	L	0.582	65.2	E	87.2	0.968	88.5	F	849.1
	T	0.582	61.8	E	87.2	0.968	85.1	F	849.1
	R	0.053	62.4	E	4.8	0.117	33.5	C	25.2
Barry Marshall Pde (E)	L	0.083	69.9	E	9.1	0.103	76.1	E	8.6
	T	0.286	67.9	E	35.7	0.373	74.4	E	35.4
	R	0.033	86.1	F	1.2	0.111	92.2	F	30.7
Fiona Wood Road (N)	L	0.515	13.9	B	116.7	0.13	10.3	B	29.4
	T	0.515	9.7	A	116.7	0.13	6.1	A	29.4
	R	0.573	28.5	C	87.8	0.965	98.5	F	215
Barry Marshall Parade (W)	L	0.557	78.4	E	56	0.796	89.2	F	479.5
	T	0.11	65.8	E	13.7	0.14	72	E	12.9
	R	0.251	83.4	F	10.5	0.245	83.5	F	10.3
All Vehicles		0.582	32.7	C	116.7	0.968	75.9	E	849.1

7.7.5 South Street/Fiona Wood Road

Table 7-23 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Fiona Wood Road (S)	L	0.641	20.6	C	56	4.275	2957.6	F	447.4
South St (E)	L	0.484	6.8	A	0	0.128	6.8	A	0
	T	0.573	0.2	A	589.4	0.582	0.3	A	584.3
All Vehicles		0.641	2.2	A	589.4	4.275	497.4	A	584.3

This result exemplifies the issues with STEM model outputs. The PM peak has been modelled with a demand of 1,400 vehicles an hour, which must turn left onto South Street. This is twice the demand modelled through the MAC TIA and well beyond the capacity of a give-way left-turn, particularly where it merges into a 3,700 vehicle per hour traffic flow.

7.7.6 Summary of Results

The result of this assessment shows that under the STEM growth scenario, all intersections (South Street/Murdoch Drive and Murdoch Drive/Discovery Way/Barry Marshall Parade) operate beyond practical capacity with significant level of queuing and delays.

However, given the modelled traffic demands considerably exceed the carrying capacity of the network, they are not considered to represent real-life traffic, nor provide a suitable baseline for evaluating the impact of demand growth within the MAC Precinct.

7.8 Scenario 5 – 2031 with STEM Growth including SJGMH Redevelopment

The Scenario 5 assessment takes the traffic growth based on STEM outputs and includes the traffic generated by the future redevelopment of SJGMH. The intention of this assessment is to show incremental impacts of the proposed redevelopment along the surrounding road network.

In this case, the projected network function is not considered to be representative of future function, as it retains the unrealistic traffic demands displayed in STEM outputs. For a more realistic evaluation of the impact on intersection level of service, congestion, and delays, refer to Scenario 3 (**Section 7.6**).

7.8.1 South Street/Murdoch Drive

Table 7-24 SIDRA Results for South Street/Murdoch Drive Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr (S)	L	0.495	24.3	C	119.2	0.628	36.2	D	178.7
	T	0.9	61	E	172.8	0.726	63.3	E	125.9
	R	0.605	65.3	E	66.8	1.728	431.3	F	783.3
South St (E)	L	0.977	92.2	F	458.5	0.427	27.8	C	119.5
	T	1.709	657.4	F	685.4	1.448	426.1	F	685.4
	R	0.484	54.2	D	115.3	0.745	68.8	E	140.8
Murdoch Dr (N)	L	0.546	21.7	C	166.5	0.682	38.7	D	203.8
	T	1.735	543.5	F	951.6	1.410	307.2	F	720.7
	R	1.681	677.4	F	683.4	1.208	272.2	F	343.8
South St (W)	L	0.327	17.9	B	85.2	0.217	15.8	B	53.2
	T	1.557	358	F	934.4	1.731	462.3	F	1653.5
	R	1.760	749.3	F	1657.3	1.767	754.1	F	1216.3
All Vehicle		1.76	368.1	F	1657.3	1.767	327.3	F	1653.5

**Movements related to SJGMH travel are highlighted, for reference*

7.8.2 Murdoch Drive/Discovery Way/Barry Marshall Parade

Table 7-25 SIDRA Results for Murdoch Drive/Discovery Way/Barry Marshall Parade Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr (S)	L	0.289	11.4	B	58.2	0.062	8.5	A	7.4
	T	2.497	1137.7	F	5030	1.932	753	F	3409.5
	R	2.414	1327.4	F	1336.1	1.872	844.8	F	547.8
Barry Marshall Pde (E)	L	0.118	6.7	A	7.5	0.378	15.2	B	103.6
	T	0.222	74.3	E	30.5	0.227	63.1	E	33.1
	R	0.520	70.2	E	63.7	1.835	612.5	F	666.2
Murdoch Dr (N)	L	0.592	12.6	B	153.3	0.224	8	A	15.3
	T	1.001	78.5	E	537.4	0.621	33.5	C	224.7
	R	1.36	399.7	F	447.5	0.796	78.8	E	64.8
Discovery Way (W)	L	0.146	27.8	C	31.3	0.447	43.4	D	74.3
	T	0.184	65.6	E	23.5	0.195	65.8	E	24.6
	R	0.239	67.6	E	28.1	0.542	70.8	E	67
All Vehicles		2.497	660.7	F	5030	1.932	446.9	F	3409.5

**Movements related to SJGMH travel are highlighted, for reference*

7.8.3 Barry Marshall Parade/Fiona Wood Road

Table 7-26 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Fiona Wood Road (S)	L	0.582	65.2	E	87.2	1.034	132	F	893.9
	T	0.582	61.8	E	87.2	1.034	128.5	F	893.9
	R	0.053	62.4	E	4.8	0.125	36.3	D	26.4
Barry Marshall Pde (E)	L	0.083	69.9	E	9.1	0.103	76.1	E	8.6
	T	0.286	67.9	E	35.7	0.373	74.4	E	35.4
	R	0.033	86.1	F	1.2	0.111	92.2	F	33.5
Fiona Wood Road (N)	L	0.515	13.9	B	116.7	0.13	10.3	B	29.4
	T	0.515	9.7	A	116.7	0.13	6.1	A	29.4
	R	0.573	28.5	C	87.8	1.022	135.8	F	267.3
Barry Marshall Parade (W)	L	0.554	78.6	E	55.8	0.777	88.5	F	509.7
	T	0.108	65.8	E	13.5	0.137	72	E	12.6
	R	0.250	83.4	F	10.5	0.239	83.4	F	10.1
All Vehicles		0.582	32.7	C	116.7	1.034	105.2	F	893.9

7.8.4 South Street/Fiona Wood Road

Table 7-27 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Fiona Wood Road (S)	L	0.655	21	C	60.8	4.423	3090.7	F	447.4
South St (E)	L	0.512	6.9	A	0	0.162	6.8	A	0
	T	0.573	0.2	A	630.7	0.582	0.3	A	585.2
All Vehicles		0.655	2.3	A	630.7	4.423	532.1	A	585.2

Table 7-28 shows the summary comparing the SJGMH redevelopment impacts under the STEM growth scenario. Relative to the STEM growth, the anticipated addition traffic only results in a marginal increase in delays and queues. These are exaggerated by the degree the baseline 2031 STEM values exceed the capacity of the network.

Table 7-28 Comparison of Overall Critical Intersection Performance (Scenarios 4 and 5)

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr / South St	S4	1.681	332.6	F	1449.5	1.731	321.8	F	1653.5
	S5	1.76	368.1	F	1657.3	1.767	327.3	F	1653.5
Murdoch Dr / Barry Marshall Pde	S4	2.45	645.7	F	4967.9	1.877	415	F	3339
	S5	2.497	660.7	F	5030	1.932	446.9	F	3409.5
Fiona Wood Road / South St	S4	0.582	32.7	C	116.7	0.968	75.9	E	849.1
	S5	0.582	32.7	C	116.7	1.034	105.2	F	893.9

S4: 2031 STEM Model Outputs
S5: 2031 STEM Model plus SJOGMH Redevelopment

7.9 Main Roads WA Comments

Table 7-29 and **Table 7-30** provide a summary of Main Roads WA comments.

Table 7-29 Main Roads WA Comments (5/10/2022)

Main Roads WA Comments	Response
Further explanation is required on the derived trip rate and source for **Table 7-16** Redevelopment Trip Generation (per occupied bay). It is unclear how the information has been derived.	Additional information has been incorporated in the report.
Section 7.5 suggests that the road network as envisaged by the MAC has fundamentally changed and the traffic volumes projected are no longer representative. **Table 7-18** suggests there is minimal difference in the peak volumes between existing scenario and future 2031 volumes. Further explanation is required on how	This Section references the premise of the MAC transport environment, which understands that the road network has a fixed capacity, and that this will create a fundamental limit on traffic volumes. The MAC Transport Assessment identifies several key pinch points in the network, particularly along Mudoch Drive and Farrington Road. Some of these pinch points have been removed, which changes the capacity constraint and obviates the parking cap that was derived from it. We note that the South Street / Murdoch Drive intersection is basically unchanged from the modelled geometry, though the assumed turning movements for background trips is not the same as observed.

the background growth was considered.	**Section 7.6** provides a comparison of the proposed development scenario against the full build-out of the MAC and network function as intended. It acknowledges the capacity limit of the network rather than assuming background traffic will continue to grow unencumbered. It is therefore a more accurate assessment of function and impact than the alternative assessment (**Sections 7.7 and 7.8**), using traditional growth assumptions, which result in infeasibly high traffic volume – well beyond the carrying capacity of the network. These later sections therefore merely describe the degree of latent demand, not actual traffic projections.
SIDRA models needs to be calibrated and validated:	
▪ Phase times and phase activations are to be modified to reflect 2021 conditions and provide reference to the date the data was sourced from.	Phase times were for the period between 22/02/2021 to 28/02/2021. The alternate phases can be removed from the SIDRA assessments.
▪ Further to the above, the date of traffic volumes should be provided.	Traffic volumes were for the period between 22/02/2021 to 28/02/2021.
▪ All-Red time for G phase should be 3 seconds instead of 2 seconds.	SIDRA model has been updated to address this comment.
▪ Model should replicate the existing traffic lane utilisation at the intersection.	SIDRA model has been updated to address this comment.
▪ There are significant discrepancies in traffic flow between modelled intersections (midblock flow).	To reach the anticipated volumes shown in STEM, some midblock sections required significant levels of growth compared to other sections resulting in different scaling factors applied throughout the network. The end result of this is that the midblock volumes will differ significantly at some sections. Regardless, the intersections will operate well beyond practical capacity with STEM growth and these scenarios are more intended to show the relative impacts of the SJGMH redevelopment.
▪ Outputs should be modified to show the 95th percentile queue instead of average queues.	SIDRA model has been updated to address this comment.

Table 7-30 Main Roads WA Comments (28/10/2022)

Main Roads WA Comments	Response
Whilst it is acknowledged that the applicant's response to Main Roads comments provides sufficient detail in how the values on **Table 7-16** were derived, this information should be incorporated into a revised TIA.	Additional information has been incorporated in the report.
The proponent's reasoning on the capacity constraints of the wider network & their effect of limiting the traffic demands at the intersections in the vicinity of the development site is acknowledged. However, no information has been provided on where in the wider network such capacity constraints exist.	While the TIA focuses on intersections in the immediate vicinity of the Site, the ROM plots provided by DoT illustrate specific pinch points in the wider network. In particular, around the South Street / Freeway interchange, along Farrington Road, and along North Lake Road. It is noted that these ROM plots are not considered to be predictive of actual traffic function, as outlined in the previous response, but assist in determining where 'hotspots' might occur.

When considering the unencumbered scenarios (**Sections 7.7 and 7.8**), the modelling results indicates that the redevelopment contributes to congestion at South Street and Murdoch Drive intersection. Upgrades to the intersection should be considered, especially for the eastbound right turn movement.	It is noted that **Sections 7.7 and 7.8** reflect an unconstrained network scenario that is not reflective of real-world conditions and the congestion identified in these modelling scenarios is not considered to be indicative of future function. Feasible upgrades at this at-grade signalised intersection are limited – the construction of a double right-turn from South Street onto Murdoch Drive southbound has potential, but at a cost that considerably outweighs the potential benefit. The realignment of Roe Highway to connect to South Street was a regional project that presupposed a substantial peak period overcapacity in the network. The contribution of the proposed redevelopment to these peak period turning movements is assessed to be in the order of 20 vehicles per hour. The redevelopment is shown to contribute a negligible volume to the overall demand, even under the exaggerated outcomes described in **Sections 7.7 and 7.8**.
The SIDRA models should be updated and the TIA amended accordingly.	SIDRA models have been updated.

8 Conclusion

This Transport Impact Assessment outlines the transport aspects of the proposed St John of God Murdoch Hospital redevelopment focusing on traffic operations, loading vehicle operations, access, and the provision of car parking.

This assessment has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines for Developments: Volume 4 – Individual Developments* (2016).

The following are conclusions about the proposed redevelopment:

- The proposed redevelopment comprises of the following:
  - Construction of the Mental Health facility
  - Expansion of the endoscopy unit and recovery
  - Fitting out a 30-bed shelled ward (St Juliana's)
  - 2 new operating theatres
  - New radiation oncology service
  - New renal dialysis service and
  - Refurbishment of the emergency department.
- Public transport amenity is considered to be excellent with various bus services operating within the vicinity including train services at Murdoch Station.
- Walking and cycling amenity are considered to be excellent with high quality shared path and footpath links to the Site including the Kwinana Freeway PSP.
- Current parking demand levels are at practical capacity with both staff and visitor demands in excess of 90% occupancy.

  The proposed redevelopment of SJGMH is therefore contingent on the construction of the proposed multi-deck car park, and the additional 472 bays it provides. This work will allow for substantial improvements to the operation of the campus, the legibility of access, and the provision of health services to the southern suburbs.

  Further detailed assessment on parking within the SJGMH is provided in the Traffic and Parking Assessment (**Appendix A**) and Parking Management Plan (**Appendix C**).
- Two different methodologies have been used to assess traffic impact of the proposed redevelopment: comparison against the full build-out horizon (nominally 2031) as defined by the MAC Structure Plan TIA, and comparison against the unrestrained STEM outputs for the same 2031 horizon (as requested by the Department of Planning, Lands and Heritage).

  Of these methodologies, the STEM outputs are not considered to be representative of baseline network function and cannot be relied upon to provide an accurate indication of the relative impacts of the redevelopment.
- In either method, the ultimate impact of the proposed redevelopment is shown to be minor, due to the distribution of demand across the day and the relationship between directional distribution and high-capacity road infrastructure in the vicinity.

APPENDIX

A

TRAFFIC AND PARKING ASSESSMENT

St John of God Murdoch Redevelopment

Traffic and Parking Assessment

CW1181000

Prepared for
St John of God

1 November 2021

Cardno®

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1 Introduction

1.1 Background

St John of God Murdoch Hospital (SJGMH) is the largest private hospital in Perth's southern suburbs, delivering a broad range of high quality specialist services to the community.

The Hospital currently comprises 511 beds, 18 Operating Theatres, private Emergency Department, a Hospice, a Day Surgery Unit and a Radiation Oncology facility. The campus also accommodates two large Medical Clinics, which are the consulting base for hundreds of specialist doctors.

The Hospital directly employs in excess of 2,700 staff & volunteers and a further 2,800 people work in the Medical Clinics & for third party service providers. This represents a health service precinct that is closer in scale to an **800-bed** hospital. On average 1,600 staff and 3,200 patients and visitors seek parking on campus each day. Daily demand for on-site parking currently exceeds supply, leading to staffing accessibility issues, missed appointments, patient frustration and complaints.

The demand for physical and mental health services in the southern metropolitan area continues to grow rapidly and public sector hospitals are frequently overwhelmed. SJGMH can support the growing need for health services in the Southern Suburbs, through a series of expansion projects across the campus. This includes the following works:

- New Mental Health facility
- Two additional Operating Theatres
- One additional (30 bed) Ward
- Redesign of the Emergency Department to accommodate growing demand
- Upgrade of Surgicentre Day Surgery
- New Renal Dialysis service
- Additional Endoscopy Procedure Room and beds

The intensity of the proposed redevelopment is comparable to an additional 118 beds.

A copy of current redevelopment plans is included at **Appendix A.**

1.2 Parking

A hospital is a complex system with numerous overlapping parking needs, including not only key shift-worker positions, but also core staff, executives, consultants, patients and visitors etc.

It is understood that parking is an important part of the transport network, particularly for staff and patients who have few alternative options. This makes parking provisions and restrictions a very sensitive topic that must be treated with the greatest of care. Cardno's intention throughout this process is to uphold the goals of efficient and fair distribution of parking, acknowledging at all times the additional constraints associated with a 24/7 workplace with a wide range of employee and visitor needs.

Standard practice for hospital parking is to provide approximately 3-4 spaces per bed. This is considered generally sufficient to accommodate both staff and visitor parking, but should only be considered as a basic benchmark for comparison.

This simple benchmark does not necessarily include the variety of other health services provided on a modern campus. The various clinics, consultation spaces etc, outside of a hospital environment, would be expected to generate up to 5 parking spaces per 'practitioner' (based on standard practice guidelines). There are approximately 300 specialists operating out of clinics on the SJGMH campus, each with their own requirements for staff and visitor parking in addition to the gross allocation of 'beds'.

For reference, the on-site parking provision at the adjacent Fiona Stanley Hospital is described in **Table 1-1**.

Table 1-1 Current Parking Supply at Perth Hospitals

Hospital	Number of Beds	Number of Parking Bays	Ratio
Fiona Stanley Hospital	783	3,600	1:4.60
St John of God Murdoch	511 (beds only) **811 (beds & consultants)**	**1,892**	1:3.70 **1:2.33**

The SJGMH campus operates under a parking cap; a concept that the Department of Planning, Lands and Heritage (DPLH) has initiated for a number of Activity Centres in Metropolitan Perth. It restricts the number of parking bays available to an individual land parcel or Precinct with the intention of limiting the impact of development on the peak period operation of the road network.

The level of parking under a cap is usually defined by modelling of the surrounding road network for the full build-out horizon, including both background growth and local development expansion, and set such that significant network improvements are unnecessary. For SJGMH, the parking cap was set in 2011 according to a simple area rate of 170 bays per hectare, which is applied to development within 800m of the Murdoch Train Station. The area of the SJGM campus is 12.2Ha, which results in a maximum permissible parking supply of 2,074 bays. This rate was determined as appropriate when applied to the full build-out of the MAC under a nominal 2031 development horizon.

However, it is noted that recent upgrades to the freeway network, including interchange works at Kwinana Freeway / Murdoch Drive and realignment of Murdoch Drive *significantly* increased the carrying capacity of the local road network.

1.3 Purpose of Study

Cardno has been commissioned by St John of God Murdoch (SJGMH) to explore the need for additional parking beyond the existing parking cap, to allow for future expansion at the hospital site and to assess the potential impact of this increase on the surrounding road network.

The following investigation interrogates the application of the parking cap for the Murdoch Activity Centre (MAC) in general and the SJGMH campus in particular. The Study compares the development and transport provision of the MAC against the approved *Murdoch Activity Centre Structure Plan* which underpins the parking cap. It also analyses the impacts of additional parking on the boundary road system, in the context of the overall build-out scenario assessed in the *Murdoch Activity Centre Transport Assessment*.

Previous research undertaken by Cardno has identified the impact of various contributing factors to parking demand, in particular the effect of shift work, preferential parking and other allocation and usage effects. These impacts will be discussed where relevant, and included in the justification of parking supply and management.

This Study comprises the following investigations:

- Description of the formulation of the MAC parking cap, its premise and constituent factors and influences (**Section 2**).
- A comparison of the existing situation to the full build-out horizon upon which the parking cap is based (**Section 3**).
- Description of the current situation at SJGM in terms of: beds, employees, car parking supply and demand (**Section 4**).
- Operational assessment of existing car park and network function (**Section 5** and **Section 6**) including comparison of the existing situation to the full build-out horizon upon which the parking cap is based.
- Consideration for the incremental impact of the proposed supply increase using a growth scenario based on the development expansion focused on the needs of patients and visitors and the gradual displacement of staff to other modes (**Section** Error! Reference source not found.).
- Justifications for an increase in the parking cap and a recommendation as to what that cap should be (**Section 0**).

2 Policy Review

The following documents were considered relevant to the project and reviewed in full. A summary of the contents is provided in **Table 2-1**.

Table 2-1 Summary of Planning Documents Reviewed

Document and Date	Summary of Content
Murdoch Specialised Activity Centre Structure Plan (2014)	The Murdoch Specialised Activity Centre Structure Plan (2014) is a framework for the strategic development of the MAC. It is noted within the plan that it will require further consideration over time, including a list of recommended further studies. The Structure Plan relates to a future scenario in which there is an anticipated 35,000 jobs and 44,000 students within the activity centre. The document discusses transport connections to other centres as well as internal transit recommendations, road network access strategy, measures to improve pedestrian and cyclist access, and a strategy for parking. It makes recommendations for specific transport infrastructure to be developed, including an east-west rapid transit system along Barry Marshall Parade from Murdoch Station and across to Discovery Way on Murdoch University campus.
MAC Interim Access and Parking Policy (2011)	Adopted as a 'guide' pending the finalisation of SPP – Metropolitan Centres Parking. The policy provides a series of general principles. The traffic modelling estimated the increased peak hour traffic would require a reduction of 22% on the predicted 7,890 peak vehicles per hour by 2021. Therefore, each landowner is required to manage the number of people arriving as a car driver. Parking pricing is one mechanism to manage parking demand and some key principles on implementing parking charges, including peak hour pricing strategy. Parking caps are set and minimum bicycle parking provision is recommended. Target mode shares for employees and students (included in a Travel Plan) are a maximum of 62% for car driver and a minimum 38% for other modes. Landowners are responsible for maintaining a parking management plan to work towards the goals of the policy and 25% of the parking is required as public and visitor parking. The parking cap imposed on the SJGM Hospital precinct is 2,074, excluding special purpose parking (disabled bays, motorbike parking, loading zones, ambulance bays). This Interim Policy was intended to be subsumed into the SPP - *Activity Centres Parking*, but that document was never fully progressed.
State Planning Policy 4.2 Activity Centres for Perth and Peel	SPP 4.2 defines a series of activity centres within the Perth and Peel area, with respect to their hierarchical position. The hierarchical position reflects the purpose of the centre, as well as priorities in terms of land use mix and transport and parking functions for the centre. An activity centre is defined within SPP 4.2 as follows: "Activity centres are community focal points. They include activities such as commercial, retail, higher density housing, entertainment, tourism, and medical services. Activity Centres vary in size and diversity and are designed to be well-serviced by public transport." Section 7.7 *Movement and Access* describes the support for centres with a balanced access and movement network. It states for parking in strategic metropolitan and specialised activity centres, the responsible authority should: ▪ Establish mode share targets promoting a shift away from private vehicle use to the maximum extent possible based on the current and planned capacity of the movement network and access needs of the centre. ▪ Establish a parking cap to constrain private vehicle trip generation and promote mode shift. ▪ Develop a parking plan outlining how public parking will be supplied and managed across the whole activity centre to prioritise use and availability between different user groups. ▪ Require major development to prepare and implement travel plans and parking supply & management plans that support the mode share target. All precinct structure plans for activity centres must satisfy relevant requirements for *Design Element 4: Movement in SPP 7.2*
Parking Guidelines for Activity Centres (2016)	The objectives of the parking guidelines are to ensure activity centres provide sufficient development intensity and land use mix to support high-frequency public transport and maximise access to activity centres by walking, cycling, and public transport, while reducing private car trips. The following principles apply to the management of parking facilities at SJGM:

	– Planning approvals should identify specific parking types or uses (e.g. visitor, disabled or service/delivery) that must be catered for and the quantum of each type; – Definitions of parking types and uses should be clear and consistent with existing legislation and planning practice, such as those in the Perth Parking Policy; – Planning approvals should distinguish between short stay parking facilities that cater typically for visitors and commuter orientated long stay car parks; – While a centre is in transition to its ultimate level of development, temporary car parking facilities may be approved with strict limits on how long they may operate for; – For campus style developments or large-scale subdivisions or developments, land for parking should be retained by the original landowner to ensure that the parking management can be changed over time and parking numbers can be managed within any allocated caps; and – Different parking types may be supplied within the one parking facility, but the use must conform to the planning approvals.
State Planning Policy 7.2 Precinct Design Guidelines (2020) Design Element 4: Movement	SPP 7.2 Guidelines provides support to implement SPP 7.2 which is to ensure precinct planning and design processes accommodate growth in a coordinated manner. Objective 4. *To ensure the quantity, location, management and design of parking supports the vision of the precinct* Consideration C4.41: *Provide the minimum amount of car parking appropriate for the precinct.* Consideration C4.4.2: *Manage and locate car parking to prioritise access according to the needs of different user groups*.

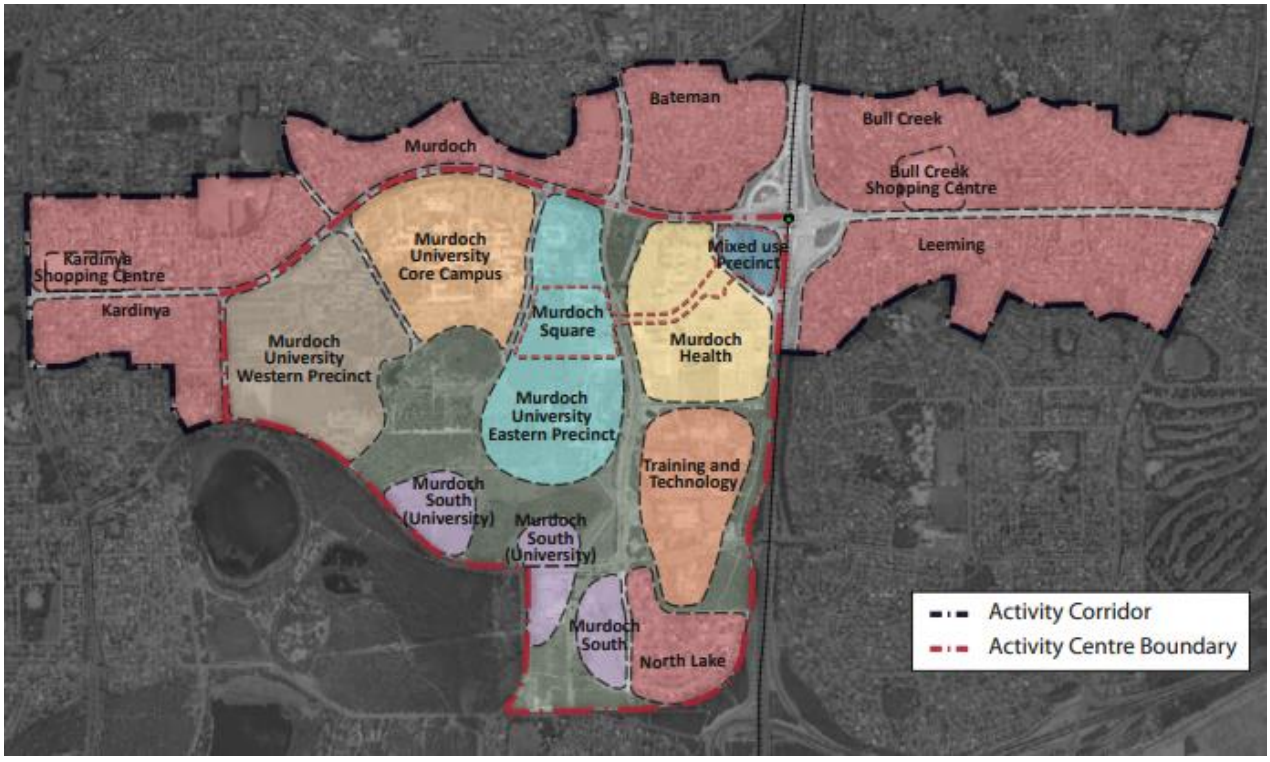
3 MAC Development Review

3.1 Planned MAC Development

The *Murdoch Specialised Activity Centre Structure Plan* (**Figure 3-1**) consists of a broad structure which includes key health, education and municipal destinations and a mixed-use precinct (MUP) located adjacent to the train station.

The mixed-use precinct (MUP), located adjacent to the Health precinct, is proposed to contain associated health care and accommodation facilities. But its broader function, as part of Murdoch Activity Centre's diverse urban core, will be as a key arrival gateway between Murdoch Station and the central area of the Activity Centre.

Figure 3-1 Murdoch Activity Centre Precincts



The *MAC Structure Plan* describes the MUP as a "transit based, 'destination' hub that provides a range of complementary activities including commercial office, allied health, retail, residential and short-stay accommodation." An image of this prospective development form is shown below in **Figure 3-2**.

Figure 3-2 Stage 2 and Stage 1 MAC development plans

Source: Murdoch Mixed-Use Precinct Activity Centre Structure Plan

It is understood that the implementation of Stage 2 cannot occur until such time as an alternative solution for the location of the 'Park and Ride' facility is agreed. This facility, consisting of 1,154 parking spaces, is a significant contributor to the intensity of peak hour travel, comparable in scale to the entire generation from SJGMH.

These development proposals were intended for the short-term, and have been delayed for a variety of reasons. The consequence of this delay is that the integrated mixed-use precinct, which was to comprise a range of destinations and development offerings, is currently limited to a series of largely unconnected destination uses. This means that all non-work journeys must be taken outside of the MAC, largely eliminating the opportunities for internal trips, and reducing the viability of non-driving modes.

The built-out MAC was projected to have a mode share of at least 40% by public transport and a trip containment factor of 24%. The lack of amenities within the activity centre means that internal trip capture is virtually zero, which results in staff commuting to work by car, citing the need to do errands along the journey, such as drop children at day-care or stop at the shops.

The proposed residential opportunities within the MUP are also unrealised. This limits the ability for staff to live close to the hospital, one of the primary aspects of the *Structure Plan* that would contribute to low private vehicle mode shares.

Figure 3-3 Current state of the MAC

Source: Metromaps (dated 14/8/2021)

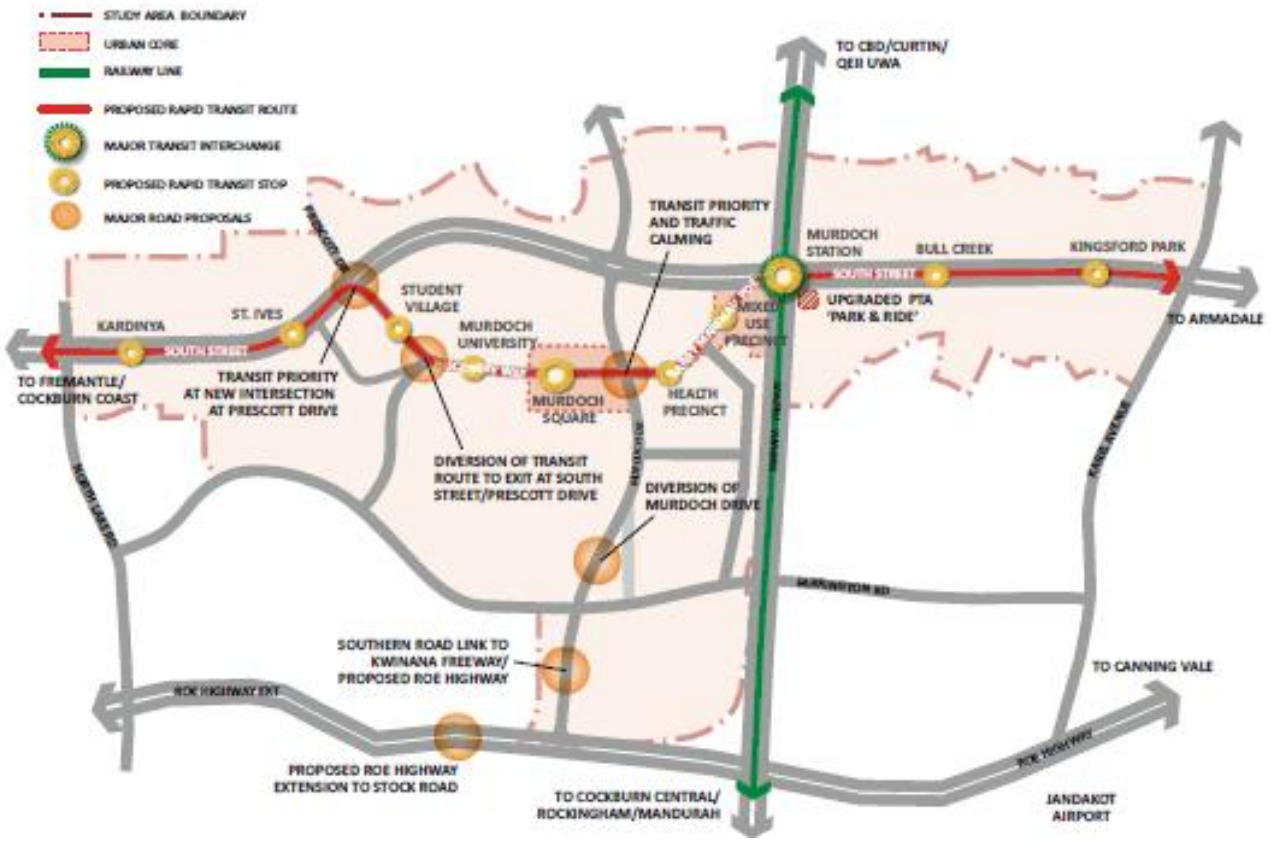
The implications of these decisions are that each the key destinations within the broader MAC, but particularly the health services providers at Fiona Stanley Hospital and SJGMH, have an ongoing need for on-site parking to mitigate the lack of opportunities in the MAC. There are no nearby residential developments, no childcare facilities, no retail or entertainment sites which could reduce the need for separate private vehicle trip-chains to access community services.

It is acknowledged that the prospective Murdoch Health and Knowledge Precinct is expected to deliver Stage 1A between 2023 and 2025. This component of the planned development would ultimately include a medi-hotel, aged care facility, super medical clinic, residential dwellings in a development featuring commercial, retail, food and beverage spaces. This will at least partially mitigate the additional private vehicle travel that is necessitated by the lack of viable integration in the MAC, but is unlikely to be sufficient in itself.

3.2 Planned Public Transport Provision

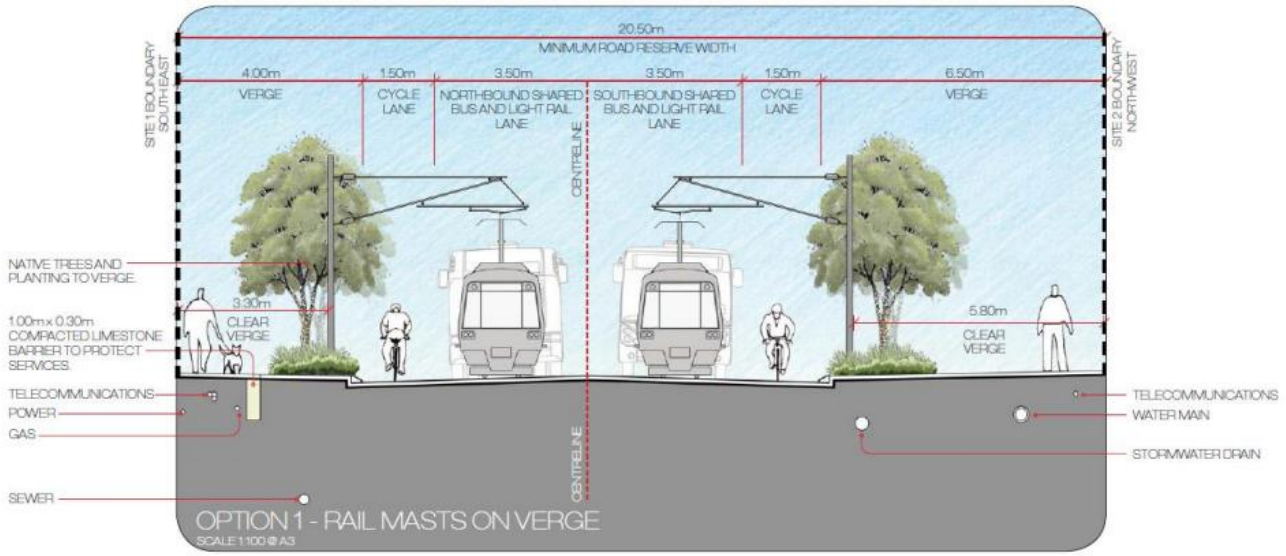
The premise of a low-car destination precinct is predicted on the availability of appropriate, attractive alternative transport. The long-term transit network developed in the *Structure Plan* is shown in **Figure 3-4** below, and is necessary to support mode shift even for employees working in standard 'core hours' shifts (nominally between the hours of 7am and 6pm).

Figure 3-4 Long Term Transit Network for the Murdoch Activity Centre



The *Murdoch Specialised Activity Centre Structure Plan* shows the Murdoch Health Precinct with strong connections along a 'Proposed Rapid Transit Route' between the train station and Murdoch University via Barry Marshall Parade, with provision for Light Rail Transit (LRT) consistent with the draft *Public Transport for Perth in 2031* plan (**Figure 3-5**).

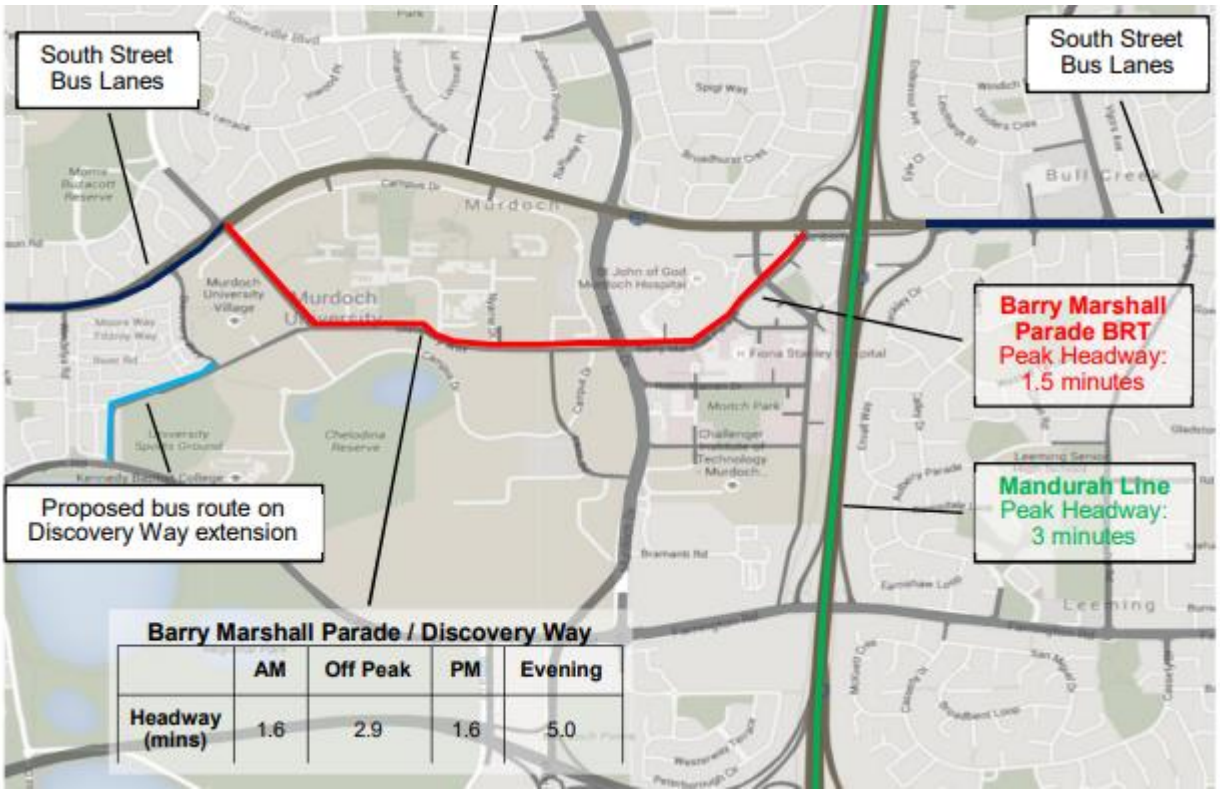
Figure 3-5 Indicative light rail options for Barry Marshall Parade transit link



Source: MAC Transport Assessment

The *Murdoch Activity Centre Transport Assessment* elaborates on this plan, indicating service frequencies along Barry Marshall Parade in the order of 90 second headways during the peak period (**Figure 3-6**).

Figure 3-6 Public transport provision through the Murdoch Health Precinct



Source: MAC Transport Assessment

In reality, service provision lags this vision by a considerable margin. In particular, because the 'last-mile' connection between Murdoch Station and SJGMH is the least important component of a public transport journey. The majority of trips comprise two or three legs, connecting via bus or train service to the Murdoch Station before transitioning to Barry Marshall Parade.

Therefore, while shuttle service from Murdoch Station operates at 4 minute headways, this should be viewed in the context of 10-12 minute headways for train service to Murdoch Station, and 15-30 minute headways for the majority of home locations.

The improvements to public transport infrastructure, as envisaged by the *MAC Structure Plan*, are important to create an alternative to private vehicle transport. Measures such as South Street bus lanes, increased service provision and improved pedestrian facilities are vital to support the objectives of the MAC. While this infrastructure is missing, measures by the Hospital sites cannot hope to generate the level of mode shift required to support the constrained parking scenario.

3.3 Planned Parking Allocation

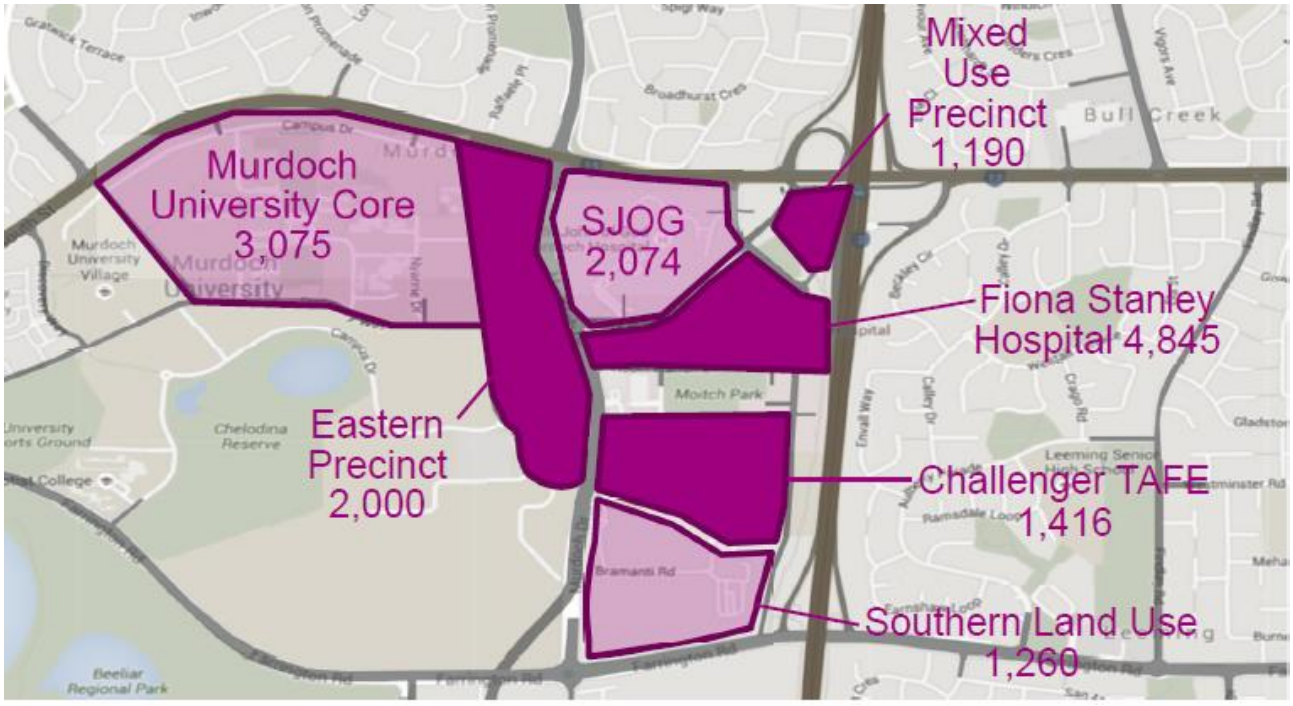
The stated intention of *the Murdoch Activity Centre Access and Parking Policy* (2011) was to provide an optimum number of parking bays which considered the capacity of the surrounding road network, the landowner's requirements and the opportunities for people to access the precinct via alternative modes of transport. In April 2011, the WAPC approved an interim *Access and Parking Policy* after submissions from stakeholders, including the City of Melville's Murdoch Precinct Strategic Group.

