PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL
Approval no: DEV2024/1553
Date: 20 December 2024

Stormwater Management Plan

LOT 600 SP321692 and LOT 50 SP305312
FIRST AVENUE
MAROOCHYDORE CITY CENTRE

Walker Corporation

September 2024

Rev C

Projex Partners Pty Ltd
Level 3
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Maroochydore Qld 4558

Our ref: 571-002

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DOCUMENT ISSUE RECORD

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B	27/08/2024	Client comments included	WB	KAP	DAB
C	17/09/2024	Catchment A6 details and Cardno Memo added	DAB	KAP	DAB

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CERTIFICATION

Report Title	Stormwater Management Plan LOT 600 SP321692, LOT 50 SP305312 FIRST AVENUE / SOUTH SEA ISLANDER WAY MAROOCHYDORE CITY CENTRE	
Affected Properties	LOT 600 SP321692, LOT 50 SP305312	
Street Address	First Avenue, Maroochydore QLD 4558	
RP Description	LOT 600 SP321692, LOT 50 SP305312	
Prepared For	Walker Corporation	
Date	17/09/2024	
Revision No.	C	
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Qualifications	Managing Director / Principal Engineer BE (Civil) | CPEng | RPEQ 06343 | FIEAust | NER 1391840 | APEC	
Company	Projex Partners Pty Ltd	
Phone No.	0400 604 556	
Industry Accreditation	RPEQ No. 06343	
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1 INTRODUCTION

1.1 Background Information

Projex Partners have been engaged to develop a Stormwater Management Plan (SMP) for submission to Economic Development Queensland (EDQ) as part of a Material Change of Use (MCU) application for the proposed multi-use development to be located on Lot 600 and Lot 50 First Avenue, Maroochydore (Lot 600 SP321692 and Lot 50 SP305312).

The proposed development will involve the construction of two multi-storey towers, supported on a common podium recreation area over three parking levels, ground floor retail and carparking.

1.2 Scope of SMP

The objective of this SMP is to address how the proposed development will satisfy SCC Planning Scheme policies for stormwater quality. The SMP will document how the proposed development will satisfy the State Planning Policy (SPP) stormwater quality objectives. The SMP will document the pre and post development peak flow rates and document the proposed treatment trains to ensure compliance with SPP water quality targets.

1.3 Referenced Documentation

- Queensland Urban Drainage Manual (QUDM) 2017
- State Planning Policy 2017 (SPP)
- Sunshine Coast Council Flooding and Stormwater Management Guidelines, September 2020
- Sunshine Coast Council Planning Scheme Policy – Development Works.

2 PRE-DEVELOPMENT CONDITIONS

2.1 Location of Site

The development site is located at lot 600 SP321692 and lot 50 SP305312 on First Avenue and South Sea Islander Way, Maroochydore. The site location is shown below in Figure 2-1.

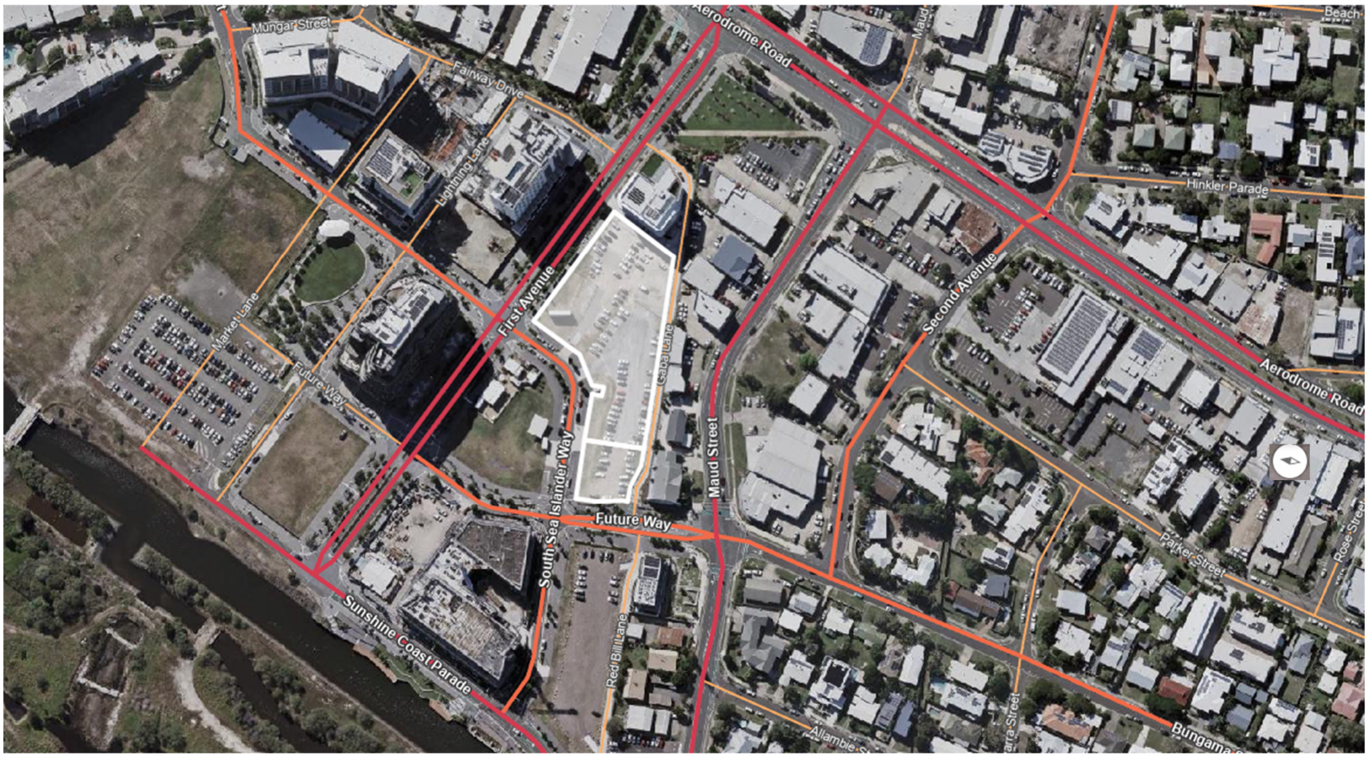


Figure 2-1: Site Locality (QLD Globe, 2024)

2.2 Existing Site Characteristics

The proposed development site is bordered by a sewerage easement and the A1 Maroochydore office development on the northern boundary, First Avenue and South Sea Islander Way on the western boundary, Future Way on the southern boundary, and Gaba Lane on the eastern boundary.

The current site is undeveloped and primarily composed of pervious surfaces. Most of the area is covered with gravel providing private parking for workers, surrounded by grassed slopes leading to the parking lot. Two concrete driveways provide access to the site, with the southern entrance connecting to approximately 85m^2 of sealed pavement.

The northern section of the property is currently used for construction materials and machinery storage, as shown in Figure 2-2. This storage area is currently fenced.

Figure 2-2: Northern Extent Conditions (Projex Partners Site Inspection, 2024)

2.3 Existing Drainage Infrastructure

The feature and services survey conducted by Project Urban on 28 June 2021 (***Appendix A***) identified five field inlets located on the grassed slope next to the concrete footpath along the western boundary of the property. These inlets are connected to the road network by 375mm or 450mm reinforced concrete pipes (RCP).

Lot 50 is drained via a field inlet within the site that discharges to the South Sea Islander Way network.

2.4 Lawful Point of Discharge

2.4.1 Existing Discharge Regime

The existing site catchments have been identified and illustrated in Figure 2-3, enabling the assessment of the current discharge regimes.

The details are as follows:

- Sheet flow in Catchment A and B runs as overland flow into the surrounding road drainage network for First Avenue and South Sea Islander Way.
- Stormwater runoff from Catchment C is collected through a field inlet and discharged via a 450mm RCP into the South Sea Islander Way drainage network.

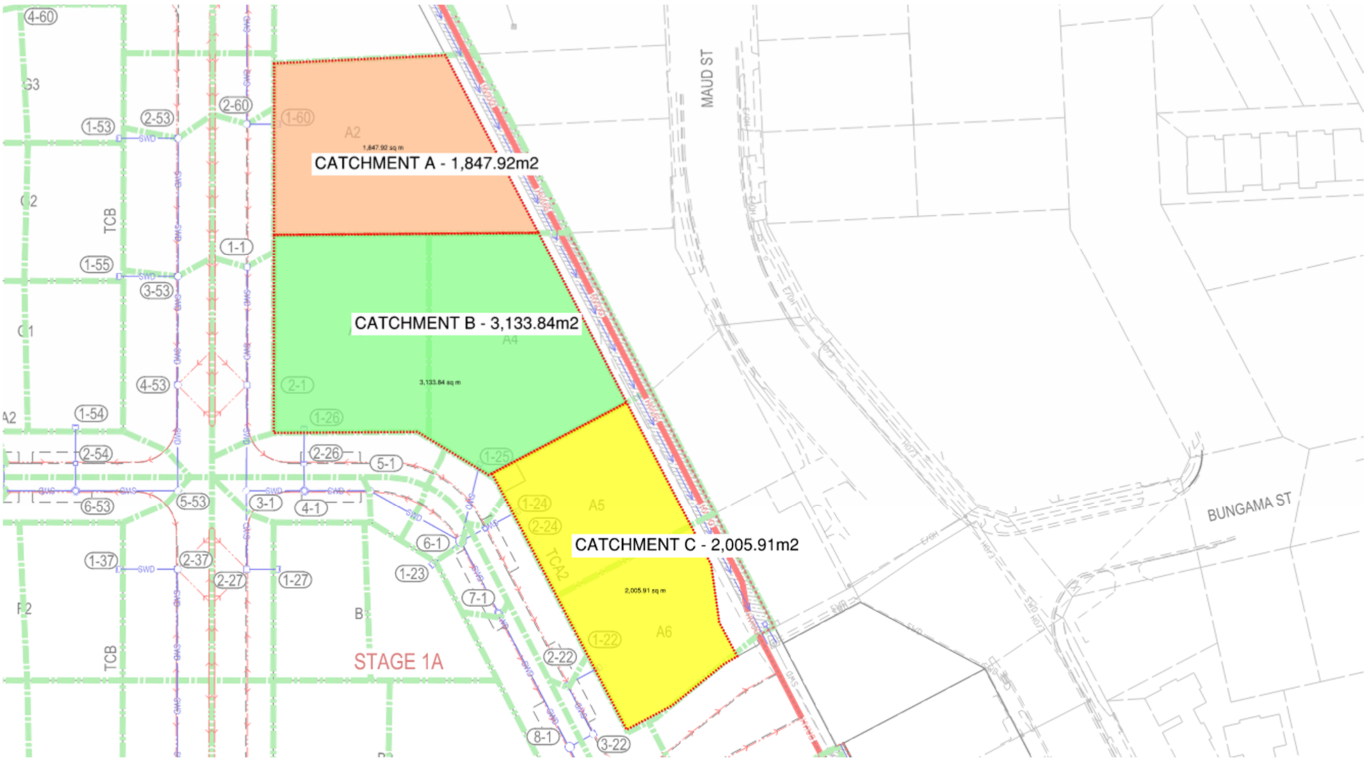


Figure 2-3: Existing Catchment Area Delineation

The existing discharge regime is shown in Figure 2-4 below.

Figure 2-4: Existing Discharge Regime

2.4.2 Proposed Lawful Point of Discharge

The proposed lawful points of discharge (LPD) for the development site are as detailed below in Figure 2-5. These points connect to the existing First Ave/South Sea Islander Way underground stormwater network. Site runoff flows up to the 1% AEP event will be captured in the proposed site drainage system and discharge to the existing Lawful Points of Discharge.

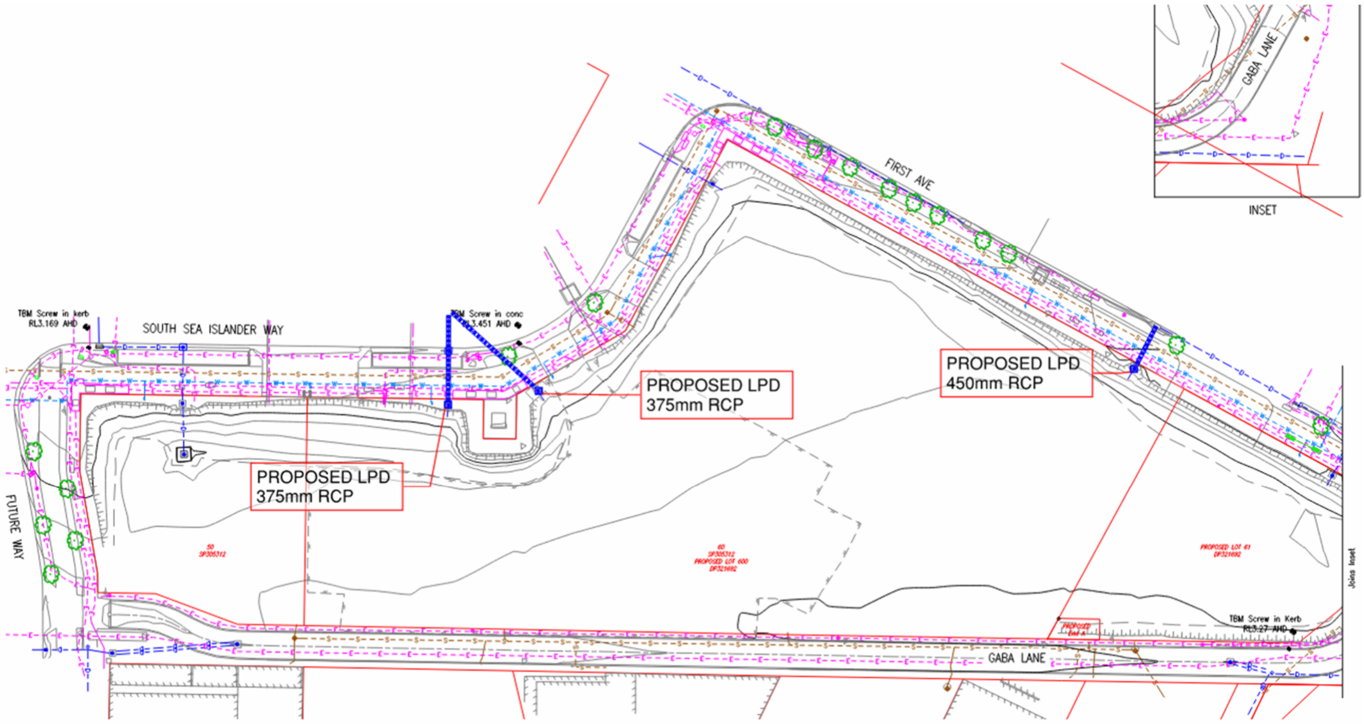


Figure 2-5: Proposed Lawful Point of Discharge

2.5 Flooding Assessment

Council's MyMaps (Flood Mapping and Information, 2023) indicates that the site is not subject to current and future (Year 2100) flooding up to a 1% AEP flood event. An extract of flood hazards (ARR) from Council mapping for the site is provided below in Figure 2-6.

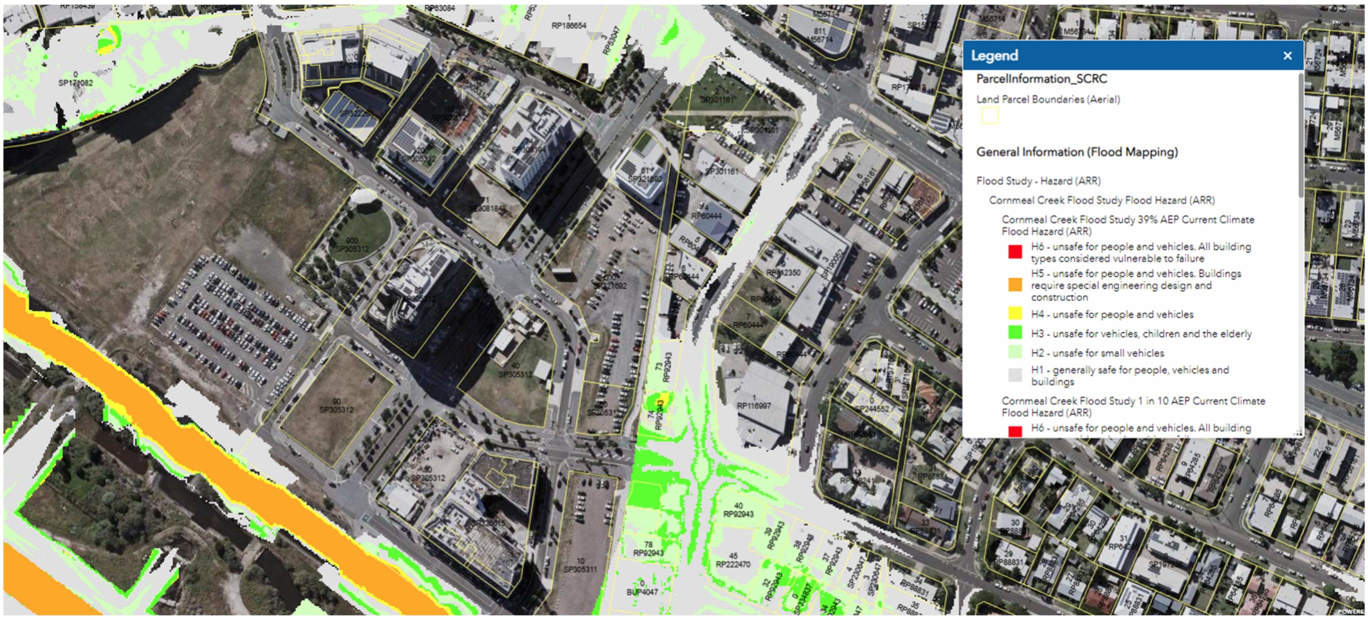


Figure 2-6: **SCC MyMaps Flooding Hazards ARR (Sunshine Coast Council)**

Further assessment shows that the site is within the flood hazard buffer zone as detailed in the flood hazard area buffer on Council's MyMaps. An extract of flood hazard area for land use planning from Council mapping for the site is provided below in Figure 2-7.

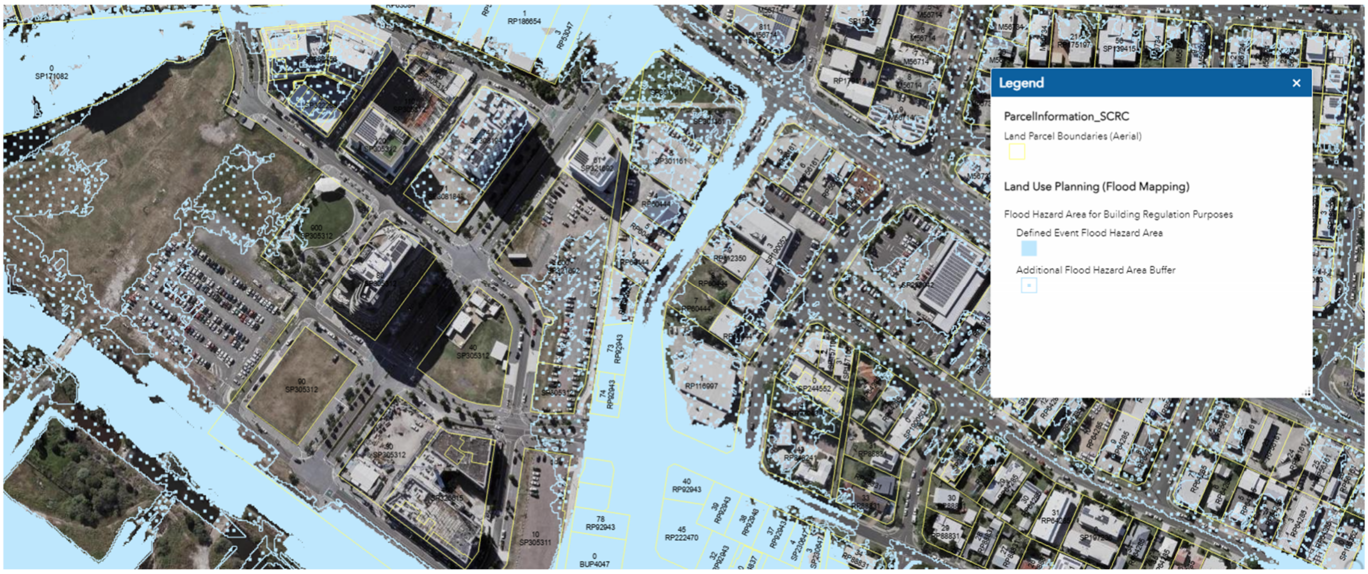


Figure 2-7: **SCC MyMaps Flooding Hazards ARR (Sunshine Coast Council)**

It is noted that the Maroochydore City Centre master drainage plan and Cornmeal Creek Flood Study (*Cardno, 06/11/2013*) intends for these lots to be fully developed and has established finished floor levels for the site.

3 DEVELOPED CONDITIONS

3.1 Description of Proposed Development

The proposed development will involve the construction of two multi-storey towers, supported on a common podium recreation area over three parking levels, ground floor retails and a basement carpark. The proposed layout is attached in ***Appendix B***.

3.2 Stormwater Drainage Infrastructure

The stormwater drainage infrastructure was designed to satisfy the requirements of the SCC Planning Scheme Policy – Development Works and QUDM.

The drainage network was sized to capture peak flow rates up to the 1% AEP storm event. The underground network was sized to cater for larger storm events than what is required by the SCC Planning Scheme Policy – Development Works to avoid on site detention storage.

To comply with the State Planning Policy's stormwater quality reduction targets, a proprietary treatment train is proposed to treat stormwater prior to discharging from the site. Further information on the treatment train proposed to satisfy the SPP reduction targets is discussed further in Section 6.

4 STORMWATER QUANTITY MANAGEMENT

4.1 Stormwater Quantity Analysis

Stormwater quantity analysis to determine pre and post development peak flow rates was undertaken using the Rational Method, as described in Section 4.3 of the Queensland Urban Drainage Manual (QUDM).

All catchments' areas have been maintained to match the previous masterplanning catchments as defined in Section 2.4. The internal building hydraulics has been designed to maintain the catchment areas.

Rainfall intensities for each storm event were obtained using the Rainfall Intensity-Frequency-Duration (IFD) information provided by the Bureau of Meteorology (BoM). Predevelopment catchment areas were calculated using Project Urban survey plans. Post development catchment areas were developed using architectural site layouts. Time of concentration for pre and post development conditions were calculated per Section 4.6 of QUDM. Predevelopment time of concentrations were calculated using Friends equation. Post development time of concentrations were calculated using standard inlet times.

To comply with SCC *Flooding and Stormwater Management Guidelines (September 2020)*, an allowance of 20% was added to peak flow rates to account for future climate change rainfall intensities.

Rational Method calculations are included in ***Appendix D***. A summary of peak flow rates for the minor and major storm events (10% and 1% AEP) in both pre and post development conditions is provided in Table 4-1.

Table 4-1: Pre vs Post Development Peak Flow Rates Summary

Storm Event (AEP)	Pre-Development % Impervious	Post Development % Impervious	Pre-Development Peak Flow Rate (m^3/s)	Post Development Peak Flow Rate (m^3/s)
10%	20	90	0.298	0.463
1%	20	90	0.517	0.831

4.2 Minor Drainage System

As the site is located within the "Principal Centre Zone" under the SCC Planning Scheme, the underground drainage network has been designed to convey peak flows up to the 10% AEP storm event. Captured stormwater will discharge to the proposed lawful point of discharge documented in Section 2.4.2.

4.3 Major Drainage System

Peak flow rates above the 10% AEP and up to the 1% AEP event will discharge to the underground stormwater network within the site and to the proposed Lawful Points of Discharge.

4.4 Detention Modelling

As the site characteristics will change from pervious to impervious surfaces, increases in peak flow rates in post development conditions are anticipated. Stormwater from the site is proposed to discharge via the existing 375mm and 450mm RCPs as detailed in Figure 2-5.

The drainage network downstream of the Lawful Points of Discharge flows to a major detention water body prior to discharge from the Maroochydore City Centre development. This water body has been designed to ameliorate flow volumes from the fully developed upstream catchments, including this development.

As there is no change to the developed use previously anticipated for these lots in the site-wide development planning and previous site-wide flood detention modelling, no on-site flow amelioration or detention is proposed.

5 FINISHED FLOOR LEVELS

5.1 Master Planning Phase Finished Floor Levels

Finished floor levels for development on the site were identified during the initial site master planning phase for each sub-catchment within Lots 600 and 50.

The Finished Floor Levels previously adopted align with sub-catchments and the existing drainage discharges from the site and the previous property boundaries assumed during the site master planning and are shown in Council's Flood Information Search (***Appendix C***) and in Figure 5-1.

Figure 5-1: Finished Floor Level Sub-Catchments

Minimum finished floor levels established during the site master-planning as listed on Sunshine Coast Council's Flood Information Search Cer24 08605 are as follows:

Table 5-1: Minimum Finished Floor Levels (extracted from SCC Flood Information Search Cer24 08605)

Lot / Catchment Identifier	Pit Identifier	Minimum Floor Level (mAHD)
A2	1-60	3.89
A3	1-26	3.74
A4	1-25	3.70
A5	1-24	3.70
A6	1-22	3.66

We note that these Finished Floor Levels were developed prior to the Lot 600 lot amalgamation and assume independent development within each catchment area.

It is proposed to undertake flow diversion and amendment of these Finished Floor Levels as outlined in Section 5.

5.2 Proposed Amendments to Finished Floor Levels

The approach previously adopted for Finished Floor Levels assumed independent development on each of the previously planned lots and assumes a "worst case" for each lot.

The lot amalgamation create Lot 600 has significantly changed the development to create an integrated development footprint.

On the First Avenue Frontage, the floor level control (RL3.89m AHD) is via the inlet pit on the northern-most side of Lot 600 (*Pit 1-60 on Cardno Drawing 249402-CI-1302 in **Appendix C***) that accommodates overflow from this pit and ingress into the development. This pit is also nominated as a Lawful Point of Discharge for the development and will collect all flows from the Gaba Lane frontage to First Avenue (*Catchment A2 on Cardno Drawing 249402-CI-1302 in **Appendix C***).

It is noted that the previous master planning catchments do not anticipate that flows within the Gaba Lane frontage are a control on the Finished Floor Level due to the significantly lower levels of Gaba Lane compared to the First Avenue/ South Sea Islander Way and Future Way frontages. Review of the local catchment flows on Gaba Lane indicates local runoff from the Maud Street properties and the minor areas on the Maroochydore City Centre side of Gaba Lane are contained within the Gaba Lane formation (refer **Appendix J** for Gaba Lane capacity calculations).

To provide a consistent form of development within the site and reflect the current lot amalgamation it is proposed that the extents of the Finished Floor Levels be adjusted to reflect the potential overflow from the First Avenue on-street drainage as follows:

- Maintain the overland flows external to the site within the road frontages in accordance with previous master planning, including no changes to runoff catchments or Points of Discharge as outlined above.
- Finished Floor Level of the proposed terrace housing frontage on First Avenue to be above RL3.89m AHD. This will provide flow diversion of any flows in excess of the underground drainage network capacity south within the First Avenue reserve along the frontage of the townhouses. This provides compliance with the minimum floor levels proposed in Council's Flood Search and the intent of the drainage regime.
- Amend the proposed Finished Floor Levels within the balance of Catchment A2 to reflect the Finished Floor Level defined by the diverted flows on Catchment A3 (minimum RL3.74m AHD). This provides compliance with Council's Flood Search as the only point of overland flow ingress into the balance of Lot 600 on the First Avenue frontage is through Catchment A3 (FFL = 3.74m AHD).
- Maintain the balance of the lots at or above the Finished Floor Levels defined in Council's Flood Search

The proposed overland drainage regime and Finished Floor Levels are shown in ***Appendix I***.

