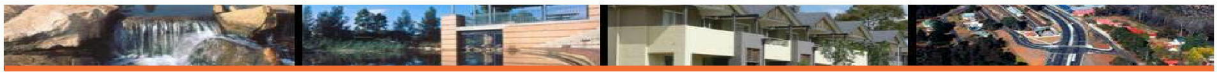
J. WYNDHAM PRINCE CONSULTING CIVIL INFRASTRUCTURE ENGINEERS & PROJECT MANAGERS



ABN 67 002 318 621

Our Ref: 110358_JWP_Playing Field Compliance Letter.docx
DC:cr

8 June 2017

LegPro Pty Ltd ATF LegPro 54 Unit Trust
Level 27, MLC Centre
19 – 29 Martin Place
Sydney NSW 2000

Attn: **Mike Williams**

Subject: **Caddens Road, Caddens Hill**
Playing Field DA – Certificate of Compliance

Dear Mike,

This letter is to certify that the Playing Field Development Application (DA) Engineering Plans are generally in accordance with the *"Stormwater Management Strategy Report Stages 2 to 4"* (JWP, December 2016) report which was undertaken to support Stages 2 to 4 of the overall O'Connell Street, Caddens development.

We hereby confirm that J. Wyndham Prince has prepared the Playing Field DA plans (ref: 110358DA400 to DA404 rev A) for Council approval. To support the submission to Council, we have undertaken additional investigations to confirm that the current development / playing field layout and catchment areas are relatively consistent with the original strategy. The investigation has utilised the Water Quality and Quantity modelling which underlied the overall strategy and updated these models to ensure they reflect both the revised layout / catchment and the additional road widening (half road construction) of Caddens Road.

Results of the assessment confirm that the Playing Field DA works are generally in accordance with the overall strategy (JWP, 2016) and comply with statutory requirements of Penrith City Council. The following amendments are made from the original stormwater strategy:

- The external catchment 6 (to the south of Caddens Road) now bypasses the GPT.
- The raingarden filter area in Basin D remains at 3100 m^2 and complies with Council's pollutant removal targets.
- The Basin D volume is slightly adjusted to manage additional catchment area from Caddens Road. The detention volume utilised in the 1% AEP has been increased from 6904 m^3 to 6947 m^3 (which is within the volume provided of 6950 m^3)

Further discussion of water quality and quantity included in Attachments A, B and C. Should you have any queries regarding this matter please do not hesitate to contact the undersigned on (02) 4720 3342.

Yours faithfully

CHRIS RANDALL
Senior Water Resources Manager

PO Box 4366
PENRITH WESTFIELD, NSW 2750
P 02 4720 3300
W www.jwprince.com.au
E jwp@jwprince.com.au

ATTACHMENT A – WATER QUALITY

A.1 Water Quality

The *"Stormwater Management Strategy Report Stages 2 to 4"* (JWP, December 2016) identified an appropriate strategy to control the quality of stormwater runoff leaving the site in accordance with statutory requirements.

A.2 Modelling Inputs and Assumptions

The Water Quality management system included a "treatment train" of water quality devices which included a combined system of rainwater tanks, Gross Pollutant Traps (GPT) and bio-retention raingardens.

The *MUSIC* Modelling has assumed the following in determination of results:

- Residential catchment 85% impervious overall;
- Roof area cover 75% of lots;
- Road reserve 95% impervious;
- Open Space 50% impervious;
- 3.0 kL rainwater tanks on each lot, 2.4 kL re-usable storage above top-up;
- Rainwater tank re-use has been assumed as follows:
  - 0.08 kL/day internal use per lot; and
  - 25 kL/year PET rain.

A generic GPT node was conservatively been adopted in MUSIC to provide flexibility in detailed design. This generic node adopted no TSS, TP or TN removal. Such devices may include proprietary GPTs such as a Humeceptor (or equivalent).

A.3 Updates to Modelling

As discussed in the overall strategy (JWP, 2016) the catchment plan for Stages 2 to 6 has been split into three (3) distinct sub-catchments, each being serviced by a treatment train that will incorporate gross pollutant traps upstream of a common bio-retention raingarden devices.

The original strategy included two (2) external catchments which enter the subject site from surrounding areas. This includes a large undeveloped catchment (8.8 Ha) to the south of Caddens Road and a smaller catchment (3 Ha) just to the north of Basin D. These external catchments have been considered in the model as forest nodes due to the undeveloped nature.

There is a small portion of development (rear of lots) which will bypass the Basin B. The strategy has overcompensated for this area.

The following updates / checks have been undertaken as part of the compliance assessment:

- It is noted that Catchment D (residential area) which drains to Basin D remains unchanged
- The upstream catchment (Ex. Cat 6) previously connected to a GPT prior to the Playing Field and Basin D. Modelling has been adjusted to separate this upstream catchment from the GPT. The high flow bypass for the Gross Pollutant Trap was updated with the revised 3 month ARI flows. It is noted that a HumeGard GPT is proposed on DA plans, which is consistent with original assumptions.
- An additional road catchment (External Catchment 8) has been added into the MUSIC model representing the Caddens Road half road construction and adopts a fraction impervious as digitally measured. This additional catchment is 0.25 Ha.

- It is noted that the "Urban Park" node which represents the Playing Field was previously adopted at 50% impervious in the Stage 2 – 4 Assessment (JWP, 2016). Importantly, it is noted that the calculated fraction impervious of this catchment based on the current Playing Field DA plans is 50% and is therefore consistent with the original strategy and Council standards.
- Based on industry best practice, an additional GPT has been included alongside the proposed carpark at the Playing Fields. This also receives the additional catchment from Caddens Road and treats flows prior to discharging to Basin D and the bio-retention raingarden. Conservatively, this GPT was not included in MUSIC.
- To achieve the overall TSS / TP / TN pollutant removal targets, the size of the bio-retention filter area has remained the same (3100 m^2).

The revised MUSIC Model Layout is shown on Plate A.1.

