



STORMWATER MANAGEMENT PLAN

Submission to Byron Shire Council

58-60 Bangalow Road, Byron Bay
Lot 1 DP 525896, Lot 11 DP 593328, Part Lot 14 DP 792128



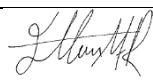




For:
Propel Investment Management

BYRON SHIRE COUNCIL
Development Application
APPROVED PLAN
DA No. 10.2023.465.1
Date: 14/11/2024

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0	Original Issue
1	Revised Issue
2	Updated to Address Council RFI
3	Updated for new area in table 2

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1. Introduction

Ardill Payne and Partners (APP) has been commissioned to develop a Stormwater Management Plan (SMP) for the proposed development at 58-60 Bangalow Road, Byron Bay. The development includes the construction of 24 residential units and associated driveway and carparking infrastructure.

The SMP employs the principles of Water Sensitive Urban Design, which focuses on reducing pollutant export and storm flows as well as improving visual aesthetics of the urban landscape as a part of the greater concept of Ecologically Sustainable Design (ESD). The SMP uses the guidelines outlined in the *“Byron Shire Development Control Plan 2014 Chapter B3 Services”*, The Byron Shire Council *“Comprehensive Guidelines for Stormwater Management”*, and the Northern Rivers Local Government Development Design and Construction Manual, *“D10 Handbook of Stormwater Drainage Design”*.

A site locality is included as Figure 1 below.



Figure 1: Site Locality

2. Objectives

Ardill Payne has performed a review of the relevant documentation described in section 1 and has identified a range of stormwater management objectives for the site. Objectives for the site also considered the Advice from the Development Advisory Panel produced on Tuesday the 28th March 2023 at 2PM. The stormwater management objectives are as follows.

- The provision of on-site stormwater detention to limit post development peak flow from the site to less than or equal to pre-development peak flows for the 0.2 EY, 10% AEP, 5% AEP, 2% AEP, 1% AEP.
- Stormwater quality to meet the key pollutant criteria identified in Tables B3.1 “Key Pollutants in stormwater flows to be addressed” and B3.2 “Pollutants and Retention Criteria” of *“Byron Shire Development Control Plan 2014 Chapter B3 Services”*.
- Maintain catchment discharge to the West as is the existing case.

3. Existing Site Conditions

The subject site occupies an area of approximately 3713 m² and grades generally from east to west. The site is bordered by Residential Development to the North, East, and South. The Western Boundary of the site is bordered by an existing wetland area. The site is not expected to receive runoff from neighbouring properties due to its topography and therefore no additional runoff has been included in catchment calculations.

The site currently contains two existing dwellings houses and several ancillary structures forming a total roofed area of 588m². In addition to roofed structures there is significant existing paved and concrete areas on site totalling 334m². **Table 1** below summarises the existing ground and roof level catchments for the site.

Table 1: Existing Catchment Characteristics

Existing Catchment	Impervious Area	Pervious Area	% Impervious
Ground Area	335	2760	10.8%
Roof Area	588	0	100%

Geotechnical investigation shows groundwater was present at various depths/layers below the existing surface. The investigation was undertaken following a period of high rainfall and may differ over time. Groundwater depths at the closest borehole to the infiltration area (BH5) are 0.3m below finished surface. It should be noted that some water table heights were the result of perched clay layers causing groundwater levels to vary throughout the site.

4. Proposed Site Conditions

The proposed site will accommodate 24 new residential units (approximate roof area 1284m²) as well as associated ground level infrastructure including driveways and parking. The proposed site drainage system will discharge to the rear of the subject site post retention and quality treatment. The characteristics of the proposed site catchment are summarised below in **Table 2**.

