

Armidale Sewage Treatment Plant (STP)

Location: 631 Cafferies Road, Armidale NSW 2350

Environment Protection Licence Number: 1722 Activities: Sewage treatment

Licensee under Protection of Environment Operations Act 1997 (POEO Act): Armidale Dumaresq Council, PO Box 75A, Armidale NSW 2350

The internet link to Licence No. 1722 is <http://www.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=30769&SYSUID=1&LICID=1722>

Council is required to monitor the volume and quality of outgoing treated wastewater (also called effluent). Up to 50% of the treated wastewater is used for irrigation on Council's surrounding cropping and grazing properties. Soils, biosolids, and groundwater are also tested to assist environmental management. This document details recent results. To meet its obligation under Section 66 (6) of the POEO Act, a link to the current version of this document is available on Council's website.

The locations of sampling points are shown on the adjacent figure. Some historical names are used. P stands for piezometer; WW = Windways Well. Corresponding Environment Protection Authority (EPA) Identification Numbers detailed on the Licence are provided below.

EPA Point No. 1 (quality monitoring - discharge to Commissioners Waters)

EPA Point No. 2 (soils and mass monitoring on 'Mt Kennedy' & areas A & B irrigation fields)

EPA Point No. 3 (volume monitoring for 'Mt Kennedy' & areas A, B & C)

EPA Point No. 4 (soils & mass monitoring 'Windways' irrigation fil

EPA Point No. 5 (volume monitoring of discharge to 'Windways')

EPA Point No. 6 (quality monitoring of electric pump discharge to 'Mt Kennedy' & areas A, B & C)

EPA Point No. 7 (quality monitoring of diesel pump discharge to 'Windways' irrigation areas)

EPA Point No. 8 (volume monitoring sludge lagoons)

EPA Point No. 9 (Biosolids monitoring)

EPA Point No. 9 (Biosolids monitoring)

EPA Point No. 10 (P6 groundwater monitoring)

EPA Point No. 11 (P17 groundwater monitoring)

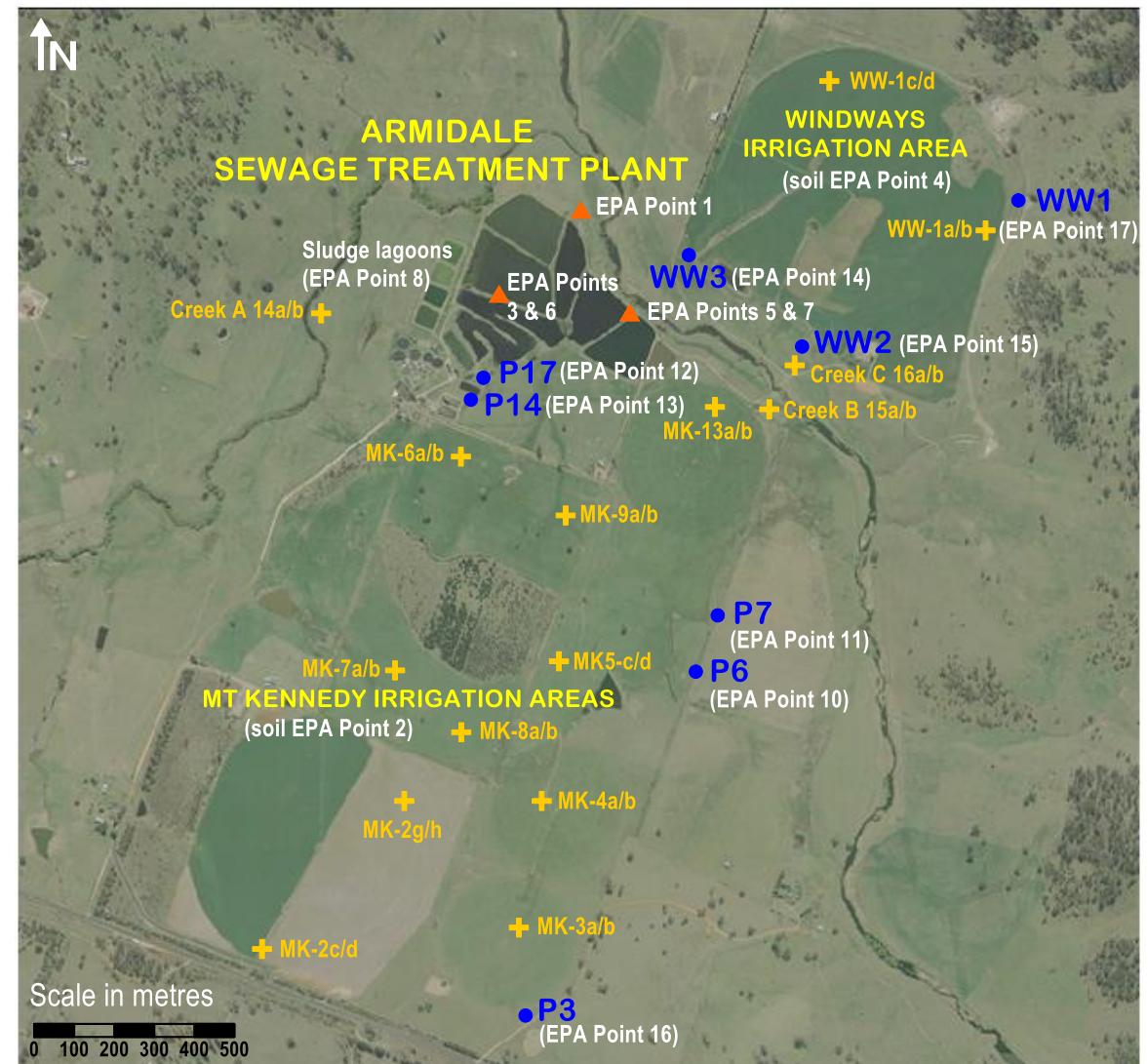
EPA Point No. 12 (P11 groundwater monitoring)
EPA Point No. 13 (P14 groundwater monitoring)

EPA Point No. 13 (P-14 groundwater monitoring)

EPA Point No. 14 (WW3 groundwater monitoring)

EPA Point No. 15 (WW2 groundwater monitoring)
EPA Point No. 16 (P3 groundwater monitoring)

EPA Point No. 16 (P-5 groundwater monitoring)



Base map: Department of Lands 2010. Deep yellow sampling points – soil sample location examples 2012 & 2014.

Monitoring results for the last four years are presented on following pages – as required in the EPA publishing requirements.

The following tables provide results required by licence. Some additional results are also provided. Results are organised in their field and laboratory presentation order.

Abbreviations in the tables are provided here in alphabetical order:

BOD₅ = Biochemical Oxygen Demand over five days; Ca = Calcium; Cl = Chloride; EC = Electrical Conductivity also called conductivity; ESP = Exchangeable Sodium Percentage: Ex = Exchangeable; FC = Faecal Coliforms; K = Potassium; Na = Sodium; Mg = Magnesium; NH₃ = Ammonia as a measure of ammonium ions; M = Monthly; NO₃ = Nitrate; NO_x = Nitrite + Nitrate = Nitrogen Oxides; NC = Not continuing; NR = Not required; OM = Organic Matter; O&G = Oil and Grease; PSC = Phosphorus Sorption Capacity; S = Sulphur; SAR = Sodium Absorption Ratio; SRP = Soluble Reactive Phosphorus (also RP); TSS = Total suspended solids; TKN = Total Kjeldahl Nitrogen (organic nitrogen + ammonia); TN = Total Nitrogen; TP = Total Phosphorus; Q = Quarterly.

Measures:

CFU/100mL = Colony Forming Units/100mL; dS/cm = deciSiemens per centimetre; mg/kg = milligram/kilogram; mg/L = milligram per litre (equivalent to ppm); $\mu\text{S}/\text{cm}$ = microSiemens per cm; < = less than, kL = kilolitres.

Limits:

90 percentile concentration - the monitoring results should not exceed the specified limit for 90% of the time, so for monthly tests, only 1 of the 12 results in the year should exceed the 90% concentration. These concentration limits apply to BOD, O&G, and TSS. For TN and TP, Council pays a fee based on the load (mass in the volume) discharged to Commissioners Waters.

