Ref: 04257

19 July 2017

Coffs Harbour City Council
Locked Bag 155
COFFS HARBOUR NSW 2450

de Groot & Benson Pty Ltd

Consulting Engineers & Planners

Attention: Ms Renah Givney

PARK BEACH RESIDENCES
DEVELOPMENT APPLICATION 0902/17 DA
AMENDMENT TO DEVELOPMENT APPLICATION

This letter is a request by the applicant to amend the above development application prior to determination of the application. This letter also summarises responses to 'stop the clock' requests for information issued by Council, and attaches amended information submitted by the applicant.

Council 'stop the clock' requests and a statement outlining the response is summarised herein;

Vegetation

Council requested clarification, and the applicant responded by email, indicating where the requested information could be found in the documentation. No changes to documentation were made in response to the Council request for information. No further information is attached to this letter.

Noise

Council requested additional information and clarifications. The applicants responses are the following documents;

- dGB email dated 8 June 2017 requesting consideration of certain aspects in conditioning of any development consent
- Rodney Stevens Acoustics letter R170181L1 dated 8 June 2017
- Rodney Stevens Acoustics amended report R170181R1 dated 7 June 2017

Robert de Groot
Gregory Benson
Graham Knight
Anthony Greenland
John Anderson

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Traffic

Council commented upon the traffic generation assessment used in the traffic impact assessment, and proposed a different generation rate in its email dated 5 June 2017. Council also requested information regarding intersection works at the San Francisco Ave-Arthur Street intersection, that accounted for the proposed development plus traffic generated under a prior development consent for Park Beach Plaza. These matters were investigated over a period of time, and the applicants responses are the following documents;

- The development application is requested to be amended to remove the access to San Francisco Ave, thus remove the traffic impact at that intersection.
- The amended traffic impact statement attached to this letter includes amended traffic generation rates based on RMSGTTGD, including updated 2013 traffic surveys under RMS document TDT2013/04a
- The amended traffic impact statement attached to this letter considers the impact of a single access to the land from York Street on the public road network.
- Amended plans have been produced to address the comments made by Council and show a single site access at York Street, plus reconfigured on grade carpark arising from removal of the originally proposed site access at San Francisco Ave.
- Amended plans are tabled below;

Boffa Robertson Group Architects		
Drawing Numbers 1542	Amendment No	Drawing Title
DA 01	9	Site Plan
DA02	5	Site Analysis
DA 03	11	Ground floor plan- overall
DA 04	10	First floor plan- overall
DA 12	11	Ground floor plan- RCF
DA 13	10	First floor plan- RCF
DA 29	4	Solar access Townhouse
DA 52	4	Fencing plan
DA54	3	Shadow diagrams- Summer solstice- 1
DA 55	3	Shadow diagrams- Summer solstice - 2
DA 56	6	Shadow diagrams- Winter solstice- 1
DA 57	6	Shadow diagrams- Winter solstice -2

Parking

Council commented upon parking matters in its email dated 5 June 2017. Council marked up a plan with comments for the applicant to address. These matters were investigated over a period of time, and the applicants responses are the following documents;

- Amended plan have been produced to address the comments made by Council and show compliant accessible parking, internal turning arrangements, swept path diagrams.

DA 19	10	Building A,B,C,D Ground floor plan- carpark

Water

Council requested correction of an asset label on a proposed connection, and reflection of additional sewer loads in a report. The applicants response are the following documents;

- Plan 04257-C07 revision P2
- Amended report 04257 2017-02-14 rev A sewerage
- Amended statement of environmental effects section 5.5

Yours faithfully

G P Benson

Annexure - Noise

Applicants response dated 08/06/2017 to noise comment in Councils email dated 29/05/2017

Hi Renah

further to the noise matter noted in your email dated 29 Aug we submit herewith;

1. an amended noise report R170181R1, prepared by Rodney Stevens Acoustics and dated 7 June 2017.
2. a letter prepared by Rodney Stevens Acoustics dated 8 June 2017.

The amended report notes the Pacific Hwy in section 7 of the report, and we trust that the amended report will permit Council to be satisfied under SEPP Infrastructure (2007) clause 102.

The letter advises that detailed acoustic information, upon which a detailed noise impact assessment can be carried out, is not available at DA stage of the project. Previous experience indicates the development will be capable of achieving compliance. May we respectfully submit that Council can condition a development consent for the application, to include a requirement to provide an appropriate acoustic assessment prior to issue of the occupation certificate for the development, where the relevant construction certificate includes works that would generate operational noise from mechanical plant and equipment and carpark operations.

Such a condition will permit the issue of construction certificates for building works and place the onus upon the developer to demonstrate appropriate construction has been implemented prior to occupation of the works. Please note our view that conditions of consent requiring provision of an acoustic report prior to issue of any construction certificate might have the unwanted impact of preventing the issue of construction certificate for early works not involving mechanical services and carparking noise generation. Thus the administrative burden, of having to amend a consent in order to permit early works, can be avoided.

Regards

Greg Benson

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Reference: R170181L1
Date: 8 June 2017

Bachrach Naumburger Group
c/- Boffa Robertson Group
Suite 7, Level 1 Epica, 9 Railway Parade
Chatswood NSW

Attention: Gregory Benson

Mechanical Plant Noise and Carpark Noise Statement
Proposed Retirement Village
Arthur Street & York Street
Coffs Harbour NSW

Rodney Stevens Acoustics (RSA) has been commissioned by Bachrach Naumburger Group to provide a statement regarding the noise emissions from the operation of the mechanical plant and the car park at the proposed retirement village to be located at Arthur Street and York Street Coffs Harbour NSW.

RSA has previously prepared a noise impact assessment (revised 7 June 2017) addressing road traffic noise intrusion into the living areas of the proposed development. The noise assessment included a noise survey of the existing noise environment and a review of the architectural plans to ensure compliance to the SEPP Clause 102. Recommendations have been presented in the acoustic report to enable the development to achieve acoustic compliance.

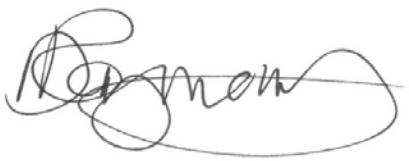
Coffs Harbour Council has requested for further information on the acoustic impact to nearby sensitive receivers from the operation of the mechanical plants & equipment and the car park. Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the EPA. The EPA oversees the Commercial Noise Policy (INP) January 2000 which provides a framework and process for deriving noise criteria and guidelines on the assessment of mechanical plants and car park noise emissions. For assessing intrusiveness, the background noise generally needs to be measured. The intrusiveness criterion essentially means that the equivalent continuous noise level (LAeq) of the source should not be more than 5 dB(A) above the measured Rated Background Level (RBL), over any 15 minute period.

At this stage of the development, a mechanical plant schedule hasn't been drafted. For a comprehensive acoustic assessment to be conducted for the operation of the mechanical plant; plant selection and location needs to be finalised by mechanical services engineer. For a comprehensive acoustic assessment for the operation of the car park, traffic analysis for the car park needs to be conducted to determine hourly vehicle movements.

Preliminary review of the mechanical needs of the development highlighted the need for outdoor condenser units for the living areas. Based on previous acoustic assessments of similar developments, conventional operation mechanical plants and the operation of similar size car park show compliance to the INP criteria at the nearest residential receivers.

It is in the opinion of Rodney Stevens Acoustics that conventional mechanical plant operation and the use of the car park will not have an adverse acoustic amenity to nearby residents. It is recommended that a comprehensive acoustic assessment of the mechanical plants and carpark be conducted prior to the issue of a construction certification or when the mechanical plant schedule has been drafted.

Regards,



Desmond Raymond - MAAS
Senior Acoustic Consultant
Rodney Stevens Acoustics

ABN 78 149 311 455

RODNEY STEVENS ACOUSTICS
Acoustic Consultants
Member Australian Acoustical Society

Proposed Retirement Village

Arthur Street & York Street, Coffs Harbour

Road Traffic Noise Impact Assessment

REPORT R170181R1

Revision 0

Prepared for:

Bachrach Naumburger Group

C/- Boffa Robertson Group

Suite 7, Level 1 Epica, 9 Railway Street

CHATSWOOD NSW

7 June 2017

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Proposed Retirement Village

Arthur Street & York Street, Coffs Harbour

Road Traffic Noise Impact Assessment

PREPARED BY:

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Email: info@rodneystevensacoustics.com.au
Web: www.rodneystevensacoustics.com.au

DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
R170181R1	Revision 0	7 June 2017	Desmond Raymond	Thomas Carney	Rodney Stevens

TABLE OF CONTENTS

1 INTRODUCTION

Rodney Stevens Acoustics Pty Ltd (RSA) has been engaged by Bachrach Naumburger Group to prepare a Road Traffic Noise Assessment for a Proposed Retirement Village located at Arthur Street & York Street, Coffs Harbour NSW.

Bachrach Naumburger Group requires a statement addressing road traffic noise to accompany the Development Application (DA) for the proposal. The primary purpose of the assessment is to determine the site's exposure to road traffic noise and where required, provide in-principle design advice to achieve the requirements of acoustic amenity within future apartments.

Specific acoustic terminology is used in this report. An explanation of common acoustic terms is provided in Appendix C.

2 PROJECT OVERVIEW

2.1 Proposed Development

The proposed development is located at Arthur Street & York Street, Coffs Harbour NSW. The project area and its surrounding environment are presented in Figure 2-1 below.

Figure 2-1 Project Area and Surrounding Environment

Aerial image courtesy of © 2017 nearmap ltd

The proposed development is construction of a retirement village with apartment complex of up to seven levels. The proposed site layouts of the development site are presented below.

Figure 2-2 Proposed Ground Floor Plan

Figure 2-3 Proposed First Floor Plan

Figure 2-4 Proposed Second Floor Plan

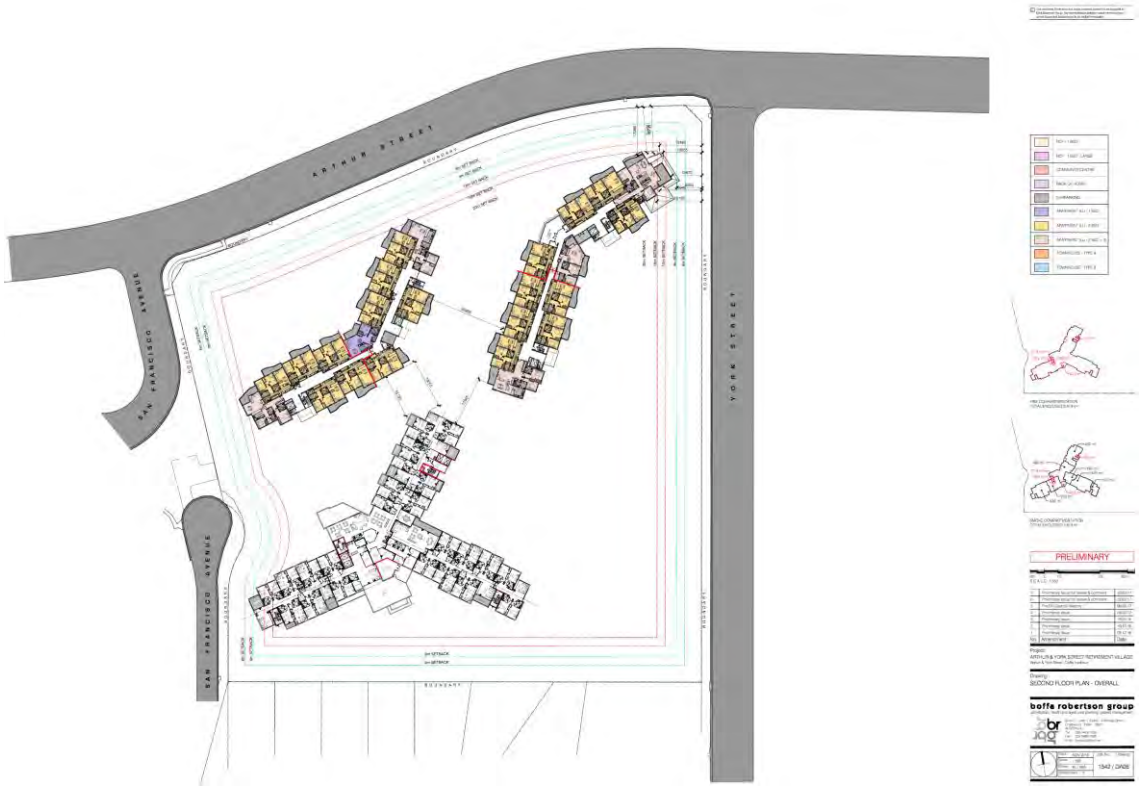


Figure 2-5 Proposed Third Floor Plan

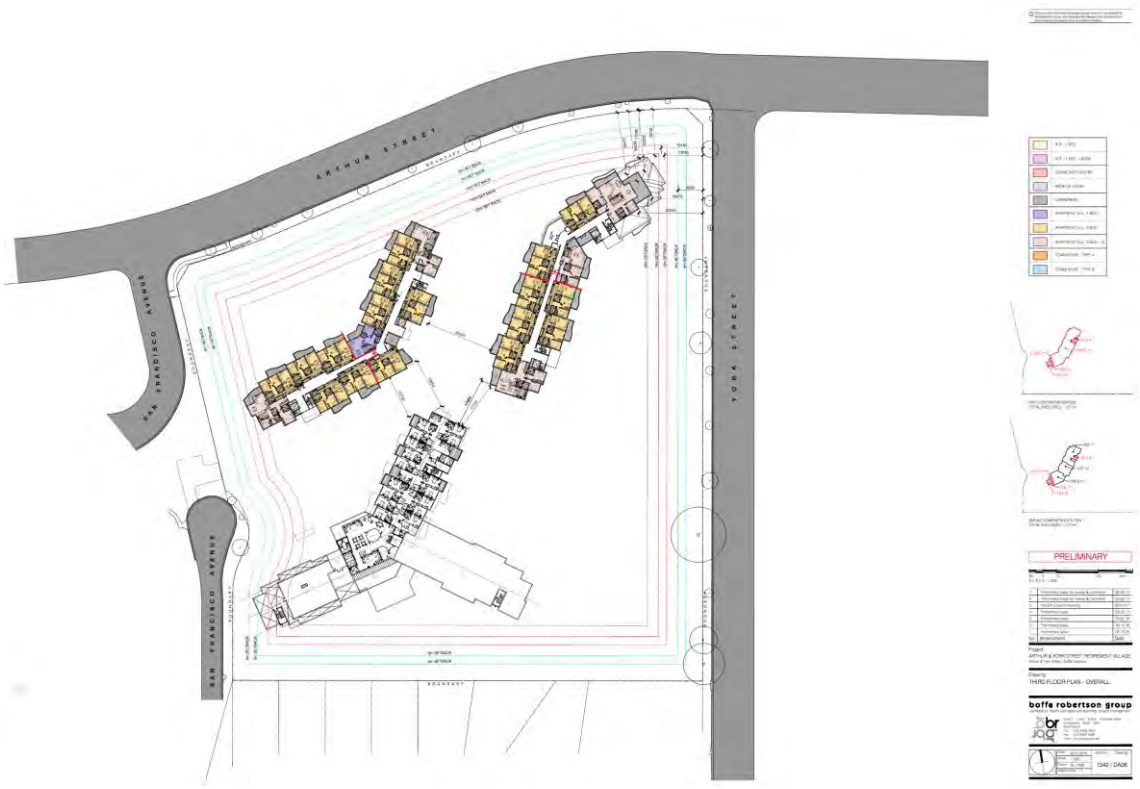


Figure 2-6 Proposed Fourth Floor Plan

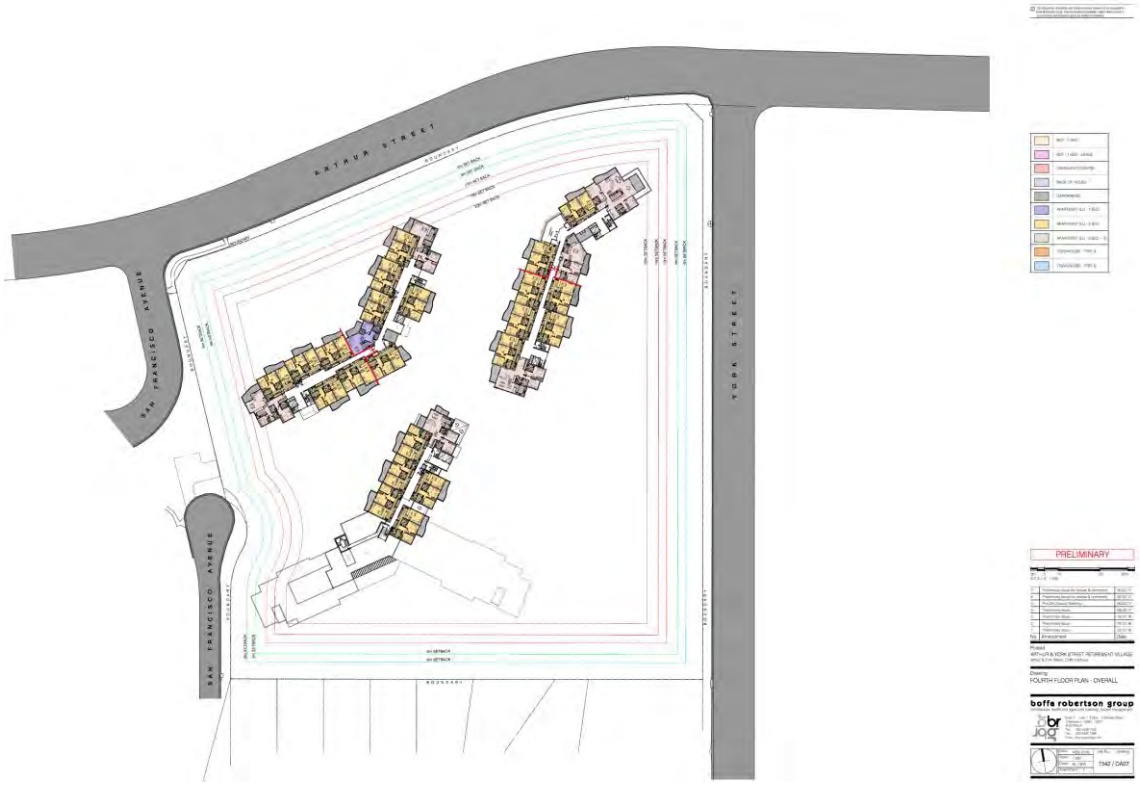


Figure 2-7 Proposed Fifth Floor Plan

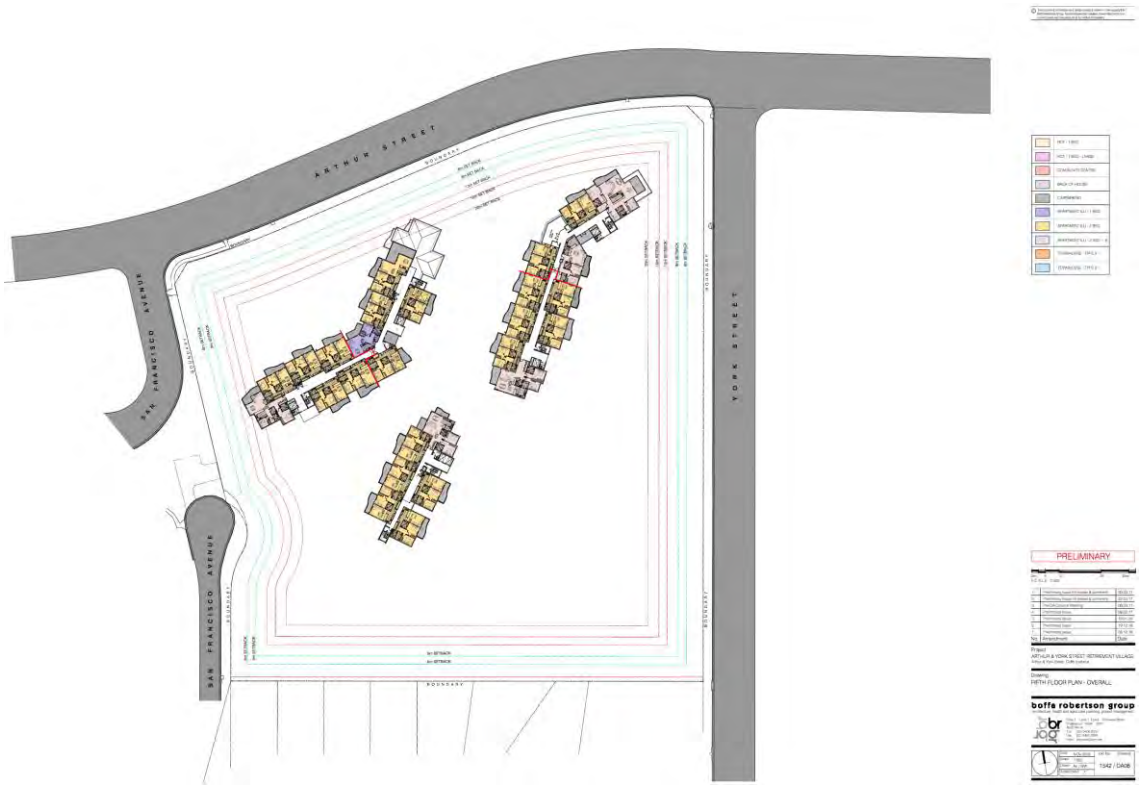


Figure 2-8 Proposed Sixth Floor Plan

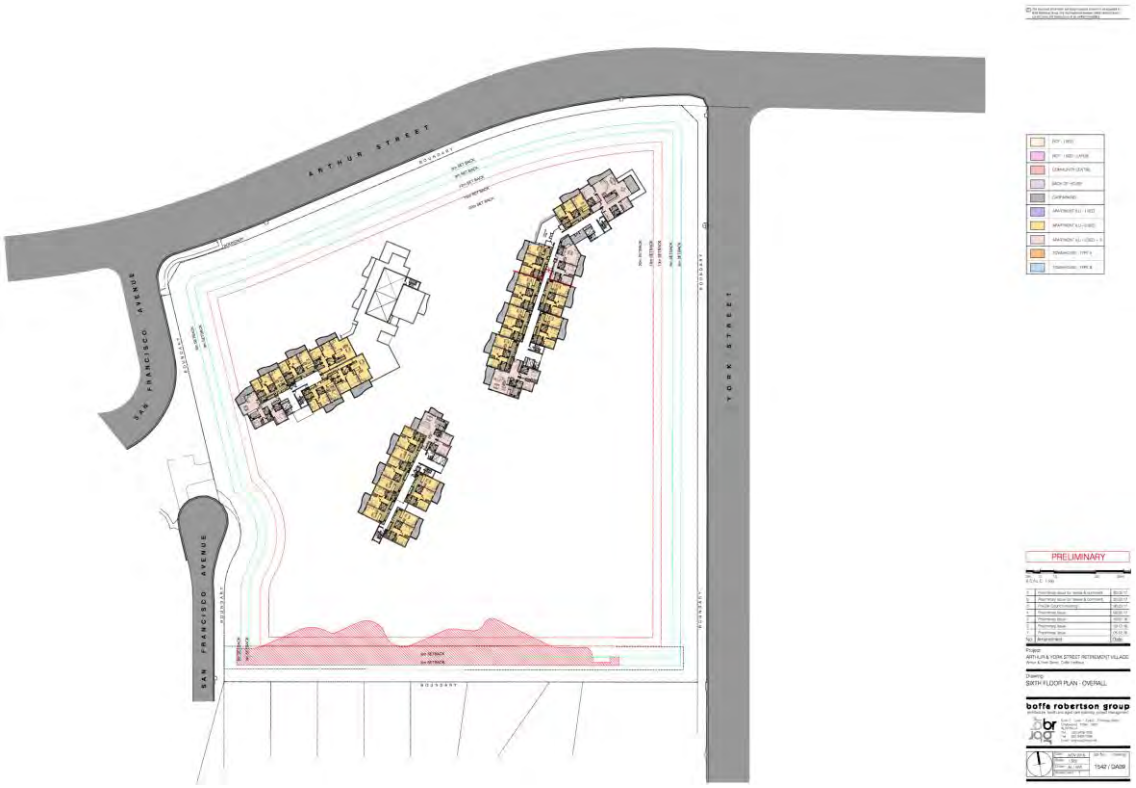
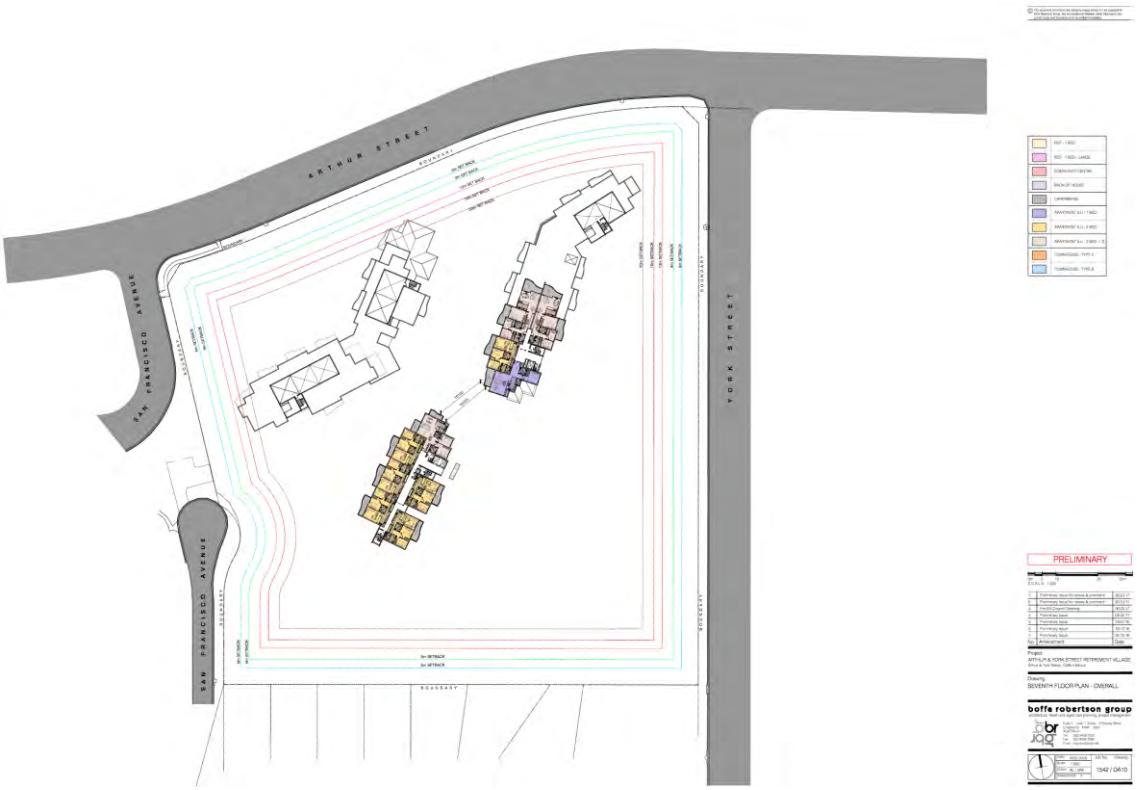


Figure 2-9 Proposed Seventh Floor Plan



3 EXISTING NOISE ENVIRONMENT

Noise monitoring for the development was carried out between 18 April and 19 April 2017 at the locations shown in Figure 2-1.