At the time, it was anticipated that the Metropolitan Region Scheme designation for the MAC Precinct would be progressively changed to bring the land under the planning control of the City of Melville. At that stage, amendments to the Local Planning Scheme and the associated local parking policies and these amendments would occur to reflect the WAPC policy position.

The interim *Parking and Access Policy* presumes the development of the MAC in line with development and transport infrastructure described by the Structure Plan. Its sufficiency therefore relies on the construction of road infrastructure improvements, the development of a dense mixed-use, transit oriented precinct and suitable investment in public transport to achieve optimistic mode share targets.

The allocation of parking in the Murdoch Activity Centre (MAC) as determined in the Interim *Parking and Access Policy* is shown in **Figure 3-7**. All sub-precincts are required to manage at least 25% of their parking as public and visitor parking.

Figure 3-7 MAC Parking Cap



Source: MAC Transport Assessment, AECOM (2016)

At the time it was the intention to prepare a State Planning Policy framework to guide the management of parking and the establishment of individual Access and Parking Policies in Activity Centres across the metropolitan area. In 2011 the preparation of a SPP addressing access and parking management at Activity Centres was endorsed by the Infrastructure Coordination Committee (Resolution 90.9.2 24 January 2011).

The proposed *State Planning Policy - Metropolitan Centres Parking* was never published. In August 2020, the draft SPP 4.2 *Activity Centres* was revised, which refers to movement and access - specifically that precinct structure plans must satisfy relevant requirements of Design Element 4: Movement in SPP 7.2 *Precinct Design and Precinct Design Guidelines*.

None of these statutory documents refers to specific parking caps, stating only that the responsible authority should "establish a parking cap to constrain private vehicle trip generation and promote mode shift."

Parking Guidelines for Activity Centres (June 2016) was produced by the Department of Transport and states as a principle to "adhere to any cap on parking supply for individual sites, precincts or entire centres as adopted by the WAPC or other responsible planning authority."

3.4 Planned Road Network Effects

The scale of the MAC parking cap was derived from detailed traffic modelling for the ultimate development horizon and set at 17,500 spaces specifically as a function of the limited capacity of the road network, under the premise that significant road upgrades would not be required.

However, it was modelled under a particular network scenario which included the completion of the Roe8 extension and an at-grade tie in to Murdoch Drive.

This modelled network, and the identified constraints identified for the 2031 horizon are shown below in an extract from the *MAC Transport Assessment* (**Figure 3-8**).

Figure 3-8 Forecast Year (2031) Network and Constraints Map

Source: MAC Transport Assessment (2011)

Since this time, substantial changes to the strategic road network have been made, including the removal of Roe8 and the realignment of Murdoch Drive to connect to Kwinana Freeway and Roe Highway as a freeway – freeway interchange.

This modification has greatly increased the capacity of the network and removed several of the constraining features of the network that were identified in the *MAC Transport Assessment*.

For reference the current network (2021) is shown below, **Figure 3-9**.

Figure 3-9 Current (2021) Road Network

Source: MAC Transport Assessment

The parking cap therefore no longer reflects the material characteristics of the network and cannot be considered fit-for-purpose.

3.5 Review Summary

The parking cap placed upon the MAC at its inception was determined by assessing the total capacity of the local network to accept traffic generated by the Centre, and allocating that parking using a coarse methodology that does not relate to the intensity of use, or the limitations in alternative transport in the local network.

The draft Murdoch Parking and Access Policy was established under the premise that:

> *An adequate range of parking facilities will be provided and managed having regard to core business functionality, availability of public transport, road capacity, traffic flow and environmental conditions.*

Comparing the MAC Structure Plan document to the current situation reveals the following:

1. Community health service needs have grown faster than anticipated.
2. Development of the MAC Mixed Use Precinct has lagged substantially. There are currently no adjacent land uses that would support reduced car travel (child-care, retail, residential etc.)
3. The construction of the at-grade PTA park and ride facility creates a substantial fraction of the trip generation envisaged in the parking cap.
4. The public transport network is not yet sufficiently developed to accommodate the low private vehicle mode shares projected in the MAC Transport Assessment.
5. Fundamental changes to the strategic network have been completed subsequent to the determination of the parking cap, calling into question the validity of the 17,500 bay limit.

The following Sections describe the results of detailed parking demand analysis, the implications of increased parking on peak period travel and a justification for an increased parking provision on the SGJMH campus to reflect the current and future requirements for health service provision.

4 Existing Parking Supply and Demand

4.1 Parking Supply

The current form of allocation provides dedicated parking to individual groups, with staff, doctor and public parking maintained in separate areas.

A summary of existing parking allocation is given below, **Table 4-1**.

Table 4-1 Current parking allocation

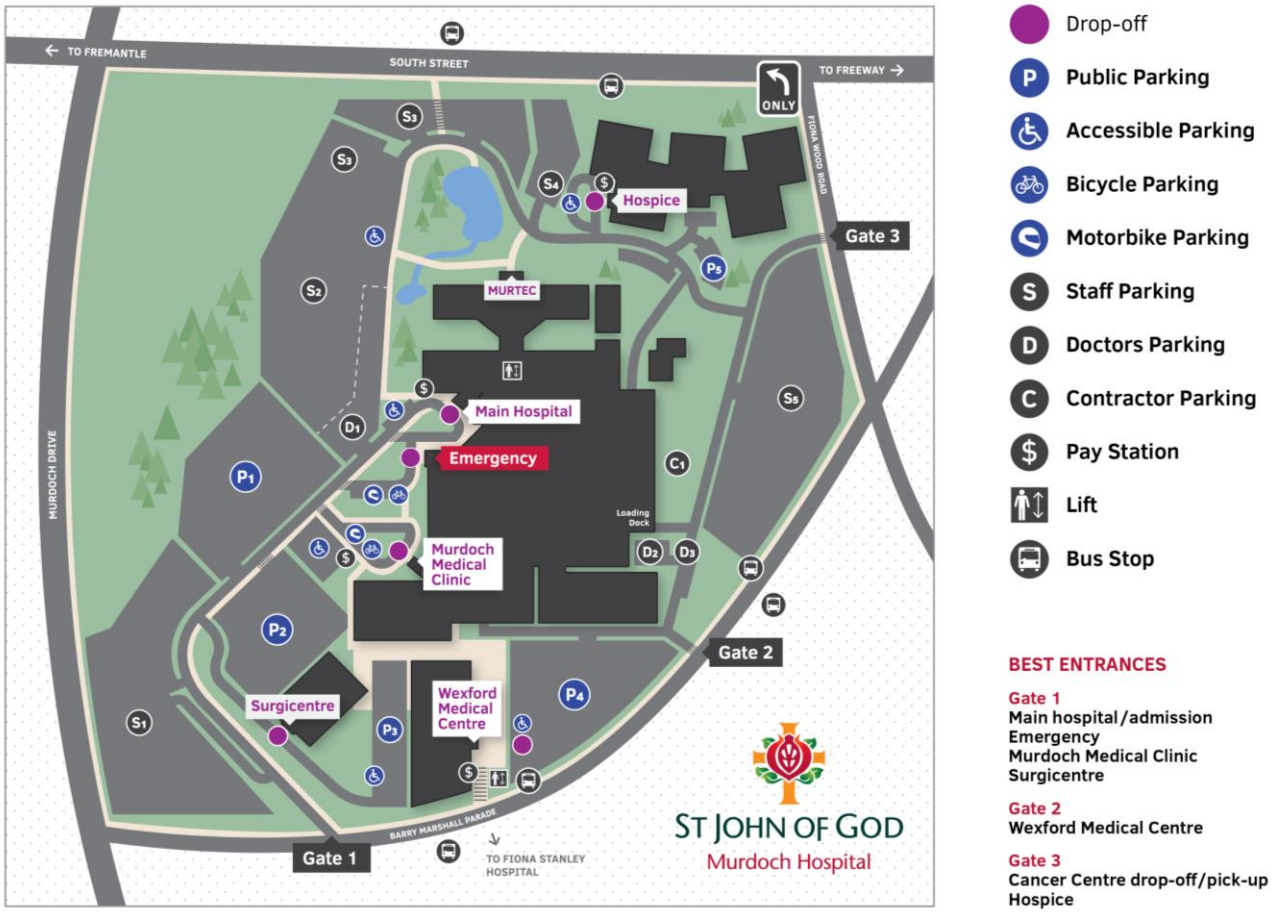
Group	Allocation
General Staff Parking	
S1	224
S2, S3 & S4	518
S5	203
Medical Clinic	48
Wexford Clinic	89
South Wing	53
Contractor Bays	*14*
Staff Parking Total	**1,149**
Doctor Parking	
D1	75
D2 & D3	40
Doctor Parking Total	**115**
Patient/Visitor Parking	
P1	258
P2	127
P3	56
P4	134
P5	53
Patient/Visitor Parking Total	**628**
Hospital Parking Total	**1,892**

In addition to these parking bays, the hospital provides a number of specialty bays which fall outside of the parking cap, including:

- 33 disabled parking bays
- 9 emergency vehicle bays
- 11 pick-up/drop-off bays
- 22 motorcycle/scooter bays
- 4 loading bays

Figure 4-1 shows the location of this parking across the SJGMH campus.

Figure 4-1 Parking location map



4.2 Parking Management

The existing parking management regime provides gated access control via a ticket system for visitors and swipe card access for staff.

All parking is paid across the site, with visitors paying $3.00/hour (long-stay passes are available at a reduced rate) and staff paying $3.60/day.

4.3 Parking Demand

Parking access data was analysed to identify existing parking usage, across all staff and visitor car parks. Information was provided for all visitor entry/exit data and staff entry data for the one-month period between Saturday 1 May 2021 and Monday 31 May 2021. This data included time, location, visitor ticket number, Staff ID, access profile and more.

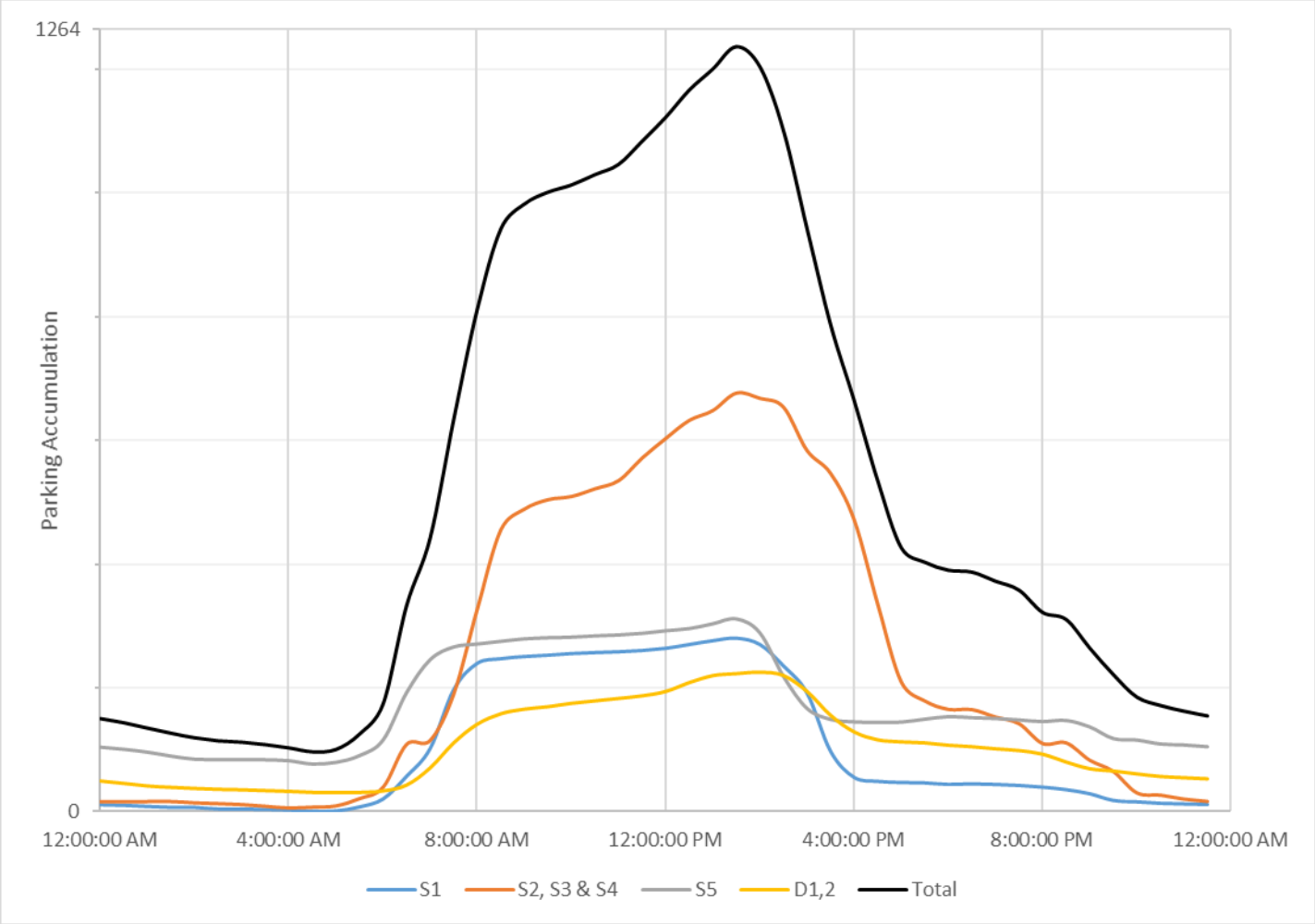
The density of information allows for a fine-grained understanding of the existing parking needs of the campus, and has been related to both the service provision, staffing level and parking supply to allow for future impact assessment.

The following charts are a synthesis of the data available from the parking control system.

4.3.1 Staff parking occupancy

The demand for staff parking is highest during the weekdays, dropping off substantially on Saturday and Sunday. **Figure 4-2** shows the profile for staff parking demand at the SJGMH campus.

Figure 4-2 Staff parking accumulation – average weekday



This profile is fairly typical of a large hospital. It is characterised by a relatively slow arrival period, which is the effect of morning and day shift times, levelling off through the midday.

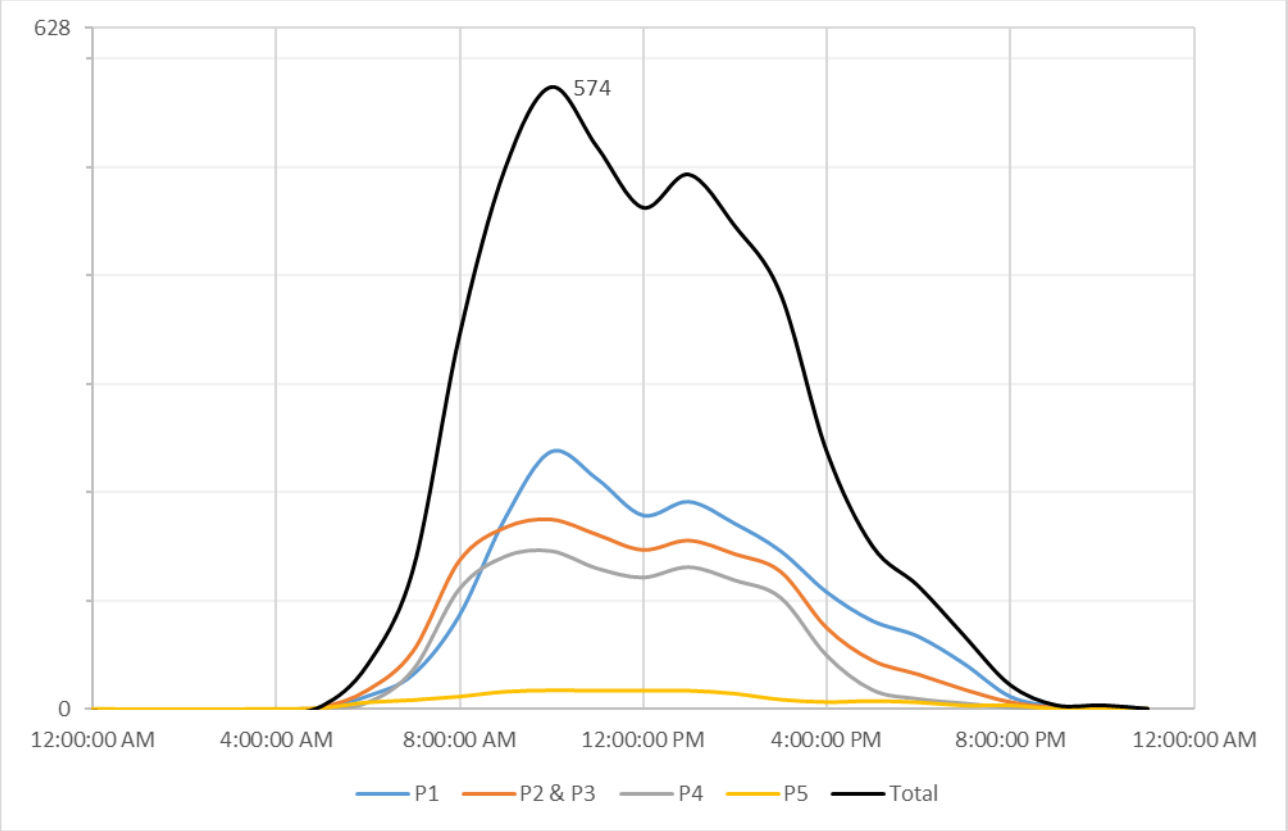
A distinct afternoon peak demand is also evident, which corresponds to the overlap period between the start of the afternoon shift and the end of the morning shift. This overlap period is vital for safe and effective handover, as well as a number of critical hospital functions. However, there is a significant impact on the efficiency of staff parking. As shown above, approximately 200 additional spaces are necessary to accommodate the shift overlap.

Most relevant to the operation of the on-site parking, the *average* peak parking demand across the Site is shown to approach the total parking supply. Some individual days clearly indicate demand exceeding available supply, requiring staff to queue and wait to start work.

4.3.2 Visitor parking occupancy

Visitor parking demand tends to be distributed fairly evenly throughout the day, with the greatest demand occurring in the mid-morning, as shown below in **Figure 4-3**.

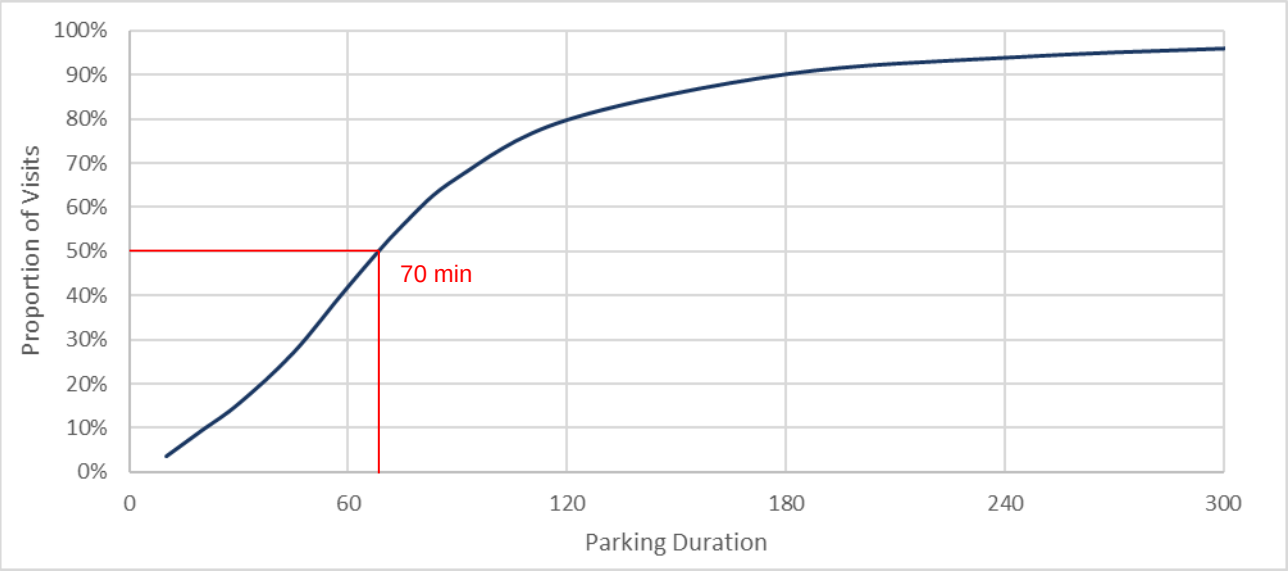
Figure 4-3 Visitor parking accumulation – average weekday



The current demand for parking is effectively sitting at practical capacity, being approximately 90% of the total visitor parking supply during the average day.

Visitor duration of stay is generally fairly short, with a median stay of about 70 minutes (as shown in **Figure 4-4**). This allows the SJGMH car park to support visitation by approximately 3,500 visitors access the campus each day.

Figure 4-4 Visitor parking duration of stay



The current arrangement of car parking, which comprises 5 distinct parking areas, is not as efficient as a single combined car park. The consequence of this is that connections between parking and hospital destinations are closer, but individual car parks may experience considerable stress even while parking remains available in other locations on the campus. The proposed SJGMH redevelopment would address this inefficiency by improving connection through the campus by opening up the internal 'ring road' and by consolidating visitor parking.

One noticeable feature of the parking accumulation chart above: afternoon parking requirements are markedly lower than the mid-morning peak. This occurs at the same time as the afternoon overlap shown in the staff parking profile.

Unfortunately, there are no mechanisms that can be used to effectively and consistently share parking between afternoon shift and visitors. As such, a segregated supply remains the appropriate allocation of parking across the site, despite the inherent inefficiencies. This should also be considered in the context of the potential trip generation for parking; an increase in parking supply does not necessarily result in an increase in trips (for example, if that parking is provided for exclusive use by afternoon shift staff, no peak period trips are generated).

5 Existing SJGMH Traffic Generation

5.1 Alternative Travel

There are four distinct user groups for the hospital:

- hospital staff (inc. nurses, doctors, clerical, cleaning, catering) and visiting medical specialists;
- patients (in-patients and out-patients);
- patient visitors; and
- other visitors (via Emergency Vehicles, Delivery Vehicles, and Taxis)

Each of these groups have their own needs that affect travel choices. An understanding of the travel patterns of these different groups can therefore help with supporting mode change.

SJGMH operates a number of initiatives to support sustainable transport objectives, and is continuing to modify and improve their systems. As part of this, an updated Green Travel Plan has been developed to incentivise staff and visitors to use alternative modes where available.

This Plan identifies the following objectives:

1. To manage and reduce the demand for parking at SJGM Hospital;
2. To ensure high levels of accessibility to and from the site for all, and
3. To support physical and mental health and wellbeing through the promotion of active transport modes.

To achieve these objectives, SJGMH has a range of actions already in place, including:

- Paid staff and visitor parking
- A Green Travel Allowance: which gives staff a financial bonus if they do not drive to the SJGMH campus
- High quality end-of-trip facilities
- Carpooling initiatives
- Transport focus at orientation and annual competency training

These efforts have been expanded in the updated Green Travel Plan, to focus on areas that are lacking, and to improve the awareness and culture of sustainable transport for staff and visitors.

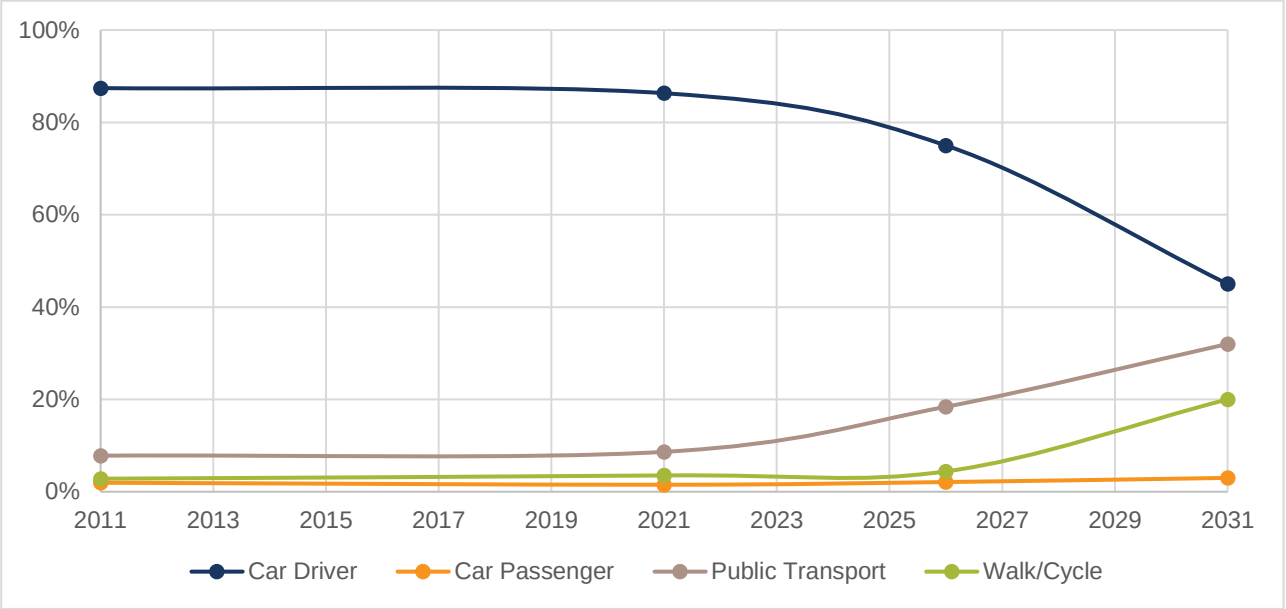
Based on the existing mode share for the Hospital, the following future mode share targets for 2026 (**Table 5-1**) have been developed for employees and visitors. This is based on the availability of sustainable transport modes and the continuation and improvement of on-campus initiatives detailed in the 2021 Green Travel Plan

These targets have been selected to align with the MAC Structure Plan, but they ***cannot*** be achieved without supporting public transport and land use infrastructure.

Table 5-1 Mode Share Targets

Mode	2021 (Existing)	2026 (Target)	2031 (Target)
Car Driver	86.3%	75.0%	45.0%
Car Passenger	1.5%	2.1%	3.0%
Public Transport	8.6%	18.4%	32.0%
Walk/Cycle	3.5%	4.4%	20.0%

Figure 5-1 Potential Mode Share Change



A copy of the 2021 Green Travel Plan has been included as **Appendix C**. There are four distinct user groups for the hospital:

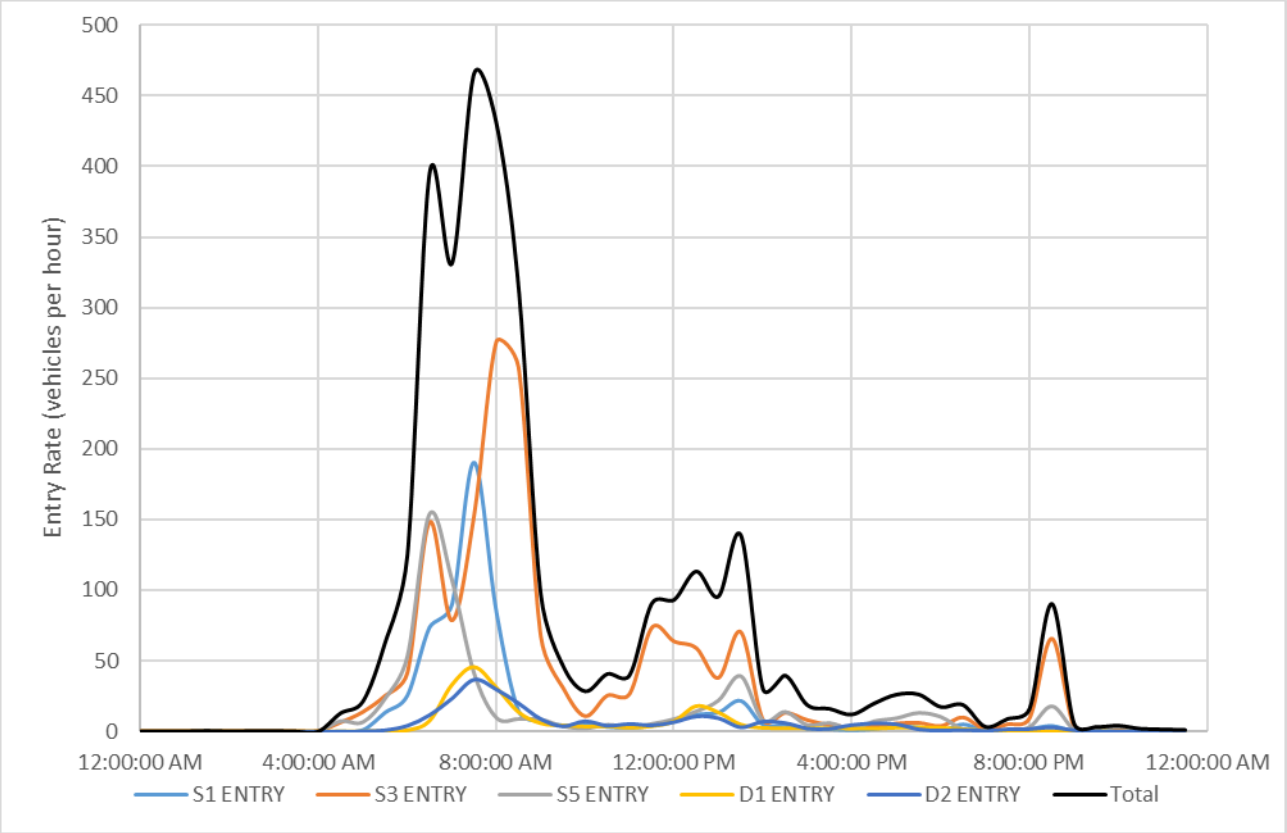
- hospital staff (inc. nurses, doctors, clerical, cleaning, catering) and visiting medical specialists;
- patients (in-patients and out-patients);
- patient visitors; and
- other visitors (via Emergency Vehicles, Delivery Vehicles, and Taxis)

Each of these groups have their own needs that affect travel choices. An understanding of the travel patterns of these different groups can therefore help with supporting mode change.

5.2 Staff Entry

A profile for staff entry has been calculated from this weekday data (**Figure 5-2**) to provide an understanding of the impact this particular demand has on the network. This is expressed in vehicles per hour for each 30-minute time step across the day.

Figure 5-2 Staff entry times – average weekday



The chart clearly shows the effect of the different shift on the travel behaviour of staff. Through the day this can be categorised as follows:

- 6:00-7:30am: Morning Shift starts. This group constitutes a wide variety of caretakers and support staff. Approximately 425 staff arriving during this 90 minute period.
- 7:30-9:00am: Day Shift starts. This group consists both of caretakers and administration staff, with another 600 staff arriving during this time.
- 12:00-2:00pm: Afternoon Shift starts. Approximately 220 staff members arrive during this period, primarily carers and support services.
- 8:00-9:00pm: Night Shift starts: The parking requirements for the night shift are relatively low, in the order of 100 trips.

In addition to these distinct entry times, there is a continual flow of access by staff to the campus as a result of attending physicians, allied health services and specialists accessing the site.

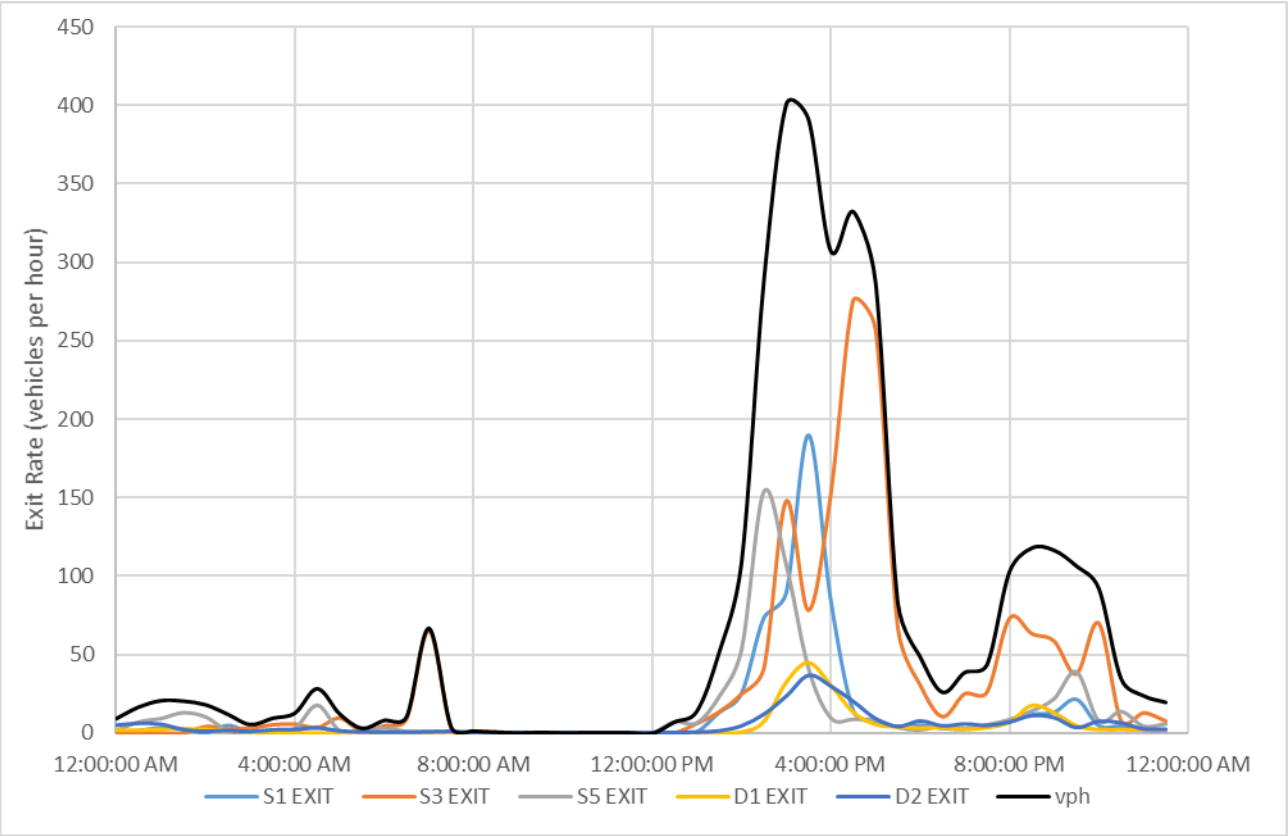
In the context of establishing a metric for peak period trip generation, current evidence shows that staff generate a maximum of approximately 445 trips during the busiest 1-hour period (7:30am-8:30am), with an average peak hour trip generation rate of 0.356vph per staff parking space. It is noted that this tends to overlap with the morning roadway peak period.

5.3 Staff Egress

The SJGMH parking system does not currently log egress times for staff across the campus. As such, these have been estimated using standard shift rosters to provide an indication of the intensity and duration of egress movements.

The travel behaviour of staff is mirrored in the egress profiles, as shown in **Figure 5-3** below.

Figure 5-3 Staff exit times – average weekday



This suggests a prolonged and distributed outbound movement that starts at 2pm and extends through to 5:30pm. The trip generation for the afternoon peak is therefore less intense than the morning peak, in the order of 400 trips per hour (3:00pm-4:00pm). This lies outside of the network peak hour (4:00-5:00pm).

An indicative staff trip generation rate could therefore be expressed as:

> 0.316vph per staff parking space (PM peak hour of generator)

> 0.253vph per staff parking space (PM network peak)

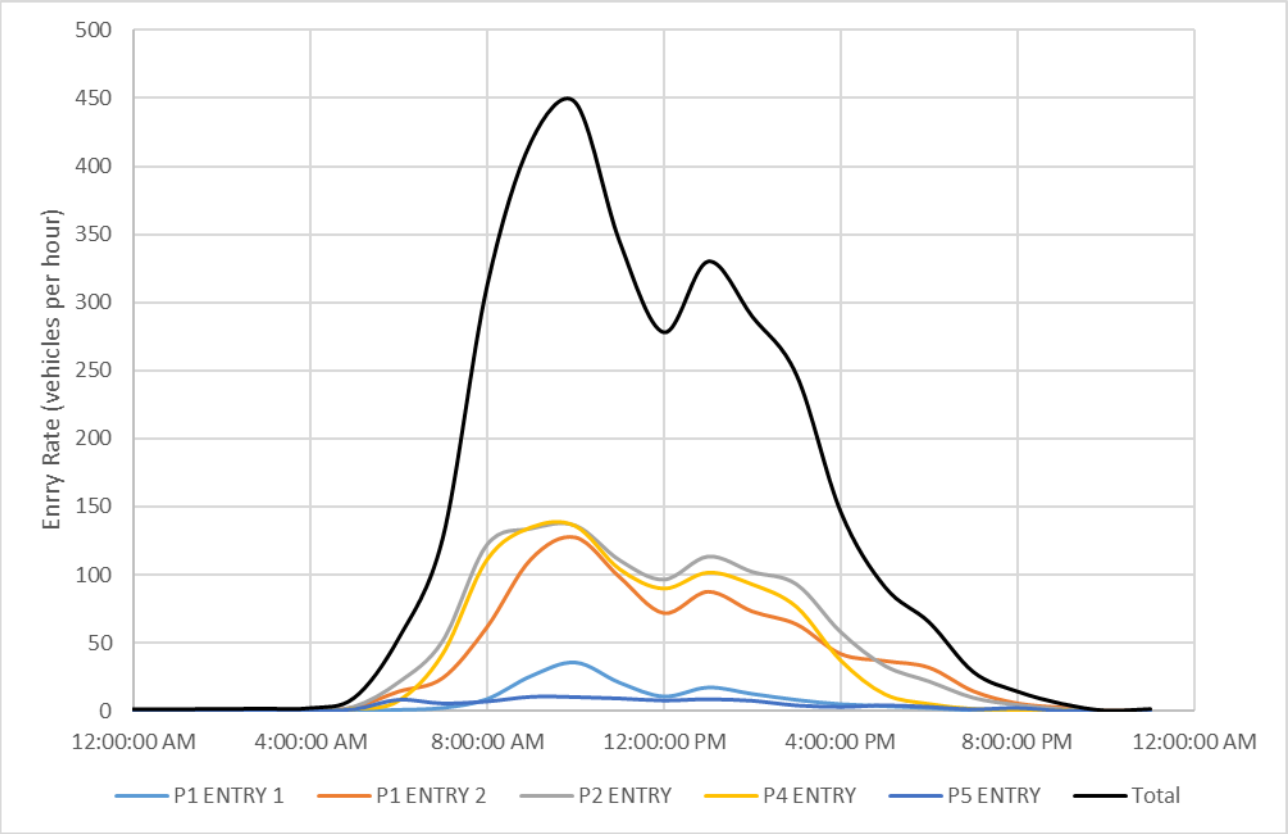
Key to understanding the importance and effect of parking is identifying the proportion of staff members who operate outside of ‘core hours’, nominally 7am-6pm. For the SJGMH campus, this includes upwards of 44% of staff, who can be considered to have a reduced access to alternative transport.

While the local public transport connection to Murdoch Station and along the Mandurah Line exhibits reasonable frequency outside of core hours, this is not consistent across the wider network.

5.4 Visitor Entry

All visitor entry and egress for the month-long survey was captured by the access control system. The average weekday flow rate for entry to the SJGMH campus by visitors is shown in **Figure 5-4** below.

Figure 5-4 Visitor entry times – average weekday

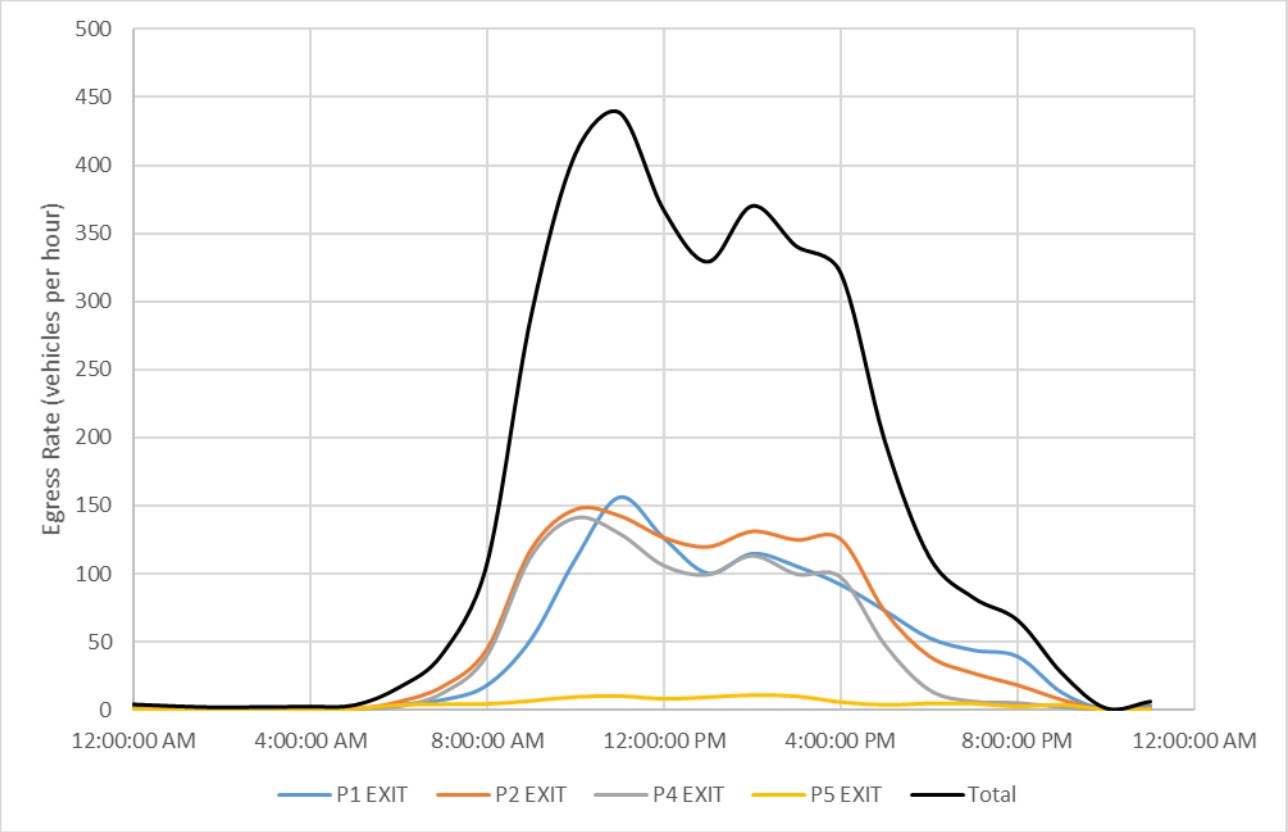


This shows that the peak period for vehicle entry is between 9:00am and 11:00am, well after the staff peak period.

