



Licence WU67 Monthly Environmental Flow Report October 2022

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1. Introduction

Icon Water holds a Licence to Take Water under the Water Resources Act 2007 – Licence Number WU67.

Under Licence Number WU67 clause C1, it is a requirement to provide the following information to the Environment Protection Authority (EPA) by the 15th day of each month.

2. Compliance Analysis and Operational Interactions

Table 1 - Notes relating to the reporting month Environmental Flow releases

Reservoir	Notes
Corin	Corin Dam spilled throughout October. The bi-monthly riffle release was achieved from spillway flow. Releases were at licence requirements throughout October.
Bendora	Bendora Dam spilled throughout October. Planned release variation was changed to +/-25% on 20 September to minimise dislodgement of Macquarie Perch eggs in downstream reaches. The bi-monthly riffle release was achieved from spillway flow. Releases were at licence requirements throughout October.
Cotter	Cotter Dam spilled throughout October. Releases were at licence requirements throughout October.
Googong	Googong Dam spilled throughout October. The Googong mini-hydro generator operated from 26 October. Releases above licence requirements while the mini-hydro was operating.

Table 2 – Notes relating to abstraction from Murrumbidgee River

Mt MacDonald river gauge	Not applicable, natural river flows.
Murrumbidgee abstraction	There was no Murrumbidgee River abstraction for consumption in October.
Murrumbidgee To Cotter Eflow	M2C did not operate in October.
Murrumbidgee to Googong	M2G did not operate in October .
Angle Crossing river gauge	Not applicable, natural river flows.

3. Environmental Release Data

The environmental flow release requirements for the current month (a combination of requirements) are detailed in Table 3.

Table 3 – Current month Environmental Flow releases (Total for month in ML)

	Corin	Bendora	Cotter	Googong
Previous month's shortfall (-) or Excess (+) *	129	201		
Monthly 75% of the 80 th %tile ML #	1290	2010		
Additional release required?	No	No	No	No
Current month's release target	1161	1809	535	390

Note: * Excess carried forward is capped at 10% of the current month's base flow.

Shortfall carried forward is 100% of the amount of water under released.

Under stage 1 or greater water restrictions, targets flow change to a predetermined base flow.

Daily totals in Table 4 to Table 7 are reported as the 24-hour average from midnight to midnight. Operational changes to environmental flow releases occur during business hours, and therefore the value reported may be slightly different to the target flow on the day the flow is changed. This is particularly evident for large changes in flow e.g. the riffle and pool flushes as the flow is averaged for the day.

The actual daily flows, in megalitres per day (ML/d), from each reservoir are detailed in Table 4 to Table 7 together with the water produced at the water treatment plants (WTP) in Table 10.

Table 8 provides more detail with respect to environmental flows provided below Cotter Dam. The e-flows are made up of two components: water released from the Cotter Dam and water being pumped from Murrumbidgee River to below Cotter Dam. This is to satisfy the requirements set out by ACT EPA and Federal Department of the Environment for the operation of the Enlarged Cotter Dam.

Table 9 provides flow details for the operations of the Murrumbidgee to Googong pipeline. It details daily flows through the high lift pumps station as well as daily flows in the Murrumbidgee River at Angle crossing. This is to demonstrate compliance with the requirements set out by ACT EPA, Federal Department of the Environment and NSW Department of Planning.

Table 10 also details the quantity of treated water that has been transferred to Googong reservoir from Stromlo WTP.

