

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

2 June 2020

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – January 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwall 304 Water Management Plan (LW304 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW304 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW304 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW304 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW304 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2019) in accordance with the LW304 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in January 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in January 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW304 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for January 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 31 January 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 31 January 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 31 January 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October 2018, November 2018, December 2018, September 2019, and now January 2020, with below average rainfall recorded in all other months (Table 1).

Total rainfall in January 2020 was 133.0 mm, above the average rainfall at Darkes Forest (131.2 mm), with rainfall occurring from 7 to 8 January (totalling 3.0 mm rainfall), 12 to 14 January (totalling 14.0 mm rainfall), 17 January (84.0 mm rainfall), 21 January (24.0 mm rainfall) and 25 to 27 January 2020 (totalling 8.0 mm rainfall). Shallow groundwater levels correlate with the rainfall trend.

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data (mm) for PV7, January 2018 to January 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to January 2020.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese (II) ion, Mn²⁺) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

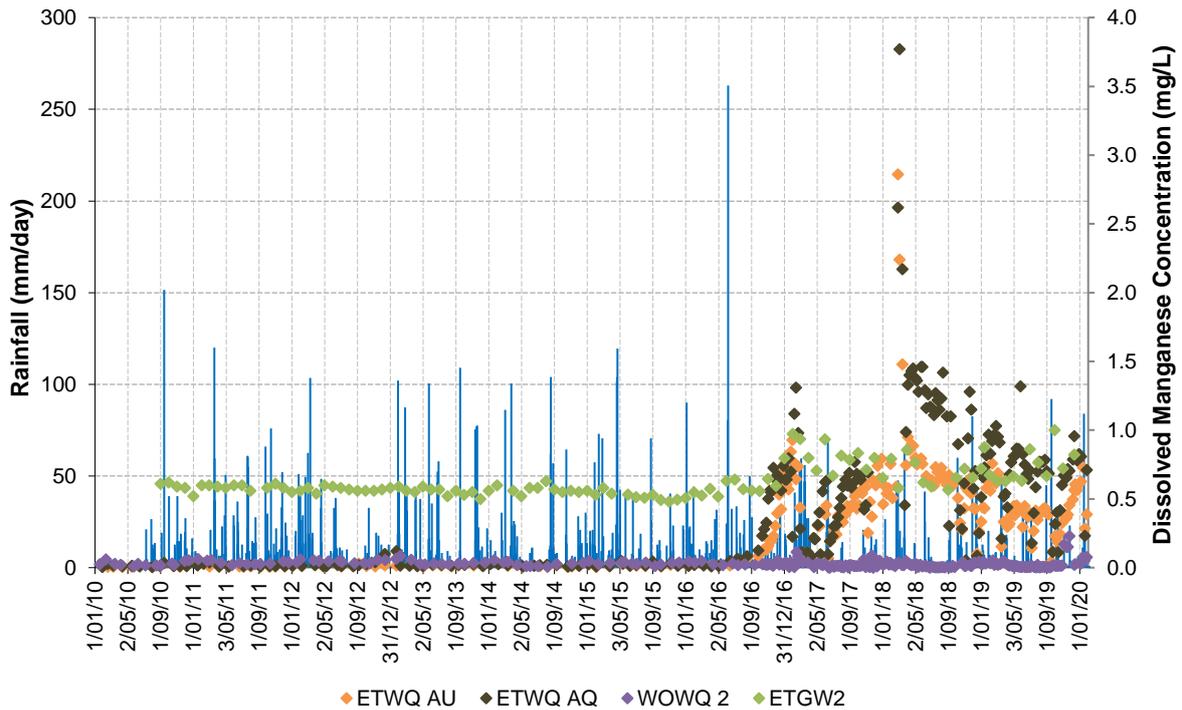


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 31 January 2020)

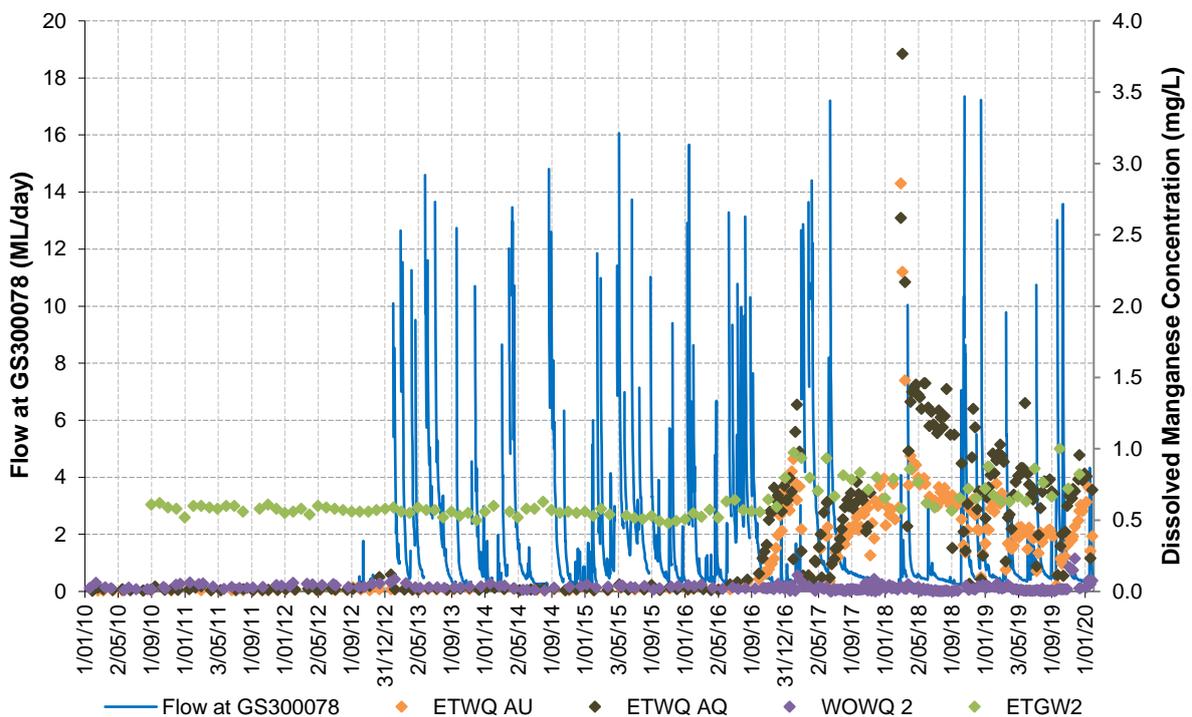
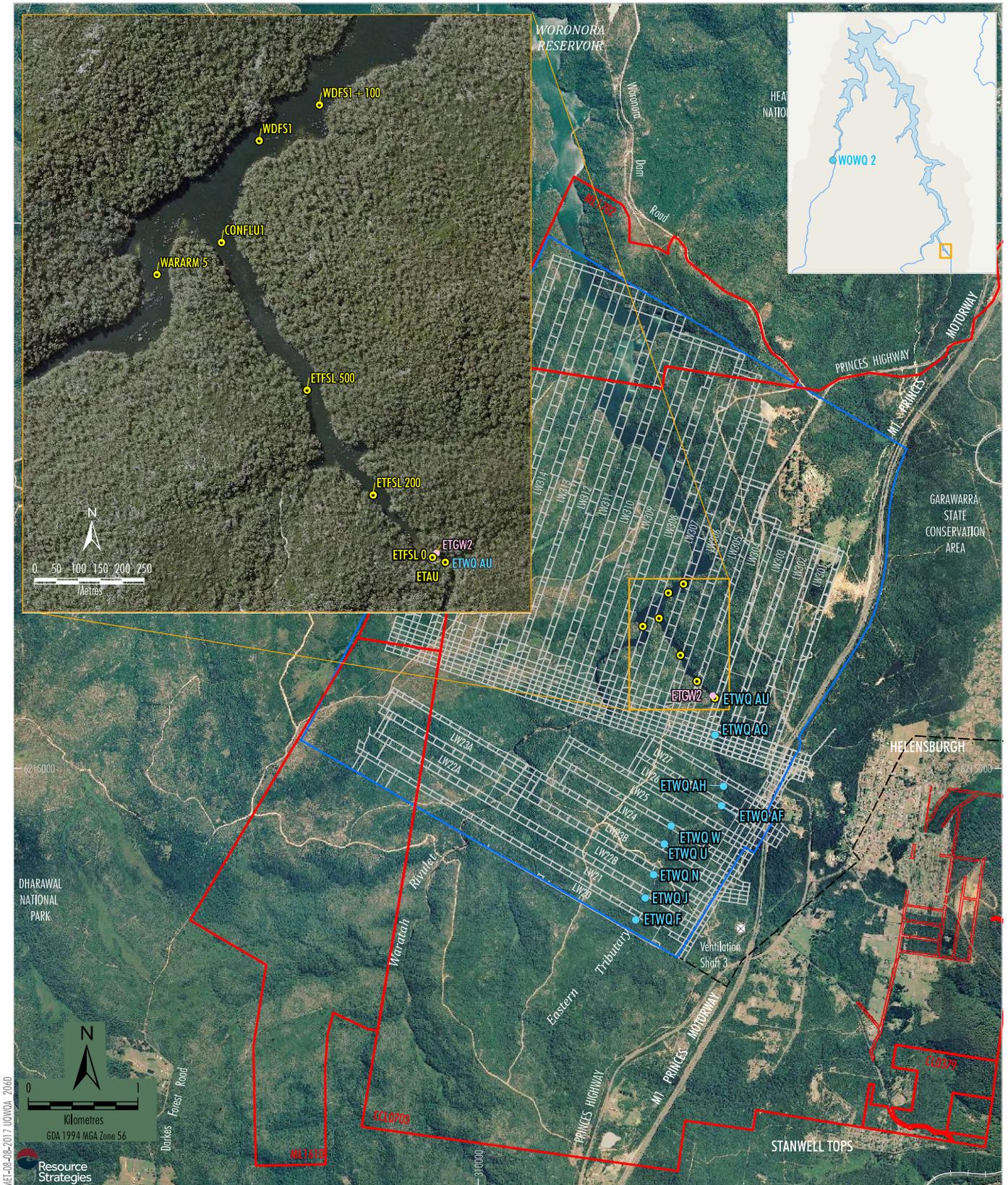


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 31 January 2020)



MET-08-08-2017 UOWDA 2060

- LEGEND**
- Mining Lease Boundary
 - Railway
 - Project Underground Mining Area
Longwalls 20-27 and 301-317
 - Existing Underground Access Drive (Main Drift)
 - Surface Water Quality Site on Eastern Tributary
 - Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
 - Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody
METROPOLITAN COAL
Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran *et al.*, 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In January 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.285 mg/L and 0.730 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016, as well as the rainfall event on 17 January 2020, which had a similar effect on the dissolved manganese concentration. Concentrations subsequently increased, but remained notably lower than those recorded prior to the rainfall event.

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 µm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In January 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.58 to pH 6.99);
- EC concentrations (lab measurement) ranged between 244 µS/cm and 331 µS/cm; and
- ORP (field measurement) ranged between 42.7 mV and 146.4 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW304 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW304 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018.

Metropolitan Coal has taken a photographic record of the watercourse / waterbody at the time of sampling, estimated the width of the watercourse / water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (HCPL, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in January 2020 the Woronora Reservoir water level varied between 151.13 mAHD (on 2 January 2020) and 150.88 mAHD (on 30 January 2020) (water level decreased slightly). The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during January 2020 was approximately 3,492 m (corresponding to 151 mAHD) downstream of site ETSFL 0.

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout January 2020, the Woronora Reservoir water level was downstream of site WDFS1+100 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to January 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level decreased slightly in January 2020, and was downstream of site WDFS1+100. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of January 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for January 2020 ranged from 0.285 mg/L to 0.730 mg/L at site ETAU, 0.131 mg/L to 0.213 mg/L at site ETFSL 200, 0.189 mg/L to 0.304 mg/L at site ETFSL 500, 0.066 mg/L to 0.130 mg/L at site CONFLU1, 0.031 mg/L to 0.068 mg/L at site WARARM5, 0.020 mg/L to 0.089 mg/L at site WDFS1 and 0.006 mg/L to 0.114 mg/L at site WDFS1+100 (Chart 3).

Total manganese concentrations for January 2020 followed similar trends, ranging from 0.306 mg/L to 0.729 mg/L at site ETAU, 0.151 mg/L to 0.210 mg/L at site ETFSL 200, 0.202 mg/L to 0.313 mg/L at site ETFSL 500, 0.068 mg/L to 0.116 mg/L at site CONFLU1, 0.034 mg/L to 0.072 mg/L at site WARARM5, 0.038 mg/L to 0.112 mg/L at site WDFS1 and 0.021 mg/L to 0.136 mg/L at site WDFS1+100 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

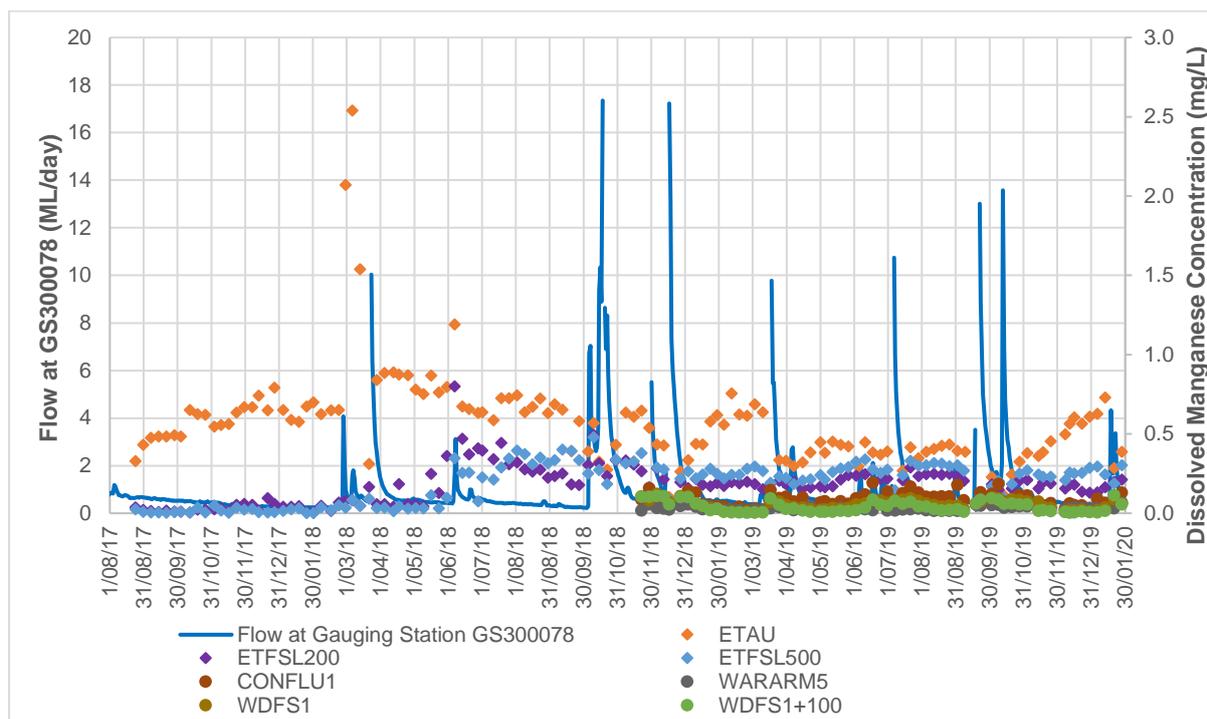


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 January 2020)

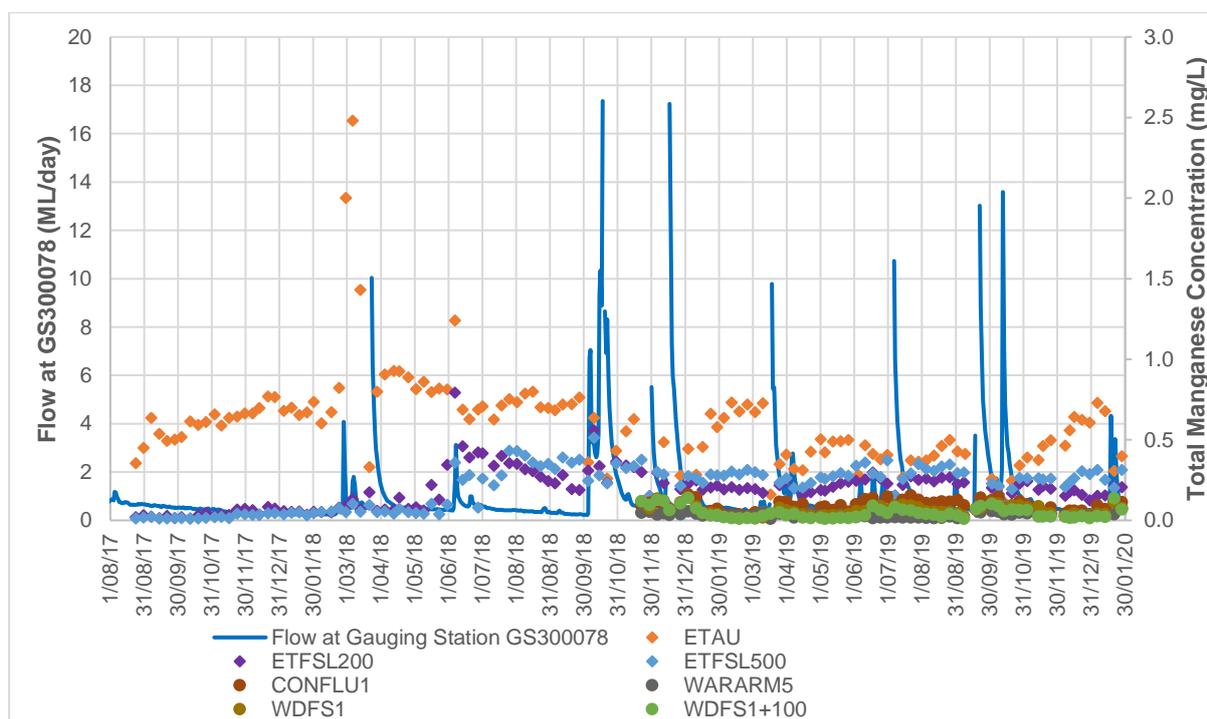


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 January 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG, 2011) are published by the National Health and Medical Research Council and updated most recently in 2018; the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the Australian Drinking Water Guideline before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG (2011) guidelines are based on total concentrations of manganese in water. The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to January 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5 – 8.5. The pH values at all sites fluctuated during January 2020, with all sites reducing by the end of the month (ETAU from 6.77 to 6.58, ETFSL 200 from 7.6 to 7.41, ETFSL 500 from 7.33 to 7.20, CONFLU1 from 7.66 to 7.57, WARARM5 from 7.65 to 7.54, WDFS1 from 7.75 to 7.67, and WDFS1+100 from 8.55 to 7.91). At the end of January 2020, all sites were within the ADWG value range for pH (Attachment A).

The groundwater at ETGW2 below ETAU on 12 December 2019 was pH 6.89 and 13 January 2020 was pH 6.51, indicating that seeping groundwater was not a source of higher pH water entering the reservoir.

The pH of creek water following limited rain events may fluctuate slightly because dry iron oxyhydroxide in contact with water undergoes hydrolysis. It is possible that the higher pH water in the reservoir is linked to the limited rain events recorded at PV7 since September 2019, as both arms of the Woronora Reservoir appear to have increasing pH of water associated with a limnological process. Given the limited rain events recorded leading up to January 2020, the fluctuations within the creek water pH are considered to be natural. In January 2020, the pH values at all sites were within the ADWG value range (Attachment A).

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in January 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for January 2020, show the quality of water below ETAU fluctuated during January 2020, with the water observed to be clear at the beginning of January due to the rainfall event on 26 December 2019, after which the water showed mild turbidity until later in the month, where the water was again observed to be clear due to the rainfall event on 17 January 2020. A slight increase in the presence of orange-yellow coating on the bed rock surfaces of the sites was observed by the end of January 2020. The presence of orange-yellow coating on the creek sediment surface will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In January 2020, the Woronora Reservoir water level was downstream of site WDFS1+100. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

ADWG (2011) Australian Drinking Water Guidelines – National Water Quality Management Strategy. The National Health and Medical Research Council Canberra.

Helensburgh Coal Pty Ltd (2008) Metropolitan Coal Project Environmental Assessment.

Hydro Engineering & Consulting Pty Ltd (2019) Metropolitan Coal LW 304 Extraction Plan Triggers – Water Quality and Pool Water Level Analysis January 2020.

Raveendran, R., Ashworth, B. and Chatelier, B. (2001) Manganese removal in drinking water systems, in Proceedings of the 64th Annual Water Industry Engineers and Operations Conference, pp. 92–100, Bendigo, Australia.

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES

ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, WARARM5, CONFLU1, WDFS1 and
WDFS1+100

JANUARY 2018 TO JANUARY 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	- ⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

2 June 2020

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – February 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwall 304 Water Management Plan (LW304 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW304 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW304 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW304 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW304 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW304 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in February 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in February 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW304 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for February 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 29 February 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 29 February 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 29 February 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January 2020 and February 2020 with below average rainfall recorded in all other months (Table 1).

Total rainfall in February 2020 was 730.0 mm, well above the average rainfall at Darkes Forest (159.5 mm), with rainfall occurring from 3 to 5 February (totalling 22.5 mm rainfall), 7 to 19 February (totalling 700.0 mm rainfall, with 0 mm on 12 and 15 February), 22-24 February (7.0 mm rainfall) and 27 February (0.5 mm rainfall). Shallow groundwater levels correlate with the rainfall trend.

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data (mm) for PV7, January 2018 to February 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to February 2020.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese (II) ion, Mn²⁺) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

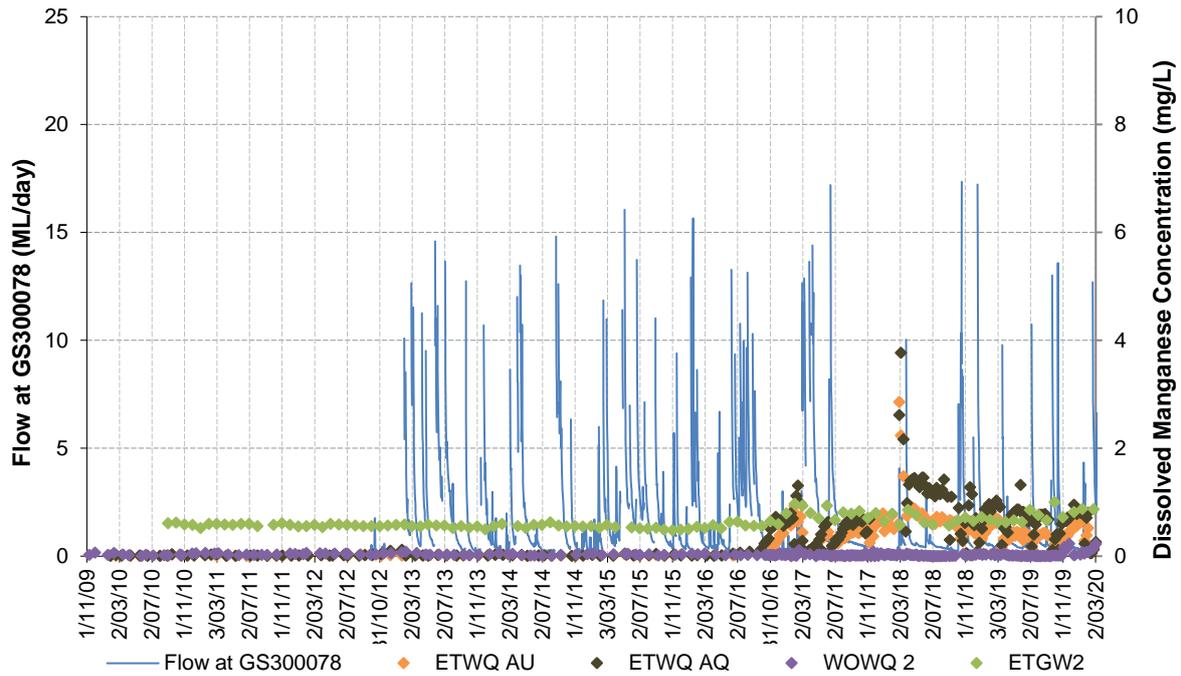


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 29 February 2020)

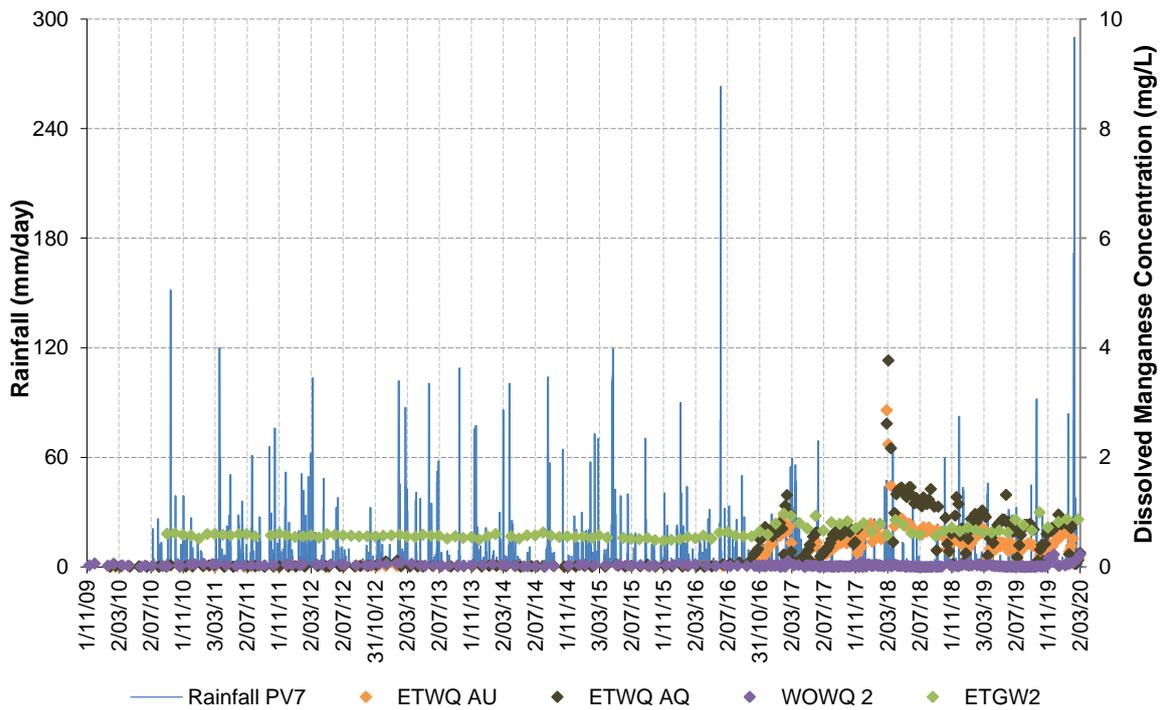
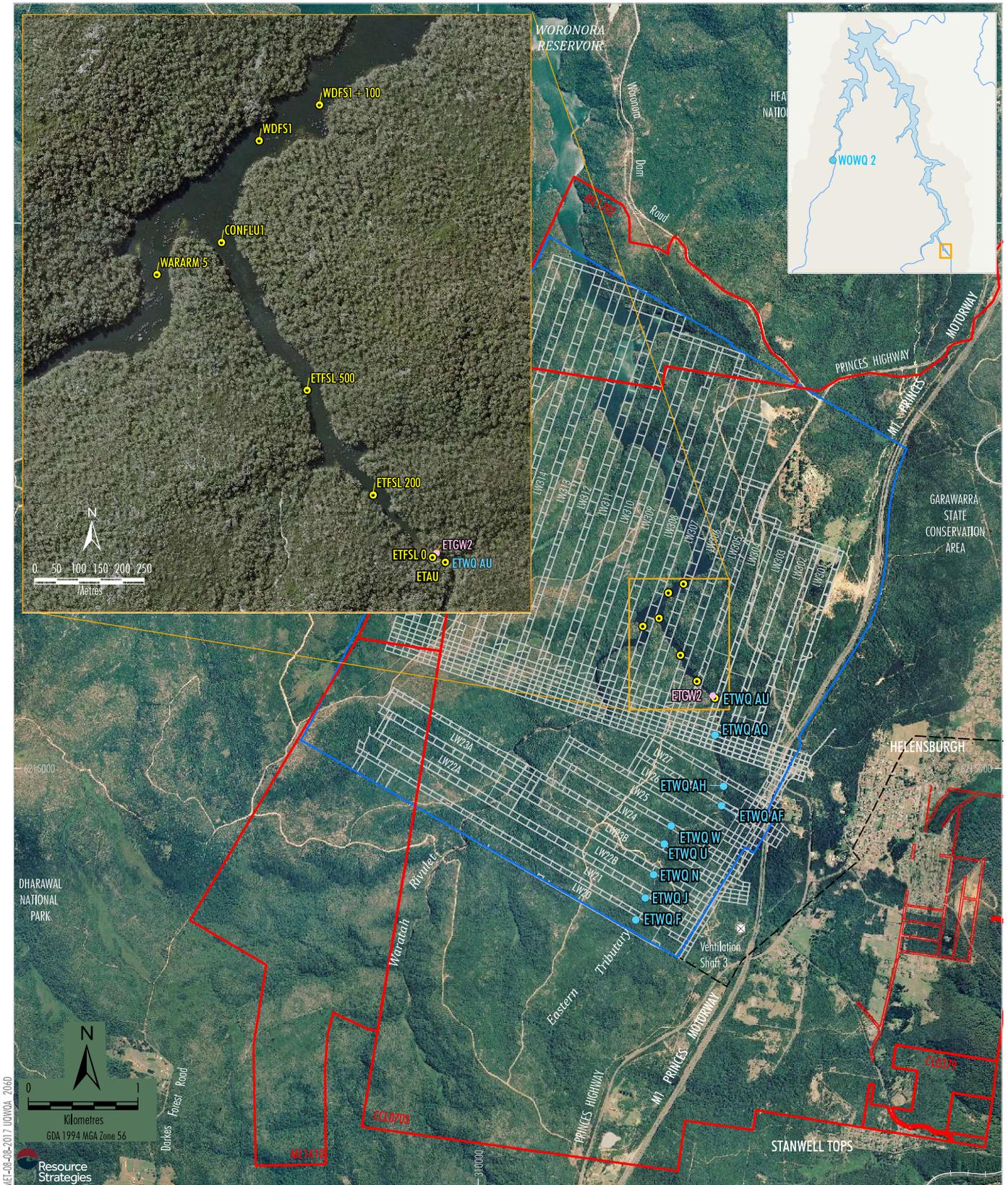


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 29 February 2020)



MET-08-08-2017 UOWDA 2060

LEGEND

- Mining Lease Boundary
- Railway
- Project Underground Mining Area
Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Surface Water Quality Site on Eastern Tributary
- Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
- Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody

METROPOLITAN COAL

Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran *et al.*, 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In February 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.058 mg/L and 0.522 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events on 17 January 2020 and throughout February 2020. Dissolved manganese concentrations remained below the long-term mean (0.33 mg/L) for the remainder of February 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 µm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In February 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.64 to pH 7.01);
- EC concentrations (lab measurement) ranged between 120 µS/cm and 348 µS/cm; and
- ORP (field measurement) ranged between 97.4 mV and 170 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW304 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW304 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017. Due to the reducing water level in the Woronora Reservoir, in November 2018, I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018.

Metropolitan Coal has taken a photographic record of the watercourse / waterbody at the time of sampling, estimated the width of the watercourse / water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in February 2020 the Woronora Reservoir water level varied between 150.76 mAHD (on 6 February 2020) and 160.7 mAHD (on 20 February 2020) (water level increased). The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during February 2020 was approximately 139.25 m (corresponding to 161 mAHD) downstream of site ETSFL 0.

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout February 2020, the Woronora Reservoir water level was downstream of site WDFS1+100 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to February 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level increased significantly in February 2020 following heavy rainfall in the period 7 to 10 February, and was just upstream of site ETFSL 200. Accordingly, only one sample was taken at sites CONFLU1, WARARM5, WDFS1 and WDFS+100 during February 2020 (i.e. on 4 February, Attachment A) prior to the increased Woronora Reservoir water level. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of February 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for February 2020 ranged from 0.058 mg/L to 0.522 mg/L at site ETAU, 0.047 mg/L to 0.176 mg/L at site ETFSL 200, 0.052 mg/L to 0.275 mg/L at site ETFSL 500, 0.061 mg/L at site CONFLU1, 0.041 mg/L at site WARARM5, 0.046 mg/L at site WDFS1 and 0.017 mg/L at site WDFS1+100 (Chart 3).

Total manganese concentrations for February 2020 followed similar trends, ranging from 0.059 mg/L to 0.546 mg/L at site ETAU, 0.051 mg/L to 0.178 mg/L at site ETFSL 200, 0.048 mg/L to 0.296 mg/L at site ETFSL 500, 0.067 mg/L at site CONFLU1, 0.039 mg/L at site WARARM5, 0.056 mg/L site WDFS1 and 0.027 mg/L at site WDFS1+100 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

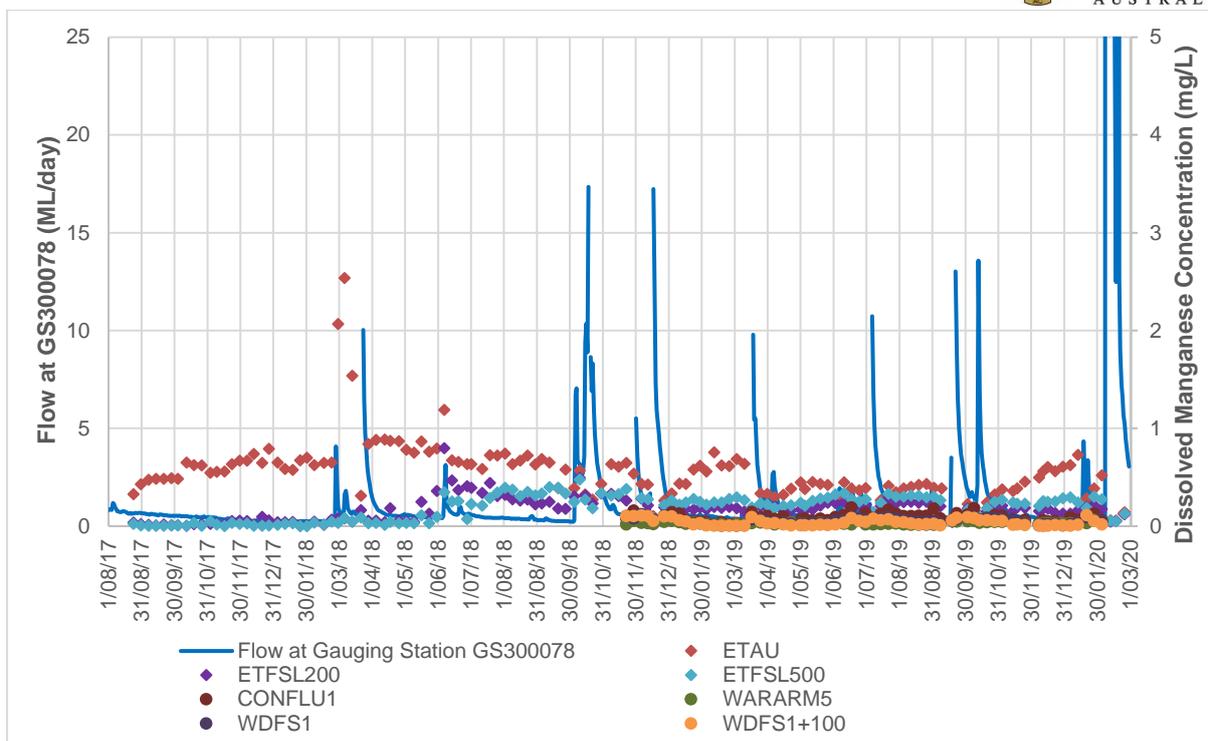


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 29 February 2020)

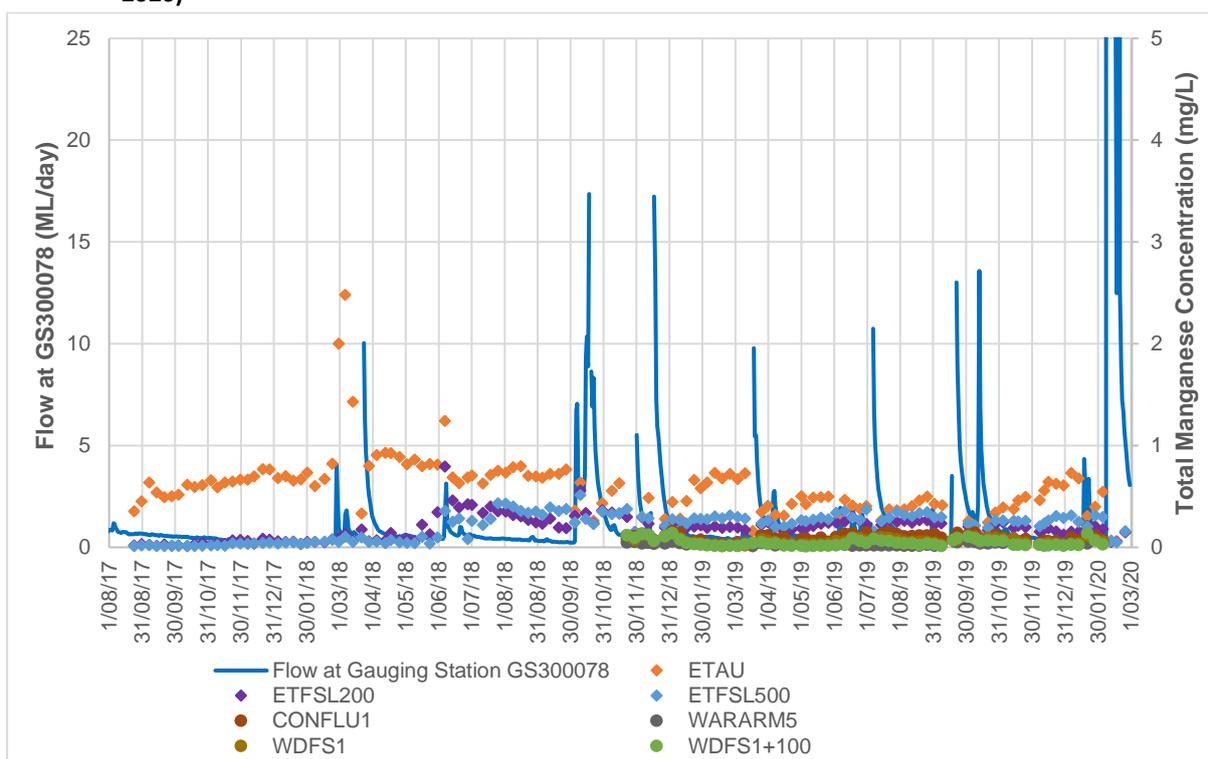


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 29 February 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG, 2011) are published by the National Health and Medical Research Council and updated most recently in 2018; the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the Australian Drinking Water Guideline before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG (2011) guidelines are based on total concentrations of manganese in water. The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to February 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5 – 8.5. The pH values at sites ETAU, ETFSL 200 and ETFSL 500 fluctuated during February 2020 within the ADWG value range for pH (Attachment A) (ETAU from 6.64 to 7.01, ETFSL 200 from 6.7 to 7.36 and ETFSL 500 from 6.83 to 7.38). The single measurement for the remaining sites were also within the ADWG value range for pH (Attachment A) (CONFLU1 at 7.7, WARARM5 at 7.55, WDFS1 at 7.68, and WDFS1+100 at 7.87).

The groundwater at ETGW2 below ETAU was pH 6.51 on 13 January 2020 and pH 6.58 on 24 February 2020, indicating that seeping groundwater was not a source of higher pH water entering the reservoir.

The pH of creek water following limited rain events may fluctuate slightly because dry iron oxyhydroxide in contact with water undergoes hydrolysis. It is possible that the higher pH water in the reservoir is linked to the limited rain events recorded at PV7 between September 2019 and January 2020, as both arms of the Woronora Reservoir appear to have increasing pH of water associated with a limnological process. Given the limited rain events recorded leading up to January 2020, the fluctuations within the creek water pH are considered to be natural.

Notwithstanding, the highwall rainfall events recorded during February 2020 are considered to have attributed to the generally decreased pH recorded in February 2020, due to the lower pH (5.6) of rainwater in equilibrium with dissolved carbon dioxide (Ayers and Gillett, 1984) and the large input to creek flow (Attachment A).

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in February 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for February 2020, show the quality of water below ETAU to be generally consistent during February 2020, with the water observed to be clear throughout February due to multiple rainfall events throughout January and February 2020. A slight increase in the presence of orange-yellow coating on the bed rock surfaces of the sites was however observed by the end of February 2020. The presence of orange-yellow coating on the creek sediment surface will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In February 2020, the Woronora Reservoir water level was just upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES

ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, WARARM5, CONFLU1, WDFS1 and
WDFS1+100

JANUARY 2018 TO FEBRUARY 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	- ⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/01/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/01/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/01/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/01/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/01/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/01/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/01/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020	WDFS1+100	0.017	0.027	0.26	1.22	-965	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
12/02/2020	CONFLU1							
12/02/2020	WARARM5							
12/02/2020	WDFS1							
12/02/2020	WDFS1+100							
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
17/02/2020	CONFLU1							
17/02/2020	WARARM5							
17/02/2020	WDFS1							
17/02/2020	WDFS1+100							
24/02/2020	ETAU	0.128		0.28		97.4	6.82	172
24/02/2020	ETFSL200							
24/02/2020	ETFSL500							
24/02/2020	CONFLU1							
24/02/2020	WARARM5							
24/02/2020	WDFS1							
24/02/2020	WDFS1+100							
25/02/2020	ETAU	0.144	0.154	0.29	1.5	-	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
25/02/2020	CONFLU1							
25/02/2020	WARARM5							
25/02/2020	WDFS1							
25/02/2020	WDFS1+100							

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

29 July 2020

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – March 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwall 304 Water Management Plan (LW304 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW304 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW304 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW304 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW304 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW304 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in March 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in March 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW304 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for March 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 31 March 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 31 March 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 31 March 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January 2020, February 2020 and March 2020 with below average rainfall recorded in all other months (Table 1).

Total rainfall in March 2020 was 236.0 mm, above the average rainfall at Darkes Forest (154.3 mm), with rainfall occurring from 3 to 11 March (totalling 108.0 mm rainfall), 13 to 18 March (totalling 86.0 mm rainfall), 20 March (0.5 mm rainfall), 23 to 24 March (totalling 4.0 mm rainfall) and 26 to 31 March (totalling 37.5 mm rainfall). Shallow groundwater levels correlate with the rainfall trend.

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data (mm) for PV7, January 2018 to March 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to February 2020.

