Technical Memorandum

To:	Outcross Agri Services (Tony Dean)
From:	AWC – Adrian Leader, Will Dale
Date:	9 October 2024
Pg/Attach.:	13 pages plus attachment
Job ref:	1-201354_05_20a_NRLX_GW_SW_EFF_RVC -

Northern Rivers Livestock Exchange (NRLX): Environmental Monitoring Report September 2024

AWC commenced routine environmental monitoring at the NRLX in September 2021, which includes extraction of groundwater samples from monitoring bores, collection of water samples from the storage/irrigation ponds and surface waters. Soil samples are also collected from the irrigation zone annually and results are included in a separate report. Under the current environmental protection license (EPL) quarterly collection of water samples from surface waters, storage/irrigation ponds and monitoring of ground water field parameters are required. Table 1 provides details of the EPL and project.

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Table 1 Site and project details

NRLX	
Site Identification	Lot 1 DP 1240949 Dargaville Drive, Casino NSW 2470
Current reporting period	September 2024 (Quarterly monitoring)
EPL	3878 (17-April-2023)
Attachments	Attachment 1 Historic treated effluent quality monitoring results (Part 1) Attachment 2 Historic treated effluent quality monitoring results (Part 2) Attachment 3 Historic treated effluent quality monitoring results (Yearly) Attachment 4 Historic monitoring results (field parameters) for GW1, GW2 Attachment 5 Historic monitoring results for SW1 trigger event Attachment 6 Historic monitoring results for SW2 trigger event Attachment 7 Site Map Attachment 8 Laboratory sheets

Summary

The following is a summary of the monitoring results:

- All recorded values for effluent monitoring (EPA-1) were within their historic range apart from Thermotolerant Coliforms which recorded a new maximum value of (8000 cfu/100ml)
- Field parameters for groundwater typically exceeded relevant field monitoring WQOs
- Many laboratory analysis results of groundwater quality showed exceedance of respective WQOs
- At both SW1 and SW2 many WQOs have been exceeded.
- At SW1 all analytes recorded values within their historic ranges except for Organic Nitrogen (0.122 mg/L), TKN (0.147 mg/L) and Total Nitrogen (0.147 mg/L) recorded new minimum values.
- At SW2 all analytes recorded values within their historic ranges.

1.1 Water Quality Objectives

Water Quality Objectives (WQO) were sourced from *Environmental Earth Services* (EES, 2019), as provided in Table 2 below and are attributable to groundwater and surface water. There are no trigger values as part of the EPL.

Table 2 Water Quality Objectives (Sourced ESS 2019)

Analyte	WQO
pH	6.5 – 8.0
EC (dS/m)	0.125 – 2.2
Thermotolerant coliforms (cfu/100mL)	1000
BOD_5 (mg/L)	15
Total Suspended Solids (TSS) (mg/L)	40
Chlorophyll 'a' (mg/L)	0.003
Dissolved Oxygen (DO) (%)	85 - 110

Analyte	WQO
Total Nitrogen (TN) (mg/L)	0.35
Oxidised Nitrogen (NOx) (mg/L)	0.04
Ammonia (mg/L)	0.02
Total Phosphorus (mg/L)	0.025
Plant available Phosphorus (mg/L)	0.02

1.2 Weather Monitoring – Rainfall

Monthly rainfall totals recorded at the Casino Airport (BOM station 058208). Rainfall for June (4.4 mm) was below its respective historic average of 68.3 mm whereas July (41.8 mm) and August (95.0 mm) recorded values above their respective historic averages of 32.5 mm and 42.7 mm (refer Figure 1).

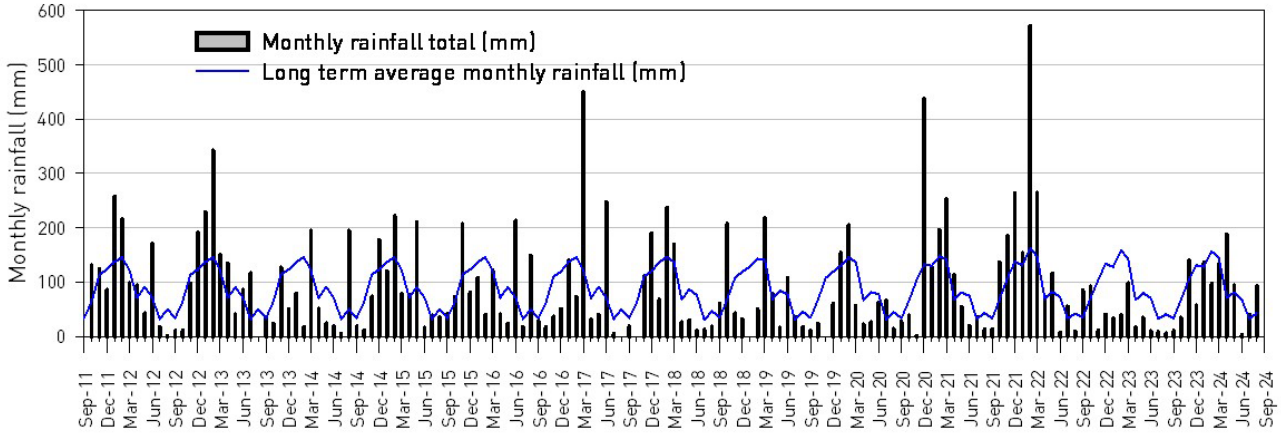


Figure 1 Monthly rainfall records and long-term averages Source: BOM station 058208 Casino Airport)

2.0 Surface Water Monitoring - Routine

Routine surface water sampling was undertaken by AWC on the 3rd of September 2024. The locations of the sampling sites are shown in the attached site plan. Table 3 provides details of the surface water sampling. EAL performed all analysis.

Table 3 Surface Water Quality Monitoring details

Surface Water Quality Monitoring sampling details – NRLX	
Sample date	3/09/2024
Sampled by	Will Dale (AWC)
Sample time	SW1 (13:10), SW2 (14:50)
Location	SW1 (EPA 7) & SW2(EPA 8) shown on the site plan attached
Sample collection methods	Grab samples are taken from surface water locations shown on the attached map. Each sample bottle is rinsed three times with sample water prior to filling the bottle. Sample bottle is capped, minimising the air bubbles in the bottle, kept cool (stored on ice) and out of direct sunlight and sent/delivered to EAL for analysis.
Sample analytes	Refer results tables below and laboratory results sheets attached
Sample frequency	Quarterly

2.1 Surface Water Quality Results

EAL performed all analysis. A summary of monitoring results compared with WQOs and summary statistics of the historic data set are provided in Table 4 and Table 5. Compared to the last round of surface water sampling, concentrations of nutrients including; Total Phosphorus (TP), Total Nitrogen (TN) and Phosphate at SW1 are considerably lower. In this round of surface water sampling SW2 recorded elevated concentrations of nutrients including TN (15.8 mg/L), TP (14.1 mg/L) and Phosphate (0.02 mg/l) which may be contributed to Organic nitrogen inputs by NRLX and/or higher levels of nutrients within the suspended solids at SW2 sample location.