The locations were selected after a detailed inspection of the project area considering other noise sources that may influence the readings, the proximity of noise-sensitive receivers and security issues for the noise monitoring device and gaining permission for access from the residents or landowners. The results of the ambient noise monitoring are shown in Table 3-1.

Instrumentation for the survey comprised of a Svantek Model 979 Type I Sound Level Meter (serial number 12613) fitted with a microphone windshield. Calibration of the SLM was checked prior to and following measurements. Drift in calibration did not exceed ±0.5 dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. Weather conditions during the noise monitoring period was considered to be fine with an ambient temperature ranging from 17deg to 26deg with no wind or rain.

From the measured noise levels, the results have been summarised and presented in Table 3-1. These results represent the external noise exposure to the Proposed Retirement Village from the road traffic noise on Arthur Street and York Street and noise from the operation of the nearby shopping centre.

The monitored baseline noise levels are detailed in Table 3-1.

Table 3-1 Measured Existing Noise Levels Corresponding SEPP Assessment Time Periods

Location	Measurement Descriptor	Measured Noise Level – dBA re 20 µPa	
		Daytime 7.00 am – 10.00 pm	Night-time 10.00 pm – 7.00 am
Location 1 (York Street)	LAeq[1]	60	52
Location 2 (Arthur Street)	LAeq[1]	59	51
Location 3 (Shopping Centre)	LAeq[1]	64	54

Note 1: The LAeq is essentially the average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

4 ASSESSMENT CRITERIA

4.1 Road Traffic Noise Assessment Criteria

Residential Buildings require a statement addressing “AS 3671 Road Traffic Noise Intrusion Guidelines”. Clause 3.23 requires dwellings adjoining arterial roads to be designed “to acceptable internal noise level, based on AS 3671 Road Traffic Noise Intrusion Guidelines”. Australian Standard 3671:1989 “Acoustics – Road traffic noise intrusion Building siting and construction” provides the guidelines for determining the type of building construction necessary to achieve the acceptable indoor noise levels, as recommended by Australian/New Zealand Standard “2107:2000 Acoustics - Recommended design sound levels and reverberation times for building interiors”.

AS/NZS 2107:2000 is primarily concerned with establishing internal noise levels for relatively steady noise sources, such as air conditioning plant and continuous road traffic noise. Table 4-1 provides a summary of

recommended noise levels for residential buildings near “major” roads given in AS/NZS 2107:2000. The guideline lower and upper range of the noise levels are described as “satisfactory” and “maximum” respectively.

Table 4-1 AS/NZS 2107:2000 Recommended Design Sound Levels for Residential Spaces

Type of Occupancy/Activity	Recommended Design Sound Level LAeq dBA re 20 µPa	
	Satisfactory	Maximum
Houses and apartments near major roads		
Living areas	35 dBA	45 dBA
Sleeping areas	30 dBA	40 dBA
Work areas	35 dBA	45 dBA

SEPP (Infrastructure) 2007 was introduced to assist the delivery of necessary infrastructure by improving regulatory certainty and efficiency. The Infrastructure SEPP has specific planning provisions and development controls for various types of infrastructure and to development adjacent to infrastructure.

Clause 102 includes provisions to ensure that noise sensitive development proposed adjacent to road corridors which carry considerable traffic volumes are not adversely affected by road noise. The clause applies to development adjacent to roads with an annual average daily traffic volume (AADT) of more than 40, 000 vehicles (based on the traffic volume data published on the website of Roads & Marine Services (RMS)), and that the consent authority considers likely to be adversely affected by road noise. Where residential development is proposed, appropriate measures must be taken to ensure that the following internal noise levels are met:

- The L_{Aeq} noise level between the hours of 10.00 pm and 7.00 am shall not exceed 35 dB(A) with a bedroom, and

- The L_{Aeq} noise level within any other habitable room (excluding a garage, kitchen, bathroom or hallway) shall not exceed 40 dB(A) at any time.

The Department of Planning and Infrastructure’s Development near Rail Corridors and Busy Roads – Interim Guideline (2008) aims to assist in the planning, design and assessment of developments in, or adjacent to, busy roads and supports the specific provisions of SEPP (Infrastructure) 2007 in relation to road traffic noise. The Guideline states that in circumstances where development is proposed adjacent to a road with an annual average daily traffic volume of 20,000 to 40,000 vehicles, the guidelines provide best practice advice.

For consistency with the widely recognised criteria, including the NSW Department of Planning’s SEPP (Infrastructure) 2007 and Development near Rail Corridors and Busy Roads – Interim Guideline, AS 3671:1989 Acoustics road traffic noise Building siting and construction, AS/NZS 2107:2000 Acoustics – recommended design sound levels and reverberation times for building interiors, we recommend the following internal noise levels be adopted for the assessment of road traffic noise intrusion:

- The L_{Aeq} noise level between the hours of 10.00 pm and 7.00 am shall not exceed 35 dB(A) with a bedroom, and

- The L_{Aeq} noise level within any other habitable room (excluding a garage, kitchen, bathroom or hallway) shall not exceed 40 dB(A) at any time.

5 NOISE ASSESSMENT

5.1 Road Traffic Noise Intrusion

The noise survey measured the noise exposure on site from the nearby Pacific Highway, Arthur Street and York Street and the Shopping Centre. As the shopping centre has a greater adverse acoustic impact on the amenity of the development than the Pacific Highway, noise from the shopping centre (including the carpark) has been considered for this assessment. This assessment predicts road traffic noise intrusion from nearby Arthur Street and York Street and the operation of the nearby Shopping Centre to the Proposed Retirement Village.

Standard window glazing of a building will typically attenuate these noise levels by 20 dB(A) with windows closed and 10 dB(A) with windows open (allowing for natural ventilation). The predicted internal noise levels of the proposed residential units are presented in Table 5-1 for the windows open and windows closed scenarios.

Standard window system (4 mm thick glass with aluminum frame) has been assumed for this prediction.

Table 5-1 Predicted Internal Noise Levels

Type of Occupancy	Descriptor	Internal Noise Level		Noise Criteria
		Windows Open	Windows Closed	
Apartments on Northern Boundary (Arthur Street)				
Living Areas (Daytime)	$L_{Aeq,15hour}$	54 dB(A)	44 dB(A)	40 dB(A)
Living Areas (Night time)	$L_{Aeq,9hour}$	42 dB(A)	32 dB(A)	40 dB(A)
Sleeping Areas (Night time)	$L_{Aeq,9hour}$	42 dB(A)	32 dB(A)	35 dB(A)
Apartments on Eastern Façades (York Street)				
Living Areas (Daytime)	$L_{Aeq,15hour}$	50 dB(A)	40 dB(A)	40 dB(A)
Living Areas (Night time)	$L_{Aeq,9hour}$	41 dB(A)	31 dB(A)	40 dB(A)
Sleeping Areas (Night time)	$L_{Aeq,9hour}$	41 dB(A)	31 dB(A)	35 dB(A)

Type of Occupancy	Descriptor	Internal Noise Level		Noise Criteria
		Windows Open	Windows Closed	
Apartments on Western façade (facing the Shopping Centre)				
Living Areas (Daytime)	$L_{Aeq,15hour}$	49 dB(A)	39 dB(A)	40 dB(A)
Living Areas (Night time)	$L_{Aeq,9hour}$	44 dB(A)	34 dB(A)	40 dB(A)
Sleeping Areas (Night time)	$L_{Aeq,9hour}$	44 dB(A)	34 dB(A)	35 dB(A)

The predicted internal noise levels indicate that road traffic noise on the proposed dwellings will potentially exceed the noise criteria with windows opened and closed for the apartments on the Northern boundary facing Arthur Street. When windows are closed, road traffic noise in the Living Areas and Sleep Areas comply with the internal noise criteria for the reminder of the apartments.

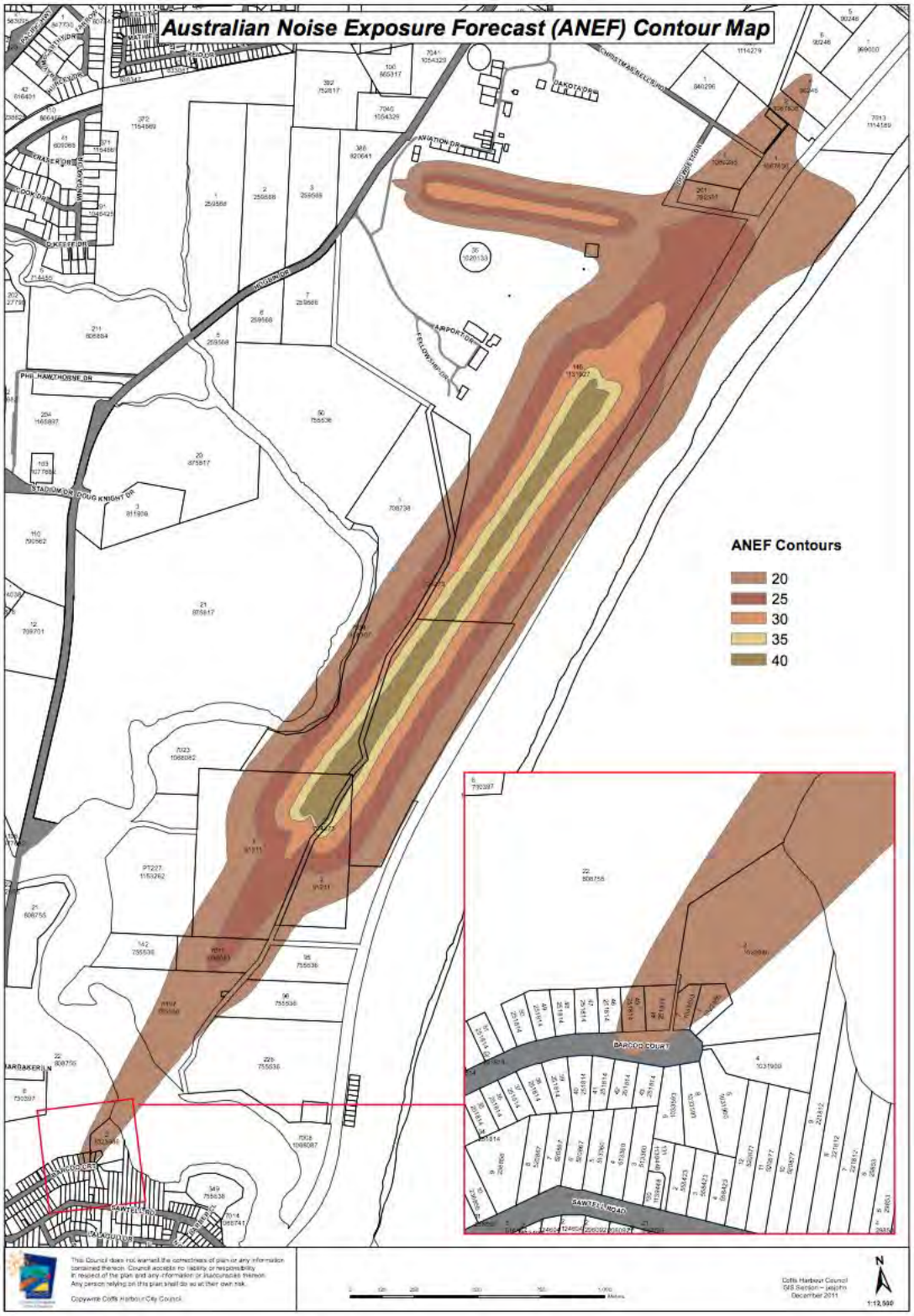
5.2 Aircraft Noise Impact Assessment

Coffs Harbour has a fully operational airport located approximately 3.7 km south of the development. AS 2021-2015 contains a detailed procedure for assessing maximum levels of aircraft noise intrusion based on the location of a building with respect to ANEF (Australian Noise Exposure Forecast) contours. The suitability of the site for a given building type is then ranked as either "Unacceptable", "Conditionally Acceptable" or "Acceptable". Based on the acceptability of the site for the proposed building use, there are further detailed procedures to determine the noise reduction required from the building construction to control maximum internal noise levels during aircraft flyovers.

Figure 5-1 shows the location of the residential properties with respect to the most up-to-date excerpt from Coffs Harbour Airport 2033 ANEF contour map. This shows that the project site is located outside of the nearest ANEF contour.

A review of AS 2021-2000 Table 2.1 "*Building Site Acceptability Based on ANEF Zones*" reveals that the project site, located outside of the contours, are classified as "Acceptable" for residential land use with respect to future development. The operation of Coffs Harbour Airport will have no adverse acoustic impact on the proposed development.

Figure 5-1 Coffs Harbour Airport ANEF



6 RECOMMENDATIONS

Based on the above-predicted road traffic impact the following noise control measures are recommended for the residential units:

- Where glazed windows and doors on of residential development need to be closed to meet internal noise levels, alternative ventilation methods which meet the ventilation requirements of the BCA and Australian Standard AS 1668.2:2002 will be required and design input should be sought from an appropriately qualified mechanical services consultant.

Based on the predicted internal noise levels, glazed windows and doors certain facades of residential development should have the following minimum Rw rating as indicated in Table 6-1 below.

Table 6-1 In-principle Glazing Recommendations

Location	Glazing Type	Minimum Glazing Rw Rating	Indicative Glazing System
Apartments on 20m setback from Arthur Street			
Living Rooms	Sliding Door	Rw 24	5mm clear glass in acoustically sealed frame*
	Sliding Window	Rw 24	5mm clear glass in acoustically sealed frame*
Bedrooms	Sliding Door	Rw 29	6mm clear glass in acoustically sealed frame*
	Sliding Window	Rw 29	6mm clear glass in acoustically sealed frame*
Apartments facing York Street (Ground-First Floor)			
Bedrooms	Sliding Door	Rw 24	5mm clear glass in acoustically sealed frame*
	Sliding Window	Rw 24	5mm clear glass in acoustically sealed frame*
Apartments on Western boundary facing Shopping Centre			
Living Rooms	Sliding Door	Rw 24	5mm clear glass in acoustically sealed frame*

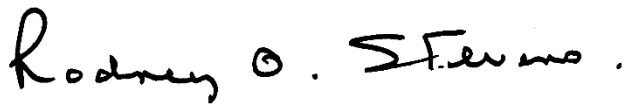
Bedrooms	Sliding Window	Rw 24	5mm clear glass in acoustically sealed frame*
	Sliding Door	Rw 29	6mm clear glass in acoustically sealed frame*
	Sliding Window	Rw 29	6mm clear glass in acoustically sealed frame*

Note *: glazing system are for reference only. Any glazing system to be installed for the development is to achieve the minimum Rw rating indicated above.

Please note Rw ratings provided in Table 6-1 rely on the acoustic performance of the window glazing and frame. Rw ratings should be checked with glazing manufacturers and frames should be selected and installed as to not degrade the performance of the glazing. It is also recommended that glazing specifications are reviewed at the detailed design stage, most notably if changes to the glazing area are made throughout the design.

7 CONCLUSION

Rodney Stevens Acoustics has conducted Road Traffic Noise Assessment for the Proposed Retirement Village site at Arthur Street & York Street, Coffs Harbour NSW. The assessment has been conducted to satisfy State Environmental Planning Policy (Infrastructure) 2007 Clause 102. This requirement will be achieved within the bedrooms and habitable rooms with recommendations set out in this report.



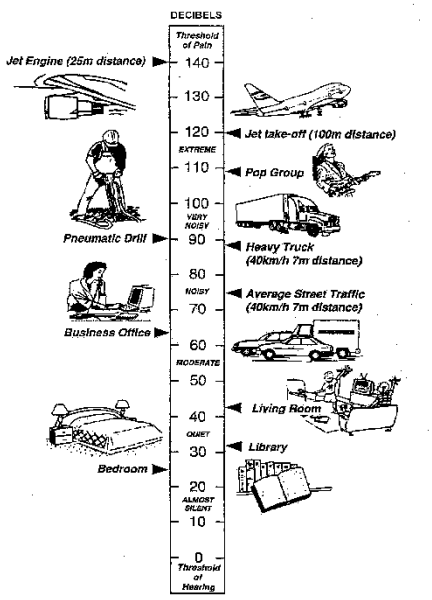
Rodney Stevens - MAAS

Appendix A – Acoustic Terminology

A-weighted sound pressure	The human ear is not equally sensitive to sound at different frequencies. People are more sensitive to sound in the range of 1 to 4 kHz (1000 – 4000 vibrations per second) and less sensitive to lower and higher frequency sound. During noise measurement an electronic '*A-weighting*' frequency filter is applied to the measured sound level *dB(A)* to account for these sensitivities. Other frequency weightings (B, C and D) are less commonly used. Sound measured without a filter is denoted as linear weighted dB(linear).
Ambient noise	The total noise in a given situation, inclusive of all noise source contributions in the near and far field.
Community annoyance	Includes noise annoyance due to: ▪ character of the noise (e.g. sound pressure level, tonality, impulsiveness, low-frequency content) ▪ character of the environment (e.g. very quiet suburban, suburban, urban, near industry) ▪ miscellaneous circumstances (e.g. noise avoidance possibilities, cognitive noise, unpleasant associations) ▪ human activity being interrupted (e.g. sleep, communicating, reading, working, listening to radio/TV, recreation).
Compliance	The process of checking that source noise levels meet with the noise limits in a statutory context.
Cumulative noise level	The total level of noise from all sources.
Extraneous noise	Noise resulting from activities that are not typical to the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Feasible and reasonable measures	Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors: ▪ Noise mitigation benefits (amount of noise reduction provided, number of people protected). ▪ Cost of mitigation (cost of mitigation versus benefit provided). ▪ Community views (aesthetic impacts and community wishes).

- Noise levels for affected land uses (existing and future levels, and changes in noise levels).

Impulsiveness	Impulsive noise is noise with a high peak of short duration or a sequence of these peaks. Impulsive noise is also considered annoying.
Low frequency	Noise containing major components in the low-frequency range (20 to 250 Hz) of the frequency spectrum.
Noise criteria	The general set of non-mandatory noise levels for protecting against intrusive noise (for example, background noise plus 5 dB) and loss of amenity (e.g. noise levels for various land use).
Noise level (goal)	A noise level that should be adopted for planning purposes as the highest acceptable noise level for the specific area, land use and time of day.
Noise limits	Enforceable noise levels that appear in conditions on consents and licences. The noise limits are based on achievable noise levels, which the proponent has predicted can be met during the environmental assessment. Exceedance of the noise limits can result in the requirement for either the development of noise management plans or legal action.
Performance-based goals	Goals specified in terms of the outcomes/performance to be achieved, but not in terms of the means of achieving them.
Rating Background Level (RBL)	The rating background level is the overall single figure background level representing each day, evening and night time period. The rating background level is the 10^{th} percentile min L_{A90} noise level measured over all day, evening and night time monitoring periods.
Receptor	The noise-sensitive land use at which noise from a development can be heard.
Sleep disturbance	Awakenings and disturbance of sleep stages.
Sound and decibels (dB)	Sound (or noise) is caused by minute changes in atmospheric pressure that are detected by the human ear. The ratio between the quietest noise audible and that which should cause permanent hearing damage is a million times the change in sound pressure. To simplify this range the sound pressures are logarithmically converted to decibels from a reference level of 2 x 10-5 Pa. The picture below indicates typical noise levels from common noise sources.



dB is the abbreviation for decibel – a unit of sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure.

Sound Power Level (SWL)

The sound power level of a noise source is the sound energy emitted by the source. Notated as SWL, sound power levels are typically presented in *dB(A)*.

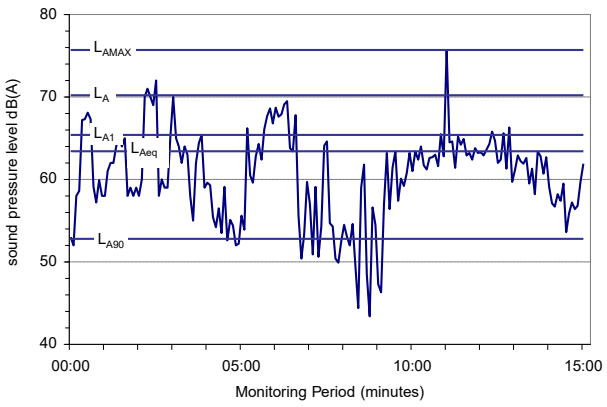
Sound Pressure Level (SPL)

The level of noise, usually expressed as SPL in *dB(A)*, as measured by a standard sound level meter with a pressure microphone. The sound pressure level in *dB(A)* gives a close indication of the subjective loudness of the noise.

Statistical noise levels

Noise levels varying over time (e.g. community noise, traffic noise, construction noise) are described in terms of the statistical exceedance level.

A hypothetical example of A weighted noise levels over a 15 minute measurement period is indicated in the following figure:



Key descriptor

- LAmax Maximum recorded noise level.

- L_{A1} The noise level exceeded for 1% of the 15 minute interval.
- L_{A10} Noise level present for 10% of the 15 minute interval. Commonly referred to the average maximum noise level.
- L_{Aeq} Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound.
- L_{A90} Noise level exceeded for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

Threshold	The lowest sound pressure level that produces a detectable response (in an instrument/person).
Tonality	Tonal noise contains one or more prominent tones (and characterised by a distinct frequency components) and is considered more annoying. A 2 to 5 dBA penalty is typically applied to noise sources with tonal characteristics.

Annexure - Traffic

4 TRAFFIC (Amended)

4.1 Introduction

4.1.1 General

The proposed aged care development will generate traffic. This report considers the impact of the traffic on the road network and on the site layout.

Traffic generation, road network capacity, intersection analyses, car parking demand, pedestrian movement and internal roads are considered within this section of this Statement of Environmental Effects.

