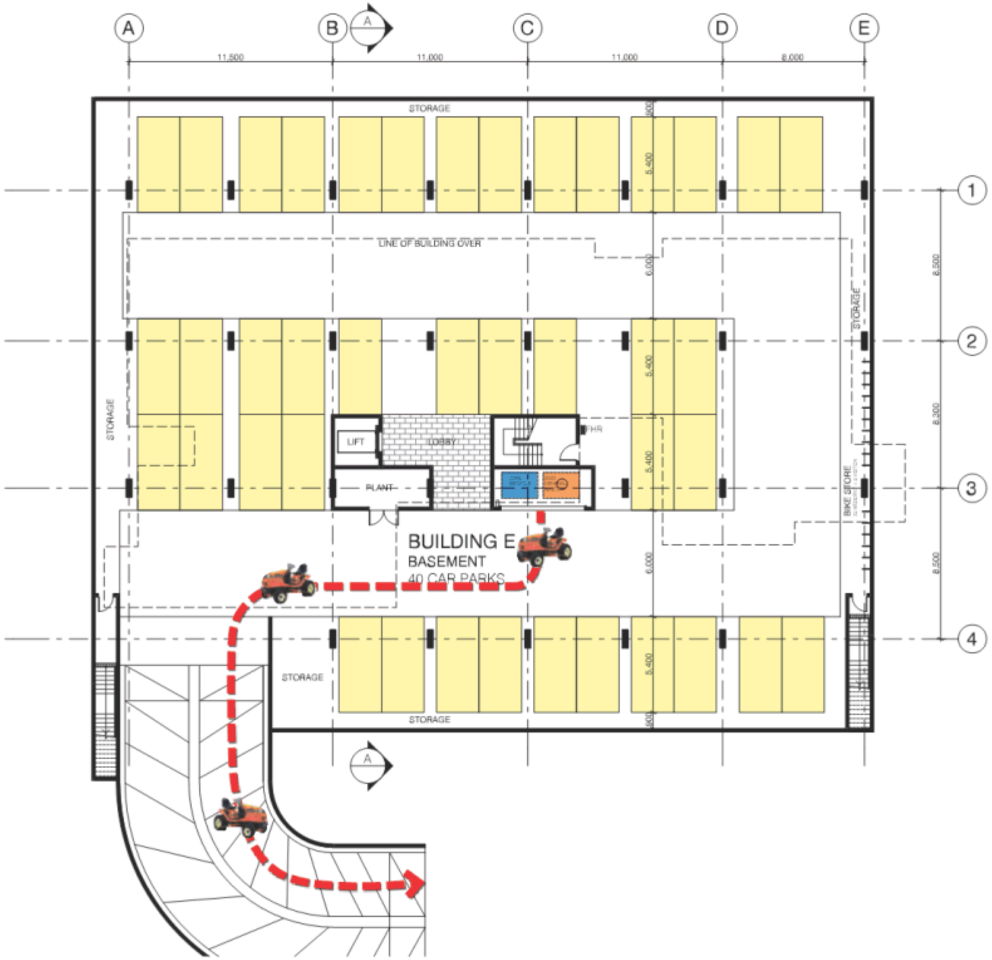
4.10 WASTE TYPICAL BASEMENT PLAN



GENERAL WASTE STORAGE AREA

RECYCLED WASTE STORAGE AREA

PATH OF MANAGERS TRANSFER OF BINS TO PICKUP

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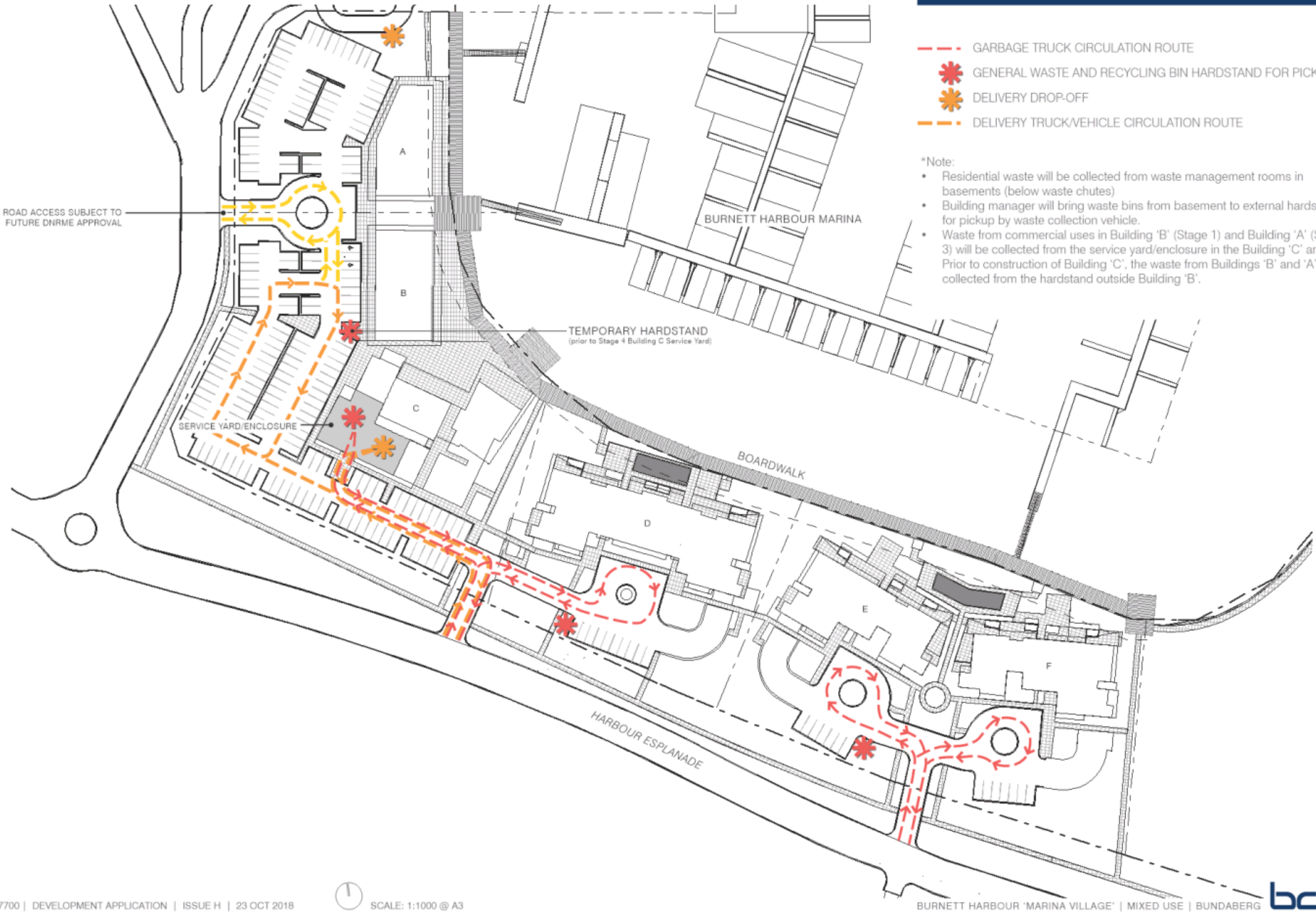
4.11 WASTE MANAGEMENT PLAN



*Note:

- Residential waste will be collected from waste management rooms in basements (below waste chutes)
- Building manager will bring waste bins from basement to external hardstand for pickup by waste collection vehicle.
- Waste from commercial uses in Building 'B' (Stage 1) and Building 'A' (Stage 3) will be collected from the service yard/enclosure in the Building 'C' area. Prior to construction of Building 'C', the waste from Buildings 'B' and 'A' is collected from the hardstand outside Building 'B'.

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4.12 WASTE MANAGEMENT CALCULATION (1)

BUILDING A (SHOPS, YACHT CLUB & COMMERCIAL USES)

OFFICE
General Waste
458.5m² @ 30L/100m²/day = 962.85L / week
Recyclable Waste
458.5m² @ 40L/100m²/day = 1,283.8L / week

YACHT CLUB
General Waste
229m² @ 50L/100m²/day = 801.5L / week
Recyclable Waste
229m² @ 50L/100m²/day = 801.5L / week

RESTAURANT
General Waste
334.5m² @ 660L/100m²/day = 15,453.9L / week
Recyclable Waste
334.5m² @ 200L/100m²/day = 4,683L / week

SHOP TENANCIES
General Waste
441m² @ 50L/100m²/day = 1,543.5L / week
Recyclable Waste
441m² @ 50L/100m²/day = 1,543.5L / week

BUILDING B

SHOP TENANCIES
General Waste
334m² @ 50L/100m²/day = 1,169L / week
Recyclable Waste
334m² @ 50L/100m²/day = 1,169L / week

SHORT TERM ACCOMMODATION
General Waste
28 x 1 Bed Apartments @ 80L/apt/week = 2,240L / week
Recyclable Waste
28 x 1 Bed Apartments @ 50L/apt/week = 1,400L / week

SUMMARY (BUILDINGS A & B)
Total General Waste 22,170.75L / Week
4 x 3000L bin with 2 weekly pickup will provide an adequate weekly capacity.

Total Recyclable Waste 10,880.8L / Week
4 x 3000L bin with 1 weekly pickup will provide an adequate weekly capacity.

BUILDING C

RESTAURANT
General Waste
752.5m² @ 660L/100m²/day = 34,765.5L / week
Recyclable Waste
752.5m² @ 200L/100m²/day = 10,535L / week

SHOP TENANCIES
General Waste
398.5m² @ 50L/100m²/day = 1,394.75L / week
Recyclable Waste
398.5m ² @ 50L/100m²/day = 1,394.75L / week

FOOD (CAFE)
General Waste
135.4m² @ 300L/100m²/day = 2,843.4L / week
Recyclable Waste
135.4m ² @ 200L/100m²/day = 1,895.6L / week

DINING
General Waste
597.1m² @ 50L/100m²/day = 2,089.85L / week
Recyclable Waste
597.1m² @ 50L/100m²/day = 2,089.85L / week

SUMMARY (BUILDING C)
Total General Waste 40,145.7L / Week
7 x 3000L bin with 2 weekly pickup will provide an adequate weekly capacity.

Total Recyclable Waste 15,915.2L / Week
3 x 3000L bin with 2 weekly pickup will provide an adequate weekly capacity.

4.13 WASTE MANAGEMENT CALCULATION (2)

BUILDING D
General Waste
18 x 2 Bed Apartments @ 100L/apt/week = 1,800L/week
18 x 3 Bed Apartments @ 120L/apt/week = 2,160L/week

Recyclable Waste
18 x 2 Bed Apartments @ 60L/apt/week = 1,080L/week
18 x 3 Bed Apartments @ 80L/apt/week = 1,440L/week

SUMMARY (BUILDING D)
Total General Waste 3,960L/week
1 x 2,250L bin with 2 weekly pickups will provide an adequate weekly capacity.

Total Recyclable Waste 2,520L/week
1 x 3,000L bin with 1 weekly pickup will provide an adequate weekly capacity.

BUILDING E
General Waste
11 x 2 Bed Apartments @ 100L/apt/week = 1,100L/week
13 x 3 Bed Apartments @ 120L/apt/week = 1,560L/week

Recyclable Waste
11 x 2 Bed Apartments @ 60L/apt/week = 660L/week
13 x 3 Bed Apartments @ 80L/apt/week = 1,040L/week

SUMMARY (BUILDING E)
Total General Waste 2,660L/week
1 x 3000L bin with 1 weekly pickup will provide an adequate weekly capacity.

Total Recyclable Waste 1,700L/week
1 x 2250L bin with 1 weekly pickup will provide an adequate weekly capacity.

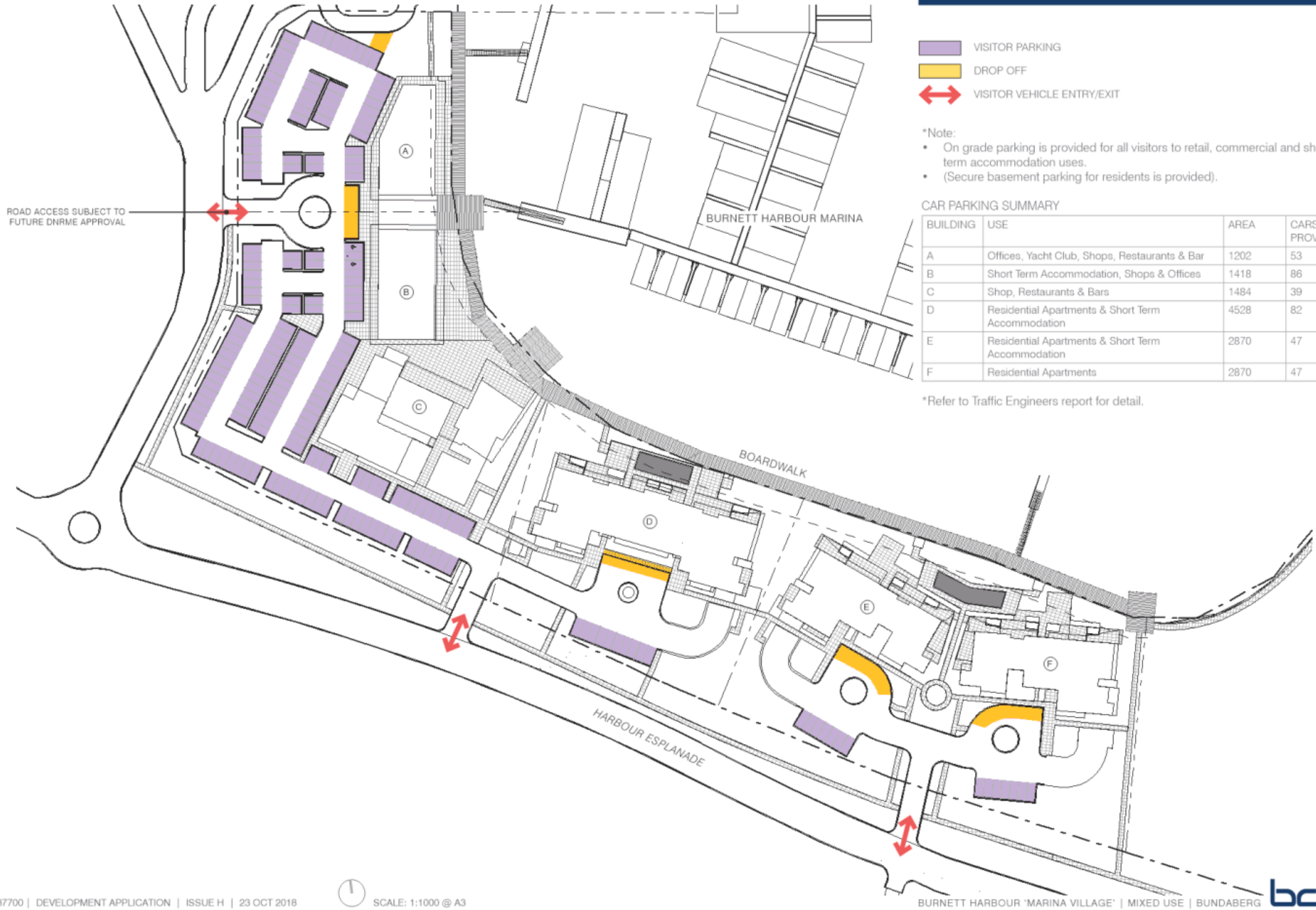
BUILDING F
General Waste
11 x 2 Bed Apartments @ 100L/apt/week = 1,100L/week
13 x 3 Bed Apartments @ 120L/apt/week = 1,560L/week

Recyclable Waste
11 x 2 Bed Apartments @ 60L/apt/week = 660L/week
13 x 3 Bed Apartments @ 80L/apt/week = 1,040L/week

SUMMARY (BUILDING F)
Total General Waste 2,660L/week
1 x 3000L bin with 1 weekly pickup will provide an adequate weekly capacity.

Total Recyclable Waste 1,700L/week
1 x 2250L bin with 1 weekly pickup will provide an adequate weekly capacity.

4.14 VISITOR PARKING



VISITOR PARKING
DROP OFF
VISITOR VEHICLE ENTRY/EXIT

*Note:
- On grade parking is provided for all visitors to retail, commercial and short term accommodation uses.
- (Secure basement parking for residents is provided).

CAR PARKING SUMMARY

BUILDING	USE	AREA	CARS PROVIDED
A	Offices, Yacht Club, Shops, Restaurants & Bar	1202	53
B	Short Term Accommodation, Shops & Offices	1418	86
C	Shop, Restaurants & Bars	1484	39
D	Residential Apartments & Short Term Accommodation	4528	82
E	Residential Apartments & Short Term Accommodation	2870	47
F	Residential Apartments	2870	47

*Refer to Traffic Engineers report for detail.

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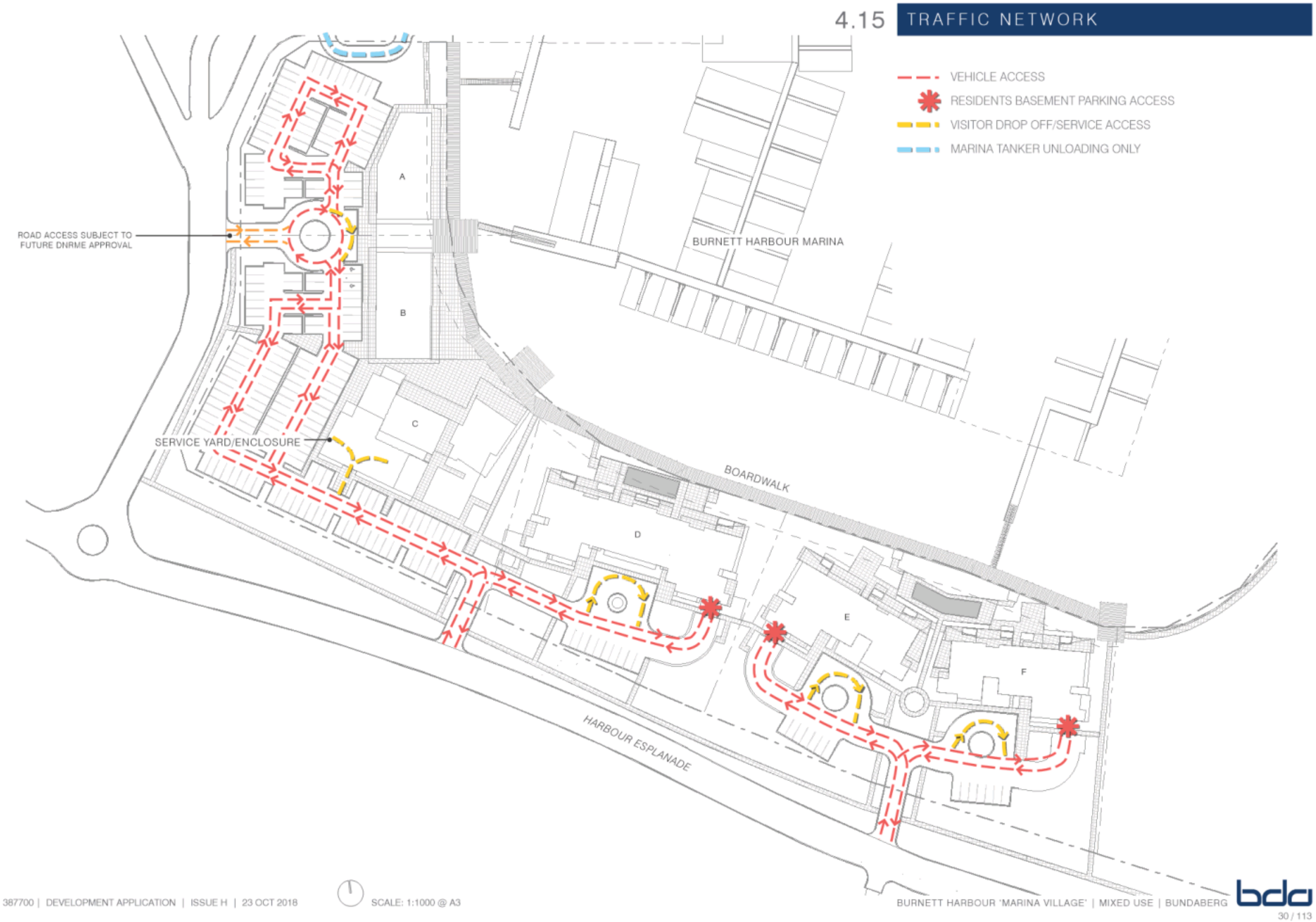
4.15 TRAFFIC NETWORK
VEHICLE ACCESS
RESIDENTS BASEMENT PARKING ACCESS
VISITOR DROP OFF/SERVICE ACCESS
MARINA TANKER UNLOADING ONLY
ROAD ACCESS SUBJECT TO FUTURE DNRME APPROVAL
BURNETT HARBOUR MARINA
A
B
C
D
E
F
SERVICE YARD/ENCLOSURE
BOARDWALK
HARBOUR ESPLANADE
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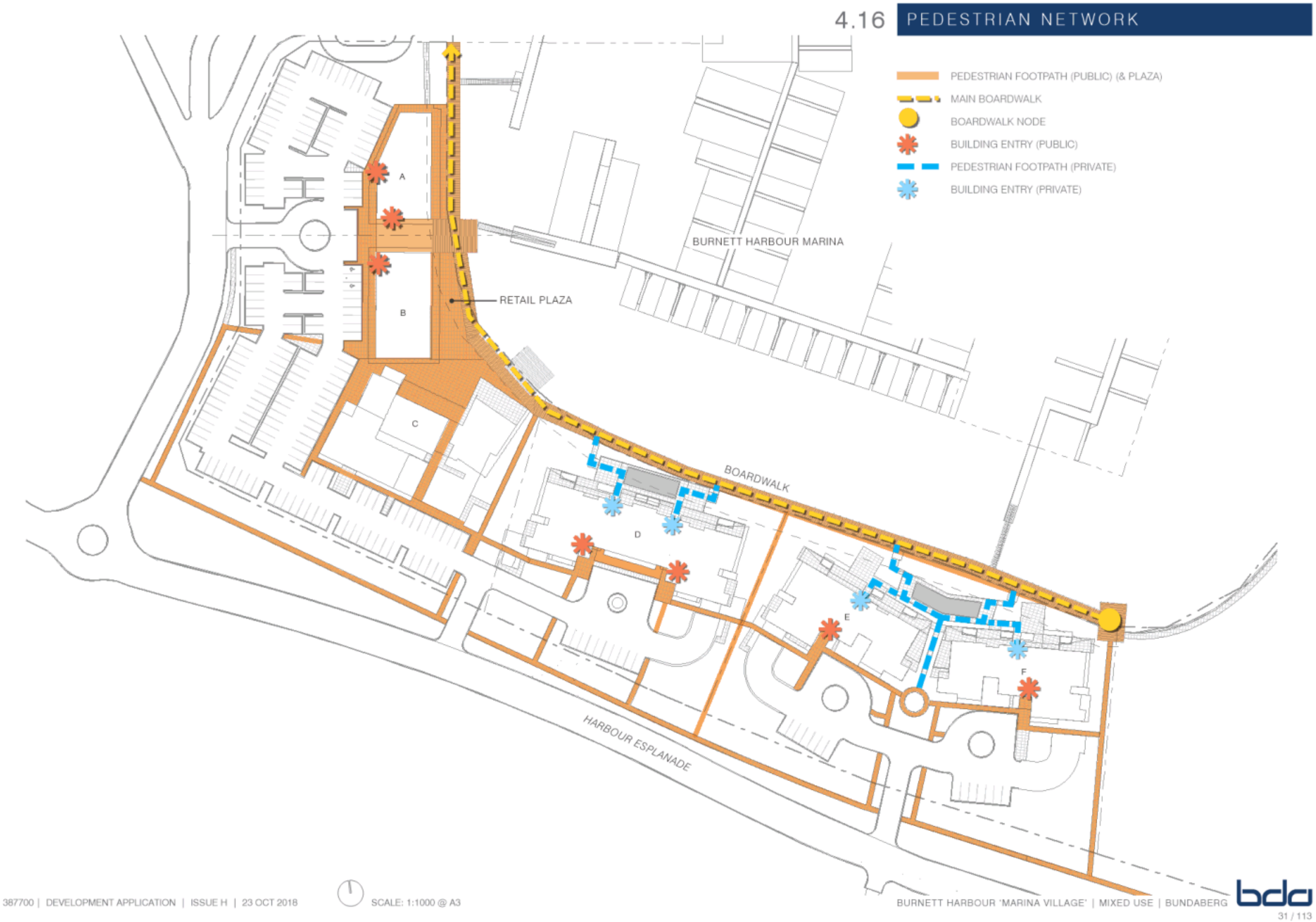
4.16
PEDESTRIAN NETWORK
PEDESTRIAN FOOTPATH (PUBLIC) (& PLAZA)
MAIN BOARDWALK
BOARDWALK NODE
BUILDING ENTRY (PUBLIC)
PEDESTRIAN FOOTPATH (PRIVATE)
BUILDING ENTRY (PRIVATE)
BURNETT HARBOUR MARINA
RETAIL PLAZA
BOARDWALK
HARBOUR ESPLANADE
A
B
C
D
E
F
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4.17 STREETSCAPES

STREETSCAPE 01 - VIEW FROM HARBOUR ESPLANADE LOOKING NORTH-EAST

STREETSCAPE 02 - VIEW FROM MARINA ACCESS ROAD LOOKING EAST

4.18 SITE SECTION A & B

SITE SECTION A-A - BUILDING A/B ATRIUM

SITE SECTION B-B - BUILDING A/B & C

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4.19 SITE SECTION C & D

SITE SECTION C-C - BUILDING D

SITE SECTION D-D (PART 1) - BUILDINGS C & D

SITE SECTION D-D (PART 2) - BUILDINGS E & F

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4.20 SITE SECTION E

SITE SECTION E-E - BUILDING F

5.0

DEVELOPMENT SUMMARY

5.1 DEVELOPMENT SUMMARY

BUILDINGS A, B, C

BUILDING A

	Component(s)	Non GFA (sq.m)	GFA (sq.m)
BUILDING A - SHOPS / YACHT CLUB - RESTAURANT / OFFICES & BAR			
Level 02	Commercial - Office		337
	Core/Toilets/Services	100	
	Balcony - Private	60	
Subtotal			**337**
Level 01	Yacht Club - Restaurant		345
	Core/Toilets/Services	101	
	Balcony - Outdoor Dining		220
Subtotal			**565**
Ground	Shops - Convenience / Chandlery / Fashion / Souvenirs / Gift		300
	Marina Amentites	129	
	Core/Toilets/Services	32	
Subtotal			**300**
Total		422	**1202**

BUILDING B

	Type A	Type B
Internal Area (sq m)	28	37
Balcony Area (sq m)	8	11
No. of Bedrooms	1	1
Bathrooms	1	1

	Component(s)	Type A 1 Bed	Type B 1 Bed	No of Apartments	No. of Bedrooms	Core/Service (sq.m)	Non GFA (sq.m)	GFA (sq.m)
BUILDING B - SHOPS / RESTAURANTS / SHORT TERM ACCOMMODATION & OFFICE								
Level 02	Guest Suites	7	7	14	14	147		464
	Balconies						134	
Level 01	Guest Suites	7	7	14	14	147		464
	Balconies						134	
Ground Level	Offices							172
	Reception/Lobby/Office					23		131
	Shops - Broker, Real Estate & Café/Bakery					29		283
	Marina Management							62
Subtotal		**14**	**14**	**28**	**28**	**346**	**268**	**1576**

BUILDING C

		Non GFA (sq.m)	GFA (sq.m)
BUILDING C - SHOPS / RESTAURANTS / OFFICES / BAR			
Level 01	Gym/Spa		327
	Balconies - Private	51	
	Office		297
	Balcony - Private	60	
	Core/Services	147	
Subtotal		258	**624**
Ground	Restaurant		212
	Dining Pavilion		114
	Outdoor Dining	206	
	Shops		322
	Take Away Food		212
	Core/Services/Toilets/Mall (Service yard not included)	181	
Subtotal		387	**860**
Total		645	**1484**

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5.2 DEVELOPMENT SUMMARY

BUILDINGS D, E, F

	Type A	Type B	Type C	Type C1	Type C2	Type C3	Type D	Type D1	Type E	Type E1	Type F	Type G1	Type H	Type I
Internal Area (sqm)	117	130	89	84	88	84	132	126	192	152	214	114	165	89
Balcony Area	31	32	16	22	18	53	34	34	168	163	126	30	44	54
No. of Bedrooms	3	3	2	2	2	2	2	2	3	3	3	2	3	2
Bathrooms	2	2	2	2	2	2	2	2	3	2	3	2	2	2

	Component(s)	Type A 3 Bed	Type B 3 Bed	Type C 2 Bed	Type C1 2 Bed	Type C2 2 Bed	Type C3 2 Bed	Type D 2 Bed	Type D1 2 Bed	Type E 3 Bed	Type E1 3 Bed	Type F 3 Bed	Type G1 2 Bed	Type H 3 Bed	Type I 2 Bed	No of Apartments	No. of Bedrooms	Core/Service (sq.m)	Basement (sq.m)	GFA (sq.m)
BUILDING D - RESIDENTIAL APARTMENTS & SHORT TERM ACCOMMODATION																				
Roof Terrace	Apartments																	31		21
Level 04	Apartments									2		2				4	12	102		776
Level 03	Apartments	2	2	2				2								8	20	132		951
Level 02	Apartments	2	2	2				2								8	20	132		951
Level 01	Apartments	2	2	2				2								8	20	132		951
Ground Level	Apartments	2							2				2		2	8	18	186		899
Parking	Basement																		2499	
Subtotal		**8**	**6**	**6**	**0**	**0**	**0**	**6**	**2**	**2**	**0**	**2**	**2**	**0**	**2**	**36**	**90**	**715**	**2499**	**4528**
BUILDING E - RESIDENTIAL APARTMENTS & SHORT TERM ACCOMMODATION																				
Level 04	Apartments				1	1					1			1		4	5	93		500
Level 03	Apartments	1	1	1	1									1		5	10	98		597
Level 02	Apartments	1	1	1	1									1		5	10	98		597
Level 01	Apartments	1	1	1	1									1		5	10	98		597
Ground Level	Apartments	1					1						1	1	1	5	9	117		579
Parking	Basement																		1579	
Subtotal		**4**	**3**	**3**	**4**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**5**	**1**	**24**	**44**	**504**	**1579**	**2870**
BUILDING F - RESIDENTIAL APARTMENTS																				
Level 04	Apartments				1	1					1			1		4	5	93		500
Level 03	Apartments	1	1	1	1									1		5	10	98		597
Level 02	Apartments	1	1	1	1									1		5	10	98		597
Level 01	Apartments	1	1	1	1									1		5	10	98		597
Ground Level	Apartments	1					1						1	1	1	5	9	117		579
Parking	Basement																		1579	
Subtotal		**4**	**3**	**3**	**4**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**5**	**1**	**24**	**44**	**504**	**1579**	**2870**
Overall Total Residential Apartments		**16**	**12**	**12**	**8**	**2**	**2**	**6**	**2**	**2**	**2**	**4**	**4**	**10**	**4**	**84**	**178**	**1723**	**5657**	**10268**


6.0
STATEMENT OF ARCHITECTURAL
DESIGN INTENT
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6.1 ARCHITECTURAL DESIGN INTENT

The marine village comprises a linear cluster of buildings spread along the shoreline. It's proposed building form encloses the western edge and part of the southern edge of the existing harbour basin. The site's northern aspect and its location at the mouth of the Burnett River are ideal for a mixed use resort residential development of this nature.

The intent of the design is to create a high quality mixed use residential community at Burnett Heads, achieving a design outcome that provides a high standard of liveability and responds appropriately to the scale and developing character of the context and to its natural waterfront setting.

In overall shape, massing, composition and detail, the proposed built form has evolved through a considered analysis of the physical form, existing character, natural landscape, climatic conditions and envisaged potential for the future development of Burnett Heads.

Each building is composed and articulated utilising a consistent architectural language, which contributes to the creation of a place of distinct character. The accordant nature of this language reinforces the concept of the linear cluster of buildings along the 'natural' edge to the harbour, celebrating the boardwalk as a unique place for the whole community to experience.

Exterior building forms are highly articulated and modelled as a series of individual architectural elements, expressing the variety of individual commercial uses and/or dwelling types within. Each of these elements are arranged in a composition of sculpturally distinct yet interconnected architectural forms, articulated by deep recesses and extruded shapes.

Building elevations vary in height and setback, utilising a planar language of blade walls, extruded boxes, cantilevered slabs, glazed balconies, overhanging roofs plus aluminium louvred screens and timber cladding.

Exterior styling is restrained and simple yet bold. The architectural language is contemporary and minimal.

All buildings are designed to be fully accessible.

Commercial buildings contain retail, restaurants, offices and marina support facilities plus some short term accommodation. They vary in height between 1 and 3 storeys. In their external expression these buildings possess a subtropical ambience, which is characterized by off white concrete forms with partial stone and timber cladding and aluminium screens. Their forms are enlivened through the expression of extruded white open box like elements with screened balconies. Cantilevered upper levels create extensive covered pedestrian areas at ground level. Central retail and mixed use buildings possess timber clad and/or metal clad blade walls with 'flying' skillion roof elements over, creating dramatic forms on key buildings.

Residential buildings are angled in plan shape and offset from each other, resulting in an interesting and sinuous built edge of varying height. All apartments open out onto terraces or balconies and possess northern aspect, ranging from north-east to north-west. Building footprints are configured to conceal the core and services. Internal lobbies are glazed and naturally lit and naturally ventilated. AC condensers are screened from view on the southern elevations.

Proposed construction is generally of reinforced concrete foundations and floor slabs, rendered concrete masonry and rendered concrete external walls with concrete and metal roofs.

Exterior materials are to be predominantly glass, natural stone, prefinished aluminium, painted concrete, cement render and prefinished steel.

ESD initiatives proposed in the design, in addition to those required by regulations include:

- Natural cross ventilation
- Fixed sun shading of selected glazing and adjustable screening
- Passive thermal design for ventilation, heating and cooling
- Viridian Comfort Plus Neutral glass (clear) for window glazing generally
- Use of solar panels
- Natural ventilation and lighting of all rooms where possible
- Deep soil zones for groundwater recharge and establishment of vegetation

6.2 PERSPECTIVE VIEW 1

PERSPECTIVE VIEW BUILDING 'A' - LOOKING SOUTH

6.3 PERSPECTIVE VIEW 2

OVERALL PROJECT PERSPECTIVE VIEW LOOKING FROM CNR HARBOUR ESPLANADE AND MARINA ACCESS ROAD

6.4 PERSPECTIVE VIEW 3

PERSPECTIVE VIEW BUILDING 'D' - FROM HARBOUR ESPLANADE

6.5 PERSPECTIVE VIEW 4

PERSPECTIVE VIEW FROM HARBOUR - BUILDINGS A, B, C, D & E

6.6 PERSPECTIVE VIEW 5

PERSPECTIVE VIEW FROM HARBOUR - BUILDINGS A, B, C, D, E & F

6.7 PERSPECTIVE VIEW 6

PERSPECTIVE VIEW FROM HARBOUR - BUILDINGS A, B, C, D, E & F

6.8 PERSPECTIVE VIEW 7

PERSPECTIVE VIEW FROM BOARDWALK - BUILDINGS D, E, F AND A, B, C

6.9 PERSPECTIVE VIEW 8

ENTRY VIEW TO MIXED-USE BUILDING

6.10 PERSPECTIVE VIEW 9

MARINA VIEW TO MIXED-USE BUILDING

6.11 PERSPECTIVE VIEW 10

AERIAL VIEW OF PROJECT LOOKING SOUTH-EAST

6.12 MIXED USE BUILDING

COLOURS AND MATERIALS

WALLS

1. Painted Render/R.C. Dulux 'Vivid White'
2. Painted Render Dulux 'Urban Obsession'
3. Stone Natural Sandstone Colour

BALUSTRADES, FRAMES & GLASS

4. Clear Glass Balustrade Powdercoated Silver
5. Solid Upstand Balustrade Dulux 'Vivid White'
6. Black Powdercoated Aluminium window & door frames, clear glass at ground level retail and Grey Body Tinted Glass

ARCHITECTURAL ELEMENTS

7. Plywood Timber Soffit
8. Metal Colorbond Fascia 'Surfmist'
9. Powdercoated Aluminium Louvred Screens, Timber Look
10. Vertical Aluminium Louvre Blades Powdercoated Silver

6.13 MIXED USE BUILDING

COLOURS AND MATERIALS

WALLS

1. Painted Render Dulux 'Vivid White'
2. Zinc Sheet Cladding
3. Copper Cladding

BALUSTRADES, FRAMES & GLASS

4. Clear Glass Balustrade Powdercoated Silver
5. Black Powdercoated Aluminium window, door frames, Grey Body Tinted Glass

ARCHITECTURAL ELEMENTS

6. Plywood Timber Soffit
7. Metal Colorbond Fascia 'Surfmist'

6.14 APARTMENT BUILDING

COLOURS AND MATERIALS

WALLS

1. Painted Render Dulux 'Vivid White'
2. Painted Render Dulux 'Urban Obsession'

BALUSTRADES, FRAMES & GLASS

3. Clear Glass Balustrade Powdercoated Silver
4. Solid Upstand Balustrade Dulux 'Vivid White'
5. Black Powdercoated Aluminium window, door frames, Grey Body Tinted Glass

ARCHITECTURAL ELEMENTS

6. Plywood Timber Soffit
7. Metal Colorbond Fascia 'Surfmist'
8. Powdercoated Aluminium Screens, Timber Look


7.0
ARCHITECTURAL DRAWINGS
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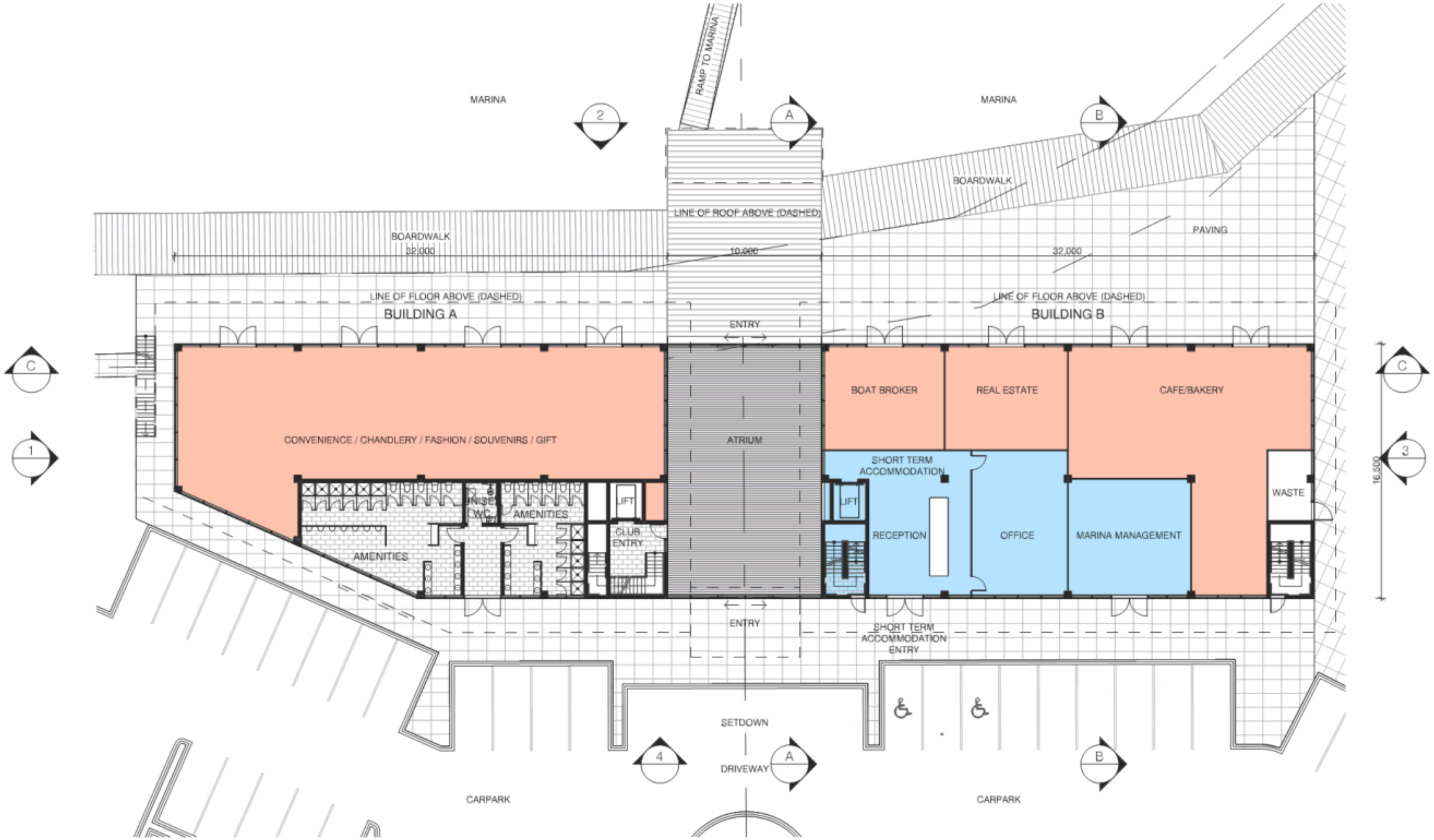
7.1 MIXED USE BUILDINGS A & B

GROUND FLOOR PLAN



NOTE:
ALL HABITABLE ROOMS SHALL BE 300mm ABOVE THE DESIGNATED FLOOD LEVEL

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7.2 MIXED USE BUILDINGS A & B

LEVEL 1 FLOOR PLAN

DEVELOPMENT SUMMARY
SHORT STAY ACCOMMODATION

SUITE A	14 Suites (50%)	37.75 m² Enclosed 10.75 m² Balcony 48.5 m² Total
SUITE B	14 Suites (50%)	25 m² Enclosed 9.25 m² Balcony 33.25 m² Total
TOTAL	28 SUITES	
OFFICE	LEVEL 2	337 m² Enclosed 60 m² Balcony 397 m² Total
YACHT CLUB	LEVEL 1	345 m² Enclosed 220 m² Balcony 565 m² Total

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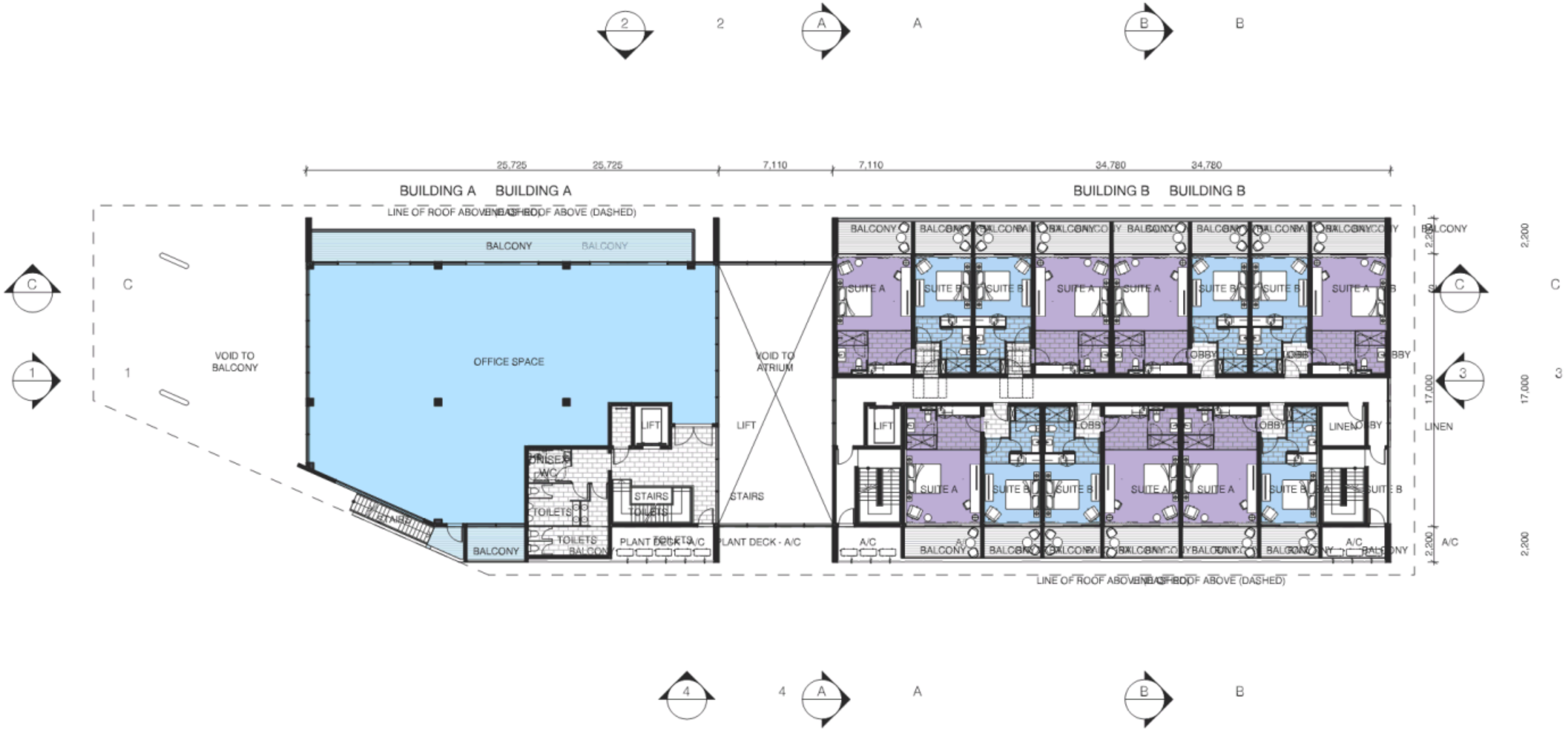
7.3 MIXED USE BUILDINGS A & B

LEVEL 2 FLOOR PLAN



DEVELOPMENT SUMMARY
SHORT STAY ACCOMMODATION

SUITE A	14 Suites (50%)	37.75 m² Enclosed 10.75 m² Balcony 48.5 m² Total
SUITE B	14 Suites (50%)	25 m² Enclosed 9.25 m² Balcony 33.25 m² Total
TOTAL	28 SUITES	
OFFICE	LEVEL 2	337 m² Enclosed 60 m² Balcony 397 m² Total
YACHT CLUB	LEVEL 1	345 m² Enclosed 220 m² Balcony 565 m² Total

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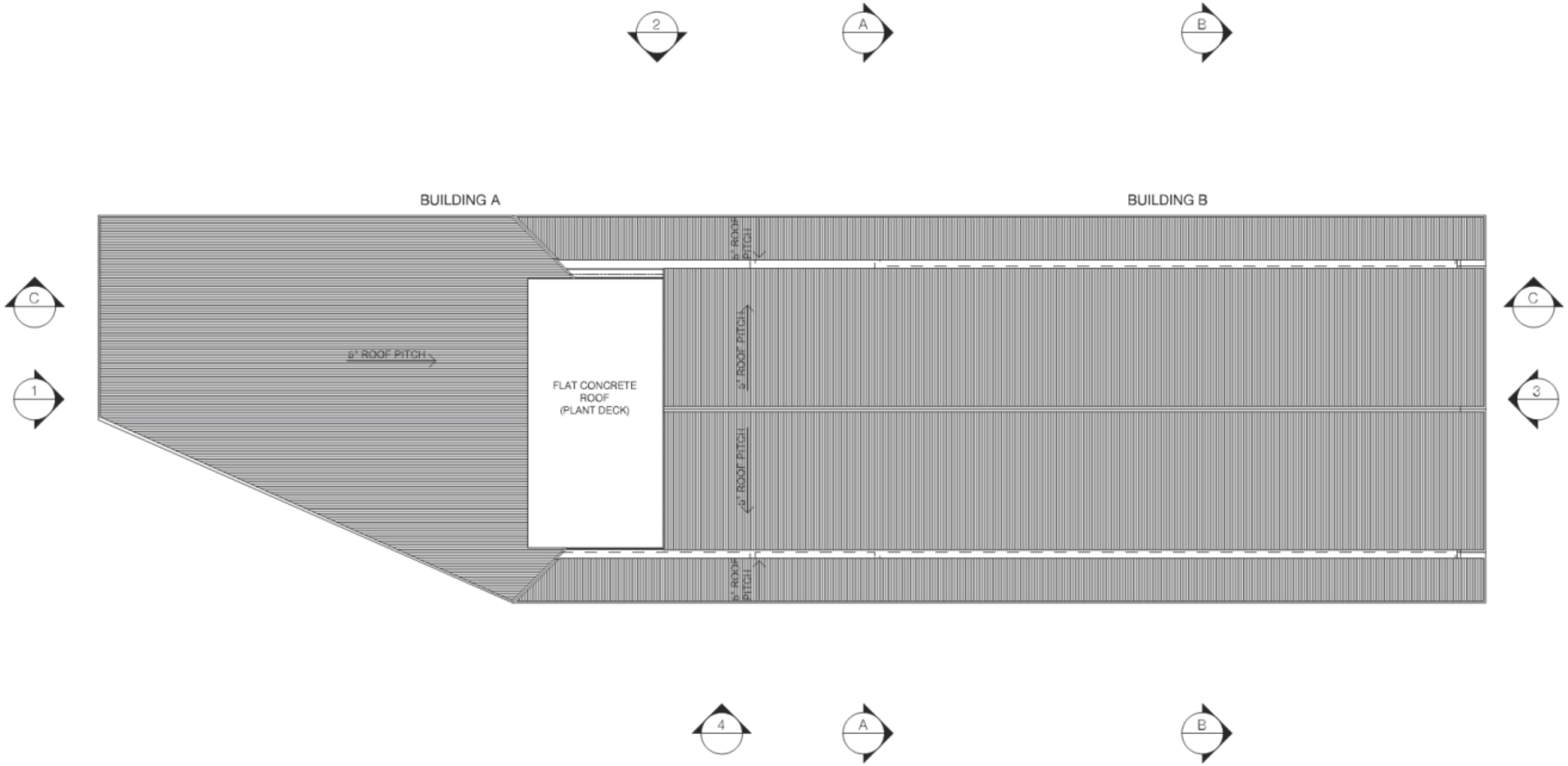
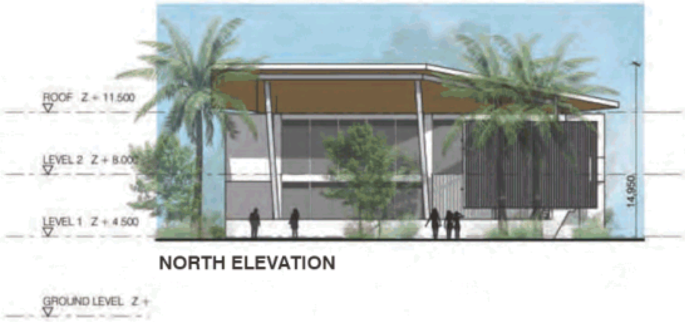
7.4 MIXED USE BUILDINGS A & B

ROOF PLAN

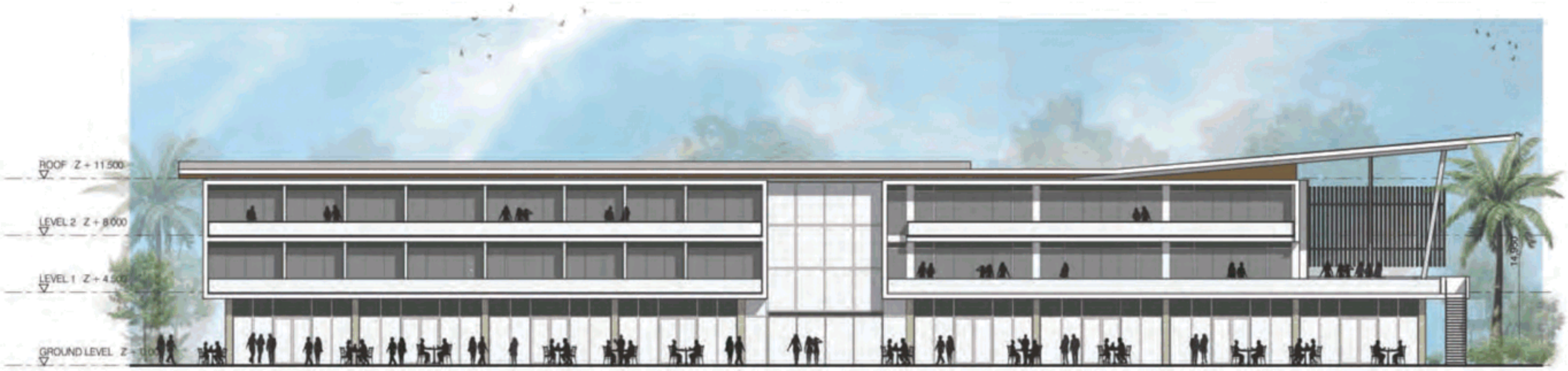


7.5 MIXED USE BUILDINGS A & B

ELEVATIONS (1)



NORTH ELEVATION



WEST ELEVATION

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7.6 MIXED USE BUILDINGS A & B

ELEVATIONS (2)

SOUTH ELEVATION

EAST ELEVATION

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7.7 MIXED USE BUILDINGS A & B

SECTIONS

SECTION A-A - ATRIUM

SECTION B-B

SECTION C-C

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7.8
RETAIL BUILDING C
GROUND FLOOR PLAN
BUILDING B
BOARDWALK
OUTDOOR DINING PAVILION
OUTDOOR DINING TERRACE
BUILDING ABOVE OUTLINE
OUTDOOR DINING TERRACE
SHOP
TAKE AWAY FOOD
TAKE AWAY FOOD
TAKE AWAY FOOD
RESTAURANT
LIFT
TOILETS
TOILETS
MALL
BINS
GATE
SERVICE YARD / WASTE MANAGEMENT
GATE
SHOP
SHOP
BOARDWALK
NOTE:
ALL HABITABLE ROOMS SHALL BE 300mm ABOVE THE DESIGNATED FLOOD LEVEL
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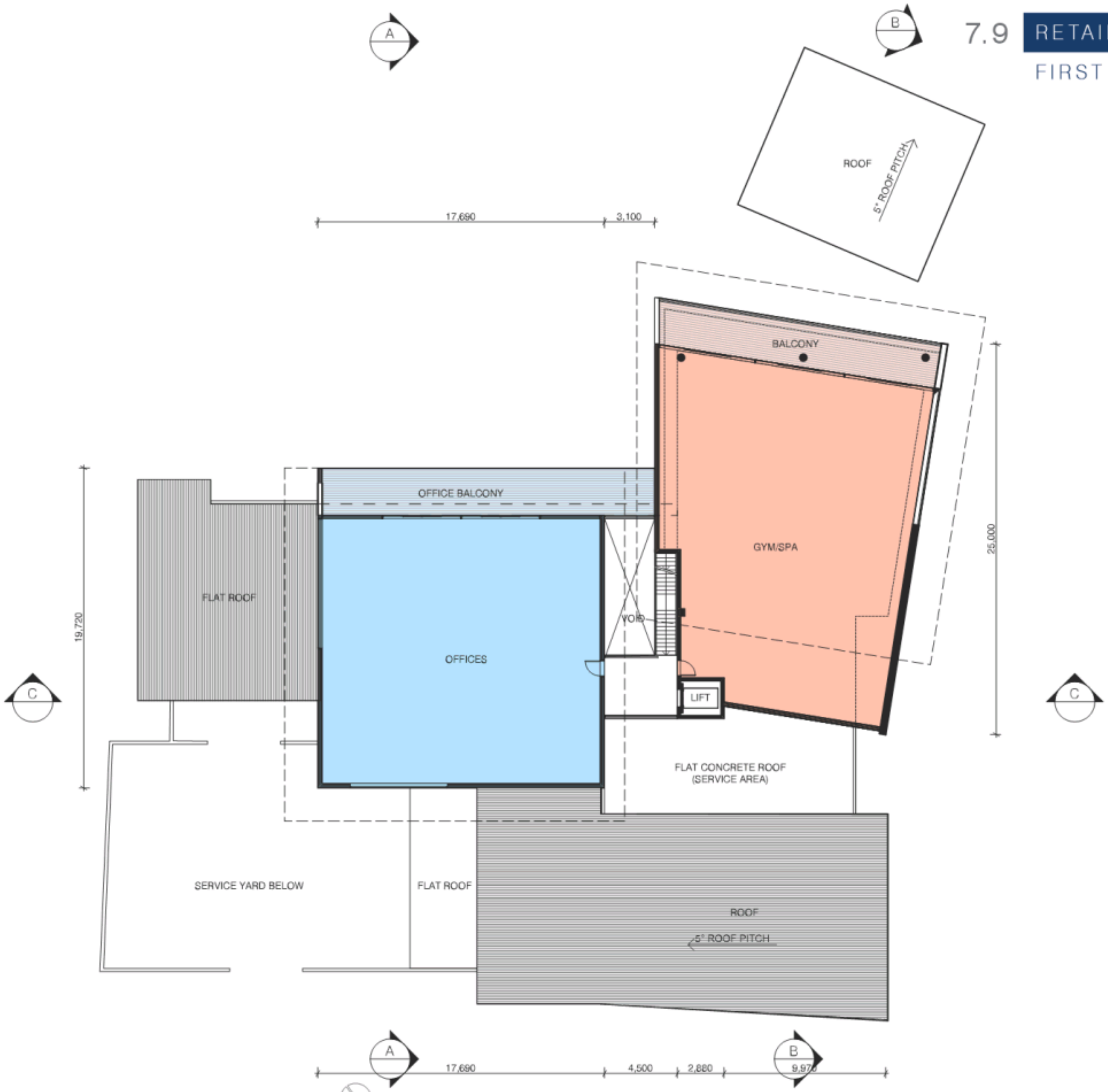
7.9 RETAIL BUILDING C

FIRST FLOOR PLAN



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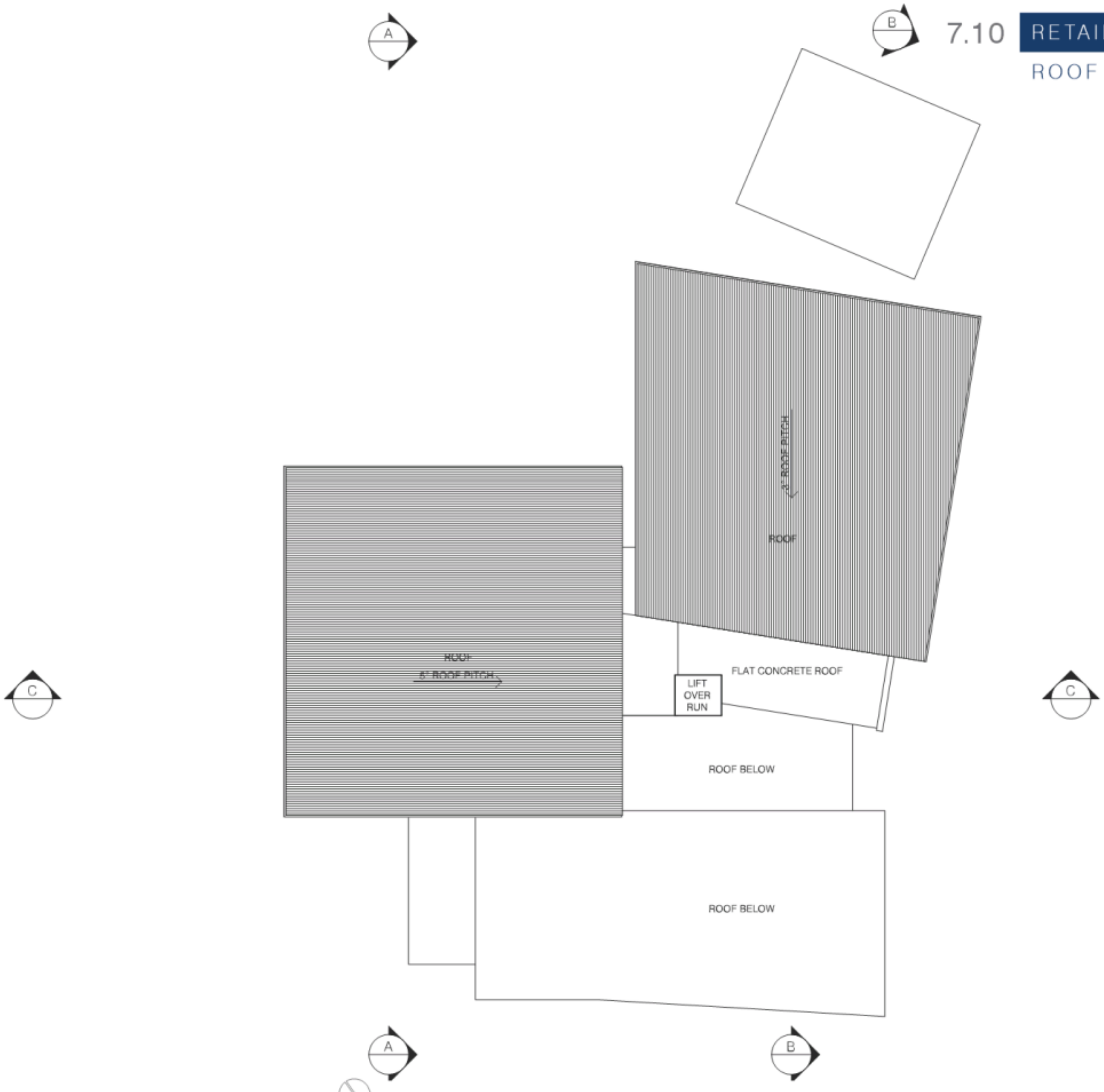
7.10 RETAIL BUILDING C

ROOF PLAN



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7.11 RETAIL BUILDING C

ELEVATIONS (1)

WEST ELEVATION

NORTH ELEVATION

7.12 RETAIL BUILDING C

ELEVATIONS (2)

EAST ELEVATION

SOUTH ELEVATION

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7.13 RETAIL BUILDING C

ELEVATIONS (3)

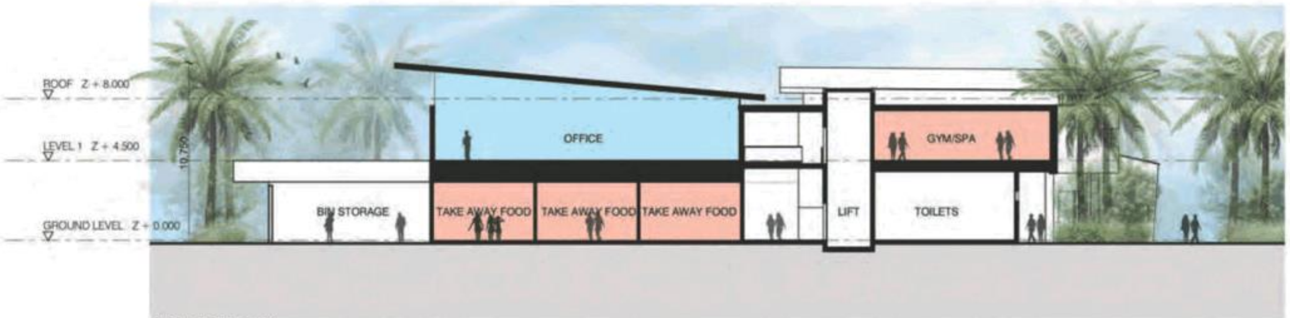
NORTH ELEVATION
(dining pavilion removed)

7.14 RETAIL BUILDING C

SECTIONS

SECTION A-A

SECTION B-B



SECTION C-C

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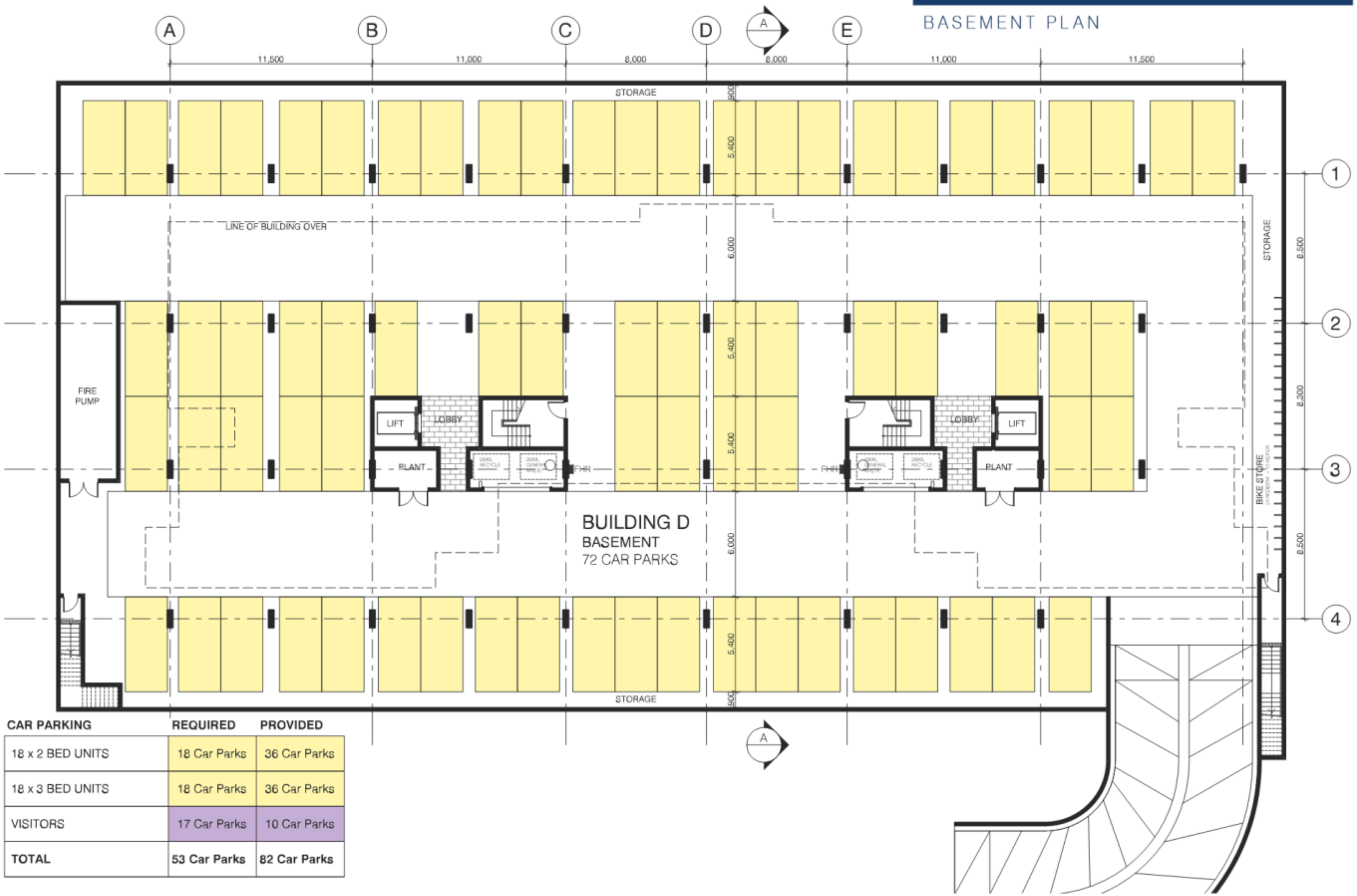
BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG bda

7.15 APARTMENT BUILDING D

BASEMENT PLAN



CAR PARKING	REQUIRED	PROVIDED
18 x 2 BED UNITS	18 Car Parks	36 Car Parks
18 x 3 BED UNITS	18 Car Parks	36 Car Parks
VISITORS	17 Car Parks	10 Car Parks
TOTAL	**53 Car Parks**	**82 Car Parks**

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BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG

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7.16 APARTMENT BUILDING D

GROUND FLOOR PLAN

NOTE:
All habitable rooms shall be 300mm above the designated flood level.

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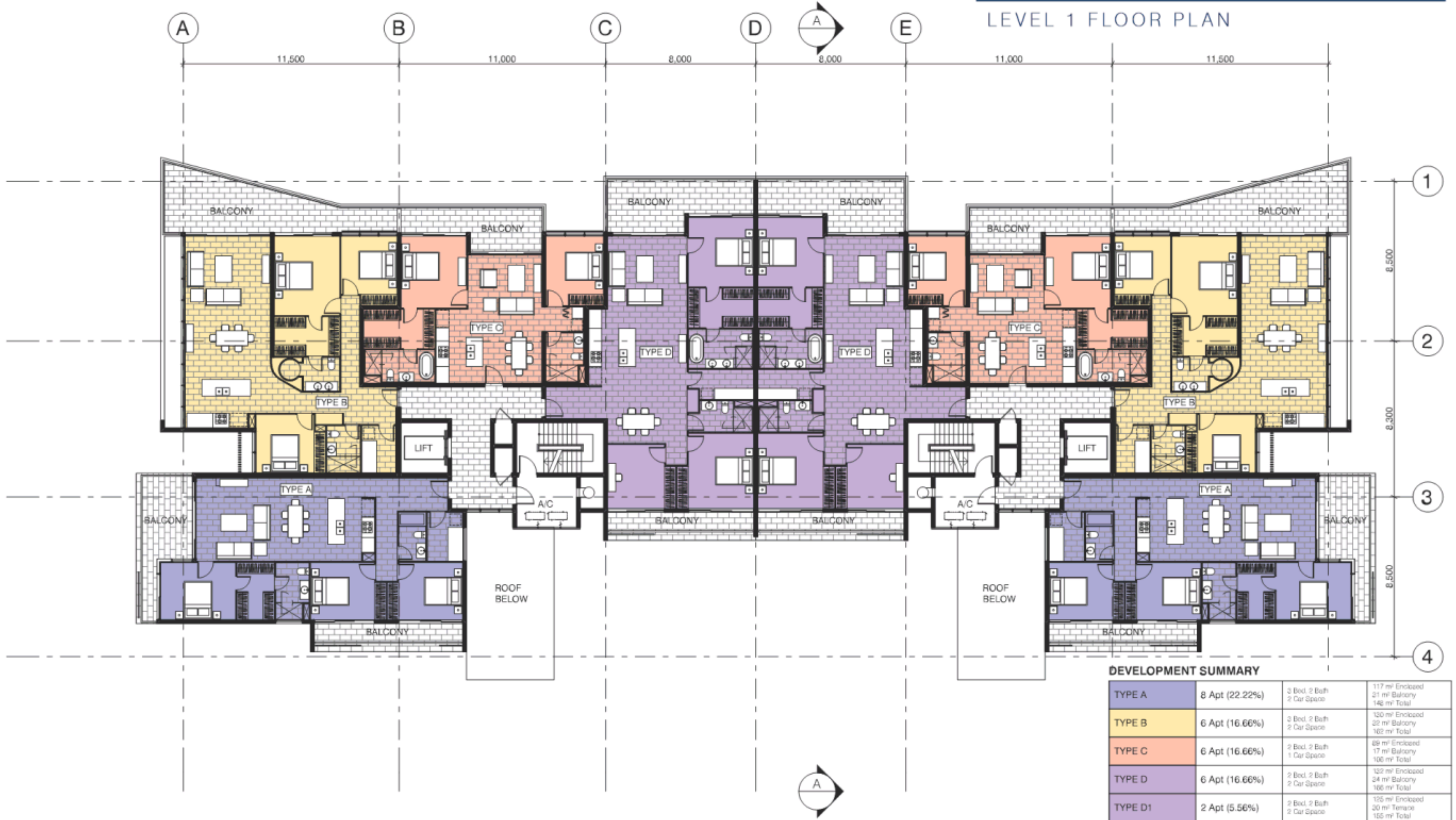
7.17 APARTMENT BUILDING D

LEVEL 1 FLOOR PLAN



DEVELOPMENT SUMMARY

TYPE A	8 Apt (22.22%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	6 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	6 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE D	6 Apt (16.66%)	2 Bed, 2 Bath 2 Car Space	132 m² Enclosed 34 m² Balcony 166 m² Total
TYPE D1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	125 m² Enclosed 30 m² Terrace 155 m² Total
TYPE E	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	192 m² Enclosed 168 m² Balcony 360 m² Total
TYPE F	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	214 m² Enclosed 126 m² Balcony 340 m² Total
TYPE G1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE I	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Terrace 143 m² Total
TOTAL	36 APARTMENTS		

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BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG

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7.18 APARTMENT BUILDING D

LEVEL 2 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	8 Apt (22.22%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 21 m² Balcony 148 m² Total
TYPE B	6 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	6 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE D	6 Apt (16.66%)	2 Bed, 2 Bath 2 Car Space	132 m² Enclosed 34 m² Balcony 166 m² Total
TYPE D1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	125 m² Enclosed 30 m² Terrace 155 m² Total
TYPE E	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	192 m² Enclosed 168 m² Balcony 360 m² Total
TYPE F	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	214 m² Enclosed 126 m² Balcony 340 m² Total
TYPE G1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE I	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Terrace 143 m² Total
TOTAL	36 APARTMENTS		

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BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG

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7.19 APARTMENT BUILDING D

LEVEL 3 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	8 Apt (22.22%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	6 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	6 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE D	6 Apt (16.66%)	2 Bed, 2 Bath 2 Car Space	132 m² Enclosed 34 m² Balcony 166 m² Total
TYPE D1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	125 m² Enclosed 30 m² Terrace 155 m² Total
TYPE E	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	192 m² Enclosed 168 m² Balcony 360 m² Total
TYPE F	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	214 m² Enclosed 126 m² Balcony 340 m² Total
TYPE G1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE I	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Terrace 143 m² Total
TOTAL	36 APARTMENTS		

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BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG

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7.20 APARTMENT BUILDING D

LEVEL 4 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	8 Apt (22.22%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	6 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 22 m² Balcony 162 m² Total
TYPE C	6 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE D	6 Apt (16.66%)	2 Bed, 2 Bath 2 Car Space	132 m² Enclosed 24 m² Balcony 166 m² Total
TYPE D1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	125 m² Enclosed 30 m² Terrace 155 m² Total
TYPE E	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	192 m² Enclosed 168 m² Balcony 360 m² Total
TYPE F	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	214 m² Enclosed 126 m² Balcony 340 m² Total
TYPE G1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE I	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Terrace 143 m² Total
TOTAL	36 APARTMENTS		

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bda

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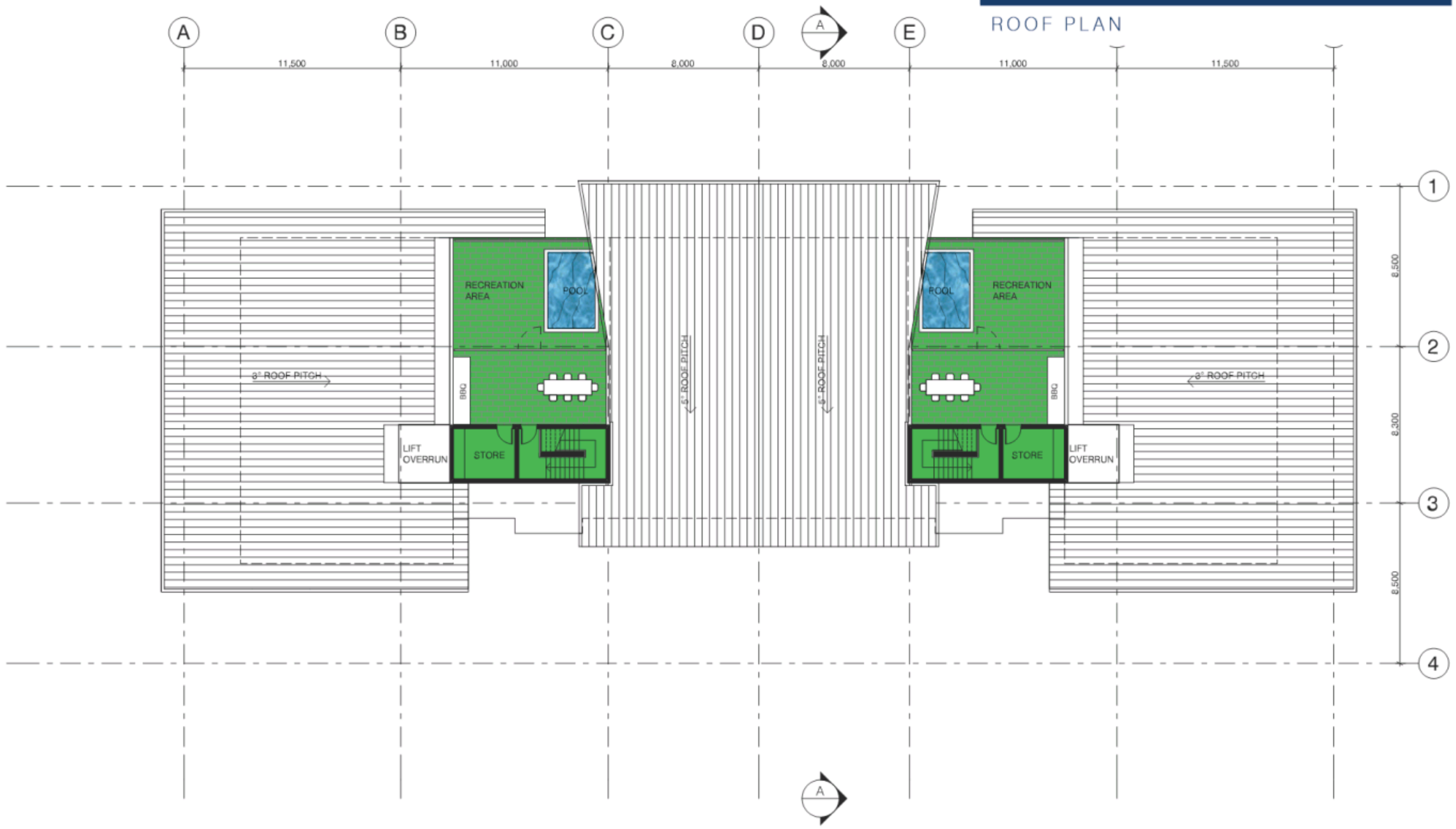
7.21 APARTMENT BUILDING D

ROOF PLAN



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BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG

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7.22 APARTMENT BUILDING D

ELEVATION (1)

EAST ELEVATION

7.23 APARTMENT BUILDING D

ELEVATION (2)

NORTH ELEVATION

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7.24 APARTMENT BUILDING D

ELEVATION (3)

WEST ELEVATION

7.25 APARTMENT BUILDING D

ELEVATION (4)

SOUTH ELEVATION

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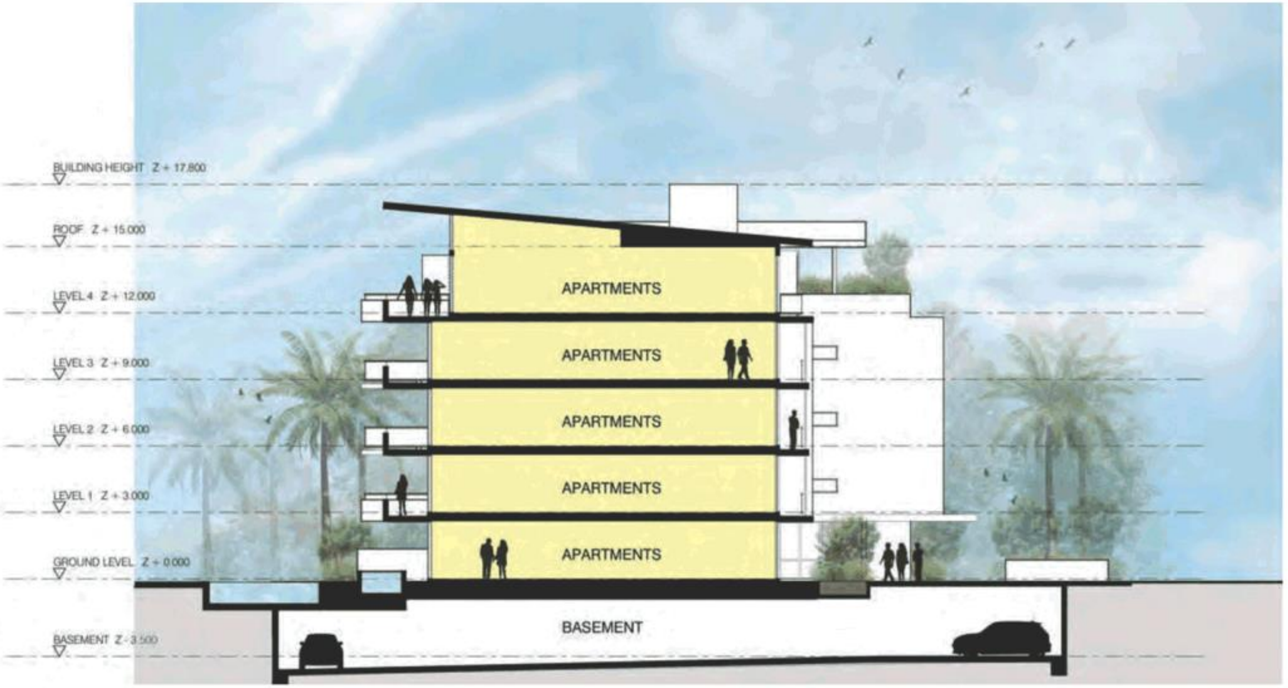
BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG bda 79 / 113

7.26 APARTMENT BUILDING D

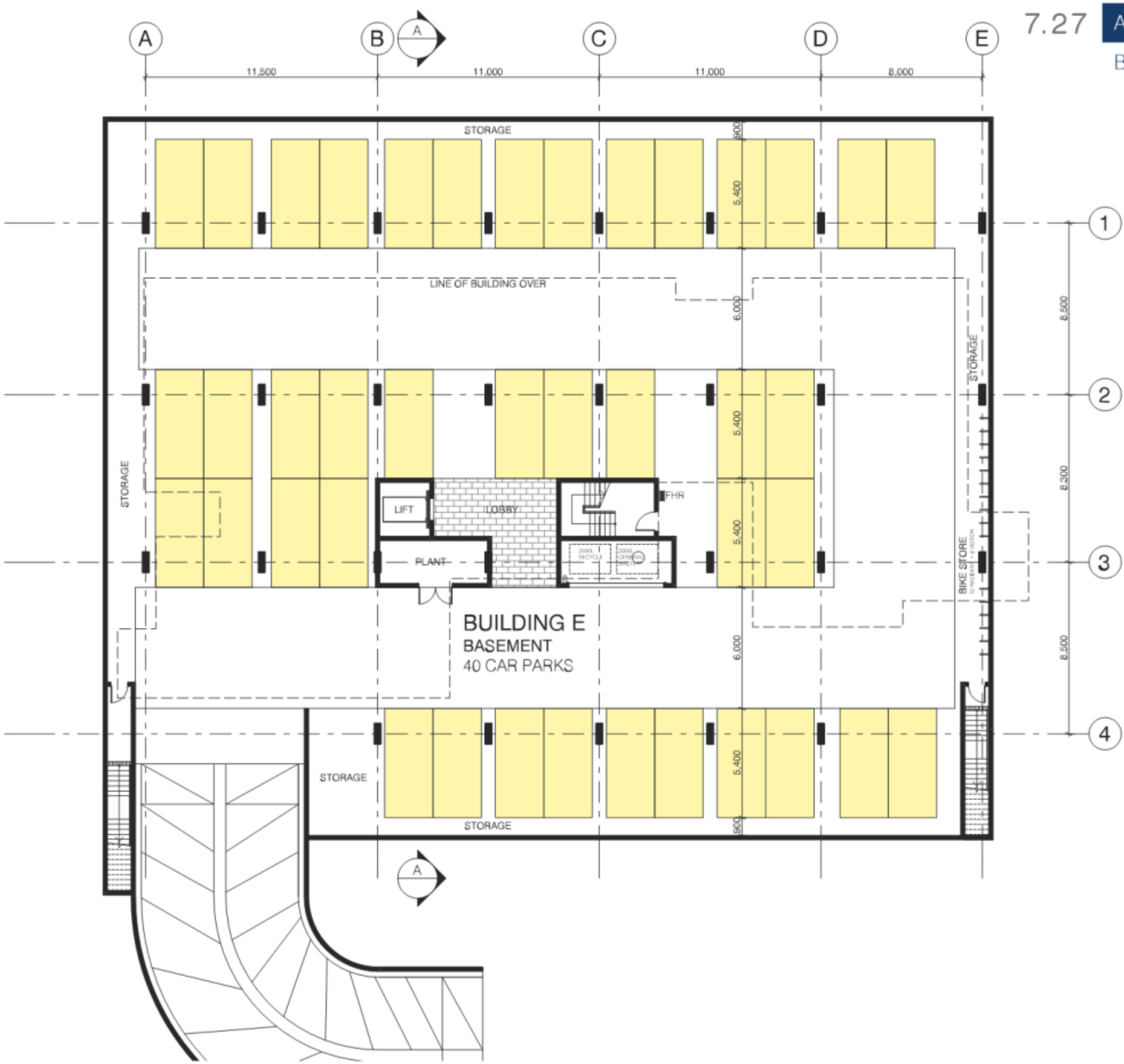
SECTION



SECTION A-A

7.27 APARTMENT BUILDING E

BASEMENT PLAN



CAR PARKING	REQUIRED	PROVIDED
11 x 2 BED UNITS	11 Car Parks	14 Car Parks
13 x 3 BED UNITS	13 Car Parks	26 Car Parks
VISITORS (ON GRADE)	12 Car Parks	7 Car Parks
TOTAL	**36 Car Parks**	**47 Car Parks**

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7.28 APARTMENT BUILDING E

GROUND FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	3 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	3 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

NOTE:
ALL HABITABLE ROOMS SHALL BE 300mm ABOVE THE DESIGNATED FLOOD LEVEL

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bda

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7.29 APARTMENT BUILDING E

LEVEL 1 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	3 Bed, 2 Bath 2 Car Space	152 m² Enclosed 162 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	3 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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7.30 APARTMENT BUILDING E

LEVEL 2 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	2 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG

7.31 APARTMENT BUILDING E

LEVEL 3 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	2 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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7.32 APARTMENT BUILDING E

LEVEL 4 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	3 Bed, 2 Bath 2 Car Space	152 m² Enclosed 162 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	3 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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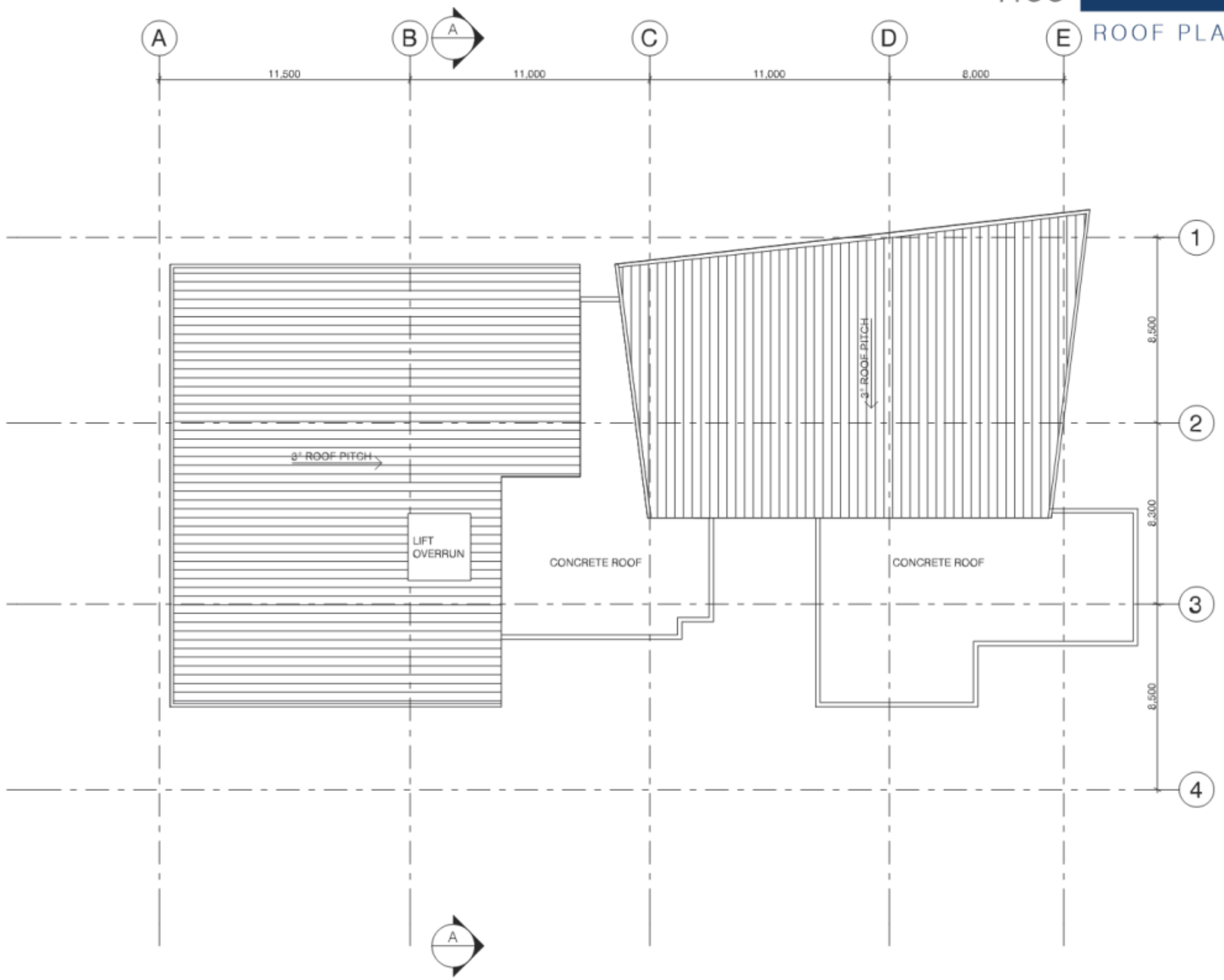
BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG

7.33 APARTMENT BUILDING E

ROOF PLAN



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7.34 APARTMENT BUILDING E

ELEVATION (1)

EAST ELEVATION

7.35 APARTMENT BUILDING E

ELEVATION (2)

NORTH ELEVATION

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7.36 APARTMENT BUILDING E

ELEVATION (3)

WEST ELEVATION

7.37 APARTMENT BUILDING E

ELEVATION (4)

SOUTH ELEVATION

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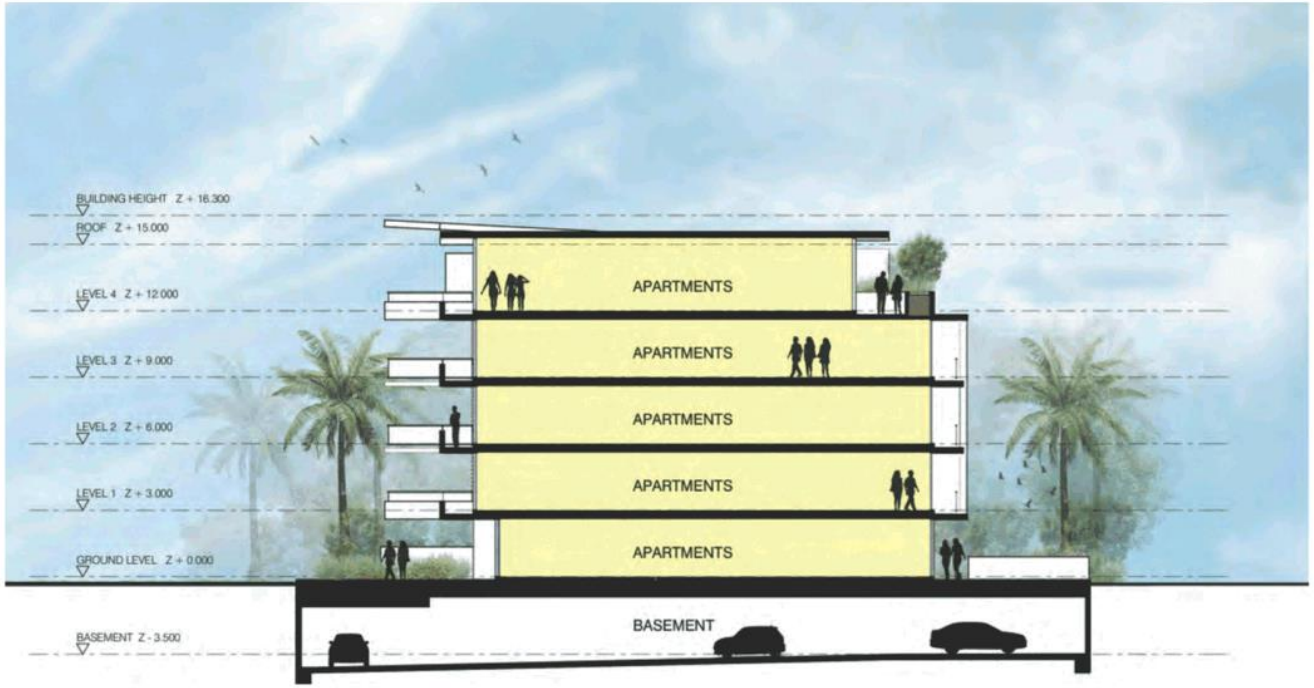
7.38 APARTMENT BUILDING E

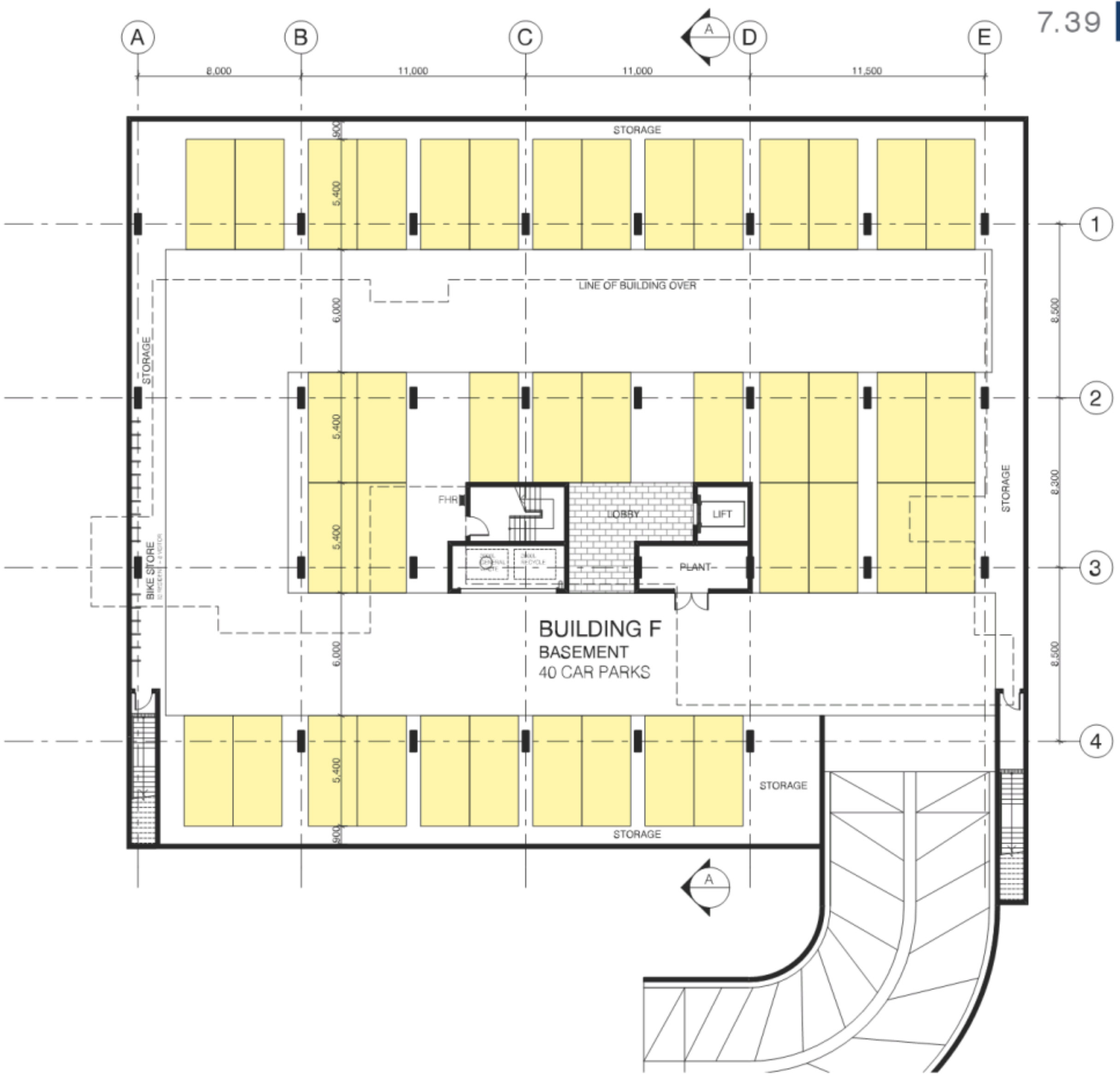
SECTION



SECTION A-A

7.39 APARTMENT BUILDING F

BASEMENT PLAN



CAR PARKING	REQUIRED	PROVIDED
11 x 2 BED UNITS	11 Car Parks	14 Car Parks
13 x 3 BED UNITS	13 Car Parks	26 Car Parks
VISITORS (ON GRADE)	12 Car Parks	7 Car Parks
TOTAL	36 Car Parks	47 Car Parks

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7.40 APARTMENT BUILDING F

GROUND FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m^2 Enclosed 31 m^2 Balcony 148 m^2 Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m^2 Enclosed 32 m^2 Balcony 162 m^2 Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m^2 Enclosed 17 m^2 Balcony 106 m^2 Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m^2 Enclosed 22 m^2 Balcony 106 m^2 Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m^2 Enclosed 18 m^2 Balcony 106 m^2 Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m^2 Enclosed 18 m^2 Balcony 106 m^2 Total
TYPE E1	1 Apt (4.17%)	3 Bed, 2 Bath 2 Car Space	152 m^2 Enclosed 162 m^2 Balcony 440 m^2 Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m^2 Enclosed 149 m^2 Balcony 283 m^2 Total
TYPE H	5 Apt (20.83%)	3 Bed, 2 Bath 2 Car Space	165 m^2 Enclosed 47 m^2 Balcony 212 m^2 Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m^2 Enclosed 54 m^2 Balcony 145 m^2 Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

NOTE:
ALL HABITABLE ROOMS SHALL BE 300mm ABOVE THE DESIGNATED FLOOD LEVEL

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7.41 APARTMENT BUILDING F

LEVEL 1 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	3 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	3 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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7.42 APARTMENT BUILDING F