Choice of water quality analytes:

Some analytes are tested because they give a general understanding of the discharge quality of treated effluent. For example, it is best that effluent used for irrigation or discharge to streams is not too salty. EC is an indicator of salt levels. It is best that EC be at least <1000 $\mu\text{S}/\text{cm}$. The pH range recommended for discharged effluent is pH 6.5 to 8.5, which is not too acidic or too alkaline to harm the bacteria breaking down the effluent, or the stream biota. Reasons for some other analytes are as follows:

- The BOD₅ test has traditionally been used by wastewater professionals to manage wastewater treatment processes. It is measured by the quantity of oxygen consumed by microorganisms during a five-day period, as a measure of the amount of biodegradable organic material in, or strength of, sewage. Sewage high in BOD can deplete oxygen in receiving waters, causing fish kills and ecosystem changes. A common standard is to treat sewage so that the BOD₅ of treated effluent is less than 20 mg/L (i.e. 20 mg of O₂ are consumed per litre of water over 5 days to break down the waste).
- The volume of sludge produced in a treatment plant is directly related to the TSS present in the sewage. The extent to which a treatment plant removes suspended solids (SS), as well as BOD₅, determines the efficiency of the treatment process. Suspended solids can smother stream biota. A common standard is to treat sewage so that the TSS of the treated effluent is less than 30 mg/L.
- Chloride and sodium are major elements of salt that can cause foliar injury during irrigation.
- SAR (Sodium Absorption Ratio) indicates if soil may be affected by sodicity, that is, the presence of a high proportion of sodium (Na⁺) ions relative to calcium (Ca²⁺) and magnesium (Mg²⁺) ions in soil or water. Sodicity degrades soil structure by breaking down clay aggregates. This makes the soil more erodible, less permeable to water, and reduces plant growth. In general, the higher the sodium adsorption ratio, the less suitable the water is for irrigation. Plants have ranges of SAR tolerance. Examples: citrus trees can tolerate SAR 2 to 8; oats SAR 18 to 46; and wheat, cotton and barley SAR 4 to 102.
- Increased levels of faecal coliforms (FC) warn of problems with the effluent treatment and possible contamination with pathogens. Raw sewage FC counts are in the millions. Note the low counts of the treated effluent in Table 1.
- Ammonia as ammonium ions can cause fish kills and affect other stream biota. While travelling through sewer pipes, the majority of the nitrogen contained in raw sewage is converted from organic-nitrogen to ammonium compounds.
- At the sewage treatment works, bacteria remove nitrogen compounds from the effluent by a two-step biological process. The first step is nitrification in which ammonium is converted to nitrate nitrogen in aerobic conditions (with air). (NO_x is usually predominantly nitrate.) The second step is denitrification in which nitrate is reduced to nitrogen gas (N₂) in anaerobic conditions (without air). So testing for the various nitrogen compounds alerts to any problems in the sewage treatment process.
- Total Phosphorus (TP) is a component of animal and plant matter in sewage. SRP represents the fraction of TP that is available to organisms for growth. If discharged into streams in high quantities, it may stimulate growth of photosynthetic organisms such as algae. The discharged phosphorus is diluted many times in Commissioners Waters.

Table 1a: Treated wastewater discharge quality – EPA Point No.1 – discharge to Commissioners Waters

EPA Point No. 1 – discharge to Commissioners Waters	Received from laboratory	Accessible on Council website by	BOD	TSS	O&G	pH	NH ₃	NO _x	TKN	TN	SRP	TP	EC	FC	Na	Ca	K	Mg	SAR	CI	Remarks
Measure			mg/L	mg/L	mg/L	1-14	mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	µS/cm	CFU /mL	mg/L	mg/L	mg/L	mg/L	ratio	mg/L	
90 percentile concentration			20	30	10																
Frequency required by licence			M	M	M	M	M	M	M	M	M	M	M	NR	NR	NR	NR	NR	NR		
Sampling date																					
31/07/19	07/08/19	08/08/19	4.5	15	<5	7.91	12.2	3.56	18.9	22.2	5.20	5.58	917	20	92.9	40.2	26.0	28.5	2.7	79	
29/08/19	03/09/19	05/09/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No discharge over the weir	
27/09/19	08/11/19	08/11/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No discharge over the weir	
31/10/19	06/10/19	08/11/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No discharge over the weir	
29/11/19	05/12/19	09/12/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No discharge over the weir	
30/12/19	05/01/20	07/01/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No discharge over the weir	
30/01/20	04/02/20	07/02/20	14.3	23	<5	8.91	3.33	2.20	8.5	10.7	4.83	4.92	646	900	86.0	31.3	25.9	24.4	2.8	65	30/01/20
28/02/20	05/03/20	09/03/20	18	17.5	<5	8.56	2.61	4.84	6.76	11.6	3.63	4.17	639	340	62.7	39.4	17.3	21.3	2	53	28/02/20
31/03/20	06/04/20	09/04/20	7.2	10	<5	8.00	11.2	2.06	13.6	15.7	7.14	7.57	813	13	97.4	42.4	24.1	28.2	2.8	71	31/03/20
30/04/20	07/05/20	11/05/20	8.9	13	<5	7.95	12.8	1.75	16.3	18	6.62	8.02	841	40	74.1	41.9	22.5	23.1	2.3	65	30/04/20
29/05/20	04/06/20	11/06/20	12.0	15	<5	7.95	15.4	8.48	15.3	23.8	6.05	6.10	897	10	86.0	38.8	24.7	23.8	2.7	71	29/05/20
29/06/20	06/07/20	06/07/20	5.1	8	<2	8.10	17.9	9.3	16.4	25.7	5.54	6.21	926	5	89.8	38.5	23.8	27.0	2.7	74	29/06/20
30/12/19	05/01/20	07/01/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No discharge over the weir	
30/01/20	04/02/20	07/02/20	14.3	23	<5	8.91	3.33	2.20	8.5	10.7	4.83	4.92	646	900	86.0	31.3	25.9	24.4	2.8	65	30/01/20
28/02/20	05/03/20	09/03/20	18	17.5	<5	8.56	2.61	4.84	6.76	11.6	3.63	4.17	639	340	62.7	39.4	17.3	21.3	2	53	28/02/20
31/03/20	06/04/20	09/04/20	7.2	10	<5	8.00	11.2	2.06	13.6	15.7	7.14	7.57	813	13	97.4	42.4	24.1	28.2	2.8	71	31/03/20
30/04/20	07/05/20	11/05/20	8.9	13	<5	7.95	12.8	1.75	16.3	18	6.62	8.02	841	40	74.1	41.9	22.5	23.1	2.3	65	30/04/20
29/05/20	04/06/20	11/06/20	12.0	15	<5	7.95	15.4	8.48	15.3	23.8	6.05	6.10	897	10	86.0	38.8	24.7	23.8	2.7	71	29/05/20
29/06/20	06/07/20	06/07/20	5.1	8	<2	8.10	17.9	9.3	16.4	25.7	5.54	6.21	926	5	89.8	38.5	23.8	27.0	2.7	74	29/06/20
30/07/20	12/08/20	14/08/20	4.8	10	<2	8.23	20.8	8.08	21.4	29.5	5.86	6.4	960	180	89.3	37.8	25	27.4	2.7	70	
31/08/20	07/09/20	08/09/20	14.1	8	<2	7.89	15.3	8.2	18.7	26.9	5.54	5.68	771	<1	78.9	40	21.5	26.4	2.4	66	
30/09/20	07/10/20	19/10/20	8.4	13	<2	8.13	15.0	4.47	14.5	19.0	6.47	6.99	842	40	91.3	43.0	25.7	30.4	2.6	71	
29/10/20	04/11/20	06/10/20	5.1	20	<2	7.95	16.6	2.05	20.6	22.6	7.17	7.86	838	20	85.5	39.1	25.0	28.3	2.5	85	
27/11/20	04/12/20	08/12/20	14.3	50	<2	8.62	12.6	1.33	11.1	12.4	7.08	8.28	748	110	85.8	37.8	23.8	29.3	2.5	76	Weir discharge ceased. Pond stagnant.
23/12/20	30/12/20	06/01/21	15.9	40	<2	8.58	5.39	1.30	8.70	10.0	5.20	6.36	680	400	67.5	32.0	20.5	24.3	2.2	69	Recent wet weather causing higher flow rate
29/01/21	03/02/21	04/02/21	17.1	68	<5	9.26	4.52	0.14	6.66	6.8	2.27	2.34	586	105	72.4	31.1	17.9	25.9	2.3	64	At time of collection no water was flowing over weir
25/02/21	04/03/21	08/03/21	14.9	29	<5	7.88	2.3	1.6	5.1	6.7	6.5	6.6	666	260	80.7	28.6	22.4	28.9	2.4	70	
30/03/21	7/04/221	28/04/21	21.4	13	<5	7.8	3.98	5.89	4.71	10.6	2.61	2.84	580	600	49.0	44.1	12.7	22.9	1.5	48	High algal growth
29/04/21	06/05/21	11/05/21	6.2	8	<5	7.88	9.77	6.90	12.4	19.3	4.68	4.82	760	5	82.6	37.3	18.7	27	2.5	67	
31/05/21	7/06/21	23/06/21	6.0	5	<5	7.89	13.3	8.8	10.1	18.9	5.61	5.70	805	20	87.3	35.2	23.1	24.7	2.8	69	
29/06/21	05/07/21	13/07/21	4.8	8	<5	7.81	13.8	10.6	11.3	21.9	5.09	5.50	7.31	130	81.2	31.4	18.9	21.2	2.7	62	
29/07/21	04/08/21	04/08/21	11.1	13	<5	7.95	10.8	9.1	13.3	22.4	4.03	4.24	671	60	71	34.5	15.8	23.4	2.3	54	