This traffic impact assessment is structured as follows;
Section 4.2 considers the existing traffic conditions and the public road network
Section 4.3 considers traffic generated by the proposed development
Section 4.4 describes the traffic modelling conducted as part of this assessment
Section 4.5 considers the impact of additional traffic on the public road network
Section 4.6 considers the internal road network
Section 4.7 considers internal parking arrangements and service vehicles
Section 4.8 considers public transport
Section 4.9 considers public road paths and pedestrian access
Section 4.10 considers lighting of parking areas
Section 4.11 considers concludes the traffic impact assessment and provides recommendations
Section 4.12 contains SIDRA model results

4.1.2 References

The following standards, guidelines and documents were used in preparing this report;
Austroads Guide to Traffic Generating Developments 2002
Austroads Design Vehicles and Turning Path Templates 2005
AS2890.1 Parking Code - Off Street Parking
AS2890.2 Parking Code - Off Street Parking Commercial Vehicles
AS2890.6 Parking Code - Off street parking for people with disabilities
Coffs Harbour City Council – Development Control Plan DCP 2015
RMS Guide to Traffic Generating Developments 2002 (RMSGTTGD)
TDT-04a 2013 updated traffic surveys to RMSGTTGD

4.1.3 The Proposal

The proposed development comprises housing for seniors or people with a disability in the form of;

- 120 bed residential care facility
- 21 townhouse style self contained dwellings
- 162 apartment style self contained dwellings

Traffic access to the proposed development will be via one access point at York Street. The access is opposite playing fields and has no impact on nearby dwellings. *This traffic impact assessment has been amended by the removal of the proposed access from the land to San Francisco Ave.*

4.1.4 Study methodology

The traffic impact assessment is provided in the form of this report embodied in Section 4 of this Statement of Environmental Effects. The traffic assessment is based on the guidelines provided in the RMSGTTGD, including the TDT-04a 2013 updated traffic surveys.

This assessment utilises land use traffic generations from the RMSGTTGD along with existing traffic data to conduct intersection assessments using SIDRA analysis.

Parking demand was derived based on SEPP (Seniors Living) requirements, as that SEPP prevails over Council DCP 2015.

4.2 Existing Road Network

4.2.1 General

The subject land is bounded by Arthur Street to the north, York Street to the east and San Francisco Avenue to the west, all being local roads. The site is approximately 350m west of the Pacific Highway, directly accessed via Arthur Street grade separated intersection. Figure 4.1 shows the locality plan, indicating the site location in the context of the Coffs Harbour road network.

Figure 4.1 shows the Park Beach local road network at the site. Figure 4.3 shows an aerial view of the Park Beach road network, sourced from Coffs Harbour City Council website

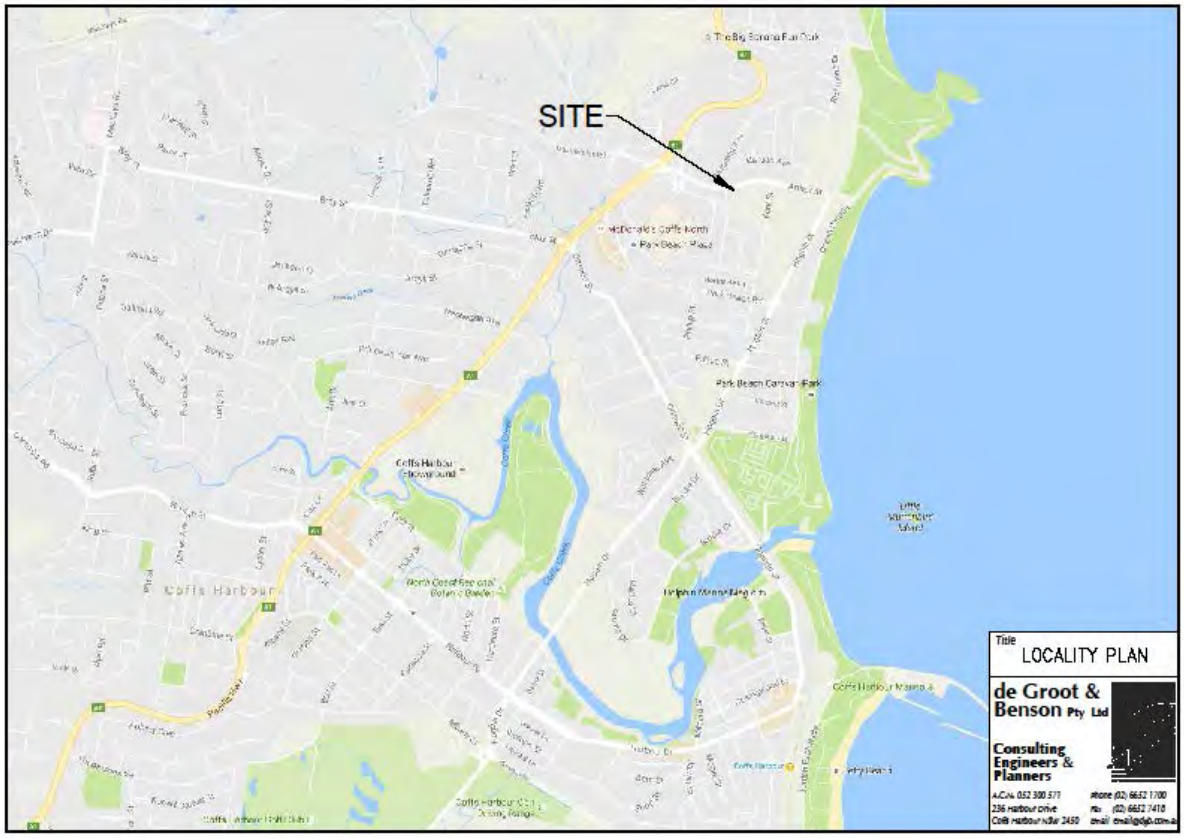


Figure 4.1 Locality Plan

The North Coast Railway is approximately 0.6km south-west of the site.

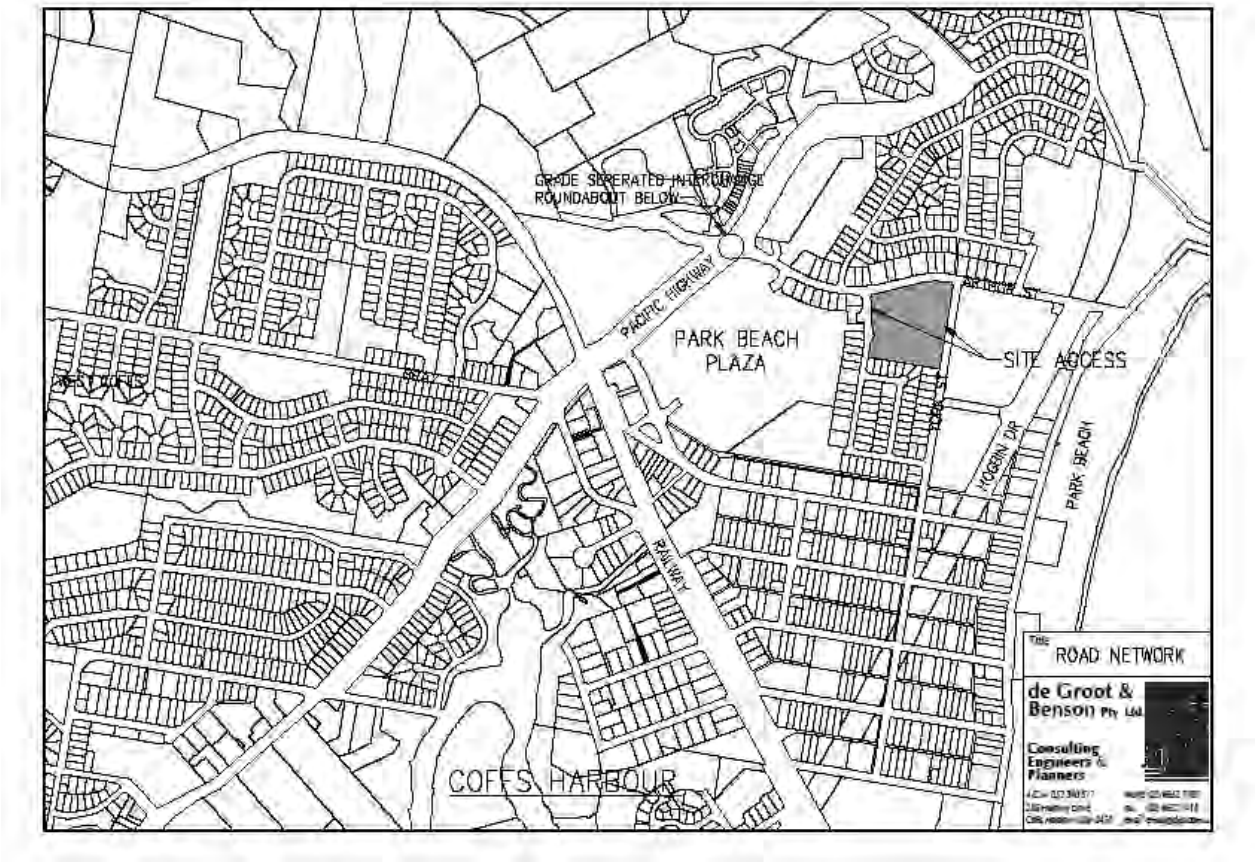


Figure 4.2 Local road network

4.2.2 **Arthur Street**

Arthur Street is a sealed two lane local distributor road, 13m wide between kerbs. The pavement is linemarked as a 2 lane road along the frontage of the subject site, and has been marked with a left turn lane for entry from the east into San Francisco Ave. At that left turn lane Arthur Street is signed as 'no stopping'.

Arthur Street is the terminus of the north-south Hogbin Drive link that connects the southern urban areas of Sawtell and Boambee to Park Beach, paralleling the Pacific Highway. Arthur Street has a signed speed limit of 60 km/hr and serves as a bus route. Arthur Street is flat and gently curved with good sight distances.

Image 4.1 is a drone shot of Arthur Street and the subject site, looking west, with Park Beach Plaza and the Pacific Hwy in the distance.

Image 4.1 Arthur St View, looking west over the subject site

Image 4.2 is a drone shot of Arthur Street and the subject site, looking east, with the Pacific Ocean in the distance. Intersection improvements have been made in the past at San Francisico Ave with turn lane, island and pedestrian shelter.

Image 4.2 Arthur St View, looking east over the subject site

4.2.3 **York Street**

York Street is a sealed two lane local street, 13m wide between kerbs, and services a number of residential dwellings as well as the York St Playing Fields. York St is a bus route, with a bus stop at the land frontage. It terminates as a 'Give Way' controlled tee intersection with Arthur Street to the north, and connects to Park Beach Road by a 'stop' sign controlled intersection.

Image 4.3 is a drone shot of York Street with the playing fields to the left and the subject site on the right hand side of the image. The street is flat and straight, with good sight distances.

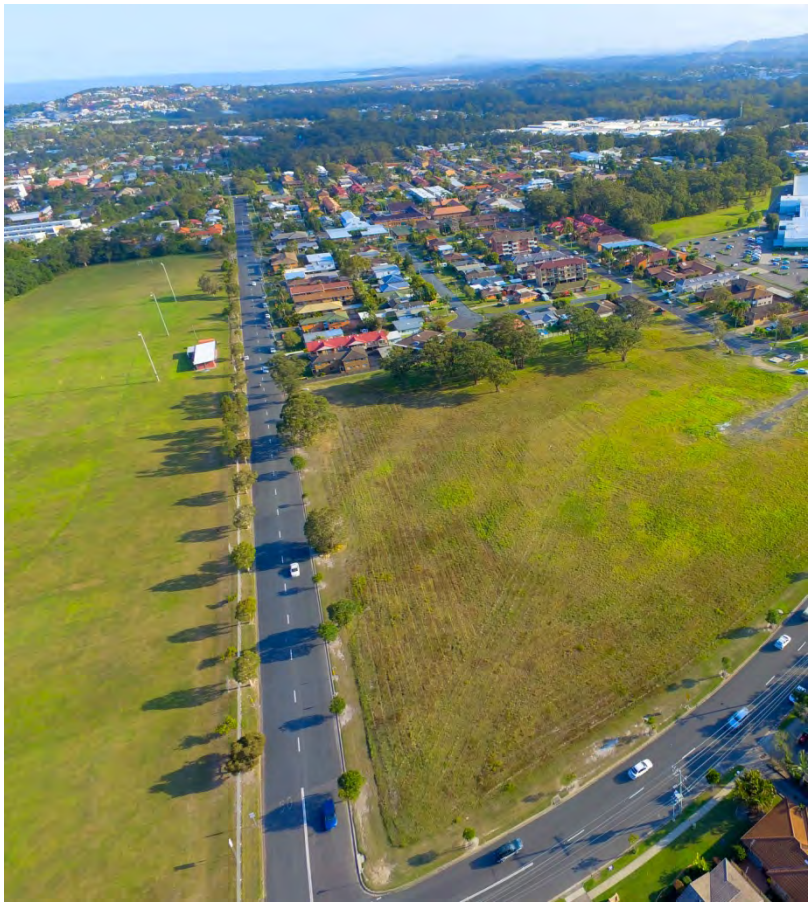


Image 4.3 York Street view, looking south from Arthur Street

4.2.4 San Francisco Avenue

San Francisco Avenue is a local street mostly developed with low-medium density residential development to the south and west of the site. The street is unformed for part of the site frontage, with a Council sewer pump station developed on the unformed section of road reserve, which divides the road into a northern leg and a southern leg.

The northern leg of the road serves as an access for Park Beach Plaza shopping centre, whilst the southern leg services residential development, and connects to York Street via Columbus Circuit. Both legs are flat gradients, with good sight lines.

Image 4.4 is a drone shot of San Francisco Avenue, looking north over the subject site. The northern and southern legs can be clearly seen, to the left and middle of the image. An informal site access is visible from the north leg.

The original development proposal was to provide vehicular access to San Francisco Ave to the development, however that original proposal has been amended to remove that access. San francisio Ave will play a role in pedestrian connectivity to retail and services to meet the daily needs of the resident aged care population. The unformed section of road provides a safe environment for that pedestrian connectivity.

Image 4.3 San Francisco Avenue view, looking north

4.2.5 **Road network traffic flows**

Traffic flows are presented below as AADT and are based on referenced sources, including 2007 data supplied by RTA. Available local traffic counts are 2008 and Dec 2016, and indicate traffic volumes of;

- Arthur Street east of Richmond Drive 6,200 AADT (CHCC 2008)
- Park beach Road between Phillip and York 6100 AADT (CHCC 2008)
- Park Beach Road between Hogbin and Ocean 1,702 AADT (CHCC Dec 2016)
- Hogbin Drive north 13,000 AADT, (CHCC 2008)
- Hogbin Drive north 13,624 AADT, 1395 peak hourly (CHCC Dec 2016)
- Pacific Hwy Orlando Street at railway bridge approximately 44,000 at 2004 and 2007 and estimated 36,000 at Big Banana hill just north of Park Beach Plaza (RMS)

Traffic counts are not available for York Street, but have been estimated at around 1,223 AADT and 252 peak hour by using the RMSGTTGD. Weekend traffic associated with ordinary playing field activity will not occur at same time as weekday peak hour traffic, thus is not considered as the critical case.

San Francisco Avenue north leg has traffic counts from Park Beach Plaza traffic of around 1,450 AADT (2008), whilst the southern leg has no traffic counts.

Further information on traffic volumes for these roads can be found in Section 4.4. Given the 2008 and 2016 volumes on Hogbin Dr, the annual growth is 0.6%.

4.2.6 **Relevant intersections**

Nearby intersections that could potentially carry additional traffic generated by the proposal include;

- York Street - Arthur Street
- York Street - Park Beach Road

These intersections can be seen in the context of the surrounding areas in Figure 4.3

Figure 4.3 Aerial view of the local road network at Park Beach

The amenity of these intersections, as well as the proposed developments access point on York Street was assessed using computer modelling, which is further discussed below.

4.3 Traffic generated by the proposed development

This section considers traffic generation determined by RMS Guide to Traffic Generating Development to predict volumes, and considers data regarding existing traffic volumes.

4.3.1 Traffic generation from RMS Guide to Traffic Generating Developments

The proposed development has been assessed for traffic generation using the RMS Guide to Traffic Generating Developments (2002), updated by the 2013 surveys. The proposal provides a 120 bed residential care facility and 183 self contained ILU's. The traffic generation of the proposed development is taken from the model provided in the 2013 survey update to RMS Guide to Traffic Generating Developments, which is based on the total number of occupied independent living units and RCF beds, in this case 183 ILU plus 120 RCF beds = 303 'dwellings'. For the purpose of this traffic impact assessment the development is considered to be fully occupied. Aged care traffic generation is given as;

Daily traffic;
weekday vehicle trips = 2.1 per dwelling
hence weekday trip generation = 2.1 x 303 dwellings + RCF rooms = 636 trips

Peak hour traffic;
peak hour traffic generation rate = 0.4 per dwelling
hence peak hour trips generation = 0.4 x 303 dwellings + RCF rooms = 121 trips

4.3.2 Traffic Growth

A twenty year planning horizon has been specified by Council for consideration in this proposal. The aged care development is not expected to grow itself, however Coffs Harbour will continue to develop.

For the purposes of traffic modelling, a conservative growth rate of 2.8% for the Pacific Highway has been adopted, as that has been recorded over a long term period in Coffs Harbour.

Local roads (Arthur St, York St, San Francisco Ave and Park Beach Rd) have been assumed to have a growth rate of 1.0%, which is more in line with population growth, and not influenced by long distance state traffic on the Pacific Highway. Growth on Hogbin Dr from the 2008 and 2016 counts is 0.6%.

A 1% growth rate in the local street network equates to 22% traffic increase over 20 years. Traffic volumes from 2008 counts have been brought forward to 2016 numbers by imposition of the assumed 1% growth rate aslo, in order to define the base loading.

4.3.3 Distribution of additional traffic generation to the road network

Traffic generated by the development will use York Street to connect to the public road network. Traffic using York Street can turn north to Arthur Street or south to Park Beach Road which will distribute traffic into the wider network. Up to 66% of York St base traffic is assigned to each intersection

Traffic to and from the development can head north or south on York Street. The north direction to Arthur Street is expected to be preferred by most drivers, as Arthur Street provides the easiest and quickest connection to Pacific Hwy and Hogbin Drive, thus providing access to the greater road network. Hence York Street-Arthur Street intersection model is tested for up to 66% of peak hourly flow, represented by up to 80vph additional traffic. The York Street-Park Beach Road intersection, with 'stop' control, is tested for 50% of peak hour ttraffic, represented by 60 vph additional traffic through the intersection.

4.4 Traffic Modelling

To quantify the impact of the development on the surrounding road network, computer traffic modelling at York St – Arthur St intersection and Park Beach Rd – York St intersection was undertaken using the computer program SIDRA (version 6.1). The following scenarios were modelled:

2016. The existing pre-development peak hour case.

2016. The post-development peak hour case (when the site is fully constructed and operational).

2036 has been requested by Council as a planning horizon for traffic growth. The following traffic cases are investigated;

- 2036 predicted traffic with no development, representing 22% growth in network traffic (1% annual growth)
- 2036 case with the addition of the development traffic
- 2036 case with the addition of development traffic and Park Beach Plaza approved development traffic under development consent 574/11. It could be argued that the Plaza additional traffic is a part of the general growth of the network, however both cases are tested for sensitivity.

4.4.1 Traffic Loading

4.4.1.1 Existing Traffic Loading

The recorded AADT data shown in section 4.2.5 was used to model the intersections of interest in SIDRA.

Traffic volume data was available from Council or the RMS for the Pacific Highway, Hogbin Dr, Arthur St and Park Beach Rd, but not for York St or San Francisco Ave. As such, further investigation was necessary to calculate existing traffic loadings for the two roads.

York St existing traffic was calculated by desktop survey of the developments serviced by the local road, and then using RMSGTTGD rates to determine existing loads. The amended proposal does not rely upon traffic in San Francisco Ave.

The following table summarises the manner in which 2016 AADT data was derived, and the peak hour flow for each road calculated. Note that the peak hour traffic of each road was assumed to be 15% of the AADT volume.

Table 4.2 Existing Traffic Loadings

Existing Traffic Loading (2016 base case)						
Road	**Measured AADT**	**Year of Measurement**	**Growth Rate**	**Years of Growth**	**Pre-development AADT (2016)**	**Peak Hour Loading (2016)**
	veh/day		%		veh/day	veh/hr
Arthur St	6,200	2008	1.0%	8	6700	1008
York St	1,223	RMSGTTGD	1.0%	-	1223	252
Park Beach Rd	6,100	2008	1.0%	8	6600	967

4.4.1.2 **Post-Development Traffic Loading**

The post-development traffic loading was taken to be the amalgamation of the background traffic and the traffic generated by the development. In the 2016 post-development case the background traffic was considered to be the pre-development traffic levels shown in the table above. The major retail expansion approved for Park Beach Plaza has not occurred as yet thus that traffic has not been generated.

4.4.1.3 **Peak Hour Traffic Loading & Distribution**

The AADT loadings for each case where used to calculate peak hour traffic for each intersection, and local knowledge, anecdotal evidence, as well as brief observations of the intersections of interest, the traffic volumes were distributed amongst the various possible traffic movements.

The following assumptions were used to determine the distribution of the traffic loading at each intersection:

- Arthur St – 50% of traffic counted is heading east, 50% is heading west
- Development traffic assigned to York St-Arthur St intersection is assumed to be 60% to or from Pacific Highway, 40% to or from Hogbin Dr. This has been assumed due to the fact that more developed areas are easily accessible from the Pacific Highway than from Hogbin Dr.
- Up to 66% of the development traffic is assumed at each of the York St-Arthur St intersection and up to 50% of the traffic for the York St-Park Beach Rd intersection, in order to validate capacity of intersections.

Table 4.4 summarises the results of the traffic distribution calculations used for modelling the intersections. Movement definitions may be found in figure 4.4.

The York Street access driveway has been checked as an intersection, for 60% of traffic to and from Hogbin Drive and 40% of traffic to and from Park Beach Road.

Table 4.4 Peak Hour Traffic Loadings – Local Road Intersections

Peak Hour Traffic Loadings (veh/hr)					
York St - Arthur St					
	2016 Pre-dev	**2016 post dev**	**2036**	**2036 post dev**	**2036 post dev + Plaza**
7	465	477	567	567	612
8	39	63	48	72	72
9	478	478	583	583	638
10	26	42	33	48	48
11	59	83	72	96	96
12	39	55	48	64	64
Total	1,106	1,198	1351	1430	1530
Park Beach Rd - York St					
	2016 Pre-dev	**2016 post dev**	**2036**	**2036 post dev**	
13	444	444	542	542	
14	39	57	48	66	
15	12	12	15	15	
16	4	4	5	5	
17	39	51	48	60	
18	59	77	72	90	
19	424	424	517	517	
20	12	12	15	15	
21	26	38	32	44	
22	4	4	5	5	
23	12	12	15	15	
24	12	12	15	15	
Total	1,087	1,147	1,329	1389	

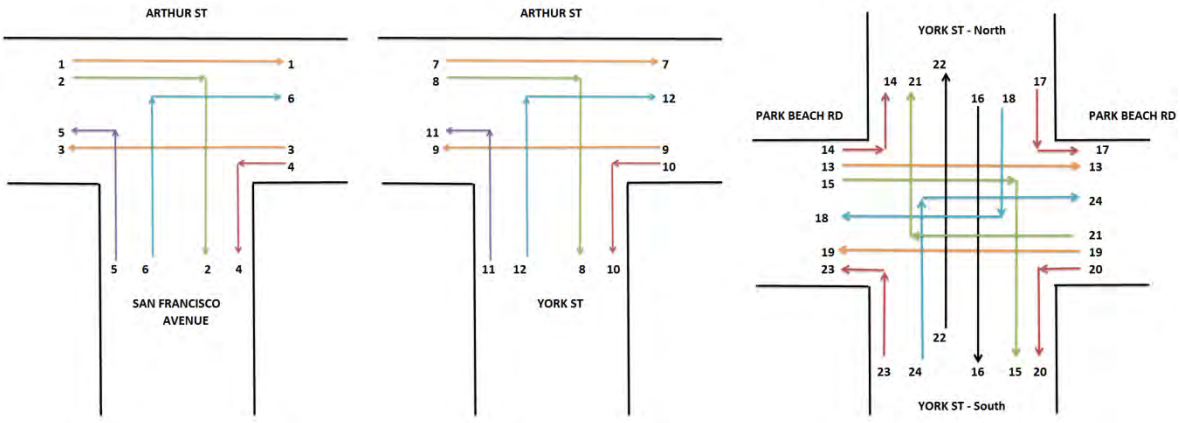


Figure 4.4 Movement Identification Summary – Local Road Intersections (note: the San Francisco Ave intersection is not further examined in this amended report)

Table 4.5 Peak Hour Traffic Loadings – Access Driveways

Peak Hour Traffic Loadings (veh/hr)		
Access - York St		
year	**2016**	**2036**
G	126	156
H	40	40
I	126	156
J	20	20
K	40	40
L	20	20
Total	372	482

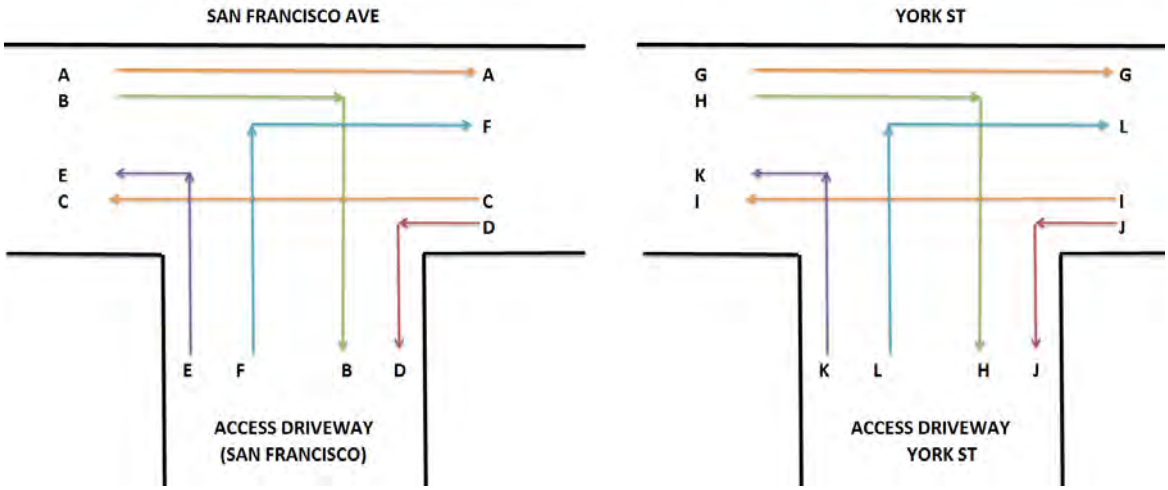


Figure 4.5 Movement Identification Summary – Access Driveways

4.4.2 **Model Results**

The performance of the intersections of interest and the access driveways was modelled for peak hour traffic using the computer program SIDRA (ver 6.1).

