



Integrated Water Cycle Management Strategy

IWCMS |

453 Culburra Road, Wollumboola

Prepared for: Scots College

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Introduction

Background

MIEngineers have been engaged by The Scots College to undertake stormwater drainage design services for proposed campus buildings roadworks and landscaping at 453 Culburra Road, Wollumboola, NSW, 2540.

The proposed development is designated as a large-scale development in Shoalhaven City Council's Development Control Plan (SCC DCP) Chapter G2 and thereby requires preparation of an Integrated Water Cycle Management Strategy (IWCMS) prior to the issue of developmental approval.

This IWCMS prepared by MIEngineers will demonstrate compliance with Council's controls regarding stormwater management, including on-site detention, water quality and peak flows.

Objectives

The primary objectives of this report is to satisfy SCC DCP Chapter G2 for development approval. In achieving this objective, this report aims to:

- Outline the design of proposed minor and major stormwater systems
- Detail the proposed On-site Stormwater Detention (OSD) strategy to ensure that peak runoff flows do not increase as part of the development.
- Detail the proposed water quality treatment measures to achieve the required pollutant load reductions for stormwater discharging from the development.
- Provide a typical erosion and sediment control strategy to ensure that appropriate measures are implemented during construction to manage erosion and sedimentation.

Site Description and Locality

The development site, as seen below in Figure 1, is located at 453 Culburra Road, a semi-rural area approximately 5km from Culburra Beach town centre, and 11km from Nowra's town centre. The site immediately backs onto the Crookhaven River, which holds significant recreational and commercial value as the Shoalhaven region's major oyster farming area. Figure 2 shows oyster farm locations immediately north of the development site.

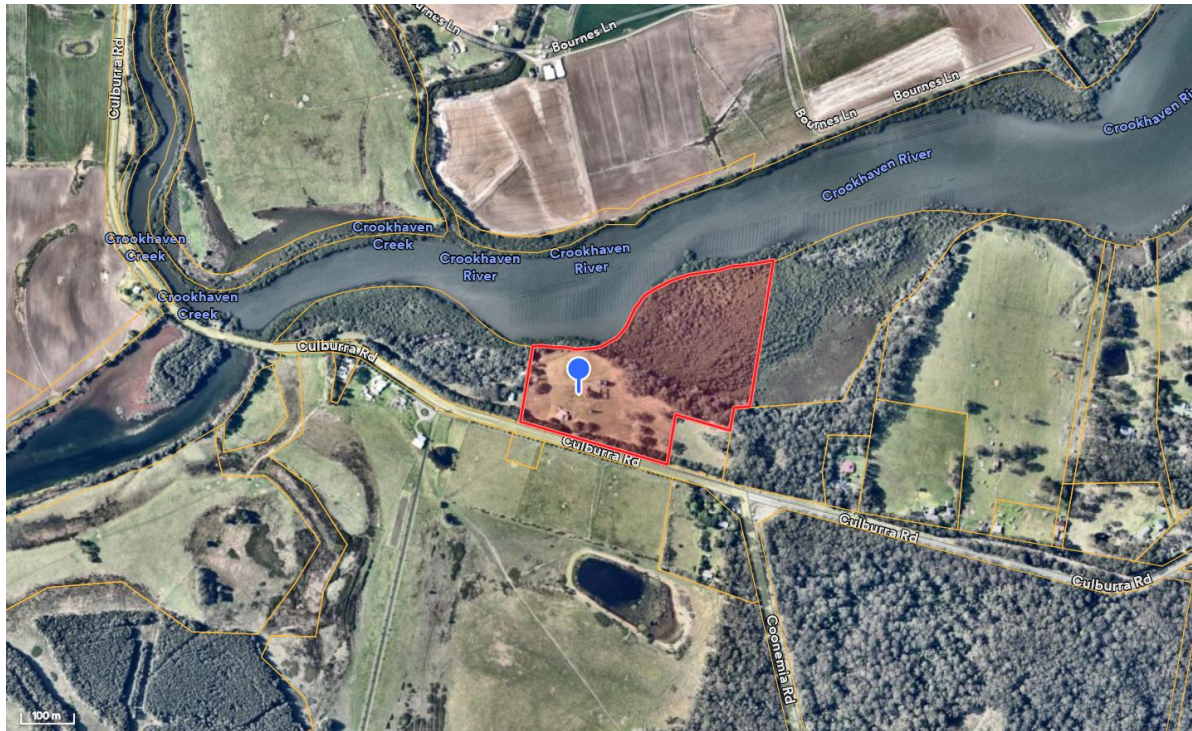


Figure 1: Site locality - lot area shown in red, development area at marker (Nearmap 2024)



Figure 2: Oyster farms north of site, shown in pink (Nearmap 2024)

Existing Topography and Drainage Characteristics

Detail Survey

A detail survey was conducted over part of the lot however, it did not include the north-eastern portion which resides outside the intended development area. The survey included site topography and details of the existing infrastructure, such as existing structure levels, apparent utility locations and water course location. The survey provided levels on Australian Height Datum (AHD).

Existing Drainage Characteristics

The site generally slopes to the north-west, towards the Crookhaven River, at an average grade of 4%, and is primarily grassland bordered on 3 sides by a narrow strip of native forest. Adjacent to the property is Culburra Road and runoff from the road reserve, as well as a small portion the southern side of the property, is conveyed to the west via an unlined gravel table drain.

There are no existing formalised stormwater drainage systems, and stormwater is allowed to sheet flow across the development area to the river.



Figure 3: Site Plan

Flooding

The northern side of the site is classified as Flood Prone Land, as defined in Council's DCP Chapter G9: Development on Flood Prone Land. The site is situated within the Lower Shoalhaven River catchment, including the Crookhaven River, which directly borders the northern edge of this site. The intention is that the proposed development area will not include any works within the Projected 2050 1% AEP flood affected area (i.e. RL 3.2m AHD). See copy of the Flood Certificate for the site below.

FLOOD CERTIFICATE

According to the *Lower Shoalhaven River Floodplain Risk Management Plan – Climate Change Assessment (2011)* and *Lower Shoalhaven River Flood Study (2022)* this property, 453 Culburra Rd, WOLLUMBOOLA – LOT 2 DP 1017929, Land ID – 90563, comprises Flood Prone Land. This property is located below the Flood Planning Level and is affected by the 1% AEP flood event.

