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WATER SENSITIVE DESIGN STRATEGY FOR



PROPOSED SUBDIVISION OF LOT 75 DP1300031 STAGE 5 'SUMMER GREEN' MYALL DRIVE, FORSTER

April 2024 Issue 1

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1 INTRODUCTION

This document has been prepared to address stormwater management strategies for a proposed subdivision of part Lot 75 DP1300031, Myall Drive, Forster known as 'Summer Green' Stage 5.

This strategy will conceptually size stormwater water quality measures to comply with Mid-Coast Council's stormwater quality management objectives. Stormwater will be treated by a combination of traditional drainage measures, as well as water sensitive urban design (WSUD) techniques. The strategy will also address stormwater quantity.

The 9.17ha site is located on the southern section of Myall Drive in Forster on the NSW Mid North Coast. The site is bordered by The Southern Parkway to the north, Council public reserve and existing residential land to the east, The Lakes Way to the south and recently developed residential to the west.

The proposed development footprint within the subject site is cleared as part of a bulk earthworks approval. The overall site primarily grades eastwards with slopes of 0.1 to 6% ranging from elevations of 7m to 3.5m AHD northwards towards a low lying part of the site, which eventually drains via a constructed open channel with concrete drain within the downstream The Lakes Estate.

The insitu soils on the site are expected to generally consist of a silty clay topsoil with underlying silty clays and alluvial sandy clays in the lower parts of the site (*Coffey Geotechnics Pty Ltd* - 17 *October* 2007).

This document follows on from a previous strategy prepared for the site for the purpose of rezoning (*Stormwater Management Strategy, WorleyParsons Services Pty Ltd, 12th November 2008*), which was in accordance with recommendations from a peer review by *BMT WBM Pty Ltd*, (17th December 2007) and a subsequent Water Sensitive Design Strategy (Lidbury, Summers & Whiteman, 2018) approved for the adjoining residential stages of 'Summer Green'.

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1.1 BACKGROUND

1.1.1 Proposed Development

The proposed development is a residential subdivision of part Lot 75 DP1300031. The proposed development consists of:

- 16 Residential Lots + Residue Lot
- Drainage Reserve (water quality bioretention basins and surrounding areas)
- Public Reserve
- Associated Infrastructure
- Roadways

The proposed development is shown in Figure 1.

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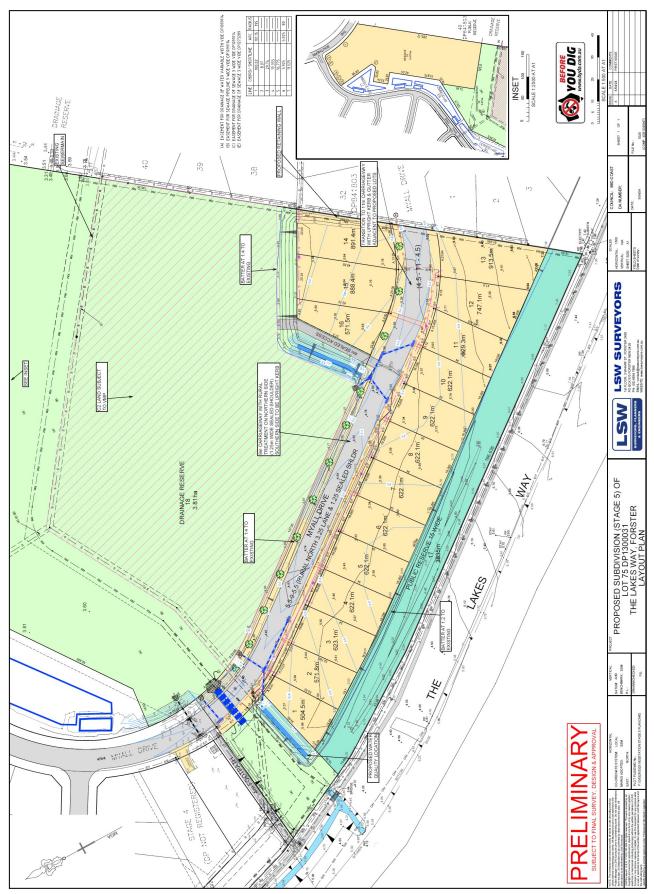


Figure 1 – Proposed Development

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1.2 STORMWATER MANAGEMENT PERFORMANCE TARGETS

The objectives for water quality adopted for this Water Sensitive Design Strategy are based on *Great Lakes Council's* DCP Chapter 11 *Water Sensitive Design.* As the development footprint is greater than 2000m² and is a "Greenfield" subdivision (less than 10% of existing Lot impervious), the targets are:

• Post development loads of Gross Pollutants are to be reduced to 90%, and TSS, TN and TP are to be reduced to less than or equal to pre-developed pollutant loads (i.e. "neutral or beneficial effect on water quality").

Additionally, the objectives for water quantity adopted for this Water Sensitive Design Strategy are based on *Great Lakes Council's* DCP Chapter 9.2.5 *Subdivision (Drainage).* The targets are:

• Attenuate post-development peak discharges to maintain existing flows for all storm events up to and including the 1% AEP rainfall event.

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1.3 PROPOSED STORMWATER MANAGEMENT STRATEGY

This Water Sensitive Design Strategy proposes to incorporate a Water Sensitive Urban Design (WSUD) "treatment train" approach, consisting of control measures at source and end-of-line measures to manage the discharge of nutrients and pollutants leaving the site to be reduced to meet the objectives proposed above.

On a typical lot, roof water will be captured by a 5kL Rainwater Tank (100% of roof area, utilising a sealed downpipe system) for the purpose of indoor (plumbed to toilets and laundry) re-use. Any overtopping of this captured roof water will discharge to the inter-allotment or roadside drainage system. For other impervious areas such as patios and paths etc., runoff will discharge to the inter-allotment or roadside drainage system. The captured stormwater for the roadway will drain via kerb and gutter which will convey stormwater to the underground stormwater system.

The captured stormwater for the roadway will drain via kerb and gutter which will convey stormwater to the underground stormwater system. 3 month ARI flows will discharge to the endof-line bioretention basins. Coarse sediment forebays in the bioretention basins will act as gross pollutant traps and will capture coarse sediment, trash and vegetation matter. Flows greater than the capacity of the basins will bypass and/or overtop via a weir or surcharge pit and into the adjoining drainage reserves. Flows greater than the 3 month ARI will discharge directly into the adjoining drainage reserves.

The external catchments outside the development footprint have been excluded from the water quality modelling as they bypass any treatment measures and are equivalent in both the predeveloped and post-developed scenarios.

The insitu soils on the site are expected to generally consist of a silty clay topsoil with underlying silty clays and alluvial sandy clays in the lower parts of the site (*Coffey Geotechnics Pty Ltd* – 17 *October 2007*). The report found that groundwater was encountered within 0.2m below the existing surface (prior to filling) at the time of fieldwork. The base of the bioretention basins will be lined and no infiltration has been included in the hydrologic modelling. It is not proposed to utilise infiltration measures as part of the stormwater concept strategy at this time.

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2 WATER QUALITY ASSESSMENT

2.1 MUSIC Water Quality Model

MUSIC (Model for Stormwater Improvement Conceptualisation) Version 6.3 was developed by the Cooperative Research Centre for Catchment Hydrology (CRCCH). MUSIC is a conceptual continuous simulation water quality assessment design tool that estimates stormwater pollutant generation from different land uses and routes the stormwater pollutants through a user defined network of stormwater treatment measures ('treatment train') to estimate the performance of a proposed water quality strategy in meeting specified water quality objectives.

As the name suggests, MUSIC is a conceptual tool that simplifies a complex system. MUSIC is based on observed average water quality data, and while all effort has been made to accurately model the proposed scenario, there should be some recognition of the variability in the final performance of the proposed water quality treatment measures to the estimated average results modelled in MUSIC.

To undertake the water quality assessment, a MUSIC model was established for the subject site with a pre development and post development scenario. The results from the pre development modelling were compared to the post development (with water quality treatment measures) modelling to assess the performance of the proposed stormwater quality controls to meet the water quality objectives stated above.

2.2 Rainfall and Evaporation

In order to establish a MUSIC model, rainfall and evaporation records in the vicinity of Forster were sought.

2.2.1 Rainfall

Bureau of Meteorology records from Station 60013 (Forster Tuncurry Marine Rescue) were reviewed to determine that the average annual rainfall depth is approximately 1,217mm. A 9-year consecutive period of data was required which included both wet and dry years with an average annual rainfall over the period being close to the historic average. Mid-Coast Council have provided a rainfall template to be adopted within the LGA with an average of 1234mm rainfall.

A 6-minute rainfall time step was considered necessary to model the performance of rainwater tanks more accurately and biofiltration devices. It should be noted that this water quality modelling exercise is a comparative assessment (i.e. pre development versus post development with treatment). Therefore, the actual rainfall year selected is not significant to the outcome provided a reasonable correlation to the average rainfall depth is achieved.

Areal potential evapotranspiration values have also been provided in the template to be adopted within the LGA.

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2.3 Soil Data and Model Calibration

A rainfall-runoff calibration was undertaken to match the predicted runoff to expected values. The model was calibrated in accordance with the *Guidelines for Water Sensitive Design Strategies* - *Mid-Coast Council October 2019* for a Soil Hydrologic Group 'D', which broadly corresponds to a Clay soil. The adopted parameters are summarised below:

Impervious Properties	Pervious properties	Groundwater Properties
Rainfall threshold: 1mm (roofs with first flush) and 1.5mm (roads and Impervious areas) Pervious areas 1mm	Soil storage:90 Initial Storage:25 Field Capacity: 65 Infiltration coefficient A: 135 Infiltration coefficient B: 4.0	Initial Depth: 10mm Daily recharge rate: 10% Daily baseflow rate: 10% Daily deep seepage rate: 0%

Table 1 – MUSIC Rainfall-Runoff parameters

2.4 Pollutant Concentrations

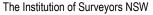
The pollutant concentrations adopted for existing-state and developed state modelling are shown in Table 3. The event mean concentrations (EMC's) for each of these land uses were derived from *Fletcher et al (2004)* and *Draft NSW MUSIC Modelling Guidelines.*

Land use/ Surface Type	Storm flow Concentration Log10 mg/l	Std. Dev. Log10 mg/l	Baseflow Concentration Log10 mg/l	Std. Dev. Log10 mg/l
Rural				
Suspended Solids	1.95	0.32	1.15	0.17
Total Phosphorous	-0.66	0.25	-1.22	0.19
Total Nitrogen	0.30	0.19	-0.05	0.12
Roofs				
Suspended Solids	1.30	0.32	-	-
Total Phosphorous	-0.89	0.25	-	-
Total Nitrogen	0.30	0.19	-	-
Urban Residential				
Suspended Solids	2.15	0.32	1.20	0.17
Total Phosphorous	-0.60	0.25	-0.85	0.19
Total Nitrogen	0.30	0.19	0.11	0.12
Sealed Roads				
Suspended Solids	2.43	0.32	1.20	0.17
Total Phosphorous	-0.30	0.25	-0.85	0.19
Total Nitrogen	0.34	0.19	0.11	0.12

Table 3 – Pollutant Concentrations

For the pre-developed model the development footprint was determined as Rural, which is consistent with previous strategies.

For the developed model the proposed site was separated into Roof Areas, Impervious and Pervious areas. Lot impervious areas have been assigned the Urban Residential EMC's.







2.5 Catchment Definition

For the purpose of the water quality modelling, the site was separated into Roof Area, Roads and Driveways (Impervious area) and pervious areas. The pre-developed and post-developed catchments can be seen in Appendix D.

It was assumed that an average lot in the residential lot release would be 60% impervious, consisting of roof area of 300m² and impervious of 120m².

It should once again be noted that the external catchments that do not enter the water quality basins have been excluded from the water quality modelling as they bypass any treatment measures and are equivalent in both the pre-developed and post-developed scenarios.

PRE-DEVELOPED Sub-Catchment	Area (ha)	% Imperviousness
1 Existing Pervious Cleared Footprint (Rural)	1.864	0%
2 Existing Upstream Pervious (The Lakes Estate)	0.088	0%
3 Existing Upstream The Lakes Estate (Sealed Roads)	0.062	100%
4 Existing U/S The Lakes Estate Road Reserve Pervious (Urban)	0.043	0%
TOTAL	2.057	3%

Table 4 – MUSIC Pre-Develop	ped Catchment Details
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Table 5 – MUSIC Post-Developed Catchme	ent Details	
POST-DEVELOPED "A" Sub-Catchment	Area (ha)	% Imperviousness
2 Existing Upstream Pervious (The Lakes Estate)	0.088	0%
3 Existing Upstream The Lakes Estate (Sealed Roads)	0.062	100%
4 Existing U/S The Lakes Estate Road Reserve Pervious (Urban)	0.043	0%
6 EAST Roadway & sealed shoulder (Sealed Roads)	0.113	100%
7 EAST 11 x Roofs (Roofs)	0.330	100%
8 EAST Lot Impervious, Dways, Footpath (Urban)	0.166	100%
9 EAST Remaining Lot Pervious (Urban)	0.308	0%
14 EAST Bioretention Basin (Urban)	0.035	0%
11 EAST Sealed Driveway (Sealed Roads)	0.017	100%
12 EAST Verge Pervious (Urban)	0.103	0%
12 EAST The Lakes Way Road Reserve Pervious (Urban)	0.177	0%
6 WEST Roadway & sealed shoulder (Sealed Roads)	0.038	100%
7 WEST 5 x Roofs (Roofs)	0.150	100%
8 WEST Lot Impervious, Dways, Footpath (Urban)	0.077	100%
9 WEST Remaining Lot Pervious (Urban)	0.085	0%
14 WEST Bioretention Basin (Urban)	0.026	0%
12 WEST Verge Pervious (Urban)	0.051	0%
6 BYPASS Roadway (Sealed Roads)	0.095	100%
17 BYPASS Batter/ Verge Pervious (Urban)	0.093	0%
TOTAL	2.057	51%

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2.6 Modelling Stormwater Management Controls

The following water quality treatment devices were included in the developed state water quality model:

2.6.1 Rainwater Tanks

Providing water for an increasing population in Australian climatic conditions is becoming a significant issue, rainwater collection and re-use tanks are considered an important *Best Management Practice* for all developments.

On a typical site, roof water will be captured by a 5kL Rainwater Tank (100% of roof area, utilising a sealed downpipe system), for the purpose of indoor (plumbed to toilets and cold-water laundry) re-use. Any overtopping of this captured roof water will discharge to either the inter-allotment or roadside drainage system.

These tanks will require a council approved first flush stormwater filter device, prior to water entering the unit. To ensure the tank will always contain water for indoor re-use, a potable water top-up device with backflow prevention device is to be fitted to the tank. The rainwater tank is to have re-use capabilities in accordance with BASIX requirements. All taps connected to the rainwater tanks are to be identified as *'Rainwater'* with a sign complying with AS1319. Re-use of the collected stormwater runoff is to be used for non-potable indoor and outdoor purposes only including toilet flushing and cold-water laundry, and outdoor garden irrigation.

For MUSIC modelling, the following parameters were used:

- 5kL tank per dwelling for re-use capturing all roof area (100% capture)
- Mid-Coast Water have provided estimates of typical non-potable water demands for residential dwellings across the LGA over the last 10-years. A constant Internal Reuse of 150L/day/dwelling (re-use for toilet and laundry) and Outdoor Re-use of 98L/day/dwelling were adopted (*Guidelines for Water Sensitive Design Strategies October 2019*)
- The conservative PET Rain option was chosen for re-use modelling (i.e. outdoor re-use demand is zero when the rainfall exceeds the PET).