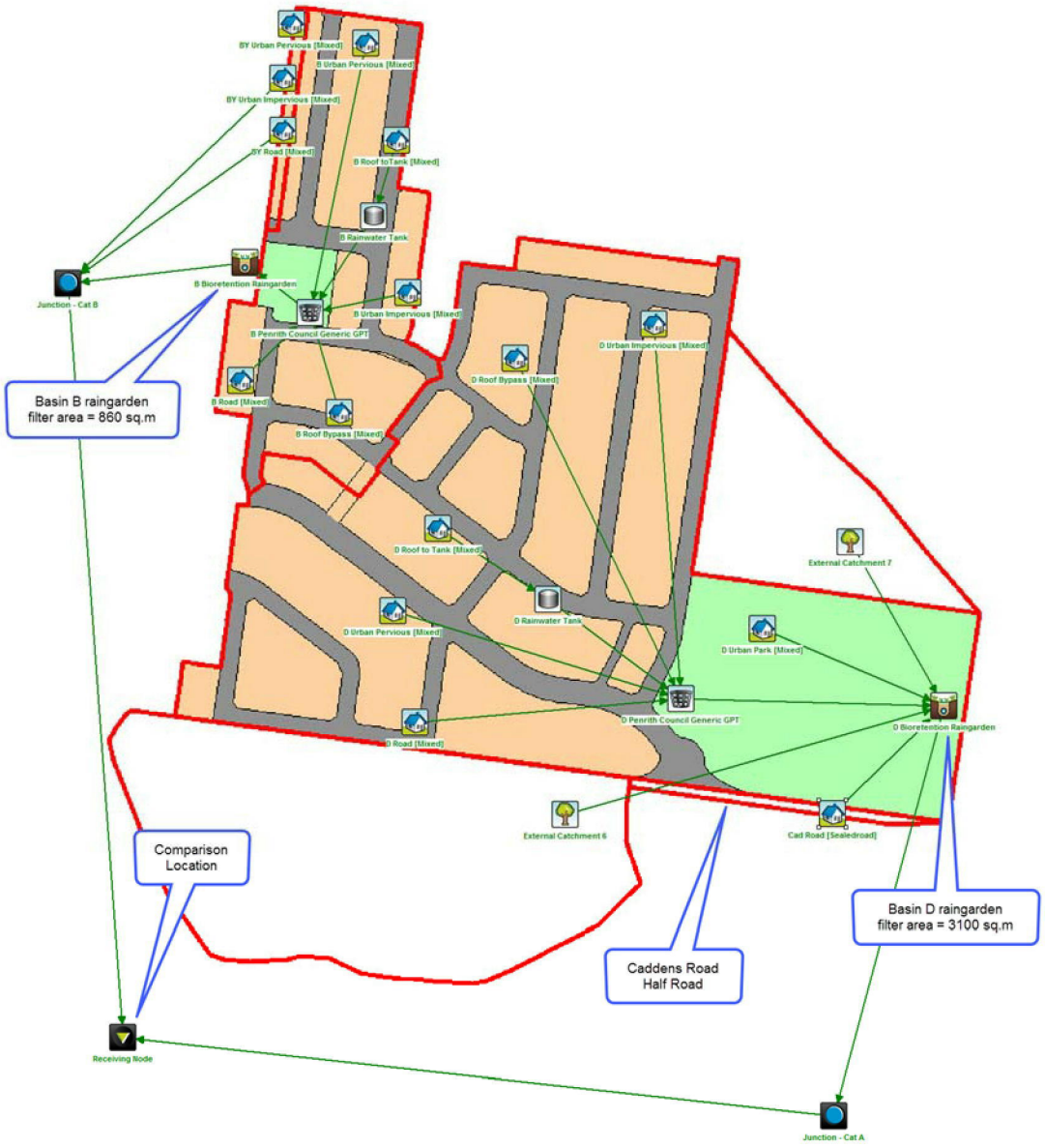


PLATE A-1 REVISED MUSIC MODEL LAYOUT

The model was updated to reflect the Caddens Road catchment and the Playing Field DA layout. Iterations have been undertaken within *MUSIC 6.2* to confirm the revised raingarden sizes in order to achieve the statutory removal rates of 85 % Total Suspended Solids (TSS), 65 % Total Phosphorus (TP) and 45 % Total Nitrogen (TN). The size of the proposed bio-retention raingardens are summarised in Table A.1 below.

TABLE A.1 – SUMMARY OF MUSIC RESULTS

Pollutant	Total Developed Source Nodes	Minimum Reduction Required	Total Residual Load from Site	Total Reduction Achieved	Target Reduction Required	Total Reduction Achieved
	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)	(%)	(%)
TSS	22700	19295	3390	19310	85.0%	85.1%
TP	45.6	29.6	13.4	32.2	65.0%	70.6%
TN	338	152.1	135	203.0	45.0%	60.1%
Gross Pollutants	3970	3573	149	3821	90.0%	96.2%

The updated results indicate that the proposed treatment system that includes on-lot rainwater tanks, gross pollutant trap and bio-retention raingarden will provide adequate treatment removal in accordance with Council's WSUD Policy (PCC, 2013a). Minimum raingarden sizes are summarised in Table 6.2.

TABLE A.1 – SUMMARY OF MINIMUM RAINGARDEN SIZES

Basin	Filter Area (m^2)	Percentage of Catchment
B	860	1.5%
D	3100	1.4%

A *MUSIC-LINK* report was generated which demonstrates that the *MUSIC* modelling achieves Penrith City Council's water quality targets. A copy is included.

ATTACHMENT B – WATER QUANTITY

B.1 Water Quantity

In December 2016, J. Wyndham Prince prepared a hydrological assessment within XP-RAFTS software. The assessment included two (2) detention basins (Basins "B" and "D") to manage stormwater runoff from Stages 2 to 4 of the O'Connell Street development. A third detention basin (Basin "C" to the north) was then also proposed to be constructed at a later date to support the future Stage 5 and 6 works.

The primary objective of the 2016 Report was to determine the necessary detention volumes to ensure post development flows do not exceed existing condition flows exiting the subject site.

B.2 Original Basin Design

The proposed Playing Fields are located at Basin "D" within the overall Stormwater Management Strategy. The initial strategy (JWP, 2016) allowed for Basin D to receive flows from Stages 2, 3 and 4 as well as the "future subdivision" near Road 18 and 19. The external catchment "Ex Cat 7" was also considered to enter the basin, but was considered as undeveloped. Similarly, "Ex Cat 5" was also considered as undeveloped and connects just downstream of the basin.

Basin D is located just to the east of the proposed playing field (in the SP2 land) and receives flows via the proposed pipe network and channel. Flows will be attenuated and treated prior to discharge into the existing 1650 mm dia pipe which connects the subject site, through a drainage easement and along Vivaldi Street to the east.

The basin design considered freeboard to the existing residential properties to the east and included a raingarden for water quality in the base.

Discharge estimates were derived for both the "existing" and "developed" catchments for the 1%, 20% and 50% AEP events with comparisons made between pre and post development discharges at the Basin D outlet and just downstream.

B.3 Updates to Modelling

J. Wyndham Prince have updated the *XP-RAFTS* models (which underlied the 2016 strategy), to reflect the latest layout and to include an additional catchment area from the half road construction works in Caddens Road.

The additional catchment area from Caddens Road has been derived at 0.25 Ha and has been added to both the existing and development models. The increase in fraction impervious is adopted from the road widening shown on plan 110358DA403.

Models were updated for the 50%, 20% and 1% AEP storms for the full range of durations. Minor amendments were subsequently made to the basin to ensure pre to post is achieved. This included:

- The Basin D volume has slightly been adjusted to manage additional catchment area from Caddens Road. The detention volume utilised in the 1% AEP has been increased from 6904 m^3 to 6947 m^3 (which is within the volume provided of 6950 m^3)
- The outlet arrangement remains consistent with the original strategy.

Results indicate that by constructing the proposed basin, the pre-post targets for the 50%, 20% and 1% AEP results are events are still satisfied at the basin outlet and in Vivaldi Street. Freeboard is also achieved to the surrounding houses to the east. Refer to Table B.2. Results of the Basin configuration are also included at Table B.3.

