

APPENDIX V



BEALE PARK REDEVELOPMENT
Traffic Impact Statement

15 November 2024

Prepared for:
The City of Cockburn

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Project Number:
301400746

Beale Park Redevelopment

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Beale Park Redevelopment

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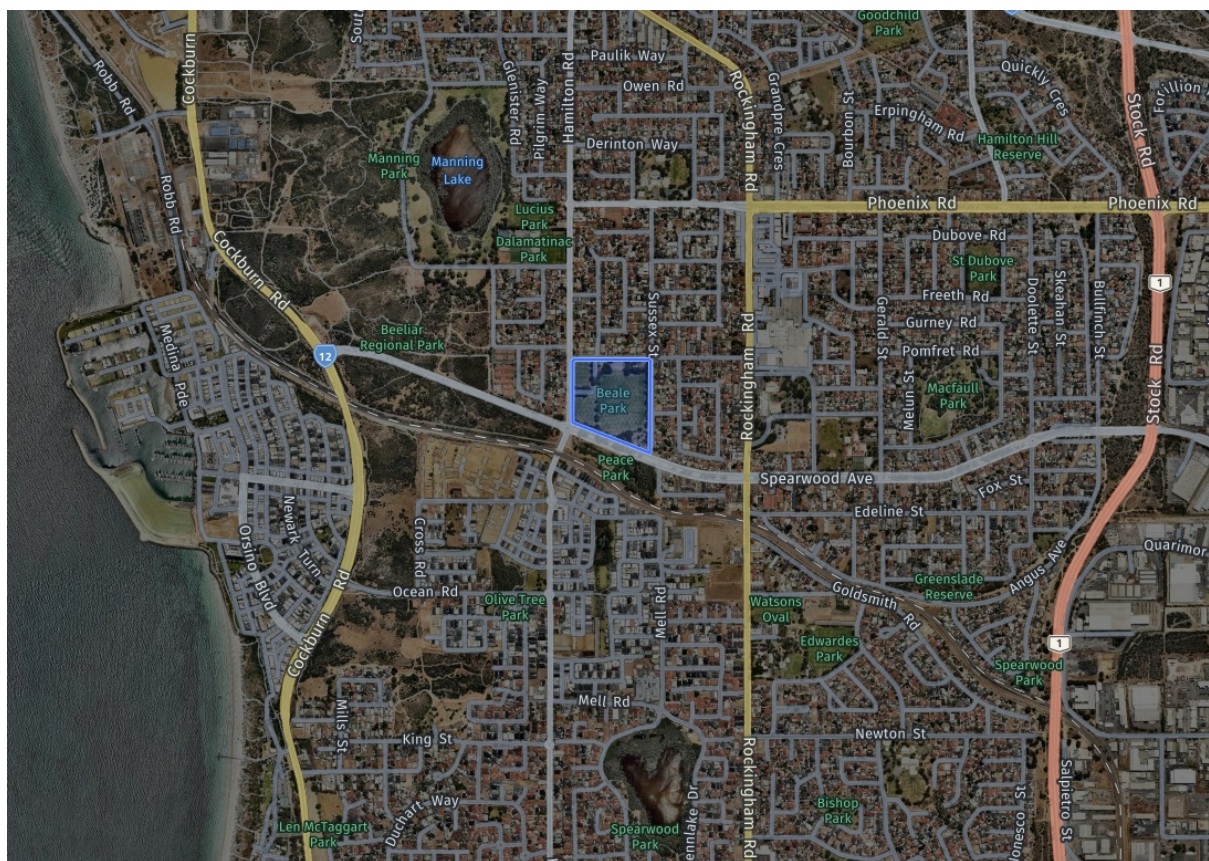


1 Introduction

1.1 Background

Stantec were engaged by City of Cockburn to undertake a Traffic Impact Statement for the Beale Park Redevelopment within the City of Cockburn Local Government Area (LGA). The development is located in the suburb of Spearwood, bound by Spearwood Avenue, Hamilton Road, Kent Street and Sussex Street as shown in Figure 1-1.

Figure 1-1: Site Locality Plan



(Source: Nearmap)

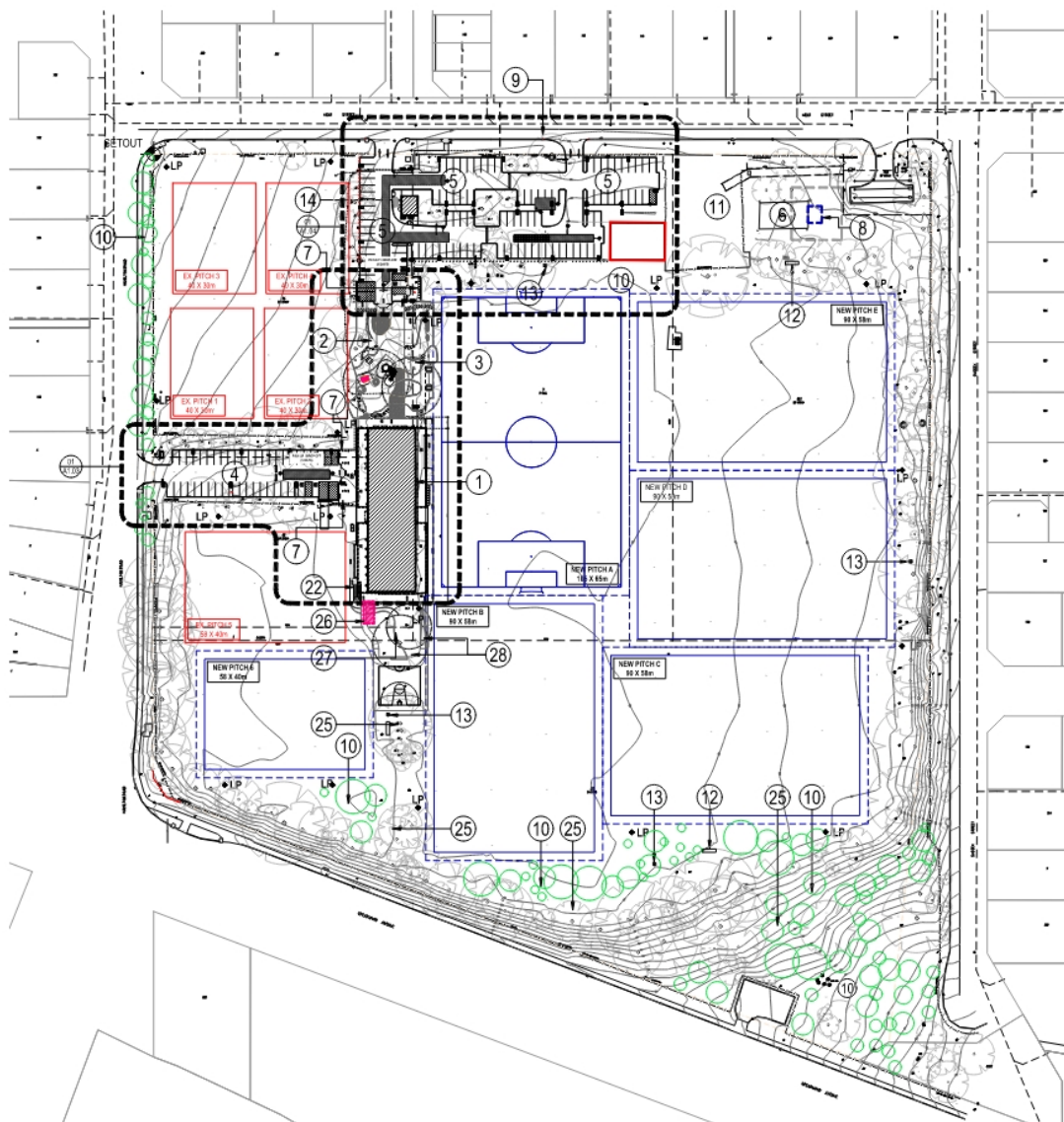
Beale Park Redevelopment

1 Introduction

The proposed redevelopment of Beale Park includes an upgrade to the playing fields and facilities as shown in Figure 1-2. The BDG2054 Master Site Plan SK1.01-1000 Rev P (October 2024) includes the provision of eleven soccer fields in addition to the following amenities:

- Car park upgrade
- New lighting
- 2 home and away unisex changing rooms
- Referees/officials room
- Function and club room
- External and internal storage areas
- Public toilets (including ambulant toilets)
- Offices & meeting room
- First aid room
- Bar and kiosk
- Nature / movement / local history themed public artwork incorporated into proposed new clubhouse
- Play space and amenity area – informal seating and shade structures with BBQs
- 137 car parking spaces (inc. 4 ACROD)
- 2 ambulance spaces and 2 loading spaces
- Bike racks
- Outdoor exercise station and landscaping
- Park benches
- Bin lay down area, locations, and enclosure
- New cyclone fencing
- Native garden bed of small shrubs and ground cover

Figure 1-2: Proposed Redevelopment



(Source: BDG2054 SK01.01 Proposed Master Site Plan REV P – October 2024)



1.2 Purpose of the Report

Western Australian Planning Commission Transport Assessment Guidelines (WAPC Guidelines) provide direction on the level of assessment which is necessary to be carried out with respect to the likely traffic impact of a development proposal. Typically, any development which is expected to have a 'high' traffic impact, that is, generating more than 100 trips in the peak hour is satisfied by a Traffic Impact Assessment (TIA). Any development which is expected to generate less than 100 trips in the peak hour requires a Transport Impact Statement (TIS) to be undertaken. Both types of assessment consider the operation and layout of the site, but they differ in their assessment of external traffic impact.

In the context of this proposal, the trips generated by a sporting facilities are based on the number of playing fields on site. Given the proposal has the same number of playing fields as the existing development, it is estimated there will be less than 100 **additional** trips generated as compared to the existing conditions in a given peak hour if applying 'typical' traffic generation rates. In this case a TIS is appropriate. This TIS briefly outlines the transport aspects surrounding the proposed development. The intent of a TIS, as per the WAPC Guidelines, is to provide the approving authority with sufficient transport information to confirm that the Applicant has adequately considered the transport aspects of the proposed development and that it would not have an adverse transport impact on the surrounding area.

In accordance with the WAPC Guidelines, this TIS outlines:

- Existing transport conditions proximate to the site
- Suitability of the proposed parking provision within the site
- The adequacy of the proposed site layout
- The traffic generating characteristics of the proposed development
- The anticipated impact of the proposed development on the surrounding road network.

1.3 References

In preparing this report, reference has been made to the following:

- Bollig Design Group (BDG) Proposed Master Site Plan - SK1.01 Rev P (October 2024)
- Bollig Design Group (BDG) Proposed Site Plan Part 1 of 2 - SK1.02 Rev O (October 2024)
- Bollig Design Group (BDG) Proposed Site Plan Part 2 of 2 - SK1.03 Rev P (October 2024)
- City of Cockburn IntraMaps
- City of Cockburn Town Planning Scheme No.3 (TPS3)
- Department of Transport (DoT) Long-Term Cycle Network (LTCN)
- WAPC Transport Impact Assessment Guidelines Volume 4 - Individual Developments



2 Proposed Development

2.1 Existing Land Uses

Beale Park currently facilitates soccer games. The maximum number of observed fields were captured from 2012 aerials showing a total of nine soccer/football fields, ranging from 7-aside to 11-aside sizes, as shown in Figure 2-1.

Figure 2-1: Existing and Proposed Land Uses for Soccer



(Imagery Source: Metromaps)

In addition to the sporting fields, the current Beale Park facilities also include a playground and two pavilions. A portion of the existing northern pavilion, which is Cockburn Volunteer Emergency Services (CVES) headquarters, will be demolished, while retaining only the storage of the building.

The western pavilion, which is the clubroom buildings, is currently used by Cockburn City Soccer Club will be upgraded to include facilities such as 2 home and away unisex changerooms, referees/officials room, function and club room, external and internal storage area, public toilets (inc. Ambulant Toilets), office and meeting room, bar and kiosk, and nature/movement/local history themed public artwork incorporated into the new clubhouse.

During sporting events, the parking lot associated with the Cadets is closed off and unavailable for use meaning there is a high number of verge parking of vehicles. There are two carparks connecting



to the club pavilion with one access from the north via Kent Street and the other from the west via Hamilton Road. Furthermore, an additional smaller carpark is located near the south-east corner and a turning hardstand at the north-eastern corner.

2.2 Proposed Land Use

The proposed redevelopment of Beale Park is inclusive of the land uses outlined in Table 2-1.

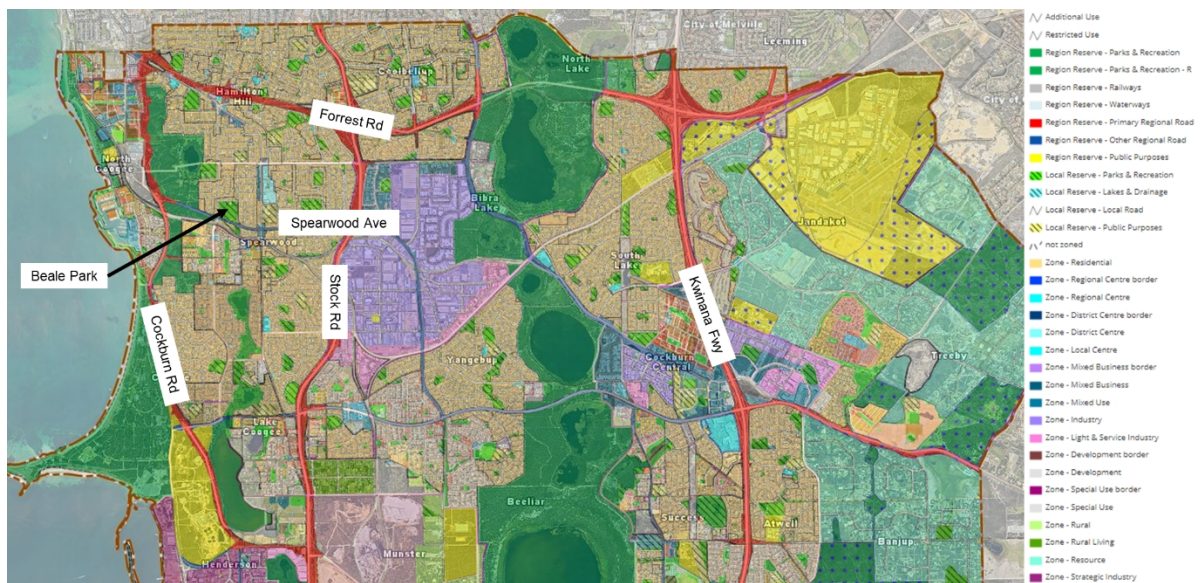
Table 2-1: Beale Park Redevelopment Proposed Land Uses

Proposed Land Use	Size
Soccer pitch (11-aside)	1 x (105m x 65m), 4 x (90m x 58m)
Soccer pitch (9-aside)	2 x (58m x 40m)
Soccer pitch (7-aside)	4 x (40m x 30m)
Carpark (off Hamilton Road)	40 bays (includes 5 pick-up/drop-off) * 2 ACROD 1 Emergency 1 Loading
Carpark (off Kent Street)	93 bays (includes 5 pick-up/drop-off) ** 2 ACROD 1 Emergency 1 Loading
6 unisex changing rooms	300 sqm (2 x 48 sqm and 4 x 51 sqm)
Referees/officials room	25 sqm
Function space	131 sqm
Club space	133 sqm
External and internal storage areas	63 sqm (1 x 27 sqm, 1 x 20 sqm, 2 x 8 sqm)
Public toilets (including ambulant toilets)	60 sqm (22 sqm each, 2 x 8 sqm UAT)
Office	14 sqm
First aid room	9 sqm
Kitchen, Cool room, Bar and kiosk	76 sqm
Playpark	≈ 180 sqm
Outdoor dining and seating	≈ 135sqm
Outdoor gym equipment area	≈ 30 sqm

2.3 Context with Surrounds

Beale Park is largely surrounded by residential developments to the right of a regional reserve. To the east is an industrial area approximately 1.9km away. The nearest major roads are the key north to south Primary Distributors of Stock Road 1.9km to the east, Kwinana Freeway 6.6km to the east and Cockburn Road 820m to the west. The site is adjacent to Spearwood Avenue (an Other Regional Road) as shown in Figure 2-2.