LEVEL 2 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	2 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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7.43 APARTMENT BUILDING F

LEVEL 3 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 22 m² Balcony 152 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	2 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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7.44 APARTMENT BUILDING F

LEVEL 4 FLOOR PLAN

DEVELOPMENT SUMMARY

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m² Enclosed 31 m² Balcony 148 m² Total
TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m² Enclosed 32 m² Balcony 162 m² Total
TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total
TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total
TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total
TYPE E1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total
TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total
TYPE H	5 Apt (20.83%)	2 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total
TOTAL	24 APARTMENTS		

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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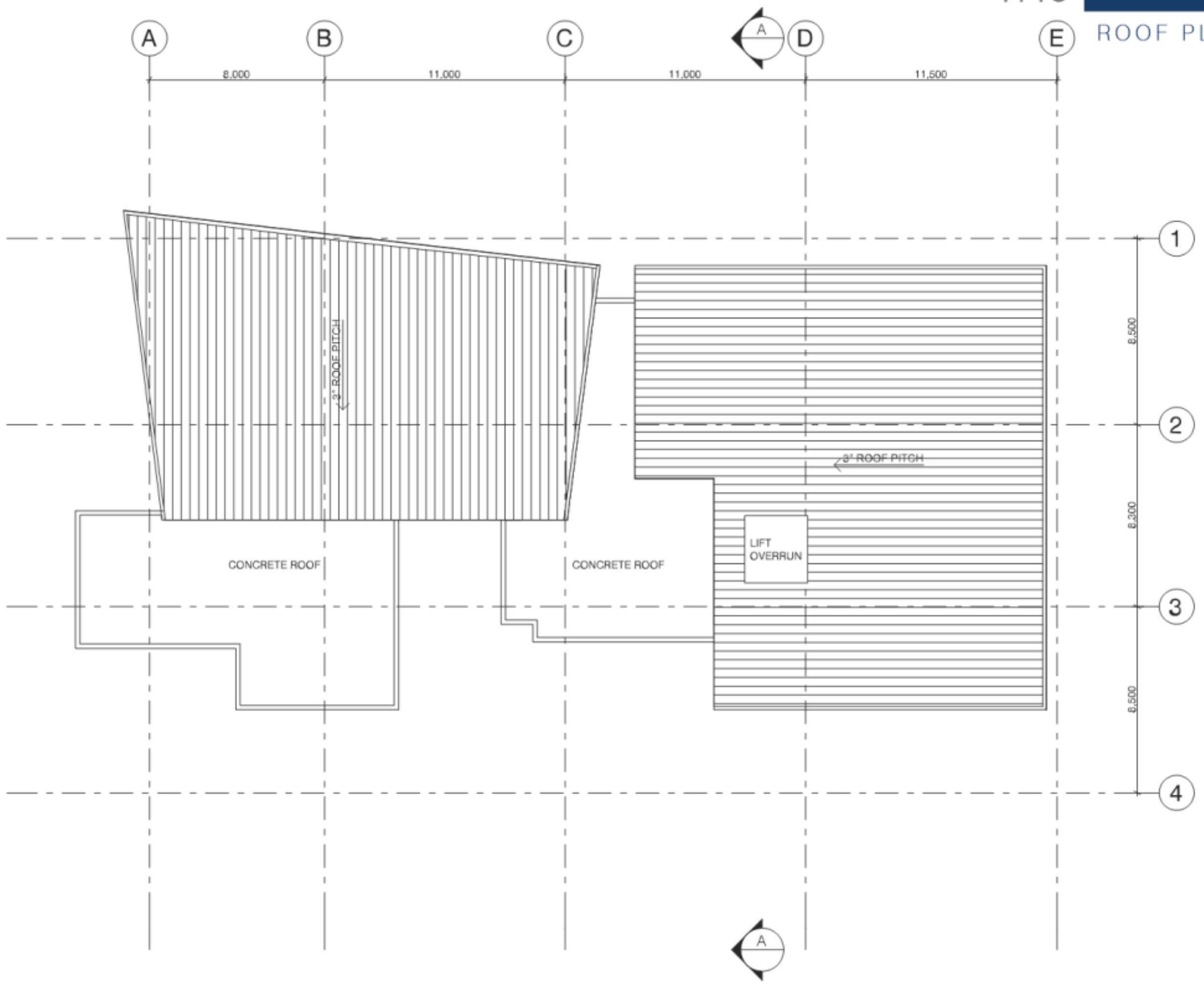
7.45 APARTMENT BUILDING F

ROOF PLAN



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7.46 APARTMENT BUILDING F

ELEVATION (1)

EAST ELEVATION

7.47 APARTMENT BUILDING F

ELEVATION (2)

NORTH ELEVATION

7.48 APARTMENT BUILDING F

ELEVATION (3)

WEST ELEVATION

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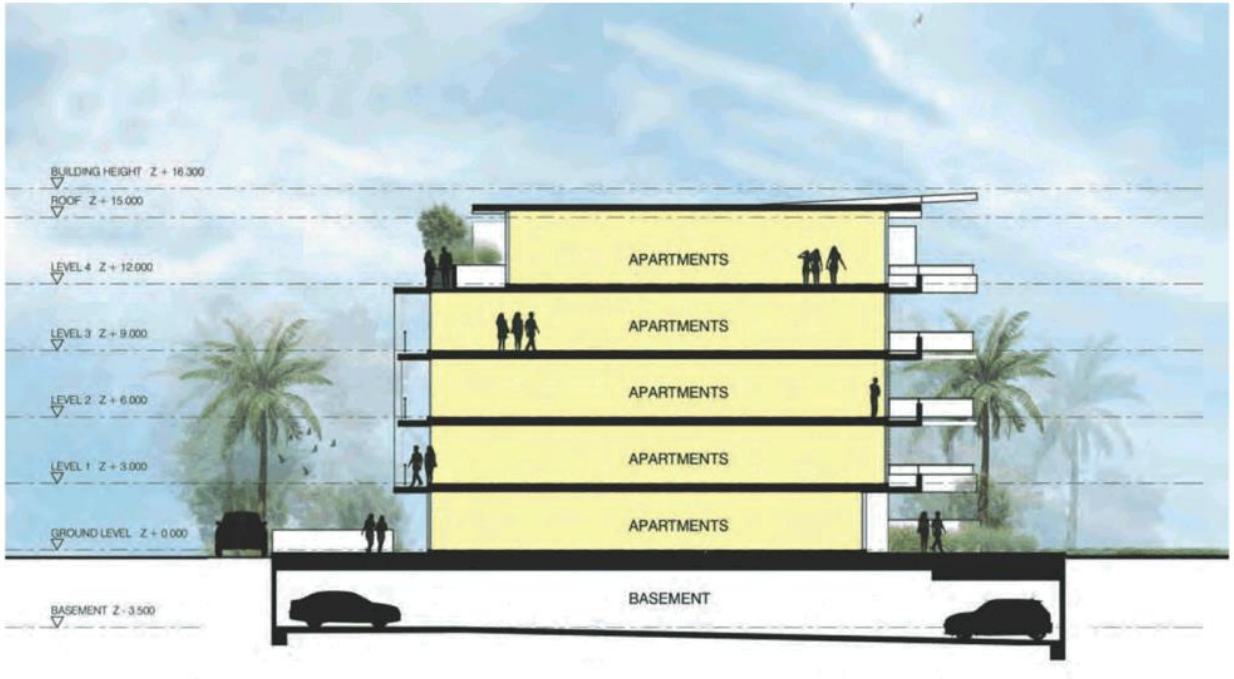
7.49 APARTMENT BUILDING F

ELEVATION (4)

SOUTH ELEVATION

7.50 APARTMENT BUILDING F

SECTION



SECTION A-A

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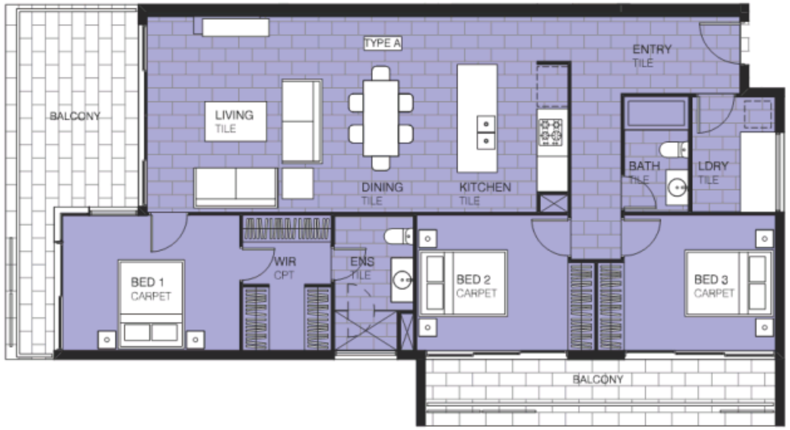
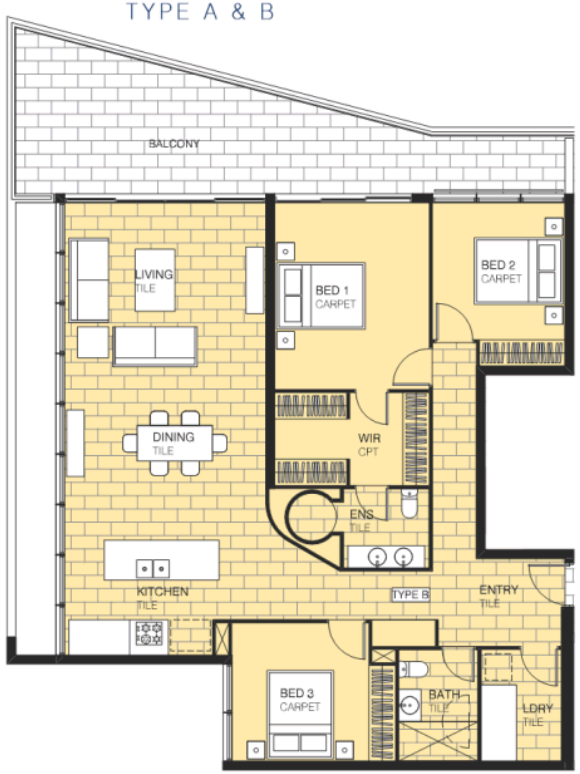
7.51 TYPICAL APARTMENT PLANS

TYPE A & B





UNIT TYPE A - 1:100 (A3)

BUILDING D

TYPE A	8 Apt (22.22%)	3 Bed, 2 Bath 2 Car Space	117 m^2 Enclosed 31 m^2 Balcony 148 m^2 Total

BUILDING E

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m^2 Enclosed 31 m^2 Balcony 148 m^2 Total

BUILDING F

TYPE A	4 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	117 m^2 Enclosed 31 m^2 Balcony 148 m^2 Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

UNIT TYPE B - 1:100 (A3)

BUILDING D

TYPE B	6 Apt (16.66%)	3 Bed, 2 Bath 2 Car Space	130 m^2 Enclosed 32 m^2 Balcony 162 m^2 Total

BUILDING E

TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m^2 Enclosed 32 m^2 Balcony 162 m^2 Total

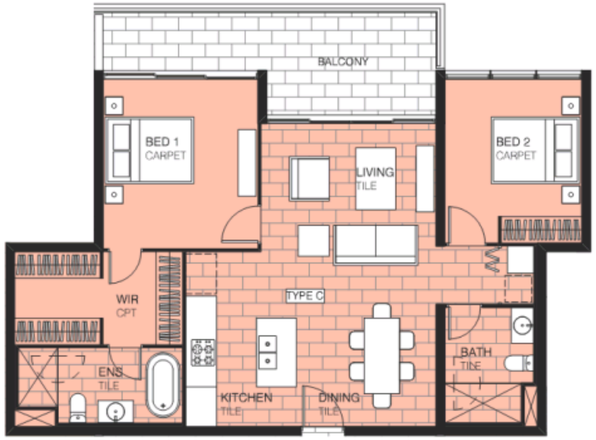
BUILDING F

TYPE B	3 Apt (12.5%)	3 Bed, 2 Bath 2 Car Space	130 m^2 Enclosed 32 m^2 Balcony 162 m^2 Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

7.52 TYPICAL APARTMENT PLANS

TYPE C & C1



UNIT TYPE C - 1:100 (A3)

BUILDING D

TYPE C	6 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total

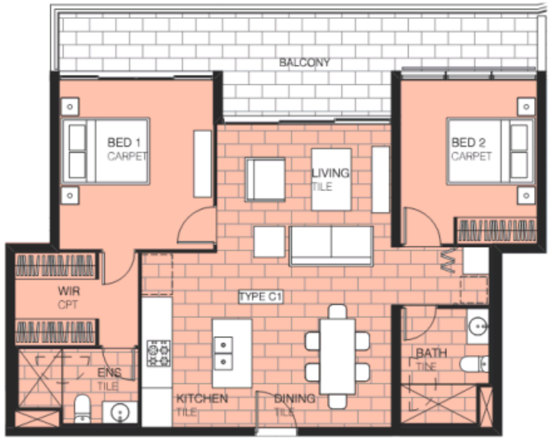
BUILDING E

TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total

BUILDING F

TYPE C	3 Apt (12.5%)	2 Bed, 2 Bath 1 Car Space	89 m² Enclosed 17 m² Balcony 106 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change



UNIT TYPE C1 - 1:100 (A3)

BUILDING E

TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total

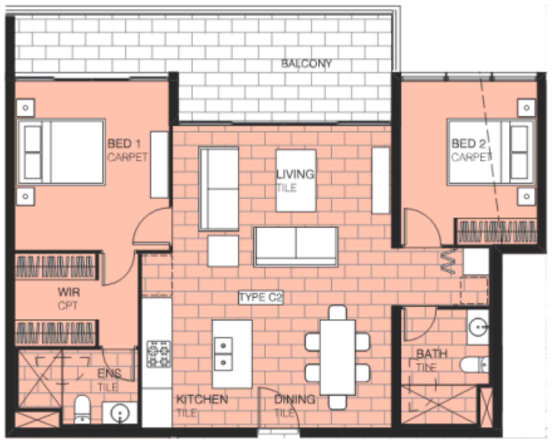
BUILDING F

TYPE C1	4 Apt (16.66%)	2 Bed, 2 Bath 1 Car Space	84 m² Enclosed 22 m² Balcony 106 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

7.53 **TYPICAL APARTMENT PLANS**

TYPE C2, C3 & D



UNIT TYPE C2 - 1:100 (A3)

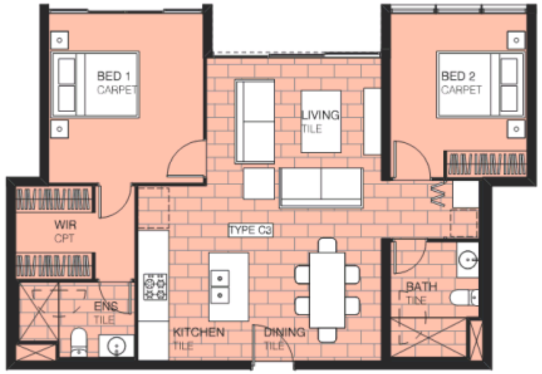
BUILDING E

TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total

BUILDING F

TYPE C2	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change



UNIT TYPE C3 - 1:100 (A3)

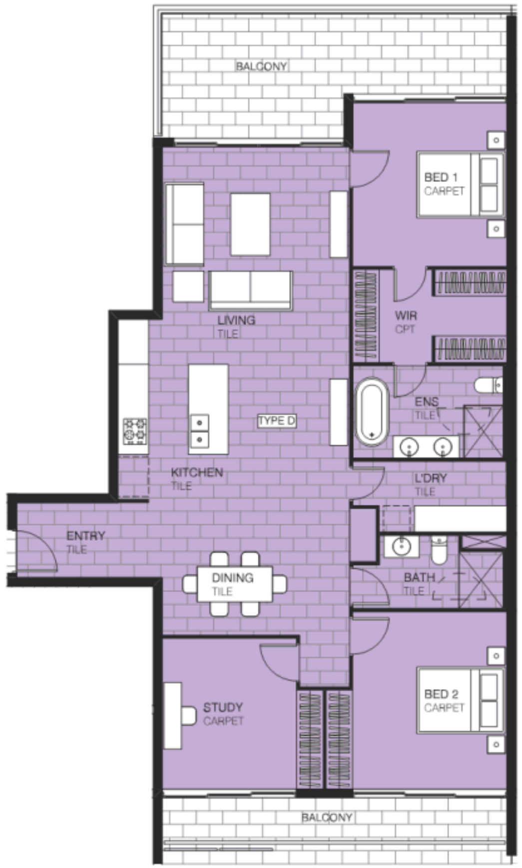
BUILDING E

TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total

BUILDING F

TYPE C3	1 Apt (4.17%)	2 Bed, 2 Bath 1 Car Space	88 m² Enclosed 18 m² Balcony 106 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change



UNIT TYPE D - 1:100 (A3)

BUILDING D

TYPE D	6 Apt (16.66%)	2 Bed, 2 Bath 2 Car Space	132 m² Enclosed 34 m² Balcony 166 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

7.54 TYPICAL APARTMENT PLANS

TYPE E

TYPE E1 1 Apt (4.17%)

TYPE E1 1 Apt (4.17%)

UNIT TYPE E - 1:100 (A3)

BUILDING D

TYPE E	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	192 m² Enclosed 168 m² Balcony 360 m² Total

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Bed, 3 Bath
Car Space

192 m² Enclosed
168 m² Balcony
360 m² Total

UNIT TYPE E1 - 1:100 (A3)

BUILDING E

TYPE E1	1 Apt (4.17%)	3 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total

BUILDING F

TYPE E1	1 Apt (4.17%)	3 Bed, 2 Bath 2 Car Space	152 m² Enclosed 163 m² Balcony 440 m² Total

7.55 TYPICAL APARTMENT PLANS

TYPE E1

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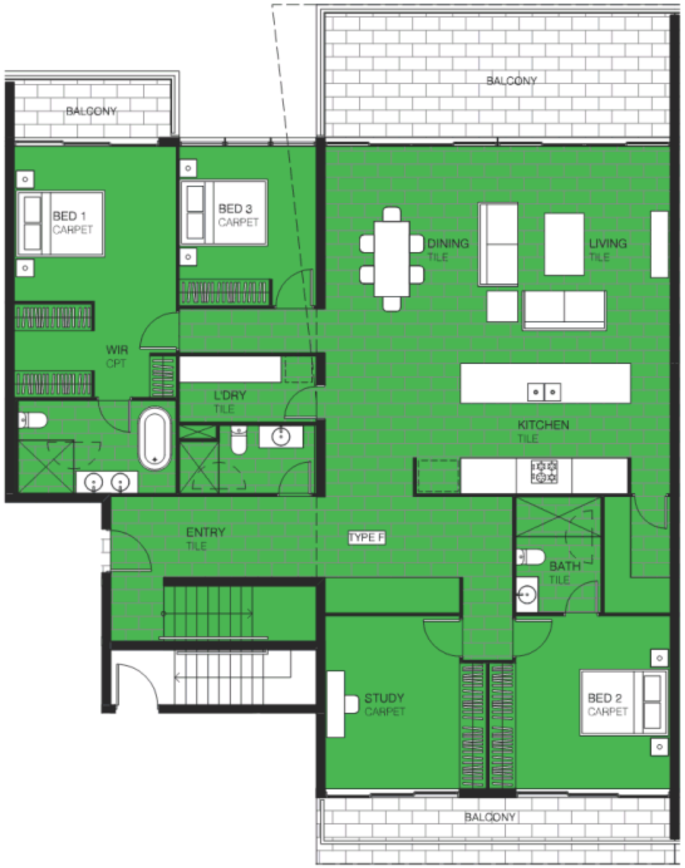
7.56 TYPICAL APARTMENT PLANS

TYPE F

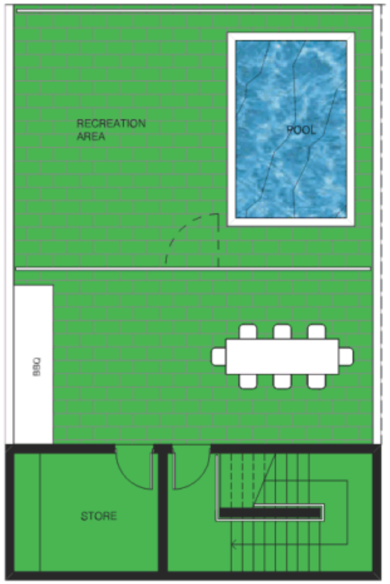


UNIT TYPE F - 1:100 (A3)

BUILDING D

TYPE F	2 Apt (5.56%)	3 Bed, 3 Bath 2 Car Space	214 m² Enclosed 126 m² Balcony 340 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change



UNIT TYPE F ROOF - 1:100 (A3)

7.57 TYPICAL APARTMENT PLANS

TYPE G & H

UNIT TYPE H - 1:100 (A3)

BUILDING E

TYPE H	5 Apt (20.83%)	3 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total

BUILDING F

TYPE H	5 Apt (20.83%)	3 Bed, 2 Bath 2 Car Space	165 m² Enclosed 47 m² Balcony 212 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

UNIT TYPE G - 1:100 (A3)

BUILDING D

TYPE G1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total

BUILDING E

TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total

BUILDING F

TYPE G1	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	134 m² Enclosed 149 m² Balcony 283 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

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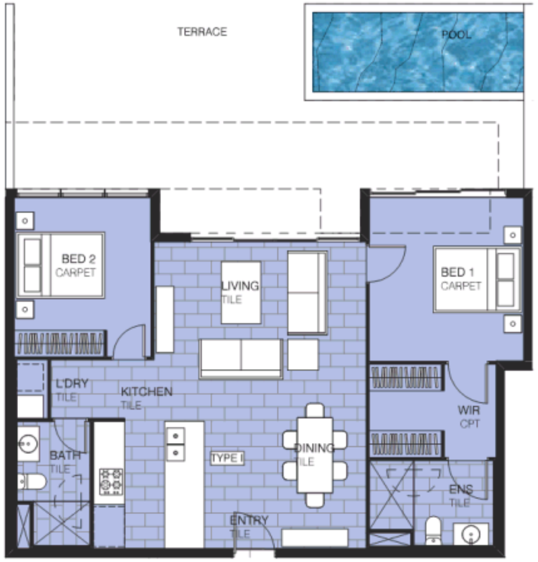
7.58 TYPICAL APARTMENT PLANS

TYPE I & D1



UNIT TYPE I - 1:100 (A3)

BUILDING D

TYPE I	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Terrace 143 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

BUILDING E

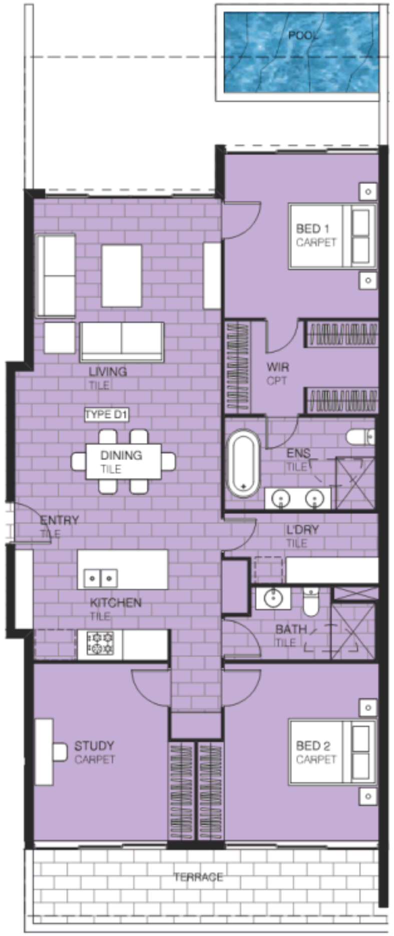
TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

BUILDING F

TYPE I	1 Apt (4.17%)	2 Bed, 2 Bath 2 Car Space	89 m² Enclosed 54 m² Balcony 145 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change



UNIT TYPE D1 - 1:100 (A3)

BUILDING D

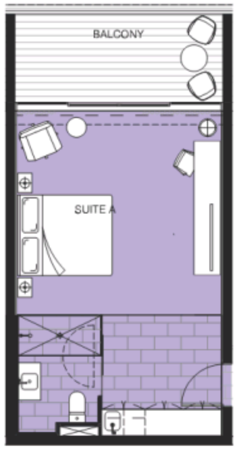
TYPE D1	2 Apt (5.56%)	2 Bed, 2 Bath 2 Car Space	125 m² Enclosed 30 m² Terrace 155 m² Total

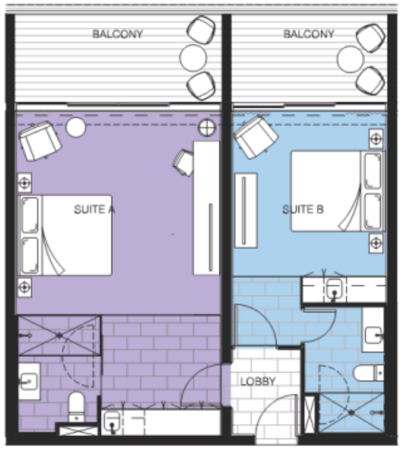
* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

7.59 TYPICAL SHORT TERM ACCOMMODATION

TYPE A & B

Note: These suites are configured in pairs to create a twin key apartment with shared entry.





SUITE TYPE A - 1:100 (A3)

SUITE A	14 Suites (50%)	37.75 m² Enclosed 10.75 m² Balcony 48.5 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

SUITE TYPE B - 1:100 (A3)

SUITE B	14 Suites (50%)	25 m² Enclosed 9.25 m² Balcony 33.25 m² Total

* Saleable Unit Areas measured to the centreline of party walls and centreline of external walls.
Areas are approximate and will be subject to change

COMBINED SUITE - 1:100 (A3)

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Burnett Harbour 'Marina Village' Bundaberg - Stage 2

Preliminary Approval Application

23 October 2018
Issue F

for BH Developments Qld Pty Ltd

bda

0.0 CONTENTS

1.0 APPLICATION & CONSULTANTS

1.1 APPLICATION:

1.1.0 APPLICANT:
BH Developments Qld Pty Ltd

1.1.1 APPLICATION:
Preliminary Approval

1.1.2 STREET ADDRESS:
44 Harbour Esplanade, Burnett Heads

1.1.3 PROPERTY DESCRIPTION:
Part of Lot 1 on SP157913

1.2 CONSULTANTS:

1.2.1 ARCHITECTS & URBAN DESIGN
BDA Architecture
Contact: Darren Greenaway Ph - (07) 5555 2600

1.2.2 TOWN PLANNER
InsiteSJC
Contact: Randall Barrington Ph - (07) 4151 6677

1.2.3 CIVIL
RMA Engineers
Contact: Scott Graham Ph - (07) 3846 5885

1.2.4 TRAFFIC
RMA Engineers
Contact: Perci Barnes Ph - (07) 3846 5885

2.0 EXECUTIVE SUMMARY

DEVELOPMENT SUBMISSION

The development application process for this project is in two parts:
- A Development Application for the western end Marina Village Stage 1; and
- A Preliminary Approval Application for the Eastern and Marina Village Stage 2.

This approach secures specific development outcomes for Stage 1, and secures the in-principle development strategy for Stage 2, with a little more flexibility for future development.

OVERVIEW

This application for Preliminary Approval seeks approval for Stage 2 of the project; the eastern component of the proposed marina village, which comprises the resort complex buildings I, J, K and L, waterfront villas M, eco villas N and residential apartment buildings G and H.

Through thoughtful consideration of the existing waterfront context and its envisaged potential for urban development, the execution of this design will result in the addition of a high quality waterfront resort residential community providing both short and long term accommodation, which will provide significant amenity for residents and visitors and contribute positively to the existing community of Burnett Heads.

3.0

STATEMENT OF URBAN DESIGN INTENT

- SITE ANALYSIS

3.1 CONTEXT PLAN

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3.2 EXISTING BUILDINGS & ROADS

- SUBJECT SITE
- ADJACENT SITE SUBJECT TO SEPARATE DA APPLICATION
- EXISTING SITE ENTRIES
- HARBOUR ESPLANADE
- EXISTING 'BLUE WATER CLUB'
- EXISTING WORKSHOP, CHANDLERY, CARETAKER RESIDENCE
- EXISTING VOLUNTEER MARINE RESCUE BUILDING

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3.3 STREET VIEWS

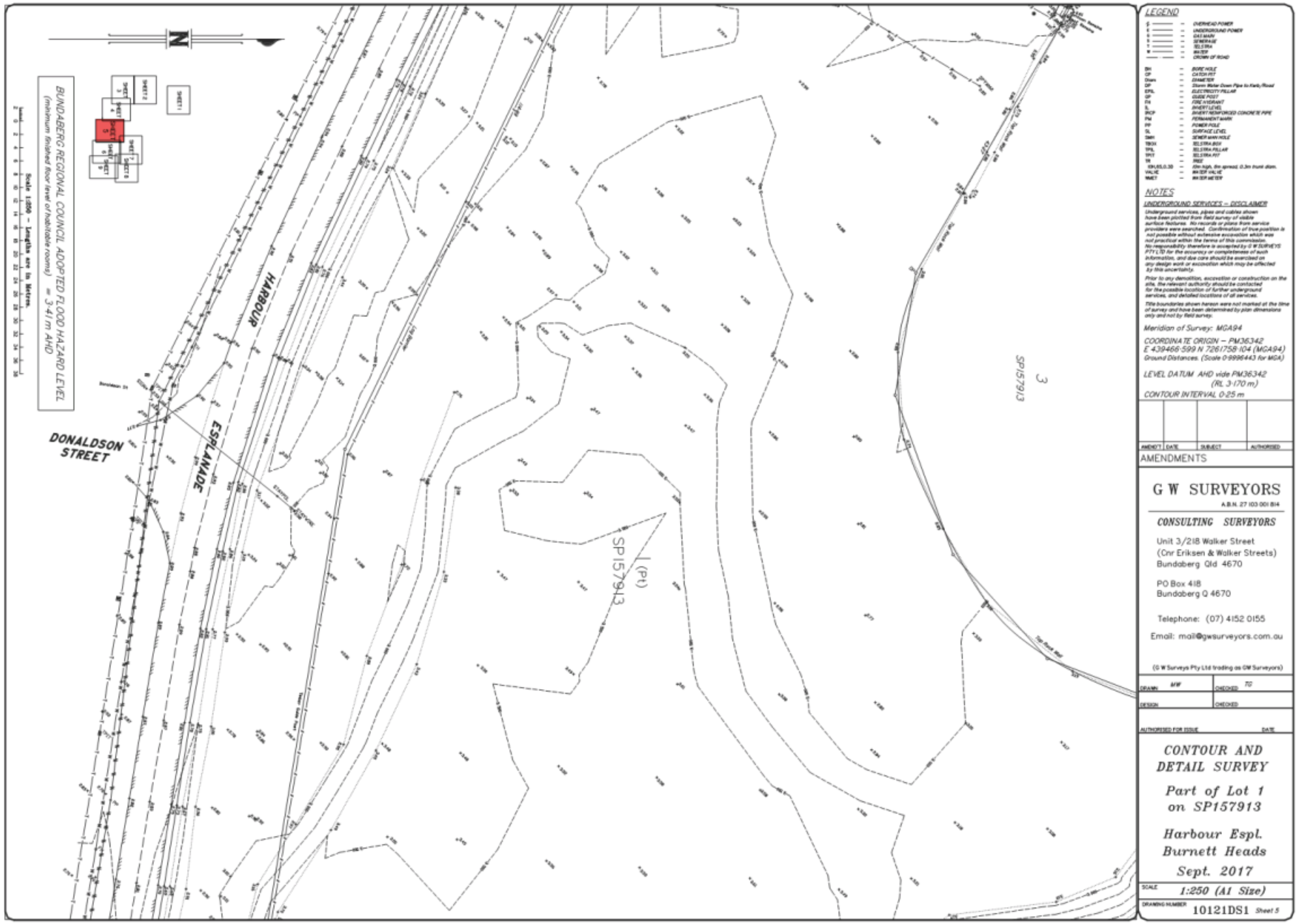
VIEW LOOKING SOUTH-EAST FROM HARBOUR ESPLANADE

VIEW LOOKING NORTH FROM HARBOUR ESPLANADE

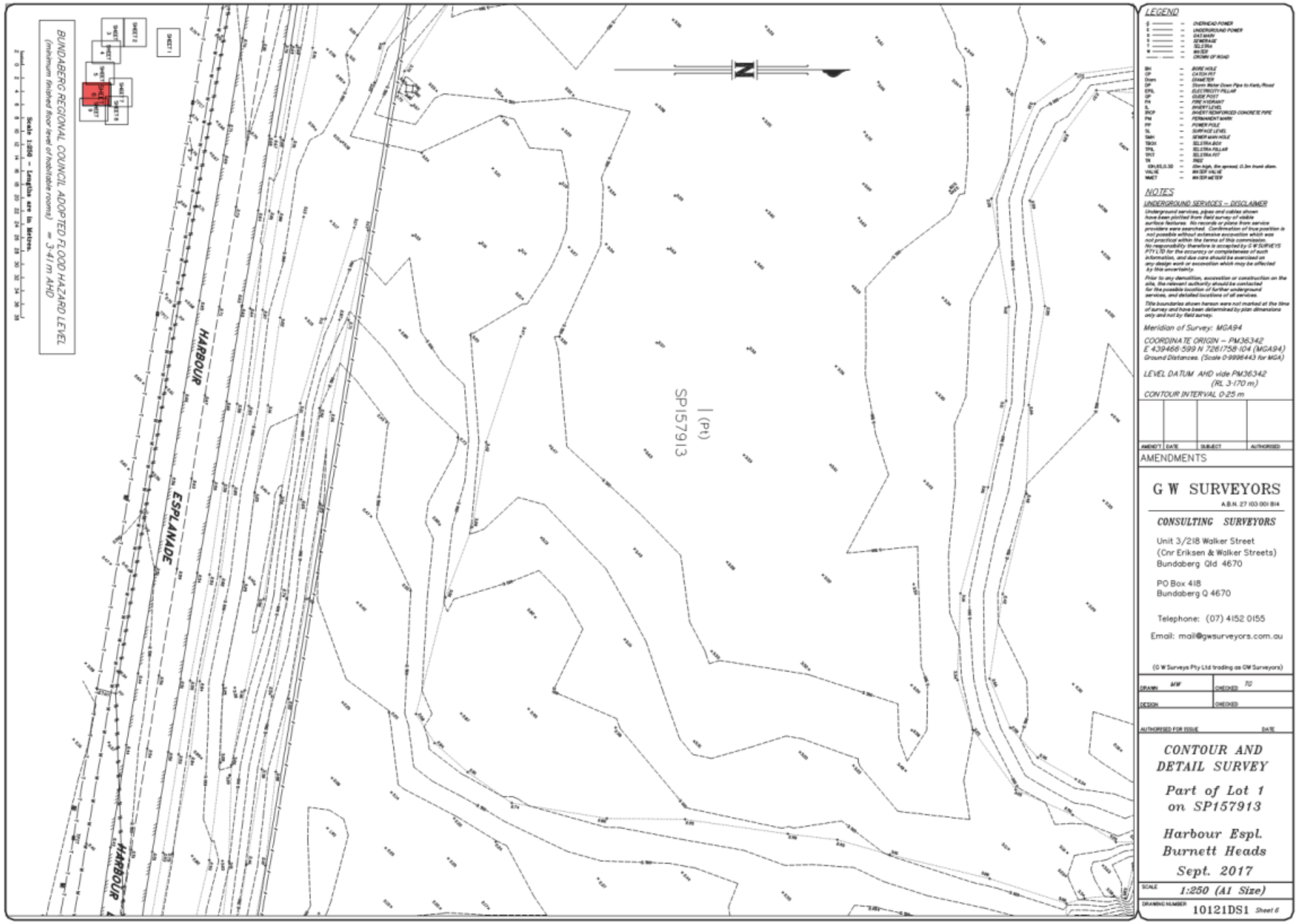
VIEW LOOKING SOUTH-EAST FROM HARBOUR ESPLANADE

VIEW LOOKING NORTH FROM HARBOUR ESPLANADE

3.4 EXISTING SURVEY PLAN (1)



3.5 EXISTING SURVEY PLAN (2)



3.6 EXISTING SURVEY PLAN (3)

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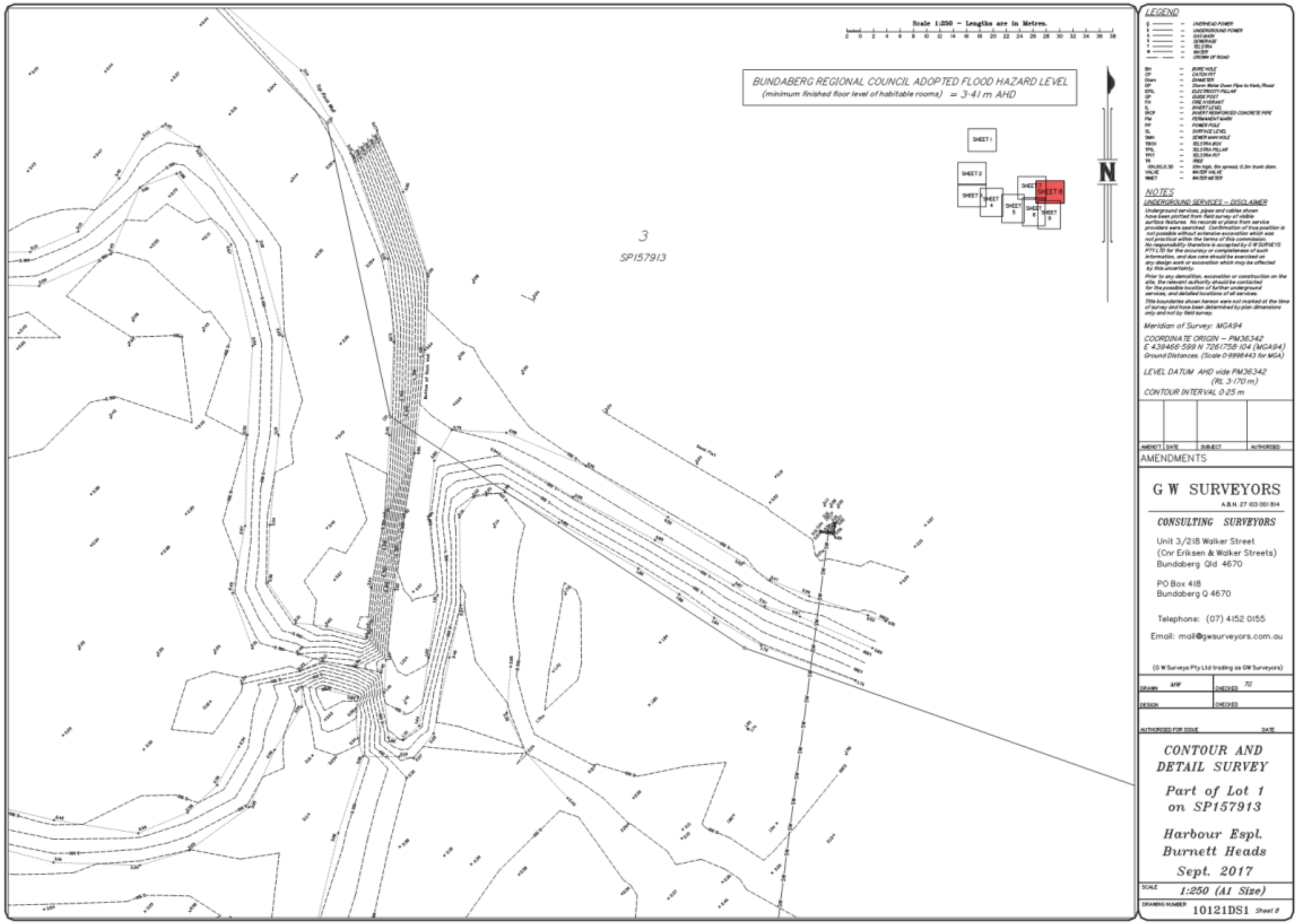
3.7 EXISTING SURVEY PLAN (4)



3.8 EXISTING SURVEY PLAN (5)

4.0

STATEMENT OF URBAN DESIGN INTENT

- MASTER PLAN

4.1 STATEMENT OF URBAN DESIGN INTENT

URBAN DESIGN OVERVIEW

The Burnett Harbour Marina Village has been designed as a high quality integrated mixed-use marine village located on the southwestern shore of Burnett Harbour. Marina. Its architectural form comprises a linear cluster of buildings spread along the shoreline with each end clearly defined by a principal node. The commercial heart marks the western end of the village (Stage 1 - seperate DA Submission). This is balanced by the resort complex (Stage 2), which identifies the eastern end (the subject of this application).

Organic in its shape, the built form pattern respects and follows the line of the existing landform edge. In this way the structure of the village can be regarded as a seamless whole, maintaining a natural and meaningful relationship with its surroundings. An east-facing boardwalk, which overlooks the marina, provides access to retail, commercial, restaurant and short-term accommodation facilities within, promoting a vibrant and interesting waterfront edge.

Stage 2 includes a series of residential buildings which are distributed along the waterfront to the east of the village centre. These comprise a mix of product types, including 4 – 5 storey low-rise apartment buildings, 2 storey waterfront villas, 2 storey eco-villas and a 6 – 10 storey resort complex. The resort complex is located centrally on the small peninsula on a north-south axis running from Harbour Esplanade to the marina. Complex facilities embrace and overlook a large lagoon pool.

As the tallest structure, the resort complex will provide a distinctive landmark on the shore, identifying the river mouth on approach from the sea.

Residential buildings are angled in plan shape and offset from each other resulting in an interesting and sinuous built edge of varying height, which maximizes views to the marina and the ocean for residents. Lower height buildings are generally positioned closer to the edges of the site with the tallest structure located the furthest distance from the site's boundaries. Generous gaps between buildings provide view shafts to the marina from Harbour Esplanade.

The public boardwalk continues along the harbour edge in front of all buildings. This is linked by pathways to additional boardwalks, BBQ and picnic areas and a small beach, providing public access to almost the entire waterfront edge of the site. A series of lateral pathways between the buildings, connect the boardwalk to Harbour Esplanade, providing a choice of routes through the village and along the waterfront for both residents and the wider community.

Vehicular access to the site is provided through a formal high landscaped entry boulevard which distributes vehicles to residential and resort buildings from a central roundabout.

Parking for each of the residential and resort buildings is provided in basements beneath each building, with visitor parking at grade.

The concept design for this preliminary approval application describes a resolved resort residential scheme which both compliments the Stage 1 development and responds sensitively to the constraints and opportunities of this special waterfront site.

4.2 STATEMENT OF URBAN DESIGN INTENT

KEY URBAN DESIGN PRINCIPLES
Key principles of good urban places considered in the design include:

Accessibility
Good places are accessible to all members of the community. Proposed buildings will cater for people arriving by foot, bicycle, car, coach, boat or future public transport. All areas within the site will allow equitable access for people with disabilities.

Comprehendibility
People can take full advantage of a place if they can readily understand it, easily interpret it and it is imbued with meaning corresponding with its use. The proposed built environment has clear points of reference in its circulation routes and meeting and gathering places and building entrances. Individual buildings are designed to exhibit clear legibility through architectural language, colour, materiality, transparency and articulation.

Variety and Interest
Variety is an essential ingredient of good urban places. Variety implies varied forms, uses and meanings. The visual appearance of building forms will be given increased variety through the layering of façades, variation in height and roof shape, the use of a wide range of exterior materials and the natural landscape. The dynamic composition of building elements within the overall 'horizontal' built form of the development will create visual interest for both residents and visitors.

Accommodation Choice
The wide range of accommodation choice proposed will cater for a broad range of occupants over the long term.

Connectivity
Generous gaps between buildings will provide view shafts to the marina from Harbour Esplanade and the existing residential neighborhood to the south. The waterfront boardwalk provides public access to the entire waterfront edge of the site. A series of lateral pathways between the buildings, connect the boardwalk to Harbour Esplanade, providing a choice of routes through the village and along the waterfront for residents and for the wider community.

Qualities of Edges
All edges of the resort residential precinct are readily accessible and have been designed to be legible and interesting in appearance, easy and safe to access, using appropriate materials, finishes and landscaping, which will also provide shade and weather protection.

Human Scale
Good urban places affirm the importance of people, helping us to relate to, interpret and enjoy the built environment. The proposed development is broken into a series of human scaled building elements, which will relate well to the landform context at the mouth of the Burnett River. Richness will be achieved through the articulation, materiality and detailing of building forms.

Space Making
A good environment possesses well defined public spaces, in which people will feel comfortable. The public waterfront and other circulation areas within the site comprise a series of interconnected human scaled spaces containing communal meeting places at nodal points. Residents are provided with sheltered outdoor living and recreation areas.

Sense of Community
Good places enhance the sense of community and provide for social interaction. The design of the circulation and communal areas will provide comfortable places in which people can meet and socialise enjoying a good sense of well being.

Public and Private Aspects
The close proximity of public and private realms has been given consideration in the design.

Apaptability and Versatility
The proposal has been designed to allow its construction to be staged so that it can be developed at an appropriate pace over time. Many internal walls of the buildings are non load bearing providing adaptive design to readily accommodate changing uses over time.

Environmental Qualities
The design satisfies environmental qualities for users of the site including the quality of air and water, noise and visual pollution, bio diversity in the landscape and the minimization of energy use and waste.

Safety
In its layout, the masterplan has been configured to provide safe access within the site as well as to and from the new village. This includes the provision of clear sightlines along all pathways.

4.3 OVERALL MASTER PLAN

STAGE 1 & STAGE 2

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SCALE: 1:2000 @ A3 0m 10 20 50 100

BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG bda 17 / 35

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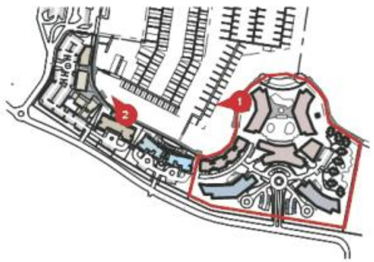
4.5 CONCEPT SKETCHES (1)

PROPOSED BUILT FORM CHARACTER SKETCHES

The attached images illustrate design intent for subtropical architecture and materials within the general massing.

WATERFRONT VIEW BUILDINGS C & D

RETAIL PRECINCT WATERFRONT VIEW

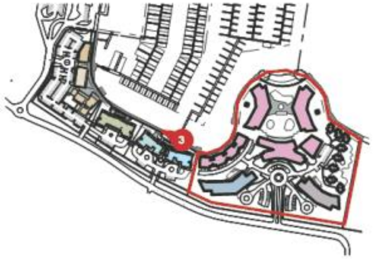


4.6 CONCEPT SKETCHES (2)

PROPOSED BUILT FORM CHARACTER SKETCHES

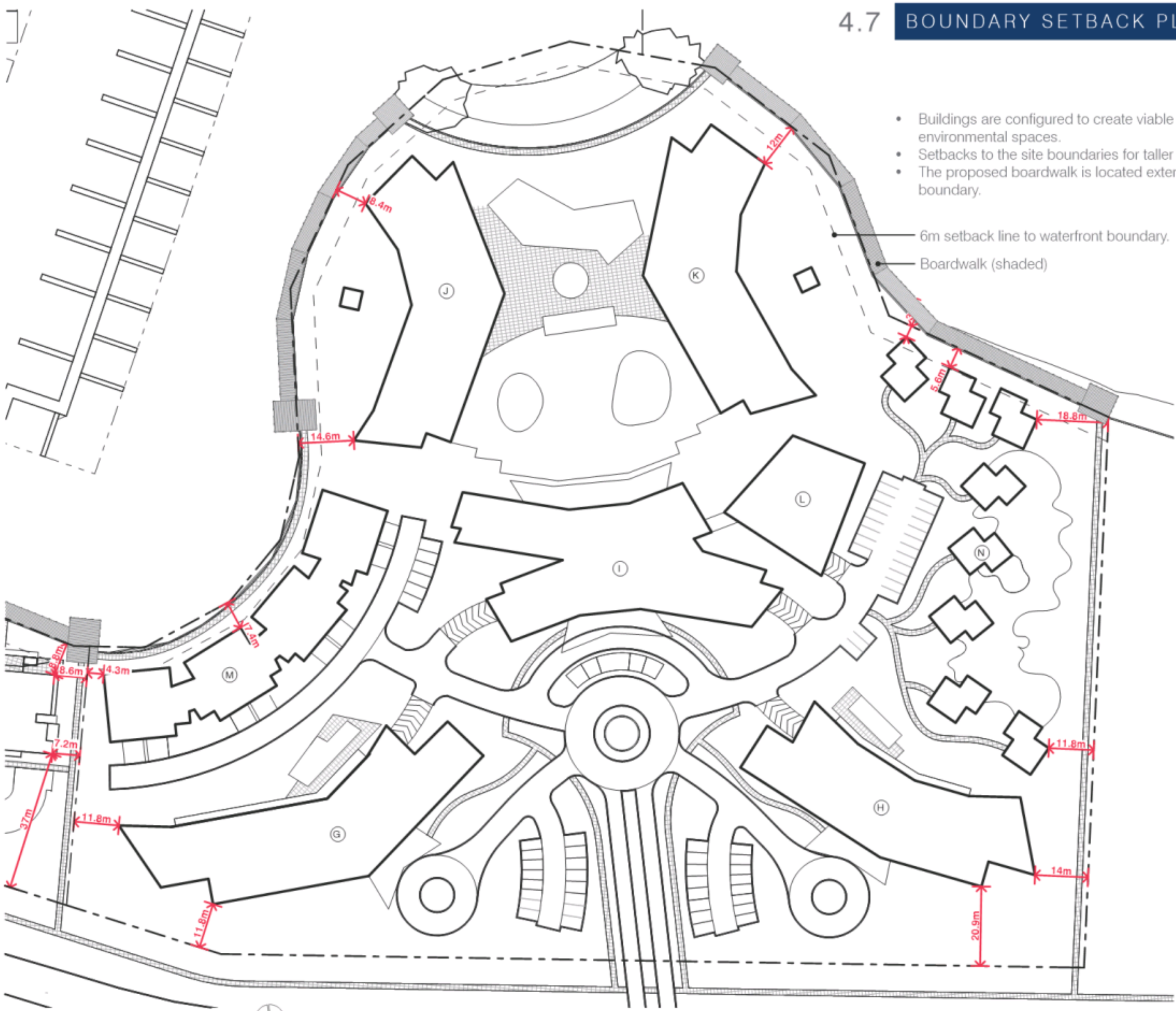
The attached images illustrate design intent for subtropical architecture and materials within the general massing.

BOARDWALK VIEW 1
STAGE 1 ONLY - SEPARATE APPLICATION



4.7 BOUNDARY SETBACK PLAN

- Buildings are configured to create viable outdoor recreation and environmental spaces.
- Setbacks to the site boundaries for taller buildings are generous.
- The proposed boardwalk is located external to the site waterfront boundary.



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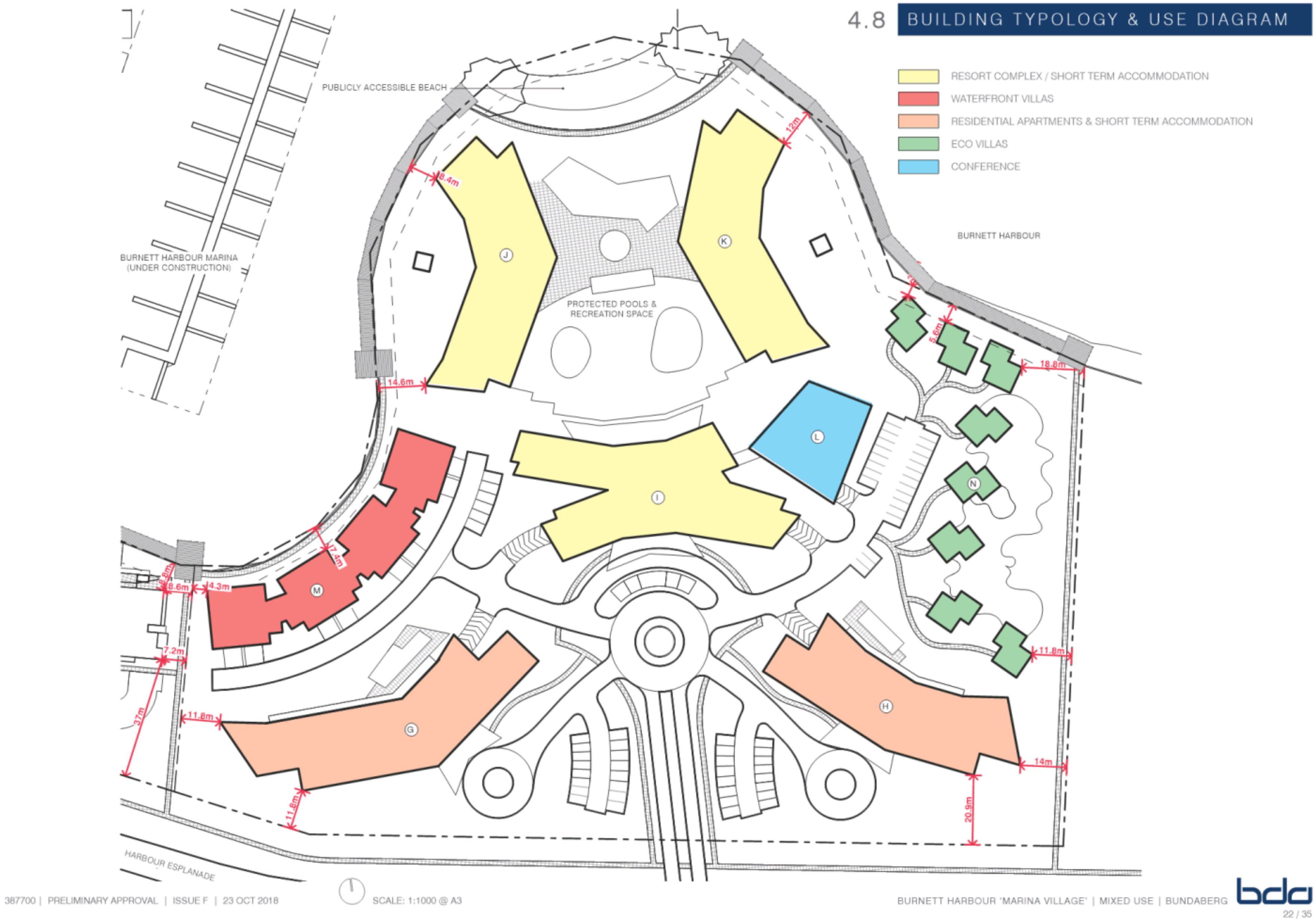
BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG bda 21 / 35


4.8 BUILDING TYPOLOGY & USE DIAGRAM
RESORT COMPLEX / SHORT TERM ACCOMMODATION
WATERFRONT VILLAS
RESIDENTIAL APARTMENTS & SHORT TERM ACCOMMODATION
ECO VILLAS
CONFERENCE
PUBLICLY ACCESSIBLE BEACH
BURNETT HARBOUR MARINA (UNDER CONSTRUCTION)
PROTECTED POOLS & RECREATION SPACE
BURNETT HARBOUR
HARBOUR ESPLANADE
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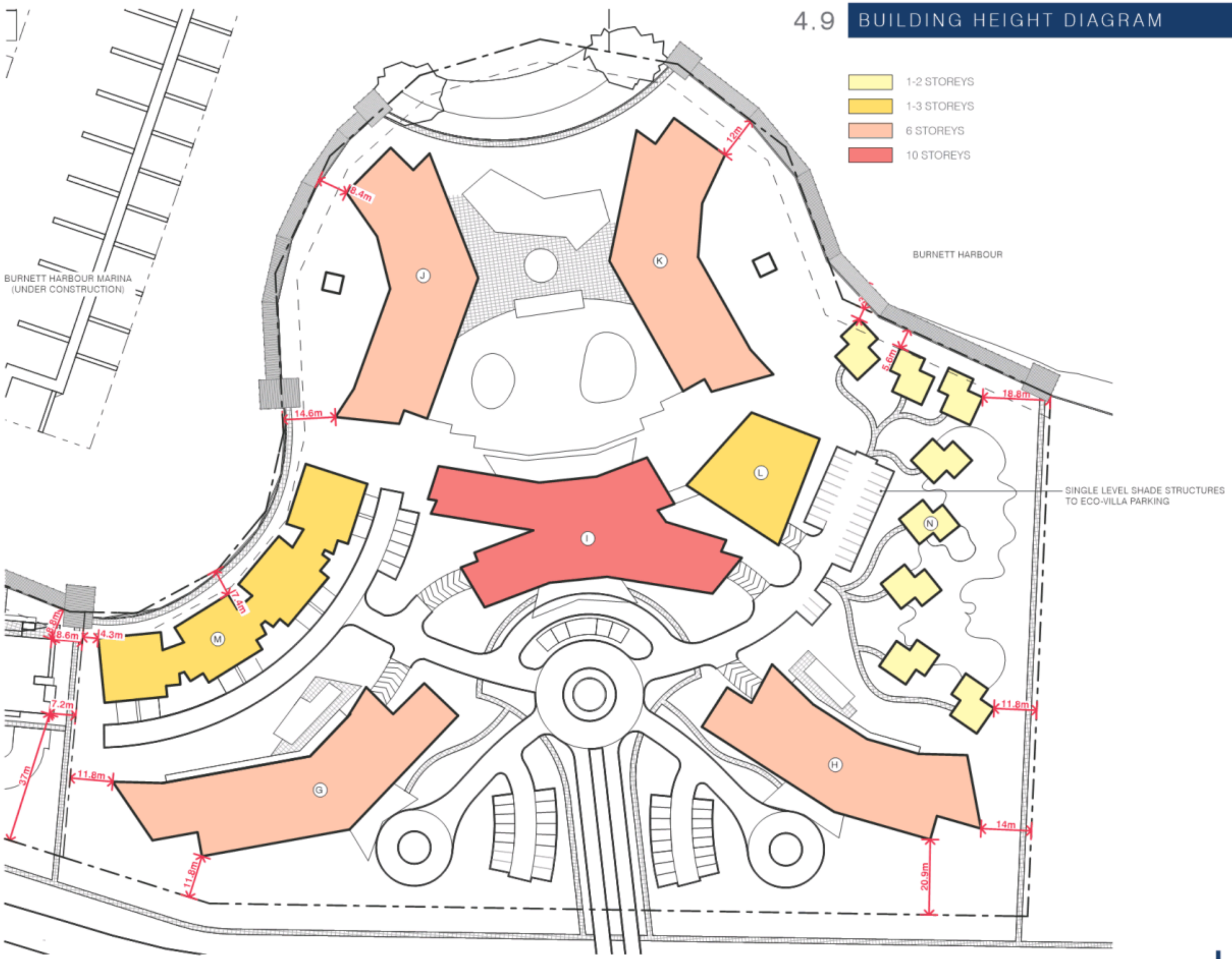
4.9 BUILDING HEIGHT DIAGRAM



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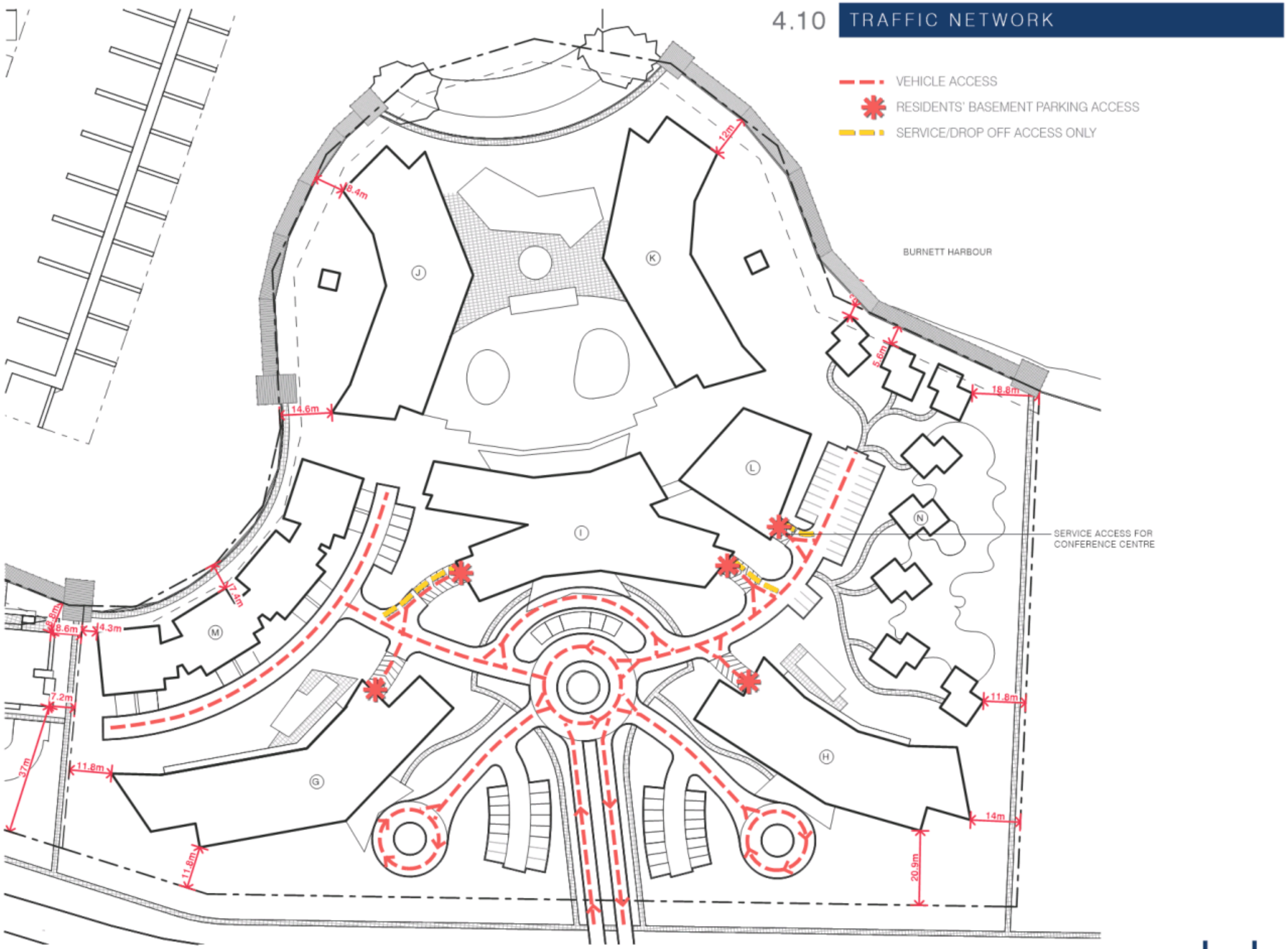
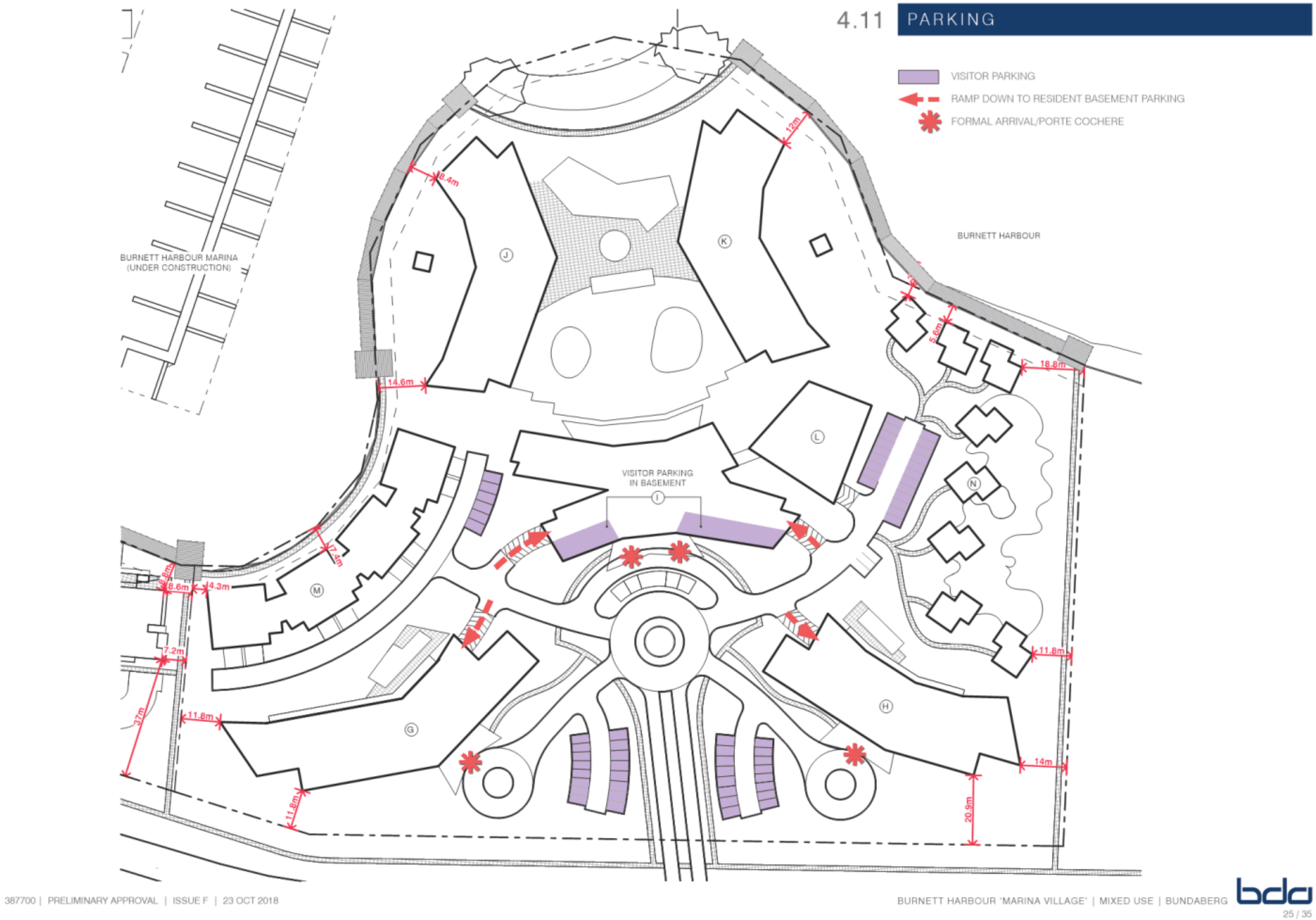
4.10 TRAFFIC NETWORK




4.11 PARKING
VISITOR PARKING
RAMP DOWN TO RESIDENT BASEMENT PARKING
FORMAL ARRIVAL/PORTE COCHERE
BURNETT HARBOUR
BURNETT HARBOUR MARINA
(UNDER CONSTRUCTION)
VISITOR PARKING
IN BASEMENT
J
K
L
N
M
I
G
H
12m
8.4m
14.6m
5.6m
18.8m
17.4m
8.6m
4.3m
7.2m
37m
11.8m
11.8m
11.8m
14m
20.9m
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4.12
PEDESTRIAN & OPEN SPACE NETWORK
PEDESTRIAN FOOTPATH (PUBLIC)
PEDESTRIAN NODE
PEDESTRIAN FOOTPATH (PRIVATE)
BUILDING ENTRY (PUBLIC)
BEACH (PUBLIC)
POCKET PARK
J
K
L
N
I
M
G
H
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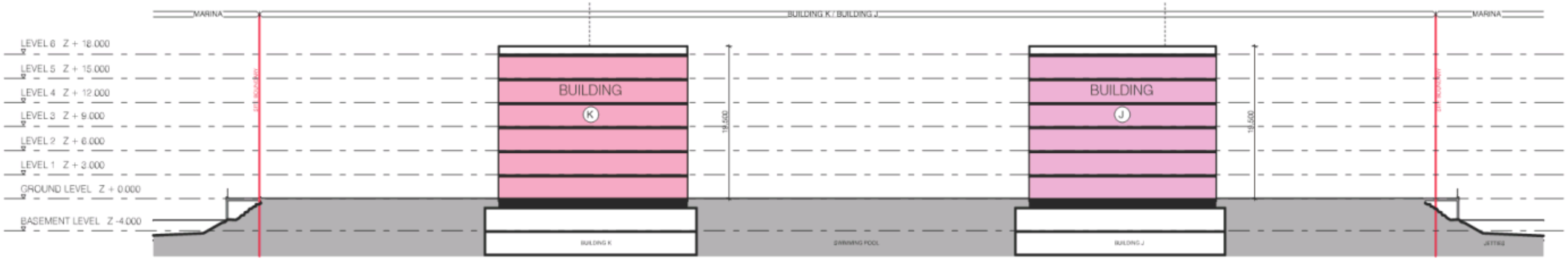
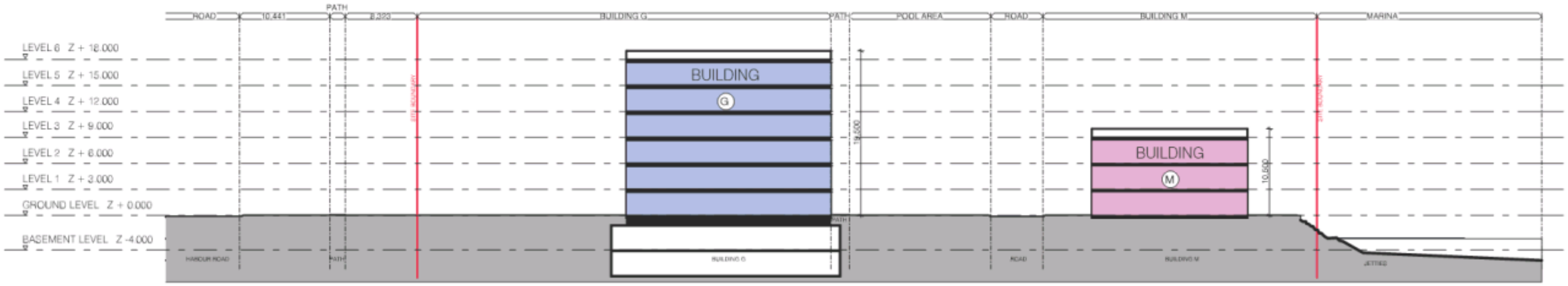
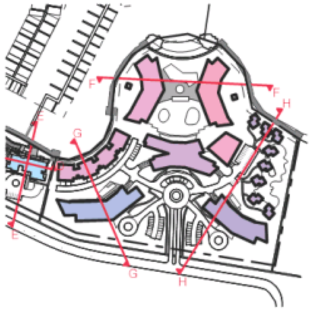
4.13 SITE SECTIONS F & G







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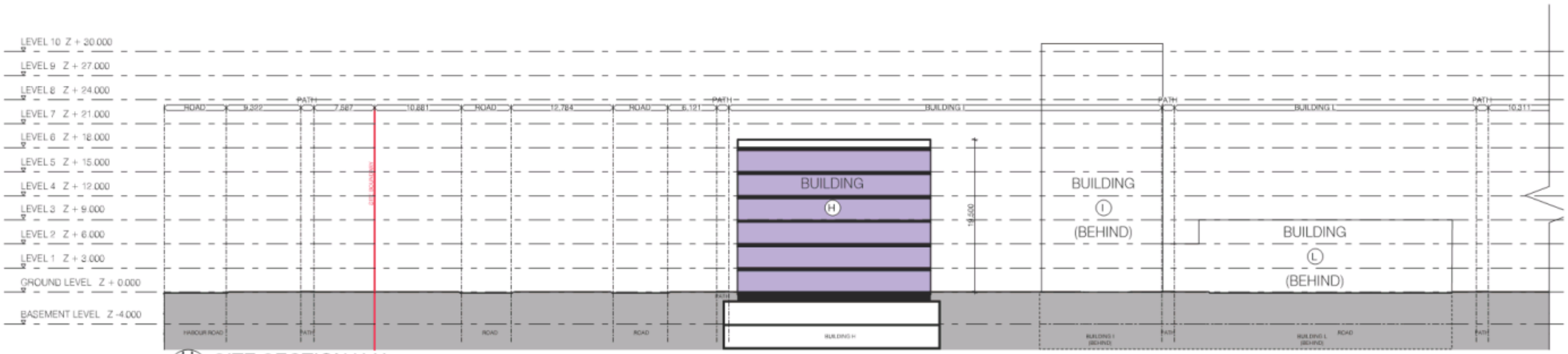
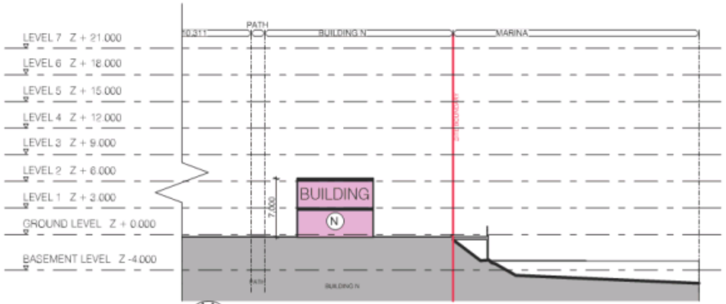
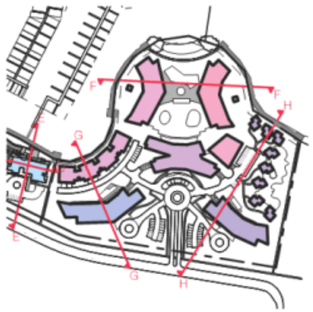
4.14 SITE SECTION H-H



H SITE SECTION H-H
Scale - 1:500



H SITE SECTION H-H (CONT'D.)
Scale - 1:500



5.0

DEVELOPMENT SUMMARY

5.1 DEVELOPMENT SUMMARY

OVERALL

DEVELOPMENT SUMMARY
OVERALL "STAGE 2" DEVELOPMENT

Building	Height	Use	No of Apts/Keys	GFA (sq.m)
G	6 Storeys + 2 Basement	Residential & Short Term	70	8424
H	7 Storeys + 2 Basement	Residential & Short Term	70	8424
I	10 Storeys + 1 Basement	Resort Complex	250	15000
J	6 Storeys + 2 Basement	Residential & Short Term	100	10346
K	6 Storeys + 2 Basement	Residential & Short Term	100	10346
L	3 Storeys + 1 Basement	Conference	0	2205
M	2 Storeys	Residential	8	2640
N	2 Storeys	Short Term	8	1600
Total			**606**	**58985**

5.2 DEVELOPMENT SUMMARY

BUILDINGS G, H, I & L

BUILDING G - APARTMENT BUILDING
APARTMENT AREA BREAKDOWN

	Type A	Type B	Type C
Internal Area	140	100	72
Balcony Area	20	12	9
No. of Bedrooms	3	2	1
Bathrooms	2	2	1

	Component(s)	Type A 3 Bed	Type B 2 Bed	Type C 1 Bed	No of Keys	No. of Bedrooms	NSA (sq.m)	GFA (sq.m)
BUILDING G - RESIDENTIAL APARTMENTS & SHORT TERM ACCOMMODATION								
Level 05	Residential	2	8	2	12	24	1224	1404
Level 04	Residential	2	8	2	12	24	1224	1404
Level 03	Residential	2	8	2	12	24	1224	1404
Level 02	Residential	2	8	2	12	24	1224	1404
Level 01	Residential	2	8	2	12	24	1224	1404
Ground Level	Residential	2	8		10	22	1080	1404
B1	Parking							
B2	Parking							
	Visitor Parking							
Total		**12**	**48**	**10**	**70**	**142**	**7,200**	**8424**

BUILDING H - APARTMENT BUILDING
APARTMENT AREA BREAKDOWN

	Component(s)	Type A 3 Bed	Type B 2 Bed	Type C 1 Bed	No of Keys	No. of Bedrooms	NSA (sq.m)	GFA (sq.m)
BUILDING H - RESIDENTIAL APARTMENTS & SHORT TERM ACCOMMODATION								
Level 05	Residential	2	8	2	12	24	1224	1404
Level 04	Residential	2	8	2	12	24	1224	1404
Level 03	Residential	2	8	2	12	24	1224	1404
Level 02	Residential	2	8	2	12	24	1224	1404
Level 01	Residential	2	8	2	12	24	1224	1404
Ground Level	Residential	2	8		10	22	1080	1404
B1	Parking							
B2	Parking							
	Visitor Parking							
Total		**12**	**48**	**10**	**70**	**142**	**7,200**	**8424**

BUILDING I & L - RESORT COMPLEX & CONFERENCE CENTRE
TYPICAL SUITE BREAKDOWN

	Type A
Internal Area	40
Balcony Area	4
No. of Bedrooms	1
Bathrooms	1

	Component(s)	Type A 1 Bed	No of Keys	No. of Bedrooms	GFA (sq.m)
BUILDING I - RESORT COMPLEX					
Level 09	Suites	32	32	32	1500
Level 08	Suites	32	32	32	1500
Level 07	Suites	32	32	32	1500
Level 06	Suites	32	32	32	1500
Level 05	Suites	32	32	32	1500
Level 04	Suites	32	32	32	1500
Level 03	Suites	32	32	32	1500
Level 02	Suites	26	26	26	1500
Level 01	Lobby				1500
Ground Level	BOH				1500
B1	Parking				
Total		**250**	**250**	**250**	**15000**

	Component(s)	GFA (sq.m)
BUILDING L - CONFERENCE BUILDING		
Level 02	Conference	735
Level 01	Conference	735
Ground Level	Lobby, F+B	735
B1	Parking	
Total		**2205**

NOTE:
All areas are approximate only and subject to detail design and future approval.

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5.3 DEVELOPMENT SUMMARY

BUILDINGS J,K, M & N

BUILDING J & K - APARTMENT BUILDINGS
APARTMENT AREA BREAKDOWN

	Type A	Type B	Type C
Internal Area	140	100	72
Balcony Area	20	12	9
No. of Bedrooms	3	2	1
Bathrooms	2	2	1

	Component(s)	Type A 3 Bed	Type B 2 Bed	Type C 1 Bed	No of Keys	No. of Bedrooms	NSA (sq.m)	GFA (sq.m)
BUILDING J - RESIDENTIAL APARTMENTS & SHORT TERM ACCOMODATION								
Level 05	Residential	2	4	9	15	23	1328	1478
Level 05	Residential	2	4	9	15	23	1328	1478
Level 04	Residential	2	4	9	15	23	1328	1478
Level 03	Residential	2	4	9	15	23	1328	1478
Level 02	Residential	2	4	9	15	23	1328	1478
Level 01	Residential	2	4	9	15	23	1328	1478
Ground Level	Residential	2	4	4	10	18	968	1478
B1	Parking							
B2	Parking							
	Visitor Parking							
Total		**14**	**28**	**58**	**100**	**156**	**8,936**	**10346**

	Component(s)	Type A 3 Bed	Type B 2 Bed	Type C 1 Bed	No of Keys	No. of Bedrooms	NSA (sq.m)	GFA (sq.m)
BUILDING K - RESIDENTIAL APARTMENTS & SHORT TERM ACCOMODATION								
Level 05	Residential	2	4	9	15	23	1328	1478
Level 05	Residential	2	4	9	15	23	1328	1478
Level 04	Residential	2	4	9	15	23	1328	1478
Level 03	Residential	2	4	9	15	23	1328	1478
Level 02	Residential	2	4	9	15	23	1328	1478
Level 01	Residential	2	4	9	15	23	1328	1478
Ground Level	Residential	2	4	4	10	18	968	1478
B1	Parking							
B2	Parking							
	Visitor Parking							
Total		**14**	**28**	**58**	**100**	**156**	**8,936**	**10346**

BUILDING M - WATERFRONT VILLAS
VILLA AREA BREAKDOWN

	Type A
Internal Area	290
Balcony Area	40
No. of Bedrooms	4
Bathrooms	2

	Component(s)	Type A 4 Bed	No of Keys	No. of Bedrooms	GFA (sq.m)
BUILDING M - WATERFRONT RESIDENTIAL VILLAS					
Level 01	RESIDENTIAL				1320
Ground Level	RESIDENTIAL	8	8	32	1320
Visitor Parking					
Total		**8**	**8**	**32**	**2640**

BUILDING N - ECO VILLAS (SHORT TERM ACCOMMODATION)
ECO VILLA AREA BREAKDOWN

	Type A
Internal Area	200
Balcony Area	40
No. of Bedrooms	3
Bathrooms	1

	Component(s)	Type A 3 Bed	No of Keys	No. of Bedrooms	GFA (sq.m)
BUILDING N - ECO VILLAS SHORT TERM ACCOMMODATION					
Level 01	RESIDENTIAL				800
Ground Level	RESIDENTIAL	8	8	24	800
Visitor Parking					
Total		**8**	**8**	**24**	**1600**

NOTE:
All areas are approximate only and subject to detail design and future approval.

6.0

STATEMENT OF ARCHITECTURAL DESIGN INTENT

6.1 ARCHITECTURAL DESIGN INTENT

STAGE 2 ARCHITECTURAL VISION

Stage 2 of the overall Marine Village is the subject of this submission.

The intent of the design is to create a high quality mixed use residential community and resort which integrates visually with Stage 1 of the overall project (seperate application)

Each building will be composed and articulated utilising a consistent architectural language, which contributes to the creation of a place of distinct character.

Exterior building forms are proposed to be highly articulated and modelled as a series of individual architectural elements, expressing the variety of individual dwelling types. Each of these elements will be arranged in a composition of sculpturally distinct yet interconnected architectural forms.

Building heights vary from 2 levels to 10 levels. All buildings have outlook over water or resort landscaped recreation spaces.

All buildings are designed to be fully accessible.

The resort complex buildings, which primarily provide short term accommodation, contain a variety of uses including restaurants, bars, convention facilities, guest suites, specialty retail and extensive recreational facilities. These buildings are arranged around a tropically landscaped lagoon pool, and vary in height between 6 and 10 storeys. The concept design will ensure the creation of a subtropical ambience, which will be characterized by white concrete forms with partial stone and timber cladding and aluminium screens.

Buildings are angled in plan shape and offset from each other, resulting in an interesting and sinuous built edge of varying height. All apartments will open out onto terraces or balconies primarily possessing northern aspect, ranging from north-east to north-west, creating outstanding amenity for residents and visitors in this resort community.

6.2 PERSPECTIVE VIEW 1

INDICATIVE PERSPECTIVE VIEW FROM STAGE 1
MARINA VILLAGE RETAIL

Appendix C: Suggested approval conditions

Recommended Conditions of Development Approval for Marine Turtle Management

Lighting

1. Prior to Council approval of the first operational works application, the applicant shall submit to Council for approval a Lighting Management Plan that inter alia-
    a. Incorporates the lighting recommendations of the Turtle Management Plan.
    b. Provides lighting plans for each building/section of walkway, including number, type and specification of each light fitting.
    c. Recommends a post construction audit compliance with the approved lighting design and regulatory conditions.
    d. Recommends an annual auditing schedule of lighting in public or communal areas to be undertaken at the commencement of the turtle season to ensure compliance with lighting designs.
    e. Recommends an annual monitoring schedule of direct visible light from the development at Oaks Beach.
2. Each building and associated public or communal area shall be developed in accordance with the Lighting Management Plan with an electrical engineer certifying same prior to commencement of the relevant use.
3. All exterior lights utilise amber LED emitters (~585nm 'true amber' emitters, 'phosphor converted amber') or, where white light is required under a specific Standard, LEDs with a correlated colour temperature (CCT) equal to or lower than 2700K.
4. External lighting achieves an upward waste light output ratio (ULR) of 0%, achieved by:
    a. Shielding, by recessing the light fitting into roof structures, eaves or building ceilings.
    b. Shielding, by the light housing which prevents horizontal light above a 45-degree angle.
    c. Mounting external lights (i.e. on walls, stairs and walkways) as low as physically possible and using targeted asymmetrical distribution to illuminate only the specific areas of need, while minimising the angle of incidence and reflectance.
5. Security lighting will be motion activated and supplemented with computer monitored infrared detection systems from 8pm until dawn during turtle season ie 1 December – 30 March.
6. Motion activated external walkway lighting for residential premises occurs from 8pm until dawn during turtle season ie 1 December – 30 March.
7. Motion activated lights will have an associated deactivation period of a maximum of five minutes.
8. Exterior finishes on all buildings will be matte and have a maximum reflective value of 30%.
9. All balcony and/or verandah electric lighting to residential and non-residential land uses, excluding cafes/bars/restaurants, will turn off at 9:00pm during the turtle season i.e. 1 December – 30 March, or an alternative solution is identified that achieves the same objective, that is, no light source located on balconies/verandahs can be detected external to the building after 9 pm at night during the turtle season .
10. All indoor lighting will have a correlated colour temperature (CCT) equal to or lower than 2700K.
11. Apartment downlights will be built-in to the fixture, not a replaceable fixture.
12. All glass (windows/doors) to all residential premises and non-residential premises operating after 9:00pm, excluding cafes/bars/restaurants, will have opaque (block-out) blinds or curtains or shutters fitted.

13. Interior finishes of all buildings will be matte and have a maximum reflective value of 30%.
14. All exterior glazed windows and doors of buildings six (6) storeys or more above finished ground level shall have a maximum light transmittance of 50%.
15. Notwithstanding Condition (14), all exterior glazed windows and doors of any building elevation that faces the ocean shall have a maximum light transmittance of 50%.
16. Skylights will not be incorporated in any building design.
17. The boundary of artificial water bodies will only be illuminated at night if night activities are intended.
18. Swimming pools will either be in-ground design or enclosed with solid walls (i.e. no glass windows).
19. In-pool lighting will be the minimum and lowest intensity needed for safe swimming and use of steps to access the water. Lights will be aimed at or below the horizontal.
20. Pool surfaces will be dark coloured to reduce light reflection from the water.
21. Pool decking will be a dark colour to minimise reflection.
22. Pool deck lighting will be low level, shielded, mini-bollard amber LED.
23. Car parks, driveways and walkways will-
    a. Incorporate flashing/intermittent lights or reflective material instead of fixed beam to identify an entrance or delineate a pathway;
    b. Use amber LED emitters (~585nm 'true amber' emitters, or 'phosphor converted amber') for car park lighting; and
    c. Carpark lighting will be low level, bollard style with an upward waste light output ratio (ULR) of 0%.
24. No construction activity that requires flood lighting shall occur during the turtle season ie 1 December – 31 March.
25. A post construction audit of each building shall be undertaken by an appropriately qualified electrical engineer and provided to Council prior to occupation of the relevant building demonstrating compliance with the approved lighting design and regulatory conditions.
26. Each community management scheme shall incorporate the following responsibilities of the body corporate manager-
    a. Confirmation at the beginning of the turtle season (ie prior to 1 December) that no direct visible light from the body corporate premises is observed from Oaks Beach (NB Footage from a drone will suffice as confirmation.)
    b. Ensure the body corporate premises is, to the extent relevant, compliant with the Lighting Management Plan.
    c. Ensure that each owner and each visitor is provided with a copy of the Marina Village Residents and Visitors Code of Conduct.
    d. Should significant light be observed from any residential premise after 9:00pm during the turtle season (ie 1 December – 31 March), the body corporate manager will draw the resident's attention to the requirements of the Marina Village Residents and Visitors Code of Conduct.
27. Each community management scheme shall incorporate a Marina Village Residents and Visitors Code of Conduct (Code of Conduct) which shall include marine turtle protection measures and responsibilities of owners and visitors. The Code of Conduct will include-

    Lighting Advice

    a. No electric lighting to balconies or verandahs, except ground level cafes/bars/restaurants, shall occur after 9:00pm during the turtle season ie 1 December – 31 March.

b. No electric internal lighting, including light from television and computer screens, shall be emitted after 9:00pm during the turtle season ie 1 December – 31 March. (Ground level cafes/bars/restaurants excepted.)

Recreational Fishing and Boat Use Advice

a. All discarded fishing gear and rubbish to be disposed of in bins.
b. Check crab pots regularly, set your pots to avoid loose rope floating about in the water and ensure pot entrances are not large enough to trap a turtle.
c. Report all sightings of any sick, injured or dead turtles by calling the RSPCA Queensland (1300 264 625).
d. Avoid shallow seagrass areas when boating. If you cannot avoid seagrass areas, reduce speed to below 10 knots (off the plane) and look out for turtles and dugong.

Turtle Watching and Beach Use Advice

a. Stay well clear (at least two meters) of turtles.
b. Turn off all lights until laying begins.
c. Keep still and quiet.
d. Remain behind turtles as they dig and lay their eggs – do not stand in front of or where they can see you.
e. Restrict flash photography to a minimum and only take flash photos once the eggs have been laid.
f. Remove/turn off lights and back away from the turtles if they appear to show signs of disturbance.
g. Watch where you step to avoid crushing eggs or hatchlings.
h. Do not disturb or dig up nests.
i. Be aware that turtles have good eyesight and an excellent sense of smell.

Waste Management

1. A Waste Management Plan (WMP) addressing the construction phase of development shall be submitted to and approved by Council prior to approval of the first operational works application. The WMP will specifically address the measures proposed to ensure no escape of rubbish from the site to Burnett Heads Boat Harbour.
2. A Waste Management Plan (WMP) addressing the operation of each development shall be submitted to and approved by Council prior to approval of the first operational works application. The WMP will specifically address the measures proposed to ensure no escape of rubbish from the site to Burnett Heads Boat Harbour.

Storage of Chemicals

1. Chemicals shall be stored and disposed of in accordance with their Material Safety Data Sheet.

Open Space Plan

BUNDABERG REGIONAL COUNCIL

Plan number 1
issue A

Projection: GDA_1994_MGA_Zone_56 Date: 11/11/2020 4:07 PM Scale 1: 4,000.00 on A4 Sheet

Author: -Author-

203.20 0 101.60 203.20Meters

LONJAC
CIVIL • MARINE • MANAGEMENT

REPORT

BURNETT HARBOUR 'MARINA VILLAGE' BUNDABERG

Rock Revetment Wall Inspection Report

Prepared for BH Developments

NOVEMBER 2019

This document has been prepared for the benefit of BH Developments. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other persons.

This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval to fulfil a legal requirement.

REVISION SCHEDULE

REV NO	DATE	DESCRIPTION	PREPARED BY	REVIEWED BY	APPROVED BY
A	24/10/19	Issued for Client Comment	JL	JL	JL
B	15/11/19	FINAL	JL	AL	JL

Contents

1. EXECUTIVE SUMMARY

LONJAC PTY LTD has been commissioned by BH Developments to undertake an inspection of the existing Rock Revetment Wall associated with the proposed Stage 1 of the Burnett Harbour 'Marine Village' Bundaberg Development.

The 'Marine Village' comprises of an integrated, mixed use development containing six (6) architecturally designed buildings varying in height between 1-2 levels and 4-5 levels and with commercial, retail, restaurant/cafe, club, indoor recreation, short term accommodation in the form of serviced rooms, serviced apartments and multiple dwellings.

An existing Rock Revetment Wall divides the land from the tidal zone where a marina will be developed that is associated with the facilities infrastructure.

The inspection has found that sections of the Rock Revetment Wall would not meet the original design intent and replacement of these areas should be considered prior or during the development of the site.

Most of the existing wall remains in good condition. Considerations have been identified and discussed in Section 9 to ensure that all aspects of the development align with the current or renewed embankment protection. Some of these considerations include the aesthetic appearance, vessel movements and Storm Tide Inundation.

Future recommendations are provided to ensure the final configuration of the Rock Revetment Wall meets the structural purpose for the facility.

2. INTRODUCTION

LONJAC PTY LTD has been commissioned by BH Developments to undertake an inspection of the existing Rock Revetment Wall associated with the proposed Stage 1 of the Burnett Harbour 'Marine Village' Bundaberg Development.

The Rock Revetment Wall (Figure 1) is located within the Burnett Heads Marina and protected to the North by the Channel Breakwater and the Marina Breakwater. The Rock Revetment was originally constructed in the early 1970's (between 1970 and 1973) with no records of further development or maintenance on the wall discovered during the investigation period.

One significant weather event has occurred in the region since the initial construction of the wall with no recorded catastrophic consequences or evidence discovered during the investigation period.

This document reports the Field Inspection undertaken on the development site, considerations for the future development incorporating the Rock Revetment Wall as part of the facilities infrastructure and further actions required to ensure that the Rock Revetment Wall meets the intended purpose of the facilities infrastructure

Figure 1 – Stage 1 'Marine Village'

3. SCOPE OF WORKS

The scope of this works is in accordance with LONJAC PTY LTD email dated 10th April 2019 and includes the following:

- Executive Summary
- Historic/Background Data Search
- Coastal Process (minor)
- Inspection Detail
- Inspection Findings
- Further Actions

No assessment has been provided on Riverine Flooding or Storm Tide impacts other than to acknowledge these as a costal process.

Further direction has been provided when planning infrastructure by providing Development Considerations when deciding on the final requirements of the developed structures, facilities and loads that effect the final decision on the chosen Revetment Wall.

4. BACKGROUND INFORMATION

4.1. DATA INVESTIGATION

An investigation into the original construction was undertaken to identify historical information on the era of construction and if drawings / engineering detail of the Rock Revetment Wall exists in any of the previous or current custodians of the land.

Gladstone Ports Corporation (GPC) is the most recent title holder of the greater precinct area, and through transfer of the Port of Bundaberg to them in 2009 hold key data on the original intent and development of the Burnett Heads Marina Precinct.

A request for information on the original construction of the Rock Revetment Wall was forwarded to GPC to identify the timing of construction.

During the collection of data associated with this request, it was identified that the former Department of Harbours and Marine (January 1929 to December 1989) were responsible for the initial development of the area. It has been recalled by staff with historic knowledge of the development that Construction Drawings were developed for the installation of the Rock Revetment Wall. To date, LONJAC PTY LTD has not been able to obtain any evidence of the original drawings / engineering detail of the constructed Rock Revetment Wall

4.2. ORIGINAL CONSTRUCTION

Data obtained from both GPC and information contained within the current development submission (FPE Preliminary Site Investigation Summary – Reference 3194-01) can be used to pinpoint the original construction period of the wall. Table 1 below provides the specific Data used to pinpoint the construction history of the Burnett Heads Marina Area.

IMAGE DATE	IMAGE REFERANCE	ROCK REVETMENT WALL DEVELOPMENT
1956	GPC Supplied Aerial Image (Appendix A – Image 1)	Initial Development of Harbour Breakwater
1965	FPE Preliminary Site Investigation Summary Image Reference: QAP1633012	Channel Breakwater in place to the same extent of the Harbour Breakwater. No Rock Revetment Wall Development
1970	GPC Supplied Aerial Image (Appendix A – Image 2)	No Dredging within the harbor area undertaken No Rock Revetment Wall Development
1973	FPE Preliminary Site Investigation Summary Image Reference: QAP2664096	Development of the Rock Revetment Wall has occurred to the west of the site covering the Stage 1 Area. No Dredging at the foot of the wall has occurred
1976	GPC Supplied Aerial Image (Appendix A – Image 3)	No further Development of the Rock Revetment Wall past the Stage 1 Area. Dredging has occurred along the extent of the toe of the Rock Revetment Wall Developed.

IMAGE DATE	IMAGE REFERANCE	ROCK REVETMENT WALL DEVELOPMENT
1979	GPC Supplied Aerial Image (Appendix A – Image 4)	Development of the Rock Revetment Wall has occurred to the east of the Stage 1 area (Stage 2 Area)
1984	FPE Preliminary Site Investigation Summary Image Reference: QAP4326	No Further Development of the Rock Revetment Wall.
1986	FPE Preliminary Site Investigation Summary Image Reference: QAP4809	Development of the Harbor Breakwater past the extent of the Channel Breakwater to enclose the Harbour Area. A small passage is cut through the western end of the Harbour Breakwater to allow vessels access to the Harbour Area.

Table 1 – Historical Aerial Image Review

Additional Images supplied by GPC are located within Appendix 1.

Initial Construction of the Rock Revetment Wall in the Stage 1 Development Area occurred between 1970 and 1973.

Re-configuration of the wall then occurred as premises stated trading within the Harbour Area. From the aerial photography, this started to occur from between 1981 to 1983

4.3. CONTINUED DEVELOPMENT / CHANGES

Due to the nature of developing harbours, the above investigation of historical aerial imagery undertaken to identify the initial construction timeframes are not likely to reflect the final dates of the placement of the rock armour on the Rock Revetment Wall. Reclamation works that can be seen occurring for over a decade in the general area. These reclamation works would be required to be complete for the placement of the rock to its full and current height extent.

No Data is evident or forthcoming as to the specific construction timeframes of the Rock Revetment Wall and it is unknow if any major or minor repairs / defect works have been carried out on the Rock Revetment Wall in the Stage 1 Development Area.

5. COASTAL PROCESS

The coastal process that present the greatest structural risk to Rock Revetment Walls are coastal erosion or storm-tide inundation.

Coastal erosion and storm tide inundation are naturally occurring coastal processes that are referred to as coastal hazards as they have the potential to impact on public safety and development along the coast. They are quite different processes and are usually referred to when describing effects on the typical coastline environments, but they are still the major contributor to the cause of failure in Rock Revetment Walls.

5.1. COASTAL EROSION

Coastal erosion is a natural phenomenon. The coast responds to environmental factors such as annual variations in the amount of sand washed down from rivers; changes in the geometry of river delta channels; and changes in the weather, especially prevailing winds, severe storms and tropical cyclones.

As environmental conditions change, the coastal profile changes as sand and silt is moved onshore or offshore seeking an equilibrium profile. The movement of material may appear as erosion, build-up or the formation of nearshore sand bars.

Typically, the coast line never achieves a stable profile due to ever-changing environmental conditions unless sufficient artificial protections are installed.

Coastal Erosion within harbours can occur even with artificial protections by having significant changes to the seabed profile due to dredging or other mechanical changes and can have influence on structures designed to protect against Coastal Erosion.

5.2. STORM TIDE INUNDATION

A storm tide is the combination of a storm surge and the normal astronomical tide. A storm surge is an increase (or decrease) in water level associated with some significant meteorological event (for example, a change in atmospheric pressure such as a low pressure system associated with a tropical cyclone). Combined with a normal astronomical tide, this can result in a recorded water level higher than the predicted tide. The magnitude of the storm surge is dependent on the severity and duration of the meteorological event, the seabed shape and the proximity of bays, headlands and islands. Large waves can also be generated by winds associated with the meteorological event increasing the risk of the storm surge in coastal areas. In some situations, such as when winds blow offshore, the actual tide level can be lower than that predicted. In Queensland, most large surges are caused by tropical cyclones.