Table 2: Proposed Catchment Characteristics

Existing Catchment	Impervious Area	Pervious Area	% Impervious
Ground Area	1100	1203	47.7%
Roof Area	1380	0.0	100%
Total Area	2480	1203	67.3%

5. Proposed Stormwater Management

It is proposed to implement a number of stormwater treatment measures to meet the quantity and quality requirements for the proposed site, these include:

- Roofwater from each unit shall be directed to a separate 2500L rainwater tank. Each tank shall contain 1500L of reuse volume and 1000L of detention volume. The detention volume shall be controlled by a 25mm orifice at the base of the detention volume and a 100mm overflow outlet at the top of the tank.
- All stormwater from the site shall be collected by either a stormwater pit and pipe network or swales as shown on the Stormwater Management Plan. Stormwater from swales and pipes shall be directed to the rear of the site where it shall be discharged to the proposed bioretention area.
- All stormwater from the site shall outlet to a proposed 40m² Bioretention area at the western side of the site. This bioretention area shall include a 400mm thick filtration media, with underdrain present, and 40mm of extended detention depth. The bioretention areas underdrain system shall outlet to the West of the site. Outlet flows not infiltrating through the bioretention area shall be discharged via sheet flow spilling from the bioretention area. The top of the bioretention area shall be made level to achieve a sheet flow discharge scenario.

A layout of the proposed stormwater management plan is provided in **Attachment 1**.

6. Stormwater Quantity Modelling

Stormwater quantity modelling has been undertaken using DRAINS Software. Drains modelling has been performed using an allowance of 1000L of detention volume in each stormwater tank. The tank depth containing the detention volume is 750mm and includes a 25mm orifice at the base. A 100mm overflow pipe is present above the detention area above each tank.

Below is a summary of the runoff rates generated by the site Pre and Post development.

Table 3: Development Runoff Rates

Storm Event	Pre Development (L/s)	Post Development without Mitigation (L/s)	Post Development With Mitigation (L/s)
0.2EY	89	121	86
10% AEP	128	153	110
5% AEP	153	175	143
2% AEP	193	204	175
1% AEP	212	228	209

DRAINS modelling details and results have been provided within **Attachment 2**.

7. Water Sensitive Urban Design

It is proposed that these pollutant reductions be achieved through the use of a rainwater tank for each unit containing 1500L of reuse volume. Outlet from rainwater tanks and piped drainage shall all be directed towards a proposed 40m² bioretention area at the Western side of the site. Water shall enter the bioretention area via a charged inlet overflowing at the top of the extended detention depth 80mm below carpark level.

This bioretention area shall include a 400mm thick filtration media, with underdrain present. The bioretention area shall be built up above the existing surface level to keep the full filtration depth and subsoil drain above the ground water table. The bioretention area shall include 40mm of extended detention depth. This extended detention depth shall be maintained throughout the use of a formed concrete edge at the spill level (RL 2.67m) and shall be maintained in accordance with a site maintenance plan to maintain an effective extended detention depth. Note that the outlet from the subsoil underdrain shall outlet to the existing surface level of RL 2.18m. Given that the underdrain shall outlet to a free outlet no infiltration into existing ground will be required and so the existing site infiltration rate shall not affect the efficiency of the system.

The stormwater quality targets have been modelled to suit the specifications in Table B3.1 and Table B3.2 of 'Byron Shire Development Control Plan 2014 Chapter B3 Services'. Stormwater quality modelling has been performed using MUSIC. A layout of the proposed model and results has been provided in **Attachment 3**. Modelling results have been provided in **Table 4** below. It should also be noted that the reductions achieved through the proposed on-site treatment systems shall reduce the post development stormwater pollutant loadings to less than the predevelopment stormwater pollutant loadings for all four identified pollutant types.

Table 4: Development Pollutant Reductions

Pollutant		Sources	Residual Load	% Reduction	Target %
Litter (ML / yr)		113	0	100	70
Total Suspended Solid (Kg / yr)	Course Sediment	1270	155	87.8	80
	Fine Particles				50
Total Phosphorous (Kg / yr)		1.69	0.393	76.7	45
Total Nitrogen (Kg / yr)		11.0	4.84	56.2	45

Music modelling details and results have been provided within **Attachment 3**.