Figure 2-2: Land Uses of Surrounding Areas



(Source: City of Cockburn Intramaps)

3 Vehicular Access and Parking

3.1 Access Arrangements

There are two proposed access points to the car parks, one from Kent Street at the north of the site and one from Hamilton Road at the west of the site.

3.2 Public, Private, Disabled Parking

Stantec undertook a Car Parking and Traffic Appraisal Technical Note outlining the parking requirements of the site land uses due to the City of Cockburn Town Planning Scheme No.3 (TPS3) not including applicable parking rates for sporting facilities and associated multi-purpose pitches. Therefore, Stantec developed rates based on a desktop survey of parking utilisation, and City of Cockburn modelling and parking assumptions. This found a requirement for 385 bays to be provided as detailed in Appendix A.

3.3 Set Down/Pick Up

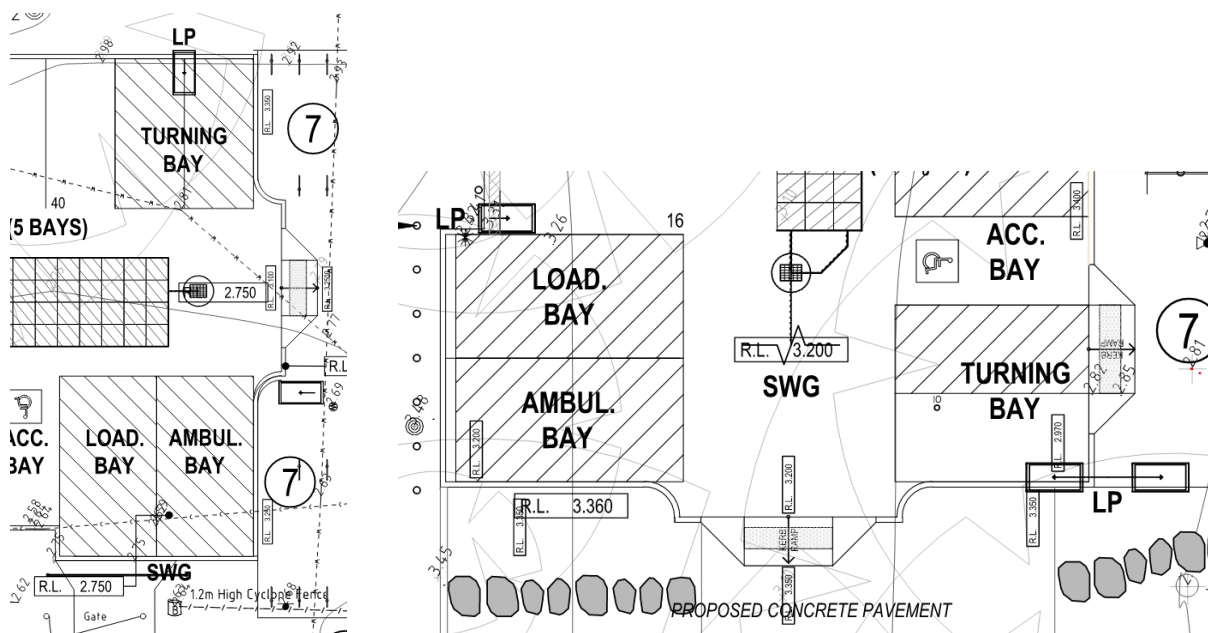
The plans allow for the provision of five pickup/drop-off bays in each car park.

4 Service Vehicles

4.1 Access Arrangements

Access for vehicles serving the site (service vehicle and ambulance) is provided via the carpark entries from Hamilton Street and Kent Street. A swept path analysis previously undertaken, indicated the need for a turning bay in each car park for the entry and exit to the dedicated service and ambulance bays. This provision of a turning bay is shown in Figure 4-1 which resulted in a net loss of two bays per carpark.

Figure 4-1: Turning Bay for Service and Emergency Bays



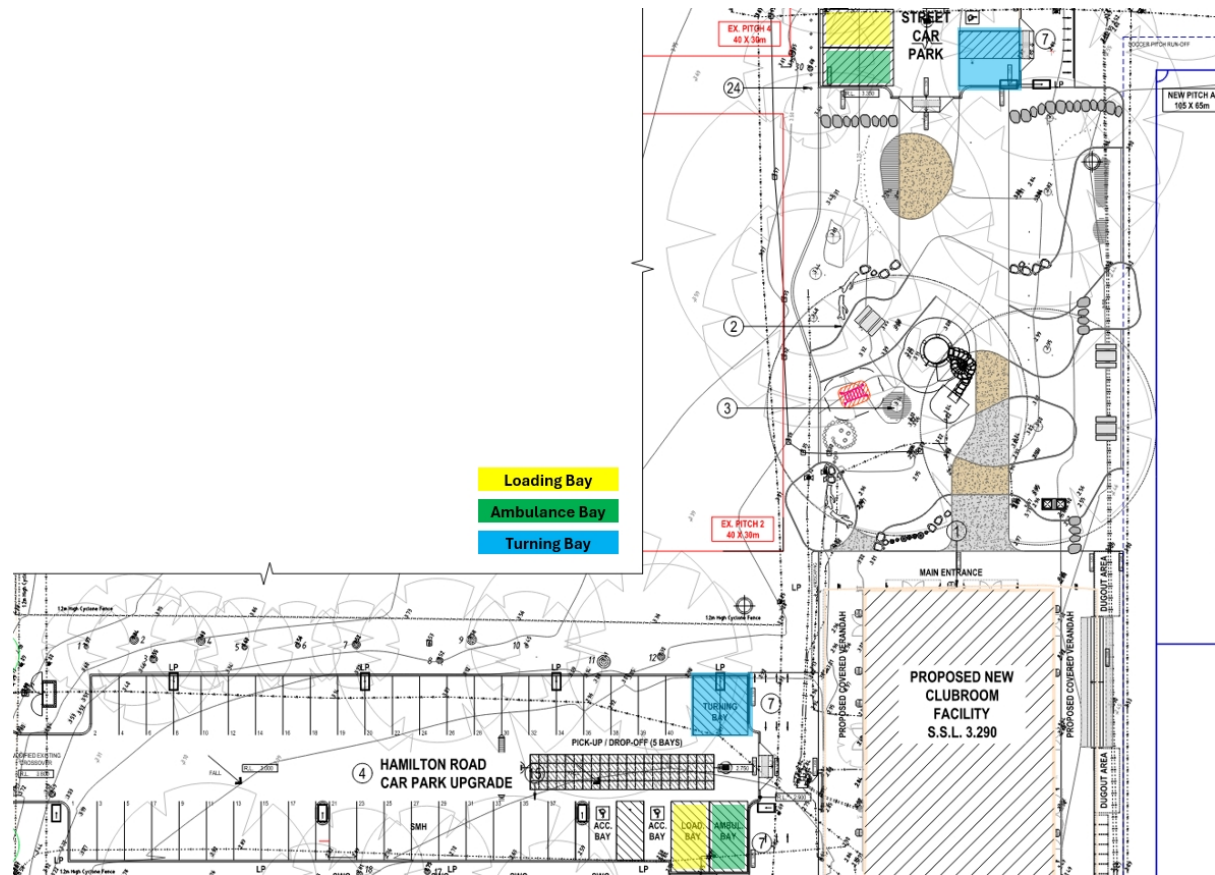
(Source: BGD SK1.02 Rev O & SK1.03 Rev P – October 2024)

A swept path analysis of the entry and exit to these bays for each carpark is shown in Appendix B and found there to be no issues with the carpark layout.

4.2 On/Off-Site Loading Facilities

The proposed redevelopment allows for one loading bay and one ambulance bay in each carpark as highlighted in Figure 4-2.

Figure 4-2: On-Site Loading Facilities



(Imagery Source: BGD SK1.02 Rev O – October 2024)

With reference to Technical Note as per attached in Appendix A, the proposed redevelopment was expected to have a total number of 153 on-site car parking bays, including 1 loading bay and 1 ambulance bay per car park. Along with the 118 parking spaces in the surrounding streets, this brings it to a total of 273 car parking spaces. This results in a loss of 122 bays.

Further to the proposal to retain portion of the northern pavilion, this requires redesign of the car park layout. With reference to the revised car park layout, the on-site car parking bays will be reduced to 137 bays. This results total proposed (on-site and off-site) parking of 255 car parking bays. The technical note determined a minimum need for 316 bays (61 bays shortfall) with the City of Cockburn model determining a more conservative requirement for 385 bays (130 bays shortfall).

5 Hours of Operation

It is assumed that sporting events will be held between the hours of 7am and 9pm with typical peak use during weekends with the inclusion of training and late-night games during weekdays.



6 Traffic Volumes

6.1 Daily or Peak Traffic Volumes

6.1.1 EXISTING TRAFFIC VOLUMES

The road network surrounding the site, with the exception of Sussex Street, has available traffic count traffic as captured in Table 6-1.

Table 6-1: Existing Traffic Volumes on Surrounding Road Network

Location	Average Weekday	AM Peak	PM Peak
Kent St – 65m east of Norland Wy (25/03/22)	1,401 veh/day	109 veh/hr (9am)	116 veh/hr (5pm)
Hamilton Rd – 90m north of Spearwood Ave (08/12/23)	12,957 veh/day	1,096 veh/hr (8am)	1,092 veh/hr (4pm)
Spearwood Ave – 60m east of Hamilton Rd (02/07/20)	9,781 veh/day	732 veh/hr (8am)	892 veh/hr (4pm)

(Source: City of Cockburn IntraMaps)

6.1.2 TRAFFIC GENERATION RESULTING FROM THE DEVELOPMENT

It has been assessed that due to the reduction in the parking supply at Beale Park, it is likely that there will be a reduction in traffic flows as compared to the current site and thus there is expected to be less of an impact as compared to the existing conditions following the redevelopment of the site.

6.2 Type of Vehicles

It is assumed that all the vehicles associated with the trip generation of the site in the peak periods will be passenger cars in the exemption of when medical attention is required in the form of an ambulance, these typically being of a Small Rigid Vehicle (SRV) size. Service vehicles (also SRVs) are assumed to only access the site out of the peak periods typically during weekdays for deliveries to the site.

7 Traffic Management on Frontage Streets

Spearwood Avenue and Hamilton Road are both two lane divided Distributor B roads (with Spearwood is also classifies as an Other Regional Road (ORR)/Blue Road under the MRS, whereas Kent Street and Sussex Street are both 2 lane undivided Access Roads with no line markings. There are no dedicated on-street parking provisions on any of the surrounding roads. additionally, there is no Local Area Traffic Management (LATM) on any roads.

Sussex Street is a no-through road and is controlled by a Stop Sign at the 4-way intersection with Kent Street. Hamilton Road and Kent Street intersection is 3-way and Give-Way controlled on Kent Street. Spearwood Avenue and Hamilton Road is a 4-way intersection controlled by a roundabout.

8 Public Transport Access

8.1 Nearest Bus/Train Routes

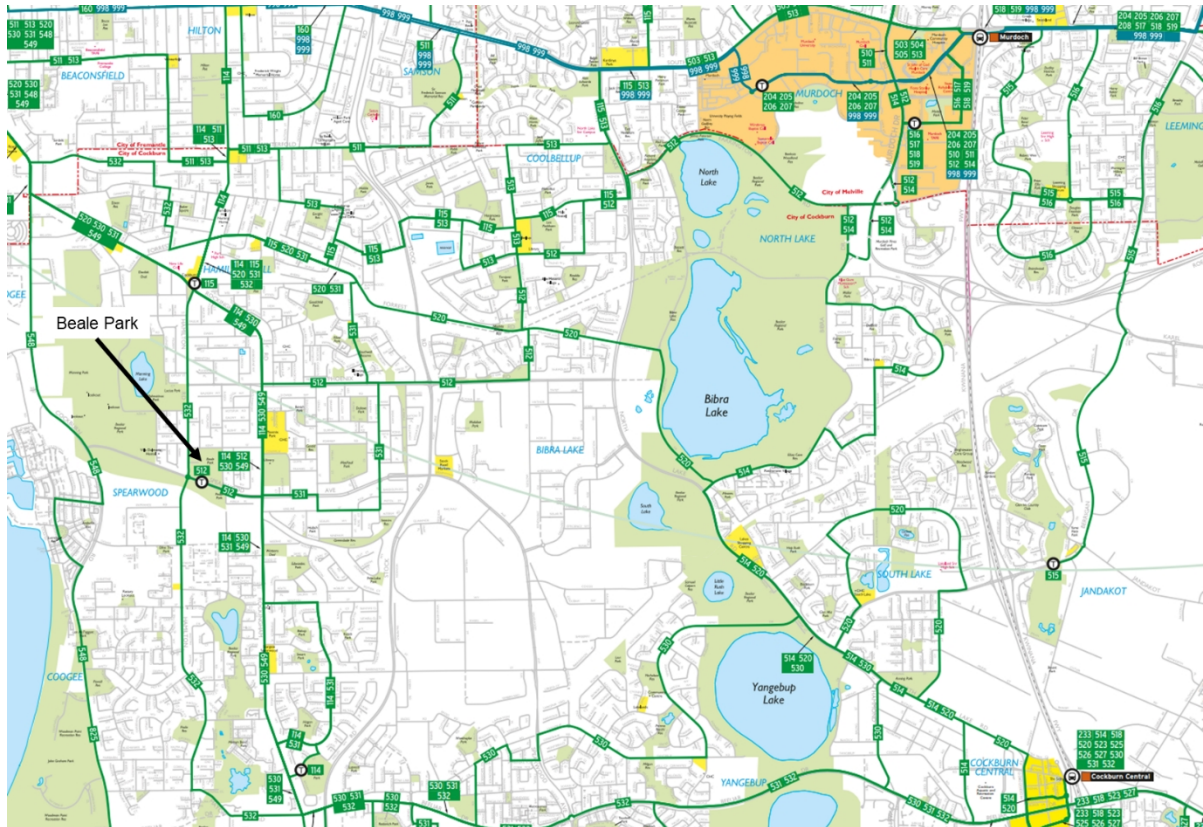
The nearest train stations to Beale Park are Cockburn Central (approximately 9km) and Murdoch Train Station (approximately 11km). Both stations are part of the Mandurah line which runs from Mandurah to Perth Underground. In addition, services in the peak hours run to and from Cockburn Central and Perth Underground. The nearest bus routes to Beale Park are shown diagrammatically in Table 8-1 and Figure 8-1.