Table 4.6 summarises the results of the modelling. York Street access driveway has adequate performance post development and in the 20 year planning horizon with a 22% increase in network traffic.

Table 4.6 Peak Hour Traffic Loadings – Access Driveways

Mov. ID	Level of Service (LOS)			Average Delay		
York St - Arthur St						
	Pre dev. 2016	**Post Dev. 2016**	**2036 no PBP/with PBP**	**Pre dev 2016**	**Post Dev. 2016**	**2036 natural growth/ natural growth+dev + no PBP/ natural growth+dev+ PBP**
7	A	A	A/A/A	0.4	0.7	0.7/1.2/1.4
8	A	A	A/A/A	8.4	8.7	10.0/10.3/11.3
9	A	A	A/A/A	0	0	0/0/0
10	A	A	A/A/A	5.6	5.6	5.6/5.6/5.6
11	A	A	A/A/A	7.6	7.7	8.7/9.5/10.7
12	A	A	**B/B/B**	12.7	13.6	17.3/19.3/22.8
Park Beach Rd - York St						
	Pre dev. 2016	**Post Dev. 2016**	**2036 no PBP/with PBP**	**Pre dev 2016**	**Post Dev. 2016**	**2036 natural growth/ natural growth+dev**
13	A	A	A/A	0.1	0.1	0.2/0.2
14	A	A	A/A	6.2	6.1	6.7/6.4
15	A	A	A/A	7.8	7.9	8.9/9.0
16	A	A	**B/B**	11.7	12.9	17.7/20.9
17	A	A	A/A	7.6	8.2	10.0/12.1
18	B	B	B/B	15.2	16.5	22.5/26.1
19	A	A	A/A	0.3	0.4	0.5/0.8
20	A	A	A/A	7.3	7.6	8.4/9.0
21	A	A	A/A	7.7	7.9	9.1/9.4
22	A	A	**B/B**	11.1	11.6	15.0/16.0
23	A	A	A/A	7.2	7.2	7.7/7.7
24	A	**B**	**B/B**	14.2	14.7	19.1/20.0
York St Access						
G	-	A	A	-		
H	-	A	A	-		
I	-	A	A	-		
J	-	A	A	-		
K	-	A	A	-		
L	-	A	A	-		

The level of service (LOS) is a subjective measure of movement performance and is based on average wait times. LOS A to B is considered good, with minimal delay to traffic making the

movement. LOS C is acceptable. LOS D is still acceptable, but poor. LOS E is very poor and LOS F is considered not acceptable.

The interpretation of the SIDRA modelling results presented are further discussed below.

4.5 Impact of additional traffic on public road network

The additional traffic generated by the development will impose additional load on the public road network. This section considers the impact of the additional traffic.

4.5.1 Intersection Performance

4.5.1.1 York St-Arthur St intersection

This is a tee intersection with York Street under 'Give Way' control. The results of the intersection are summarised herein;

- 2016 pre-development has all legs of the intersection at LOS 'A'
- 2016 post development has all legs of the intersection at LOS 'A'
- 2036 1% annual network growth and no development sees the right turn from York St into Arthur St change to LOS 'B'
- 2036 with 1% annual network growth plus the development traffic sees the right turn from York St into Arthur St change to LOS 'B'.
- 2036 with the addition of Park Beach Plaza expansion traffic sees no change in LOS from the other two models for 2036

From this it is concluded that the development has no adverse impact on the LOS of the intersection, and natural growth in traffic over a 20 year planning horizon will degenerate the right turn movement out of York Street performance to LOS 'B', whilst the addition of the development traffic does not change the LOS 'B' result. Whether the traffic generated by Park Beach Plaza expansion is considered part of the 1% annual growth or not has been tested, and the results are indicating no change in the LOS at that planning horizon at the York St-Arthur St intersection (which is modelled with 66% of development traffic). The intersection is not sensitive to the development and to Park Beach Plaza traffic in the 2036 planning horizon.

4.5.1.2 York St - Park Beach Rd intersection

This is a cross intersection with York Street under 'Stop' control. The results of the intersection are summarised herein;

- 2016 pre-development has all legs of the intersection at LOS 'A'
- 2016 post development has all legs of the intersection at LOS 'A' other than the right turn from south leg of York St into Park Beach Rd changing to LOS ,B, with an increase in the average delay 0.6 sec
- 2036 1% annual network growth and no development sees three movements degenerate from LOS 'A' to LOS 'B'
- 2036 with 1% annual network growth plus the development traffic sees the same three movements degenerate from LOS 'A' to LOS 'B' ie no change from where the network will be due to natural growth. The majority of Plaza traffic from the Park Beach Road entry is derived from Pacific Hwy, so the relatively small volume from eastern parts of Park Beach are considered part of the natural growth in traffic.

From this it is concluded that the development has a minor adverse impact on the LOS of the intersection. Natural growth in traffic over a 20 year planning horizon will degenerate the

intersection performance to LOS 'B', whilst the addition of the development traffic does not change the LOS 'B' result in the 20 tear planning horizon. No works are warranted at the intersection.

Further modelling data and SIDRA results for the intersections modelled can be found in section 4.12 of this SEE.

4.5.2 **Arthur Street**

A conservative allocation of 2/3 of the traffic generation by the proposed devlopment, being an additional daily traffic of approximately 420 vpd or 80 peak hour trips on Arthur St is expected to increase the AADT by approximately 6.8%. A daily flow in the order of 6,900 vpd is within the roadway capacity, and therefore will not be an issue for this development.

4.5.3 **York Street and San Francisco Avenue (north leg)**

A count of dwellings in the area serviced by York Street and application of the trip generation rates from RMSGTTGD indicates an existing traffic load of 1223 trips AADT and 252 peak hour on York Street. An additional load of 636 AADT and 121 peak hour trips is within the environmental capacity of the road of 900 vehicles per hour each way on this 2 lane road.

No additional traffic is generated on San Francisico Ave by the proposed aged care development, as the originally proposed site access is now proposed to be removed.

4.5.4 **Hogbin Drive**

A conservative allocation of 2/3 of the traffic generation by the proposed development, being an additional daily traffic of or approximately 420 vpd or 80 peak hour trips on Hogbin Drive from Arthur St and Park Beach Road is expected to increase the AADT by approximately 3.08%. A daily flow in the order of 14,100 vpd is within the roadway capacity, and therefore will not be an issue for this development.

4.5.5 **Park Beach Road**

Allocation of 50% of the traffic generation by the proposed development, being an additional daily traffic of or approximately 318 vpd or 60 peak hour trips on Park Beach Road is expected to increase the AADT by approximately 4.8%. A daily flow in the order of 6900 vpd is within the roadway capacity, and therefore will not be an issue for this development.

4.5.6 **Conclusion & Recommendations**

The public road network has sufficient capacity to cater for the traffic generated by the proposed development.

4.6 Internal road network

As part of the proposed development an internal road network would be constructed to distribute traffic to parking areas and the various buildings of the developed site.

The proposed geometry of the internal roads responds to the building layout and the functional requirements of the road.

The proposed internal road network for the development includes:

- Two way sealed roads of minimum 6.5m width, refer architectural drawings.
- A site access at York St via a Council crossing
- Turning arrangements at the end of cul-de-sacs suitable for garbage collection vehicles
- Driveways off internal roads to dwellings and car parking
- Carparking Areas, open air and in buildings
- Waste collection and loading areas with adequate turning arrangements
- Shared zone to central road near swimming pool suitably marked signposted and speed controlled
- General speed control limit of 15 km/hr suitably signposted

4.6.1 Loading dock and service bays

A loading dock for service vehicles up to MRV size is proposed to service the new buildings. The loading bay is to be situated adjacent to the 'back of house' area of the proposed RCF, along with the waste collection area.
The geometry of these areas has been designed to allow the largest vehicle expected (a local garbage truck, as is discussed in section 4.8) to ingress and egress with only one reversing movement.
This was achieved by using turning templates to design the layout of the proposed service areas and internal roads.

Manoeuvring diagrams for loading dock are given in this repohe architectural drawings to demonstrate adequacy of the internal road system for the traffic.

4.7 Internal car parking arrangement

As part of the development, suitable car parking will be provided in accordance with SEPP (Seniors Living) plus some additional visitor parking provision on site.

The proposed car parking would include:

- Communal car parking for ILU apartments
- Private car parking at the garaged for each ILU townhouse
- Community bus parking
- A dedicated ambulance space
- RCF visitor and staff parking in open marked carparks
- Additional visitor parking in marked parking areas

Further details on the car parking requirements and provisions for the proposed development are discussed below.

The development does not rely upon kerbside parking at public streets in order to meet the requirements of SEPP (Seniors Living). The kerbside parking length along the land's street frontages is 340m and will provide capacity for peak demand such as Christmas Day and Mothers Day visitation to the development.

4.7.1 **Relevant standards**

The proposal has been designed to meet the standards imposed by;

- SEPP (Seniors Living) for parking capacity
- Coffs Harbour City Council DCP 2015
- AS2890 Parking Code for parking characteristics.

4.7.2 **Parking demand**

Parking demand could be expected to include:

- parking for residents in 183 self care dwellings
- parking for Residential Care Facility as prescribed in SEPP (Seniors Living) for staff and visitors to the RCF
- ambulance parking at RCF
- visitors to self care dwellings (not prescribed in SEPP hence not required, however some provision has been made)

The following table summarises the parking demand for the development

Form of housing	**SEPP reference**	**Car parking requirement**
Residential care facility (residents and visitors)	Chapter 3 Part 7 Division 2 clause 48	1 space per 10 beds 1 space per 2 employees 1 ambulance parking space
Self contained dwellings	Chapter 3 Part 7 Division 4 clause 50	0.5 space for each bedroom

Item	**Car parking requirement**	**Car parking provision**
Residential care facility (120 beds, 46 employees assumed)	1 space per 10 beds	12 spaces
	1 space per 2 employees	23 spaces assumed
	Ambulance	1 dedicated space
Self contained dwellings (318 bedrooms assumed)	0.5 space per bedroom	159 spaces
Visitors to 183 self contained dwellings.	Not required under SEPP	11 marked parking spaces plus parking in front of garages at 21 townhouses
2-bed Townhouses x 21 off	0.5 space per bedroom	21 townhouse parking spaces in the form of a garage at each townhouse.
Community Bus	1 space	1 space provided
Loading bay	1 space	1 space provided
Total		**229 total comprising marked parking spaces + ambulance space + garage spaces** plus **21 informal parking for visitors**

the car parking calculation and provision is tabled below;

The provision of ancillary uses in the development is considered to be ancillary and not a traffic or parking generator in its own right. This view is a consequence that ancillary development is there for the support of the resident aged community. Looking at various ancillary uses in turn;

- the cafe is small, contained within the RCF reception area and is a convenience for the daily needs of staff, the resident aged community and their visitors. As such the cafe does not trade to the general public nor is in a recognisable position to attract passing trade. Hence there is nil additional traffic generation or parking demand as the cafe is not a destination
- the retail space is very small and is a gifts service basically for visitors to the RCF residents, for the purchase of flowers, sweets and the like. It does not have sufficient scale or trade catchment to be a sustainable business in its own right, nor to meet the
- daily needs of the resident community, and is more likely to be a volunteer arrangement staffed by residents
- the hair dressers room will again be restricted to the resident community needs and will likely be staffed on a part time basis by a visiting hairdresser, (anticipated to be a half day several days per week) who can park in the RCF allocated parking or in a visitors space in the development
- the doctors consulting room will again be a visiting medical officer on a part time basis or on a scheduled consultation basis as required, and the doctor can use the allocated RCF parking or a visitors parking space.
- The business unit will be for the use of residents and will likely contain some library facility plus supporting business equipment such as a photocopier, printer, fax, computer etc to allow residents to engage in some small degree of part time work activity, and this space will not contain permanent staff

Other modes of transport requiring parking include provision for;

- There is motorcycle parking provided in the parking area for the independent living units. Motor cycle parking is not required under SEPP (Seniors Housing).

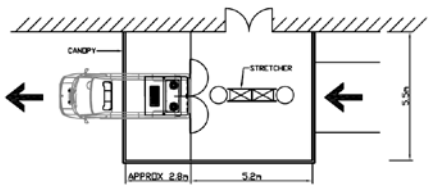
- Bicycle parking is provided in the parking area for the independent living units.

4.7.3 **Carpark Assessment to AS2890.1 Off Street Parking Code**

An exhaustive analysis of AS2890 would be part of a detailed design proposal for the site. Major elements of AS2890.1 have been assessed and this section demonstrates general compliance of the proposal with AS2890.1. Table 4.7.2. provides the assessment of compliance

Table 4.7.2 Assessment of compliance with AS2890.1 (2004)

Clause	Design issue	Proposed solution
1.4	Classification	The proposal is classified as 1A, which is suitable for residential domestic and employee parking. Accessible parking will be class 4.
2.3.2	Parking angle	90 degree parking is the most efficient use of area and is the basis of this proposal, with limited use of parallel parking
2.3.3	Parking aisle length	parking aisle lengths do not exceed 100m limits,
2.4	Parking module	AS2890 requires the parking spaces to be; Class 1A - 2.4m wide x 5.4m long (mostly provided as 2.6m wide for increased convenience of residents) class 4 - 2.4m wide x 5.4m long adjacent to a 2.4m wide shared zone, (which permits spaces to be 3.8m wide)
2.4.3	Parking aisles	The minimum aisle width in AS2890 is 5.8m. The proposed aisle width is 6.5m
2.4.5	Physical controls	Kerbs or wheel stops provide for control of parking, consistent with provision of accessible paths of travel
2.4.6.1	Max gradients	Maximum gradients in parking spaces are 4%, which is within limits. Generally grades will be in the order of 1-2%
2.4.6.2	Min gradients	Minimum gradients for concrete parking decks should be 1% and for asphalt areas 2%. .
2.4.7	Motorcycles	motorcycle may park in allocated spaces for the appropriate residence
2.5.2(a)	Straight driveways	Straight driveway within the parking area is proposed, whilst lane widths will

		exceed minimum standards in order to provide more comfortable access for users. Curved roadways should be not less than 6.5m wide, widening to 7.0m recommended for curves of radius less than R20m.
2.5.3	Circulation roadways and driveway grades	Circulation road grades will generally be graded less than 3%.
3.1.2	Category of access driveway	A class 1A parking facility requires a category 2 access driveway to a local road, for 100-300 parking spaces
3.2.1	Access driveway width	The access driveways for category 2 comprises an a combined entry and exit driveway of 6-9m width. It is recommended to have a 7.5m driveway width that will also service garbage collection vehicles.
3.2.3(b)	Access driveway locations	Category 2 driveways should not be closer to an intersection than 6m, and the proposed locations are at least 30m from an intersection zones in AS2890.1 Fig 3.1 hence complies. The York Street access is not near any other driveway hence there are no conflicts. The San Francisco Ave access is on the public road access to Park Beach Plaza. Both site access points have been modelled using SIDRA and the model predicted satisfactory performance.
3.2.4	Sight distances at driveway exit	York Street driveway exits provide sight distance >120m for traffic exiting the site hence well exceed minimum 69 metre sight distance standard for 50 km/hr roads.
3.4	Queuing areas	The internal road system has adequate queue capacity within the site The peak hourly traffic flow is 121 vph, which can be assumed to be spread across inflow and outflow trips ie the flow is not tidal or casual flow. Accordingly, for more than 100 cars parked in the development, a flow of up to 67% of 121 vph might be a conservative inflow ie 80 vph or an average of 1.333 vehicles per minute. A queue capacity of 4 vehicles to the controlling entry is sufficient for this flow. During normal visiting hours for the RCF visitors will not be impeded by a controlled entry, ie the gate will be open, and closed outside normal visiting hours so that resident security is enhanced at night. Consequently controlled access queues are not likely to form to any significant degree with due to smaller traffic flows outside normal visiting hours.
4.1	Pedestrian service	Defined pedestrian access is proposed, with pedestrian access from public roads via paths, and within the land, by footpaths and low traffic private roads
4.2	Bicycle parking	A bicycle parking rack is proposed near each of the ground level entries to buildings
4.3	Signposting	The carpark will be signposted for the benefit of users as to speed, direction to facilities, identification of parking aisles, access and egress for vehicles, and the like.
4.4	Pavement markings	Parking spaces will be linemarked, directional arrows will be painted on the pavement and lines provided for lane guidance, and no parking areas.
4.7	Lighting	Carparks will be lit to relevant standards
4.8	Landscaping	Areas that are not sealed will be landscaped
4.10	Special loading (Ambulance space at RCF porte cochere, not marked)	**ASNSW AMBULANCE ACCESS**  **FIRST PREFERENCE** Drive through "Porte Cochere" access to hospital ambulance entry.

4.7.4 **Parking layouts**

Parking is proposed to be provided at ground level.
Parking is mostly standard 90 degree parking, with very limited parallel parking.

Parking areas is separated from the internal circulation roads and have an identifiable access.

4.7.5 Accessible parking spaces

Accessible parking spaces are grouped close to entry points and are proposed at ground floor. Garages and parking spaces for self contained dwellings meet accessibility standards under SEPP (SENIORS LIVING), noting that the 3.8m parking space specification in the SEPP has been overtaken by the current parking space with shared zone for wheelchair loading to the current parking code.

4.7.6 Drop off and pick up parking

The proposal provides for a taxi and car drop off and pick up facility under the RCF porte cochere, so that residents are protected from the weather.

4.7.7 Service vehicles

This section considers service vehicle arrangements on the site.

4.7.7.1 Service vehicle characteristics

Service vehicles to the proposed development will include a spectrum of vehicle classifications from cars to heavy rigid vehicles (MRV). Articulated heavy vehicles are not expected to service the operational development.

Service vehicles will be required to provide linen, food and beverage, consumables associated with the RCF, office supplies, building services and landscaping maintenance, furniture replacement, meals and personal services, courier services, and a wide range of deliveries associated with the operation of a vibrant seniors community.

Most commonly the development will be serviced by small trucks, with the largest regular service vehicle likely to be garbage trucks.

A residents community bus is expected to be provided, with passenger load and unload at the RCF porte cochere and a dedicated parking space on the site for parking when not in use.

The following figure shows the various vehicle types which may access the development, as per AS 2890.2.

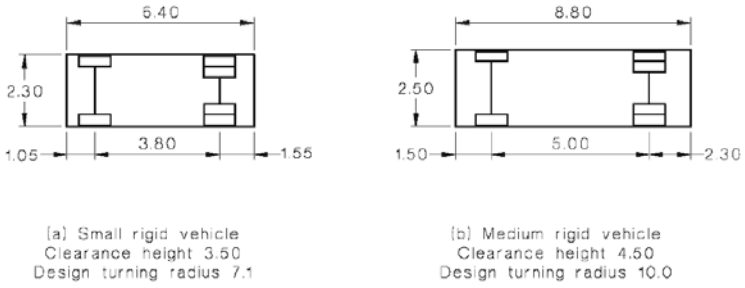


Fig 4.8.1 Design Service Vehicles as per AS 2890.2

4.7.8 **Service vehicle access to proposed development**

The layout of the internal road system has been designed to allow the relevant service vehicles to access all associated service areas.

Service vehicles up to MRV or single unit truck/bus size can access the site from eitherthe York St access. The loading dock could expect 3 truck and 5 smaller van/courier average daily deliveries, plus a daily garbage truck service.

The loading dock and driveway access has been configured so that a service vehicle can stand and manoeuvre clear of circulating traffic and so that there is space for a waiting vehicle.

Meals and personal services associated with 'ageing in place' services can park at individual townhouses or in visitor parking spaces for self care dwellings.

4.7.9 **Carpark Assessment to AS2890.2 Off Street commercial vehicle facilities**

An exhaustive analysis of AS2890 would be part of a detailed design proposal for the site. Critical elements of AS2890.2 have been assessed and this section demonstrates general compliance of the proposal with AS2890.2. Table 4.8.5 provides the assessment of compliance.

Table 4.8.5 Assessment of compliance with AS2890.2 (2004)

Clause	Design issue	Proposed solution
2.2	Vehicle classification	The proposal is likely to be serviced by SRV and MRV vehicles The proposal is classified as a minor service area, which is a service area regularly served by rigid vehicles. It would be unusual for more than 2 service vehicles at one time to be at the development.
3.2.1	Design principles	The service area access must suit the design vehicle, major (local) road and regular level of service.
3.2.3	Regular service – major roads	Combined entry and exit driveways of adequate width are proposed, and movements on and off the site are in a forward direction. Internal roads permit travel to dedicated service areas at the RCF. The garbage collection vehicles have dedicated areas at apartment building A/B and C/D for standing near to garbage rooms.
3.3.1	Circulation roadways width	The minimum road width is 3.5m for single lane and 6.8m for two lane, however the proposal seeks to provide a internal road width of 7 metres.
3.3.3	Circulation roadway maximum grades	The site is flat and proposed grades of less than 3% are well within the limits of 15.4%.

3.4.1	Access driveway general	The access driveways are from local roads. The site planning provides for adequate circulation of service vehicles
3.4.3	Access driveways layout design requirements	Road widths will meet or exceed minimum requirements. Driveway crossings should be provided to meet AS2890.2 Fig 3.1 or the commercial vehicle driveway standards of the Council.
3.4.4	Driveway grading	roads will be graded at less than 3% generally
3.4.5	Sight distance requirements	York Street sight distance is greater than 120m, hence is adequate for vehicles leaving the site on a 50km/hr speed road (requirement is 69m in AS2890.2 Fig 3.3)..
3.2.3	Major road	A service area unobstructed by other vehicles and on site activities is proposed for unloading of service vehicle, with access from an internal circulation road
4.2	Dimension of service bays	A dedicated service bay of adequate size for standing and unloading of a HRV trucks is proposed. The service bay at the new dock should be at least 8.8m x 3.5m and vertical clearance not less than 4.5m
4.3.1	Service area layout	The service area provides adequate space for manoeuvring in and out of the service bay. There is space for a waiting vehicle.

4.8 Public Transport

4.8.1 Buses

Bus routes along Arthur Street and along York Street currently run past the development site. A bus stop is situated along the York Street frontage of the subject land, and another bus stop is located on Arthur Street, just west of the San Francisco Ave intersection.