8. Conclusion

The SMP developed by APP outlines the methods used to comply with Council's requirements with respect to stormwater quantity, quality and conveyance.

WSUD measures will be implemented within the site drainage design to provide a multi-faceted treatment train for the site.

Stormwater runoff peak flows do not increase from the pre-development condition of the site and is not expected to cause adverse stormwater related impacts.

9. Scope of Engagement

This report has been prepared by Ardill Payne & Partners (APP) at the request of Propel Investment Management for the purpose of a Stormwater Management Plan for 58-60 Bangalow Road, Byron Bay and is not to be used for any other purpose or by any other person or corporation.

This report has been prepared from the information provided to us and from other information obtained as a result of enquiries made by us. APP accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

No part of this report may be reproduced, stored or transmitted in any form without the prior consent of APP.

APP declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately it is recommended that you consult with APP before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

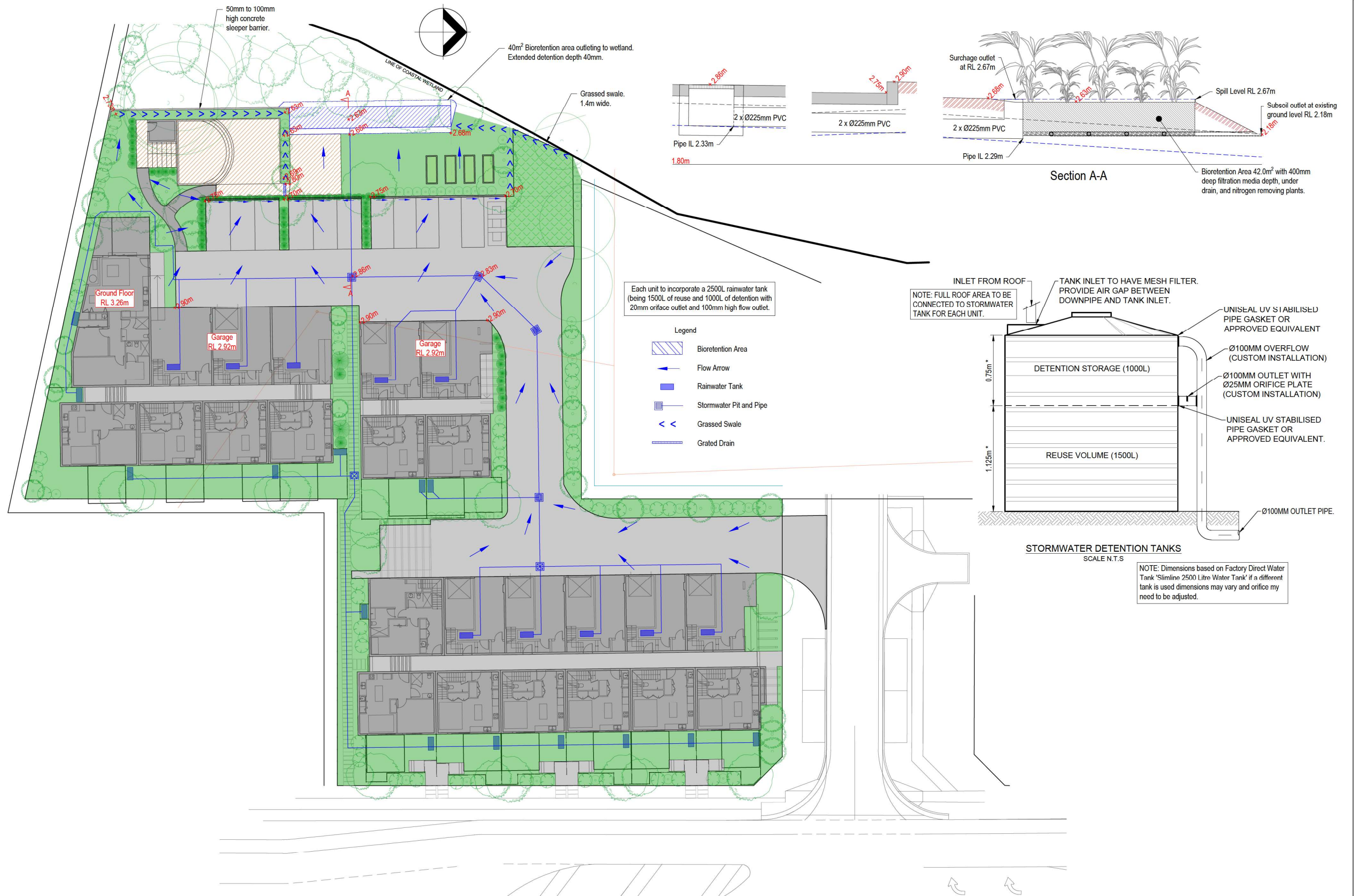
10. Attachments

Attachment 1	Proposed Stormwater Management Plan
Attachment 2	DRAINS Model and Output
Attachment 3	MUSIC link Report

ATTACHMENT 1

Attachment 1: Proposed Stormwater Management Sketch

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This plan is NOT to be used for construction purposes unless it carries the approval stamp of the local authority.

Issue	Date	Description	App'd
C	05/08/2024	Orifice Amendments	AH
B	02/07/2024	Original Issue	AH
A	10/08/2023	Draft Issue	AH

Client:	Mark Howard
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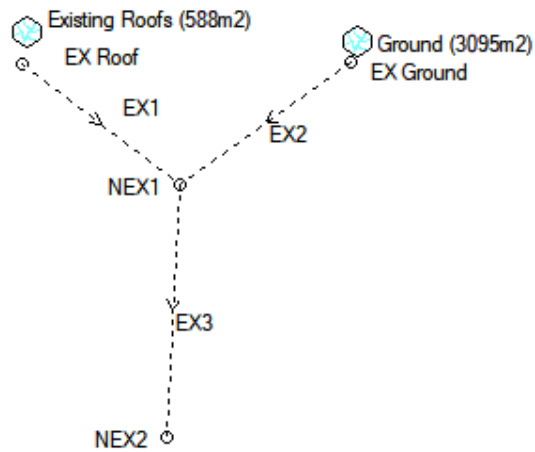
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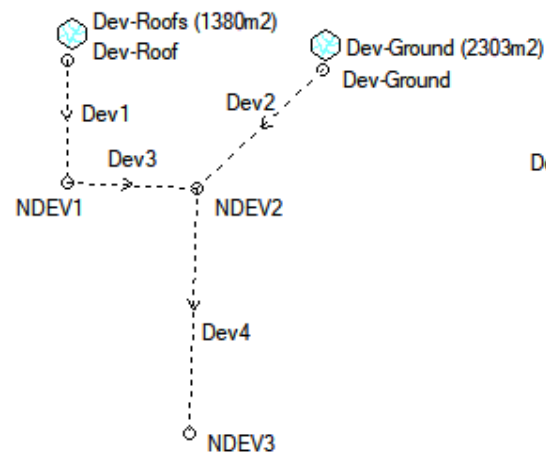
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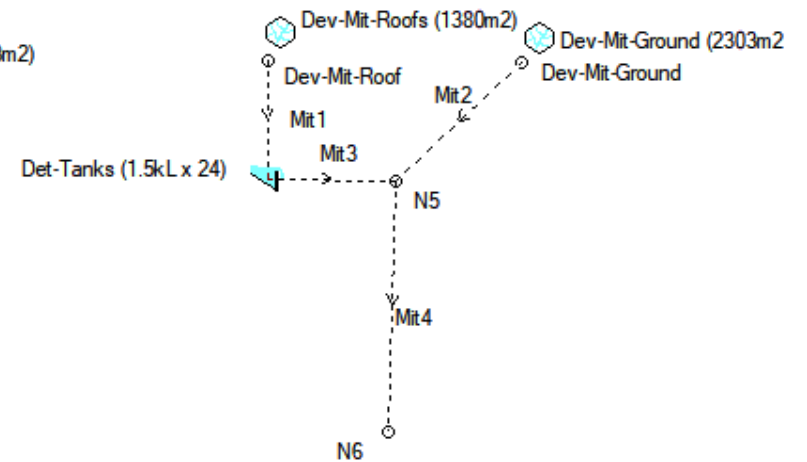
ATTACHMENT 2