30/08/21	5/09/21	8/09/21	7.5	15	<5	8.13	10.5	6.39	12.8	19.2	3.70	3.72	609	15	59.3	31.5	13.7	21.0	2	48
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Table 1a continued: Treated wastewater discharge quality – EPA Point No.1 – discharge to Commissioners Waters

EPA Point No. 1 – discharge to Commissioners Waters	Received from laboratory	Accessible on Council website by	BOD	TSS	O&G	pH	NH ₃	NO _x	TKN	TN	SRP	TP	EC	FC	Na	Ca	K	Mg	SAR	Cl	Remarks
Measure			mg/L	mg/L	mg/L		mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	µS/cm	CFU/mL	mg/L	mg/L	mg/L	mg/L	mg/L		
90 percentile concentration			20	30	10																
Frequency required by licence			M	M	M	M	M	M	M	M	M	M	M	M	NR	NR	NR	NR	NR	NR	
Sampling date																					
30/09/21	05/10/21	11/10/21	6.3	18	<5	7.88	11.4	3.9	16.1	20.0	6.46	6.60	7.14	15	74.6	34.2	17.4	24.0	2.4	69	
28/10/21	03/11/21	4/11/21	5.6	10	<5	7.89	10.5	2.06	14.1	16.2	4.71	4.90	633	5	67.2	30.3	16.4	21.5	2.3	53	
30/11/21	6/12/21	10/12/21	7.5	3	<5	7.96	4.67	2.98	8.32	11.3	2.74	2.92	512	320	47.8	34.5	9.5	20.1	1.6	36	
30/12/21	5/01/22	20/01/21	7.8	15	<5	8.11	1.2	1.85	4.95	6.8	4.20	4.56	599	70	66.9	35.0	11.6	23.6	2.1	52	
31/01/22	6/02/22	7/02/22	9.3	17	<5	9.02	0.58	0.95	3.55	4.5	2.23	3.64	568	80	70.7	12.6	15.3	22.5	2.4	55	
28/02/22	06/03/22	9/03/22	25.4	23	<5	8.41	3.94	3.15	7.05	10.2	5.42	5.64	614	550	65.7	30.7	16.6	19.1	2.3	57	Recent wet weather causing higher flow rate
31/03/22	7/04/22	8/02/22	8.7	10	<5	7.67	6.33	5.38	8.82	14.2	2.59	2.80	535	1500	45.2	30.9	11.8	16.8	1.6	38	
26/04/22	10/05/22	11/05/22	4.5	5	<5	7.92	3.4	6.5	8.50	15.0	3.81	3.82	647	70	62.4	35.6	14.8	21.3	2.0	55	
31/05/22	06/06/22	07/06/22	2.5	13	<5	7.97	8.7	10.0	11.4	21.4	4.27	4.44	663	310	53.5	34.1	15.1	20.1	1.8	56	
29/06/22	05/07/22	12/07/22	5.5	3	<5	7.84	9.24	12.1	11.7	23.8	4.35	4.38	742	15	63.4	23.0	16.9	23.0	2	60	
28/07/22	02/08/22	03/08/22	3.6	3	<5	7.97	11.2	6.67	16.1	22.8	3.86	4.22	720	25	59.6	37.0	14.0	22.5	1.9	55	
31/08/22	06/09/22	07/09/22	2.1	3	<5	7.03	9.80	8.53	15.00	23.50	4.58	4.90	711	25	61.0	37.2	15.8	23.3	1.9	45	
07/10/22	13/10/22	19/10/22	4	5	<5	8.06	5.14	5.45	8.10	13.60	2.92	2.98	600	5	55.6	38.6	11.8	21.5	1.8	40	
31/10/22	06/11/22	08/11/22	6	8	<5	7.93	3.00	3.60	5.80	9.40	2.46	2.84	508	15	43.7	35.6	9.6	19.4	1.5	35	
30/11/22	09/12/23	06/02/23	18	5	<5	8.45	0.57	1.25	2.95	4.2	3.8	4.32	573	10	61.1	36.8	13.5	22.2	2	54	
29/12/22	03/01/23	06/02/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No outflow due to irrigation	
31/01/23	05/02/23	06/02/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No outflow due to irrigation	
28/02/23	05/03/23	9/03/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No outflow due to irrigation	
29/03/23	03/04/23	04/04/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	At the time of collection there was no flow	
28/04/23	4/05/23	13/06/23	9.8	5	<10	7.79	9.26	6.19	13.6	19.8	5.35	5.54	691	130	59	32.8	18.2	20.6	2.0	59	
31/05/23	06/06/23	13/06/23	3.8	5	<5	7.91	11.8	9.04	16.2	25.2	5.03	5.86	725	40	66.2	32.5	20.4	21.5	2.2	67	
29/06/23	04/07/23	5/07/23	6.4	8	<10	7.81	15.0	10.5	19.0	29.5	6.04	6.32	775	10	66.1	30.5	20.4	20.8	2.3	66	
27/07/23	01/08/23	08/08/23	8.4	5	<10	7.70	14.7	10.7	23.0	33.7	5.89	6.26	775	25	65.9	29.8	21.2	22.1	2.2	67	
31/08/23	05/09/23	6/09/23	5.4	5	<10	7.83	15.6	9.75	20.7	30.4	6.75	7.20	874	115	73.9	34.3	22.9	24.	02.4	70	
29/09/23	03/10/23	16/10/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No outflow due to irrigation	
31/10/23	06/11/23	7/11/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No outflow due to irrigation	
29/11/203	5/12/23	6/12/23	7.5	17.5	<10	7.78	10.8	2.64	12.6	15.2	6.64	7.00	709	400	67.9	30.2	20.3	20.9	2.3	62	
28/12/23	2/01/24	12/01/24	6.0	15	<10	7.94	7.21	2.00	10.6	12.6	5.28	5.66	630	450	56.9	29.7	17.9	17.5	2.0	56	

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Table 1b: Treated wastewater discharge quality – EPA Point No.6 – electric pump irrigation to Mt Kennedy