FLOOD INFORMATION

Year	Existing	Projected 2050	Projected 2100
Flood Planning Level (m AHD)	Not Applicable	4.2**	4.4**
Hazard and Hydraulic Category*	High Hazard Flood Storage	High Hazard Flood Storage	High Hazard Flood Storage
Probable Max Flood Level (m AHD)	6.0	6.0	6.1
0.2% AEP Flood Level (m AHD)	3.9	4.0	4.1
1% AEP Flood Level (m AHD)	3.0	3.2	3.4
2% AEP Flood Level (m AHD)	2.5	2.6	2.7
5% AEP Flood Level (m AHD)	2.3	2.3	2.4
10% AEP Flood Level (m AHD)	1.6	1.7	1.8
Velocity (0.2% AEP flood event) (m/s)	0.2	0.2	0.2
Velocity (1% AEP flood event) (m/s)	0.2	0.2	0.2

* Refer to Standard Considerations in this Flood Certificate for further details.

** Flood Planning Levels obtained from the *Lower Shoalhaven River Floodplain Risk Management Plan – Climate Change Assessment (2011)* in accordance with the *Flood Planning Level for the Lower Shoalhaven River Floodplain Policy (2023)*. The hazard and hydraulic category, flood levels and flood velocities have been obtained from the *Lower Shoalhaven River Flood Study (2022)*.

SITE SPECIFIC CONSIDERATIONS

1. Current NSW Government legislation requires climate change to be considered as part of this Floodplain Risk Management Study and Plan. Climate change related information evolves with time and it is expected that existing flood behaviour and levels may change in the future.
2. All applications for buildings, and the like, must take into account the projected 2050 flood information. All subdivision and other long-term planning must take into account the projected 2100 flood information.
3. Other hazard and hydraulic categories may affect the property. For more specific information regarding the different hazard and hydraulic categorisations affecting this property please refer to Map 1 and Map 2 below or contact Council on 1300 293 111.

Figure 4: Flood Certificate

Proposed Development

The proposed development is a contemporary boarding school campus, and involves:

- The demolition of the existing roadway and small shed,
- Construction of two new two-story buildings and upgrades to existing buildings,
- Construction of paved vehicular access roads,
- provision for carparking,
- paved areas for pedestrian access, associated landscaped areas and,
- Services installation (i.e. stormwater drainage, sewer, water, telecommunications and electricity).

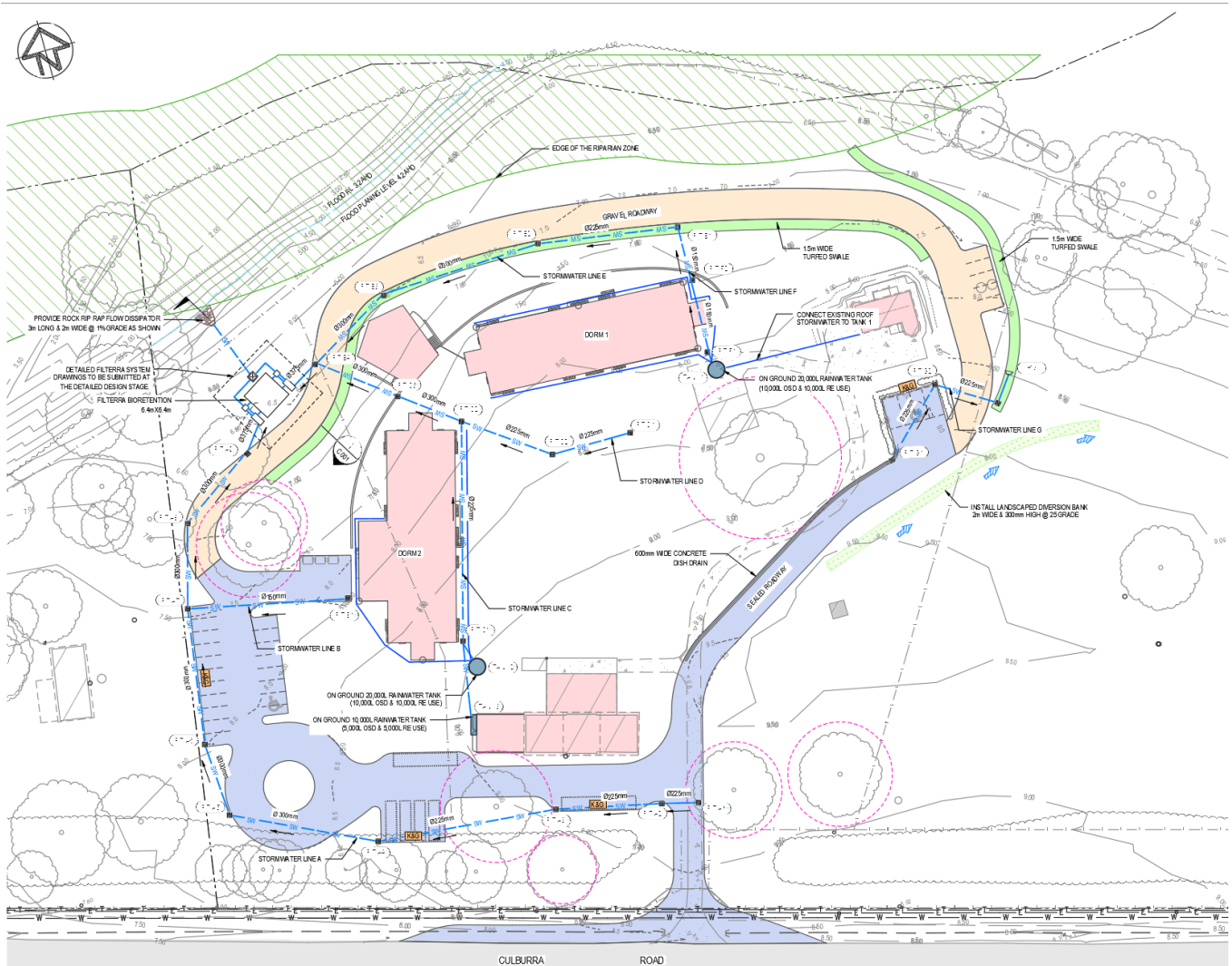


Figure 5: Stormwater Plan

Scope of Work

The scope of work undertaken by MIEngineers included:

- Design of proposed minor and major stormwater systems,
- Prepare an On-site Stormwater Detention (OSD) strategy,
- Detail water quality treatment measures to achieve the required pollutant load reductions and
- Provide a typical erosion and sediment control strategy.

The proposed civil engineering plans for the development are shown in drawing package 24P00242 and are provided in Appendix 1.