Table 4 - Monthly Environmental Flow release data for Corin dam

SUM	410730 Gingera (unverified)	410730 Gingera (verified)	Environmental flow release below Corin	Daily base flow	Additional release (pool / riffle)	Planned +/- 50% release regime	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	Adjusted daily base flow. EOM = Revised monthly target	410752 Corin D/S (Unverified)	410752 Corin D/S (Verified)	EOM Excess (+) / Shortfall (-) to carry forward	EOM Correction to 410730, Verified Vs unverified	EOM Correction to 410752, Verified Vs unverified	Comments
			Date												
Previous months adjustment										-198.4					
		371.6	Sat 1-Oct-22	64.00		48.0		530.8	64.0	489.15	491.9				
		347.8	Sun 2-Oct-22	64.00		48.0		496.8	64.0	473.33	475				
		319.7	Mon 3-Oct-22	64.00		48.0		456.6	64.0	443.55	443.5				
		305.2	Tue 4-Oct-22	64.00		48.0		435.9	64.0	422.11	422.2				
		404.2	Wed 5-Oct-22	64.00		48.0		577.3	64.0	476.2	476.2				
		897.5	Thu 6-Oct-22	64.00		80.0		1281.9	64.0	817.0	816.9				
		986.3	Fri 7-Oct-22	64.00		80.0		1408.7	64.0	956.3	955.1				
		979.6	Sat 8-Oct-22	64.00		80.0		1399.2	64.0	1034.1	1035				
		1091	Sun 9-Oct-22	64.00		80.0		1558.3	64.0	1058.73	1059				
		852.3	Mon 10-Oct-22	64.00		80.0		1217.3	64.0	890.10	891.3				
		729.8	Tue 11-Oct-22	64.00		80.0		1042.4	64.0	771.1	772.7				
		643.3	Wed 12-Oct-22	64.00		80.0		918.8	64.0	691.6	691.9				
		586	Thu 13-Oct-22	64.00		48.0		837.0	64.0	643.5	642.2				
		743.2	Fri 14-Oct-22	64.00		48.0		1061.5	64.0	751.1	750.6				
		580.2	Sat 15-Oct-22	64.00	150	48.0		828.7	150.0	663.7	665.8				
		503.9	Sun 16-Oct-22	64.00	150	48.0		719.7	150.0	595.5	595.8				
		506.6	Mon 17-Oct-22	64.00	150	48.0		723.6	150.0	582.6	582.6				Riffle release achieved
		444.3	Tue 18-Oct-22	64.00		48.0		634.6	64.0	552.45	552.8				
		406.9	Wed 19-Oct-22	64.00		48.0		581.2	64.0	529.04	528.3				
		377.6	Thu 20-Oct-22	64.00		80.0		539.3	64.0	496.35	495.9				
		735.5	Fri 21-Oct-22	64.00		80.0		1050.5	64.0	648.67	648.7				
		1542	Sat 22-Oct-22	64.00		80.0		2202.4	64.0	[]					410752 Data not recorded
		1205	Sun 23-Oct-22	64.00		80.0		1721.1	64.0	[]					410752 Data not recorded
		1042	Mon 24-Oct-22	64.00		80.0		1488.3	64.0	1077.24	1078				
		961.9	Tue 25-Oct-22	64.00		80.0		1373.9	64.0	980.09	981				
		837.4	Wed 26-Oct-22	64.00		80.0		1196.1	64.0	862.13	862.1				
		781.3	Thu 27-Oct-22	64.00		48.0		1115.9	64.0	801.73	802.3				
		725.8	Fri 28-Oct-22	64.00		48.0		1036.7	64.0	722.56	723.1				
		653.9	Sat 29-Oct-22	64.00		48.0		934.0	64.0	683.18	683.4				
		591	Sun 30-Oct-22	64.00		48.0		844.1	64.0	619.44	621.8				
		797.1	Mon 31-Oct-22	64.00		48.0		1138.5	64.0	734.55	734.4				
SUM	-	21949.9		1984.0	450.0	1936.0	0.0	31351.0	2043.6	20467.0	20479.5	129.0	#DIV/0!	0.1%	