* Data from Station 68024 is not available for March 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for March 2020.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese (II) ion, Mn²⁺) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

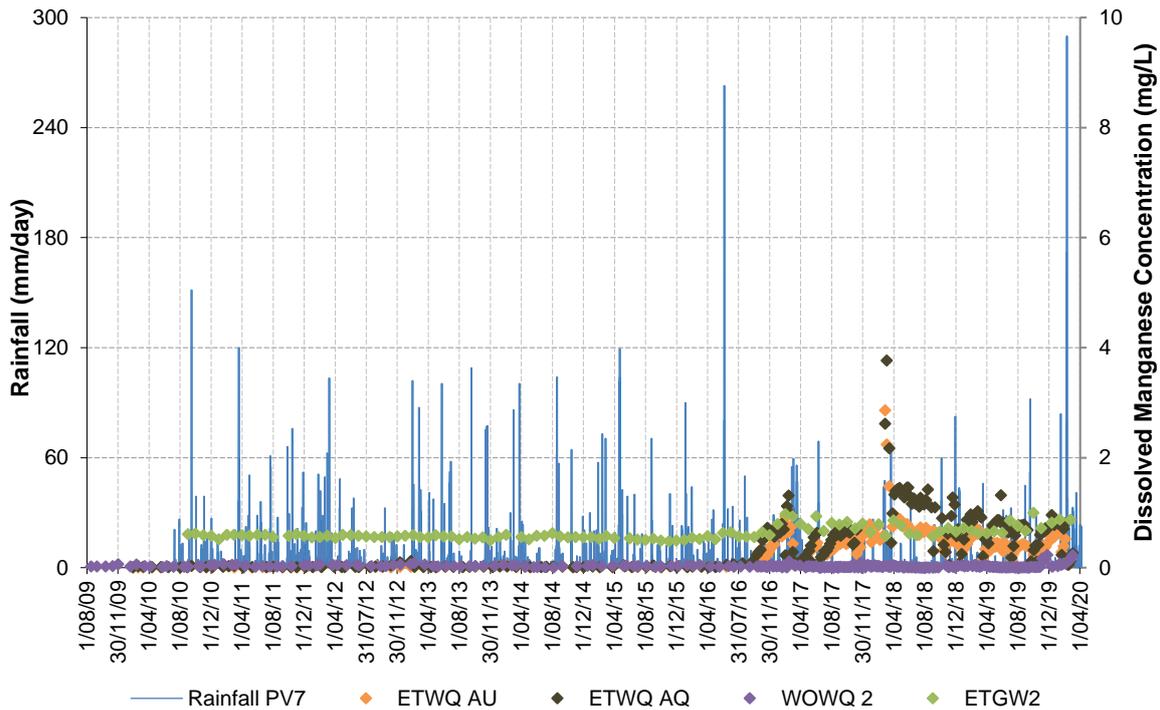


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 31 March 2020)

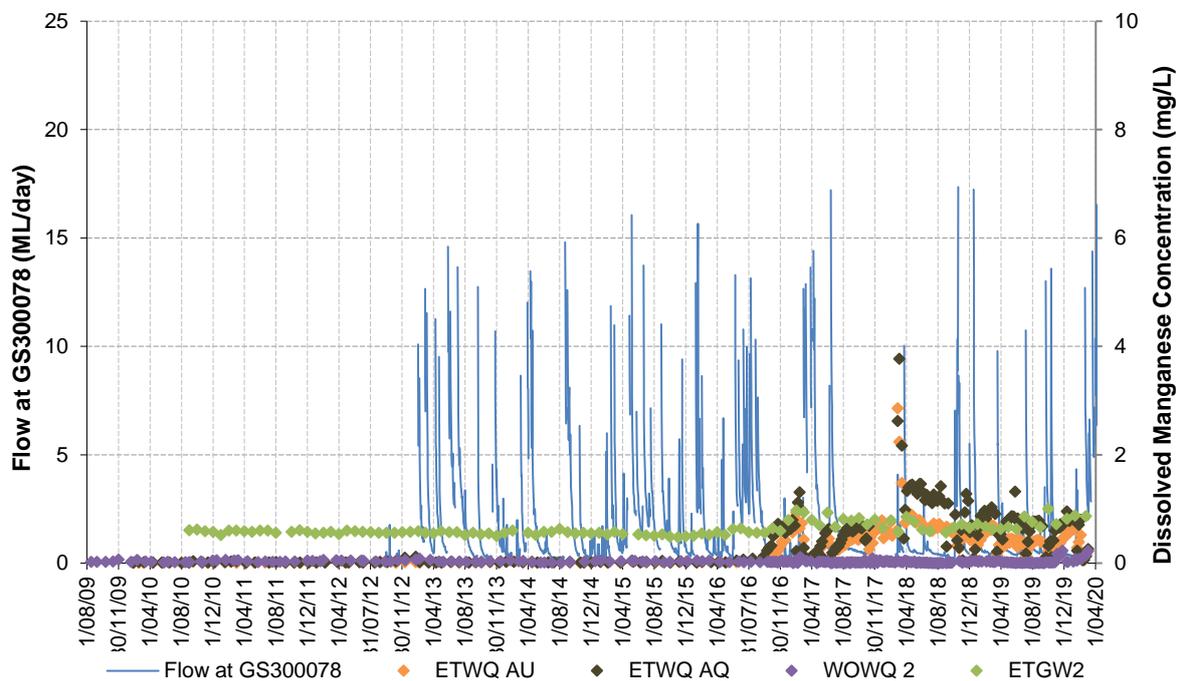
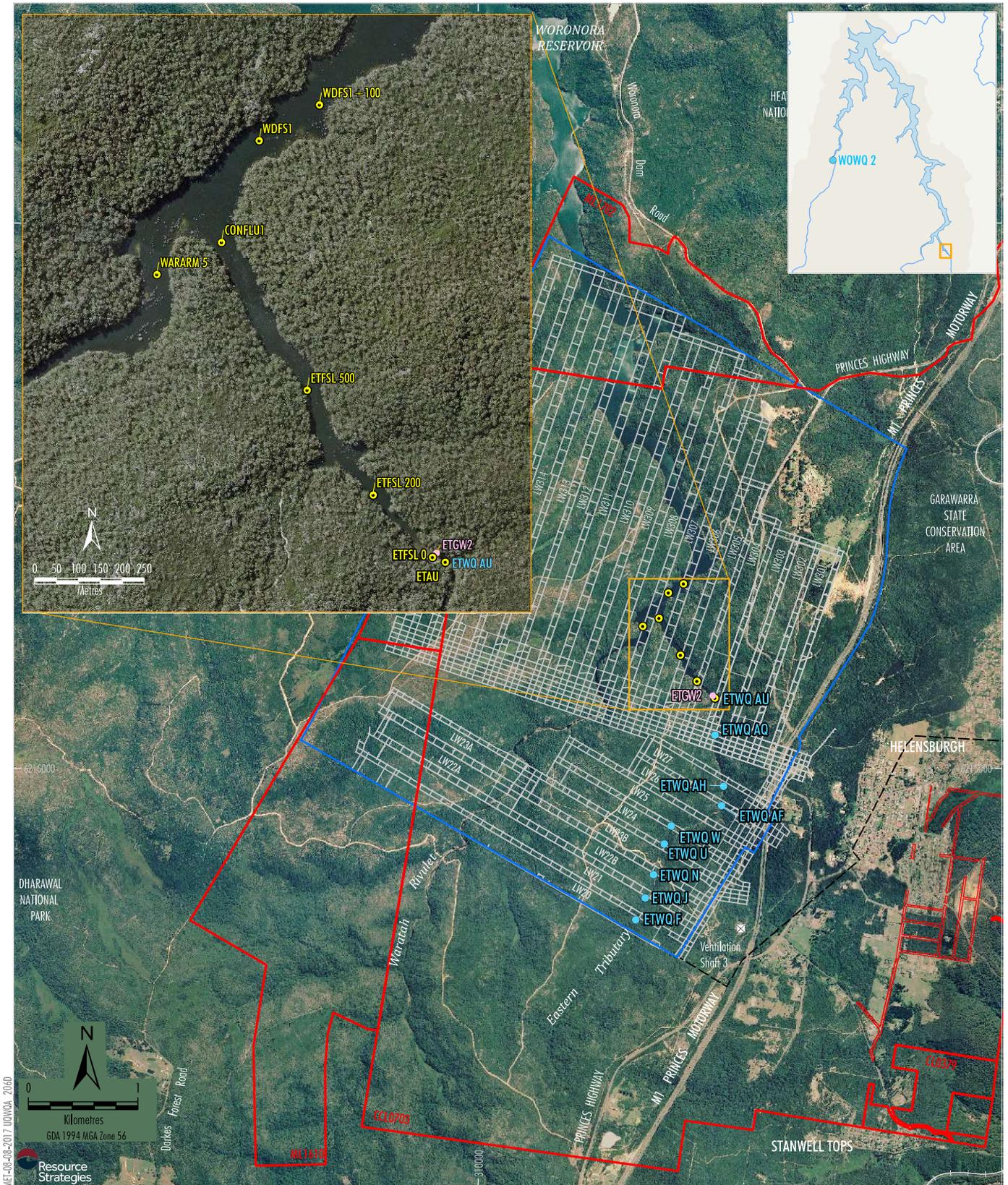


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 31 March 2020)



MET-08-08-2017 UOWDA 2060

LEGEND

- Mining Lease Boundary
- Railway
- Project Underground Mining Area
Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Surface Water Quality Site on Eastern Tributary
- Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
- Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody

METROPOLITAN COAL

Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran *et al.*, 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In March 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.038 mg/L and 0.233 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events on 17 January 2020, and throughout February and March 2020. Dissolved manganese concentrations remained below the long-term mean (0.33 mg/L) for the entirety of March 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 µm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In March 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.45 to pH 7.05);
- EC concentrations (lab measurement) ranged between 125 µS/cm and 208 µS/cm; and
- ORP (field measurement) ranged between 35.3 mV and 134.7 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW304 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW304 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Sampling at some sites downstream of site ETWQ AU was not undertaken throughout February and March 2020 due to the high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir (Appendix A).

Metropolitan Coal has taken a photographic record of the watercourse / waterbody at the time of sampling, estimated the width of the watercourse / water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in March 2020 the Woronora Reservoir water level varied between 160.50 mAHD (on 15 March 2020) and 160.71 mAHD (on 19 March 2020) (water level increased slightly). The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during March 2020 was approximately 153 m downstream of site ETSFL 0 (corresponding to 161 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout March 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to March 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level increased slightly in March 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of March 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for March 2020 ranged from 0.038 mg/L to 0.233 mg/L at site ETAU, 0.037 mg/L to 0.139 mg/L at site ETFSL 200, 0.038 mg/L to 0.195 mg/L at site ETFSL 500, 0.038 mg/L to 0.079 mg/L at site CONFLU1, 0.029 mg/L to 0.044 mg/L at site WARARM5, 0.045 mg/L to 0.059 mg/L at site WDFS1 and 0.048 mg/L to 0.065 mg/L at site WDFS1+100 (Chart 3).

Total manganese concentrations for March 2020 followed similar trends, ranging from 0.048 mg/L to 0.237 mg/L at site ETAU, 0.039 mg/L to 0.169 mg/L at site ETFSL 200, 0.041 mg/L to 0.211 mg/L at site ETFSL 500, 0.040 mg/L to 0.089 mg/L at site CONFLU1, 0.028 mg/L to 0.050 mg/L at site WARARM5, 0.049 mg/L to 0.074 mg/L at site WDFS1 and 0.053 mg/L to 0.065 mg/L at site WDFS1+100 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

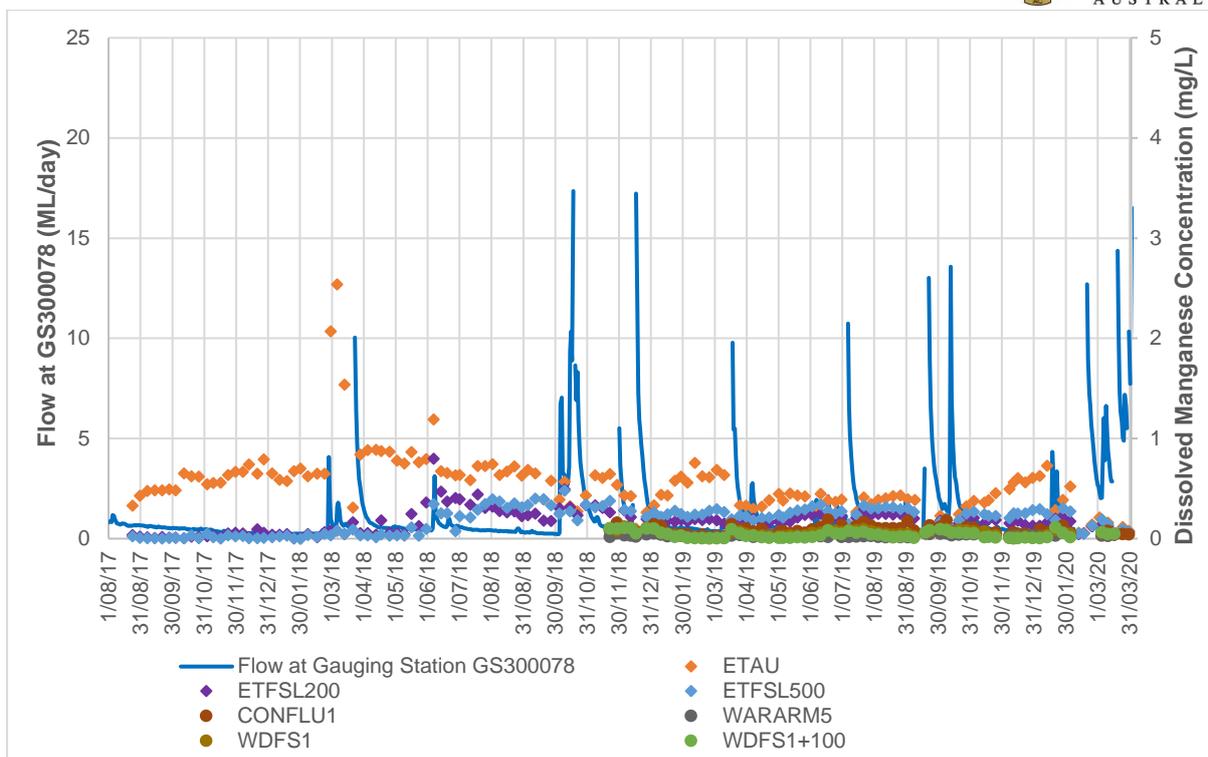


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 March 2020)

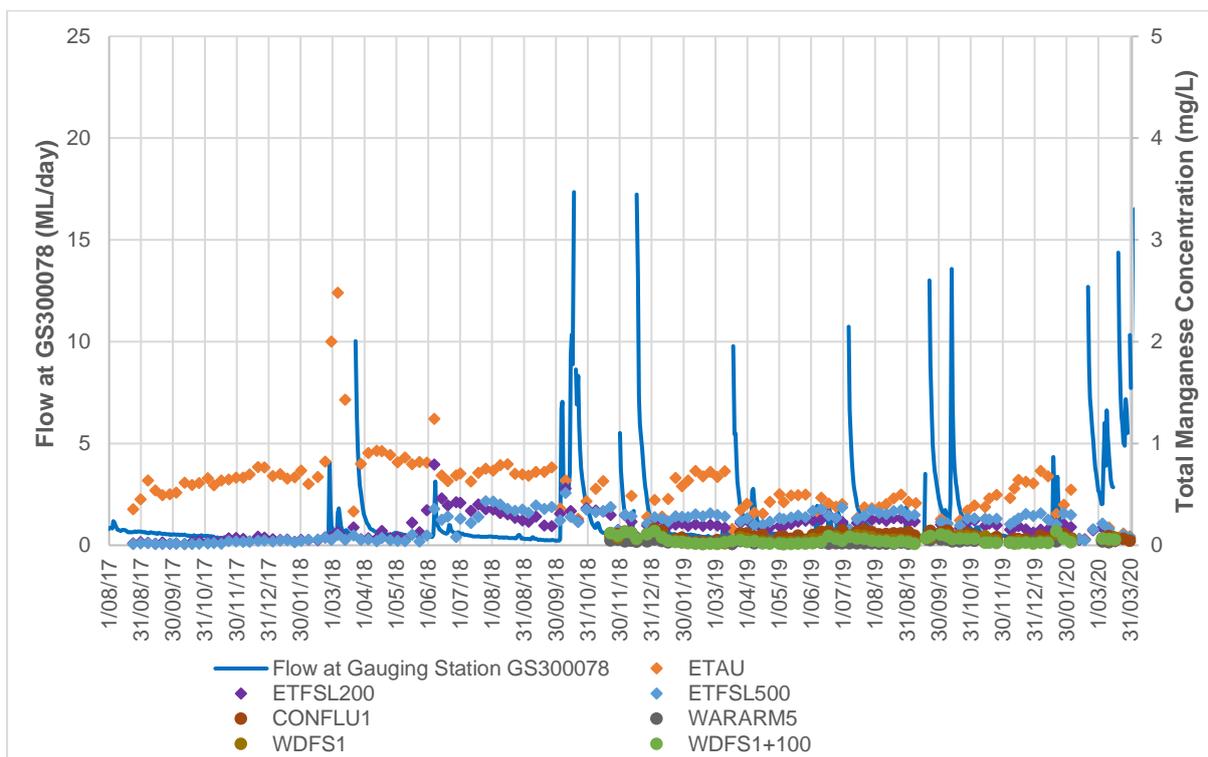


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 March 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG, 2011) are published by the National Health and Medical Research Council and updated most recently in 2018; the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the Australian Drinking Water Guideline before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG (2011) guidelines are based on total concentrations of manganese in water. The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to March 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters EC and ORP showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5 – 8.5. The pH values at all sites fluctuated during March 2020, with some sites reducing by the end of the month (ETFSL 200 from 7.37 to 7.08, CONFLU1 from 7.34 to 7.13, WARARM5 from 7.48 to 6.64, WDFS1 from 7.10 to 6.56, and WDFS1+100 from 7.14 to 6.53), and some sites increasing by the end of the month (ETAU from 6.61 to 7.05, and ETFSL 500 from 7.13 to 7.25). At the end of March 2020, all sites were within the ADWG value range for pH (Attachment A).

The groundwater at ETGW2 below ETAU on 24 February 2020 was pH 6.58 and 25 March 2020 was pH 6.32, indicating that seeping groundwater was not a source of higher pH water entering the reservoir.

In March 2020, the pH values at all sites were within the ADWG value range (Attachment A).

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in February 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records show the quality of water below ETAU fluctuated slightly during March 2020, with the water observed to be slightly turbid at the beginning of March, after which the water was more clear due to significant rainfall in early to mid March. The presence of orange-yellow coating on the bed rock surfaces of the sites was observed throughout March 2020, similar in extent to February 2020. The presence of orange-yellow coating on the creek sediment surface will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In March 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES

ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, WARARM5, CONFLU1, WDFS1 and
WDFS1+100

JANUARY 2018 TO MARCH 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	- ⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

17 August 2020

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – April 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwalls 305-307 Water Management Plan (LW305-307 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW305-307 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW305-307 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW305-307 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW305-307 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW305-307 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in April 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in April 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW305-307 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for April 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 30 April 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 30 April 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 30 April 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January 2020, February 2020 and March 2020 with below average rainfall recorded in all other months (Table 1).

Total rainfall in April 2020 was 88.5 mm, below the average rainfall at Darkes Forest (126.1 mm), with rainfall occurring from 1 to 5 April (totalling 34.0 mm rainfall), 7 April (0.5 mm rainfall), 9 to 11 April (totalling 36.5 mm rainfall), and 30 April (17.5 mm rainfall).

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data (mm) for PV7, January 2018 to April 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3
April 2020	88.5	73.0*	126.1

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to February 2020.

* Data from Station 68024 is not available for March and April 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for these months.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese [II] ion, Mn²⁺) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

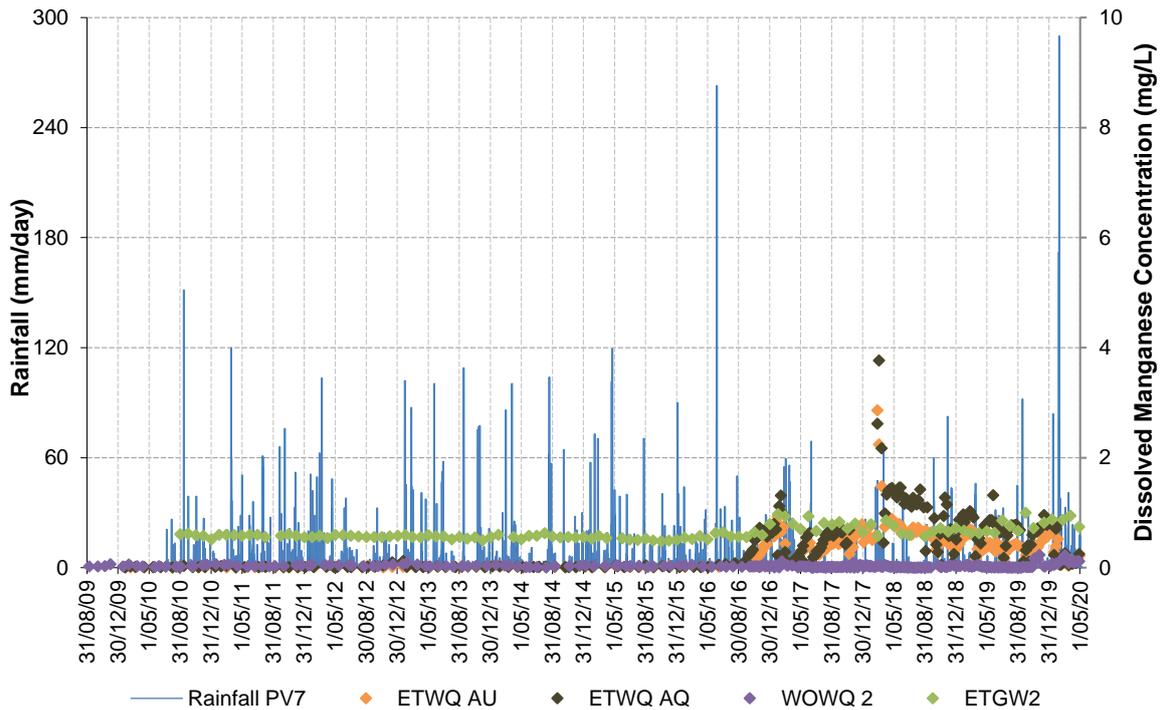


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 30 April 2020)

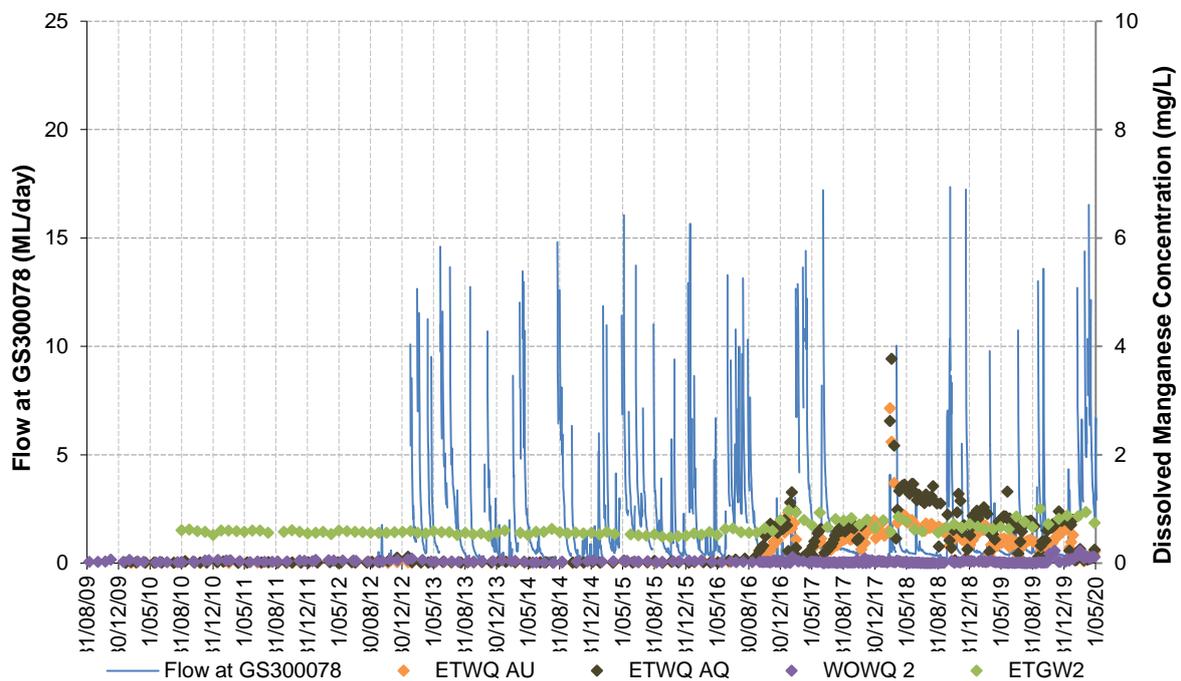
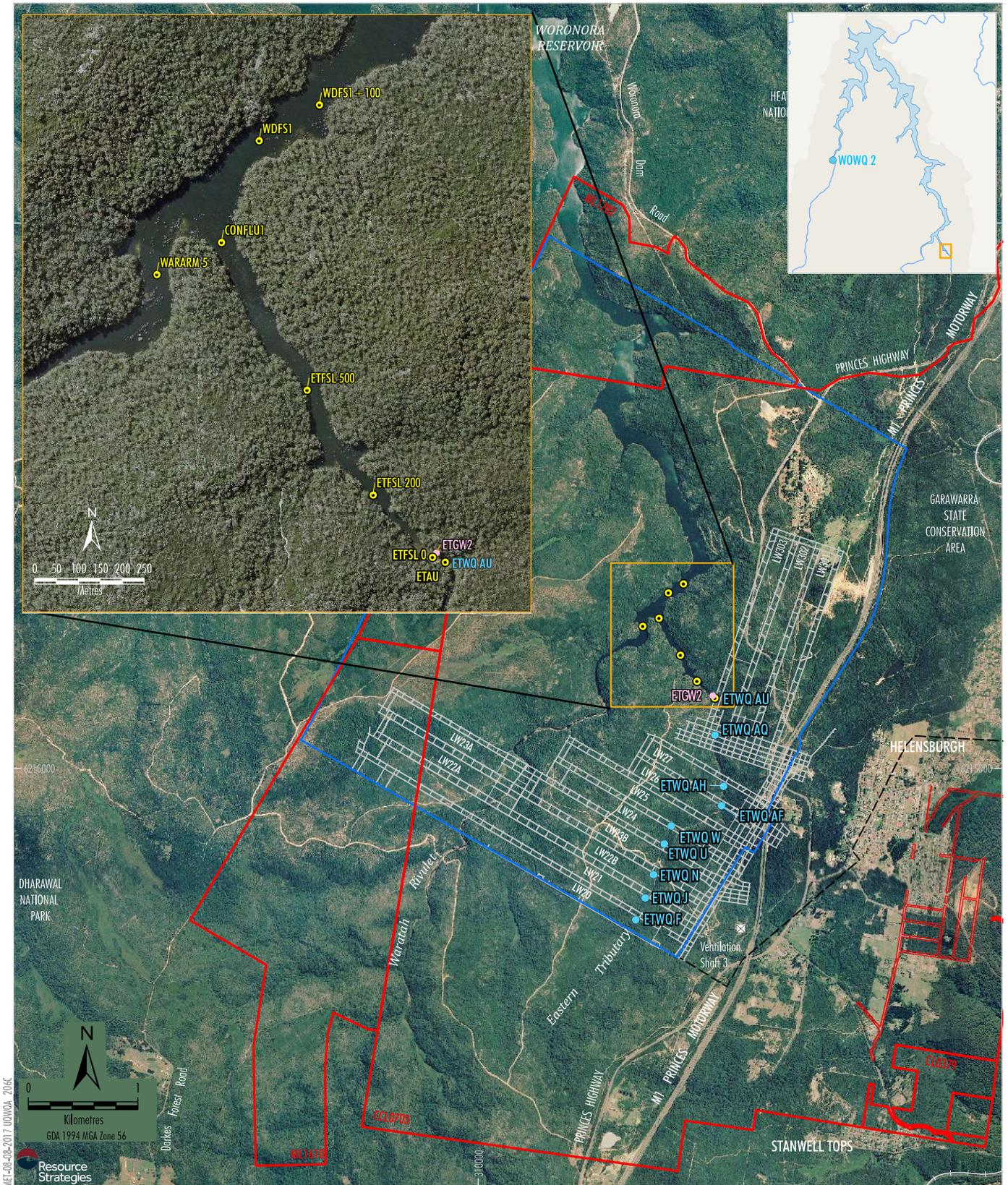


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 30 April 2020)



MET-08-08-2017 UOWDA 2066C

- LEGEND**
- Mining Lease Boundary
 - Railway
 - Project Underground Mining Area
Longwalls 20-27 and 301-317
 - Existing Underground Access Drive (Main Drift)
 - Surface Water Quality Site on Eastern Tributary
 - Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
 - Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody
METROPOLITAN COAL
Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran et al., 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In April 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.087 mg/L and 0.224 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events on 17 January 2020, and throughout February and March 2020. Dissolved manganese concentrations remained below the long-term mean (0.33 mg/L) for the entirety of April 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 µm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In April 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.70 to pH 6.91);
- EC concentrations (lab measurement) ranged between 171 µS/cm and 237 µS/cm; and
- ORP (field measurement) ranged between 71.0 mV and 143.5 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW305-307 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW305-307 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Sampling at some sites downstream of site ETWQ AU was not undertaken throughout February and March 2020 due to the high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir (Appendix A). Further, and due to the increasing water level in the Woronora Reservoir throughout February and March 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken in April 2020 (Appendix A).

Metropolitan Coal has taken a photographic record of the watercourse / waterbody at the time of sampling, estimated the width of the watercourse / water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in April 2020 the Woronora Reservoir water level varied between 160.69 mAHD (on 1 April 2020) and 160.82 mAHD (on 11 April 2020), and dropped back down to 160.70 mAHD at the end of the month. The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during April 2020 was approximately 153 m downstream of site ETSFL 0 (corresponding to 161 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout April 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to April 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level fluctuated slightly in April 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of April 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for March 2020 ranged from 0.087 mg/L to 0.224 mg/L at site ETAU, 0.071 mg/L to 0.155 mg/L at site ETFSL 200, 0.083 mg/L to 0.184 mg/L at site ETFSL 500, and 0.034 mg/L to 0.166 mg/L at site CONFLU1 (Chart 3).

Total manganese concentrations for April 2020 followed similar trends, ranging from 0.105 mg/L to 0.227 mg/L at site ETAU, 0.083 mg/L to 0.158 mg/L at site ETFSL 200, 0.093 mg/L to 0.185 mg/L at site ETFSL 500, and 0.037 mg/L to 0.183 mg/L at site CONFLU1 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

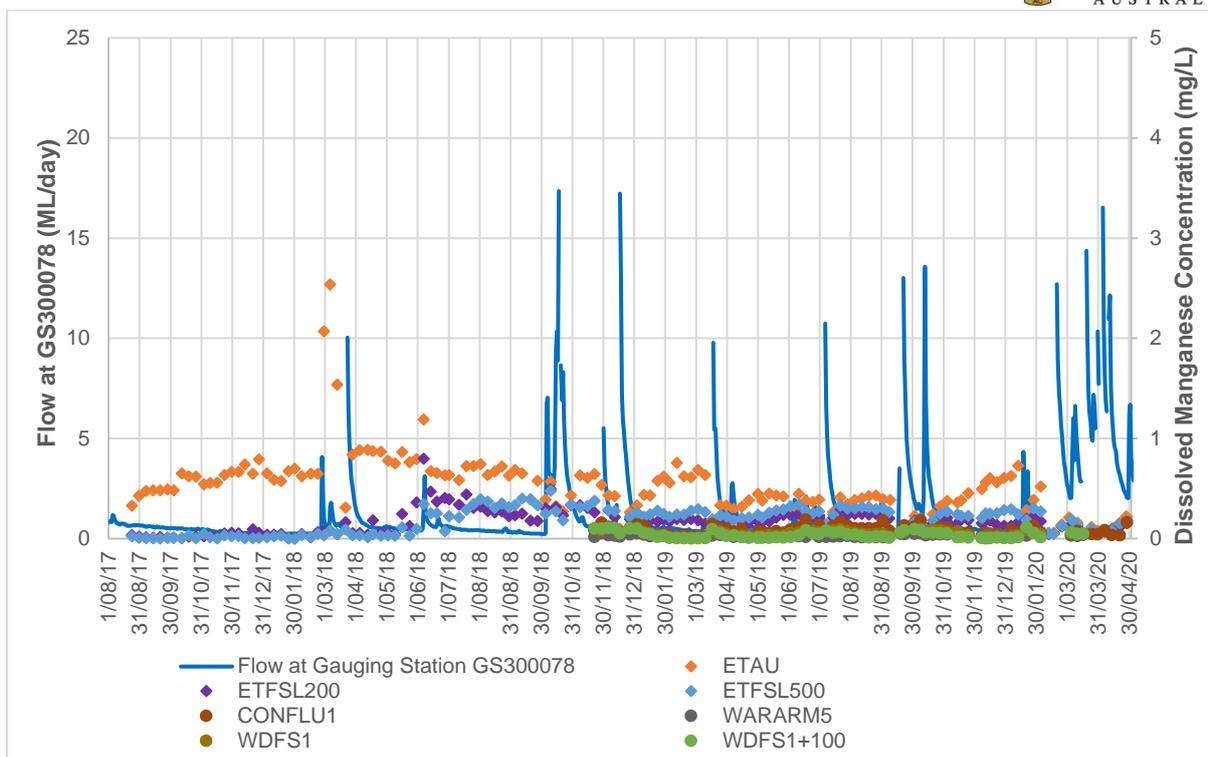


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 30 April 2020)

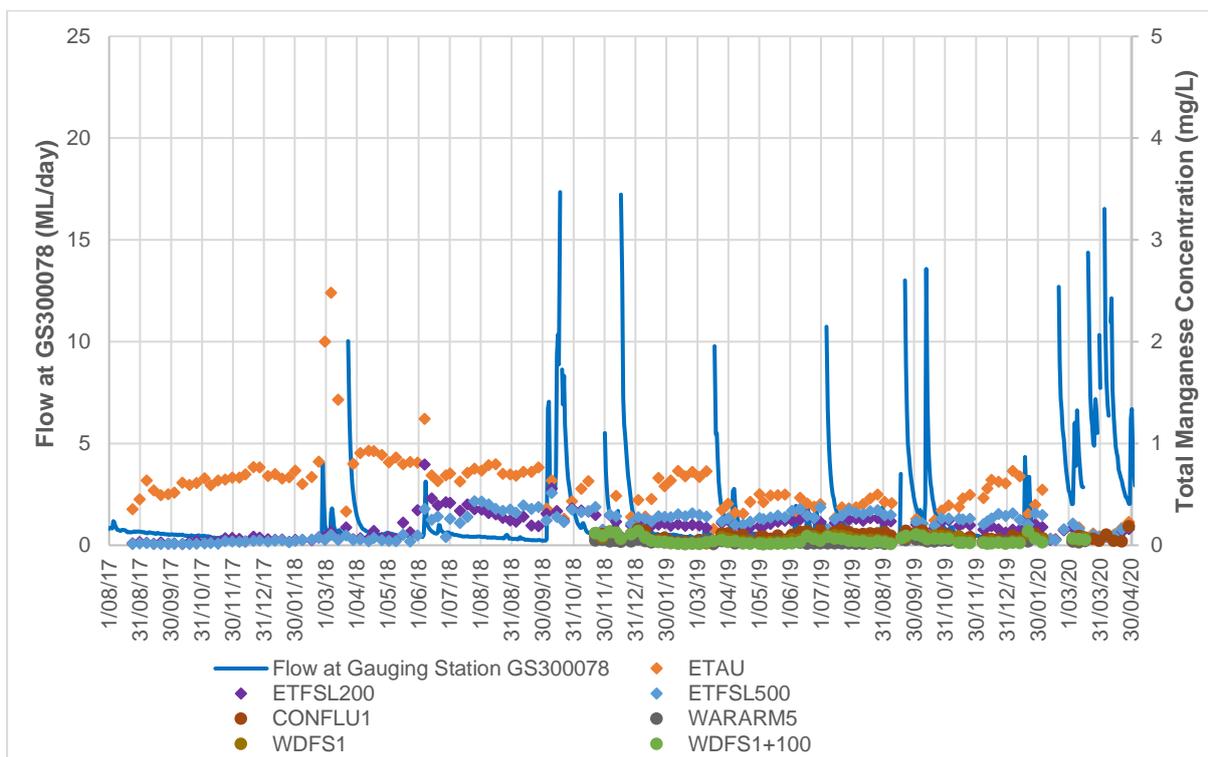


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 30 April 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG) are published by the National Health and Medical Research Council and updated most recently in 2018 (NHMRC & NRMCC, 2011); the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the Australian Drinking Water Guideline before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG are based on total concentrations of manganese in water (NHMRC & NRMCC, 2011). The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to April 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5 – 8.5. The pH values at all sites fluctuated during April 2020, with some sites reducing by the end of the month (ETAU from 6.91 to 6.70, and CONFLU1 from 6.95 to 7.27), and some sites increasing by the end of the month (ETFSL 200 from 7.04 to 7.05, and ETFSL 500 from 7.05 to 7.11). At the end of April 2020, all sites were within the ADWG value range for pH (Attachment A).

The groundwater at ETGW2 below ETAU on 25 March 2020 was pH 6.32 and 28 April 2020 was pH 6.71, indicating that seeping groundwater was not a source of higher pH water entering the reservoir.

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in April 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for April 2020 show the quality of water below ETAU fluctuated during April 2020, with the water observed to be slightly turbid at the beginning of April, after which the water was more clear due to significant rainfall in the early-mid month. Later in the month, the water was again observed to be turbid due to minimal rainfall. A slight increase in the presence of orange-yellow coating on the bed rock surfaces of the sites was observed by the end of April 2020. The presence of orange-yellow coating on the creek sediment surface will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In April 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

Helensburgh Coal Pty Ltd (2008) *Metropolitan Coal Project Environmental Assessment*.

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES

ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, WARARM5, CONFLU1, WDFS1 and
WDFS1+100

JANUARY 2018 TO APRIL 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	- ⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

- ¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.
- ² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/04/2020 ³	ETAU	0.087	0.105	0.32	1.26	71	6.91	171
7/04/2020	ETFSL200	0.071	0.083	0.85	0.12	71.1	7.04	171
7/04/2020	ETFSL500	0.083	0.093	0.42	1.1	65.1	7.05	175
7/04/2020	CONFLU1	0.087	0.103	0.16	1.21	109.6	7.01	173
15/04/2020	ETAU	0.108	0.109	0.31	1.16	126.9	6.81	175
14/04/2020	ETFSL200	0.091	0.09	0.2	0.95	64.9	7.05	171
14/04/2020	ETFSL500	0.085	0.095	0.27	1.13	102.2	6.96	174
14/04/2020	CONFLU1	0.039	0.042	0.05	0.74	185.6	7.14	183
22/04/2020	ETAU	0.155	0.167	0.17	1.63	121.2	6.87	207
22/04/2020	ETFSL200	0.119	0.126	0.06	1.26	128.9	7.34	203
22/04/2020	ETFSL500	0.148	0.156	0.45	1.63	91.5	7.21	217
22/04/2020	CONFLU1	0.034	0.037	0.09	0.78	119.1	7.27	213
29/04/2020	ETAU	0.221	0.227	0.56	2.18	136.8	6.7	225
29/04/2020	ETFSL200	0.155	0.158	<0.05	1.32	147.8	7.05	233
29/04/2020	ETFSL500	0.184	0.185	0.24	1.75	51.4	7.11	259
29/04/2020	CONFLU1	0.166	0.183	<0.05	2.03	157.1	6.95	247

Note:

³ Due to the increasing water level in the Woronora Reservoir throughout February and March 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken in April 2020.

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

14 October 2020

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – June 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwalls 305-307 Water Management Plan (LW305-307 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW305-307 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW305-307 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW305-307 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW305-307 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW305-307 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in June 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in June 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW305-307 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for June 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 30 June 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 30 June 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 30 June 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January 2020, February 2020 and March 2020 with below average rainfall recorded in all other months (Table 1).

Total rainfall at PV7 in June 2020 was 59.0 mm, below the average rainfall at Darkes Forest (145.8 mm), with rainfall occurring on 3 June (1.5 mm), 8 to 15 June (29.5 mm), 18 June (16.5 mm), 22 June (9.0 mm), 26 June (0.5 mm), and 29 to 30 June (2.0 mm).

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data for PV7, January 2018 to June 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3
April 2020	88.5	73.0*	126.1
May 2020	88.0	111.0*	128.1
June 2020	59.0	65.0*	145.8

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to February 2020.

^{*} Data from Station 68024 is incomplete or not available for the period of March to June 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for these months.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese [II] ion, Mn²⁺) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

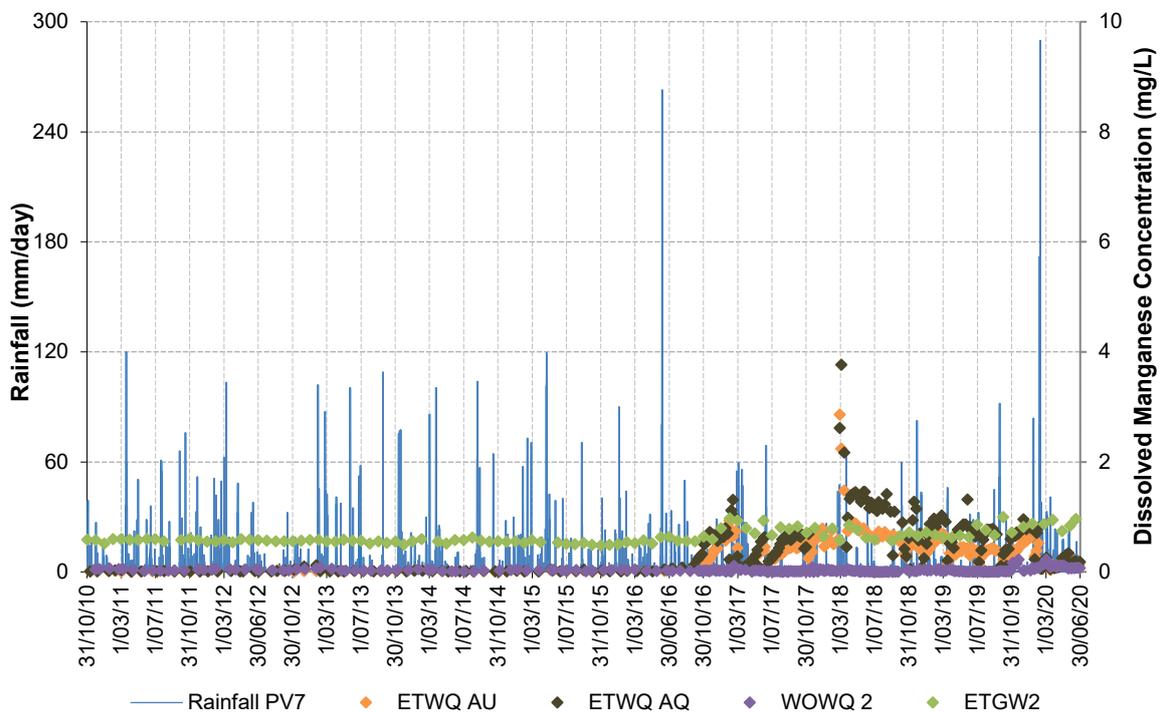


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 30 June 2020)

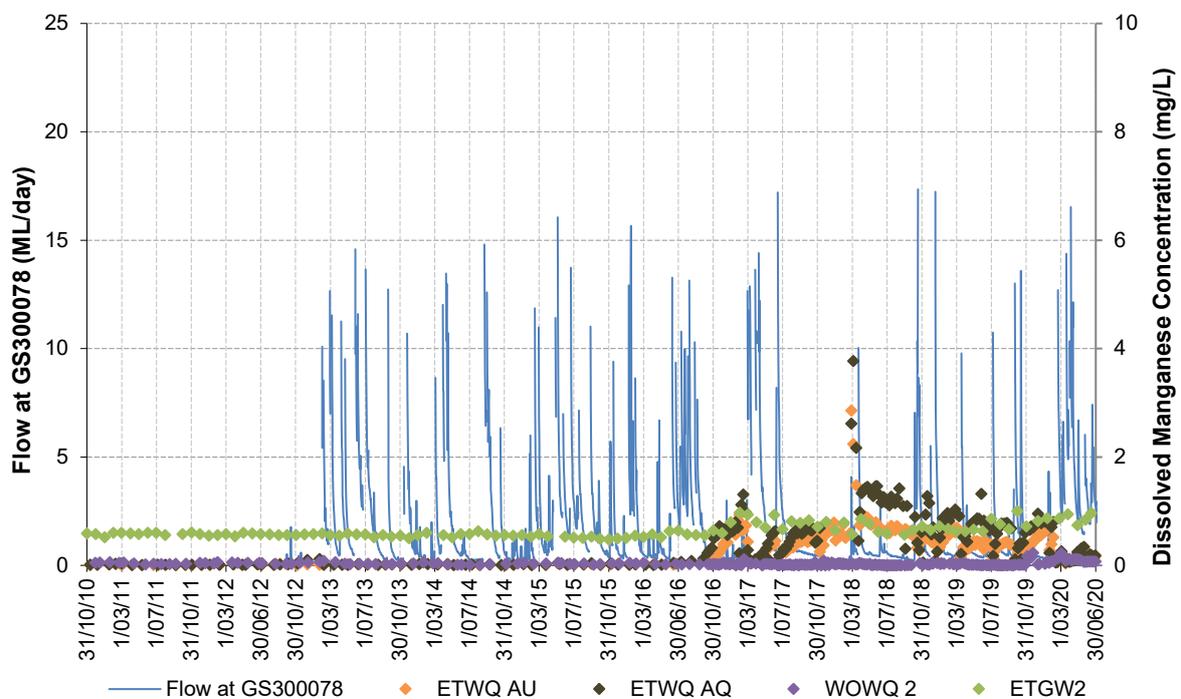
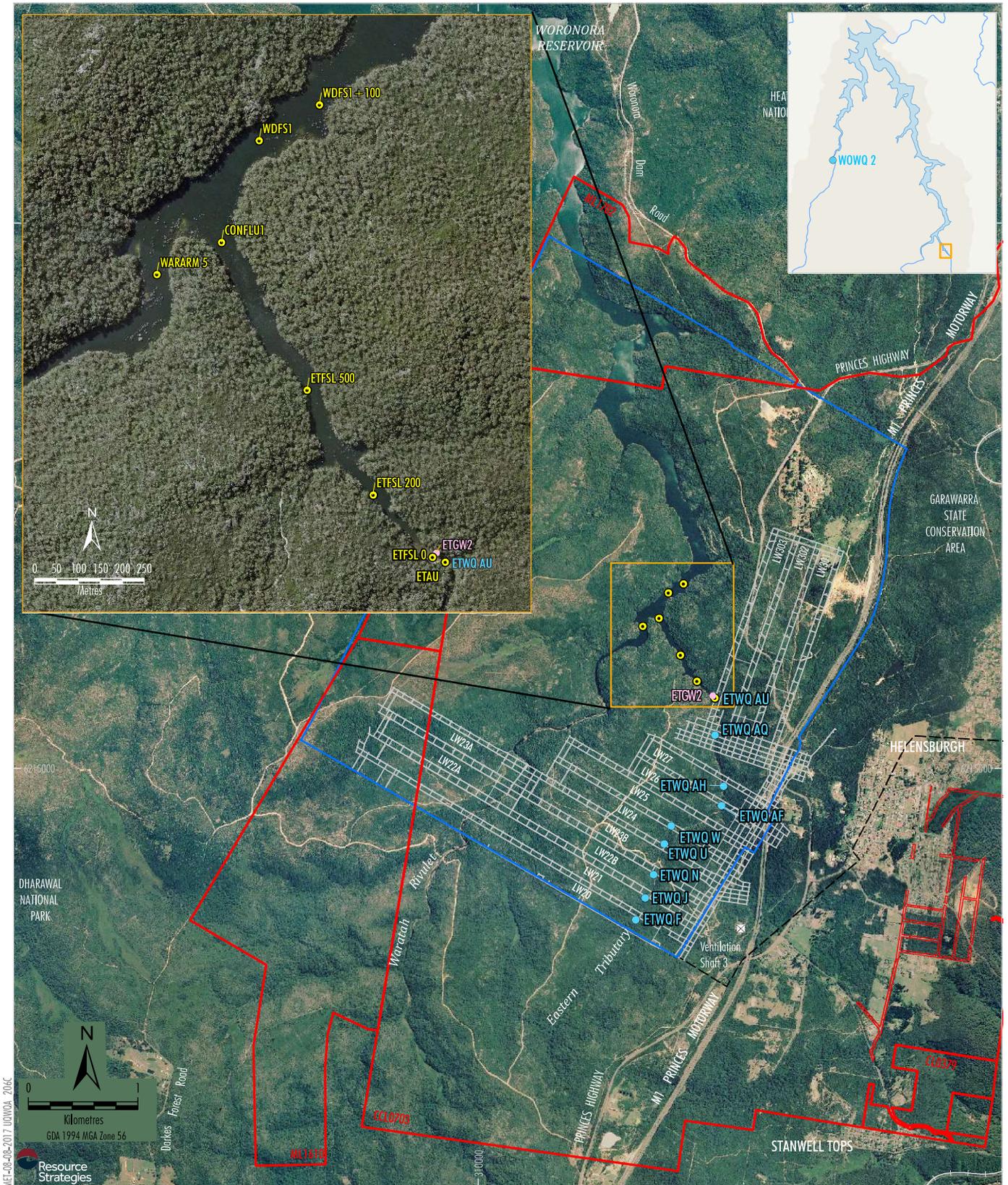


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 30 June 2020)



MET-08-08-2017 UOWDA 2066

LEGEND

- Mining Lease Boundary
- Railway
- Project Underground Mining Area
Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Surface Water Quality Site on Eastern Tributary
- Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
- Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody
METROPOLITAN COAL
Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran et al., 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In June 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.121 mg/L and 0.210 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events on 17 January 2020, and throughout February and March 2020. Dissolved manganese concentrations remained below the long-term mean (0.33 mg/L) for the entirety of June 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 μm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In June 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.26 to pH 6.79);
- EC concentrations (lab measurement) ranged between 197 $\mu\text{S}/\text{cm}$ and 233 $\mu\text{S}/\text{cm}$; and
- ORP (field measurement) ranged between 17.1 mV and 69.3 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW305-307 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW305-307 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Sampling at some sites downstream of site ETWQ AU was not undertaken throughout February and March 2020 due to the high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir (Appendix A). Further, and due to the increasing water level in the Woronora Reservoir throughout April 2020, and sustaining water level through May 2020, sampling at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 was not undertaken in June 2020 (Appendix A).