EPA Point No. 6 – electric pump irrigation to Mt Kennedy	Received from laboratory	Accessible on Council website by	BOD	TSS	O&G	pH	NH ₃	NO _x	TKN	TN	SRP	TP	EC	FC	Na	Ca	K	Mg	SAR	Cl	Remarks
Measure			mg/L	mg/L	mg/L		mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	CFU/mL	μS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
90 percentile concentration			20	30	10																
Frequency required by licence			M	M	M	M	NR	NR	NR	M	NR	M	M	M	Q	Q	Q	Q	Q	Q	
Sampling date																					
31/07/19	07/08/19	08/08/19	9.2	10	<5	7.74	14.4	2.27	24.2	26.5	5.64	6.02	936	268	91.6	37.1	25.5	27.5	2.8	78	
29/08/19	03/09/19	05/09/19	8.0	15	<5	8.33	21.6	5.95	22.1	28.1	5.55	6.52	911	105	88.5	39.0	26.0	27.8	2.6	76	
27/09/19	08/11/19	08/11/19	3.0	18	<5	8.90	1.67	4.46	14.2	18.7	5.02	5.70	821	40	96.2	36.1	27.3	30.8	2.8	66	
31/10/19	06/10/19	08/11/19	15.5	55	<5	8.68	14.4	1.66	18.9	20.6	6.47	7.69	826	92	91.3	39.7	28.8	30.2	2.7	79	Weir discharge ceased. Pond stagnant.
29/11/19	05/12/19	09/12/19	8.4	90	<5	9.78	3.04	1.22	9.68	10.9	1.19	3.43	743	92	102	24.7	29.1	25.5	3.4	79	Weir discharge ceased. Pond stagnant.
30/12/19	05/01/20	07/01/20	6.6	53	<5	9.76	2.92	1.03	8.1	9.1	1.96	3.72	752	500	102.8	22.4	34.8	27.7	3.4	93	Weir discharge ceased. Pond stagnant.
30/01/20	04/02/20	07/02/20	9.5	10	<5	8.35	9.19	3.20	13.7	16.9	6.14	7.25	683	550	83.6	35.6	23.4	23.5	2.7	57	30/01/20
28/02/20	05/03/20	09/03/20	18	20	<5	8.09	8.88	5.17	12.6	17.8	4.05	4.22	713	710	67.2	39.3	18.4	21.5	2.1	60	28/02/20
31/03/20	06/04/20	09/04/20	6.8	15	<5	7.90	18.2	2.70	20.1	22.8	6.71	6.92	874	60	97.0	40.0	24.1	27.1	2.9	71	31/03/20
30/04/20	07/05/20	11/05/20	8.55	20	<5	8.05	14.2	3.77	19.2	23	5.92	6.84	869	35	77.9	41.2	22.5	22.8	2.4	67	30/04/20
29/05/20	04/06/20	11/06/20	9.2	13	<5	7.87	15.3	11.4	15.8	27.2	6.08	4.13	915	110	82.6	36.5	24.5	22.8	2.6	72	29/05/20
29/06/20	06/07/20	06/07/20	6.1	10	<2	8.10	16.6	9.2	21.1	30.3	6.10	6.35	920	280	89.0	38.5	23.3	26.8	2.7	74	29/06/20
30/07/20	12/08/20	14/08/20	4.7	10	<2	8.23	20.8	8.08	21.4	29.5	5.86	6.4	960	180	86.8	36.3	23.8	26.2	2.7	68	
31/08/20	07/09/20	08/09/20	8.6	3	<2	7.91	14.2	7.9	19.6	27.5	5.36	5.56	833	75	81	40.8	22	27	2.4	69	
30/09/20	07/10/20	19/10/20	7.2	17	<2	8.61	16.9	5.06	17.3	22.4	5.96	6.89	830	120	90.7	41.6	25.5	29.5	2.6	71	
29/10/20	04/11/20	06/10/20	7.8	13	<2	7.92	15.5	3.69	20.5	24.2	5.65	6.46	793	400	78.8	36.5	23.7	26.2	2.4	78	
27/11/20	04/12/20	08/12/20	11.0	30	<2	8.41	21.3	0.51	19.3	19.8	7.58	8.04	779	450	92.3	38.3	24.4	30.0	2.7	73	
23/12/20	30/12/20	06/01/21	20.4	32	<2	8.11	10.6	1.97	13.0	15.0	4.85	6.20	694	1500	63.4	33.4	19.7	24.0	2.0	65	
29/01/21	03/02/21	04/02/21	14.6	65	<5	9.40	5.54	1.43	6.97	8.4	2.25	2.36	618	420	77.9	30.6	19.5	26.3	2.5	678	Effluent pond was very green
25/02/21	04/03/21	08/03/21	42.0	20	<5	7.79	2.0	4.3	6.9	11.2	6.0	6.2	695	760	79.7	37.6	23.2	28.3	2.4	71	Algae
30/03/21	7/04/221	28/04/21	12.2	10	<5	7.89	4.16	6.19	4.71	10.9	2.58	2.88	600	1050	52.2	42.6	13	23.6	1.6	49	
29/04/21	06/05/21	11/05/21	8.1	5	<5	7.82	11.6	7.88	13.3	21.2	5.03	5.32	765	145	84.6	34.1	19.0	25.4	2.7	67	
31/05/21	7/06/21	23/06/21	8.6	8	<5	7.75	14.8	11.6	6.92	15.8	5.94	6.00	8.34	320	87.5	33.9	23.2	24.2	2.8	70	
29/06/21	05/07/21	13/07/21	10.4	5	<5	7.71	14.4	11.7	9.55	21.2	5.28	5.62	737	1000	77.5	30.7	18.1	20.8	2.6	64	
29/07/21	04/08/21	04/08/21	10.8	13	<5	7.93	12.3	10.1	11.6	21.6	4.19	4.48	695	600	70.4	34.2	16.0	23.3	2.3	60	
30/08/21	5/09/21	8/09/21	7.7	10	<5	7.88	9.13	6.44	11.8	18.2	3.12	3.18	577	125	52.2	31.3	11.9	20.6	1.8	47	
30/09/21	05/10/21	11/10/21	11.1	18	<5	7.95	16.1	5.4	20.1	25.5	6.07	6.38	738	90	76.4	32.6	18.5	22.8	2.5	67	
28/10/21	03/11/21	4/11/21	5.3	10	<5	7.82	10.6	2.58	14.6	17.2	4.81	5.02	647	80	68.4	32.0	16.3	22.4	2.3	54	
30/11/21	6/12/21	10/12/21	6.3	5	<5	7.63	4.30	2.76	7.34	10.1	2.44	2.74	519	430	48.8	35.7	10.2	21.0	1.6	36	
30/12/21	5/01/22	20/01/21	11.9	8	<5	7.81	4.6	2.38	8.72	11.1	4.87	4.98	611	70	68.9	33.3	11.9	23.2	2.2	55	
31/01/22	6/02/22	7/02/22	15	23	<5	8.41	1.11	3.78	3.62	7.4	3.29	4.16	586	310	67.9	29.7	15.4	22.1	2.3	56	
28/02/22	06/03/22	9/03/22	22.4	13	<5	7.89	8.15	4.35	7.25	11.6	5.19	5.36	629	2000	61.2	30.3	16.5	18.6	2.2	54	Hi flow rate from wet weather

Table 1b continued: Treated wastewater discharge quality – EPA Point No.6 – electric pump irrigation to Mt Kennedy

Table 1c: Treated wastewater discharge quality – EPA Point No.7 – diesel pump irrigation to Windways

EPA Point No. 7 – diesel pump irrigation to Windways	Received from laboratory	Accessible on Council website by	BOD	TSS	O&G	pH	NH ₃	NO _x	TKN	TN	SRP	TP	EC	FC	Na	Ca	K	Mg	SAR	CI	Remarks
Measure			mg/L	mg/L	mg/L		mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	µS/cm	CFU/ mL	mg/L	mg/L	mg/L	mg/L	mg/L		
90 percentile concentration			20	30	10																
Frequency required by licence			M	M	M	M	NR	NR	NR	M	NR	M	M	M	Q	Q	Q	Q	Q	Q	
Sampling date																					
31/07/19	07/08/19	08/08/19	4.8	8	<5	7.89	2.27	0.60	6.3	6.9	3.18	3.81	846	100	98.8	38.9	23.7	28.2	2.9	70	
29/08/19	03/09/19	05/09/19	3.0	15	<5	9.28	0.9	2.29	27	5.0	2.43	2.72	777	10	97.9	37.3	23.7	27.9	3.0	86	
27/09/19	08/11/19	08/11/19	11.1	15	<5	7.67	18.8	8.72	24.6	13.3	4.77	5.56	919	440	85.6	36.7	25.0	28.9	2.6	66	
31/10/19	06/10/19	08/11/19	8.9	25	<5	9.20	0.86	1.32	4.48	5.8	3.71	3.84	744	40	104.8	31.0	26.8	29.4	3.2	90	
29/11/19	05/12/19	09/12/19	8.1	20	<5	8.90	3.10	0.84	5.56	6.4	4.65	4.98	771	40	709.8	29.6	26.7	28.0	3.5	101	
30/12/19	05/01/20	07/01/20	15.9	35	<5	8.59	11.8	4.36	7.0	11.4	7.84	7.9	817	360	96.1	36.6	31.8	29.6	2.9	80	Algae
30/01/20	04/02/20	07/02/20	15.6	15	<5	7.95	9.09	6.69	11.1	17.8	3.38	4.06	665	1400	81.5	35.3	20.1	21.8	2.7	53	
28/02/20	05/03/20	09/03/20	10.4	10	<5	7.86	11.0	7.05	14.1	21.1	4.06	4.24	732	1250	68.1	36.7	18.4	20.6	2.2	57	
31/03/20	06/04/20	09/04/20	7.8	10	<5	7.84	14.1	8.25	22.1	30.3	5.94	6.49	850	3000	90.7	37.3	22.2	24.7	2.8	65	
30/04/20	07/05/20	11/05/20	12.9	8	<5	7.83	16.8	12.0	23.2	35	6.14	7.20	967	800	86.0	40.9	24.7	23.4	2.7	72	
29/05/20	04/06/20	11/06/20	10.7	8	<5	7.51	17.0	17.7	15.0	32.7	5.61	5.73	902	1150	77.6	34.5	23.3	21.6	2.6	68	
29/06/20	06/07/20	06/07/20	15.0	25	<2	8.07	19.0	14.1	23.7	36.8	6.04	6.98	1002	1000	89.1	40.3	24.1	27.5	2.7	75	
30/07/20	12/08/20	14/08/20	0.9	10	<2	8.02	16.5	7.76	17.9	26.7	4.25	5.01	806	2500	72.5	33	19	22.7	2.4	55	
31/08/20	07/09/20	08/09/20	17.6	5	<2	7.76	18.6	9.6	21.5	31.1	6.55	7.2	915	900	88.7	41.4	23.8	27.8	2.6	70	
30/09/20	07/10/20	19/10/20	14.1	10	<2	7.91	15.9	7.86	22.4	30.3	5.53	6.29	884	1250	92.0	41.5	25.6	29.3	2.7	72	
29/10/20	04/11/20	06/10/20	7.8	15	<2	8.08	14.8	8.28	18.6	26.9	4.95	5.80	762	1250	72.4	35.8	22.3	24.7	2.3	72	
27/11/20	04/12/20	08/12/20	13.1	33	<2	7.9	25.2	4.10	19.9	24.0	7.90	8.64	838	600	92.3	38.7	25.2	30.2	2.7	81	Weir discharge ceased. Pond stagnant.
23/12/20	30/12/20	06/01/21	14.9	20	<2	7.91	12.8	6.14	10.1	16.2	4.93	5.32	669	3000	61.6	32.2	16.8	21.9	2.1	57	
29/01/21	03/02/21	04/02/21	8.1	20	<5	8.19	13.0	6.57	15.4	22.0	5.85	6.04	805	760	81.6	37.6	23.0	29.6	2.4	73	
25/02/21	04/03/21	08/03/21	13.7	7	<5	7.75	13.3	5.4	16.6	22.0	6.4	6.5	825	2250	78.8	36.8	23.7	27.2	2.4	70	
30/03/21	7/04/221	28/04/21	5.4	5	<5	7.83	2.18	3.63	4.67	8.3	5.20	5.5	640	900	76.4	36.1	18.6	26.3	2.4	77	
29/04/21	06/05/21	11/05/21	3.9	3	<5	8.04	5.28	5.72	5.9	11.6	5.12	5.28	726	600	87.4	33.5	17.4	26.5	2.7	70	
31/05/21	7/06/21	23/06/21	6.0	8	<5	7.85	9.76	8.37	3.93	12.3	5.02	5.28	770	1120	86.9	34.9	20.9	25.2	2.7	73	
29/06/21	05/07/21	13/07/21	8.6	8	<5	7.64	16.2	13.9	17.4	31.3	5.47	5.82	761	2500	76.8	31.0	17.3	20.3	2.6	63	
29/07/21	04/08/21	04/08/21	11.4	8	<5	7.79	14.8	12.3	15.4	27.7	4.51	4.84	727	2000	75.3	34.2	17.2	23.3	2.4	64	
30/08/21	5/09/21	8/09/21	6.6	5	<5	7.70	8.51	8.03	12.1	20.1	2.88	2.90	605	800	54.6	33.5	11.5	21.7	1.8	49	
30/09/21	05/10/21	11/10/21	14.0	15	<5	7.79	16.4	11.3	23.7	35.0	6.43	6.92	800	201	76.9	31.7	19.5	22.2	2.6	67	
28/10/21	03/11/21	4/11/21	13.2	13	<5	8.0	14.2	9.51	20.9	30.4	5.75	6.18	763	1500	77.9	34.7	19.9	23.9	2.5	64	
30/11/21	6/12/21	10/12/21	9.2	5	<5	7.57	5.19	5.07	8.63	13.7	2.50	2.56	542	1500	55.4	37.5	10.6	22.2	1.8	41	
30/12/21	5/01/22	20/01/21	10.8	3	<5	7.60	11.1	7.05	14.6	21.6	4.19	4.78	667	1200	67.1	30.6	11.7	22.2	2.3	53	
31/01/22	6/02/22	7/02/22	21.2	35	<5	9.18	0.36	0.35	4.25	4.6	1.88	3.24	555	120	68.4	22.8	14.6	28.3	2.3	61	Hi flow rate from wet weather