Table 8-1: Public Transport provision

Service	Route	Route Description	Distance to Nearest Stop	Frequency On/Off Peak
Bus	114	Elizabeth Quay Bus Station - Asquith St Before Beckett Cl (Munster)	430m	30 min on / 60 min off
Bus	512	Murdoch Station – Spearwood	180m	15 min on / 60 min off
Bus	530	Cockburn Centra Station – Fremantle Station via Yangebup Road	430m	15 min on / 30 min off
Bus	531	Cockburn Centra Station – Fremantle Station via Marvell Avenue & The Grange	760m	20 min on / 60 min off
Bus	532	Cockburn Centra Station – Fremantle Station via Beeliar Drive	50m ~ 100m	10 min on / 60 min off
Bus	549	Fremantle Station – Rockingham Station via Rockingham Road & Kwinana Town Centre	430m	15 min on / 60 min off

Beale Park Redevelopment 8 Public Transport Access

Figure 8-1: Nearest Bus/Train Routes



(Source: Transperth Network Map Sheet 5 in 2022)

8.2 Nearest Bus Stops/Train Stations

As mentioned in the previous section, Cockburn Central and Murdoch Train Station are the closest train stations to Beale Park. The bus stops servicing routes 512 and 532 to Murdoch and Cockburn respectively are within 400m walking distance of the site. There are three existing bus stops adjacent to the site and two directly opposite the site servicing both directions of travel. The closest bus stop is within 220m walking distance from the centre of Beale Park as shown in Figure 8-2

Figure 8-2: Nearest Bus Stops to Beale Park



(Source: Transperth - Stops Near Me)

8.3 Pedestrian/Cycle Links to Bus Stops/Train Station

Cockburn Central is approximately 9.4km from the site which will take around 2 hours to walk and 36 mins to cycle. Therefore, it may be more desirable to catch a bus to a train station with services 512 and 532 taking around 29 mins and 37 mins, respectively. Figure 8-3 shows the existing footpath infrastructure adjacent to the site with respect to the nearest bus stop locations mentioned in section 8.2.

Figure 8-3: Walking Links to Bus Stops



(Imagery Source: City of Cockburn IntraMaps)

Due to the cycling time being similar to the bus travel times, a review of the existing cycle network shows the likely route to be along Spearwood Avenue, connecting to Beeliar Drive. This route would primarily involve on-road cycling along Spearwood Avenue due to the provided paths being for pedestrians only. However, Beeliar Drive has an off-road Principal Shared Path (PSP) on the southern side for the most part allowing cyclists to be fully protected from traffic. The Department of Transport (DoT) Long-Term Cycle Network (LTCN) references Spearwood Avenue as a Secondary Route and Beeliar Drive as a Primary Route.

9 Pedestrian Access/Facilities

9.1 Existing Pedestrian Facilities within the Development

The existing facilities within the development include the following:

- 2 Pavilions
- Playground
- Playing fields

9.2 Proposed Pedestrian Facilities within Development

The redevelopment proposed the following facilities to be provided within the development:

- Playing fields
- New lighting
- 2 home and away unisex changing rooms
- Referees/officials room
- Function and club room
- External and internal storage areas
- Public toilets (including ambulant toilets)
- Offices & meeting room
- First aid room
- Bar and kiosk
- Nature / movement / local history themed public artwork incorporated into proposed new clubhouse
- Play space and amenity area – informal seating and shade structures with BBQs
- 137 car parking spaces (inc. 4 ACROD)
- 2 ambulance spaces and 2 loading spaces
- Bike racks
- Outdoor exercise station and landscaping
- Park benches
- Bin lay down area, locations, and enclosure
- New cyclone fencing
- Native garden bed of small shrubs and ground cover

9.3 Existing Pedestrian Facilities on Surrounding Roads

The majority of the surrounding road network is accompanied by pedestrian paths as shown by the outlines in Figure 9-1.

Figure 9-1: Existing Footpaths surrounding the site



(Source: City of Cockburn IntraMaps)



9.4 Proposals to Improve Pedestrian Access

There are no proposals to improve pedestrian access to the site. However, with the redevelopment of the clubhouse, it will provide easier access from the carpark due to the extension and redesign of the car park layout. There is also provision for a new playground to be placed adjacent to the clubhouse



10 Cycle Access/Facilities

10.1 Existing Cycle Facilities within the Development

There are no existing cycling facilities on site.

10.2 Proposed Cycle Facilities within Development

The plan proposes to include bike racks for cyclists within the car park. Additionally, the public toilets may provide cyclists with an End of Trip (EOT) facility. However, if the players cycle to a game, there are changing facilities within the clubhouse.

10.3 Existing Cycle Facilities on Surrounding Roads

There are no existing cycling facilities on the surrounding roads.

10.4 Proposals to Improve Cycle Access

The car park proposal includes kerb ramps to the bike rack facilities.

11 Site Specific Issues

All site-specific issues have been rectified and incorporated into subsequent design revisions further to consultation with the project Architects and City representatives.

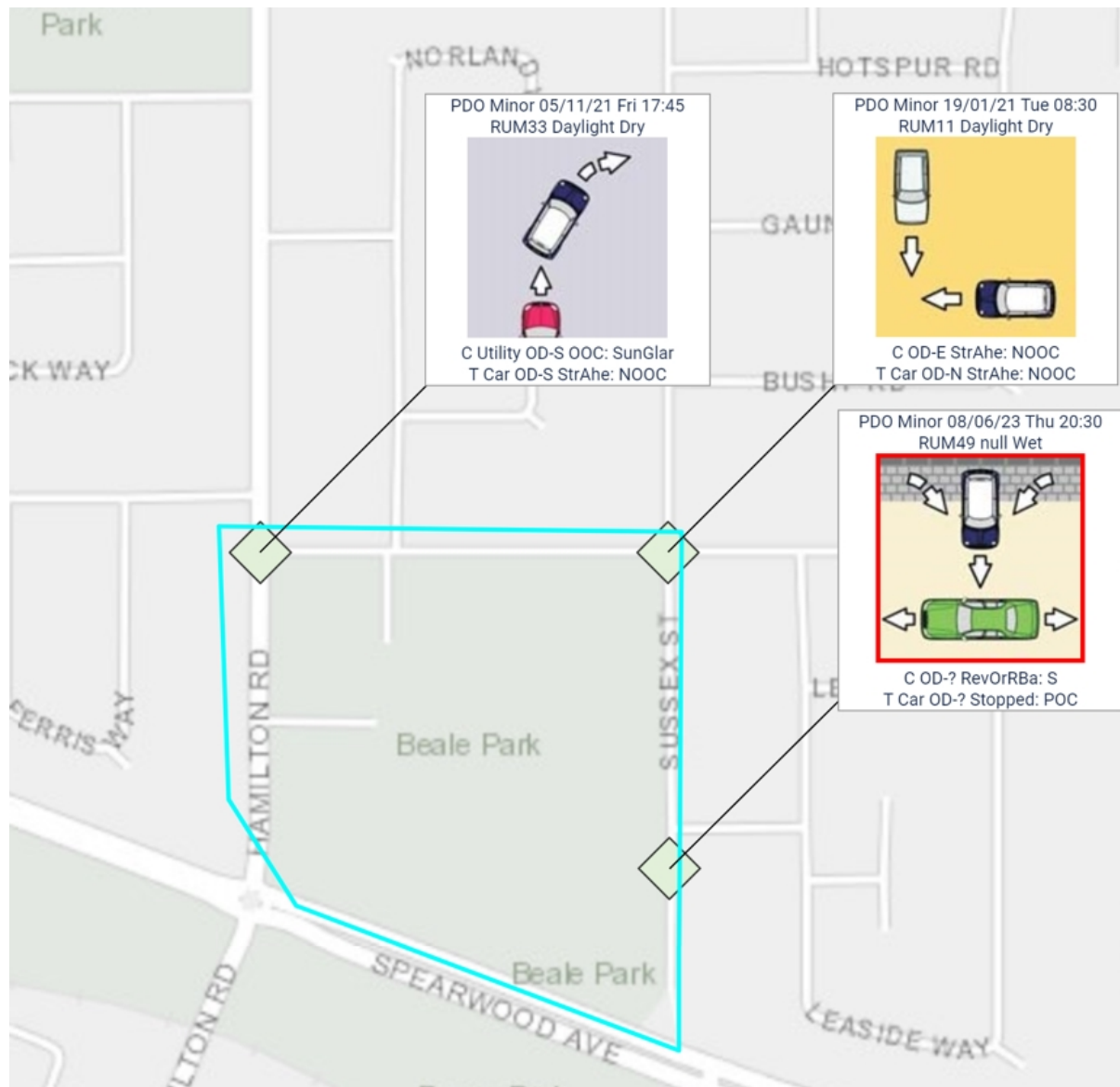


12 Safety Issues

12.1 Identified Issues

A crash analysis of the surrounding roads where verge parking was available was undertaken for the 5-year period between 1 January 2019 to 31 December 2023 with the results shown in Figure 12-1.

Figure 12-1: Crash Data for Beale Park Surrounding Roads



(Source: MRWA Crash Map)

As shown from the figure, there were only three (3) recordings of crash, where two happened at intersections. As the proposed redevelopment does not involve relocating accesses, it is not expected to increase the likelihood of this trend as identified from the crash analysis.

Besides that, there was one (1) recording of crash along Sussex Street where it involved vehicle reversing into a parked car on carriageway due to sun glare. As such, it can be considered that there are currently no road safety issues on the roads surrounding the site.

The existing conditions identified that vehicles drive over the pedestrian path on Hamilton Road to park on the verge. The proposal includes the plant of trees along the verge of Hamilton Road in order to prevent vehicles from parking and crossing the footpath to do so.

12.2 Remedial Measures

The service access is proposed to be reconsidered by rearranging the car park layout.

13 Conclusion

The proposed redevelopment of Beale Park involves new facilities in addition to a car park modification, allowing for more off-street car parking bays with the inclusion of bicycle racks enhances the overall facility attraction. This Traffic Impact Statement identified the following findings:

- The redevelopment will create a little to no additional impact on existing traffic conditions as the land uses remain similar however, there is a reduction in available parking bays which is likely to reduce the number of vehicles accessing the site
- Turning has been provided at blind aisles for easy manoeuvrability of SRV and emergency vehicle, as well as turning around.
- Existing public transport infrastructure available via bus stops directly adjacent to the site offering bus service connections to Cockburn Central and Murdoch Train Stations

APPENDICES



Appendix A Car Parking and Traffic Appraisal



TECHNICAL NOTE

Car Parking and Traffic Appraisal

Project Code:	W200040 / 301400746	Project Name:	Beale Park Redevelopment
Date:	15 June 2022	Version No.	D
Author:	Neale McCracken / Cameron Steel	Reviewer:	Tim Judd / Rodney Ding

Background & Purpose of Note

The City of Cockburn is currently preparing a master plan for the redevelopment of Beale Park, Spearwood. The master plan is to guide the future development planned to occur at the park. Legacy GTA Consultants, now Stantec, had been commissioned to conduct a car parking appraisal of the proposed redevelopment. This will supplement a full Transport Impact Statement report, to be completed in a later stage of this project.

This Technical Note (TN01) sets out our understanding of the existing operations of the on-site car parking and access during its peak operational periods and provides guidance on the appropriateness of the proposed future parking provision and management. A preliminary assessment of likely traffic impact is also provided.

This note has been prepared based on Stantec's initial review of the proposed development plans together with the expected development yield (number of pitches and size of buildings etc.) and likely activity schedule. This information was provided to Stantec by the City of Cockburn.

Findings

Our findings are based on the above-noted information and Stantec's assessment of parking demand and proposed site layout, as set out further in this note.

- The existing use of the site as a sporting facility is considered to have a parking demand of up to 231 car parking spaces with a supply of up to 393 car parking spaces, equivalent to the currently available on-site parking and verge parking available in surrounding streets.
- The proposal has an estimated parking demand of 316 car parking spaces. This is due to an increase in the number of soccer pitches compared to Stantec observation of the existing use of the site. However, the City of Cockburn carpark modelling for the Cockburn City Soccer Club NPL Challenge Cup in March 2021 estimated a need for 385 car parking spaces which adds an additional 69 bays. Due to this demand being more conservative, 385 car parking spaces was used therein for the appraisal.
- The proposed redevelopment will see 153 car spaces being provided on-site. This will result in a net loss of 122 car spaces when combined with verge parking in immediately surrounding streets (a total of 270 spaces compared to the existing 393 spaces). Therefore, the anticipated parking demand cannot be accommodated by the available parking supply.
- It is assumed that 7-aside/9-aside matches will be played at separate times to 11-aside matches, therefore an additional two 9-aside matches, or four 7-aside matches can be played on 11-aside pitch. This will allow for a reduction in 46 to 88 car parking spaces from the total 316 calculated by Stantec. It is assumed a similar reduction can be applied to the 385 car parking spaces demand. Therefore, it is recommended that 11-aside games be run at separate times to 7-aside and 9-aside games so that these games can be maximised in addition to reducing the parking demand.

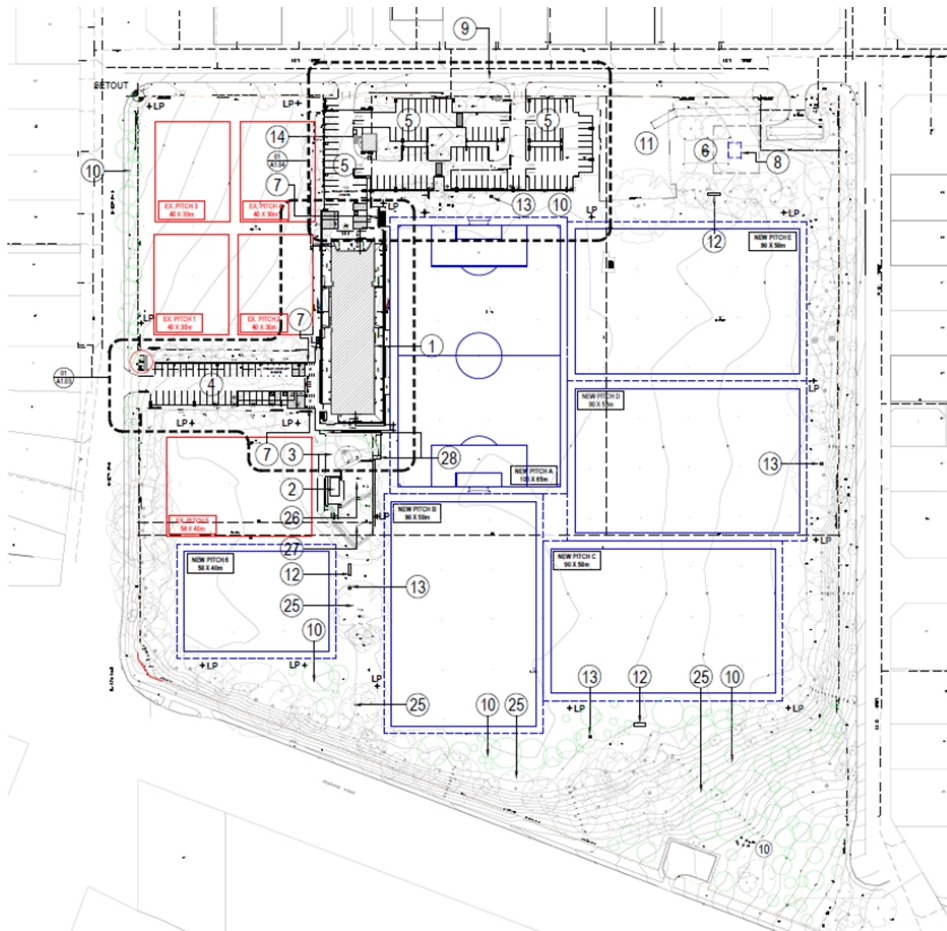
- The number of games that can be running at the same time should be limited or the number of on-site parking bays should be increased if the maximum capacity of the redeveloped facility is to be achieved.
- Further work is required to determine a suitable number of formalised bicycle parking spaces to provide at the redeveloped facility. This could be established through mode share targets which should be determined through a Green Travel Plan process in consultation with sports clubs and other stakeholders.
- Stantec's preliminary view is that traffic impacts are likely to be minimal, as even in the alternative scenario, the maximum number of games that could be supported by the redeveloped facility is the same as the existing facility. While separate rounds of games could be scheduled across the day, the roster should be managed to ensure there is minimal overlap between people leaving one session when others are arriving for the next session. This is primarily driven by our view that, from a parking perspective, any significant overlap is likely to result in an unmanageable overspill of parking into surrounding streets. As noted, this can be managed in a simple manner to ensure minimal overlap.
- A review of the car park layout has been completed and recommendations are made as noted further in this report.