Metropolitan Coal has taken a photographic record of the watercourse / waterbody at the time of sampling, estimated the width of the watercourse / water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in June 2020 the Woronora Reservoir water level fell from 160.53 mAHD (on 1 June 2020) to 160.38 mAHD at the end of the month. The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during June 2020 was approximately 165 m downstream of site ETSFL 0 (corresponding to a water level of 160 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout June 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to June 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³, however has since recommenced following the increased Woronora Reservoir water level. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level fluctuated slightly in June 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of June 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for June 2020 ranged from 0.121 mg/L to 0.210 mg/L at site ETAU, 0.091 mg/L to 0.156 mg/L at site ETFSL 200, and 0.100 mg/L to 0.181 mg/L at site ETFSL 500 (Chart 3).

Total manganese concentrations for June 2020 followed similar trends, ranging from 0.120 mg/L to 0.224 mg/L at site ETAU, 0.091 mg/L to 0.161 mg/L at site ETFSL 200, and 0.097 mg/L to 0.179 mg/L at site ETFSL 500 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

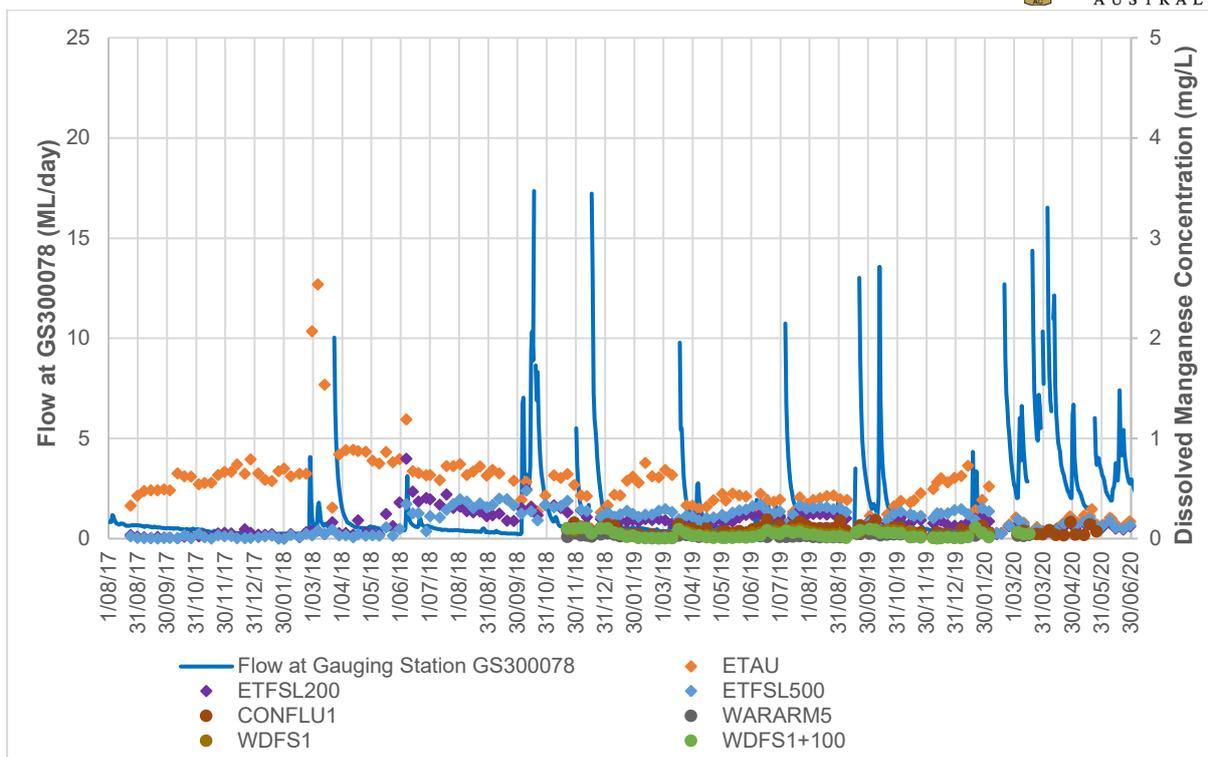


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 30 June 2020)

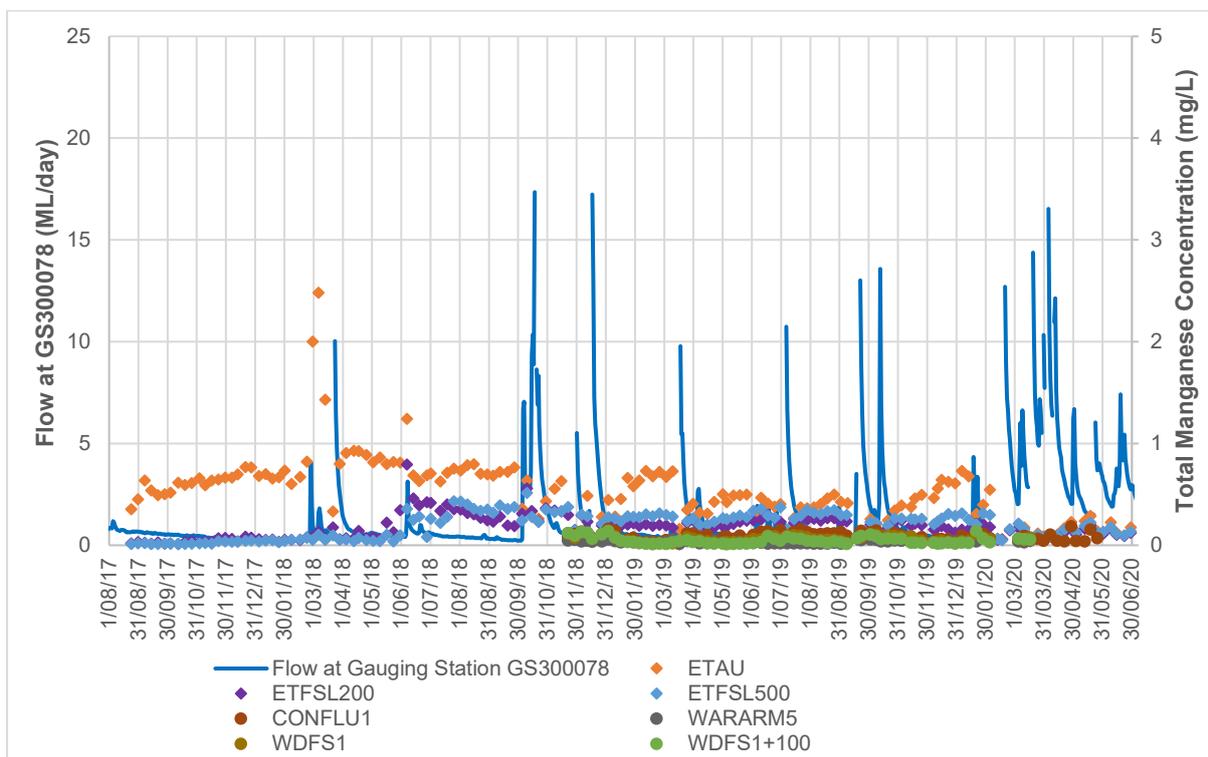


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 30 June 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG) are published by the National Health and Medical Research Council and updated most recently in 2018 (NHMRC & NRMCC, 2011); the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the Australian Drinking Water Guideline before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG are based on total concentrations of manganese in water (NHMRC & NRMCC, 2011). The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to June 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5 – 8.5. The pH values at all sites fluctuated during June 2020, with some sites reducing by the end of the month (ETAU from 6.75 to 6.71), and some sites increasing by the end of the month (ETFSL 200 from 6.48 to 6.74, and ETFSL 500 from 6.50 to 6.80). At the end of June 2020, all sites were within the ADWG value range for pH (Attachment A).

The groundwater at ETGW2 below ETAU on 26 May 2020 was pH 6.41 and 16 June 2020 was pH 6.72, indicating that seeping groundwater was not a source of higher pH water entering the reservoir.

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in June 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for June 2020 show the quality of water below ETAU was consistent during June 2020, with the water observed to be generally clear due to rainfall occurring in the preceding months. The presence of orange-yellow coating on the creek sediment surface, continued to be observed throughout June 2020, will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In June 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

Helensburgh Coal Pty Ltd (2008) *Metropolitan Coal Project Environmental Assessment*.

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500,
WARARM5, CONFLU1, WDFS1 and WDFS1+100

JANUARY 2018 TO JUNE 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

- ¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.
- ² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/04/2020 ³	ETAU	0.087	0.105	0.32	1.26	71	6.91	171
7/04/2020	ETFSL200	0.071	0.083	0.85	0.12	71.1	7.04	171
7/04/2020	ETFSL500	0.083	0.093	0.42	1.1	65.1	7.05	175
7/04/2020	CONFLU1	0.087	0.103	0.16	1.21	109.6	7.01	173
15/04/2020	ETAU	0.108	0.109	0.31	1.16	126.9	6.81	175
14/04/2020	ETFSL200	0.091	0.09	0.2	0.95	64.9	7.05	171
14/04/2020	ETFSL500	0.085	0.095	0.27	1.13	102.2	6.96	174
14/04/2020	CONFLU1	0.039	0.042	0.05	0.74	185.6	7.14	183
22/04/2020	ETAU	0.155	0.167	0.17	1.63	121.2	6.87	207
22/04/2020	ETFSL200	0.119	0.126	0.06	1.26	128.9	7.34	203
22/04/2020	ETFSL500	0.148	0.156	0.45	1.63	91.5	7.21	217
22/04/2020	CONFLU1	0.034	0.037	0.09	0.78	119.1	7.27	213
29/04/2020	ETAU	0.221	0.227	0.56	2.18	136.8	6.7	225
29/04/2020	ETFSL200	0.155	0.158	<0.05	1.32	147.8	7.05	233
29/04/2020	ETFSL500	0.184	0.185	0.24	1.75	51.4	7.11	259
29/04/2020	CONFLU1	0.166	0.183	<0.05	2.03	157.1	6.95	247
4/05/2020	ETAU	0.143	0.137	0.5	1.49	86	6.89	203
4/05/2020	ETFSL200	0.106	0.104	0.13	1.18	110.5	7.32	202
4/05/2020	ETFSL500	0.132	0.128	0.52	1.62	26.1	7.21	212
4/05/2020	CONFLU1	0.04	0.039	0.09	0.75	39.7	7.35	205
13/05/2020	ETAU	0.232	0.236	0.1	2.11	89.2	7.23	234
13/05/2020	ETFSL200	0.156	0.162	0.05	1.5	84.7	7.34	222
13/05/2020	ETFSL500	0.173	0.19	0.34	1.84	2.6	7.42	244
13/05/2020	CONFLU1	0.039	0.036	0.13	0.75	18.9	7.28	219
19/05/2020	ETAU	0.226	0.288	0.42	2.3	42.4	6.71	231
19/05/2020	ETFSL200	0.179	0.198	0.05	1.29	56.3	6.65	230
19/05/2020	ETFSL500	0.199	0.22	0.39	1.9	32.8	6.66	248
19/05/2020	CONFLU1	0.143	0.151	0.05	1.14	9.4	6.66	238
26/05/2020	ETAU	0.142	0.136	0.59	1.43	39	6.36	202
26/05/2020	ETFSL200	0.11	0.111	0.18	1.05	34.5	6.4	201
26/05/2020	ETFSL500	0.119	0.122	0.32	1.26	23	6.42	206
26/05/2020	CONFLU1	0.072	0.069	0.09	0.95	45	6.39	202
1/06/2020	ETAU	0.136	0.126	0.46	1.06	17.1	6.75	203
1/06/2020	ETFSL200	0.11	0.111	0.16	0.95	22.1	6.48	201
1/06/2020	ETFSL500	0.128	0.13	0.45	1.28	17.5	6.5	211
9/06/2020	ETAU	0.21	0.224	1.04	1.93	47.4	6.71	233
9/06/2020	ETFSL200	0.156	0.161	0.25	1.03	73.2	6.81	228
9/06/2020	ETFSL500	0.181	0.179	0.41	1.4	23.7	6.80	246
15/06/2020	ETAU	0.121	0.12	0.64	1.14	35.9	6.26	209
15/06/2020	ETFSL200	0.103	0.103	0.22	0.76	7.9	6.4	207
15/06/2020	ETFSL500	0.111	0.112	0.4	1.1	46.8	6.38	215
30/06/2020	ETAU	0.173	0.173	0.69	1.51	60.9	6.71	200
30/06/2020	ETFSL200	0.123	0.120	0.1	0.96	73	6.74	189
30/06/2020	ETFSL500	0.136	0.133	0.3	1.29	38.3	6.8	198

Note:

³ Due to the increasing water level in the Woronora Reservoir throughout February and March 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken in April, May or June 2020, and site CONFLU1 was not sampled in June 2020.

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

17 December 2020

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – July 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwalls 305-307 Water Management Plan (LW305-307 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW305-307 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW305-307 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW305-307 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW305-307 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW305-307 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in July 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in July 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW305-307 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for July 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 31 July 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 31 July 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 31 July 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January to March 2020, and July 2020 with below average rainfall recorded in all other months (Table 1).

Total rainfall at PV7 in July 2020 was 237.0 mm, above the average rainfall at Darkes Forest (96.0 mm), with rainfall occurring on 5 July (0.5 mm), 8 July (4.0 mm), 11 to 15 July (30.0 mm), 23 July (1.0 mm), and 26 to 29 July (201.5 mm).

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data for PV7, January 2018 to July 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3
April 2020	88.5	73.0*	126.1
May 2020	88.0	111.0*	128.1
June 2020	59.0	65.0*	145.8
July 2020	237.0	185.0*	96.0

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to February 2020.

* Data from Station 68024 is incomplete or not available for the period of March to July 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for these months.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese [II] ion, Mn²⁺) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

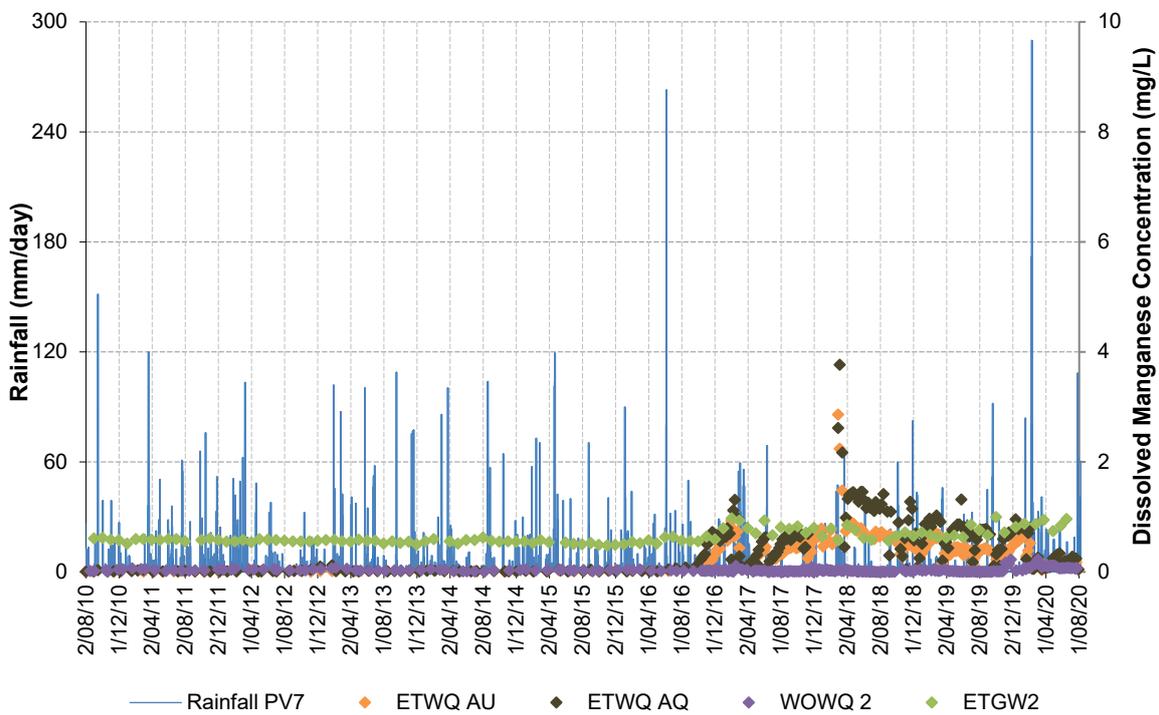


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 31 July 2020)

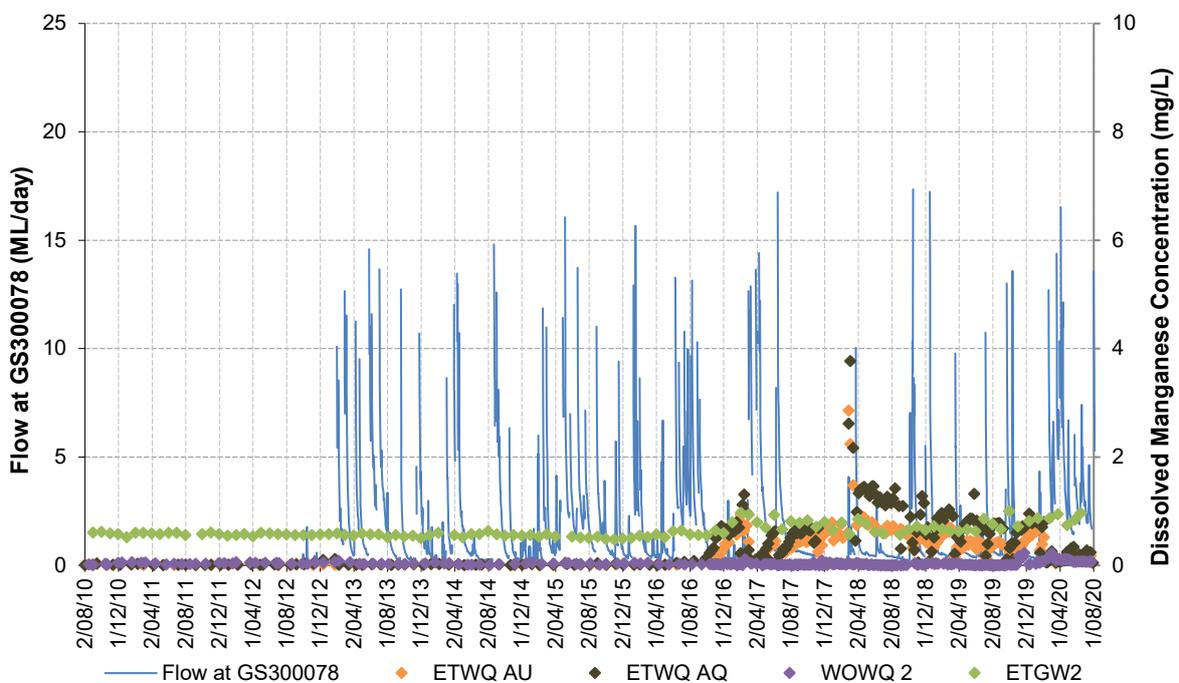
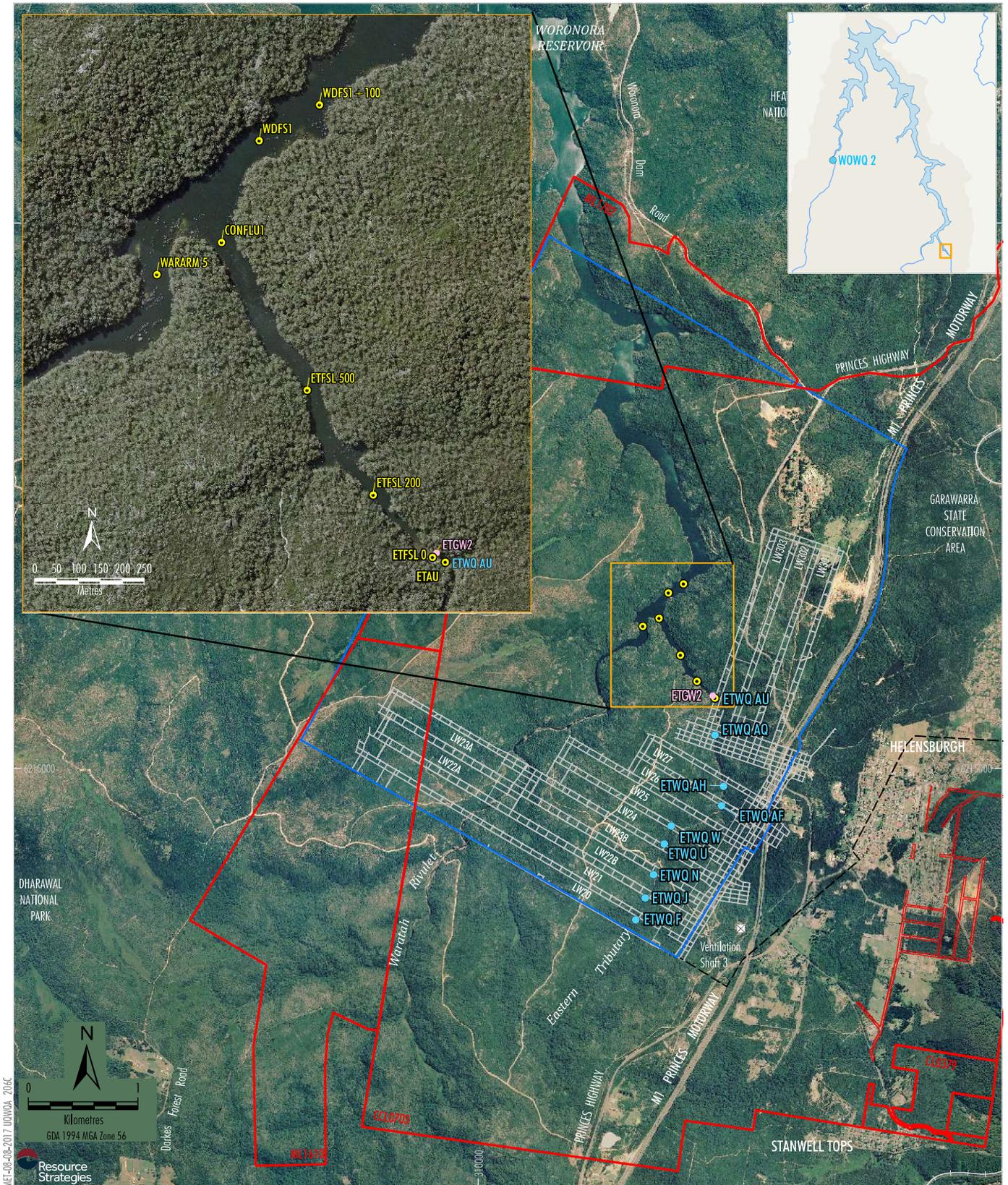


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 31 July 2020)



MET-08-08-2017 UOWDA 2066C

- LEGEND**
- Mining Lease Boundary
 - Railway
 - Project Underground Mining Area
Longwalls 20-27 and 301-317
 - Existing Underground Access Drive (Main Drift)
 - Surface Water Quality Site on Eastern Tributary
 - Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
 - Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody
METROPOLITAN COAL
Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran et al., 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In July 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.050 mg/L and 0.218 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to generally below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events on 17 January 2020, and throughout February and March 2020. Dissolved manganese concentrations remained below the long-term mean (0.33 mg/L) for the entirety of July 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 μm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In July 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.58 to pH 7.45);
- EC concentrations (lab measurement) ranged between 113 $\mu\text{S}/\text{cm}$ and 239 $\mu\text{S}/\text{cm}$; and
- ORP (field measurement) ranged between 2.79 mV and 109.3 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW305-307 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW305-307 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Sampling at some sites downstream of site ETWQ AU was not undertaken throughout February and March 2020 due to the high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir (Appendix A).

Subsequently, and due to the increasing water level in the Woronora Reservoir in early 2020, which was sustained throughout March to July 2020, sampling at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 was not undertaken in July 2020 (Appendix A).

Metropolitan Coal has taken a photographic record of the watercourse/waterbody at the time of sampling, estimated the width of the watercourse/water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in July 2020 the Woronora Reservoir water level fell from 160.37 mAHD (on 1 July 2020) to 160.22 mAHD (on 25 July 2020), before rising to 162.74 mAHD at the end of the month. The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during July 2020 was approximately 165 m downstream of site ETSFL 0 (corresponding to a water level of 160 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout July 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to July 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³, however has since recommenced following the increased Woronora Reservoir water level in early 2020. Accordingly, sampling at sites CONFLU1, WARARM5, WDFS1 and WDFS+100 has been suspended. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level rose in July 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of July 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for July 2020 ranged from 0.050 mg/L to 0.218 mg/L at site ETAU, 0.041 mg/L to 0.147 mg/L at site ETFSL 200, and 0.041 mg/L to 0.176 mg/L at site ETFSL 500 (Chart 3).

Total manganese concentrations for July 2020 followed similar trends, ranging from 0.107 mg/L to 0.195 mg/L at site ETAU, 0.042 mg/L to 0.155 mg/L at site ETFSL 200, and 0.042 mg/L to 0.177 mg/L at site ETFSL 500 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

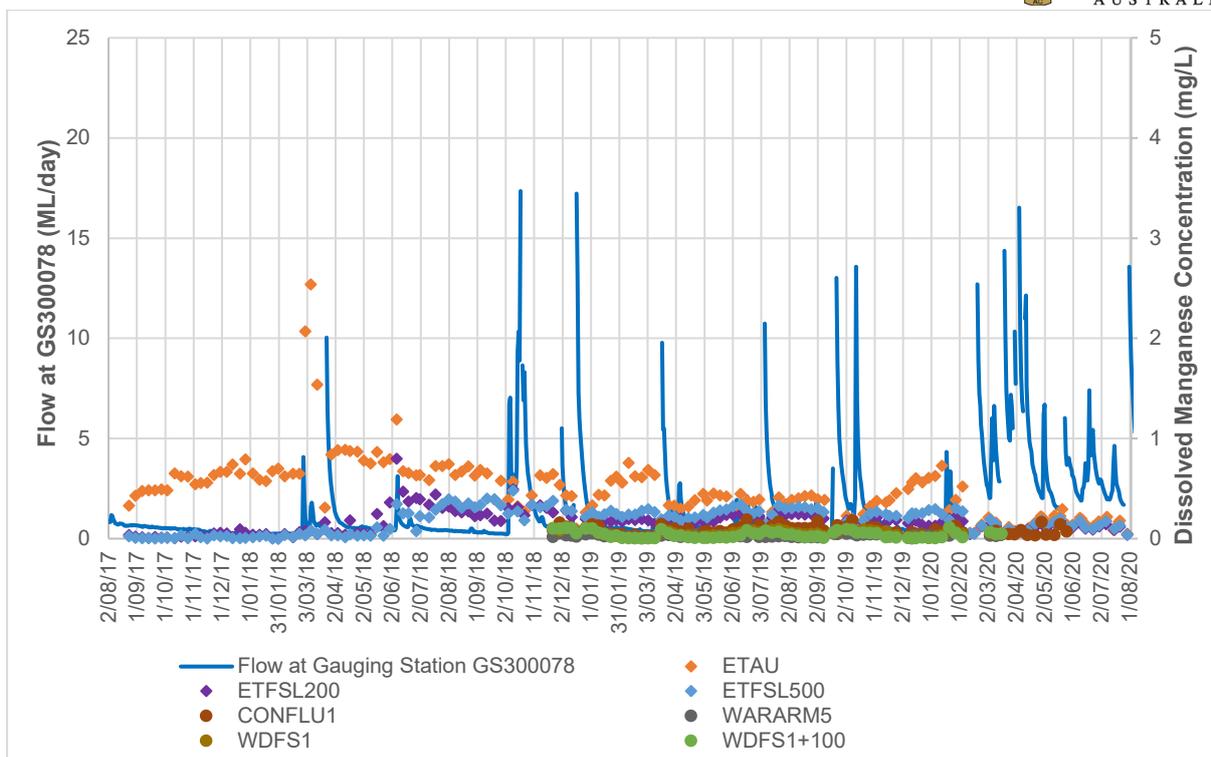


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 July 2020)

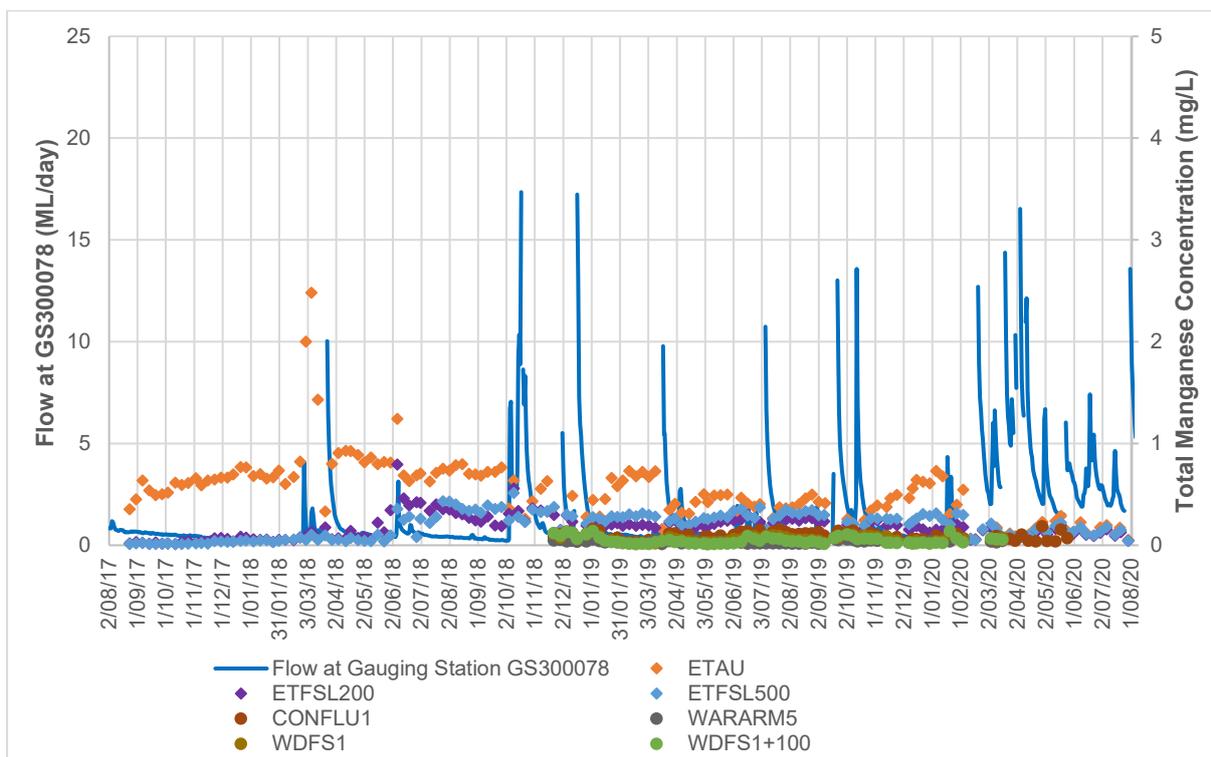


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 July 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG) are published by the National Health and Medical Research Council and updated most recently in 2018 (NHMRC & NRMCC, 2011); the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the ADWG before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG are based on total concentrations of manganese in water (NHMRC & NRMCC, 2011). The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to July 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5 – 8.5. The pH values at all sites fluctuated during July 2020 (ETAU from 7.45 to 6.58, ETFSL 200 from 7.63 to 6.18, and ETFSL 500 from 7.57 to 6.17). At the end of July 2020, two sites were outside the ADWG value range for pH (Attachment A).

A groundwater quality sample was not able to be collected from site ETWG 2 in July 2020 due to the high flows along the Eastern Tributary arm of the Woronora Reservoir following heavy rainfall.

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in July 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for July 2020 show the quality of water below ETAU was consistent during July 2020, with the water observed to have some sedimentation due to limited rainfall occurring in the preceding months. The presence of orange-yellow coating on the creek sediment surface was predominantly observed in early July 2020, and became more clear as the month went on, consistent with moderate rainfall in the middle of the month.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In July 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

- Helensburgh Coal Pty Ltd (2008) *Metropolitan Coal Project Environmental Assessment*.
- Hydro Engineering & Consulting Pty Ltd (2020) *Metropolitan Coal LW 305-307 Extraction Plan Triggers – Water Quality and Pool Water Level Analysis 3rd Quarter 2020*.
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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500,
WARARM5, CONFLU1, WDFS1 and WDFS1+100

JANUARY 2018 TO JULY 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

- ¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.
- ² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/04/2020 ³	ETAU	0.087	0.105	0.32	1.26	71	6.91	171
7/04/2020	ETFSL200	0.071	0.083	0.85	0.12	71.1	7.04	171
7/04/2020	ETFSL500	0.083	0.093	0.42	1.1	65.1	7.05	175
7/04/2020	CONFLU1	0.087	0.103	0.16	1.21	109.6	7.01	173
15/04/2020	ETAU	0.108	0.109	0.31	1.16	126.9	6.81	175
14/04/2020	ETFSL200	0.091	0.09	0.2	0.95	64.9	7.05	171
14/04/2020	ETFSL500	0.085	0.095	0.27	1.13	102.2	6.96	174
14/04/2020	CONFLU1	0.039	0.042	0.05	0.74	185.6	7.14	183
22/04/2020	ETAU	0.155	0.167	0.17	1.63	121.2	6.87	207
22/04/2020	ETFSL200	0.119	0.126	0.06	1.26	128.9	7.34	203
22/04/2020	ETFSL500	0.148	0.156	0.45	1.63	91.5	7.21	217
22/04/2020	CONFLU1	0.034	0.037	0.09	0.78	119.1	7.27	213
29/04/2020	ETAU	0.221	0.227	0.56	2.18	136.8	6.7	225
29/04/2020	ETFSL200	0.155	0.158	<0.05	1.32	147.8	7.05	233
29/04/2020	ETFSL500	0.184	0.185	0.24	1.75	51.4	7.11	259
29/04/2020	CONFLU1	0.166	0.183	<0.05	2.03	157.1	6.95	247
4/05/2020	ETAU	0.143	0.137	0.5	1.49	86	6.89	203
4/05/2020	ETFSL200	0.106	0.104	0.13	1.18	110.5	7.32	202
4/05/2020	ETFSL500	0.132	0.128	0.52	1.62	26.1	7.21	212
4/05/2020	CONFLU1	0.04	0.039	0.09	0.75	39.7	7.35	205
13/05/2020	ETAU	0.232	0.236	0.1	2.11	89.2	7.23	234
13/05/2020	ETFSL200	0.156	0.162	0.05	1.5	84.7	7.34	222
13/05/2020	ETFSL500	0.173	0.19	0.34	1.84	2.6	7.42	244
13/05/2020	CONFLU1	0.039	0.036	0.13	0.75	18.9	7.28	219
19/05/2020	ETAU	0.226	0.288	0.42	2.3	42.4	6.71	231
19/05/2020	ETFSL200	0.179	0.198	0.05	1.29	56.3	6.65	230
19/05/2020	ETFSL500	0.199	0.22	0.39	1.9	32.8	6.66	248
19/05/2020	CONFLU1	0.143	0.151	0.05	1.14	9.4	6.66	238
26/05/2020	ETAU	0.142	0.136	0.59	1.43	39	6.36	202
26/05/2020	ETFSL200	0.11	0.111	0.18	1.05	34.5	6.4	201
26/05/2020	ETFSL500	0.119	0.122	0.32	1.26	23	6.42	206
26/05/2020	CONFLU1	0.072	0.069	0.09	0.95	45	6.39	202
1/06/2020	ETAU	0.136	0.126	0.46	1.06	17.1	6.75	203
1/06/2020	ETFSL200	0.11	0.111	0.16	0.95	22.1	6.48	201
1/06/2020	ETFSL500	0.128	0.13	0.45	1.28	17.5	6.5	211
9/06/2020	ETAU	0.21	0.224	1.04	1.93	47.4	6.71	233
9/06/2020	ETFSL200	0.156	0.161	0.25	1.03	73.2	6.81	228
9/06/2020	ETFSL500	0.181	0.179	0.41	1.4	23.7	6.80	246
15/06/2020	ETAU	0.121	0.12	0.64	1.14	35.9	6.26	209
15/06/2020	ETFSL200	0.103	0.103	0.22	0.76	7.9	6.4	207
15/06/2020	ETFSL500	0.111	0.112	0.4	1.1	46.8	6.38	215
30/06/2020	ETAU	0.173	0.173	0.69	1.51	60.9	6.71	200
30/06/2020	ETFSL200	0.123	0.120	0.1	0.96	73	6.74	189
30/06/2020	ETFSL500	0.136	0.133	0.3	1.29	38.3	6.8	198

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/07/2020	ETAU	0.179	0.195	0.4	1.62	104.1	7.45	239
7/07/2020	ETFSL200	0.147	0.155	0.06	1.00	76.3	7.63	238
7/07/2020	ETFSL500	0.176	0.177	0.45	1.36	33.6	7.57	252
8/07/2020	ETAU	0.218	-	1.14	1.89	47	6.99	234
15/07/2020	ETAU	0.089	-	0.51	0.99	92	6.85	206
16/07/2020	ETAU	0.109	0.107	0.71	1.04	31.7	6.73	217
16/07/2020	ETFSL200	0.090	0.093	0.26	0.92	31.5	7.09	214
16/07/2020	ETFSL500	0.101	0.103	0.42	1.10	12.1	7.01	220
21/07/2020	ETAU	0.170	0.171	0.48	1.32	32.2	6.58	220
22/07/2020	ETAU	-	0.171	0.76	1.21	2.97	6.58	225
22/07/2020	ETFSL200	0.122	0.128	<0.05	0.70	25.8	7.07	216
22/07/2020	ETFSL500	0.134	0.148	0.36	0.92	-25.7	6.99	230
30/07/2020	ETAU	0.050	0.052	0.32	0.72	109.3	6.11	113
30/07/2020	ETFSL200	0.041	0.042	0.3	0.67	120.3	6.18	109
30/07/2020	ETFSL500	0.041	0.042	0.28	0.68	124	6.17	106

Note:

³ Due to the increasing water level in the Woronora Reservoir throughout February and March 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken from April to July 2020, and site CONFLU1 was not sampled in June or July 2020.

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

17 December 2020

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – August 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwalls 305-307 Water Management Plan (LW305-307 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW305-307 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW305-307 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW305-307 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW305-307 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW305-307 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in August 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in August 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW305-307 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for August 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 31 August 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 31 August 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 31 August 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January to March 2020, July 2020, and August 2020, with below average rainfall recorded in all other months (Table 1).

Total rainfall at PV7 in August 2020 was 151.5 mm, above the average rainfall at Darkes Forest (88.9 mm), with rainfall occurring on 8 to 11 August (140.0 mm), 13 August (5.0 mm), and 15 to 16 August (6.5 mm).

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data for PV7, January 2018 to August 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm)#	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm)#
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3
April 2020	88.5	73.0*	126.1
May 2020	88.0	111.0*	128.1
June 2020	59.0	65.0*	145.8
July 2020	237.0	185.0*	96.0
August 2020	151.5	86.0*	88.9

Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to February 2020.