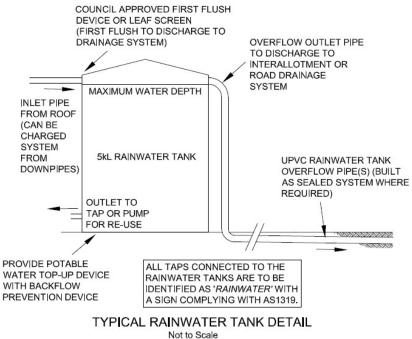
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2.6.2 Water Quality Bioretention Basins

Constructed water quality bioretention basins are shallow, extensively vegetated water bodies that use enhanced sedimentation, fine filtration, and pollutant uptake processes to remove pollutants from stormwater. These processes are engaged by slowly passing runoff through vegetated areas. Plants filter sediments and pollutants from the water, while biofilms that grow on the plants can absorb nutrients and other associated contaminants.

For this development, it is proposed to construct an end-of-line water quality bioretention basin to serve the development catchment. The basins will also offer benefits to residents by providing aesthetic qualities and habitat for wildlife.

For MUSIC modelling, the following water quality basin parameters were used:

- 0.30m extended detention depth, 1:3 internal side batters.
- Effective vegetation planted
- Filter media 300mm thick (Sandy Loam) with 100mm transition layer with underlying 250mm drainage layer and 300mm submerged zone
- Filter Media Total Nitrogen = 400mg/kg and Orthophosphate = 40mg/kg (*Using MUSIC in Sydney's Drinking Water Catchment*, SCA, Dec 2012)
- Subsoil drains which will drain to adjacent drainage reserve
- Top 100mm ameliorated to provide for plant uptake
- Energy Dissipator & concrete sediment forebays at pipe outlets

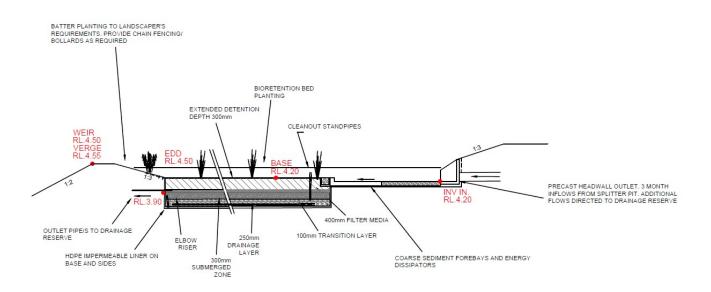
The basins will have a "splitter pit" arrangement to allow for approximately 3-month ARI inflows only (however it may be inundated in larger events, but at low velocities). Flows exceeding the approximate 3-month event will be conveyed via pipe or overland flow to the adjacent drainage reserves. The basins will be dedicated to Council as drainage reserve.

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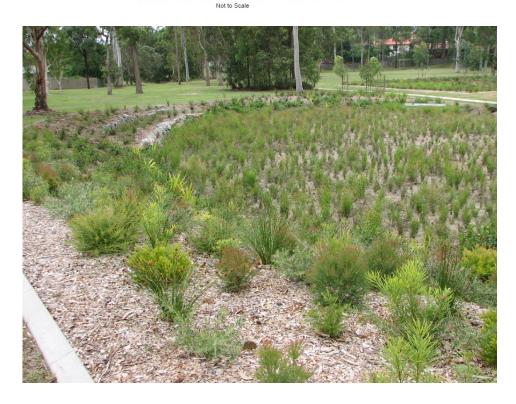


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TYPICAL BIORETENTION BASIN



2.6.3 Buffer Strips

Buffer Strips are essentially grassed or otherwise vegetated areas formed to filter sheet flow runoff from an impervious source.

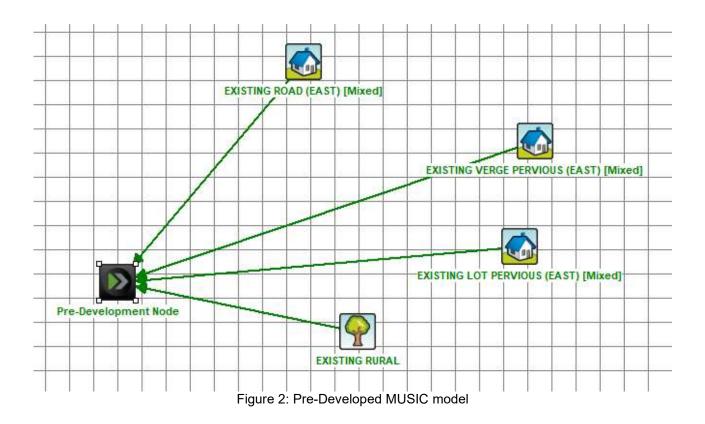
A 1m wide strip of turf running the length of the sealed rural shoulder will be placed on the downslope side to facilitate removal of coarse pollutants. For MUSIC modelling, 100% of the upstream area was buffered.

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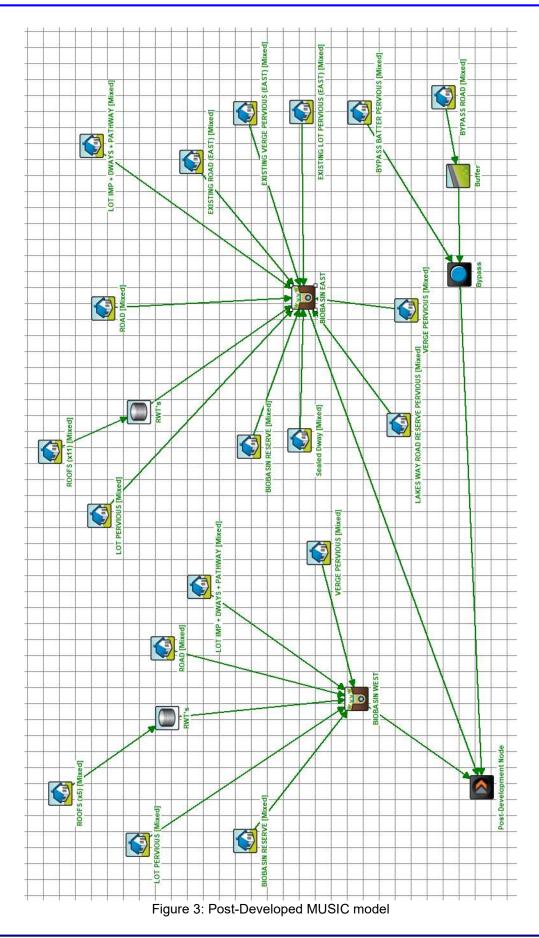




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2.7 Model Results

Table 6 presents the average annual pollutant export loads at the downstream extent of the entire subject site under both pre developed and post developed conditions (with and without treatment).

Ta	able 6 - Annu	al Average Poll	utant Export Lo	ads
	Pr	oposed Devel	opment Catchr	nent
Pollutant	Existing Site Load (kg/yr)	Developed Site Load (without treatment) (kg/yr)	Developed Site Load (with treatment) (kg/yr)	% Reduction
Gross Pollutants	16.1	281	25.8	90.8
TSS	1,230	2,680	748	72.0
TP	2.69	4.87	2.65	45.6
TN	20.7	35.5	20.4	42.4

The results in Table 6 indicate that the proposed Water Sensitive Design Strategy would meet or exceed the water quality objectives for the site, which were:

• Post development loads of Gross Pollutants are to be reduced to 90%, and TSS, TN and TP are to be reduced to less than or equal to pre-developed pollutant loads (i.e. "neutral or beneficial effect on water quality").

Refer to the Water Sensitive Design Plan for the locality, size and details of the proposed stormwater treatment measures.

2.8 Construction Stage

Water quality during the construction stage will be addressed by a Stormwater Management plan prepared in accordance with NSW Department of Housing "Blue Book" 2004. Construction methods will be detailed in designs for the construction certificate.

An Operations and Maintenance Manual is to be prepared for the stormwater quality devices proposed for the development. This document will be prepared at the construction certificate stage in accordance with final DA conditions.



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3 HYDROLOGIC ANALYSIS

3.1 Overview

Hydraulic modelling for this strategy has been undertaken using DRAINS software with a RAFTS Hydrological model.

This methodology was adopted to match existing ILSAX detailed drainage design previously undertaken for previously constructed stages, but allow for conceptual modelling of the subject catchment. A more detailed ILSAX modelling of the proposed urban catchment will be undertaken at detailed design stage.

3.2 RAFTS Model

The hydrologic modelling in the previous *WorleyParsons* strategy utilised XP-RAFTS runoff routing design and analysis software. Generally the XP-Rafts parameters adopted by *WorleyParsons* (link lags and manning's 'n', Bx = 1) have been utilised for the modelling, however losses updated to ARR2019. The catchments, slopes and impervious percentages however have been revised to reflect the current site layout.

Rainfall inputs were entered using IFD relationships from BOM IFD for the subject site and temporal patterns from ARR2019). These rainfalls have increased since previous strategies.

3.3 ILSAX Model

Hydraulic modelling for the existing urban catchments has been previously undertaken using DRAINS software with an ILSAX Hydrological model. The DRAINS Parameters were modified to provide a realistic hydrological model for the subject site's future detailed modelling. The following parameters were adopted for the DRAINS ILSAX Model:

- Paved (Impervious) Depression Storage 1mm
- Supplementary Depression Storage 1mm
- Grassed (Pervious) Depression Storage 5mm
- Soil Type 3 (typically slow infiltration rates)
- Antecedent Moisture Condition 3 (indicates rather wet starting condition for storm event)

Rainfall inputs were entered using IFD relationships from BOM for Forster and temporal patterns from ARR2019. These rainfalls have increased since previous strategies.

3.4 Catchments

The pre-developed and post-developed hydrological catchments can be seen in Appendix D. The pre-developed (XP-RAFTS) catchments are per Appendix B, and a partial catchment draining west has been included in the areas. The post-developed catchments for the subject site are per Section 2.5 above and also Appendix C. The external catchments and catchments are per the *WorleyParsons* strategy and are assumed to drain to the outlet point in all scenarios.

3.5 Pre-Developed Scenario

The pre-developed model includes a detention basin mimicking the natural attenuation in the downstream low lying area. The stage vs storage relationships has been reduced slightly than previously undertaken by *WorleyParsons* due to The Southern Parkway link being constructed in

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this area. The stage vs discharge to The Lakes Estate open channel has adopted the *WorleyParsons* relationship. Future detailed modelling at Construction Certificate stage will confirm this relationship and any downstream tailwater effect.

This scenario is consistent with previous strategies.

The results are provided in Section 3.7 below.

3.6 Post-Developed Scenarios

Various post-development scenarios have been undertaken to demonstrate the objectives in Section 1.2 can be achieved.

Scenario E models the development of Stage 5 (16 Residential Lots) fully developed with no detention measures. This scenario demonstrates that upon development, no stage detention basin is required (due to it's proximity to the outlet, the peak is best leaving first prior to the larger upstream peak arriving).

Scenario F is similar to the previous *WorleyParsons* post-developed strategy, where the entire residential zoned area is fully developed, however the downstream low lying area is also developed as playing fields, and an end-of-line constriction provided on the outlet to The Lakes Estate. This model has only been provided to model the highest expected tailwater condition for the subject site. The stage vs discharge to The Lakes Estate open channel has adopted the *WorleyParsons* relationship for the constriction. Future detailed modelling at Construction Certificate stage will confirm this relationship and any downstream tailwater effect.

The existing natural surface of the low-lying wetland has been adopted for the pre-developed scenario, and post-developed scenario E (reduced storage with filling into the flood storage below RL 3.92). Scenario F has the playing fields/ Council area proposed filling added to the model (further reduced storage). All models are subject to final detailed design.

The proposed Stage 5 bioretention basins have conservatively not been included in the hydrologic modelling.

The results of all the scenarios are provided in Section 3.7 below.

3.7 Results and Commentary

The results of the pre-developed and post-developed models are shown in Table 9.

SCENARIO	20% AEP	20% AEP	1% AEP	1% AEP
	Peak Discharge	Peak Flood Level (in basin)	Peak Discharge	Peak Flood Level (in basin)
	(m ³ /s)	(RL mAHD)	(m ³ /s)	(RL mAHD)
Pre-Developed	2.53	3.77	6.62	3.92
Post-Developed SCENARIO E	2.39	3.76	6.14	3.90
Post-Developed SCENARIO F	1.38	3.92	3.87	4.22

Table 9 – Summary of Stormwater Quantity



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As can be seen, the post-developed peak flows are less than the pre-developed peak flows, which satisfies the objectives (Note the previous modelling was undertaken using ARR 2001 rainfalls and achieved better correlation with previous studies. The new ARR2019 parameters have increased peak flows (relative to pre and post-developed)).

Scenario E demonstrates that no specific detention is required for the subject Stage 5. This is due to the Stage 5 being at the downstream end of the catchment, and this peak flow discharging prior to the upper peak arriving.

Scenario F demonstrates that if the playing fields are constructed and an outlet constriction constructed, the peak flows can be substantially reduced. The model has adopted the *WorleyParsons* relationship of stage vs discharge for the proposed constriction to The Lakes Estate open channel. Whilst this scenario has been provided to model the highest expected local tailwater condition for the subject site, if this scenario does eventuate, the constriction could be reduced to reduce the tailwater level.

3.8 Climate Change

The subject site is mapped as a Flood Planning Area within the Great Lakes LEP 2014. The projected Flood Planning Level is the 2100 1% AEP flood level (projected sea level rise) with an additional 500mm freeboard.

Recent modelling of the downstream catchment by *BMT WBM Pty Ltd* (Dunns Creek Catchment Water Management Strategy, August 2015), indicates the 1% AEP flood level within the site is approximately RL 4.30. However this peak results from backwater effects from the overall Wallis Lake catchment and would be expected to occur after the local catchment peak has passed.

The strategy proposes that all proposed dwellings within the site have a minimum freeboard of 0.5m above the local 1% design flood level (without climate change forecasts). The highest level in the proposed Scenario F is RL 4.22 (very conservative given the over constriction), which would require minimum lot levels above this level, and minimum floor levels of RL 4.72.

The lowest minimum lot level within the entire proposed development is RL 5.2, and a minimum floor level of RL 4.8 is recommended, which satisfies any of the above criteria.

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4 SUMMARY

4.1.1 Water Quality

A combination of measures discussed above including rainwater tanks and water quality bioretention basins have been proposed to manage the discharge of nutrients and pollutants leaving the site. The modelling shows that the water quality objective of "neutral or beneficial effect on water quality" can be achieved for the proposed subdivision.

4.1.2 Minor Storm Event

The utilisation of detention in the detention/ bioretention basins in the adjoining development will attenuate captured stormwater runoff. The minor flow (Q_5) criteria is to attenuate post-development peak discharges to maintain existing flows for all storm events up to and including the 20% AEP peak rainfall event.

The modelling shows that the total post-developed peak discharges from the 5 year ARI peak storm event for the catchment are less than the pre-developed peak discharges.

4.1.3 Major Storm Event

The major flow criteria is to attenuate post-development peak discharges to maintain existing flows for all storm events up to and including the 1% AEP peak rainfall event.