Table B.1 – Pre & Post Development Discharges at Basin D outlet

AEP	Existing (m^3/s)	Post - Development (m^3/s)	Post / Pre ratio
50%	2.41	2.34	0.97
20%	3.96	3.48	0.88
1%	8.76	7.82	0.89

Table B.2 – Pre & Post Development Discharges at Total East

AEP	Existing (m^3/s)	Post - Development (m^3/s)	Post / Pre ratio
50%	2.45	2.38	0.97
20%	4.05	3.54	0.87
1%	8.91	7.96	0.89

Table B.3 – Basin "D" Performance

Basin D Performance						
AEP	Peak Inflow	Storm Duration	Peak Outflow	Storm Duration	Storage Used	Top Water Level
	(m^3/s)	(min)	(m^3/s)	(min)	(m^3)	RL (m)
50%	5.06	90	2.34	120	3152	36.23
20%	7.10	90	3.48	120	4268	36.36
1%	12.65	90	7.82	120	6947	36.68

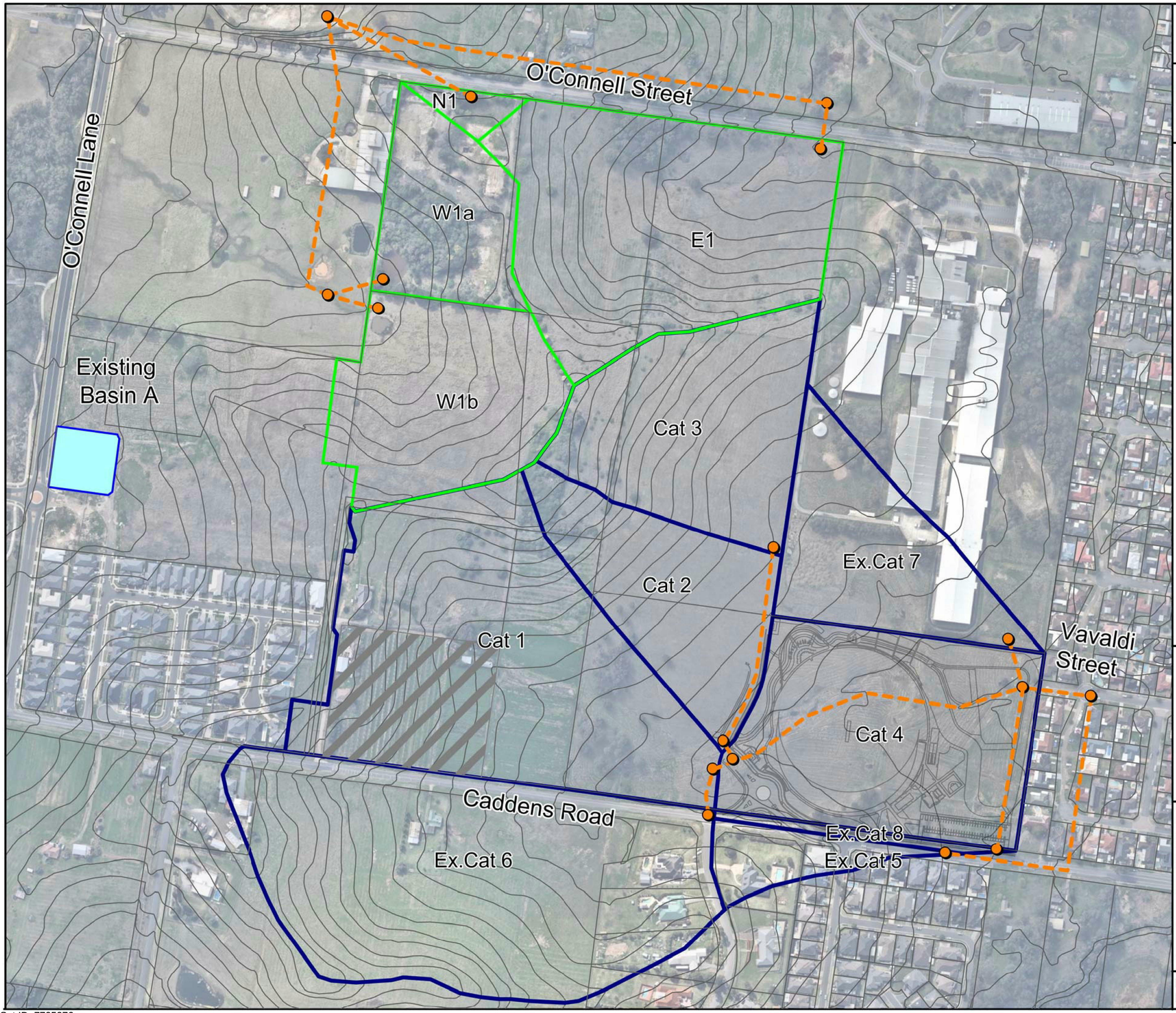
Source: 110358_RA6 Dev (South).xp

B.3 Discussion of Modelling Results

The following key discussions are provided:

- The results of the revised hydrological modelling show that the proposed detention basin "D" will ensure that post-development flows do not exceed pre-development flows at key comparison locations for the 1%, 20% and 50% AEP storm events.
- Section 3.3.4 of Council's Technical Guidelines (PCC, 2013) states that "large open basins (greater than $50m^3$)" can have a maximum depth up to 1200 mm.
- With regards to plant life in raingarden areas, results indicate that the depth of on-site detention (over the extended detention zone) is limited in the 50% AEP to 0.52m for basin D which is consistent with the original strategy. Results also indicate that the basins will drain out in a relatively short time frame (approximately three (3) hours). Suitable plant species will therefore be selected on this basis.
- The peak detention volume depth of 0.98 m only occur in the major 1% AEP event, with results showing that the basins will entirely drain within four (4) hours. The risk to plant life is therefore considered to be minimal.

ATTACHMENT C – REVISED FIGURES



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J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS & PROJECT MANAGERS
PO Box 4366 PENRITH WESTFIELD NSW 2750
P 02 4720 3300 W www.jwprince.com.au
F 02 4721 7638 E jwp@jwprince.com.au

LEGEND

- XP-RAFTS Catchments (North)
- XP-RAFTS Catchments (North-West)
- XP-RAFTS Catchments (South)
- Basin
- Future Development
- XP-RAFTS Node/Basin
- XP-RAFTS Link
- Cat 1 — XP-RAFTS Catchment Name