6 STORMWATER QUALITY MANAGEMENT

6.1 Construction Phase Water Quality Issues

Water quality management is required to be implemented during the construction and operational phases of the development. Potential pollutants associated with the construction phase cannot be modelled due to the site-specific nature of the pollutant sources. The major pollutant of concern is suspended solids due to erosion associated with earthworks operations on site. Other pollutants of concern include hydrocarbons resulting from fuel and oil spills from construction equipment and vehicles and toxic materials from construction works. Potential pollutant export is largely dependent on site management practices and varies throughout the construction phase depending on the construction activities being undertaken.

6.2 Erosion and Sediment Control

The construction contractor is required to prepare a construction phase Erosion and Sediment Control Plan (ESCP), to document the proposed ESC devices that will be utilised on site to minimise impacts associated with stormwater discharging from the site during construction and meet SCC water quality objectives.

6.3 Water Quality Objectives

Table 6-1 below documents the water quality objectives applied to developments within the Sunshine Coast Council area. These objectives were extracted from the State Planning Policy 2017.

Table 6-1: State Planning Policy Water Quality Targets

Pollutant	Reduction Requirement
Total Suspended Solids (TSS)	80% of average annual load
Total Phosphorus	60% of average annual load
Total Nitrogen	45% of average annual load
Gross Pollutants (GP)	90% of average annual load

6.4 Proposed Water Quality Treatment Train

A SQIDEP approved proprietary stormwater treatment device, AtlanFilter, will be implemented on the site to treat stormwater runoff prior to discharge.

The SQIDEP approval certificate for the AtlanFilter system is included in ***Appendix E***.

The proposed AtlanFilter installation location can be noted on the indicative drainage layout in ***Appendix F*** and treats all site runoff prior to discharge.

6.5 MUSIC Modelling

Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.3 was utilised to determine the requirements for the water quality treatment trains.

6.5.1 Rainfall Data

Six-minute rainfall data, obtained from eWater for station 40282 – Nambour DPI was used to develop the model. This station was recommended for use when modelling site in this area of the Sunshine Coast. The data for the station is documented below in Table 6-2.

Table 6-2: MUSIC Rainfall Data

Rainfall Station	Modelling Period	Annual Rainfall (mm)	Recording Interval (mins)
40282 – Nambour DPI	1/1/1989 – 31/12/1998	1527	6

6.5.2 Pollutant Export Parameters

The catchments were modelled using the Split Urban Residential catchment parameters. The pollutant export parameters for this node are documented below in Table 6-3. These values were obtained from Table 3.8 of the MUSIC Modelling Guidelines.

Table 6-3: Split Urban Residential Pollutant Export Parameters

Land Use	Flow Type	TSS log^{10} value		TP log^{10} value		TN log^{10} value	
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Split Urban Residential – Roof	Baseflow Parameters	0.00	0.00	0.00	0.00	0.00	0.00
	Stormflow Parameters	1.30	0.34	-0.89	0.31	0.26	0.23
Split Urban Residential – Roads	Baseflow Parameters	1.00	0.34	-0.97	0.31	0.20	0.20
	Stormflow Parameters	2.43	0.39	-0.30	0.31	0.26	0.23
Split Urban Residential – Ground Level	Baseflow Parameters	1.00	0.34	-0.97	0.31	0.20	0.20
	Stormflow Parameters	2.18	0.39	-0.47	0.31	0.26	0.23

6.5.3 Rainfall-Runoff Parameters

The MUSIC Rainfall-Runoff parameters for Urban Residential Sites are documented below in Table 6-4. These parameters were obtained from Table A1.2 of the MUSIC modelling guidelines.

Table 6-4: Rainfall Runoff Parameters

Parameter	Value
Rainfall Threshold (mm)	1
Soil Storage Capacity (mm)	500
Initial Storage Capacity (%)	10
Field Capacity (mm)	200
Infiltration Capacity Coefficient A	211
Infiltration Capacity Coefficient B	5.0
Initial Depth (mm)	50
Daily Recharge Rate (%)	28
Daily Baseflow Rate (%)	27
Daily Deep Seepage Rate (%)	0

6.5.4 Treatment Train

The node parameters that were entered into the MUSIC model are documented as part of the SQIDEP approval certificate (***Appendix E***) and were applied to this project.

The treatment train used in the MUSIC model is shown below in Figure 6-1. The stormwater catchment areas used to generate the MUSIC nodes shown below are documented in ***Appendix G*** and are sourced from the Cardno Stormwater Drainage Plan for Maroochydore City Centre.

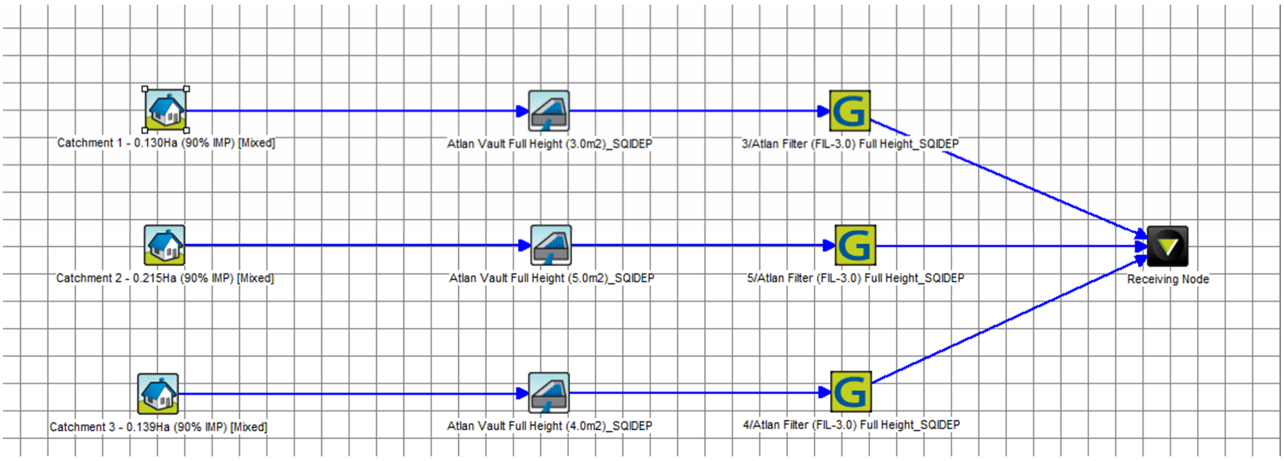
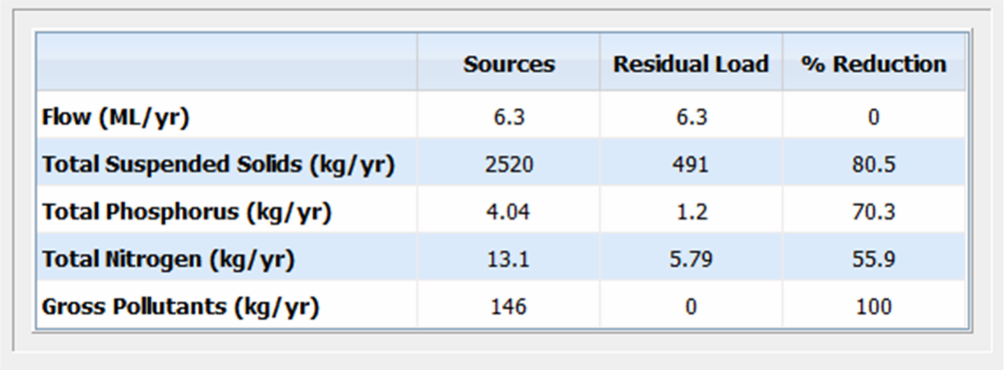


Figure 6-1: MUSIC Modelling Treatment Train (Atlan Stormwater)

The MUSIC modelling results shown in Figure 6-2 demonstrate that the nominated AtlanFilters within the Atlan CircaVault satisfy the SPP water quality targets.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	6.3	6.3	0
Total Suspended Solids (kg/yr)	2520	491	80.5
Total Phosphorus (kg/yr)	4.04	1.2	70.3
Total Nitrogen (kg/yr)	13.1	5.79	55.9
Gross Pollutants (kg/yr)	146	0	100

Figure 6-2: MUSIC Modelling Results

6.5.5 AtlanFilter FIL-3.0 Maintenance and Whole of Life Information

The following information was provided by Atlan Stormwater regarding the lifecycle and maintenance frequencies of the AtlanFilter:

- Filters to be replaced at scheduled maintenance intervals. Atlan estimates the life of the AtlanFilter to be between 6-8 years. As a minimum requirement, each AtlanFilter cartridge should be replaced within 10 years.
- The site will require 12x AtlanFilter FIL-3.0, 2x CircaVault SV.350D-1615, and 1x CircaVault SV.250D-1610.

The AtlanFilter Operations and Maintenance Manual is attached in ***Appendix H*** for detailed information on the operation of the AtlanFilter and maintenance requirements.

APPENDIX A

Survey

Legend

Top of bank	╨╨╨╨╨
Toe of bank	— · · — · · —
Stormwater	—— D ——
Sewer	—— S ——
Telstra	—— T ——
Electricity	—— E ——
Under Ground	—— U/G ——
Water	—— W ——
Fence	—— // ——
☒	Electrical Power Box
☐	Electrical Pit
◉	Power Pole
☼	Light Pole
FH	Fire Hydrant
Ⓢ	Sewerage Manhole
SW	Stormwater Manhole
▨	Telstra Pit
WM	Water Meter
⋈	Water Valve
▤	Gully Trap
◉	Permanent Survey Mark
⊕	Temporary Bench Mark
△	Traverse Station
○	Peg - Original
●	Bollard
σ	Traffic light
✿	Tree

Other Features noted on Face of Plan

DISCLAIMER

Boundaries shown hereon are plotted from deed dimensions and were not reinstated at the time of survey.

Only visible services have been located. Before commencement of any design and construction works, the location of these services must be verified on site by the relevant authorities.

The shapes displaying services are symbolic representations and whilst they are accurately placed they are not to scale.

We Project Urban Pty Ltd hereby certify that the levels and detail shown hereon are an accurate representation of the site at the time of survey.

NOTE: All underground services plotted from As Constructed information provided by Shadforth on the 12/03/2019 unless otherwise stated.

PROJECT URBAN

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Project Urban Pty Ltd
ACN 608 895 923 ABN 97 608 895 923

CLIENT WALKER CORPORATION

PROJECT
CONTOUR AND DETAIL SURVEY
COMPLETED 28/06/2021
LOT50 & 60 SOUTH SEA ISLANDER WAY, MAROOCHYDORE
50 & 60 ON SP305312

NOTES
VERTICAL DATUM: AHD
LEVEL ORIGIN: PSM198719
RL: 4.008

HORIZONTAL DATUM: Plane GDA94
Site Datum Maroochydore City Centre

Major Contour Interval: 1m
Minor Contour Interval: 0.25m

AMENDMENTS		DATE
A		
B		
C		
D		
E		
F		
G		

DESIGNED
SURVEYED GH
DRAWN GH
DATE 28/06/2021

SHEET NO... 3 OF 3 ...SHEETS
COMPUTER FILE 21006_CD_c3d2020_250621.dwg
SCALE 1:150 A1
DRAWING No 21006_CD-02
AMEND

Legend

Top of bank	╨ ╨ ╨ ╨ ╨
Toe of bank	— · · — · · —
Stormwater	—— D ——
Sewer	—— S ——
Telstra	—— T ——
Electricity	—— E ——
Under Ground	—— U/G ——
Water	—— W ——
Fence	—— // ——
☒	Electrical Power Box
▢	Electrical Pit
◉	Power Pole
☼	Light Pole
FH	Fire Hydrant
Ⓢ	Sewerage Manhole
SW	Stormwater Manhole
▨	Telstra Pit
WM	Water Meter
⋈	Water Valve
▤	Gully Trap
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△	Traverse Station
○	Peg - Original
●	Bollard
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✿	Tree

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CLIENT WALKER CORPORATION

PROJECT
CONTOUR AND DETAIL SURVEY
COMPLETED 28/06/2021
LOT50 & 60 SOUTH SEA ISLANDER WAY, MAROOCHYDORE
50 & 60 ON SP305312

NOTES
VERTICAL DATUM: AHD
LEVEL ORIGIN: PSM198719
RL: 4.008

HORIZONTAL DATUM: Plane GDA94
Site Datum Maroochydore City Centre

Major Contour Interval: 1m
Minor Contour Interval: 0.25m

AMENDMENTS		DATE
A		
B		
C		
D		
E		
F		
G		

DESIGNED
SURVEYED GH
DRAWN GH
DATE 28/06/2021

SHEET NO... 1 OF 3 ...SHEETS
COMPUTER FILE 21006_CD_c3d2020_250621.dwg
SCALE 1:150 A1
DRAWING No 21006_CD-02
AMEND

DISCLAIMER

Boundaries shown hereon are plotted from deed dimensions and were not reinstated at the time of survey.

Only visible services have been located. Before commencement of any design and construction works, the location of these services must be verified on site by the relevant authorities.

The shapes displaying services are symbolic representations and whilst they are accurately placed they are not to scale.

We Project Urban Pty Ltd hereby certify that the levels and detail shown hereon are an accurate representation of the site at the time of survey.

NOTE: All underground services plotted from As Constructed information provided by Shadforth on the 12/03/2019 unless otherwise stated·

Legend

Top of bank	┬ ┬ ┬ ┬ ┬
Toe of bank	— · · — · · —
Stormwater	—— D ——
Sewer	—— S ——
Telstra	—— T ——
Electricity	—— E ——
Under Ground	—— U/G ——
Water	—— W ——
Fence	—— // ——
☒	Electrical Power Box
☐	Electrical Pit
◉	Power Pole
☼	Light Pole
FH	Fire Hydrant
Ⓢ	Sewerage Manhole
SW	Stormwater Manhole
▨	Telstra Pit
WM	Water Meter
⋈	Water Valve
▤	Gully Trap
◉	Permanent Survey Mark
⊕	Temporary Bench Mark
△	Traverse Station
○	Peg - Original
●	Bollard
⌀	Traffic light
✿	Tree

Other Features noted on Face of Plan

PROJECT URBAN

Sunshine Coast
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www.ProjectUrban.com.au
Project Urban Pty Ltd
ACN 608 895 923 ABN 97 608 895 923

CLIENT WALKER CORPORATION

PROJECT
CONTOUR AND DETAIL SURVEY
COMPLETED 28/06/2021
LOT50 & 60 SOUTH SEA ISLANDER WAY, MAROOCHYDORE
50 & 60 ON SP305312

NOTES
VERTICAL DATUM: AHD
LEVEL ORIGIN: PSM198719
RL: 4.008

HORIZONTAL DATUM: Plane GDA94
Site Datum Maroochydore City Centre

Major Contour Interval: 1m
Minor Contour Interval: 0.25m

AMENDMENTS		DATE
A		
B		
C		
D		
E		
F		
G		

DESIGNED

SHEET NO... 2 OF 3 ...SHEETS

SURVEYED GH

COMPUTER FILE 21006_CD_c3d2020_250621.dwg

DRAWN GH

SCALE 1:150 A1

DATE 28/06/2021

DRAWING No 21006_CD-02

AMEND

APPENDIX B

Proposed Site Layout

plus architecture

DA100
FLOOR PLAN - GROUND LEVEL

ISSUE I

Date of Issue | 24.07.31

70850 | WALKER'S MAROOCHYDORE | CORNER FIRST AVE AND,
SOUTH SEA ISLANDER WAY, MAROOCHYDORE

DEVELOPMENT APPLICATION | PLUS ARCHITECTURE

APPENDIX C

SCC Flood Information Search

Request Type

☐ Self-Assessable Dwelling

☒ All Other

Flood Information Search

This search is issued in response to an information request for a property which is located within the geographical boundaries of Sunshine Coast Council. This search is valid for 6 months from date of issue.

Applicant's Name	Brooke Ferguson	Issue Date	19 July 2024
Applicant's Address	16 Stephenson Ct BEERWAH QLD 4519	Land Number	1536513
		Property Description	Lot 600 SP 321692
		Address	First Ave MAROOCHYDORE QLD 4558
		Our Reference	Cer24/08605
Email Address	brookeferguson@projexpartners.com.au	Issuing Officer	jdm
		Your Reference	Not Applicable

ENQUIRY DATE:	15/07/2024
REGISTERED OWNER(S) NAME:	Sunshine Coast Regional Council

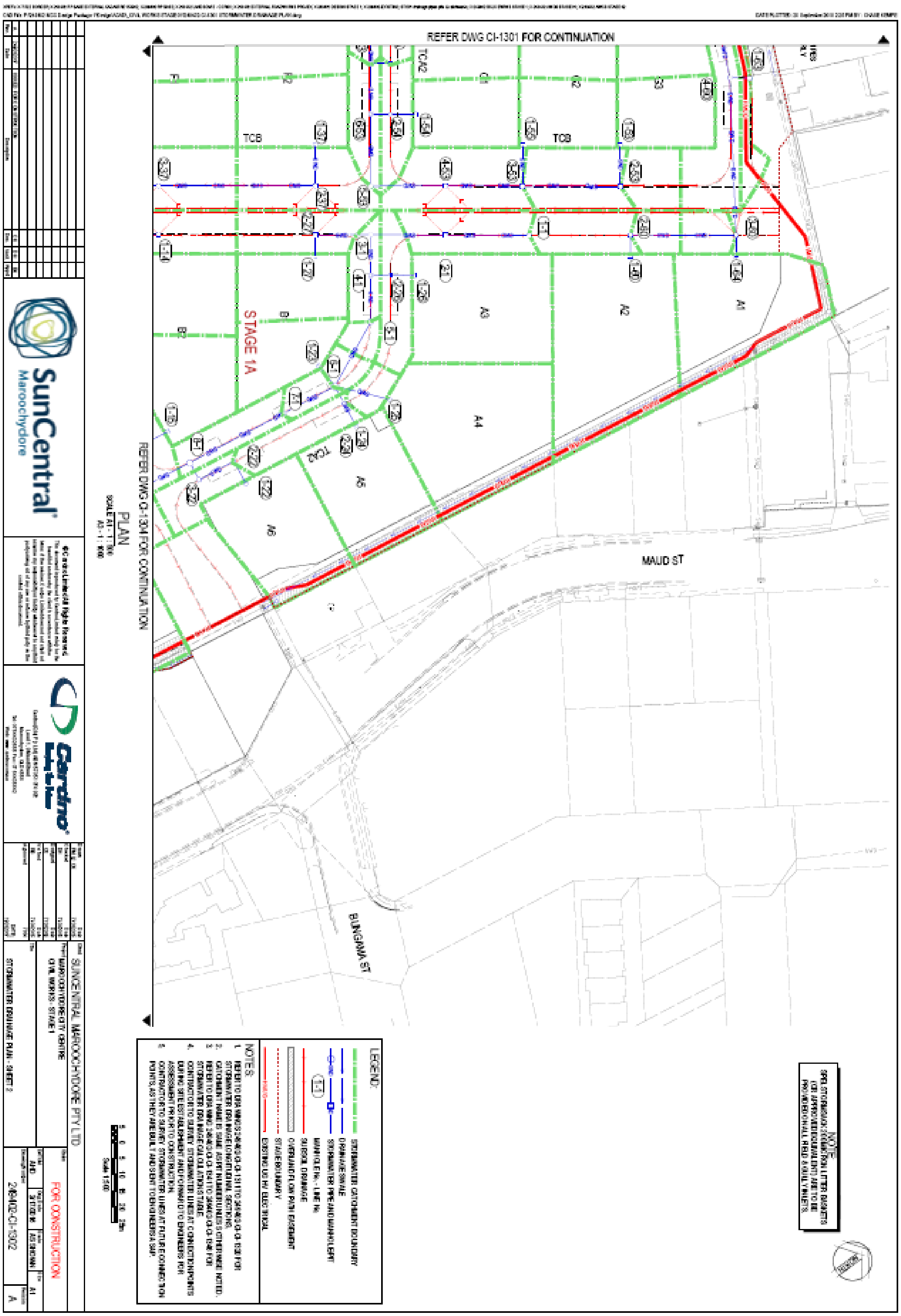
Flood Hazard Area for Building Regulation Purposes – Minimum Finished Floor Level

For the purposes of the QDC MP 3.5 (2012) and The Building Regulations S8.1 (2021) the levels provided in this table for new buildings are a declaration of the Finished Floor Level requirements for Class 1 buildings built in all or part of the Flood Hazard Area

Defined Flood Event (DFE) level – 1% AEP (at 2100)	As per table
Source of information (DFE):	Technical Memorandum – Maroochydore City Centre Stage 1 Local Flooding (Cardno, 29 October 2015)
Maximum flow velocity:	Not Available
Backwater or inactive flow area	Velocity Not provided
Freeboard	Not Available
Minimum Finished Floor Level:	As per table

Lot Identifier	Pit Identifier	1% AEP (at 2100) Peak Flood Level (m AHD)		Minimum Floor Level (mAHD)
		Local Drainage	Regional	
A2	1-60	3.59	2.92	3.89
A3	1-26	3.44	2.92	3.74
A4	1-25	3.40	2.92	3.70
A5	1-24	3.40	2.92	3.70

Figure 1. Property Boundary Relative to Council Flood Mapping



T 0754757272 **F** 07 5475 7277 | mail@sunshinecoast.qld.gov.au
Locked Bag 72 Sunshine Coast Mail Centre Qld 4560 | **www.sunshinecoast.qld.gov.au**

NOTES SPECIFIC TO THE FLOOD LEVELS QUOTED ON THIS SEARCH.
None Applicable

CLIMATE ASSUMPTIONS

The advice provided in this search is based upon standards relating to current and year 2100 climatic conditions and historically recorded flood events only. Year 2100 estimates include allowances for future climate conditions which specifically include increased rainfall intensity (20%) and higher mean sea level (0.8m).

Are you flood ready? Prepare with Council's award-winning Disaster Hub, now including Council's network of rainfall & water level gauges.

- Review Flood Mapping that shows how flood hazard changes as events get larger.
- Prepare your emergency plan and kit.
- Keep current with water levels, emergency warnings and road closure information.

Sunshine Coast COUNCIL Disaster Hub ©

INTERPRETATION NOTES FOR THIS SEARCH

1. Minimum finished floor levels are provided for residential land uses only in accordance with the criteria for self-assessable development in the Sunshine Coast Planning Scheme, 2014, Flood Overlay Code. For other types of development the flood overlay code of the planning scheme may assign a different event probability to the Defined Flood Event and specify different freeboard requirements. Refer to Table 8.2.7.3.3 of the Flood Overlay Code. In such instances a development application should already be lodged and the Development Services staff assisting with this application will provide guidance on the determination of minimum finished floor levels.
2. This search has not been prepared with knowledge of the date of construction or approval for development. It is incumbent upon the applicant, or the agent representing the applicant, in a purchasing situation to determine the date of approval for development in order to ascertain which of the minimum floor levels provided on this search are appropriate.
3. The absence of Highest Historical Flood Level information does not imply that the property is not subject to flooding, simply that Council has no record of this property flooding. Applicants are encouraged to make their own local enquiries.
4. The absence of local flood mapping does not imply that the above property is not subject to localised stormwater flooding. Please be aware of the natural topography in your area and the location of drainage infrastructure. Water runoff which exceeds the capacity of the drainage system (if present) and/or concentrates in surface depressions and gullies can cause localised stormwater flooding which may not be identified in this search.
5. Where a storm tide flood level is greater than the riverine flood level at the probability of the Defined Flood Event, then the Defined Flood Event is the Defined Storm Tide Event as reported on this search.
6. The MINIMUM FINISHED FLOOR LEVEL as required by the Flood Overlay Code of the Sunshine Coast Council Planning Scheme, 2014, is calculated as whichever is greater of either:
   (a) 500mm freeboard added to the Defined Flood Event Level (Regional, Riverine or Storm Tide) for the site; or
   (b) 300mm freeboard added to the Defined Flood Event Level (Drainage/Overland Flow) for the site as per the Queensland Urban Drainage Manual.
7. Surface water should be managed according to the requirements of the National Construction Code (Volume 2 and the ABCB Housing Provisions). In order to meet these requirements, the FINISHED FLOOR LEVEL may need to be higher than specified in this search.
8. Construction of all internal stormwater drainage must comply with the relevant sections of Australian Standard *AS/NZS 3500.3 – Plumbing and Drainage*.
9. Building certifiers should be aware that their certification requires them to ensure no unacceptable off-site or on-site impacts associated with the drainage of buildings or land.
10. If the property is located within a declared Drainage Deficient Area the MINIMUM FINISHED FLOOR LEVEL may be returned as 'DDA Survey Required'. If so, refer Drainage Deficient Area requirements attachment for details.
11. For properties located adjacent to Lake Weyba or within 200m of the Pumicestone Passage, when calculating MINIMUM FINISHED FLOOR LEVEL an additional 300mm allowance for wave setup is added to the 500mm freeboard for properties. This results in a total freeboard of 800mm above the Defined Flood Level.
12. All buildings shall conform to the relevant Planning Scheme Code in the Sunshine Coast Regional Council, 2014.
13. Flood modelling is based on periodic aerial laser survey of the ground surface which filters out buildings and fences. Flow diversions caused by solid obstructions may not be identified in this search. Changes to surface levels and drainage may have altered the overland flow and flood behaviour within this property.
14. Council advises that if there are openings to basements these openings require a minimum level at least equal to the minimum finished floor level.
15. The levels and velocities provided on this search are derived from information relating to the flood hazard that is deemed most current and reliable at the time of search provision. This information may supersede flood information contained on the Sunshine Coast Regional Council Planning Scheme Flood Overlay (2014) which requires planning scheme amendment to maintain currency.
16. Section 8 of Building Regulations defines an inactive flow or backwater area to mean *all or part of a flood hazard area where the maximum flow velocity of water is not likely to be greater than 1.5m/s*. Council advises that velocity in some waterways, floodways and overland flow paths is less than 1.5m/s and would therefore meet this definition. Obstructing such flow paths is inherently problematic and likely to cause adverse impact. The declaration of a backwater area or inactive flow path should not be interpreted as acceptable to obstruct.
17. Additional information on the frequency and extent of flooding within this property can be found on Council's online mapping at: https://www.sunshinecoast.qld.gov.au/Development/Development-Tools-and-Guidelines/Sunshine-Coast-Mapping-MyMaps

DISCLAIMERS

Flood information provided by Council represents the best information available to Council. It should only be used as a guide to the extent of flooding on the property. This information may be inaccurate or incomplete and it is recommended that purchasers make their own local enquiries with regard to the flooding and drainage history of the site.

The flood level information supplied does not represent the highest possible flood level that could occur on this property. Statistics indicate that a flood of equivalent or greater magnitude than the defined flood event is possible and has a 1% chance of occurring in any given year and similarly a 50% chance of occurring within 70 years.

The absence of flood information does not imply that the property is not subject to flooding, simply that Council has no information for this property flooding. If the property has a history of flooding or drainage problems, Council recommends you seek professional advice on this matter.

