



**van der meer**

## **WATER MANAGEMENT PLAN**

**ATSYD2**  
**1 Sirius Road**  
**Lane Cove West NSW 2066**

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Approved by:	Andrew Wallis	Phillip Salem
Position:	Civil Manager	Senior Civil Engineer
Signed:		
Date:	18-11-2024	
Job No:	SY182-105	

## REVISION STATUS

Revision	Description of Revision	Date	Issued By:
1	FOR APPROVAL	7 October 2020	Rod Burrough
2	REVISED FOR APPROVAL	15 May 2023	Nathan Taufer
3	REVISED FOR APPROVAL	18 Nov 2024	Phillip Salem

Recipients are responsible for eliminating all superseded documents in their possession.

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## 1. Introduction

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### 1.1 Background

Van Der Meer Consulting has been commissioned by A W Edwards Pty Ltd to prepare a Water Management Plan (WMP) to support a S4.55(1A) of the Environmental Planning and Assessment Act 1979 - Modification of an approved Development Application for a proposed office and data centre development at 1 Sirius Road, Lane Cove West.

This WMP has been developed to:

- Detail water use, metering, disposal and management on-site
- Document the proposed Surface Water Management Plan including:
  - (i) the program to monitor:
    - Surface water flows and quality; and
    - Surface water storage and use
  - (ii) sediment and erosion control plans
  - (iii) surface water impact assessment criteria, including trigger levels for investigating potential adverse surface water impacts
  - (iv) a protocol for investigation and mitigation of identified exceedances of the surface water impact assessment criteria

The WMP provides an overall framework for water management during operation. It has been developed to satisfy the requirements of Condition B48 of the Development Consent for SSD-9741-Mod-1 dated 9 March 2020 and the following information and documents were utilised in this investigation:

- Sydney Water – Stormwater Quality Target 2016
- Detailed Site Survey Plans
- Architectural plans defining proposed works and existing infrastructure
- Lane Cove Council DCP – Part O: Stormwater Management

The report also includes a comprehensive assessment of Water Quality, including management, treatment for Lane Cove Council.

Council has advised that due to the sites' close proximity the river, on-site detention is not required for this development.

### 1.2 Existing Site

The site is within the Lane Cove Council LGA. It consists of a single lot which is located in west of Sirius Road, and north-west of Apollo Place and back of the building to the Lane Cove River (see Figure 1.1). Appendix C includes the survey for the existing site. The site is entirely covered by a drainage easement benefitted Lane Cove Council.



The site area is approximately 3.94 ha. The topography of the site is generally grading towards the river at 10-20%.

An upstream catchment of 5.5Ha is directed through the site. The catchment consists of the following:

- Street drainage easement from Apollo Place between Nos. 1 and 2 Apollo Place via a 375mm dia concrete pipe.
- An overland flow path at the end of Apollo between Nos. 2 and 3 Apollo Place draining excess stormwater that cannot be captured by the pipeline.
- Interallotment drainage pipes from No. 1, 2 & 3 Apollo Place.
- Sirius Road accessway.
- Street drainage easement from the end of Sirius Road across the rear of 1A Sirius Road (Harley Davidson)
- And finally, a small catchment (400m<sup>2</sup> approx.) from the low side of 3 Apollo draining the hardstand of the property.



Figure 1.1 – Site Area



### **1.3 Proposed Works**

The proposed development involves the construction of a new 4 storey data centre building development. The development comprises approximately 65% of the site.

The building will require all existing council stormwater to be diverted around the new building directed to Stringy Bark Creek together with an overland flow from Apollo Place to the southwest of the site.

Lane Cove Council has recommended that the building and hardstand areas be discharged in a manner that maintains groundwater flow to surrounding bushland and wetlands. The agreed solution is to implement a series of infiltration trenches around the low side of the building on the north west and south west boundaries that will maintain groundwater levels along the perimeter of the site. In larger storm events the trenches are designed to surcharge to existing lowpoints in the site as indicated by arrows in figure 1.1

## **2. Stormwater Quality Control**

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### **2.1 Objectives and Targets**

The quality of runoff from a catchment depends upon many factors such as land use, degree of urbanisation, population density, sanitation, waste disposal practices, landform, soil types, and climate. Pollutants typically transported by runoff include litter, sediment, nutrients, oil, grease, and heavy metals. Whilst all these pollutants have a negative impact on the receiving water quality, suspended solids and nutrients cause the highest detrimental impact to the environment.

Also, soil erosion during the construction phase presents a potential risk to water quality. The primary risk occurs while soils are exposed during earthworks when suspended sediment and associated pollutants can be washed into downstream watercourses.

### **Quality Requirements**

Lane Cove Council has adopted the Lane Cove River Coastal Zone Management Plan and as yet no specific water quality targets have been nominated. For this reason we have adopted the Sydney Water targets recommended for use in the Management Plan. The site-specific water quality targets are outlined below in Table 2.1. It should be noted that these targets are similar to the targets set by the adjoining City of Ryde also a party to the Lane Cove River Coastal Zone Management Plan.



Pollutant	Reduction Target
<b>Total Suspended Solids (kg/yr)</b>	85% reduction of the annual load
<b>Total Phosphorus (kg/yr)</b>	60% reduction of the annual load
<b>Total Nitrogen (kg/yr)</b>	45% reduction of the annual load
<b>Gross Pollutants (kg/yr)</b>	90% reduction of the annual load

**Table 2.1 – Sydney Water Pollution Reduction Targets**



## 2.2 Water Quality Control Measures

The treatment train proposed for the redevelopment are summarised below:

### Erosion & Sediment Control Plan

- During construction, water quality control is achieved by deposition and trapping of silts and clays which often have nutrients such as phosphorus and nitrogen attached to their surfaces. Silt fences will be erected prior to construction to control sediment runoff. This will reduce and isolate sediments and particulate matter.
- An Erosion and Sediment Control Plan has been provided in accordance with Council Development Control Plan (2012) and with Landcom's "Managing Urban Stormwater – Soils and Construction (2004). This will ensure that a significant portion of sediments and attached nutrients can be contained on site during construction. A copy of the Erosion and Sediment control plan is contained within the Civil Plans shown in Appendix A.

### CDS Separator

- *CDS Separator* is a device to contain and retain gross pollutants, litter, sediments, and associated oils using energy of the inflow to create a vortex flow regime within the CDS screening chamber.
- Research has shown (CRCCH, 1999) that CDS can remove nearly all gross pollutant and a significant proportion of fine pollutants, particularly during storms. Moreover, as per Portland State University 2002 CDS generally remove over 95% particles greater than 215 microns with screen apertures of both 2400 microns and 4700 microns.
- Walker, Allison, Wong, Wootton, 1999) that 70% of oils can be associated with solids in the stormwater and that over a period of dry weather conditions the highest oil content was found in the sediment range of 200 to 400 microns. In the category of attached pollutant, CDS were the only Gross Pollutant Trap device that even be considered capable of capturing anything (CSIRO 1999). Based on UCLA Report 1998, CDS has an oil removal efficiency from 82-94%.
- A single CDS 1012 or approved equivalent will be used at the site discharge point.

### Rainwater Tank

- 100kL rainwater tank will be placed at the proposed location within the proposed development.
- Based on the analysis using MUSIC, rainwater tank helps the reduction of the flow out by 44.5%

### Filter Cartridges

- StormFilter is a proprietary device containing multiple cartridge units in a single system,
- thereby suitable for large catchments. Also, the cartridges come with various filtration
- media available to target site-specific pollutants.



- 690mm Psorb Storm Filter cartridges as detailed in the engineering drawings. A total of 15 cartridges are proposed.

#### Infiltration Trenches

- Infiltration trenches are suitable for holding water and slowly releasing into the surrounding soil. They assist in improving ground water levels, removing pollutants, primarily sediments and reducing runoff.
- The trench system totals 240m in length and runs along much of the north western and south western perimeter of the site. Refer appendix A for details.

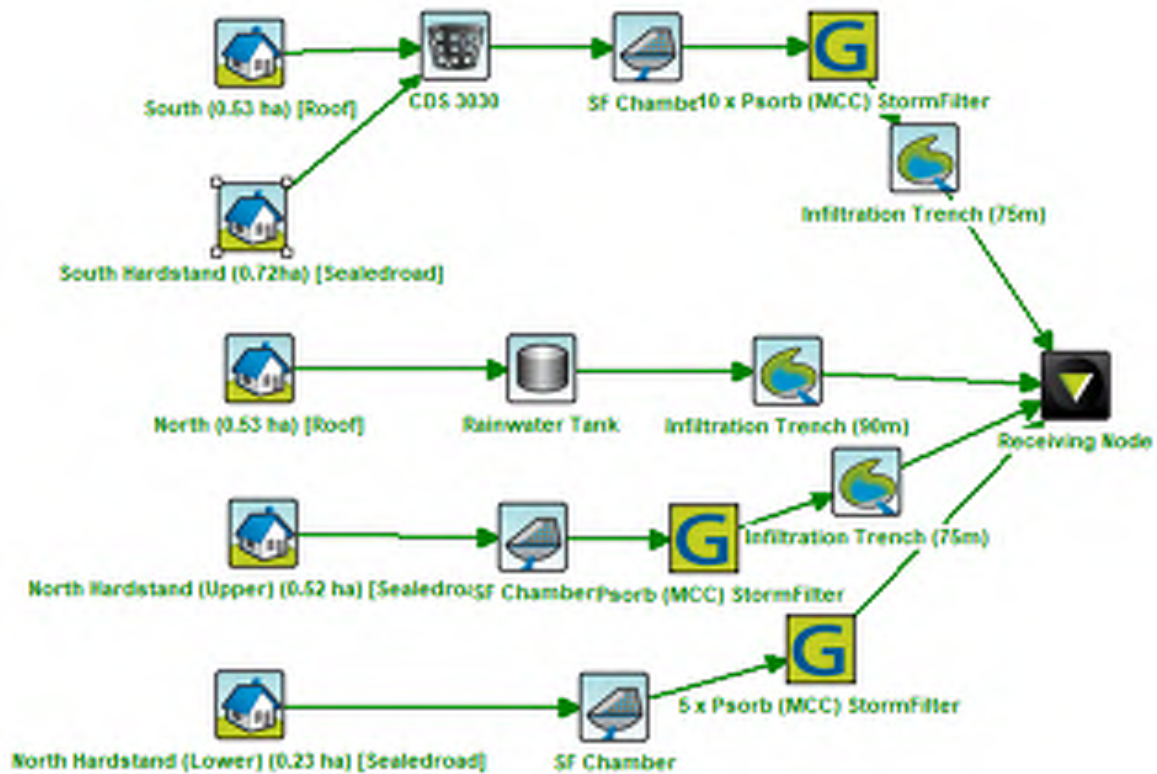
### **2.3 Water Quality Modelling**

#### **2.3.1 MUSIC**

The effectiveness of the proposed water quality measures have been assessed using numerical modelling. Water quality modelling has been conducted using the software program MUSIC (Model for Urban Stormwater Improvement Conceptualisation). This program is used to establish the effectiveness of the water quality treatment proposed for the development site. MUSIC has been developed by the Cooperative Research Centre for Catchment Hydrology, and is designed as a planning tool for water quality treatment trains for catchment runoff. The program is able to model pollutant loads present in stormwater runoff from a catchment and assess the effectiveness of different treatment devices in terms of pollutant load reduction.

The rainfall data used to develop the model was taken at six minute time intervals from 2000 to 2010 at Sydney Airport AMO Rainfall Station. The MUSIC model layout is shown in Figure 2.1.





**Fig. 2.1 – Water Quality Treatment Train Diagram**

### 2.3.2 Land Use

Table 2.2 details the land use areas for the proposed development. A scaled set of civil and architectural plans are included in Appendix A and Appendix B respectively and a survey of the existing property is included in appendix C.

Land Use / Surface Type	Area (m2)
Building Roof	10,600
Impermeable/Pavement	14,700
Landscaping (Excluded in MUSIC)	14,150
<b>Total</b>	<b>39,450</b>

**Table 2.2 – Land Use Areas**



### 2.3.3 Results

Table 2.3 below shows the calculated mean annual pollutant loads for the proposed site conditions before and after the implementation of the treatment devices.

	Total Suspended Solids (kg/yr)	Total Phosphorus (kg/yr)	Total Nitrogen (kg/yr)	Gross Pollutants (kg/yr)
Pre-treatment	3910	7.56	36.4	482
Post-treatment	539	1.63	12.4	0

**Table 2.3 – Summary of Treatment Train**

Sydney Water Stormwater Quality Target 2016 outlines the requirements for the reduction of pollutants from stormwater before it can be discharged from the site. These targets are listed in Table 4.3 below together with the percentage pollution reductions that will be achieved by the proposed treatment train.

Pollutant	Reduction Target	Reduction Achieved	Target Achieved
Total Suspended Solids	85%	86.2.0%	YES
Total Phosphorus	60%	78.4%	YES
Total Nitrogen	45%	65.9%	YES
Gross Pollutants	100%	100%	YES

**Table 2.4 – Comparison of Pollutant Reduction Target vs. Achieved**

It is clear from the previous table that the proposed water quality measures enable the reduction targets to be achieved for all key stormwater pollutants. Therefore, by implementing the proposed treatment train measures within the proposed development there will be no detrimental effect on the quality of stormwater running off from the site.



### **3. Flood Study**

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GRC Hydro has carried out a flood study for the subject site to obtain the flood levels information which consider the whole local catchment area since the subject site is located at the downstream end of the Stringybark Creek. A WBNM model was developed in order to generate catchment flows from the applied rainfall. Resultant flows were then applied to the site TUFLOW model. It was found that the mainstream flood levels of the subject site are as follow:

- 1% AEP – 2.5 mAHD
- 0.5% AEP – 2.5 mAHD
- PMF AEP – 5.4 mAHD

As the lowest proposed building level is at 6.5 mAHD, it is reasonable to suggest that the development is unaffected by flooding. Refer to Appendix D for the complete GRC Hydro Flood Study.

### **4. Surface Water Impact Assessment**

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#### **4.1 Flow to site infrastructure**

Most of the surface runoff at ground level is collected by pit and pipe and discharged through downstream in a manner that closely reflects the predevelopment scenario. Prior to discharge the stormwater is treated via a number of devices as listed in the stormwater quality section of this report. This will ensure downstream vegetation and water bodies are not adversely affected.

#### **4.2 Flow from Roof**

Runoff from the roof is divided into north and south sides.

- The south discharges to the west of the site into the bushland, low flows are treated and directed through to the infiltration trench to provide slow-release flows and increase groundwater levels.
- The north discharges to a 100kL rainwater reuse tank to be reused on site for landscape purposes, roofwater that bypasses/overflows the rainwater tank will be directed this same infiltration trench and provide water to recharge groundwater levels to the north of the site.,

#### **4.3 Overland flow from upstream infrastructure.**

GRC Hydro has carried out a Flood Liability Study to analyse the proposed stormwater system and the overflow structure of the subject site. It was found that in 1% AEP, the maximum water level is 8.29m AHD. As such, the data hall (8.4m AHD) is sufficient with 0.11 m freeboard.

Elsewhere GRC study indicates no flood liability for all intents and purposes. Level 1 is subject to a depth of 10mm in the largest possible flood event (Probable Maximum Flood) which has



a probability in the order of 100,000Y ARI event. Sufficient number of opening have been nominated to guarantee the overflow capacity of the subject site. Refer to Appendix E for the complete GRC Hydro Flood Liability Study.

## **5. Maintenance Schedule**

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The monitoring of water quality from the site is not deemed required based on the nature of the development. Contamination due to spills from toxic substances such as oils and chemicals are protected by bunding and other such methods as covered by the EPA's storage & handling of liquids.

area and lower quality risk posed by this area.

Monitoring and maintenance are required to make sure the stormwater treatment devices work properly on the daily basis. Any unusual event in regards to stormwater system should be investigated and mitigated as soon as possible. For instance, any local flooding should be investigated and reported which could indicate a blockage in the stormwater pit and pipe system. Any roof water spilled over could indicate a blockage in the roof main pipe system. Any problems with the stormwater should be quickly investigated, reported, and mitigated to avoid any damage caused by stormwater flowing/leaking into the building. Refer to Appendix F for complete maintenance schedule for stormwater system/devices used in the subject site.



## 6. Conclusion

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The proposed development of the site could potentially lead to significant changes in water quantity and quality if a water sensitive urban design approach is not adopted as part of the development strategy.

The key strategies to be adopted for this development include the following:

1. A pit and pipe network to collect minor storm runoff from surface areas which will minimise nuisance flooding
2. CDS Separator to treat stormwater runoff before discharge into the downstream waterways;
3. 100kL rainwater tank will be used to collect storm water runoff from roof used for irrigation.
4. 3 chambers with 5, 5 and 10 filter cartridges at proposed locations.

The results from the investigations and modelling for this project that have been summarised in this report indicate the assessment of impact to the related infrastructure and ecosystem and show that the development with the proposed WSUD strategy and management can provide a safe and ecologically sustainable environment.

The proposed development and the proposed water quality treatment devices comply with the requirements of Sydney Water and Lane Cove Council.



## 7. References

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- Sydney Water Water Quality Requirement 2016
- Lane Cove Council DCP – Part O: Stormwater Management
- “Australian Runoff Quality – A Guide to Water Sensitive Urban Design”, Engineers Australia (2006)
- “Australian Rainfall and Runoff – A Guide to Flood Estimation”, Institute of Engineers, Australia (1987)
- eWater – MUSIC Version 6.1 (Build 0.767)
- Lane Cove River Coastal Zone Management Plan – Final Draft, March 2013



## Appendix A – Civil Engineering Plans

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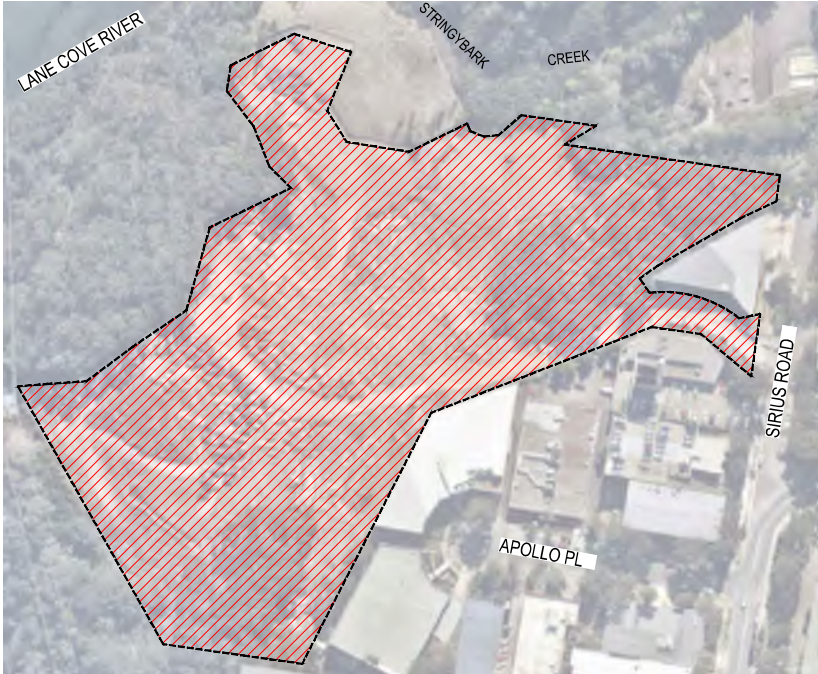




**ATSYD2**  
**IE COVE WEST**

## CIVIL DRAWING LIST

ATSYD2-SSD-DRG-VDIM-CIV-000	COVER SHEET
ATSYD2-SSD-DRG-VDIM-CIV-001	STANDARD NOTES
ATSYD2-SSD-DRG-VDIM-CIV-0211	BULK EARTHWORKS PLAN
ATSYD2-SSD-DRG-VDIM-CIV-0212	BULK EARTHWORKS SECTIONS
ATSYD2-SSD-DRG-VDIM-CIV-0219	EROSION & SEDIMENT CONTROL
ATSYD2-SSD-DRG-VDIM-CIV-0411	DRAINAGE LAYOUT
ATSYD2-SSD-DRG-VDIM-CIV-0450	TYPICAL DRAINAGE DETAILS
ATSYD2-SSD-DRG-VDIM-CIV-0811	3D VISUALISATION
ATSYD2-SSD-DRG-VDIM-CIV-0812	DEPTH COLOUR MAP



LOCALITY PL  
NTS









Issue Date Description  
05 14.12.22 ISSUED FOR \$4.55

**NOTE:**

- THIN RED DASHED LINES DENOTE ROCK CUT FACE
- THICK RED DASHED LINES DENOTES RETAINING WALL
- ALL DIMENSIONS ARE TO FACE OF WALL OR CUT ROCK FACE.

CLOUDED ITEMS  
PART OF MOD 3  
AMENDMENTS

CLOUDED ITEMS  
PART OF MOD 3  
AMENDMENTS

**BULK EARTHWORKS QUANTITIES**

CUT VOLUME: 91,000m<sup>3</sup>  
FILL VOLUME: 28,600m<sup>3</sup>

**NOTE**

1. B.E.L. REFERS TO BULK EXCAVATION LEVEL
2. F.F.L. REFERS TO FINISHED FLOOR LEVEL
3. CONTOURS AND SPOT LEVELS ON THIS PLAN DENOTE PROPOSED SUBGRADE LEVEL
4. TEMPORARY BATTERS ARE NOT SHOWN FOR CLARITY
5. REFER TO CIVIL SPECIFICATIONS ON DRAWING C001 FOR SUBGRADE PREPARATION REQUIREMENTS
6. THIS PLAN IS TO BE READ IN CONJUNCTION WITH:
  - THE GEOTECHNICAL REPORT
  - STRUCTURAL GROUND FLOOR ARRANGEMENT PLAN
  - ARCHITECT'S GENERAL ARRANGEMENT PLAN
7. BUILDING SLAB BULK EARTHWORKS LEVELS BASED ON EXCAVATION FOR SLAB AND BASE THICKNESS AS DETAILED ON THE STRUCTURAL ENGINEERS' PLANS. NO STRIPPING CONSIDERED FOR CUT AND FILL QUANTITIES
- 8.

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ATSVD2  
1 SIRIUS ROAD  
LANE COVE WEST, NSW 2206

Drawn By: AS SHOWN @ AS  
Checked By: Approved By:

Rev: 01 Date: 01/12/2022

Project Name: BULK EARTHWORKS - FULL SITE

Project Location: ATSYDE-BRD-DMS-VDM

Project Number: CN2021105

Project Status: FOR APPROVAL

Project Description: BULK EARTHWORKS - FULL SITE

Project Location: ATSYDE-BRD-DMS-VDM

Project Number: CN2021105





—||—||—||— - SEDIMENT CONTROL FENCE



-DIVERSION DRAIN

B11. EROSION & SEDIMENT CONTROL SIGNAGE AVAILABLE FROM COUNCIL MUST BE ATTACHED TO THE MOST PROMINENT AVAILABLE STRUCTURE AND BE VISIBLE AT ALL TIMES WHEN ENTERING THE SITE FOR THE DURATION OF CONSTRUCTION.



The diagram illustrates a cross-section of a wire mesh structure used for erosion control. It shows a sloped surface with a wire mesh installed over it. The mesh is supported by posts driven into the ground. A geotextile filter fabric is shown beneath the mesh. The diagram labels the 'DIRECTION OF FLOW' as indicated by an arrow. Key dimensions and components are labeled: 'WIRE OR STEEL MESH', '3m MAX' (width of the mesh section), 'GEOTEXTILE FILTER FABRIC', 'POSTS DRIVEN 0.6m INTO THE GROUND OR ALTERNATIVELY ATTACH TO EXISTING CHAINWIRE', 'DISTURBED AREA', 'UNDISTURBED AREA', '0.6m MAX' (height of the mesh section), and 'DETAIL OF OVERLAP'.

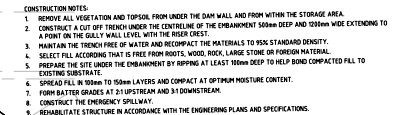
N.T.S.

NTS

A cross-sectional diagram of a steel shaker grid installed at a construction site. The grid consists of several parallel steel bars. Labels indicate a 'STEEL SHAKER GRID @ 200 CENTRE' and a 'CONSTRUCTION SITE'. Dimensions shown are 'MIN LENGTH 10m' and 'MIN WIDTH 3m'. The grid is supported by a 'CONCRETE' base.