Scale of Development

For purposes of stormwater management, SCC DCP Chapter G2 (section 6.1) provides guidance on whether a particular development is classified as small, medium, or large scale. With reference to Chapter G2, Table 5, the proposed development is:

- *A development with a development footprint greater than 2,500m²*
- *An industrial, commercial or residential development (including alterations and/or additions), where the new impervious area for the site exceeds 1,000m²*

Hence, the new development is deemed to be **Large Scale** and will require an Integrated Water Cycle Management Strategy (IWCMS) to demonstrate how the development meets the relevant stormwater controls of Chapter G2.

Catchment Description

The stormwater catchments have been determined by the existing topography and design spot levels provide to MIEngineers. The catchments are made up of both pervious and impervious areas with varying percentages of each. The overall change in pre and post percentages is summarised below. Details are as per Table 1 and Figure 6 below.

	Area
Total Lot area	89,000m ²
Proposed Development Catchment Area	14,200m ²
Development Area as a Percentage of Lot Area	16%
Impervious Development Area Pre-development	1,212m ²
Impervious Development Area Post-development	8,482m ²

Table 1 – Catchment Areas

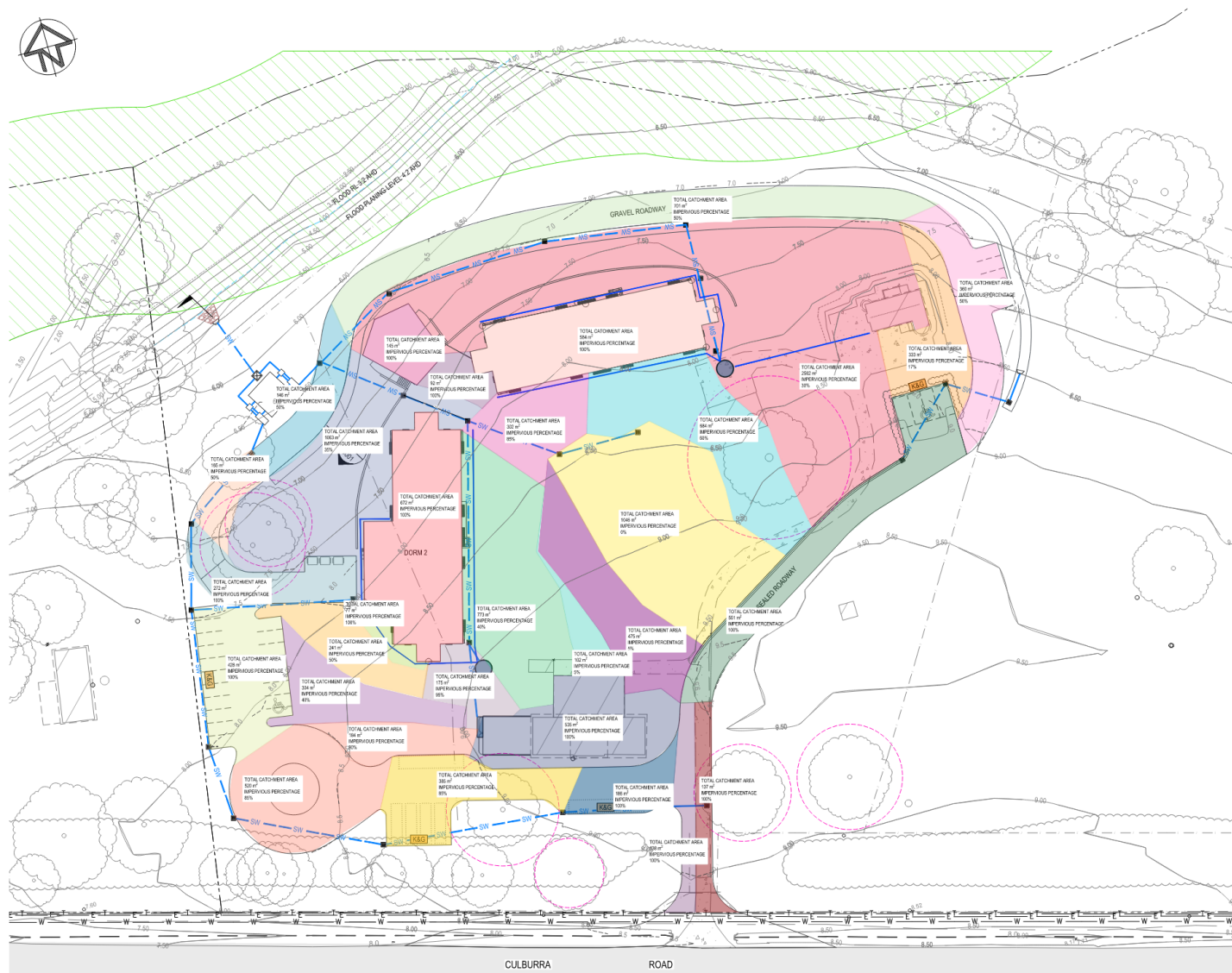


Figure 6: Stormwater Catchment Plan

Major /Minor Systems

The elements making up the stormwater management strategy include:

- Roadway/car parking area runoff,
- Pits and pipes,
- Flow Dissipators,
- On-site Detention,
- Water Reuse,
- Water Quality treatment.

In accordance with SCC DCP Chapter G2, the minor and major drainage systems for the development have been appropriately design to the following criteria:

- Minor System Drainage – 10 Year ARI (10% AEP)
- Major System Drainage – 100-year ARI (1% AEP)

The minor and major drainage systems consist of a pit and pipe network which outlet into a swale/flow- dissipator (Refer Appendix A for C002 Stormwater Plan). The pits are located as to collect the majority of run-off from key catchment areas. Additionally, rainwater tanks are provided for roof runoff from the two large buildings, with the overflow conveyed to the proposed pit and pipe network. The swale/flow-dissipator along with the other measures proposed will effectively reduce overland flow velocities and reduce the potential for scouring. The stormwater drainage pipes have been sized to cater for the 10% AEP storm event with 50% inlet blockage factors on pits as per SCC D5.05.4. The pits have been adequately sized to allow complete intake of water from the upstream catchment. Overland flow paths have been checked for suitability in the event of a pit blockage.

Stormwater Management Strategy

The development catchment areas generally grade from south to north with the lowest point being in the northwest corner. However, the development site can be examined/discussed as 4 independent sections.

Section 1 – Culburra Rd. Runoff along the southern boundary of the development will not be significantly altered or increased. Currently it is conveyed to Culburra Rd and then directed west via a dedicated road table-drain. The Culburra Rd intersection will require upgrading, however, the stormwater runoff from the site and the direction of flow, will remain basically unaffected by the development.