Key findings include:

SW1

- All analytes recorded values within their historic ranges except for Organic Nitrogen (0.122 mg/L), TKN (0.147 mg/L), (Nitrate & Nitrite 0.010 mg/L) and TN (0.147 mg/L) recorded new minimum values.
- pH (8.31), Ammonia (0.025 mg/L), Suspended Solids (44 mg/L) and Chlorophyll 'A' (0.013 mg/L) recorded values outside their respective WQO
- pH (8.31) and Suspended Solids (44 mg/L) recorded values above their respective 75th percentiles
- Nitrate (<0.005 mg/L), Nitrite (<0.005 mg/L) and Total Phosporus (<0.01 mg/L) all recorded values below their respective detection limits

SW2

- All analytes recorded values within their historic ranges
- Ammonia (0.265 mg/L), Biological Oxygen Demand (102 mg/L), Chlorophyll a (0.726 mg/L), TN (15.8 mg/L), TP (14.1 mg/L), Suspended Solids (5430 mg/L), and Thermotolerant Coliforms (2500 mg/L) recorded values outside their respective WQO
- EC (0.827 dS/m), Ammonia (0.265 mg/L), BOD (102 mg/L), Chlorophyll 'A' (0.726 mg/l), TP (14.1 mg/L), Organic Nitrogen (15.5 mg/L), TKN (15.8 mg/L), TN (15.8 mg/L) and Suspended Solids (5450 mg/L) recorded values above their respective 75th percentiles
- Phosphate (0.02 mg/L) recorded a value below its respective 25th percentile
- Nitrate (<0.005 mg/L) recorded a value below its respective detection limit

Table 4 Current results for SW1 with a summary statistics of the historic data set

SW1 – current monitoring results, WQOs and summary statistics								
Parameter	**WQOs**	**Current**	**Min.**	**Max.**	**Mean**	**Median**	**25th %ile**	**75th %ile**
pH	6.5-8.0	**8.31**	6.18	8.38	7.515	7.61	7.025	8.07
EC	0.125-2.2 dS/m	1.13	0.015	5.082	1.198	1.13	0.4785	1.38
TDS	-	768	110	1648	690.01	768	231	872
Ammonia (as N)	0.02	**0.025**	0.005	8.69	0.577	0.0745	0.0195	0.323
(BOD-5 Day)	15	2.15	1	13.2	3.855	3.2	2.025	5
Chlorophyll a	0.003	**0.013**	0.005	7.5	0.697	0.027	0.013	0.089
Dissolved Organic Carbon	-	24	14	43.8	24.200	21.7	17.9	29
Nitrate & Nitrite (as N)	-	0.01	0.01	13.34	1.360	0.0955	0.019	1.664
Nitrate (as N)	-	0.005	0.005	12.97	1.289	0.063	0.006	1.575
Nitrite (as N)	-	0.005	0.005	0.374	0.070	0.02	0.009	0.075
Total Kjeldahl Nitrogen (as N)	-	0.147	0.147	9.52	2.164	1.4	1.07	2.775
Total Nitrogen (as N)	0.35	0.147	0.147	17.32	3.598	2.3	1.415	3.48
Total Phosphorus (mg/L P)	0.025	0.01	0.01	1.26	0.174	0.08	0.052	0.15
Phosphate (mg/L P)	0.02	0.011	0.005	0.208	0.056	0.02	0.011	0.0775
Suspended Solids	40	**44**	4	527	48.935	25	9.65	41
Thermotolerant Coliforms	1000	780	10	65000	5261.8	1170	270	3550
Shaded and bold denotes exceedance of WQO								

Table 5 Current results for SW2 with a summary statistics of the historic data set

SW2 – current monitoring results, WQOs and summary statistics								
Parameter	**WQOs**	**Current**	**Min.**	**Max.**	**Mean**	**Median**	**25th %ile**	**75th %ile**
pH	6.5-8.0	7.09	6.24	8.85	7.15	7.06	6.61	7.52
EC	0.125-2.2 dS/m	0.827	0.2	1.24	0.62	0.59	0.41	0.74
TDS	-	562	160	841	455.53	420	360	562.00
Ammonia (as N)	0.02	**0.265**	0.01	1.30	0.17	0.06	0.03	0.15
(BOD-5 Day)	15	**102**	2.4	175	18.82	5	3.40	9.30
Chlorophyll a	0.003	**0.726**	0.004	5	0.62	0.09	0.01	0.31
Dissolved Organic Carbon	-	24.5	16	53.6	28.63	24.35	18.2	39.98
Nitrate & Nitrite (as N)	-	0.034	0.01	1.57	0.27	0.04	0.02	0.46
Nitrate (as N)	-	0.005	0.01	1.49	0.21	0.02	0.01	0.35
Nitrite (as N)	-	0.029	0.01	0.47	0.06	0.02	0.01	0.05
Total Kjeldahl Nitrogen (as N)	-	15.8	1	57.2	5.81	2.2	1.26	3.73
Total Nitrogen (as N)	0.35	**15.8**	1.13	57.2	5.88	2.36	1.38	3.88
Total Phosphorus (mg/L P)	0.025	**14.1**	0.28	31.7	3.50	0.66	0.35	2.51
Phosphate (mg/L P)	0.02	**0.02**	0.01	3.74	0.54	0.13	0.09	0.53
Suspended Solids	40	**5430**	8	30540	1845.37	55	23.5	299.5
Thermotolerant Coliforms	1000	**2500**	100	188000	14928	2750	477.5	10950
Shaded and bold denotes exceedance of WQO								

3.0 Treated Effluent Monitoring

Sampling was undertaken by AWC in accordance with the EP Licence and EPA approved guidelines. Table 6 provides details of the effluent sampling. EAL performed all analysis.

Table 6 Treated Effluent Quality Monitoring details

Treated Effluent Quality Monitoring (EPA1) sampling details – NRLX	
Sample date	3/09/2024
Sampled by	Will Dale (AWC)
Sample time	13:50
Location	EPA1 shown on the site plan attached
Sample collection methods	Grab sample extracted from treatment pond adjacent the pump station: Sample bottle is rinsed three times with sample water prior to filling the bottle. Sample bottle is capped, minimising the air bubbles in the bottle, kept cool (stored on ice) and out of direct sunlight and sent/delivered to EAL for analysis.
Sample analytes	Refer results tables and laboratory results sheets attached for quarterly and yearly monitoring results
Sample frequency	Quarterly

3.1 Treated Effluent Quality Results

Monitoring of treated effluent provides an indication of the quality of water that is disposed of via irrigation. This is the fifteenth round of sampling conducted by AWC, however there is historic data (2017-2020) that will be included in the graphs and statistical summary. Table 7 shows the current monitoring results along with summary statistics of the total data set for context. Figure 2 shows selected historic monitoring results in graph form. The entire data set including results from the yearly monitoring requirements and laboratory results sheet are included as an attachment.

Key findings of the treated effluent monitoring include:

- All concentrations were within their historic range except Thermotolerant Coliforms which recorded a new maximum value of (8000 cfu/100ml)
- SAR (4.48) recorded a value above its 75th percentiles
- EC (1.11 dS/m), Reactive Phosphorus (1.41 mg/L) and TP (1.85 mg/L) recorded values below their respective 25th percentiles
- The SAR value of 4.48 is in the preferred range of <6, with the relationship to EC being in the preferred range in accordance with the DEC (2004) (*Environmental Guidelines: Use of Effluent for Irrigation*)

    - Effluent with a SAR (sodium adsorption ratio) of greater than 6 has been shown to raise exchangeable sodium percentage (ESP) in non sodic soils, creating soils with poor structure that are susceptible to dispersion where effluent with a SAR of less than 3 may lower ESP in sodic soils.

Table 7 Treated effluent monitoring - current results and summary statistics of historic data set (select parameters)

	Unit	Current result	*n*	Min.	Max.	Mean	75th %ile	Median	25th %ile
Electrical Conductivity	(dS/m)	1.11	43	0.419	2.211	1.39	1.682	1.43	1.2
pH		9.08	43	7.62	9.53	8.64	9.08	8.69	8.16
Reactive Phosphorus	(mg/L)	1.41	42	0.434	10.7	3.73	4.49	2.835	1.9125
Total Phosphorus	(mg/L)	1.85	43	1.3	13	5.19	5.57	4.72	2.968
Suspended Solids	(mg/L)	49	43	11	1500	133.07	136	83	35
Total Dissolved Solids	(mg/L)	794	17	323	1503	791.45	951.5	794	554.5
Total Nitrogen	(mg/L)	4.51	43	1.9	14	6.64	8.896	6.26	4.03
Alkalinity as calcium carbonate	(mg/L)	424	27	112	620	398.59	480	410	340
Sodium	(mg/L)	136	27	38.7	1100	305.46	530	127	104
Sodium Adsorption Ratio		4.48	17	1.9	5.4	3.58	4.35	3.7	2.75
Thermotolerant Coliforms	(cfu / 100ml)	8000	8	80	8000	2973.75	5675	2180	817.5

