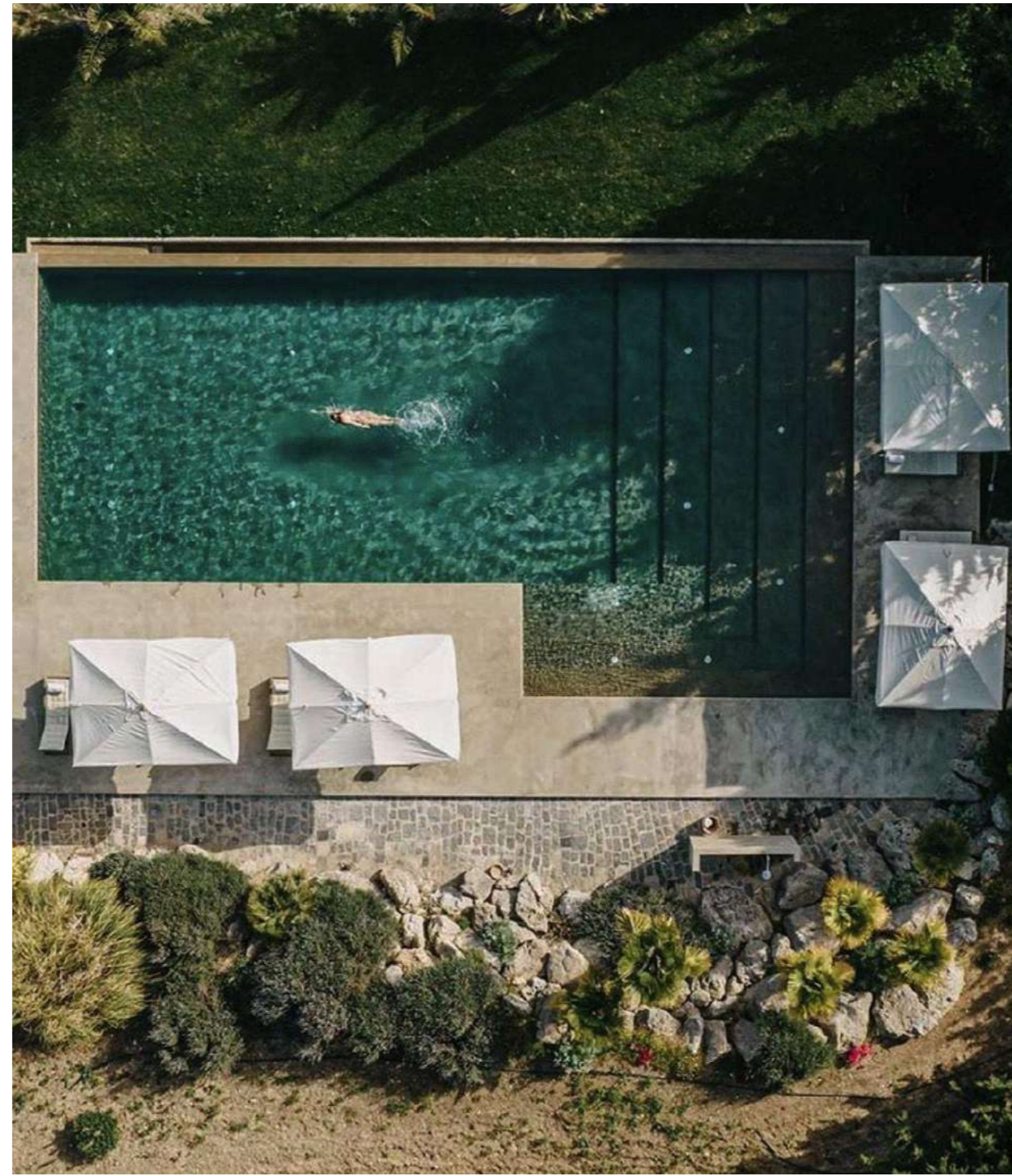


# North Shore Lifestyle Community - DESIGN PRINCIPLES



DRAWING THE LANDSCAPE THROUGH



FORMALITY & RURAL CHARACTER



NATURAL / RUGGARD LANDSCAPE

REV	DATE	DESCRIPTION	DRAWN	CHECKED
A	31/10/2025	DRAFT DA ISSUE	JRY	LH
B	18/12/2025	DRAFT DA ISSUE	JRY	OGE
C	22/1/2026	DA ISSUE	JRY	OGE

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PROJECT  
North Shore Lifestyle Community  
Part Majors Creek Junction, 74 Main  
Street, Burdell, Qld 4818

DRAWING TITLE  
DESIGN PRINCIPLES  
CLIENT  
INGENIA COMMUNITIES

DATE  
22/1/2026  
PROJECT No.  
25026  
DRAWING No.  
**DA\_2.03**  
ISSUE No.  
**C**

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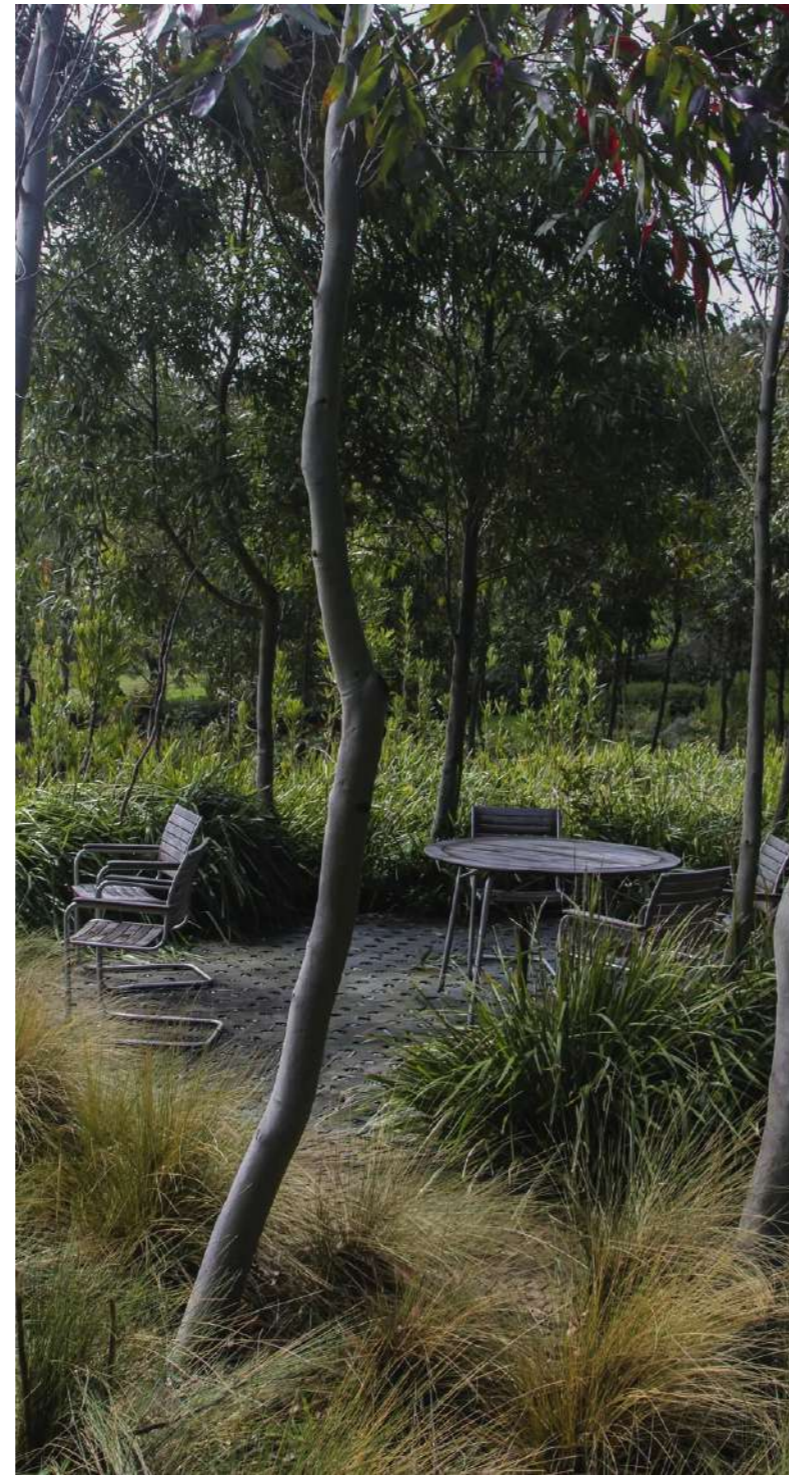


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# North Shore Lifestyle Community - DESIGN PRINCIPLES



SPACES TO GATHER + RECREATE



SHADED SPACES TO RETREAT



INTEGRATED NATURAL LANDSCAPE + ORGANIC SHAPES



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A	31/10/2025	DRAFT DA ISSUE	JRY	LH
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Part Majors Creek Junction, 74 Main  
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DRAWING TITLE  
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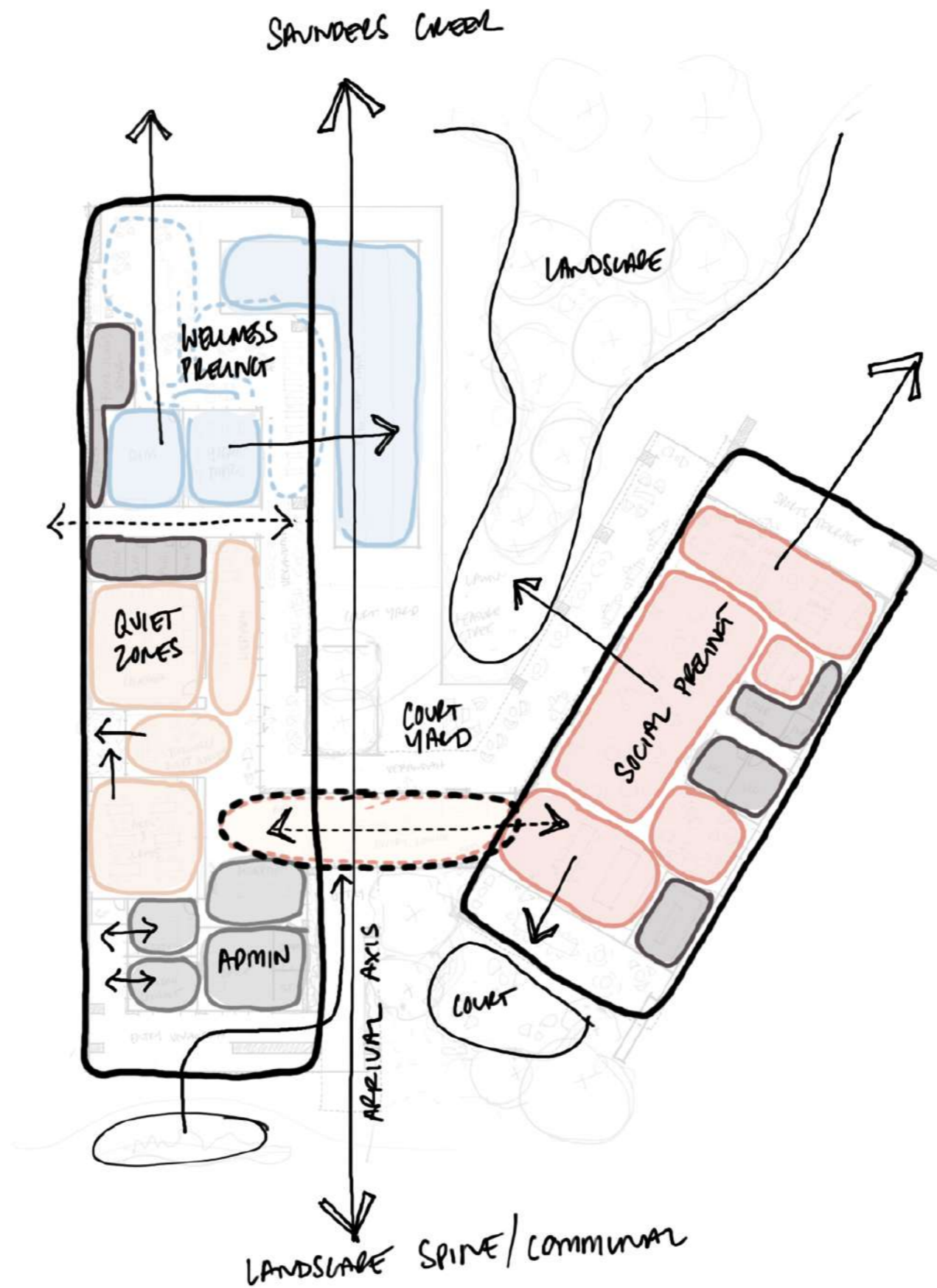
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# North Shore Lifestyle Community - ZONING DIAGRAM



## LEGEND

- Social Precinct
- Quiet activities & zones
- Wellness Precinct
- Admin / meeting / consult rooms
- BOH / Services
- ➔ Key Connections
- - - Linkages

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DRAWING TITLE  
ZONING DIAGRAM

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# North Shore Lifestyle Community - LANDSCAPE INTENT



## LEGEND

-  FEATURE LANDSCAPE + SHADING
-  LAWN + GARDENS
-  LAWN + GARDENS
-  SHADE TREES + FEATURE LANDSCAPE
-  SHADE TREES + LANDSCAPE BUFFERING
-  LANDSCAPE LINKAGES

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LANDSCAPE INTENT  
CLIENT  
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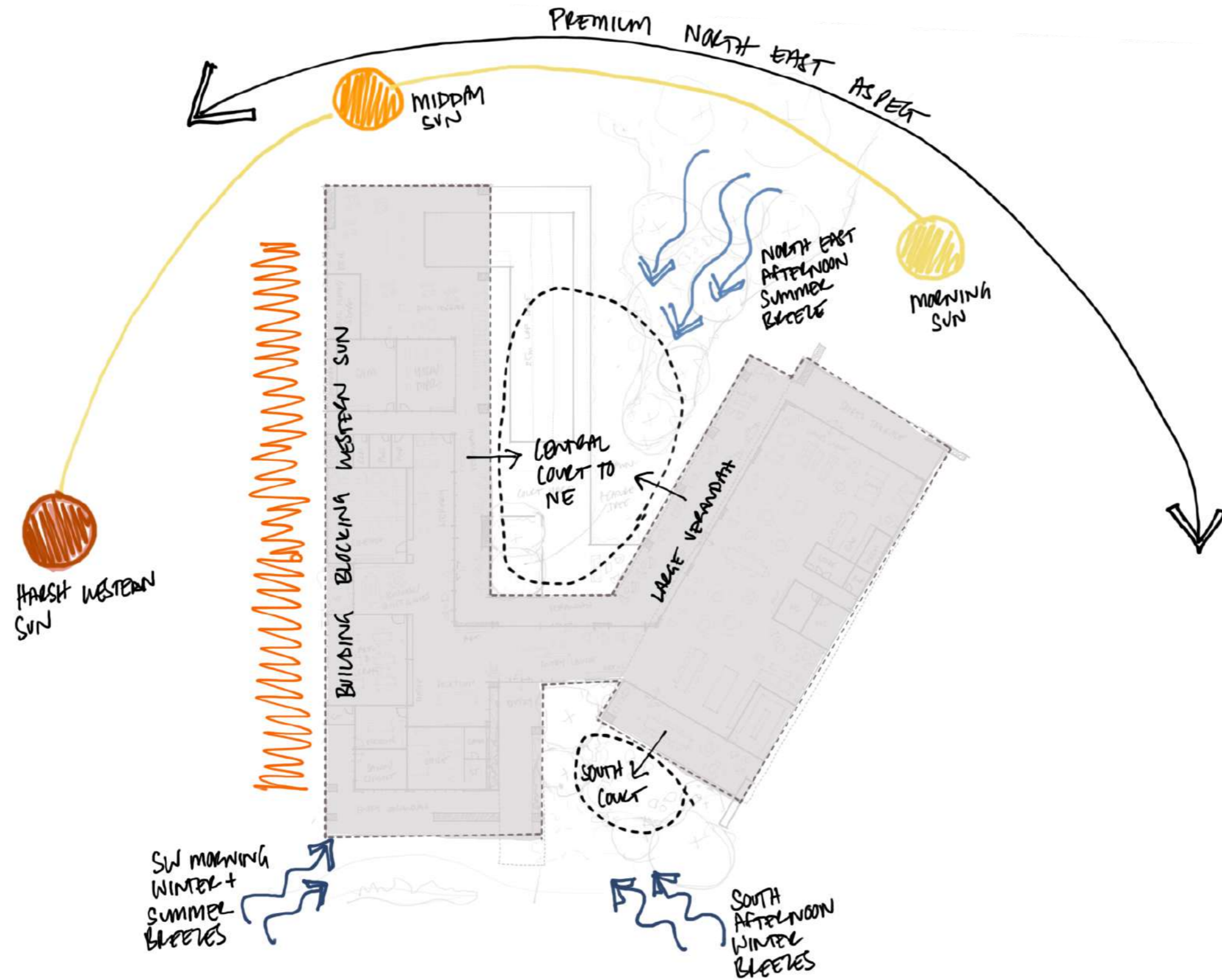
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# North Shore Lifestyle Community - SOLAR ORIENTATION



## LEGEND

- West Sun - Afternoon Sun
- Midday Sun
- East - Morning Sun
- Courtyard zones
- Courtyard zones
- North East / Afternoon summer breeze
- SW Morning / winter + summer breezes
- Harsh Western Sun

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North Shore Lifestyle Community  
Part Majors Creek Junction, 74 Main Street, Burdell, Qld 4818

DRAWING TITLE  
SOLAR ORIENTATION  
CLIENT  
INGENIA COMMUNITIES

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# North Shore Lifestyle Community - BUILDING AREA PLAN

**TOTAL BUILDABLE AREA = 2,416.68 m<sup>2</sup>**

## SCHEDULE OF AREAS

GROUND LEVEL		
ARTS & CRAFT	1	66.93
BAR	1	147.25
CINEMA	1	85.94
CIRCULATION	1	46.14
COMMS	1	10.30
DINING	1	225.66
EMG	1	2.07
ENTRY LOUNGE	1	142.89
FEMALE	1	15.39
GYM	1	58.03
KITCHEN	1	73.99
LIBRARY	1	49.36
LOUNGE	1	105.30
MALE	1	15.30
MEETING	1	24.04
OFFICE	1	53.08
PANTRY	1	30.40
PWD	3	20.93
QUITE GAMES/ BUISNESS HUB	1	61.22
RECEPTION	1	57.38
SALON	1	22.06
STORE	3	46.22
YOGA /MPR	1	57.42
		<b>1,417.30 m<sup>2</sup></b>

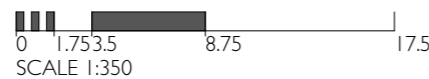
## EXTERNAL AREAS

GROUND LEVEL		
BINS	1	9.33
BOH	1	4.98
MECH	2	17.09
POOL PUMP	1	36.50
VERANDAH	5	931.48
		<b>999.38 m<sup>2</sup></b>



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A	31/10/2025	DRAFT DA ISSUE	JRY	LH
B	26/11/2025	COORDINATION ISSUE	DH	LH
C	18/12/2025	DRAFT DA ISSUE	DH	OGE
D	22/1/2026	DA ISSUE	DH	OGE

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BUILDING AREA PLAN  
CLIENT  
INGENIA COMMUNITIES

DATE  
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1:350, 1:1  
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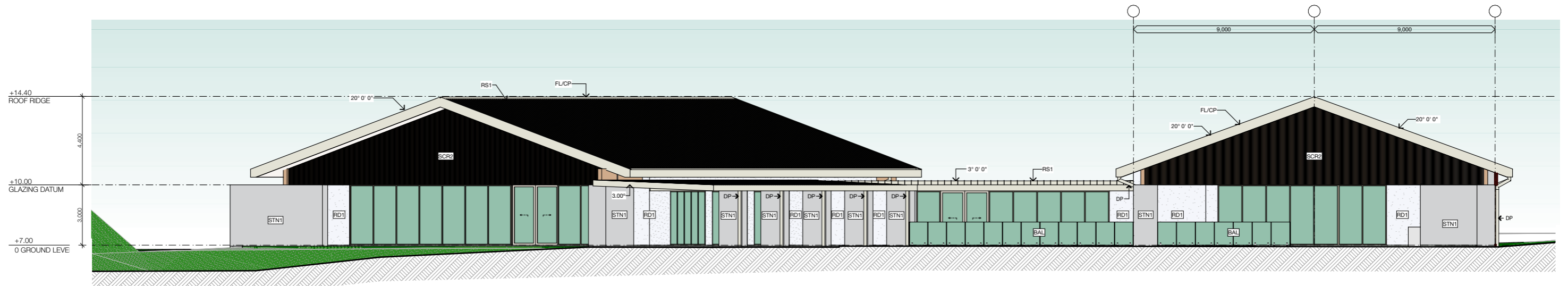
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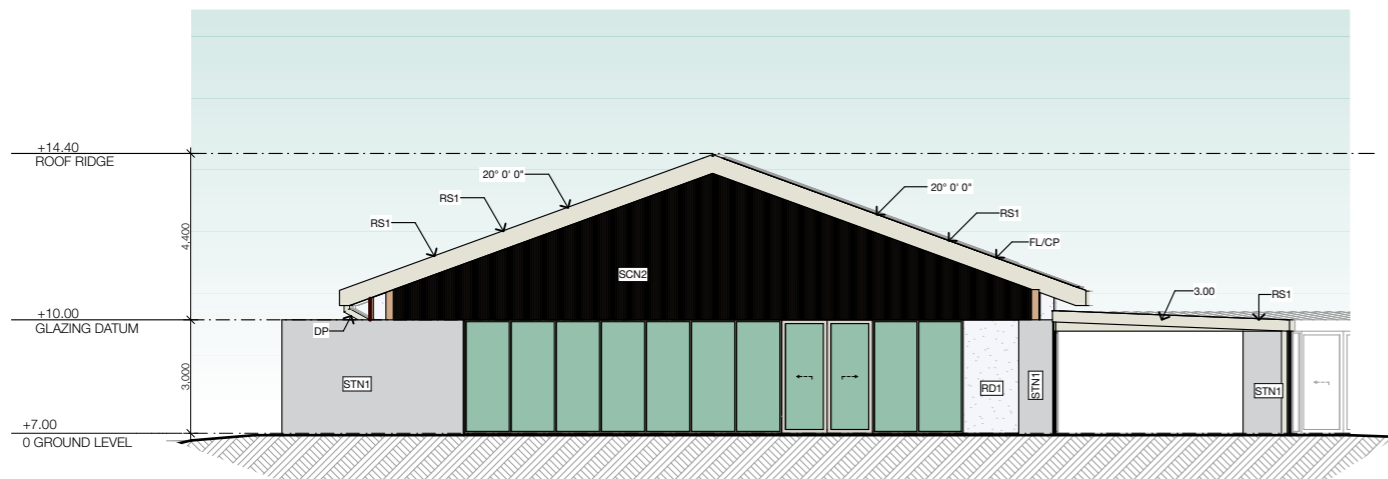


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# North Shore Lifestyle Community - ELEVATION SHEET 01



**N1 NORTH ELEVATION 1**  
Scale 1:200



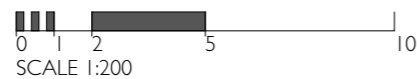
**N2 NORTH ELEVATION 2**  
Scale 1:200

## LEGEND

- BAL1 GLASS POOL FENCE
- STN1 FEATURE STONE TILE
- RD1 RENDERED BLOCKWORK
- FC1 FC CLADDING
- RS1 METAL ROOF SHEET
- SCN1 FIXED VERTICAL SCREENING
- SCN2 TIMBER LOOK BATTEN SCREEN
- FL/CP FLASHING AND CAPPING
- GU COLORBOND HALFROUND GUTTER
- DP COLORBOND DOWNPIPE

REV	DATE	DESCRIPTION	DRAWN	CHECKED
A	31/10/2025	DRAFT DA ISSUE	JRY	LH
B	18/12/2025	DRAFT DA ISSUE	JRY	OGE
C	22/1/2026	DA ISSUE	JRY	OGE

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DRAWING TITLE  
ELEVATION SHEET 01

CLIENT  
INGENIA COMMUNITIES

DATE  
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25026

DRAWING No.  
**DA\_2.09**

ISSUE No.  
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SCALE @ A3  
1:200

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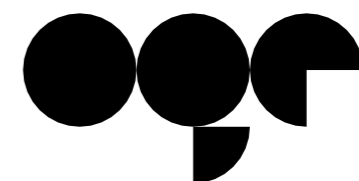
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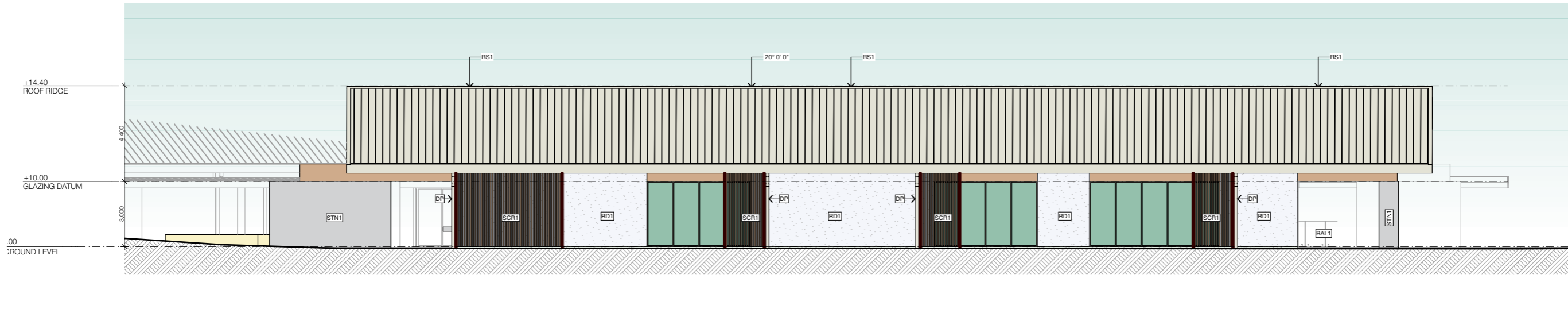
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# North Shore Lifestyle Community - ELEVATION SHEET 02



**E1 EAST ELEVATION 1**  
Scale 1:200



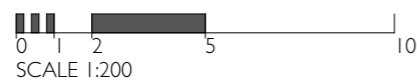
**E2 EAST ELEVATION 2**  
Scale 1:200

## LEGEND

- BAL1 GLASS POOL FENCE
- STN1 FEATURE STONE TILE
- RD1 RENDERED BLOCKWORK
- FC1 FC CLADDING
- RS1 METAL ROOF SHEET
- SCN1 FIXED VERTICAL SCREENING
- SCN2 TIMBER LOOK BATTEN SCREEN
- FL/CP FLASHING AND CAPPING
- GU COLORBOND HALFROUND GUTTER
- DP COLORBOND DOWNPIPE

REV	DATE	DESCRIPTION	DRAWN	CHECKED
01	18/12/2025		JRY	OGE
A	22/1/2026	DA ISSUE	JRY	OGE

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DRAWING TITLE  
ELEVATION SHEET 02  
CLIENT  
INGENIA COMMUNITIES

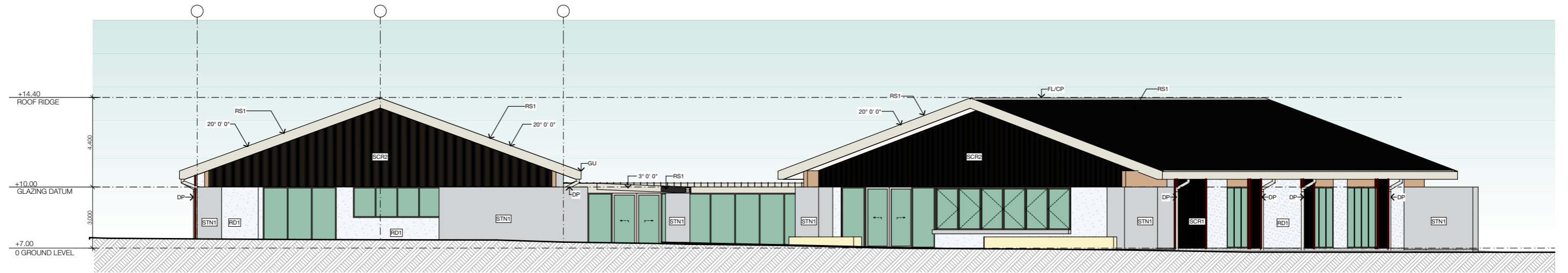
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# North Shore Lifestyle Community - ELEVATION SHEET 03



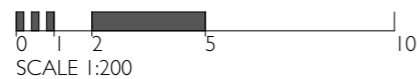
**S1 SOUTH ELEVATION**  
Scale 1:200

## LEGEND

- BAL1 GLASS POOL FENCE
- STN1 FEATURE STONE TILE
- RD1 RENDERED BLOCKWORK
- FC1 FC CLADDING
- RS1 METAL ROOF SHEET
- SCN1 FIXED VERTICAL SCREENING
- SCN2 TIMBER LOOK BATTEN SCREEN
- FL/CP FLASHING AND CAPPING
- GU COLORBOND HALFROUND GUTTER
- DP COLORBOND DOWNPIPE

REV	DATE	DESCRIPTION	DRAWN	CHECKED
A	31/10/2025	DRAFT DA ISSUE	JRY	LH
B	18/12/2025	DRAFT DA ISSUE	JRY	OGE
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ELEVATION SHEET 03  
CLIENT  
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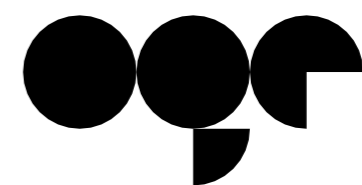
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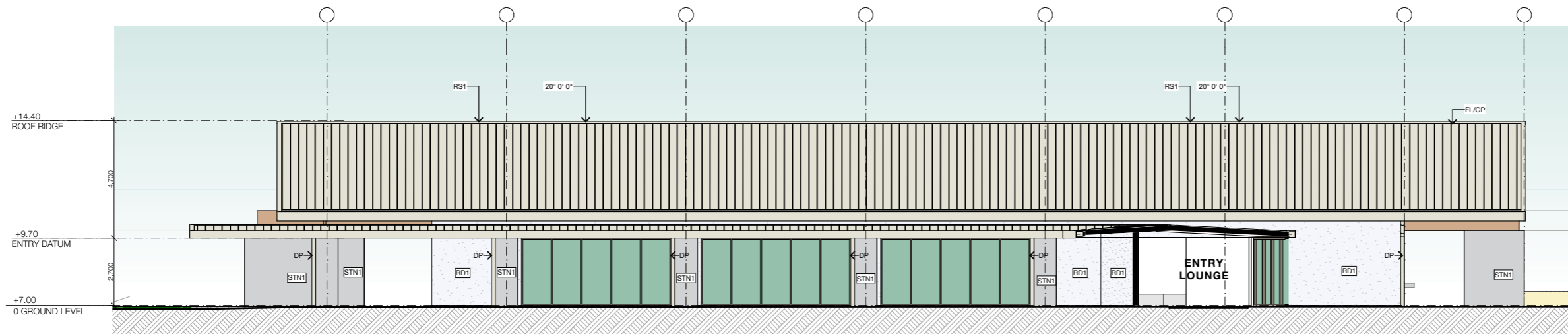
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# North Shore Lifestyle Community - ELEVATION SHEET 04



**W1 WEST ELEVATION 1**  
Scale 1:200



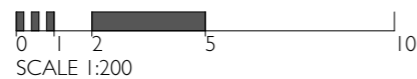
**W2 WEST ELEVATION 2**  
Scale 1:200

## LEGEND

- BAL1 GLASS POOL FENCE
- STN1 FEATURE STONE TILE
- RD1 RENDERED BLOCKWORK
- FC1 FC CLADDING
- RS1 METAL ROOF SHEET
- SCR1 FIXED VERTICAL SCREENING
- SCR2 TIMBER LOOK BATTEN SCREEN
- FL/CP FLASHING AND CAPPING
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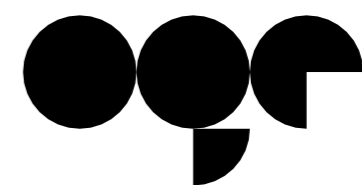
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# North Shore Lifestyle Community - RENDERS



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DRAWING TITLE  
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CLIENT  
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# North Shore Lifestyle Community - RENDERS



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Version: 1, Version Date: 09/02/2026

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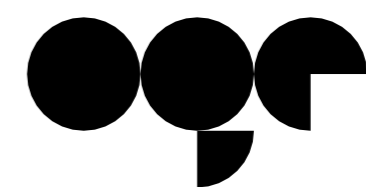
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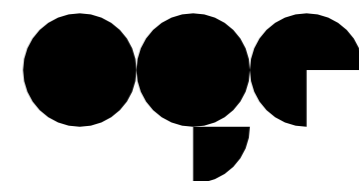
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# 03 HOUSING —

# North Shore Lifestyle Community - DESIGN INTENT



MODERN RESORT



LIGHT WEIGHT + SOLID ELEMENTS



SIMPLE STRUCTURE & FORM



NATURAL TONES

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# North Shore Lifestyle Community - DESIGN INTENT



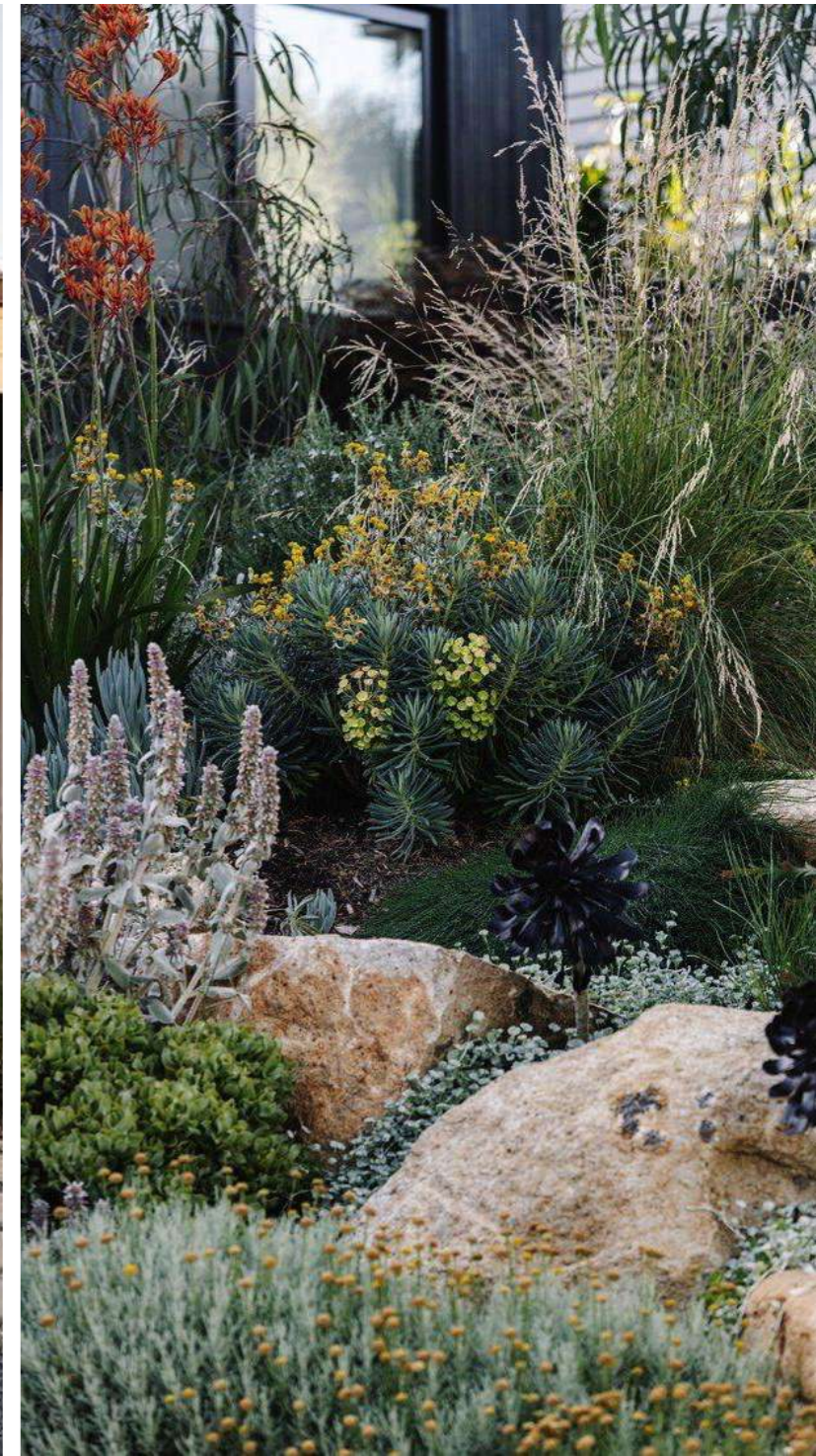
MODERN RESORT



SENSE OF ENTRY + OUTDOOR ROOMS



SIMPLE STRUCTURE & FORM



NATURAL TONES

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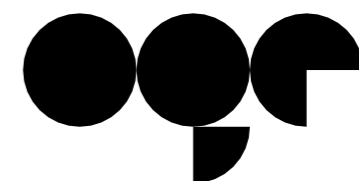
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# North Shore Lifestyle Community - FACADE EXAMPLES



**INDICATIVE HOUSING DESIGN ONLY**  
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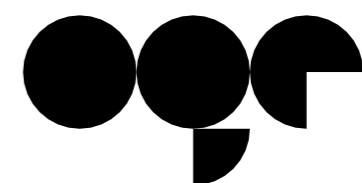
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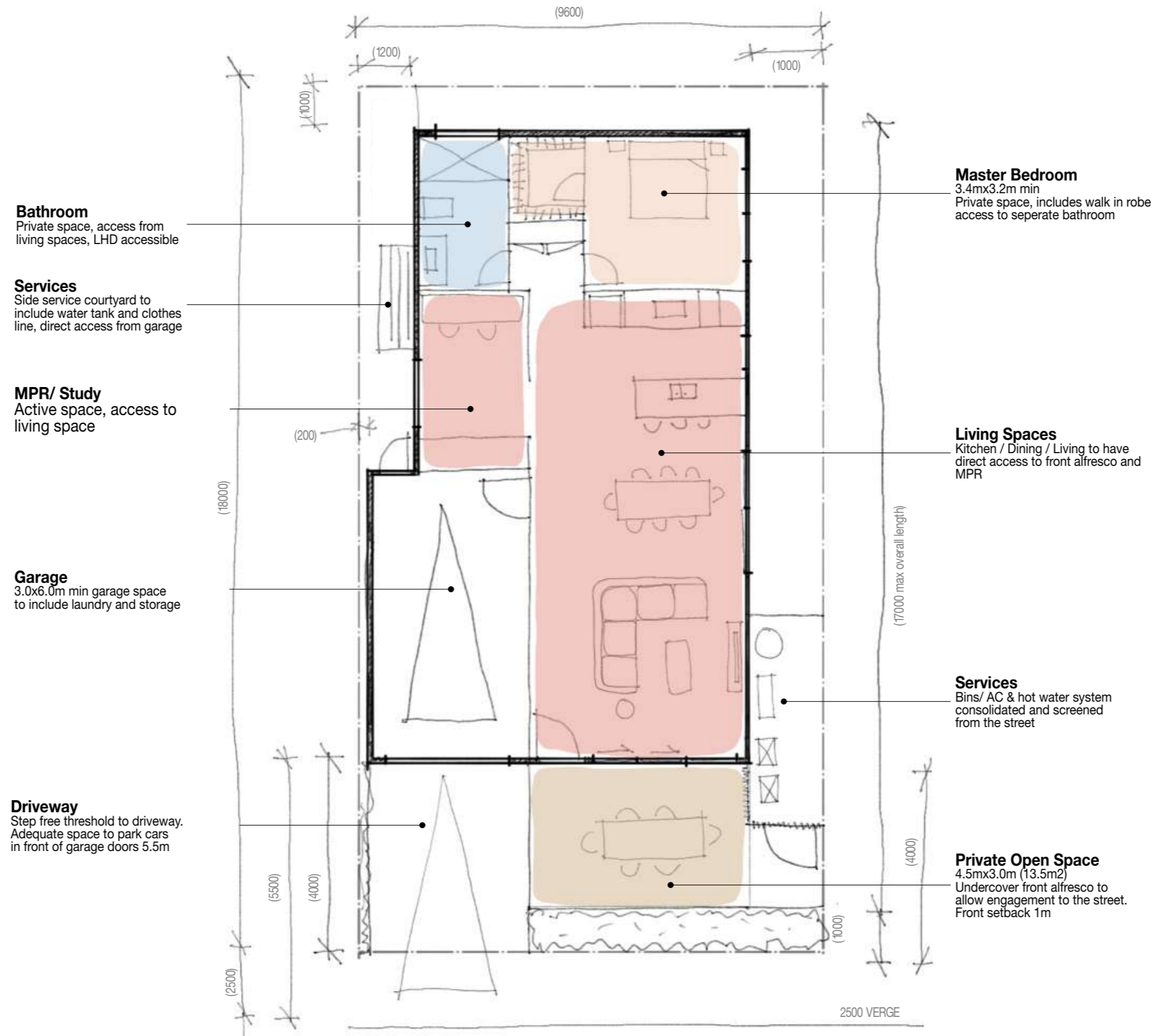
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# North Shore Lifestyle Community - HOUSING EXAMPLE - 9.6M LOT



## SUMMARY :

Lot dimensions:	9.6m W x 18m D
Internal size:	120-125m <sup>2</sup>
Front setback:	1.0m
Rear setback:	1.0m
Side setback:	0.2 - 1.0m

NOTE: Examples provided are indicative design intent only. Future compliant designs may be adopted during the detailed design phase.