Table 5 - Monthly Environmental Flow release data for Bendora dam

SUM	410730	410730	Environmental flow release below Bendora Date	Daily base flow	Additional release (pool / riffle)	Planned +/- 50% release regime	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	Adjusted daily base flow. EOM = Revised monthly target	410747	410747	EOM Excess (+) / Shortfall (-) to carry forward	EOM Correction to 410730, Verified Vs unverified	EOM Correction to 410747, Verified Vs unverified	Comments
	Gingera (unverified)	Gingera (verified)								Bendora D/S (Unverified)	Bendora D/S (Verified)				
Previous months adjustment															
		371.6	Sat 1-Oct-22	100.00			75.0		817.5	100.0	792.53	755.8			
		347.8	Sun 2-Oct-22	100.00			75.0		765.2	100.0	735.40	708.8			
		319.7	Mon 3-Oct-22	100.00			75.0		703.3	100.0	670.18	650.3			
		305.2	Tue 4-Oct-22	100.00			75.0		671.4	100.0	619.33	604.7			
		404.2	Wed 5-Oct-22	100.00			125.0		889.2	100.0	666.4	658.1			
		897.5	Thu 6-Oct-22	100.00			125.0		1974.5	100.0	1633.3	1633			
		986.3	Fri 7-Oct-22	100.00			125.0		2169.9	100.0	2151.1	2151			
		979.6	Sat 8-Oct-22	100.00			125.0		2155.1	100.0	2403.9	2404			
		1091	Sun 9-Oct-22	100.00			125.0		2400.2	100.0	2267.02	2267			
		852.3	Mon 10-Oct-22	100.00			125.0		1875.1	100.0	1839.85	1840			
		729.8	Tue 11-Oct-22	100.00			125.0		1605.6	100.0	1514.5	1514			
		643.3	Wed 12-Oct-22	100.00			75.0		1415.3	100.0	1295.4	1295			
		586	Thu 13-Oct-22	100.00			75.0		1289.2	100.0	1142.4	1142			
		743.2	Fri 14-Oct-22	100.00			75.0		1635.0	100.0	1325.7	1326			
		580.2	Sat 15-Oct-22	100.00			75.0		1276.4	100.0	1188.0	1188			
		503.9	Sun 16-Oct-22	100.00			75.0		1108.6	100.0	1006.2	1006			
		506.6	Mon 17-Oct-22	100.00			75.0		1114.5	100.0	934.0	934			
		444.3	Tue 18-Oct-22	100.00			75.0		977.5	100.0	866.67	866.7			
		406.9	Wed 19-Oct-22	100.00	150		125.0		895.2	150.0	800.21	800.2			bi-monthly riffle release achieved
		377.6	Thu 20-Oct-22	100.00	150		125.0		830.7	150.0	738.52	738.5			
		735.5	Fri 21-Oct-22	100.00	150		125.0		1618.1	150.0	974.79	974.8			
		1542	Sat 22-Oct-22	100.00			125.0		3392.4	100.0	3409.99	3410			
		1205	Sun 23-Oct-22	100.00			125.0		2651.0	100.0	3530.35	3530			
		1042	Mon 24-Oct-22	100.00			125.0		2292.4	100.0	2568.02	2568			
		961.9	Tue 25-Oct-22	100.00			125.0		2116.2	100.0	2198.43	2198			
		837.4	Wed 26-Oct-22	100.00			75.0		1842.3	100.0	1873.63	1874			
		781.3	Thu 27-Oct-22	100.00			75.0		1718.9	100.0	1669.29	1669			
		725.8	Fri 28-Oct-22	100.00			75.0		1596.8	100.0	1472.18	1472			
		653.9	Sat 29-Oct-22	100.00			75.0		1438.6	100.0	1366.76	1367			
		591	Sun 30-Oct-22	100.00			75.0		1300.2	100.0	1170.99	1171			
		797.1	Mon 31-Oct-22	100.00			75.0		1753.6	100.0	1354.94	1355			
SUM	-	21949.9		3100.0	450.0	3025.0	0.0	48289.8	2940.0	46179.8	46071.9	201.0	#DIV/0!	-0.2%	