GLOSSARY OF TERMS

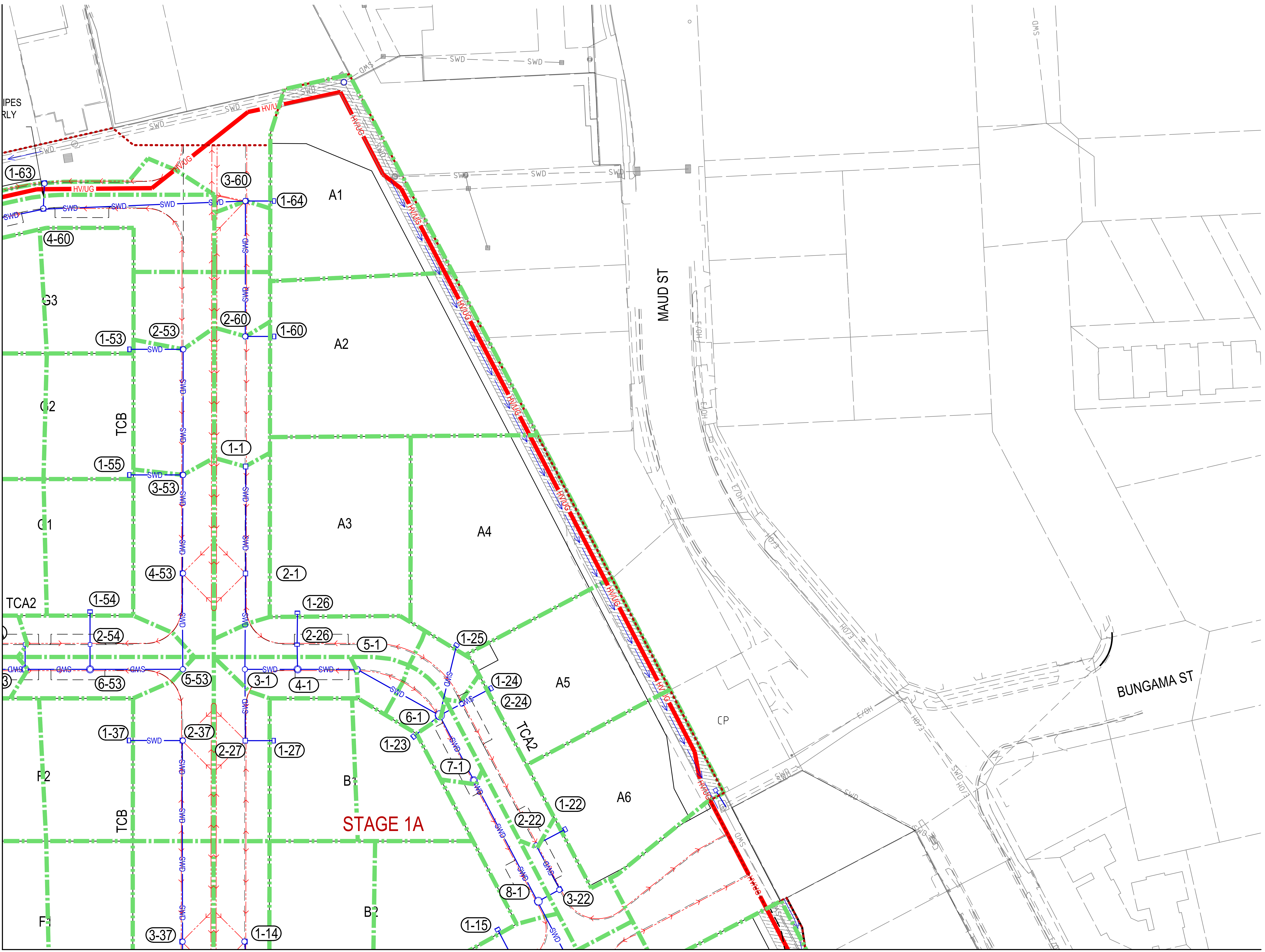
Term	Definition
Applicant	The individual(s) requesting a flood search to be completed for a specified property.
Registered Owners	The individual(s) that are registered by Council as owning the property for which a flood search is requested.
AHD	The Australian Height Datum (AHD) is the reference level for defining reduced levels adopted by the National Mapping Council of Australia. The level of 0.0 m AHD is approximately mean sea level.
Defined Flood Event Level	A water level derived through mathematical modelling of the Defined Flood Event.
Defined Flood Event	Terminology consistent with Single State Planning Policy (SPP, 2013) which states “Defined Flood Event is the flood event adopted by a local government for the management of development in a particular area”. This may also be the defined storm tide event where the flood level of the storm tide exceeds the flood level of the freshwater flood event (at the AEP of the defined flood event).
Source of Information	Is a reference to the document summarising the results of the anticipated flooding relevant to this location.
Highest Recorded Flood Level	The highest relevant flood water level from all historic events for which Council has records.
Location of Highest Recorded Event	A description of the site where the Highest Historical Flood Level was recorded.
Date of Highest Recorded Event	The date on which the Highest Historical Flood Level occurred.
Minimum Finished Floor Level	The minimum finished floor level calculated in accordance with the planning scheme flood overlay through the addition of the relevant freeboard to the Defined Flood Event Level or the Highest Recorded Historical Flood Level. The minimum finished floor level on this search relates to a flooding requirement. In some instances town planning notation may also specify a minimum finished floor level. The applicant should ensure that a town planning notation search is also undertaken. The minimum finished floor level is the higher of the level provided on this search and a minimum finished floor level from a town planning notation.
AEP	Annual Exceedance Probability. The 1% AEP has a 1% chance of exceedance in any year.
Rainfall Intensity	The amount of rainfall occurring in a unit of time, usually expressed in millimetres/hour.
Mean Sea Level	A tidal datum; the arithmetic mean of hourly heights of the sea at the tidal station observed over a period of time (preferably 19 years). Source: BOM This is approximately 0.0 m AHD
Storm Tide	The elevation of water generated by a severe weather event such as an east coast low pressure system or tropical cyclone above the normal astronomical tide.
Tropical Cyclone	A tropical cyclone is a low-pressure system which is sufficiently intense to produce sustained winds of at least 63 km/h or greater and gusts in excess of 90 km/h near the centre.
Freeboard	A factor of safety usually expressed as a height above the adopted Defined Flood Level. A freeboard tends to compensate for factors such as wave action and historical and modelling uncertainties.
Flood Hazard Area	An area, whether or not mapped, designated by a local government as a natural hazard area (flood) in the Building Regulation 2021, section 8.
Drainage Flood	This flood type has a flood level derived from a stormwater drainage study with rainfall as the source of flooding. This is normally a local area study that incorporates elements of the stormwater network in the assessment. These studies can provide flood levels associated with overland flow beyond the flood extent shown derived from a Riverine\Creek flood study
Regional/Riverine	This flood type has a flood level derived from a Regional (Riverine or Creek) flood study with rainfall as the source of flooding. As these studies are for larger areas they only consider surface flows and not the sub surface drainage network. Often flows will be input into the flood model at ‘source points’ and thus overland flows are not represented for the whole catchment area.
Storm Tide Flood	This flood type has a flood level derived from a Storm Tide flood study with the ocean condition as the source of flooding.

XREF's: X-TITLE BORDER; X-249402 RP BASE EXTERNAL CADASTRE 150302; X-249402 RP BASE; X-249402 LANDSCAPE - CORSO; X-249402 EXTERNAL ROADWORKS PROJEX; X-249402 DESIGN STAGE 1; X-249402-EXISTING; STG01 drainage pipes pits & catchments; X-249402 BULK EWRKS STAGE 1; X-249402 AWCS STAGE 01; X-249402 AWCS STAGE 02

CAD File: P:\249402 MCC Design Package 1\Design\ACAD_CIVIL WORKS STAGE 01\249402-CI-1301 STORMWATER DRAINAGE PLAN.dwg

DATE PLOTTED: 20 September 2018 2:25 PM BY : CHASE KEMPE

REFER DWG CI-1301 FOR CONTINUATION



REFER DWG CI-1304 FOR CONTINUATION

PLAN

SCALE A1 - 1 : 500
A3 - 1 : 1000

NOTE:
SPEL STORMSACK 200 MICRON LITTER BASKETS
(OR APPROVED EQUIVALENT) ARE TO BE
PROVIDED ON ALL FIELD & GULLY INLETS.

LEGEND:

🟩	STORMWATER CATCHMENT BOUNDARY
→ →	DRAINAGE SWALE
SWD SWD	STORMWATER PIPE AND MANHOLE/PIT
1-1	MANHOLE No. - LINE No.
→ → →	SUBSOIL DRAINAGE
▨	OVERLAND FLOW PATH EASEMENT
·······	STAGE BOUNDARY
HV/UG	EXISTING UG HV ELECTRICAL

NOTES:

1. REFER TO DRAWINGS 249402-CI-CI-1311 TO 249402-CI-CI-1320 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS.
2. CATCHMENT NAME IS SAME AS PIT NUMBER UNLESS OTHERWISE NOTED.
3. REFER TO DRAWING 249402-CI-CI-1341 TO 249402-CI-CI-1346 FOR STORMWATER DRAINAGE CALCULATIONS TABLE.
4. CONTRACTOR TO SURVEY STORMWATER LINES AT CONNECTION POINTS DURING SITE ESTABLISHMENT AND FORWARD TO ENGINEERS FOR ASSESSMENT PRIOR TO CONSTRUCTION.
5. CONTRACTOR TO SURVEY STORMWATER LINES AT FUTURE CONNECTION POINTS, AS THEY ARE BUILT AND SENT TO ENGINEERS ASAP.

5 0 5 10 15 20 25m
Scale 1:500

Rev.	Date	Description	Des.	Verif.	Appd.
A	24/03/2017	ISSUED FOR CONSTRUCTION	CK	DH	BK

SunCentral
Maroochydore

Cardno
Shaping the Future

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Web: www.cardno.com.au

Drawn	PM LC CK	Date 7/10/2015
Checked	DH	Date 7/10/2015
Designed	CK	Date 7/10/2015
Verified	RB	Date 7/10/2015
Approved	7884	DATE; 1/03/2017

Client SUNCENTRAL MAROOCHYDORE PTY LTD

Project MAROOCHYDORE CITY CENTRE
CIVIL WORKS - STAGE 1

Title STORMWATER DRAINAGE PLAN - SHEET 2

Status FOR CONSTRUCTION

DATUM	Orig. Date	Scale	Size
AHD	2/17/2016	AS SHOWN	A1

Drawing Number 249402-CI-1302

Revision A

Technical Memorandum

Title	**Maroochydore City Centre Stage 1 Local Flooding**		
Client	Suncentral Maroochydore	**Project No**	249402
Date	29 October 2015	**Status**	Preliminary
Author	Nadia Guterres	**Discipline**	Civil Engineering
Reviewer	Darryl Hone	**Office**	Sunshine Coast

1. Summary

Given the flat nature of the Stage 1 works and the locations of raised intersections which would block overland flow paths, detailed two-dimensional flood analysis was conducted to ensure that the proposed road and internal drainage design would be sufficient to convey stormwater flows during major flood events. The purpose of this analysis was to:

> Determine the 100 year ARI local flood levels throughout Stage 1 and the corresponding floor levels for each lot.

> Determine the impact of complete blockage of stormwater gully and field inlets to ensure that the freeboard provided to minimum floor levels was sufficient.

> Determine whether the peak depths within the road reserve during major flood events complied with the requirements of QUDM.

> Determine if any areas required additional drainage infrastructure.

The proposed stormwater drainage has been designed to have 5% Annual Exceedance Probability (AEP) capacity using 12d. This drainage design was then transferred into TUFLOW for analysis of the major 1% AEP storm event.

2. Methodology

The TUFLOW model was set up using the following methodology:

> The 1% AEP rainfall was increased by 20% to account for the potential impact of climate change.

> The Duration Independent Storm (DIS) was used, with a time step of 5 minutes. The DIS method converts peak rainfall intensities from various storm duration into the one temporal pattern.

> A 0.5m grid size was adopted so that the road reserve was captured in sufficient detail.

> The road reserve areas were modelled using rainfall on grid. No rainfall losses were assumed

> The runoff from the surrounding lots was directed towards the underground drainage network. As the roof drainage is likely to have 5% AEP capacity, flows in excess of this capacity were directed as inflows onto the road surface. No rainfall losses were assumed.

> The tailwater level in the canal was assumed to be 2.35m AHD. This is the 1% AEP storm tide level with potential climate change included. Storm tide levels are to be used in preference to

storm surge levels as wave runup is not included as it is not a factor in protected waterways such as Maud Canal.

> The tailwater level for the existing northern drainage system was assumed to be equal to the obvert of the existing pipe.

> The road reserve was modelled with a Manning's roughness of 0.02.

> For the design scenario the blockage factors for field and gully inlets as specified by QUDM were assumed.

> For the blockage scenario all inlets were blocked by 100%. Roof water drainage (to 5% AEP capacity) was still assumed to be able to enter the drainage network.

> The manhole losses were automatically calculated by TUFLOW using the Engelhund Method.

3. Results

The preliminary results of the analysis identified areas where additional inlets would be required. Once these modifications were made to the design the results showed that:

> The depth of flooding in the 1% AEP climate change design event was less than 250mm in all areas of the proposed development.

> Once complete blockage of inlets was included the increase in peak water levels was less than 300mm in all areas of the site. As freeboard of 300mm above the 1% AEP local flood level is required for minimum floor levels based on the requirements of QUDM, this confirmed that all lots would have sufficient flood immunity for the major local flood event. For the majority of the site the increase was less than 100mm, with 95% of impacts being less than 200mm.

> The peak depth-velocity (dV) product for the 1% AEP design flood event was extremely low in all areas, with a maximum of around 0.05m^2/s. This indicates that flood hazards to motorists and pedestrians will be minimal.

The preliminary proposal for drainage design within Stage 1 nominated that areas where overland flow paths were blocked would have a duplicate drainage network with 1% AEP capacity. The results of this analysis have shown that even if all inlets are completely blocked that the peak water levels will not be increased by more than the specified minimum freeboard of 300mm. This is because there are some alternate flow paths available for areas around the raised intersections. It has therefore been deemed not necessary to provide a dual drainage network for these areas.

The results of the TUFLOW modelling are shown in the attached figures.

The minimum floor level for each lot, as specified by the manhole number relating to the roof drainage inlet point, is summarised in Table 1. A freeboard of 300mm above the 1% AEP flood level with climate change has been specified to comply with QUDM. The minimum floor levels required are all higher than those obtained using the 1% AEP climate change storm surge level, i.e. 3.32m AHD. The minimum floor levels in Table 1 were obtained by adding 300mm to the maximum design flood level along the street frontage of each lot.

Addendum to Table 1 in Maroochydore City Centre Stage 1 Local Flooding Technical Memo 2015

Table 1 Minimum Floor Levels for each lot

LOT No.	PIT No.	MINIMUM FLOOR LEVEL (mAHD)	FREEBOARD WITH COMPLETE BLOCKAGE (mm)	LOT No.	PIT No.	MINIMUM FLOOR LEVEL (mAHD)	FREEBOARD WITH COMPLETE BLOCKAGE (mm)
A1	1-64	3.89	299	**G2**	1-55	3.86	292
A2	1-60	3.89	299	**G2**	1-58	3.87	300
A3	1-26	3.74	248	**G3**	1-30	3.85	397
A4	1-25	3.70	222	**G3**	1-53	3.90	300
A5	1-24	3.70	244	**H1**	1-45	3.86	290
A6	1-22	3.66	248	**H1**	1-48	3.89	285
B1	1-23	3.69	206	**H2**	1-50	3.88	294
B1	1-27	3.69	203	**H2**	1-57	3.87	300
B2	1-15	3.60	179	**H3**	1-59	3.92	300
B2	1-18	3.68	213	**H3**	1-61	3.87	284
C1	1-12	3.67	258	**I1**	1-49	3.88	296
C2	1-12A	3.56	159	**I1**	1-65	3.32*	590
C3	1-3	3.71	300	**I1**	1-66	3.79	294
D1	1-11	3.60	187	**I2**	1-52	3.74	300
D1	1-16	3.59	175	**I3**	1-51	3.97	300
D2	1-6	3.58	237	**J1**	1-75	3.80	215
D2	1-7	3.52	263	**J1**	1-91	3.97	300
D3	1-17	3.66	238	**J2**	1-90	3.78	267
D3	1-8	3.67	257	**J2**	1-92	3.70	186
E1	1-31	3.66	215	**K1**	1-81	3.77	245
E1	1-33	3.60	184	**K1**	1-85	3.63	118
E2	1-35	3.63	162	**K2**	1-80	3.70	175
E2	1-39	3.70	227	**K2**	1-83	3.63	180
F1	1-38	3.69	210	**L1**	1-32	3.60	182
F1	1-41	3.70	226	**L1**	1-84	3.63	180
F2	1-37	3.70	199	**L2**	1-34	3.74	254
F2	1-42	3.72	217	**L2**	1-86	3.72	209
G1	1-54	3.74	245	**N**	1-76	3.77	247
G1	1-56	3.82	297	**N**	1-79	3.67	147

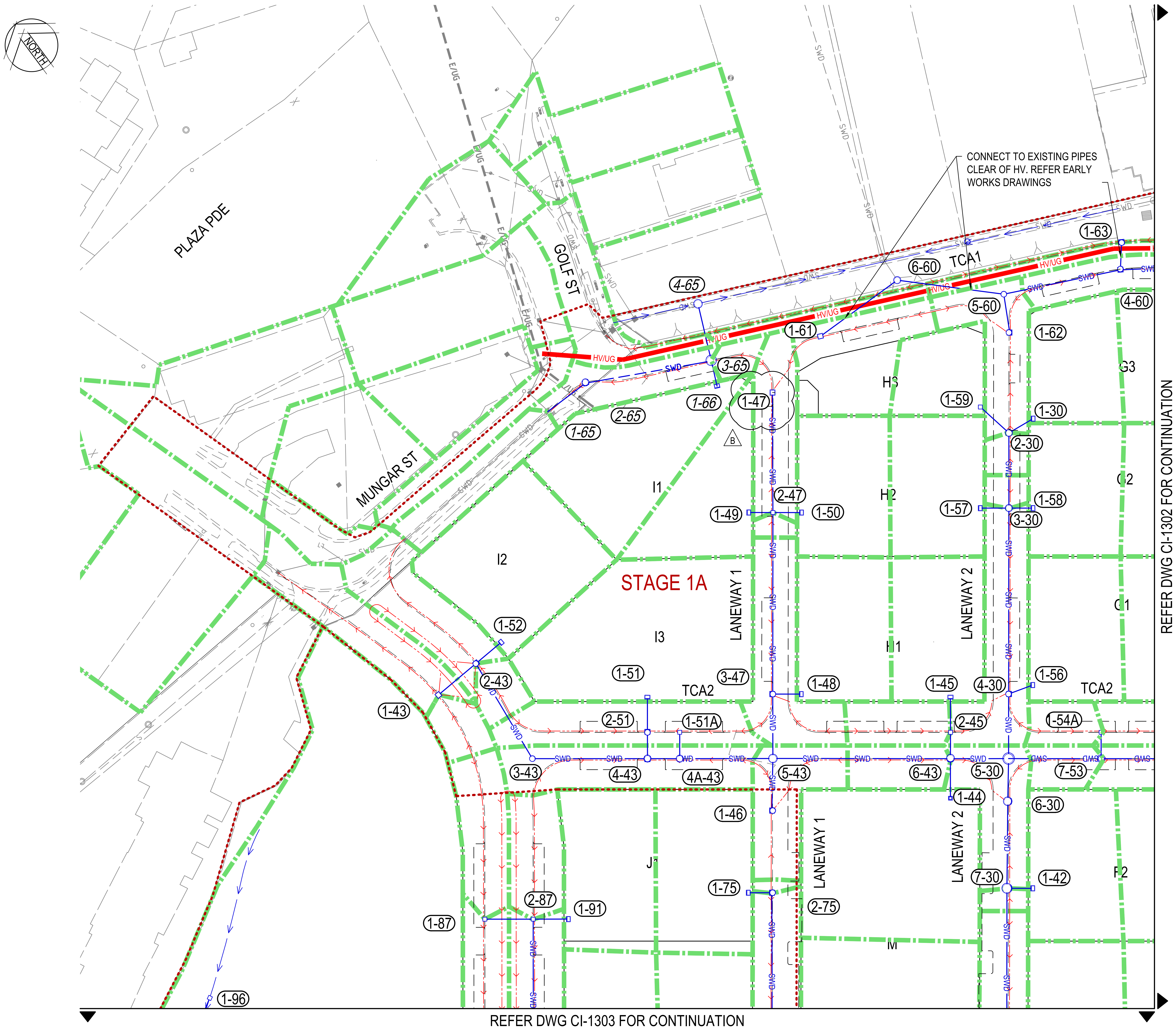
** Based on 1% AEP Strom Surge Level*

DATE PLOTTED: 20 September 2018 2:24 PM BY : CHASE KEMPE

XREF's: X-TITLE BORDER; X-249402 RP BASE EXTERNAL CADASTRE 150302; X-249402 RP BASE; X-249402 LANDSCAPE - CORSO; X-249402 EXTERNAL ROADWORKS PROJEX; X-249402 DESIGN STAGE 1; X-249402-EXISTING; STG01 drainage pipes pits & catchments; X-249402 BULK EWRKS STAGE 1; X-249402 AWCS STAGE 01; X-249402 AWCS STAGE 02

CAD File: P:\249402 MCC Design Package 1\Design\ACAD_CIVIL WORKS STAGE 01\249402-CI-1301 STORMWATER DRAINAGE PLAN.dwg

NOTE:
SPEL STORMSACK 200 MICRON LITTER BASKETS
(OR APPROVED EQUIVALENT) ARE TO BE
PROVIDED ON ALL FIELD & GULLY INLETS.



PLAN

SCALE A1 - 1 : 500
A3 - 1 : 1000

LEGEND:

🟩	STORMWATER CATCHMENT BOUNDARY
→	DRAINAGE SWALE
○ SWD ▣ SWD	STORMWATER PIPE AND MANHOLE/PIT
1-1	MANHOLE No. - LINE No.
→	SUBSOIL DRAINAGE
▨	OVERLAND FLOW PATH EASEMENT
🟥	STAGE BOUNDARY
HV/UG	EXISTING UG HV ELECTRICAL

NOTES:

1. REFER TO DRAWINGS 249402-CI-CI-1311 TO 249402-CI-CI-1320 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS.
2. CATCHMENT NAME IS SAME AS PIT NUMBER UNLESS OTHERWISE NOTED.
3. REFER TO DRAWING 249402-CI-CI-1341 TO 249402-CI-CI-1346 FOR STORMWATER DRAINAGE CALCULATIONS TABLE.
4. CONTRACTOR TO SURVEY STORMWATER LINES AT CONNECTION POINTS DURING SITE ESTABLISHMENT AND FORWARD TO ENGINEERS FOR ASSESSMENT PRIOR TO CONSTRUCTION.
5. CONTRACTOR TO SURVEY STORMWATER LINES AT FUTURE CONNECTION POINTS, AS THEY ARE BUILT AND SENT TO ENGINEERS ASAP.

5 0 5 10 15 20 25m
Scale 1:500

Rev.	Date	Description	Des.	Verif.	Appd.
B	30/05/2018	STRUCTURE 1-47 LOCATION UPDATED	CK	DH	BK
A	24/03/2017	ISSUED FOR CONSTRUCTION	CK	DH	BK

SunCentral®
Maroochydore

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Shaping the Future

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Web: www.cardno.com.au

Drawn PM LC CK	Date 7/10/2015
Checked DH	Date 7/10/2015
Designed CK	Date 7/10/2015
Verified RB	Date 7/10/2015
Approved	7884 DATE; 1/03/2017

Client SUNCENTRAL MAROOCHYDORE PTY LTD

Project MAROOCHYDORE CITY CENTRE
CIVIL WORKS - STAGE 1

Title STORMWATER DRAINAGE PLAN - SHEET 1

Status FOR CONSTRUCTION

DATUM	Orig. Date	Scale	Size
AHD	17/02/2016	AS SHOWN	A1

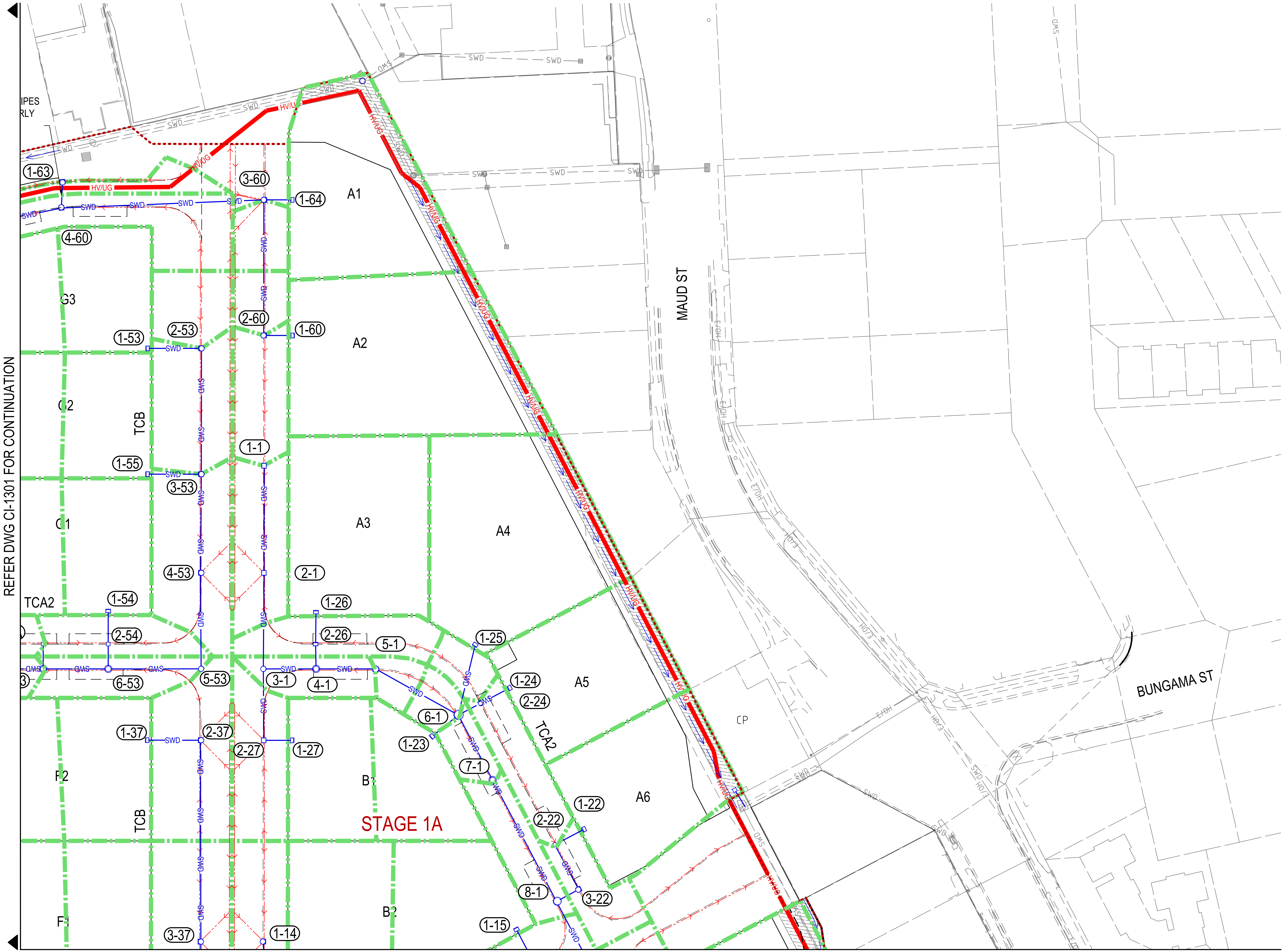
Drawing Number	Revision
249402-CI-1301	B

XREF's: X-TITLE BORDER; X-249402 RP BASE EXTERNAL CADASTRE 150302; X-249402 RP BASE; X-249402 LANDSCAPE - CORSO; X-249402 EXTERNAL ROADWORKS PROJEX; X-249402 DESIGN STAGE 1; X-249402-EXISTING; STG01 drainage pipes pits & catchments; X-249402 BULK EWRKS STAGE 1; X-249402 AWCS STAGE 01; X-249402 AWCS STAGE 02

CAD File: P:\249402 MCC Design Package 1\Design\ACAD_CIVIL WORKS STAGE 01\249402-CI-1301 STORMWATER DRAINAGE PLAN.dwg

DATE PLOTTED: 20 September 2018 2:25 PM BY : CHASE KEMPE

REFER DWG CI-1301 FOR CONTINUATION



REFER DWG CI-1304 FOR CONTINUATION

NOTE:

SPEL STORMSACK 200 MICRON LITTER BASKETS (OR APPROVED EQUIVALENT) ARE TO BE PROVIDED ON ALL FIELD & GULLY INLETS.