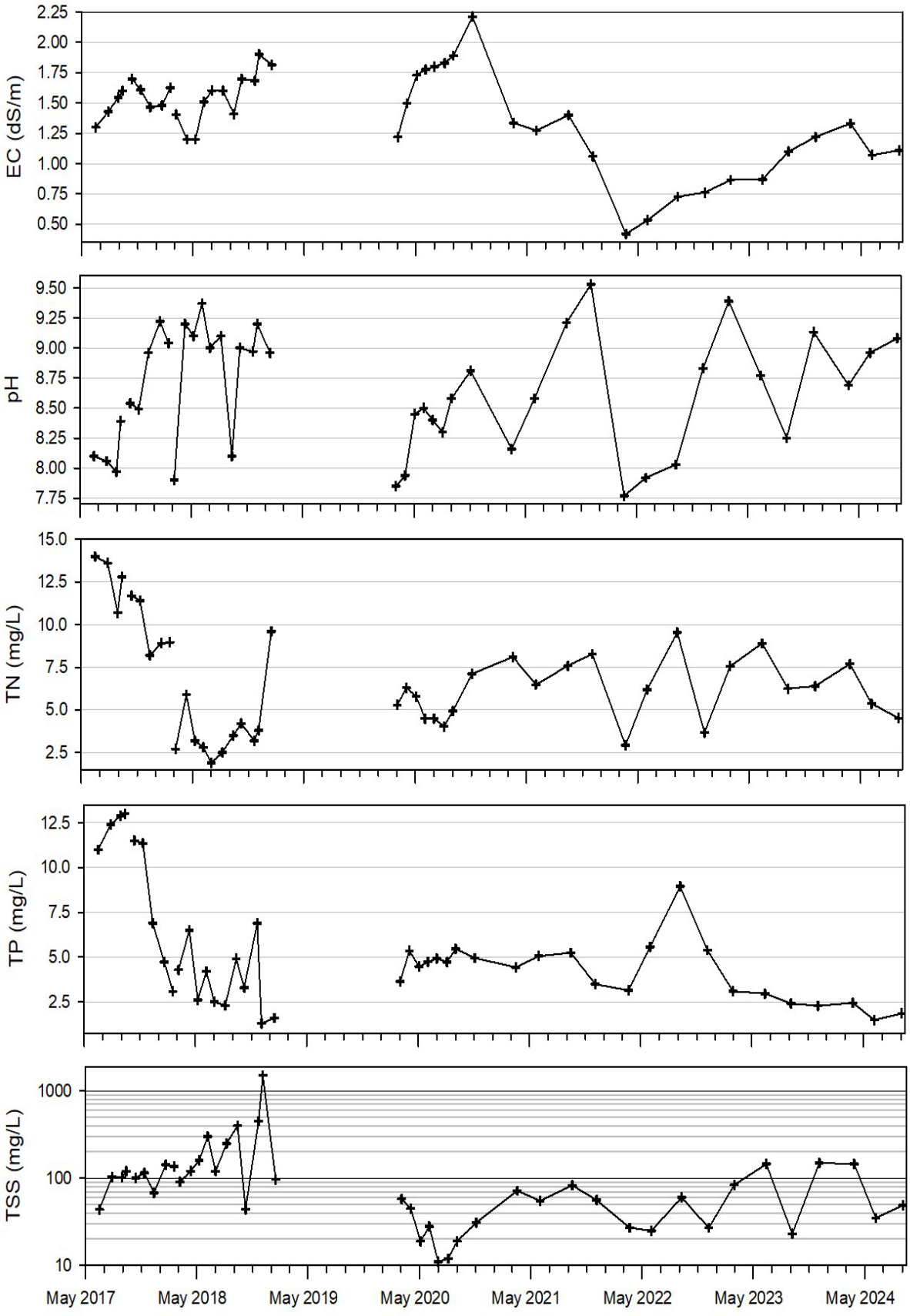


Figure 2 Historic treated effluent quality monitoring, select parameters (AWC commenced monitoring in March 2021)

4.0 Groundwater Quality Monitoring

Three groundwater monitoring bores have samples extracted on a quarterly basis with field parameters recorded and laboratory analysis undertaken on a six-monthly basis. The locations of the bores are shown in the attached site plan. Groundwater is required to be sampled as part of EPL requirements via the *NRLX Water Monitoring Plan* (AWC, 2017) being *Section 8 Pollution Studies and Reduction Programs*, Clause *U1 Water Quality Monitoring Program*. Table 8 provides details of the groundwater sampling.

Table 8 Groundwater Quality Monitoring details

Groundwater Quality Monitoring sampling details – NRLX			
Sample date	3/09/2024		
Sampled by	Will Dale (AWC)		
Sample time	GW1 (EPA 4) 14:10	GW2 (EPA 5) 13:35	GW3 (EPA 6) 14:45
Location	GW1, GW2 and GW3; shown on the site plan attached		
Sample collection methods	Groundwater samples are extracted using a 50mm submersible bore pump. Bore purging followed methods set out in Sandaran *et al.* (2009); briefly, at least three times the volume of the bore (3 x πr^2 x height) was extracted before field parameters are recorded and laboratory samples are collected (6-monthly)		
Sample analytes	Refer results tables below		
Sample frequency	Quarterly (some analytes only analysed quarterly)		

4.1 Groundwater Quality Monitoring Results

Scheduled monitoring of field parameters (pH, Conductivity, ORP, DO and Temperature) with a calibrated water quality probe and collection of a representative sample for analysis of selective analytes by a NATA approved laboratory are required during the biannual reporting period for NRLX groundwater monitoring locations. Field results are shown in Table 9 and within Attachments 4.Historic groundwater results are shown in Figure 3 while current results and summary statistics of historic data set are shown in Tables 10, 11 and 12.

Key findings of the recent groundwater monitoring are as follows:

Field results

- EC values for groundwater at all bores are above the WQO of 2.2 dS/m
- The recorded values for pH at all groundwater bores were below the WQO range of 6.5-8
- DO values for all groundwater bores were below the WQO of 85-110%

GW1

- Total Suspendis Solids (TSS) (7100 mg/L), Ammonia (0.325 mg/L), TP (2.23 mg/L), EC (2.41 dS/m), pH (6.15), DO (49.5%Sat) and TN (1.62 mg/L) recorded values above their respective WQO
- DOC (9.9 mg/L) recorded a value below its 25th percentile

GW2

- TSS (272mg/L), Ammonia (0.025 mg/L), EC (4.93 dS/m), pH (5.81), DO (56.9%Sat) and Phosphorus (0.173 mg/L) recorded values above their respective WQO
- Potassium (0.66 mg/L) recorded a new minimum value
- TSS (272 mg/L) and (Calcium (12.5 mg/L), recorded values below its respective 25th percentiles
- Nitrite and Nitrate recorded a value below their detection limits of 0.005 mg/L

GW3

- Sodium (731 mg/L) and Chloride (1087 mg/L) recorded a new maximum value
- TSS (216 mg/L), pH (6.41), EC (4.16 dS/m), DO (37 %Sat) Reactive Phosphorus (0.021 mg/L) and TP (0.17mg/L) recorded values above their respective WQO
- TDS (2737 mg/L) recorded a value above its respective 75th percentile
- TSS (216 mg/L),pH (6.41), DOC (1.34 mg/L) recorded values below their respective 25th percentiles Nitrite, recorded a value below its detection limit of 0.005 mg/L

Table 9 Groundwater field monitoring results

Groundwater Field Monitoring sampling details – NRLX				
Sampled by		Will Dale (AWC)		
Site		GW1	GW2	GW3
Sample time		14:10	13:35	14:45
Parameters	WQO			
Purge Volume (L)		31	45	44
Depth (mBGL)		1.68	2.01	0.03
EC (ds/m)	0.25-2.2	**2.41**	**4.93**	**4.16**
pH	6.5-8.0	**6.15**	**5.81**	**6.41**
ORP		3.00	39	29
DO (%)	85-110	**49.5**	**56.9**	**37**
Temp		19.87	20.62	20.61
Odour		None	None	None
Colour		Cloudy Brown/Turbid	Pale Brown/Turbid	Pale Brown/Turbid
Bold and shaded cell denotes outside WQO value range mBGL= m below ground level TOC= top of cast				