N
W E
S

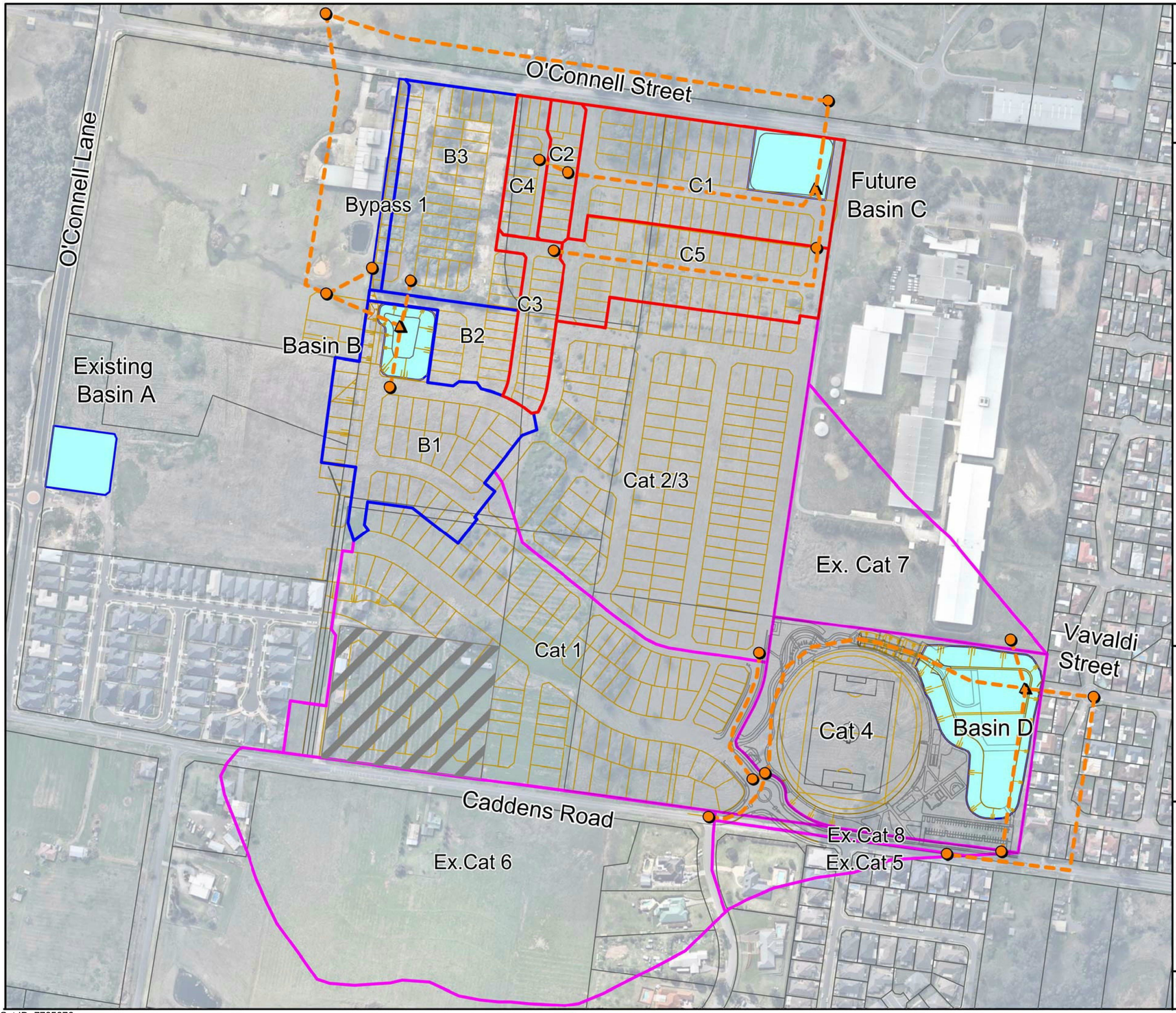
Scale 1: 3,500 @ A3

100 0 m

Figure 1
Stages 2 to 4
O'Connell Street
Caddens

Existing Catchment Plan

File Name: 110358 Figure 1
Date : 9/06/17 Issue : B



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& PROJECT MANAGERS
PO Box 4366 PENRITH WESTFIELD NSW 2750
P 02 4720 3300 W www.jwprince.com.au
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LEGEND

- XP-RAFTS Catchments (North)
- XP-RAFTS Catchments (North-West)
- XP-RAFTS Catchments (South)
- Basin
- Future Development
- XP-RAFTS Node/Basin
- XP-RAFTS Link
- Cat 1 — XP-RAFTS Catchment Name

N W E S

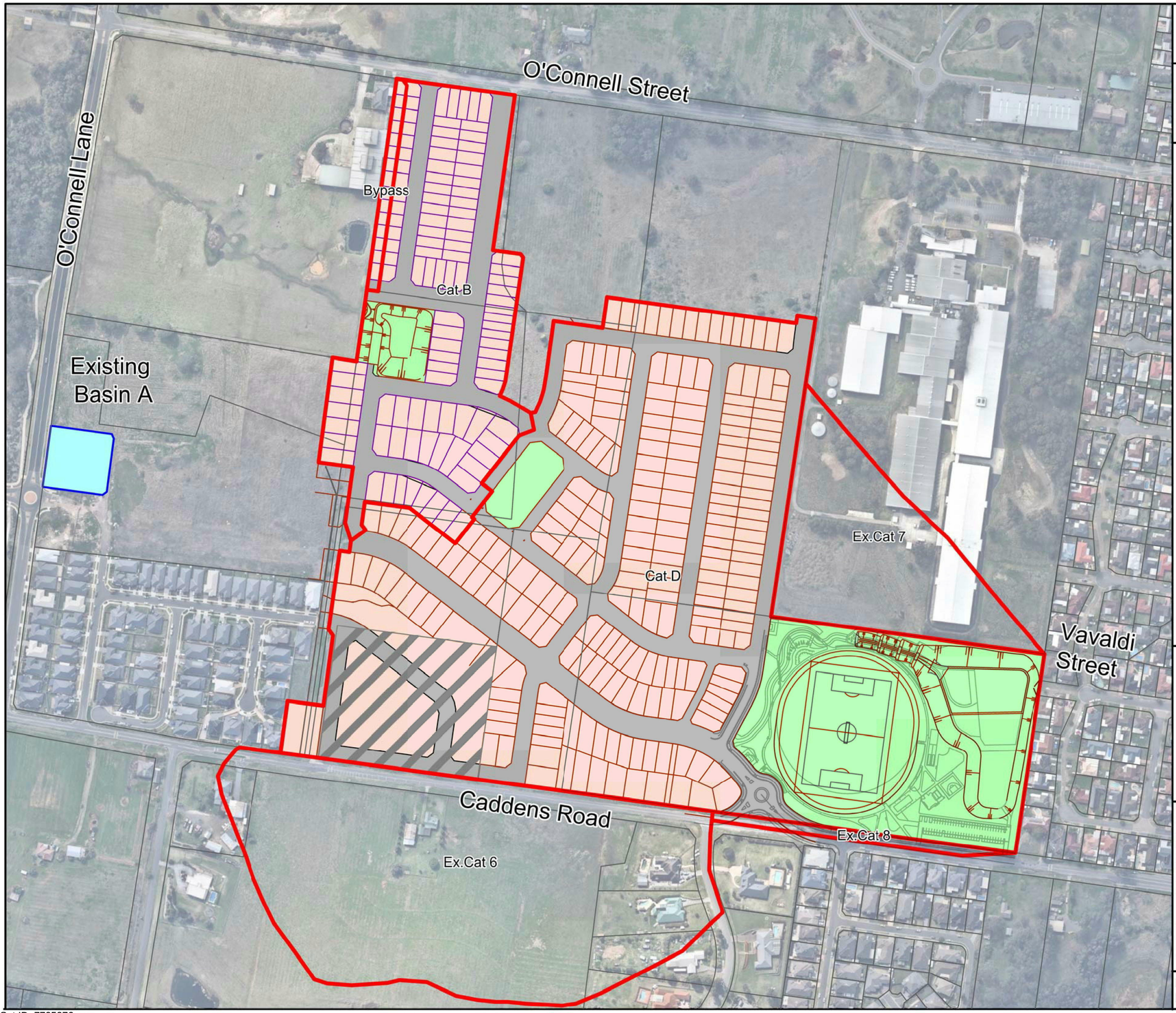
Scale 1: 3,500 @ A3

100 0 m

Figure 2
Stages 2 to 4
O'Connell Street
Caddens

Developed Catchment Plan

File Name: 110358 Figure 2
Date : 9/06/17 Issue : B



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F 02 4721 7638 E jwp@jwprince.com.au

