

TOMAGO ALUMINIUM CO. PTY. LTD.



ENVIRONMENT REPORT

FIRST QUARTER 2023

CONTENTS

INTRODUCTION:	3
EMISSION MONITORING SUMMARY REPORT	4
AMBIENT AIR REPORT	10
1. FLUORIDE CONCENTRATION IN AMBIENT AIR	11
2. SULFUR DIOXIDE CONCENTRATIONS IN AMBIENT AIR	15
METEOROLOGICAL REPORT	18
VEGETATION MONITORING REPORT	20
WATER MONITORING REPORT	22
INSTRUMENT AVAILABILITY REPORT	28
APPENDICES	30
APPENDIX 1 – SAMPLE SITES	31
APPENDIX 2 - EMISSION MONITORING DATA	32
APPENDIX 3 - FLUORIDE IN AMBIENT AIR DATA	33
APPENDIX 4 - METEOROLOGICAL DATA	34
APPENDIX 5 - VEGETATION MONITORING DATA	35
APPENDIX 6 – WATER MONITORING DATA	36
APPENDIX 7 – SAMPLING PROCEDURES	37
APPENDIX 8 - CUSTOMER FEEDBACK FORM	39
APPENDIX 9 - ECOSYSTEM REPORT 2022	41

INTRODUCTION:

This document details results from the environmental monitoring program conducted at the Tomago Aluminium Smelter for the first quarter of 2023. The document is prepared to comply with the Environmental reporting conditions set out in the development consents.

The report is forwarded to the following government departments and statutory authorities:

NSW Environment Protection Authority
Office of Environment and Heritage - National Parks and Wildlife Service
Department of Primary Industries (NSW Fisheries)
Port Stephens Council
Hunter Water Corporation
Department of Planning
Hunter Region Botanic Gardens

For procedures used in the sampling and/or analyses contained in this report, please refer to Appendix 7.

Any statements of conformity contained within this report are based purely on the result obtained, without consideration of any associated measurement uncertainties.

All enquiries should be directed to Ms Robyn Parker (robyn.parker@tomago.com.au) in the first instance.

EMISSION MONITORING SUMMARY REPORT

JANUARY - MARCH

2023

1. FLUORIDE EMISSION MONITORING

All monitoring as required under the Protection of the Environment Operations Act Licence 6163 and Development Consent was carried out. No exceedances of licence conditions occurred during the reporting period. A map showing the location of site source monitoring points appears in Appendix 1.

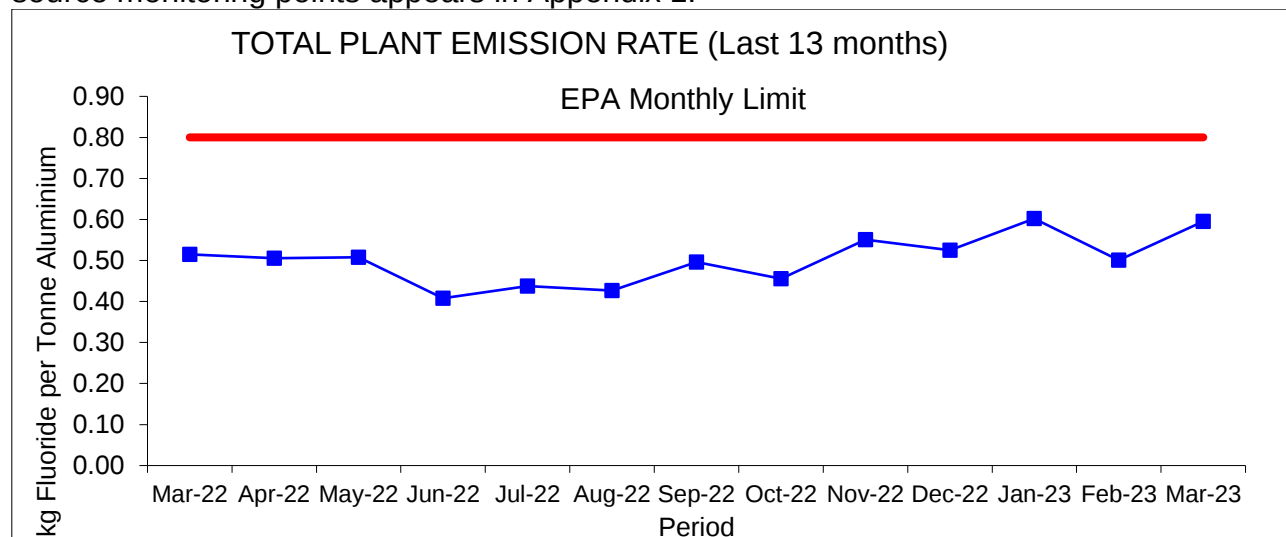


Figure 1: Total Plant Fluoride Emission Rate for last 12 months. This is defined as the sum of the average fluoride emissions for Potline Stacks, Bake Ovens Stacks and Potline Roof Vents.

1.1 STACK COMPLIANCE MONITORING

1.1.1 Potline Stacks

Detailed results of the Potline Stack compliance tests performed during the reporting period are presented in Appendix 2. There are no applicable limits for the potline stack concentrations as they are included in the Total Plant Emission Rate.

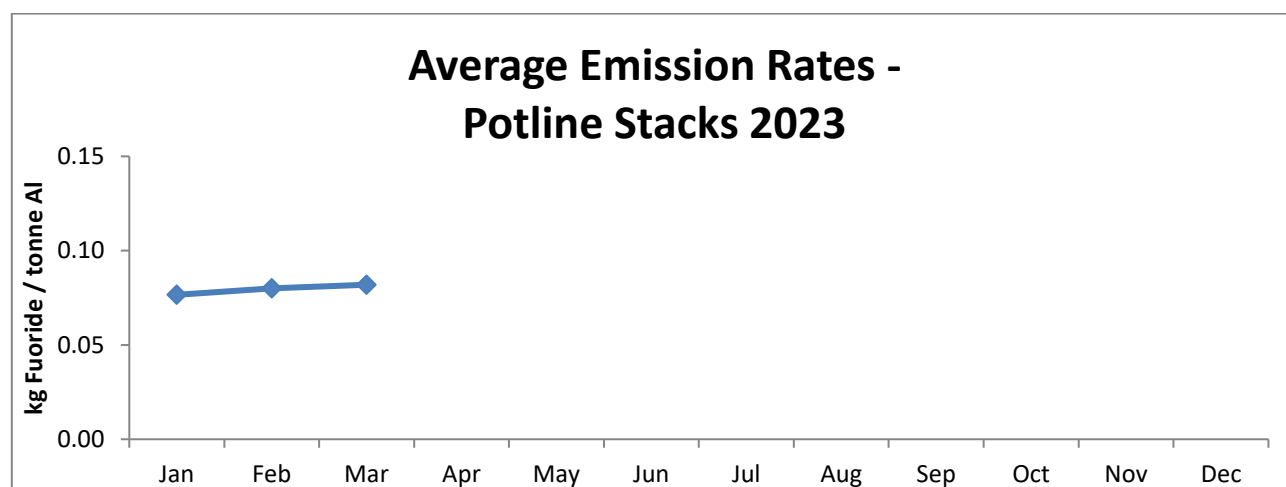


Figure 2: Average Potline Stack Fluoride Emission Rates – 2023

1.1.2 Carbon Bake Oven Stacks

Detailed results of the Bake Oven Stack compliance tests performed during the reporting period are presented in Appendix 2. There are no applicable limits for the Bake Ovens Stack concentrations as they are included in the Total Plant Emission Rate.

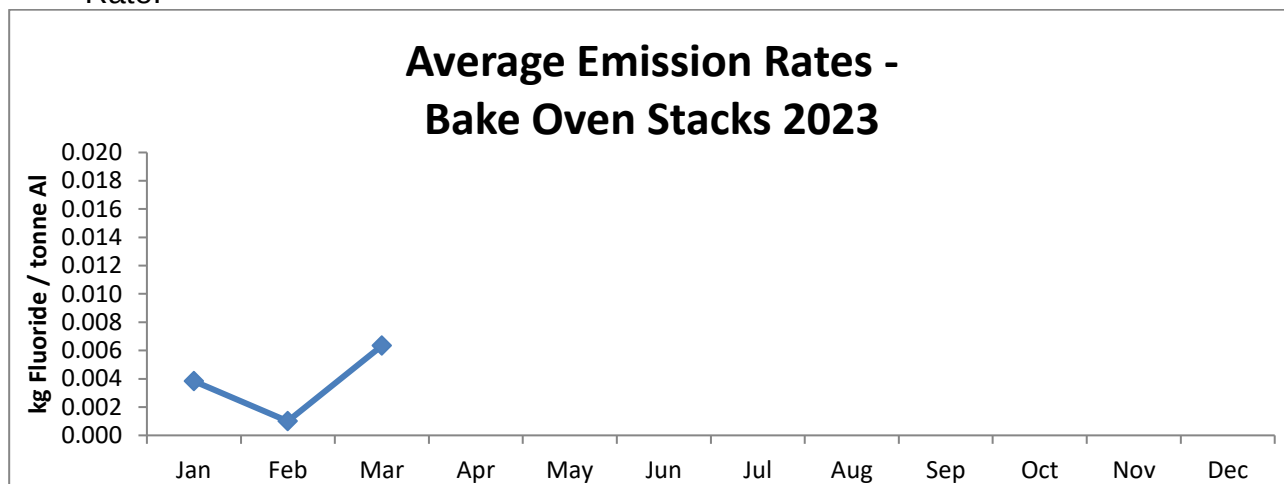


Figure 3: Average Bake Ovens Stack Fluoride Emission Rates – 2023

1.2 STACK CONTINUOUS GASEOUS FLUORIDE MONITORING

Detailed results on the continuous gaseous fluoride monitoring performed during the reporting period are presented in Appendix 2. The continuous monitoring of gaseous fluoride at the stacks is a condition of EPL 6163, however there are no applicable licence limits. The live monitoring data is used by plant operations to optimise emission control equipment.

Table 1: Average monthly stack gaseous fluoride emissions from continuous monitoring – 2023

STACK	mg/m3											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
POTLINE 1 West	0.41	0.48	0.49									
POTLINE 1 East	0.30	0.32	0.24									
POTLINE 2 West	0.38	0.46	0.42									
POTLINE 2 East	0.25	0.28	0.34									
POTLINE 1 & 2 EXT	0.34	0.74	0.40									
POTLINE 3 West	0.45	0.50	0.45									
POTLINE 3 East	0.36	0.41	0.93									
CARBON BAKE OVEN No. 1	0.36	0.35	0.45									
CARBON BAKE OVEN No. 2&3	0.76	0.94	1.05									

1.3 POTLINE ROOF VENTS

The detailed results of the Roof Vent compliance tests performed during the reporting period are presented in Appendix 2. There are no applicable limits for the Potline Roof Vent concentrations as they are included in the Total Plant Emission Rate.

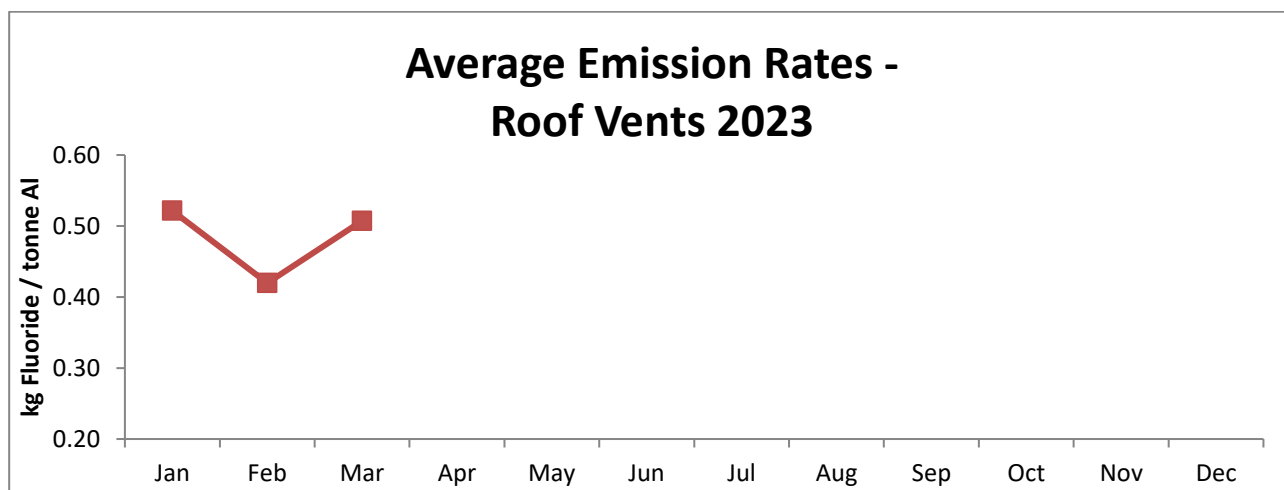


Figure 4: Average Potline Roof Vent Fluoride Emission Rates – 2023

2. SULFUR DIOXIDE EMISSION MONITORING

2.1 RAW MATERIALS

The sulfur content in the coke used for anode manufacture met the Environment Protection Licence limit of 3.5%. There is no applicable Environment Protection Licence limit for sulfur in pitch. Trends in sulfur levels in the coke and pitch are shown below.

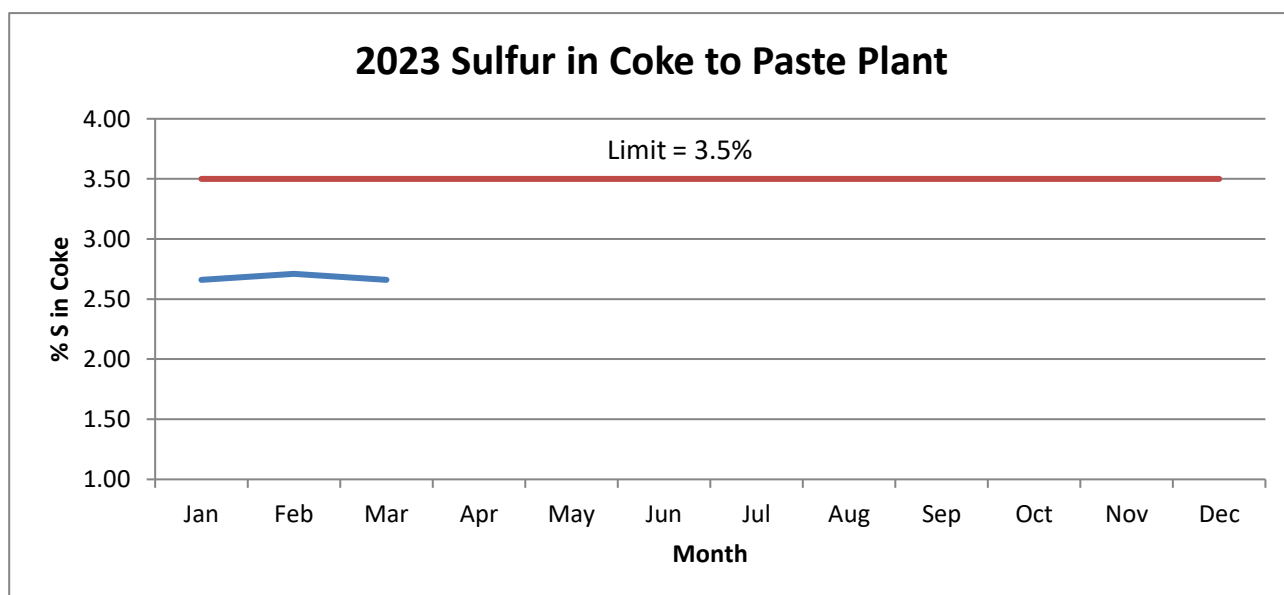


Figure 5: 2023 Sulfur in Coke to paste plant



Figure 6: 2023 Sulfur in Pitch received

2.2 SULFUR DIOXIDE MONITORING

Sulfur dioxide emission rates measured for the 2022 - 2023 EPA licence year are on track to meet the annual sulfur dioxide load limit for the site.