VEHICLE EXIT

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SITE AREA	
TOTAL CATCHMENT AREA (a)	3.35
DESTRUCTURED CATCHMENT AREA (b)	3.9
RAINFALL DATA	
DESIGN RAINFALL DEPTH (DEPT)	6
DESIGN RAINFALL DEPTH (percentile)	80
X-RAY, % PERCENTILE RAINFALL EVENT	29.8
RAINFALL DURATION: 1 YEAR, 6-HOUR STORM	12.2
RUNOFF FACTORS	
RAINFALL RUNOFF COEFFICIENT	0.35
SOIL EROSIONITY (F) FACTOR	0.038
SLOPE LENGTH (n)	210
SLOPE GRADE (%)	1.5
LENGTH PROTECTION (L=5m)	0.27
EROSION: CONTROL PRACTICE (P factor)	1.33
GROUND COVER (C=5m)	1
VOLUME RUNOFF: ROFF COEFFICIENT (S (%))	0.5
CALCULATION	
SOIL LOSS (mg/m <sup>2</sup> )	50
SOIL LOSS CLASS	SEMI 1
SOIL LOSS (mg/m <sup>2</sup> /ha)	44
SOIL LOSS (mg/m <sup>2</sup> /ha)	44
TOTAL SOIL LOSS STORAGE VOLUME, m <sup>3</sup>	20
SEDIMENT BASIN SETTING VOLUME, m <sup>3</sup>	80
TOTAL SEDIMENT BASIN SETTING VOLUME, m <sup>3</sup>	100

Issue	Date	Description
05	14.12.22	ISSUED FOR \$4.55

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 11111  
 11111  
 11111

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Checked By	Approved By

AW

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Date: Job Number: SY182-10

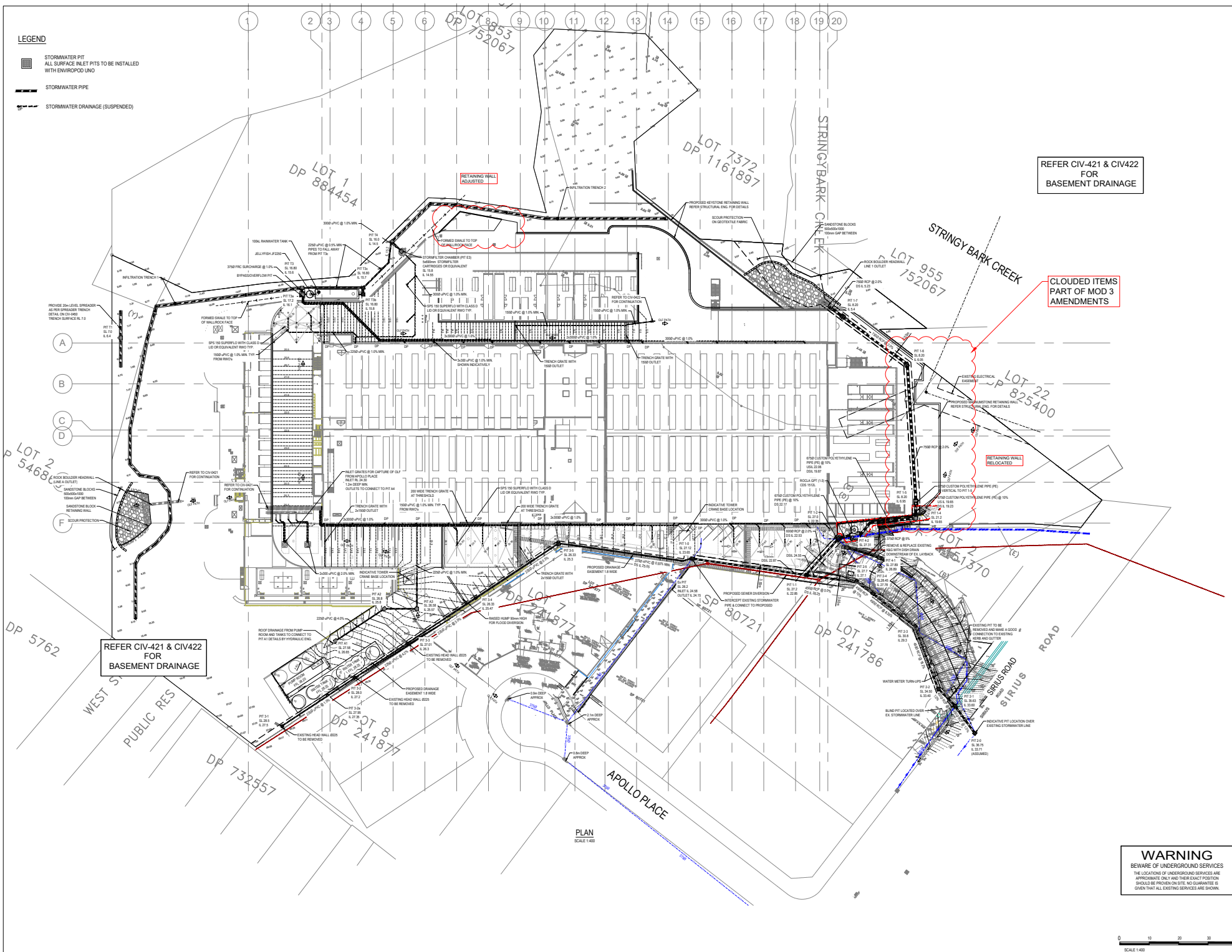
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EROSION AND SEDIMENT CONTROL

ATSYD2-SSD-ORG-VDM  
Drawing Number & Revision  
CIV-0219.05

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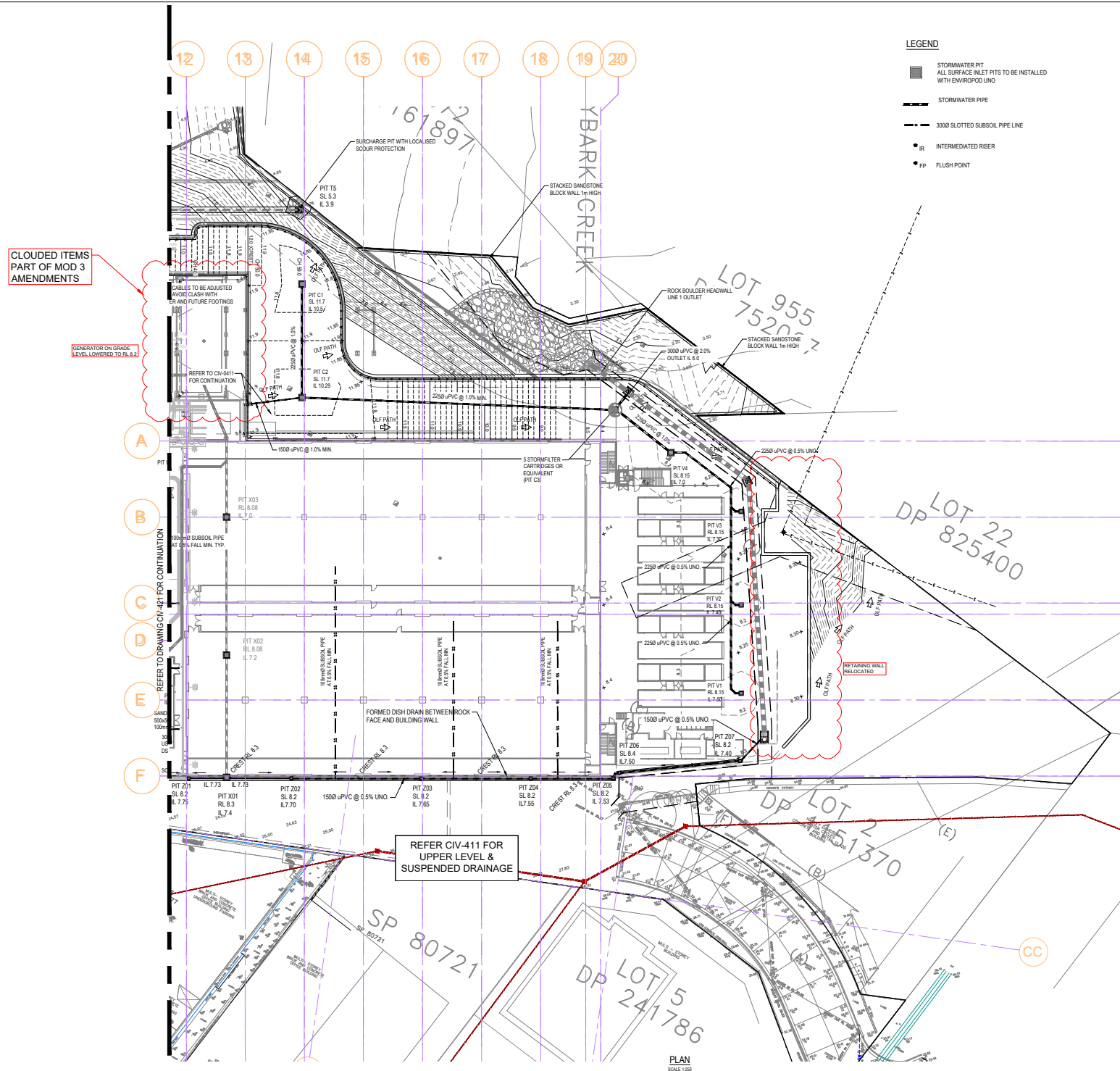


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Project	
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Checked By	Approved By
<b>AW</b>	
Date	Job Number
	<b>SY182-185</b>
Project Status	
<b>FOR APPROVAL</b>	
Drawing Title	
<b>DRAINAGE LAYOUT - FULL SITE</b>	
Project Identifier	
<b>ATSYD2-SSD-DRG-VDM</b>	
Drawing Number & Revision	
<b>P25/MS11.06</b>	

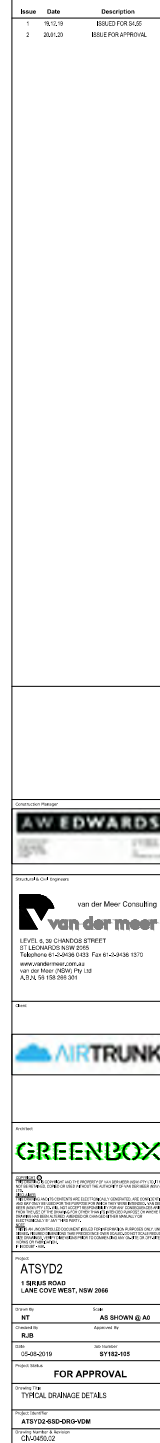


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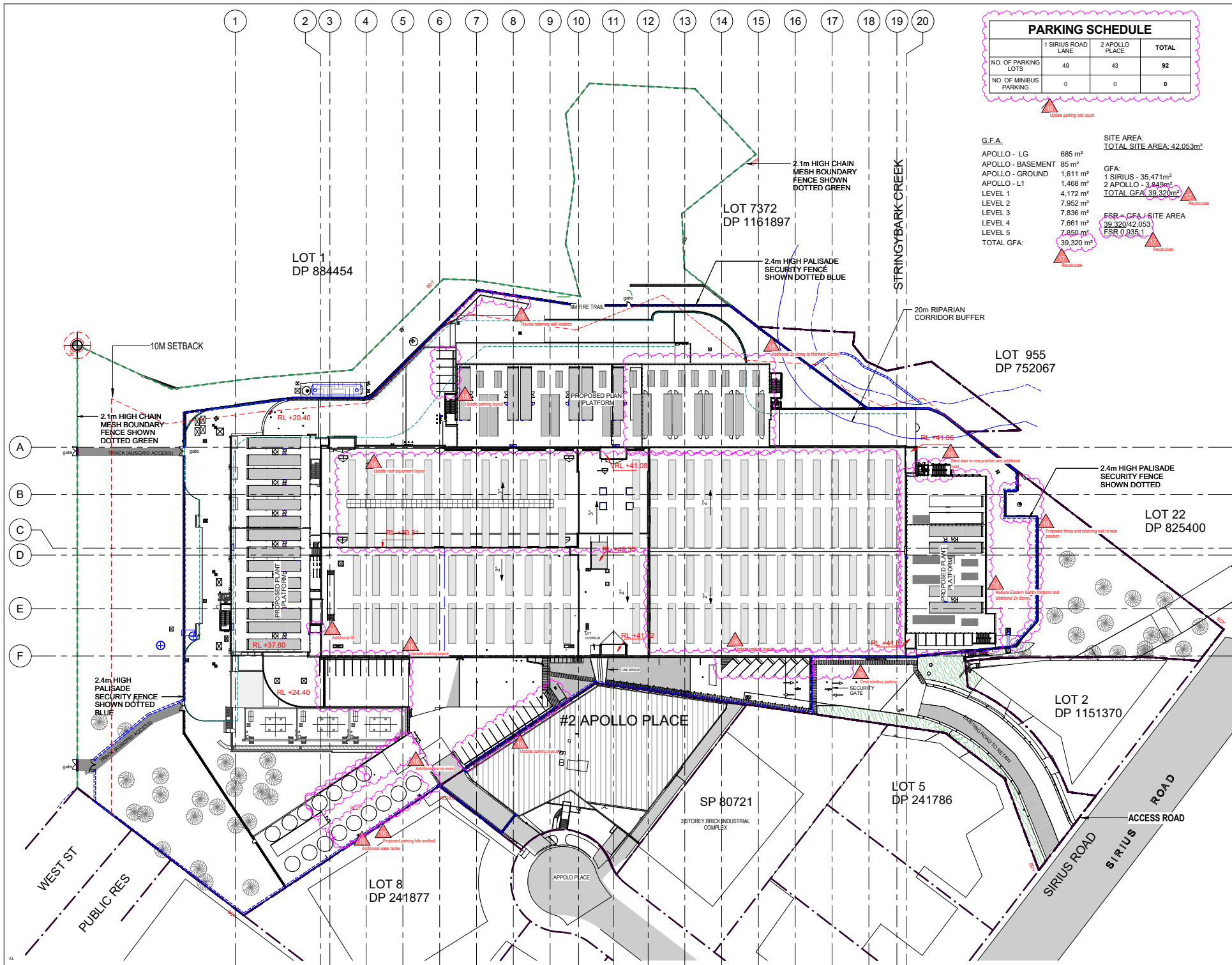




## **Appendix B – Architect’s Plan**

---





PARKING SCHEDULE		
	1 SIRIUS ROAD LANE	2 APOLLO PLACE
NO. OF PARKING LOTS	49	43
NO. OF MINIBUS PARKING	0	0

G.F.A.  
APOLLO - LG 685 m<sup>2</sup>  
APOLLO - BASEMENT 85 m<sup>2</sup>  
APOLLO - GROUND 1,611 m<sup>2</sup>  
APOLLO - L1 1,468 m<sup>2</sup>  
LEVEL 1 4,172 m<sup>2</sup>  
LEVEL 2 7,952 m<sup>2</sup>  
LEVEL 3 7,836 m<sup>2</sup>  
LEVEL 4 7,661 m<sup>2</sup>  
LEVEL 5 7,850 m<sup>2</sup>  
TOTAL GFA: 39,320 m<sup>2</sup>

SITE AREA:  
TOTAL SITE AREA: 42,053 m<sup>2</sup>

GFA:  
1 SIRIUS - 35,471 m<sup>2</sup>  
2 APOLLO - 3,849 m<sup>2</sup>  
TOTAL GFA: 39,320 m<sup>2</sup>

FSR = GFA / SITE AREA  
39,320 / 42,053  
FSR 0.9351

Issue Date Description

01 12.12.18 ISSUE FOR APPROVAL  
02 13.12.18 ISSUE FOR APPROVAL  
03 14.12.18 ISSUE FOR SUBMISSION  
04 24.06.19 FOR REVIEW  
05 28.06.19 ISSUED FOR RESUBMISSION  
06 07.08.19 REVISED SUB  
07 16.09.19 REVISED SUB SUBMISSION  
08 17.01.20 FOR REVIEW  
09 23.01.20 S4 SS SUBMISSION  
10 14.08.20 PRELIMINARY  
11 25.08.20 PRELIMINARY  
12 01.09.20 FOR INFORMATION  
13 11.09.20 S4 SS SUBMISSION  
14 24.09.20 FOR INFORMATION  
15 28.09.20 FOR INFORMATION  
16 05.09.22 S4 SS SUBMISSION  
17 02.11.22 S4 SS SUBMISSION  
18 30.11.22 S4 SS SUBMISSION  
19 09.12.22 S4 SS SUBMISSION

Sc: 1:500 0 5 10 15 25m

Project Manager

Service Design

**Greenbox**

+61 2 8069 8930

LEVEL 25

25 BLIGH ST

SYDNEY NSW 2000 AUSTRALIA

GREENBOX ARCHITECTURE PTY LTD

ABN: 78 139 779 098

ISO 9001 CERTIFIED QUALITY SYSTEM

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- Do not scale from drawing  
- Contractors shall confirm all dimensions on-site prior to commencing any work or producing any shop drawings  
- All materials to be used in accordance with the manufacturer's specifications and instructions and shall comply with the relevant Australian Standards  
- Copyright of this drawing and design remain the property of Greenbox Architecture Pty Ltd  
- Nominated Architect - Gerard Page, NSW reg No 7247, NZ reg No 3715, Vic reg No 17664, SA reg No 3061, QLD reg No 4538, WA reg No 2489

Client

Project  
ATSYD2  
1 SIRIUS ROAD LANE COVE WEST

Drawn By  
SF, JM

Scale  
1:500 @ A1

Checked By  
DK

Approved By  
AO

Date  
09.12.22

Job Number  
180095

Project Status  
S4.55 - MOD-3

Drawing Title  
MASTER PLAN

Drawing Number  
ATSYD2\_SSD\_DRG\_ARC\_0050

Issue

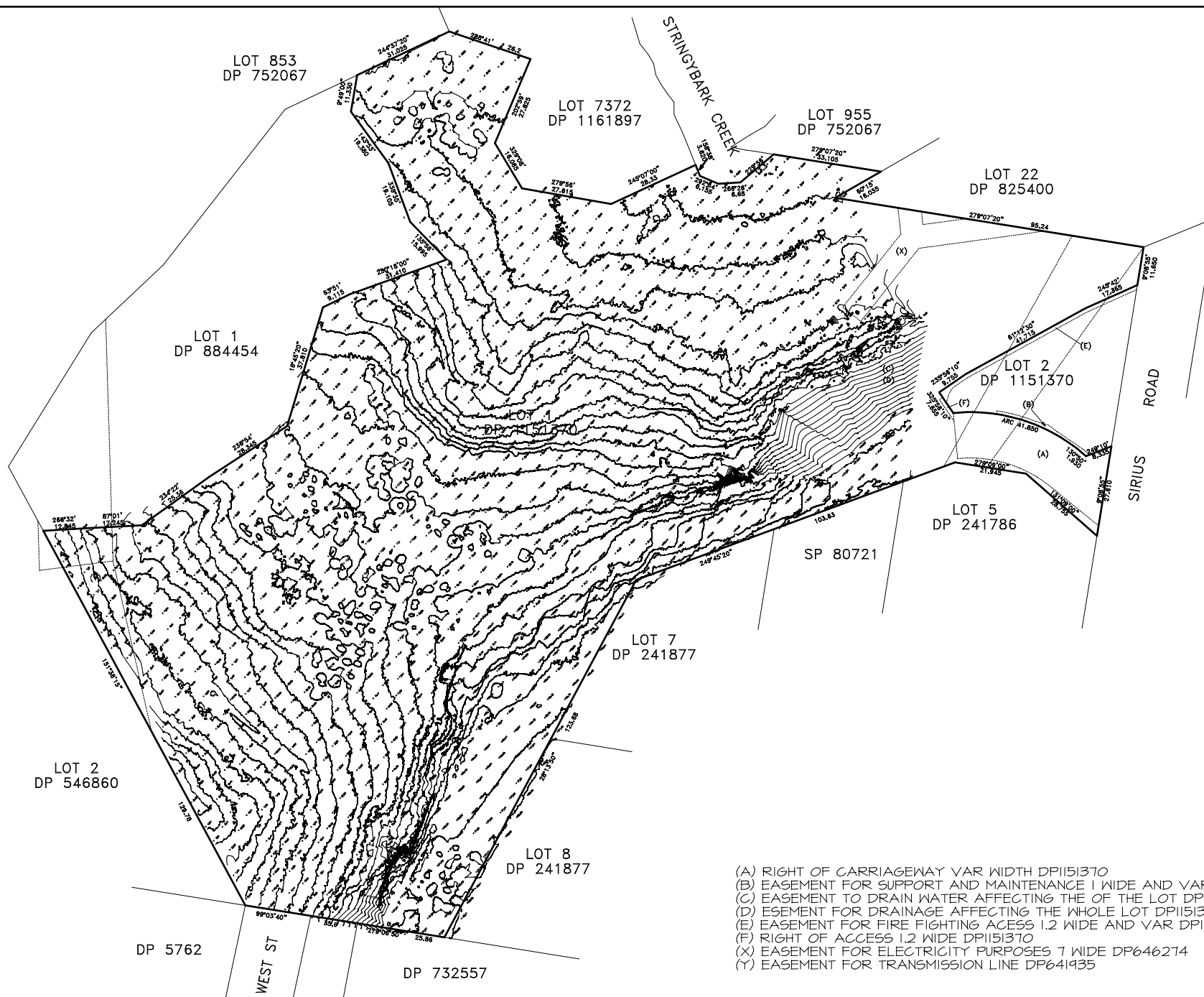
19



## Appendix C – Site Survey

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- (A) RIGHT OF CARRIAGEWAY VAR WIDTH DP1151370  
 (B) EASEMENT FOR SUPPORT AND MAINTENANCE 1 WIDE AND VAR DP1151370  
 (C) EASEMENT TO DRAIN WATER AFFECTING THE OF THE LOT DP1151370  
 (D) ESEMENT FOR DRAINAGE AFFECTING THE WHOLE LOT DP1151370  
 (E) EASEMENT FOR FIRE FIGHTING ACCESS 1.2 WIDE AND VAR DP1151370  
 (F) RIGHT OF ACCESS 1.2 WIDE DP1151370  
 (X) EASEMENT FOR ELECTRICITY PURPOSES 7 WIDE DP646214  
 (Y) EASEMENT FOR TRANSMISSION LINE DP641935

DRAWING STATUS

PROJECT:

**AIRTRUNK  
1 SIRIUS ROAD  
LANE COVE**

CLIENT:

**A.W. EDWARDS PTY LTD**

BUILDERS AND CONTRACTORS  
131 SAILORS BAY ROAD  
NORTHERIDGE NSW 2063  
Ph (02) 9958 1474 Fax (02) 9958 6208

**S.P. SITE SETOUT PTY LTD**

**CONSTRUCTION SURVEYING**

UNIT 36/4 HOYLE AVENUE  
CASTLE HILL, 2154  
Mobile: 0411 315 319  
Telephone: (02) 9654 3316  
Facsimile: (02) 9654 3318  
Email: stephen@spsite.com.au



SCALE 1:600 (AI)

DATE 17/09/2018 DATUM A.H.D

CADD FILE REF AWE/LANE\_COVE

DWG No: SPII21-001.PRO

PLAN:

SHOWING EXISTING LEVELS  
OVER SITE

**SHEET 1 OF 9**



## Appendix D – Flood Study

---



Job Number: 180073  
Date: 10th December 2018

Van der Meer Consulting  
Level 6 39 Chandos Street  
ST LEONARDS NSW 2065

 GRC Hydro  
Level 9, 233 Castlereagh Street  
Sydney NSW 2000  
Tel: +61 413 631 447  
[www.grchydro.com.au](http://www.grchydro.com.au)

Dear Rod,

## **Re: 1 Sirius Road, Lane Cove West - Flood Report**

### **INTRODUCTION**

GRC Hydro Pty Ltd has been engaged by Van der Meer Consulting Pty Ltd to carry out a flood study for 1 Sirius Road, Lane Cove West. Figure 1 presents the location of the subject site which is situated west of Sirius Road, south of Epping Road and north-west of Apollo Place.

The report addresses flood issues for this property via the following:

- Analysis of previous flood information; and
- Hydrologic and hydraulic analysis.

### **SITE DESCRIPTION**

The subject site is situated at the downstream end of the Stringybark Creek. The local catchment of the subject site has an area of 264 hectares which flows to the Lane Cove River. The subject site is immediately adjacent to the confluence of Lane Cove River and Stringybark Creek. A catchment map for the subject site is shown in Figure 2.

### **PREVIOUS STUDIES**

#### Swaines Creek Flood Study (Lyll& Associates, 2014)

Lyll & Associates consulting undertook a flood study for Swaines Creek which is located at the upstream end of the Lane Cove River. The study was undertaken on behalf of Willoughby City Council and used a TUFLOW model to calculate the 1% peak flood level and Probable Maximum Flood (PMF). They have extended their model to a location 2.2 km downstream of the Epping Road bridge which is approximately 800 meters upstream of the subject site. The designed water surface profile for 20 Year ARI, 100 Year ARI and PMF at the Lane Cove River adjacent to the subject site were determined to be 1.38 m AHD, 2.35 m AHD and 4.3 m AHD respectively. They used 0.04 as the surface roughness parameter known as "Manning's n" for Lane Cove River. Also, they adopted a constant value of 2.5 mm/hr for continuing losses, and they undertook sensitivity analyses for the value of initial losses during their hydraulic model tuning process, as a result, they used 10mm as their initial losses.

The Lyll study has been used to inform model parameters and tailwater levels used in modelling work reported upon herein.



## PROJECT SCOPE

The following work scope has been executed:

- Collection and review of previous studies;
- Construction of WBNM and TUFLOW models;
- Reporting inclusive of work undertaken, models, results and recommendations.

## HYDROLOGIC MODELLING

A WBNM model was developed in order to generate catchment flows from applied rainfall. Resultant flows were then applied to the Site TUFLOW model.