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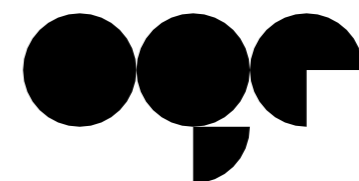
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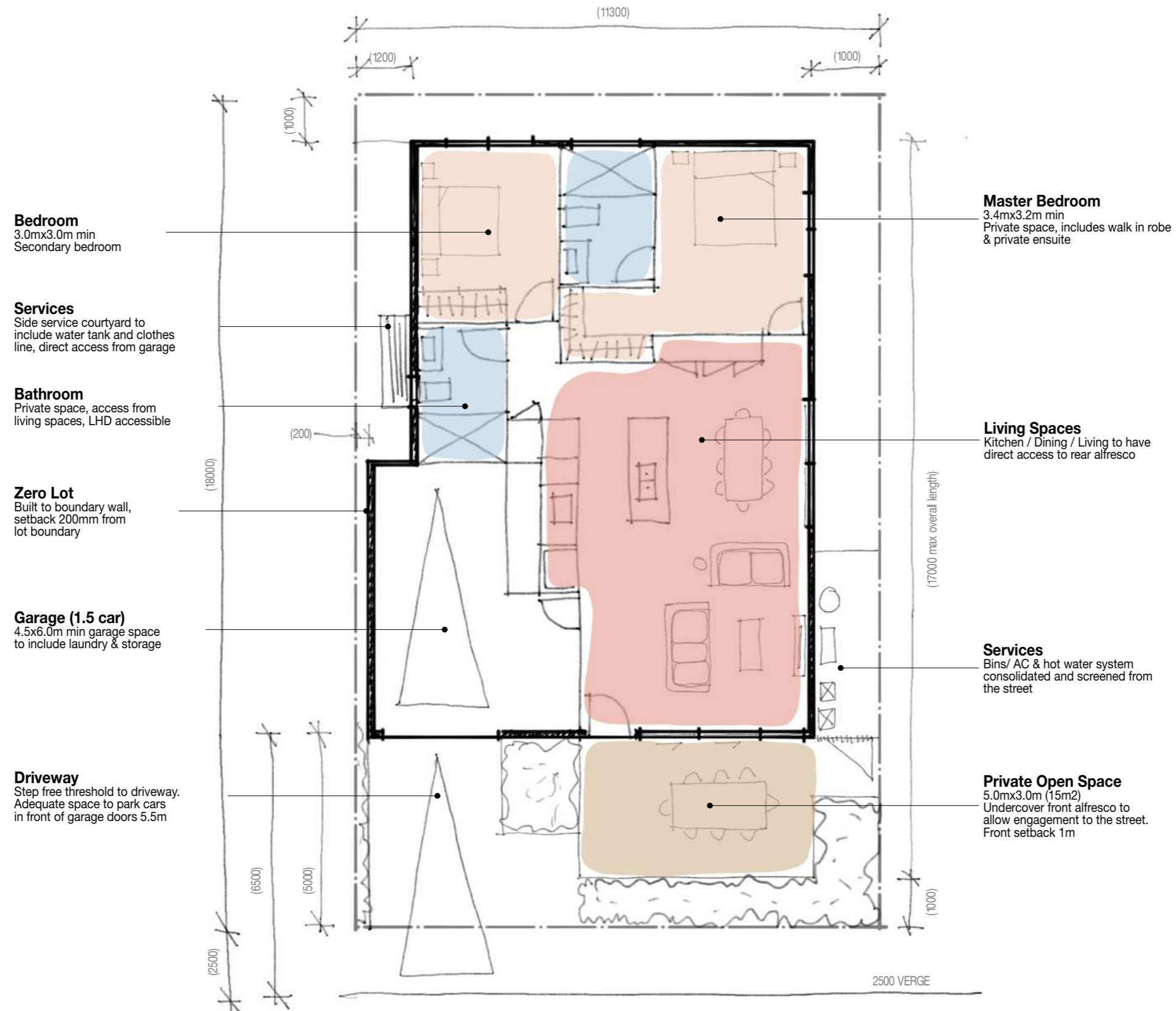
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# North Shore Lifestyle Community - HOUSING EXAMPLE - 11.3 LOT



## SUMMARY :

Lot dimensions:	11.3m W x 18m D
Internal size:	140-145m <sup>2</sup>
Front setback:	1.0m
Rear setback:	1.0m
Side setback:	0.2 - 1.0m

NOTE: Examples provided are indicative design intent only. Future compliant designs may be adopted during the detailed design phase.

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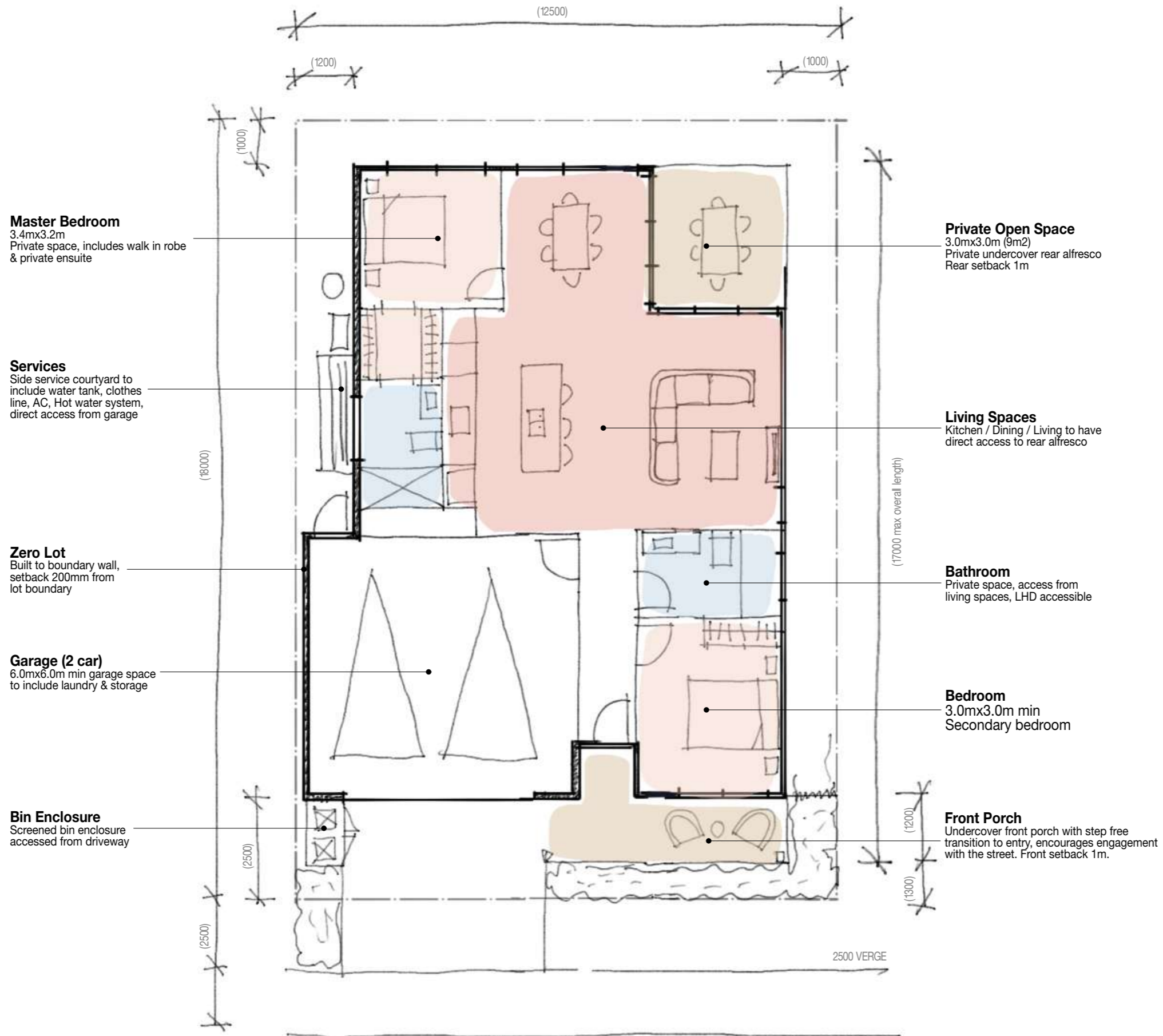
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# North Shore Lifestyle Community - HOUSING EXAMPLE - 12.5M LOT



## SUMMARY :

Lot dimensions:	12.5m W x 18m D
Internal size:	150-160m <sup>2</sup>
Front setback:	1.0m
Rear setback:	1.0m
Side setback:	0.2 - 1.0m

NOTE: Examples provided are indicative design intent only. Future compliant designs may be adopted during the detailed design phase.

**Master Bedroom**  
3.4m x 3.2m  
Private space, includes walk in robe & private ensuite

**Services**  
Side service courtyard to include water tank, clothes line, AC, Hot water system, direct access from garage

**Zero Lot**  
Built to boundary wall, setback 200mm from lot boundary

**Garage (2 car)**  
6.0m x 6.0m min garage space to include laundry & storage

**Bin Enclosure**  
Screened bin enclosure accessed from driveway

**Private Open Space**  
3.0m x 3.0m (9m<sup>2</sup>)  
Private undercover rear alfresco  
Rear setback 1m

**Living Spaces**  
Kitchen / Dining / Living to have direct access to rear alfresco

**Bathroom**  
Private space, access from living spaces, LHD accessible

**Bedroom**  
3.0m x 3.0m min  
Secondary bedroom

**Front Porch**  
Undercover front porch with step free transition to entry, encourages engagement with the street. Front setback 1m.

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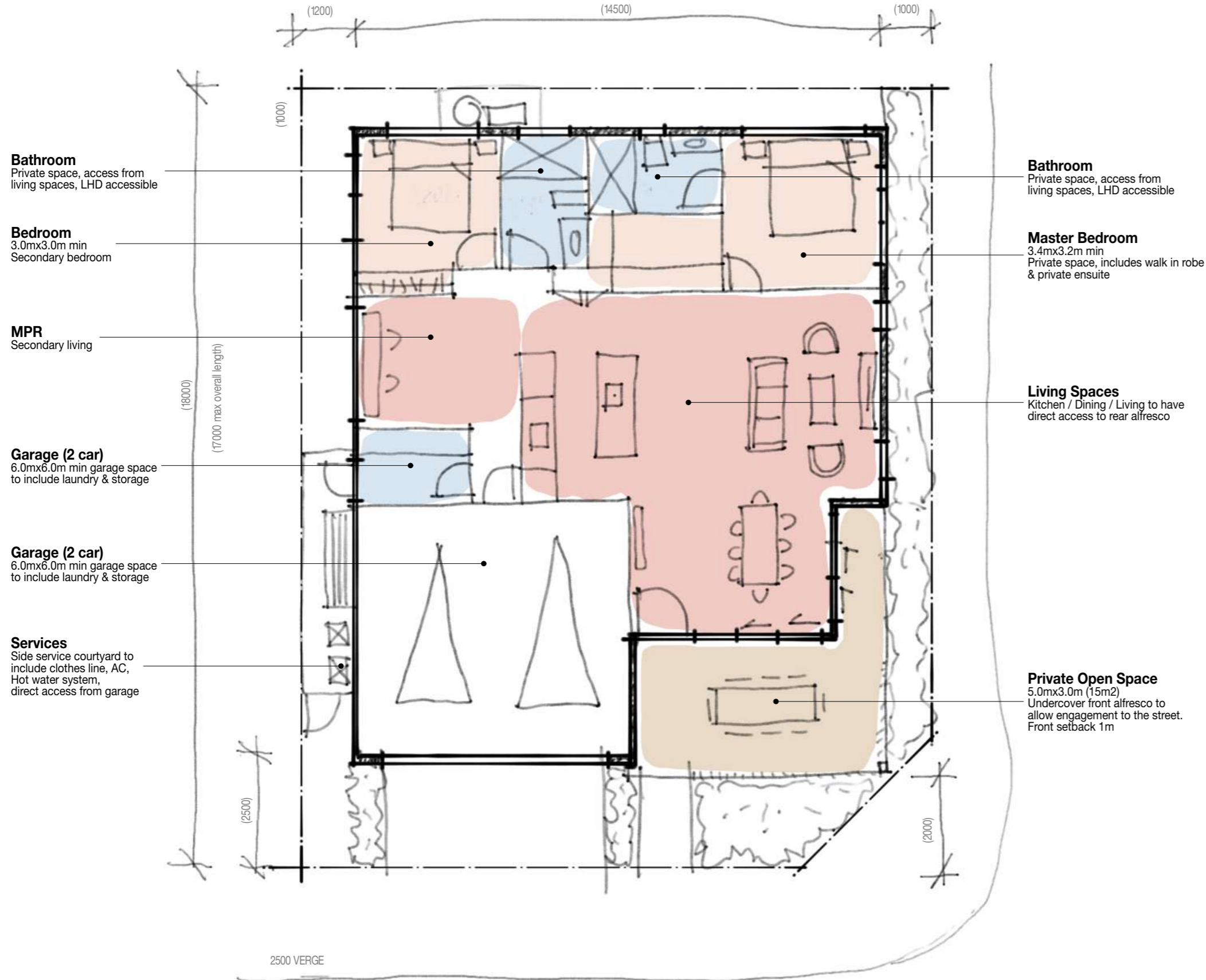


# North Shore Lifestyle Community - HOUSING EXAMPLE - 14.5M LOT

## SUMMARY :

Lot dimensions:	14.5m W x 18m D
Internal size:	150-160m <sup>2</sup>
Front setback:	1.0m
Rear setback:	1.0m
Side setback:	0.2 - 1.0m

NOTE: Examples provided are indicative design intent only. Future compliant designs may be adopted during the detailed design phase.



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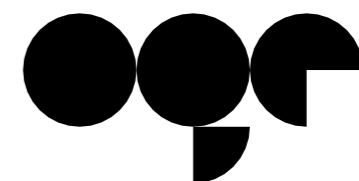
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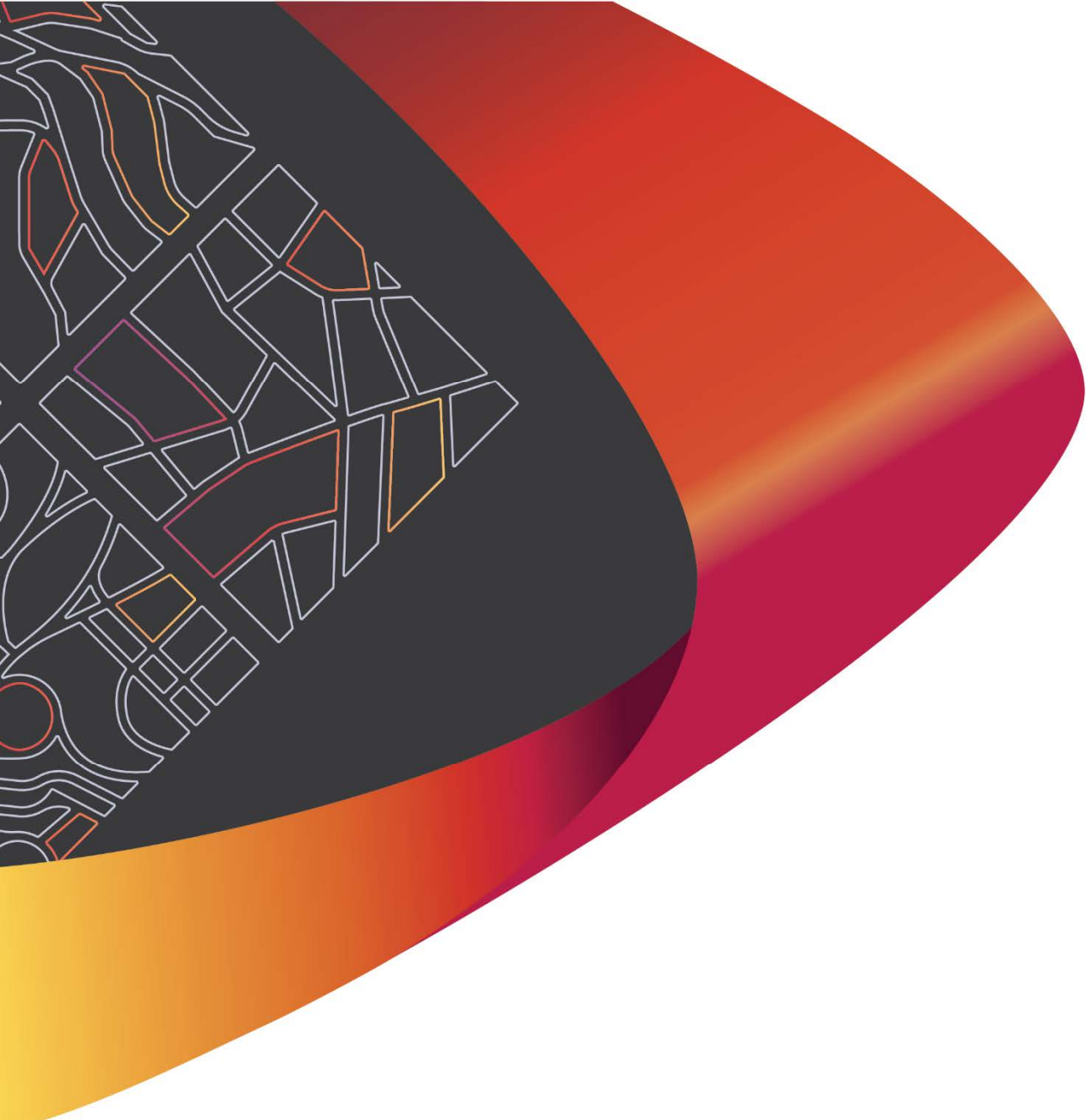


# APPENDIX F

Engineering Report prepared by Premise

brazier motti





# North Shore Lifestyle Community – Engineering Report

Ingenia Communities

P003520-R02

Rev: B

4 February 2026






**Premise**

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Document Reference: P003520-R02

Document Authorisation					
Revision	Revision Date	Proposal Details			
Draft	24/10/2025	For review			
A	21/01/2025	For approval			
B	4/02/2026	Revised for approval			
Prepared by		Reviewed by		Authorised by	
Danielle Bamber		Katie De Lacey		Adam Pease	

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Appendix A Locality and Staging Plans
Appendix B Preliminary Road Hierarchy Plans
Appendix C Preliminary Stormwater Drainage Plan and Music Parameters
Appendix D Preliminary Water Reticulation Plan and Water Network Analysis
Appendix E Preliminary Sewer Reticulation Plan

## 1. INTRODUCTION

This report assesses the Civil Engineering aspects of the proposal to establish the North Shore Lifestyle Community located in Burdell under the municipality of Townsville City Council. The North Shore Lifestyle Community is made up 303 proposed dwellings in approximately 13.3ha of undeveloped land on the southern end of the North Shore Development, to the South of Saunders Creek and North of the Bruce Highway.

This report has been commissioned by the developer Ingenia Communities, to support their Development Application with Townsville City Council (TCC) for the North Shore Lifestyle Community.

An overall layout of the North Shore Lifestyle Community is shown in the Locality Plan *P003520-SCK001* in Appendix A.

## 2. EXISTING SITE

The site for North Shore Lifestyle Community forms part of an existing parcel of land described as Lot 857 on SP359106 on Main Street in Burdell. The subject site is bound by Main Street to the North, an undeveloped parcel to the West and drainage reserves to the South and East. The land is generally flat with overland runoff flowing to the northeast in the direction of a Saunders Creek. The site location is shown in Figure 1 below.



Figure 1 - Site Location

### 3. PROPOSED DEVELOPMENT

The proposed development is a land lease community to contain approximately 303 residential dwellings in addition to community facilities and purpose-built infrastructure to support lifestyles integrated with recreation vehicles and caravans. Dwelling allotments range from 173m<sup>2</sup> to 261m<sup>2</sup> with an average lot size of 222m<sup>2</sup>. A, Locality Plan *P003520-SKC001* and a Staging Plan *P003520-SKC002* are provided in Appendix A. As the client has advised that the development yield may increase, provision for water and sewer has been modelled based on 310 lots.

### 4. TRAFFIC AND ROADWAYS

#### 4.1 General

Access to the development is proposed to be via an existing single lane, four (4) leg roundabout where the south leg is Main Street, the north leg is Yalbira Drive, the east leg is access for Arcare Aged Care North Shore, and the west leg is the proposed development's access. An additional emergency access is proposed at the north-east corner of the site on Main Street between Earlando Lane and Yalbira Drive. This additional access is intended for emergency use, and for direct access to the allocated caravan parking bays. This additional access will be controlled by a gate and managed by the onsite management team, with appropriate signage in place directing visitors to the main entrance.

A separate Traffic Impact Assessment (TIA) has been completed for the North Shore Lifestyle Community; *P003520-R03*.

#### 4.2 External Road Network

Main Street is an existing Minor Collector under the governing authority of Townsville City Council with a road reserve width of 32m. Main Street is currently a no through road, running east-west connecting to North Shore Boulevard in the east. Fronting the development site, Main Street is a divided carriageway providing traffic flow in both directions and features an approximate 6.5m median strip.

The Townsville City Plan shows that Main Street will be upgraded to a Major Collector Road with connectivity provided to Yalbira Drive in the northwest.

Access to the development is via a priority controlled four (4) leg single lane roundabout under the governing authority of Townsville City Council. The roundabout features an approximate 11m diameter centre island with (give-way) line marking on all four (4) approaches. The Traffic Impact Assessment (TIA) prepared for the North Shore Lifestyle Community; *P003520-R03* concludes that existing roundabouts on Main Street, including the roundabout at the proposed site entrance and the Main Street / Nexus Drive roundabout can accommodate forecast development traffic, with acceptable delays and queues allowing for conservative forecasts of ultimate traffic.

#### 4.3 Internal Road Network

An internal private road network will be provided to service the development. The road hierarchy plan for this network *P003520-SKC002*, along with typical cross sections *P003520-SCK003* & *SCK004* are provided in Appendix B.

## 5. ALLOTMENTS AND EARTHWORKS

All allotments for residential dwellings in the proposed development shall be shaped to ensure positive drainage towards roadways or drainage reserves. Allotment slopes will be 1 in 200 minimum to roadways or drainage reserves from residential dwellings.

All allotment earthworks shall be carried out under Level 1 Geotechnical supervision.

## 6. SOIL EROSION AND SEDIMENT CONTROL

Soil Erosion and Sediment Control Plans, including Stormwater Quality Management, shall be prepared for the Construction Phase of the project and supplied with the Operational Works application for the development. The purpose being to minimise loss on the site prior to re-establishment of vegetation.

## 7. HYDRAULICS

A Hydraulic Impact Assessment has been completed for this proposed development. The report incorporates the latest available TCC Bohle River Flood Model and will be used to set the Q100 and immunity levels for the proposed development.

## 8. STORMWATER DRAINAGE

Internal stormwater flows from the proposed development will be directed and discharged to the drain to the east of the site, and to a tributary of Saunders Creek to the northwest of the site. Internal site stormwater drainage shall be designed and constructed in accordance with the Townsville City Plan SC6.4.8 to SC6.4.9 and will be provided to council as part of future applications. A conceptual layout is provided as part of the Stormwater Drainage Plan (incorporating Stormwater Quality) *P003520-SKC005* in Appendix C.

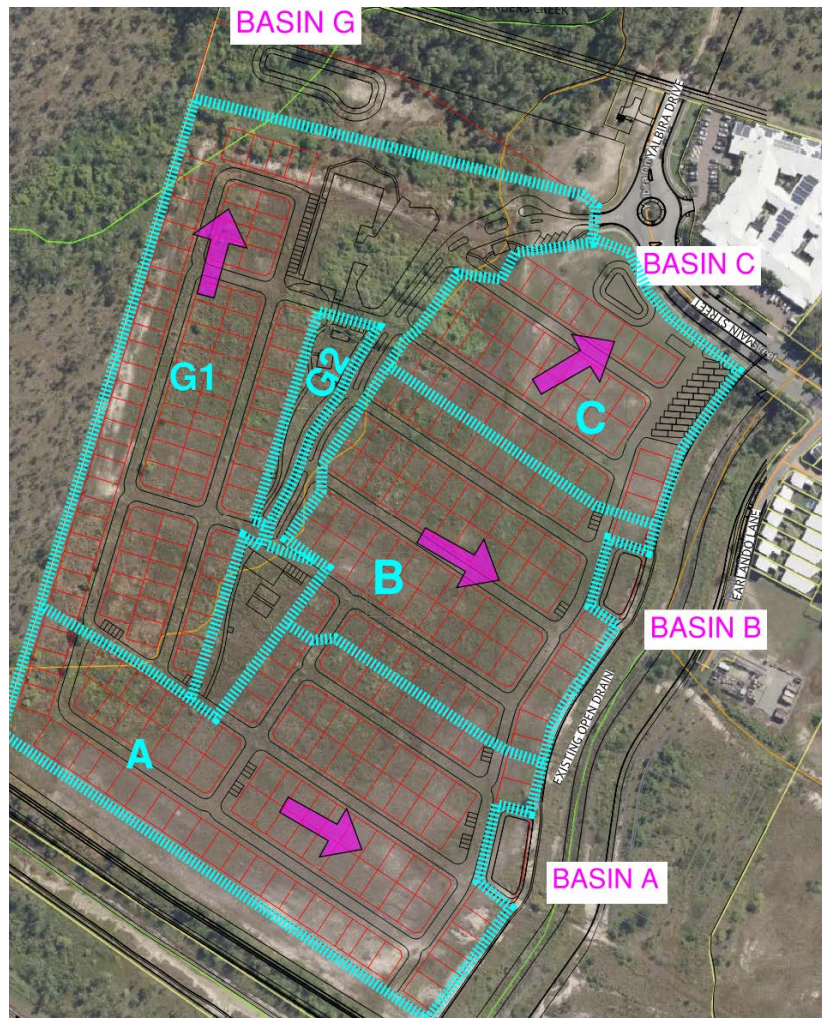
Minor system (Q2 – 39% AEP) stormwater will sheet flow to the roadways and be collected and transported via inlet pits and underground drainage pipes. The Q3month/ 98% AEP component shall be treated onsite before all the minor flows are discharged into the Saunders Creek catchment via the lawful point of discharge.

Major system (Q100 – 1% AEP) flows, (surplus to the minor system volume), shall be transported via the roadway systems along the main drainage paths, and discharged as per normal Council requirements.

## 9. STORMWATER QUALITY

On site stormwater quality determinations will be in accordance with the Townsville City Plan SC6.4.10.

Figure 2 shows the stormwater quality catchments assessed. This report addresses the water quality treatment for catchments A, B, C, G1 and G2, and details the treatment train requirements to meet State Planning Policy pollutant reduction targets.



**Figure 2 - Bio Retention Basin Catchments.**

Catchment G1 and G2 (shown in Figure 2) represents the areas to be treated by Bio Basin G. Minor flows from G1 and G2 are transported to Bio Basin G and ultimately Saunders Creek and the Bohle River, after treatment. Catchment G2 consists of primarily vegetated areas and is separated due to the fraction impervious differential.

Catchments A, B, and C, direct minor flows to Bio Basins A, B, C respectively with the treated stormwater discharged to Saunders Creek and then ultimately the Bohle River.

## 9.1 Stormwater Quality Treatment (Construction Phase)

During the construction phase various pollutants are generated which can find their way into the stormwater runoff. These pollutants can affect the quality of the stormwater runoff and hence pollute both the site and the downstream receiving environment. Table 1 below outlines the major sources of pollutants.

**Table 1 – Typical Construction Phase Pollutants**

<b>Construction Phase Pollutants</b>
Litter from construction packaging, paper, food packaging, off cuts, etc.
Sediment from erosion of exposed soils and stockpiles.
Hydrocarbons - from fuel and oil spills, leaks from construction equipment.
Toxic Materials - cement slurry, solvents, cleaning agents, wash waters.
pH altering substances - cement slurry, wash waters.

Erosion and sediment control measures used during the construction phase of the development will be designed and installed in accordance with International Erosion Control Association (Australasia) - “Best Practice Erosion & Sediment Control – for building and construction sites” November 2008 as well as the TCC Development Guidelines for Erosion and Sediment Control.

## 9.2 State Planning Policy Compliance

The latest SPP (2017) Stormwater Management Design Objectives (SMDO’s) have been adopted for the operational phases of the development and is detailed in Table 2 below.

**Table 2 – Stormwater Quality Objective**

Pollutant	Reductions in Mean Annual Load from unmitigated development (%)
<b>Suspended Solids</b>	80
<b>Total Phosphorus</b>	65
<b>Total Nitrogen</b>	40
<b>Gross Pollutants</b>	90

## 9.3 Stormwater Quality Modelling

Stormwater Pollutant modelling for the development has been generated using the modelling program ‘Model for Urban Stormwater Improvement Conceptualisation’ (MUSIC), version 6.3.0, adhering to the prescribed Water by Design MUSIC modelling guidelines Version 3.0, 2018 (WBDMG).

The following data was used as input for the MUSIC model:

- > Long term rainfall data was obtained from the Townsville AERO pluviometer (gauge number 032040) at a six (6) minute data interval for a representative period from 1990-1999;
- > Monthly aerial potential evapotranspiration data from the Townsville Aero pluviometer;

- > The Values for typical Impervious Fractions used have been conservatively calculated from areas on the design plans, and/or adopted from Table SC6.4.9.2 - Design AEPs and fraction Impervious for Land Use Zones in line with TCC City Plan - Stormwater Quantity section.
- > Pollutant export parameters have been adopted from Table 3.8 and 3.9 in the Healthy Land and Water (2018) MUSIC Modelling Guidelines Version 3.0, 2018, and Mackay MUSIC Guidelines Version 1.1 (2008), for a land use type of residential.

Details of Catchment assumptions can be seen in Table 3. Full detail design of treatment train will comply with TCC City plan SC6.4.8 and SC6.4.10 where applicable and are included in Appendix C.

**Table 3 – MUSIC Model Catchment Parameters**

Catchment ID	Land Use	Node Type	Total Area (ha)	Fraction Impervious	Treatments
<b>A</b>	<b>Lumped</b> Catchment Residential	Urban	3.50	90%	BIO BASIN A
<b>B</b>	<b>Lumped</b> Catchment Residential	Urban	2.48	90%	BIO BASIN B
<b>C</b>	<b>Lumped</b> Catchment Residential	Urban	1.52	90%	BIO BASIN C
<b>G1</b>	<b>Lumped</b> Catchment Residential	Urban	4.36	90%	BIO BASIN G
<b>G2</b>			0.54	10%	

Final bioretention locations are to be confirmed during detailed design. A snapshot of the MUSIC model setup can be seen below in Figure 3 with further detail in drawing *P003520 SKC005* in Appendix C.