LEGEND:

━·━·━	STORMWATER CATCHMENT BOUNDARY
→ →	DRAINAGE SWALE
○ SWD ▣ SWD	STORMWATER PIPE AND MANHOLE/PIT
(1-1)	MANHOLE No. - LINE No.
―›―·―	SUBSOIL DRAINAGE
▨	OVERLAND FLOW PATH EASEMENT
·······	STAGE BOUNDARY
― HV/UG ―	EXISTING UG HV ELECTRICAL

NOTES:

1. REFER TO DRAWINGS 249402-CI-CI-1311 TO 249402-CI-CI-1320 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS.
2. CATCHMENT NAME IS SAME AS PIT NUMBER UNLESS OTHERWISE NOTED.
3. REFER TO DRAWING 249402-CI-CI-1341 TO 249402-CI-CI-1346 FOR STORMWATER DRAINAGE CALCULATIONS TABLE.
4. CONTRACTOR TO SURVEY STORMWATER LINES AT CONNECTION POINTS DURING SITE ESTABLISHMENT AND FORWARD TO ENGINEERS FOR ASSESSMENT PRIOR TO CONSTRUCTION.
5. CONTRACTOR TO SURVEY STORMWATER LINES AT FUTURE CONNECTION POINTS, AS THEY ARE BUILT AND SENT TO ENGINEERS ASAP.

PLAN

SCALE A1 - 1 : 500
A3 - 1 : 1000

5 0 5 10 15 20 25m
Scale 1:500

Rev.	Date	Description	Des.	Verif.	Appd.
A	24/03/2017	ISSUED FOR CONSTRUCTION	CK	DH	BK

SunCentral
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Drawn PM LC CK	Date 7/10/2015
Checked DH	Date 7/10/2015
Designed CK	Date 7/10/2015
Verified RB	Date 7/10/2015
Approved	7884 DATE; 1/03/2017

Client SUNCENTRAL MAROOCHYDORE PTY LTD

Project MAROOCHYDORE CITY CENTRE
CIVIL WORKS - STAGE 1

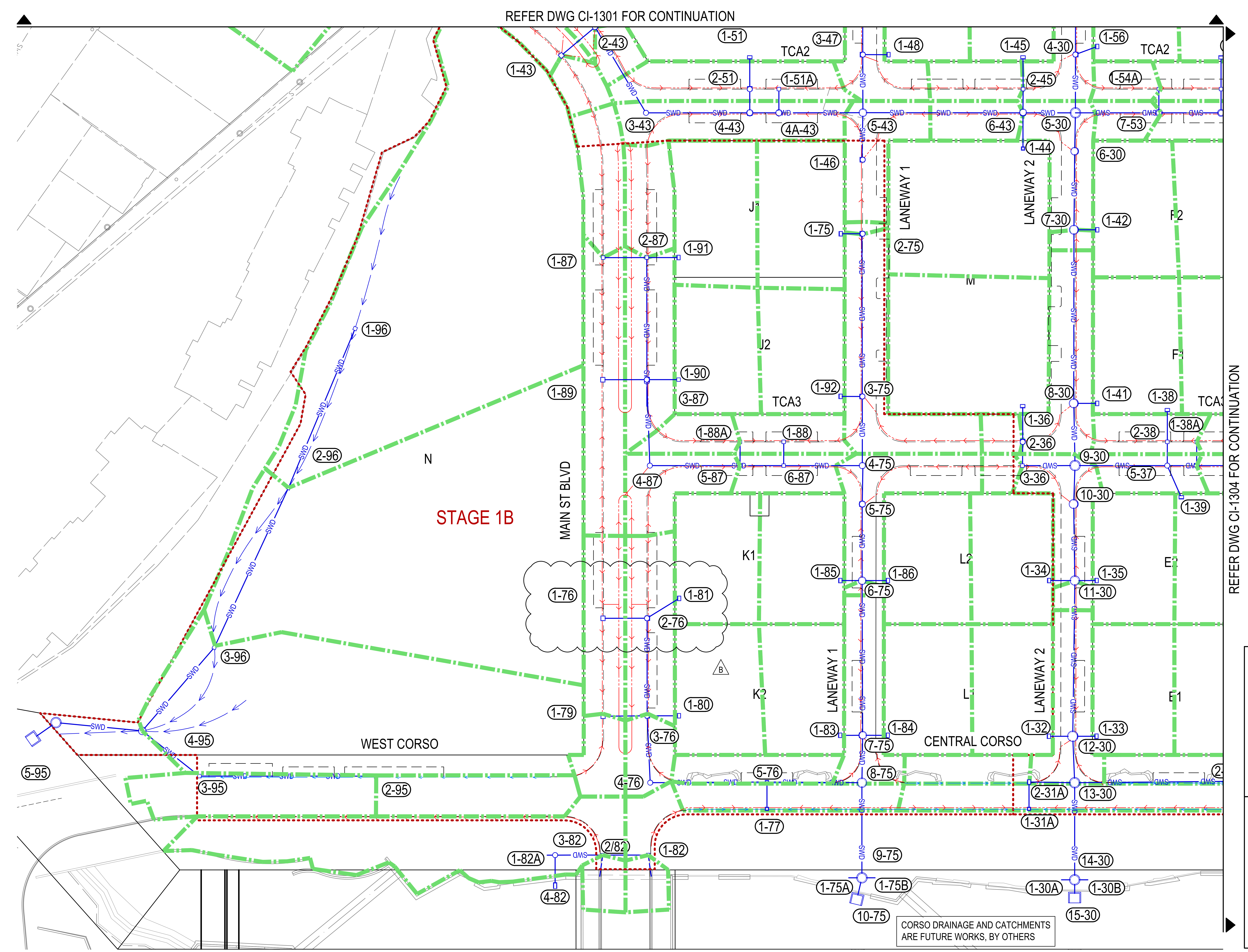
Title STORMWATER DRAINAGE PLAN - SHEET 2

Status FOR CONSTRUCTION

DATUM	Orig. Date	Scale	Size
AHD	2/17/2016	AS SHOWN	A1

Drawing Number	Revision
249402-CI-1302	A

REFER DWG CI-1301 FOR CONTINUATION



REFER DWG CI-1304 FOR CONTINUATION

NORTH

NOTE:
SPEL STORMSACK 200 MICRON LITTER BASKETS
(OR APPROVED EQUIVALENT) ARE TO BE
PROVIDED ON ALL FIELD & GULLY INLETS.

LEGEND:

🟩	STORMWATER CATCHMENT BOUNDARY
→	DRAINAGE SWALE
○ SWD ─ ▢SWD	STORMWATER PIPE AND MANHOLE/PIT
(1-1)	MANHOLE No. - LINE No.
→ - - →	SUBSOIL DRAINAGE
▨	OVERLAND FLOW PATH EASEMENT
┅	STAGE BOUNDARY
HV/UG	EXISTING UG HV ELECTRICAL

NOTES:

1. REFER TO DRAWINGS 249402-CI-CI-1311 TO 249402-CI-CI-1320 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS.
2. CATCHMENT NAME IS SAME AS PIT NUMBER UNLESS OTHERWISE NOTED.
3. REFER TO DRAWING 249402-CI-CI-1341 TO 249402-CI-CI-1346 FOR STORMWATER DRAINAGE CALCULATIONS TABLE.
4. CONTRACTOR TO SURVEY STORMWATER LINES AT CONNECTION POINTS DURING SITE ESTABLISHMENT AND FORWARD TO ENGINEERS FOR ASSESSMENT PRIOR TO CONSTRUCTION.
5. CONTRACTOR TO SURVEY STORMWATER LINES AT FUTURE CONNECTION POINTS, AS THEY ARE BUILT AND SENT TO ENGINEERS ASAP.

PLAN

SCALE A1 - 1 : 500
A3 - 1 : 1000

5 0 5 10 15 20 25m
Scale 1:500

Rev.	Date	Description	Des.	Verif.	Appd.
B	14/09/2018	MAIN ST BLVD PITS REVISED	CK	DH	TH
A	24/03/2017	ISSUED FOR CONSTRUCTION	CK	DH	BK

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Drawn	PM LC CK	Date 7/10/2015
Checked	DH	Date 7/10/2015
Designed	CK	Date 7/10/2015
Verified	RB	Date 7/10/2015
Approved	7884	DATE; 1/03/2017

Client SUNCENTRAL MAROOCHYDORE PTY LTD

Project MAROOCHYDORE CITY CENTRE
CIVIL WORKS - STAGE 1

Title STORMWATER DRAINAGE PLAN - SHEET 3

Status FOR CONSTRUCTION

DATUM	Orig. Date	Scale	Size
AHD	17/02/2016	AS SHOWN	A1

Drawing Number	Revision
249402-CI-1303	B

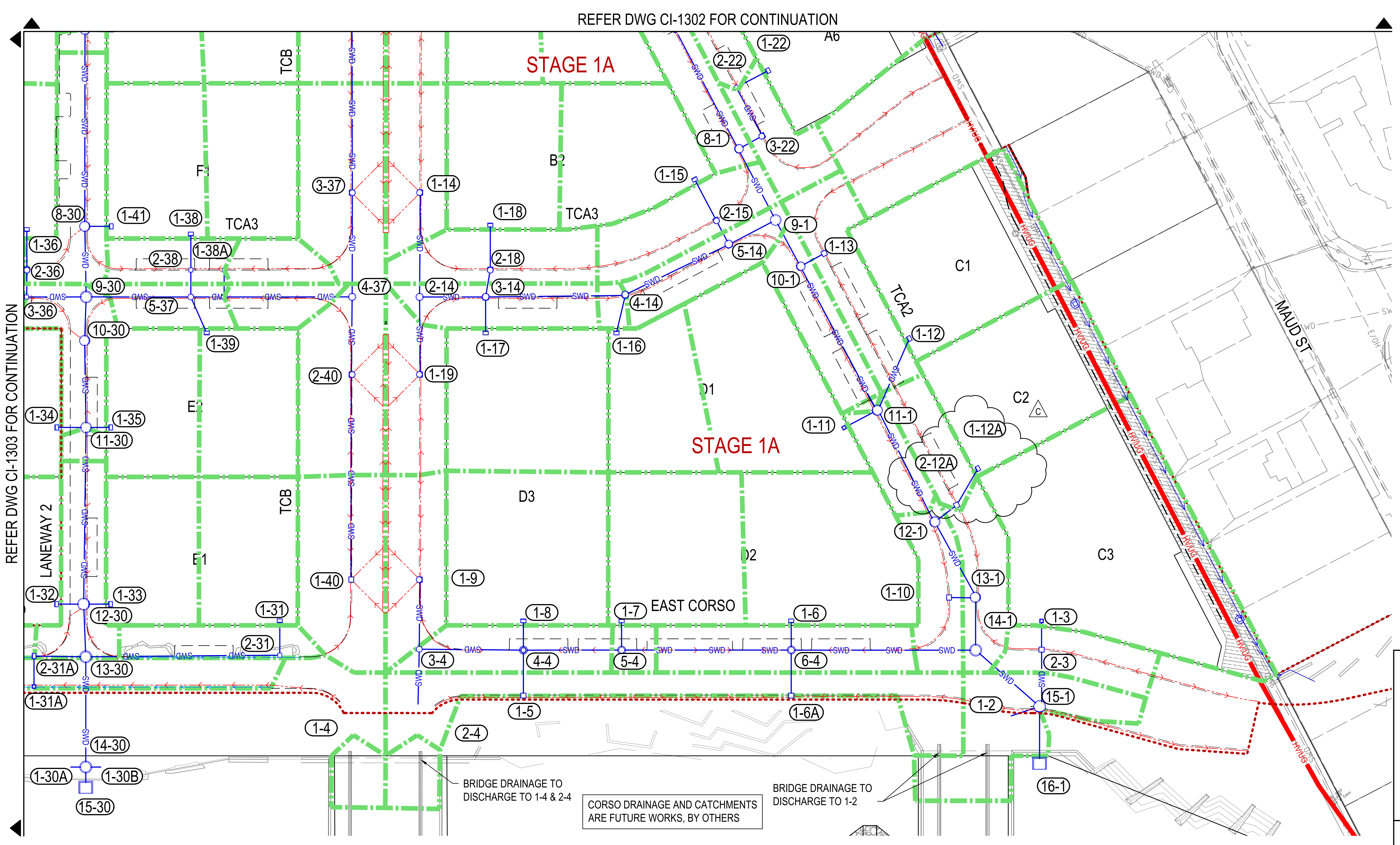
XREF's: X-TITLE BORDER; X-249402 RP BASE EXTERNAL CADASTRE 150302; X-249402 RP BASE; X-249402 LANDSCAPE - CORSO; X-249402 EXTERNAL ROADWORKS PROJEX; X-249402 DESIGN STAGE 1; X-249402-EXISTING; STG01 drainage pipes pits & catchments; X-249402 BULK EWRKS STAGE 1; X-249402 AWCS STAGE 01; X-249402 AWCS STAGE 02
CAD File: P:\249402 MCC Design Package 1\Design\ACAD_CIVIL WORKS STAGE 01\249402-CI-1301 STORMWATER DRAINAGE PLAN.dwg
DATE PLOTTED: 20 September 2018 2:25 PM BY : CHASE KEMPE

DATE PLOTTED: 20 September 2018 2:26 PM BY : CHASE KEMPE

XREF's: X-TITLE BORDER; X-249402 RP BASE EXTERNAL CADASTRE 150302; X-249402 RP BASE; X-249402 LANDSCAPE - CORSO; X-249402 EXTERNAL ROADWORKS PROJEX; X-249402 DESIGN STAGE 1; X-249402-EXISTING; STG01 drainage pipes pits & catchments; X-249402 BULK EWRKS STAGE 1; X-249402 AWCS STAGE 01; X-249402 AWCS STAGE 02

CAD File: P:\249402 MCC Design Package 1\Design\ACAD_CIVIL WORKS STAGE 01\249402-CI-1301 STORMWATER DRAINAGE PLAN.dwg

NOTE:
SPEL STORMSACK 200 MICRON LITTER BASKETS (OR APPROVED EQUIVALENT) ARE TO BE PROVIDED ON ALL FIELD & GULLY INLETS.



LEGEND:

▬ · ▬ · ▬	STORMWATER CATCHMENT BOUNDARY
→ → →	DRAINAGE SWALE
─○─SWD──▢─SWD─	STORMWATER PIPE AND MANHOLE/PIT
(1-1)	MANHOLE No. - LINE No.
→·→·→	SUBSOIL DRAINAGE
▨	OVERLAND FLOW PATH EASEMENT
········	STAGE BOUNDARY
── HV/UG ──	EXISTING UG HV ELECTRICAL

NOTES:

1. REFER TO DRAWINGS 249402-CI-CI-1311 TO 249402-CI-CI-1320 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS.
2. CATCHMENT NAME IS SAME AS PIT NUMBER UNLESS OTHERWISE NOTED.
3. REFER TO DRAWING 249402-CI-CI-1341 TO 249402-CI-CI-1346 FOR STORMWATER DRAINAGE CALCULATIONS TABLE.
4. CONTRACTOR TO SURVEY STORMWATER LINES AT CONNECTION POINTS DURING SITE ESTABLISHMENT AND FORWARD TO ENGINEERS FOR ASSESSMENT PRIOR TO CONSTRUCTION.
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5 0 5 10 15 20 25m
Scale 1:500

PLAN

SCALE A1 - 1 : 500
A3 - 1 : 1000

Rev.	Date	Description	Des.	Verif.	Appd.
C	14/06/2017	LINE 12A RENUMBERED	CK	DH	BK
B	13/06/2017	LOT C2/3 BDY & STORMWATER REVISED	CK	DH	BK
A	24/03/2017	ISSUED FOR CONSTRUCTION	CK	DH	BK

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Checked	DH	Date 7/10/2015
Designed	CK	Date 7/10/2015
Verified	RB	Date 7/10/2015
Approved	7884	DATE; 1/03/2017

Client SUNCENTRAL MAROOCHYDORE PTY LTD

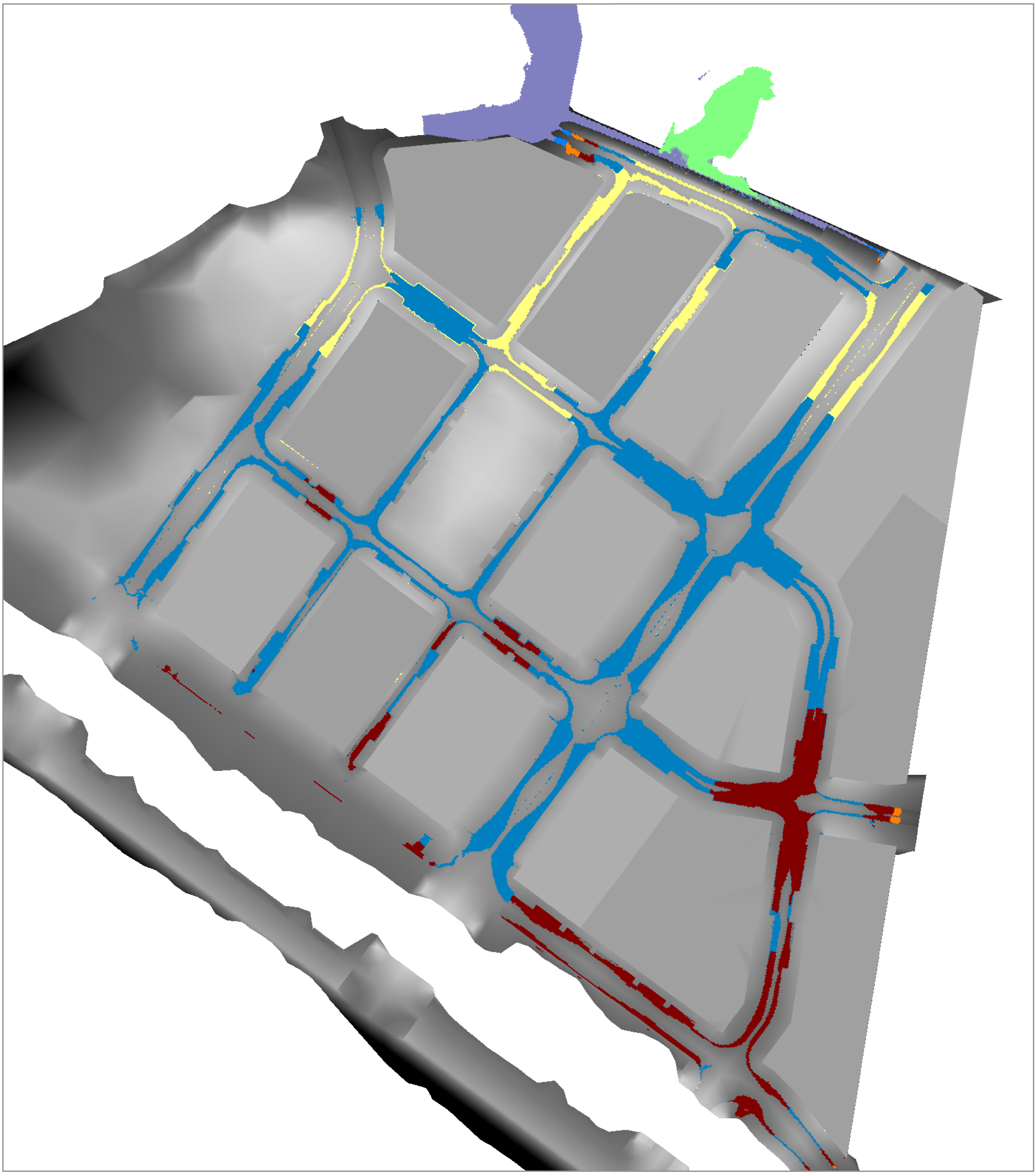
Project MAROOCHYDORE CITY CENTRE
CIVIL WORKS - STAGE 1

Title STORMWATER DRAINAGE PLAN - SHEET 4

Status FOR CONSTRUCTION

DATUM	Orig. Date	Scale	Size
AHD	2/17/2016	AS SHOWN	A1

Drawing Number 249402-CI-1304
Revision C



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Scale: 1:1,500

Peak Water Level (mAHD)

🟩	2.00 to 2.25
🟪	2.25 to 2.50
🟦	2.50 to 2.75
🟧	2.75 to 3.00
🟥	3.00 to 3.25
🟦	3.25 to 3.50
🟨	3.50 to 3.75

Figure 1

1% AEP Design
Peak Flood Level
with Climate Change

Stage 1 Internal Drainage

SHEET	A3
Project No:	2492-02
Date:	30 October 2015
Revision Number:	
Designed by:	
Client Name:	SunCentral Maroochydore

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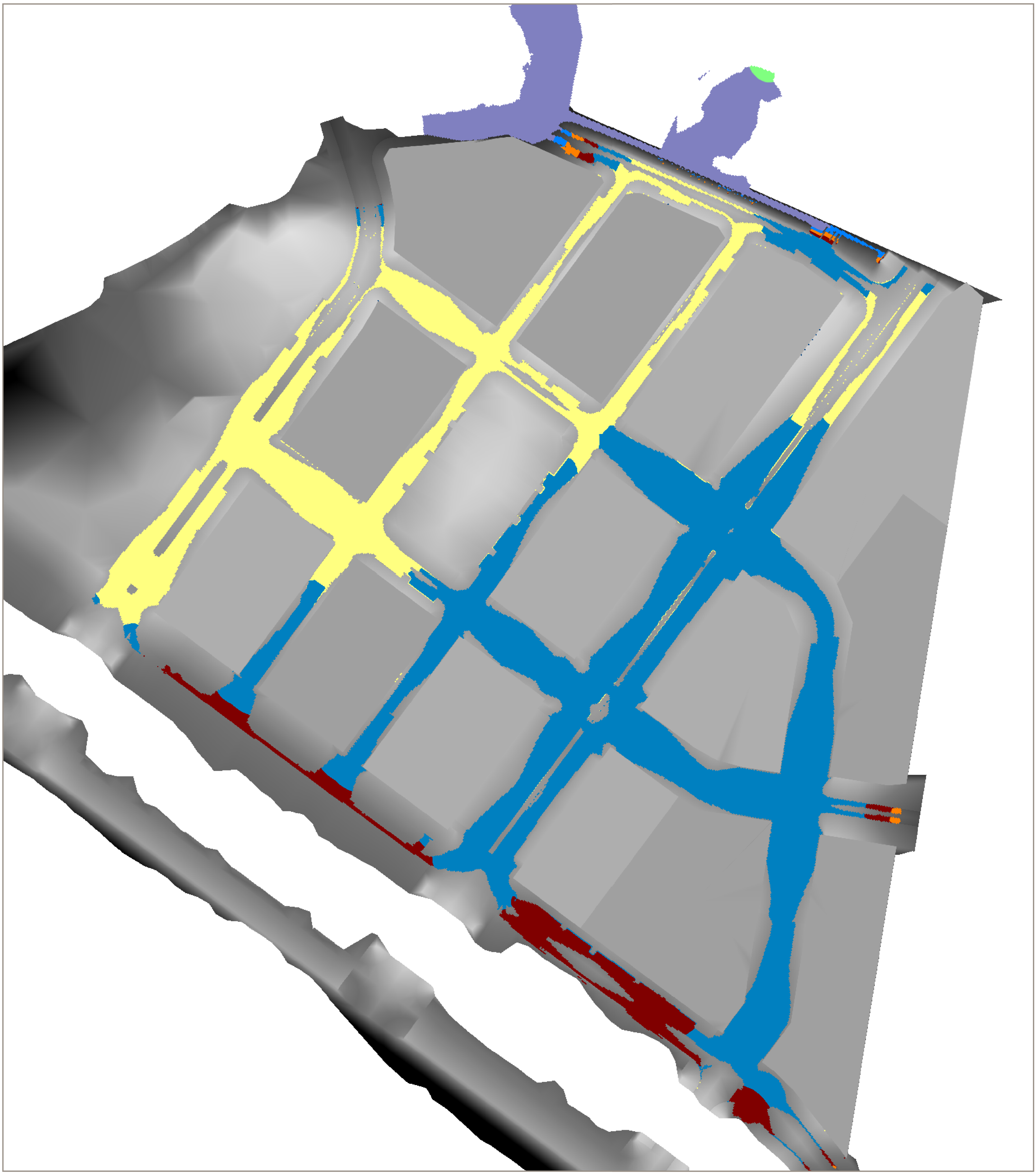

O:\2494-02 MCC\TUFLOW_Stg1_Internal\Figures

Scale: 1:1,500

15 0 15 30 45

Metres

N
W E
S

SHEET	A3
Project No:	2492-02
Date:	30 October 2015
Revision Number:	
Designed by:	
Client Name:	SunCentral Maroochydore

Peak Water Level (mAHD)

🟩	2.00 to 2.25
🟪	2.25 to 2.50
🟦	2.50 to 2.75
🟧	2.75 to 3.00
🟥	3.00 to 3.25
🟦	3.25 to 3.50
🟨	3.50 to 3.75

Figure 2

1% AEP Peak Flood Level with Climate Change and Complete Inlet Blockage

Stage 1 Internal Drainage

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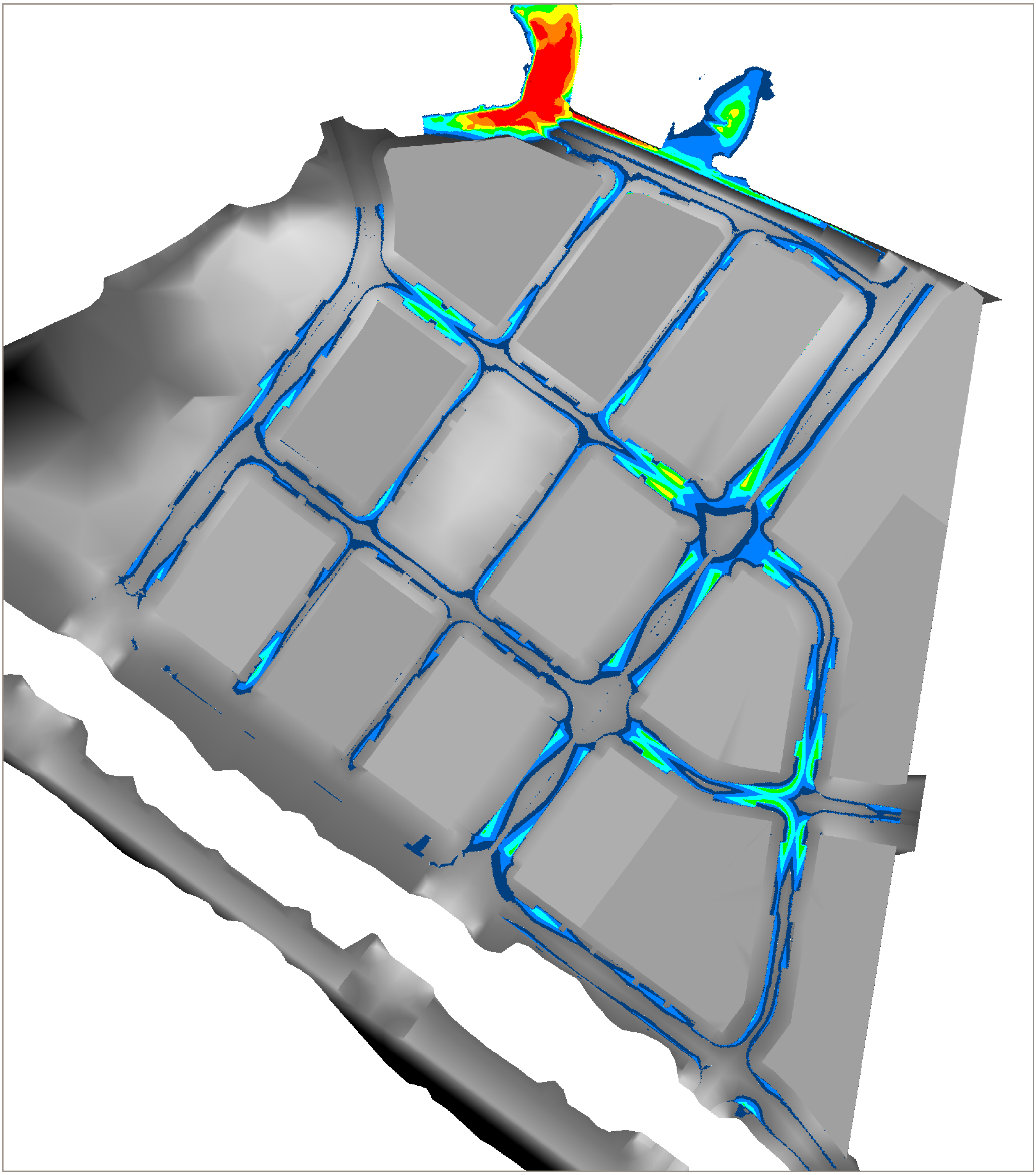
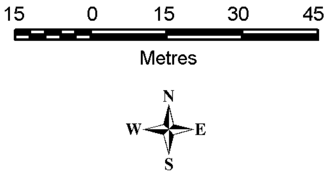


