



Transport Assessment
Shell Cove Sports & Recreation Facility
for
Shellharbour City Council

Document Control

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1 Introduction

1.1 Overview

arc traffic + transport has been engaged by Shellharbour City Council (**Council**) to prepare a Transport Assessment relating to the Shell Cove Sports & Recreation Facility (the **Facility**) at 200 Harbour Boulevard, Shell Cove (the **Site**).

The Facility will provide a cricket oval during the summer, and an AFL field – capable also of being used for multiple fields for junior players – during the winter.

At this time, a Concept Master Plan (**Concept MP**) for the Facility is nearing completion, and is anticipated to be finalised in later 2024, to allow for construction to commence in early 2025. Further details of the Facility are available on Council's website at <https://www.shellharbour.nsw.gov.au>.

1.2 Transport Assessment Tasks

This Transport Assessment provides an assessment of the access, traffic and parking characteristics of the Facility, and specifically focuses on:

- Existing local transport conditions.
- Usage profiles for both the summer and winter seasons.
- Vehicles access to on-site parking areas.
- Trip generation and distribution, and potential mitigation measures required to ensure that the local road network operates with appropriate efficiency and amenity.
- Parking requirements and provision.
- The design of access, parking and servicing infrastructure.
- A high-level Plan of Management (**Facility POM**) to best manage the transport operations of the Site.

1.3 Reference Documents

1.3.1 Planning Controls and Strategies

The Site lies within the Shellharbour LGA; key Council planning documents referenced in the preparation of this Transport Assessment include:

- Shellharbour Local Environmental Plan 2013 (**LEP 2013**);
- Shellharbour Development Control Plan 2013 (**DCP 2013**)
- The Concept MP, prepared by Council in association with Taylor Brammer Architects.
- Participation numbers and game structures for both cricket and AFL, which were determined by Council in consultation with local sports clubs.

1.3.2 Transport & Planning Guidelines and Strategies

This Transport Assessment references numerous general transport and planning guidelines and strategies relevant to the Proposal, including:

- Guide to Traffic Generating Developments 2002, Roads & Traffic Authority (**RTA Guide**);
- Australian Standard 2890.1: Parking Facilities – Off-Street Car Parking 2009 (**AS 2890.1**);
- Australian Standard 2890.2: Parking Facilities – Off-Street Commercial Vehicle Facilities 2018 (**AS 2890.2**);
- Australian Standard 2890.2: Parking Facilities – Bicycle Parking Facilities 2015 (**AS 2890.3**); and
- Australian Standard 2890.6: Parking Facilities – Off-Street Parking for People with a Disability 2009 (**AS 2890.6**).

1.4 First Principles

From the outset, it is important to note that there are few detailed trip or parking rates relating specifically to developments such as the Facility, and as such the analysis of traffic and parking conditions provided in the Transport Assessment is largely based on first principles; in this regard, **arc traffic + transport** has specifically considered factors such as:

- Scheduled games/training across the week;
- Game start and finish times;
- The number of people on-site at any one time, and during changeover (between games) periods;
- Travel modes, noting that as a worst case it is assumed that all trips would be by private vehicle; and
- Car occupancies.

It is noted that **arc traffic + transport** has prepared a number of similar reports for major sporting facilities based on consideration of these same factors, and as such we are confident that the analysis provided in this Transport Assessment will accurately detail the traffic and parking characteristics of the Facility once it commences operations.

2 The Existing Site

2.1 Location

The Site is located at 200 Harbour Boulevard, Shell Cove. It is bordered by Harbour Boulevard to the north; industrial land to the east; Killalea Regional Park to the south; and Rangoon Avenue to the east.

The Site is shown in its local context in **Figure 1**.

Figure 1: The Site



Source: Google

2.2 Existing Site Characteristics

The Site is currently undeveloped, but was first identified as suitable to provide a sports and recreation facility in Council's Section 94 Plan 2005.

2.3 Public Transport

There are currently no public transport (bus) services in local roads in the immediate vicinity of the Site.

2.4 Active Transport

High-standard active transport infrastructure is provided across Shell Cove, including a shared path along Harbour Boulevard connecting to shared and bike path networks across the LGA; and footpaths provided in most local roads. The Facility will provide strong connections to the Harbour Boulevard shared path and broader footpath network.

2.5 Traffic

2.5.1 Traffic Surveys

Council has provided data from a 7 day counter which was installed in Harbour Boulevard immediately north-west of Rangoon Avenue. The data includes hourly north-west bound and south-east bound volumes as well as the percentage of heavy vehicles.

For the traffic analysis, arc traffic + transport has adopted the peak hour data for the weekday PM peak, and then for both the Saturday and Sunday AM and PM peaks. It is likely that some peak trip generating activities at the Facility would not specifically occur during these [commuter and recreational] peaks, but this provides for a worst case scenario.

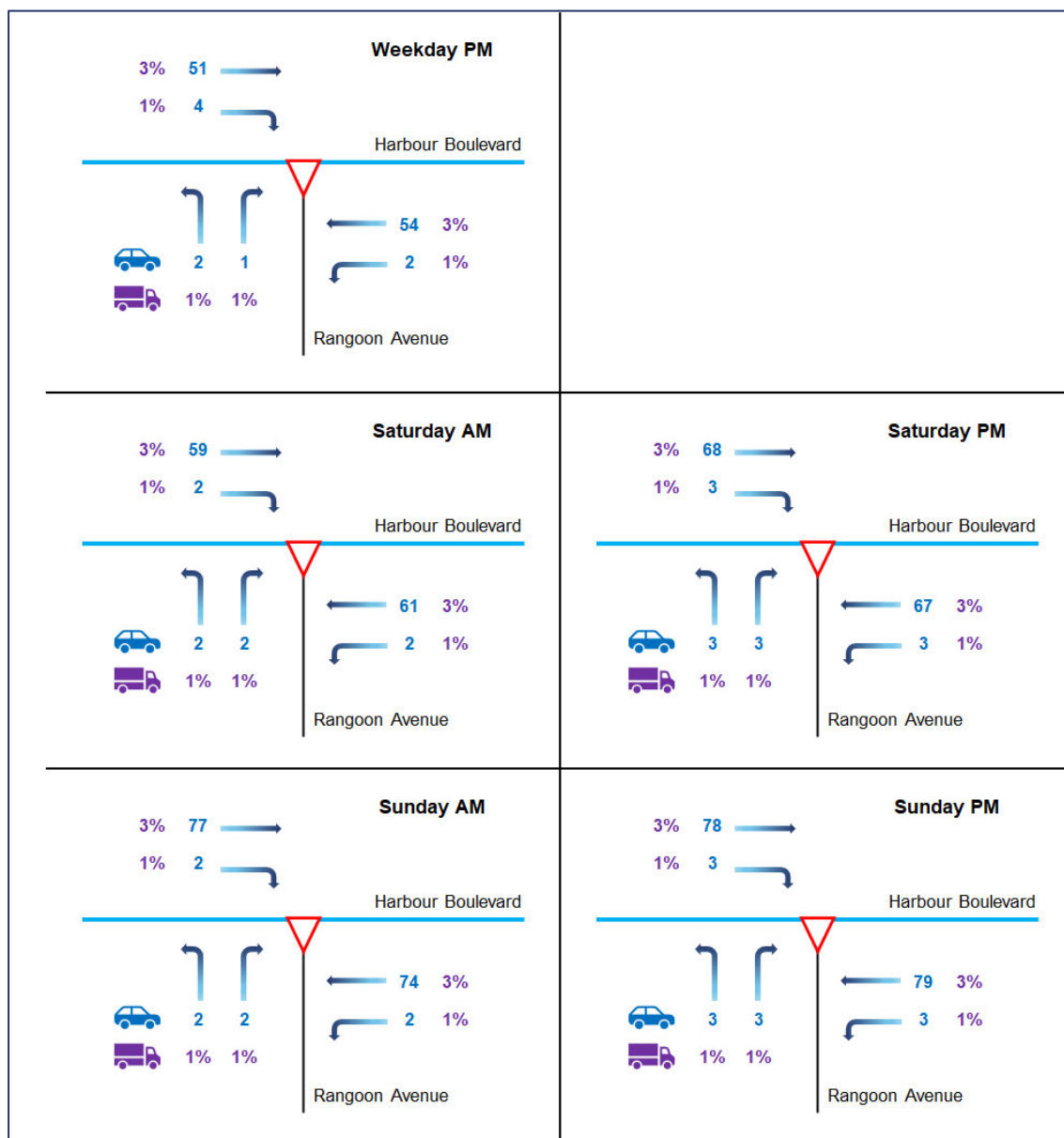
For Rangoon Avenue, we have estimated the traffic volumes in each of the Facility's peak periods based on the number of dwellings with primary access to the broader local road network via the Harbour Boulevard & Rangoon Avenue intersection as opposed to the Cove Boulevard & Shallows Drive intersection to the west. With regard to trip distribution, we have assigned the majority of trips to/from the north-west based on the location of key attractors in Shell Cove and broader LGA.