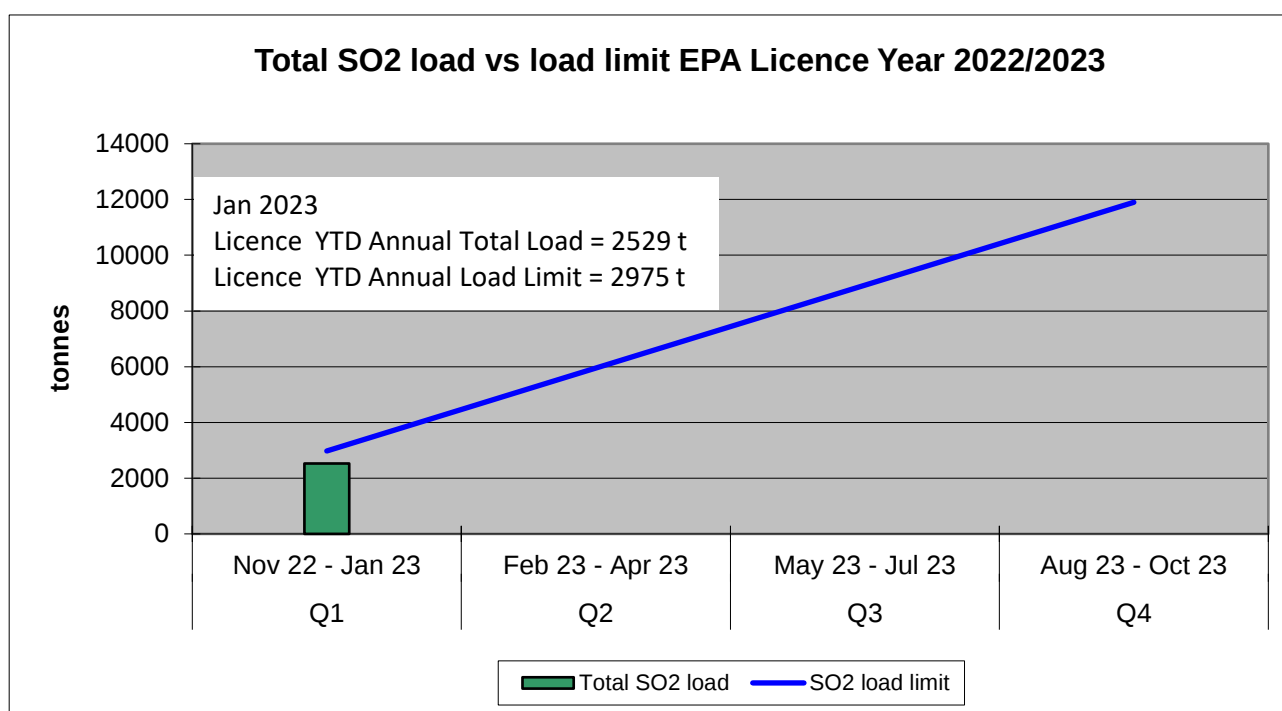


Figure 7: Sulfur Dioxide Load for the 2022 – 2023 EPA Licence Year

This page intentionally left blank

AMBIENT AIR REPORT

JANUARY - MARCH

2023

SECTION

- 1 AMBIENT AIR RESULTS (FLUORIDE)**
- 2 AMBIENT AIR RESULTS (SULFUR DIOXIDE)**

AMBIENT AIR QUALITY REPORT

FIRST QUARTER 2023

All monitoring as required under the Protection of the Environment Operations Act Licence 6163 and Development Consent was carried out. The monthly data summaries for ambient air sampled in the vicinity of Tomago Aluminium smelter appear below. The concentrations of fluoride in ambient air were determined in accordance with AS/NZS 3580.13. 2. The concentrations of sulfur dioxide were determined in accordance with AS 3580.4.1.

1. FLUORIDE CONCENTRATION IN AMBIENT AIR

The weekly average gaseous fluoride results are illustrated in this section where they are compared to 7 day National Goals established by the Australian and New Zealand Environment Conservation Council (ANZECC).

The ANZECC guidelines state (in part) that:

“...goals for ambient air fluoride are designed to protect against injury to plants and grazing animals rather than to protect human health. This is because fluoride can injure vegetation at one-thousandth the level of concern to human health.”

“The goals set for General Land Use (including residential) are designed to protect most of the sensitive species in the natural environment.

The goals set for Specialised Land Use apply when commercially valuable plants, which are demonstrated to be very sensitive to fluoride are being considered.”

“The ambient air goals for fluoride are intended for areas of commercial or conservation value and not intended for comparison with airborne or foliar fluoride levels within industrial areas or buffer zones associated with fluoride emitting industries.”

“Air quality objectives will generally be applied at the outer limits of an industrial buffer zone.” (ANZECC 1990).

The concentrations of gaseous fluoride in ambient air are compared to these guidelines, with sites within the designated buffer zone compared to the general land use goals while sites outside the buffer zone are compared to the specialised land use goals. There was a single exceedance of the general land use goal at Site 181 (Tomago Farm) at the end of the first quarter. This site is to the South East of the smelter, inside the designated buffer zone, and the result is reflective of the change in prevailing winds as we move into the autumn months.

Results in tabular form for each site are displayed in Appendix 3.

A map showing the location of the ambient air monitoring points appears in Appendix 1.

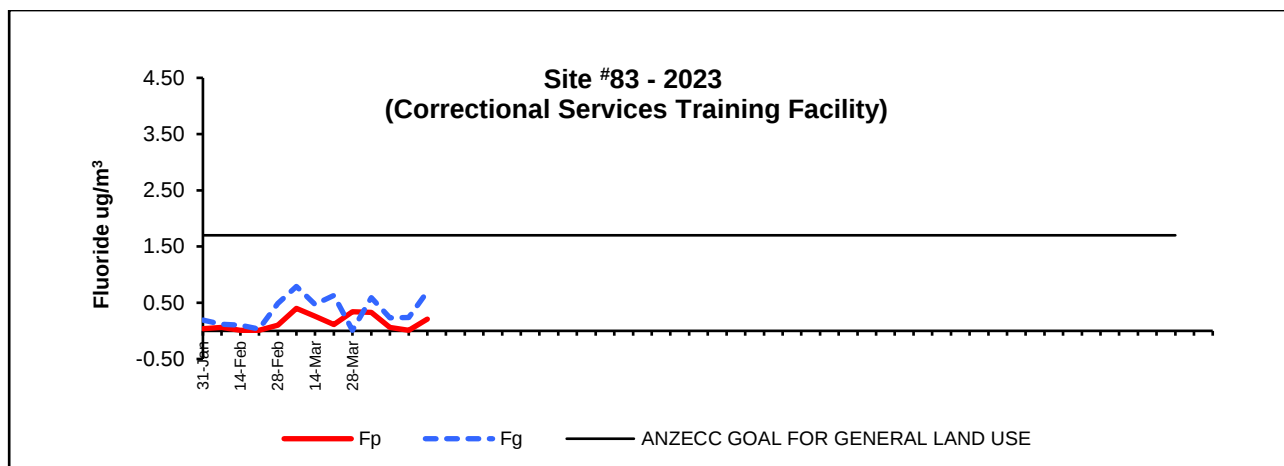
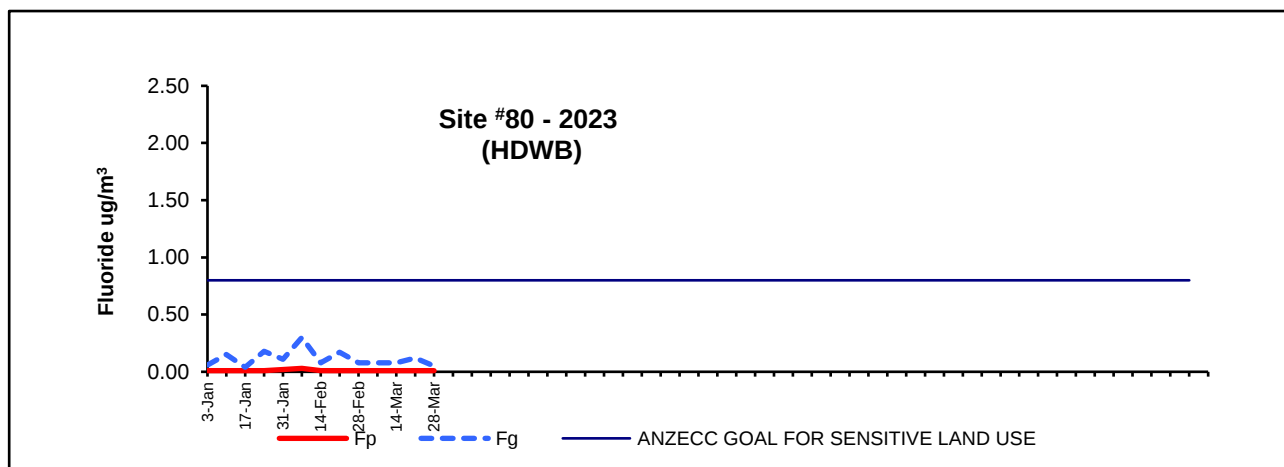


Figure 8: Ambient Fluoride measured concentrations – 2023

Note: Fp = particulate fluoride

Fg = gaseous fluoride

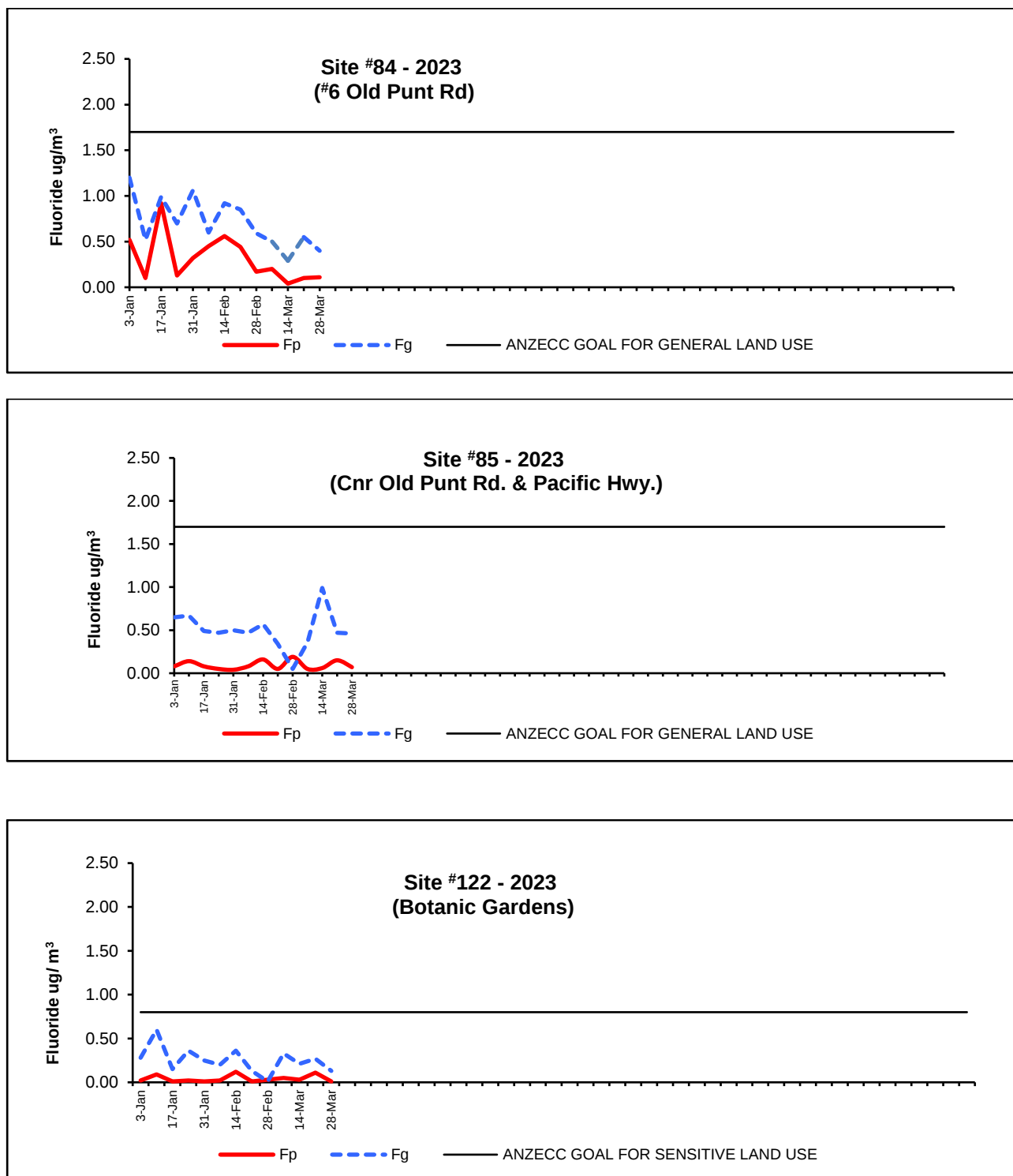


Figure 8: Ambient Fluoride measured concentrations – 2023

Note: Fp = particulate fluoride

Fg = gaseous fluoride

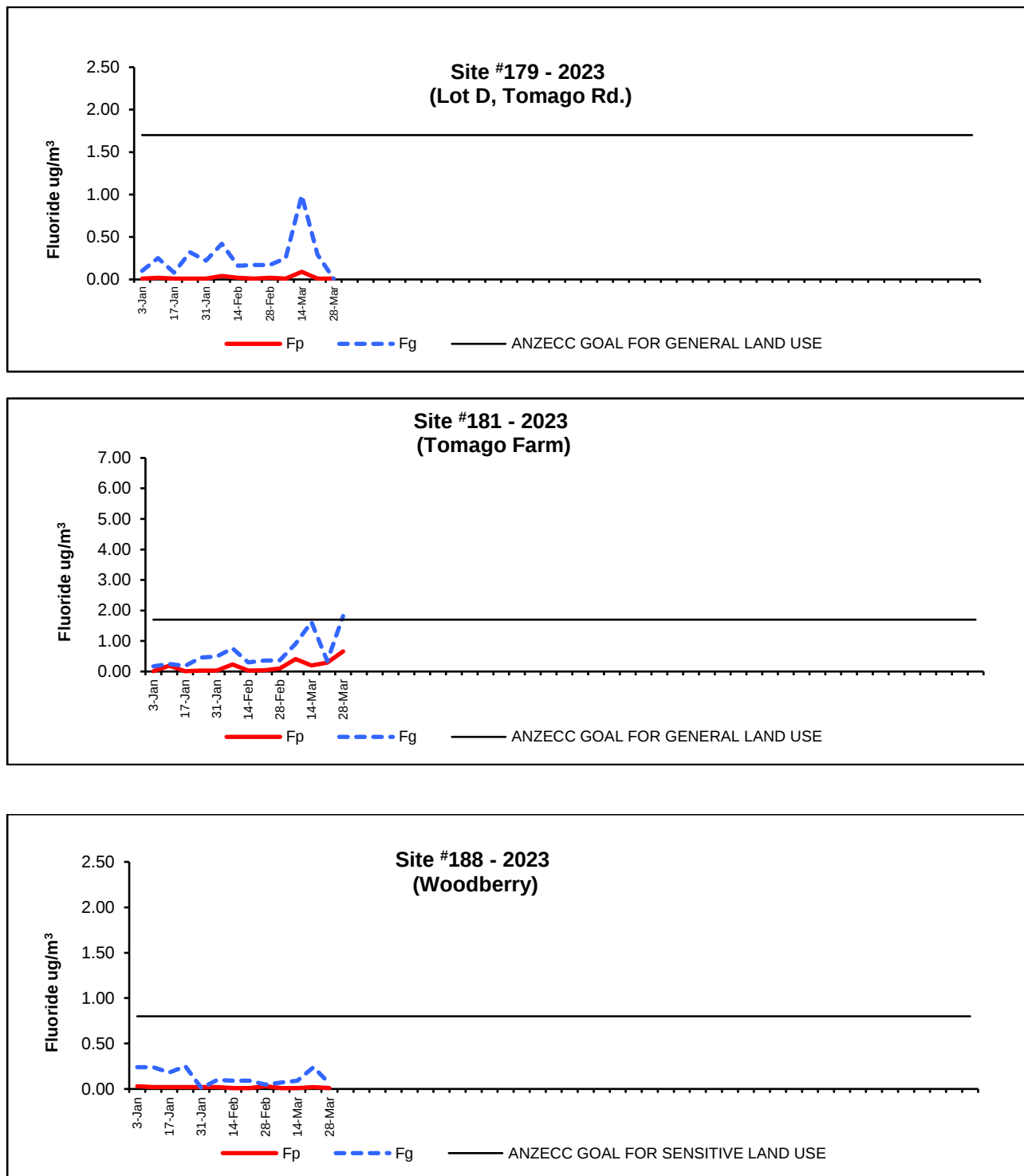


Figure 8: Ambient Fluoride measured concentrations – 2023

Note: Fp = particulate fluoride

Fg = gaseous fluoride

2. SULFUR DIOXIDE CONCENTRATIONS IN AMBIENT AIR

Tomago Aluminium operates five ambient Sulfur Dioxide monitoring stations in accordance with POEO Licence 6163. A map of the sites is located in Appendix 1.

The results for the year to date 2023 are presented in this section.

The NSW EPA's "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW" contains impact assessment criteria for sulfur dioxide. It should be noted that the assessment criteria are designed to be applied at the nearest off-site sensitive receptor, and all five monitoring stations are within the company buffer zone; however, the levels have been used as a point of reference here.

The impact assessment criteria for sulfur dioxide referenced here are:

Averaging Period

1 hour	10	pphm
1 day	2	pphm

Sulfur Dioxide - Parts per Hundred Million (pphm)

Meteorological Station (Grid Reference 812 681)												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
% Sampling Time	99	99	91									
Monthly Average	0.3	0.2	0.2									
Maximum 24 Hour Value	2.7	2.3	0.9									
Maximum 1 Hour Value	6.9	6.8	5.1									
90 %ile Value (1 Hr)	0.7	0.3	0.4									
EXCEEDANCE OF ASSESSMENT CRITERIA												
24 Hour	1	1	0									
1 Hour	0	0	0									

Tomago Road Farm (Grid Reference 813 665)												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
% Sampling Time	92	99	99									
Monthly Average	0.05	0.2	0.6									
Maximum 24 Hour Value	0.4	1.1	3.0									
Maximum 1 Hour Value	3.1	7.4	15.0									
90 Percentile Value (1 Hr)	0.05	0.3	2.2									
EXCEEDANCE OF ASSESSMENT CRITERIA												
24 Hour	0	0	2									
1 Hour	0	0	2									

Highway (Grid Reference 793 688)												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
% Sampling Time	96	99	97	82	96	97	99	99	95	94	98	93
Monthly Average	0.3	0.3	0.3	0.1	0.1	0.3	0.3	0.2	0.3	0.2	0.4	0.5
Maximum 24 Hour Value	1.2	2.1	1.1	1.2	0.3	0.7	1.3	0.5	3.1	1.6	2.7	1.8
Maximum 1 Hour Value	4.8	5.5	6.7	4.8	2.5	6.8	9.5	2.6	8.1	5.9	10.1	5.4
90 % ile Value (1 Hr)	0.5	0.7	0.6	0.3	0.3	0.5	99	99	95	0.3	0.7	1.7
EXCEEDANCE OF ASSESSMENT CRITERIA												
24 Hour	0	1	0									
1 Hour	0	0	0									

Laverick Ave (Grid Reference 784 667)												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
% Sampling Time	99	99	98									
Monthly Average	0.8	0.9	0.5									
Maximum 24 Hour Value	3.1	2.3	1.7									
Maximum 1 Hour Value	7.5	9.2	8.6									
90 % ile Value (1 Hr)	2.1	2.5	0.8									
EXCEEDANCE OF ASSESSMENT CRITERIA												
24 Hour	2	1	0									
1 Hour	0	0	0									

Site 179 (Grid Reference 817 671)												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
% Sampling Time	99	99	99									
Monthly Average	0.05	0.1	0.2									
Maximum 24 Hour Value	0.2	1.3	1.0									
Maximum 1 Hour Value	1.7	6.7	5.3									
90 Percentile Value (1 Hr)	0.1	0.3	0.4									
EXCEEDANCE OF ASSESSMENT CRITERIA												
24 Hour	0	0	0									
1 Hour	0	0	0									

This page intentionally left blank

METEOROLOGICAL REPORT

JANUARY - MARCH

2023

METEOROLOGICAL REPORT

FIRST QUARTER 2023

- Detailed statistics can be found in Appendix 4.
- A summary of this data is found in Table 4 below.