5.5 Visitor egress

The corresponding egress movements by visitors are shown in **Figure 5-5**, with a peak demand period of between 10:00am and noon.

Figure 5-5 Visitor egress times – average weekday



The impact of staff and visitor access and egress movements has been assessed in the context of the boundary road network, with the results shown in **Section 6** below.

Using the same methodology as above, an indicative visitor trip generation rate can therefore be expressed as:

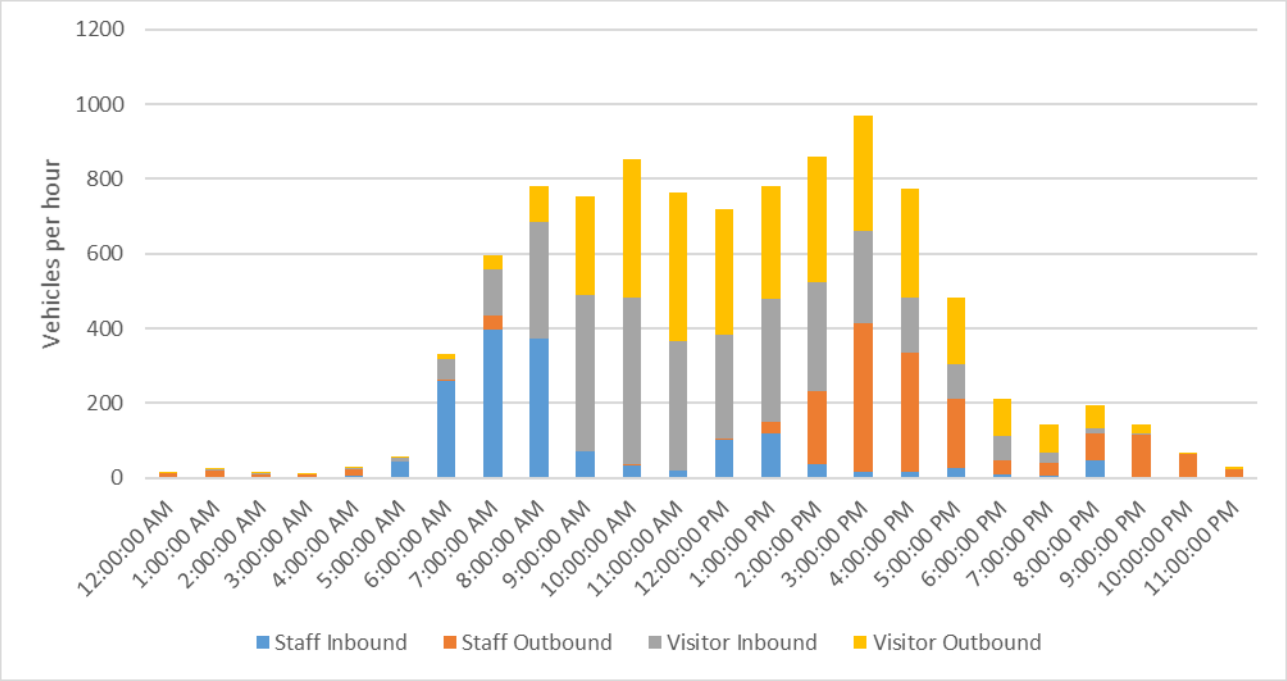
- 1.361vph per visitor parking space (AM peak hour of generator)
- 1.051vph per staff parking space (PM peak hour of generator)

Noting that neither of these peak periods coincides with network peaks.

5.6 Combined traffic generation

The two user groups (visitors and staff) generate traffic at different times of day, as described in **Figure 5-6**. As a result, the Hospital generates ***considerably*** fewer trips in the peak periods than the equivalent number of parking bays at a retail or office development.

Figure 5-6 Traffic Volume Summary for the SJGM Hospital



The combined traffic generation for the hospital can be used to estimate future development impacts, in the form of trips generated per parking bay (**Table 5-2**). This has been determined for the roadway peak hour, to provide input into operational modelling.

Table 5-2 Parking-based trip generation

User Group	AM Peak (8:00-9:00am)		PM Peak (4:00-5:00pm)	
	In	**Out**	**In**	**Out**
Staff	*372 trips / 1264 bays = 0.294vph*	*10trips / 1264 bays = 0.008vph*	*15trips / 1264 bays = 0.012vph*	*320 trips / 1264 bays = 0.253vph*
Visitors	*311 trips / 628 bays = 0.495vph*	*107 trips / 628 bays = 0.170vph*	*146 trips / 628 bays = 0.232vph*	*321 trips / 628 bays = 0.511vph*

These calculations likely overestimate the actual impact of additional parking, since the existing Site operates in excess of practical capacity. That is, best-practice parking operates at approximately 85-90% occupancy during peak periods. This allows parkers to quickly navigate to available bays without excessive search times or delays.

The difference between this optimal behaviour and current function would result in a lower trip generation rate per space. The above rate is therefore considered to be conservative.

5.7 Comparison of Existing Traffic and Parking Cap Peak Traffic

As part of the Structure Plan Transport Assessment, a 2-hour peak period trip generation for the associated Precincts was determined and related to the identified parking cap (the use of 2-hour peak periods reflects the strategic nature of development and network analysis). The results of this assessment has been extracted and provided below in **Figure 5-7** for reference.

Note that the identified 2-hour peak periods are coincident with the assumed roadway peaks: 7:00-9:00am and 3:00-5:00pm.

Figure 5-7 Parking Constraints and Peak Hour Car Trips

Precinct	Parking Cap	AM Peak Car Trips		PM Peak Car Trips	
		Inbound	Outbound	Inbound	Outbound
Murdoch University	3,075	2,387	235	568	1,630
Eastern Precinct	2,000	1,402	542	1,033	2,078
St John of God	2,074	1,134	246	459	1,263
Mixed Used Precinct	1,190	843	783	876	939
Fiona Stanley Hospital	4,845	1,978	467	840	2,217

Source: MAC Transport Assessment, AECOM (2016)

To assess the accuracy of these prediction, access gate data was interrogated to determine the actual generation by SJGMH, and shown below (**Table 5-3)**. A full breakdown of the constituent traffic demands across the day are shown in **Figure 5-6**.

Table 5-3 Peak Hour Car Trips (2-hour period)

Land Use	AM Peak (7am-9am)		PM Peak (3pm-5pm)	
	In	**Out**	**In**	**Out**
MAC Transport Assessment	1,134	246	459	1,263
Observed Entry and Exit	1,208	170	426	1,318
Difference	**74**	**-76**	**-33**	**55**

This comparison shows that the projected 2031 trip generation for SJGMH was remarkably close to current operation, based on a future land use assumption of 3,000 employees. While the total supply of existing parking (1,893 bays) is less than the full parking cap, it is related to a service provision that has already reached the planned build-out horizon.

6 Analysis of Transport Network

6.1 Background Traffic

6.1.1 Road Network

Table 6-1 provides a summary of the surrounding area roads characteristics.

Table 6-1 Surrounding Road Network

Road	Characteristics
South Street	▪ Classified as a Primary Distributor Road according to the MRWA Metropolitan Functional Road Hierarchy ▪ Posted speed limit of 60km/h ▪ Four-lane dual carriageway
Murdoch Drive	▪ Classified as a Distributor A according to the MRWA Metropolitan Functional Road Hierarchy ▪ Posted speed limit of 70km/h ▪ Four-lane dual carriageway with on-road painted cycling lanes
Barry Marshall Parade	▪ Classified as an Access Road according to the MRWA Metropolitan Functional Road Hierarchy ▪ Priority bus lanes/cycle lane ▪ Single lane carriageway with limited on-street parking ▪ Posted speed limit of 40km/h ▪ Act as an activity centre connector, providing public transport/cycling/pedestrian function with an emphasis on creating a vibrant thoroughfare and movement corridor through the urban core.
Fiona Wood Road	▪ Classified as an Access Road according to the MRWA Metropolitan Functional Road Hierarchy ▪ Priority bus lanes/cycle lane ▪ Posted speed limit of 40km/h

6.1.2 Intersections

The following intersections are located within the immediate locality of the site:

> Murdoch Drive/Discovery Way/Barry Marshall Parade

> South Street/Fiona Wood Road

> Barry Marshall Parade/Fiona Wood Road

> South Street/Murdoch Drive

6.1.3 Traffic Volumes

Traffic volumes were obtained from Main Roads Traffic Map for roads in the vicinity of the site. The AM peak hour period occurred between 8-9am and the PM peak period occurred between 4-5pm.

Table 6-2 Traffic Volumes

Road	Weekday Daily Volume	AM Peak (8-9am)	PM Peak (4-5pm)
Fiona Wood Rd	5,031	515	371
Barry Marshall Pde	2,099	229	140
Murdoch Dr	26,241	2,063	1,560
South St	48,780	3,311	4,002

Source: Main Roads Traffic Map

6.2 Assessment Years and Time Period

The weekday peak times selected are 8:00am-9:00am and 4:00pm-5:00pm respectively for the morning and afternoon peak periods, as identified from the traffic volumes sourced from Main Traffic Map.

The following model scenarios have therefore been analysed as part of this assessment:

- Scenario 1 – 2021 existing traffic operation
- Scenario 2 – 2031 planning horizon for the full build-out of the MAC
- Scenario 3 – 2031 including SJGMH redevelopment

6.3 Intersection Analysis

Analysis of the traffic impacts of the proposed development has been carried out for the following intersections:

- South Street/Murdoch Drive
- Murdoch Drive/Discovery Way/Barry Marshall Parade
- Barry Marshall Parade/Fiona Wood Road
- South Street/Fiona Wood Road

The identified intersections have been analysed using the SIDRA analysis program. This program calculates the performance of intersections based on input parameters, including geometry and traffic volumes. As an output SIDRA provides values for the Degree of Saturation (DOS), queue lengths, delays, level of service, and 95th Percentile Queue. These parameters are defined as follows:

- Degree of Saturation (DOS): is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The theoretical intersection capacity is exceeded for an un-signalized intersection where DOS > 0.80;
- 95% Queue: is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- Average Delay: is the average of all travel time delays for vehicles through the intersection. An unsignalised intersection can be considered to be operating at capacity where the average delay exceeds 40 seconds for any movement; and
- Level of Service (LOS): is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The different levels of service can generally be described as shown in **Table 6-3**.

Table 6-3 Level of Service (LoS) Performance Criteria

LOS	Description	Signalised Intersection	Unsignalised Intersection
A	Free-flow operations (best condition)	≤10 sec	≤10 sec
B	Reasonable free-flow operations	10-20 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	25-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

A LOS exceeding these values indicates that the road section is exceeding its practical capacity. Above these values, users of the intersection are likely to experience unsatisfactory queueing and delays during the peak hour periods.

6.4 Scenario 1 - 2021 Existing Traffic

6.4.1 South Street/Murdoch Drive

Figure 6-1 SIDRA Layout for South Street/Murdoch Drive Intersection

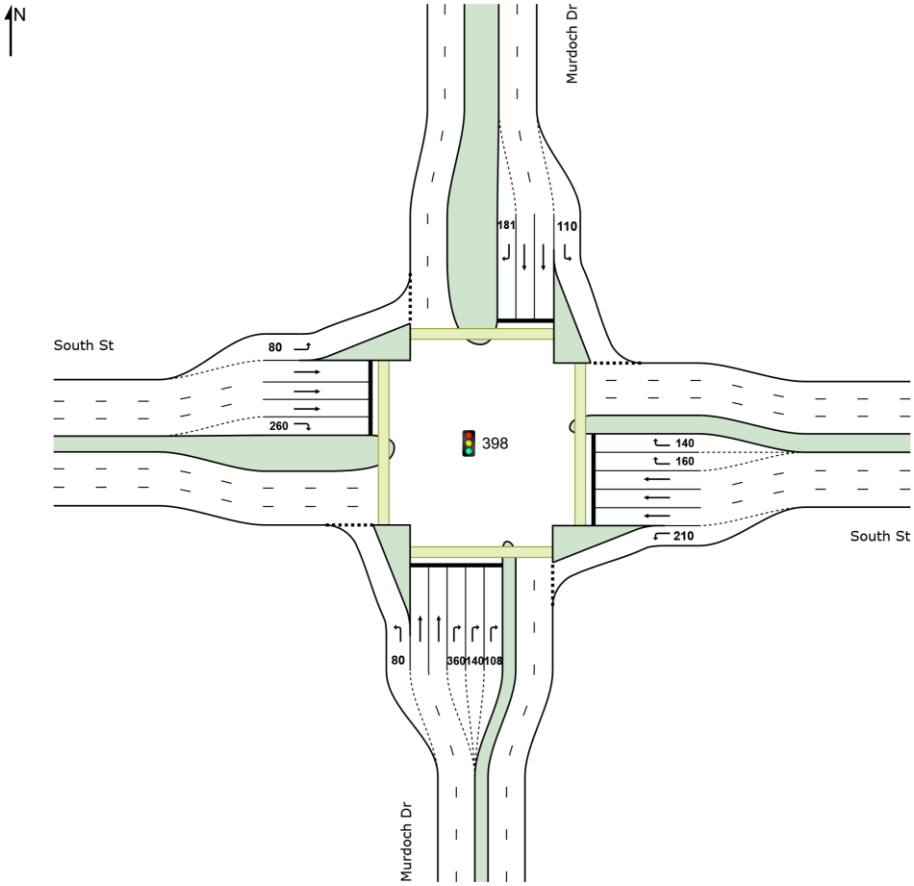


Table 6-4 SIDRA Results for South Street/Murdoch Drive Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr (S)	L	0.519	23.2	C	90.7	0.432	16.7	B	53.7
	T	0.896	74.2	E	116.2	0.486	58.6	E	51.3
	R	0.479	67.4	E	28.2	0.854	58.4	E	62.9
South St (E)	L	0.455	23.6	C	86	0.2	14	B	24
	T	0.899	73.5	E	156.2	0.869	59.5	E	133.9
	R	0.334	54.9	D	43.3	0.421	58.6	E	36
Murdoch Dr (N)	L	0.256	11.5	B	31.2	0.297	17	B	42.5
	T	0.644	61.1	E	73.5	0.532	51.4	D	52.9
	R	0.922	96.4	F	70.6	0.572	64.5	E	40.6
South St (W)	L	0.156	14.1	B	20.3	0.089	10.4	B	8.1
	T	0.542	53.6	D	76.2	0.673	47.2	D	88.9
	R	0.879	74.3	E	150.9	0.838	70	E	84.4
All Vehicle		0.922	54.8	D	156.2	0.869	47.8	D	133.9

**Movements related to SJGMH travel are highlighted, for reference*

6.4.2 Murdoch Drive/Discovery Way/Barry Marshall Parade

Figure 6-2 SIDRA Layout for Murdoch Drive/Discovery Way/Barry Marshall Parade Intersection

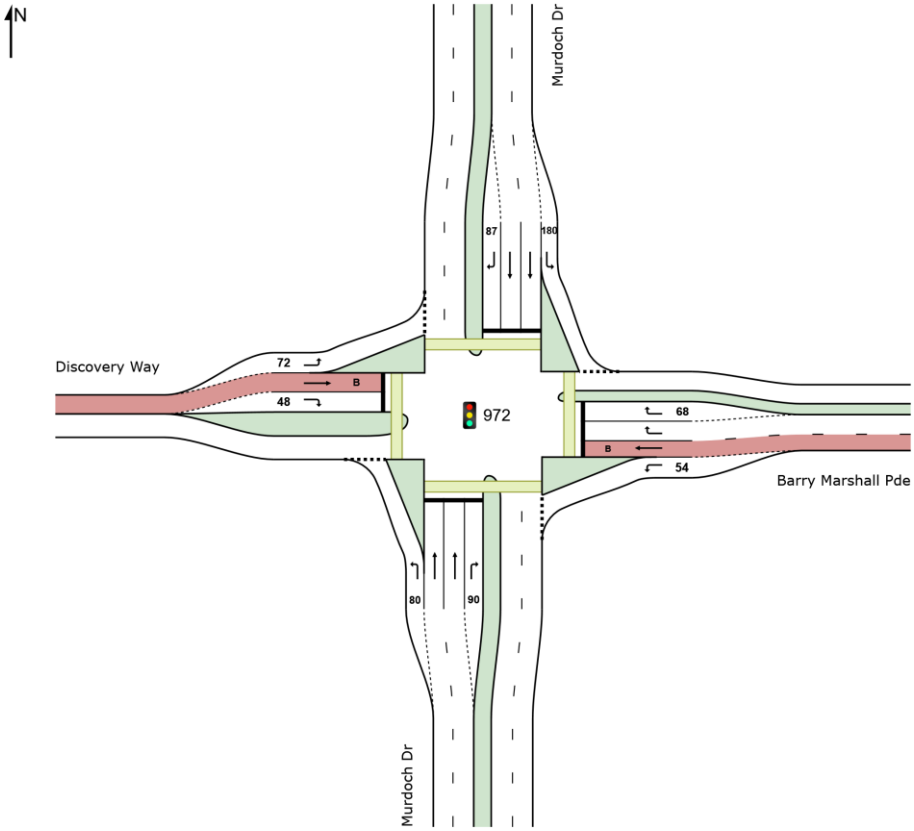


Table 6-5 SIDRA Results for Murdoch Drive/Discovery Way/Barry Marshall Parade Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Murdoch Dr (S)	L	0.113	10	A	10.8	0.026	7.9	A	1.4
	T	0.875	49	D	194.4	0.630	35.5	D	105.1
	R	0.858	84.8	F	76.1	0.629	70.9	E	31.3
Barry Marshall Pde (E)	L	0.082	12.6	B	18	0.2	8.8	A	25.2
	T	0.206	74	E	17.3	0.129	60	E	12.4
	R	0.426	69.6	E	31.5	0.619	58.2	E	53.6
Murdoch Dr (N)	L	0.345	9.6	A	31.9	0.15	8.1	A	8.7
	T	0.424	34.1	C	88	0.431	32.8	C	69
	R	0.842	82.9	F	73.1	0.51	73.3	E	25.5
Discovery Way (W)	L	0.116	15	B	12	0.185	13	B	17.6
	T	0.168	65.4	E	13.1	0.154	55.3	E	11.2
	R	0.217	67.4	E	15.6	0.432	59.7	E	30.3
All Vehicles		0.875	42.7	D	194.4	0.63	35.8	D	105.1

**Movements related to SJGMH travel are highlighted, for reference*

6.4.3 Barry Marshall Parade/Fiona Wood Road

Figure 6-3 SIDRA Layout for Barry Marshall Parade/Fiona Wood Road Intersection

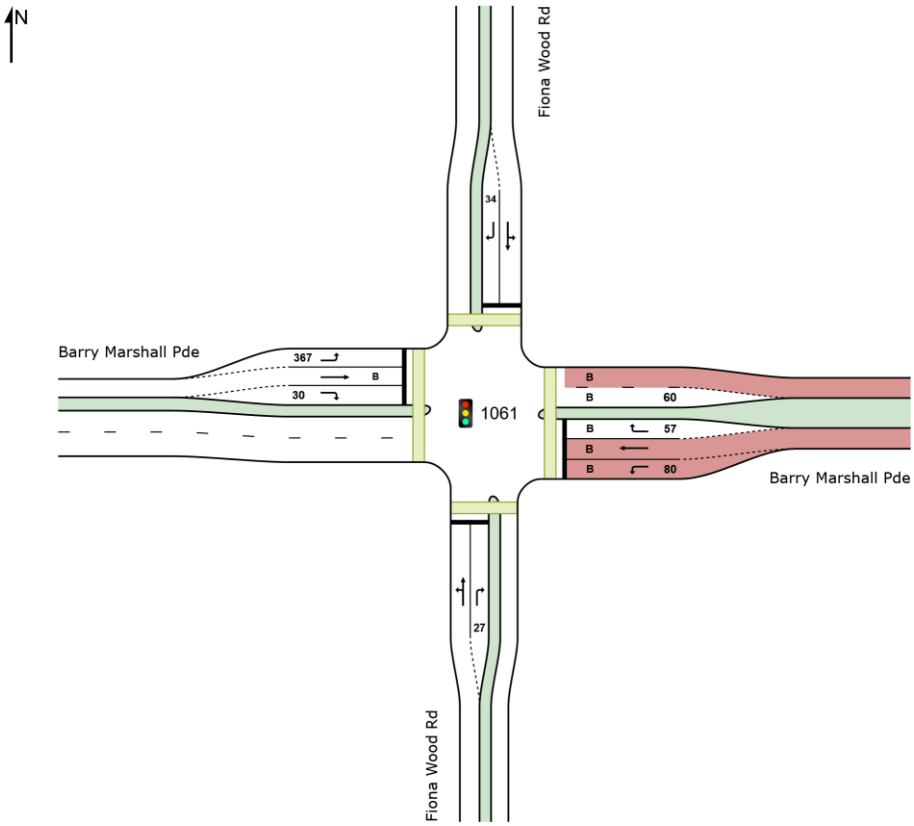


Table 6-6 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Fiona Wood Road (S)	L	0.23	62	E	20.7	0.222	56.9	E	15.6
	T	0.230	58.5	E	20.7	0.222	53.5	D	15.6
	R	0.016	61.5	E	1.1	0.028	56.6	E	2
Barry Marshall Pde (E)	L	0.058	64.1	E	4.7	0.056	58.5	E	3.7
	T	0.204	61.7	E	18.8	0.212	56	E	15.7
	R	0.023	85.4	F	0.7	0.052	77.1	E	1.2
Fiona Wood Road (N)	L	0.276	17.6	B	43.3	0.082	13.2	B	11
	T	0.276	13.4	B	43.3	0.082	9	A	11
	R	0.204	33.8	C	31.7	0.218	26.8	C	30.6
Barry Marshall Parade (W)	L	0.276	46.8	D	36.5	0.17	52.7	D	20.1
	T	0.058	45.5	D	9.1	0.05	49.7	D	6.5
	R	0.161	73.4	E	8.4	0.220	72.8	E	6.6
All Vehicles		0.276	34.2	C	43.3	0.222	36	D	30.6

While the configuration of the SJGMH internal road network requires that vehicles accessing the Main Hospital use the Barry Marshall Parade entrance. The proposed improvements, including reconfiguration of the 'ring road' will allow visitors and staff to access most destinations on the campus from either Fiona Wood Road or Barry Marshall Road. This will greatly reduce the volume of SJGMH traffic that uses the Barry Marshall Parade / Fiona Wood Road intersection.

6.4.4 South Street/Fiona Wood Road

Figure 6-4 SIDRA Layout for South Street/Fiona Wood Road Intersection

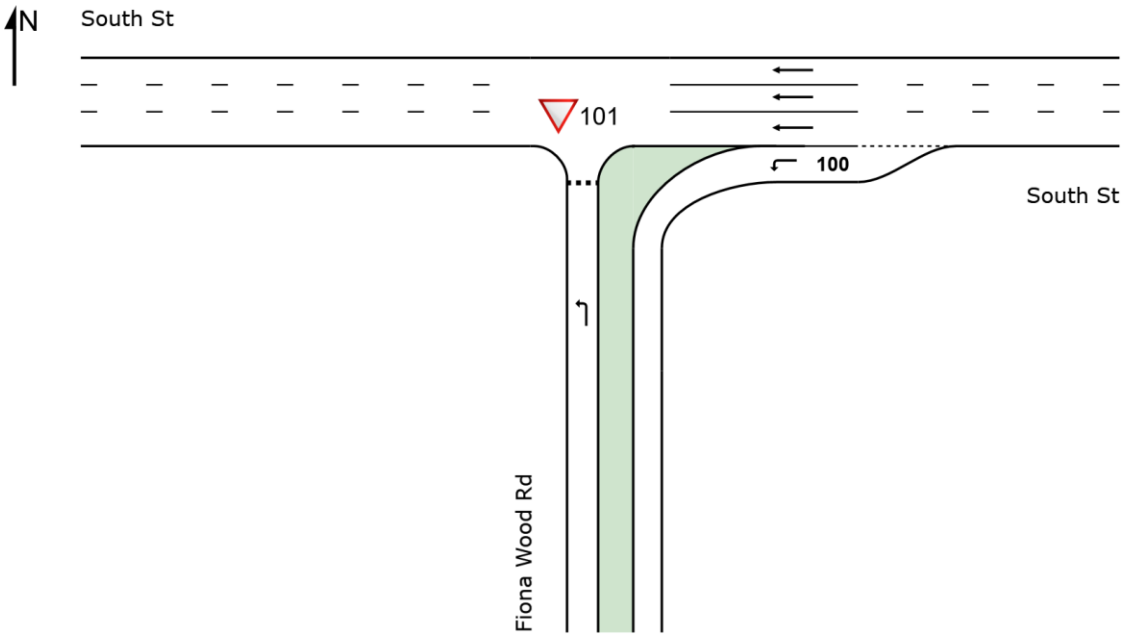


Table 6-7 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection Approach		AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Fiona Wood Road (S)	L	0.065	6.8	A	0.6	0.057	6.1	A	0.6
South St (E)	L	0.293	6.8	A	0	0.052	6.7	A	0
	T	0.347	0.1	A	0	0.3	0.1	A	0
All Vehicles		0.347	1.7	NA	0.6	0.3	0.6	NA	0.6

6.5 Scenario 2 – Anticipated 2031 Traffic Generation

The following SIDRA intersection assessment outcomes have been extracted from the MAC Transport Assessment for comparison. They describe the results of intersection operation analysis for the full build-out of the MAC, as well as regional traffic demand growth through to the 2031 horizon.

This traffic environment is critical to the impact assessment for the SJGMH redevelopment proposal, as it is this level of traffic that is envisaged by the MAC Transport Assessment, and has been used to define the parking cap. However, it should be recognised that the road network on which this cap was based as fundamentally changed, and so the traffic volumes projected in this work are no longer representative.

6.5.1 South Street/Murdoch Drive

Table 6-8 SIDRA Results for South Street/Murdoch Drive Intersection (2031 at MAC full build-out)

AM Peak

Intersection	Approach	Base Case			With Proposed Modification		
		LoS	Delay	Volume	LoS	Delay	Volume
Murdoch Dr / South St	South St WB	E	59	2089	E	62	2229
	Murdoch Dr NB	D	52	729	E	56	735
	Murdoch Dr SB	F	85	1314	F	85	1312
	South St EB	E	61	1338	E	57	1327
	All	**E**	65		**E**	66	

PM Peak

Intersection	Approach	Base Case			With Proposed Modification		
		LoS	Delay	Volume	LoS	Delay	Volume
Murdoch Dr / South St	South St WB	E	66	1755	E	56	1793
	Murdoch Dr NB	D	47	1550	D	53	1566
	Murdoch Dr SB	F	89	1267	F	86	1262
	South St EB	F	108	1788	F	93	1788
	All	**E**	78		**E**	72	

The total traffic volume identified through the Murdoch Drive / South Street intersection at the 2031 horizon is shown to be 5,470vph and 6,360vph respectively, for the base case.

6.5.2 Murdoch Drive/Discovery Way/Barry Marshall Parade

Table 6-9 SIDRA Results for Murdoch Drive/Discovery Way/Barry Marshall Parade Intersection

Intersection	Approach	Base Case			With Proposed Modification		
		LoS	Delay	Volume	LoS	Delay	Volume
Murdoch Dr / Discovery Way	Murdoch Dr NB	D	52	1155	D	41	1203
	Murdoch Dr SB	E	59	1647	E	61	1748
	Discovery Way	D	41	340	D	43	343
	Barry M WB	D	42	255	D	39	266
	All	**D**	53		**D**	51	

6.5.3 Barry Marshall Parade/Fiona Wood Road

Table 6-10 SIDRA Results for Barry Marshall Parade/Fiona Wood Road Intersection

Intersection	Approach	Base Case			With Proposed Modification		
		LoS	Delay	Volume	LoS	Delay	Volume
Barry Marshall Pde / Fiona Wood Rd	Barry M EB	E	59	258	E	68	269
	Barry M WB	D	54	138	D	50	97
	Fiona Wood NB	D	47	183	D	54	191
	Fiona Wood SB	C	29	687	C	32	707
	All	**D**	41		**D**	45	

6.6 Scenario 3 – 2031 including SJGMH Redevelopment

6.6.1 Development extent

There are extensive plans to redevelop the SJGMH campus, including the following works:

- Construction of the Mental Health facility
- Expansion of the endoscopy unit and recovery;
- Fitting out a 30 bed shelled ward (St Juliana's);
- 2 new operating theatres;
- New radiation oncology service;
- New renal dialysis service and
- Refurbishment of the emergency department.

While the majority of these improvements involve modifications within the existing structure of SJGMH, construction of the Mental Health Unit requires a considerable footprint, taking up land currently occupied by at-grade parking. This parking, and the additional growth in demand related to the redevelopment works, can be provided within a purpose-built multi-deck car park.

The spatial orientation of the proposed redevelopment is shown below, **Figure 6-5**.

Figure 6-5 SJGMH redevelopment plan

6.6.2 Effect on parking supply

These developments would generate an additional requirement for 472 parking spaces, based on the following **Table 6-11**. The additional visitor and staff parking supply requirement associated with each component of works has been determined based on current behaviour, and including reasonable best-practice operational efficiencies.

Table 6-11 Parking supply growth

Expansion works	Visitor Parking Requirement	Staff Parking Requirement
Renal Dialysis	25 bays	19 bays
Mental Health	96 bays	130 bays
Endoscopy	20 bays	17 bays
Wards & Theatre Expansion	34 bays	58 bays
Radiation Oncology	42 bays	30 bays
Total	**217 bays**	**255 bays**

The addition of these parking bays would take the total supply on-site to **2,365 bays**, allocated approximately as follows:

- 1,450 general staff parking bays
  - Including 250 bays dedicated for afternoon shift parking
- 165 doctors/specialist parking bays
- 750 visitor parking bays

This represents an increase in staff parking of 28% and an increase in visitor parking of 20%. This is intended to support both the increased need for parking and support better on-site efficiency.

A detailed Parking Management Plan has been completed to determine how these would be allocated, and attached as **Appendix B**.

6.6.3 Traffic generation

Trip generation has been calculated for the proposed development utilising trip generation rates from the *Institute of Transportation Engineers (ITE) "Trip Generation" 10th Ed*. The following tables provide a benchmark for directional distribution and total trip generation as a result of the proposed redevelopment. This has been compared against observed trip generation rates for SJGMH, which include the effect of on-site clinics and services beyond the main hospital.

Table 6-12 provides the trip generation rate during the AM and PM peak hours, **Table 6-13** outlines the directional distribution acquired from ITE for the proposed development and **Table 6-14** states the theoretical trip generation for the redevelopment component, which is equivalent to an additional 118 beds.

Table 6-12 Trip generation rate – peak hour generator

Land Use	ITE Code/Source	AM Peak	PM Peak
Hospital (118 beds)	610	1.89 trips per bed	2.09 trips per bed

Table 6-13 Directional distribution

Land Use	AM Peak		PM Peak	
	In	Out	In	Out
Hospital (118 beds)	71%	29%	30%	70%

Table 6-14 Redevelopment trip generation

Land Use	AM Peak		PM Peak	
	In	Out	In	Out
Hospital Expansion	197	26	75	150
Total	**223**		**247**	

The proposed development represent a trip generation of approximately 223 vehicles during the AM peak hour and 247 vehicles during the PM peak hour, according to best-practice trip generation rates.

An alternative assessment can be determined based on the proposed increase in parking supply. Applying the generation rates derived from the parking data yields the following estimates, **Table 6-15.**

Table 6-15 Parking-based trip generation

User Group	AM Peak (8:00-9:00am)		PM Peak (4:00-5:00pm)	
	In	Out	In	Out
Staff (255 bays)	*0.294vph x 255 bays* 75 trips	*0.008vph x 255 bays* 2 trips	*0.012vph x 255 bays* 3 trips	*0.253vph x 255 bays* 65 trips
Visitors (217 bays)	*0.495vph x 217 bays* 107 trips	*0.170vph x 217 bays* 37 trips	*0.232vph x 217 bays* 50 trips	*0.511vph x 217 bays* 111 trips
Total	**221**		**229**	

This parking-based estimate assumes that parking continues to be highly constrained. However, despite using entirely different bases, the two estimates align extremely closely and can therefore be considered a reasonable estimate of future trip generation growth.

It is noted that parking provided surplus to demand generates no trips, and that a portion of the proposed additional supply is required to reach a target efficiency rate of 85% (visitors) and 90% (staff).

6.6.4 Distribution to the Network

The distribution of traffic for the MAC, as expressed in the *MAC Transport Assessment* report has been used as the basis of understanding for the increase in traffic to the network. This has been assessed at the key intersections to identify the magnitude of change associated with the redevelopment scenario.

The changes to the strategic road network can be expected to have an impact on the assignment of trips, but are unlikely to have a significant effect on the broad distribution of traffic to and from home location.

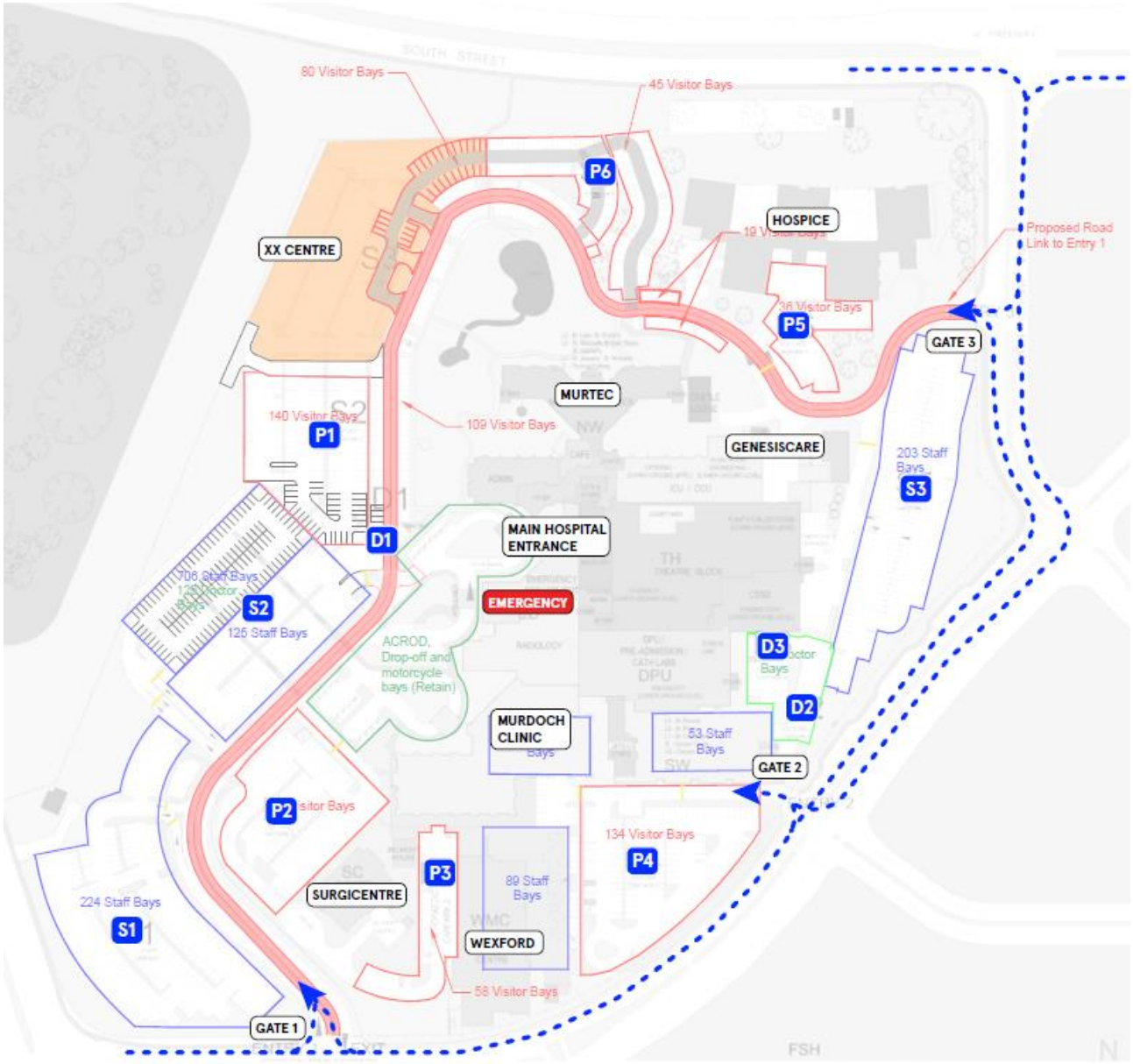
These trip distribution assumptions are shown below for reference, **Figure 6-6**. The 24% internal trip capture is not considered relevant for the purpose of traffic impact and has therefore been excluded in the following assessment.

Figure 6-6 Assumed all-day trip distribution

Source: MAC Transport Assessment

On of the major changes to the SJGMH campus is the establishment of the internal 'ring road', which allows effective access to all destinations within the Site from either Murdoch Drive or South Street. This change supports more effective and efficient access, and a reduced impact on the local network.

Figure 6-7 Proposed ring road and access arrangement



Based on this, and the orientation and access limitations in the local road network, a traffic assignment model has been developed; shown below in **Figure 6-8**. In this case the colours have been chosen to be consistent with the distribution diagram.

The results suggest that the traffic is well distributed and tend to assign to movements that do not experience significant congestion and delay, particularly left-turn entry and egress movements assisted by the operation of upstream signals.

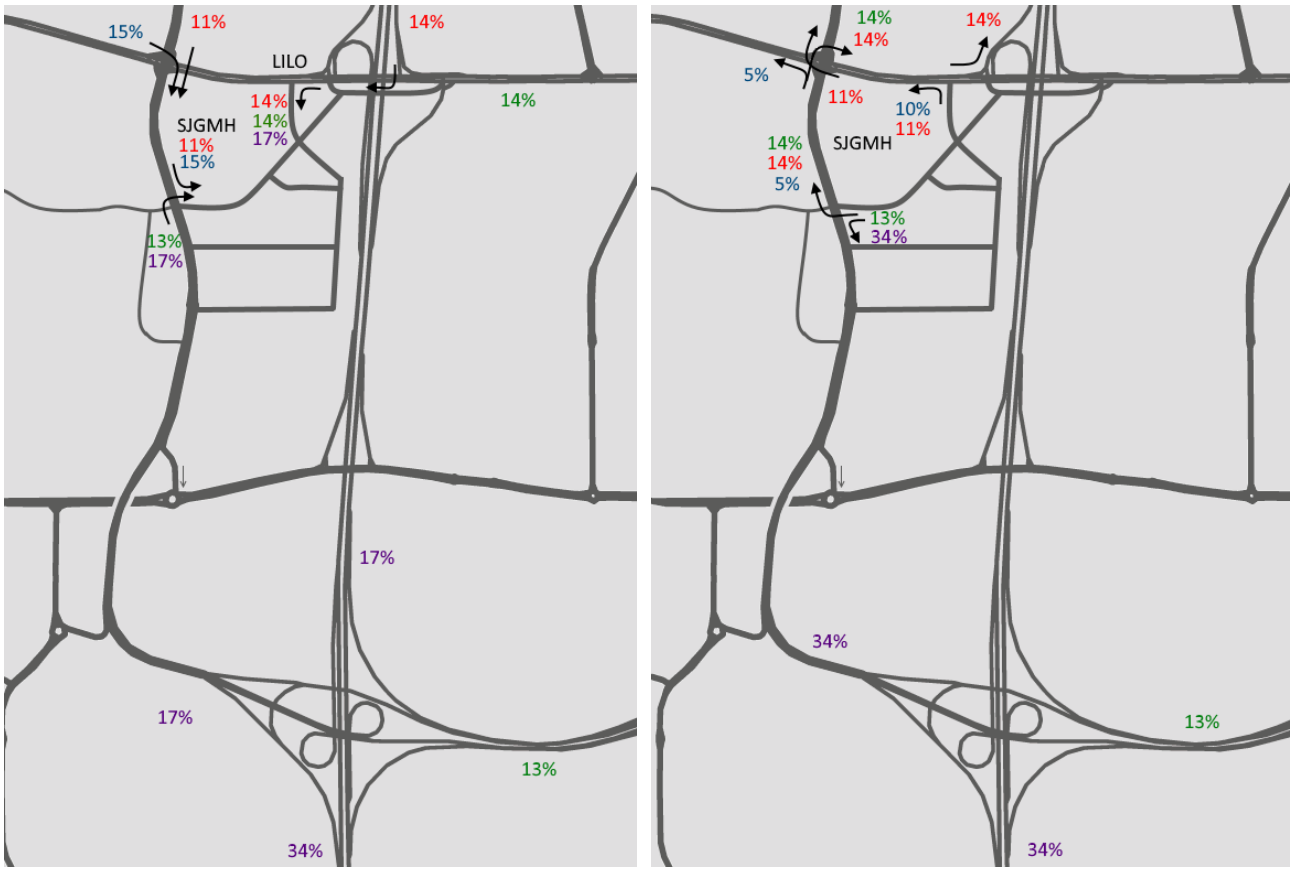
Interactions with critical intersections are therefore limited to the following, Table 6-16.

Table 6-16 Increase in turning movement volumes as a result of redevelopment

Intersection	Approach	Inbound Traffic			Outbound Traffic		
		% of total	AM Trips	PM Trips	% of total	AM Trips	PM Trips
Murdoch Dr / South St	South St (E)	-	-	-	11%	4	19
	Murdoch Dr (S)	-	-	-	33%	13	58
	Murdoch Dr (N)	11%	20	2	-	-	-
	South St (W)	15%	27	8	-	-	-

Murdoch Dr / Barry Marshall Pde	Murdoch Dr (S)	30%	55	17	-	-	-
	Murdoch Dr (N)	26%	47	14	-	-	-
	Barry Marshall Pde (E)	-	-	-	79%	31	139
South St / Fiona Wood Rd	South St (E)	45%	82	37	-	-	-
	Fiona Wood Rd (S)	-			11%	4	19

Figure 6-8 SJGMH traffic assignment



The relative magnitude of this additional traffic is described in the context of Scenario 1 and Scenario 2. That is, with respect to current traffic volumes (including the influence of the capacity increase in the regional network), and compared with the original modelling for the MAC and surrounds. This comparison is shown below, **Table 6-17**.