The modelling shows that the total post-developed peak discharges from the 1% AEP peak storm event for the catchment are less than the pre-developed peak discharges.

Refer to the Water Sensitive Design Strategy Plan (Appendix D) for the locality, size and details of the proposed stormwater treatment measures.

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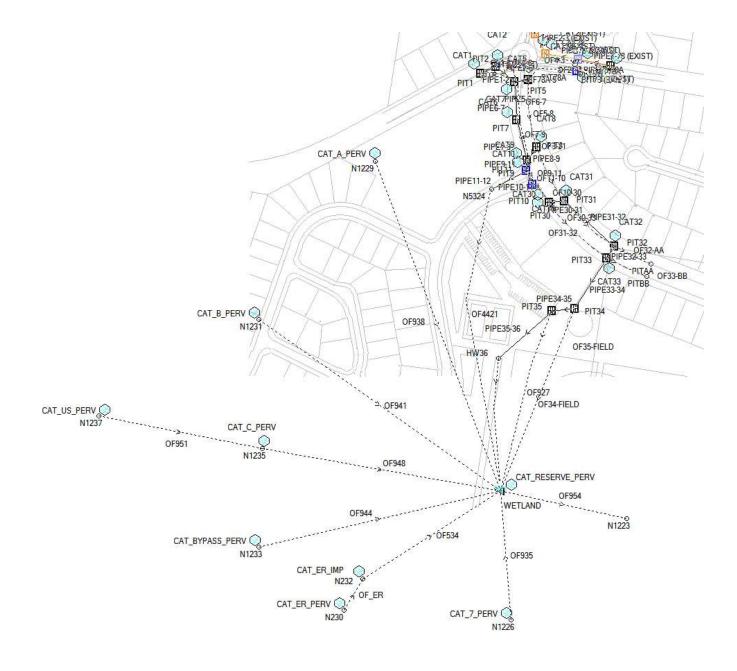


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B DRAINS (Pre-Developed Modelling) OUTPUT FILES

B.1 DRAINS Pre-Developed Model



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DETENTION BASIN DETAILS					ſ					Ĺ		0				
Name	Elev	Volume	Not Used	OutletType	×	Dia(mm)	Centre RL	Pit Family	Pit Type	×	y HED	Crest RL	Crest Length(m)	pi		
WETLAND	3.5	0		None						901,848	1392.2 No			433653218	18	
	3.55												2			
	3.6															
	3.65										22			24		
	3.7												0			
	3./5					Ī							2	2		
	2.0					I										
	3.9	20077														
	3.95															
	4															
	4.05															
	4.1															
	4.15															
	4.2															
	4.25															
	4.3															
	4.35												24			
	4.4															
	4.40					ſ					2					
SUB-CATCHMENT DETAILS					383								201	121	131	
Name	Pit or		Paved	Grass	Supp	Paved	Grass	Supp	Paved	Grass	Supp Paved	ed Grass	Supp	Paved	Grass	Supp
		Ar ea	Area	Area			Time	Time	Length			Slope(%) Slope	Slope	Rough	Rough	Rough
			56	36	0				(m)		96 (m)	36	56		· .	
	PIT1	0.195	1/2	4 46	0	0	0	0	5	160	0	0	1	0 0.012	12 0.21	0
	PIT2	0.017			0	5		0								
	PITG	0.051			0	0		0								
	PIT7	0.069		2 68	0	0		0	37	35		25	0	0 0.012	12 0.21	0
CAL	PILS .	0.02			0	0			40	~	0	1.4	2	0.0		Þ
	DITE	900.0	04			0 4										
CAT78A	PIT 78A	0.189		6 44	0	0		0	130	5	0	1.6	m	0 0.012	12 0.21	0
	PIT 78 (EXIST)	0.058			0	0		0	30			0.5	0			0
XIST)	PIT2(EXIST)	0.0001			0	5		0								
CX IST)	PIT3(EXIST)	0.029	70		0	5		0								
CAT8	PIT8	0.142			23	0		0	65	10	9	2	0	3 0.012	12 0.21	0.012
CAT10	PIT 10	0.033			0	0		0								
CAT30	PIT30	0.026			0	0		0	22		0	0.5	en 1	0 0.012		
CATSI	PII31	0.133	C C	30	3 2				90		Z I	0.5	n e	3 0.012	12.0 21	210.0
CATSS	pff33	10			0				8 6	a	0	0.5	0 m	0.012		
CAT1 (EXIST)	PIT 1(EXIST)	0.205			0	0		0	100	37		-		0 0.012		0
Name	Pit or	Total	Impervious	Avg	Mannings 1	Time lag	Rainfall	Hyd rological								
		Area	Area	Slope(%)	E	(mins)	Multiplier	Model								
	N230	10.31		0 4	0.025	0	1	Forster - PAFTS 29 0.92								
	N232	7.27	100	0 4	0.015	0		1 Forster - RAFTS 29 0.92					-			
	N1226	3.97		1 1	0.04	0	1	Forster - RAFTS 29 0.92								
	N1229	5.052		0 4	0.04	0		1 Forster - RAFTS 29 0.92			-	_	~	3		
	N1231	3.877		0 4	0.04	0	11	Forster - RAFTS 29 0.92								
CAT_BYPASS_PERV	N1233	0.41		1	0.04	0		1 Forster - RAFTS 29 0.92								
	N1235	2.91		3	0.04	0	-	Forster - RAFTS 29 0.92								
	N1237	0.59			0.04	0	1	Forster - RAFTS 29 0.92								
	WETLAND	7.655		0.3	0.04	0	44	Forster - RAFTS 29 0.92				_				

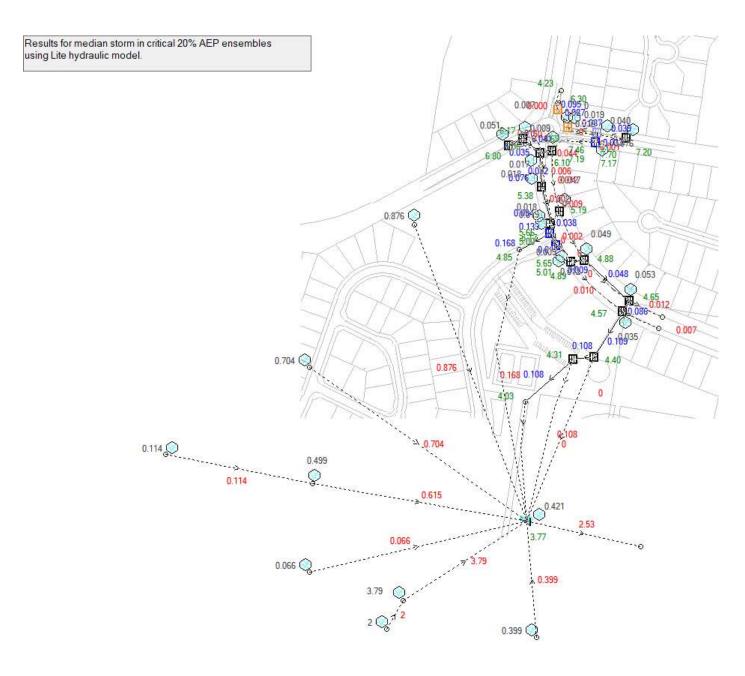




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B.2 DRAINS Pre-Developed Model (20% AEP Peak Flows)

DRAINS Worst Case Peak Flows (i.e. worst case storm event for each outlet).



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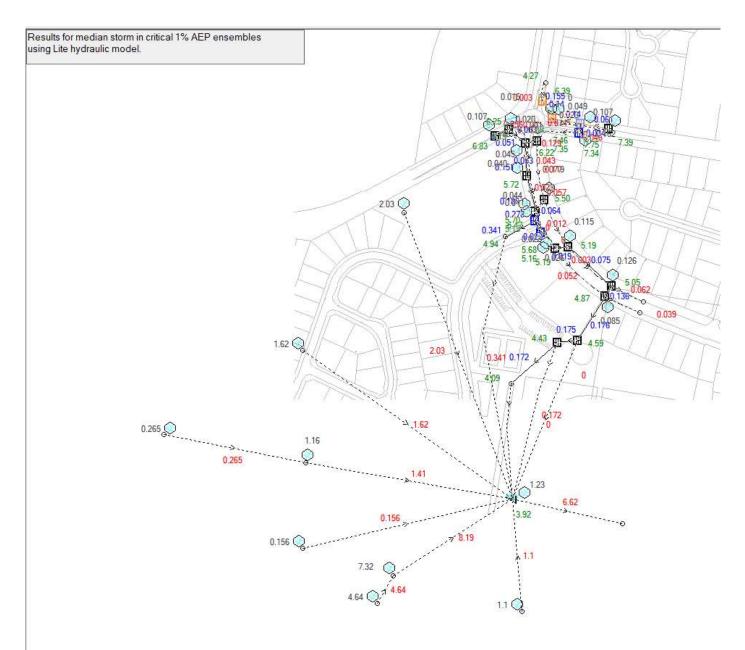
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B.3 DRAINS Pre-Developed Model (1% AEP Peak Flows)

DRAINS Worst Case Peak Flows (i.e. worst case storm event for each outlet). 50% Blockage factor (DRAINS new theory) applied to Q100 post-developed model.



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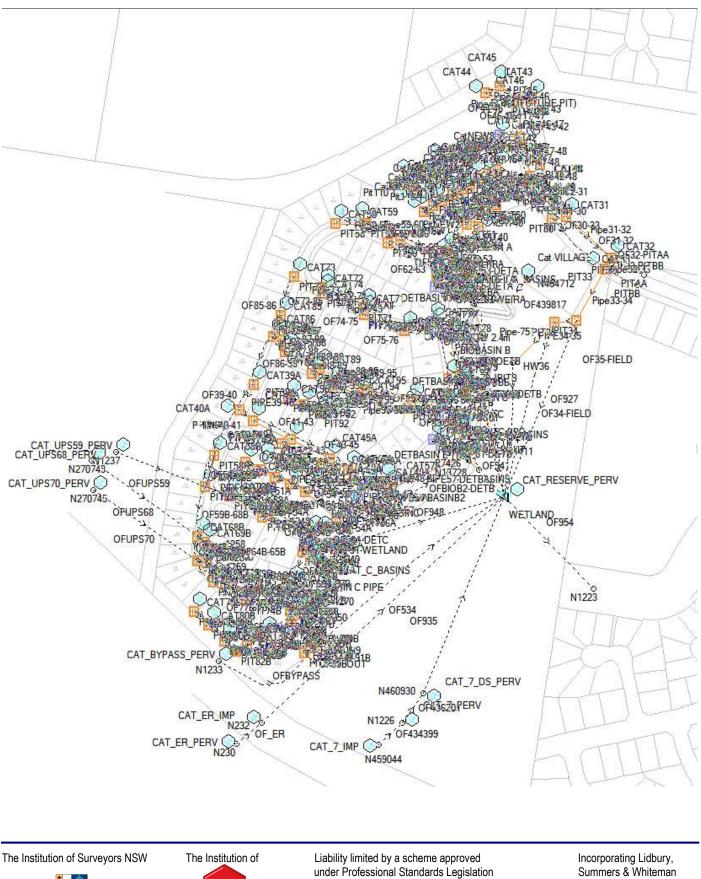


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- C DRAINS (Post-Developed Modelling) OUTPUT FILES
- C.1 DRAINS Post-Developed Model SCENARIO E