The following information was used in this model:

- Percentage impervious (0% - 90%) for each catchment based on available aerial photography;
- Bureau of Meteorology 1987 rainfall intensities;
- Initial losses: 10mm (Lyll& Associates, 2014);
- Continuing losses: 2.5 mm/hr (Lyll& Associates, 2014).

The WBNM model was run for a range of durations as per the ARR87 and PMF methodologies. Critical duration for Stringybark Creek analysis was undertaken in the WBNM model to determine the storm duration responsible for 1% AEP and PMF events peak flood levels in the catchment. The results of the critical durations were 2 hours for 1% AEP (assume same for 0.5% AEP event) and 1 hour for PMF.

## TUFLOW MODELLING

TUFLOW is a 2D numerical modelling package. This software is widely used and is considered best practice under the NSW Floodplain Risk Management Program. It is used to route applied flow in order to achieve flood levels, depths, extent, velocities and hazard.

The hydraulic modelling system is comprised of the following elements:

- LiDAR data has been used to inform a 2 m finite difference grid. This data has a typical accuracy of  $\pm 0.15$  m (1st confidence interval);
- No pipes have been included and instead flow is routed to Stringybark Creek in the hydrologic model. This makes for an appropriately conservative approach as it minimises any in catchment attenuation which may reduce resultant peak flow;
- The kerb/gutter and road crests are hydraulic features that have a significant impact on flood behaviour. As such these features have been represented in the model as break lines with invert heights determined by analysis of the LiDAR;
- Buildings can block flood waters natural flow path and therefore significantly impact flood behaviour. As such, buildings in the vicinity of the subject site were blocked out of the TUFLOW model;
- Manning's roughness values were applied as follows
  - Road - 0.02;
  - Vegetated Area - 0.08;
  - Lane Cove River - 0.04;
  - Commercial Core - 0.04; and
  - Residential - 0.055.



- Fixed inflow and tailwater for different events were adopted at the catchment's upstream and downstream boundary of Lane Cove River.

## MODEL RESULTS

The flood levels at the four reported points are shown in Table 1.

Table 1 Flood Levels in Critical Durations for Each Event

	Point 1 Flood Level (m AHD)	Point 2 Flood Level (m AHD)	Point 3 Flood Level (m AHD)	Point 4 Flood Level (m AHD)
1% AEP	2.6	2.5	2.5	2.4
0.5% AEP	2.7	2.5	2.5	2.4
PMF	5.6	5.5	5.4	5.2

Results for the events run (1%, 0.5 AEP and PMF) are presented in Figures 3, 4 and 5.

These results indicate that:

- Flood levels in the relevant reach of Stringybark Creek pertain more to the Lane Cover River water level than they do the flow generated by the catchment; and
- To be flood free buildings would be set at a level no higher than ~ 5.4 mAHd.

## TAILWATER SENSITIVITY

The 1% AEP peak flood levels at four critical points have been obtained from the TUFLOW model results, shown in the table below. These result further reinforce the idea that in the reach of Stringybark Creek adjacent to the Site, flood levels are largely determined by Lane Cove River levels, not by the flow magnitude in Stringybark Creek.

Table 2: Sensitivity Study of the Tailwater Level in the Lane Cove River

	Point 1 Flood Level for 1% AEP (m AHD)	Point 2 Flood Level for 1% AEP (m AHD)	Point 3 Flood Level for 1% AEP (m AHD)	Point 4 Flood Level for 1% AEP (m AHD)
Tailwater Level for 20 year ARI event (1.38 m AHD)	2.1	1.8	1.8	1.4
Tailwater Level for 100 year ARI event (2.35 m AHD)	2.5	2.4	2.4	2.4
Tailwater Level for PMF event (4.3 m AHD)	5.0	5.1	5.0	4.8

## CONCLUSIONS / RECOMMENDATIONS

An assessment has been undertaken to assess the flood liability of 1 Sirius Road Lane Cove West to Stringybark Creek flooding. The assessment has included the following scope of work:



- Built hydrologic and hydraulic models;
- Utilised model parameters from adjacent flood studies carried out for Council; and
- Incorporated highly conservative Lane Cove River tail water levels.

Based on this work it is apparent that the following mainstream flood levels apply to the Site (or surrounds);

- 1% AEP – 2.5 mAHD;
- 0.5% AEP – 2.5 mAHD;
- PMF – 5.4 mAHD.

As the lowest proposed building level is 6.5 mAHD it is reasonable to suggest that the development is unaffected by flooding. Please note however that intra-lot stormwater will need to be dealt with.

Yours Sincerely



Steve Gray  
Director



# ***FIGURES***

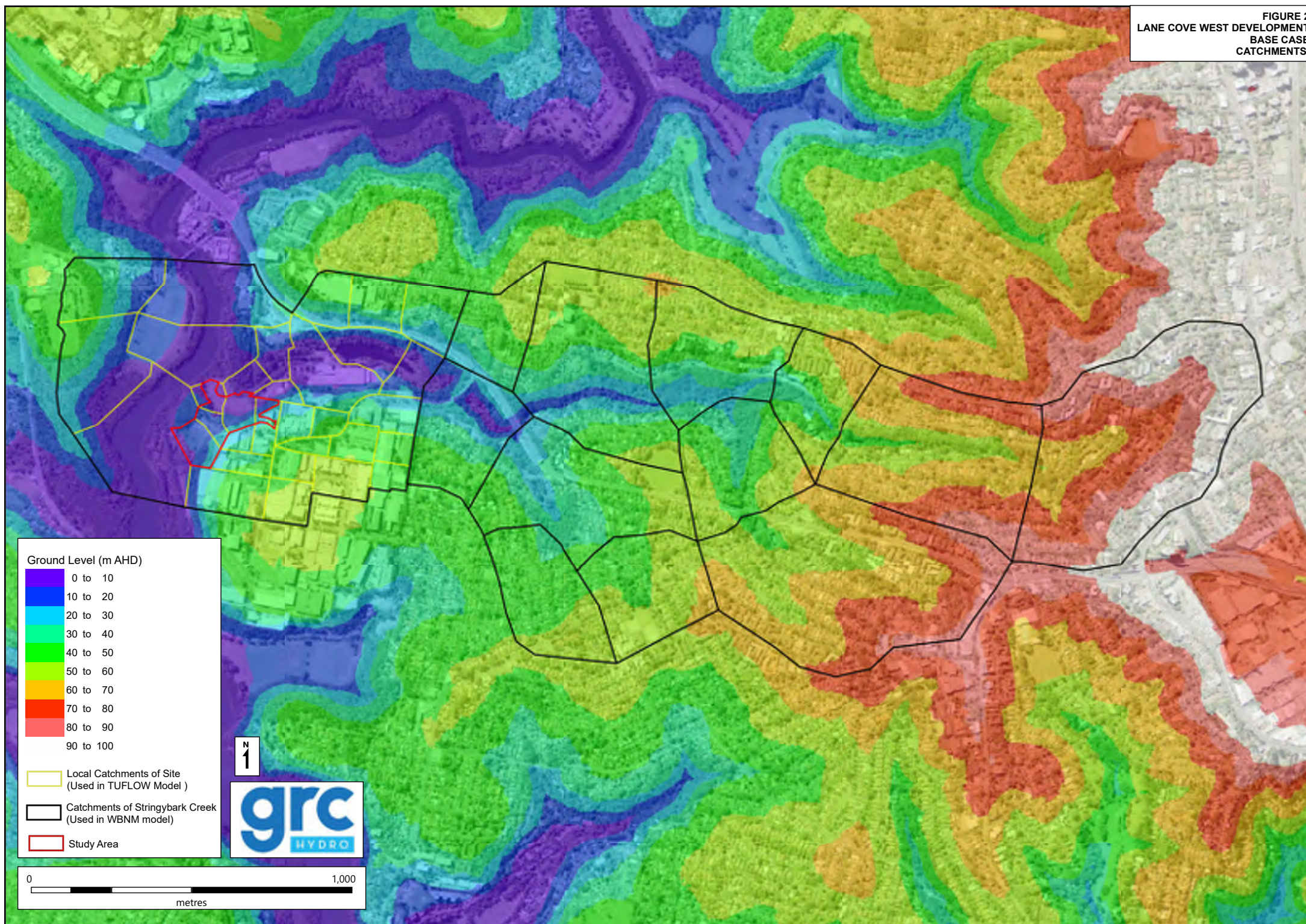


FIGURE 1  
LANE COVE WEST DEVELOPMENT  
SUBJECT SITE LOCATION



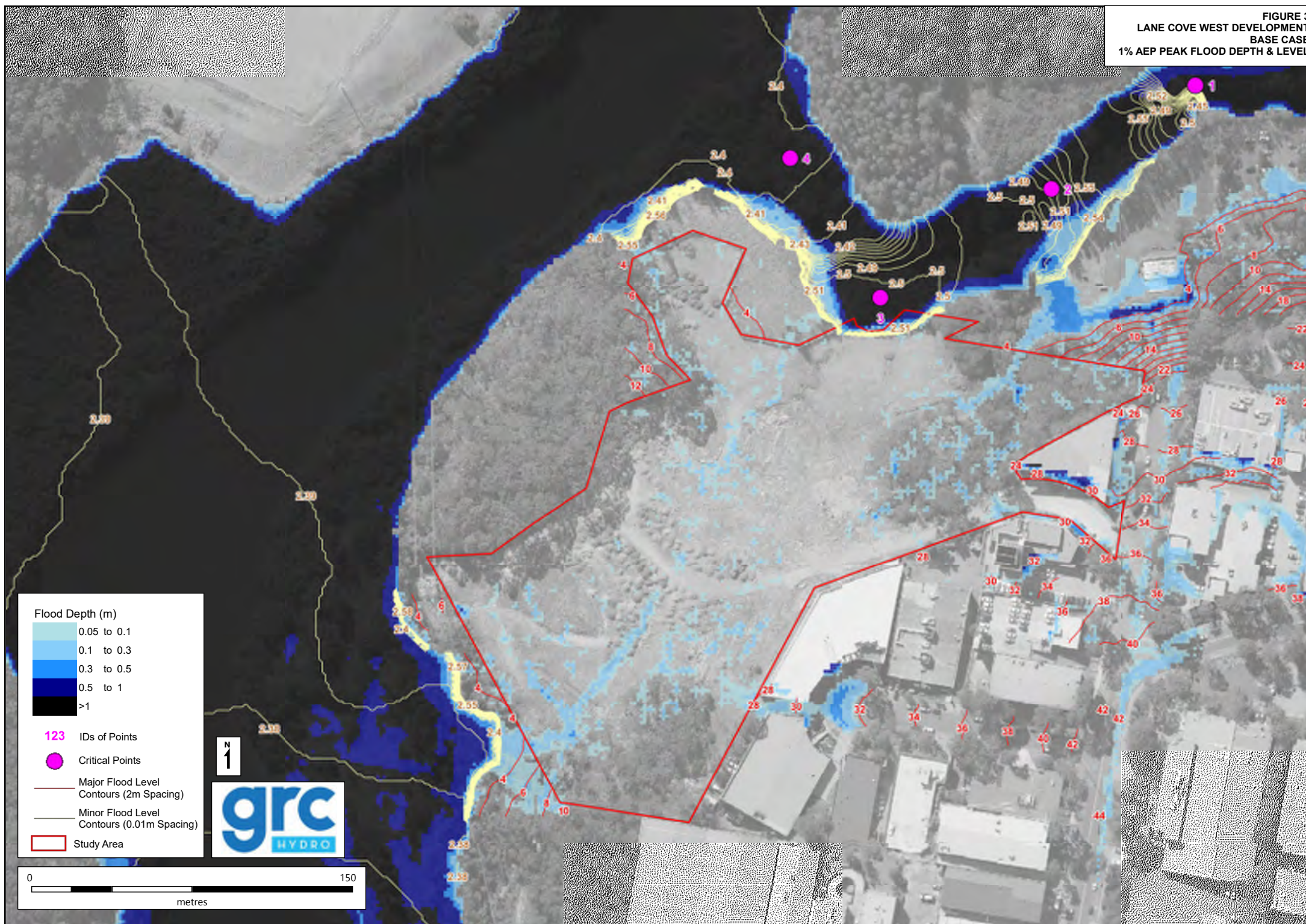


FIGURE 2  
LANE COVE WEST DEVELOPMENT  
BASE CASE  
CATCHMENTS



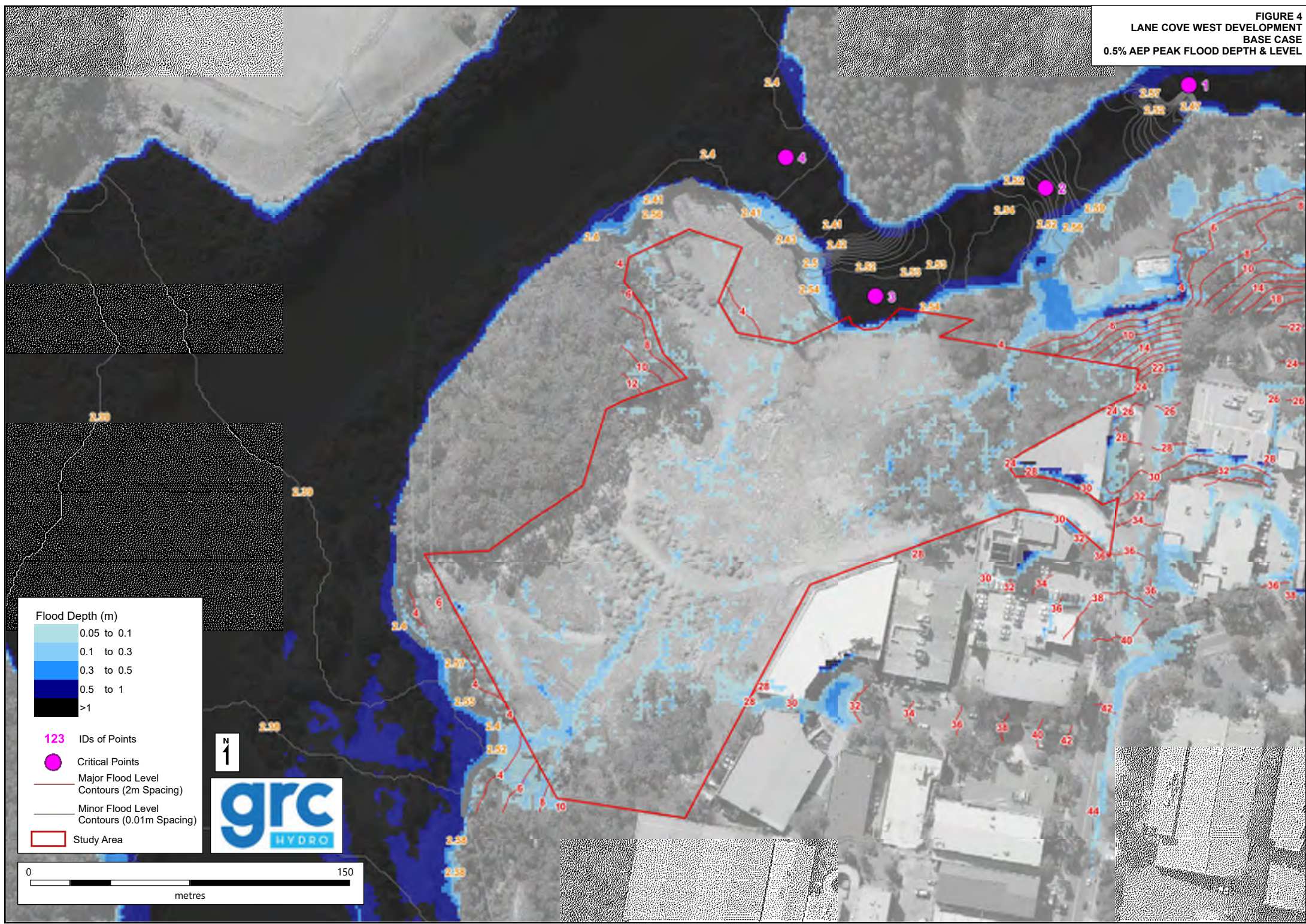


**FIGURE 3  
LANE COVE WEST DEVELOPMENT  
BASE CASE  
1% AEP PEAK FLOOD DEPTH & LEVEL**



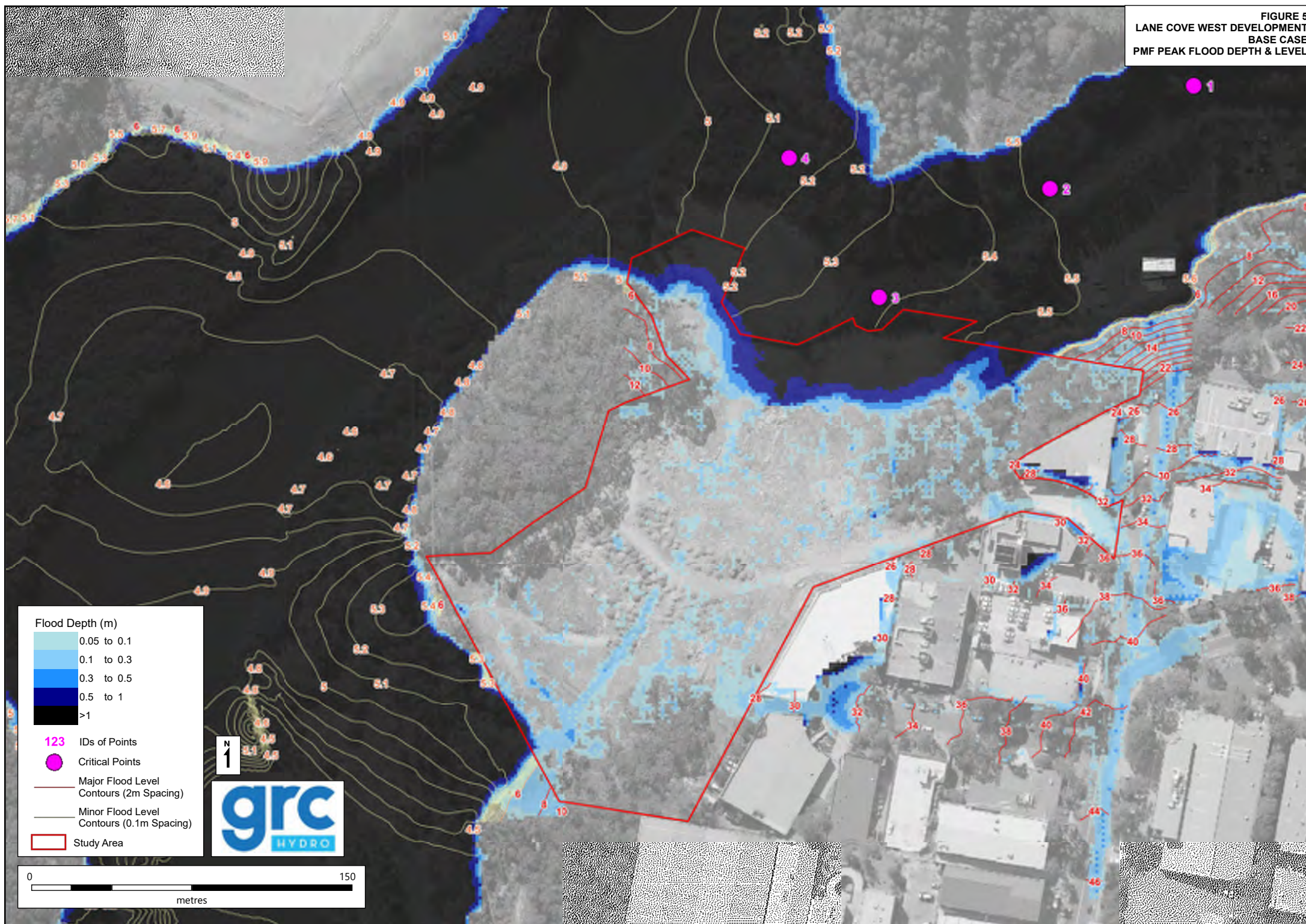


**FIGURE 4**  
**LANE COVE WEST DEVELOPMENT**  
**BASE CASE**  
**0.5% AEP PEAK FLOOD DEPTH & LEVEL**

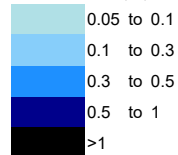




**FIGURE 5**  
**LANE COVE WEST DEVELOPMENT**  
**BASE CASE**  
**PMF PEAK FLOOD DEPTH & LEVEL**



**Flood Depth (m)**



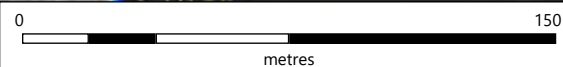
123 IDs of Points

Critical Points

Major Flood Level  
Contours (2m Spacing)

Minor Flood Level  
Contours (0.1m Spacing)

Study Area





## **Appendix E – Flood Liability Study**

---



# Flood Liability Study

## Lane Cove West Data Centre



JULY 2020







## Flood Liability Study Lane Cove West Data Centre

**Project:** Flood Liability Study Lane Cove West Data Centre  
**Project Number:** 200057  
**Client:** A W Edwards Pty Limited  
**Report Author:** Stephen Gray, Director

Date	Version	Description
July-2020	1	Draft - Report – v01
July-2020	2	Final Draft - Report – v02

J:\200057\Admin\Report\GRChydro\_Validation\_Of\_Drainage\_Design\_LaneCove\_West\_v2.docx

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# GLOSSARY

## Glossary of Key Terminology

<b>Annual exceedance probability (AEP)</b>	the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. Eg, if a peak flood discharge of 500 m <sup>3</sup> /s has an AEP of 5%, it means that there is a 5% chance (that is one-in-20 chance) of a 500 m <sup>3</sup> /s or larger events occurring in any one year (see ARI).
<b>Australian Height Datum (AHD)</b>	a common national surface level datum approximately corresponding to mean sea level.
<b>average recurrence interval (ARI)</b>	the long-term average number of years between the occurrence of a flood as big as or larger than the selected event. For example, floods with a discharge as great as or greater than the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.
<b>catchment</b>	the land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
<b>discharge</b>	the rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m <sup>3</sup> /s). Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, metres per second (m/s).
<b>flood</b>	relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage (refer Section C6) before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunamis.



<b>flood planning levels (FPLs)</b>	are the combinations of flood levels (derived from significant historical flood events or floods of specific AEPs) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans. FPLs supersede the “standard flood event” in the 1986 manual.
<b>flood storage areas</b>	those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas.
<b>floodway areas</b>	those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, or a significant increase in flood levels.
<b>hazard</b>	a source of potential harm or a situation with a potential to cause loss. In relation to this manual the hazard is flooding which has the potential to cause damage to the community.
<b>hydraulics</b>	term given to the study of water flow in waterways; in particular, the evaluation of flow parameters such as water level and velocity.
<b>hydrograph</b>	a graph which shows how the discharge or stage/flood level at any particular location varies with time during a flood.
<b>hydrology</b>	term given to the study of the rainfall and runoff process; in particular, the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.
<b>local overland flooding</b>	inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.
<b>local drainage</b>	smaller scale problems in urban areas. They are outside the definition of major drainage in this glossary.
<b>mainstream flooding</b>	inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.



## major drainage

councils have discretion in determining whether urban drainage problems are associated with major or local drainage. For the purposes of this manual major drainage involves:

- the floodplains of original watercourses (which may now be piped, channelised or diverted), or sloping areas where overland flows develop along alternative paths once system capacity is exceeded; and/or
- water depths generally in excess of 0.3m (in the major system design storm as defined in the current version of Australian Rainfall and Runoff). These conditions may result in danger to personal safety and property damage to both premises and vehicles; and/or
- major overland flowpaths through developed areas outside of defined drainage reserves; and/or
- the potential to affect a number of buildings along the major flow path.

## mathematical/computer models

the mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.

## minor, moderate and major flooding

both the SES and the BoM use the following definitions in flood warnings to give a general indication of the types of problems expected with a flood:

minor flooding: causes inconvenience such as closing of minor roads and the submergence of low level bridges. The lower limit of this class of flooding on the reference gauge is the initial flood level at which landholders and townspeople begin to be flooded.

moderate flooding: low-lying areas are inundated requiring removal of stock and/or evacuation of some houses. Main traffic routes may be covered.

major flooding: appreciable urban areas are flooded and/or extensive rural areas are flooded. Properties, villages and towns can be isolated.

## peak discharge

the maximum discharge occurring during a flood event.

## probable maximum flood (PMF)

the PMF is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation, and where applicable, snow melt, coupled with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer



than the flood used for designing mitigation works and controlling development, up to and including the PMF event should be addressed in a floodplain risk management study.

<b>Probable maximum precipitation (PMP)</b>	the PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends (World Meteorological Organisation, 1986). It is the primary input to PMF estimation.
<b>probability</b>	a statistical measure of the expected chance of flooding (see AEP).
<b>runoff</b>	the amount of rainfall which actually ends up as streamflow, also known as rainfall excess.
<b>stage</b>	equivalent to water level (both measured with reference to a specified datum).
<b>stage hydrograph</b>	a graph that shows how the water level at a particular location changes with time during a flood. It must be referenced to a particular datum.
<b>survey plan</b>	a plan prepared by a registered surveyor.
<b>water surface profile</b>	a graph showing the flood stage at any given location along a watercourse at a particular time.