Proposed Development

The proposed development in Figure 1 includes the following sizes of sporting fields:

- Five 11-aside soccer pitches (90m x 58m)
- Two 9-aside soccer pitches (58m x 40m)
- Four 7-aside soccer pitches (40m x 30m)

Figure 1: Proposed Development



Source: BDG SK1.01 Rev O – April 2022

Information provided on the BDG plan^[1] indicates that the proposed development will consist of:

¹ BDG drawing A1.01 Revision L

TECHNICAL NOTE

Car Parking and Traffic Appraisal

- Car park upgrade
- New lighting
- 3 home and away unisex changing rooms
- Referees/officials room
- Function space (270sqm)
- External and internal storage areas
- Public toilets (including ambulant toilets)
- Offices & meeting room
- First aid room
- Bar and kiosk
- Nature / movement / local history themed public artwork incorporated into proposed new clubhouse
- BBQ equipment, picnic tables & seating, water fountain with dog bowl & bins
- Play equipment with jumping, sliding and swinging features. Climbing frames.
- Seating & fencing
- 153 car parking spaces (inc. 4 ACROD)
- 2 ambulance spaces and 2 loading spaces
- Bike racks
- Outdoor gym equipment area

Bicycle Parking

The City of Cockburn does not have a statutory bicycle parking requirement for sporting facilities. However, the travel characteristics of this type of development should be aligned with the principles of a healthy lifestyle, meaning bicycle parking should be provided.

Formal bicycle parking should be provided, as while there is extensive land available where people could simply set their bicycle down, they will be encouraged to take their bicycle if they know there is a reasonably secure place to put it while they use the sporting facility.

It is difficult to predict demand for bicycle parking in isolation, therefore this should be determined through targeted mode share, aspirational or otherwise. This would normally be set out in a Green Travel Plan, developed at club level, and disseminated to individual members by team coaching staff or mail-drop.

It is anticipated that further work is required in this regard through consultation with the City of Cockburn and the relevant sports clubs and other stakeholders.

Existing Car Parking Conditions

Existing Car Parking Supply

The subject site is currently served by several on-site car parks together with verge parking along frontage roads, these are shown on Figure 2. Parking is unrestricted both on-site and in surrounding streets.

Stantec has compiled an inventory of the on and off-site parking supply, this is set out in Table 1. There is a total of approximately 393 car spaces, consisting of 104 on-site car parking spaces, including 2 spaces for people with disabilities, and approximately 289 off-site (verge) car parking spaces in surrounding streets.

It is noted that of the 3 on-site car parking locations accessed from Kent Street, only the westernmost is generally open for car parking. The central car park appears permanently closed, and the easternmost car park is generally closed to all but a handful of parked cars. This is consistent with observations made by Stantec during a site visit in December 2020.

Figure 2: Existing On- and Off-Site Car Parking Locations



Source: Nearmap edited by Stantec

Table 1: Current Parking Inventory

Location	On-site Parking	Verge Parking	Total
Hamilton Road	49 spaces + 2 DDA	~ 76 spaces	~ 127 spaces
Kent Street	46 spaces	~ 90 spaces	~ 136 spaces
Sussex Street	0 spaces	~ 73 spaces	~ 73 spaces
Spearwood Avenue	7 spaces	~ 50 spaces	~ 57 spaces
Total	102 + 2 DDA spaces	~ 289 spaces	~ 393 spaces

Source: Stantec

Observed Parking Demands

The subject site has historically been configured as soccer pitches. There are currently no sports scheduled to take place at Beale Park, therefore, Stantec has reviewed aerial imagery that covers peak use of the sports pitches while games are occurring, to capture a suitable estimate of parking demand as well as used anecdotal evidence of parking during peak use by residents and City employees.

The observed dates and associated activities from Nearmap are:

- Saturday 30 June 2012 – Soccer (9 active soccer matches)

The observed car parking demands (while activities are underway) is set out in Table 2. Demand for on-site parking is high at up to 79% occupancy. Overall, during games, a maximum of 59% occupancy was observed.

Table 2: Observed Parking Demands

Street	Parking Type	Available Parking	Occupancy	Total	Utilisation
Hamilton Road	Verge	76	21	54	28%
	Parking Lot	51	33		65%
Spearwood Ave	Verge	50	38	44	76%
	Parking Lot	7	6		86%
Sussex Street	Verge	73	48	48	66%
Kent Street	Verge	90	42	85	47%
	Parking Lot	46	43		93%
Total		393	231	231	59%

Source: Stantec

The parking demands in Table 2 indicate the following individual parking demand for each activity:

- 26 car parking spaces per active pitch

Of course, the demands shown in Table 2 are a snapshot of parking demand while activities are underway, it is unknown if this is a peak demand, or if the peak demand occurs either before or after games (with additional demands due to drop-off/pick-up occurring).

What is clear is that there is a gap between total parking available (393 car spaces) and parking demand during games (up to 231 car spaces, or 59% occupancy). Review of aerial imagery indicates that there is no demand for parking beyond the immediate frontage roads and it stands to reason that any drop-off/pick-up parking would take place also in the immediate vicinity of the subject site.

It is, therefore, reasonable to take 393 car spaces as the maximum peak parking demand that could occur, indicating the following individual parking demand for each activity:

- 44 car parking spaces per active pitch

Parking Appraisal

Statutory Requirements

The City of Cockburn Town Planning Scheme No.3 (TPS3) sets out the car parking requirements for various land uses; however, this does not include sporting facilities and associated multi-purpose pitches.

Parking Demand Assessment

Empirical Data

The parking associated with the proposed soccer activities are dependent upon the number of players, spectators and officials per field. It is assumed that spectators will arrive in the same vehicle as a player. However, an addition of one spectator per player will allow for additional spectators in the event where additional spectators may be present for younger players or cup games.

Therefore, the following parking rates have been developed based on this assumption.

- 1 parking space per player
- 1 parking space per spectator
 - 0.5 additional spectators per player (11-aside)
 - 1 additional spectator per player (9-aside)
 - 1.5 additional spectators per player (7-aside)
- 1 parking space per official

Parking Demand

Using the rates above, the parking requirements outlined in Table 3 shall satisfy the use of the proposed activities.

Table 3: Anticipated Parking Rates: Proposed Redevelopment

Activity	11-aside	9-aside	7-aside
Fielded Players	11	9	7
Substitutes	7	5	3
Spectators	9	14	15
Officials	3	3	1
TOTAL (no. of spaces)	30 per pitch	31 per pitch	26 per pitch

The anticipated parking demands of the proposed redevelopment are set out in Table 4 below.

Table 4: Anticipated Parking Demand: Proposed Redevelopment

Activity	Proposed Provision	Parking Rate	Parking Demand
Soccer	Five 11-aside	30 car spaces per pitch	150 car spaces
	Two 9-aside	31 car spaces per pitch	62 car spaces
	Four 7-aside	26 car spaces per pitch	104 car spaces
	TOTAL	316 car spaces	

Based on the above, the proposed redevelopment is anticipated yielding parking demand requires up to 316 car parking spaces. In comparison to the existing conditions where 231 car parking spaces are utilised this shows an increased demand of 85 car parking spaces resulting from an additional two 7-aside fields.

The existing conditions provide 393 car parking spaces which would still satisfy the proposed demand from the development with a utilisation of 80% assuming all activities are run at the same time. It is worth noting that under 9s (7-aside) and under 11s (9-aside) generally compete on Saturday mornings whereas over 12's (11-aside) generally compete on Sunday morning/afternoon. Therefore, it is possible that games are managed so that there is not a "worst -case scenario" peak parking demand occurring from all games being held at once.

While there are other uses on the site, such as a function area, the peak parking demand of the overall facility is expected to occur during game times. Therefore, the overall peak parking demand of the subject site is captured in the above assessment.

Tournament Fixtures

A carpark modelling has been undertaken and provided to Stantec by City of Cockburn based on the fixtures planned for the Cockburn City Soccer Club NPL Challenge Cup on Saturday 6th March 2021 and Sunday 7th March 2021. This model has taken the followings into account:

- Players and their family members
- Arrival and departure time of visitors
- Non-player team members (coaches/managers/officials)
- Team representation rate
- Mode share

Based on the carpark modelling, the proposed redevelopment is anticipated to result in a parking demand of up to 385 car parking spaces during peak hour. This results in 69 car parking spaces more than the empirical data (316 car parking spaces) discussed in the section above. Going forward, 385 car parking spaces will be used as the parking demand for the remaining of the parking appraisal given that it will provide a more conservative outcome.

Adequacy of Proposed Parking Provision

Proposed on-site parking provision

153 car spaces are proposed to be provided on the redeveloped site (subject to the final arboriculture report where a potential loss of 11 bays may apply), an increase of 48 car spaces compared to the existing provision. This is anticipated to result in a shortfall of 232 car parking spaces, compared to the demand for up to 385 car spaces on soccer tournament game days. Per the existing situation, this parking demand is proposed to be partially met off-site by informal verge parking.

Availability of off-site car parking

The City of Cockburn / PGA master plan indicates that land on the Kent Street verge, within the current road reserve, is to be acquired for the use of the on-site car park. However, a review of the master plan drawing does not indicate a reduction in verge width that would appear to reduce the ability to park cars there.

Conservatively, if it is assumed that the reduction in verge width results in a 50% reduction in the ability to park cars on the Kent Street verge, then the overall verge parking reduces by 45 car spaces – down to approximately 244 car spaces.

In addition to the above, as discussed with City of Cockburn, parking restriction should be implemented on along Hamilton Road and Spearwood Avenue and disregarded in the calculation of the off-site parking even though this was happening regularly on-site. With the footpaths located at the edge close to Hamilton Road and Spearwood Avenue, this poses threats to both the pedestrians and road users by driving over the footpaths and then reversing out onto these busy roads. Sufficient car parking should be provided to discourage vehicles from parking on the verges along Hamilton Road and Spearwood Avenue. This further reduces the overall verge parking by 126 spaces – down to 118 car parking spaces. Parking signage should be erected along Sussex Street and Kent Street to inform drivers to park appropriately and safely.

The available off-site parking will therefore be unable to accommodate the anticipated off-site parking demand of the subject site (232 parking spaces) and is therefore unacceptable.

Combined On- and Off-Site Car Parking

The proposed redevelopment results in a net loss of 122 car parking spaces on the subject site and immediately surrounding streets, compared to the existing situation:

- Proposed total of 271 car spaces, including 153 spaces on-site and 118 spaces in surrounding streets
- Existing total of 393 spaces, including 104 spaces on-site and 289 spaces in surrounding streets.

However, this is a net benefit compared to the existing situation due to an increase in formal parking and a decrease in informal verge parking.

Game end/start Overlap

There is not a lot of surplus parking provision that would allow people turning up at prior to a game to park their car while many others from the previous game are still using the car park. A significant schedule overlap is likely to result in an unmanageable overspill of parking into surrounding streets.

This can be managed in a simple manner to ensure minimal overlap. The schedule of games should be managed (through increasing the time between end of one game and the start of the following) to ensure there is minimal overlap between people leaving one session when others are arriving for the next session.

Summary of Parking Demand

On this basis, the anticipated demand of the proposed redeveloped sporting facility (316 car spaces) cannot be adequately accommodated by the proposed on-site parking and the parking in immediate surrounding streets (270 spaces) and is therefore unacceptable. The number of games that can be running at the same time should be limited or number of on-site parking should be increased if the maximum capacity of the redeveloped facility is to be achieved. As noted previously, this could be achieved by limiting the soccer games to 7-side and 9-side on Saturday and 11-side on Sunday. This will result in a reduction of the required spaces by 150.

Car Park & Access Layout Review

Under AS/NZ 2890.1:2004, the subject site is a User Class 2 facility (sports facility). The proposed car park generally is set out in a regular configuration, with spaces measuring 2.5m wide by 5.4m long, all served by 6.2m wide parking aisles. This exceeds the requirements of a User Class 2 car parking facility of 2.5m wide by 5.4m long parking space and 5.8m wide parking aisle and is therefore acceptable.

Preliminary Traffic Impact Statement

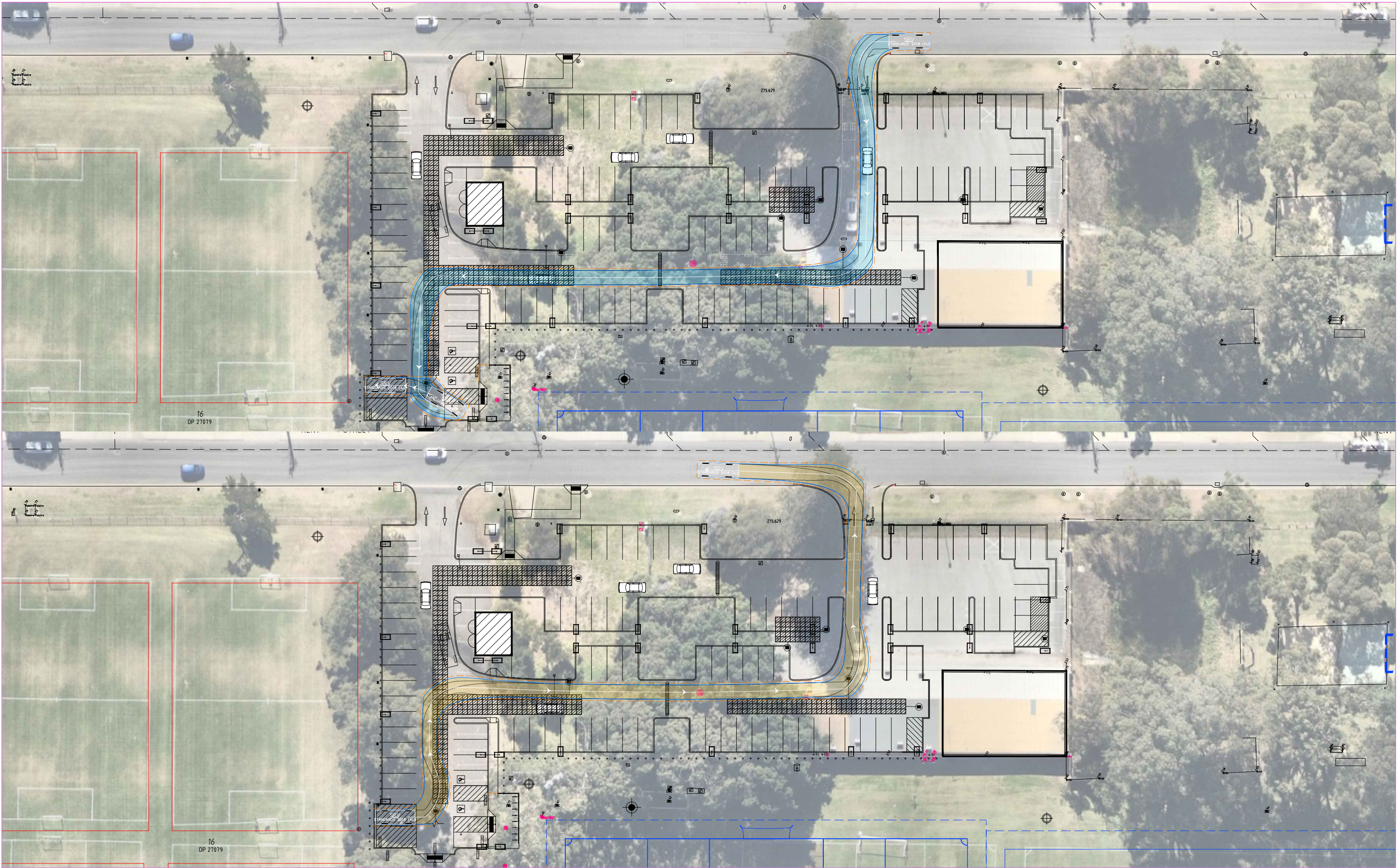
Primarily, from a parking perspective, any significant overlap in parking between games is likely to result in an unmanageable overspill of parking into surrounding streets. As noted, this can be managed in a simple manner to ensure minimal session overlap.