Table 6-17 Comparison of critical intersection traffic volumes (Scenarios 1, 2 and 3)

Intersection	Approach	AM Peak			PM Peak		
		Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Murdoch Dr / South St	South St (E)	1942	2229	1946	1693	1793	1712
	Murdoch Dr (S)	1428	735	1441	1470	1566	1528
	Murdoch Dr (N)	957	1312	977	841	1262	843
	South St (W)	1303	1327	1330	1289	1788	129
	Total	**5630**	**5603**	**5694** (+1.1%)	**5293**	**6409**	**5380** (+1.6%)
Murdoch Dr /	Murdoch Dr (S)	1517	1155	1572	993	935	1010
	Murdoch Dr (N)	1345	1647	1392	881	956	895

Barry Marshall Pde	Discovery Wy (W)	161	340	161	278	763	278
	Barry Marshall Pde (E)	323	255	354	637	694	776
	Total	**3346**	**3397**	**3479** (+4.0%)	**2789**	**3348**	**2959** (+6.1%)

This comparison shows that the current function of the network is similar in scale to that of the projected 2031 scenario (this reflects a range of factors including the strategic function of boundary roads, the intensity of key uses within the MAC reaching their 2031 horizon threshold and the high impact of the PTA park and ride facility on peak period traffic. However, the traffic growth and impact resulting from the proposed SJGMH redevelopment is comparatively minor, and concentrated particularly at the left-turn egress from Barry Marshall Way onto Murdoch Drive, a movement which does not contribute to network congestion.

This is exemplified in the results of SIDRA analysis for the with and without scenarios, a summary of which is shown below, **Figure 6-9** and **Figure 6-10**. This shows a minor impact on two intersection approaches during the AM peak (South Street eastbound and Fiona Wood Road), and no change in the PM peak.

Figure 6-9 AM peak comparison – without redevelopment (left) and with redevelopment (right)

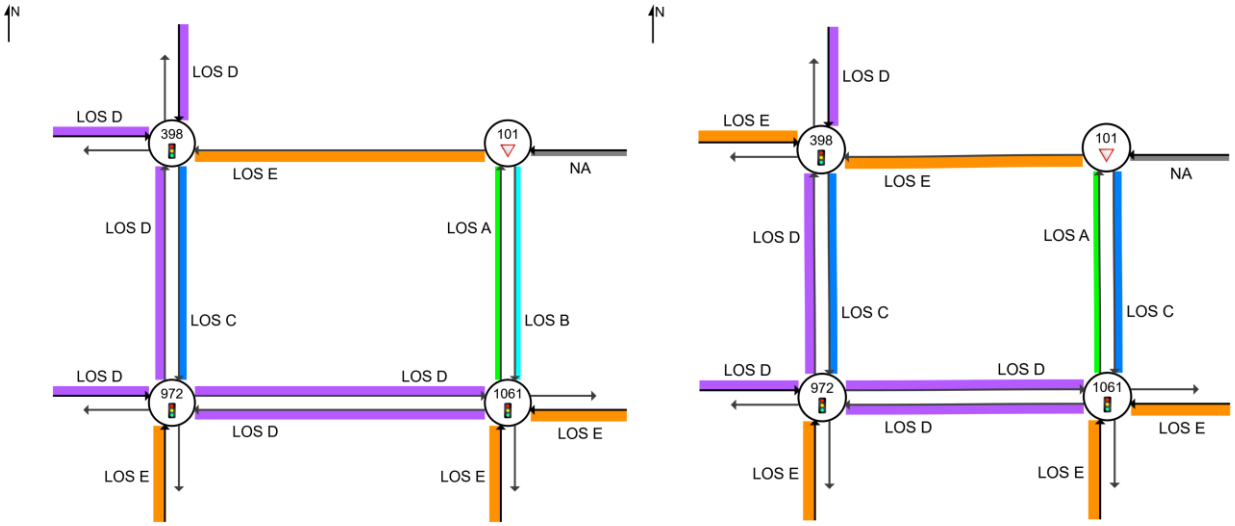
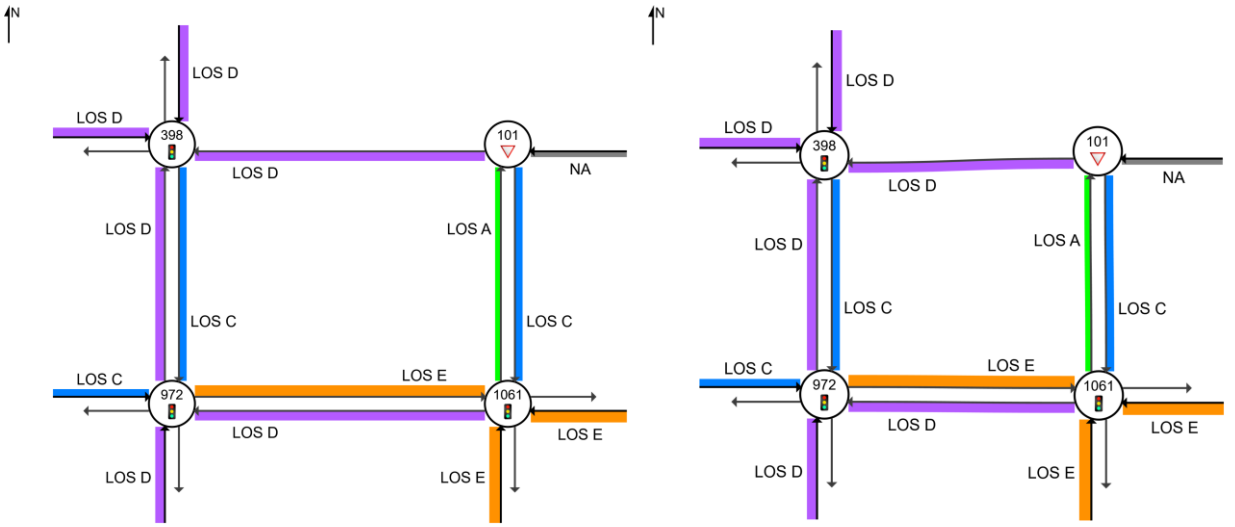


Figure 6-10 PM peak comparison – without redevelopment (left) and with redevelopment (right)



7 Discussion and Justification

A 'parking cap' is a concept that the Department of Planning, Lands and Heritage initiated for a number of Activity Centres in Metropolitan Perth. It restricts the number of parking bays available to an individual land parcel or Precinct to constrain parking supply and limit the impact of development on the operation of the road network. The level of parking is usually defined by modelling of the surrounding road network, including both background growth and local development expansion, and set such that significant network improvements are unnecessary. In this instance, the policy was predicated on the provision of significant network improvements, but there is no mechanism to adjust the parking cap without those improvements. It assumes road upgrades and the ability of public transport infrastructure to attract patronage, achieve mode share targets and meet travel demand.

The flat rate parking cap for the entire MAC precinct does not provide a response to factors such as possible differing land uses within the various sub precincts, priority for protection of 'pedestrian areas' and varying distances of different parcels of land from the Murdoch station. There should be consideration of variation provisions for developments where the parking usage characteristics and available access do not interfere with peak hour capacity.

It demonstrates that setting a suitable parking cap is an intricate process and one that should be flexible and adaptable in the face of growing development and changes in the transport environment.

The key points from this analysis are:

- The delay of the full build out of the MAC Structure Plan has resulted in a lack of a mixed-use precinct, which was to comprise a range of destinations and development offerings. This means that all non-work journeys must be taken outside of the MAC, largely eliminating the opportunities for internal trips, and reducing the viability of non-driving modes.
- The implementation of Stage 2 will not occur until such time as an alternative solution for the location of the 'Park and Ride' facility is agreed. This facility, consisting of 1,154 parking spaces, is a significant contributor to the intensity of peak hour travel, comparable in scale to the entire generation from SJGMH.
- Transport network improvements, such as the South Street bus lanes, increased service provision, Rapid Transit Route on Barry Marshall Parade and improved pedestrian facilities are vital to support the objectives of the MAC. This infrastructure is still missing.
- While the above supporting infrastructure is missing, measures by the Hospital cannot hope to generate the level of mode shift required to support the constrained parking scenario.
- Standard practice for hospital parking is to provide approximately 3-4 spaces per bed. This is considered generally sufficient to accommodate both staff and visitor parking, but should only be considered as a basic benchmark for comparison. For reference, the on-site parking provision at the adjacent Fiona Stanley Hospital.

Hospital	Number of Beds	Number of Parking Bays	Ratio
Fiona Stanley Hospital	783	3,600	1:4.60
St John of God Murdoch	511 (beds only) **811 (beds & consultants)**	**1,892**	1:3.70 **1:2.33**

- The parking cap calculation was not based on the intensity of land uses but instead on the carrying capacity of the road network. That capacity has been increased substantially by the direct connection of Murdoch Drive to the Kwinana Freeway / Roe Highway interchange.
- The allocation of parking within the MAC is based on a crude measure of land area, rather than development potential or demand.
- The ultimate impact of the proposed redevelopment is very minor, due to the distribution of demand across the day and the relationship between directional distribution and high-capacity road infrastructure in the vicinity.

For all of these reasons, the current MAC parking cap structure, while a progressive and forward-thinking concept, cannot be considered fit-for-purpose. Rather than facilitating mode shift to alternative transport and preserving the integrity of the local network, it instead serves to stifle development. In the long term, these effects will presumably be mitigated once the promise of the MAC Structure Plan is delivered. But the factors that drive the success of that vision are outside of the control of individual land owners. Until then, vital service providers such as SJGMH will continue to need on-site parking to facilitate access.

The proposed redevelopment of SJGMH is therefore contingent on the construction of the proposed multi-deck car park, and the additional 472 bays it provides. This work will allow for substantial improvements to the operation of the campus, the legibility of access, and the provision of health services to the southern suburbs.

APPENDIX

B

PARKING MANAGEMENT PLAN

St John of God Murdoch Hospital

Parking Management Plan

CW1181000

Prepared for
St John of God Murdoch

2 November 2021

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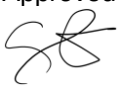

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Figures

1 Introduction

This Parking Management Plan (PMP) identifies strategies to optimise the parking within the SJGM site. It has been produced on the basis of a detailed parking demand model for SJGM Hospital and the surrounding land uses. This demand model includes consideration for the needs of different trip purposes.

The identified demand has been considered in the context of the existing and proposed public and staff supply to determine an optimised management structure for parking in the vicinity. Previous research undertaken by Cardno has identified the impact of various contributing factors to parking demand, in particular the effect of shift work, preferential parking and other allocation and usage effects. These impacts will be discussed where relevant, and included in the justification of parking supply and management.

1.1 Background

Cardno has been commissioned by St John of God Health Care to conduct a parking management plan for the St John of God Murdoch Hospital (SJGM) located in Murdoch. This plan details the current allocation, control and function of car parking management in addition to advice regarding future requirements for parking and changes required to parking supply, management and allocation for the Masterplan build-out horizon.

1.2 Geographical Context

The Site is located at the southern side of South Street, east of Murdoch University. SJGM is bounded by the major road corridors of South Street and Murdoch Drive; lesser roads Barry Marshall Parade and Fiona Wood Road. The location of the Site is shown in **Figure 1-1**. It is a 12-hectare site approximately 15 kms south of City of Perth, and it is located within the Murdoch Activity Centre Precinct.

Figure 1-1 Site location

Source: Metromap

1.3 Development Intent

The demand for physical and mental health services in the southern metropolitan area continues to grow rapidly and public sector hospitals are frequently overwhelmed. SJGMH can support the growing need for health services in the Southern Suburbs, through a series of expansion projects across the campus. This includes the following works:

> New Mental Health facility

> Two additional Operating Theatres

> One additional (30 bed) Ward

> Redesign of the Emergency Department to accommodate growing demand

> Upgrade of Surgicentre Day Surgery

> New Renal Dialysis service

> Additional Endoscopy Procedure Room and beds

While the majority of these improvements involve modifications within the existing structure of SJGMH, construction of the Mental Health Unit requires a considerable footprint, taking up land currently occupied by at-grade parking. This parking, and the additional growth in demand related to the redevelopment works, can be provided within a purpose-built multi-deck car park. The spatial orientation of the proposed redevelopment is shown below, **Figure 1-2**.

Figure 1-2 Hospital redevelopment plan

2 Existing Parking Demand (2021)

The following Parking Management System has been determined based on the results of detailed analysis for the existing function, as detailed below.

2.1 Parking Supply

The current form of allocation provides dedicated parking to individual groups, with staff, doctor and public parking maintained in separate areas.

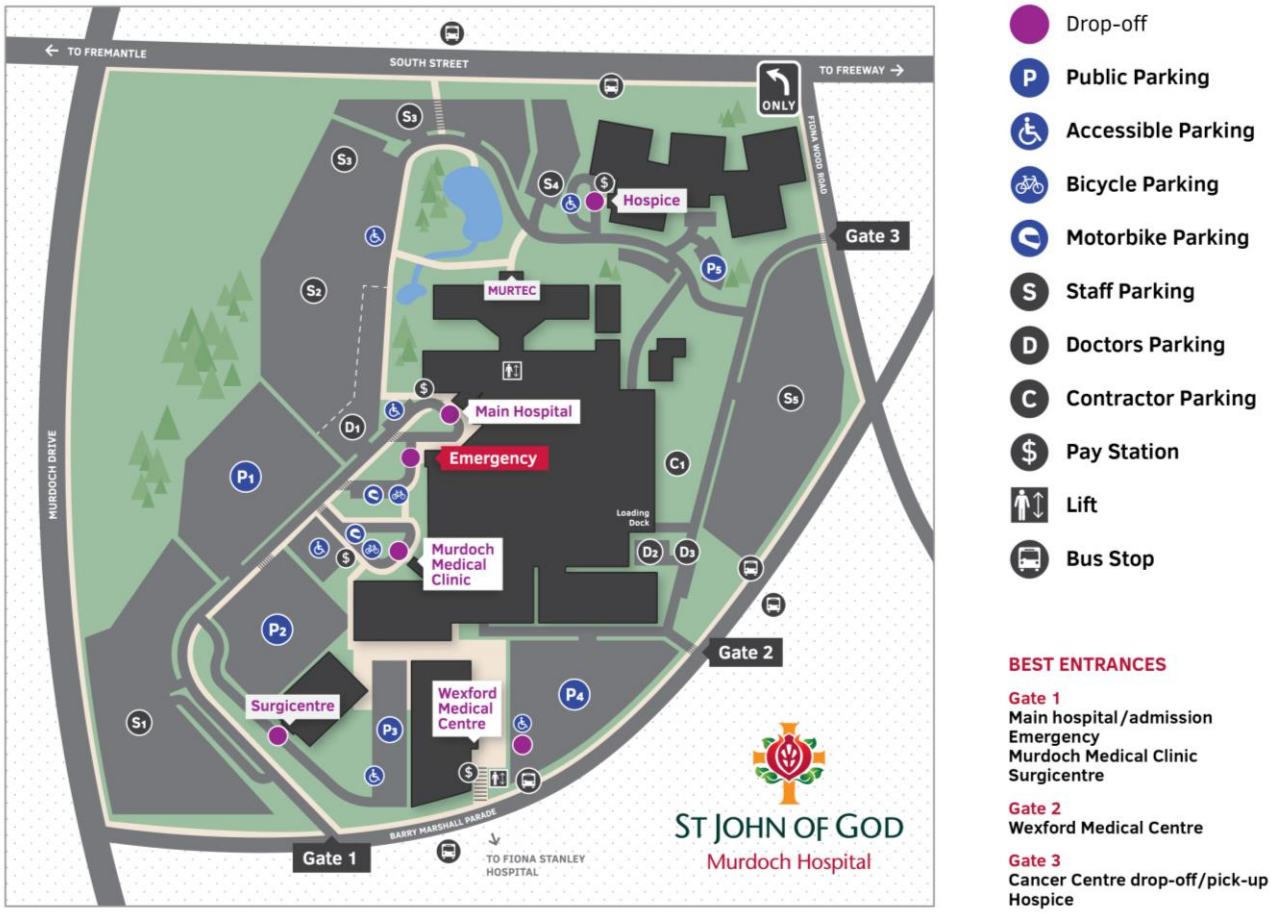
A summary of existing parking allocation is given below, **Table 2-1**.

Table 2-1 Current parking allocation

Group	Allocation
General Staff Parking	
S1	224
S2, S3 & S4	518
S5	203
Medical Clinic	48
Wexford Clinic	89
South Wing	53
Contractor Bays	*14*
Staff Parking Total	**1,149**
Doctor Parking	
D1	75
D2 & D3	40
Doctor Parking Total	**115**
Patient/Visitor Parking	
P1	258
P2	127
P3	56
P4	134
P5	53
Patient/Visitor Parking Total	**628**
Hospital Parking Total	**1,892**

Figure 2-1 shows the location of this parking across the SJGMH campus prior to redevelopment.

Figure 2-1 Parking location map



2.2 Parking Management

The existing parking management regime provides gated access control via a ticket system for visitors and swipe card access for staff.

All parking is paid across the site, with visitors paying $3.00/hour (long-stay passes are available at a reduced rate) and staff paying $3.60/day.

2.3 Parking Demand

Parking access data was analysed to identify existing parking usage, across all staff and visitor car parks. Information was provided for all visitor entry/exit data and staff entry data for the one-month period between Saturday 1 May 2021 and Monday 31 May 2021. This data included time, location, visitor ticket number, Staff ID, access profile and more.

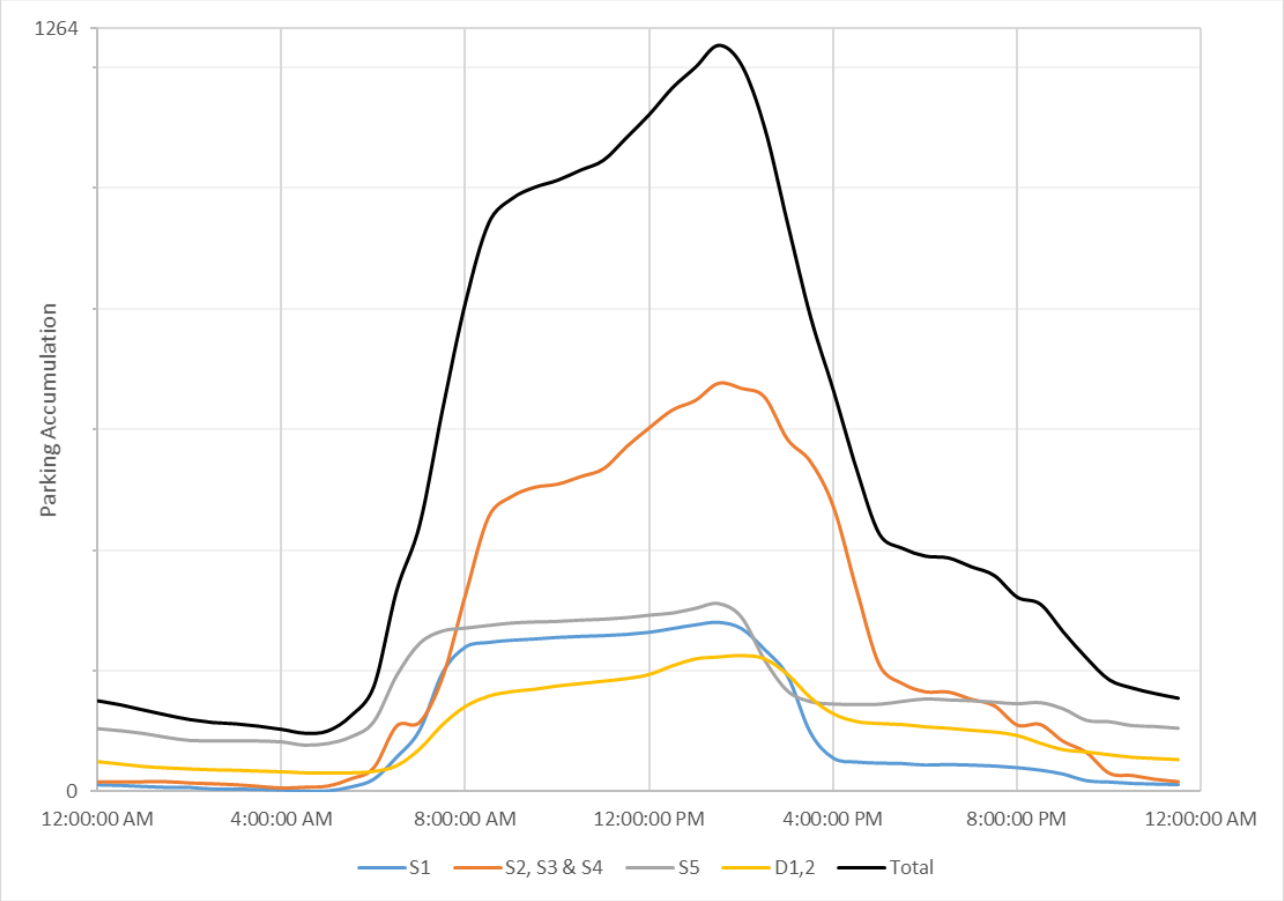
The density of information allows for a fine-grained understanding of the existing parking needs of the campus, and has been related to both the service provision, staffing level and parking supply to allow for future impact assessment.

The following charts are a synthesis of the data available from the parking control system.

2.3.1 Staff parking occupancy

The demand for staff parking is highest during the weekdays, dropping off substantially on Saturday and Sunday. **Figure 2-2** shows the profile for staff parking demand at the SJGMH campus.

Figure 2-2 Staff parking accumulation – average weekday



This profile is fairly typical of a large hospital. It is characterised by a relatively slow arrival period, which is the effect of morning and day shift times, levelling off through the midday.

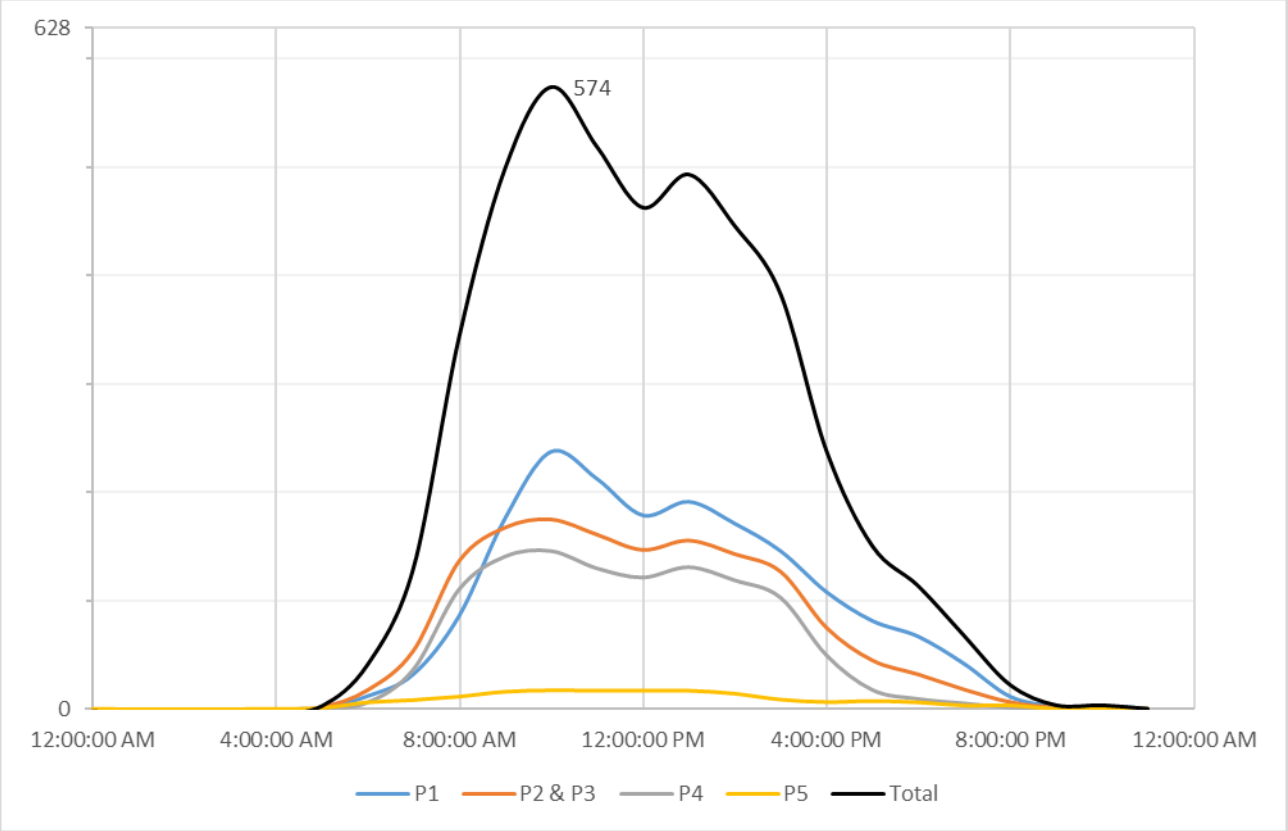
A distinct afternoon peak demand is also evident, which corresponds to the overlap period between the start of the afternoon shift and the end of the morning shift. This overlap period is vital for safe and effective handover, as well as a number of critical hospital functions. However, there is a significant impact on the efficiency of staff parking. As shown above, approximately 200 additional spaces are necessary to accommodate the shift overlap.

Most relevant to the operation of the on-site parking, the *average* peak parking demand across the Site is shown to approach the total parking supply. Some individual days clearly indicate demand exceeding available supply, requiring staff to queue and wait to start work.

2.3.2 Visitor parking occupancy

Visitor parking demand tends to be distributed fairly evenly throughout the day, with the greatest demand occurring in the mid-morning, as shown below in **Figure 2-3**.

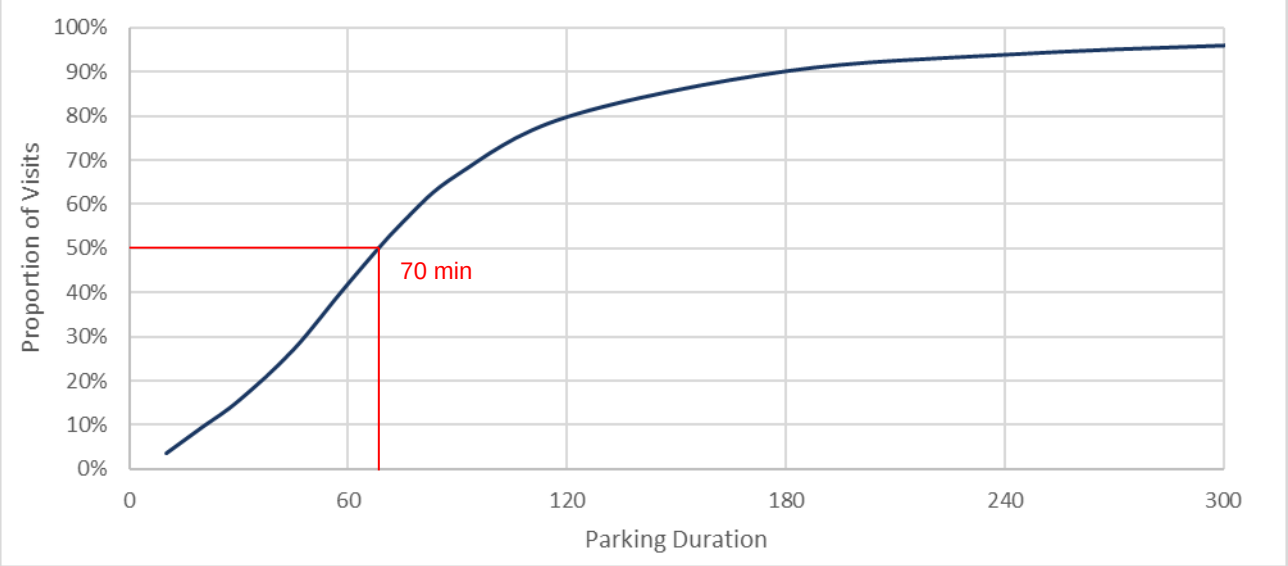
Figure 2-3 Visitor parking accumulation – average weekday



The current demand for parking is effectively sitting at practical capacity, being approximately 90% of the total visitor parking supply during the average day.

Visitor duration of stay is generally fairly short, with a median stay of about 70 minutes (as shown in **Figure 2-4**). This allows the SJGMH car park to support visitation by approximately 3,500 visitors access the campus each day.

Figure 2-4 Visitor parking duration of stay



The current arrangement of car parking, which comprises 5 distinct parking areas, is not as efficient as a single combined car park. The consequence of this is that connections between parking and hospital destinations are closer, but individual car parks may experience considerable stress even while parking remains available in other locations on the campus. The proposed SJGMH redevelopment would address this inefficiency by improving connection through the campus by opening up the internal 'ring road' and by consolidating visitor parking.

One noticeable feature of the parking accumulation chart above: afternoon parking requirements are markedly lower than the mid-morning peak. This occurs at the same time as the afternoon overlap shown in the staff parking profile.

Unfortunately, there are no mechanisms that can be used to effectively and consistently share parking between afternoon shift and visitors. As such, a segregated supply remains the appropriate allocation of parking across the site, despite the inherent inefficiencies. This should also be considered in the context of the potential trip generation for parking; an increase in parking supply does not necessarily result in an increase in trips (for example, if that parking is provided for exclusive use by afternoon shift staff, no peak period trips are generated).

3 Projected Parking Demand

The extent of development identified in **Section 1.3** is considered to be equivalent to an additional 118 beds, requiring 472 parking spaces, based on the following **Table 3-1**. The growth in visitor and staff parking associated with each component of works has been determined based on current behaviour, and including reasonable best-practice operational efficiencies.

Table 3-1 Parking supply growth

Expansion works	Visitor Parking Requirement	Staff Parking Requirement
Renal Dialysis	25 bays	19 bays
Mental Health	96 bays	130 bays
Endoscopy	20 bays	17 bays
Wards & Theatre Expansion	34 bays	58 bays
Radiation Oncology	42 bays	30 bays
Total	**217 bays**	**255 bays**

The addition of these parking bays would take the total supply on-site to **2,365 bays**, allocated approximately as follows:

- 1,450 general staff parking bays
  - Including 250 bays dedicated for afternoon shift parking
- 165 doctors/specialist parking bays
- 750 visitor parking bays

This represents an increase in staff parking supply of 28% and an increase in visitor parking supply of 20%. This is intended to support both the increased need for parking and support better on-site efficiency.

Note that this means the actual parking demand does not increase at the same rate. Current parking is significantly over capacity during peak periods, and therefore does not operate as intended. The ultimate goal would be to improve access to parking for staff and visitors who need it, while maintaining a system that functions at or near its practical capacity (approximately 85-90% full during standard peak periods). As such, the future peak occupancy of on-site parking is expected to increase by only 10-15%.

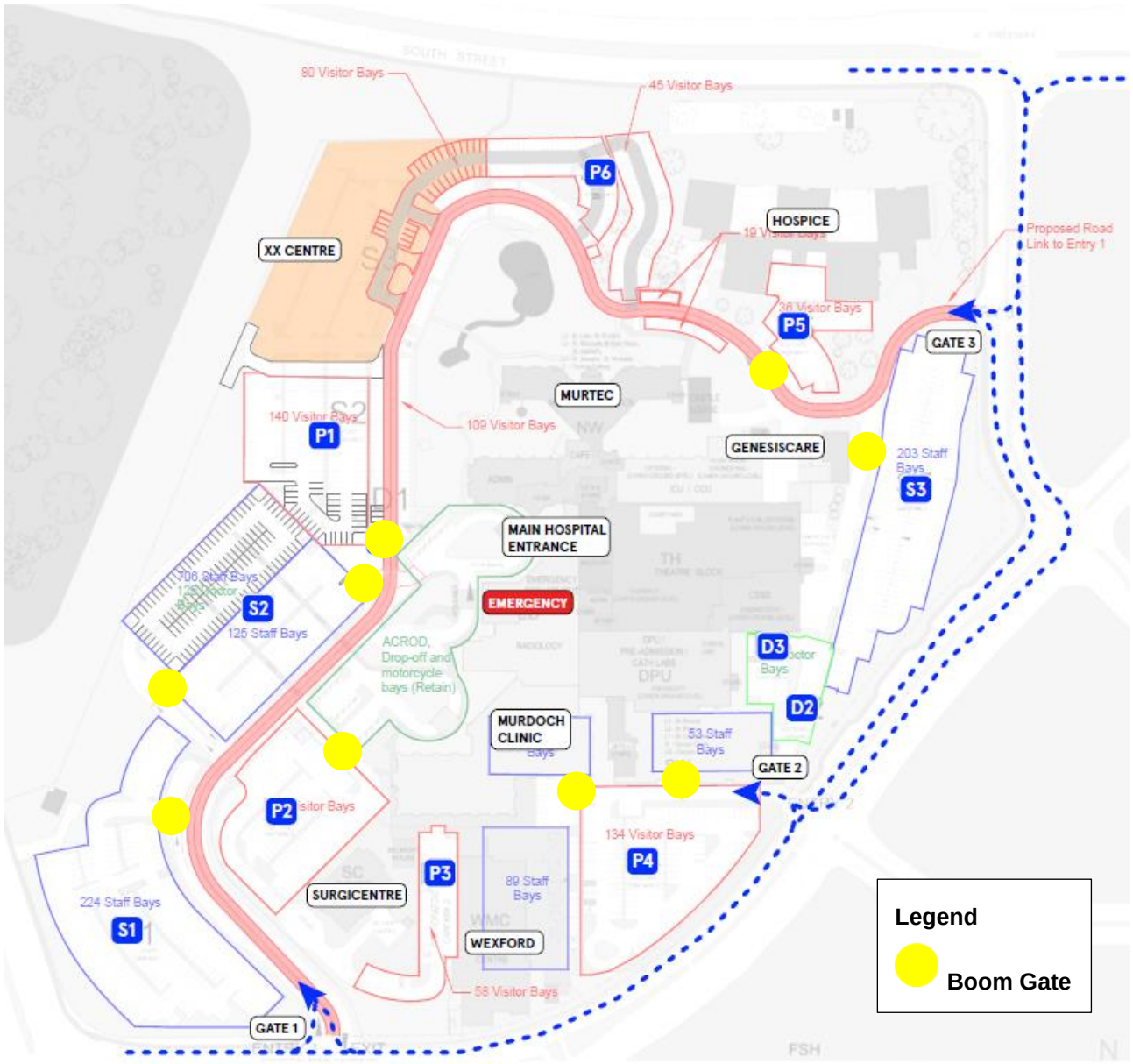
4 Access and Parking

4.1 Access Controls

The existing parking management regime provides gated access control via a ticket system for visitors and swipe card access for staff. This would be maintained and improved as part of the redevelopment, including the modification of the internal access road to create a complete internal 'ring road' providing connection to all potential destinations.

Figure 4-1 shows the proposed boom gate locations within the Hospital campus.

Figure 4-1 Proposed boom gate locations



These gates will integrate with the existing parking system, which operates via pay-on-exit for visitors and swipe card access/egress for permitted staff. The structure has been determined to maximise the legibility of visitor parking, by locating the majority of bays in the centre of the campus (P1, P5 and P6). Existing visitor car parks have been retained adjacent to key destinations:

- P2 next to the Surgicentre;
- P3 next to the Wexford Clinic; and,
- P4 next to the Murdoch Clinic and Wexford Clinic.

Conversely, staff parking has generally been retained at the periphery of the campus.

4.2 Car Parking Provision and Allocation

The proposed system will continue to provide dedicated parking to individual groups, with staff, doctor and public parking maintained in separate areas. In addition, a supply of quarantined afternoon shift parking is provided within the new multi-deck car park to ensure accessible and legible parking is available during the critical shift-change period.

A summary of the proposed parking allocation is given below, **Table 4-1.**

Table 4-1 Parking allocation

Group	Allocation
General Staff	1,450 (including 250 bays accessible only after 12 noon)
Doctors/Specialists	165
Visitors	750
Total	2,365

In addition to these parking bays, the hospital provides a number of specialty bays which fall outside of the parking cap, including:

- 33 disabled parking bays;
- 9 emergency call out bays;
- 11 pick-up/drop-off bays (15 min only);
- 22 motorcycle/scooter bays; and
- 4 loading bays.

4.3 ACROD/Motorcycle/Emergency/Loading/Drop Off and Pick Up Bays

The majority of ACROD, motorcycle, emergency call out, loading bays and 15-minute drop off/pick up bays will continue to be located at the Main Hospital entrance (**Figure 4-2**).

This area sits outside of the controlled access parking system and does not require swipe access or parking fees. This is specifically intended to improve the accessibility of parking for critical users – in particular doctors and specialists on emergency calls that require immediate attention.

Figure 4-2 Location of uncontrolled bays

ACROD bays have been clustered in two main locations, at the Main Hospital entrance and adjacent to the Medical Clinic. This maximises the legibility of these bays, reducing the search time for disabled patients and visitors. In addition to these primary destinations, ACROD bays are also provided at key building entrances throughout the campus.

The ACROD bays are constructed with appropriate signage, line-marking and symbols in accordance with Australian Standards (AS2890.6). ACROD bays may only be used by drivers who display the relevant permit.

Motorcycle bays are located within staff and doctor parking and at the Medical Clinic (12 bays).

The Loading Dock area provides 2 of the 4 loading bays and five short-stay delivery bays, restricted to 15-minutes.

4.4 Drop off/Pick Up Areas

Drop-off/pick-up areas (**Figure 4-2**) are intended to allow visitors to quickly drop-off and pick-up patients at the respective entrances to the hospital. Dwell times at these areas are short (enough time for patients to safely enter and exit a vehicle) with a strict no parking rule implemented at these areas (currently signs are placed at the entrances of these drop-off/pick-up areas.

No changes are proposed to this arrangement however, if compliance at these locations is poor, additional staff/security will be assigned to these locations to prevent drivers from parking or staying for extended periods.

4.5 Bicycle Parking and End of Trip Provision

Racks are located adjacent to buildings in most cases although an audit should be undertaken to identify whether these racks are well placed in terms of access to building entrances and passive surveillance, and provide secure parking options for those with different bike styles. There is a bike rack outside the Main Hospital entrance.

There are a total of 216 bike parking spaces located across the Site;

- 126 spaces in the end of trip facilities
- 16 spaces in Carpark P3 and 14 spaces outside main entrance
- 48 spaces at Wexford Medical Clinic
- 26 spaces at Murdoch Medical Clinic

The hospital has a centralised bicycle parking area located near the security office on the lower ground floor and is undercover, well lit, and secure. It is a short walk from change rooms and lockers on the Lower Ground Floor.

In addition to the lockers provided generally to staff, there are 92 lockers available in the men's change rooms, and 92 in the women's change rooms. These lockers are available for permanent staff members by application. There are three showers in the men's change room and four showers in the women's change-room, plus 2 showers each for men and women in the Wexford Centre.

4.6 Sustainable Modes of Transport

The campus has good access to public transport facilities, cycling and pedestrian facilities. These facilities support sustainable travel by visitors and staff members, which help reduce the parking demand for the proposed development.

A shift towards active modes, such as is proposed in the Green Travel Plan, requires well-maintained, high-quality end-of-trip facilities to encourage cycling and walking.

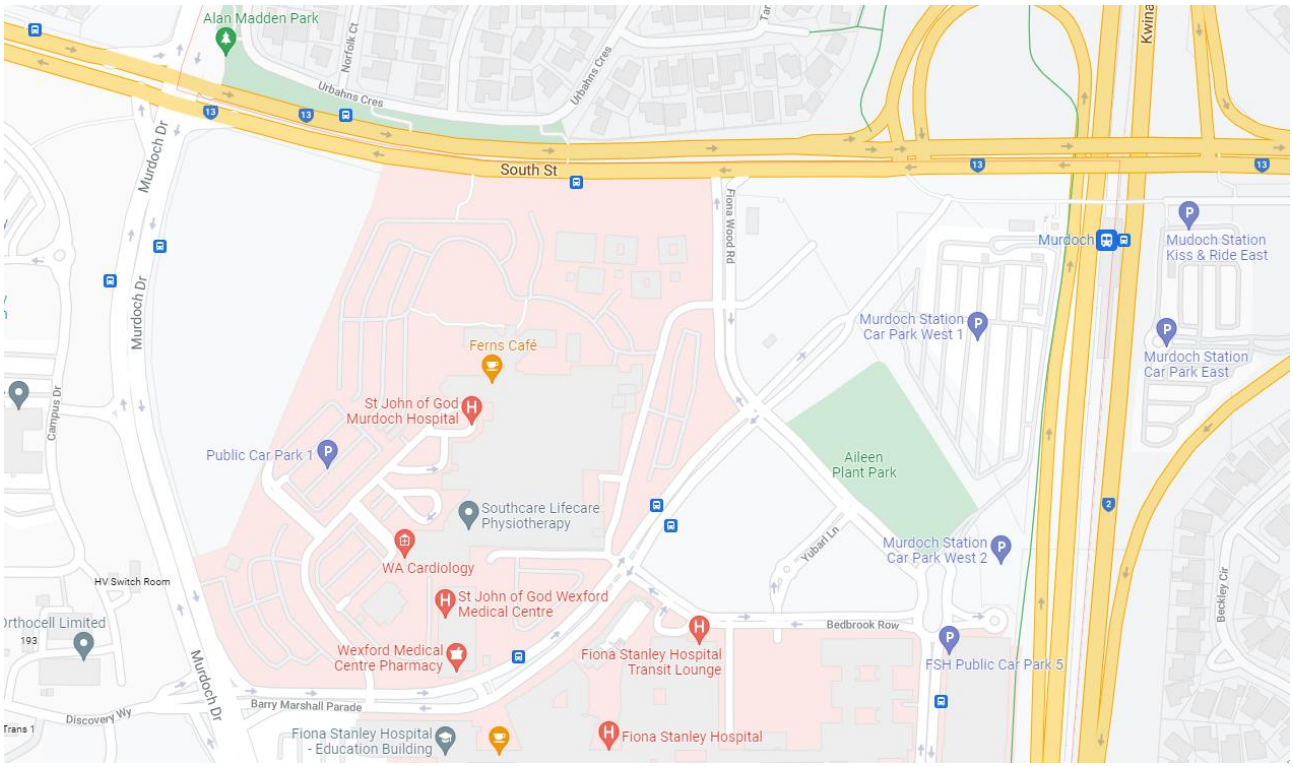
4.7 Public Transport Facilities

There are a number of bus stops located on major road corridors such as South Street and Murdoch Drive. The availability of bus stops along Barry Marshall Drive results in easy access to high frequency bus services that feed into Murdoch Train Station.

However, public transport accessibility to a wide catchment of home locations is still difficult for staff working outside of core hours, or staff that need to incorporate other destinations into work trips.

A locational map of nearby bus stops is provided in **Figure 4-3.**

Figure 4-3 Bus stop locations



Source: Google Maps

4.8 Pedestrian/Cycle Networks and Facilities

The Site is surrounded by numerous walking facilities and is accessible via:

> Pedestrian walkways permeating the Site providing accessibility to hospital facilities;

> Pedestrian priority on internal roads; and

> Access from South Street between Fiona Wood Road and Murdoch Drive.