		JAN	FEB	MAR
Predominant Wind Directions, % (at 30m)		E 21.0	E 15.9	W 14.4
		ENE 13.4	ENE 14.5	WSW 12.9
		NE 12.3	NE 13.2	E 10.8
Wind Speed (m/s) (at 30m)	Maximum	9.0	8.2	9.0
	Average	3.4	3.5	3.2
Rainfall (mm)				
	Total Monthly	74.5	95.0	95.0
	Maximum Daily	15.0	81.5	20.0
Temperature (°C)				
	Average Daily Max	26.2	28.3	27.9
	Average Daily Min	17.6	18.1	18.0

Table 4: Meteorological data summary – Quarter 1, 2023

VEGETATION MONITORING REPORT

JANUARY - MARCH

2023

VEGETATION MONITORING REPORT

FIRST QUARTER 2023

An extensive vegetation monitoring program is conducted around the smelter with sites that are situated at varying distances from the smelter sampled on a monthly or quarterly basis. To complement this program an annual visual inspection of the condition of vegetation is conducted. The inspection report for 2023 will appear in The Fourth Quarter report.

Gaseous fluoride concentrations in the air can affect the condition of vegetation. Gaseous fluoride is absorbed by plants via the leaf stomata during normal respiration processes. The gaseous fluoride is preferentially absorbed instead of carbon dioxide and can reduce the capacity of the plant to photosynthesize. The extent to which fluoride accumulates in vegetation depends upon a number of variables including exposure regimes, meteorological conditions and plant species characteristics. Specific plant characteristics are an important variable as plants can vary in their sensitivity to fluoride. Sensitive species often display foliar damage at tissue concentrations of 50 µg/g. Intermediate species may be damaged at 200 µg/g and resistant species can tolerate tissue concentrations above 500 µg/g before exhibiting symptoms. Background concentrations are typically around 20 µg/g. Historical data shows that fluoride concentration and visible damage to vegetation decreases very rapidly with increasing distance from the smelter.

The monthly data from the Tomago Aluminium vegetation monitoring program for year to date 2023 is found in Appendix 5.

Vegetation data collected for January to March of 2023, including overstorey and cultivated vegetation, exhibits similar concentrations and trends to previous years on a monthly basis and from species to species.

The average year to date 2023 overstorey results for sites 111, 112, 113, 114, 115, 116, 117, 118 and 119 have a combined average of 321 ug/g fluoride. These sites are close to the smelter with most sites being within 0.5 km of the potlines.

The average year to date 2023 overstorey results for sites 120, 121, 123, 126, 168, 174, 182 and 194 have a combined average of 63 ug/g fluoride. These sites are within 3 km of the smelter.

Maps of the vegetation monitoring sites can be found in Appendix 1.

WATER MONITORING REPORT

FOR

JANUARY - MARCH

2023

WATER MONITORING SUMMARY

- 1 SEWERAGE TREATMENT OPERATIONS REPORT**
- 2 STORMWATER RETENTION ANALYSIS REPORT**
 - i. Controlled Discharge**
 - ii. Monitoring**
 - iii. Heavy Metal and Cyanide results**
- 3 SURFACE AND GROUNDWATER REPORT**

WATER MONITORING SUMMARY

1. SEWAGE TREATMENT

The sewage treatment system operated without down time and all treated effluent was used for site irrigation. The volume of sewage treated and the quantity and quality of effluent used for irrigation are presented in specific reports in Appendix 6.

2. STORMWATER SYSTEM

i. Controlled Discharge (EPA Licence Point 16)

To allow for the collection of 'first flush' stormwater originating from the site, stormwater pond capacity is maintained by discharging water from the stormwater pond to the Hunter River under controlled conditions. Water samples are taken daily during the discharge. Table 5 below shows the monitoring parameters and limits for stormwater discharged under controlled conditions from Licence Point 16 during Quarter 1, 2023.

Date of discharge start	Total Volume Discharged (ML)	PAH (mg/L)	TRH (mg/L)	Maximum daily discharge volume (ML)	Ave pH	Ave Fluoride (mg/L)	Ave conductivity (uS/cm)	Ave Suspended Solids (mg/L)
23/02/23	4.629	<0.001	0.17	2.935	6.7	32	135	10
Applicable Limits	N/A	N/A	N/A	4.32	6.5-8.5	40	N/A	50

Table 5: Controlled stormwater discharge results and comparison to applicable limits.

ii. Continuous monitoring of weir overflow (EPA Licence Point 35)

On-site stormwater is collected in the sedimentation basin. This water then may overflow via a v-notch weir to the Hunter River once the capacity of the stormwater pond has been reached. Daily overflow results for this quarter can be found in Appendix 6, whilst the monthly averages are presented in Table 6 below. There are no applicable EPL limits to stormwater overflow.

Month – Averages during days of overflow			Jan	Feb	Mar
Weir v-notch	pH		5.9	5.8	6.4
	Conductivity	uS/cm	298	260	325
	Soluble Fluoride*	mg/L	60	38	50
	PAH	mg/L	<0.001	<0.001	<0.001
	TRH	mg/L	<0.1	0.2	<0.1
Flow to Hunter River		L/sec	76	230	50
		kL/day	6552	19893	2326
Rainfall	Total monthly	mm.	74.5	95.0	95.0
Number of days with v-notch flow			8	3	24

NF= No Flow over weir

*Volume weighted average

Table 6: Average Monthly Stormwater Overflow Results for First Quarter 2023

iii. Other monitoring of weir overflow (EPA Licence Point 35)

Samples from the v-notch sampling point above (EPA Licence Point 35) are taken at least once per discharge and dispatched to external testing facilities for total heavy metals, free cyanide, Polycyclic Aromatic Hydrocarbons (PAH) and Total Recoverable Hydrocarbons (TRH) determination.

The results of these analyses are found below in Table 7.

Table 7: *Stormwater Heavy Metals, Cyanide, PAH and TRH – First Quarter 2023

	mg/L (dissolved)																			
Sample Date	Fe	Ag	Al	As	Be	Cd	Co	Cr	Cu	Mn	Ni	Pb	Sb	Se	Tl	Zn	Hg	Free CN	PAH	TRH
06/01/2023	No results available – sample lost by laboratory																			
23/01/2023	<0.05	<0.005	20	<0.001	0.004	0.0012	0.001	0.002	0.003	0.13	0.20	<0.001	<0.005	<0.001	nra	1.5	<0.0001	<0.005	<0.001	<0.1
22/02/2023	0.13	<0.005	14	0.001	0.003	0.0006	<0.001	<0.001	0.020	0.087	0.13	<0.001	0.005	<0.001	<0.005	1.2	<0.0001	<0.005	<0.001	0.2
15/03/2023	<0.05	<0.005	17	0.002	0.004	0.0012	0.001	<0.001	0.004	0.11	0.17	<0.001	0.006	<0.001	<0.005	1.5	<0.0001	<0.005	<0.001	<0.1
24/03/2023	<0.05	<0.005	16	0.001	0.004	0.0011	0.001	<0.001	0.005	0.10	0.14	<0.001	0.006	<0.001	<0.001	1.4	<0.0001	<0.005	<0.001	0.1
27/03/2023	<0.05	<0.005	16	0.001	0.004	0.0008	<0.001	<0.001	0.005	0.12	0.14	<0.001	0.005	<0.001	<0.005	1.1	<0.0001	<0.005	<0.001	<0.1

*Analysis performed by Eurofins I mgt, NATA accreditation No. 1261

3. SURFACE AND GROUNDWATER MONITORING

Surface water and groundwater monitoring in the vicinity of the smelter was carried out during the quarter. The groundwater monitoring includes sites monitored by both the Hunter Water Corporation and Tomago Aluminium. Analysis of the fluoride levels for the quarter revealed no abnormalities to normal trends. A detailed analysis of the groundwater and surface water monitoring is provided in the Annual Report.

The results of surface water and groundwater monitoring in the vicinity of the smelter are presented in Appendix 6.

Sites are displayed in Appendix 1, Maps 5 and 6.

This page intentionally left blank

INSTRUMENT AVAILABILITY REPORT

FOR

JANUARY - MARCH

2023

INSTRUMENT AVAILABILITY – FIRST QUARTER 2023

<u>AMBIENT FLUORIDE MONITORING</u>		% DATA RECOVERY		
		Jan	Feb	Mar
Site	80	100	100	100
	83	100	100	100
	84	100	100	100
	85	100	100	100
	122	100	100	100
	179	100	100	100
	181	100	100	100
	188	100	100	100

<u>STORMWATER MONITORING</u>		% DATA RECOVERY		
		Jan	Feb	Mar
Stream 3 (at V Notch)	pH	100	100	100
	FLUORIDE	100	100	100
	PAH	67	100	100
	TRH	67	100	100

NF = No Flow

<u>CONTINUOUS STACK GASEOUS FLUORIDE MONITORING</u>		% DATA RECOVERY		
		Jan	Feb	Mar
	Stack 1 West	100	100	100
	1 East	100	93	100
	2 West	94	100	100
	2 East	100	100	100
	3 West	100	100	100
	3 East	100	100	100
	1 & 2 Ext.	100	100	100
	Bake Ovens 1	100	100	100
	Bake Ovens 2 & 3	100	100	100

APPENDICES

APPENDIX 1 - SAMPLE SITES

APPENDIX 2 - EMISSION MONITORING DATA

APPENDIX 3 - FLUORIDE IN AMBIENT AIR DATA

APPENDIX 4 - METEOROLOGICAL DATA

APPENDIX 5 - VEGETATION MONITORING DATA

APPENDIX 6 - WATER MONITORING DATA

APPENDIX 7 - SAMPLING PROCEDURES

APPENDIX 8 - CUSTOMER FEEDBACK FORM

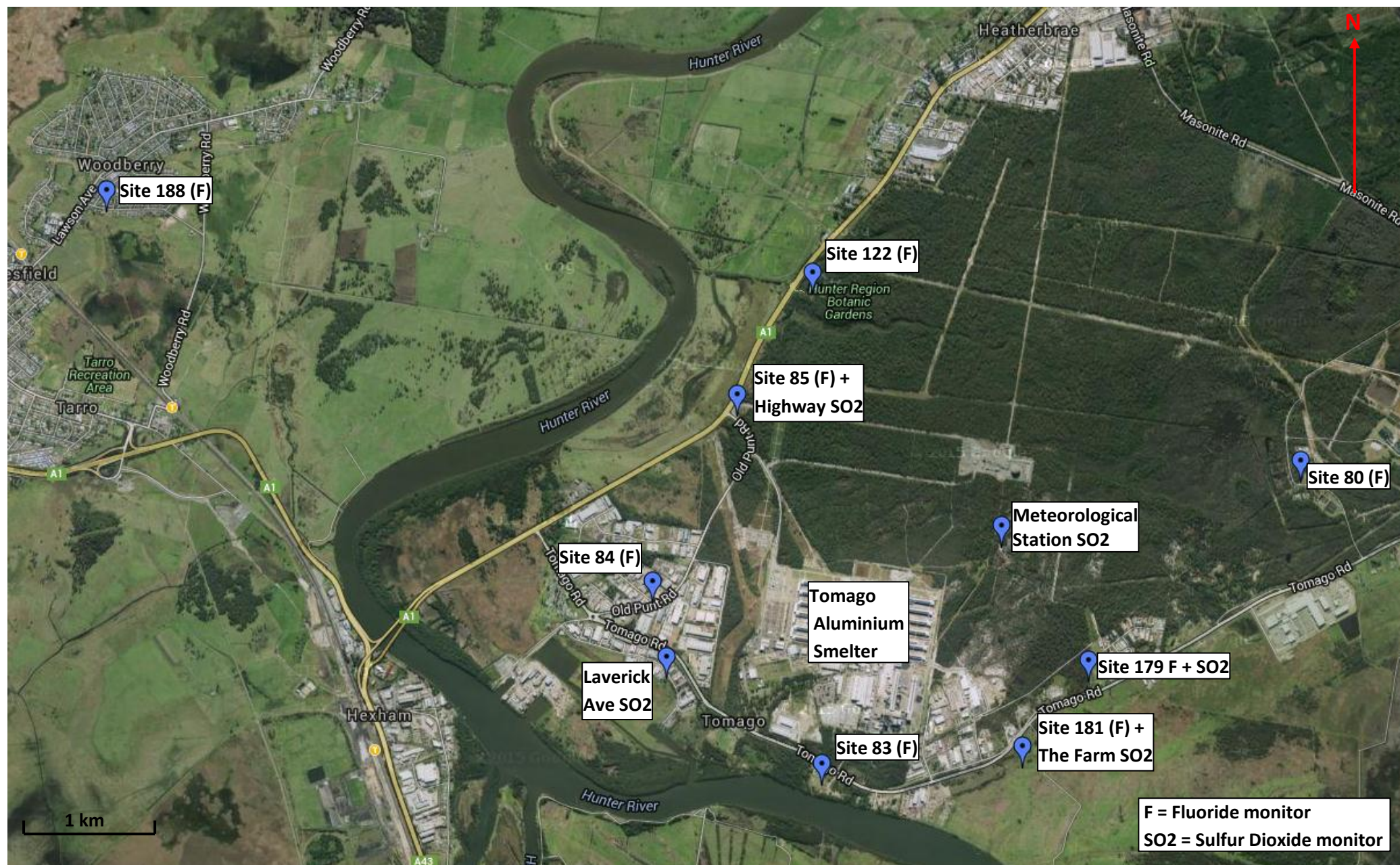
APPENDIX 9 - ECOSYSTEM REPORT 2022

APPENDIX 1 –

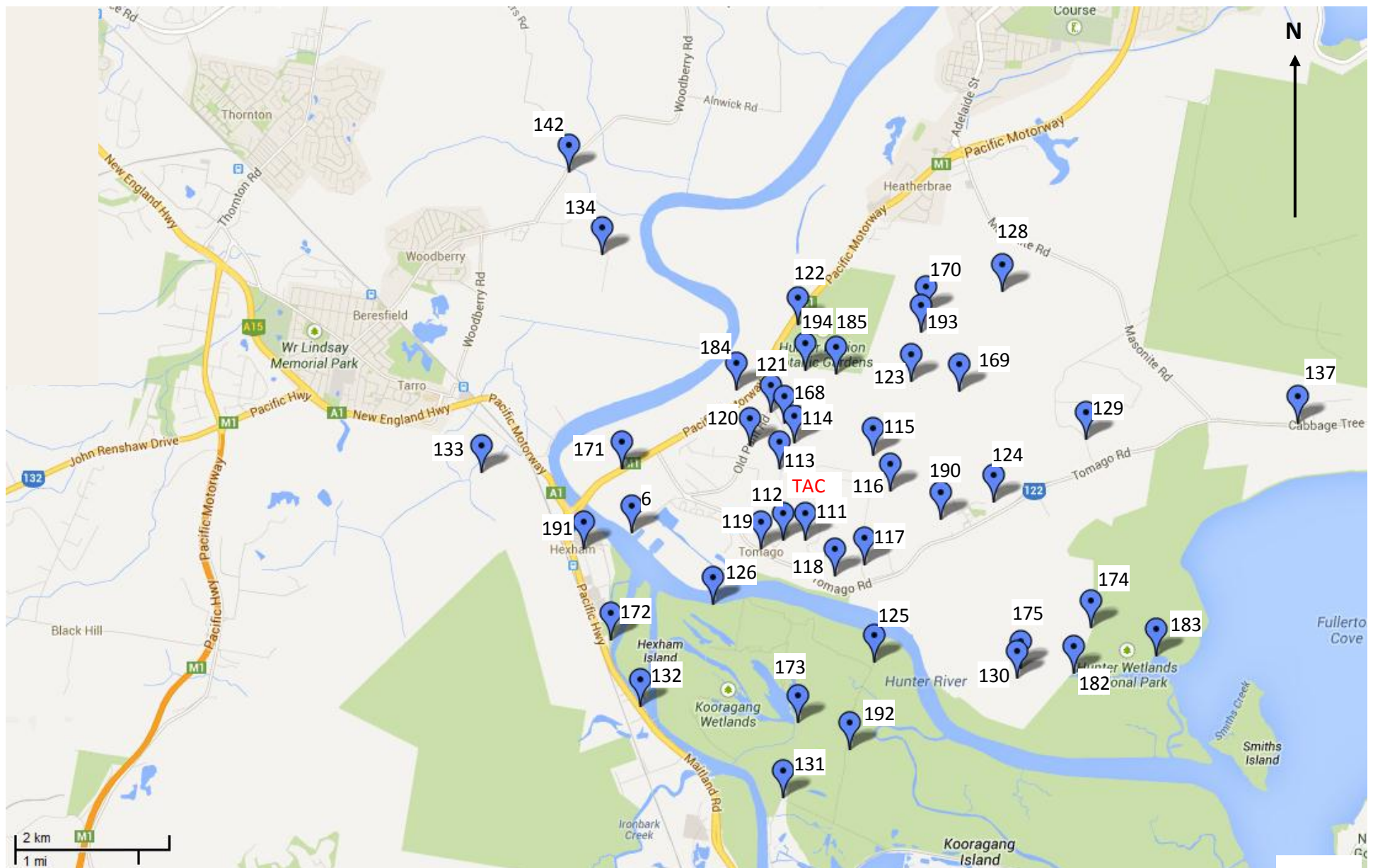
SAMPLE SITES

Map 1	Ambient Air monitoring sites.
Map 2	Overstorey monitoring sites.
Map 3	Forage monitoring sites.
Map 4	Surface Water monitoring sites.
Map 5	Groundwater sites monitored by HWC.
Map 6	Groundwater sites monitored by TAC.
Map 7	TAC Emission Source monitoring sites.