Section 2 – Eastern side of the site. A 6m wide sealed internal access road is proposed to be constructed along the eastern side of the development. Runoff east of this roadway will be directed into the existing grasslands to the east, via landscaping and will not increase run off from this area. The road will collect and convey runoff via a concrete dish drain then pit and pipes into a biofiltration swale. The swale will convey flows to the northern side of the development where it will be released via a flow dissipater.

Section 3- Roadways. Along the southern and western sides (i.e. north and west of Section1), it is proposed to provide a pit and pipe drainage system which will convey runoff from the roads, car parking areas, roundabout and loading dock to the north into an Ocean Protect, Filtterra biofiltration system.

Section 4 – Northern Road and Central Recreation Area. - Any excess runoff from the landscaped areas, pathways or buildings will be collected in the grass swale infiltrate into the soil and/or be conveyed to the Filtterra Biofiltration system via pits and pipes. Stormwater landing on the gravel road will runoff to the north as sheet flow across the grassland. The grassland area thereby providing a filter for this water before reaching the riparian zone. The Filtterra Biofiltration system removes, phosphorus, nitrogen, suspended solids and gross pollutants from the system to meet the targets required by Chapter G2 SCC DCP2014.

Onsite Detention (OSD). In order to reduce peak runoff to pre-developed levels it is proposed to install 3 above ground tanks (near the proposed Dormitories) with a total of 25,000 litres OSD. All works will be undertaken outside the dedicated riparian zone and above the 1% AEP Flood Level.

SCC DCP Compliance - Major/Minor Drainage

The proposed minor and major drainage system is assessed against the relevant criteria outlined in SCC DCP Chapter G2 in Table 2 below.

Performance Criteria	Acceptable Solutions	How the proposal addresses the criteria
P1 Minor and major drainage systems are appropriately designed to: - Not increase the risk of life or safety person during a storm event. Note: Refer to Supporting Document 1: Sustainable Stormwater Technical Guidelines. - Manage stormwater discharge from the development or work to safely convey stormwater flows. - Discharge runoff from the development without adverse impacts on existing infrastructure and neighbouring properties. - Ensure continuity of overland flow paths where possible. - Ensure stormwater systems are designed in accordance with industry standards.	General A1.1 Runoff from impervious areas must not be concentrated or directed onto neighbouring properties.	Design complies.
	Minor System Drainage A1.2 For residential and rural residential areas, drainage must be designed to cater for a 5-year Average Recurrence Interval (ARI) event.	N/A
	A1.3 For mixed residential/commercial, commercial and industrial development, drainage must be designed to cater for a 10-year ARI event.	Design complies.
	A1.4 Kerb and gutters are required where soil permeability is not sufficient to allow natural infiltration of stormwater runoff without causing adverse impacts onsite or to neighbouring properties.	Design Complies. Concrete dish drains, kerb & gutter and paved roadways will collect and convey runoff to the pits & pipe and water quality treatment system.
	A1.5 Runoff from roofs and other impervious areas shall be directed to an existing or proposed stormwater system when it can be proven to Council's satisfaction that the design capacity of the system is not exceeded.	Stormwater run-off is to be captured by appropriately sized pit and pipe network and conveyed to the water quality treatment system prior to release into flow dissipators.

	A1.6 Where onsite infiltration / absorption is proposed for stormwater disposal, supporting geotechnical reports are submitted with a development application to assess the suitability of the proposal. Note: The geotechnical report shall also identify the depth to groundwater and measured on-site infiltration rate. Where onsite infiltration is proposed for stormwater disposal, the applicant must demonstrate that this will not occur in areas with known soil or groundwater contamination.	N/A.
	A1.7 Stormwater inlet structures must be designed with a blockage factor provision in accordance with the latest version of the Australian Rainfall and Runoff (ARR) guidelines.	50% inlet blockage has been applied to all drainage structures in the DRAINS model
	Major System Drainage A1.8 Major system drainage must be designed for a 100-year ARI event.	Design complies.
	A1.9 Trunk stormwater systems (e.g. open channels, large conduits and overland flow paths) are designed for storms up to 100-year ARI event.	Overland flow paths have been deemed safe for the 100 Year ARI event,
	A1.10 The following overland flow paths shall be utilised as major system flow routes: • Roadways including footpath. • Pathways. • Parkland or open space.	A flow dissipator will release the 1% ARI flows downstream via open space.

	Note: Overland flow paths on private land within subdivisions will not be supported.	
	A1.11 Flow paths must be designed to ensure a velocity depth product of less than $0.3\text{m}^2/\text{s}$ for a 100-year ARI storm event.	Design complies.
	A1.12 The continuity of overland flow paths must not be obstructed by fences, walls, footpaths and the like. Note: For example, where a roadway acting as an overland flow path discharges stormwater to a pathway, park, stormwater reserve, etc., the footpath must have a reverse crossfall to facilitate the overland flow.	Design complies.

Table 2 – SCC DCP Table

On-Site Stormwater Detention (OSD)

In accordance with SCC DCP Chapter G2, On-site Stormwater Detention (OSD) it is proposed to ensure post-development peak flows from the site do not exceed pre-development flows.

Hydrological Analysis

The computer software DRAINS was chosen to develop the hydrological model for the proposed development.

Drains Parameters

A Watershed Bounded Network Model (WBNM) was developed using Australian Rainfall and Runoff (ARR) 2019 procedures in accordance with the DRAINS manual (Watercom, July 2023).

The 2016 Intensity, Frequency & Duration (IFD) factors used in the hydrological model were obtained from the Bureau of Meteorology's (BOM) online Rainfall IFD data system for the minor and major storm events.

Impervious fractions were developed based on the SCC DCP G2 guidelines and through measured percentages.

Pre-Development

Pre-Development calculations were undertaken in DRAINS to provide a baseline for the permissible site discharge in the design storm events. The pre-development model consisted of a single node representing the site area and the predevelopment impervious fraction.

Post-Development

A detailed DRAINS model was prepared for the post-development model. The model was broken into sub catchments comprising of several pit catchment areas. The post-development model build for the 0.2EY, 10%AEP, 5%AEP & 1%AEP is shown in Figures below:



OSD Strategy

To meet requirements of SCC DCP Chapter G2, the post-development model was populated with OSD measures to limit the discharge to pre-development peak flows.

OSD is proposed to be achieved by the installation of 3 above ground rainwater tanks to reduce peak flows from the site.