Photo 14 existing bus stop at York Street frontage

Image 16 bus stop timetable

The scale of the development is such that there is likely to be a community bus for the residents amenity, thus day trips for residents will not totally be reliant upon public transport.

However, internal and external concrete footpaths will connect the residential buildings of the development to the aforementioned bus stops, and thusly allow patrons to utilise the public transport system.

4.8.2 Taxis

The development may be serviced by taxis, by collection and delivery of passengers to either public roads around the site boundaries or to an internal location within the internal road network.

There is no need for a taxi rank in the development, but rather, taxi parking can occur at opportunistic locations such as the porte cochere or the internal service road.

4.9 Public road paths network

The land fronts public roads on 3 sides, however only a relatively small section of public road footpath has been constructed at the intersection of Arthur Street and San Francisco Avenue. Public road footpaths will need to be constructed to the balance of the land's road frontages. The concept plan for pedestrian paths is indicated on the site plan. The paths will provide all weather access to bus stop and services and facilities in the area.

A path is proposed to connect the development to Park Beach Plaza, since that shopping centre contains many of the services and facilities needed by residents. That path will need to cross the public road reserve near the Council sewer pump station, then connect to the path on Park Beach Plaza land at the road reserve boundary.

4.9.1 Internal pedestrian access

The proposed redevelopment will require appropriate pedestrian access within the site. The proposal features pedestrian access in the following ways;

- Pedestrian access via internal private roads, footpaths and the residents walking trail
- internal pathways within the development linking buildings and facilities.
- External grades are relatively gentle and do not exceed 1 in 20, and mostly are flatter than 1 in 30.
- A shared zone be implemented on the internal road in the vicinity of the swimming pool

The proposal uses landscaping, railings and barriers to create visual and physical barriers to undesirable pedestrian movements, such as to the swimming pool, the flood storage basin, the loading dock, electrical and gas utilities and dementia gardens.

4.10 Lighting of pathways

Lighting of the paths can be provided in accordance with relevant Australian Standards and with SEPP (Seniors Living) Schedule 3, to a minimum of 20 lux at the pathway surface. The lighting design will be implemented so to avoid spill beyond boundaries, glare nuisance to public road users, dwellings on the land and to surrounding properties. The light level will be capable of being dimmed if residents consider the lighting to be too bright.

Relevant standards for the design of lighting are;
AS1158.3.1 (Categories – P11a, P12) for external carparks (with compliance to AS 4282)
AS1680.2.1 (Table E1, item- 11)for covered carparks
AS2293.1 for exit and emergency lighting
AS1158.3.1 (Category –P7) for bus area

4.11 Conclusion and recommendations for traffic management

4.11.1 Conclusion

The proposed development is able to be implemented without adverse impact on the public road network. The work internal to the site accommodates pedestrian and vehicular access in a safe and efficient manner.

The proposal can be approved subject to the recommendations outlined in this report.

4.11.2 Recommendations

This traffic impact statement makes the following recommendations for the proposed development;

1. The works be approved in accordance with the Drawings and this report
2. concrete paths to Council standards be provided to the land frontages
3. concrete path connection is made to Park Beach Plaza
4. concrete path connection is made to the bus stop on York Street

4.12 SIDRA MODELLING DATA & RESULTS

MOVEMENT SUMMARY

Site: Park Beach - York - 2016 pre-development

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: York St - South											
23	L2	12	3.0	0.056	7.2	LOS A	0.2	1.3	0.57	0.76	49.7
22	T1	4	3.0	0.056	11.1	LOS A	0.2	1.3	0.57	0.76	49.9
24	R2	12	3.0	0.056	14.2	LOS A	0.2	1.3	0.57	0.76	43.2
Approach		28	3.0	0.056	10.7	LOS A	0.2	1.3	0.57	0.76	47.6
East: Park Beach Rd											
20	L2	12	3.0	0.253	7.3	LOS A	0.4	2.7	0.10	0.05	55.7
19	T1	424	3.0	0.253	0.3	LOS A	0.4	2.7	0.10	0.05	58.6
21	R2	26	3.0	0.253	7.7	LOS A	0.4	2.7	0.10	0.05	54.7
Approach		462	3.0	0.253	0.9	NA	0.4	2.7	0.10	0.05	58.3
North: York St - North											
17	L2	39	3.0	0.221	7.6	LOS A	0.8	5.5	0.64	0.83	33.7
16	T1	4	3.0	0.221	11.7	LOS A	0.8	5.5	0.64	0.83	48.9
18	R2	59	3.0	0.221	15.2	LOS B	0.8	5.5	0.64	0.83	48.3
Approach		102	3.0	0.221	12.1	LOS A	0.8	5.5	0.64	0.83	43.3
West: Park Beach Rd											
14	L2	39	3.0	0.264	6.2	LOS A	0.2	1.4	0.05	0.06	57.5
13	T1	444	3.0	0.264	0.1	LOS A	0.2	1.4	0.05	0.06	58.7
15	R2	12	3.0	0.264	7.8	LOS A	0.2	1.4	0.05	0.06	56.9
Approach		495	3.0	0.264	0.8	NA	0.2	1.4	0.05	0.06	58.5
All Vehicles		1087	3.0	0.264	2.1	NA	0.8	5.5	0.14	0.15	55.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DELAY (CONTROL)

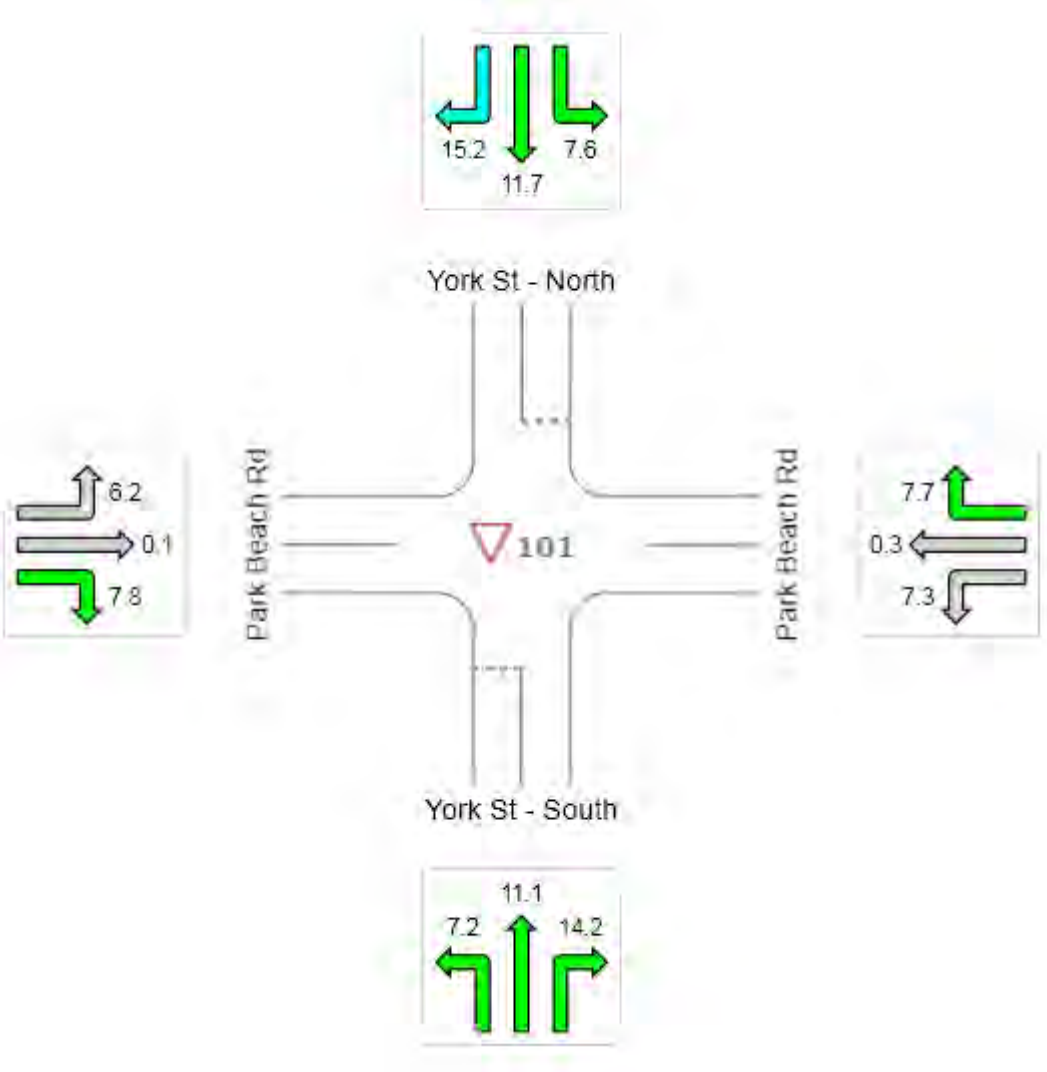
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: Park Beach - York - 2016 pre-development

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
	10.7	0.9	12.1	0.8	2.1
LOS	A	NA	A	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Park Beach - York 2016 post development

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: York St - South											
23	L2	12	3.0	0.059	7.2	LOS A	0.2	1.4	0.58	0.76	49.5
22	T1	4	3.0	0.059	11.7	LOS A	0.2	1.4	0.58	0.76	49.6
24	R2	12	3.0	0.059	14.8	LOS B	0.2	1.4	0.58	0.76	42.9
Approach		28	3.0	0.059	11.1	LOS A	0.2	1.4	0.58	0.76	47.3
East: Park Beach Rd											
20	L2	12	3.0	0.270	7.7	LOS A	0.6	4.3	0.16	0.07	55.1
19	T1	424	3.0	0.270	0.5	LOS A	0.6	4.3	0.16	0.07	57.9
21	R2	42	3.0	0.270	8.0	LOS A	0.6	4.3	0.16	0.07	54.1
Approach		478	3.0	0.270	1.3	NA	0.6	4.3	0.16	0.07	57.4
North: York St - North											
17	L2	54	3.0	0.317	8.4	LOS A	1.3	9.0	0.67	0.88	32.9
16	T1	4	3.0	0.317	13.3	LOS A	1.3	9.0	0.67	0.88	48.0
18	R2	83	3.0	0.317	16.9	LOS B	1.3	9.0	0.67	0.88	47.4
Approach		141	3.0	0.317	13.6	LOS A	1.3	9.0	0.67	0.88	42.5
West: Park Beach Rd											
14	L2	63	3.0	0.278	6.0	LOS A	0.2	1.4	0.05	0.08	57.3
13	T1	444	3.0	0.278	0.1	LOS A	0.2	1.4	0.05	0.08	58.3
15	R2	12	3.0	0.278	7.9	LOS A	0.2	1.4	0.05	0.08	56.7
Approach		519	3.0	0.278	1.0	NA	0.2	1.4	0.05	0.08	58.1
All Vehicles		1166	3.0	0.317	2.9	NA	1.3	9.0	0.18	0.19	54.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DELAY (CONTROL)

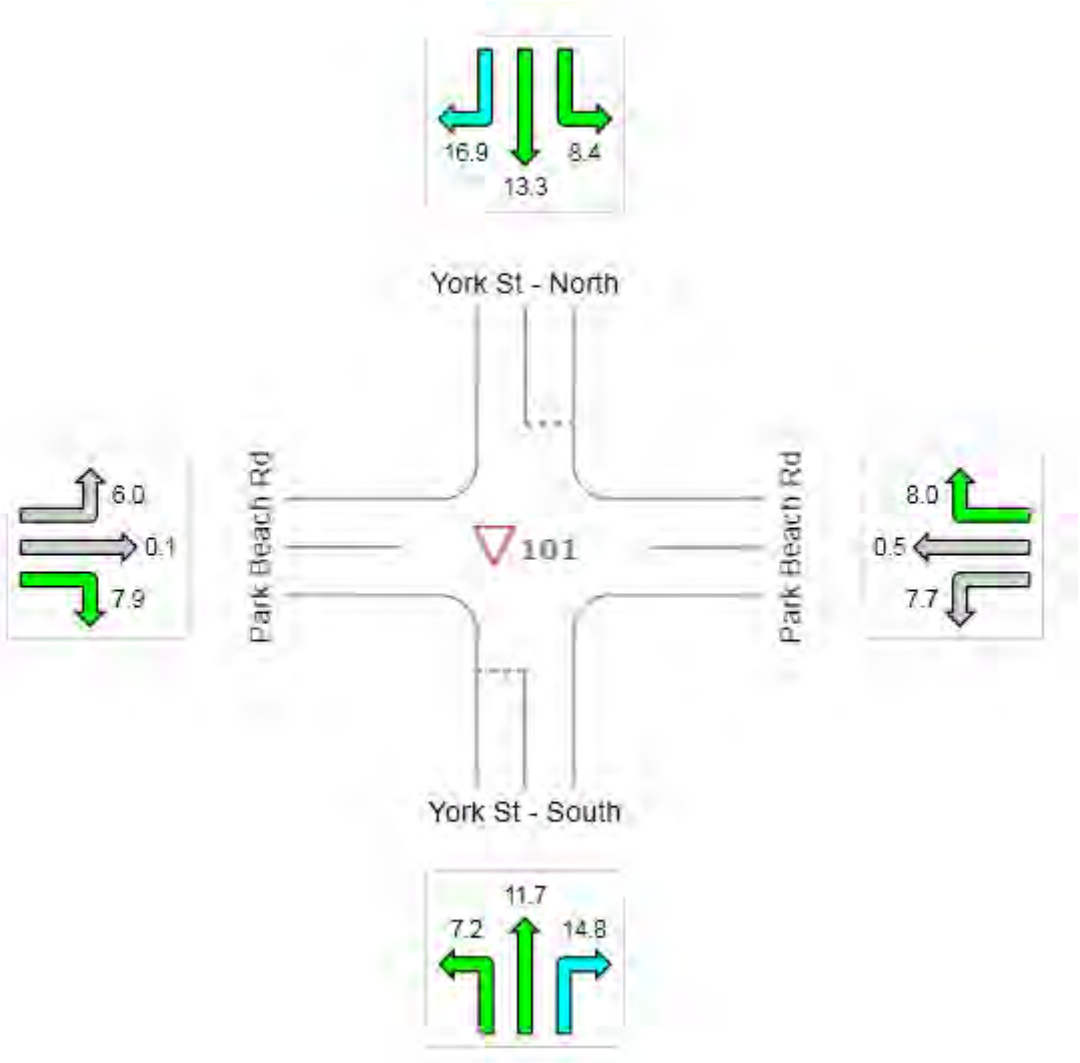
Average control delay per vehicle, or average pedestrian delay (seconds)

▽ Site: Park Beach - York 2016 post development

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
	11.1	1.3	13.6	1.0	2.9
LOS	A	NA	A	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Park Beach - York 2036 no dev

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: York St - South											
23	L2	15	3.0	0.096	7.7	LOS A	0.3	2.2	0.69	0.82	47.8
22	T1	5	3.0	0.096	15.0	LOS B	0.3	2.2	0.69	0.82	48.0
24	R2	15	3.0	0.096	19.1	LOS B	0.3	2.2	0.69	0.82	40.8
Approach		35	3.0	0.096	13.6	LOS A	0.3	2.2	0.69	0.82	45.5
East: Park Beach Rd											
20	L2	15	3.0	0.314	8.4	LOS A	0.6	4.6	0.13	0.05	55.3
19	T1	517	3.0	0.314	0.5	LOS A	0.6	4.6	0.13	0.05	58.1
21	R2	32	3.0	0.314	9.1	LOS A	0.6	4.6	0.13	0.05	54.3
Approach		564	3.0	0.314	1.2	NA	0.6	4.6	0.13	0.05	57.8
North: York St - North											
17	L2	48	3.0	0.370	10.0	LOS A	1.4	10.4	0.76	0.97	31.1
16	T1	5	3.0	0.370	17.7	LOS B	1.4	10.4	0.76	0.97	45.6
18	R2	72	3.0	0.370	22.5	LOS B	1.4	10.4	0.76	0.97	45.1
Approach		125	3.0	0.370	17.5	LOS B	1.4	10.4	0.76	0.97	40.3
West: Park Beach Rd											
14	L2	48	3.0	0.325	6.7	LOS A	0.3	2.4	0.06	0.06	57.4
13	T1	542	3.0	0.325	0.2	LOS A	0.3	2.4	0.06	0.06	58.5
15	R2	15	3.0	0.325	8.9	LOS A	0.3	2.4	0.06	0.06	56.8
Approach		605	3.0	0.325	0.9	NA	0.3	2.4	0.06	0.06	58.3
All Vehicles		1329	3.0	0.370	2.9	NA	1.4	10.4	0.17	0.16	54.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: DE GROOT AND BENSON PTY LTD | Processed: Friday, 7 July 2017 11:47:09 AM

DELAY (CONTROL)

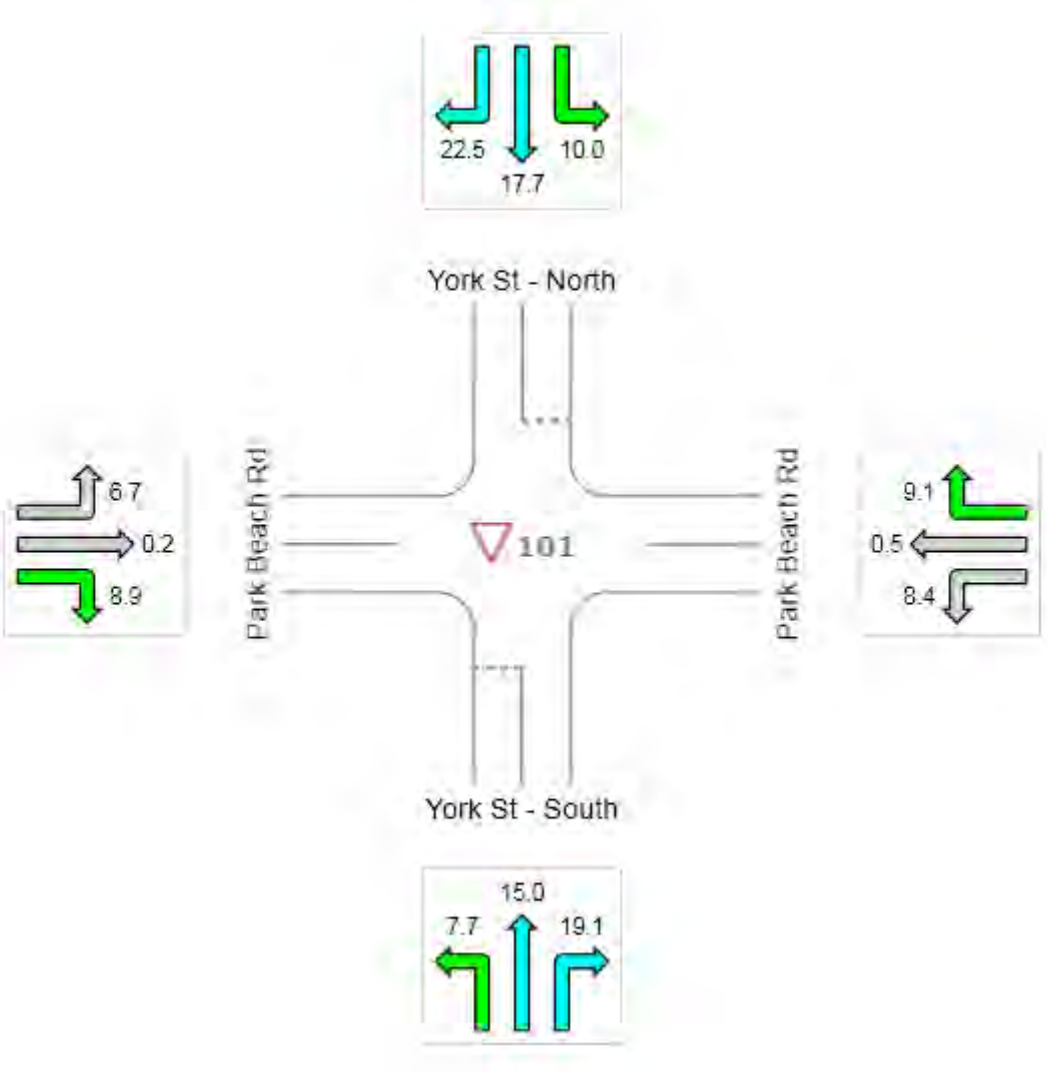
Average control delay per vehicle, or average pedestrian delay (seconds)

▽ Site: Park Beach - York 2036 no dev

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
	13.6	1.2	17.5	0.9	2.9
LOS	A	NA	B	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Park Beach - York 2036 post dev

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: York St - South											
23	L2	15	3.0	0.101	7.7	LOS A	0.3	2.3	0.70	0.83	47.5
22	T1	5	3.0	0.101	16.0	LOS B	0.3	2.3	0.70	0.83	47.6
24	R2	15	3.0	0.101	20.0	LOS B	0.3	2.3	0.70	0.83	40.4
Approach		35	3.0	0.101	14.2	LOS A	0.3	2.3	0.70	0.83	45.1
East: Park Beach Rd											
20	L2	15	3.0	0.333	9.0	LOS A	1.0	7.1	0.18	0.07	54.5
19	T1	517	3.0	0.333	0.8	LOS A	1.0	7.1	0.18	0.07	57.3
21	R2	48	3.0	0.333	9.4	LOS A	1.0	7.1	0.18	0.07	53.6
Approach		580	3.0	0.333	1.7	NA	1.0	7.1	0.18	0.07	56.9
North: York St - North											
17	L2	64	3.0	0.509	12.1	LOS A	2.3	16.2	0.80	1.04	29.8
16	T1	5	3.0	0.509	20.9	LOS B	2.3	16.2	0.80	1.04	44.0
18	R2	96	3.0	0.509	26.1	LOS B	2.3	16.2	0.80	1.04	43.5
Approach		165	3.0	0.509	20.5	LOS B	2.3	16.2	0.80	1.04	38.7
West: Park Beach Rd											
14	L2	72	3.0	0.338	6.4	LOS A	0.4	2.6	0.06	0.08	57.2
13	T1	542	3.0	0.338	0.2	LOS A	0.4	2.6	0.06	0.08	58.2
15	R2	15	3.0	0.338	9.0	LOS A	0.4	2.6	0.06	0.08	56.6
Approach		629	3.0	0.338	1.1	NA	0.4	2.6	0.06	0.08	57.9
All Vehicles		1409	3.0	0.509	3.9	NA	2.3	16.2	0.21	0.21	53.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DELAY (CONTROL)

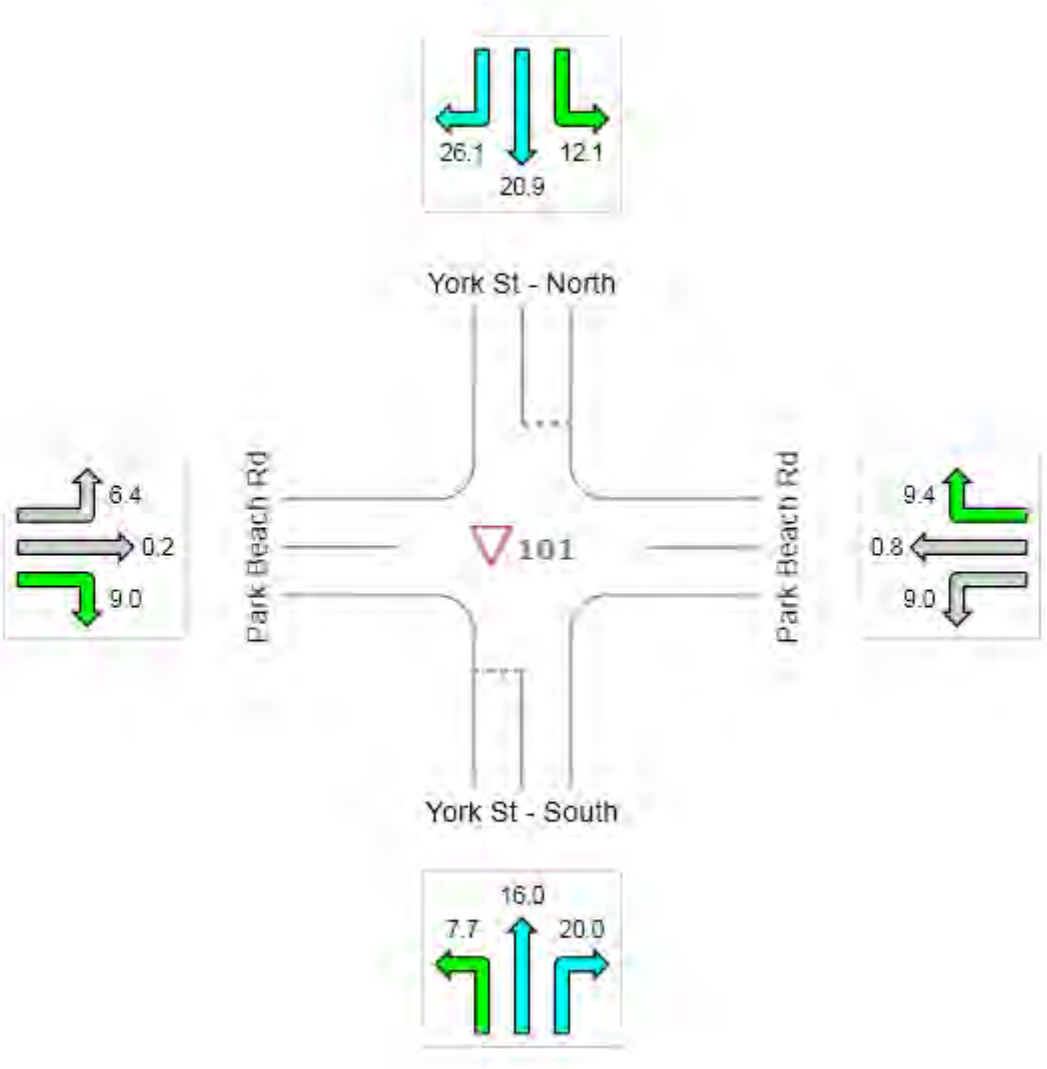
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: Park Beach - York 2036 post dev