* Data from Station 68024 is incomplete or not available for the period of March to August 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for these months.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese [II] ion, Mn^{2+}) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

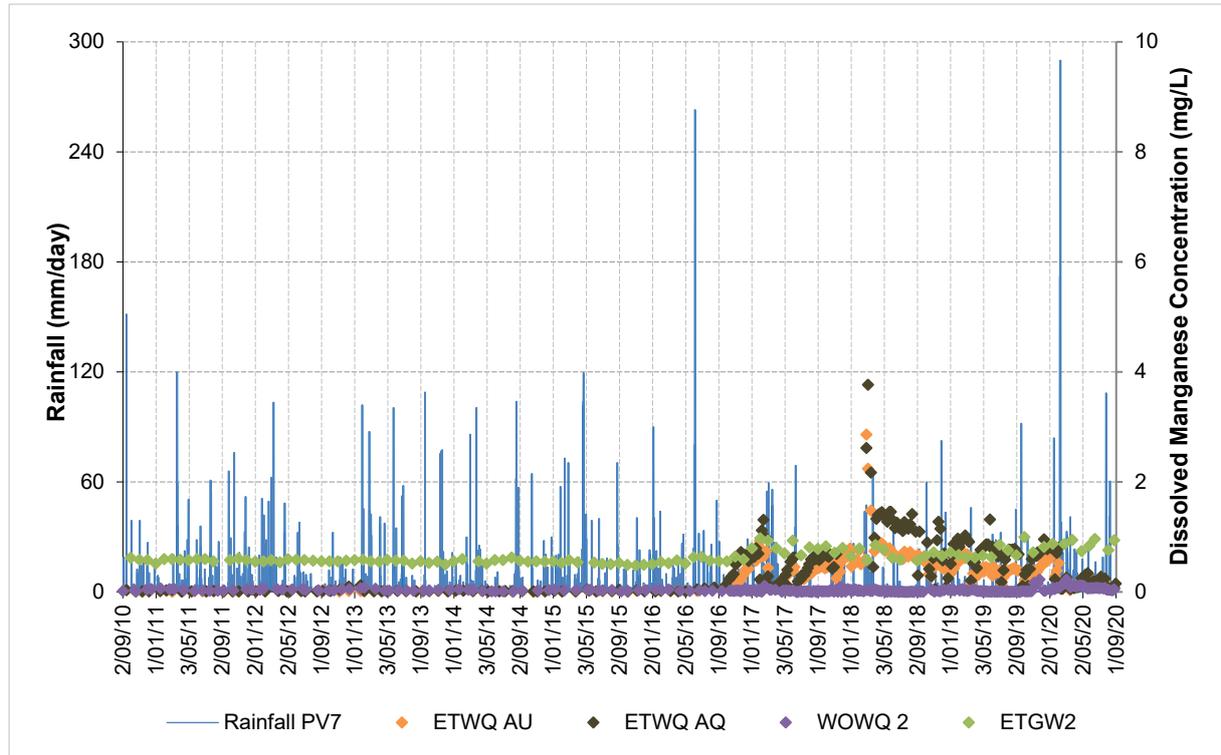


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 31 August 2020)

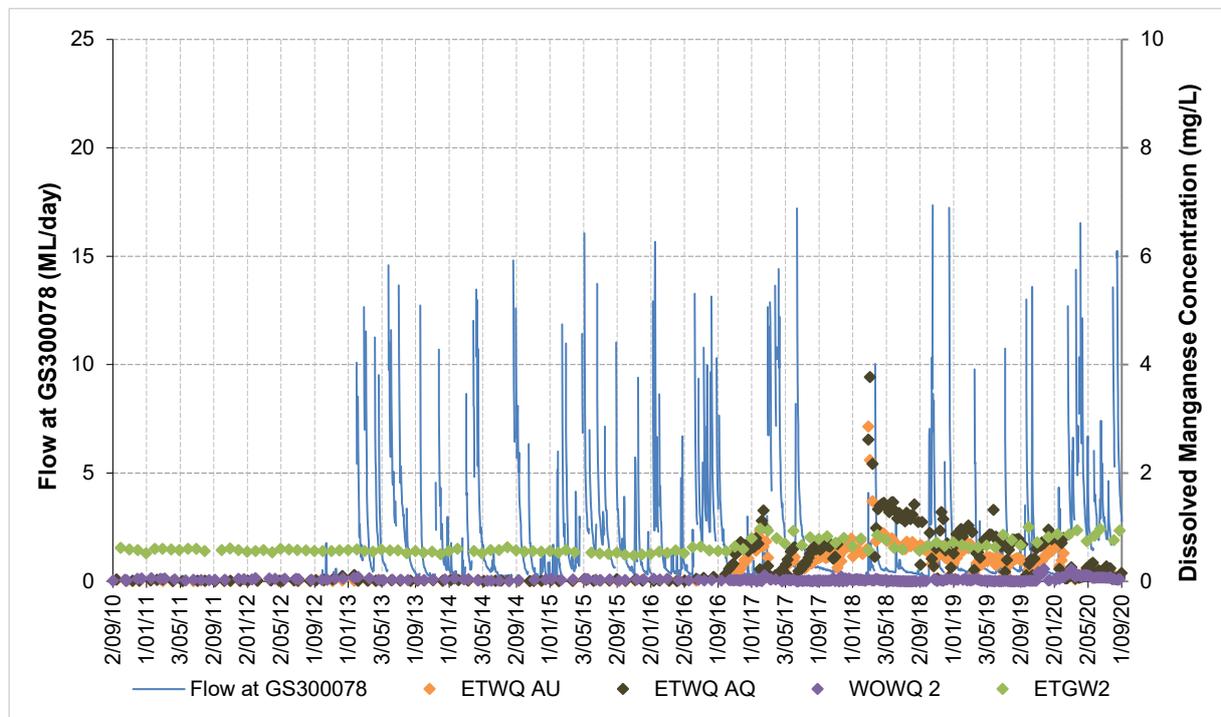
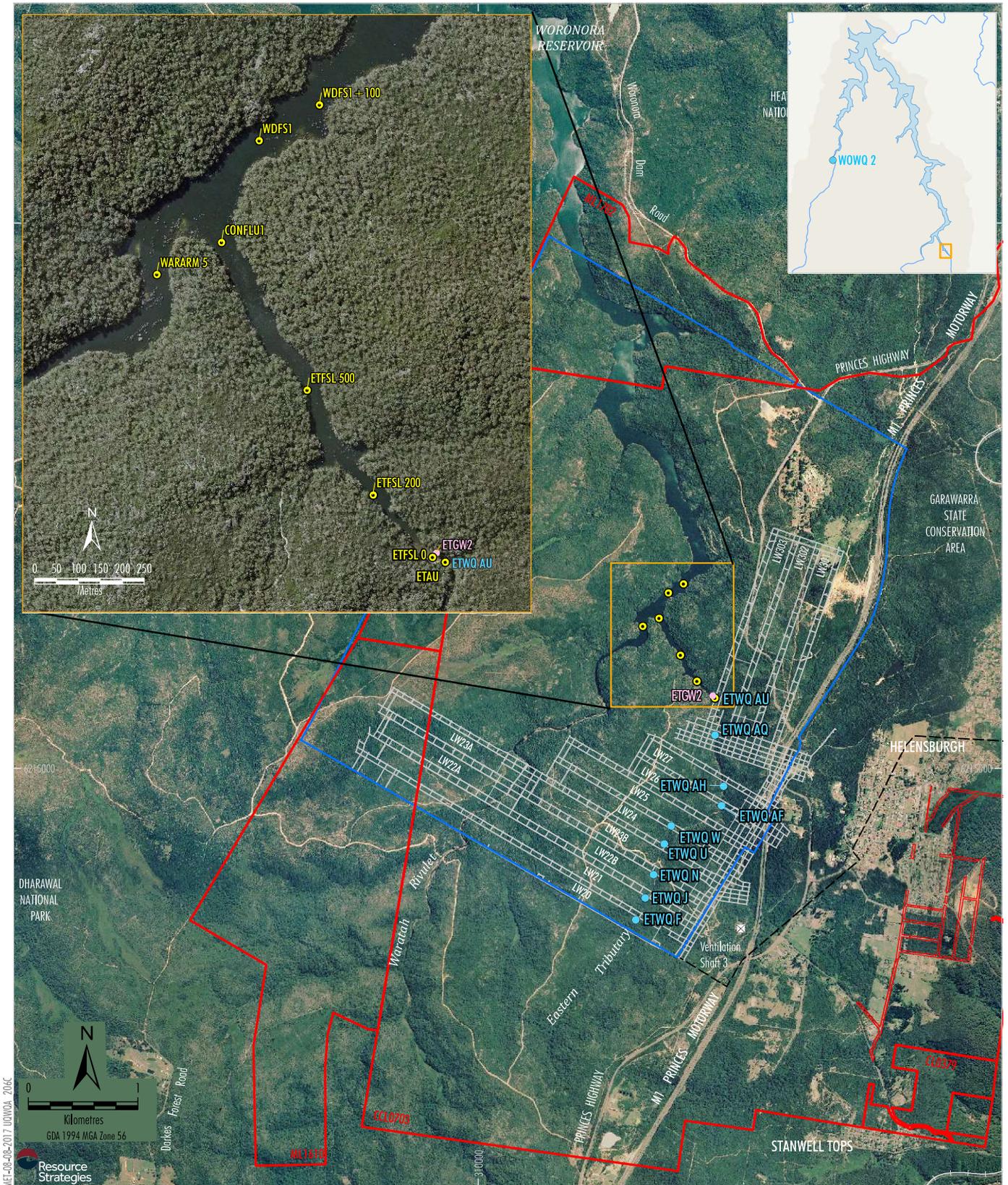


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 31 August 2020)



MET-08-08-2017 UOWDA 2066C

LEGEND

- Mining Lease Boundary
- Railway
- Project Underground Mining Area
Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Surface Water Quality Site on Eastern Tributary
- Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
- Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody
METROPOLITAN COAL
Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran et al., 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In August 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.043 mg/L and 0.109 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to generally below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events in January to March 2020, and late July 2020. Dissolved manganese concentrations remained below the long-term mean (0.33 mg/L) for the entirety of August 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 μm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In August 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.33 to pH 6.85);
- EC concentrations (lab measurement) ranged between 107 $\mu\text{S}/\text{cm}$ and 160 $\mu\text{S}/\text{cm}$; and
- ORP (field measurement) ranged between 49.2 mV and 112 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW305-307 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW305-307 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Sampling at some sites downstream of site ETWQ AU was not undertaken throughout February and March 2020 due to the high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir (Appendix A).

Subsequently, and due to the increasing water level in the Woronora Reservoir in early 2020, which was sustained throughout March to August 2020, sampling at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 was not undertaken in August 2020 (Appendix A).

Metropolitan Coal has taken a photographic record of the watercourse/waterbody at the time of sampling, estimated the width of the watercourse/water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in August 2020 the Woronora Reservoir water level rose from 162.72 mAHD (on 1 August 2020) to 164.28 mAHD at the end of the month. The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during August 2020 was upstream of site ETSFL 200 (corresponding to a water level of 164 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout August 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to August 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³, however has since recommenced following the increased Woronora Reservoir water level. Water quality data for filtered and total manganese from November 2018 to March 2020 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level rose in August 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for August 2020 ranged from 0.043 mg/L to 0.109 mg/L at site ETAU, 0.035 mg/L to 0.083 mg/L at site ETFSL 200, and 0.034 mg/L to 0.088 mg/L at site ETFSL 500 (Chart 3).

Total manganese concentrations for August 2020 followed similar trends, ranging from 0.048 mg/L to 0.091 mg/L at site ETAU, 0.049 mg/L to 0.078 mg/L at site ETFSL 200, and 0.033 mg/L to 0.083 mg/L at site ETFSL 500 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

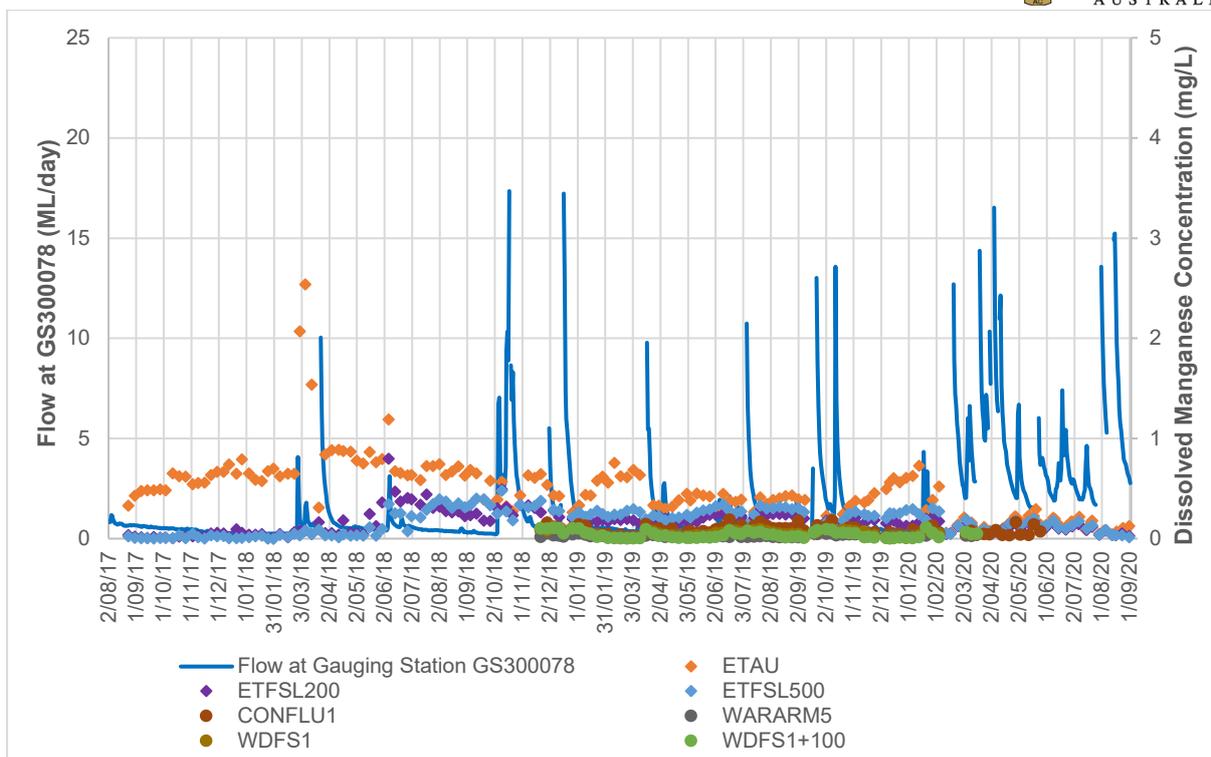


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 August 2020)

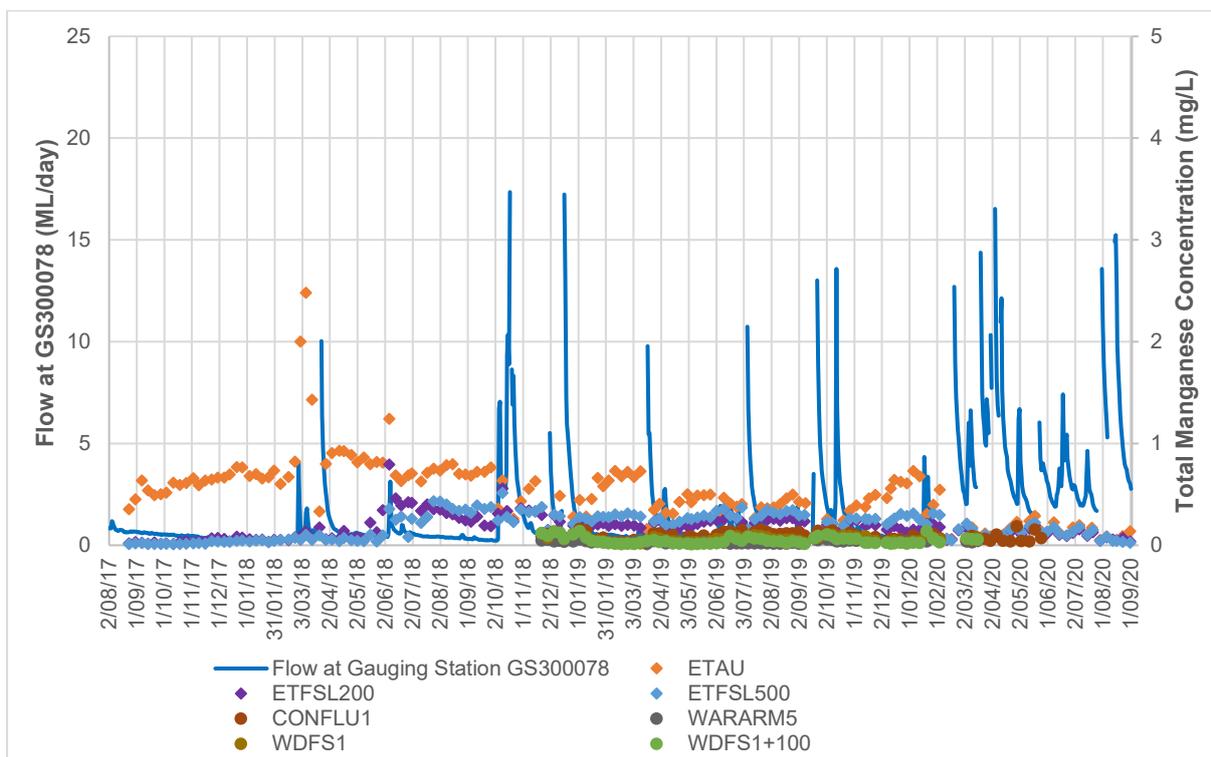


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 August 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG) are published by the National Health and Medical Research Council and updated most recently in 2018 (NHMRC & NRMCC, 2011); the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the ADWG before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG are based on total concentrations of manganese in water (NHMRC & NRMCC, 2011). The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to August 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5 – 8.5. The pH values at all sites fluctuated during August 2020, with values ranging from 6.85 to 6.33 at ETAU, 7.02 to 6.37 at ETFSL 200, and 7.03 to 6.2 at ETFSL 500. Notwithstanding, all sites were within the ADWG value range for pH at the end of August 2020 (Attachment A).

The groundwater at ETGW2 below ETAU on 4 August 2020 was pH 6.19 and 25 August 2020 was pH 6.51, indicating that seeping groundwater may have been a source of lower pH water entering the reservoir.

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in August 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for August 2020 show the quality of water below ETAU was consistent during August 2020, with the water observed to be clear due to heavy rainfall occurring at the end of July. The presence of orange-yellow coating on the creek sediment surface, continued to be observed throughout August 2020, will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In August 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

- Helensburgh Coal Pty Ltd (2008) *Metropolitan Coal Project Environmental Assessment*.
- Hydro Engineering & Consulting Pty Ltd (2020) *Metropolitan Coal LW 305-307 Extraction Plan Triggers – Water Quality and Pool Water Level Analysis 3rd Quarter 2020*.
- NHMRC & NRMCC (2011) *Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy*. National Health and Medical Research Council, National Resource Management Ministerial Council, Commonwealth of Australia, Canberra.
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- Yee, N., Shaw, S., Benning, L.G. and Nguyen, T.N. (2006) *The rate of ferrihydrite transformation to goethite via the Fe (II) pathway*. *American Mineralogist* 91: 92-96.

Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500,
WARARM5, CONFLU1, WDFS1 and WDFS1+100

JANUARY 2018 TO AUGUST 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/04/2020 ³	ETAU	0.087	0.105	0.32	1.26	71	6.91	171
7/04/2020	ETFSL200	0.071	0.083	0.85	0.12	71.1	7.04	171
7/04/2020	ETFSL500	0.083	0.093	0.42	1.1	65.1	7.05	175
7/04/2020	CONFLU1	0.087	0.103	0.16	1.21	109.6	7.01	173
15/04/2020	ETAU	0.108	0.109	0.31	1.16	126.9	6.81	175
14/04/2020	ETFSL200	0.091	0.09	0.2	0.95	64.9	7.05	171
14/04/2020	ETFSL500	0.085	0.095	0.27	1.13	102.2	6.96	174
14/04/2020	CONFLU1	0.039	0.042	0.05	0.74	185.6	7.14	183
22/04/2020	ETAU	0.155	0.167	0.17	1.63	121.2	6.87	207
22/04/2020	ETFSL200	0.119	0.126	0.06	1.26	128.9	7.34	203
22/04/2020	ETFSL500	0.148	0.156	0.45	1.63	91.5	7.21	217
22/04/2020	CONFLU1	0.034	0.037	0.09	0.78	119.1	7.27	213
29/04/2020	ETAU	0.221	0.227	0.56	2.18	136.8	6.7	225
29/04/2020	ETFSL200	0.155	0.158	<0.05	1.32	147.8	7.05	233
29/04/2020	ETFSL500	0.184	0.185	0.24	1.75	51.4	7.11	259
29/04/2020	CONFLU1	0.166	0.183	<0.05	2.03	157.1	6.95	247
4/05/2020	ETAU	0.143	0.137	0.5	1.49	86	6.89	203
4/05/2020	ETFSL200	0.106	0.104	0.13	1.18	110.5	7.32	202
4/05/2020	ETFSL500	0.132	0.128	0.52	1.62	26.1	7.21	212
4/05/2020	CONFLU1	0.04	0.039	0.09	0.75	39.7	7.35	205
13/05/2020	ETAU	0.232	0.236	0.1	2.11	89.2	7.23	234
13/05/2020	ETFSL200	0.156	0.162	0.05	1.5	84.7	7.34	222
13/05/2020	ETFSL500	0.173	0.19	0.34	1.84	2.6	7.42	244
13/05/2020	CONFLU1	0.039	0.036	0.13	0.75	18.9	7.28	219
19/05/2020	ETAU	0.226	0.288	0.42	2.3	42.4	6.71	231
19/05/2020	ETFSL200	0.179	0.198	0.05	1.29	56.3	6.65	230
19/05/2020	ETFSL500	0.199	0.22	0.39	1.9	32.8	6.66	248
19/05/2020	CONFLU1	0.143	0.151	0.05	1.14	9.4	6.66	238
26/05/2020	ETAU	0.142	0.136	0.59	1.43	39	6.36	202
26/05/2020	ETFSL200	0.11	0.111	0.18	1.05	34.5	6.4	201
26/05/2020	ETFSL500	0.119	0.122	0.32	1.26	23	6.42	206
26/05/2020	CONFLU1	0.072	0.069	0.09	0.95	45	6.39	202
1/06/2020	ETAU	0.136	0.126	0.46	1.06	17.1	6.75	203
1/06/2020	ETFSL200	0.11	0.111	0.16	0.95	22.1	6.48	201
1/06/2020	ETFSL500	0.128	0.13	0.45	1.28	17.5	6.5	211
9/06/2020	ETAU	0.21	0.224	1.04	1.93	47.4	6.71	233
9/06/2020	ETFSL200	0.156	0.161	0.25	1.03	73.2	6.81	228
9/06/2020	ETFSL500	0.181	0.179	0.41	1.4	23.7	6.80	246
15/06/2020	ETAU	0.121	0.12	0.64	1.14	35.9	6.26	209
15/06/2020	ETFSL200	0.103	0.103	0.22	0.76	7.9	6.4	207
15/06/2020	ETFSL500	0.111	0.112	0.4	1.1	46.8	6.38	215
30/06/2020	ETAU	0.173	0.173	0.69	1.51	60.9	6.71	200
30/06/2020	ETFSL200	0.123	0.120	0.1	0.96	73	6.74	189
30/06/2020	ETFSL500	0.136	0.133	0.3	1.29	38.3	6.8	198

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/07/2020	ETAU	0.179	0.195	0.4	1.62	104.1	7.45	239
7/07/2020	ETFSL200	0.147	0.155	0.06	1.00	76.3	7.63	238
7/07/2020	ETFSL500	0.176	0.177	0.45	1.36	33.6	7.57	252
8/07/2020	ETAU	0.218	-	1.14	1.89	47	6.99	234
15/07/2020	ETAU	0.089	-	0.51	0.99	92	6.85	206
16/07/2020	ETAU	0.109	0.107	0.71	1.04	31.7	6.73	217
16/07/2020	ETFSL200	0.090	0.093	0.26	0.92	31.5	7.09	214
16/07/2020	ETFSL500	0.101	0.103	0.42	1.10	12.1	7.01	220
21/07/2020	ETAU	0.170	0.171	0.48	1.32	32.2	6.58	220
22/07/2020	ETAU	-	0.171	0.76	1.21	2.97	6.58	225
22/07/2020	ETFSL200	0.122	0.128	<0.05	0.70	25.8	7.07	216
22/07/2020	ETFSL500	0.134	0.148	0.36	0.92	-25.7	6.99	230
30/07/2020	ETAU	0.050	0.052	0.32	0.72	109.3	6.11	113
30/07/2020	ETFSL200	0.041	0.042	0.3	0.67	120.3	6.18	109
30/07/2020	ETFSL500	0.041	0.042	0.28	0.68	124	6.17	106
4/08/2020	ETAU	0.080	-	0.57	0.98	83.2	6.73	155
6/08/2020	ETAU	0.084	0.088	0.57	1.00	94	6.85	148
6/08/2020	ETFSL200	0.083	0.078	0.34	0.88	89.1	7.02	147
6/08/2020	ETFSL500	0.088	0.083	0.25	0.91	126.7	7.03	146
13/08/2020	ETAU	0.043	0.048	0.28	0.53	70.8	6.67	107
13/08/2020	ETFSL200	0.038	0.055	0.24	0.75	75.4	6.48	104
13/08/2020	ETFSL500	0.037	0.043	0.26	0.54	79.4	6.49	101
17/08/2020	ETAU	0.061	0.068	0.43	0.80	112	6.45	133
17/08/2020	ETFSL200	0.035	0.049	0.14	0.49	180.9	6.37	106
17/08/2020	ETFSL500	0.038	0.042	0.12	0.45	214.5	6.20	105
24/08/2020	ETAU	0.090	0.091	0.5	1.16	83.1	6.70	155
24/08/2020	ETFSL200	0.054	0.072	0.12	0.74	138.5	6.85	131
24/08/2020	ETFSL500	0.034	0.033	0.10	0.46	159.6	6.63	123
25/08/2020	ETAU	0.109	-	0.46	1.39	49.2	6.33	160

Note:

³ Due to the increasing water level in the Woronora Reservoir throughout early 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken from April to August 2020, and site CONFLU1 was not sampled from June to August 2020.

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

17 December 2020

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – September 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwalls 305-307 Water Management Plan (LW305-307 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW305-307 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW305-307 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW305-307 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW305-307 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW305-307 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in September 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in September 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW305-307 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for September 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 30 September 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 30 September 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 30 September 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January to March 2020, and July and August 2020, with below average rainfall recorded in all other months (Table 1).

Total rainfall at PV7 in September 2020 was 31.0 mm, below the average rainfall at Darkes Forest (76.8 mm), with rainfall occurring on 5 September (6.5 mm), 10 to 12 September (totalling 11.5 mm), 19 to 23 September (totalling 11.5 mm), and 26 September (1.5 mm).

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data for PV7, January 2018 to September 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3
April 2020	88.5	73.0*	126.1
May 2020	88.0	111.0*	128.1
June 2020	59.0	65.0*	145.8
July 2020	237.0	185.0*	96.0
August 2020	151.5	86.0*	88.9
September 2020	31.0	36.0	76.8

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to February 2020, and September 2020.

* Data from Station 68024 is incomplete or not available for the period of March to August 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for these months.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese [II] ion, Mn²⁺) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

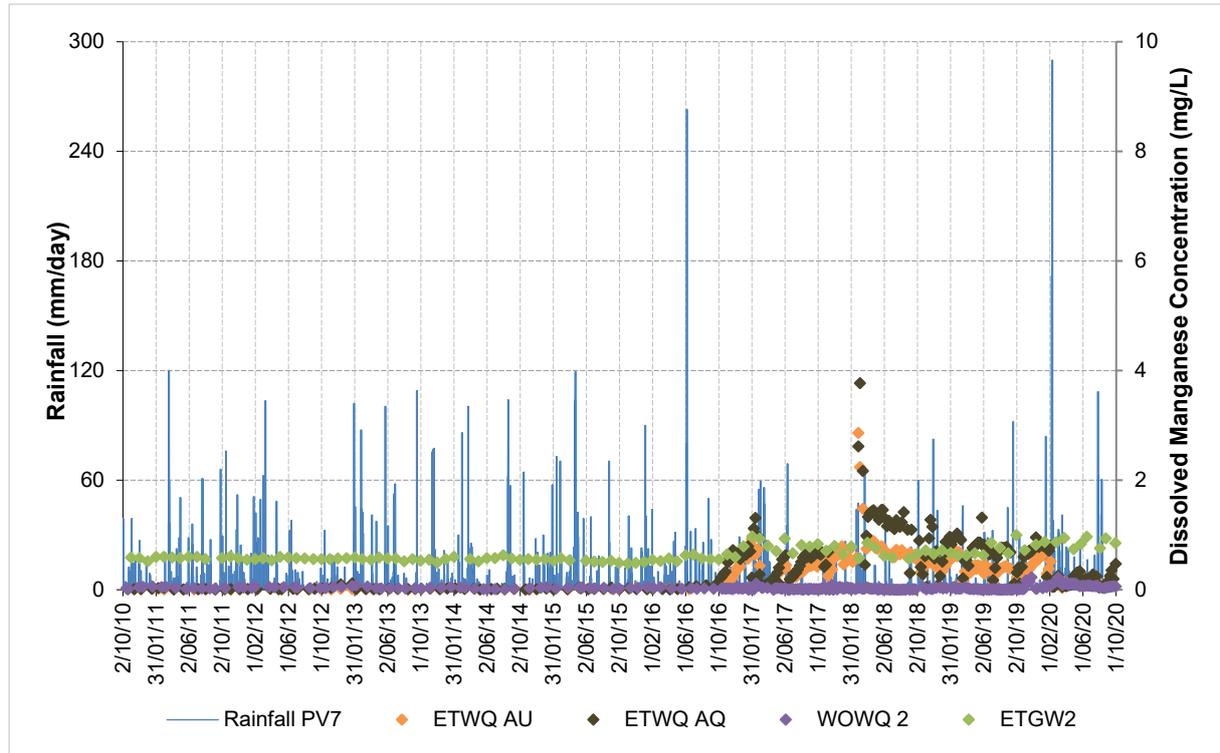


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 30 September 2020)

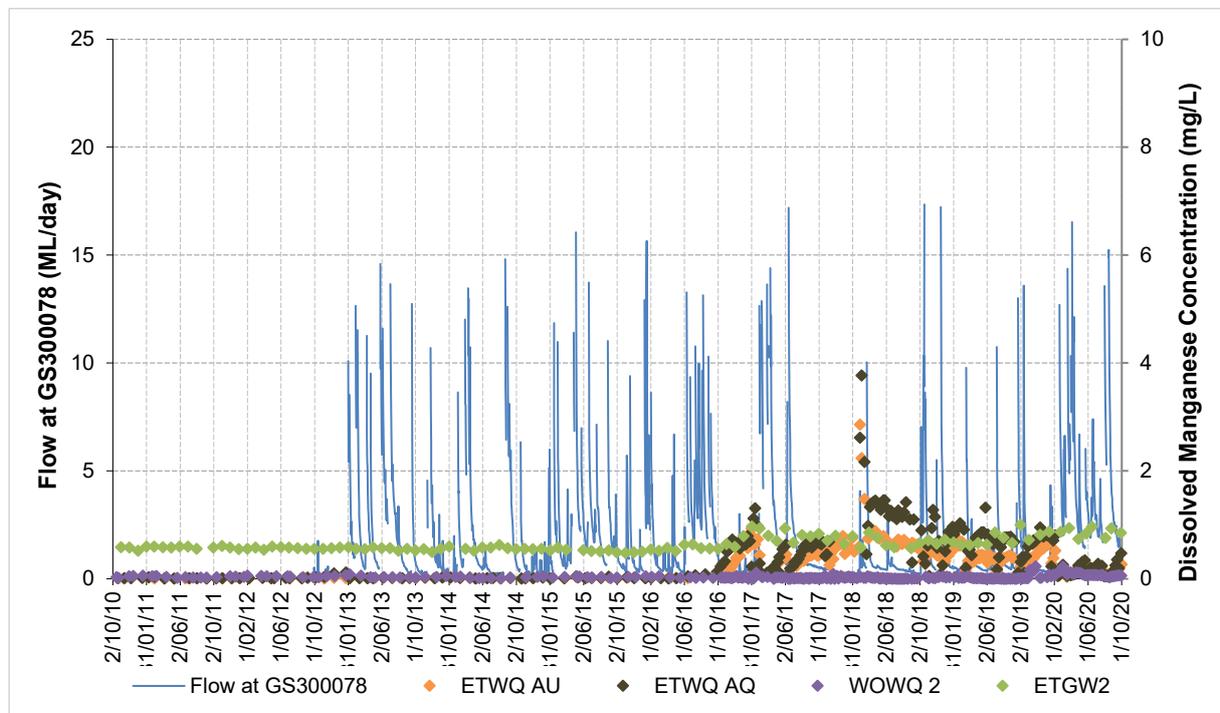
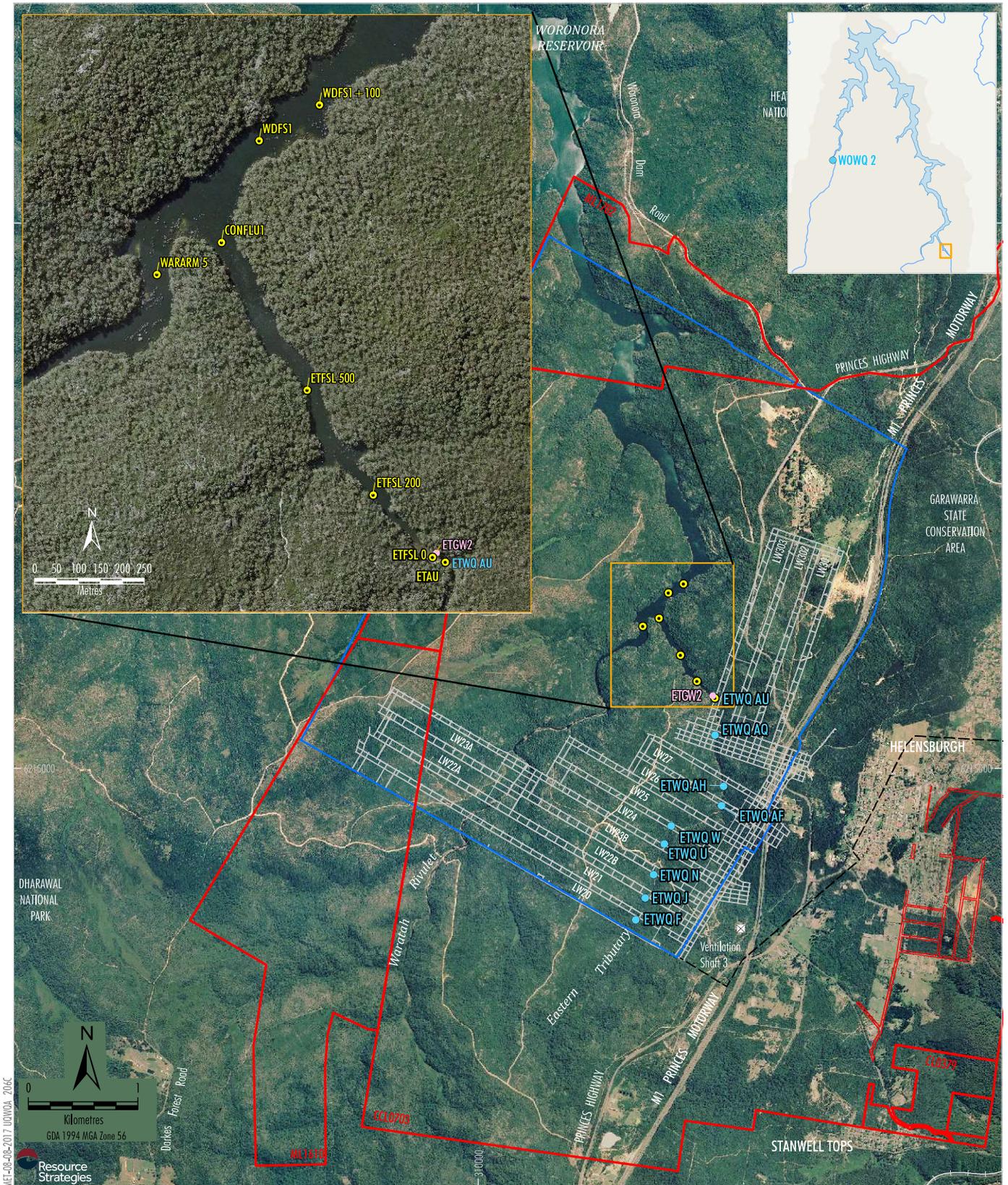


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 30 September 2020)



- LEGEND**
- Mining Lease Boundary
 - Railway
 - Project Underground Mining Area
Longwalls 20-27 and 301-317
 - Existing Underground Access Drive (Main Drift)
 - Surface Water Quality Site on Eastern Tributary
 - Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
 - Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran et al., 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In September 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.128 mg/L and 0.271 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events in January to March 2020, and late July 2020. Dissolved manganese concentrations remained below the long-term mean (0.33 mg/L) for the entirety of September 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 µm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In September 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.50 to pH 7.14);
- EC concentrations (lab measurement) ranged between 193 µS/cm and 223 µS/cm; and
- ORP (field measurement) ranged between 45.3 mV and 173.6 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW305-307 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW305-307 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Due to the increasing water level in the Woronora Reservoir throughout early 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken from April to September 2020, and site CONFLU1 was not sampled from June to September 2020.

Metropolitan Coal has taken a photographic record of the watercourse/waterbody at the time of sampling, estimated the width of the watercourse/water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in September 2020 the Woronora Reservoir water level fell slightly from 164.27 mAHD (on 1 September 2020) to 164.02 mAHD at the end of the month. The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during September 2020 was upstream of site ETSFL 200 (corresponding to a water level of 164 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout September 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to September 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³, however has since recommenced following the increased Woronora Reservoir water level. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir fell slightly in September 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for September 2020 ranged from 0.128 mg/L to 0.271 mg/L at site ETAU, 0.017 mg/L to 0.029 mg/L at site ETFSL 200, and 0.012 mg/L to 0.018 mg/L at site ETFSL 500 (Chart 3).

Total manganese concentrations for September 2020 followed similar trends, ranging from 0.136 mg/L to 0.201 mg/L at site ETAU, 0.026 mg/L to 0.040 mg/L at site ETFSL 200, and 0.023 mg/L to 0.055 mg/L at site ETFSL 500 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

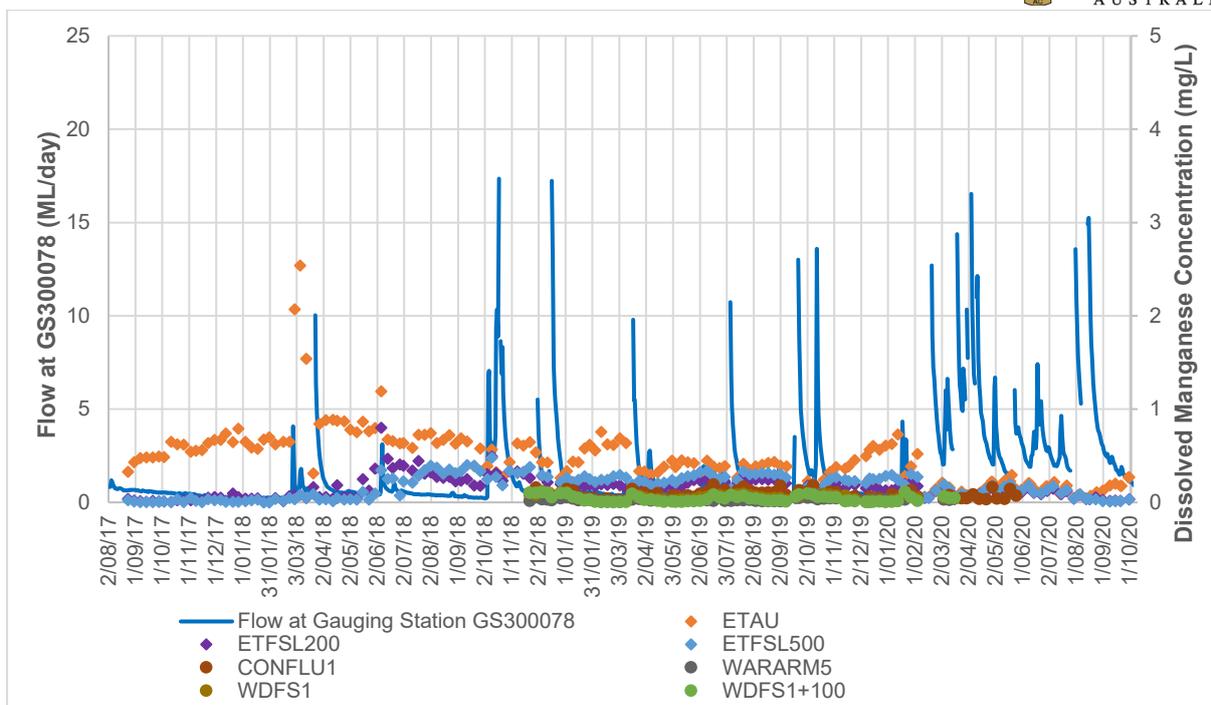


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 30 September 2020)

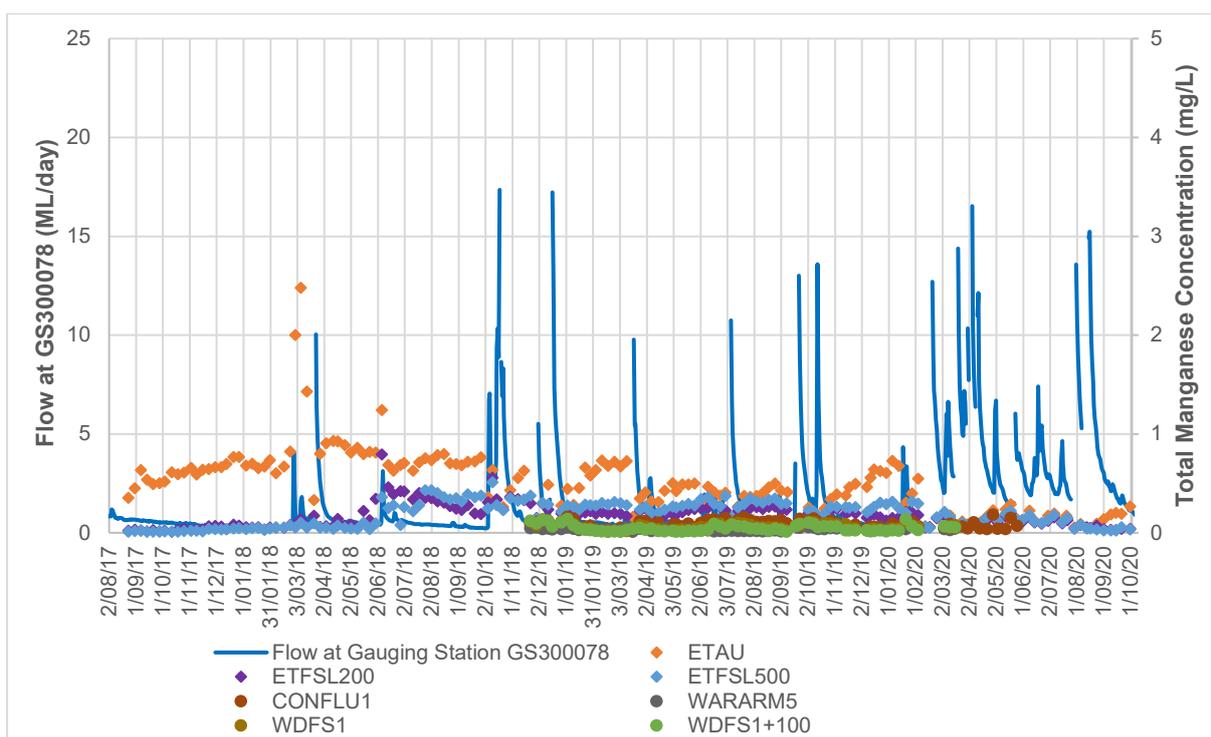


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 30 September 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG) are published by the National Health and Medical Research Council and updated most recently in 2018 (NHMRC & NRMCC, 2011); the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the ADWG before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG are based on total concentrations of manganese in water (NHMRC & NRMCC, 2011). The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to September 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5 – 8.5. The pH values at all sites fluctuated during August 2020, with values ranging from 6.5 to 7.14 at ETAU, 6.02 to 7.43 at ETFSL 200, and 6.21 to 7.28 at ETFSL 500. All sites were within the ADWG value range for pH at the end of September 2020, with the exception of sites ETFSL 200 and ETFSL 500 (Attachment A).

The groundwater at ETGW2 below ETAU on 25 August 2020 was pH 6.51 and 29 September 2020 was pH 6.24, indicating that seeping groundwater may have been a source of lower pH water entering the reservoir.

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in September 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for September 2020 show the quality of water below ETAU was consistent during September 2020, with the water observed to be generally clear due to rainfall occurring in the preceding months and during September. The presence of orange-yellow coating on the creek sediment surface, continued to be observed throughout September 2020, which will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In September 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

Helensburgh Coal Pty Ltd (2008) *Metropolitan Coal Project Environmental Assessment*.

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500,
WARARM5, CONFLU1, WDFS1 and WDFS1+100

JANUARY 2018 TO SEPTEMBER 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

- ¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.
- ² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/04/2020 ³	ETAU	0.087	0.105	0.32	1.26	71	6.91	171
7/04/2020	ETFSL200	0.071	0.083	0.85	0.12	71.1	7.04	171
7/04/2020	ETFSL500	0.083	0.093	0.42	1.1	65.1	7.05	175
7/04/2020	CONFLU1	0.087	0.103	0.16	1.21	109.6	7.01	173
15/04/2020	ETAU	0.108	0.109	0.31	1.16	126.9	6.81	175
14/04/2020	ETFSL200	0.091	0.09	0.2	0.95	64.9	7.05	171
14/04/2020	ETFSL500	0.085	0.095	0.27	1.13	102.2	6.96	174
14/04/2020	CONFLU1	0.039	0.042	0.05	0.74	185.6	7.14	183
22/04/2020	ETAU	0.155	0.167	0.17	1.63	121.2	6.87	207
22/04/2020	ETFSL200	0.119	0.126	0.06	1.26	128.9	7.34	203
22/04/2020	ETFSL500	0.148	0.156	0.45	1.63	91.5	7.21	217
22/04/2020	CONFLU1	0.034	0.037	0.09	0.78	119.1	7.27	213
29/04/2020	ETAU	0.221	0.227	0.56	2.18	136.8	6.7	225
29/04/2020	ETFSL200	0.155	0.158	<0.05	1.32	147.8	7.05	233
29/04/2020	ETFSL500	0.184	0.185	0.24	1.75	51.4	7.11	259
29/04/2020	CONFLU1	0.166	0.183	<0.05	2.03	157.1	6.95	247
4/05/2020	ETAU	0.143	0.137	0.5	1.49	86	6.89	203
4/05/2020	ETFSL200	0.106	0.104	0.13	1.18	110.5	7.32	202
4/05/2020	ETFSL500	0.132	0.128	0.52	1.62	26.1	7.21	212
4/05/2020	CONFLU1	0.04	0.039	0.09	0.75	39.7	7.35	205
13/05/2020	ETAU	0.232	0.236	0.1	2.11	89.2	7.23	234
13/05/2020	ETFSL200	0.156	0.162	0.05	1.5	84.7	7.34	222
13/05/2020	ETFSL500	0.173	0.19	0.34	1.84	2.6	7.42	244
13/05/2020	CONFLU1	0.039	0.036	0.13	0.75	18.9	7.28	219
19/05/2020	ETAU	0.226	0.288	0.42	2.3	42.4	6.71	231
19/05/2020	ETFSL200	0.179	0.198	0.05	1.29	56.3	6.65	230
19/05/2020	ETFSL500	0.199	0.22	0.39	1.9	32.8	6.66	248
19/05/2020	CONFLU1	0.143	0.151	0.05	1.14	9.4	6.66	238
26/05/2020	ETAU	0.142	0.136	0.59	1.43	39	6.36	202
26/05/2020	ETFSL200	0.11	0.111	0.18	1.05	34.5	6.4	201
26/05/2020	ETFSL500	0.119	0.122	0.32	1.26	23	6.42	206
26/05/2020	CONFLU1	0.072	0.069	0.09	0.95	45	6.39	202
1/06/2020	ETAU	0.136	0.126	0.46	1.06	17.1	6.75	203
1/06/2020	ETFSL200	0.11	0.111	0.16	0.95	22.1	6.48	201
1/06/2020	ETFSL500	0.128	0.13	0.45	1.28	17.5	6.5	211
9/06/2020	ETAU	0.21	0.224	1.04	1.93	47.4	6.71	233
9/06/2020	ETFSL200	0.156	0.161	0.25	1.03	73.2	6.81	228
9/06/2020	ETFSL500	0.181	0.179	0.41	1.4	23.7	6.80	246
15/06/2020	ETAU	0.121	0.12	0.64	1.14	35.9	6.26	209
15/06/2020	ETFSL200	0.103	0.103	0.22	0.76	7.9	6.4	207
15/06/2020	ETFSL500	0.111	0.112	0.4	1.1	46.8	6.38	215
30/06/2020	ETAU	0.173	0.173	0.69	1.51	60.9	6.71	200
30/06/2020	ETFSL200	0.123	0.120	0.1	0.96	73	6.74	189
30/06/2020	ETFSL500	0.136	0.133	0.3	1.29	38.3	6.8	198

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/07/2020	ETAU	0.179	0.195	0.4	1.62	104.1	7.45	239
7/07/2020	ETFSL200	0.147	0.155	0.06	1.00	76.3	7.63	238
7/07/2020	ETFSL500	0.176	0.177	0.45	1.36	33.6	7.57	252
8/07/2020	ETAU	0.218	-	1.14	1.89	47	6.99	234
15/07/2020	ETAU	0.089	-	0.51	0.99	92	6.85	206
16/07/2020	ETAU	0.109	0.107	0.71	1.04	31.7	6.73	217
16/07/2020	ETFSL200	0.090	0.093	0.26	0.92	31.5	7.09	214
16/07/2020	ETFSL500	0.101	0.103	0.42	1.10	12.1	7.01	220
21/07/2020	ETAU	0.170	0.171	0.48	1.32	32.2	6.58	220
22/07/2020	ETAU	-	0.171	0.76	1.21	2.97	6.58	225
22/07/2020	ETFSL200	0.122	0.128	<0.05	0.70	25.8	7.07	216
22/07/2020	ETFSL500	0.134	0.148	0.36	0.92	-25.7	6.99	230
30/07/2020	ETAU	0.050	0.052	0.32	0.72	109.3	6.11	113
30/07/2020	ETFSL200	0.041	0.042	0.3	0.67	120.3	6.18	109
30/07/2020	ETFSL500	0.041	0.042	0.28	0.68	124	6.17	106
4/08/2020	ETAU	0.080	-	0.57	0.98	83.2	6.73	155
6/08/2020	ETAU	0.084	0.088	0.57	1.00	94	6.85	148
6/08/2020	ETFSL200	0.083	0.078	0.34	0.88	89.1	7.02	147
6/08/2020	ETFSL500	0.088	0.083	0.25	0.91	126.7	7.03	146
13/08/2020	ETAU	0.043	0.048	0.28	0.53	70.8	6.67	107
13/08/2020	ETFSL200	0.038	0.055	0.24	0.75	75.4	6.48	104
13/08/2020	ETFSL500	0.037	0.043	0.26	0.54	79.4	6.49	101
17/08/2020	ETAU	0.061	0.068	0.43	0.80	112	6.45	133
17/08/2020	ETFSL200	0.035	0.049	0.14	0.49	180.9	6.37	106
17/08/2020	ETFSL500	0.038	0.042	0.12	0.45	214.5	6.20	105
24/08/2020	ETAU	0.090	0.091	0.5	1.16	83.1	6.70	155
24/08/2020	ETFSL200	0.054	0.072	0.12	0.74	138.5	6.85	131
24/08/2020	ETFSL500	0.034	0.033	0.10	0.46	159.6	6.63	123
25/08/2020	ETAU	0.109	-	0.46	1.39	49.2	6.33	160
1/09/2020	ETAU	0.128	0.136	0.5	1.48	104.1	7.14	193
1/09/2020	ETFSL200	0.029	0.035	<0.05	0.47	191.5	7.43	128
1/09/2020	ETFSL500	0.014	0.024	<0.05	0.38	256.7	7.28	119
9/09/2020	ETAU	0.181	0.186	0.57	1.75	45.3	7.01	193
9/09/2020	ETFSL200	0.017	0.031	<0.05	0.43	104.7	6.02	121
9/09/2020	ETFSL500	0.012	0.023	<0.05	0.38	188.5	6.46	114
15/09/2020	ETAU	0.202	0.201	0.6	1.88	71.9	6.5	209
15/09/2020	ETFSL200	0.020	0.026	<0.05	0.43	188.7	6.29	131
15/09/2020	ETFSL500	0.014	0.024	<0.05	0.39	193.4	6.21	126
21/09/2020	ETAU	0.177	0.193	<0.05	1.66	173.6	6.82	205
21/09/2020	ETFSL200	0.019	0.040	<0.05	0.52	204.6	6.1	123
21/09/2020	ETFSL500	0.018	0.055	<0.05	0.52	183.5	6.36	122
22/09/2020	ETAU	0.177	-	0.19	1.61	75.3	6.65	212
30/09/2020	ETAU	0.271	-	0.36	2.54	75.6	6.67	223

Note:

³ Due to the increasing water level in the Woronora Reservoir throughout early 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken from April to September 2020, and site CONFLU1 was not sampled from June to September 2020.