Table 6 - Monthly Environmental Flow release data for Cotter dam

SUM	Environmental flow release below Cotter	Daily base flow	Additional release (pool / riffle)				EOM = Revised monthly target	410700 Cotter D/S (Unverified)	410700 Cotter D/S (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410700 , Verified Vs unverified	Comments
SUM	Date	flow	(pool / riffle)					(Unverified)	(Verified)			
Previous months adjustment							0.0					
	Sat 1-Oct-22	15					15.0	1306.7	1296			
	Sun 2-Oct-22	15					15.0	1188.9	1173			
	Mon 3-Oct-22	15					15.0	1065.7	1049			
	Tue 4-Oct-22	15					15.0	968.3	953.2			
	Wed 5-Oct-22	15					15.0	1058.6	1052			
	Thu 6-Oct-22	15					15.0	4160.0	4160			
	Fri 7-Oct-22	15					15.0	4976.0	4976			
	Sat 8-Oct-22	15					15.0	4929.3	4929.0			
	Sun 9-Oct-22	15					15.0	4567.4	4567.0			
	Mon 10-Oct-22	15					15.0	3785.7	3786.0			
	Tue 11-Oct-22	15					15.0	2877.9	2878.0			
	Wed 12-Oct-22	15					15.0	2288.2	2288.0			
	Thu 13-Oct-22	15					15.0	1893.1	1893.0			
	Fri 14-Oct-22	15					15.0	2123.7	2124.0			
	Sat 15-Oct-22	15					15.0	1991.1	1991			
	Sun 16-Oct-22	15					15.0	1597.7	1598			
	Mon 17-Oct-22	15					15.0	1420.8	1421			
	Tue 18-Oct-22	15					15.0	1319.8	1320			
	Wed 19-Oct-22	15					15.0	1218.3	1218			
	Thu 20-Oct-22	15					15.0	1115.0	1115			
	Fri 21-Oct-22	15					15.0	1444.0	1444			
	Sat 22-Oct-22	15					15.0	5006.1	5006			
	Sun 23-Oct-22	15					15.0	5370.8	5371			
	Mon 24-Oct-22	15					15.0	4566.29	4566			
	Tue 25-Oct-22	15					15.0	3890.37	3890			
	Wed 26-Oct-22	15					15.0	3259.66	3260			
	Thu 27-Oct-22	15					15.0	2749.34	2749			
	Fri 28-Oct-22	15					15.0	2364.25	2364			
	Sat 29-Oct-22	15					15.0	2067.28	2067			
	Sun 30-Oct-22	15					15.0	1752.01	1752			
	Mon 31-Oct-22	15					15.0	2279.9	2280			
SUM		465.0	0.0				465.0	80602.5	80536.2	80071.2	-0.1%	