A storm surge results in large volumes of water being pushed against the coast. This causes flooding of low-lying coastal areas referred to as storm tide inundation. The worst impacts occur when the storm surge coincides with a normal high tide. When this happens, the storm tide can inundate areas within a time period of several hours that might otherwise have been free of inundation. Storm tide inundation results in the accelerated erosion of dunes. It can also damage property and infrastructure that is not normally subject to flooding by sea water, and therefore can pose risks to life.

The Queensland State Government issues Costal Hazard Area Maps for the Queensland Coastline. The Burnett Heads map is contained within Appendix 2 for reference.

6. HISTORICAL WEATHER

6.1. HISTORICAL TROPICAL CYCLONE DATA

The Bureau of Meteorology have recorded all past tropical cyclones going back to 1970 with all recorded telemetry available via the online National Weather Services. Various cyclones have tracked along the coast and within the general area of Bundaberg and its adjacent coastline. Figure 2 identifies these various recorded cyclone paths within this vicinity.

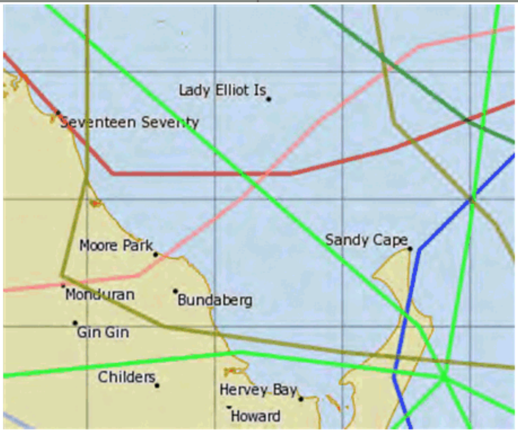


Figure 2 – Bundaberg Region Recorded Cyclone Paths (from 1970)

Cyclone *Beth* crossed the coastline between Moore Park and Burnett Heads in 1976 and is a good example of a weather systems effect on the development site.

6.2. CYCLONE BETH (1976)

Cyclone *Beth's* track is captured in Figure 3. The cyclone was very asymmetric with a band of hurricane force winds on the southern flank where it interacted with an intensifying high to the south. Widespread damage occurred in the Maryborough-Bundaberg area with 200 homes unroofed, two aircraft damaged and rainfall up to 200 mm caused flash flooding and cut roads for 18 hours. Heavy swell pounded the south coast and the wave recording station at Double Island Point recorded a significant wave (peak) height of 5.4 m (10.0 m). *Beth* crossed the coast with a barometric pressure between 994hPa and 996hPa with wind speeds ranking it at the lowest end of the intensity scale.

Figure 3 – Cyclone Beth (Track Reflected as Pink Line)

During this Time the Channel Breakwater and Harbour Breakwater were in place. The available before and after imagery shows no disruption to these breakwaters as the general areas was under development.

7. INSPECTION DETAIL

7.1. GENERAL INSPECTION SCOPE

A visual inspection was carried out over the Stage 1 length of the Rock Revetment Wall on Friday 27th September 2019. The inspection was timed to a targeted Lowest Astronomical Tide (LAT) enabling visual access to the lowest possible point of the Revetment.

No intrusive investigation was undertaken as part of the inspection. The external visual condition of the wall has been assessed.

For the assessment as part of the inspection, four key aspects of the wall were observed and noted. Table 2 identifies these key assessment areas and provides the scope that they cover and the Failure mode that could potentially occur.

AREA	SCOPE	FAILURE MODES
Crest	Existence of a crest Surrounding objects interfering or having the potential to interfere with the crest Observed Erosion Settlement	Erosion due to wave energy Erosion due to storm water Crest De-stabilisation
Toe	Foundation Materials (where evident) Rock Grading of lower wall Heaving of foundation materials Rock Spoil at Toe	Scouring of foundation Scouring of lower Rock area Slip Circle Failure Wall Cave in
Rock	Observed Rock Fracture Observed Rock De-composition Rock Size (Upper Level) Rock Size (Lower Level)	Erosion of embankment material Decomposition of embankment material Washout due to wave energy Backfill Washout
Embankment Profile	Rock Positioning Rock Compaction Profile of rock wall batter Observed void areas	Washout due to wave energy Backfill Washout

Table 2 – Assessment Criteria

To rank the condition of the wall in the particular areas, the Condition Category nominated in Table 3 was used.

CONDITION CATEGORY	DEFINITION
Very Poor	No evident structure forming a minimum standard of asset No structural resistance to identified failure modes
Poor	Detreated / non-conforming structure forming a minimum standard of asset Minimal structural resistance to identified failure modes

CONDITION CATEGORY	DEFINITION
Average	Non-conforming structure forming a minimum standard of asset Possible structural resistance to identified failure modes
Good	Consistent Structure with minimal to no deterioration meeting structures intended purpose Structural resistance to identified failure modes (to original design intent)

Table 3 – Condition Category

Specific defects have been identified where the Condition Category of a section of wall is deemed to be in 'Good' condition. The defect will relate to a specific location / area and relate to the Rock Revetment Wall as a system being able to withstand the identified failure modes.

7.2. INSPECTION AREA

The Rock Revetment Wall was broadly divided into lengths that reflected the general condition of the wall within that length. A chainage system was adopted to broadly identify the divisions and where along the Rock Revetment Wall features were found. The starting point was chosen at the most Northern point of the Rock Revetment Wall on the Stage 1 Site. Figure 4 highlights the division of the areas within the Stage 1 development used for the assessment.

Figure 4 – Chainage Divisions for the Inspection

7.3. INSPECTION LIMITATIONS

A non-intrusive field inspection has been undertaken on the Rock Revetment Wall. The following limitations to the extent of the condition inspection occur due to the inspection scope:

- Foundation Conditions / Materials supporting the wall;
- Underlying Rock condition / thickness;

- Identification of Rock Revetment Formation Treatments (Geotextile or otherwise); and,
- Limit of the Embedded Toe.

8. INSPECTION FINDINGS

The Rock Revetment Wall can be generally categorised as a '*Rock Rubble-mound*' wall as shown in Figure 5.

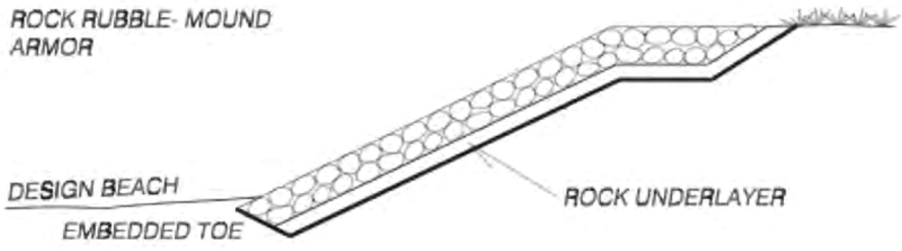


Figure 5 Typical Rock Rubble-Mound Armour Wall

The full Field Inspection Repot is contained within Appendix 3. Table 4 summarises the findings of the field inspection to provide an overview of the general condition.

CHANAGE	CREST	TOE	ROCK	EMBANKMENT
0 to 30	POOR	POOR	GOOD	VERY POOR
30 to 52	POOR	AVERAGE	GOOD	GOOD
52 to 68	N/A	VERY POOR	GOOD	VERY POOR
68 to 280	GOOD	GOOD	GOOD	GOOD

Table 4 – Condition Summary

The Rock Revetment Wall between chainages 0 to 68 has been extensively modified due to the adjacent development. It is apparent that over the life of the industrial use, no maintenance has occurred on the wall with deterioration from its existing condition evident.

This section of wall would not meet the original design intent with full re-design and replacement to be considered as the final solution for the development.

Between chainages 68 to 280, minor access points and infrastructure associated with the adjoining industry / services have occurred. These works have modified the typical profile of the Rock Revetment Wall and thus created defects such as dislodgement of the armour rocks, exposure of underlying rock / backfill or lowering of the Rock Revetment crest.

This length of Rock Revetment Wall can be classed as a being in line with the original design intent of the structure with modifications allowing adjacent facilities harbour access which will ultimately need remediation as part of the Stage 1 Development. The choice of retention for the Stage 1 development will be based on the described Development Considerations outlined in Section 9.

Over the entire length of the Rock Revetment Wall there are general deficiencies when comparing the structure to modern day design thus increasing the walls resistance to the described failure modes, theses are identified below:

- **Geotextiles** – No Geotextile material was visible separating the embankment fill from the underlying rock. Geotextiles or synthetic materials are used as additional scour protection of the embankment fill and is included in all modern Rock Revetment Walls.
- **Crest Scour Protection** – no scour protection is provided immediately adjacent to the crest of the Rock Revetment Wall extending into the finer fill materials.

9. DEVELOPMENT CONSIDERATIONS

In order to provide guidance for the planning and development associated with the Stage 1 works, the following Rock Revetment Wall Considerations (RRWC) should be addressed in there presented order to drive the most efficient modifications and/or repairs undertaken on the Rock Revetment Wall in preparation for the Development:

RRWC-01: ROCK PROFILE / SURFACE AESTHETICS

An assessment of the existing rock surface profile should be undertaken to ensure that both the profile and appearance of the wall and the interface and/or transition into the harbour meets the desired view of the facilities planner and/or stakeholders. This consideration should be determined from the Lowest Astronomical Tide (LAT) level to the top of the current wall height.

RRWC-02: MARINA DEVELOPMENT

Planning for the marina berths and vessel channels will need to consider the dredge profiles that are required to access all areas along the Rock Revetment Wall. Dredge profiles adjacent to the wall shall not induce failure modes either as a direct or indirect consequence of the works.

RRWC-03: VESSEL MOVEMENT

The position and alignment of marina berths and channels shall not induce the failure modes of the Rock Revetment Wall as a result of vessel movements within the harbour.

RRWC-04: BUILDING & STRUCTURE LOADS

All building and/or structures adjacent to the Rock Revetment Wall shall ensure load transfer via the fill to the wall shall be considered. This shall apply to both the permanent load case and the temporary loading during construction activities.

RRWC-05: CREST HEIGHT

Final determination of the crest height of the Rock Revetment Wall shall be determined through a detailed design incorporating the following sub-considerations

RRWC-05A: STORM TIDE INUNDATION

The Storm Tide height incorporating the allowable wave height shall be determined specifically for the site. As part of the assessment, existing primary protections that already exist on the site should be considered. The Channel and Harbour Breakwaters may provide a level of protection to the development that can be incorporated into the specific risk strategy for determining the appropriate Storm Tide levels.

RRWC-05B: STORM TIDE EFFECTS

Consideration of the secondary effects of Storm Tides should be made with regard to the specific marina infrastructure and vessels causing damage to the wall during such a weather event.

RRWC-05C: MAINTAINING OF PRIMARY PROTECTIONS

A suitable maintenance regime (including responsibilities) is to ensure the Stage 1 development areas primary protections (Breakwaters) are maintained for the life of the facility during its operation.

RRWC-06: CREST FILL SURFACE EROSION

Surface finishes in the fill immediately adjacent to the crest shall ensure that no erosion of the fill occurs during storm surge behind the crest of the wall and that the chosen fill integrates with the crest of the Rock Revetment Wall to provide adequate structural protections.

RRWC-07: ADJACENT ITEMS

The positioning of poles, paths, walls & plants immediately adjacent to the crest shall be considered to ensure that the wall cannot be destabilised by the activity or the long term effects of the item within the structural zone.

RRWC-08: DRAINAGE

The effects of surface (stormwater) drainage shall be considered with all free water being directed away from the crest.

10. FURTHER ACTIONS

After assessment of the Development Considerations by all stakeholders involved in the development, the following actions should be considered for any retention of the Rock Revetment Wall between chainages 68 to 280:

- Setting of Storm Tide Levels for the Development Site (choosing/incorporating RRWC-05 considerations);
- Structural Assessment (with respect to storm tide and wave impact) of the retained wall sections;
- Modification and/or rectification design & specifications for works to retain the structure;
- Rock Revetment Wall replacement design & specifications;
- Tidal Works Applications for undertaking works within Tidal Waters;
- Rock Revetment Works;
- Continued maintenance and inspection plans (incorporated into the facilities information management system).

APPENDIX 1 – Historical Aerial Imagery

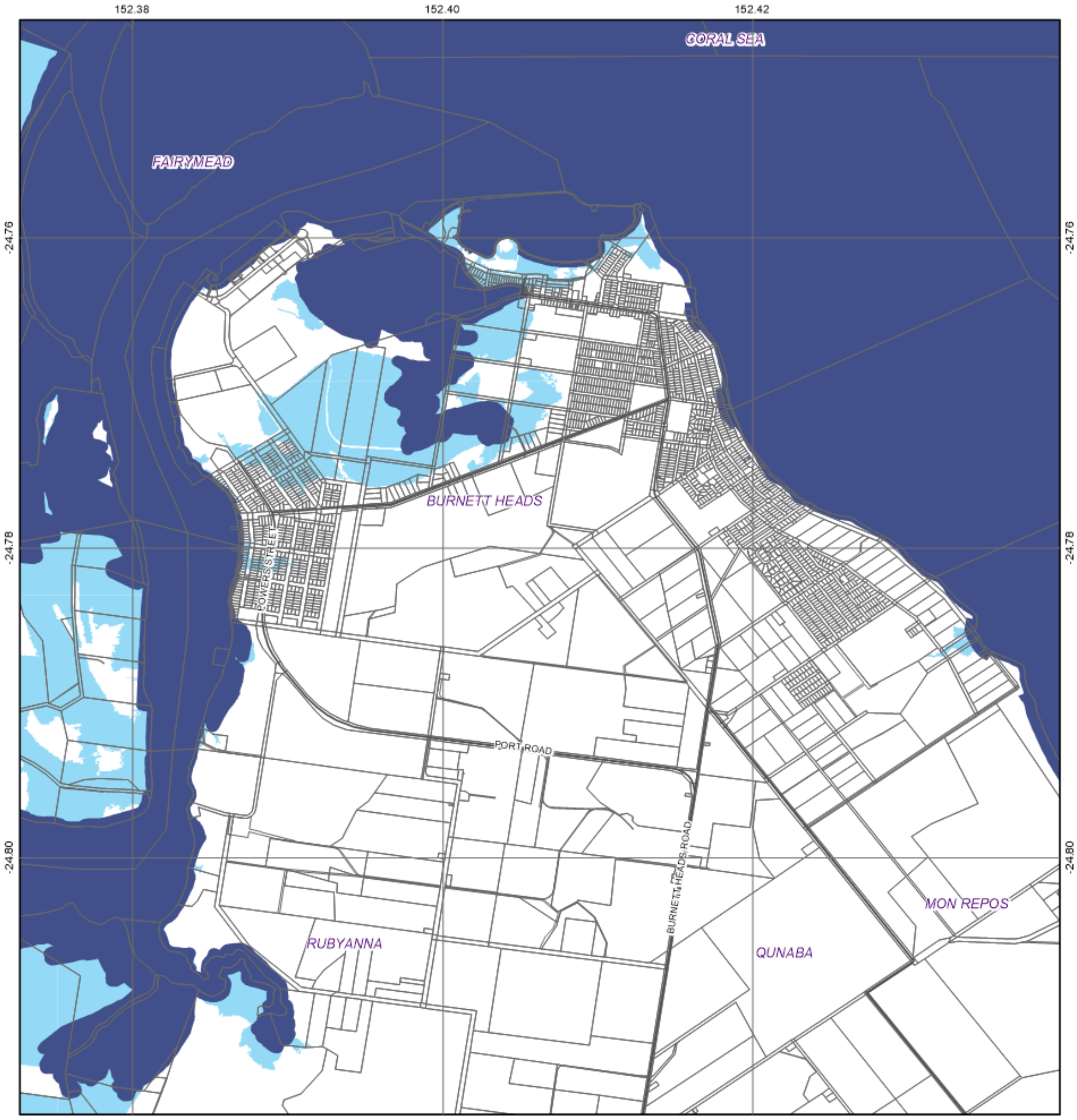
IMAGE 1 – 1956:

IMAGE 2 - 1970:

IMAGE 3 - 1976:

IMAGE 4 - 1979:

APPENDIX 2 – Coastal Hazard Area Maps



Notes
1. The areas shown on this map are indicative of the extent of erosion and permanent inundation defined by erosion prone area plans declared under the *Coastal Protection and Management Act 1995*. Only the declared erosion prone area plans should be used for development assessment. To determine the actual position of the erosion prone area a registered surveyor or geotechnical consultant may be required if there is any doubt.

2. Erosion prone area plans for each local government area and a comprehensive description of their determination are available from the Department of Environment and Heritage Protection website at www.ehp.qld.gov.au

Disclaimer
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Queensland Government

0 0.5 1
Kilometres
Scale at A4: 1:40,000

Coastal Hazard Areas Map
Erosion Prone Area

Version 6 - October 2016

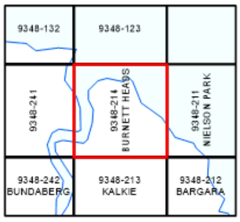
9348-214 BURNETT HEADS

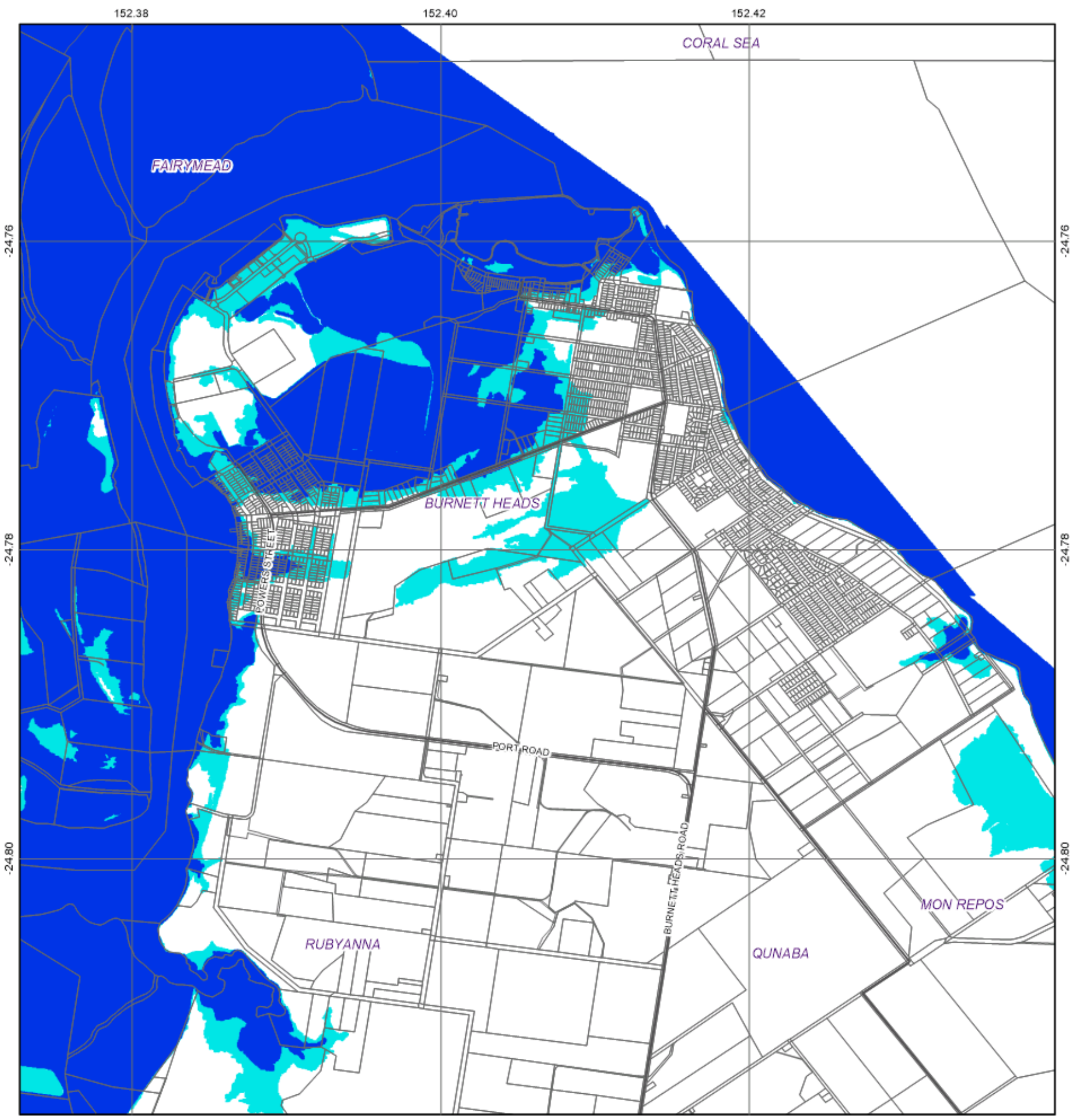
Indicative Erosion Prone Area footprint (including projected climate change impacts*)

Erosion due to storm impact and long term trends of sediment loss and channel migration.

Erosion and permanent tidal inundation due to sea level rise.

*Sea level rise of 0.8m at 2100





Notes

1. A default storm tide inundation level of 1.5 m HAT in South East Queensland regional planning area and 2.0 m HAT for the remainder of Queensland is used where projected storm tide inundation levels have not been determined locally.
The default level uses a sea level rise factor of 0.8m to 2100.

2.The high hazard area may be also subject to permanent inundation by sea level rise - refer to the Erosion Prone Area map.

3. The map should be used as a guide only. Field surveys are recommended to verify feature boundaries.

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Queensland Government

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Kilometres
Scale at A4: 1:40,000

Coastal Hazard Areas Map
Storm Tide Inundation Areas

Version 4 - July 2015

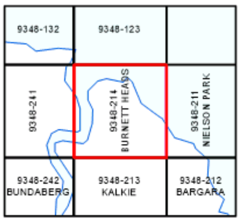
9348-214 BURNETT HEADS

Storm Tide Inundation Area (including projected climate change impacts to 2100)

High hazard area
(greater than 1.0 m water depth)

Medium hazard area
(less than 1.0 m water depth)

Coastal hazard data not available in this area. Refer to notes 1 and 2 to determine.



APPENDIX 3 – Field Inspection Report

FIELD INSPECTION REPORT

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CLIENT: BH Developments	**PAGE No: 1** of **6**
PROJECT: Burnett Harbour 'Marina Village'	**DATE:** 27 September 2019
LOCATION: Harbour Esp, Burnett Heads	**TIME:** 1320 – 1550hrs
PROJECT No: 20086	**TIDE:** 0.29m LAT (Rising)

GENERAL INSPECTION RECORD:

START CHG	FINISH CHG	OBSERVATIONS	PHOTO LOG
0	30	General Observations • Area heavily modified due to adjoining industry • Existing infrastructure (Jetty) still in place from previous industry • Poor rock placement / positioning over area • Type – Rock / Rubble-Mound. • No observed Geofabric.	
		Crest • No Defined Crest • Structures & Vegetation on Edge of Wall • Evidence of Crest Erosion • No evidence of settlement • **Poor Crest Condition**	
		Toe • Exposed Seabed Materials at Low Tide • Soft Silty Sand build-up against lower rock • Poorly Graded rock • No ground heaving identified • **Poor Toe Condition**	
		Rock • No Evident Fracture / Decomposition of Rock • Avg rock Size (Top 2/3) = 800 – 1000mm • Avg rock Size (Bottom 1/3) = 300 – 800mm • **Good Structural Rock**	
		Embankment Profile • Poorly Positioned / Compacted Rock • No evident Rock profile / Batter • Significant void areas over length • **Very Poor Wall Profile**	

Remarks: Stage 1 Development Area	**Inspection By:** J.Lawley

FIELD INSPECTION REPORT

LONJAC
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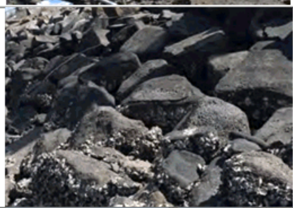
CLIENT: BH Developments	**PAGE No: 2** of **6**
PROJECT: Burnett Harbour 'Marina Village'	**DATE:** 27 September 2019
LOCATION: Harbour Esp, Burnett Heads	**TIME:** 1320 – 1550hrs
PROJECT No: 20086	**TIDE:** 0.29m LAT (Rising)

START CHG	FINISH CHG	OBSERVATIONS	PHOTO LOG
30	52	General Observations • Area generally modified due to adjoining industry • Good rock placement / positioning over area • Type – Rock / Rubble-Mound. • No observed Geofabric.	
		Crest • No Defined Crest • Structures & Vegetation on Edge of Wall • Evidence of Crest Erosion • No evidence of settlement • **Poor Crest Condition**	
		Toe • Exposed Seabed Materials at Low Tide • Soft Silty Sand build-up against lower rock • Rock Spoil Build-up at toe • Average Grading of rock • No ground heaving identified • **Average Toe Condition**	
		Rock • No Evident Fracture / Decomposition of Rock • Avg rock Size (Top 2/3) = 800 – 1000mm • Avg rock Size (Bottom 1/3) = 200 – 800mm • **Good Structural Rock**	
		Embankment Profile • Well Positioned / Compacted Rock • Good Rock profile / Batter • Minimal void areas over length • **Good Wall Profile**	

Remarks: Stage 1 Development Area	**Inspection By:** J.Lawley

FIELD INSPECTION REPORT

LONJAC
CIVIL • MARINE • MANAGEMENT

CLIENT: BH Developments	**PAGE No: 3** of **6**
PROJECT: Burnett Harbour 'Marina Village'	**DATE:** 27 September 2019
LOCATION: Harbour Esp, Burnett Heads	**TIME:** 1320 – 1550hrs
PROJECT No: 20086	**TIDE:** 0.29m LAT (Rising)

START CHG	FINISH CHG	OBSERVATIONS	PHOTO LOG
		General Observations • Original Area for RO-RO utilised by adjoining Industry • No Structure Evident • Observed as Temporary measure to fill RO-RO Ramp • Type – N/A. • Geofabric Observed – Recent Placement as Temporary Measure.	
		Crest • No Crest • Rock placed lower than adjacent structures • No Land development behind crest • No evidence of settlement • **Crest Condition – N/A**	
52	68	Toe • Exposed Seabed Materials at Low Tide • Evidence of original RO-RO Ramp at Toe • Poorly Graded Material • No ground heaving identified **Very Poor Toe Condition**	
		Rock • No Evident Fracture / Decomposition of Rock • Avg rock Size = Highly Variable **Good Structural Rock**	
		Embankment Profile • Variably Placed Rock **Very Poor Wall Profile**	

Remarks: Stage 1 Development Area	**Inspection By:** J.Lawley

FIELD INSPECTION REPORT

LONJAC
CIVIL • MARINE • MANAGEMENT

CLIENT: BH Developments	**PAGE No: 4** of **6**
PROJECT: Burnett Harbour 'Marina Village'	**DATE:** 27 September 2019
LOCATION: Harbour Esp, Burnett Heads	**TIME:** 1320 – 1550hrs
PROJECT No: 20086	**TIDE:** 0.29m LAT (Rising)

START CHG	FINISH CHG	OBSERVATIONS	PHOTO LOG
68	280	General Observations • Consistent wall construction over length • Wall modified in specific locations (VMR & Access Ramp) due to adjoining industry / Services. See 'Specific Defects Below' • Good rock placement / positioning over length • Type – Rock / Rubble-Mound. • No observed Geofabric.	
		Crest • Well Defined Crest • Consistent Level • Some Structures & Vegetation on Edge of Wall • No Evidence of Crest Erosion • No evidence of settlement • **Good Crest Condition**	
		Toe • Exposed Seabed Materials at Low Tide • Soft Silty Sand build-up against lower rock • Well Graded Rock at toe intersection • No ground heaving identified **Good Toe Condition**	
		Rock • No Evident Fracture / Decomposition of Rock • Avg rock Size (Top 4/5) = > 1000mm • Avg rock Size (Bottom 1/5) = 100 – 500mm • **Good Structural Rock**	
		Embankment Profile • Well Positioned / Compacted Rock • Good Rock profile / Batter • Minimal void areas over length • **Good Wall Profile**	

Remarks: Stage 1 Development Area | **Inspection By:** J.Lawley

FIELD INSPECTION REPORT

LONJAC
CIVIL • MARINE • MANAGEMENT

CLIENT: BH Developments	**PAGE No: 5** of **6**
PROJECT: Burnett Harbour 'Marina Village'	**DATE:** 27 September 2019
LOCATION: Harbour Esp, Burnett Heads	**TIME:** 1320 – 1550hrs
PROJECT No: 20086	**TIDE:** 0.29m LAT (Rising)

SPECIFIC DEFECTS IDENTIFIED#:

APPROX. CHG	DEFECT DESCRIPTION	PHOTO LOG
130	**Armour Rock Void** • Missing surface armour rock exposing underlying Rock Layer	 
150 to 165	**VMR Facility** • Wall Modifications to suit VMR infrastructure • Lowering of Crest • Modifications to Toe • Installation of concrete RO-RO Ramp • Varied abutment profiles	
185 to 195	**RO-RO Ramp** • Installation of concrete RO-RO Ramp • Poor Modifications to Abutments • Concrete spoil over wall adjacent abutments	 

Remarks: Stage 1 Development Area	**Inspection By:** J.Lawley

FIELD INSPECTION REPORT

LONJAC
CIVIL • MARINE • MANAGEMENT

CLIENT: BH Developments
PROJECT: Burnett Harbour 'Marina Village'
LOCATION: Harbour Esp, Burnett Heads
PROJECT No: 20086

PAGE No: 6 of **6**
DATE: 27 September 2019
TIME: 1320 – 1550hrs
TIDE: 0.29m LAT (Rising)

APPROX. CHG	DEFECT DESCRIPTION	PHOTO LOG
205 to 245	**Crest Vegetation** • Significant Trees on Crest • Tree Stump within 1m of crest	
250	**Crest Modification** • Disused walkway anchor point	
255	**Minor Rock Slump** • Armour Rock Slump • Likely cause adjacent mooring / anchor	 

 # - Specific Defects only identified over length of wall in 'good condition' between Chainages 68 and 280

Remarks: Stage 1 Development Area	**Inspection By:** J.Lawley

TRAFFIC IMPACT ASSESSMENT
Bundaberg Gateway Marina Development

Traffic Engineering Report (Development Permit)

Date 14 January 2020
Project number 13101

REPORT CONTROL SHEET

RMA ref.	**13101**
Project name:	Burnett Heads Harbour Village Development
Report title:	Traffic Impact Assessment – Traffic Engineering Report (Development Permit)
Report author:	Sheldon Lopez / Adam Gwatking

Document control						
Revision	**Author**	**Reviewer**	**Approved for issue**			
			Name	**RPEQ no.**	**Signature**	**Date**
0	B Brown	A Gwatking	A Gwatking	15158	A Gwatking	14/01/20

Disclaimer:

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The conclusions in this report should not be read in isolation. We recommend that its contents be reviewed in person with the author so that the assumptions and available information can be discussed in detail to enable the reader to make their own risk assessment in conjunction with information from other sources.

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Table of Contents

1. Introduction

RMA Engineers has been engaged by BH Developments QLD Pty Ltd to undertake a Traffic Impact Assessment (TIA) in support of a development application for the proposed Burnett Heads Harbour Village development located at Harbour Esplanade in Burnett Heads, Queensland. The proposed development consists of an integrated mix of uses including a marina (with fixed wet berths), and commercial, retail, recreation, residential and accommodation facilities. The proposed development is located on the southwestern side of Burnett Harbour and is expected to attract tourism to the Burnett Heads area.

This report has been prepared in support of an application for a development permit to be lodged with the Bundaberg Regional Council (BRC).

This traffic report has been undertaken generally in accordance with the relevant road transport related requirements identified by the BRC and associated planning scheme.

1.1 Background

A previous Preliminary Traffic Engineering Assessment Report DP, prepared by RMA Engineers, dated 24 October 2018, was submitted to the Bundaberg Regional Council as part of a preliminary approval application. The traffic engineering report documented an initial investigation of the transport elements of the proposed development, including its integration with relevant land use and transport planning.

Since the lodgement of the preliminary approval application, an information request has been issued by the BRC, dated 15 February 2019. The information request indicate that a TIA report is required to adequately address the performance outcomes of the Council Planning Scheme.

Therefore, this report also addresses the traffic and transport items identified by the information request. The information request document is provided at Appendix B.

1.2 Report objectives and scope

The purpose of this report is to investigate the traffic and transport related impacts of the proposed development on the surrounding local road network.

This report considers:

- The existing transport operation and environment of the surrounding local road network
- Estimated development traffic generation and distribution
- Operational assessment of key intersections
- Internal site layout and car parking review
- Safety considerations, review of historical crash data and commentary on required mitigation measures (if any)
- Active and public transport considerations
- Compliance with government planning criteria

Where required, this report makes recommendations for the mitigation of development impacts.

1.3 Reference material

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

- Bundaberg Regional Council Planning Scheme
- Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections – 2010
- Austroads Guide to Traffic Management, Part 12: Traffic Impacts of Developments – 2009
- DTMR Road Planning and Design Manual (RPDM) – 2013
- Australian Standard 2890 – Parking Facilities – 2009
- Australian Standard 1428.1 – Design for Access and Mobility – 2009
- Disability (Access to Premises – Buildings) Standards – 2010
- Guide to Generating Traffic Developments – NSW Roads and Maritime Services (formerly Roads and Traffic Authority) – 2002

2. Proposed development

2.1 Location

The subject site is situated along Harbour Esplanade within Burnett Heads north of Bundaberg. The subject site occupies a portion of Lot 1 on plan SP157913 within the BRC local government area. The development site is bound by Harbour Esplanade in the south, the Bundaberg Port development area to the west, the Burnett River estuary in the north, and land under the administration of Gladstone Ports Corporation to the east. The existing road network surrounding the subject site is described in detail in Section 3.

Access to the development site is proposed via Harbour Esplanade and ultimately the Port Roadway (which is currently is a public road that is situated on park and recreation reserve located within the Bundaberg Port development). The subject site is classified as community facilities in the BRC Planning Scheme. The land to the south of the development site is predominantly zoned as medium density residential and open space.

The subject site and its environs are illustrated on the locality plan in Figure 2-1.

Figure 2-1: Locality plan

2.2 Development characteristics

The development is proposed as a material change of use for an integrated mixed-use development. The marina village will be located on the south-western shore of Burnett Harbour and consists of the land uses and yields illustrated in Table 2-1.

Table 2-1: Development land uses and yields

Building / facility	Land use	Qty.	Unit of measure
A	Commercial - office	337	sq.m GFA
	Club (restaurant)	565	sq.m GFA
	Retail (shops)	300	sq.m GFA
B	Guest suites (short term accommodation)	28	Rooming unit
	Commercial - office	172	sq.m GFA
	Shops (Broker, real estate & Café/ Bakery)	283	sq.m GFA
C	Gym / Spa (Indoor sport and recreation)	327	sq.m GFA
	Commercial - office	297	sq.m GFA
	Food and beverage (restaurant / dining pavilion / outdoor dining / takeaway food)	538	sq.m GFA
	Retail (shops)	322	sq.m GFA
D	Residential (apartments)	36	Dwelling
E	Residential (apartments)	24	Dwelling
F	Residential (apartments)	24	Dwelling
Marina	Marina Stage 1	140	Wet berth
	Marina Stage 2	179	Wet berth
	Refuelling facility for the marina use	-	-

Note: sq.m – square metres, GFA – gross floor area

The layout of the development illustrating the location of each use is provided in Appendix A.

2.3 Development staging

The development will be constructed over several stages due to its size. The expected staging and timing of the development has been provided by the client and is shown in Table 2-2.

Table 2-2: Development staging

Stage	Estimated completion Year	Building / Uses
1A	2021	B, Marina Stage 1
1B	2022	C
2A	2023	E
2B	2024	F, Marina Stage 2
3	2025	D
4	2026	A

It should be noted that the staging has a key influence on the required parking demands of the site. This is discussed further in Section 7.2 of this report.

2.4 Site access

The development proposes two accesses along Harbour Esplanade and one access on the Port Roadway (refer to Figure 2-2). Access to the eastern residential portion of the site (consisting of buildings E and F) is proposed by one single access to Harbour Esplanade (Access 1 - the eastern Harbour Esplanade access). The internal car parking circulation aisles of the western mixed-use portion of the site provides an internal connection between the western Harbour Esplanade access (Access 2) and the Port Roadway access (Access 3). Access to refuelling facility on the northern side of the development is proposed via the Port Roadway.

It should be noted that no internal vehicle connectivity is provided between the western mixed-use portion of the site, the eastern residential portion of the site and the refuelling facility.

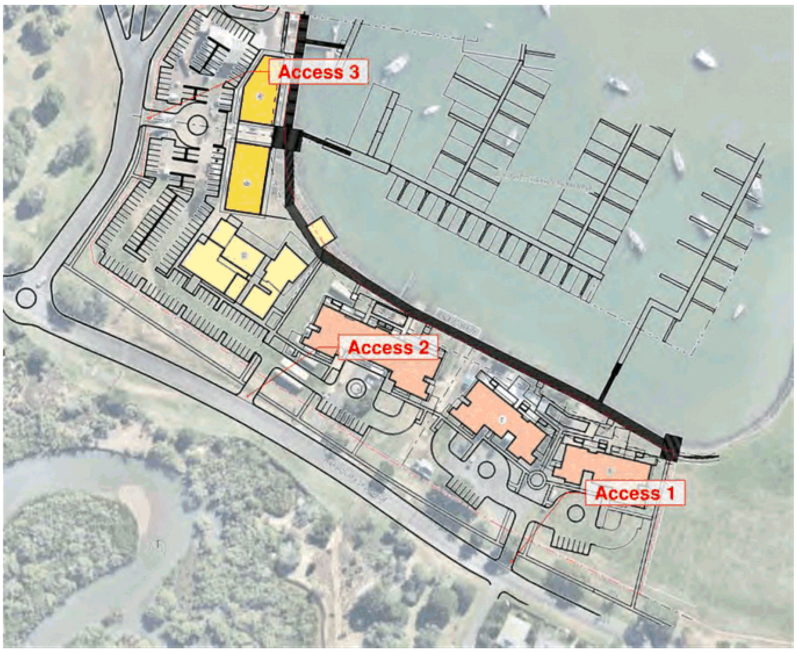

Figure 2-2 Proposed development access locations

2.5 Car parking and servicing

The development includes a total of 354 car parks. Public car parking will primarily be provided for Building A, B and C. Residential buildings D, E and F include basement car parking for residents and at-grade visitor parking in front of the buildings. Car parking arrangements and requirements are further discussed in Section 7.2 of this report.

Goods and refuse servicing for the development will occur at loading areas located near Building C as shown on plans provided in Appendix A which is accessed through the internal car parking area.

Fuel delivery for the marina use (at the northern end of the site) will be provided via the existing boat ramp roadway to the north of Building A.

3. Existing transport environment

3.1 Surrounding road environment

The BRC Local Government Infrastructure Plan (LGIP) *Existing and Future Transport Network (Roads) Trunk Infrastructure* mapping as extracted for the surrounding area in Figure 3-1 shows the existing roads in the subject area and their respective classifications. The immediate local road network is further discussed in Sections 3.1.1 to 3.1.5.

Note: Contrary to what is illustrated, it is understood that Zunker Street west of Marshall Street is under the jurisdiction of local authority while the remaining segment is state controlled.

Figure 3-1: BRC road hierarchy map (extracted from BRC online mapping: LGIP)

3.1.1 Harbour Esplanade

Harbour Esplanade follows the coastline around Burnett River extending from Marina Drive in the west to Moss Street in the east. The segment of Harbour Esplanade from Moss Street to Somerville Street provides access to three residential houses. Harbour Esplanade is classified as a trunk collector in the BRC Planning Scheme and has the following features in the vicinity of the subject site (refer to Figure 3-2):

- Two-way, two lane road configuration
- Road reserve width of approximately 30 m and road carriageway of 6.8m
- Unmarked pavement in the road segment along the frontage of the subject site
- Posted speed limit of 50 km/h

Figure 3-2: Harbour Esplanade looking west

3.1.2 Moss Street

Moss Street maintains a two-way, two lane road configuration and extends from the Harbour Esplanade in the north to Zunker Street in the south. Moss Street is classified as a trunk collector in the BRC Planning Scheme and forms the link between Zunker Street and Harbour Esplanade. It is understood that Moss Street was recently upgraded in 2018 to include a local centre road environment with a low speed limit of 40 km/h as part of the Burnett Head Town Centre streetscaping project. Moss Street has the following features (refer to Figure 3-3):

- Road reserve width of approximately 20 m
- Roadway width of approximately 12 m

Figure 3-3: Moss Street looking south

3.1.3 Zunker Street

Zunker Street extends from Moss Street in the west to Sea Esplanade in the east. Zunker Street is classified as a trunk collector in the BRC Planning Scheme and continues onto Burnett Heads Road which provides a direct route to the Bundaberg CBD. A portion of Zunker Street (between Moss Street and Paul Mittelheuser Street) was upgraded in 2018 to include a shared zone as part of the Burnett Head Town Centre streetscaping project. The segment of Zunker Street west of Marshall Street is under the jurisdiction of local authority while the remaining segment is state controlled. The upgraded road segment of Zunker Street has the following characteristics in the vicinity of the subject site (refer to Figure 3-4):

- Two-way, two lane road configuration
- Angled parking bays on south sides of the street at the western end and parallel parking bays on the north and south side of the street between Hermans Road and Mittelheuser Street.
- Road reserve width of approximately 30 m
- Lane width of 3.2 m and provision of bicycle lane
- Pedestrian footpath along the entirety of the south side of the road
- Pedestrian footpath along the northern side of the road from Moss Street to Brewer Street
- Posted speed limit of 40 km/h transitioning to 50 km/h outside the local centre area

Figure 3-4: Zunker Street looking east

3.1.4 Port Roadway (boat ramp access road)

The Port Roadway is a public road that is situated on park and recreation reserve and provides access to the existing boat ramp and associated parking areas. The roadway has a two-way, two lane road configuration from the intersection with Harbour Esplanade to the car park entrance (refer to Figure 3-5), and a one-way circulation road through the car parking area. The two-way, two lane section of the road is approximately 11 m in width and maintains kerb and channelling throughout.

Figure 3-5: Port Roadway looking north towards the car parking area

3.1.5 Donaldson Street, Bengsten Street and Finucane Street

Donaldson Street, Bengsten Street and Finucane Street are local streets that form one continuous road segment intersecting with Harbour Esplanade at either end. These streets provide access to an existing parcel of medium density residential housing. In the vicinity of the subject site Donaldson Street, Bengsten Street and Finucane Street (refer to Figure 3-6) have the following characteristics:

- Road reserve with of approximately 20 m
- Road width of 3.3 m

Figure 3-6: Finucane Street looking south

3.2 Key intersections

The key intersections on the local road network relevant to the proposed development include:

- Finucane Street / Harbour Esplanade
- Donaldson Street / Harbour Esplanade
- Port Roadway / Harbour Esplanade
- Harbour Esplanade / Moss Street
- Moss Street / Zunker Street / Retail Access
- Hermans Road / Zunker Street
- Somerville Street / Zunker Street

The current intersection configurations and their respective features are further discussed in Section 3.2.1 to 3.2.6.

3.2.1 Finucane Street / Harbour Esplanade and Donaldson Street / Harbour Esplanade

The Finucane Street / Harbour Esplanade and Donaldson Street / Harbour Esplanade intersections consist of standard priority T arrangements, maintaining priority to Harbour Esplanade. Currently there are no forms of traffic controls at the intersections. The separation distance between the two intersections is approximately 115 m.

3.2.2 Port Roadway / Harbour Esplanade

The Port Roadway / Harbour Esplanade intersection consists of a standard priority T arrangement, maintaining priority along Harbour Esplanade. The intersection provides access to the existing boat ramp and associated parking area. The intersection has priority controls on the minor road approach including stop line marking and 'Stop' signage.

3.2.3 Harbour Esplanade / Moss Street

The Harbour Esplanade / Moss Street intersection is a reverse priority-controlled T arrangement, maintaining priority along the curve of Harbour Esplanade and Moss Street. The minor eastern Harbour Esplanade leg of the intersection currently provides road access to a small number of residences and connects through to Sommerville Street.

3.2.4 Moss Street / Zunker Street / Retail Access

The Moss Street / Zunker Street / Retail Access intersection is a reverse priority-controlled T arrangement, maintaining priority along the corner of Moss Street and Zunker Street. The intersection was recently upgraded in 2018 as part of the Burnett Head Town Centre Local Plan and includes a short channelised right turn lane for motorists turning from Moss Street into the retail access.

3.2.5 Hermans Road / Zunker Street

The Hermans Road / Zunker Street intersection consists of a standard priority T arrangement, maintaining priority along Zunker Street. The intersection was recently upgraded in 2018 as part of the Burnett Head Town Centre Local Plan. A short channelised right turn lane exists for motorists turning from Zunker Street into Hermans Road.

3.2.6 Somerville Street / Zunker Street

The Somerville Street / Zunker Street intersection consists of a standard priority T arrangement, maintaining priority along Zunker Street. The intersection was recently upgraded in 2018 as part of the Burnett Head Town Centre Local Plan and includes angled parking provisions within close proximity to the intersection.

3.3 Crash data

Data and descriptions of crashes that have occurred over the last 10 years have been detailed for the surrounding road network in the vicinity of the proposed development site. This includes the local Burnett Heads town centre, the frontage of the development (along Harbour Esplanade and the Port Roadway) and the key intersections as identified previously in Section 3.2.

Data was extracted from Queensland Globe and the Open Data Portal – Data Explorer (both provided by the Queensland Government). Crash data has been obtained at all locations for the last ten years (between 1 October 2009 and 31 December 2018) for all crash severities and types. However, it should be noted that 'property damage only' severity crashes are only available up to 31 December 2010.

The recorded crashes incidents over the ten year period have been visually presented in Figure 3-7.

Figure 3-7: Road crash locations

Crashes have occurred in 2011, 2012, 2014 and 2017 (labelled as no. 1, 2, 4 and 3 respectively in Figure 3-7) with no reported fatalities. Table 3-1 summarises the corresponding crash data.

Table 3-1: Crash data summary – Burnett Heads Town Centre

No.	Severity	Date	DCA code	DCA description	Road surface condition	Atmospheric condition	Lighting condition
1	Medical treatment	2011	201	Vehicles opposite approach: head-on	Sealed - dry	Clear	Daylight
2	Minor injury	2012	803	Off path- curve: off carriageway right bend hit object	Sealed - wet	Clear	Darkness-lighted
3	Hospitalisation	2017	506	Vehicles overtaking: Overtake- right turn same direction	Sealed - dry	Clear	Daylight
4	Hospitalisation	2014	400	Veh'S Manoeuvring: Other	Unsealed - dry	Clear	Daylight

As shown in Table 3-1, the number of crashes that have occurred in the vicinity of the development over the last 10 years is relatively low. All crashes occurred under different circumstances, locations and type (DCA codes). Therefore, no crash patterns or crash mitigation measures have been identified from the available crash data.

It should also be noted that the town centre area has recently been upgraded in 2018. The upgrades (including the town centre road environment, a lower speed limit (40 km/h) and shared zone) will help increase road safety in the area.

3.1 Existing public transport services

Currently there is one public transport bus service, Route 5, operating between Bundaberg CBD and the Burnett Heads region. Route 5 begins at Bundaberg Plaza within the CBD before proceeding to Burnett Heads via Bundaberg Port Road. The bus service loops around the Burnett Heads area passing the marina and the proposed site in an eastbound direction. Route 5 is illustrated in Figure 3-8 below.

Bus services typically operate between 7:14am and 4:21pm on weekdays with a maximum frequency of two hours. On Saturdays there are two bus services, one in the morning (operating between 8:30am and 9:31am) and the other in the afternoon (operating between 12:30pm and 1:31pm).

The closest bus stop to the development is located approximately 130 m east of the Hermans Road / Zunker Street intersection. It is situated approximately 800 m walking distance from the centre of the proposed development site.

It is expected that as demand grows in the Burnett Heads region, the bus trip frequency will also increase to meet demand.

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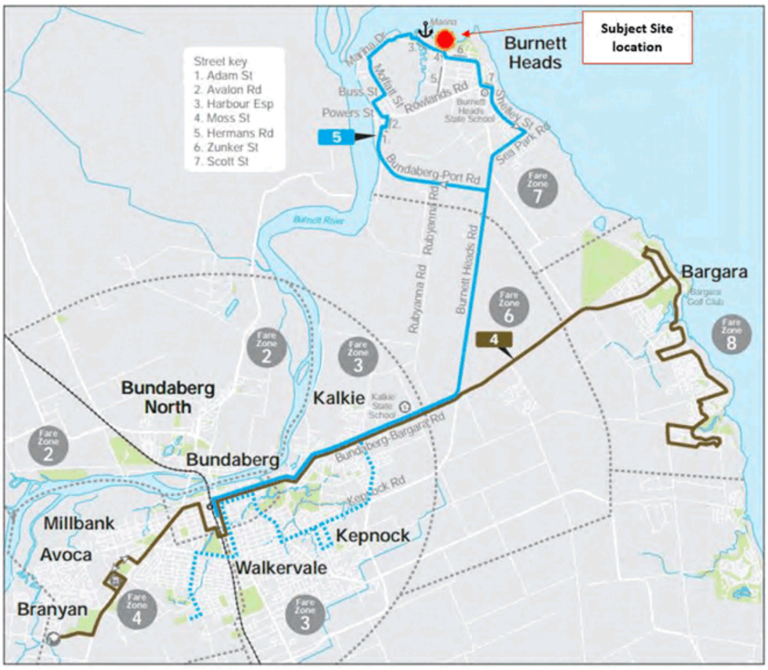

Figure 3-8: Public Transport service between Bundaberg CBD and Burnett Heads

3.2 Traffic count data and peak time periods

It is recognised that the proposed development has different uses that may coincide with different peak periods. For example, the residential and commercial uses align with weekday AM and PM commuter peak periods whereas the marina and retail (tourism) peak typically aligns with weekend midday peak periods. Therefore, all three peak periods have been adopted for the assessment.

Traffic counts were undertaken during the following three peak scenarios:

- Thursday 15th August 2019, between 7am to 9am – this represents a typical weekday morning peak period (for residential and commercial uses such as school and commuter travel).
- Thursday 15th August 2019, between 4pm to 6pm – this represents a typical weekday afternoon peak period (for residential and commercial uses such as commuter travel).
- Saturday 17th August 2019, between 11am to 9am – this represents a weekend midday peak (for marina, retail and tourist uses).

The traffic counts were undertaken at the following intersections:

- Port Roadway / Harbour Esplanade
- Moss Street / Zunker Street / Retail Access
- Hermans Road / Zunker Street
- Somerville Street / Zunker Street

The traffic survey data is provided in Appendix C.

4. Future road network

4.1 Local Plan road network

The Burnett Head Town Centre Local Plan (2017), herein referred to as the Local Plan, focuses on Zunker Street (between Moss Street and Paul Mittelheuser Street) and its immediate surrounds. The Local Plan aims to provide strategic recommendations for future development of the Burnett Heads region with a focus on promoting active transport.

As part of long-term planning, the Local Plan illustrates an extension of Zunker Street via Lutz Street to connect with Harbour Esplanade at or near Finucane Street as shown in Figure 4-1. The long-term planning includes terminating Moss Street at Harbour Esplanade through the provision of a cul-de-sac, while maintaining an active transport link to the foreshore.

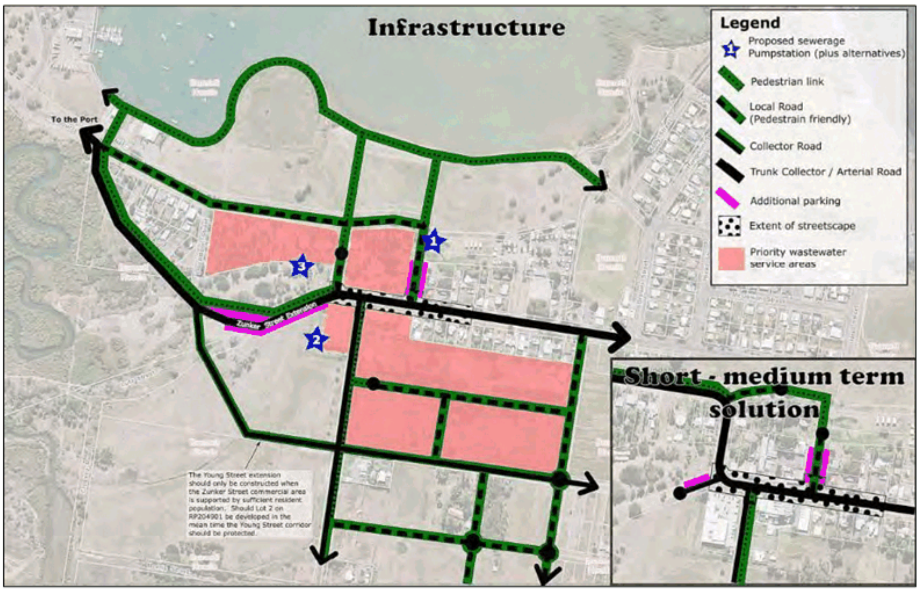

Figure 4-1: Local Plan Mapping- Infrastructure extracted from Burnett Heads Town Centre Local Plan

Recently, as per the Local Plan, Zunker Street has been upgraded with the short-medium term streetscape concept. It is recognised that the 30 m road reserve width will be continued through the proposed Zunker Street extension. Upon completion of these upgrades and in consideration of the increase in population within the Local Plan area, Young Street is proposed to be extended to link to the proposed Zunker Street extension.

4.2 Harbour Esplanade planned upgrades

It is understood that council intends to condition the upgrade of Harbour Esplanade to a trunk collector standard. This is consistent with Council's LGIP which identifies Harbour Esplanade as a trunk collector. Consequently, any works undertaken by the applicant in the Harbour Esplanade road reserve is trunk work and will attract infrastructure credits.

Given that the southern side of the development frontage adjoins Wallace Creek and that parking is provided internally to the development site, council's constrained corridor cross section is assumed to be most appropriate. It is likely that for the section south of the crown of the road, an amended cross section may be worthwhile with considering a flush kerb to sheet flow into Wallace Creek. This will be determined at detailed design.

From a traffic generation and operational perspective, a trunk collector standard is generally triggered when the traffic volumes reach around 3,000vpd. From the current plan and estimated development staging (as illustrated previously in Table 2-2), this 3,000vpd volume is likely not to be triggered until the year 2024, when background traffic has grown to approximately 900vpd and when the development Stages 1A, 1B, 2A and 2B are completed (refer Table 4-1). Therefore, the upgrade of Harbour Esplanade to a trunk collector standard (along the frontage of the development) should be conditioned to occur prior to the introduction of uses that imposes a total development generation in the order of greater than 2100vpd at the year 2024 (assumed to be at the opening of stage 3 on the current submitted plan).

Table 4-1: Forecasted Harbour Esplanade traffic volumes

Year	Daily volumes							Total (vpd)
	Base	Staging						
		1A	1B	2A	2B	3	4	
2019	770	0	0	0	0	0	0	770
2020	793	0	0	0	0	0	0	793
2021	817	776	0	0	0	0	0	1,593
2022	841	776	658	0	0	0	0	2,275
2023	867	776	658	96	0	0	0	2,397
2024	893	776	658	96	580	0	0	3,003
2025	919	776	658	96	580	144	0	3,173
2026	947	776	658	96	580	144	588	3,789
2027	975	776	658	96	580	144	588	3,817
2028	1,005	776	658	96	580	144	588	3,847
2029	1,035	776	658	96	580	144	588	3,877
2030	1,066	776	658	96	580	144	588	3,908
2031	1,098	776	658	96	580	144	588	3,940
2032	1,131	776	658	96	580	144	588	3,973
2033	1,165	776	658	96	580	144	588	4,007
2034	1,200	776	658	96	580	144	588	4,042
2035	1,236	776	658	96	580	144	588	4,078
2036	1,273	776	658	96	580	144	588	4,115

Note: estimated traffic generation volumes for each development stage are detailed in Section 5

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5. Traffic operation

5.1 Development traffic generation

In order to estimate the impact of the development on the surrounding road network, the projected number of vehicle trips likely to be generated by the proposed development have been determined based on the NSW *Guide to Traffic Generating Developments* (NSW Roads and Maritime Services (formerly NSW Roads and Traffic Authority), 2002) and the Institute of Transportation Engineering (ITE) *Trip Generation Guide* (10th Edition).

The traffic generation rates adopted for the assessment are detailed below in Table 5-1.

Table 5-1: Traffic generation rates

Development land use	Peak hour rate (vph)			Daily rate (vpd)	Unit	Source
	Weekday AM	Weekday PM	Saturday midday			
Marina	0.1	0.1	0.1	2.7	per fixed wet berth	Sawley Marina survey and ITE 9th Edition survey information
Club (restaurant)	1	5	5	60	per 100 sq.m GFA	RTA Guide
Food and beverage	0.5	5	5	60	per 100 sq.m GFA	RTA Guide
Office and commercial	2	2	2	10	per 100 sq.m GFA	RTA Guide
Retail (shops)	2	12	16	121	per 100 sq.m GFA	Cardno Traffic Impact Assessment Report for a mixed-use marina precinct development in Morayfield QLD (2008)
Residential (multiple dwelling units)	0.4	0.4	0.4	4	per dwelling unit	ITE Trip Generation 10th Edition
Residential (short term accommodation)	0.5	0.5	0.5	5	per dwelling unit	ITE Trip Generation 10th Edition
Gym / spa (Indoor sport and recreation)	1.9	2.5	2.5	20	per 100 sq.m GFA	ITE Trip Generation 10th Edition

Note: sq.m – square metres, vph – vehicle trips per hour, vpd – vehicle trips per day, GFA – gross floor area

It should be noted that the weekend peak hour generation has also been taken to represent the weekday PM peak hour generation in most cases. This is because it is expected that the weekday PM and weekend midday peak periods will have similar demands.

The refuelling facility is not considered to generate additional vehicle trips during the peak hours as it is an ancillary use to the marina operations and the development.

Reductions for cross-utilisation have been applied to reflect the mixed-use nature of the site as patrons will visit multiple uses. To estimate cross-utilisation factors the National Cooperative Highway Research Program (NCHRP) Enhancing Internal Trip Capture Estimation for Mixed-Use Developments tool was used. The NCHRP methodologies are based on existing data from prior surveys of mixed use development sites and new data collected at three mixed use development sites located in Dallas, Atlanta and Plano (in the US) with each site containing uses including office, retail, restaurant, entertainment, residential and hotel (similar to the development site). RMA are not aware of any similar Australian study or published data in relation to cross-utilisation of mixed-use developments.

Analysis using the NCHRP Internal Trip Capture Estimation tool identified an overall reduction of approximately 20 % in the AM peak period and 55 % in the PM peak period based on the traffic generation, mix and sizes of the uses contained within the development site. To provide a conservative review the lower reduction of 20 % has been applied to the overall development site uses (excluding the Marina and long-term residential uses).

From the above trip generation rates, and the consideration of the cross utilisation, the estimated trip generation volumes for the site is summarised in Table 5-2. Peak development demand has also been conservatively taken to coincide with the surrounding road network peak.

RMA Engineers

Table 5-2: Estimated development traffic generation

Building / facility	Land use	Qty.	Unit of measure	Proposed trip reduction (cross utilisation reduction)	Peak hour trip generation (vph)			Daily trip generation (vpd)
					Weekday AM	Weekday PM	Saturday midday	
A	Commercial - office	337	sq.m GFA	20%	5	5	5	27
	Club (restaurant)	565	sq.m GFA	20%	5	23	23	271
	Retail (shops)	300	sq.m GFA	20%	5	29	38	290
B	Guest suites (short term accommodation)	28	Rooming unit	20%	11	11	11	112
	Commercial - office	172	sq.m GFA	20%	3	3	3	13
	Shops (Broker, real estate & Café/ Bakery)	283	sq.m GFA	20%	5	27	36	273
C	Gym / Spa (Indoor sport and recreation)	327	sq.m GFA	0%	6	8	8	65
	Commercial - office	297	sq.m GFA	20%	5	5	5	23
	Food and beverage (restaurant / dining pavilion / outdoor dining / takeaway food)	538	sq.m GFA	20%	2	22	22	258
	Retail (shops)	322	sq.m GFA	20%	5	31	41	311
D	Residential (apartments)	36	Dwelling	0%	14	14	14	144
E	Residential (apartments)	24	Dwelling	0%	10	10	10	96
F	Residential (apartments)	24	Dwelling	0%	10	10	10	96
Marina	Marina Stage 1	140	Wet berth	0%	14	14	14	378
	Marina Stage 2	179	Wet berth	0%	18	18	18	483
Total					**117**	**229**	**258**	**2,840**

Note: sq.m – square metres, vph – vehicle trips per hour, vpd – vehicle trips per day, GFA – gross floor area

5.2 Development traffic distribution

5.2.1 In and Out splits

Table 5-3 below details the adopted In and Out splits used for this assessment for each peak period. The In and Out splits have been obtained from the ITE Trip Generation Manual (10th Edition).

Table 5-3: Adopted In / Out splits

Land Use	Weekday AM peak %		Weekday PM peak %		Saturday midday peak %	
	IN	OUT	IN	OUT	IN	OUT
Marina	80%	20%	20%	80%	20%	80%
Club	50%	50%	50%	50%	50%	50%
Food and beverage	50%	50%	50%	50%	50%	50%
Gym / Spa	60%	40%	50%	50%	50%	50%
Office and commercial	80%	20%	20%	80%	50%	50%
Retail *	50%	50%	50%	50%	50%	50%
Residential (multiple dwelling)	30%	70%	70%	30%	50%	50%
Residential (short term accommodation)	60%	40%	50%	50%	50%	50%

5.2.2 Internal distribution

Access to the eastern residential portion of the site (consisting of buildings E and F) is proposed by one single access to Harbour Esplanade (Access 1 - the eastern Harbour Esplanade access). Therefore 100 % of the traffic generated by buildings E and F will utilised this access.

The internal car parking circulation aisles of the western mixed-use portion of the site provides an internal connection between the western Harbour Esplanade access (Access 2) and the Port Roadway access (Access 3). Given that the Port Roadway currently is a public road that is situated on park and recreation reserve, the traffic distribution from this portion of the site is conservatively assumed to wholly use Access 2 and not the Port Roadway. Therefore, 100 % of the traffic generated by buildings A, B, C, D and both Marina stages will use Access 2.

For the analysis, a sensitivity test was also undertaken to determine the operation of accesses 2 and 3 and the Port Roadway / Harbour Esplanade intersection with an internal distribution of the relevant land uses split 50% / 50%.

5.2.3 Distribution onto the external road network

The estimated development traffic distribution has been determined using background traffic patterns and local trip attractors and generators. The resultant distribution adopted for the assessment is as follows:

- 70 % to/from the Bundaberg CBD via Zunker Street and Burnett Heads Road
- 15 % to/from Bargara via Zunker Street and Burnett Heads Road
- 10 % to/from the local Burnett Heads town centre and surrounding local residential areas
- 5 % to/from Bundaberg Port Marina via Harbour Esplanade

Application of the above distribution of development traffic movements at key intersections is illustrated in Appendix D.

5.3 Base and design traffic volumes

Based on information obtained from the developer, it is understood that the subject site is expected to be completed and fully operational in 2026. The assessment on the external road network will be undertaken at year of completion (2026) and at a 10-year design horizon (2036).

A 3% per annum compound background growth rate was adopted based on the existing population growth illustrated within the Local Plan for the Burnett Heads Region and advice received from Council. The existing 2019 traffic survey data was growth up to determine a 'base' (traffic without development) traffic scenario.

Application of the previously described distribution assumptions to the estimated development traffic demand (development generation) was added to the appropriate base scenario which resulted in a 'design' (traffic post development) traffic scenario.

For conservativeness, the worst-case peak hour volumes for each intersection was used in the analysis. The peak hour generation for the development is assumed to correspond with these intersection peaks.

6. Operational assessment

6.1 Intersection assessment parameters

6.1.1 Assessment scope

An assessment of the development traffic impacts has been carried out with both the base and design scenarios for the following years for the weekday AM, weekday PM and Saturday midday peak periods:

- Year of opening (2026)
- 10-year design horizon (2036)

Intersection operational assessment was undertaken at the request of Council on the local road network along the primary travel route of development traffic. The assessment was undertaken on the following key intersections (working from east to west):

- Somerville Street / Zunker Street
- Hermans Road / Zunker Street
- Moss Street / Zunker Street / Retail Access
- Harbour Esplanade / Bengsten Street / Site Access 1 (100% distribution)
- Harbour Esplanade / Site Access 2 (100% distribution)

As discussed previously in Section 5.2.2 a sensitivity assessment to determine the impact on the Port Roadway if Access 3 was utilised (i.e. 50% / 50% split between Access 2 and 3) was also undertaken for the following intersections:

- Port Roadway / Harbour Esplanade
- Port Roadway / Site Access 3 (50% distribution)

6.1.2 Assessment criteria

An assessment of the traffic impacts resulting from the proposed development have been carried out at the 10-year design horizon (2036) and, if required, the year of completion (2026). The analysis was undertaken using SIDRA 8.0 intersection analysis program.

This program calculates the operational performance of the intersections based on input parameters such as road geometry and traffic volumes. Results of the modelling (outputs) that have been recorded include the Degree of Saturation (DOS), queue lengths (in metres) and delay times (in seconds). The DOS is a commonly used value, which is principally a volume to capacity ratio.

The typical industry accepted values for DOS and intersection performance are summarised in Table 6-1. A DOS exceeding these values indicates that the intersection is exceeding its practical capacity and users of the intersection are likely to experience unsatisfactory queuing and delays.

Table 6-1: Typical acceptable DOS for intersections

Intersection type	Maximum DOS
Signalised intersection	90% - 95% (0.90 - 0.95)
Roundabout	85% (0.85)
Unsignalised intersections	80% (0.80)

These values are also recommended by Austroads Guide to Traffic Management – Part 12. The difference in delays between the base and design scenarios has also been considered as part of the assessment.

6.1.3 Assessment methodology

The 2036 design horizon was modelled in SIDRA first to determine if the intersection operates adequately. If the analysis indicates that the intersection cannot operate satisfactory within the required DOS at the design horizon, further analysis was then undertaken at the 2026 year of opening (to determine the likely year that the intersection would need to be upgraded). Following from this, any mitigation measures required to ameliorate the impacts on the intersection would then be proposed and reanalysed at the 2036 design horizon.

6.2 Intersection assessment – SIDRA analysis

6.2.1 Somerville Street / Zunker Street

The Somerville Street / Zunker Street intersection layout as modelled in SIDRA is shown in Figure 6-1. The intersection is modelled as a simple priority T-intersection with priority provided along Zunker Street.

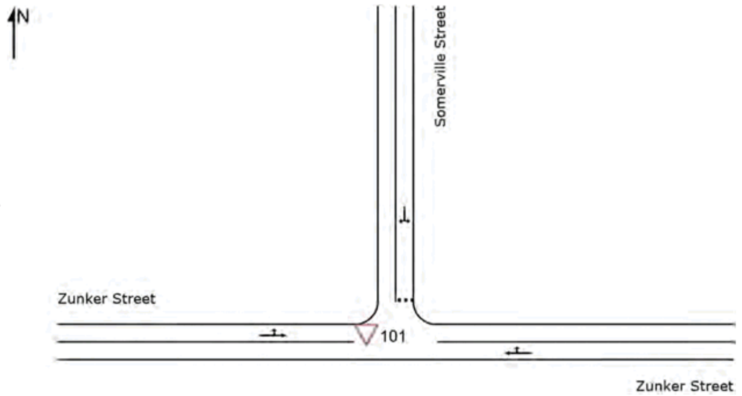

Figure 6-1: Somerville Street / Zunker Street - SIDRA layout

Table 6-2 summarises the SIDRA results for the Somerville Street / Zunker Street intersection. Detailed SIDRA outputs are provided in Appendix G.

Table 6-2: Somerville Street / Zunker Street SIDRA results summary

Year	Scenario	Peak period	Demand (veh)	Degree of saturation	Queue distance (m)	Average delay (sec)
2036	Base Traffic	Weekday AM	246	0.08	0.2	0.3
		Weekday PM	268	0.07	0.3	0.3
		Saturday midday	483	0.13	0.9	0.7
	Design Traffic	Weekday AM	352	0.11	0.2	0.2
		Weekday PM	475	0.12	0.3	0.2
		Saturday midday	719	0.19	1.2	0.5

The results of the analysis indicate that the intersection operates well within acceptable operating limits (DOS) at the 10-year design horizon. The intersection operates with minimal delay and queuing, with negligible difference in operational performance between base and design traffic scenarios.

Therefore, from the analysis, the intersection can operate within acceptable limits for the 2036 design scenarios and no mitigation measures or upgrades are required based on the operational capacity of the intersection.

6.2.2 Hermans Road / Zunker Street

The Hermans Road / Zunker Street intersection layout as modelled in SIDRA is shown in Figure 6-2. The SIDRA layout reflects the recently upgraded intersection modifications.

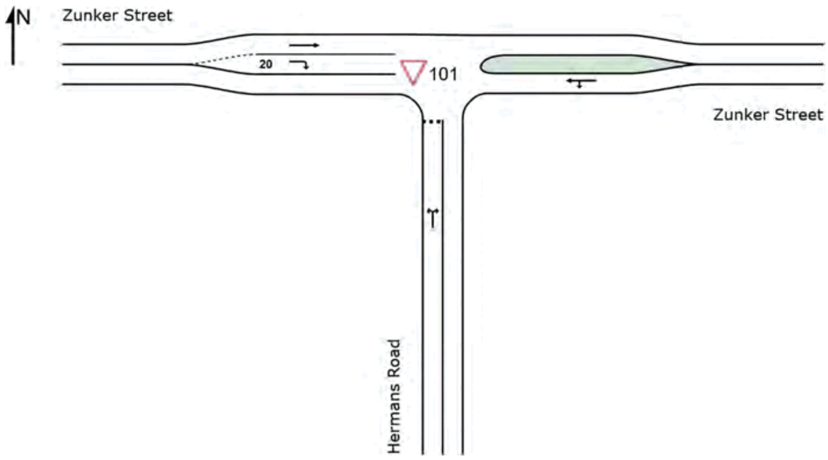

Figure 6-2: Hermans Road / Zunker Street - SIDRA layout

Table 6-3 summarises the SIDRA results for the Hermans Road / Zunker Street intersection. Detailed outputs are provided in Appendix G.

Table 6-3: Hermans Road / Zunker Street SIDRA results summary

Year	Scenario	Peak period	Demand (veh)	Degree of saturation	Queue distance (m)	Average delay (sec)
2036	Base Traffic	Weekday AM	235	0.07	0.8	0.9
		Weekday PM	277	0.06	1.5	1.4
		Saturday midday	442	0.10	1.8	1.1
	Design Traffic	Weekday AM	340	0.10	0.9	0.7
		Weekday PM	483	0.11	1.8	1.0
		Saturday midday	678	0.16	2.4	0.9

The results of the analysis indicate that the intersection operates well within acceptable operating limits (DOS) at the 10-year design horizon. The intersection operates with minimal delay and queuing, with negligible difference in operational performance between base and design traffic scenarios.

Therefore, from the analysis, the intersection can operate within acceptable limits for the 2036 design scenarios and no mitigation measures or upgrades are required based on the operational capacity of the intersection.

6.2.3 Moss Street / Zunker Street / Retail Access

The Moss Street / Zunker Street / Retail Access intersection layout as modelled in SIDRA is shown in Figure 6-3.

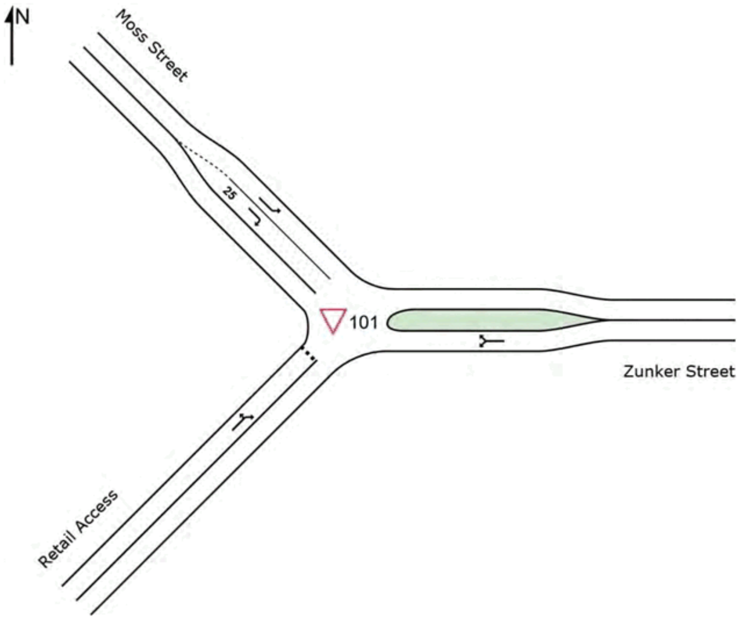

Figure 6-3: Moss Street / Zunker Street / Retail Access - SIDRA layout

Table 6-4 summarises the SIDRA results for the Moss Street / Zunker Street / Retail Access intersection. Detailed outputs are provided in Appendix G.

Table 6-4: Moss Street / Zunker Street / Retail Access SIDRA results summary

Year	Scenario	Peak period	Demand (veh)	Degree of saturation	Queue distance (m)	Average delay (sec)
2036	Base Traffic	Weekday AM	192	0.06	0.7	3.2
		Weekday PM	211	0.05	1.2	3.4
		Saturday midday	362	0.08	1.4	3.4
	Design Traffic	Weekday AM	308	0.09	0.9	3.2
		Weekday PM	439	0.10	1.8	3.4
		Saturday midday	626	0.15	2.1	3.5

The results of the analysis indicate that the intersection operates well within acceptable operating limits (DOS) at the 10-year design horizon. The intersection operates with minimal delay and queuing, with negligible difference in operational performance between base and design traffic scenarios.

Therefore, from the analysis, the intersection can operate within acceptable limits for the 2036 design scenarios and no mitigation measures or upgrades are required based on the operational capacity of the intersection.

6.2.4 Harbour Esplanade / Bengsten Street / Site Access 1 (100% distribution)

The Harbour Esplanade / Bengsten Street / Site Access 1 intersection layout as modelled in SIDRA is shown in Figure 6-4.

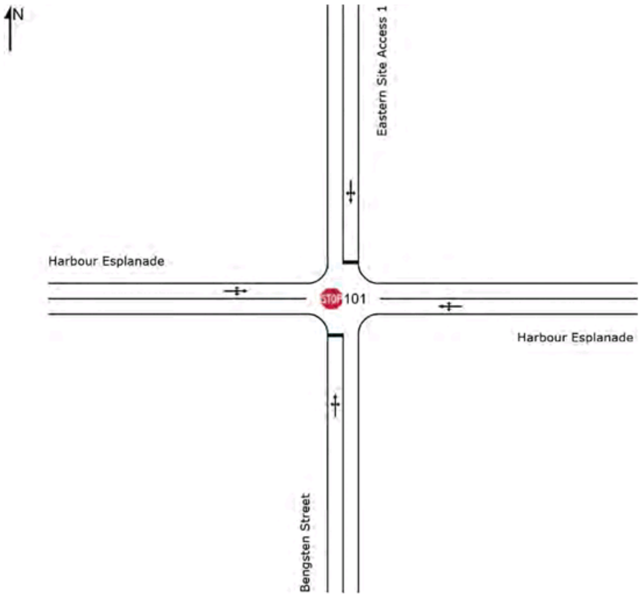

Figure 6-4: Site Access 1 – SIDRA Layout

Table 6-5 summarises the SIDRA results for the Harbour Esplanade / Bengsten Street / Site Access 1 intersection. Detailed outputs are provided in Appendix G.

Table 6-5: Harbour Esplanade / Bengsten Street / Site Access 1 SIDRA results summary

Year	Scenario	Peak period	Demand (veh)	Degree of saturation	Queue distance (m)	Average delay (sec)
2036	Design Traffic	Weekday AM	328	0.09	0.8	1.8
		Weekday PM	415	0.10	0.9	2.5
		Saturday midday	609	0.16	1.0	2.7

The results of the analysis indicate that the proposed access intersection operates well within acceptable operating limits (DOS) at the 10-year design horizon. The intersection operates with minimal delay and queuing.

6.2.5 Harbour Esplanade / Site Access 2 (100% distribution)

The Harbour Esplanade / Site Access 2 intersection layout as modelled in SIDRA is shown in Figure 6-5.

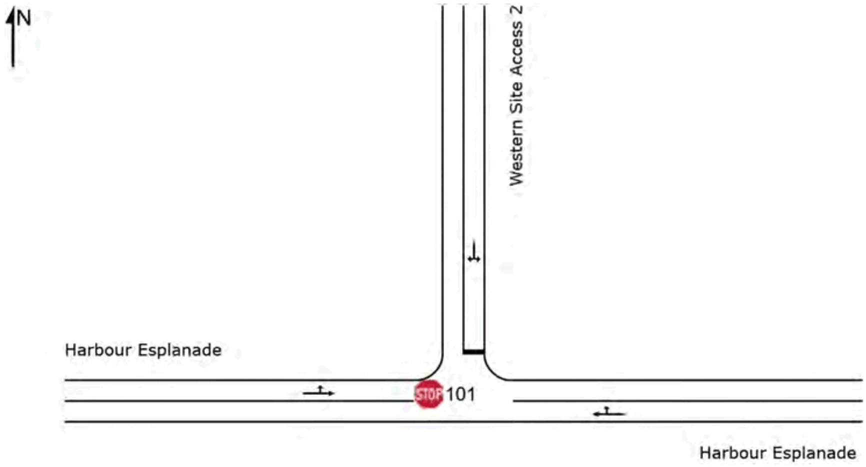

Figure 6-5: Site Access 2 – SIDRA Layout

Table 6-6 summarises the SIDRA results for the Harbour Esplanade / Site Access 2 intersection. Detailed outputs are provided in Appendix G.

Table 6-6: Harbour Esplanade / Site Access 2 SIDRA results summary

Year	Scenario	Peak period	Demand (veh)	Degree of saturation	Queue distance (m)	Average delay (sec)
2036	Design Traffic	Weekday AM	249	0.09	2.3	2.6
		Weekday PM	340	0.09	2.9	4.2
		Saturday midday	531	0.14	4.5	3.3

The results of the analysis indicate that the proposed access intersection operates well within acceptable operating limits (DOS) at the 10-year design horizon. The intersection operates with minimal delay and queuing.

From analysis, it is acknowledged that Access 2 can satisfactory cater for the development traffic if Access 3 is not constructed (or constructed at later stages in the future) due to access approvals required with the Bundaberg Port development for connection and use of the Port Roadway.

6.2.6 Port Roadway / Harbour Esplanade

The Port Roadway / Harbour Esplanade intersection layout as modelled in SIDRA is shown in Figure 6-6.

The intersection was modelled with the base 2036 volumes to determine the operation of the intersection without nay development influence. It was also modelled with a design 2036 scenario which includes trips using the western Access 3 (i.e. 50% / 50% split of development volumes between Access 2 and Access 3).

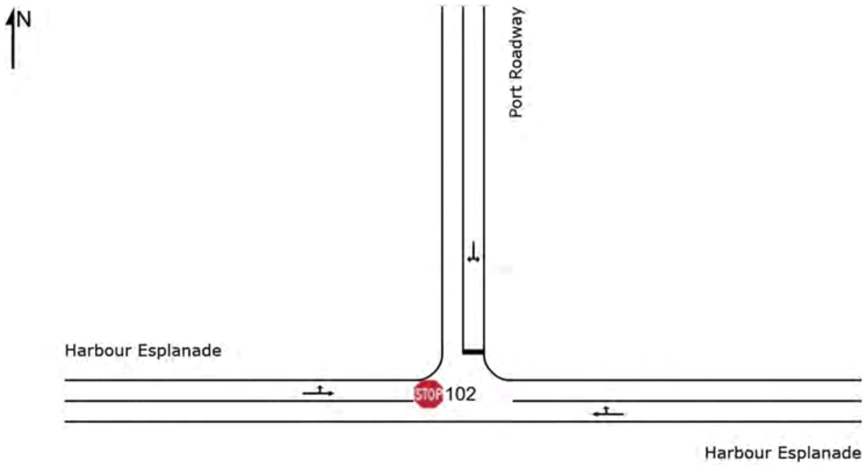

Figure 6-6: Port Roadway / Harbour Esplanade – SIDRA Layout

Table 6-7 summarises the SIDRA results for the Port Roadway / Harbour Esplanade intersection. Detailed outputs are provided in Appendix G.

Table 6-7: Port Roadway / Harbour Esplanade SIDRA results summary

Year	Scenario	Peak period	Demand (veh)	Degree of saturation	Queue distance (m)	Average delay (sec)
2036	Base Traffic	Weekday AM	129	0.04	1.1	3.7
		Weekday PM	126	0.03	0.6	2.8
		Saturday midday	299	0.08	2.2	4.1
	Design Traffic (with 50% development volumes using the Port Roadway)	Weekday AM	184	0.06	1.9	4.4
		Weekday PM	241	0.07	1.9	4.7
		Saturday midday	432	0.15	4.5	5.1

The results of the analysis indicate that the intersection operates well within acceptable operating limits (DOS) at the 10-year design horizon. The intersection operates with minimal delay and queuing.

Therefore, from the analysis, the intersection can operate within acceptable limits for the 2036 design scenarios and no mitigation measures or upgrades are required based on the operational capacity of the intersection.

6.2.7 Port Roadway / Site Access 3 (50% distribution)

The Port Roadway / Site Access 3 intersection layout as modelled in SIDRA is shown in Figure 6-7.

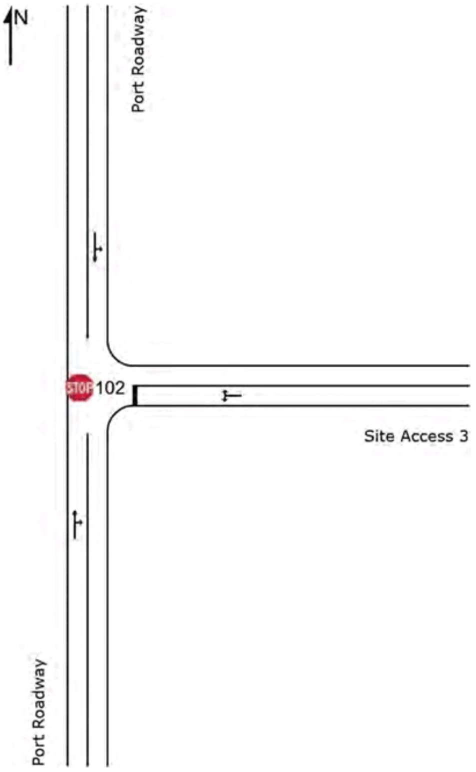

Figure 6-7: Site Access 3 – SIDRA Layout

Table 6-8 summarises the SIDRA results for the Port Roadway / Site Access 3 intersection. Detailed outputs are provided in Appendix G.

Table 6-8: Port Roadway / Site Access 3 SIDRA results summary

Year	Scenario	Peak period	Demand (veh)	Degree of saturation	Queue distance (m)	Average delay (sec)
2036	Design Traffic	Weekday AM	125	0.04	1.1	2.6
		Weekday PM	160	0.06	1.5	4.4
		Saturday midday	297	0.07	2.1	2.9

The results of the analysis indicate that the proposed access intersection operates well within acceptable operating limits (DOS) at the 10-year design horizon. The intersection operates with minimal delay and queuing.

6.2.8 Intersection assessment summary

From the SIDRA analysis, all the existing intersection layouts operate well under practical capacity with minimal DOS, queuing and delays for the 2036 design horizon with the proposed development volumes. Therefore, no mitigation or upgrades are triggered as part of the proposed development. All the access intersections can operate as standard T arrangements with priority control.

From analysis, it is acknowledged that Access 2 can satisfactory cater for the development traffic if Access 3 is not constructed (or constructed at later stages in the future) due to resistance from the Department of Natural Resources, Mines and Energy.

It is noted that although the existing and proposed intersection layouts are considered satisfactory from an operation viewpoint, the intersections may require channelisation for the respective turning demands from a safety viewpoint. The relevant safety provisions are discussed in detail in Section 9.

The operational analysis did not take into account the future long-term infrastructure plan, noting these works are high level planning concepts and subject to change. Analysis indicated that the local road network has capacity to cater for the development traffic within the Harbour Esplanade road corridor. The future network proposes an extension of Zunker Street which will provide additional route choice in the area and should result in some dispersion of development traffic through the road network. Therefore, the future long-term infrastructure plan of the Burnett Heads Town Centre is not expected to be adversely impacted by the development traffic demands.

6.3 Mid-block assessment (link level of service)

Level of service (LoS) values for midblock locations on urban roads with interrupted flow conditions are described in Table 6-9. Peak hour traffic flow ranges are based on broad assumptions and could potentially change depending on the width of traffic lanes, adjacent intersection arrangements and other factors.

Table 6-9 Midblock level of service description

Level of service		Peak hour traffic flow (veh per hour per lane)	
		From	To
A	Free flow – drivers are virtually unaffected by other drivers in the traffic stream	0	200
B	Stable flow – drivers have reasonable freedom to manoeuvre and select their desired speed	200	380
C	Stable flow – drivers are restricted to some extent in their freedom to manoeuvre and select their desired speed	380	600
D	Approaching unstable flow – drivers are severely restricted in their freedom to manoeuvre and select their desired speed	600	900
E	Unstable flow – traffic volumes at or close to capacity, drivers have virtually no freedom to manoeuvre or select their desired speed	900	1,400
F	Forced flow – traffic volumes over capacity with flow breakdown, queueing and delays	Greater than 1,400	

Source: Guide to Traffic Generating Developments (NSW RMS, 2002)

These capacity ranges have been applied to midblock link locations along the local and state-controlled road network. The levels of service for the subject road links identified are summarised in Table 6-10 for 2036 (10-year design horizon) with design volumes.

Table 6-10 Midblock level of service assessment with 2036 design peak hour volumes

Road link	Section	Inbound to Development						Outbound from Development					
		AM peak		PM peak		Saturday midday peak		AM peak		PM peak		Saturday midday peak	
		Veh/ lane	LoS	Veh/ lane	LoS	Veh/ lane	LoS	Veh/ lane	LoS	Veh/ lane	LoS	Veh/ lane	LoS
Harbour Esplanade	Site Access to Moss Street	150	A	152	A	232	B	100	A	180	A	285	B
Zunker Street	Moss Street to Hermans Road	159	A	179	A	250	B	103	A	202	B	296	B
	Somerville Street to Paul Mittelheuser Street	192	A	220	B	323	B	139	A	226	B	347	B
Burnett Heads Road	Mittelheuser Road to Bundaberg Port Road	180	A	345	B	354	B	355	B	231	B	244	B
	Grange Road to Bargara Road	275	B	405	C	425	C	474	C	368	B	379	B

Table 6-10 indicates that all road links on the surrounding road network operate within acceptable service levels (LoS C or better).

It is also acknowledged that both the local and state road network are expected to operate within daily capacity limits as specified in Table 6-11. The highest 2036 design daily volumes is approximately 8,400vpd on Burnett Heads Road between Grange Road and Bargara Road (for the state-controlled network) and approximately 4,800vpd on Zunker Street just to the east of Somerville Street (for the local Burnett Heads town centre road network).

Table 6-11 Midblock daily capacity limits

Road Name	Classification	Daily link capacity
Harbour Esplanade	Trunk Collector	10,000vpd
Moss Street	Trunk Collector	
Zunker Street	Trunk Collector	
Burnett Heads Road	District Road (DTMR)	

Therefore, from the above midblock capacity assessment, no mitigation measures or upgrades are warranted on the surrounding road network

7. Site layout review

The proposed site layout provided in Appendix A is a concept of the site and is subject to change slightly as the site progresses to the detailed design stage. The layout in Appendix A has been used as a basis for the site layout review.

It is noted that the grades and level transitions throughout the site are not currently available and therefore was not considered in the review. It is expected that the grades of the internal layout will be addressed in future detailed design as part of civil grading plans and is expected to comply with relevant standards.

7.1 Site access review

The development proposes two accesses along Harbour Esplanade and one access on the Port Roadway (refer to Figure 2-2). Access to the eastern residential portion of the site (consisting of buildings E and F) is proposed by one single access to Harbour Esplanade (Access 1 - the eastern Harbour Esplanade access). The internal car parking circulation aisles of the western mixed-use portion of the site provides an internal connection between the western Harbour Esplanade access (Access 2) and the Port Roadway access (Access 3). Access to refuelling facility on the northern side of the development is proposed via the Port Roadway.

All site access driveway widths are in accordance with Table 3.2 of Australian Standards 2890.1 *Parking Facilities – Part 1: Off-street carparking*. All development accesses are provided at a minimum width of 6.5 m and have been designed generally in accordance with BRC Standard Type A driveways. They all exceed the minimum 6 m width for two-way access movements and the BRC standard drawing (R1011) minimum width of 6 m for industrial and commercial driveways.

The accesses have been reviewed in the following sections based on location (separation and sight distances) and accessibility/geometry (turning provisions).

7.1.1 Separation distances

As noted in pre-lodgement meeting minutes, the alignment of the proposed driveways with respect to the external road network are to maintain 100 m separation distances from intersections. The proposed access maintains this minimum as shown in Figure 7-1.

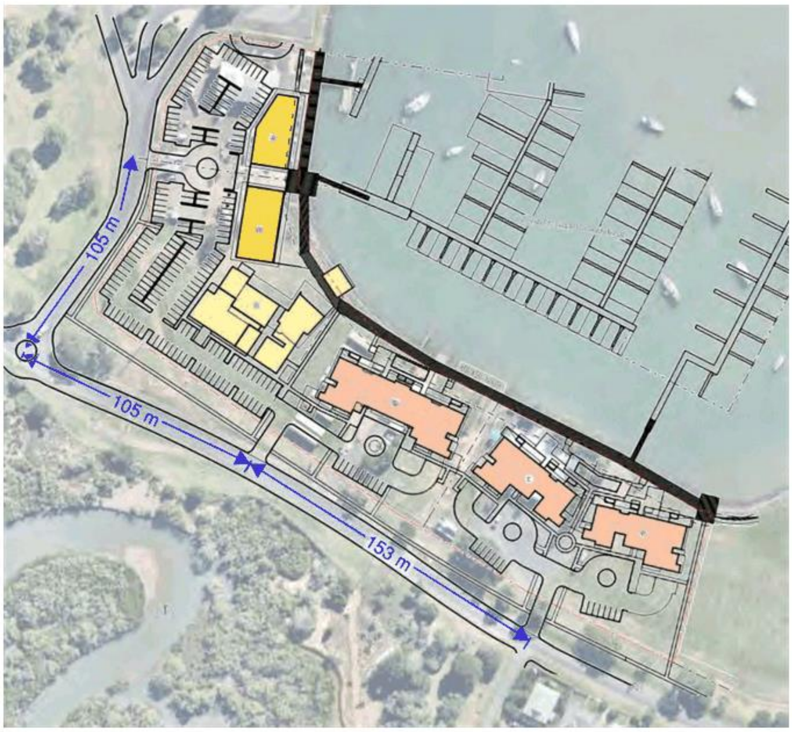

Figure 7-1: Development access separation distances

7.1.2 Sight distance assessment

Sight distance was assessed for the proposed access locations (Access 1 and Access 2 onto Harbour Esplanade, and Access 3 onto the Port Roadway) in accordance with Australian Standard 2890.1 1 *Parking Facilities – Part 1: Off-street car parking* using the parameters outline in Table 7-1. The minimum requirements are in terms of safe stopping sight distance (SSD) for the major road.

Table 7-1: Site access stopping sight distance requirements

Approach road	Operational speed (km/h)	Distance along frontage road (m)	
		5 s gap	Minimum SSD
Harbour Esplanade	50	69	45
Port Roadway	>50 (assumed 50km/h for the assessment)	69	45

Sight distances assessments for the proposed accesses are detailed below.

Access 1 sight distance assessment

The measured extent of the stopping sight distance (SSD) at Access 1 along Harbour Esplanade and corresponding sight lines are depicted in Figure 7-2. Figure 7-3 and Figure 7-4 show the corresponding sight lines.

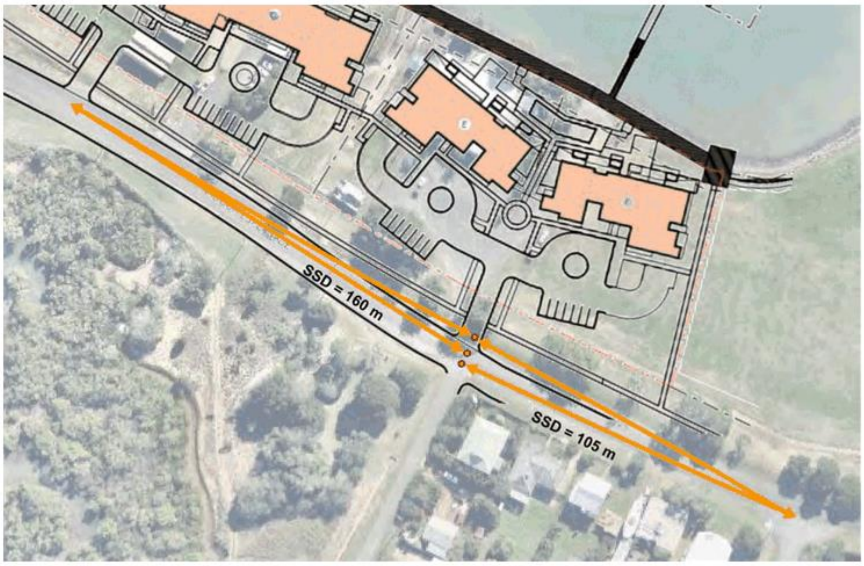

Figure 7-2: Access 1 measured SSD

Figure 7-3: Access 1 looking south east

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Figure 7-4: Access 1 looking north west

Access 2 sight distance assessment

The measured extent of the stopping sight distance (SSD) at Access 2 along The Harbour Esplanade and corresponding sight lines are depicted in Figure 7-5. Figure 7-6 and Figure 7-7 show the corresponding sight lines.

Figure 7-5: Access 2 measured SSD

Figure 7-6: Access 2 looking north west

Figure 7-7: Access 2 looking south east

Access 3 sight distance assessment

The extent of the stopping sight distance (SSD) at Access 3 along the Port Roadway and corresponding sight lines are depicted in Figure 7-8.

Figure 7-8: Access 3 SSD

As shown above, the access locations meet the minimum SSD requirements. It should also be noted that the proposed long-term road upgrades to the local road network are not expected to have any adverse impacts on sight distance provisions. The future proposed widening of the Harbour Esplanade frontage to a trunk collector standard (as discussed in Section 4.2) may increase the available sight distance at Access 1 and Access 2.

7.1.3 Turn warrant assessment

A turn warrant assessment has been undertaken for the proposed Harbour Esplanade / Site Access 2 intersection, which is expected to operate as the main access point to the development. A summary of outcomes is provided in Table 7-2 for the design traffic scenarios. Detailed turn warrant graphs are provided in Appendix H.

Table 7-2: Turn warrant assessment outcomes

Peak scenario	2026 Design Traffic		2036 Design Traffic	
	Left turn	Right turn	Left turn	Right turn
AM peak	BAL	BAR	BAL	BAR
PM peak	BAL	BAR	BAL	BAR
Saturday midday	BAL	BAR	BAL	CHR(S)

Note: BAR – Basic right turn treatment, CHR(S) – Channelised right turn treatment (short)
BAL – Basic left turn treatment

From the turn warrant assessment it is recommended that a CHR(S) and BAL turn treatment be constructed at the main development access (Access 2) to cater for the expected turning demands. It is suggested that these works could be undertaken in conjunction with the future planned Harbour Esplanade upgrade works as discussed in Section 4.2. It should be noted that if the development traffic volumes are split 50% / 50% between the accesses (Access 2 and 3), the channelisation requirements (CHR(S)) is still triggered for Access 2.

Additional turn warrant assessments were undertaken at the other development site accesses (Harbour Esplanade / Bengsten Street / Site Access 1 intersection and Port Roadway / Site Access 3 intersection), and the Harbour Esplanade / Port Roadway intersection, under the assumption that 50 % development traffic would use the Port Roadway to gain access to the development. It is noted that none of these intersections triggered anything more than a standard BAR / BAL turn treatment for the 10-year design horizon (2036).

The proposed future changes to the travel patterns in the vicinity of the proposed access intersection, as a result of the Local Plan, should also be taken into consideration. The extension of Zunker Street may reduce the demand for right turning volumes into the site Access 1 as visitors will travel along the extension and then back eastbound along the Harbour Esplanade. It is suggested that further discussions with the BRC be undertaken to determine the design of the access intersections with consideration of the planned future road corridor.

7.1.4 Queuing provisions

The internal driveway lengths for Access 1, 2 and 3 are approximately 20 m, 20 m, and 15 m respectively, from the external road carriageway to the first conflict location internal to the site (the main internal intersections). Given the consideration of the expected operational capacity of the internal intersections (with respect to the SIDRA results of the site access intersections as illustrated in Section 6.1), the driveway lengths are considered satisfactory to cater for queuing vehicles internal to the site without impacting on the external road network.

This is further justified using steady state queuing theory (as illustrated in Austroads Guide to Traffic Management: Part 2) for queues with random arrival rates. The queues were calculated as follows:

Access 1 queue calculation

A queue length of 6 m (98 % back of queue of one (1) vehicle) is calculated for the worst case peak hour volumes (ingress) of 14vph, and a conservative service rate of 10 seconds per vehicle (i.e. representing an average delay per vehicle on this approach). The probability of no queues at any given instant in this peak hour ingress is 96 %, with an average number of vehicles present of zero (0) vehicles.

Access 2 queue calculation

A queue length of 18 m (98 % back of queue of three (3) vehicles) is calculated for the worst case peak hour volumes (ingress) of 111vph (using 100 % traffic generation using this access), and a conservative service rate of 10 seconds per vehicle (i.e. representing an average delay per vehicle on this approach). The probability of no queues at any given instant in this peak hour ingress is 69 %, with an average number of vehicles present of 0.4 vehicles.

Access 3 queue calculation

A queue length of 12 m (98 % back of queue of two (2) vehicles) is calculated for the worst case peak hour volumes (ingress) of 56vph (using 50 % traffic generation using this access), and a conservative service rate of 10 seconds per vehicle (i.e. representing an average delay per vehicle on this approach). The probability of no queues at any given instant in this peak hour ingress is 84 %, with an average number of vehicles present of 0.2 vehicles.