Frequency Descriptor	EY	AEP (%)	AEP	ARI
			(1 in x)	
Very Frequent	12			
	6	99.75	1.002	0.17
	4	98.17	1.02	0.25
	3	95.02	1.05	0.33
	2	86.47	1.16	0.5
	1	63.21	1.58	1
Frequent	0.69	50	2	1.44
	0.5	39.35	2.54	2
	0.22	20	5	4.48
	0.2	18.13	5.52	5
	0.11	10	10	9.49
Rare	0.05	5	20	20
	0.02	2	50	50
	0.01	1	100	100
Very Rare	0.005	0.5	200	200
	0.002	0.2	500	500
	0.001	0.1	1000	1000
	0.0005	0.05	2000	2000
Extreme	0.0002	0.02	5000	5000
			↓	
			PMP/ PMPDF	



# EXECUTIVE SUMMARY

AW Edwards have engaged GRC Hydro to analyse the flood liability of the Data Centre design currently being constructed at 1 Sirius Road Lane Cove West. This is intended as both a check of the current drainage design and an exercise in better visualising drainage features of the Subject Site. Further, given the sensitivity of the development, GRC have examined rarer events than were considered in the drainage design as well as worst case circumstances including 100% blockage of all pits.

Results of the analysis indicate that:

- Generally the current drainage design calculations are validated by the work GRC Hydro has done;
- An important exception to the above is that GRC's work has identified that flows onto the ramp near Level 4 building entrances are in excess of what previous analysis has identified;
- In the 1% AEP event and assuming 50% blockage GRC estimate a depth of 50 mm at the Level 4 loading dock entrance and same at the pedestrian entrance. Depths double in the 2,000Y ARI event;
- Elsewhere GRC's work indicates no flood liability for all intents and purposes. Level 1 is subject to a depth of 10 mm in the largest possible flood event (Probable Maximum Flood) which has a probability in the order of 100,000Y ARI event.

There is a risk then that stormwater flows will cause inundation of the Level 4 loading dock and pedestrian entrance and that water will enter the complex from either but especially the latter. The risk is compounded by the decision to have ramp levels flush with building levels.

Minor changes to levels could entirely mitigate inundation risk. Alternatively other works may be considered such as flood gates etc. Please note however that further drainage works are not sufficient as blockage of inlet pits should always be expected in extreme flooding as per ARR2019 and as such flood immunity must be achieved without dependence on sub-surface drains.

GRC recommend passive measures that do not require operation and that are not subject to non-operation in extreme scenarios. For example a 0.15 m speed bump at the loading dock entrance could prevent ingress of flow in all but events exceeding the 2,000Y ARI.



# 1. INTRODUCTION

In May 2020, GRC Hydro mapped the overland flow for the new Data Centre in 1 Sirius Road, Lane Cove West.

The Mapping operation was based on flow hydrographs and inflow locations derived from a DRAINS model.

As the DRAINS software is based on a conceptual schematization of the hydrology of the Site, interrogation of the model setup and results can be challenging.

Further, the DRAINS model was limited to analysis of the 1% to 0.5% AEP design events. Rarer events are possible and given the implications of flooding at a data centre AW Edwards staff saw it as prudent to investigate the impact of rarer events on Subject Site flood liability.

As such GRC Hydro were requested to analyse rarer flood events as well as confirm flows developed in the DRAINS model.

## 1.1 Objectives

The overall objective is to report on Subject Site flood liability. This breaks down to the following sub-tasks:

- Confirm catchment areas;
- Provide a check of design calculations as well as visualise the flooding extent;
- Examine Site flood liability in context of rare events and in conjunction with conservative blockage assumptions;
- Compare the hydrographs with the results of DRAINS Model;
- Verify the interaction between overland flow and pipes flow;
- Verify the overflow structures.



## 2.FLOOD STUDY

A flood study was undertaken using a TUFLOW hydraulic model. The Model is based on the existing surface Lidar on which the digital elevation models (DEM) of the currently designed surfaces were superimposed.

The existing and proposed stormwater network were input to the TUFLOW model, with data of the pipes' size, invert levels, slopes , pits location and sizes, acquired from the DRAINS model and from design drawings.

Flood simulations were run for two blockage Scenarios:

- Scenario 1) 50% blockage of stormwater pits;
- Scenario 2) 100% blockage of stormwater pits;

The 100Y, 200Y, 2000Y ARI events and PMP were modelled.

### 2.1 Study Area

The Project Site is located at 1 Sirius Road, Lane Cove West and it is shown with yellow lines in the satellite image of Figure 1.



*Figure 1: Location of Project Area*

In this instance, application of TUFLOW to an extended 2-dimensional domain allowed for independent and data driven identification of all the catchment areas that impact the Site.

It was found that three main watersheds impact the Site as shown in Figure 2:





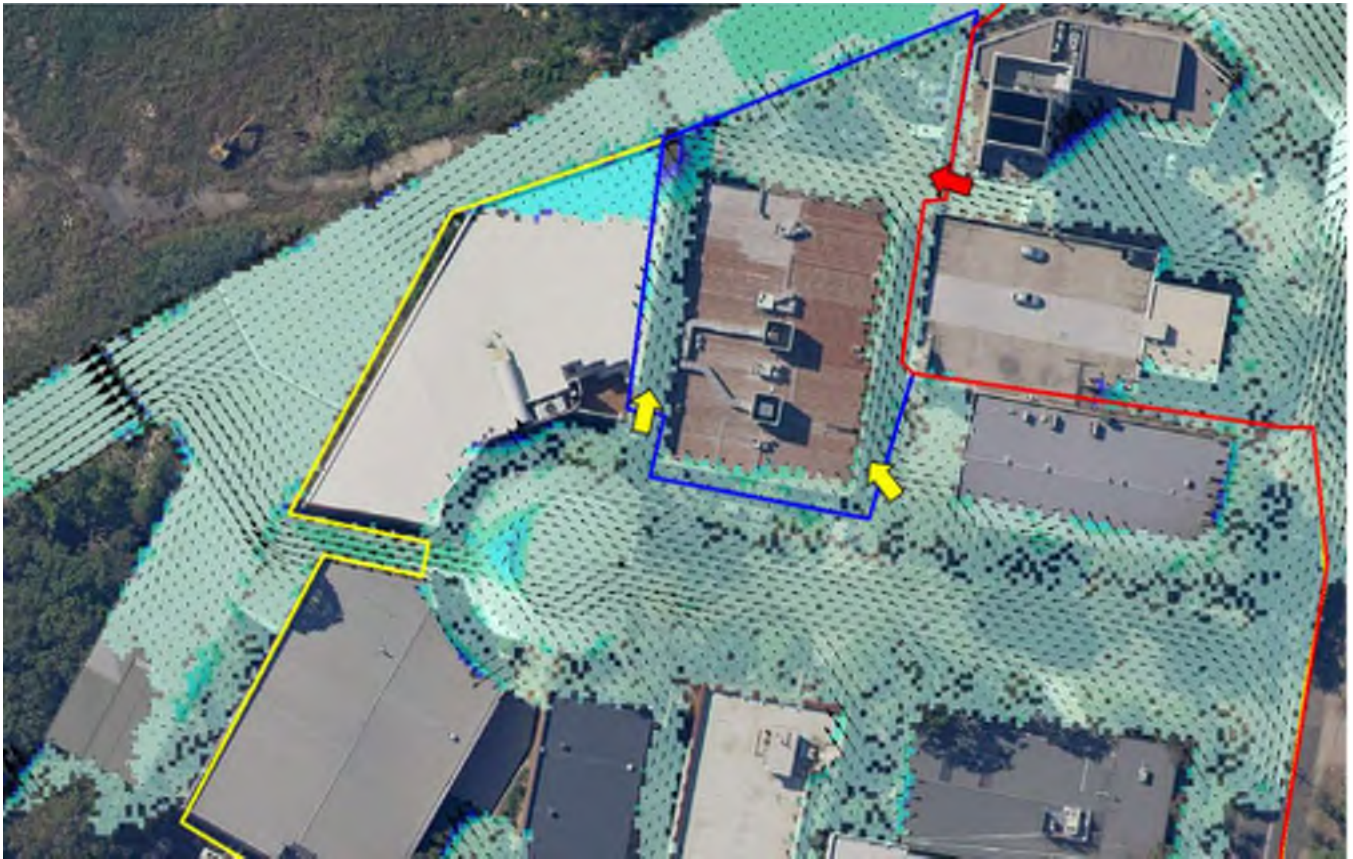
*Figure 2: Catchment Area*

The total Catchment area is around 5.27ha and it is split as follows:

- 2.21ha for Catchment 1 (yellow area in Figure 2)
- 2.76ha for Catchment 2 (red area in Figure 2)
- 0.30ha for Catchment 3 (blue area in Figure 2)

The three sub-catchments are ill-defined in proximity of the Subject Site. Figure 3 shows an example where water migrates from one sub-catchment to the other rather than being directed to the Subject Site. The application of a “rainfall on grid” approach (further explained in Paragraph 2.7), allows for flow to move as the pits and pipes and topography direct. This eliminates any boundary impacts at the Subject Site and allows for a data driven validation of catchments calculated for the Site.



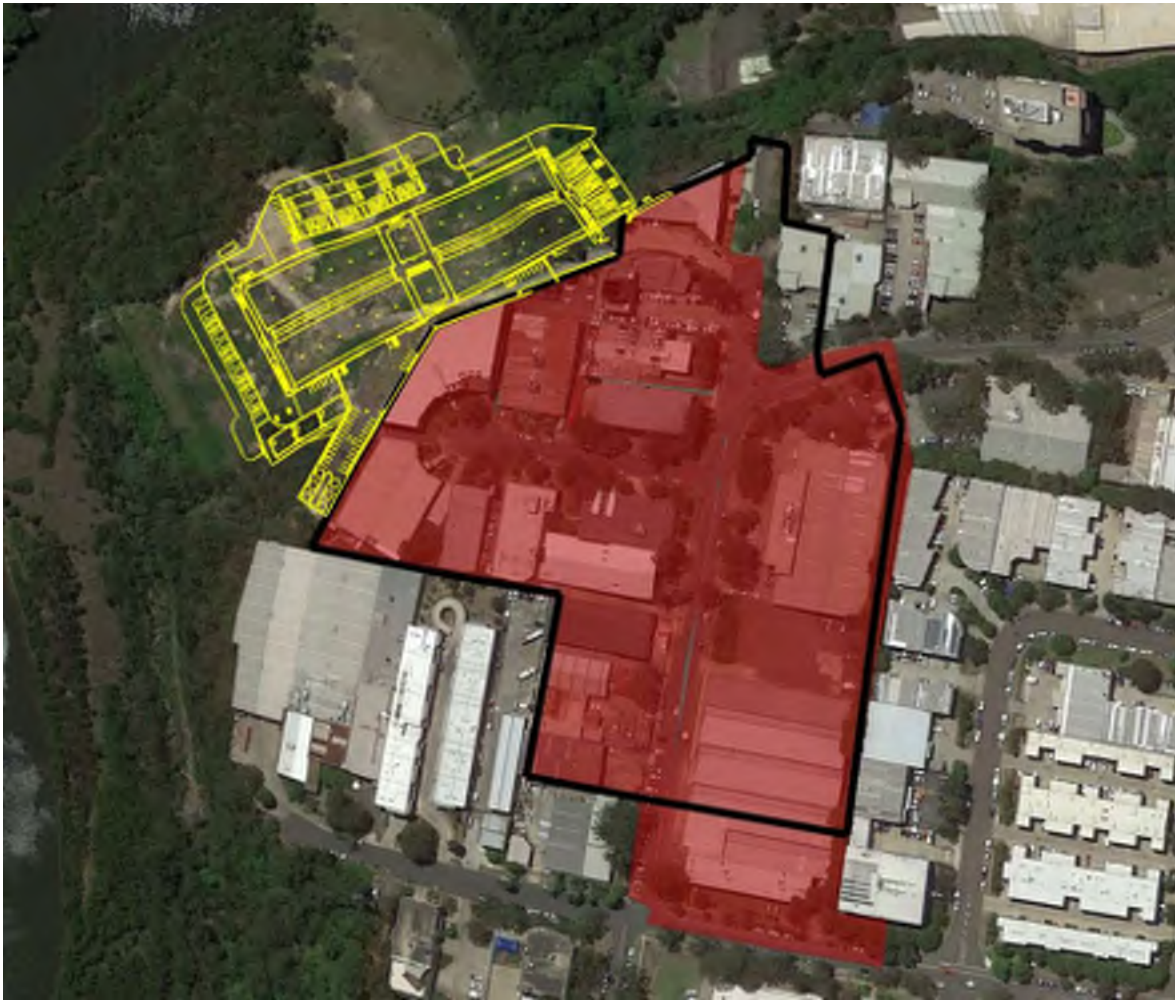


*Figure 3: Water migration within Catchments. (Yellow Line = Catchment 1, Red Line = Catchment 2, Blue Line = Catchment 3 . Yellow Arrow = Water migrating from Catchment 1 to Catchment 3. Red Arrows = Water migrating from Catchment 2 to Catchment 3)*

Comparison between current design Catchment area and GRC Catchment is shown in Figure 4.

Overall the difference is minor with slightly more Catchment area to the south and slightly less catchment to the east. In aggregate GRC's work indicates that the current drainage design catchments align with GRC's analysis as presented herein.





*Figure 4: Catchment Comparison. Current Design (Black Outline) VS GRC Hydro (Red Shaded Area)*

## 2.2 Simulated Rainfall

Following best practice ARR2019 procedures, an ensemble of 10 different time patterns were considered for each design rainfall event.

Durations of 10 minutes, 20 minutes and 45 minutes were trialled. For each duration, the median storm amongst the 10 trialled was considered as representative for the specified duration. Critical duration was found to be equal to 10 or 20 minutes depending on the location.

The 100 years, 200 years and 2000 years ARI events and PMP were considered. Noting then that previously the design has been examined for at worst, the 200Y ARI event with 50% pit blockage. GRC's analysis does then examine much rarer flood events with (Scenario 2) more extreme blockage assumptions.

## 2.3 Hydrodynamic model Setup

A TUFLOW hydraulic model was constructed for the Site, in order to map flooding in the vicinity of the Subject Site. TUFLOW is 2D numerical modelling package which is suitable for creeks, floodplains and for simulations of overland flow.



Various data and parameters implemented in the TUFLOW model are discussed below:

- Model Domain and Grid Size – The hydraulic model domain covers an area of 7.7 ha which extends around 160m upstream the Subject Site. A model grid size of 2m x 2m was implemented for the analysis. This grid resolution is considered best practice to model the Site Area hydraulic features as per ARR 2019 Project 15.
- Digital Elevation Model (DEM) – A 1 m DEM (Digital Elevation Model) has been used to inform the topography of the 2D hydraulic model. Additionally DEMs of the designed surfaces were included in the model as discussed in paragraph 2.4
- Boundary Conditions – Boundary conditions are discussed in paragraph 2.6.
- Buildings: Buildings were excluded from the 2d domain and considered as obstructions to the flow.
- Manning's Roughness – A Manning value of 0.025 has been applied to the whole 2d domain. Conservative Manning value of 0.015 has been applied to all pipes.
- Hydrological Losses – Rainfall Continuous Losses are not applied in the model due to the high degree of urbanization of the area. 1mm of Rainfall Initial Losses is applied to simulate small storage phenomena.

## **2.4 Available Elevation Data**

Ground level survey data consisting of Digital Elevation Models (DEM) derived from LiDAR were downloaded from the government website 'ELVIS – Elevation and Depth – Foundation Spatial Data' (<https://elevation.f sdf.org.au/>).

1-meter resolution data provided by NSW Government Spatial Services is available. The Lidar survey was conducted in 2013 and has a specified accuracy (to the 1<sup>st</sup> confidence interval) of  $\pm 0.15$  m vertical and  $\pm 0.4$  m horizontal.

In addition, digital elevation surfaces for Level 4 (top design surface level) and Level 1 (bottom design surface level) of the Project Site were applied to the model.



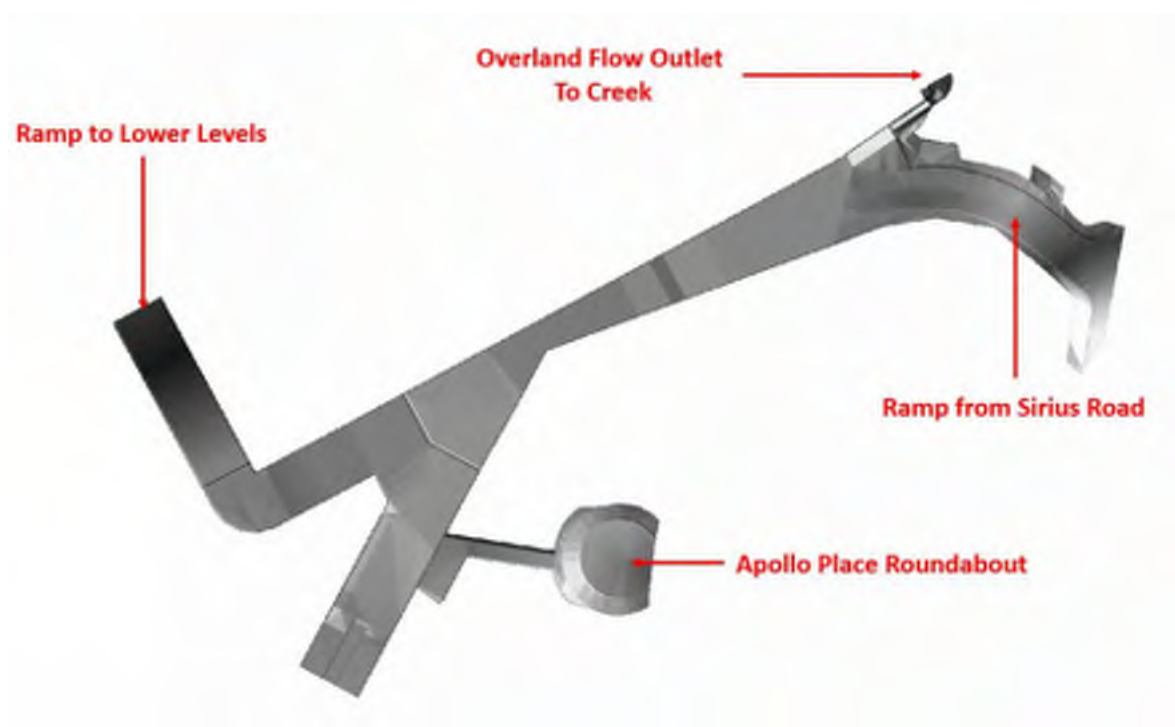


Figure 5: Level 4 Digital Elevation Model

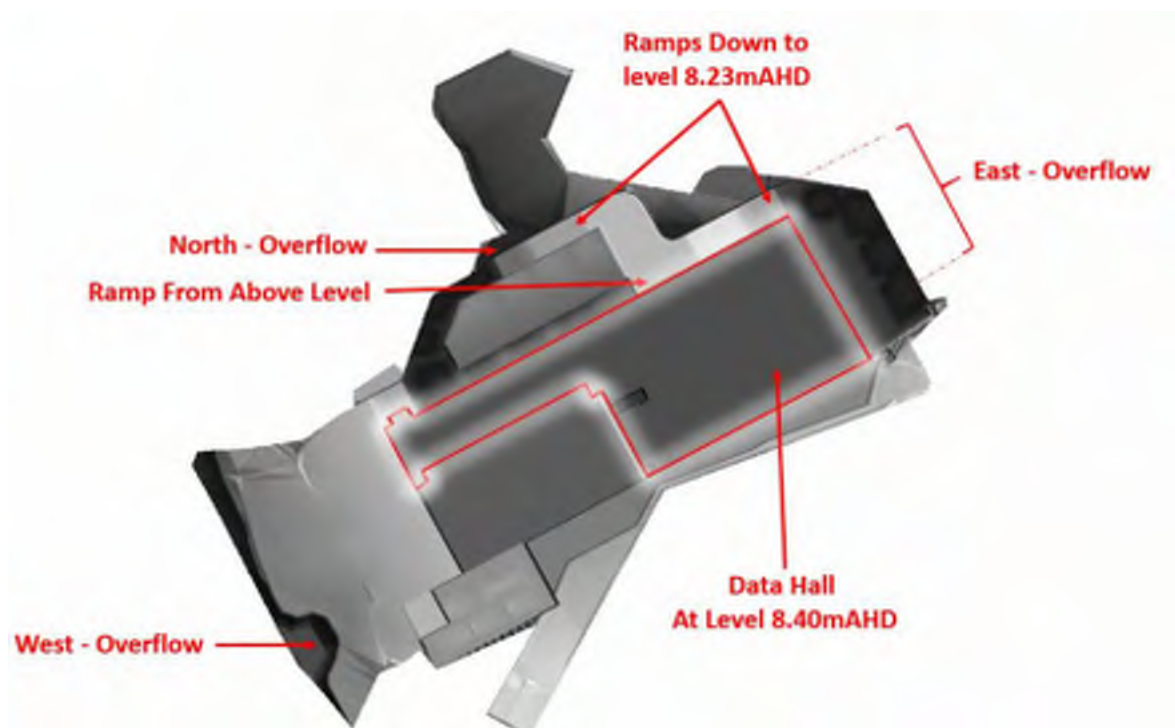


Figure 6: Level 1 Digital Elevation Model



Design Surface of Level 4 incorporates the existing roundabout at the end of Apollo Place and the designed ramp from Sirius road at East. At North-East, the design surface includes the overland flow outlet to the existing creek . At North-West, portion of the ramp which goes from level 24.34mAHD down to Level 1 is represented. (see Figure 5).

Design Surface of Level 1 includes portion of the ramp at level 11.89mAHD which connects to the above levels, and the two ramps which go down to level 8.23mAHD. The Data Hall Area is set at level 8.40mAHD. Overflows on Level1 are located at North, West and East. (see Figure 6).

## **2.5 Drainage Network**

Existing and Proposed Drainage network is made up by a combination of pits, pipes and grated drains. Information about the invert levels of the pipes, slopes, location and size of pits as well as the depth/discharge curve associated with each pit inlet, was derived from the DRAINS model and from design drawings.

With regards to blockage assumptions, two Scenarios were considered:

- Scenario 1: Following DRAINS model assumptions, Scenario 1 considers 50% blockage at all pits inlets;
- Scenario 2: Conservatively, Scenario 2 assumes 100% blockage at all pits.

Proposed drainage at intermediate levels was not included in the model and hence it is assumed to be 100% blocked in all Scenarios. Also proposed Drainage network at Level 1 is not included with exception of pipes connected to Level 4.

The modelled stormwater network is shown in yellow in Figure 7 and Figure 8.





Figure 7: Existing Stormwater network and Proposed Network at Level 4

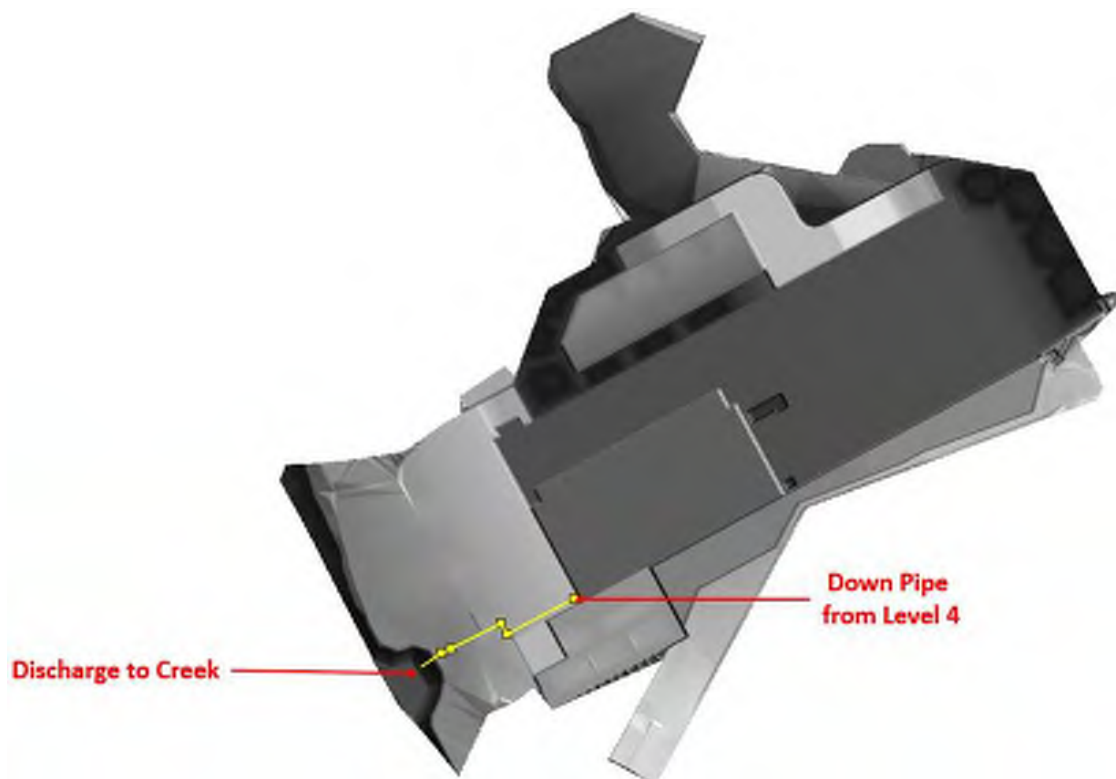


Figure 8: Modelled stormwater Network at Level 1



A crucial element of the proposed stormwater network are the two pits located at the top of the designed ramp at west. Two pits of dimension 1.5m x 1.5m with grated inlet are proposed at this location. The pits RL is 24.3m AHD. A crest at level 24.45m is designed to allow for 0.15m of inlet depth before water spills to the lower levels via the ramp as shown in Figure 9 below. In the current design, all pits are 50% blocked. Hence, the combined depth/discharge curve of 2 pits 50% blocked is equal to the depth/discharge curve of 1 single unblocked pit. The Depth/Discharge relationship for the 1.5m x 1.5m pit was derived from the DRAINS Model which is best practice. From the curve the peak flow through the inlet, before spilling occurs, is 0.58 m<sup>3</sup>/s.