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

16 March 2021

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – October 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwalls 305-307 Water Management Plan (LW305-307 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW305-307 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW305-307 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW305-307 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW305-307 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW305-307 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in October 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in October 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW305-307 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for October 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 31 October 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 31 October 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 31 October 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January to March 2020, July and August 2020, and October 2020, with below average rainfall recorded in all other months (Table 1).

Total rainfall at PV7 in October 2020 was 131.5 mm, below the average rainfall at Darkes Forest (92.0 mm), with rainfall occurring on 2 October (3.5 mm), 8 October (2.5 mm), 18 to 19 October (totalling 17.5 mm), 23 October (1.5 mm), 25 to 28 October (totalling 94.5 mm), and 30 October (12.0 mm).

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data for PV7, January 2018 to October 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3
April 2020	88.5	73.0*	126.1
May 2020	88.0	111.0*	128.1
June 2020	59.0	65.0*	145.8
July 2020	237.0	185.0*	96.0
August 2020	151.5	86.0*	88.9
September 2020	31.0	36.0	76.8
October 2020	131.5	158.0	92.0

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to February 2020, and September to October 2020.

^{*} Data from Station 68024 is incomplete or not available for the period of March to August 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for these months.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese [II] ion, Mn²⁺) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred.

Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

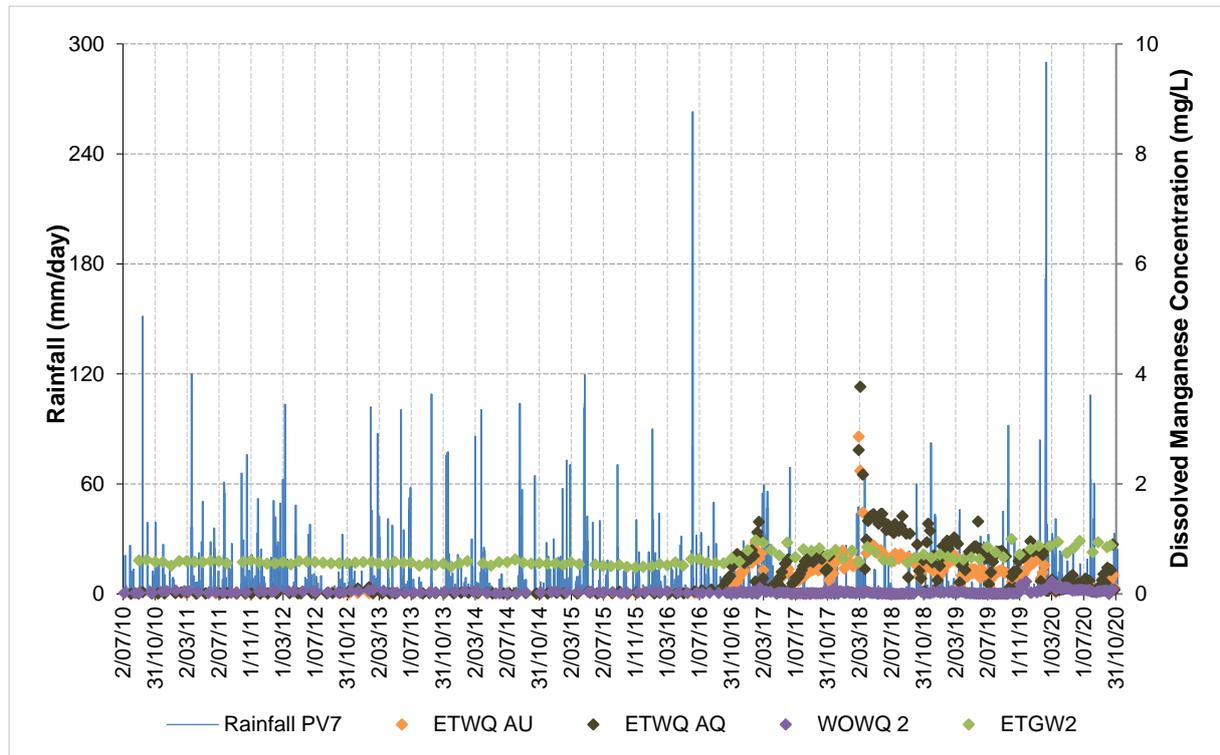


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 31 October 2020)

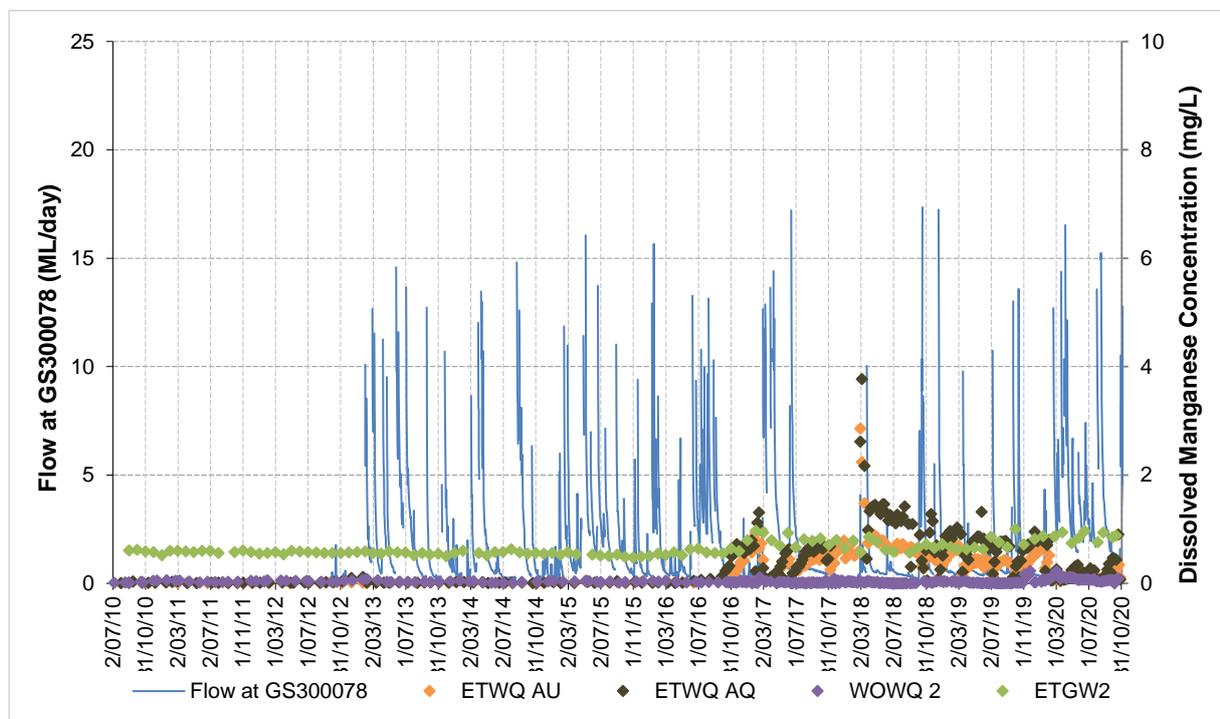
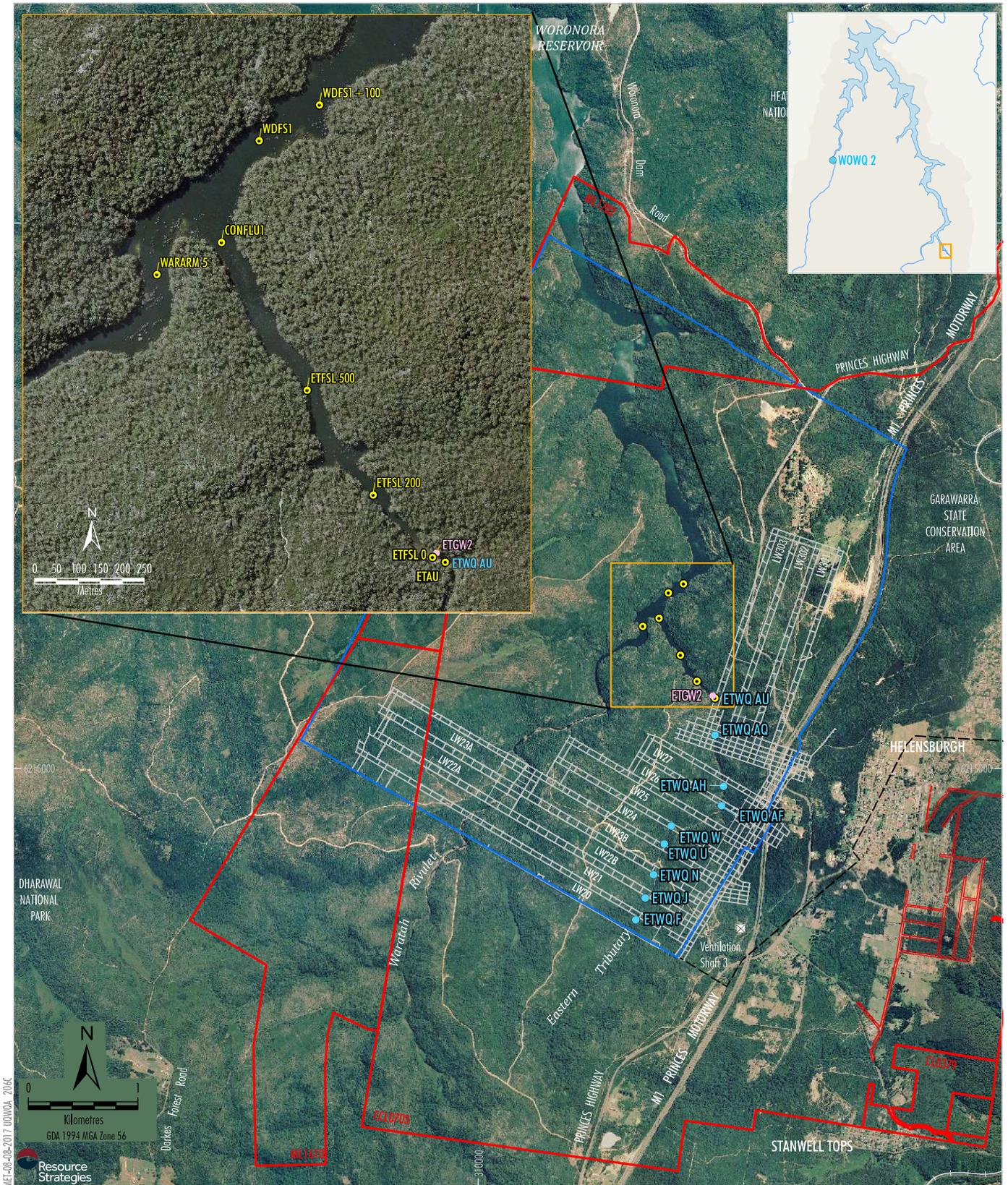


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 31 October 2020)



MET-08-08-2017 UOWDA 2066C

LEGEND

- Mining Lease Boundary
- Railway
- Project Underground Mining Area
Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Surface Water Quality Site on Eastern Tributary
- Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
- Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody

METROPOLITAN COAL

Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran et al., 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In October 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.110 mg/L and 0.345 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events on 17 January 2020, and throughout February and March 2020. Dissolved manganese concentration was measured as being above the long-term mean (0.30 mg/L) on 20 and 22 October 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 μm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In October 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.45 to pH 6.99);
- EC concentrations (lab measurement) ranged between 144 $\mu\text{S}/\text{cm}$ and 269 $\mu\text{S}/\text{cm}$; and
- ORP (field measurement) ranged between 33.5 mV and 126.4 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW305-307 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW305-307 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Sampling at some sites downstream of site ETWQ AU was not undertaken throughout February and March 2020 due to the high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir (Appendix A). Further, and due to the increasing water level in the Woronora Reservoir throughout April 2020, and sustaining water level through to October 2020, sampling at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 was not undertaken in October 2020 (Appendix A).

Metropolitan Coal has taken a photographic record of the watercourse/waterbody at the time of sampling, estimated the width of the watercourse/water body at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in October 2020 the Woronora Reservoir water level fell slightly from 164.01 mAHD (on 1 October 2020) to 163.83 mAHD at the end of the month. The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during October 2020 was upstream of site ETSFL 200 (corresponding to a water level of 164 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout October 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to October 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³, however has since recommenced following the increased Woronora Reservoir water level. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level fell slightly in October 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of October 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for October 2020 ranged from 0.110 mg/L to 0.345 mg/L at site ETAU, 0.035 mg/L to 0.137 mg/L at site ETFSL 200, and 0.032 mg/L to 0.101 mg/L at site ETFSL 500 (Chart 3).

Total manganese concentrations for October 2020 followed similar trends, ranging from 0.122 mg/L to 0.287 mg/L at site ETAU, 0.041 mg/L to 0.150 mg/L at site ETFSL 200, and 0.034 mg/L to 0.115 mg/L at site ETFSL 500 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

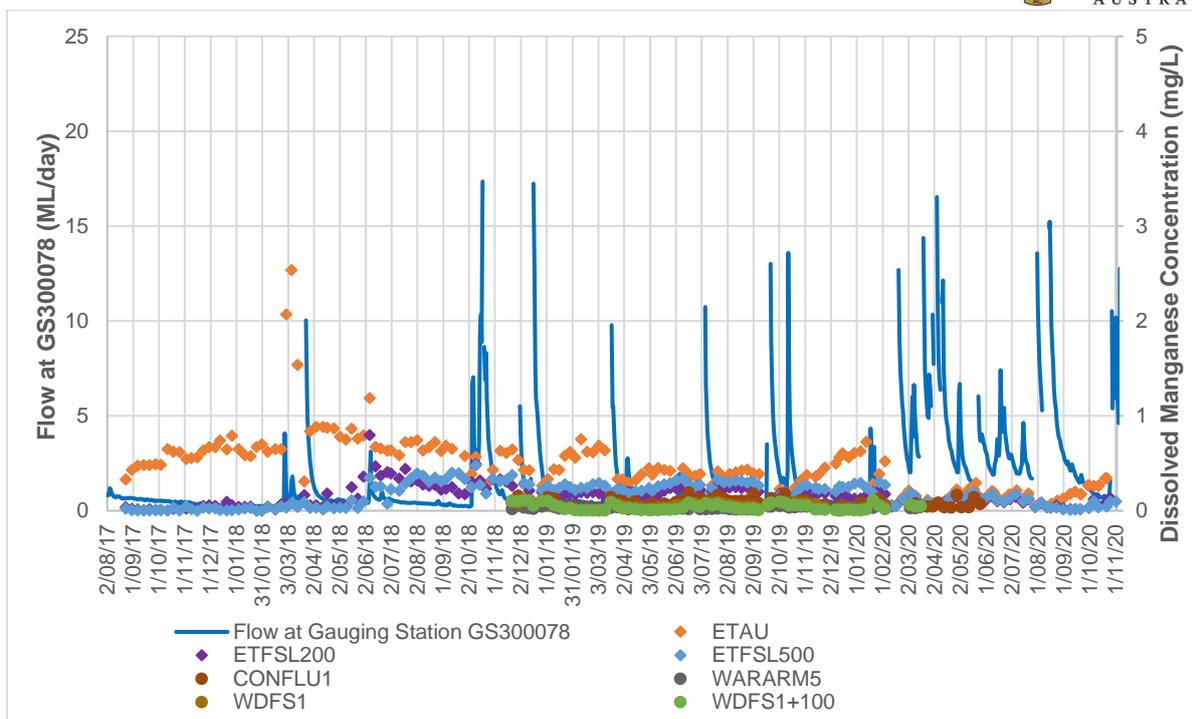


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 October 2020)

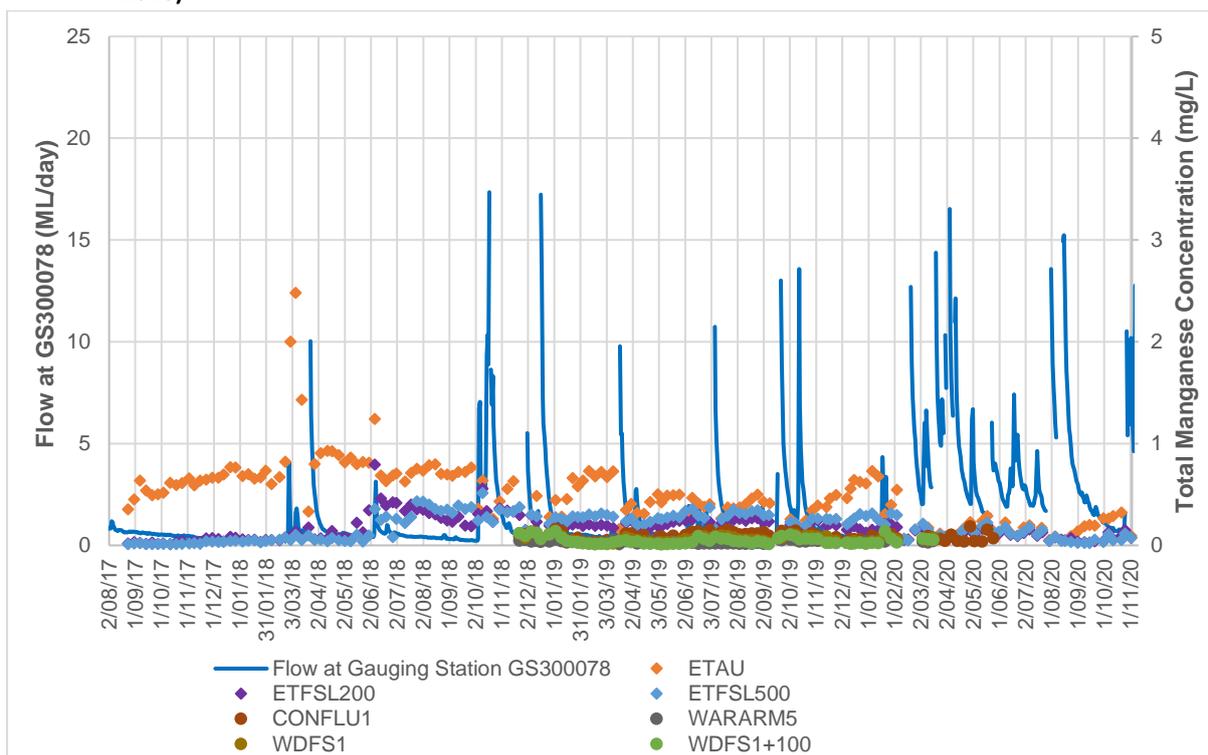


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 October 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG) are published by the National Health and Medical Research Council and updated most recently in 2018 (NHMRC & NRMCC, 2011); the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the ADWG before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG are based on total concentrations of manganese in water (NHMRC & NRMCC, 2011). The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to October 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5-8.5. The pH values at all sites fluctuated during October 2020, with some sites reducing by the end of the month (ETAU from 6.83 to 6.55 and ETFSL 200 from 6.59 to pH 6.40), and some sites increasing by the end of the month (ETFSL 500 from 6.49 to 6.45). At the end of October 2020, all sites except ETFSL 200 were within the ADWG value range for pH (Attachment A).

The groundwater at ETGW2 below ETAU on 29 September 2020 was pH 6.24 and 12 October 2020 was pH 6.55, indicating that seeping groundwater may have been a source of lower pH water entering the reservoir.

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in October 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for October 2020 show the quality of water below ETAU was consistent during October 2020, with the water further downstream observed to be generally clear due to rainfall occurring into the preceding months. The presence of orange-yellow coating on the creek sediment surface, continued to be observed throughout October 2020, will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In October 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500,
WARARM5, CONFLU1, WDFS1 and WDFS1+100

JANUARY 2018 TO OCTOBER 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	- ⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

- ¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.
- ² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/04/2020 ³	ETAU	0.087	0.105	0.32	1.26	71	6.91	171
7/04/2020	ETFSL200	0.071	0.083	0.85	0.12	71.1	7.04	171
7/04/2020	ETFSL500	0.083	0.093	0.42	1.1	65.1	7.05	175
7/04/2020	CONFLU1	0.087	0.103	0.16	1.21	109.6	7.01	173
15/04/2020	ETAU	0.108	0.109	0.31	1.16	126.9	6.81	175
14/04/2020	ETFSL200	0.091	0.09	0.2	0.95	64.9	7.05	171
14/04/2020	ETFSL500	0.085	0.095	0.27	1.13	102.2	6.96	174
14/04/2020	CONFLU1	0.039	0.042	0.05	0.74	185.6	7.14	183
22/04/2020	ETAU	0.155	0.167	0.17	1.63	121.2	6.87	207
22/04/2020	ETFSL200	0.119	0.126	0.06	1.26	128.9	7.34	203
22/04/2020	ETFSL500	0.148	0.156	0.45	1.63	91.5	7.21	217
22/04/2020	CONFLU1	0.034	0.037	0.09	0.78	119.1	7.27	213
29/04/2020	ETAU	0.221	0.227	0.56	2.18	136.8	6.7	225
29/04/2020	ETFSL200	0.155	0.158	<0.05	1.32	147.8	7.05	233
29/04/2020	ETFSL500	0.184	0.185	0.24	1.75	51.4	7.11	259
29/04/2020	CONFLU1	0.166	0.183	<0.05	2.03	157.1	6.95	247
4/05/2020	ETAU	0.143	0.137	0.5	1.49	86	6.89	203
4/05/2020	ETFSL200	0.106	0.104	0.13	1.18	110.5	7.32	202
4/05/2020	ETFSL500	0.132	0.128	0.52	1.62	26.1	7.21	212
4/05/2020	CONFLU1	0.04	0.039	0.09	0.75	39.7	7.35	205
13/05/2020	ETAU	0.232	0.236	0.1	2.11	89.2	7.23	234
13/05/2020	ETFSL200	0.156	0.162	0.05	1.5	84.7	7.34	222
13/05/2020	ETFSL500	0.173	0.19	0.34	1.84	2.6	7.42	244
13/05/2020	CONFLU1	0.039	0.036	0.13	0.75	18.9	7.28	219
19/05/2020	ETAU	0.226	0.288	0.42	2.3	42.4	6.71	231
19/05/2020	ETFSL200	0.179	0.198	0.05	1.29	56.3	6.65	230
19/05/2020	ETFSL500	0.199	0.22	0.39	1.9	32.8	6.66	248
19/05/2020	CONFLU1	0.143	0.151	0.05	1.14	9.4	6.66	238
26/05/2020	ETAU	0.142	0.136	0.59	1.43	39	6.36	202
26/05/2020	ETFSL200	0.11	0.111	0.18	1.05	34.5	6.4	201
26/05/2020	ETFSL500	0.119	0.122	0.32	1.26	23	6.42	206
26/05/2020	CONFLU1	0.072	0.069	0.09	0.95	45	6.39	202
1/06/2020	ETAU	0.136	0.126	0.46	1.06	17.1	6.75	203
1/06/2020	ETFSL200	0.11	0.111	0.16	0.95	22.1	6.48	201
1/06/2020	ETFSL500	0.128	0.13	0.45	1.28	17.5	6.5	211
9/06/2020	ETAU	0.21	0.224	1.04	1.93	47.4	6.71	233
9/06/2020	ETFSL200	0.156	0.161	0.25	1.03	73.2	6.81	228
9/06/2020	ETFSL500	0.181	0.179	0.41	1.4	23.7	6.80	246
15/06/2020	ETAU	0.121	0.12	0.64	1.14	35.9	6.26	209
15/06/2020	ETFSL200	0.103	0.103	0.22	0.76	7.9	6.4	207
15/06/2020	ETFSL500	0.111	0.112	0.4	1.1	46.8	6.38	215
30/06/2020	ETAU	0.173	0.173	0.69	1.51	60.9	6.71	200
30/06/2020	ETFSL200	0.123	0.120	0.1	0.96	73	6.74	189
30/06/2020	ETFSL500	0.136	0.133	0.3	1.29	38.3	6.8	198

Note:

³ Due to the increasing water level in the Woronora Reservoir throughout February and March 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken from April to October 2020, and site CONFLU1 was not sampled from June to October 2020.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/07/2020	ETAU	0.179	0.195	0.4	1.62	104.1	7.45	239
7/07/2020	ETFSL200	0.147	0.155	0.06	1.00	76.3	7.63	238
7/07/2020	ETFSL500	0.176	0.177	0.45	1.36	33.6	7.57	252
8/07/2020	ETAU	0.218	-	1.14	1.89	47	6.99	234
15/07/2020	ETAU	0.089	-	0.51	0.99	92	6.85	206
16/07/2020	ETAU	0.109	0.107	0.71	1.04	31.7	6.73	217
16/07/2020	ETFSL200	0.090	0.093	0.26	0.92	31.5	7.09	214
16/07/2020	ETFSL500	0.101	0.103	0.42	1.10	12.1	7.01	220
21/07/2020	ETAU	0.170	0.171	0.48	1.32	32.2	6.58	220
22/07/2020	ETAU	-	0.171	0.76	1.21	2.97	6.58	225
22/07/2020	ETFSL200	0.122	0.128	<0.05	0.70	25.8	7.07	216
22/07/2020	ETFSL500	0.134	0.148	0.36	0.92	-25.7	6.99	230
30/07/2020	ETAU	0.050	0.052	0.32	0.72	109.3	6.11	113
30/07/2020	ETFSL200	0.041	0.042	0.3	0.67	120.3	6.18	109
30/07/2020	ETFSL500	0.041	0.042	0.28	0.68	124	6.17	106
4/08/2020	ETAU	0.080	-	0.57	0.98	83.2	6.73	155
6/08/2020	ETAU	0.084	0.088	0.57	1.00	94	6.85	148
6/08/2020	ETFSL200	0.083	0.078	0.34	0.88	89.1	7.02	147
6/08/2020	ETFSL500	0.088	0.083	0.25	0.91	126.7	7.03	146
13/08/2020	ETAU	0.043	0.048	0.28	0.53	70.8	6.67	107
13/08/2020	ETFSL200	0.038	0.055	0.24	0.75	75.4	6.48	104
13/08/2020	ETFSL500	0.037	0.043	0.26	0.54	79.4	6.49	101
17/08/2020	ETAU	0.061	0.068	0.43	0.80	112	6.45	133
17/08/2020	ETFSL200	0.035	0.049	0.14	0.49	180.9	6.37	106
17/08/2020	ETFSL500	0.038	0.042	0.12	0.45	214.5	6.20	105
24/08/2020	ETAU	0.090	0.091	0.5	1.16	83.1	6.70	155
24/08/2020	ETFSL200	0.054	0.072	0.12	0.74	138.5	6.85	131
24/08/2020	ETFSL500	0.034	0.033	0.10	0.46	159.6	6.63	123
25/08/2020	ETAU	0.109	-	0.46	1.39	49.2	6.33	160
1/09/2020	ETAU	0.128	0.136	0.5	1.48	104.1	7.14	193
1/09/2020	ETFSL200	0.029	0.035	<0.05	0.47	191.5	7.43	128
1/09/2020	ETFSL500	0.014	0.024	<0.05	0.38	256.7	7.28	119
9/09/2020	ETAU	0.181	0.186	0.57	1.75	45.3	7.01	193
9/09/2020	ETFSL200	0.017	0.031	<0.05	0.43	104.7	6.02	121
9/09/2020	ETFSL500	0.012	0.023	<0.05	0.38	188.5	6.46	114
15/09/2020	ETAU	0.202	0.201	0.6	1.88	71.9	6.5	209
15/09/2020	ETFSL200	0.020	0.026	<0.05	0.43	188.7	6.29	131
15/09/2020	ETFSL500	0.014	0.024	<0.05	0.39	193.4	6.21	126
21/09/2020	ETAU	0.177	0.193	<0.05	1.66	173.6	6.82	205
21/09/2020	ETFSL200	0.019	0.040	<0.05	0.52	204.6	6.1	123
21/09/2020	ETFSL500	0.018	0.055	<0.05	0.52	183.5	6.36	122
22/09/2020	ETAU	0.177	-	0.19	1.61	75.3	6.65	212
30/09/2020	ETAU	0.271	-	0.36	2.54	75.6	6.67	223

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/10/2020	ETAU	0.27	0.266	0.33	2.35	116.5	6.83	226
1/10/2020	ETFSL200	0.035	0.262	0.05	0.59	126.8	6.59	140
1/10/2020	ETFSL500	0.032	0.034	0.05	0.58	130.5	6.49	139
7/10/2020	ETAU	0.263	0.262	<0.05	1.46	80.9	6.84	248
7/10/2020	ETFSL200	0.122	0.129	0.05	1	70.8	6.95	194
7/10/2020	ETFSL500	0.101	0.109	0.05	1.05	84	6.82	173
12/10/2020	ETAU	0.264	0.287	<0.05	1.16	101.2	6.97	269
12/10/2020	ETFSL200	0.058	0.062	0.05	0.79	87.8	6.78	158
12/10/2020	ETFSL500	0.04	0.05	0.06	0.77	48	6.74	150
13/10/2020	ETAU	0.267	-	<0.05	1.58	45.8	6.99	246
20/10/2020	ETAU	0.342	-	0.2	2.41	107	6.73	232
22/10/2020	ETAU	0.345	0.322	<0.05	0.322	126.4	6.45	241
22/10/2020	ETFSL200	0.096	0.094	0.08	1.08	106.9	6.72	132
22/10/2020	ETFSL500	0.047	0.053	0.08	0.86	110.5	6.54	114
26/10/2020	ETAU	0.116	0.122	0.59	1.25	63.1	6.59	132
26/10/2020	ETFSL200	0.137	0.15	0.36	1.32	67.4	6.4	133
26/10/2020	ETFSL500	0.1	0.115	0.2	1.35	142.7	6.65	116
27/10/2020	ETAU	0.11	-	0.75	1.38	33.5	6.55	144

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

16 March 2021

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – November 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwalls 305-307 Water Management Plan (LW305-307 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW305-307 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW305-307 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW305-307 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW305-307 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2020) in accordance with the LW305-307 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in November 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in November 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW305-307 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for November 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 30 November 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 30 November 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 30 November 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January to March 2020, July and August 2020, and October 2020, with below average rainfall recorded in all other months (Table 1).

Total rainfall at PV7 in November 2020 was 87.5 mm, below the average rainfall at Darkes Forest (104.6 mm), with rainfall occurring on 1 to 2 November (totalling 25.0 mm), 6 to 7 November (totalling 25.0 mm), 13 to 14 November (totalling 34.0 mm), 19 November (0.5 mm), and 24 November (3.0 mm).

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data for PV7, January 2018 to November 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3
April 2020	88.5	73.0*	126.1
May 2020	88.0	111.0*	128.1
June 2020	59.0	65.0*	145.8
July 2020	237.0	185.0*	96.0
August 2020	151.5	86.0*	88.9
September 2020	31.0	36.0	76.8
October 2020	131.5	158.0	92.0
November 2020	87.5	65.0	104.6

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to November 2020.

^{*} Data from Station 68024 is incomplete or not available for the period of March to August 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for these months.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese [II] ion, Mn^{2+}) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred. Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

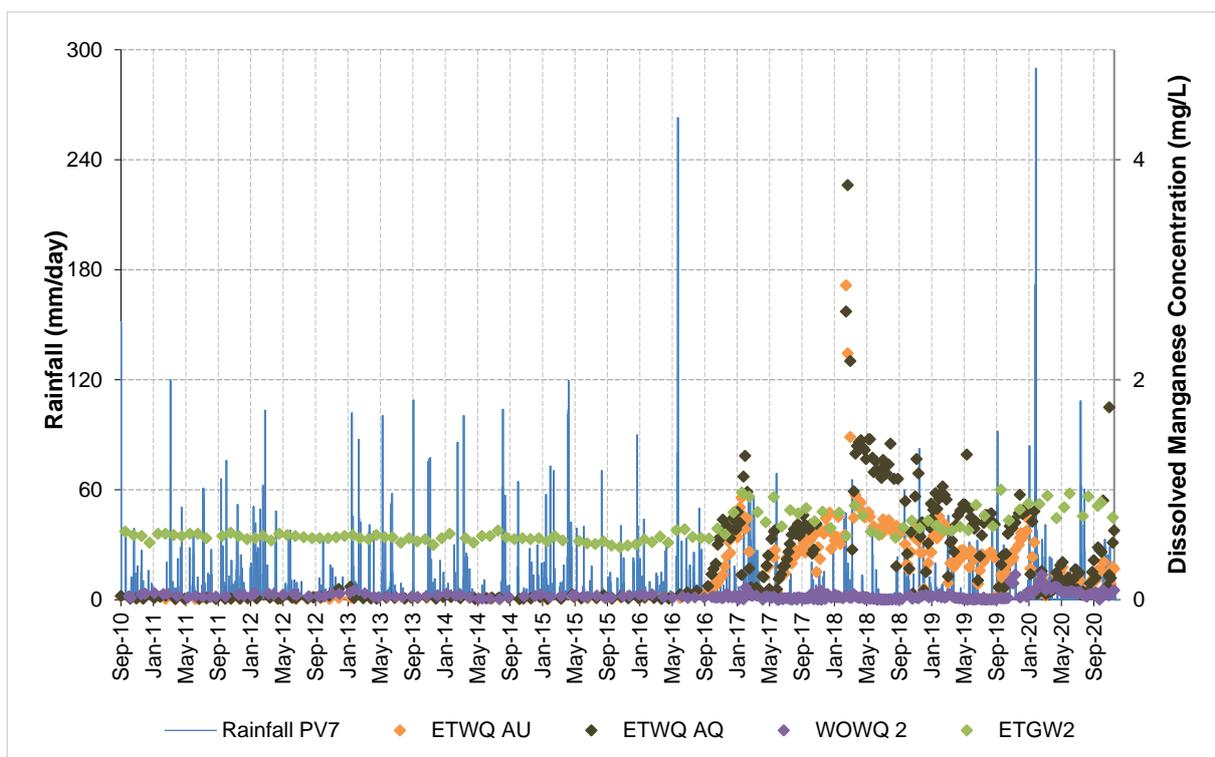


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 30 November 2020)

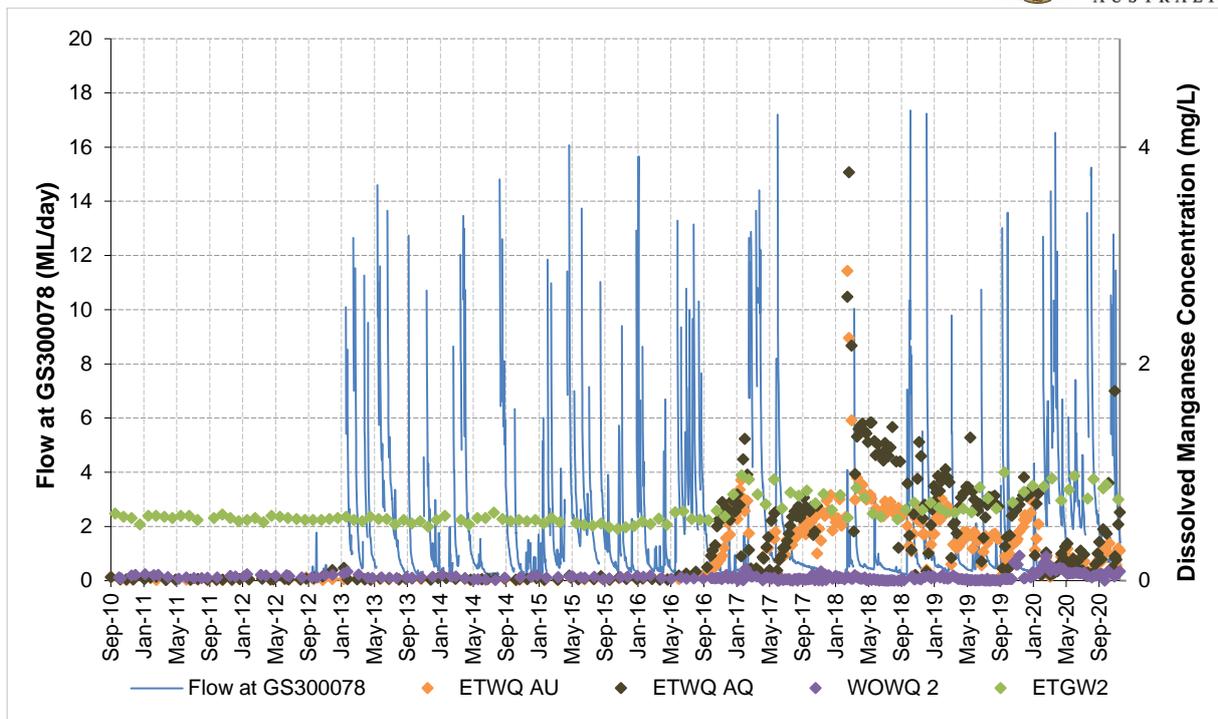
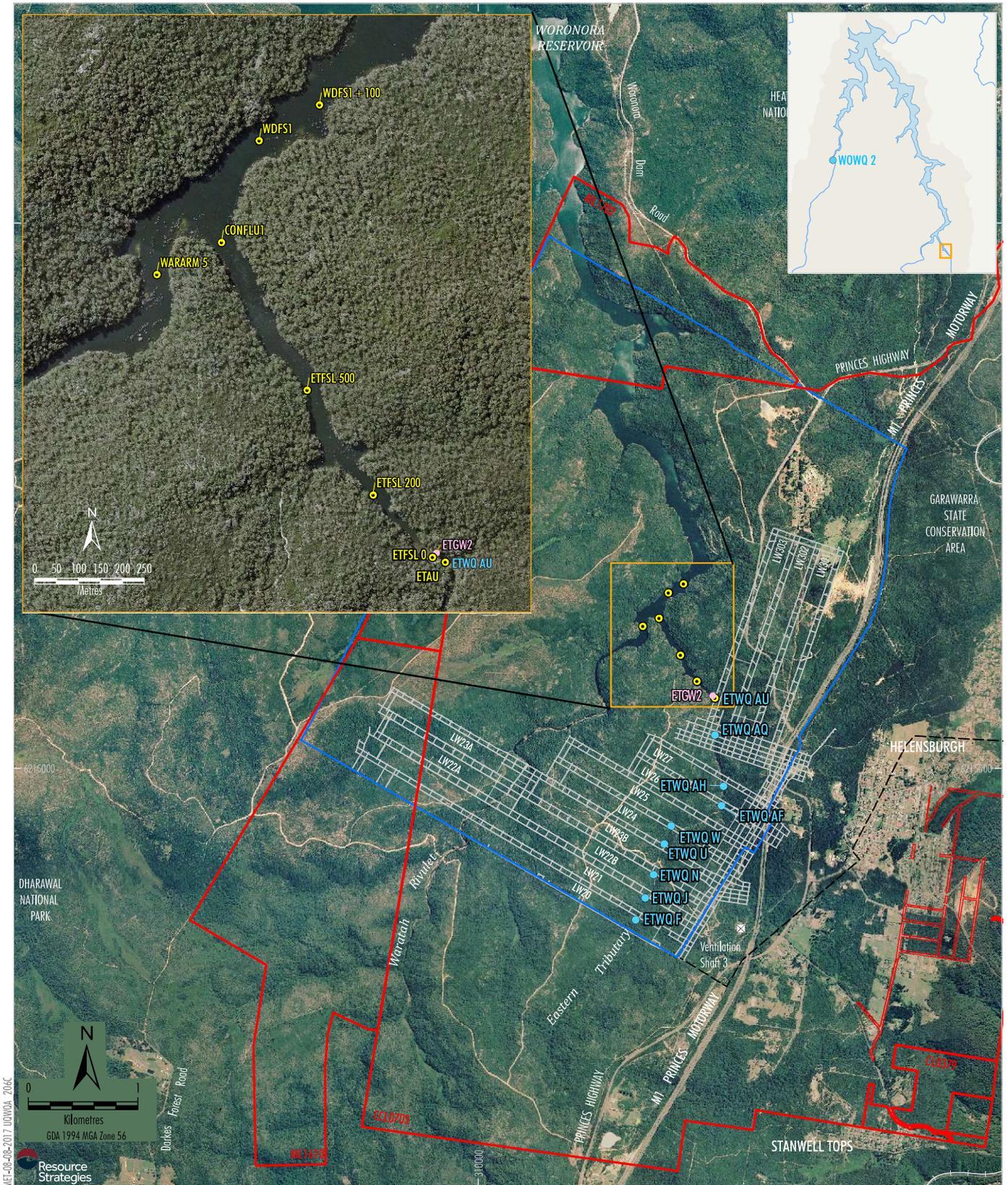


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 30 November 2020)

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran et al., 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In November 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.107 mg/L and 0.298 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events on 17 January 2020, and throughout February and March 2020. Dissolved manganese concentration remained below the long-term mean (0.30 mg/L) throughout November 2020 (Attachment A).



MET-08-08-2017 UOWDA 2066C

LEGEND

- Mining Lease Boundary
- Railway
- Project Underground Mining Area
Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Surface Water Quality Site on Eastern Tributary
- Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
- Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody
METROPOLITAN COAL
Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 µm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

In November 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.09 to pH 7.04);
- EC concentrations (lab measurement) ranged between 170 µS/cm and 232 µS/cm; and
- ORP (field measurement) ranged between 27.3 mV and 205.9 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW305-307 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW305-307 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Sampling at some sites downstream of site ETWQ AU was not undertaken throughout February and March 2020 due to the high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir (Appendix A). Further, and due to the increasing water level in the Woronora Reservoir throughout April 2020, and sustaining water level through November 2020, sampling at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 was not undertaken in November 2020 (Appendix A).

Metropolitan Coal has taken a photographic record of the watercourse/waterbody at the time of sampling, estimated the width of the watercourse/waterbody at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in November 2020 the Woronora Reservoir water level fell slightly from 163.87 mAHD (on 1 November 2020) to 163.69 mAHD at the end of the month. The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during November 2020 was upstream of site ETSFL 200 (corresponding to a water level of 164 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout November 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to November 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETSFL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³, however has since recommenced following the increased Woronora Reservoir water level. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level fluctuated slightly in November 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of November 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for November 2020 ranged from 0.084 mg/L to 0.298 mg/L at site ETAU, 0.026 mg/L to 0.069 mg/L at site ETFSL 200, and 0.022 mg/L to 0.074 mg/L at site ETFSL 500 (Chart 3).