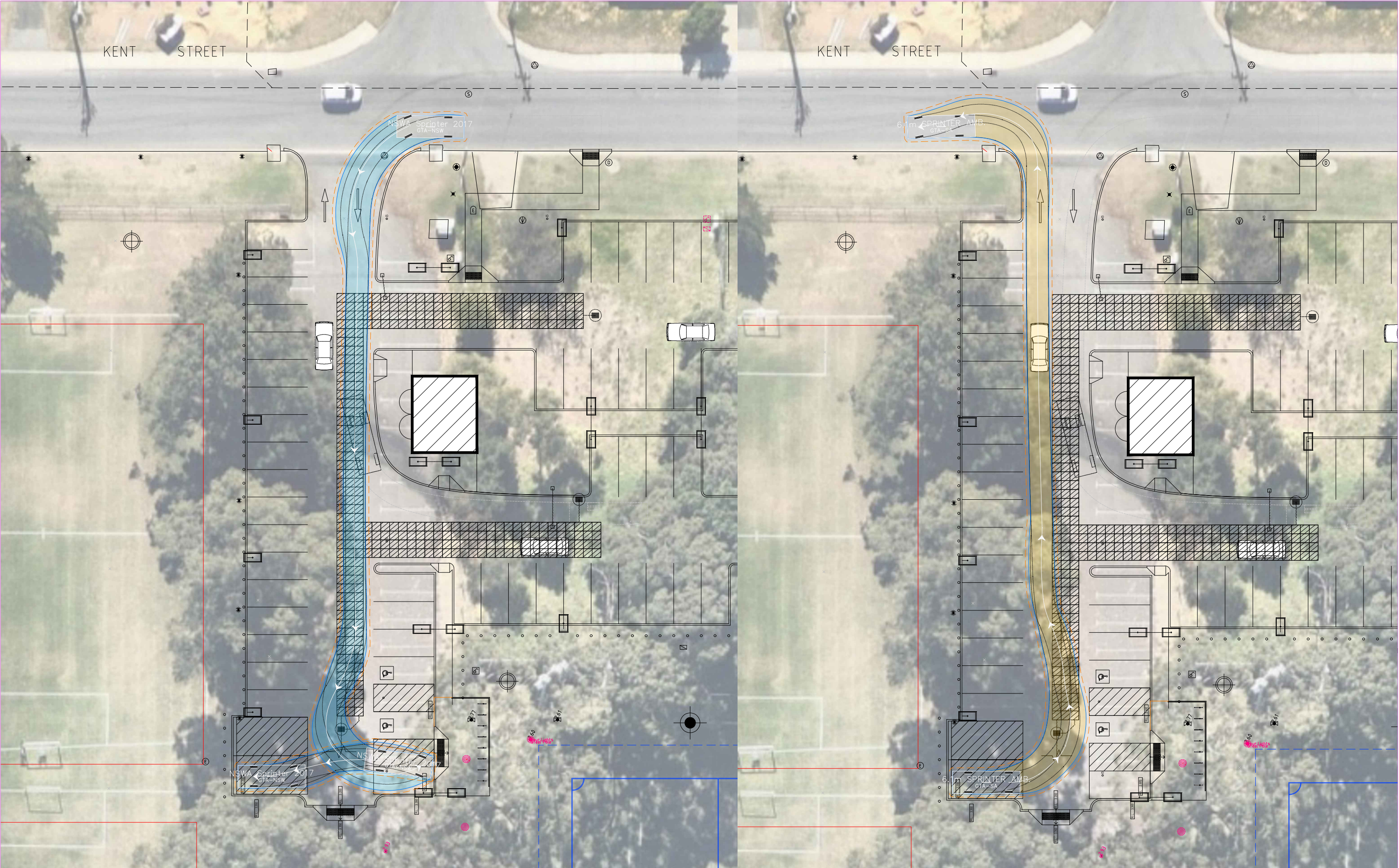
It is noted that the maximum number of games that can be scheduled to occur simultaneously is the same for the proposed redevelopment as it is now. On this basis, the traffic generated by the proposed redevelopment during any one definable peak period of demand (be that 30 minutes or an hour), is not likely to be significantly different to what it is now.

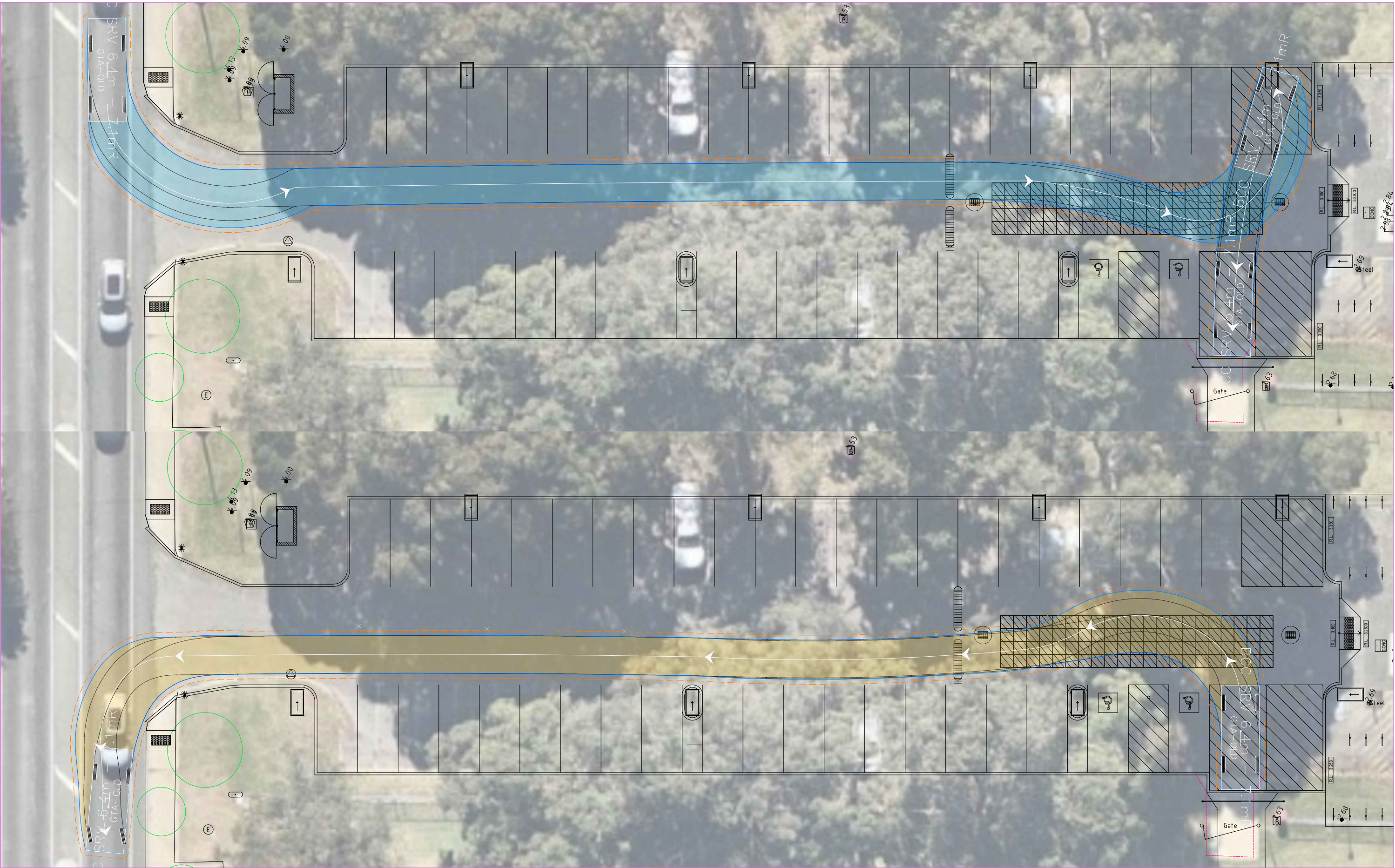
Therefore, the traffic impact of the proposed redeveloped sports facility is likely to be minimal as compared to what presently occurs.

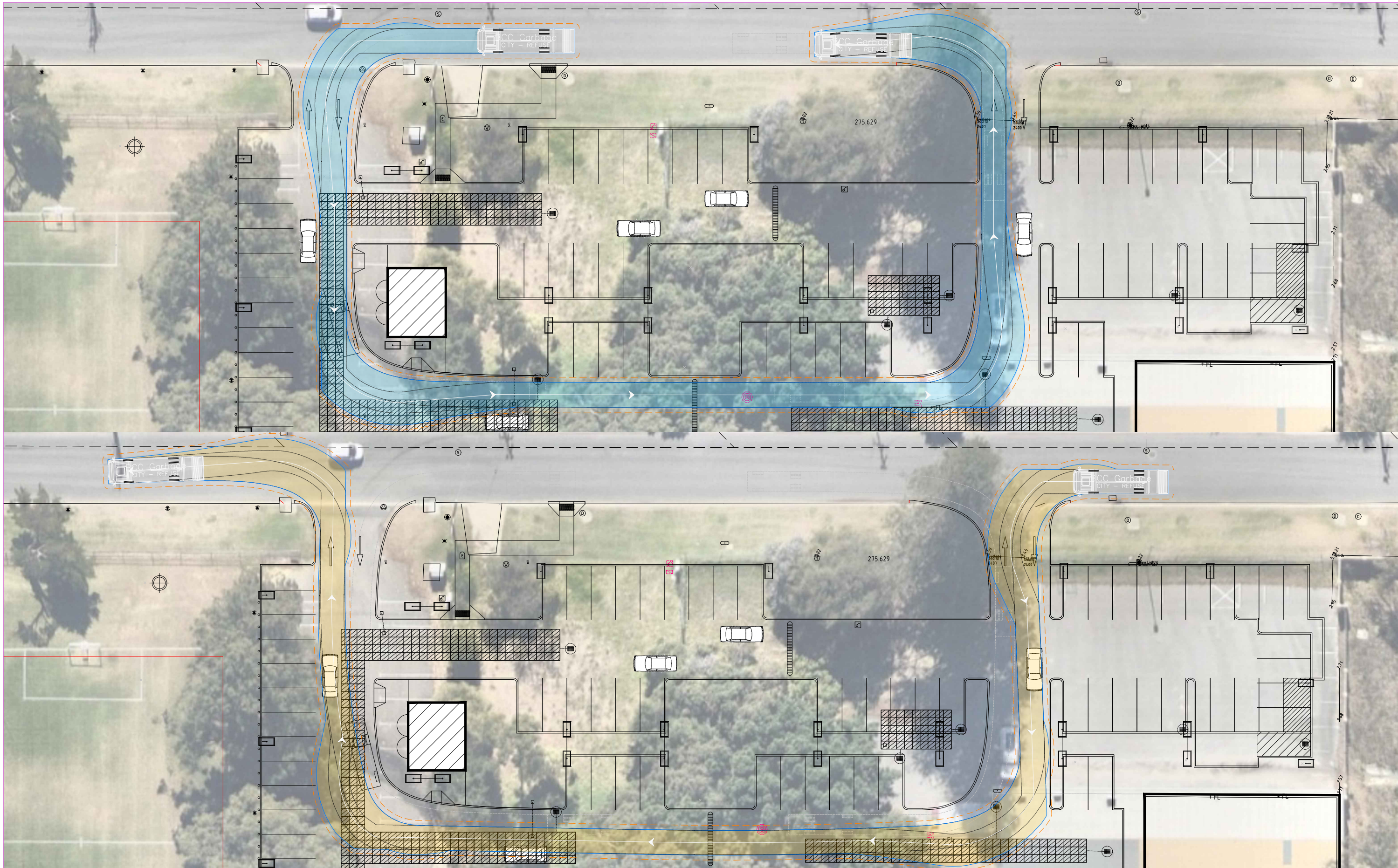
Appendix B Swept Path Analysis











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Notes

Client/Project
CITY OF COCKBURN

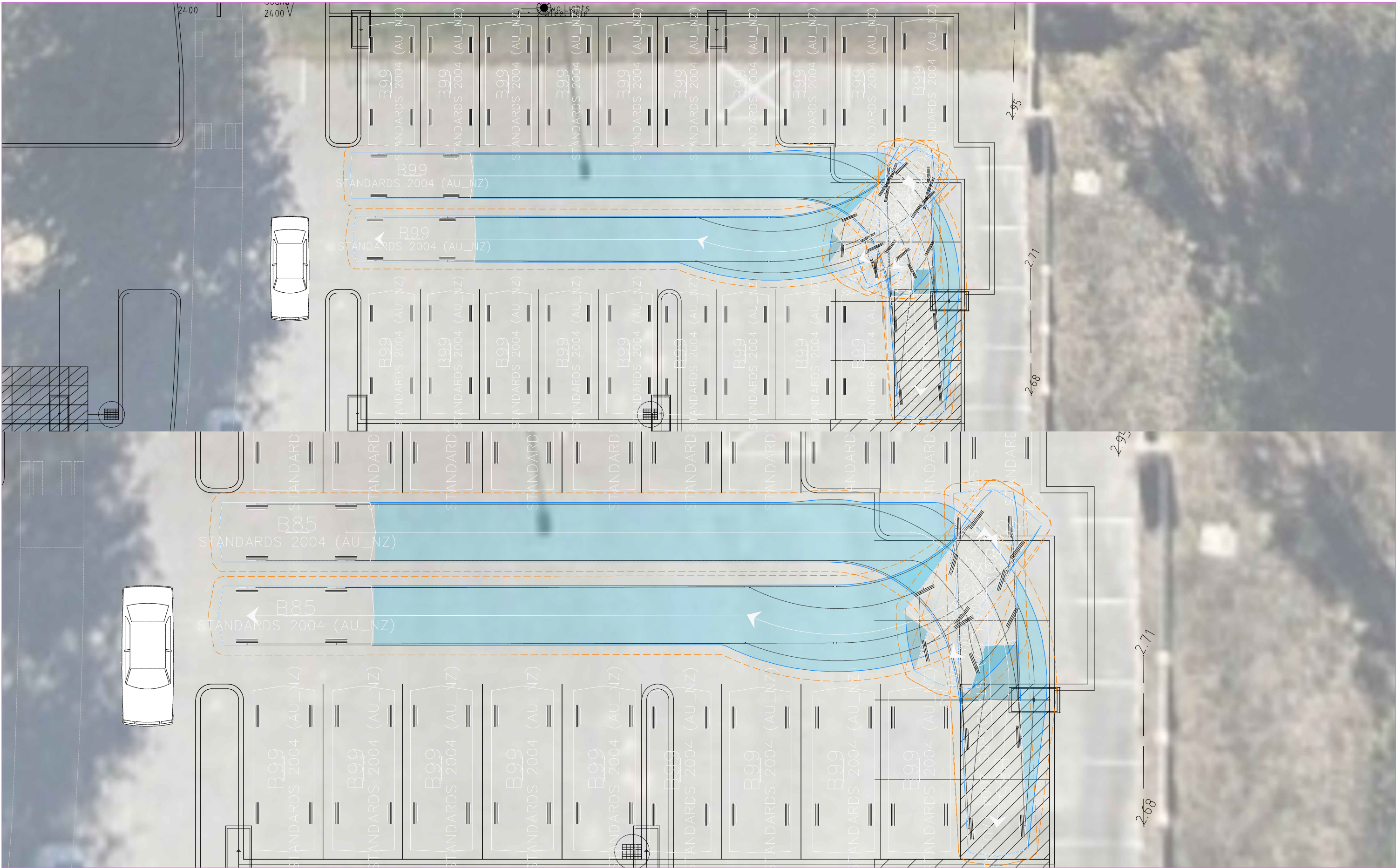
BEALE PARK
REDEVELOPMENT

Project No.
301400746

Title
SEMI-RIGID VEHICLE SWEEP
PATH

Revision
C
Reference Sheet

Date
2024.11.15
Figure No.