Table 10 GW1 current results and summary statistics of historic data set

	Unit	Current result	*n*	Min.	Max.	Mean	75th %ile	Median	25th %ile
TDS	(mg/L)	1472	10	426	2797	1714.7	2300.5	1713	1036
TSS	(mg/L)	7100	10	1834	23900	7220.4	8610	6220	2402.5
Ammonia (mg/L)	(mg/L)	0.325	10	0.034	0.959	0.24	0.33	0.135	0.060
Dissolved Organic Carbon	(mg/L)	9.9	9	8.5	75.9	29.42	49.14	19.1	11.4
Nitrate & Nitrite (as N)	(mg/L)	0.044	10	0.014	0.345	0.0845	0.105	0.05	0.033
Nitrate (as N)	(mg/L)	0.02	10	0.005	0.319	0.058	0.061	0.019	0.012
Nitrite (as N)	(mg/L)	0.026	10	0.006	0.055	0.024	0.035	0.023	0.009
Organic Nitrogen (as N)	(mg/L)	1.25	10	0.13	4.18	1.32	1.6	1.09	0.6662
Phosporus total (as P)	(mg/L)	2.23	10	0.021	13.3	2.51	2.723	1.13	0.432
Phosporus filterable reactive	(mg/L)	0.017	10	0.006	0.29	0.0573	0.072	0.022	0.015
Total Kjeldahl Nitrogen (as N)	(mg/L)	1.576	11	0.23	4.251	1.512	1.92	1.325	0.86
Total Nitrogen (as N)	(mg/L)	1.62	10	0.29	4.37	1.65	2.07	1.59	0.797
Calcium	(mg/L)	17	9	8.15	39.5	22.61	31.55	18.6	16.7
Magnesium	(mg/L)	25.2	9	7.41	36.7	26.01	33.7	30	18.15
Potassium	(mg/L)	6.9	9	1.7	11.2	5.78	7.605	6.36	2.945
Sodium	(mg/L)	421	9	120	825	492.12	736	478	245.5
Chloride	(mg/L)	596	9	124	1148	645.89	1061.5	691	178
Sulfur	(mg/L)	13.7	7	13.7	43.1	24.12	34	23.6	15

Table 11 GW2 current results and summary statistics of historic data set

	Unit	Current result	*n*	Min.	Max.	Mean	75th %ile	Median	25th %ile
TDS	(mg/L)	3199	10	2217	4612	3253.1	3986.75	3153.5	2642
TSS	(mg/L)	272	10	187	2930	1376.6	2410	1051	419
Ammonia (mg/L)	(mg/L)	0.025	10	0.005	0.175	0.054	0.087	0.037	0.0087
Dissolved Organic Carbon	(mg/L)	3.23	9	1.5	21.8	6.45	10.1	3.23	1.75
Nitrate & Nitrite (as N)	(mg/L)	0.01	10	0.005	0.091	0.027	0.0315	0.015	0.009
Nitrate (as N)	(mg/L)	0.005	10	0.005	0.091	0.0217	0.026	0.007	0.005
Nitrite (as N)	(mg/L)	0.005	10	0.005	0.011	0.006	0.008	0.005	0.005
Organic Nitrogen (as N)	(mg/L)	0.075	10	0	0.376	0.1407	0.28	0.082	0.044
Phosporus total (as P)	(mg/L)	0.173	10	0.024	1.51	0.705	1.302	0.595	0.1672
Phosporus filterable reactive	(mg/L)	0.007	10	0.005	0.06	0.0196	0.0293	0.016	0.005
Total Kjeldahl Nitrogen (as N)	(mg/L)	0.10	10	0.015	0.45	0.1984	0.4	0.123	0.0935
Total Nitrogen (as N)	(mg/L)	0.11	10	0.01	0.54	0.22	0.41	0.155	0.105
Calcium	(mg/L)	12.5	9	10.8	52.4	31.23	43.85	30.2	15.25
Magnesium	(mg/L)	83.1	9	55	152	86.522	106.95	75.1	62.45
Potassium	(mg/L)	0.66	9	0.66	2.38	1.53	2.15	1.48	0.978
Sodium	(mg/L)	858	9	679	1221	880.89	1047.5	858	711.5
Chloride	(mg/L)	1548	9	1110	1893	1486.78	1790.5	1538	1131.5
Sulfur	(mg/L)	6.73	9	3	24	11.326	20	7	6.35

Table 12 GW3 current results and summary statistics of historic data set

	Unit	Current result	*n*	Min.	Max.	Mean	75th %ile	Median	25th %ile
TDS	(mg/L)	2737	10	1752	2751	2558.1	2720.5	2680	2500
TSS	(mg/L)	216	10	83	2290	1082.4	1948.25	816	361.5
Ammonia (mg/L)	(mg/L)	0.012	10	0.005	0.104	0.041	0.079	0.0305	0.005
Dissolved Organic Carbon	(mg/L)	1.34	9	0.9	25.9	7.93	11.55	6.9	1.87
Nitrate & Nitrite (as N)	(mg/L)	0.017	10	0.005	0.228	0.044	0.0485	0.0165	0.01
Nitrate (as N)	(mg/L)	0.012	10	0.005	0.218	0.0376	0.044	0.0085	0.005
Nitrite (as N)	(mg/L)	0.005	10	0.005	0.011	0.007	0.010	0.005	0.005
Organic Nitrogen (as N)	(mg/L)	0.02	9	0.005	0.868	0.182	0.369	0.01	0.0015
Phosporus total (as P)	(mg/L)	0.17	10	0.019	2.14	0.697	0.96	0.585	0.15
Phosporus filterable reactive	(mg/L)	0.021	10	0.01	0.1	0.0276	0.028	0.017	0.016
Total Kjeldahl Nitrogen (as N)	(mg/L)	0.03	11	0	0.97	0.1874	0.164	0.050	0.01
Total Nitrogen (as N)	(mg/L)	0.044	10	0.01	1.2	0.246	0.305	0.095	0.0175
Calcium	(mg/L)	76.5	9	71.6	89.1	79.46	86.35	77.3	74.45
Magnesium	(mg/L)	67.9	9	57	77.8	66.51	69	67.5	62.95
Potassium	(mg/L)	1.46	9	1.4	2.6	1.91	2.35	1.9	1.435
Sodium	(mg/L)	731	9	635	731	696.22	722.5	703	673
Chloride	(mg/L)	1087	9	758	1087	972.56	1054	998	920.5
Sulfur	(mg/L)	15.8	9	10	41	19.67	32.1	12	11.1