2.5.2 Base Assessment Volumes

The peak trip generation of the Facility will occur during a short period at game or training changeover time; during this period, there can be trips being generated both to and from the Facility over a period of approximately 20 minutes. While it is unlikely that all of these arrival and departure trips would occur at the same time (i.e. most arrival trips would occur before departure trips commence) as a worst case for the traffic analysis it is assumed that peak arrival and departure trips could be generated in the same 20 minute period.

As such, the surveyed hourly traffic volumes in Harbour Boulevard, and hourly estimated volumes in Rangoon Avenue, has been factored to 20 minute volumes. These volumes are shown in **Figure 2**

Figure 2: Harbour Boulevard & Rangoon Avenue 20 Minute Analysis Volumes



3.2 Usage Profile

3.2.1 Overview

Sections below provide analysis of the anticipated usage profile of the Facility. The analysis references information provided by local sports clubs in regard to the number of players; game start times; game duration; and training times.

3.2.2 Players

With reference to information provided by Shellharbour City Cricket Club, the key characteristics of cricket during the summer season include:

- Saturday games commencing at 8:00am and finishing after 6:00pm.
- Generally 2 games each Saturday, being a juniors game in the morning (8:00am to 12:00pm) and a seniors game in the afternoon (1:00pm to 6:00pm).
- 40 junior players and 25 senior players currently registered, but these numbers are anticipated to grow in the short term. However, it is noted that the Facility would still generally provide for only 1 game in the morning and 1 game in the afternoon, regardless of registered players.

With reference to information provided by Shellharbour Swans Junior AFL Club, the key characteristics of junior AFL during the winter season include:

- Sunday games starting at 7:00pm and finishing at 5:00pm
- With reference to the 2023 season schedule, an average game time of 60 minutes with a 5 – 10 gap between games.
- The field split into 2, i.e. 2 games commencing each start time.
- A maximum of 18 players per team.
- 118 male juniors and 52 female juniors currently registered, but these numbers are anticipated to grow in the short term. Based on the number of players per team for junior AFL, there would currently be 7 male junior teams and 3 female junior teams, or a total of 10 teams. This is anticipated to grow to up to 9 male junior teams and 5 female junior teams.
- Training Monday to Friday between 4:00pm and 6:00pm, with up to 2 teams training from 4:00pm, and up to 2 teams training from 5:00pm, each weekday.

With reference to information provided by Shellharbour City Suns AFL Club, the key characteristics of senior AFL during the winter season include:

- Saturday games starting at 9:00am and finishing at 5:30pm
- An average game time of 2.5 hours for male seniors and 90 minutes for female seniors, with a 15 - 20 minute gap between games.
- A maximum of 20 players per team.
- Training Mondays and Fridays 5:45pm – 8:00pm.

With reference to the above, the peak traffic and parking generation of the Facility will be associated with the use of the Facility for junior AFL on a Sunday, where each game start time could generate an occupancy of 72 players, being 36 players from the 2 home teams, and 36 players from the 2 away teams.

Mid-week, the peak traffic and parking generation of the Facility would be associated with junior AFL training, where there would be up to 36 players training from 4:00pm to 5:00pm, and 36 players training from 5:00pm to 6:00pm.

3.2.3 Coaching Staff and Spectators

There is no expectation that standard games for either sport would generate any significant number of additional coaching staff or spectators, as both staff and spectators are usually related to the player, and in most instances would travel to/from the Facility together.

3.2.4 Car Occupancy

Based on out past studies of sporting facilities, car occupancy is approximately 1.3 players per vehicle on game days and 1.5 players per vehicle on training days.

3.3 Access

3.3.1 Vehicle Access

Vehicle access to Car Park 2 is provided via Rangoon Avenue, and in turn the intersection of Harbour Boulevard & Rangoon Avenue. Vehicle access to Car Park 2 will be provided via a new roundabout of Harbour Boulevard & Maritime Drive and what we have termed **CP 2 Road** for ease of reference, which links to Car Park 2.

At this time, it is noted that the Concept MP (**Figure 3**) indicates a roundabout at this intersection; however, the need for this roundabout (or other intersection works) is examined further in **Section 3.5**.

3.3.2 Pedestrian Access

On-site pedestrian and shared paths will connect across the Site, and to the existing shared path along the southern side of Harbour Boulevard.

3.4 Parking

3.4.1 Parking Requirement

As discussed, the DCP does not provide any guidance as to the amount of parking required for the Facility, and as such it is necessary to examine what the peak parking demand might be based on the maximum usage of the Facility, as well as additional parking demand that can occur immediately prior to and immediately following the game start time, i.e. when vehicles from the earlier game start time are still parked, while vehicles are also arriving for the next game start time.

As discussed in **Section 3.2.2**, the maximum parking demand would be generated by junior AFL games on a Sunday, with the Facility having an occupancy of up to 72 junior players at each game start time. Based on an occupancy of 1.3 players per vehicle, this would generate a demand for up to 56 parking spaces.

In addition, the majority of players would arrive prior to the previous game ending, and as such the same, additional, parking demand could be generated for a short period of time (approximately 20 minutes) during the game changeover period.

The total parking demand during this game changeover period would therefore be for 112 parking spaces.

3.4.2 Parking Provision

Car Park 1 will provide capacity for 125 parking spaces, and as such could fully accommodate the peak parking demand generated on Sundays by junior AFL games, including the short game changeover period. This would also leave a small number of available spaces in Car Park 1 for others using the facility or – for example – some spectators.