ENGINEERS AUSTRALIA

Date Desc Desc <thdesc< th=""> Desc Desc D</thdesc<>	DETENTION DACIN DETAIL O					1	-			1							-	
BOM BOM BOM BOM BOM	DETENTION BASIN DETAILS Name	Elev	Volume	Not Used	Outlet Type	К	Dia(mm)	Centre RL	Pit Family	Pit Type	х	y	HED	Crest RL	Crest Leng	id		
H H </td <td>BIOBASIN B</td> <td></td> <td>0</td> <td></td> <td>None</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>863.672</td> <td>1514.677</td> <td>No</td> <td></td> <td></td> <td>4.45E+08</td> <td></td> <td></td>	BIOBASIN B		0		None						863.672	1514.677	No			4.45E+08		
140 140 140 140 150 <td></td>																		
1000 130 130 140<		4.5	50.1															
1.3. 0.3. 0.4.					Nono						000 977	1202 775	No			4.245+09		
110 140 </td <td>ILIBRO .</td> <td></td> <td></td> <td></td> <td>Home</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>500.077</td> <td>1002.770</td> <td>110</td> <td></td> <td></td> <td>4.042.00</td> <td></td> <td></td>	ILIBRO .				Home						500.077	1002.770	110			4.042.00		
13 13 14 14 <															-			
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110 110 <td></td> <td>3.75</td> <td>8471</td> <td></td>		3.75	8471															
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44.0 44.0		4.25	50082															
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BOUMA Image Image <t< td=""><td></td><td>4.4</td><td>65378</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		4.4	65378															
BOM Image		4.45	70639															
	BIOBASIN A				None						853.109	1605.719	No			4.45E+08		
1 1 </td <td></td> <td>4.6</td> <td>15.6</td> <td></td> <td>6</td> <td></td> <td></td> <td></td> <td></td>		4.6	15.6											6				
1 1 </td <td></td> <td>4.7</td> <td>32.9</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td> </td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td>		4.7	32.9						-									-
44 10 10 <		4.9	70															
	BIOBASIN C				None						861.386	1467.431	No			4.5E+08		
Observa <		4.2	27.6															
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1 1 </td <td>DETBASIN B</td> <td></td> <td></td> <td></td> <td>Culvert</td> <td>0.5</td> <td></td> <td></td> <td></td> <td></td> <td>860.545</td> <td>1433.276</td> <td>No</td> <td></td> <td></td> <td>4.37E+08</td> <td></td> <td></td>	DETBASIN B				Culvert	0.5					860.545	1433.276	No			4.37E+08		
H H H H		3.61	20															
Box Form																		
Image Image <t< td=""><td>BIOBASINB2</td><td></td><td></td><td></td><td>None</td><td></td><td></td><td></td><td></td><td></td><td>789.724</td><td>1392.911</td><td>No</td><td></td><td></td><td>4.99E+08</td><td></td><td></td></t<>	BIOBASINB2				None						789.724	1392.911	No			4.99E+08		
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1 1 </td <td>BIOBASIN C2</td> <td>4.5</td> <td>93.5</td> <td></td> <td>None</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>704 427</td> <td>1278 833</td> <td>No</td> <td></td> <td></td> <td>5 22E+08</td> <td></td> <td></td>	BIOBASIN C2	4.5	93.5		None						704 427	1278 833	No			5 22E+08		
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1 1 </td <td>BIOBASIN C1</td> <td></td> <td></td> <td></td> <td>None</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>716.282</td> <td>1331.805</td> <td>No</td> <td></td> <td></td> <td>5.22E+08</td> <td></td> <td></td>	BIOBASIN C1				None						716.282	1331.805	No			5.22E+08		
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bit bit< bit< bit bit<	DETRASIN				Culuort	0.5					700.4	1212 012	No			4 295+09		
Image Image <	DEIBASING	3.85	53		Cuiven	0.5					122.4	1313.613	NO			4.300+00		
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DETENSIMA IM IM <td></td> <td>4.4</td> <td>1121</td> <td></td>		4.4	1121															
Image Image <		4.57	1277												-	10.5		
1 1 </td <td>DE IBASIN A</td> <td></td> <td></td> <td></td> <td>Culvert</td> <td>0.5</td> <td></td> <td></td> <td></td> <td></td> <td>867.572</td> <td>1589.674</td> <td>No</td> <td></td> <td></td> <td>4.34E+08</td> <td></td> <td>-</td>	DE IBASIN A				Culvert	0.5					867.572	1589.674	No			4.34E+08		-
Image Image <		4.2	326.2															
MAS MAS <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>											-							
index index <th< td=""><td></td><td>4.5</td><td>910.1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		4.5	910.1															
Image Image <t< td=""><td></td><td>4.6</td><td>1130.9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td></t<>		4.6	1130.9															1
Image Image <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0 5</td><td></td><td></td><td><i>c</i></td><td></td><td></td><td></td><td></td></th<>											0 5			<i>c</i>				
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net lend lend <thl>lend lend lend <t< td=""><td></td><td>Pitor</td><td>Total</td><td>Payed</td><td>Grass</td><td>Supp</td><td>Paved</td><td>Grass</td><td>Supp</td><td>Paved</td><td>Grass</td><td>Supp</td><td>Payed</td><td>Grass</td><td>Supp</td><td>Payed</td><td>Grass</td><td>Supp</td></t<></thl>		Pitor	Total	Payed	Grass	Supp	Paved	Grass	Supp	Paved	Grass	Supp	Payed	Grass	Supp	Payed	Grass	Supp
Image			Area				Time	Time	Time	Length	Length	Length			Slope			Rough
CAT7 P177 NO 0.03 S7 43 0 5 5 6 0 0 0 0 0 0 CAT8 P179 0.054 83 17 0 5 5 6 0	04770	DITTO		%		%												
CAT78 0019 84 16 0 5 6 0	CAT77			57			5	5										<u> </u>
CAT44 PIT44 (FU) 0.185 S4 48 0 5 0	CAT78	PIT78	0.019	84	16	0	5	5	6									<u> </u>
CA14s D14s 0.017 1.00 0																<u> </u>		<u> </u>
CA146 PIT46 0.051 70 30 0 5 0 <td>CAT45</td> <td>PIT45</td> <td>0.017</td> <td>100</td> <td>0</td> <td>0</td> <td>5</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	CAT45	PIT45	0.017	100	0	0	5	0	0									
CA14a 0 0 5 0 <td>CAT46</td> <td>PIT46</td> <td>0.051</td> <td>70</td> <td>30</td> <td>0</td> <td>5</td> <td>5</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>+</td>	CAT46	PIT46	0.051	70	30	0	5	5	0									+
CA149 PIT49 0.048 66 34 0 5 0																		+
CATS1 PTS1 0.125 62 38 0 5 0 <td>CAT49</td> <td>PIT49</td> <td>0.048</td> <td>66</td> <td>34</td> <td>0</td> <td>5</td> <td>5</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	CAT49	PIT49	0.048	66	34	0	5	5	0									
CATS2 PTTS2 0.154 66 34 0 5 0 <td>CAT50 CAT51</td> <td>PIT50 PIT51</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>· · · · · ·</td> <td></td> <td></td> <td></td> <td>+</td>	CAT50 CAT51	PIT50 PIT51							0					· · · · · ·				+
CATS3 PT53 0.037 84 16 0 5 0 <td>CAT52</td> <td>PIT52</td> <td></td> <td>66</td> <td>34</td> <td></td>	CAT52	PIT52		66	34													
CAT41 PIT41 0.031 68 32 0 5 0 <td>CAT53</td> <td>PIT53</td> <td>0.037</td> <td>84</td> <td>16</td> <td>0</td> <td>5</td> <td>5</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td>	CAT53	PIT53	0.037	84	16	0	5	5	0									1
CATA0 PT40 0.049 85 15 0 5 0 <td>CA142 CAT41</td> <td></td> <td>0.097</td> <td>46</td> <td>54</td> <td>0</td> <td>5</td> <td>5</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td>	CA142 CAT41		0.097	46	54	0	5	5	0							-		
CATS8 PT58 0.164 60 40 0 5 5 0 <td>CAT40</td> <td>PIT40</td> <td>0.049</td> <td>85</td> <td>15</td> <td>0</td> <td>5</td> <td>5</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	CAT40	PIT40	0.049	85	15	0	5	5	0									
CATEO PTEO 0.021 54 46 0 5 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>5</td> <td></td> <td><u> </u></td>							5											<u> </u>
CAT61 PIT61 0.177 66 34 0 5 0 <td>CAT60</td> <td>PIT60</td> <td>0.021</td> <td>54</td> <td>46</td> <td>0</td> <td>5</td> <td>5</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td>	CAT60	PIT60	0.021	54	46	0	5	5	0					1				
	CAT61	PIT61	0.177	66	34	0	5	5	i 0									F
CAT63 PIT63 0.001 50 50 0 5 5 0 0 5 5 0		PIT62 PIT63	0.159									-						<u> </u>





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CAT64	PIT64	0.126		42													
CAT65	PIT65	0.05		16	0												
CAT56 CAT73	PIT56 PIT73	0.213		32								-		2 2			24
CAT74	PIT74	0.012		54													
CAT75	PIT75	0.131		44	0	5											
CAT76	PIT76	0.18		43													
CAT72	PIT72	0.118		33													
CAT71 CAT69	PIT71 PIT69	0.141		36													
CAT90	PIT90	0.08		40													
CAT91	PIT91	0.05	60	40	0												
CAT92	PIT92	0.05		40													
CAT93 CAT94	PIT93 PIT94	0.019		51 43													
CAT95	PIT94 PIT95	0.071		43													
CAT96	PIT96	0.179		42								· · · · ·					
CAT97	PIT97	0.139		42													
CAT98	PIT98	0.108		41													
CAT85 CAT86	PIT85 PIT86	0.122		42													
CAT85	PIT80 PIT87	0.126		42													
CAT88	PIT88	0.015		30													
CAT89	PIT89	0.155		42													
CAT84	PIT84	0.039		43						-							
CAT83 CAT100	PIT83 PIT100	0.227		42													
CATION	PIT100	0.103															
CAT_B_BASINS	DETBASIN	0.362												0 0			(s
CAT43	PIT43	0.051		30			Ę	5 O									
CAT30	PIT30	0.026		46													
CAT31 CAT32	PIT31 PIT32	0.133		36													
CAT32 CAT33	PIT32 PIT33	0.148		47										-			
Cat113	Pit113	0.042		56													
Cat112	Pit112	0.083	64	36	0	5	5	i 0									
Cat114	Pit114	0.122		35													
Cat116 Cat117	Pit116 Pit117	0.121	65	35	0												
Cat117 Cat115	Pit117 Pit115	0.164		59													
Cat110	Pit110	0.165		38													
CAT39A	PIT39A	0.151	58	42	0		5	i 0									
CAT40A	PIT40A	0.185		42													
CAT41A CAT43A	PIT41A PIT43A	0.058		43					67	4	0	1.3	3	0	0.012	0.021	0
CAT45A	PIT45A PIT45A	0.103		42													
CAT45AA	PIT45AA	0.137		41													
CAT47A	PIT47A	0.102		40			5	i 0		1				2 X			
CAT48A	PIT48A	0.065		41													
CAT57A	PIT57A	0.015		46					20	4	0	0.5	3	0	0.012	0.21	0
CAT49A CAT50A	PIT49A PIT50A	0.06		40													
CAT51A	PIT50A PIT51A	0.05		40										2 Z			18. I I I I I I I I I I I I I I I I I I I
CAT52A	PIT52A	0.05		40													
CAT53A	PIT53A	0.05		40													
CAT54A	PIT54A	0.091		42										6 - N			
CAT55A	PIT55A	0.087		42													
CAT56A CAT42A	PIT56A PIT42A	0.08		44					41	4	0	1	3	0	0.012	0.21	0
CAT44A	PIT44A	0.036		40					45	4	0	0.6	3	0	0.012	0.21	0
CAT46A	PIT46A	0.115		41									-				
CAT79B	PIT79B	0.043		40													
CAT80B	PIT80B	0.053		40													
CAT81B CAT83B	PIT81B PIT83B	0.062		40										2			
CAT84B	PIT83B PIT84B	0.024	60	40													
CAT85B	PIT85B	0.01	63	37					13.5	4	0	0.72	3	0	0.012	0.21	0
CAT87B	PIT87B	0.044		42					58.2	4	0	0.54	3	0	0.012	0.21	0
CAT68B	PIT68B	0.198		42													
CAT69B	PIT69B PIT71B	0.036		62 48					37.45	4	0	0.78	3	0	0.012	0.21	0
CAT71B CAT73B	PIT73B	0.017		40					20.7	4	0	0.42	3	0	0.012	0.21	0
CAT75B	PIT75B	0.073		44													
CAT77B	PIT77B	0.148		42		5											
CAT78B	PIT78B	0.152		41								1					
CAT70B CAT72B	PIT70B PIT72B	0.137		42													
CAT/2B CAT74B	PIT72B PIT74B	0.151		44					40	4	0	2.09	3	0	0.012	0.21	0
CAT76B	PIT76B	0.04		70	0							1.00				5.21	
CAT89B	PIT89B	0.229	62	38	0		E	5 O									
CAT90B	PIT90B	0.034		52					33.1	4	0	0.51	3	0	0.012	0.21	0
CAT58B CAT59B	PIT58B PIT59B	0.152		42													
CAT60B	PIT60B	0.203		42					83	4	0	1	3	0	0.012	0.21	0
CAT62B	PIT62B	0.188	61	39	0	5	E	0									
CAT63B	PIT63B	0.141	57	43	0	5	E	0									
CAT64B	PIT64B	0.202		36					10.00						0.04-		
CAT65B CAT66B	PIT65B PIT66B	0.009		65 49					13.26 8.18	4		1.14	3	0	0.012	0.21	0
CAT61B	PIT61B	0.005		49					3.10	4	0	2.00	3	0	0.012	0.21	0
CatNEW7	PitNEW7	0.054	70	30	0	5	Ę	5 0									
CatNEW8	PitNEW8	0.031		30													
CatNEW9	PitNEW9 PitNEW1	0.031		30													
CatNEW1 CatNEW2	DP/ITNEW1	0.037		30						-							
CatNEW2 CatNEW3				30													
CatNEW4	PitNEW2	0.031		30													
Oddreff			70	30 30		5	Ę							5			
CatNEW5	PitNEW2 PitNEW3 PitNEW4 PitNEW5	0.031 0.031 0.031 0.031	70 70 70	30 30	0	5	Ę	i 0									
CatNEW5 CatNEW6	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6	0.031 0.031 0.031 0.031 0.031	70 70 70 70	30 30 30	000000000000000000000000000000000000000	5	Ę	5 0 5 0									
CatNEW5 CatNEW6 Cat VILLAGE	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712	0.031 0.031 0.031 0.031 0.031 0.031	70 70 70 70 50	30 30 30 50	000000000000000000000000000000000000000	5	5	5 0 5 0									
CatNEW5 CatNEW6 Cat VILLAGE CAT_C_BASINS	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712 DETBASIN	0.031 0.031 0.031 0.031 0.031 0.031 0.6	70 70 70 70 50 0	30 30 30 50 100	000000000000000000000000000000000000000	5 5 5		0 0 0 5 5 5 5 5									
CatNEW5 CatNEW6 Cat VILLAGE	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712	0.031 0.031 0.031 0.031 0.031 0.031 0.6	70 70 70 70 50 0	30 30 30 50	000000000000000000000000000000000000000	5 5 5		0 0 0 5 5 5 5 5									
CatNEW5 CatNEW6 Cat VILLAGE CAT_C_BASINS	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712 DETBASIN	0.031 0.031 0.031 0.031 0.031 0.031 0.6	70 70 70 70 50 0	30 30 30 50 100 100	000000000000000000000000000000000000000	5 5 5 5		5 0 5 5 5 5 5 5 5 5	al								
CanNews CanNews CanNews CanNews CanVLLAGE CAT_C_BASINS CAT_A_BASINS Name	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712 DETBASIN DETBASIN Pit or Node	0.031 0.031 0.031 0.031 0.031 0.6 0.317 0.439 Total Area	70 70 70 50 0 0 1mpervious Area	30 30 50 100 100 Xvg Slope(%)	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 5 5 7 7 1 me lag (mins)	Rainfall Multiplier	5 0 5 0 5 5 5 5 5 5 5 5 7 8 4 9 4 9 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7									
CaNEWS CANEWS CANULAGE CAT ULAGE CAT & BASINS CAT & BASINS Name CAT_ER_PERV	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712 DETBASIN DETBASIN Pit or Node N230	0.031 0.031 0.031 0.031 0.031 0.031 0.439 Total Area 10.31	70 70 70 50 0 10 10 8 70 70 70 70 70 70 70 70 70 70 70 70 70	30 30 50 100 100 80pe(%) 4	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 5 5 7 Time lag (mins) 0	Rainfall Multiplier	5 0 6 0 6 5 6 5 6 5 6 5 6 5 1 Hydrologic: Model Forster - RA	FTS 29 0.92								
CanNEWS CaNLEWS CanVEUAGE CAT/CLASINS CAT_CLASINS Name CAT_ER/PERV CAT_ER/PERV CAT_ER/IMP	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712 DETBASIN DETBASIN Pit or Node N230 N232	0.031 0.031 0.031 0.031 0.031 0.04 0.317 0.439 Total Area 10.31 7.27	70 70 70 50 0 10 10 70 70 70 70 70 70 70 70 70 70 70 70 70	30 30 50 100 100 100 80pe(%) 4 4	00000000000000000000000000000000000000	5 5 5 5 7 Time lag (mins) 0 0	Rainfall Multiplier	5 0 5 5 5 5 6 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	FTS 29 0.92	2							
CaNEWS CANEWS CANEWS CANUAGE CAVULAGE CAT_C ASINS CAT_C ASINS CAT_C ASINS CAT_R PERV CAT_ER_IMP CAT_ER_IMP CAT_Z PERV	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712 DETBASIN DETBASIN Pit or Node N230 N232 N1226	0.031 0.031 0.031 0.66 0.317 0.439 Total Area 10.31 7.27 1.008	70 70 70 50 0 0 10 100 100 0 0 0 0 0 0 0 0 0 0	30 30 50 100 100 100 8lope(%) 4 4 4 1	00000000000000000000000000000000000000	55555555555555555555555555555555555555	Rainfall Multiplier	5 0 5 5 5 5 6 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	AFTS 29 0.92 AFTS 29 0.92 AFTS 29 0.92	2							
CanNEWS CaNLEWS CanVEUAGE CAT/CLASINS CAT_CLASINS Name CAT_ER/PERV CAT_ER/PERV CAT_ER/IMP	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712 DETBASIN DETBASIN Pit or Node N230 N232	0.031 0.031 0.031 0.031 0.031 0.04 0.317 0.439 Total Area 10.31 7.27	70 70 70 50 0 0 1mpervious Area 0 100 0 0 0 0 0	30 30 50 100 100 100 8lope(%) 4 4 4 1	00000000000000000000000000000000000000	55555555555555555555555555555555555555	Rainfall Multiplier	5 0 5 5 5 5 6 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	FTS 29 0.92 FTS 29 0.92 FTS 29 0.92 FTS 29 0.92	2							
CanteWs CanteWs CanteWs CanteWs CanteRate CanteRate CanteRate CanteRate CanteRateRate CanteRateRate CanteRateRate CanteRateRate CanteRateRate CanteRateRate CanteRateRate CanteRateRate CanteRateRateRate CanteRateRateRate CanteRateRateRate CanteRateRateRate CanteRateRateRate CanteRateRateRate CanteRateRateRateRate CanteRateRateRateRate CanteRateRateRateRate CanteRateRateRateRate CanteRateRateRateRateRate CanteRateRateRateRateRateRateRate CanteRateRateRateRateRateRateRateRateRateRa	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW6 N464712 DETBASIN DETBASIN DETBASIN Pit or Node N230 N232 N1233 N1233 WETLAND	0.031 0.031 0.031 0.031 0.031 0.031 0.031 0.031 7.0438 Area 10.31 7.22 1.008 0.13 0.13 0.13	70 70 70 50 0 0 100 100 0 0 0 0 0 0 0 0 0 0 0 0	30 30 30 50 100 100 100 80pe(%) 4 4 4 4 1 1 3 3 0.3	00000000000000000000000000000000000000	55555555555555555555555555555555555555	Rainfall Multiplier 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5 0 5 5 5 5 6 5 6 5 6 5 6 5 6 7 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7	FTS 29 0.92 FTS 29 0.92 FTS 29 0.92 FTS 29 0.92 FTS 29 0.92 FTS 29 0.92	2 2 2 2 2							
CanNEWS CaNNEWS CaNLEAGE CarVILLAGE CAT_C ASINS CAT_A BASINS Name CAT_ER_PERV CAT_RMP CAT_PERV CAT_PERV CAT_UPS89_PERV CAT_UPS80_PERV CAT_UPS89_PERV CAT_UPS89_PERV CAT_UPS	PitNEW2 PitNEW3 PitNEW5 PitNEW5 PitNEW6 N464712 DETBASIN DETBASIN DETBASIN Pit or Node N230 N232 N1226 N1233 N1237 N1237 N1237 N1237	0.031 0.031 0.031 0.031 0.031 0.031 0.031 0.031 0.031 7.041 Area 10.31 7.22 1.008 0.13 0.1 0.1 7.744 0.27	70 70 70 50 0 0 0 0 1 100 0 0 0 0 0 0 0 0 0 0 0	30 30 30 50 100 100 100 8 0 8 0 9 4 4 4 4 1 1 3 3 0.3 3 3 3 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	55555555555555555555555555555555555555	E E E E E E E E E E E E E E E E E E E	0 0 5 0 5 5 5 5 6 5 7 5 7 5 8 7 9 7	FTS 29 0.92 FTS 29 0.92 FTS 29 0.92 FTS 29 0.92 FTS 29 0.92 FTS 29 0.92 FTS 29 0.92	2 2 2 2 2 2 2							
Cantews Cantews Cantews Cantews Cantews Canter Cant	PitNEW2 PitNEW3 PitNEW4 PitNEW5 PitNEW5 PitNEW5 DETBASIN DETBASIN DETBASIN Pit or Node N232 N1226 N1233 N1237 WETLAND N270745	0.031 0.031 0.031 0.031 0.031 0.031 0.439 Total Area 10.31 7.27 1.000 0.13 0.13 0.13 0.13 0.13 0.13 0.22 0.23	70 70 70 50 0 0 100 100 0 0 0 0 0 0 0 0 0 0 0 0	30 30 30 50 1000 100 8lope(%) 4 4 1 1 1 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	55555555555555555555555555555555555555	E E E E E E E E E E E E E E E E E E E	6 0 6 0 6 5 5 5 6 5 6 5 6 5 6 5 6 5 6 5 7 Forster - RA Forster - RA Forster - RA	FTS 29 0.92 FTS 29 0.92	2 2 2 2 2 2 2 2 2 2							
CanNEWS CaNNEWS CaNLEAGE CarVILLAGE CAT_C ASINS CAT_A BASINS Name CAT_ER_PERV CAT_RMP CAT_PERV CAT_PERV CAT_UPS89_PERV CAT_UPS80_PERV CAT_UPS89_PERV CAT_UPS89_PERV CAT_UPS	PitNEW2 PitNEW3 PitNEW5 PitNEW5 PitNEW6 N464712 DETBASIN DETBASIN DETBASIN Pit or Node N230 N232 N1226 N1233 N1237 N1237 N1237 N1237	0.031 0.031 0.031 0.031 0.031 0.031 0.031 0.031 0.031 7.041 Area 10.31 7.22 1.008 0.13 0.1 0.1 7.744 0.27	70 70 70 50 0 100 100 0 0 0 0 0 0 0 0 0 0 0 0 0	30 30 30 50 100 100 100 8 0 8 0 9 4 4 4 4 1 1 3 3 0.3 3 3 3 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	55555555555555555555555555555555555555	E E E E E E E E E E E E E E E E E E E	0 0 5 0 5 5 5 5 6 5 7 5 7 5 8 7 9 7	FTS 29 0.92 FTS 29 0.92	2 2 2 2 2 2 2 2 2 2 2							