The Site is located near to the Kwinana Freeway PSP, though connections through the MAC are much less developed, consisting of unprotected and unsheltered on-street bike lanes adjacent to traffic. Once inside the site, cyclists can utilise the low speed internal road network to reach bicycle parking destinations.

Source: Department of Transport

5 Parking Management Options

Parking is the most perceptible traffic problem around hospitals and one that elicits serious concern from their administrators. A parking shortage at a hospital can affect employee recruitment, may impede access to the hospital, and may strain the relationship between the hospital and the surrounding community. This section of the report will focus on general recommendations to maximise parking and ensure it is managed effectively.

5.1 Supporting Mode Shift

This involves the promotion of alternative transport modes as a replacement for driving. Incentives / strategies such as the promotion car-pooling, incentives for cycling, walking, public transport use or workplace Travelsmart programmes. These modes play a crucial role in meeting future transport requirements and forms an essential part of the Parking Management Plan.

The mode share targets shown in **Table 5-1** are supported by the Hospital's *Green Travel Plan 2021*, with delivery of near-term 2026 targets related to the implementation and uptake of incentives for staff.

The long-term objectives have been chosen to align with the vision for the Murdoch Activity Centre. Achieving these ambitious targets requires substantial infrastructure support in the form of high-quality, high-capacity public transport, comprehensive and attractive pedestrian/cycling routes and a high degree of integrated development which can foster a significant proportion of internal trips. The Action Plan can be found in **Appendix A.**

Table 5-1 Mode share targets

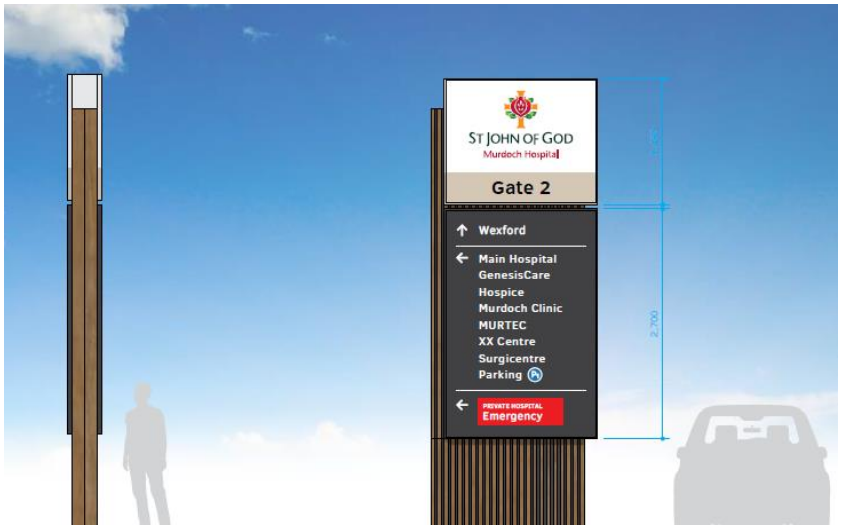
Mode	2011	2021	2026	2031
Car Driver	87.4%	86.3%	75.0%	45.0%
Car Passenger	2.0%	1.5%	2.1%	3.0%
Public Transport	7.8%	8.6%	18.4%	32.0%
Walk/Cycle	2.8%	3.5%	4.4%	20.0%

5.2 Improve User Information and Marketing

This would include information for users about parking availability and alternative parking options. Particularly useful if there is a perceived parking shortage and space is actually available elsewhere on the site or in the area).

5.3 Wayfinding and Signage

Figure 5-1 Proposed external wayfinding signage design



Source: ID Laboratory

The effectiveness of parking is greatly improved through supplying better information to users. This information is typically provided in a range of media, including maps, mobile applications, static and dynamic signage and prominent parking information.

An External Wayfinding Signage Design and Strategy has been developed by ID Laboratory as part of the redevelopment plan (**Figure 5-1** above).

The general strategy is to direct traffic to all internal sites from Gate 1 (Barry Marshal Road near Murdoch Drive entrance) and Gate 3 (Fiona Wood Road near South Street entrance) via the internal ring road. This simple overarching direction allows for a flexible and robust system that is legible even to unfamiliar users.

5.4 Enforcement of Visitor Hours

Visiting hours at SJGM are theoretically between 3:00pm and 8:00pm, with the exception of the Maternity and Critical Care Units. In addition to ensuring that clinical care needs can be delivered through the day, these visitation restrictions reduce the overlap between visitor demand and staff parking requirements during the busiest part of the day. A 'bump' in staff demand of approximately 160 bays was observed across the campus between noon and 2:30pm. This restricts parking availability during this time.

If visitation were limited, then this could allow for shared use of some parking bays between morning staff and visitors. The extent to which this would reduce parking requirements is not clear from the data available.

5.5 Potential Parking Priority System

It is recommended that SJGMH investigate the application of priority and permit systems to manage parking. Parking permits would be allocated generally within two tiers, consisting of key user groups and limited impact parking, plus staff with limited alternative transport options (Priority Group 1), and staff more able to shift to other modes or parking locations (Priority Group 2).

This methodology is similar to the successful system implemented by QEII Medical Centre between 2011 and 2019.

5.5.1 Priority Group 1

- Shift worker permits would be provided to all appropriate staff and would allow for parking to the shift car park after a given start time (nominally 11:30am). Night shift demands do not impact on core-hour capacity. A similar form of permit could be used to support very early start times (kitchen staff etc. who would not have access to alternative transport options).
- Car pool and limited-use permits: these are likely to represent a very small segment of the overall demand and are generally considered to have little impact on core-hour parking. However, the travel demand management (TDM) function of these permits makes them worthwhile.

  This component relies on formal car pooling initiatives by SJGMH, which have been identified in the Green Travel Plan.
- Consultants, specialists etc. can be given parking permits at the discretion of management. The structure of parking described above allocates two areas specifically for key staff who are critical to hospital operations: at the Ground Floor of the new multi-deck car park, and in the existing D2/D3 car park located to the east of the Main Hospital.
- On-call permits would be provided to the appropriate staff and managed to ensure equitable use of the on-site parking quantum, currently located next to the Emergency entrance. An audit procedure is recommended to ensure parking privileges are not abused. A periodic review of on-call permit use is recommended, with inactive (or over-active) parking permissions removed from staff.
- Exceptional permits: allocated on a temporary basis, would allow for management to accommodate the needs of staff and address work/life balance. Because these permits are discretionary, they should be given out only temporarily (in recognition of illness or injury etc.)
- Temporary permits: allocated on a short-term basis for use by visiting professors/consultants, VIPs etc.
- Couriers, delivery vehicles and other short-stay parking functions would not need permits, as this activity would take place within dedicated short-stay parking zones outside of access control points, or supported via an intercom system.

- Motorcycle permits may be issued without impacting on core-hour capacity, so long as sufficient motorcycle parking bays are available in convenient locations.

The provision of parking permits for staff who need to drive to collect children from day care or other similar needs is potentially possible, but without knowing how many permits would be issued, and with no known way of administering them, it is not considered feasible from a management standpoint.

Many of these requirements will ultimately be addressed by the development of the nearby MAC Mixed Use Precinct, which would provide local opportunities for trip chaining, including child care services.

However, there could be flexibility within the proposed Exceptional Circumstances Permits to allow organisations to address work/life balance issues in the meantime.

5.5.2 Priority Group 2

The remainder of the parking quantum can be allocated to core-hour staff (morning and day shift) such that the demand for parking by both Priority Groups is equivalent to the supply.

5.6 Parking Fees

Paid parking should continue for staff and visitors, with consideration made to increasing the fees as a disincentive for driving. The current Green Travel Allowance allocates $6/day to staff who choose to arrive on campus by a mode other than by car.

A proportion of parking fees could be allocated to a hypothecated fund, to be used for improving active transport facilities or to contribute to the incentive scheme.

6 Parking Compliance and Enforcement

6.1 Staff/Visitor Feedback

Feedback from staff and visitors on the Site will provide a good indication of parking compliance. A reporting system shall be implemented to allow staff and visitors to easily report any parking non-compliances occurring on Site (e.g. filling out a form, online reporting and/or reporting via phone/in person.)

6.2 Monitoring the Car Park

The security staff shall be tasked with patrolling the car park areas periodically to ensure compliance with the parking conditions and restrictions on-site and also report damaged or worn out signage.

6.3 Demonstrating Compliance

A warning will be issued to those who fail to comply with the conditions and restrictions set for the parking area. Multiple offences will incur further disciplinary action which may include having the vehicle towed off the Site or a fine issued (e.g. currently, any caregivers, doctors, contractors or medical suite staff caught parking on a footpath or crosswalks receive a written warning on the first occurrence with subsequent occurrences resulting in the removal of their parking privileges for 6 months.) Any non-compliances should be kept on record and an annual/biannual review should be conducted to determine the effectiveness of the implemented parking management plan.

Modification to the Parking Management Plan should be made if further restrictions are required to ensure compliance.

6.4 Review of Parking Management Plan

The measures implemented in the PMP should be reviewed periodically (ideally once every 12-18 months) to evaluate which management measures were most/least effective. This allows for the inclusion of new measures and modifications of existing measures (including parking pricing adjustments) to improve parking management.

7 Safety and Security Measures

Given the nature of hospitals developments, it is common to have staff on-site throughout all hours of the day to keep the hospital operating. Therefore, it is important to ensure that staff feel safe and secure when walking to and from their vehicles, especially during late night periods.

7.1 CCTV Cameras

CCTV cameras should be installed in the car park to provide an additional layer of security and surveillance throughout the car park, as required. The placement of any CCTV cameras should cover all areas of the car park and ensure that there are no blind spots.

7.2 Monitoring the Car Park

The building caretaker or security staff shall be tasked with patrolling the car park areas periodically and using the CCTV system to monitor any suspicious behaviour and ensure that visitors and hospital staff feel safe and secure when entering and leaving the Site.

7.3 Lighting

Walking routes to staff parking areas should be appropriately illuminated to provide a sense of security.

8 Conclusion and Recommendations

This Parking Management Plan outlines the recommended on-site management measures to address the parking demands of the proposed development at SJGM Hospital, including:

- Support for mode shift through implementing the Green Travel Plan, and continuing the Green Travel Allowance;
- Access controls through the use of boom gates and swipe access for staff;
- Improved wayfinding and signage to clearly identify the parking locations;
- Enforcement of visitor hours;
- Potential parking priority system;
- Parking fees; and
- Improve information and communication for transport options.

APPENDIX

C

GREEN TRAVEL PLAN

Green Travel Plan

St John of God Murdoch Hospital

CW1176100

Prepared for

St John of God Murdoch Hospital

22 September 2021

Cardno

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Executive Summary

Cardno has been engaged by St John of God Murdoch Hospital (SJGM) to develop a Green Travel Plan. The stated objectives for this study are as follows:

- Identify potential for mode shift for staff and visitors;
- Identify benefits, opportunities, potential barriers and potential risks to an increase mode shift to sustainable transport options;
- Liaise with staff and visitors to set out and prioritise actions to facilitate a mode shift; and
- Set out an Active Travel communication plan and a monitoring framework to measure uptake.

A number of policy documents were reviewed to develop a picture of future planning in the Murdoch Activity Centre (MAC).

The intention is to develop the wide Murdoch Activity Centre as a transit hub, providing efficient connection between the centre and other significant centres, and within the centre itself. The aims of this Travel Plan (TP) are aligned with these plans and policies.

A wide variety of stakeholders were contacted for this study including key hospital staff, surrounding local governments and government transport agencies.

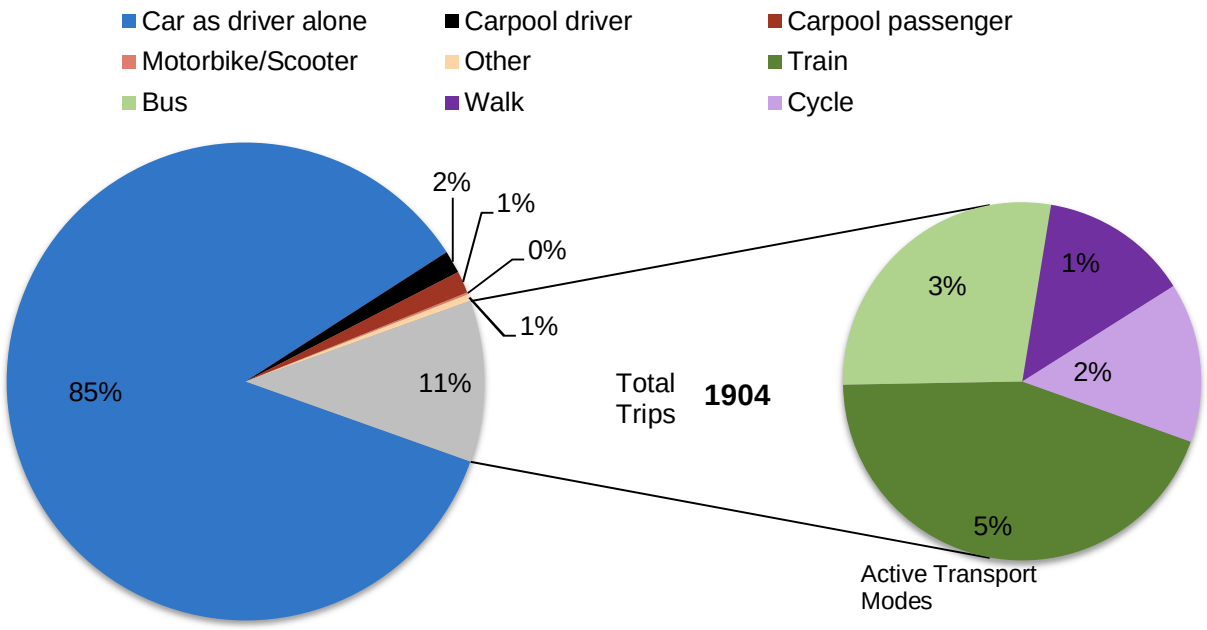
A workshop with internal SJGMH stakeholders raised the following topics in relation to the Travel Plan:

- Driving and parking
- Public transport
- Cycling & walking
- Policies and practices
- Success factors
- Communication plan.

External stakeholders identified a number of considerations for travel to and from the site. In particular, the importance of high-quality regional cycling connections was raised by the City of Cockburn. This network is anticipated to be improved by the implementation of the Long-Term Cycling Network for Perth and Peel region.

A travel behaviour and attitude survey identified current patterns of travel for staff accessing the hospital site. The survey identified that the quality and convenience of the connection between the hospital and Murdoch Station for pedestrians, cyclists, and people catching the bus is a barrier to sustainable transport modes. The current breakdown of mode of travel for staff commuting to SJGM Hospital is shown in **Figure 1-1.**

Figure 1-1 SJGM Staff Mode of Travel to/from Work



Three objectives were revealed for the TP through engagement with stakeholders internal and external to the hospital, through policy review, and via survey of travel behaviour of staff and visitors.

1. To manage and reduce the demand for parking at St John of God Murdoch Hospital;
2. To ensure high levels of accessibility to and from the site for all; and
3. To support physical and mental health and wellbeing through the promotion of active transport modes.

In their 2011 Travel Plan, St John of God Hospital Murdoch identified many benefits associated with promoting the TravelSmart program. These include:

> decreased pressure on parking availability;
> decreased parking maintenance costs;
> potential increase in employee health, satisfaction and productivity; and
> a reduction in the organisation's environmental footprint.

These objectives provided direction in the selection of suitable mode share targets for 2026 as follows:

Mode Share Targets

Mode	2011	2021	2026	2031
Car Driver	87.4%	86.3%	75.0%	45.0%
Car Passenger	2.0%	1.5%	2.1%	3.0%
Public Transport	7.8%	8.6%	18.4%	32.0%
Walk/Cycle	2.8%	3.5%	4.4%	20.0%

Short-term Actions

A number of short-term actions have been identified in this travel plan to achieve these mode share targets. These actions are either fundamental to the success of the travel plan, or are quick wins that can be implemented relatively easily and/or cheaply to support travel behaviour change. These include:

- Appoint a Travel Smart Coordinator
- Gain endorsement of the Travel Plan by the Board
- Initiate communications relating to Travel Plan launch, and identifying regular opportunities (ideally quarterly as a minimum) for communicating the outcomes of the Travel Plan activities
- Engage with the Your Move program and forums to collaborate and share ideas on travel behaviour change
- Create and collate Travel Smart and transport related materials (hard copy and online, including the SJGMH website). Ensure availability for specific groups such as the Culturally and Linguistically Diverse (CALD) group.
- Launch this plan to senior staff about sustainable transport and the principles behind it
- Launch this plan to SJGM community at large
- Monitor usage of bike racks, car parks; parking permit data; parking infringement data; bus stop patronage data; participation in events and Travel Plan Coordinator enquiries
- Include transport and travel information in new staff welcome packs
- Develop a short 1-2-line reference regarding sustainable transport that can be used on all hospital events.
- Create targeted communications for staff who live within a five km radius to identify further opportunities for walking and cycling
- Ensure end of trip facilities meet Australian Standards/Guidelines
- Set up routine scheduling for maintenance of end of trip facilities, including emptying of bike lockers, bike compounds and removal of old locks from racks.
- >Audit walking and cycling facilities between the PSP, external roads, train station and the hospital as this was noted as being particularly unclear for walking and cycling movements
- Consider bike part vending machine or internal shop to sell locks, bike tyre repair kits, personal items etc.

A flexible Communication Plan has been devised to assist in keeping the Travel Plan and its measures front of mind, while recognising that a TP is a living document which should be able to respond to changes in circumstances relating to transport, and communicate a diverse range of topics to the SJGMH community. An indicative review process has also been defined to plan regular travel surveys and monitoring activities which will help to track mode shift and identify any measures which need review.

In summary, there are many opportunities to convert single occupancy vehicles to more sustainable and active modes, and implement policies which support it. The mode share targets support those of the wider MAC, and the hospital as it grows.

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Appendices

Tables

Figures

1 Background

Cardno has been appointed by St John of God Murdoch Hospital to prepare a Travel Plan (TP) for the St John of God Murdoch Hospital (SJGM). This TP has been produced taking the following into account:

- The location of the hospital within the MAC which is planned to be home to a number of significant trip attractors.
- The future growth of services at SJGM including a new Mental Health facility.
- The existing demands on the supply of parking at SJGMH from staff, visitors and nearby facilities.

This Travel Plan provides a comprehensive document which set out:

- Realistic mode share targets for staff;
- Robust measures based on extensive stakeholder engagement;
- A plan to communicate these actions to the hospital community; and
- A framework by which to monitor progress against the actions and targets.

1.1 Why a Travel Plan?

Hospitals or heath campuses are major generators of traffic. Traffic congestion with growing car parking demand is a common problem for hospitals, affecting their accessibility and efficiency. The preparation, adoption and implementation of a Travel Plan by SJGMH is primarily being motivated by the issue of insufficient parking supply to meet unconstrained parking demand, particularly by staff.

Workplaces need to ensure that staff have appropriate incentives to choose alternative transport modes and by working to improve these alternatives, organisations can achieve significant success.

What is the purpose of a Travel Plan?

- Improve access/address parking problems (e.g. free up car bays for visitors)
- Reduce organisation's carbon footprint
- Promote employee health and wellbeing
- Engage whole organisation in corporate sustainability initiative
- Show leadership in community/industry sector

Benefits and cost savings from implementing a Travel Plan include:

- Efficient allocation of parking
- Reducing the traffic congestion that would otherwise result from unconstrained parking supply
- Managing the impacts of more intense development on the site by prioritising more efficient and environmentally friendly transport modes
- Redirecting space and resources from parking on site to a focus on core activities (i.e. health care, research and education)
- Providing equitable access to the site for non-car owners and non-drivers
- Happier and healthier staff, reducing turnover and lost productivity (e.g. sick days)
- Creation of a 'greener' image for the hospital

1.2 Study Objectives

The stated objectives for this study are as follows:

Table 1-1 Study Objectives

Objectives	Addressed in Section
Identify potential mode shift for staff	**Section 5**
Identify the benefits, opportunities, potential barriers and risks to an increased mode shift to sustainable transport options	**Section 1.3**
Set out and prioritise actions to facilitate mode shift through engagement with SJGM staff and visitors	**Section 7**
Set out an Active Travel Communication Plan and a monitoring framework to measure uptake	**Section 8**

1.3 Benefits, Opportunities, Barriers and Risks from Mode Shift

There are a number of benefits, opportunities, barriers and risks associated with mode shift, revealed through engagement with stakeholders internal and external to SJGM Hospital, through policy review, and via survey of travel behaviour of staff. These include:

> Benefits
  - Improved health outcomes associated with physical activity
  - People using active transport can contribute to safety by being ‘eyes on the street’
  - Reducing the number of trips taken by private vehicles can reduce carbon emissions and result in improved air quality
  - Reinforcing the hospital’s position as a leader in sustainability issues with a reduction in the organisation’s environmental footprint
  - Decreased pressure on parking availability
  - Potential increase in employee satisfaction and productivity

> Opportunities
  - Improving connection to Murdoch Station by various modes, including public transport
  - Provision of shade and weather protection
  - Investigating a bus stop near the hospital entrance to reduce walk time
  - Support improvements to cycling and walking routes to the hospital through the MAC (may include additional wayfinding, shade and weather protection)
  - E-bikes (and potentially other micro-modes) both in terms of providing increased charging points and novated lease schemes
  - Bike and micro-mobility loan programs for a ‘try before you buy’ for supporting travel behaviour change
  - Promotion of and improvements to existing end-of-trip facilities (rather than the specific development of additional ones unless supported by survey and monitoring data)
  - Advocate to local and state government for services within MAC – (such as gym, childcare, and shops) to reduce the need to travel off site to such facilities.

> Barriers
  - Cycling and pedestrian environment between SJGMH and the station and surrounding areas
  - Inability to take bikes on public transport during peak times
  - Costs associated with using public transport
  - Insufficient weather protection on Barry Marshall Drive
  - Insufficient or inadequate bike repair stations

- Lack of widespread travel information
- Reliance on external agencies to implement improvements to the external local and regional transport networks.
- Some infrastructure solutions may represent a significant cost barrier

> Risks

- Stifle the growth and the development of the hospital over time
- As the wider population grows and density increases, potential staff will be less likely to own cars and therefore more likely to look towards locations which are much more accessible
- Attraction and retention of staff is impacted by accessibility
- Worsening traffic congestion and pressures on parking infrastructure reducing amenity for staff and patients
- Additional parking represents a considerable cost, and would be at the expense of other more productive uses of land.
- Lack of commitment to achieving the desired outcomes of the TP, or lack of staffing resources (Travel Plan Coordinator) to implement the plan, resulting in staff having less support in their transition to alternative modes and increasing reliance on the private car, exacerbating all of the negative effects of car dependency.

1.4 Factors for Success

Research undertaken regarding implementation of travel plans highlighted the following as key ingredients for success:

> Supporting policy
> Car parking management
> Ownership and engagement
> Dedicated funding
> Robust monitoring
> Comprehensive travel plan measures
> Management support and business value
> Enthusiastic and dedicated travel plan coordinator
> Clear roles and responsibilities.

Ensuring that these key foundations exist, the travel plan will be a success and its outcomes achieved.

1.5 Methodology

The following methodology was used to approach the tasks required for this study:

Understand where we are now:

> Undertake a site assessment
> Undertake a literature review (**see Appendix B**)
> Analyse available transport related data and other information
> Identify suitable TP objectives (see **Section 4**)

Understand where we want to be:

> Undertake stakeholder engagement (methodology summarised in **Appendix D**) with:

- SJGM Representatives
- City of Cockburn
- Department of Transport

- Host a travel survey for SJGM staff (findings summarised in **Appendix C**)

Understand how we get there:

- Set out realistic and achievable mode share targets (see **Section 5**)
- Identify suitable strategies to achieve mode shift through the use of information, engagement, policies and practices, and facilities and fleet (See **Section 6**)
- Identify suitable actions to achieve the targets (linked to the objectives and categorised by strategy – see **Section 7**)
- Define a communication plan to ensure the SJGM community is aware of and buys into the TP and its objectives (See **Section 8**)
- Outline a monitoring framework to measure progress against targets and use of transport infrastructure which supports the use of active and sustainable modes (see **Section 9**).

2 Site Context

The Site is located at the southern side of South Street, east of Murdoch University. SJGM is bounded by the major road corridors of South Street and Murdoch Drive; lesser roads Barry Marshall Parade and Fiona Wood Road. The location of the Site is shown in **Figure 2-1**. It is a 12-hectare site approximately 15kms south of City of Perth, and it is located within the Murdoch Activity Centre Precinct.

Figure 2-1 Site Location

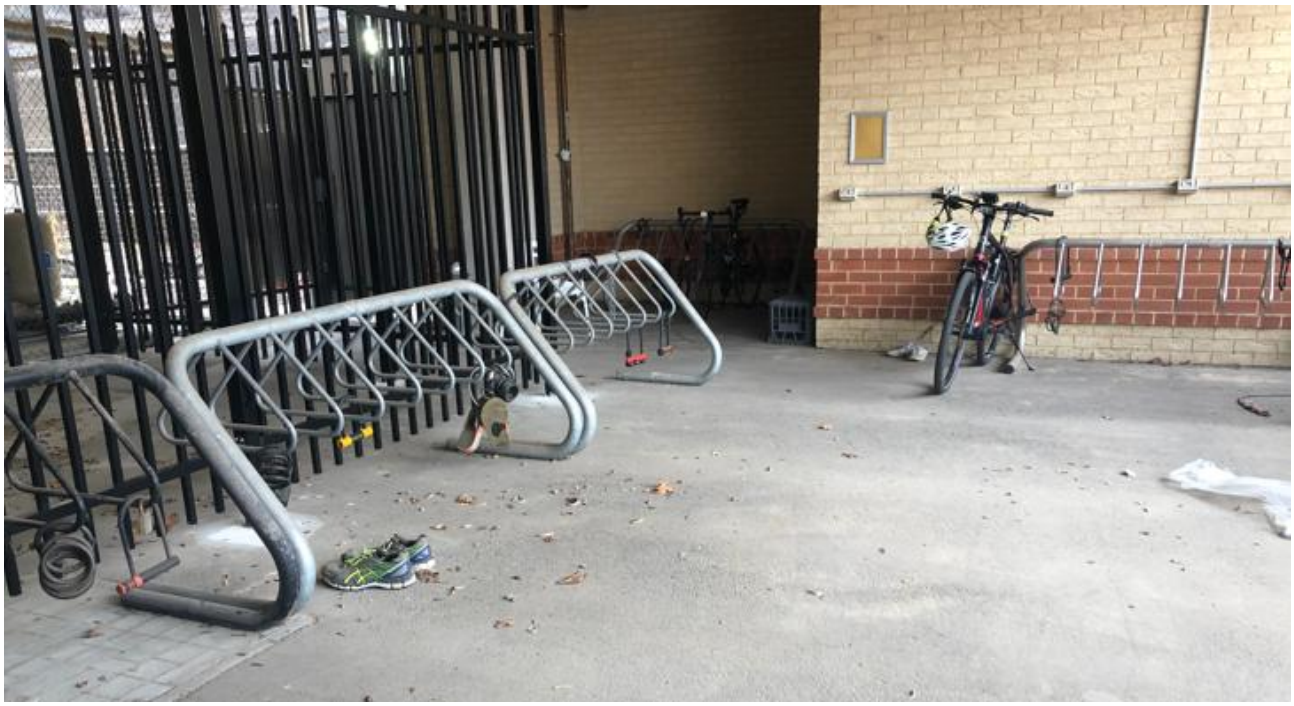
St John of God Murdoch Hospital employs over 1500 caregivers and currently provides 509 beds, 16 operating theatres and a 24-hr emergency department. In addition, there is a separate medical clinic, day surgery centre, multi storey medical centre, cancer centre and endoscopy unit.

The Murdoch Activity Centre Access and Parking Policy identified a parking cap for the site with up to 2,074 spaces for staff and visitors.

2.2 End of Trip Facilities

The hospital has a centralised bicycle parking area with the capacity to safely store more than 40 bicycles. The area is located near the security office on the lower ground floor and is undercover, well lit, and secure. It is a short walk from change rooms and lockers on the Lower Ground Floor. There are 92 lockers available in the men's change rooms, and 92 in the women's change rooms. They are available for permanent staff members who must apply to security to be allocated a locker. Ward areas have lockers; however, these are small (approximately hand-bag size) and not practical for use by cyclists. Additionally, there are three showers available in the men's change room and four showers available in the women's change-room.

Figure 2-2 Secure Bike Parking



Source: Cardno 2021

A detailed Transport Context for the Site discussing pedestrian and cycling environment, bus and train networks, and parking facilities is provided in **Appendix A**.

The Wexford Medical Clinic has 22 bike parking spaces in unsecured racks, 2 women and 2 men's showers and no lockers. The Murdoch Medical Clinic has 22 bike parking spaces in unsecured racks, no lockers and no showers.

3 Summary of Findings

Policy review, engagement with stakeholders internal and external to the Hospital, and the staff travel survey have revealed several key themes and issues for consideration, and assists in the identification of benefits, opportunities, barriers and risks to mode shift towards sustainable transport options. The details of the policy review, stakeholder engagement and travel survey can be found in **Appendices B, C and D**.

The survey identified current patterns of travel for staff to be used for benchmarking for future mode share and identified that most staff drove private vehicles to and from work.

The survey revealed a number of people were unaware of the Green Travel Allowance which offers payment to those that choose not to drive to work. Respondents also seemed unaware of the end-of-trip facilities available to them.

External stakeholders identified a number of considerations for travel to and from the site. The importance of high-quality regional cycling connections was emphasised and these are anticipated to be improved by the Long-Term Cycling Network Plan for Perth and Peel region.

The quality and convenience of the connection between SJGM and Murdoch Station for pedestrians, cyclists, and people catching the bus were also raised by external stakeholders.

The importance of these connections was also made clear in the policy review. Overall, it is agreed that significant growth is anticipated to occur within the broader activity centre. It is recognised that simultaneous corresponding growth in private vehicle trips is not supported and that active and sustainable solutions must instead be sought. Restraining parking is a recognised mechanism for adjusting travel behaviour, particularly for commuter trips. Parking supply must therefore be considered in terms of its strategic relationship with mode choice.

Currently, future planning for the region sees an increasingly significant role played by public transport in the area, with future transport planning seeing significant increases in the people carrying capacity of public transport in the region, including along the South Street corridor.

There was a considerable emphasis given to enhancing the connection between Murdoch Station and St John of God Murdoch Hospital using a shuttle bus or providing a bus stop outside the main hospital entrance.

There is opportunity to further develop the role of cycling to the hospital through provision of additional wayfinding signage and promotion of route/facility information.

4 Travel Plan Objectives

The transport context for St John of God Murdoch Hospital is changing as the site expands, however it is likely that much of this change will be an emphasis on provision for sustainable and active modes and better connections to Murdoch Station and within the MAC. In addition, with the advancement of on-demand transport services such as Uber, and developments in vehicle technology such as self-driving and alternately-fuelled vehicles, facilities may be required to accommodate these modes.

These changes will result in:

> A wider catchment for staff and visitors accessing the Site due to improvements in public transport infrastructure;

> High levels of pedestrian activity to and around the Site;

> Potential increases in cycle activity to and around the Site;

> A requirement for efficient drop off and pick up areas; and

> Potential for more electric charging points within car parking areas.

It is therefore logical that broad objectives for this TP are set in support of the above outcomes and in consideration of uncertain environments, and these will assist in the selection of suitable mode share targets (see **Section 0)** and actions (see **Section 0**). These objectives are set out below:

1. To manage and reduce the demand for parking at SJGM Hospital;
2. To ensure high levels of accessibility to and from the site for all, and
3. To support physical and mental health and wellbeing through the promotion of active transport modes.

5 Targets and Key Performance Indicators

There are four distinct user groups for the hospital:

- hospital staff (inc. nurses, doctors, clerical, cleaning, catering) and visiting medical specialists;
- patients (in-patients and out-patients);
- patient visitors; and
- other visitors (via Emergency Vehicles, Delivery Vehicles, and Taxis)

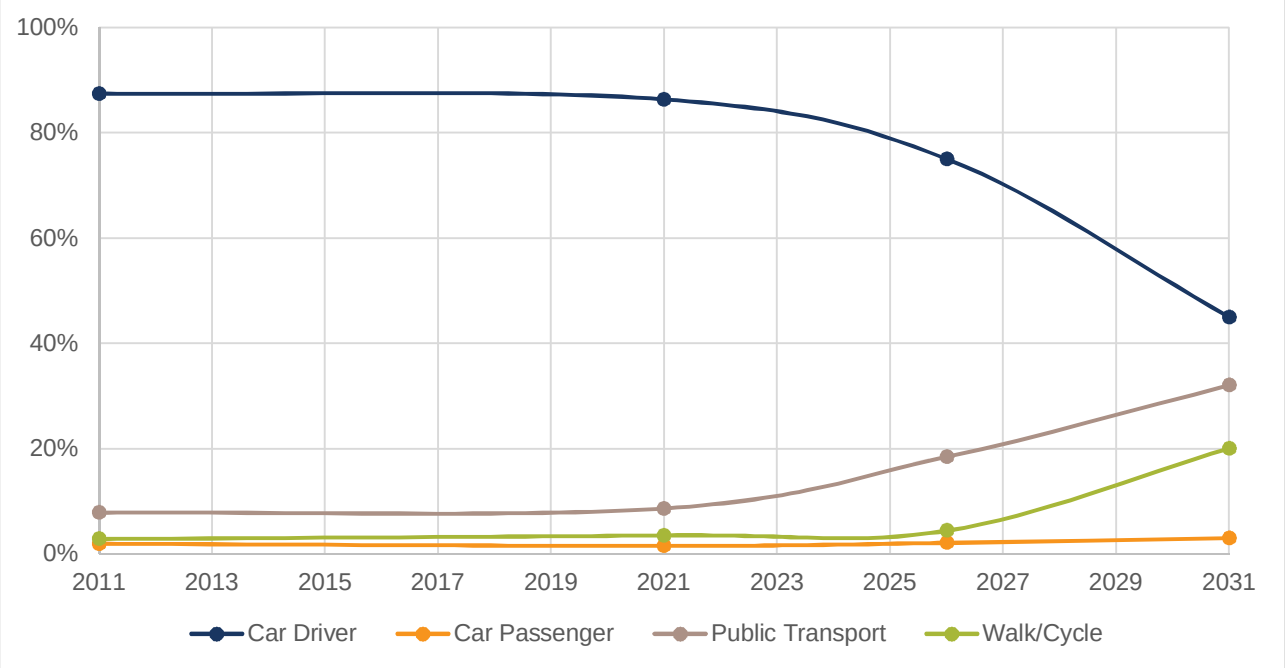
Each of these groups have their own needs that affect travel choices. An understanding of the travel patterns of these different groups can therefore help with supporting mode change. For instance, hospital staff will typically stay for 7 hours or more, whereas patients and visitors will arrive and depart throughout the day.

Based on the existing mode share for the Hospital, the following future mode share targets for 2026 (**Table 5-1**) have been developed for employees and visitors. This is based on the availability of sustainable transport modes. Mode share targets are based on a model created by Cardno which takes account of a number of different sources of mode share data and trip purposes from all around Australia. Identifying the most suitable variables for the planning scenario, the model is able to provide mode share estimates for different development types. Teleworking, which does not generate trips, has been excluded from these targets.

Table 5-1 Mode Share Targets

Mode	2021 (Existing)	2026 (Target)	2031 (Target)
Car Driver	86.3%	75.0%	45.0%
Car Passenger	1.5%	2.1%	3.0%
Public Transport	8.6%	18.4%	32.0%
Walk/Cycle	3.5%	4.4%	20.0%

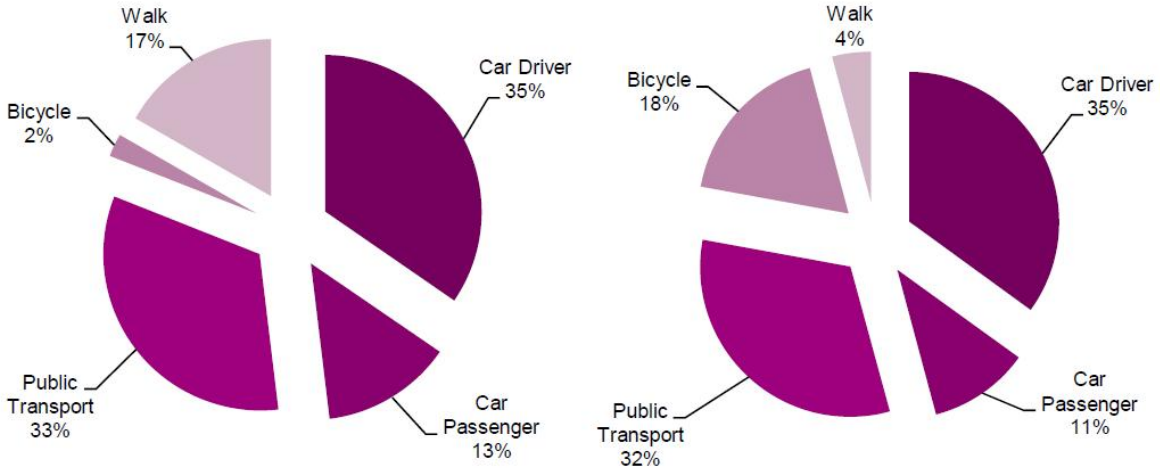
Figure 5-2 Potential Mode Share Change



The Murdoch Activity Centre Transport Assessment provides a target mode share across the entire activity centre area is shown in **Figure 5-3**. This is based on transport assessment analysis in 2016, and relies on

future mixed-use land uses, expansion of enrolments at the University and MAC being a major employment centre surrounded by residential suburbs.

Figure 5-3 2031 Mode Share During AM and PM Peak Periods



Source: MAC Transport Assessment 2016, AECOM

* The above charts display imbalanced walking and cycling trips for the commuter peak AM and PM periods. The data represents peak hour activity, which in this instance is the main commuter period. A large quantity of active transport trips are undertaken by students who do not necessarily travel during traditional commuter peaks. Therefore, these charts represent the proportion of active transport trips undertaken in the traditional commuter peak and exclude the cycling and walking trips undertaken by students during different times of the day.

Based on the existing mode shares, reaching the sustainable transport targets established by the Murdoch Specialised Activity Centre Plan would require significant changes outside of SJGM Hospital's capabilities. The targets were based on assumptions that have yet to materialise, such as increased bus frequency, dedicated bus lanes on South Street and a mixed-use precinct.

6 Behaviour Change Strategies

This chapter provides a broad overview of strategies that, when combined, can influence travel behaviour change. **Section 7** provides more detail of how these strategies will drive the implementation of particular measures at SJGM.

6.1 Provision of information

It is important to provide suitable information on suitable platforms at suitable times in order to empower staff and visitors to make the best travel choices.

Suitable types of information include:

- Branded marketing materials (posters/leaflets/billboards);
- Online information;
- Bus or train timetables;
- Website or online links;
- Maps;
- Getting to the hospital guide which promotes public transport and active transport as preferred options;
- Collaborate with student housing providers to promote public transport information
- Presentations and workshops;
- Case studies and stories;
- Real time travel information provided;
- Directional signage to bus stops, train station, bike racks, taxi stands etc.;
- Personalised travel planning sessions; and
- Seek out opportunities to talk about the travel plan or transport issues.

However, information on its own will not create travel behaviour change and it must be paired with infrastructure and initiatives to be effective.

6.2 Engagement

Regular engagement with the different stakeholder groups will mean that the TP, its objectives and its associated initiatives will remain front of mind. In addition to the engagement strategies mentioned in **Section 6** the following ways of engaging with SJGM staff and visitors will be considered following the launch of the TP:

- Competitions and challenges;
- Reward schemes for active travellers
- Events (e.g. Bike Month, Steptember, wellbeing initiatives);
- Support Travel Behaviour Change programs (e.g. Your Move)
- Workshops (e.g. cycle training);
- Walking or cycling buddy groups;
- Online social media groups and forums; and
- Support or lobby for public transport service improvements.

6.3 Policies and Practices

Policies and practices should be designed with the facilitation of sustainable and active transport modes in mind. Relevant policies and practices for SJGM include:

- Supply transport information to new staff **in advance** of their first day;
- Continue Travel Green Allowance initiative, consider a more flexible policy and an increase in allowance;

- Parking Supply and Management Strategy; and
- Have transport as a standing item in relevant meetings.

6.4 Facilities and Fleet

Facilities and the availability of fleet vehicles can provide support for those wishing to adopt alternative modes. Facilities can be tangible or intangible. Relevant examples for SJGM include:

- Secure bike racks in highly visible locations;
- End of Trip facilities (lockers, showers etc.);
- Cycle repair stands;
- Electric bike charging points;
- Negotiate discounts with local bike shops;
- Provide legible and safe access for pedestrians and cyclists across car parks to the hospital;
- Provide a pool of SmartRider cards (owned by SJGMH rather than individuals) for public transport fares for business travel, or investigate ways to alter purchasing policies to allow this within ATO rules;
- Carpooling bays in the staff car park;
- Car pool matching service;
- Electric Bike pool to loan to staff to ‘try before you buy’; and
- Guaranteed ride home in an emergency.

7 Action Plan

The 2010 Travel Plan provided Key Performance Indicators until 2014 and are listed in **Table 7-1.**

Table 7-2 provides a reminder of the TP objectives and targets for the plan to achieve. Both objectives and targets link to the actions listed in **Table 7-3**.

Table 7-1 2010 Travel Plan KPIs

Key Performance Indicator	Timescale/Target			
	Start	2011/12	2012/13	2013/14
1. Increase the number of caregivers who apply for the Green Travel Allowance	0	50	100	150
2. Decrease the percentage of patients and visitors who arrive to SJGHM as a car driver.	75%	73%	70%	68%
3. Increase the number of caregivers who stop driving as a result of the Green Travel Allowance	0	15	30	60

Table 7-2 Targets linked to Objectives

Objective	Target
To manage and reduce demand for car parking	A. Reduce single occupancy car trips B. Increase car pooling
To ensure high levels of accessibility to and from the site for all	C. Increase use of public transport
To support physical and mental health and wellbeing of staff through promotion of active transport modes	D. Increase walking E. Increase cycling

The actions are categorised by levers: Information, Engagement, Policies and Practices and Facilities and Fleet.