Tank Description	Capacity	OSD STORAGE	RE-USE STORAGE
Tank 1 (on ground for dormitory 01)	20,000L	10,000L	10,000L
Tank 2 (on ground for dormitory 02)	20,000L	10,000L	10,000L
Tank 3 (on ground for existing shed)	10,000L	5,000L	5,000L
Total	50,000L	25,000L	25,000L

Table 3 – OSD capacity details

The OSD volume required was estimated using the rational method in excel, before fine tuning the volumes in DRAINS design software by iteration. Based on the modelling a total volume of 25,000 litres was determined to meet the OSD requirements.

It is proposed that 25,000L be available for re-use of collected tank water. This volume can be raised or lowered depending on a hydraulic assessment of the intended use (e.g. irrigation) and the needs of the facility.

A summary of the design findings is provided in Table 3 below.

DRAINAGE SUMMARY	
<u>INTENSITIES: 5 MIN</u>	
$I_5 = 139 \text{ mm/Hr}$	
$I_{20} = 198 \text{ mm/Hr}$	
$I_{100} = 276 \text{ mm/Hr}$	
TOTAL SITE/TRIBUTARY AREA =	14200m ²
<u>PRE-DEVELOPMENT AREAS:</u>	
IMPERVIOUS ROOF AREA =	380m ²
IMPERVIOUS PAVED AREA =	832m ²
PERVIOUS AREA =	12988m ²
<u>PRE-DEVELOPMENT SITE DISCHARGE:</u>	
$Q_5 =$	252.0 L/s
$Q_{10} =$	325.0 L/s
$Q_{20} =$	425.0 L/s
$Q_{100} =$	700.0 L/s
<u>POST-DEVELOPMENT AREAS:</u>	
(TOTAL SITE)	IMP. % = 59.7%
IMPERVIOUS ROOF AREA =	2446m ²
IMPERVIOUS PAVED AREA =	6036m ²
PERVIOUS AREA =	5718m ²
<u>POST-DEVELOPMENT SITE DISCHARGE:</u>	
(BEFORE OSD RESTRICTIONS)	
$Q_5 =$	410.0 L/s
$Q_{10} =$	470.0 L/s
$Q_{20} =$	584.0L/s
$Q_{100} =$	886.0 L/s
<u>POST-DEVELOPMENT SITE DISCHARGE:</u>	
(AFTER OSD RESTRICTIONS)	
$Q_5 =$	297.0 L/s
$Q_{10} =$	369.0 L/s
$Q_{20} =$	458.0L/s
$Q_{100} =$	695.0 L/s
<u>OSD SUMMARY</u>	
RAINWATER TANK (TANK 01) FOR DORMITORY 01- 20,000L (10,000L OSD AND 10,000L FOR REUSE)	
RAINWATER TANK (TANK 02) FOR DORMITORY 02- 20,000L (10,000L OSD AND 10,000L FOR REUSE)	
RAINWATER TANK (TANK 03) FOR SHED- 10,000L (5,000L OSD AND 5,000L FOR REUSE)	

Table 4 – Drains model Analysis Summary

Hydrologic modelling demonstrates that for the critical design flood (1% AEP), peak discharge from the site remains lower than pre-development (0.700 m³/s) while frequent events show moderate increases compared with pre-development, these increases are negligible relative to the receiving Crookhaven River and do not result in any measurable increase in downstream flood levels or hazard.

SCC DCP Compliance

The proposed minor and major drainage system is assessed against the relevant criteria outlined in SCC DCP Chapter G2 in Table 5 below.

Performance Criteria	Acceptable Solutions	How the proposal addresses the criteria
P5 The use of onsite stormwater detention is appropriate for the needs of the development and is designed to ensure: • Post development peak flow matches pre-development peak flow as closely as possible. • Safe onsite stormwater detention measures. • That development does not place an unacceptable financial burden on landowners or the community. • Compliance with industry standards.	A5.1 Onsite stormwater detention is to be sized to match pre-development peak flow rates for the 5, 20 and 100-year ARI rain events for the site.	Peak flow rates are summarized in Table 4 above.
	A5.2 For development other than subdivision, pre and post-development peak flow calculations must be based on the: • Impervious percentages in Table 1, or • Actual impervious surface area as detailed on development plans, whichever is greater.	Design Complies. Impervious percentages have been calculated based on actual values determined from the design drawings.
	A5.3 For subdivisions, pre and post-development peak flow calculations must be based on the impervious percentages in Table 1.	N/A
	A5.4 Onsite stormwater detention design must consider downstream boundary conditions for the 100-year ARI level of the receiving water.	Considered. The development is above the 100-year ARI level.
	A5.5 Detention storage must be located at a level above the 5-year ARI flood level.	Design complies.

	A5.6 If onsite stormwater detention is provided in landscaped areas, the desirable maximum depth of ponding under design conditions is 300mm.	N/A
	A5.7 Despite A5.6, the desirable maximum depth of ponding under design conditions can be increased to 1200mm provided that: • Site slopes of the basin are 1:6 or shallower (less than 1:6); or • The storage provided is fenced off.	N/A
	A5.8 For subdivisions, onsite stormwater detention shall be: • Designed at the subdivision stage. • Constructed at the individual dwelling stage where OSD is proposed to be provided on each lot. • Constructed at the subdivision stage where OSD is proposed to be provided through dedicated detention storage.	NA

	A5.9 50% of any retention volume can contribute towards the onsite stormwater detention volume required for the development, where continual reuse of the retention volume can be demonstrated.	This clause has been utilised for OSD calculations.
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Table 5 – SCC DCP Compliance

Water Quality Criteria

SCC DCP2014 dictates water quality targets for developments. In order to achieve the requirements of the DCP, various water quality elements have been included in the proposed design. These include:

- Stormwater drainage collection,
- Onsite Detention and retention,
- Water conservation,
- Bio filtration
- Erosion and sediment management and
- Stormwater quality and waterway protection.

Pollutant Load Reduction

The proposed developments require the modelling of the pre and post development pollutant loads using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) computer software. Minimum Pollutant load reductions required by DC2014 Chapter G2 are as indicated in Table 5 below.

Pollutant	% Reduction Post Development
Gross Pollutants	End of stormwater network solution is to achieve the following: • Litter: Retention of litter greater than 40mm for flows up to the 4 exceedances per year (EY) event (3-month ARI peak flow). • Coarse sediment: Retention of sediment coarser than 0.125mm for flows up to the 4EY peak flow
Total Suspended Solids	80
Total Phosphorus	45
Total Nitrogen	45

Table 6 – SCC DCP Compliance

MUSIC Modelling

MUSIC modelling has been undertaken to provide pollutant load reductions as required by DCP2014.