Car Park 2 would provide an additional 92 spaces. Under most circumstances, there would be little demand for these spaces, but the potential exists for the Facility to be used for activities that could generate a higher parking demand than on a standard Sunday (or any other day of the week). These activities might include:

- Finals matches, particularly for the senior AFL teams, where a higher number of spectators might be in attendance.
- Repurposing the Facility to accommodate higher occupancy sports, such as junior football (soccer), whereby the Facility could likely accommodate at least 8 smaller junior football fields.
- School or other regional sporting carnivals/events.

In each of these instances, car occupancy would be at least that of players car occupancy, and in the case of spectators at least double the players car occupancy, and as such Car Park 2 could accommodate a very significant additional parking demand than the demand generated on a standard weekend and standard weekday.

As such, **arc traffic + transport** has concluded that the parking proposed for the Facility would appropriately accommodate even super-peak demand every day of the week.

3.5 Traffic

3.5.1 Peak Trip Generation & Distribution

The trip generation of the facility on different days of the week has been determined with reference to the usage profiles detailed in **Section 3.2**, and the application of the different car occupancies between game trips and training trips.

In regard to trip distribution, based on the location of the Site within Shell Cove, and moreover the urban areas within Shell Cove and the broader LGA from which players will be drawn, the majority of trips are anticipated to be via Harbour Boulevard to/from the north-west. As well as locations within Shell Cove itself, those urban areas to the north and north-west of Shell Cove would travel via Harbour Boulevard, Shellharbour Road and Wattle Road; while those in urban areas to the west and south of Shell Cove would travel via Harbour Boulevard, Cove Boulevard and Shellharbour Road.

Further to these considerations, **Figure 4** provides a summary of the trip generation of the Facility during different peak periods across the week, and then **Figure 5** provides a summary of total trips during different peak periods across the week, i.e. base volumes plus the Facility's trips, again within the 20 minute changeover period between games and training sessions.

Figure 4: Harbour Boulevard & Rangoon Avenue Facility Peak Trips

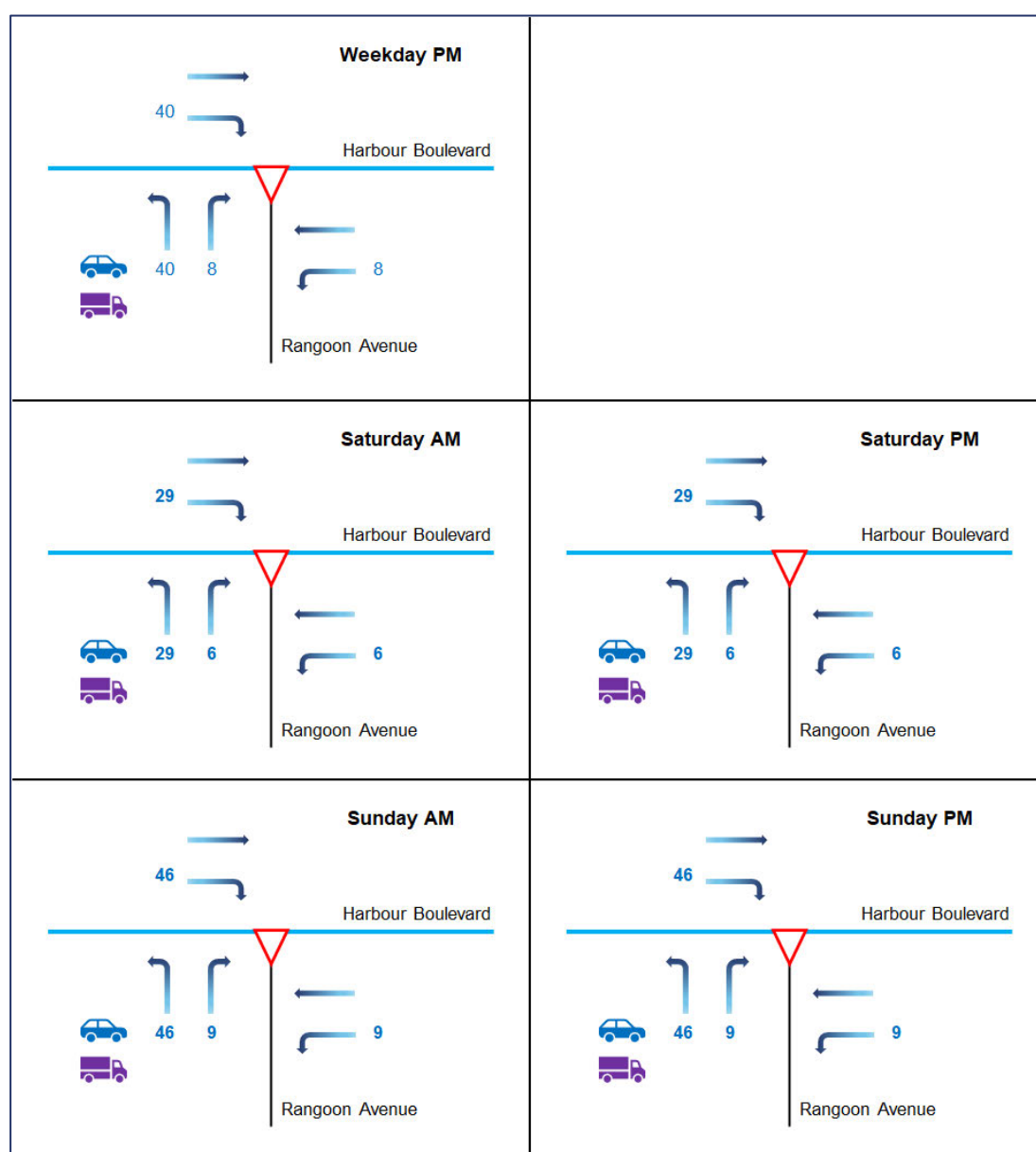
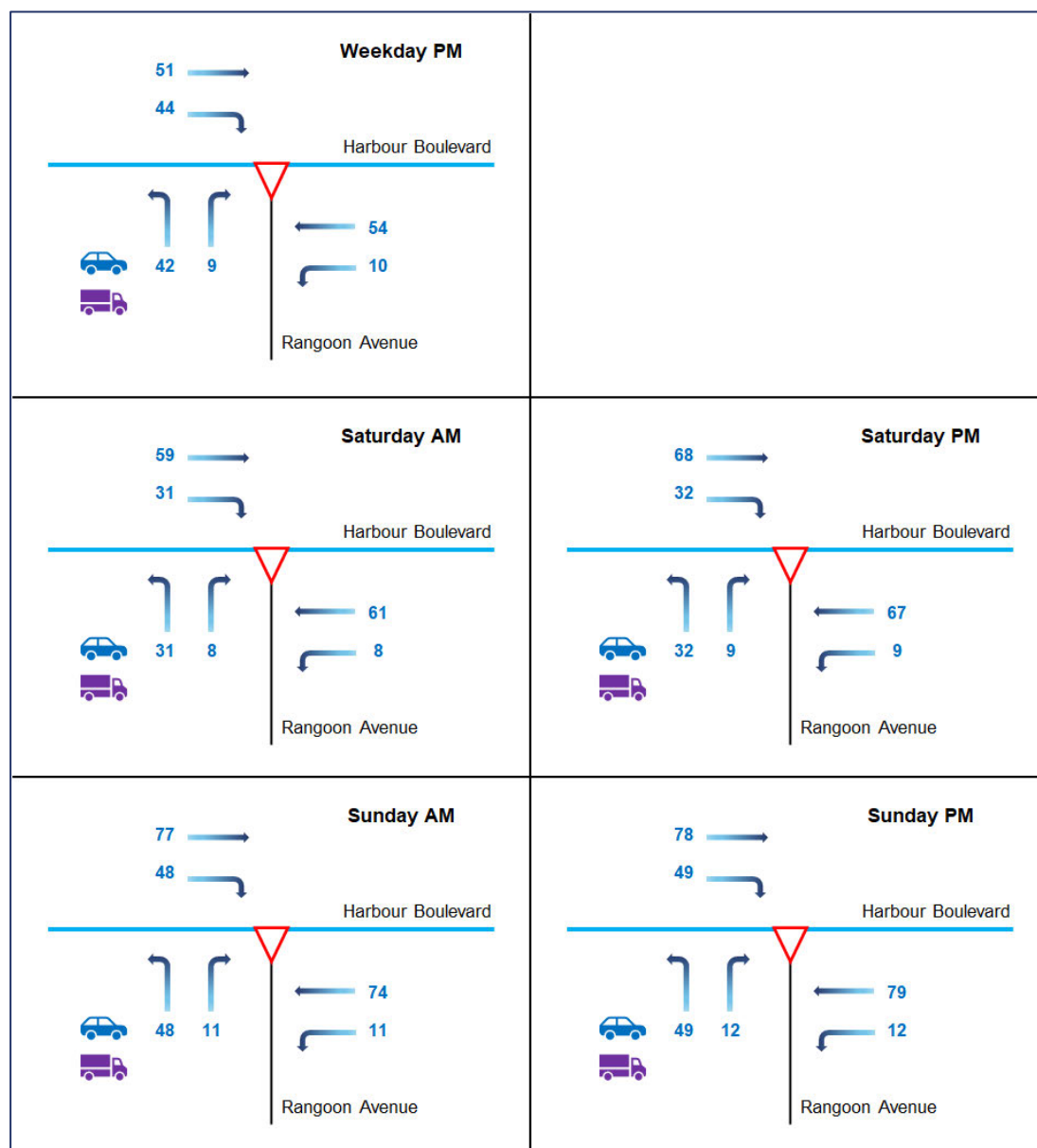