Appendix C WAPC Guidelines Checklist

Item	Provided	Comments/Proposals
Summary	✓	
Introduction/Background	✓	
Structure plan proposal	✓	
regional context	✓	
proposed land uses	✓	
table of land uses and quantities	✓	
major attractors/generators	✓	
specific issues	✓	
Existing situation	✓	
existing land uses within structure plan	✓	
existing land uses within 800 metres of structure plan area	✓	
existing road network within structure plan area	✓	
existing pedestrian/cycle networks within structure plan area	✓	
existing public transport services within structure plan area	✓	
existing road network within 2 (or 5) km of structure plan area	✓	
traffic flows on roads within structure plan area (PM and/or AM peak hours)	✓	
traffic flows on roads within 2 (or 5) km of structure plan area (AM and/ or PM peak hours)	✓	
existing pedestrian/cycle networks within 800m of structure plan area	✓	
existing public transport services within 800m of structure plan area	✓	
Proposed internal transport networks	✓	
changes/additions to existing road network or proposed new road network	✓	
road reservation widths	✓	
road cross-sections & speed limits	✓	
intersection controls	✓	
pedestrian/cycle networks and crossing facilities	✓	
public transport routes	✓	
Changes to external transport networks	✓	
road network	✓	
intersection controls	✓	
pedestrian/cycle networks and crossing facilities	✓	
public transport services	✓	
Integration with surrounding area	✓	
trip attractors/generators within 800 metres	✓	
proposed changes to land uses within 800 metres	✓	



Beale Park Redevelopment WAPC Guidelines Checklist

travel desire lines from structure plan to these attractors/generators	✓	
adequacy of external transport networks	✓	
deficiencies in external transport networks	✓	
remedial measures to address deficiencies	✓	
Analysis of internal transport networks	✓	
assessment year(s) and time period(s)	✓	
structure plan generated traffic	✓	
extraneous (through) traffic	✓	
design traffic flows (that is, total traffic)	✓	
road cross-sections	✓	
intersection controls	✓	
access strategy	✓	
pedestrian/cycle networks	✓	
safe routes to schools	✓	
pedestrian permeability & efficiency	✓	
access to public transport	✓	
Analysis of external transport networks	✓	
extent of analysis	✓	
base flows for assessment year(s)	✓	
total traffic flows	✓	
road cross-sections	✓	
intersection layouts & controls	✓	
pedestrian/cycle networks	✓	
Conclusions	✓	



APPENDIX W

Tree Survey – Beale Park, Prepared for City of Cockburn



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Tree Survey – Beale Park, Spearwood – March 2021

BRIEF:

The City of Cockburn has commissioned this consultant to inspect and submit a report in respect of 70 trees situated within the site known as Beale Park, Spearwood due to the proposed project to upgrade the existing clubroom, community facilities, car parking areas and soccer pitches layout.

The survey is to establish the trees botanical name, common name, approximate height and canopy spread, diameter taken at breast height (DBH), diameter of root flare (DRF), health and structure of the tree, QTRA risk of harm calculation. Tree pruning works or tree removal have been recommended (if necessary, based upon safety grounds). The survey also identified the possible occurrence of black cockatoo foraging.

Each tree has had the tree protection zones (TPZ) and structural root zone (SRZ) worked out and provided to assist in future management around the retained trees.

An inspection of these trees was previously undertaken by Paperbark Technologies in January 2018.

A total of seventy trees have been audited and photographed.

The inspection consisted of several parts:

- Examination, observation and documenting the health, the condition and tree inventory details.
- Provide a QTRA Risk Assessment for each tree.
- Provide TPZ and SRZ radius details.
- Provide an itemised list of trees which require tree surgery works.
- Photograph and tagging each tree.
- Adding tree numbers to an aerial map for clarification.

This consultant confirms that the site inspections were carried out on the 29th & 30th of March 2021.

FORM AND APPROACH:

Below are the definitions for the captured information provided:

Botanical name Information:

Botanical names are listed detailing the generic name followed by the specific epithet. The variety is named where applicable. Only the scientific and botanical names should be accepted to identify an exact tree species.

The botanical name is used in the spread sheet in this report and the common name is provided for your reference.

Tree health:

Good

The tree is demonstrating good or exceptional growth for the species. The tree should exhibit a full canopy of foliage, and have only minor pest or diseases problems. Foliage colour, size and density should be typical of a healthy specimen of that species.

Fair

The tree is in reasonable condition and growing well for the species. The tree should exhibit an adequate canopy of foliage. There may be some dead wood present in the crown, some grazing by insects or animals may be evident and/or foliage colour, size or density may be atypical for a healthy specimen of that species.

Poor

The tree is not growing to its full capacity; extension growth of the laterals may be minimal. The canopy may be thinning or sparse. Large amounts of dead wood may be evident throughout the crown. Significant pest and disease problems may be evident or symptoms of stress indicating tree decline.

Very poor

The tree appears to be in a state of decline and the canopy may be very thin and sparse. A significant volume of deadwood may be present in the canopy or pest and disease problems may be causing a severe decline in tree health.

Dead

The tree is dead

Tree Structure:

Each tree surveyed was examined in detail to ascertain its overall structural condition and then placed into one of five categories:

Good: The tree has a well-defined and balanced crown. Branch unions appear to be strong, with no defects evident in the trunk or the branches. Major limbs are well defined. The tree would be considered a good example of the species. Probability of significant failure is highly unlikely.

Fair: The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance, and some branch unions or branches may be exhibiting minor structural faults. If the tree is single trunked, this may be on a slight lean or be exhibiting minor defects. Probability of significant failure is low.

Poor: The tree may have a poorly structured crown. The crown may be unbalanced or exhibit large gaps. Major limbs may not be well defined. Branches may be rubbing or crossing over. Branch unions may be poor or faulty at the point of attachment. The tree may have suffered major root damage. Probability of significant failure is moderate.

Very Poor: The tree has a poorly structured crown. The crown is unbalanced or exhibits large gaps. Major limbs are not well defined. Branch unions may be poor or faulty at the point of attachment. A section of the tree has failed or is in imminent danger of failure. Active failure may be present or failure is probable in the immediate future.

Has Failed: A significant section of the tree or the whole tree has failed.

TPZ – Tree Protection Zone

The Australian Standard AS 4970-2009 *Protection of trees on development sites* provides generic guidelines regarding a suitable TPZ to ensure the protection of trees on sites where development is to occur. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance and thereby ensuring that the tree/s remain viable.

Where proposed encroachment is greater than 10% into the TPZ the Arborist must be able to demonstrate that the tree(s) are likely to remain viable.

Where design changes occur the project Arborist may need to re-inspect selected trees to ensure the trees are adequately protected.

A Tree Protection Zone radius for each tree based upon AS4970-2009 is included within the survey data.

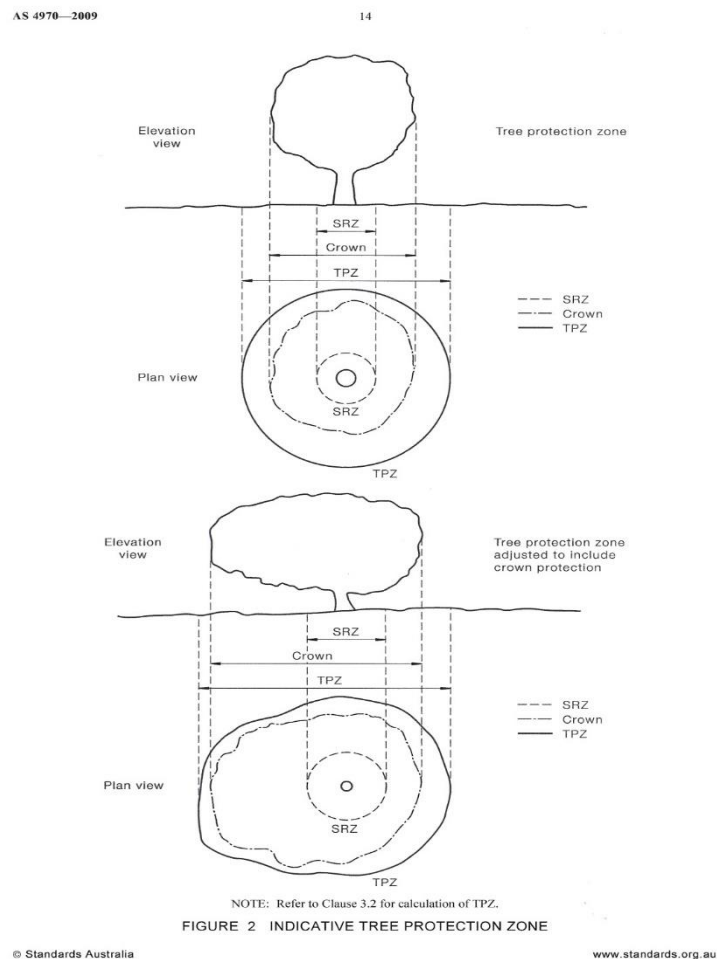


Figure 1 Indicative tree protection zone from AS 4970-2009

SRZ – Structural Root Zone

The structural root zone area of a tree is the area where generally larger diameter woody roots required to support above ground parts of the tree have developed.

Australian Standard AS 4970-2009 *Protection of trees on development sites* provides a formula based upon basal trunk diameter to determine a structural root zone radius where major encroachment into a TPZ is proposed.

This zone considers a tree's structural stability only and not the root zone required for a tree's health and long term viability, which is usually a much larger area.

A Structural Root Zone radius for each tree based upon AS4970-2009 is included within the survey data.



The curve can be expressed by the following formula:
 $R_{SRZ} = (D \times 50)^{0.42} \times 0.64$

NOTES:

- 1 R_{SRZ} is the calculated structural root zone radius (SRZ radius).
- 2 D is the stem diameter measured immediately above root buttress.
- 3 The R_{SRZ} for trees less than 0.15 m diameter is 1.5 m.
- 4 The R_{SRZ} formula and graph do not apply to palms, other monocots, cycads and tree ferns.
- 5 This does not apply to trees with an asymmetrical root plate.

Figure 2 Displays the Structural Root Zone Calculation from AS 4970-2009 *Protection of trees on development sites* and indicates how to work out the SRZ of each tree.

Quantified Tree Risk Assessment (QTRA) – www.qtra.co.uk

The acceptable level of risk is set by the Quantified Tree Risk Assessment methodology at 1/10,000. This means that the suggested limit of acceptable risk to the public is a 1 in 10,000 chance of tree failure causing damage/death or serious injury to persons or property. If a Risk of Harm rating exceeds 1/10,000 (meaning a number less than 10,000) remedial action should be considered to reduce the risk to the public.

Using the Quantified Tree Risk Assessment system (QTRA) allows us to evaluate the risk of significant harm from tree failure. This system assesses the risk of significant harm from the failure of a tree within a period of **one year** from the risk assessment.

The majority of trees were assessed using the target rating of either 2 or 3. This was assessed by consideration of the proximity of the tree to current and future targets such as play equipment, soccer pitches, clubroom, seating, pathways, roadway and car parks and general thoroughfare of pedestrians.

Each location is assessed to obtain a target rating and then the tree hazard is assessed in relation to that target.

If further clarification is required after reading through the report, please don't hesitate to contact us or www.qtra.co.uk.

QTRA Advisory Risk Thresholds:

	UNACCEPTABLE Risks will not ordinarily be tolerated	Control the risk
1/1 000	UNACCEPTABLE (where imposed on others) Risks will not ordinarily be tolerated	- Control the risk - Review the risk
	TOLERABLE (by agreement) Risks may be tolerated if those exposed to the risk accept it or if the tree has exceptional value	Control the risk unless there is broad stakeholder agreement to tolerate it or the tree has exceptional value
1/10 000	TOLERABLE (where imposed on others) Risks are tolerable if ALARP	- Assess costs and benefits of risk control - Control the risk only where a significant benefit might be achieved at reasonable cost - Review the risk
1/1 000 000	BROADLY ACCEPTABLE Risk is already ALARP	- No action currently required - Review the risk

The target ratings of 2 & 3 as defined by QTRA version 5.3.3 are:

Target 2

- 8 – 72 pedestrians or cyclists per hour within close proximity of the tree
- 15 – 144 minutes per day where people are within close proximity of the tree
- 480 - 4700 vehicles per day which drive past or park underneath the tree
- \$38,000 - \$380,000 estimated value of the damage to property should whole tree failure or branch failure occur

Target 3

- 2– 7 pedestrians or cyclists per hour within close proximity of the tree
- 2 – 14 minutes per day where people are within close proximity of the tree
- 48 - 470 vehicles per day which drive past or park underneath the tree
- \$3,800 - \$38,000 estimated value of the damage to property should whole tree failure or branch failure occur

Size of stem or branch

Next we assess the tree for a stem or branch which is most likely to fail within the one year period. This is assessed as a size of part and the most used range which was used was Size of Part 3 or 4.

Size of Part: **3** – 110mm -250mm diameter branch (Size of branch which may drop within 1 year, in this case predominantly lateral limbs).

Size of Part: **4** - >25mm-100mm diameter branch (Size of branch which may drop within 1 year, in this case it was lateral limbs or epicormic growth).

Probability of failure

The Probability of failure (PoF) is defined as “the probability that the tree or branch will fail within the coming year”. (QTRA User Manual Vers.5)

Selecting a PoF range requires the consultant to compare their assessment of the tree or branch against a benchmark of either a non-compromised tree or first order limb of the same species or a tree or first order limb that could be expected to fail within the year.

In this audit a Probability of Failure range of 2 and 3 were used.