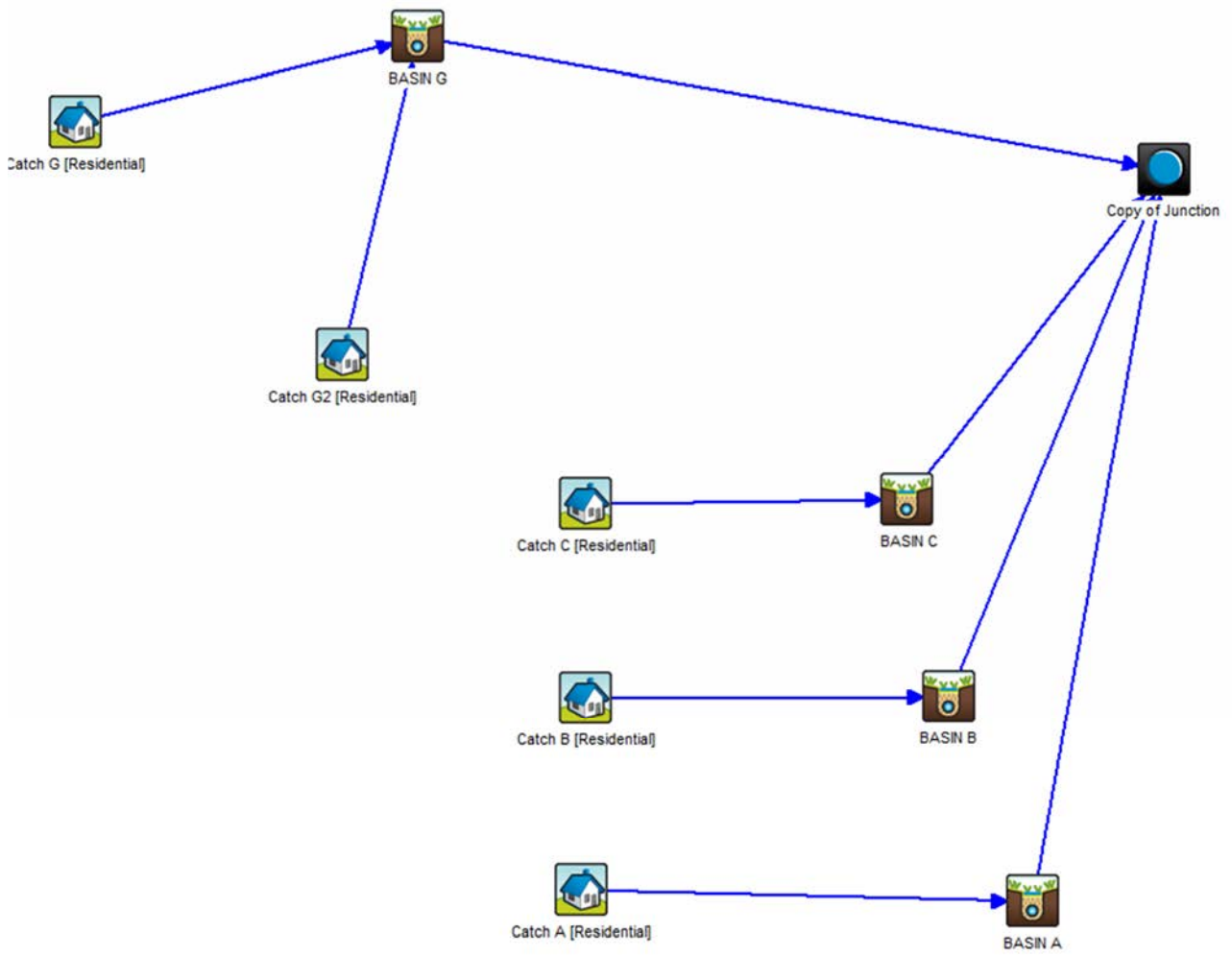


Figure 3 - MUSIC Model Layout

## 9.4 Treatment Nodes

Overall treatment devices which form part of the overall treatment train are shown in Table 4, and Table 5 (below).

**Table 4 – Treatment Device Parameters – Bioretention Basins**

		BIO A	BIO B	BIO C	BIO G
Inlet Properties	Low Flow Bypass (m <sup>3</sup> /s)	0	0	0	0
	High Flow Bypass (m <sup>3</sup> /s)	100	100	100	100
Storage Properties	Extended Detention Depth (EDD) (m)	0.3	0.3	0.3	0.3
	Surface Area (m <sup>2</sup> )	672	483	257	1302
Filter And Media Properties	Filter Area (m <sup>2</sup> )	591	415	216	1148
	Unlined Filter Area Perimeter (m)	105	88	65	202
	Saturated Hydraulic conductivity (mm/hr)	180	180	180	180
	Filter Depth (m)	0.6	0.6	0.6	0.6
	TN Content of Filter material (mg/kg)	800	800	800	800
	Orthophosphate content of Filter media (mg/kg)	30	30	30	30
Infiltration Properties	Exfiltration rate (mm/hr)	0	0	0	0

All bio basins are modelled with an unlined base, are vegetated with effective nutrient removal plants, and have an underdrain present and submerged zone with carbon (0.35m).

## 9.5 Treatment Train Effectiveness

Table 5 outlines the effectiveness of the overall MUSIC Model Treatment Train in achieving the set Stormwater Management Design Objectives (SMDO's) for pollutant reduction for the subject catchments.

**Table 5 – Treatment Train Effectiveness – at JUNCTION (SAUNDERS CREEK)**

Pollutant	Sources (kg/yr)	Residual Load (kg/yr)	Reduction (%)	Target Reduction (%)
<b>Suspended Solids (TSS)</b>	25100	4060	<b>83.8</b>	80
<b>Total Phosphorus (TP)</b>	47.4	16.6	<b>64.9</b>	65
<b>Total Nitrogen (TN)</b>	232	114	<b>50.6</b>	40
<b>Gross Pollutants (GP)</b>	2050	0	<b>100</b>	90

The overall site meets the Pollutant reduction objectives as shown in Table 5.

## 10. STORMWATER QUALITY MAINTENANCE

Prior to commencement of construction, an Erosion and Sediment Control Plan (ESCP) will be prepared and implemented to minimise the impacts on stormwater quality. The plan will address site and catchment specific erosion control measures, generally adhering to the following control measures.

### 10.1 Pre-Construction

Before construction the following measures will be established and maintained for any to be disturbed:

- > Stockpile areas to be designated to minimise impacts on site runoff.
- > Provision of shakedown pit for any entry/exit points to the site; and
- > Toolbox talk to inform any regular site personnel.

### 10.2 During Construction

- > Construction related activities will be contained within the subject site where possible to minimise areas of disturbance.
- > Topsoil retention for site rehabilitation.
- > Regular inspection of sediment control measures; and
- > Dynamic response to any changing site conditions

### 10.3 Post-Construction

Following construction any disturbed areas will be stabilised through revegetation which is to be maintained until established.

## 11. WATER RETICULATION

The North Shore Lifestyle Community will be provided with a reticulated water supply via underground PVC water mains connecting to Council's existing water mains. The proposed connection is to the existing 250mm diameter trunk water main adjacent to the roundabout on Main Street. The proposed connection site is shown on the preliminary Water Reticulation Plan (*P003520 SKC006*) in Appendix D, along with the Water Supply Planning Report.

### 11.1 Water Demand

The proposed land lease development is assumed to have an equivalent population (EP) of **1.6 persons per allotment**, in line with previously approved land lease communities.

The planning has been completed based conservatively on 310 residential lots;

- > EP = 310 x 1.6 EP per lot
- > Demand Total = **496 EP**
- > This equivalent population was used in WaterGEMS modelling.

Peak hour water demand is 0.033 L/s/EP in accordance with the Cairns Townsville Mackay (CTM) *Water Alliance Design and Construction Code* (also see Townsville City Plan SC6.4.11). From the same source, fire flow water demand for residential dwellings is 15 L/s in the water network model and is applied concurrently with the Peak Hour water demand.

The preliminary (internal) Water Reticulation Plan for the proposed North Shore Lifestyle Community is included in Appendix D. With the inclusion of the proposed water infrastructure and water demands for the residential lifestyle community, including the preliminary private internal site water mains, the water network performance is summarised below:

- > The existing DN600 trunk water main along North Shore Boulevard is adequately sized to service the development. This trunk water main was sized to service the full development of the North Shore area so is able to cater for the proposed lifestyle community demands.
- > The existing DN250 PVC water main along Main St is also adequately sized to service the proposed development with peak hour and fire flows.
- > The water pressure on the proposed "private" internal development water mains is reduced to a minimum of 537 kPa at 7:00 pm which is the peak residential demand period.
- > The water pressure on the existing DN250 PVC water main on Main St at the proposed offtake to the residential lifestyle community site is 543 kPa.
- > All the water pressures in the North Shore development area in the vicinity of the proposed lifestyle community development are above 530 kPa and therefore meet the minimum peak hour water pressure requirement of 220 kPa.
- > The velocity and headloss gradients for the existing and proposed water mains that will service the proposed lifestyle community off Main St are up to 0.52 m/s and 0.002 m/m respectively. These are in accordance with Council standards.
- > With the inclusion of the 15 l/s residential fire flows on the most distant node within the proposed lifestyle community site (being Node J-15432), the water pressure is 512 kPa at 7:00 pm. This water pressure is above the minimum allowable 120 kPa pressure.

- > The velocity along the existing and proposed reticulation water mains with the inclusion of the 15 l/s fire flow is up to 1.00 m/s which is below the 4.0 m/s maximum value in Council standards.

Further detail regarding the water network performance can be found in the Water Supply Planning Report in Appendix D.

## 11.2 Internal Water Network

Internal water network modelling will be undertaken as a part of future development application.

All streets within the development shall be serviced by water mains of DN150, DN100 PVC or 63 OD HDPE rider mains, as required. Valves and hydrants shall be provided generally in accordance with normal Council requirements.

## 12. SEWERAGE

The North Shore Lifestyle Community will be provided with sewerage reticulation via gravity reticulation sewers connecting to Council's existing sewerage mains. The two proposed connections to the existing trunk gravity main are at the Northeast corner of the development; and adjacent to the Main Street roundabout. The proposed development will be serviced by Sewer Pump Station P/S BU2 which is located on the western side of Yalbira Drive, to the northeast of the development. The proposed connection site is shown on the Sewer Reticulation Layout *P003520 SKC007* in Appendix E.

### 12.1 Design Residential Population

The proposed land lease development is assumed to have an equivalent population (EP) of 1.6 persons per allotment, in line with previously approved land lease communities. Provision for sewer reticulation has been planned based conservatively on 310 residential lots, and therefore a total EP of 496.

### 12.2 Sewer Capacity Assessment

Sewer Pump Station P/S BU2 (formerly identified as Sewerage Pump Station ML03) was designed by UDP Consulting Engineers (the precursor to Premise) in June 2008 to service the western half of the North Shore town centre. The pump station was designed to service an Equivalent Population (EP) of 3,532 EP. Commercial land use contributed 1,104 EP, and residential development contributed 2,428 EP.

Of the sewer pump station capacity designated to residential development, approximately 340 EP is required for the existing Arcare aged care facility, and the existing low density residential development on Earlando Drive. There are two (2) additional areas highlighted for future residential development as shown in Figure 4, which require approximately 228 EP. Therefore, the available sewer capacity for residential development is approximately 1860 EP. With a demand of 1.6 EP/lot and 310 lots, the North Shore Lifestyle Community sewerage capacity demand is 496, which can be more than adequately serviced by P/S BU2. These figures are shown in Table 6 below with associated references.

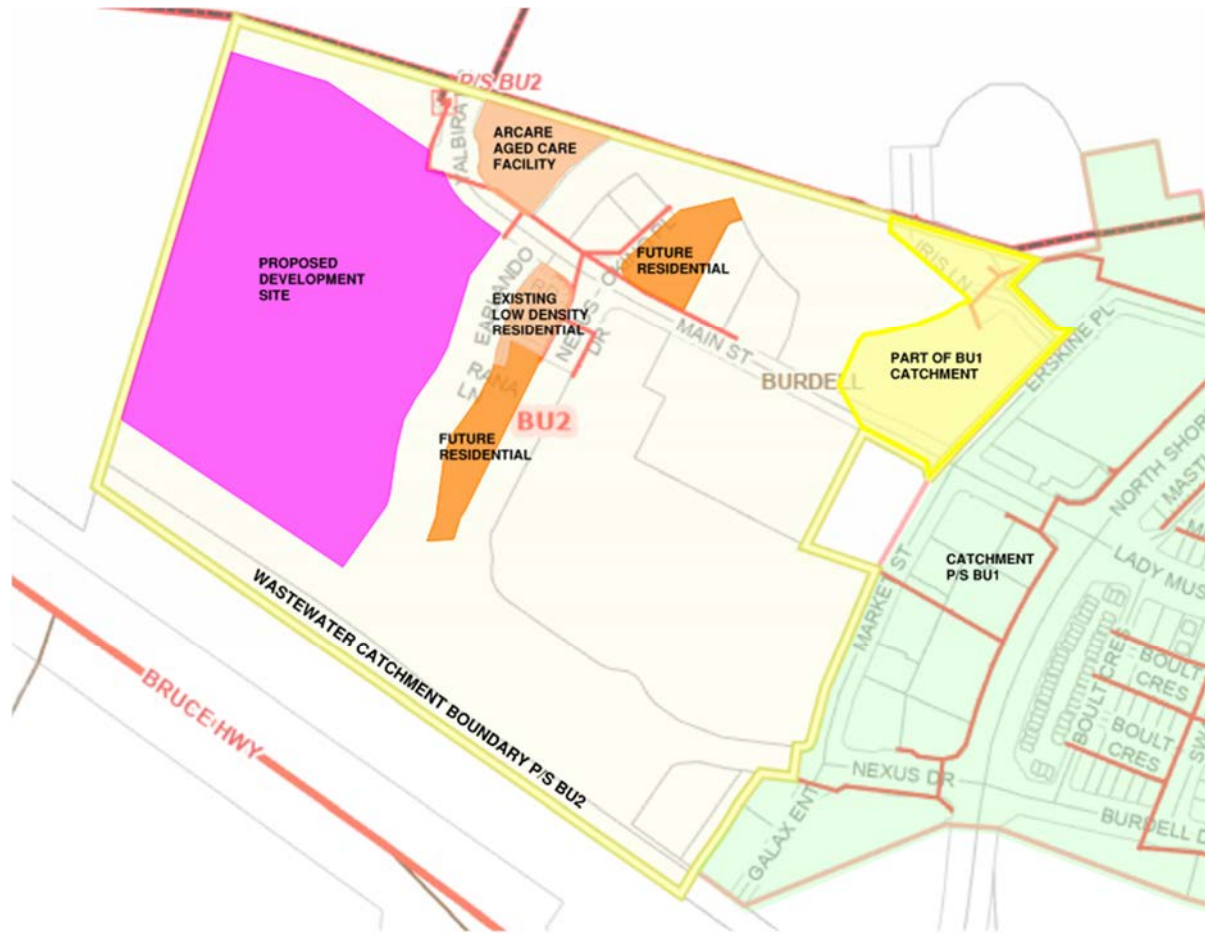


Figure 4 - Residential Developments within Wastewater Catchment Boundary P/S BU2

Table 6 - P/S BU2 Capacity Assessment

Demand Location	Population (EP)	Information Source
<b>P/S BU2 Capacity allocated to Residential Development</b>	2428	COT022/R01 SPS ML03 Design Report section 2.1
<ul style="list-style-type: none"> <li><b>Demand: Arcare</b></li> </ul>	306	90 private rooms, based on an EP of 3.4 EP/available bed as per WSA 02-2014-3.1 Table B1
<ul style="list-style-type: none"> <li><b>Demand: Earlando Drive</b></li> </ul>	34	12 lots, based on an EP of 2.8 persons per lot
<ul style="list-style-type: none"> <li><b>Demand: Future residential</b></li> </ul>	228	1.9 ha at 120 EP/ha as referenced in COT022/R01 SPS ML03 Design Report section 2.1
<b>Available Capacity</b>	1860	
<ul style="list-style-type: none"> <li><b>Demand from Northshore Lifestyle Community</b></li> </ul>	496	demand modelled on 310 lots at 1.6 EP per lot
<b>Spare Capacity</b>	1364	

### 12.3 Sewerage Design Criteria

The internal reticulation will be designed during the Operational Works Permit Application stage. All residential dwellings within the proposed development shall be serviced by a minimum DN100mm sewer house connection. Internal reticulation sewerages will be DN150mm and DN200mm as required.

The sewerage network shall be designed and constructed in accordance with CTM *Water Alliance Design and Construction Code*, Water Services Australia Specification 03-2011 and the Townsville City Plan SC6.4.11.

## 13. POWER AND COMMUNICATIONS

Negotiations shall be undertaken with utility service providers for the supply of electricity and telecommunications to the development.

Preliminary discussions indicate that the supply of power and telecommunications to the proposed development is possible.



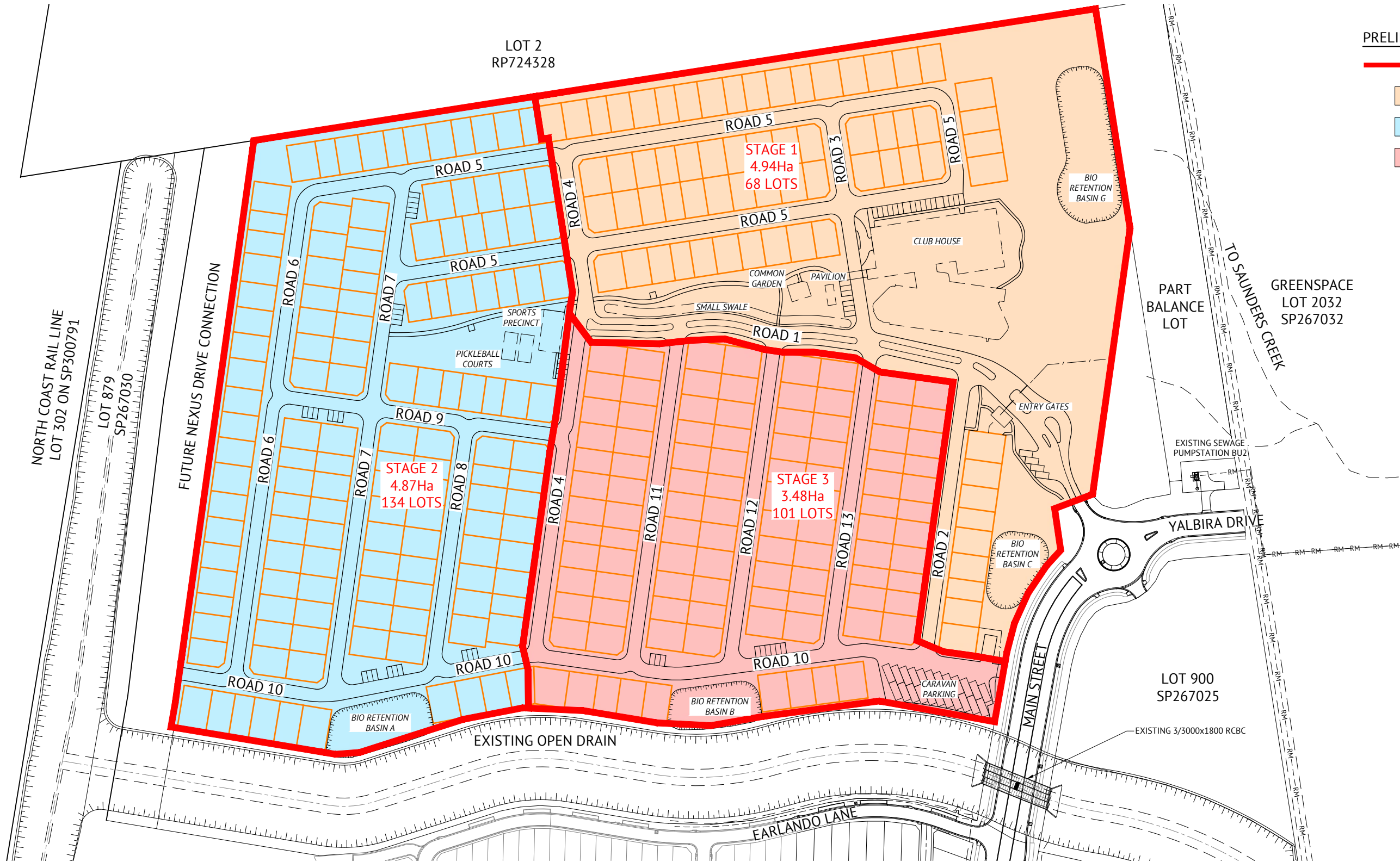
# APPENDIX A

## LOCALITY AND STAGING PLANS

*P003520 SKC001*

*P003520 SKC008*





**PRELIMINARY STAGING LEGEND:**

- STAGE BOUNDARY
- STAGE 1 WORK EXTENTS
- STAGE 2 WORK EXTENTS
- STAGE 3 WORK EXTENTS

**STAGING PLAN**  
SCALE 1:1000

**PRELIMINARY - NOT FOR CONSTRUCTION**

DATE	REV	DESCRIPTION	SK	KD
		REVISIONS	REC	APP
21/01/2026	1	CONCEPT - FOR INFORMATION		

**Premise**  
PART OF THE ARVAY GROUP

**TOWNSVILLE OFFICE**  
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**K.DE LACEY**

CHECKED  
**D.BAMBER**

PROJECT MANAGER  
**A.PEASE**

ENGINEERING CERTIFICATION

A.PEASE RPEQ 22556

SCALE

SCALE 1:1000 (A1)  
ORIGINAL SHEET SIZE A1

CLIENT  
**INGENIA COMMUNITIES PTY LTD**

PROJECT  
**NORTH SHORE LIFESTYLE COMMUNITY**

LOCATION  
**MAIN STREET, BURDELL**

SHEET TITLE  
**STAGING PLAN**

JOB CODE  
**P003520**

SHEET NUMBER  
**SKC008**

REV  
**1**



# APPENDIX B

## PRELIMINARY ROAD HIERARCHY PLANS AND TYPICAL ROAD CROSS SECTIONS

*P003520 SKC002*

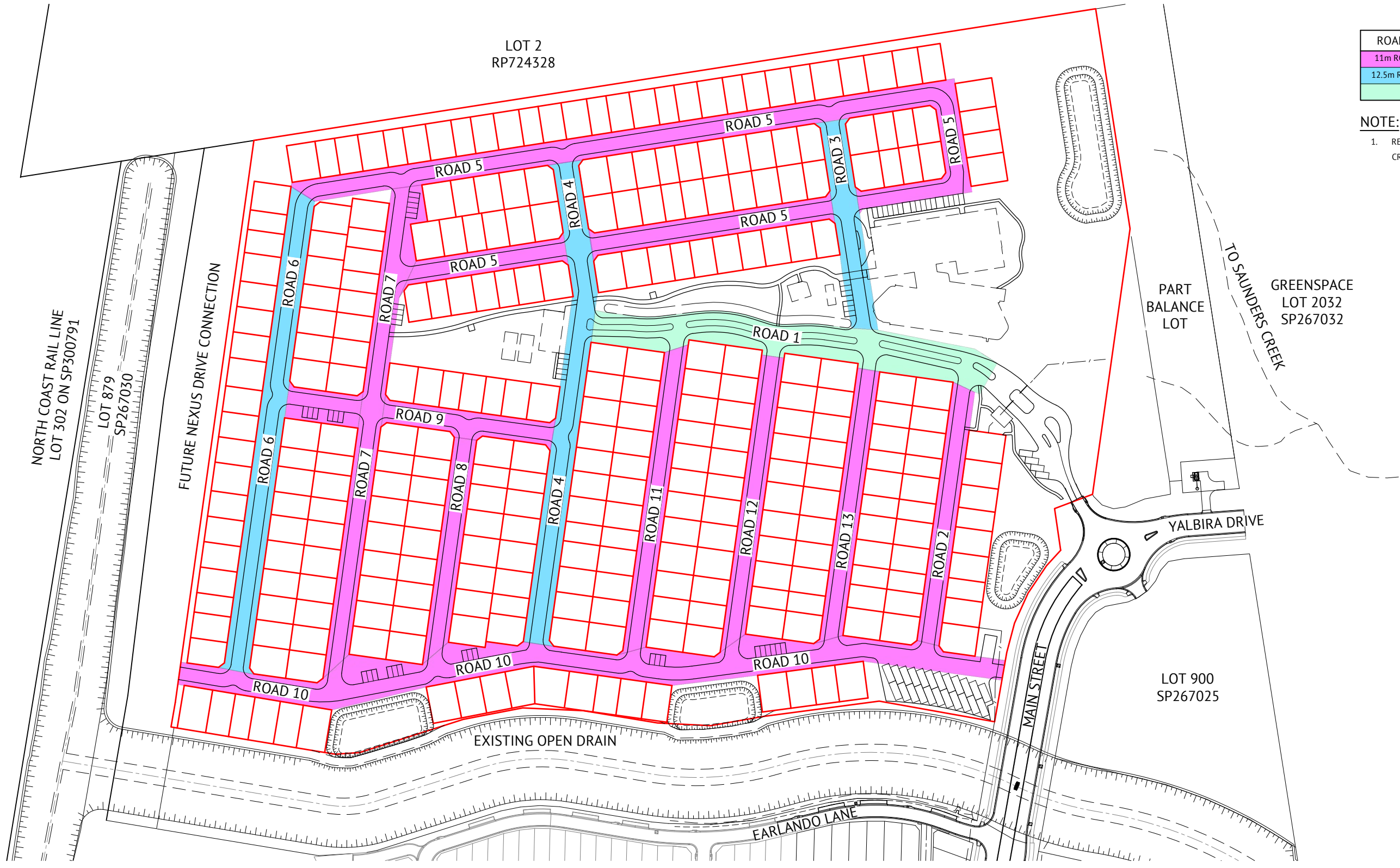
*P003520 SKC003*

*P003520 SKC004*



ROAD DESCRIPTION	
11m ROAD RESERVE WIDTH	
12.5m ROAD RESERVE WIDTH	
ENTRY ROAD	

**NOTE:**  
 1. REFER SKC003 FOR TYPICAL CROSS SECTIONS



**PRELIMINARY - NOT FOR CONSTRUCTION**

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21/01/2026	1	CONCEPT - FOR INFORMATION		

**Premise**  
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D.BAMBER

PROJECT MANAGER  
A.PEASE

ENGINEERING CERTIFICATION

A.PEASE RPEQ 22556 *AP*

SCALE

SCALE 1:1000 (A1)

ORIGINAL SHEET SIZE A1

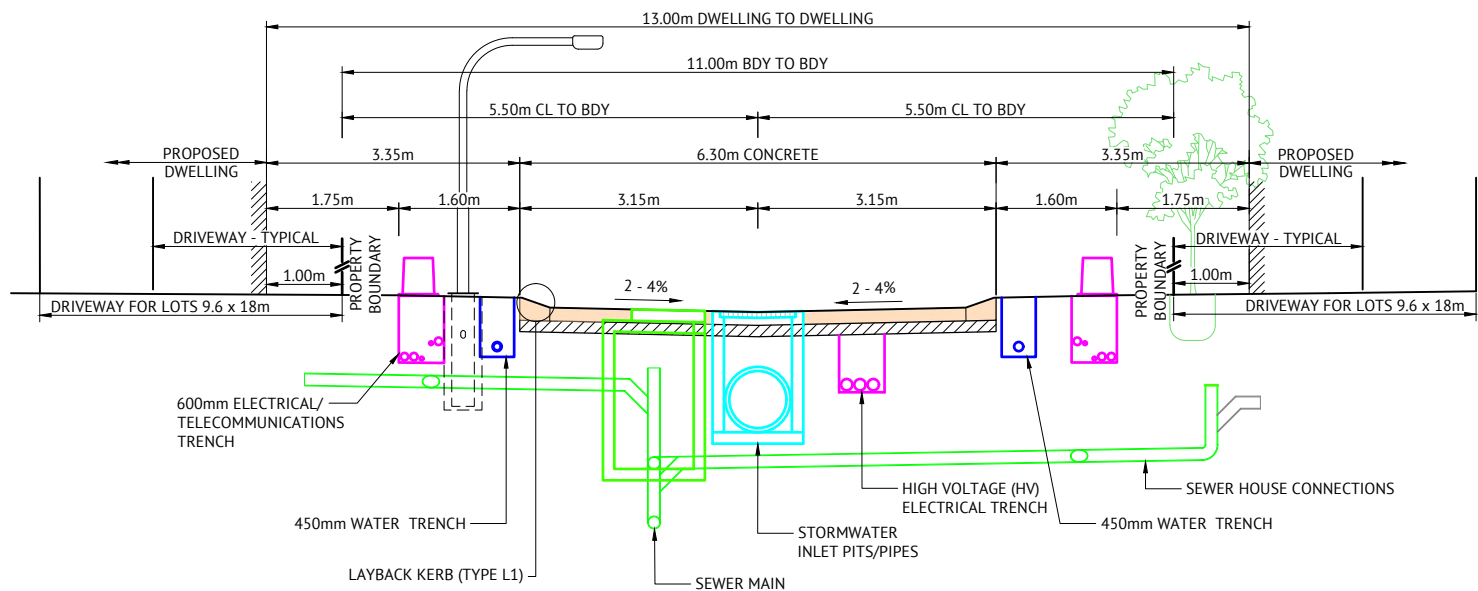
CLIENT  
**INGENIA COMMUNITIES PTY LTD**

PROJECT  
**NORTH SHORE LIFESTYLE COMMUNITY**

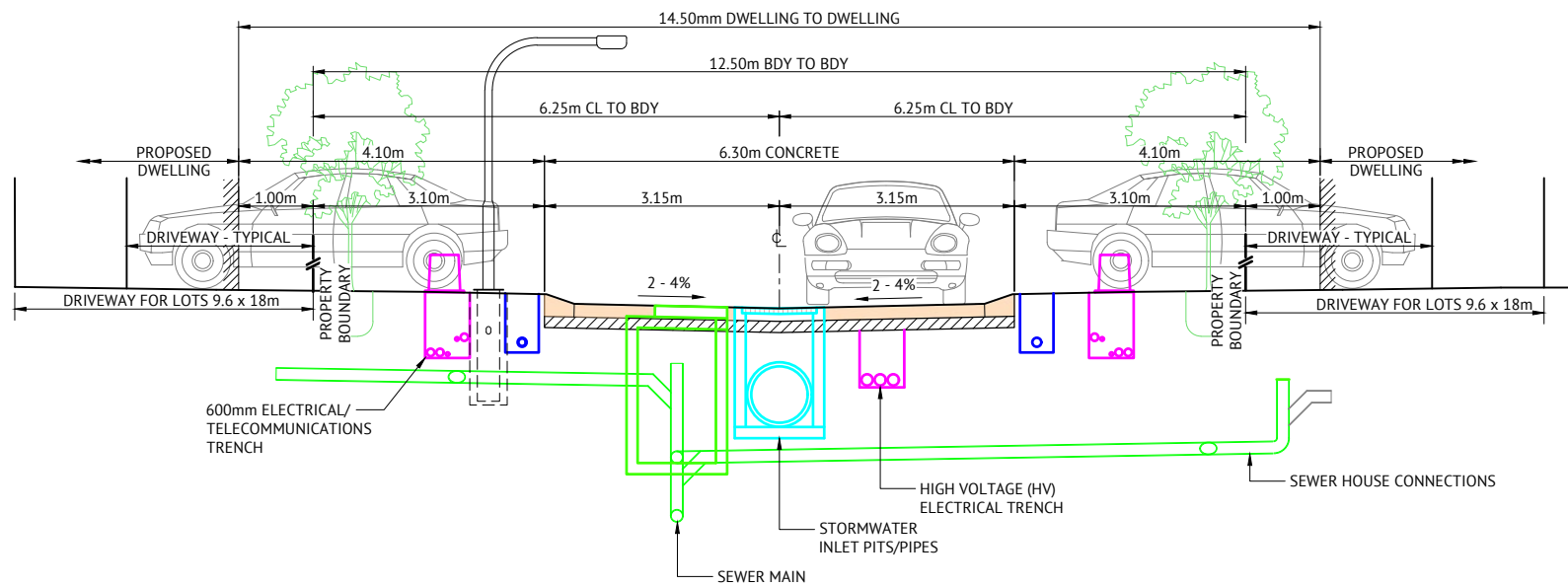
LOCATION  
**MAIN STREET, BURDELL**

SHEET TITLE  
**ROAD HIERARCHY PLAN**

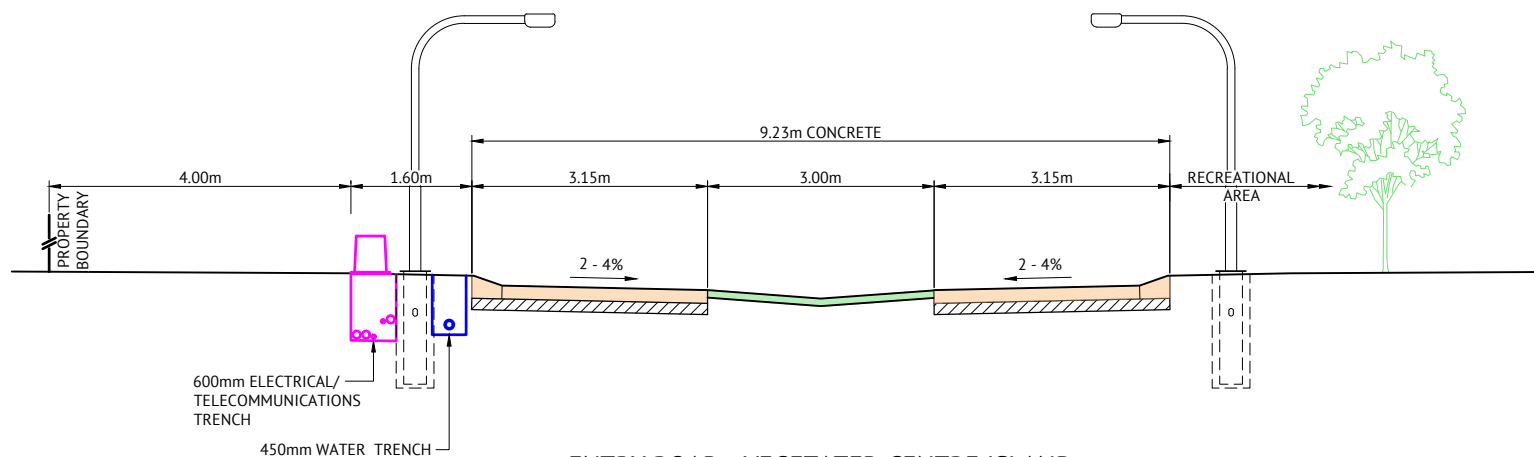
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SHEET NUMBER <b>SKC002</b>	REV <b>1</b>



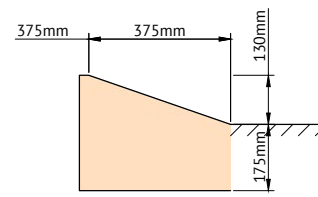
**11m ROAD RESERVE - 1 TREE**  
SCALE 1:50



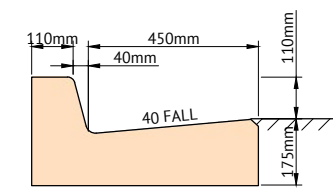
**12.5m ROAD RESERVE - 2 TREES**  
SCALE 1:50



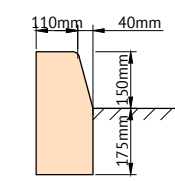
**ENTRY ROAD - VEGETATED CENTRE ISLAND**  
SCALE 1:50



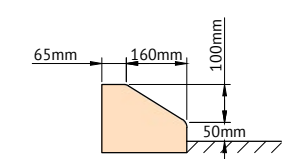
**LAYBACK KERB (TYPE L1)**



**BARRIER KERB AND CHANNEL (TYPE B1)**



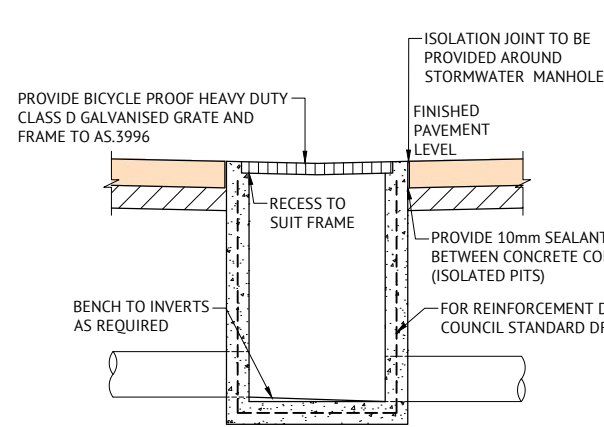
**BARRIER KERB (TYPE B3)**



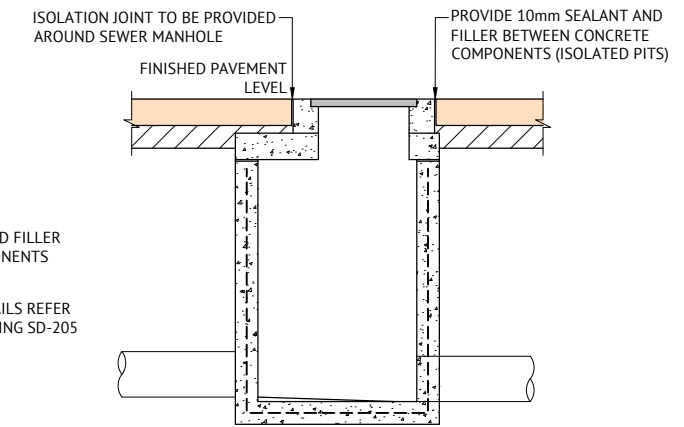
**SEMI MOUNTABLE KERB (TYPE SM2)**

**TYPICAL KERB PROFILES**  
SCALE 1:10

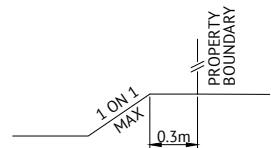
SEWER MANHOLE:  
SEWER MANHOLE AND REINFORCEMENT TO BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST RELEVANT COUNCIL AND CTM WATER ALLIANCE STANDARDS



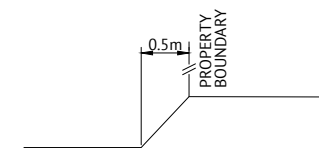
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SCALE 1:25



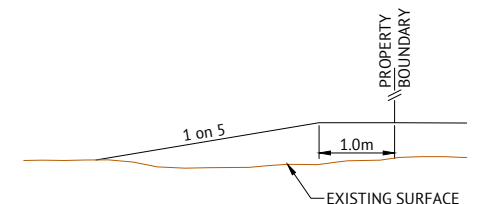
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SCALE 1:25



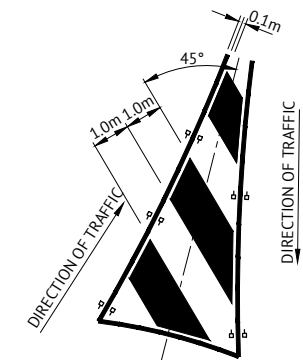
**TYPICAL SIDE BATTER ON LOTS**  
NTS



**TYPICAL REAR BATTER ON LOTS**  
NTS

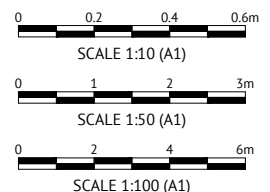


**TYPICAL BATTER TO EXISTING**  
NTS



**TYPICAL CHEVRON MARKING**

SCALE 1:100  
♦ DENOTES UNI-DIRECTIONAL R.R.P.M.'S, LOCATED CENTRALLY BETWEEN DIAGONALLY PAINTED MARKINGS IN EVERY SPACE. FOR DETAILS ON R.R.P.M.'S COLOUR REFER MUTCD.