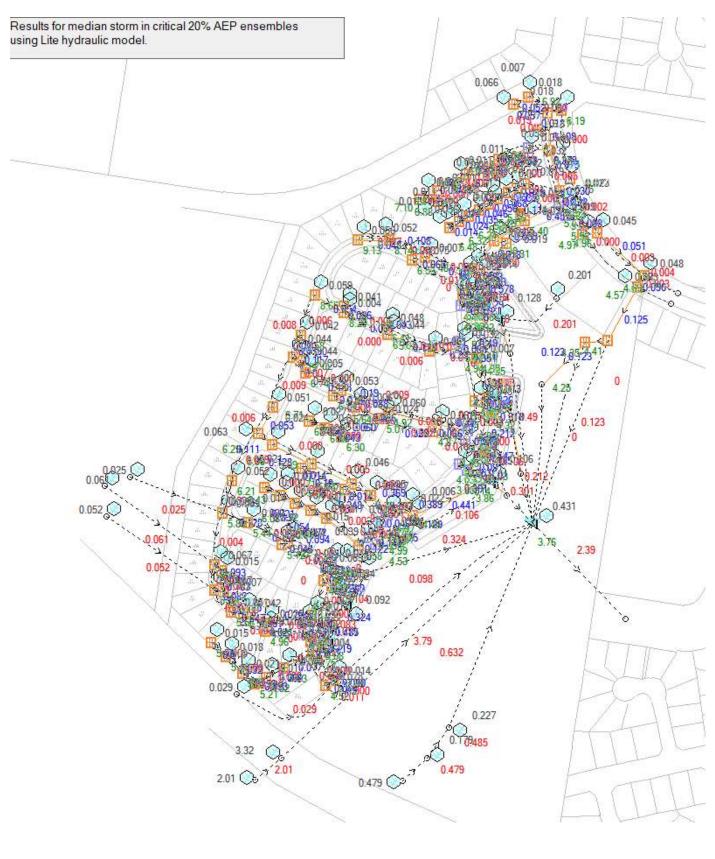




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C.2 DRAINS Post-Developed Model SCENARIO E (20% AEP Peak Flows)

DRAINS Worst Case Peak Flows (i.e. worst case storm event for each outlet).



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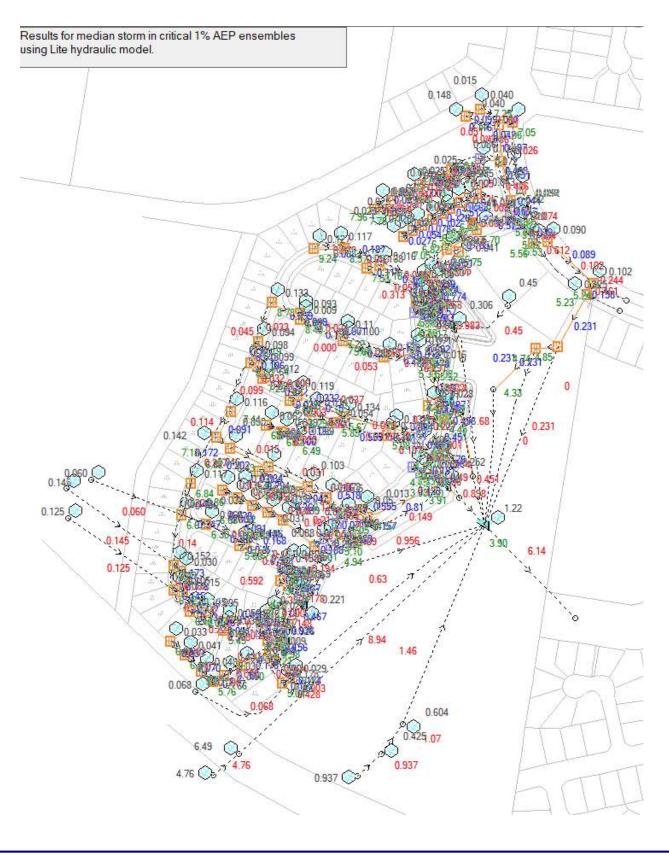
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C.3 DRAINS Post-Developed Model SCENARIO E (1% AEP Peak Flows)

DRAINS Worst Case Peak Flows (i.e. worst case storm event for each outlet). 50% Blockage factor (DRAINS new theory) applied to 1% post-developed model.



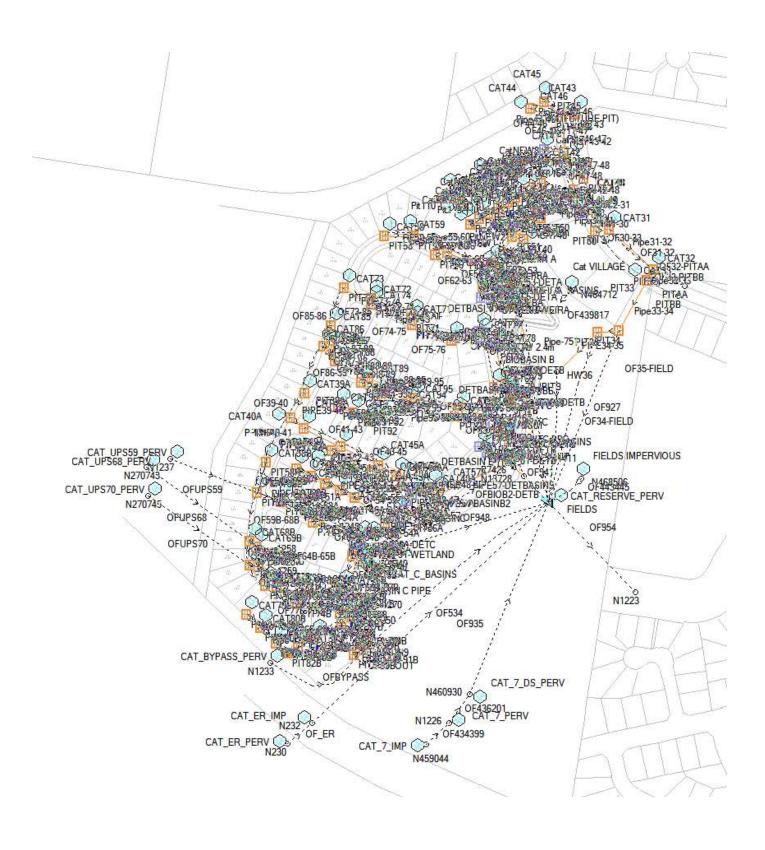
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C.4 DRAINS Post-Developed Model SCENARIO F