Scale: 1:1,500



Depth (m)

☐	0.00 to 0.01
🟦	0.01 to 0.05
🟦	0.05 to 0.10
🟦	0.10 to 0.15
🟩	0.15 to 0.20
🟨	0.20 to 0.25
🟧	0.25 to 0.30
🟥	0.30 to 0.50

Figure 3

1% AEP Design Peak Depth with Climate Change

Stage 1 Internal Drainage

SHEET	A3
Project No:	2492-02
Date:	30 October 2015
Revision Number:	
Designed by:	
Client Name:	SunCentral Maroochydore

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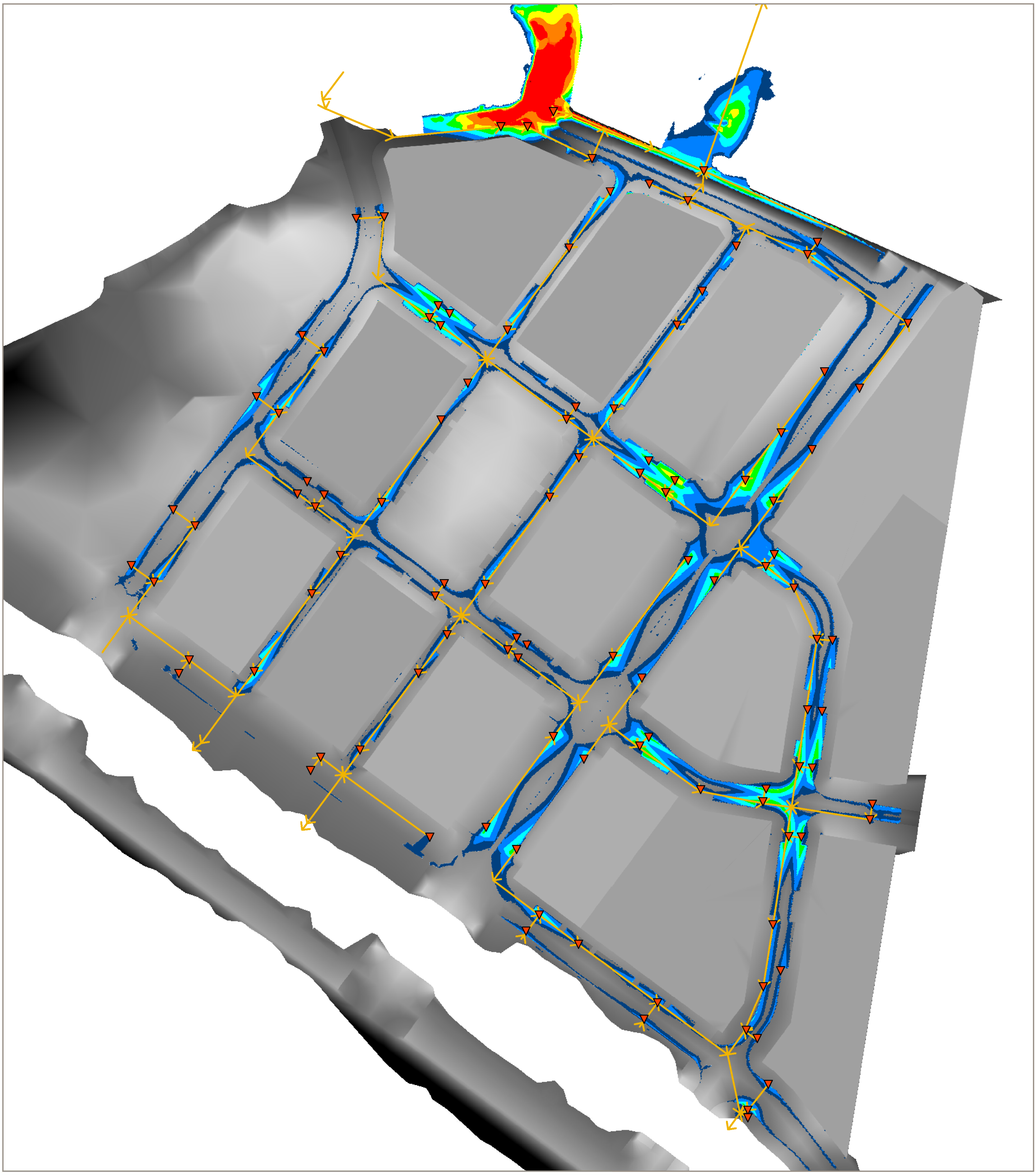

O:\2494-02 MCC\TUFLOW_Stg1_Internal\Figures

Scale: 1:1,500

15 0 15 30 45

Metres

N W E S

SHEET	A3
Project No:	2492-02
Date:	30 October 2015
Revision Number:	
Designed by:	
Client Name:	SunCentral Maroochydore

Depth (m)

☐	0.00 to 0.01
■	0.01 to 0.05
■	0.05 to 0.10
■	0.10 to 0.15
🟩	0.15 to 0.20
🟨	0.20 to 0.25
🟧	0.25 to 0.30
🟥	0.30 to 0.50

▼	Inlet Pits
→	Stormwater Drainage

Figure 4

1% AEP Design Peak Depth with Climate Change

Stage 1 Internal Drainage

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APPENDIX D

Rational Calculations

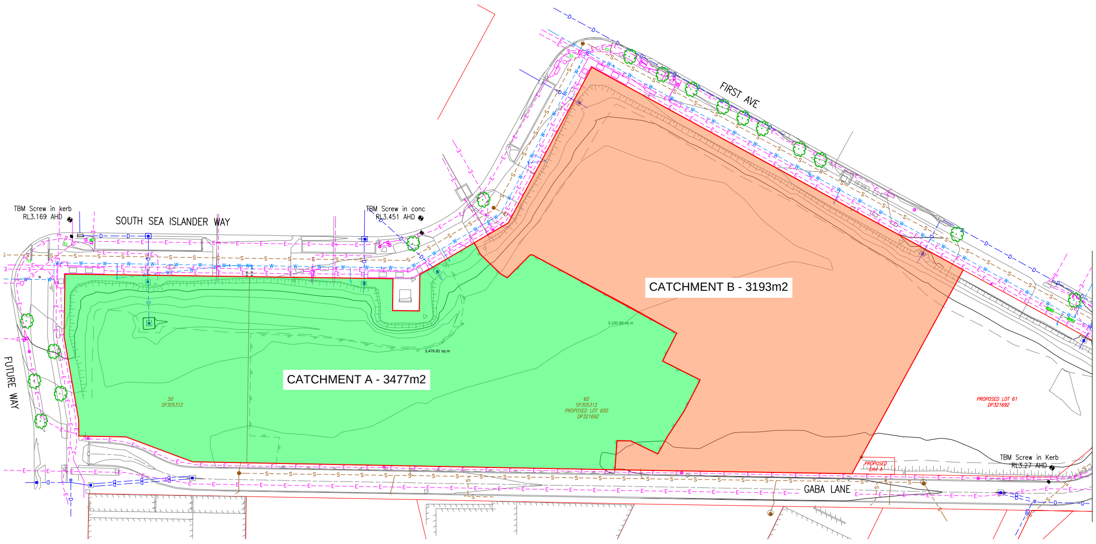
RATIONAL METHOD CALCULATIONS - LOT 600 FIRST AVENUE, MAROOCHYDORE QLD 4558

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING

PROJECT NO:	571-002	DATE:	03/07/2024
BY:	WB	REVISION	1

CATCHMENT DEFINITION

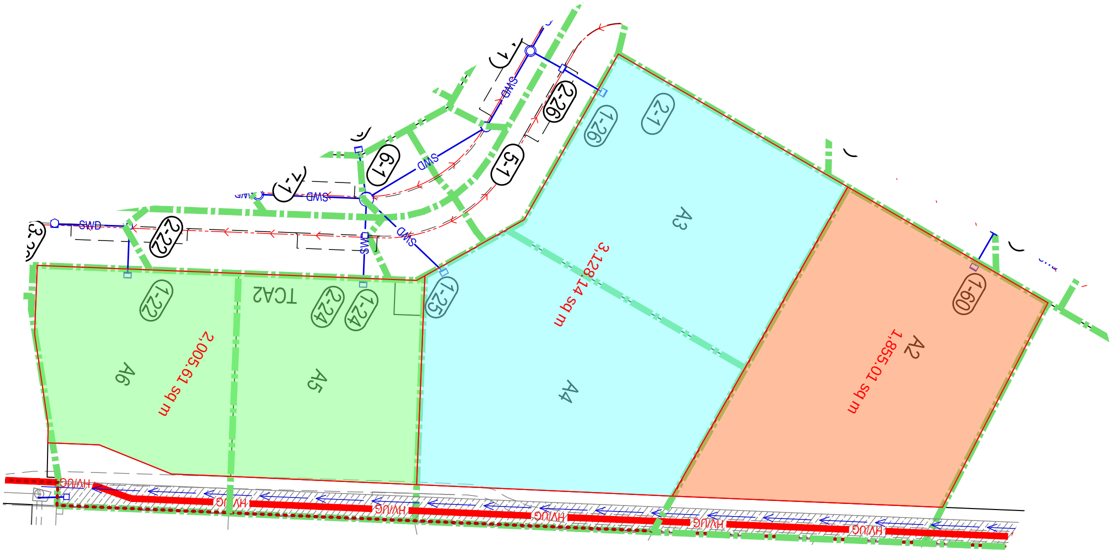
Pre-Development Catchment Areas



Catchment EA (20% impervious) = 3,477m2 = 0.3477ha
Catchment EB (20% impervious) = 3,193m2 = 0.3193ha

Total = 0.6670ha

Proposed Development Catchment Area



Catchment PA (90% impervious) = 1,855 = 0.1855ha
Catchment PB (90% impervious) = 3,128 = 0.3128ha
Catchment PC (90% impervious) = 2,005 = 0.2005ha

RATIONAL METHOD CALCULATIONS - LOT 600 FIRST AVENUE, MAROOCHYDORE QLD 4558

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING

PROJECT NO: 571-002
DATE: 03/07/2024
BY: WB
REVISION 1

TIME OF CONCENTRATION FOR PREDEVLOPMENT CONDITIONS

Friend's equation:

$$t = (107n\,L^{0.333})/S^{0.2} \qquad (4.5)$$

where:

t = overland sheet flow travel time (min)
L = overland sheet flow path length (m)
n = Horton's surface roughness factor
S = slope of surface (%)

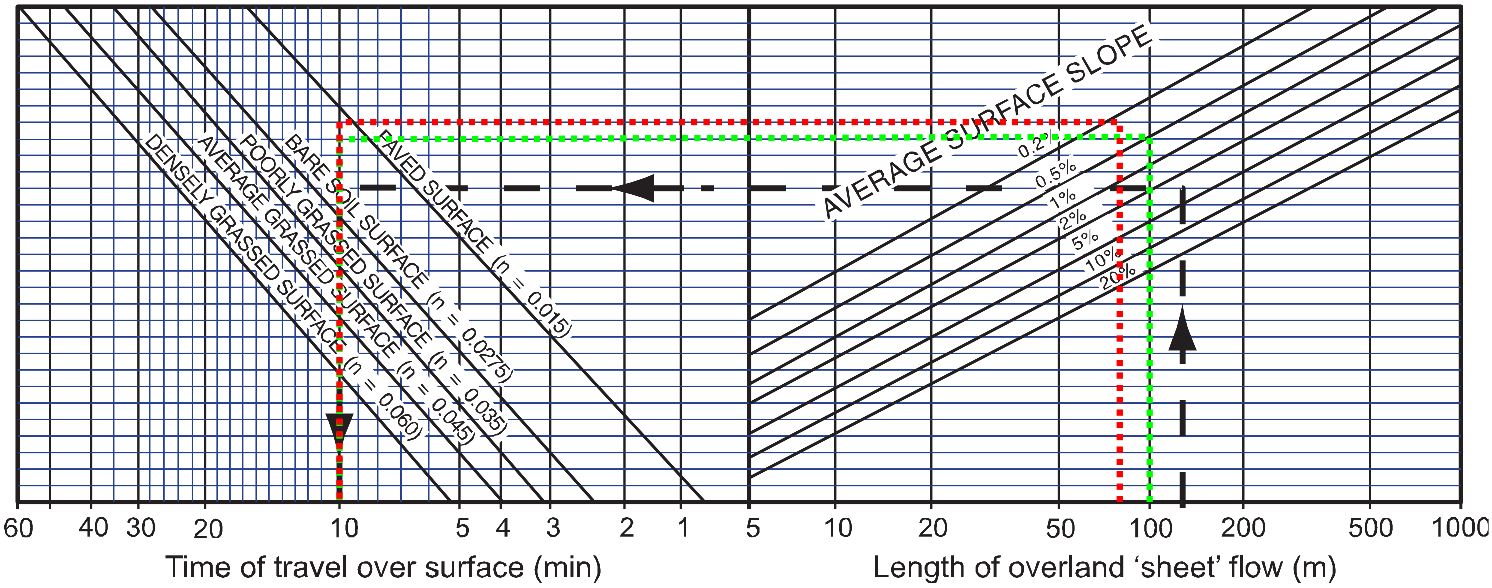


Figure 4.4 – Overland sheet flow times (shallow sheet flow only) (source: ARR, 1977)

Adopted Times

CATCHMENT A time of concentration - 10mins
CATCHMENT B time of concentration - 10mins

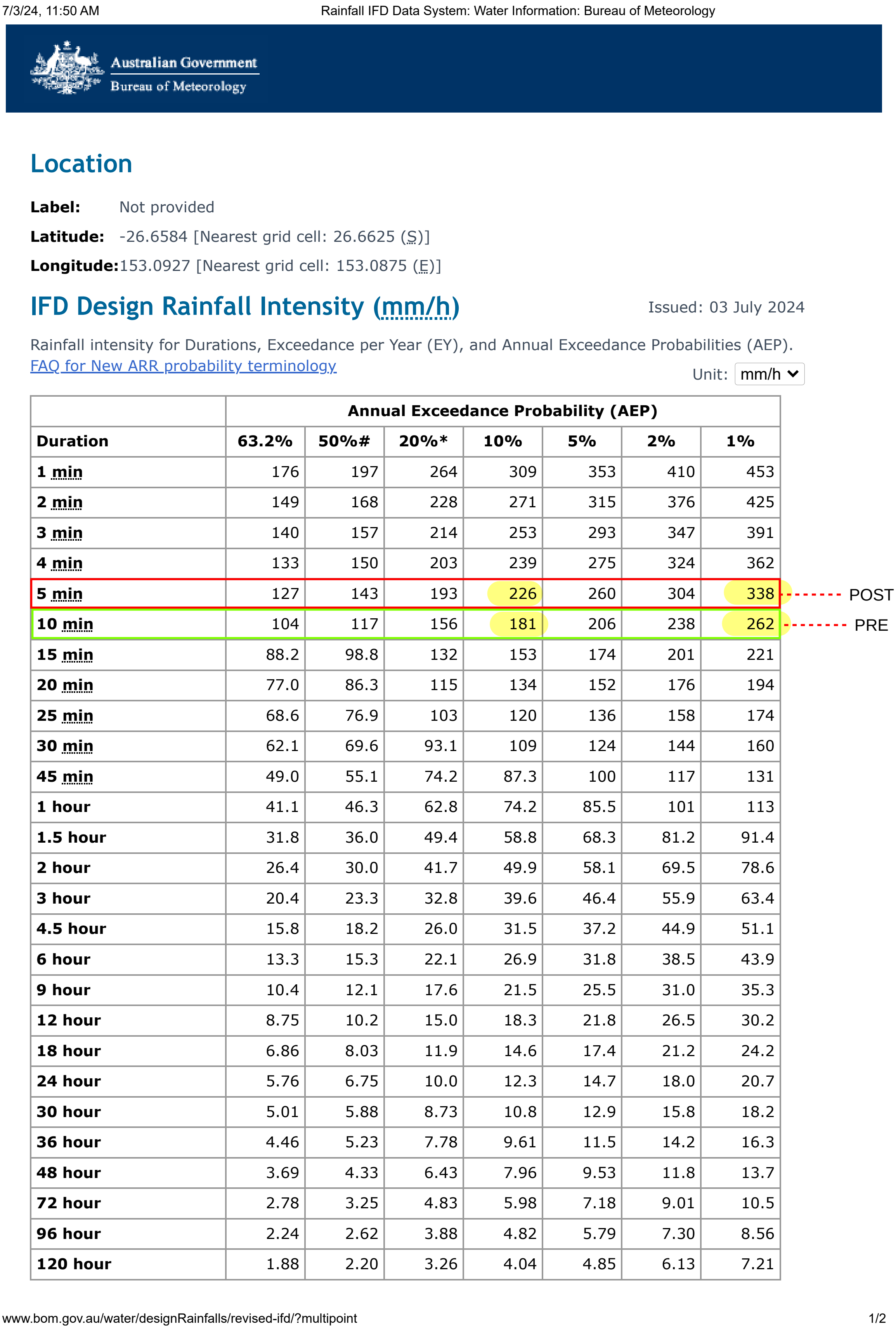
Standard time of concentration 5mins used for Proposed Catchments

RATIONAL METHOD CALCULATIONS - LOT 600 FIRST AVENUE, MAROOCHYDORE QLD 4558

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING

PROJECT NO:	571-002	DATE:	03/07/2024
BY:	WB	REVISION	1

IFD RAINFALL DATA



7/3/24, 11:50 AM Rainfall IFD Data System: Water Information: Bureau of Meteorology

Australian Government
Bureau of Meteorology

Location

Label: Not provided

Latitude: -26.6584 [Nearest grid cell: 26.6625 (S)]

Longitude: 153.0927 [Nearest grid cell: 153.0875 (E)]

IFD Design Rainfall Intensity (mm/h)

Issued: 03 July 2024

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
FAQ for New ARR probability terminology

Unit: mm/h

	Annual Exceedance Probability (AEP)							
Duration	**63.2%**	**50%#**	**20%***	**10%**	**5%**	**2%**	**1%**	
1 min	176	197	264	309	353	410	453	
2 min	149	168	228	271	315	376	425	
3 min	140	157	214	253	293	347	391	
4 min	133	150	203	239	275	324	362	
5 min	127	143	193	226	260	304	338	POST
10 min	104	117	156	181	206	238	262	PRE
15 min	88.2	98.8	132	153	174	201	221	
20 min	77.0	86.3	115	134	152	176	194	
25 min	68.6	76.9	103	120	136	158	174	
30 min	62.1	69.6	93.1	109	124	144	160	
45 min	49.0	55.1	74.2	87.3	100	117	131	
1 hour	41.1	46.3	62.8	74.2	85.5	101	113	
1.5 hour	31.8	36.0	49.4	58.8	68.3	81.2	91.4	
2 hour	26.4	30.0	41.7	49.9	58.1	69.5	78.6	
3 hour	20.4	23.3	32.8	39.6	46.4	55.9	63.4	
4.5 hour	15.8	18.2	26.0	31.5	37.2	44.9	51.1	
6 hour	13.3	15.3	22.1	26.9	31.8	38.5	43.9	
9 hour	10.4	12.1	17.6	21.5	25.5	31.0	35.3	
12 hour	8.75	10.2	15.0	18.3	21.8	26.5	30.2	
18 hour	6.86	8.03	11.9	14.6	17.4	21.2	24.2	
24 hour	5.76	6.75	10.0	12.3	14.7	18.0	20.7	
30 hour	5.01	5.88	8.73	10.8	12.9	15.8	18.2	
36 hour	4.46	5.23	7.78	9.61	11.5	14.2	16.3	
48 hour	3.69	4.33	6.43	7.96	9.53	11.8	13.7	
72 hour	2.78	3.25	4.83	5.98	7.18	9.01	10.5	
96 hour	2.24	2.62	3.88	4.82	5.79	7.30	8.56	
120 hour	1.88	2.20	3.26	4.04	4.85	6.13	7.21	

www.bom.gov.au/water/designRainfalls/revised-ifd/?multipoint 1/2

RATIONAL METHOD CALCULATIONS - LOT 600 FIRST AVENUE, MAROOCHYDORE QLD 4558

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING

PROJECT NO: 571-002 DATE: 03/07/2024
BY: WB REVISION 1

$$Q_y = (C_y \, . \, {}^tI_y \, . \, A)/360 \qquad (4.2)$$

where:

Q_y = peak flow rate (m^3/s) for annual exceedence probability (AEP) of 1 in *'y'* years
C_y = coefficient of discharge (dimensionless) for AEP of 1 in *'y'* years
A = area of catchment (ha)
${}^tI_y$ = average rainfall intensity (mm/h) for a design duration of *'t'* hours and an AEP of 1 in *'y'* years
t = the nominal design storm duration as defined by the time of concentration (t_c)

Table 4.5.2 – Table of frequency factors

AEP (%)	ARI (years)	Frequency factor (F_y)
63%	1	0.80
39%	2	0.85
18%	5	0.95
10%	10	1.00
5%	20	1.05
2%	50	1.15
1%	100	1.20

Table 4.5.3 – Table of C_{10} values

Intensity (mm/hr) ${}^1I_{10}$	Fraction impervious f_i						
	0.00	**0.20**	**0.40**	**0.60**	**0.80**	**0.90**	**1.00**
39-44	Refer to Table 4.5.4	0.44	0.55	0.67	0.78	0.84	0.90
45-49		0.49	0.60	0.70	0.80	0.85	0.90
50-54		0.55	0.64	0.72	0.81	0.86	0.90
55-59		0.60	0.68	0.75	0.83	0.86	0.90
60-64		0.65	0.72	0.78	0.84	0.87	0.90
65-69		0.71	0.76	0.80	0.85	0.88	0.90
70-90		0.74	0.78	0.82	0.86	0.88	0.90

CATCHMENT EA (EXISTING)

AEP %	Frequency Factor (Fy)	I (mm/h) for 1hr 1in10	Fraction Impervious (Fi)	C10	Coefficient of discharge (Cy)	I (mm/h (10mins)	Area (ha)	Q (m3/s)	CC Factor (+20%) (m3/s)	L/s
63	0.80	74.2	0.2	0.74	0.59	104	0.3477	0.0595	0.0714	71.36
39	0.85				0.63	117		0.0711	0.0853	85.29
18	0.95				0.70	156		0.1059	0.1271	127.11
10	1.00				0.74	181		0.1294	0.1552	155.24
5	1.05				0.78	206		0.1546	0.1855	185.51
2	1.15				0.85	238		0.1956	0.2347	234.74
1	1.20				0.89	262		0.2247	0.2696	269.65

CATCHMENT EB (EXISTING)

AEP %	Frequency Factor (Fy)	I (mm/h) for 1hr 1in10	Fraction Impervious (Fi)	C10	Coefficient of discharge (Cy)	I (mm/h (10mins)	Area (ha)	Q (m3/s)	CC Factor (+20%) (m3/s)	L/s
63	0.80	74.2	0.2	0.74	0.59	104	0.3193	0.0546	0.0655	65.5289
39	0.85				0.63	117		0.0653	0.0783	78.3275
18	0.95				0.70	156		0.0973	0.1167	116.7233
10	1.00				0.74	181		0.1188	0.1426	142.5568
5	1.05				0.78	206		0.1420	0.1704	170.3593
2	1.15				0.85	238		0.1796	0.2156	215.5679
1	1.20				0.89	262		0.2064	0.2476	247.6235

CATCHMENT PA (PROPOSED)

AEP %	Frequency Factor (Fy)	I (mm/h) for 1hr 1in10	Fraction Impervious (Fi)	C10	Coefficient of discharge (Cy)	I (mm/h (10mins)	Area (ha)	Q (m3/s)	CC Factor (+20%) (m3/s)	L/s
63	0.80	74.2	0.9	0.88	0.70	127	0.1855	0.0461	0.0553	55.2839
39	0.85				0.75	143		0.0551	0.0661	66.1394
18	0.95				0.84	193		0.0831	0.0998	99.7668
10	1.00				0.88	226		0.1025	0.1230	122.9741
5	1.05				0.92	260		0.1238	0.1485	148.5484
2	1.15				1.01	304		0.1585	0.1902	190.2290
1	1.20				1.06	338		0.1839	0.2207	220.7005

CATCHMENT PB (PROPOSED)

AEP %	Frequency Factor (Fy)	I (mm/h) for 1hr 1in10	Fraction Impervious (Fi)	C10	Coefficient of discharge (Cy)	I (mm/h (10mins)	Area (ha)	Q (m3/s)	CC Factor (+20%) (m3/s)	L/s
63	0.80	74.2	0.9	0.88	0.70	127	0.3128	0.0777	0.0932	93.2227
39	0.85				0.75	143		0.0929	0.1115	111.5278
18	0.95				0.84	193		0.1402	0.1682	168.2322
10	1.00				0.88	226		0.1728	0.2074	207.3655
5	1.05				0.92	260		0.2087	0.2505	250.4902
2	1.15				1.01	304		0.2673	0.3208	320.7743
1	1.20				1.06	338		0.3101	0.3722	372.1569

CATCHMENT PC (PROPOSED)

AEP %	Frequency Factor (Fy)	I (mm/h) for 1hr 1in10	Fraction Impervious (Fi)	C10	Coefficient of discharge (Cy)	I (mm/h (10mins)	Area (ha)	Q (m3/s)	CC Factor (+20%) (m3/s)	L/s
63	0.80	74.2	0.9	0.88	0.70	127	0.2005	0.0498	0.0598	59.7543
39	0.85				0.75	143		0.0596	0.0715	71.4876
18	0.95				0.84	193		0.0899	0.1078	107.8342
10	1.00				0.88	226		0.1108	0.1329	132.9181
5	1.05				0.92	260		0.1338	0.1606	160.5604
2	1.15				1.01	304		0.1713	0.2056	205.6114
1	1.20				1.06	338		0.1988	0.2385	238.5469

