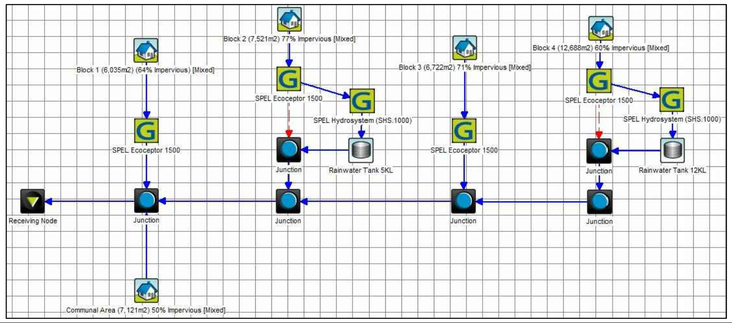
STORMWATER MANAGEMENT SCHEDULE

Block	Block 1	Block 2	Block 3	Block 4	Common	Total
Block Area	**6035**	**7521**	**6722**	**12688**	**7,121**	**40087**
Impervious Area - Roof Area						
Roof Connected to rainwater storage	**1728**	**3156**	**2545**	**4290**	**0**	**11719**
Roof area not connected to storage	0	0	0	0	0	
Total	**1,728**	**3,156**	**2,545**	**4,290**	**0**	**11,719**
Impervious Area - Paved Areas						
Hard Paved Areas (shedding to drainage)	1374	2066	1541	1650	2380	6631
Permeable / porous paving (shedding to drainage)						
Paved areas shedding runoff to garden beds and/or lawns	733.25	574.75	659	1687	1185.25	3654
Total	**2,107**	**2,641**	**2,200**	**3,337**	**3,565**	**10,285**
Total Impervious areas *(with 50% reduction applied to permeable paving areas, and excluding paving with runoff to garden beds and or lawn)*	**3,835**	**5,797**	**4,745**	**7,627**	**3,565**	**22,004**
Minimum Site Storage Required						
Development Type						
Portion of site area excluded from retention calculation	**50%**	**50%**	**50%**	**50%**	**50%**	**50%**
Impervious area contributing to storage volume calculation	818	2,036	1,384	1,283	5	5,521
Site storage required at 1.4kl per 100m^2 of impervious area	**11**	**29**	**19**	**18**	**0**	**77**
OSD						
Impervisity	64%	77%	71%	60%	50%	55%
Proportion of site	15%	19%	17%	32%	18%	100%
PSD	81.9	102.1	91.3	172.3	96.7	544
Share of OSD Storage	65.1	81.1	72.5	136.8	76.8	432
ESD contribution to OSD	50%	50%	50%	50%	50%	50%
Net OSD required	59.3	66.8	62.8	127.8	76.7	393.4
Combined tank volume	**70.8**	**95.3**	**82.1**	**145.8**	**76.8**	**470.8**

POLLUTION REDUCTION SCHEDULE

Music Inputs	Block 1	Block 2	Block 3	Block 4	Common	Total
Total Area	6035	7521	6722	12688	7121	40087
Impervisity	64%	77%	71%	60%	50%	55%
ESD	11	29	19	18		77
OSD	59.3	66.8	62.8	127.8		316.7
Re-use Retention	0	5000	0	12000		17000.0
Reuse rate (l/day)	0	398	0	820	0	1218.6
GPT	Optional	Yes	Optional	Yes	No	Varies
SQID	No	Optional	No	Optional	No	Varies

Music Node Diagram



Treatment Train Effectiveness

	Sources	Residual Load	% Reduction
Flow (ML/yr)	17.9	17.5	2.3
Total Suspended Solids (kg/yr)	2770	743	73.2
Total Phosphorus (kg/yr)	4.01	1.24	69
Total Nitrogen (kg/yr)	47.7	22.2	53.4
Gross Pollutants (kg/yr)	676	114	83.1

WATER REDUCTION CALCULATIONS

Subdivision		Precinct 1	Precinct 2	Precinct 3	Precinct 4	Development Totals
Indoor Information	No units / townhouses	112	44	39	46	241
	Average beds per unit / TH	1.88	2	2	2	1.94
	Number of Bedrooms	210	88	78	92	468
	Shower Head Rating	4 Star	4 Star	4 Star	4 Star	4 Star
	Clothes Washing Machine Rating	4 Star	4 Star	4 Star	4 Star	4 Star
	Dishwashers Rating	5 Star	5 Star	5 Star	5 Star	5 Star
	Toilet Rating	4 Star	4 Star	4 Star	4 Star	4 Star
Site Information	Site Area (m^2)	**6035**	**7521**	**6722**	**12688**	**32,966**
	Total Roof Area (m^2)	1728	3156	2545	4290	11719
	Lawn Area (m^2)	0				0
	Irrigated Garden Area (m^2)	1,100	862	989	2531	5481
	Impervious Pavement or Driveway (m^2)	2107	2641	2200	3337	10285
Rainwater Tank information	Are There going to be water tanks installed	No	Yes	No	Yes	Varies
	Total size of all the tanks (ltr)	0	5000	0	12000	17,000
	Total impervious area flowing into the tanks (m^2)	3835	5797	4745	7627	22,004
	What will be the use for the water in the tanks	n/a	Garden	n/a	Garden	Varies
Pool, Spa or Pond Information	Is there going to be a pool, spa, or pond ?	Yes	No	No	No	Varies
	Is there going to be a cover on the pool or spa ?	Yes	-	-	-	
	Average depth of the pool, spa or pond (m)	1.2	-	-	-	
	Average length of the pool, spa or pond (m)	35	-	-	-	
	Average width of the pool, spa or pond (m)	5	-	-	-	
	The volume of the pool, spa or pond is (ltr)	210,000	-	-	-	
Water Reduction Information	Potable Water Usage with Reductions (L/day)	20,947	8,776	8,229	10,129	**48,082**
	Pre 2003 Potable Water Usage (L/day)	34,981	15,232	13,507	16,560	**80,279**
	Reduction (L/day)	14,033	6,456	5,278	6,431	**32,198**
	% Reduction	40%	42%	39%	39%	40%