LEGEND

- MUSIC Catchment Boundary
- Residential Lots
- Road Reserve
- Open Space
- Future Development

N
W E
S

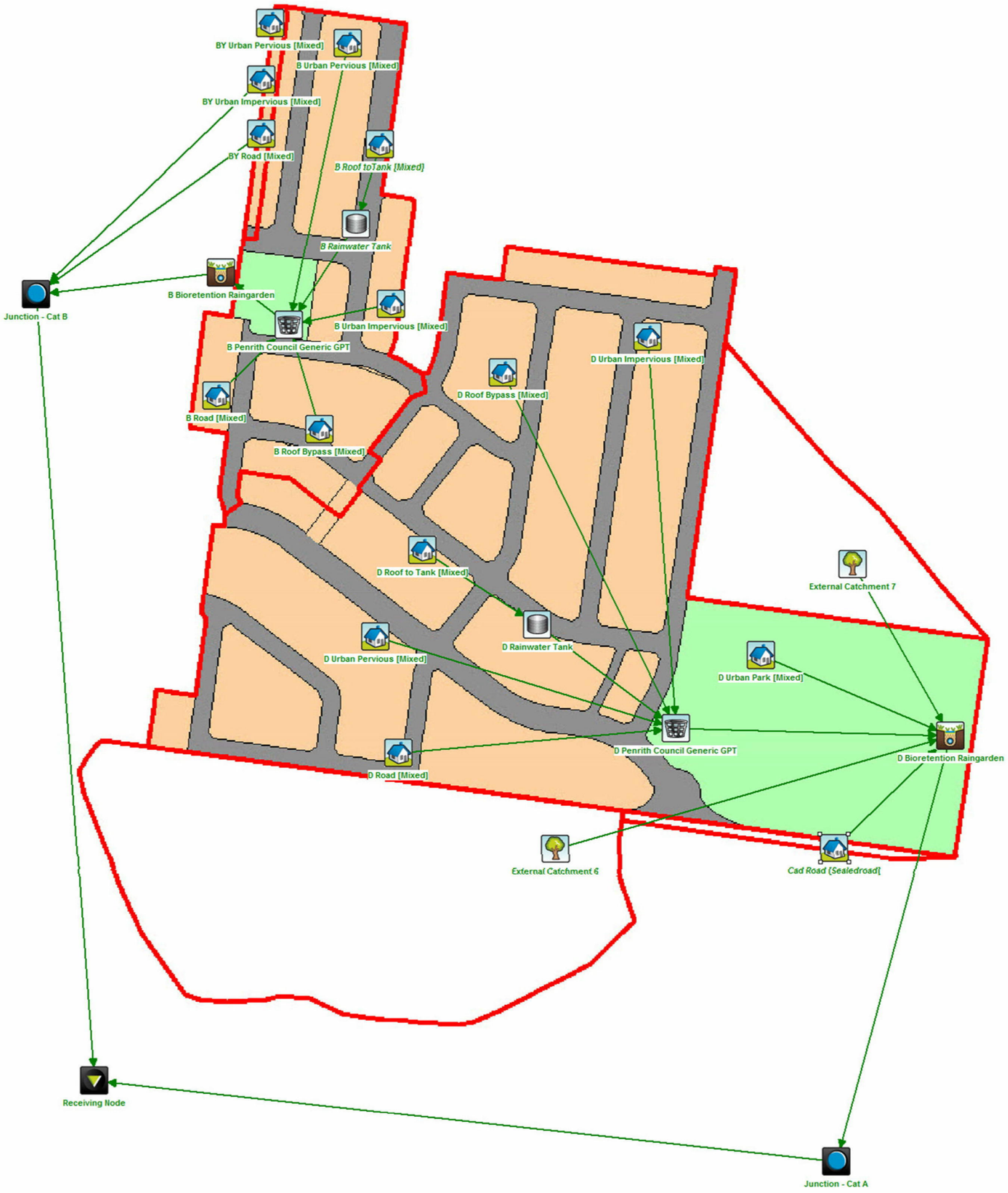
Scale 1: 3,500 @ A3

100 0 m

Figure 3
Stages 2 to 4
O'Connell Street
Caddens

MUSIC
Catchment Plan

File Name: 110358 Figure 3
Date : 9/06/17 Issue : C



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LEGEND

- MUSIC Catchment Boundary
- Residential Lots
- Road Reserve
- Open Space
- Future Development

N
W E
S

Figure 4
Stages 2 to 4
O'Connell Street
Caddens

MUSIC
Catchment Plan

File Name: 110358 Figure 4
Date : 9/06/17 Issue : C

ATTACHMENT D – XP-RAFTS INPUT DETAILS

RAFTS INPUT PARAMETERS

Table B 1 - Initial / Continuing Loss

Initial/ Continuing Losses		
Loss	**Pervious Catchment**	**Impervious Catchment**
Initial Loss	10.0	1.0
Continuing Loss	2.5	0.0

Table B 2 - Adopted PERNS

Catchment Condition	Adopted PERNs
Rural Pervious	0.05
Urban Pervious	0.025
Urban Impervious	0.015