Total manganese concentrations for November 2020 followed similar trends, ranging from 0.092 mg/L to 0.314 mg/L at site ETAU, 0.031 mg/L to 0.074 mg/L at site ETFSL 200, and 0.030 mg/L to 0.075 mg/L at site ETFSL 500 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

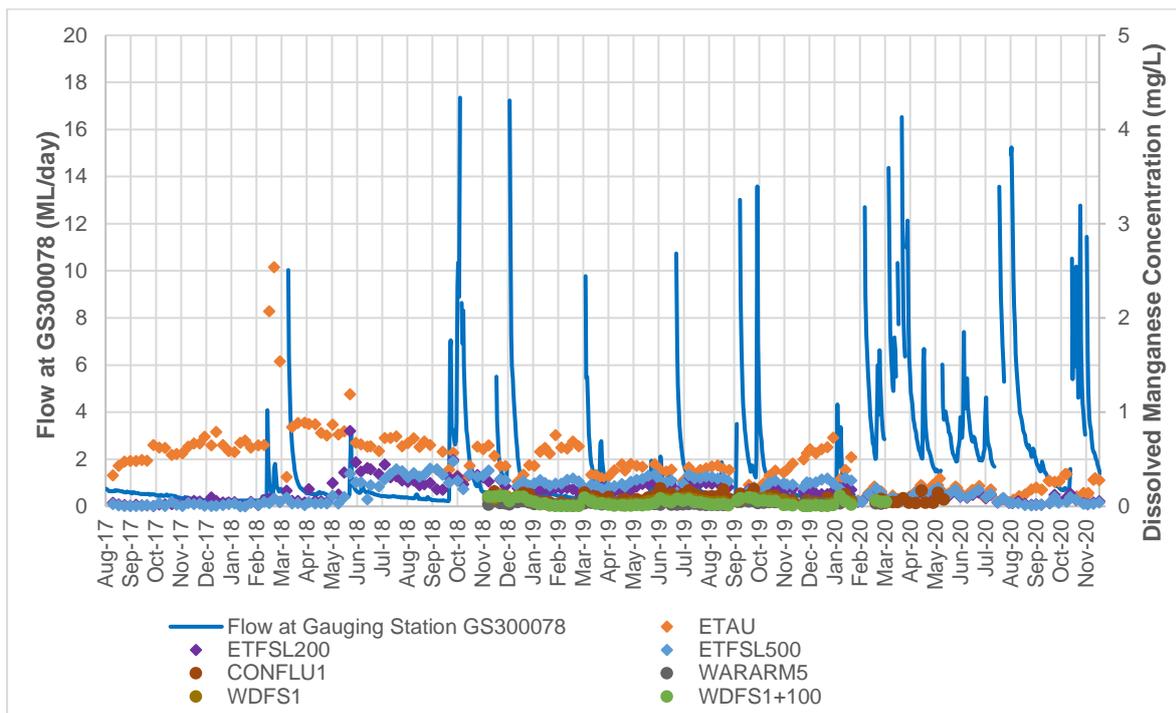


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 30 November 2020)

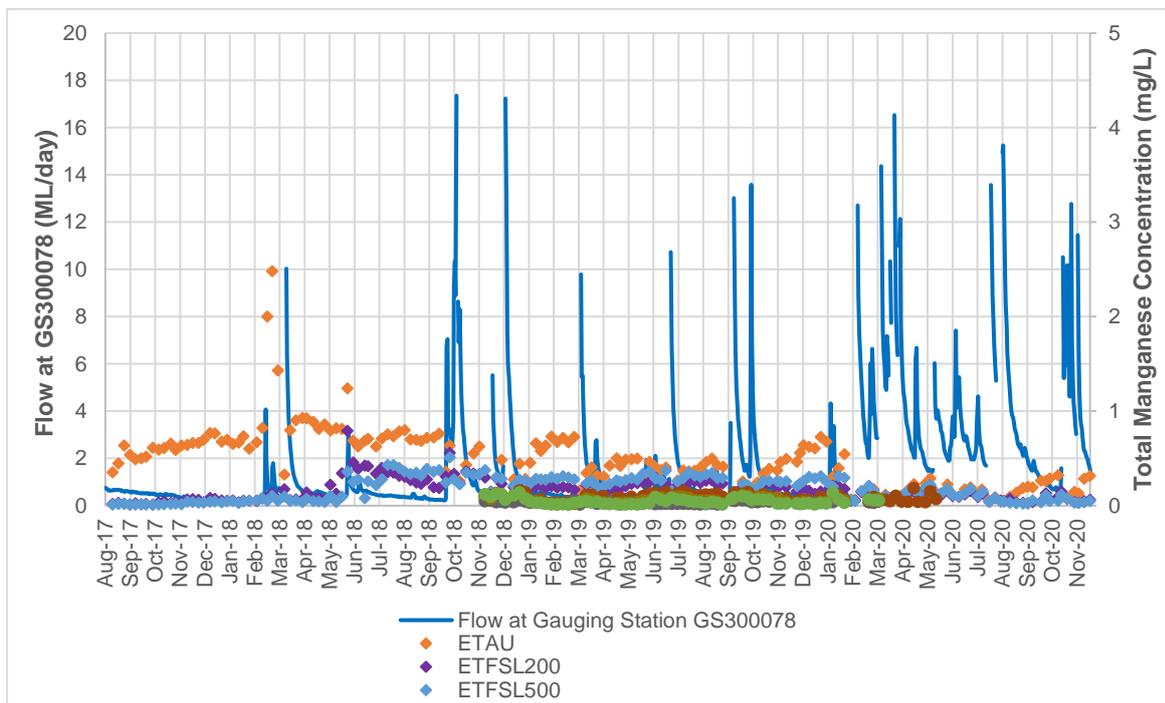


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 30 November 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG) are published by the National Health and Medical Research Council and updated most recently in 2018 (NHMRC & NRMCC, 2011); the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the ADWG before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG are based on total concentrations of manganese in water (NHMRC & NRMCC, 2011). The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to November 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5-8.5. The pH values at all sites fluctuated during November 2020, with sites reducing by the end of the month (ETAU from 7.04 to 6.09, ETFSL 200 from 7.38 to pH 6.27 and ETFSL 500 from 7.41 to 6.08). At the end of November 2020, all sites except ETFSL 200 and ETFSL 500 were within the ADWG value range for pH (Attachment A).

The groundwater at ETGW2 below ETAU on 12 October 2020 was pH 6.55 and 25 November 2020 was pH 6.44, indicating that seeping groundwater may have been a source of lower pH water entering the reservoir.

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in November 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for November 2020 show the quality of water below ETAU was consistent during November 2020, with the water further downstream observed to be generally clear due to rainfall occurring in the preceding months. The presence of orange-yellow coating on the creek sediment surface, continued to be observed throughout November 2020, will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In November 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500,
WARARM5, CONFLU1, WDFS1 and WDFS1+100

JANUARY 2018 TO NOVEMBER 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	- ⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

- ¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.
- ² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/04/2020 ³	ETAU	0.087	0.105	0.32	1.26	71	6.91	171
7/04/2020	ETFSL200	0.071	0.083	0.85	0.12	71.1	7.04	171
7/04/2020	ETFSL500	0.083	0.093	0.42	1.1	65.1	7.05	175
7/04/2020	CONFLU1	0.087	0.103	0.16	1.21	109.6	7.01	173
15/04/2020	ETAU	0.108	0.109	0.31	1.16	126.9	6.81	175
14/04/2020	ETFSL200	0.091	0.09	0.2	0.95	64.9	7.05	171
14/04/2020	ETFSL500	0.085	0.095	0.27	1.13	102.2	6.96	174
14/04/2020	CONFLU1	0.039	0.042	0.05	0.74	185.6	7.14	183
22/04/2020	ETAU	0.155	0.167	0.17	1.63	121.2	6.87	207
22/04/2020	ETFSL200	0.119	0.126	0.06	1.26	128.9	7.34	203
22/04/2020	ETFSL500	0.148	0.156	0.45	1.63	91.5	7.21	217
22/04/2020	CONFLU1	0.034	0.037	0.09	0.78	119.1	7.27	213
29/04/2020	ETAU	0.221	0.227	0.56	2.18	136.8	6.7	225
29/04/2020	ETFSL200	0.155	0.158	<0.05	1.32	147.8	7.05	233
29/04/2020	ETFSL500	0.184	0.185	0.24	1.75	51.4	7.11	259
29/04/2020	CONFLU1	0.166	0.183	<0.05	2.03	157.1	6.95	247
4/05/2020	ETAU	0.143	0.137	0.5	1.49	86	6.89	203
4/05/2020	ETFSL200	0.106	0.104	0.13	1.18	110.5	7.32	202
4/05/2020	ETFSL500	0.132	0.128	0.52	1.62	26.1	7.21	212
4/05/2020	CONFLU1	0.04	0.039	0.09	0.75	39.7	7.35	205
13/05/2020	ETAU	0.232	0.236	0.1	2.11	89.2	7.23	234
13/05/2020	ETFSL200	0.156	0.162	0.05	1.5	84.7	7.34	222
13/05/2020	ETFSL500	0.173	0.19	0.34	1.84	2.6	7.42	244
13/05/2020	CONFLU1	0.039	0.036	0.13	0.75	18.9	7.28	219
19/05/2020	ETAU	0.226	0.288	0.42	2.3	42.4	6.71	231
19/05/2020	ETFSL200	0.179	0.198	0.05	1.29	56.3	6.65	230
19/05/2020	ETFSL500	0.199	0.22	0.39	1.9	32.8	6.66	248
19/05/2020	CONFLU1	0.143	0.151	0.05	1.14	9.4	6.66	238
26/05/2020	ETAU	0.142	0.136	0.59	1.43	39	6.36	202
26/05/2020	ETFSL200	0.11	0.111	0.18	1.05	34.5	6.4	201
26/05/2020	ETFSL500	0.119	0.122	0.32	1.26	23	6.42	206
26/05/2020	CONFLU1	0.072	0.069	0.09	0.95	45	6.39	202
1/06/2020	ETAU	0.136	0.126	0.46	1.06	17.1	6.75	203
1/06/2020	ETFSL200	0.11	0.111	0.16	0.95	22.1	6.48	201
1/06/2020	ETFSL500	0.128	0.13	0.45	1.28	17.5	6.5	211
9/06/2020	ETAU	0.21	0.224	1.04	1.93	47.4	6.71	233
9/06/2020	ETFSL200	0.156	0.161	0.25	1.03	73.2	6.81	228
9/06/2020	ETFSL500	0.181	0.179	0.41	1.4	23.7	6.80	246
15/06/2020	ETAU	0.121	0.12	0.64	1.14	35.9	6.26	209
15/06/2020	ETFSL200	0.103	0.103	0.22	0.76	7.9	6.4	207
15/06/2020	ETFSL500	0.111	0.112	0.4	1.1	46.8	6.38	215
30/06/2020	ETAU	0.173	0.173	0.69	1.51	60.9	6.71	200
30/06/2020	ETFSL200	0.123	0.120	0.1	0.96	73	6.74	189
30/06/2020	ETFSL500	0.136	0.133	0.3	1.29	38.3	6.8	198

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/07/2020	ETAU	0.179	0.195	0.4	1.62	104.1	7.45	239
7/07/2020	ETFSL200	0.147	0.155	0.06	1.00	76.3	7.63	238
7/07/2020	ETFSL500	0.176	0.177	0.45	1.36	33.6	7.57	252
8/07/2020	ETAU	0.218	-	1.14	1.89	47	6.99	234
15/07/2020	ETAU	0.089	-	0.51	0.99	92	6.85	206
16/07/2020	ETAU	0.109	0.107	0.71	1.04	31.7	6.73	217
16/07/2020	ETFSL200	0.090	0.093	0.26	0.92	31.5	7.09	214
16/07/2020	ETFSL500	0.101	0.103	0.42	1.10	12.1	7.01	220
21/07/2020	ETAU	0.170	0.171	0.48	1.32	32.2	6.58	220
22/07/2020	ETAU	-	0.171	0.76	1.21	2.97	6.58	225
22/07/2020	ETFSL200	0.122	0.128	<0.05	0.70	25.8	7.07	216
22/07/2020	ETFSL500	0.134	0.148	0.36	0.92	-25.7	6.99	230
30/07/2020	ETAU	0.050	0.052	0.32	0.72	109.3	6.11	113
30/07/2020	ETFSL200	0.041	0.042	0.3	0.67	120.3	6.18	109
30/07/2020	ETFSL500	0.041	0.042	0.28	0.68	124	6.17	106
4/08/2020	ETAU	0.080	-	0.57	0.98	83.2	6.73	155
6/08/2020	ETAU	0.084	0.088	0.57	1.00	94	6.85	148
6/08/2020	ETFSL200	0.083	0.078	0.34	0.88	89.1	7.02	147
6/08/2020	ETFSL500	0.088	0.083	0.25	0.91	126.7	7.03	146
13/08/2020	ETAU	0.043	0.048	0.28	0.53	70.8	6.67	107
13/08/2020	ETFSL200	0.038	0.055	0.24	0.75	75.4	6.48	104
13/08/2020	ETFSL500	0.037	0.043	0.26	0.54	79.4	6.49	101
17/08/2020	ETAU	0.061	0.068	0.43	0.80	112	6.45	133
17/08/2020	ETFSL200	0.035	0.049	0.14	0.49	180.9	6.37	106
17/08/2020	ETFSL500	0.038	0.042	0.12	0.45	214.5	6.20	105
24/08/2020	ETAU	0.090	0.091	0.5	1.16	83.1	6.70	155
24/08/2020	ETFSL200	0.054	0.072	0.12	0.74	138.5	6.85	131
24/08/2020	ETFSL500	0.034	0.033	0.10	0.46	159.6	6.63	123
25/08/2020	ETAU	0.109	-	0.46	1.39	49.2	6.33	160
1/09/2020	ETAU	0.128	0.136	0.5	1.48	104.1	7.14	193
1/09/2020	ETFSL200	0.029	0.035	<0.05	0.47	191.5	7.43	128
1/09/2020	ETFSL500	0.014	0.024	<0.05	0.38	256.7	7.28	119
9/09/2020	ETAU	0.181	0.186	0.57	1.75	45.3	7.01	193
9/09/2020	ETFSL200	0.017	0.031	<0.05	0.43	104.7	6.02	121
9/09/2020	ETFSL500	0.012	0.023	<0.05	0.38	188.5	6.46	114
15/09/2020	ETAU	0.202	0.201	0.6	1.88	71.9	6.5	209
15/09/2020	ETFSL200	0.020	0.026	<0.05	0.43	188.7	6.29	131
15/09/2020	ETFSL500	0.014	0.024	<0.05	0.39	193.4	6.21	126
21/09/2020	ETAU	0.177	0.193	<0.05	1.66	173.6	6.82	205
21/09/2020	ETFSL200	0.019	0.040	<0.05	0.52	204.6	6.1	123
21/09/2020	ETFSL500	0.018	0.055	<0.05	0.52	183.5	6.36	122
22/09/2020	ETAU	0.177	-	0.19	1.61	75.3	6.65	212
30/09/2020	ETAU	0.271	-	0.36	2.54	75.6	6.67	223

Note:

³ Due to the increasing water level in the Woronora Reservoir throughout February and March 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken from April to November 2020, and site CONFLU1 was not sampled from June to November 2020.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/10/2020	ETAU	0.27	0.266	0.33	2.35	116.5	6.83	226
1/10/2020	ETFSL200	0.035	0.262	0.05	0.59	126.8	6.59	140
1/10/2020	ETFSL500	0.032	0.034	0.05	0.58	130.5	6.49	139
7/10/2020	ETAU	0.263	0.262	<0.05	1.46	80.9	6.84	248
7/10/2020	ETFSL200	0.122	0.129	0.05	1	70.8	6.95	194
7/10/2020	ETFSL500	0.101	0.109	0.05	1.05	84	6.82	173
12/10/2020	ETAU	0.264	0.287	<0.05	1.16	101.2	6.97	269
12/10/2020	ETFSL200	0.058	0.062	0.05	0.79	87.8	6.78	158
12/10/2020	ETFSL500	0.04	0.05	0.06	0.77	48	6.74	150
13/10/2020	ETAU	0.267	-	<0.05	1.58	45.8	6.99	246
20/10/2020	ETAU	0.342	-	0.2	2.41	107	6.73	232
22/10/2020	ETAU	0.345	0.322	<0.05	0.322	126.4	6.45	241
22/10/2020	ETFSL200	0.096	0.094	0.08	1.08	106.9	6.72	132
22/10/2020	ETFSL500	0.047	0.053	0.08	0.86	110.5	6.54	114
26/10/2020	ETAU	0.116	0.122	0.59	1.25	63.1	6.59	132
26/10/2020	ETFSL200	0.137	0.15	0.36	1.32	67.4	6.4	133
26/10/2020	ETFSL500	0.1	0.115	0.2	1.35	142.7	6.65	116
27/10/2020	ETAU	0.11	-	0.75	1.38	33.5	6.55	144
2/11/2020	ETAU	0.084	0.092	0.57	1.15	42.4	7.04	170
2/11/2020	ETFSL200	0.069	0.074	0.15	1.14	45.8	7.38	166
2/11/2020	ETFSL500	0.074	0.075	0.13	1.28	118	7.41	164
3/11/2020	ETAU	0.107	-	0.59	1.52	114.1	6.09	174
11/11/2020	ETAU	0.144	0.148	0.2	1.5	88.6	6.89	194
11/11/2020	ETFSL200	0.036	0.038	0.07	0.88	90.6	6.9	157
11/11/2020	ETFSL500	0.027	0.032	0.07	0.88	164	6.78	151
16/11/2020	ETAU	0.127	0.13	0.47	1.57	27.3	6.25	180
16/11/2020	ETFSL200	0.026	0.031	0.05	0.7	87.4	6.1	135
16/11/2020	ETFSL500	0.022	0.03	0.05	0.74	79.2	6.15	135
17/11/2020	ETAU	0.142	-	0.24	1.73	85.7	6.78	191
23/11/2020	ETAU	0.281	0.284	<0.05	2.69	78.8	6.88	219
23/11/2020	ETFSL200	0.041	0.05	<0.05	1.02	58.8	7.13	145
23/11/2020	ETFSL500	0.027	0.034	<0.05	0.91	77.4	6.85	136
25/11/2020	ETAU	0.298	-	<0.05	1.96	205.9	6.71	217
30/11/2020	ETAU	0.28	0.314	<0.05	0.314	136.8	6.53	232
30/11/2020	ETFSL200	0.055	0.063	0.52	1.31	164.5	6.27	145
30/11/2020	ETFSL500	0.042	0.05	0.46	1.2	141.5	6.08	140

Sustainable Minerals Institute
Sir James Foots Building
Cnr College and Staff House Road
St Lucia QLD 4072 Australia

Director
Professor Neville Plint

CRICOS PROVIDER NUMBER 000258

16 March 2021

Mr. Stephen Love
Environment & Community Superintendent
Metropolitan Coal
Peabody Energy Australia
PO Box 402
Helensburgh NSW 2508

Dear Stephen,

Subject: Assessment against Water Quality Performance Measure – December 2020

The Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal not to exceed the subsidence impact performance measures outlined in Table 1 of Condition 1, Schedule 3. Table 1 of Condition 1, Schedule 3 includes a performance measure for negligible reduction to the quality of water resources reaching the Woronora Reservoir.

The Metropolitan Coal Longwalls 305-307 Water Management Plan (LW305-307 WMP) establishes subsidence impact performance indicators for each performance measure. The performance indicator for negligible reduction to the quality of water resources reaching the Woronora Reservoir is:

Changes in the quality of water entering Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations, that are not also occurring at control site WOWQ2.

The LW305-307 WMP requires that analysis of the performance indicator be undertaken on a quarterly basis, however, in the event that analysis identifies a Level 2 or Level 3 significance level (in accordance with the LW305-307 WMP Trigger Action Response Plan [TARP]), the frequency of data analysis is required to be increased to a monthly basis (until such time that data analysis indicates a return to Level 1).

The LW305-307 WMP describes that field filtered water quality parameters (i.e. iron, manganese and aluminium) at site WRWQ 9 on Waratah Rivulet, site ETWQ AU on Eastern Tributary and at control site WOWQ 2 on the Woronora River are used to assess the performance indicator. The LW305-307 WMP describes these as “key water quality parameters of relevance to water supply and effects of subsidence”.

If data analysis indicates a performance indicator has been exceeded, an assessment is to be made against the performance measure.

Analysis conducted by Hydro Engineering & Consulting (2021) in accordance with the LW305-307 WMP, identified that the performance indicator for water resources reaching the Woronora Reservoir was exceeded for dissolved (i.e. filtered <0.45 µm fraction) manganese on the Eastern Tributary at site ETWQ AU in December 2020 (as there was not a similar exceedance of the trigger recorded at control site WOWQ 2 on the Woronora River). The performance indicator was not exceeded for field filtered iron or aluminium in December 2020 and therefore these parameters are not discussed in this report.

In accordance with the LW305-307 WMP, exceedance of the subsidence impact performance indicator has triggered an assessment against the water quality subsidence impact performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*. The term 'negligible' is defined in the Project Approval as *small and unimportant, such as to be not worth considering*.

This assessment against the water quality subsidence impact performance measure has been prepared for December 2020 in consideration of:

- pluviograph data;
- flow data from the Eastern Tributary gauging location (GS 300078);
- groundwater level and groundwater quality results for Eastern Tributary sites up to 31 December 2020¹;
- surface water quality data at site ETWQ AU/ETAU² and sites further upstream on the Eastern Tributary up to 31 December 2020;
- surface water quality data at sites downstream of ETWQ AU/ETAU² up to 31 December 2020; and
- the Australian Drinking Water Guidelines.

1. PLUVIOGRAPH, EASTERN TRIBUTARY FLOW AND GROUNDWATER LEVEL DATA

The monthly rainfall recorded for the Eastern Tributary at PV7 has been frequently below the average monthly rainfall (Darkes Forest long term monthly mean) since 2016. Since January 2018, above average rainfall has only been recorded in October to December 2018, September 2019, January to March 2020, July 2020, August 2020, October 2020, and December 2020, with below average rainfall recorded in all other months (Table 1).

Total rainfall at PV7 in December 2020 was 106.0 mm, above the average rainfall at Darkes Forest (103.0 mm), with rainfall occurring on 2 to 3 December (totalling 4.0 mm), 6 December (2.0 mm), 11 to 12 December (totalling 67.0 mm), 26 to 27 December (totalling 4.0 mm), and 29 to 31 December (totalling 29.0 mm).

¹ Groundwater quality at site ETWG1 has not been able to be sampled since August 2017.

² Site ETAU is the same as site ETWQ AU (i.e. samples are taken at the same location). The difference between the sites relates to the time of sampling. Site ETWQ AU monitoring is conducted on the same day as sites upstream of ETWQ AU/ETAU (shown on Charts 1 to 2), while site ETAU monitoring is conducted on the same day as the sites downstream of ETWQ AU/ETAU (described in Section 3 and shown on Charts 3 to 4). From 29 January 2019, water quality sampling of all sites on the Eastern Tributary was undertaken in a single day. Future reporting will identify the data at this site as site ETWQ AU.

Table 1 Monthly Rainfall Data for PV7, January 2018 to December 2020

Month/Year	Rainfall at PV7 (mm)	Rainfall at Darkes Forest (mm) [#]	Monthly Mean Rainfall at Darkes Forest (1894-2020) (mm) [#]
January 2018	48.0	12.0	132.4
February 2018	115.5	16.6	159.6
March 2018	151.0	45.0	153.9
April 2018	32.0	21.6	126.8
May 2018	12.5	8.0	129.1
June 2018	112.0	91.8	146.6
July 2018	3.5	0.4	96.4
August 2018	12.5	15.8	89.1
September 2018	52.0	41.8	76.6
October 2018	197.0	200.8	91.9
November 2018	114.5	127.8	105.4
December 2018	120.0	91.0	103.8
January 2019	58.5	55.4	131.8
February 2019	41.0	54.2	158.7
March 2019	149.0	201.2	154.3
April 2019	35.0	46.0	126.1
May 2019	8.5	8.0	128.1
June 2019	115.5	47.4	145.8
July 2019	56.0	46.4	96.0
August 2019	53.0	58.8	88.9
September 2019	162.5	150.2	77.2
October 2019	53.0	37.4	91.5
November 2019	47.0	43.8	104.9
December 2019	6.5	3.6	103.0
January 2020	133.0	56.2	131.2
February 2020	730.0	255.2	159.5
March 2020	236.0	146.0*	154.3
April 2020	88.5	73.0*	126.1
May 2020	88.0	111.0*	128.1
June 2020	59.0	65.0*	145.8
July 2020	237.0	185.0*	96.0
August 2020	151.5	86.0*	88.9
September 2020	31.0	36.0	76.8
October 2020	131.5	158.0	92.0
November 2020	87.5	65.0	104.6
December 2020	106.0	104.0	103.0

[#] Bureau of Meteorology Station Number 68024 established in 1894. Each monthly mean is calculated using all data obtained since the commencement of monitoring at Station 68024 to December 2020.

^{*} Data from Station 68024 is incomplete or not available for the period of March to August 2020. Data from nearby Station 66176 (Audley) has therefore been substituted for these months.

2. EASTERN TRIBUTARY SURFACE WATER AND GROUNDWATER QUALITY DATA

There has been a notable increase in dissolved manganese at site ETWQ AU compared to prior concentrations since July 2016. Reducing conditions (through water saturation excluding oxygen) has solubilised manganese in the groundwater. The soluble manganese (manganese [II] ion, Mn^{2+}) has been transferred to surface water through mine-induced cracking, resulting in an increase in dissolved manganese concentrations in the Eastern Tributary. The concentration of dissolved manganese is typically higher upstream of site ETWQ AU (for example, site ETWQ AQ shown on Charts 1 and 2), where cracking and the diversion of flows has occurred. Plots of dissolved manganese at surface water quality sites ETWQ AU, ETWQ AQ (upstream on the Eastern Tributary) and WOWQ 2 (control site) and at groundwater quality site ETGW2, are compared to rainfall at PV7 (Chart 1) and streamflow at GS 300078 (Chart 2) (Figure 1).

While groundwater quality site ETGW2 is downstream of site ETWQ AU, the groundwater quality data are indicative of the characteristics of the groundwater. Manganese will remain dissolved in the water column as oxidation at near-neutral pH is slow (Raveendran et al., 2001) and soluble manganese (II) is the most stable species (Rayner-Canham, 1996). Low levels of manganese, e.g. <0.1 mg/L, exist in the natural creek water. Dissolved manganese is easily diluted by freshwater flow to low levels when higher creek flows occur.

In December 2020, dissolved manganese concentrations at site ETWQ AU ranged between 0.282 mg/L and 0.407 mg/L. As described above, prior to October 2018, rainfall was well below average for an extended period of time. The low stream flows resulted in insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese at site ETWQ AU. During October to December 2018, heavy rainfall increased flow in the Eastern Tributary sufficiently to dilute dissolved manganese at site ETWQ AU to below 0.5 mg/L and demonstrated that the high dissolved manganese in the Eastern Tributary could be diluted by creek flow. The dilution of dissolved manganese concentrations during high flows was also evident as a result of the rainfall event observed over 17 to 21 September 2019, which increased flows in the Eastern Tributary and resulted in the dissolved manganese concentration dropping to the lowest level recorded since October 2016. This also occurred following the rainfall events on 17 January 2020, and throughout February and March 2020. Dissolved manganese concentration was measured as being above the long-term mean (0.33 mg/L) on 16, 21 and 30 November 2020 (Attachment A).

Water quality parameters pertinent to the increase in manganese (dissolved-filtered <0.45 μm fraction) concentration are pH, oxidation-reduction potential (ORP) and electrical conductivity (EC). The pH and ORP define the physico-chemical form of manganese that can exist in water based on whether the conditions are oxidising or reducing. The EC results indicate whether there has been an increase in salinity (following the mixing of groundwater with the creek water). Water is generally weakly oxidizing and becomes reducing when ORP is below approximately 10 mV.

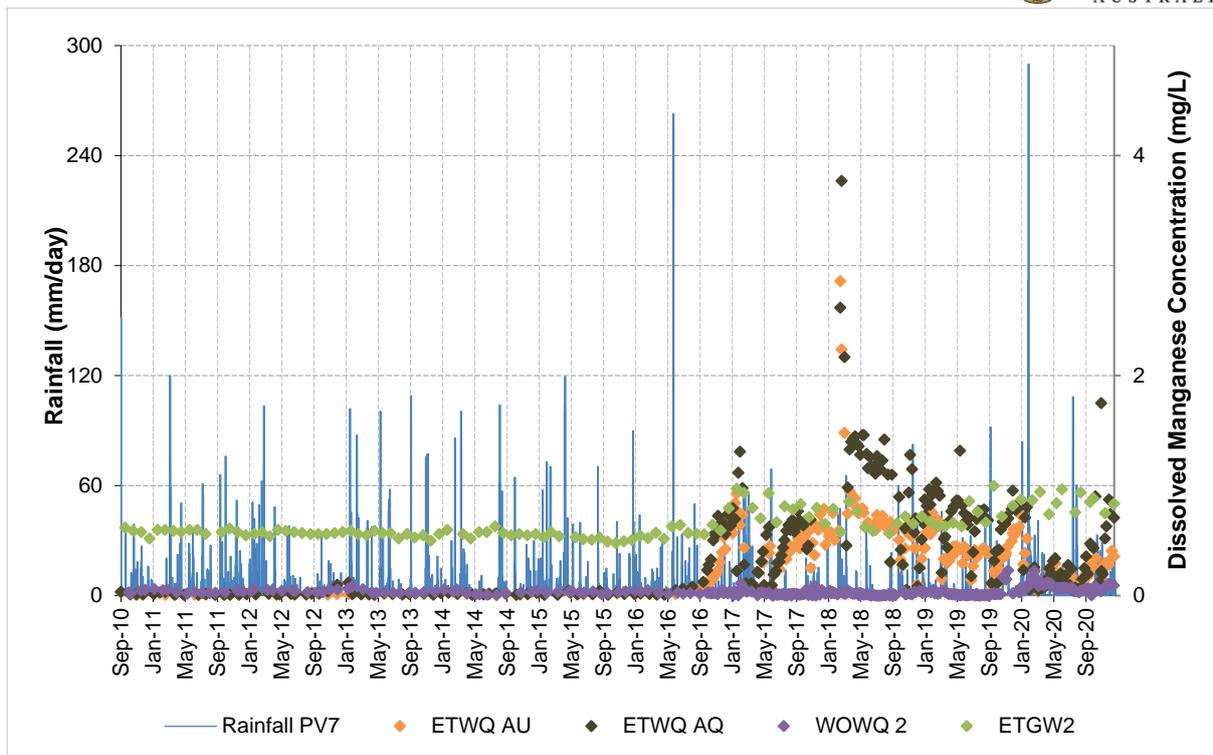


Chart 1 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Rainfall (to 31 December 2020)

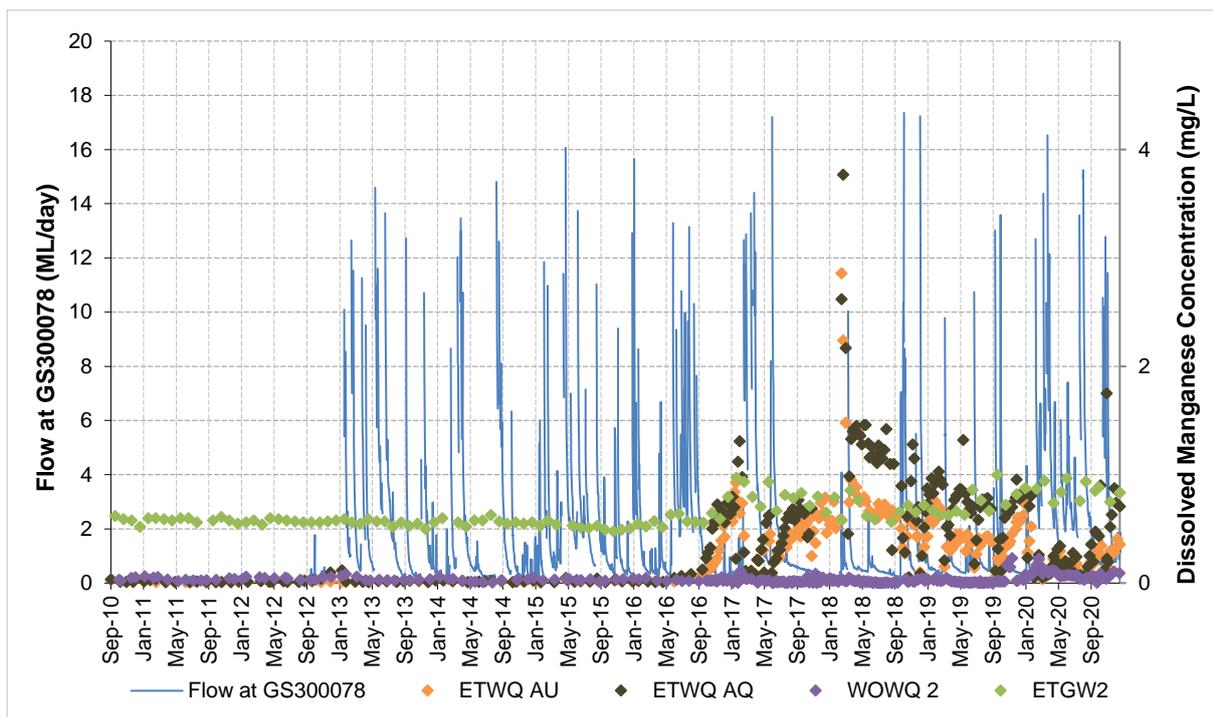
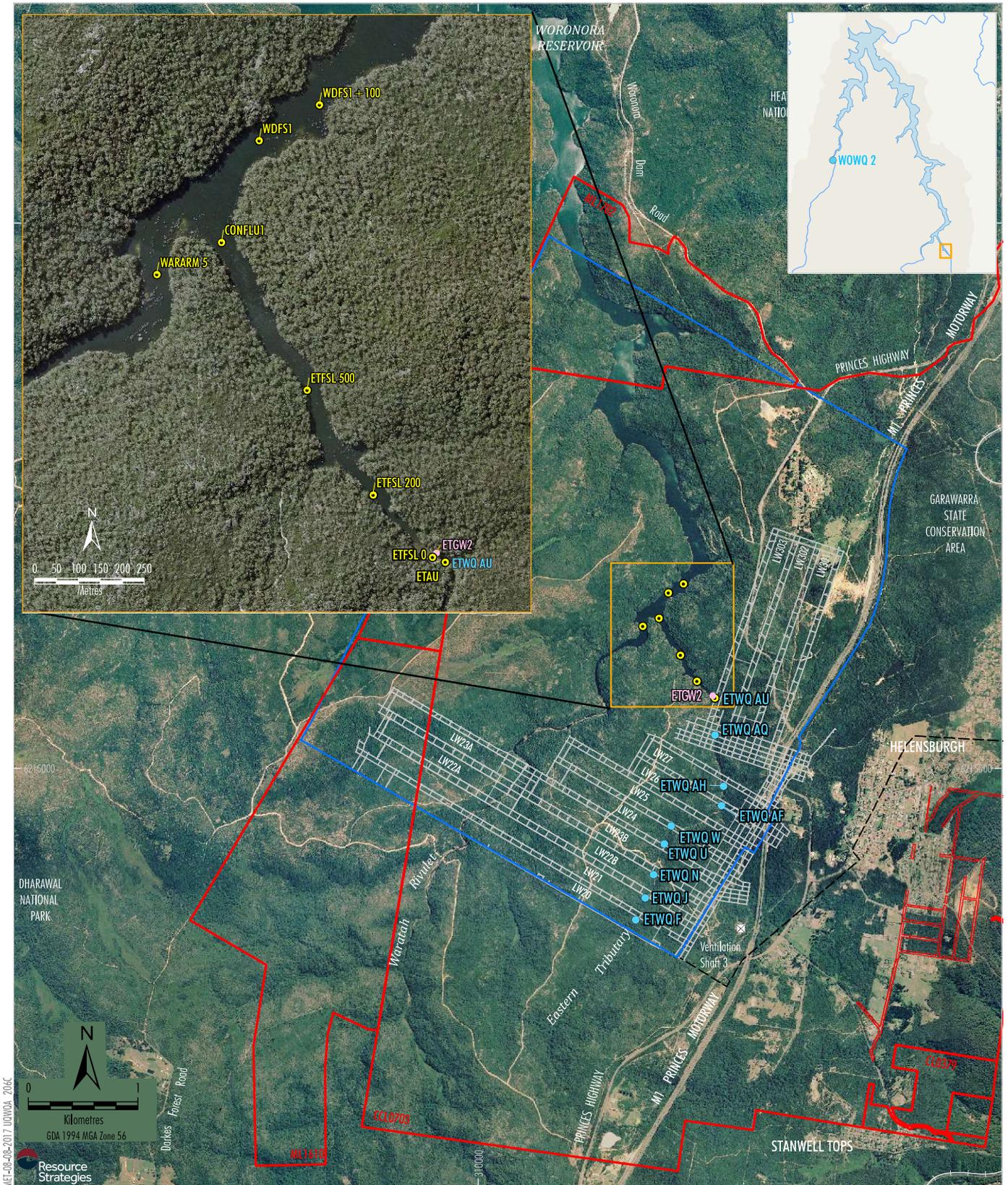


Chart 2 Dissolved Manganese Concentrations at Surface Water Quality Sites ETWQ AU, ETWQ AQ and WOWQ 2 and Groundwater Quality Site ETGW2, and Stream Flow (to 31 December 2020)



MET-08-08-2017 UOWDA 2066C

- LEGEND**
- Mining Lease Boundary
 - Railway
 - Project Underground Mining Area
Longwalls 20-27 and 301-317
 - Existing Underground Access Drive (Main Drift)
 - Surface Water Quality Site on Eastern Tributary
 - Water Quality Site on Eastern Tributary and/or in Woronora Reservoir
 - Groundwater Quality Site of Eastern Tributary

Source: Land and Property Information (2015); Date of Aerial Photography 1998 and 2017; Department of Industry (2015); Metropolitan Coal (2018); WaterNSW (2018)

Peabody
METROPOLITAN COAL
Surface Water Quality Sampling of
Eastern Tributary Watercourse
and Woronora Reservoir

Figure 1

In December 2020 at site ETWQ AU:

- pH (lab measurement) was generally consistent (pH 6.96 to pH 7.27);
- EC concentrations (lab measurement) ranged between 249 $\mu\text{S}/\text{cm}$ and 268 $\mu\text{S}/\text{cm}$; and
- ORP (field measurement) ranged between 79.8 mV and 129.9 mV.

3. WATER RESOURCES REACHING THE WORONORA RESERVOIR

In accordance with the LW305-307 WMP, site ETWQ AU on the Eastern Tributary and control site WOWQ 2 on the Woronora River are used to assess the LW305-307 WMP water quality performance indicator. As described earlier, in the event the water quality performance indicator is exceeded, an assessment is required to be conducted against the water quality performance measure.

As site ETWQ AU on the Eastern Tributary does not represent where water resources reach the Woronora Reservoir, I previously recommended to Metropolitan Coal that additional sampling be conducted at, and downstream of, site ETWQ AU to inform assessments against the performance measure. The additional sampling commenced in August 2017 at sites ETFSL100 to ETFSL500. Due to the reducing water level in the Woronora Reservoir, in November 2018 I recommended to Metropolitan Coal that the sampling program should be extended further downstream (i.e. further into the Woronora Reservoir). The additional sampling commenced on 22 November 2018. Sampling at some sites downstream of site ETWQ AU was not undertaken throughout February and March 2020 due to the high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir (Appendix A). Further, and due to the increasing water level in the Woronora Reservoir throughout April 2020, and sustaining water level through to December 2020, sampling at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 was not undertaken in December 2020 (Appendix A).

Metropolitan Coal has taken a photographic record of the watercourse/waterbody at the time of sampling, estimated the width of the watercourse/waterbody at the sample location and recorded the depth at which the water sample was taken.

The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area (Helensburgh Coal Pty Ltd, 2008). The Woronora River, Waratah Rivulet and Eastern Tributary are some of the tributaries which flow into the Woronora Reservoir (Figure 1). The length of the watercourse/waterbody from the start of the Eastern Tributary 'arm' of the reservoir to the reservoir wall is some 10 km (Figure 1).

The Woronora Reservoir receives flow from the Eastern Tributary which enters a mixing zone in the upper arm of the reservoir. Based on Woronora Reservoir water level data, in December 2020 the Woronora Reservoir water level fell slightly from 163.68 mAHD (on 1 December 2020) to 163.37 mAHD at the end of the month. The position of the reservoir water level can only be determined to the closest one metre contour, accordingly, the reservoir water level during December 2020 was upstream of site ETSFL 200 (corresponding to a water level of 164 mAHD).

Water reaching the Woronora Reservoir occurs where the inflowing Eastern Tributary stream water meets the reservoir water body. The interface point between ponded flow from the Eastern Tributary and the reservoir water body varies constantly with the level of the reservoir and the rate of inflow from the Eastern Tributary. Throughout December 2020, the Woronora Reservoir water level was upstream of site ETFSL 200 (Figure 1). The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

4. QUALITY OF WATER REACHING THE WORONORA RESERVOIR

Water quality data for filtered and total manganese for January 2018 to December 2020 at sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400 and ETFSL 500 is provided in Attachment A. As described earlier, sampling at sites ETFSL 100, ETFSL 300 and ETFSL 400 was suspended once monitoring at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 commenced on 22 November 2018³, however has since recommenced following the increased Woronora Reservoir water level. Water quality data for filtered and total manganese since sampling commenced on 22 November 2018 at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 is also provided in Attachment A.

As described above, the Woronora Reservoir water level fluctuated slightly in December 2020, and was upstream of site ETFSL 200. The results for dissolved and total manganese at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 since the commencement of monitoring to the end of December 2020, are shown on Charts 3 and 4, respectively. These sites provide a profile along the arm of the Woronora Reservoir.

The filtered manganese concentrations for December 2020 ranged from 0.282 mg/L to 0.407 mg/L at site ETAU, 0.050 mg/L to 0.092 mg/L at site ETFSL 200, and 0.032 mg/L to 0.053 mg/L at site ETFSL 500 (Chart 3).

Total manganese concentrations for December 2020 followed similar trends, ranging from 0.358 mg/L to 0.418 mg/L at site ETAU, 0.066 mg/L to 0.098 mg/L at site ETFSL 200, and 0.050 mg/L to 0.069 mg/L at site ETFSL 500 (Chart 4).

³ Sampling at site ETAU was also temporarily suspended during this period but was resumed on 12 December 2018. Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU during this period. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

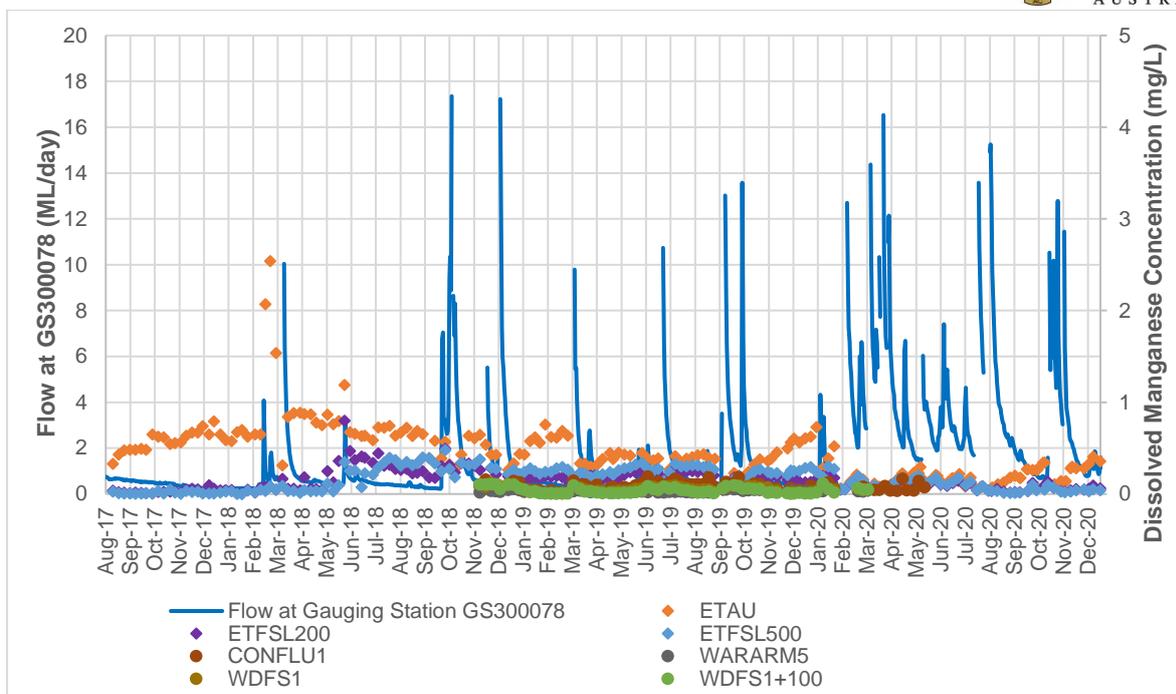


Chart 3 Dissolved Manganese Concentrations at Surface Water Quality Sites ETAU⁴, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 December 2020)

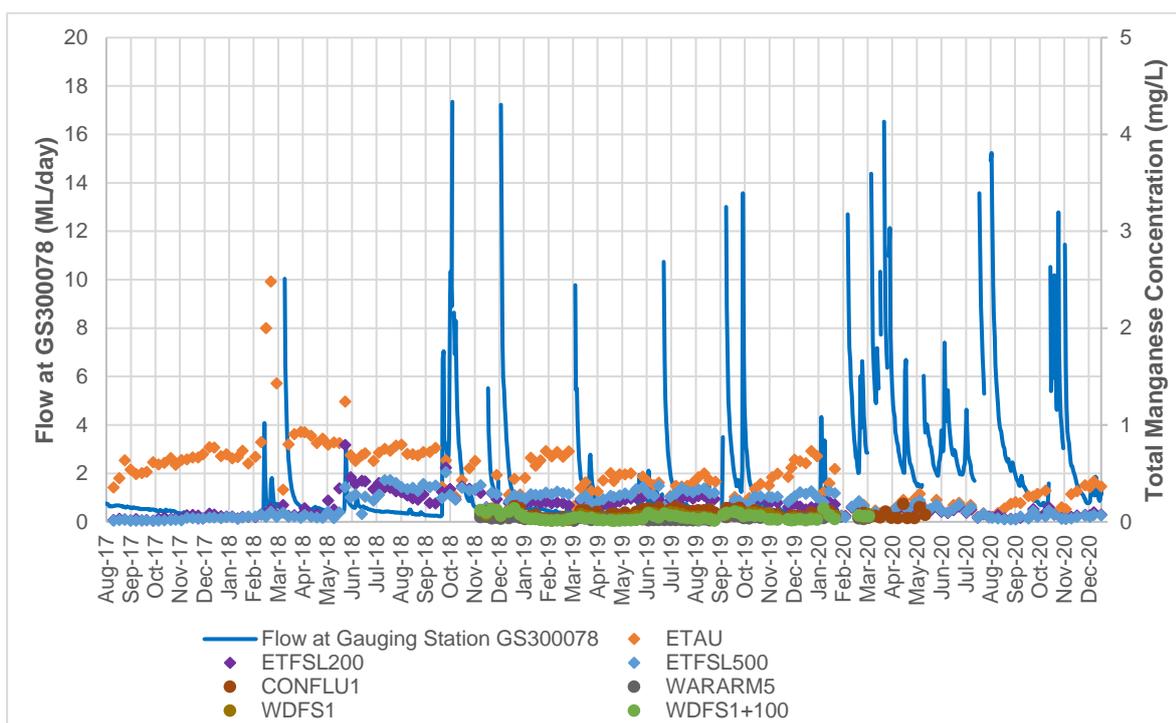


Chart 4 Total Manganese Concentrations at Surface Water Quality Sites ETAU⁵, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100, and Stream Flow (August 2017 to 31 December 2020)

⁴ Data from sampling undertaken at site ETWQ AU has been substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

⁵ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

The Australian Drinking Water Guidelines (ADWG) are published by the National Health and Medical Research Council and updated most recently in 2018 (NHMRC & NRMCC, 2011); the manganese guidelines remain unchanged. The Woronora Dam is operated by WaterNSW. Water from the Woronora Dam is treated in the Woronora Filtration Plant to the standards set by the ADWG before being supplied to the Helensburgh area as well as parts of the Sutherland Shire and northern Wollongong (WaterNSW, 2017).