Table 7 - Monthly Environmental Flow release data for Googong dam

	410781 Upstream Googong (Unverified)	410781 Upstream Googong (Verified)	Environmental flow release below Googong Date	Daily base flow	Additional release (pool / riffle)	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	EOM = Revised monthly target	410760 Wickerslack (Unverified)	410760 Wickerslac k (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410781, Verified Vs unverified	EOM Correction to 410760, Verified Vs unverified	Comments
Previous months adjustment														
	776.3		Sat 1-Oct-22	10.0		993.6		10.0	1255.76	1256				
	601.1		Sun 2-Oct-22	10.0		769.4		10.0	835.10	835.1				
	471.6		Mon 3-Oct-22	10.0		603.7		10.0	603.70	603.7				
	402.4		Tue 4-Oct-22	10.0		515.1		10.0	470.5	470.5				
	423.4		Wed 5-Oct-22	10.0		542.0		10.0	435.9	435.9				
	1933.2		Thu 6-Oct-22	10.0		2474.5		10.0	1293.5	1294				
	2555.3		Fri 7-Oct-22	10.0		3270.8		10.0	3561.3	3561				
	3327.8		Sat 8-Oct-22	10.0		4259.6		10.0	4380.8	4381				
	6903.27		Sun 9-Oct-22	10.0		8836.2		10.0	12266.2	12264				
	2938.16		Mon 10-Oct-22	10.0		3760.8		10.0	6735.2	6745				
	1710.6		Tue 11-Oct-22	10.0		2189.6		10.0	3132.0	3144				
	1284.8		Wed 12-Oct-22	10.0		1644.6		10.0	1923.9	1925				
	1077.8		Thu 13-Oct-22	10.0		1379.6		10.0	1410.8	1411				
	1519.8		Fri 14-Oct-22	10.0		1945.3		10.0	1693.1	1693				
	1009.4		Sat 15-Oct-22	10.0		1292.1		10.0	1639.19	1639				
	794.3		Sun 16-Oct-22	10.0		1016.7		10.0	1132.92	1133				
	1056.6		Mon 17-Oct-22	10.0		1352.5		10.0	945.57	945.6				
	795.16		Tue 18-Oct-22	10.0		1017.8		10.0	981.45	981.4				
	635.64		Wed 19-Oct-22	10.0		813.6		10.0	795.90	795.9				
	554.90		Thu 20-Oct-22	10.0		710.3		10.0	638.80	638.8				
	2998.70		Fri 21-Oct-22	10.0		3838.3		10.0	542.19	542.2				
	5731.35		Sat 22-Oct-22	10.0		7336.1		10.0	6431.86	6425				
	3881.76		Sun 23-Oct-22	10.0		4968.7		10.0	8121.36	8126				
	2363.08		Mon 24-Oct-22	10.0		3024.7		10.0	4230.10	4241				
	3107.79		Tue 25-Oct-22	10.0		3978.0		10.0	3119.83	3119				
	2300.31		Wed 26-Oct-22	10.0		2944.4		10.0	3567.03	3569				
	1631.72		Thu 27-Oct-22	10.0		2088.6		10.0	2436.45	2439				
	1290.44		Fri 28-Oct-22	10.0		1651.8		10.0	1740.54	1745				
	1088.68		Sat 29-Oct-22	10.0		1393.5		10.0	1322.45	1322				
	914.57		Sun 30-Oct-22	10.0		1170.6		10.0	1074.34	1072				
	2376.27		Mon 31-Oct-22	10.0		3041.6		10.0	1749.82	1736				
SUM	58456.4	0.0		310.0	0.0	74824.1	0.0	310.0	80467.6	80489.1	80179.1	-100.0%	0.0%	

Note:

410781 Upstream Googong verified data is provided every second month.

Table 8 – Monthly flow data for Cotter River Environmental Flows

Date	Cotter River e-flows below Cotter Dam		Comments
	E-flow sourced from Murrumbidgee via M2C	E-flow sourced from Cotter Dam release/spill	
Sat 1-Oct-22	0	1296	
Sun 2-Oct-22	0	1173	
Mon 3-Oct-22	0	1049	
Tue 4-Oct-22	0	953.2	
Wed 5-Oct-22	0	1052	
Thu 6-Oct-22	0	4160	
Fri 7-Oct-22	0	4976	
Sat 8-Oct-22	0	4929.0	
Sun 9-Oct-22	0	4567.0	
Mon 10-Oct-22	0	3786.0	
Tue 11-Oct-22	0	2878.0	
Wed 12-Oct-22	0	2288.0	
Thu 13-Oct-22	0	1893.0	
Fri 14-Oct-22	0	2124.0	
Sat 15-Oct-22	0	1991	
Sun 16-Oct-22	0	1598	
Mon 17-Oct-22	0	1421	
Tue 18-Oct-22	0	1320	
Wed 19-Oct-22	0	1218	
Thu 20-Oct-22	0	1115	
Fri 21-Oct-22	0	1444	
Sat 22-Oct-22	0	5006	
Sun 23-Oct-22	0	5371	
Mon 24-Oct-22	0	4566	
Tue 25-Oct-22	0	3890	
Wed 26-Oct-22	0	3260	
Thu 27-Oct-22	0	2749	
Fri 28-Oct-22	0	2364	
Sat 29-Oct-22	0	2067	
Sun 30-Oct-22	0	1752	
Mon 31-Oct-22	0	2280	
Total	0.0	80536.2	