**PRELIMINARY - NOT FOR CONSTRUCTION**

DATE	REV	DESCRIPTION	SK REC	KD APP
21/01/2026	1	CONCEPT - FOR INFORMATION		

**Premise**  
PART OF THE Arvey GROUP

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ENGINEERING CERTIFICATION

A.PEASE RPEQ 22556

SCALE  
AS SHOWN

ORIGINAL SHEET SIZE A1

CLIENT  
**INGENIA COMMUNITIES PTY LTD**

PROJECT  
**NORTH SHORE LIFESTYLE COMMUNITY**

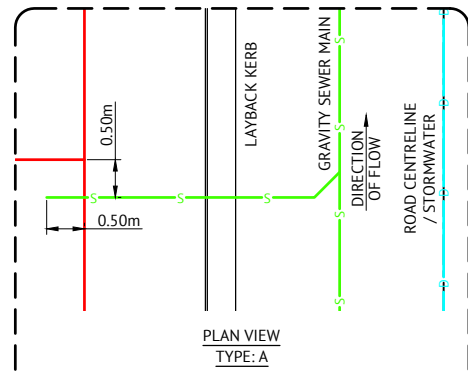
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SHEET TITLE  
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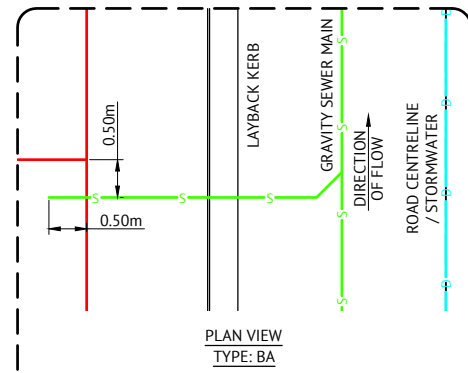
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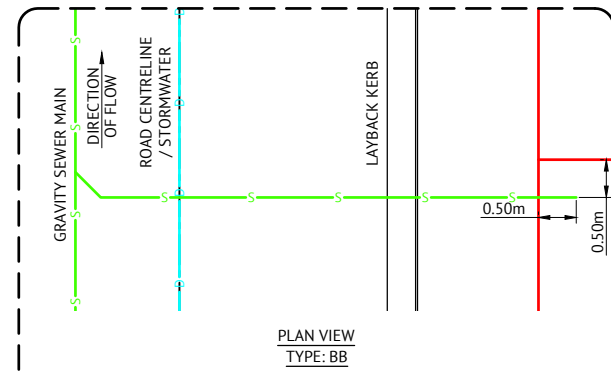
REV  
**1**



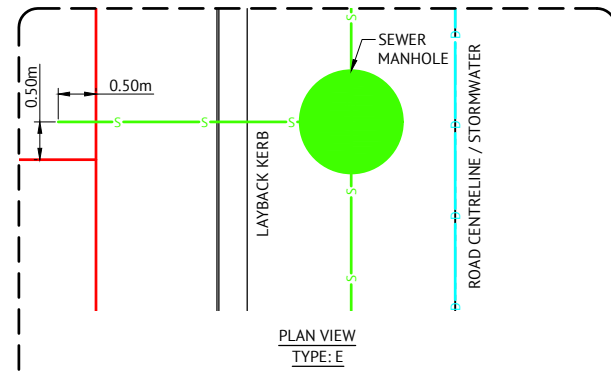
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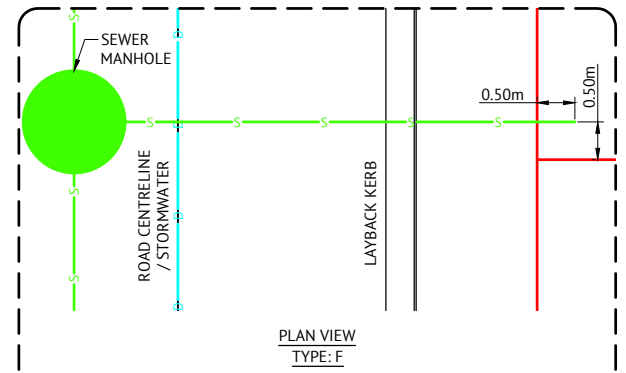
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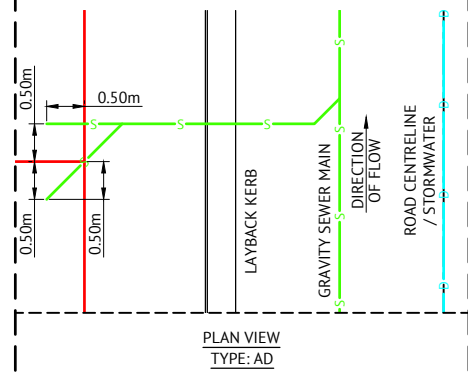
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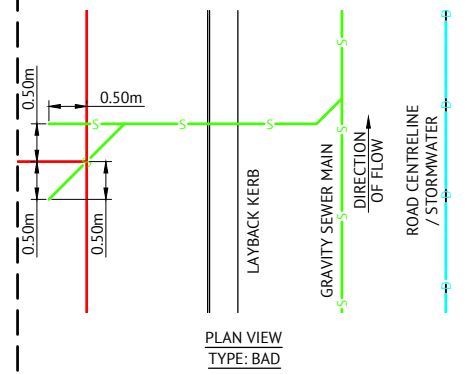
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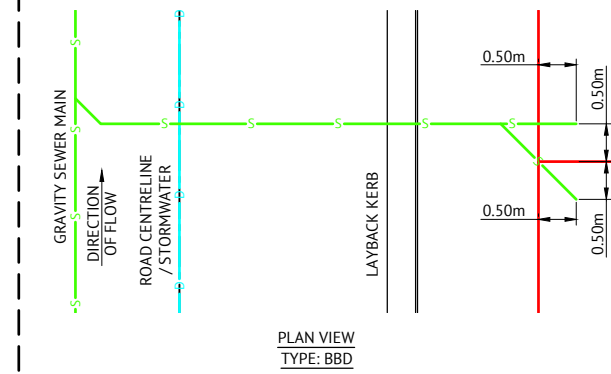
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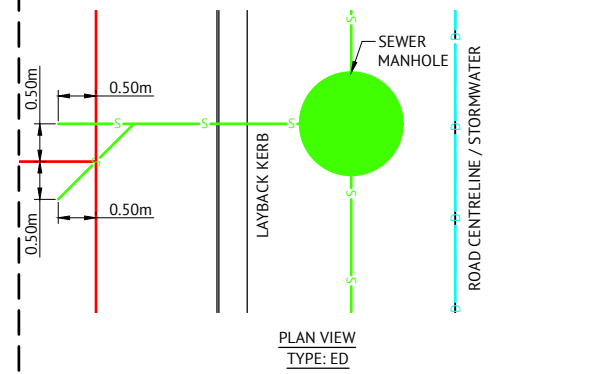
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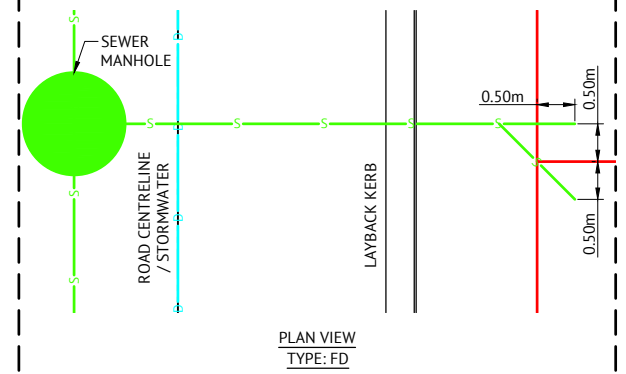
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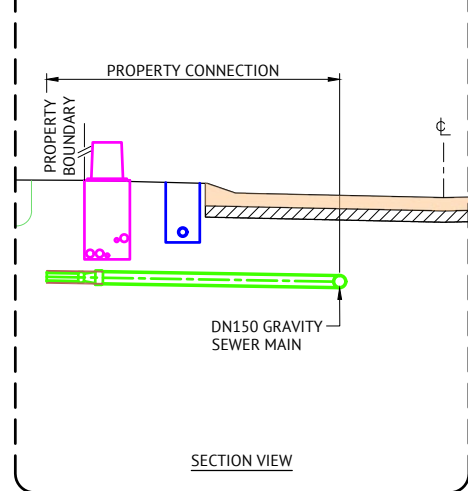
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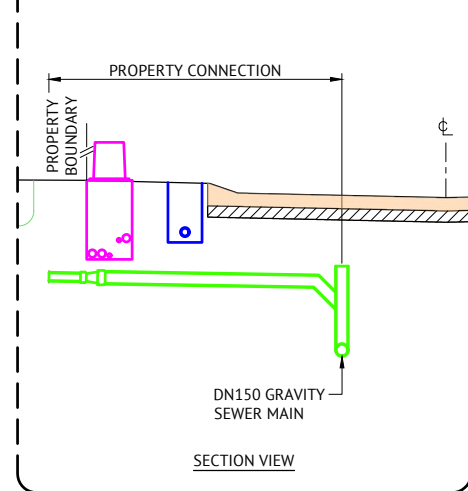
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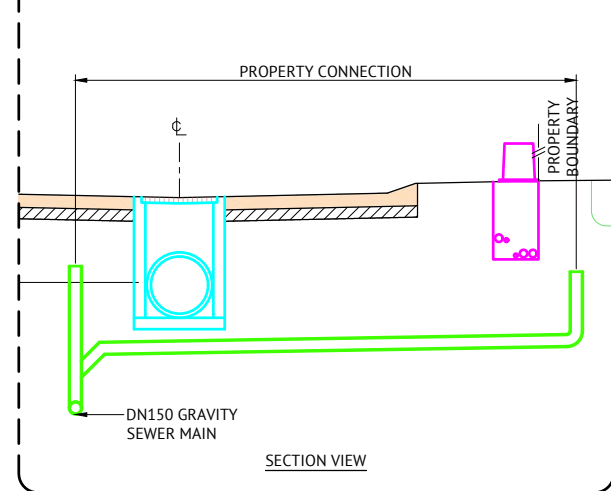
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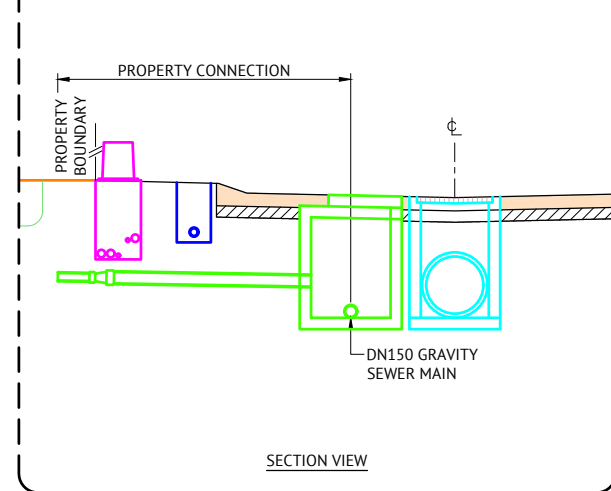
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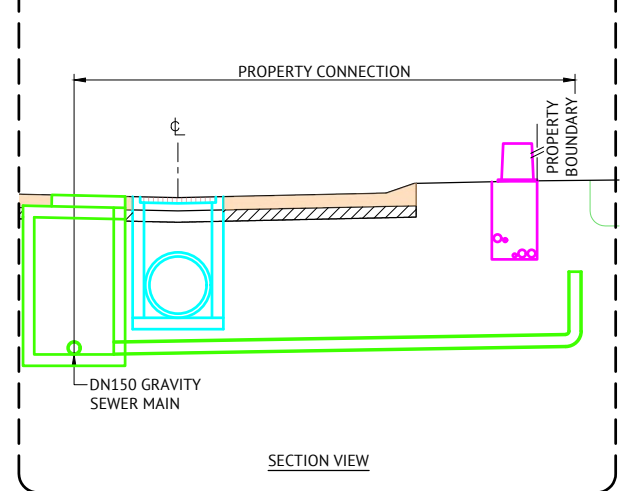
SECTION VIEW



SECTION VIEW



SECTION VIEW



SECTION VIEW

SEWER HOUSE CONNECTION  
TYPE: A/AD  
SCALE 1:50

SEWER HOUSE CONNECTION  
TYPE: BA/BAD  
SCALE 1:50

SEWER HOUSE CONNECTION  
TYPE: BB/BBD  
SCALE 1:50

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SCALE 1:50

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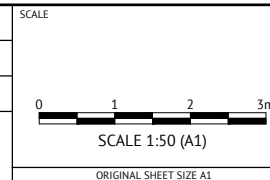
PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	SK	KD
21/01/2026	1	CONCEPT - FOR INFORMATION		



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A.PEASE  
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A.PEASE RPEQ 22556



CLIENT

INGENIA COMMUNITIES PTY LTD

PROJECT

NORTH SHORE LIFESTYLE COMMUNITY

LOCATION

MAIN STREET, BURDELL

SHEET TITLE

TYPICAL DETAILS - SHEET 2 OF 2

JOB CODE

P003520

SHEET NUMBER

SKC004

REV

1

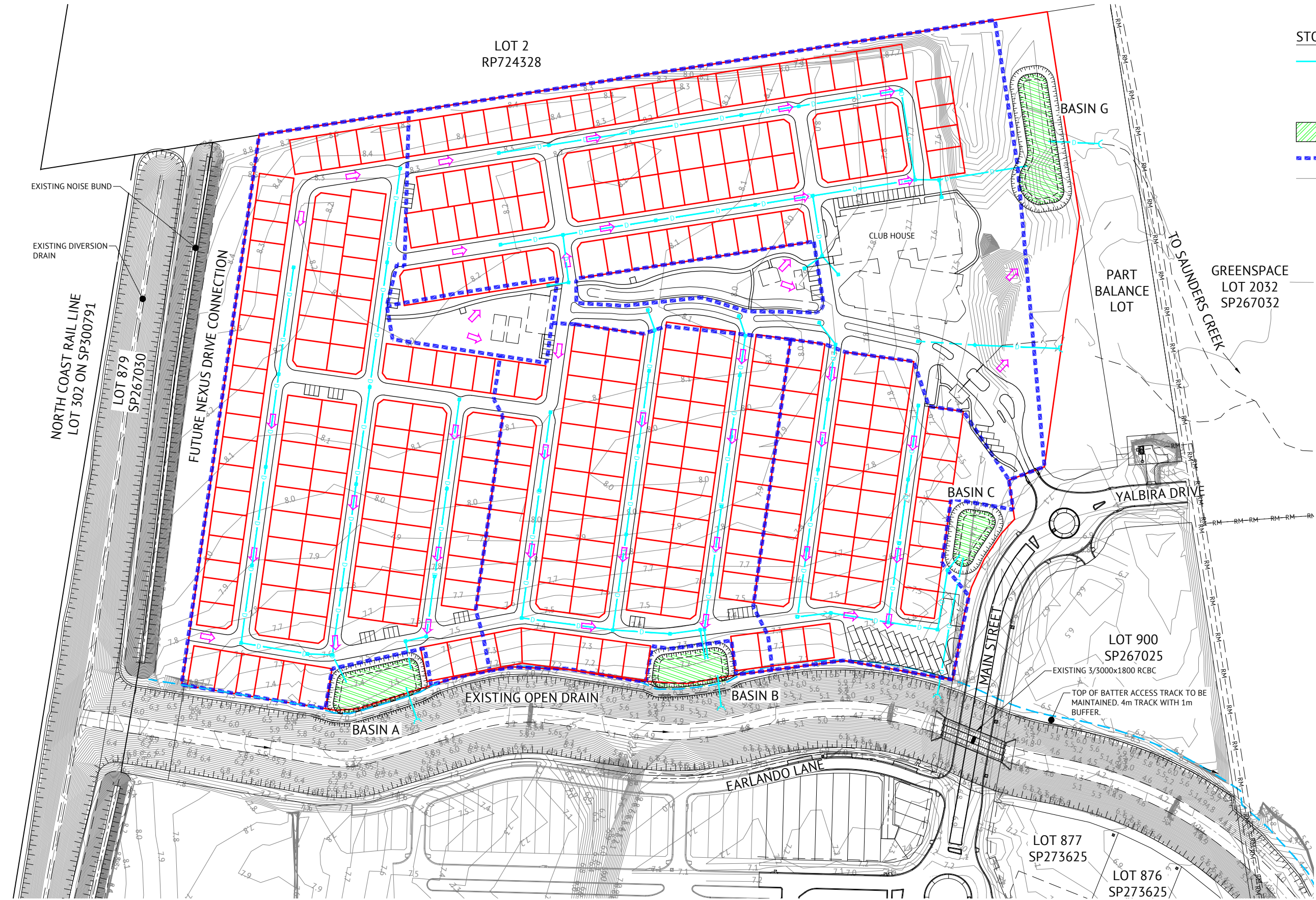


# APPENDIX C

## PRELIMINARY STORMWATER DRAINAGE PLAN AND MUSIC PARAMETERS

*P003520 SKC005*

*MUSIC Parameters*



- STORMWATER LEGEND:**
- PROPOSED STORMWATER DRAINAGE
  - PROPOSED STORMWATER INLET PIT
  - DIRECTION OF MAJOR FLOWS
  - BIO BASIN
  - STORMWATER QUALITY CATCHMENTS
  - 7.6 EXISTING SURFACE CONTOUR (0.1m)

**STORMWATER DRAINAGE PLAN**  
SCALE 1:1000

**PRELIMINARY - NOT FOR CONSTRUCTION**

**Premise**  
PART OF THE  
Avery GROUP

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*AP*  
A.PEASE RPEQ 22556

SCALE  
0 20 40 60m  
SCALE 1:1000 (A1)  
ORIGINAL SHEET SIZE A1

CLIENT  
**INGENIA COMMUNITIES PTY LTD**

PROJECT  
**NORTH SHORE LIFESTYLE COMMUNITY**

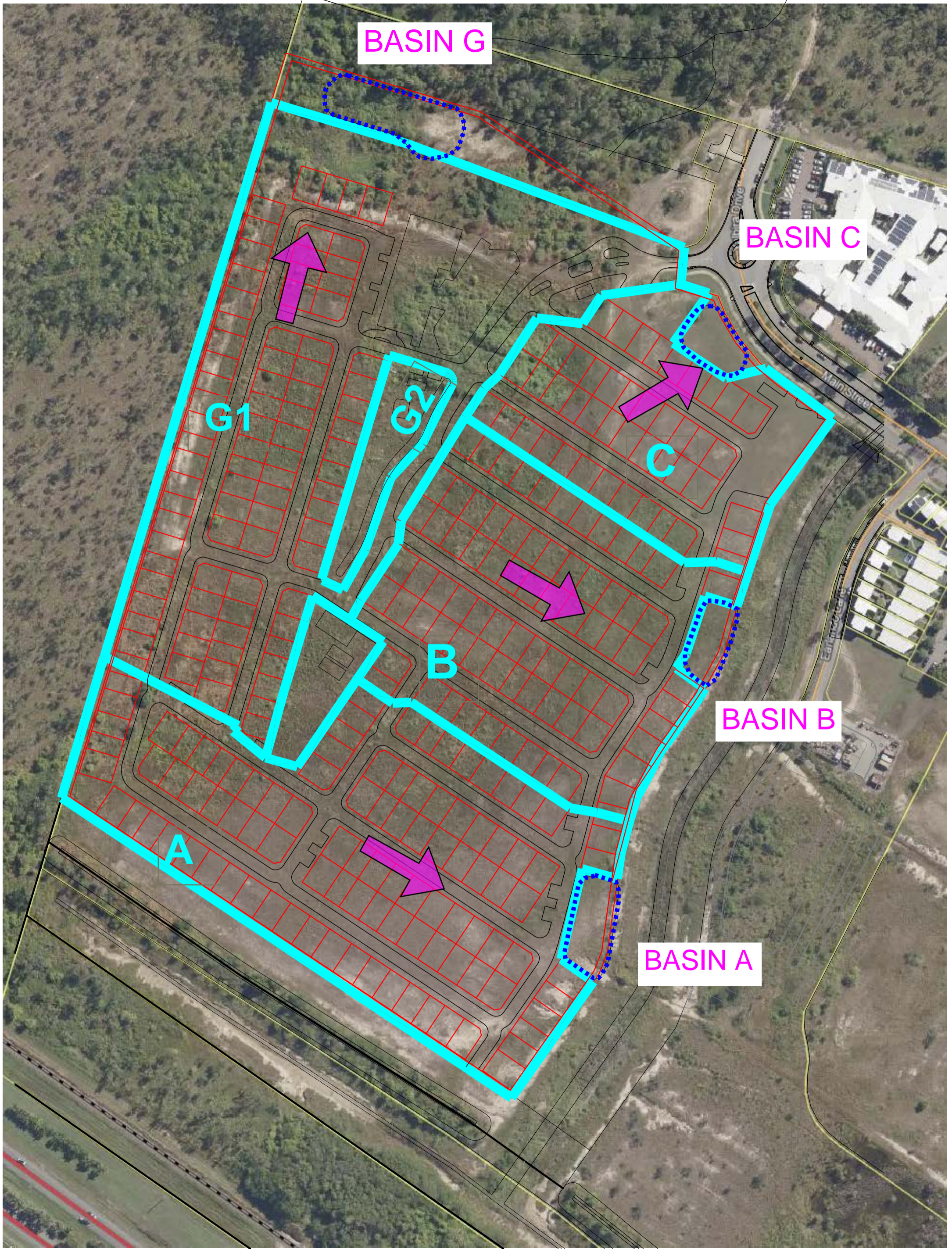
LOCATION  
**MAIN STREET, BURDELL**

SHEET TITLE  
**STORMWATER DRAINAGE PLAN**

JOB CODE  
**P003520**

SHEET NUMBER	REV
<b>SKC005</b>	<b>1</b>

DATE	REV	DESCRIPTION	SK REC	KD APP
21/01/2026	1	CONCEPT - FOR INFORMATION		



BASIN G

BASIN C

G1

G2

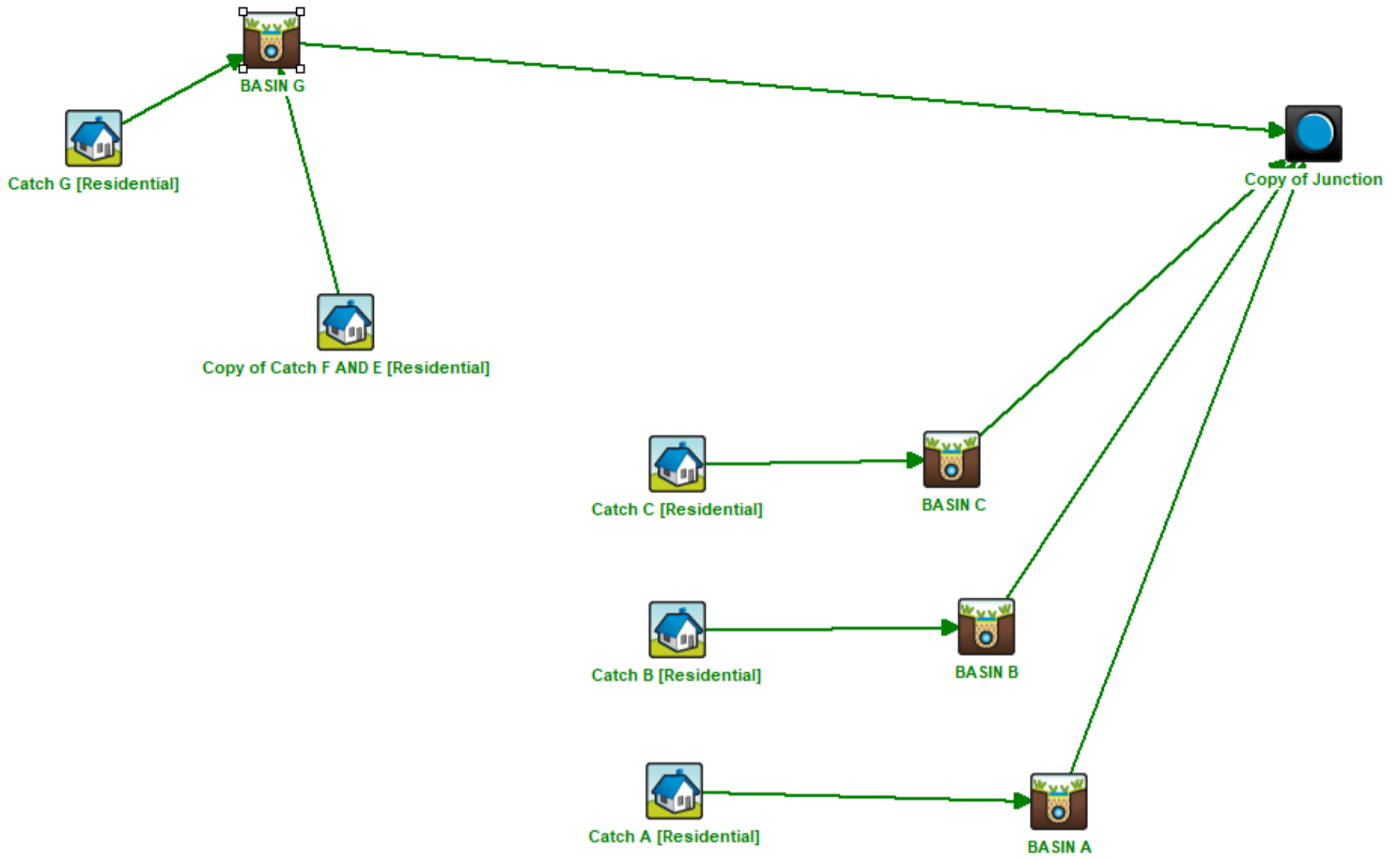
C

B

BASIN B

A

BASIN A



Pollutant Reduction at JUNCTION			
	SOURCES	RESIDUAL LOAD	% REDUCTION
<b>Flow (ML/yr)</b>	111	105	5.6
<b>Total Suspended Solids (kg/yr)</b>	24400.00	3790.00	84.50
<b>Total Phosphorus (kg/yr)</b>	47.6	16.6	65.1
<b>Total Nitrogen (kg/yr)</b>	231	114	50.8
<b>Gross Pollutants (kg/yr)</b>	2050	0	100

Catchment ID	Land Use	Node Type	Total Area (ha)	Fraction Impervious	Treatments
<b>A</b>	<b>Lumped</b> Catchment Residential	Urban	3.50	90%	BIO BASIN A
<b>B</b>	<b>Lumped</b> Catchment Residential	Urban	2.48	90%	BIO BASIN B
<b>C</b>	<b>Lumped</b> Catchment Residential	Urban	1.52	90%	BIO BASIN C
<b>G1</b>	<b>Lumped</b> Catchment Residential	Urban	4.36	90%	BIO BASIN G
<b>G2</b>			0.54	10%	

		BIO A	BIO B	BIO C	BIO G
Inlet Properties	Low Flow Bypass (m <sup>3</sup> /s)	0	0	0	0
	High Flow Bypass (m <sup>3</sup> /s)	100	100	100	100
Storage Properties	Extended Detention Depth (EDD) (m)	0.3	0.3	0.3	0.3
	Surface Area (m <sup>2</sup> )	672	483	257	1302
Filter And Media Properties	Filter Area (m <sup>2</sup> )	591	415	216	1148
	Unlined Filter Area Perimeter (m)	105	88	65	202
	Saturated Hydraulic conductivity (mm/hr)	180	180	180	180
	Filter Depth (m)	0.6	0.6	0.6	0.6
	TN Content of Filter material (mg/kg)	800	800	800	800
	Orthophosphate content of Filter media (mg/kg)	30	30	30	30
Infiltration Properties	Exfiltration rate (mm/hr)	0	0	0	0

**NORTHSHORE LIFESTYLE COMMUNITY - MUSIC MODELLING P003520**

VersionNumber

205 {MUSIC Setup File version number}

Node Type	Urban Source Node				
Zoning Surface Type	Residential				
Node Name	<b>Catch A</b>	<b>Catch B</b>	<b>Catch C</b>	<b>Catch G</b>	<b>Catch G2</b>
Node ID	1	2	3	4	10
<b>Areas - Total Area (ha)</b>	<b>3.5</b>	<b>2.48</b>	<b>1.52</b>	<b>4.36</b>	<b>0.54</b>
Areas - Impervious (%)	90	90	90	90	10
Areas - Pervious (%)	10	10	10	10	90
Rainfall-Runoff - Impervious Area - Rainfall Threshold (mm/day)	1				
Rainfall-Runoff - Pervious Area - Soil Storage Capacity (mm)	250				
Rainfall-Runoff - Pervious Area - Initial Storage (% of Capacity)	30				
Rainfall-Runoff - Pervious Area - Field Capacity (mm)	100				
Rainfall-Runoff - Pervious Area - Infiltration Capacity Coefficient - a	200				
Rainfall-Runoff - Pervious Area - Infiltration Capacity Exponent - b	1				
Rainfall-Runoff - Groundwater Properties - Initial Depth (mm)	10				
Rainfall-Runoff - Groundwater Properties - Daily Recharge Rate (%)	4				
Rainfall-Runoff - Groundwater Properties - Daily Baseflow Rate (%)	2				
Rainfall-Runoff - Groundwater Properties - Daily Deep Seepage Rate (%)	0.4				
Total Suspended Solids - Base Flow Concentration - Mean (log mg/L)	1				
Total Suspended Solids - Base Flow Concentration - Std Dev (log mg/L)	0.34				
Total Suspended Solids - Base Flow Concentration - Estimation Method = Stochastically generated	1				
Total Suspended Solids - Base Flow Concentration - Serial Correlation (R squared)	0				
Total Suspended Solids - Storm Flow Concentration - Mean (log mg/L)	2.18				
Total Suspended Solids - Storm Flow Concentration - Std Dev (log mg/L)	0.39				
Total Suspended Solids - Storm Flow Concentration - Estimation Method = Stochastically generated	1				
Total Suspended Solids - Storm Flow Concentration - Serial Correlation (R squared)	0				
Total Phosphorus - Base Flow Concentration - Mean (log mg/L)	-0.97				
Total Phosphorus - Base Flow Concentration - Std Dev (log mg/L)	0.31				
Total Phosphorus - Base Flow Concentration - Estimation Method = Stochastically generated	1				
Total Phosphorus - Base Flow Concentration - Serial Correlation (R squared)	0				
Total Phosphorus - Storm Flow Concentration - Mean (log mg/L)	-0.47				
Total Phosphorus - Storm Flow Concentration - Std Dev (log mg/L)	0.31				
Total Phosphorus - Storm Flow Concentration - Estimation Method = Stochastically generated	1				

Total Phosphorus - Storm Flow Concentration - Serial Correlation (R squared)	0
Total Nitrogen - Base Flow Concentration - Mean (log mg/L)	0.2
Total Nitrogen - Base Flow Concentration - Std Dev (log mg/L)	0.2
Total Nitrogen - Base Flow Concentration - Estimation Method = Stochastically generated	1
Total Nitrogen - Base Flow Concentration - Serial Correlation (R squared)	0
Total Nitrogen - Storm Flow Concentration - Mean (log mg/L)	0.26
Total Nitrogen - Storm Flow Concentration - Std Dev (log mg/L)	0.23
Total Nitrogen - Storm Flow Concentration - Estimation Method = Stochastically generated	1
Total Nitrogen - Storm Flow Concentration - Serial Correlation (R squared)	0
Import Flow Properties - Import Flow Enabled	1
Import Flow Properties - Header lines	0
Import Flow Properties - Baseflow Column	0
Import Flow Properties - Impervious Stormflow Column	0
Import Flow Properties - Pervious Stormflow Column	0
Import Flow Properties - Unit = m3/S	5
Import Flow Properties - Catchment Area for GP (ha)	1

Node Type	BioRetention Node V4			
Node Name	BASIN A	BASIN B	BASIN C	BASIN G
Node ID	5	6	7	8
General - Flux File Timestep (in seconds)	360	360	360	360
Inlet Properties - Low Flow By-pass (cubic metres per sec)	0			
Inlet Properties - High Flow By-pass (cubic metres per sec)	100			
Storage Properties - Extended Detention Depth (metres)	0.3			
<b>Storage Properties - Surface Area (square metres)</b>	<b>672</b>	<b>483</b>	<b>257</b>	<b>1302</b>
<b>Filter and Media Properties - Filter Area (square metres)</b>	<b>591</b>	<b>415</b>	<b>216</b>	<b>1148</b>
<b>Filter and Media Properties - Unlined Filter Media Perimeter (metres)</b>	<b>105</b>	<b>88</b>	<b>65</b>	<b>202</b>
Filter and Media Properties - Saturated Hydraulic Conductivity (mm/hr)	180			
Filter and Media Properties - Filter Depth (metres)	0.6			
Filter and Media Properties - TN Content of Filter Media (mg/kg)	800			
Filter and Media Properties - Orthophosphate Content of Filter Media (mg/kg)	30			
Infiltration Properties - Exfiltration Rate (mm/hr)	0			
Lining Properties - Base Lined	1			
<b>Vegetated with Effective Nutrient Removal Plants</b>				
Outlet Properties - Overflow Weir Width (metres)	20	20	20	8
Outlet Properties - Underdrain Present	0			
Outlet Properties - Submerged Zone With Carbon Present	0			
Outlet Properties - Submerged Zone Depth (metres)	0.35			
Advanced Properties - Total Suspended Solids - k (m/yr)	8000			
Advanced Properties - Total Suspended Solids - C* (mg/L)	20			
Advanced Properties - Total Phosphorus - k (m/yr)	6000			

Advanced Properties - Total Phosphorus - C* (mg/L)	0.13
Advanced Properties - Total Nitrogen - k (m/yr)	500
Advanced Properties - Total Nitrogen - C* (mg/L)	1.4
<b>Loamy Sand</b>	
Advanced Properties - Weir Coefficient	1.7
Advanced Properties - Pet Scaling Factor	2.1
Advanced Properties - Number of CSTR Cells	3
Advanced Properties - Porosity of Filter Media	0.35
Advanced Properties - Porosity of Submerged Zone	0.35
Advanced Properties - Horizontal Flow Coefficient	3
<b>Node Type</b>	<b>Junction Node</b>
Node Name	Junction
Node ID	9

Link Name	Drainage Link									
Source Node ID	1	2	3	4	8	7	6	5	10	
Target Node ID	5	6	7	8	9	9	9	9	8	
Notes										
Routing	Not Routed									
Muskingum K	30	30	30	30	30	30	30	30	30	30
Muskingum Theta	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Secondary Outflow Components										



# APPENDIX D

## PRELIMINARY WATER RETICULATION PLAN AND WATER NETWORK ANALYSIS

*P003520 SKC006*



**LEGEND**

	PROPOSED 630D WATER MAIN
	PROPOSED DN100 WATER MAIN
	PROPOSED DN150 WATER MAIN
	PROPOSED DN200 WATER MAIN
	EXISTING WATER MAIN



**WATER RETICULATION PLAN**  
SCALE 1:1000

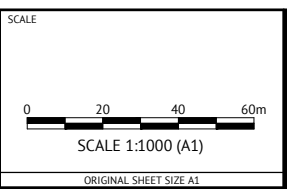
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DATE	REV	DESCRIPTION	SK	KD
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21/01/2026	1	CONCEPT - FOR INFORMATION		



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A.PEASE RPEQ 22556



CLIENT  
**INGENIA COMMUNITIES PTY LTD**

PROJECT  
**NORTH SHORE LIFESTYLE COMMUNITY**

LOCATION  
**MAIN STREET, BURDELL**

SHEET TITLE  
**WATER RETICULATION PLAN**

JOB CODE	<b>P003520</b>	
SHEET NUMBER	<b>SKC006</b>	REV
		<b>1</b>



# **NORTH SHORE LIFESTYLE COMMUNITY**

## **WATER SUPPLY PLANNING REPORT**


**Date: 20 October 2025 (Rev 1)**

## TABLE OF CONTENTS

1	INTRODUCTION .....	1
2	POPULATION ASSESSMENT .....	2
3	WATER SUPPLY PLANNING .....	3
3.1	Water Demand .....	3
3.2	Water Supply Assessment.....	3

## APPENDICES

- Appendix A        Lifestyle Community Layout Plans
- Appendix B        WaterGEMs Figure & Modelling Results

<b>REPORT AUTHORISATION</b>				
<b>Revision</b>	<b>Revision Date</b>	<b>Details</b>	<b>Prepared by</b>	<b>Signature</b>
1	20/10/2025	Initial Report	Desmond Moseley	

## 1 INTRODUCTION

A proposed residential lifestyle village is planned on the northern side of Bruce Highway and to the west of Earlando Lane in Burdell. The site is currently a vacant land parcel. The residential lifestyle community is proposed to consist of up to 310 houses with the concept plan provided below. A larger version of the concept plan is provided in Appendix A. The development will need to be serviced with a reticulated water system.