Table 7-3 Action Plan

Lever		Action	Links to target	Responsibility	Cost ($/$$/$$$)	Timeframe (S/M/L term)	Ongoing
Information	1	Ensure all online and hard copy maps are updated as needed to show all transport related facilities	A, B, C, D, E	Travel Plan Coordinator	$	S	Y
	2	Review online and hard copy travel information and update as required to include sustainable transport options	A, B, C, D, E	Travel Plan Coordinator	$	S	Y
	3	Provide specific information relating to the bus services which operate between the hospital and Murdoch Station	C	Travel Plan Coordinator	$	S	Y
	4	Investigate options for providing real time public transport information relating to the Barry Marshall Pde bus stops within buildings	C	Travel Plan Coordinator	$$$	M	N
	4	Run information sessions to educate all staff on the importance of using sustainable modes of transport, particularly relating to cycling facilities	A, B, C, D, E	Director & Managers	$	S	Y
	5	Promote the Green Travel Allowance to staff	A, B, C, D, E	Travel Plan Coordinator	S	S	Y
	6	Review the use of staff induction to include sustainable transport modes. Information to include a journey planner or a link to the Perth PTA journey planner. Info may best fit in the Welcome Packs. Provide transport information using hierarchy in descending order of sustainability	A, B, C, D, E	Travel Plan Coordinator	$	S	Y
	7	Create Travel Smart materials for specific groups such as the Culturally and Linguistically Diverse (CALD) groups	A, B, C, D, E	Travel Plan Coordinator	$	S	Y

	8	Develop active transport materials and outreach programmes targeting new staff, people who live within a certain radius of the hospital, people from CALD backgrounds, etc.	D, E	Travel Plan Coordinator	$$	M	Y
	9	Develop a short 1-2-line reference regarding sustainable transport that can be used on all hospital events.	A, B, C, D, E	Corporate events	$	S	N
	10	Ensure a biennial access audit is completed and information used to update campus and Your Move outreach materials/ projects/ programmes	A, B, C, D, E	Travel Plan Coordinator	$$	M	Y
Engagement	1	Appoint a Travel Smart Coordinator to establish a Travel Smart working group and be responsible for implementing this plan.	A, B, C, D, E	Director of Finance	$$$	S	N
	2	Launch this plan (soft launch), via an invitational morning tea and information session to senior staff about sustainable transport and the principles behind it.	A, B, C, D, E	Managers/ Travel Plan Coordinator	$$	S	N
	3	Launch this plan (full launch) online via an information session to staff about sustainable transport and the principles behind it backed up by suitable events and high-profile competitions/branding (as per the Communication Plan)	A, B, C, D, E	Travel Plan Coordinator	$$	S	N
	4	Communicate outcomes and successes of TP activities at regular intervals	A, B, C, D, E	Travel Plan Coordinator/ Marketing	$$	S	Y
	5	Engage with the Your Move program and forums to collaborate and share ideas on travel behaviour change initiatives and events. Share outcomes with staff	A, B, C, D, E	Travel Plan Coordinator	$	S	Y
	6	Offer personalised travel planning sessions for staff to assist in identifying suitable transport modes for journeys to and from work	A, B, C, D, E	Travel Plan Coordinator	$	M	Y

	7	Conduct biennial travel survey (alongside the access audit) with lessees, tenants and staff, to identify trends and emerging issues, barriers and opportunities. Report on progress towards mode share targets	A, B, C, D, E	Travel Plan Coordinator	$	M	Y
	8	Implement cycling education programmes, such as People on Bicycles, to re-introduce staff to riding a bicycle	D	Travel Plan Coordinator	$$	S	N
	9	Consider suitable activation techniques to promote sustainable transport facilities on site	A, B, C, D, E	Travel Plan Coordinator	$	M	Y
	10	Create a contact list of staff who have postcodes within a five km radius. Run targeted information sessions or workshops for these staff to change travel behaviour from driving to cycling/walking, where possible	A, D, E	Travel Plan Coordinator	$	S	Y
	11	Identify staff who are champions in the area of sustainable transport & promote these champions. Invite champions to speak at events and create innovative ways of promoting these champions	A, B, C, D, E	Travel Plan Coordinator	$	M	Y
	12	Lobby for improved pedestrian and cycle connections and amenity between SJGM, the station and through the MAC	A, C, D, E	Travel Plan Coordinator Facilities	$	M-L	Y
	13	Lobby for/support train station bike hire scheme. Consider hosting bike hire station	D	Travel Plan Coordinator	$	L	N
	14	Liaise with PTA to investigate a shuttle bus service for MAC, and for any other service improvements	C	Travel Plan Coordinator	$	M – L	Y
	15	Engage with other transport agencies (DoT/MRWA) for TP support, and updates and feedback relating to transport network improvements	A, B, C, D, E	Travel Plan Coordinator	$	M	Y
	16	Liaise with City of Melville and City of Cockburn regarding TP initiatives, to obtain feedback, lobby for support or funding of initiatives	A, B, C, D, E	Travel Plan Coordinator	$	M	Y

	17	Engage with MAC neighbours to identify opportunities for collaboration relating to transport improvements	A, B, C, D, E	Travel Plan Coordinator	$	M	Y
	18	Promote TP actions to visitors and wider community and seek feedback on transport experiences. Conduct snapshot intercept travel surveys concurrently with the SJGM travel survey to identify mode share of visitors	A, B, C, D, E	Travel Plan Coordinator	$$	M	Y
	19	Run at least one event annually to promote sustainable transport; e.g. bike repair workshops, 'Rusty Riders'/ safety training, International Car Free Day etc	A, B, C, D, E	Travel Plan Coordinator	$	M	Y
	20	Start a SJGM walking group to meet regularly and walk around MAC	D	OHS team / Travel Plan Coordinator	$	M	N
	21	Investigate TravelSmart reward/incentive/pledge program	A, B, C, D, E	Travel Plan Coordinator	$$	M-L	N
	22	Consider incentives to encourage staff to try out sustainable transport modes, such as an eBike 'try before you buy' Lending Program	D, E, F	Travel Plan Coordinator	$$	M	Y
	23	Investigate third party carpooling app and identify opportunities to attract potential carpooling staff away from single occupancy vehicle trips (e.g. using targeted messages via parking permit information streams, reduced parking fees etc.)	A, B	Travel Plan Coordinator/Facilities Manager	$$$	M	Y
	24	Promote the City of Cockburn Bicycle User Group Facebook group to learn about community rides and bike related information and events	A, E	Travel Plan Coordinator	S	S	Y
Policies and Practices	1	Gain endorsement of the Travel Plan by the SJGM Board	A, B, C, D E	Director	$	S	N
	2	Ensure a request for funding for Travel Plan measures is included in each budget request	D, E	Director	$	M	Y
	3	Review Green Travel Allowance policy to make it more flexible, consider increase in allowance and link to user profiles	A, B, C, D, E	Director	$	S	N

	4	Regularly monitor usage of bike racks, EoT facilities, car parks; parking permit data; parking infringement data; bus patronage data; participation in events and TPC enquiries	A, C, D, E	Travel Plan Coordinator Facilities Manager	$	S	Y
	5	Conduct annual reviews and reporting of travel plan activities to aid planning for the following year. Include specific initiatives to address winter travel issues	A, B, C, D E	Travel Plan Coordinator	$	M	Y
	6	Audit locations of bike racks to ensure locations are accessible, secure, visible, close to adjacent building entrances	D	Travel Plan Coordinator Facilities	$	M	N
	7	Investigate novated lease scheme for e-bikes	D	Travel Plan Coordinator HR	$$	M	N
	8	Review novated lease scheme for cars and consider inclusion of text which support increased uptake of electric vehicles, or other inclusions which may encourage staff towards alternative transport modes some of the time	A	Travel Plan Coordinator HR	$$	M	N
	9	Consider requirements for cultural shift from staff in relation to travel behaviour change, understanding differences and plan more strategic or costly travel behaviour change measures (such as changes to parking restrictions, fees or permits) on a suitable timeline	A, B, C, D E	Director	$$	M-L	N
	10	Develop Parking Supply and Management Plan in accordance with DOT Guidelines. Include review of methodology for directing parking fee revenue towards implementation of sustainable transport initiatives.	A	Director	$$	M	N
	11	Provide incentives to carpooling, such as subsidised reserved car bays in high profile areas, such as a ‘Green Commuter’ section at front of house	B	Director/ Facilities Manager/HR	$	M	Y
	12	Apply for grant funding to support the implementation of this action plan, i.e. through the Healthier Workplace Grants or other sources.	A, B, C, D, E	Travel Plan Coordinator	$	M	Y
	13	Monitor and report on progress toward sustainable transport benchmarks in the Annual Report.	A, B, C, D, E	Director	$	M	Y

Facilities and Fleet	1	Improve bus stops on Barry Marshall Pde to provide respite from heat, rain and wind	A, C	Travel Plan Coordinator Facilities	$$	M	N
	2	Develop creative, engaging signage for bike racks, directing bike users to end of trip facilities i.e. bus stops, cycle ways, walkways including estimated travel times and distances	C, D, E	Facilities Manager/Travel Plan Coordinator	$$	M	N
	3	Set up routine scheduling for maintenance of end of trip facilities, including emptying of bike lockers, bike compounds and removal of old locks from racks. Where replacement is necessary, ensure high quality facilities are used	D	Facilities Manager	$	S	Y
	4	Ensure all end of trip facilities meet Australian Standards/Guidelines	D	Facilities Manager	$	S	Y
	5	Retail outlets (giftshop, vending machines) to sell inexpensive emergency items, locks, bike tyre repair kits, etc.	D	Travel Plan Coordinator Retail tenants	$	S	Y
	6	Provide a bike repair station	D	Travel Plan Coordinator Facilities Manager	$$	S	Y
	7	Consider installation of additional facilities for charging of e-bikes/e-scooters as uptake increases (monitor usage of e-bikes/e-scooters during bike counts)	D	Travel Plan Coordinator	$$	M	Y
	8	Keep abreast of developments in transport technology advances including micro-mobility and Mobility as a Service to ensure facilities remain cutting edge	A, B, C, D, E	Travel Plan Coordinator Facilities Manager	$	M-L	Y
	9	Consider electric vehicle charging points as uptake increases (solar charging preferred)	A	Travel Plan Coordinator Facilities Manager	$$	M-L	Y
	10	Provide clear access and wayfinding signage to bus stops along South Street and Murdoch Drive	A, C, D	Travel Plan Coordinator Facilities Manager	$	S-M	N

8 Communication Plan

Identifying the different stakeholder groups and how their roles contribute towards achievement of the TPs objectives is an important step towards creating a communication plan for the TP as engagement and communication approaches for each group differ.

Table 8-1 builds on DoT travel planning guidelines by providing suitable engagement strategies for each stakeholder group.

Strategies described in this section are deliberately high level to enable a flexible response to communications, given that a TP is a living document and actions may need to be adapted to address the transport issues and circumstances at the time.

Table 8-1 Stakeholder Engagement Strategies

Stakeholder	Role/value	Engagement Methods	Engagement Strategy
Director	▪ Understanding of issues and management strategies for the campus ▪ Coordinate and resource implementation of the plan ▪ Provision and management of common facilities ▪ Hospital information and promotional events ▪ Communication of TP measures to external visitors and customers	▪ Coordinate plan development over time to address changes in circumstances ▪ Communicate with other stakeholders	▪ Travel Plan soft launch and test with key staff ▪ Travel Plan full launch ▪ Obtain feedback from key staff on future iterations of the travel plan prior to official release ▪ Consult with key representatives ▪ New starter information packs ▪ Your Move platform ▪ Travel survey
Staff	▪ Understanding of staffing schedules and access issues ▪ Communication with employees ▪ Promotional activities	▪ Workshops to provide feedback on TP measures ▪ Provide feedback on TP collateral including reports and marketing	▪ Travel Plan soft launch and test with key staff ▪ Travel Plan full launch ▪ Obtain feedback from key staff on future iterations of the travel plan prior to official release ▪ New starter information packs ▪ Your Move platform ▪ Travel Survey
City of Melville and City of Cockburn	▪ Management of local roads and pathways connecting to the centre ▪ Awareness of transport issues and strategies for the local area	▪ Stakeholder workshop ▪ One-on-one contact where necessary or via email/phone	▪ Feedback progress to the City as required ▪ Contact for assistance promoting local transport initiatives (may provide funding for additional measures)
MAC neighbours	▪ Demand for transport impacts other activity centre stakeholders and vice versa	▪ Meetings or through other established communication channels	▪ Transport as a standing item in established meetings or communications

Transport agencies	▪ Public transport services ▪ Advice on travel planning process and behaviour change strategies	▪ Via Your Move ▪ One-on-one contact where necessary or via email/phone	▪ Contact prior to survey periods to obtain guidance on travel surveys ▪ Contact for guidance on selection and implementation of measures
Wider community, local community and visitors	▪ Simultaneous users of public transport infrastructure ▪ Demand for particular transport services can benefit SJGM ▪ Can provide word of mouth messages to the wider community (positive and negative)	▪ SJGM marketing materials ▪ Online (website and social media) ▪ Traditional media ▪ One-on-one contact where necessary (promotional activities)	▪ Travel Plan launch (competitions and branded materials) where appropriate ▪ Regular travel surveys (intercept surveys at entry points)

An indicative timeline of communications events has been prepared below. Communication with stakeholders should also continue throughout the year as appropriate.

Table 8-2 Communications and Engagement Actions Timeline

Timeframe		Action	Relevant Behaviour Change Strategy
Year 1	Pre-launch	▪ Prepare new starter information packs ▪ Prepare marketing materials (including communications around short term actions) ▪ Collate important transport information resources (e.g. timetables) ▪ Produce marketing collateral for new and existing transport features following implementation of quick wins from action plan	Information
		▪ Soft launch with key stakeholders (to test content and actions) ▪ Engage with Your Move for ideas for launch and ongoing sustainable transport events ▪ Plan full launch	Engagement
	Q1	▪ Full launch ▪ Support sustainable transport events/competitions ▪ Communicate outcomes from TP activities	Engagement
	Q2	▪ Support sustainable transport events/competitions ▪ Communicate outcomes from TP activities	Engagement
	Q3	▪ Support sustainable transport events/competitions ▪ Communicate outcomes from TP activities	Engagement
	Q4	▪ Targeted communications regarding travel options in winter ▪ Engage with Your Move for ideas for ongoing sustainable transport events ▪ Communicate outcomes from TP activities	Engagement
		▪ Planning for the coming year ▪ Parking and other monitoring data collection and analysis ▪ Annual report	Policies and practices
Year 2	Q1	▪ Biennial staff Travel Survey ▪ Support sustainable transport events/competitions ▪ Communicate outcomes from TP activities	Engagement
	Q2	▪ Communicate findings to SJGM Community	Information

		▪ Support sustainable transport events/competitions	Engagement
	Q3	▪ Support sustainable transport events/competitions ▪ Communicate outcomes from TP activities	Engagement
	Q4	▪ Targeted communications regarding travel options in winter ▪ Engage with Your Move for ideas for ongoing sustainable transport events ▪ Communicate outcomes from TP activities	Engagement
		▪ Planning for the coming year ▪ Parking and other monitoring data collection and analysis ▪ Annual report	Policies and practices
Year 3	Q1	▪ Support sustainable transport events/competitions ▪ Communicate outcomes from TP activities	Engagement
	Q2	▪ Support sustainable transport events/competitions ▪ Communicate outcomes from TP activities	Engagement
	Q3	▪ Support sustainable transport events/competitions ▪ Communicate outcomes from TP activities	Engagement
	Q4	▪ Targeted communications regarding travel options in winter ▪ Communicate outcomes from TP activities	Engagement
		▪ Planning for the coming year ▪ Parking and other monitoring data collection and analysis ▪ Annual report	Policies and practices

9 Monitoring and Evaluation

9.1 Why monitor and evaluate the Travel Plan?

Monitoring and evaluation of a Travel Plan is critical to its success, ensuring that a record is kept of what actions are actually implemented, their timing, and enabling an assessment of their effectiveness.

The following section sets out the recommended monitoring and evaluation activities.

9.2 Travel Plan Coordinator

9.2.1 Position

Not dedicating a resource to implementation of the actions of this TP represents a risk to its success and the achievement of the stated objectives. The key ingredients required for a successful TP are listed in **Section 7**.

The Travel Plan Coordinator (TPC) role will be carried out by SJGM's Facilities Manager in the first instance until the workload and budget availability dictate that it becomes its own role.

9.2.2 TPC Responsibilities

The TPC will be responsible for the following:

> Liaise with SJGM staff and visitors to continually promote and raise awareness of the TP and its measures

> Engage with the SJGM community to ensure that transport initiatives are meeting their needs

> Engage with the Your Move program

> To revise and update the travel plan following survey results or relevant developments on site and provide written reports to the City of Melville/DoT if required during stages of development

> To develop and implement on-site travel measures which support survey findings

> To provide SJGM staff and visitors with up to date travel information pertaining to the local area and act as a resource for travel related enquiries

> To engage with the City of Melville and MAC neighbours to ensure travel planning measures are complementary to any nearby developments and activities

> To act as a point of contact on transport matters at the site.

9.3 Annual Reporting

The Travel Plan Coordinator should prepare a brief Annual Report, outlining the progress implementing the actions in the Travel Plan. Key features of the report should include:

> Actions implemented

> Actions planned for implementation in the next 12 months

> Reasons for not implementing any actions not included in the above two categories

> A summary of constraints identified in implementing any of the actions

> Anecdotal evidence indicating the effectiveness of actions

> A summary of any qualitative and quantitative evaluation carried out – e.g. how many people attended a cycling breakfast

> A record of lessons learned on the effectiveness of different strategies

This reporting should ensure that the corporate knowledge accumulated through the Travel Plan process is retained regardless of any changes in staff, and ensure that the Board is aware of the progress of the Plan.

9.4 Travel Survey

A Travel Survey of staff, visitors and outpatients should be undertaken once every two years, at a minimum. SJGM commits to undertaking a travel survey of staff biennially which will allow progress against the targets outlined in this document to be measured over time. The Travel Survey should contain questions which are consistent with previous surveys to ensure that the data collected can be accurately compared over multiple years to identify short, medium- and long-term trends.

As far as possible, the Survey should be undertaken at a consistent time of year to minimise the risk of seasonal factors distorting the results, and ideally include a travel diary element of at least a week's duration.

9.5 Monitoring Activities

Other regular monitoring activities will be undertaken including:

> Bike counts (usage of bike racks)

> Car park usage

> Parking data

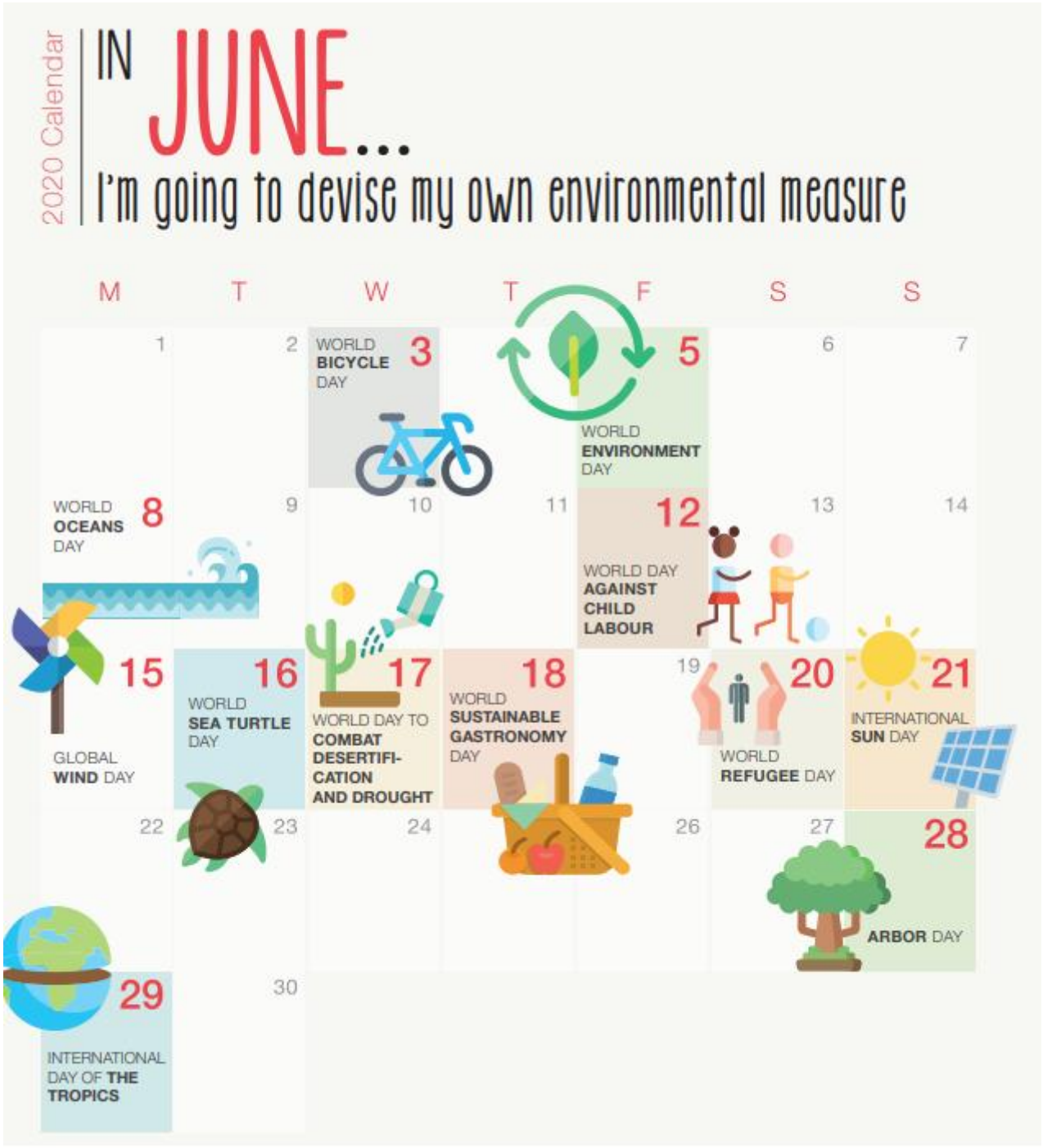
> Parking infringement data

> Patronage data for Wexford Clinic bus stop

> Participation in events (a yearly event calendar could be developed at the start of each year to guide events throughout the year, as in the Acconia Sustainability Calendar (**Figure 9-1**).

> TPC enquiries.

Figure 9-1 Excerpt from 2020 World Sustainability Calendar (Acconia)



A monitoring framework is required to indicate timeframes for monitoring activities; an example is provided in **0.**

Table 9-1 Monitoring Frequency

Frequency	Data
Quarterly	Public transit patronage
Semi-annually	Bike counts EoT facilities usage (lockers etc.) Review travel information on website Event participation
Annually	Car park usage Parking data Parking infringements EoT Audit TPC enquiries
Biennially	Travel Survey

9.6 Travel Plan Review and Update

At the end of a period of 5 years, the effectiveness of the Travel Plan should be comprehensively reviewed.

A new Travel Plan should then be prepared to guide the next 5 years of Travel Demand Management initiatives.

10 Conclusions

This TP has developed targets for mode share based on existing surrounding infrastructure and current mode share for staff and visitors, based on the methodology and analysis contained in **Chapter 5**.

Table 10-1 Travel Plan Target Mode Share (2026)

Mode	2021 (Existing)	2026 (Target)	2031 (Target)
Car Driver	86.3%	75.0%	45.0%
Car Passenger	1.5%	2.1%	3.0%
Public Transport	8.6%	18.4%	32.0%
Walk/Cycle	3.5%	4.4%	20.0%

A number of short-term actions have been identified in this travel plan to achieve these mode share targets. These actions are either fundamental to the success of the travel plan, or are quick wins that can be implemented relatively easily and/or cheaply to support travel behaviour change. These include:

- Appoint a Travel Plan Coordinator
- Gain endorsement of the Travel Plan by the SLGM Hospital Board
- Initiate communications relating to TP launch, and identifying regular opportunities (ideally quarterly as a minimum) for communicating the outcomes of the TP activities
- Engage with the Your Move program and forums to collaborate and share ideas on travel behaviour change
- Create and collate Travel Smart and transport related materials (hard copy and online, including the MSJG website, and particularly bus services in addition to the Circle Route). Ensure availability for specific groups such as the Culturally and Linguistically Diverse (CALD)
- Launch this plan to senior staff about sustainable transport and the principles behind it
- Launch this plan to SJGM community at large
- Monitor usage of bike racks, car parks; parking data; parking infringement data; bus stop patronage data; participation in events and TPC enquiries
- Include transport and travel information in new staff welcome packs
- Create targeted communications for staff who live within a five km radius to identify further opportunities for walking and cycling
- Ensure all end of trip facilities meet Australian Standards/Guidelines
- Set up routine scheduling for maintenance of end of trip facilities, including emptying of bike lockers, bike compounds and removal of old locks from racks
- Retail outlets (giftshop, vending machines) to sell inexpensive emergency toiletries, locks, bike tyre repair kits, etc.

A flexible Communication Plan has been devised to assist the TPC in keeping the Travel Plan and its measures front of mind, while recognising that a TP is a living document which should be able to respond to changes in circumstances relating to transport, and communicate a diverse range of topics to the SJGM community. An indicative review process has also been defined to plan regular travel surveys and monitoring activities which will help track mode shift and identify any measures which need review

In summary, there are many opportunities to convert single occupancy vehicles to more sustainable and active modes, and implement policies which support it. The mode share targets support those of the wider MAC, and will support the Hospital as it grows

APPENDIX

A

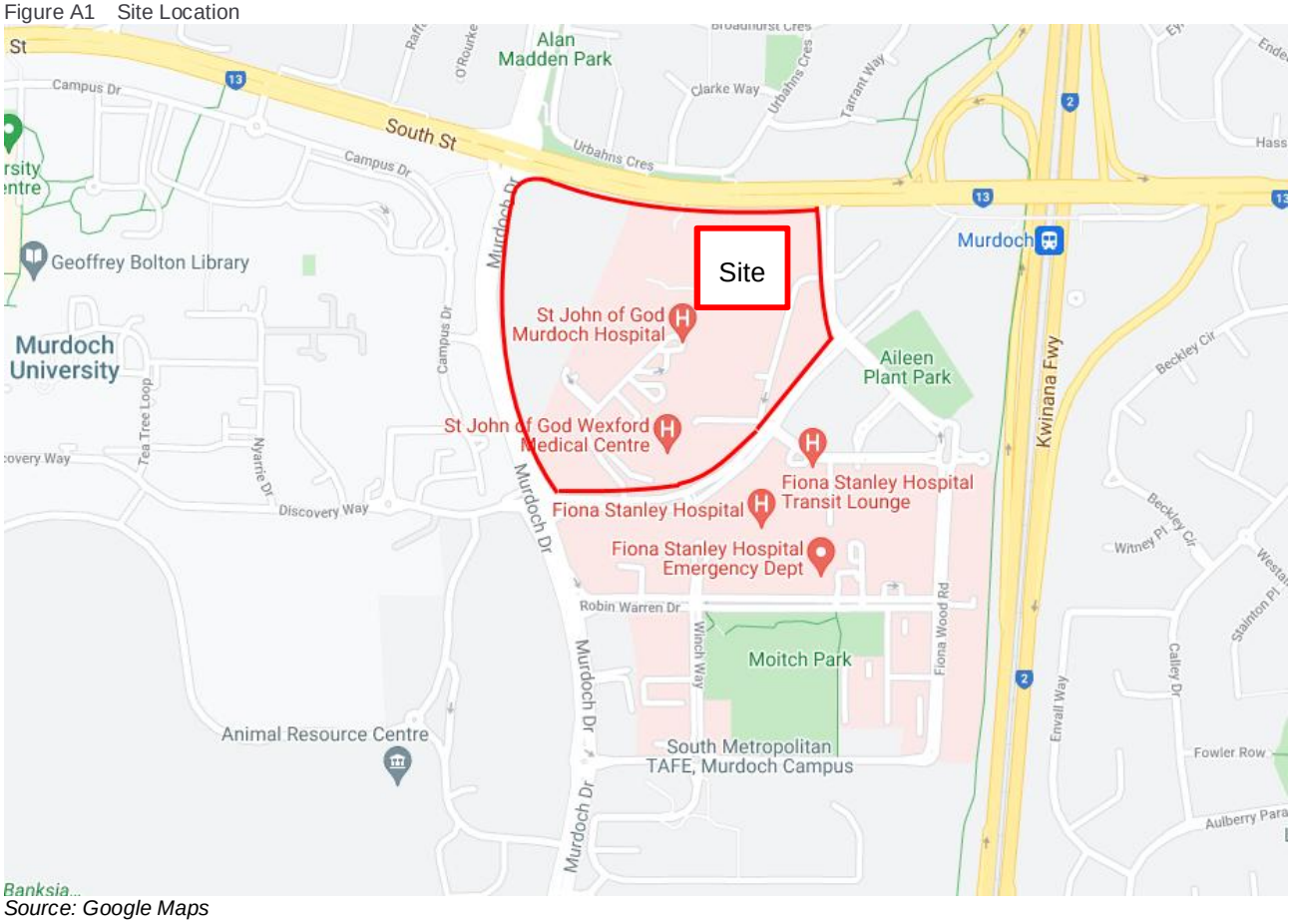
TRANSPORT CONTEXT

A Transport Context

A.1 Location

The Site is located South of South Street, to the east of Murdoch University. SJGM is bounded by major road corridors of South Street, Murdoch Drive and the Mitchell Freeway. The location of the Site as shown in **Figure A1.**

Figure A1 Site Location



Source: Google Maps

A.2 Walking

The Site is surrounded by numerous high-quality walking facilities. The Site is accessible on foot, having facilities such as:

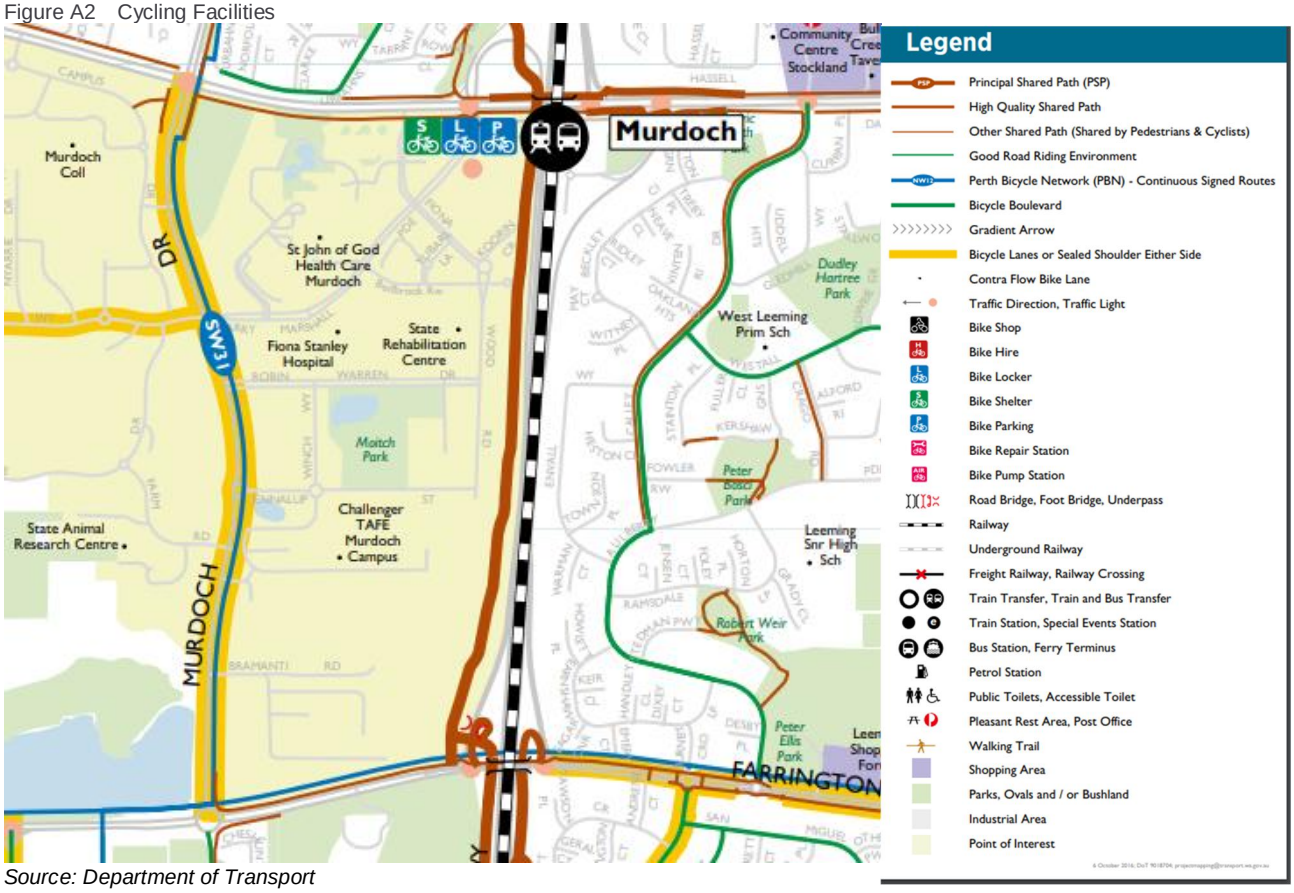
- Pedestrian walkways permeating the Site providing accessibility to hospital facilities;
- Pedestrian priority on internal roads; and
- Access from South Street between Fiona Wood Road and Murdoch Drive.

With a maximum walk speed of 5km/hr, pedestrians are able to access the majority of SJGM facilities within 10 minutes of walking, generally in a pleasant walking environment, though some locations require attention to shade and shelter. Pedestrians are able to access all the bus stops along South Street, Murdoch Drive and Barry Marshall Parade within 10 minutes, increasing the potential for public transport use.

A.3 Cycling

The Site is surrounded by numerous high-quality cycling facilities (**Figure A2)**.

Figure A2 Cycling Facilities



Source: Department of Transport

An audit of SJGM End of Trip cycling facilities was completed in August 2021. It reviewed the condition of the existing bike infrastructure and information regarding its usage. Below are the key findings obtained from the audit:

- Total of 216 bike rack locations across the Site;
  - 126 spaces in the end of trip facilities
  - 16 spaces in Carpark P3 and 14 spaces outside main entrance
  - 48 spaces at Wexford Medical Clinic
  - 26 spaces at Murdoch Medical Clinic
- 126 secure bike parking spaces
- 2 of the 126 parking spaces in use at time of audit which equates to <1% occupancy of available spaces (note: cold and rainy day in August);
- There are 5 types of racks available
- 5 male and 6 female showers including:
  - 2 men/2women showers in Wexford Medical Centre
  - No showers in Murdoch Medical Clinic
- 92 male and 92 female lockers available with more than half being used
  - No lockers in Wexford Medical Centre
  - No lockers in Murdoch Medical Clinic
- 42% bike parking is open rack and 58% is secured parking.

Figure A3 Permanent Tire Pump

End of Trip facilities play an important role in increasing the usage of transportation by bicycles, as it provides a safe location to store bikes and associated equipment, as well as the opportunity for riders to freshen up following rides. Based on the information obtained from the audit, it suggests that there is a significant lack of utilisation of existing bike infrastructure. Better promotion of the facilities may result in greater use, and an increase in the cycling mode share. **Figure A3** is an image of a bike tire pump located in the bike cage secure parking.

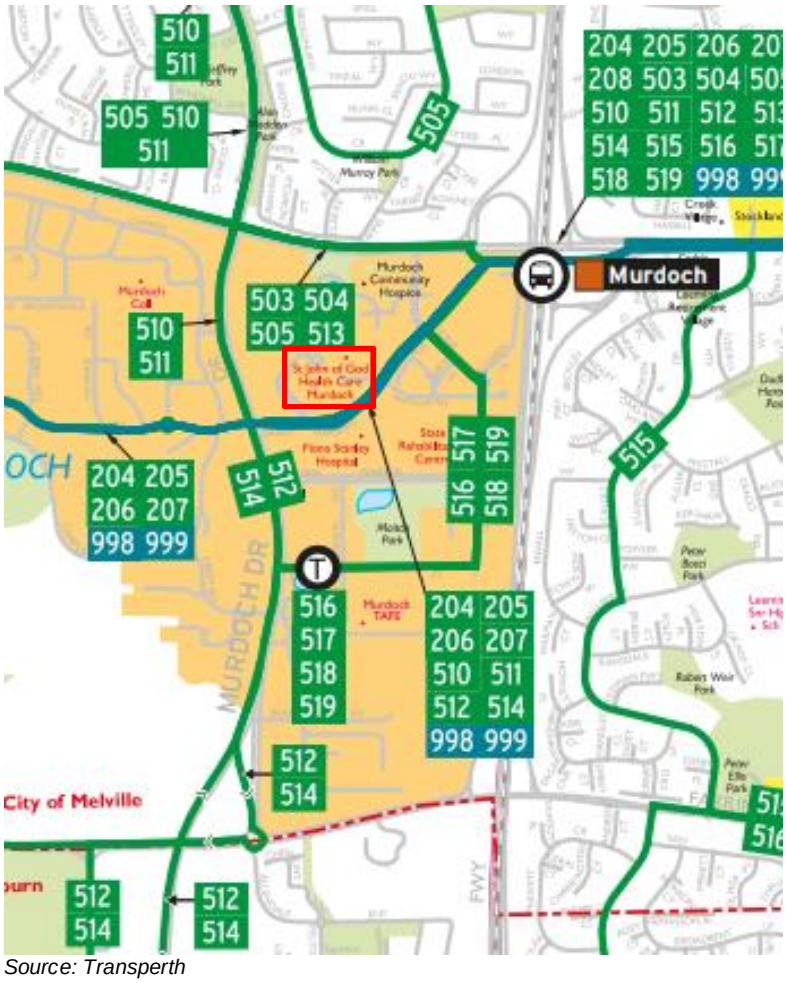
Racks are located adjacent to buildings in most cases although an audit should be undertaken to identify whether these racks are well placed in terms of access to building entrances and passive surveillance, and provide secure parking options for those with different bike styles.

The installation of additional bike racks should be considered whenever informal bike parking takes place in appropriate nearby locations. Over time, these facilities could be consolidated.

A.4 Public Transport

The Site has excellent access to public transport with a number of bus stops located on major road corridors such as South Street and Murdoch Drive. The availability of bus stops along Barry Marshall Drive results in easy access to high frequency bus services that feed into Murdoch Train Station. **Figure A4** below illustrates the large number of bus routes that serve SJGM Hospital, and the close proximity of Murdoch Station to the Site.

Figure A4 Transperth Network Map



Source: Transperth

A.4.1 Bus

Buses travel along Barry Marshall Parade from Murdoch train station every 5 to 10 minutes and stop at the Wexford Medical Centre. Bus services operate between 6:00am and 11:30pm. Show the average frequency of bus services for each bus service surrounding the Site.

Table A1 Barry Marshall Drive

Route	Destination	Frequency
204	Murdoch University – Maddington Station	Every 30 minutes
205	Murdoch University – Maddington Station	Every 33 minutes
206	Murdoch University – Cannington Station	Every 19 minutes
207	Murdoch University – Cannington Station	Every 24 minutes
510	Murdoch Station – Booragoon Bus Station	Every 15 minutes (peak)
511	Murdoch Station – Fremantle Station	Every 30 minutes
512	Murdoch Station – Spearwood Ave	Every 30 minutes
514	Murdoch Station – Cockburn Central Station	Every 30 minutes (peak)

Table A2 Murdoch Station

Route	Destination	Frequency
998	Curtin University Bus Station – Fremantle Station	Every 15 minutes
999	Fremantle Station – Fremantle Station	Every 15 minutes

Table A3 South Street

Route	Destination	Frequency
503	Bull Creek Station – Murdoch Station	Every 35 minutes
504	Bull Creek Station – Murdoch Station	Every 31 minutes
505	Bull Creek Station – Murdoch Station	Every 20 minutes (peak)
513	Fremantle Station – Murdoch Station	Every 30 minutes

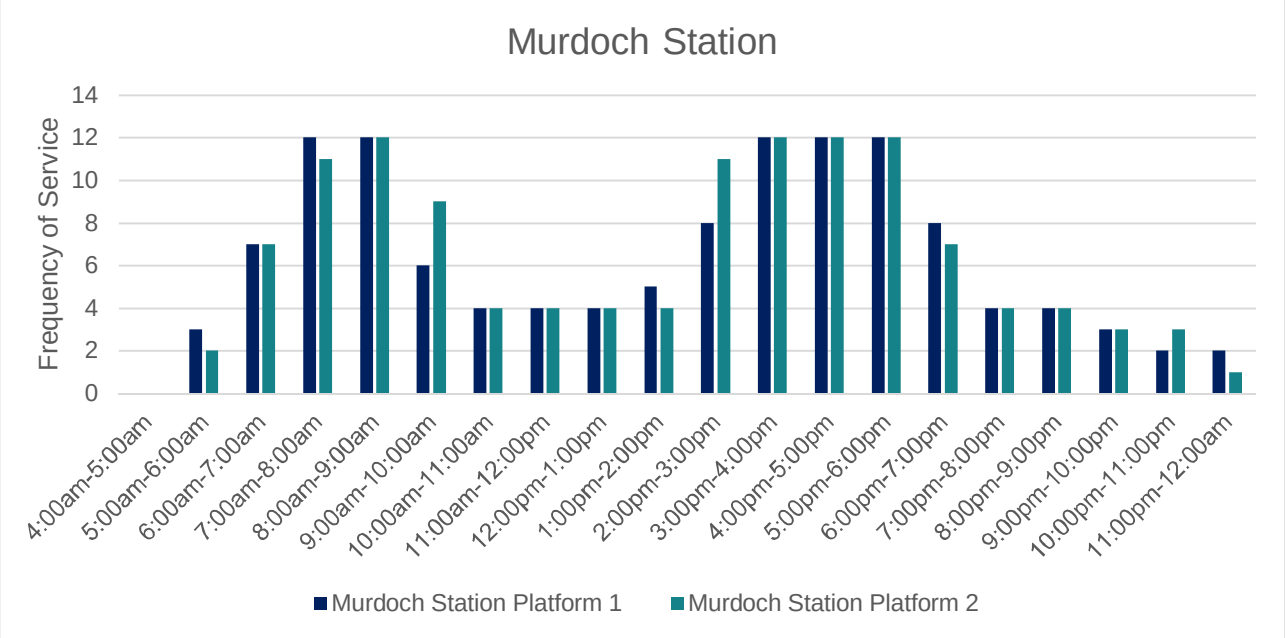
Table A4 Fiona Wood Road

Route	Destination	Frequency
516	Jandakot - Willetton	Every hour
517	Thornlie Station – Murdoch Station	Every hour
518	Murdoch Station – Cockburn Central	Every 20 minutes (evening peak)
519	Murdoch Station – Cockburn Central Station	Every 30 minutes (evening peak)

A.4.2 Train

The train station services the Mandurah line, connecting Mandurah to Perth Underground Station and beyond. The frequency of services is shown in **Figure A5.**

Figure A5 Frequency of services for Murdoch Station



This chart shows a higher number of services corresponds with the peak morning hours of 7-10am, and an extended afternoon peak between 2pm-7pm.

A.5 Road Network

The Site is bounded by South Street to the north and Murdoch Drive to the west. Below are the descriptions and characteristics of these major road corridors surrounding the Site:

- **South Street:** Located towards the north of the Site, South Street is classified as a primary distributor hence experiencing large volumes of traffic. It forms an intersection with Fiona Wood Road with a posted speed limit of 70km/hr. South Street also forms an intersection with Murdoch Drive to the east, providing additional bus stops and access to the MAC.
- **Barry Marshall Parade:** Running through the middle of the Site, it provides excellent accessibility from Fiona Wood Road and Murdoch Drive to multiple on-site parking facilities and has a speed limit of 25km/hr.
- **Murdoch Drive:** Murdoch Drive is to the east of the Site and is classified as a Distributor A, with a speed limit of 70 km/hr. Recent road network changes provide greater connection of Murdoch Drive with Roe Highway and Kwinana Freeway at Farrington Road.