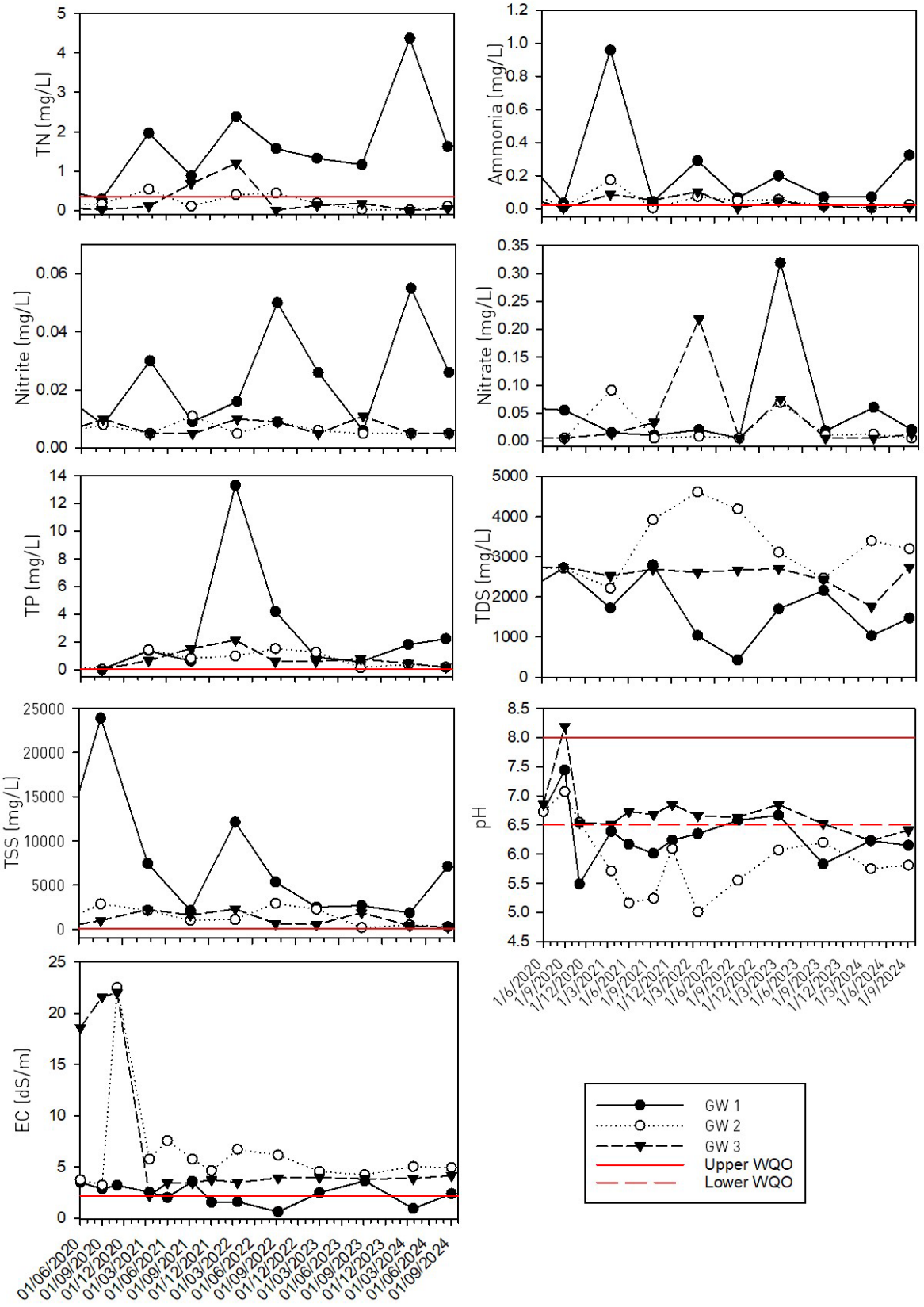


Figure 3 Historical groundwater results for selected parameters

Attachment 1 Historic treated effluent quality monitoring results (Part 1)

Date	Sampler	Electrical Conductivity	pH	Reactive Phosphorus	Total Phosphorus	Suspended Solids	Total Dissolved Solids	Total Nitrogen	Alkalinity (as calcium carbonate)	Sodium	Sodium Adsorption Ratio	Thermotolerant Coliforms
		(dS/m)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		(cfu / 100ml)
Monitoring Frequency		Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	##	Quarterly	Yearly
16/06/2017		1.30	8.1	10.1	11.0	44	NR	14.0	390	468	NR	NR
27/07/2017		1.43	8.06	9.76	12.4	104	NR	13.6	NR	NR	NR	NR
29/08/2017		1.54	7.97	10.7	12.9	102	NR	10.7	NR	NR	NR	NR
12/09/2017		1.60	8.39	9.9	13.0	120	NR	12.8	NR	NR	NR	NR
12/09/2017		NR	NR	NR	NR	NR	NR	NR	520	545	NR	NR
13/10/2017		1.70	8.54	7.2	11.5	100	NR	11.7	NR	NR	NR	NR
10/11/2017		1.61	8.49	9.42	11.35	115.12	NR	11.4	NR	NR	NR	NR
12/12/2017		1.466	8.96	4.97	6.9	68	NR	8.21	480	563	NR	NR
19/01/2018		1.48	9.22	2.663	4.72	142	NR	8.91	540	530	NR	NR
16/02/2018		1.627	9.04	1.93	3.08	136	NR	8.96	NR	NR	NR	NR
12/12/2017		NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
7/03/2018		1.404	7.9	2.9	4.3	91	NR	2.7	410	140	NR	2400
11/04/2018	RVC	1.2	9.2	2.6	6.5	120	NR	5.9	NR	NR	NR	NR
9/05/2018	RVC	1.2	9.1	2.6	2.6	160	NR	3.2	NR	NR	NR	NR
6/06/2018	EES	1.51	9.37	2	4.2	300	NR	2.8	520	960	NR	NR
2/07/2018	RVC	1.6	9	<0.05	2.5	120	NR	1.9	NR	1000	NR	NR
7/08/2018	RVC	1.6	9.1	1.8	2.3	250	NR	2.5	NR	1100	NR	NR
12/09/2018	EES	1.41	8.1	1.8	4.9	400	NR	3.5	620	1000	NR	NR
8/10/2018	RVC	1.7	9	1.4	3.3	44	NR	4.2	NR	NR	NR	NR
20/11/2018	EES	1.682	8.97	3.1	6.9	450	NR	3.2	530	170	NR	NR
4/12/2018	RVC	1.9	9.2	0.8	1.3	1500	NR	3.8	NR	NR	NR	NR
15/01/2019	RVC	1.815	8.96	1.1	1.6	97	NR	9.6	NR	NR	NR	NR
1/02/2019	RVC	Dry Ponds – no samples taken										
1/03/2019	EES											
1/04/2019	RVC											
1/05/2019	RVC											
1/06/2019	EES											
1/07/2019												
1/08/2019												
1/09/2019												
1/10/2019												
1/11/2019												
1/12/2019												
1/01/2020												
1/02/2020												
3/03/2020	EES	1.22	7.85	3.149	3.65	58	NR	5.29	340	120	NR	NR
2/04/2020	RVC	1.498	7.94	3.981	5.35	45	NR	6.31	NR	NR	NR	NR
4/05/2020	RVC	1.73	8.45	2.77	4.47	19	NR	5.8	NR	NR	NR	NR
2/06/2020	EES	1.777	8.5	3.86	4.74	28	NR	4.5	480	171	NR	NR

Attachment 2 Historic treated effluent quality monitoring results (Part 2)

Date	Sampler	Electrical Conductivity	pH	Reactive Phosphorus	Total Phosphorus	Suspended Solids	Total Dissolved Solids	Total Nitrogen	Alkalinity (as calcium carbonate)	Sodium ##	Sodium Adsorption Ratio	Thermotolerant Coliforms
		(dS/m)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		(cfu / 100ml)
Monitoring Frequency		Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	##	Quarterly	Yearly
	RVC	1.8	8.4	4.25	4.92	11	NR	4.5	NR	NR	NR	NR
3/08/2020	RVC	1.829	8.3	4.47	4.73	12	NR	4.03	NR	NR	NR	80
1/09/2020	EES	1.89	8.58	4.47	5.46	19	1285	4.93	605	NR	5.2	NR
3/11/2020	EES	2.211	8.81	0.434	4.95	31	1503	7.12	395	NR	5.4	NR
18/03/2021	AWC (AL)	1.336	8.16	3.637	4.428	72	936	8.107	462	131.73	4.08	1960
01/06/2021	AWC (AL)	1.273	8.58	4.21	5.06	55	816	6.48	193	104	3.3	NR
14/09/2021	AWC (AL)	1.4	9.21	3.54	5.24	83	967	7.6	466	125	3.7	NR
3/12/2021	AWC (AL)	1.06	9.53	2.32	3.49	56	447	8.28	411	109	3.8	NR
21/03/2022	AWC (AL)	0.419	7.77	2.53	3.15	27	323	2.93	140	38.7	1.9	610
1/06/2022	AWC (AL)	0.535	7.62	4.98	5.57	25	425	6.19	195	47.1	2	NR
08/09/2022	AWC (AL)	0.727	8.03	5.17	8.95	60	504	9.54	254	65	2.3	NR
6/12/2022	AWC (AL)	0.763	8.83	4.55	5.39	27	605	3.67	280	60.7	2.3	NR
28/02/2023	AWC (AL)	0.866	9.39	1.86	3.1	84	712	7.56	112	86.6	3.2	2600
06/09/2023	AWC (AL)	1.1	8.25	1.98	2.41	23	860	6.26	408	107	3.4	1440
04/12/2023	AWC (WD)	1.22	9.13	1.45	2.29	150	971	6.4	449	122	3.8	NR
27/03/2024	AWC (WD)	1.33	8.69	2.02	2.44	145	913	7.7	399	127	4.6	6700
6/06/2024	AWC (WD)	1.07	8.96	1.13	1.49	35	768	5.38	380	125	4.22	NR
3/09/2024	AWC (WD)	1.11	9.08	1.41	1.85	49	794	4.51	424	136	4.48	8000

##=no longer required as part of EPL
NR = not required during the monitoring period
Values in red denote results reported as less than (<)

Attachment 3 Historic treated effluent quality monitoring results (Yearly)