RATIONAL METHOD CALCULATIONS - LOT 600 FIRST AVENUE, MAROOCHYDORE QLD 4558

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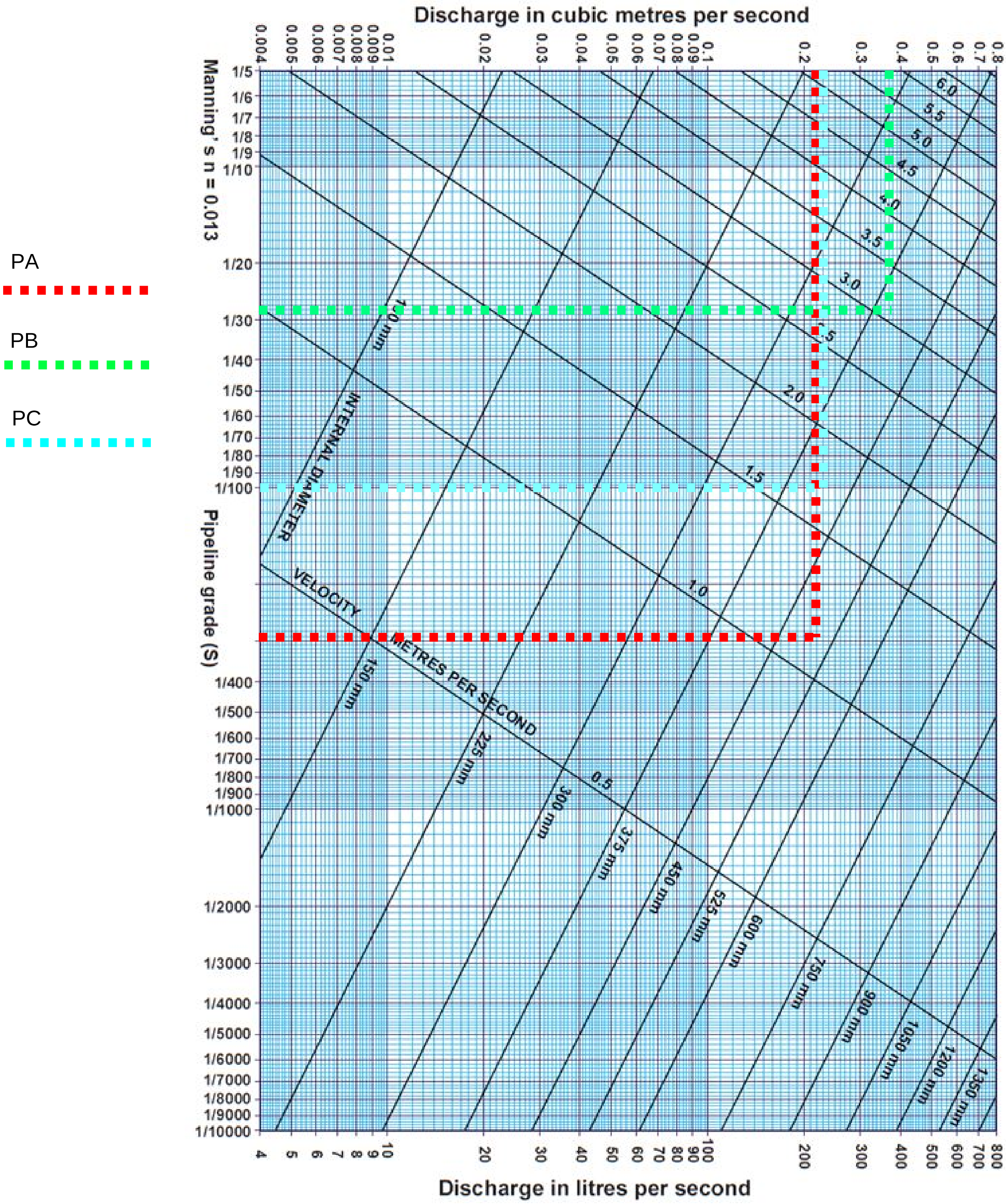
PROJECT NO:	571-002	DATE:	03/07/2024
BY:	WB	REVISION	1

PROPOSED LAWFUL POINT OF DISCHARGE - CATCHMENT NOMOGRAPH VERIFICATION



Catchment	Q (m3/s)		Nompgraph Validation				
	10%	1%	LPD	Existing Pipe Diameter (mm)	Grade %	S (1 in X)	Aligns with ex. LPD
EA	0.1552	0.2696					
EB	0.1426	0.2476					
PA	0.1230	0.2207	1	450	0.78	1 in 129	YES
PB	0.2074	0.3722	2	375	3.50	1 in 28	YES
PC	0.1329	0.2385	3	375	0.98	1 in 100	YES

APPENDIX E

SQIDEP Certification for AtlanFilter

STORMWATER AUSTRALIA

Stormwater Quality Improvement Device Evaluation Protocol (SQIDEP)

VERIFICATION CERTIFICATE

Applicant Information

Applicant Name	**SPEL Stormwater Pty Ltd**
Applicant Address	**130 Sandstone Pl, Parkinson QLD 4115**
Phone Number	**+61 1300 773 500**
Email	**sales@spel.com.au**
Website	**www.spel.com.au**

Verified Technology	**SPELFilter**
Issue Date	**23 December 2022**
Reviewed Documents	● SPEL Body of Evidence application submission (Prepared by Drapper Environmental Consultants) ● Statutory Declaration by Drapper Environmental Consultants ● Hydrographs of compliant and partially compliant events at the Hilton Foods site showing inflow, outflow, rainfall and samples collected (42 items) ● Sample collection and/or reset emails/site records at the Hilton Foods site (50 items) ● Laboratory Chain of Custody forms, Quality Control reports, QC Compliance Reviews & Certificates of Analysis ● Subsequent hydrograph plots for Hilton Foods site that included monitored outflow rates (and summary table of results) – (37 items), 17 October 2022.

Technology Information

Applicant's Verified Performance Claims	Treatable flow rate = 3 L/s per filter cartridge	
	Total Suspended Solids (TSS)	85 %
	Total Phosphorus (TP)	74 %
	Total Nitrogen (TN)	59 %
	Total Petroleum Hydrocarbons	0 %
	Gross Pollutants	0 %

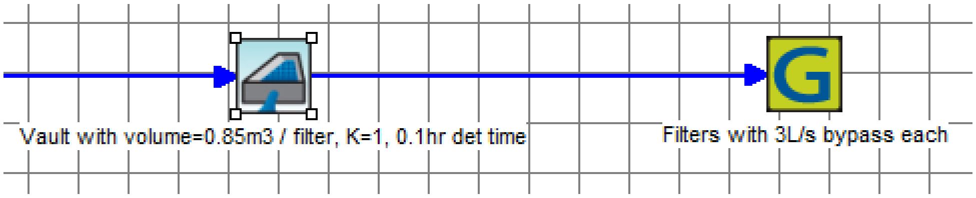
Maintenance performed during monitoring

None over 13 months

Verified method to model in MUSIC

Modelling a SPELFilter in MUSIC is as follows:

1. Use a detention basin node to represent the vault (with modified ‘K’ values and nominal detention time set to the treatment flow rate of the cartridges)
2. Use a generic node with the monitored pollutant reduction values and have a high flow bypass of 3 L/s per cartridge.



- The input criteria for the node is;

1. Use a detention basin node to represent the vault
    - with modified ‘K’ values with K=1
    - use size of 1m^2 per cartridge and 0.85m extended detention depth
    - adopt a nominal detention time of 0.1 hours (plus or minus 10%).
2. Use a generic node with:
    - a high flow bypass of 3 L/s per cartridge
    - pollutant reductions of 85% for TSS
    - pollutant reductions of 74% for TP
    - pollutant reductions of 59% for TN.

When entering the data into MUSIC the detention basin surface area and high flow bypass rate of the generic node is factored up depending on the number of filter cartridges proposed. All other values listed above remain the same (note: the *Notional Detention Time* is adjusted by changing the *Low Flow Pipe Diameter*).

Conditions

The limitations of the acceptance of these claims include:

- Pit insert “Stormsacks” (for coarse material capture) are used for inlets upstream of the SPELFilter installation to ensure longevity of the filters
- Regular inspection & maintenance should be performed in accordance with the Manufacturer’s Maintenance Plans.

Independent Reviewers

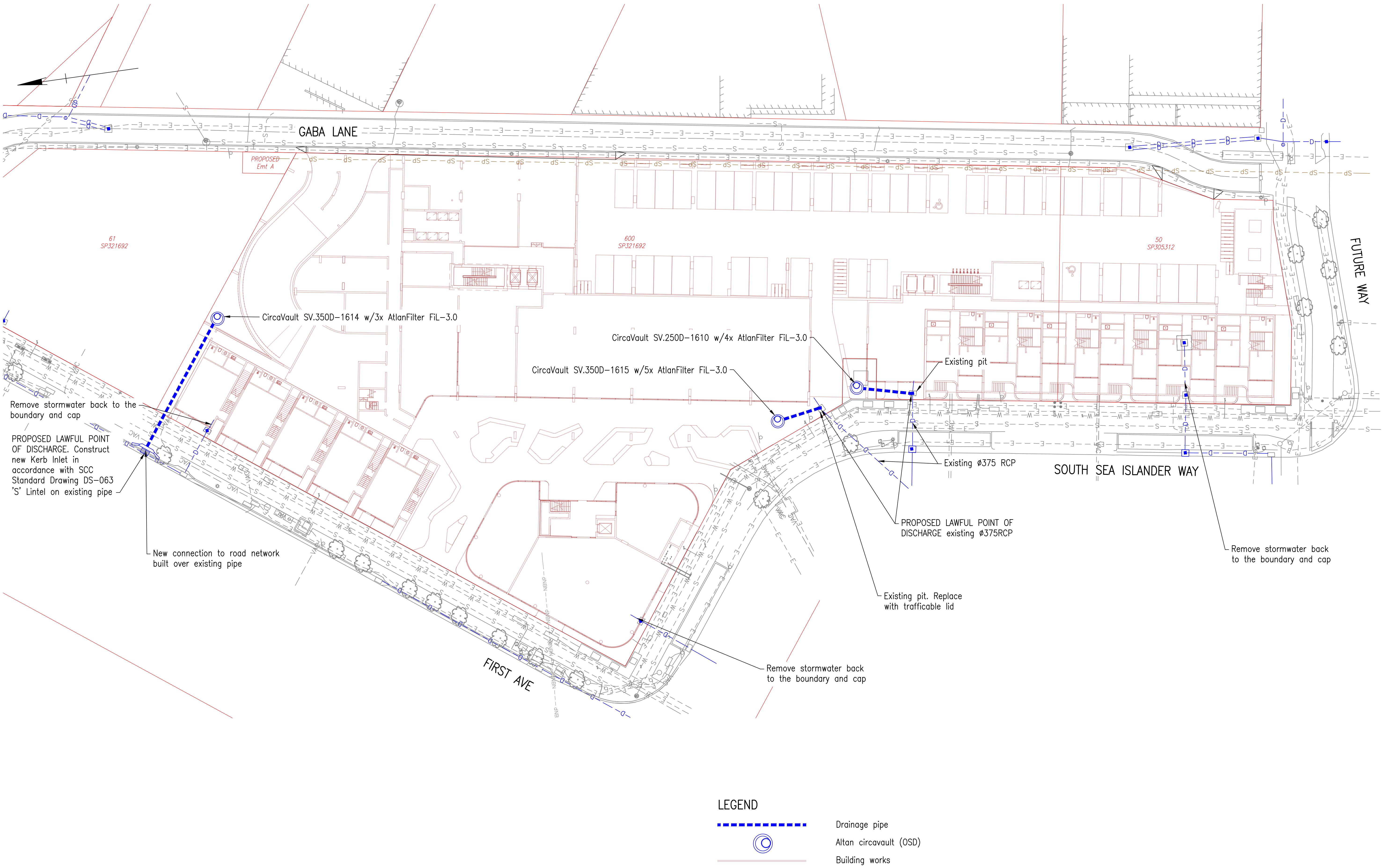
Dr Robin Allison

Dr Ricky Kwan

Accepted by Governance Panel	22 December 2022
Accepted by Stormwater Australia Board	23 December 2022

APPENDIX F

Indicative Drainage Layout



Last Modified - Aug 28, 2024 - 12:11pm C:\12d\data\S-AP-01\571-002 Lot 600_25192\Design\AutoCAD_DRG\571-002.dwg By - CourtneyB

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Ph: 1300 789 214 www.projexpartners.com.au

CLIENT
walker

Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial	
A	APPROVAL	28/08/24	FRG	KAP	KAP	6343	DAB

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	Daniel Berry		6343	28/8/2024

SCALE
1:250 A1
1:500 A3
0 5 10

LOTS 600 AND 50 MAROOCHYDORE CITY CENTRE

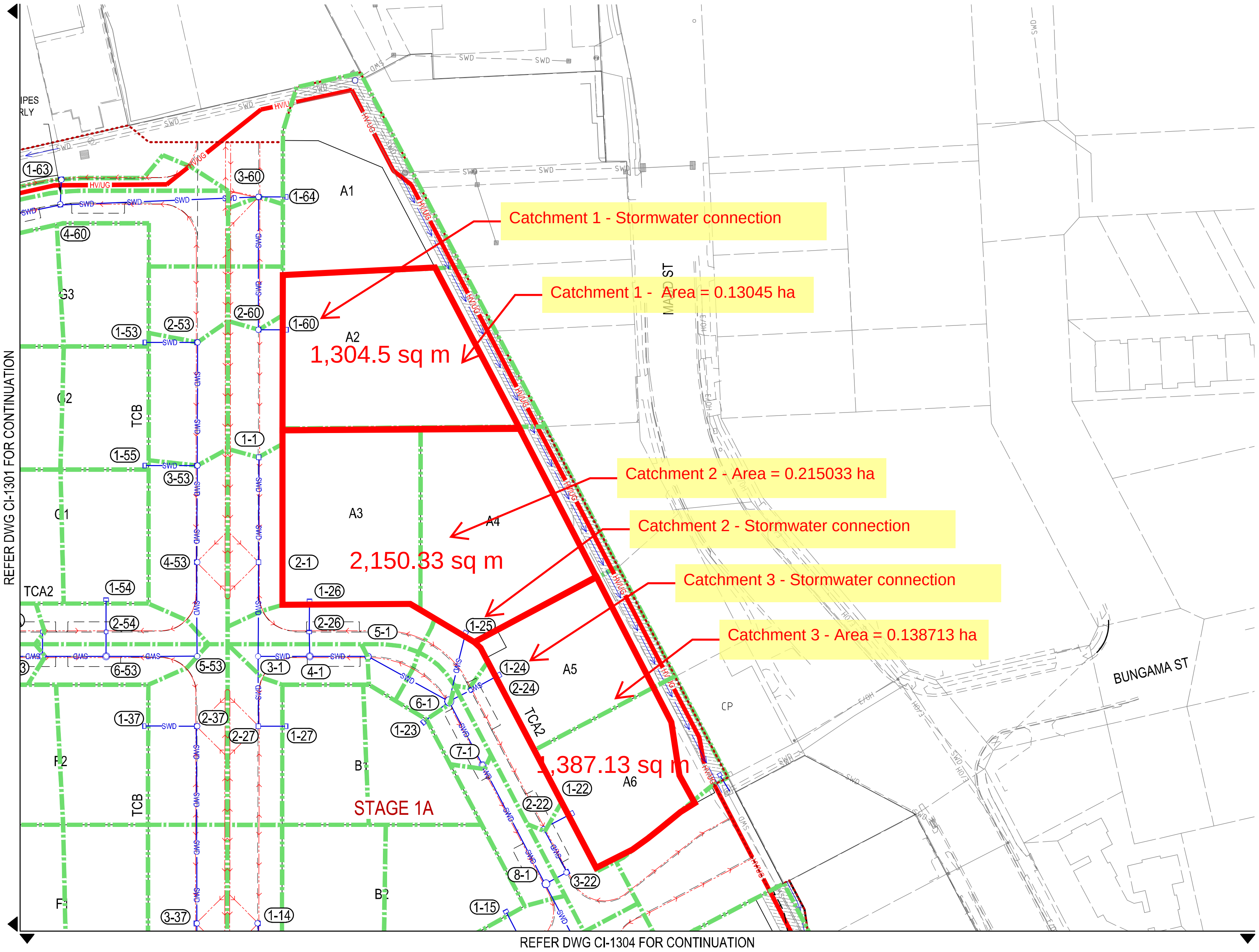
INDICATIVE DRAINAGE PLAN

DRAWING NUMBER 571-002-C110
No IN SET 6 of 6
REVISION A

APPENDIX G

MUSIC modelling catchments (proposed development)

NOTE:
SPEL STORMSACK 200 MICRON LITTER BASKETS
(OR APPROVED EQUIVALENT) ARE TO BE
PROVIDED ON ALL FIELD & GULLY INLETS.



PLAN

SCALE A1 - 1 : 500
A3 - 1 : 1000

LEGEND:

🟩	STORMWATER CATCHMENT BOUNDARY
→ →	DRAINAGE SWALE
○ SWD ▭ SWD	STORMWATER PIPE AND MANHOLE/PIT
(1-1)	MANHOLE No. - LINE No.
→ →	SUBSOIL DRAINAGE
▨	OVERLAND FLOW PATH EASEMENT
·······	STAGE BOUNDARY
HV/UG	EXISTING UG HV ELECTRICAL

NOTES:

1. REFER TO DRAWINGS 249402-CI-CI-1311 TO 249402-CI-CI-1320 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS.
2. CATCHMENT NAME IS SAME AS PIT NUMBER UNLESS OTHERWISE NOTED.
3. REFER TO DRAWING 249402-CI-CI-1341 TO 249402-CI-CI-1346 FOR STORMWATER DRAINAGE CALCULATIONS TABLE.
4. CONTRACTOR TO SURVEY STORMWATER LINES AT CONNECTION POINTS DURING SITE ESTABLISHMENT AND FORWARD TO ENGINEERS FOR ASSESSMENT PRIOR TO CONSTRUCTION.
5. CONTRACTOR TO SURVEY STORMWATER LINES AT FUTURE CONNECTION POINTS, AS THEY ARE BUILT AND SENT TO ENGINEERS ASAP.

5 0 5 10 15 20 25m
Scale 1:500

Rev.	Date	Description	Des.	Verif.	Appd.
A	24/03/2017	ISSUED FOR CONSTRUCTION	CK	DH	BK

SunCentral
Maroochydore

Cardno
Shaping the Future
Cardno (Qld) Pty Ltd | ABN 57 051 074 992
Level 1, 9 Maud Street
Maroochydore, QLD 4558
Tel: 07 5443 2555 Fax: 07 5443 5642
Web: www.cardno.com.au

Drawn PM LC CK Date 7/10/2015
Checked DH Date 7/10/2015
Designed CK Date 7/10/2015
Verified RB Date 7/10/2015
Approved 7884
DATE; 1/03/2017

Client SUNCENTRAL MAROOCHYDORE PTY LTD
Project MAROOCHYDORE CITY CENTRE
CIVIL WORKS - STAGE 1
Title STORMWATER DRAINAGE PLAN - SHEET 2
Status FOR CONSTRUCTION
DATUM AHD
Orig. Date 2/17/2016
Scale AS SHOWN
Size A1
Drawing Number 249402-CI-1302
Revision A

DATE PLOTTED: 20 September 2018 2:25 PM BY : CHASE KEMPE
XREF's: X-TITLE BORDER; X-249402 RP BASE EXTERNAL CADASTRE 150302; X-249402 RP BASE; X-249402 LANDSCAPE - CORSO; X-249402 EXTERNAL ROADWORKS PROJEX; X-249402 DESIGN STAGE 1; X-249402-EXISTING; STG01 drainage pipes pits & catchments; X-249402 BULK EWRKS STAGE 1; X-249402 AWCS STAGE 01; X-249402 AWCS STAGE 02
CAD File: P:\249402 MCC Design Package 1\Design\ACAD_CIVIL WORKS STAGE 01\249402-CI-1301 STORMWATER DRAINAGE PLAN.dwg

APPENDIX H

AltanFilter Manual

OPERATION & MAINTENANCE MANUAL

AtlanFilter

(Formerly SPELFilter)

atlan.com.au

CONTENTS

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Sizes.. 6

System Configuration..7

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Maintenance frequency..10

Maintenance Procedure..11

General Cleaning..12

Cartridge Recycling and Replacement 13

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INTRODUCTION

Understanding how to correctly and safely maintain the AtlanFilter (formerly SPELFilter) is essential for the preservation of the filter's condition and its operational effectiveness. The AtlanFilter is a highly engineered stormwater filtration device designed to remove sediments, heavy metals, nitrogen and phosphorus from stormwater runoff.

The filters can be housed in either a concrete or fibreglass structure that evenly distributes the flow between cartridges.

Flow through the filter cartridges is gravity driven and self-regulating, which makes the AtlanFilter system a low maintenance, high performance stormwater treatment device.

This guide will provide the necessary steps that are to be taken to correctly and efficiently ensure the life of the AtlanFilter product.

Figure 1 - AtlanFilters in a concrete chamber / vault

FEATURES

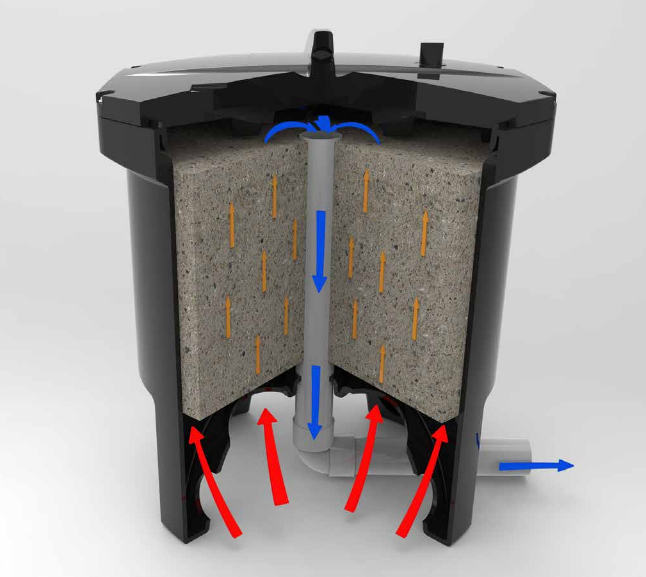


Figure 2 - Diagram of water flow through AtlanFilter

The AtlanFilter has a patented design that facilitates influent flow over the entire surface area of the media, providing consistent pollutant removal within a small footprint.

The AtlanFilter provides highly effective media filtration using gravity flow conditions, without the need for moving parts or floating valves. This eliminates the risk of mechanical failure, such as stuck valves and seizing components during its service life. This provides highly robust treatment performance.

Hydraulic head provided by a suitably sized weir in the filter vault forces stormwater through the filter media via the inlet ports underneath the filter cartridge.

Refer to the table below for minimum head required for the AtlanFilter cartridges to assist in sizing the weir.

The water to be treated enters the AtlanFilter cartridge via an upwards direction as the water level builds up around the AtlanFilter. This 'up flow' reduces the amount of sediment that could enter the media cartridge, as the sediment is allowed to drop to the vault floor under gravity. Any remaining sediment in the water is introduced through the filter media under hydraulic pressure and is filtered.

Water is filtered through the media, where dissolved and particulate Total Nitrogen and Total Phosphorus are removed via reaction with the media, in addition to the removal of Total Suspended Solids / sediment.

AtlanFilter Media Self-Backwash feature

A one-way air release valve located at the top of the filter cartridge allows air to escape as the cartridge fills up with water. This creates a siphonic flow condition as the air is completely evacuated from inside the AtlanFilter cartridge. Siphonic flow conditions are maintained until such time the water level outside of the cartridge falls beneath the inlet ports underneath the filter. At this moment, the water level inside the AtlanFilter cartridge is higher than the surrounding water level.

The water inside the AtlanFilter cartridge is then expelled upon the break of the siphon, and the water flows down and out of the inlet ports under gravity, onto the vault floor.

This is a highly effective backwash of the media and allows the expulsion of a high proportion of sediment out from the AtlanFilter media. The expelled sediment can be removed either manually or with a vacuum from the vault floor.

This backwash effect allows the media to remain highly conductive and is the key to the industry leading longevity of the AtlanFilter cartridge system, which does not need replacement for at least 5 years, and typically will achieve up to 6-8years of service, subject to the AtlanFilter being regularly maintained in accordance with this guideline and in accordance with the specific needs of the catchment.

Figure 3 - Typical Outlet Weir Wall

FEATURES

Self Supporting Feet

Each AtlanFilter cartridge stands on 4 feet, which negates the need for the construction of a false floor in the vault. The feet are bolted to the vault floor with the supplied stainless steel angles and M10 bolts. The feet allow a clear height from the vault floor up to the inlet ports of 240mm. The absence of a false floor allows plenty of room for backwashed sediment to evacuate from underneath the cartridges and thereby avoid blocking the inlet ports to the AtlanFilter from sediment buildup. It is for this reason that Atlan recommended the sediment buildup not exceed 150mm above the vault floor, so as to avoid blocking the inlet ports of the AtlanFilter. Blockage of the inlet ports due to sediment accumulation in the vault floor will cause the AtlanFilter to go into bypass and be ineffective. Hence it is important to keep up to date with monitoring and maintaining the AtlanFilter vault.

Figure 4 - Bolting the feet.

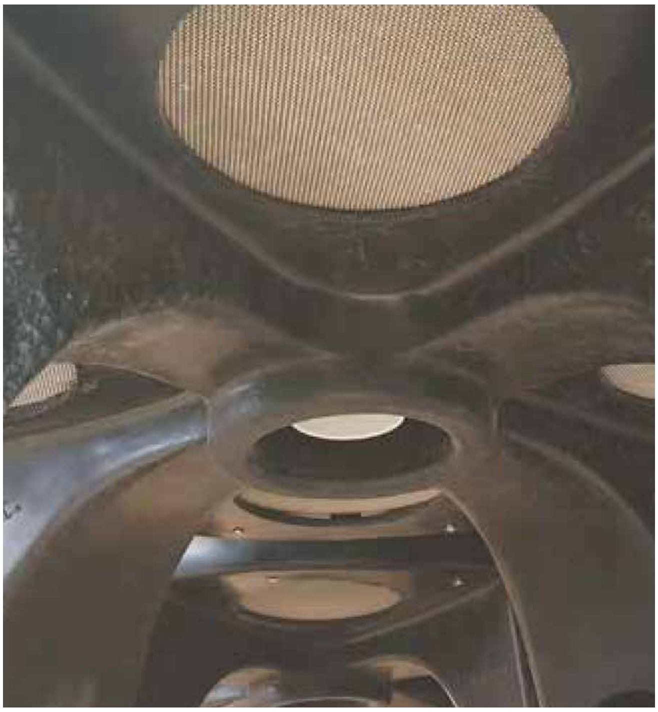


Figure 5 - Underside of the AtlanFilter showing the screened inlet ports and the connection for the outlet pipe in the middle.

Figure 6 - the top of the AtlanFilter showing the location of the one way air valve.

SIZES

Atlan Stormwater manufactures two height cartridges for varying site constraints as shown below. Each cartridge is designed to treat stormwater at a flow rate of 1.5 litres per second and 3.0 litres per second for the half height cartridge (model no. FIL-1.5) and full-height cartridge (model no. FIL-3.0) respectively.