Figure 5: Harbour Boulevard & Rangoon Avenue Total Future Volumes



3.6 Harbour Boulevard & Rangoon Avenue Intersection Operations

3.6.1 Modelling Options

As discussed with Council, in the first instance the traffic analysis has considered the existing intersection of Harbour Boulevard & Rangoon Avenue operating as a T-Intersection under priority (Give Way) control, and allowing for all movements.

3.6.2 SIDRA

The analysis of the intersection of Harbour Boulevard & Rangoon Avenue has been undertaken using SIDRA; SIDRA provides a number of key outputs by which to measure the performance of an intersection, including:

- **Average Vehicle Delay (AVD):** AVD is used to determine an intersection's Level of Service (see below). For priority intersections, the AVD used to determine Level of Service is determined with reference to the [average] Worst Approach Delay (**Worst AVD**), i.e. the highest delay of all approaches.
- **Degree of Saturation (DOS):** DOS is defined as the ratio of demand (arrival) flow to capacity. Degrees of Saturation above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity).
- **95%ile Queue Length (95QL):** 95QL is the length of queue on an approach to an intersection below which 95% of all observed cycle queue lengths fall, or where 5% of observed queues exceed.
- **Level of Service (LOS):** is a comparative measure that provides an indication of the operating performance; as discussed, for priority intersections LOS is based on WVD.

With regard to LOS, **Table 1** provides a summary of the SIDRA recommended criteria for the assessment of intersections.

Table 1: SIDRA Level of Service Criteria

Level of Service	Worst Vehicle Delay (seconds per vehicle)	Stop & Give Way
A	less than 14	Good operation
B	15 to 28	Acceptable delays and spare capacity
C	29 to 42	Satisfactory, but accident study required
D	43 to 56	Near capacity and accident study required
E	57 to 70	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires other control mode or major treatment.

Source: SIDRA Systems

For the SIDRA analysis, we have include the following:

- A reduced peak time period, such that all peak hour arrival and departure trips occur during a 20 minute period;
- An inter peak flow period of 10 minutes.

- The existing geometry of the intersection, which essentially provides no auxiliary turning or passing lanes;
- A 50 km/h speed limit in both roads; and
- As discussed, allowing all movements at the intersection.

3.6.3 SIDRA Results

A summary of the SIDRA modelling results during each of the Facility's peak periods is provided in **Table 2**, and SIDRA Movement Summary reports are provided in **Appendix A**.

Table 2: Harbour Boulevard & Rangoon Avenue Intersection Operations

Peak Period	LOS	Worst Delay (s)	DOS	95QL (m)	
Weekday PM	A	6.9	0.179	6.0	HB Sthbnd
Saturday AM	A	6.9	0.165	4.7	HB Sthbnd
Saturday PM	A	7.2	0.184	5.2	HB Sthbnd
Sunday AM	A	8.2	0.238	7.9	HB Sthbnd
Sunday PM	A	8.5	0.244	8.3	HB Sthbnd

With reference to **Table 2**, it is clear that the intersection of Harbour Boulevard & Rangoon Avenue can operate at a good LOS even during the Facility's peak changeover periods, with very modest queues (vehicles turn right from Harbour Boulevard to Rangoon Avenue) and the retention of significant spare capacity.

Finally, and as a final capacity test, the trip generation of the Facility was doubled during the Sunday PM peak (where Harbour Boulevard traffic volumes peak), and moreover in the 20 minute Sunday PM peak. The results of this analysis indicate that the intersection would still operate at a LOS A but with additional queues (14.2m); again though, this could only be considered as good operations.

As such, it is the conclusion of **arc traffic + transport** that the intersection of Harbour Boulevard & Rangoon Avenue does not need to be upgraded to support the Facility, but rather can continue to provide appropriate efficiency as a simple priority intersection.

3.7 Additional Traffic Considerations

3.7.1 Environmental Capacity

Section 4.3.5 of the RTA Guide provides guidance in regard to the environmental capacity of a road, which reflects providing an appropriate level of amenity for residents and efficiency for traffic movements. Table 4.6 of the RTA Guide identifies different target and maximum peak hour capacity limits for different types of road, and is reproduced below.

Table 3: Environmental Capacity Performance Standards

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Source: RTA Guide

With reference to the peak trip generation estimates in **Section 3.5.1** as well as the residential trip generation in Rangoon Avenue, it is estimated that for short periods there could be up to 130 vehicle trips per hour in Rangoon Avenue between Harbour Boulevard and the Car Park 1 driveway during the Sunday junior ALF games.

This total is lower than the environmental goal for a “local street”, which is the best description for this section of Rangoon Avenue, and as such the peak operation of the Facility is not anticipated to have significant amenity impacts.

3.7.2 Vehicle Speeds

Finally, it is important to note that given the short distance of Rangoon Avenue between Harbour Boulevard and the Car Park 1 driveway, vehicle speeds in Rangoon Avenue would likely be well below the 50km/h posted speed limit.

3.8 Traffic Summary

With reference to sections above, the trip generation of the Facility even during peak operating period will be very moderate. Further to assigning the majority of trips to/from Harbour Boulevard north-west of Rangoon Avenue, the SIDRA modelling indicates that the intersection of Harbour Boulevard & Rangoon Avenue will operate at a good LOS, with very minimal delays and queues, while continuing to provide for all movements at the intersection.