WSUD COMPLIANCE SCHEDULE

Rule	Requirement	Response
R86	The Development achieves a minimum 40% reduction in mains water consumption compared to an equivalent development constructed in 2003, without reliance on landscaping measures	Compliance is achieved by the use of high water efficiency fixtures and appliances as scheduled below. Basins: 4 Star (7.0l/min) Showers: 4 Star (7.5l/min max flow rate) WC's : 4 Star (4.5/3.0ltr dual flush) Dishwashers: 4 Star (supplied with unit inclusions) Washing Machines: 4 Star (supplied with unit inclusions) In addition to the above the Irrigation systems to blocks 2 and 4 will be provided with harvested rainwater. Refer to Water Reduction spreadsheet provided on this drawing for demonstration of compliance for each block and the development as a whole.
R87	On sites larger than 2000m^2 stormwater management measures comply with all of the following: a) provision for the retention of stormwater on the block is equivalent to at least 1.4kl per 100m2 of impervious area. b) the retained stormwater complies with one of more of the following - i) is stored for later re-use ii) it is released to the stormwater system over a period of not less than 1 day	As the site is a commercial redevelopment the storage volume has been calculated based on 50% of the site area being excluded from the calculation as permitted by the ACT Water Ways WSUD General Code Section 4.2 Performance Targets. Each of the 4No Blocks are provided with individual extended storage detention tanks with slow release to stormwater over 1-2 days. Blocks 2 and 4 are further provided with additional retention storage for re-use to irrigation systems. Refer to separate Stormwater Management calculation spreadsheet on this drawing for the extended storage detention volumes to be provided for each site. The common area is not provided with storage as the high degree of pervious area results in additional storage not being required.
R88	For blocks 5,000m^2 or larger, the average annual stormwater pollutant export is reduced for all of the following : a) suspended solids by at least 60% b) total phosphorous by at least 45% c) total nitrogen by at least 40% compared with an urban catchment with no water quality managment controls.	This criteria is achieved by the the implementation of a Stormwater Quality Improvement treatment trains to each block to receive all inflow from the piped systems, and each comprising of; i) Spel Ecoceptor gross pollutant trap, followed by a Spel Hydrosystem for nutrient reduction in the cases of Blocks 2 and 4. ii) in the case of Blocks 2 and 4 the discharge from the SQID for flow rates up to a one in three month storm event will be directed a SW retention tank from which water will be used for irrigation on the respective blocks. The outcomes of the above treatment measures have been modelled utilising MUSIC Version 6.0 with the following reduction outcomes, demonstrating compliance with the required reductions.
R89	On previously developed blocks larger than 2000m^2 the capacity of the existing pipe (minor) stormwater connection is not exceeded in the 1-in-10 year storm event and the capacity of the existing major overland stormwater system is not exceeded in the 1-in-100 year stormevent.	Compliance with this criteria is achieved by the provision of an Onsite Stormwater Detention systems for each block to limit the post development stormwater run-off to the flow rate corresponding to the 1-in-5 Year storm event for the existing site conditions, together with the limiting capacity of the existing 450dia stormwater tie point servicing the site. The OSD systems will comprise of; i) An OSD control sump fitted with a orifice plate to the outlet drain to ensure a maximum discharge rate as individually calculated for each block to achieve a combined maximum discharge rate of 544l/s for the development. ii) Below ground OSD tanks are connected to the control sump in order to achieve high early discharge. The tanks have been sized to contain the full run-off from a 1-in-100 year stormevent. Refer to the Stormwater Management Schedule on this drawing for the individual site PSD's and detention storage volumes.

This site is zoned under the Territory Plan as CZ2 and accordingly is required to comply with the Commercial Zones Development Code which under Part F requires Residential development in Commercial zoned areas to comply with the Multi Unit Housing Development Code. Accordingly the WSUD design response for this project has been determined to comply with Element 8: Enviroment of the Multi Unit Housing Development Code. Extracts from the code together with compliance statements are provided in the above schedule.

No.	REVISION/ISSUE	DATE	BY	CHECKED
4	WORKS APPROVAL ISSUE	23.01.19	DNT	DNT
3	DCP AND CONCEPT PLAN ISSUE	03.09.18	DNT	DNT
2	PRELIMINARY AMENDED MASTERPLAN ISSUE	28.08.18	DNT	DNT
1	MASTERPLAN ISSUE	14.12.16	APT	DNT

DOMA

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DRAWN: APT | DESIGNED: DNT | CHECKED:

PROJECT: **SECTION 38 CAMPBELL**

BLOCK: 4&5 SECTION: 38 SUBURB: CAMPBELL

DRAWING: HYDRAULIC SERVICES SW MANAGEMENT SCHEDULES

File Name: TH180036-WA-H002.DWG
Plot Date: 24/01/2019 7:18 AM

DATE: AUG'18 | SCALE: NTS

PROJECT: TH180036 | DWG No: H002 | REV: 4 | STATUS: PRELIMINARY

A1 SHEET