From the above, the driveway lengths are considered satisfactory to cater for queuing vehicles internal to the site without impacting on the external road network.

7.1.5 Emergency access provisions

It is acknowledged that the eastern residential portion of the site (consisting of buildings E and F) only has one access location. Given the size of the site, it is recommended that an additional emergency access (or an emergency connection to neighbouring areas) be provided in the event of an emergency or if the site access becomes unavailable or blocked.

7.2 Car parking

7.2.1 Numerical car parking provisions

The car parking requirements for the proposed development were determined in accordance with the BRC Planning Scheme Transport and Parking Code, the RTA *Guide to Traffic Generating Developments*, and recommendations by the Australian Marine Industries Association (MIA).

A lower parking rate of 0.15 spaces per berth compared to the recommended rate of 0.3 spaces per berth (as illustrated in the Australian Standard AS3962 *Guidelines for Design of Marinas*) is applied to the development. This lower rate is currently considered for recommendation by the MIA in their 2016 submission to Standards Australia (from correspondence with Colin Bransgrove, Executive Officer, MIA), which includes submissions for marinas with a high proportion of the national cruising market (coastal cruisers) and international cruising market. Given that Bundaberg receives the highest number of international recreational craft per annum on the east coast of Australia, the lower rate is considered applicable to the development.

A traffic and parking assessment completed by SKM in October 2007 identified an average parking demand per berth of 0.13 for weekend peak parking. The study considered the parking demands at marinas in NSW including Rose Bay, Point Piper and Double Bay Marina in summer and Easter peak times. It should be noted these rates were observed at marinas located in the major capital city of Sydney which is expected to have a higher demand for car parking than a marina located in a regional city such as Bundaberg. This is due to the difference in marina use and operation. It is anticipated that the operation of a regional marina typically consists of patrons temporarily docking vessels while completing long term trips. The operation at capital city marina is expected to be comprised of owners which travel to the facility where their vessels are permanently docked and used only for short to medium term trips. Therefore, a car parking rate of 0.15 spaces per berth is considered appropriate for this assessment.

Development car parking requirements are summarised for the proposed commercial precinct uses in Table 7-3. As shown, cross-utilisation has been applied to reflect patron activity (i.e. restaurant customers will also utilise the retail facilities). To estimate cross-utilisation factors the National Cooperative Highway Research Program (NCHRP) Enhancing Internal Trip Capture Estimation for Mixed-Use Developments tool was used. The NCHRP methodologies are based on existing data from prior surveys of mixed use development sites and new data collected at three mixed use development sites located in Dallas, Atlanta and Plano (in the US) with each site containing uses including office, retail, restaurant, entertainment, residential and hotel (similar to the development site). RMA are not aware of any similar Australian study or published data in relation to cross-utilisation of mixed-use developments.

Analysis using the NCHRP Internal Trip Capture Estimation tool identified an overall reduction of approximately 20 % in the AM peak period and 55 % in the PM peak period based on the traffic generation, mix and sizes of the uses contained within the development site. To provide a conservative review the lower reduction of 20 % has been applied to the overall development site uses (excluding the Marina and long-term residential parking) as shown in Table 7-3. This review is considered conservative as the assessment does not consider the normalisation of the development uses which have differing peak parking times and weekly periods.

A parking reduction has been applied for the short-term accommodation use onsite given that visitors and tourists utilising these uses are likely to have a high degree of cross-utilisation between residential and retail / food & drink usages.

En globo provisions

The proposed development provides a total of 354 car parking spaces. From an 'en globo' assessment the total required parking is 331 car parking spaces. Therefore, the development car parking provisions exceeds the requirements outlined in the BRC Planning Scheme with consideration of reductions (cross-utilisation). The proposed development is considered a multi-use destination where parking demand meets the requirements of each of the site's components throughout varying peak events during the week and at the weekend, and during off-peak periods. With consideration of this the car parking provisions are considered adequate.

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Table 7-3: Car parking requirements

Building /facility	Land use	Qty.	Unit of measure	Parking rate			Car parking requirement		Proposed trip reduction (cross utilisation reduction)	Car parking requirement (with reduction(s))	
				Standard	Visitor	Source	Standard	Visitor		Standard	Visitor
A	Commercial - office	337	m² (GFA)	1 / 30m2	N/A	BRC	11	0	20%	9	0
	Club (restaurant)	565	m² (GFA)	1 / 15m2	N/A	BRC	38	0	20%	30	0
	Retail (shops)	300	m² (GFA)	1 / 20m2	N/A	BRC	15	0	20%	12	0
B	Guest suites (short term accommodation)	28	Rooming unit	1 / rooming unit	1 / 10 rooming unit	BRC	28	3	20%	22	2
	Commercial - office	172	m² (GFA)	1 / 30m2	N/A	BRC	6	0	20%	5	0
	Shops (Broker, real estate & Café/ Bakery)	283	m² (GFA)	1 / 20m2	N/A	BRC	14	0	20%	11	0
C	Gym / Spa (Indoor sport and recreation)	327	m² (GFA)	1 / 20m2	N/A	Refer to Table A*	16	0	0%	16	0
	Commercial - office	297	m² (GFA)	1 / 30m2	N/A	BRC	10	0	20%	8	0
	Food and beverage (restaurant / dining pavilion/outdoor dining/ takeaway food)	538	m² (GFA)	1 / 15m2	N/A	BRC	36	0	20%	29	0
	Retail (shops)	322	m² (GFA)	1 / 20m2	N/A	BRC	16	0	20%	13	0
D	Residential (apartments)	36	Dwelling	1 / dwelling	1 / 2 dwellings	BRC	36	18	0%	36	18
E	Residential (apartments)	24	Dwelling	1 / dwelling	1 / 2 dwellings	BRC	24	12	0%	24	12
F	Residential (apartments)	24	Dwelling	1 / dwelling	1 / 2 dwellings	BRC	24	12	0%	24	12
Marina	Marina Stage 1	140	Wet berth	0.15 / wet berth	N/A	Australian MIA**	21	0	0%	21	0
	Marina Stage 2	179	Wet berth	0.15 / wet berth	N/A	Australian MIA**	27	0	0%	27	0
						Total without reductions	**367**		**Total required (Global)**	**331**	
									Total supplied	**354**	

**Table A in Appendix E*
***Refer to Table B in Appendix E*
Uses including receptions / lobby and marina management are considered as ancillary and therefore to not require car parking

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Staged provisions

The proposed development will be delivered in stages. Accordingly, a staged parking assessment has been undertaken. It is noted that overflow parking provisions will be available in the greenfield spaces associated with buildings to be constructed at later stages of the development. Figure 7-9 illustrates an indicative staging option for the site as advised by the client.

Figure 7-9: Indicative staging of the proposed development site

The staging of the site will depend on the access provisions available to the Port Roadway (i.e. Access 3). If this access cannot be provided during Stage 1A (due to access approvals required with the Bundaberg Port development for connection and use of the Port Roadway) then the internal connection through to Access 2 could be constructed.

If all the parking spaces are available for public use (including the basement parking for the residential buildings), then the staging is considered satisfactory. However, this will not be the case as the basement parking levels will be secured for visitors and residents of the residential uses (for buildings D, E, and F).

Therefore, a parking review of the available spaces has been undertaken with the following assumptions:

- Residential basement car parks (for buildings D, E, and F) include visitor spaces for residents but not public access
- At grade car parking is used by public parking and marina use
- Build a small portion of Stage 4 car park as part of Stage 3B to cater for the expected marina parking associated with the second stage of the marina

Table 7-4 shows the outcomes of the parking with consideration of the staging with the above assumptions.

Table 7-4: Car parking staging review

Stage	Completion Year	Building / Uses	Parking spaces required	Parking spaces provided	Parking excess (accumulative)*
1A	2021	B, Marina Stage 1	62-72**	103	31
1B	2022	C	66	36	11
2A	2023	E	36	7 excess at grade	18
2B	2024	F,	36	7 excess at grade	25
		Marina Stage 2	27	Build a segment of Stage 4 (8 spaces)	6
3	2025	D	54	10 excess at grade	16
4	2026	A	51	31	-4

**A positive number results in an excess of parking supply, a negative number denotes a deficiency in parking supply*

***This parking requirement varies as the initial stage will not have any cross-utilisation (i.e. 72 spaces are required), once additional stages are completed the number of parking spaces required for this use will reduce to 62*

It is acknowledged from Table 7-4 that the proposed development will experience a minor shortfall of public parking at final completion (4 car spaces). It is noted that the PWD shared space requirements may decrease the supply by possibly an additional 3 spaces (refer to Section 7.2.2 below). This reduction could increase the final shortfall spaces by approximately 7 spaces.

The 7 spaces are not considered to be an adverse shortfall for the site due to the following reasons:

- The parking rates assume that the peak parking demands for all the uses occur at the same time. It does not account for the differential in the separate peak demands and utilisation of each use.
- No factors have been added to account for the number of marina berths which are utilised and dedicated to owners of residential units, which would not require additional car parking associated with their marina berth.

Because of the above, it is recommended that after the completion of Stage 1A, 1B and 2A, a car park occupancy study be undertaken to determine if the car parking provided at that date is adequate and to test the parking rates applied. Findings of this assessment of the actual parking demands, patterns and utilisation can then be used to identify how parking will be managed as the site further develops.

Additionally, as part of this parking study, the operators can identify the number of marina berths which are utilised and dedicated to owners of residential units, which would not require additional car parking associated with their marina berth.

Should these studies identify a shortfall may still exist, the following strategies are proposed for further consideration:

- As part of the parking study, identify the usage of the public carparking to the north of the proposed site, which provides in the order of 25 carparks. This existing parking is understood to be historically underutilised and may be able to address any shortfall onsite.
- The client may also elect to investigate additional land area on lot 1 on SP 157913 to provide an overflow carpark.
- Consider slightly revising the yields or uses accordingly. An example of this could be to change the gym/spa to be restricted use by residents and their visitors only, or reduction of GFA slightly across the site.

As the development maintains an overall surplus in car parking provisions, and that there are a number of management options which are to be considered in future staging of the development (to address any parking shortfall associated with the development staging and land uses), the car parking provisions for the proposed development is considered acceptable.

7.2.2 Parking provisions for persons with disabilities (PWD)

Numerical car parking requirements for the development site has been reviewed in accordance with Australian Standards AS2890.6:2009 and the Building Code of Australia (BCA) provisions which provides car parking standards for persons with disabilities. It is recommended that PWD parking bays be provided in accordance with AS2890.6 to provide parking bays at minimum widths of 2.4m with an adjacent 2.4m (min) shared bay.

In accordance with the Building Code of Australia (BCA) provisions, PWD car parking provisions should be provided at approximately 1 PWD space per every 50 total car parking spaces for shops and 1 PWD space per every 100 total car parking spaces for office use. Additionally, it is suggested that PWD parking for residential uses be provided at based on the following ratios:

- Accessible sole-occupancy units to the total number of sole-occupancy units; or
- Accessible bedrooms to the total number of bedrooms.

Based on the above total number of public car spaces, and adopting a rate of 1 PWD space per every 50 total car parking spaces, it is suggested that the development provide a minimum of seven (7) PWD spaces. It is noted that the plans have indicated two (2) PWD car parking bays in the at-grade carpark in front of buildings A, B and C. The remaining five (5) spaces should be spread equally across the development and located as close to possible to building access points.

It is envisaged that PWD parking for the residential uses be catered for in the basement car park of Buildings D, E and F.

The PWD requirement and design can be undertaken in future detailed design stages of the development.

7.2.3 Carpark dimensions

The reconfigured carpark layout has generally been designed in accordance with Australian Standard AS2890.1:2006 which recommends parking provisions for User Class 2 for commercial uses (suitable for medium-term parking) and User Class 1A (suitable for residential uses). The Australian Standards provides the following recommendations with regards to parking dimensions:

- The length of parking spaces shall be a minimum of 5.4 m;
- The width of parking spaces shall be a minimum of 2.5 m and 2.4 m for commercial and residential parking respectively;
- Parking aisles shall not be less than 5.8 m (minimum); and
- The width of parking space for a person with a disability is 2.4 m, with an adjacent 2.4 m vacant bay, as specified in Australian Standards AS2890.6:2009.

A dimension check of the onsite carparking indicates that onsite parking generally complies with the requirements of AS2890.1:2006. Refer to RMA drawings provided in Appendix F.

7.2.4 Carpark layout

The car parking layout provides adequate accessibility and circulation within an intuitive layout. Internal potential conflicts are reduced with minimal number of intersections.

Blind car parking aisles are all considered satisfactory as they are less than 6 bays in length and therefore no turn around provisions are required. The exception to this is the basement car parking spaces. However, these bays are for residential parking which would likely be secured and reserved for owners. Therefore, these blind aisles are not considered an issue with regards to providing turn around provisions.

Additional recommendations to improve the car parking of the site include:

- It is identified that the southern circulation aisle (shown in Figure 7-10) would need speed reduction devices (such as raised speed platforms) to keep internal circulation speeds low. This is because the aisle is longer than 100 m which can encourage higher speeds not conducive to parking operations.

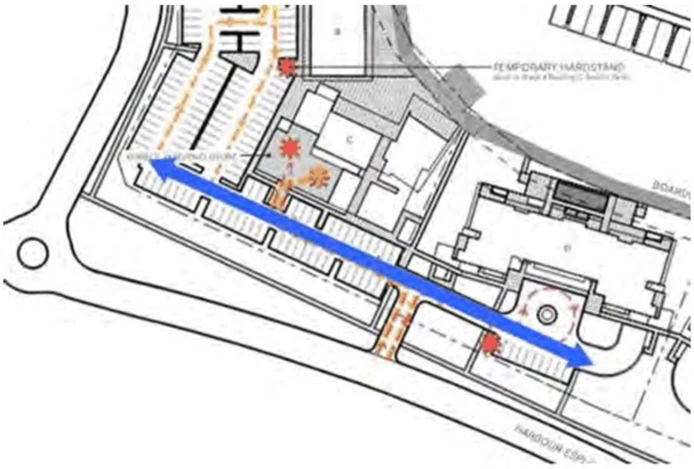

Figure 7-10: Long car parking aisle length (greater than 100m)

- To improve pedestrian accessibility, wheelstops or bollards should be provided at all car parking spaces that are adjacent to footpaths, as shown in Figure 7-11. This will help stop vehicle overhang impeding pedestrian movement.

Figure 7-11: Car parking spaces to consider wheelstops or bollards (shown in red)

- The access gate locations for the basement carparks and how they will impact on other car parking areas and accessibility is not shown on the concept layouts. It is recommended that the gate locations, associated infrastructure for these gates (such as card readers) and queuing provisions will need to be considered during detailed design of the site.
- It is suggested that other car park users be incorporated into the detailed design of the site, such as motorcycle spaces.

From the above review, the general layout of the car park is considered appropriate for the site. A couple of recommendations and suggestions can be incorporated into the future detailed design stages of the development.

7.3 Servicing

The servicing requirements of the proposed development have been determined with consideration of the Bundaberg Regional Council Planning Scheme. The site proposes a main central service yard (mainly for refuse collection) and parallel service bays throughout the site (such as sharing the port cochere areas) for smaller deliveries and servicing with quick dwell times. The servicing provisions for the proposed uses onsite are detailed in Table 7-5. Swept path assessment of the manoeuvrability of the vehicles through the site is discussed in Section 7.4.

Table 7-5: Servicing requirements

Building	Land use	Qty.	Recommendation	Provision	Comment
A	Office	337	-	SRV / MRV	Loading in service area between Building A & B (which can cater for up to an MRV design vehicle). AND Loading in central servicing yard (can cater for up to a 10.5m RCV vehicle).
	Club	565	1 SRV	SRV	
	Retail (shops)	300	1 SRV (< 500m² GFA)	SRV / MRV	
B	Guest suites	28	1 MRV	MRV	
	Office	172	Not specified	SRV / MRV	
	Retail (shops)	283	1 SRV (<500m² GFA)	SRV / MRV	
C	Gym / spa	327	-	-	Loading in central servicing yard (can cater for up to a 10.5m RCV vehicle).
	Office	297	-	SRV / MRV	
	food and drink	538	1 SRV	SRV	
	Retail (shops)	322	1 SRV (< 500m² GFA)	SRV / MRV	
D	Residential	36	1 SRV (>10 dwellings)	SRV	Loading in porte-cochere adjacent to Building D, E and F.
E	Residential	24			
F	Residential	24			
Marina (refuelling area)		319	-	HRV	Small fuel tanker

Note: SRV – small rigid vehicle, MRV – medium rigid vehicle, HRV – heavy rigid vehicle, RCV – refuse collection vehicle.

It is acknowledged that the servicing of the site will be undertaken outside peak periods when the traffic generation and parking utilisation is low.

It is understood that refuse will be collected centrally from the service yard enclosure adjacent to Building C. The refuse collection vehicle can access the service yard via the western site access (Access 2) from Harbour Esplanade. Future detailed design and waste management planning stages of the development will identify the requirement for number and location of refuse bins, storage area size and number of vehicle service bays. From a review of the proposed development layout plans, there are currently no issues identified that would adversely affect the servicing of the site.

7.4 Swept path assessment

Swept path assessment has been undertaken for the internal layout of the development. The swept path review was undertaken based on parameters in accordance with the Australian Standards AS2890.1:2004.

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Swept paths were undertaken using the AutoTurn 10 program. It should be noted that the modelling of swept paths are considered conservative and therefore more difficult to work within the geometry specifications of relevant standards, whilst maintaining adequate buffer offset distance (i.e. especially within constrained residential basements). The assessment outcomes are discussed in further detail below.

7.4.1 Basement car parking areas

Turn paths for a standard car (B85) within the residential basement carpark are illustrated on Figure T-SK0004 provided in Appendix F. It is noted that two-way passing at corners is not always possible and that vehicles may need to give-way to one another. This is considered acceptable given the relatively low vehicle volumes within the basement car parks. The swept paths shown on Figure T-SK0004 indicate that the vehicles can access and generally manoeuvre through the car park satisfactorily.

It was identified that the basement ramps could be redesigned to flare out at the basement level to assist with the turning movements, especially for the Building E basement ramp. This can be accommodated by decreasing the adjacent storage area and can be undertaken as a minor modification.

7.4.2 At-grade parking areas

The at-grade car parking areas have been assessed using a large car (B99) turn template. A B99 vehicle can traverse the car parking aisles without any major issues, apart from minor corner truncations to the medians to provide ease of movement through intersections and access to car parking spaces. It is noted that two-way passing of B99 vehicles at corners is not always possible and that vehicles may need to give-way to one another. However, the is considered acceptable as the aisles meet the minimum widths specified in the Australian Standards AS2890.1, and the suggested corner truncations (to be investigated in future design stages) would assist with this movement.

A small rigid vehicle (SRV), medium rigid vehicle (MRV) and front lift refuse collection vehicle (RCV) have also been assessed through the at-grade parking areas, around the port cochere facilities, and to the central servicing yard. The swept paths for these service vehicles are illustrated on the relevant sketches provided in Appendix F. The swept paths indicate the service vehicles can traverse through the site without any issues.

7.4.3 Servicing of the refuelling area

The swept path of a 12.5 m long heavy rigid vehicle (HRV) has also been undertaken to simulate a small tanker to service (deliver fuel) to the refuelling area at the northern side of the site. The HRV swept path is illustrated on Figure T-SK0008 provided in Appendix F. This service vehicle operates external to the proposed development and travels along Harbour Esplanade and the Port Roadway. From the assessment, minor modifications to the existing boat ramp refuelling area may be required to accommodate the swept path of this vehicle. Given that there are no major identified constraints regarding this refuelling area, this design modification can be undertaken in future detailed design of the site.

The swept path assessment indicates that the site can be accessed appropriately by the required design vehicles. Minor modifications are identified and can be investigated further in future detailed design stages of the development.

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8. Active and public transportation considerations

8.1 Active transport

8.1.1 Development pedestrian movement network

A nominal street and pedestrian movement network is presented in Figure 8-1. The street and movement network have been developed in consideration of Council's local planning and in consultation with BRC officers through the pre-lodgement process.

In aligning with the local planning movement network visions, the development is expected to provide a pedestrian network along the full length of the waterfront that is accessible by the community via several pedestrian footpaths as highlighted in Figure 8-1. As shown, pedestrian or shared paths are separated from driveway crossovers to minimise conflicts between pedestrians and vehicles. Alignment of the development's pedestrian movement network with the local plan is described in Section 10.1.5.

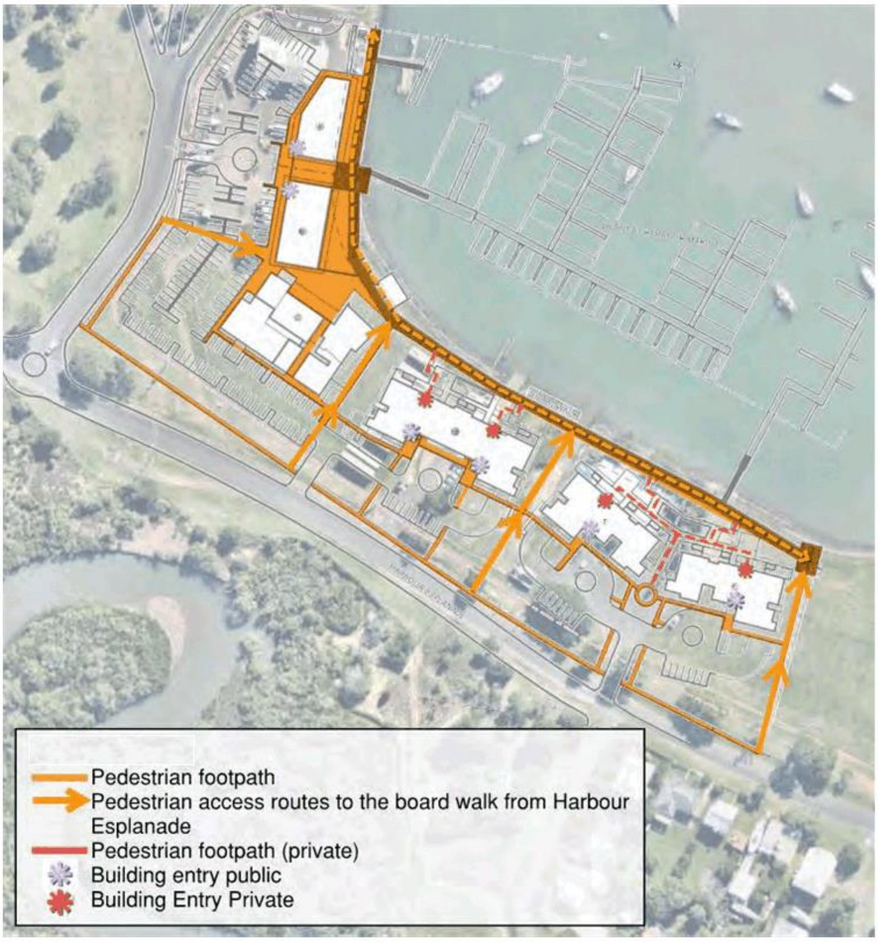


Figure 8-1: Pedestrian movement network

The proposed active transport provisions, developed in consultation with Council, is designed in consideration of logic, legibility, accessibility and desire lines. As shown Figure 8-1, pedestrian or shared paths are separated (where possible) from driveway crossovers to minimise conflicts between pedestrians and vehicles.

It is identified that additional internal pathways can be incorporated within the design to further enhance pedestrian connectivity and safety. These additional connections can include the implementation of raised pedestrian crossings across the parking aisles. By raising the crossing (as per a Wombat pedestrian crossing type) will help slow down speeds internal to the site (especially along the southern long straight aisle). These additional connections are shown in Figure 8-2 and can be incorporated into the future designs of the development as part of future development applications.

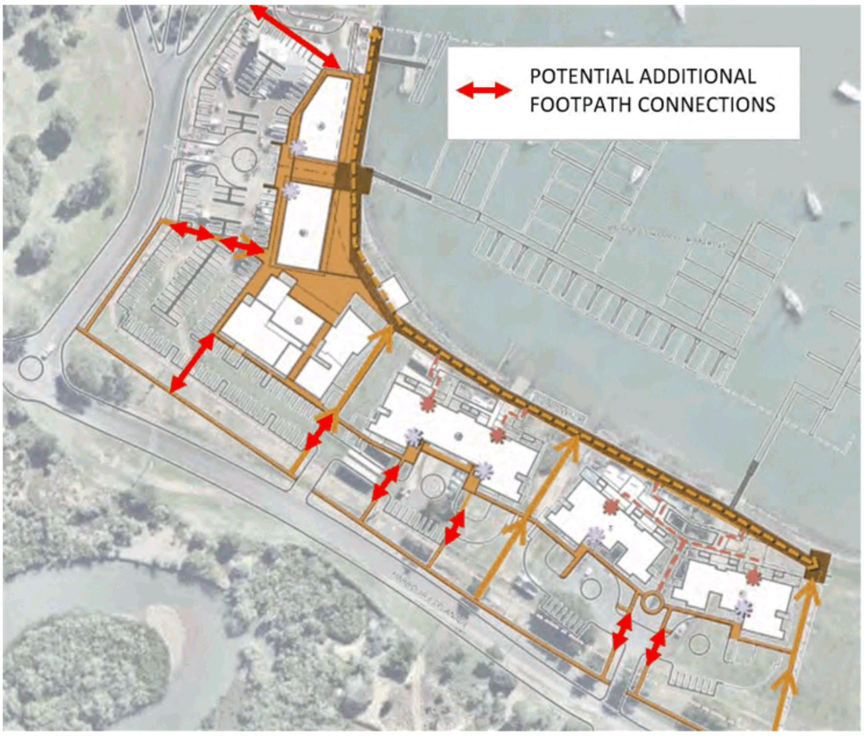


Figure 8-2: Potential additional footpath and crossing connections

It is anticipated that time separated pedestrian crossings (i.e. 'zebra' crossings) along Harbour Esplanade will be considered by Council as part of its further Local Plan implementation.

In consideration of future bus network planning and infrastructure, the development layout includes active transport permeability to Harbour Esplanade and the boardwalk along the foreshore.

It should be noted that pedestrian safety should also be considered in further detailed design of the development, such as Crime Prevention Through Environmental Design principles and the provision of adequate barriers (such as balustrading) of paths and boardwalk interfaces with the ocean (or edge drops).

8.1.2 Cyclist provisions

It has been identified that the recent upgrade of the local road network of the Burnett Heads town centre and the proposed upgrade of Harbour Esplanade to a trunk collector standard (as discussed in Section 4-2) will provide good connectivity to the site for cyclists.

To encourage and accommodate cyclists within the development, adequate bicycle parking and end of trip facilities have been reviewed. As per the BRC Planning Scheme – Transport and Parking Code, the minimum number of 'en globo' bicycle parking is required:

- Retail, commercial, food and beverage uses – 13 bicycle spaces
- Residential uses – 28 bicycle spaces

The basement parking proposes bicycle provisions for the residential requirements which is considered satisfactory for the site. However, the proposed layout does not provide any bicycle parking space on grade for the remaining land uses (such as retail, commercial, food and beverage uses). It is recommended that short term bicycle parking (including locking rails) and lockers be provided for the development (Stages 1A and 1B). It is also recommended that end of trip facilities be provided for cyclists (i.e. showers and lockers) central to each of the commercial uses.

8.2 Public transport

It is noted that the proposed development will be a catalyst for growth in the region, resulting greater transport movements between Bundaberg CBD and the Burnett Heads region. To facilitate the increased travel demand to/from the area, the development proposes an additional bus stop, indented on the northern verge of Harbour Esplanade, just to the east of the Port Roadway. This bus stop infrastructure is located adjacent the proposed development (outside Building C) which is considered satisfactory walking distance and accessibility in accordance with the TransLink *Public Transport Infrastructure Manual* guidelines. The location is considered ideal to cater for visitors to the boat ramp and other surrounding potential development sites in the area.

The location of the proposed bus stop infrastructure is illustrated below in Figure 8-3 and Figure 8-4.

Figure 8-3 Proposed Bus location on Harbour Esplanade and catchment area

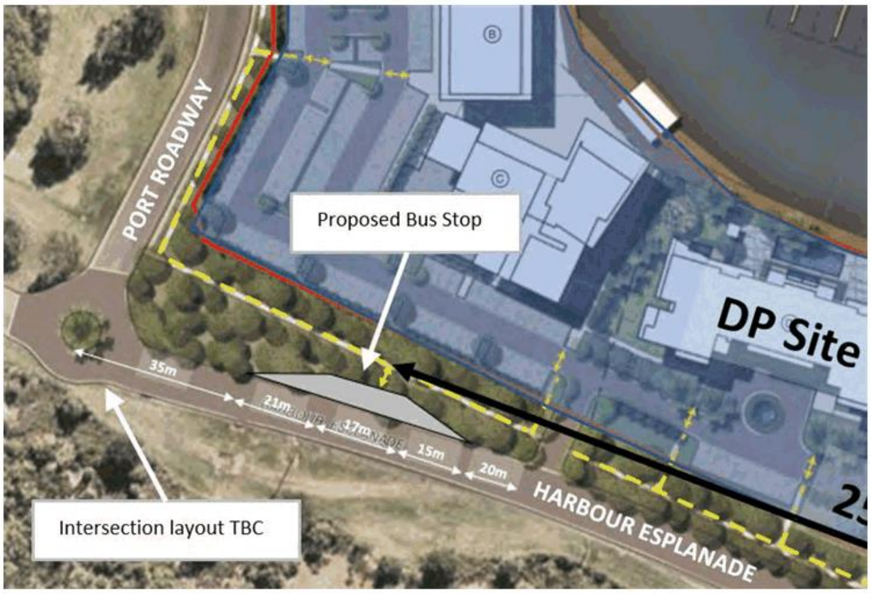


Figure 8-4 Proposed Bus Stop concept sketch along Harbour Esplanade

The bus stop was situated with consideration of the future Zunker Street extension, and future intersections and accesses to the Harbour Esplanade as part of the planning for the area. From a preliminary review, the sight distances (from motorists at adjacent intersections and also the driver of the bus) are considered appropriate for the indented stop position (refer to Figure 8-5), however, this will need to be confirmed during the detailed design of the bus stop facility and in conjunction with the following:

- The future planned upgrades of Harbour Esplanade to a trunk collector standard as part of the Local Plan, and
- The future Harbour Esplanade / Port Roadway intersection form and layout
- The landscaping of the adjacent verge areas.

Footpath connectivity will be provided via the Harbour Esplanade frontage.

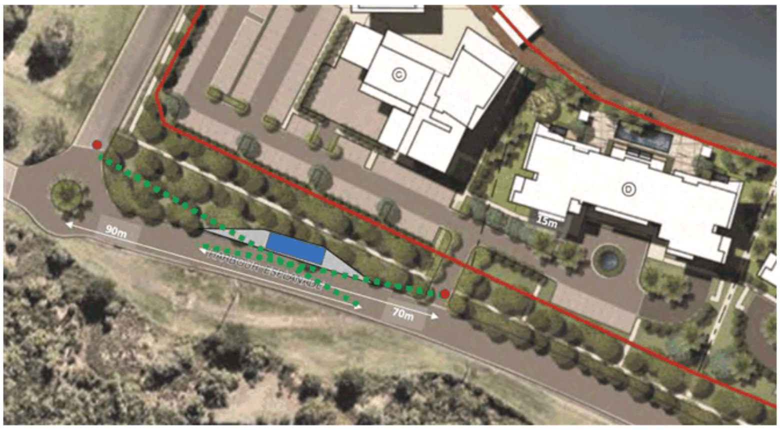


Figure 8-5: Sight Distance Provisions with Proposed Bus Stop

9. Safety review

The following summarises the road safety considerations that have been identified as part of undertaking this TIA.

9.1 Historical crash data

From a review of the historical crash data within the local town centre and in the vicinity of the site, no crash patterns or mitigation measures have been identified.

9.2 Intersection operation

No safety issues were identified at the key intersections.

9.3 Access provisions

The development accesses have been reviewed with regards to sight distance provisions and turning warrants. The sight distances are considered acceptable. It is recommended from the turning warrants that a short channelised right turning lane and a basic left turning treatment be implemented on the Harbour Esplanade for the main access (Access 2) to increase the safety of motorists turning into the development. Basic turning treatments are warranted at the other accesses (Access 1 and Access 3) and the Harbour Esplanade / Port Roadway intersection.

It is recommended that an additional emergency access (or an emergency connection to neighbouring areas) be provided for the eastern residential portion of the site (Buildings E and F) in the event of an emergency or if the site access becomes unavailable or blocked.

9.4 Car parking layout

It is identified that the southern circulation aisle would need speed reduction devices (such as raised speed platforms) to keep internal circulation speeds low ad conducive to parking areas.

9.5 Active and public transport safety provisions

It was identified that pedestrian safety should be considered in further detailed design of the development, such as implementing raised pedestrian crossings, Crime Prevention Through Environmental Design principles and the provision of adequate barriers (such as balustrading) of paths and boardwalk interfaces with the ocean (or edge drops).

From the above, no adverse safety issues (that are consider high risk) have been identified.

10. Compliance with Council planning criteria

10.1 Local Plan alignment

This section provides a general discussion of the development proposal in the context of the Local Plan, in terms of its alignment with the relevant transport elements for the Burnett Heads Harbour site (as stated in Appendix 5 of the Local Plan). The Local Plan provides strategic recommendations by Council for the future development of the Burnett Heads Town Centre and its immediate surrounds.

The Local Plan discusses policy direction for Council with its land use, settlement pattern, and infrastructure delivery. The plan also provides concept plans for a main street streetscape and wastewater infrastructure plan. The Local Plan recommendations are intended to work in conjunction to ensure maximum return on infrastructure investment while retaining and building upon the character and needs of the local community.

The Local Plan elements relevant to the transport provisions of the proposed development include the following:

- Burnett Heads Harbour site vision
- Land uses
- Urban design
- Built form
- Movement network
- Service infrastructure

Alignment of the development proposal with the above are discussed in the following sections. The wording provided in the below grey text boxes are a direct excerpt of Appendix 5 of the Burnett Heads Town Centre Local Plan.

Discussions specific land use, architecture and other service elements are provided in respective planning, architectural/landscape and engineering documentation in support of the development application.

10.1.1 Local Plan development vision

> The strategic foreshore location, scale and significant development capacity of the Burnett Heads Marina offers a significant opportunity to be a catalyst development site for the Bundaberg Region, particularly tourism related development. The development of this site will provide opportunity for a new integrated resort development with a range of related uses including function and entertainment facilities, hotel, retail, tourist attractions, residential, and marina related businesses.
>
> Development of the Burnett Heads Marina will:-
>
> - Provide an iconic contribution to the coastline and the head of the Burnett River;
> - Provide opportunities for the existing Burnett Heads community through connections and integration with the existing urban form of the locality.

The proposed connections to the surrounding road network have been developed in consultation with Council officers through the pre-lodgement process. Considerations for land use and transport integration with the wider Local Plan network, as discussed with Council, included:

- Rationalisation of access to provide permeability and accessibility to both the existing and future road networks
- Provision of active transport linkages along Harbour Esplanade and the foreshore
- Compliance of access locations with respect to separation distance to other intersections

Further discussions on development access and transport network is provided in Sections 10.1.2 to 0.

10.1.2 Local Plan future land use

> The marina site is to cater for a mix of compatible land uses amongst open space areas that are accessible to the broader community. Land uses that support and complement the marina's primary use and location are to be integrated so as to minimise potential conflicts. Permanent and tourism related accommodation, commercial, and marina related (low impact) industries are appropriate within the marina site.
>
> Conflicts between land uses are to be managed through design elements, buffering and other separation measures.
>
> Due to the scale and the expected medium to long term time frame for the marina's ultimate development, interim land uses may be considered on the site.

The Burnett Heads Marina offers a significant catalyst opportunity for future development of the Burnett Heads region, particularly tourism related development. The development of this site will provide opportunity for a new integrated development with a range of related uses including commercial, retail, tourist attractions, residential, and marina related businesses.

The development of the Burnett Heads Marina will:

- Provide an iconic contribution to the coastline and the head of the Burnett River;
- Provide opportunities for the existing Burnett Heads community through connections and integration with the existing urban form of the locality.

The proposed development has been developed in consultation with BRC to ensure that the uses and location are integrated with as minimal conflict as possible. Council have not raised any objections to the location of use proposed onsite.

10.1.3 Local Plan urban design

> The urban design of the Burnett Heads Marina through form, type and arrangement of buildings, streets, and public spaces achieves best practice outcomes which:-
>
> - Creates a foreshore for everyone;
> - Creates a recognisable local identity which attracts local, interstate and international visitors;
> - Incorporates sub-tropical architecture and landscaping;
> - Is sensitive to the interface and relationship with the existing Burnett Heads town centre and broader community;
> - Provides activity nodes and points of interest along the foreshore, and throughout other open space areas;
> - Protects sightlines and view corridors to the foreshore via the extension of Moss and Sommerville Streets;
> - Is easily navigable and accessible.

The access interfaces and the proposed development circulation roadway, parking and servicing provisions were presented to Council through the pre-lodgement process. The interface with the local road network, including access provisions for motorised and active forms of transport, were developed in consultation with Council officers and in consideration of the following:

- Maintaining separation distance between development driveways and nearby intersections (to a minimum 100 m).
- Separation of development footpaths and driveways.
- Connectivity between nodes/points of interest along the foreshore, through the provision of a foreshore walkway.
- Accessibility to the development and the foreshore through the provision of driveways, and direct footpath connections through the development between Harbour Esplanade and the foreshore.

Further detail on form of access in terms of location and design compliance is discussed in Section 7.1.

10.1.4 Local Plan built form

Development of the Burnett Heads Marina delivers architecturally significant built forms which:-

- Reinforces the pedestrian amenity of the foreshore and pedestrian connections to the Burnett Heads Town Centre;
- Responds to the sub-tropical climate;
- Respects the Harbour Esplanade frontage;
- Are of a height and scale that makes efficient use of land, is consistent with planned infrastructure, and respects the interface with the adjacent Town Centre;

  Note: Building heights nominated in Map 6 for the marina development site are indicative and are illustrative of the preferred layout and development orientation. Development that varies from these nominated outcomes are to demonstrate how impacts such as overshadowing, and the appropriateness of the development's bulk and scale are addressed.
- Provides active frontages which relate to the waterfront promenade, Harbour Esplanade, and the extensions of Moss and Sommerville Streets;
- Provides adequate building separation to allow light penetration and air circulation to private and public open space;
- Minimises the potential conflicts between motor vehicles, pedestrians, and cyclists through appropriate design and works, including for example, by limiting (where possible) the number of driveways and road crossings of pedestrian and cycle paths;
- Provide lighting that ensures public spaces are safe after dark and building entrances are easily identifiable. Lighting within the development is to minimise light spillage to limit the glow effect on nearby nesting sea turtles and their hatchlings;

As discussed in Section 10.1.1, the proposed connections to the surrounding road network have been developed in consultation with Council officers through the pre-lodgement process, in consideration of access rationalisation, permeability and accessibility. The access provisions are rationalised in terms of mode of transport, with footpath access provided adjacent and separate to driveway crossovers.

As shown in the development plan in Appendix A, the foreshore along the northern site frontage is activated by way of a proposed boardwalk.

10.1.5 Local Plan movement network

Development of the marina site is to ensure connections to the surrounding movement networks and within the site are well designed, legible, and safe. Vehicle, cycle, and pedestrian networks are all to be catered for ensuring easy accessibility to, from and through the site. The movement network is to:-

- Encourage people to walk to their local destination rather than drive;
- Provide a promenade for the full length of the waterfront that is accessible by the community;
- Contribute to protecting sightlines of views of the marina from Sommerville and Moss Streets;
- Be easily navigable with a well-connected, logical and legible active transport network that minimises the need for directional signage;
- Provide equitable access for all;
- Where practical, separate vehicles from pedestrians and cyclists;
- Cater for buses and service vehicles on site.

The proposed active transport provisions, developed in consultation with Council, is designed in consideration of logic, legibility, accessibility and sight lines. As shown in the development plan in Appendix A, pedestrian or shared paths are separated from driveway crossovers to minimise conflicts between pedestrians and vehicles. It is anticipated that time separated pedestrian crossings (i.e. 'zebra' crossings) along Harbour Esplanade will be considered by Council as part of its further Local Plan implementation.

In consideration of future bus network planning and infrastructure, the development plan includes active transport permeability to Harbour Esplanade.

10.1.6 Local Plan service infrastructure

The marina site is to be connected to water, wastewater, transport, stormwater, and telecommunication networks.

The proposed development plan and access provisions account for vehicular and active modes of transport. As discussed in Section 10.1.5 the proposed movement provisions consider active transport permeability to Harbour Esplanade in anticipation of future bus infrastructure to be accommodated in the immediate road network.

10.2 Code compliance

The proposed development has been reviewed in accordance with the BRC Planning Scheme criteria for assessment with the Transport and Parking code tables.

The tables and associated responses are provided at Appendix I. Review of the relevant criteria generally identified no non-compliance items.

11. Summary

RMA Engineers has been engaged by BH Developments QLD Pty Ltd to undertake a Traffic Impact Assessment (TIA) in support of a development application for the proposed Burnett Heads Harbour Village development located at Harbour Esplanade in Burnett Heads, Queensland. The proposed development consists of an integrated mix of uses including a marina (with fixed wet berths), and commercial, retail, recreation, residential and accommodation facilities. The proposed development is located on the southwestern side of Burnett Harbour and is expected to attract tourism to the Burnett Heads area.

This report has been prepared in support of an application for a development permit to be lodged with the Bundaberg Regional Council (BRC) and has been undertaken generally in accordance with the relevant road transport related requirements identified by the BRC and associated planning scheme.

The following is a summary of findings and recommendations of the TIA.

Operational assessment:

- The estimated number of trips that will be generated by the development is:
  - Weekday AM peak hour = 117 trips per hour
  - Weekday PM peak hour = 229 trips per hour
  - Saturday midday peak hour = 258 trips per hour
  - Daily = 2,840 trips per day
- From the SIDRA analysis, all the existing intersection layouts operate well under practical capacity with minimal DOS, queuing and delays for the 2036 design horizon with the proposed development volumes. Therefore, no mitigation or upgrades are triggered as part of the proposed development. All the access intersections can operate as standard T arrangements with priority control.
- From analysis, it is acknowledged that Access 2 can satisfactory cater for the development traffic if Access 3 is not constructed (or constructed at later stages in the future) due to resistance from the Department of Natural Resources, Mines and Energy.
- From a midblock capacity assessment, no mitigation measures or upgrades are warranted on the surrounding road network

Site layout:

- The proposed site accesses are considered appropriate with regards to separation from other accesses and intersections, queuing and sight distance.
- From the turn warrant assessment it is recommended that a CHR(S) and BAL turn treatment be constructed at the main development access (Access 2) to cater for the expected turning demands. It is suggested that these works could be undertaken in conjunction with the future planned Harbour Esplanade upgrade works as discussed in Section 4.2.

- Additional turn warrant assessments were undertaken at the other development site accesses (Harbour Esplanade / Bengsten Street / Site Access 1 intersection and Port Roadway / Site Access 3 intersection), and the Harbour Esplanade / Port Roadway intersection, under the assumption that 50 % development traffic would use the Port Roadway to gain access to the development. It is noted that none of these intersections triggered anything more than a standard BAR / BAL turn treatment for the 10-year design horizon (2036).
- It is recommended that an additional emergency access (or an emergency connection to neighbouring areas) be provided in the event of an emergency or if the site access becomes unavailable or blocked.
- The proposed development provides a total of 354 car parking spaces. From an 'en globo' assessment the total required parking is 331 car parking spaces. Therefore, the development car parking provisions exceeds the requirements outlined in the BRC Planning Scheme with consideration of reductions (cross-utilisation).
- It is expected that from a staged assessment of the car parking provisions the development will experience a minor shortfall of public parking at final completion. There are a number of management options discussed in Section 7.2.1 which are to be considered in future staging of the development (to address any parking shortfall associated with the development staging and land uses). Because of this the car parking provisions for the proposed development is considered acceptable.
- It is suggested that the development provide a minimum of seven (7) PWD spaces. The PWD requirement is discussed in Section 7.2.2 and the design of spaces can be undertaken in future detailed design stages of the development.
- The car parking layout and geometry is designed within accordance to the relevant Australian Standards (AS2890.1).
- The swept path assessment indicates that the site can be accessed and serviced appropriately by the required design vehicles.
- A number of minor layout changes are recommended from the internal layout review, including the provision of wheelstops (or bollards), raised speed platforms, corner truncations, motorcycle parking, basement ramp flares and minor modification to the refuelling area. These are considered minor adjustments and can be investigated further in future detailed design (and waste management planning) stages of the development.

Active transport:

- A street and pedestrian movement network is illustrated in Figure 8-1. The street and movement network plan has been developed in consideration of Council's local planning as well as consultation with BRC officers through the pre-lodgement process. The proposed active transport provisions, developed in consultation with Council, is designed in consideration of logic, legibility, accessibility and desire lines.
- Pedestrian safety should also be considered in further detailed design of the development, such as implementing raised pedestrian crossings and connections, Crime Prevention Through Environmental Design principles and the provision of adequate barriers (such as balustrading) of paths and boardwalk interfaces with the ocean (or edge drops).

- It is recommended that short term bicycle parking (including locking rails) and lockers be provided for the development (Stages 1A and 1B). It is also recommended that end of trip facilities be provided for cyclists (i.e. showers and lockers) central to each of the commercial uses.

Public transport:

- The development proposes an additional bus stop, indented on the northern verge of Harbour Esplanade, just to the east of the Port Roadway. This bus stop infrastructure is located adjacent the proposed development (outside Building C) which is considered satisfactory walking distance and accessibility in accordance with the TransLink *Public Transport Infrastructure Manual* guidelines. The location is considered ideal to cater for visitors to the boat ramp and other surrounding potential development sites in the area.
- The bus stop was situated with consideration of the future Zunker Street extension, and future intersections and accesses to the Harbour Esplanade as part of the planning for the area.

Safety:

- From a review of the historical crash data within the local town centre and in the vicinity of the site, no crash patterns or mitigation measures have been identified.
- No adverse safety issues (that are considered high risk) have been identified as part of undertaking this TIA.

Compliance with Council planning criteria:

- The development aligns with the relevant transport provisions of the BRC Local Plan.
- Review of the BRC Planning Scheme (Transport and Parking code) generally identified no non-compliance items.

With respect to the consideration and implementation of the above findings and recommendations (which can be undertaken as part of future design stages of the development), the proposed Burnett Heads Harbour Village development can proceed without any unacceptable or adverse impacts on the external road network. No traffic and transport engineering matters have been identified that should preclude the approval of the proposed development.

Appendix A Development layout

387700 | DEVELOPMENT APPLICATION | ISSUE H | 23 OCT 2018 SCALE: 1:1000 @ A3

BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG bda
18 / 113

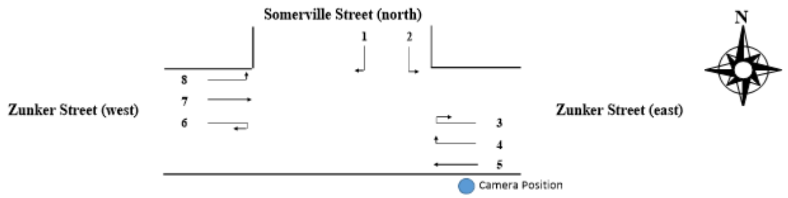
RMA Engineers

Appendix B Information request

Appendix C Traffic count data

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Zunker Street/Somerville Street, Burnett Heads
Day/Date: Saturday, 17 August 2019
Peak: *Hour ending - 12:45 PM*

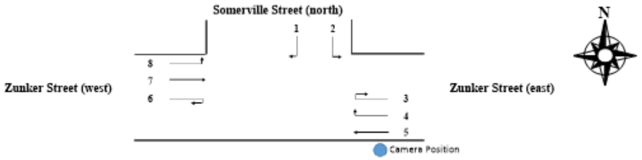


TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4		
	Light Vehicles	*Heavy Vehicles*	*Total*	*Light Vehicles*	*Heavy Vehicles*	*Total*	*Light Vehicles*	*Heavy Vehicles*	*Total*	*Light Vehicles*	*Heavy Vehicles*	*Total*
11:15 AM	1	0	**1**	0	0	**0**	0	0	**0**	1	0	**1**
11:30 AM	1	0	**1**	2	0	**2**	0	0	**0**	0	0	**0**
11:45 AM	1	0	**1**	0	0	**0**	0	0	**0**	1	0	**1**
12:00 PM	0	0	**0**	2	0	**2**	0	0	**0**	3	0	**3**
12:15 PM	0	0	**0**	4	0	**4**	0	0	**0**	1	0	**1**
12:30 PM	2	0	**2**	3	0	**3**	0	0	**0**	1	0	**1**
12:45 PM	1	0	**1**	5	0	**5**	0	0	**0**	4	0	**4**
1:00 PM	2	0	**2**	2	0	**2**	0	0	**0**	3	0	**3**
2 hr Total	8	0	8	18	0	18	0	0	0	14	0	14
Peak	3	0	3	14	0	14	0	0	0	9	0	9

TIME (1/4 hr end)	Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	*Total*	*Light Vehicles*	*Heavy Vehicles*	*Total*	*Light Vehicles*	*Heavy Vehicles*	*Total*	*Light Vehicles*	*Heavy Vehicles*	*Total*
11:15 AM	30	0	**30**	0	0	**0**	24	0	**24**	0	0	**0**
11:30 AM	26	0	**26**	0	0	**0**	23	0	**23**	0	0	**0**
11:45 AM	26	0	**26**	0	0	**0**	25	0	**25**	3	0	**3**
12:00 PM	42	1	**43**	0	0	**0**	32	0	**32**	1	0	**1**
12:15 PM	29	0	**29**	1	0	**1**	31	0	**31**	0	0	**0**
12:30 PM	29	1	**30**	0	0	**0**	29	0	**29**	2	0	**2**
12:45 PM	21	0	**21**	0	0	**0**	31	1	**32**	2	0	**2**
1:00 PM	35	0	**35**	1	0	**1**	32	0	**32**	1	0	**1**
2 hr Total	238	2	240	2	0	2	227	1	228	9	0	9
Peak	121	2	123	1	0	1	123	1	124	5	0	5

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Zunker Street/Somerville Street, Burnett Heads
Day/Date: Thursday, 15 August 2019
AM Peak: *Hour ending - 9:00 AM*
PM Peak: *Hour ending - 5:00 PM*



TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
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8:00 AM	1	0	1	1	0	1	0	0	0	0	0	0	11	0	11	0	0	0	6	0	6	1	0	1
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8:45 AM	0	0	0	1	0	1	0	0	0	1	0	1	15	2	17	1	0	1	17	0	17	0	0	0
9:00 AM	0	0	0	1	0	1	0	0	0	0	0	0	16	1	17	0	0	0	13	1	14	0	0	0
2 hr Total	1	0	1	5	0	5	0	0	0	2	0	2	118	3	121	1	0	1	77	4	81	4	0	4
AM Peak	0	0	0	4	0	4	0	0	0	2	0	2	77	3	80	1	0	1	51	3	54	1	0	1

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
4:15 PM	1	0	1	2	0	2	0	0	0	1	0	1	21	1	22	0	0	0	16	1	17	1	0	1
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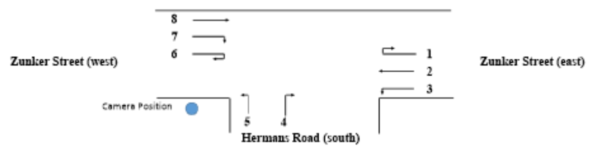
2 hr Total	2	0	2	6	0	6	0	0	0	3	0	3	129	2	131	0	0	0	134	2	136	2	0	2
PM Peak	1	0	1	5	0	5	0	0	0	2	0	2	72	2	74	0	0	0	70	1	71	2	0	2

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 **Weather:** Fine
Location: Zunker Street/Hermans Road, Burnett Heads
Day/Date: Saturday, 17 August 2019
Peak: *Hour ending - 1:00 PM*



TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
11:15 AM	0	0	**0**	24	0	**24**	7	0	**7**	5	0	**5**	3	0	**3**	0	0	**0**	0	0	**0**	20	0	**20**
11:30 AM	0	0	**0**	16	0	**16**	5	0	**5**	7	0	**7**	1	0	**1**	1	0	**1**	2	0	**2**	19	0	**19**
11:45 AM	0	0	**0**	20	0	**20**	0	0	**0**	11	0	**11**	1	0	**1**	0	0	**0**	3	0	**3**	18	0	**18**
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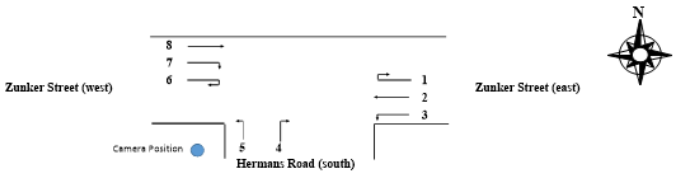
12:45 PM	1	0	**1**	16	0	**16**	2	0	**2**	9	1	**10**	1	0	**1**	0	0	**0**	2	0	**2**	24	0	**24**
1:00 PM	0	0	**0**	30	0	**30**	3	0	**3**	4	0	**4**	2	0	**2**	0	0	**0**	3	0	**3**	30	0	**30**
2 hr Total	2	0	2	181	2	183	30	0	30	58	1	59	11	0	11	1	0	1	18	0	18	185	0	185
Peak	1	0	1	92	1	93	14	0	14	28	1	29	4	0	4	0	0	0	11	0	11	102	0	102

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 **Weather:** Fine
Location: Zunker Street/Hermans Road, Burnett Heads
Day/Date: Thursday, 15 August 2019
AM Peak: *Hour ending - 9:00 AM*
PM Peak: *Hour ending - 5:00 PM*

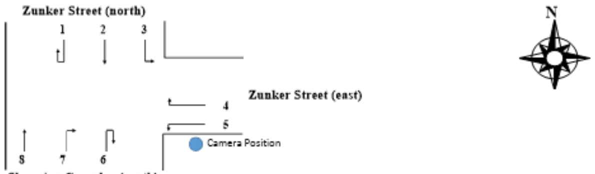


TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
7:15 AM	0	0	0	15	0	15	1	0	1	1	0	1	1	0	1	0	0	0	0	0	0	9	0	9
7:30 AM	0	0	0	5	0	5	0	0	0	3	0	3	1	0	1	0	0	0	0	0	0	4	1	5
7:45 AM	0	0	0	8	0	8	0	0	0	1	0	1	3	0	3	0	0	0	1	0	1	4	0	4
8:00 AM	1	0	1	10	0	10	1	0	1	1	0	1	2	0	2	0	0	0	0	0	0	8	0	8
8:15 AM	1	0	1	17	0	17	2	0	2	6	0	6	1	0	1	0	0	0	1	0	1	3	0	3
8:30 AM	0	0	0	20	0	20	3	0	3	1	1	2	1	0	1	0	0	0	2	0	2	10	1	11
8:45 AM	0	0	0	14	1	15	0	0	0	3	0	3	1	0	1	0	0	0	2	0	2	14	0	14
9:00 AM	1	0	1	13	0	13	2	0	2	0	1	1	3	0	3	0	0	0	1	0	1	11	0	11
2 hr Total	3	0	3	102	1	103	9	0	9	16	2	18	13	0	13	0	0	0	7	0	7	63	2	65
AM Peak	2	0	2	64	1	65	7	0	7	10	2	12	6	0	6	0	0	0	6	0	6	38	1	39

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
4:15 PM	0	0	0	16	0	16	3	1	4	6	0	6	1	0	1	0	0	0	1	0	1	12	1	13
4:30 PM	0	0	0	13	0	13	4	1	5	5	0	5	0	0	0	0	0	0	2	0	2	5	0	5
4:45 PM	0	0	0	10	0	10	3	0	3	8	0	8	0	0	0	0	0	0	2	0	2	19	0	19
5:00 PM	0	0	0	11	0	11	3	0	3	10	0	10	1	0	1	0	0	0	4	0	4	17	0	17
5:15 PM	0	0	0	12	0	12	3	0	3	4	0	4	1	0	1	0	0	0	3	0	3	12	0	12
5:30 PM	1	0	1	9	0	9	2	0	2	3	0	3	0	0	0	0	0	0	3	0	3	10	1	11
5:45 PM	0	0	0	15	0	15	2	0	2	4	0	4	0	0	0	0	0	0	2	0	2	11	0	11
6:00 PM	0	0	0	7	0	7	2	0	2	7	0	7	1	0	1	0	0	0	0	0	0	15	0	15
2 hr Total	1	0	1	93	0	93	22	2	24	47	0	47	4	0	4	0	0	0	17	0	17	101	2	103
PM Peak	0	0	0	50	0	50	13	2	15	29	0	29	2	0	2	0	0	0	9	0	9	53	1	54

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 3 **Weather:** Fine
Location: Zunker Street/Shopping Complex, Burnett Heads
Day/Date: Thursday, 15 August 2019
Peak: *Hour ending - 9:00 AM*



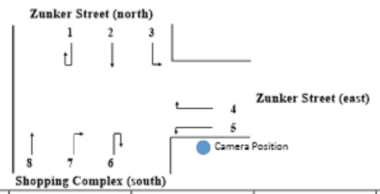
TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
11:15 AM	0	0	**0**	2	0	**2**	12	0	**12**	16	0	**16**
11:30 AM	0	0	**0**	2	0	**2**	10	0	**10**	7	0	**7**
11:45 AM	0	0	**0**	0	0	**0**	15	0	**15**	11	0	**11**
12:00 PM	0	0	**0**	1	0	**1**	20	0	**20**	23	1	**24**
12:15 PM	0	0	**0**	2	0	**2**	17	0	**17**	13	0	**13**
12:30 PM	0	0	**0**	0	0	**0**	24	0	**24**	16	0	**16**
12:45 PM	0	0	**0**	3	0	**3**	21	0	**21**	8	0	**8**
1:00 PM	0	0	**0**	1	0	**1**	24	0	**24**	25	0	**25**
2 hr Total	0	0	0	11	0	11	143	0	143	119	1	120
Peak	0	0	0	6	0	6	86	0	86	62	0	62

TIME (1/4 hr end)	Movement 5			Movement 6			Movement 7			Movement 8			Movement 9		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Heavy Vehicles	Light Vehicles	Total
11:15 AM	8	0	**8**	0	0	**0**	7	0	**7**	1	0	**1**	0	0	**0**
11:30 AM	9	0	**9**	0	0	**0**	8	0	**8**	2	0	**2**	0	0	**0**
11:45 AM	7	0	**7**	0	0	**0**	3	0	**3**	3	0	**3**	2	0	**2**
12:00 PM	7	0	**7**	0	0	**0**	8	0	**8**	3	0	**3**	1	0	**1**
12:15 PM	8	0	**8**	0	0	**0**	8	0	**8**	1	0	**1**	1	0	**1**
12:30 PM	6	1	**7**	0	0	**0**	2	0	**2**	4	0	**4**	0	0	**0**
12:45 PM	7	0	**7**	0	0	**0**	4	0	**4**	1	0	**1**	0	0	**0**
1:00 PM	4	0	**4**	0	0	**0**	7	0	**7**	1	0	**1**	2	0	**2**
2 hr Total	56	1	57	0	0	0	47	0	47	16	0	16	6	0	6
Peak	25	1	26	0	0	0	21	0	21	7	0	7	3	0	3

Page 1 of 2

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 3 **Weather:** Fine
Location: Zunker Street/Shopping Complex, Burnett Heads
Day/Date: Thursday, 15 August 2019
AM Peak: *Hour ending - 9:00 AM*
PM Peak: *Hour ending - 5:00 PM*



TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8			Movement 9		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Heavy Vehicles	Light Vehicles	Total
7:15 AM	0	0	0	1	0	1	4	0	4	9	0	9	5	0	5	0	0	0	3	0	3	3	0	3	0	0	0
7:30 AM	0	0	0	1	0	1	3	1	4	4	0	4	1	0	1	0	0	0	1	0	1	2	0	2	0	0	0
7:45 AM	0	0	0	2	0	2	2	0	2	8	0	8	3	0	3	0	0	0	2	0	2	2	0	2	1	0	1
8:00 AM	0	0	0	1	1	2	3	0	3	6	0	6	3	0	3	0	0	0	2	0	2	3	0	3	0	0	0
8:15 AM	0	0	0	0	0	0	3	0	3	12	0	12	5	0	5	0	0	0	1	0	1	2	0	2	0	0	0
8:30 AM	0	0	0	2	0	2	9	0	9	15	0	15	3	0	3	0	0	0	2	1	3	1	0	1	0	0	0
8:45 AM	0	0	0	2	0	2	9	0	9	9	1	10	3	0	3	0	0	0	2	0	2	1	0	1	1	0	1
9:00 AM	0	0	0	1	0	1	5	0	5	9	0	9	5	0	5	0	0	0	4	0	4	3	0	3	0	0	0
2 hr Total	0	0	0	10	1	11	38	1	39	72	1	73	28	0	28	0	0	0	17	1	18	17	0	17	2	0	2
AM Peak	0	0	0	5	0	5	26	0	26	45	1	46	16	0	16	0	0	0	9	1	10	7	0	7	1	0	1

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8			Movement 9		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Heavy Vehicles	Light Vehicles	Total
4:15 PM	0	0	0	2	0	2	6	1	7	9	0	9	8	0	8	0	0	0	6	0	6	1	0	1	1	0	1
4:30 PM	0	0	0	0	0	0	5	0	5	6	0	6	8	0	8	0	0	0	3	0	3	0	0	0	0	0	0
4:45 PM	0	0	0	1	0	1	13	0	13	4	0	4	6	0	6	0	0	0	7	0	7	1	0	1	0	0	0
5:00 PM	0	0	0	1	0	1	13	0	13	4	0	4	6	0	6	0	0	0	7	0	7	3	0	3	1	0	1
5:15 PM	0	0	0	1	0	1	10	0	10	7	0	7	5	0	5	0	0	0	3	0	3	1	0	1	0	0	0
5:30 PM	0	0	0	1	0	1	6	1	7	4	0	4	6	0	6	0	0	0	6	0	6	0	0	0	0	0	0
5:45 PM	0	0	0	1	0	1	6	0	6	3	0	3	12	0	12	0	0	0	9	0	9	1	0	1	0	0	0
6:00 PM	0	0	0	1	0	1	9	0	9	4	0	4	4	0	4	0	0	0	4	0	4	2	0	2	0	0	0
2 hr Total	0	0	0	8	0	8	68	2	70	41	0	41	55	0	55	0	0	0	45	0	45	9	0	9	2	0	2
PM Peak	0	0	0	4	0	4	37	1	38	23	0	23	28	0	28	0	0	0	23	0	23	5	0	5	2	0	2

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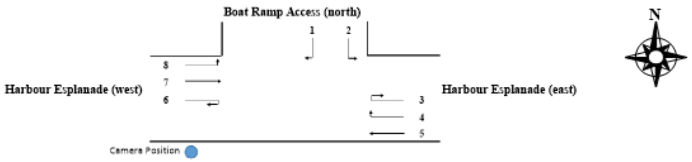
AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 4 **Weather:** Fine
Location: Harbour Esplanade/Boat Ramp Access, Burnett Heads
Day/Date: Saturday, 17 August 2019
Peak: *Hour ending - 1:00 PM*

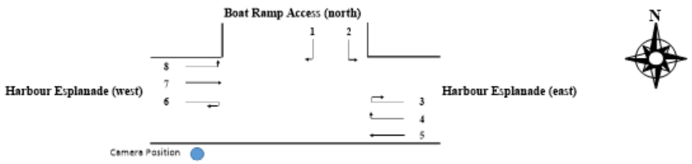


TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
11:15 AM	1	0	1	6	0	6	0	0	0	6	0	6	9	0	9	0	0	0	8	0	8	0	0	0
11:30 AM	2	0	2	3	0	3	0	0	0	3	0	3	4	0	4	0	0	0	7	0	7	2	0	2
11:45 AM	4	0	4	5	0	5	0	0	0	2	0	2	10	0	10	0	0	0	9	0	9	4	0	4
12:00 PM	4	0	4	8	0	8	0	0	0	13	0	13	10	1	11	0	0	0	6	0	6	4	0	4
12:15 PM	5	0	5	8	0	8	0	0	0	5	0	5	10	0	10	0	0	0	11	0	11	3	0	3
12:30 PM	4	0	4	14	0	14	0	0	0	9	0	9	5	0	5	0	0	0	8	0	8	6	0	6
12:45 PM	0	0	0	11	0	11	0	0	0	2	0	2	7	0	7	0	0	0	13	0	13	3	0	3
1:00 PM	2	0	2	11	0	11	0	0	0	13	0	13	11	0	11	0	0	0	10	0	10	1	0	1
2 hr Total	22	0	22	66	0	66	0	0	0	53	0	53	66	1	67	0	0	0	72	0	72	23	0	23
Peak	11	0	11	44	0	44	0	0	0	29	0	29	33	0	33	0	0	0	42	0	42	13	0	13

Page 1 of 2

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 4 **Weather:** Fine
Location: Harbour Esplanade/Boat Ramp Access, Burnett Heads
Day/Date: Thursday, 15 August 2019
AM Peak: *Hour ending - 9:00 AM*
PM Peak: *Hour ending - 5:30 PM*



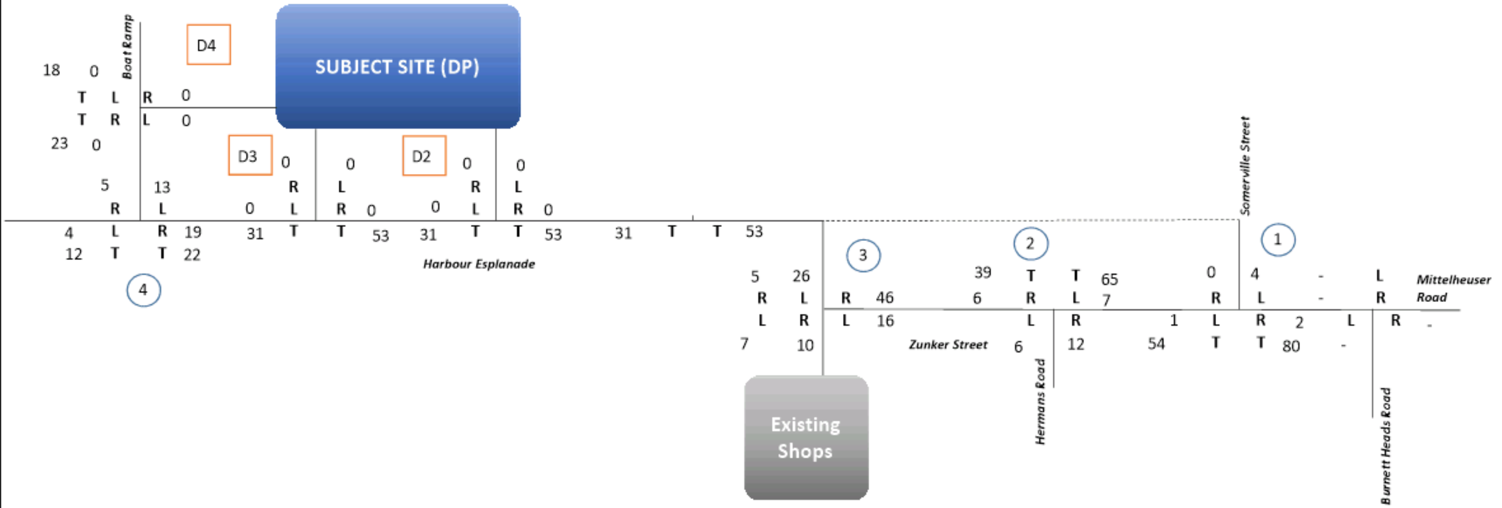
TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
7:15 AM	1	0	1	2	0	2	0	0	0	7	0	7	5	0	5	0	0	0	3	0	3	1	0	1
7:30 AM	0	0	0	1	0	1	0	0	0	1	0	1	4	0	4	0	0	0	2	1	3	2	0	2
7:45 AM	0	0	0	3	0	3	0	0	0	5	0	5	2	0	2	0	0	0	2	0	2	0	0	0
8:00 AM	1	0	1	3	0	3	0	0	0	5	0	5	4	0	4	0	0	0	0	1	1	2	0	2
8:15 AM	2	0	2	0	0	0	0	0	0	3	0	3	7	0	7	0	0	0	2	0	2	0	0	0
8:30 AM	2	0	2	6	0	6	0	0	0	6	0	6	2	0	2	0	0	0	4	0	4	2	0	2
8:45 AM	0	0	0	2	0	2	0	0	0	6	0	6	5	0	5	0	0	0	4	0	4	1	0	1
9:00 AM	1	0	1	4	1	5	0	0	0	4	0	4	7	1	8	0	0	0	2	0	2	1	0	1
2 hr Total	7	0	7	21	1	22	0	0	0	37	0	37	36	1	37	0	0	0	19	2	21	9	0	9
AM Peak	5	0	5	12	1	13	0	0	0	19	0	19	21	1	22	0	0	0	12	0	12	4	0	4

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total	Light Vehicles	Heavy Vehicles	Total
4:15 PM	1	0	1	2	0	2	0	0	0	2	0	2	6	0	6	0	0	0	4	1	5	0	0	0
4:30 PM	0	0	0	1	0	1	0	0	0	1	0	1	2	0	2	0	0	0	4	0	4	0	0	0
4:45 PM	1	0	1	3	0	3	0	0	0	2	0	2	5	0	5	0	0	0	9	0	9	1	0	1
5:00 PM	1	0	1	5	0	5	0	0	0	4	0	4	2	0	2	0	0	0	9	0	9	0	0	0
5:15 PM	0	0	0	2	0	2	0	0	0	1	0	1	7	0	7	0	0	0	5	0	5	1	0	1
5:30 PM	1	0	1	2	0	2	0	0	0	3	0	3	1	0	1	0	0	0	5	1	6	1	0	1
5:45 PM	0	0	0	2	0	2	0	0	0	0	0	0	3	0	3	0	0	0	4	0	4	0	0	0
6:00 PM	1	0	1	0	0	0	0	0	0	1	0	1	4	0	4	0	0	0	7	0	7	0	0	0
2 hr Total	5	0	5	17	0	17	0	0	0	14	0	14	30	0	30	0	0	0	47	2	49	3	0	3
PM Peak	3	0	3	12	0	12	0	0	0	10	0	10	15	0	15	0	0	0	28	1	29	3	0	3

RMA Engineers

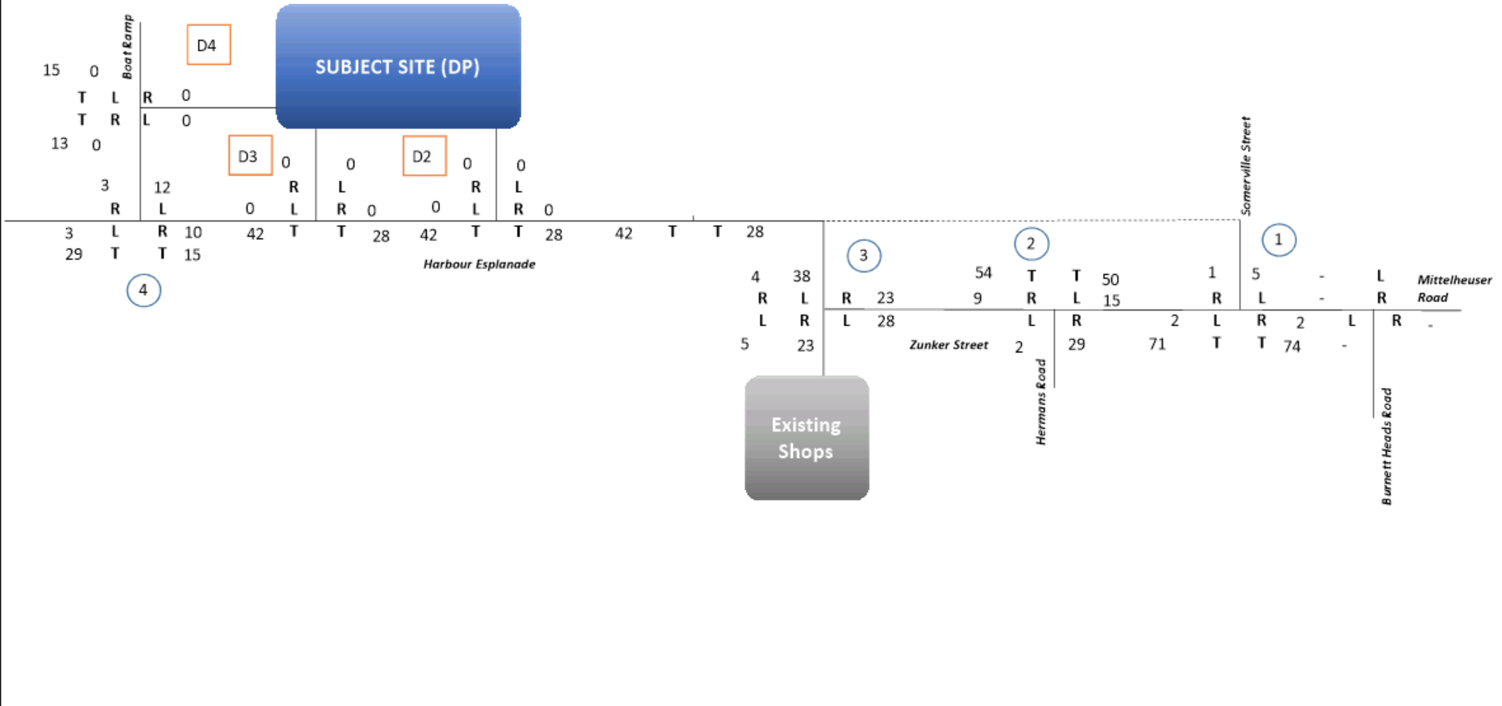
Appendix D Traffic volume diagrams

Marina Development - Bundaberg	
Figure	Figure 1
Scenario	2019 Weekday AM - Existing Volumes
Project No	13101
Date	4/10/2019



RMA Engineers

Marina Development - Bundaberg	
Figure	Figure 2
Scenario	2019 Weekday PM - Existing Volumes
Project No	13101
Date	4/10/2019

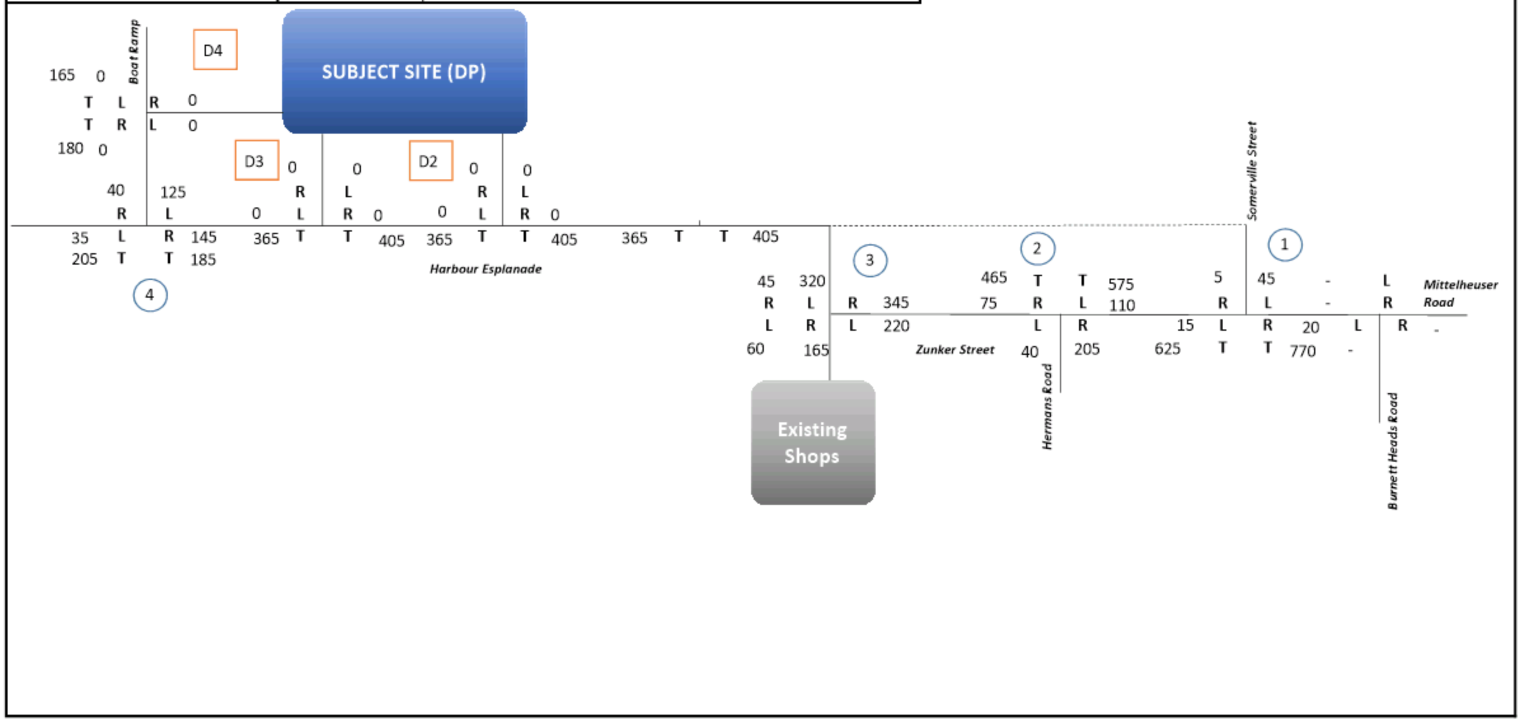


RMA Engineers

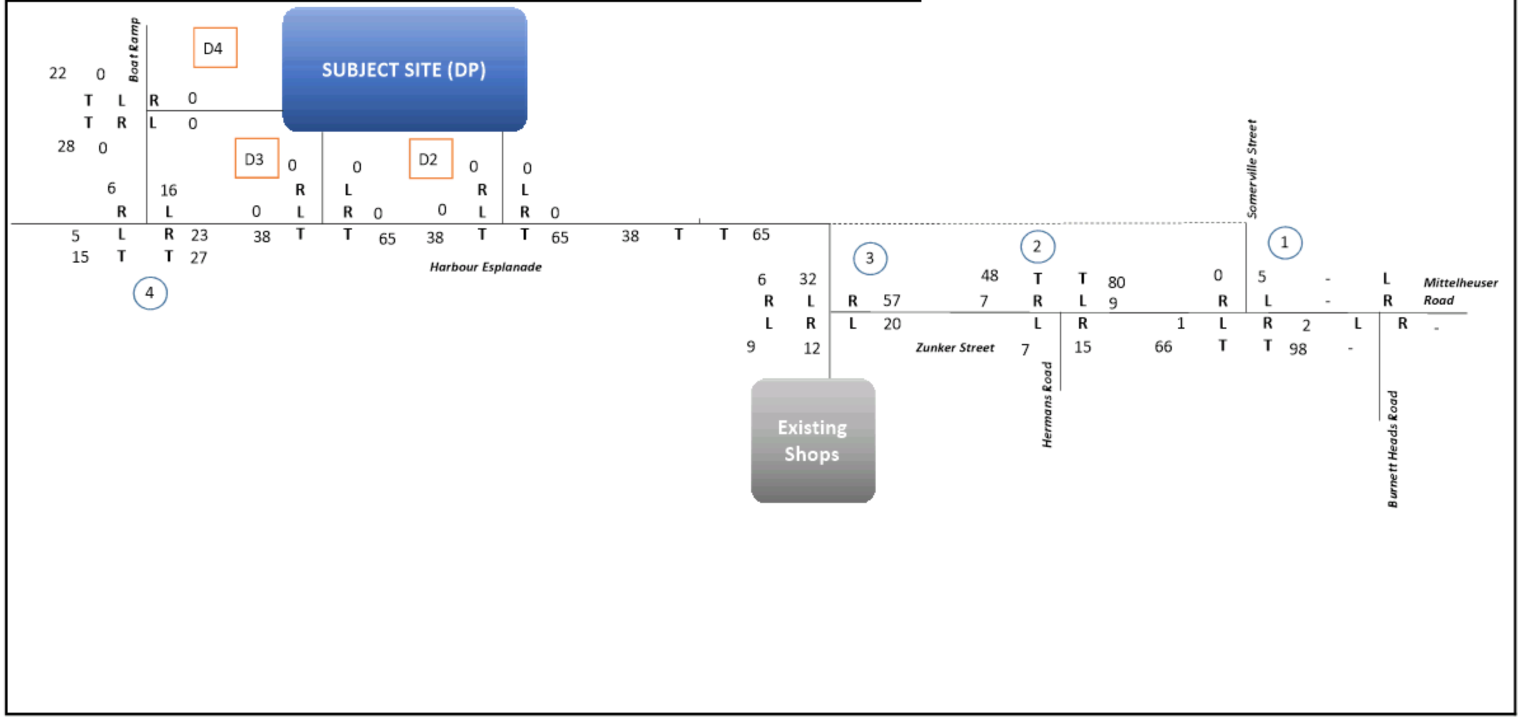
Marina Development - Bundaberg	
Figure	Figure 3
Scenario	2019 Saturday Noon - Existing Volumes
Project No	13101
Date	4/10/2019

Marina Development - Bundaberg

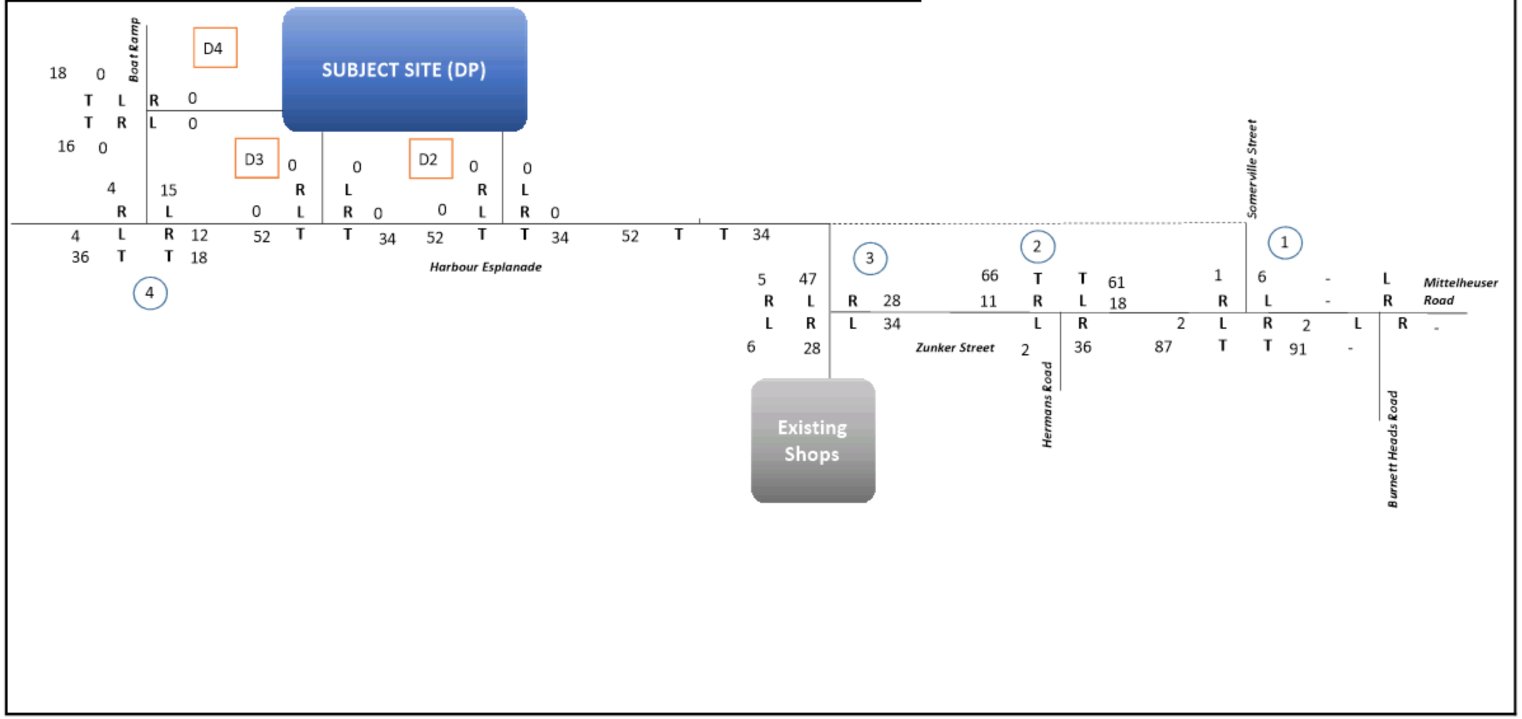
Figure	Figure 4
Scenario	2019 Saturday Noon - Estimated Daily
Project No	13101
Date	4/10/2019



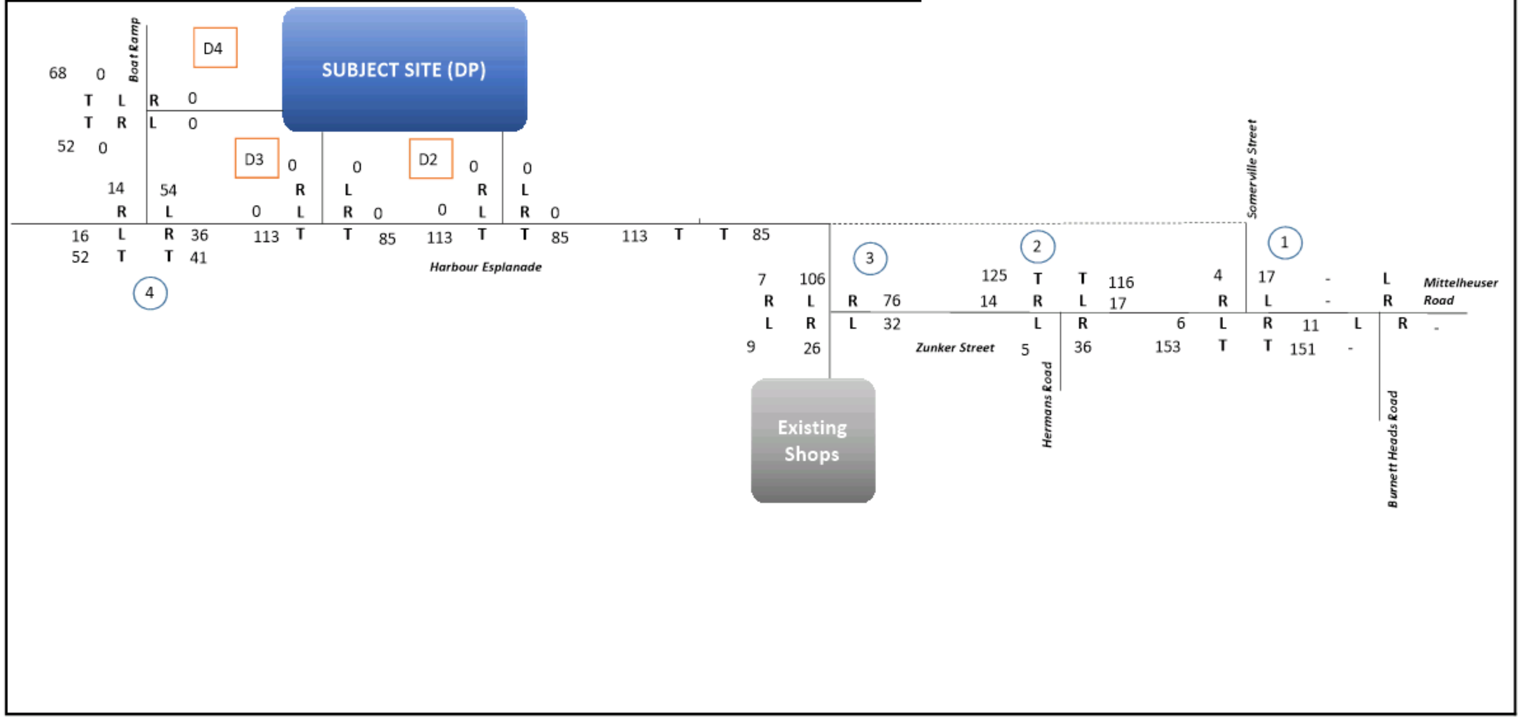
	Marina Development - Bundaberg
Figure	Figure 5
Scenario	2026 Weekday AM - Base Volumes (DP)
Project No	13101
Date	4/10/2019



Marina Development - Bundaberg	
Figure	Figure 6
Scenario	2026 Weekday PM - Base Volumes (DP)
Project No	13101
Date	4/10/2019



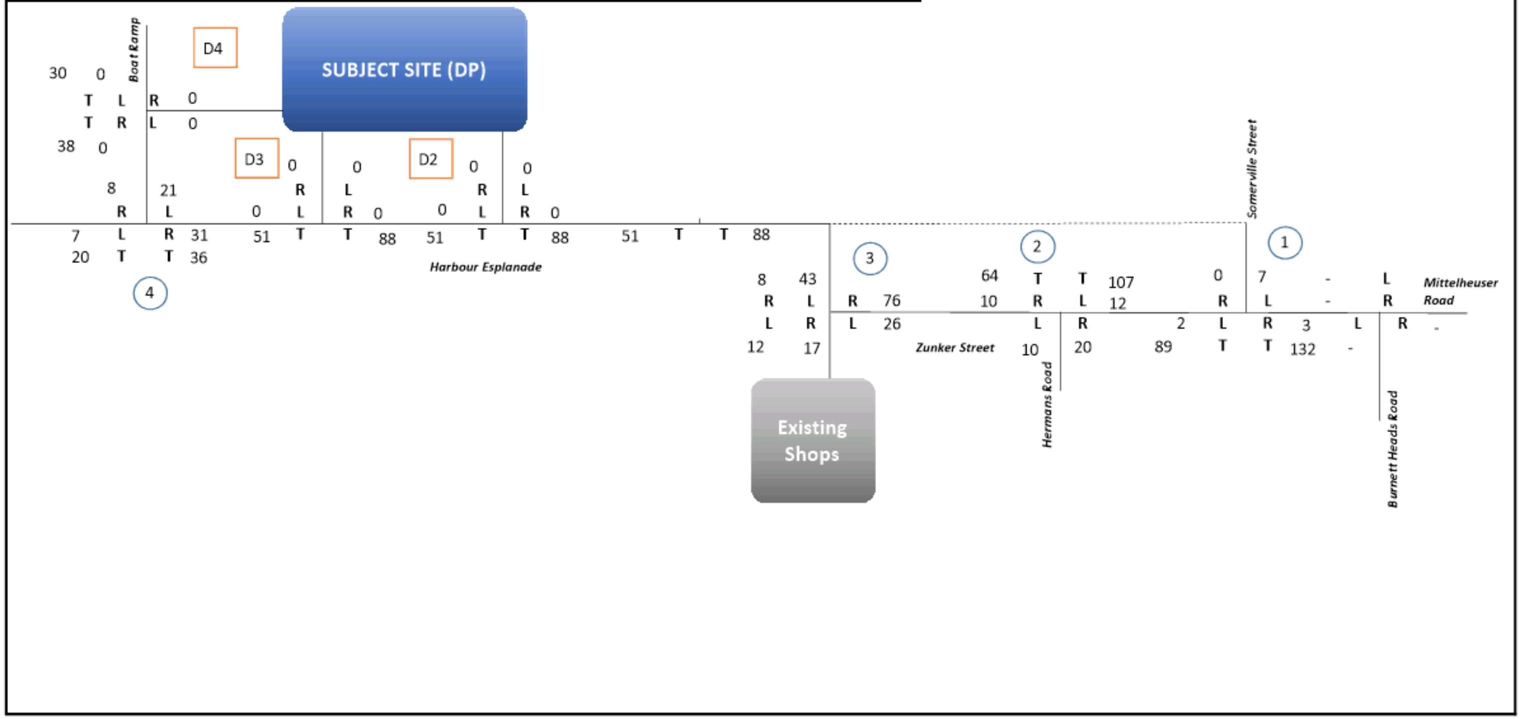
Marina Development - Bundaberg	
Figure	Figure 7
Scenario	2026 Saturday Noon - Base Volumes (DP)
Project No	13101
Date	4/10/2019



RMA Engineers

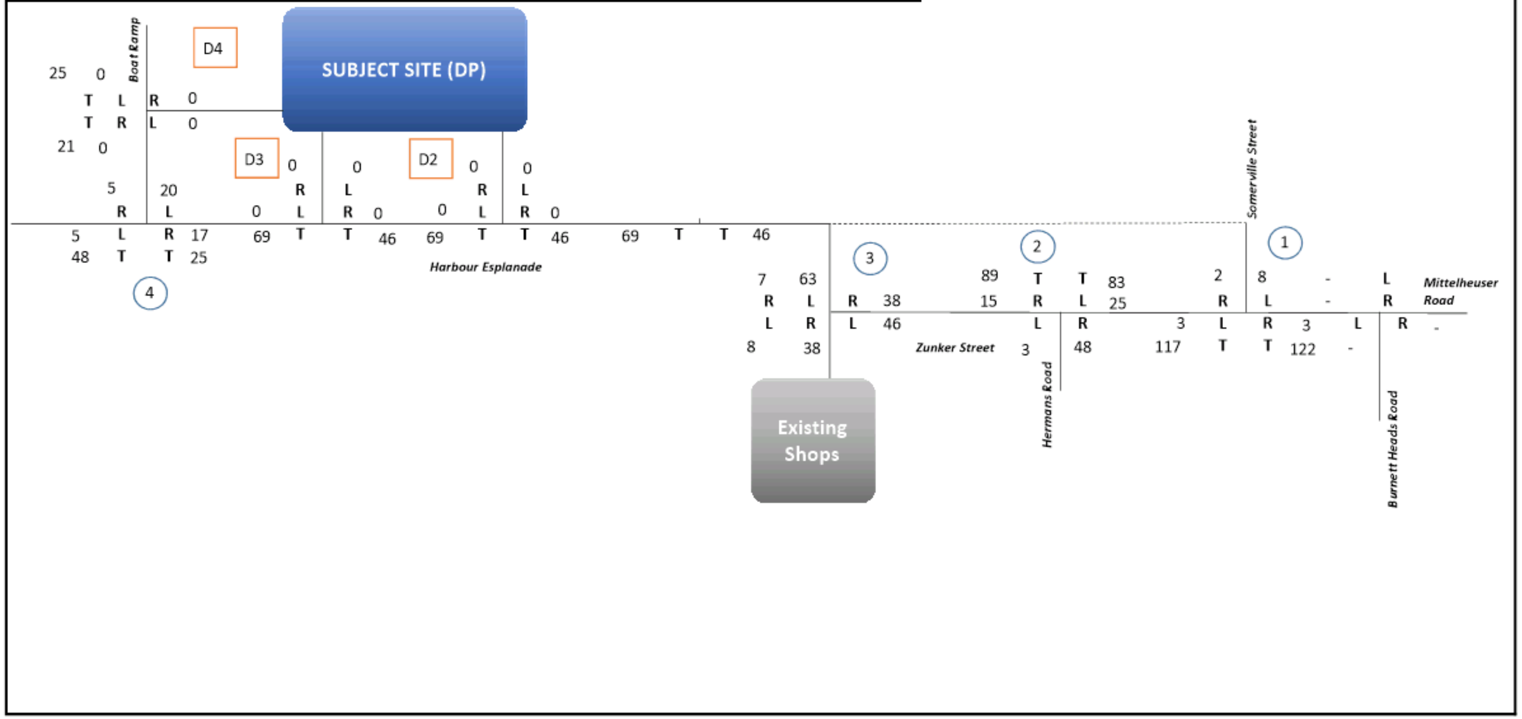
Marina Development - Bundaberg	
Figure	Figure 8
Scenario	2026 Daily Base Volumes
Project No	13101
Date	4/10/2019

	Marina Development - Bundaberg
Figure	Figure 9
Scenario	2036 Weekday AM - Base Volumes (DP)
Project No	13101
Date	4/10/2019



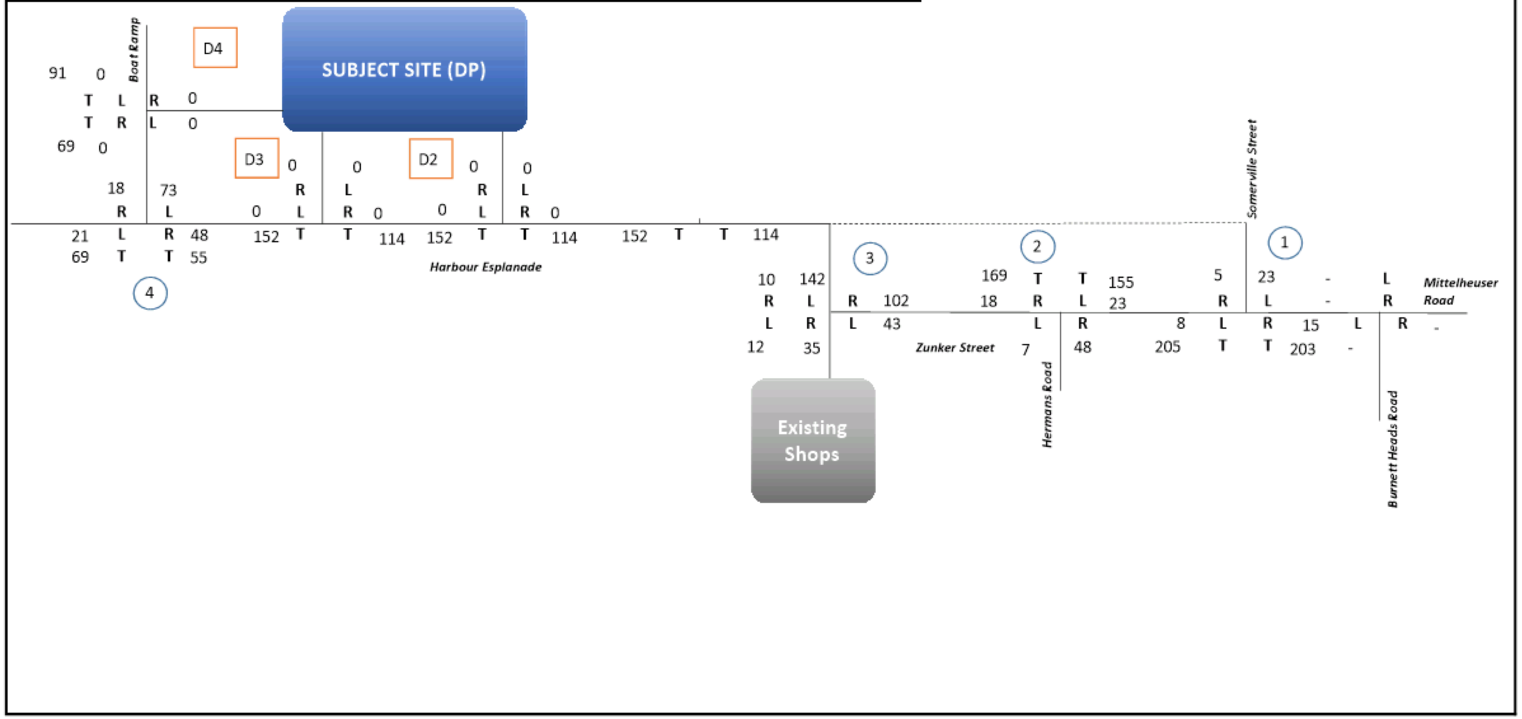
RMA Engineers

Marina Development - Bundaberg	
Figure	Figure 10
Scenario	2036 Weekday PM - Base Volumes (DP)
Project No	13101
Date	4/10/2019