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DETENTION BASIN DETAILS Name BIOBASIN B																	
BIOBASIN B	Elev	Volume	Not Used	Outlet Type	ĸ	Dia(mm)	Centre RL	Pit Family	PitType	x	y 1514.677	HED	Crest RL	Crest Length(m)	id		
	4.1	3 15.		None						863.672	1514.677	No			444669020		
	4.4	31.	8														
	4.1	5 50.	1														
FIELDS	3.5	5 63	5	None						900.877	1392.775	No			433653218		
	3.6	5 63 5 147	9														
	3.61	5 261 7 400	8		-	-											
	3.7	5 564	2														
	3.8	5 966	5														
	3.5	1196	2														
	3.9	1701	9														
	4.0	5 1979 1 2271	6														
	4.1	5 2578	6														
	4.2	2 2901 5 3241	8														
	4.3	3 3596	7														
	4.3	5 3966 4 4349	7														
	4.4	5 4746	7														
BIOBASIN A	4.1	5	0	None						853.109	1605.719	No			444668856		
	4.6	3 15. 7 32.	6														
	4.1	51.	5														
BIOBASIN C	43	9 7	0	None						861,386	1467.431	No			450321257		
	4.:	13.	9														
	43	2 27.	7														
DETBASIN B	4,4	1 4	3	Culvert	0.5					000 545	1433.276	Ne			437390392		
DEIDASIN B	3.6	1 2	0	Culven	0.5					000.545	1433.270	NU			437330332		
	4.	131	5														
BIOBASINB2	3.9	5	0	None						789.724	1392.911	No			499485365		
	4.:	l 19.	3						-]					
	4.3	3 52.	1														
	4.	5 93.	5														
BIOBASIN C2	4.2	2	0	None		-				704.427	1278.833	No			522353267		
	4.3	8.	4														
	4.4	18.	1	-	<u> </u>												<u> </u>
	4.5	5 3	5														
BIOBASIN C1	4.2	51	4	None						716.282	1331.805	No			522353262		
	4.3	8.	4														
	4.4	1 18. 5 2	9		-												
DETRAPING	4.5	5 2	5	Cubur 1						635 of -	4844.00	Ne			4100000		
DETBASINB	4.:	57.	2	Culvert	0.5					875.969	1506.26	ne0			449635845		
	43	2 121.	5	-													
	4.4	271.	3														
	4.1	5 356	4														
	4.6	543.	3														
DETBASIN C	4.8	3 55	0	Culvert	0.5				_	722.4	1313.813	No			437550961		
	3.0	3 5 5 9 11	3														
	3.5	1 23	9														
	4.:	1 38	3														
	43	3 72	0														
	4,4	91	2														
	4.5	5 112	1														
	4.5	127	7														
DETBASIN A		1	0	Culvert	0.5					867.572	1589.674	No			434358683		
DETBASIN A	4.:	t L 157.	4	Culvert	0.5					867.572	1589.674	No			434358683		
DETBASIN A	4.1 4.2 4.3 4.3	4 1 157. 2 326. 3 507.	0 4 2 8	Gulvert	0.5					867.572	1589.674	No			434358683		
DETBASIN A	4.3 4.3 4.3 4.3 4.3 4.4	4 1 157. 2 326. 3 507. 4 702.	0 4 2 8 4 4	Culvert	0.6					867.572	1589.674	No			434358683		
DETBASIN A	4.) 4.) 4.) 4.) 4.) 4.) 4.) 4.)	4 1 157. 2 326. 3 507. 4 702. 5 910. 3 1130.	0 4 2 8 4 1 9	Culvert	0.5					867.572	1589.674	No			434358683		
DETBASIN A	4.3 4.3 4.3 4.3 4.3 4.4	4 1 157. 2 326. 3 507. 4 702. 5 910. 3 1130. 7 136	0 4 2 8 4 4 1 9 5	Culvert	0.5					867.572	1589.674	No			434358683		
SUB-CATCHMENT DETAILS	4.: 4.: 4.: 4.: 4.: 4.: 4.: 4.: 4.: 4.:	4 1 157. 2 326. 3 507. 4 702. 5 910. 3 1130. 7 136 3 137	0 4 2 8 4 1 9 9 5 0														
SUB-CATCHMENT DETAILS Name	4.: 4.: 4.: 4.: 4.: 4.: 4.: 4.: 4.: 4.:	4 1 157. 2 326. 3 507. 4 702. 5 910. 3 1130. 7 136 3 137	0 4 2 8 4 1 9 5 5 0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9				Grass Tere	Supp	Paved				Grass	Supp Slope			Supp
SUB-CATCHMENT DETAILS	4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7.	4 157. 2326. 3507. 4702. 5910. 3130. 7136. 137. 705. 4137. 705. 4702. 5910. 3130. 7136. 7137. 7136. 7137. 7136. 7136. 7136. 7136. 7136. 7136. 7136. 7137. 7136. 7146. 714	0 4 2 8 4 1 1 9 8 8 9 8 9 9 8 9 9 8 9 9 8 9 9 9 9	Grass Area %	Supp Area %		Grass Time (ms)	Time (min)	[(m)	Grass			Grass Stope %	Supp Slope %		Grass	Supp Rough
SUB-CATCHHONT DETAILS Name CAT70 CAT70	, , , , , , , , , , , , , , , , , , ,	4 1157. 2 326. 3 507. 4 702. 5 910. 3 1130. 7 136. 3 137. Total Area (ha) 0.21 0.09	0 4 2 2 4 4 1 5 0 0 9 8 0 0 0 0 0 0 0 0 0 8 8 8 8 8 8 8	Grass Area %	Supp Area %	Paved Time (min) 5	Time	Time (min) 6	(m)	Grass	Supp Length		Grass Slope %	Supp Slope %			Supp Rough
SUB-CATOHMENT DETAILS Name CAT70 CAT77 CAT77		4 1 157. 2 326. 3 507. 4 702. 5 910. 3 1130. 7 136. 3 137. Total Area (ha) 0.21 0.09 0.01	0 4 2 2 4 4 5 5 6 6 7 8 8 8 8 8 8 6 2 9 8 8 6 2 9 8 8 4 4	Grass Area %	Supp Area %	Paved Time (min) 5 5 5	Time (min) 5 5 5	Time (min) 6 6 6	(m)	Grass	Supp Length		Grass Slope %	Supp Slope %			Supp Rough
SUB-CATOHRAN DETALS Name CAT70 CAT70 CAT70 CAT70 CAT70 CAT70 CAT41 CAT41 CAT41		4 1 157, 2 326, 3 607, 4 702, 5 910, 1 130, 7 136 3 137 Total Area (ha) 0.21 0.00 0.01 0.03 0.19	0 4 2 2 4 4 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Grass Area 16 38 43 16 17 46	Supp Area %	Paved Time (min) 5 5 8 8	Time (min) 5	Time (min) 6 6 6 6 6 6 6 0 0	(m)	Grass	Supp Length		Grass Slope %	Supp Slope %			Supp Rough
538-CATCHMENT DETAILS Norme CAT70 CAT77 CAT77 CAT74 CAT74 CAT44 CAT70 CA		4 1 157, 2 326, 3 507, 4 702, 5 910, 7 136, 3 137, 7 0, 8 137, 7 0, 9 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 4 4 2 3 4 4 4 5 9 9 9 9 9 9 9 9 9 9 9 9 9	Grass Area % 43 16 17 46 0 0	Supp Area % 3 0 3 0 5 0 5 0 7 0 5 0 0 0 0 0 0 0	Paved Time (min) 5 5 5 5 5 5 5 5 5 5 5 5 5	Time (min) 5 5 5 5 5 5 5 6 0 0 0	Time (min) 6 6 6 6 0 0 0 0 0	(m) 	Grass	Supp Length		Grass Slope %	Supp Slope %			Supp Rough
SUB-CATOHIGHT DETAILS Name CAT70 CAT70 CAT70 CAT70 CAT70 CAT70 CAT74 CAT44 CAT44 CAT44 CAT44 CAT44 CAT47 CAT	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	t 157, 2326, 3507, 2326, 302, 303,	0 4 2 2 4 4 5 6 6 7 8 8 8 8 8 8 8 8 8 8 8 8 8	Grass Area % 43 16 17 46 0 0	Supp Area % 3 0 3 0 5 0 5 0 7 0 5 0 0 0 0 0 0 0	Paved Time (min) 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Time (min) 5 5 5 6 8	Time (min) 6 6 6 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(m) 	Grass	Supp Length		Grass Slope %	Supp Slope %			Supp Rough
SUB-CATCHHUNT DETAILS Name CAT70 CAT	4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4	4 157.7 2 326.5 5 607.7 4 7702.2 5 910.0 7 136.0 7	0 4 2 2 4 4 5 6 6 7 8 8 8 8 8 8 8 8 8 8 8 8 8	Grass Area % 43 16 17 46 0 0	Supp Area % 3 0 3 0 5 0 5 0 7 0 5 0 0 0 0 0 0 0	Paved Time (min) 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Time (min) 5 5 5 5 5 6 6 7 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Time (min) 66 66 66 00 00 00 00 00 00 00 00 00 00		Grass	Supp Length		Grass Slope %	Supp Slope %			Supp Rough
SUB-CATOHERN DETAILS Name CAT70 CAT70 CAT70 CAT70 CAT70 CAT74 CAT7		4 107.7 2 326.3 5 970.2 5 970.2 5 970.0 5 910.0 5 9	0 4 2 3 4 5 6 6 7 7 8 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9	Grass Area % 43 16 17 46 0 0	Supp Area % 3 0 3 0 5 0 5 0 7 0 5 0 0 0 0 0 0 0	Paved Time (min) 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Time (min) 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	Time (min) 6 6 6 6 6 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(m) 	Grass	Supp Length		Orass Stope %	Supp Stope %			Supp Rough
SUB-CATOHHON DETALS Name CATO CATO CATO CATO CATO CATO CATO CATO		4 107.7 2 328.0 5 970.2 5 970.2 5 970.0 5 910.0 5 9	0 4 4 4 4 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Grass Area % 43 16 17 46 0 0	Supp Area % 3 0 3 0 5 0 5 0 7 0 5 0 0 0 0 0 0 0	Pared Time Time (min) 9 9 9 9 9 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Time (mm) (mm) (mm) (mm) (mm) (mm) (mm) (m	Time (min) 6 6 6 6 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(m)	Grass	Supp Length		Grass Slope %	Supp Stope %			Supp Rough
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SUB-CATOHHON DETALS Name CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9		1 107.7 1 107.7 2 366. 907.0 900.0 5 901.0 5 1130.0 7 1368.0 10 137.0 7 1369.0 0.01 0.01 0.02 0.01 0.03 0.01 0.05 0.03 0.04 0.05 0.05 0.03 0.03 0.03 0.04 0.04 0.05 0.03 0.04 0.04 0.05 0.03 0.04 0.04 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05	0 2 3 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5	Grass Area 56 38 43 43 46 16 17 466 0 30 0 40 40 40 40 40 40 40 40 40 40 40 40	Supp Area 9 % 3 0 5 0 5 0 5 0 5 0 5 0 6 0 5 0 6	Paved Time (min) 6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Tree (mi) (mi) (mi) (mi) (mi) (mi) (mi) (mi)	Time (min) 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(m) 	Grass	Supp Length		Orass Stops %	Supp Stopp %			Supp
SUB-CATCHHENT DETALS Name CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9	1 4 4 4 4 4 4 4 4 4 4 4 4 4 6 4 6 4 7 7 8 6 9 7	4 107.74 107.75 2 326. 5 907.75 5 101.05 7 139.07 7 0.07 0 0.	0 4 5 6 6 6 6 6 6 6 7 7 8 6 7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9	Crass Area 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	Supp Area 3 0 0 5 0 0 6 0 0 7 0 6 0 0 7 0 6 0 0 7 0 7 0 8 0 0 7 0 8 0 0 9 0 0 0 0	Paved Time (min) 6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Time (Intel (Int	Time (mn) 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Grass	Supp Length		Gross Stope %	Supp Slope %			Supp Rough
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SUB-CATOHHEM TOETALS Name SUB-CATOHHEM TOETALS Name CAT70 CAT70 CAT71 CAT72 CAT73 CAT74 CAT75 CAT76 CAT77 CAT78 CAT44 CAT45 CAT47 CAT47 CAT48 CAT49 CAT49 CAT49 CAT41 CAT42 CAT42 CAT43 CAT44 CAT45 CAT44 CAT45 CAT44 CAT45 CAT44 CAT45		4 5 5 5 5 5 5 5 5 5 5 5 5 5	0 4 4 4 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Grass Ares 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9,	Supp Area Area N Suppoint	Pared Pared	Time (Imi) (Tera (Fina) (Fin	(m) 	Grass	Supp Length		Grass Stope %	Supp Stope Stope %			Supp
308-CATCHHON TOTALS Name CAT70 CAT70 CAT70 CAT70 CAT70 CAT70 CAT70 CAT74 CAT75 CAT74		4 357 2 368 3 762 3 762 3 763 7 764 7 763 7 764 765	0 1 1 1 1 1 1 1 1 1 1 1 1 1	Grass Ares 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9,	Supp Area Area N Suppoint	Payed Time (min) (The Unit of Control of	Tens (ma) (mb)	(m) 	Grass	Supp Length		Oross Stope	5upp 5sope 9 %			Supp Rough
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SUB-CATCHHENT DETAILS Name SUB-CATCHHENT DETAILS Name ANT	1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 6 4 6 4 7 7 8 7 9 7	4 107 2 36.0 3 702.0 4 702.0 5 707.0 5 701.0 701.0 110.0 701.0 110.0 702.0 100.0 703.0 100.0 704.0 0.0 705.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0	Grass Grass 4 Area 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Supp Area 0 0	Pered Trans (mm) (mm) (mm) (mm) (mm) (mm) (mm) (mm	Tree (m)	Tens (ma) (mb)	(m) 	Grass	Supp Length		Grass Supe Y	Supp Supp Sbpe N N			Supp Rough
SUB-CATO/HIGHT OF TALS Name SUB-CATO/HIGHT OF TALS Name CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT4	1 1 1 4 4 4 4 4 4 4 4 4 6 4 7 6 7 7	4 4 5 5 5 5 5 5 5 5 5 5 5 5 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0	Crass Ares 3 4 5 5 5 6 6 6 6 7 7 7 6 6 6 7 7 7 7 8 7 8 7 8 7	Supp Supp Ares Supp 0 <	Pared	Tree (m) (m)	Time (ma) (ma) (ma) (ma) (ma) (ma) (ma) (ma)	(m) 	Grass	Supp Length		Gress Greek Steps	Supp Stopp Stopp 9 9			Supp Rough