Date	Sampler	Aluminium	Arsenic	Beryllium	Cadmium	Chromium (hexavalent)	Cobalt	Copper	Iron	lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Selenium	Zinc
18/03/2021	AWC (AL)	0.175	0.002	0.001	0.001	0.001	0.001	0.001	0.967	0.001	0.001	0.342	0.0005	0.001	0.001	0.002	0.003
21/03/2022	AWC (AL)	0.088	0.002	0.005	0.001	0.001	0.001	0.001	0.508	0.001	0.001	0.14	0.0005	0.001	0.001	0.002	0.002
28/02/2023	AWC (AL)	1.04	0.005	0.005	0.001	0.001	0.001	0.001	0.055	0.001	0.001	0.044	0.0005	0.001	0.001	0.002	0.003
27/03/2024	AWC (WD)	0.223	0.006	0.005	0.001	0.004	0.001	0.001	0.318	0.001	0.001	0.029	0.0005	0.001	0.001	0.002	0.01
3/09/2024	AWC (WD)	0.315	0.005	0.005	0.001	0.004	0.001	0.001	0.544	0.001	0.001	0.057	0.0005	0.001	0.001	0.002	0.004

Values in red denote results reported as less than (<)

Attachment 4 Historic monitoring results (field parameters) for GW1, GW2 and GW3

Sampler	Date	Time	Purge Volume (L)	EC (dS/m)	pH	ORP	DO	Temp	Odour	Colour
GW1 (EPA4) Field Parameters										
Trigger values				**0.25-2.2**	**6.5-8.0**		**85-110**			
Michael K - EES	3/03/2020		12	**3.21**	**6.21**	-88.00		24.30	none	Cloudy brown
Amy Whitley - EES	2/06/2020		13	**3.52**	6.73	60.80		20.30	none	Milky brown
Daniel White - EES	1/09/2020		14	**2.85**	7.44	-64.00		20.40	none	Brown turbid
Daniel White- EES	3/11/2020		10	**3.23**	**5.49**	85.00		20.50	none	Brown turbid
AWC (AL)	18/03/2021	12:00	49	**2.54**	**6.39**	128.90	**51.0**	26.70	none	cloudy/milky
AWC (AL)	1/06/2021	12:30	35	2.03	**6.17**	179.80	**53.2**	20.30	none	Milky brown
AWC (JM)	*21/06/2021	14:20	30	**2.39**	**4.28**	405.00	**47.2**	-	none	Yellow/brown
AWC (AL)	14/09/2021	10:20	27	**3.6**	**6.01**	105.80	**55.0**	21.20	none	Milky brown
AWC (AL)	3/12/2021	13:25	32	1.56	**6.24**	43.6	**38.91**	26.23	None	Milky/Brown
AWC (AL)	21/03/2022	12:00	35	1.62	**6.35**	86.00	**36.0**	23.10	None	Milky brown/ turbid
AWC (AL)	2/06/2022	12:45	33	0.76	6.13	165	82	21.6	None	Milky brown
AWC (AL)	8/09/2022	14:00	31	0.995	6.88	36	**34.1**	21.8	None	Cloudy Brown/ Turbid
AWC (AL)	28/02/2023	10:30	28	**2.504**	**6.25**	33.00	**19.01**	26.10	None	Cloudy Brown/ Turbid
AWC (AL)	13/06/2023	12:30	29	**2.95**	**6.15**	24.1	**18.35**	24.5	None	Cloudy Brown/ Turbid
AWC (AL)	06/09/2023	12:00	27	**3.6**	**5.83**	-69.8	**41.9**	23.7	None	Cloudy Brown/ Turbid
AWC (WD)	4/12/2023	16:40	25	**2.7**	**6.18**	74	**32.08**	28	None	Cloudy Brown/ Turbid
AWC (WD)	27/03/2024	8:10	35	**0.936**	**6.23**	15.59	**65.02**	23.28	None	Cloudy Brown/turbid
AWC (WD)	6/06/2024	15:45	32	0.647	6.72	102.47	71.57	20.31	none	Cloudy Brown/ Turbid
AWC (WD)	3/09/2024	14:10	31	**2.41**	**6.15**	3.00	**49.50**	19.87	None	Cloudy Brown/ Turbid
GW2 (EPA5) Field Parameters										
Michael K - EES	3/03/2020		22	**3.89**	6.06	-81.40		24.80	none	Cloudy
Amy Whitley - EES	2/06/2020		15	**3.75**	6.73	20.00		20.70	none	Cloudy brown
Daniel White - EES	1/09/2020		17	**3.23**	7.07	64.00		21.70	none	Cloudy brown
Daniel White- EES	3/11/2020		-	**22.5**	6.54	86.00		20.80	none	Brown
AWC (AL)	17/03/2021	12:25	47	**5.78**	**5.71**	162	**30.08**	22.3	none	Milky / cloudy
AWC (AL)	1/06/2021	11:45	47	**7.57**	**5.61**	421	**45.5**	21.6	none	Cloudy/Reddish/Brown
AWC (JM)	*21/06/2021	14:40	42	**5.39**	**6.31**	150	**54.9**	-	none	Brownish yellow
AWC (AL)	14/09/2021	9:50	39	**5.24**	**6.1**	73.9	**55**	20.1	none	Brownish yellow
AWC (AL)	3/12/2021	13:00	42	**4.64**	**6.09**	31.3	**36.06**	24.66	None	Cloudy/Reddish/Brown
AWC (AL)	21/03/2022	11:00	50	**6.71**	**5.01**	71	**32.1**	23.4	none	Cloudy brown
AWC (AL)	2/06/2022	12:00	46	**6.15**	**4.61**	341	**65.59**	21.2	none	Cloudy brown
AWC (AL)	8/09/2022	13:30	45	**5.98**	**5.98**	107	**60**	22.1	none	Cloudy brown/yellow
AWC (AL)	28/02/2023	11:00	42	**4.581**	**6.19**	25	**59**	26.88	one	Cloudy brown
AWC (AL)	13/06/2023	12:00	41	**4.75**	**5.93**	104	**23.9**	22.6	none	Cloudy brown
AWC (AL)	06/09/2023	11:40	40	**4.24**	**6.2**	-143.04	**44.8**	28.8	none	Clear
AWC (WD)	4/12/2023	16:00	40	**3.57**	**6.61**	134	86.77	24.64	none	Cloudy brown
AWC (WD)	27/03/2024	7:45	43	**5.038**	**5.75**	42.36	37.27	22.1	none	Cloudy grey, Turbid
AWC (WD)	6/06/2024	15:10	45	5.221	6.14	135.7	**70**	21.28	none	Pale brown, turbid
AWC (WD)	3/09/2024	13:35	45	4.93	5.81	39	**56.9**	20.62	none	Pale brown, turbid
GW3 (EPA6) Field Parameters										
Michael K - EES	3/03/2020		12	**19**	**6.47**	-83.00		24.90	none	Milky
Amy Whitley - EES	2/06/2020		20	**18.6**	6.86	2.60		19.30	slight anoxic odour	Dark brown (black sediment)
Daniel White - EES	1/09/2020		15	**21.6**	8.19	78.00		19.90	none	Cloudy brown
Daniel White- EES	3/11/2020		-	**22**	6.54	86.00		20.80	none	Brown
AWC (AL)	17/03/2021	12:50	35	**2.2**	6.51	166	**48.5**	23.7	none	milky / cloudy
AWC (AL)	1/06/2021	13:00	43	**3.467**	6.73	199	**21.8**	19.9		
AWC (JM)	*21/06/2021	13:50	40	**3.77**	**5.49**	77	**68.7**	-	none	Yellowish/brown
AWC (AL)	14/09/2021	10:45	40	**3.46**	6.68	11.3	**56.8**	21.1	none	milky / cloudy
AWC (AL)	3/12/2021	14:15	43	**3.76**	6.85	14.14	**68.3**	22.58	none	Milky