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
	14.2	1.7	20.5	1.1	3.9
LOS	A	NA	B	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: York-Arthur -amend 2016 pre development

York St - Arthur St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: York St											
11	L2	59	3.0	0.152	7.6	LOS A	0.5	3.8	0.55	0.77	21.1
12	R2	39	3.0	0.152	12.7	LOS A	0.5	3.8	0.55	0.77	45.3
Approach		98	3.0	0.152	9.6	LOS A	0.5	3.8	0.55	0.77	32.3
East: Arthur St											
10	L2	26	3.0	0.264	5.6	LOS A	0.0	0.0	0.00	0.03	56.7
9	T1	478	3.0	0.264	0.0	LOS A	0.0	0.0	0.00	0.03	59.5
Approach		504	3.0	0.264	0.3	NA	0.0	0.0	0.00	0.03	59.3
West: Arthur St											
7	T1	465	3.0	0.282	0.4	LOS A	0.5	3.8	0.13	0.05	58.4
8	R2	39	3.0	0.282	8.4	LOS A	0.5	3.8	0.13	0.05	48.2
Approach		504	3.0	0.282	1.0	NA	0.5	3.8	0.13	0.05	58.0
All Vehicles		1106	3.0	0.282	1.5	NA	0.5	3.8	0.11	0.10	56.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DELAY (CONTROL)

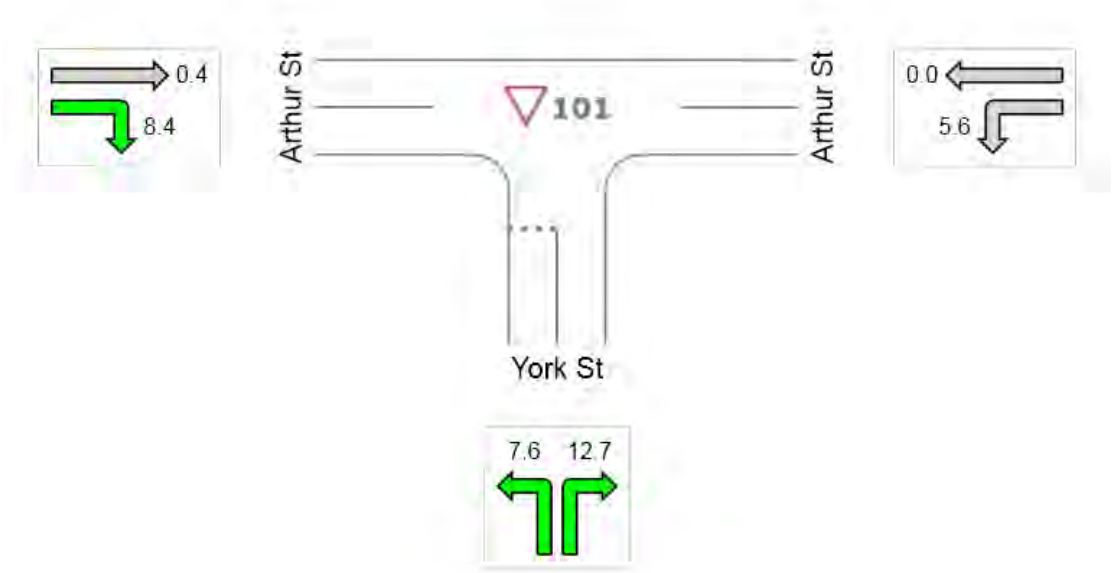
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: York-Arthur -amend 2016 pre development

York St - Arthur St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
	9.6	0.3	1.0	1.5
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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MOVEMENT SUMMARY

Site: York-Arthur -amend 2016 post development

York St - Arthur St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: York St											
11	L2	83	3.0	0.222	7.7	LOS A	0.8	5.7	0.57	0.79	20.9
12	R2	55	3.0	0.222	13.6	LOS A	0.8	5.7	0.57	0.79	44.9
Approach		138	3.0	0.222	10.1	LOS A	0.8	5.7	0.57	0.79	32.0
East: Arthur St											
10	L2	42	3.0	0.273	5.6	LOS A	0.0	0.0	0.00	0.05	56.5
9	T1	478	3.0	0.273	0.0	LOS A	0.0	0.0	0.00	0.05	59.2
Approach		520	3.0	0.273	0.5	NA	0.0	0.0	0.00	0.05	59.0
West: Arthur St											
7	T1	465	3.0	0.306	0.7	LOS A	0.9	6.5	0.20	0.08	57.4
8	R2	63	3.0	0.306	8.7	LOS A	0.9	6.5	0.20	0.08	46.5
Approach		528	3.0	0.306	1.7	NA	0.9	6.5	0.20	0.08	56.8
All Vehicles		1186	3.0	0.306	2.1	NA	0.9	6.5	0.16	0.15	54.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DELAY (CONTROL)

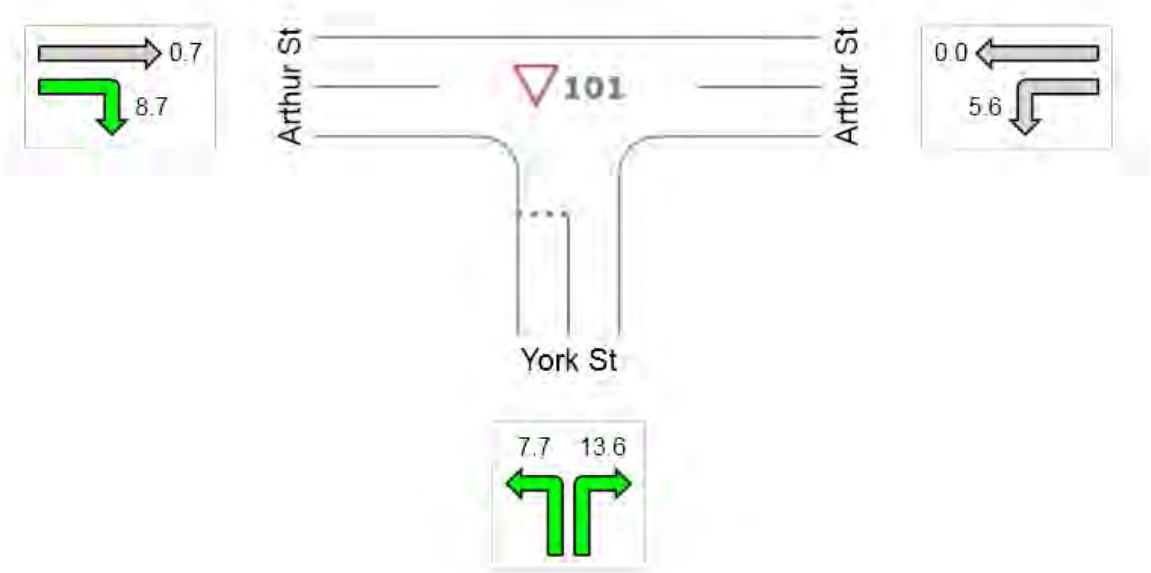
Average control delay per vehicle, or average pedestrian delay (seconds)

▽ Site: York-Arthur -amend 2016 post development

York St - Arthur St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
	10.1	0.5	1.7	2.1
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Organisation: DE GROOT AND BENSON PTY LTD | Processed: Thursday, 6 July 2017 5:12:22 PM
Project: S:\04\04257 Cnr Arthur York San Francisco Lot 2\Calcs\Civil\04257 - 2016 DA.sip6

MOVEMENT SUMMARY

Site: Park Beach - York 2036 no dev

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: York St - South											
23	L2	15	3.0	0.096	7.7	LOS A	0.3	2.2	0.69	0.82	47.8
22	T1	5	3.0	0.096	15.0	LOS B	0.3	2.2	0.69	0.82	48.0
24	R2	15	3.0	0.096	19.1	LOS B	0.3	2.2	0.69	0.82	40.8
Approach		35	3.0	0.096	13.6	LOS A	0.3	2.2	0.69	0.82	45.5
East: Park Beach Rd											
20	L2	15	3.0	0.314	8.4	LOS A	0.6	4.6	0.13	0.05	55.3
19	T1	517	3.0	0.314	0.5	LOS A	0.6	4.6	0.13	0.05	58.1
21	R2	32	3.0	0.314	9.1	LOS A	0.6	4.6	0.13	0.05	54.3
Approach		564	3.0	0.314	1.2	NA	0.6	4.6	0.13	0.05	57.8
North: York St - North											
17	L2	48	3.0	0.370	10.0	LOS A	1.4	10.4	0.76	0.97	31.1
16	T1	5	3.0	0.370	17.7	LOS B	1.4	10.4	0.76	0.97	45.6
18	R2	72	3.0	0.370	22.5	LOS B	1.4	10.4	0.76	0.97	45.1
Approach		125	3.0	0.370	17.5	LOS B	1.4	10.4	0.76	0.97	40.3
West: Park Beach Rd											
14	L2	48	3.0	0.325	6.7	LOS A	0.3	2.4	0.06	0.06	57.4
13	T1	542	3.0	0.325	0.2	LOS A	0.3	2.4	0.06	0.06	58.5
15	R2	15	3.0	0.325	8.9	LOS A	0.3	2.4	0.06	0.06	56.8
Approach		605	3.0	0.325	0.9	NA	0.3	2.4	0.06	0.06	58.3
All Vehicles		1329	3.0	0.370	2.9	NA	1.4	10.4	0.17	0.16	54.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DELAY (CONTROL)

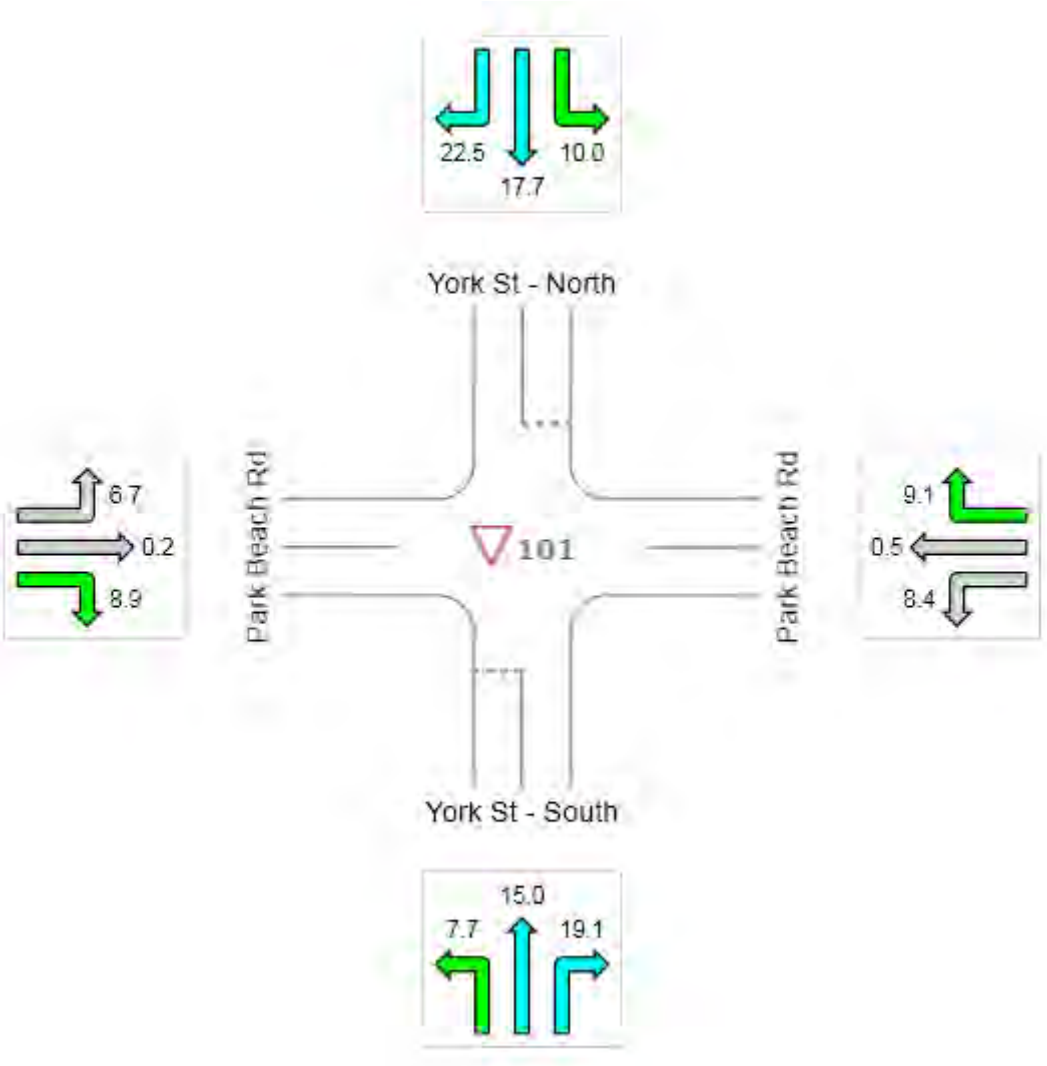
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: Park Beach - York 2036 no dev

Park Beach Rd / York St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
	13.6	1.2	17.5	0.9	2.9
LOS	A	NA	B	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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Project: S:\04\04257 Cnr Arthur York San Francisco Lot 2\Calcs\Civil\04257 - 2016 DA.sip6

MOVEMENT SUMMARY

Site: York-Arthur -amend 2036 post development (no plaza)

York St - Arthur St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: York St											
11	L2	96	3.0	0.339	9.5	LOS A	1.4	9.7	0.70	0.93	19.2
12	R2	64	3.0	0.339	19.3	LOS B	1.4	9.7	0.70	0.93	42.0
Approach		160	3.0	0.339	13.4	LOS A	1.4	9.7	0.70	0.93	29.7
East: Arthur St											
10	L2	48	3.0	0.331	5.6	LOS A	0.0	0.0	0.00	0.05	56.5
9	T1	583	3.0	0.331	0.0	LOS A	0.0	0.0	0.00	0.05	59.2
Approach		631	3.0	0.331	0.5	NA	0.0	0.0	0.00	0.05	59.0
West: Arthur St											
7	T1	567	3.0	0.381	1.2	LOS A	1.5	10.8	0.24	0.08	56.6
8	R2	72	3.0	0.381	10.3	LOS A	1.5	10.8	0.24	0.08	45.0
Approach		639	3.0	0.381	2.2	NA	1.5	10.8	0.24	0.08	56.0
All Vehicles		1430	3.0	0.381	2.7	NA	1.5	10.8	0.18	0.16	53.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DELAY (CONTROL)

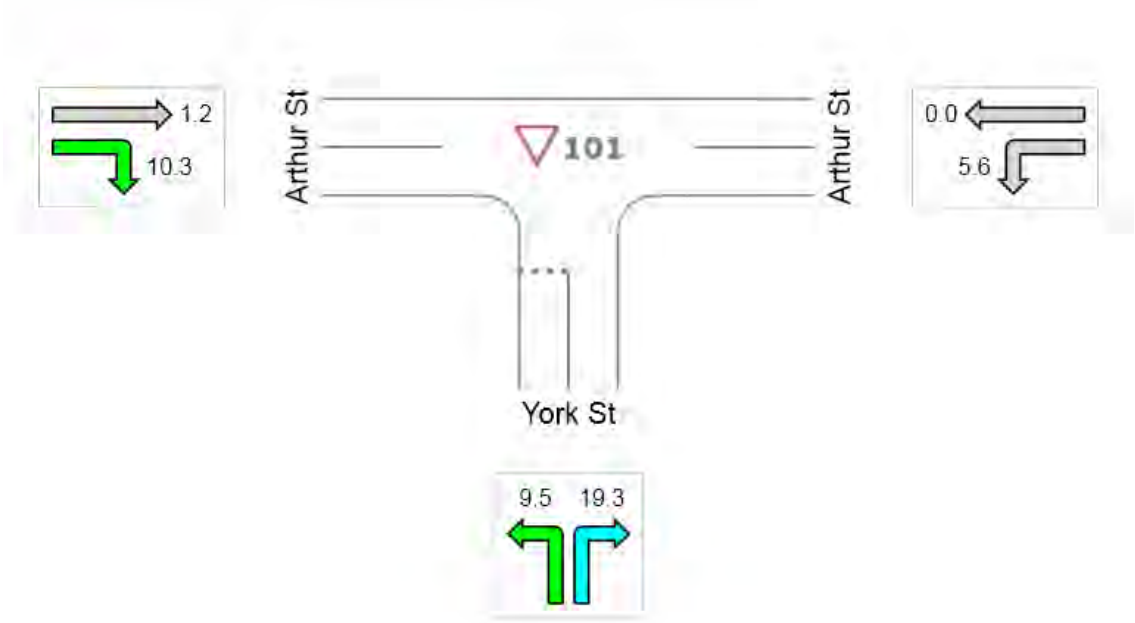
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: York-Arthur -amend 2036 post development (no plaza)

York St - Arthur St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
	13.4	0.5	2.2	2.7
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: York-Arthur -amend 2036 post development + Plaza

York St - Arthur St Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: York St											
11	L2	96	3.0	0.391	10.7	LOS A	1.6	11.3	0.75	0.97	18.3
12	R2	64	3.0	0.391	22.8	LOS B	1.6	11.3	0.75	0.97	40.5
Approach		160	3.0	0.391	15.5	LOS B	1.6	11.3	0.75	0.97	28.4
East: Arthur St											
10	L2	48	3.0	0.360	5.6	LOS A	0.0	0.0	0.00	0.04	56.5
9	T1	638	3.0	0.360	0.0	LOS A	0.0	0.0	0.00	0.04	59.3
Approach		686	3.0	0.360	0.4	NA	0.0	0.0	0.00	0.04	59.1
West: Arthur St											
7	T1	612	3.0	0.411	1.4	LOS A	1.8	12.6	0.25	0.08	56.2
8	R2	72	3.0	0.411	11.3	LOS A	1.8	12.6	0.25	0.08	44.4
Approach		684	3.0	0.411	2.5	NA	1.8	12.6	0.25	0.08	55.6
All Vehicles		1530	3.0	0.411	2.9	NA	1.8	12.6	0.19	0.15	53.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: S:\04\04257 Cnr Arthur York San Francisco Lot 2\Calcs\Civil\04257 - 2016 DA.sip6

DELAY (CONTROL)

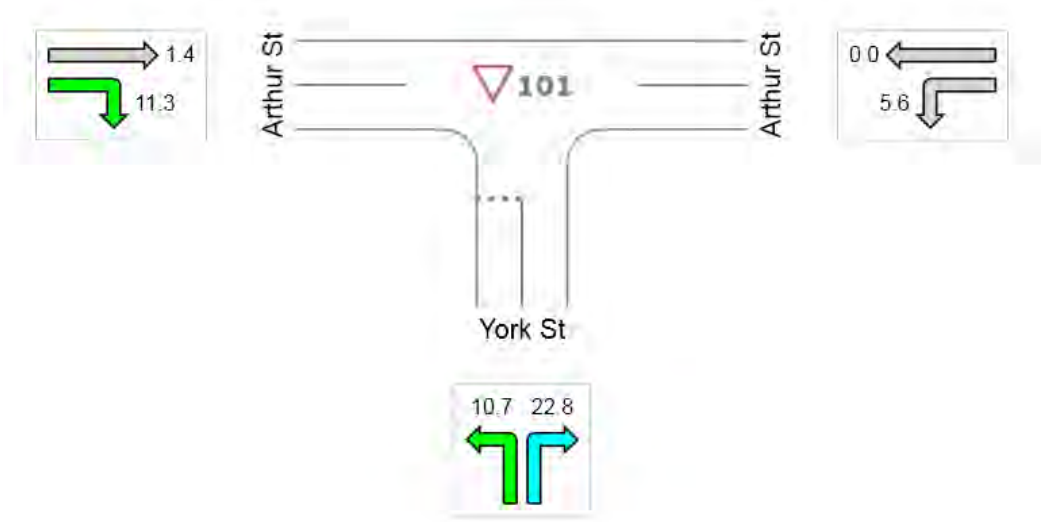
Average control delay per vehicle, or average pedestrian delay (seconds)

▽ Site: York-Arthur -amend 2036 post development + Plaza

York St - Arthur St Intersection
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
	15.5	0.4	2.5	2.9
LOS	B	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Access - York St - 2016 amended

York St Access Driveway
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD	Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Driveway (York)												
K		L2	40	3.0	0.052	0.4	LOS A	0.2	1.5	0.26	0.14	26.4
L		R2	20	3.0	0.052	1.9	LOS A	0.2	1.5	0.26	0.14	19.2
Approach			60	3.0	0.052	0.9	LOS A	0.2	1.5	0.26	0.14	25.3
East: York St												
J		L2	20	3.0	0.011	5.6	LOS A	0.0	0.0	0.00	0.58	32.2
I		T1	126	3.0	0.066	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach			146	3.0	0.066	0.8	NA	0.0	0.0	0.00	0.08	58.3
West: York St												
G		T1	126	3.0	0.099	0.2	LOS A	0.3	2.1	0.14	0.12	39.0
H		R2	40	3.0	0.099	4.2	LOS A	0.3	2.1	0.14	0.12	37.9
Approach			166	3.0	0.099	1.2	NA	0.3	2.1	0.14	0.12	38.8
All Vehicles			372	3.0	0.099	1.0	NA	0.3	2.1	0.10	0.11	41.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: DE GROOT AND BENSON PTY LTD | Processed: Friday, 14 July 2017 9:11:00 AM
Project: S:\04\04257 Cnr Arthur York San Francisco Lot 2\Calcs\Civil\04257 - 2016 DA.sip6

DELAY (CONTROL)

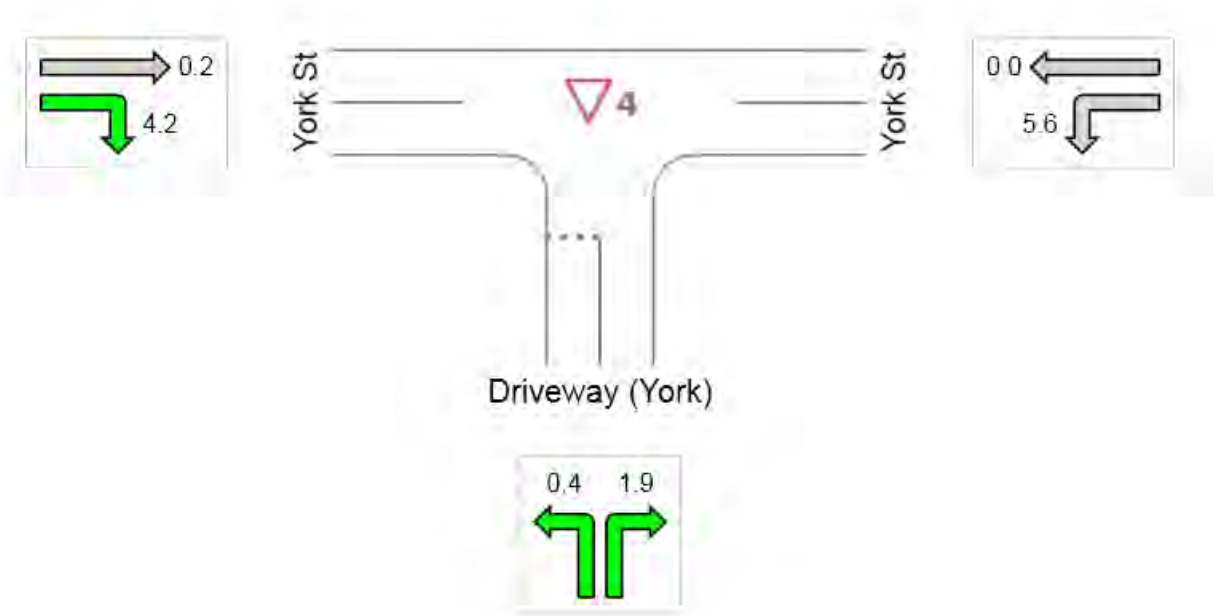
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: Access - York St - 2016 amended