	Full Height FIL-3.0	Half Height FIL-1.5
AtlanFilter total height	860mm	660mm
AtlanFilter Diameter	740mm	740mm
Minimum Head required	850mm	550mm
Treatment flow rate	3.0 L/s	1.5 L/s
Height of inlet ports above vault floor	250mm	250mm
Filtered water collection pipe diameter	50mm	50mm

AtlanFilter Full Height - FIL-3.0

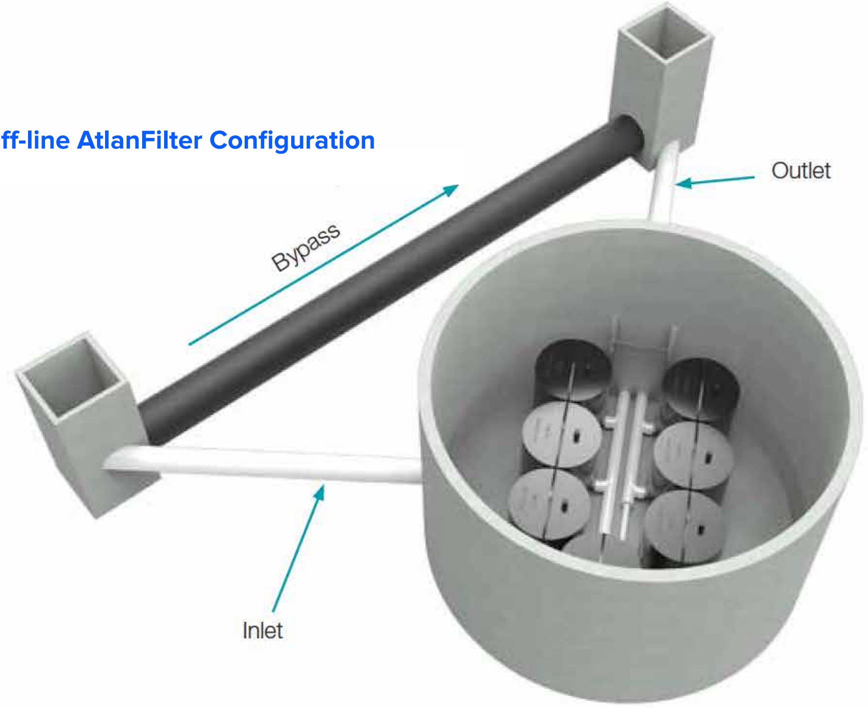
AtlanFilter Half Height - FIL1.5

SYSTEM CONFIGURATION

AtlanFilter cartridges are installed in concrete or fibreglass tanks commonly referred to as ‘vaults’. The vault selection and configuration are based on site characteristics and/or constraints; computational stormwater quality modelling; and selected AtlanFilter models. Typical AtlanFilter system configurations are shown below.

In-line AtlanFilter Configuration

Off-line AtlanFilter Configuration



HEALTH AND SAFETY

A. Personal health & safety

When carrying out the necessary installation operations of the AtlanFilter all contractors and staff personnel must comply with all current workplace health and safety legislation.

The below measures should be adhered to as practically as possible.

- Comply with all applicable laws, regulations and standards.
- All those involved are informed and understand their obligations in respect of the workplace health and safety legislation.
- Ensure responsibility is accepted by all employees to practice and promote a safe and healthy work environment.

B. Personal protective equipment/safety equipment

When carrying out the necessary installation operations of the AtlanFilter, wearing the appropriate personal protective equipment and utilising the adequate safety equipment is vital to reducing potential hazards.

Personal protective equipment / safety equipment in this application includes:

- Eye protection
- Safety apron
- Fluorescent safety vest
- Form of skin protection
- Puncture resistant gloves
- Steel capped safety boots
- Ear muffs
- Hard hat/s
- Sunscreen

C. Confined space

In the event access is required into the vault, confined space permits will be required which is not covered in this Guide. Typical equipment required for confined space entry include:

- Harness
- Gas detector
- Tripod
- Spotter

D. Traffic Control

It is not uncommon for Atlan Filter cartridges to be installed underneath trafficable areas. Minimum traffic control measures will need to be put in place in accordance with traffic control plans set out by respective local and state road authorities.

⚠ Vaults are to be treated as confined space.

Entry by permit only.

⚠ Monitor weather conditions prior to operation maintenance. Do not enter a vault during an episode of heavy rain as this can create a risk of drowning.

MAINTENANCE FREQUENCY

The AtlanFilter's design allows for a greater life span when frequently maintenance. Maintenance is broken up into three categories which include:

- Standard inspection
- General cleaning
- Cartridge replacement.

Standard Inspection

Standard inspections are conducted at regular four month intervals. At this time, an approved trained maintenance officer or Atlan representative shall undertake all measures outlined in Maintenance Procedure, Standard Inspection.

General Cleaning

At the end of each standard inspection, trigger measures will identify if general cleaning is required.

General cleaning will need to be executed immediate during standard inspections if the follow triggers are satisfied:

- Build-up of debris/pollutants within the vault greater than 150mm;
- Accumulation of debris/pollutants on the outlet chamber of the AtlanFilter vault;
- After large storm events, tidal or flooding impacts at the request of the owner;

Cartridge Replacement

Stormwater treatment is dependent on the effectiveness of the AtlanFilter cartridge system. As the AtlanFilter ages, pollutants will inundate the cartridge and ultimately reduce the treatment flow rate. At this point, a AtlanFilter flow test apparatus will be utilities to determine if replacement cartridges are required.

Based on the [site] concept modelling (MUSIC) and previous industry experience, we estimate the life of the AtlanFilter to be between 6 - 8 years. As a minimum requirement, each AtlanFilter cartridge should be replaced within 10 years.

The life cycle of the AtlanFilter can be impacted if standard inspections and general maintenance is not undertaken in accordance with this operation and maintenance Guide.

Other factors that will affect the above life cycle of the AtlanFilter include:

- Installation of cartridge system during construction phase and impacted by construction sediment loads;
- Neglecting to install pre-treatment using an industry approved GPT or a surface inlet pit trash bag such as the Atlan StormSack.
- Unforeseen environmental hazards affecting the AtlanFilter functionality.

MAINTENANCE PROCEDURES

Stormwater pollutants captured and retained by the AtlanFilter system need to be periodically removed to ensure environmental values are upheld. All associated maintenance works is heavily dependent on the site's operational activities and generated stormwater pollutants. To ensure the longevity of the installed AtlanFilter treatment system, it is imperative that the procedures detailed in this Guide are followed and all appropriate measures are actioned immediately.

Standard inspection

The standard inspection requires personal experience of Atlan products to visual inspection the vault and filter conditions.

Confined space requirements may not be required if a full inspection and assessment of each AtlanFilter can be achieved at surface level without being deemed a confined space entry.

The standard inspection requires personal experience of Atlan products to visual inspection the vault and filter conditions.

Confined space requirements may not be required if a full inspection and assessment of each AtlanFilter can be achieved at surface level without being deemed a confined space entry.

Site Inspection Procedures

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free. (Refer to figure 4.)

2. Set-up gantry tripod above manhole

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the Atlan Filters.

Perform safety procedures ie. Attach harnesses etc. (if confined space).

3. Open manhole lid

Once you have set up the Gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

4. Conduct gas tests

(If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space

6. AtlanFilter system assessment

Perform a review of the AtlanFilter system using the AtlanFilter assessment report/checklist. Sign off and forward a copy of the report to property manager and Atlan representative.

7. Reinstate AtlanFilter system and disposal

At the completion of the site inspection, ensure the site is reinstated back to its initial state and all pollutants are removed from the site in line with pollutant disposal procedures.

8. Sign off and forward a copy of the report to property manager and Atlan representative

GENERAL CLEANING

Vacuum out of Filter tank, removal, and disposal of pollutants at the completion of a standard inspection, general cleaning may be deemed necessary immediately or scheduled for a future date. Steps undertaken for general cleaning should be in general accordance with the procedure outlined below but not limited.

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free. (Refer to figure 4.)

2. Set-up gantry tripod above manhole

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the AtlanFilters.

Perform safety procedures ie. attach harnesses etc. (if confined space).

3. Open manhole lid

Once you have sent up the Gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

4. Conduct gas tests

(If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space

6. AtlanFilter system assessment

Perform a review of the AtlanFilter system using the AtlanFilter assessment report/checklist.

7. Pollutant removal from tank

Perform clean-up using a licenced vacuum truck contractor or wet/dry vacuum, depending on level of sediment built up and/or tank size.

8. Reinstate AtlanFilter system and disposal

At the completion of the site inspection, ensure the site is reinstated back to its initial state and all pollutants are removed from the site in line with pollutant disposal procedures.

9. Sign off and forward a copy of the report to property manager and Atlan representative

CARTRIDGE RECYCLING AND REPLACEMENT

AtlanFilter cartridges can be swapped out for new cartridges. The spent AtlanFilter cartridges can be collected from site and sent to Atlan Stormwater's facilities, where the spent media will be removed from the cartridge in factory conditions and disposed of in accordance with environmental regulations.

The AtlanFilter cartridge will be recharged with new media, thereby recycling and repurposing the cartridge.

AtlanFilter replacement procedures may vary depending on the configuration of the AtlanFilters, the type of vault and engineers' specs. Replacement instructions for manhole AtlanFilter systems and precast vault AtlanFilter systems are contained in this section.

At the completion of a standard inspection, AtlanFilter replacement may be deemed necessary immediately or scheduled for a future date. Steps undertaken for cartridge replacement should be in general accordance with the procedure outlined below but not limited.

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free.

2. Set-up gantry tripod above manhole

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the AtlanFilters.

Perform safety procedures ie. attach harnesses etc. (if confined space).

3. Open manhole lid

Once you have sent up the gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

4. Conduct gas tests

(If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space procedures are followed.

6. Remove exhausted cartridges

Disconnect all internal pipe work from inside the vault. Unbolt anti-floatation measures and remove cartridges from the vault using Gantry Tripod method.

7. Pollutant removal

Using a wet/dry vacuum or sucker truck, suck out all the residual pollutant from the vault.

8. Install pipework and AtlanFilters

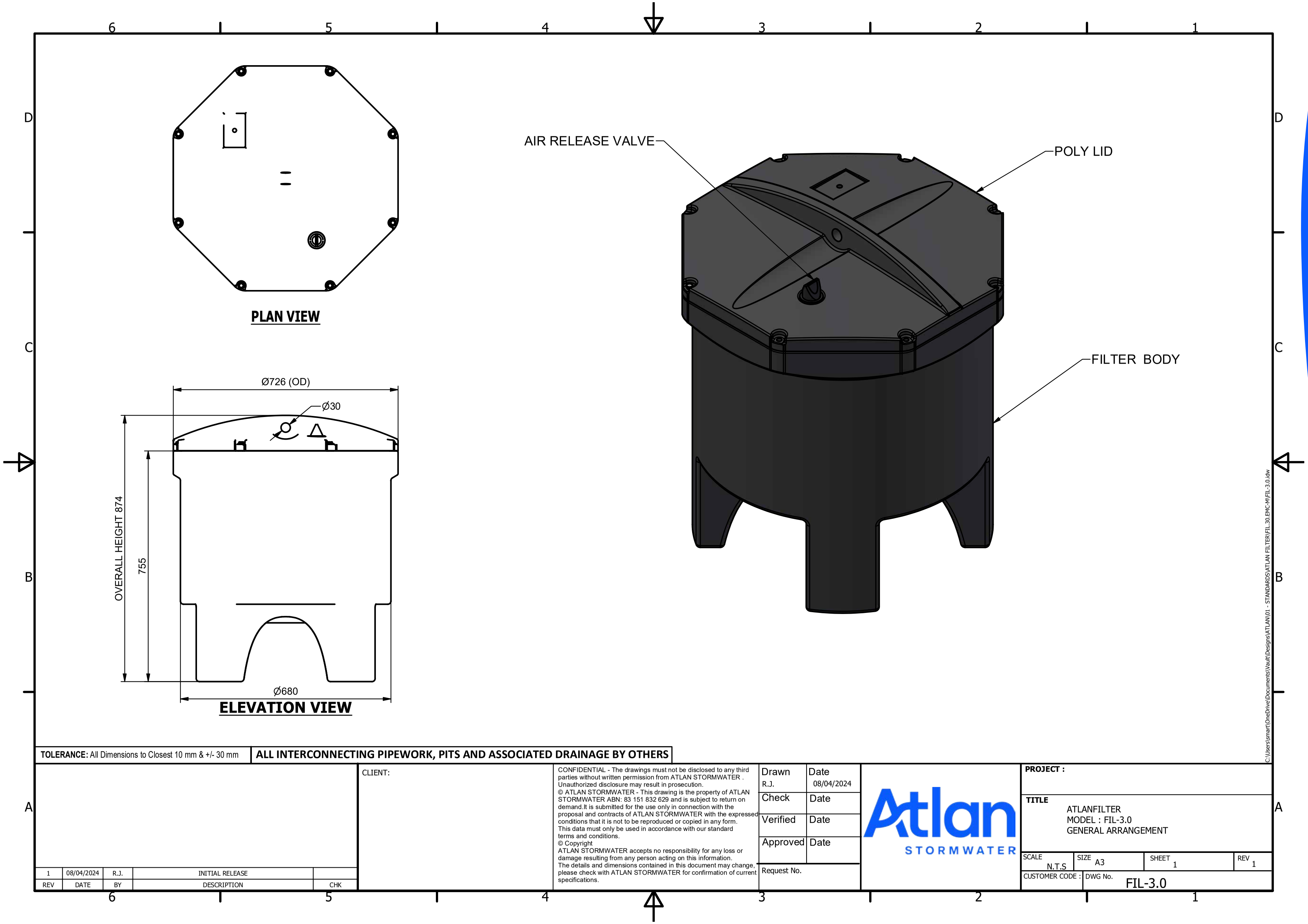
Please refer to the below standard install diagrams for the AtlanFilters. Then refer to your site specific drawings, as site requirements may require something different to the standard layout. Lower filters into tank, position into place, connect filter outlet pipework with the supplied fittings.

9. Install anti–floatation system

Please refer to the detailed drawings showing how the anti-floatation (anchor) bars are to be installed.

10. Sign off and forward a copy of the report to property manager and Atlan representative

Drawing
Full Height



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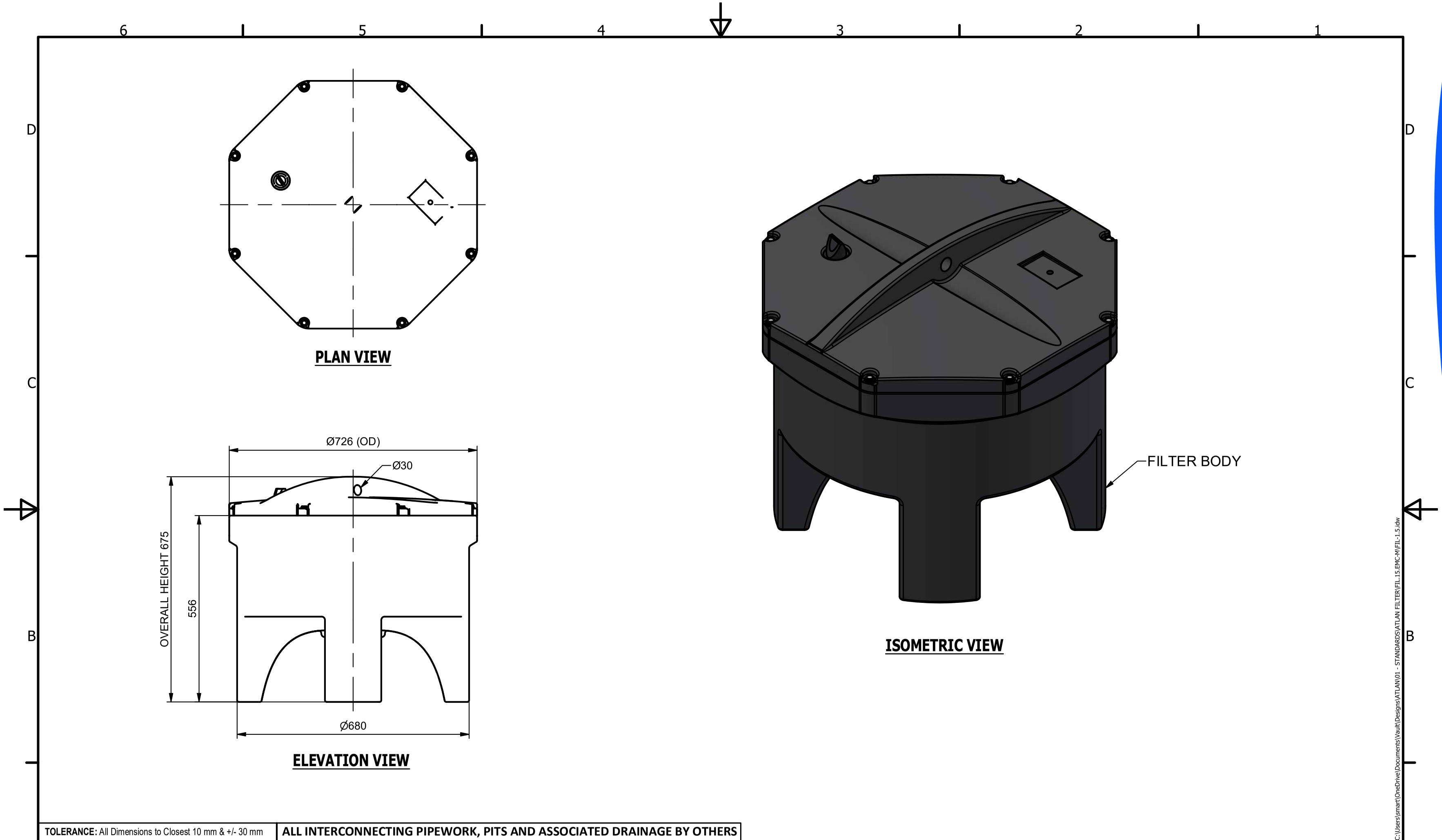
Drawing
Half Height



TOLERANCE: All Dimensions to Closest 10 mm & +/- 30 mm

ALL INTERCONNECTING PIPEWORK, PITS AND ASSOCIATED DRAINAGE BY OTHERS

REV	DATE	BY	DESCRIPTION	CHK
1	08/04/2024	R.J.	INITIAL RELEASE	

CLIENT:

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Drawn R.J.	Date 08/04/2024
Check	Date
Verified	Date
Approved	Date
Request No.	

Atlan STORMWATER

PROJECT :

TITLE
ATLANFILTER
MODEL : FIL-1.5
GENERAL ARRANGEMENT

SCALE	SIZE	SHEET	REV
N.T.S	A3	1	1

CUSTOMER CODE : | DWG No. FIL-1.5

SITE EXIT & CLEAN UP

At the end of the scheduled maintenance, approved contractors or Atlan maintenance crew are required to reinstate the site to pre-existing conditions. Steps included but limited to are:

- Ensure all access covers are securely inserted back into their frames;
- Remove and dispose collected pollutants from the site in accordance with local regulator authorities;
- Retrieve all traffic control measures and maintenance tools; and
- Return all exhausted and/or damaged Atlan products to Atlan Stormwater to begin recycling program.

Joy in water

‘We believe clean waterways are a right not a privilege and we work to ensure a Joy in Water experience for you, with your children and grandchildren.’

Andy Hornbuckle

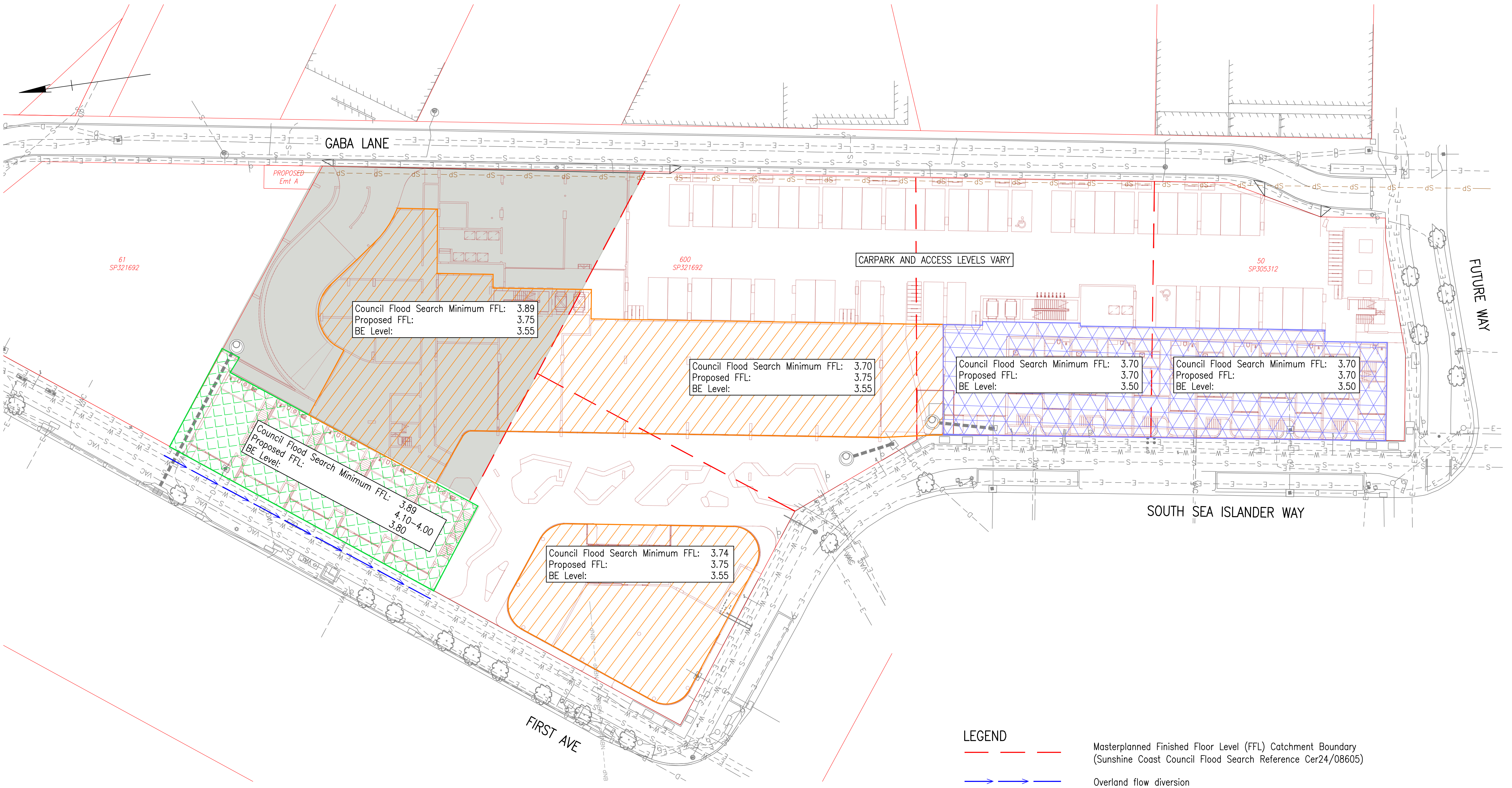
Atlan
STORMWATER

P 02 8705 0255
sales@atlan.com.au
100 Silverwater Rd,
Silverwater NSW 2128
atlan.com.au

0524

APPENDIX I

Proposed Finished Floor Levels



LEGEND

— — —	Masterplanned Finished Floor Level (FFL) Catchment Boundary (Sunshine Coast Council Flood Search Reference Cer24/08605)
→ → —	Overland flow diversion
▒	Proposed Change to Finished Floor Level following Overland Flow Diversion
▨	Building Footprint FFL 3.70
▨	Building Footprint FFL 3.75
▨	Building Footprint FFL >3.89

NOTE

All levels to AHD

Last Modified - Aug 28, 2024 - 12:11pm C:\12dS\data\S-AP-01\571-002 Lot 600_25192\Design\AutoCAD_DRG\571-002.dwg By - CourtneyB

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Ph: 1300 789 214 www.projexpartners.com.au

CLIENT
walker

Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial	
A	APPROVAL	28/08/24	FRG	KAP	KAP	6343	DAB

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	Daniel Berry		6343	28/8/2024