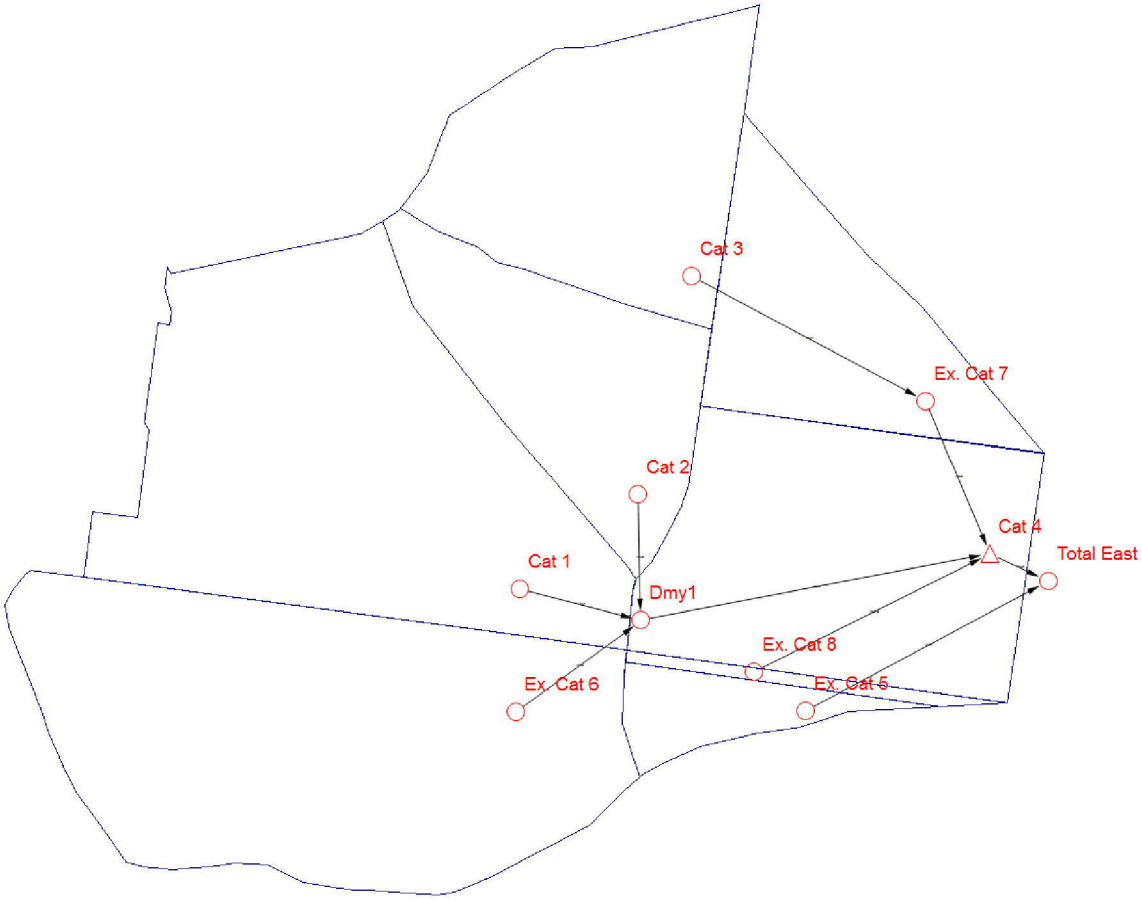


Plate B.1 – XP-RAFTS Layout Existing (Southern portion of site)

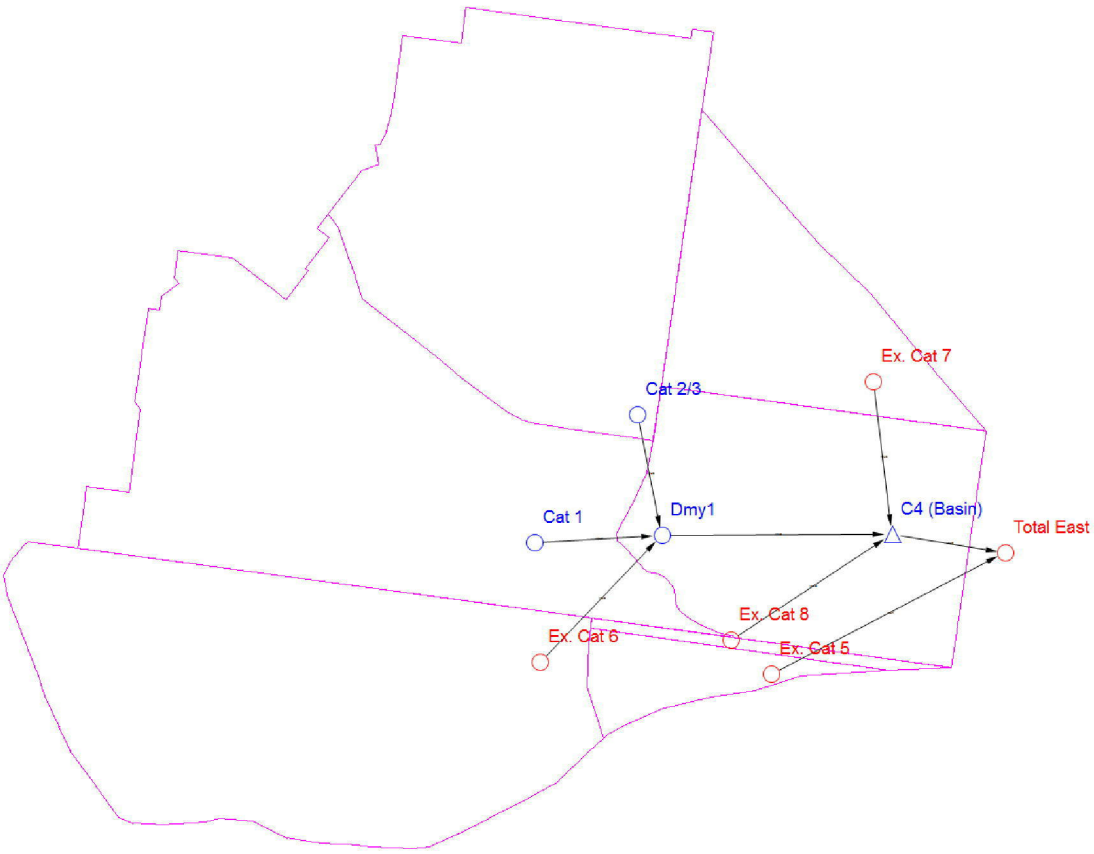


Plate B.2 – XP-RAFTS Layout Developed (Southern portion of site)

Table B 3 – SOUTHERN PORTION OF SITE

XP-RAFTS Model - Southern Portion of Site

Existing

Catchment Name	Area (Ha)	Fraction Impervious	Slope U/S Level	Slope D/ S Level	Slope Length	Catchment Slope	Area (Ha) Impervious	Area (Ha) Pervious
Cat 1	8.2	5	69.4	43.2	433	6%	0.4	7.8
Cat 2	3.3	5	73	42.4	340	9%	0.2	3.1
Cat 3	4.2	5	71.5	46.8	246	10%	0.2	4.0
Cat 4	5.5	5	45.7	37	350	2%	0.3	5.2
Ex.Cat 5	1.1	85	51.8	37.3	471	3%	1.0	0.2
Ex.Cat 6	8.8	15	73.5	45.7	305	9%	1.3	7.5
Ex.Cat 7	3.1	20	52	37.8	394	4%	0.6	2.5
Total	34.3							

Links Name	Length	Link time at 2m/s
dmy 2 - out	300	2.5
dmy 1 - out	350	2.9

Developed

Catchment Name	Area (Ha)	Fraction Impervious	Slope U/S Level	Slope D/ S Level	Slope Length	Catchment Slope	Area (Ha) Impervious	Area (Ha) Pervious
Cat 1	8.8	85	67	43.8	434	5%	7.5	1.3
Cat 2/3	7.8	85	67.6	44.6	623	4%	6.6	1.2
Cat 4	5.1	50	41.5	37.9	358	1%	2.56	2.56
Ex.Cat 5	1.1	85	51.8	37.3	471	3%	1.0	0.2
Ex.Cat 6	8.8	15	73.5	45.7	305	9%	1.3	7.5
Ex.Cat 7	3.1	20	52	37.8	394	4%	0.6	2.5
Total	34.80							

Links Name	Length	Link time (min) at 2m/s
Ex Cat 6 - dummy	95	0.8
Cat 2/3 - dummy	94	0.8
dummy to outlet	358	3.0