Existing Site

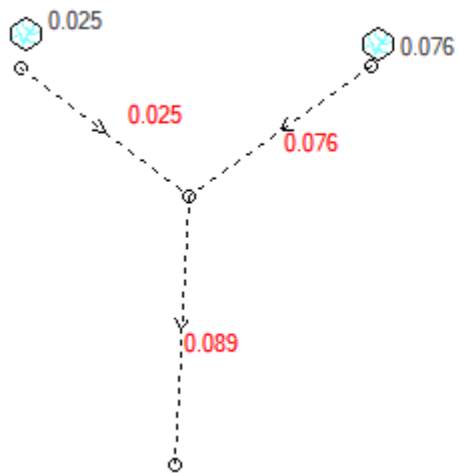


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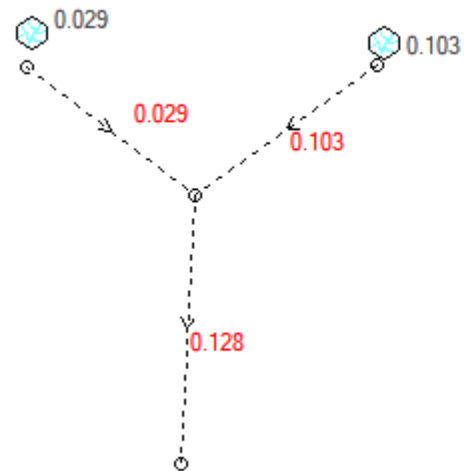


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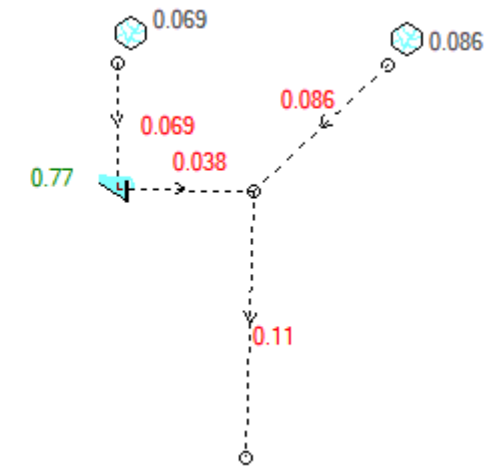
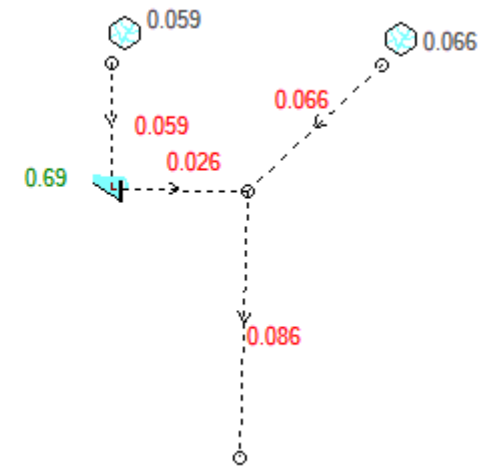
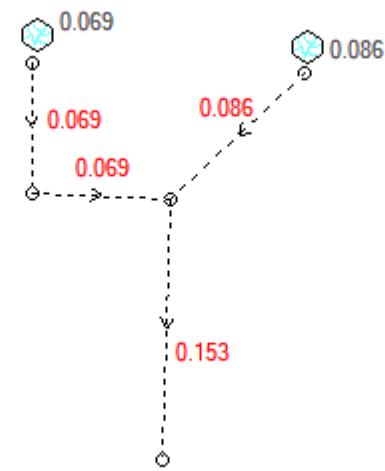
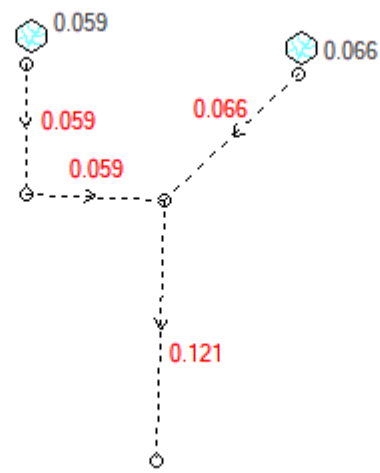
DRAINS Model Layout