A.6 Parking

There are numerous vehicle parking facilities on the Site. **Figure A6** identifies the parking locations available at the hospital.

Figure A6 Parking facilities

Source: SJGM Hospital

Visitor parking is $3.00/hour and capped at $21.00/day. A three-day visitor parking ticket is $50, a seven-day visitor parking ticket is $80.

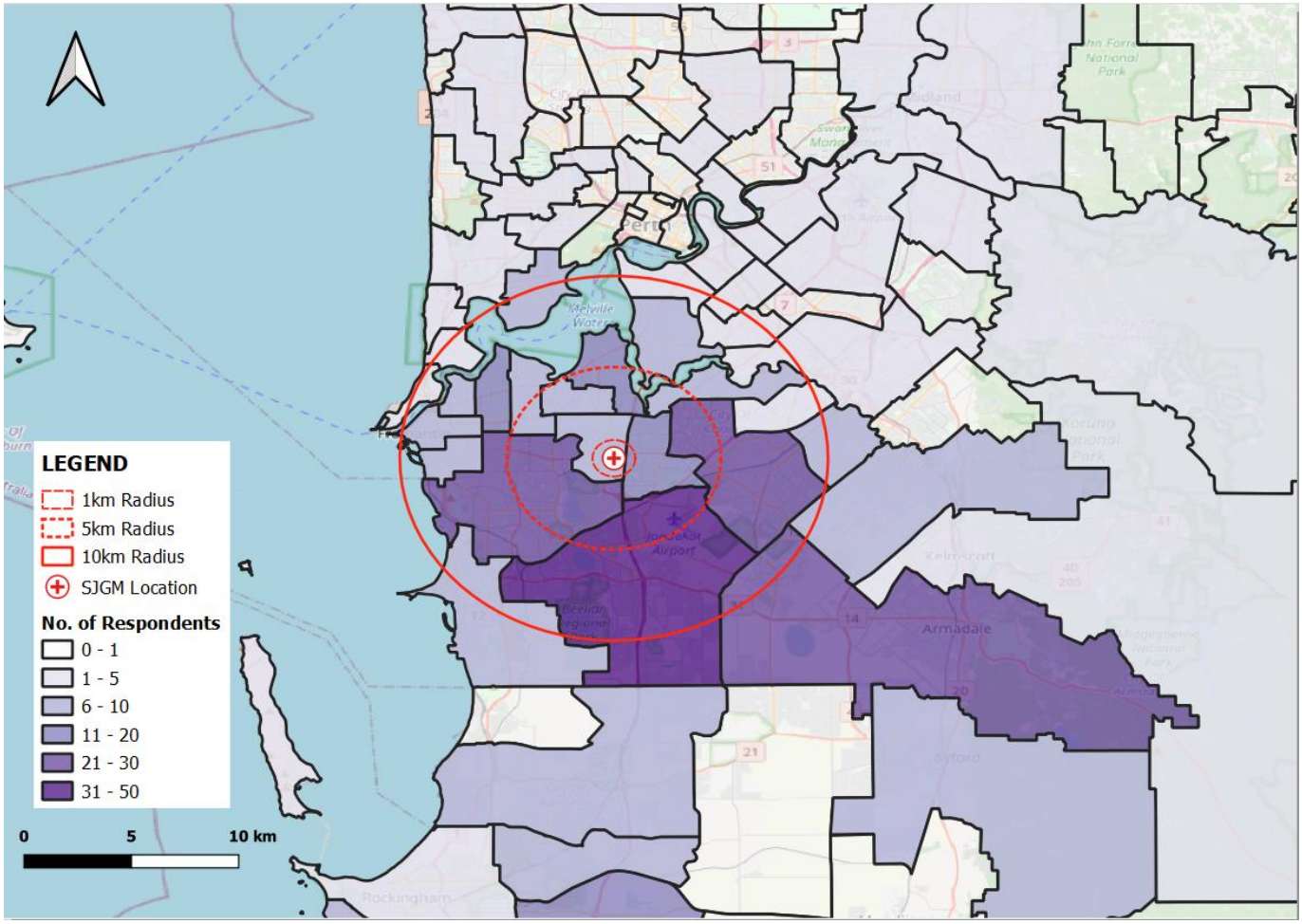
Parking areas are divided into sections for public, staff and doctor parking. Staff parking is also paid parking, at $3.60/day.

A.7 Transport Opportunities by Home Postcode

As part of the data collected in the 2021 travel survey, respondents were asked about their home postcodes. The heat map shown in Error! Reference source not found. gives an indication of where staff are travelling from, and the darker the shade of the suburb, the greater the number of originating journeys.

Given the geographical spread of staff, and the need to change mode for those not living with easy connection to direct public or active transport routes, it is easy to see why driving would be an attractive mode choice. As public transport provision improves over time, a wider range of transport options will become available to those travelling to SJGM Hospital.

Figure A7 Home Postcode of Survey Respondents



APPENDIX

B

POLICY SUPPORT

B Policy Support

B.1 State

B.1.1 Parking Guidelines for Activity Centres

Activity centres for the Perth and Peel metropolitan area are defined in State Planning Policy 4.2 Activity Centres for Perth and Peel as detailed above. The Department of Transport has produced this document which provides guidelines related to the provision of parking within these activity centres, which are to be detailed as part of activity centre structure plans.

The objectives of the parking guidelines are as follows:

- Ensure activity centres provide sufficient development intensity and land use mix to support high-frequency public transport; and
- Maximise access to activity centres by walking, cycling, and public transport, while reducing private car trips.

The following principles apply to the management of parking facilities at Murdoch University:

- Planning approvals should identify specific parking types or uses (e.g. visitor, disabled or service/delivery) that must be catered for and the quantum of each type;
- Definitions of parking types and uses should be clear and consistent with existing legislation and planning practice, such as those in the Perth Parking Policy;
- Planning approvals should distinguish between short stay parking facilities that cater typically for visitors and commuter orientated long stay car parks;
- For campus style developments or large-scale subdivisions or developments, land for parking should be retained by the original landowner to ensure that the parking management can be changed over time and parking numbers can be managed within any allocated caps; and
- Different parking types may be supplied within the one parking facility, but the use must conform to the planning approvals.

The DoT parking guidelines ensures that good access is maintained to evolving developments such as the Murdoch University campus and that a sustainable transport outcome is achieved.

B.1.2 Directions 2031

Directions 2031 Spatial Framework for Perth and Peel defines spatially how Perth should grow and identifies the structural changes to transport land use required to support that growth. Directions 2031 includes strategies to encourage a shift towards active transport, particularly as portions of the transport network become more congested.

Directions 2031 supports the promotion of sustainable transport options including the planning and design of activity centres around transit-oriented development principles to promote public transport, walking and cycling as alternatives to private car use.

B.1.3 Perth and Peel Transport Plan

This strategy is planning a transport network for the long term. The vision is for *'a vibrant, connected and productive Perth*' with an increase in public transport to 11% for all-day trips and 65% of peak period trips and a reduction to 32% of peak period mode by private vehicle.

For SJGM it indicates bus rapid transit or light rail beyond 3.5M between Murdoch Station to the Cockburn Coast via Fremantle and an upgrade to Reid and Roe Highways to freeway standard by 2.7M.

B.1.4 State Planning Policy 4.2 Activity Centres for Perth and Peel

State Planning Policy 4.2 Activity Centres for Perth and Peel (SPP 4.2) defines a series of activity centres within the Perth and Peel area, with respect to their hierarchical position. The hierarchical position then reflects the purpose of the centre, as well as priorities in terms of land use mix and transport and parking functions for the centre.

An activity centre is defined within SPP 4.2 as follows:

"Activity centres are community focal points. They include activities such as commercial, retail, higher density housing, entertainment, tourism, and medical services. Activity Centres vary in size and diversity and are designed to be well-serviced by public transport."

The activity centre hierarchy is summarised below:

- Perth City Centre (Capital City);
- Primary Centres;
- Strategic Metropolitan Centres;
- Secondary Centres;
- District Centres;
- Neighbourhood Centres;
- Local Centres
- Specialised Centres.

The MAC is identified as a Specialised Centre for Health, Education and Research, which "focus on regionally significant economic or institutional activities that generate many work or visitor trips, which therefore require a high level of transport accessibility".

The policy goes on to say that planning making decisions should "facilitate co-location of retail, residential, commercial, entertainment and other compatible urban uses with tertiary education, health and other suitable specialised centres".

Figure B1 illustrates the policy's position with respect to movement.

Figure B1 SPP4.2 - Movement

Strategic metropolitan and specialised centres

(7) The responsible authority should:

- provide guidance for the location and management of parking supply to prioritise access between different user groups and specify targets (eg. short stay turnover, supply and management of service/delivery parking, compliance and an enforcement regime for public parking);
- base parking supply and management standards on reciprocal use and other efficiency opportunities, especially common-user parking facilities;
- ensure that the access, circulation and parking needs for all users including cyclists, motor cyclists, disability parking, service/delivery vehicles, public transport and essential services are catered for; and
- require application of a regulatory and parking fee system that supports the efficient supply and use of parking and alternatives to private car use.

B.2 Local

B.2.1 MAC

The Murdoch Specialised Activity Centre Structure Plan (2014) is a high-level, aspirational plan. It is noted within the plan that it will require further consideration over time, including a list of recommended further studies. The Structure Plan relates to a future scenario in which there is an anticipated 35,000 jobs and 44,000 students within the activity centre.

The Structure Plan identifies that the MAC presents a unique and exciting opportunity to combine specialised employment, residential living and education in one place, while also activating the area so it becomes a distinctive and engaging location for the community.

It is noted that there will be a dynamic shift in the approach to transport planning, and the introduction of major public transport trunk infrastructure in an east-west direction will transform the MAC from being an origin of PT trips and a redirector of traffic to a centre which is both an origin and a destination.

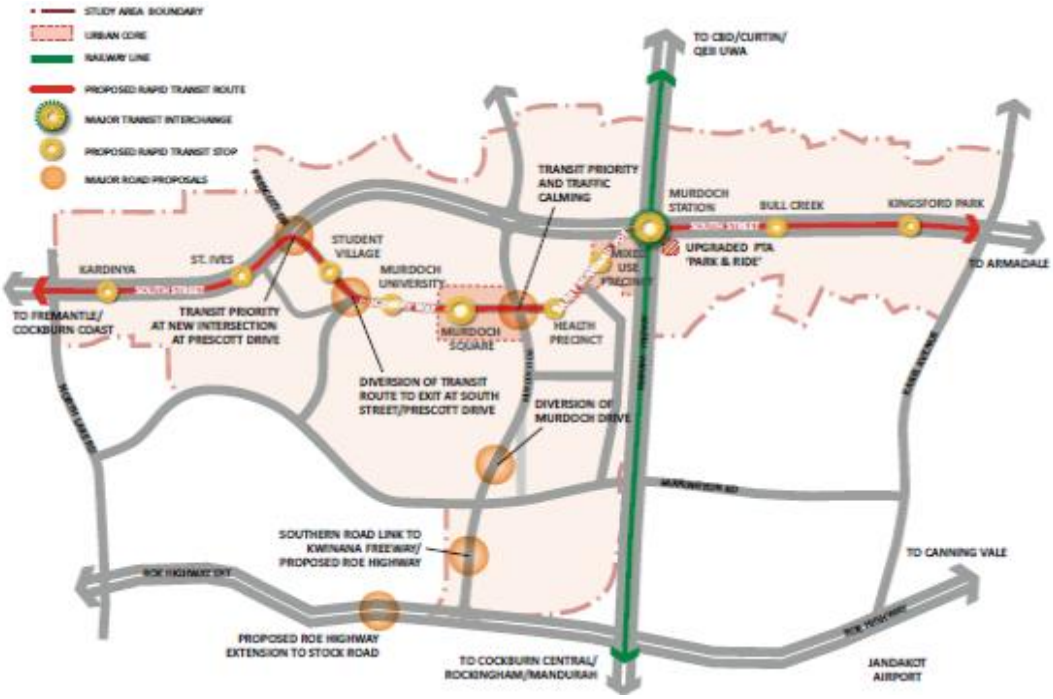
Significant densification of development is anticipated to occur on both the SJGMH site and within the MAC more broadly. The long-term transport vision for the centre positions the Murdoch Activity Centre within the regional hierarchy of centres, and requires fast and efficient connections with other centres. To support efficient connection, provisions for future rapid transit are necessary. These provisions are not actions that

can be included in the SJGM Hospital Green Travel Plan in isolation, and will require ongoing consideration and negotiation with all activity centre stakeholders and State and various local government bodies.

The Structure Plan makes recommendations for specific transport infrastructure to be developed, including an east-west rapid transit system along Discovery Way (internal to Murdoch University) and Barry Marshall Parade to Murdoch Station. Initial stages of this infrastructure have been developed.

The long-term transit network developed in the Structure Plan is show in **Figure B2** below.

Figure B2 Long Term Transit Network for Murdoch Activity Centre



The Structure Plan notes precinct-based priorities will support transport mode shift. It is recommended that the following are considered for parking and travel management in the activity centre:

- Parking caps for sub-precincts, **Figure B3** shows the requirement for SJGM Hospital
- Staged developments be required to demonstrate the need for parking
- Range of parking facilities provided based on considerations of core business function, availability of public transit, road capacity, traffic flow, environmental conditions
- Parking reciprocity, efficiency, priority, quality, management (no allocation)
- Outside of the University Education precinct, sub-precincts required to manage 25% of parking as public and visitor parking

The above does not retroactively apply, however will be applied if site development/redevelopment occurs. Site users and employers will be required to develop and implement travel plans, including parking pricing strategies.

Figure B3 Parking cap

St John of God Hospital	*12.2*	*170*	***2074** bays – determined by application of the parking rate to the gross land area for land substantially within 800m of the Murdoch Train Station.*

Western Australian Planning Commission Resolution

At its meeting on 13 May 2011 the Western Australian Planning Commission (WAPC) resolved to:

1. Adopt the draft "Murdoch Activity Centre Access and Parking Policy" as a guide for the future transport planning for the MAC Precinct until the proposed State Planning Policy (SPP) - Metropolitan Centres Parking has been gazetted and the draft Access and Parking Policy can be updated and modified to be consistent with the SPP.

2. Adopt and apply to subdivisions and development applications the planning principles outlined in Attachment 1 to planning approvals within the Murdoch Activity Centre (MAC).

3. Adopt and apply to development applications a maximum parking provision (parking cap) for the MAC of 17,500 bays as allocated for each sub-precinct landowner in table 1 and only support subdivisions that maintain ownership and control of parking with the original sub-precinct owner.

B.2.2 Murdoch Activity Centre Access and Parking Policy

Murdoch Access and Parking Policy - Principles to Guide Planning Approvals 2011

- The volume of traffic to and from the MAC is to be managed within the capacity of the planned external road network, especially during peak periods. Development approval will be conditional on not exceeding the parking cap for each sub-precinct as per table 1.
- Staged developments of a sub-precinct need to demonstrate a reasonable need for the proposed parking even though it may not exceed the parking cap.
- An adequate range of parking facilities will be provided and managed having regard to core business functionality, availability of public transport, road capacity, traffic flow and environmental conditions.
- Parking facilities will be provided and operated to maximise their efficiency in accordance with the following principles:

a. Sharing: parking facilities should serve multiple users and destinations in each sub-precinct.

b. Efficient utilisation: parking facilities should be sized and managed so spaces are frequently occupied

c. Prioritisation: the most desirable spaces should be managed to favour higher priority users

d. Quality: importance should be placed on aesthetics, security, accessibility and legibility

e. Subdivision of land for parking purposes will not be permitted. The landowner is to retain the management of all parking within the precinct and thus no parking bays can be allocated to individual properties as part of any lease agreement.

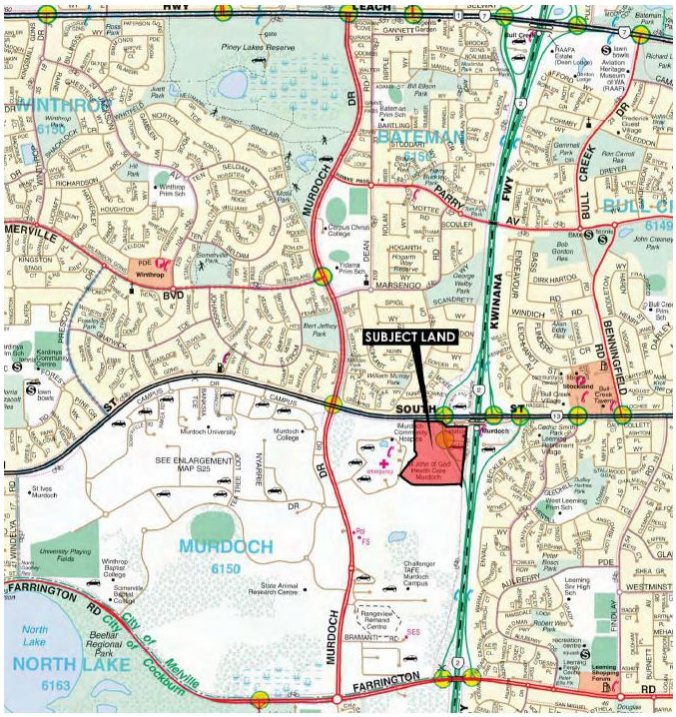
- Sub-precincts will be required to manage at least 25% of their parking as public and visitor parking (except Murdoch University education precinct)
- The planning approval elements of the policy will not be applied retrospectively to existing parking facilities for which appropriate approvals have been gained. However, where site development or re-development occurs, proposals will be assessed in terms of the policy.
- Off-street parking areas should be located and designed so they are an integral part of the development of the site. Disabled parking and cycling facilities should be visible and conveniently located. Parking facilities can offer a mix of long stay and short stay parking.
- On-street parking areas will be for short stay parking only.
- Landowners will be responsible for developing and maintaining a Parking Management Plan for their site that will work towards achieving the intent of the MAC Parking and Access Policy and any relevant planning approvals.

Site users and employers will be required to develop and implement Travel Plans. Draft Travel Plans will require to be submitted with all development applications and should include parking pricing strategies and the relativity with other sub-precincts including the Health Departments adopted Access and Parking Policy.

B.2.3 Murdoch Mixed Use Precinct Activity Centre Structure Plan

Murdoch Mixed Use Precinct (MUP) is located within the wider Murdoch Activity Centre, and is shown below in **Figure B4**. A detailed Transport Assessment for the MUP Activity Centre Structure Plan was conducted in 2016. This has been reviewed below, with reference to the transport connectivity across the centre.

Figure B4 MUP Site



The relevant MUP objectives for pedestrian and cycling access are:

- Provide easy and safe access to the bus / rail interchange.
- Provide effective pedestrian linkages through the site.
- Strengthen pedestrian and cycle connectivity to and within the precinct.

It is noted that MUP contributes to the opportunity to develop a transport-oriented hub in a significant and rapidly growing activity centre, and as such the following opportunities were identified for the centre:

- Bike hire scheme for MAC
- Direct pedestrian and cycling connections between catchments on eastern side of Kwinana Freeway (Leeming and Bull Creek) and the MUP, wider MAC site, including a pedestrian bridge which connects to Murdoch Station
- Pedestrian and cycling crossing improvements for South Street and Murdoch Drive
- Pedestrian bridge over Murdoch Drive, into MUP and then to Murdoch Station
- Light rail transit link through MUP to Murdoch Station (this is again long term and ambitious but a similar link has occasionally been noted, without specific alignments or detailed plans being proposed). Light rail or trackless trams represent a long-term ambitious future plan, not currently being specifically prepared for.
- Free transit zone for MAC
- Murdoch Station bus bridge capacity improvement
- Relocation of the western Park n Ride Facility (potentially to a multi-storey carpark on the eastern side of Kwinana Freeway)

These recommendations and supporting analysis for the activity centre have been considered in the development of the Travel Plan, as it is important that aspirations for all developments across the centre are well integrated and support the strategic goals of the centre.

B.2.4 Murdoch Activity Centre Main Street and Mixed-Use Precinct Design Guidelines (2011)

This document provides guidelines for land use and design options for Barry Marshall Drive and the area immediately adjacent to the train station.

B.2.5 City of Melville Bike Plan

The City's Bike Plan was released in 2012 and covers 2012-2019. The Plan provides a list of roads and streets which should form both high and mid order routes.

In 2020, a shared path was completed on part of Murdoch Drive between Leach Hwy and South Street to make it safer and easier to access the MAC.

B.2.6 SJGM Hospital Internal Policy – Green Travel Allowance

The hospital provides a Green Travel Allowance to permanent caregivers who walk, cycle, travel by public transport or travel as a passenger in another vehicle to work. If they choose to use other means than as the driver of their private vehicle to commute to and from work the initiative provides an allowance of $6/working day to a maximum of $60/fortnight.

APPENDIX

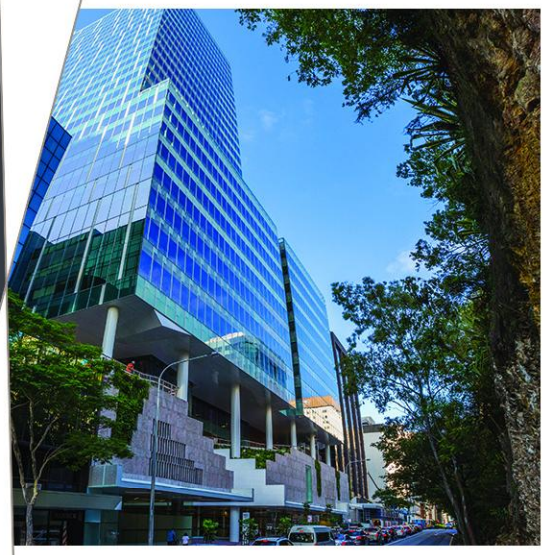
C

STAKEHOLDER ENGAGEMENT OUTCOMES

Internal Stakeholder Engagement Workshop

Green Travel Plan

CW1176100



Prepared for

St John of God Murdoch Hospital

22 September 2021

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A		Draft for Issue	SL	JM

Table of Contents

Appendices

Tables

Figures

1 Stakeholder Engagement

1.1 Methodology

The Stakeholder Engagement plan is provided in **Appendix A**.

2 Internal Stakeholders

A workshop was held at SJGMH with representatives including:

- Dilwyn Griffiths – Director of Finance
- Deb Barbas – Manager Hospital Redevelopment Projects
- Ashlee Lewis – Manager Security & Parking
- Kimberley Montgomery – Deputy Director of Nursing Clinical Safety & Quality
- Julie Rogers – Manager Strata Properties & Leasing
- Michael Salter – Director Corporate Services
- Ben Dellar – Director Business & Service Development
- Phil Pavlos – Lead OHS Consultant
- Olivia Harvey – Manager Public Relations & Engagement
- Colleen Marinovich – Volunteer
  Louise Hutchinson – Clinical Nurse, Emergency Department

The key messages from the workshop are summarised in the following table.

Table 2-1 SJGMH Internal Stakeholder Workshop Discussion Points

Topic	Discussion Points
Public Transport	Child drop off, time, trip chaining Real or perceived safety threats from public transit Freedom of last-minute options en route to home Live 40 minutes away Benefit – lack of parking availability, environment, reliable and provides free time for yourself, avoid traffic Need improved transport links Better connection to hospital, no shelter or lighting along the footpath Bus stop too far from main building, stops in front of Wexford On-site childcare, would that make PT easier Home to node transit often poor (Baldivis, Warnbro)
Cycling & Walking	Too far Need to live closer Need for vehicle before and after work Long time to cool down Benefits – fitness, lifestyle, convenience Deadlines after work make this difficult Need better access to hospital Not interested in fitness side of transport Legibility to the station, no amenity/shelter/shade Internal connections between eot and changerooms Availability of lockers
Driving	Benefits - Time, convenience, family, personal preference, easy, comfortable, staying late at work Weather is a factor; bad weather leads to increases in driving Visitor parking gets filled with visitors for Fiona Stanley, now they have lost parking due to Covid Clinic and maintenance on multi-storey carpark Volunteer shifts are 4 hours, free parking

	Many staff travel a long distance to work No disadvantage to driving Unpredictable trip time/duration
Success Factors	Hesitant to move to parking priority for shift workers or to limit parking access based on proximity of home to work. Patient transport via Uber Black? Uber discounts Small changes Shuttle bus service from train station, the PTA buses drop off at Wexford Centre which still leaves 5-minute walk for people working in main building. e-Bike Loan Program for staff to borrow an e-Bike/eScooter to 'try before you buy' – positive response to this idea Novated leasing of e-Bikes (e-Stralian) Carpooling app to connect staff living near each other Increase parking fees from $3.60 for staff Increase cost of lease parking bays Improved bike paths and access from the PSP and better paths on surrounding roads More secure bike parking with a fee
Policy Changes	Update Green Travel Allowance to be more flexible, link in with profile for parking. The profile now provides parking between 5pm and 4am and receive allowance for travel between 4am and 5pm. Increase $ for Green Travel Allowance Flexible financial incentives
Communication Plan	Agreement amongst internal stakeholders that communication strategy is integral Communicating the 'real cost' of car ownership Promote Green Travel Allowance for carpool passengers Green Travel Day, stories from staff, a champion Information about no additional cost to catch bus from train station

A full version of the minutes can be found in **Appendix B**.

3 Travel Survey

A travel survey was conducted over a two-week period in August in order to understand how SJGMH staff typically travel to and from the hospital. The survey was distributed online and publicised through internal channels to staff and hard copy surveys were also available.

A total of 457 responses were collected, with some questions skipped. Questions which were left black were disregarded only for those questions; the entire response was not rejected.

The survey was used to develop a picture of existing mode share for travel to and from the hospital, by indicating how many days in a typical week the respondents use various modes of travel, including private vehicles, public transport and active modes. It also asked a series of questions relating to the respondents' demographics, travel information and transport benefits. A copy of the survey form is shown in **Appendix C**.

The results of the survey are analysed below.

3.1 Demographics

Figure 3-1 shows the distribution of responses by gender for the survey, confirming that a substantial majority of staff are women. **Figure 3-2** shows the age profile of the respondents, showing the diverse age range of employees.

Figure 3-1 Gender Profile of Respondents

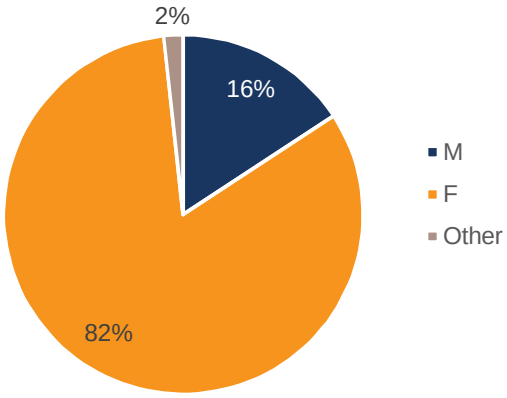


Figure 3-2 Age Profile of Respondents

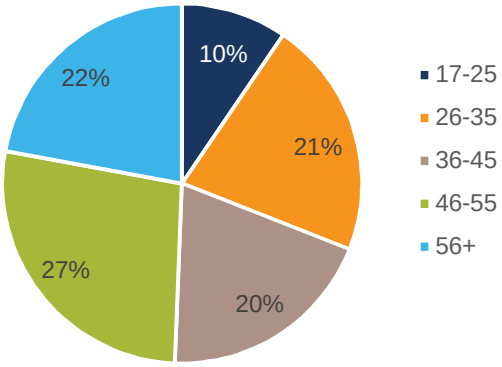
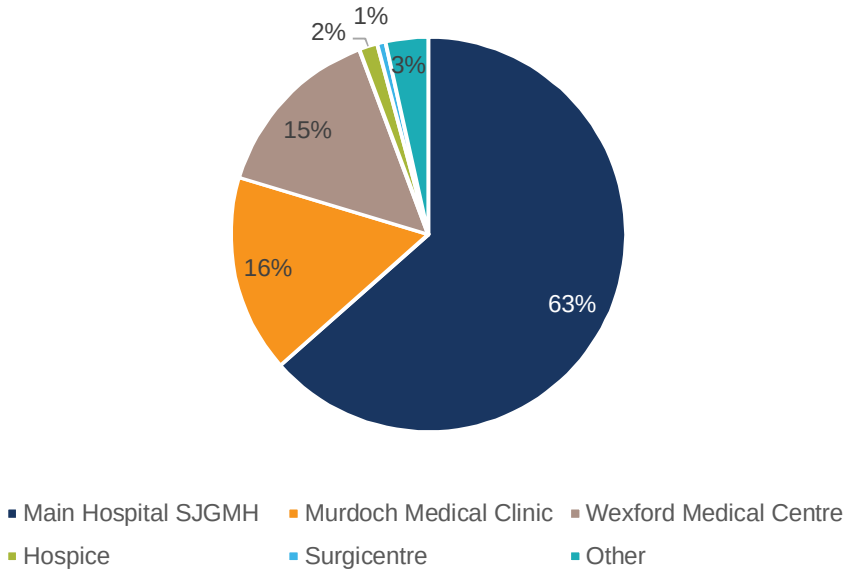


Figure 3-3 indicates the areas of the hospital in which staff are employed, with the largest number of responses coming from the Main Hospital.

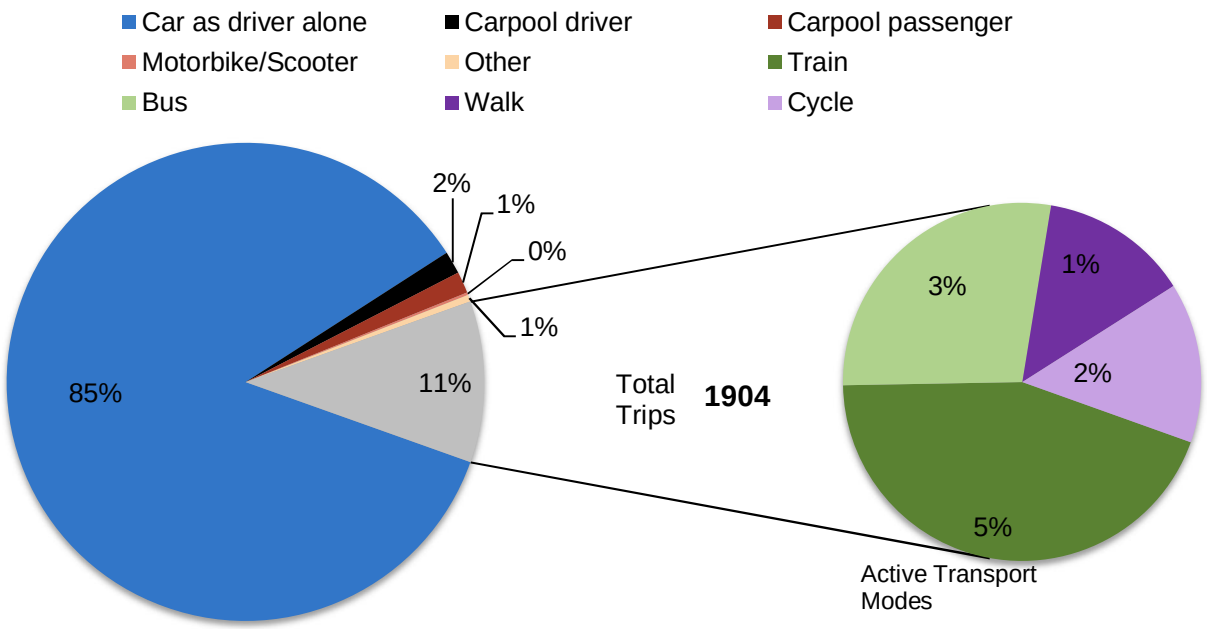
Figure 3-3 Area of Employment



3.2 Mode Share

The survey collected results for existing mode share, with the results shown in **Figure 3-4**. Note that this data counts each mode in a trip chain, and so marginally over-estimates public transport usage where both bus and train trips were used.

Figure 3-4 Mode Share for Employees



3.3 Mode Share by Home Postcode

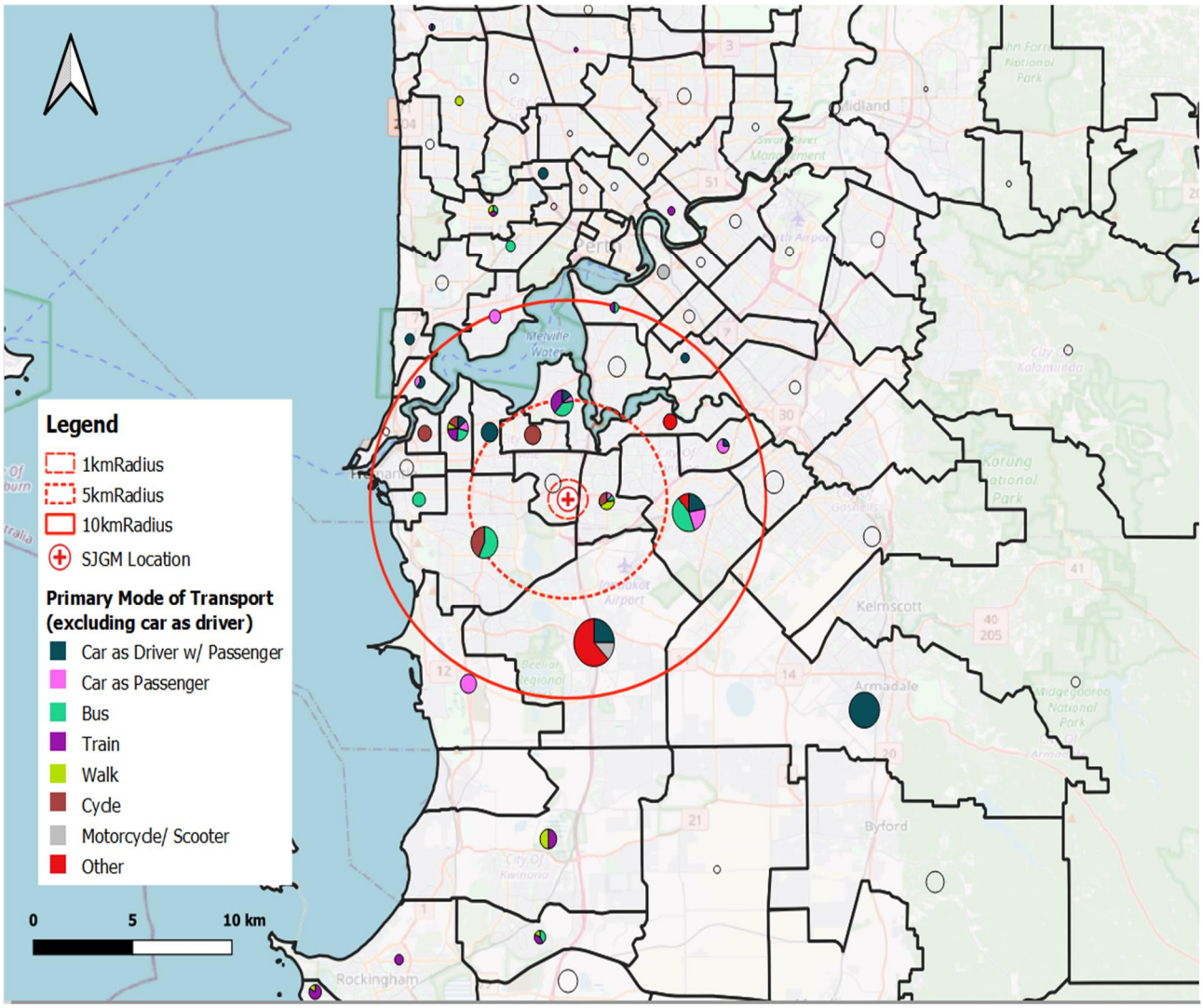
Figure 3-5 shows the home postcode location of staff respondents and their primary mode of transport (excluding car-as-driver modes). These 'car as driver alone' modes have been omitted to make alternative transport options appear more prominent.

This data shows that cycling modes are more popular for employees living closer to the Hospital, but there is also a considerable proportion of bike trips from suburbs along the south bank of the Swan River, up to 10km away.

This is despite the fact that bike routes to the east of the Freeway, in addition to the Kwinana Freeway PSP itself, are generally more connected than those heading west towards Fremantle. This may be more indicative of the density of residential development, and the relative travel distances from these homes.

The demand for public transport to the Hospital is very low, particularly given the proximity of the Site to Murdoch Station. Spatial distribution of these trips appears to map to the Transperth bus routes and train line, suggesting a reluctance (or an inability) to undertake multiple public transport changes to access the Hospital.

Figure 3-5 Mode of Transport by Home Postcode



3.4 Mode Choice Decision Making Factors

Respondents were asked to rank how important certain variables were to their choice of travel to SJGM.

Convenience and travel time were the main reasons for mode choice; this is typical of all travel behaviour across most industries. However, respondents also commented that shift work makes it difficult to rely on public transport and safety concerns if leaving a late shift, whether using public transport or cycling.

3.5 Stops

Respondents traveling in private vehicles (either driving alone or with passengers) were much more likely to "make stops along the way", than non-car users. This highlights the convenience and flexibility of driving and is one of the primary reasons respondents stated they used their car.

Staff indicated the most common trip chains were for child care duties – picking up/dropping off from school or daycare. There is scope to replace some of these stops in the longer term, by providing services within the proposed MAC mixed-use precinct. This could support increased uptake of active and sustainable transport modes.

3.6 Arrival & Departure Times

Survey participants were asked about their usual arrival and departure times. Employee answers are presented in **Figure 3-6** and **Figure 3-7**.

Figure 3-6 Arrival Times

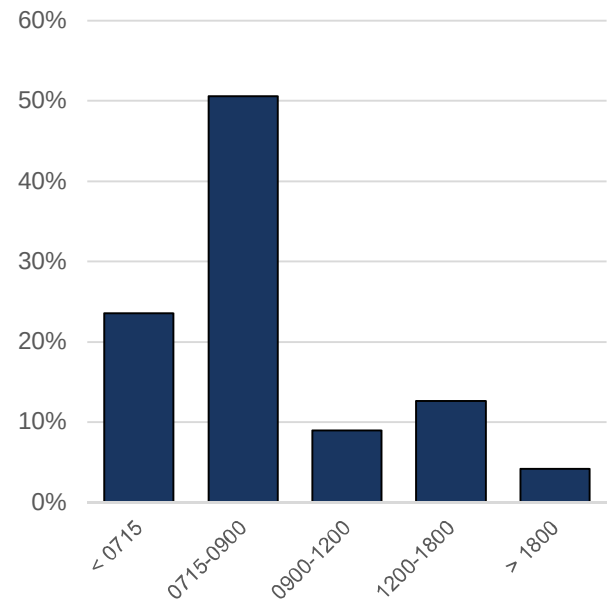
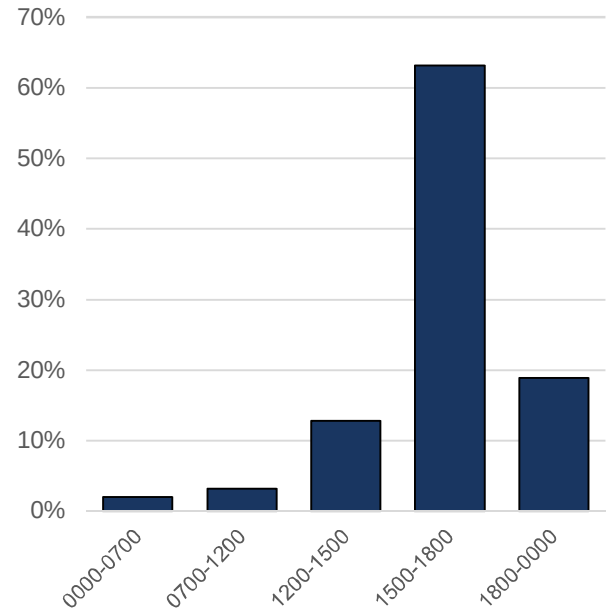


Figure 3-7 Departure Times

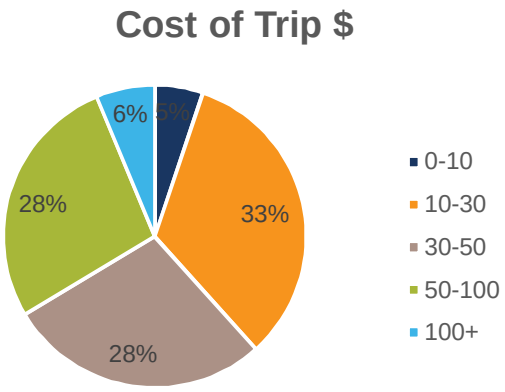


While the results show that the peak arrival and departure times generally match roadway and public transport peak periods. However, there is a significant proportion of trips that arrive prior to 7am or depart after 7pm. These trips are difficult to shift to other modes due to the lack of effective public transport options for a large proportion of home locations. Analysis of parking entry/exit data provided by SJOGMH indicates that 30-40% of staff have trips outside of convenient travel periods.

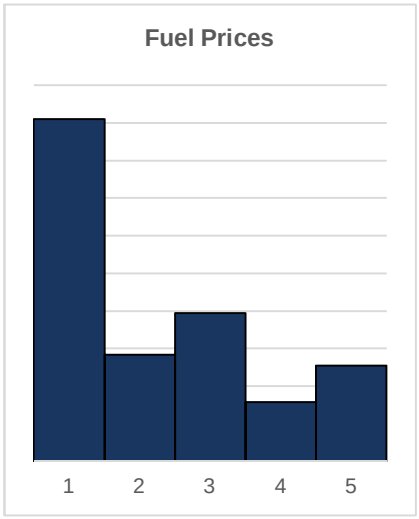
3.7 Estimated Cost of Travel

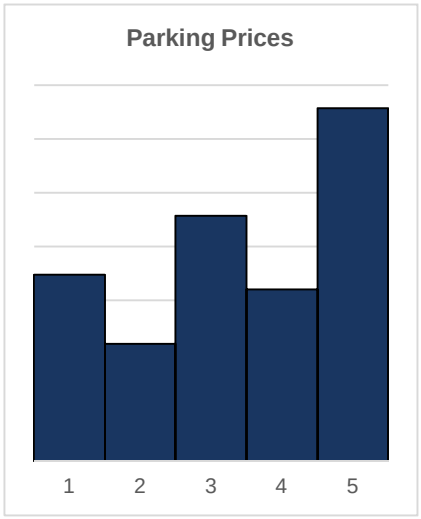
Staff estimated the cost of travel to work for the 7 days prior to the survey at approximately $40. Noting that the average public transport fare is $8-$11 per day (plus $2/day if using park and ride), this shows that in addition to being generally quicker, more convenient and more flexible than other modes, driving is also cost-competitive with public transport. This assumes that a household already owns a car (depreciation is one of the largest costs of vehicle ownership, but that occurs whether or not the vehicle is used).