The peak trip generation of the Facility would not result in environmental capacity limits in Rangoon Avenue being exceeded, and the short distance between Harbour Boulevard and the Car Park 1 driveways means that vehicles speeds would remain low.

As such, arc traffic + transport would support the Facility further to traffic considerations, and moreover support the retention of the existing intersection of Harbour Boulevard & Rangoon Avenue without any requirement for a further upgrade.

3.9 Design

3.9.1 General Design

Based on our review of the design of access driveways to the car parks, and the car parks themselves, it appears that the design has appropriately referenced the relevant Australian Standards, but we note the following requirements to provide compliance with Australian Standards, and specifically compliance with the requirements for User Class 3 parking per Table 1.1 of AS 2890.1, and the general requirements of AS 2890.6:

- Access driveways and parking aisles need to provide a minimum width of 5.8m;
- Parking spaces need to provide dimensions of 5.4m by 2.6m; and
- Accessible spaces need to provide a space with dimension of 5.4m by 2.4m adjacent to a shared space with a bollard (i.e. not to be used for parking) also of dimensions 5.4m by 2.4m.

3.9.2 Car Park 1

With regard to the design of Car Park 1:

- Car Park 1 has a blind aisle immediately south of the Car Park 1 driveway, but does not provide a turning bay or the like. Part 2.4.2c of AS 2890.1 allows for blind aisle with a length of up to 6 spaces (i.e. 6 by 90° spaces) whereas the Concept MP shows a length of 8 spaces. This could be rectified by reallocating one of the parking spaces at the end of the aisle as a turning space.
- The marked path through Car Park 1 extends to Rangoon Avenue, but there is no footpath in Rangoon Avenue that this would connect to. This is acceptable if a footpath is to be provided in Rangoon Avenue, otherwise the path should terminate within Car Park 1.
- While Car Park 2 has a drop-off zone, Car Park 1 – which will be the primary car park – does not have a drop-off zone. Given that more parking is provided than will be required in peak periods, consideration could be given to providing a drop-off zone adjacent to the amenities building. This could be provided as short term parking as currently shown (1 minute parking or the like) or as parallel short term parking (similar to a school Kiss & Drop) but this would require the removal of parking spaces.

3.9.3 Car Park 2

With regard to the design of Car Park 2:

- We would recommend that accessible parking (2 spaces) also be provided in Car Park 2, preferably adjacent to the path from Car Park 2 into the Facility.
- It is unclear how the drop-off zone in Car Park 2 would operate.

3.9.4 Servicing

The Concept MP does not provide any details of how servicing will be undertaken at the Facility, including (for example) waste collection and maintenance vehicles access the fields. It is the case that these waste collection could generally be undertaken outside of activity periods, and as such simply use Car Park 1, but there will be a need to larger vehicles to access the fields themselves on occasion.

As such, a more detailed assessment of service vehicle requirements should be undertaken.

3.10 Facility Plan of Management

With reference to sections above, it is unlikely that there will be any traffic or parking impacts arising from the standard weekly use of the Facility given that traffic volumes will remain low, and parking is provided in excess of requirements.

Notwithstanding, it is recommended that a Parking POM be prepared that outlines the broader operation of the Facility itself, as well as the car parks, to maximise the efficiency and safety of all on-site areas and local roads. Some of the issues that should be considered in the Parking POM include:

- Maximum occupancy numbers and game times per day, and training times per evening.
- Revisions as required to the length of the gap between games if there were occupancy increases, which would allow more vehicles to depart Car Park 1 prior to new arrivals to Car Park 1.
- Managing the distribution of trips between Car Park 1 and Car Park 2 if super-peak events were to occur.
- Revisions as required is there was a need to fit in more games on any day.
- Servicing protocols.

4 Conclusions

Further to our detailed assessment of the future operation of the Facility, arc traffic + transport provides the following Conclusions:

- The Facility provides good vehicle and pedestrian connectivity with the local road network.
- The parking provided in Car Park 1 is anticipated to provide for most peak activities at the Site, but any additional demand could certainly be accommodated in Car Park 2.
- The trip generation of the Facility will be moderate, even during peak changeover periods.
- Based on the SIDRA modelling, the intersection of Harbour Boulevard & Rangoon Avenue would operate at a LOS A, with only very minor queuing, during peak game and training changeover periods.
- The environmental capacity of Rangoon Avenue would not be compromised during peak changeover periods, and vehicle speeds would be low based on the short distance between Harbour Boulevard and the Car Park 1 driveway.
- There are some minor design issues within the car parks and internal footpaths, and there needs to be some consideration of servicing the Facility. However, these are not significant and could easily be resolved as part of future work.
- A Plan of Management should be prepared for the broader operation of the Facility, which would include consideration of access and parking demands during super-peak periods, where parking could be better managed between Car Park 1 and Car Park 2.

In summary, arc traffic + transport has determined that the Concept Master Plan for the Facility is entirely supportable further to access, traffic and parking considerations.

Appendix A: SIDRA Movement Summary Reports

Weekday PM Peak

MOVEMENT SUMMARY

▽ Site: [Harbour Boulevard & Rangoon Avenue Weekday PM (Site Folder: General)]

Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No Cycles	Aver Speed
		[Total veh/20min	HV] %	[Total veh/h	HV] %	v/c	sec	of Service	[Veh. veh	Dist] m				km/h
South: Rangoon Avenue														
1	L2	42	1.0	133	1.0	0.130	5.2	LOS A	0.5	3.7	0.28	0.56	0.28	45.9
3	R2	9	1.0	28	1.0	0.130	6.9	LOS A	0.5	3.7	0.28	0.56	0.28	45.5
Approach		51	1.0	161	1.0	0.130	5.5	LOS A	0.5	3.7	0.28	0.56	0.28	45.9
East: Harbour Boulevard														
4	L2	10	1.0	32	1.0	0.106	4.6	LOS A	0.0	0.0	0.00	0.09	0.00	49.0
5	T1	54	3.0	171	3.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	49.5
Approach		64	2.7	202	2.7	0.106	0.7	NA	0.0	0.0	0.00	0.09	0.00	49.4
West: Harbour Boulevard														
11	T1	51	3.0	161	3.0	0.179	0.5	LOS A	0.8	6.0	0.29	0.27	0.29	47.9
12	R2	44	1.0	139	1.0	0.179	5.3	LOS A	0.8	6.0	0.29	0.27	0.29	46.9
Approach		95	2.1	300	2.1	0.179	2.8	NA	0.8	6.0	0.29	0.27	0.29	47.4
All Vehicles		210	2.0	663	2.0	0.179	2.8	NA	0.8	6.0	0.20	0.28	0.20	47.6

Saturday AM Peak

MOVEMENT SUMMARY

▽ Site: [Harbour Boulevard & Rangoon Avenue Saturday AM (Site Folder: General)]

Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/20min]		DEMAND FLOWS [Total veh/h]		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist]		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rangoon Avenue														
1	L2	31	1.0	98	1.0	0.103	5.2	LOS A	0.4	2.8	0.30	0.56	0.30	45.9
3	R2	8	1.0	25	1.0	0.103	6.9	LOS A	0.4	2.8	0.30	0.56	0.30	45.5
Approach		39	1.0	123	1.0	0.103	5.6	LOS A	0.4	2.8	0.30	0.56	0.30	45.8
East: Harbour Boulevard														
4	L2	8	1.0	25	1.0	0.114	4.6	LOS A	0.0	0.0	0.00	0.06	0.00	49.1
5	T1	61	3.0	193	3.0	0.114	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	49.6
Approach		69	2.8	218	2.8	0.114	0.6	NA	0.0	0.0	0.00	0.06	0.00	49.5
West: Harbour Boulevard														
11	T1	59	3.0	186	3.0	0.165	0.4	LOS A	0.7	4.7	0.25	0.20	0.25	48.3
12	R2	31	1.0	98	1.0	0.165	5.4	LOS A	0.7	4.7	0.25	0.20	0.25	47.4
Approach		90	2.3	284	2.3	0.165	2.1	NA	0.7	4.7	0.25	0.20	0.25	48.0
All Vehicles		198	2.2	625	2.2	0.165	2.3	NA	0.7	4.7	0.17	0.22	0.17	48.1

Saturday PM Peak

MOVEMENT SUMMARY

▽ Site: [Harbour Boulevard & Rangoon Avenue Saturday PM (Site Folder: General)]

Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/20min]		DEMAND FLOWS [Total veh/h]		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist]		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rangoon Avenue														
1	L2	32	1.0	101	1.0	0.112	5.3	LOS A	0.4	3.1	0.32	0.58	0.32	45.9
3	R2	9	1.0	28	1.0	0.112	7.2	LOS A	0.4	3.1	0.32	0.58	0.32	45.4
Approach		41	1.0	129	1.0	0.112	5.7	LOS A	0.4	3.1	0.32	0.58	0.32	45.8
East: Harbour Boulevard														
4	L2	9	1.0	28	1.0	0.126	4.6	LOS A	0.0	0.0	0.00	0.06	0.00	49.1
5	T1	67	3.0	212	3.0	0.126	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	49.6
Approach		76	2.8	240	2.8	0.126	0.6	NA	0.0	0.0	0.00	0.06	0.00	49.5
West: Harbour Boulevard														
11	T1	68	3.0	215	3.0	0.184	0.5	LOS A	0.7	5.2	0.25	0.19	0.25	48.3
12	R2	32	1.0	101	1.0	0.184	5.5	LOS A	0.7	5.2	0.25	0.19	0.25	47.4
Approach		100	2.4	316	2.4	0.184	2.1	NA	0.7	5.2	0.25	0.19	0.25	48.0
All Vehicles		217	2.2	685	2.2	0.184	2.2	NA	0.7	5.2	0.18	0.22	0.18	48.1

Sunday AM Peak

MOVEMENT SUMMARY

▽ Site: [Harbour Boulevard & Rangoon Avenue Sunday AM (Site Folder: General)]

Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/20min HV] %		DEMAND FLOWS [Total veh/h HV] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rangoon Avenue														
1	L2	48	1.0	152	1.0	0.167	5.4	LOS A	0.7	4.7	0.35	0.60	0.35	45.8
3	R2	11	1.0	35	1.0	0.167	8.2	LOS A	0.7	4.7	0.35	0.60	0.35	45.4
Approach		59	1.0	186	1.0	0.167	5.9	LOS A	0.7	4.7	0.35	0.60	0.35	45.7
East: Harbour Boulevard														
4	L2	11	1.0	35	1.0	0.141	4.6	LOS A	0.0	0.0	0.00	0.07	0.00	49.0
5	T1	74	3.0	234	3.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	49.5
Approach		85	2.7	268	2.7	0.141	0.6	NA	0.0	0.0	0.00	0.07	0.00	49.5
West: Harbour Boulevard														
11	T1	77	3.0	243	3.0	0.238	0.7	LOS A	1.1	7.9	0.32	0.23	0.32	48.0
12	R2	48	1.0	152	1.0	0.238	5.7	LOS A	1.1	7.9	0.32	0.23	0.32	47.1
Approach		125	2.2	395	2.2	0.238	2.6	NA	1.1	7.9	0.32	0.23	0.32	47.6
All Vehicles		269	2.1	849	2.1	0.238	2.7	NA	1.1	7.9	0.23	0.26	0.23	47.8

Sunday PM Peak

MOVEMENT SUMMARY

▽ Site: [Harbour Boulevard & Rangoon Avenue Sunday PM (Site Folder: General)]

Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/20min HV] %		DEMAND FLOWS [Total veh/h HV] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rangoon Avenue														
1	L2	49	1.0	155	1.0	0.177	5.5	LOS A	0.7	5.0	0.37	0.61	0.37	45.7
3	R2	12	1.0	38	1.0	0.177	8.5	LOS A	0.7	5.0	0.37	0.61	0.37	45.3
Approach		61	1.0	193	1.0	0.177	6.1	LOS A	0.7	5.0	0.37	0.61	0.37	45.6
East: Harbour Boulevard														
4	L2	12	1.0	38	1.0	0.151	4.6	LOS A	0.0	0.0	0.00	0.07	0.00	49.0
5	T1	79	3.0	249	3.0	0.151	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	49.5
Approach		91	2.7	287	2.7	0.151	0.6	NA	0.0	0.0	0.00	0.07	0.00	49.5
West: Harbour Boulevard														
11	T1	78	3.0	246	3.0	0.244	0.8	LOS A	1.2	8.3	0.34	0.24	0.34	48.0
12	R2	49	1.0	155	1.0	0.244	5.8	LOS A	1.2	8.3	0.34	0.24	0.34	47.0
Approach		127	2.2	401	2.2	0.244	2.7	NA	1.2	8.3	0.34	0.24	0.34	47.6
All Vehicles		279	2.1	881	2.1	0.244	2.8	NA	1.2	8.3	0.23	0.26	0.23	47.7

Sunday PM Super-Peak Sensitivity Test

MOVEMENT SUMMARY

▽ Site: [Harbour Boulevard & Rangoon Avenue Sunday Super Peak (Site Folder: General)]

Super-Peak Sensitivity Test
Facility Traffic Volumes Doubled
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/20min HV] %		DEMAND FLOWS [Total veh/h HV] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rangoon Avenue														
1	L2	90	1.0	284	1.0	0.288	5.6	LOS A	1.3	9.0	0.40	0.61	0.40	45.7
3	R2	12	1.0	38	1.0	0.288	10.5	LOS A	1.3	9.0	0.40	0.61	0.40	45.3
Approach		102	1.0	322	1.0	0.288	6.2	LOS A	1.3	9.0	0.40	0.61	0.40	45.6
East: Harbour Boulevard														
4	L2	12	1.0	38	1.0	0.151	4.6	LOS A	0.0	0.0	0.00	0.07	0.00	49.0
5	T1	79	3.0	249	3.0	0.151	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	49.5
Approach		91	2.7	287	2.7	0.151	0.6	NA	0.0	0.0	0.00	0.07	0.00	49.5
West: Harbour Boulevard														
11	T1	78	3.0	246	3.0	0.340	1.1	LOS A	2.0	14.2	0.44	0.34	0.44	47.3
12	R2	90	1.0	284	1.0	0.340	6.0	LOS A	2.0	14.2	0.44	0.34	0.44	46.4
Approach		168	1.9	531	1.9	0.340	3.7	NA	2.0	14.2	0.44	0.34	0.44	46.8
All Vehicles		361	1.9	1140	1.9	0.340	3.6	NA	2.0	14.2	0.32	0.35	0.32	47.1

28/07/2026

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Shellharbour City Council
76 Cygnet Avenue
Shellharbour City Centre NSW 2529

Att: [REDACTED]

Shell Cove Sports Facility Stage 1 Transport Assessment Addendum

Dear [REDACTED],

1 Introduction

In 2024, arc traffic + transport prepared a Transport Assessment (**TA 2024**) relating to the access, traffic and parking characteristics of the Shell Cover Sports Facility (the **Facility**, located south of Harbour Boulevard, Shell Cove (the **Site**). The Facility will provide a cricket oval during the summer, and an AFL field – capable also of being used for multiple fields for junior players (games and training) – during the winter.