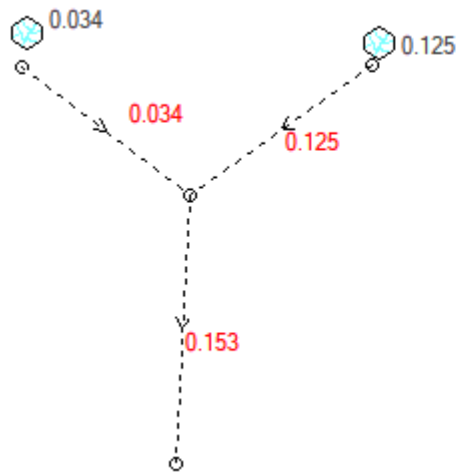


DRAINS Storm Event (0.2 EY)

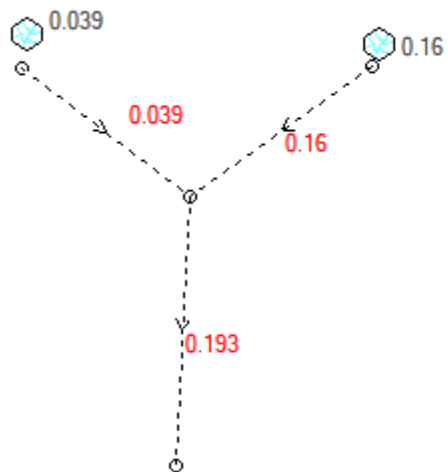
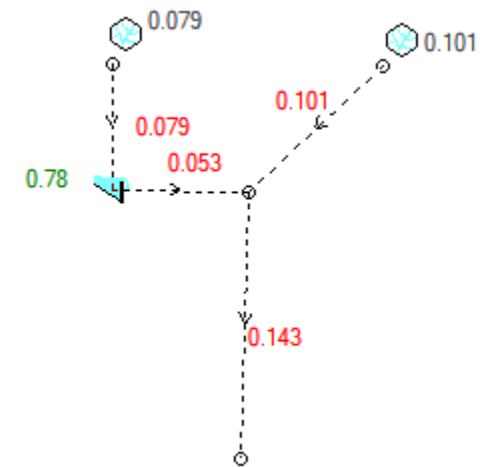
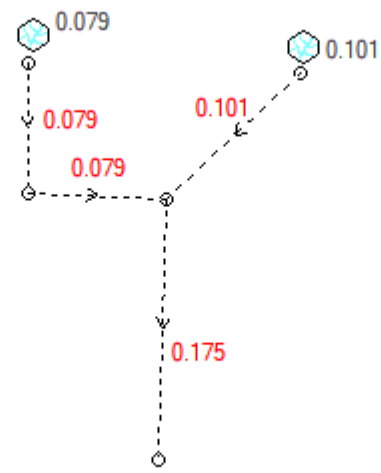