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SUB-CATCHMENT DETAILS Name SUB-CATCHMENT DETAILS Name CAT79 CAT79 CAT79 CAT79 CAT70 CAT71 CAT73 CAT74 CAT75 CAT84 CAT84 CAT84 CAT84 CAT84 CAT84 CAT84 CAT83 CAT83 CAT84 CAT84 CAT84 CAT84 CAT84 CAT85 CAT84 CAT84 CAT85 CAT84 CAT85 CAT84 CAT85 CAT86 CAT87 CAT88 CAT88 CAT89 CAT81 CAT82 CAT84 CAT85 CAT86 CAT87 CAT87 CAT88 <td></td> <td>4 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>6 6 7 7 7 7 7 7 7 7 7 7 7 7 7</td> <td>Grass Aras 3 3 4 4 3 3 3 3 4 3 4 3 3 3 4 3 4 3 4</td> <td>Supp Supp Area 0 0 0</td> <td>Pered Trans (mb) (mb) (mb) (mb) (mb) (mb) (mb) (mb)</td> <td>Tree (m) (m)</td> <td>Time (ma)</td> <td>(m) </td> <td>Grass</td> <td>Supp Length</td> <td></td> <td>Grass Stope %</td> <td>Supp Supp Supp b b</td> <td></td> <td></td> <td>Supp Prough</td>		4 5 5 5 5 5 5 5 5 5 5 5 5 5	6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Grass Aras 3 3 4 4 3 3 3 3 4 3 4 3 3 3 4 3 4 3 4	Supp Supp Area 0 0 0	Pered Trans (mb) (mb) (mb) (mb) (mb) (mb) (mb) (mb)	Tree (m) (m)	Time (ma)	(m) 	Grass	Supp Length		Grass Stope %	Supp Supp Supp b b			Supp Prough
SUB-CATOINEDIT DETALS Name SUB-CATOINEDIT DETALS Name CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT4	1 1 1 4 4 4 4 4 4 4 4 4 4 4 6 4 7 4 7 10 7<	4 97 2 36.0 3 762.0 3 762.0 3 762.0 3 762.0 3 763.0 4 763.0 7 1137.0 7 763.0 7	0	Grass Grass 4, 4, 4, 4, 4, 4, 4, 4, 4, 4,		Pered	Tme (m)	Tens (Pend)	(m) 	Grass	Supp Length		Grass Stope %	Supp Stopp Stope %			Supp Rough
SUB-CATOMENT DETALS Name SUB-CATOMENT DETALS Name CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT4 CAT4 <	1 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 6 4 6 4 6 4 6 4 7 7	4 97 2 36, 36 3 762, 36 4 762, 36 5 967, 36 6 967, 36 7 762, 36 7 762, 37 7 762, 37 7 762, 37 7 762, 37 7 762, 37 7 762, 37 7 762, 37 7 762, 37 7 762, 37 7 763, 37 7 763, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7 764, 37 7	0	Grass Grass 4, 4, 4, 4, 4, 4, 4, 4, 4, 4,		Pared Pared Pa	Tme (ma) (Tens (ma) (mb)	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Grass Supe N N	Supp Supp Bope N N N			Supp Rough
SUB-CATURINON DETALS Name SUB-CATURINON DETALS Name CAT70 CAT71 CAT73 CAT73 CAT74 CAT75 CAT76 CAT77 CAT78 CAT78 CAT78 CAT78 CAT78 CAT44 CAT45 CAT46 CAT47 CAT48 CAT49 CAT49 CAT41 CAT42 CAT43 CAT44 CAT45 CAT44 CAT45 CAT44 CAT45 CAT44 CAT45 CAT45 CAT46 CAT47 CAT48 CAT47 CAT48 CAT47 CAT47 CAT47 CAT47 CAT47 CAT47 CAT47		4	6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Grass Grass 4, 4, 4, 4, 4, 4, 4, 4, 4, 4,		Pened Trans (mb) (mb) (mb) (mb) (mb) (mb) (mb) (mb)	Tree (me) (me) (me) (me) (me) (me) (me) (m	Time (mm) (mm) (mm) (mm) (mm) (mm) (mm) (m	(m) 	Grass	Supp Length		Oress Stepe %	Supp Supp Supp 9 9			Supp Rough Prough
SUB-CATOINEDIT DETALS Name Sub-CATOINEDIT DETALS Name CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT4		4 97.0 2 36.0 3 702.0 3 702.0 3 702.0 3 702.0 3 702.0 3 702.0 4 702.0 5 702.0 6 0.0 0.0	0	Grass Area Area 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Supp Supp Supp -	Pared Pared Pa	Tme (ma) (ma) (ma) (ma) (ma) (ma) (ma) (ma)	Time	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Grass Stope ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	Supp Stopp Stopp 9 9 9			Supp Rough
SUB-CATCHMENT DETALS Name SUB-CATCHMENT DETALS Name CAT20 CAT21 CAT21 CAT21 CAT21 CAT23 CAT24 CAT25 CAT44 CAT45 CAT44 CAT45 CAT44 CAT44 CAT45 CAT44 CAT45 CAT44 CAT45 CAT46 CAT47 CAT48 CAT48 CAT49 CAT41 CAT41 CAT41 CAT41 CAT41 CAT42 CAT43 CAT44 CAT45 CAT45 CAT46 CAT47 CAT48 CAT49 CAT41 CAT45 CAT47 CAT47 CAT47 CAT47		4 107 0 36.0 0 970.0 0 970.0 0 970.0 0 970.0 0 970.0 1 900.0 1 910.0 1 910.0 1 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 90.0 0 90.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0 910.0 0	0	Grand Arteg Wey Grand Gr	Supp Area Area Composition Composition Composition Composition <td>Pared Pared Pared</td> <td>Tee (m) (m) (m) (m) (m) (m) (m) (m) (m) (m)</td> <td>The second secon</td> <td>(m) (m) (m) (m) (m) (m) (m) (m)</td> <td>Grass</td> <td>Supp Length</td> <td></td> <td>Grass</td> <td>5upp 5upp 5upp 5upp 5up 5up 5up 5up 5up</td> <td></td> <td></td> <td>Supp Recipt</td>	Pared Pared	Tee (m) (m) (m) (m) (m) (m) (m) (m) (m) (m)	The second secon	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Grass	5upp 5upp 5upp 5upp 5up 5up 5up 5up 5up			Supp Recipt
SUB-CATURMENT DETALS Name SUB-CATURMENT DETALS Name CAT70 CAT71 CAT72 CAT73 CAT74 CAT75 CAT76 CAT78 CAT78 CAT78 CAT78 CAT78 CAT78 CAT84 CAT85 CAT84 CAT85 CAT84 CAT85 CAT85 CAT84 CAT85 CAT84 CAT85 CAT84 CAT85 CAT84 CAT85 CAT86		4 97 2 36.0 3 762.0 3 762.0 3 762.0 3 762.0 3 763.0 4 763.0 7 763.1 7	0	Grand Arteg Wey Grand Gr	Supp Area Area Composition Composition Composition Composition <td>Pered Pered Teo Pered Pere</td> <td>Tme (ma) (ma) (ma) (ma) (ma) (ma) (ma) (ma)</td> <td>Time (ma)</td> <td>(m) (m) (m) (m) (m) (m) (m) (m)</td> <td>Grass</td> <td>Supp Length</td> <td></td> <td>Gress Greek State State</td> <td>Supp Stopp Stopp 50pp 9 9</td> <td></td> <td></td> <td>Sopp Roogh</td>	Pered Pered Teo Pered Pere	Tme (ma) (ma) (ma) (ma) (ma) (ma) (ma) (ma)	Time (ma)	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Gress Greek State	Supp Stopp Stopp 50pp 9 9			Sopp Roogh
BUE-CATCHMEDT DETAILS Name SAUE-CATCHMEDT DETAILS Name CATP		4 0.7 2 36.0 3 702.0 4 702.0 3 702.0 3 702.0 3 702.0 3 702.0 4 702.0 5 703.0 6 0.0 0.0	0	Oracs Area Area Area Area Area Area Area Area	Supp Area Vit Joint Control J	Pared Pared		Tens (ma) (mb)	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Grass Suge No. No. No. No. No. No. No. No. No. No.	Supp Supp Bope N N N N N N N N N N N N N N N N N N N			Supp
SUB-CATCHMENT DEPAILS Name SUB-CATCHMENT DEPAILS Name CATP SUB-CATCHMENT DEPAILS CATP		4	6 4 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Oracs Area Area Area Area Area Area Area Area	Supp Area Vit Joint Control J	Pened Trans (mb) (mb) (mb) (mb) (mb) (mb) (mb) (mb)		Time (ma)	(M) (M) (M) (M) (M) (M) (M) (M)	Grass	Supp Length		Orass Stepe %	Supp Supp Stope 9 9			Sopp
SUB-CATOMENT DETALS Nime SUB-CATOMENT DETALS Nime CATP CATP <		4 107 0 36.0 0 907.0 0 907.0 0 907.0 0 907.0 0 907.0 1 900.0 1 900.0 1 910.0 0	0	Grass Area 14 14 14 14 14 14 14 14 14 14 14 14 14		Pered Pered Team	Tme (m)	The set of	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Grass	Supp Supp Stope 9 9			Supp Rough
BUE-CATCHMENT DETAILS Name SAUE-CATCHMENT DETAILS Name CATP		4 0.0 0 105.0 0 105.0 0 907.0 0 907.0 0 907.0 0 907.0 0 907.0 0 907.0 100.0 900.0 0 900.0 0 900.0 0.000.0 0.000.0 0.010 0.010.0 0.010 0.010.0 0.010 0.010.0 0.010 0.010.0 0.010 0.010.0 0.011 0.010.0 0.020 0.020.0 0.010 0.010.0 0.010 0.010.0 0.010 0.010.0 0.010 0.010.0 0.010 0.010.0 0.010 0.010.0 0.010 0.010.0 0.011 0.010.0 0.012 0.010.0 0.011 0.011.0 0.012 0.012.0 0.012	0	Grass Area 14 14 14 14 14 14 14 14 14 14 14 14 14		Pered Pered Team		The second secon	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Grass	5upp 5upp 5upp 5upp 5up 5up 5up 5up 5up			Supp Rough
SUB-CATCHMENT DEPAILS Name SUB-CATCHMENT DEPAILS SUB-CATCHM		4 97 2 36. 3 762. 3 762. 3 762. 3 762. 3 763. 4 763. 7 762. 7 763. <tr< td=""><td>0 </td><td>Grass Area 14 14 14 14 14 14 14 14 14 14 14 14 14</td><td></td><td>Pened Trans (mb) (mb) (mb) (mb) (mb) (mb) (mb) (mb)</td><td></td><td>Time (ma) (ma) (ma) (ma) (ma) (ma) (ma) (ma)</td><td>(m) (m) (m) (m) (m) (m) (m) (m)</td><td>Grass</td><td>Supp Length</td><td></td><td>Gress Greek State State</td><td>Supp Stopp Stopp Stopp 1 Stopp</td><td></td><td></td><td>Supp Rough</td></tr<>	0	Grass Area 14 14 14 14 14 14 14 14 14 14 14 14 14		Pened Trans (mb) (mb) (mb) (mb) (mb) (mb) (mb) (mb)		Time (ma) (ma) (ma) (ma) (ma) (ma) (ma) (ma)	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Gress Greek State	Supp Stopp Stopp Stopp 1 Stopp			Supp Rough
SUB-CATCHNEOT DETAUS Tame SUB-CATCHNEOT DETAUS Tame CAT9 CAT44 CAT44 CAT45 CAT44 CAT45 CAT44 CAT45 CAT45 CAT46 CAT47 CAT48 CAT49 CAT41 CAT41 CAT41 CAT41 CAT42 CAT43 CAT44 CAT45 CAT45 CAT45 CAT46 CAT47 CAT47 CAT48 CAT47 CAT47 CAT47 CAT47 CAT47		4 107 1 108 2 108 3 907 3 900 4 900 5 900 5 900 1100 900 1100 900 1100 900 1100 900 1100 900 000 0.010 000 0.010 000 0.010 000 0.010 0000 0.010 0000 0.010 0000 0.010 0000 0.010 0000 0.010 0010 0.010 0010 0.010 0010 0.010 0010 0.010 0010 0.010 0010 0.010 0010 0.010 0010 0.010 0010 0.010 0010 0.010 0010 0.010 </td <td>0 </td> <td>Grass Area 14 14 14 14 14 14 14 14 14 14 14 14 14</td> <td></td> <td>Paved Paved Paved</td> <td></td> <td>Tens (ma)</td> <td>(m) (m) (m) (m) (m) (m) (m) (m)</td> <td>Grass</td> <td>Supp Length</td> <td></td> <td></td> <td>Supp Supp Supp N N N N N N N N N N N N N N N N N N</td> <td></td> <td></td> <td>Supp Recipt</td>	0	Grass Area 14 14 14 14 14 14 14 14 14 14 14 14 14		Paved		Tens (ma)	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length			Supp Supp Supp N N N N N N N N N N N N N N N N N N			Supp Recipt
SUB-CATCHMENT DETAILS Name SAP10 CATA		4 0.00 0 105.00 0 105.00 0 907.00 0 907.00 0 907.00 0 907.00 0 907.00 0 907.00 0 900.00 0 900.00 0 900.00 0.00 0.00 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.011 0.010 0.012 0.010 0.013 0.010 0.014 0.010 0.015 0.010 0.010 0.011 0.011 0.011 0.012 0.012 0.013 0.011 0.014 0.010 0.021 0.021 0.021 0.021	0	Grass Area 14 14 14 14 14 14 14 14 14 14 14 14 14		Pared Pared		Time (ma) (ma) (ma) (ma) (ma) (ma) (ma) (ma)	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Grass	Supp Supp Supp 9 9 9			Supp Rough
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SUB-CATCHNEON DETAULS Name CAT9 CAT4 <		4 107 108 108 10 108 10 108 10 100 1100 1100 1100 1100 1100 1100 1100 101 1100 101 1100 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 002 011 003 011 011 011 012 011 013 011 014 010 015 011 016 012 017 013 018 <td>0 </td> <td>Grass Arass 161 142 143 143 143 143 143 143 143 143 143 143</td> <td></td> <td>Paned Paned Time (mm) (mm) (mm) (mm) (mm) (mm) (mm) (m</td> <td></td> <td>The second secon</td> <td>(m) (m) (m) (m) (m) (m) (m) (m)</td> <td>Grass</td> <td>Supp Length</td> <td></td> <td>Grass Grass Grass</td> <td>Supp Supp Supp N N N N N N N N N N N N N N N N N N</td> <td></td> <td></td> <td>Supp Rough</td>	0	Grass Arass 161 142 143 143 143 143 143 143 143 143 143 143		Paned Paned Time (mm) (mm) (mm) (mm) (mm) (mm) (mm) (m		The second secon	(m) (m) (m) (m) (m) (m) (m) (m)	Grass	Supp Length		Grass	Supp Supp Supp N N N N N N N N N N N N N N N N N N			Supp Rough
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SUB-CATCHHENT OF TALLS SUB-CATCHHENT OF TALLS Name SUB-CATCHHENT OF TALLS Name CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT9 CAT4 C		4 0.7 1 0.8 2 0.8 3 702. 3 702. 3 702. 3 702. 3 702. 3 702. 4 702. 5 703. 704. 703. 705. 703.	0	Gass Area Area 1 4 4 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		Pared Time Imm Imm Imm Imm Imm Imm Imm Imm Imm I				Grass	Supp Supp (m) 	Pered Stop(%) %		5xpp 5xpp 7bpe 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Paxed Paxed 	Grass Rough	