Table 1c continued: Treated wastewater discharge quality – EPA Point No.7 – diesel pump irrigation to Windways

Table 1d: Annual reporting year summary table of effluent quality at EPA Point No 1 - discharge to Commissioners Water

Reporting Year	Pollutant	Units of Measure	Monitoring frequency required by licence	No. of times measured during year	Min. value	Max. value	90 percentile value	90 percentile limit	Exceedance (yes/no)	Remarks
2018/19	BOD	mg/L	12	10	2	16	9.94	20	No	Nil discharge into Commissioners Water Feb & Mar 2019.
	Oil and Grease	mg/L	12	10	<5	<5	<5	10	No	Nil discharge into Commissioners Water Feb & Mar 2019.
	Total Suspended Solids	mg/L	12	10	5	58	30	30	No	Nil discharge into Commissioners Water Feb & Mar 2019.
2019/20	BOD	mg/L	12	8	2	18	15.41	20	No	Nil discharge into Commissioners Water Sept, Oct, Nov, Dec 2019.
	Oil and Grease	mg/L	12	8	<5	<5	<5	10	No	Nil discharge into Commissioners Water Sept, Oct, Nov, Dec 2019.
	Total Suspended Solids	mg/L	12	8	8	23	19.15	30	No	Nil discharge into Commissioners Water Sept, Oct, Nov, Dec 2019.
2020/21	BOD	mg/L	12	12	5	21	17.10	20	No	
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	8	68	50	30	Yes	High algal growth on maturation ponds.
2021/22	BOD	mg/L	12	12	4.8	25.4	11.10	20	Yes	Recent wet weather causing higher flow rate
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	3	23	18	30	No	
2022/23	BOD	mg/L	12	8	2	18	10.52	20	No	Nil discharge into Commissioners Water Dec & Mar 22-23
	Oil and Grease	mg/L	12	8	<5	<5	<5	10	No	Nil discharge into Commissioners Water Dec & Mar 22-23
	Total Suspended Solids	mg/L	12	8	3	13	10	30	No	Nil discharge into Commissioners Water Dec & Mar 22-23

Note: Annual reporting year is from 1 May to 30 April.

Table 1e: Annual reporting year summary table of effluent quality at EPA Point No 6 – electric pump irrigation to Mt Kennedy

Reporting Year	Pollutant	Units of Measure	Monitoring frequency required by licence	No. of times measured during year	Min. value	Max. value	90 percentile value	90 percentile limit	Exceedance (yes/no)	Remarks
2018/19	BOD	mg/L	12	12	8.3	20	15.8	20	No	
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	5	60	50.7	30	Yes	High algal growth. No concern. Discharge is irrigated to paddock
2019/20	BOD	mg/L	12	12	3	18	14.9	20	No	
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	5	90	54.8	30	Yes	Pond stagnant. High algal growth. No concern. Discharge is irrigated.
2020/21	BOD	mg/L	12	12	4.7	42	20.4	20	Yes	High algal growth. No concern. Discharge is irrigated to paddock
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	3	65	32	30	Yes	High algal growth. No concern. Discharge is irrigated to paddock
2021/22	BOD	mg/L	12	12	5.3	22.4	15.0	20	Yes	Recent wet weather causing higher flow rate
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	5	23	18	30	No	
2022/23	BOD	mg/L	12	12	2	50.4	23.3	20	Yes	High algal growth. No concern. Discharge is irrigated to paddock
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	3	80	73	30	Yes	High algal growth. No concern. Discharge is irrigated to paddock

Note: Annual reporting year is from 1 May to 30 April.

Table 1f: Annual reporting year summary table of effluent quality at EPA Point No 7 – diesel pump irrigation to Windways

Reporting Year	Pollutant	Units of Measure	Monitoring frequency required by licence	No of times measured during year	Min. value	Max. value	90 percentile value	90 percentile limit	Exceedance (yes/no)	Remarks
2018/19	BOD	mg/L	12	12	8.3	20	15.8	20	No	
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	5	60	52.7	30	Yes	High algal growth. No concern. Discharge is irrigated to paddock.
2019/20	BOD	mg/L	12	12	3	16	15.3	20	No	
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	5	35	24.5	30	No	
2020/21	BOD	mg/L	12	12	1	18	15	20	No	
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	5	33	25	30	Yes	High algal growth. No concern. Discharge is irrigated to paddock
2021/22	BOD	mg/L	12	12	6	21	15.50	20	Yes	C
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	3	35	15	30	Yes	Recent wet weather causing higher flow rate
2021/22	BOD	mg/L	12	12	1	16	12.8	20	No	
	Oil and Grease	mg/L	12	12	<5	<5	<5	10	No	
	Total Suspended Solids	mg/L	12	12	3	115	30	30	Yes	High algal growth. No concern. Discharge is irrigated to paddock

Note: Annual reporting year is from 1 May to 30 April.

Table 2a: Soil monitoring of different soil types in irrigation areas – ongoing – 3 yearly – Mt Kennedy areas