A summary of the proposed water quality treatment train is as follow.

Stormwater runoff from the catchments including roofs of the buildings from western side of the site will pass through a series of stormwater pits to the Filterra bioscope system. Filterra® is a specially engineered stormwater treatment system incorporating high performance biofiltration media to remove pollutants from stormwater runoff. The system's biota (vegetation and soil microorganisms) then further breakdown and absorb captured pollutants. All components of the system work together to provide a sustainable long-term solution for treating stormwater runoff.

The incoming pipe is directed to a Filterra forebay pit which contains a high flow weir arrangement and purpose designed up flow bubbler systems to evenly disperse the stormwater flows across the bio surface ensuring adequate watering of all plants with the Filterra system during times of drought. The Filterra is designed with a 150 mm EDD which is controlled by an overflow pit placed within the filter area.

Excessive flows are diverted over the high flow weirs and exit the system via overflow pipes located at convenient positions for the site connections and final Filterra layout.

The current layout has proposed 2 inlet pipes, 2 forebays and 2 high flow bypass pipes and a single outlet control pit for EDD control.

The final Filterra layout, shape and levels may differ slightly to what has been depicted in the stormwater catchment plan however the hydraulic operation of the Filterra will remain as explained above and will be fully detailed by Ocean Protect prior to construction commencing.

Furthermore, the eastern side of the site will discharge through the turfed swale drain.

A MUSIC model for the development site has been developed based on the subdivision of areas as indicated. Details of the individual elements and the Treatment Train Effectiveness of the proposed controls is summarised in Figure 6 below.

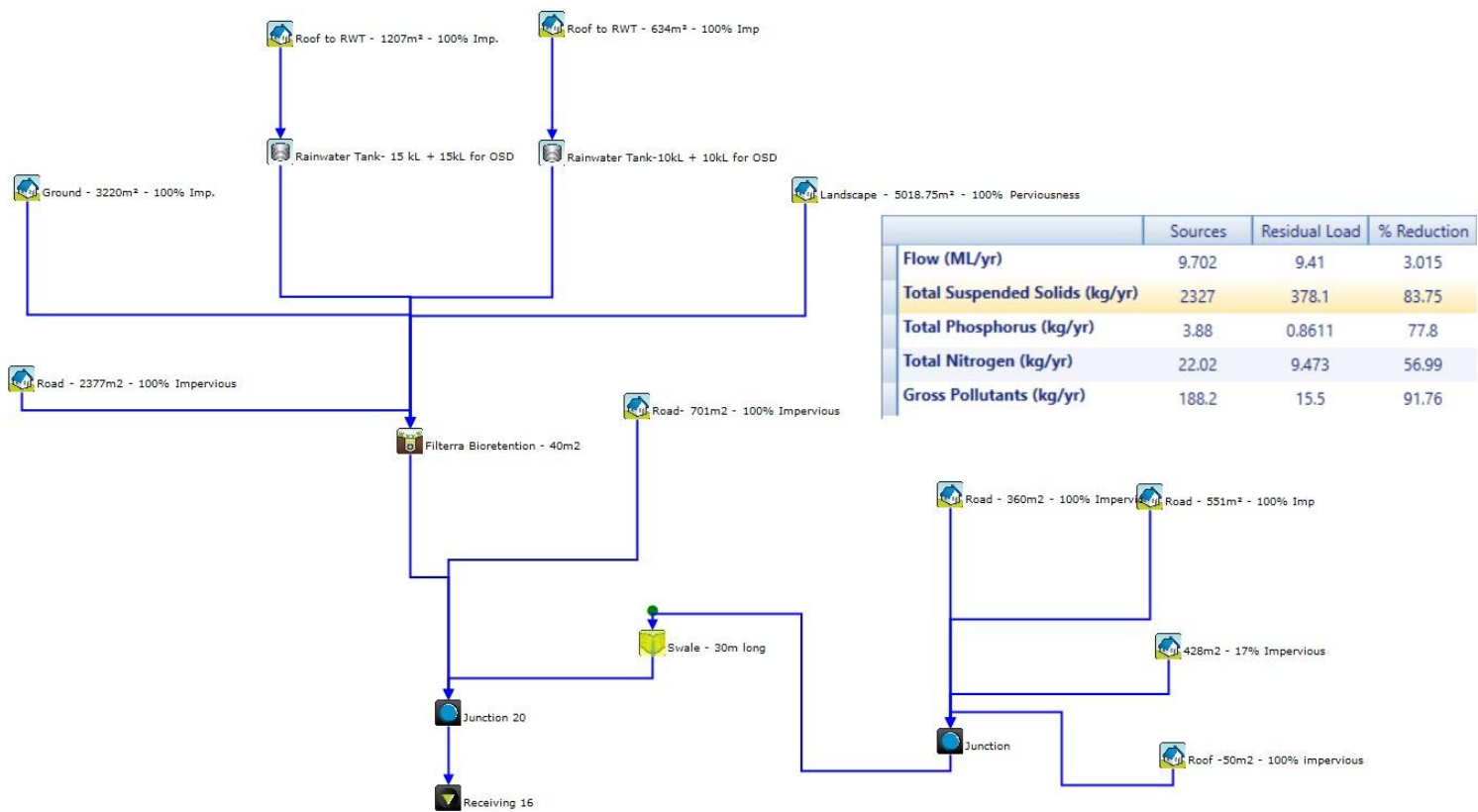
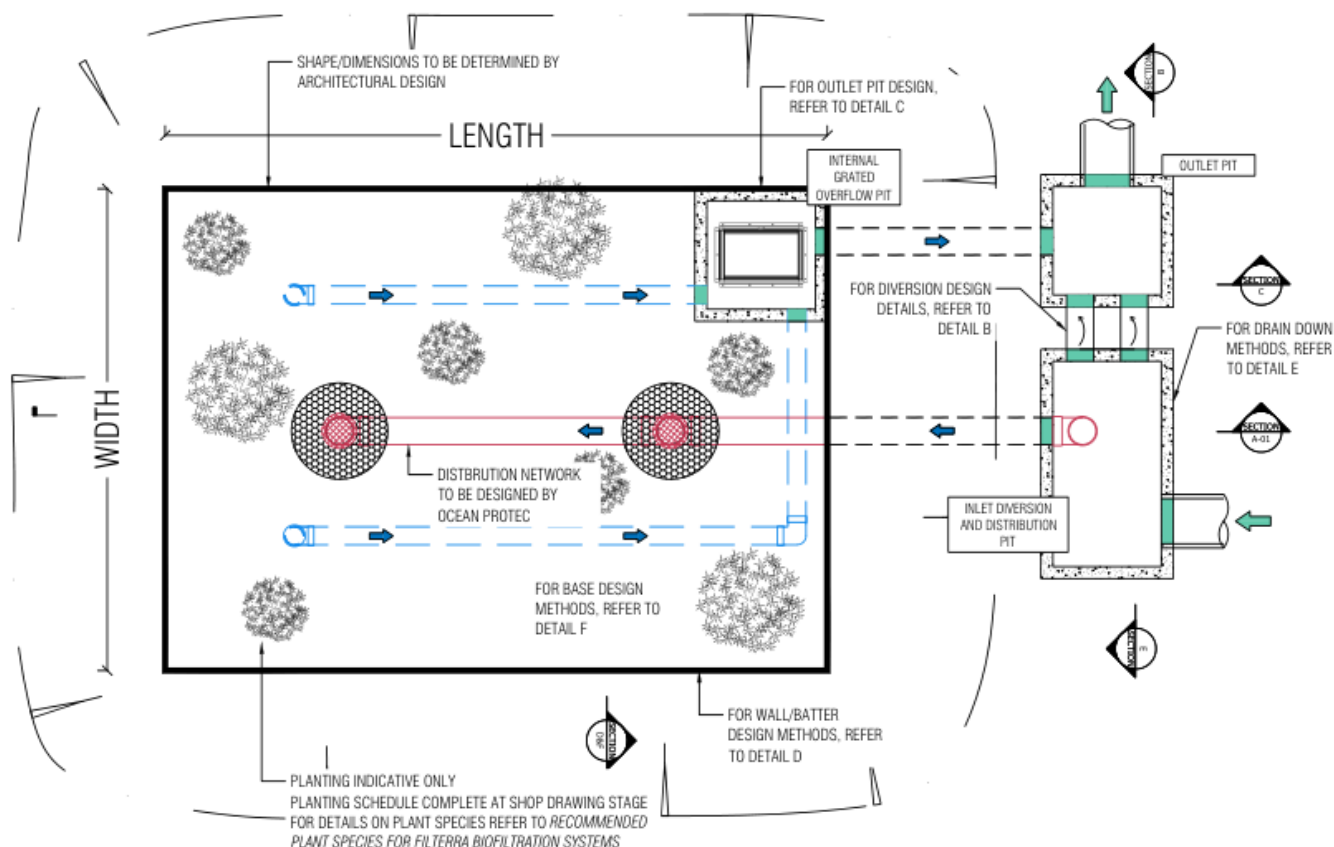