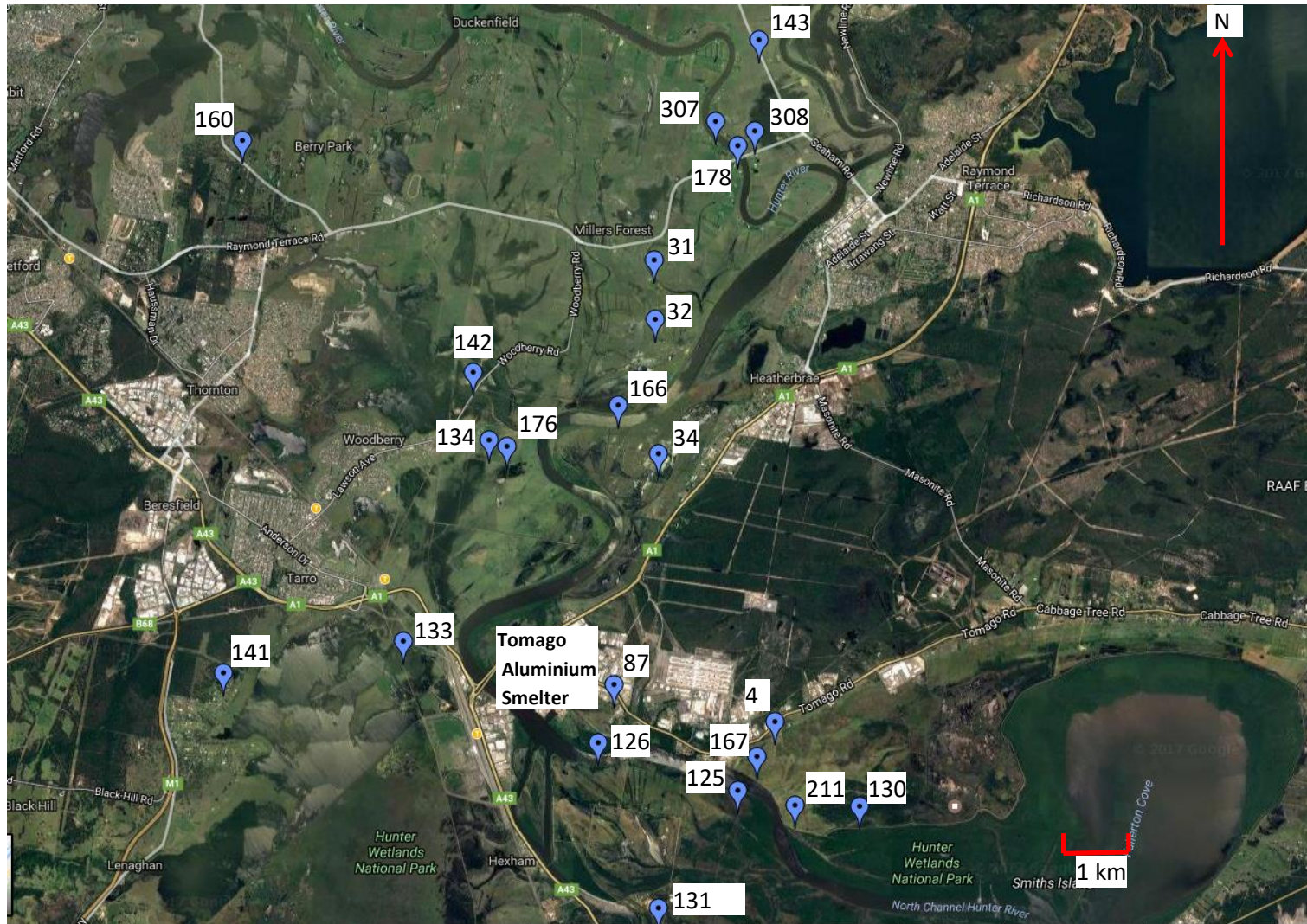
Map 1 Ambient Air Monitoring Sites



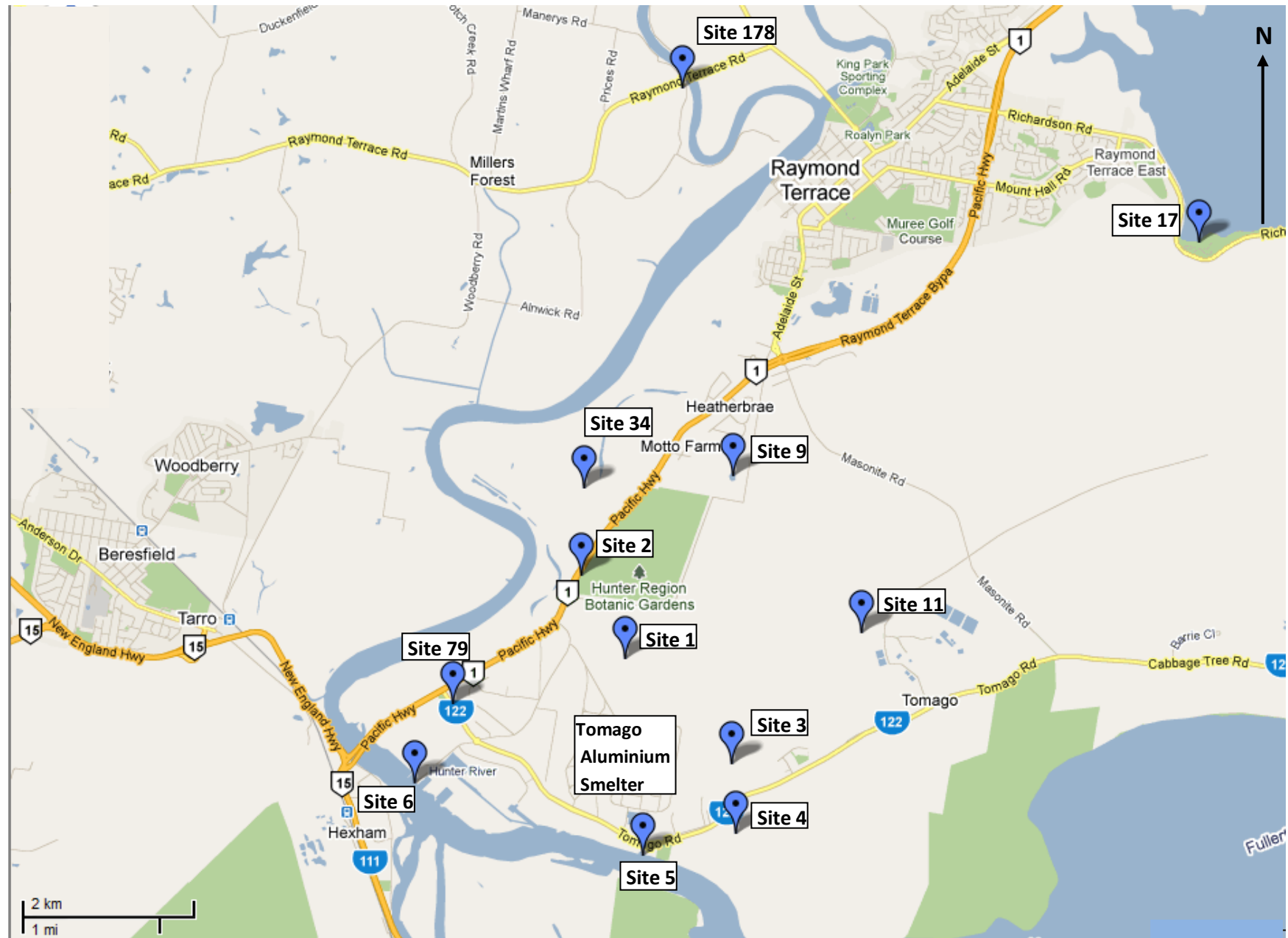
Map 2 Overstorey Sites



Map 3 Forage Sites



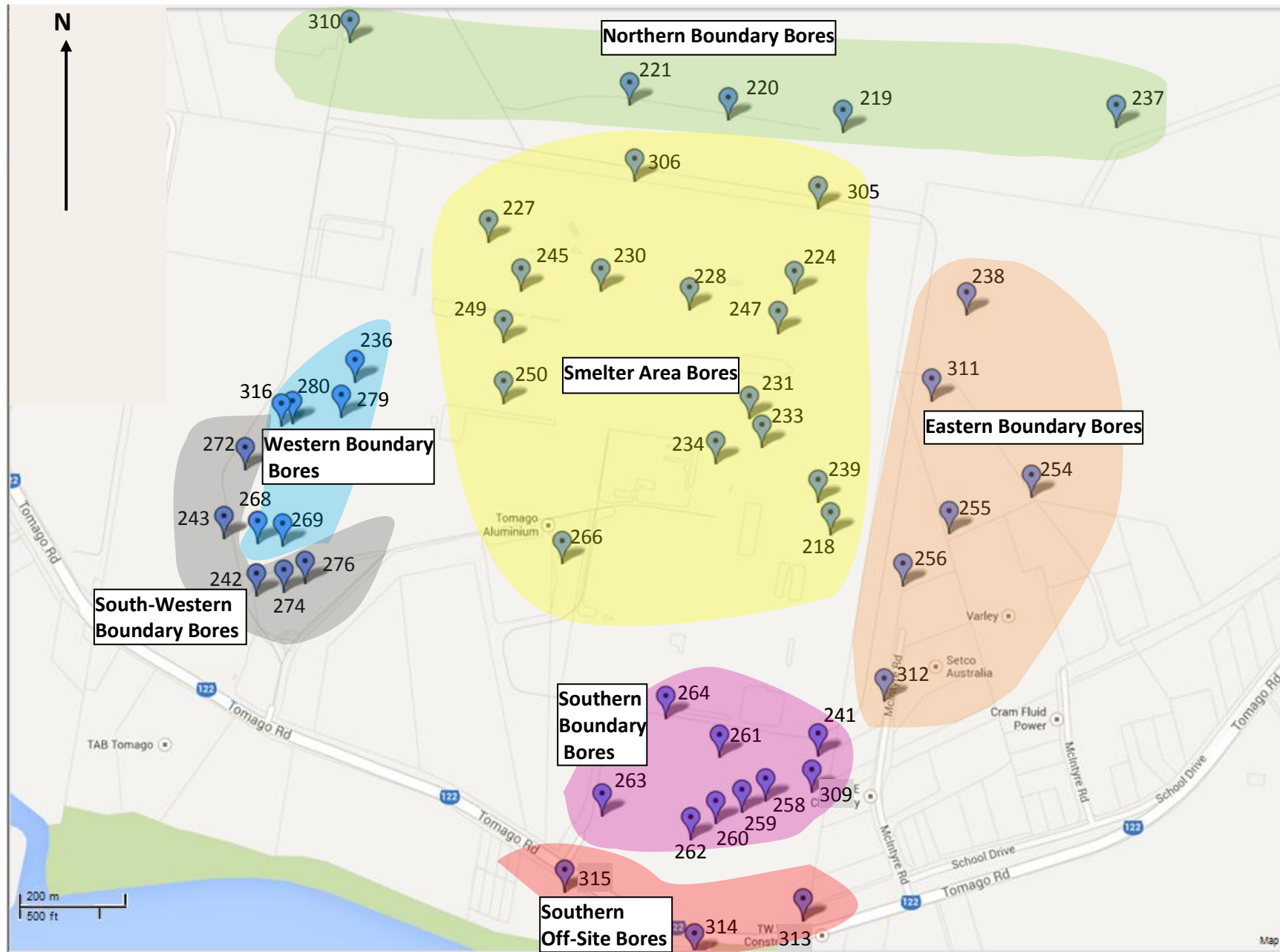
Map 4 Surface Water Sites



Map 5 Groundwater Sites Monitored by Hunter Water

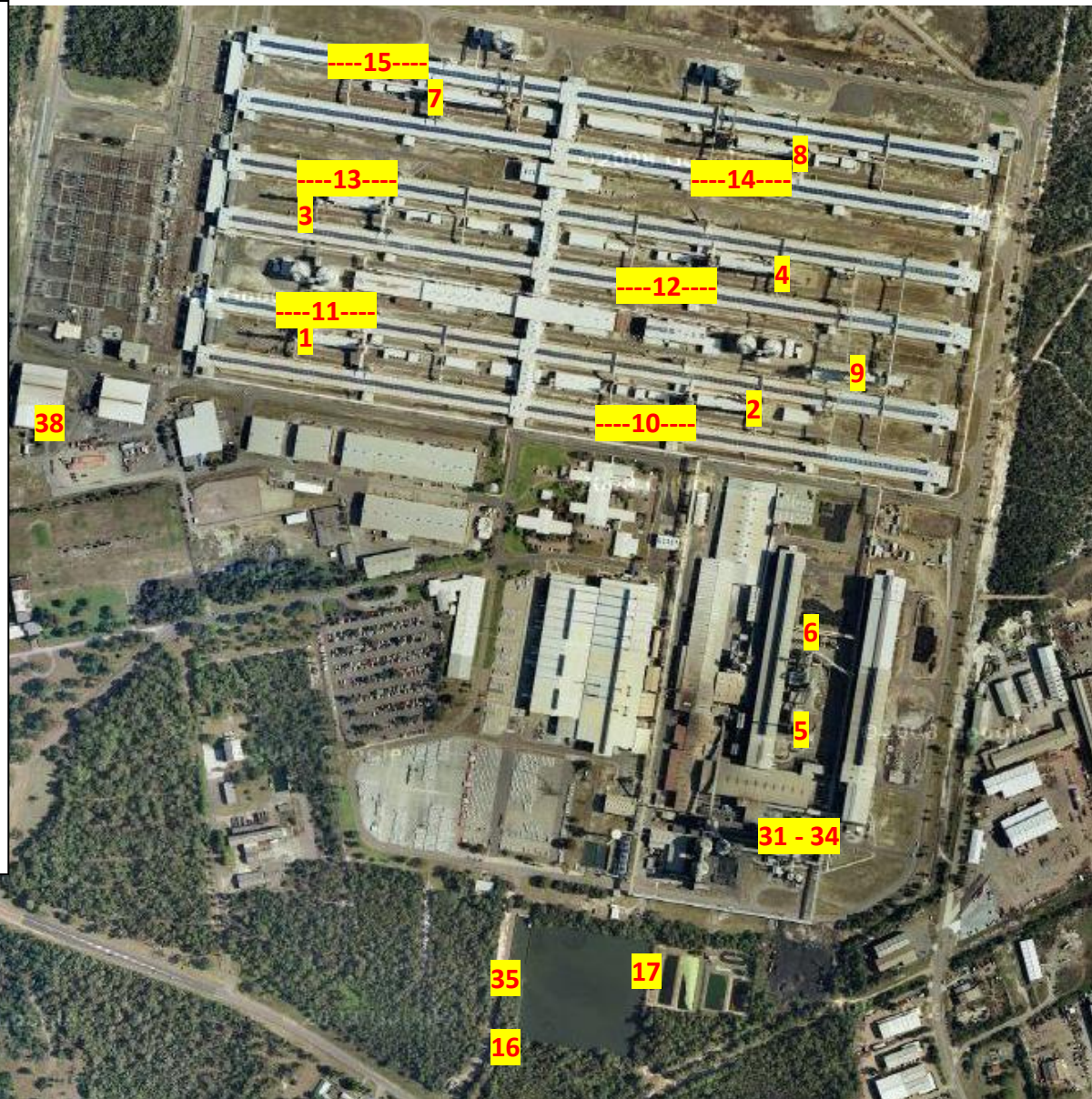


Map 6 Plant Groundwater Sites



Map 7: TAC Source Monitoring Locations

EPA Point	Location
1	Potline Stack 1 West
2	Potline Stack 1 East
3	Potline Stack 2 West
4	Potline Stack 2 East
5	Potline Stack Bake Ovens 1
6	Potline Stack Bake Ovens 2&3
7	Potline Stack Line 3 West
8	Potline Stack Line 3 East
9	Potline Stack Lines 1&2 Extension
10	Potroom A Pots A074-A080
11	Potroom B Pots B018-B024
12	Potroom C Pots C074-C080
13	Potroom D Pots D018-D024
14	Potroom E Pots E074-E080
15	Potroom F Pots F020-F026
16	Stormwater controlled discharge point
17	Effluent to on site irrigation system
31-34	Paste plants stacks
35	Overflow from 1 st flush stormwater system
38	Deline dedust filter