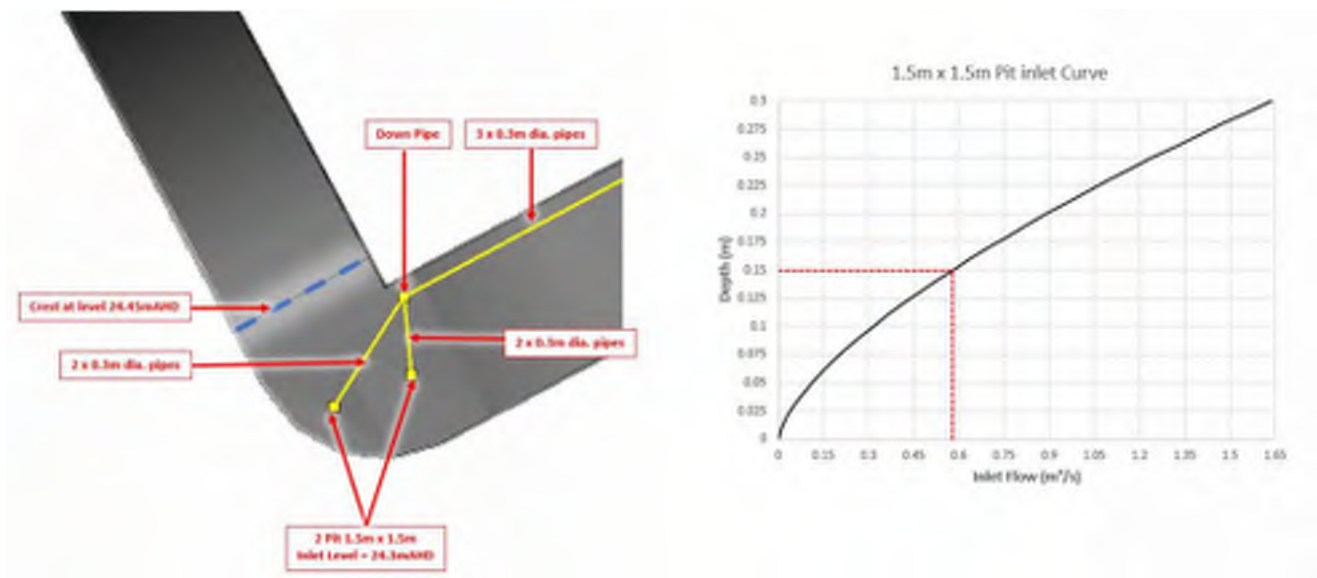


Figure 9: Drainage at Level 4 West Ramp

## 2.6 Boundary Conditions

The analysis of the overland flow between different levels at the Subject Site was carried out by transfer of flow hydrographs and momentum from the top to bottom surfaces.

Figure 10 shows the downpipe and ramp transfer from Level 4 to Level 1, along with the location of the Model downstream boundary conditions ("Model DS/BC") where water is allowed to leave the 2d computational domain.



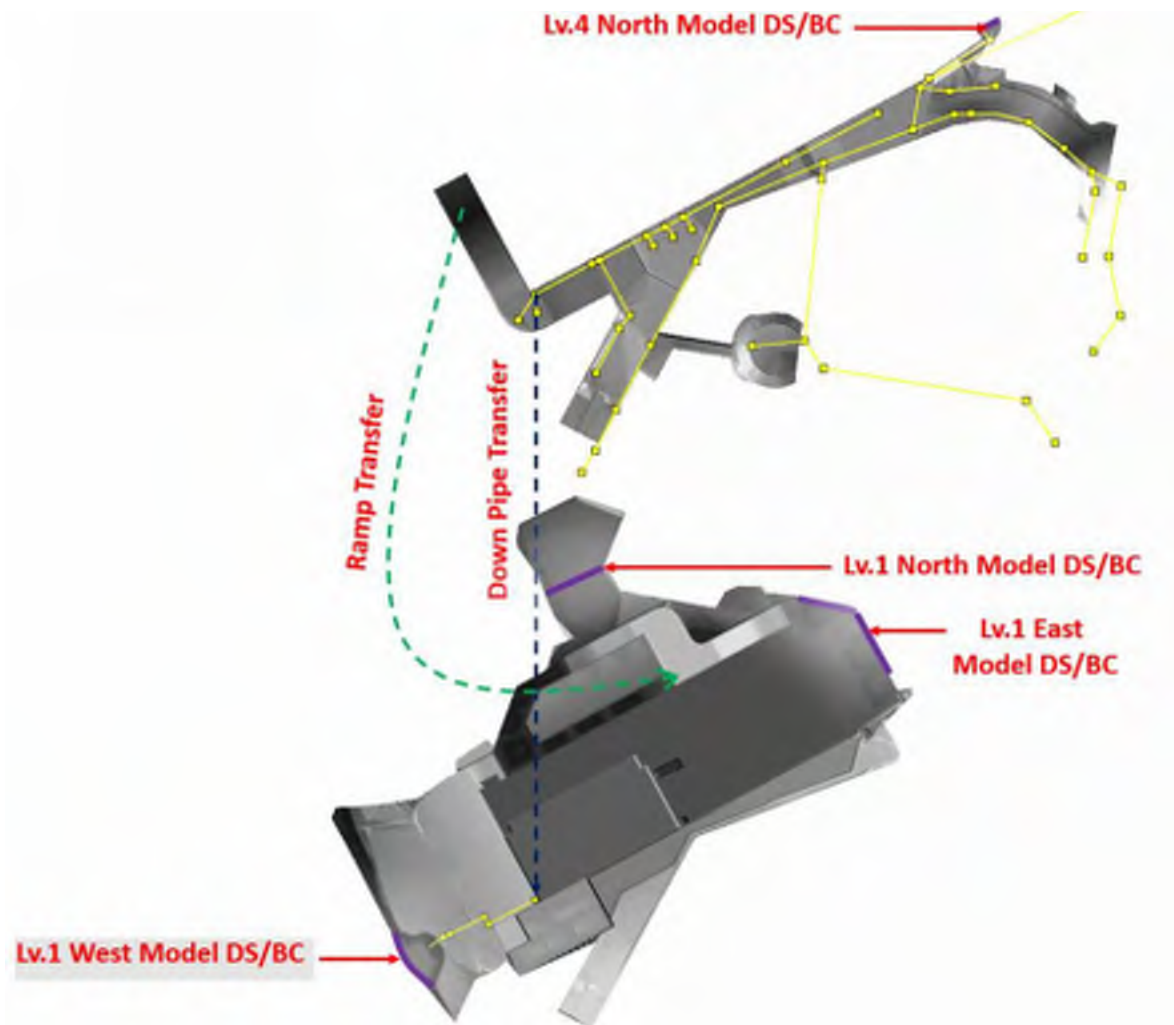


Figure 10: 2d Model Boundaries

It shall be noted that "Level 1 East Model DS/BC" extends all the way along the wall/parapet until the proposed surface is in Fill. At this location, a sufficient number of openings shall be provided to guarantee sufficient overflow capacity. After a discussion with the designer held on 14/07/2020, it was confirmed that a handrail is proposed at that location and therefore the modelling assumptions are respected.







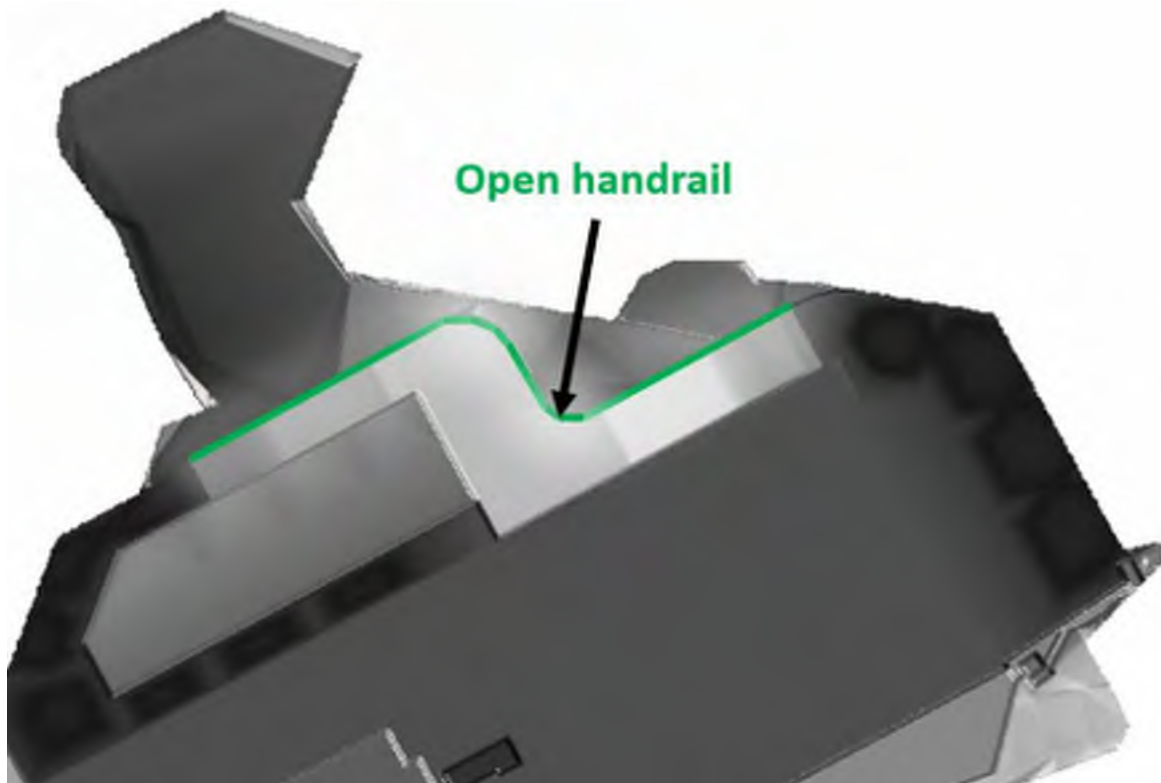


Figure 12: Open handrail on ramp

## 2.7 Model Inflows

The hydrodynamic model is based on a hybrid hydrological approach, where inflows from different sources are combined. The hybrid approach allows for advantages of both models to be addressed. In fact:

- Peak flow hydrographs of major sub-catchments which are sufficiently far from the design area are derived from a hydrological model developed with DRAINS software. The use of a hydrological model is generally considered best practice for peak flow estimation. However the manual application of flows does introduce potential issues in that they may skew runoff outcomes proximate to placement locations. Further away from the flow application location, this become a non-issue. Where locations of flow application points are sufficiently distant from the Subject Site, accuracy of outcomes is improved. The benefits of the use of an hydrological model results are:
  - Peak flow estimation which is more reliable than the inflow generated by a rainfall on grid model;
  - Possibility to truncate the model Domain allowing for faster simulation runs;
  - Improved model stability.
- In close proximity of the project area, a “rainfall on grid” approach is used. This method applies direct rainfall to all the cells of the 2d domain. This allows to:
  - Eliminate the uncertainites due to flow splits which are automatically solved by the hydrodynamic model basing on topography;



- Locate otherwise unidentified flow paths (if any);
- Eliminate the uncertainties caused by arbitrary application of inflow points to the model.

Location of Hydrographs' input and Direct Rainfall Area are shown in Figure 13 and Figure 14.



Figure 13: Model Inflows on existing surface and Proposed Level 4 Surface



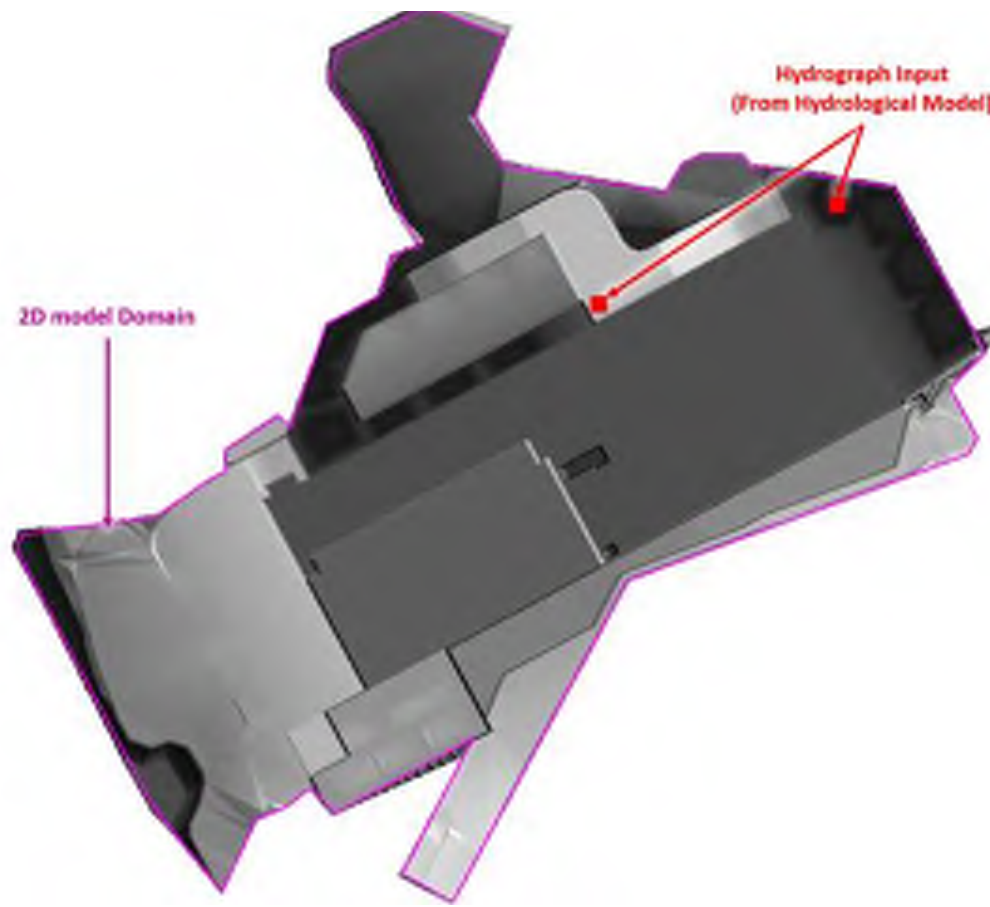


Figure 14: Model Inflows to Level 1 proposed Surface

## 2.8 Simulation Results

### 2.8.1 Validation of DRAINS calculations

The 100 years rainfall event with 50% blockage assumptions at pits (Scenario 1) , was also modelled in DRAINS. This allowed for a results comparison with TUFLOW. Figure 15 is the DRAINS Results Map for the critical 10 minutes duration 100 years rainfall event . In the Figure, black lines represent the stormwater network, while dashed black lines are the Overland Flow directions. Blue numbers indicate the pipe flow while red numbers are the Overland Flows (units for all figures are " $\text{m}^3/\text{s}$ ").





Figure 15: DRAINS Model results (100 year event, 10min durations, storm 7)

Using the same map, TUFLOW results are shown in Figure 16. In the Figure, the overland flow is shown at the cross sections where it was extracted rather than on the dashed lines.



Figure 16: TUFLOW flows (100 year event, 10min durations, storm 7)



Comparing TUFLOW and DRAINS results we can say:

- 1) Generally there is a good match between GRC's work reported upon herein and the current design, indicating a validation of the DRAINS work that underpins the current design. There is however an area which the TUFLOW work has identified flow additional to that estimated via the current design. This is described below:

- a. Additional flow is possible onto the ramp at Level 4 with this flow coming from areas to the east and south-east around adjacent buildings;

*More specifically, referring to*

- b. Figure 17 Location A, water flows to this location from the south (driveway to 2 Apollo Place basement car park) but more significantly from the west (with this flowpath not previously identified). Water accumulates at Location A due to the obstruction caused by the new proposed design surface which is around 1.5m higher than the existing ground level. Around 0.65m of water depth are calculated at this location in the 1% AEP event. At Level 26.3mAHD, water begins to spill from Location A west into the existing car Park of 2 Apollo Place;

*At the western end of the carpark the ground level matches the ramp level and such flow moves onto the ramp. This is seen in*

- c. Figure 17 where peak flow of  $0.17 \text{ m}^3/\text{s}$  is shown flowing west toward the loading dock. This means that  $0.17 \text{ m}^3/\text{s}$  in the 1% AEP event (Scenario 1) is flowing towards the loading dock, creating a depth of 0.05 m at the building entrance in the 1% AEP event.



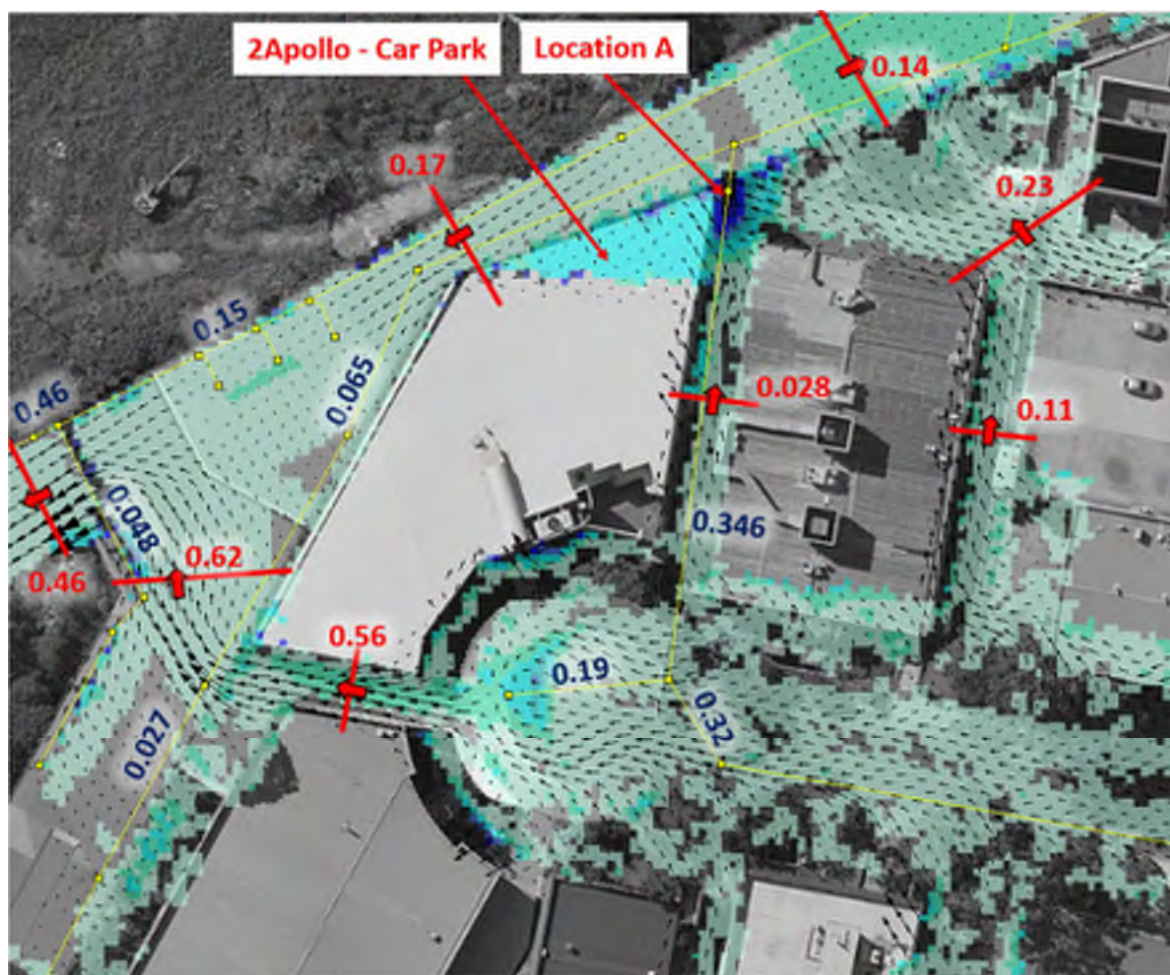


Figure 17: Water accumulation and flow split at the car park north of Apollo Place Roundabout

We note that the lack of freeboard at building entrances means that any flow depth on the ramp potentially exposes the Level 4 entrances to water flows. A minor level difference between Level 4 entrances and the ramp heights would prevent any issue with these minor flows.

## 2.8.2 Flooding Maps

This Chapter presents flood maps for different design events and stormwater network blockage conditions. The Maps were obtained by extraction of median results from the ensemble of storms for each AEP and subsequent envelope of results.

### 2.8.2.1 100 Years Event – Scenario 1

As per the TUFLOW modelling work, in the 100 year event Scenario 1 (50% blockage at pits), the 2x1.5mx1.5m pits proposed in the current design, are marginally undersized. Some water spills across the crest level at 24.45m but flow is negligible ( $\sim 0\text{m}^3/\text{s}$ ). This result is in minor disagreement with the DRAINS result where water level is 24.39mAHD (versus 24.45 mAHD in TUFLOW) with 0.06m of freeboard below the crest level at 24.45mAHD. **In this instance it is deemed that DRAINS results are preferred.** It is noteworthy however, that even if pit capacity is insufficient, flow will move harmlessly off site in any case albeit via the ramps.

At Level 1, the 1% AEP maximum water level is 8.29mAHD. As such, the Data Hall (8.4 mAHD) is dry with 0.11m freeboard.



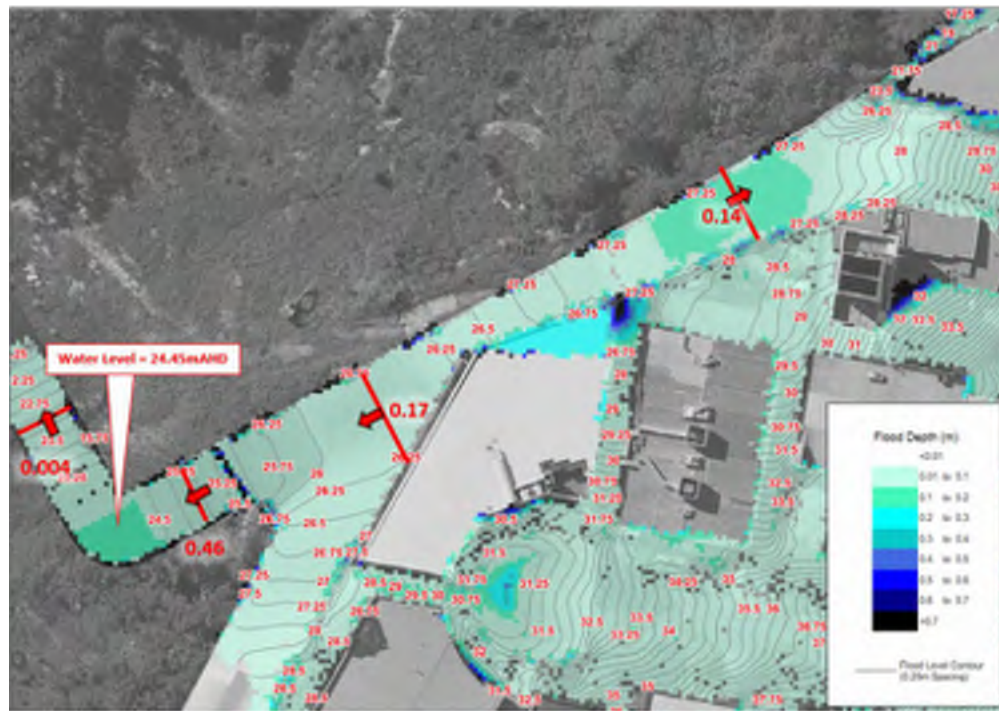


Figure 18: 100 Year Event - Scenario 1 Flood Map (1 of 2)

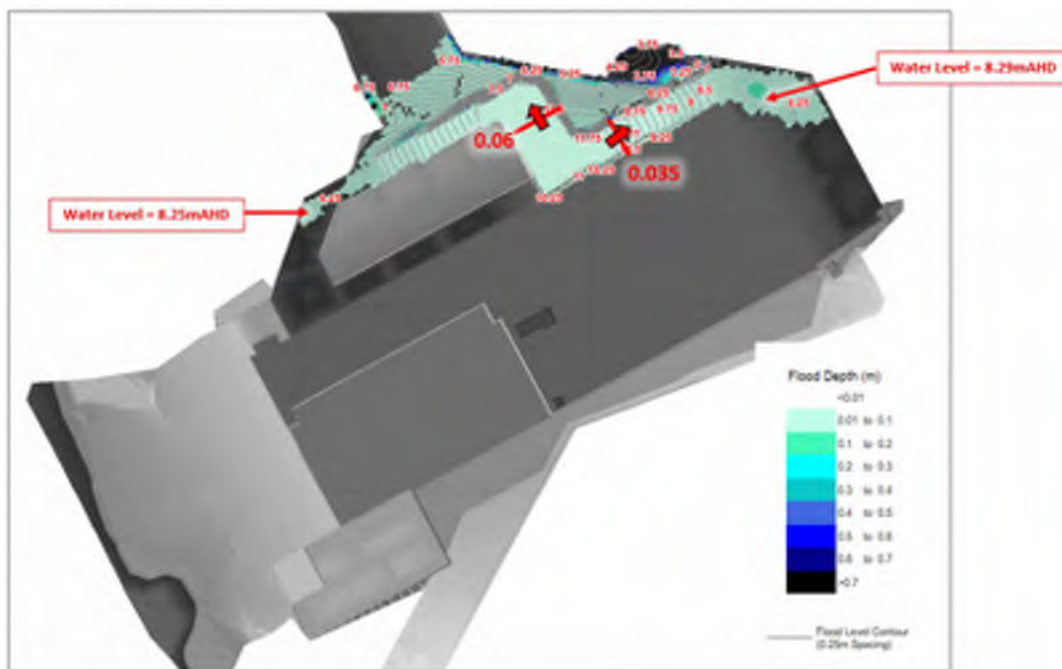


Figure 19: 100 Year Event - Scenario 1 Flood Map (2 of 2)

#### 2.8.2.2 200 Years Event – Scenario 1

In the 200 year event Scenario 1 (50% blockage at pits), the 2x1.5mx1.5m pits are marginally undersized. Some water spills across the crest level at 24.45m but flow is minor (0.05 m<sup>3</sup>/s). As per the results for the 100Y event however, DRAINS modelling of the pit inlet capacity is preferred and in any case, flow that does enter the pit inlet (0.05 m<sup>3</sup>/s) flows harmlessly down the ramp. At Level



1, the maximum water level is 8.30mAHD. As such, the Data Hall whose level is at 8.4mAHD is dry with 0.1m freeboard.