Figure 6: Music model



GENERAL PLAN LAYOUT
FILTERRA FOOTPRINT < 90m²

DESIGN NOTES

- THIS APPROACH IS TO BE USED FOR FILTERRA BIORETENTION SYSTEMS LESS THAN 90m² OR FOR CATCHMENTS < 3Ha
- FOR SYSTEMS LARGER THAN 90m² OR CATCHMENTS > 3Ha PLEASE CONTACT OCEAN PROTECT FOR SITE SPECIFICATION SPECIFICATION DESIGN
- THE INLET DISTRIBUTION NETWORK SHOWN DEFINES A BUBBLER DISTRIBUTION NETWORK. FOR ADDITIONAL DISTRIBUTION METHODS, REFER TO DETAIL A-01

Figure 7: General Layout of the Filterra system with Inlet diversion and distribution pit and outlet pit.

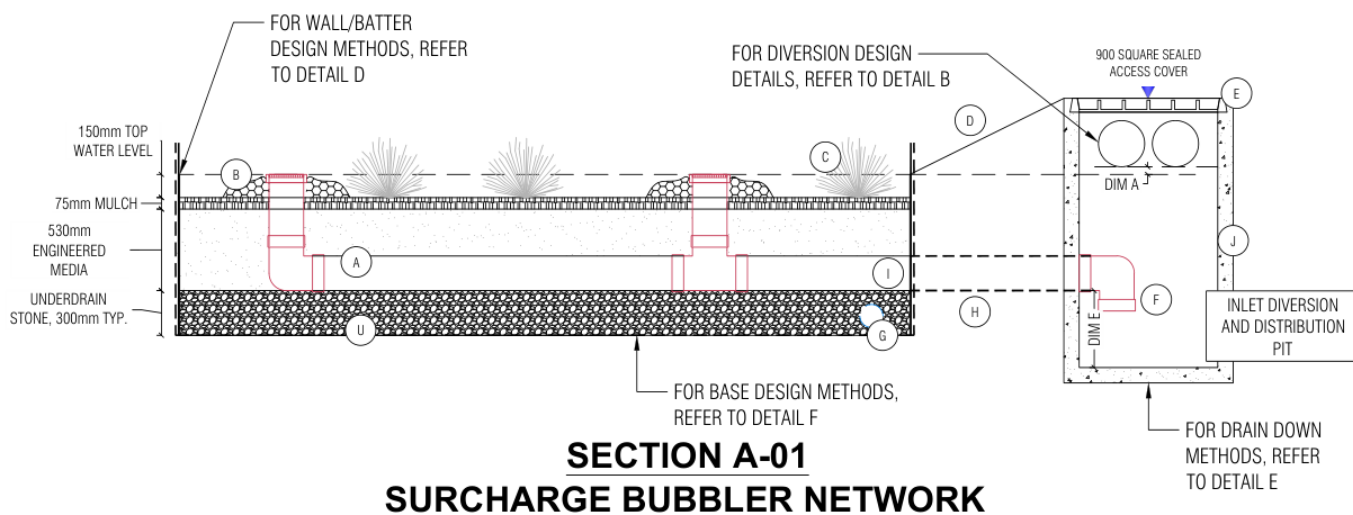


Figure 8: Sectional detail of the typical bubbler detail

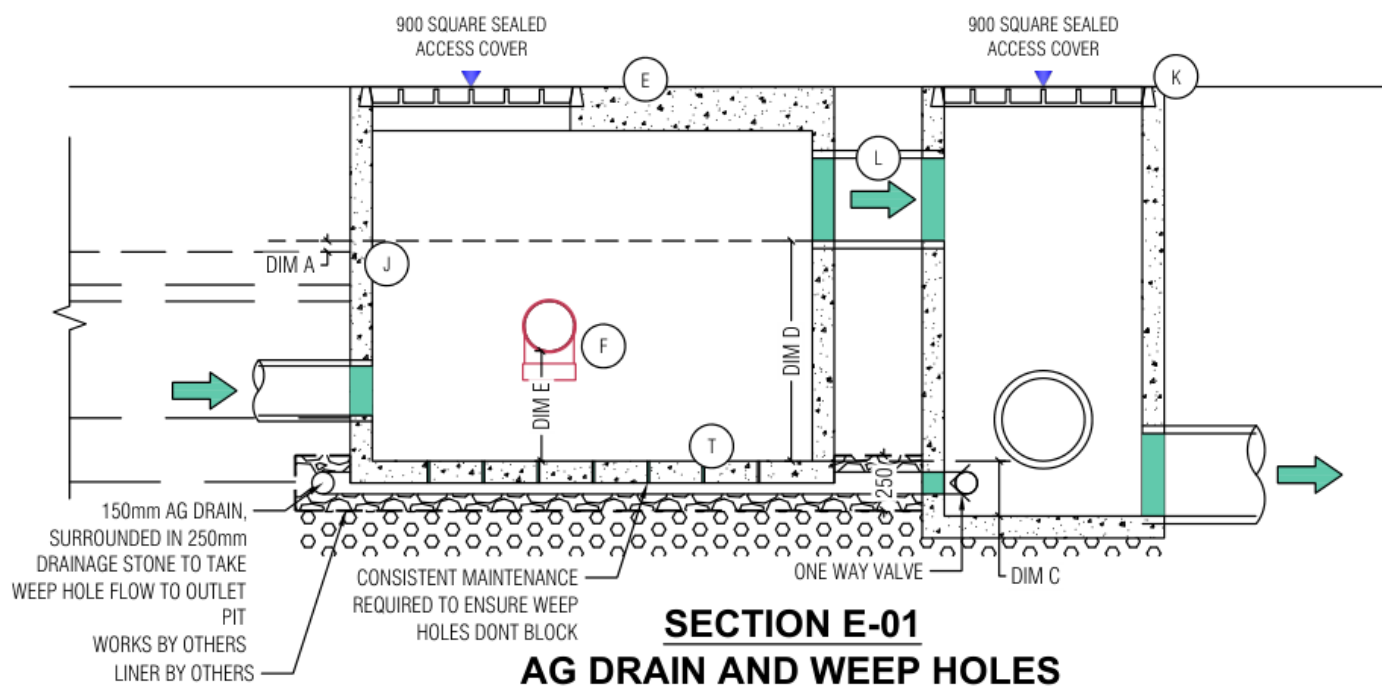


Figure 10: Sectional detail through Inlet Diversion and Distribution pit.

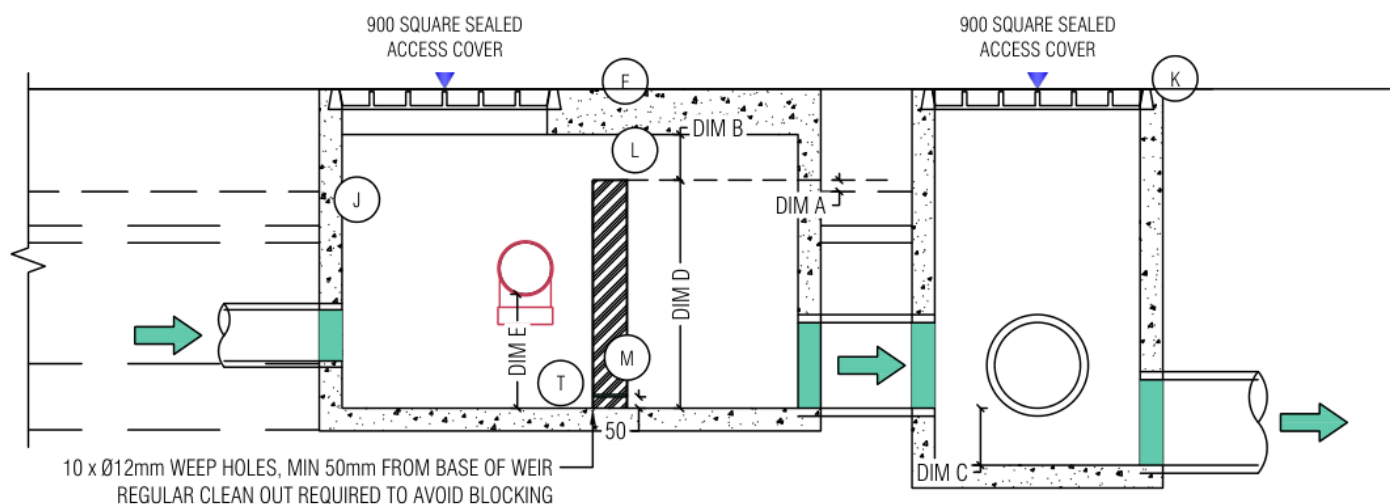


Figure 11: internal weir arrangement when levels are limited.

Operation and Maintenance Plan

The operation of the proposed system requires minimal maintenance. However, regular inspections (i.e. every 3 months and following each rain event) should be undertaken to confirm that pits and pipes are not blocked and any debris contained within the pits is to be removed.

Swale drains, flow dissipators and/or diversion banks are to be kept vegetated and free of any debris. A maintenance schedule and details of tasks will be required prior to Construction Certificate approval.

Conclusion