QTRA version 5.3.3 defines these ranges as:

Probability of Failure 2

1/10 – > 1/100 (likelihood of a branch failing within one year considering demonstrated previous & recent limb failures and the characteristics of the species)

Probability of Failure 3

1/100 – > 1/1,000 (likelihood of a branch failing within one year considering demonstrated previous & recent limb failures and the characteristics of the species)

Risk of Harm

These three components provide a risk of harm rating outcome.

55 of the 70 trees inspected passed the QTRA Risk of Harm calculation:

- Seven trees were found to have a calculated Risk of Harm of less than 1/1,000,000.
- Twenty-four trees were found to have a calculated Risk of Harm of 1/500,000.
- Twenty-four trees were found to have a calculated Risk of Harm of 1/50,000.

Tree Survey – Beale Park, Spearwood – March 2021

This means that in the case of these 55 trees there is an estimated 1 in 50,000 to less than 1 in 1 million chance of tree or limb failure that may cause significant damage to property or death or serious injury to persons. These trees therefore pose either a tolerable or broadly acceptable level of risk to the public at this time.

The remaining 15 trees are found to have a calculated Risk of Harm of **1/5,000** which means that these trees pose an **unacceptable** level of risk to the public at this time. Pruning works, consisting predominantly of the removal of major deadwood, have been recommended to reduce the risk, if the trees are going to be retained.

It is important to note that the QTRA Risk Assessment calculations are valid for one year from the time of inspection on 30th of March 2021. It is recommended that these trees be inspected and assessed annually to ensure they remain at an acceptable level of risk. If the target in relation to the tree changes within the coming year, e.g a bench seat or path is installed within target range of a tree which was previously not installed. The tree/s will need to be re-assessed to ensure that the QTRA Risk Assessment calculation remains acceptable.

- **Tree Survey Details over leaf.**

Tree Survey – Beale Park, Spearwood – March 2021

Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
1	<i>Corymbia citriodora</i>	Semi-mature	9.5	7	340	440	Found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Crossing and rubbing branches. Minor deadwood.	No works recommended at this time.	1/50,000	No	4.08	2.34
2	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	Mature	18.5	14	670	870	Was found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Epicormic growth developing due to previous limb failure. Minor deadwood.	No works recommended at this time.	1/50,000	No	8.04	3.12
3	<i>Eucalyptus gomphocephala</i>	Mature	11	8	680	740	Found in good health and fair structural condition displaying a full coverage of foliage supported by codominant stems. Main union and branch attachments appear sound at this time. Minor deadwood.	No works recommended at this time.	1/50,000	No	8.16	2.92

Tree Survey – Beale Park, Spearwood – March 2021

Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
4	<i>Eucalyptus platypus</i>	Mature	8.5	8	420	770	Leaning tree found in good health and poor structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Previous major limb removal. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/50,000	No	5.04	2.97
5	<i>Eucalyptus gomphocephala</i>	Mature	9.5	8.5	560	630	Specimen found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Minor deadwood.	No works recommended at this time.	1/50,000	No	6.72	2.73
6	<i>Eucalyptus robusta</i>	Semi-mature	9	6.5	300	460	Found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/50,000	No	3.6	2.39

Tree Survey – Beale Park, Spearwood – March 2021

Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
7	<i>Eucalyptus globulus</i>	Mature	13	8	520	780	Was found in poor health and fair structural condition displaying a reduced coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth developing in the lower crown. Canopy decline. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	6.24	2.98
8	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	Semi-mature	15.5	9	590	680	Specimen found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Previous major limb removal. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/50,000	No	7.08	2.81
9	<i>Eucalyptus gomphocephala</i>	Mature	16	14.5	720	910	Was found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth developing in the lower crown. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	8.64	3.18

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
10	<i>Eucalyptus robusta</i>	Semi-mature	11	9	310	448	Found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/50,000	No	3.72	2.36
11	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	Mature	19.5	13	1240	1650	Specimen found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Exposed roots. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	14.9	4.08
12	<i>Eucalyptus gomphocephala</i>	Semi-mature	12.5	10	660	830	Was found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/500,000	No	7.92	3.06

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
13	<i>Callistemon 'Kings Park Special'</i>	Semi-mature	3.5	3	220	240	Found in fair health and poor structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth developing due to previous pruning. Minor deadwood.	No works recommended at this time.	1/500,000	No	2.64	1.82
14	<i>Callistemon 'Kings Park Special'</i>	Semi-mature	3	3	230	260	Specimen found in fair health and poor structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth developing due to previous pruning. Minor deadwood.	No works recommended at this time.	1/500,000	No	2.76	1.88
15	<i>Eucalyptus robusta</i>	Mature	20	9	525	680	Was found in good health and fair structural condition displaying a suitable coverage of foliage supported by codominant stems. Main union and branch attachments appear sound at this time. Previous limb failure. Minor deadwood.	No works recommended at this time.	1/500,000	No	6.3	2.81

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
16	<i>Eucalyptus rudis</i>	Mature	21.5	13	735	990	Found in good health and poor structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Bark damage visible within major forks due to bird browsing activity. Multiple limb failures. Minor deadwood.	No works recommended at this time.	1/50,000	No	8.82	3.30
17	<i>Corymbia citriodora</i>	Mature	17	12	390	550	Was found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth developing due to previous limb failure. Minor deadwood.	No works recommended at this time.	1/500,000	No	4.68	2.57
18	<i>Corymbia citriodora</i>	Mature	18	14	480	600	Specimen found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/50,000	No	5.76	2.67

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
19	<i>Casuarina cunninghamiana</i>	Mature	20	9	470	650	Found in good health and structural condition displaying a suitable coverage of foliage supported by a tall and upright form. Main branch attachments appear sound at this time. Exposed roots. Minor deadwood.	No works recommended at this time.	1/500,000	No	5.64	2.76
20	<i>Eucalyptus robusta</i>	Mature	13.5	12	500	660	Was found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Minor deadwood.	No works recommended at this time.	1/500,000	No	6	2.78
21	<i>Eucalyptus globulus</i>	Mature	14.5	9	595	750	Specimen found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Minor deadwood.	No works recommended at this time.	1/500,000	No	7.14	2.93

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
22	<i>Cedrus species</i>	Mature	6.5	7.5	780	950	Found in fair health and poor structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Multiple limb failures. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	9.36	3.24
23	<i>Casuarina cunninghamiana</i>	Mature	15	8	610	720	Found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Epicormic growth throughout. Minor deadwood.	No works recommended at this time.	1/500,000	No	7.32	2.88
24	<i>Eucalyptus robusta</i>	Mature	21.5	8	470	640	Was found in good health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth developing throughout. Multiple limb failures. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/50,000	No	5.64	2.74

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
25	<i>Eucalyptus botryoides</i>	Mature	16	10	620	850	Specimen found in good health and fair structural condition displaying a suitable coverage of foliage supported by a tall and upright form. Main branch attachments appear sound at this time. Previous limb failure. Broken branch held in the canopy. Minor deadwood.	Remove hanger, if retained.	1/50,000	No	7.44	3.09
26	<i>Casuarina cunninghamiana</i>	Mature	12.5	8	480	620	Was found in good health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth throughout. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/500,000	No	5.76	2.71
27	<i>Agonis flexuosa</i>	Semi-mature	5.5	7	430	620	Found in fair health and fair structural condition displaying a suitable coverage of foliage supported by codominant stems. Main union and branch attachments appear sound at this time. Previous limb failure. Broken branch held in the canopy. Minor deadwood.	Remove hanger, if retained.	1/50,000	No	5.16	2.71

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
28	<i>Eucalyptus gomphocephala</i>	Mature	21.5	15	1160	1320	Specimen found in fair health and fair structural condition displaying a suitable coverage of foliage supported by codominant stems. Bird damage within major forks. Multiple small diameter limb failures. Moderate borer infestation within upper limbs. Minor deadwood.	No works recommended at this time.	1/50,000	Yes	13.9	3.72
29	<i>Casuarina cunninghamiana</i>	Mature	12.5	7	400	500	Found in good health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth throughout. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/500,000	No	4.8	2.47
30	<i>Melaleuca lanceolata</i>	Mature	5.5	6	530	530	Specimen found in fair health and fair structural condition displaying a suitable coverage of foliage supported by codominant stems. Main union and branch attachments appear sound at this time. Minor deadwood.	No works recommended at this time.	1/500,000	No	6.36	2.53

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
31	<i>Melaleuca lanceolata</i>	Mature	5	5	540	540	Was found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Minor deadwood.	No works recommended at this time.	1/500,000	No	6.48	2.55
32	<i>Eucalyptus gomphocephala</i>	Mature	22	10	1100	1390	Found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Bark damage visible within major forks due to bird browsing activity. Moderate borer infestation within upper limbs. Minor deadwood.	No works recommended at this time.	1/50,000	Yes	13.2	3.80
33	<i>Eucalyptus melliodora</i>	Semi-mature	12	9	410	520	Specimen found in good health and fair structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Main union and branch attachments appear sound at this time. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/500,000	No	4.92	2.51

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
34	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	Semi-mature	15	9	410	430	Leaning tree found in good health and fair structural condition displaying a suitable coverage of foliage supported by codominant stems. Main union and branch attachments appear sound at this time. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/50,000	No	4.92	2.32
35	<i>Eucalyptus species</i>	Mature	19.5	16	990	1180	Was found in good health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Evidence of bird browsing activity within major forks. Minor deadwood.	No works recommended at this time.	1/500,000	Yes	11.9	3.55
36	<i>Eucalyptus botryoides</i>	Mature	16.5	9	480	710	Found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/500,000	No	5.76	2.87

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
37	<i>Corymbia citriodora</i>	Mature	13	9	530	660	Was found in fair health and poor structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Excessive limb loading. Major deadwood.	Selectively clean up canopy of deadwood and reduce excessive limb loading in the lower crown, if retained.	1/5,000	No	6.36	2.78
38	<i>Eucalyptus robusta</i>	Semi-mature	17	5	490	550	Specimen found in poor health and structural condition displaying a reduced coverage of foliage supported by a tall and upright form. Major limb forks appear sound at this time. Severe canopy decline. Major deadwood.	Remove tree due to poor health and condition.	1/5,000	No	5.88	2.57
39	<i>Eucalyptus globulus</i>	Mature	16.5	6	680	840	Found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Epicormic growth developing throughout. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	8.16	3.08

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
40	<i>Eucalyptus globulus</i>	Mature	17.5	9	640	810	Was found in poor health and fair structural condition displaying a reduced coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Epicormic growth developing throughout. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	7.68	3.03
41	<i>Eucalyptus gomphocephala</i>	Mature	20	13	840	1120	Was found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Multiple small diameter limb failures. Bark damage visible within major forks due to bird browsing activity. Moderate borer infestation within upper limbs. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	Yes	10.1	3.47

Tree Survey – Beale Park, Spearwood – March 2021

Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
42	<i>Eucalyptus gomphocephala</i>	Mature	21	10	740	960	Specimen found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Multiple small diameter limb failures. Bark damage visible within main codominant fork due to bird browsing activity. Moderate borer infestation within upper limbs. Minor deadwood.	No works recommended at this time.	1/50,000	Yes	8.88	3.25
43	<i>Eucalyptus globulus</i>	Mature	18	9	750	1060	Found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	9	3.39
44	<i>Casuarina cunninghamiana</i>	Semi-mature	14	5	300	650	Was found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/500,000	No	3.6	2.76

Tree Survey – Beale Park, Spearwood – March 2021

Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
45	<i>Eucalyptus platypus</i>	Mature	6.5	5.5	460	530	Specimen found in fair health and poor structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Multiple limb failures. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/50,000	No	5.52	2.53
46	<i>Eucalyptus robusta</i>	Semi-mature	14.5	6	360	490	Found in good health and fair structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Main union and branch attachments appear sound at this time. Mild canopy suppression. Minor deadwood.	No works recommended at this time.	1/500,000	No	4.32	2.45
47	<i>Eucalyptus robusta</i>	Semi-mature	14.5	7	410	640	Was found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Minor deadwood.	No works recommended at this time.	1/500,000	No	4.92	2.74

Tree Survey – Beale Park, Spearwood – March 2021

Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
48	<i>Casuarina cunninghamiana</i>	Mature	14	7	510	650	Found in good health and structural condition displaying a suitable coverage of foliage supported by a tall and upright form. Major limb forks appear sound at this time. Minor deadwood.	No works recommended at this time.	1/500,000	No	6.12	2.76
49	<i>Corymbia citriodora</i>	Mature	18	16	900	980	Specimen found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Multiple limb failures. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	10.8	3.28
50	<i>Corymbia citriodora</i>	Mature	15.5	13.5	690	790	Found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	8.28	3.00

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
51	<i>Corymbia citriodora</i>	Mature	14	13	560	650	Was found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	6.72	2.76
52	<i>Corymbia citriodora</i>	Mature	16.5	12	570	700	Specimen found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Evidence of bird browsing activity. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	Yes	6.84	2.85
53	<i>Corymbia citriodora</i>	Mature	17.5	10	620	790	Found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/5,000	No	7.44	3.00

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
54	<i>Corymbia citriodora</i>	Mature	13	11	580	650	Was found in poor health and structural condition displaying a reduced coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Severe canopy decline. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/50,000	No	6.96	2.76
55	<i>Corymbia citriodora</i>	Mature	15	15	600	680	Leaning tree found in fair health and poor structural condition displaying a slightly reduced coverage of foliage supported by codominant stems. Main branch attachments appear sound at this time. Moderate canopy suppression. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/50,000	No	7.2	2.81
56	<i>Ficus benjamina variegata</i>	Semi-mature	7	5.5	230	320	Was found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Two broken branches held in the canopy. Minor deadwood.	Remove hangers, if retained.	<1/1,000,000	No	2.76	2.05

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
57	<i>Corymbia citriodora</i>	Semi-mature	11	6	210	260	Found in good health and structural condition displaying a satisfactory coverage of foliage supported by a tall and upright form. Major limb forks appear sound at this time. Minor deadwood.	No works recommended at this time.	<1/1,000,000	No	2.52	1.88
58	<i>Araucaria heterophylla</i>	Mature	37	16	2000	2500	Specimen found in good health and fair structural condition displaying a full coverage of foliage supported by a tall and upright form. Main branch attachments appear sound at this time. Evidence of previous beehive on the eastern side of the trunk. Minor deadwood.	No works recommended at this time.	1/500,000	No	15	4.86
59	<i>Agonis flexuosa</i>	Mature	8.8	8	850	930	Was found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Minor deadwood.	No works recommended at this time.	<1/1,000,000	No	10.2	3.21

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
60	<i>Eucalyptus cinerea</i>	Mature	7	6.5	370	380	Found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Suppressed canopy. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/50,000	No	4.44	2.20
61	<i>Corymbia ficifolia</i>	Mature	8.5	9	900	920	Found in poor health and structural condition displaying a reduced coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Severe canopy decline. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/50,000	No	10.8	3.20
62	<i>Schefflera actinophylla</i>	Mature	8	6	610	610	Specimen found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple stems. Major limb forks appear sound at this time.	No works recommended at this time.	<1/1,000,000	No	7.32	2.69

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
63	<i>Olea europea</i>	Mature	9	7	750	750	Was found in fair health and poor structural condition displaying a satisfactory coverage of foliage supported by multiple stems. Main branch attachments appear sound at this time. Suppressed canopy. Minor deadwood.	No works recommended at this time.	1/500,000	No	9	2.93
64	<i>Callistemon 'Kings Park Special'</i>	Semi-mature	6	6.5	290	320	Found in poor health and structural condition displaying a reduced coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Severe canopy suppression. Minor deadwood.	Remove tree due to poor health and condition.	1/500,000	No	3.48	2.05
65	<i>Corymbia citriodora</i>	Mature	14	10	560	580	Specimen found in fair health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Suppressed canopy. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/50,000	No	6.72	2.63

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
66	<i>Ficus microcarpa</i>	Mature	17	19.5	930	1160	Was found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Surface roots. Minor deadwood.	No works recommended at this time.	<1/1,000,000	No	11.2	3.52
67	<i>Ficus microcarpa</i>	Mature	13.5	9	840	840	Found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Previous major limb removal. Surface roots. Minor deadwood.	No works recommended at this time.	<1/1,000,000	No	10.1	3.08
68	<i>Callistemon 'Kings Park Special'</i>	Semi-mature	5	6	260	280	Specimen found in poor health and structural condition displaying a reduced coverage of foliage supported by codominant stems. Major limb forks appear sound at this time. Severe canopy suppression. Minor deadwood.	Remove tree due to poor health and condition.	1/500,000	No	3.12	1.94

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Tree tag n.	Botanical name	Age Class	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health and condition	Recommended Works	QTRA Risk of Harm	Evidence of Cockatoos Yes/No	TPZ (m)	SRZ (m)
69	<i>Corymbia citriodora</i>	Mature	18.5	16	670	720	Was found in fair health and fair structural condition displaying a suitable coverage of foliage supported by multiple crown leaders. Major limb forks appear sound at this time. Suppressed canopy. Major deadwood.	Selectively clean up canopy of deadwood, if retained.	1/50,000	No	8.04	2.88
70	<i>Ficus microcarpa</i>	Mature	14.5	16	860	1020	Found in good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Main branch attachments appear sound at this time. Surface roots. Minor deadwood.	No works recommended at this time.	<1/1,000,000	No	10.3	3.34

Summary

This consultant's inspection of the seventy designated trees located within Beale Park, Spearwood were found to be predominantly in fair health and predominantly sound structural condition at this time.