ATTACHMENT E – MUSIC MODELLING PARAMETERS AND REPORT

110358 - MUSIC MODELLING WORKSHEET

O'CONNELL LANE - STAGES 2 - 4

	Catchment Division				Node Inputs								
Catchment	Total Catchment Area (ha)	Residential Lot Area (ha)	Road (icl. Reserve) Area (ha)	Open Space	Road (ha)	Roof to Tank (ha)	Roof Bypass (ha)	Urban Impervious	Urban Pervious	Forest	check	RG Size (ha)	RG Size (% cat)
Catchment D	22.12	11.414	5.207	5.504	5.207	4.280	4.280	3.893	4.464	0.000	22.12	0.33187	1.50%
Catchment B	5.75	3.461	1.777	0.516	1.777	1.298	1.298	0.604	0.777	0.000	5.75	0.08631	1.50%
External Cat 6	8.81	0.000	0.000	8.806	0.000	0.000	0.000	0.000	0.000	8.806	8.81	Part of D	
External Cat 7	3.08	0.000	0.000	3.083	0.000	0.000	0.000	0.000	0.000	3.083	3.08	Part of D	
External Cat 8	0.25	0.000	0.190	0.060	0.190	0.000	0.000	0.030	0.030	0.060		0.00375	1.50%
Bypassing	0.23	0.216	0.012	0.000	0.012	0.000	0.000	0.184	0.032	0.000	0.23	Assumed Not Treated	

O'Connell Lane bypassing - assumed not to be part of treatable flows

Assumed external catchments remain undeveloped, yet remain part of this assessment

Flow to GPT/Raingarden

	Area (ha)	1yr Flow (m^3/s)	3mth Flow (m^3/s)
Catchment D - park	17.01	1.18	0.61
Catchment D + Cat 6, 7(ext) & 8	34.26	2.06	1.07
Catchment B	5.75	0.49	0.26
O'Connell Lane	Assumed Not Treated		

Section of Cat D that does not go through GPT:

Catchment	Total	Urban Impervious	Urban Pervious
Park	5.11	2.56	2.56
remainder	17.01	1.34	1.91

					RAINWATER TANK						
					Overflow Pipe Dia		High Flow By-pass	Daily Demand	PET - RAIN		Tank Surface Area
	Catchment	Lots	Equivalent Pipe Area (m^2)	Equivalent Pipe radius (m)	Equivalent Pipe dia (mm)	Total Area of Roof to Tank (Ha)	1yr flow on roof (m^3/s)	Daily Demand (kL)	Annual Demand (kL/yr)	Total Tank Volume (m^3)	Tank Surface Area (m^2)
	Catchment D	222	0.436	0.372	745	4.280	0.892	17.76	5550	532.8	416.25
	Catchment B	103	0.202	0.254	507	1.298	0.270	8.24	2575	247.2	193.13
	Catchment C	122	0.239	0.276	552	1.571	0.327	9.76	3050	292.8	228.75
*Backyard only	Bypassing	0	0.000	0.000	0	0.000	0.000	0	0	0.0	0.00

Captured - 447 lots only, including Existing development, excluding external catchment

Bypassing - Backyard potion of lots assumed not to have rainwater tanks with backyard flows darining to X street

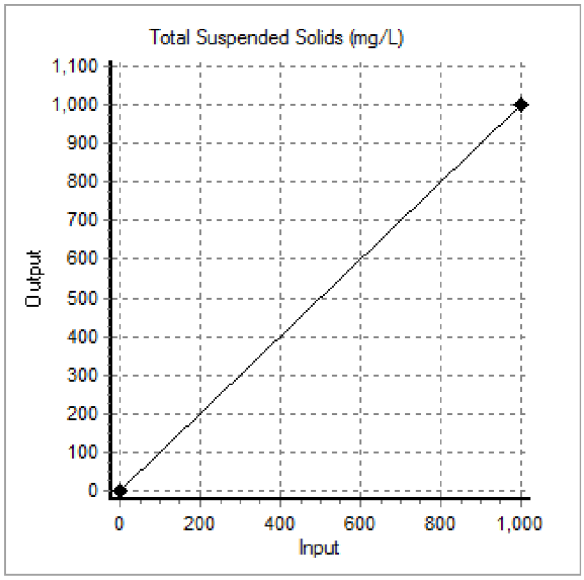
PET - Rain for landscape area	25	kL/year/dwelling
Assumed Daily Demand	80	L/day
Adopted Tank Size	3	kL
Assumed 80% is useable (w/o topups)	80	%
Useable tank	2.4	kL
Assumed Tank height	1.6	m
I5min/1yr	75	mm/hr

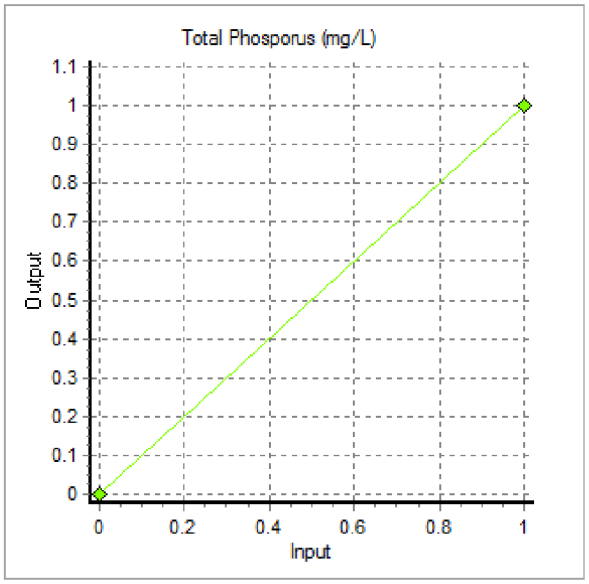
Basin 'A' Raingarden Design Parameters		Value
Catchment Area	(ha)	10.37
High Flow Bypass (3 month ARI)	(m^3/s)	0.45
Extended Detention Depth	(m)	0.3
Raingarden Storage Surface Area	(m^2)	1250
Filter Depth	(m)	0.5

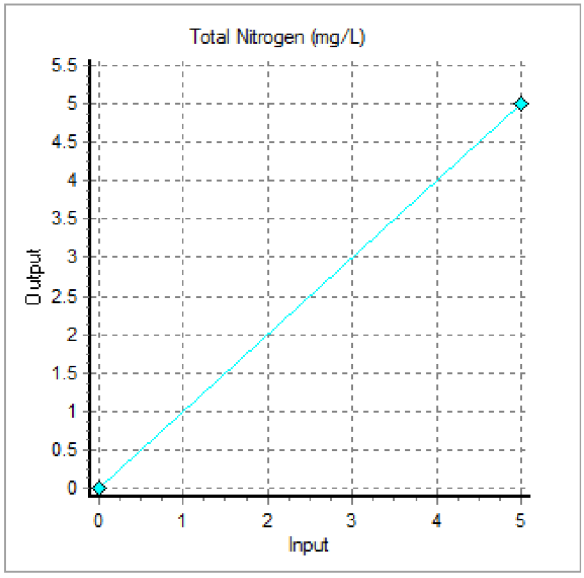
Input

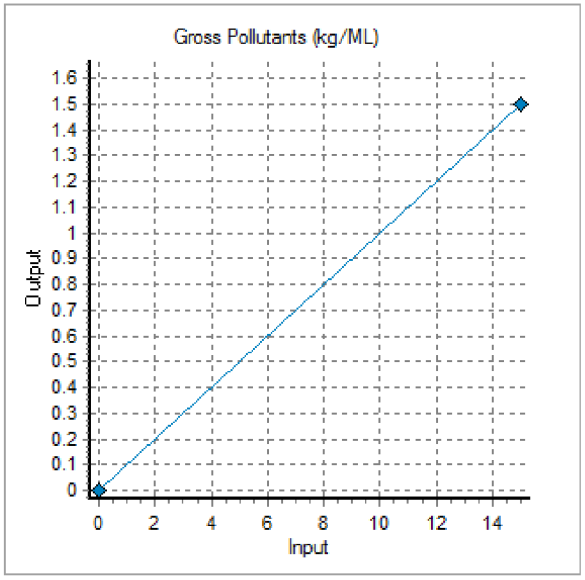
MUSIC Input

Gross Pollutant Parameters (adopted in MUSIC)