RMA Engineers

Marina Development - Bundaberg	
Figure	Figure 11
Scenario	2036 Saturday Noon - Base Volumes (DP)
Project No	13101
Date	4/10/2019



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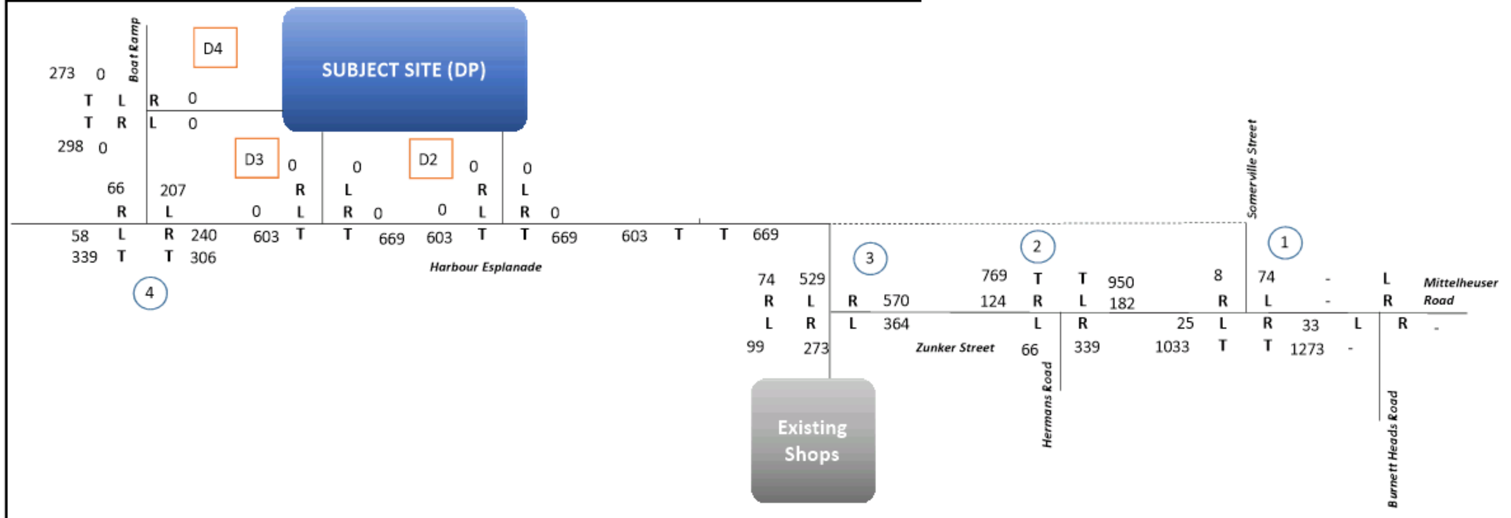
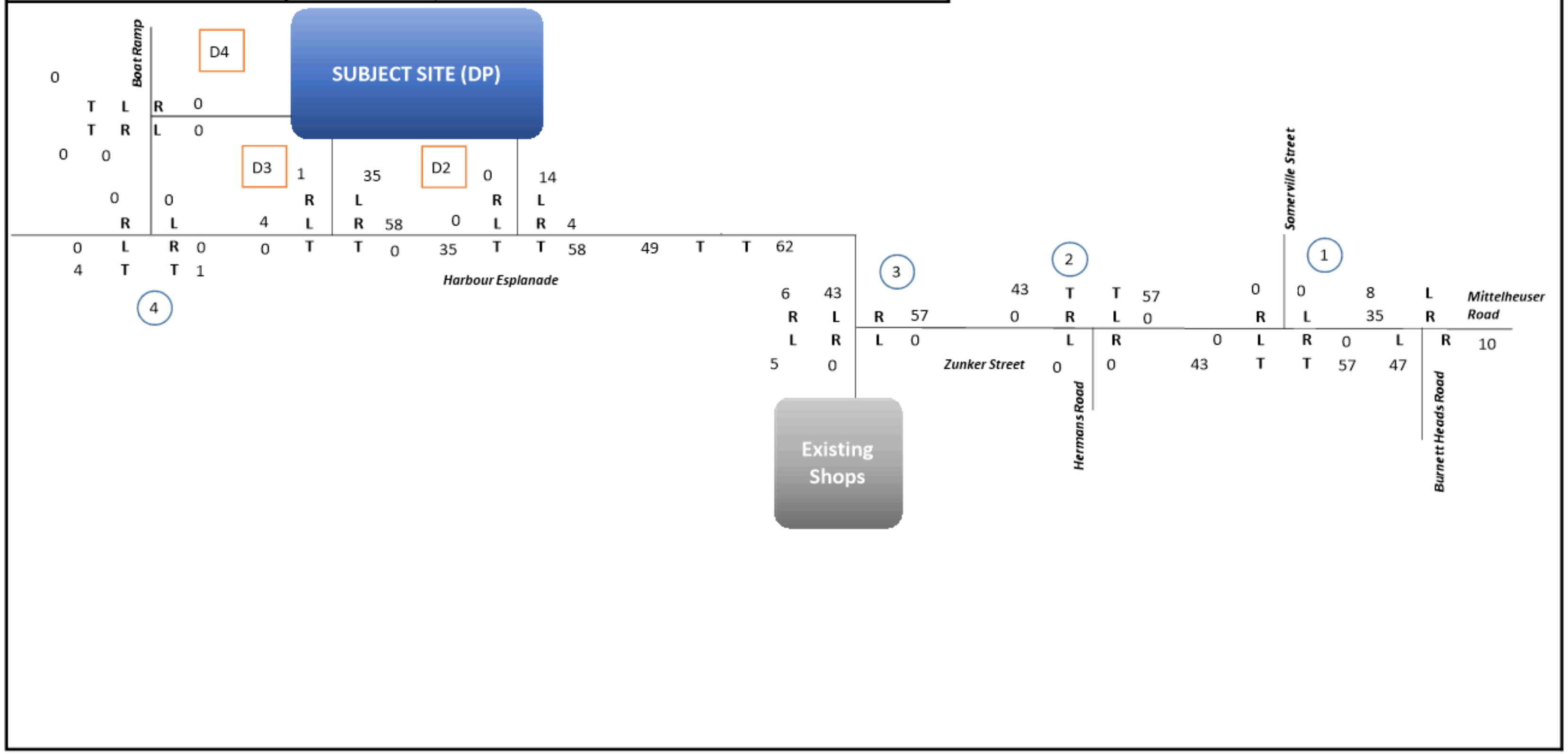
Marina Development - Bundaberg	
Figure	Figure 12
Scenario	2036 Daily Base Volumes
Project No	13101
Date	4/10/2019



RMA Engineers	Marina Development - Bundaberg
Figure	Figure 13
Scenario	Development Traffic DP Ultimate - Weekday AM
Project No	13101
Date	4/10/2019



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Marina Development - Bundaberg	
Figure	Figure 14
Scenario	Development Traffic DP Ultimate - Weekday PM
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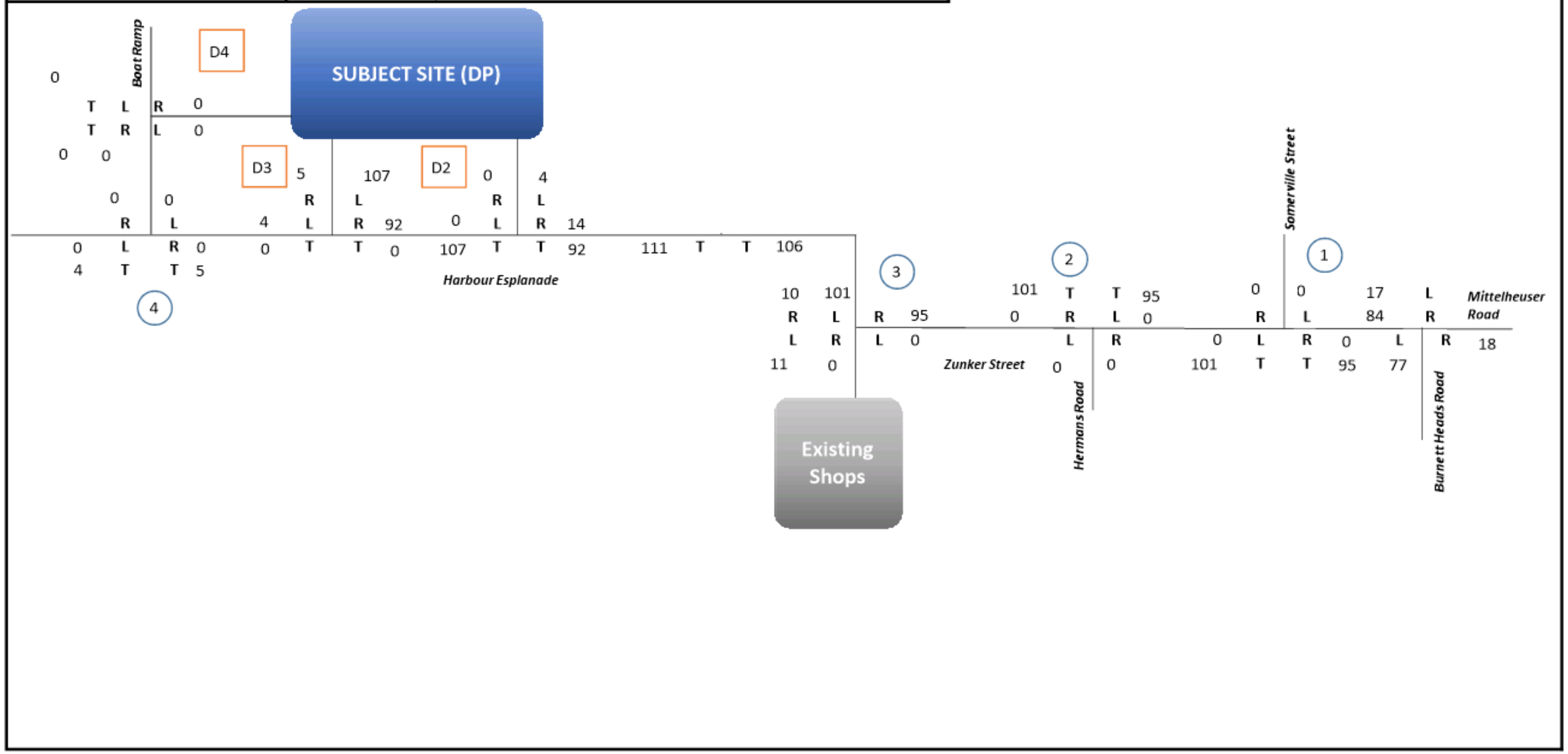

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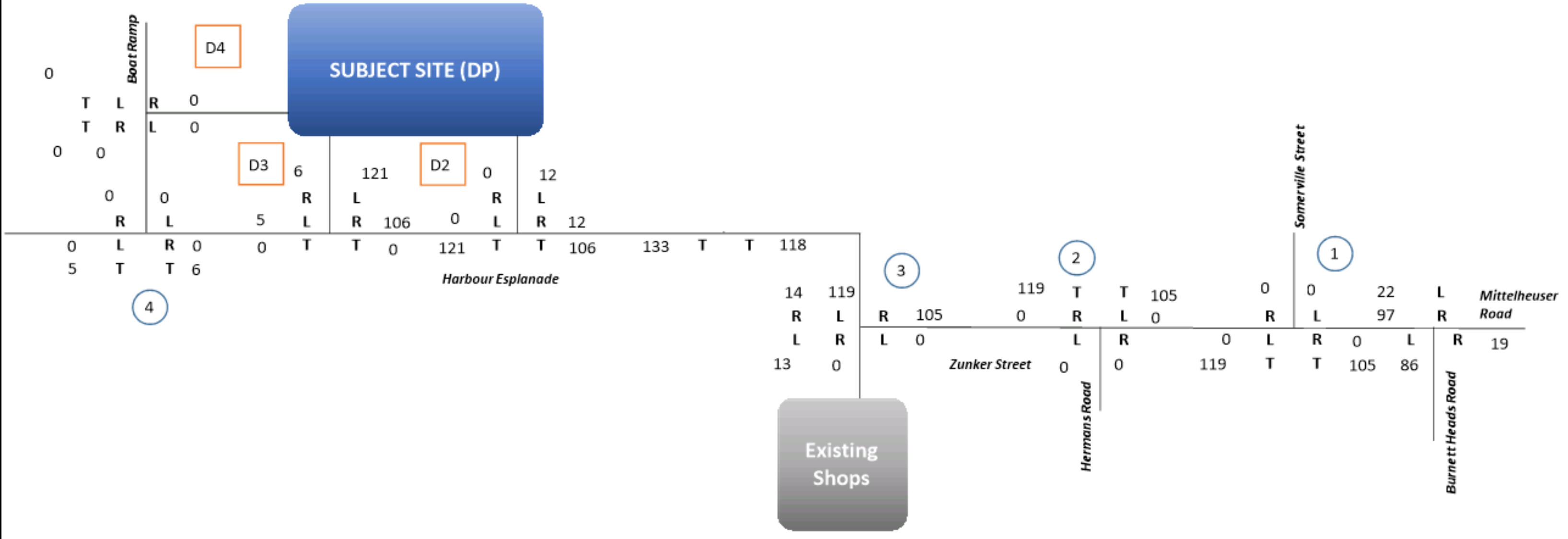
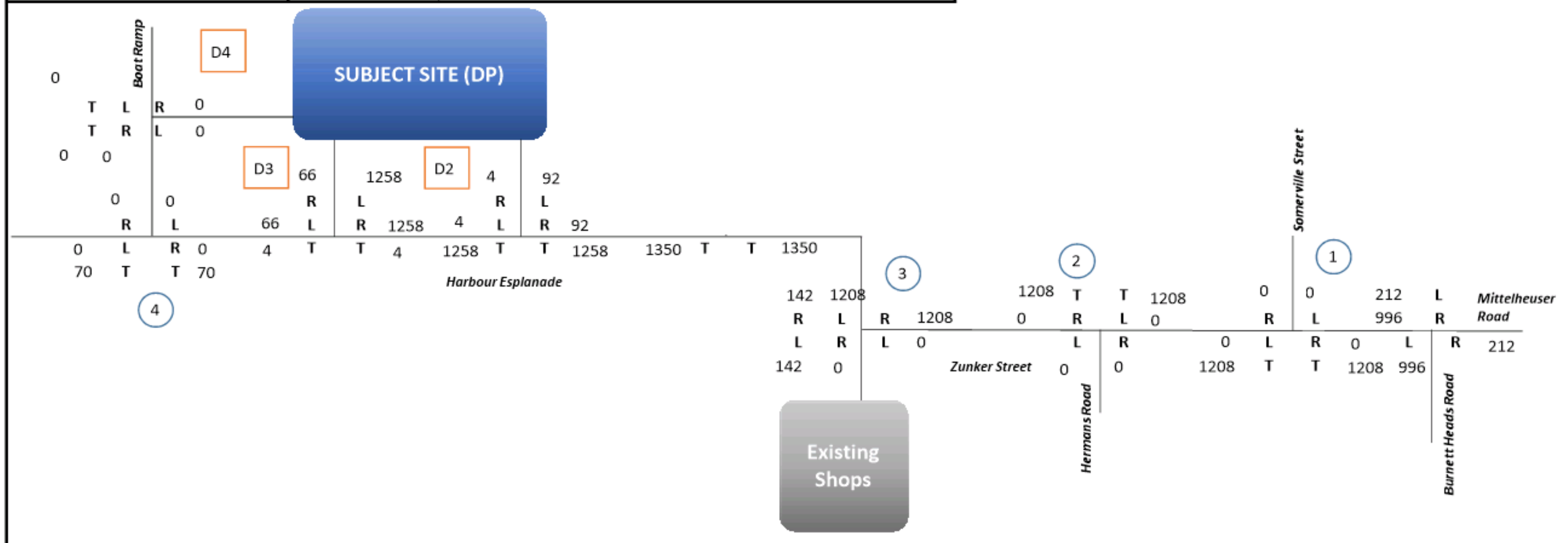
Marina Development - Bundaberg	
Figure	Figure 15
Scenario	Development Traffic DP Ultimate - Saturday Noon
Project No	13101
Date	4/10/2019



Marina Development - Bundaberg	
Figure	Figure 16
Scenario	Development Traffic DP Ultimate - Daily
Project No	13101
Date	4/10/2019



Marina Development - Bundaberg	
Figure	Figure 17
Scenario	2026 Weekday AM - Design Volumes DP
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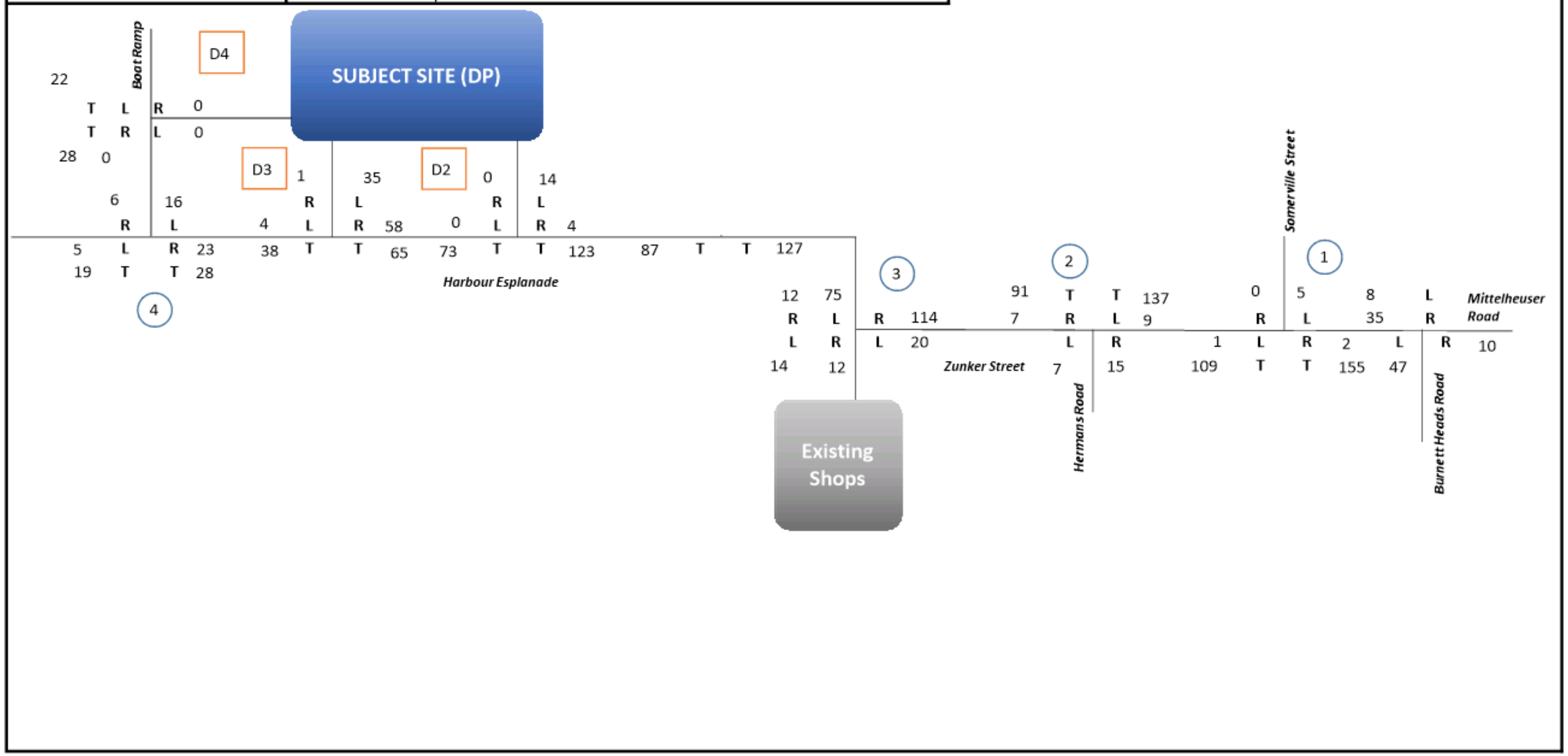
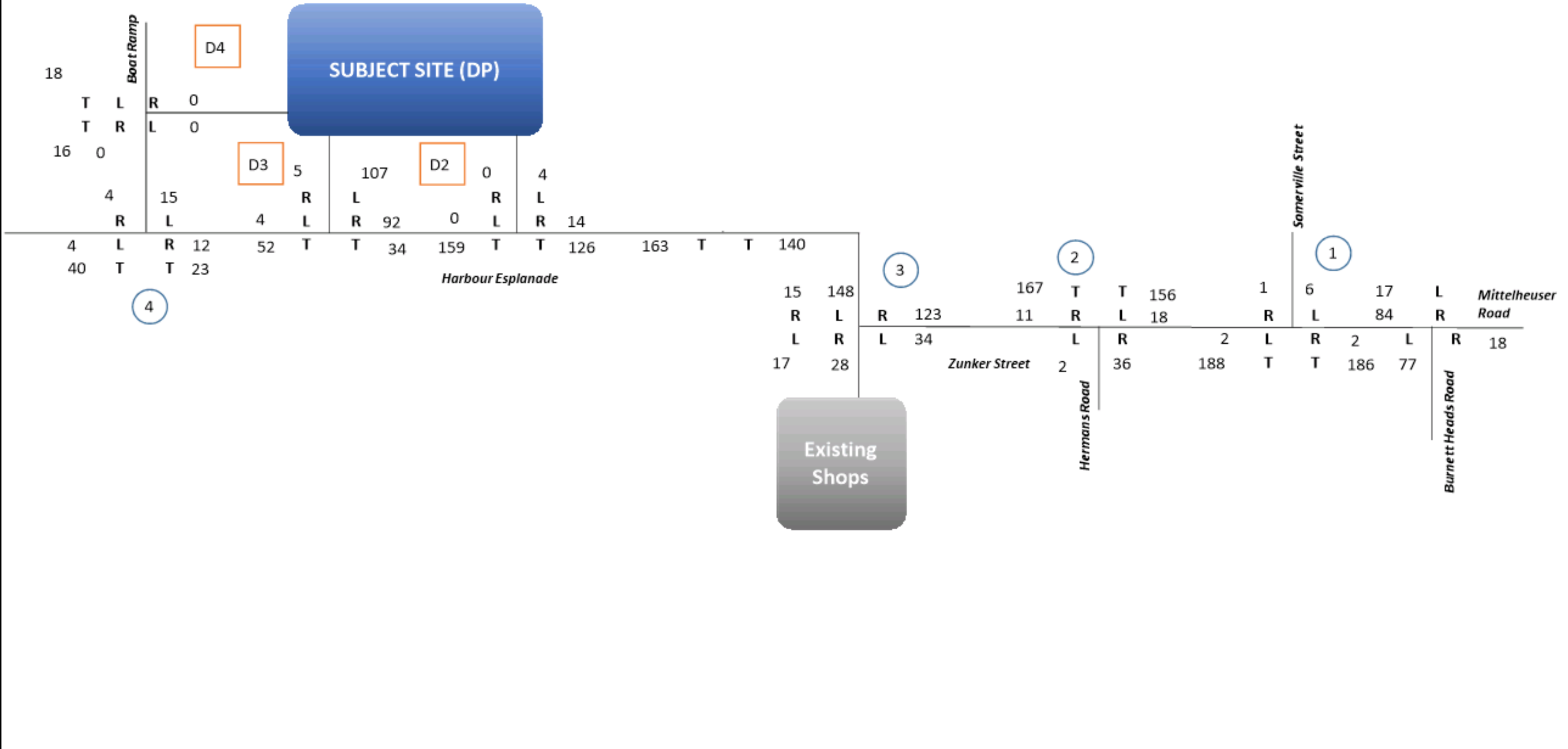


Marina Development - Bundaberg

Figure	Figure 18
Scenario	2026 Weekday PM - Design Volumes DP
Project No	13101
Date	4/10/2019



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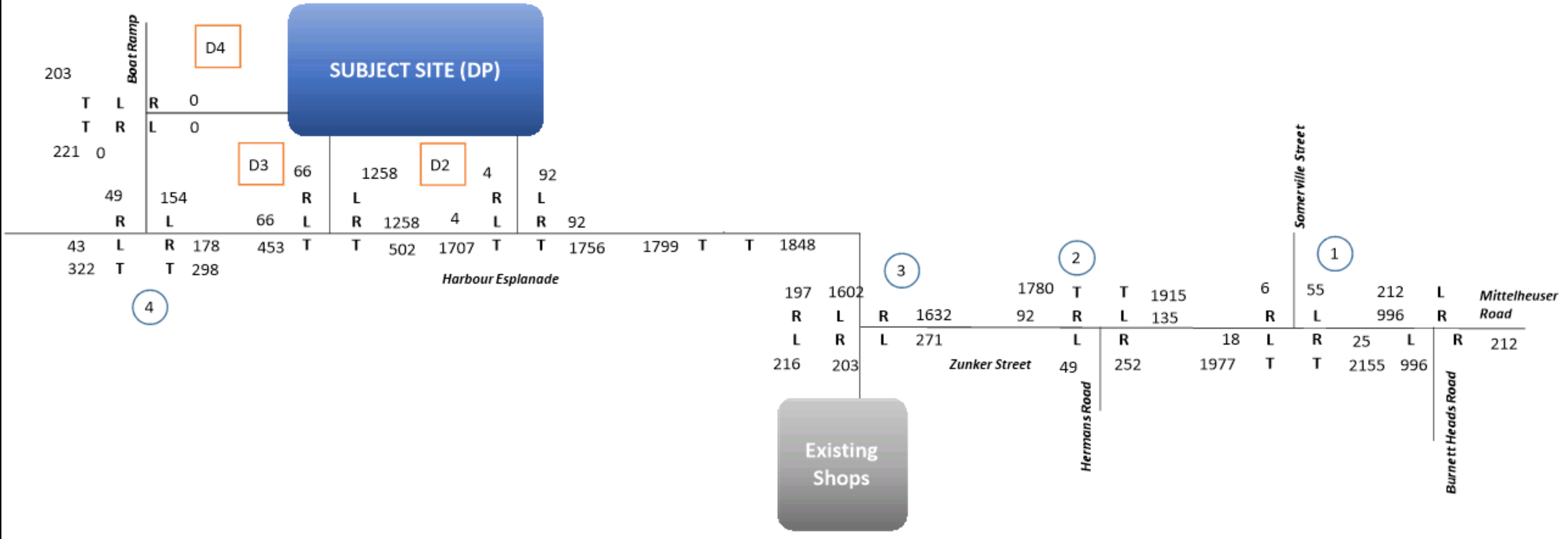
Marina Development - Bundaberg	
Figure	Figure 19
Scenario	2026 Saturday Noon - Design Volumes DP
Project No	13101
Date	4/10/2019

Marina Development - Bundaberg	
Figure	Figure 20
Scenario	2026 Daily - Design Volumes DP
Project No	13101
Date	4/10/2019



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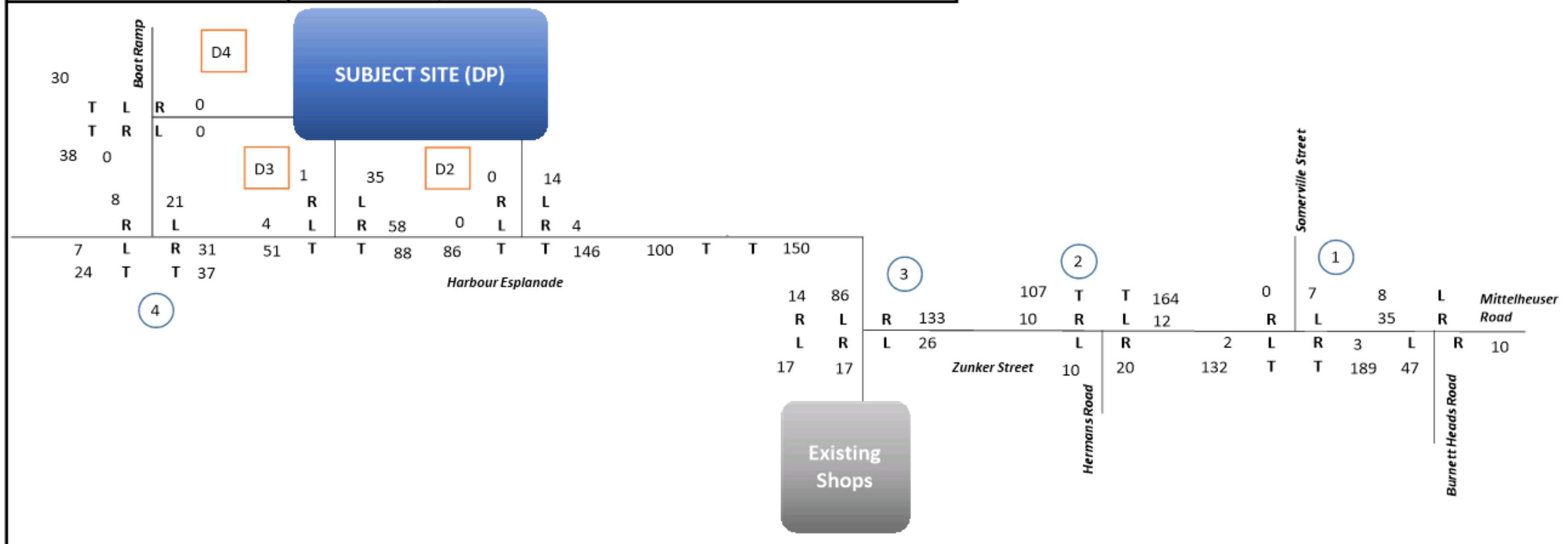
Marina Development - Bundaberg	
Figure	Figure 21
Scenario	2036 Weekday AM - Design Volumes DP
Project No	13101
Date	4/10/2019



Marina Development - Bundaberg

Figure	Figure 22
Scenario	2036 Weekday PM - Design Volumes DP
Project No	13101
Date	4/10/2019

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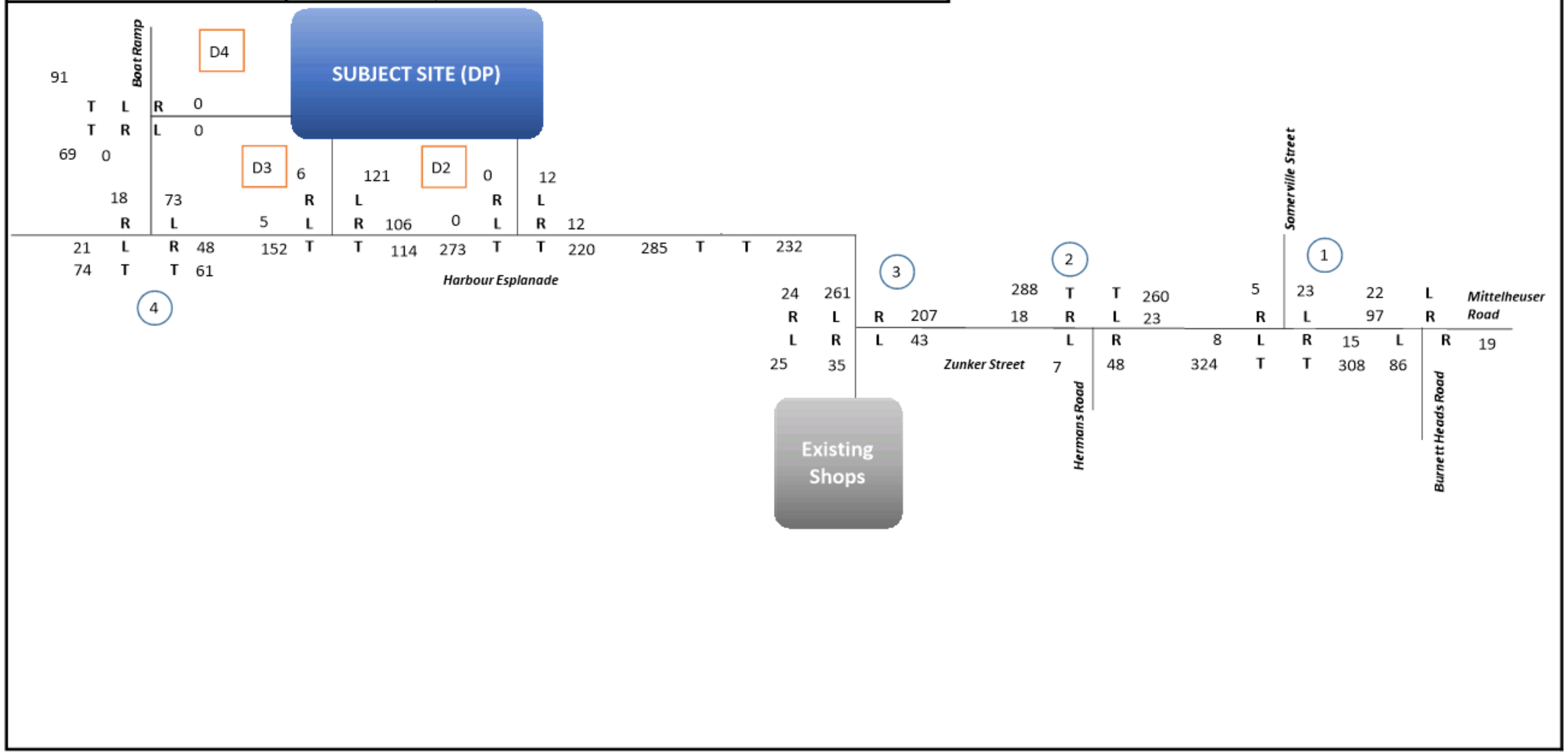
Marina Development - Bundaberg	
Figure	Figure 23
Scenario	2036 Saturday Noon - Design Volumes DP
Project No	13101
Date	4/10/2019



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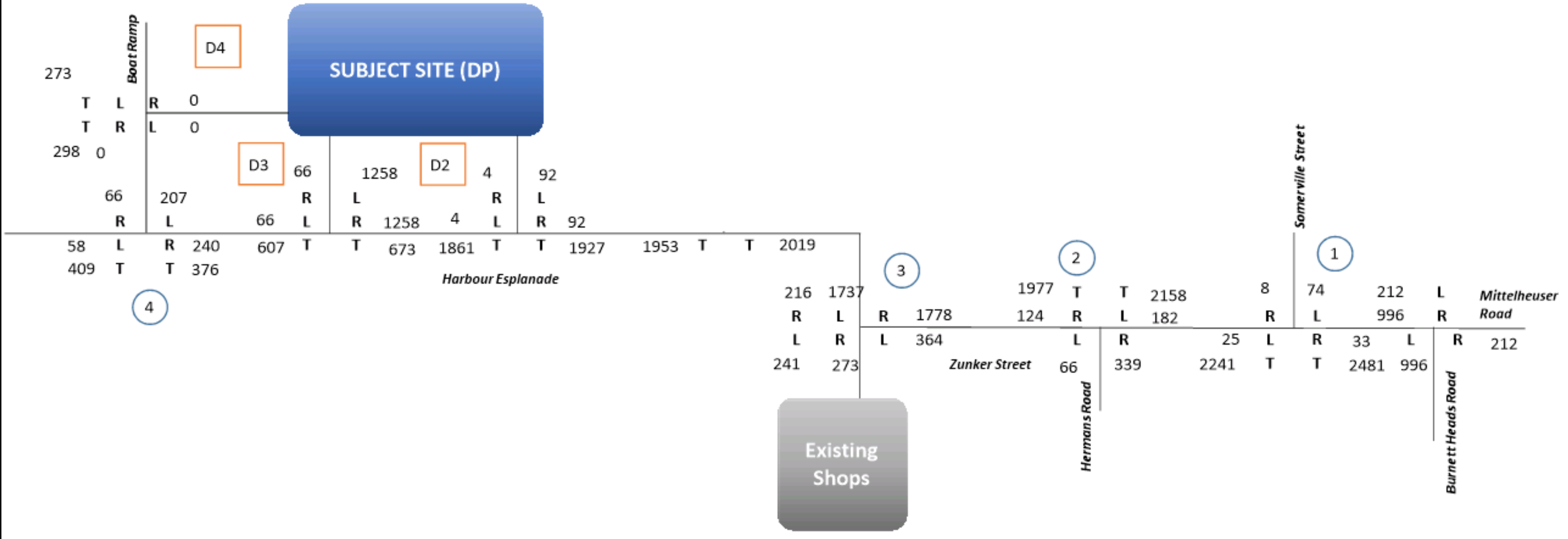
Marina Development - Bundaberg	
Figure	Figure 24
Scenario	2036 Daily - Design Volumes DP
Project No	13101
Date	4/10/2019



Appendix E Car parking supplementary tables

Table A		
Council	**Use**	**Requirement**
Fraser Coast Regional Council	Indoor sport and recreation	1 space per 20 m² total use area
Gladstone Regional Council	Indoor sport and recreation: gymnasium	1 space per 20m² GFA
Livingstone Regional Council	Gymnasium	1 space per 20m² GFA

Table B (Extracted from SKM report – *Rose Bay and Point Piper Marinas – Independent Review and Traffic Report* (Oct 2007))

Marina	**Season**	**Boats used per berth**	**Parking demand per berth**	**Boats used per mooring**	**Parking demand per mooring**
Rose Bay	Autumn 2000	0.143	**0.175**	0.193	0.295
Rose Bay	Summer 2000/1	0.153	**0.238**	0.225	0.362
Point Piper	Autumn 2000	0.111	**0.114**	0.083	0.121
Rose Bay and Point Piper combined	Winter 2006	0.055	**0.067**	0.068	0.071
Rose Bay + Point Piper	Spring-Summer 2006	0.036	**0.054**	0.072	0.069
Broken Bay	Winter 2006	0.045	**0.048**	-	-
Double Bay	Easter 2006	0.11	**0.212**	0.33	0.37
Double Bay	December 2006	0.15	**0.144**	0.2	0.24
Rose Bay and Point Piper combined	December 2006 - January 2007	0.07	**0.094**	0.081	0.086
Rose Bay and Point Piper combined	Summer	0.111	**0.166**	0.153	0.224
		Average	**0.130**		

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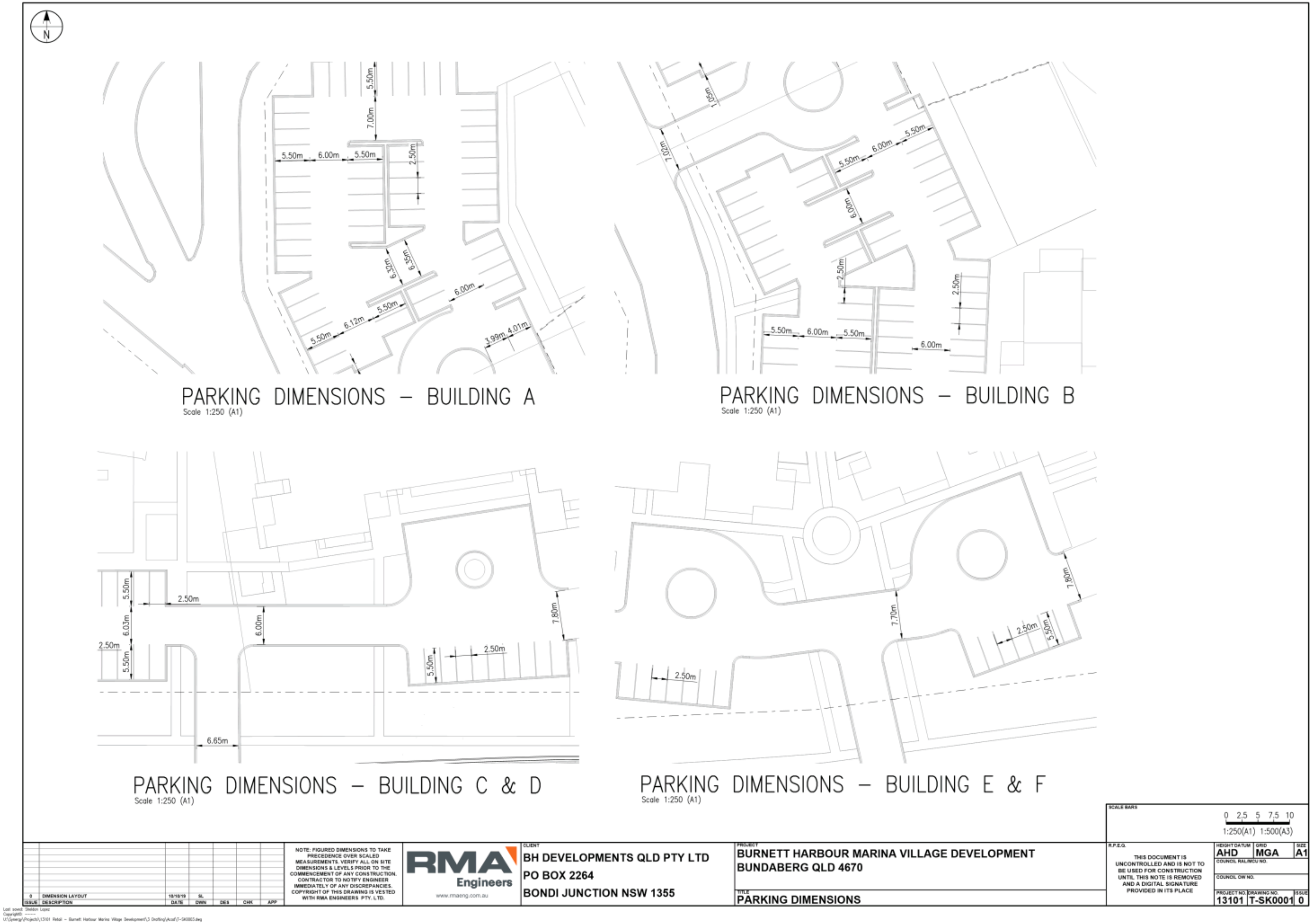
Appendix F Internal layout review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Scale 1:250 (A1)
PARKING DIMENSIONS – BUILDING B
Scale 1:250 (A1)
PARKING DIMENSIONS – BUILDING C & D
Scale 1:250 (A1)
PARKING DIMENSIONS – BUILDING E & F
Scale 1:250 (A1)
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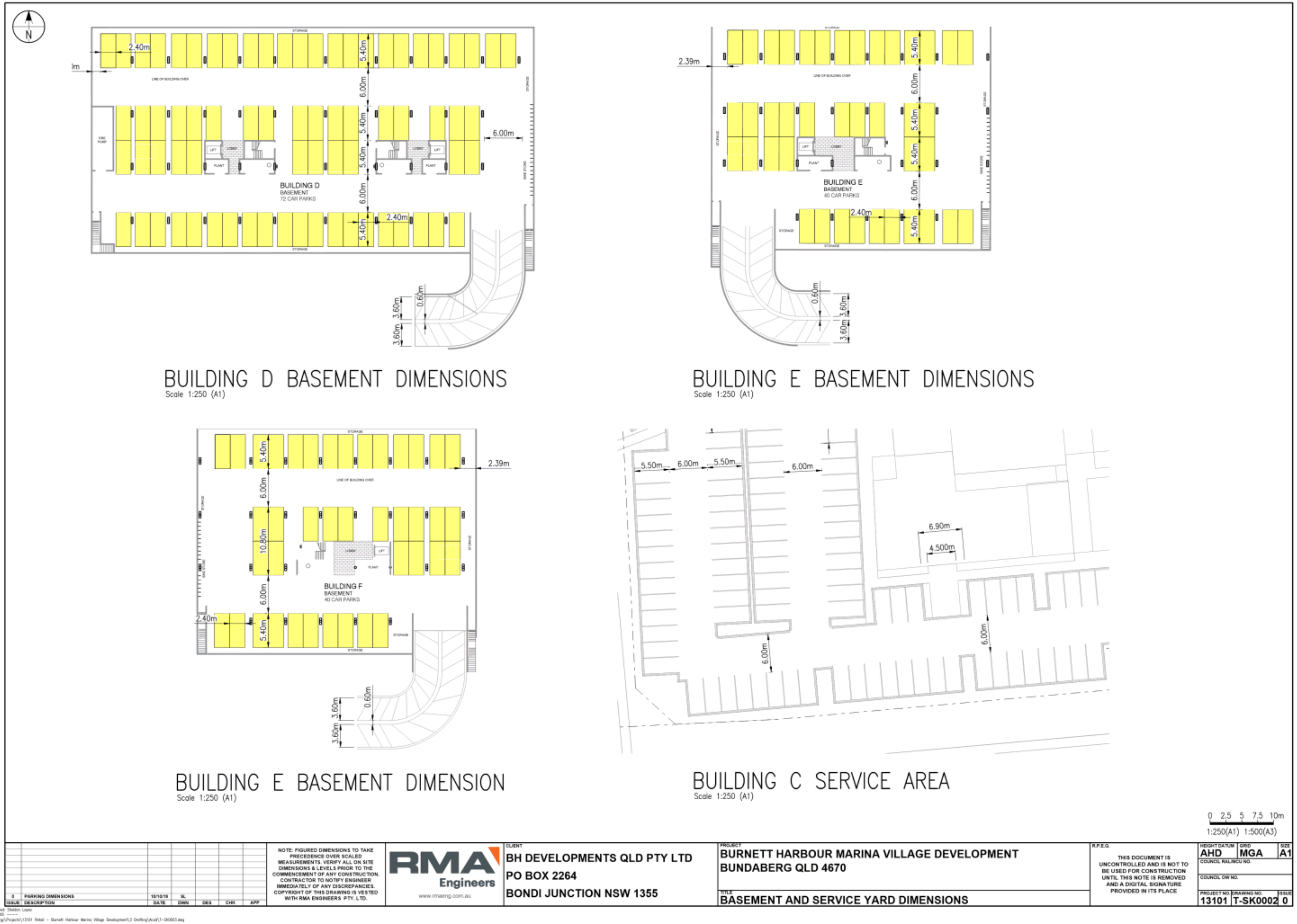
PARKING DIMENSIONS
AHD
MGA
A1
13101
T-SK0001
0
DIMENSION LAYOUT
1:250(A1) 1:500(A3)



BUILDING D BASEMENT DIMENSIONS
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BUILDING D
BASEMENT
72 CAR PARKS
2.40m
5.40m
6.00m
6.00m
3.60m
0.60m
BUILDING E BASEMENT DIMENSIONS
Scale 1:250 (A1)
BUILDING E
BASEMENT
40 CAR PARKS
2.39m
BUILDING E BASEMENT DIMENSION
Scale 1:250 (A1)
BUILDING F
BASEMENT
40 CAR PARKS
10.80m
BUILDING C SERVICE AREA
Scale 1:250 (A1)
5.50m
6.90m
4.500m
0 2.5 5 7.5 10m
1:250(A1) 1:500(A3)
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BASEMENT AND SERVICE YARD DIMENSIONS
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SIZE A1
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0 PARKING DIMENSIONS 10/10/19 SL
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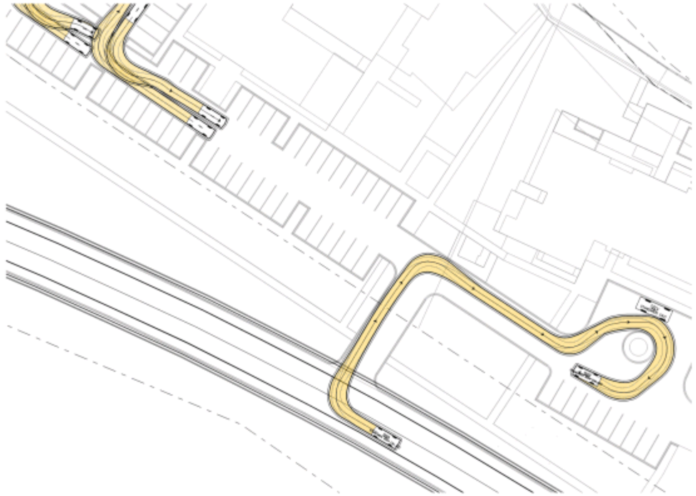
B99 SWEPT PATH – BUILDING B
Scale 1:250 (A1)



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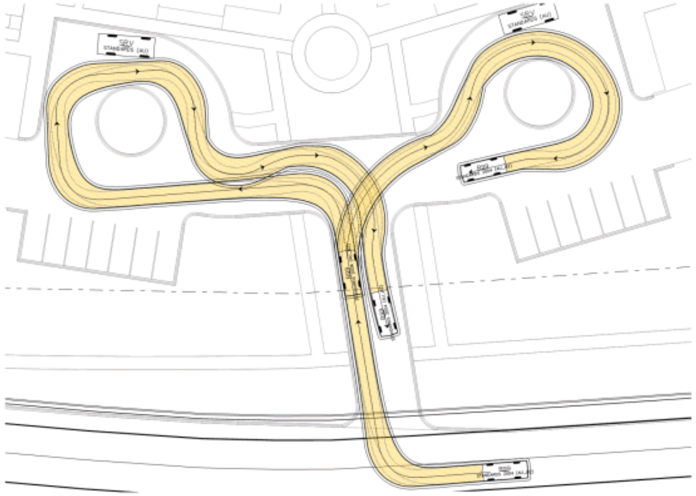

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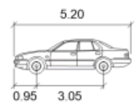

B99

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Steering Angle	: 33.9

SCALE BARS
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1:250(A1) 1:500(A3)

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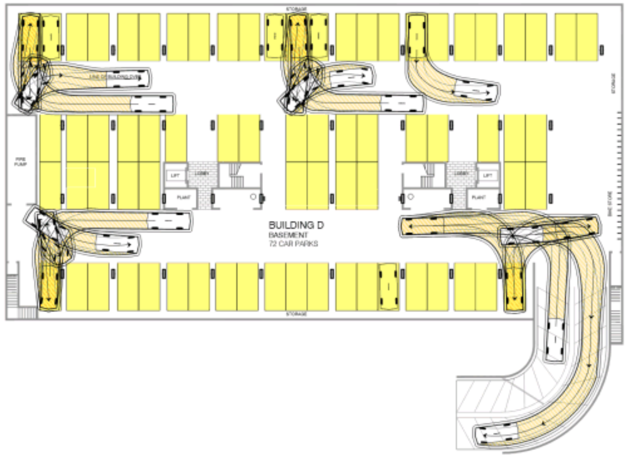

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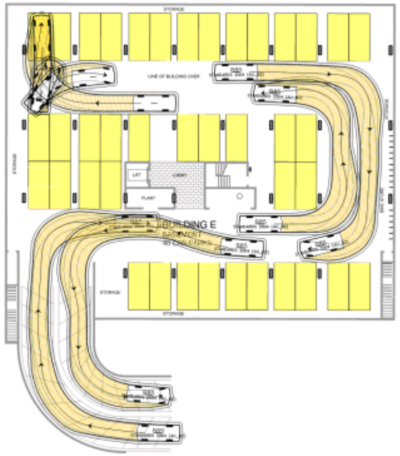

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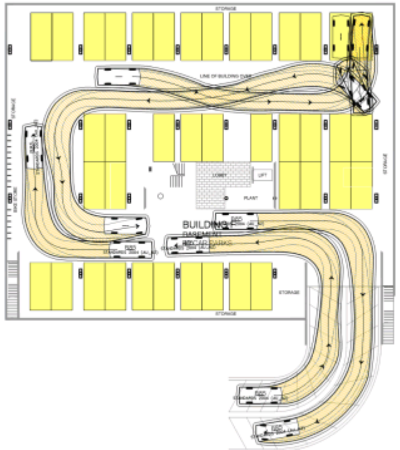

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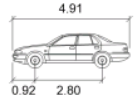

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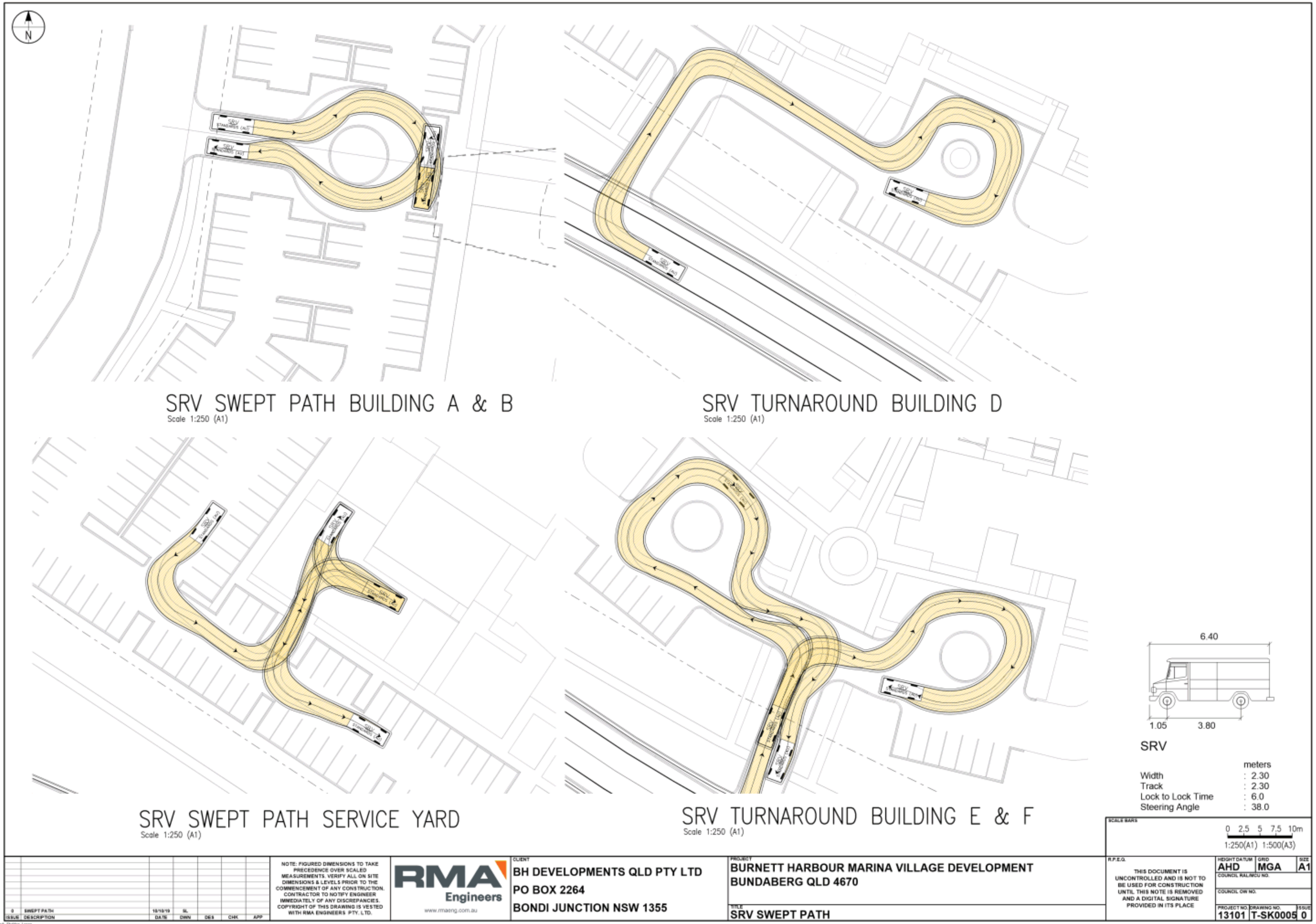
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SRV TURNAROUND BUILDING D
Scale 1:250 (A1)
SRV SWEPT PATH SERVICE YARD
Scale 1:250 (A1)
SRV TURNAROUND BUILDING E & F
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1.05
3.80
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Track : 2.30
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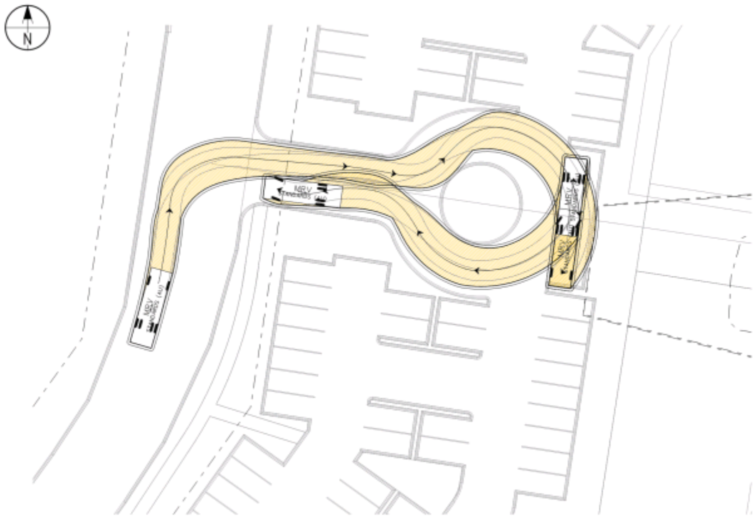

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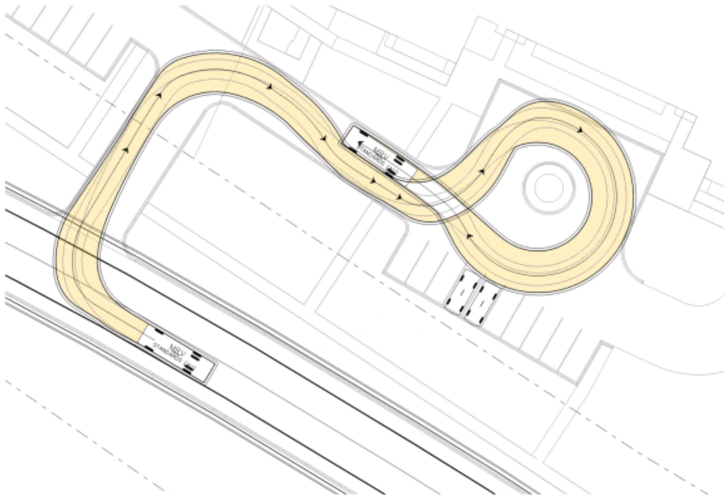

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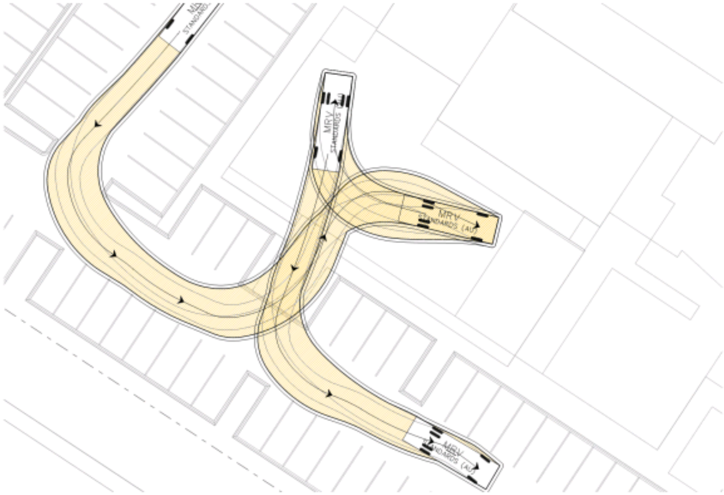

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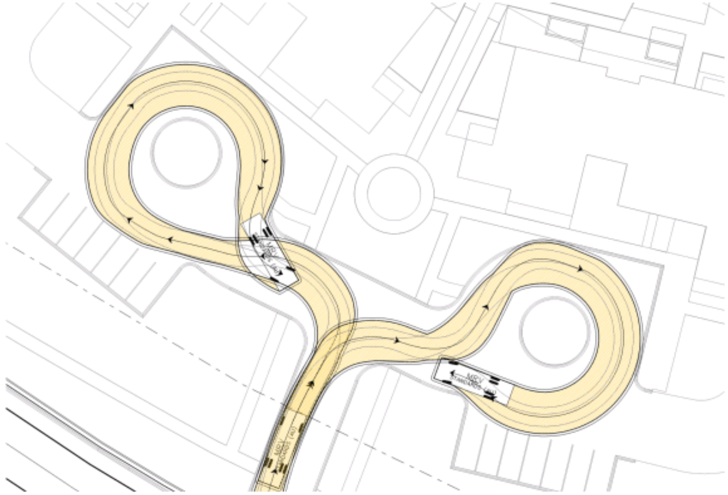

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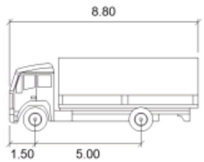

MRV

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SCALE BARS
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1:250(A1) 1:500(A3)

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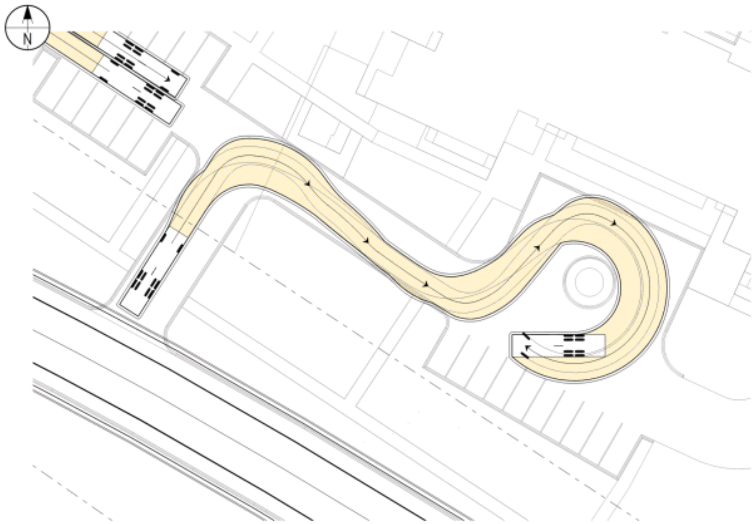

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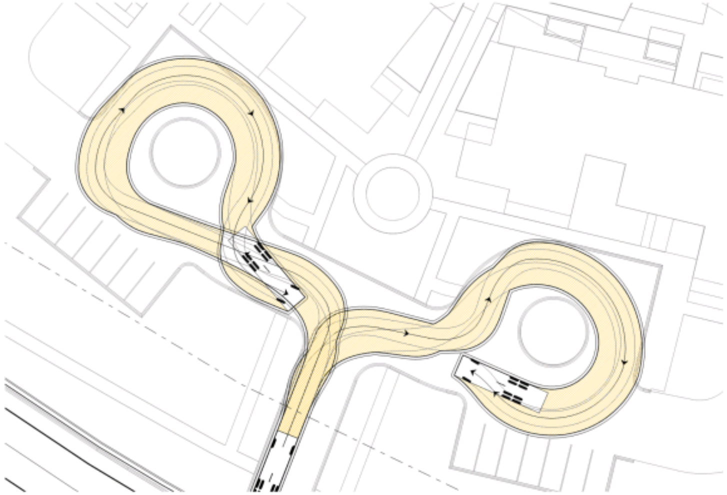

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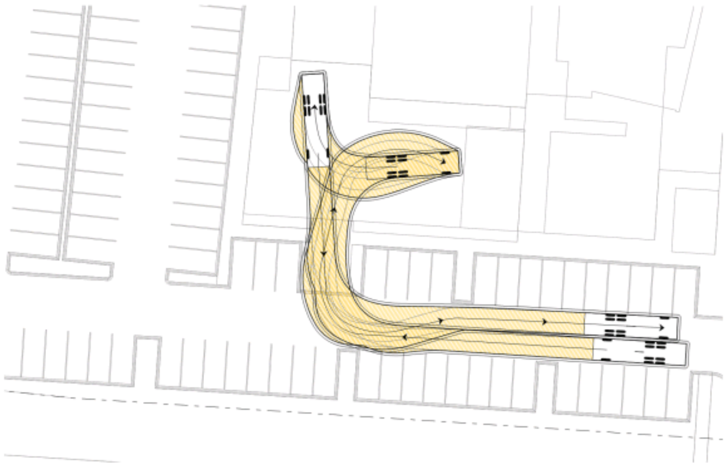

FRONT LOAD RCV SERVICE YARD
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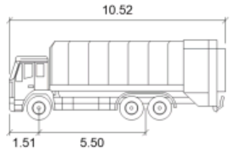

BCC ACCO 2350 Front Lift Refuse

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Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

SCALE BARS

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1:250(A1) 1:500(A3)

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HRV FUEL TANKER
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ISSUE	DESCRIPTION	DATE	DWN	DES	CHK	APP
0	SWEPT PATH	10/10/19	SL			

NOTE: FIGURED DIMENSIONS TO TAKE PRECEDENCE OVER SCALED MEASUREMENTS. VERIFY ALL ON SITE DIMENSIONS & LEVELS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

RMA Engineers
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CLIENT
BH DEVELOPMENTS QLD PTY LTD
PO BOX 2264
BONDI JUNCTION NSW 1355

PROJECT
BURNETT HARBOUR MARINA VILLAGE DEVELOPMENT
BUNDABERG QLD 4670

TITLE
HRV SWEPT PATH

R.P.E.Q.
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HEIGHT DATUM	GRID	SIZE
AHD	MGA	A1

COUNCIL RAL/MCU NO.
COUNCIL OW NO.

PROJECT NO.	DRAWING NO.	ISSUE
13101	T-SK0008	0

Last saved: Sheldon Lopez
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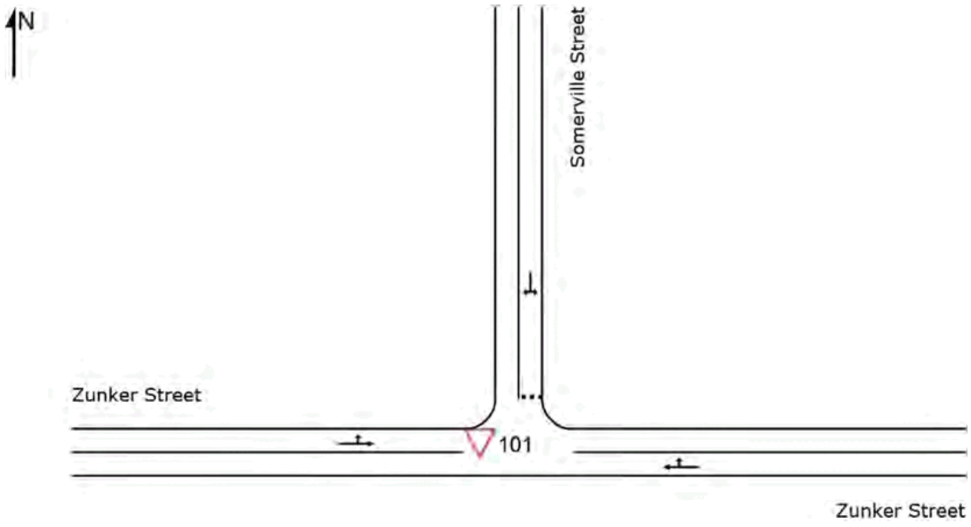
U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\3 Drafting\Acad\T-SK0003.dwg

Appendix G SIDRA Outputs

SITE LAYOUT

Site: 101 [2036 Base - Weekday AM]

Somerville Street / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 101 [2036 Base - Weekday AM]

Somerville Street / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
5	T1	139	5.0	0.076	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.9
6	R2	3	5.0	0.076	4.9	LOS A	0.0	0.2	0.01	0.01	0.01	48.8
Approach		142	5.0	0.076	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.9
North: Somerville Street												
7	L2	7	5.0	0.007	4.9	LOS A	0.0	0.2	0.20	0.50	0.20	46.1
9	R2	1	5.0	0.007	5.8	LOS A	0.0	0.2	0.20	0.50	0.20	45.7
Approach		8	5.0	0.007	5.1	LOS A	0.0	0.2	0.20	0.50	0.20	46.0
West: Zunker Street												
10	L2	2	5.0	0.051	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
11	T1	94	5.0	0.051	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		96	5.0	0.051	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		246	5.0	0.076	0.3	NA	0.0	0.2	0.01	0.03	0.01	49.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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: C:\Users\dina.delac\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\JOPL6UTJ\Somerville_Zunker - DP.sip8

MOVEMENT SUMMARY

▽ Site: 101 [2036 Base - Weekday PM]

Somerville Street / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
5	T1	128	5.0	0.070	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.9
6	R2	3	5.0	0.070	5.0	LOS A	0.0	0.2	0.01	0.01	0.01	48.8
Approach		132	5.0	0.070	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.9
North: Somerville Street												
7	L2	8	5.0	0.009	5.1	LOS A	0.0	0.3	0.24	0.51	0.24	46.0
9	R2	2	5.0	0.009	5.9	LOS A	0.0	0.3	0.24	0.51	0.24	45.6
Approach		11	5.0	0.009	5.2	LOS A	0.0	0.3	0.24	0.51	0.24	45.9
West: Zunker Street												
10	L2	3	5.0	0.067	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.3
11	T1	123	5.0	0.067	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		126	5.0	0.067	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		268	5.0	0.070	0.3	NA	0.0	0.3	0.02	0.03	0.02	49.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 101 [2036 Base - Saturday Midday]

Somerville Street / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
5	T1	214	5.0	0.125	0.1	LOS A	0.1	0.9	0.06	0.04	0.06	49.6
6	R2	16	5.0	0.125	5.5	LOS A	0.1	0.9	0.06	0.04	0.06	48.6
Approach		229	5.0	0.125	0.5	NA	0.1	0.9	0.06	0.04	0.06	49.5
North: Somerville Street												
7	L2	24	5.0	0.029	5.5	LOS A	0.1	0.8	0.34	0.55	0.34	45.8
9	R2	5	5.0	0.029	7.4	LOS A	0.1	0.8	0.34	0.55	0.34	45.3
Approach		29	5.0	0.029	5.8	LOS A	0.1	0.8	0.34	0.55	0.34	45.7
West: Zunker Street												
10	L2	8	5.0	0.119	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	49.3
11	T1	216	5.0	0.119	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.9
Approach		224	5.0	0.119	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.8
All Vehicles		483	5.0	0.125	0.7	NA	0.1	0.9	0.05	0.06	0.05	49.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

▽ Site: 101 [2036 Design - Weekday AM]

Somerville Street / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
5	T1	199	5.0	0.107	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.9
6	R2	3	5.0	0.107	5.1	LOS A	0.0	0.2	0.01	0.01	0.01	48.9
Approach		202	5.0	0.107	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.9
North: Somerville Street												
7	L2	7	5.0	0.007	5.1	LOS A	0.0	0.2	0.25	0.51	0.25	46.0
9	R2	1	5.0	0.007	6.5	LOS A	0.0	0.2	0.25	0.51	0.25	45.5
Approach		8	5.0	0.007	5.3	LOS A	0.0	0.2	0.25	0.51	0.25	45.9
West: Zunker Street												
10	L2	2	5.0	0.075	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
11	T1	139	5.0	0.075	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		141	5.0	0.075	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		352	5.0	0.107	0.2	NA	0.0	0.2	0.01	0.02	0.01	49.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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.

MOVEMENT SUMMARY

Site: 101 [2036 Design - Weekday PM]

Somerville Street / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
5	T1	228	5.0	0.123	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.9
6	R2	3	5.0	0.123	5.5	LOS A	0.0	0.2	0.01	0.01	0.01	48.9
Approach		232	5.0	0.123	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.9
North: Somerville Street												
7	L2	8	5.0	0.011	5.5	LOS A	0.0	0.3	0.35	0.54	0.35	45.7
9	R2	2	5.0	0.011	7.4	LOS A	0.0	0.3	0.35	0.54	0.35	45.3
Approach		11	5.0	0.011	5.9	LOS A	0.0	0.3	0.35	0.54	0.35	45.7
West: Zunker Street												
10	L2	3	5.0	0.123	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.4
11	T1	229	5.0	0.123	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		233	5.0	0.123	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		475	5.0	0.123	0.2	NA	0.0	0.3	0.01	0.02	0.01	49.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

▽ Site: 101 [2036 Design - Saturday Midday]

Somerville Street / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
5	T1	324	5.0	0.185	0.1	LOS A	0.2	1.2	0.06	0.03	0.06	49.7
6	R2	16	5.0	0.185	6.2	LOS A	0.2	1.2	0.06	0.03	0.06	48.6
Approach		340	5.0	0.185	0.4	NA	0.2	1.2	0.06	0.03	0.06	49.6
North: Somerville Street												
7	L2	24	5.0	0.036	6.2	LOS A	0.1	0.9	0.44	0.62	0.44	45.3
9	R2	5	5.0	0.036	9.8	LOS A	0.1	0.9	0.44	0.62	0.44	44.8
Approach		29	5.0	0.036	6.8	LOS A	0.1	0.9	0.44	0.62	0.44	45.2
West: Zunker Street												
10	L2	8	5.0	0.185	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.3
11	T1	341	5.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		349	5.0	0.185	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		719	5.0	0.185	0.5	NA	0.2	1.2	0.04	0.04	0.04	49.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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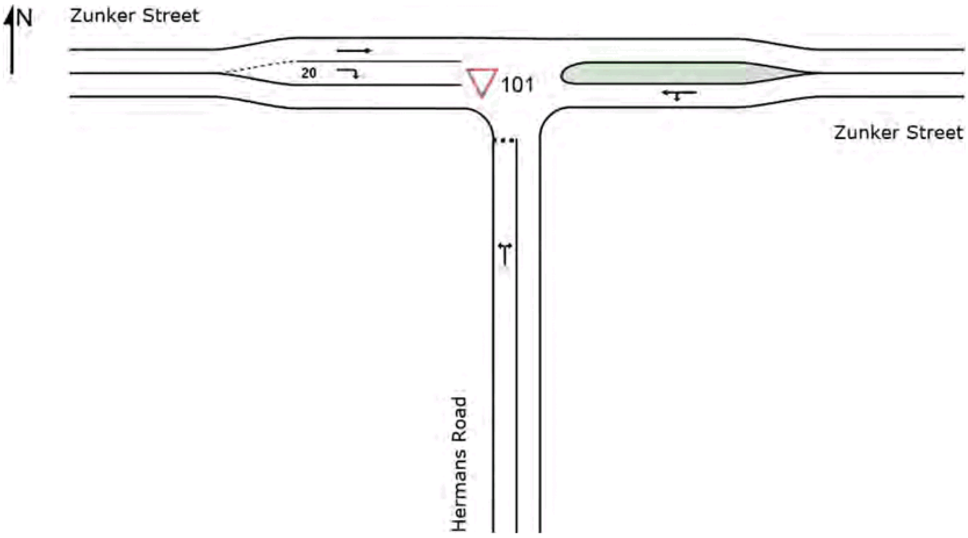
SITE LAYOUT

▽ Site: 101 [2036 Base - Weekday AM]

Hermans Road / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)



Organisation: RMA ENGINEERS PTY LTD | Created: Friday, 25 October 2019 10:07:02 AM
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MOVEMENT SUMMARY

Site: 101 [2036 Base - Weekday AM]

Hermans Road / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Hermans Road												
1	L2	11	3.0	0.030	3.8	LOS A	0.1	0.8	0.26	0.49	0.26	38.3
3	R2	21	3.0	0.030	4.5	LOS A	0.1	0.8	0.26	0.49	0.26	37.9
Approach		32	3.0	0.030	4.3	LOS A	0.1	0.8	0.26	0.49	0.26	38.0
East: Zunker Street												
4	L2	13	3.0	0.066	3.4	LOS A	0.0	0.0	0.00	0.05	0.00	40.0
5	T1	113	3.0	0.066	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	39.8
Approach		125	3.0	0.066	0.4	NA	0.0	0.0	0.00	0.05	0.00	39.9
West: Zunker Street												
11	T1	67	3.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
12	R2	11	3.0	0.007	3.9	LOS A	0.0	0.2	0.23	0.46	0.23	38.0
Approach		78	3.0	0.036	0.5	NA	0.0	0.2	0.03	0.06	0.03	39.7
All Vehicles		235	3.0	0.066	0.9	NA	0.1	0.8	0.05	0.11	0.05	39.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

▽ Site: 101 [2036 Base - Weekday PM]

Hermans Road / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Hermans Road												
1	L2	3	3.0	0.056	3.8	LOS A	0.2	1.5	0.30	0.52	0.30	38.2
3	R2	51	3.0	0.056	4.6	LOS A	0.2	1.5	0.30	0.52	0.30	37.9
Approach		54	3.0	0.056	4.6	LOS A	0.2	1.5	0.30	0.52	0.30	37.9
East: Zunker Street												
4	L2	26	3.0	0.060	3.4	LOS A	0.0	0.0	0.00	0.11	0.00	39.8
5	T1	87	3.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	39.7
Approach		114	3.0	0.060	0.8	NA	0.0	0.0	0.00	0.11	0.00	39.7
West: Zunker Street												
11	T1	94	3.0	0.049	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
12	R2	16	3.0	0.010	3.9	LOS A	0.0	0.3	0.22	0.46	0.22	38.0
Approach		109	3.0	0.049	0.6	NA	0.0	0.3	0.03	0.07	0.03	39.7
All Vehicles		277	3.0	0.060	1.4	NA	0.2	1.5	0.07	0.17	0.07	39.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

▽ Site: 101 [2036 Base - Saturday Midday]

Hermans Road / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Hermans Road												
1	L2	7	3.0	0.070	4.1	LOS A	0.3	1.8	0.40	0.59	0.40	37.9
3	R2	51	3.0	0.070	5.7	LOS A	0.3	1.8	0.40	0.59	0.40	37.5
Approach		58	3.0	0.070	5.5	LOS A	0.3	1.8	0.40	0.59	0.40	37.6
East: Zunker Street												
4	L2	24	3.0	0.099	3.4	LOS A	0.0	0.0	0.00	0.06	0.00	39.9
5	T1	163	3.0	0.099	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.8
Approach		187	3.0	0.099	0.5	NA	0.0	0.0	0.00	0.06	0.00	39.8
West: Zunker Street												
11	T1	178	3.0	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
12	R2	19	3.0	0.013	4.1	LOS A	0.1	0.4	0.29	0.48	0.29	37.9
Approach		197	3.0	0.094	0.4	NA	0.1	0.4	0.03	0.05	0.03	39.8
All Vehicles		442	3.0	0.099	1.1	NA	0.3	1.8	0.06	0.12	0.06	39.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 101 [2036 Design - Weekday AM]

Hermans Road / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Hermans Road												
1	L2	11	3.0	0.034	4.1	LOS A	0.1	0.9	0.33	0.53	0.33	38.1
3	R2	21	3.0	0.034	5.1	LOS A	0.1	0.9	0.33	0.53	0.33	37.8
Approach		32	3.0	0.034	4.8	LOS A	0.1	0.9	0.33	0.53	0.33	37.9
East: Zunker Street												
4	L2	13	3.0	0.097	3.4	LOS A	0.0	0.0	0.00	0.03	0.00	40.0
5	T1	173	3.0	0.097	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	39.9
Approach		185	3.0	0.097	0.2	NA	0.0	0.0	0.00	0.03	0.00	39.9
West: Zunker Street												
11	T1	113	3.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
12	R2	11	3.0	0.007	4.1	LOS A	0.0	0.2	0.29	0.47	0.29	37.9
Approach		123	3.0	0.059	0.4	NA	0.0	0.2	0.02	0.04	0.02	39.8
All Vehicles		340	3.0	0.097	0.7	NA	0.1	0.9	0.04	0.08	0.04	39.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 101 [2036 Design - Weekday PM]

Hermans Road / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
South: Hermans Road												
1	L2	3	3.0	0.071	4.2	LOS A	0.3	1.8	0.44	0.62	0.44	37.7
3	R2	51	3.0	0.071	6.0	LOS A	0.3	1.8	0.44	0.62	0.44	37.4
Approach		54	3.0	0.071	5.9	LOS A	0.3	1.8	0.44	0.62	0.44	37.4
East: Zunker Street												
4	L2	26	3.0	0.112	3.4	LOS A	0.0	0.0	0.00	0.06	0.00	39.9
5	T1	187	3.0	0.112	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.8
Approach		214	3.0	0.112	0.4	NA	0.0	0.0	0.00	0.06	0.00	39.8
West: Zunker Street												
11	T1	200	3.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
12	R2	16	3.0	0.011	4.2	LOS A	0.0	0.3	0.31	0.48	0.31	37.9
Approach		216	3.0	0.106	0.3	NA	0.0	0.3	0.02	0.04	0.02	39.8
All Vehicles		483	3.0	0.112	1.0	NA	0.3	1.8	0.06	0.11	0.06	39.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 101 [2036 Design - Saturday Midday]

Hermans Road / Zunker Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Hermans Road												
1	L2	7	3.0	0.094	4.6	LOS A	0.3	2.4	0.52	0.71	0.52	37.1
3	R2	51	3.0	0.094	7.8	LOS A	0.3	2.4	0.52	0.71	0.52	36.8
Approach		58	3.0	0.094	7.4	LOS A	0.3	2.4	0.52	0.71	0.52	36.9
East: Zunker Street												
4	L2	24	3.0	0.156	3.4	LOS A	0.0	0.0	0.00	0.04	0.00	40.0
5	T1	274	3.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	39.9
Approach		298	3.0	0.156	0.3	NA	0.0	0.0	0.00	0.04	0.00	39.9
West: Zunker Street												
11	T1	303	3.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
12	R2	19	3.0	0.014	4.5	LOS A	0.1	0.4	0.38	0.51	0.38	37.8
Approach		322	3.0	0.159	0.3	NA	0.1	0.4	0.02	0.03	0.02	39.8
All Vehicles		678	3.0	0.159	0.9	NA	0.3	2.4	0.05	0.09	0.05	39.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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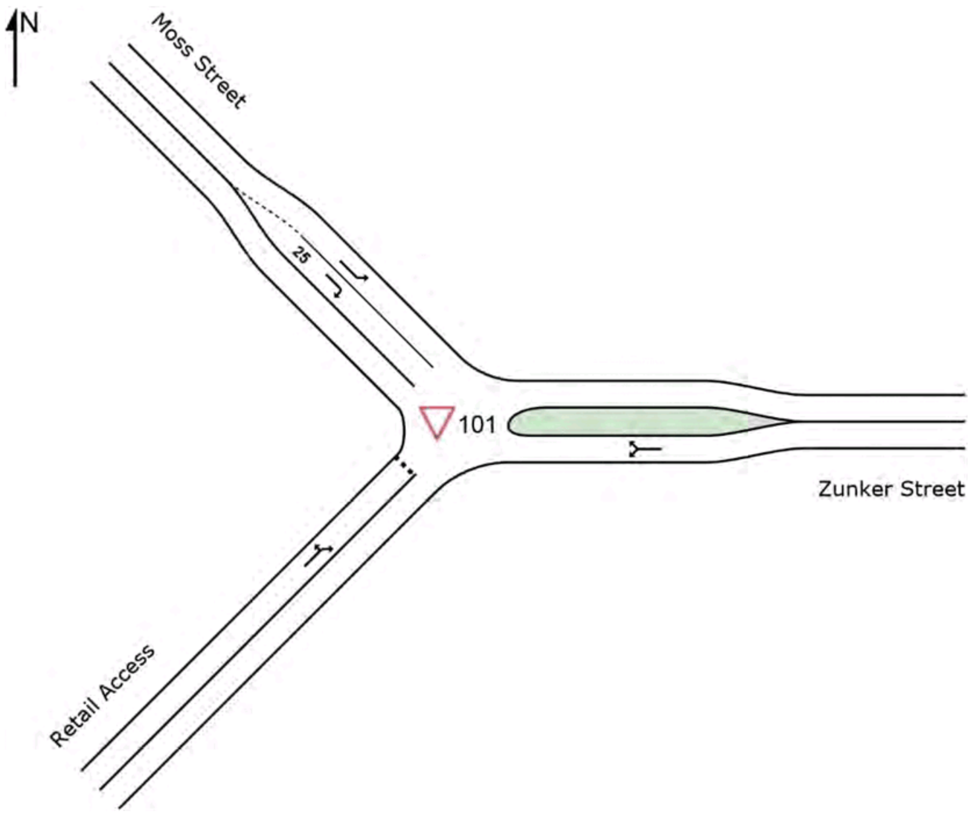
SITE LAYOUT

Site: 101 [2036 Base - Weekday AM]

Moss Street / Zunker Street / Retail Access
Site Category: (None)
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 101 [2036 Base - Weekday AM]

Moss Street / Zunker Street / Retail Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
4a	L1	27	3.0	0.057	3.4	LOS A	0.0	0.0	0.00	0.44	0.00	38.6
6a	R1	80	3.0	0.057	2.8	LOS A	0.0	0.0	0.00	0.44	0.00	38.7
Approach		107	3.0	0.057	2.9	NA	0.0	0.0	0.00	0.44	0.00	38.7
NorthWest: Moss Street												
27a	L1	45	3.0	0.024	3.4	LOS A	0.0	0.0	0.00	0.48	0.00	38.4
29	R2	8	3.0	0.005	3.8	LOS A	0.0	0.2	0.18	0.46	0.18	38.1
Approach		54	3.0	0.024	3.5	NA	0.0	0.2	0.03	0.48	0.03	38.3
SouthWest: Retail Access												
30	L2	13	3.0	0.027	3.7	LOS A	0.1	0.7	0.21	0.45	0.21	38.5
32a	R1	18	3.0	0.027	3.7	LOS A	0.1	0.7	0.21	0.45	0.21	38.2
Approach		31	3.0	0.027	3.7	LOS A	0.1	0.7	0.21	0.45	0.21	38.3
All Vehicles		192	3.0	0.057	3.2	NA	0.1	0.7	0.04	0.45	0.04	38.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 101 [2036 Base - Weekday PM]

Moss Street / Zunker Street / Retail Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
4a	L1	48	3.0	0.047	3.4	LOS A	0.0	0.0	0.00	0.46	0.00	38.5
6a	R1	40	3.0	0.047	2.8	LOS A	0.0	0.0	0.00	0.46	0.00	38.6
Approach		88	3.0	0.047	3.1	NA	0.0	0.0	0.00	0.46	0.00	38.5
NorthWest: Moss Street												
27a	L1	66	3.0	0.035	3.4	LOS A	0.0	0.0	0.00	0.48	0.00	38.4
29	R2	7	3.0	0.004	3.7	LOS A	0.0	0.1	0.12	0.46	0.12	38.1
Approach		74	3.0	0.035	3.5	NA	0.0	0.1	0.01	0.48	0.01	38.3
SouthWest: Retail Access												
30	L2	8	3.0	0.045	3.6	LOS A	0.2	1.2	0.19	0.45	0.19	38.5
32a	R1	40	3.0	0.045	3.7	LOS A	0.2	1.2	0.19	0.45	0.19	38.3
Approach		48	3.0	0.045	3.7	LOS A	0.2	1.2	0.19	0.45	0.19	38.3
All Vehicles		211	3.0	0.047	3.4	NA	0.2	1.2	0.05	0.46	0.05	38.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

▽ Site: 101 [2036 Base - Saturday Midday]

Moss Street / Zunker Street / Retail Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
4a	L1	45	3.0	0.082	3.4	LOS A	0.0	0.0	0.00	0.44	0.00	38.5
6a	R1	107	3.0	0.082	2.8	LOS A	0.0	0.0	0.00	0.44	0.00	38.7
Approach		153	3.0	0.082	3.0	NA	0.0	0.0	0.00	0.44	0.00	38.7
NorthWest: Moss Street												
27a	L1	149	3.0	0.080	3.4	LOS A	0.0	0.0	0.00	0.48	0.00	38.4
29	R2	11	3.0	0.007	3.9	LOS A	0.0	0.2	0.21	0.46	0.21	38.0
Approach		160	3.0	0.080	3.5	NA	0.0	0.2	0.01	0.48	0.01	38.3
SouthWest: Retail Access												
30	L2	13	3.0	0.052	3.8	LOS A	0.2	1.4	0.30	0.50	0.30	38.3
32a	R1	37	3.0	0.052	4.6	LOS A	0.2	1.4	0.30	0.50	0.30	38.1
Approach		49	3.0	0.052	4.4	LOS A	0.2	1.4	0.30	0.50	0.30	38.1
All Vehicles		362	3.0	0.082	3.4	NA	0.2	1.4	0.05	0.47	0.05	38.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

▽ Site: 101 [2036 Design - Weekday AM]

Moss Street / Zunker Street / Retail Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
4a	L1	27	3.0	0.089	3.4	LOS A	0.0	0.0	0.00	0.43	0.00	38.6
6a	R1	140	3.0	0.089	2.8	LOS A	0.0	0.0	0.00	0.43	0.00	38.7
Approach		167	3.0	0.089	2.9	NA	0.0	0.0	0.00	0.43	0.00	38.7
NorthWest: Moss Street												
27a	L1	91	3.0	0.049	3.4	LOS A	0.0	0.0	0.00	0.48	0.00	38.4
29	R2	15	3.0	0.009	4.0	LOS A	0.0	0.3	0.24	0.47	0.24	38.0
Approach		105	3.0	0.049	3.5	NA	0.0	0.3	0.03	0.48	0.03	38.3
SouthWest: Retail Access												
30	L2	18	3.0	0.034	4.0	LOS A	0.1	0.9	0.28	0.48	0.28	38.3
32a	R1	18	3.0	0.034	4.4	LOS A	0.1	0.9	0.28	0.48	0.28	38.1
Approach		36	3.0	0.034	4.2	LOS A	0.1	0.9	0.28	0.48	0.28	38.2
All Vehicles		308	3.0	0.089	3.2	NA	0.1	0.9	0.04	0.46	0.04	38.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 101 [2036 Design - Weekday PM]

Moss Street / Zunker Street / Retail Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
4a	L1	48	3.0	0.101	3.4	LOS A	0.0	0.0	0.00	0.44	0.00	38.6
6a	R1	140	3.0	0.101	2.8	LOS A	0.0	0.0	0.00	0.44	0.00	38.7
Approach		188	3.0	0.101	2.9	NA	0.0	0.0	0.00	0.44	0.00	38.7
NorthWest: Moss Street												
27a	L1	173	3.0	0.093	3.4	LOS A	0.0	0.0	0.00	0.48	0.00	38.4
29	R2	18	3.0	0.011	4.0	LOS A	0.1	0.4	0.25	0.47	0.25	38.0
Approach		191	3.0	0.093	3.5	NA	0.1	0.4	0.02	0.48	0.02	38.3
SouthWest: Retail Access												
30	L2	20	3.0	0.066	4.0	LOS A	0.2	1.8	0.33	0.52	0.33	38.2
32a	R1	40	3.0	0.066	5.0	LOS A	0.2	1.8	0.33	0.52	0.33	37.9
Approach		60	3.0	0.066	4.7	LOS A	0.2	1.8	0.33	0.52	0.33	38.0
All Vehicles		439	3.0	0.101	3.4	NA	0.2	1.8	0.06	0.47	0.06	38.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 101 [2036 Design - Saturday Midday]

Moss Street / Zunker Street / Retail Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Zunker Street												
4a	L1	45	3.0	0.141	3.4	LOS A	0.0	0.0	0.00	0.44	0.00	38.6
6a	R1	218	3.0	0.141	2.8	LOS A	0.0	0.0	0.00	0.44	0.00	38.7
Approach		263	3.0	0.141	2.9	NA	0.0	0.0	0.00	0.44	0.00	38.7
NorthWest: Moss Street												
27a	L1	275	3.0	0.148	3.4	LOS A	0.0	0.0	0.00	0.48	0.00	38.3
29	R2	25	3.0	0.017	4.2	LOS A	0.1	0.5	0.32	0.49	0.32	37.9
Approach		300	3.0	0.148	3.5	NA	0.1	0.5	0.03	0.48	0.03	38.3
SouthWest: Retail Access												
30	L2	26	3.0	0.081	4.4	LOS A	0.3	2.1	0.42	0.59	0.42	37.8
32a	R1	37	3.0	0.081	6.6	LOS A	0.3	2.1	0.42	0.59	0.42	37.6
Approach		63	3.0	0.081	5.7	LOS A	0.3	2.1	0.42	0.59	0.42	37.7
All Vehicles		626	3.0	0.148	3.5	NA	0.3	2.1	0.05	0.47	0.05	38.4

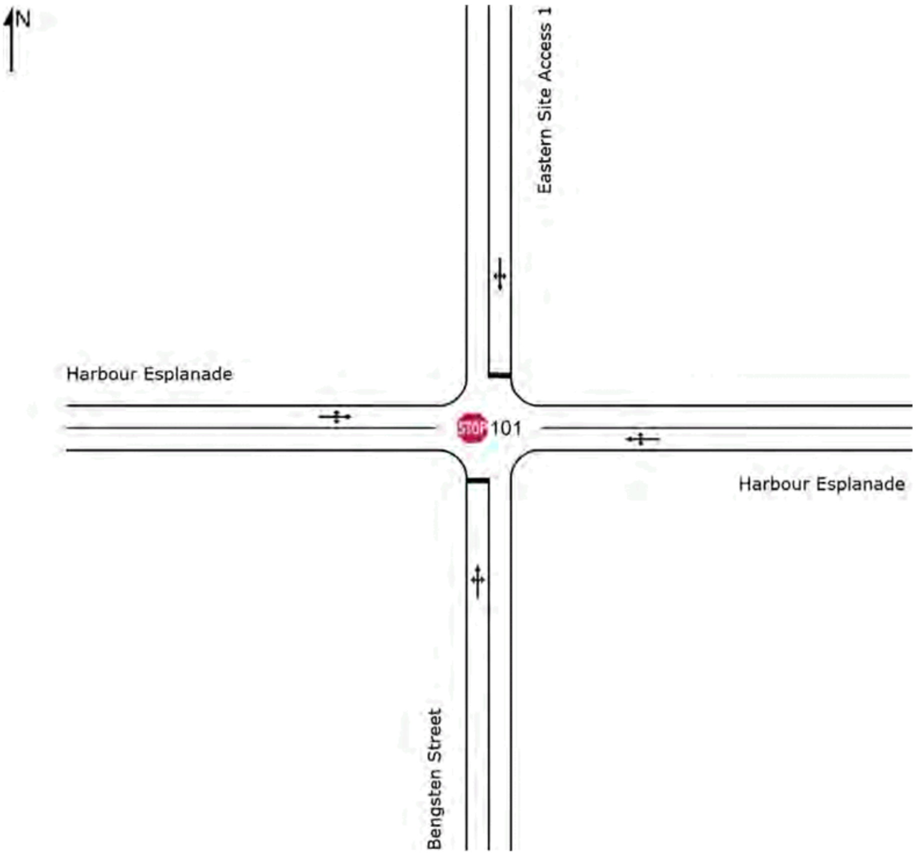
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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: RMA ENGINEERS PTY LTD | Processed: Thursday, 24 October 2019 12:28:26 PM
Project: C:\Users\dina.delac\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\JOPL6UTJ\Moss_Zunker_Retail Access - DP.sip8

SITE LAYOUT

Site: 101 [2036 Design - Weekday AM]

Harbour Esplanade / Bengsten Street / Site Access 1
Site Category: (None)
Stop (Two-Way)



Project: U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\Traffic\TIA\VAR - PA + DP\SIDRAs\DP\Harbour_Site Access 1.sip8

MOVEMENT SUMMARY

Site: 101 [2036 Design - Weekday AM]

Harbour Esplanade / Bengsten Street / Site Access 1
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
South: Bengsten Street												
1	L2	11	0.0	0.032	7.3	LOS A	0.1	0.8	0.31	0.90	0.31	43.0
2	T1	11	0.0	0.032	7.8	LOS A	0.1	0.8	0.31	0.90	0.31	37.1
3	R2	11	0.0	0.032	7.7	LOS A	0.1	0.8	0.31	0.90	0.31	42.7
Approach		32	0.0	0.032	7.6	LOS A	0.1	0.8	0.31	0.90	0.31	40.7
East: Harbour Esplanade												
4	L2	11	0.0	0.089	5.6	LOS A	0.0	0.3	0.02	0.05	0.02	48.0
5	T1	154	3.0	0.089	0.0	LOS A	0.0	0.3	0.02	0.05	0.02	59.5
6	R2	4	3.0	0.089	5.8	LOS A	0.0	0.3	0.02	0.05	0.02	47.4
Approach		168	2.8	0.089	0.5	NA	0.0	0.3	0.02	0.05	0.02	58.2
North: Eastern Site Access 1												
7	L2	15	3.0	0.024	7.1	LOS A	0.1	0.6	0.22	0.93	0.22	42.9
8	T1	11	0.0	0.024	7.9	LOS A	0.1	0.6	0.22	0.93	0.22	37.1
9	R2	1	3.0	0.024	7.8	LOS A	0.1	0.6	0.22	0.93	0.22	42.6
Approach		26	1.8	0.024	7.4	LOS A	0.1	0.6	0.22	0.93	0.22	40.4
West: Harbour Esplanade												
10	L2	1	3.0	0.055	6.1	LOS A	0.1	0.5	0.07	0.07	0.07	47.7
11	T1	91	3.0	0.055	0.1	LOS A	0.1	0.5	0.07	0.07	0.07	59.1
12	R2	11	0.0	0.055	6.0	LOS A	0.1	0.5	0.07	0.07	0.07	47.2
Approach		102	2.7	0.055	0.7	NA	0.1	0.5	0.07	0.07	0.07	57.5
All Vehicles		328	2.4	0.089	1.8	NA	0.1	0.8	0.08	0.21	0.08	53.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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: RMA ENGINEERS PTY LTD | Processed: Monday, 28 October 2019 9:35:47 AM
Project: U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\Traffic\TIA\VAR - PA + DP\SIDRAs\DP\Harbour_Site Access 1.sip8

MOVEMENT SUMMARY

Site: 101 [2036 Design - Weekday PM]