Table 9 – Monthly flow data for Murrumbidgee to Googong

Date	M2G Flow	Comments
Sat 1-Oct-22	0.0	
Sun 2-Oct-22	0.0	
Mon 3-Oct-22	0.0	
Tue 4-Oct-22	0.0	
Wed 5-Oct-22	0.0	
Thu 6-Oct-22	0.0	
Fri 7-Oct-22	0.0	
Sat 8-Oct-22	0.0	
Sun 9-Oct-22	0.0	
Mon 10-Oct-22	0.0	
Tue 11-Oct-22	0.0	
Wed 12-Oct-22	0.0	
Thu 13-Oct-22	0.0	
Fri 14-Oct-22	0.0	
Sat 15-Oct-22	0.0	
Sun 16-Oct-22	0.0	
Mon 17-Oct-22	0.0	
Tue 18-Oct-22	0.0	
Wed 19-Oct-22	0.0	
Thu 20-Oct-22	0.0	
Fri 21-Oct-22	0.0	
Sat 22-Oct-22	0.0	
Sun 23-Oct-22	0.0	
Mon 24-Oct-22	0.0	
Tue 25-Oct-22	0.0	
Wed 26-Oct-22	0.0	
Thu 27-Oct-22	0.0	
Fri 28-Oct-22	0.0	
Sat 29-Oct-22	0.0	
Sun 30-Oct-22	0.0	
Total	0.0	

Table 10 – Monthly water production data and water transferred to Googong reservoir

Day	Stromlo WTP ML			Googong WTP ML	Transfer from SWTP to Googong res.
	M'bidgee	Cotter	Bendora		
1	0.0	0.0	0.0	107.1	0.0
2	0.0	0.0	0.0	107.5	0.0
3	0.0	0.0	0.0	105.7	0.0
4	0.0	0.0	0.0	105.9	0.0
5	0.0	0.0	0.0	107.5	0.0
6	0.0	0.0	0.0	106.6	0.0
7	0.0	0.0	0.0	103.0	0.0
8	0.0	0.0	0.0	105.5	0.0
9	0.0	0.0	0.0	102.3	0.0
10	0.0	0.0	0.0	102.5	0.0
11	0.0	0.0	0.0	113.2	0.0
12	0.0	0.0	0.0	117.0	0.0
13	0.0	0.0	0.0	95.3	0.0
14	0.0	0.0	0.0	96.2	0.0
15	0.0	0.0	0.0	97.7	0.0
16	0.0	0.0	0.0	96.0	0.0
17	0.0	0.0	0.0	96.1	0.0
18	0.0	0.0	0.0	99.9	0.0
19	0.0	0.0	0.0	102.1	0.0
20	0.0	0.0	0.0	114.8	0.0
21	0.0	0.0	0.0	125.5	0.0
22	0.0	0.0	0.0	131.0	0.0
23	0.0	0.0	0.0	108.2	0.0
24	0.0	0.0	0.0	107.0	0.0
25	0.0	0.0	2.5	111.1	0.0
26	0.0	0.0	5.4	110.0	0.0
27	0.0	0.0	7.5	106.7	0.0
28	0.0	0.0	21.7	92.6	0.0
29	0.0	0.0	23.6	89.3	0.0
30	0.0	0.0	0.0	109.4	0.0
31	0.0	0.0	0.0	110.4	0.0
Total	0.0	0.0	60.7	3283.0	0.0

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