The ADWG are based on total concentrations of manganese in water (NHMRC & NRMCC, 2011). The ADWG value is 0.5 mg/L total manganese for health. Filtered and total manganese concentrations at site ETFSL 500 have been below 0.5 mg/L for the period of record, with the exception of one total manganese result on 10 October 2018 (0.512 mg/L). All filtered and total manganese concentrations at sites CONFLU1, WARARM5, WDFS1 and WDFS1+100 have been below 0.5 mg/L for the period of record (Charts 3 and 4).

Water quality data for parameters pertinent to dissolved manganese for January 2018 to December 2020 at sites ETAU, ETFSL 200, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100 is provided in Attachment A. The water quality parameters (ORP and EC) showed no unusual features.

The ADWG value for pH (aesthetic) is 6.5-8.5. The pH values at all sites fluctuated during December 2020, with some sites reducing by the end of the month (ETFSL 500 from 6.95 to 6.41 and ETFSL 200 from 7.36 to pH 6.54), and some sites increasing by the end of the month (ETAU from 7.21 to 7.27). At the end of December 2020, all sites except ETFSL 500 were within the ADWG value range for pH (Attachment A).

The groundwater at ETGW2 below ETAU on 25 November 2020 was pH 6.55 and on December 30 was pH 6.49, indicating that seeping groundwater may have been a source of lower pH water entering the reservoir.

5. ASSESSMENT AGAINST THE PERFORMANCE MEASURE

The subsidence impact performance indicator for water quality reaching the Woronora Reservoir was exceeded in relation to dissolved manganese at site ETWQ AU on the Eastern Tributary in December 2020, which has triggered assessment against the water quality subsidence impact performance measure.

Soluble manganese from groundwater has been transferred to surface water through mine-induced cracking. The climatic conditions in 2018 resulted in low stream flows and insufficient surface water to dilute the elevated concentrations of dissolved manganese from the groundwater, resulting in higher concentrations of dissolved manganese in the Eastern Tributary. Manganese concentrations are easily diluted by freshwater flow to low levels when higher creek flows occur.

Comparison of the photographic records for December 2020 show the quality of water below ETAU was consistent during December 2020, with the water further downstream observed to be generally clear due to rainfall occurring in the preceding months, and some sites closer to ETAU showing some orange-yellow sediment. The presence of orange-yellow coating on the creek sediment surface, continued to be observed throughout December 2020, will darken with time as conversion to goethite occurs.

Water reaching the Woronora Reservoir occurs where the inflowing stream water meets the reservoir waterbody. In December 2020, the Woronora Reservoir water level was upstream of site ETFSL 200. The mixing zone (downstream of the reservoir water level) is variable and influenced by the rate of inflow from the Eastern Tributary.

The manganese concentration reaching the Woronora Reservoir has been considered. Water quality data obtained to date is considered to represent a negligible reduction to the quality of water resources reaching the reservoir. The watercourse performance measure, *Negligible reduction to the quality of water resources reaching the Woronora Reservoir*, is not considered to have been exceeded.

6. REFERENCES

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Yours Sincerely,



Barry N Noller

Principal Research Fellow

Centre For Mined Land Rehabilitation

ATTACHMENT A

WATER QUALITY DATA FOR SITES ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500,
WARARM5, CONFLU1, WDFS1 and WDFS1+100

JANUARY 2018 TO DECEMBER 2020

ATTACHMENT A

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/01/2018	ETAU	0.652	0.678	<0.05	0.59	132	7.37	351
4/01/2018	ETFSL100	0.281	0.305	<0.05	0.82	125.3	7.75	337
4/01/2018	ETFSL200	0.042	0.057	<0.05	0.68	132.7	7.05	118
4/01/2018	ETFSL300	0.038	0.052	0.06	0.6	13.2	6.92	111
4/01/2018	ETFSL400	0.024	0.037	<0.05	0.47	129.9	6.96	110
4/01/2018	ETFSL500	0.016	0.036	<0.05	0.46	121.7	6.74	111
11/01/2018	ETAU	0.588	0.698	0.13	1.36	55.9	7.56	364
11/01/2018	ETFSL100	0.197	0.237	<0.05	0.55	24.3	7.88	345
11/01/2018	ETFSL200	0.041	0.053	<0.05	0.63	101	7.14	139
11/01/2018	ETFSL300	0.067	0.078	1.89	2.1	35.2	6.88	128
11/01/2018	ETFSL400	0.106	0.052	0.47	0.66	52	6.84	124
11/01/2018	ETFSL500	0.026	0.046	0.06	0.78	94.4	7.01	122
18/01/2018	ETAU	0.577	0.653	<0.05	1.15	136.4	7.67	366
18/01/2018	ETFSL100	0.211	0.22	<0.05	0.64	131.9	7.74	353
18/01/2018	ETFSL200	0.046	0.055	<0.05	0.79	131.2	7	129
18/01/2018	ETFSL300	0.058	0.057	0.06	0.84	125.5	6.94	126
18/01/2018	ETFSL400	0.038	0.048	<0.05	0.71	139.6	6.96	125
18/01/2018	ETFSL500	0.032	0.049	<0.05	0.78	121.4	6.94	123
25/01/2018	ETAU	0.674	0.668	<0.05	0.52	56.8	7.55	378
25/01/2018	ETFSL100	0.074	0.152	<0.05	0.46	-4.4	7.82	360
25/01/2018	ETFSL200	0.007	0.034	<0.05	0.41	70.6	7.16	120
25/01/2018	ETFSL300	0.005	0.035	<0.05	0.46	22.8	7.09	117
25/01/2018	ETFSL400	0.001	0.032	<0.05	0.41	55	7	118
25/01/2018	ETFSL500	0.002	0.03	<0.05	0.35	288.6	7.04	115
31/01/2018	ETAU	0.7	0.734	<0.05	0.67	82.3	7.46	374
31/01/2018	ETFSL100	0.089	0.147	<0.05	0.36	30.7	8.01	361
31/01/2018	ETFSL200	0.005	0.052	<0.05	0.57	79.1	7.28	139
31/01/2018	ETFSL300	0.002	0.049	<0.05	0.66	42.7	7.08	123
31/01/2018	ETFSL400	0.001	0.046	<0.05	0.54	92	7.05	122
31/01/2018	ETFSL500	0.001	0.044	<0.05	0.55	71	7.01	122
7/02/2018	ETAU	0.625	0.601	<0.05	0.65	106.9	7.39	374
7/02/2018	ETFSL100	0.102	0.129	<0.05	0.75	14.8	7.78	359
7/02/2018	ETFSL200	0.047	0.051	<0.05	0.48	80.4	7.04	119
7/02/2018	ETFSL300	0.049	0.059	<0.05	0.65	38.2	6.97	119
7/02/2018	ETFSL400	0.112	0.07	0.27	0.74	1	6.77	118
7/02/2018	ETFSL500	0.038	0.053	0.11	0.58	86.6	6.92	117
16/02/2018	ETAU	0.65	0.67	<0.05	0.66	158.8	7.54	380
16/02/2018	ETFSL100	0.075	0.126	<0.05	0.33	163.9	7.96	369
16/02/2018	ETFSL200	0.016	0.048	<0.05	0.6	152	7.05	128
16/02/2018	ETFSL300	0.023	0.058	<0.05	0.81	121.1	6.88	124
16/02/2018	ETFSL400	0.012	0.049	<0.05	0.54	143.2	6.83	121
16/02/2018	ETFSL500	0.019	0.054	<0.05	0.54	144.1	6.82	120
23/02/2018	ETAU	0.651	0.822	<0.05	1.72	163.6	7.21	400
23/02/2018	ETFSL100	0.12	0.2	<0.05	0.5	31.8	7.75	384
23/02/2018	ETFSL200	0.068	0.078	<0.05	0.93	55.8	6.92	140
23/02/2018	ETFSL300	0.065	0.07	0.07	0.88	55.2	6.8	136
23/02/2018	ETFSL400	0.062	0.075	<0.05	0.93	41.8	6.78	135
23/02/2018	ETFSL500	0.049	0.075	<0.05	1.07	-119.2	6.78	132

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/03/2018	ETAU	2.07	2	5.96	5.69	83.1	6.32	492
1/03/2018	ETFSL100	1.78	1.72	2.41	2.7	36.7	6.31	464
1/03/2018	ETFSL200	0.08	0.087	0.08	0.83	59	6.45	133
1/03/2018	ETFSL300	0.059	0.069	0.16	0.79	43.5	6.36	127
1/03/2018	ETFSL400	0.05	0.064	0.1	1.03	32	6.35	125
1/03/2018	ETFSL500	0.036	0.051	0.08	0.65	2.3	6.38	123
7/03/2018	ETAU	2.54	2.48	7.52	7.23	168.1	6.12	514
7/03/2018	ETFSL100	2.21	2.15	4.12	4.43	158.6	6.11	479
7/03/2018	ETFSL200	0.082	0.132	0.07	0.92	166.8	6.29	147
7/03/2018	ETFSL300	0.108	0.12	<0.05	0.91	149	6.32	147
7/03/2018	ETFSL400	0.088	0.11	<0.05	0.78	161.1	6.79	142
7/03/2018	ETFSL500	0.083	0.102	0.07	0.76	154.5	6.32	138
14/03/2018	ETAU	1.54	1.43	3.72	6.68	41.4	6.58	450
14/03/2018	ETFSL100	0.907	1.08	0.55	3.58	31.6	6.95	431
14/03/2018	ETFSL200	0.047	0.066	<0.05	0.63	76	6.84	135
14/03/2018	ETFSL300	0.048	0.054	<0.05	0.56	41.4	6.83	133
14/03/2018	ETFSL400	0.064	0.055	0.06	0.61	3.3	6.86	132
14/03/2018	ETFSL500	0.047	0.052	<0.05	0.47	21.9	6.79	131
22/03/2018	ETAU	0.312	0.33	0.73	1.46	229.3	5.24	237
22/03/2018	ETFSL100	0.362	0.363	0.71	1.69	182.9	5.08	240
22/03/2018	ETFSL200	0.166	0.173	0.44	1.63	71.9	6.51	160
22/03/2018	ETFSL300	0.118	0.118	0.28	1.33	70.6	6.54	153
22/03/2018	ETFSL400	0.146	0.136	0.8	1.66	22.8	6.61	152
22/03/2018	ETFSL500	0.091	0.095	0.14	1.02	32.6	6.65	144
29/03/2018	ETAU	0.841	0.798	2.83	3.32	148	6.66	341
29/03/2018	ETFSL100	0.732	0.729	1.87	2.6	40.9	6.63	332
29/03/2018	ETFSL200	0.058	0.059	0.11	0.62	84.2	6.65	131
29/03/2018	ETFSL300	0.047	0.053	0.08	0.59	65.9	6.64	131
29/03/2018	ETFSL400	0.051	0.055	0.08	0.74	71.4	6.64	130
29/03/2018	ETFSL500	0.033	0.051	0.08	1.29	27.3	6.68	128
5/4/2018	ETAU	0.885	0.904	2.84	4.76	182.7	6.57	384
5/4/2018	ETFSL100	0.674	0.672	0.73	2.41	191.7	6.67	374
5/4/2018	ETFSL200	0.058	0.067	0.08	0.62	211.9	6.32	142
5/4/2018	ETFSL300	0.044	0.058	0.07	0.57	209.4	6.37	142
5/4/2018	ETFSL400	0.04	0.058	0.13	0.77	209.1	6.39	141
5/4/2018	ETFSL500	0.035	0.054	0.09	0.66	205.9	6.4	141
13/4/2018	ETAU	0.888	0.927	1.42	4.26	156.2	6.76	391
13/4/2018	ETFSL100	0.614	0.651	0.13	2.46	172.9	6.92	382
13/4/2018	ETFSL200	0.042	0.065	0.08	0.7	42.8	6.84	153
13/4/2018	ETFSL300	0.033	0.051	0.05	0.5	40.9	6.52	145
13/4/2018	ETFSL400	0.023	0.048	<0.05	0.59	64.1	6.6	147
13/4/2018	ETFSL500	0.014	0.04	<0.05	0.51	58.6	6.61	142
18/4/2018	ETAU	0.875	0.925	0.62	2.62	192.1	6.77	397
18/4/2018	ETFSL100	0.614	0.636	0.13	2.27	192.3	7.19	390
18/4/2018	ETFSL200	0.184	0.14	0.57	1.14	184.8	6.75	178
18/4/2018	ETFSL300	0.059	0.074	0.08	0.86	186.3	6.81	162
18/4/2018	ETFSL400	0.05	0.069	<0.05	0.64	181.3	6.76	159
18/4/2018	ETFSL500	0.044	0.071	0.07	0.76	185.5	6.76	160

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/4/2018	ETAU	0.871	0.887	3.01	4.32	7.2	7.02	1040
26/4/2018	ETFSL100	0.587	0.631	0.1	2.06	9.6	7.42	409
26/4/2018	ETFSL200	0.059	0.071	0.08	0.69	45.1	7.01	159
26/4/2018	ETFSL300	0.043	0.055	<0.05	0.54	2.5	6.96	159
26/4/2018	ETFSL400	0.04	0.055	<0.05	0.54	36	6.97	155
26/4/2018	ETFSL500	0.03	0.05	0.05	0.51	94.3	6.96	152
3/5/2018	ETAU	0.781	0.813	2.38	2.38	76.9	6.9	362
3/5/2018	ETFSL100	0.58	0.611	0.18	3.02	20	7.47	358
3/5/2018	ETFSL200	0.056	0.081	0.07	0.78	43.5	7.01	142
3/5/2018	ETFSL300	0.053	0.059	0.13	0.55	5.3	7.02	136
3/5/2018	ETFSL400	0.044	0.052	0.06	0.45	55.3	7	132
3/5/2018	ETFSL500	0.034	0.044	0.07	0.68	60.7	7.01	128
10/5/2018	ETAU	0.752	0.86	4.66	4.66	176.7	6.75	388
10/5/2018	ETFSL100	0.553	0.628	0.06	4.58	191.5	7.19	384
10/5/2018	ETFSL200	0.044	0.061	<0.05	0.89	187.4	6.64	129
10/5/2018	ETFSL300	0.042	0.051	0.08	0.56	180.2	6.67	131
10/5/2018	ETFSL400	0.051	0.056	0.1	0.5	170.7	6.71	133
10/5/2018	ETFSL500	0.032	0.04	0.08	0.45	164	6.68	124
17/5/2018	ETAU	0.868	0.795	3.32	3.32	160	6.78	383
17/5/2018	ETFSL100	0.634	0.605	<0.05	2.66	178.5	7.12	375
17/5/2018	ETFSL200	0.249	0.22	0.25	1.87	178.5	6.85	246
17/5/2018	ETFSL300	0.176	0.178	0.12	1.57	175.8	6.84	230
17/5/2018	ETFSL400	0.146	0.14	0.1	1.32	179.3	6.78	202
17/5/2018	ETFSL500	0.113	0.102	0.12	1.36	179.6	6.65	176
24/5/2018	ETAU	0.763	0.795	3.22	3.22	192.8	7.22	381
24/5/2018	ETFSL100	0.563	0.63	<0.05	4.36	194.2	7.12	375
24/5/2018	ETFSL200	0.128	0.128	0.58	1.03	189.4	6.95	158
24/5/2018	ETFSL300	0.04	0.053	0.05	0.62	102.2	6.78	125
24/5/2018	ETFSL400	0.037	0.043	0.07	0.39	184.9	6.72	145
24/5/2018	ETFSL500	0.031	0.037	<0.05	0.33	185.2	6.76	120
31/5/2018	ETAU	0.797	0.812	3.74	3.74	193.3	7.22	378
31/5/2018	ETFSL100	0.626	0.598	<0.05	2.57	197.5	7.12	375
31/5/2018	ETFSL200	0.362	0.344	0.48	2.18	187.7	7.18	260
31/5/2018	ETFSL300	0.177	0.171	0.24	1.44	185.8	7.18	188
31/5/2018	ETFSL400	0.178	0.162	0.67	1.86	179.9	7.19	184
31/5/2018	ETFSL500	0.098	0.096	0.11	0.89	176	7.12	154
7/6/2018	ETAU	1.19	1.24	3.12	4.03	188.4	6.8	361
7/6/2018	ETFSL100	0.889	0.942	1.43	2.91	185.7	7.19	342
7/6/2018	ETFSL200	0.8	0.792	1.29	3.2	189.2	7.17	327
7/6/2018	ETFSL300	0.625	0.67	0.9	3.42	178.7	7.16	304
7/6/2018	ETFSL400	0.402	0.442	0.06	4.24	182.9	7.25	271
7/6/2018	ETFSL500	0.347	0.358	0.35	3.74	183.4	7.27	268
14/6/2018	ETAU	0.674	0.686	2.1	3.89	99.8	6.94	314
14/6/2018	ETFSL100	0.34	0.539	0.26	2.33	73.3	7.27	309
14/6/2018	ETFSL200	0.47	0.459	0.72	2.12	178.9	7.09	300
14/6/2018	ETFSL300	0.377	0.37	0.26	2.25	167.8	7.12	264
14/6/2018	ETFSL400	0.292	0.288	0.08	2.17	192.4	7.15	228
14/6/2018	ETFSL500	0.255	0.251	0.08	1.94	203.5	7.04	201

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
20/6/2018	ETAU	0.657	0.628	3.62	5.4	188.3	6.72	337
20/6/2018	ETFSL100	0.457	0.468	0.9	3.16	19	6.9	324
20/6/2018	ETFSL200	0.371	0.39	0.72	2.4	191.4	6.95	320
20/6/2018	ETFSL300	0.384	0.377	0.34	2.42	190.5	6.98	322
20/6/2018	ETFSL400	0.331	0.333	<0.05	2.84	191.2	7	312
20/6/2018	ETFSL500	0.256	0.28	<0.05	2.67	184.8	7.01	273
28/6/2018	ETAU	0.634	0.687	4.08	7	185.8	6.6	328
28/6/2018	ETFSL100	0.501	0.559	1.04	3.95	188.8	7.02	329
28/6/2018	ETFSL200	0.409	0.422	1.45	3.94	187.2	6.82	306
28/6/2018	ETFSL300	0.176	0.207	<0.05	1.95	199.7	6.77	190
28/6/2018	ETFSL400	0.108	0.111	<0.05	1.04	198.5	6.67	128
28/6/2018	ETFSL500	0.075	0.079	0.05	0.79	179.7	6.61	118
2/7/2018	ETAU	0.637	0.706	3.29	6.24	39.9	7.05	352
2/7/2018	ETFSL100	0.519	0.558	0.97	4.38	191	7.31	351
2/7/2018	ETFSL200	0.395	0.416	0.86	2.28	191.4	7.34	344
2/7/2018	ETFSL300	0.391	0.426	1.19	3.57	193.9	7.25	342
2/7/2018	ETFSL400	0.327	0.349	0.15	3.82	195.4	7.22	311
2/7/2018	ETFSL500	0.226	0.258	0.06	2.37	194.2	7.15	252
12/7/2018	ETAU	0.587	0.626	1.11	2.33	456.6	7.31	370
12/7/2018	ETFSL100	0.501	0.492	0.63	1.6	163.5	7.59	367
12/7/2018	ETFSL200	0.342	0.338	0.73	1.42	160.3	7.5	355
12/7/2018	ETFSL300	0.324	0.373	1.16	2.87	154.8	7.49	361
12/7/2018	ETFSL400	0.338	0.353	0.44	3.85	1596	7.55	356
12/7/2018	ETFSL500	0.212	0.218	<0.05	2.45	158.3	7.37	259
19/7/2018	ETAU	0.726	0.712	0.63	3.5	177	7	377
19/7/2018	ETFSL100	0.576	0.565	0.11	3.01	202.8	7.37	371
19/7/2018	ETFSL200	0.444	0.4	0.36	2.35	200.6	7.24	360
19/7/2018	ETFSL300	0.462	0.402	1.11	3.68	202	7.21	372
19/7/2018	ETFSL400	0.431	0.374	0.57	3.48	203.3	7.33	384
19/7/2018	ETFSL500	0.288	0.279	<0.05	3.33	203.6	7.21	330
26/7/2018	ETAU	0.725	0.753	4.1	6.53	-5.9	6.59	364
26/7/2018	ETFSL100	0.522	0.566	0.19	2.89	10.8	6.78	356
26/7/2018	ETFSL200	0.31	0.353	0.29	1.73	9.8	6.79	351
26/7/2018	ETFSL300	0.35	0.35	1.59	2.55	-0.3	6.71	353
26/7/2018	ETFSL400	0.375	0.397	1.92	3.56	-12.3	6.75	370
26/7/2018	ETFSL500	0.346	0.431	<0.05	3.13	107.8	6.88	378
02/8/2018	ETAU	0.744	0.733	0.44	2.96	54.8	6.53	366
02/8/2018	ETFSL100	0.526	0.544	0.09	2.48	325	6.57	359
02/8/2018	ETFSL200	0.321	0.350	0.39	1.44	265.1	6.51	352
02/8/2018	ETFSL300	0.337	0.348	1.79	2.59	263.4	6.39	355
02/8/2018	ETFSL400	0.398	0.420	3.38	4.5	251.8	6.59	397
02/8/2018	ETFSL500	0.395	0.429	1.14	3.44	236.4	6.8	386
09/8/2018	ETAU	0.637	0.785	2.11	5.08	257.2	6.73	367
09/8/2018	ETFSL100	0.538	0.644	0.18	5.24	256.6	6.92	363
09/8/2018	ETFSL200	0.276	0.316	0.20	1.56	248.6	6.86	355
09/8/2018	ETFSL300	0.285	0.306	1.68	2.50	233.3	6.75	355
09/8/2018	ETFSL400	0.375	0.416	5.43	6.97	254.2	6.99	436
09/8/2018	ETFSL500	0.373	0.401	3.02	4.50	253.7	6.9	390

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/8/2018	ETAU	0.672	0.797	1.53	3.99	250.1	6.71	365
16/8/2018	ETFSL100	0.491	0.584	0.08	2.32	264.8	7.16	362
16/8/2018	ETFSL200	0.263	0.304	0.1	1.17	265.4	7.13	353
16/8/2018	ETFSL300	0.249	0.298	1.02	1.98	267.4	6.96	349
16/8/2018	ETFSL400	0.336	0.351	3.57	4.23	260.7	7.12	405
16/8/2018	ETFSL500	0.309	0.358	1.69	3.18	261.3	6.98	386
23/8/2018	ETAU	0.724	0.701	0.92	3.12	266.4	7.03	358
23/8/2018	ETFSL100	0.489	0.505	0.07	2.26	271.7	6.97	351
23/8/2018	ETFSL200	0.274	0.270	0.1	1.01	267.1	7.11	344
23/8/2018	ETFSL300	0.227	0.273	0.83	1.83	265.6	7.04	341
23/8/2018	ETFSL400	0.267	0.279	2.11	2.50	261.8	7.05	365
23/8/2018	ETFSL500	0.352	0.337	2.34	3.41	258.1	7.23	382
30/8/2018	ETAU	0.632	0.696	<0.05	2.52	99.5	7.97	368
30/8/2018	ETFSL100	0.440	0.491	<0.05	2.09	77	7.73	354
30/8/2018	ETFSL200	0.225	0.243	0.06	0.85	23.2	7.85	350
30/8/2018	ETFSL300	0.236	0.248	0.96	1.70	256.2	7.78	345
30/8/2018	ETFSL400	0.327	0.343	3.30	4.50	252.5	8.20	399
30/8/2018	ETFSL500	0.316	0.350	2.05	3.65	228.1	8.18	387
05/9/2018	ETAU	0.688	0.683	0.66	4.54	25.2	7.44	363
05/9/2018	ETFSL100	0.476	0.483	<0.05	2.06	53.5	7.77	350
05/9/2018	ETFSL200	0.234	0.23	0.09	0.98	12.5	7.71	340
05/9/2018	ETFSL300	0.259	0.238	1.08	1.71	-12.5	7.57	333
05/9/2018	ETFSL400	0.367	0.371	4.53	5.96	-42.4	7.65	404
05/9/2018	ETFSL500	0.336	0.318	2.52	3.73	1.5	7.69	372
12/9/2018	ETAU	0.653	0.719	<0.05	3.72	178.2	7.05	360
12/9/2018	ETFSL100	0.461	0.521	<0.05	2.72	71.7	7.54	356
12/9/2018	ETFSL200	0.25	0.28	<0.05	0.96	20.1	7.49	346
12/9/2018	ETFSL300	0.3	0.301	0.41	1.73	3.1	7.38	345
12/9/2018	ETFSL400	0.389	0.34	2.15	2.77	-62.7	7.39	359
12/9/2018	ETFSL500	0.401	0.39	1.04	3.87	-17.4	7.43	381
20/9/2018	ETAU	0.392	0.721	1.14	2.49	272.4	7.11	362
20/9/2018	ETFSL100	0.179	0.467	<0.05	1.88	272.4	7.18	350
20/9/2018	ETFSL200	0.182	0.194	0.63	0.7	25.2	7.17	341
20/9/2018	ETFSL300	0.227	0.233	0.63	1.5	-11.9	7.08	337
20/9/2018	ETFSL400	0.386	0.356	2.66	5.39	-34.2	7.21	397
20/9/2018	ETFSL500	0.394	0.358	1.1	3.15	25.4	7.25	371
27/9/2018	ETAU	0.58	0.763	<0.05	2.24	234	7.33	400
27/9/2018	ETFSL100	0.434	0.493	<0.05	1.54	268.1	7.64	392
27/9/2018	ETFSL200	0.178	0.188	<0.05	0.61	272.8	7.55	381
27/9/2018	ETFSL300	0.231	0.239	0.4	1.6	270.8	7.33	377
27/9/2018	ETFSL400	0.331	0.325	1.49	3.55	263.1	7.41	400
27/9/2018	ETFSL500	0.335	0.375	0.83	3.46	266.8	7.67	416
05/10/2018	ETAU	0.39	0.359	2.14	3.49	274.6	7.28	250
05/10/2018	ETFSL100	0.297	0.686	0.32	12	271	7.57	286
05/10/2018	ETFSL200	0.305	0.308	0.29	2.72	269.7	7.67	295
05/10/2018	ETFSL300	0.272	0.305	0.32	2.72	267.7	7.66	291
05/10/2018	ETFSL400	0.364	0.299	0.63	2.95	259.8	7.73	294
05/10/2018	ETFSL500	0.251	0.245	0.36	2.11	242.9	7.58	271

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
10/10/2018	ETAU	0.569	0.635	1.8	2.68	266.6	6.59	308
10/10/2018	ETFSL100	0.571	0.602	1.62	2.25	267.5	6.66	304
10/10/2018	ETFSL200	0.494	0.558	1.07	1.88	269.6	6.78	302
10/10/2018	ETFSL300	0.492	0.49	1.05	1.42	269.6	6.81	303
10/10/2018	ETFSL400	0.479	0.503	2.3	3.04	267.3	7.07	334
10/10/2018	ETFSL500	0.48	0.512	1.36	2	266.7	6.98	308
15/10/2018	ETAU	0.325	0.333	0.9	1.33	285.6	6.35	269
15/10/2018	ETFSL100	0.298	0.302	0.69	1.2	278.5	6.36	259
15/10/2018	ETFSL200	0.316	0.336	0.66	1.9	276.9	6.37	262
15/10/2018	ETFSL300	0.286	0.298	0.57	1.41	279.5	6.39	259
15/10/2018	ETFSL400	0.276	0.3	0.6	1.38	279.9	6.56	266
15/10/2018	ETFSL500	0.273	0.279	0.63	1.18	263	7.71	267
22/10/2018	ETAU	0.274	0.259	0.76	1.26	276.9	6.52	281
22/10/2018	ETFSL100	0.25	0.244	0.56	1.13	270.7	6.57	278
22/10/2018	ETFSL200	0.235	0.233	0.41	1.01	270.4	6.53	275
22/10/2018	ETFSL300	0.236	0.228	0.42	1	269	6.58	275
22/10/2018	ETFSL400	0.304	0.263	1.8	2.51	264.8	7.01	321
22/10/2018	ETFSL500	0.184	0.229	0.26	1.19	258.5	6.74	279
30/10/2018	ETAU	0.432	0.431	1.79	2.55	15.1	6.65	290
30/10/2018	ETFSL100	0.376	0.39	0.76	1.78	-0.4	6.91	286
30/10/2018	ETFSL200	0.336	0.363	0.37	1.47	3.8	6.92	285
30/10/2018	ETFSL300	0.341	0.35	0.39	1.32	7.6	6.99	291
30/10/2018	ETFSL400	0.36	0.364	1.58	3.1	-77.3	7.09	329
30/10/2018	ETFSL500	0.34	0.351	0.5	1.63	-4.2	7.05	296
08/11/2018	ETAU	0.635	0.553	0.76	3.15	23.3	7.07	307
08/11/2018	ETFSL100	0.429	0.433	0.14	1.59	12.9	7.35	307
08/11/2018	ETFSL200	0.333	0.34	0.06	1	20	7.31	303
08/11/2018	ETFSL300	0.333	0.329	0.06	1.1	5.4	7.32	304
08/11/2018	ETFSL400	0.431	0.403	5.31	5.49	247.1	7.47	385
08/11/2018	ETFSL500	0.315	0.325	0.37	1.54	248.4	7.30	310
15/11/2018	ETAU	0.609	0.628	0.53	2.04	264.1	7.09	334
15/11/2018	ETFSL100	0.399	0.414	<0.05	1.6	172.9	7.32	328
15/11/2018	ETFSL200	0.308	0.331	<0.05	1.34	272	7.31	325
15/11/2018	ETFSL300	0.321	0.298	0.08	1.15	271	7.28	324
15/11/2018	ETFSL400	0.396	0.383	1.44	4.72	262.5	7.35	373
15/11/2018	ETFSL500	0.328	0.336	0.24	1.76	267.3	7.38	345
19/11/2018	ETWQ AU	0.647	- ⁶	0.08	2.42	259.1	7.22	345
22/11/2018	ETFSL200	0.264	0.298	<0.05	0.82	30.9	7.29	355
22/11/2018	ETFSL500	0.38	0.376	0.67	1.88	-3.3	7.50	373
22/11/2018	CONFLU1	0.085	0.088	0.12	0.9	-1.1	7.51	307
22/11/2018	WARARM5	0.018	0.046	0.25	1	54.6	7.57	297
22/11/2018	WDFS1	0.105	0.114	0.12	1.15	40.1	7.53	307
22/11/2018	WDFS1+100	0.103	0.119	0.1	1.06	26	7.55	306

⁶ Total manganese is not sampled at site ETWQ AU, and therefore results were unable to be substituted for site ETAU from 22 November to 6 December 2018 and 17 December 2018. Sampling at site ETAU was undertaken on 12 and 27 December 2018.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
26/11/2018	ETWQ AU	0.538	- ⁶	<0.05	1.36	83.8	7.11	354
29/11/2018	ETFSL200	0.139	0.15	0.54	1.2	36.1	7.07	195
29/11/2018	ETFSL500	0.167	0.147	0.3	1.19	30.1	6.94	195
29/11/2018	CONFLU1	0.158	0.108	0.27	1.18	29.5	7.19	200
29/11/2018	WARARM5	0.055	0.052	0.18	0.92	66.7	7.5	206
29/11/2018	WDFS1	0.082	0.074	0.18	0.21	36.7	7.8	206
29/11/2018	WDFS1+100	0.103	0.094	0.19	1	38.4	7.36	200
4/12/2018	ETWQ AU	0.433	- ⁶	1.65	2.36	30.6	7	266
6/12/2018	ETFSL200	0.283	0.295	0.26	1.04	242.7	6.97	260
6/12/2018	ETFSL500	0.29	0.3	0.62	1.47	249.5	7.23	270
6/12/2018	CONFLU1	0.112	0.114	0.12	1.13	243.8	7.24	243
6/12/2018	WARARM5	0.034	0.035	<0.05	0.75	250.1	7.29	238
6/12/2018	WDFS1	0.122	0.134	0.07	1.12	241.4	7.29	246
6/12/2018	WDFS1+100	0.109	0.126	<0.05	0.99	251.1	7.3	245
12/12/2018	ETAU	0.428	0.484	1.49	3.33	-	6.86	269
12/12/2018	ETFSL200	0.215	0.232	<0.05	0.42	255.3	7.4	245
12/12/2018	ETFSL500	0.276	0.284	0.27	0.89	251.9	7.41	262
12/12/2018	CONFLU1	0.081	0.091	0.45	0.8	17.9	7.39	219
12/12/2018	WARARM5	0.03	0.042	<0.05	0.58	236.4	7.53	214
12/12/2018	WDFS1	0.108	0.121	0.41	1.09	27.5	7.44	225
12/12/2018	WDFS1+100	0.105	0.12	<0.05	0.99	42.3	7.24	243
17/12/2018	ETWQ AU	0.102	- ⁶	0.18	0.75	280.3	6.50	152
17/12/2018	ETFSL200	0.076	0.084	0.17	0.7	274.8	6.76	152
17/12/2018	ETFSL500	0.087	0.086	0.19	0.76	274.8	6.56	150
17/12/2018	CONFLU1	0.068	0.068	0.16	0.78	270.9	6.64	152
17/12/2018	WARARM5	0.023	0.032	0.08	0.54	257.5	6.77	156
17/12/2018	WDFS1	0.069	0.062	0.15	0.75	273	6.67	153
17/12/2018	WDFS1+100	0.055	0.063	0.12	0.71	278.4	6.71	154
27/12/2018	ETAU	0.263	0.277	0.61	1.81	24.3	6.72	217
27/12/2018	ETFSL200	0.196	0.194	0.09	0.93	30.6	7.11	216
27/12/2018	ETFSL500	0.219	0.213	0.3	1.37	-6.9	7.13	224
27/12/2018	CONFLU1	0.071	0.075	<0.05	0.86	21.4	7.15	208
27/12/2018	WARARM5	0.045	0.036	<0.05	0.48	3.4	7.3	206
27/12/2018	WDFS1	0.108	0.11	0.06	0.99	24.9	7.12	210
27/12/2018	WDFS1+100	0.101	0.105	<0.05	0.93	37.4	7.13	210
3/01/2019	ETWQ AU	0.335	0.443	<0.05	1.57	110.1	7.35	300
3/01/2019	ETFSL200	0.159	0.226	<0.05	0.63	113.1	7.63	290
3/01/2019	ETFSL500	0.265	0.274	0.12	1.32	11.5	7.5	302
3/01/2019	CONFLU1	0.143	0.16	<0.05	1.21	4.8	7.29	270
3/01/2019	WARARM5	0.055	0.054	<0.05	0.64	56.4	7.46	256
3/01/2019	WDFS1	0.106	0.14	<0.05	1.27	72	7.45	265
3/01/2019	WDFS1+100	0.101	0.138	<0.05	1.16	56.2	7.42	263
10/01/2019	ETWQ AU	0.438	0.282	<0.05	1.41	244.1	6.92	268
10/01/2019	ETFSL200	0.216	0.246	<0.05	0.62	26.8	8.03	279
10/01/2019	ETFSL500	0.22	0.262	<0.05	1.18	-9.3	7.64	300
10/01/2019	CONFLU1	0.129	0.141	<0.05	1.11	-33.7	7.55	269
10/01/2019	WARARM5	0.042	0.041	<0.05	0.6	90.3	7.62	252
10/01/2019	WDFS1	0.061	0.087	<0.05	0.92	22.1	7.59	242
10/01/2019	WDFS1+100	0.061	0.074	<0.05	0.97	6.9	7.58	240

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
16/01/2019	ETWQ AU	0.433	0.454	<0.05	1.86	171.1	6.75	282
16/01/2019	ETFSL200	0.18	0.189	<0.05	0.4	258.4	7.67	275
16/01/2019	ETFSL500	0.244	0.233	0.38	1	262.4	7.65	303
16/01/2019	CONFLU1	0.058	0.049	0.12	0.86	261.2	7.68	249
16/01/2019	WARARM5	0.025	0.028	0.11	0.52	268.1	7.82	242
16/01/2019	WDFS1	0.046	0.044	0.16	0.92	263.5	7.76	256
16/01/2019	WDFS1+100	0.047	0.044	0.19	0.94	259.2	7.79	260
23/01/2019	ETWQ AU	0.579	0.661	<0.05	2.09	184.3	6.78	292
23/01/2019	ETFSL200	0.171	0.204	<0.05	0.38	96.8	7.65	286
23/01/2019	ETFSL500	0.28	0.284	0.2	1.62	-11.1	7.65	316
23/01/2019	CONFLU1	0.052	0.056	<0.05	1.11	5.6	7.7	264
23/01/2019	WARARM5	0.043	0.036	<0.05	0.74	-38.4	7.7	253
23/01/2019	WDFS1	0.032	0.042	<0.05	1.08	19.6	7.77	266
23/01/2019	WDFS1+100	0.02	0.029	<0.05	0.92	-16.6	7.83	266
29/01/2019	ETAU	0.62	0.578	0.07	1.52	66.8	6.7	294
29/01/2019	ETFSL200	0.19	0.216	<0.05	0.44	36.2	7.23	282
29/01/2019	ETFSL500	0.249	0.279	<0.05	1.48	12.1	7.34	310
29/01/2019	CONFLU1	0.048	0.07	<0.05	1.05	-20.8	7.54	282
29/01/2019	WARARM5	0.031	0.028	<0.05	0.54	49.5	7.34	251
29/01/2019	WDFS1	0.027	0.038	<0.05	0.96	29.7	7.49	260
29/01/2019	WDFS1+100	0.03	0.03	<0.05	0.91	9.9	7.49	260
4/02/2019	ETAU	0.559	0.635	<0.05	1.04	51.1	6.8	283
4/02/2019	ETFSL200	0.173	0.191	<0.05	0.34	9.1	7.26	275
4/02/2019	ETFSL500	0.221	0.276	0.31	1.7	-18.6	7.35	302
4/02/2019	CONFLU1	0.043	0.036	0.16	0.85	-51.7	7.55	252
4/02/2019	WARARM5	0.023	0.029	0.19	0.74	139.1	7.58	240
4/02/2019	WDFS1	0.012	0.021	0.27	0.8	73.2	7.71	252
4/02/2019	WDFS1+100	0.01	0.02	0.29	0.74	50	7.71	255
11/02/2019	ETAU	0.757	0.731	<0.05	1.5	261.4	6.86	288
11/02/2019	ETFSL200	0.197	0.206	<0.05	0.36	6.8	7.21	280
11/02/2019	ETFSL500	0.243	0.302	0.5	1.86	-33.9	7.3	306
11/02/2019	CONFLU1	0.023	0.033	0.24	0.94	-96.7	7.48	255
11/02/2019	WARARM5	0.019	0.026	0.24	0.66	53.5	7.46	243
11/02/2019	WDFS1	0.011	0.018	0.31	0.98	-26	7.62	259
11/02/2019	WDFS1+100	0.005	0.013	0.3	0.83	64.5	7.62	258
18/02/2019	ETAU	0.624	0.675	0.17	1.51	51.8	6.91	303
18/02/2019	ETFSL200	0.189	0.19	0.19	0.36	12.8	7.27	296
18/02/2019	ETFSL500	0.243	0.284	0.23	1.77	-15.6	7.86	277
18/02/2019	CONFLU1	0.041	0.035	0.13	0.9	6.6	7.73	291
18/02/2019	WARARM5	0.022	0.024	0.19	0.64	64.1	7.46	262
18/02/2019	WDFS1	0.007	0.012	0.31	0.78	26.7	7.83	279
18/02/2019	WDFS1+100	0.006	0.011	0.24	0.64	23.3	7.84	279
25/02/2019	ETAU	0.616	0.719	<0.05	0.93	273.1	7.19	283
25/02/2019	ETFSL200	0.198	0.199	<0.05	0.54	270.5	7.06	271
25/02/2019	ETFSL500	0.281	0.312	1.72	2.11	270.6	7.3	307
25/02/2019	CONFLU1	0.022	0.027	0.06	0.86	274.6	7.37	247
25/02/2019	WARARM5	0.014	0.023	<0.05	0.53	264.2	7.4	238
25/02/2019	WDFS1	0.009	0.017	<0.05	0.79	272.6	7.55	248
25/02/2019	WDFS1+100	0.004	0.014	0.05	0.92	264.9	7.6	246

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/03/2019	ETAU	0.688	0.67	<0.05	0.13	104.3	6.74	306
04/03/2019	ETFSL200	0.185	0.193	0.12	0.48	259.3	7.18	294
04/03/2019	ETFSL500	0.295	0.298	0.76	2.02	271.1	7.33	334
04/03/2019	CONFLU1	0.032	0.049	0.12	1.71	277.1	7.56	274
04/03/2019	WARARM5	0.025	0.031	0.12	1.02	277.7	7.44	248
04/03/2019	WDFS1	0.006	0.013	0.13	0.81	273.6	7.75	271
04/03/2019	WDFS1+100	0.005	0.011	0.21	0.71	249.3	7.58	270
11/03/2019	ETAU	0.638	0.726	0.08	0.94		6.87	322
11/03/2019	ETFSL200	0.152	0.170	0.06	0.38	227.4	7.24	310
11/03/2019	ETFSL500	0.266	0.28	0.5	1.91	219.5	7.43	347
11/03/2019	CONFLU1	0.024	0.03	0.23	0.96	228.5	7.53	289
11/03/2019	WARARM5	0.018	0.052	0.19	0.71	202.5	7.53	269
11/03/2019	WDFS1	0.01	0.018	0.26	0.8	219.7	7.07	276
11/03/2019	WDFS1+100	0.006	0.027	0.22	1.45	215.9	7.82	289
18/03/2019	ETAU	0.153	0.16	0.84	1.21	239	6.77	175
18/03/2019	ETFSL200	0.187	<0.01	0.5	0.204	237.9	6.62	180
18/03/2019	ETFSL500	0.193	<0.01	0.63	0.197	230.4	6.7	184
18/03/2019	CONFLU1	0.146	0.02	0.5	0.156	50.3	6.72	172
18/03/2019	WARARM5	0.032	<0.01	0.3	0.034	49.3	6.67	153
18/03/2019	WDFS1	0.071	0.04	0.44	0.073	21.4	6.67	159
18/03/2019	WDFS1+100	0.094	0.04	0.42	0.099	57.1	6.61	158
26/03/2019	ETAU	0.335	0.347	0.46	1.91	29.3	6.74	230
26/03/2019	ETFSL200	0.205	0.217	<0.05	1.04	23.5	6.96	224
26/03/2019	ETFSL500	0.233	0.234	0.5	1.39	227	6.99	239
26/03/2019	CONFLU1	0.095	0.114	<0.05	0.8	237.9	7.02	206
26/03/2019	WARARM5	0.039	0.041	<0.05	0.45	241.4	6.92	195
26/03/2019	WDFS1	0.073	0.076	<0.05	0.65	236.4	7.02	200
26/03/2019	WDFS1+100	0.054	0.049	<0.05	0.64	241.1	7.03	199
01/04/2019	ETAU	0.332	0.407	<0.05	1.51	160	7.3	256
01/04/2019	ETFSL200	0.184	0.248	<0.05	0.78	-1.8	7.68	248
01/04/2019	ETFSL500	0.222	0.261	0.47	1.14	-4.8	7.64	263
01/04/2019	CONFLU1	0.103	0.116	0.17	0.92	9	7.68	232
01/04/2019	WARARM5	0.034	0.037	0.1	0.42	36.8	7.71	207
01/04/2019	WDFS1	0.051	0.061	0.18	0.64	0.8	7.67	221
01/04/2019	WDFS1+100	0.027	0.031	0.14	0.56	43.5	7.73	219
08/04/2019	ETAU	0.298	0.319	0.64	1.89	35.8	6.86	225
08/04/2019	ETFSL200	0.200	0.198	0.12	0.96	273.8	7.09	212
08/04/2019	ETFSL500	0.184	0.2	0.34	1.34	264	7.25	220
08/04/2019	CONFLU1	0.073	0.082	0.14	0.77	238.9	7.54	212
08/04/2019	WARARM5	0.02	0.018	0.06	0.35	252.5	7.6	204
08/04/2019	WDFS1	0.039	0.05	0.11	0.7	236.9	7.56	205
08/04/2019	WDFS1+100	0.03	0.038	0.08	0.58	242.3	7.61	205
16/04/2019	ETAU	0.321	0.31	<0.05	1.31	259.8	7.17	240
16/04/2019	ETFSL200	0.156	0.154	<0.05	0.64	83.9	7.48	233
16/04/2019	ETFSL500	0.207	0.204	0.53	1.25	11.4	7.65	262
16/04/2019	CONFLU1	0.099	0.1	0.06	0.73	3.8	7.69	235
16/04/2019	WARARM5	0.024	0.021	0.21	0.34	21.6	7.62	207
16/04/2019	WDFS1	0.035	0.035	0.13	0.62	0.9	7.6	215
16/04/2019	WDFS1+100	0.017	0.017	0.14	0.48	4.6	7.67	214