Harbour Esplanade / Bengsten Street / Site Access 1
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
South: Bengsten Street												
1	L2	11	0.0	0.035	7.2	LOS A	0.1	0.9	0.33	0.90	0.33	42.8
2	T1	11	0.0	0.035	8.5	LOS A	0.1	0.9	0.33	0.90	0.33	37.0
3	R2	11	0.0	0.035	8.3	LOS A	0.1	0.9	0.33	0.90	0.33	42.5
Approach		32	0.0	0.035	8.0	LOS A	0.1	0.9	0.33	0.90	0.33	40.6
East: Harbour Esplanade												
4	L2	11	0.0	0.092	6.0	LOS A	0.1	0.9	0.07	0.09	0.07	47.6
5	T1	145	3.0	0.092	0.1	LOS A	0.1	0.9	0.07	0.09	0.07	58.9
6	R2	15	3.0	0.092	6.1	LOS A	0.1	0.9	0.07	0.09	0.07	47.1
Approach		171	2.8	0.092	1.0	NA	0.1	0.9	0.07	0.09	0.07	56.8
North: Eastern Site Access 1												
7	L2	4	3.0	0.018	7.5	LOS A	0.1	0.5	0.37	0.91	0.37	42.7
8	T1	11	0.0	0.018	8.4	LOS A	0.1	0.5	0.37	0.91	0.37	37.0
9	R2	1	3.0	0.018	8.4	LOS A	0.1	0.5	0.37	0.91	0.37	42.4
Approach		16	1.0	0.018	8.2	LOS A	0.1	0.5	0.37	0.91	0.37	38.7
West: Harbour Esplanade												
10	L2	1	3.0	0.104	6.1	LOS A	0.1	0.6	0.04	0.04	0.04	48.0
11	T1	185	3.0	0.104	0.0	LOS A	0.1	0.6	0.04	0.04	0.04	59.5
12	R2	11	0.0	0.104	6.0	LOS A	0.1	0.6	0.04	0.04	0.04	47.5
Approach		197	2.8	0.104	0.4	NA	0.1	0.6	0.04	0.04	0.04	58.6
All Vehicles		415	2.5	0.104	1.5	NA	0.1	0.9	0.09	0.16	0.09	55.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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: U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\Traffic\TIA\VAR - PA + DP\SIDRAs\DP\Harbour_Site Access 1.sip8

MOVEMENT SUMMARY

Site: 101 [2036 Design - Saturday Midday]

Harbour Esplanade / Bengsten Street / Site Access 1
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
South: Bengsten Street												
1	L2	11	0.0	0.042	7.6	LOS A	0.1	1.0	0.43	0.92	0.43	42.4
2	T1	11	0.0	0.042	10.0	LOS A	0.1	1.0	0.43	0.92	0.43	36.6
3	R2	11	0.0	0.042	9.8	LOS A	0.1	1.0	0.43	0.92	0.43	42.0
Approach		32	0.0	0.042	9.1	LOS A	0.1	1.0	0.43	0.92	0.43	40.2
East: Harbour Esplanade												
4	L2	11	0.0	0.136	6.3	LOS A	0.1	0.9	0.06	0.05	0.06	47.8
5	T1	232	3.0	0.136	0.1	LOS A	0.1	0.9	0.06	0.05	0.06	59.2
6	R2	13	3.0	0.136	6.6	LOS A	0.1	0.9	0.06	0.05	0.06	47.3
Approach		255	2.9	0.136	0.7	NA	0.1	0.9	0.06	0.05	0.06	57.9
North: Eastern Site Access 1												
7	L2	1	3.0	0.038	8.0	LOS A	0.1	0.9	0.51	0.94	0.51	42.0
8	T1	11	0.0	0.038	10.0	LOS A	0.1	0.9	0.51	0.94	0.51	36.4
9	R2	13	3.0	0.038	10.0	LOS A	0.1	0.9	0.51	0.94	0.51	41.7
Approach		24	1.7	0.038	9.9	LOS A	0.1	0.9	0.51	0.94	0.51	39.2
West: Harbour Esplanade												
10	L2	1	3.0	0.158	6.5	LOS A	0.1	0.6	0.03	0.02	0.03	48.1
11	T1	287	3.0	0.158	0.0	LOS A	0.1	0.6	0.03	0.02	0.03	59.6
12	R2	11	0.0	0.158	6.4	LOS A	0.1	0.6	0.03	0.02	0.03	47.6
Approach		299	2.9	0.158	0.3	NA	0.1	0.6	0.03	0.02	0.03	59.1
All Vehicles		609	2.7	0.158	1.3	NA	0.1	1.0	0.08	0.12	0.08	56.1

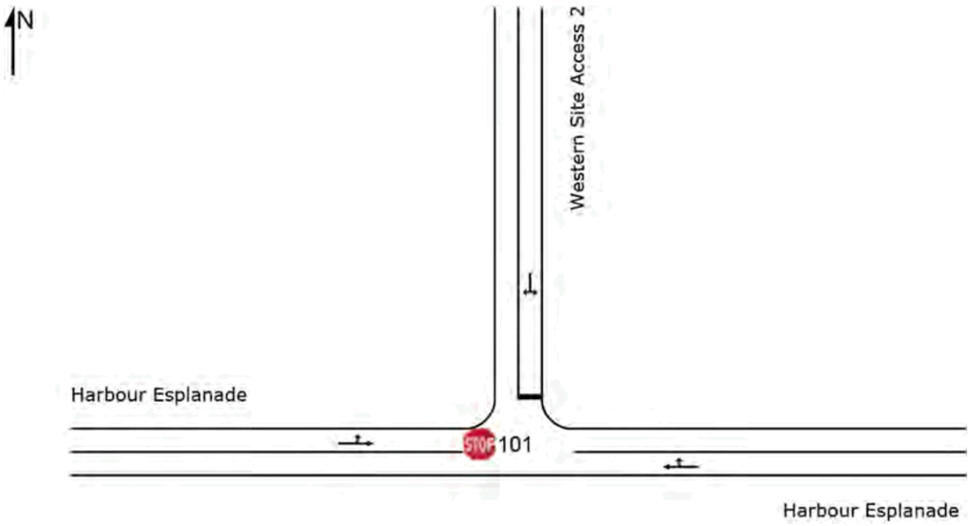
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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: RMA ENGINEERS PTY LTD | Processed: Monday, 28 October 2019 9:35:48 AM
Project: U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\Traffic\TIA\VAR - PA + DP\SIDRAs\DP\Harbour_Site Access 1.sip8

SITE LAYOUT

Site: 101 [2036 Design - Weekday AM]

Harbour Esplanade / Site Access 2
Site Category: (None)
Stop (Two-Way)



Organisation: RMA ENGINEERS PTY LTD | Created: Friday, 25 October 2019 10:15:31 AM
Project: C:\Users\dina.delac\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\JOPL6UTJ\Harbour_Site Access 2.sip8

MOVEMENT SUMMARY

Site: 101 [2036 Design - Weekday AM]

Harbour Esplanade / Site Access 2
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	93	3.0	0.086	0.1	LOS A	0.3	2.3	0.12	0.23	0.12	57.5
6	R2	61	3.0	0.086	5.7	LOS A	0.3	2.3	0.12	0.23	0.12	46.2
Approach		154	3.0	0.086	2.3	NA	0.3	2.3	0.12	0.23	0.12	52.4
North: Western Site Access 2												
7	L2	37	3.0	0.028	7.0	LOS A	0.1	0.8	0.14	0.91	0.14	43.0
9	R2	1	3.0	0.028	7.4	LOS A	0.1	0.8	0.14	0.91	0.14	42.7
Approach		38	3.0	0.028	7.0	LOS A	0.1	0.8	0.14	0.91	0.14	43.0
West: Harbour Esplanade												
10	L2	4	3.0	0.030	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.8
11	T1	54	3.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		58	3.0	0.030	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5
All Vehicles		249	3.0	0.086	2.6	NA	0.3	2.3	0.09	0.29	0.09	52.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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: RMA ENGINEERS PTY LTD | Processed: Thursday, 24 October 2019 12:48:05 PM
Project: C:\Users\dina.delac\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\JOPL6UTJ\Harbour_Site Access 2.sip8

MOVEMENT SUMMARY

Site: 101 [2036 Design - Weekday PM]

Harbour Esplanade / Site Access 2
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	48	3.0	0.085	0.2	LOS A	0.4	2.9	0.18	0.38	0.18	56.0
6	R2	97	3.0	0.085	5.7	LOS A	0.4	2.9	0.18	0.38	0.18	45.2
Approach		145	3.0	0.085	3.9	NA	0.4	2.9	0.18	0.38	0.18	48.3
North: Western Site Access 2												
7	L2	113	3.0	0.091	7.1	LOS A	0.4	2.7	0.18	0.90	0.18	43.0
9	R2	5	3.0	0.091	7.6	LOS A	0.4	2.7	0.18	0.90	0.18	42.7
Approach		118	3.0	0.091	7.1	LOS A	0.4	2.7	0.18	0.90	0.18	43.0
West: Harbour Esplanade												
10	L2	4	3.0	0.040	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	57.9
11	T1	73	3.0	0.040	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		77	3.0	0.040	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.6
All Vehicles		340	3.0	0.091	4.2	NA	0.4	2.9	0.14	0.48	0.14	48.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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: RMA ENGINEERS PTY LTD | Processed: Thursday, 24 October 2019 12:48:06 PM
Project: C:\Users\dina.delac\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\JOPL6UTJ\Harbour_Site Access 2.sip8

MOVEMENT SUMMARY

Site: 101 [2036 Design - Saturday Midday]

Harbour Esplanade / Site Access 2
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	120	3.0	0.137	0.4	LOS A	0.6	4.5	0.26	0.28	0.26	56.6
6	R2	112	3.0	0.137	6.1	LOS A	0.6	4.5	0.26	0.28	0.26	45.6
Approach		232	3.0	0.137	3.1	NA	0.6	4.5	0.26	0.28	0.26	50.7
North: Western Site Access 2												
7	L2	127	3.0	0.114	7.5	LOS A	0.5	3.4	0.29	0.88	0.29	43.0
9	R2	6	3.0	0.114	8.9	LOS A	0.5	3.4	0.29	0.88	0.29	42.6
Approach		134	3.0	0.114	7.6	LOS A	0.5	3.4	0.29	0.88	0.29	42.9
West: Harbour Esplanade												
10	L2	5	3.0	0.087	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.0
11	T1	160	3.0	0.087	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		165	3.0	0.087	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.8
All Vehicles		531	3.0	0.137	3.3	NA	0.6	4.5	0.18	0.35	0.18	50.8

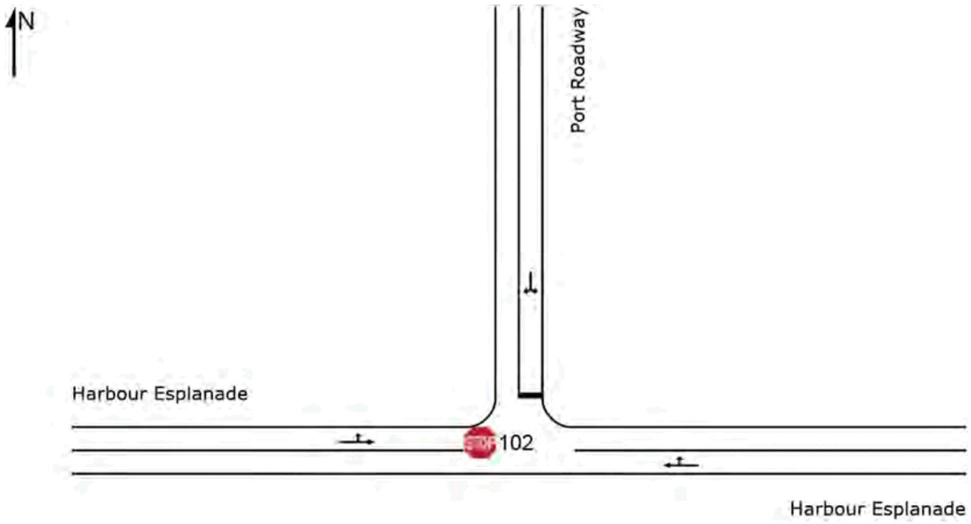
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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: RMA ENGINEERS PTY LTD | Processed: Thursday, 24 October 2019 12:48:06 PM
Project: C:\Users\dina.delac\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\JOPL6UTJ\Harbour_Site Access 2.sip8

SITE LAYOUT

Site: 102 [2036 Base - Weekday AM]

Port Roadway / Harbour Esplanade
Site Category: (None)
Stop (Two-Way)



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Organisation: RMA ENGINEERS PTY LTD | Created: Friday, 25 October 2019 10:16:51 AM
Project: C:\Users\dina.delac\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\JOPL6UTJ\Port Roadway_Harbour Esplanade - DP.sip8

MOVEMENT SUMMARY

Site: 102 [2036 Base - Weekday AM]

Port Roadway / Harbour Esplanade
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	38	3.0	0.039	0.1	LOS A	0.2	1.1	0.08	0.27	0.08	57.3
6	R2	33	3.0	0.039	5.6	LOS A	0.2	1.1	0.08	0.27	0.08	55.1
Approach		71	3.0	0.039	2.6	NA	0.2	1.1	0.08	0.27	0.08	56.3
North: Port Roadway												
7	L2	22	3.0	0.024	8.2	LOS A	0.1	0.7	0.08	0.95	0.08	51.7
9	R2	8	3.0	0.024	8.0	LOS A	0.1	0.7	0.08	0.95	0.08	51.2
Approach		31	3.0	0.024	8.2	LOS A	0.1	0.7	0.08	0.95	0.08	51.6
West: Harbour Esplanade												
10	L2	7	3.0	0.015	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	56.9
11	T1	21	3.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	58.6
Approach		28	3.0	0.015	1.4	NA	0.0	0.0	0.00	0.15	0.00	58.2
All Vehicles		129	3.0	0.039	3.7	NA	0.2	1.1	0.06	0.40	0.06	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 102 [2036 Base - Weekday PM]

Port Roadway / Harbour Esplanade
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	26	3.0	0.025	0.1	LOS A	0.1	0.6	0.11	0.23	0.11	57.5
6	R2	18	3.0	0.025	5.6	LOS A	0.1	0.6	0.11	0.23	0.11	55.3
Approach		44	3.0	0.025	2.3	NA	0.1	0.6	0.11	0.23	0.11	56.6
North: Port Roadway												
7	L2	21	3.0	0.020	8.3	LOS A	0.1	0.6	0.14	0.91	0.14	51.7
9	R2	5	3.0	0.020	8.0	LOS A	0.1	0.6	0.14	0.91	0.14	51.2
Approach		26	3.0	0.020	8.3	LOS A	0.1	0.6	0.14	0.91	0.14	51.6
West: Harbour Esplanade												
10	L2	5	3.0	0.029	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.7
11	T1	51	3.0	0.029	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.5
Approach		56	3.0	0.029	0.5	NA	0.0	0.0	0.00	0.06	0.00	59.3
All Vehicles		126	3.0	0.029	2.8	NA	0.1	0.6	0.07	0.30	0.07	56.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 102 [2036 Base - Saturday Midday]

Port Roadway / Harbour Esplanade
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	58	3.0	0.062	0.2	LOS A	0.3	1.8	0.17	0.27	0.17	57.0
6	R2	51	3.0	0.062	5.8	LOS A	0.3	1.8	0.17	0.27	0.17	54.8
Approach		108	3.0	0.062	2.8	NA	0.3	1.8	0.17	0.27	0.17	55.9
North: Port Roadway												
7	L2	77	3.0	0.078	8.4	LOS A	0.3	2.2	0.18	0.90	0.18	51.7
9	R2	19	3.0	0.078	8.6	LOS A	0.3	2.2	0.18	0.90	0.18	51.2
Approach		96	3.0	0.078	8.5	LOS A	0.3	2.2	0.18	0.90	0.18	51.6
West: Harbour Esplanade												
10	L2	22	3.0	0.050	5.6	LOS A	0.0	0.0	0.00	0.14	0.00	57.0
11	T1	73	3.0	0.050	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	58.7
Approach		95	3.0	0.050	1.3	NA	0.0	0.0	0.00	0.14	0.00	58.3
All Vehicles		299	3.0	0.078	4.1	NA	0.3	2.2	0.12	0.43	0.12	55.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 102 [2036 Design - Weekday AM]

Port Roadway / Harbour Esplanade
50% vols to Access 3
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	39	3.0	0.058	0.1	LOS A	0.3	1.9	0.10	0.35	0.10	56.5
6	R2	63	3.0	0.058	5.6	LOS A	0.3	1.9	0.10	0.35	0.10	54.3
Approach		102	3.0	0.058	3.5	NA	0.3	1.9	0.10	0.35	0.10	55.1
North: Port Roadway												
7	L2	40	3.0	0.038	8.2	LOS A	0.1	1.1	0.08	0.95	0.08	51.7
9	R2	9	3.0	0.038	8.2	LOS A	0.1	1.1	0.08	0.95	0.08	51.2
Approach		49	3.0	0.038	8.2	LOS A	0.1	1.1	0.08	0.95	0.08	51.6
West: Harbour Esplanade												
10	L2	9	3.0	0.017	5.6	LOS A	0.0	0.0	0.00	0.17	0.00	56.8
11	T1	23	3.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	58.4
Approach		33	3.0	0.017	1.6	NA	0.0	0.0	0.00	0.17	0.00	57.9
All Vehicles		184	3.0	0.058	4.4	NA	0.3	1.9	0.08	0.48	0.08	54.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 102 [2036 Design - Weekday PM]

Port Roadway / Harbour Esplanade
50% vols to Access 3
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	29	3.0	0.055	0.2	LOS A	0.3	1.8	0.15	0.39	0.15	56.0
6	R2	66	3.0	0.055	5.7	LOS A	0.3	1.8	0.15	0.39	0.15	53.9
Approach		96	3.0	0.055	4.0	NA	0.3	1.8	0.15	0.39	0.15	54.5
North: Port Roadway												
7	L2	77	3.0	0.065	8.3	LOS A	0.3	1.9	0.14	0.91	0.14	51.7
9	R2	8	3.0	0.065	8.3	LOS A	0.3	1.9	0.14	0.91	0.14	51.2
Approach		85	3.0	0.065	8.3	LOS A	0.3	1.9	0.14	0.91	0.14	51.6
West: Harbour Esplanade												
10	L2	7	3.0	0.032	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	57.6
11	T1	53	3.0	0.032	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.3
Approach		60	3.0	0.032	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.1
All Vehicles		241	3.0	0.065	4.7	NA	0.3	1.9	0.11	0.50	0.11	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 102 [2036 Design - Saturday Midday]

Port Roadway / Harbour Esplanade
50% vols to Access 3
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
East: Harbour Esplanade												
5	T1	61	3.0	0.099	0.3	LOS A	0.5	3.4	0.21	0.36	0.21	56.1
6	R2	106	3.0	0.099	5.8	LOS A	0.5	3.4	0.21	0.36	0.21	53.9
Approach		167	3.0	0.099	3.8	NA	0.5	3.4	0.21	0.36	0.21	54.7
North: Port Roadway												
7	L2	80	3.0	0.154	8.5	LOS A	0.6	4.5	0.22	0.91	0.22	51.5
9	R2	83	3.0	0.154	9.1	LOS A	0.6	4.5	0.22	0.91	0.22	51.0
Approach		163	3.0	0.154	8.8	LOS A	0.6	4.5	0.22	0.91	0.22	51.2
West: Harbour Esplanade												
10	L2	25	3.0	0.054	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	56.9
11	T1	76	3.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	58.7
Approach		101	3.0	0.054	1.4	NA	0.0	0.0	0.00	0.15	0.00	58.2
All Vehicles		432	3.0	0.154	5.1	NA	0.6	4.5	0.17	0.52	0.17	54.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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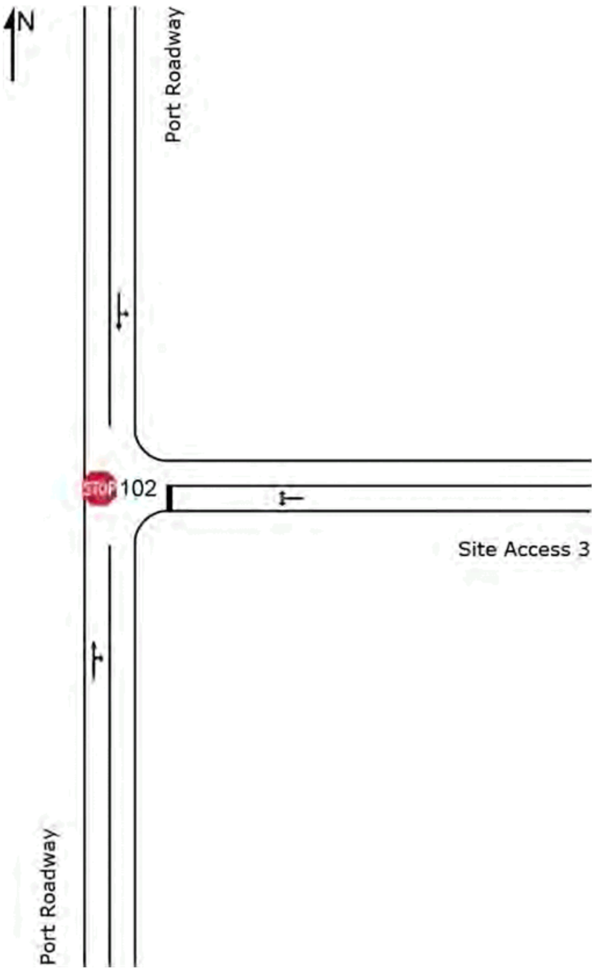
SITE LAYOUT

Site: 102 [2036 Design - Weekday AM]

Port Roadway / Site Access 3
50% vols to Access 3
Site Category: (None)
Stop (Two-Way)



MOVEMENT SUMMARY

Site: 102 [2036 Design - Weekday AM]

Port Roadway / Site Access 3
50% vols to Access 3
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
South: Port Roadway												
2	T1	40	0.0	0.040	0.1	LOS A	0.2	1.1	0.08	0.26	0.08	57.4
3	R2	33	0.0	0.040	5.5	LOS A	0.2	1.1	0.08	0.26	0.08	46.1
Approach		73	0.0	0.040	2.5	NA	0.2	1.1	0.08	0.26	0.08	51.7
East: Site Access 3												
4	L2	1	0.0	0.019	6.8	LOS A	0.1	0.5	0.19	0.89	0.19	43.3
6	R2	19	3.0	0.019	6.8	LOS A	0.1	0.5	0.19	0.89	0.19	42.8
Approach		20	2.8	0.019	6.8	LOS A	0.1	0.5	0.19	0.89	0.19	42.9
North: Port Roadway												
7	L2	1	3.0	0.017	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.0
8	T1	32	0.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		33	0.1	0.017	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.8
All Vehicles		125	0.5	0.040	2.6	NA	0.2	1.1	0.08	0.30	0.08	51.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 102 [2036 Design - Weekday PM]

Port Roadway / Site Access 3
50% vols to Access 3
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
South: Port Roadway												
2	T1	22	0.0	0.040	0.1	LOS A	0.2	1.3	0.09	0.40	0.09	56.2
3	R2	51	0.0	0.040	5.5	LOS A	0.2	1.3	0.09	0.40	0.09	45.3
Approach		73	0.0	0.040	3.9	NA	0.2	1.3	0.09	0.40	0.09	48.2
East: Site Access 3												
4	L2	1	0.0	0.056	6.8	LOS A	0.2	1.5	0.20	0.90	0.20	43.3
6	R2	59	3.0	0.056	6.8	LOS A	0.2	1.5	0.20	0.90	0.20	42.9
Approach		60	2.9	0.056	6.8	LOS A	0.2	1.5	0.20	0.90	0.20	42.9
North: Port Roadway												
7	L2	1	3.0	0.014	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.0
8	T1	26	0.0	0.014	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		27	0.1	0.014	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		160	1.1	0.056	4.4	NA	0.2	1.5	0.12	0.52	0.12	47.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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MOVEMENT SUMMARY

Site: 102 [2036 Design - Saturday Midday]

Port Roadway / Site Access 3
50% vols to Access 3
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows 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	Aver. No. Cycles	Average Speed km/h
South: Port Roadway												
2	T1	73	0.0	0.074	0.2	LOS A	0.3	2.1	0.17	0.26	0.17	57.1
3	R2	59	0.0	0.074	5.7	LOS A	0.3	2.1	0.17	0.26	0.17	45.9
Approach		132	0.0	0.074	2.7	NA	0.3	2.1	0.17	0.26	0.17	51.5
East: Site Access 3												
4	L2	1	0.0	0.073	7.0	LOS A	0.3	1.9	0.33	0.89	0.33	43.0
6	R2	67	3.0	0.073	7.6	LOS A	0.3	1.9	0.33	0.89	0.33	42.6
Approach		68	3.0	0.073	7.6	LOS A	0.3	1.9	0.33	0.89	0.33	42.6
North: Port Roadway												
7	L2	1	3.0	0.050	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	96	0.0	0.050	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		97	0.0	0.050	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.9
All Vehicles		297	0.7	0.074	2.9	NA	0.3	2.1	0.15	0.32	0.15	51.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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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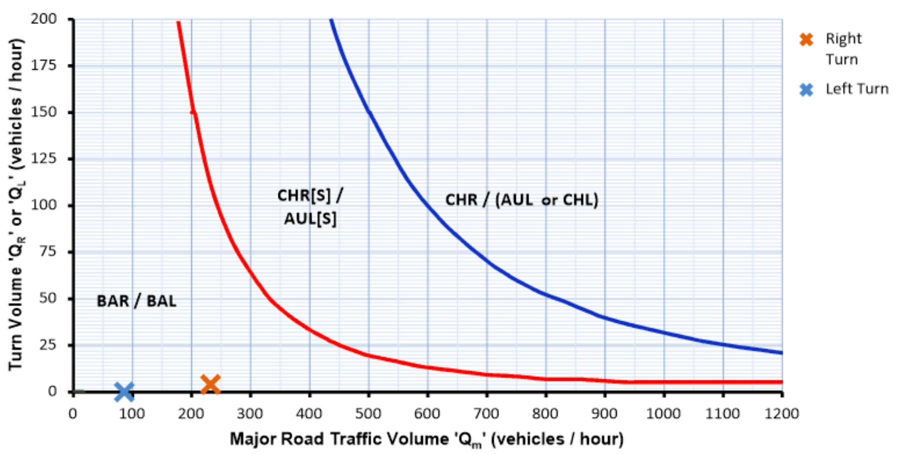
Appendix H Turn warrant assessment

WARRANTS FOR TURN TREATMENTS CALCULATOR
PROJECT: Marina DP - AM - 2036

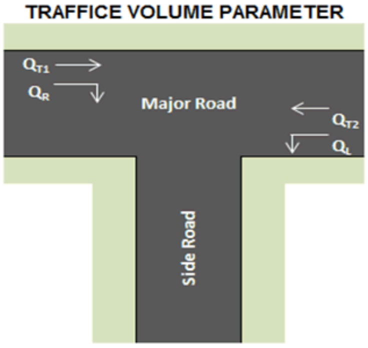
RMA Engineers

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (1)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	146
Major Road opposing through traffic flow	Q_{T2}	86
Right Turn Traffic Flow	Q_R	4
Left Turn Traffic Flow	Q_L	0
Major Road Traffic Volume for Right Turn	Q_M	232
Major Road Traffic Volume for Left Turn	Q_M	86

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

NOTES:

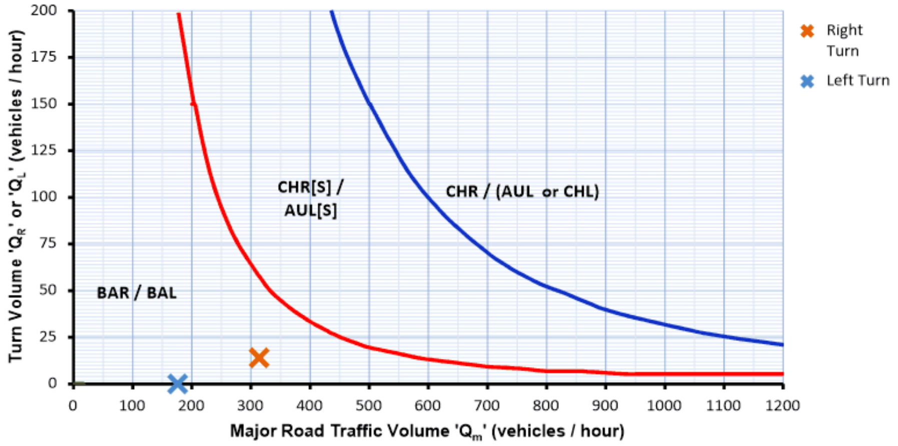
WARRANTS FOR TURN TREATMENTS CALCULATOR

PROJECT: Marina DP - PM - 2036

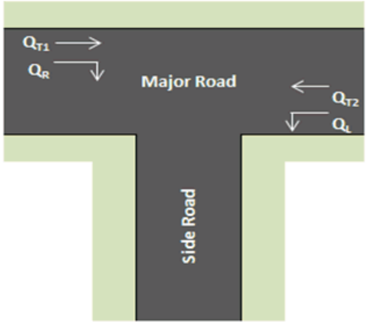
RMA Engineers

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (1)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	138
Major Road opposing through traffic flow	Q_{T2}	176
Right Turn Traffic Flow	Q_R	14
Left Turn Traffic Flow	Q_L	0
Major Road Traffic Volume for Right Turn	Q_M	314
Major Road Traffic Volume for Left Turn	Q_M	176

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



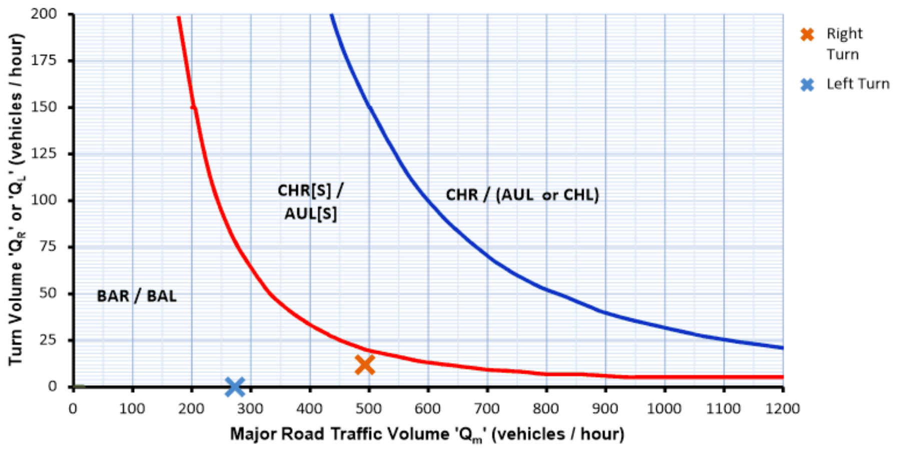
TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

NOTES:

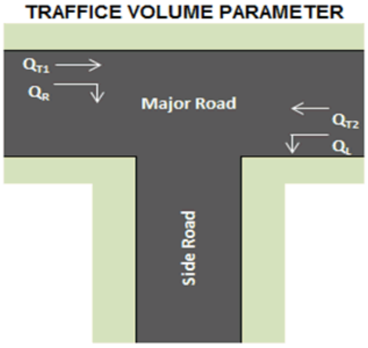
WARRANTS FOR TURN TREATMENTS CALCULATOR
PROJECT: Marina DP - Sat Midday - 2036

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (1)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	220
Major Road opposing through traffic flow	Q_{T2}	273
Right Turn Traffic Flow	Q_R	12
Left Turn Traffic Flow	Q_L	0
Major Road Traffic Volume for Right Turn	Q_M	493
Major Road Traffic Volume for Left Turn	Q_M	273

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

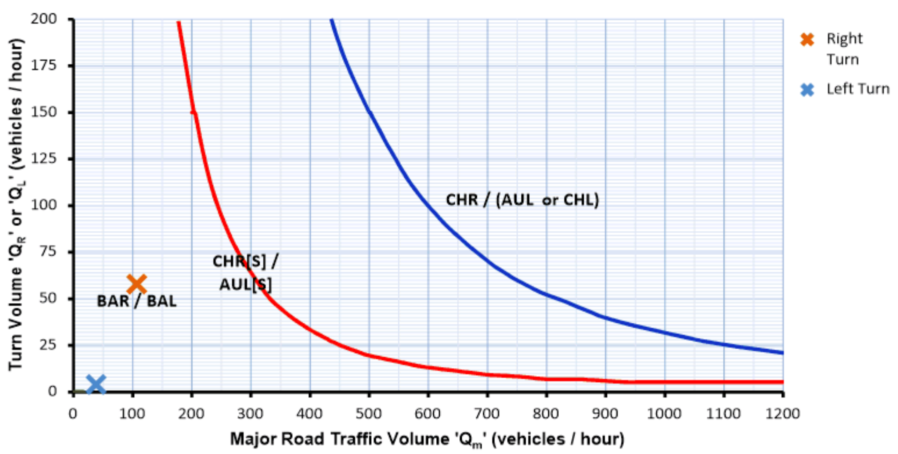
NOTES:

WARRANTS FOR TURN TREATMENTS CALCULATOR

PROJECT: Marina DP - AM - 2026

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (2)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	65
Major Road opposing through traffic flow	Q_{T2}	38
Right Turn Traffic Flow	Q_R	58
Left Turn Traffic Flow	Q_L	4
Major Road Traffic Volume for Right Turn	Q_M	107
Major Road Traffic Volume for Left Turn	Q_M	38

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



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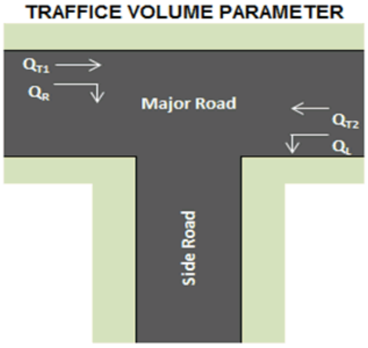


TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

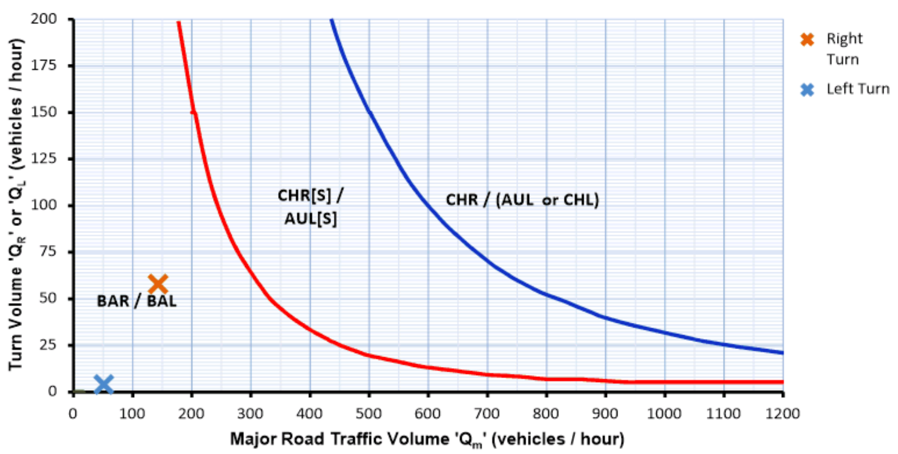
NOTES:

WARRANTS FOR TURN TREATMENTS CALCULATOR
PROJECT: Marina DP - AM - 2036

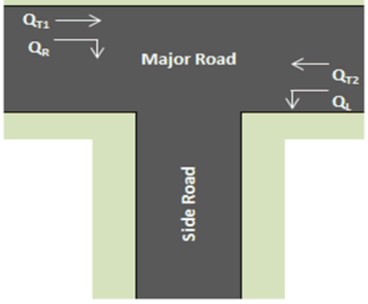
RMA Engineers

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (2)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	88
Major Road opposing through traffic flow	Q_{T2}	51
Right Turn Traffic Flow	Q_R	58
Left Turn Traffic Flow	Q_L	4
Major Road Traffic Volume for Right Turn	Q_M	143
Major Road Traffic Volume for Left Turn	Q_M	51

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

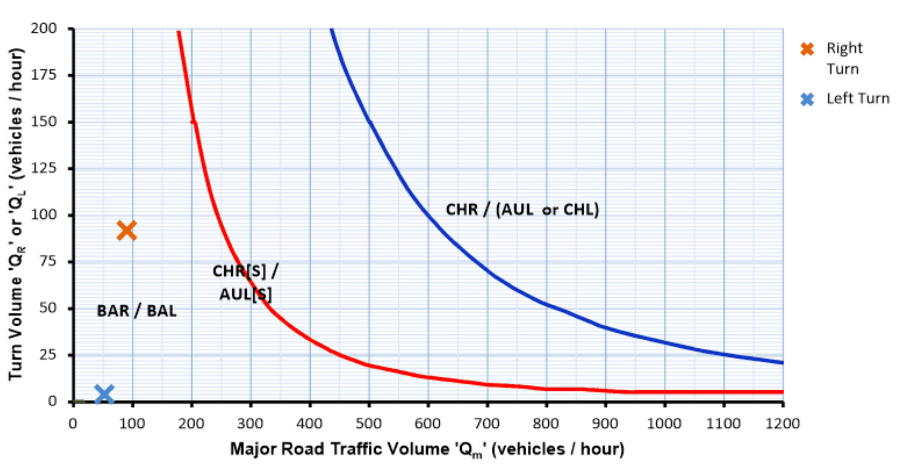
NOTES:

WARRANTS FOR TURN TREATMENTS CALCULATOR

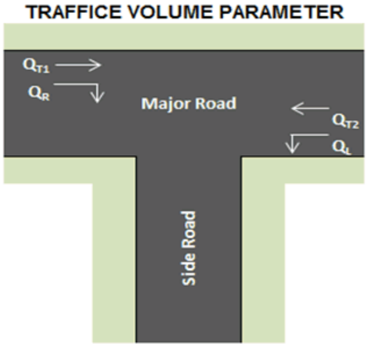
PROJECT: Marina DP - PM - 2026

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (2)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	34
Major Road opposing through traffic flow	Q_{T2}	52
Right Turn Traffic Flow	Q_R	92
Left Turn Traffic Flow	Q_L	4
Major Road Traffic Volume for Right Turn	Q_M	90
Major Road Traffic Volume for Left Turn	Q_M	52

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

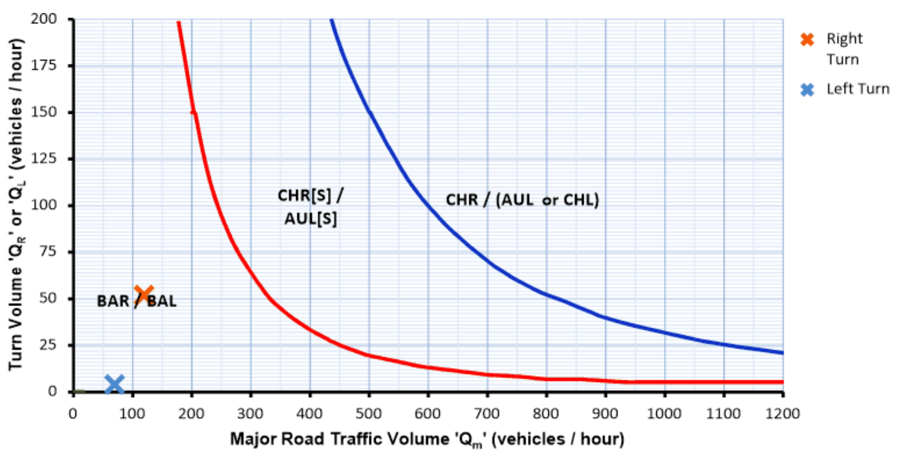
NOTES:

WARRANTS FOR TURN TREATMENTS CALCULATOR

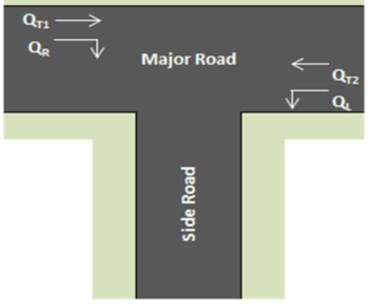
PROJECT: Marina DP - PM - 2036

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (2)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	46
Major Road opposing through traffic flow	Q_{T2}	69
Right Turn Traffic Flow	Q_R	52
Left Turn Traffic Flow	Q_L	4
Major Road Traffic Volume for Right Turn	Q_M	119
Major Road Traffic Volume for Left Turn	Q_M	69

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

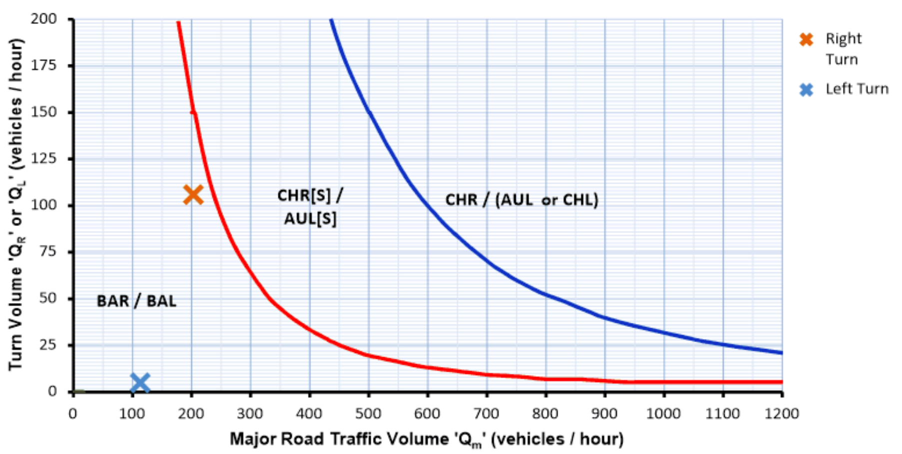
NOTES:

WARRANTS FOR TURN TREATMENTS CALCULATOR
PROJECT: Marina DP - Sat Midday - 2026

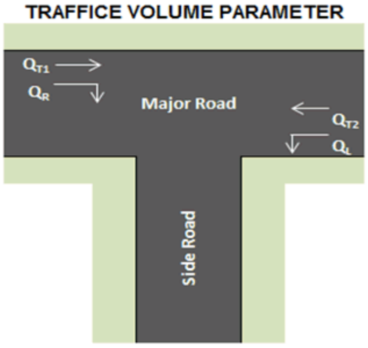
RMA Engineers

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (2)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	85
Major Road opposing through traffic flow	Q_{T2}	113
Right Turn Traffic Flow	Q_R	106
Left Turn Traffic Flow	Q_L	5
Major Road Traffic Volume for Right Turn	Q_M	203
Major Road Traffic Volume for Left Turn	Q_M	113

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

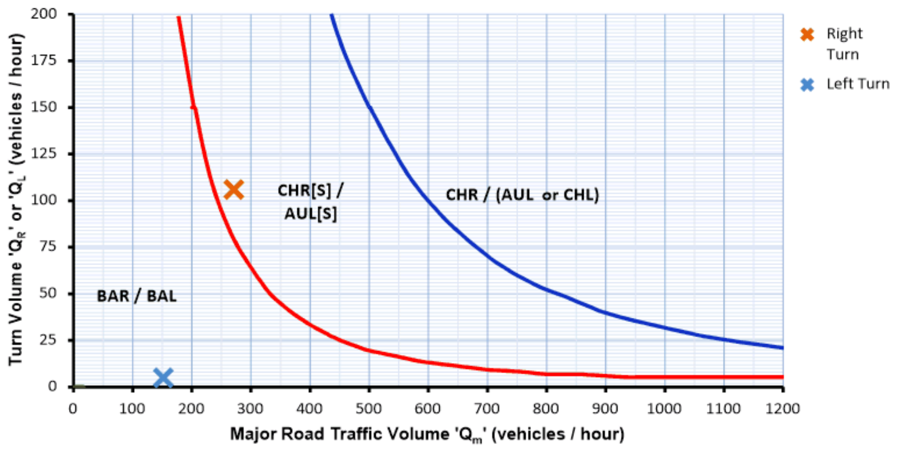
NOTES:

WARRANTS FOR TURN TREATMENTS CALCULATOR
PROJECT: Marina DP - Sat Midday - 2036

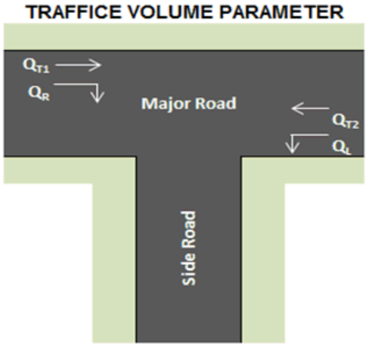
RMA Engineers

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		DP Site Access (2)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	114
Major Road opposing through traffic flow	Q_{T2}	152
Right Turn Traffic Flow	Q_R	106
Left Turn Traffic Flow	Q_L	5
Major Road Traffic Volume for Right Turn	Q_M	271
Major Road Traffic Volume for Left Turn	Q_M	152

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

NOTES:

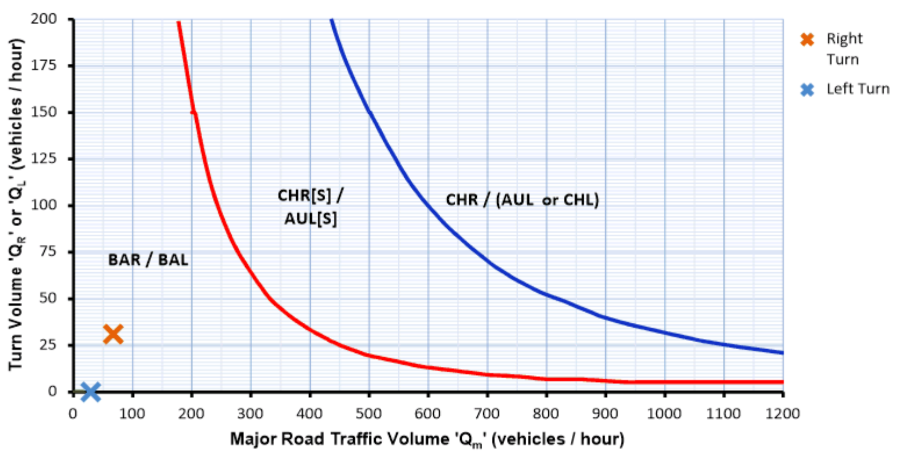
WARRANTS FOR TURN TREATMENTS CALCULATOR

PROJECT: Marina DP - AM - 2036

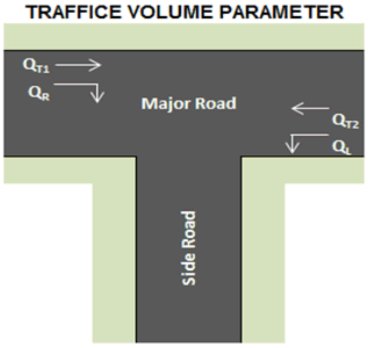
RMA Engineers

INTERSECTION DETAILS		
Major Road		Port Roadway
Side Road		DP Site Access (3) - 50% dev vols
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	38
Major Road opposing through traffic flow	Q_{T2}	29
Right Turn Traffic Flow	Q_R	31
Left Turn Traffic Flow	Q_L	0
Major Road Traffic Volume for Right Turn	Q_M	67
Major Road Traffic Volume for Left Turn	Q_M	29

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

NOTES:

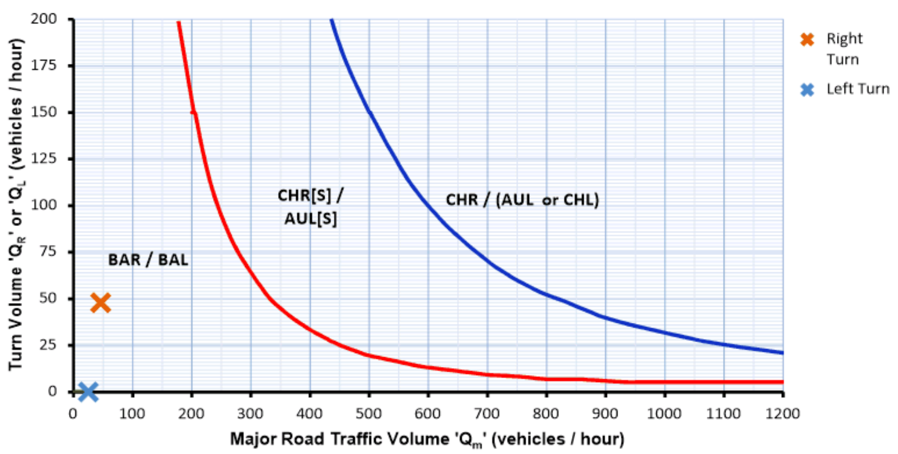
WARRANTS FOR TURN TREATMENTS CALCULATOR

PROJECT: Marina DP - PM - 2036

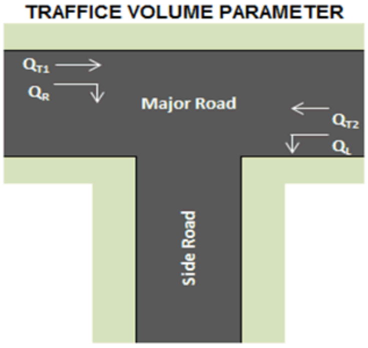
RMA Engineers

INTERSECTION DETAILS		
Major Road		Port Roadway
Side Road		DP Site Access (3) - 50% dev vols
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	21
Major Road opposing through traffic flow	Q_{T2}	25
Right Turn Traffic Flow	Q_R	48
Left Turn Traffic Flow	Q_L	0
Major Road Traffic Volume for Right Turn	Q_M	46
Major Road Traffic Volume for Left Turn	Q_M	25

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

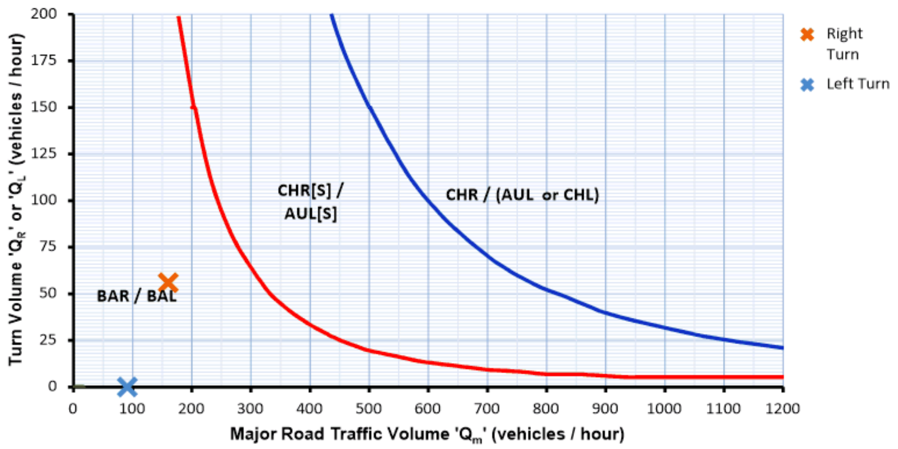
NOTES:

WARRANTS FOR TURN TREATMENTS CALCULATOR
PROJECT: Marina DP - Sat Midday - 2036

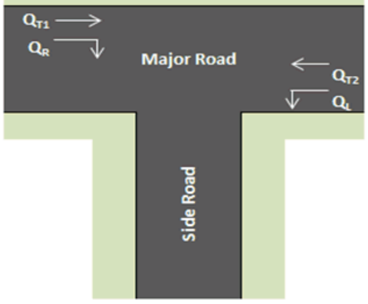
RMA Engineers

INTERSECTION DETAILS		
Major Road		Port Roadway
Side Road		DP Site Access (3) - 50% dev vols
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	69
Major Road opposing through traffic flow	Q_{T2}	91
Right Turn Traffic Flow	Q_R	56
Left Turn Traffic Flow	Q_L	0
Major Road Traffic Volume for Right Turn	Q_M	160
Major Road Traffic Volume for Left Turn	Q_M	91

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

NOTES:

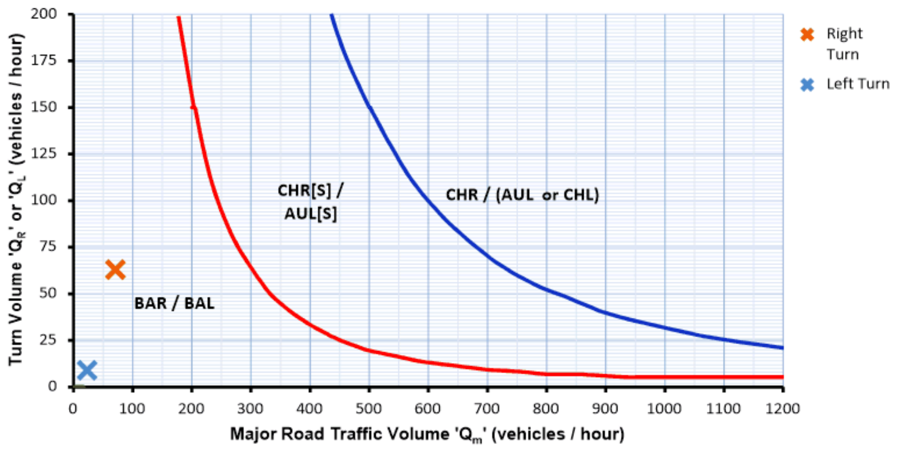
WARRANTS FOR TURN TREATMENTS CALCULATOR

PROJECT: Marina DP - AM - 2036

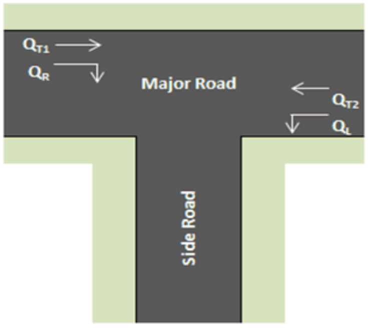
RMA Engineers

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		Port Roadway (with 50 % dev volumes to Access 3)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	39
Major Road opposing through traffic flow	Q_{T2}	23
Right Turn Traffic Flow	Q_R	63
Left Turn Traffic Flow	Q_L	9
Major Road Traffic Volume for Right Turn	Q_M	71
Major Road Traffic Volume for Left Turn	Q_M	23

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

NOTES:

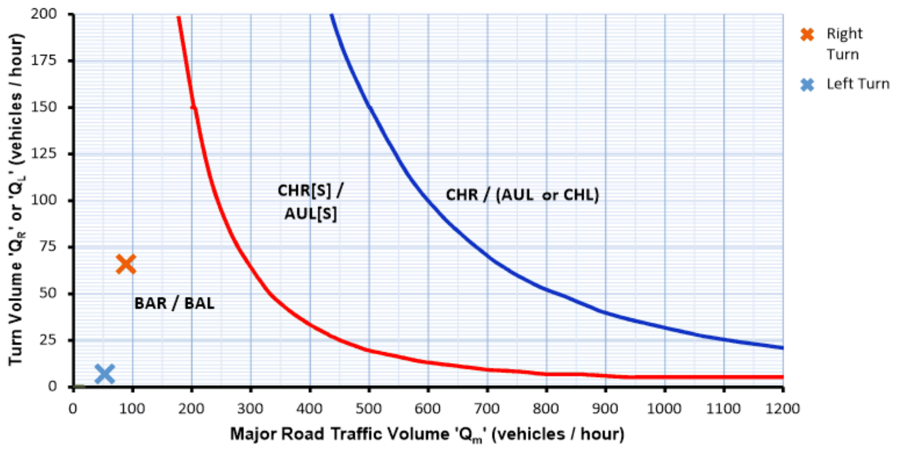
WARRANTS FOR TURN TREATMENTS CALCULATOR

PROJECT: Marina DP - PM - 2036

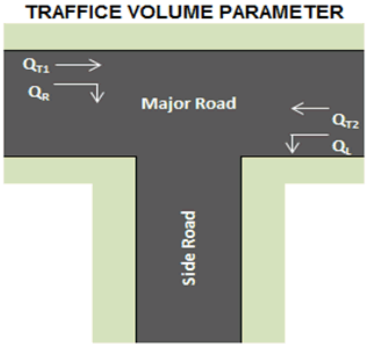
RMA Engineers

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		Port Roadway (with 50 % dev volumes to Access 3)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	29
Major Road opposing through traffic flow	Q_{T2}	53
Right Turn Traffic Flow	Q_R	66
Left Turn Traffic Flow	Q_L	7
Major Road Traffic Volume for Right Turn	Q_M	89
Major Road Traffic Volume for Left Turn	Q_M	53

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

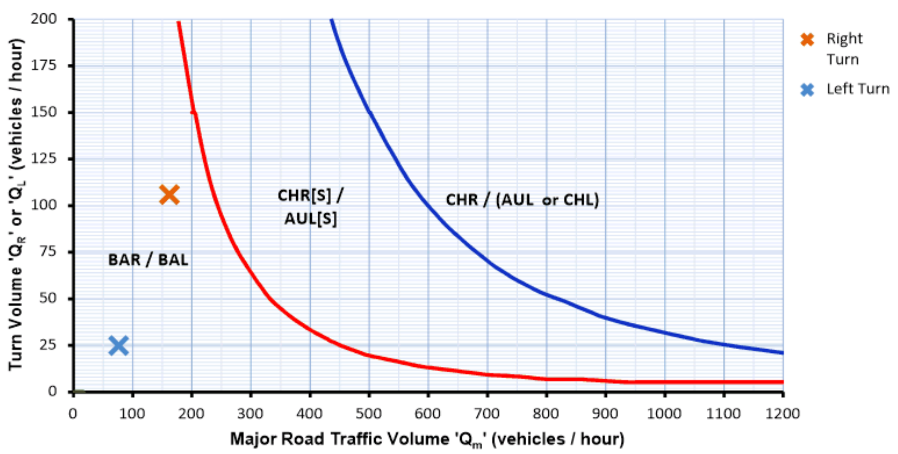
NOTES:

WARRANTS FOR TURN TREATMENTS CALCULATOR
PROJECT: Marina DP - Sat Midday - 2036

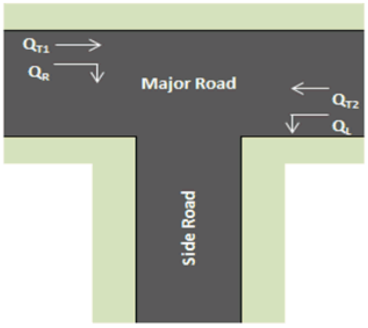
RMA Engineers

INTERSECTION DETAILS		
Major Road		Harbour Esplanade
Side Road		Port Roadway (with 50 % dev volumes to Access 3)
Splitter Island on Major Road	Yes or No	No
Design Domain	NDD or EDD	NDD
Major Road Design Speed	(km/h)	60
TRAFFIC VOLUMES (Vehicles/Hour)		
Major Road approaching through traffic Flow	Q_{T1}	61
Major Road opposing through traffic flow	Q_{T2}	76
Right Turn Traffic Flow	Q_R	106
Left Turn Traffic Flow	Q_L	25
Major Road Traffic Volume for Right Turn	Q_M	162
Major Road Traffic Volume for Left Turn	Q_M	76

TURN WARRANT GRAPH (as adapted from RPDM Figure 13.23)



CALCULATION OF MAJOR ROAD TRAFFICE VOLUME PARAMETER



TURN TYPE	SPLITTER ISLAND	Q_M
Right	No	$Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$Q_{T1} + Q_{T2}$
Left	No/Yes	Q_{T2}

NOTES:

Appendix I Code response

Transport and Parking Code

RMA Engineers

Table 9.3.5.3.1 - Requirements for development accepted subject to requirements and benchmarks for assessable development

Performance outcomes	Acceptable outcomes	Compliance Summary
On-site parking and access		
PO1 Development ensures that the location, layout and design of vehicle access, on-site circulation systems and parking and service areas: (a) is safe, convenient and legible for all users including people with disabilities, pedestrians, cyclists and public transport services, where relevant; (b) does not interfere with the planned function, safety, capacity, efficiency and operation of the transport network; (c) provides sufficient on-site parking to meet the needs of, and anticipated demand generated by, the development; (d) limit potential conflict between service vehicles, other vehicles and pedestrians; and (e) minimises adverse impacts on the local streetscape character and amenity of the surrounding area.	**AO1.1** The location, design and provision of any site access, access driveways, internal circulation and manoeuvring areas, service areas and parking areas is in accordance with the standards specified in the Planning scheme policy for development works, including ensuring: (a) the number and type of vehicles planned for the development can be accommodated on-site; (b) on-site vehicle parking and manoeuvring areas provide for vehicles to enter and leave the site in a forward motion; and (c) a progressive reduction in vehicle speed between the external transport corridor and internal parking spaces such that lower speeds occur near areas of high pedestrian activity. **AO1.2**	**Generally complies:** The proposed access locations have been discussed and agreed in consultation with Council. The proposed site accesses have been assessed in accordance with: • Sight distance • Separation distance • Turn warrants • Geometric layout provisions As noted in the traffic report all site accesses are provided in accordance with Bundaberg Standard drawings. All site accesses are provided with sufficient stopping sight distance (SSD) suggestions made in Australian Standards (AS2890.1). Onsite parking provisions have been provided with consideration of the parking rates specified in the BRC

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	For assessable development, the number of site access driveways is minimised (usually one), with access to the lowest order transport corridor to which the site has frontage, consistent with amenity impact constraints. **AO1.3** Development provides on-site parking spaces at the rate specified in Table 9.3.5.3.3 (Minimum on-site parking requirements). Note—where the calculated number of spaces in not a whole number, the required number of parking spaces is the nearest whole number. Note—the minimum on-site parking rates specified in Table 9.3.5.3.3 provide for the needs of all users of the development including employees, customers, students and visitors. **AO1.4** Development provides clearly defined pedestrian paths within and around on-site vehicle parking areas that: (a) are located in areas where people will choose to walk; and	planning scheme. It is acknowledged that a minor shortfall in public carparking numbers will occur in the final stage of the development. Appropriate parking management strategies have been proposed onsite where required.

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	(b) ensure pedestrian movement through vehicle parking areas is along aisles rather than across them. **AO1.5** Driveways, internal circulation areas, manoeuvring areas and service areas (including loading and unloading areas and refuse collection facilities) are: (a) designed and provided to accommodate the nominated design vehicles for each development type; and (b) are constructed in accordance with the standards specified in the **Planning scheme policy for development works.**	
Strategic transport network		
PO2 Development, particularly where involving high trip generating land uses or the creation of new roads and other transport corridors, ensures provision of a transport network that: (a) accords with the Strategic transport network as shown on **Strategic Framework Map SFM-003 (Transport and infrastructure elements) and the Priority Infrastructure Plan;**	**AO2** No acceptable outcome provided. Editor's note—**the Planning scheme policy for development works** specifies standards and provides guidance for the design and construction of roads and transport corridors. Editor's note—the Council may require submission of a traffic impact assessment report prepared in accordance with the **Planning scheme policy for**	Complies with performance outcome – It is understood that Council has requested that Harbour Esplanade should be upgraded to an urban typical standard. Acknowledging this road upgrade, it is anticipated that the local road network will be sufficient to cater for increased traffic volumes associated with the development traffic. The development has also been designed with active and public transport demands in mind, providing suitable footpath connectivity between the Burnett

Transport and Parking Code

(b) provides visible distinction of roads, with the design of streets and roads based on function, safety and efficiency; (c) provides convenient, safe and efficient movement for all modes of transport between land use activities with priority given to pedestrian movement and bicycle use over vehicle movements; (d) allows for unimpeded and practical access to the development site and each proposed lot; (e) facilitates and promotes the use of public and active transport, including access to cycle and pedestrian pathways; (f) facilitates a high standard of urban design which reflects a grid pattern (or modified grid pattern) to assist in connectivity and permeability, particularly for pedestrians and cyclists; (g) connects to and integrates with existing roads and other relevant facilities within and external to the land to be developed or subdivided; (h) provides for the dedication and construction of roads where required to allow access to, and proper development of, adjoining land that is intended for development;	**information that Council may require** to demonstrate compliance with Performance outcome PO1.	Heads town centre and proposed public transport provisions. Proposed access roads connect to and integrate with existing roads and other relevant facilities within and external to the land to be developed or subdivided.

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(i) provides for the construction and adequate drainage of all proposed roads, pathways, laneways and bikeways within and adjoining the land to be developed; (j) minimises any adverse impacts on the existing transport network, surrounding land uses, and the amenity of the surrounding environment; and (k) does not adversely impact on wildlife movement corridors.		
PO3 In Woodgate Beach, development provides for the extension and continuation of residential access streets between First Avenue and Seventh Avenue, including but not limited to Palm Court, Jacaranda Court, Oleander Court and Banksia Court, consistent with the established cadastral and road alignment pattern in the area, and so as not to preclude or prejudice access to and development of adjacent and nearby properties	**AO3** No acceptable outcome provided.	N/A
Pedestrian and bicycle network facilities		
PO4 Development provides for the establishment of a safe and convenient network of pedestrian and bicycle paths that:	**AO4** No acceptable outcome provided. Editor's note—**the Planning scheme policy for development works** specifies standards and provides guidance for the design and construction of pedestrian and bicycle paths.	Complies with performance outcomes Safe and convenient movement of pedestrians will be accommodated through the site. In line with the local plan for Burnett Heads pedestrian / cyclist footpaths have been provided connecting the development to the Burnett Heads town centre as well as local residential areas.

Transport and Parking Code

(a) provides a high level of permeability and connectivity; (b) provide for joint usage where appropriate; (c) maximises opportunities to link activity centres, employment areas, residential areas, community facilities, open space and public transport stops located internally and externally to the site; (d) have an alignment that maximises visual interest, allows for the retention of trees and other significant features and does not compromise the operation of or access to other infrastructure; (e) incorporates safe street crossings with adequate sight distances, pavement markings, warning signs and safety rails; and (f) is well lit and located where there is casual surveillance from nearby premises.		
PO5 Appropriate on-site end of trip facilities are provided to encourage walking and cycling as an alternative to private car travel.	**AO5.1** Development for a business activity, community activity, sport and recreation activity, or for rooming accommodation, short-term accommodation, resort complex or air services provides residents, employees and visitors with shower cubicles and ancillary change rooms and lockers (including provision for both males and females) at the following rates:	AO5.1 – As part of the traffic reporting this has not been reviewed. It is recommended that end of trip facilities be incorporated into the commercial part of the development. AO5.2 – Achieved – Refer to Traffic assessment for details on the pedestrian links and bike facilities.

Transport and Parking Code

	(a) 1 cubicle and 5 lockers for the first 5,500m2 of gross floor area, provided that the development exceeds a minimum gross floor area of 1,500m²; plus (b) 1 additional cubicle and 5 additional lockers for that part of the development that exceeds 5,500m2 gross floor area up to a maximum of 30,000m² gross floor area; plus (c) 2 additional cubicles and 10 additional lockers for that part of the development that exceeds 30,000m2 gross floor area. **AO5.2** Development provides bicycle access, parking and storage facilities that: (a) are located close to the building's pedestrian entrance; (b) are obvious and easily and safely accessible from outside the site; (c) do not adversely impact on visual amenity; and (d) are designed in accordance with the **Planning scheme policy for development works.**	

Transport and Parking Code

Public transport facilities		
PO6 Development encourages the use of public transport through: (a) appropriate development design which maximises accessibility via existing and planned public transport facilities; and (b) appropriate provision of on-site or off-site public transport facilities, having regard to the specific nature and scale of development, and the number of people or lots involved.	**AO6.1** Development is designed and arranged to provide safe, convenient and functional linkages to existing and proposed public transport facilities. **AO6.2** On-site public transport facilities are provided in conjunction with the following development: (a) shopping centre, where having a gross floor area of greater than 10,000m²; (b) tourist attraction, having a total use area of greater than 10,000m²; (c) educational establishment, where accommodating more than 500 students; (d) major sport, recreation and entertainment facility; (e) indoor sport and recreation, where having a gross floor area of more than 1,000m2 or for spectator sports; and	Complies with performance outcome – Refer to TIA report regarding public transport provisions. In accordance with Council advice received during the pre-lodgement stage of the application, bus stop infrastructure provisions have been provided along Harbour Esplanade fronting the DP site.

Transport and Parking Code

	(f) outdoor sport and recreation where for spectator sports. **AO6.3** On-street public transport facilities are provided as part of the following development: (a) shopping centre, where having a gross floor area of 10,000m2 or less; (b) tourist attraction, where having a gross floor area of 10,000m2 or less; (c) educational establishment, where accommodating 500 or less students; and (d) indoor sport and recreation where having a gross floor area of 500m2 or less and not for spectator sports. **AO6.4** Where not otherwise specified above, on-street public transport facilities are provided where development is located on an existing or future public transport route. **AO6.5**	

Transport and Parking Code

	Public transport facilities are located and designed in accordance with the standards specified in the **Planning scheme policy for development works.**	
Amenity and environmental impacts of transport infrastructure		
PO7 Development ensures that on-site vehicle access, manoeuvring and parking facilities do not have adverse impacts on people, properties or activities, with regard to light, noise, emissions or stormwater run-off.	**AO7** No acceptable outcome provided.	Complies with performance outcome – The location and design of the internal road network and parking facilities ensure that on-site access, manoeuvring and parking facilities do not have adverse impacts on people, properties or activities, with regard to light, noise, emissions or storm water runoff.
Transport corridor widths, pavement, surfacing and verges		
PO8 Development provides the reserve width and external road works along the full extent of the site frontage, and other transport corridors where appropriate, to support the function and amenity of the transport corridor, including where applicable: (a) paved roadway; (b) kerb and channel; (c) safe vehicular access; (d) safe footpaths and bikeways; (e) safe on-road cycle lanes or verges for cycling.	**AO8** The design and construction of road works, including external road works, is: (a) undertaken in accordance with the **Planning scheme policy for development works**; and (b) consistent with the characteristics intended for the particular type of transport corridor specified in the **Planning scheme policy for development works.**	Complies with performance outcome – The road reserve in its current width is sufficient for the proposed road profile. Stormwater assessments have been undertaken as part of the RMA Stormwater Management plan to indicate no actionable nuisance. Further detailed design is required in operational works applications.

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(f) stormwater drainage; (g) provision of public utility services; (h) streetscaping and landscaping; and (i) provision of street lighting systems, road signage and line marking.		
Intersection and traffic control		
PO9 Development provides for traffic speeds and volumes to be catered for through the design and location of intersections and traffic controls so as to: (a) ensure the function, safety and efficiency of the road network is maintained; (b) minimise unacceptable traffic noise to adjoining land uses; and (c) maintain convenience and safety levels for pedestrians, cyclists and public transport.	**AO9** Intersections and speed control devices are designed and constructed in accordance with the **Planning scheme policy for development works.**	Complies with performance outcome – The development layout ensures that traffic speeds and volumes are sufficiently controlled within the site providing safety and efficiency of the road network, minimising noise from traffic and maintaining convenience and safety for active and public transport. Traffic controls will be implemented where required for straight sections of parking aisles within the development, that exceed 100 m.
Development staging		
PO10 Staged development is planned, designed and constructed to ensure that:	**AO10** No acceptable outcome provided.	The development is to comply with these staging provisions of this performance outcome.

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(a) each stage of the development can be constructed without interruption to services and utilities provided to the previous stages; (b) transport infrastructure provided is capable of servicing the entire development; (c) early bus access and circulation is achieved through the connection of collector roads; and (d) materials used are consistent throughout the development.		

Burnett Harbour Marina Development

Stormwater Management Plan

Date 14 January 2020

Project Number 13101

rmaeng.com.au

REPORT CONTROL SHEET

RMA Ref No	Project No 13101
Site:	Lot 1 on SP1579, Harbour Esplanade, Burnett Heads
Report Title:	Stormwater Management Plan
Report Author:	Hamish Gadischkie / Ben Brown

Document Control					
Revision	Author	Reviewer	Approved for Issue		
			Name	Signature	Date
0	Hamish Gadischkie / Ben Brown	Josh Goodall	Josh Goodall		14/01/20

Disclaimer:

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The conclusions in this report should not be read in isolation. We recommend that its contents be reviewed in person with the author so that the assumptions and available information can be discussed in detail to enable the reader to make their own risk assessment in conjunction with information from other sources.

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Table of Contents

1. Introduction

1.1 General

RMA Engineers Pty Ltd has been commissioned by BH Developments (the Client) to produce a Stormwater Management Plan in support of a development permit application. This report has been prepared:

- In response to BRC's request for further information dated 15 February 2019
- To build upon the high level engineering philosophies presented in RMA's preliminary engineering assessment report dated 24 October 2018. This previously submitted report was prepared over both this site and the adjoining site to the east, which is subject to a separate preliminary approval application before council.

The purpose of this report is to provide specific stormwater and flooding solutions for the development permit area, application number 522.2018.89.1. Some reference is provided to the adjoining and separate preliminary approval area where relevant for modelling consistency.

The development permit will be a material change of use for a staged integrated mixed use commercial, retail, restaurant/café, club, indoor recreation, short term accommodation and multiple dwelling development.

For stormwater quantity and flooding, the report will address:

- A drainage and discharge philosophy for the development
- Management of post-development stormwater discharge rates for the development, including:
  - Calculation of design storm existing peak discharge rates and corresponding water surface levels (WSL's) for the 10%, 1% and 1% including climate change Annual Exceedance Probability (AEP) storm events
  - Calculation of design storm post-development peak discharge rates and corresponding WSL's for the 10%, 1% and 1% AEP (including climate change) storm events
- For stormwater quality, the report will address water quality targets outlined in the July 2017 State Planning Policy (SPP) for the staged development.

1.2 Basis of report

This report has been compiled based on:

- Discussions between RMA Engineers and the Client
- Discussions between RMA Engineers and Bundaberg Regional Council
- Survey prepared by G W SURVEYORS
- Bundaberg City Council Engineering Design Planning Scheme Policy Chapter 2 – Drainage
- Queensland Urban Drainage Manual (QUDM), Volume 1, Fourth Edition 2016
- Australian Rainfall and Runoff (AR&R), 1987
- Council's XPStorm flood model
- July 2017 State Planning Policy (SPP)
- Prelodgement meetings with BRC, held on 27/7/17 and 3/11/17

2. Site characteristics

2.1 Location and description

The site is located on Harbour Esplanade on land described as Lot 1 on SP157913, covering an area of approximately 2.4ha.

It is bounded by Harbour Esplanade to the south, a public access road to the west which leads to a public carpark and boat-ramp to the north-west (refer to callout 1 in **Figure 1**), and the Burnett Heads Harbour to the north.

The site is generally highlighted on the aerial photograph below.

Figure 1: Aerial Photo (QLD Globe)

2.2 Existing uses

The site is predominantly undeveloped, with the exception of the Blue Water Sports Club building (2), Volunteer Marine Rescue (3), and a boat yard with associated caretaker residence (4) and their relative hardstand/sealed areas (refer to **Figure 1**).

The existing land use consists of a few commercial properties with the majority of the land undeveloped and with good grass coverage. The 'bauble' area identified in **Figure 1** (5) has dense grass coverage with a sandy type soil. The area of the site immediately to the east of the bauble area is also sandy.

2.3 Current Planning Scheme zoning

The site is zoned as Community Facility according to BRC online mapping.

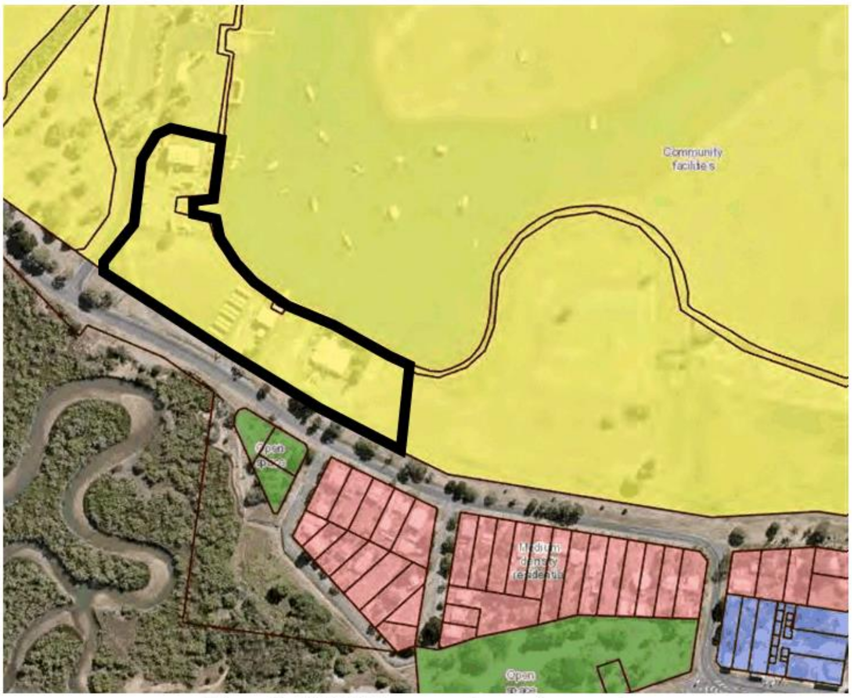

Figure 2: BRC Online mapping zoning overlay

The site is also mapped under several Council and State planning overlays including:

- BRC Acid Sulphate Soils
- BRC Coastal Protection
- BRC Flood Hazard Area Resolution
- SPP Coastal Protection

2.4 Topography and existing drainage

The existing site is relatively flat. The natural contours of the site range from 3.5m to 2.5m, falling in different directions. Refer to **Appendix D** for the detailed site survey.

Site runoff discharges in multiple locations as shown below in **Figure 3**.

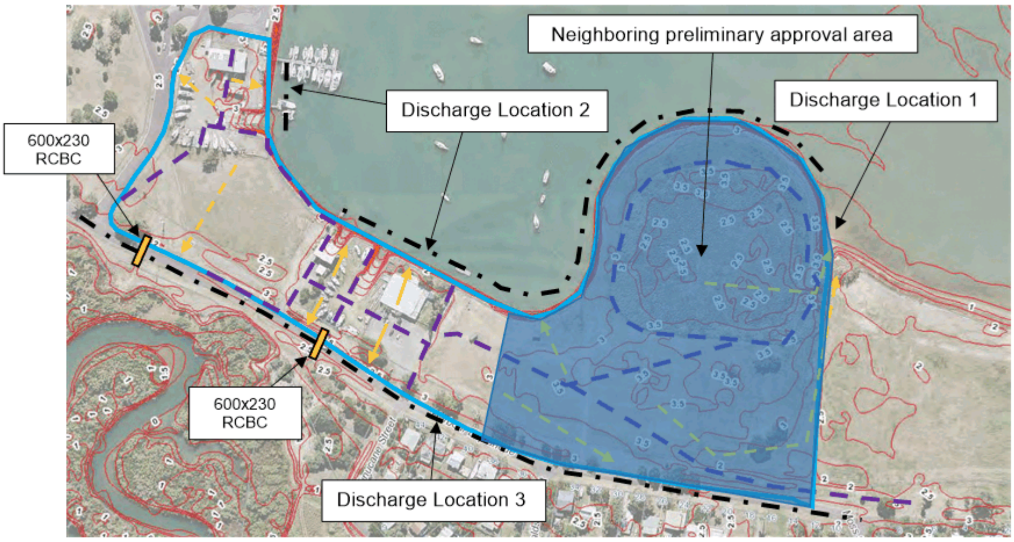

Figure 3: Existing Discharge Locations

Flows originating from external catchments generally discharge through existing stormwater infrastructure to join upstream flows in Wallace Creek, which conveys flows toward the Burnett River. Site runoff generally discharges towards Harbour Esplanade and to the Burnett Heads Harbour itself.

The western side of the site discharges predominantly towards Harbour Esplanade. A section of the boat yard (refer to callout 4 in **Figure 1**) drains directly to the Burnett Heads Harbour at Discharge Location 2 (refer to Figure 3).

The centre of the site drains equally to Harbour Esplanade (Discharge Location 3) and the Burnett Heads Harbour (Discharge Location 2).

The very eastern side of the site drains predominantly through the adjoining preliminary approval area, before discharging to the Burnett Heads Harbour (Discharge Location 2), with a small portion just east of the Blue Water Sports Club draining back to Harbour Esplanade (Discharge Location 3).

The large 'bauble' area of the site acts as an informal retention basin which ponds water and eventually discharges to the Burnett Heads Harbour at Discharge Location 1 as identified in **Figure 3**.

The site is subject to inundation during the design event (refer to **Section 2.5**).

2.5 Council flooding information

Based on BRC's online mapping and Flood Hazard Area Resolution, the site and surrounding areas are subject to flooding as per the images in **Figures 4**, **5** and **6**.

Figure 4: Areas Subject to Storm Tide

Figure 5: Areas Subject to Riverine Flood Events

Figure 6: Local Defined Flood Event Extents

The site is located within a flood hazard area with a storm tide level of 2.92m.

BRC's flood property report for the site (refer to **Appendix E**) references a local DFL of 3.11m. After interrogation of BRC's flood model data, it appears that this level has been taken in the large 'bauble area' (refer to callout 5 in **Figure 1**) that has been formed in the north-east corner of the site.

Refer to **Section 5** for further information regarding existing flood behaviour.

3. Proposed development

3.1 General

The development is proposed to be undertaken in stages.

The area seeking a development permit consists of the following:

- A commercial building containing marina facilities, retail, restaurants, bars, a yacht club, office space and short stay studio apartments
- A series of apartment buildings
- A boardwalk
- Associated driveways and carparking including single level basements for residential parking

Figure 7: Development Permit Site Layout

Refer to **Appendix F** for the proposed site layout plans.

4. Concept Civil Design

4.1 General

As discussed in **Section 2.5**, the site is subject to flooding. To address flood immunity requirements, filling of the site will be required.

Earthworks associated with the proposed development will be detailed in subsequent development permit applications for Operational Works. Earthworks will be designed in accordance with current BRC Planning Scheme Policies, the constraints of the site and good engineering practice.

As noted, the site is located in the Acid Sulphate Soils overlay. A management plan will need to be prepared and integrated into the earthworks operations.

Erosion and sediment control (ESC) measures will be required to be established and maintained in accordance with BRC's current standards. A detailed ESC plan showing how ESC will be managed during the construction phase of the project will be provided as part of future Operational Works applications.

It will be the responsibility of the Principal Contractor to implement, and update as necessary, the ESC plan during the construction phase.

As a result of the filling and earthworks, the impact of the removal of flood storage and alteration of flood behaviours needs to be assessed.

4.2 Site grading and Civil Design Philosophy

In consideration of council's request for information, and in order to prepare a site based stormwater solution for the development site, a civil master planning exercise has been undertaken.

This process included testing different options and incorporating these options into other development drivers with the client and development team.

In reviewing the council's RFI and the client's key drivers for the site, the following list was developed to assess options against:

- To elevate the buildings and surrounding essential infrastructure that could be susceptible to ultimate storm tide effects (as per council's RFI and that the quoted council storm surge Q100 plus climate change level for the site is 2.95m AHD).
- To elevate where possible, other site infrastructure from the effects of frequent influences of saltwater intrusion (including stormwater treatment devices as noted in council's RFI). Highest Astronomical Tide (HAT) for the site is approximately 1.9m AHD. HAT only occurs approximately once every 18 years, therefore this was used as design criteria for addressing 'frequent' salt water influences.
- To consider practical measures to address potential impacts from storm surge on buildings and basements, through elevation and proprietary measures.
- To develop a simplistic site grading philosophy that directed stormwater away from buildings and maintained achievable crossfalls for asphalt carparks.
- Maintain similar overall catchment flow regimes and overflow locations.
- To have vegetated stormwater treatment systems positioned away from high impact visual amenity areas, and concentrate to landscape buffers.
- To introduce some level change between the proposed finished floor levels and the proposed foreshore pathway.

The stormwater management philosophy for the development is to convey a portion of the post-developed site runoff towards the Marina with another portion conveyed to culverts located under Harbour Esplanade.

The following figure illustrates the general stormwater catchment and discharge philosophy for the post-development site.

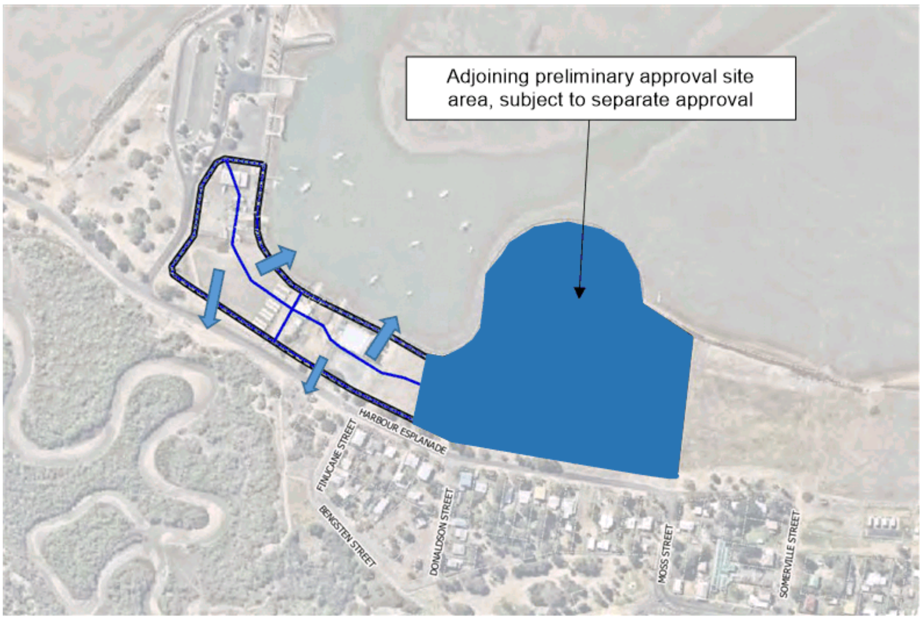

Figure 8: General catchment split

Based on this philosophy and in consideration of the criteria noted above, a site grading and stormwater management philosophy has been developed and is provided in **Appendix G.** This philosophy has incorporated a preliminary finished floor level for buildings which has been seen at 3.9m AHD.

This concept design addresses the criteria above and provides practical solutions to items contained in Council's RFI.

Notable attributes of the design include:

- With the buildings elevated, the car parks and landscaping can grade away from the buildings to stormwater quality devices located along the property boundaries. The stormwater quality devices can be located at select locations to treat runoff prior to flows discharging off-site. These treatment devices can be arranged to compliment the development staging.
- Grades across the proposed carpark allow for suitable cross fall for asphalt pavements
- An additional benefit of grading all stormwater to the boundary of the site is that, as a fail safe, when the stormwater network is exceeded, stormwater overflows into the road reserve and not towards the buildings.
- The stormwater quality devices have been designed in consideration of the highest astronomical tide (HAT). The surface levels of the bioretention basins are at RL2.9m and the invert levels are above RL1.9m (HAT). With the adopted bioretention invert levels and also by adopting salt tolerant plants, as

well as flood flaps or back flow prevention devices, the development is taking all practical steps to protect the longevity of the bioretention basins

- The elevation around buildings also allows for inverts of proprietary stormwater quality devices to be located above HAT, with stormwater outlets including backflow protection for storm surge events.
- Two existing culverts, within Harbour Esplanade, will require upgrades as part of the development works (refer **Section 5.3.2** below).
- Basement threshold levels would be set higher than both the council's nominated storm surge and council's Q100 plus climate change levels. This serves to provide a practical measure to reduce the probability of storm surge and flood waters from entering the basements.
- Basements are likely to incorporate some drainage, for intercepting flows from ramps and nuisance flows. The discharge arrangement for this would likely be a sump and pump, discharging into the buildings stormwater proprietary treatment device (as noted above). This arrangement would therefore not allow backflow surcharging into basements.
- It is understood that some ground water exists in and around the proposed development site. In cases where ground water exists, basements are often designed as per AS 3735 Concrete structure retaining liquids. This solution is referred to as a 'fully tanked' basement solution. The basement may also be designed with a secondary system for redundancy. The secondary system may consist of either a membrane or a concrete additive. The exact structural configuration will be further investigated at detailed design.
- Building foundations will be designed in accordance with the relevant Australian Standards, which consider climatic and environmental effects, and subsequently address durability requirements.
- Councils storm tide modelling was completed by BMT-WBM to inform council's strategic planning. The results of this modelling are documented in BMT-WBM's report Coastal Storm Tide (2013).

  Through initial and preliminary discussions with WBM-BMT it was advised that the site is likely protected from the direct full impact of the open coast. BRC Engineers have advised that council has recently had storm surge modelling peer reviewed to confirm those levels nominated in council's flood check property report.

  It has been a deliberate decision by the developer, that in consideration and additional to the other engineering drivers, to set the finished floor levels of the development to above the 1 in 1000 year storm tide including climate change level (without waves) of 3.82m (as noted in Table 4-5 of BMT-WBM's report Coastal Storm Tide dated 2013).
- Where practical, services will be located above the receiving water levels. Infrastructure necessary to service the development will be designed and constructed to resist hydrostatic and hydrodynamic forces as a result of inundation by the defined flood level (based on assessment in detailed design against probability of events versus measures employed and risk of failure). Services will be designed in accordance with specifications, relevant guidelines and good engineering practice. Many services within the site will be positioned above HAT which as discussed, only is likely once every 18 years.

This proposed concept will be refined through detailed design.

The remainder of this report focuses on detailed stormwater analyses that have been undertaken to support this concept design.

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5. Flooding and stormwater quantity management

5.1 General

Detailed modelling of the post-development catchment behaviour has been undertaken.

The assessment was performed to analyse the effect of development on surrounding properties during three scenarios:

1. "Current day" 1% Annual Exceedance Probability (AEP) with HAT of RL1.9m. This scenario represents the current 1% AEP design requirement.
2. "Current day 2" 10% AEP with HAT of RL1.9m. This scenario was run to examine the impact on the locale during a more frequent storm event.
3. "Future" 1% AEP with an allowance for climate change (1% AEP + CC), with HAT plus climate change of RL2.95m. This scenario was run to examine the provision for climate change as required by Council's planning scheme.

For the "Current day" 1% AEP and "Current day" 10% AEP scenarios, work was undertaken using a node-inflow XPStorm model. In these types of models, catchment areas are coupled together with their relative fractions impervious, associated losses and approximate topographic characteristics to calculate an inflow. This inflow is then applied at respective inflow nodes located within the model.

For the "Future" 1% AEP + CC scenario, the XPStorm model encountered a known software issue. The rainfall generator within the XPStorm software malfunctioned and incorrect hydrographs were inserted into the model. Given the rainfall issue is a software based problem which the user has no control over, the XPStorm model was converted to a Tuflow model. Therefore, the "Future" 1% AEP + CC scenario has been assessed with a Tuflow model which has been setup from the data in the XPStorm model.

The hydraulic analysis considered both pre-development and post-development scenarios, based on a range of storm durations. To identify development impacts, an envelope of maximum water surface levels (WSL's) were compared for each scenario.

For wholeness and consistency with the previous modelling, the neighbouring preliminary approval site was included in the post-development flood modelling. This site was directed to the Marina, as per one of the options in the previous modelling. The downstream drainage within the residential area to the south is unlikely to accommodate the lower ARI events runoff from that development.

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5.2 Stormwater quantity assessment

The QUDM lawful point of discharge test was used to assess the potential impact of the development on each discharge location.

The following figure shows the lawful point of discharge criteria as per QUDM 2016.

The criteria for determining the lawful point of discharge are:

(i) Will the proposed development alter the site's stormwater discharge characteristics in a manner that may substantially damage a third party property[ii] (see Section 3.6)?

- If not, then no further steps are required to obtain tenure for a lawful point of discharge (assuming any previous circumstances and changes were lawful).
- If there is a reasonable risk of such damage, then consider issue (ii) or (iii).

(ii) Is the location of the discharge from the development site under the lawful control of the local government or other statutory authority from whom permission to discharge has been received? This will include a park, watercourse, drainage or road reserve, stormwater registered drainage easement, or land held by local government (including freehold land).

Note: The regulatory authority (in its capacity as land holder) is likely to require information about the potential impact of the site's stormwater discharge characteristics on third party properties (particularly those downstream of the proposed discharge point) before it will consent to the discharge entering its land.

- If so, then no further steps are required to obtain tenure for a lawful point of discharge.
- If not, then consider issue (iii). A land owner or regulator may require that the developer obtain an authority to discharge as described in (iii) in order for the stormwater to ultimately flow to a location described in (ii).

(iii) An authority to discharge over affected properties will be necessary. In descending order of certainty, an authority may be in the form of:

- Dedication of a drainage reserve or park
- A registered easement for stormwater discharge/works
- Written discharge approval

Figure 9: Lawful point of discharge test (QUDM 2016)

5.3 Existing (pre-development) model

5.3.1 General

The existing XPStorm model was generated from an older node-inflow model obtained from Bundaberg Regional Council. The model represents the existing site and infrastructure as reflected in BRC's online mapping and confirmed by a site inspection and detailed survey.

5.3.2 Supplied model adjustments

For the purpose of the XPStorm analysis, the grid orientation has been aligned to run parallel to Harbour Esplanade and the development sites southern property boundary.

Some nearby existing stormwater infrastructure was excluded in Council's original model. That infrastructure was updated within the model, based on detailed survey and site inspections.

The following figure generally outlines the infrastructure within the vicinity of the site.

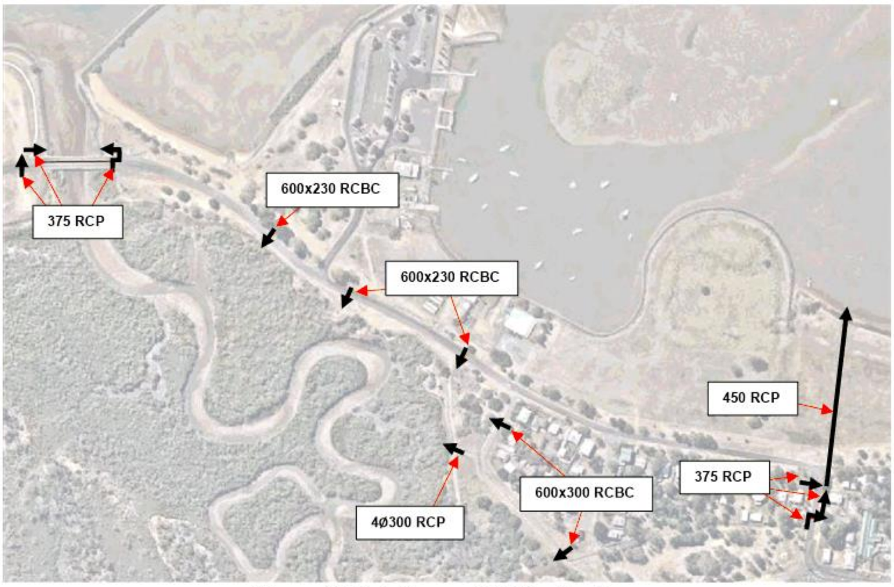

Figure 10: Existing model infrastructure

The existing model surface was generated from LiDAR survey data (supplied within the XPStorm model), as indicated in the relief map below.

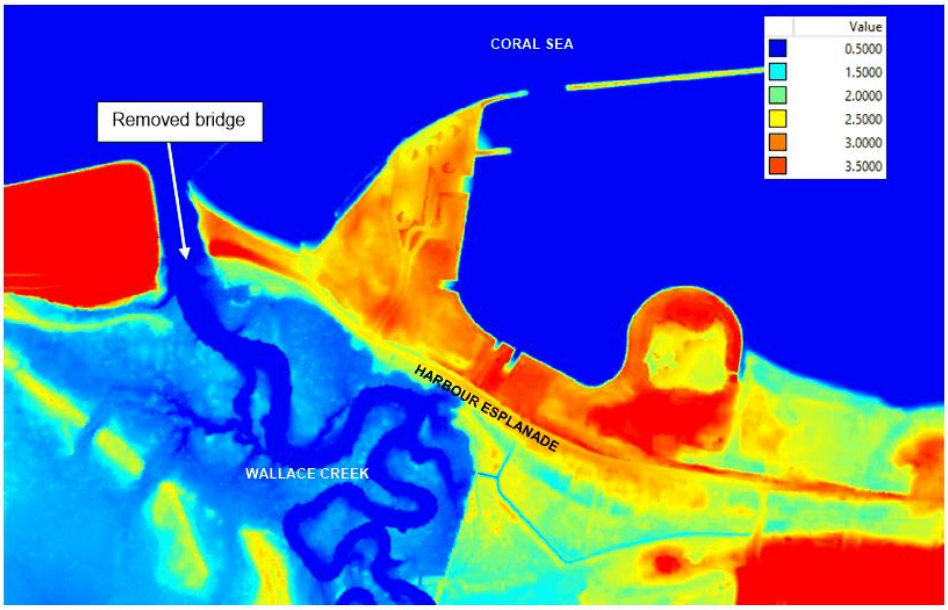

Figure 11: Existing model surface

The bridge between the western and eastern banks at the mouth of Wallace Creek had been removed from the existing model LiDAR, by BRC.

5.3.3 Existing catchments

The existing scenario catchments were adjusted to define flow locations within the vicinity of the site. An existing scenario catchment plan is included in **Appendix A** which includes catchment details.

5.4 Post-development model

5.4.1 Model surface

A site grading for the development, as well as a conceptual Harbour Esplanade road profile, was created in 12D. The 12D surfaces were imported into the 2D hydraulic model and used in the analysis.

As previously mentioned, the preliminary approval site was conceptually included in the model for wholeness and consistency from the previous flood modelling. An elevation shape was used to represent the filling of the Preliminary Approval site above inundation levels. The elevation shape was adjusted to drain to the Marina.

A relief map of the surface is provided below.