### NORTH SHORE LIFESTYLE COMMUNITY - MASTERPLAN



Figure 1.1 – Residential Lifestyle Community Layout Plan

The following sections of this report provide a summary of the water network capacity assessment for the residential lifestyle community with this showing:

- The existing DN250 PVC water main on Main St is sufficiently sized to service the 310 lot development with both peak hour and fire flows. There will be one connection off the existing trunk water main to service the residential lifestyle community.
- The internal development water network will be private as there will be a single water service and meter to the site. The preliminary sizing of the internal water network has been included in the network modelling to confirm the full site is able to be serviced with a reticulated water supply. The internal network will consist of DN150 and DN100 PVC water mains.
- The internal water network layout and sizing will be confirmed as part of the future plumbing and hydraulic assessment (by others).

The location of the site is illustrated on the Townsville City Council GIS extract below.



**Figure 1.2 – Residential Lifestyle Community Location Figure**

## 2 POPULATION ASSESSMENT

The following table provides the population assessment for the proposed development.

The client has advised that the equivalent population per lot will be 1.6 EP/lot. This loading rate is due to the proposed site use which will be a retirement lifestyle village with one and two bedroom houses.

**Table 2.1 –Population Assessment**

	<b>Number</b>	<b>Rate</b>	<b>EP</b>
North Shore Lifestyle Community	310 lots	1.6 EP/lot	496 EP

The above equivalent population has been used in the water assessment.

### 3 WATER SUPPLY PLANNING

#### 3.1 Water Demand

Water demands have been calculated in accordance with Townsville City Council planning scheme and associated CTM Code. The following table provides the “residential” water demand parameters from the Townsville Planning Scheme for each equivalent person (EP).

**Table SC6.4.3.21.2 Water supply unit demand parameters**

Parameter	Unit Demand	Peaking Factor
Average Day (AD)	600 L/day/EP	
Mean Day Max Month (MDMM)	900 L/day/EP	1.5 AD
Peak Day (PD)	1125 L/day/EP	1.25 MDMM
Peak Hour (PH)	0.0333 L/s/EP	2.56 PD

The peak hour water demand for the proposed 310 lot residential lifestyle community is therefore  $496 \text{ EP} \times 0.033 = 16.37 \text{ l/s}$ .

As the development is residential it has been modelled to also have a 15 l/s fire flow concurrent with the above maximum hour demands in accordance with Townsville Water design standards.

#### 3.2 Water Supply Assessment

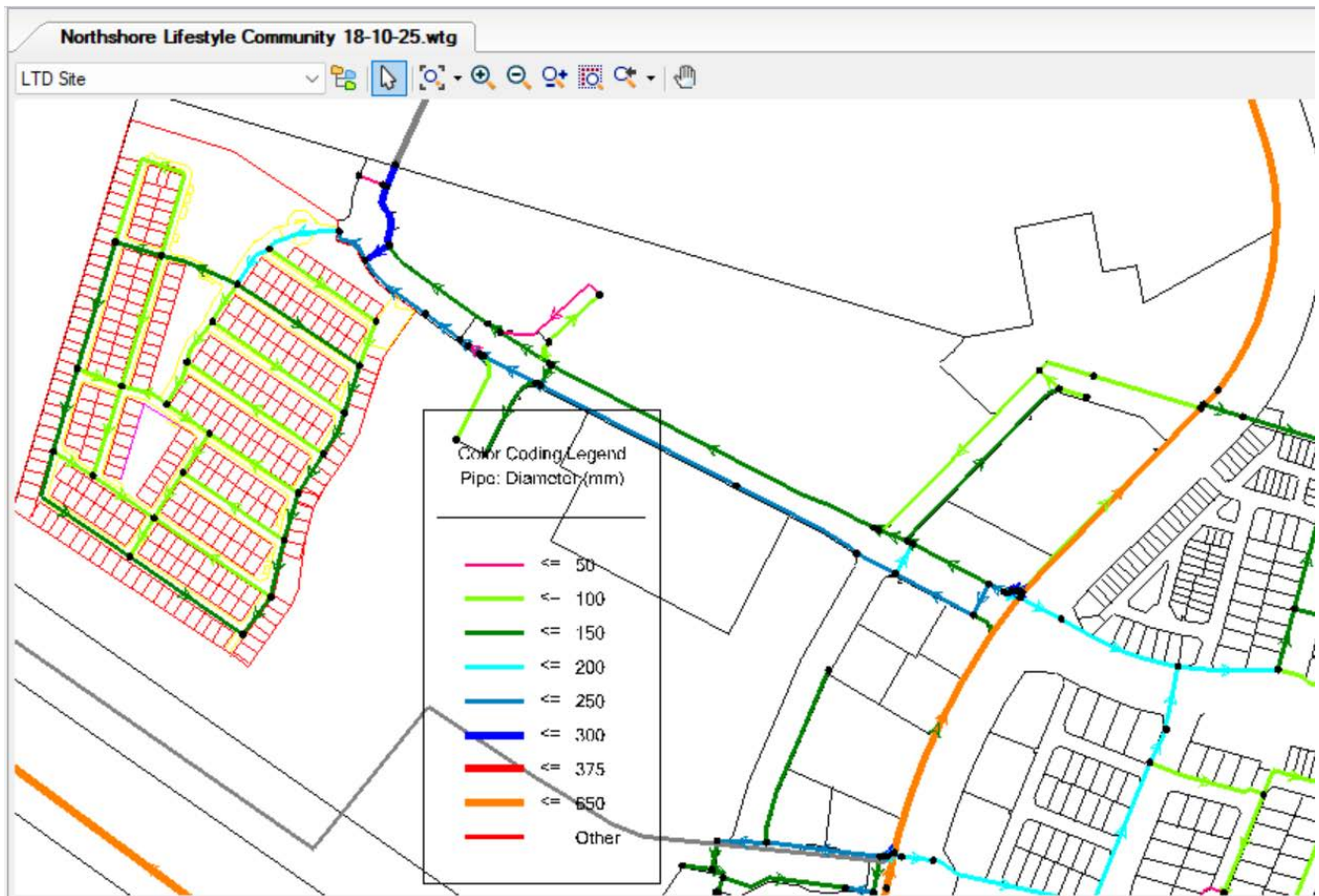
The water network modelling for the development has been performed using the WaterGEMS network model. The WaterGEMS network model includes the existing water infrastructure along with the existing water demands for all of the Bushland Beach, Northshore, Sanctum and Mt Low areas that are located on the northern side of the Bruce Hwy.

The WaterGEMS network model has been updated to include the water demands for the residential lifestyle community of 310 lots on the south western side of Main St in Burdell. The trunk water infrastructure that services this development area consists of:

- The Mt Spec Pipeline. These dual DN600 MSCL and DN485 MSCL bulk water pipelines run along the southern/western side of the Bruce Hwy. These bulk water pipelines can be supplied water from either the 3 x 22.5 ML Mt Louisa reservoirs or from the Northern Water Treatment Plant via the 10 ML Mt Kulburn reservoir.
- There is a DN600 trunk water main connection off the Mt Spec pipelines opposite the North Shore Boulevard intersection. This offtake includes a PRV to lower the water pressures into the reticulation network. The normal pressure setting for the PRV is 64m HGL (being 52m pressure based on a ground elevation of 12m).
- The DN600 trunk water main crosses under the Bruce Hwy and continues along the western side of North Shore Boulevard.
- A DN250 PVC water main connects to the DN600 trunk water main on Nexis St and a DN250 PVC water main connects to the DN600 trunk water main on Main St. Both these connections direct water into the reticulation network in North Shore. It is noted that both these offtakes include PRV's but they are not currently in use.

- The DN250 PVC main continues to the west along Main St and to the frontage of the lifestyle community development site.

The following Figure 3.1 from the WaterGEMS model illustrates the existing water infrastructure along with the preliminary private internal development water layout for the proposed 310 lot residential lifestyle community.



**Figure 3.1 – Residential Lifestyle Community WaterGEMS Model**

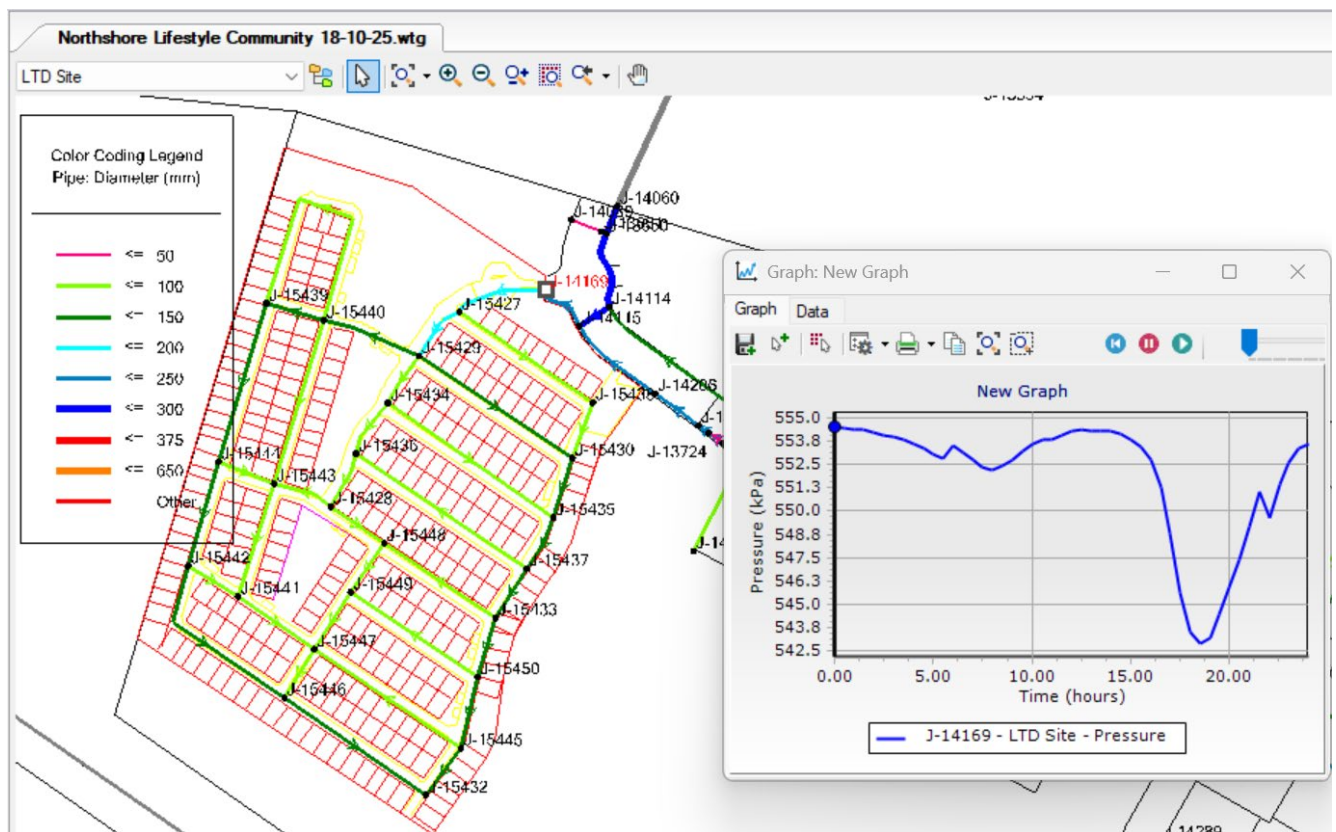
With the inclusion of the proposed water infrastructure and water demands for the residential lifestyle community, including the preliminary private internal site water mains, the water network performance is summarised below:

- The existing DN600 trunk water main along North Shore Boulevard is adequately sized to service the development. This trunk water main was sized to service the full development of the North Shore area so is able to cater for the proposed lifestyle community demands.
- The existing DN250 PVC water main along Main St is also adequately sized to service the proposed development with peak hour and fire flows.
- The water pressure on the proposed “private” internal development water mains is reduced to a minimum of 537 kPa at 7:00 pm which is the peak residential demand period.
- The water pressure on the existing DN250 PVC water main on Main St at the proposed offtake to the residential lifestyle community site is 543 kPa.
- All the water pressures in the North Shore development area in the vicinity of the proposed lifestyle community development are above 530 kPa and therefore meet the minimum peak hour water pressure requirement of 220 kPa.

- The velocity and headloss gradients for the existing and proposed water mains that will service the proposed lifestyle community off Main St are up to 0.52 m/s and 0.002 m/m respectively. These are in accordance with Council standards.
- With the inclusion of the 15 l/s residential fire flows on the most distant node within the proposed lifestyle community site (being Node J-15432), the water pressure is 512 kPa at 7:00 pm. This water pressure is above the minimum allowable 120 kPa pressure.
- The velocity along the existing and proposed reticulation water mains with the inclusion of the 15 l/s fire flow is up to 1.00 m/s which is below the 4.0 m/s maximum value in Council standards.

The WaterGEMS network modelling results are provided in Appendix B.

Figure 3.2 below from the WaterGEMS model illustrates the water pressure at the offtake from the existing DN250 PVC water main on Main St that will service the proposed lifestyle community development.



**Figure 3.2 – Lifestyle Community Offtake WaterGEMS Model Peak Hour Pressures**

The water network modelling shows the existing water network in the North Shore development area is sufficiently sized to service the proposed 310 lot lifestyle community development. The assessment also illustrates that preliminary private internal development water main sizing that will be confirmed as part of the future plumbing and internal development hydraulic assessment.

# **APPENDIX A LIFESTYLE COMMUNITY LAYOUT PLAN**

# NORTH SHORE LIFESTYLE COMMUNITY - MASTERPLAN

## COMMUNAL LEGEND

- 1 **Main Clubhouse**  
*"Northshore Homestead"*
  - Dance Floor / Function Hall
  - Main Kitchen & Servery
  - Bar / Lounge
  - Recreation / Pool Tables
  - Arts & Craft Area
  - Resort Style Pool & Spa
  - Gym / Outdoor Yoga
  - Quiet Game / Library
  - Outdoor BBQ Area
  - Outdoor Seating
  - Hairdressing Salon
  - Medical Consult Room
  - Community Bus
- 2 **Sports Precinct**  
*"Club Northshore"*
  - Bowling Green
  - Pickleball Court
- 3 **BBQ Area**
  - Outdoor Kitchen
  - Community Garden
- 4 **Workshop**



## LEGEND

Lot Size	Quantity	Percentage
9.6m x 18m Lots	41	13%
11.3m x 18m Lots	51	16%
12.5m x 18m Lots	141	46%
14.5m x 18m Lots	77	25%

**TOTAL** 310

Parking Type	Space Ratio	Provided	Quantity
CAR	1 SPACE PER 5 DWELLINGS	PROVIDED	62
CARAVAN	1 SPACE PER 10 DWELLINGS	PROVIDED	24

- COMMUNAL FACILITIES
- GREEN PUBLIC SPACE
- BIO DETENTION
- Q100 FLOOD LEVEL - TBC\*
- OVERLAND FLOW
- FENCE LINE
- FOOTPATH

## MASTERPLAN

PROJECT NAME & ADDRESS  
 NORTH SHORE LIFESTYLE COMMUNITY  
 Part Majors Creek Junction, 74 Main Street, Burrell, Old 4818

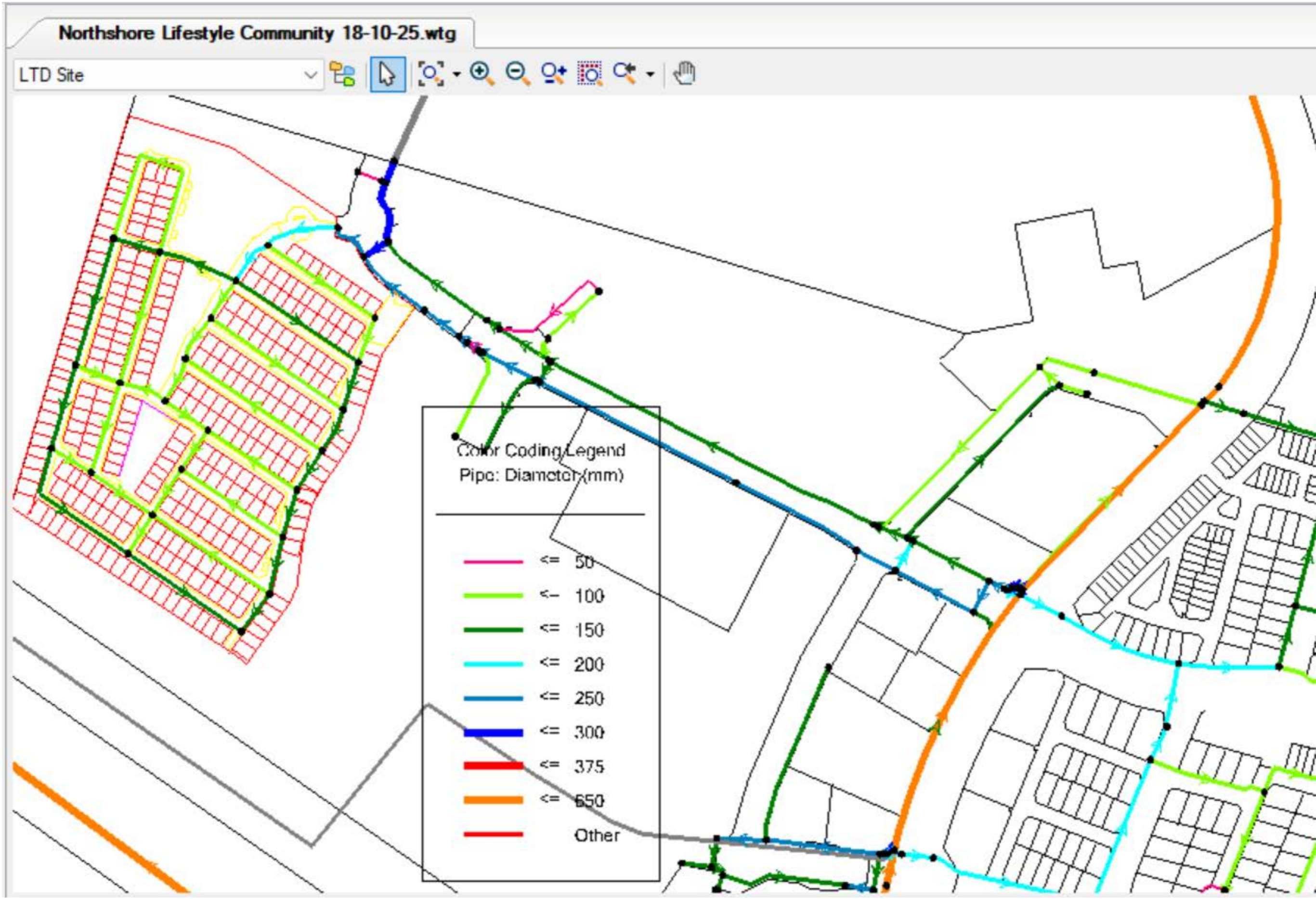
CLIENT: INGENIA COMMUNITIES  
 PROJECT No: 25026  
 DATE: 10/9/2025  
 REVISION: 1

0 10 20 50 100  
 SCALE 1:2000

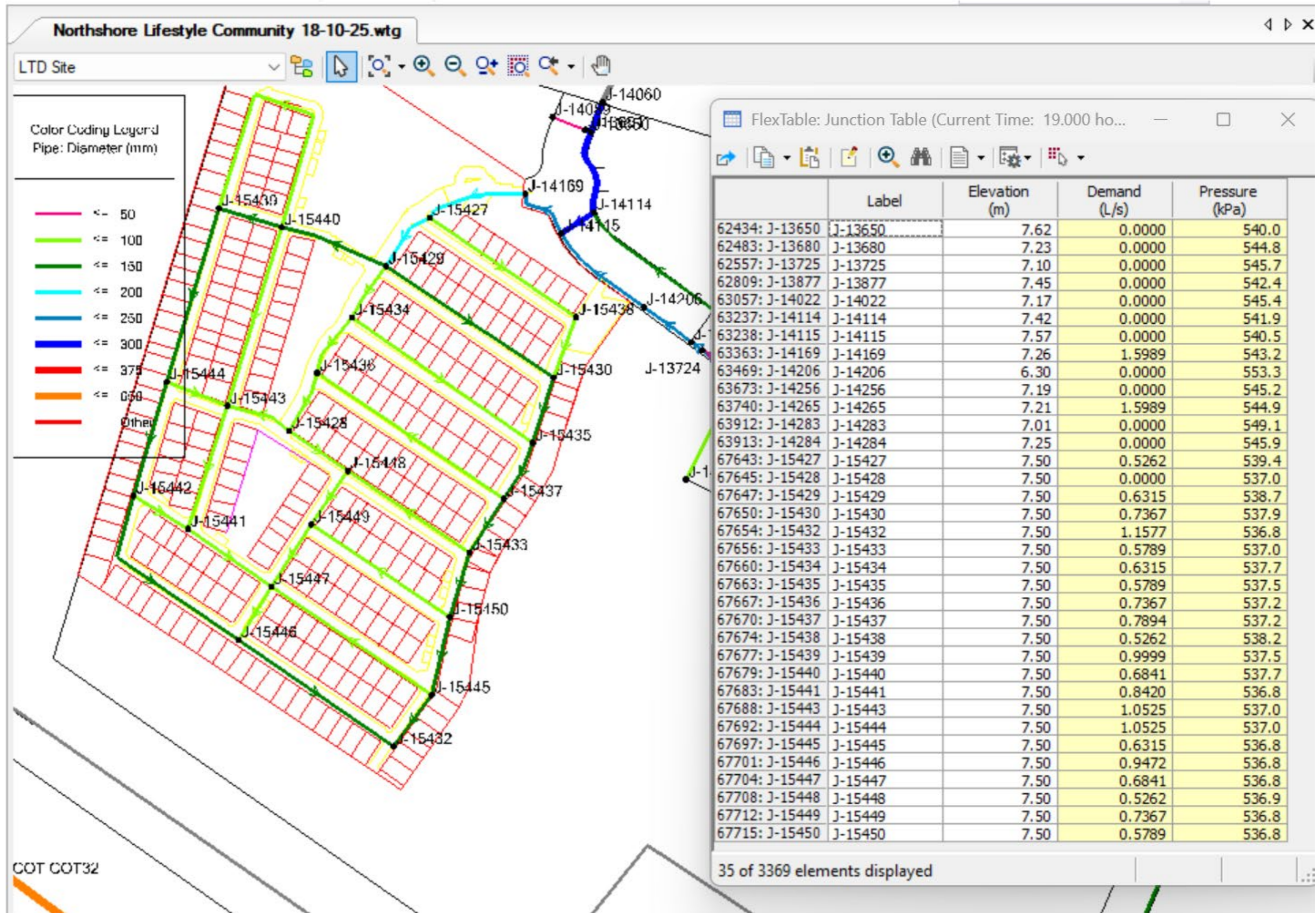


OGE Group Architects

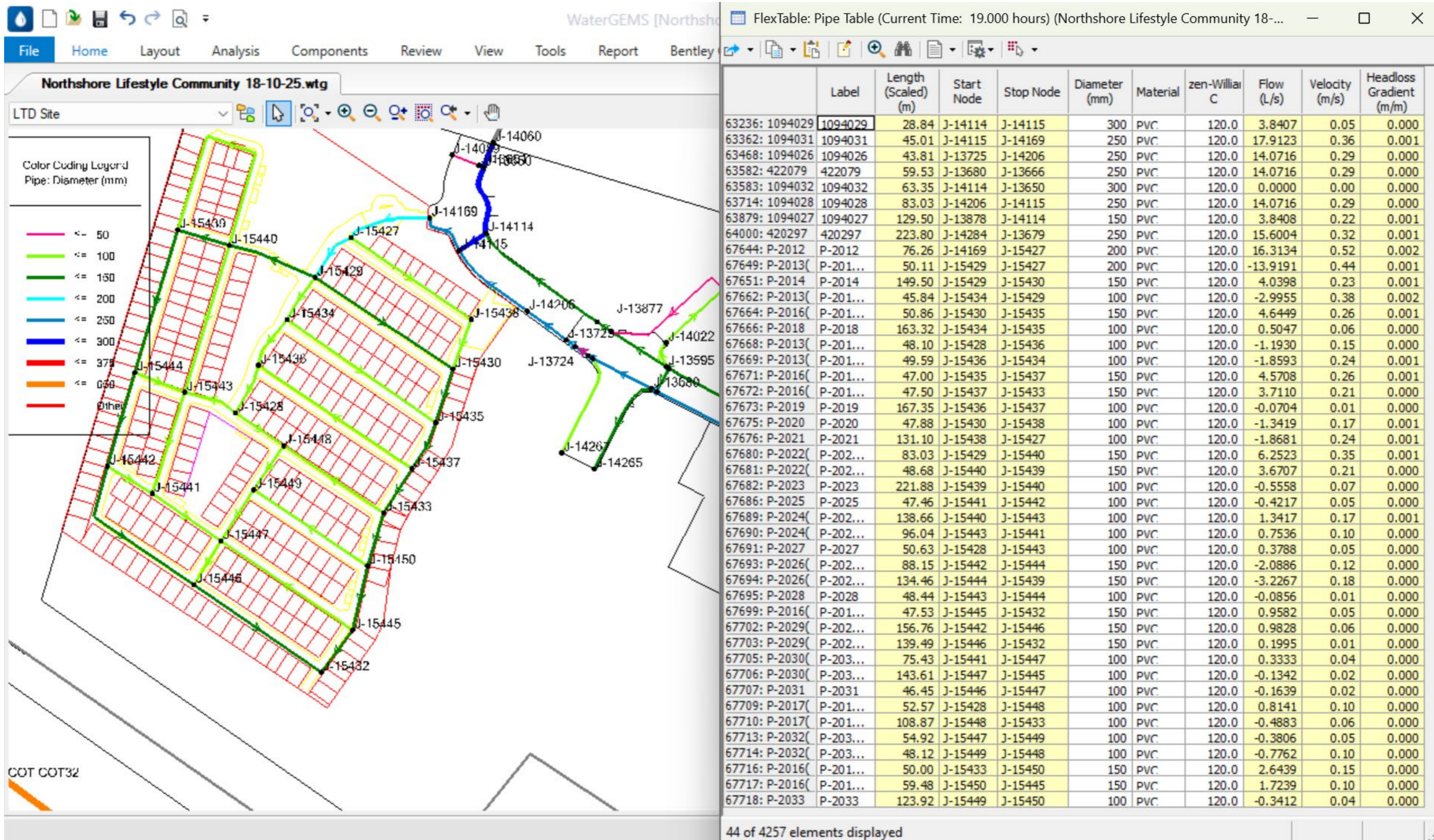
## **APPENDIX B WATER MODELLING FIGURE & RESULTS**



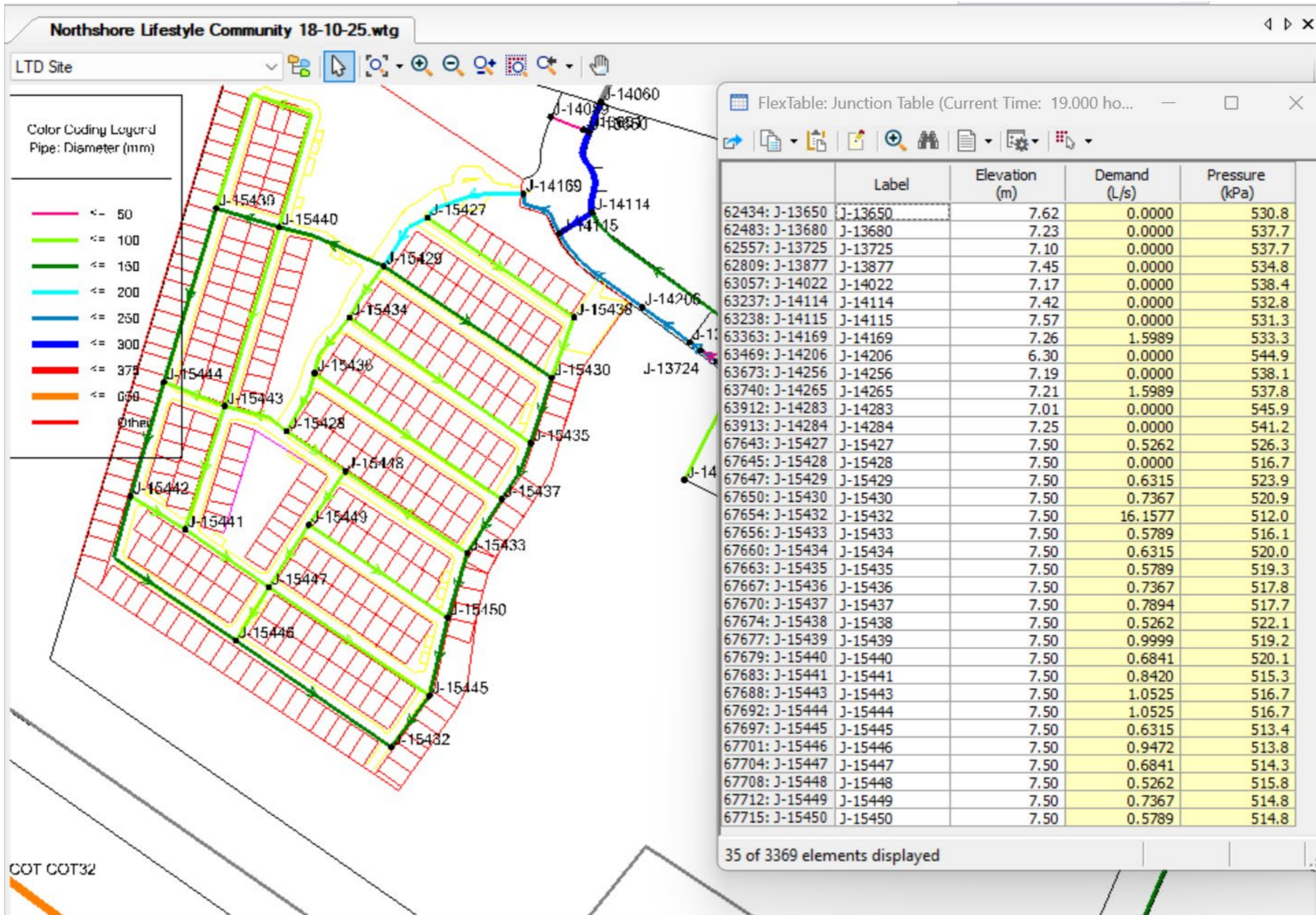
**LIFESTYLE VILLAGE SITE – WATERGEMS MODELLING FIGURE**



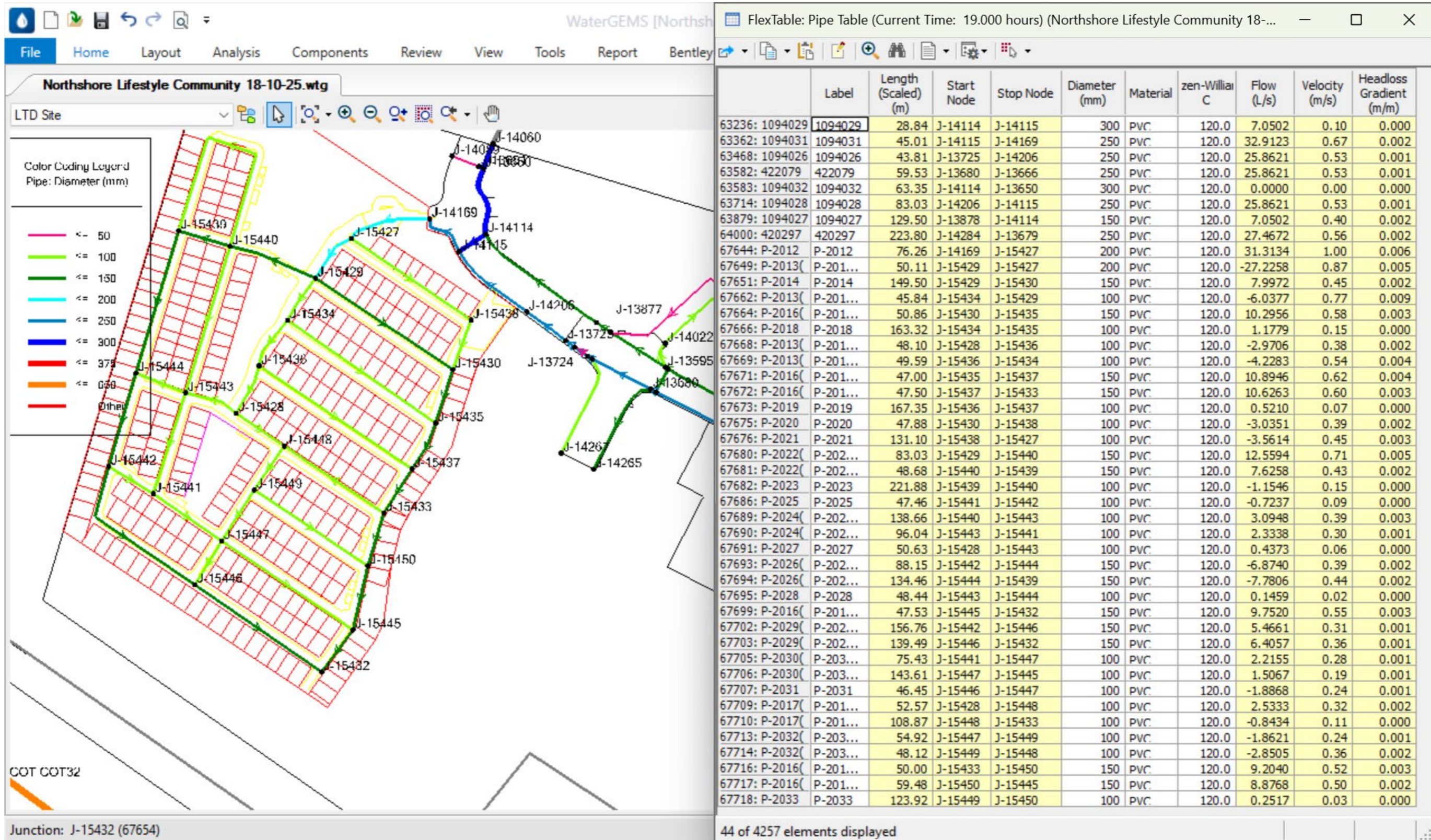
## WATERGEMS MODELLING RESULTS – PEAK HOUR NODES



## WATERGEMS MODELLING RESULTS – PEAK HOUR PIPES



## WATERGEMS MODELLING RESULTS – FIRE FLOW NODES



## WATERGEMS MODELLING RESULTS – FIRE FLOW PIPES



# APPENDIX E

## PRELIMINARY SEWER RETICULATION PLAN

*P003520 SKC007*



**LEGEND**

	PROPOSED DN100 GRAVITY SEWER MAIN
	PROPOSED DN150 GRAVITY SEWER MAIN
	PROPOSED DN225 GRAVITY SEWER MAIN
	EXISTING GRAVITY SEWER MAIN WITH MANHOLE
	EXISTING SEWER RISING MAIN