APPENDIX 2 -

EMISSION MONITORING DATA

Continuous Gaseous Fluoride (mg/m³)
From 01/01/23 to 31/01/23

Date	1WF	1EF	2WF	2EF	3WF	3EF	12E	BO1	BO2
01/01/23	0.38	0.25	0.48	0.25	0.32	0.24	0.48	0.45	0.25
02/01/23	0.43	0.24	0.44	0.22	0.38	0.33	0.33	0.48	0.27
03/01/23	0.49	0.27	0.40	0.24	0.35	0.38	0.35	0.55	0.28
04/01/23	0.43	0.32	0.36	0.24	0.34	0.40	0.32	0.40	0.33
05/01/23	0.30	0.27	0.26	0.20	0.28	0.24	0.22	0.35	1.11
06/01/23	0.30	0.19	0.25	0.19	0.40	0.27	0.22	0.56	0.95
07/01/23	0.33	0.18	nra	0.19	0.50	0.28	0.21	0.81	1.54
08/01/23	0.30	0.20	nra	0.22	0.38	0.30	0.26	0.48	0.36
09/01/23	0.34	0.24	0.31	0.23	0.24	0.41	0.25	0.38	0.50
10/01/23	0.33	0.27	0.40	0.37	0.20	0.30	0.28	0.24	0.32
11/01/23	0.31	0.24	0.36	0.21	0.22	0.23	0.18	0.56	0.29
12/01/23	0.28	0.20	0.41	0.21	0.39	0.15	0.20	0.38	0.28
13/01/23	0.33	0.22	0.48	0.28	0.40	0.35	0.25	0.44	0.25
14/01/23	0.38	0.28	0.31	0.25	0.45	0.51	0.29	0.48	0.42
15/01/23	0.56	0.37	0.29	0.27	0.44	0.36	0.35	0.32	0.42
16/01/23	0.48	0.41	0.28	0.27	0.49	0.23	0.29	0.32	0.37
17/01/23	0.33	0.49	0.31	0.29	0.53	0.27	0.36	0.29	0.54
18/01/23	0.52	0.32	0.35	0.38	0.79	0.44	0.39	0.29	0.49
19/01/23	0.32	0.29	0.32	0.25	0.66	0.43	0.34	0.34	2.65
20/01/23	0.37	0.23	0.33	0.20	0.46	0.35	0.25	0.42	5.45
21/01/23	0.36	0.27	0.35	0.23	0.33	0.25	0.38	0.29	3.12
22/01/23	0.39	0.25	0.35	0.32	0.25	0.24	0.28	0.28	0.57
23/01/23	0.38	0.25	0.33	0.27	0.33	0.30	0.80	0.24	0.55
24/01/23	0.42	0.30	0.37	0.26	0.57	0.35	0.38	0.24	0.47
25/01/23	0.50	0.31	0.47	0.24	0.52	0.38	0.37	0.23	0.35
26/01/23	0.56	0.37	0.44	0.26	0.50	0.41	0.36	0.31	0.31
27/01/23	0.68	0.43	0.54	0.28	0.60	0.47	0.40	0.25	0.23
28/01/23	0.52	0.41	0.54	0.28	0.62	0.58	0.46	0.21	0.21
29/01/23	0.54	0.42	0.49	0.26	0.61	0.54	0.39	0.20	0.20
30/01/23	0.46	0.34	0.43	0.28	0.65	0.62	0.41	0.20	0.22
31/01/23	0.51	0.34	0.46	0.28	0.59	0.71	0.41	0.22	0.28
Average	0.41	0.30	0.38	0.25	0.45	0.36	0.34	0.36	0.76

nra = no result available

EVR530

TOMAGO ALUMINIUM COMPANY PTY. LIMITED (A.C.N. 001 862 228)

08:28 04/05/23

ENVIRONMENT SYSTEM

PAGE 1

EMISSION MONITORING PROGRAM

STACK EMISSION REPORT FOR JANUARY 2023

Stack	S A M P L E				Sample Vol m3 N.T.P. (Dry)	Gaseous Particulate Total			Exit Temp. deg.C	Exit Velocity m/Sec	Volumetric Flow Rate 1000 m3/hr	Al Prod	Emission Rate kg F/t
	Start Date	Time	End Date	Time		Fluoride (as F) mg/m3	Fluoride (as F) mg/m3	Fluoride (as F) mg/m3					
Al													
POTLINE 1, EAST	17/01/23	07:50	17/01/23	14:50	6.26	0.79	0.50	1.28	107	20.4	698	67.9	0.09
	18/01/23	07:30	18/01/23	14:30	6.53	0.45	0.74	1.18	108	20.1	687	68.1	0.08
	20/01/23	07:30	20/01/23	14:30	6.80	0.27	0.60	0.87	99	20.2	704	68.1	0.06
Average					6.53	0.50	0.61	1.11	105	20.2	696	68.0	0.08
POTLINE 2, WEST	10/01/23	07:45	10/01/23	14:45	7.43	0.37	0.50	0.87	102	19.7	685	68.6	0.06
	11/01/23	07:24	11/01/23	14:24	7.49	0.34	0.63	0.96	104	21.1	727	68.7	0.07
	13/01/23	07:25	13/01/23	14:25	7.15	0.46	0.64	1.10	106	20.4	701	68.6	0.08
Average					7.36	0.39	0.59	0.98	104	20.4	704	68.6	0.07
POTLINE 2,EAST S	10/01/23	06:45	10/01/23	13:45	7.14	0.91	1.10	2.01	103	21.1	728	68.1	0.15
	11/01/23	06:30	11/01/23	13:30	7.71	0.28	0.85	1.13	103	20.9	722	68.1	0.08
	13/01/23	06:15	13/01/23	13:15	7.70	0.43	0.76	1.18	104	21.5	740	68.1	0.09
Average					7.52	0.54	0.90	1.44	103	21.2	730	68.1	0.11
BAKE OVEN NO.1 S	04/01/23	07:45	04/01/23	13:45	4.41	0.36	0.16	0.52	102	15.2	125	202.0	<0.01
	05/01/23	07:20	05/01/23	13:20	5.00	0.30	0.08	0.37	98	14.5	121	202.0	<0.01
	06/01/23	07:05	06/01/23	13:05	4.66	0.24	0.11	0.35	100	15.0	124	202.0	<0.01
Average					4.69	0.30	0.11	0.41	100	14.9	123	202.0	<0.01
BAKE OVEN NO.2 S	16/01/23	06:54	16/01/23	12:54	6.28	0.34	0.76	1.09	98	20.5	171	240.1	<0.01
	18/01/23	06:30	18/01/23	12:30	6.80	0.40	0.62	1.03	97	21.2	177	240.1	<0.01
	19/01/23	06:59	19/01/23	12:59	6.41	1.10	0.97	2.07	99	20.6	170	240.1	0.01
Average					6.50	0.61	0.78	1.40	98	20.8	173	240.1	0.01
POTLINE 3 WEST S	04/01/23	06:41	04/01/23	13:41	7.55	0.45	0.30	0.75	106	22.9	985	80.9	0.06
	06/01/23	06:25	06/01/23	13:25	7.68	0.29	0.23	0.52	98	22.2	976	80.3	0.04
	09/01/23	06:52	09/01/23	13:52	7.40	0.29	0.18	0.48	101	22.3	976	80.3	0.04
Average					7.54	0.35	0.24	0.58	102	22.5	979	80.5	0.05

END OF REPORT

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR JANUARY 2023

POTLINE 1

Manifold Location	Start Date	Start Time	End Date	End Time	Sample Vol m3 N.T.P. (Dry)	Fluoride mg/m3 as F	Exit Temperatures degrees Celsius Avg	Exit Velocity metres/hour Avg	Volumetric Flow Rate 1000 m3/hr	Al Prod	Emission Rate kg F/t Al	Average Rate kgF/tAl
Cassette Location												
A074	03/01/23	07:45	06/01/23	07:45	9.39	0.59						}
A076	03/01/23	07:45	06/01/23	07:45	9.39	0.57						}
A078	03/01/23	07:45	06/01/23	07:45	9.39	0.70						}
A080	03/01/23	07:45	06/01/23	07:45	9.39	0.65						}
Total	03/01/23	07:45	06/01/23	07:45	37.57	0.63	36	5485	6269	474.7	0.60	}
A074	16/01/23	08:30	19/01/23	08:30	8.39	0.63						}
A076	16/01/23	08:30	19/01/23	08:30	8.39	0.69						}
A078	16/01/23	08:30	19/01/23	08:30	8.39	0.70						}
A080	16/01/23	08:30	19/01/23	08:30	8.39	0.79						}
Total	16/01/23	08:30	19/01/23	08:30	33.55	0.70	40	4963	5591	475.0	0.60	}
B018	13/01/23	07:50	16/01/23	07:50	8.54	0.67						}
B020	13/01/23	07:50	16/01/23	07:50	8.54	0.68						}
B022	13/01/23	07:50	16/01/23	07:50	8.54	0.68						}
B024	13/01/23	07:50	16/01/23	07:50	8.54	0.58						}
Total	13/01/23	07:50	16/01/23	07:50	34.17	0.65	43	4791	3947	350.4	0.53	}
B018	17/01/23	06:50	20/01/23	06:50	8.07	0.70						}
B020	17/01/23	06:50	20/01/23	06:50	8.07	0.87						}
B022	17/01/23	06:50	20/01/23	06:50	8.07	0.87						}
B024	17/01/23	06:50	20/01/23	06:50	8.07	0.65						}
Total	17/01/23	06:50	20/01/23	06:50	32.26	0.77	42	4703	3839	350.3	0.61	}

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR JANUARY 2023

POTLINE 2

[illegible]

ENVIRONMENT SYSTEM

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR JANUARY 2023

POTLINE 3

----- S A M P L E -----					Sample Vol	Fluoride	Exit Temperatures	Exit Velocity	Volumetric	Al	Emission	Average
Manifold	--- Start ---	---	---- End ----	---	m3 N.T.P.	mg/m3	degrees Celsius	metres/hour	Flow Rate	Prod	Rate	Rate
Location	Date	Time	Date	Time	(Dry)	as F	Avg	Avg	1000 m3/hr		kg F/t Al	kgF/tAl
Cassette												
Location												
E074	09/01/23	08:05	12/01/23	08:05	8.21	0.73						}
E076	09/01/23	08:05	12/01/23	08:05	8.21	0.64						}
E078	09/01/23	08:05	12/01/23	08:05	8.21	0.79						}
E080	09/01/23	08:05	12/01/23	08:05	8.21	0.80						}
Total	09/01/23	08:05	12/01/23	08:05	32.82	0.74	37	4562	5251	474.6	0.59	}
												}
E074	20/01/23	06:30	23/01/23	06:30	8.37	0.49						}
E076	20/01/23	06:30	23/01/23	06:30	8.37	0.49						}
E078	20/01/23	06:30	23/01/23	06:30	8.37	0.49						}
E080	20/01/23	06:30	23/01/23	06:30	8.37	0.62						}
Total	20/01/23	06:30	23/01/23	06:30	33.48	0.53	36	4564	5259	470.3	0.42	}
												0.51
F020	16/01/23	08:05	19/01/23	08:05	6.87	0.54						}
F022	16/01/23	08:05	19/01/23	08:05	6.87	0.67						}
F024	16/01/23	08:05	19/01/23	08:05	6.87	0.64						}
F026	16/01/23	08:05	19/01/23	08:05	6.87	0.62						}
Total	16/01/23	08:05	19/01/23	08:05	27.48	0.62	41	4434	3625	356.0	0.45	}
												}
F020	24/01/23	07:20	27/01/23	07:20	8.08	0.44						}
F022	24/01/23	07:20	27/01/23	07:20	8.08	0.49						}
F024	24/01/23	07:20	27/01/23	07:20	8.08	0.53						}
F026	24/01/23	07:20	27/01/23	07:20	8.08	0.40						}
Total	24/01/23	07:20	27/01/23	07:20	32.33	0.47	41	4558	3748	348.8	0.36	}
												0.41

 END OF REPORT

Continuous Gaseous Fluoride (mg/m³)
From 01/02/23 to 28/02/23

Date	1WF	1EF	2WF	2EF	3WF	3EF	12E	BO1	BO2
01/02/23	0.55	0.52	0.49	0.25	0.55	0.61	0.56	0.24	0.35
02/02/23	0.56	1.00	0.51	0.26	0.46	0.46	0.41	0.24	0.36
03/02/23	0.56	1.01	0.45	0.23	0.50	0.43	0.48	0.32	0.67
04/02/23	0.44	nra	0.31	0.18	0.32	0.28	0.35	0.22	0.56
05/02/23	0.49	nra	0.30	0.18	0.48	0.24	0.29	0.33	0.51
06/02/23	0.60	0.18	0.51	0.19	0.55	0.56	0.82	0.33	0.40
07/02/23	0.62	0.27	0.52	0.19	0.55	0.46	0.87	0.43	0.30
08/02/23	0.59	0.29	0.53	0.32	0.59	0.39	9.18	0.31	0.47
09/02/23	0.53	0.32	0.63	0.34	0.59	0.46	0.93	0.21	1.77
10/02/23	0.48	0.32	0.48	0.38	0.73	0.49	0.51	0.28	2.40
11/02/23	0.55	0.31	0.41	0.37	0.51	0.55	0.41	0.23	0.54
12/02/23	0.49	0.38	0.42	0.33	0.50	0.38	0.41	0.20	0.32
13/02/23	0.48	0.26	0.43	0.38	0.48	0.32	0.36	0.18	0.62
14/02/23	0.31	0.27	0.42	0.37	0.45	0.40	0.36	0.30	1.21
15/02/23	0.28	0.22	0.47	0.36	0.48	0.33	0.35	0.93	0.85
16/02/23	0.29	0.26	0.35	0.22	0.51	0.30	0.35	0.67	0.26
17/02/23	0.36	0.39	0.36	0.20	0.61	0.39	0.40	0.30	0.33
18/02/23	0.47	0.34	0.56	0.21	0.51	0.41	0.44	0.25	0.51
19/02/23	0.52	0.16	0.43	0.25	0.34	0.26	0.35	0.22	0.74
20/02/23	0.55	0.18	0.44	0.26	0.37	0.32	0.36	0.25	0.58
21/02/23	0.54	0.17	0.51	0.25	0.48	0.63	0.34	0.20	0.61
22/02/23	0.71	0.17	0.44	0.21	0.73	0.48	0.23	0.26	1.65
23/02/23	0.44	0.19	0.55	0.24	0.46	0.55	0.31	0.85	3.48
24/02/23	0.34	0.12	0.54	0.24	0.38	0.57	0.32	0.50	1.87
25/02/23	0.38	0.15	0.55	0.29	0.43	0.32	0.32	0.37	1.17
26/02/23	0.40	0.18	0.41	0.37	0.33	0.31	0.37	0.38	0.95
27/02/23	0.40	0.20	0.46	0.34	0.54	0.35	0.38	0.31	0.94
28/02/23	0.48	0.39	0.48	0.32	0.55	0.32	0.33	0.39	1.76
Average	0.48	0.32	0.46	0.28	0.50	0.41	0.74	0.35	0.94

nra – no results available

EVR530

TOMAGO ALUMINIUM COMPANY PTY. LIMITED (A.C.N. 001 862 228)

08:28 04/05/23

ENVIRONMENT SYSTEM

PAGE 1

EMISSION MONITORING PROGRAM

STACK EMISSION REPORT FOR FEBRUARY 2023

Stack	S A M P L E				Sample Vol m3 N.T.P. (Dry)	Gaseous Particulate Total			Exit Temp. deg.C	Exit Velocity m/Sec	Volumetric Flow Rate 1000 m3/hr	Al Prod	Emission Rate kg F/t
	Start	Time	End	Time		Fluoride (as F) mg/m3	Fluoride (as F) mg/m3	Fluoride (as F) mg/m3					
Al													
POTLINE 1 WEST S	01/02/23	07:40	01/02/23	14:40	6.67	0.61	0.45	1.05	108	20.6	703	68.8	0.07
	02/02/23	07:20	02/02/23	14:20	6.48	0.56	0.43	0.99	109	19.8	674	68.7	0.07
	03/02/23	07:25	03/02/23	14:25	6.26	0.50	0.46	0.96	108	20.3	693	68.7	0.07
Average					6.47	0.56	0.45	1.00	108	20.3	690	68.7	0.07
POTLINE 2, WEST	15/02/23	07:05	15/02/23	14:05	7.13	0.37	0.58	0.96	106	21.8	748	69.2	0.07
	16/02/23	07:15	16/02/23	14:15	7.30	0.31	0.55	0.87	104	22.1	760	69.2	0.07
	17/02/23	06:45	17/02/23	13:45	7.07	0.36	0.53	0.89	107	21.9	750	69.2	0.07
Average					7.17	0.35	0.55	0.91	105	21.9	753	69.2	0.07
BAKE OVEN NO.1 S	02/02/23	07:32	02/02/23	13:32	4.37	0.16	0.11	0.27	101	13.6	112	202.8	<0.01
	03/02/23	06:45	03/02/23	12:45	4.24	0.18	0.14	0.32	102	13.9	114	202.8	<0.01
	06/02/23	06:31	06/02/23	12:31	4.40	0.21	0.11	0.33	101	13.7	113	202.8	<0.01
Average					4.34	0.18	0.12	0.30	101	13.7	113	202.8	<0.01
POTLINE 3 WEST S	08/02/23	07:45	08/02/23	14:45	7.26	0.55	0.60	1.15	106	21.3	919	80.8	0.09
	09/02/23	07:20	09/02/23	14:20	7.22	0.52	0.94	1.46	104	22.5	974	80.5	0.12
	13/02/23	07:35	13/02/23	14:35	7.32	0.43	0.24	0.67	104	22.3	967	80.2	0.06
Average					7.27	0.50	0.59	1.10	105	22.0	953	80.5	0.09
POTLINE 3 EAST S	01/02/23	06:45	01/02/23	13:45	7.00	0.80	0.54	1.34	106	20.8	896	80.1	0.10
	02/02/23	06:50	02/02/23	13:50	7.21	0.75	0.19	0.94	108	20.8	893	80.8	0.07
	03/02/23	06:20	03/02/23	13:20	7.27	0.60	0.22	0.82	109	20.4	875	80.8	0.06
Average					7.16	0.72	0.31	1.03	108	20.7	888	80.6	0.08
1+2 EXP STACK	09/02/23	06:28	09/02/23	13:28	5.20	0.99	0.36	1.36	103	17.2	509	46.2	0.10
	10/02/23	06:31	10/02/23	13:31	5.30	0.77	0.37	1.14	106	16.9	499	46.1	0.09
	17/02/23	06:41	17/02/23	13:41	5.30	0.45	0.84	1.29	103	15.5	461	46.1	0.09
Average					5.26	0.74	0.52	1.26	104	16.5	490	46.1	0.09