Figure 20: 200 Year Event - Scenario 1 Flood Map (1 of 2)

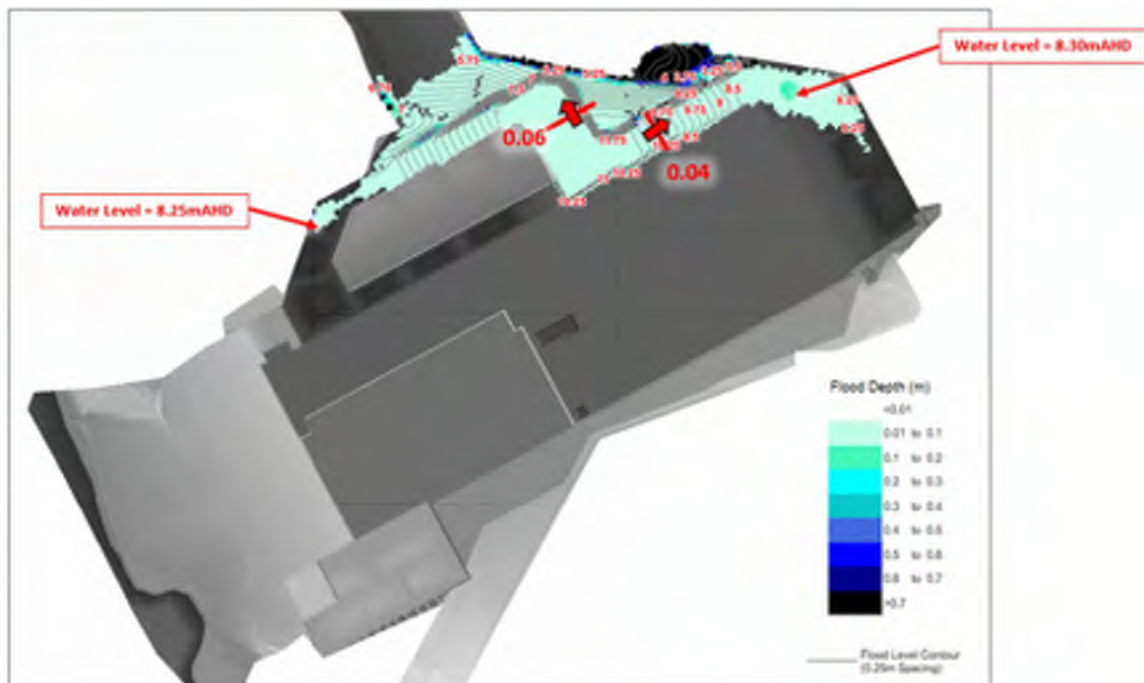


Figure 21: 200 Year Event - Scenario 1 Flood Map (2 of 2)

### 2.8.2.3 2000 Years Event – Scenario 2

In the 2000 years event Scenario 2 (100% blockage at pits), peak flow of  $1.76\text{m}^3/\text{s}$  is calculated down the west ramp. At Level 1, the peak water level is 8.40mAHD. This is a match for the Data Hall ground



level and as such in the 2,000 year flood event with total pit blockage the Data Hall remains flood free, albeit being on the cusp of very shallow flooding.



Figure 22: 2000 Year Event - Scenario 2 Flood Map (1 of 2)

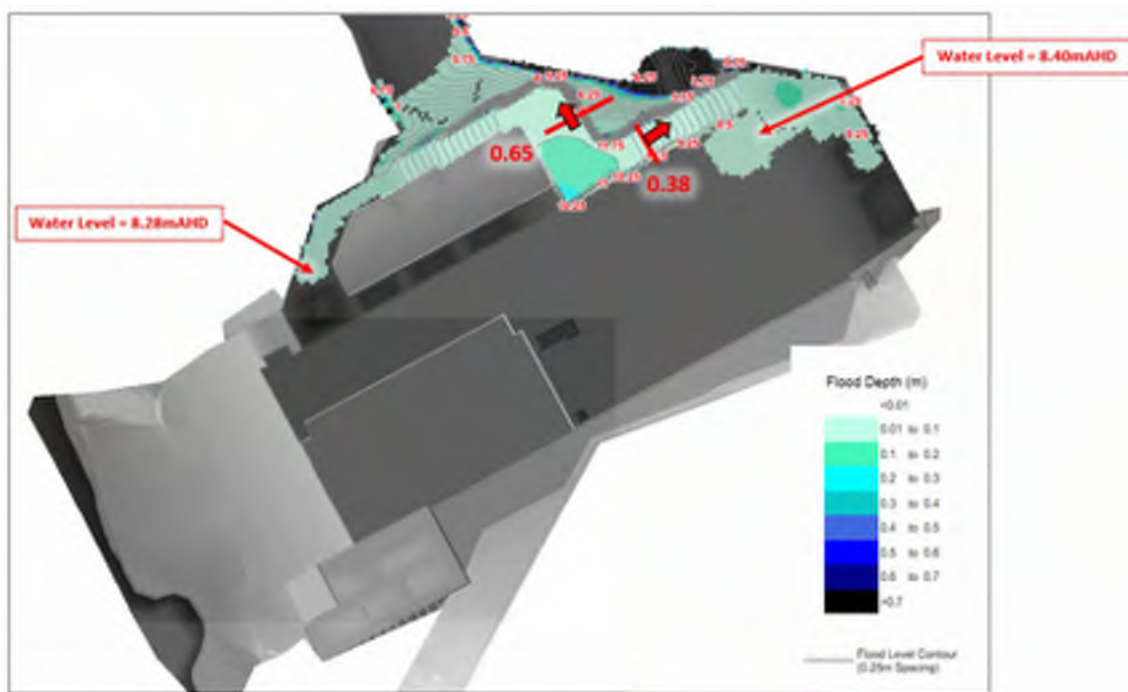


Figure 23: 2000 Year Event - Scenario 2 Flood Map (2 of 2)

#### 2.8.2.4 PMP Event – Scenario 2

In the PMP event Scenario 2 (100% blockage at pits), around 5.65m<sup>3</sup>/s of water goes down the western ramp. At Level 1, the calculated peak water level is 8.41m AHD. As such, the Data Hall is



estimated to be flooded to a depth of ten millimetres. A caveat to this statement is that the result presumes free outflow is available as described in earlier sections of the report. If outlet capacity at Level 2 or Level 1 is reduced below what has been assumed, the peak flood level at Level 1 will increase.

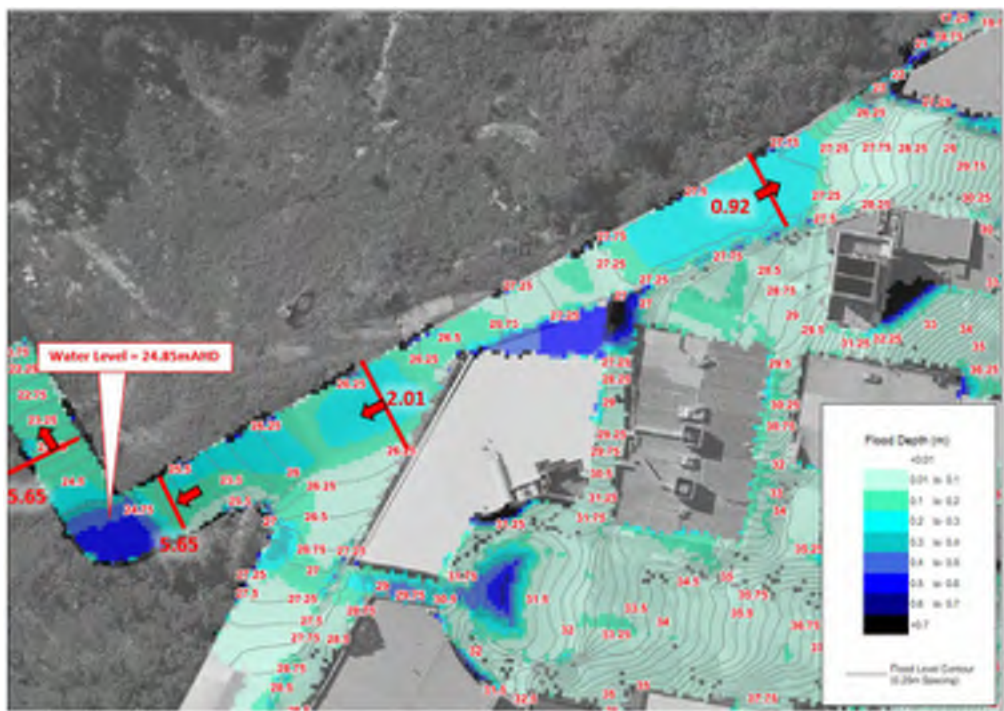


Figure 24: PMP Event - Scenario 2 Flood Map (1 of 2)

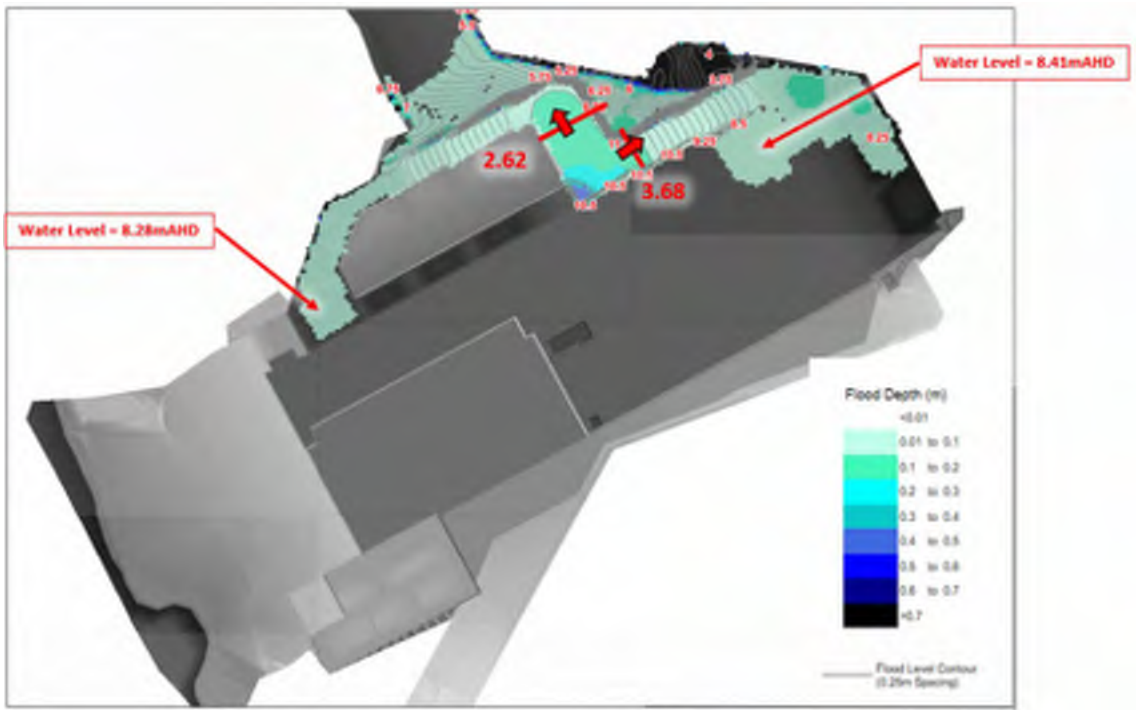


Figure 25: PMP Event - Scenario 2 Flood Map (2 of 2)



## 2.9 Summary of Results

### 2.9.1 Level 4

Entrances at Level 4 are liable to inflows of water in storm events. Results are

ARI	FPL at Building Entrance (mAHD)	Water Level at Building Entrance (mAHD)	Depth Above Building FPL (m)
100 Y	26.00	26.05	0.05
200 Y	26.00	26.06	0.06
2000 Y	26.00	26.10	0.10
PMP	26.00	26.21	0.21

As such based on 50% blockage it is estimated that the building will suffer ingress of water in the 1% AEP event. Smaller events have not been examined but it seems likely that some flood liability will exist for these also.

### 2.9.2 Level 1

Level 1 is free from flooding in all events modelled (inclusive of total system blockage) other than the largest possible flood event the Probable Maximum Flood, in which it is subject to a flood depth of 10 mm.

## 3.SUMMARY

As per the results summarised above there is flood liability at the building. Level 4 is the biggest concern as it may see water entering the building at available entrances with some frequency. Certainly in the 1% AEP event, assuming 50% blockage, we see an estimated depth of 0.05 m and hence substantial water in Level 4 of the building. This issue was not previously identified as it pertains to flows that were not previously identified. The source of these flows is described on Page 23.

As a result of the additional flow on the ramp a previous design feature endorsed by GRC in their May report should now be removed. This recommendation is described below.

Following the mapping operation undertaken by GRC hydro in May 2020, it was decided to include a speed hump to impede flooding of the loading dock from overland flow coming from West.





Figure 26: 100Years ARI Flood Mapping of May 2020

Current modelling revealed a flow component travelling along the East to West direction as shown in

Figure 17. Therefore the addition of the speed hump worsens the flooding at the loading dock, as shown in Figure 27 , where comparison of flooding levels with and without the speed hump is done. Light green area shows a reduction in flood depths of 0.05 m following the removal of the speed hump.

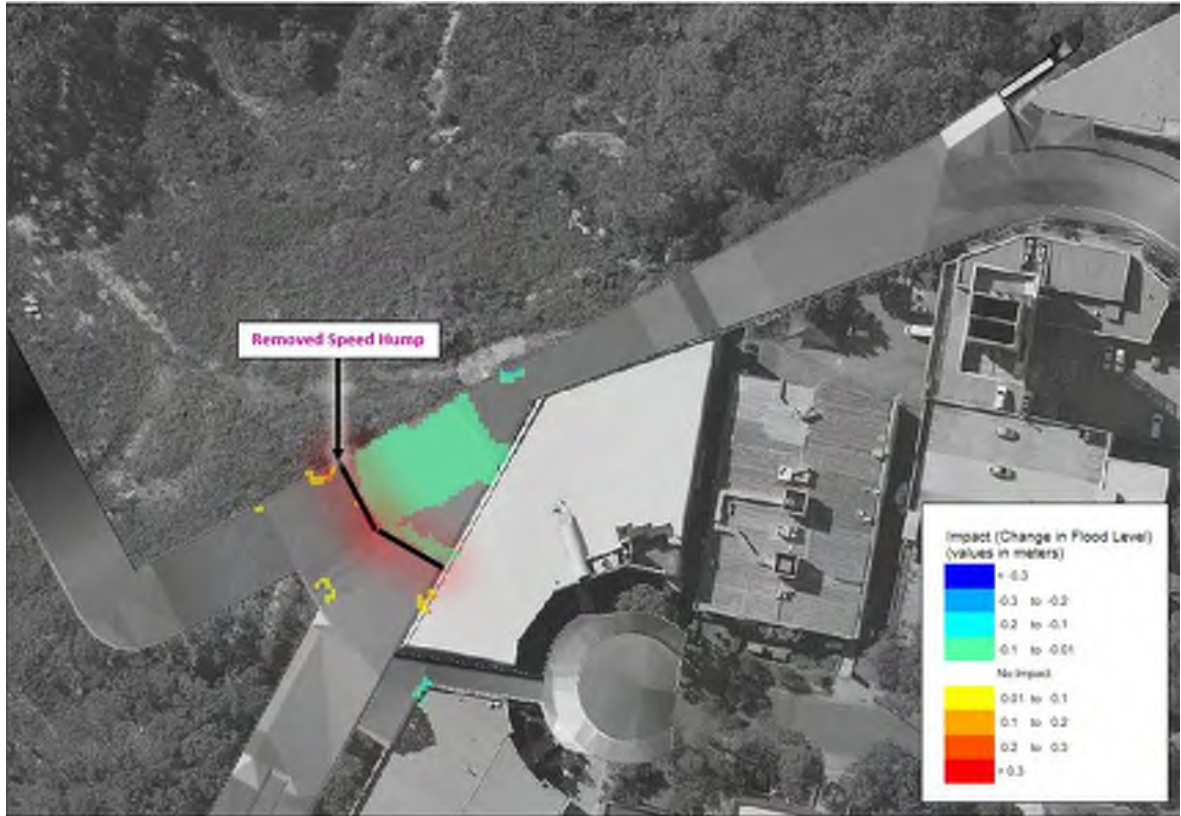


Figure 27: 100 Years ARI Flood impact map due to remotion of speed hump



## **Appendix F – Maintenance Schedule**

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MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
<b>INFILTRATION TRENCH/SWALE</b>			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications.
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of rutting and erosion	Six monthly/ After major storm	Maintenance Contractor	Reinstate eroded areas so that original swale profile is maintained. Fill eroded area and secure with biodegradable fabric. Revegetate as required.
Weed infestation	Three monthly	Maintenance Contractor	Remove any weed infestation ensuring all weed root balls are removed. Replace with vegetation where required.
<b>RAINWATER TANK</b>			
Check for any clogging and blockage of first flush device	Monthly	Maintenance Contractor	First flush device to be cleaned out.
Check for any clogging and blockage of the tank inlet - leaf and litter screen	Six monthly	Maintenance Contractor	Leaves and debris to be removed from inlet litter screen.
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable depth as specified by the hydraulic consultant.
<b>INLET &amp; JUNCTION PITS</b>			
Inside Pit	Six monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of Pit	Four monthly/ After major storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.



General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.
<b>ROCLA CDS GPT</b>			
Refer to manufacturer operation and maintenance manual	Refer to Manual	Maintenance Contractor	Refer to Manual
<b>STORMFILTER</b>			
Refer to manufacturer operation and maintenance manual	Refer to Manual	Maintenance Contractor	Refer to Manual





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## Surface Water Management Plan

Airtrunk Data Centre -1 Sirius Road, Lane Cove West, NSW

20 November 2024





# Document Information

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0	26/06/2023	Senversa	Matt Beasley	Naomi Lukeman	Andrei Woinarski	For Issue
1	07/07/2023	Senversa	Matt Beasley	Naomi Lukeman	Andrei Woinarski	For Issue
2	20/11/2024	Senversa			Naomi Lukeman	Final

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Senversa acknowledges the traditional custodians of the land on which this work was created and pay our respect to Elders past and present.





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## Appendices

### Appendix A: Figures





# List of Acronyms

Acronym	Definition	Acronym	Definition
<b>ANZG</b>	Australian and New Zealand Governments	<b>NSW</b>	New South Wales
<b>AS</b>	Australian Standard	<b>NZS</b>	New Zealand Standard
<b>CDS</b>	Continuous Deflection Separation	<b>OCP</b>	Organochlorine Pesticides
<b>COA</b>	Conditions of Approval	<b>POEO Act</b>	Protection of the Environment Operations Act 1997
<b>DEC</b>	Department of Environment and Conservation	<b>RAP</b>	Remediation Action Plan
<b>DCP</b>	Development Control Plan	<b>QA</b>	Quality assurance
<b>DGV</b>	Default Guideline Values	<b>QC</b>	Quality control
<b>LCC</b>	Lane Cove Council	<b>SSD</b>	State Significant Development
<b>LGA</b>	Local government area	<b>SWMP</b>	Surface Water Management Plan
<b>MGA</b>	Map Grid Australia	<b>TDS</b>	Total dissolved solids
<b>MUSIC</b>	Model for Urban Stormwater Improvement Conceptualisation	<b>TPH</b>	Total petroleum hydrocarbons
<b>NATA</b>	National Association of Testing Authorities	<b>TSS</b>	Total suspended solids
<b>NEPC</b>	National Environment Protection Council	<b>WMP</b>	Water Management Plan
		<b>WSUD</b>	Water Sensitive Urban Design





# 1.0 Introduction and Objective

## 1.1 General

Senversa Pty Ltd (Senversa) was engaged by Airtrunk Pty Ltd (Airtrunk) to prepare a Surface Water Management Plan (SWMP) for the operation of a data centre located at 1 Sirius Road, Lane Cove West, New South Wales (NSW) (the site).

The SWMP is required for the operation of the site under State Significant Development 9741 (SSD-9741). The site location is provided on **Figure 1** (Senversa, Nov 2021).

## 1.2 Document Context and Purpose

Approval for SSD-9741 permitted redevelopment of the into a data centre. A Water Quality Report (Van Der Meer, Aug 2019) was developed to support the overarching Environmental Impact Statement (Willowtree Planning, Sept 2019) for the site. Information within the Water Quality Report has been relied upon for development of this SWMP.

Key works approved following the initial development application and subsequent modifications submitted to the Department of Planning, Industry and Environment (DPIE) for the site are listed in **Table 1-1**.

**Table 1-1 SSD Application and Modifications for the Site**

SSD Application / Modification	Key Works
<b>SSD-9741</b>	Permitted the construction and 24-hour operation of a data centre with associated office, supporting infrastructure and services, car parking and landscaping
<b>SSD-9741-MOD-1</b>	Allowed for: <ul style="list-style-type: none"> <li>• amendments to the size and quantity of back-up generators</li> <li>• an increase in the volume of diesel fuel stored at the site.</li> </ul>
<b>SSD-9741-MOD-2</b>	Allowed for: <ul style="list-style-type: none"> <li>• refurbishment and use of the existing building at 2 Apollo Place as associated office space;</li> <li>• construction of a link bridge between 2 Apollo Place and the data centre building;</li> <li>• amendments to the extent of the fire trail;</li> <li>• extension of the external plant platforms; and</li> <li>• minor alterations and additions to the data centre building</li> </ul>
<b>SSD-9741-MOD-3</b>	Allowed for a number of amendments to the design of the data centre, including two additional storeys on the building's southern and western plant gantries.

## 1.3 SWMP Scope and Objectives

The objective of this SWMP is to document surface water management controls, procedures and monitoring requirements for ongoing operation of the site in line with the requirements outlined in the conditions of approval (COA) B48(d) provided in the SSD-9741 Development Consent.





## 1.4 Performance Objectives

The SWMP must be prepared and incorporated into an overarching WMP prior to commencement of site operations. The conditions of the relevant SSD approval, as well as requirements of Lane Cove Council (LCC) guidelines, along with where they are addressed in this SWMP, are provided in **Table 1-2** below.