Twenty-two tree species were identified.

Species List

Botanical Name	Common Name
<i>Agonis flexuosa</i>	WA Peppermint
<i>Araucaria heterophylla</i>	Norfolk Island Pine
<i>Callistemon 'Kings Park Special'</i>	King Park Bottlebrush
<i>Casuarina cunninghamiana</i>	River She-oak
<i>Cedrus species</i>	Cedar
<i>Corymbia citriodora</i>	Lemon Scented Gum
<i>Corymbia ficifolia</i>	Red-flowering gum
<i>Eucalyptus botryoides</i>	Southern Mahogany
<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum
<i>Eucalyptus cinerea</i>	Argyle Apple
<i>Eucalyptus globulus</i>	Southern Blue Gum
<i>Eucalyptus gomphocephala</i>	Tuart
<i>Eucalyptus melliodora</i>	Yellow Box
<i>Eucalyptus platypus</i>	Round-leaved Moort
<i>Eucalyptus robusta</i>	Swamp Mahogany
<i>Eucalyptus rudis</i>	Flooded Gum
<i>Eucalyptus species</i>	Gum
<i>Ficus benjamina</i> variegata	Variegated Weeping Fig
<i>Ficus microcarpa</i>	Chinese Banyan
<i>Melaleuca lanceolata</i>	Rottneist Island Tea Tree
<i>Olea europea</i>	Olive
<i>Schefflera actinophylla</i>	Australian Umbrella Tree

The tree survey revealed:

- 55 of the 70 trees inspected passed the QTRA Risk of Harm calculation; the remaining 15 trees received an unacceptable level of risk to the public based on current and future targets, however pruning works have been recommended to reduce the risk.
- 2 trees are recommended to be removed due to being in poor health and structural condition.
- 24 trees require remedial pruning work which consists of predominantly deadwood removal.
- Three tree species found within the site are recognised as important for foraging, nesting and roosting trees for the Black Cockatoo. The species considered of high importance to the Black Cockatoo population are *Corymbia ficifolia* (WA Red Flowering Gum), *Eucalyptus gomphocephala* (Tuart) and *Eucalyptus robusta* (Swamp Mahogany).

Tree Survey – Beale Park, Spearwood – March 2021

- Six trees within this section of Beale Park were considered suitable for Black Cockatoo foraging, nesting and roosting due to their age class, trunk diameter and already visible browsing activity within their canopies. These trees are noted within the survey.
- Carnaby Cockatoos generally seek to nest in hollows of live or dead *Eucalyptus species* and *Corymbia calophylla/ficifolia*. Trees take around 100 – 150 years to develop suitable nesting hollows. The hollows will generally be situated between 2m and 10m from ground level, with the depth of the cavity ranging from 250mm and upwards.
- *Corymbia citriodora* (Lemon Scented Gum), located predominantly on the eastern side of the existing clubrooms, was a species of tree that represented a low importance to the Black Cockatoo population and is considered unfavourable for foraging, nesting and roosting.
- The TPZ and SRZ radius details for each tree are provided in the attached survey spread sheet. It is recommended that any works proposed around these trees are to be made in accordance using the Australian Standard 4970-2009 Protection of trees on development sites. This Standard is to be used as a guide to assist with the care and protection of trees. This consultant advises that the AS 4970-2009 cannot always be achieved however further investigations of select trees may be required at ground level by way of hand digging to assess visible surface roots.
- It is advised that if trees are to be retained that all remedial tree surgery works be carried out by a competent Arborist to the relevant Australian Standards - *Pruning of amenity trees* 4373-2007.
- The future management, maintenance and condition of the trees have a considerable bearing on their location, with safety to property and persons the main priority. Therefore, each tree retained is recommended to be re-inspected on an annual basis to ensure that the trees remain healthy and in a structurally sound condition with a level of risk that is acceptable.
- If trees are to be retained, ensure the following Contractor Specification is used as a guideline when designing and working around the retained trees.

A list of remedial pruning work accompanies this report.

Contractor Specification

To reduce the effects that a development can have upon the health of retained trees, suitable forms of protection are required together with the steps necessary to limit deterioration of those trees left standing on the development site.

This consultant confirms that there is clear evidence that mature trees are more sensitive to contractor pressure than young and semi-mature specimens, where the younger trees are able to compensate and adapt to new ground conditions by producing new roots. However, although younger trees can exhibit a remarkable tolerance to the adverse effects of building operations and site alterations, this is conditional upon the location and extent of works carried out within the root zone of the tree and therefore the extent of primary root removal.

Trees store vast amounts of carbohydrate in their root system, subsequently when major roots are severed the tree is unable to replenish its depleted energy levels, which gradually results

in the decline of the canopy and often the death of the tree, with such symptoms often not evident until some years later.

Therefore, there must be clear recommendations to alleviate detrimental tree damage from the commencement through to the completion of the development, with the recommendations enforced and clearly understood by all contractor staff.

- All trees identified for retention shall be clearly marked and a **Tree Protection Zone (TPZ)** confirmed prior to the commencement of the development. The tree protection zone is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, to ensure the tree remains viable. To determine the radius of the TPZ for each tree, the DBH is multiplied x 12. DBH is the trunk diameter 1.4m above ground level. The radius is measured from the centre of the stem at ground level. E.g. a tree's trunk diameter is 0.3m x 12 = 3.6m, meaning that a 3.6m radius around the tree is the recommended TPZ. As confirmed in the AS 4970-2009 a TPZ should not be less than 2m nor greater than 15m (unless crown protection is required).
- This consultant advises that a **structural root zone** area of a tree is required for tree stability. Using Australian Standards AS 4970-2009 *Protection of trees on development sites* the structural root zone area can be calculated when major encroachment into a TPZ is proposed. This zone considers a tree's structural stability only and not the root zone required for a tree's health and long-term viability, which is usually a much larger area.
- No building materials are to be stored or disposed of within the tree protection zone, with provisions implemented so that building chemicals do not come into contact with the root rhizosphere or the roots themselves.
- Excavated soil shall not be stored or built up around the trunk of retained trees. **Soil levels shall not be changed around the base of trees, either raised or lowered.**
- No filling, trenching or other earthworks shall be carried out closer than the determined structural root zone of the individual tree without written Arborist approval.
- If a bob cat is to be used it is to be driving in a forward and backwards motion within the trees TPZ and no turning or squirreling is to be carried out within the TPZ radius. This is to ensure that the soil is not dug into when turning which will rip and tear surface roots.
- It is a requirement that the mini excavator have a flat edge bucket and is used to reduce the weight and compaction of soil around the tree protection and root zones.
- If soil is to be lowered or grass layer removed a spotter will be required to watch all works and it is preferable to use a mini excavator (Not a bobcat) when carrying out this work. The mini excavator is to lightly scrape the top layer off not gouge deep sections of soil. All works are to be supervised by a spotter for root damage when working in the TPZ radius.
- Approved excavations within the structural root zone shall be undertaken under supervision with the exposed roots having a diameter less than 25mm diameter cleanly severed to initiate occlusion. **Roots above 30mm diameter are not to be cut without authorisation from a qualified Arborist.**
- Any remedial works which requires the removal of lower limbs to facilitate access by large machinery or to alleviate the level of risk to the contract staff shall be carried out by a

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competent Arborist to the relevant Australian Standards AS 4373-2007 *Pruning of amenity trees*.

- If trees are growing close together any felling and root removal shall be done with care to avoid damage to the retained trees.
- Under boring to a depth of 1.5m – 2m is the preferred method of installing pipes and services near mature trees. This minimises disturbance to trees root systems as the top 1.5m – 2m of soil is where the trees major structural and nutrient feeder root systems are located and this will ensure the future health and condition of the tree is maintained.
- Where the extent of construction works has resulted in a nominated tree becoming structurally unstable or within a location to render the tree a high level of risk to property and persons, the contractor shall inform the works supervisor for further instructions.
- Any damage to the protected tree during the preliminary stages of site clearance or during the construction works shall be reported immediately to the site supervisor with remedial works carried out by a qualified Arborist to the relevant Australian Standard.
- Supplementary watering to retained trees may be required over summer months where works are in proximity of the trees. Watering the trees is required to minimise stress on the trees while works are occurring. It is recommended to water deeply a minimum of once per week for a total of 1000 litres per tree for mature trees and 600 litres for trees less than 8m in height. It is recommended that the water truck have a wetting agent in the tank to assist to get the water through to sandy layer to the trees root system.
- Established trees of good vigour and structure represent an asset to any development site. Trees are living organisms that require certain environmental conditions in order to maintain their value as an asset. Damage must be avoided or minimized during the development process and procedures to ensure the protection of trees must be in place at all stages.



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Limitation of liability

Trees can be managed, but they cannot be controlled. To live or work near a tree involves a degree of risk.

This report only covers identifiable defects present at the time of inspection. Paperbark Technologies accepts no responsibility and cannot be held liable for any structural defect or unforeseen event/situation or adverse weather conditions that may occur after the time of inspection.

Paperbark Technologies cannot guarantee that the tree/s contained within this report will be structurally sound under all circumstances, and is not able to detect every condition that may possibly lead to the structural failure of a tree. Paperbark Technologies cannot guarantee that the recommendations made will categorically result in the tree being made safe.

Unless specifically mentioned this report will only be concerned with above ground inspections, as such all observations have been visually assessed from ground level. Trees are living organisms and as such cannot be classified as safe under any circumstances. Trees fail in ways that the arboriculture industry does not fully understand.

The recommendations are made on the basis of what can be reasonably identified at the time of inspection therefore Paperbark Technologies accepts no liability for any recommendations made.

All care has been taken to obtain information from reliable sources, however Paperbark Technologies can neither guarantee nor be responsible for the accuracy of information provided by others.

In the event that re-inspection of the tree/s is recommended it is the client's responsibility to make arrangements with Paperbark Technologies.

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Overall Map of Beale Park



Tree Survey – Beale Park, Spearwood – March 2021

Map 1 (Northern section)



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Map 2 (Centre and southern section)



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Photos of each tree



Tree 1



Tree 2



Tree 3



Tree 4



Tree 5



Tree 6



Tree 7



Tree 8

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Tree 9



Tree 10



Tree 11



Tree 12



Tree 13



Tree 14



Tree 15



Tree 16

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Tree 17



Tree 18



Tree 19



Tree 20



Tree 21



Tree 22



Tree 23



Tree 24

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Tree 25



Tree 26



Tree 27



Tree 28



Tree 29



Tree 30



Tree 31



Tree 32

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Tree 33



Tree 34



Tree 35



Tree 36



Tree 37



Tree 38



Tree 39



Tree 40

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Tree 41



Tree 42



Tree 43



Tree 44



Tree 45



Tree 46



Tree 47



Tree 48

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Tree 49



Tree 50



Tree 51



Tree 52



Tree 53



Tree 54



Tree 55



Tree 56

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Tree 57



Tree 58



Tree 59



Tree 60



Tree 61



Tree 62



Tree 63



Tree 64

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Tree 65



Tree 66



Tree 67



Tree 68

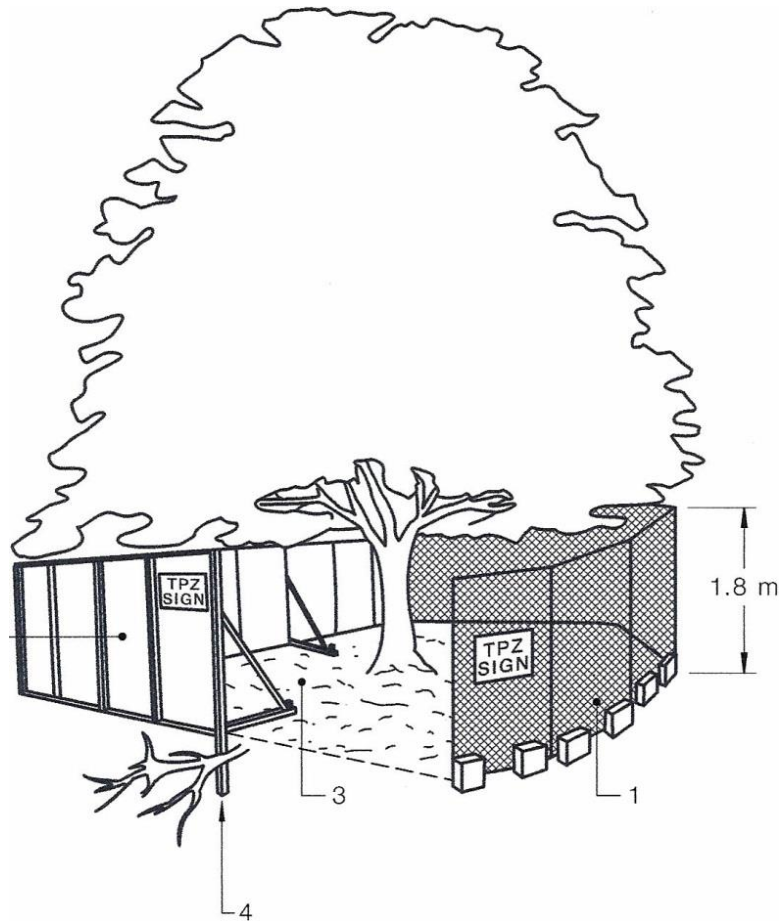


Tree 69



Tree 70

Example of Tree Protection Fencing from AS 4970-2009



LEGEND:

- 1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
- 2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
- 3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
- 4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.