PENRITH CITY COUNCIL

music@link

MUSIC-*link* Report

Project Details		Company Details	
Project:	110358 O' Connell Lane Caddens	**Company:**	J Wyndham Prince
Report Export Date:	30/05/2017	**Contact:**	David Crompton
Catchment Name:	110358_MU5	**Address:**	580 High Street, Penrith, NSW
Catchment Area:	40.238ha	**Phone:**	02 4720 3340
Impervious Area*:	56.49%	**Email:**	DCrompton@jwprince.com.au
Rainfall Station:	67113 PENRITH		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1999 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	691mm		
Evapotranspiration:	1158mm		
MUSIC Version:	6.2.0		
MUSIC-link data Version:	6.20		
Study Area:	Penrith		
Scenario:	Penrith Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Receiving Node	**Reduction**	**Node Type**	**Number**	**Node Type**	**Number**
Flow	12.9%	Bio Retention Node	2	Urban Source Node	15
TSS	85.3%	Rain Water Tank Node	2	Forest Source Node	2
TP	70.4%	GPT Node	2		
TN	60%				
GP	96.2%				

Comments

Rainwater reuse demand (80%) not required

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	B Bioretention Raingarden	Hi-flow bypass rate (cum/sec)	None	99	0.26
Bio	B Bioretention Raingarden	PET Scaling Factor	2.1	2.1	2.1
Bio	D Bioretention Raingarden	Hi-flow bypass rate (cum/sec)	None	99	1.07
Bio	D Bioretention Raingarden	PET Scaling Factor	2.1	2.1	2.1
Forest	External Catchment 6	Area Impervious (ha)	None	None	0
Forest	External Catchment 6	Area Pervious (ha)	None	None	8.806
Forest	External Catchment 6	Total Area (ha)	None	None	8.806
Forest	External Catchment 7	Area Impervious (ha)	None	None	0
Forest	External Catchment 7	Area Pervious (ha)	None	None	3.083
Forest	External Catchment 7	Total Area (ha)	None	None	3.083
GPT	B Penrith Council Generic GPT	Hi-flow bypass rate (cum/sec)	None	99	0.26
GPT	D Penrith Council Generic GPT	Hi-flow bypass rate (cum/sec)	None	99	0.61
Receiving	Receiving Node	% Load Reduction	None	None	12.9
Receiving	Receiving Node	GP % Load Reduction	90	None	96.2
Receiving	Receiving Node	TN % Load Reduction	45	None	60
Receiving	Receiving Node	TP % Load Reduction	60	None	70.4
Receiving	Receiving Node	TSS % Load Reduction	85	None	85.3
Urban	B Road	Area Impervious (ha)	None	None	1.725
Urban	B Road	Area Pervious (ha)	None	None	0.096
Urban	B Road	Total Area (ha)	None	None	1.822
Urban	B Roof Bypass	Area Impervious (ha)	None	None	1.281
Urban	B Roof Bypass	Area Pervious (ha)	None	None	0
Urban	B Roof Bypass	Total Area (ha)	None	None	1.281
Urban	B Roof toTank	Area Impervious (ha)	None	None	1.281
Urban	B Roof toTank	Area Pervious (ha)	None	None	0
Urban	B Roof toTank	Total Area (ha)	None	None	1.281
Urban	B Urban Impervious	Area Impervious (ha)	None	None	0.604
Urban	B Urban Impervious	Area Pervious (ha)	None	None	0
Urban	B Urban Impervious	Total Area (ha)	None	None	0.604
Urban	B Urban Pervious	Area Impervious (ha)	None	None	0
Urban	B Urban Pervious	Area Pervious (ha)	None	None	0.777
Urban	B Urban Pervious	Total Area (ha)	None	None	0.777
Urban	BY Road	Area Impervious (ha)	None	None	0.011
Urban	BY Road	Area Pervious (ha)	None	None	0.000
Urban	BY Road	Total Area (ha)	None	None	0.012
Urban	BY Urban Impervious	Area Impervious (ha)	None	None	0.183
Urban	BY Urban Impervious	Area Pervious (ha)	None	None	0
Urban	BY Urban Impervious	Total Area (ha)	None	None	0.183
Urban	BY Urban Pervious	Area Impervious (ha)	None	None	0
Urban	BY Urban Pervious	Area Pervious (ha)	None	None	0.032

Only certain parameters are reported when they pass validation

PENRITH CITY COUNCIL

music@link

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	BY Urban Pervious	Total Area (ha)	None	None	0.032
Urban	Cad Road	Area Impervious (ha)	None	None	0.224
Urban	Cad Road	Area Pervious (ha)	None	None	0.025
Urban	Cad Road	Total Area (ha)	None	None	0.25
Urban	D Road	Area Impervious (ha)	None	None	5.014
Urban	D Road	Area Pervious (ha)	None	None	0.237
Urban	D Road	Total Area (ha)	None	None	5.252
Urban	D Roof Bypass	Area Impervious (ha)	None	None	4.263
Urban	D Roof Bypass	Area Pervious (ha)	None	None	0
Urban	D Roof Bypass	Total Area (ha)	None	None	4.263
Urban	D Roof to Tank	Area Impervious (ha)	None	None	4.263
Urban	D Roof to Tank	Area Pervious (ha)	None	None	0
Urban	D Roof to Tank	Total Area (ha)	None	None	4.263
Urban	D Urban Impervious	Area Impervious (ha)	None	None	1.34
Urban	D Urban Impervious	Area Pervious (ha)	None	None	0
Urban	D Urban Impervious	Total Area (ha)	None	None	1.34
Urban	D Urban Park	Area Impervious (ha)	None	None	2.542
Urban	D Urban Park	Area Pervious (ha)	None	None	2.568
Urban	D Urban Park	Total Area (ha)	None	None	5.111
Urban	D Urban Pervious	Area Impervious (ha)	None	None	0
Urban	D Urban Pervious	Area Pervious (ha)	None	None	1.91
Urban	D Urban Pervious	Total Area (ha)	None	None	1.91

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Rain	B Rainwater Tank	% Reuse Demand Met	80	None	62.87
Rain	D Rainwater Tank	% Reuse Demand Met	80	None	69.82

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