Sampler	Date	Time	Purge Volume (L)	EC (dS/m)	pH	ORP	DO	Temp	Odour	Colour
AWC (AL)	21/03/2022	11:35	45	**3.5**	6.66	29.0	**41.0**	23.1	none	Milky
AWC (AL)	2/06/2022	13:30	45	**4.28**	**6.49**	92.8	**24.13**	21.7	none	Milky
AWC (AL)	8/09/2022	14:50	43	**3.77**	6.52	60	**33.2**	20.9	none	Milky brown
AWC (AL)	28/02/2023	12:00	44	**4.01**	6.58	100	**53.36**	26.1	none	Cloudy
AWC (AL)	13/06/2023	13:00	42	**4.52**	6.46	31.3	**27.5**	21.96	none	Cloudy
AWC (AL)	6/09/2023	12:30	40	**3.84**	6.52	-33.8	**35.5**	22.3	none	Cloudy
AWC (WD)	4/12/2023	17:10	40	**4.24**	**6.29**	141.2	**47.7**	22.87	none	Cloudy
AWC (WD)	27/03/2024	8:40	43	**3.881**	**6.23**	14.52	**42.02**	21.2	none	Pale brown / Turid
AWC (WD)	6/06/2024	16:30	44	**3.7917**	6.68	189.2	**20.99**	20.19	none	pale brown turbid
AWC (WD)	3/09/2024	14:45	44	**4.16**	**6.41**	29	**37**	20.61	none	pale brown turbid

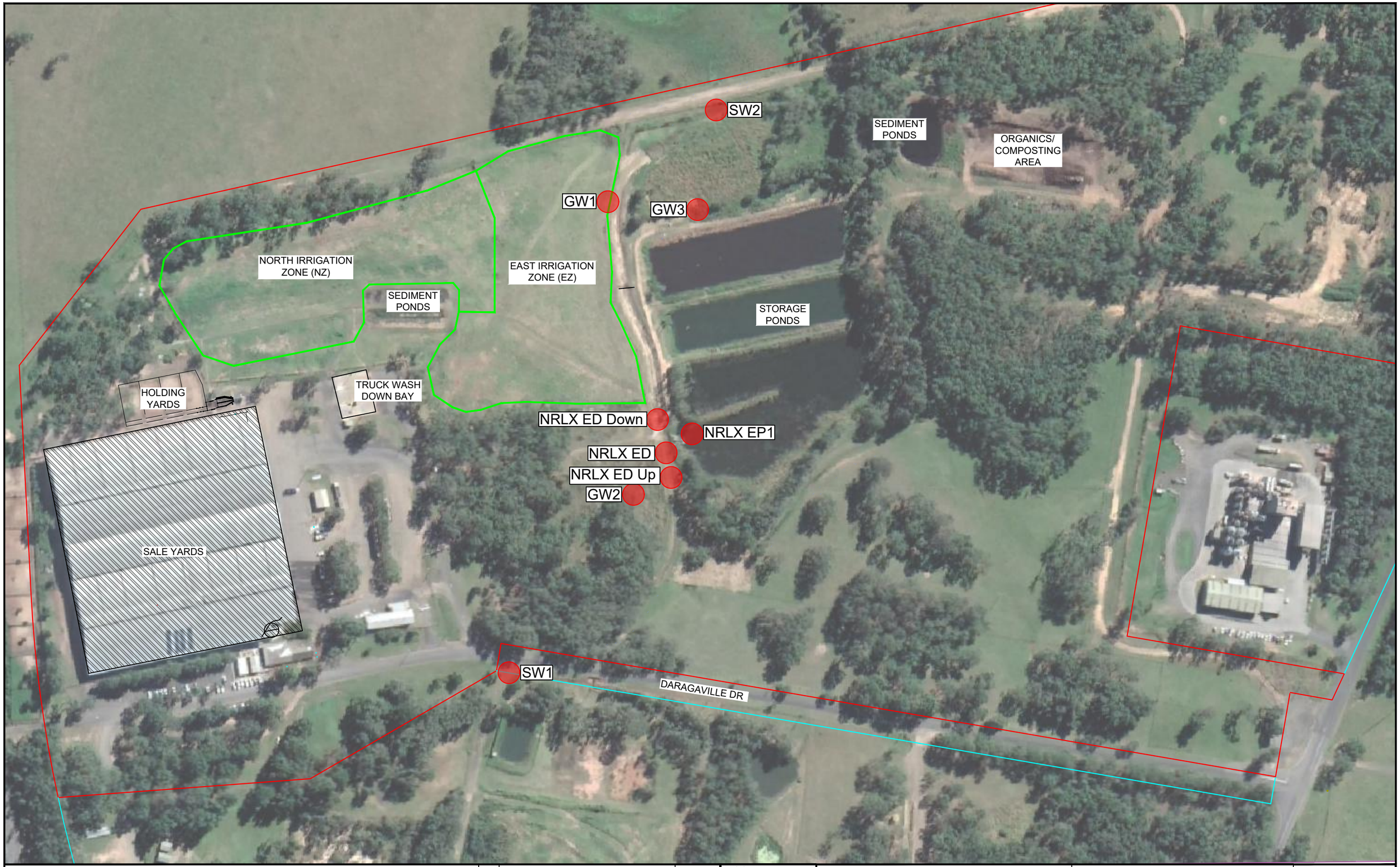
* Additional analysis run undertaken as full suite not collected on 18/03/2021
Bold and shaded cell denotes outside WQO value range

Attachment 5 Historic monitoring results for SW1 trigger event

Date	pH	EC	TDS	Ammonia (as N)	(BOD-5 Day)	Chlorophyll a	Dissolved Organic Carbon	Nitrate & Nitrite (as N)	Nitrate (as N)	Nitrite (as N)	Total Kjeldahl Nitrogen (as N)	TN	TP	Phosphate	Suspended Solids	Thermotolerant Coliforms
		uS/cm	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	cfu/100ml
15/12/2020	6.45	143	97	0.028	1.70	0.004	22.8		1.18	4.18	1.17	2.37	0.12	0.064	1	650
21/12/2020	7.33	704	479	0.32	2.00	0.027	35.8		5.161	0.11	0.87	6.14	0.19	0.094	6	3900
30/12/2020	7.01	242	165	0.024	2.60	0.009	39.8		0.136	0.021	1.75	1.91	0.18	0.055	12	3600
18/01/2021	6.96	126	86	0.067	5.80	0.017	18.7		0.567	0.028	1.2	1.8	0.37	0.243	95	13600
20/02/2021	7.26	257	175	0.428	3.60	0.01	29.9		4.719	0.125	3.72	8.57	0.18	0.071	27	4300
1/12/2021	7.36	248	169	0.122	1.70	0.011	14.3	1.239	1.195	0.044	1.31	2.55	0.41	0.062	48	12000
3/02/2022	7.07	0.193	131	0.340	3.7	0.021	17.2	0.442	0.370	0.072	1.59	2.03	0.263	0.044	55	128,000
24/02/2022	7.19	0.15	102	0.221	3.5	0.014	16.9	0.734	0.67	0.064	1.45	2.18	0.3	0.082	59	16000

Attachment 6 Historic monitoring results for SW2 trigger event

Date	pH	EC	TDS	Ammonia (as N)	(BOD-5 Day)	Chlorophyll a	Dissolved Organic Carbon	Nitrate & Nitrite (as N)	Nitrate (as N)	Nitrite (as N)	Total Kjeldahl Nitrogen (as N)	TN	TP	Phosphate	Suspended Solids	Thermotolerant Coliforms
		uS/cm	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	cfu/100ml
15/12/2020	7	284	193	0.117	4.8	0.005	19.8		4.18	0.099	1.28	5.56	0.32	0.174	15	520
21/12/2020	7.47	487	331	0.101	1.4	0.027	52.4		0.183	0.026	3.52	3.73	2.01	1.589	13	5200
30/12/2020	7.25	243	165	0.024	2.6	0.009	39.8		0.136	0.021	1.75	1.91	0.18	0.055	12	3600
18/01/2021	6.77	101	69	0.1	5.2	0.022	17.3		0.323	0.026	1.22	1.57	0.39	0.17	86	9000
20/02/2021	6.87	591	402	0.125	2.4	0.004	22.2		0.617	0.091	1.84	2.54	0.2	0.077	8	2900
1/12/2021	7.18	140	95	0.059	2	0.012	11.6	0.592	0.564	0.028	1.13	1.72	0.28	0.12	43	23000
3/02/2022	7.00	0.135	92	0.111	3.8	0.024	25.1	0.219	0.178	0.041	1.66	1.88	0.296	0.095	65	84,000
24/02/2022	7.07	0.127	86	0.211	4.2	0.021	13.3	0.294	0.029	0.265	1.34	1.63	0.3	0.23	53	21000



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CLIENT:

Richmond Valley Council

NRLX

REV.	ISSUE / AMENDMENTS	DATE
A	FIGURE ONLY	2021

Survey: Newton Denny Chapelle (2017)
Aerial imagery: Google Earth (2021)