	Frequency required by licence	Received from laboratory	Accessible on Council website by	Location	Stability (Emerson)	Ex Ca	Ex K	Ex Mg	Ex Na	ESP	pHw	pHca	EC	OM as Org C	Extractable Phosphorus	NO ₃ (Mineral N)	PSC
Measure					description	mg/kg	mg/kg	mg/kg	mg/kg	%		dS/cm	%	mg/kg	mg/kg	kg/ha	
EPA Point No. 2 Mt Kennedy areas	3 yearly (Rotated locations)																
June 2019	06/06/19	14/08/20	5 tower 2a	water stable, no swell	1559	1559	540	178	4.6	6.65	5.87	0.134	3.48	34.4	24.8	2200	
June 2019	06/06/19	14/08/20	5 tower 2b	slake 1	1041	1041	447	222	7.7	6.94	5.91	0.104	1.24	1.8	0.41	5800	
June 2019	06/06/19	14/08/20	5 tower 2e	water stable	1259	1259	481	338	9.8	7.52	6.48	0.264	4.02	39.8	9.66	1500	
June 2019	06/06/19	14/08/20	5 tower 2f	slake 2	657	657	378	394	17.5	7.30	6.23	0.159	0.31	2.00	0.85	10700	
June 2019	06/06/19	14/08/20	Eastern 5a	water stable	903	903	337	228	9.4	7.25	6.29	0.172	3.16	22.0	6.83	1100	
June 2019	06/06/19	14/08/20	Eastern 5b	slake 2	855	855	524	516	17.3	7.26	6.19	0.204	0.44	1.10	1.79	5800	
June 2019	06/06/19	14/08/20	Prairie Sth 11a	water stable	2098	2098	782	551	9.7	7.56	6.83	0.41	6.42	48.8	24.97	1700	
June 2019	06/06/19	14/08/20	Prairie Sth 11b	slake 2	704	704	280	1278	42.2	8.06	6.95	1.023	0.39	3.60	13.10	2600	
June 2019	06/06/19	14/08/20	Shed 12a	water stable, no swell	1687	1687	549	64	1.6	6.52	5.93	0.233	5.59	54.6	40.7	900	
June 2019	06/06/19	14/08/20	Shed 12b	slake 2	1021	1021	310	90	3.7	7.05	6.24	0.135	1.69	47.2	10.32	1400	
June 2019	06/06/19	14/08/20	Prairie Nth 14a	water stable, no swell	2751	2751	1091	326	4.5	7.02	6.32	0.186	6.80	51.6	13.59	1500	
June 2019	06/06/19	14/08/20	Prairie Nth 14b	slake 1	2092	2092	771	564	10.0	8.55	6.81	0.192	1.69	43.7	2.73	900	
June 2020	22/06/20	14/08/20	Surface (WW 1a)	water stable, no swell	1412	125	490	94	3.5	6.38	5.37	0.150	4.66	36.7	53.1	1200	
June 2020	22/06/20	14/08/20	Subsoil (WW1b)	slake 3	1241	102	1044	426	11.0	6.72	5.48	0.155	1.06	0.1	4.5	7900	
June 2020	22/06/20	14/08/20	Creek Nth (16a)	water stable, no swell	3483	242	1416	118	1.71	7.70	6.60	0.241	6.81	31.3	5.9	1300	
June 2020	22/06/20	14/08/20	Creek Nth (16b)	slake1	2655	100	984	338	6.36	8.24	6.70	0.329	1.38	4.1	0.3	2800	
June 2020	22/06/20	14/08/20	Surface 5 Tower 2c	water stable, no swell	1291	160	524	76	2.87	7.01	6.58	0.161	4.08	56.5	20.8	1500	
June 2020	22/06/20	14/08/20	Subsoil 5 Tower 2d	slake 3	783	71	545	302	13.3	7	6.52	0.148	1.13	1.1	12.3	15900	
June 2020	22/06/20	14/08/20	Surface Fescue 1 3a	water stable, no swell	1661	193	713	118	3.4	7.12	6.46	0.172	5.53	30.4	9.9	1500	
June 2020	22/06/20	14/08/20	Subsoil Fescue 1 3b	slake 3	555	42	343	283	17.8	7.75	6.47	0.093	0.52	0.1	0.1	7600	
June 2020	22/06/20	14/08/20	Surface East Paddock 5c	water stable, no swell	1727	282	605	91	2.7	7.00	6.37	0.137	6.15	47.2	10.6	1400	
June 2020	22/06/20	14/08/20	Subsoil East Paddock 5d	slake 3	667	156	257	120	8.2	7.81	6.43	0.068	1.13	4.7	0.5	2800	
June 2020	22/06/20	14/08/20	Surface Rye 3 – 8a	water stable, no swell	1308	292	534	148	5.2	6.86	6.32	0.194	5.25	24.8	15.0	1700	
June 2020	22/06/20	14/08/20	Subsoil Rye 3 – 8b	slake2	547	52	294	237	16.4	7.35	6.31	0.126	0.88	0.9	0.5	4600	
June 2020	22/06/20	14/08/20	Surface Rye 4 – 9a	water stable, no swell	1846	220	715	155	4.1	7	6.32	0.18	6.8	28.8	14.6	1400	
June 2020	22/06/20	14/08/20	Subsoil Rye 4 – 9b	slake1	523	51	287	299	20.3	8.12	6.37	0.135	0.71	0.4	0.3	2900	
June 2021	24/06/21	13/07/21	Fescue 2 North 4a	Water stable 8	1586	173	630	219	6.6	6.98	6.98	0.205	5.74	23.8	10.44	1800	
June 2021	24/06/21	13/07/21	Fescue 2 North 4b	3/6, slake 3	572	41	322	249	16.2	7.70	6.29	0.082	0.48	0.69	0.00	4600	
June 2021	24/06/21	13/07/21	Rye 1 6a	Water stable 8	1883	218	650	331	8.6	7.04	6.34	.288	5.23	28.0	21.36	1400	
June 2021	24/06/21	13/07/21	Rye 1 6b	3/6 slake 2	453	59	255	177	14.6	7.29	6.12	0.09	0.42	2.8	0	6700	
June 2021	24/06/21	13/07/21	Rye 2 7a	Water stable 7	1417	238	507	273	9.1	7.07	6.33	0.244	5.18	25.9	7.8	2000	
June 2021	24/06/21	13/07/21	Rye 2 7b	3/6, slake 3	547	195	354	358	20.2	7.26	6.17	0.169	0.44	3.6	0.00	14000	
June 2021	24/06/21	13/07/21	House 13a	Water stable 7	1605	258	637	101	3.1	7.17	6.46	0.157	4.09	49.7	7.55	1000	
June 2021	24/06/21	13/07/21	House 13b	3/6 slake 2	973	86	724	442	14.8	7.70	6.54	0.154	0.92	1.02	0.00	6400	
June 2021	24/06/21	13/07/21	Creek Xing 15a	Water stable 7	1789	247	682	738	17.5	7.08	6.69	0.926	4.43	10.3	1.54	1500	
June 2021	24/06/21	13/07/21	Creek Xing 15b	3/6, slake 2	2534	171	960	711	12.9	8.41	7.54	0.401	0.92	0.11	0.00	6500	

Table 2a continued: Soil monitoring of different soil types in irrigation areas – ongoing – 3 yearly – Mt Kennedy areas

Table 2b: Soil monitoring of different soil types in irrigation areas – ongoing – 3 yearly – Windways areas

	Frequency required by licence	Received from laboratory	Accessible on Council website by	Location	Stability (Emerson)	Ex Ca	Ex K	Ex Mg	Ex Na	ESP	pHw	pHca	EC	OM as Org C	Extractable Phosphorus	NO ₃ (Mineral N)	PSC
Measure				description	mg/kg	mg/kg	mg/kg	mg/kg	%		dS/cm	%	mg/kg	mg/kg	kg/ha		
EPA Point No. 4 Windways areas	3 yearly (Rotated locations)																
June 2019	06/06/19	14/08/20	Windways 1e	water stable, no swell	1969	140	772	227	5.6	6.91	6.18	0.156	3.86	27.00	26.00	2000	
June 2019	06/06/19	14/08/20	Windways 1f	Water stable swell	1505	71	727	362	10.3	6.92	5.95	0.158	1.19	1.60	1.19	2900	
June 2020	22/06/20	14/08/20	Surface (WW 1a)	water stable, no swell	1412	125	490	94	3.5	6.38	5.37	0.150	4.66	36.7	53.1	1200	
June 2020	22/06/20	14/08/20	Subsoil (WW1b)	slake 3	1241	102	1044	426	11.0	6.72	5.48	0.155	1.06	0.1	4.5	7900	
June 2021	24/06/21	13/07/21	Windways 1c	Water stable,swell Class 7	1123	210	433	100	4.3	6.65	5.95	0.15	2.73	55.3	21.9	800	
June 2021	24/06/21	13/07/21	Windways 1d	3/6, Slake 3	1015	77	645	357	12.8	6.51	5.33	0.121	0.63	2.60	13.51	6800	
June 2022	28/06/22	12/07/22	Windways 1e	Water stable swell	2551	205	864	177	3.6	6.85	6.52	0.24	3.24	53.4	26.9	2200	
June 2022	28/06/22	12/07/22	Windways 1f	Slake 3	2403	99	1218	384	7.0	7.33	6.44	0.126	0.45	1.8	5.0	4600	
June 2023	06/06/23	13/06/223	Windways 1a		8	1332	221	363	110	4.4	6.82	6.00	0.119	2.28	26.2	15.1	1100
June 2023	06/06/23	13/06/223	Windways 1b	Slake 3	1053	82	945	304	8.9	7.04	5.67	0.086	0.26	0.1	0.0	4800	
June 2023	06/06/23	13/06/223	Creek north 16a		8	2305	150	949	449	8.95	6.65	5.67	0.445	3.04	9.0	1.1	2200
June 2023	06/06/23	13/06/223	Creek north 16b	Slake 1	2137	111	886	364	7.82	6.60	5.90	0.331	0.87	0.1	0.0	2500	