Liability limited by a scheme approved under Professional Standards Legislation

CAT47A	PIT47A	0.102					5	5									
CAT48A	PIT48A	0.065	5	9 41			5	5				-					
CAT57A	PIT57A	0.015						0		4	0	0.5	2	0	0.012	0.21	
								5			0	0.5	3	0	0.012	0.21	
CAT49A	PIT49A	0.06															
CAT50A	PIT50A	0.05					5	5									
CAT51A	PIT51A	0.05	6	0 40	0			5									
CAT52A	PIT52A	0.05					5	5									
CAT53A	PIT53A	0.05					-	5									
CAT54A	PIT54A	0.091					5	5									
CAT55A	PIT55A	0.087	5	8 42			5	5									
CAT56A	PIT56A	0.08						0	41	4	0	1	2	0	0.012	0.21	0
								5					<u> </u>		0.042	0.2.4	
CAT42A	PIT42A	0.042					2										
CAT44A	PIT44A	0.036	5	1 45				0	45	4	0	0.6	3	0	0.012	0.21	C
CAT46A	PIT46A	0.115	5	9 41				5									
CAT79B	PIT79B	0.043						5									
CAT80B	PIT80B	0.053						5 (
CAT81B	PIT81B	0.062	6	0 40	0 0		5	5									
CAT83B	PIT83B	0.05	6					5									
CAT84B	PIT84B	0.024						5									
															-		
CAT85B	PIT85B	0.01						0 (4	0	0.72	3	0	0.012		0
CAT87B	PIT87B	0.044	5	8 42		(0	58.2	4	0	0.54	3	0	0.012	0.21	0
CAT68B	PIT68B	0.198						5		1	- 1						
CAT69B	PIT69B	0.036						0		4	6	0.70	~		0.000	0.01	
					- (0	0.78	3	0	0.012		0
CAT71B	PIT71B	0.017				(0		4	0	0.42	3	0	0.012	0.21	0
CAT73B	PIT73B	0.123	5	9 41	0			5									
CAT75B	PIT75B	0.073						5							1		
CAT77B	PIT77B	0.148						5							1		
CAT78B	PIT78B	0.152	5	9 41			5	5							1		
CAT70B	PIT70B	0.137				,	5	5									
								5									
CAT72B	PIT72B	0.151	5	6 44													
CAT74B	PIT74B	0.045		3 67	0			0	40	4	0	2.09	3	0	0.012	0.21	0
CAT76B	PIT76B	0.04	3	0 70			5	5									
CAT89B	PIT89B	0.229						5									
CAT90B	PIT90B	0.034						0 (4	0	0.51	3	0	0.012	0.21	0
CAT58B	PIT58B	0.152	5	8 42			5	5									
CAT59B	PIT59B	0.203	54	8 42	0			5									
CATGOB	PIT60B	0.08						0		4	0		0		0.012	0.21	
				3 5/	1					4	U	1	3	0	0.012	0.21	
CAT62B	PIT62B	0.188					5	5									
CAT63B	PIT63B	0.141	5	7 43	1 (5	5									
CAT64B	PIT64B	0.202	6				5	5									
CAT65B																	
	PIT65B	0.009						0 (4	0	1.14	3	0	0.012		0
CAT66B	PIT66B	0.005						0		4	0	2.08	3	0	0.012	0.21	0
CAT61B	PIT61B	0.153	5	7 43			5	5									
CatNEW7	PitNEW7	0.054	7	0 30		,		5									
				30	1												
CatNEW8	PitNEW8	0.031						5 (
CatNEW9	PitNEW9	0.031		0 30			5	5									
CatNEW1	PitNEW1	0.037	7	0 30			5	5									
CatNEW2	PitNEW2	0.031													1		
	prosective.																
CatNEW3								5 (
	PitNEW3	0.031	7	0 30	0			5									
CatNEW4	PitNEW4	0.031	7	0 30						_	-						
	PitNEW4	0.031	7	0 30			5	5		-							
CatNEW5	PitNEW4 PitNEW5	0.031 0.031 0.031	71 71 71	0 30 0 30 0 30			5	5 0									
CatNEW5 CatNEW6	PitNEW4 PitNEW5 PitNEW6	0.031 0.031 0.031 0.031	רק ק ק ק ק	0 30 0 30 0 30 0 30			5	5 0 5 0 5 0									
CatNEW5 CatNEW6 Cat VILLAGE	PitNEW4 PitNEW5 PitNEW6 N464712	0.031 0.031 0.031 0.031 0.031	7) 7) 7) 7) 5)	0 30 0 30 0 30 0 30 0 30 0 50			5	5 0 5 0 5 0 5 0									
CatNEW5 CatNEW6	PitNEW4 PitNEW5 PitNEW6	0.031 0.031 0.031 0.031	7) 7) 7) 7) 5)	0 30 0 30 0 30 0 30 0 30 0 50			5	5 0 5 0 5 0									
CatNEW5 CatNEW6 Cat VILLAGE FIELDS IMPERVIOUS	PitNEW4 PitNEW5 PitNEW6 N464712 N468506	0.031 0.031 0.031 0.031 0.031 0.6 0.44	7) 7) 7) 7) 5) 10	0 30 0 30 0 30 0 30 0 30 0 50 0 0 0			5 5 5 5	5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0									
CatNEW5 CatNEW6 Cat VILLAGE FIELDS IMPERVIOUS CAT_C_BASINS	PitNEW4 PitNEW5 PitNEW5 N464712 N468506 DETBASIN C	0.031 0.031 0.031 0.031 0.6 0.44 0.317	7) 7) 7) 7) 5) 10	0 30 0 30 0 30 0 30 0 30 0 50 0 50 0 0 0			5 5 5 5 8	5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0									
CatNEW5 CatNEW6 Cat VILLAGE FIELDS IMPERVIOUS	PitNEW4 PitNEW5 PitNEW6 N464712 N468506	0.031 0.031 0.031 0.031 0.031 0.6 0.44	7) 7) 7) 7) 5) 10	0 30 0 30 0 30 0 30 0 30 0 50 0 50 0 0 0			5 5 5 5 8	5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0									
CatNEW5 CatNEW6 Cat VILLAGE FIELDS IMPERVIOUS CAT_C_BASINS	PitNEW4 PitNEW5 PitNEW5 N464712 N468506 DETBASIN C	0.031 0.031 0.031 0.66 0.44 0.317 0.439	7) 7) 7) 7) 5) 10	0 30 0 30 0 30 0 30 0 30 0 50 0 50 0 0 0			5 5 5 5 8	5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0									
CaINEWS CaINEW6 CarVILLOE FIELDS IMPERVIOUS CAT_C_BASINS CAT_A_BASINS	PitNEW4 PitNEW5 PitNEW6 N464712 N468506 DETBASIN C DETBASIN A	0.031 0.031 0.031 0.66 0.44 0.317 0.439	7) 7) 7) 7) 7) 5) 10	0 30 0 30 0 30 0 30 0 50 0 50 0 100 0 100			5 5 5 5 8	5 0 0 5 0 0 0 5 0 0 0 5 0 0 0 0									
CatNEW5 CatNEW6 Cat VILLAGE FIELDS IMPERVIOUS CAT_C_BASINS	PINEW4 PINEW5 PINEW5 N464712 N466506 DETBASIN C DETBASIN A PIt or	0.031 0.031 0.031 0.031 0.6 0.44 0.317 0.439 Total	7) 7) 7) 7) 5) 10) 10) 10) 10) 10) 10) 10) 10) 10) 10	0 30 0 30 0 30 0 30 0 30 0 50 0 50 0 0 0 100 Avg) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	time lag	s 5 6 7 8 8 8 8 8 8 8 8 1 8	5 1 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5									
CanNews CanNews Gar WILLOGE FIELDS IMPERVIOUS CAT CASINS CAT ABSINS Name	PitNEW4 PitNEW5 PitNEW6 N464712 N468506 DETBASIN C DETBASIN C DETBASIN A Pit or Node	0.031 0.031 0.031 0.031 0.66 0.44 0.317 0.439 Total Area	7) 7) 7) 5) 10 10 10 10 10 10 10 10 10 10 10 10 10	0 30 0 30 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Time lag (mins)	5 5 5 5 5 5 5	5 0 0 5 0 0 0 0									
CaNRW6 CaNRW6 CaNRW6 CarVILL06 FIFLD3 INPERVOUS CAT_6_BASINS CAT_6_BASINS Name CAT_6_RPERV	PRINEW4 PRINEW5 PRINEW5 PRINEW6 N464712 N468506 DCTBASIN C DCTBASIN C PR or Node N230	0.031 0.031 0.031 0.6 0.44 0.317 0.439 Total Area 10.31	7) 7) 7) 5) 10 10 10 10 10 10 10 10 10 10 10 10 10	0 30 0 30 0 0 30 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Time lag (mins)	Rainfall Multiplier	5 1 1 5 1 1 1 5 1 1 1 5 1 1 1 1									
CanNevs CanNevs CanNevs CanNevs CanNevs CanNevs Can Labore Fields Fields Fields Fields Fields Fields Fields Fields Can Labore Can Labore Can Labore Can Labore Can Labore Can Labore Fields Fie	PitNEW4 PitNEW5 PitNEW6 N464712 N468506 DETBASIN C DETBASIN C DETBASIN A Pit or Node	0.031 0.031 0.031 0.031 0.66 0.44 0.317 0.439 Total Area	7) 7) 7) 5) 10 10 10 10 10 10 10 10 10 10 10 10 10	0 30 0 30 0 0 30 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Time lag (mins)	Rainfall Multiplier	5 0 0 5 0 0 0 0									
CanNevs CanNevs CanNevs CanNevs CanNevs CanNevs Can Labore Fields Fields Fields Fields Fields Fields Fields Fields Can Labore Can Labore Can Labore Can Labore Can Labore Can Labore Fields Fie	PRINEWS PRINEWS PRINEWS PRINEWS N4465506 DETBASIN C DETBASIN C DETBASIN A PR of Node N230 N232	0.031 0.031 0.031 0.64 0.44 0.317 0.439 Total Area 10.31 7.27	77 77 77 18 10 10 10 10 10 10 10 10 10 10 10 10	0 30 0 30 0 30 0 30 0 30 0 50 0 50 0 100 0 100 0 4vg Slope(%) 0 4	Mannings Mannings 0 0 0 0 0 0 0 0 0 0 0 0 0	Time lag (mins)		6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1									
CanNivo CanNivo CanViu.Ace FIELDS IMPERVAUS CAT, 2, JANNIS CAT, 2, JANNIS CAT, 2, RASINS CAT, 2, RPERV CAT, 2, RPERV CAT, 2, RPERV	PRINEW4 PRINEW5 PRINEW5 PRINEW6 N468506 DETBASIN C DETBASIN A PR or N200 N200 N200 N200 N200 N200 N200 N20	0.031 0.031 0.031 0.66 0.44 0.317 0.439 Total Area 10.31 7.27 1.008	7 7 7 7 10 10 10 10 10 10 10 10 10 10 10 10 10	0 30 0 30 0 30 0 30 0 30 0 50 0 100 0 100 0 100 0 100 0 40 0 50 0	Mannings Mannings 0 0 0 0 0 0 0 0 0 0 0 0 0	Time lag (mins)	Rendal Matigar	5 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7									
CanNIVS CanNIVS CanNIVS CanVILLOE CanVILLOE CAVULLOE CAVULLOE CAVULLOE CAVILLOE CAVI	PHNEWA PHNEW6 PHNEW6 NA64712 NA66506 DETBASIN C DETBASIN C DETBASIN A PR or Node N230 N232 N1226 N1233	0.031 0.031 0.031 0.66 0.44 0.317 0.439 Total Area 10.31 7.27 1.008 0.13	77 77 77 75 100 10 10 10 10 Area 10 10	0 30 0 30 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Time Lag (mins) (0	Autoral Restat	6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1									
CanNovs CanNovs CanNovs CanNovs CanVutAe CanNovs CanVutAe	PINEWA PINEWA PINEW6 NA469712 N4669712 N4669712 DETBASIN C DETBASIN A PIt or N0de N230 N232 N1233 N1237	0.031 0.031 0.031 0.66 0.44 0.317 0.439 Total Area 10.31 7.27 1.008 0.13 0.1	7 7 7 7 7 7 8 10 10 10 10 10 10 10 10 10 10 10 10 10	0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 100 0 100 0 100 0 40 0 40 0 40 0 30 0 100 0 000 0 000 0 000 0 000 0 000 0 000 0 000 0 000 0 000	C C C C C C C C C C C C C C C C C C C	Time lag (mins) (0) (0) (0) (0) (0) (0) (0) (0) (0) (0		6 1 5 1 5 1 5 1 5 1 6 1 7 1 6 1 7 1 7 1 6 1 1 Forster - RAFIS 20.92									
CanNovs CanNovs CanNovs CanNovs CanVutAe CanNovs CanVutAe	PINEWA PINEWA PINEW6 NA469712 N4669712 N4669712 DETBASIN C DETBASIN A PIt or N0de N230 N232 N1233 N1237	0.031 0.031 0.031 0.66 0.44 0.317 0.439 Total Area 10.31 7.27 1.008 0.13 0.1	7 7 7 7 7 7 8 10 10 10 10 10 10 10 10 10 10 10 10 10	0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 100 0 100 0 100 0 40 0 40 0 40 0 30 0 100 0 000 0 000 0 000 0 000 0 000 0 000 0 000 0 000 0 000	C C C C C C C C C C C C C C C C C C C	Time lag (mins) (0) (0) (0) (0) (0) (0) (0) (0) (0) (0		6 1 5 1 5 1 5 1 5 1 6 1 7 1 6 1 7 1 7 1 6 1 1 Forster - RAFIS 20.92									
CanNY69 CanNY69 CanNY60 CanVUL06 CanVUL06 CanVUL06 CanVUL06 CAT C BARNS CAT C BARNS CAT A BARNS CAT A BARNS CAT A BARNS CAT A BARNS CAT BARN CAT BARN CAT BARN CAT BARN CAT BARN CAT BARN CAT BARNS CAT C BARNS CA	PHEWA PHEWA PHEW6 Neke712 Neke712 Neke712 DETMASIN A DETMASIN A DETMASIN A PR or N230 N1230 N1230 N1233 N1237 FIELDS	0.031 0.031 0.033 0.033 0.044 0.347 0.439 Total Area 10.31 7.27 1.008 0.13 0.11 7.305	77 77 77 55 100 11 11 11 11 11 11 11 11 11 11 11 11	0 30 0 33 0 33 0 33 0 35 0 36 0 500 0 500 0 1000 Avg Stope(%) 0 4 0 4 0 1 0 1 0 30 0 30	C C C C C C C C C C C C C C C C C C C	Time Lag (mins) (0 (0) (0) (0) (0) (0) (0) (0) (0) (0)	Rabrial Rabrial Mutipler	5 5 5 5 5 5 5 5 5 6 6 7 7 7 7 7 7 7 7 7									
CanNovs CanNovs CanNovs CanNovs CanNovs CanVuLoE	PHNEWA PHNEWA PHNEWA PHNEWA MAGATI2 MI23 MI232 MI233 MI237 FIELDS MI270743	0.031 0.031 0.031 0.04 0.44 0.449 70tal Area 10.31 7.27 1.000 0.13 0.13 0.13 0.13 0.13 0.13 0.27	77 77 77 78 10 10 10 10 10 10 10 10 10 10 11 10 11 11	0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 100 Avg Avg Stope(%) 0 0 4 0 4 0 1 0 30 0 30	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Time lag (mins) (0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7									
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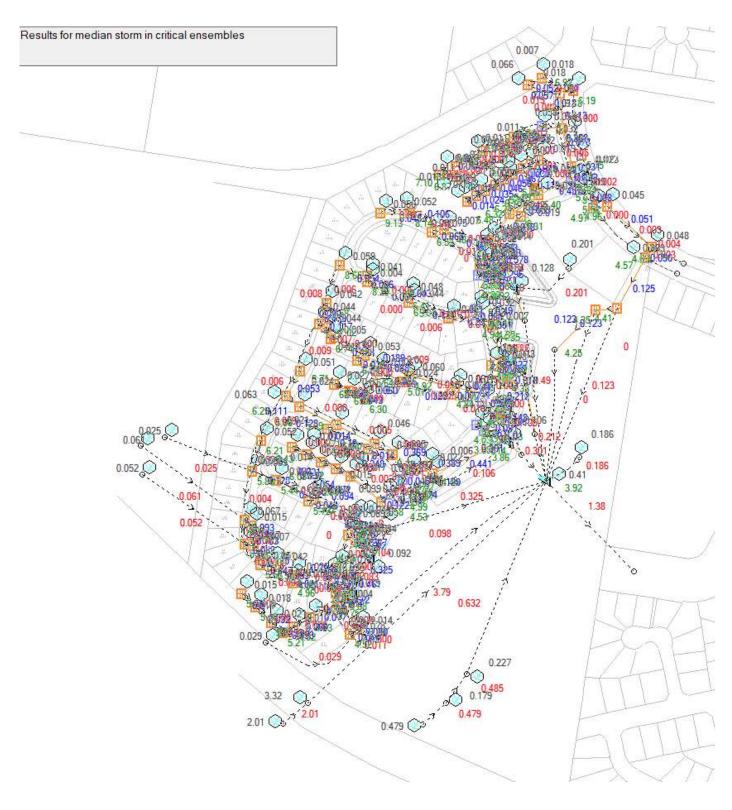
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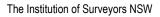


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C.5 DRAINS Post-Developed Model SCENARIO F (20% AEP Peak Flows)

DRAINS Worst Case Peak Flows (i.e. worst case storm event for each outlet).







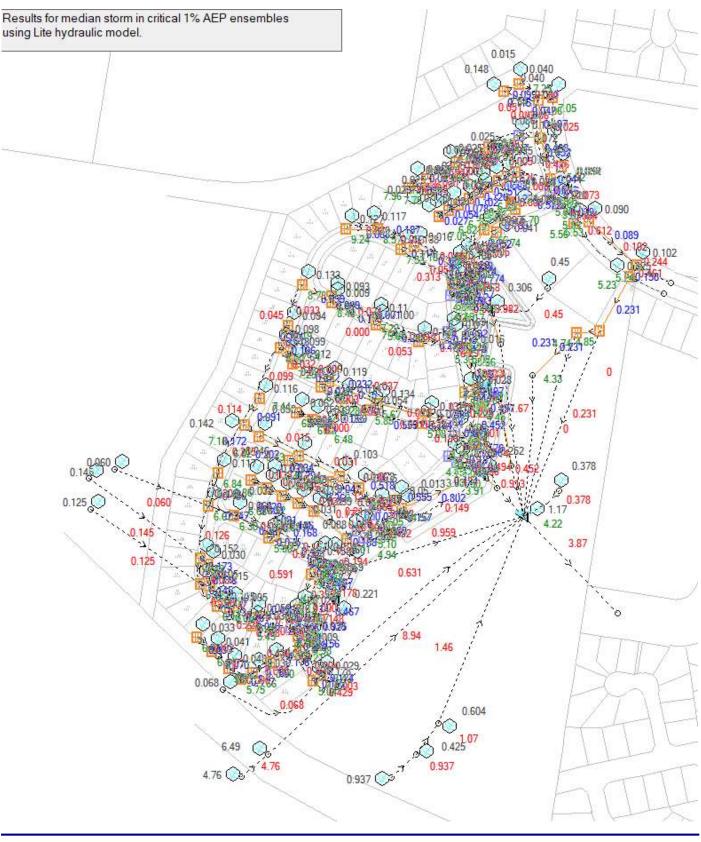
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C.6 DRAINS Post-Developed Model SCENARIO F (1% AEP Peak Flows)

DRAINS Worst Case Peak Flows (i.e. worst case storm event for each outlet). 50% Blockage factor (DRAINS new theory) applied to Q100 post-developed model.



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D Pre-Developed Catchment Plan

Post-Developed Catchments/ Water Sensitive Design Strategy Plan

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