SCALE
1:250 A1
1:500 A3
0 5 10

LOTS 600 AND 50 MAROOCHYDORE CITY CENTRE

PROPOSED FINISHED FLOOR LEVELS

DRAWING NUMBER 571-002-C030
No IN SET 2 of 6
REVISION A

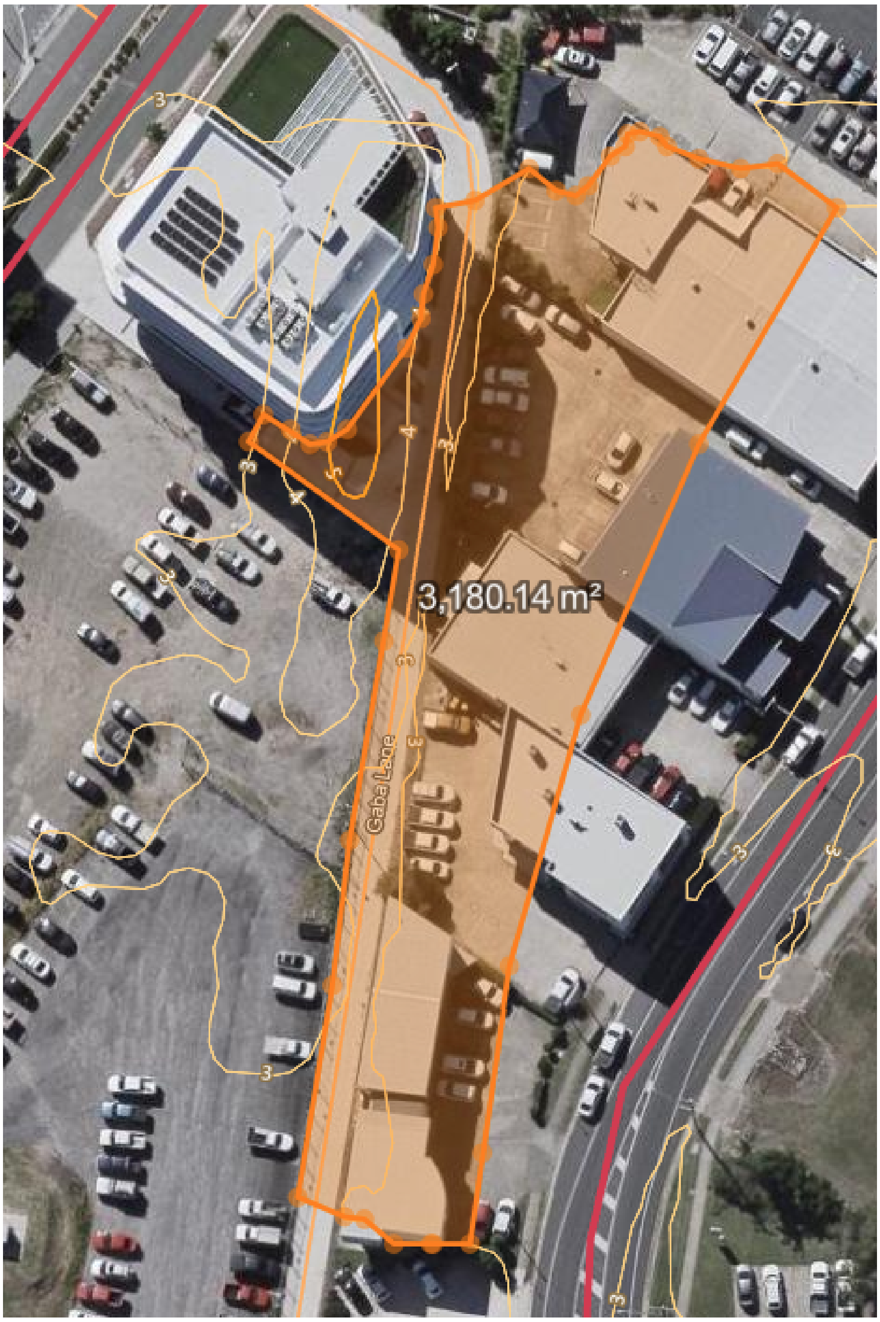
APPENDIX J

Gaba Lane Capacity Calculations

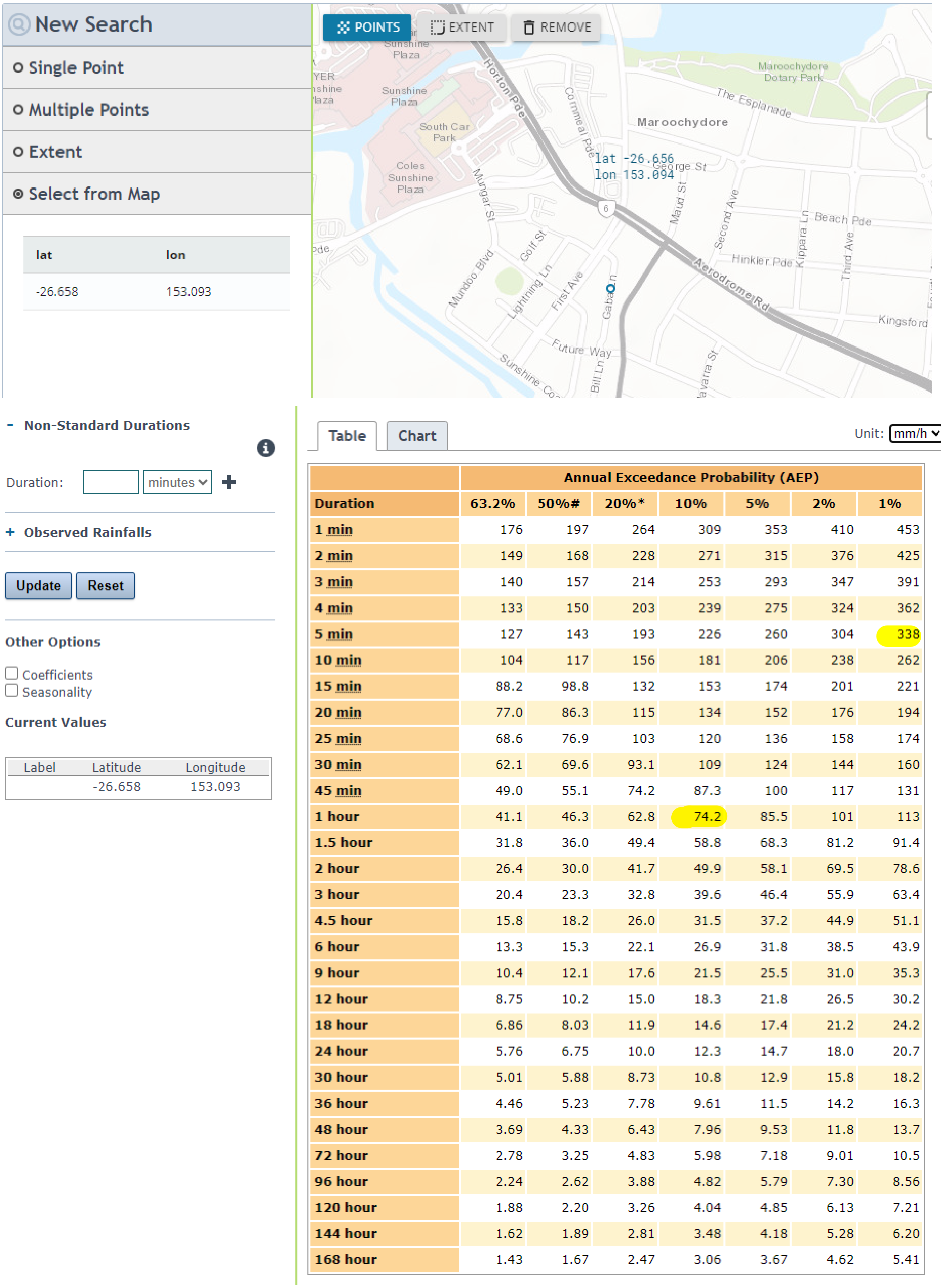
ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Building community through our people

[571-002] Lot 600: Gaba Lane Drainage Calculations

Rational Calculation:
Catchment 1 Area



Rational Calculation: IFD Rainfall Data
(sourced from BoM)



New Search

○ Single Point

○ Multiple Points

○ Extent

● Select from Map

lat	lon
-26.658	153.093

- Non-Standard Durations

Duration: ☐ minutes +

+ Observed Rainfalls

Update Reset

Other Options

☐ Coefficients
☐ Seasonality

Current Values

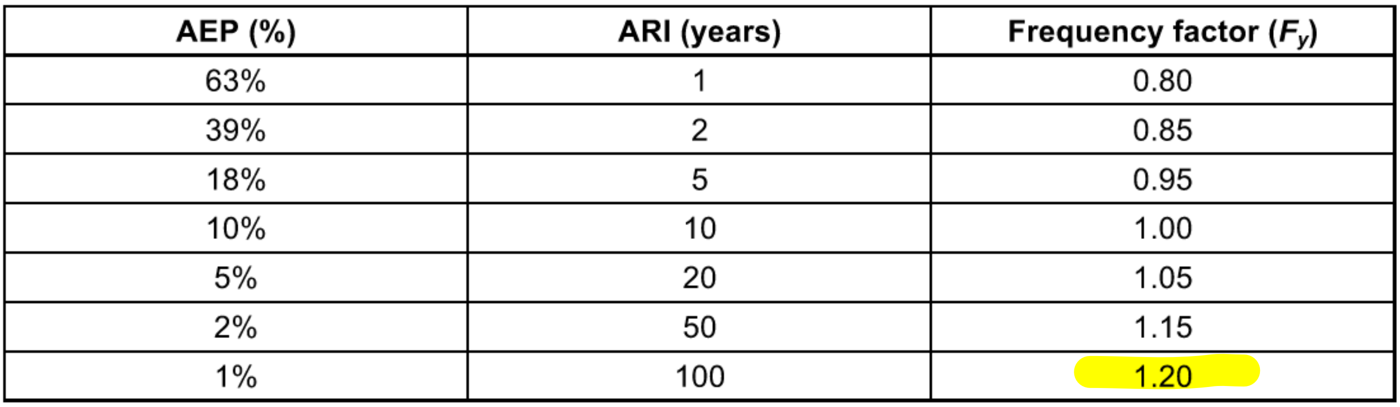
Label	Latitude	Longitude
	-26.658	153.093

Table Chart Unit: mm/h

	Annual Exceedance Probability (AEP)						
Duration	**63.2%**	**50%#**	**20%***	**10%**	**5%**	**2%**	**1%**
1 min	176	197	264	309	353	410	453
2 min	149	168	228	271	315	376	425
3 min	140	157	214	253	293	347	391
4 min	133	150	203	239	275	324	362
5 min	127	143	193	226	260	304	338
10 min	104	117	156	181	206	238	262
15 min	88.2	98.8	132	153	174	201	221
20 min	77.0	86.3	115	134	152	176	194
25 min	68.6	76.9	103	120	136	158	174
30 min	62.1	69.6	93.1	109	124	144	160
45 min	49.0	55.1	74.2	87.3	100	117	131
1 hour	41.1	46.3	62.8	74.2	85.5	101	113
1.5 hour	31.8	36.0	49.4	58.8	68.3	81.2	91.4
2 hour	26.4	30.0	41.7	49.9	58.1	69.5	78.6
3 hour	20.4	23.3	32.8	39.6	46.4	55.9	63.4
4.5 hour	15.8	18.2	26.0	31.5	37.2	44.9	51.1
6 hour	13.3	15.3	22.1	26.9	31.8	38.5	43.9
9 hour	10.4	12.1	17.6	21.5	25.5	31.0	35.3
12 hour	8.75	10.2	15.0	18.3	21.8	26.5	30.2
18 hour	6.86	8.03	11.9	14.6	17.4	21.2	24.2
24 hour	5.76	6.75	10.0	12.3	14.7	18.0	20.7
30 hour	5.01	5.88	8.73	10.8	12.9	15.8	18.2
36 hour	4.46	5.23	7.78	9.61	11.5	14.2	16.3
48 hour	3.69	4.33	6.43	7.96	9.53	11.8	13.7
72 hour	2.78	3.25	4.83	5.98	7.18	9.01	10.5
96 hour	2.24	2.62	3.88	4.82	5.79	7.30	8.56
120 hour	1.88	2.20	3.26	4.04	4.85	6.13	7.21
144 hour	1.62	1.89	2.81	3.48	4.18	5.28	6.20
168 hour	1.43	1.67	2.47	3.06	3.67	4.62	5.41

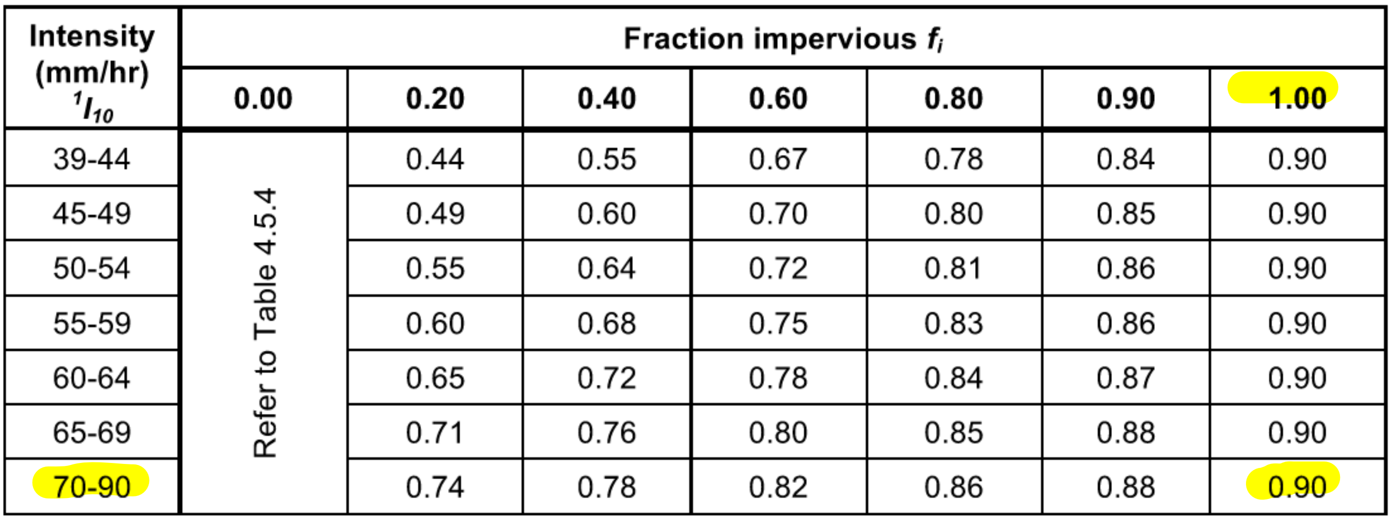
Rational Calculation: Fy and C10 value's
(sourced from QDUM 2017 4th Edition)

Table 4.5.2 – Table of frequency factors



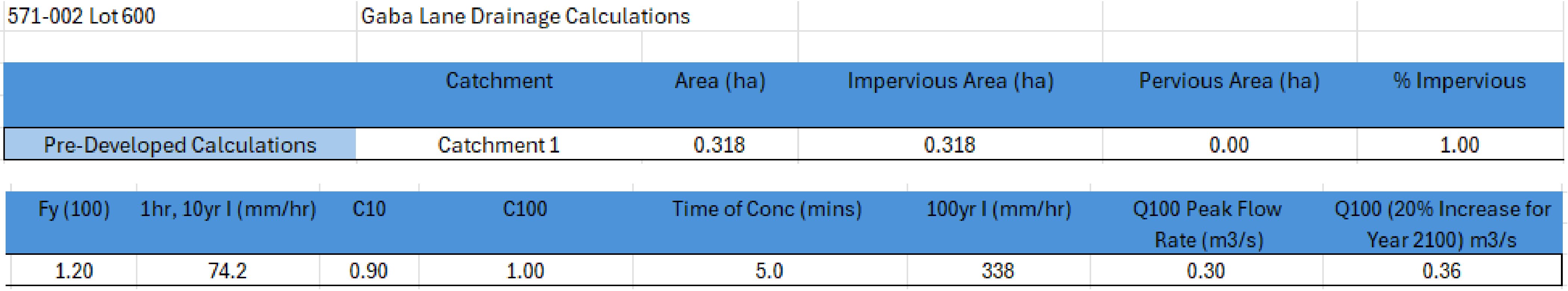
AEP (%)	ARI (years)	Frequency factor (F_y)
63%	1	0.80
39%	2	0.85
18%	5	0.95
10%	10	1.00
5%	20	1.05
2%	50	1.15
1%	100	1.20

Table 4.5.3 – Table of C_{10} values



Intensity (mm/hr) $^1I_{10}$	Fraction impervious f_i						
	0.00	**0.20**	**0.40**	**0.60**	**0.80**	**0.90**	**1.00**
39-44	Refer to Table 4.5.4	0.44	0.55	0.67	0.78	0.84	0.90
45-49		0.49	0.60	0.70	0.80	0.85	0.90
50-54		0.55	0.64	0.72	0.81	0.86	0.90
55-59		0.60	0.68	0.75	0.83	0.86	0.90
60-64		0.65	0.72	0.78	0.84	0.87	0.90
65-69		0.71	0.76	0.80	0.85	0.88	0.90
70-90		0.74	0.78	0.82	0.86	0.88	0.90

Rational Calculation:



571-002 Lot 600	Gaba Lane Drainage Calculations				
	Catchment	Area (ha)	Impervious Area (ha)	Pervious Area (ha)	% Impervious
Pre-Developed Calculations	Catchment 1	0.318	0.318	0.00	1.00

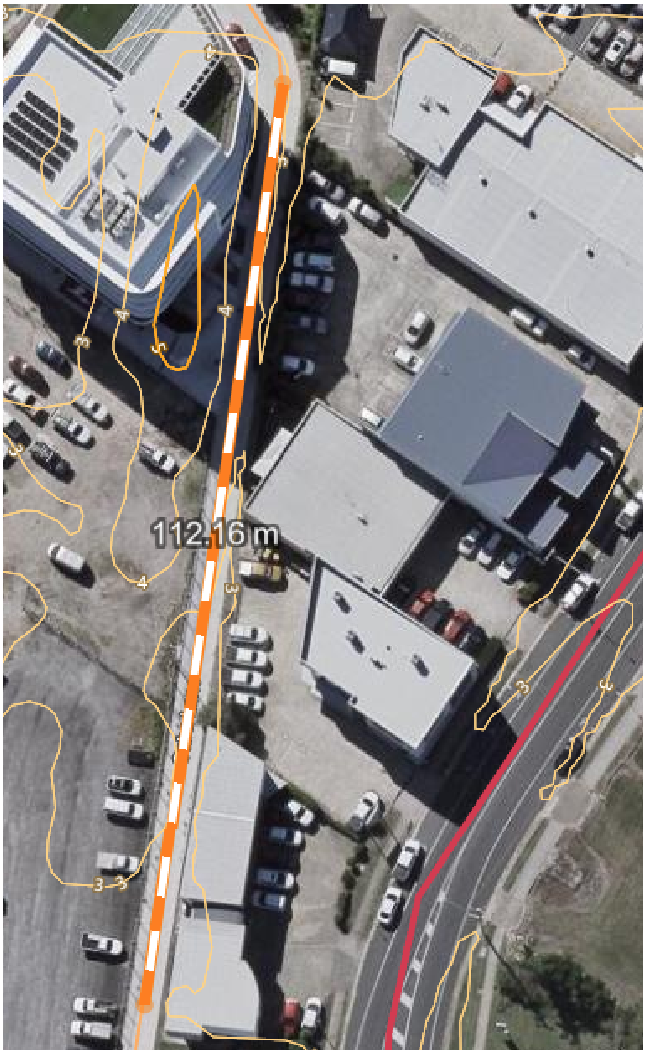
Fy (100)	1hr, 10yr I (mm/hr)	C10	C100	Time of Conc (mins)	100yr I (mm/hr)	Q100 Peak Flow Rate (m3/s)	Q100 (20% Increase for Year 2100) m3/s
1.20	74.2	0.90	1.00	5.0	338	0.30	0.36

The 1% AEP of 0.4001 m3/s was adopted to account for climate change.

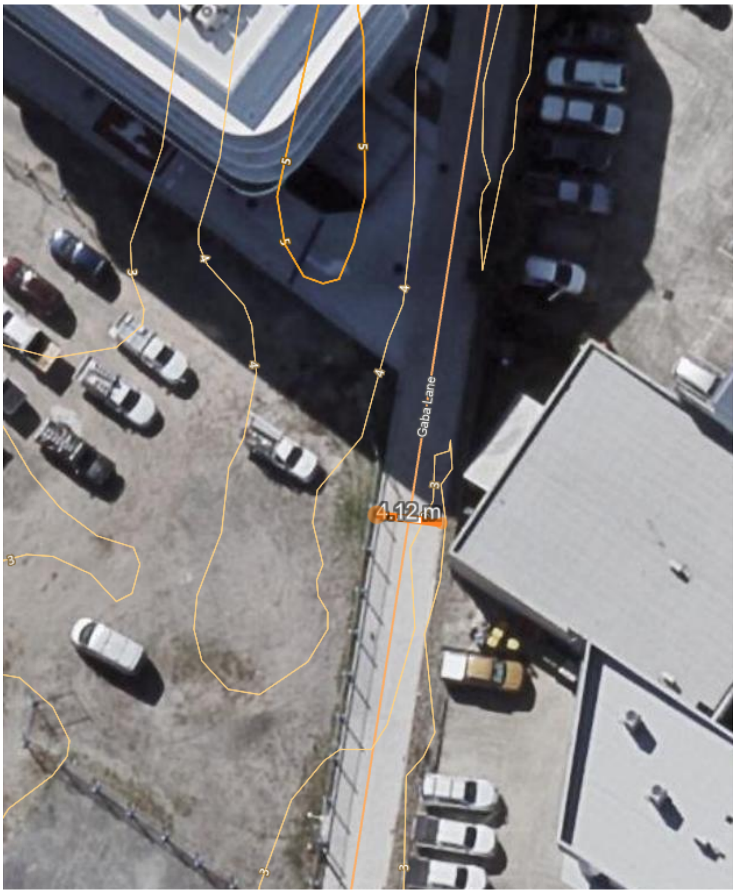
Extracted from attached excel calculation spreadsheet (571-002 Gaba Lane Rational Calculations).

Manning's Calculation: channel length and width

Length:

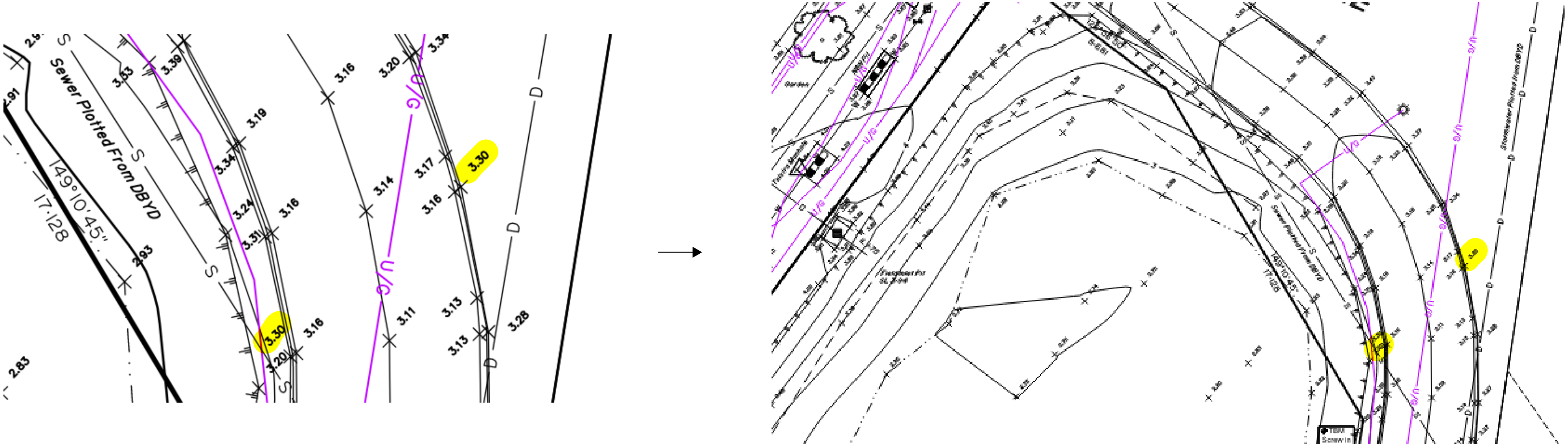


Width:



Manning's Calculation: US and DS IL

US IL (sourced from survey - 21006_CD-02 sheet1):



DS IL (sourced from survey - 21006_CD-02 sheet2):

Manning's Calculation: manning's "n"
(sourced from QDUM 2017 4th Edition)

Manning's "n" :

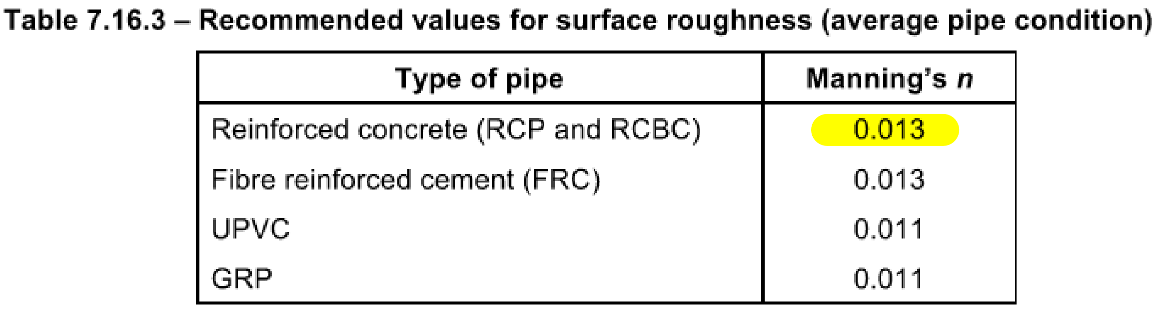
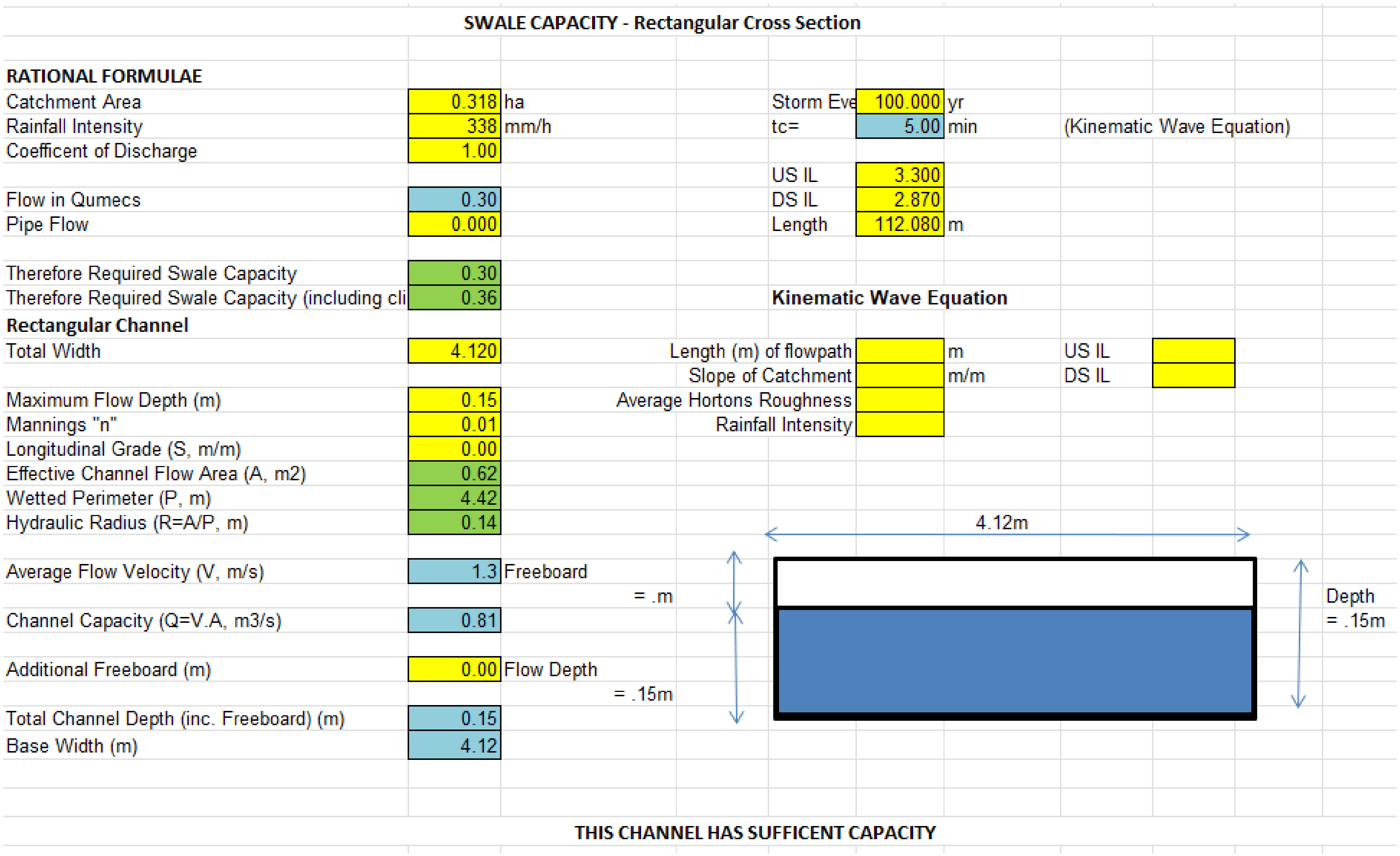


Table 7.16.3 – Recommended values for surface roughness (average pipe condition)

Type of pipe	Manning's *n*
Reinforced concrete (RCP and RCBC)	0.013
Fibre reinforced cement (FRC)	0.013
UPVC	0.011
GRP	0.011

Manning's Calculation:



SWALE CAPACITY - Rectangular Cross Section

RATIONAL FORMULAE

Catchment Area	0.318	ha
Rainfall Intensity	338	mm/h
Coefficent of Discharge	1.00	
Flow in Qumecs	0.30	
Pipe Flow	0.000	
Therefore Required Swale Capacity	0.30	
Therefore Required Swale Capacity (including cli	0.36	

Storm Eve	100.000	yr
tc=	5.00	min
US IL	3.300	
DS IL	2.870	
Length	112.080	m

(Kinematic Wave Equation)

Rectangular Channel

Total Width	4.120	
Maximum Flow Depth (m)	0.15	
Mannings "n"	0.01	
Longitudinal Grade (S, m/m)	0.00	
Effective Channel Flow Area (A, m2)	0.62	
Wetted Perimeter (P, m)	4.42	
Hydraulic Radius (R=A/P, m)	0.14	
Average Flow Velocity (V, m/s)	1.3	Freeboard
Channel Capacity (Q=V.A, m3/s)	0.81	
Additional Freeboard (m)	0.00	Flow Depth
Total Channel Depth (inc. Freeboard) (m)	0.15	
Base Width (m)	4.12	

Kinematic Wave Equation

Length (m) of flowpath		m	US IL	
Slope of Catchment		m/m	DS IL	
Average Hortons Roughness				
Rainfall Intensity				

THIS CHANNEL HAS SUFFICENT CAPACITY

Extracted from attached excel calculation spreadsheet (571-002 Gaba Lane Manning's Calculations).