York St Access Driveway
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
	0.9	0.8	1.2	1.0
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Access - York St - 2036 amended

York St Access Driveway
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Driveway (York)											
K	L2	40	3.0	0.055	0.5	LOS A	0.2	1.5	0.29	0.17	26.3
L	R2	20	3.0	0.055	2.3	LOS A	0.2	1.5	0.29	0.17	19.0
Approach		60	3.0	0.055	1.1	LOS A	0.2	1.5	0.29	0.17	25.2
East: York St											
J	L2	20	3.0	0.011	5.6	LOS A	0.0	0.0	0.00	0.58	32.2
I	T1	156	3.0	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		176	3.0	0.082	0.6	NA	0.0	0.0	0.00	0.07	58.6
West: York St											
G	T1	156	3.0	0.116	0.3	LOS A	0.3	2.3	0.14	0.11	39.1
H	R2	40	3.0	0.116	4.4	LOS A	0.3	2.3	0.14	0.11	38.0
Approach		196	3.0	0.116	1.1	NA	0.3	2.3	0.14	0.11	38.9
All Vehicles		432	3.0	0.116	0.9	NA	0.3	2.3	0.10	0.10	42.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: DE GROOT AND BENSON PTY LTD | Processed: Friday, 14 July 2017 9:12:12 AM

DELAY (CONTROL)

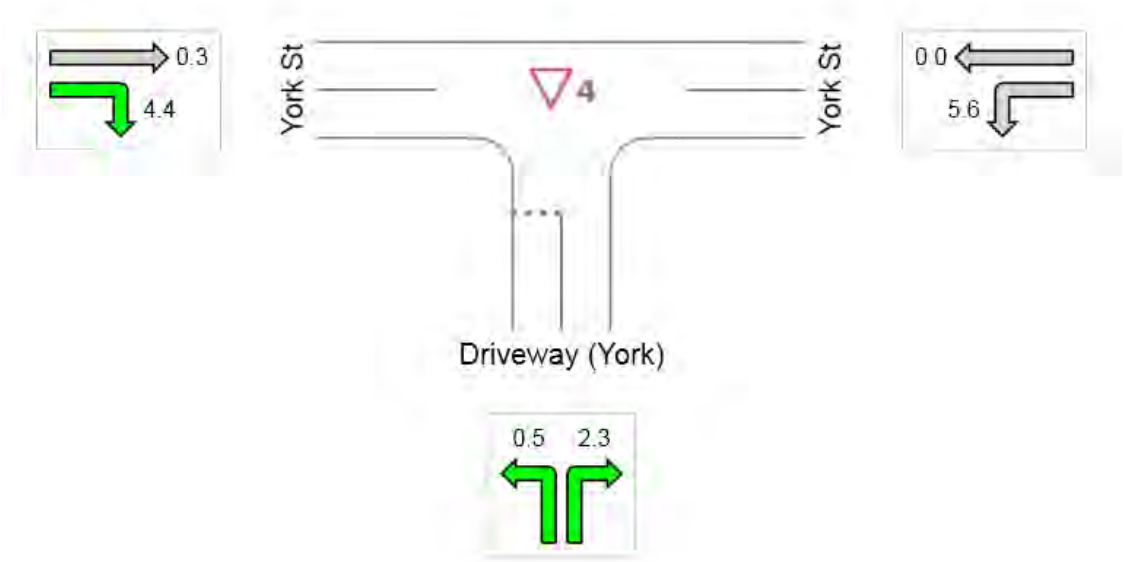
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: Access - York St - 2036 amended

York St Access Driveway
Giveway / Yield (Two-Way)

All Movement Classes

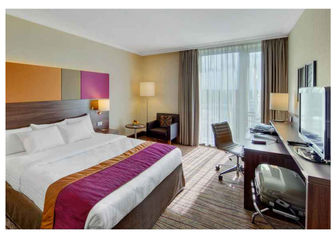
	South	East	West	Intersection
	1.1	0.6	1.1	0.9
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.



	PROPOSED RCF
	TOWNHOUSE - TYPE A
	TOWNHOUSE - TYPE B
	ILU BUILDINGS
	CARPARKING

DEVELOPMENT STATISTICS (RCF)	
SITE AREA	32,450 m²
GROUND FLOOR (Measure External Wall)	
- RCF	1,603 m²
- COMMUNITY CENTRE	832 m²
- CARPARK	980 m²
FIRST FLOOR (Measure External Wall)	
- RCF	2,611 m²
- COMMUNITY CENTRE	234 m²
SECOND FLOOR(Measure External Wall)	
- RCF	2,619 m²
THIRD FLOOR (Measure External Wall)	
- RCF	1,127 m²

RESIDENT ACCOMMODATION (RCF)			
	1 bed	1bed (large)	Total
GROUND FL.	12	4	16
FIRST FL.	36	8	44
SECOND FL.	36	8	44
THIRD FL.	16	0	16
TOTAL	100	20	120
TOTAL NUMBER OF RESIDENTS = 120			

INDEPENDENT LIVING UNITS				
	1 bed	2 bed	2 bed+S	TOTAL
BUILDING A,B	1	49	19	69
BUILDING C,D	5	54	10	69
BUILDING E	0	20	4	24
TOTAL	6	123	33	162
TOTAL No. OF ILU's = 162				

TOWN HOUSES		
TOWNHOUSE A		
146.13 m² x 16	=	2,338 m²
TOWNHOUSE B		
134.42 m² x 5	=	672 m²

CARPARK	
CARPARK 1 (ILU A, B, C & D)	5,210 m²
CARPARK 2 (ILU E)	980.0 m²
CARPARK 3 (EXTERNAL PARKING)	1,048.0m²
CARPARK TOTAL	7,238 m²

DEVELOPMENT STATISTICS (external)	
SITE AREA	32,450 m²
ILUS AND TOWNHOUSES	25,416 m²
COMMUNITY CENTRE	1,066 m²
RESIDENTIAL CARE FACILITY	7,960 m²

0m 5 10 25 35m
SCALE: 1:500

No.	Amendment	Date
9	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
8	DA Issue	20.04.17
7	Preliminary Issue for review & comment	12.04.17
6	Preliminary Issue for review & comment	30.03.17
5	Pre-DA Council Meeting	06.03.17
4	Preliminary Issue	08.02.16
3	Preliminary Issue	19.01.16
2	Preliminary Issue	19.12.16
1	Preliminary Issue	05.12.16

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

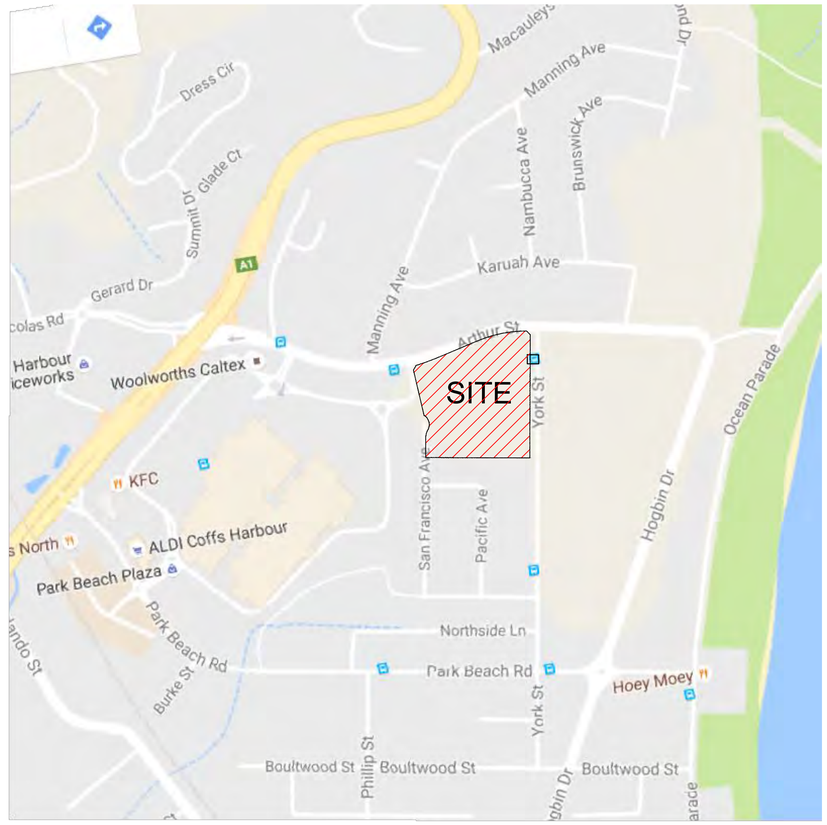
Drawing
SITE PLAN

boffa robertson group
architecture, health and aged care planning, project management
Suite 7, Level 1 Epica, 9 Railway Street
Chatswood NSW 2067
AUSTRALIA
Tel. (02) 9406 7000
Fax. (02) 9406 7099
Email : brgroup@brgr.net

Date	NOV 2016	Job No. : Drawing	
Scale	1:500		1542 / DA01
Drawn	WW		
Amendment	9		

SITE ANALYSIS

1 : 1000@A1

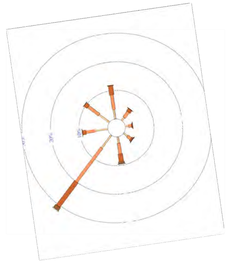


LOCALITY PLAN

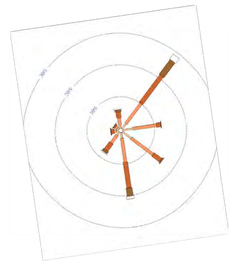
1 : 3000@A1

COFFS HARBOUR AMO

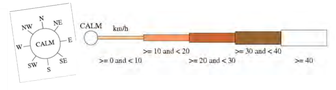
WINDROSE
ANNUAL: 9 a.m.



WINDROSE
ANNUAL: 3 p.m.



WINDROSE KEY



0m 10 25 50 75m
SCALE: 1:1000

No.	Amendment	Date
5	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
4	DA Issue	20.04.17
3	Preliminary Issue for review & comment	12.04.17
2	Preliminary Issue for review & comment	30.03.17
1	Preliminary Issue	05.12.16

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
SITE ANALYSIS

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architecture, health and aged care planning, project management
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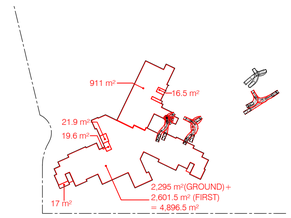
Date	NOV 2016	Job No. : Drawing	
Scale	1:1000	1542 / DA02	
Drawn	JN		
Amendment	5		

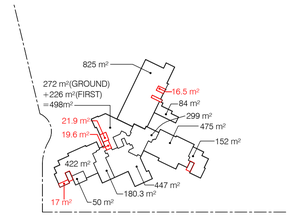
NOTE

- ALL FOOTPATH WITHIN THE SITE TO BE NOT LESS THAN 1800mm WIDE

	ENTRY / COMMUNITY AREA
	RCF - BEDROOM
	RCF - RESIDENTS COMMON AREA
	BACK OF HOUSE
	CAR PARK
	ILU - 1 BED
	ILU - 2 BED
	ILU - 2 BED + S
	TOWNHOUSE - TYPE A
	TOWNHOUSE - TYPE B



FIRE COMPARTMENTATION
TOTAL ENCLOSED 3,415 m²



SMOKE COMPARTMENTATION
TOTAL ENCLOSED 3,415 m²

0m 5 10 25 35m
SCALE: 1:500

No.	Amendment	Date
11	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
10	- Footpath modified to 1800mm wide - Porte cochere driveway widened to allow passing bay - Accessible carparking modified to allow for 2.4m shared zone - Footpath to 2 x RCF carparks added - Gate deleted @ San Francisco Avenue - Gate added @ Main entry @ York Street	14.06.17
9	Additional turning vehicle diagrams added	07.06.17
8	DA Issue	20.04.17
7	Preliminary Issue for review & comment	12.04.17
6	Preliminary Issue for review & comment	30.03.17
5	Pre-DA Council Meeting	06.03.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
GROUND FLOOR PLAN - OVERALL

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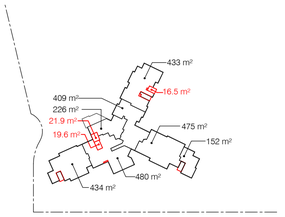
Email : brgroup@brgr.net

	Date	NOV 2016	Job No. : Drawing
	Scale	1:500	1542 / DA03
	Drawn	AL / VW	
	Amendment	11	

	ENTRY / COMMUNITY AREA
	RCF - BEDROOM
	RCF - RESIDENTS COMMON AREA
	BACK OF HOUSE
	CAR PARK
	ILU - 1 BED
	ILU - 2 BED
	ILU - 2 BED + S
	TOWNHOUSE - TYPE A
	TOWNHOUSE - TYPE B

FIRE COMPARTMENTATION
TOTAL ENCLOSED 2,845 m²



SMOKE COMPARTMENTATION
TOTAL ENCLOSED 2,845 m²

0m 5 10 25 35m
S C A L E: 1:500

No.	Amendment	Date
10	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
9	DA Issue	20.04.17
8	Preliminary Issue for review & comment	12.04.17
7	Preliminary Issue for review & comment	30.03.17
6	Preliminary Issue for review & comment	22.03.17
5	Pre-DA Council meeting	06.03.17
4	Preliminary Issue	08.02.17
3	Preliminary Issue	19.01.16
2	Preliminary Issue	19.12.16
1	Preliminary Issue	05.12.16

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
FIRST FLOOR PLAN - OVERALL

boffa robertson group
architecture, health and aged care planning, project management
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Tel. (02) 9406 7000
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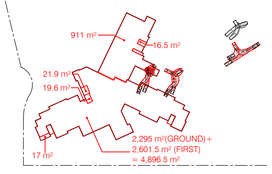
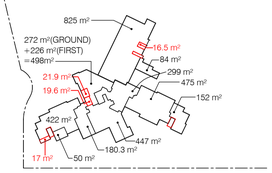
Date	NOV 2016	Job No. : Drawing
Scale	1:500	1542 / DA04
Drawn	AL / WW	
Amendment	10	

	ENTRY / COMMUNITY AREA
	RCF - BEDROOM
	RCF - RESIDENTS COMMON AREA
	BACK OF HOUSE
	CAR PARK



FIRE COMPARTMENTATION
TOTAL ENCLOSED 3,415 m²



SMOKE COMPARTMENTATION
TOTAL ENCLOSED 3,415 m²

0m 2 5 10 15m
SCALE: 1:200

No.	Amendment	Date
11	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
10	- Footpath modified to 1800mm wide - Porte cochere driveway widened to allow passing bay - Accessible carparking modified to allow for 2.4m shared zone - Footpath to 2 x RCF carparks added - Gate deleted @ San Francisco Avenue - Gate added @ Main entry @ York Street	14.06.17
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7	Preliminary Issue for review & comment	30.03.17
6	Preliminary Issue for review & comment	22.03.17
5	Pre-DA Council Meeting	06.03.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
GROUND FLOOR PLAN - RCF

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Email : brgroup@brgr.net

Date	NOV 2016	Job No. : Drawing	
Scale	1:200		1542 / DA12
Drawn	AL / WW		
Amendment	11		

SAN FRANCISCO AVENUE

BOUNDARY

9295

6m SETBACK

9m SETBACK

9m SETBACK

6m SETBACK

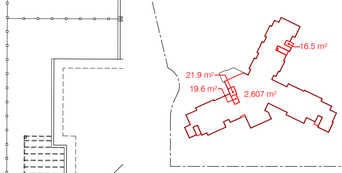
BOUNDARY

15600

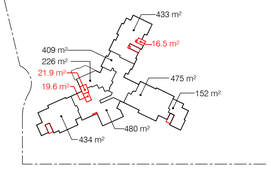
19730

17845

	ENTRY / COMMUNITY AREA
	RCF - BEDROOM
	RCF - RESIDENTS COMMON AREA
	BACK OF HOUSE
	CAR PARK



FIRE COMPARTMENTATION
TOTAL ENCLOSED 2,845 m²



SMOKE COMPARTMENTATION
TOTAL ENCLOSED 2,845 m²

0m 2 5 10 15m
SCALE: 1:200

No.	Amendment	Date
10	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
9	DA Issue	20.04.17
8	Preliminary Issue for review & comment	12.04.17
7	Preliminary Issue for review & comment	30.03.17
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4	Preliminary Issue	08.02.17
3	Preliminary Issue	19.01.16
2	Preliminary Issue	19.12.16
1	Preliminary Issue	05.12.16

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
FIRST FLOOR PLAN - RCF

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architecture, health and aged care planning, project management
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Tel. (02) 9406 7000
Fax. (02) 9406 7099
Email : brgroup@brgr.net

Date	NOV 2016	Job No. : Drawing	
Scale	1:200		
Drawn	AL / WW		1542 / DA13
Amendment	10		

ARTHUR STREET

BOUNDARY

SAN FRANCISCO AVENUE

BOUNDARY

YORK STREET

BOUNDARY

ILU A.B,C & D
GROUND FLOOR
CAR PARKING

RESIDENTIAL
CARE FACILITY

SAN FRANCISCO AVENUE

BOUNDARY

BOUNDARY

BOUNDARY

TH.A-1
TH.A-2
TH.A-3
TH.A-4
TH.B-1
TH.A-5
TH.A-6
TH.A-7
TH.A-8
TH.A-9
TH.A-10
TH.B-2
TH.B-3
TH.B-4
TH.B-5
TH.A-11
TH.A-12
TH.A-13
TH.A-14
TH.A-15
TH.A-16

LESS THAN 3 HOUR
Minimum of 3 HOUR
NO SOLAR ACCESS
NATURAL CROSS VENTILATION

0m 2 10 20 30m
SCALE: 1:400

No.	Amendment	Date
4	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
3	DA Issue	20.04.17
2	Preliminary Issue for review & comment	12.04.17
1	Preliminary Issue for review & comment	30.03.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
SOLAR ACCESS DIAGRAMS
TOWNHOUSES

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architecture, health and aged care planning, project management
Suite 7, Level 1 Epica, 9 Railway Street
Chatswood NSW 2067
AUSTRALIA
Tel. (02) 9406 7000
Fax. (02) 9406 7099
Email : brgroup@brgr.net

Date	MAR 2017	Job No. : Drawing	
Scale	1:400		1542 / DA29
Drawn	WW		
Amendment	4		

ARTHUR STREET

BOUNDARY

BOUNDARY

SAN FRANCISCO AVENUE

BOUNDARY

BUS STOP

ILU BUILDING A

ILU BUILDING B

ILU BUILDING C

ILU BUILDING D

CARPARK

CARPARK

CARPARK

CARPARK +Bus parking

ILU BUILDING E

AMBULANCE BAY - ENTRY

POOL

BBQ

PROPOSED RESIDENTIAL CARE FACILITY

LOADING BAY

BOUNDARY

SAN FRANCISCO AVENUE

YORK STREET

BOUNDARY

PRPOSED FLOOD STORAGE

PRPOSED FLOOD STORAGE

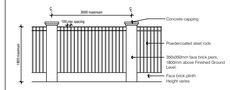
EXISTING FENCE

BOUNDARY

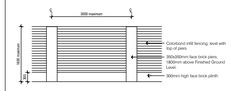
EXISTING FENCE

LEGEND

FENCE TYPE 1



FENCE TYPE 2



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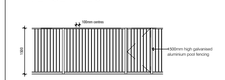

0m 2 5 10 20 28m
SCALE: 1:400

No.	Amendment	Date
4	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
3	Road access to San Francisco Avenue deleted, Fence modified, Carparking modified, Footpath added	19.07.17
2	DA Issue	20.04.17
1	Preliminary Issue for review & comment	12.04.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
FENCING PLAN

boffa robertson group
architecture, health and aged care planning, project management
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AUSTRALIA
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Fax. (02) 9406 7099
Email : brgroup@brgr.net

	Date	APR 2017	Job No. : Drawing
	Scale	1:400	1542 / DA52
	Drawn	AL	
	Amendment	4	

December 21 - 9 a.m.

December 21 - 10 a.m.

December 21 - 11 a.m.

December 21 - 12 noon

No.	Amendment	Date
3	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
2	DA Issue	20.04.17
1	Preliminary Issue for review & comment	12.04.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
SHADOW DIAGRAMS -
SUMMER SOLSTICE (DECEMBER 21) - 1

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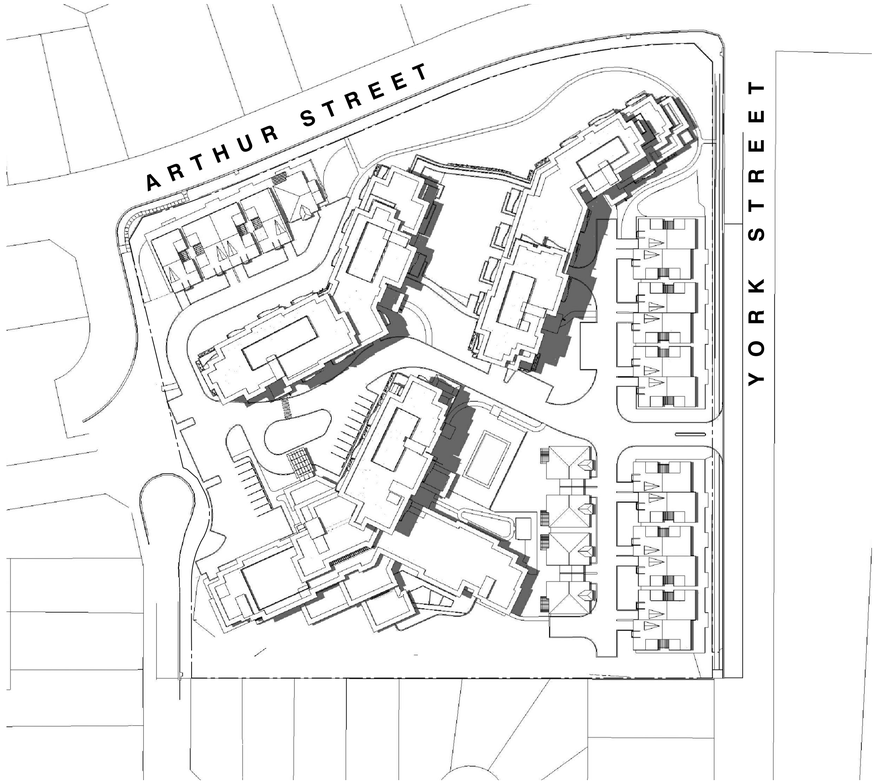
Date	MAR 2017	Job No. : Drawing
Scale	NTS	1542 / DA54
Drawn	-	
Amendment	3	



December 21 - 1 p.m.

December 21 - 2 p.m.

December 21 - 3 p.m.