END OF REPORT

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR FEBRUARY 2023

POTLINE 1

Manifold Location	Start Date	Time	End Date	Time	Sample Vol m3 N.T.P. (Dry)	Fluoride mg/m3 as F	Exit Temperatures degrees Celsius Avg	Exit Velocity metres/hour Avg	Volumetric Flow Rate 1000 m3/hr	Al Prod	Emission Rate kg F/t Al	Average Rate kgF/tAl
Cassette Location												
A074	03/02/23	07:30	06/02/23	07:30	8.54	0.39						}
A076	03/02/23	07:30	06/02/23	07:30	8.54	0.49						}
A078	03/02/23	07:30	06/02/23	07:30	8.54	0.45						}
A080	03/02/23	07:30	06/02/23	07:30	8.54	0.42						}
Total	03/02/23	07:30	06/02/23	07:30	34.16	0.44	40	5018	5693	475.2	0.38	}
A074	07/02/23	07:50	10/02/23	07:50	8.58	0.48						}
A076	07/02/23	07:50	10/02/23	07:50	8.58	0.52						}
A078	07/02/23	07:50	10/02/23	07:50	8.58	0.47						}
A080	07/02/23	07:50	10/02/23	07:50	8.58	0.61						}
Total	07/02/23	07:50	10/02/23	07:50	34.30	0.52	40	4954	5584	475.0	0.44	}
B018	03/02/23	07:55	06/02/23	07:55	7.28	0.45						}
B020	03/02/23	07:55	06/02/23	07:55	7.28	0.63						}
B022	03/02/23	07:55	06/02/23	07:55	7.28	0.45						}
B024	03/02/23	07:55	06/02/23	07:55	7.28	0.43						}
Total	03/02/23	07:55	06/02/23	07:55	29.10	0.49	42	4697	3840	350.4	0.39	}
B018	14/02/23	08:25	17/02/23	08:25	8.18	0.92						}
B020	14/02/23	08:25	17/02/23	08:25	8.18	0.73						}
B022	14/02/23	08:25	17/02/23	08:25	8.18	0.61						}
B024	14/02/23	08:25	17/02/23	08:25	8.18	0.57						}
Total	14/02/23	08:25	17/02/23	08:25	32.70	0.71	40	4784	3983	349.6	0.58	}

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR FEBRUARY 2023

POTLINE 2

Manifold Location	Start Date	Start Time	End Date	End Time	Sample Vol m3 N.T.P. (Dry)	Fluoride mg/m3 as F	Exit Temperatures degrees Celsius Avg	Exit Velocity metres/hour Avg	Volumetric Flow Rate 1000 m3/hr	Al Prod	Emission Rate kg F/t Al	Average Rate kgF/tAl
Cassette Location												
C074	03/02/23	07:45	06/02/23	07:45	8.14	0.38						}
C076	03/02/23	07:45	06/02/23	07:45	8.14	0.46						}
C078	03/02/23	07:45	06/02/23	07:45	8.14	0.39						}
C080	03/02/23	07:45	06/02/23	07:45	8.14	0.61						}
Total	03/02/23	07:45	06/02/23	07:45	32.55	0.46	40	4965	5597	474.7	0.39	}
C074	14/02/23	07:55	17/02/23	07:55	8.59	0.61						}
C076	14/02/23	07:55	17/02/23	07:55	8.59	0.75						}
C078	14/02/23	07:55	17/02/23	07:55	8.59	0.70						}
C080	14/02/23	07:55	17/02/23	07:55	8.59	0.78						}
Total	14/02/23	07:55	17/02/23	07:55	34.38	0.71	38	5145	5823	474.6	0.63	}
D018	07/02/23	07:30	10/02/23	07:30	8.01	0.46						}
D020	07/02/23	07:30	10/02/23	07:30	8.01	0.54						}
D022	07/02/23	07:30	10/02/23	07:30	8.01	0.58						}
D024	07/02/23	07:30	10/02/23	07:30	8.01	0.60						}
Total	07/02/23	07:30	10/02/23	07:30	32.02	0.55	44	4989	4076	356.0	0.45	}
D018	17/02/23	08:40	20/02/23	08:40	8.71	0.76						}
D020	17/02/23	08:40	20/02/23	08:40	8.71	0.88						}
D022	17/02/23	08:40	20/02/23	08:40	8.71	0.81						}
D024	17/02/23	08:40	20/02/23	08:40	8.71	0.77						}
Total	17/02/23	08:40	20/02/23	08:40	34.83	0.81	45	4897	3956	356.0	0.65	}

ENVIRONMENT SYSTEM

PAGE 3

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR FEBRUARY 2023

POTLINE 3

----- S A M P L E -----					Sample Vol	Fluoride	Exit Temperatures	Exit Velocity	Volumetric	Al	Emission	Average
Manifold	--- Start ---		---- End ----		m3 N.T.P.	mg/m3	degrees Celsius	metres/hour	Flow Rate	Prod	Rate	Rate
Location	Date	Time	Date	Time	(Dry)	as F	Avg	Avg	1000 m3/hr		kg F/t Al	kgF/tAl
Cassette												
Location												
E074	07/02/23	08:20	10/02/23	08:20	7.98	0.32						}
E076	07/02/23	08:20	10/02/23	08:20	7.98	0.45						}
E078	07/02/23	08:20	10/02/23	08:20	7.98	0.42						}
E080	07/02/23	08:20	10/02/23	08:20	7.98	0.40						}
Total	07/02/23	08:20	10/02/23	08:20	31.90	0.40	38	4484	5070	474.5	0.30	}
E074	14/02/23	07:50	17/02/23	07:50	7.78	0.40						}
E076	14/02/23	07:50	17/02/23	07:50	7.78	0.39						}
E078	14/02/23	07:50	17/02/23	07:50	7.78	0.47						}
E080	14/02/23	07:50	17/02/23	07:50	7.78	0.57						}
Total	14/02/23	07:50	17/02/23	07:50	31.12	0.46	37	4416	5088	474.6	0.35	}
F020	03/02/23	08:25	06/02/23	08:25	6.97	0.30						}
F022	03/02/23	08:25	06/02/23	08:25	6.97	0.36						}
F024	03/02/23	08:25	06/02/23	08:25	6.97	0.47						}
F026	03/02/23	08:25	06/02/23	08:25	6.97	0.43						}
Total	03/02/23	08:25	06/02/23	08:25	27.86	0.39	39	4360	3611	349.8	0.29	}
F020	07/02/23	07:45	10/02/23	07:45	7.32	0.26						}
F022	07/02/23	07:45	10/02/23	07:45	7.32	0.23						}
F024	07/02/23	07:45	10/02/23	07:45	7.32	0.29						}
F026	07/02/23	07:45	10/02/23	07:45	7.32	0.23						}
Total	07/02/23	07:45	10/02/23	07:45	29.28	0.26	40	4421	3660	350.0	0.19	}

END OF REPORT



Continuous Gaseous Fluoride (mg/m³)

From 01/03/23 to 31/03/23

Date	1WF	1EF	2WF	2EF	3WF	3EF	12E	BO1	BO2
01/03/23	0.50	0.23	0.44	0.35	0.50	0.36	0.38	0.38	1.50
02/03/23	0.46	0.19	0.41	0.36	0.49	0.30	0.32	0.34	1.03
03/03/23	0.58	0.17	0.39	0.45	0.58	0.31	0.35	0.27	0.85
04/03/23	0.53	0.15	0.41	0.38	0.31	0.29	0.32	0.31	0.65
05/03/23	0.48	0.13	0.47	0.29	0.84	0.51	0.32	0.31	0.62
06/03/23	0.57	0.17	0.53	0.33	0.42	0.58	0.36	0.33	0.66
07/03/23	0.50	0.18	0.49	0.32	0.56	0.48	0.42	1.71	2.31
08/03/23	0.59	0.15	0.47	0.34	0.54	0.52	0.63	0.54	2.27
09/03/23	0.53	0.14	0.45	0.41	0.48	0.30	0.40	0.40	0.67
10/03/23	0.57	0.15	0.36	0.41	0.36	0.27	0.46	0.38	0.57
11/03/23	0.46	0.20	0.40	0.28	0.28	0.29	0.43	0.40	0.75
12/03/23	0.46	0.27	0.42	0.31	0.31	0.30	0.37	0.47	1.34
13/03/23	0.52	0.31	0.35	0.30	0.39	0.26	0.34	0.34	1.23
14/03/23	0.39	0.38	0.37	0.42	0.39	0.34	0.51	0.59	1.39
15/03/23	0.41	0.17	0.47	0.39	0.82	0.49	0.50	0.39	1.38
16/03/23	0.45	0.20	0.57	0.32	0.67	0.54	0.41	0.45	1.04
17/03/23	0.39	0.24	0.46	0.26	0.48	0.42	0.39	0.53	0.64
18/03/23	0.62	0.26	0.32	0.27	0.54	0.40	0.37	0.57	1.03
19/03/23	0.86	0.42	0.40	0.28	0.40	0.44	0.47	0.49	0.71
20/03/23	0.33	0.18	0.44	0.27	0.28	0.35	0.31	0.40	0.87
21/03/23	0.68	0.16	0.64	0.23	0.37	0.27	0.26	0.41	0.86
22/03/23	0.59	0.17	0.48	0.24	0.39	0.35	0.36	0.46	1.13
23/03/23	0.52	0.38	0.35	0.26	0.45	0.40	0.40	0.48	1.05
24/03/23	0.53	0.35	0.41	0.34	0.56	0.39	0.40	0.40	0.67
25/03/23	0.41	0.36	0.38	0.28	0.70	0.39	0.39	0.35	0.61
26/03/23	0.46	0.38	0.43	0.34	0.24	0.59	0.62	0.31	0.55
27/03/23	0.30	0.32	0.47	0.46	0.41	0.32	0.29	0.31	0.51
28/03/23	0.28	0.21	0.46	0.44	0.30	4.40	0.33	0.40	0.77
29/03/23	0.42	0.26	0.34	0.71	0.28	12.50	0.37	0.44	0.65
30/03/23	0.38	0.33	0.28	0.42	0.37	0.98	0.35	0.55	0.97
31/03/23	0.35	0.30	0.26	0.26	0.34	0.54	0.52	0.37	3.17
Average	0.49	0.24	0.42	0.34	0.45	0.93	0.40	0.45	1.05

ENVIRONMENT SYSTEM

EMISSION MONITORING PROGRAM
STACK EMISSION REPORT FOR MARCH 2023

----- S A M P L E -----					Gaseous Particulate Total			Exit		Exit		Volumetric		Al Emission	
--- Start ---					Sample Vol	Fluoride	Fluoride	Fluoride	Temp.	Velocity	Flow Rate	Al	Emission		
--- End ---					m3 N.T.P.	(as F)	(as F)	(as F)	deg.C	m/Sec	1000 m3/hr	Prod	Rate		
Stack	Date	Time	Date	Time	(Dry)	mg/m3	mg/m3	mg/m3					kg	F/t	Al
POTLINE 1 WEST S	01/03/23	07:05	01/03/23	14:05	6.30	0.44	0.91	1.34	108	19.4	663	68.1	0.09		
	02/03/23	06:20	02/03/23	13:20	7.46	0.27	0.34	0.62	106	19.5	667	68.0	0.04		
	03/03/23	06:45	03/03/23	13:45	6.64	0.69	0.44	1.14	108	19.4	663	67.7	0.08		
	Average				6.80	0.47	0.57	1.03	107	19.4	664	67.9	0.07		
POTLINE 1, EAST	15/03/23	06:42	15/03/23	13:42	6.60	0.35	0.53	0.88	102	20.4	708	68.6	0.06		
	16/03/23	06:38	16/03/23	13:38	6.73	0.73	0.66	1.39	107	20.5	701	68.6	0.10		
	20/03/23	06:39	20/03/23	13:39	6.58	0.43	0.83	1.26	104	20.7	715	67.9	0.09		
	Average				6.63	0.50	0.67	1.18	104	20.6	708	68.4	0.08		
POTLINE 2, EAST S	15/03/23	07:45	15/03/23	14:45	7.82	0.62	1.11	1.73	105	21.1	725	69.2	0.13		
	16/03/23	08:00	16/03/23	15:00	7.64	0.51	1.05	1.56	104	21.4	737	68.6	0.12		
	17/03/23	07:25	17/03/23	14:25	8.01	0.34	1.70	2.03	106	21.8	746	68.6	0.15		
	Average				7.83	0.49	1.28	1.77	105	21.4	736	68.8	0.13		
BAKE OVEN NO.2 S	15/03/23	06:50	15/03/23	12:50	6.29	1.19	0.48	1.67	101	19.9	164	241.7	0.01		
	16/03/23	07:10	16/03/23	13:10	6.43	1.31	0.48	1.78	102	20.7	170	241.7	0.01		
	17/03/23	06:20	17/03/23	12:20	6.23	0.65	0.43	1.08	102	20.1	166	241.7	<0.01		
	Average				6.32	1.05	0.46	1.51	102	20.2	167	241.7	0.01		
POTLINE 3 EAST S	08/03/23	06:38	08/03/23	13:38	7.02	0.72	0.22	0.94	106	20.4	878	80.8	0.07		
	10/03/23	06:24	10/03/23	13:24	7.00	0.43	0.24	0.66	103	20.4	888	80.8	0.05		
	14/03/23	06:32	14/03/23	13:32	6.97	0.43	0.51	0.94	101	20.2	884	78.6	0.07		
	Average				7.00	0.53	0.32	0.85	103	20.3	883	80.1	0.07		
1+2 EXP STACK	08/03/23	07:20	08/03/23	14:20	5.52	0.60	0.23	0.83	105	16.9	499	46.1	0.06		
	09/03/23	07:29	09/03/23	14:29	5.73	0.42	0.15	0.57	102	17.0	504	46.1	0.04		
	10/03/23	07:13	10/03/23	14:13	5.70	0.71	0.16	0.88	103	17.1	507	46.1	0.07		
	Average				5.65	0.58	0.18	0.76	103	17.0	503	46.1	0.06		

END OF REPORT

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR MARCH 2023

POTLINE 1

Manifold Location	Start Date	Start Time	End Date	End Time	Sample Vol m3 N.T.P. (Dry)	Fluoride mg/m3 as F	Exit Temperatures degrees Celsius Avg	Exit Velocity metres/hour Avg	Volumetric Flow Rate 1000 m3/hr	Al Prod	Emission Rate kg F/t Al	Average Rate kgF/tAl
Cassette Location												
A074	03/03/23	07:12	06/03/23	07:12	8.62	0.52						}
A076	03/03/23	07:12	06/03/23	07:12	8.62	0.59						}
A078	03/03/23	07:12	06/03/23	07:12	8.62	0.69						}
A080	03/03/23	07:12	06/03/23	07:12	8.62	0.69						}
Total	03/03/23	07:12	06/03/23	07:12	34.50	0.62	40	4954	5611	473.9	0.53	}
A074	21/03/23	07:01	24/03/23	07:01	9.76	0.53						}
A076	21/03/23	07:01	24/03/23	07:01	9.76	0.48						}
A078	21/03/23	07:01	24/03/23	07:01	9.76	0.54						}
A080	21/03/23	07:01	24/03/23	07:01	9.76	0.51						}
Total	21/03/23	07:01	24/03/23	07:01	39.04	0.52	38	4887	5598	468.2	0.44	}
B018	03/03/23	07:37	06/03/23	07:37	8.29	0.54						}
B020	03/03/23	07:37	06/03/23	07:37	8.29	0.65						}
B022	03/03/23	07:37	06/03/23	07:37	8.29	0.49						}
B024	03/03/23	07:37	06/03/23	07:37	8.29	0.55						}
Total	03/03/23	07:37	06/03/23	07:37	33.18	0.56	42	4763	3928	349.5	0.45	}
B018	10/03/23	06:50	13/03/23	06:50	8.54	0.66						}
B020	10/03/23	06:50	13/03/23	06:50	8.54	0.79						}
B022	10/03/23	06:50	13/03/23	06:50	8.54	0.65						}
B024	10/03/23	06:50	13/03/23	06:50	8.54	0.59						}
Total	10/03/23	06:50	13/03/23	06:50	34.17	0.67	43	4757	3906	349.7	0.54	}