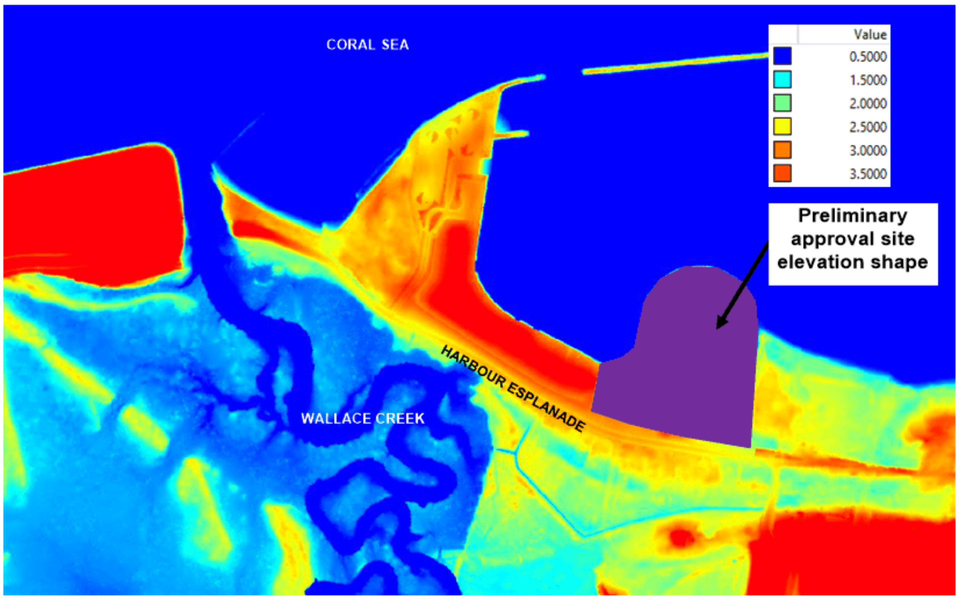

Figure 12: Post-developed model surface

5.4.2 Model infrastructure

As the development is located adjacent to the Marina and near the mouth of Wallace Creek, on-site detention has not been incorporated into the analysis. The best solution for the development is to allow flows to discharge un-detained.

The existing culverts under Harbour Esplanade were upgraded to accommodate increased flows from the development site. These locations were maintained in order to discharge stormwater to Wallace Creek at the same location as the existing condition.

Earthworks at the outlet locations were also incorporated into the model via elevation shapes. These were introduced to accommodate a lowering of the invert level of these crossing to achieve suitable cover on the drainage. The final location and form of the outlet works will be done at detailed design and in consideration of the requirements of a subsequent prescribed tidal works application.

Council have also noted the future intention to have Harbour Esplanade upgraded to a trunk collector standard, as such, it is anticipated that these outlets would be incorporated into upgraded road drainage.

The following figure outlines the culvert locations and elevation shapes.

Figure 13: Culvert locations and elevation shapes

At the two culvert locations a 750x600 RCBC was adopted.

As part of the Stage 1A works (Building B) , the culvert at Culvert Location 1 (refer **Figure 13**) will be upgraded.

As part of the Stage 2A works (Building E), the culvert at Culvert Location 2 (refer **Figure 13**) will be upgraded.

5.4.3 Post-development catchments

The post-development scenario catchments were adjusted to define flow locations within the vicinity of the site. A developed scenario catchment plan is included in **Appendix A** which includes catchment details.

5.5 Model parameters

The cell size nominated in the Council supplied model has been unchanged. The 2D hydraulic modelling has continued to adopt a 4m cell size.

The active model domain has also remained unchanged from Council's original model.

Manning's values have been adopted from Council's supplied model. The following table outlines the adopted Manning's roughness values.

Table 1: Adopted roughness parameters

Land Use	Manning's Roughness
Unmaintained Grass	0.040
Sugarcane	0.080
Sparse Forest	0.050
Dense Forest	0.080
Road	0.020
Low Density Urban Residential	0.100
Medium Density Urban Residential	0.300
Sand	0.020
Creek	0.040

Originally, a range of storm durations of 15, 20, 25, 30, 45, 60, 90, 120, 180, 270, 360 and 540 minutes were modelled.

Following subsequent model runs, it was determined that the storm runs that produced critical levels in the resulting envelope of maximums could be limited to the 25, 45, 60, 90, 120, 270, 360 and 540 minute storms.

The following table outlines the adopted rainfall depths (2016 IFD's) for relevant storm durations and AEP's for the 1987 design storm temporal rainfall patterns.

Table 2: IFD rainfall depth

Storm (min)	10% AEP Depth (mm)	1% AEP Depth (mm)	1% AEP + CC Depth (mm)
25	51.60	73.30	81.73
45	67.00	96.40	107.490
60	75.1	109.00	121.54
90	876	129.00	143.84
120	97.3	146.00	162.79
270	130.00	204.00	227.46
360	145.00	229.00	255.34
540	167.00	270.00	301.05

The 1% AEP + CC rainfall depths include an 11.5% increase on 2016 IFD rainfall depths. The IFD data was obtained from the Australian Bureau of Meteorology's IFD tables, consistent with Australian Rainfall and Runoff 2016 (ARR 2016) Chapter 1, Book 6, and the Australian Rainfall and Runoff Data Hub (ARR 2016) interim climate change factors for the development site location.

Rainfall losses within the model reflect those adopted in BRC's original model and Planning Scheme (**Table 3**).

Table 3: Adopted rainfall losses

Loss Type	Impervious areas	Pervious areas
Initial (mm)	0	0
Continuing (mm/h)	0	2.5

A height versus time boundary condition was set as the downstream boundary for the model. For the analysis, the downstream boundary adopted a constant level of 1.9m for the 1% AEP and 10% AEP scenarios, and 2.95m for the 1% AEP + CC scenario.

The Tuflow model, used in assessing the "Future" 1% AEP + CC scenario, has also been based on the parameters outlined above.

5.6 Results

5.6.1 Peak water surface level comparisons

Flood extent maps for both the existing and developed scenarios are included in **Appendix B**.

Water surface level difference plots have been prepared for the following scenarios:

› "Current" day 1% AEP

› "Current" day 10% AEP

› "Future" 1% AEP + CC

The following outlines the comparison results.

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5.6.2 "Current" day 1% AEP

The following figure outlines the comparison for the "Current" day 1% AEP.

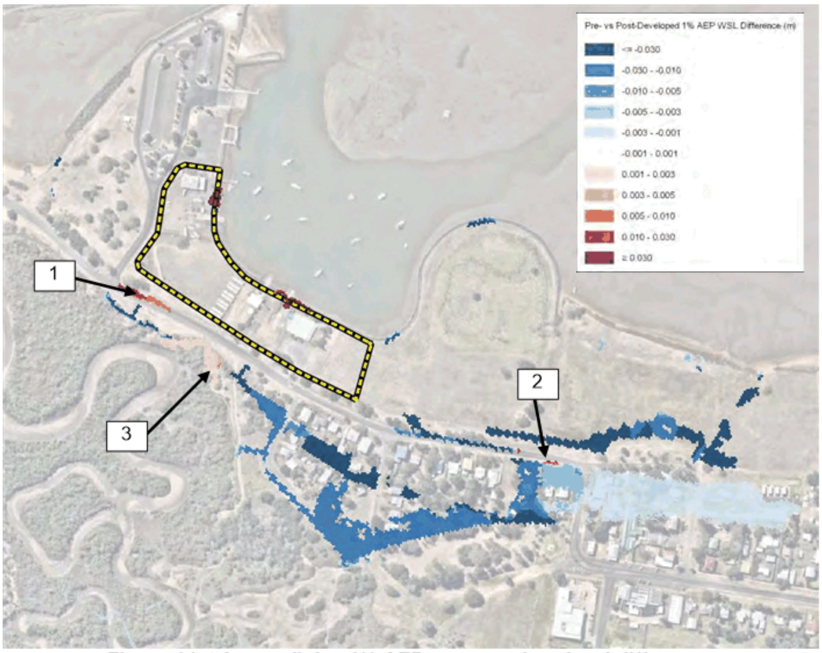

Figure 14: "Current" day 1% AEP water surface level difference

The slight increase in water surface levels identified at location 1 and 2 on **Figure 14** are a result of the conceptual Harbour Esplanade road surface. As the post-development surface is slightly different to the existing scenario, small variances in the water surface level have occurred. The slight increases are not considered an actionable nuisance as the differences are limited to the road reserve area.

The slight increase in Wallace Creek (refer location 3 on **Figure 14**) will not result in an actionable nuisance with quantifiable loss. The slight increase in located within an area which is already inundated during storm events.

Within the vicinity of the site, some minor water surface level reductions are shown within the neighbouring residential area.

A water surface level difference plot for the "Current" day 1% AEP scenario is included in **Appendix B**.

5.6.3 "Current" day 10% AEP

The following figure outlines the comparison for the "Current" day 10% AEP.

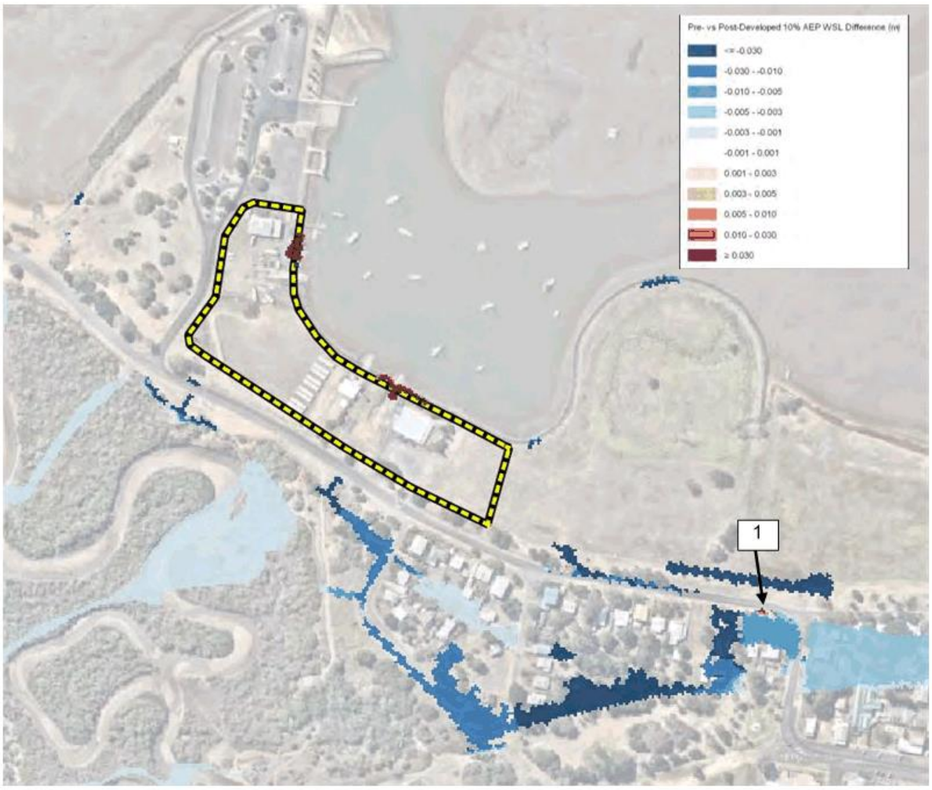

Figure 15: "Current" day 10% AEP water surface level difference

The slight increase in water surface levels identified at location 1 on **Figure 15** are a result of the conceptual Harbour Esplanade road surface. As the post-development surface is slightly different to the existing scenario, small variances in the water surface level have occurred. The slight increases are not considered an actionable nuisance as the differences are limited to the road reserve area.

Within the vicinity of the site, some minor water surface level reductions are shown within the residential area.

A water surface level difference plot for the "Current" day 10% AEP scenario is included in **Appendix B**.

5.6.4 "Future" 1% AEP + CC

The following figure outlines the comparison for the "Future" 1% AEP + CC.

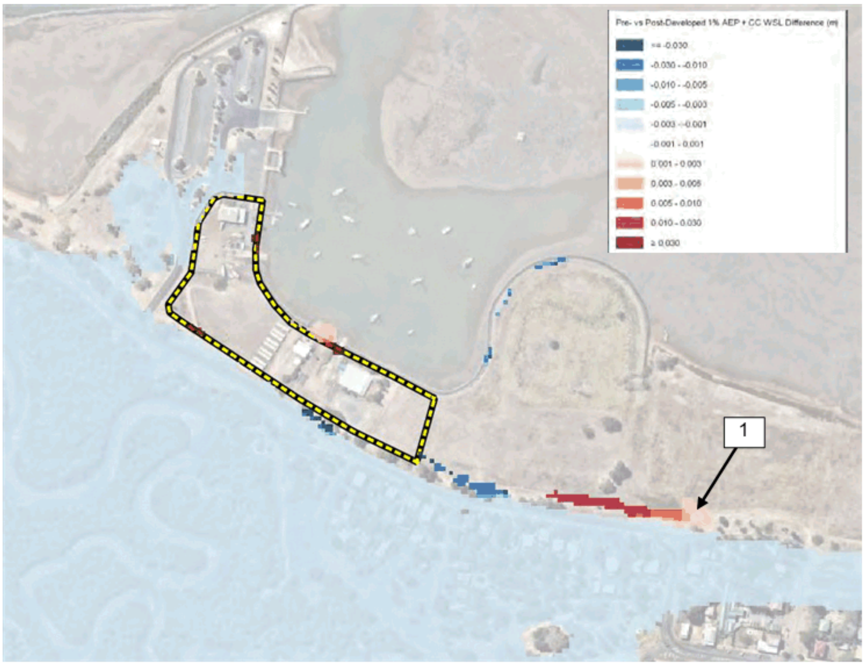

Figure 16: "Future" 1% AEP + CC water surface level difference

The slight increase in water surface levels identified at location 1 on **Figure 16** are not considered an actionable nuisance. The slight increase in water surface levels are generally less than 3mm. This impact is also related to the inclusion of the adjoining preliminary approval area into the modelling, which would be subject to future impact assessments when development applications are lodged over this area.

The results indicate no significant change occurs within the neighbouring residential area.

As a Tuflow HPC GPU licence was used in the assessment of the "Future" 1% AEP + CC scenario, the software automatically adjusts the timestep to optimise model run times. The slight decrease of 1mm within the Wallace Creek area is attributable to the variable timestep between the existing and developed scenario model runs.

A water surface level difference plot for the "Future" 1% AEP scenario is included in **Appendix B**.

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5.6.5 Modelling Outcomes

Based on the three scenario's, the following have been observed:

- For all modelled events, no actionable nuisance with quantifiable loss has been identified.
- The site grading and stormwater discharge concept, derived for the development layout, generally resembles the existing drainage characteristics within the area and directs flows away from the neighbouring adjacent residential areas.
- The impact of the adjoining preliminary approval site has also been addressed, with favourable results that would be anticipated to be further refined in further flood modelling at the appropriate time for that development.

5.6.6 Council Flood Hazard Code

A response to the Council Flood Hazard Code is included in **Appendix C**.

6. Stormwater quality management

6.1 General

The State Planning Policy (SPP) released in July 2017 provides new guidelines on the application of stormwater quality treatment.

The site is located within the Central Coast (South) climatic region. The SPP states that the pollutant reduction design objectives for the Central Coast (South) climatic region are applicable for an application for Material Change of Use for an urban purpose that involves premises 2,500m^2 or greater in size and will result in either six or more dwellings or an impervious area greater than 25% of the net developable area.

The development triggers these criteria.

Table 4: SPP Design Objectives for the Central Coast (South) climatic region

Indicator	Reduction in average annual pollutant load discharging from the site
Total Suspended Solids (TSS)	85%
Total Phosphorous (TP)	60%
Total Nitrogen (TN)	45%
Gross Pollutants (GP)	90%

6.2 MUSIC model

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC version 6) water quality modelling software has been adopted to develop a concept stormwater treatment train and analyse stormwater quality impacts for the development.

Modelling has been carried out in accordance with the MUSIC Modelling Guideline v1.0 – 2010.

6.3 Model parameters

6.3.1 Catchments

The MUSIC analysis has been undertaken for each stage of the proposed development.

In accordance with the MUSIC Modelling Guidelines, the proposed development has been split into various catchments for the purposes of modelling in MUSIC.

Areas for the catchment types have been adopted based on site layout plans (refer to **Appendix G** for the conceptual plan that outlines the catchments relevant to quality analysis).

The following table summarises the individual catchment area characteristics used in the modelling, for each stage of the development.

Table 5: Staged Catchment Areas (for MUSIC)

Development Stage	Catchment	Area (ha)	Percentage Impervious (%)	Discharge Direction
Stage 1A	S1A_Commercial_Ground	0.081	50	Harbour Esplanade
	S1A_Commercial Road	0.324	100	Harbour Esplanade
	S1A_M_Commercial_Ground	0.058	50	Marina
	S1A_M_Commercial_Roof	0.051	100	Marina
Stage 1B	S1B_Commercial_Ground	0.039	50	Harbour Esplanade
	S1B_Commercial_Road	0.158	100	Harbour Esplanade
	S1B_Commercial Roof	0.114	100	Harbour Esplanade
	S1B_M_Commercial_Ground	0.070	50	Marina
	S1B_M_Commercial_Roof	0.030	100	Marina
Stage 2A	S2A_Commercial_Ground	0.084	50	Harbour Esplanade
	S2A_Commercial_Road	0.127	100	Harbour Esplanade
	S2A_Commercial Roof	0.016	100	Harbour Esplanade
	S2A_M_Commercial_Ground	0.096	50	Marina
	S2A_M_Commercial_Roof	0.073	100	Marina
Stage 2B	S2B_Commercial_Ground	0.099	50	Harbour Esplanade
	S2B_Commercial_Road	0.099	100	Harbour Esplanade
	S2B_Commercial Roof	0.004	100	Harbour Esplanade
	S2B_M_Commercial_Ground	0.090	50	Marina
	S2B_M_Commercial_Roof	0.091	100	Marina
Stage 3	S3_Commercial_Ground	0.109	50	Harbour Esplanade
	S3_Commercial_Road	0.109	100	Harbour Esplanade
	S3_Commercial Roof	0.081	100	Harbour Esplanade
	S3_M_Commercial_Ground	0.094	50	Marina
	S3_M_Commercial_Roof	0.056	100	Marina
Stage 4	S4_Commercial_Ground	0.008	50	Harbour Esplanade
	S4_Commercial_Road	0.076	100	Harbour Esplanade

	S4_M_Commercial_Ground	0.077	50	Marina
	S4_M_Commercial_Road	0.028	100	Marina
	S4_M_Commercial_Roof	0.047	100	Marina

6.3.2 Rainfall data

The following rainfall and potential evapotranspiration (PET) data has been adopted.

Table 6: Rainfall and PET data (for MUSIC)

Council	Station ID	Station Name	Climate Period
Bundaberg Regional Council	39128	Aero Bundaberg	01/07/2000 – 30/06/2010

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
188.2	149.8	155.3	118.7	89.7	76.9	77.2	97.7	120.9	155.3	175.1	183.7

6.3.3 Source nodes

The following tables summarise the recommended rainfall runoff parameters and pollutant export parameters for split catchment land use that have been used in the MUSIC model.

Table 7: Source nodes - pollutant export parameters

Parameter	Commercial Land Use
Rainfall Threshold (mm)	1
Soil Storage Capacity (mm)	18
Initial Storage (% capacity)	10
Field Capacity (mm)	80
Infiltration Capacity Coefficient, a	243
Infiltration Capacity Exponent, b	0.6
Initial Depth (mm)	50
Daily Recharge Rate (%)	0
Daily Baseflow Rate (%)	31
Daily Deep Seepage Rate (%)	0

Table 8: Source nodes - pollutant export parameters

Land Use	Surface Type	Flow Type	TSS Log_{10} values (mg/L)		TP Log_{10} values (mg/L)		TN Log_{10} values (mg/L)	
			Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Commercial	Roof	Baseflow	-	-	-	-	-	-
	Roads	Baseflow	0.78	0.39	-0.60	0.50	0.32	0.30
	Ground	Baseflow	0.78	0.39	-0.60	0.50	0.32	0.30
Commercial	Roof	Stormflow	1.30	0.38	-0.89	0.34	0.37	0.34
	Roads	Stormflow	2.43	0.38	-0.30	0.34	0.37	0.34
	Ground	Stormflow	2.16	0.38	-0.39	0.34	0.37	0.34

6.1 Treatment train

6.1.1 MUSIC model schematic

The MUSIC model schematic in the figure below outlines a conceptual treatment train for the overall development.

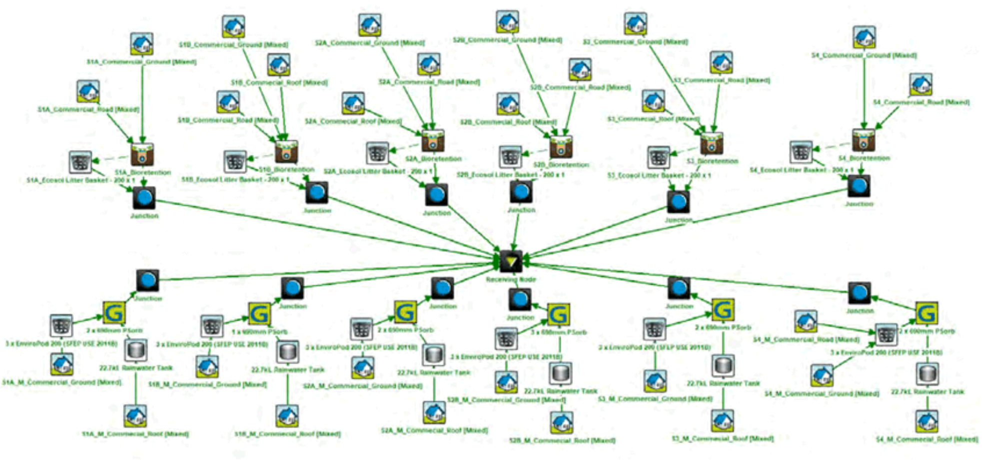

Figure 17: MUSIC model schematic for the overall development

6.1.2 Treatment devices

The following tables outline details of the various treatment components included in the treatment train analysis.

Ecosol litter baskets (200μm)

Table 9: Characteristics of the proposed treatment device – Ecosol Litter Baskets 200μm

Parameter	Value
Low Flow By-pass (m^3/s)	0.000
High Flow By-pass (m^3/s)	0.050
Other parameters	As per manufacturers specification

The Ecosol Litter Baskets will be located in the bioretention basin overflow pits which discharge towards Harbour Esplanade.

Bioretention basins

Table 10: Bioretention basin characteristics

Parameter	S1A Bioretention	S1B Bioretention	S2A Bioretention	S2B Bioretention	S3 Bioretention	S4 Bioretention
Extended Detention Depth	0.10m	0.10m	0.10m	0.10m	0.10m	0.10m
Saturated Hydraulic Conductivity	200 mm/hr	200 mm/hr	200 mm/hr	200 mm/hr	200 mm/hr	200 mm/hr
Filter Depth	0.50m	0.50m	0.50m	0.50m	0.50m	0.5m
Surface Area	49m^2	39m^2	27m^2	22m^2	36m^2	11m^2
Filter Area	49m^2	39m^2	27m^2	22m^2	36m^2	11m^2
TN Content of Filter Media	400mg/kg	400mg/kg	400mg/kg	400mg/kg	400mg/kg	400mg/kg
Orthophosphate Content of Filter Media	30mg/kg	30mg/kg	30mg/kg	30mg/kg	30mg/kg	30mg/kg
Overflow Weir Width	3.6m	3.6m	3.6m	3.6m	3.6m	3.6m
Underdrain	Yes	Yes	Yes	Yes	Yes	Yes

The bioretention basins will discharge towards Harbour Esplanade.

The naming convention for each of the bioretention basin correlates to the development staging.

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EnviroPod 200 (SPEP USE 2011B)

Table 11: Characteristics of the proposed treatment device - EnviroPods

Parameter	S1A_M	S1B_M	S2A_M	S2B_M	S3_M	S4_M
Quantity	3	3	3	3	3	3
Low Flow By-pass (m^3/s)	0.000	0.000	0.000	0.000	0.000	0.000
High Flow By-pass (m^3/s)	0.060	0.060	0.060	0.060	0.060	0.060

The EnviroPod 200 litter baskets will be located upstream of the 690mm Phosphosorb media devices.

The naming convention for each of the EnviroPods correlates to the development staging.

690mm Phosphosorb Media

Table 12: Characteristics of the proposed treatment device - 690mm Phosphosorb media

Parameter	S1A_M	S1B_M	S2A_M	S2B_M	S3_M	S4_M
Quantity	2	1	2	3	2	2
Low Flow By-pass (m^3/s)	0.000	0.000	0.000	0.000	0.000	0.000
High Flow By-pass (m^3/s)	0.0018	0.0009	0.0018	0.0027	0.0018	0.0018

Outflows from the 690mm Phosphosorb media are directed to the Marina.

The naming convention for each of the Phosphosorb media devices correlates to the development staging.

Refer to **Appendix H** for 690mm Phosphosorb media details.

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Rainwater Tanks

Table 13: Characteristics of rainwater tanks

Parameter	S1A_M	S1B_M	S2A_M	S2B_M	S3_M	S4_M
Volume (kL)	22.7	22.7	22.7	22.7	22.7	22.7
Depth above overflow (m)	0.2	0.2	0.2	0.2	0.2	0.2
Surface Area (m^2)	10	10	10	10	10	10
Overflow Pipe (mm)	300	300	300	300	300	300
Irrigation Demand (kL/yr distribution PET – Rain)	120	144	197	185	193	158

Outflows from the rainwater tanks are directed to the 690mm Phosphosorb media devices prior to discharging to the Marina.

The naming convention for each of the rainwater tanks correlates to the development staging.

The irrigation demand for each rainwater tank has been calculated in accordance with the MUSIC Modelling Guideline. An annual irrigation rate of 548mm has been adopted along with an effective irrigation area based on 75% of the catchment pervious area.

6.2 MUSIC results

6.2.1 General

The MUSIC model results for the various development stages are outlined below.

6.2.2 Stage 1A

MUSIC model results from the Stage 1A analysis are shown below.

Table 14: Treatment train MUSIC model Stage 1A results

Indicator	Sources	Residual Load	Percentage Reduction Achieved	Target Reductions
Total Suspended Solids (kg/yr)	1,040	149	85.7%	85%
Total Phosphorous (kg/yr)	1.97	0.442	77.5%	60%
Total Nitrogen (kg/yr)	10.7	5.73	46.5%	45%
Gross Pollutants (kg/yr)	72.4	0	100%	90%

The results show Stage 1A of the development achieves the SPP pollutant reduction targets.

6.2.3 Stage 1B

MUSIC model results from the Stage 1B analysis are shown below.

Table 15: Treatment train MUSIC model Stage 1B results

Indicator	Sources	Residual Load	Percentage Reduction Achieved	Target Reductions
Total Suspended Solids (kg/yr)	573	82	85.7%	85%
Total Phosphorous (kg/yr)	1.24	0.318	74.5%	60%
Total Nitrogen (kg/yr)	8.42	4.37	48.1%	45%
Gross Pollutants (kg/yr)	58	0	100%	90%

The results indicate Stage 1B of the development achieves the SPP pollutant reduction targets.

6.2.4 Stage 2A

MUSIC model results from the Stage 2A analysis are shown below.

Table 16: Treatment train MUSIC model Stage 2A results

Indicator	Sources	Residual Load	Percentage Reduction Achieved	Target Reductions
Total Suspended Solids (kg/yr)	577	83.7	85.5%	85%
Total Phosphorous (kg/yr)	1.25	0.332	73.4%	60%
Total Nitrogen (kg/yr)	7.92	4.22	46.8%	45%
Gross Pollutants (kg/yr)	52.6	0	100%	90%

The analysis indicates Stage 2A of the development achieves the SPP pollutant reduction targets.

6.2.5 Stage 2B

MUSIC model results from the Stage 2B analysis are shown below.

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Table 17: Treatment train MUSIC model Stage 2B results

Indicator	Sources	Residual Load	Percentage Reduction Achieved	Target Reductions
Total Suspended Solids (kg/yr)	518	77.7	85.0%	85%
Total Phosphorous (kg/yr)	1.17	0.312	73.3%	60%
Total Nitrogen (kg/yr)	7.52	3.97	47.2%	45%
Gross Pollutants (kg/yr)	50.2	0	100%	90%

The analysis indicates Stage 2A of the development achieves the SPP pollutant reduction targets.

6.2.6 Stage 3

MUSIC model results from the Stage 3 analysis are shown below.

Table 18: Treatment train MUSIC model Stage 3 results

Indicator	Sources	Residual Load	Percentage Reduction Achieved	Target Reductions
Total Suspended Solids (kg/yr)	552	78.9	85.7%	85%
Total Phosphorous (kg/yr)	1.29	0.339	73.7%	60%
Total Nitrogen (kg/yr)	8.95	4.68	47.7%	45%
Gross Pollutants (kg/yr)	59.7	0	100%	90%

The results indicate Stage 3 of the development achieves the SPP pollutant reduction targets.

6.2.7 Stage 4

MUSIC model results from the Stage 4 analysis are shown below.

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Table 19: Treatment train MUSIC model Stage 4 results

Indicator	Sources	Residual Load	Percentage Reduction Achieved	Target Reductions
Total Suspended Solids (kg/yr)	389	48.2	87.6%	85%
Total Phosphorous (kg/yr)	0.81	0.229	71.7%	60%
Total Nitrogen (kg/yr)	4.77	2.43	49.0%	45%
Gross Pollutants (kg/yr)	32.3	0	100%	90%

The results indicate Stage 4 of the development achieves the SPP pollutant reduction targets.

6.2.8 Overall development

MUSIC model results from the overall development are shown below.

Table 20: Treatment train MUSIC model overall development results

Indicator	Sources	Residual Load	Percentage Reduction Achieved	Target Reductions
Total Suspended Solids (kg/yr)	3,650	521	85.7%	85%
Total Phosphorous (kg/yr)	7.73	1.97	74.5%	60%
Total Nitrogen (kg/yr)	48.3	25.4	47.4%	45%
Gross Pollutants (kg/yr)	325	0	100%	90%

The analysis shows the overall development achieves the minimum SPP pollutant reduction targets.

The preliminary configuration of the stormwater quality devices for each stage are shown on the schematic civil concept plan shown in **Appendix G**. It is anticipated that these locations will be refined in detailed design in accordance with the modelling outcomes of this report.

6.2.9 Sensitivity analysis for the overall development

In accordance with the MUSIC Modelling Guideline, a sensitivity test of the MUSIC model was undertaken with the hydraulic conductivity of the bioretention basins reduced from 200mm/hr to 50mm/hr.

The following table outlines the results of the sensitivity analysis for the overall development.

Table 15: Sensitivity MUSIC model overall development results

Indicator	Sources	Residual Load	Percentage Reduction Achieved	Target Reductions
Total Suspended Solids (kg/yr)	3,680	615	83.3%	85%
Total Phosphorous (kg/yr)	7.68	2.21	71.2%	60%
Total Nitrogen (kg/yr)	48.0	28.5	40.7%	45%
Gross Pollutants (kg/yr)	325	0	100%	90%

The sensitivity analysis shows the treatment train is generally robust. Should the hydraulic conductivity of the bioretention basins be reduced, significant pollutant reductions will still be achieved.

6.3 Stormwater quality discussion

The analysis indicates the combination of both vegetated bioretention basins and proprietary stormwater treatment devices achieves the minimum pollutant reductions outlined in the SPP.

In coastal areas, plant selections for bioretention basins should be based on salt tolerant plant species. During detailed design, the plant species for the bioretention basins will be determined in consultation with a Landscape Architect, or a suitably qualified person.

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7. Conclusion

This report has investigated the impacts of the proposed development on flooding, stormwater quantity and quality.

A concept design has been prepared that addresses development drivers as well as provides practical design philosophies that address council's RFI items. These design philosophies can be further developed in the detailed design process for the site.

Hydraulic modelling demonstrates that the stormwater philosophy of conveying a portion of the site runoff to the Marina and another portion to Harbour Esplanade will not result in an actionable nuisance with quantifiable loss to neighbouring properties.

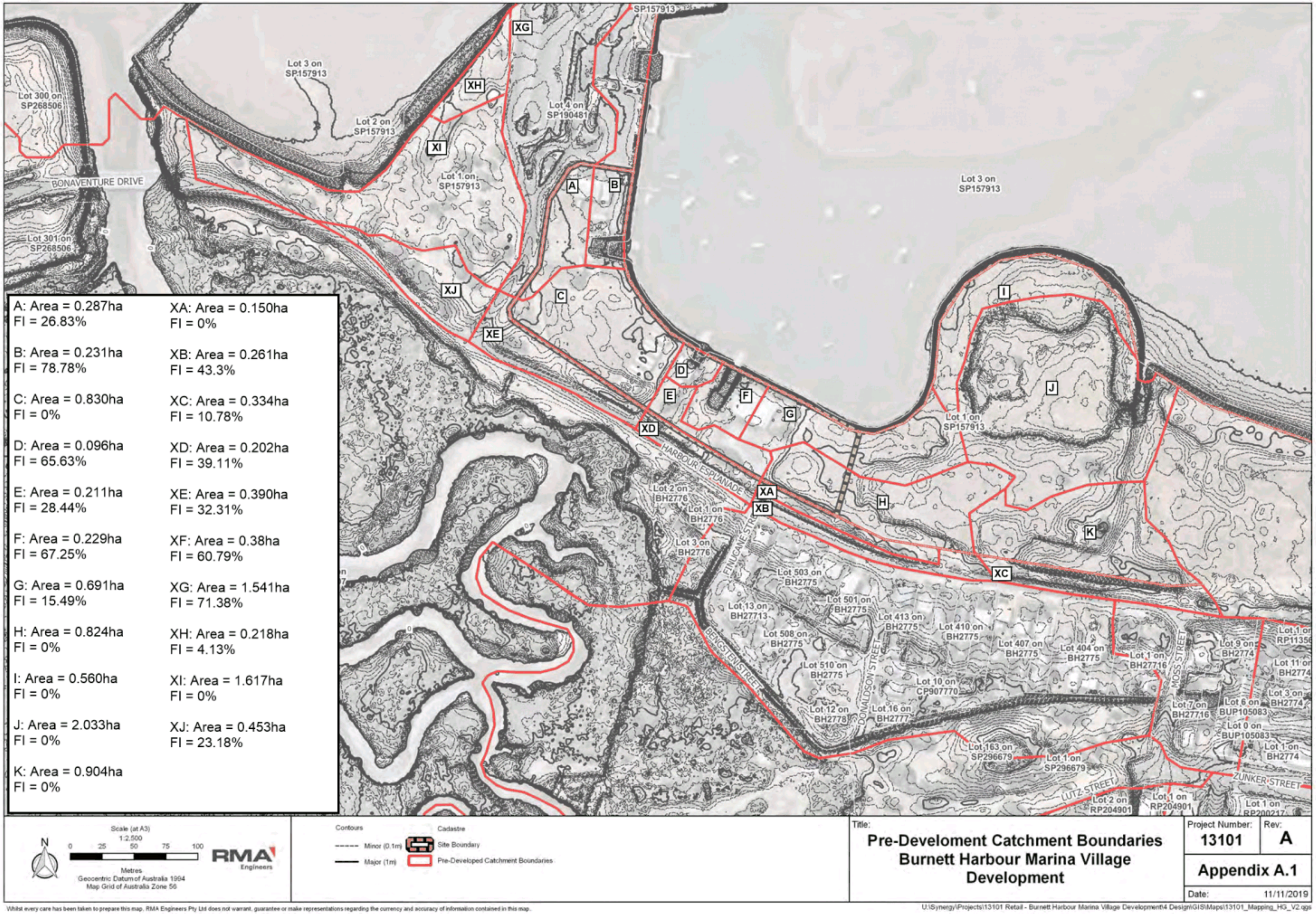
Given the location of the development next to the Marina and within close proximity to the mouth of Wallace Creek, no on-site detention is necessary for the development.

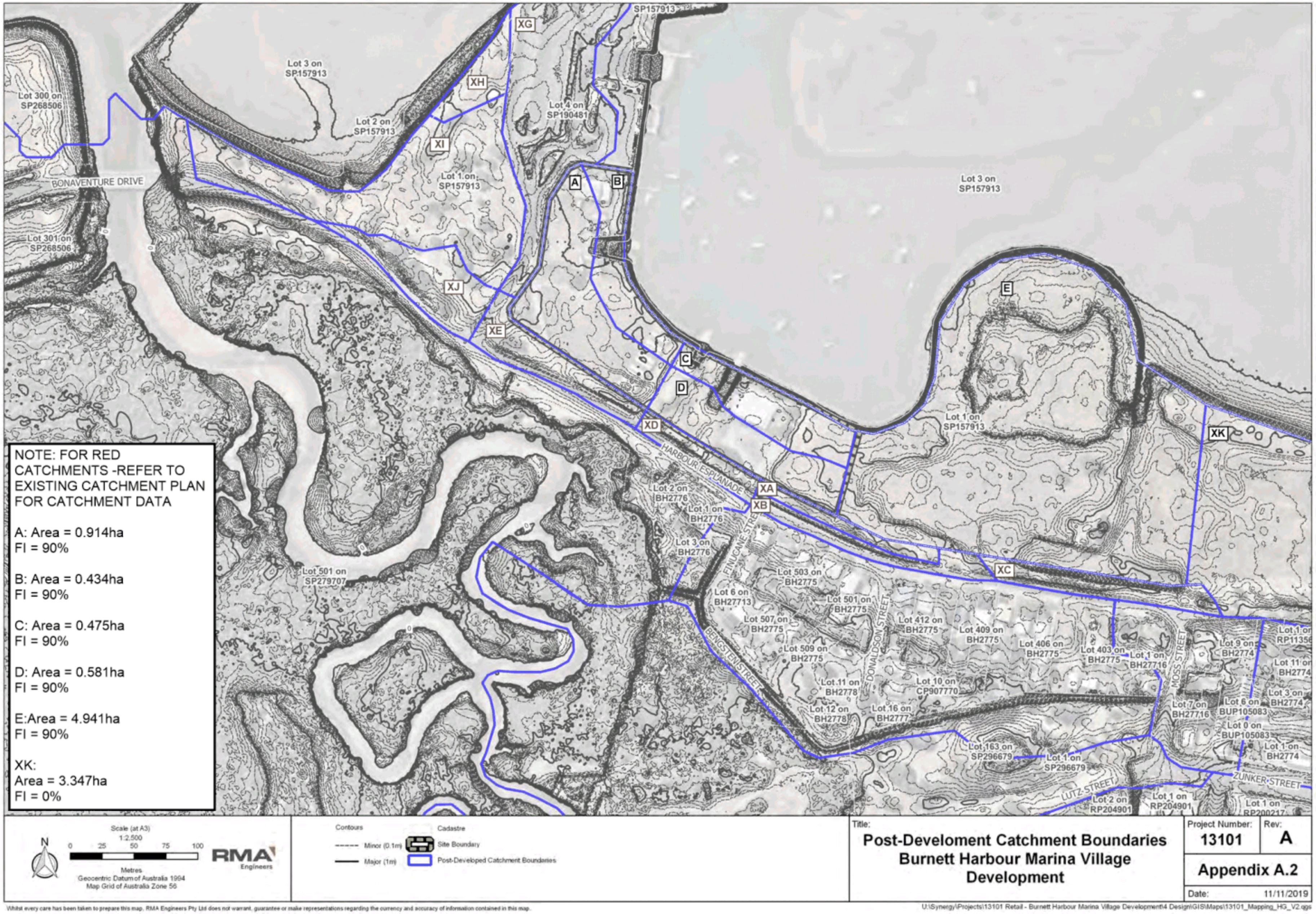
The two existing culverts under Harbour Esplanade will be upgraded as part of the development staged works. Earthworks at the culvert outlets will be subject to prescribed tidal works applications, as will the stormwater outlets to the marina.

The stormwater quality analysis indicates the combination of both vegetated bioretention basins and proprietary stormwater treatment devices achieves the pollutant reduction targets. The analysis also shows the treatment devices nominated for each stage of the development will achieve the SPP pollutant reduction targets.

Appendices

Appendix A – Catchment Plans


A: Area = 0.287ha
FI = 26.83%
B: Area = 0.231ha
FI = 78.78%
C: Area = 0.830ha
FI = 0%
D: Area = 0.096ha
FI = 65.63%
E: Area = 0.211ha
FI = 28.44%
F: Area = 0.229ha
FI = 67.25%
G: Area = 0.691ha
FI = 15.49%
H: Area = 0.824ha
FI = 0%
I: Area = 0.560ha
FI = 0%
J: Area = 2.033ha
FI = 0%
K: Area = 0.904ha
FI = 0%
XA: Area = 0.150ha
FI = 0%
XB: Area = 0.261ha
FI = 43.3%
XC: Area = 0.334ha
FI = 10.78%
XD: Area = 0.202ha
FI = 39.11%
XE: Area = 0.390ha
FI = 32.31%
XF: Area = 0.38ha
FI = 60.79%
XG: Area = 1.541ha
FI = 71.38%
XH: Area = 0.218ha
FI = 4.13%
XI: Area = 1.617ha
FI = 0%
XJ: Area = 0.453ha
FI = 23.18%
BONAVENTURE DRIVE
HARBOUR ESPLANADE
Lot 3 on SP157913
Lot 2 on SP157913
Lot 1 on SP157913
Lot 4 on SP190481
Lot 300 on SP268506
Lot 301 on SP268506
Title:
Pre-Develoment Catchment Boundaries
Burnett Harbour Marina Village
Development
Project Number:
13101
Rev:
A
Appendix A.1
Date:
11/11/2019
RMA Engineers
Contours
Minor (0.1m)
Major (1m)
Cadastre
Site Boundary
Pre-Developed Catchment Boundaries


NOTE: FOR RED CATCHMENTS -REFER TO EXISTING CATCHMENT PLAN FOR CATCHMENT DATA
A: Area = 0.914ha
FI = 90%
B: Area = 0.434ha
FI = 90%
C: Area = 0.475ha
FI = 90%
D: Area = 0.581ha
FI = 90%
E:Area = 4.941ha
FI = 90%
XK:
Area = 3.347ha
FI = 0%
A
B
C
D
E
XA
XB
XC
XD
XE
XG
XH
XI
XJ
XK
BONAVENTURE DRIVE
HARBOUR ESPLANADE
FINUCANE STREET
BENGSTEN STREET
DONALDSON STREET
MOSS STREET
ZUNKER STREET
LUTZ STREET
Lot 3 on SP157913
Lot 2 on SP157913
Lot 1 on SP157913
Lot 4 on SP190481
Lot 300 on SP268506
Lot 301 on SP268506
Lot 501 on SP279707
Lot 163 on SP296679
Lot 1 on SP296679
Post-Develoment Catchment Boundaries
Burnett Harbour Marina Village Development
Project Number: 13101
Rev: A
Appendix A.2
Date: 11/11/2019
Scale (at A3) 1:2,500
Metres
Geocentric Datum of Australia 1994
Map Grid of Australia Zone 56
RMA Engineers
Contours
Minor (0.1m)
Major (1m)
Cadastre
Site Boundary
Post-Developed Catchment Boundaries

Appendix B – Flood Maps

Scale (at A3) 1:2,500

0 25 50 75 100

Metres

Geocentric Datum of Australia 1994

Map Grid of Australia Zone 56

RMA Engineers

Legend: Cadastre Site Boundary

Title:

Pre-Developed
10% AEP Water Surface Depth
Burnett Harbour Marina Village Development

Project Number: 13101	Rev: A
Appendix B.1	
Date: 11/11/2019	

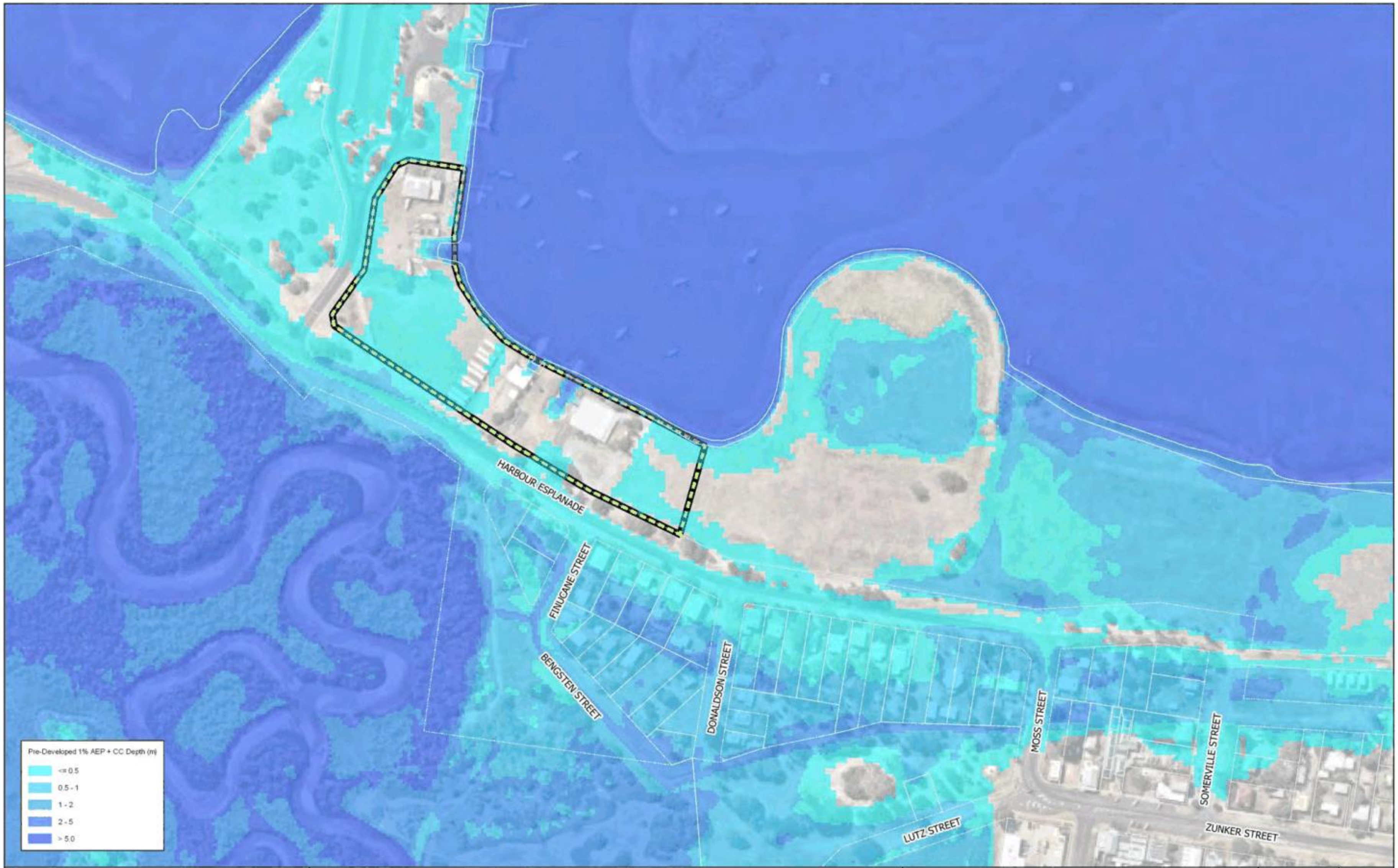
Whilst every care has been taken to prepare this map, RMA Engineers Pty Ltd does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\GIS\Maps\13101_Mapping_HG_V3.qgs

N Scale (at A3) 1:2,500 0 25 50 75 100 Metres Geocentric Datum of Australia 1994 Map Grid of Australia Zone 56 RMA Engineers	Legend: Cadastre, Site Boundary	Title: **Pre-Developed 1% AEP Water Surface Depth Burnett Harbour Marina Village Development**	Project Number: **13101** Rev: **A** **Appendix B.2** Date: 11/11/2019

Whilst every care has been taken to prepare this map, RMA Engineers Pty Ltd does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\GIS\Maps\13101_Mapping_HG_V3.qgs



N

Scale (at A3) 1:2,500

0 25 50 75 100

Metres

Geocentric Datum of Australia 1994
Map Grid of Australia Zone 56

RMA Engineers

Legend: Cadastre Site Boundary

Title:

Pre-Developed
1% AEP + CC Water Surface Depth
Burnett Harbour Marina Village Development

Project Number:	Rev:
13101	A
Appendix B.3	
Date:	11/11/2019

U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\GIS\Maps\13101_Mapping_HG_V3.qgs

Scale (at A3) 1:2,500

N

0 25 50 75 100

Metres

Geocentric Datum of Australia 1994

Map Grid of Australia Zone 56

RMA Engineers

Legend: Cadastre Site Boundary

Title: **Post-Developed 10% AEP Water Surface Depth Burnett Harbour Marina Village Development**

Project Number:	Rev:
13101	A

Appendix B.4

Date: 11/11/2019

Whilst every care has been taken to prepare this map, RMA Engineers Pty Ltd does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\GIS\Maps\13101_Mapping_HG_V3.qgs


HARBOUR ESPLANADE
FINUCANE STREET
BENGSTEN STREET
DONALDSON STREET
MOSS STREET
SOMERVILLE STREET
LUTZ STREET
ZUNKER STREET
Post-Developed 1% AEP Depth (m)
<= 0.5
0.5 - 1
1 - 2
2 - 5
> 5.0
Scale (at A3)
1:2,500
0 25 50 75 100
Metres
Geocentric Datum of Australia 1994
Map Grid of Australia Zone 56
N
RMA Engineers
Legend:
Cadastre
Site Boundary
Title:
Post-Developed
1% AEP Water Surface Depth
Burnett Harbour Marina Village
Development
Project Number:
13101
Rev:
A
Appendix B.5
Date:
11/11/2019
Whilst every care has been taken to prepare this map, RMA Engineers Pty Ltd does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.
U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\GIS\Maps\13101_Mapping_HG_V3.qgs

Scale (at A3)
1:2,500
0 25 50 75 100
Metres
Geocentric Datum of Australia 1994
Map Grid of Australia Zone 56

RMA Engineers

Legend: Cadastre Site Boundary

Title:
Post-Developed
1% AEP + CC Water Surface Depth
Burnett Harbour Marina Village
Development

Project Number:	Rev:
13101	A
Appendix B.6	
Date: 11/11/2019	

U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\GIS\Maps\13101_Mapping_HG_V3.qgs

N

Scale (at A3)
1:2,500
0 25 50 75 100
Metres
Geocentric Datum of Australia 1994
Map Grid of Australia Zone 56

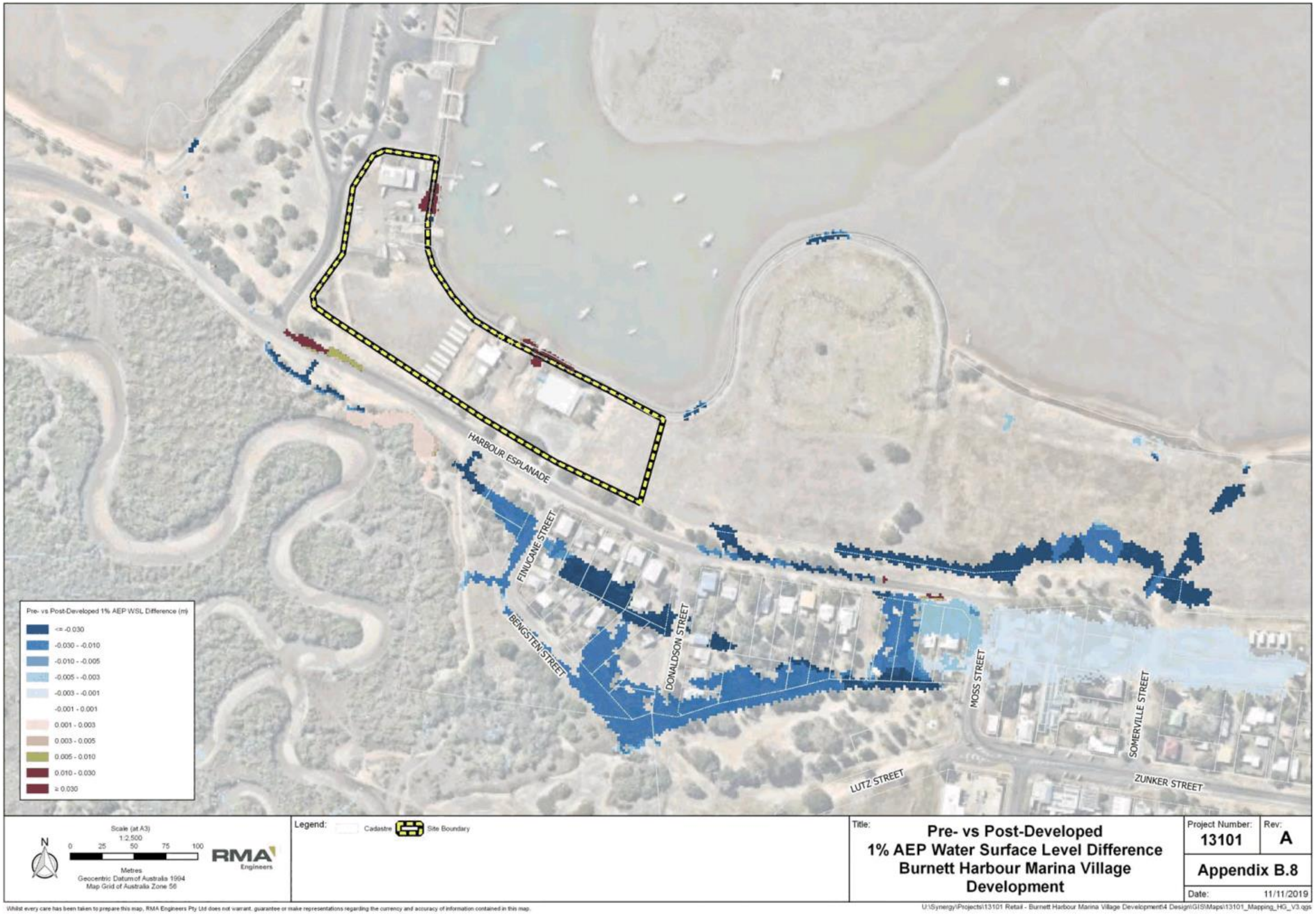
RMA Engineers

Legend: Cadastre Site Boundary

Title:
Pre- vs Post-Developed
10% AEP Water Surface Level Difference
Burnett Harbour Marina Village
Development

Project Number:	Rev:
13101	**A**
Appendix B.7	
Date:	11/11/2019

U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\GIS\Maps\13101_Mapping_HG_V3.qgs


HARBOUR ESPLANADE
FINUCANE STREET
BENGSTEN STREET
DONALDSON STREET
MOSS STREET
SOMERVILLE STREET
LUTZ STREET
ZUNKER STREET
Pre- vs Post-Developed 1% AEP WSL Difference (m)
<= -0.030
-0.030 - -0.010
-0.010 - -0.005
-0.005 - -0.003
-0.003 - -0.001
-0.001 - 0.001
0.001 - 0.003
0.003 - 0.005
0.005 - 0.010
0.010 - 0.030
≥ 0.030
Scale (at A3)
1:2,500
0 25 50 75 100
Metres
Geocentric Datum of Australia 1994
Map Grid of Australia Zone 56
N
RMA Engineers
Legend: Cadastre Site Boundary
Title:
Pre- vs Post-Developed
1% AEP Water Surface Level Difference
Burnett Harbour Marina Village
Development
Project Number: 13101
Rev: A
Appendix B.8
Date: 11/11/2019
Whilst every care has been taken to prepare this map, RMA Engineers Pty Ltd does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

Scale (at A3) 1:2,500
0 25 50 75 100
Metres
Geocentric Datum of Australia 1994
Map Grid of Australia Zone 56

RMA Engineers

Legend: Cadastre Site Boundary

Title: **Pre- vs Post-Developed 1% AEP + CC Water Surface Level Difference Burnett Harbour Marina Village Development**

Project Number: 13101	Rev: A
Appendix B.9	
Date: 11/11/2019	

Whilst every care has been taken to prepare this map, RMA Engineers Pty Ltd does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

U:\Synergy\Projects\13101 Retail - Burnett Harbour Marina Village Development\4 Design\GIS\Maps\13101_Mapping_HG_V3.qgs

Appendix C – Flood Hazard Code

8.2.8 Flood hazard overlay code[1 2]

8.2.8.1 Application

This code applies to development:-

(a) subject to the flood hazard shown on the Flood hazard maps adopted by Council; and

(b) identified as requiring assessment against the Flood hazard overlay code by the tables of assessment in **Part 5 (Tables of assessment)**.

8.2.8.2 Purpose and overall outcomes

(1) The purpose of the Flood hazard overlay code is to ensure that development protects people and avoids or mitigates the potential adverse impacts of flood and storm tide inundation on property, economic activity and the environment, taking into account the predicted effects of climate change.

(2) The purpose of the code will be achieved through the following overall outcomes:-

(a) floodplains and the flood conveyance capacity of watercourses are protected;

(b) development in areas at risk from flood or storm tide inundation is compatible with the nature of the flood or storm tide hazard;

(c) the safety of people is protected and the risk of harm to property and the natural environment from flood and storm tide inundation is minimised;

(d) wherever practical, infrastructure essential to the health, safety and wellbeing of the community is located and designed to function effectively during and immediately after a flood or storm tide event;

(e) development does not result in a material increase in the extent or severity of flood or storm tide inundation.

8.2.8.3 Specific benchmarks for assessment

Table 8.2.8.3.1 Requirements for development accepted subject to requirements and benchmarks for assessable development

Performance outcomes	Acceptable outcomes	Compliance / Representations
Assessment benchmarks for dwelling houses		
PO1 Dwelling houses are resilient to flooding and storm tide inundation by ensuring that:-	**AO1.1** The finished floor level of all habitable rooms of the dwelling house is at or above the flood hazard level (FHL).	All buildings will be constructed with appropriate freeboard to the relevant defined flood level.

[1] Editor's note—to demonstrate compliance with the relevant performance outcomes of this code, a site-based flood study that investigates the impact of the development on the floodplain may be required. The **Planning scheme policy for information Council may request, and preparing well made applications and technical reports** provides guidance for preparing a site-based flood study.

[2] Editor's note—the Flood hazard maps adopted by Council identify flood hazard areas (including storm tide inundation areas) for the Bundaberg Region declared by Council resolution under section 13 of the Building Regulation 2006, as referenced at **Section 1.7.4 (Other documents incorporated in the planning scheme)**.

Performance outcomes	Acceptable outcomes	Compliance / Representations
(a) they are sited and located to avoid or minimise risk to people and damage to property; and (b) essential infrastructure effectively maintains its function during and immediately after flood and storm tide events.	**OR** Where involving an extension to an existing dwelling house that is situated below the DFL and the extension constitutes less than 50% of the gross floor area of the existing building:- (a) the extension has a gross floor area not exceeding $50m^2$; and (b) the finished floor level of habitable rooms is not less than the floor level of existing habitable rooms. **OR** Where DFL data is not available, flood resilience is optimised by ensuring that the dwelling house (including extensions to an existing dwelling house):- (a) is elevated; and (b) located on the highest part of the site. Note—the highset 'Queenslander' style house is a resilient housing form in flood hazard areas. Editor's note—dwelling houses utilising slab on ground construction are generally inappropriate within flood hazard areas.	
	AO1.2 Infrastructure necessary to service the dwelling house is designed and constructed to resist hydrostatic and hydrodynamic forces as a result of inundation by the DFL. Notes— (a) The relevant building assessment provisions under the *Building Act 1975*, including QDC MP3.5 – Construction of Buildings in Flood Hazard Areas, apply to building work within a flood hazard area. (b) The Queensland Government Fact Sheet 'Repairing your house after a flood' provides information about water resilient products and building techniques.	Construction of infrastructure can comply. The infrastructure will be designed and constructed in accordance with the relevant standards.

Performance outcomes	Acceptable outcomes	Compliance / Representations
	Editor's note—it is recommended that building materials and surface treatments used under the DFL are resistant to water damage and do not include wall cavities that may be susceptible to the intrusion of water and sediment. Council guidelines for building within a flood hazard area provide information and recommendations for improving resilience against scour and the forces of flood waters.	
PO2 Dwelling houses do not directly, indirectly or cumulatively change flood characteristics which may cause adverse impacts external to the development site.	**AO2** Building work does not involve filling within a flood hazard area as identified on a Flood hazard map adopted by Council.	Building work involves filling within the flood hazard area however there are no actionable nuisances external to the development site. Refer RMA Stormwater Management Report (Job Number 13101) for flood modelling results.
PO3 The height of dwelling houses does not negatively impact on the visual amenity and streetscape of the surrounding area as a result of the raising of floor levels for flood immunity purposes. Note—alternative provision to QDC MP1.1, P4 and MP1.2, P4.	**AO3** Where required to increase flood resilience of a dwelling house (or part of the dwelling) by raising the habitable floor height, the building height (measured from ground level to the highest point of the building roof) is not greater than 9.5m. Note—alternative provision to QDC MP1.1, A4 and MP1.2, A4.	The development is not a dwelling house.

Table 8.2.8.3.2 Benchmarks for assessable development only

Performance outcomes	Acceptable outcomes	Compliance / Representations
Development siting and design		
PO4 Development is sited and designed such that potential risk to people and damage to property on the site from flooding or storm tide inundation is avoided or minimised.	**AO4.1** There is no intensification of residential uses on premises situated below the DFL, including the development of dual occupancy and multiple residential uses. **AO4.2** No additional residential lots are created below the DFL. **AO4.3** Development that increases the number of people living or working in a flood or storm tide hazard area has an emergency evacuation plan for people to evacuate to a	The development is sited and designed such that potential risk to people and damage to property from flooding or storm tide inundation is minimised. Refer RMA Stormwater Management Report (Job Number 13101) for further detail. Complies. No additional residential lots created. A flood evacuation and emergency plan is anticipated to be prepared prior to the opening of the development and will incorporate operational measures of the proposed

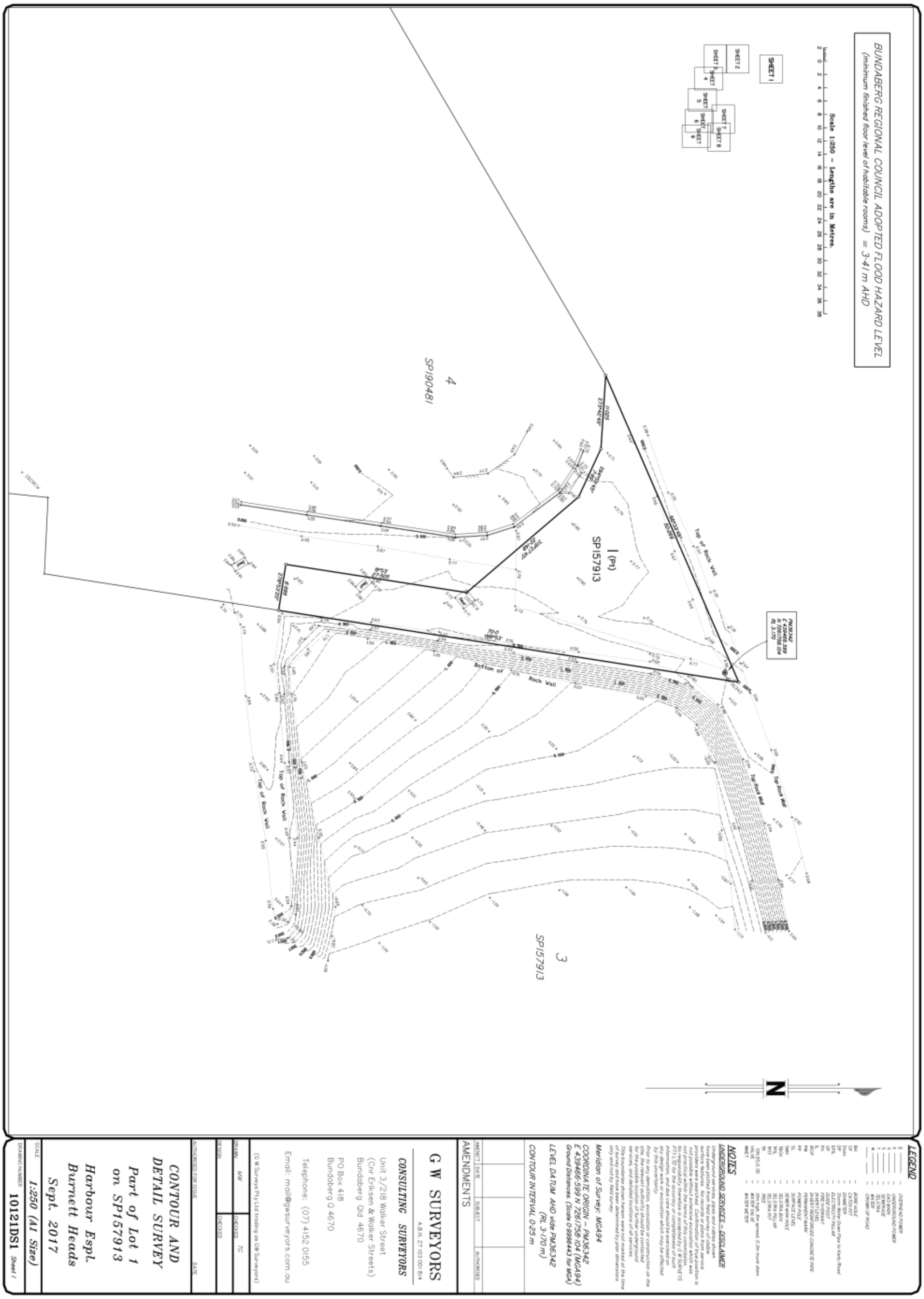
Performance outcomes	Acceptable outcomes	Compliance / Representations
	gathering point above the DFL in the face of advancing flood waters. **AO4.4** Buildings and other structures are sited on the highest part of the site, or in the area of least hazard, to increase flood resilience. Notes— (a) The relevant building assessment provisions under the *Building Act 1975*, including QDC MP3.5 – Construction of Buildings in Flood Hazard Areas, apply to building work within a flood hazard area. (b) The Queensland Government Fact Sheet 'Repairing your house after a flood' provides information about water resilient products and building techniques.	facility to warn residents of triggers and measures based on warning times for different events. Complies. Development is proposed on the highest part of the site.
Building design and built form		
PO5 Building design and built form:- (a) is resilient to flood and storm tide events by appropriately responding to the potential risks of flooding and inundation; and (b) maintains a functional and attractive street front address appropriate to the intended use.	**AO5.1** The design and layout of buildings used for residential purposes minimises risks from flooding and inundation by providing:- (a) non-habitable uses at ground level such as parking and other low intensity uses (e.g. temporary storage of readily removable items); and (b) the finished floor level of all habitable rooms is at or above the flood hazard level (FHL). **AO5.2** Buildings incorporate appropriate screening to ensure that the under-storey is not visible from the street, where such screening does not impede flood water flows. ***Additional requirements for non-residential uses*** **AO5.3** Where possible, the design and layout of building used for non-residential purposes provides for:- (a) parking or other low intensity uses at ground level; (b) retail, commercial and work areas are located above parking areas to increase resilience to flooding and inundation.	Site levels have been modelled above flood level to minimise risks from flooding and inundation. Refer RMA Stormwater Management Report (Job Number 13101) for further detail. Not applicable. Complies.

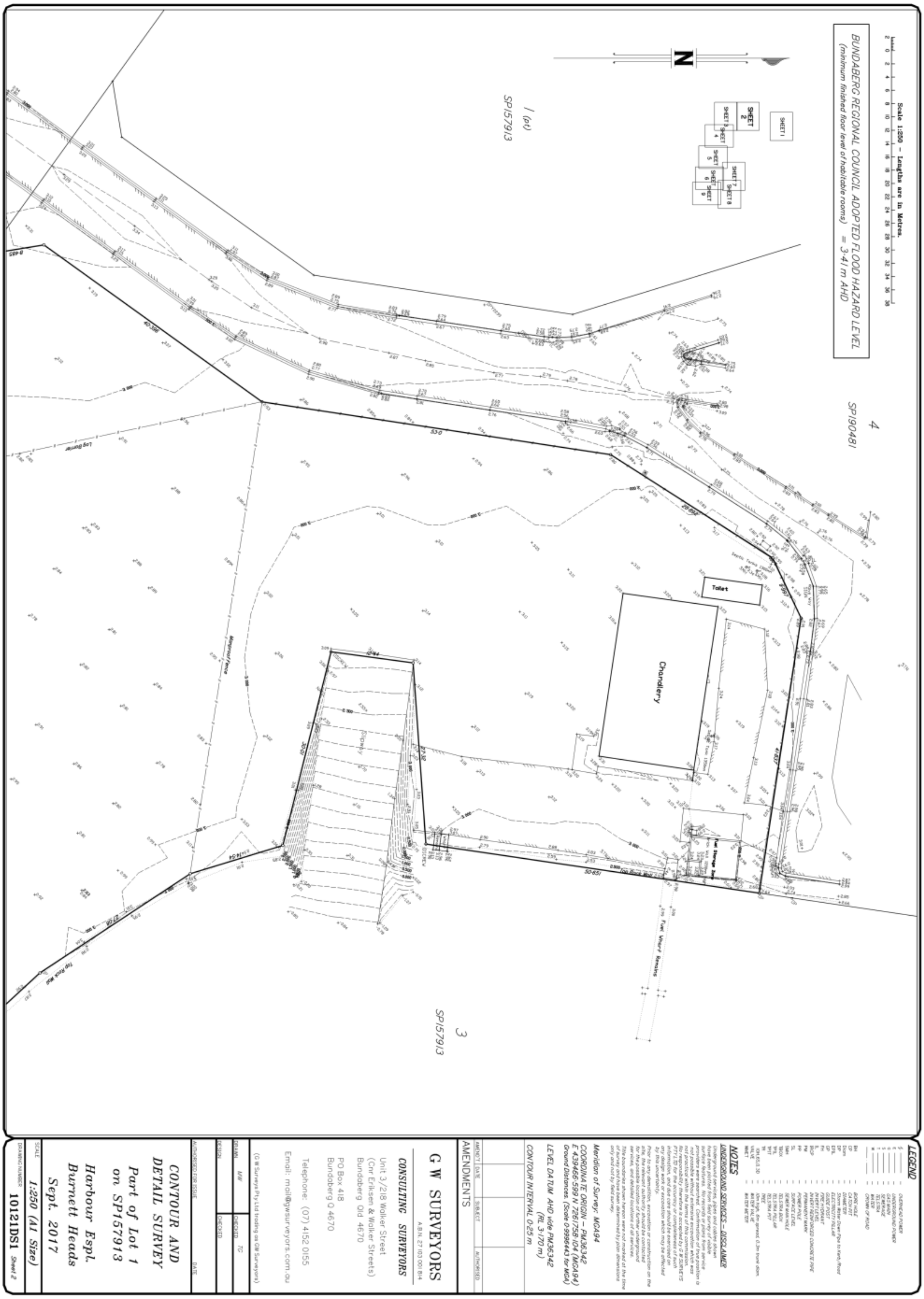
Part 8 – Overlays

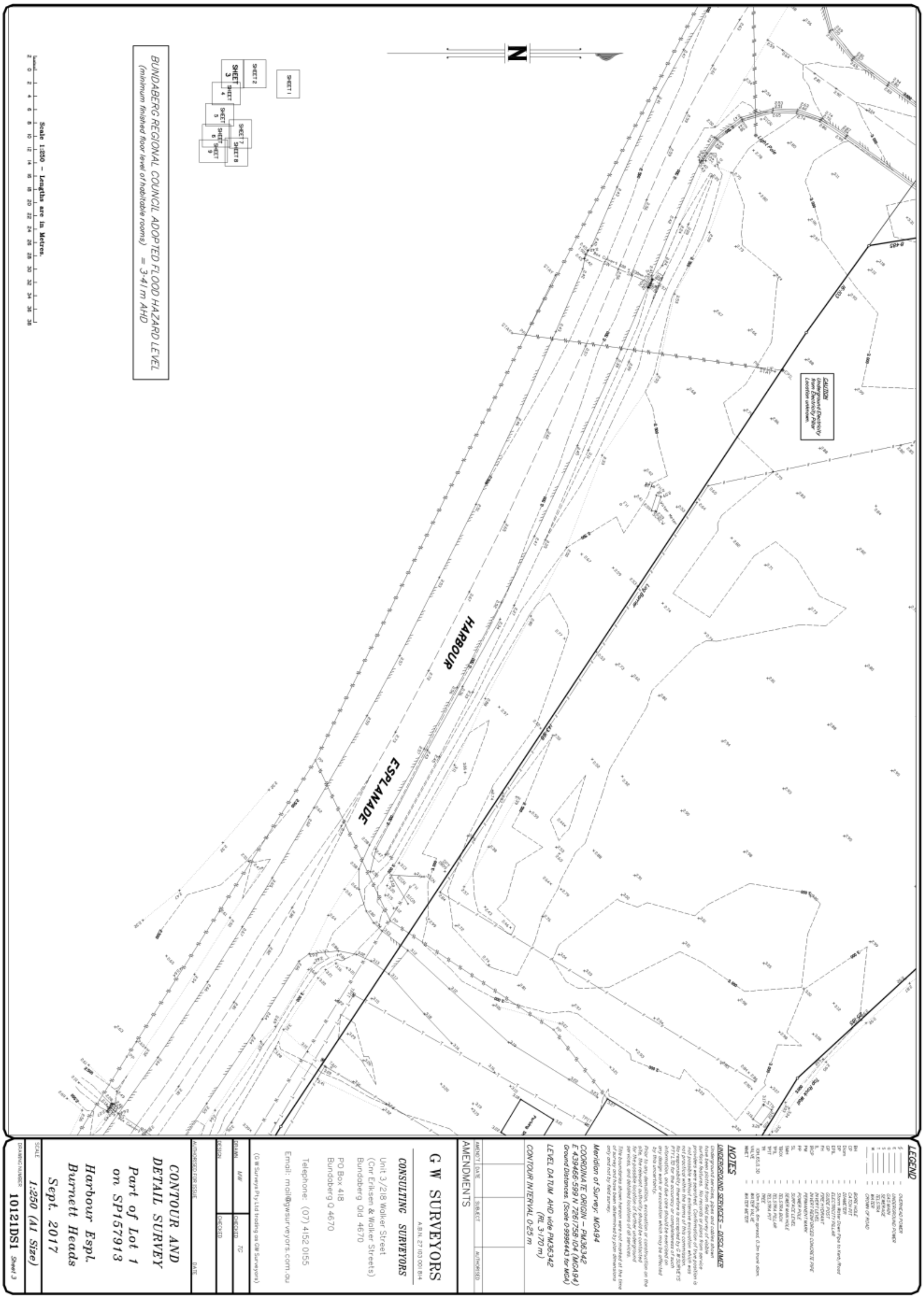
Performance outcomes	Acceptable outcomes	Compliance / Representations
	Note—business owners/applicants should undertake their own risk assessment to determine the floor level that maximises flood resilience for mechanical plant, equipment and stock. Editor's note—Council guidelines for building within a flood hazard area provide information and recommendations for improving resilience against scour and the forces of flood waters.	
Essential services infrastructure		
PO6 Essential services infrastructure within a site (including electricity, gas, water supply, wastewater and telecommunications) maintains effective functioning during and immediately after flood and storm tide events.	**AO6** Infrastructure necessary to service the development is designed and constructed to resist hydrostatic and hydrodynamic forces as a result of inundation by the DFL.	Complies. Construction of essential services can comply. The essential services will be designed and constructed in accordance with the future asset owner standard for each service.
Utility installations, telecommunications facilities and emergency services		
PO7 Utility installations, telecommunications facilities and emergency services are able to function effectively during and immediately after flood events.	**AO7** No acceptable outcome provided.	Utility installations, telecommunications facilities, and emergency services for the development will be constructed in accordance with the providers guidelines and will therefore comply.
Hazardous and other materials		
PO8 Public safety and the environment are not adversely affected by the detrimental impacts of floodwater on materials, including hazardous materials, manufactured or stored on site.	**AO8** Materials stored on-site:- (a) are those that are readily able to be moved in a flood or storm tide event; (b) are not hazardous or noxious, or comprise materials that may cause a detrimental impact on the environment if discharged in a flood or storm tide event; and (c) where at risk of creating a safety hazard by being shifted by flood waters, are contained in order to minimise movement in times of flood or inundation. Note—businesses should ensure that the necessary continuity plans are in place to account for the potential need to relocate property prior to a flood event (e.g. allow enough time to transfer stock to the upper-storey of a building or off-site).	Complies. All proposed buildings are positioned above the defined flood level.
Flood impacts		
PO9 Development does not directly, indirectly or cumulatively change flood characteristics	**AO9.1** Development within the flood hazard area does not result in a reduction in flood storage capacity.	Complies. The Stormwater Management Report (Job Number 13101) prepared by RMA Engineers

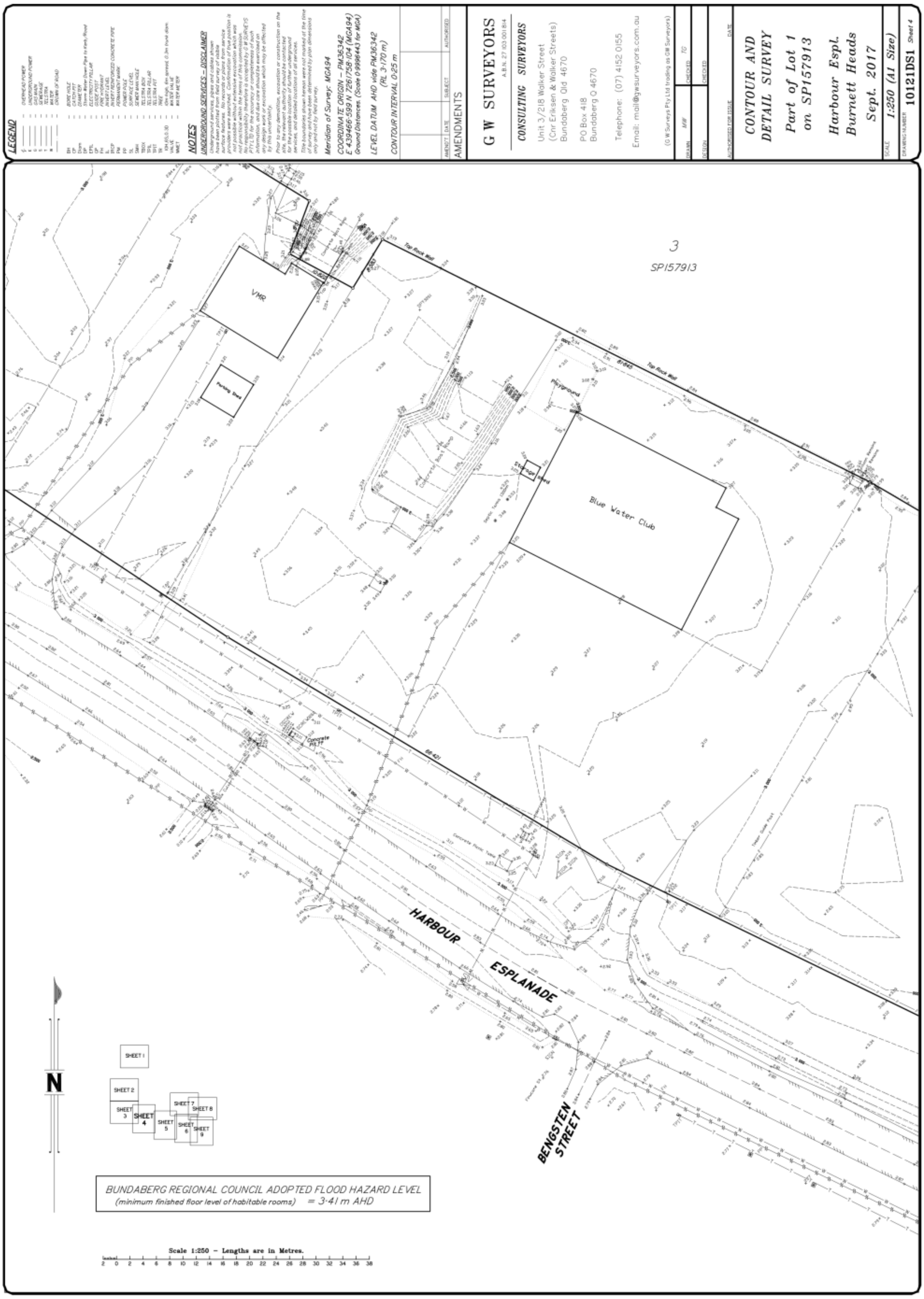
Performance outcomes	Acceptable outcomes	Compliance / Representations
which may cause adverse impacts external to the development site.		demonstrates that the development does not affect conveyance capacity or compromise flood storage capacity.
	AO9.2 Development does not increase the flood hazard (e.g. by way of increased depth, duration or velocity of flood waters or a reduction in warning times) for premises external to the development site.	Complies. The Stormwater Management Report (Job Number 13101) prepared by RMA Engineers demonstrates that the development does not increase the flood hazard for premises external to the development site.
	AO9.3 No earthworks (including filling of land or reduction of flood storage capacity) occurs on land below the DFL, unless – (a) such earthworks result in the rehabilitation and repair of the hydrological network and the riparian ecology of the watercourse; and (b) an assessment, undertaken by a suitably qualified consultant, demonstrates that the reforming of the land does not negatively impact on the overall hydrology, hydraulics and flood capacity of the watercourse and does not in any way result in the reduction of flood storage capacity on the site. Note—the Council may consider acceptable tolerances for changes to flood behaviour compared to existing conditions where included in an approved floodplain management plan.	Complies. The Stormwater Management Report (Job Number 13101)prepared by RMA Engineers demonstrates that the proposed filling will not result in an actionable nuisance with quantifiable loss to neighbouring properties.

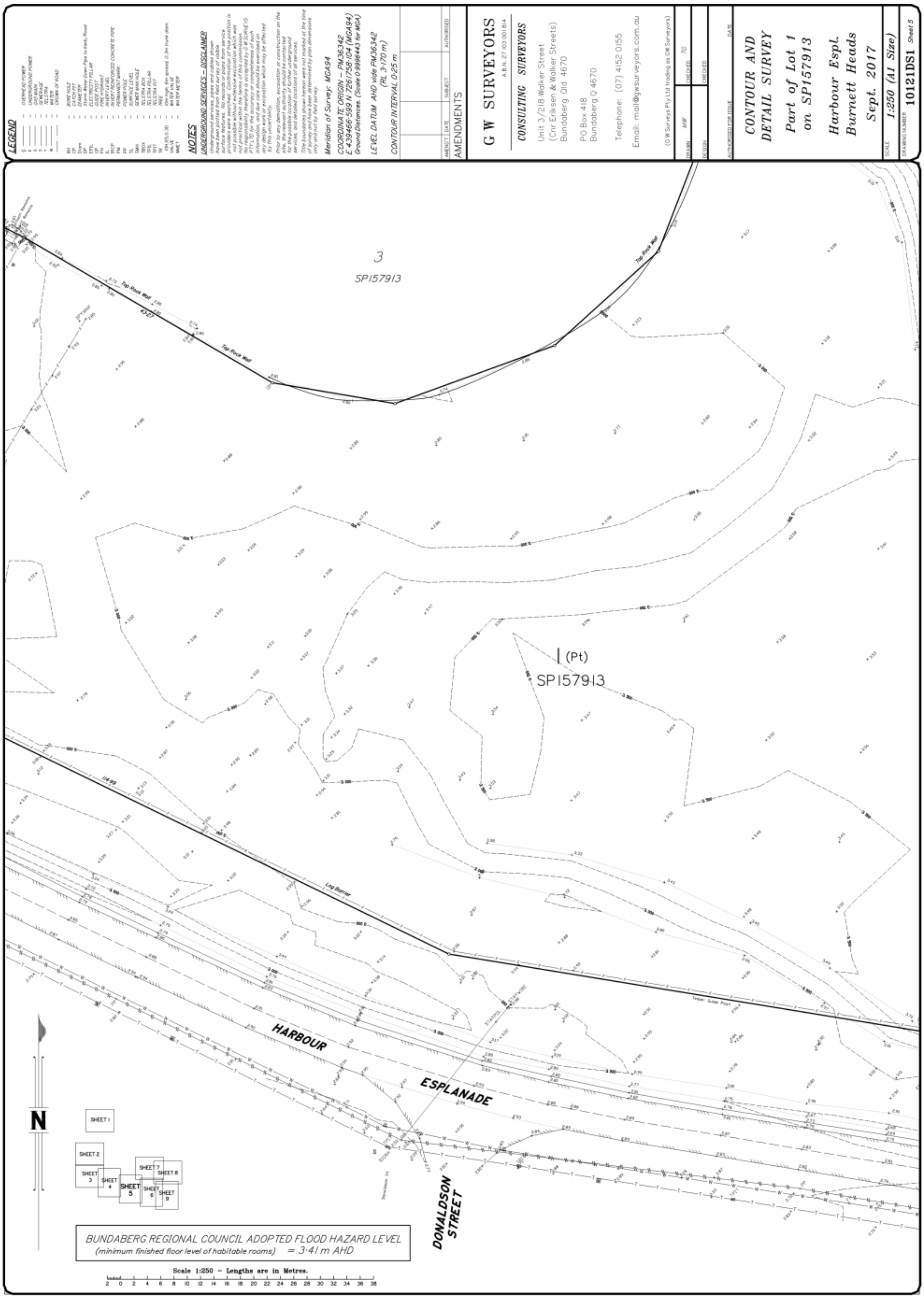
Appendix D – Detailed Survey

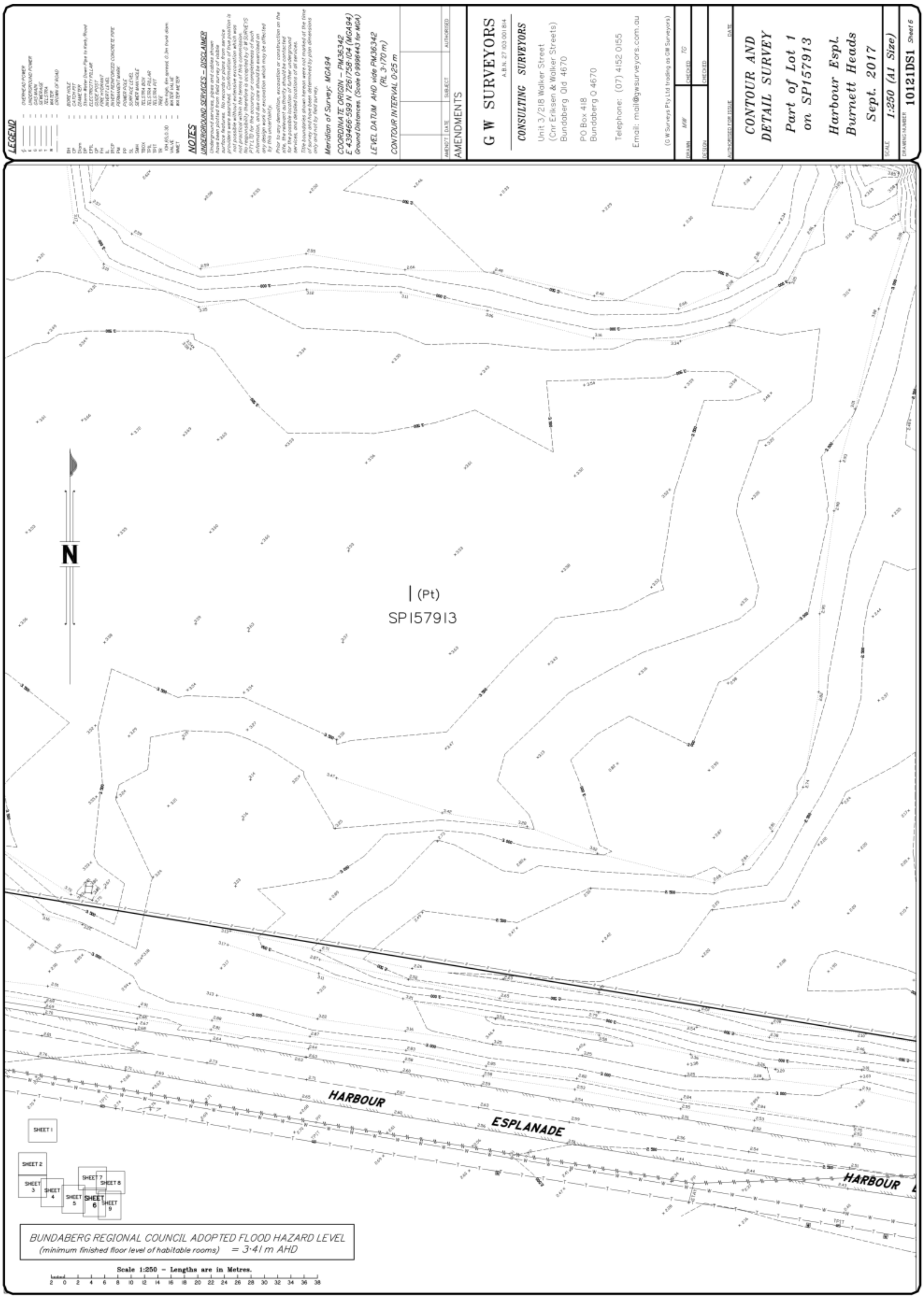

BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
(minimum finished floor level of habitable rooms) = 3·41 m AHD
Scale 1:250 – Lengths are in Metres.
1 (pt)
SP157913
4
SP190481
3
SP157913
Top of Rock Wall
Bottom of Rock Wall
LEGEND
NOTES
Meridian of Survey: MGA94
COORDINATE ORIGIN – PM36342
LEVEL DATUM AHD vide PM36342
(RL 3·170 m)
CONTOUR INTERVAL 0·25 m
AMENDMENTS
G W SURVEYORS
CONSULTING SURVEYORS
Unit 3/218 Walker Street
(Cnr Eriksen & Walker Streets)
Bundaberg Qld 4670
PO Box 418
Bundaberg Q 4670
Telephone: (07) 4152 0155
Email: mail@gwsurveyors.com.au
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl.
Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1

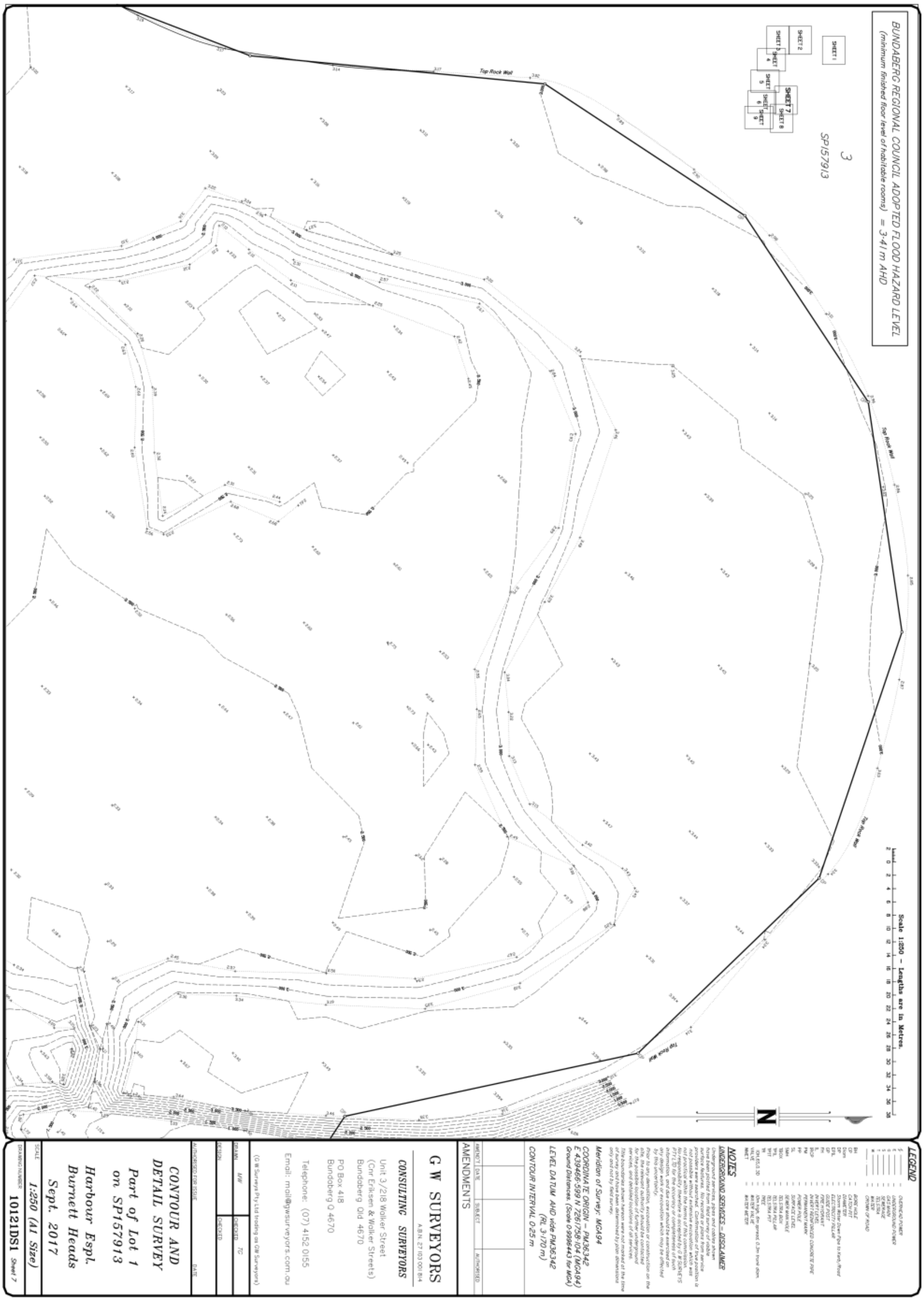

BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
(minimum finished floor level of habitable rooms) = 3.41 m AHD
Chandlery
Toilet
G W SURVEYORS
CONSULTING SURVEYORS
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl. Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1

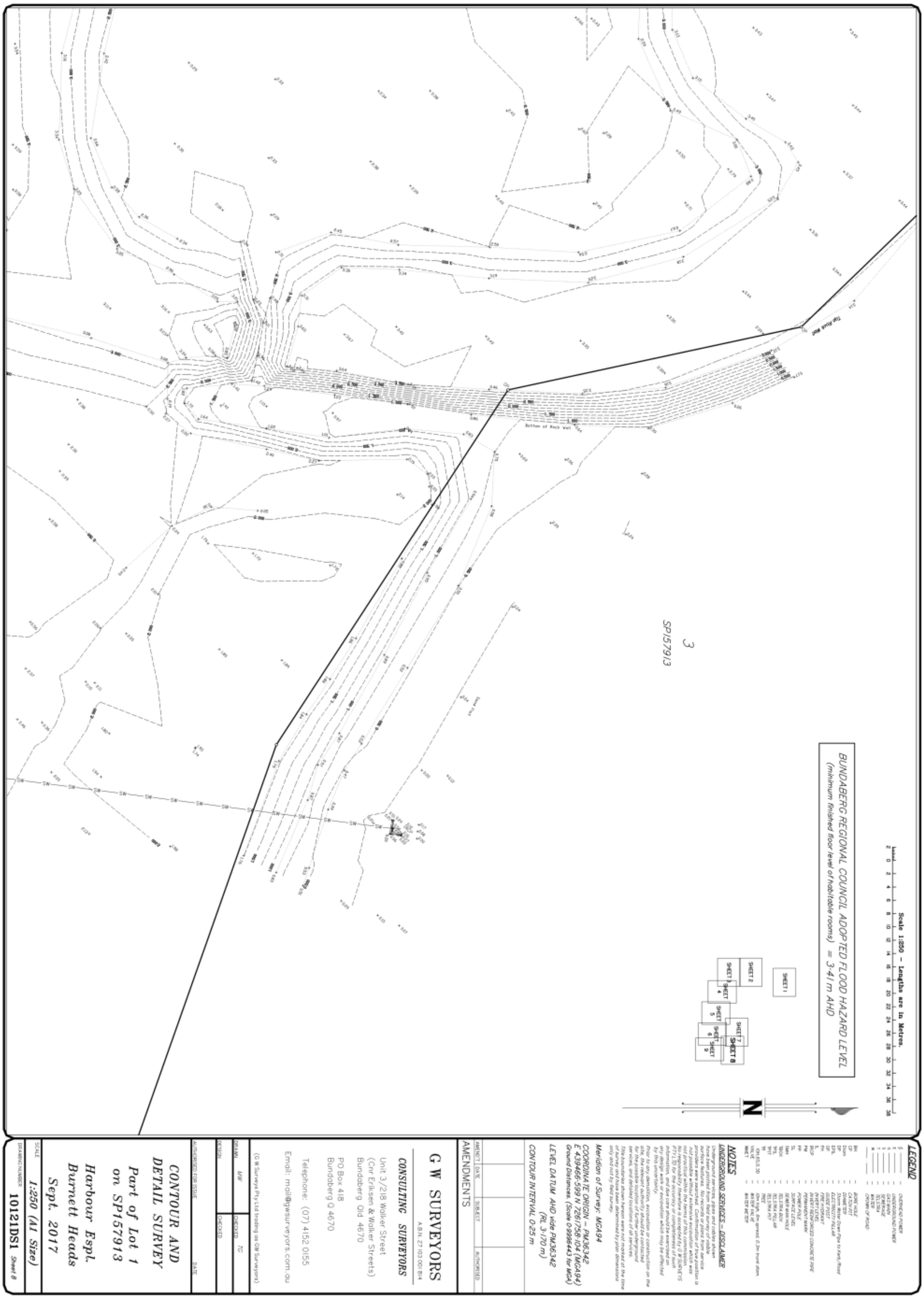

BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
(minimum finished floor level of habitable rooms) = 3·41 m AHD
Scale 1:250 – Lengths are in Metres.
HARBOUR
ESPLANADE
G W SURVEYORS
CONSULTING SURVEYORS
AMENDMENTS
NOTES
LEGEND
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl. Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1 Sheet 3

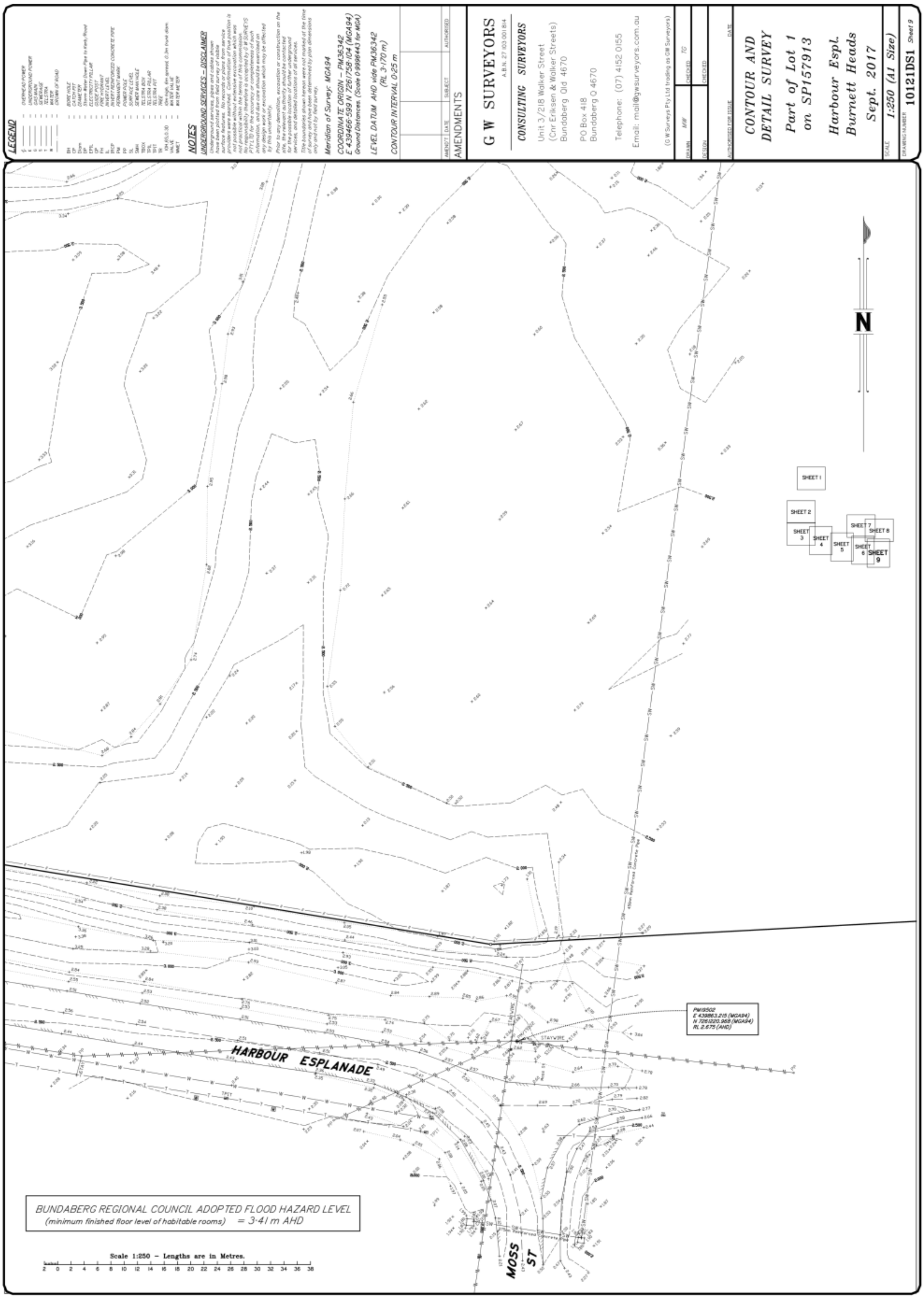

G W SURVEYORS
CONSULTING SURVEYORS
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl. Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1
3
SP157913
VMR
Blue Water Club
HARBOUR ESPLANADE
BENGSTEN STREET
N
BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
(minimum finished floor level of habitable rooms) = 3·41 m AHD
Scale 1:250 – Lengths are in Metres.