No.	Amendment	Date
3	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
2	DA Issue	20.04.17
1	Preliminary Issue for review & comment	12.04.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
SHADOW DIAGRAMS -
SUMMER SOLSTICE (DECEMBER 21) - 2

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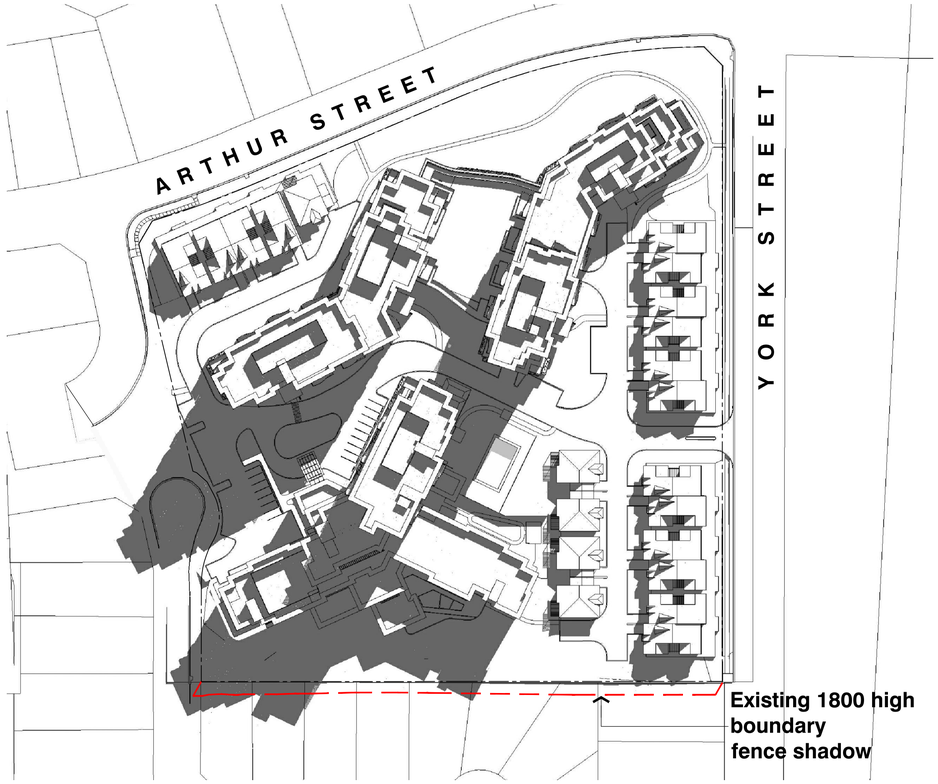
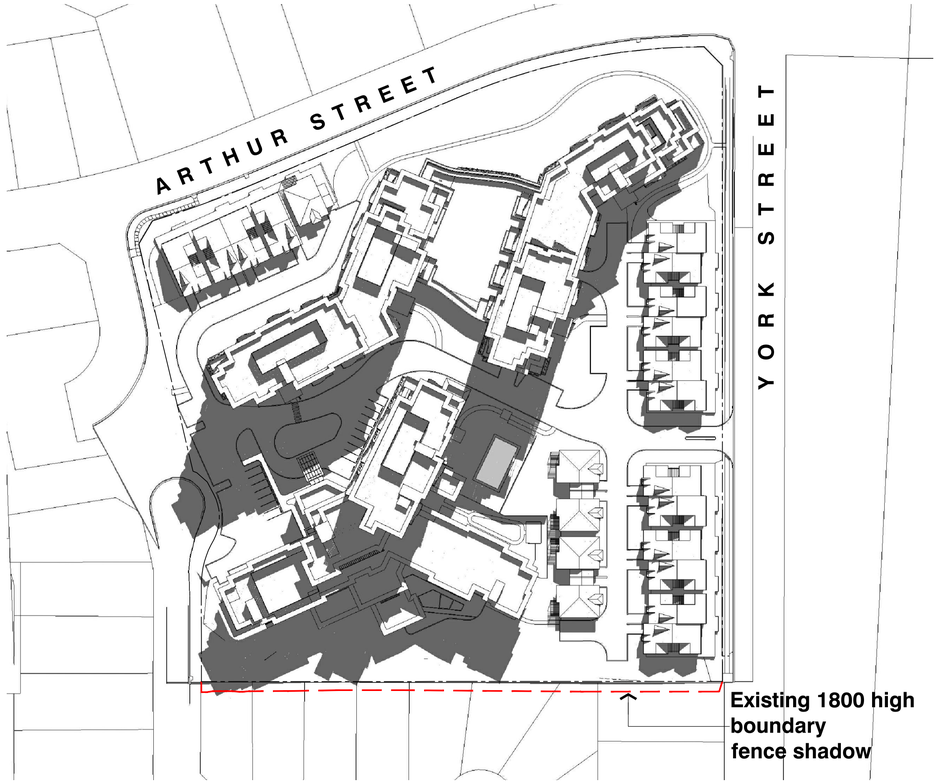
Email : brgroup@brgr.net

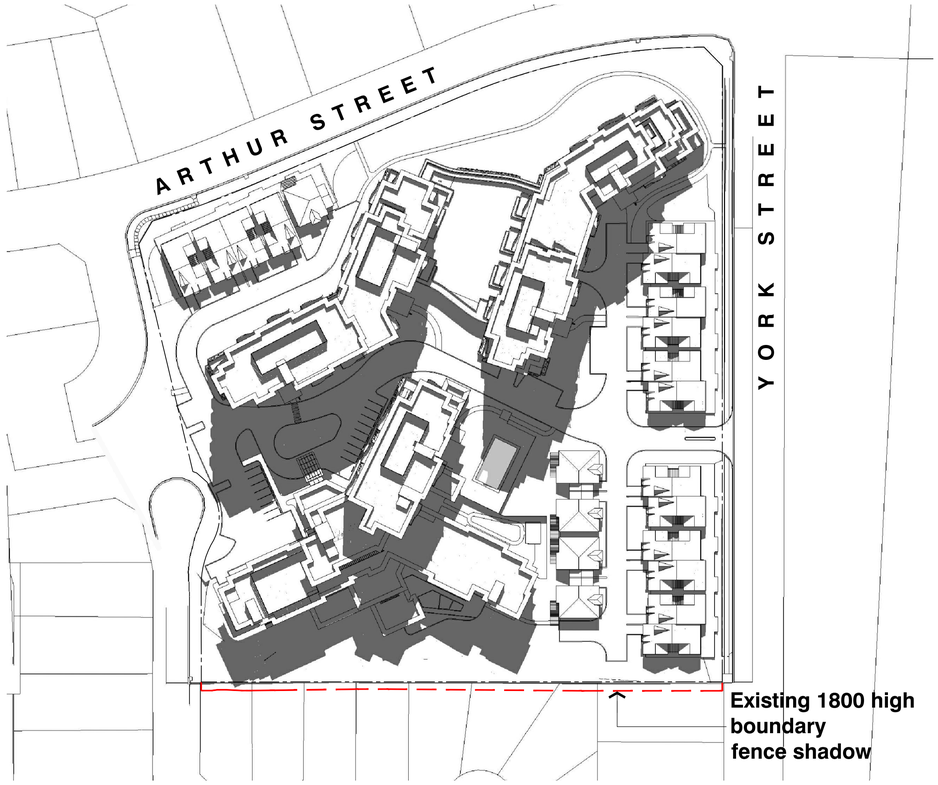
Date	MAR 2017	Job No. : Drawing
Scale	NTS	1542 / DA55
Drawn	-	
Amendment	3	



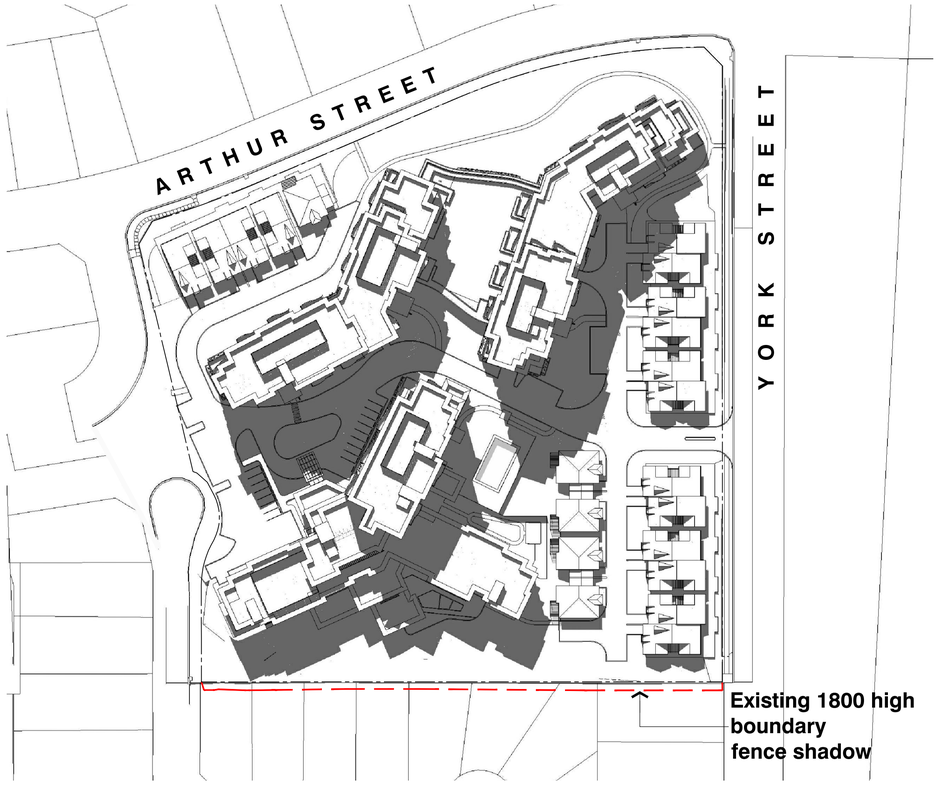
June 21 - 9 a.m.



June 21 - 10 a.m.



June 21 - 11 a.m.



June 21 - 12 noon

No.	Amendment	Date
6	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
5	DA Issue	20.04.17
4	Preliminary Issue for review & comment	12.04.17
3	Preliminary Issue for review & comment	30.03.17
2	Pre-DA Council Meeting	06.03.17
1	Preliminary Issue	01.03.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
SHADOW DIAGRAMS -
WINTER SOLSTICE (JUNE 21) - 1

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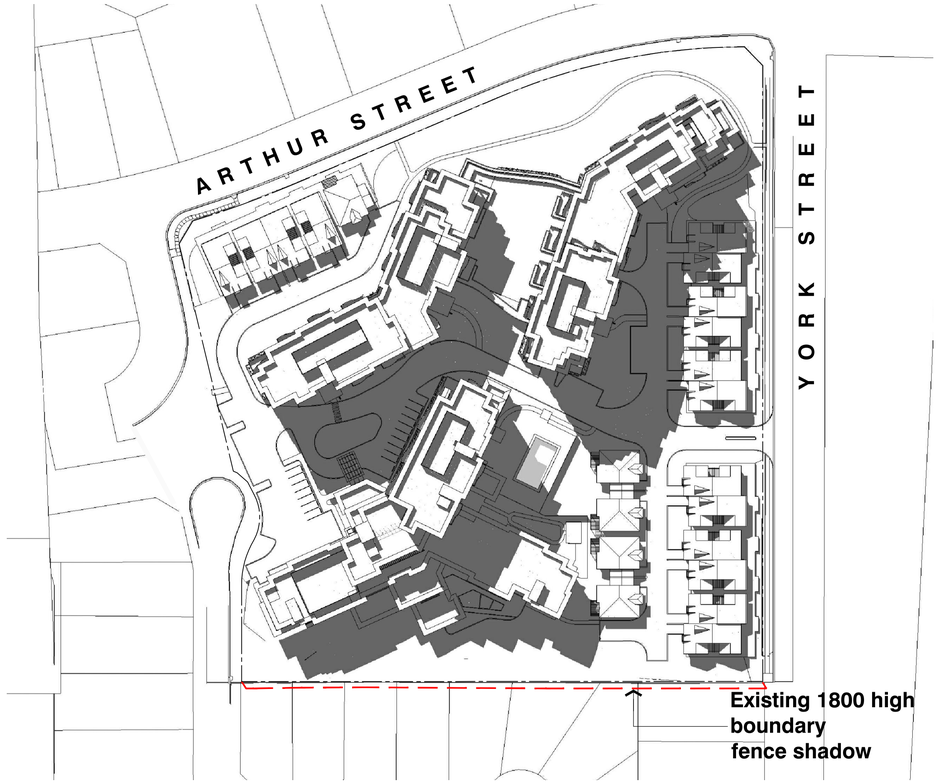
Email : brgroup@brgr.net

Date	MAR 2017	Job No. : Drawing
Scale	NTS	1542 / DA56
Drawn	-	
Amendment	6	



June 21 - 1 p.m.

June 21 - 2 p.m.

June 21 - 3 p.m.

No.	Amendment	Date
6	Road access to San Francisco Avenue deleted, Carparking modified, Footpath added	19.07.17
5	DA Issue	20.04.17
4	Preliminary Issue for review & comment	12.04.17
3	Preliminary Issue for review & comment	30.03.17
2	Pre-DA Council Meeting	06.03.17
1	Preliminary Issue	01.03.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
SHADOW DIAGRAMS -
WINTER SOLSTICE (JUNE 21) - 2

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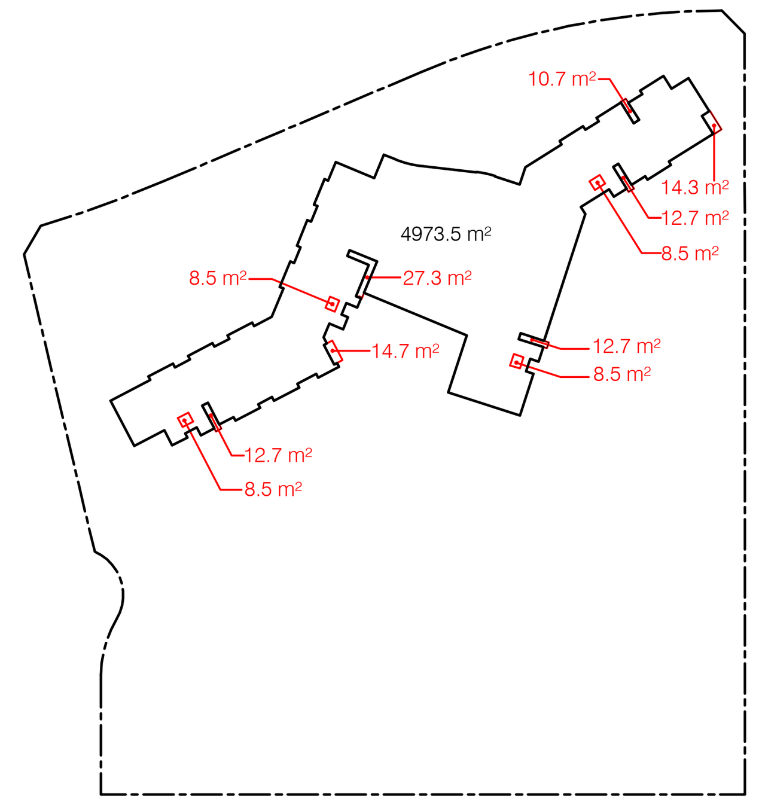
Email : brgroup@brgr.net

Date	MAR 2017	Job No. : Drawing
Scale	NTS	1542 / DA57
Drawn	-	
Amendment	6	

Annexure - Parking



SMOKE COMPARTMENTATION
TOTAL ENCLOSED 5,210m²

0m 2 5 10 15m
SCALE: 1:200

No.	Amendment	Date
10	- Footpath modified to 1800mm wide - Porte cochere driveway widened to allow passing bay - Accessible carparking modified to allow for 2.4m shared zone - Footpath to 2 x RCF carparks added - Gate deleted @ San Francisco Avenue - Gate added @ Main entry @ York Street	14.06.17
9	DA Issue	20.04.17
8	Preliminary Issue for review & comment	12.04.17
7	Preliminary Issue for review & comment	30.03.17
6	Preliminary Issue for review & comment	22.03.17
5	Pre-DA Council Meeting	06.03.17

Project
ARTHUR & YORK STREET RETIREMENT VILLAGE
Arthur & York Street, Coffs Harbour

Drawing
BUILDING A, B, C & D - ILU
GROUND FLOOR PLAN - CARPARK

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Date	NOV 2016
Scale	1:200
Drawn	WW
Amendment	10
Job No. : Drawing	1542 / DA19

Annexure - Water

NOTE:

WATER RETICULATION TO DEVELOPMENT SUBJECT TO FUTURE WATER SERVICE APPLICATION AND DESIGN PLANS FOR CONSTRUCTION CERTIFICATES.

NOTES:

1. THIS PLAN IS NOT A WATER SERVICE APPLICATION PLAN. IT IS A CONCEPT PLAN TO DEMONSTRATE LAND SERVICING.
2. ALL WORKS TO COMPLY WITH COUNCIL SPECIFICATIONS AND REQUIREMENTS.
3. STAGE 1 OF DEVELOPMENT TO BE CONNECTED TO NEW SOUTHERN SEWER LINE AND CONNECT TO COUNCIL SYSTEM AT SMH A/2 ADJACENT TO PUMP STATION
4. STAGES 2 AND 3 OF DEVELOPMENT TO NORTHERN SEWER LINE FOR CONNECTION TO COUNCIL SYSTEM AT ARTHUR ST. STAGE 3 TOWNHOUSES TO CONNECT TO SOUTHERN SEWER LINE.

LEGEND

- SEWER MANHOLE & SEWER PIPE — SMH — S
- WATER RETICULATION — W
- STORMWATER
- STOP VALVE — SV

10 0 10 20 30 40 50

SCALE OF METRES 1:500

REV.	DATE	REVISION	DR.BY	AP.BY
P2	16/06/17	PRELIMINARY - FOR DISCUSSION	JPA	GPB
P1	23/12/16	PRELIMINARY - FOR DISCUSSION	TJP	GJK

de Groot & Benson
Consulting Engineers & Planners
A.C.N. 052 300 571
236 Harbour Drive, Coffs Harbour NSW 2450
Phone (02) 6652 1700
Fax (02) 6652 7418
Email: email@dgb.com.au

Scale	AS SHOWN	Cad File No.	04257 Civil.dwg
Surveyed	-----	Datum	AHD
Drawn	KLE	Designed	GJK
Checked	GJK	Date	2017
Approved	GJK	No. of dwgs	---

Project: LOT 2, CNR ARTHUR ST & SAN FRANCISCO AVE, COFFS HARBOUR

Client: PARK BEACH RESIDENCE Pty Ltd

Title: SEWER & WATER SERVICES CONCEPT PLAN

Project No.	04257
Drawing No.	C07
Amendment No.	P2

Ref: 04257

19 June 2017

The General Manager
Coffs Harbour City Council
Locked Bag 155
COFFS HARBOUR NSW 2450

Attention: Mr Ben Hope

de Groot & Benson Pty Ltd

Consulting Engineers & Planners

Proposed Sewerage Arrangements
Lot 2 DP 731016 Auther St Coffs Harbour
REVISION A REPORT DATED 19 JUNE 2017

At a Council TLC meeting of 16 November 2016, Council advised that the sewage from the proposed development should be conveyed to SHM EK/02, which is located adjacent the York Street playing fields opposite Richmond Drive. This is some 135 m from the property boundary and across York Street. The level of this connection point makes servicing the development by gravity sewer exceedingly difficult and potentially requiring a pump station or substantial filling. We consider this request as unreasonable as there are suitable connection points immediately adjacent the property.

We have investigated this further and propose an alternative solution. We propose to connect to a SMH near the SPS1017A such as SMH A/02 on the attached plan, which is expected to be deep enough to adequately service the entire property by gravity. We advise:

- Council's letter of 2 February 2007 (P/N 701900, P/N 2202275 IR 1436782) refers to works for the relocation of an existing sewage pump station and sewer mains on the property, to be replaced with the current SPS 1017A adjacent the property. In the letter, Council states "*the proposed works will be designed and constructed to meet the existing and future needs of the local community including the potential development of your client's property.*"

- The land owner paid a $150,000 cash contribution to Council for these sewer works.

- We have estimated the proposed sewage load in accordance with Appendix B WSA 02-2014 at 268 ET as summarised in Table 1 below:

Table 1 – Sewage Load Estimation

Accomodation unit type	Bedrooms	Number	EP per unit	EPs	ETs
Apartments	2	155	3.0	465	133
	1	1	3.0	3	1
Townhouses	2 & 3	21	3.0	63	18
Nursing home bed	1	120	3.4	408	117
			Total	**939**	**268**

Note. 3.5 EP per ET

Robert de Groot
Gregory Benson
Graham Knight
Anthony Greenland
John Anderson

236 Harbour Drive, Coffs Harbour 2450

PO Box 1908, Coffs Harbour 2450

Phone: (02) 6652 1700
Email: email@dgb.com.au

A.C.N. 052 300 571
A.B.N 50 772 141 249

- This estimation is likely to be conservative (high) as the apartments and townhouses will be part of the aged care community and occupied by seniors with varying degrees of independent living. The average population per unit is likely to be considerable less than 3.0 and probably somewhere between 1 and 2. A calculation based on CHCC's water and wastewater contribution plans has a senior independent living dwelling at 0.55 ET and a nursing home bed at 0.35 ET. Under these rates the development amounts to 139 ET. Regardless, for the purpose of this assessment of sewer design flows we have adopted the higher figure of 268 ET.

- We have compared this sewage load with the maximum load permissible under the R3 zoning of the property. The DCP allows for 1 dwelling per 100 sq.m of land area for buildings greater than 8.5 m high. The height control on the land is 15.5 m, hence it is reasonable to anticipate apartments of four to five stories in height. The property covers some 32,450 sq.m. Assuming unit development, this equates to:

32,450 / 100 x 3.0 / 3.5 = 279 ET.

As the proposed sewage loading, at a conservative estimate of 268 ET, is within the anticipated developable sewage loading under Council LEP and DCP, we request that Council honour its commitment stated in their letter of 2 February 2007 and allow the development to connect to a SMH adjacent or on the property and deep enough to adequately service the proposed development.

We appreciate Council's desire to not have to pump the development's sewage through SPS1017A.
In that regard, we advise that, if Council are prepared to accept two connection points for the property, it may be possible to direct up to 138 ET to SMH EG/04*A*. However, the remaining 130 ET will need to flow into *SMH A/02* as it cannot reach SMH EG/04*A* by gravity.

Please consider this alternative solution and advise if acceptable.

Please contact Graham Knight should you require any further information.

Yours faithfully

Graham Knight


ARTHUR STREET
HOGBIN DRIVE NORTH
RICHMOND DRIVE
KARUAH AVENUE
YORK STREET
MANNING AVENUE
EK/01
EK/01A
EK/02
EK/03
H/01
H/03
O1/DE
O/01
EG/02
EG/03
EG/04A
EG/04
A1/DE
A/01
A2/DE
A/02
A/03
L/03
S/DE
L/02
L/01
T/01
X/DE
F/04
F/03
F/01
G/01
H/DE
M/01
75
96.3
129.5
92.75
81.6
61.57
35.5
69.5
20.3
72.85
49.3
52.1
19
21
27
23
41
50.4
77.2
49.38
54.86
56.14
24.99
44.81
61.52
73.2
27.56
36
49.68
112466

5.5 Services and Public Utilities *amended document*

Existing high voltage service in Arthur Street will provide electrical power to two new kiosk transformer substations. The new electrical transformers are proposed to be located adjacent to the land boundaries on York Street and San Francisico Avenue. Existing high voltage supply is adequate.

Existing NBN fibre optic cables run along the western boundary of the land, and will be available to suit new development, via a new NBN node.

Water supply to the site will be via an extension of the existing 250mm main in Arthur Street. Water supply and fire mains will branch from the extended Council water main and reticulate across the site. New fire hydrants will be installed onto the new fire ring main, to ensure coverage of all new works.

The development proposal seeks consent to extend the 250mm water supply main eastwards to York Street intersection. This will permit the water main infrastructure to be placed for the intent to service future development of the proponents land in Richmond Drive, and avoid the need to dig up public footpaths to be constructed under this aged care proposal. The water main can be isolated from being fully commissioned, so that Council does not need to undertake mains flushing, and fully commissioned when needed for the future development of the land at Richmond Drive.

Sewer connection is available at the south-western corner, along the western boundary and on the northern boundary of the land. A sewer strategy has been prepared and discussed with Council, utilising the western Council sewer manhole and a Council sewer manhole on the Arthur Street frontage. Council has advised that connection of proposed development to this sewer is acceptable; refer to email correspondence included at **Appendix C**.

The Coffs Harbour water and wastewater developer contribution plans provides;

- 0.55 ET per seniors living dwelling (ILU apartments and ILU townhouses) , the calculation of ET becomes;
  183 dwellings x 0.55 = 97.35 ET
- 0.35 ET per bed for nursing homes , the calculation of ET becomes;
  120 beds x 0.35 = 42 ET

Hence the total sewer load is calculated at 139.35 ET. The water supply load is similarly calculated at the same rates to be 139.35 ET.

Payment of Council contributions is requested on the basis of the relevant contribution for each stage of development, payable at time of issue of construction certificate for that stage of works. Sewer concept design is provided on the Sewer concept plan.

Gas will be supplied to the development and reticulated from a large bottle. This will improve energy efficiency for the development. The development will also be supplied with 2 x 50 kW solar panel arrays to generate electricity and reduce demand upon the electrical grid.