**SEWER RETICULATION PLAN**  
SCALE 1:1000

**PRELIMINARY - NOT FOR CONSTRUCTION**

DATE	REV	DESCRIPTION	SK REC	KD APP
21/01/2026	1	CONCEPT - FOR INFORMATION		

**Premise**  
PART OF THE ARVIND GROUP

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**K.DE LACEY**

CHECKED  
**D.BAMBER**

PROJECT MANAGER  
**A.PEASE**

ENGINEERING CERTIFICATION

A.PEASE RPEQ 22556

SCALE

SCALE 1:1000 (A1)  
ORIGINAL SHEET SIZE A1

CLIENT  
**INGENIA COMMUNITIES PTY LTD**

PROJECT  
**NORTH SHORE LIFESTYLE COMMUNITY**

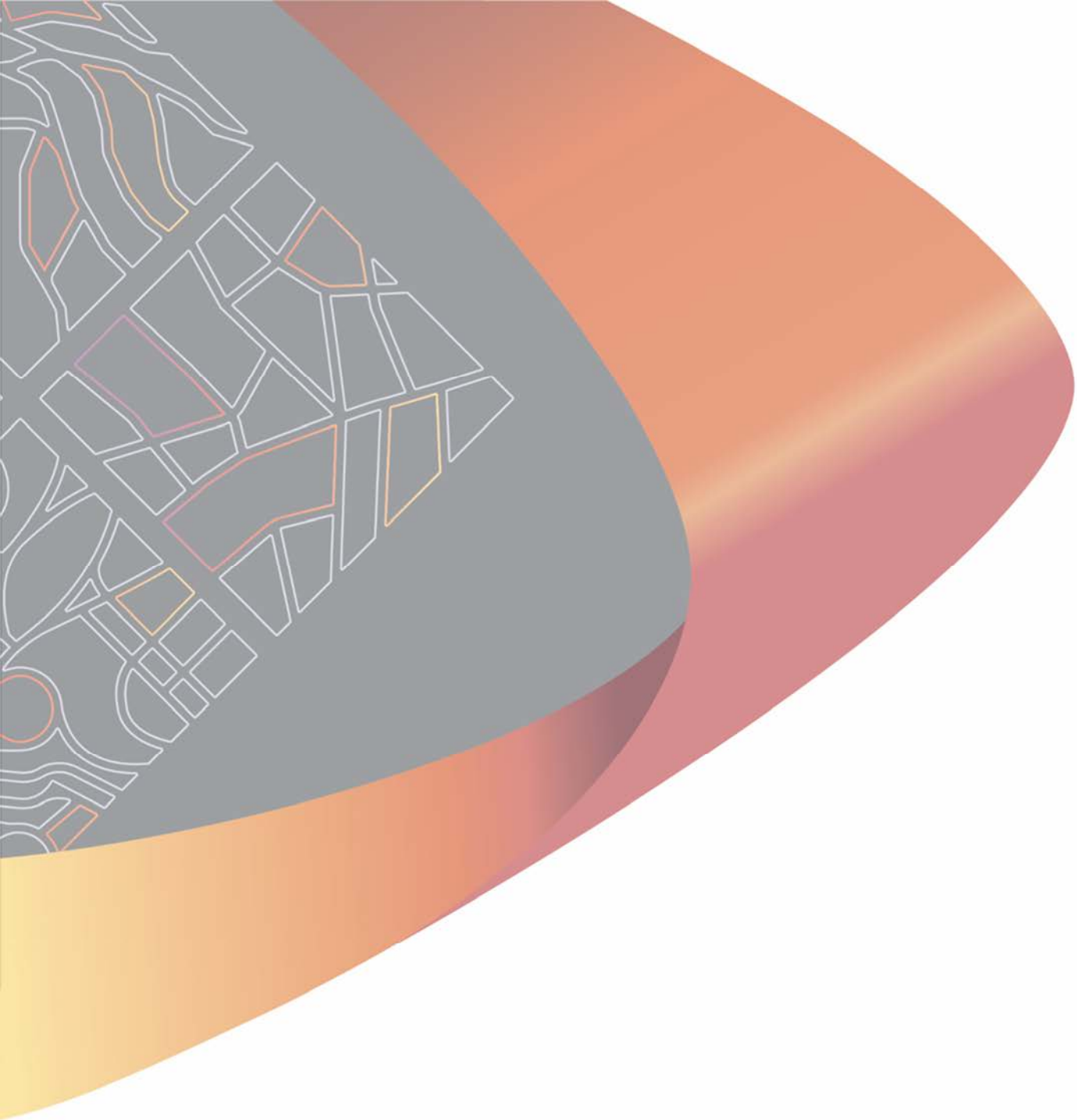
LOCATION  
**MAIN STREET, BURDELL**

SHEET TITLE  
**SEWER RETICULATION PLAN**

JOB CODE  
**P003520**

SHEET NUMBER  
**SKC007**

REV  
**1**

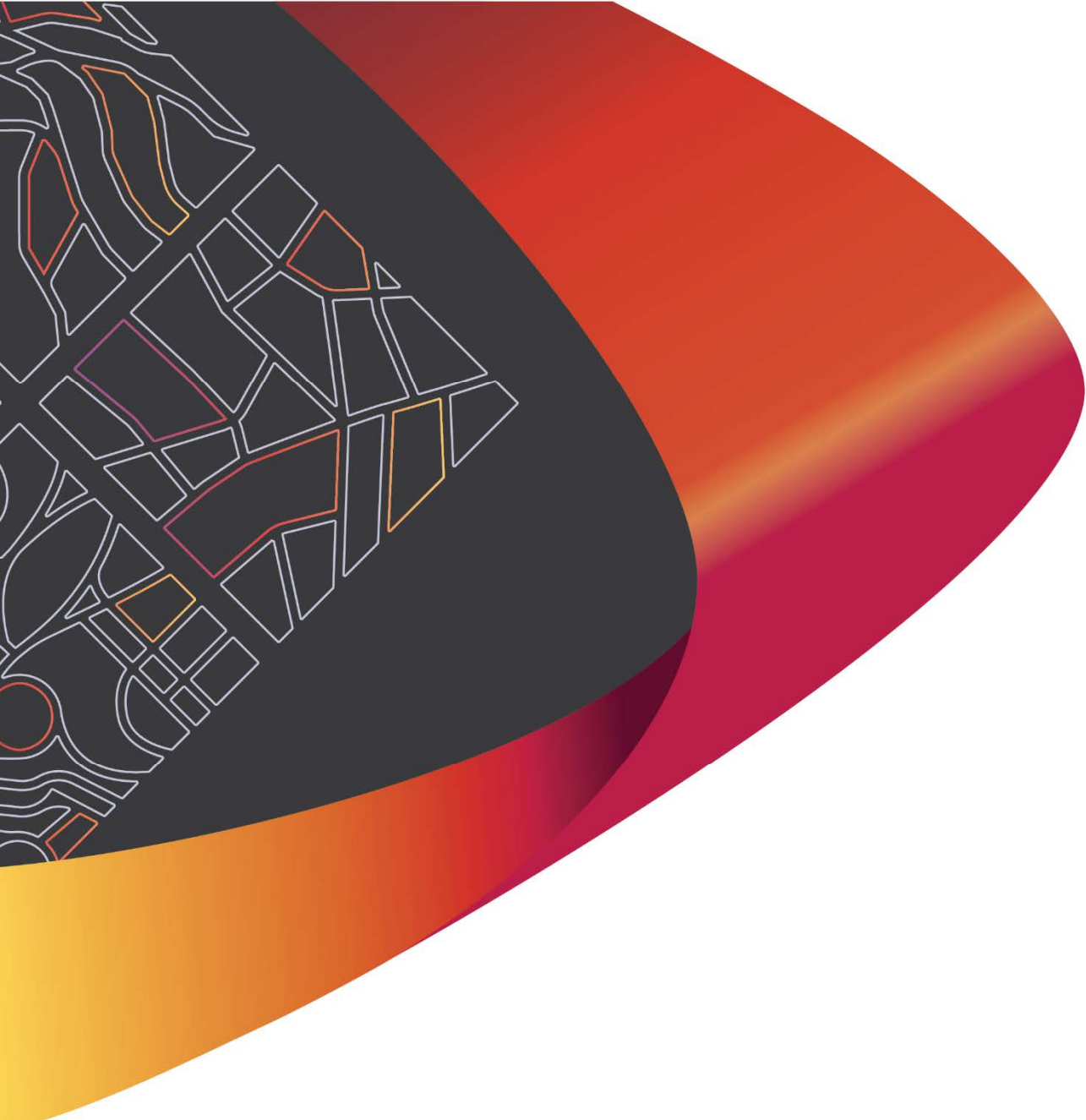


# APPENDIX G

Traffic Impact Assessment prepared by Premise

brazier motti





# **North Shore Lifestyle Community- Traffic Assessment Impact**

Ingenia Communities

P003520-R03

Revision B

19 January 2026



**Premise**

PART OF THE  
Amey GROUP

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Document Reference: P003520-R03

Document Authorisation					
Revision	Revision Date	Proposal Details			
Draft	17/10/2025	For review			
A	18/12/2025	For approval			
B	19/01/2026	Updated site layout			
Prepared by		Reviewed by		Authorised by	
Danielle Bamber	<i>D Bamber</i>	Bradley Jones	<i>Bradley Jones</i>	Bradley Jones	<i>Bradley Jones</i>

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## EXECUTIVE SUMMARY

Premise Australia Pty Ltd (Premise) has been engaged by Ingenia Communities to undertake a Traffic Impact Assessment (TIA) for the proposed North Shore Lifestyle Community located in Burdell, Queensland, in the municipality of Townsville City Council. The development has a proposed completion year of 2035.

The North Shore Lifestyle Community development comprises 303 residential dwellings supported by community facilities and purpose-built infrastructure. The community is intended to operate under Ingenia's lifestyle model, which provides housing for downsizing residents within a managed land-lease setting, incorporating shared amenities and facilities, and provision for the storage of caravans. The proposed development is modelled conservatively to have 320 residential dwellings for the purposes of this TIA.

Access to the development will be established in the Northeast corner and be provided via Main Street. Access from Main Street will be via the west leg of the existing four (4) leg single-lane roundabout, the other approaches being Main Street, Yalbira Drive and access to the Arcare Aged Care Facility. An additional access is proposed at the north-east corner of the site on Main Street between Earlando Lane and Yalbira Drive. This additional access is intended for emergency use, and for direct access to the allocated caravan parking bays.

The traffic generated by the proposed development in its opening year was assessed utilising SIDRA to determine the impact on the site access roundabout and the Main Street / Nexus Drive Roundabout. This assessment found that both roundabouts can accommodate forecast development traffic, with acceptable delays indicating a Level of Service B (LoS B), and Degree of Saturation (DoS) well below practical capacity.

Considering crashes in the study area for the last 16 years a road safety risk assessment determined a medium overall risk level. The proposed development is not expected to increase the overall risk level, and no further mitigation is required.

A road environment safety assessment found that a road safety audit was not required for Main Street. However, a road safety assessment is required and can be conducted by either an accredited road safety auditor or a Registered Professional Engineer of Queensland (RPEQ). This requirement would be satisfied by safety reports prepared in accordance with Section 295 of the Work Health and Safety Regulation 2011 as part of the design process.

# 1. INTRODUCTION

Premise Australia Pty Ltd (Premise) has been engaged by Ingenia Communities to undertake a Traffic Impact Assessment (TIA) for the proposed North Shore Lifestyle Community, Burdell, QLD, in accordance with the Department of Transport and Main Roads' (TMR's) "Guide to Traffic Impact Assessment" (GTIA) and Townsville City Plan SC6.4.5.2 Traffic Impact Assessment.

## 1.1 Background

The North Shore Lifestyle Community is a land lease community (LLC). This proposed development is located at 74 Main Street Burdell, registered as Lot 857 on SP359106, on approximately 13.3ha of undeveloped land toward the southern end of the North Shore Development. The development site is bound by Saunders Creek to the north, an undeveloped parcel of land to the west, and drainage reserves to the south and east.

The proposed development comprises 303 residential dwellings supported by community facilities and purpose-built infrastructure. The community is intended to operate under Ingenia's lifestyle model, which provides housing for downsizing residents within a managed land-lease setting, incorporating shared amenities and facilities, reduced on-site maintenance requirements, and provision for the storage of caravans.

## 1.2 Scope and Study Area

Figure 1 shows the proposed development site and the surrounding road network.

Development is proposed to be staged with completion of the final stage expected to occur in 2035. The design year of the development for the purpose of this traffic analysis will be taken as 2041.

**Figure 1 - Impact Assessment Area**



### 1.3 Level of Assessment

The level of Traffic Impact Assessment is determined in accordance with Townsville City Plan SC6.4.5.2(2). Relevant development details are:

- > Location in an urban area;
- > Generation of 64 vph during the peak hour;
- > Direct access to a street;
- > Residential development where the primary commercial vehicle generation is expected to be weekly refuse collection; and
- > Provision of more than 10 onsite car parking spaces.

**Table 1 – Townsville City Plan Table SC6.4.5.2 ‘Urban Area TIA Impact Level Assessment Criteria’**

Criteria	Impact		
	Low	Moderate	High
Trip Generation	New or additional trip generation in a peak hour of less than 20 trips directly accessing a street.	New or additional trip generation in a peak hour of 20 to 300 trips directly accessing a street.  New or additional trip generation directly accessing a sub arterial, arterial, or highway.	New or additional trip generation in a peak hour of more than 300 trips.
Commercial Vehicles	5 or less new or additional commercial vehicles per day in a residential area. Less than 10 new or additional commercial vehicles per day in a non- residential area.	More than 5 and up to 300 new or additional commercial vehicles per day in a residential area.	More than 300 new or additional commercial vehicles per day.
Car Parking	An increase or decrease of 9 or less onsite car park spaces. Loss of 2 or less line marked on-street carparks or loading zones.	An increase or decrease of 10 or more on-site car park spaces. Loss of between 3 or more line-marked on street carparks or loading zones.	
Public Transport	Relocation of any bus zone or taxi rank.	Impacts on the bus interchange or bus routes.	
Transport System	No change to existing transport network operation.	Changes to the connectivity between local streets and collector roads.	Changes to the connectivity between arterial and sub-arterial roads.

Using the criteria of the Townsville City Plan provided in Table 1, it is determined that a MODERATE level traffic impact assessment is adequate for this proposed development.

## 2. EXISTING CONDITIONS

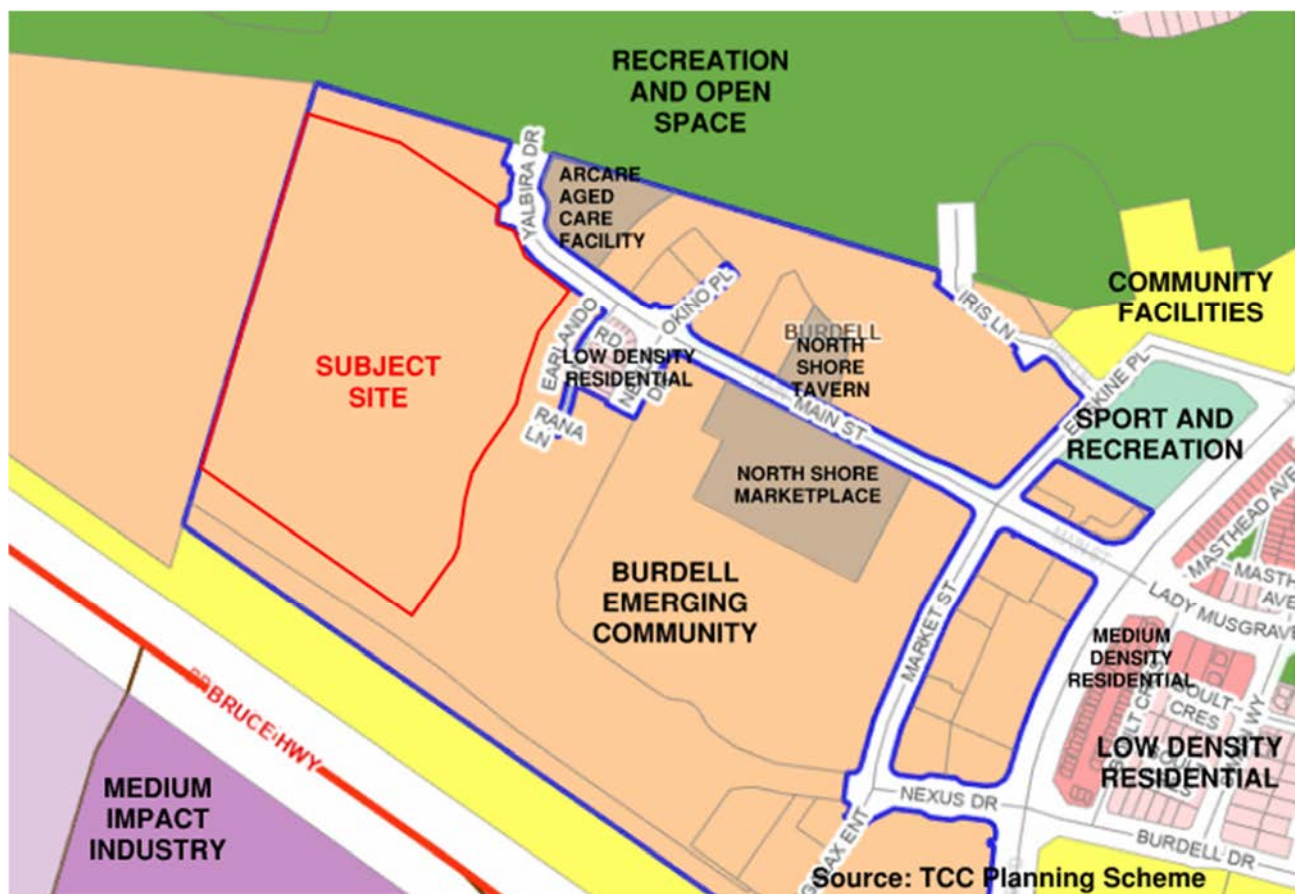
### 2.1 Land Use Zoning

The subject site forms part of a parcel of land located in the Burdell precinct of the Emerging Community Zone in the Townsville City Council Planning Scheme. The Burdell precinct is designed to create an identifiable community with a mix of housing, integrated open space, and safe, connected access throughout the area.

### 2.2 Adjacent Land Uses / Approval

As shown by Figure 2 below, the subject site is surrounded by land also zoned as emerging community. The land use to the north of the subject site is zoned as recreation and open space, and there is a small area zoned as low density residential to the east of the subject site. The nearby community facilities consist of North Shore Presbyterian Church and Townsville Grammar School North Shore Campus, with Sport and Recreation Facilities consisting of the Northern Beaches Leisure Centre and Suns AFL club. The Neighbourhood retail on Main Street is anchored by the North Shore Marketplace and the North Shore Tavern. Near to the subject site is the Arcare Aged Care facility.

Figure 2 - Surrounding Area Land Use



A Traffic Impact Assessment for the North Shore Tavern at 37 Main Street, Burdell was completed by Premise in May 2019 in response to Condition 26 of the MCU17/0067 Decision Notice responding to a request for 'a change to the approval other than a permissible change' for the Tavern.

A Technical Memorandum: Traffic Engineering Matters was prepared by Cardno (Qld) Pty Ltd to provide traffic engineering advice on the Arcare Aged Care Facility.

## 2.3 Surrounding Road Network Details

The surrounding road network is shown by Figure 1 and Figure 2.

The subject site has frontage to an existing single lane, four (4) leg roundabout under the governing authority of TCC. The roundabout features an approximately 16m diameter centre island with an 8m wide circulating roadway. The approaches are Main Street, Yalbira Drive, access to the Arcare Aged Care Facility and access to the proposed development site. The roundabout is shown in Figure 3 below.

**Figure 3 -Existing Roundabout at Proposed Site Entrance**



Main Street is an existing Minor Collector Road under the governing authority of TCC with a road reserve width of 32m. Main Street is currently a no through road running East West connecting to North Shore Boulevard in the East. At the development frontage, Main Street is a divided carriageway providing a single lane for traffic flow in each direction and features an approximate 6.5m median strip. This section of Main Street has a posted speed limit of 60km/h.

Yalbira Drive forms the northern leg of the roundabout at the subject site frontage as can be seen in Figure 3. This section of Yalbira Drive south of Saunders Creek is a no through road and does not connect to the section of Yalbira Drive north of Saunders Creek. Yalbira Drive south of Saunders Creek provides access the Sewer Pump Station BU2. Section 2.3 details the future road network planning that includes extension of Yalbira Drive.

### 2.3.1 INTERSECTIONS

The surrounding road network includes the intersections of Main Street with:

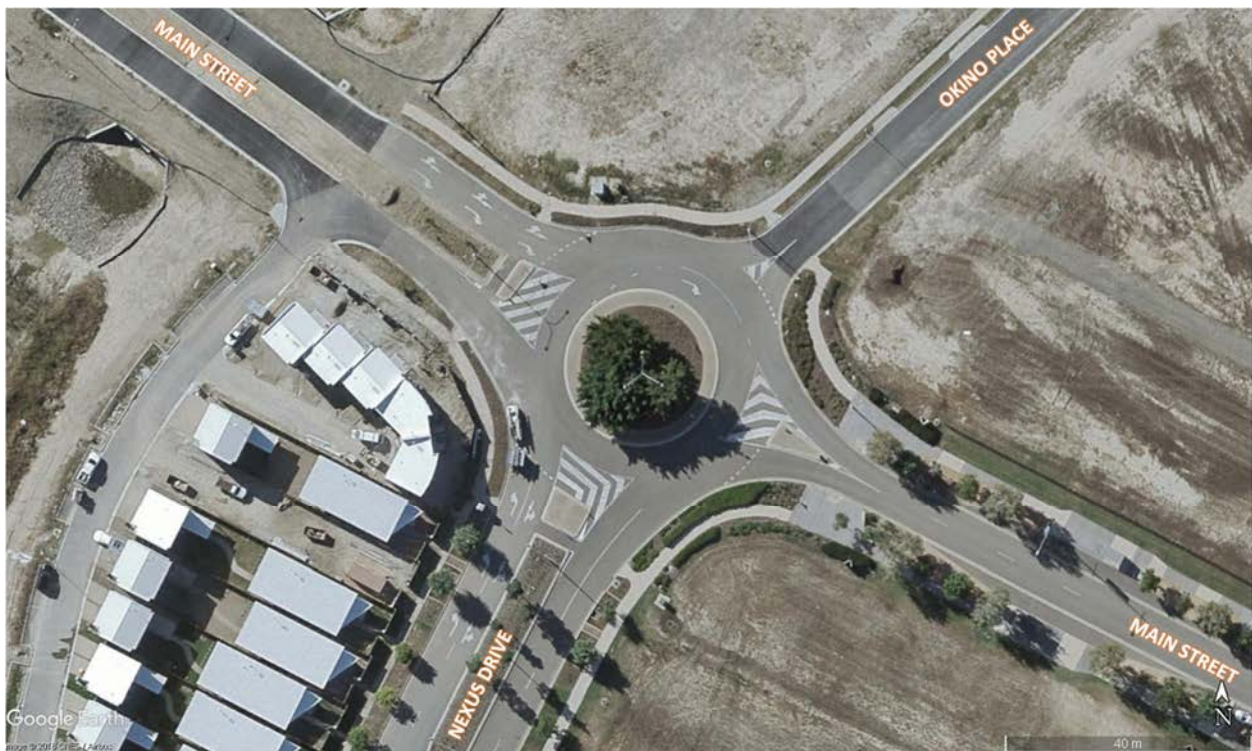
- > Nexus Drive
- > Market Street

#### 2.3.1.1 Main Street / Nexus Drive Roundabout

The Main Street / Nexus Drive intersection is a roundabout controlled crossroads on the local government road network with a central island diameter of 25m. As shown by Figure 4 the roundabout is essentially a single lane roundabout with:

- > Two (2) approach lanes on the south and west legs;
- > Two (2) departure lanes on the south leg; and
- > Two (2) circulating lanes past the north leg.

**Figure 4 - Main Street / Nexus Drive Roundabout**



2.3.1.2 Main Street / Market Street traffic signals;

The Main Street / Market Street intersection is a signalised crossroads on the local government road network as shown in Figure 5 below.

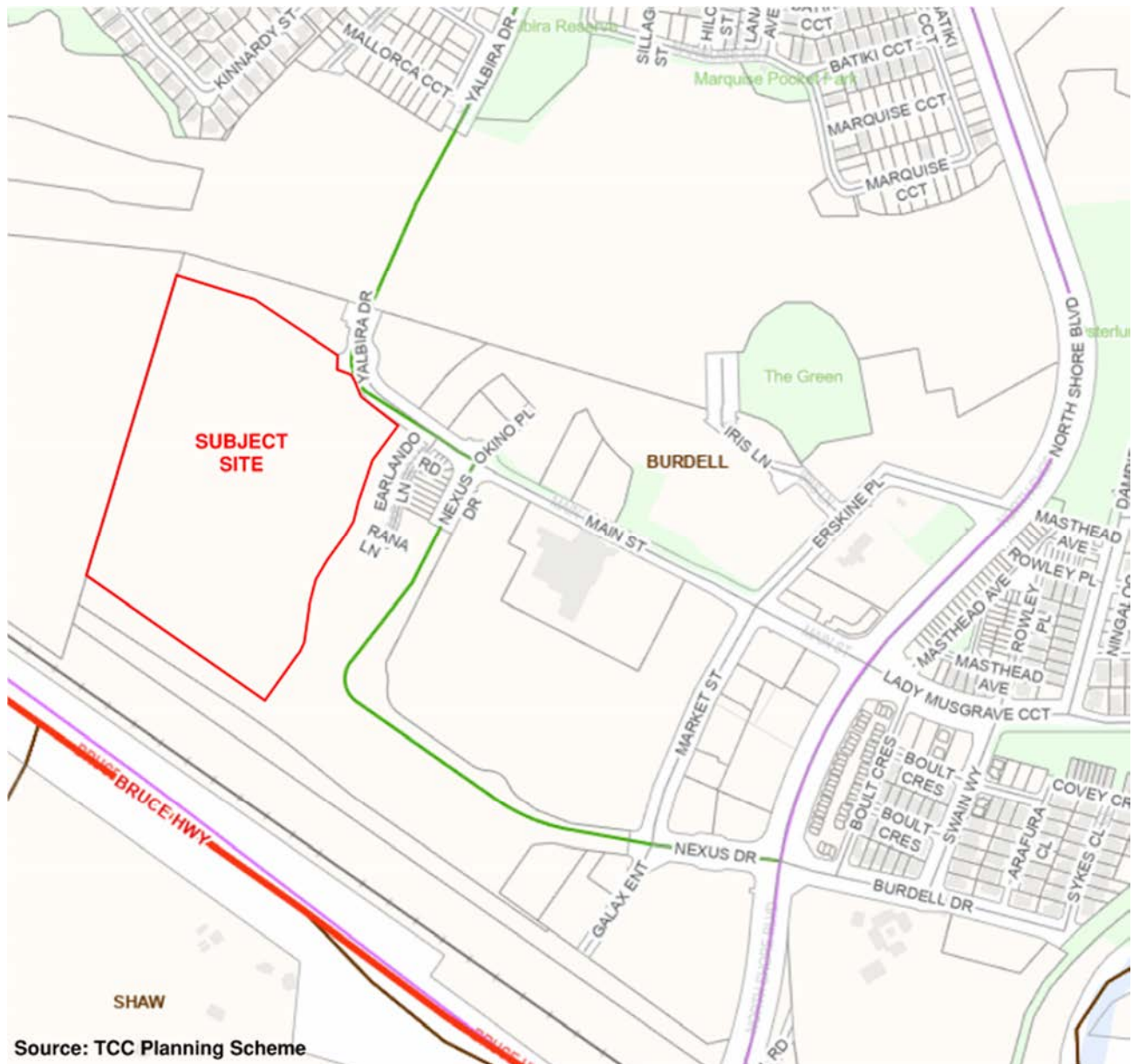
**Figure 5 - Main Street / Market Street Signalised Intersection**



### 2.3.2 FUTURE ROAD NETWORK PLANNING

The Townsville City Plan Road Hierarchy Map (future) shows that a Major Collector Road link is to be formed by the completion of Nexus Drive to the southwest of North Shore Marketplace and continuing northwest from the Main Street / Nexus Drive roundabout to Yalbira Drive, north of Saunders Creek. This is shown in Figure 6 below.

**Figure 6 - Future Road Hierarchy**



## 2.4 Road Safety Issues

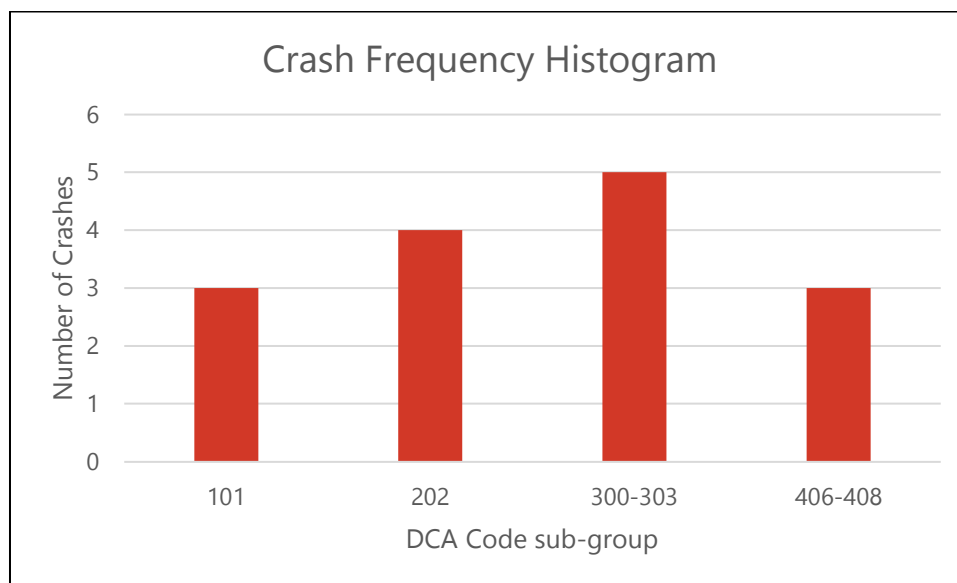
Existing road safety issues in the study area were identified through crash rate analysis. The analysis was conducted on data supplied by TMR. The analysis was undertaken for Main Street from North Shore Boulevard to Yalbira Drive and connecting streets, for the period 2009 to 2024 inclusive. The connecting streets included Market Street within 100m of Main Street, Erskine Place within 100m of Main Street, Okino Place, Nexus Drive, Earlando Lane and Yalbira Drive south of Saunders Creek. The information provided for each crash includes the crash type, location, year, number/type of vehicles involved, vehicle direction, and conditions.

There was a total of fifteen (15) crashes recorded in this study area for this period consisting of ten (10) crashes at the intersection of Main Street and North Shore Boulevard, three (3) crashes on Main Street and two (2) crashes on Erskine Place.

Analysis of crash data was conducted through use of a crash factor matrix which can be found in Appendix A. The crash factor matrix groups data according to the TMR Definitions for Coding Accidents (DCA codes) which can be found in Appendix A.

As can be seen in Figure 7 below, the most frequent type of crash occurs in the subgroup 300-303 which describes rear end collisions between vehicles travelling in the same direction.

**Figure 7 - Crash Accident Code Frequency**



Key points identifiable from the crash factor matrix are:

- > Five (5) crashes were rear end crashes, two (2) for vehicles travelling in the same direction (DCA 301), two (2) left rear (DCA 302), and one (1) right rear (DCA 303). These crashes occurred in the vicinity of intersections. The right rear collision occurred on Market Street outside of the Service Station and required hospitalisation. The other four (4) rear end collisions occurred at the intersection of North Shore Boulevard and Main Street. Two (2) resulted in minor injury and two (2) resulted in medical treatment.
- > Four (4) crashes were collisions between a right turning vehicle and vehicle traveling in the opposite direction (DCA 202). All of these crashes occurred at the intersection of North Shore Boulevard and Main Street, and all four crashes resulted in hospitalisation.
- > Three (3) crashes were between vehicles travelling from adjacent approaches (DCA 101). Two (2) of these occurred at the intersection of North Shore Boulevard and Main Street, and resulted in hospitalisation,

while the other one occurred at the intersection of Market Street and Main Street and resulted in medical treatment.

- > Two (2) crashes involving a vehicle manoeuvring from a footway (DCA 408) occurred on Market Street outside of the North Shore Marketplace and resulted in hospitalisation.
- > One (1) crash occurred outside the Market Street entrance to North Shore Marketplace as a vehicle was leaving a driveway (DCA 206). This crash resulted in hospitalisation.
- > Fourteen (14) of the fifteen (15) crashes occurred in dry weather, and
- > Approximately half of the crashes occurred in daylight hours.

## 2.5 Site Access

Access to the development will be established in the Northeast corner and be provided via Main Street. Access from Main Street will be via the west leg of the existing four (4) leg single-lane roundabout described in Section 2.3. This roundabout provides access to the nearby Arcare Aged Care North Shore facility.

## 2.6 Public Transport

The closest public transport facility is the bus stop at Main Street, adjacent to North Shore Marketplace, located approximately 400 metres (around 5 minutes' walk) east of the subject site. This stop is serviced by:

- > Route 232 Townsville Shopping Centre – Burdell.
- > Route 233 Townsville Shopping Centre – Bushland Beach via Deeragun and Jensen.

Together, these services provide connections with the Townsville Shopping Centre approximately once per hour on weekdays and on Saturdays with reduced frequency, neither service operates on Sundays. Townsville Shopping Centre is a major hub in the Townsville public transport network supporting interchange between 11 of Townsville's 16 mainland bus services.

## 2.7 Active Transport

Footpaths are provided on both sides of Main Street providing connectivity to the North Shore Town Centre. These paths extend from the proposed site entrance through to North Shore Boulevard. Formal facilities for pedestrians crossing Main Street are:

- > Incorporated into the Main Street / Market Street traffic signals;
- > A mid-block wombat crossing (pedestrian crossing (zebra) on a flat top road hump) immediately to the east of the North Shore Marketplace and North Shore Tavern; and
- > Incorporated into the Main Street / North Shore Boulevard traffic signals.

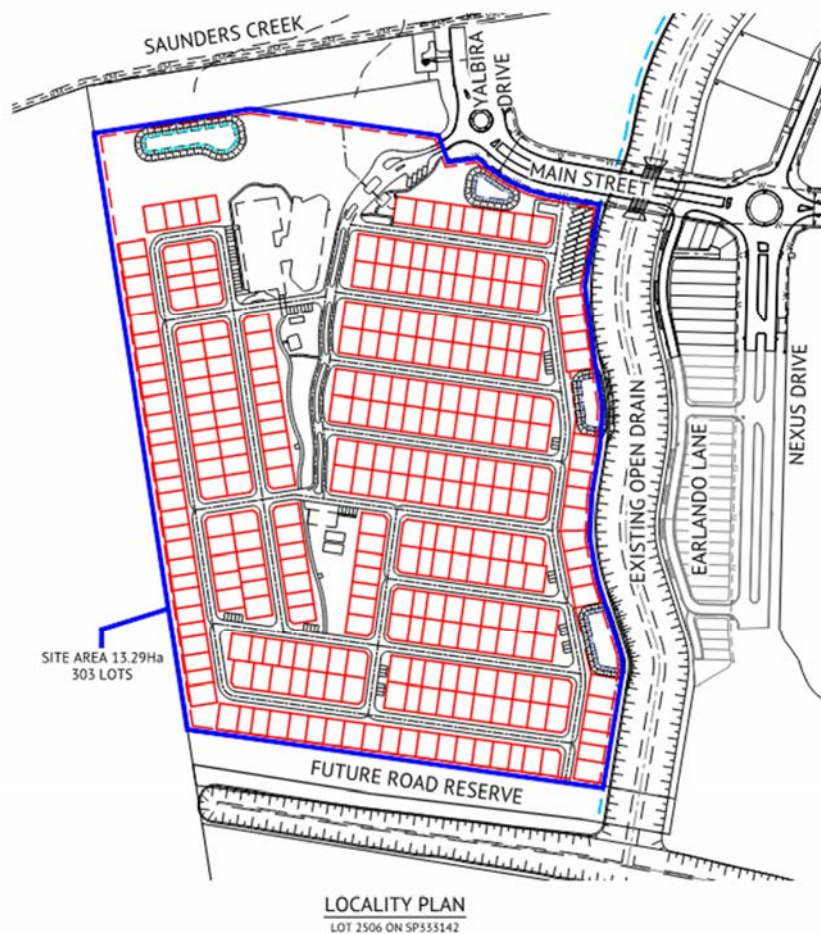
A network of shared paths provides pedestrian and cycle access from the proposed development to the nearby North Shore Tavern and from there, through to the greenspace along Saunders Creek. The shared path through Saunders Creek provides pedestrian connectivity to community facilities in the greater North Shore development, including the North Shore dog park and numerous other parks.