Table 3: Treated wastewater discharge & irrigation volumes

	Frequency required by licence	Reporting month	Month's Total	Lowest daily volume	Mean daily volume	Greatest daily volume		Frequency required by licence	Reporting month	Month's Total	Lowest daily volume	Mean daily volume	Greatest daily volume	Accessible on Council website
Electronic measure			kL	kL/day	kL/day	kL/day		Electronic measure			kL	kL/day	kL/day	
EPA Point No. 1 (Commissioners Waters)	/daily						EPA Points Nos. 3 & 5 (Mt Kennedy & Windways irrigation areas)	daily						
		Jan 2019	6706	0	216.3	1870			Jan 2019	118399	8	3819	7115	22/02/19
		Feb 2019	0	0	0	0			Feb 2019	136600	1993	4879	6264	14/03/19
		Mar 2019	0	0	0	0			Mar 2019	127882	0	4125	6190	05/04/19
		Apr 2019	362	0	12.1	201			Apr 2019	127152	2489	4238	5987	10/05/19
		May 2019	28206	0	909.9	2440			May 2019	112442	322	3627	5340	12/06/19
		June 2019	43170	0	1439	3634			Jun 2019	85197	1194	2840	5477	25/07/19
		July 2019	56712	0	1829	3894			July 2019	83608	843	2697	5547	08/08/19
		Aug 2019	32068	0	1034	3014			Aug 2019	106936	1587	3450	5915	05/09/19
		Sep 2019	0	0	0	0			Sep 2019	117227	968	3908	6127	8/11/19
		Oct 2019	0	0	0	0			Oct 2019	113231	1023	3653	5600	8/11/19
		Nov 2019	0	0	0	0			Nov 2019	84281	1416	2809	3881	9/12/19
		Dec 2019	0	0	0	0			Dec 2019	86794	0	2800	5255	07/01/20
		Jan 2020	70300	0	2268	15072			Jan 2020	82661	0	2666	6521	07/02/20
		Feb 2020	250236	474	8629	26318			Feb 2020	16730	0	577	3678	09/03/20
		Mar 2020	155386	3528	5012	6542			Mar 2020	6479	0	209	3848	9/04/20
		Apr 2020	101354	784	3378	8036			Apr 2020	47916	0	1597	3302	11/05/20
		May 2020	72960	514	2354	5506			May 2020	63912	0	2062	4436	11/06/20
		June 2020	118586	1388	3953	6324			June 2020	29329	0	978	3495	06/07/20
		July 2020	138784	2232	4477	9356			July 2020	22510	0	726	2823	14/08/20
		Aug 2020	167570	4174	5405	8198			Aug 2020	0	0	0	0	08/09/20
		Sep 2020	108190	820	3606	13514			Sep 2020	41094	0	1370	3964	19/10/20
		Oct 2020	90936.9	0.0	2933.4	9719.1			Oct 2020	58913	0	1900	7783	06/11/20
		Nov 2020	33931	0	1131	7688			Nov 2020	90400	0	3013	5112	08/12/20
		Dec 2020	69574	0	2312	9563			Dec 2020	50977	0	1644	3483	06/01/21
		Jan 2021	197432	0	6369	108011			Jan 2021	21135	0	682	4439	04/02/21
		Feb 2021	34312	0	1225	17120			Feb 2021	68941	0	2337	5129	8/03/21
		Mar 2021	361081	4842	11648	48926			Mar 2021	433	0	14	302	28/04/21
		Apr 2021	123648	1316	4122	8748			Apr 2021	36587	0	1220	3192	11/05/21
		May 2021	116798	1470	3768	6934			May 2021	43887	0	1416	3188	23/06/21
		Jun 2021	168336	2192	5611	7996			Jun 2021	19876	0	663	2724	13/07/21
		Jul 2021	247838	5896	7995	12120			Jul 2021	0	0	0	0	04/08/21
		Aug 21	288472	5330	9306	23586			Aug 21	0	0	0	0	8/09/21
		Sep 21	118474	1524	3949	7266			Aug 21	47429	0	1581	3632	11/10/21
		Oct 21	194682	908	6280	15148			Oct 21	47852	0	1544	5373	04/11/21
		Nov 21	315966	742	10532	36578			Nov 21	42822	0	1427	3588	10/12/21

Dec 21 334684 3110 10736 34668 | | Dec 21 9546 0 308 25972 | 20/01/22

Frequency of measurement required by licence is daily, and the daily limits are **16,500 kL** for discharge to Commissioners Waters; and **7,000 kL** for only EPA Point 3, the Mt Kennedy irrigation areas.

Table 3 continued: Treated wastewater discharge & irrigation volumes

Table 4: Biosolids sludge volume and spread monitoring

	Frequency required by licence	Reporting month	Sludge lagoons	to Mt Kennedy areas	to Windways areas	Accessible on Council website
Measure			kL (~m³)	kL (~m³)	kL (~m³)	
EPA Point No. 8	daily during discharge					
		Jan 2019	No desludging	0	0	22/02/19
		Feb 2019	No desludging	0	0	14/03/19
		Mar 2019	No desludging	0	0	05/04/19
		Apr 2019	No desludging	0	0	10/05/19
		May 2019	No desludging	0	0	12/06/19
		Jun 2019	No desludging	0	0	25/07/19
		July 2019	No desludging	0	0	08/09/19
		Aug 2019	No desludging	0	0	05/09/19
		Sep 2019	No desludging	0	0	08/11/19
		Oct 2019	No desludging	0	0	08/11/19
		Nov 2019	No desludging	0	0	09/12/19
		Dec 2019	No desludging	0	0	07/01/20
		Jan 2020	No desludging	0	0	11/06/20
		Feb 2020	No desludging	0	0	11/06/20
		Mar 2020	No desludging	0	0	11/06/20
		Apr 2020	No desludging	0	0	11/06/20
		May 2020	No desludging	0	0	11/06/20
		Jun 2020	No desludging	0	0	06/07/20
		July 2020	810	730	80	14/08/20
		Aug 2020	760	0	760	08/09/20
		Sept 2020	No desludging	0	0	19/10/20
		Oct 2020	No desludging	0	0	06/11/20
		Nov 2020	No desludging	0	0	08/12/20
		Dec 2020	No desludging	0	0	06/01/21
		Jan 2021	No desludging	0	0	04/02/21
		Feb 2021	No desludging	0	0	08/03/21
		Mar 2021	No desludging	0	0	28/04/21
		Apr 2021	No desludging	0	0	11/05/21
		May 2021	No desludging	0	0	23/06/21
		Jun 2021	No desludging	0	0	13/07/21
		July 2021	No desludging	0	0	04/08/21
		Aug 2021	No desludging	0	0	8/09/21
		Sep 2021	No desludging	0	0	11/10/21
		Oct 2021	No desludging	0	0	04/11/21
		Nov 2021	No desludging	0	0	10/12/21