**Table 1-2 Approval and LCC Policy Requirements**

Approval / Licence	Conditions
SSD-9741 Development Consent	<ul style="list-style-type: none"> <li>Condition B48 states that prior to the commencement of operation, the Applicant must prepare a WMP to the satisfaction of the Secretary. The WMP must:               <ol style="list-style-type: none"> <li>Contain a Surface Water Management Plan, including:                   <ol style="list-style-type: none"> <li>A program to monitor:                       <ul style="list-style-type: none"> <li>Surface water flows and quality.</li> <li>Surface water storage and use.</li> <li>Infiltration trench operation.</li> </ul> </li> <li>Surface water impact assessment criteria, including trigger levels for investigating and potential adverse surface water impacts; and,</li> <li>Protocol for the investigation and mitigation of identified exceedances of the surface water impact assessment criteria.</li> </ol> </li> </ol> </li> </ul>
LCC DCP (2017) <i>Stormwater Management</i>	<ul style="list-style-type: none"> <li>From discussions with council and due to the sites' close proximity to the river, on-site detention is not required for this development (Van Der Meer, Aug 2019).</li> <li>Stormwater Water quality targets are not prescribed in the DCP. On this basis Sydney Water stormwater quality targets were adopted when modelling and designing the stormwater management system (refer <b>Section 2.4</b>).</li> </ul>
Sydney Water – Stormwater Quality Target Policy 2021	<ul style="list-style-type: none"> <li>The following stormwater pollutant reduction targets must be met before stormwater runoff enters Sydney Water Assets or natural water ways:               <ul style="list-style-type: none"> <li>Gross Pollutants: 90%</li> <li>Total Suspended Solids (TSS): 85%</li> <li>Total Phosphorus (TP): 60%</li> <li>Total Nitrogen (TN): 45%</li> </ul> <p>The site-specific water quality targets are also in line with the City of Ryde targets which have been specified in the appendix of the Lane Cove River Estuary Coastal Zone Management Plan (Final draft) (Van Der Meer, Aug 2019).</p> </li> </ul>

## 1.5 Relevant Legislation, Policy and Guidelines

Relevant legislation, subordinate regulation and guidelines considered applicable to the WMP at the site include, but are not necessarily limited to, the following:

- Environmental Planning and Assessment Act 1979 (principally, development consent conditions).
- Contaminated Land Management Act 1997.
- National Environmental Protection (Assessment of Site Contamination) Measure, National Environment Protection Council 1999 (as amended May 2013) (NEPC, 2013).

## 1.6 SWMP Exclusions

This SWMP is for ongoing operation of the facility post development and does not provide controls for any construction activities undertaken onsite.





## 2.0 Overview of Site

### 2.1 Site Identification

The site identification information is presented within the table below:

**Table 2-1 Site Identification**

Item	Description
<b>Site Address</b>	1 Sirius Road. Lane Cove West, NSW, 2066
<b>Legal Description</b>	Lot 1 in DP 1271404
<b>Geographical Coordinates (MGA Zone 56)</b>	330 48' 28" S 1510 8' 40" E
<b>Site Elevation in metres Australian Height Datum (m AHD)</b>	Ranging between approximately 2 - 34 m AHD
<b>Site Owner</b>	Airtrunk Pty Ltd
<b>Local Government Area</b>	Lane Cove Council
<b>Consent Authority</b>	The Department of Planning, Industry and Environment
<b>Site Zoning</b>	Light Industrial – IN2

### 2.2 Environmental Setting

Approximately half the site discharges into Stringybark Creek and then Lane Cove River. The other half discharges into undisturbed bushland and surrounding wetlands (Van Der Meer. Aug 2019). The Lane Cove River is identified as an estuarine wetland (Land Insight and Resources, Sept 2018).

### 2.3 Site History and Proposed Development

The site was subject to historical landfilling and uncontrolled importation of fill material to the site. To facilitate development of the data centre a Remedial Action Plan (RAP<sup>1</sup>) and Validation Sampling and Analysis Plan<sup>2</sup> were developed to outline the required processes and procedures to be implemented during site remediation works to make the site suitable for the proposed use.

Remediation and validation works were completed in 2020 and an Environmental Management Plan (Senversa, April 2022) was developed to outline the minimum environmental management measures required to protect human health and the environment from potential risks associated with contaminated media at the site. Construction of the data centre is still in progress.

<sup>1</sup> Senversa (2019c). *Remedial Action Plan, 1 Sirius Road, Lane Cove West, NSW*. 14 August 2019.

<sup>2</sup> Senversa (2019d). *Sampling and Analytical Quality Plan – Site Validation Works, 1 Sirius Road, Lane Cove West, NSW*. 31 October 2019.





The proposed development includes:

- Construction of a new 5 storey data centre building development (total of 39,453 m<sup>2</sup>). Impermeable pavement makes up 25,417 m<sup>2</sup> of the development, while landscaped areas make up the other 14,037 m<sup>2</sup> of the development.
- An easement providing interallotment drainage to capture and divert flows from upstream catchments through to Stringybark Creek.
- Provision of overland flow from Apollo Place to the southwest of the site.
- Building and hardstand areas to be discharged in a manner that maintains groundwater flow to surrounding bushland and wetlands. A series of infiltration trenches that will maintain groundwater levels along the perimeter of the site. In larger storm events the trenches are designed to surcharge to existing low points in the site as indicated by arrows in **Figure 1** below.



**Figure 2-1 – Site Area and Infiltration Trench Discharge Points (Van Der Mer, Aug 2019)**

## 2.4 Surface Water Flows and Quality

Van Der Meer (Aug 2019) developed a proposed water sensitive urban design (WSUD) to reduce stormwater pollutant loads as required by Sydney Water Stormwater Quality Target Policy (refer Table 1.2 above). The water quality treat measures were assessed using numerical modelling using the software program MUSIC (Model for Urban Stormwater Improvement Conceptualisation). The program is able to model pollutant loads present in stormwater runoff from a catchment and assess the effectiveness of different treatment devices in terms of pollutant load reduction.

The outcomes of the modelling indicated that the proposed water quality treatment measures would enable Sydney Waters reduction targets to be achieved for all key stormwater pollutants. The modelled treatment train layout is presented in **Figure 1** below.



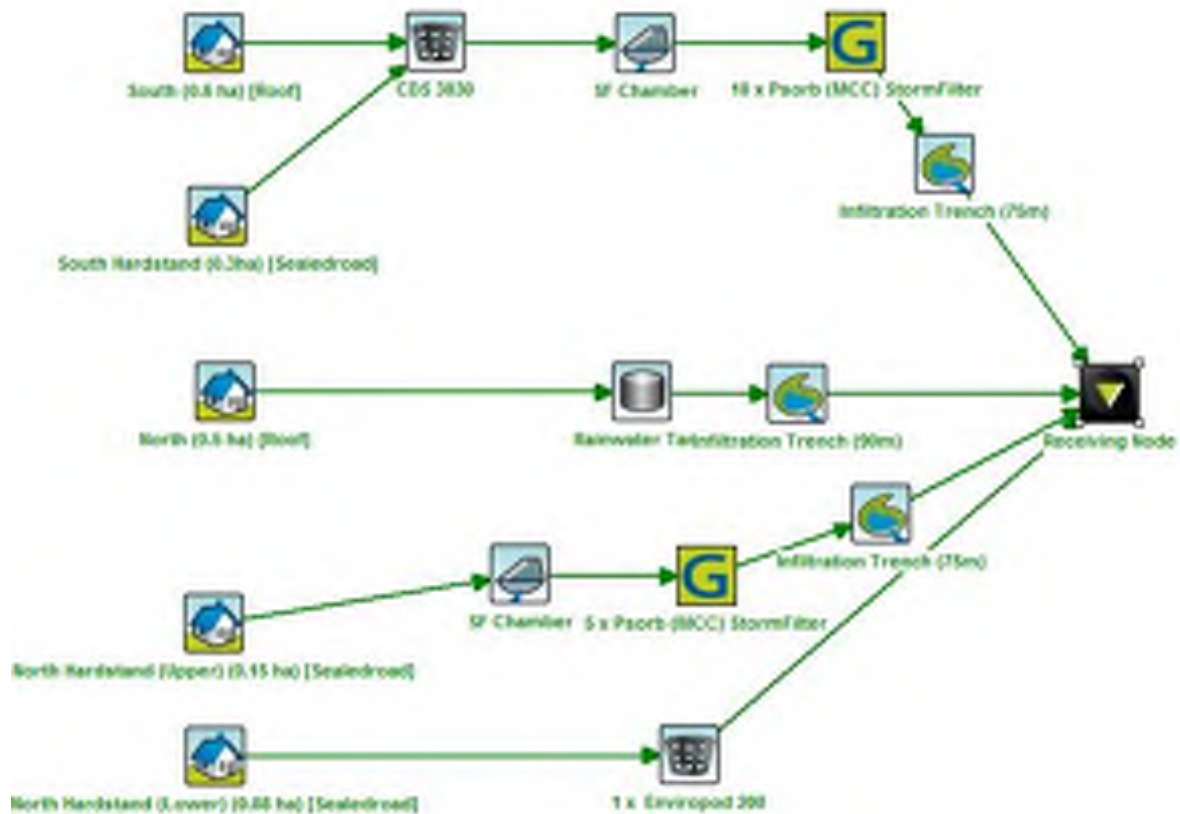


Figure 2-2- Modelled Water Quality Treatment Train (Van Der Meer, Aug 2019)

## 2.5 Stormwater Flows, Storage and Treatment

The key stormwater treatment measures for the proposed development are detailed in the Water Quality Report (Van der Meer, Aug 2019) and summarised in **Table 2.2** below. The proposed location of the infrastructure is illustrated in the Drainage Plans (Van Der Meer, April 2023) (**Appendix A**)

**Table 2-2 Stormwater Quality Management Measures – Key Infrastructure**

Device /Infrastructure	Description	Example Image
Pits and Pipework	<ul style="list-style-type: none"> <li>Pits and pipe network to collect minor storm runoff from surface areas which will minimise nuisance flooding.</li> </ul>	





Device /Infrastructure	Description	Example Image
<b>CDS</b>	<ul style="list-style-type: none"> <li>CDS Separator to treat stormwater runoff before discharge into the downstream waterways. A single CDS 1012 or approved equivalent will be used at the site discharge point.</li> <li>Continuous Deflection Separation (CDS) is a device to contain and retain gross pollutants, litter, sediments, and associated oils using energy of the inflow to create a vortex flow regime within the CDS screening chamber.</li> </ul>	
<b>EnviroPod</b>	<ul style="list-style-type: none"> <li>EnviroPod 200 filters will be placed at all proposed surface inlet pits within the proposed development.</li> <li>EnviroPod units retain all litter up to an approach flow of 100L/s (Van der Meer, Aug 2019).</li> <li>EnviroPod 200 filters show remove a large portion of suspended solids for particulate sizes in the range of 100-500µ (Van der Meer, Aug 2019).</li> </ul>	
<b>Filter Catriges</b>	<ul style="list-style-type: none"> <li>StormFilter is a proprietary device containing multiple cartridge units in a single system,</li> <li>A total of 15 690mm Psorb Storm Filter cartridges are proposed for the development.</li> </ul>	
<b>Rainwater Tank</b>	<ul style="list-style-type: none"> <li>1 110kL rainwater tank will be used to capture stormwater from some roof areas and could be used to water landscaped area.</li> <li>Based on modelling undertaken by Van Der Meer, rainwater tank reduces stormwater flow from the site by up to 48%.</li> </ul>	
<b>Infiltration Trenches</b>	<ul style="list-style-type: none"> <li>Infiltration trenches are suitable for holding water and slowly releasing into the surrounding soil. They assist in improving ground water levels, removing pollutants, primarily sediments and reducing runoff.</li> <li>The trench system totals 240m in length and runs along much of the north western and south western perimeter of the site.</li> </ul>	





## 3.0 Surface Water Management Plan

### 3.1 Surface Water Management

The Water Quality Report (Van Der Meer, Aug 2019) stated that the proposed WSUD complies with the requirements of Sydney Water Quality requirements and implementation of the design, along with ongoing management, can provide a safe and ecologically sustainable environment.

On this basis, key stormwater management requirements consist of:

- Validating that the WSUD is meeting performance criteria.
- Ongoing inspection and maintenance of the WSUD infrastructure.
- Implementing mitigation measures as required.

The surface water management plan is provided in **Table 3.1** below.

**Table 3-1: Surface Water Management Plan**

Item	Details
<b>Objective</b>	To minimise the discharge of sediment and other pollutants to lands and/or waters during site operations.
<b>Statutory Requirements</b>	<ul style="list-style-type: none"> <li>• <i>Protection of the Environment Operations Act 1997 (The POEO Act)</i>.</li> <li>• Department of Environment &amp; Climate Change NSW: <i>Managing Urban Stormwater; Soils and Construction 2008</i> ('The Blue Book').</li> <li>• Sydney Water Quality Targets Policy (Sydney Water, Feb 2021).</li> <li>• Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).</li> </ul>
<b>Assessment Criteria</b>	<ul style="list-style-type: none"> <li>• Sydney Water Quality Targets               <ul style="list-style-type: none"> <li>▪ Gross Pollutants: 90%</li> <li>▪ Total Suspended Solids (TSS): 85%</li> <li>▪ Total Phosphorus (TP): 60%</li> <li>▪ Total Nitrogen (TN): 45%</li> </ul> </li> <li>• ANZG (2018) default guideline values for 95% species protection as the ecological setting of the site is considered disturbed. Fresh water guidelines will be adopted. It is noted that these criteria are for screening purposes to trigger further assessment (and are not appropriate to directly assess the level of risk to receptors within Stringybark creek and/or Lane Cove River).</li> <li>• Greater than 20% increase in chemical results compared to historical range. Results should be compared to results from a minimum of two other monitoring events.</li> </ul>
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>• Ensure monitoring and inspections are undertaken in accordance with <b>Section 3.2</b>.</li> </ul>
<b>Responsible Person</b>	<ul style="list-style-type: none"> <li>• The site manager and/or environmental manager are responsible for activities and areas under their control.</li> </ul>
<b>Reporting</b>	<ul style="list-style-type: none"> <li>• The site manager shall be responsible for reporting any incident which causes or threatens to cause material environmental harm or breaches regulatory requirements to the environmental manager as soon as possible.</li> <li>• A record of inspections and chemical results should be maintained on file.</li> </ul>





Item	Details
<b>Corrective Actions</b>	<p>Should an incident in relation to discharge water quality occur, one or more of the following corrective actions shall be implemented as considered appropriate:</p> <ul style="list-style-type: none"> <li>• An investigation will be undertaken by the Site Manager or Environmental Manager to determine the cause of the problem.</li> <li>• If stormwater management infrastructure devices are not operating effectively, they will be repaired or replaced.</li> </ul>
<b>Review and Revisions</b>	<p>Airtrunk as the owner of this document is responsible for the review and revision of this SWMP. The review and any updates of this SWMP should be conducted by a suitably qualified and experienced person and tracked via a version control record .</p> <p>The review process may consider:</p> <ul style="list-style-type: none"> <li>• Changes in legislation or regulatory requirements.</li> <li>• Inputs or responses from regulatory agencies.</li> <li>• Monitoring outcomes.</li> <li>• Incident investigations and non-conformances.</li> <li>• Audit and inspection findings.</li> <li>• Changes in organisational structure and/or responsibilities.</li> </ul>

## 3.2 Surface Water Monitoring and Inspections

### 3.2.1 Monitoring Objectives

The objectives of surface water monitoring are to:

- Ensure surface water/stormwater controls are adequately maintained and performing to meet the performance targets set out in **Table 3.1** above.
- Assess stormwater quality with assessment criteria set out in **Table 3.1** above.

### 3.2.2 Monitoring Network

- Monitoring locations consist of the following:
  - General site areas that comprise pits, water storage and filtration.
  - Outflow point (point of discharge point) to Stringybark Creek in the northeast and to surrounding bushland in southwest.

### 3.2.3 Monitoring Requirements

The monitoring program shall broadly comprise regular site inspections and checks of stormwater control systems, and periodic sampling of stormwater quality. Additional monitoring is triggered by changes in site activities, environmental incidents or unexpected finds. A surface water monitoring program is outlined in Table 3-1: Surface Water Management Plan with triggers and actions presented in **Section 4.3**.



**Table 3-2 Surface Water Monitoring Programs**

Event Type	Frequency	Monitoring Aspect	Locations	Inspection Sample Analytical Schedule	Reporting Schedule
<b>Ongoing Inspections*</b>	Quarterly (or daily following a significant rainfall event).	Observation	General site areas CDS EnviroPod Filter Cartridges Rainwater Tank Infiltration Trenches Discharge points.	No gross pollutants or sediment accumulated on ground surface surround infrastructure.  Stormwater control devices maintained and operating as designed. No significant sediment accumulated in drains, pits and filters. Water levels in water tank should remain below 50% where possible.	Maintain record of inspections.
<b>Ongoing Sampling</b>	Six-monthly (following a rainfall event) for two years, then annual (subject to review of results).	Quality	Discharge to Stringybark Creek	A sample of the discharged water is to be collected bi-annually during a heavy rainfall event and analysed for pH, total petroleum hydrocarbons (TPH), metals*, TSS, TP, TN.	Maintain a record of analytic results.
<b>Triggered (e.g. environmental incident or unexpected find)*</b>	Event based.	Observation, quality	Sampling of discharge point to Stringybark Creek as required by trigger action requirements outlined in <b>Table 4.3</b> below.	As required – default is pH, TPH, heavy metals, TSS, TP, TN.	Maintain a record of analytic results and responses to actions.

\* The required inspection, sampling and analytical schedule should be assessed by a suitable qualified and experienced person at the time of the trigger response.

\*Dissolved metals: Arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury

### 3.2.4 Sampling Methodology

Sampling shall be undertaken by a suitably qualified and experienced person consistent with guidance in:

- DEC (2004). *Approved Methods for Sampling and Analysis of Water Pollutants in NSW*. March 2004. NSW Department of Environment and Conservation.
- Australian Standard/New Zealand Standard (AS/NZS) 5667.1:1998, *Water Quality – Sampling series*.
- NEPC (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013), Schedule B (2) Guideline on Site Characterisation.

Records of sampling time/date, sampler, and observations (colour, odour, sheen, turbidity) shall be recorded. Appropriate data quality assurance (QA) and quality control (QC) procedures consistent with the above guidance shall be implemented and assessed as part of the program.

All analyses shall be conducted by a National Association of Testing Authorities (NATA) accredited laboratory.





### 3.2.5 Trigger Levels and Action Responses

The stormwater system should be inspected, monitored and maintained to maximise the performance of the treatment train as outlined in **Table 3.2** above. The outcomes of the monitoring should be compared to the trigger criteria outlined in **Table 3.3** below, and appropriate actions taken as required.

**Table 3-3 Triggers and Action Responses**

Item being monitored	Monitoring Task	Purpose of Monitoring	Maintenance Action
<b>General</b>			
<b>Environmental Incident or Unexpected Find</b>	Environmental incident on site. Visual indications of gross contamination at ground surface, drain or stormwater control device (e.g. a visible sheen, hydrocarbon odour or staining, gross waste/litter).	Check whether additional environmental controls or monitoring are required.	Implement additional environmental controls (e.g. spill clean-up) Review and conduct additional sampling of stormwater discharge points as required.
<b>Sediment Build Up</b>	Check for excessive build-up of sediment in stormwater system including pits and pipes. If sediment build-up is noted, identify source.	If sediment accumulates in stormwater pits and pipes, capacity reduction can occur. Excessive build-ups of sediments can reduce the effectiveness of the devices over time and may contribute to increased transport of pollutants.	Once sediment source has been identified, remove accumulated sediment by flushing the system and/or emptying the filters.
<b>Inlet and Outlet Pits</b>	Ensure inflow areas and grates over pits are clear of litter and in good condition. Check for dislodged or damaged pit covers and ensure safety and general structural integrity.	If pits become blocked it will significantly reduce the amount of stormwater entering the system. Pit covers could also be a safety hazard if not fitted correctly.	Remove debris and litter, repair damage.
<b>Devices</b>			
<b>CDS, Enviropods and Filter Cartridges</b>	Check for dislodged or damaged covers and ensure general structural integrity of device. Maintenance is generally to be in accordance with the manufacturer's instructions and procedures. Ensure no significant build up of debris in devices.	If litter collection chamber is full then the device will be unable to collect gross pollutants from stormwater. Dislodged or damaged pit covers present a safety hazard.	Organise a vacuum truck to clean the device. Contact the manufacturer or contractor to repair any structural damage.
<b>Rainwater Tank</b>	Ensure downpipe leaf eaters, first flush devices and litter screens are unblocked and are operating correctly. Regularly check the structural integrity of the tank. Maintain 50% of water tank capacity where required	If any fixtures are not operating correctly, it is likely that sediment and debris will accumulate in the tank and reduce water quality. Check water level of tank.	Remove any litter, settlement or debris from the devices. Repair or replace any damaged components. Use water on landscaped areas to maintain water levels as much as possible.
<b>Infiltration Trenches</b>	Inspect inlets and gravels for debris, sediment or other signs of clogging.	Failure of the infiltration trenches to perform as designed may result in local overflows and/or sediment and deposit downstream.	Replace pea gravel and topsoil (when clogged). As needed Clear inlets of debris, including sediment and oil/grease. Totally rehabilitate the trench and restore its design storage capacity if required.





## 4.0 Principles and Limitations of Report

The following principles (summarised in **Table 4.1** below) are intended to be referred to in resolving any ambiguity or exercising such discretion.

**Table 4-1 Principles and Limitations of Report**

Area	Principle and Limitation
<b>Limitations of Information</b>	<p>This SWMP has been prepared by Senversa for the use of Airtrunk Pty Ltd.</p> <p>The sources of information used by Senversa are outlined in this Report. In preparing the Report, Senversa has relied upon information regarding the proposed development and stormwater management system prepared by other companies of works and we assume no liability for any inaccuracies in or omissions to that information. No indications were found during our development of the Report that information contained in this Report as provided to Senversa was intentionally false.</p>
<b>Level of Assessment</b>	<p>Senversa prepared this Report in a manner consistent with the level of care and skill ordinarily exercised by members of Senversa's profession practicing in the same locality under similar circumstances at the time the services were performed.</p>
<b>Nature of Advice</b>	<p>This Report should be read in full. No responsibility is accepted for use of any part of this Report in any other context or for any other purpose or by third parties. Senversa does not seek or purport to provide legal or business advice.</p>





## 5.0 References

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).
- Department of Environment & Climate Change NSW: Managing Urban Stormwater; Soils and Construction 2008 ('The Blue Book').
- DEC (2004). *Approved Methods for Sampling and Analysis of Water Pollutants in NSW*. March 2004. NSW Department of Environment and Conservation.
- Australian Standard/New Zealand Standard (AS/NZS) 5667.1:1998, Water Quality – Sampling series.
- NEPC (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013), Schedule B (2) Guideline on Site Characterisation.
- Lane Cove Council (2010) *Lane Cove Development Control Plan. Part O - Stormwater Management 2010*. (Effective 22 February 2011).
- LandInsight and Resources (2018) Enviro-Screen, 1 Sirius Rd, Lane Cove West NSW, dated 27 September 2018.
- Protection of the Environment Operations Act 1997 (The POEO Act).
- Senversa (2018) Remediation Action Plan, 1 Sirius Road, Lane Cove West, NSW 2066.
- Sydney Water Quality Targets Policy (Sydney Water, Feb 2021).
- Van Der Meer (2019) Water Quality Report, 1 Sirius Road, Lane Cove West, NSW 2066, dated 28 August 2019.