### 3. PROPOSED DEVELOPMENT DETAILS

#### 3.1 Development Site Plan

The proposed North Shore Lifestyle Community development contains 303 residential dwellings with lot size ranging from 173m<sup>2</sup> to 261m<sup>2</sup>, in addition to community facilities and purpose-built infrastructure to support lifestyles integrated with recreation vehicles and caravans. The client has advised that development yield may increase. The site layout is shown below in Figure 8.

Figure 8 - Site Layout



#### 3.2 Operational Details

The proposed development is expected to be completed in 2035.

#### 3.3 Proposed Access and Parking

Access to the proposed development will be established in the Northeast corner and be provided by the western leg of the existing four (4) leg roundabout. Access to the site will be controlled by a gate.

The proposed development includes 65 visitor car parks and provision for 23 caravan parking spaces. Each residential dwelling will have provision for either a single or double garage.

An additional access is proposed at the north-east corner of the site on Main Street between Earlando Lane and Yalbira Drive. This access is located 76m from Earlando Lane and is intended for emergency use, and for direct access to the allocated caravan parking bays. This additional access will be controlled by a gate and managed by the onsite management team, with appropriate signage in place directing visitors to the main entrance.

The speed limit within the development will be posted as 40km/h.

## 4. DEVELOPMENT TRAFFIC

### 4.1 Traffic Generation

In accordance with the GTIA's guidance, the following data sources have been used to determine traffic generation rates for this development. They are:

1. Traffic Generation Data 2006-2021 (Queensland) Open Data
2. Guide to Traffic Generating Developments", RTA (2002)

Traffic generation data for the proposed development was sourced from the *Traffic Generation Data 2006–2021 (Queensland) Open Data* set. The retirement village land use category was adopted as the most representative comparator, as it aligns with the intended function of the proposed LLC development. The LLC is designed to accommodate downsizing residents within a managed land-lease framework, providing shared amenities and facilities, reduced on-site maintenance requirements, and provisions for the storage and use of recreational vehicles and caravans.

In accordance with the methodology described in Appendix A1 of the GTIA, the 85<sup>th</sup> percentile traffic generation rate for retirement villages bedrooms is:

- > 0.4 vehicle trips per hour for the AM peak hour
- > 0.6 vehicle trips per hour for the PM peak hour
- > 3.4 vehicle trips per day

However, retirement village peak periods do not coincide with the peak period on the surrounding road network.

The Guide to Traffic Generating Developments, RTA (2002) indicates that housing for aged and disabled persons has an evening peak hour trip generation rate of 0.1 to 0.2 per dwelling and daily trip generation rate of 1-2 per dwelling. This document notes that rates at the lower end of the range are based on research which concentrated on subsidised development and rates at the higher end of the range are based on resident funded development. Therefore, trip generation rates at the higher end of the range have been considered appropriate for this LLC development.

This trip generation rate correlates with advice recently received from the Department of Traffic and Main Roads (TMR), which recommend adopting a traffic generation rate of 0.2vph per dwelling during commuter peak hours.

The proposed development is modelled conservatively to have 320 residential dwellings in a land lease community. Considering the data sources outline above, this TIA assumes that each dwelling generates four

(4) vehicle trips per day. Adopting a traffic generation rate of 0.2vph per dwelling during peak hours, 64 vehicle trips are produced for the AM peak hour, and 64 vehicle trips are produced for the PM peak hour for this LLC.

## 4.2 Trip Distribution

External trips generated by the LLC are expected to be attracted to the community and commercial facilities in the emerging Burdell major centre, the Townsville Principal Centre (CBD) and specialised centres such as James Cook University / Townsville University Hospital, Fulham Road medical precinct, Bayswater Road medical precinct, Townsville Airport, and Domain Central.

It is therefore assumed that all traffic generated by the LLC will be inbound / outbound to / from North Shore Boulevard via Main Street. For all traffic, the directional split is assumed to be 80:20 during commuter peak hours with the peak direction being eastbound during the morning peak and westbound during the evening peak.

## 4.3 Development Traffic Volumes on the Network

The LLC development will generate the following traffic movements:

**Figure 9 - Development AM Peak Traffic Volume**

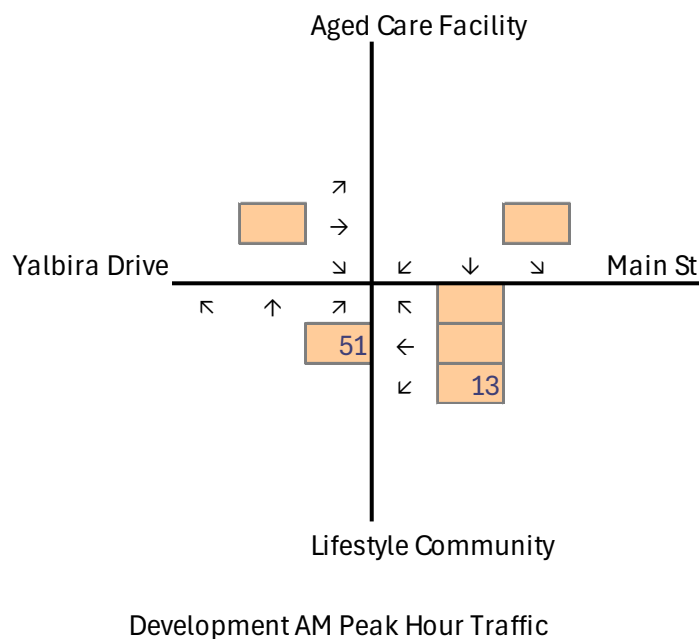
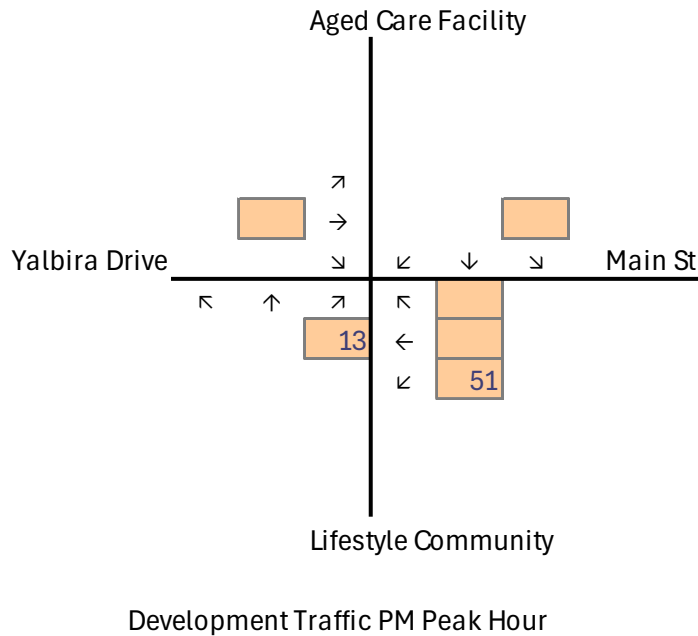


Figure 10 - Development PM Peak Traffic Volume



## 5. IMPACT ASSESSMENT AND MITIGATION

### 5.1 With and Without Development Traffic Volumes

#### 5.1.1 WITHOUT DEVELOPMENT TRAFFIC

The 'Without Development' Traffic model was determined from ultimate traffic projections contained in traffic studies for the Northshore Tavern and the Arcare Aged Care Facility (refer Section 2.2).

A Traffic Impact Assessment for the North Shore Tavern at 37 Main Street, Burdell was completed by Premise in May 2019 in response to Condition 26 of the MCU17/0067 Decision Notice responding to a request for 'a change to the approval other than a permissible change' for the Tavern. The North Shore Tavern TIA (MIS-0432-R01RevA) was used to forecast 'without development' traffic. This traffic model assumes the areas shown in Figure 11 below are fully developed in accordance with planning assumptions contained in the TCC City Plan which was current at the time the report was prepared. "With development" traffic forecasts contained in MIS-0432-R01RevA for the Main Street / Nexus Drive roundabout are adopted as "without development" traffic forecasts in this report. MIS-0432-R01RevA, being for a tavern development, forecast only evening peak hour traffic. The forecast evening peak hour traffic projections were reversed to provide a conservative estimate of morning peak hour traffic volumes.

**Figure 11 - Background Traffic Model Fully Developed Areas**



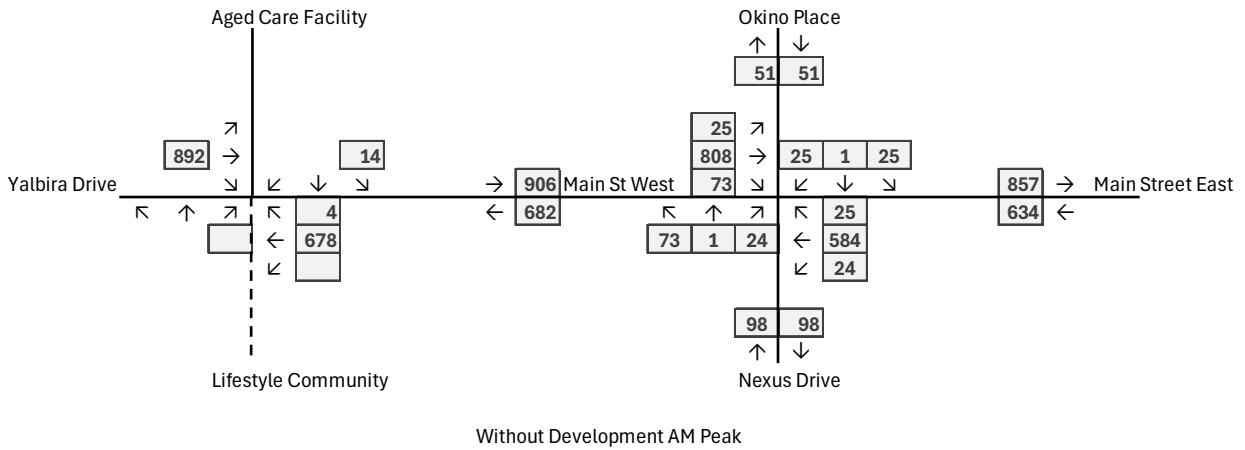
The full development traffic modelled in MIS-0432-R01RevA is significantly higher than the Townsville Aimsum Integrated Model (TAIMS) 2041 Forecast traffic volumes on Main Street between Market Street and Nexus Drive as can be seen in Table 2 below. It is therefore considered highly conservative and appropriate for use in this Traffic Impact Assessment.

**Table 2 - Main Street Traffic Model Comparison**

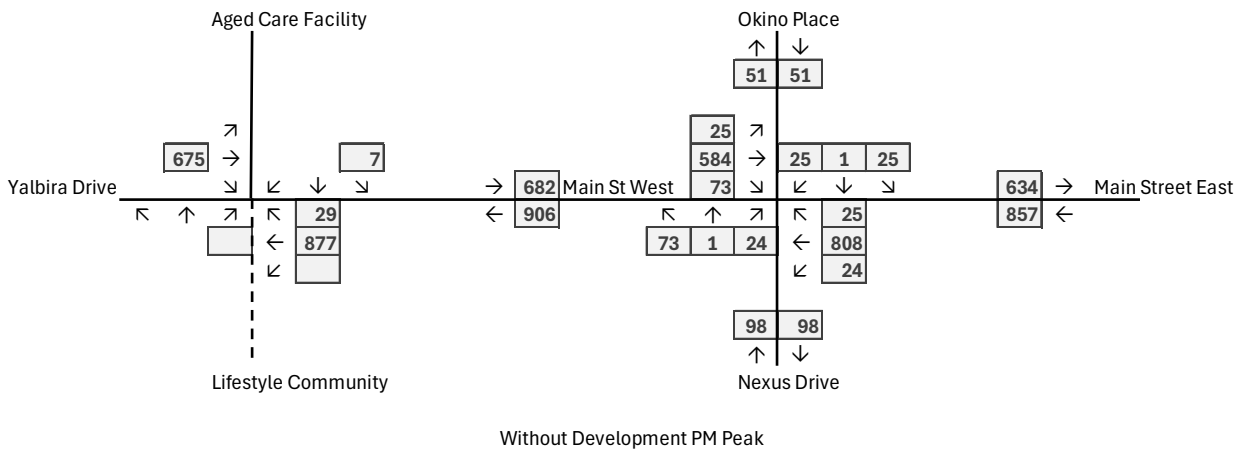
Route	Period	TAIMS 2041 forecast traffic volumes (vph)	MIS-0432-R01RevA Traffic Model for full development (vph)
<b>Main Street Eastbound</b>	AM Peak	161	906
	PM Peak	192	682
<b>Main Street Westbound</b>	AM Peak	233	682
	PM Peak	102	906

A Technical Memorandum: Traffic Engineering Matters was prepared by Cardno (Qld) Pty Ltd to provide traffic engineering advice on the Arcare Aged Care Facility. This is referred to as the Cardno Memo and was used to source 'without development' traffic generated by the Aged Care facility accessing the roundabout at the entrance to the subject site as shown in Figure 12 and Figure 13 below.

**Figure 12 - Without Development AM Peak Traffic Volume**



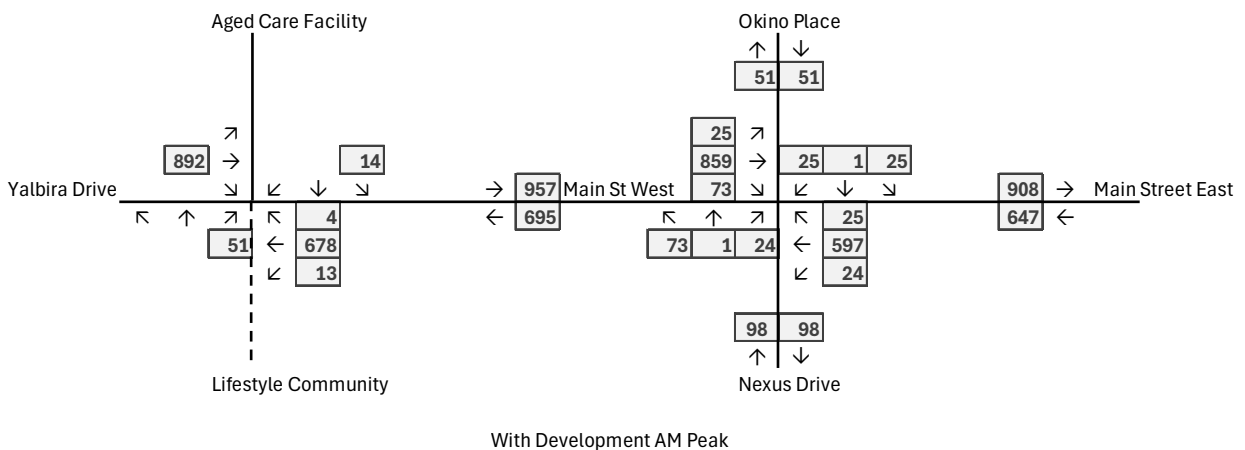
**Figure 13 - Without Development PM Peak Traffic Volumes**



5.1.2 WITH DEVELOPMENT

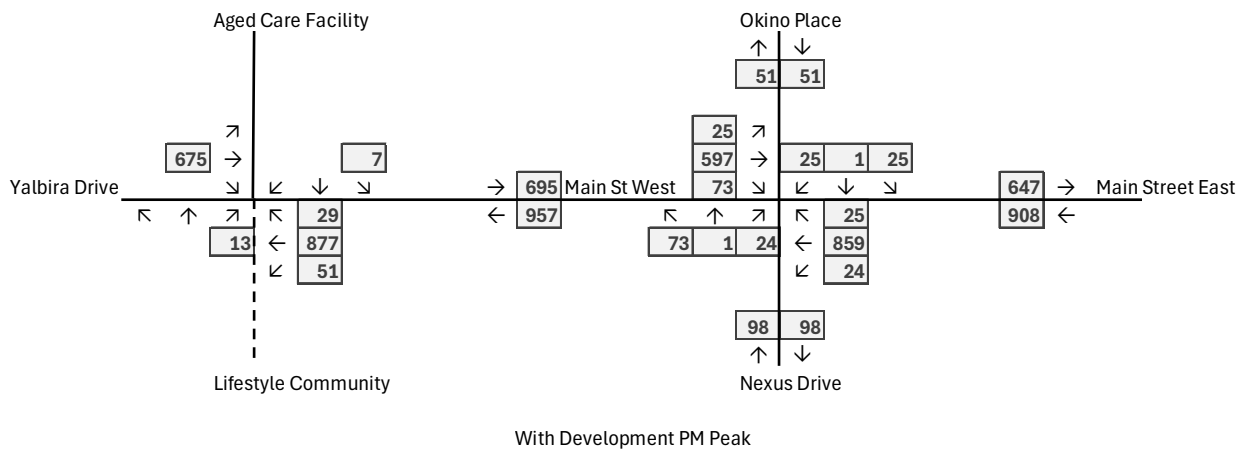
The 'with development' morning peak hour traffic is shown in Figure 14. It is the sum of the development traffic shown in Figure 9 and 'without development' traffic shown in Figure 12.

**Figure 14 - With Development AM Peak Traffic Volume**



The 'with development' afternoon peak hour traffic is shown in Figure 15. It is the sum of the development traffic shown in Figure 10 and 'without development' traffic shown in Figure 13.

**Figure 15 - With Development PM Peak Traffic Volume**



## 5.2 Road Safety Impact Assessment and Mitigation

The GTIA specifies the following two stage process for assessment of road safety impacts:

1. Road Safety Risk Assessment to determine the change in risk profile associated with existing road safety issues as a result of the development; and
2. Road Environment Safety Assessment to determine if changes to infrastructure require either a road safety audit by an accredited road safety auditor or a road safety assessment by either an RSA or a Registered Professional Engineer of Queensland (RPEQ).

### 5.2.1 ROAD SAFETY RISK ASSESSMENT

A road safety risk assessment was conducted in accordance with the risk assessment process specified by the GTIA, the risk assessment process involves the following steps for each risk item:

- > Evaluate potential consequences based on accident severity from 1, property damage only, to 5, fatality;
- > Evaluate potential likelihood from 1, rare, to 5, almost certain; and
- > Sum the potential consequence and likelihood values to determine the risk score with scores up to and including 4 considered low risk, 5 to 7 medium risk, and 8 or greater high risk, in accordance with Figure 9.3.2(a) *Safety risk score matrix* from the GTIA.

Table 3 summarises the road safety risk assessment with further detail provided in the following sections. Hazards were identified through a crash factor matrix (included as Appendix A) utilising crash data from TMR in the vicinity Main Street from North Shore Boulevard to Yalbira Drive and connecting streets including the functional area of associated intersections. Also see Section 2.4 of this TIA for a summary of the crash data.

As traffic from the proposed development is not anticipated to have a significant impact on traffic volumes on Market Street or North Shore Boulevard, only crashes that occurred on Main Street were included in the Road Safety Risk Assessment.

**Table 3 - Road Safety Risk Assessment**

Crash Location	Crash Severity					Without development			With development			Mitigation Measures	With development & mitigation		
	(1)	(2)	(3)	(4)	(5)	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Main Street		1	1	1		2	4	M	3	4	M	Not required			

5.2.1.1 Without Development Road Safety Risk Assessment

To provide an objective assessment of the potential likelihood, Premise uses the average recurrence interval/frequency criteria listed in Table 4. These criteria are more conservative than those suggested by TMR’s *Guide to Traffic Impact Assessment: Frequently Asked Questions* (December 2017) but are consistent with other TMR guidelines that three (3) fatal or serious injury (potential consequence 4) accidents in five (5) years (potential likelihood 4) is high risk and should be mitigated.

**Table 4 - Potential Likelihood Evaluation Criteria**

Potential Likelihood	Average Recurrence Interval	Accidents over 16 years
Almost Certain (5)	≤ 1 year	16 or more
Likely (4)	≤ 2 years	8 to 15
Moderate (3)	≤ 4 years	4 to 7
Unlikely (2)	≤ 8 years	2 or 3
Rare (1)	> 8 years	1

Including the crash at the Main Street / Market Street intersection there were a total of three (3) crashes (potential likelihood 2) on Main Street where the development impact may be significant with the most severe being one (1) hospitalisation crash (potential consequence 4) resulting in a medium risk score.

5.2.1.2 With Development Road Safety Risk Assessment

To provide an objective assessment of the potential likelihood increase, Premise uses the volume ratio of “with development” traffic and “without development” traffic (“with development” traffic divided by “without development” traffic) listed in Table 5.

The peak hour, peak direction volume ratio was calculated by dividing the total ‘with development’ volumes by the ‘without development’ volumes for all traffic on Main Street. The resulting volume ratio was found to be 1.06 which in accordance with Table 5, increased the likelihood rating by one (1) band. Despite increasing the potential likelihood of existing risk items by one (1) band the risk score will remain medium and no action is required to mitigate the risk.

Table 5 - Potential Likelihood Increase Criteria

Potential Likelihood Increase	Volume Ratio (R)
+4 bands	$8 < R$
+3 bands	$4 < R \leq 8$
+2 bands	$2 < R \leq 4$
+1 band	$1.05 < R \leq 2$
No increase	$R \leq 1.05$

## 5.2.2 ROAD ENVIRONMENT SAFETY ASSESSMENT

In accordance with the Section 9.3.3 of the GTIA, Main Street is assessed as having a MEDIUM road environment risk based on having a posted speed limit of 60 km/h and an AADT of more than 8,000 vpd.

The proposed development is a Planning Act Development, therefore any changes to the road environment would not require a road safety audit but should be subject to a road safety assessment. A road safety assessment may be conducted by either an accredited road safety auditor or a Registered Professional Engineer of Queensland (RPEQ). This requirement would be satisfied by safety reports prepared in accordance with Section 295 of the Work Health and Safety Regulation 2011 as part of the design process.

## 5.3 Access and Frontage Impact Assessment

### 5.3.1 INTERSECTION ANALYSES

Intersection delay impacts were assessed for the site access roundabout and the Main Street / Nexus Drive roundabout base on 'with development' traffic volumes (Figure 14 and Figure 15).

Intersection performance has been assessed using SIDRA Intersection 10 software (SIDRA). SIDRA is an advanced analytical traffic tool for the evaluation of intersection performance, including delays, queue lengths, and Level of Service. SIDRA was used to assess the impact of the development on intersection performance.

SIDRA reports intersection performance in terms of a range of parameters including:

- > **Demand Volumes (V):** The modelled number of vehicles arriving at the intersection during the assessment hour. Demand volumes are calculated by dividing the peak hour volume by the peak flow factor (PFF). SIDRA's default PFF of 95% has been adopted for the purposes of this traffic impact assessment.
- > **Degree of Saturation (DoS):** The ratio of the demand volume, V, to the theoretical capacity. A roundabout is considered to be operating at its practical capacity when the DoS reaches 0.85.
- > **Average Delay (D):** The mean control delay, including both queuing and geometric delays, for all vehicles arriving during the assessment period. This also accounts for any delay experienced after the end of the flow period until the departure of the last vehicle that arrived during that period. **Townsville City Plan Table SC6.4.5.6** specifies desirable control delays of less than 35 seconds per vehicle for roundabouts.

The **GTIA** states that where average peak-hour delays at roundabouts exceed 42 seconds, the roundabout should be upgraded for safety reasons.

- > **Level of Service (LoS):** An index of the operational performance of traffic. This provides a quantitative stratification of delay that represents quality of service, measured on an A to F scale, with LoS A representing the best operating conditions from the traveller's perspective and LoS F the worst.
- > **95th Percentile Back of Queue Length (Q):** The maximum backward extent of the queue relative to the stop line or give-way / yield line during a signal cycle or gap acceptance cycle below which 95% of all queue lengths fall. The 95th percentile back of queue length is generally accepted as the maximum queue length for design purpose.

The SIDRA models are based on traffic volumes as shown in Figure 14 and Figure 15 with the minimum volume assumed to make any movement taken as one (1) (not zero (0)). Heavy vehicles are assumed to make up 5% of all movements. SIDRA outputs are enclosed in Appendix B.

#### 5.3.1.1 Site Access Roundabout

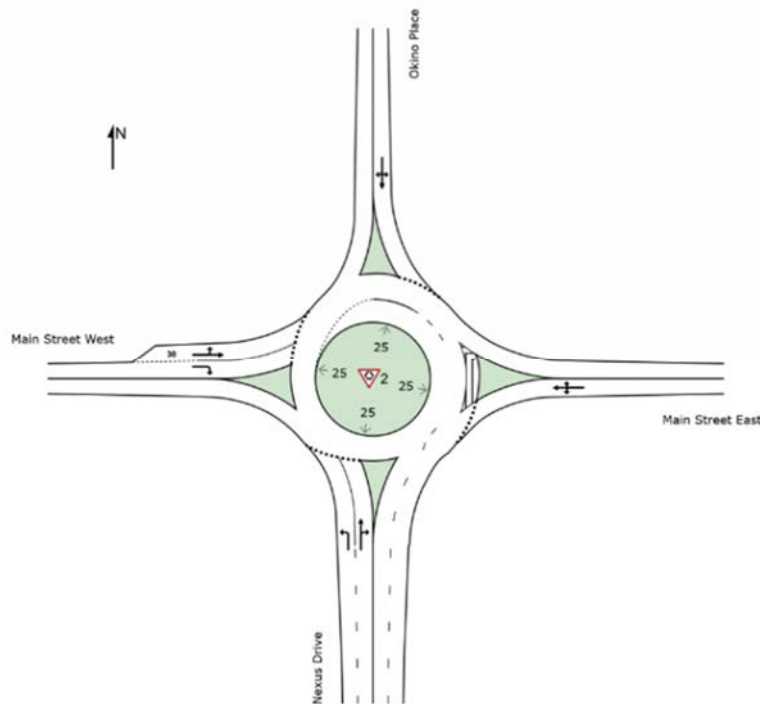
The site access roundabout has been modelled in SIDRA as a 16m diameter, four (4) approach, single lane roundabout. In accordance with Measure of Effectiveness (MOE) reporting requirements outlined in Section 6.4.5.2(4)(c) of the TCC City Plan, key findings are:

- > The maximum average delay to any movement is 12.9s for vehicles turning right from the Arcare Aged Care facility during the morning peak hour. This corresponds to a LoS B which is acceptable.
- > The access is operating well below practical capacity ( $DoS < 0.85$ ), with maximum DoS being 0.632 for vehicles entering the roundabout from Yalbira Drive during the morning peak hour, and 0.599 for vehicles entering the roundabout from Main Street during the evening peak hour.
- > 95<sup>th</sup> percentile back of queue lengths are calculated as 7.3 vehicles for vehicles entering the roundabout from Yalbira Drive during the morning peak hour and 6.7 vehicles for vehicles entering the roundabout from Main Street during the evening peak hour. Although the 95th percentile back-of-queue lengths may appear relatively long, the queues are best described as *rolling queues*, characterised by continuous vehicle movement and short individual delays (LoS A), which is typical of roundabout operation. Even queues of seven (7) vehicles on Yalbira Drive and Main Street will not adversely impact on the operation of adjacent intersections or accesses. Queues on the exits from the development and the Arcare Aged Care Facility are not expected to exceed one (1) vehicle which is ideal.

#### 5.3.1.2 Main Street / Nexus Drive Roundabout

The Main Street / Nexus Drive roundabout has a 25m diameter and primarily functions as a single-lane roundabout, incorporating two-lane approaches on the south and west legs, a two-lane departure on the south leg, and two (2) lanes on the circulating roadway adjacent to the north leg with a spiral transition as can be seen in the SIDRA layout in Figure 16 below.

Figure 16 - Main Street / Nexus Drive SIDRA layout



In accordance with Measure of Effectiveness (MOE) reporting requirements outlined in Section 6.4.5.2(4)(c) of the TCC City Plan, key findings are:

- > The maximum average delay to any movement is 16.4s for vehicles turning right from the Nexus Drive during the evening peak hour. This corresponds to LoS B which is acceptable.
- > The access is operating well below practical capacity ( $DoS < 0.85$ ), with maximum DoS being 0.562 for vehicles entering the roundabout from Main Street West during the morning peak hour, and 0.691 for vehicles entering the roundabout from Main Street East during the evening peak hour.
- > 95<sup>th</sup> percentile back of queue lengths are calculated as 5.3 vehicles for vehicles entering the roundabout from Main Street West during the morning peak hour and 7.5 vehicles for vehicles entering the roundabout from Main Street East during the evening peak hour. Although the 95th percentile back-of-queue lengths may appear relatively long, the queues are best described as *rolling queues*, characterised by continuous vehicle movement and short individual delays (LoS A for all queued vehicles except the right turn into Okino Place during the afternoon peak hour), which is typical of roundabout operation. Queued vehicles are not expected to adversely impact on the operation of any adjacent intersections or accesses.

### 5.3.2 SIGHT DISTANCES

Sight distance requirements have been assessed in accordance with Appendix A11 of the Guide to Traffic Impact Assessment (GTIA). For intersections and access driveways, the GTIA specifies that Approach Sight Distance (ASD) should be achieved to ensure adequate visibility for approaching drivers.

Based on a range of operating speeds inclusive of a shared zone environment with an intended speed limit of 10 km/h and speeds above 10km/h on Main Street posted speed limit, Table 6 below lists ASD requirements determined in accordance with the equation provided in Section 3.2.1 of Austroads Guide to Road Design Part 4A: Intersections and Crossings – General (AGRD4A-2021):

**Table 6 - Approach Sight Distance**

Operating Speed (km/h)	ASD (m)
10	5
20	13
30	22
40	34
50	47
60	63
70	81

The main site access is an existing roundabout which has additional sight distances as outlined in the Austroads Guide to Road Design Part 4B: Roundabouts (AGRD4B–2025). The existing roundabout geometry and layout is assumed to comply with the relevant design standards, including Minimum Gap Sight Distance (MGSD) criteria outlined in the AGRD4B–2025. Consequently, this assessment is limited to verifying the provision of ASD between the roundabout and the entry / exit gate. The assessment confirms that the required ASD is achieved for a speed of 40km/h, and therefore the main site access satisfies the relevant sight distance requirements.

An additional site access intended for direct access to the allocated caravan parking bays is proposed at the north-eastern corner of the site, providing connection to Main Street, which has a posted speed limit of 60 km/h. The access is situated 76 metres from Earlando Drive. In accordance with Table 6, available ASD for this location exceeds minimum requirements for the posted speed limit.

Provision of sight distances consistent with the operating speed should be considered at all stages in the design process for site accesses and the internal transport network.

## 6. CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Summary of Impacts and Mitigation Measures

This section summarises the key findings of the traffic impact assessment and outlines the expected impacts of the proposed development on the surrounding transport network.

The North Shore Lifestyle Community development comprises 303 residential dwellings supported by community facilities and purpose-built infrastructure. The community is intended to operate under Ingenia's lifestyle model, which provides housing for downsizing residents within a managed land-lease setting, incorporating shared amenities and facilities, and provision for the storage of caravans. The proposed development is modelled conservatively to have 320 residential dwellings for the purposes of this TIA.

The existing roundabouts on Main Street, including the roundabout at the proposed site entrance and the Main Street / Nexus Drive roundabout can accommodate forecast development traffic, with acceptable delays and queues allowing for conservative forecasts of ultimate traffic.

A road safety risk assessment was undertaken using 16 years of crash data to establish the existing safety profile. The proposed development is not expected to increase the overall risk above its current medium risk level, resulting in no adverse road safety impact and no further mitigation is required.

A road environment safety assessment found that a road safety audit was not required for Main Street. However, a road safety assessment is required and can be conducted by either an accredited road safety auditor or a Registered Professional Engineer of Queensland (RPEQ). This requirement would be satisfied by

safety reports prepared in accordance with Section 295 of the Work Health and Safety Regulation 2011 as part of the design process.



# **APPENDIX A**

## **CRASH FACTOR MATRIX**

Crash Factor Matrix

TMR Definitions for Coding Accidents (DCA)





Figure B 3: Department of Transport and Main Roads Queensland

**DEFINITIONS FOR CODING ACCIDENTS**

NOTE:- 1 = Key vehicle direction, ie; The direction in which the key vehicle was travelling as it approached the crash location.