Table 4: continued

Table 5: Biosolids sludge quality monitoring

Table 6a: Groundwater quality & depth – WW1, WW2, WW3

Wells	Frequency required by licence	DO	EC	pH	Eh	Temp	D	WL RL	Received from laboratory	Accessible on Council website by	NO _x	TKN	TN	TP
Measure		mg/L	µS/cm	1-14	mV	°C	m	m			mg/L as N	mg/L as N	mg/L	mg/L
WW1	6 monthly								WW1					
Sampling date														
19/09/19		0.78	1651	6.96	+123	17.9	11.89	965.04						
06/05/20		0.46	1615	7.00	+138	16.6	10.21	966.72						
28/10/20		Well standpipe bent over. Vehicle impression noted. Internal PVC standpipe squeezed. Not possible to insert pump.												
19/03/21		2.68	1451	6.83	+104	22.1	8.28	968.65	06/04/21	27/04/21	2.64	0.4	3.0	0.05
22/04/21		0.83	1385	7.00	+185	16.4	7.74	969.19	05/05/21	25/05/21	1.88	0.4	2.3	0.04
01/11/21		0.64	1243	7.00	+108	17.1	6.93	970.00	11/11/21	01/12/21	1.72	0.4	2.1	0.03
23/03/22		0.86	1258	6.85	+48	18.7	6.47	970.46	04/04/22	26/04/22	1.46	0.2	1.7	0.01
16/12/22		0.68	1162	6.94	+103	16.6	5.48	971.45	03/01/23	23/01/23	1.05	0.3	1.4	<0.01
23/03/23		0.56	1161	6.91	+142	18.3	6.88	970.05	05/04/23	28/04/23	1.04	0.1	1.1	<0.01
14/09/23		7.01	1134	7.00	+159	17.9	7.99	968.94	26/09/23	16/10/23	1.19	0.2	1.4	0.01
WW2	6 monthly								WW2					
19/09/19		0.15	1298	7.01	+107	16.5	2.05	952.93	26/09/19	11/10/19	0.03	<0.1	<0.1	<0.01
06/05/20		0.11	1239	7.18	+95	17.5	1.50	953.48	12/05/20	01/06/20	0.04	0.2	0.2	<0.01
28/10/20		0.11	1218	7.11	+168	16.1	1.46	953.52	09/11/20	27/11/20	0.05	<0.1	<0.1	0.03
22/04/21		0.23	1222	7.04	+164	16.2	0.93	954.05	05/05/21	25/05/21	0.06	<0.1	<0.1	0.01
01/11/21		0.23	1180	7.04	+88	15.9	1.04	953.94	11/11/21	01/12/21	0.10	0.2	0.3	<0.01
23/03/22		0.30	1157	6.92	+36	18.6	0.82	954.16	04/04/22	26/04/22	0.11	<0.1	0.1	<0.01
16/12/22		0.21	1107	6.97	+105	16.2	1.16	953.82	03/01/23	23/01/23	0.14	<0.1	0.1	<0.01
23/03/23		0.15	1072	6.94	+114	18.0	1.56	953.42	05/04/23	28/04/23	0.15	<0.1	0.2	<0.01
14/09/23		0.23	971	6.89	+117	16.3	1.25	953.73	26/09/23	16/10/23	0.15	0.6	0.8	<0.01
WW3	6 monthly								WW3					
19/09/19		0.68	930	7.69	-44	17.3	2.72	953.08	26/09/19	11/10/19	0.30	<0.1	0.3	0.02
06/05/20		0.30	901	7.64	-12	18.0	1.91	953.89	12/05/20	01/06/20	0.14	0.2	0.3	0.04
28/10/20		0.27	905	7.41	-14	17.8	1.50	954.30	09/11/20	27/11/20	0.02	<0.1	<0.1	0.05
22/04/21		0.42	923	7.45	-33	16.9	0.41	955.39	05/05/21	25/05/21	0.01	<0.1	<0.1	0.06
01/11/21		0.58	894	7.49	-29	17.9	0.33	955.47	11/11/21	01/12/21	0.03	<0.1	<0.1	0.06
23/03/22		0.82	899	7.41	-18	18.7	0.32	955.48	04/04/22	26/04/22	0.02	<0.1	<0.1	0.04
16/12/22		0.51	864	7.27	+47	17.3	0.38	955.42	03/01/23	23/01/23	<0.01	<0.1	<0.1	0.03
23/03/23		0.60	843	7.27	+21	18.5	0.92	954.88	05/04/23	28/04/23	<0.01	<0.1	<0.1	0.04
14/09/23		2.87	777	7.26	+64	16.4	1.19	954.61	26/09/23	16/10/23	<0.01	0.2	0.2	0.04

Table 6b: Groundwater quality & depth – P3, P6, P7

Wells	Frequency required by licence	DO	EC	pH	Eh	Temp	D	WL RL	Received from laboratory	Accessible on Council website by	NO _x	TKN	TN	TP
Measure		mg/L	µS/cm	1-14	mV	°C	m	m			mg/L as N	mg/L as N	mg/L	mg/L
P3	6 monthly								P3					
Sampling date														
19/09/19		DRY												
06/05/20		DRY												
28/10/20		DRY												
22/04/21		DRY												
01/11/21		DRY												
23/03/22		DRY												
16/12/22		DRY												
23/03/23		DRY												
14/09/23		DRY												
P6	6 monthly								P6					
19/09/19		5.61	744	6.95	+190	15.6	4.99	956.70	26/09/19	11/10/19	0.11	0.2	0.3	<0.01
06/05/20		6.19	634	7.53	+204	18.9	4.54	957.15	12/05/20	01/06/20	0.16	0.8	1.0	0.01
28/10/20		5.20	1319	6.46	+124	18.1	4.61	957.08	09/11/20	27/11/20	0.06	0.4	0.5	0.03
22/04/21		6.70	845	7.53	+51	17.5	3.27	958.42	05/05/21	25/05/21	0.08	0.9	1.0	0.03
01/11/21		6.53	1642	6.31	+123	16.6	3.69	958.00	11/11/21	01/12/21	0.05	0.9	1.0	0.02
23/03/22		6.84	1318	7.43	+81	24.8	2.96	958.73	04/04/22	26/04/22	0.03	0.7	0.7	0.02
16/12/22		5.58	1285	6.59	+176	18.0	3.32	958.37	03/01/23	23/01/23	0.03	1.3	1.3	<0.01
23/03/23		4.96	1323	6.50	+114	18.0	4.44	957.25	05/04/23	28/04/23	0.12	1.6	1.7	0.01
14/09/23		6.97	1168	6.72	+217	16.1	4.48	957.21	26/09/23	16/10/23	0.06	1.0	1.1	<0.01
P7	6 monthly								P7					
19/09/19		9.74	372	7.81	+176	14.6	1.60	960.09	26/09/19	11/10/19	0.14	<0.1	0.1	0.18
06/05/20		8.30	371	7.41	+233	18.7	1.19	960.50	12/05/20	01/06/20	0.11	0.9	1.0	0.17
28/10/20		8.43	336	7.21	+112	17.2	1.49	960.20	09/11/20	27/11/20	0.13	0.2	0.3	0.20
22/04/21		9.00	345	7.68	+100	16.2	0.44	961.25	05/05/21	25/05/21	0.02	0.6	0.6	0.19
01/11/21		10.23	337	7.53	+126	15.6	0.91	960.78	11/11/21	01/12/21	0.02	<0.1	<0.1	0.12
23/03/22		9.10	329	7.66	+80	22.9	0.51	961.18	04/04/22	26/04/22	0.02	0.1	0.1	0.08
16/12/22		10.14	332	8.38	+140	18.8	0.80	960.89	03/01/23	23/01/23	0.02	<0.1	<0.1	0.08
23/03/23		7.82	335	7.89	+15	20.5	1.42	960.27	05/04/23	28/04/23	0.01	<0.1	<0.1	0.07
14/09/23		9.38	318	7.58	+213	16.2	1.38	960.31	26/09/23	16/10/23	0.06	0.2	0.3	0.16

Table 6c: Groundwater quality & depth – P14, P17

Wells	Frequency required by licence	DO	EC	pH	Eh	Temp	D	WL RL	Received from laboratory	Accessible on Council website by	NO _x	TKN	TN	TP	Remarks
Measure		mg/L	µS/cm	1-14	mV	°C	m	m			mg/L as N	mg/L as N	mg/L	mg/L	
P14	6 monthly								P14						
Sampling date															
19/09/19		7.69	681	6.95	+140	16.0	2.53	958.54	26/09/19	11/10/19	5.24	0.8	6.0	0.14	
06/05/20		6.24	665	7.26	+277	18.3	2.33	958.74	12/05/20	01/06/20	2.93	1.1	4.0	0.17	
30/10/20		5.11	770	7.12	+119	16.8	1.16	959.91	09/11/20	27/11/20	3.37	0.8	4.2	0.15	
22/04/21		7.86	594	7.53	+75	17.2	1.34	959.73	05/05/21	25/05/21	0.77	1.1	1.9	0.21	
01/11/21		6.30	641	7.48	+71	18.4	1.93	959.14	11/11/21	01/12/21	2.03	0.9	2.9	0.16	
23/03/22		6.86	596	7.61	+192	24.0	1.57	959.50	04/04/22	26/04/22	2.22	0.7	2.9	0.17	
16/12/22		5.07	659	7.02	+217	19.1	1.55	959.52	03/01/23	23/01/23	3.37	1.0	4.4	0.12	
23/03/23		4.88	652	6.98	+102	22.2	2.20	958.87	05/04/23	28/04/23	3.38	0.8	4.2	0.14	Fresh biosolids upgradient.
14/09/23		6.72	417	7.00	+164	18.9	1.38	959.69	26/09/23	16/10/23	0.28	0.6	0.9	0.16	
P17	6 monthly								P17						
19/09/19		5.51	2503	7.67	+170	16.7	3.48	954.16	26/09/19	11/10/19	4.35	0.4	4.8	0.10	
06/05/20		5.96	2470	8.17	+126	18.3	3.35	954.29	12/05/20	01/06/20	9.24	0.8	10.0	0.13	
30/10/20		2.72	4460	7.53	+116	16.6	3.17	954.47	09/11/20	27/11/20	19.00	3.4	22.4	0.11	Fresh biosolids upgradient.
22/04/21		5.71	2975	7.70	+117	17.4	3.17	954.47	05/05/21	25/05/21	9.12	1.4	10.5	0.20	
01/11/21		3.68	4535	7.38	+64	17.9	3.17	954.47	11/11/21	01/12/21	3.39	2.1	5.5	0.21	
23/03/22		3.75	4230	7.50	+136	22.3	1.68	955.96	04/04/22	26/04/22	1.69	1.5	3.2	0.18	
16/12/22		3.22	3475	7.40	+177	19.0	1.96	955.68	03/01/23	23/01/23	1.24	1.3	2.5	0.13	
23/03/23		2.61	3411	7.35	+68	21.4	2.83	954.81	05/04/23	28/04/23	0.79	1.0	1.8	0.16	
14/09/23		5.87	3235	7.47	+131	18.6	2.01	955.63	26/09/23	16/10/23	0.63	2.4	3.0	0.20	