

Appendix F
Sewer Pump Station Upgrade Assessment

For former Gosford LGA a sewer pump station assessment was carried out for all the pump stations in 2012 Mater Plan study.

The first step was to identify the SPSs that need amplifications for the 2012 scenario.

This study identified the pump stations that need amplifications on emergency storage and pump capacity by assessing dry weather emergency storages and peak wet weather flow.

Peak wet weather analysis was carried out for 1 in 2 yr ARI, 1 in 5 yr ARI and 1 in 10Yr ARI rainfall events. However, a specific containment standard was not recommended in Master Plan study. Hence, SPSs were not included in the recommended asset amplifications.

Some of the pump stations identified as capacity restricted in 2012 Master Plan study have been amplified already (E.g. SPS SI2,KA1).

The assessment carried out for new Local Environment Plan (LEP) assessment also carried out an analysis on the pump capacity for each catchment. All sewer systems were assessed for 1 in 5 yr ARI event and pump stations that had a capacity less than or close to the peak wet weather flow were for current scenario were selected for as SPSs that need amplification.

Two sewer models were used to assess future wet weather flow;

- Master Plan Model 2012; The average and peak dry weather in each catchment was assessed by running dry weather flow runs for model scenarios in Master Plan 2012 model for future. The growth up to 2031 horizon in each catchment was assessed by these results.
- Calibrated model 2015; The storm allowance for each catchment was calculated based on dry weather and wet weather flow in the calibrated model (2015). The future wet weather flow was calculated based on future dry weather flow and storm allowance in each catchment. Proposed pump capacity was decided on the peak wet weather predicted for future horizon.

The current emergency storage time for each pump station was assessed by using the current calibrated model. The future emergency storage time for each pump station was assessed by calculating the holding time proportionately to the growth within the catchment.

Rising main velocity for the current pump capacities were obtained from the current calibrated model. The rising mains that had velocities higher than 2.5 m/s were identified for amplifications. In addition the rising main velocities were assessed for future pump capacities and proposed for amplification if the velocities were higher than 2.5 m/s.

The following attached tables shows the analysis carried out for identification of SPS upgrade , rising main amplification and emergency storage upgrade.

Pump Station Analysis carried out based on future growth and current asset performance

Service Area	Sewer SPS catchment	SPS Capacity	ADWF_Current (l/s)	1: 5 YR PWWF-Current	ADWF_2031 (l/s)	1: 5 YR PWWF-2031	Emergency Storage time-Current(hrs)	Emergency Storage time-2031(hrs)	RM Velocity-Current(m/s)	RM Velocity_2031 (m/s)	1:5 Yr ARI (Current > SPS capacity)	Year of Mech Elec Upgrade	Year of RM Upgrade	Civil Upgrade	Comments (Comparison to results in Master Plan 2012)
KMJ	ER11	18	0.9	22.8	1.7	25	7	3.8	0.8	0.80	Yes	2031		2031	Identified as capacity restrained in 2012 MP
	ER9	19	0.7	20	1.5	22	6	2.9	1.1	0.71	Yes	2031		2031	
	ER1	108	6.3	98	8.1	103	5	3.9	1	1.46	No	2031	2031		
	K1	20	2.0	23	2.0	23	4	4.0	1.1	1.30	Yes				Identified as capacity restrained in 2012 MP
	KS2	7	0.4	12.5	0.4	13	23	23.0	0.9	1.59	Yes	2021			Identified as capacity restrained in 2012 MP
	M1	154	9.0	194.6	11.1	201	4.5	3.7	1.4	1.82	Yes	2020			Due for Upgrade within 2020(Identified in IPART18-2020)
	M2	130	6.0	144.5	8.7	153	3	2.1	1.84	2.16	Yes	2021	2021	2021	Additional storage is recommended
	M3	100	3.5	109.2	5.5	115	4	2.5	3.2	3.67	Yes	2026	2026	2031	Some sewer mains exceed capacity. 1:5 Yr ARI flow exceeds the pump capacity.
	SD2	80	6.0	105.8	7.5	110	9	7.2	0.72	1.00	Yes	2021			Identified as capacity restrained in 2012 MP
	SD5	25	1.6	33	1.9	34	23	19.4	0	1.08	Yes	2026			
SD9	35	1.6	42	2.2	44	12	8.6	1.1	1.40	Yes	2026				
M4	25	1.1	31.6	1.7	34	3	1.9	1.4	1.90	Yes	2026				
ECS	S4	33	2.1	36	2.1	36	4	3.9	1.9	2.04	Yes				Some reticulation mains upstream of SPS exceed capacity
	S5	80	10.0	91	14.1	103	2.5	1.8	1.1	1.46	Yes	2026		2021	Identified as capacity restrained in 2012 MP. Some trunk mains and reticulation mains upstream of SPS exceed capacity
	S6	32	1.7	38	2.5	40	3	2.1	1.8	2.28	Yes	2026	2026	2026	Some reticulation mains upstream of SPS exceed capacity
	S8	15	1.2	29	1.8	31	7	4.7	1.93	3.92	Yes	2021	2026		Due for Upgrade within 2020(Identified in IPART18-2020)
	S9	15	3.5	21	5.5	27	4	2.5	0.22	0.38	Yes	2026			