DESIGNED JM
DRAWN JM
CHECKED MB

PROJECT
NRLX
ENVIRONMENTAL MONITORING

DRAWING
ATTACHMENT 6
MONITORING LOCATIONS

SCALE 1:2500 at A3
0m 50m 100m

DRAWING CREATED 10/12/2020

DWG No. 1-201335_NRLX_EnvMon_01

CAD FILE No. 1-201335_NRLX_EIMP

REV. A

RESULTS OF EFFLUENT ANALYSIS

1 sample supplied by Australian Wetlands Consulting Pty Ltd on 3/09/2024. Lab Job No. R8460.
Samples submitted by Jesse Munro. Your Job: RVC Landfill.
25 Leslie Street BANGALOW NSW 2479

Parameter	Methods reference	Sample 1 NRLX-EPA1 3/9/24
	Job No.	*R8460/1*
pH	APHA 4500-H^+-B	9.08
Conductivity (EC) (dS/m)	APHA 2510-B	1.11
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	755
Total Dissolved Solids (mg/L)	** APHA 2540C - Evaporation of filtrate	794
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	49
Total Alkalinity (mg/L $CaCO_3$ equivalent)	** Total Alkalinity - APHA 2320	424
Total Phosphorus (mg/L P)	In house method W4	1.85
Phosphate (mg/L P)	APHA 4500 P-G	1.41
Total Nitrogen (mg/L N)	In house method W4	4.51
Nitrate (mg/L N)	APHA 4500 NO_3^--F	<0.005
Nitrite (mg/L N)	APHA 4500 NO_2^--I	0.012
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.029
Hexavalent Chromium VI (mg/L)	**subcontracted: SGS report SE 270563	<0.004
Sodium (mg/L)	APHA 3125 ICPMS*note 1&2	136
Potassium (mg/L)	APHA 3125 ICPMS*note 1&2	142
Calcium (mg/L)	APHA 3125 ICPMS*note 1&2	28.4
Magnesium (mg/L)	APHA 3125 ICPMS*note 1&2	25.2
Sodium Absorption Ratio (SAR)	** By calculation	4.48
Chloride (mg/L)	APHA 3125 ICPMS*note 1&2	180
Sulfate (mg/L SO_4^{2-})	APHA 3125 ICPMS*note 1&2	13.9
Chloride/Sulfate Ratio	** Calculation	12.9
Thermotolerant Faecal Coliforms (cfu/100 ml)	** APHA 9222-D	8,000
Aluminium (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	0.315
Arsenic (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	0.005
Cadmium (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.001
Chromium (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.001
Copper (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.001
Iron (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	0.544
Manganese (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	0.057
Nickel (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.001
Lead (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.001
Selenium (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.002
Zinc (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	0.004
Mercury (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.0005
Beryllium (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.005
Cobalt (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	0.001
Lithium (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	<0.001
Molybdenum (mg/L)	Total Available - APHA 3125 ICPMS*note 1&2	0.001

Notes:

1. Total metals - samples digested with nitric acid; Total available (acid soluble/ extractable) metals - samples acidified with nitric acid to pH <2; Dissolved metals - samples filtered through 0.45µm cellulose acetate and then acidified with nitric acid prior to analysis
2. Metals and salts analysed by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS).
3. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
4. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
5. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
6. Analysis conducted between sample arrival date and reporting date.
7. ** NATA accreditation does not cover the performance of this service.
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10. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal or on request).
11. Results relate only to the samples tested.
12. This report was re-issued on 11/09/2024 and replaces the report issued on 12/09/2024. Al/As data updated.

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checked: .....
Graham Lancaster
Laboratory Manager

RESULTS OF WATER ANALYSIS

3 samples supplied by Australian Wetlands Consulting Pty Ltd on 3/09/2024. Lab Job No. R8462.

Samples submitted by Jesse Munro. Your Job: RVC Landfill

25 Leslie Street BANGALOW NSW 2479

Parameter	Methods reference	Sample 1 NRLX-GW1 3/9/24	Sample 2 NRLX-GW2 3/9/24	Sample 3 NRLX-GW3 3/9/24
	Job No.	*R8462/1*	*R8462/2*	*R8462/3*
pH	APHA 4500-H^+-B	6.22	5.79	6.93
Conductivity (EC) (dS/m)	APHA 2510-B	2.16	4.71	4.03
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	1,472	3,199	2,737
Total Dissolved Solids (mg/L)	** APHA 2540C - Evaporation of filtrate	2,400	2,892	2,212
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	7,100	272	216
Total Phosphorus (mg/L P)	In house method W4	2.23	0.173	0.170
Phosphate (mg/L P)	APHA 4500 P-G	0.017	0.007	0.021
Total Nitrogen (mg/L N)	In house method W4	1.62	0.110	0.044
Nitrate (mg/L N)	APHA 4500 NO_3^--F	0.018	<0.005	0.012
Nitrite (mg/L N)	APHA 4500 NO_2^--I	0.026	<0.005	<0.005
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.325	0.025	0.012
Sodium (mg/L)	APHA 3125 ICPMS*note 1&2	421	858	731
Potassium (mg/L)	APHA 3125 ICPMS*note 1&2	6.93	0.660	1.46
Calcium (mg/L)	APHA 3125 ICPMS*note 1&2	17.3	12.5	76.5
Magnesium (mg/L)	APHA 3125 ICPMS*note 1&2	25.2	83.1	67.9
Sodium Absorption Ratio (SAR)	** By calculation	15.1	19.3	14.7
Chloride (mg/L)	APHA 3125 ICPMS*note 1&2	596	1,548	1,087
Sulfate (mg/L SO_4^{2-})	APHA 3125 ICPMS*note 1&2	41.0	20.2	47.5
Chloride/Sulfate Ratio	** Calculation	14.5	76.7	22.9
Dissolved Organic Carbon (mg/L)	APHA 5310-B	9.90	3.23	1.34

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
3. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
4. Analysis conducted between sample arrival date and reporting date.
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9. Results relate only to the samples tested.
10. This report was issued on 12/09/2024.

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checked: .....
Graham Lancaster
Laboratory Manager

RESULTS OF WATER ANALYSIS

2 samples supplied by Australian Wetlands Consulting Pty Ltd on 3/09/2024. Lab Job No. R8461.

Samples submitted by Jesse Munro. Your Job: RVC Landfill

25 Leslie Street BANGALOW NSW 2479

Parameter	Methods reference	Sample 1 NRLX-SW1 3/9/24	Sample 2 NRLX-SW2 3/9/24
	Job No.	*R8461/1*	*R8461/2*
pH	APHA 4500-H^+-B	8.31	7.09
Conductivity (EC) (dS/m)	APHA 2510-B	1.13	0.827
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	768	562
Total Dissolved Solids (mg/L)	** APHA 2540C - Evaporation of filtrate	681	610
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	44	5,430
Biochemical Oxygen Demand$_5$ (mg/L O_2)	APHA 5210-B	2.15	102
Total Phosphorus (mg/L P)	In house method W4	<0.01	14.1
Phosphate (mg/L P)	APHA 4500 P-G	0.011	0.020
Total Nitrogen (mg/L N)	In house method W4	0.147	15.8
Total Kjeldahl Nitrogen (mg/L N)	** Calculation: TN – NOx	0.147	15.8
Total Organic Nitrogen (mg/L N)	** Calculation: TKN – NH4	0.122	15.5
Nitrate (mg/L N)	APHA 4500 NO_3^--F	<0.005	<0.005
Nitrite (mg/L N)	APHA 4500 NO_2^--I	<0.005	0.029
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.025	0.265
Faecal Coliforms (cfu/100 ml)	APHA 9222-D	780	2,500
Dissolved Organic Carbon (mg/L)	APHA 5310-B	24.0	24.5
Chlorophyll 'a' (mg/L)	** APHA 10200-H	0.013	0.726
Algal Biomass (mg/L)	** Inhouse	0.898	48.6

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
3. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
4. Analysis conducted between sample arrival date and reporting date.
5. ** NATA accreditation does not cover the performance of this service.
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9. Results relate only to the samples tested.
10. This report was re-issued on 19/09/2024 and replaces the report issued on 12/09/2024. TKN/TON data added.

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checked: .....
Graham Lancaster
Laboratory Manager