The IWCMS has been prepared for the proposed campus buildings roadworks and landscaping at 453 Culburra Road, Wollumboola, NSW, 2540.to demonstrate the satisfaction of SCC DCP Chapter G2. The proposed development:

- Adequately caters for the major and minor drainage systems through pit & pipe networks and overland flow paths.
- Reduces the peak flow runoff values to pre-developed levels.
- Meets the required pollutant load reductions required by SCC DCP Chapter G2 for large-scale development with the installation of a Filterra bio retention system, vegetated swale and OSD tanks.

Erosion and Sediment Control

As specified in SCC DCP Chapter G2, an Erosion & Sediment Control Plan (ERSED) will be prepared in accordance with 'Managing Urban Stormwater: Soils and Construction Volume 1' (Landcom 2004), also widely referred to as the *Blue Book*.

The ERSED will include stabilised site access at proposed access points, with barrier fencing preventing access at remaining areas. The access arrangement will be confirmed by the contractor prior to the commencement of construction. Sediment fencing will be installed down slope of all disturbed areas generally in accordance with the Blue Book. Other measures to be implemented include:

- Pit inlet protection to new pits following installation.
- Rock check dams in open channels.
- Kerb side sandbags or coir log

Appendix 1 | [Stormwater Plans]

Appendix 2 | [Landscaping Plans]