DRAINS Storm Event (10% AEP)

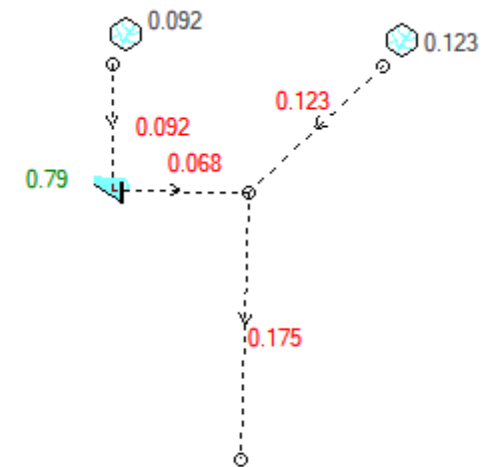
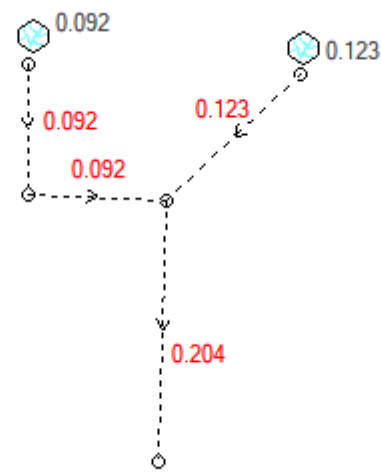


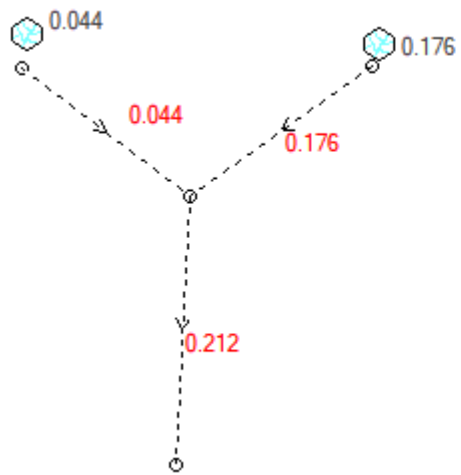


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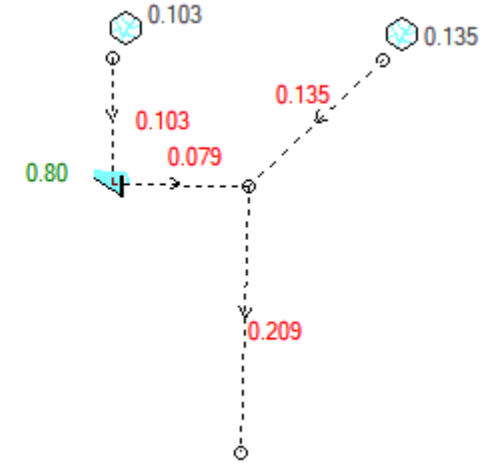
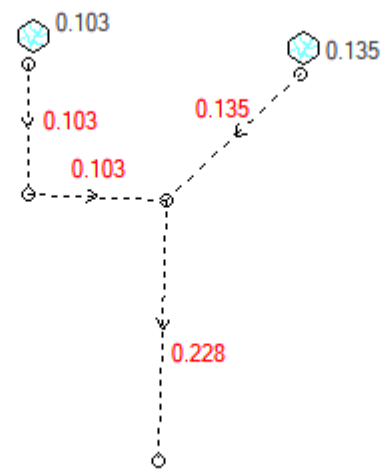


DRAINS Storm Event (2% AEP)





DRAINS Storm Event (1% AEP)



ATTACHMENT 3