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/04/2019	ETAU	0.384	0.425	<0.05	1.82	262.5	7.54	224
23/04/2019	ETFSL200	0.162	0.174	0.08	0.77	73.9	7.31	218
23/04/2019	ETFSL500	0.214	0.232	0.24	1.4	8.8	7.64	240
23/04/2019	CONFLU1	0.041	0.046	0.13	0.76	10.6	7.56	194
23/04/2019	WARARM5	0.041	0.046	0.13	0.76	63.3	7.56	194
23/04/2019	WDFS1	0.026	0.027	0.16	0.71	7.5	7.56	191
23/04/2019	WDFS1+100	0.009	0.014	0.18	0.6	45	7.59	190
02/05/2019	ETAU	0.448	0.502	0.33	4.37	78.6	6.97	235
02/05/2019	ETFSL200	0.171	0.187	0.07	0.86	213.6	7.2	226
02/05/2019	ETFSL500	0.24	0.267	0.5	1.4	208.1	7.31	248
02/05/2019	CONFLU1	0.068	0.078	0.12	0.9	198.7	7.41	215
02/05/2019	WARARM5	0.024	0.03	0.14	0.51	201.1	7.3	184
02/05/2019	WDFS1	0.022	0.024	0.19	0.62	194.3	7.31	195
02/05/2019	WDFS1+100	0.01	0.016	0.18	0.5	189.9	7.4	196
06/05/2019	ETAU	0.381	0.421	<0.05	1.3	148.2	6.89	284
06/05/2019	ETFSL200	0.164	0.183	0.1	0.62	252.8	7.18	278
06/05/2019	ETFSL500	0.212	0.256	0.7	1.68	256.8	7.34	314
06/05/2019	CONFLU1	0.076	0.084	0.12	0.78	236.9	7.48	271
06/05/2019	WARARM5	0.025	0.023	0.09	0.46	254.6	7.37	238
06/05/2019	WDFS1	0.024	0.028	0.14	0.71	216.8	7.43	250
06/05/2019	WDFS1+100	0.009	0.009	0.08	0.54	259.9	7.57	246
13/05/2019	ETAU	0.452	0.488	0.08	2.71	106.4	7.15	299
13/05/2019	ETFSL200	0.171	0.208	0.06	0.93	254.6	7.48	290
13/05/2019	ETFSL500	0.261	0.273	0.29	1.74	241.2	7.57	322
13/05/2019	CONFLU1	0.057	0.063	0.07	0.88	249.5	7.61	269
13/05/2019	WARARM5	0.028	0.026	0.07	0.52	249.3	7.6	248
13/05/2019	WDFS1	0.034	0.031	0.05	0.85	243.4	7.61	260
13/05/2019	WDFS1+100	0.009	0.011	<0.05	0.58	243.9	7.71	265
20/05/2019	ETAU	0.432	0.49	<0.05	1.93	270.8	6.96	297
20/05/2019	ETFSL200	0.212	0.230	0.1	1.27	97.3	7.79	291
20/05/2019	ETFSL500	0.282	0.292	1.16	2.02	-17.1	7.63	331
20/05/2019	CONFLU1	0.076	0.092	0.1	1.12	68	7.76	286
20/05/2019	WARARM5	0.035	0.036	0.15	0.54	58.2	7.66	252
20/05/2019	WDFS1	0.027	0.028	0.2	0.72	27.9	7.43	266
20/05/2019	WDFS1+100	0.015	0.016	0.12	0.57	113.4	7.74	270
27/05/2019	ETAU	0.422	0.498	<0.05	2.26	169.8	7.02	301
27/05/2019	ETFSL200	0.240	0.239	0.11	1.06	286.4	7.45	293
27/05/2019	ETFSL500	0.292	0.276	1.14	1.92	286	7.51	334
27/05/2019	CONFLU1	0.06	0.053	0.07	0.69	151.2	7.63	271
27/05/2019	WARARM5	0.026	0.024	<0.05	0.49	278	7.47	254
27/05/2019	WDFS1	0.034	0.037	0.1	0.82	274.3	7.57	270
27/05/2019	WDFS1+100	0.013	0.013	0.06	0.52	284.6	7.76	271
05/06/2019	ETAU	0.295	0.28	0.66	2.05	127.4	7.15	228
03/06/2019	ETFSL200	0.237	0.245	0.09	1.34	84	7.63	316
03/06/2019	ETFSL500	0.325	0.339	1.31	2.4	23	7.71	358
03/06/2019	CONFLU1	0.093	0.099	0.06	0.78	54.6	7.87	308
03/06/2019	WARARM5	0.024	0.02	0.07	0.41	122.6	7.78	275
03/06/2019	WDFS1	0.056	0.057	0.39	1.68	80.4	7.78	290
03/06/2019	WDFS1+100	0.019	0.021	0.15	0.56	87.6	7.92	291

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
11/06/2019	ETAU	0.0448	0.465	0.41	2.98	142.8	7.08	291
11/06/2019	ETFSL200	0.247	0.253	0.1	1.12	116.2	7.43	287
11/06/2019	ETFSL500	0.34	0.358	1.24	2.26	63.1	7.55	323
11/06/2019	CONFLU1	0.118	0.13	0.13	1.1	73.1	7.58	278
11/06/2019	WARARM5	0.026	0.024	0.05	0.45	82	7.55	234
11/06/2019	WDFS1	0.061	0.056	0.14	0.73	101.4	7.58	251
11/06/2019	WDFS1+100	0.035	0.03	<0.05	0.56	89.2	7.63	251
18/06/2019	ETAU	0.383	0.411	1.74	2.71	12.6	6.83	252
18/06/2019	ETFSL200	0.275	0.296	0.39	1.37	35.8	7.01	242
18/06/2019	ETFSL500	0.277	0.29	0.6	1.63	12.6	7.14	249
18/06/2019	CONFLU1	0.192	0.137	0.07	0.93	8.1	7.24	235
18/06/2019	WARARM5	0.019	0.014	<0.05	0.26	48.8	7.36	222
18/06/2019	WDFS1	0.088	0.092	0.11	0.73	3.4	7.25	229
18/06/2019	WDFS1+100	0.083	0.088	<0.05	0.71	13.9	7.26	226
25/06/2019	ETAU	0.369	0.377	2.13	3.62	-2.6	6.88	266
25/06/2019	ETFSL200	0.217	0.259	0.11	2.29	2.3	7.16	252
25/06/2019	ETFSL500	0.254	0.268	0.44	2.04	-28.1	7.22	266
25/06/2019	CONFLU1	0.076	0.09	<0.05	0.66	-7.1	7.4	246
25/06/2019	WARARM5	0.066	0.017	<0.05	0.35	4.7	7.43	236
25/06/2019	WDFS1	0.079	0.087	0.12	0.75	-9.4	7.38	241
25/06/2019	WDFS1+100	0.054	0.062	<0.05	0.64	-30.8	7.41	237
01/07/2019	ETAU	0.39	0.405	0.87	3.55	37.4	7.32	261
01/07/2019	ETFSL200	0.219	0.228	<0.05	1.47	20.7	7.21	247
01/07/2019	ETFSL500	0.275	0.372	0.85	2.78	-28.7	7.3	276
01/07/2019	CONFLU1	0.135	0.145	0.17	0.92	-10.8	7.45	250
01/07/2019	WARARM5	0.018	0.018	<0.05	0.37	5.3	7.51	226
01/07/2019	WDFS1	0.065	0.066	0.14	0.81	-13	7.39	234
01/07/2019	WDFS1+100	0.046	0.044	<0.05	0.6	-7.2	7.47	234
08/07/2019	ETAU	0.144	0.154	0.63	1.33	42.7	6.59	177
08/07/2019	ETFSL200	0.13	0.142	0.52	0.99	30.2	6.72	176
08/07/2019	ETFSL500	0.143	0.153	0.68	1.08	13	6.77	180
08/07/2019	CONFLU1	0.082	0.091	0.31	0.91	-32.7	7.01	191
08/07/2019	WARARM5	0.018	0.019	0.07	0.58	17.1	7.15	201
08/07/2019	WDFS1	0.082	0.089	0.36	0.94	1.5	6.98	190
08/07/2019	WDFS1+100	0.078	0.081	0.21	0.79	-5	7.01	188
15/07/2019	ETAU	0.268	0.266	1.11	2.05	-3.8	6.66	221
15/07/2019	ETFSL200	0.209	0.219	0.21	1.24	-4.9	6.76	218
15/07/2019	ETFSL500	0.241	0.256	0.56	1.8	-13.9	6.84	232
15/07/2019	CONFLU1	0.126	0.127	0.07	0.97	6.6	6.89	221
15/07/2019	WARARM5	0.023	0.017	<0.05	0.52	19.7	6.98	222
15/07/2019	WDFS1	0.086	0.097	0.05	0.95	15	6.9	215
15/07/2019	WDFS1+100	0.06	0.064	<0.05	0.78	-1.6	6.87	210
22/07/2019	ETAU	0.415	0.372	2.39	3.53	28.3	7.04	243
22/07/2019	ETFSL200	0.289	0.272	0.08	1.46	3.8	6.45	235
22/07/2019	ETFSL500	0.332	0.291	0.71	2.07	-38.1	6.65	254
22/07/2019	CONFLU1	0.168	0.153	0.06	0.84	10.3	6.66	233
22/07/2019	WARARM5	0.025	0.017	<0.05	0.44	9	6.66	222
22/07/2019	WDFS1	0.094	0.091	0.34	0.8	14	6.63	226
22/07/2019	WDFS1+100	0.071	0.061	0.26	0.61	-1.6	6.63	227

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
29/07/2019	ETAU	0.348	0.363	0.22	2.06	53	6.3	315
29/07/2019	ETFSL200	0.234	0.25	0.07	1.4	56.1	6.41	311
29/07/2019	ETFSL500	0.301	0.348	1.37	2.58	-3.8	6.51	342
29/07/2019	CONFLU1	0.13	0.127	0.33	1.28	14.3	6.51	312
29/07/2019	WARARM5	0.029	0.018	0.1	0.38	36.1	6.52	291
29/07/2019	WDFS1	0.077	0.078	0.15	0.87	21.1	6.58	306
29/07/2019	WDFS1+100	0.044	0.044	0.11	0.55	13.7	6.48	302
05/08/2019	ETAU	0.387	0.371	0.72	3.36	34	6.35	323
05/08/2019	ETFSL200	0.247	0.259	0.13	1.47	16.2	6.5	317
05/08/2019	ETFSL500	0.304	0.319	1.34	2.2	-8.3	6.67	354
05/08/2019	CONFLU1	0.104	0.107	0.13	0.74	4.1	6.64	311
05/08/2019	WARARM5	0.019	0.016	0.08	0.37	1.6	6.63	291
05/08/2019	WDFS1	0.061	0.055	0.43	0.86	5.9	6.61	299
05/08/2019	WDFS1+100	0.041	0.038	0.11	0.52	32.5	6.54	305
12/08/2019	ETAU	0.405	0.402	1.42	3.6	29	6.45	292
12/08/2019	ETFSL200	0.249	0.240	0.16	1.38	69.3	6.22	287
12/08/2019	ETFSL500	0.317	0.306	1.52	2.48	13.1	6.35	314
12/08/2019	CONFLU1	0.104	0.108	0.13	0.7	32.9	6.34	283
12/08/2019	WARARM5	0.016	0.013	0.09	0.38	47.9	6.32	263
12/08/2019	WDFS1	0.052	0.052	0.1	0.58	37.6	6.26	275
12/08/2019	WDFS1+100	0.028	0.035	0.13	1.65	11.2	6.35	275
19/08/2019	ETAU	0.425	0.461	1.34	3.64	14	6.29	297
19/08/2019	ETFSL200	0.242	0.264	0.12	1.37	143	6.47	290
19/08/2019	ETFSL500	0.314	0.334	1.3	2.36	-36.1	6.65	319
19/08/2019	CONFLU1	0.106	0.116	0.08	0.71	-16.8	6.62	290
19/08/2019	WARARM5	0.016	0.016	0.08	0.31	7.7	6.43	267
19/08/2019	WDFS1	0.042	0.051	0.1	0.63	-25.6	6.64	279
19/08/2019	WDFS1+100	0.017	0.021	0.12	0.52	-0.5	6.61	279
26/08/2019	ETAU	0.434	0.498	1.56	4.11	2.7	6.93	321
26/08/2019	ETFSL200	0.249	0.267	0.28	1.32	40.1	7.16	317
26/08/2019	ETFSL500	0.297	0.345	1.28	2.66	-33.7	7.21	358
26/08/2019	CONFLU1	0.106	0.115	0.26	1.0	-29	7.36	316
26/08/2019	WARARM5	0.016	0.023	0.17	0.64	-26.1	7.32	287
26/08/2019	WDFS1	0.047	0.051	0.19	0.63	-43.4	7.39	306
26/08/2019	WDFS1+100	0.021	0.038	0.14	0.7	-12.2	7.42	304
02/09/2019	ETAU	0.394	0.427	1.55	3.69	1.2	8.48	308
02/09/2019	ETFSL200	0.233	0.225	<0.05	0.73	31.4	6.13	292
02/09/2019	ETFSL500	0.304	0.293	1.08	1.5	-24.4	6.4	326
02/09/2019	CONFLU1	0.179	0.126	<0.05	0.72	16.3	6.42	290
02/09/2019	WARARM5	0.016	0.013	<0.05	0.3	223.6	6.41	262
02/09/2019	WDFS1	0.047	0.042	<0.05	0.49	4.7	6.41	272
02/09/2019	WDFS1+100	0.026	0.028	<0.05	0.47	33.7	6.41	269
09/09/2019	ETAU	0.387	0.412	1.08	2.58	1.9	7.24	314
08/09/2019	ETFSL200	0.205	0.235	0.12	1.58	41.5	7.34	306
08/09/2019	ETFSL500	0.268	0.297	1.08	2.04	-18.2	7.52	345
08/09/2019	CONFLU1	0.082	0.093	0.1	0.82	-2	7.54	300
08/09/2019	WARARM5	0.018	0.018	0.08	0.4	44.8	7.47	255
08/09/2019	WDFS1	0.025	0.025	0.16	0.61	-55.2	7.53	273
08/09/2019	WDFS1+100	0.01	0.01	0.17	0.56	34.8	7.53	275

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
19/09/2019	ETAU	0.045	0.052	0.25	0.7	108.8	7.13	128
19/09/2019	ETFSL200	0.046	0.054	0.26	0.76	111.5	5.94	132
19/09/2019	ETFSL500	0.048	0.059	0.27	0.88	114	5.94	127
19/09/2019	CONFLU1	0.058	0.068	0.25	0.81	127.9	5.93	128
19/09/2019	WARARM5	0.056	0.068	0.21	0.77	118	5.93	140
19/09/2019	WDFS1	0.064	0.073	0.22	0.75	127.2	5.93	139
19/09/2019	WDFS1+100	0.062	0.069	0.2	0.68	148.8	5.81	136
23/09/2019	ETAU	0.118	0.109	0.55	0.97	73.4	6.08	197
23/09/2019	ETFSL200	0.095	0.098	0.41	0.8	40.6	6.09	194
23/09/2019	ETFSL500	0.104	0.112	0.53	1.16	29.8	6.15	200
23/09/2019	CONFLU1	0.132	0.139	0.35	1.17	36.5	6.15	198
23/09/2019	WARARM5	0.047	0.049	0.16	0.47	72.6	6.17	199
23/09/2019	WDFS1	0.074	0.075	0.25	0.63	32.7	6.15	197
23/09/2019	WDFS1+100	0.086	0.089	0.27	0.68	14.4	6.14	196
03/10/2019	ETAU	0.229	0.256	0.43	1.95	56.4	6.08	248
03/10/2019	ETFSL200	0.182	0.202	<0.05	1.19	47.2	6.14	245
03/10/2019	ETFSL500	0.168	0.227	0.32	1.6	4.1	6.28	270
03/10/2019	CONFLU1	0.121	0.125	<0.05	0.85	27.7	6.2	248
03/10/2019	WARARM5	0.051	0.056	<0.05	0.46	36.2	6.19	238
03/10/2019	WDFS1	0.094	0.109	<0.05	0.8	20.8	6.2	242
03/10/2019	WDFS1+100	0.095	0.101	<0.05	0.81	34.1	6.39	247
09/10/2019	ETAU	0.194	0.208	0.07	1.74	113.8	6.68	241
09/10/2019	ETFSL200	0.148	0.161	<0.05	1.33	63.3	6.98	245
09/10/2019	ETFSL500	0.202	0.214	0.47	1.87	9	7.16	274
09/10/2019	CONFLU1	0.184	0.143	<0.05	0.98	39.6	7.22	256
09/10/2019	WARARM5	0.054	0.053	0.07	0.46	62.2	7.15	243
09/10/2019	WDFS1	0.094	0.103	<0.05	0.91	62.2	7.2	250
09/10/2019	WDFS1+100	0.084	0.087	0.08	0.91	71.8	7.22	246
14/10/2019	ETAU	0.111	0.112	0.67	1.18	53	6.6	199
14/10/2019	ETFSL200	0.094	0.099	0.41	0.97	36.1	6.77	195
14/10/2019	ETFSL500	0.096	0.093	0.54	0.95	32.3	6.87	206
14/10/2019	CONFLU1	0.072	0.076	0.23	0.75	33.7	7.08	224
14/10/2019	WARARM5	0.035	0.036	0.05	0.33	35	7.19	248
14/10/2019	WDFS1	0.065	0.071	0.16	0.65	23.5	7.07	229
14/10/2019	WDFS1+100	0.06	0.057	0.16	0.6	-18.3	7.02	224
21/10/2019	ETAU	0.245	0.244	0.81	2.12	81.3	7.44	260
21/10/2019	ETFSL200	0.157	0.167	<0.05	1.18	108.5	7.45	262
21/10/2019	ETFSL500	0.184	0.193	0.46	1.58	43.2	7.59	282
21/10/2019	CONFLU1	0.063	0.069	<0.05	0.61	70.3	7.58	260
21/10/2019	WARARM5	0.04	0.035	0.07	0.36	79.6	7.61	260
21/10/2019	WDFS1	0.088	0.093	<0.05	0.75	40.8	7.63	262
21/10/2019	WDFS1+100	0.061	0.066	0.09	0.73	38.9	7.64	260
28/10/2019	ETAU	0.325	0.34	<0.05	2.13	173	6.61	281
28/10/2019	ETFSL200	0.206	0.228	0.06	1.31	165.1	7.31	277
28/10/2019	ETFSL500	0.251	0.262	0.88	1.74	83.3	7.1	308
28/10/2019	CONFLU1	0.113	0.118	0.19	0.89	156.2	7.45	288
28/10/2019	WARARM5	0.044	0.047	0.19	0.41	160.3	7.44	279
28/10/2019	WDFS1	0.083	0.091	0.19	0.92	151.6	7.42	286
28/10/2019	WDFS1+100	0.056	0.062	0.18	0.7	116.1	7.71	283

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
04/11/2019	ETAU	0.379	0.39	0.41	2.29	185.3	6.81	286
04/11/2019	ETFSL200	0.211	0.242	<0.05	0.77	136.2	7.48	281
04/11/2019	ETFSL500	0.271	0.261	0.28	1.24	98.9	7.42	305
04/11/2019	CONFLU1	0.111	0.099	<0.05	0.63	122.9	7.69	275
04/11/2019	WARARM5	0.044	0.042	<0.05	0.27	131	7.78	274
04/11/2019	WDFS1	0.074	0.08	<0.05	0.59	154.4	7.62	271
04/11/2019	WDFS1+100	0.055	0.062	<0.05	0.58	90.7	7.84	272
14/11/2019	ETAU	0.362	0.374	<0.05	1.72	307.7	6.74	300
14/11/2019	ETFSL200	0.156	0.19	<0.05	0.7	172	7.39	296
14/11/2019	ETFSL500	0.244	0.26	0.36	1.58	93.1	7.24	339
14/11/2019	CONFLU1	0.04	0.046	0.16	0.7	179.6	7.78	298
14/11/2019	WARARM5	0.03	0.032	<0.05	0.39	148.3	7.6	282
14/11/2019	WDFS1	0.073	0.086	0.09	0.83	163.5	7.69	304
14/11/2019	WDFS1+100	0.015	0.023	0.15	0.59	141.1	8.51	294
18/11/2019	ETAU	0.386	0.406	<0.05	1.94	213.9	6.62	298
18/11/2019	ETFSL200	0.195	0.213	<0.05	0.05	125.4	7.47	297
18/11/2019	ETFSL500	0.23	0.253	0.22	1.43	105.6	7.44	331
18/11/2019	CONFLU1	0.049	0.053	0.15	0.66	152.1	7.82	295
18/11/2019	WARARM5	0.032	0.038	0.13	0.45	178.6	7.71	282
18/11/2019	WDFS1	0.039	0.05	0.17	0.7	154.1	7.78	295
18/11/2019	WDFS1+100	0.019	0.023	0.14	0.58	102.1	8.35	293
25/11/2019	ETAU	0.455	0.496	<0.05	1.67	227.7	6.58	300
25/11/2019	ETFSL200	0.188	0.196	<0.05	0.54	183.9	6.89	297
25/11/2019	ETFSL500	0.23	0.259	0.23	1.52	121.5	7.22	332
25/11/2019	CONFLU1	0.064	0.078	0.13	0.83	217.5	7.8	311
25/11/2019	WARARM5	0.036	0.035	0.11	0.45	205.2	7.69	292
25/11/2019	WDFS1	0.033	0.043	0.17	0.68	222.5	7.89	302
25/11/2019	WDFS1+100	0.013	0.022	0.16	0.58	170.8	8.7	302
08/12/2019	ETAU	0.498	0.463	0.08	0.76	204.4	6.65	308
08/12/2019	ETFSL200	0.156	0.152	<0.05	0.34	129.6	7.5	302
08/12/2019	ETFSL500	0.208	0.207	0.08	1.5	39.6	7.41	302
08/12/2019	CONFLU1	0.029	0.041	0.06	0.68	162.6	8.08	303
08/12/2019	WARARM5	0.021	0.026	0.2	0.49	103.8	7.95	286
08/12/2019	WDFS1	0.009	0.023	0.07	0.56	152.4	8.45	302
08/12/2019	WDFS1+100	0.009	0.023	0.07	0.56	130.8	8.45	302
12/12/2019	ETAU	0.564	0.558	0.06	1.26	68.2	7.22	348
12/12/2019	ETFSL200	0.182	0.177	<0.05	0.3	98	7.82	343
12/12/2019	ETFSL500	0.256	0.235	0.07	1.76	8.6	7.81	343
12/12/2019	CONFLU1	0.062	0.059	0.15	0.83	67.7	8.07	356
12/12/2019	WARARM5	0.031	0.029	<0.05	0.47	57.8	8.03	328
12/12/2019	WDFS1	0.018	0.029	<0.05	0.66	53.4	8.14	348
12/12/2019	WDFS1+100	0.003	0.015	<0.05	0.41	36.9	9.07	298
16/12/2019	ETAU	0.606	0.641	0.17	1.37	46	6.58	328
16/12/2019	ETFSL200	0.181	0.186	<0.05	0.44		7.36	318
16/12/2019	ETFSL500	0.25	0.261	0.22	1.61	4.2	7.3	318
16/12/2019	CONFLU1	0.051	0.058	0.13	0.95	46.4	7.99	332
16/12/2019	WARARM5	0.035	0.036	0.19	0.6	44.9	7.69	305
16/12/2019	WDFS1	0.018	0.04	0.17	0.8	9.4	8.49	325
16/12/2019	WDFS1+100	0.006	0.018	0.15	0.51	-16.4	8.83	318

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
23/12/2019	ETAU	0.564	0.624	<0.05	0.52	91.4	6.5	360
23/12/2019	ETFSL200	0.136	0.157	<0.05	0.26	95.8	7.18	349
23/12/2019	ETFSL500	0.255	0.305	0.33	1.86	6.8	7.1	349
23/12/2019	CONFLU1	0.05	0.058	0.13	0.91	36.2	7.44	367
23/12/2019	WARARM5	0.031	0.034	0.2	0.61	56.1	7.37	337
23/12/2019	WDFS1	0.021	0.03	0.21	0.79	64.8	7.64	364
23/12/2019	WDFS1+100	0.012	0.025	0.16	0.75	-50.4	8.42	364
30/12/2019	ETAU	0.609	0.606	<0.05	0.66	68	7.61	307
30/12/2019	ETFSL200	0.13	0.125	0.06	0.25	39.7	8.01	318
30/12/2019	ETFSL500	0.286	0.287	0.57	1.67	-20.7	8.05	318
30/12/2019	CONFLU1	0.028	0.031	0.13	0.63	53.4	8.12	311
30/12/2019	WARARM5	0.033	0.036	<0.05	0.59	30.7	8.13	305
30/12/2019	WDFS1	0.009	0.022	0.15	0.54	35.1	8.24	324
30/12/2019	WDFS1+100	0.008	0.013	0.08	0.36	19.9	8.28	326
06/01/2020	ETAU	0.627	0.729	<0.05	0.68	81.3	6.77	325
06/01/2020	ETFSL200	0.131	0.151	<0.05	0.28	219.9	7.6	318
06/01/2020	ETFSL500	0.295	0.313	0.5	2.28	-11.3	7.33	358
06/01/2020	CONFLU1	0.091	0.092	0.11	1.5	13	7.66	326
06/01/2020	WARARM5	0.031	0.04	0.18	0.84	46.5	7.65	306
06/01/2020	WDFS1	0.02	0.038	0.22	1.13	59.5	7.75	325
06/01/2020	WDFS1+100	0.006	0.025	0.16	0.56	38	8.55	326
13/01/2020	ETAU	0.73	0.677	<0.05	0.43	146.4	6.83	331
13/01/2020	ETFSL200	0.164	0.154	0.12	0.32	101.9	7.6	322
13/01/2020	ETFSL500	0.244	0.251	0.12	1.77	10.1	7.5	361
13/01/2020	CONFLU1	0.066	0.068	0.23	1.06	45.7	7.79	327
13/01/2020	WARARM5	0.032	0.034	0.19	0.49	65.6	7.91	308
13/01/2020	WDFS1	0.036	0.038	0.23	1.09	107.7	7.88	327
13/01/2020	WDFS1+100	0.016	0.021	0.26	0.73	94.6	8.15	330
21/02/2020	ETAU	0.285	0.306	0.85	1.68	42.7	6.99	244
21/02/2020	ETFSL200	0.199	0.21	0.33	1.04	69.1	7.36	233
21/02/2020	ETFSL500	0.189	0.202	0.31	1.24	36.5	7.37	237
21/02/2020	CONFLU1	0.091	0.116	0.16	0.92	56.2	7.61	239
21/02/2020	WARARM5	0.031	0.036	0.08	0.33	39.1	7.92	255
21/02/2020	WDFS1	0.089	0.112	0.17	0.93	35.2	7.63	238
21/02/2020	WDFS1+100	0.114	0.136	0.16	0.94	22.4	7.5	232
28/01/2020	ETAU	0.388	0.397	<0.05	1.29	122.5	6.58	288
28/01/2020	ETFSL200	0.213	0.205	<0.05	0.55	164.8	7.41	283
28/01/2020	ETFSL500	0.304	0.313	0.68	2.17	-11.8	7.2	321
28/01/2020	CONFLU1	0.13	0.113	0.1	1.11	25.1	7.57	297
28/01/2020	WARARM5	0.068	0.072	0.24	0.79	48.3	7.54	275
28/01/2020	WDFS1	0.062	0.074	0.25	1.08	33.5	7.67	286
28/01/2020	WDFS1+100	0.056	0.066	0.31	0.82	-153.3	7.91	285

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
4/02/2020	ETAU	0.522	0.546	<0.05	0.87	102.7	6.86	348
4/02/2020	ETFSL200	0.176	0.178	<0.05	0.51	110.3	7.36	337
4/02/2020	ETFSL500	0.275	0.296	0.74	2.1	35	7.38	384
4/02/2020	CONFLU1	0.061	0.067	0.13	1.11	64.3	7.7	356
4/02/2020	WARARM5	0.041	0.039	0.21	1.06	64.5	7.55	319
4/02/2020	WDFS1	0.046	0.056	0.26	1.41	39.9	7.68	328
4/02/2020 ¹	WDFS1+100	0.017	0.027	0.26	1.22	-96.5	7.87	325
12/02/2020	ETAU	0.061	0.064	0.42	0.63	115.5	6.64	120
12/02/2020	ETFSL200	0.047	0.051	0.3	0.55	108.1	6.7	118
12/02/2020	ETFSL500	0.057	0.062	0.32	0.6	119.1	6.83	119
17/02/2020	ETAU	0.058	0.059	0.19	0.62	170	6.73	122
17/02/2020	ETFSL200	0.053	0.056	0.23	0.69	151.1	6.96	124
17/02/2020	ETFSL500	0.052	0.048	0.25	0.57	164.5	6.95	128
25/02/2020	ETAU	0.144	0.154	0.29	1.5	97.4	7.01	178
25/02/2020	ETFSL200	0.123	0.145	0.12	1.46	65.2	7.22	175
25/02/2020	ETFSL500	0.13	0.155	0.32	2.02	40.1	7.19	182
5/03/2020	ETAU	0.233	0.237	<0.05	2.2	74.4	6.75	206
5/03/2020	ETFSL200	0.139	0.169	<0.05	1.7	34.7	7.37	200
5/03/2020	ETFSL500	0.195	0.211	0.37	2.11	-14	7.13	212
5/03/2020	CONFLU1	0.038	0.04	<0.05	0.76	23.5	7.34	194
5/03/2020	WARARM5	0.03	0.035	<0.05	0.69	59.9	7.48	194
5/03/2020	WDFS1	0.059	0.061	<0.05	0.92	69.2	7.1	195
5/03/2020	WDFS1+100	0.065	0.065	<0.05	0.97	47	7.14	194
11/03/2020	ETAU	0.161	0.174	0.38	1.98	107	7.01	208
11/03/2020	ETFSL200	0.127	0.132	0.07	1.44	109	7.31	206
11/03/2020	ETFSL500	0.147	0.158	0.22	1.75	65.7	7.24	215
11/03/2020	CONFLU1	0.079	0.089	<0.05	1.15	100.9	7.37	208
11/03/2020	WARARM5	0.029	0.028	<0.05	0.7	99	7.5	204
11/03/2020	WDFS1	0.045	0.049	<0.05	0.92	92.9	7.36	206
11/03/2020	WDFS1+100	0.048	0.058	<0.05	1.04	101.9	7.32	205
17/03/2020	ETAU	0.038	0.048	0.28	0.7	106.5	6.9	125
17/03/2020	ETFSL200	0.037	0.039	0.28	0.68	110.4	6.73	125
17/03/2020	ETFSL500	0.038	0.041	0.29	0.63	11.3	6.64	124
17/03/2020	CONFLU1	0.041	0.044	0.27	0.63	120.3	6.54	123
17/03/2020	WARARM5	0.044	0.05	0.2	0.55	118.3	6.64	140
17/03/2020	WDFS1	0.05	0.074	0.22	1.03	133.1	6.56	134
17/03/2020	WDFS1+100	0.049	0.053	0.24	0.58	126.4	6.53	134
25/03/2020	ETAU	0.116	0.115	0.29	1.34	35.3	6.95	182
25/03/2020	ETFSL200	0.086	0.094	0.11	1.16	75.7	7.14	178
25/03/2020	ETFSL500	0.097	0.102	0.27	1.23	58.3	7.13	186
25/03/2020 ²	CONFLU1	0.046	0.061	0.12	0.85	117.4	7.23	182
31/03/2020	ETAU	0.079	0.086	0.3	0.95	80	7.05	177
31/03/2020	ETFSL200	0.067	0.069	0.21	0.82	77.3	7.08	173
31/03/2020	ETFSL500	0.07	0.079	0.32	0.93	64.9	7.25	176
31/03/2020 ²	CONFLU1	0.045	0.044	0.14	0.73	55	7.13	185

Note:

- ¹ Sampling at sites downstream of site ETFSL500 were not taken between 4 and 29 February due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.
- ² Sampling at sites downstream of site CONFLU1 were not taken on 25 and 31 March due to high flow conditions present on the Eastern Tributary arm of the Woronora Reservoir.

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/04/2020 ³	ETAU	0.087	0.105	0.32	1.26	71	6.91	171
7/04/2020	ETFSL200	0.071	0.083	0.85	0.12	71.1	7.04	171
7/04/2020	ETFSL500	0.083	0.093	0.42	1.1	65.1	7.05	175
7/04/2020	CONFLU1	0.087	0.103	0.16	1.21	109.6	7.01	173
15/04/2020	ETAU	0.108	0.109	0.31	1.16	126.9	6.81	175
14/04/2020	ETFSL200	0.091	0.09	0.2	0.95	64.9	7.05	171
14/04/2020	ETFSL500	0.085	0.095	0.27	1.13	102.2	6.96	174
14/04/2020	CONFLU1	0.039	0.042	0.05	0.74	185.6	7.14	183
22/04/2020	ETAU	0.155	0.167	0.17	1.63	121.2	6.87	207
22/04/2020	ETFSL200	0.119	0.126	0.06	1.26	128.9	7.34	203
22/04/2020	ETFSL500	0.148	0.156	0.45	1.63	91.5	7.21	217
22/04/2020	CONFLU1	0.034	0.037	0.09	0.78	119.1	7.27	213
29/04/2020	ETAU	0.221	0.227	0.56	2.18	136.8	6.7	225
29/04/2020	ETFSL200	0.155	0.158	<0.05	1.32	147.8	7.05	233
29/04/2020	ETFSL500	0.184	0.185	0.24	1.75	51.4	7.11	259
29/04/2020	CONFLU1	0.166	0.183	<0.05	2.03	157.1	6.95	247
4/05/2020	ETAU	0.143	0.137	0.5	1.49	86	6.89	203
4/05/2020	ETFSL200	0.106	0.104	0.13	1.18	110.5	7.32	202
4/05/2020	ETFSL500	0.132	0.128	0.52	1.62	26.1	7.21	212
4/05/2020	CONFLU1	0.04	0.039	0.09	0.75	39.7	7.35	205
13/05/2020	ETAU	0.232	0.236	0.1	2.11	89.2	7.23	234
13/05/2020	ETFSL200	0.156	0.162	0.05	1.5	84.7	7.34	222
13/05/2020	ETFSL500	0.173	0.19	0.34	1.84	2.6	7.42	244
13/05/2020	CONFLU1	0.039	0.036	0.13	0.75	18.9	7.28	219
19/05/2020	ETAU	0.226	0.288	0.42	2.3	42.4	6.71	231
19/05/2020	ETFSL200	0.179	0.198	0.05	1.29	56.3	6.65	230
19/05/2020	ETFSL500	0.199	0.22	0.39	1.9	32.8	6.66	248
19/05/2020	CONFLU1	0.143	0.151	0.05	1.14	9.4	6.66	238
26/05/2020	ETAU	0.142	0.136	0.59	1.43	39	6.36	202
26/05/2020	ETFSL200	0.11	0.111	0.18	1.05	34.5	6.4	201
26/05/2020	ETFSL500	0.119	0.122	0.32	1.26	23	6.42	206
26/05/2020	CONFLU1	0.072	0.069	0.09	0.95	45	6.39	202
1/06/2020	ETAU	0.136	0.126	0.46	1.06	17.1	6.75	203
1/06/2020	ETFSL200	0.11	0.111	0.16	0.95	22.1	6.48	201
1/06/2020	ETFSL500	0.128	0.13	0.45	1.28	17.5	6.5	211
9/06/2020	ETAU	0.21	0.224	1.04	1.93	47.4	6.71	233
9/06/2020	ETFSL200	0.156	0.161	0.25	1.03	73.2	6.81	228
9/06/2020	ETFSL500	0.181	0.179	0.41	1.4	23.7	6.80	246
15/06/2020	ETAU	0.121	0.12	0.64	1.14	35.9	6.26	209
15/06/2020	ETFSL200	0.103	0.103	0.22	0.76	7.9	6.4	207
15/06/2020	ETFSL500	0.111	0.112	0.4	1.1	46.8	6.38	215
30/06/2020	ETAU	0.173	0.173	0.69	1.51	60.9	6.71	200
30/06/2020	ETFSL200	0.123	0.120	0.1	0.96	73	6.74	189
30/06/2020	ETFSL500	0.136	0.133	0.3	1.29	38.3	6.8	198

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
7/07/2020	ETAU	0.179	0.195	0.4	1.62	104.1	7.45	239
7/07/2020	ETFSL200	0.147	0.155	0.06	1.00	76.3	7.63	238
7/07/2020	ETFSL500	0.176	0.177	0.45	1.36	33.6	7.57	252
8/07/2020	ETAU	0.218	-	1.14	1.89	47	6.99	234
15/07/2020	ETAU	0.089	-	0.51	0.99	92	6.85	206
16/07/2020	ETAU	0.109	0.107	0.71	1.04	31.7	6.73	217
16/07/2020	ETFSL200	0.090	0.093	0.26	0.92	31.5	7.09	214
16/07/2020	ETFSL500	0.101	0.103	0.42	1.10	12.1	7.01	220
21/07/2020	ETAU	0.170	0.171	0.48	1.32	32.2	6.58	220
22/07/2020	ETAU	-	0.171	0.76	1.21	2.97	6.58	225
22/07/2020	ETFSL200	0.122	0.128	<0.05	0.70	25.8	7.07	216
22/07/2020	ETFSL500	0.134	0.148	0.36	0.92	-25.7	6.99	230
30/07/2020	ETAU	0.050	0.052	0.32	0.72	109.3	6.11	113
30/07/2020	ETFSL200	0.041	0.042	0.3	0.67	120.3	6.18	109
30/07/2020	ETFSL500	0.041	0.042	0.28	0.68	124	6.17	106
4/08/2020	ETAU	0.080	-	0.57	0.98	83.2	6.73	155
6/08/2020	ETAU	0.084	0.088	0.57	1.00	94	6.85	148
6/08/2020	ETFSL200	0.083	0.078	0.34	0.88	89.1	7.02	147
6/08/2020	ETFSL500	0.088	0.083	0.25	0.91	126.7	7.03	146
13/08/2020	ETAU	0.043	0.048	0.28	0.53	70.8	6.67	107
13/08/2020	ETFSL200	0.038	0.055	0.24	0.75	75.4	6.48	104
13/08/2020	ETFSL500	0.037	0.043	0.26	0.54	79.4	6.49	101
17/08/2020	ETAU	0.061	0.068	0.43	0.80	112	6.45	133
17/08/2020	ETFSL200	0.035	0.049	0.14	0.49	180.9	6.37	106
17/08/2020	ETFSL500	0.038	0.042	0.12	0.45	214.5	6.20	105
24/08/2020	ETAU	0.090	0.091	0.5	1.16	83.1	6.70	155
24/08/2020	ETFSL200	0.054	0.072	0.12	0.74	138.5	6.85	131
24/08/2020	ETFSL500	0.034	0.033	0.10	0.46	159.6	6.63	123
25/08/2020	ETAU	0.109	-	0.46	1.39	49.2	6.33	160
1/09/2020	ETAU	0.128	0.136	0.5	1.48	104.1	7.14	193
1/09/2020	ETFSL200	0.029	0.035	<0.05	0.47	191.5	7.43	128
1/09/2020	ETFSL500	0.014	0.024	<0.05	0.38	256.7	7.28	119
9/09/2020	ETAU	0.181	0.186	0.57	1.75	45.3	7.01	193
9/09/2020	ETFSL200	0.017	0.031	<0.05	0.43	104.7	6.02	121
9/09/2020	ETFSL500	0.012	0.023	<0.05	0.38	188.5	6.46	114
15/09/2020	ETAU	0.202	0.201	0.6	1.88	71.9	6.5	209
15/09/2020	ETFSL200	0.020	0.026	<0.05	0.43	188.7	6.29	131
15/09/2020	ETFSL500	0.014	0.024	<0.05	0.39	193.4	6.21	126
21/09/2020	ETAU	0.177	0.193	<0.05	1.66	173.6	6.82	205
21/09/2020	ETFSL200	0.019	0.040	<0.05	0.52	204.6	6.1	123
21/09/2020	ETFSL500	0.018	0.055	<0.05	0.52	183.5	6.36	122
22/09/2020	ETAU	0.177	-	0.19	1.61	75.3	6.65	212
30/09/2020	ETAU	0.271	-	0.36	2.54	75.6	6.67	223

ATTACHMENT A (Continued)

Water Quality Data for Sites ETAU, ETFSL 100, ETFSL 200, ETFSL 300, ETFSL 400, ETFSL 500, CONFLU1, WARARM5, WDFS1 and WDFS1+100

Date	Site	Manganese (mg/L) (F)	Manganese (mg/L) (T)	Iron (mg/L) (F)	Iron (mg/L) (T)	ORP (mV)	pH Lab	EC Lab (µS/cm)
1/10/2020	ETAU	0.27	0.266	0.33	2.35	116.5	6.83	226
1/10/2020	ETFSL200	0.035	0.262	0.05	0.59	126.8	6.59	140
1/10/2020	ETFSL500	0.032	0.034	0.05	0.58	130.5	6.49	139
7/10/2020	ETAU	0.263	0.262	<0.05	1.46	80.9	6.84	248
7/10/2020	ETFSL200	0.122	0.129	0.05	1	70.8	6.95	194
7/10/2020	ETFSL500	0.101	0.109	0.05	1.05	84	6.82	173
12/10/2020	ETAU	0.264	0.287	<0.05	1.16	101.2	6.97	269
12/10/2020	ETFSL200	0.058	0.062	0.05	0.79	87.8	6.78	158
12/10/2020	ETFSL500	0.04	0.05	0.06	0.77	48	6.74	150
13/10/2020	ETAU	0.267	-	<0.05	1.58	45.8	6.99	246
20/10/2020	ETAU	0.342	-	0.2	2.41	107	6.73	232
22/10/2020	ETAU	0.345	0.322	<0.05	0.322	126.4	6.45	241
22/10/2020	ETFSL200	0.096	0.094	0.08	1.08	106.9	6.72	132
22/10/2020	ETFSL500	0.047	0.053	0.08	0.86	110.5	6.54	114
26/10/2020	ETAU	0.116	0.122	0.59	1.25	63.1	6.59	132
26/10/2020	ETFSL200	0.137	0.15	0.36	1.32	67.4	6.4	133
26/10/2020	ETFSL500	0.1	0.115	0.2	1.35	142.7	6.65	116
27/10/2020	ETAU	0.11	-	0.75	1.38	33.5	6.55	144
2/11/2020	ETAU	0.084	0.092	0.57	1.15	42.4	7.04	170
2/11/2020	ETFSL200	0.069	0.074	0.15	1.14	45.8	7.38	166
2/11/2020	ETFSL500	0.074	0.075	0.13	1.28	118	7.41	164
3/11/2020	ETAU	0.107	-	0.59	1.52	114.1	6.09	174
11/11/2020	ETAU	0.144	0.148	0.2	1.5	88.6	6.89	194
11/11/2020	ETFSL200	0.036	0.038	0.07	0.88	90.6	6.9	157
11/11/2020	ETFSL500	0.027	0.032	0.07	0.88	164	6.78	151
16/11/2020	ETAU	0.127	0.13	0.47	1.57	27.3	6.25	180
16/11/2020	ETFSL200	0.026	0.031	0.05	0.7	87.4	6.1	135
16/11/2020	ETFSL500	0.022	0.03	0.05	0.74	79.2	6.15	135
17/11/2020	ETAU	0.142	-	0.24	1.73	85.7	6.78	191
23/11/2020	ETAU	0.281	0.284	<0.05	2.69	78.8	6.88	219
23/11/2020	ETFSL200	0.041	0.05	<0.05	1.02	58.8	7.13	145
23/11/2020	ETFSL500	0.027	0.034	<0.05	0.91	77.4	6.85	136
25/11/2020	ETAU	0.298	-	<0.05	1.96	205.9	6.71	217
30/11/2020	ETAU	0.28	0.314	<0.05	1.64	136.8	6.53	232
30/11/2020	ETFSL200	0.055	0.063	0.52	1.31	164.5	6.27	145
30/11/2020	ETFSL500	0.042	0.05	0.46	1.2	141.5	6.08	140
10/12/2020	ETAU	0.282	0.376	<0.05	1.8	109.6	7.21	249
10/12/2020	ETFSL200	0.05	0.07	<0.05	1.17	98.8	7.36	162
10/12/2020	ETFSL500	0.053	0.064	<0.05	1.26	94.9	6.95	154
16/12/2020	ETAU	0.331	0.358	<0.05	1.11	88.2	7.26	268
16/12/2020	ETFSL200	0.058	0.066	0.41	0.91	58.1	6.92	130
16/12/2020	ETFSL500	0.032	0.05	0.32	1.5	67.5	6.95	129
21/12/2020	ETAU	0.407	0.418	<0.05	1.9	129.9	6.96	252
21/12/2020	ETFSL200	0.092	0.098	0.05	1.12	190.3	6.66	147
21/12/2020	ETFSL500	0.051	0.069	0.34	0.99	220.3	6.66	129
30/12/2020	ETAU	0.357	0.365	<0.05	2.16	79.8	7.27	259
30/12/2020	ETFSL200	0.064	0.073	<0.05	1.04	132.7	6.54	178
30/12/2020	ETFSL500	0.043	0.066	<0.05	1.15	87.4	6.41	159

Note:

³ Due to the increasing water level in the Woronora Reservoir throughout February and March 2020, sampling at sites WARARM5, WDFS1 and WDFS1+100 was not undertaken from April to December 2020, and site CONFLU1 was not sampled from June to November 2020.