	00	10	20	30	40	50	60	70	80	90
	PEDESTRIAN on foot or in toy/pram	INTERSECTION vehicles from adjacent approaches	VEHICLES from opposing directions	VEHICLES from one direction	MANOEUVRING	OVERTAKING	ON PATH	OFF PATH ON STRAIGHT	OFF PATH ON CURVE	PASSENGERS & MISCELLANEOUS
	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER
	000	100	200	300	400	500	600	700	800	900
1	NEAR SIDE 001	THRU - THRU 101	HEAD - ON 201	VEHICLES IN THE SAME LANE REAR END 301	LEAVING PARKING 401	HEAD - ON 501	PARKED 601	OFF CARRIAGEWAY TO LEFT 701	OFF CARRIAGEWAY RIGHT BEND 801	FELL IN/ FROM VEHICLE 901
2	EMERGING 002	RIGHT - THRU 102	THRU - RIGHT 202	LEFT REAR 302	PARKING 402	OUT OF CONTROL 502	DOUBLE PARKED 602	OFF CARRIAGEWAY TO RIGHT 702	OFF CARRIAGEWAY LEFT BEND 802	
3	FAR SIDE 003	LEFT - THRU 103	RIGHT - LEFT 203	RIGHT REAR 303	PARKING VEHICLES ONLY 403	PULLING OUT 503		LEFT OFF CARRIAGEWAY INTO OBJECT 703	OFF RIGHT BEND INTO OBJECT 803	HIT TRAIN 903
4	PLAYING, WORKING, LYING, STANDING ON CARRIAGEWAY 004	THRU - RIGHT 104	RIGHT 204	U TURN 304	REVERSING IN TRAFFIC 404	CUTTING IN 504	CAR DOOR 604	RIGHT OFF CARRIAGEWAY INTO OBJECT 704	OFF LEFT BEND INTO OBJECT 804	HIT RAILWAY X-ING FURNITURE 904
5	WALKING WITH TRAFFIC 005	RIGHT - RIGHT 105	THRU - LEFT 205	VEHICLES IN PARALLEL LANES LANE SIDE SWIPE 305	REVERSING INTO FIXED OBJECT 405	PULLING OUT REAR END 505	HIT PERMANENT OBSTRUCTION 605	OUT OF CONTROL ON CARRIAGEWAY 705	OUT OF CONTROL ON CARRIAGEWAY 805	HIT ANIMAL OFF CARRIAGEWAY 905
6	FACING TRAFFIC 006	LEFT - RIGHT 106	LEFT - LEFT 206	LANE CHANGE RIGHT 306	LEAVING DRIVEWAY 406	OVERTAKING RIGHT TURN 506	HIT TEMPORARY ROADWORK 606	LEFT TURN 706	LEFT TURN 806	PARKED VEHICLE RAN AWAY 906
7	DRIVEWAY 007	THRU - LEFT 107	U TURN 207	LANE CHANGE LEFT 307	FROM LOADING BAY 407		HIT TEMPORARY OBJECT ON CARRIAGEWAY 607	RIGHT TURN 707	RIGHT TURN 807	VEHICLE MOVEMENTS NOT KNOWN 907
8	ON FOOTWAY 008	RIGHT - LEFT 108		RIGHT TURN SIDE SWIPE 308	FROM FOOTWAY 408		ACCIDENT OR BROKEN DOWN 608	MOUNTS TRAFFIC ISLAND 708	MOUNTS TRAFFIC ISLAND 808	
9	STRUCK WHILE BOARDING OR ALIGHTING 009	LEFT - LEFT 109		LEFT TURN SIDE SWIPE 309			ANIMAL 609			
0				PULLING OUT 310			LOAD HITS VEHICLE 610			



# **APPENDIX B**

## **SIDRA OUTPUT**

# SITE LAYOUT

 Site: [1] Site Access Roundabout (Folder1)

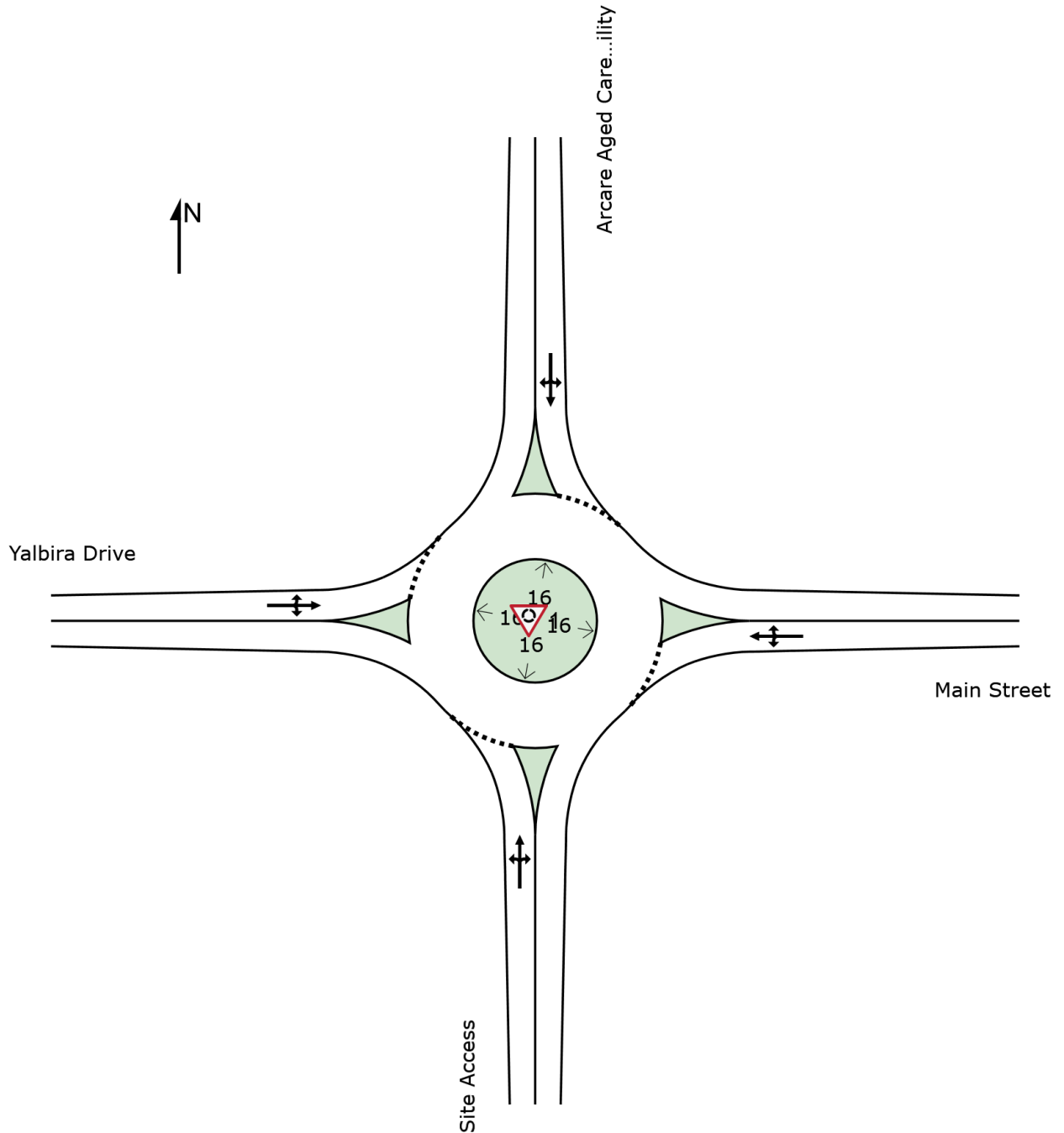
New Site

Site Category: (None)

Roundabout

Site Scenario: 1P | PM peak hour

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Organisation: PREMISE GROUP SERVICES PTY LTD | Licence: NETWORK / 1PC | Created: Tuesday, 7 October 2025 11:00:13 AM

Project: C:\Users\danielle.bamber\OneDrive - Premise\Desktop\P003520 R03 SIDRA.sipx

# MOVEMENT SUMMARY

 Site: [1] Site Access Roundabout (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

New Site

Site Category: (None)

Roundabout

Site Scenario: 1A | AM peak hour

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles	Aver. Speed
			[ Total HV ]	[ Total HV ]	[ Total HV ]	[ Total HV ]	v/c	sec		[ Veh. ]	[ Dist ]		Rate to Depart		km/h
			veh/h	%	veh/h	%				veh	m				
South: Site Access															
10	L2	All MCs	1	0.0	1	0.0	0.070	5.8	LOSA	0.4	2.7	0.65	0.74	0.65	44.6
11	T1	All MCs	1	0.0	1	0.0	0.070	6.4	LOSA	0.4	2.7	0.65	0.74	0.65	14.4
12	R2	All MCs	54	0.0	54	0.0	0.070	9.9	LOSA	0.4	2.7	0.65	0.74	0.65	32.3
Approach			56	0.0	56	0.0	0.070	9.7	LOSA	0.4	2.7	0.65	0.74	0.65	32.4
East: Main Street															
1	L2	All MCs	14	0.0	14	0.0	0.425	4.1	LOSA	3.7	25.7	0.05	0.42	0.05	42.1
2	T1	All MCs	714	0.0	714	0.0	0.425	4.4	LOSA	3.7	25.7	0.05	0.42	0.05	52.4
3	R2	All MCs	4	0.0	4	0.0	0.425	8.5	LOSA	3.7	25.7	0.05	0.42	0.05	41.3
Approach			732	0.0	732	0.0	0.425	4.4	LOSA	3.7	25.7	0.05	0.42	0.05	52.3
North: Arcare Aged Care Facility															
4	L2	All MCs	15	0.0	15	0.0	0.031	8.9	LOSA	0.2	1.4	0.82	0.71	0.82	32.0
5	T1	All MCs	1	0.0	1	0.0	0.031	9.5	LOSA	0.2	1.4	0.82	0.71	0.82	15.0
6	R2	All MCs	1	0.0	1	0.0	0.031	12.9	LOS B	0.2	1.4	0.82	0.71	0.82	44.0
Approach			17	0.0	17	0.0	0.031	9.2	LOSA	0.2	1.4	0.82	0.71	0.82	32.7
West: Yalbira Drive															
7	L2	All MCs	1	0.0	1	0.0	0.632	4.6	LOSA	7.3	51.0	0.39	0.42	0.39	42.6
8	T1	All MCs	939	0.0	939	0.0	0.632	4.9	LOSA	7.3	51.0	0.39	0.42	0.39	50.4
9	R2	All MCs	1	0.0	1	0.0	0.632	9.0	LOSA	7.3	51.0	0.39	0.42	0.39	48.3
Approach			941	0.0	941	0.0	0.632	4.9	LOSA	7.3	51.0	0.39	0.42	0.39	50.4
All Vehicles			1745	0.0	1745	0.0	0.632	4.9	LOSA	7.3	51.0	0.26	0.43	0.26	50.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Organisation: PREMISE GROUP SERVICES PTY LTD | Licence: NETWORK / 1PC | Processed: Tuesday, 7 October 2025 11:03:10 AM

Project: C:\Users\danielle.bamber\OneDrive - Premise\Desktop\P003520 R03 SIDRA.sipx

# MOVEMENT SUMMARY

 Site: [1] Site Access Roundabout (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

New Site

Site Category: (None)

Roundabout

Site Scenario: 1P | PM peak hour

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Rate	Number of Cycles to Depart	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. ]	[ Dist ]				km/h
			veh/h		veh/h					veh	m				
South: Site Access															
10	L2	All MCs	1	5.0	1	5.0	0.026	8.9	LOS A	0.2	1.1	0.76	0.74	0.76	41.9
11	T1	All MCs	1	5.0	1	5.0	0.026	9.5	LOS A	0.2	1.1	0.76	0.74	0.76	12.5
12	R2	All MCs	14	5.0	14	5.0	0.026	13.0	LOS B	0.2	1.1	0.76	0.74	0.76	28.6
Approach			16	5.0	16	5.0	0.026	12.5	LOS B	0.2	1.1	0.76	0.74	0.76	29.2
East: Main Street															
1	L2	All MCs	54	5.0	54	5.0	0.599	4.2	LOS A	6.7	48.8	0.07	0.43	0.07	41.7
2	T1	All MCs	923	5.0	923	5.0	0.599	4.4	LOS A	6.7	48.8	0.07	0.43	0.07	52.0
3	R2	All MCs	31	5.0	31	5.0	0.599	8.6	LOS A	6.7	48.8	0.07	0.43	0.07	40.9
Approach			1007	5.0	1007	5.0	0.599	4.5	LOS A	6.7	48.8	0.07	0.43	0.07	51.7
North: Arcare Aged Care Facility															
4	L2	All MCs	7	5.0	7	5.0	0.013	5.9	LOS A	0.1	0.5	0.68	0.61	0.68	35.5
5	T1	All MCs	1	5.0	1	5.0	0.013	6.5	LOS A	0.1	0.5	0.68	0.61	0.68	19.4
6	R2	All MCs	1	5.0	1	5.0	0.013	10.0	LOS A	0.1	0.5	0.68	0.61	0.68	46.6
Approach			9	5.0	9	5.0	0.013	6.4	LOS A	0.1	0.5	0.68	0.61	0.68	36.9
West: Yalbira Drive															
7	L2	All MCs	1	5.0	1	5.0	0.483	4.5	LOS A	3.9	28.7	0.25	0.41	0.25	43.3
8	T1	All MCs	711	5.0	711	5.0	0.483	4.7	LOS A	3.9	28.7	0.25	0.41	0.25	50.8
9	R2	All MCs	1	5.0	1	5.0	0.483	8.9	LOS A	3.9	28.7	0.25	0.41	0.25	49.2
Approach			713	5.0	713	5.0	0.483	4.7	LOS A	3.9	28.7	0.25	0.41	0.25	50.8
All Vehicles			1745	5.0	1745	5.0	0.599	4.7	LOS A	6.7	48.8	0.15	0.42	0.15	51.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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# SITE LAYOUT

Site: [2] Main Street / Nexus Drive (Folder1)

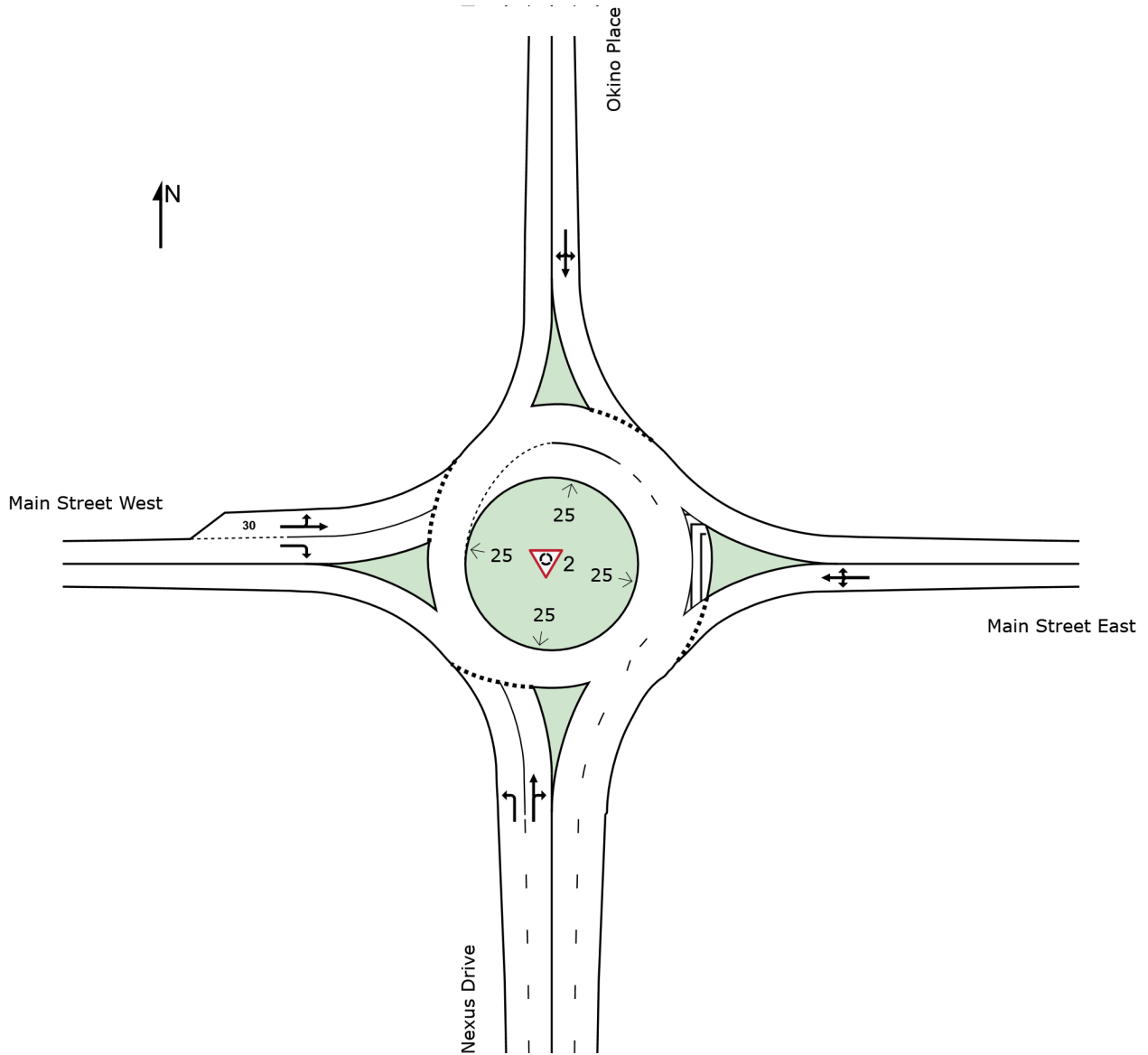
Main Street / Nexus Drive Roundabout

Site Category: (None)

Roundabout

Site Scenario: 2P | PM Peak Hour

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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# MOVEMENT SUMMARY

Site: [2] Main Street / Nexus Drive (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Main Street / Nexus Drive Roundabout

Site Category: (None)

Roundabout

Site Scenario: 2A | AM Peak Hour

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[ Total HV ]	[ Total HV ]	[ Total HV ]	[ Total HV ]	v/c	sec		[ Veh. ]	[ Dist ]				km/h
			veh/h	%	veh/h	%				veh	m				
South: Nexus Drive															
1	L2	All MCs	77	5.0	77	5.0	0.078	6.8	LOS A	0.5	3.7	0.69	0.63	0.69	49.6
2	T1	All MCs	1	5.0	1	5.0	0.038	7.6	LOS A	0.2	1.5	0.68	0.72	0.68	44.6
3	R2	All MCs	25	5.0	25	5.0	0.038	13.1	LOS B	0.2	1.5	0.68	0.72	0.68	47.2
Approach			103	5.0	103	5.0	0.078	8.3	LOS A	0.5	3.7	0.69	0.65	0.69	48.8
East: Main Street East															
4	L2	All MCs	25	5.0	25	5.0	0.501	4.4	LOS A	3.9	28.8	0.39	0.42	0.39	52.7
5	T1	All MCs	628	5.0	628	5.0	0.501	4.2	LOS A	3.9	28.8	0.39	0.42	0.39	49.9
6	R2	All MCs	26	5.0	26	5.0	0.501	9.8	LOS A	3.9	28.8	0.39	0.42	0.39	35.4
Approach			680	5.0	680	5.0	0.501	4.4	LOS A	3.9	28.8	0.39	0.42	0.39	49.3
North: Okino Place															
7	L2	All MCs	26	5.0	26	5.0	0.088	9.0	LOS A	0.4	3.0	0.68	0.78	0.68	42.5
8	T1	All MCs	1	5.0	1	5.0	0.088	9.1	LOS A	0.4	3.0	0.68	0.78	0.68	45.4
9	R2	All MCs	26	5.0	26	5.0	0.088	14.1	LOS B	0.4	3.0	0.68	0.78	0.68	35.1
Approach			54	5.0	54	5.0	0.088	11.5	LOS B	0.4	3.0	0.68	0.78	0.68	39.5
West: Main Street West															
10	L2	All MCs	26	5.0	26	5.0	0.562	4.2	LOS A	5.3	38.8	0.29	0.38	0.29	43.4
11	T1	All MCs	904	5.0	904	5.0	0.562	4.3	LOS A	5.3	38.8	0.29	0.38	0.29	50.2
12	R2	All MCs	77	5.0	77	5.0	0.073	9.3	LOS A	0.4	2.7	0.20	0.60	0.20	46.9
Approach			1007	5.0	1007	5.0	0.562	4.7	LOS A	5.3	38.8	0.28	0.40	0.28	49.8
All Vehicles			1844	5.0	1844	5.0	0.562	5.0	LOS A	5.3	38.8	0.36	0.43	0.36	49.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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# MOVEMENT SUMMARY

 Site: [2] Main Street / Nexus Drive (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Main Street / Nexus Drive Roundabout

Site Category: (None)

Roundabout

Site Scenario: 2P | PM Peak Hour

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[ Total HV ]	[ Total HV ]	[ Total HV ]	[ Total HV ]	v/c	sec		[ Veh. ]	[ Dist ]				km/h
			veh/h	%	veh/h	%				veh	m				
South: Nexus Drive															
1	L2	All MCs	77	5.0	77	5.0	0.108	9.6	LOS A	0.8	6.0	0.89	0.72	0.89	47.0
2	T1	All MCs	1	5.0	1	5.0	0.052	10.9	LOS B	0.3	2.5	0.85	0.79	0.85	42.1
3	R2	All MCs	25	5.0	25	5.0	0.052	16.4	LOS B	0.3	2.5	0.85	0.79	0.85	45.1
Approach			103	5.0	103	5.0	0.108	11.3	LOS B	0.8	6.0	0.88	0.74	0.88	46.3
East: Main Street East															
4	L2	All MCs	25	5.0	25	5.0	0.691	4.8	LOS A	7.5	54.5	0.52	0.44	0.52	52.1
5	T1	All MCs	904	5.0	904	5.0	0.691	4.6	LOS A	7.5	54.5	0.52	0.44	0.52	49.0
6	R2	All MCs	26	5.0	26	5.0	0.691	10.1	LOS B	7.5	54.5	0.52	0.44	0.52	34.9
Approach			956	5.0	956	5.0	0.691	4.7	LOS A	7.5	54.5	0.52	0.44	0.52	48.7
North: Okino Place															
7	L2	All MCs	26	5.0	26	5.0	0.072	7.0	LOS A	0.3	2.2	0.57	0.72	0.57	44.5
8	T1	All MCs	1	5.0	1	5.0	0.072	7.0	LOS A	0.3	2.2	0.57	0.72	0.57	47.2
9	R2	All MCs	26	5.0	26	5.0	0.072	12.1	LOS B	0.3	2.2	0.57	0.72	0.57	37.3
Approach			54	5.0	54	5.0	0.072	9.5	LOS A	0.3	2.2	0.57	0.72	0.57	41.6
West: Main Street West															
10	L2	All MCs	26	5.0	26	5.0	0.400	4.2	LOS A	3.1	22.5	0.24	0.38	0.24	43.9
11	T1	All MCs	628	5.0	628	5.0	0.400	4.2	LOS A	3.1	22.5	0.24	0.38	0.24	50.6
12	R2	All MCs	77	5.0	77	5.0	0.073	9.3	LOS A	0.4	2.7	0.21	0.60	0.21	46.8
Approach			732	5.0	732	5.0	0.400	4.7	LOS A	3.1	22.5	0.24	0.40	0.24	49.9
All Vehicles			1844	5.0	1844	5.0	0.691	5.2	LOS A	7.5	54.5	0.43	0.45	0.43	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

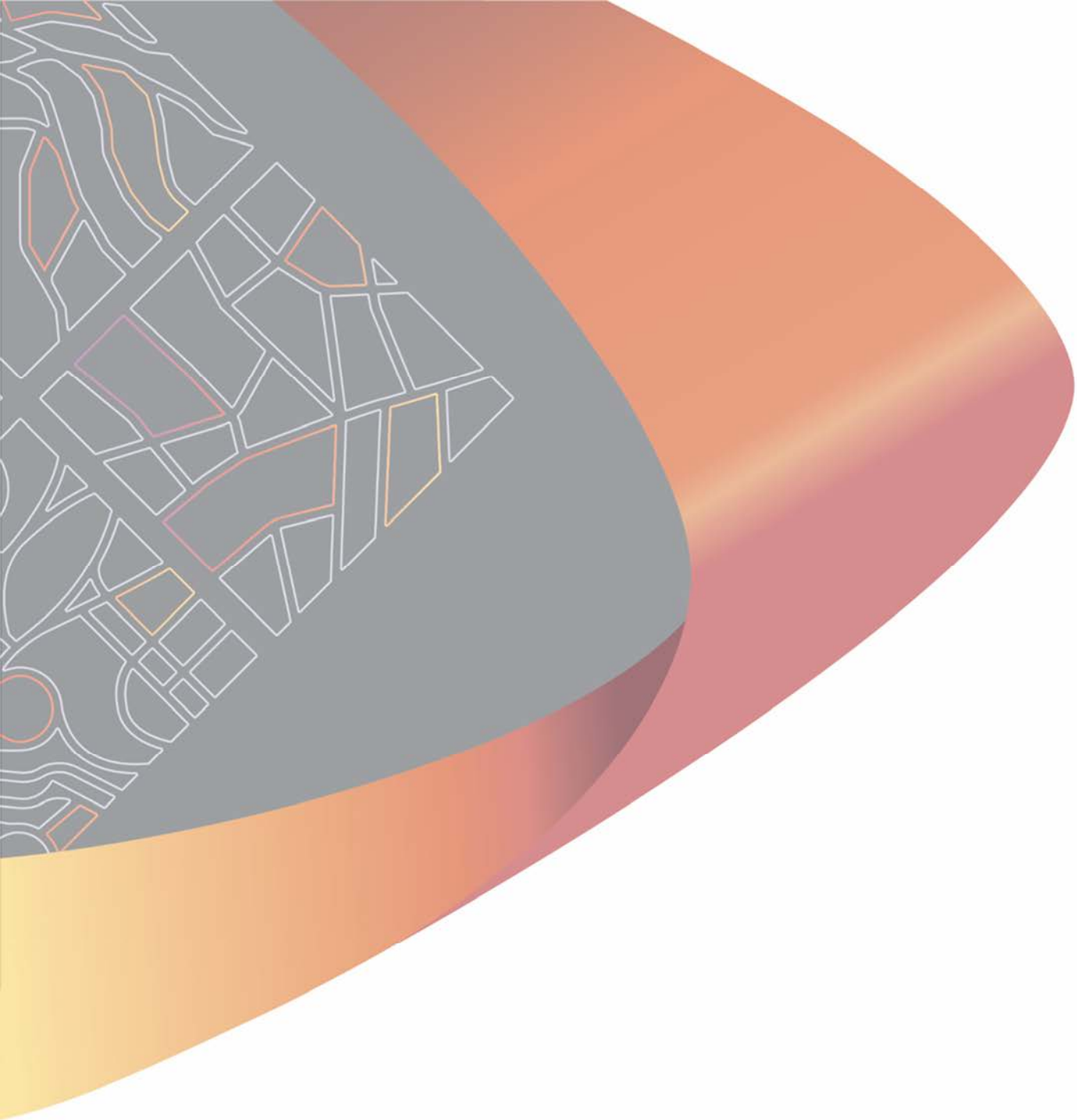
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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# APPENDIX H

Statement of Landscape Intent prepared by RPS

brazier motti



INGENIA COMMUNITIES

# NORTH SHORE LLC

LANDSCAPE  
CONCEPT

REVISION	[R1]	DATE	20/01/2026	PREPARED BY	RJ	APPROVED BY	ST
----------	------	------	------------	-------------	----	-------------	----

**Prepared for:**

Ingenia Communities

**Site Location:**

74 Main Street, Burdell, QLD

**Prepared by:**

RPS Australia East

1 Innovation Pkwy  
Birtinya  
QLD 4575 Australia

Telephone: +61 7 5436 7888

ABN: 44 140 292 762

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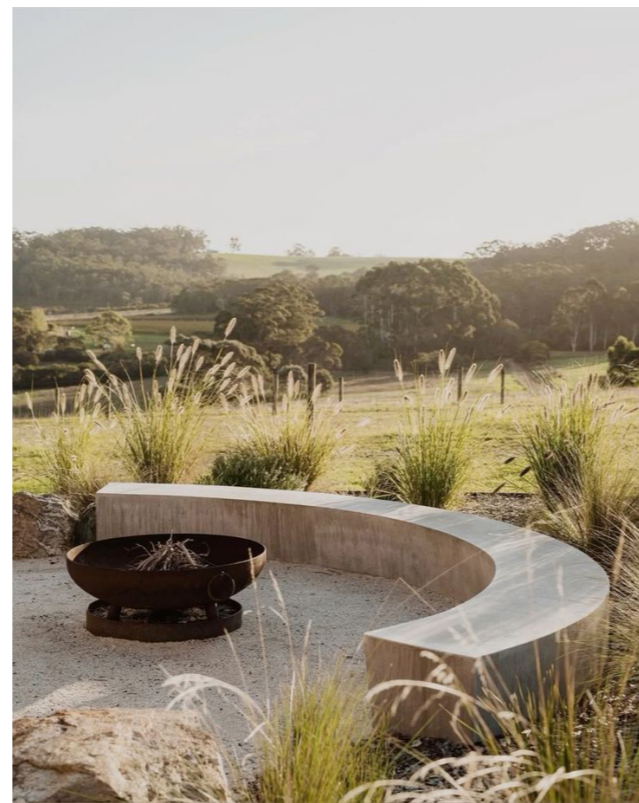
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# 1.1 LOCATION & CONTEXT



# 1.2 LANDSCAPE CHARACTER

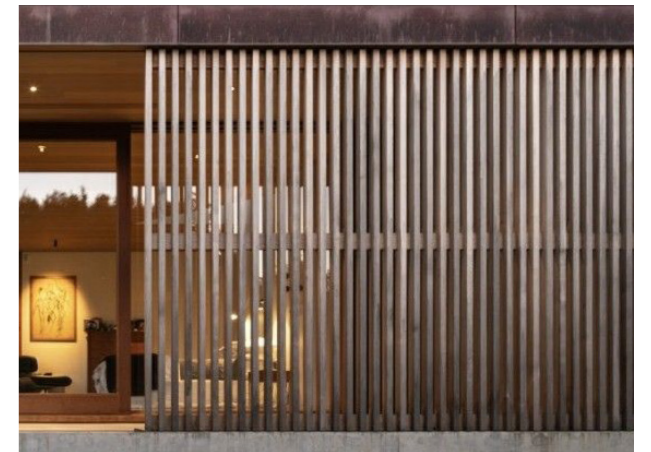


# 1.3 ENTRY & STRUCTURES

ENTRY



PAVILION



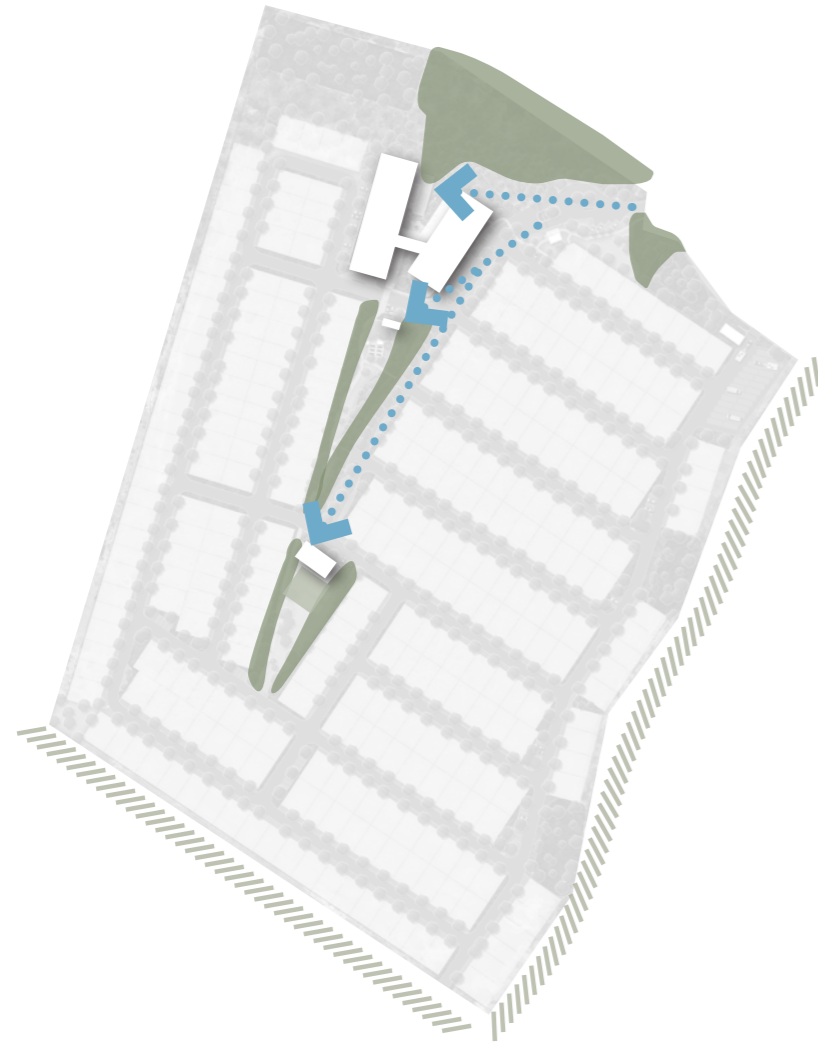
# 1.4 CIRCULATION DIAGRAM



## LEGEND

- · — · — Property Boundary
- Main pedestrian and vehicle entry/exit
- Caravan entry/exit
- Entry road with planted median
- Landscape spine/pedestrian path
- Pedestrian link
- 6m wide private shared road
- Potential seating / picnic node
- Swale
- Basins (refer to civil engineering package)

# 1.5 SITE STRATEGY DIAGRAMS

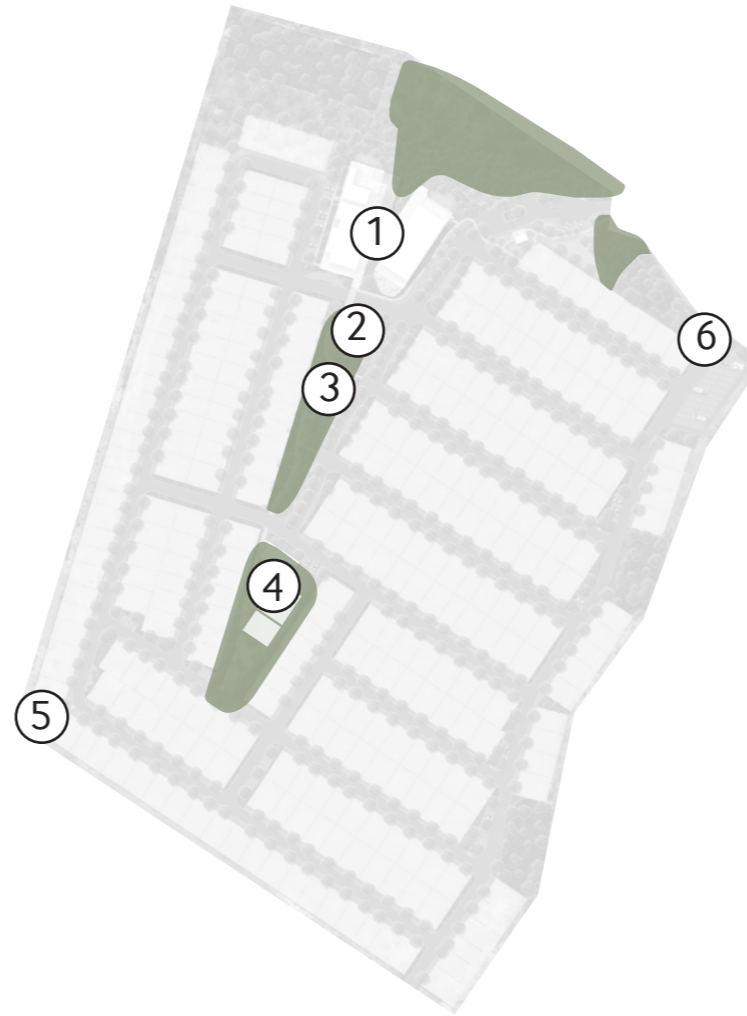


KEY SIGHTLINES & VEGETATION

-  Key sightline
-  Priority vegetation (Saunders Creek inspired)
-  Vegetation buffer

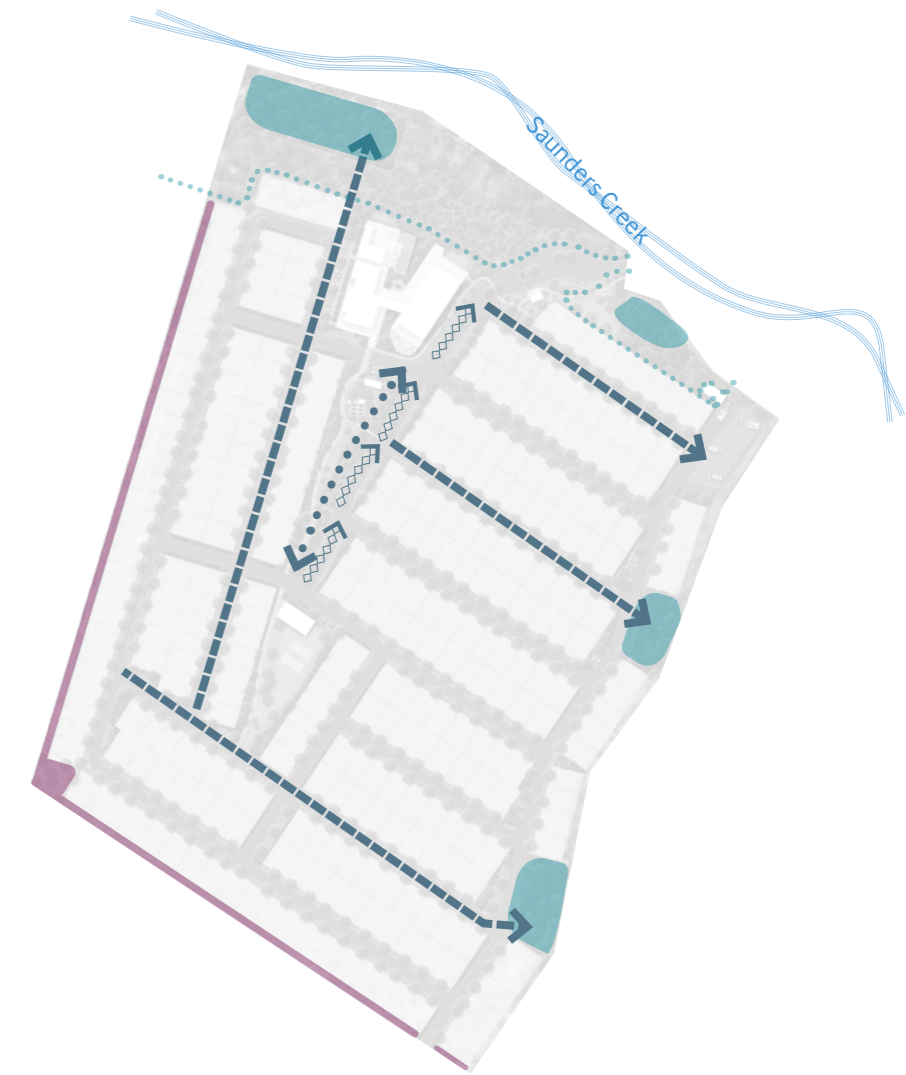
Key Considerations:

- Maintain sightline from road/entry to pool and clubhouse.
- Maintain sightline from gate to feature arbour pavilions in green spine.
- Create/maintain vegetation buffer in the North of the site, inspired by Saunders Creek. Buffer to residents and active central spine.
- Bring vegetation into the site, clubhouse and green spine.









ACTIVATION & PROGRAMMING

1. Clubhouse
2. Picnic shelter pavilion
3. Community gardens
4. Sports & BBQ pavilion and courts
5. Dog park
6. Workshop, car wash, ops maintenance



WATER STORY

-  Overland flow
-  Green spine natural rock lined swale
-  Passive irrigation in median
-  Bio detention
-  Stormwater drainage
-  Q100 flood level

# 1.6 MASTER PLAN



## LEGEND

- ① Entry
- ② Potential sales office
- ③ Clubhouse & pool
- ④ Pavilion
- ⑤ Community garden
- ⑥ Sports precinct
- ⑦ Dog park
- ⑧ Workshop/maintenance shed
- ⑨ Bio detention
- ⑩ Natural rock lined swale
- ⑪ Potential seating opportunity

# 1.7 ENTRY DETAILED PLAN



Location Map

## LEGEND

- ① Primary pedestrian and vehicle entry
- ② Vehicle access: residents
- ③ Vehicle access: visitors
- ④ Vehicle entry/exit gates
- ⑤ Visitor car parks
- ⑥ Pedestrian entry
- ⑦ Gate house with letterboxes
- ⑧ Potential sales office
- ⑨ Proposed pedestrian path
- ⑩ Planted median
- ⑪ Turf
- ⑫ Fence