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NAMJ	NA2	37	2.8	45	3.2	46	3	2.7	0.9	1.16	Yes	2021			Identified as capacity restrained in 2012 MP. Some mains exceeding capacity
	NA3	10	0.6	12	0.9	13	5	3.3	1.3	1.64	Yes				
	A4	82	5.8	92	8.1	99	7	5.0	1.2	1.40	Yes	2026			Identified as capacity restrained in 2012 MP & Some mains exceeding capacity
	A7*	7													Identified in CC Strategy to be upgraded in 2021/22. A7 repositioning and rising main to be connected to A1 rising main.
	A6	11	0.8	13.4	1.2	15	14	9.4	1.4	1.85	Yes	2031			Some mains exceeding capacity
TMJ	FB4	25	1.3	24	2.8	33	4	1.9	1.4	1.87	No	2019	2019	2031	SPS due for upgrade 19/20 due to rapid future development in the catchment.
	FB2	15	0.4	19	1.1	21	14	5.5	1.9	2.68	Yes	2026	2026		
	FB1B	144	5.4	165	11.1	182		0.0	2	2.58	Yes	2021	2021		Due for Upgrade within 2020(Identified in IPART18-2020)
	C15	32	1.2	34.6	2.2	38	6	3.3	1.8	2.13	Yes	2026	2026	2031	
	C13	165	11.7	226	16.6	241	4	2.8	2.3	3.40	Yes	2020	2020	2031	Due for Upgrade within 2020(Identified in IPART18-2020)
	C12	20	0.8	25	1.1	26	11	8.7	1.1	1.45	Yes	2026			
	C11	15	0.9	17.7	1.2	19	9.5	7.1	1.9	2.37	Yes	2031	2031		
	C8	30	2.3	36	3.3	39	7	4.9	1.7	2.21	Yes	2031	2031		I/I reduction program proposed for 2019/20. Pump may be not necessary depending on this program.
	C5A	34	2.7	35.6	4.0	39	2	1.4	1.9	2.22	Yes	2031	2031	2031	I/I reduction program proposed for 2019/20. Pump may be not necessary depending on this program.
C1	108	6.9	112	7.7	114	7.5	6.7	1.4	2.88	Yes	2031	2031	2031	Sewer mains and SPS have reached the capacity	
WGMJ	KA2	50	2.1	60.4	3.0	63	2	1.4	1	1.29	Yes	2031		2031	Flow exceeds capacity in some reticulation and emergency storage available is less than 4hrs
	WG3A	160	14.3	187	18.9	201	12	9.1	1.4	1.26	Yes	2021			Flow exceeds capacity in trunk mains and some reticulation
	WG4	100	6.4	109	8.7	116	3.25	2.4	1.4	1.64	Yes	2026		2026	Identified as capacity restrained in 2012 MP
	WG6	60	3.9	67.8	5.2	72	10	7.5	1.2	1.46	Yes	2026			Identified as capacity restrained in 2012 MP
WYMJ	N2	25	1.2	23	2.2	26		0.0	1.3	0.83	No	2026			Identified as capacity restrained in 2012 MP
WWMJ	OB2	25	0.7	27	0.8	27	20	17.5	1.4	1.54	Yes	2031			Identified as capacity restrained in 2012 MP