Importantly, the construction of the Facility is now proposed to be undertaken in 2 stages; in this regard:

- **Stage 1** provides for the construction of the majority of the Facility, including the main sports fields; amenities buildings; pedestrian infrastructure; and a new car park in the south-western corner of the Site (**Car Park 1**) to be accessed via Rangoon Avenue.
- **Stage 2** provides for additional sports field areas; the further expansion of Car Park 1; and a new car park in the eastern part of the Site (**Car Park 2**), to be accessed via a new southern approach to the roundabout intersection of Harbour Boulevard & Maritime Drive.

This **Addendum** to TA 2024 has been prepared by arc traffic + transport to specifically consider the development of the Facility further to Stage 1 only, noting that there is no information available to indicate that the operation of the completed Facility would be in any way significantly different to that assessed in TA 2024.

Noting then the proposed Stage 1 components of the Facility, this Addendum focuses on an assessment of:

- Standard peak parking demand, and the ability of Car Park 1 to accommodate that demand prior to its extension, and the construction of Car Park 2, as part of Stage 2;
- Active transport accessibility, and specifically connections between the Facility and the external active transport network; and
- The characteristics of [occasional] larger events at the Site, and measures by which to mitigate any potential impacts (and particularly parking impacts) based on only the provision of the Stage 1 infrastructure.

From the outset, it is noted that this Addendum does not provide any additional detailed traffic analysis, as the peak trip generation of the Facility was fully assessed in TA 2024, and the trip generation of the Stage 1 components will be slightly lower than generated by the completed Facility.

Finally, this Addendum should be read in conjunction with TA 2024, which is referenced in the Addendum where relevant.

2 Stage 1

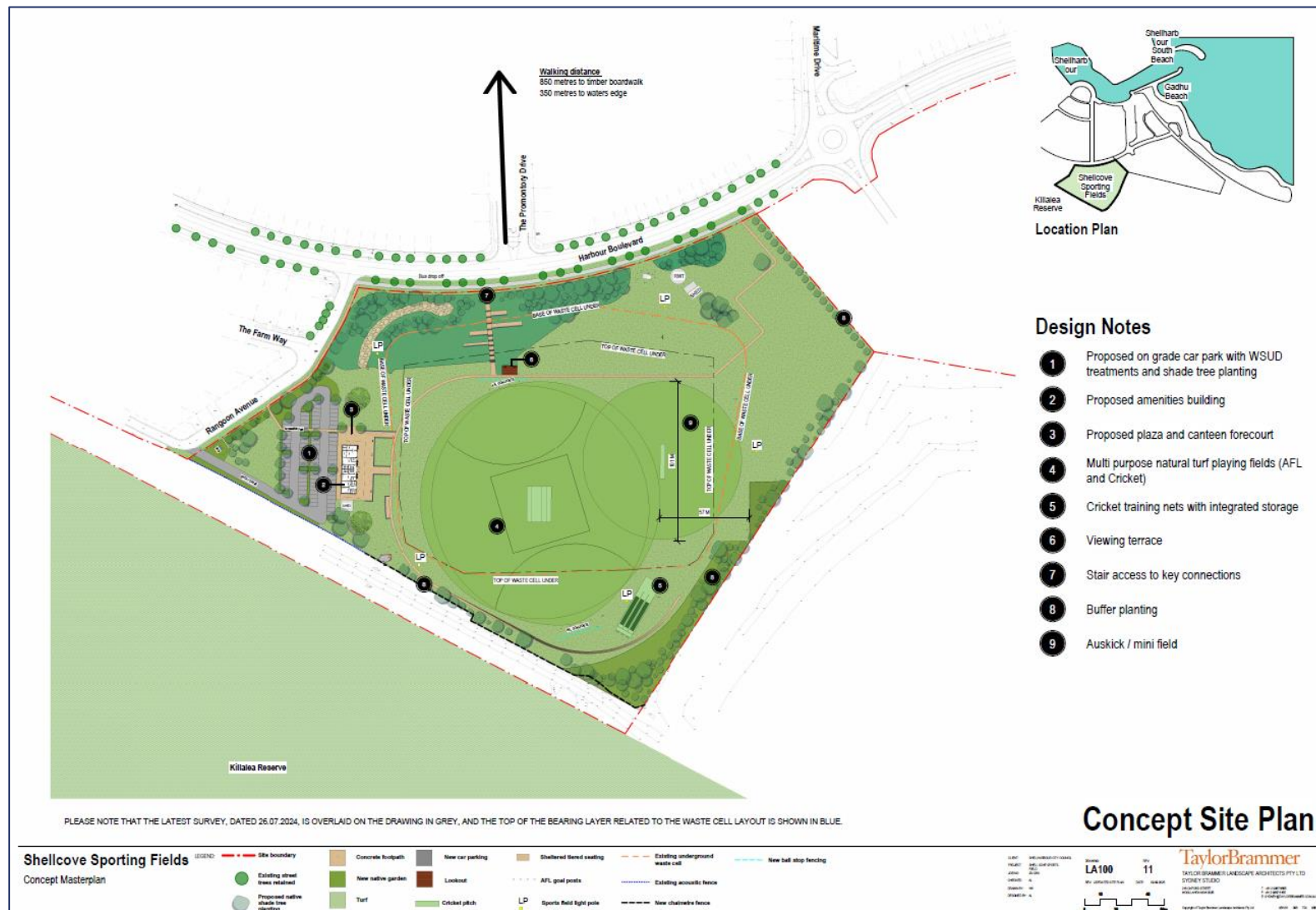
2.1 Stage 1 Facility

As discussed, the Stage 1 works provide for the construction of the majority of the Facility's infrastructure, including:

- The main sports fields;
- Amenity buildings;
- Car Park 1 (85 parking spaces); and
- Active transport infrastructure, including new shared paths connecting between the Facility and the shared path in Harbour Boulevard.

The Stage 1 Concept Plan (**Stage 1 Plan**) is shown in **Figure 1**, and **Figure 2** shows the complete development of the Facility (Stage 1 and Stage 2) for comparative purposes.

Figure1: Stage 1 Concept Plan



2.2 Operations

The operation of the Facility further to Stage 1 would not be significantly different to its operation further to full development given that the majority of the trip generation components of the Facility – and specifically the sports fields – will be provided in Stage 1.

With reference to Section 3.2 of TA 2024, the peak (standard) operation of the Site was determined based on a first principles assessment that considered:

- The peak number of players at the Facility at any one time;
- Game/practice start and finish times;
- The different characteristics of the summer season (cricket) and the winter season (AFL), with the winter season adopted for the traffic and parking assessment given the higher on-site occupancy for AFL activities; and
- Car Occupancy.