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR MARCH 2023

POTLINE 2

Manifold Location	Start Date	Start Time	End Date	End Time	Sample Vol m3 N.T.P. (Dry)	Fluoride mg/m3 as F	Exit Temperatures degrees Celsius Avg	Exit Velocity metres/hour Avg	Volumetric Flow Rate 1000 m3/hr	Al Prod	Emission Rate kg F/t Al	Average Rate kgF/tAl
Cassette Location												
C074	03/03/23	07:50	06/03/23	07:50	8.05	0.58						}
C076	03/03/23	07:50	06/03/23	07:50	8.05	0.84						}
C078	03/03/23	07:50	06/03/23	07:50	8.05	0.64						}
C080	03/03/23	07:50	06/03/23	07:50	8.05	0.86						}
Total	03/03/23	07:50	06/03/23	07:50	32.21	0.73	40	5190	5807	474.3	0.64	}
C074	10/03/23	07:10	13/03/23	07:10	8.46	0.64						}
C076	10/03/23	07:10	13/03/23	07:10	8.46	0.64						}
C078	10/03/23	07:10	13/03/23	07:10	8.46	0.55						}
C080	10/03/23	07:10	13/03/23	07:10	8.46	0.57						}
Total	10/03/23	07:10	13/03/23	07:10	33.83	0.60	41	5213	5827	468.3	0.54	}
D018	21/03/23	07:39	24/03/23	07:39	8.89	0.59						}
D020	21/03/23	07:39	24/03/23	07:39	8.89	0.54						}
D022	21/03/23	07:39	24/03/23	07:39	8.89	0.64						}
D024	21/03/23	07:39	24/03/23	07:39	8.89	0.64						}
Total	21/03/23	07:39	24/03/23	07:39	35.55	0.60	41	4936	4086	350.0	0.51	}
D018	24/03/23	07:51	27/03/23	07:51	8.18	0.69						}
D020	24/03/23	07:51	27/03/23	07:51	8.18	0.74						}
D022	24/03/23	07:51	27/03/23	07:51	8.18	0.66						}
D024	24/03/23	07:51	27/03/23	07:51	8.18	0.68						}
Total	24/03/23	07:51	27/03/23	07:51	32.73	0.69	41	4870	4028	350.3	0.57	}
Total	03/03/23	07:50	27/03/23	07:51	104.29	2.37	122	15219	15662	1472.9	1.76	0.59

ENVIRONMENT SYSTEM

PAGE 3

EMISSION MONITORING PROGRAM

ROOF VENT MONITORING REPORT FOR MARCH 2023

POTLINE 3

----- S A M P L E -----					Sample Vol	Fluoride	Exit Temperatures	Exit Velocity	Volumetric	Al	Emission	Average
Manifold	--- Start ---		---- End ----		m3 N.T.P.	mg/m3	degrees Celsius	metres/hour	Flow Rate	Prod	Rate	Rate
Location	Date	Time	Date	Time	(Dry)	as F	Avg	Avg	1000 m3/hr		kg F/t Al	kgF/tAl
Cassette												
Location												
E074	17/03/23	07:10	20/03/23	07:10	7.77	0.45						}
E076	17/03/23	07:10	20/03/23	07:10	7.77	0.57						}
E078	17/03/23	07:10	20/03/23	07:10	7.77	0.52						}
E080	17/03/23	07:10	20/03/23	07:10	7.77	0.56						}
Total	17/03/23	07:10	20/03/23	07:10	31.07	0.53	40	4594	5193	468.6	0.42	}
												}
E074	21/03/23	07:44	24/03/23	07:44	8.43	0.66						}
E076	21/03/23	07:44	24/03/23	07:44	8.43	0.83						}
E078	21/03/23	07:44	24/03/23	07:44	8.43	0.71						}
E080	21/03/23	07:44	24/03/23	07:44	8.43	0.67						}
Total	21/03/23	07:44	24/03/23	07:44	33.71	0.72	38	4570	5213	468.8	0.57	}
												0.50
F020	03/03/23	08:20	06/03/23	08:20	7.64	0.76						}
F022	03/03/23	08:20	06/03/23	08:20	7.64	0.59						}
F024	03/03/23	08:20	06/03/23	08:20	7.64	0.63						}
F026	03/03/23	08:20	06/03/23	08:20	7.64	0.57						}
Total	03/03/23	08:20	06/03/23	08:20	30.58	0.64	40	4453	3690	356.0	0.48	}
												}
F020	21/03/23	08:18	24/03/23	08:18	9.36	0.41						}
F022	21/03/23	08:18	24/03/23	08:18	9.36	0.48						}
F024	21/03/23	08:18	24/03/23	08:18	9.36	0.70						}
F026	21/03/23	08:18	24/03/23	08:18	9.36	0.45						}
Total	21/03/23	08:18	24/03/23	08:18	37.44	0.51	39	4494	3768	356.0	0.39	}
												0.43

END OF REPORT

APPENDIX 3 -

FLUORIDE IN AMBIENT AIR DATA

ENVIRONMENT SYSTEM
FLUORIDE IN AMBIENT AIR REPORT FOR JANUARY 2023

PAGE: 1

WEEKLY RESULTS :

SITE	WEEK ENDING	CORRECTED		FLUORIDE CONCENT. (ug/m3)		
		AIR VOLUME	Fp	Fg	Ft	
----	-----	-----m3	-----	-----	-----	
080	03/01	396.4	<0.01	0.06	0.07	
	10/01	399.8	0.01	0.15	0.16	
	17/01	397.9	<0.01	0.04	0.05	
	24/01	418.5	<0.01	0.18	0.19	
	31/01	389.2	0.02	0.11	0.13	
	MONTH AVG.	400.4	0.01	0.11	0.12	
083	03/01	362.3	0.04	0.19	0.23	
	10/01	358.4	0.06	0.12	0.18	
	17/01	355.7	0.01	0.10	0.11	
	24/01	349.3	<0.01	0.03	0.04	
	31/01	338.7	0.10	0.49	0.59	
	MONTH AVG.	352.9	0.04	0.19	0.23	
084	03/01	372.2	0.52	1.20	1.72	
	10/01	362.5	0.10	0.52	0.62	
	17/01	352.8	0.92	0.99	1.91	
	24/01	357.8	0.13	0.70	0.83	
	31/01	354.1	0.32	1.06	1.38	
	MONTH AVG.	359.9	0.40	0.89	1.29	
085	03/01	350.0	0.08	0.65	0.73	
	10/01	343.5	0.14	0.67	0.81	
	17/01	347.3	0.08	0.49	0.57	
	24/01	335.2	0.05	0.47	0.52	
	31/01	333.2	0.04	0.50	0.54	
	MONTH AVG.	341.8	0.08	0.56	0.63	
122	03/01	379.3	0.02	0.28	0.30	
	10/01	376.7	0.09	0.60	0.69	
	17/01	374.7	<0.01	0.15	0.16	
	24/01	368.3	0.02	0.36	0.38	
	31/01	367.6	<0.01	0.25	0.26	
	MONTH AVG.	373.3	0.03	0.33	0.36	
179	03/01	340.3	<0.01	0.10	0.11	
	10/01	392.0	0.02	0.25	0.27	
	17/01	345.6	<0.01	0.08	0.09	
	24/01	391.3	<0.01	0.32	0.33	
	31/01	337.7	0.01	0.22	0.23	
	MONTH AVG.	361.4	0.01	0.19	0.21	

WEEKLY RESULTS :

SITE	WEEK ENDING	CORRECTED		FLUORIDE CONCENT. (ug/m3)		
		AIR VOLUME		Fp	Fg	Ft
----	-----	----m3		-----	-----	-----
181	03/01	425.8		0.01	0.17	0.18
	10/01	412.3		0.19	0.25	0.44
	17/01	421.4		<0.01	0.18	0.19
	24/01	410.4		0.03	0.46	0.49
	31/01	404.0		0.03	0.49	0.52
	MONTH AVG.	414.8		0.05	0.31	0.36
188	03/01	379.6		0.03	0.24	0.27
	10/01	359.3		0.02	0.24	0.26
	17/01	388.0		0.02	0.18	0.20
	24/01	365.9		0.02	0.25	0.27
	31/01	346.0		0.02	0.01	0.03
	MONTH AVG.	367.8		0.02	0.18	0.21

Site	Grid	Ref.
080	834	687
083	799	664
084	788	676
085	794	689
122	798	697
179	818	671
181	813	665
188	748	703

nra = No Result Available

Fp = Fluoride Particulate

Fg = Fluoride Gas

Ft = Fluoride Total

Samples collected to A.S. 3580.13.2

ReportComments

END OF REPORT

ENVIRONMENT SYSTEM
FLUORIDE IN AMBIENT AIR REPORT FOR FEBRUARY 2023

PAGE: 1

WEEKLY RESULTS :

SITE	WEEK ENDING	CORRECTED		FLUORIDE CONCENT. (ug/m3)		
		AIR VOLUME	Fp	Fg	Ft	
----	-----	-----m3	-----	-----	-----	
080	07/02	396.8	0.03	0.30	0.33	
	14/02	374.9	0.01	0.08	0.09	
	21/02	348.7	<0.01	0.17	0.18	
	28/02	319.4	<0.01	0.08	0.09	
	MONTH AVG.	360.0	0.02	0.16	0.17	
083	07/02	344.5	0.40	0.79	1.19	
	14/02	329.7	0.26	0.47	0.73	
	21/02	339.6	0.11	0.63	0.74	
	28/02	360.9	0.34	0.01	0.35	
	MONTH AVG.	343.7	0.28	0.48	0.75	
084	07/02	352.4	0.45	0.60	1.05	
	14/02	347.3	0.56	0.92	1.48	
	21/02	344.7	0.44	0.85	1.29	
	28/02	388.8	0.17	0.59	0.76	
	MONTH AVG.	358.3	0.41	0.74	1.15	
085	07/02	338.1	0.08	0.47	0.55	
	14/02	333.3	0.16	0.57	0.73	
	21/02	335.5	0.05	0.34	0.39	
	28/02	342.8	0.19	0.05	0.24	
	MONTH AVG.	337.4	0.12	0.36	0.48	
122	07/02	370.4	0.02	0.20	0.22	
	14/02	363.2	0.12	0.36	0.48	
	21/02	371.3	0.01	0.13	0.14	
	28/02	379.3	0.03	0.01	0.04	
	MONTH AVG.	371.1	0.05	0.18	0.22	
179	07/02	390.3	0.04	0.42	0.46	
	14/02	379.3	0.02	0.16	0.18	
	21/02	395.4	<0.01	0.17	0.18	
	28/02	353.6	0.02	0.17	0.19	
	MONTH AVG.	379.7	0.02	0.23	0.25	

nra = No Result Available
Fp = Fluoride Particulate
Fg = Fluoride Gas
Ft = Fluoride Total

Samples collected to A.S. 3580.13.2

WEEKLY RESULTS :

SITE	WEEK ENDING	CORRECTED		FLUORIDE CONCENT. (ug/m3)		
		AIR VOLUME		Fp	Fg	Ft
----	-----	----m3		-----	-----	-----
181	07/02	416.4		0.23	0.76	0.99
	14/02	404.9		0.03	0.30	0.33
	21/02	422.7		0.04	0.36	0.40
	28/02	419.2		0.10	0.37	0.47
	MONTH AVG.	415.8		0.10	0.45	0.55
188	07/02	375.5		0.02	0.10	0.12
	14/02	380.8		<0.01	0.09	0.10
	21/02	397.4		0.01	0.09	0.10
	28/02	398.4		0.03	0.05	0.08
	MONTH AVG.	388.0		0.02	0.08	0.10

Site	Grid	Ref.
080	834	687
083	799	664
084	788	676
085	794	689
122	798	697
179	818	671
181	813	665
188	748	703

nra = No Result Available

Fp = Fluoride Particulate

Fg = Fluoride Gas

Ft = Fluoride Total

Samples collected to A.S. 3580.13.2

ReportComments

END OF REPORT

ENVIRONMENT SYSTEM
FLUORIDE IN AMBIENT AIR REPORT FOR MARCH 2023

PAGE: 1

WEEKLY RESULTS :

SITE	WEEK ENDING	CORRECTED		FLUORIDE CONCENT. (ug/m3)		
		AIR VOLUME	Fp	Fg	Ft	
----	-----	-----m3	-----	-----	-----	
080	07/03	347.0	<0.01	0.08	0.09	
	14/03	292.9	<0.01	0.08	0.09	
	21/03	306.9	<0.01	0.12	0.13	
	28/03	376.2	<0.01	0.05	0.06	
	MONTH AVG.	330.8	0.01	0.08	0.09	
083	07/03	345.6	0.33	0.59	0.92	
	14/03	333.0	0.06	0.23	0.29	
	21/03	384.8	0.01	0.24	0.25	
	28/03	343.3	0.21	0.70	0.91	
	MONTH AVG.	351.7	0.15	0.44	0.59	
084	07/03	359.9	0.20	0.50	0.70	
	14/03	390.4	0.04	0.29	0.33	
	21/03	348.1	0.10	0.55	0.65	
	28/03	341.7	0.11	0.40	0.51	
	MONTH AVG.	360.0	0.11	0.44	0.55	
085	07/03	334.1	0.05	0.36	0.41	
	14/03	357.6	0.06	0.99	1.05	
	21/03	321.7	0.15	0.47	0.62	
	28/03	315.8	0.07	0.46	0.53	
	MONTH AVG.	332.3	0.08	0.57	0.65	
122	07/03	362.8	0.05	0.33	0.38	
	14/03	355.5	0.03	0.21	0.24	
	21/03	363.4	0.11	0.27	0.38	
	28/03	355.6	0.01	0.13	0.14	
	MONTH AVG.	359.3	0.05	0.24	0.29	
179	07/03	405.3	<0.01	0.25	0.26	
	14/03	330.2	0.09	0.99	1.08	
	21/03	402.0	<0.01	0.29	0.30	
	28/03	331.1	0.01	0.01	0.02	
	MONTH AVG.	367.2	0.03	0.39	0.42	

nra = No Result Available
Fp = Fluoride Particulate
Fg = Fluoride Gas
Ft = Fluoride Total

Samples collected to A.S. 3580.13.2

WEEKLY RESULTS :

SITE	WEEK ENDING	CORRECTED		FLUORIDE CONCENT. (ug/m3)		
		AIR VOLUME		Fp	Fg	Ft
----	-----	----m3		-----	-----	-----
181	07/03	414.6		0.41	0.91	1.32
	14/03	382.2		0.20	1.62	1.82
	21/03	418.6		0.29	0.34	0.63
	28/03	388.1		0.66	1.82	2.48
	MONTH AVG.	400.9		0.39	1.17	1.56
188	07/03	410.8		<0.01	0.07	0.08
	14/03	365.1		<0.01	0.09	0.10
	21/03	351.9		0.02	0.24	0.26
	28/03	365.6		<0.01	0.06	0.07
	MONTH AVG.	373.3		0.01	0.12	0.13

Site	Grid	Ref.
080	834	687
083	799	664
084	788	676
085	794	689
122	798	697
179	818	671
181	813	665
188	748	703

nra = No Result Available

Fp = Fluoride Particulate

Fg = Fluoride Gas

Ft = Fluoride Total

Samples collected to A.S. 3580.13.2

ReportComments

END OF REPORT

APPENDIX 4 -

METEOROLOGICAL DATA

Wind Speed and Direction at 30 meters - Percent of Total Readings

Direction From	To	0.5 2.0	2.1 3.5	3.6 5.0	5.1 6.5	6.6 8.0	8.1 9.5	9.6 11.0	11.1 12.5	12.6 14.0	14.1 15.5	15.6 17.0	17.1 18.5	18.6 50.0	Total	Total Readings
N	S	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	8
NNE	SSW	1.1	0.7	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	16
NE	SW	2.3	5.5	3.1	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	90
ENE	WSW	2.3	6.3	2.0	2.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4	98
E	W	2.9	5.2	4.8	6.4	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	154
ESE	WNW	1.4	3.1	2.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	64
SE	NW	1.4	2.0	1.8	1.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	56
SSE	NNW	1.0	3.1	4.1	1.8	1.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	85
S	N	1.8	3.1	1.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	48
SSW	NNE	0.5	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	13
SW	NE	1.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	11
WSW	ENE	1.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	15
W	E	2.5	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	35
WNW	ESE	1.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	19
NW	SE	0.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	10
NNW	SSE	0.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	11
Total		23.2	36.3	20.5	15.3	4.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	733.0

Calm Readings (<0.5 mps):	11	WIND SPEED (m/sec)		TEMPERATURE (°C)		RAINFALL (mm)	
Calm Readings %:	1.5	Average:	3.4	Ave Daily Max:	26.2	Total Month:	74.50
Tot. Readings Expected (ALL):	2976	Maximum:	9.0	Ave Daily Min:	17.6	Max. Daily:	15.00
Tot. Readings Accepted (ALL):	2965	Not Validated:	0	Not Validated:	0	Not Validated:	0
Percent Accepted (ALL):	99.6	Accepted:	744	Accepted:	744	Accepted:	744
Wind Direction Accepted:	733	% Accepted:	100.0	% Accepted:	100.0	% Accepted:	100.0
Wind Direction % Accepted:	98.5						

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
1 AVE	2.09	3.90	95.78	75.47	22.42	0.44	0.00
1 MIN	0.40	2.00	68.60	52.30	18.10	-0.80	0.00
1 MAX	4.10	7.00	130.30	93.10	27.50	1.30	0.00
2 AVE	2.13	3.92	102.13	72.05	21.86	-0.20	0.00
2 MIN	0.40	1.60	11.30	36.70	15.20	-2.90	0.00
2 MAX	4.00	6.60	331.50	105.10	27.30	1.70	0.00
3 AVE	1.90	3.40	103.81	75.29	22.90	0.81	0.00
3 MIN	0.40	1.30	37.80	17.70	16.10	0.00	0.00
3 MAX	3.90	6.50	284.30	340.40	29.50	2.20	0.00
4 AVE	1.85	3.82	106.98	85.70	22.09	0.44	0.00
4 MIN	0.50	1.70	28.50	0.60	17.70	-0.80	0.00
4 MAX	4.20	7.30	264.70	232.60	27.40	1.50	2.00
5 AVE	3.07	6.29	186.44	156.55	18.60	0.83	0.00
5 MIN	0.90	2.70	174.80	146.70	16.30	0.10	0.00
5 MAX	4.70	9.00	213.00	179.40	21.40	2.20	5.50
6 AVE	1.91	3.98	193.59	163.75	18.74	0.56	0.00
6 MIN	0.90	1.50	124.40	108.60	15.00	0.10	0.00
6 MAX	3.50	6.60	248.70	210.50	23.70	1.10	10.00
7 AVE	2.27	4.65	179.28	148.23	18.76	0.78	0.00
7 MIN	0.60	1.40	160.00	132.80	17.10	0.30	0.00
7 MAX	4.30	7.60	199.20	168.60	22.70	1.90	14.00
8 AVE	1.78	3.44	172.05	142.47	19.90	-0.09	0.00
8 MIN	0.40	0.40	57.80	88.80	14.10	-3.00	0.00
8 MAX	3.10	5.50	332.90	239.90	24.20	0.80	0.00
9 AVE	1.31	2.93	196.06	183.74	19.30	-0.55	0.00
9 MIN	0.40	0.70	16.30	83.40	12.70	-3.70	0.00
9 MAX	3.20	5.10	358.60	284.90	26.00	1.40	0.00