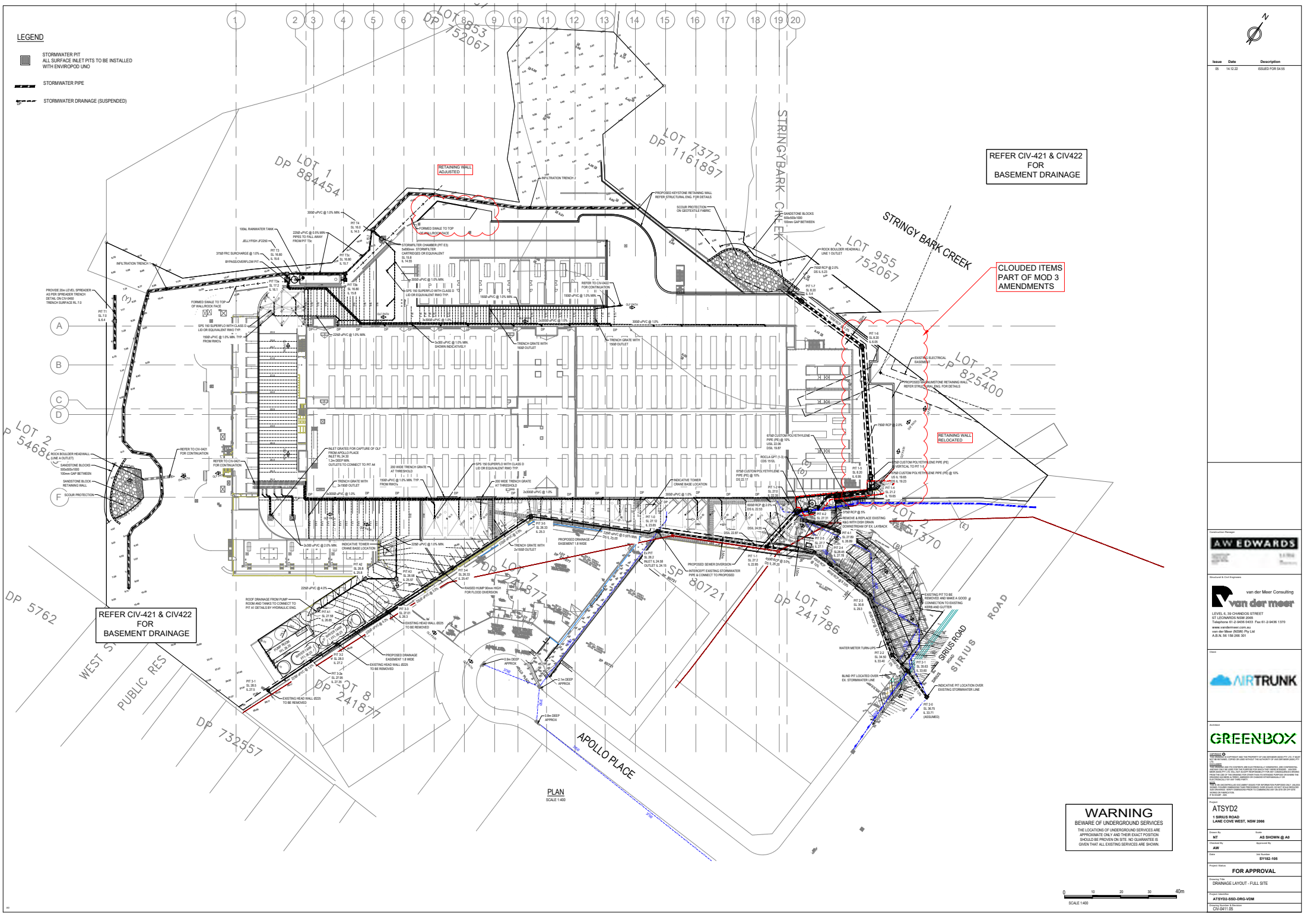






<b>Figure No:</b>	<b>1</b>
<b>Title:</b>	<b>Site Location</b>
<b>Project:</b>	Environmental Management Plan
<b>Location:</b>	1 Sirius Road, Lane Cove West
<b>Client:</b>	AirTrunk Pty Ltd





LEGEND

- STORMWATER PIT  
ALL SURFACE INLET PITS TO BE INSTALLED  
WITH ENVRPOD UNO
- STORMWATER PIPE
- STORMWATER DRAINAGE (SUSPENDED)



Issue	Date	Description
05	14.10.22	ISSUED FOR \$4.55

REFER CIV-421 & CIV422  
FOR  
BASEMENT DRAINAGE

CLOUDED ITEMS  
PART OF MOD 3  
AMENDMENTS

REFER CIV-421 & CIV422  
FOR  
BASEMENT DRAINAGE

WARNING

BEWARE OF UNDERGROUND SERVICES  
THE LOCATIONS OF UNDERGROUND SERVICES ARE  
APPROXIMATE ONLY AND THEIR EXACT POSITION  
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS  
GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.



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ATSVD2 1 SIRIUS ROAD LANE COVE WEST, NSW 2260	
Author	AS SHOWN & AS
Checked by	AW
Project Name	SY182-108
FOR APPROVAL	
DRAINAGE LAYOUT - FULL SITE	
Project Location ATSVD2-SRD-DWG-V04	
Drawing Number CIV-0411.05	





REFER TO DRAWING CN-422 FOR CONTINUATION

Project Identifier  
**ATSYD2-SSD-ORG-VOM**

Drawing Number & Revision  
**C94/0621 03**

0 1 2 3 4 5 10m 15 20m  
SCALE 1:250



CLOUDED ITEMS  
PART OF MOD 3  
AMENDMENTS

GENERATOR ON GRADE  
LEVEL LOWERED TO RL 8.2

A

B

C

D

E

F

REFER TO DRAWING CIV-421 FOR CONTINUATION

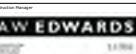
REFER CIV-411 FOR  
UPPER LEVEL &  
SUSPENDED DRAINAGE

# LEGEND

- STORMWATER PIT  
ALL SURFACE INLET PITS TO BE INSTALLED  
WITH ENVIROPOD UNO
- STORMWATER PIPE
- 3000 SLOTTED SUBSOL PIPE LINE
- INTERMEDIATE RIVER
- FLUSH POINT



Issue	Date	Description
01	14.10.22	ISSUED FOR \$4.05



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ATSYD2  
1 SIRIUS ROAD  
LANE COVE WEST, NSW 2066

Client	ATSYD2
Drawn By	AW
Checked By	AW
Project Name	ATSYD2-880-DMS-VDM

FOR APPROVAL

BASEMENT DRAINAGE PLAN - SHEET 2

ATSYD2-880-DMS-VDM

CIV-0422.05

0 5 10 15 20m  
SCALE 1:250



# Senversa Pty Ltd

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## TOHVER, Nick

---

**From:** Pradip Lamichhane <PLamichhane@lanecove.nsw.gov.au>  
**Sent:** Monday, 8 April 2024 10:23 AM  
**To:** TOHVER, Nick; Lynette Heppard Burgess  
**Cc:** Maran Muthiah; DIPAOLO, Dino  
**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

Hi Nick,

As our Development Engineer Maran advised you earlier, council does not have any comments on proposed WMP at 1 Sirius Road, Lane Cove West.

Regards,  
Pradip



Pradip Lamichhane  
*Coordinator Assets*  
48 Longueville Road Lane Cove  
9911 3658  
[plamichhane@lanecove.nsw.gov.au](mailto:plamichhane@lanecove.nsw.gov.au)

---

**From:** TOHVER, Nick <ntohver@awedwards.com.au>  
**Sent:** Friday, April 5, 2024 4:09 PM  
**To:** Pradip Lamichhane <PLamichhane@lanecove.nsw.gov.au>; Lynette Heppard Burgess <LHeppardBurgess@lanecove.nsw.gov.au>  
**Cc:** Maran Muthiah <MMuthiah@lanecove.nsw.gov.au>; DIPAOLO, Dino <ddipaolo@awedwards.com.au>  
**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

You don't often get email from [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au). [Learn why this is important](#)

Hi Pradip and Lynette,

Can you please confirm there are no comments on the water management plan for 1 Sirius Rd, Lane Cove West?

I have discussed this with Maran on the phone and he advised that he had no comments and he had confirmed this to you, however can I please request an email confirming this?

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited  
**SYD3 Project Site Office**  
51 Huntingwood Drive,



Huntingwood NSW 2148

M: 0415 054 604

E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



---

**From:** TOHVER, Nick

**Sent:** Tuesday, March 26, 2024 3:02 PM

**To:** Pradip Lamichhane <[PLamichhane@lanecove.nsw.gov.au](mailto:PLamichhane@lanecove.nsw.gov.au)>

**Cc:** [MMuthiah@lanecove.nsw.gov.au](mailto:MMuthiah@lanecove.nsw.gov.au); Lynette Heppard Burgess <[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)>

**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

Hi Pradip,

I would just like to follow up on the progress of the below enquiry.

Maran advised on the phone on the 18<sup>th</sup> of March that he had spoken to you regarding this matter.

If there are no comments, please let me know.

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited  
Level 12, 558 Pacific Highway  
St Leonards NSW 2065

M: 0415 054 604

E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



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**From:** TOHVER, Nick

**Sent:** Tuesday, March 19, 2024 6:32 AM

**To:** Pradip Lamichhane <[PLamichhane@lanecove.nsw.gov.au](mailto:PLamichhane@lanecove.nsw.gov.au)>

**Cc:** Lynette Heppard Burgess <[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)>

**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

Good morning Pradip,

Can you please provide a response to the above referenced enquiry?

I spoke to Maran Muthiah at Lane Cove Council on the phone yesterday and he advised that he had spoken to you regarding this matter.

If there are no comments, can you please let me know?

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited



Level 12, 558 Pacific Highway  
St Leonards NSW 2065

M: 0415 054 604

E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



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**From:** TOHVER, Nick  
**Sent:** Tuesday, March 12, 2024 11:55 AM  
**To:** [MMuthiah@lanecove.nsw.gov.au](mailto:MMuthiah@lanecove.nsw.gov.au)  
**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

Good morning Maran,

Can you please advise if there has been any progress on the query for 1 Sirius Rd, Lane Cove West?

Can you please provide a response or let me know if there are no comments?

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited  
**SYD3 Project Site Office**  
51 Huntingwood Drive,  
Huntingwood NSW 2148

M: 0415 054 604

E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



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**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Sent:** Friday, March 8, 2024 1:36 PM  
**To:** [MMuthiah@lanecove.nsw.gov.au](mailto:MMuthiah@lanecove.nsw.gov.au)  
**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

Good afternoon Maran,

I would just like to follow up on the progress of the below enquiry as Andrew Wallis from VDM Civil advised he discussed this with you on the phone yesterday.

Can you please provide a response or let me know if there are no comments? Thanks Maran.

Kind regards,

Nick Tohver

A W Edwards Pty Limited  
Level 12, 558 Pacific Highway  
St Leonards NSW 2065

M: 0415 054 604

E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)





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**From:** Lynette Heppard Burgess <[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)>  
**Sent:** Wednesday, February 21, 2024 12:29 PM  
**To:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Cc:** Pradip Lamichhane <[PLamichhane@lanecove.nsw.gov.au](mailto:PLamichhane@lanecove.nsw.gov.au)>  
**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

Hello Nick

Apologies I thought this had been actioned. Thank you for your patience - I will chase up for you once again.

Regards  
Netty



Lynette Heppard Burgess  
*Admin Assistant*  
48 Longueville Road Lane Cove  
9911 3619  
[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)

---

**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Sent:** Wednesday, February 21, 2024 8:46 AM  
**To:** Lynette Heppard Burgess <[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)>  
**Cc:** Pradip Lamichhane <[PLamichhane@lanecove.nsw.gov.au](mailto:PLamichhane@lanecove.nsw.gov.au)>  
**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

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Good morning Netty and Pradip,

Can you please provide a response to the above referenced enquiry? If there are no comments, please let me know.

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited  
**SYD3 Project Site Office**  
51 Huntingwood Drive,  
Huntingwood NSW 2148

M: 0415 054 604  
E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)





---

**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Sent:** Tuesday, February 13, 2024 10:54 AM  
**To:** Lynette Heppard Burgess <[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)>  
**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

Good morning Lynette, hope you're well.

I would just like to follow up on the progress of the below enquiry. Can you please request Pradip to provide a response or let me know if there are no comments this week if possible?

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited  
**SYD3 Project Site Office**  
51 Huntingwood Drive,  
Huntingwood NSW 2148

M: 0415 054 604  
E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



---

**From:** Lynette Heppard Burgess <[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)>  
**Sent:** Monday, January 22, 2024 1:48 PM  
**To:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Subject:** RE: 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

Good Afternoon Nick

Thank you for sending through the details to us. I have forwarded your email to Pradip Lamichhane in the Stormwater Department to answer your enquiry.

Kind Regards  
Netty



Lynette Heppard Burgess  
*Admin Assistant*  
48 Longueville Road Lane Cove  
9911 3619  
[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)



**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Sent:** Monday, January 22, 2024 12:50 PM  
**To:** Lynette Heppard Burgess <[LHeppardBurgess@lanecove.nsw.gov.au](mailto:LHeppardBurgess@lanecove.nsw.gov.au)>  
**Cc:** DIPAOLO, Dino <[ddipaolo@awedwards.com.au](mailto:ddipaolo@awedwards.com.au)>  
**Subject:** 1 Sirius Rd, Lane Cove West (SSD-9741) - Water Management Plan

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Hi Lynette,

Thank you for your call today regarding the Water Management Plan for the project located at 1 Sirius Rd, Lane Cove West (SSD-9741). As discussed, the attached Water Management Plan has been prepared to address Condition B48 (see below) of the SSD-9741 consent conditions and the condition references consultation with Council.

Can you please review the attached Water Management Plan with the appropriate contact at Lane Cove Council and provide any comments or feedback on the Water Management Plan for the project?

Thanks again for your assistance with this.

**Water Management Plan**  
B48. Prior to the commencement of operation, the Applicant must prepare a Water Management Plan to the satisfaction of the Planning Secretary. The Water Management Plan must:  
(a) be prepared by a suitably qualified and experienced person(s);  
(b) be prepared in consultation with Council and DPIE Water;  
(c) detail water use, metering, disposal and management on-site;  
(d) contain a **Surface Water Management Plan**, including:  
(i) a program to monitor:

- surface water flows and quality;
- surface water storage and use; and
- infiltration trench operation;

  
(ii) surface water impact assessment criteria, including trigger levels for investigating and potential adverse surface water impacts; and  
(iii) a protocol for the investigation and mitigation of identified exceedances of the surface water impact assessment criteria.

Kind regards,

Nick Tohver

A W Edwards Pty Limited  
Level 12, 558 Pacific Highway  
St Leonards NSW 2065

M: 0415 054 604  
E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



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## TOHVER, Nick

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**From:** Patricia Borges <patricia.borges@dpie.nsw.gov.au> on behalf of DPIE Water Assessments Mailbox <water.assessments@dpie.nsw.gov.au>  
**Sent:** Thursday, 22 February 2024 9:51 AM  
**To:** TOHVER, Nick  
**Subject:** SSD-9741 - Water Management Plan CRM:0122436

Good Morning Nick,

DCCEEW Water has no further comments or issues to raise.

Kind regards,

### Patricia Borges

Assistant Projects Officer  
Knowledge Office | Department of Climate Change, Energy, the Environment and Water  
E [patricia.borges@dpie.nsw.gov.au](mailto:patricia.borges@dpie.nsw.gov.au)  
Level 17, 4 Parramatta Square, Parramatta NSW 2124  
[www.dcceew.nsw.gov.au](http://www.dcceew.nsw.gov.au)

*The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.*

---

**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Sent:** Wednesday, 21 February 2024 11:54 AM  
**To:** DPIE Water Assessments Mailbox <[water.assessments@dpie.nsw.gov.au](mailto:water.assessments@dpie.nsw.gov.au)>  
**Cc:** DIPAOLO, Dino <[ddipaolo@awedwards.com.au](mailto:ddipaolo@awedwards.com.au)>  
**Subject:** RE: SSD-9741 - Water Management Plan CRM:0122436

Hi Tim,

Confirming there is no water take anticipated to occur through groundwater interception during construction and operation.

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited  
**SYD3 Project Site Office**  
51 Huntingwood Drive,  
Huntingwood NSW 2148

M: 0415 054 604  
E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)





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**From:** DPIE Water Assessments Mailbox <[water.assessments@dpie.nsw.gov.au](mailto:water.assessments@dpie.nsw.gov.au)>  
**Sent:** Wednesday, February 21, 2024 11:04 AM  
**To:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Cc:** DIPAOLO, Dino <[ddipaolo@awedwards.com.au](mailto:ddipaolo@awedwards.com.au)>  
**Subject:** RE: SSD-9741 - Water Management Plan CRM:0122436

Thanks Nick,

I understand from the comments there is no surface water to be taken. However, is water take anticipated to occur through groundwater interception during construction and operation which would need to be addressed in the WMP via condition B48(c)? Related to this, Condition B50 highlights the need to seek relevant approvals if groundwater is to be intercepted, and if this is required, I'd recommend factoring in potential application and assessment processing timeframes.

Regards  
Tim

Tim Baker  
Senior Project Officer  
Water Assessments  
**Department of Climate Change, Energy, the Environment and Water**

---

**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Sent:** Wednesday, 21 February 2024 8:24 AM  
**To:** DPIE Water Assessments Mailbox <[water.assessments@dpie.nsw.gov.au](mailto:water.assessments@dpie.nsw.gov.au)>  
**Cc:** Patricia Borges <[patricia.borges@dpie.nsw.gov.au](mailto:patricia.borges@dpie.nsw.gov.au)>; DIPAOLO, Dino <[ddipaolo@awedwards.com.au](mailto:ddipaolo@awedwards.com.au)>  
**Subject:** RE: SSD-9741 - Water Management Plan CRM:0122436

Good morning Tim,

Thank you for your email and for providing the review comment from DPIE Water. Please see attached email confirming there is no water take.

Can you please confirm there are no more comments from DPIE Water?

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited  
Level 12, 558 Pacific Highway,  
St Leonards NSW 2065  
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E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



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**From:** DPIE Water Assessments Mailbox <[water.assessments@dpie.nsw.gov.au](mailto:water.assessments@dpie.nsw.gov.au)>  
**Sent:** Monday, February 19, 2024 2:14 PM  
**To:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Subject:** RE: SSD-9741 - Water Management Plan CRM:0122436

Hi Nick,



Please see attached response following a review of the Water Management Plan.

Regards  
Tim

Tim Baker  
Senior Project Officer  
Water Assessments  
**Department of Climate Change, Energy, the Environment and Water**

---

**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Sent:** Friday, 19 January 2024 3:37 PM  
**To:** DPIE Water Assessments Mailbox <[water.assessments@dpie.nsw.gov.au](mailto:water.assessments@dpie.nsw.gov.au)>; Patricia Borges <[patricia.borges@dpie.nsw.gov.au](mailto:patricia.borges@dpie.nsw.gov.au)>  
**Cc:** DIPAOLO, Dino <[ddipaolo@awedwards.com.au](mailto:ddipaolo@awedwards.com.au)>  
**Subject:** RE: SSD-9741 - Water Management Plan CRM:0122436

Hi Patricia,

Thank you for getting back to me and for your help with this. Please see attached Water Management Plan (including Surface Water Management Plan) for the 1 Sirius Rd, Lane Cove West project (SSD-9741).

Can you please review the attached Water Management Plan for the project in accordance with Condition B48 of the consent conditions for consultation with DPIE Water?

#### **Water Management Plan**

**B48.** Prior to the commencement of operation, the Applicant must prepare a Water Management Plan of the Planning Secretary. The Water Management Plan must:

- (a) be prepared by a suitably qualified and experienced person(s);
- (b) be prepared in consultation with Council and DPIE Water;
- (c) detail water use, metering, disposal and management on-site;
- (d) contain a **Surface Water Management Plan**, including:
  - (i) a program to monitor:
    - surface water flows and quality;
    - surface water storage and use; and
    - infiltration trench operation;
  - (ii) surface water impact assessment criteria, including trigger levels for in adverse surface water impacts, and
  - (iii) a protocol for the investigation and mitigation of identified exceedances of assessment criteria.

Thanks and kind regards,

Nick Tohver

A W Edwards Pty Limited  
Level 12, 558 Pacific Highway,  
St Leonards NSW 2065  
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E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



---

**From:** Patricia Borges <[patricia.borges@dpie.nsw.gov.au](mailto:patricia.borges@dpie.nsw.gov.au)> **On Behalf Of** DPIE Water Assessments Mailbox  
**Sent:** Friday, January 19, 2024 2:37 PM  
**To:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Subject:** Re: SSD-9741 - Water Management Plan CRM:0122436

Hi Nick,

Thank you for your response.

In this case, could you please forward the documents by replying to this email, and we will process your request manually.

Kind Regards,

**Patricia Borges**

Assistant Projects Officer  
Knowledge Office | Department of Climate Change, Energy, the Environment and Water  
E [patricia.borges@dpie.nsw.gov.au](mailto:patricia.borges@dpie.nsw.gov.au)  
Level 17, 4 Parramatta Square, Parramatta NSW 2124  
[www.dccceew.nsw.gov.au](http://www.dccceew.nsw.gov.au)

*The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.*

---

**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Sent:** Friday, 19 January 2024 1:47 PM  
**To:** DPIE Water Assessments Mailbox <[water.assessments@dpie.nsw.gov.au](mailto:water.assessments@dpie.nsw.gov.au)>; Patricia Borges <[patricia.borges@dpie.nsw.gov.au](mailto:patricia.borges@dpie.nsw.gov.au)>  
**Subject:** RE: SSD-9741 - Water Management Plan CRM:0122436

Hi Patricia,

Thanks for your email and advice. I have followed the link provided and logged into my account, however the SSD-9741 project at 1 Sirius Rd, Lane Cove West does not appear in the "Projects on Exhibition" list (please see below screenshot), so I can't make a submission relating to the project through the Major Projects Portal. There doesn't appear to be any way to submit a document to DCCEEW Water Group through my Major Projects Portal login.

Can you please advise how to submit the Water Management Plan to DCCEEW Water Group and communicate with DCCEEW Water Group through the Portal? Is there a way to email or provide the Water Management Plan document by Dropbox?

The project has been determined and the Water Management Plan is a post approval document.

Thank you for your assistance with this.





## Dashboard

### Projects on Exhibition

Select a related Exhibition Case to make a Submission.

Project Name	Project ID	Exhibition Start Date
Nicholson Street Build-to-Rent	SSD-56527976	05/12/2023
Aspect Industrial Estate Stage 4 Development (Warehouse B)	SSD-60513208	05/12/2023
Aspect Industrial Estate-Mod-6	SSD-10448-Mod-6	05/12/2023
Macarthur Health Precinct Stage 2	SSD-52066209	14/12/2023
North Hangar Extension at BAE Systems, Williamtown	SSD-54974974	14/12/2023
Bank Street Park	SSD-53386706	14/12/2023

## Dashboard

### Projects on Exhibition

Select a related Exhibition Case to make a Submission.

Project Name	Project ID	Exhibition Start Date	Ex
Honeman Close Data Centre	SSD-58601963	14/12/2023	01,
301 and 305 Kent Street Concept Hotel Development	SSD-53687734	11/01/2024	07,

Kind regards,

Nick Tohver

A W Edwards Pty Limited  
Level 12, 558 Pacific Highway,  
St Leonards NSW 2065  
M: 0415 054 604



E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



---

**From:** Patricia Borges <[patricia.borges@dpie.nsw.gov.au](mailto:patricia.borges@dpie.nsw.gov.au)> **On Behalf Of** DPIE Water Assessments Mailbox

**Sent:** Friday, January 19, 2024 12:22 PM

**To:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>

**Subject:** SSD-9741 - Water Management Plan CRM:0122436

Hi Nick,

Thank you for your email.

DCCEEW Water Group requests that you submit the request in the NSW Major Projects Portal. This will ensure that your consultation is associated with your portal account and enable you to communicate directly with DCCEEW Water Group. To sign into your account, please visit the Major Projects Website [here](#).

Kind Regards,

**Patricia Borges**

Assistant Projects Officer

Knowledge Office | Department of Climate Change, Energy, the Environment and Water

E [patricia.borges@dpie.nsw.gov.au](mailto:patricia.borges@dpie.nsw.gov.au)

Level 17, 4 Parramatta Square, Parramatta NSW 2124

[www.dcceew.nsw.gov.au](http://www.dcceew.nsw.gov.au)

*The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.*

**From:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>

**Sent:** Friday, 19 January 2024 11:00 AM

**To:** DPIE Water Enquiries Mailbox <[water.enquiries@dpie.nsw.gov.au](mailto:water.enquiries@dpie.nsw.gov.au)>

**Subject:** RE: Water Enquiry

Hi Juliana,

Thanks for your email. I need to submit a Water Management Plan in accordance with Condition B48 of the consent conditions (see below condition B48 for reference) for a project located at 1 Sirius Rd, Lane Cove West, NSW 2066. The SSD consent number for the project is SSD-9741.

Can you please send me the contact details of the responsible team so I can submit the Water Management Plan for review and consultation with DPIE Water?

Thanks Juliana and please let me know if you need any further information.



## Water Management Plan

B48. Prior to the commencement of operation, the Applicant must prepare a Water Management Plan of the Planning Secretary. The Water Management Plan must:

- (a) be prepared by a suitably qualified and experienced person(s);
- (b) be prepared in consultation with Council and DPIE Water;
- (c) detail water use, metering, disposal and management on-site;
- (d) contain a **Surface Water Management Plan**, including:
  - (i) a program to monitor:
    - surface water flows and quality;
    - surface water storage and use; and
    - infiltration trench operation;
  - (ii) surface water impact assessment criteria, including trigger levels for in adverse surface water impacts, and
  - (iii) a protocol for the investigation and mitigation of identified exceedances of assessment criteria.

Kind regards,

Nick Tohver

A W Edwards Pty Limited  
Level 12, 558 Pacific Highway,  
St Leonards NSW 2065  
M: 0415 054 604  
E: [ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



**From:** DPIE Water Enquiries Mailbox <[water.enquiries@dpie.nsw.gov.au](mailto:water.enquiries@dpie.nsw.gov.au)>  
**Sent:** Friday, January 19, 2024 10:41 AM  
**To:** TOHVER, Nick <[ntohver@awedwards.com.au](mailto:ntohver@awedwards.com.au)>  
**Subject:** Water Enquiry

Dear Nick,

Thank you for your enquiry to the Water Group.

Just before I provide you with the contact details of the responsible team, could you please confirm which reports you need to submit according to the consent conditions?

Your reference number for our conversation is IS-05296.

If you have any further questions or would like more information from us, please get in touch by reply email or phone 1300 081 047 to speak to the Water Enquiries team.

Regards,

**Juliana Caixeta**  
**Senior Customer Support Officer**  
Water Enquiries  
**Department of Climate Change,  
Energy, the Environment and Water**

P 1300 081 047 | E [water.enquiries@dpie.nsw.gov.au](mailto:water.enquiries@dpie.nsw.gov.au)



4 Parramatta Square, 12 Darcy Street Parramatta NSW 2151  
Dharug Country

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***Our Vision:** Together, we create thriving environments, communities, and economies.*

*The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.*

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