Based on these, TA 2024 determined that the peak occupancy of the Site would be on a Sunday morning, where some 72 junior players would be arriving generated prior to each game/train start time, and – further to the application of a vehicle occupancy of 1.5 players per vehicle for training and 1.3 players per vehicle for games – determined that the Facility could generate up to 96 vehicle trips per hour (**vph**) during weekday PM peak periods; and up to 110vph during Sunday AM peak periods.

As discussed, the occupancy of the Facility further to Stage 1 will be slightly lower than the completed Facility given that the Auskick mini-field will only be constructed in Stage 2. This means that the peak number of player on-site during weekday PM periods would be approximately 50 players, and approximately 60 players on Sunday mornings.

Application in turn of the same vehicle occupancies as adopted in TA 2024, the Stage 1 would result in some 35 – 40 vehicles arriving prior to each game/training start times during the weekday PM peak periods, and 45 – 50 vehicles arriving prior to the game start times on Sunday mornings.

2.3 Traffic Impacts

As discussed in **Section 1**, TA 2024 provided an assessment of the peak trip generation of the completed Facility, and determined that the key intersection of Harbour Boulevard & Rangoon Avenue will operate at a good Level of Service, with very minor average delays and queue lengths. Moreover, this Level of Service was based on the intersection operating under priority control only, whereas the intersection will now be upgraded to a roundabout as part of Stage 2 (per **Figure 2** above) if required further to the Site's operations under Stage 1.

Given that the peak occupancy of the Facility under Stage 1 will be slight lower (and as such trip generation also lower), it can only be concluded that the intersection of Harbour Boulevard & Rangoon Avenue would operate with even lower delays/queues than determined for the completed Facility even if operating under priority control prior to Stage 2.

2.4 Standard Peak Parking

As discussed, Stage 1 provides for the construction of 85 parking spaces in Car Park 1, whereas the completed Facility will provide some 125 parking spaces in Car Park 1, and an additional 92 overflow parking spaces in Car Park 2.

With reference to the operation of the Facility under Stage 1 as detailed in **Section 2.2**, the peak number of vehicles attending the Site for each training/game start time would be 35 – 40 vehicles during the weekday PM peak; and 45 – 50 vehicles during the Sunday AM peak. As such, the standard peak parking demand of the Facility under Stage 1 would be easily accommodated in Car 1 Park.

As discussed in Section 3.4 of TA, there is a changeover period (between training/game sessions ending and starting) where there would be a higher parking demand, as Car Park 1 would be accommodating vehicles from the earlier training/game as those arriving for the later training/game arrive to find parking.

This changeover peak parking demand could be accommodated during the weekday PM peaks, and could also generally be accommodated during the Sunday morning peak further to consideration of the following:

- Some players arriving later (after vehicles have departed from the earlier game) and/or players departing earlier (prior to vehicles arriving for the later game);
- The availability of on-street parking in Harbour Boulevard, which is anticipated to be used by a reasonable percentage of vehicles simply given that on-street parking is available immediately adjacent to the Facility; and
- Excellent active transport connectivity between the on-street parking (and shared path) in Harbour Boulevard and the Facility, including the Rangoon Avenue footpath to the main amenities building; and the direct path/stairs running south from Harbour Boulevard to the main sports field.

With regard to on-street parking in Harbour Boulevard, there is capacity for approximately 40 vehicles to be parked immediate adjacent to the Facility on the southern side of Harbour Boulevard between Maritime Drive and Rangoon Avenue; and addition 20 – 25 spaces on the southern side of Harbour Boulevard west of Rangoon Avenue within 250m (2 – 3 minute walk distance) of the main amenities building.

There is also capacity for approximately 15 - 20 vehicles to park on either side of Rangoon Avenue adjacent to the Site. However, we would recommend that parking only be provided on the western side of Rangoon Avenue (adjacent to residential dwellings) so as to retain two-way traffic in Rangoon Avenue between Harbour Boulevard and the Car Park 1 driveway. This may (for example) require the installation of No Parking/No Stopping signage at some time in the future depending on the timing of the Stage 2 works, and specifically the timing of the Car Park 1 extension and construction of Stage 2.

This is something that Council can continue to monitor.

In summary though, it is the opinion of **arc traffic + transport** that the provision of 85 parking spaces in Car Park 1 is an appropriate amount of parking for the Stage 1 operation of the Facility.

2.5 Event Parking

As discussed in Section 3.4.2 of TA 2024, the potential exists for the Facility to host occasional events generating a higher occupancy than standard peak operations; these could include (for example):

- Finals matches, particularly for the senior AFL teams, where a higher number of spectators might be in attendance;
- Repurposing the Facility to accommodate higher occupancy sports, such as junior football (soccer), whereby the Facility could likely accommodate at least 8 smaller junior football fields; and/or.
- School or other regional sporting carnivals/events.

In each of these instances, vehicle occupancy would be at least that of players vehicle occupancy, and in the case of spectators at least double the players vehicle occupancy (likely 2.5 – 3 spectators per vehicle); and for school carnivals and the like, most of those attending will be using buses to travel to/from the Facility.

In addition, the full potential for the Facility to accommodate larger events is only anticipated to occur further to increases in the number of players over time, which is unlikely to occur prior to Stage 2, where the additional capacity of Car Park 1 and Car Park 2 would likely well exceed even an event's peak parking demand.

Finally, and as discussed in **Section 2.4**, there is a significant amount of on-street parking available in Harbour Boulevard; while some 60 spaces are available on the southern side of Harbour Boulevard within 200m of the Site; at least 150 spaces available in Harbour Boulevard within 400m of the Site (5 minute walk distance); and at least the same number of spaces again if considering other wider roads within 400m of the Site, including The Promontory Drive and Maritime Drive.

In summary, even though it is unlikely that the Facility would host large events prior to its full development, there is a significant amount of parking available within 400m of the Site such as to accommodate that [very occasional] demand.

3 Active & Public Transport

3.1 Active Transport

As discussed in numerous sections above, the Site is provided with excellent access to the broader Shellharbour active transport networks via the shared path in Harbour Boulevard. This includes the new footpath along the eastern side of Rangoon Avenue – which was not previously proposed in the Concept Master Plan – connecting between Harbour Boulevard and the main amenities building, noting that a marked footpath is also provided through Car Park 1.

In addition, a path/stairs will provide access south from Harbour Boulevard to the main sports field.

3.2 Public Transport

While the Site is not currently serviced by public transport (buses), it is anticipated that over time additional bus services will commence operations in Shellharbour (particularly further to development in Shell Cove), and Harbour Drive is a readily identifiable route given that it would provide access to key local attractors (including the Facility) and bus stops within 400m of a significant number of residential dwellings.

In the short term though, it is recommended that Council consider the provision of a bus stop on the southern side of Harbour Boulevard east of Rangoon Avenue. As discussed in regard to events, the potential exists for the Facility to be used by local schools or community groups, with those attending being transported to/from the Site by bus. While there would generally be significant capacity for a bus to set down anywhere in this section of Harbour Boulevard (given relatively low parking demand) this would be an optimal position given its immediate connectivity to the Harbour Boulevard and then Rangoon Avenue footpaths providing direct access to the main amenities building

4 Summary

Further to our assessment, **arc traffic + transport** has determined that the Stage 1 development of the Facility is entirely supportable further to access, traffic and parking considerations.

If you have any further questions in regard to the assessment provided in this Addendum, or wish to discuss the Stage proposal further, please don't hesitate to contact the undersigned.



Director, arc traffic + transport