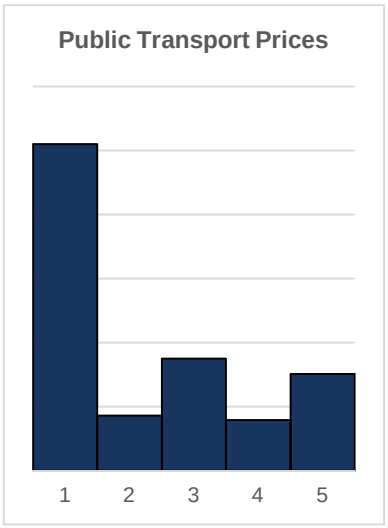
Figure 3-8 Estimated Cost of Travel to Work in Last 7 Days



With 1 being the least important and 5 being the most important, staff tended to respond that car parking prices were very important to their future trip making choices in travelling to work.







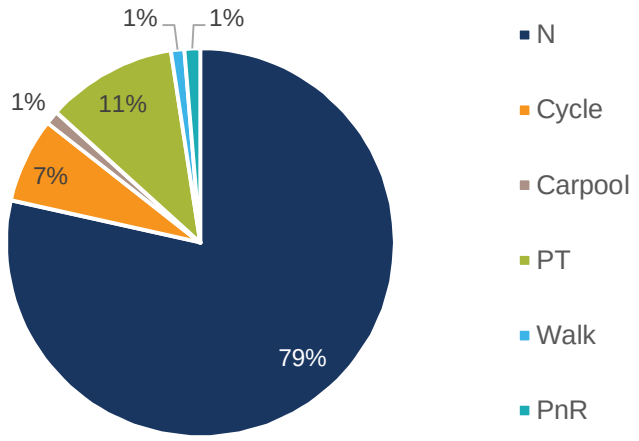
3.8 Estimated Length of Travel

Many respondents commented that they currently drive long distances to work, and those that did not drive long distances stated the trip by public transport would take 2-3 times longer.

3.9 Consideration of Mode Change

An overwhelming majority of respondents have not considered changing their mode of travel to work, with only 21% considering a change (**Figure 3-9**). The most receptive change was to public transport, with financial incentives, and cycling, with incentives to allow for parking on occasion.

Figure 3-9 Considered Changing Mode from Car Driver in Last 12 Months



3.9.2 End of Trip Facilities

An upgrade to the end of trip facilities was mentioned by a few respondents, but it was not considered enough to change their mode to cycling. Over a third of respondents were unaware of the secure bike storage and changerooms (**Figure 3-10** and **Figure 3-11**).

Figure 3-10 Awareness of End of Trip Facilities

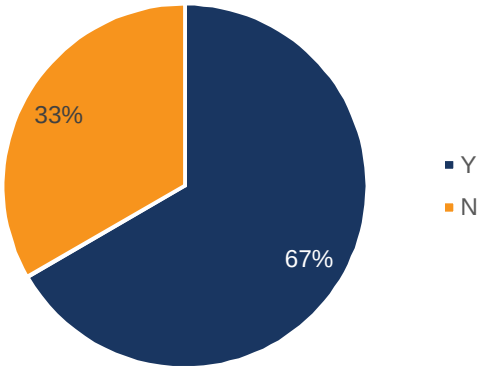
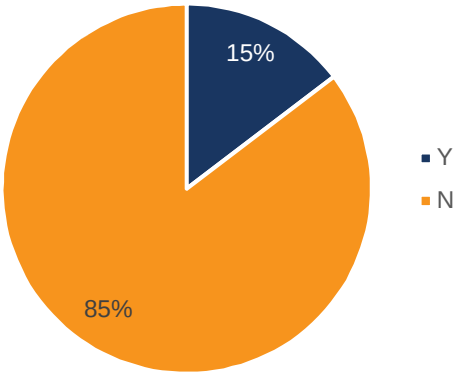


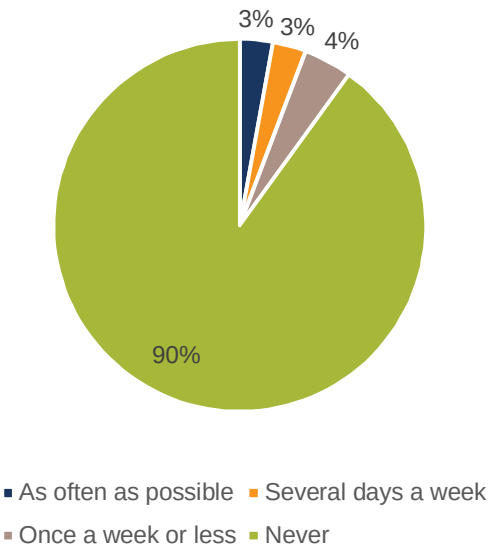
Figure 3-11 End of Trip Facility Upgrades to Change Mode Choice



3.9.3 Concept Idea: Loan Bicycle

Through the survey, staff were asked if they would consider using a loan bicycle to commute to/from work if one were provided. The use of a loan bicycle is often a stepping stone to an employee purchasing their own bicycle for some of their trips to work. **Figure 3-12** shows the results from this question.

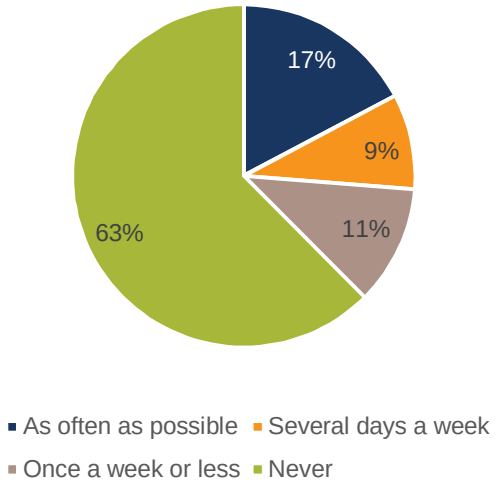
Figure 3-12 Loan Bicycle - Staff Use



3.9.4 Concept Idea: SmartRider Incentives

If a subsidised SmartRider was provided to staff, 37% of respondents stated they would use it to travel to work. Therefore, it seems many staff are unaware of the Green Travel Allowance Policy, which in effect provides a $6/day subsidy to staff who choose not to drive.

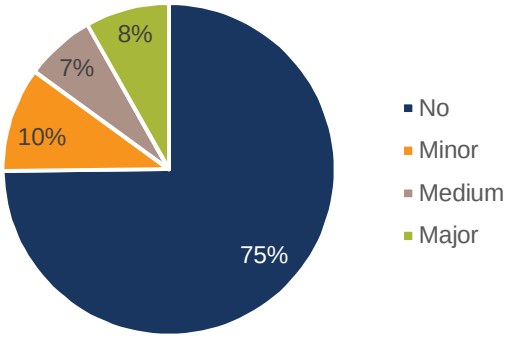
Figure 3-13 Subsidised SmartRider – Staff Use



3.9.5 Bus Services

Bus stop locations surrounding the hospital and the frequency of services along Barry Marshall Parade were not seen as barriers to using public transport, the commentary was more focused on services network wide (**Figure 3-14**).

Figure 3-14 Bus Stop Locations as Barriers to Using Public Transport



A slight majority of respondents would like the hospital to advocate for improved services along Barry Marshall Parade but the majority also responded that increased services would not change their mode to public transport (**Figure 3-15**, **Figure 3-16** and **Figure 3-17**).

Note that while almost 1/3 of staff indicated that they would be more likely to use public transport if service frequency were increased, this extent of change is unlikely to eventuate. Stated preferences rarely translate directly into action.

Figure 3-15 Need for More Frequent Buses on Barry Marshall Parade

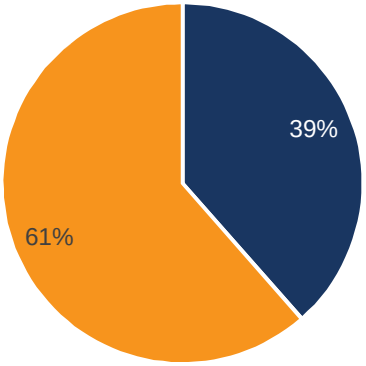


Figure 3-16 Increased Bus Services to 5 Minutes

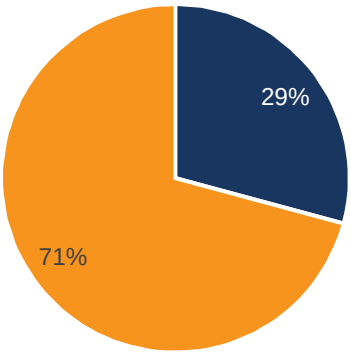
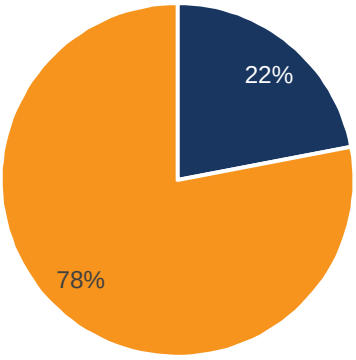


Figure 3-17 Increased Bus Services to 10 Minutes



3.10 Survey Participants Suggestions for Sustainable and Active Travel

Participants were asked if they had any suggestions to encourage active and sustainable transport to the hospital. Their comments are summarised below, according to mode.

Table 3-1 Suggestions to Encourage Sustainable and Active Travel

Mode/Theme	Comment
Public transport	Many respondents indicated the need to stop to/from work for child care and other factors such as shopping. If more facilities were located on site, or within the MAC, it could reduce need to stop on the way to/from work.
	Respondents flagged that substantial changes to public transport could make this mode more attractive, including widespread expansion of the existing public transport network and provision of higher frequency options especially after 6pm.
	A number of participants indicated that the high cost of public transport services, including park n rides, served as a deterrent to their use of public transport. It was suggested that public transport cost reimbursements could be provided to staff that are not direct employees.
	A log book was suggested for the Green Travel Allowance, and many felt the 'all or nothing' with driving or not in order to be eligible was a barrier.
	A shuttle bus service from the train station between 7am-9am and 11:30am-1pm or all day for patients and visitors was seen as a benefit, considering the bus stop is not located outside of the main hospital entrance.
Cycling & walking	Participants sought clear and direct travel by bike through SJGMH site with improved signage, and better, safe and secure bike parking. Secure scooter parking (lockers) was also mentioned.
	The availability of safe, dedicated cycling infrastructure both within and outside the site was an issue for participants, with responses indicating the need for safe, connected and convenient cycle paths throughout the metropolitan area, with connections to destinations.
	Incentives for riding to work were suggested, such as parking spots on occasion when needed, or after 50 times riding in to work staff receive a free ticket to the hospital ball.
Driving	Several respondents expressed their dissatisfaction with the availability and cost of car parking at SJGM Hospital, and many felt they had no alternative due to their personal circumstances. Driving was viewed as the most convenient option, with many respondents stating child care duties as requiring a car.
	A few participants suggested increasing the cost of parking to discourage driving.
	Several responses called for the development of carpooling groups, and the potential for reduced car parking fees for carpooling. Participants wanted the hospital to support ways in which staff can meet each other to find similar shifts/routes.

	Shift work was another factor that employees felt required driving, and sought parking to be prioritised for this group.

3.11 Key Findings from the Survey

The survey responses allowed for an investigation into the factors that determine the mode choice of employees. It also enabled an understanding of the potential for mode share change, with the existing land use and transport infrastructure.

The results indicated that:

- 87% of staff primarily travel via private vehicles, including as a driver alone and with passengers, and as a passenger in a car.
- Public transport is under represented, with bus and train accounting for 8% of staff mode. Many reported that there were not direct routes from their homes and were discouraged from public transport because of changing buses 2-3 times, as well as the longer commute.
- Those that were interested in cycling to work suggested incentives would encourage them to ride to work some of the time.
- Convenience and travel time were significant motivating factors for those who chose to drive, while environmentally friendliness was a motivation for choosing active modes and public transport
- Many respondents said they would consider public transport at least once a week if it was subsidised.
- Errands, specifically child drop off/pick up, was a key variable in choosing to drive.
- Overall, the survey shows that driving to SJGM Hospital is the most convenient mode of travel for staff.

4 External Stakeholders

Inputs from engagement with external stakeholders are summarised in the following sub-sections.

4.1 City of Cockburn

There have been many road works in the Cockburn area that have affected cycling through Cockburn to Murdoch. The Kwinana Freeway northbound widening and Murdoch Drive connection are now completed but caused long bike detours during construction. The PSP along the freeway has been upgraded and is now wider with good surface condition and better lighting at night.

The City of Cockburn received a grant from DoT for a cycle connection along Hope Road from Bibra Drive to the Freeway PSP. This connection was suggested for earlier designs of the Murdoch Drive Connection but ultimately was not included in the final plans. The 3 m wide path is due for completion late August 2021. The off-road shared path is designed to cater for less confident riders including high school students wishing to access Leeming High School. Wayfinding will assist bike riders connect from Bibra Lake shared path to the Freeway PSP.

The Hope Road shared path is the first section of the Wetlands to Waves route via Bibra Lake and Coolbellup and will connect to the proposed Stock Road Bridge.

Getting to St John of God from Murdoch Station or the Freeway PSP was difficult by bike, with paths leading from the station into car parks, and having to navigate lifts with bikes to access the correct paths. Clearer wayfinding would assist with this and a review of the legibility of the cycle route through the Murdoch Activity Centre overall. A bike share scheme for the MAC was also suggested by the City.

With regards to cycle access from the southwest, the City advised that there are good links through the wetlands that would benefit from greater promotion. The Long-Term Cycle Network will also provide greater connectivity and planning for cycle routes to the MAC from the City of Cockburn.

Wayfinding onsite can be difficult and signage would help cyclists to navigate through the site.

4.2 Murdoch Activity Centre

4.2.1 Fiona Stanley Hospital

A condition of development consent for the Fiona Stanley Hospital is a requirement to employ a Travel Plan Coordinator (TPC). This condition has not yet been realised and a clear timeline for this appointment has not been established.

FSH has a Travel and Access Plan, produced to satisfy a condition of development consent. The objectives of the Plan are to:

- “promote a positive and sustainable travel culture within the organisation with a commitment to implementation and continuous improvement including the support and promotion of travel choice and viable travel options
- “reduce single occupant car use through management of parking and promotion of alternative transport modes, particularly aimed at normal business hours employees
- “Encourage greater use of public transport through awareness and incentive programs
- “Encourage walking and cycling through awareness and incentive campaigns.”

Parking at the site is managed by private contractor Serco. Parking rates are aligned to be consistent with St John of God Hospital parking and are agreed by the WA Minister for Health. The Plan indicates that these rates will be reviewed annually.

4.3 Department of Transport

A meeting was held with Department of Transport on 9 August 2021, to discuss future transport planning for the area and state-level strategic considerations for the precinct.

The discussion additionally provided an overview of past planning considerations, and indicated that mode share targets for the activity centre were developed on the basis of road capacity.

Department of Transport indicated that high-level planning has been previously undertaken for the South Street corridor with respect to high capacity, high frequency public transit modes including light rail, noting that the corridor is indicated for high frequency public transport in the *Perth and Peel at 3.5 Million: Transport* strategic document.

The use of micro mobility modes was considered to be of particular relevance for the activity centre to facilitate access across and between elements of the activity centres. It was noted that the legislative environment required to support micro mobility modes has not yet caught up to advancements in technology.

APPENDIX

A

STAKEHOLDER ENGAGEMENT PLAN

A Stakeholder Engagement Plan

To	Deb Barbras, SJGM Hospital	**From**	Shannon Leigh, Cardno
CC		**Date**	30 June 2021
Project	SJGM Green Travel Plan	**Location/Time**	
Subject	Stakeholder Engagement and Travel Survey		
Action Required		**Attachments**	Survey Questionnaire

Introduction

This Technical Note details the methodology to be used to carry out the stakeholder engagement process for the St John of God Murdoch Travel Plan.

Stakeholder consultation is a major component of any Travel Plan (TP), allowing the relevant communities to provide input into the identification of issues and appropriate responses to these issues. Feedback and recommendations from this consultation process will be summarised and presented in the final TP report.

A range of consultative methods can be used to enable stakeholders to voice their concerns, put forward ideas and provide information on their personal experiences of transport to and from St John of God Murdoch (SJGM). Our selected methods are described in more detail below.

Methodology

Stakeholder Group	Engagement Approach
Client team and hospital management	Workshop
Staff and Patients	Travel Survey
Local and State Government	Email/telephone: > City of Melville > Department of Transport > PTA > MRWA

Travel Survey

Cardno will prepare a survey questionnaire to ensure that questions address all the necessary items required to assess current and potential travel behaviour.

Cardno will discuss the delivery of the Survey with the client and seek approval and comment on the content. However, in our experience an online approach is preferred. Hard copy surveys can be provided for staff and patients/ visitors who may not have access to email.

The survey is expected to be open for a period of four weeks and any hard copy surveys will be transcribed by Cardno staff into an electronic format for synthesis. Cardno will then analyse the resulting data and provide a summary of the findings which will form an appendix to the Travel Plan.

A summary of the key findings will be incorporated into the main body of the report.

Internal Stakeholder Workshop

Shortly after the inception meeting and the site assessment, Cardno will conduct a short workshop at the hospital with key representatives to identify transport related issues that the Travel Plan and the survey needs to consider. These representatives include:

- Security Manager
- Volunteer
- Clinical Caregiver
- Non-Clinical Caregiver
- Duty Manager
- Medical Clinic rep
- Wexford Medical rep
- Directors – Corporate, Financial & Business & Service
- OSH Manager
- Marketing Manager
- Consumer

This is also an opportunity to discuss the actions from any previous initiatives and ascertain which of these should roll into the Travel Plan and which are unlikely to progress. Cardno will produce the agenda and provide detailed notes from the session. A summary will also be included within the Stakeholder Engagement section of the Travel Plan report.

External Stakeholder Engagement

The remaining stakeholders will be contacted by email and by phone to ascertain any particular issues that they may have that may influence travel behaviour to and from the site. This may include public transport service provision from PTA, long term cycle strategies from the DoT, or significant development proposals taking place in the MAC or the surrounding area. Any impacts that may have on staff and visitors / patients accessing the site will be documented and included within the resulting analysis.

Summary

To summarise the above, Cardno's suggested approach to stakeholder engagement for this study is described in the following table.

Engagement Approach	Methodology
Staff and Patient Survey	An online survey covering views of transport to and from SJGM Hospital will be available for completion for a 4-week period. Date TBC
Internal Stakeholders	Cardno will conduct a short workshop with internal SJGM stakeholders
External Stakeholders	Cardno will contact external stakeholders directly, primarily by phone and email to obtain their thoughts on transport issues

APPENDIX

B

INTERNAL STAKEHOLDER ENGAGEMENT WORKSHOP MINUTES

B Minutes Internal Stakeholder Engagement Workshop

Project Title	SJGM Hospital Green Travel Plan	Project No:	CW1176100
Date	Monday, 16 August 2021	Time	12:00 – 1:30pm
Location	SJGM Hospital Board Room		
Aim	Internal Stakeholder Workshop		

Attendance	Apologies
SJGM Dilwyn Griffiths (DG) – Director of Finance Deb Barbras (DB) – Manager Hospital Redevelopment Projects Ashlee Lewis (AL) – Manager Security & Parking Kimberley Montgomery (KM) – Deputy Director of Nursing Clinical Safety & Quality Julie Rogers (JR) – Manager Strata Properties & Leasing Michael Salter (MS) – Director Corporate Services Ben Dellar (BD) – Director Business & Service Development Phil Pavlos (PP) – Lead OHS Consultant Olivia Harvey (OH) – Manager Public Relations & Engagement Collen Marinovich (CM)– Volunteer Louise Hutchinson (LH)- Clinical Nurse, Emergency Department **Cardno** Jacob Martin (JM) Shannon Leigh (SL)	

Item	Description	To action
1	Objectives of Green Travel Plan ▪ SL gave an overview of the objectives of the GTP.	SL
2	Current Actions	SL
2.1	▪ Travel Survey – 5-19 August (online and hardcopies) ▪ External Stakeholder Engagement	
3	Scope	SL
3.1	Part One – Where are we now? ▪ SL explained the process of reviewing the current situation and data analysis for travel to the hospital	
3.2	Part Two – Where do we want to be? ▪ Travel Survey 5-19 August (online and hardcopies) ▪ Internal Stakeholder Workshop ▪ External Stakeholder discussions	
3.3	Part Three – How do we get there? ▪ SL explained how part 1 and 2 inform the Action Plan and mode share targets	
4	Travel Plan 2011 ▪ An overview of the objectives and outcomes from the 2011 Travel Plan was presented	SL
5	Travel Plan 2021 ▪ The objectives of the 2021 Travel Plan were presented	SL

Minutes of Meeting

6	In Your Shoes – Benefits & Barriers ▪ In order to think about accessing the hospital participants were asked to consider themselves a focus group when answering questions about different modes of travel. ▪ Potential mode shift – relating back to parking supply and staff by shift and role was discussed	SL/All
6.1	Public Transport – Issues ▪ Child drop off, time, trip chaining ▪ Real or perceived safety threats from public transit ▪ Freedom of last-minute options en route to home ▪ Live 40 minutes away ▪ Benefit – lack of parking availability, environment, reliable and provides free time for yourself, avoid traffic ▪ Need improved transport links ▪ Better connection to hospital, no shelter or lighting along the footpath ▪ Bus stop too far from main building, stops in front of Wexford ▪ On-site childcare, would that make PT easier ▪ Home to node transit often poor (Baldivis, Warnbro)	
6.2	Cycling & Walking – Issues ▪ Too far ▪ Need to live closer ▪ Need for vehicle before and after work ▪ Long time to cool down ▪ Benefits – fitness, lifestyle, convenience ▪ Deadlines after work make this difficult ▪ Need better access to hospital ▪ Not interested in fitness side of transport ▪ Legibility to the station, no amenity/shelter/shade ▪ Internal connections between eot and changerooms ▪ Availability of lockers	
6.3	Driving - Issues ▪ Benefits - Time, convenience, family, personal preference, easy, comfortable, staying late at work ▪ Weather is a factor; bad weather leads to increases in driving ▪ Visitor parking gets filled with visitors for Fiona Stanley, now they have lost parking due to Covid Clinic and maintenance on multi-storey carpark ▪ Volunteer shifts are 4 hours, free parking ▪ Many staff travel a long distance to work ▪ No disadvantage to driving ▪ Unpredictable trip time/duration	
7	Success Factors – Possible Actions ▪ Hesitant to move to parking priority for shift workers or to limit parking access based on proximity of home to work. ▪ Patient transport via Uber Black? ▪ Uber discounts ▪ Small changes	SL/All

Minutes of Meeting

	▪ Shuttle bus service from train station, the PTA buses drop off at Wexford Centre which still leaves 5-minute walk for people working in main building. ▪ e-Bike Loan Program for staff to borrow an e-Bike/e-Scooter to 'try before you buy' – positive response to this idea ▪ Novated leasing of e-Bikes (e-Stralian) ▪ Carpooling app to connect staff living near each other ▪ Increase parking fees from $3.60 for staff ▪ Increase cost of lease parking bays ▪ Improved bike paths and access from the PSP and better paths on surrounding roads ▪ More secure bike parking with a fee	
7.1	Policy Changes ▪ Update Green Travel Allowance to be more flexible, link in with profile for parking. The profile now provides parking between 5pm and 4am and receive allowance for travel between 4am and 5pm. ▪ Increase $ for Green Travel Allowance ▪ Flexible financial incentives	
7.2	Communication Plan ▪ Agreement amongst internal stakeholders that communication strategy is integral ▪ Communicating the 'real cost' of car ownership ▪ Promote Green Travel Allowance for carpool passengers ▪ Green Travel Day, stories from staff, a champion ▪ Information about no additional cost to catch bus from train station	
8	Travel Survey ▪ Nurse shifts are 7 hours, other shifts are 12 hours or night shift is 10 hours ▪ 25% needing their car during the day for work seems high and needs to be analysed	SL
9	Next Steps: Analyse results and produce Action Plan and Monitoring Framework	SL

APPENDIX C

TRAVEL SURVEY FORM

C Travel Survey Form

ST JOHN OF GOD
Murdoch Hospital

SJG Murdoch Hospital Travel Survey 2021

Today's Date: _____

1. What location do you work at?
   - Main Hospital SJGMH (including agency staff) ❑
   - Murdoch Medical Clinic ❑ Hospice ❑
   - Wexford Medical Centre ❑ Surgicentre ❑
   - Other (please specify) _____
2. Gender Male ❑ Female ❑
3. Age: 17-25 ❑ 26-35 ❑ 36-45 ❑ 46-55 ❑ 55+ ❑
4. Postcode - Home Suburb _____
5. What best describes the nature of your work at SJGMH?
   - Medical (other than nursing) ❑ Nursing ❑
   - Hospital Support Services ❑ Administration
   - Allied Health ❑ Other ❑
6. On average, how many days do you work each fortnight? _____
7. What time were you rostered to commence work in the last 7 days?

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
before 7:15am	❑	❑	❑	❑	❑	❑	❑
7:15am-9am	❑	❑	❑	❑	❑	❑	❑
9am-noon	❑	❑	❑	❑	❑	❑	❑
noon-6pm	❑	❑	❑	❑	❑	❑	❑
after 6pm	❑	❑	❑	❑	❑	❑	❑
did not attend	❑	❑	❑	❑	❑	❑	❑

8. What time did you leave work in the last 7 days?

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
midnight – 7:15am	❑	❑	❑	❑	❑	❑	❑
7:15am-noon	❑	❑	❑	❑	❑	❑	❑
noon-3pm	❑	❑	❑	❑	❑	❑	❑
3pm-6:30pm	❑	❑	❑	❑	❑	❑	❑
6:30pm-midnight	❑	❑	❑	❑	❑	❑	❑
did not attend	❑	❑	❑	❑	❑	❑	❑

9. How did you travel to SJGMH in the last 7 days? (selection of multiple options is acceptable if more than one mode was used in a single trip)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Did not work	❑	❑	❑	❑	❑	❑	❑
Car as driver alone	❑	❑	❑	❑	❑	❑	❑
Carpool driver	❑	❑	❑	❑	❑	❑	❑
Carpool passenger	❑	❑	❑	❑	❑	❑	❑
Bus	❑	❑	❑	❑	❑	❑	❑
Train	❑	❑	❑	❑	❑	❑	❑
Walk	❑	❑	❑	❑	❑	❑	❑
Cycle	❑	❑	❑	❑	❑	❑	❑
Motorbike/scooter	❑	❑	❑	❑	❑	❑	❑
Other (please specify)	❑	❑	❑	❑	❑	❑	❑

10. How important are the following variables to your current and future trip making choices in coming to work (1 being not important, 5 being very important)?

	1	2	3	4	5
Fuel prices	❑	❑	❑	❑	❑
Car parking prices	❑	❑	❑	❑	❑
Public transport prices	❑	❑	❑	❑	❑
Public transport frequency	❑	❑	❑	❑	❑
Travel time	❑	❑	❑	❑	❑
Environment	❑	❑	❑	❑	❑
Convenience	❑	❑	❑	❑	❑
Exercise	❑	❑	❑	❑	❑
No car available	❑	❑	❑	❑	❑
Need to run errands	❑	❑	❑	❑	❑

ST JOHN OF GOD
Murdoch Hospital

11. Please estimate your cost of travel to/from SJGMH in the last 7 days. (For calculation purposes, you may assume fuel costs are approximately $1 per 10km travelled)
    a. Cost of Public Transport ($) :
    b. Cost of Petrol ($) :
12. In the last 7 days, how many days did you park a car at SJGMH? _____
13. How long did it take you to travel to SJGMH today?
    Approximate duration in minutes: _____
14. Did you, or will you stop off anywhere on the way to/from work today, e.g. grocery shopping? Yes ❑ No ❑
15. Have you, in the last 12 months, considered changing from car driver to another mode?

No	❑	Yes - Public Transport	❑
Yes – Cycling	❑	Yes – Walking	❑
Yes – Carpooling	❑	Yes – 'Park n Ride'	❑

16. How often do you use your car during work hours?

Never	❑	Once a week or less	❑
Several days each week	❑	Almost every day	❑

17. Are you aware of the end of trip facilities provided at SJGMH that are available to you (i.e. lockers, showers, bike parking)?
    Yes ❑ No ❑ I would like more information ❑
18. If the existing end of trip bicycle facilities at SJGMH were upgraded to include additional and/or better secure bicycle parking, would it influence your mode choice? Yes ❑ No ❑
19. What could SJGMH do to encourage you to travel by a different mode, rather than driving?
    _____
    _____
    _____
    _____
20. If a loan bicycle was made available, would you use it to cycle to work?

Never	❑	Once a week or less	❑
Several days each week	❑	As often as possible	❑

21. If a subsidised SmartRider was provided by SJGMH, would you use it to travel to work?

Never	❑	Once a week or less	❑
Several days each week	❑	As often as possible	❑

22. Would you like SJGMH to lobby for more frequent bus services on Barry Marshall Pde? Yes ❑ No ❑
    Would you be more likely to use buses if they ran every **10 minutes?** Yes ❑ No ❑
    How about a bus every **5 minutes?** Yes ❑ No ❑
23. Are the existing bus stop locations (i.e. on South Street or Murdoch Drive) a barrier to you travelling by public transport to/from SJGMH? If yes, how significant a barrier?

Not a barrier	❑	Minor inconvenience	❑
Medium inconvenience	❑	Major inconvenience	❑

If you have any further comments, please feel free to attach them on a separate page

Thank you for taking the time to complete this survey. If you would like to be eligible for one of 10 prizes, please write your name and contact details below:

_____

To ensure confidentiality, this information will not be retained with your survey response other than for the purpose of the prize draw.

Please return your completed survey to the survey box located on lower ground floor caregiver dining room or internal mail to Belmont House – Deb Barbas Manager Hospital Redevelopment Projects

About Cardno

Cardno is a professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

Contact

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APPENDIX

D

STAKEHOLDER ENGAGEMENT PLAN

D Stakeholder Engagement Plan

To	Deb Barbras, SJGM Hospital	**From**	Shannon Leigh, Cardno
CC		**Date**	30 June 2021
Project	SJGM Green Travel Plan	**Location/Time**	
Subject	Stakeholder Engagement and Travel Survey		
Action Required		**Attachments**	Survey Questionnaire

D.1 Introduction

This Technical Note details the methodology to be used to carry out the stakeholder engagement process for the St John of God Murdoch Travel Plan.

Stakeholder consultation is a major component of any Travel Plan (TP), allowing the relevant communities to provide input into the identification of issues and appropriate responses to these issues. Feedback and recommendations from this consultation process will be summarised and presented in the final TP report.

A range of consultative methods can be used to enable stakeholders to voice their concerns, put forward ideas and provide information on their personal experiences of transport to and from St John of God Murdoch (SJGM). Our selected methods are described in more detail below.

D.2 Methodology

Stakeholder Group	Engagement Approach
Client team and hospital management	Workshop
Staff and Patients	Travel Survey
Local and State Government	Email/telephone: > City of Melville > Department of Transport > PTA > MRWA

D.2.1 Travel Survey

Cardno will prepare a survey questionnaire to ensure that questions address all the necessary items required to assess current and potential travel behaviour.

Cardno will discuss the delivery of the Survey with the client and seek approval and comment on the content. However, in our experience an online approach is preferred. Hard copy surveys can be provided for staff and patients/ visitors who may not have access to email.

The survey is expected to be open for a period of four weeks and any hard copy surveys will be transcribed by Cardno staff into an electronic format for synthesis. Cardno will then analyse the resulting data and provide a summary of the findings which will form an appendix to the Travel Plan.

A summary of the key findings will be incorporated into the main body of the report.

D.2.2 Internal Stakeholder Workshop

Shortly after the inception meeting and the site assessment, Cardno will conduct a short workshop at the hospital with key representatives to identify transport related issues that the Travel Plan and the survey needs to consider. These representatives include:

- Security Manager
- Volunteer
- Clinical Caregiver
- Non-Clinical Caregiver
- Duty Manager
- Medical Clinic rep
- Wexford Medical rep
- Directors – Corporate, Financial & Business & Service
- OSH Manager
- Marketing Manager
- Consumer

This is also an opportunity to discuss the actions from any previous initiatives and ascertain which of these should roll into the Travel Plan and which are unlikely to progress. Cardno will produce the agenda and provide detailed notes from the session. A summary will also be included within the Stakeholder Engagement section of the Travel Plan report.

D.2.3 External Stakeholder Engagement

The remaining stakeholders will be contacted by email and by phone to ascertain any particular issues that they may have that may influence travel behaviour to and from the site. This may include public transport service provision from PTA, long term cycle strategies from the DoT, or significant development proposals taking place in the MAC or the surrounding area. Any impacts that may have on staff and visitors / patients accessing the site will be documented and included within the resulting analysis.

D.3 Summary

To summarise the above, Cardno's suggested approach to stakeholder engagement for this study is described in the following table.

Engagement Approach	Methodology
Staff and Patient Survey	An online survey covering views of transport to and from SJGM Hospital will be available for completion for a 4-week period. Date TBC
Internal Stakeholders	Cardno will conduct a short workshop with internal SJGM stakeholders
External Stakeholders	Cardno will contact external stakeholders directly, primarily by phone and email to obtain their thoughts on transport issues

APPENDIX

E

INTERNAL STAKEHOLDER ENGAGEMENT WORKSHOP MINUTES

E Internal Stakeholder Engagement Workshop Minutes

Minutes of Meeting

Project Title	SJGM Hospital Green Travel Plan	**Project No:**	CW1176100
Date	Monday, 16 August 2021	**Time**	12:00 – 1:30pm
Location	SJGM Hospital Board Room		
Aim	Internal Stakeholder Workshop		
Attendance			**Apologies**
SJGM Dilwyn Griffiths (DG) – Director of Finance Deb Barbras (DB) – Manager Hospital Redevelopment Projects Ashlee Lewis (AL) – Manager Security & Parking Kimberley Montgomery (KM) – Deputy Director of Nursing Clinical Safety & Quality Julie Rogers (JR) – Manager Strata Properties & Leasing Michael Salter (MS) – Director Corporate Services Ben Dellar (BD) – Director Business & Service Development Phil Pavlos (PP) – Lead OHS Consultant Olivia Harvey (OH) – Manager Public Relations & Engagement Collen Marinovich (CM)– Volunteer Louise Hutchinson (LH)- Clinical Nurse, Emergency Department **Cardno** Jacob Martin (JM) Shannon Leigh (SL)			

Item	Description	To action
1	Objectives of Green Travel Plan ▪ SL gave an overview of the objectives of the GTP.	SL
2	Current Actions	SL
2.1	▪ Travel Survey – 5-19 August (online and hardcopies) ▪ External Stakeholder Engagement	
3	Scope	SL
3.1	Part One – Where are we now? ▪ SL explained the process of reviewing the current situation and data analysis for travel to the hospital	
3.2	Part Two – Where do we want to be? ▪ Travel Survey 5-19 August (online and hardcopies) ▪ Internal Stakeholder Workshop ▪ External Stakeholder discussions	
3.3	Part Three – How do we get there? ▪ SL explained how part 1 and 2 inform the Action Plan and mode share targets	
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Minutes of Meeting

6	In Your Shoes – Benefits & Barriers ▪ In order to think about accessing the hospital participants were asked to consider themselves a focus group when answering questions about different modes of travel. ▪ Potential mode shift – relating back to parking supply and staff by shift and role was discussed	SL/All
6.1	Public Transport – Issues ▪ Child drop off, time, trip chaining ▪ Real or perceived safety threats from public transit ▪ Freedom of last-minute options en route to home ▪ Live 40 minutes away ▪ Benefit – lack of parking availability, environment, reliable and provides free time for yourself, avoid traffic ▪ Need improved transport links ▪ Better connection to hospital, no shelter or lighting along the footpath ▪ Bus stop too far from main building, stops in front of Wexford ▪ On-site childcare, would that make PT easier ▪ Home to node transit often poor (Baldivis, Warnbro)	
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6.3	Driving - Issues ▪ Benefits - Time, convenience, family, personal preference, easy, comfortable, staying late at work ▪ Weather is a factor; bad weather leads to increases in driving ▪ Visitor parking gets filled with visitors for Fiona Stanley, now they have lost parking due to Covid Clinic and maintenance on multi-storey carpark ▪ Volunteer shifts are 4 hours, free parking ▪ Many staff travel a long distance to work ▪ No disadvantage to driving ▪ Unpredictable trip time/duration	
7	Success Factors – Possible Actions ▪ Hesitant to move to parking priority for shift workers or to limit parking access based on proximity of home to work. ▪ Patient transport via Uber Black? ▪ Uber discounts ▪ Small changes	SL/All

Minutes of Meeting

	▪ Shuttle bus service from train station, the PTA buses drop off at Wexford Centre which still leaves 5-minute walk for people working in main building. ▪ e-Bike Loan Program for staff to borrow an e-Bike/e-Scooter to 'try before you buy' – positive response to this idea ▪ Novated leasing of e-Bikes (e-Stralian) ▪ Carpooling app to connect staff living near each other ▪ Increase parking fees from $3.60 for staff ▪ Increase cost of lease parking bays ▪ Improved bike paths and access from the PSP and better paths on surrounding roads ▪ More secure bike parking with a fee	
7.1	Policy Changes ▪ Update Green Travel Allowance to be more flexible, link in with profile for parking. The profile now provides parking between 5pm and 4am and receive allowance for travel between 4am and 5pm. ▪ Increase $ for Green Travel Allowance ▪ Flexible financial incentives	
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8	Travel Survey ▪ Nurse shifts are 7 hours, other shifts are 12 hours or night shift is 10 hours ▪ 25% needing their car during the day for work seems high and needs to be analysed	SL
9	Next Steps: Analyse results and produce Action Plan and Monitoring Framework	SL

APPENDIX

F

TRAVEL SURVEY FORM

F Travel Survey Form

ST JOHN OF GOD Murdoch Hospital

SJG Murdoch Hospital Travel Survey 2021

Today's Date: _____

1. What location do you work at?
   - Main Hospital SJGMH (including agency staff) ❑
   - Murdoch Medical Clinic ❑ Hospice ❑
   - Wexford Medical Centre ❑ Surgicentre ❑
   - Other (please specify) _____
2. Gender Male ❑ Female ❑
3. Age: 17-25 ❑ 26-35 ❑ 36-45 ❑ 46-55 ❑ 55+ ❑
4. Postcode - Home Suburb _____
5. What best describes the nature of your work at SJGMH?
   - Medical (other than nursing) ❑ Nursing ❑
   - Hospital Support Services ❑ Administration
   - Allied Health ❑ Other ❑
6. On average, how many days do you work each fortnight? _____
7. What time were you rostered to commence work in the last 7 days?

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
before 7:15am	❑	❑	❑	❑	❑	❑	❑
7:15am-9am	❑	❑	❑	❑	❑	❑	❑
9am-noon	❑	❑	❑	❑	❑	❑	❑
noon-6pm	❑	❑	❑	❑	❑	❑	❑
after 6pm	❑	❑	❑	❑	❑	❑	❑
did not attend	❑	❑	❑	❑	❑	❑	❑

8. What time did you leave work in the last 7 days?

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
midnight – 7:15am	❑	❑	❑	❑	❑	❑	❑
7:15am-noon	❑	❑	❑	❑	❑	❑	❑
noon-3pm	❑	❑	❑	❑	❑	❑	❑
3pm-6:30pm	❑	❑	❑	❑	❑	❑	❑
6:30pm-midnight	❑	❑	❑	❑	❑	❑	❑
did not attend	❑	❑	❑	❑	❑	❑	❑

9. How did you travel to SJGMH in the last 7 days? (selection of multiple options is acceptable if more than one mode was used in a single trip)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Did not work	❑	❑	❑	❑	❑	❑	❑
Car as driver alone	❑	❑	❑	❑	❑	❑	❑
Carpool driver	❑	❑	❑	❑	❑	❑	❑
Carpool passenger	❑	❑	❑	❑	❑	❑	❑
Bus	❑	❑	❑	❑	❑	❑	❑
Train	❑	❑	❑	❑	❑	❑	❑
Walk	❑	❑	❑	❑	❑	❑	❑
Cycle	❑	❑	❑	❑	❑	❑	❑
Motorbike/scooter	❑	❑	❑	❑	❑	❑	❑
Other (please specify)	❑	❑	❑	❑	❑	❑	❑

10. How important are the following variables to your current and future trip making choices in coming to work (1 being not important, 5 being very important)?

	1	2	3	4	5
Fuel prices	❑	❑	❑	❑	❑
Car parking prices	❑	❑	❑	❑	❑
Public transport prices	❑	❑	❑	❑	❑
Public transport frequency	❑	❑	❑	❑	❑
Travel time	❑	❑	❑	❑	❑
Environment	❑	❑	❑	❑	❑
Convenience	❑	❑	❑	❑	❑
Exercise	❑	❑	❑	❑	❑
No car available	❑	❑	❑	❑	❑
Need to run errands	❑	❑	❑	❑	❑

ST JOHN OF GOD
Murdoch Hospital

11. Please estimate your cost of travel to/from SJGMH in the last 7 days. (For calculation purposes, you may assume fuel costs are approximately $1 per 10km travelled)
    a. Cost of Public Transport ($) :
    b. Cost of Petrol ($) :
12. In the last 7 days, how many days did you park a car at SJGMH? _____
13. How long did it take you to travel to SJGMH today?
    Approximate duration in minutes: _____
14. Did you, or will you stop off anywhere on the way to/from work today, e.g. grocery shopping? Yes ❑ No ❑
15. Have you, in the last 12 months, considered changing from car driver to another mode?

No	❑	Yes - Public Transport	❑
Yes – Cycling	❑	Yes – Walking	❑
Yes – Carpooling	❑	Yes – 'Park n Ride'	❑

16. How often do you use your car during work hours?

Never	❑	Once a week or less	❑
Several days each week	❑	Almost every day	❑

17. Are you aware of the end of trip facilities provided at SJGMH that are available to you (i.e. lockers, showers, bike parking)?
    Yes ❑ No ❑ I would like more information ❑
18. If the existing end of trip bicycle facilities at SJGMH were upgraded to include additional and/or better secure bicycle parking, would it influence your mode choice? Yes ❑ No ❑
19. What could SJGMH do to encourage you to travel by a different mode, rather than driving?
    _____
    _____
    _____
    _____
20. If a loan bicycle was made available, would you use it to cycle to work?

Never	❑	Once a week or less	❑
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21. If a subsidised SmartRider was provided by SJGMH, would you use it to travel to work?

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22. Would you like SJGMH to lobby for more frequent bus services on Barry Marshall Pde? Yes ❑ No ❑
    Would you be more likely to use buses if they ran every **10 minutes?** Yes ❑ No ❑
    How about a bus every **5 minutes?** Yes ❑ No ❑
23. Are the existing bus stop locations (i.e. on South Street or Murdoch Drive) a barrier to you travelling by public transport to/from SJGMH? If yes, how significant a barrier?

Not a barrier	❑	Minor inconvenience	❑
Medium inconvenience	❑	Major inconvenience	❑

If you have any further comments, please feel free to attach them on a separate page

Thank you for taking the time to complete this survey. If you would like to be eligible for one of 10 prizes, please write your name and contact details below:

_____

To ensure confidentiality, this information will not be retained with your survey response other than for the purpose of the prize draw.

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