G W SURVEYORS
CONSULTING SURVEYORS
Unit 3/218 Walker Street
(Cnr Eriksen & Walker Streets)
Bundaberg Qld 4670
PO Box 418
Bundaberg Q 4670
Telephone: (07) 4152 0155
Email: mail@gwsurveyors.com.au
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl. Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1 Sheet 5
AMENDMENTS
LEGEND
NOTES
UNDERGROUND SERVICES – DISCLAIMER
Meridian of Survey: MGA94
LEVEL DATUM AHD vide PM36342 (RL 3·170 m)
CONTOUR INTERVAL 0·25 m
3
SP157913
1 (Pt)
SP157913
Top Rock Wall
Log Barrier
HARBOUR
ESPLANADE
DONALDSON STREET
N
SHEET 1
SHEET 2
SHEET 3
SHEET 4
SHEET 5
SHEET 6
SHEET 7
SHEET 8
SHEET 9
BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
(minimum finished floor level of habitable rooms) = 3·41 m AHD
Scale 1:250 – Lengths are in Metres.


G W SURVEYORS
CONSULTING SURVEYORS
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl. Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1
AMENDMENTS
N
1 (Pt)
SP157913
HARBOUR
ESPLANADE
BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
(minimum finished floor level of habitable rooms) = 3·41 m AHD
Scale 1:250 – Lengths are in Metres.


BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
(minimum finished floor level of habitable rooms) = 3.41 m AHD
3
SP157913
Top Rock Wall
G W SURVEYORS
CONSULTING SURVEYORS
Unit 3/218 Walker Street
(Cnr Eriksen & Walker Streets)
Bundaberg Qld 4670
PO Box 418
Bundaberg Q 4670
Telephone: (07) 4152 0155
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl. Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1 Sheet 7


G W SURVEYORS
CONSULTING SURVEYORS
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl. Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1
BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
SP157913


G W SURVEYORS
CONSULTING SURVEYORS
Unit 3/218 Walker Street
(Cnr Eriksen & Walker Streets)
Bundaberg Qld 4670
PO Box 418
Bundaberg Q 4670
Telephone: (07) 4152 0155
Email: mail@gwsurveyors.com.au
CONTOUR AND DETAIL SURVEY
Part of Lot 1 on SP157913
Harbour Espl. Burnett Heads
Sept. 2017
1:250 (A1 Size)
10121DS1
Sheet 9
LEGEND
NOTES
UNDERGROUND SERVICES – DISCLAIMER
Meridian of Survey: MGA94
COORDINATE ORIGIN – PM36342
LEVEL DATUM AHD vide PM36342
CONTOUR INTERVAL 0·25 m
AMENDMENTS
N
SHEET 1
SHEET 2
SHEET 3
SHEET 4
SHEET 5
SHEET 6
SHEET 7
SHEET 8
SHEET 9
HARBOUR ESPLANADE
MOSS ST
BUNDABERG REGIONAL COUNCIL ADOPTED FLOOD HAZARD LEVEL
(minimum finished floor level of habitable rooms) = 3·41 m AHD
Scale 1:250 – Lengths are in Metres.

Appendix E – Flood Planning Property Report

PO Box Box 3130, Bundaberg QLD 4670
Local Call 1300 883 699 Fax (07) 4150 5410
ABN 72 427 835 198

FLOOD PLANNING CONTROL PROPERTY REPORT

Property Details:

Property Address: *Harbour ESP BURNETT HEADS*
Plan Lot: *SP157913/1*
Existing Floor Level (mAHD): *No information*
Minimum Ground Level (mAHD): *0.06* *(10m resolution)*
Maximum Ground Level (mAHD): *3.69* *(10m resolution)*

Flood Information:

Within Flood Hazard Area:	*YES*
Within High Hazard Area:	*NO*
Within Flood Mitigation Area:	*NO*
Within Flood Investigation Area:	*NO*
Non-urban Creek & Overland Flow Maximum Water Level:	*No OFP Max WL*
Riverine DFL (mAHD):	*No Riverine DFL*
Local DFL (mAHD):	*3.11*
Storm Tide DFL (mAHD):	*2.92*

Flood Summary:

Maximum DFL (mAHD):	*3.11*
Source of Maximum DFL:	*Local*
Existing Floor Level above Maximum DFL:	*N/A - no building*
Flood Hazard Level* (mAHD):	*3.41*

(minimum finished floor level of habitable rooms)*

Comments:

The Maximum DFL is set by the Bundaberg Coastal Small Streams Flood Study as per Table 1.

Data Generation Date: 5/27/2017 4:17:59 AM - note subdivision may have occurred since data generation date.

Figure 1 - Flood Hazard Map

Co-ordinate System: GDA94 MGA Zone 56 Date: 30/10/2017 1:06 PM Scale 1 : 7,921.66 on A4 Sheet

Authority:

Adam Johnston
(Name of Council Officer)

Senior Development Engineer
(Position)

(Officer's Signature)

Disclaimer:

1. The Defined Flood Levels and Flood Hazard Level are determined from the information available to Council at the date of issue. These flood levels may change when more detailed information becomes available or changes are made in the method of calculating flood levels.

2. Council makes no warranty or representation regarding the accuracy or completeness of this flood enquiry. Council disclaims any responsibility or liability in relation to the use or reliance by any person on the information contained in this flood enquiry.

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ABN 72 427 835 198

FLOOD PLANNING CONTROL PROPERTY REPORT

Interpreting this report

Annual Exceedence Probability

The likelihood of the occurence of a flood of a given size or larger in any one year, usually expressed as a percentage. Council's adopted flood events are based on 1% AEP unless stated otherwise in Table 1.

Australian Height Datum (AHD)

The reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.

Contour

Lines join points of equal elevation. The contour levels on the allotment are provided in Figure 1. Please note that contours are provided at 0.5 metre intervals AHD.

Defined Flood Event (DFE)

The flood event adopted by Council to define the Flood Hazard Area. The DFE and its associated inundation level are used to manage the development of a particular area. DFE are generally measured in terms of AEP but can also refer to historical flood events. Table 1 lists the adopted DFE for the Bundaberg Regional Council Area.

Defined Flood Level (DFL)

A flood water level adopted by Council that represents the defined flood event (DFE) or defined storm tide event (DSTE) at the development site. The DFL is also the adopted flood level for the purpose of section 13(1)(b) of the Building Regulation 2006 and Queensland Development Code MP3.5 – Construction of Buildings in Flood Hazard Areas. All adopted flood events are shown in Table 1 below.

Existing Floor Level (EFL)

The floor level (where available) of an existing dwelling on the subject property as recorded in either the 2004 Flood Floor Height Survey or 2013 Bundaberg and Gin Gin Mobile LiDAR Capture of Habitable and Commercial Floor Levels. A confidence level was applied to all captured floor levels to indicate the degree of certainty of the measured level. The levels used were:

1. A high expected floor level accuracy. No obstructions were present and the base of the door could be seen.
2. A minor obstruction was present around the base of the door. In general, measured levels should meet accuracy requirements.
3. The base of the door was not visible. In these cases, a patio level was captured as close to the door as possible. Additional height may need to be added particularly for brick slab buildings to achieve the final floor level.
4. The base of the door was not visible and no suitable patio level could be measured. Additional calculations will be required to obtain the actual building floor level.

Finished Floor Level

The level of the uppermost surface of a finished floor not including any floor covering. This is the same meaning as in section 13 of the Building Regulation 2006.

Flood Hazard Area

An area, whether or not mapped, designated by a local government as a flood hazard area under the Building Regulation 2006, section 13. Note - section 13 of the Building Regulation requires a local government to keep a register of the flood hazard area it designates and when the designation was made.

Flood Hazard Level (FHL)

The defined flood level (DFL) plus the freeboard. This is the same meaning as in the Queensland Development Code MP 3.5 Construction of buildings in flood hazard areas. The FHL is used to define the finished floor level of habitable rooms in the Flood Hazard Area. Please ensure that when you set out a FHL that this level is provided by a registered surveyor, as the contours are provided for information only and are not to be used as a reference during construction processes.

Flood Investigation Area

An area where Council is currently undertaking detailed flood analysis.

Flood Mitigation Area

The area protected by flood mitigation and evacuation route upgrades constructed after the 2013 Burnett River flood event. These include the Technology Park Flood Levee and the Bundaberg-Gin Gin Road and Fairymead Road evacuation route upgrades completed in 2015.

Freeboard

The height above defined flood level that takes account of matters that may cause flood waters to rise above the defined flood level. The freeboard for a lot in a flood hazard area is:

(a) if a local government has declared a freeboard for the part of the area where the lot is located, under section 13 of the Building Regulation 2006 – the height above the defined flood level declared to be the freeboard or

(b) otherwise - a height of at least 300mm.

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FLOOD PLANNING CONTROL PROPERTY REPORT

Ground Levels (Minimum & Maximum)

The lowest and highest ground levels (AHD) on the property based on available data. For more accurate information about the levels of the allotment, owners must engage a registered surveyor. The spatial resolution of the data is shown in brackets.

Habitable Room

Has the same meaning as in the Building Code of Australia. This is generally bedrooms, living rooms, kitchen, study, family and rumpus rooms.

High Hazard Area

The part of the flood hazard area where the maximum modelled flow velocity of water is greater than 1.5m/s.

Local DFL

The flood level associated with an adopted localised flood event where the rain falls on the local stream or creek catchment.

Operational Works in Flood Hazard Area

Refers to a range of development activities including excavating or filling, erecting an advertising sign, clearing vegetation, road works and infrastructure. Some of these activities can affect the Flood Hazard Area, DFL and FHL.

Riverine DFL

The flood level associated with an adopted regional flood event where the rain falls on the entire river catchment.

Storm Tide DFL

The flood level associated with an adopted regional flood event where cyclone activity affects the entire coastline of the Bundaberg Regional Council Area.

Table 1 - Flood Studies

Column 1 - Catchment	Column 2 - Author / Date	Column 3 - Adopted defined flood event detail
Riverine DFE		
Burnett River (lower)	Flood extent Queensland Government (with Council amendments)** Flood velocity and height GHD / 2013 As amended by GHD Feb 2015	Extracted from aerial photography of the 2013 Burnett River flood event Flood velocities and heights from the modelled January 2013 flood event#
Burnett River (upper)	GHD / 2013	Modelled January 2013 flood event
Kolan River and Gin Gin Creek	GHD / 2014	1% AEP with climate change
Baffle Creek	O2 / 2014 (draft results only)	1% AEP with climate change
Burrum, Cherwell, Isis, Gregory River	GHD / 2015 (with Council amendments)**	1% AEP with climate change
Local DFE		
Saltwater Creek	Cardno / 2010 As amended by BRC / 2013	1% AEP with climate change
Bundaberg Creek	Cardno / 2013	1% AEP with climate change
McCoy Creek	GHD / 2013 (with Council amendments)**	1% AEP with climate change
Bundaberg Coastal Small Streams	BMT WBM / 2014 including updated northern area)	1% AEP with climate change
Apple Tree Creek	Cardno / 2004	1% AEP
Palmer and O'Connell Creeks	GHD / 1997	1% AEP
Other		
Non-urban creeks and Overland Flow Path	BMT WBM / 2014	100 year ARI including climate change Clipped to SPP extent only and not used in urban areas
State Planning Policy Level 1 Queensland Floodplain Assessment Overlay Mapping In catchments where Council has no historic or modelled flood data	Queensland Government	Nil
Storm Tide	BMT WBM / 2013 (with Council amendments)**	1% AEP with climate change

 # The modelled January 2013 flood event is similar in magnitude to a 1% AEP flood event. In Bundaberg, the difference between the modelled 2013 event and a modelled 1% AEP event is mostly +/- 0.02m with a maximum difference being +0.06m.

*** See Hazard Evaluation Report – Flood (BRC 2017), Appendix 1 for details. This report is available here http://www.bundaberg.qld.gov.au/files/flood_hazard_evaluation_report_may_doc.pdf*

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Local Call 1300 883 699 Fax (07) 4150 5410
ABN 72 427 835 198

FLOOD PLANNING CONTROL PROPERTY REPORT

Attachment A : Council Information Only

Property Information

Owner Name: *Gladstone Ports Corporation Limited*

Owner Postal Address: *45 Wharf Drive BURNETT HEADS QLD 4670*

Planning Scheme Information

Planning Scheme 2015 Zone: *Community facilities*

Adopted Defined Flood Events / Studies

Apple Tree Creek 1% AEP DFE (Cardno, 2004):	*Not Within*	
Bundaberg Creek 1% AEP with CC DFE (Cardno, 2013):	*Not Within*	
Burnett River 2013 Event (GHD 2013):	*Not Within*	
Burrum River 1% AEP with CC DFE (GHD, 2015) :	*Not Within*	
Coastal Small Streams 1% AEP with CC DFE – Northern Area (BMT WBM, 2015):	*Within*	*3.11 Max WL*
Coastal Small Streams 1% AEP with CC DFE – Central Area (BMT WBM, 2015):	*Not within*	
Coastal Small Streams 1% AEP with CC DFE – Southern Area (BMT WBM, 2013):	*Not within*	
Coastal Storm Tide 1% AEP with CC DSTE (BMT WBM, 2013):	*Within*	*2.92 Max WL*
Draft Baffle Creek 1% AEP with CC DFE (O2, 2014):	*Not Within*	
Kolan River & Gin Gin Creek 1% AEP with CC (GHD, 2014):	*Not within*	
McCoy Creek 1% AEP with CC DFE (GHD, 2013):	*Not within*	
Non-urban Creeks & Overland Flow Path within State Planning Policy Level 1 Area (BMT WBM, 2014):	*Not within*	
Palmer Creek 1% AEP (GHD, 1997):	*Not within*	
O'Connell Creek 1% AEP (GHD, 1997):	*Not within*	
Saltwater Creek 1% AEP with CC DFE (Cardno, 2010):	*Not Within*	
State Planning Policy Flood Hazard Area (QRA, 2013):	*Not Within*	

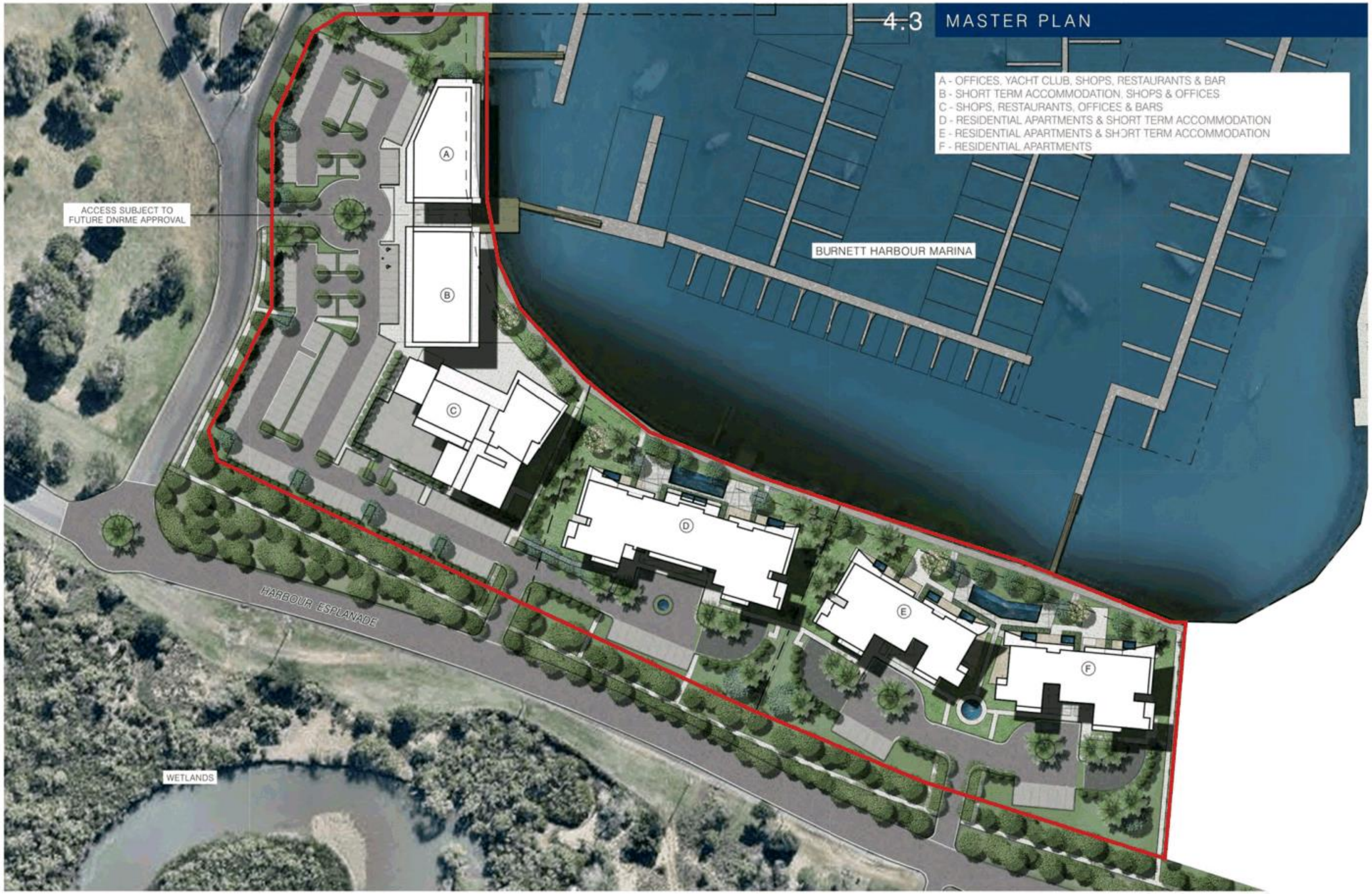
Other Flood Events

Burnett River 1942 Event (GHD 2013):	*Within*	*1.37 Max WL*
Burnett River 1971 Event (GHD 2013):	*Within*	*1.14 Max WL*
Burnett River 2010 Event (GHD 2013):	*Within*	*1.02 Max WL*
Burnett River 2011 Event (GHD 2013):	*Within*	*0.74 Max WL*

Following Design Events to be added in future version: Burnett River 1% AEP, Burnett River 0.5% AEP, Burnett River 0.2% AEP, Non-urban Creeks and Overland Flow Path in unadopted area.

Appendix F – Proposed Site Layout Plan

4.3 MASTER PLAN

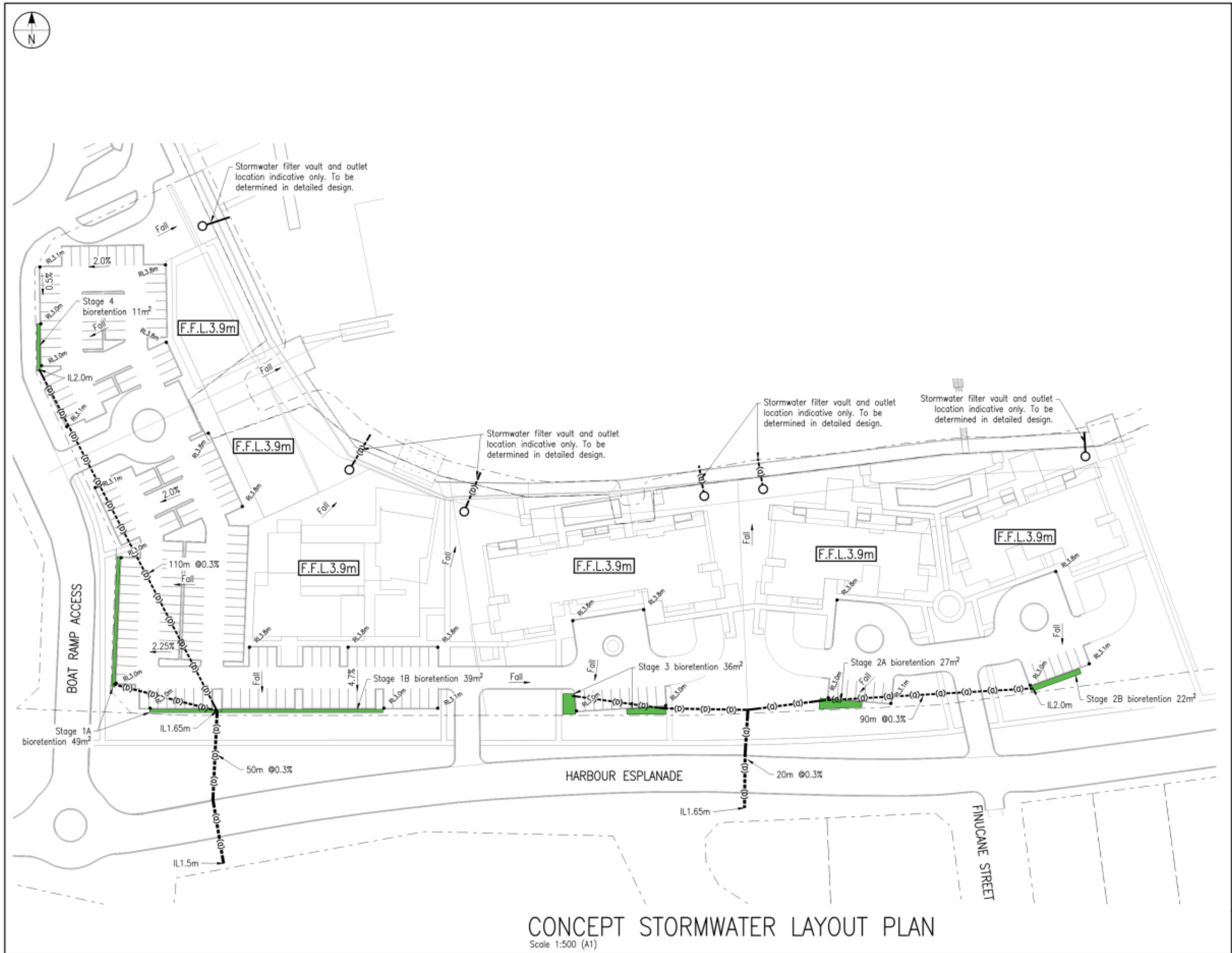


387700 | REQUEST FOR INFORMATION RESPONSE | ISSUE A | 02 OCTOBER 2019   SCALE: 1:1000 @ A3

BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG

18 / 113

Appendix G – Stormwater quality plans



CONCEPT STORMWATER LAYOUT PLAN

Scale 1:500 (A1)

LEGEND:

- Existing Property Boundary
- Existing Easement Boundary
- Proposed Property Boundary
- Proposed Easement Boundary
- --(D)---(D)-- Proposed Stormwater
- S2A_M Stormwater Catchment Label
- Stormwater Catchment Boundary

PLAN NOTES:

P.1. This is a sketch plan only and is conceptual only.
P.2. This sketch plan represents design intent and concepts only.
P.3. This plan shall not be used for tendering, financing, ordering of materials, construction or any other unintended purpose.
P.4. Information shown on these plans has been compiled from varying sources and may not be accurate and will need verifying. This includes existing infrastructure, property boundaries and natural surface data.
P.5. This plan shall not be relied upon for detailed design.

SCALE BARS: 0 5 10 15 20m — 1:500(A1) 1:1000(A3)

ISSUE	DESCRIPTION	DATE	DWN	DES	CHK	APP
A	CONCEPT	06/11/19	BHB	BHB	JTS	

NOTE: FIGURED DIMENSIONS TO TAKE PRECEDENCE OVER SCALED MEASUREMENTS. VERIFY ALL ON SITE DIMENSIONS & LEVELS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES. COPYRIGHT OF THIS DRAWING IS VESTED WITH RMA ENGINEERS PTY. LTD.

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CLIENT: BH DEVELOPMENTS QLD PTY LTD, PO BOX 2264, BONDI JUNCTION NSW 1355

PROJECT: BURNETT HARBOUR MARINA VILLAGE DEVELOPMENT, BUNDABERG QLD 4670

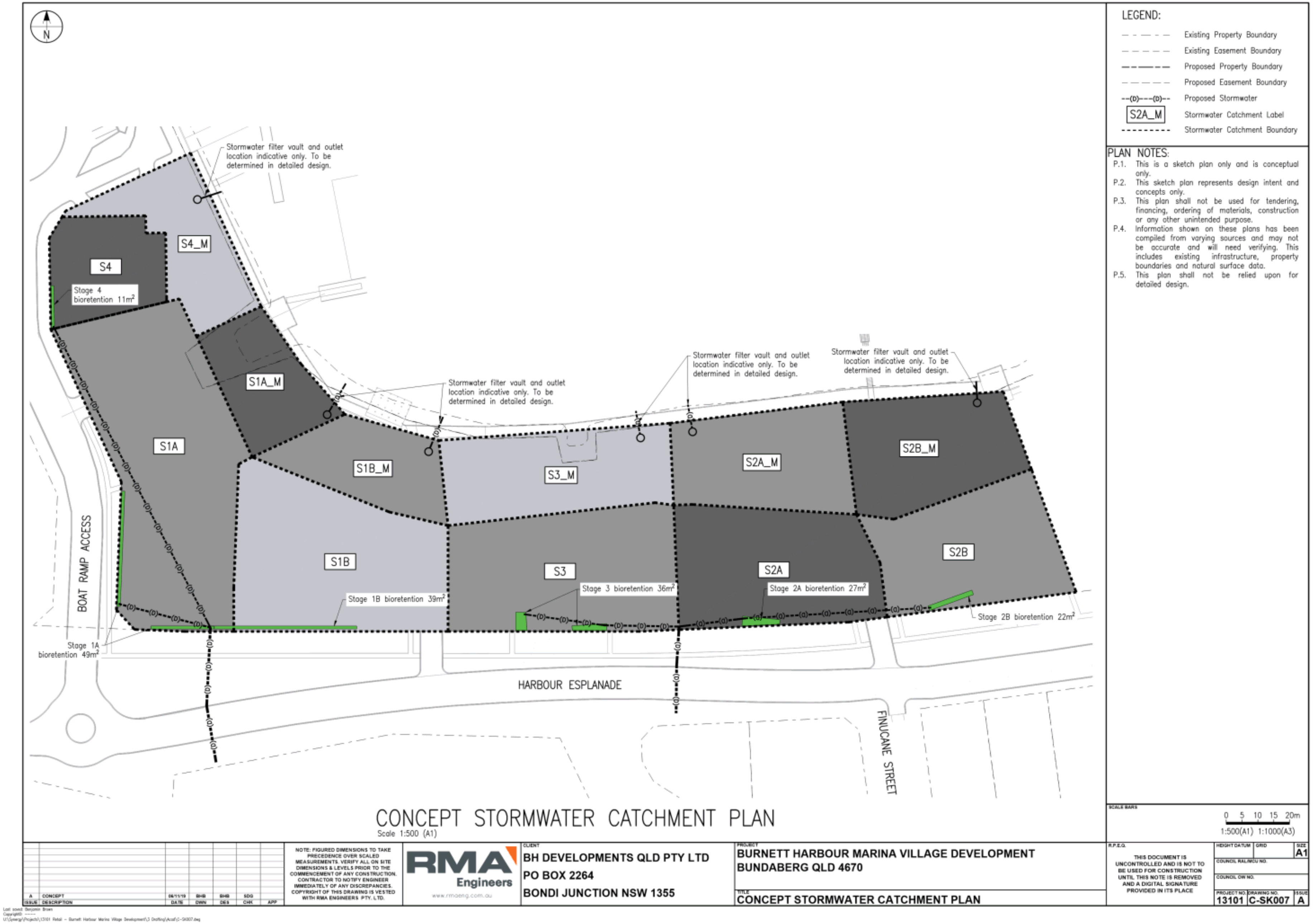
TITLE: CONCEPT STORMWATER LAYOUT PLAN

R.P.E.Q.: THIS DOCUMENT IS UNCONTROLLED AND IS NOT TO BE USED FOR CONSTRUCTION UNTIL THIS NOTE IS REMOVED AND A DIGITAL SIGNATURE PROVIDED IN ITS PLACE

HEIGHT DATUM	GRID	SIZE
		A1

COUNCIL RAL/MCU NO. / COUNCIL OW NO.

PROJECT NO.	DRAWING NO.	ISSUE
13101	C-SK002	A


N
LEGEND:
Existing Property Boundary
Existing Easement Boundary
Proposed Property Boundary
Proposed Easement Boundary
Proposed Stormwater
S2A_M Stormwater Catchment Label
Stormwater Catchment Boundary
PLAN NOTES:
P.1. This is a sketch plan only and is conceptual only.
P.2. This sketch plan represents design intent and concepts only.
P.3. This plan shall not be used for tendering, financing, ordering of materials, construction or any other unintended purpose.
P.4. Information shown on these plans has been compiled from varying sources and may not be accurate and will need verifying. This includes existing infrastructure, property boundaries and natural surface data.
P.5. This plan shall not be relied upon for detailed design.
Stormwater filter vault and outlet location indicative only. To be determined in detailed design.
S4
S4_M
Stage 4 bioretention 11m²
S1A_M
S1A
S1B_M
S3_M
S2A_M
S2B_M
S1B
S3
S2A
S2B
Stage 1B bioretention 39m²
Stage 3 bioretention 36m²
Stage 2A bioretention 27m²
Stage 2B bioretention 22m²
Stage 1A bioretention 49m²
BOAT RAMP ACCESS
HARBOUR ESPLANADE
FINUCANE STREET
CONCEPT STORMWATER CATCHMENT PLAN
Scale 1:500 (A1)
0 5 10 15 20m
1:500(A1) 1:1000(A3)
A CONCEPT 06/11/19 BHB BHB SDG
ISSUE DESCRIPTION DATE DWN DES CHK APP
NOTE: FIGURED DIMENSIONS TO TAKE PRECEDENCE OVER SCALED MEASUREMENTS. VERIFY ALL ON SITE DIMENSIONS & LEVELS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES. COPYRIGHT OF THIS DRAWING IS VESTED WITH RMA ENGINEERS PTY. LTD.
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PROJECT
BURNETT HARBOUR MARINA VILLAGE DEVELOPMENT
BUNDABERG QLD 4670
TITLE
CONCEPT STORMWATER CATCHMENT PLAN
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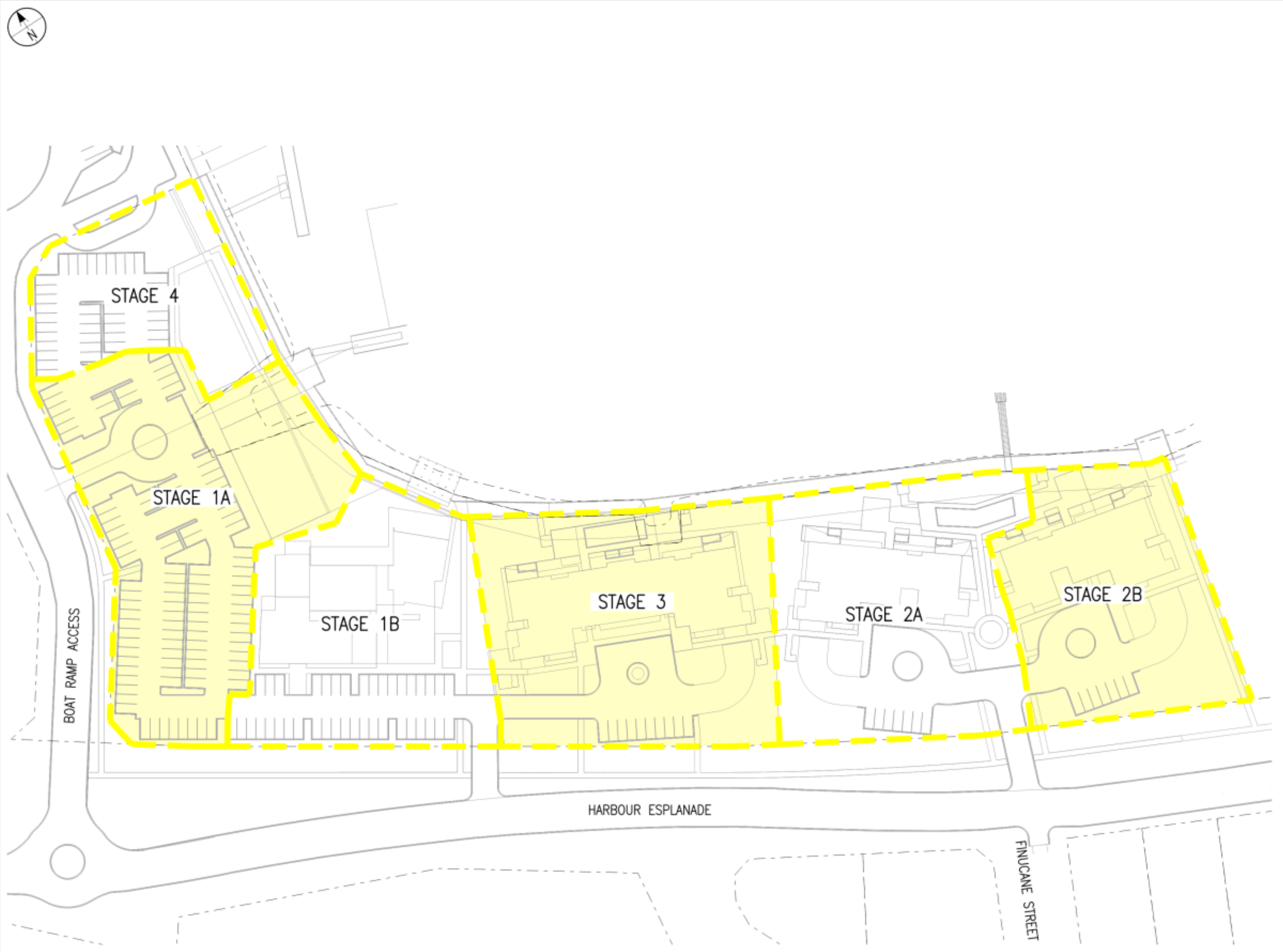
PROJECT NO. 13101 DRAWING NO. C-SK007 ISSUE A



STAGE LAYOUT

Scale 1:500 (A1)

LEGEND:

- Existing Property Boundary
- Existing Easement Boundary
- Proposed Property Boundary
- Proposed Easement Boundary
- Indicative Stage Boundary

PLAN NOTES:

P.1. This is a sketch plan only and is conceptual only.
P.2. This sketch plan represents design intent and concepts only.
P.3. This plan shall not be used for tendering, financing, ordering of materials, construction or any other unintended purpose.
P.4. Information shown on these plans has been compiled from varying sources and may not be accurate and will need verifying. This includes existing infrastructure, property boundaries and natural surface data.
P.5. This plan shall not be relied upon for detailed design.

SCALE BARS

0 5 10 15 20m
1:500(A1) 1:1000(A3)

ISSUE	DESCRIPTION	DATE	DWN	DES	CHK	APP
A	INDICATIVE	17/12/19	BHB			

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PROJECT
BURNETT HARBOUR MARINA VILLAGE DEVELOPMENT
BUNDABERG QLD 4670

TITLE
STAGE LAYOUT

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HEIGHT DATUM	GRID	SIZE
		A1

COUNCIL RAL/MCU NO.
COUNCIL OW NO.

PROJECT NO.	DRAWING NO.	ISSUE
13101	C-SK008	A

Appendix H – Stormwater 360 information

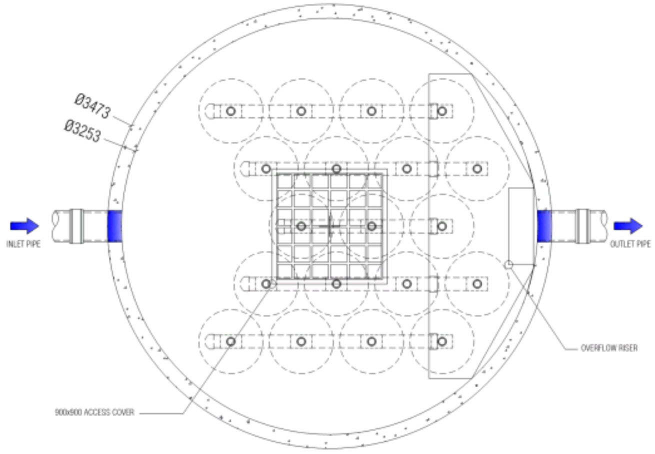
STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED AND BY REGION SPECIFIC INTERNAL FLOW CONTROLS. CONVEYANCE CAPACITY IS RATED AT 80L/S.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CIVIL ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- ALL PARTS PROVIDED AND INTERNAL ASSEMBLY BY STORMWATER360 AUSTRALIA UNLESS OTHERWISE NOTED.

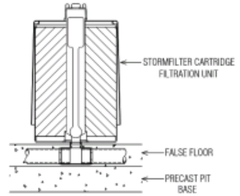
CARTRIDGE HEIGHT	690		460		310	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	930		700		550	
TREATMENT BY MEDIA SURFACE AREA L/S/m2	1.4	0.7	1.4	0.7	1.4	0.7
CARTRIDGE FLOW RATE (L/s)	1.42	0.71	0.95	0.47	0.63	0.32

GENERAL NOTES

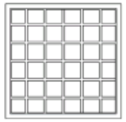
1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR. STORMFILTER IS PROVIDED WITH OPENINGS AT INLET AND OUTLET LOCATIONS.
2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. PLEASE CONTACT STORMWATER360 AUSTRALIA FOR OPTIONS.
3. THE FILTER CARTRIDGE(S) ARE SIPHON-ACTUATED AND SELF-CLEANING. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED BY STORMWATER360 AUSTRALIA IN ACCORDANCE WITH AS3600.
4. SEE STORMFILTER DESIGN TABLE FOR REQUIRED HYDRAULIC DROP. FOR SHALLOW, LOW DROP OR SPECIAL DESIGN CONSTRAINTS, CONTACT STORMWATER360 AUSTRALIA FOR DESIGN OPTIONS.
5. ALL WATER QUALITY PRODUCTS REQUIRE PERIODIC MAINTENANCE AS OUTLINED IN THE O&M GUIDELINES. PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
6. STRUCTURE AND ACCESS COVERS DESIGNED TO MEET AUSTROADS T44 LOAD RATING WITH 0.0m TO 2.0m FILL MAXIMUM (CLASS D).
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES AND VARY REGIONALLY.
8. ANY BACKFILL DEPTH, SUB-BASE, AND OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
9. CARTRIDGE HEIGHT IS 690mm (SHOWN). CARTRIDGE HEIGHT AND ASSOCIATED DESIGN PARAMETERS PER STORMFILTER DESIGN TABLE.
10. STORMFILTER BY STORMWATER360 AUSTRALIA: PHONE: 1300 354 722 OR www.stormwater360.com.au



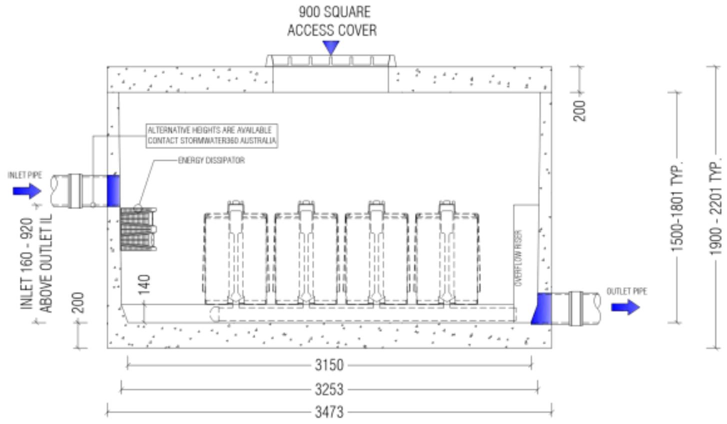
MANHOLE STORMFILTER PLAN



STORMFILTER CARTRIDGE DETAIL



900 x 900 ACCESS COVER



MANHOLE STORMFILTER SECTION

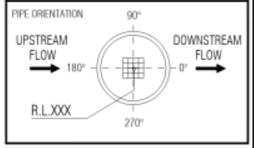
SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	XXX
WATER QUALITY FLOW RATE (L/S)	XXX
PEAK FLOW RATE (L/S)	XXX
RETURN PERIOD OF PEAK FLOW (yrs)	XXX
# OF CARTRIDGES REQUIRED (1 - 22)	19
CARTRIDGE HEIGHT (310, 460 or 690mm)	690
MEDIA TYPE (PERLITE, PERLITE/ZEOLITE OR ZPG)	XXX

PRECAST VAULT WEIGHT	13000 kg
PRECAST LID WEIGHT	4500 kg

PIPE DATA:	I.L.	MATERIAL	DIAMETER
INLET PIPE #1	XXX	XXX	XXX
INLET PIPE #2	N/A	N/A	N/A
OUTLET PIPE	XXX	XXX	XXX

PIPE ORIENTATION



LADDER		YES/NO
ANTI-FLOTATION BALLAST	N/A	N/A
	N/A	N/A

NOTES/SPECIAL REQUIREMENTS:

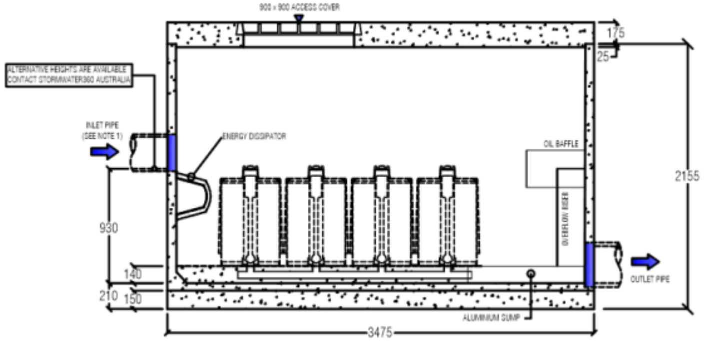
Stormwater360

STORMWATER360 AUSTRALIA 19 CARTIRDGE STORMFILTER SYSTEM Ø 3150 STORMFILTER TANK GENERAL ARRANGEMENT	DRAWING 1 A
DATE: 15.04.16 FILE NAME: 19C690_3150SFMH DRN: W.J.	CHK: M.W.

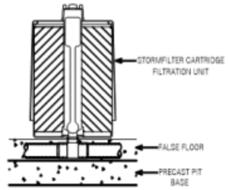
STORMFILTER DESIGN TABLE						
• STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED AND BY REGION SPECIFIC INTERNAL FLOW CONTROLS. CONVEYANCE CAPACITY IS RATED AT 80L/S. • THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CIVIL ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S). • ALL PARTS PROVIDED AND INTERNAL ASSEMBLY BY STORMWATER360 AUSTRALIA UNLESS OTHERWISE NOTED.						
CARTRIDGE HEIGHT	690		460		310	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	930		700		550	
TREATMENT BY MEDIA SURFACE AREA L/S/m2	1.4	0.7	1.4	0.7	1.4	0.7
CARTRIDGE FLOW RATE (L/s)	1.42	0.71	0.95	0.47	0.63	0.32

GENERAL NOTES

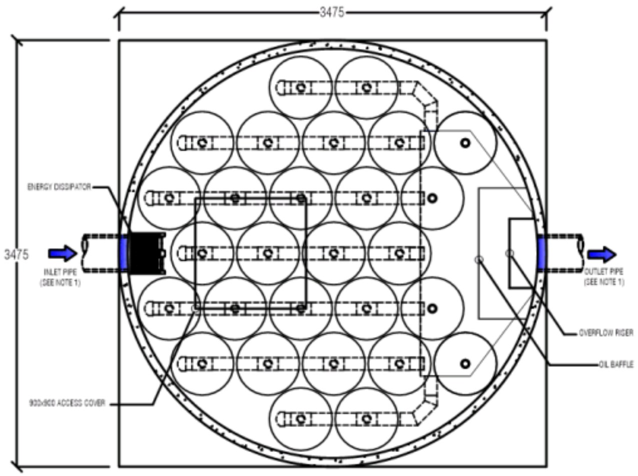
1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR. STORMFILTER IS PROVIDED WITH OPENINGS AT INLET AND OUTLET LOCATIONS.
2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. PLEASE CONTACT STORMWATER360 AUSTRALIA FOR OPTIONS.
3. THE FILTER CARTRIDGE(S) ARE SIPHON-ACTUATED AND SELF-CLEANING. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED BY STORMWATER360 AUSTRALIA IN ACCORDANCE WITH AS3600.
4. SEE STORMFILTER DESIGN TABLE FOR REQUIRED HYDRAULIC DROP. FOR SHALLOW, LOW DROP OR SPECIAL DESIGN CONSTRAINTS, CONTACT STORMWATER360 AUSTRALIA FOR DESIGN OPTIONS.
5. ALL WATER QUALITY PRODUCTS REQUIRE PERIODIC MAINTENANCE AS OUTLINED IN THE O&M GUIDELINES. PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
6. STRUCTURE AND ACCESS COVERS DESIGNED TO MEET AUSTROADS T44 LOAD RATING WITH 0.0m TO 2.0m FILL MAXIMUM (CLASS D).
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES AND VARY REGIONALLY.
8. ANY BACKFILL DEPTH, SUB-BASE, AND OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
9. CARTRIDGE HEIGHT IS 690mm (SHOWN). CARTRIDGE HEIGHT AND ASSOCIATED DESIGN PARAMETERS PER STORMFILTER DESIGN TABLE.
10. STORMFILTER BY STORMWATER360 AUSTRALIA: PHONE: 1300 354 722 OR www.stormwater360.com.au



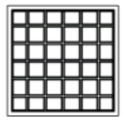
MANHOLE STORMFILTER SECTION



STORMFILTER CARTRIDGE DETAIL



MANHOLE STORMFILTER PLAN



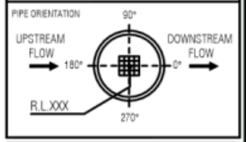
900 x 900 ACCESS COVER

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	XXX
WATER QUALITY FLOW RATE (L/S)	44
PEAK FLOW RATE (L/S)	124
RETURN PERIOD OF PEAK FLOW (yrs)	XXX
# OF CARTRIDGES REQUIRED (13-29)	28
CARTRIDGE HEIGHT (310, 460 or 690mm)	690
MEDIA TYPE (PERLITE, PERLITE/ZEOLITE OR ZPG)	ZPG
PRECAST VAULT WEIGHT	9200 kg
PRECAST LID WEIGHT	4500 kg

PIPE DATA:	I.L.	MATERIAL	DIAMETER
INLET PIPE #1	33.435	XXX	XXX
INLET PIPE #2	N/A	N/A	N/A
OUTLET PIPE	32.505	XXX	XXX

PIPE ORIENTATION



LADDER		YES/NO
ANTI-FLOTATION BALLAST	N/A	N/A
	N/A	N/A

NOTES/SPECIAL REQUIREMENTS:

Stormwater360

STORMWATER360 AUSTRALIA 28 CARTRIDGE STORMFILTER SYSTEM Ø 3475 DETENTION TANK GENERAL ARRANGEMENT			DRAWING 1 A
DATE: 04.04.14	FILE NAME: 28C690SFMH_1A	DRN: W.J.	CHK: M.W.

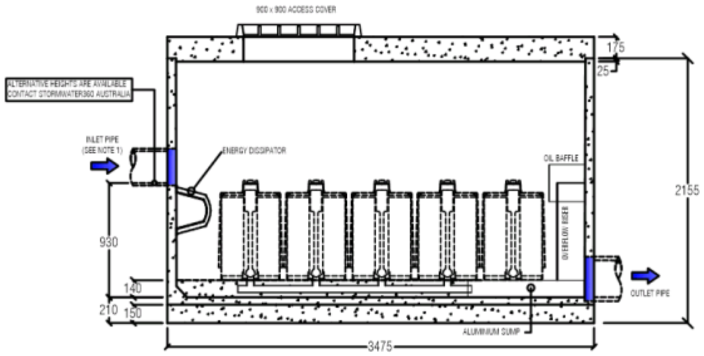
	STORMFILTER DESIGN TABLE					

• STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED AND BY REGION SPECIFIC INTERNAL FLOW CONTROLS. CONVEYANCE CAPACITY IS RATED AT 80L/S.
• THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CIVIL ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
• ALL PARTS PROVIDED AND INTERNAL ASSEMBLY BY STORMWATER360 AUSTRALIA UNLESS OTHERWISE NOTED.

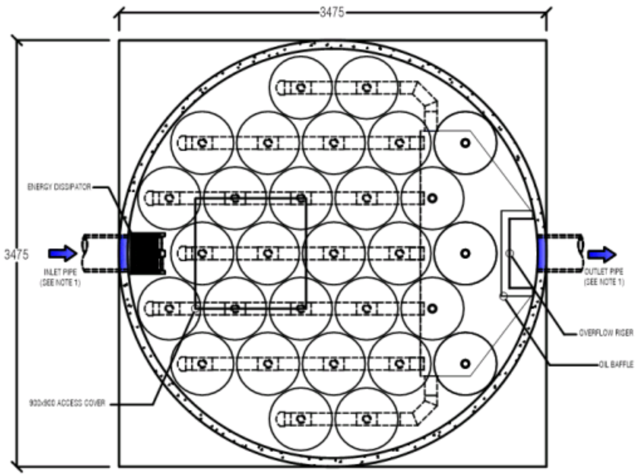
CARTRIDGE HEIGHT	690		460		310	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	930		700		550	
TREATMENT BY MEDIA SURFACE AREA L/S/m2	1.4	0.7	1.4	0.7	1.4	0.7
CARTRIDGE FLOW RATE (L/s)	1.42	0.71	0.95	0.47	0.63	0.32

GENERAL NOTES

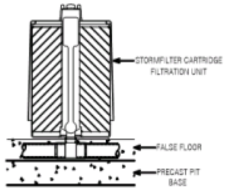
1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR. STORMFILTER IS PROVIDED WITH OPENINGS AT INLET AND OUTLET LOCATIONS.
2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. PLEASE CONTACT STORMWATER360 AUSTRALIA FOR OPTIONS.
3. THE FILTER CARTRIDGE(S) ARE SIPHON-ACTUATED AND SELF-CLEANING. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED BY STORMWATER360 AUSTRALIA IN ACCORDANCE WITH AS3600.
4. SEE STORMFILTER DESIGN TABLE FOR REQUIRED HYDRAULIC DROP. FOR SHALLOW, LOW DROP OR SPECIAL DESIGN CONSTRAINTS, CONTACT STORMWATER360 AUSTRALIA FOR DESIGN OPTIONS.
5. ALL WATER QUALITY PRODUCTS REQUIRE PERIODIC MAINTENANCE AS OUTLINED IN THE O&M GUIDELINES. PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
6. STRUCTURE AND ACCESS COVERS DESIGNED TO MEET AUSTROADS T44 LOAD RATING WITH 0.0m TO 2.0m FILL MAXIMUM (CLASS D).
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES AND VARY REGIONALLY.
8. ANY BACKFILL DEPTH, SUB-BASE, AND OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
9. CARTRIDGE HEIGHT IS 690mm (SHOWN). CARTRIDGE HEIGHT AND ASSOCIATED DESIGN PARAMETERS PER STORMFILTER DESIGN TABLE.
10. STORMFILTER BY STORMWATER360 AUSTRALIA: PHONE: 1300 354 722 OR www.stormwater360.com.au



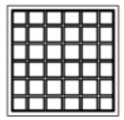
MANHOLE STORMFILTER SECTION



MANHOLE STORMFILTER PLAN



STORMFILTER CARTRIDGE DETAIL



900 x 900 ACCESS COVER

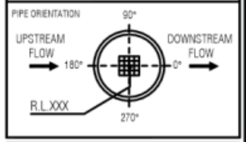
SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	XXX
WATER QUALITY FLOW RATE (L/S)	46
PEAK FLOW RATE (L/S)	126
RETURN PERIOD OF PEAK FLOW (yrs)	XXX
# OF CARTRIDGES REQUIRED (13-29)	29
CARTRIDGE HEIGHT (310, 460 or 690mm)	690
MEDIA TYPE (PERLITE, PERLITE/ZEOLITE OR ZPG)	ZPG

PRECAST VAULT WEIGHT	9200 kg
PRECAST LID WEIGHT	4500 kg

PIPE DATA:	I.L.	MATERIAL	DIAMETER
INLET PIPE #1	33.435	XXX	XXX
INLET PIPE #2	N/A	N/A	N/A
OUTLET PIPE	32.505	XXX	XXX

PIPE ORIENTATION

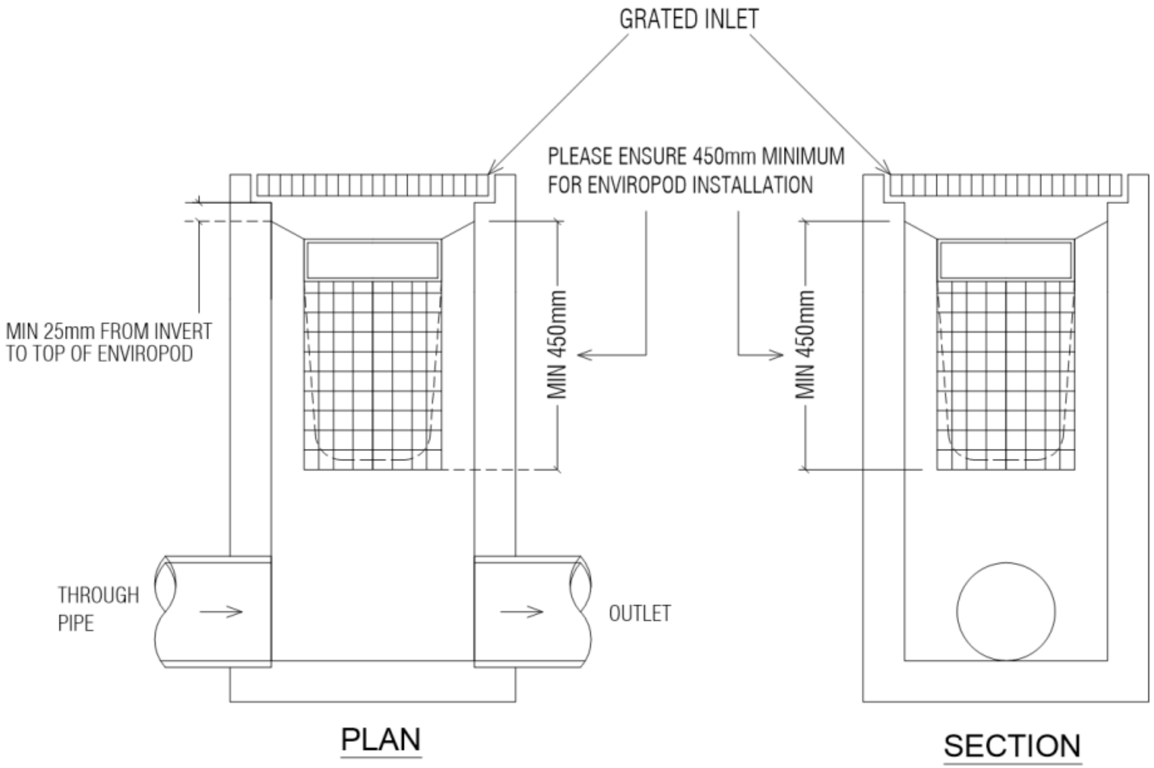


LADDER		YES/NO
ANTI-FLOTATION BALLAST	N/A	N/A
	N/A	N/A

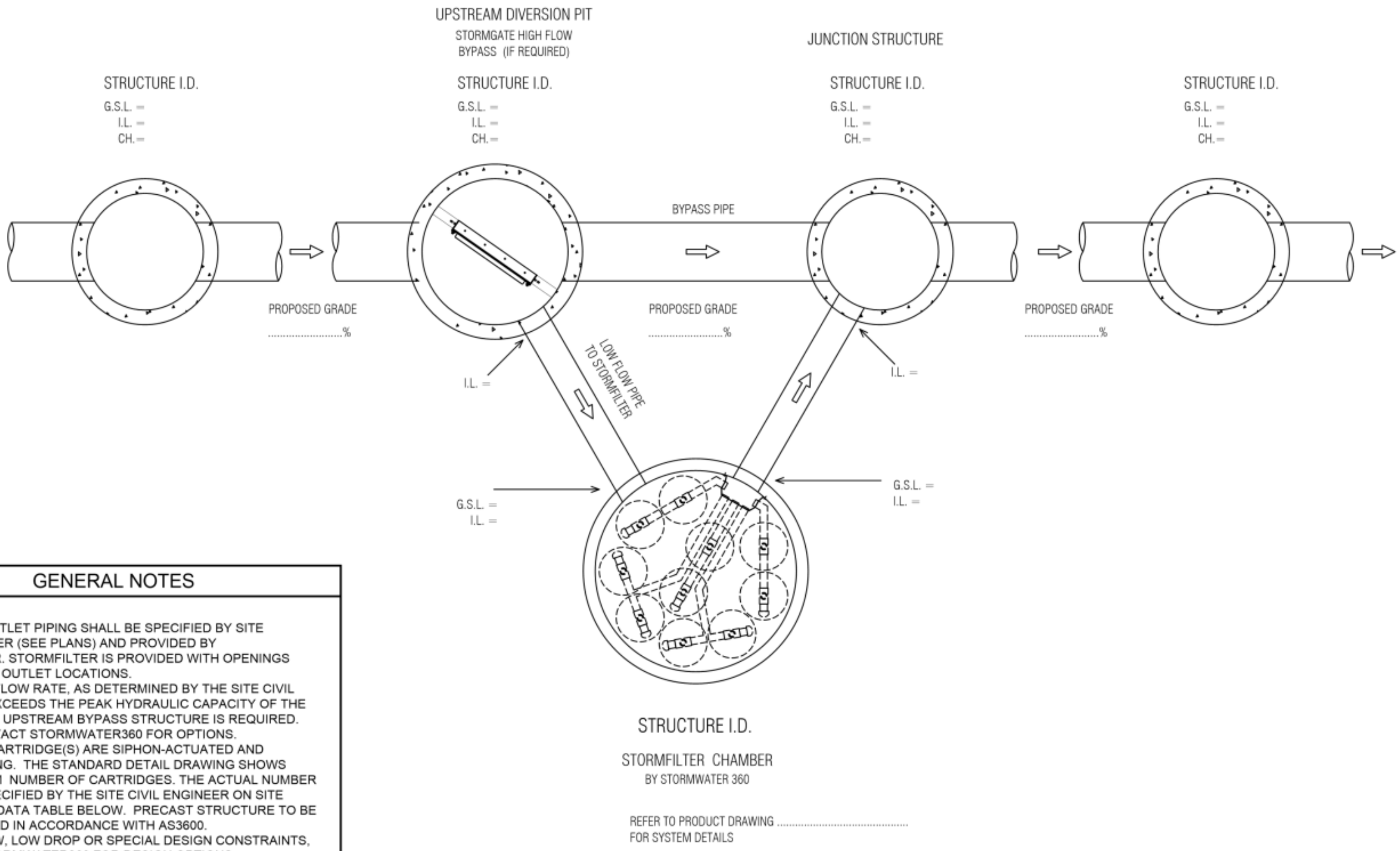
NOTES/SPECIAL REQUIREMENTS:

Stormwater360

STORMWATER360 AUSTRALIA 29 CARTRIDGE STORMFILTER SYSTEM Ø 3475 DETENTION TANK GENERAL ARRANGEMENT	DRAWING 1 A
DATE: 04.04.14 FILE NAME: 29C690SFMH_1A DRN: W.J.	CHK: M.W.



Stormwater360	STORMWATER360 STANDARD ENVIROPOD FILTER FOR STANDARD GULLY PIT GENERAL ARRANGEMENT			DRAWING 1 D
DATE: 25.09.12	SCALE: N.T.S.	FILE NAME: EP_TYP_01D	DRN: R.P.	CHK: M.W.



PLAN OF TYPICAL OFFLINE LAYOUT

GENERAL NOTES

1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR. STORMFILTER IS PROVIDED WITH OPENINGS AT INLET AND OUTLET LOCATIONS.
2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. PLEASE CONTACT STORMWATER360 FOR OPTIONS.
3. THE FILTER CARTRIDGE(S) ARE SIPHON-ACTUATED AND SELF-CLEANING. THE STANDARD DETAIL DRAWING SHOWS THE MAXIMUM NUMBER OF CARTRIDGES. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH AS3600.
4. FOR SHALLOW, LOW DROP OR SPECIAL DESIGN CONSTRAINTS, CONTACT STORMWATER360 FOR DESIGN OPTIONS.
5. ALL WATER QUALITY PRODUCTS REQUIRE PERIODIC MAINTENANCE AS OUTLINED IN THE O&M GUIDELINES. PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
6. STRUCTURE AND ACCESS COVERS DESIGNED TO MEET AUSTROADS T44 LOAD RATING WITH 0-2m FILL MAXIMUM.
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES AND VARY REGIONALLY.
8. ANY BACKFILL DEPTH, SUB-BASE, AND OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
9.. STORMFILTER BY STORMWATER360:
SYDNEY (AU) PHONE: (02) 9525 5833,
BRISBANE (AU) PHONE: (07) 3272 1872.

Stormwater360

STORMWATER360
TYPICAL OFFLINE LAYOUT
STORMGATE HIGH FLOW BYPASS (OPTIONAL)
WITH PRECAST MANHOLE STORMFILTER

DRAWING 1 A

DATE: 09.03.08	SCALE: N.T.S.	FILE NAME: SFMH_OFFLINE_TYP	DRN: R.P.	CHK: M.W.

Queensland Government

Queensland Treasury

Our reference: 1901-9386 SRA
Your reference: 522.2018.89.1
Applicant reference: GC15-352-T03

4 November 2020

The Chief Executive Officer
Bundaberg Regional Council
PO Box 3130
BUNDABERG QLD 4670
development@bundaberg.qld.gov.au

Attention: Ms Sarah Watts

Dear Ms Watts

SARA referral agency response—with conditions

(Given under Section 56 of the *Planning Act 2016*)

The development application described below was confirmed as being property referred to the State Assessment and Referral Agency (SARA) on 6 February 2019. This Referral Agency Response replaces the previous Referral Agency Response issued by SARA (formerly Department of State Development, Manufacturing, Infrastructure and Planning) on 12 March 2019 (deleted text in strikethrough and new text in bold).

Applicant details

Applicant name:	BH Developments Qld Pty Ltd C/- Insite SJC
Applicant contact details:	PO Box 1688 BUNDABERG QLD 4670 randall@insitesjc.com.au

Location details

Street address:	67 Harbour Esplanade, BURNETT HEADS
Real property description:	Lots 1, 2 & 3 on SP157913
Local government area:	Bundaberg Regional Council

Application details

Development Permit:	Material Change of Use for Mixed Use Development (Burnett Harbour Village) – Office, Shop, Food and Drink Outlet, Indoor

Wide Bay Burnett regional office
Level 1, 7 Takalvan Street, Bundaberg
PO Box 979, Bundaberg QLD 4670

Sport and Recreation, Short Term Accommodation and Multiple Dwellings

Referral triggers

The development application was referred to the Department under the following provisions of the Planning Regulation 2017:

- 10.17.3.6.1 Tidal works or work in a coastal management district

Conditions

Under Section 56(1)(b)(i) of the *Planning Act 2016* (the Act), the conditions set out in **Attachment 1** must be attached to any development approval.

Reasons for decision to impose conditions

The SARA must provide reasons for the decision to impose conditions. These reasons are set out in **Attachment 2**.

Approved plans and specifications

The SARA requires that the plans and specification set out below and enclosed must be attached to any development approval.

Drawing report/title	Prepared by	Date	Reference No.	Version/issue
Aspect of development: Material Change of Use				
Overall Master Plan, amended in red by SARA on ~~12 March 2019~~ **4 November 2020**	BDA	23 October 2018	387700, Sheet 17 of 118	H

An applicant may make representations to a concurrence agency, at any time before the application is decided, about changing a matter in the referral agency response (section 30 of the Development Assessment Rules).

Copies of the relevant provisions are in **Attachment 3**.

A copy of this response has been sent to the applicant for their information.

For further information please contact Peter Mulcahy, Principal Planning Officer, on (07) 4331 5603 or via email WBBSARA@dsdmip.qld.gov.au who will be pleased to assist.

Yours sincerely

Luke Lankowski
Manager, Planning – Wide Bay Burnett

enc Attachment 1 – Referral agency conditions
Attachment 2 – Reasons for referral agency response
Attachment 3 – Representations provisions
Attachment 4 – Approved plans and specifications

1901-9386 SRA

cc BH Developments Qld Pty Ltd
C/- Insite SJC
randall@insitesjc.com.au

1901-9386 SRA

Attachment 1—Referral agency conditions

(Under Section 56(1)(b)(i) of the *Planning Act 2016* the following conditions must be attached to any development approval relating to this application) (Copies of the plans and specifications referenced below are found at **Attachment 4**)

No.	Conditions	Condition timing
Material Change of Use		
Schedule 10, Part 17, Division 3, Table 6, Item 1 of the Planning Regulation 2017—The Chief Executive administering the *Planning Act 2016* nominates the Director-General of the Department of Environmental and Science to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):		
In accordance with the approved plans		
1.	The development must be carried out generally in accordance with the following plans: • *Overall Master Plan*, prepared by BDA, dated 23 October 2018, Plan Number 387700, Sheet 17 of 113, Revision H (amended in red by SARA on ~~12 March 2019~~ **4 November 2020**)	At all times.
Tidal works, or development in a coastal management district		
2.	For the proposed works, only use clean materials and ensure that the works do not cause contamination.	For the duration of the works associated with the development.
3.	Erosion and sediment control measures which are in accordance with the *Best Practice Erosion and Sediment Control (BPESC) guidelines for Australia (International Erosion Control Association)*, are to be installed and maintained to prevent the release of sediment to tidal waters.	For the duration of the works associated with the development.
4.	Submit "As Constructed" drawings to palm@des.qld.gov.au or mail to: Department of Environment and Science Permit and Licence Management Implementation and Support Unit GPO Box 2454 BRISBANE QLD 4001	Within two (2) weeks of the completion of works associated with the development.
5.	In the event that the works cause disturbance or oxidisation of acid sulfate soil, the affect soil must be treated and thereafter managed (until the affected soil has been neutralised and contained) in accordance with the current *Queensland Acid Sulfate Soil Technical Manual: Soil management guidelines*, prepared by the Department of Science, Information Technology, Innovation and the Arts, 2014.	Upon disturbance or oxidisation until the affected soil has been neutralised or contained.

Attachment 2—Reasons for referral agency response

(Given under Section 56(7) of the *Planning Act 2016*)

The reasons for the SARA decision are:

- To ensure the development is carried out generally in accordance with the plans of development submitted with the application
- To ensure the development avoids and minimises adverse impacts on coastal resources and their values
- To allow for compliance in relation to what is considered generally in accordance with the approve plans when preliminary plans are submitted with the application. Development inconsistent with the approval may have an impact on coastal management that was not considered in assessment
- To ensure any disturbance to acid sulfate soils is managed to prevent impacts to coastal environments

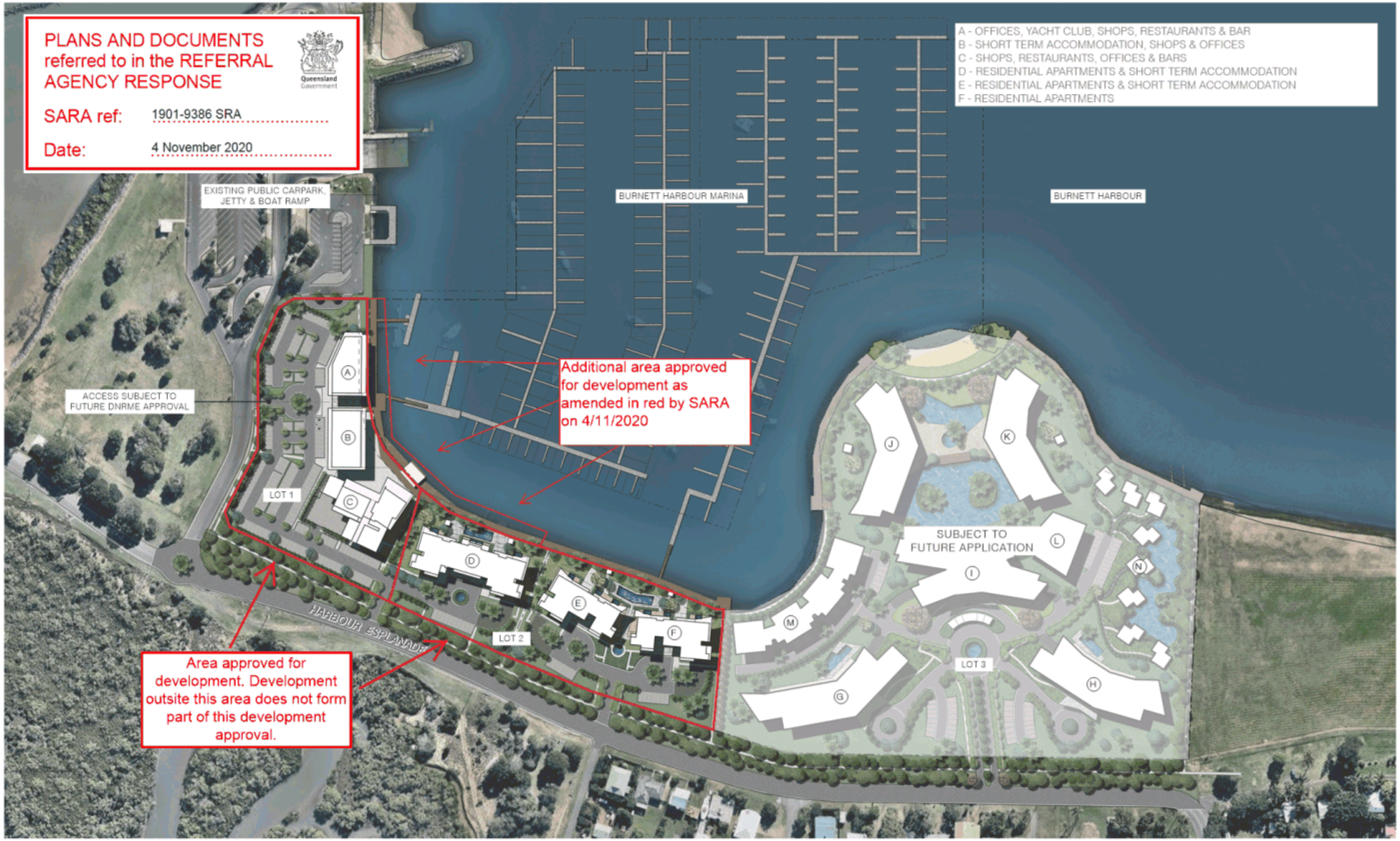
Material used in the assessment of the application:

- The development application material (received by SARA on 6 February 2019)
- Further applicant material (received by SARA on 20 October 2020)
- Confirmation Notice (received by SARA on 20 October 2020)
- *Planning Act 2016*
- Planning Regulation 2017
- The *State Development Assessment Provisions* (Version 2.4)
- The Development Assessment Rules (DA Rules)
- SARA DA Mapping system

Attachment 3—Representations about a referral agency response

Attachment 4—Approved plans and specifications

4.2 OVERALL MASTER PLAN



387700 | DEVELOPMENT APPLICATION | ISSUE H | 23 OCT 2018 SCALE: 1:2000 @ A3

BURNETT HARBOUR 'MARINA VILLAGE' | MIXED USE | BUNDABERG bda 17 / 113

Development Assessment Rules—Representations about a referral agency response

The following provisions are those set out in sections 28 and 30 of the Development Assessment Rules[1] regarding **representations about a referral agency response**

Part 6: Changes to the application and referral agency responses

28 Concurrence agency changes its response or gives a late response

28.1. Despite part 2, a concurrence agency may, after its referral agency assessment period and any further period agreed ends, change its referral agency response or give a late referral agency response before the application is decided, subject to section 28.2 and 28.3.

28.2. A concurrence agency may change its referral agency response at any time before the application is decided if—

(a) the change is in response to a change which the assessment manager is satisfied is a change under section 26.1; or

(b) the Minister has given the concurrence agency a direction under section 99 of the Act; or

(c) the applicant has given written agreement to the change to the referral agency response.[2]

28.3. A concurrence agency may give a late referral agency response before the application is decided, if the applicant has given written agreement to the late referral agency response.

28.4. If a concurrence agency proposes to change its referral agency response under section 28.2(a), the concurrence agency must—

(a) give notice of its intention to change its referral agency response to the assessment manager and a copy to the applicant within 5 days of receiving notice of the change under section 25.1; and

(b) the concurrence agency has 10 days from the day of giving notice under paragraph (a), or a further period agreed between the applicant and the concurrence agency, to give an amended referral agency response to the assessment manager and a copy to the applicant.

---

1 Pursuant to Section 68 of the *Planning Act 2016*

2 In the instance an applicant has made representations to the concurrence agency under section 30, and the concurrence agency agrees to make the change included in the representations, section 28.2(c) is taken to have been satisfied.

Part 7: Miscellaneous

30 Representations about a referral agency response

30.1. An applicant may make representations to a concurrence agency at any time before the application is decided, about changing a matter in the referral agency response.[3]

[3] An applicant may elect, under section 32, to stop the assessment manager's decision period in which to take this action. If a concurrence agency wishes to amend their response in relation to representations made under this section, they must do so in accordance with section 28.

Helen Aplitt

From: Peter Mulcahy <Peter.Mulcahy@dsdmip.qld.gov.au>
Sent: Wednesday, 4 November 2020 3:49 PM
To: Randall Barrington; Sarah Watts
Cc: Development
Subject: Proposed MCU at 67 Harbour Esplanade, Burnett Heads (GC15-351-T03 / 522.2018.89.1)
Attachments: 1901-9386 SRA - SARA Referral Agency Response 04112020.pdf; 1901-9386 SRA - SARA Approved Plan 04112020.pdf; GE83-N Representations about a referral agency response.pdf

Importance: High

Categories: Helen

Good Afternoon Randall/Sarah,

Proposed MCU at 67 Harbour Esplanade, Burnett Heads (GC15-351-T03 / 522.2018.89.1)

Please find attached SARA Referral Agency Response replacing the earlier Response issued on 12 March 2019.

Condition No. 1 and the approved plan have been revised to include part of Lots 2 and 3 on SP157913 (approved plan amended in red by SARA).

If you have any queries please contact me on (07) 4331 5603.

Kind Regards,

Peter

Peter Mulcahy
Principal Planning Officer
Planning and Development Services
Queensland Treasury
Queensland Government
P 07 4331 5603 **E** Peter.Mulcahy@dsdmip.qld.gov.au
Level 1, 7 Takalvan Street, Bundaberg QLD 4670
PO Box 979 Bundaberg QLD 4670
www.dsdmip.qld.gov.au

Helen Aplitt

From: Randall Barrington <Randall@insitesjc.com.au>
Sent: Friday, 13 November 2020 3:06 PM
To: Sarah Watts
Cc: Michael Ellery; Richard Jenner; Gary Milne; simon@beaugroup.com.au; Ianp; insite@emailmyjob.com
Subject: GC15-352-T03 Burnett Heads Marina Village Draft Conditions

Dear Sarah

Thanks very much for the opportunity to review the draft set of conditions. Simon, Ian, Gary and myself have spent several hours reviewing the conditions, advices and property notes. We have a few comments-

1. The property description at the beginning should include Lots 2 and 3.
2. Condition 4(a) seems excessive in so far as it relates to commercial activities and lockable structures. Strict adherence to the condition would see all commercial activities at least 10m from the riparian boundary which defeats the purpose of encouraging engagement and activation between the public and private realms. It would also see the residential buildings being setback some 16m from the riparian boundary which would effectively amount to a refusal of the plans. Our preference would be to allow commercial activities to be located as shown on the approved plans and to then impose a setback of 10 metres to the building facade of residential uses (it would have to be worded however to excuse Building B where upstairs overnight accommodation is proposed).
3. Condition 13 doesn't need to refer to loading docks because there will be no out of hours deliveries courtesy of Condition 27 (which I'll come back to shortly).
4. Condition 15 is ambiguous insofar as the Planning Scheme does not have a definition for the term 'supermarket'. Per the Planning Scheme definition of 'Shop', it has always been our intention to have a convenience goods store in the marina village for day-to-day convenience goods shopping for boaties (as distinct from your weekly shopping or comparison goods shopping). So long as Council is comfortable with this style of shop, we are comfortable with a 'supermarket' being excluded.
5. Condition 27. We would like the Mon-Sat hours to reflect the construction hours of 6:30am-6:30pm (Sunday hours are fine as is). The reason for these slightly extended hours is because we would like to try and separate delivery and waste collection vehicles from customer/resident traffic. It's purely operational but if we can get them through the site before trading commences or after trading, that would be a better operational outcome (and probably not a bad practical outcome either, separating delivery vehicles from customer/resident vehicles).
6. Condition 35. We are being asked to comment on dedicating land over which we have no control in accordance with a plan we have not seen. Consequently, we can't say we accept the condition. Michael explained the intention of the condition to me the other day. At first blush I thought it was opportunistic but I support the intention behind the condition. The problem with Condition 35 is that its fulfilment turns upon the goodwill of GPC. I see benefit in GPC complying with Condition 35 (including the building condition report) but none of us can see why the applicant should be burdened with any acquisition cost or any building upgrade cost that, ultimately, has no direct nexus with the proposed development. We are OK with providing the vehicle (the development approval) to achieve the outcome Council is seeking, the only codicil being that the applicant should not have to bear any cost to achieve the outcome Council is seeking.

7. Condition 36. Not acceptable. Enormous cost burden with no relevance to the DA.
8. Condition 46(r). Condition 46(r) wants the proponent to create a landscaped environment to mitigate the spillage of light in order to protect marine turtles. The best people in Australia (Pendoley) provided a Turtle Management Plan that contains I think 30 conditions which Council has imposed upon the development at Condition 34. In our opinion we have been very proactive in protecting marine turtles and volunteering conditions that we understand no other development along the Qld coastline has had imposed upon it. This is benchmark stuff and Condition 46(r) seems, in that light, to be an unreasonable and certainly an unnecessary imposition.
9. Condition 50. No objection so long as the ICN recognises this is trunk work and offsetable.
10. Condition 53. The RMA report recommends 354 car spaces and Council requires 379 car spaces. Why is that? I haven't checked bicycles yet. Our strong preference is to provide the car parking spaces identified by RMA after their comprehensive research.
11. Condition 57. I believe from other development conditions I have received that the purpose of the condition is to capture infrastructure that specifically serves the subject development. We have no problem if that is the intention but the wording should reflect it. It should refer to infrastructure that specifically serves the development as distinct from trunk infrastructure which is always better located in road reserves.
12. Condition 58. Per Condition 4(a) above.
13. Advice 11. We cannot accept this. The foreshore pathway is Council's infrastructure and therefore it should be maintained by Council.
14. Property Note. Please delete the word 'strongly'. It is emotive and portends some calamitous consequence if not listened to.

Once again thank you for allowing us to share our views about the conditions.

Atb
Randall

Item

24 November 2020

Item Number:	File Number:	Part:
O1		COMMUNITY & CULTURAL SERVICES

Portfolio:

Community & Environment

Subject:

Lease - Lot 35 on SP 254546 - Hobi & Hobi

Report Author:

Nicole Sabo, Property & Leases Officer

Authorised by:

Gavin Steele, General Manager Community & Environment

Link to Corporate Plan:

Our People, Our Business - 3.2 Responsible governance with a customer-driven focus - 3.2.3 Administer statutory compliant governance operations incorporating insurance; risk management; property management and Council policies and procedures.

Background:

Council is the freehold owner of Lot 35 on SP254546 at 3 Avro Ave, Kensington known as the Bundaberg Regional Airport ('Property'). Council leases general aviation hangars. The general aviation hangars are built and maintained by the lessee on Council land.

Jorg Hobi and Gerda Hobi ('Lessee') entered into a lease with Council for the aviation hangar site CN, commencing on 1 October 2015 and expiring on 30 September 2020 with an option of an addition five (5) years. The option was not exercised and the Lease is now operating under the holding over provision.

The Lessee wishes to enter into a new lease commencing on 1 October 2020 for a term of five (5) years with a further five (5) year option. Rent is for market value and is subject to an annual 3% increase. The Lessee is also responsible for 100% of outgoings. It is proposed that the remaining terms of the lease will be on Council's standard lease.

Council proposes to apply the exception to the tender/auction requirements contained in section 236(1)(c)(iii) of the *Local Government Regulation 2012* (Qld) given that the disposal is for the purposes of renewing the lease of land to an existing tenant of the land.

Associated Person/Organization:

Greg Barrington, Airport Manager

Consultation:

N/A

Chief Legal Officer's Comments:

Section 236(1)(c)(iii) of *Local Government Regulation 2012* (Qld) allows Council to dispose of an interest in a valuable non-current asset other than by tender or auction on the basis the disposal is for the purposes of renewing the lease of land to the existing tenant of the land.

Policy Implications:

There appears to be no policy implications.

Financial and Resource Implications:

There appears to be no financial or resource implications.

Risk Management Implications:

There appears to be no risk management implications.

Human Rights:

There appears to be no human rights implications.

Attachments:

Nil

Recommendation:

That:

1. **Council apply the exception contained in section 236(1)(c)(iii) of the *Local Government Regulation 2012* (Qld); and**
2. **the Chief Executive Officer be authorised to enter into a five (5) year Lease with a five (5) year option to Jorg Hobi and Gerda Hobi for aviation hangar site CN located on Lot 35 on SP254546 at Bundaberg Regional Airport.**

Item

24 November 2020

Item Number:	**File Number:**	**Part:**
O2		COMMUNITY & CULTURAL SERVICES

Portfolio:

Community & Environment

Subject:

Lease - Lot 35 on SP 254546 - Costi

Report Author:

Nicole Sabo, Property & Leases Officer

Authorised by:

Gavin Steele, General Manager Community & Environment

Link to Corporate Plan:

Our People, Our Business - 3.2 Responsible governance with a customer-driven focus - 3.2.3 Administer statutory compliant governance operations incorporating insurance; risk management; property management and Council policies and procedures.

Background:

Council is the freehold owner of Lot 35 on SP254546 at 3 Avro Ave, Kensington known as the Bundaberg Regional Airport ('Property'). Council leases general aviation hangars. The general aviation hangars are built and maintained by the lessee on Council land.

Daniel Papacek and Anne Papacek as Trustee entered into a Lease with Council for the aviation hangar site AE, commencing on 1 December 2015 and expiring on 30 November 2020 with an option of an addition five (5) years ('Lease'). The Lease was assigned to Costi Group Pty Ltd as Trustee for the P & K Costi Superannuation Fund on 10 June 2019 ('Lessee'). The option was not exercised.

The Lessee wishes to enter into a new lease commencing on 1 December 2020 for a term of five (5) years with a further five (5) year option. Rent is for market value and is subject to an annual 3% increase. The Lessee is also responsible for 100% of outgoings. It is proposed that the remaining terms of the lease will be on Council's standard lease.

Council proposes to apply the exception to the tender/auction requirements contained in section 236(1)(c)(iii) of the *Local Government Regulation 2012* (Qld) given that the disposal is for the purposes of renewing the lease of land to an existing tenant of the land.

Associated Person/Organization:

Greg Barrington, Airport Manager

Consultation:

N/A

Chief Legal Officer's Comments:

Section 236(1)(c)(iii) of *Local Government Regulation 2012* (Qld) allows Council to dispose of an interest in a valuable non-current asset other than by tender or auction on the basis the disposal is for the purposes of renewing the lease of land to the existing tenant of the land.

Policy Implications:

There appears to be no policy implications.

Financial and Resource Implications:

There appears to be no financial or resource implications.

Risk Management Implications:

There appears to be no risk management implications.

Human Rights:

There appears to be no human rights implications.

Attachments:

Nil

Recommendation:

That:

1. **Council apply the exception contained in section 236(1)(c)(iii) of the *Local Government Regulation 2012* (Qld); and**
2. **the Chief Executive Officer be authorised to enter into a five (5) year Lease with a five (5) year option to Costi Group Pty Ltd as Trustee for the P & K Costi Superannuation Fund for aviation hangar site AE located on Lot 35 on SP254546 at Bundaberg Regional Airport.**

BUNDABERG REGIONAL COUNCIL

Item **24 November 2020**

Item Number:	**File Number:**	**Part:**
O3		COMMUNITY & CULTURAL SERVICES

Portfolio:

Community & Environment

Subject:

Lease - Lot 35 on SP 254546 - Corpe

Report Author:

Nicole Sabo, Property & Leases Officer

Authorised by:

Gavin Steele, General Manager Community & Environment

Link to Corporate Plan:

Our People, Our Business - 3.2 Responsible governance with a customer-driven focus - 3.2.3 Administer statutory compliant governance operations incorporating insurance; risk management; property management and Council policies and procedures.

Background:

Council is the freehold owner of Lot 35 on SP254546 at 3 Avro Ave, Kensington known as the Bundaberg Regional Airport ('Property'). Council leases general aviation hangars. The general aviation hangars are built and maintained by the lessee on council land.

Corpe Super Co Pty Ltd ACN 161 024 460 as Trustee entered into a Lease with Council for the aviation hangar site CB, commencing on 1 October 2015 and expiring on 30 September 2020 with an additional five (5) year option ('Lease'). The option was not exercised and the Lease is currently operating under holding over provisions.

The Lessee wishes to enter into a new lease commencing on 1 October 2020 for a term of five (5) years with a further five (5) year option. Rent is for market value and is subject to an annual 3% increase. The Lessee is also responsible for 100% of outgoings. It is proposed that the remaining terms of the lease will be on Council's standard lease.

Council proposes to apply the exception to the tender/auction requirements contained in section 236(1)(c)(iii) of the *Local Government Regulation 2012* (Qld) given that the disposal is for the purposes of renewing the lease of land to an existing tenant of the land.

Associated Person/Organization:

Greg Barrington, Airport Manager

Consultation:

N/A

Chief Legal Officer's Comments:

Section 236(1)(c)(iii) of *Local Government Regulation 2012* (Qld) allows Council to dispose of an interest in a valuable non-current asset other than by tender or auction on the basis the disposal is for the purposes of renewing the lease of land to the existing tenant of the land.

Policy Implications:

There appears to be no policy implications.

Financial and Resource Implications:

There appears to be no financial or resource implications.

Risk Management Implications:

There appears to be no risk management implications.

Human Rights:

There appears to be no human rights implications.

Attachments:

Nil

Recommendation:

That:

1. **Council apply the exception contained in section 236(1)(c)(iii) of the *Local Government Regulation 2012* (Qld); and**
2. **the Chief Executive Officer be authorised to enter into a five (5) year Lease with a five (5) year option to Corpe Super Co Pty Ltd ACN 161 024 460 as Trustee for aviation hangar site CB located on Lot 35 on SP254546 at Bundaberg Regional Airport.**

Item

24 November 2020

Item Number:	File Number:	Part:
O4		COMMUNITY & CULTURAL SERVICES

Portfolio:

Community & Environment

Subject:

Lease - Lot 35 on SP 254546 - Mooney & Hetherington

Report Author:

Nicole Sabo, Property & Leases Officer

Authorised by:

Gavin Steele, General Manager Community & Environment

Link to Corporate Plan:

Our People, Our Business - 3.2 Responsible governance with a customer-driven focus - 3.2.3 Administer statutory compliant governance operations incorporating insurance; risk management; property management and Council policies and procedures.

Background:

Council is the freehold owner of Lot 35 on SP254546 at 3 Avro Ave, Kensington known as the Bundaberg Regional Airport ('Property'). Council leases general aviation hangars. The general aviation hangars are built and maintained by the lessee on Council land.

Paul Mooney and Loretta Hetherington entered into a lease with Council for the general aviation hangar site AC, commencing on 1 December 2015 and expiring on 30 November 2019 with an additional two (2) x three (3) year options ('Lease'). The option was not exercised. The Lease is currently operating under the holding over provision under the Lease.

The Lessee wishes to enter into a new lease commencing on 1 December 2019 for a term of five (5) years with a further five (5) year option. Rent is for market value and is subject to an annual 3% increase. The Lessee is also responsible for 100% of outgoings. It is proposed that the remaining terms of the lease will be on Council's standard lease.

Council proposes to apply the exception to the tender/auction requirements contained in section 236(1)(c)(iii) of the *Local Government Regulation 2012* (Qld) given that the disposal is for the purposes of renewing the lease of land to an existing tenant of the land.

Associated Person/Organization:

Greg Barrington, Airport Manager

Consultation:

N/A

Chief Legal Officer's Comments:

Section 236(1)(c)(iii) of *Local Government Regulation 2012* (Qld) allows Council to dispose of an interest in a valuable non-current asset other than by tender or auction on the basis the disposal is for the purposes of renewing the lease of land to the existing tenant of the land.

Policy Implications:

There appears to be no policy implications.

Financial and Resource Implications:

There appears to be no financial or resource implications.

Risk Management Implications:

There appears to be no risk management implications.

Human Rights:

There appears to be no human rights implications.

Attachments:

Nil

Recommendation:

That:

1. **Council apply the exception contained in section 236(1)(c)(iii) of the *Local Government Regulation 2012* (Qld); and**
2. **the Chief Executive Officer be authorised to enter into a five (5) year Lease with a five (5) year option to Paul Mooney and Loretta Hetherington for aviation hangar site AC located on Lot 35 on SP254546 at Bundaberg Regional Airport.**

Item

24 November 2020

Item Number:	File Number:	Part:
O5		COMMUNITY & CULTURAL SERVICES

Portfolio:

Community & Environment

Subject:

Lease of Part of 160 Hughes Road, Bargara (Lot 2 on SP 314446) - Bargara Administration Building

Report Author:

Nicole Sabo, Property & Leases Officer

Authorised by:

Gavin Steele, General Manager Community & Environment

Link to Corporate Plan:

Our People, Our Business - 3.2 Responsible governance with a customer-driven focus - 3.2.3 Administer statutory compliant governance operations incorporating insurance; risk management; property management and Council policies and procedures.

Background:

Council is the owner of the freehold property at Lot 2 on SP314446 (previously part of Lot 11 on RP7268) known as 160 Hughes Road, Bargara ('Property'). The Bargara Administration Centre is built on this land and is the home of the Ag Tech Precinct.

Lexi Tech Pte Ltd ('Lexi Tech') has previously expressed interest in leasing a portion of the Property which Council passed a Resolution for on the basis that Lexi Tech was to obtain an Australian Registered Business Number ('ARBN') prior to the Commencement Date of the Lease. A director of Lexi Tech has advised that they are experiencing significant delays in obtaining the ARBN from the Australian Securities and Investment Commission. The director has requested that the leasing entity be amended to their Australian entity, Milbank Investment Trust ('Trust').

The Lease to the Trust is proposed to be on the same lease terms as Lexi Tech Pte Ltd. That is, initial term of one (1) year with further two (2) x one (1) year options. The proposed rent is $180 per square meter per annum plus GST (being approximately gross rental amount of $8,283.60 plus GST) from the Commencement Date of the lease being 4 January 2021. The proposed rent is for market value. A security deposit of six month's rent is required. The terms and conditions of the lease are to be as per Council's standard terms.

Council proposes to apply the exception to the tender/auction requirements contained in section 236(1)(e) of *Local Government Regulation 2012* (Qld) given that the disposal is by way of lease which has been previously offered by tender.

Associated Person/Organization:

Lexi Tech Pte Ltd

The trustees for the Milbank Investment Trust

Consultation:

NIL

Chief Legal Officer's Comments:

Section 236(1)(e) of the *Local Government Regulation 2012* (Qld) allows Council to dispose of an interest in a valuable non-current asset by the grant of a lease other than by tender or auction on the basis that the asset has previously been offered by tender but a lease has not been entered into.

Policy Implications:

There appears to be no policy implications.

Financial and Resource Implications:

There appears to be no financial or resource implications.

Risk Management Implications:

There appears to be no risk management implications.

Human Rights:

There appears to be no human rights implications.

Attachments:

Nil

Recommendation:

That:

1. **Council rescind the resolution made in relation to Item T1 "Lease of Part of 160 Hughes Road, Bargara (Lot 11 on RP7268) Bargara Administration Building" on 25 August 2020 at its Ordinary Meeting;**
2. **Council apply the exception contained in section 236(1)(e) of the *Local Government Regulation 2012* (Qld); and**
3. **the Chief Executive Officer be authorised to enter into a Lease for one (1) year with two (2) x one (1) year options to Milbank Investment Trust for part of the Bargara Administration Centre, known as Lot 2 on SP314446.**

Item

24 November 2020

Item Number:	File Number:	Part:
O6	FA179088	COMMUNITY & CULTURAL SERVICES

Portfolio:

Community & Environment

Subject:

Sole Supplier – Collaborative Regions Project (Regional Arts Development Fund)

Report Author:

Rod Ainsworth, Coordinator Moncrieff Entertainment Centre

Authorised by:

Gavin Steele, General Manager Community & Environment

Link to Corporate Plan:

Our Community - 1.3 An empowered and creative place - 1.3.3 Advocate and support heritage and culture programs, projects, plans and events, which create a positive identity for the region.

Background:

The CQ Regional Arts Services Network (CQ RASN) has been funded by the State Government through Arts Queensland as a four-year program, with the current contract finishing on 31 June 2021. This program funds a Regional Arts Development Officer for two days per week to support projects across six LGAs.

A Steering Committee, which currently sits as an advisory committee to the Wide Bay Burnett Regional Organisation of Councils (WBBROC), meets regularly to provide advice, support, and guidance as to how this program operates in our region.

Through this Steering/Advisory Committee process, it was agreed that the current two days per week is only providing support to projects funded through CQ RASN and is not having enough of a broader impact on the arts sector in our regions. As a result, three Local Governments in the Wide Bay Burnett Region (Fraser Coast Regional Council, South Burnett Regional Council and Bundaberg Regional Council) agreed to make a joint submission to the Regional Arts Development Fund (also supported through Arts Queensland) to co-invest in increasing the capacity of this program to ensure the Officer is working at full time capacity until 31 June 2021 to support industry recovery programs.

This project has now been approved for all three partners through the RADF funding agreements supplied by Arts Queensland. The work plan has been agreed by all parties.

Funding is determined using the same membership formula agreed through WBBROC. There is sound precedent for this formula which is based on a per capita basis already agreed to by Council.

Associated Person/Organization:

CQUniversity Regional Arts Services Network Program
South Burnett Regional Council
Fraser Coast Regional Council

Consultation:

Portfolio Spokesperson: Cr John Learmonth
General Manager: Gavin Steele
Regional Arts Development Fund Committee
Regional Arts Services Network Advisory Group (Wide Bay Burnett Regional Organisation of Councils)

Chief Legal Officer's Comments:

Section 235(a) of the *Local Government Regulation 2012* allows the local government to resolve that it is satisfied that there is only one supplier that is reasonably available.

Policy Implications:

There appears to be no policy implications.

Financial and Resource Implications:

The project has been approved through the RADF application process to Arts Queensland in all three local government areas and, therefore, by the funding agreement that is now signed with the State Government. A total investment of $32,540 is required by Bundaberg Regional Council.

This has been approved through the Regional Arts Development Fund Committee and in the funding agreement from the State Government. Therefore, only 50% of the funding for the project is supplied by Bundaberg Regional Council ($16,270) where the remainder is funded by the State Government. The project delivers on elements of the *Arts & Culture Strategy 2019-23* which are not able to be supported with existing resources. These include:

- **C2 – Identify opportunities for working beyond the local region**
    - C2.1 – Use the opportunity of CQ RASN to partner and tour projects with the wider Central Queensland area
    - C2.2 – Host and support regional event/activity that invites and includes cross-disciplinary and cross-regional creative outcomes, as part of CQ RASN funding.

Risk Management Implications:

There appears to be no risk management implications.

Human Rights:

There appears to be no human rights implications.

Attachments:

Nil

Recommendation:

That Council award the $32,540 Collaborative Regions Contract to Central Queensland University to provide extended Regional Arts services as a Sole Supplier in accordance with section 235(a) of the *Local Government Regulation 2012* (Qld).