ENVIRONMENT SYSTEM
METEOROLOGICAL MONITORING FOR JANUARY 2023

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
10 AVE	1.51	3.40	212.28	169.19	20.17	-0.27	0.00
10 MIN	0.40	1.40	122.60	104.40	13.30	-3.90	0.00
10 MAX	3.30	5.80	358.60	279.80	25.70	1.10	0.00
11 AVE	1.45	2.87	105.30	106.74	21.35	0.62	0.00
11 MIN	0.40	0.50	0.20	59.60	16.60	0.00	0.00
11 MAX	2.90	4.60	181.80	173.20	25.70	2.20	0.00
12 AVE	1.67	3.46	104.09	86.99	20.64	-0.73	0.00
12 MIN	0.40	0.60	4.80	26.10	13.90	-3.90	0.00
12 MAX	3.60	6.20	312.50	284.10	25.90	1.10	0.00
13 AVE	2.10	3.92	89.38	70.33	22.32	-0.09	0.00
13 MIN	0.40	1.40	53.70	49.10	16.70	-2.40	0.00
13 MAX	4.30	7.00	134.20	94.80	27.80	1.10	0.00
14 AVE	2.25	3.97	76.22	55.56	21.58	-0.15	0.00
14 MIN	0.40	0.60	54.60	38.90	15.80	-2.90	0.00
14 MAX	4.40	6.70	164.80	84.40	26.40	1.40	0.00
15 AVE	1.77	3.20	145.87	132.96	22.68	-0.48	0.00
15 MIN	0.40	0.70	21.70	6.80	13.60	-3.70	0.00
15 MAX	3.80	5.60	359.90	355.40	31.30	1.20	0.00
16 AVE	2.15	4.18	106.42	82.95	22.61	-0.03	0.00
16 MIN	0.40	2.10	67.00	55.10	16.60	-2.20	0.00
16 MAX	4.00	6.70	185.00	114.10	27.50	1.50	0.00
17 AVE	1.80	3.38	118.52	80.23	22.08	-0.60	0.00
17 MIN	0.40	0.40	47.00	29.50	15.50	-3.90	0.00
17 MAX	4.20	6.90	350.20	194.50	27.60	1.30	0.00
18 AVE	1.50	3.27	155.50	157.10	24.33	-0.18	0.00
18 MIN	0.40	1.00	2.20	26.90	15.00	-2.80	0.00
18 MAX	3.30	6.20	357.60	319.30	32.80	1.50	0.00

ENVIRONMENT SYSTEM
METEOROLOGICAL MONITORING FOR JANUARY 2023

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
19 AVE	1.76	3.90	210.69	175.58	19.41	0.85	0.00
19 MIN	0.40	1.60	161.40	141.00	17.20	0.40	0.00
19 MAX	3.30	6.40	340.20	288.80	22.90	1.40	9.50
20 AVE	1.40	2.70	177.65	139.92	18.47	0.64	0.00
20 MIN	0.40	0.80	74.10	30.10	16.40	0.20	0.00
20 MAX	2.60	4.80	301.50	254.50	21.60	2.10	2.50
21 AVE	1.48	2.79	181.04	145.85	19.41	0.02	0.00
21 MIN	0.40	0.40	30.80	34.30	13.00	-1.40	0.00
21 MAX	3.70	6.50	351.70	294.40	24.60	1.20	0.00
22 AVE	0.65	1.81	148.24	116.74	18.38	0.90	0.00
22 MIN	0.40	0.40	30.50	40.00	15.60	0.00	0.00
22 MAX	1.50	3.40	311.50	273.70	21.80	2.00	10.50
23 AVE	1.11	2.28	174.42	154.78	19.91	-0.24	0.00
23 MIN	0.40	0.60	18.00	89.30	16.40	-3.20	0.00
23 MAX	2.70	4.60	350.70	333.20	24.30	0.50	0.00
24 AVE	1.30	2.67	154.17	130.84	21.74	-0.49	0.00
24 MIN	0.40	0.70	60.10	36.70	16.00	-3.00	0.00
24 MAX	3.10	5.10	357.90	288.00	27.30	0.50	0.00
25 AVE	1.44	2.85	150.50	128.39	23.43	0.11	0.00
25 MIN	0.50	1.00	71.70	58.80	19.80	-0.30	0.00
25 MAX	3.10	5.20	279.50	254.80	28.40	0.50	0.00
26 AVE	1.39	2.70	180.88	163.18	24.10	-0.39	0.00
26 MIN	0.40	0.40	29.00	39.90	16.00	-3.10	0.00
26 MAX	3.40	5.20	355.40	348.70	33.10	1.20	2.00
27 AVE	1.60	3.32	144.95	118.68	24.20	0.01	0.00
27 MIN	0.40	1.60	44.90	19.80	20.50	-1.50	0.00
27 MAX	3.00	5.30	228.00	169.50	28.00	0.50	0.50

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
28 AVE	1.84	3.05	125.19	119.91	26.00	-0.08	0.00
28 MIN	0.40	0.40	12.90	38.70	19.20	-2.40	0.00
28 MAX	3.80	5.70	349.60	349.00	32.70	1.30	0.00
29 AVE	1.35	2.57	142.76	161.63	25.26	0.12	0.00
29 MIN	0.40	0.40	4.80	33.90	19.70	-2.00	0.00
29 MAX	3.90	7.50	343.50	356.50	35.10	1.00	3.00
30 AVE	0.65	1.70	139.09	196.13	21.79	0.66	0.00
30 MIN	0.40	0.50	3.60	0.40	20.80	0.30	0.00
30 MAX	1.60	4.00	352.40	343.00	22.90	1.30	15.00
31 AVE	1.89	3.83	193.09	165.91	22.94	0.24	0.00
31 MIN	1.00	2.70	128.30	110.70	20.70	-0.40	0.00
31 MAX	2.70	5.20	248.90	201.50	26.30	1.00	0.00

Readings Not Validated: 0

END OF DATA LOGGER DAILY AVERAGES
REPORT

Wind Speed and Direction at 30 meters - Percent of Total Readings

Direction From	To	0.5 2.0	2.1 3.5	3.6 5.0	5.1 6.5	6.6 8.0	8.1 9.5	9.6 11.0	11.1 12.5	12.6 14.0	14.1 15.5	15.6 17.0	17.1 18.5	18.6 50.0	Total	Total Readings
N	S	0.5	2.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	18
NNE	SSW	0.5	2.1	2.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	38
NE	SW	1.8	6.5	2.9	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2	87
ENE	WSW	0.9	7.4	2.9	3.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	96
E	W	1.5	4.4	2.9	5.6	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9	105
ESE	WNW	1.7	3.2	5.6	2.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6	83
SE	NW	0.6	1.7	1.5	1.1	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	39
SSE	NNW	0.2	2.7	0.6	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	25
S	N	0.3	0.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	12
SSW	NNE	0.3	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	9
SW	NE	0.5	1.2	1.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	21
WSW	ENE	1.2	1.5	1.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	31
W	E	1.5	4.4	1.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	47
WNW	ESE	1.7	2.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	31
NW	SE	0.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	8
NNW	SSE	0.6	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	10
Total		13.9	43.3	23.3	15.9	3.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	660.0

Calm Readings (<0.5 mps):	12	WIND SPEED (m/sec)		TEMPERATURE (°C)		RAINFALL (mm)	
Calm Readings %:	1.8	Average:	3.5	Ave Daily Max:	28.3	Total Month:	95.00
Tot. Readings Expected (ALL):	2688	Maximum:	8.2	Ave Daily Min:	18.1	Max. Daily:	81.50
Tot. Readings Accepted (ALL):	2676	Not Validated:	0	Not Validated:	0	Not Validated:	0
Percent Accepted (ALL):	99.6	Accepted:	672	Accepted:	672	Accepted:	672
Wind Direction Accepted:	660	% Accepted:	100.0	% Accepted:	100.0	% Accepted:	100.0
Wind Direction % Accepted:	98.2						

ENVIRONMENT SYSTEM
METEOROLOGICAL MONITORING FOR FEBRUARY 2023

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
1 AVE	1.80	3.43	183.82	142.84	23.63	0.42	0.00
1 MIN	0.40	0.40	53.40	54.90	19.50	-2.00	0.00
1 MAX	3.10	5.80	349.70	215.50	29.40	2.40	0.00
2 AVE	1.31	3.35	119.30	136.10	25.30	-0.23	0.00
2 MIN	0.40	1.20	4.00	4.90	19.00	-1.70	0.00
2 MAX	3.10	6.10	348.60	334.30	34.30	0.80	0.00
3 AVE	1.59	3.81	249.46	209.85	24.72	-0.58	0.00
3 MIN	0.40	2.70	68.90	54.00	16.30	-4.20	0.00
3 MAX	3.30	5.10	339.60	324.90	32.80	1.10	0.00
4 AVE	1.58	4.01	231.42	230.69	22.11	-0.61	0.00
4 MIN	0.50	1.60	1.10	166.30	15.00	-5.80	0.00
4 MAX	2.90	5.90	330.30	273.20	29.20	1.70	0.00
5 AVE	1.52	3.41	210.46	171.13	19.84	-1.15	0.00
5 MIN	0.40	2.00	76.10	61.60	10.30	-4.90	0.00
5 MAX	3.20	5.10	357.50	272.80	26.80	1.20	0.00
6 AVE	2.38	4.25	79.39	64.62	23.34	0.24	0.00
6 MIN	0.70	2.10	43.30	29.70	18.00	-1.70	0.00
6 MAX	4.50	7.20	107.20	90.90	28.00	1.50	0.00
7 AVE	2.08	3.91	78.92	64.93	23.44	0.30	0.00
7 MIN	0.50	2.30	41.20	28.00	18.90	-1.50	0.00
7 MAX	4.20	6.80	105.50	89.70	28.60	1.30	0.00
8 AVE	2.26	4.27	87.50	70.12	22.51	-0.22	0.00
8 MIN	0.40	2.30	38.10	37.90	16.80	-2.60	0.00
8 MAX	4.20	7.30	154.60	99.20	28.10	1.70	0.00
9 AVE	1.17	2.88	96.32	88.83	21.46	-0.28	0.00
9 MIN	0.50	1.90	20.30	14.90	17.10	-2.50	0.00
9 MAX	2.10	4.30	302.70	355.30	24.80	0.90	0.00

ENVIRONMENT SYSTEM
METEOROLOGICAL MONITORING FOR FEBRUARY 2023

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
10 AVE	1.68	3.22	132.81	194.59	24.72	0.18	0.00
10 MIN	0.40	1.20	20.50	14.20	14.50	-2.50	0.00
10 MAX	3.70	6.00	348.00	355.30	30.00	1.20	0.00
11 AVE	1.45	3.23	175.47	150.42	24.72	-0.60	0.00
11 MIN	0.40	0.60	1.10	25.90	14.20	-3.80	0.00
11 MAX	3.50	5.50	358.90	304.70	36.10	1.30	0.00
12 AVE	2.21	4.52	215.00	181.41	23.90	-0.36	0.00
12 MIN	0.40	1.60	38.20	25.00	16.40	-4.80	0.00
12 MAX	4.60	8.20	352.80	354.60	30.00	1.10	0.00
13 AVE	2.15	4.35	144.75	120.30	22.63	0.46	0.00
13 MIN	0.80	2.70	117.50	106.60	20.60	0.00	0.00
13 MAX	3.20	5.70	177.70	144.30	24.90	0.60	0.00
14 AVE	1.50	3.07	133.76	122.09	20.09	0.03	0.00
14 MIN	0.50	1.30	24.40	61.30	16.20	-3.10	0.00
14 MAX	3.40	5.30	325.60	322.90	24.40	1.60	6.00
15 AVE	1.63	3.08	128.05	110.26	20.37	-0.95	0.00
15 MIN	0.40	0.40	21.50	30.60	14.90	-4.10	0.00
15 MAX	3.80	6.30	342.40	353.10	26.60	1.00	0.00
16 AVE	1.65	2.85	144.32	114.65	20.48	-1.00	0.00
16 MIN	0.40	0.40	0.10	40.20	11.40	-4.80	0.00
16 MAX	3.50	6.10	358.50	338.70	28.60	1.20	0.00
17 AVE	1.75	3.22	112.61	114.39	22.29	-0.57	0.00
17 MIN	0.40	0.90	9.80	36.40	13.50	-3.70	0.00
17 MAX	4.10	6.20	336.60	348.80	30.90	1.30	0.00
18 AVE	1.67	3.04	172.56	174.88	24.42	-0.48	0.00
18 MIN	0.40	0.40	3.00	33.30	14.60	-3.50	0.00
18 MAX	4.10	7.50	358.00	344.10	35.80	1.30	2.00

ENVIRONMENT SYSTEM
METEOROLOGICAL MONITORING FOR FEBRUARY 2023

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height: Units:	10 Meters	30 Meters	10 Meters	30 Meters	5 Meters	5 - 30M Degrees	MM. /Day
19 AVE	1.66	3.51	165.81	139.13	23.46	0.01	0.00
19 MIN	0.40	0.90	20.10	5.70	18.60	-1.20	0.00
19 MAX	3.10	7.10	359.60	289.60	28.50	0.70	0.50
20 AVE	1.69	3.30	115.68	105.96	24.31	-0.41	0.00
20 MIN	0.40	0.70	5.80	14.60	17.00	-2.20	0.00
20 MAX	4.00	6.00	348.60	316.50	32.90	0.90	0.00
21 AVE	1.66	3.03	125.19	111.69	22.92	-0.69	0.00
21 MIN	0.40	0.70	17.30	25.00	15.40	-4.00	0.00
21 MAX	4.00	6.10	356.70	325.60	30.60	0.70	0.00
22 AVE	1.65	3.79	148.59	124.03	19.08	0.45	0.00
22 MIN	0.40	0.90	29.90	49.40	17.30	-0.40	0.00
22 MAX	3.50	6.80	288.80	255.30	21.50	1.00	81.50
23 AVE	1.83	3.99	127.78	103.60	19.93	0.01	0.00
23 MIN	0.50	2.00	77.60	59.30	17.00	-1.30	0.00
23 MAX	3.70	6.60	179.90	147.00	23.50	0.90	3.50
24 AVE	1.48	3.15	153.26	93.28	19.72	-0.80	0.00
24 MIN	0.40	1.20	38.20	1.40	14.20	-4.00	0.00
24 MAX	3.50	6.00	349.50	287.00	25.30	0.80	1.50
25 AVE	1.72	3.05	125.24	136.62	19.44	-0.99	0.00
25 MIN	0.40	0.40	9.50	14.40	11.30	-4.30	0.00
25 MAX	3.80	6.00	359.30	356.90	26.20	1.60	0.00
26 AVE	1.40	3.13	210.55	180.97	22.74	-0.59	0.00
26 MIN	0.40	0.40	16.60	10.30	12.90	-3.40	0.00
26 MAX	3.00	5.00	352.90	357.20	32.90	1.30	0.00
27 AVE	1.56	3.37	166.51	166.19	22.89	-0.29	0.00
27 MIN	0.40	1.60	0.80	98.80	17.90	-3.10	0.00
27 MAX	3.10	5.70	354.30	327.90	27.70	0.80	0.00

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME
(EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
28 AVE	1.59	3.16	118.29	100.22	22.82	-0.02	0.00
28 MIN	0.40	1.50	57.60	41.50	19.00	-1.50	0.00
28 MAX	3.50	5.20	183.00	158.40	26.70	0.70	0.00

Readings Not Validated: 0

END OF DATA LOGGER DAILY AVERAGES
REPORT

Wind Speed and Direction at 30 meters - Percent of Total Readings

Direction From	To	0.5 2.0	2.1 3.5	3.6 5.0	5.1 6.5	6.6 8.0	8.1 9.5	9.6 11.0	11.1 12.5	12.6 14.0	14.1 15.5	15.6 17.0	17.1 18.5	18.6 50.0	Total	Total Readings
N	S	1.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	18
NNE	SSW	0.8	2.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	32
NE	SW	1.4	3.9	3.5	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6	69
ENE	WSW	1.7	5.0	2.1	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	68
E	W	1.0	4.6	3.7	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.8	78
ESE	WNW	1.0	2.4	5.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	76
SE	NW	1.0	1.8	0.6	1.4	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	43
SSE	NNW	1.1	1.8	0.8	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	35
S	N	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	8
SSW	NNE	0.1	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	8
SW	NE	1.0	0.6	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	21
WSW	ENE	1.4	6.4	4.4	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	93
W	E	3.2	8.0	2.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4	104
WNW	ESE	2.5	3.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	43
NW	SE	0.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	16
NNW	SSE	0.7	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	10
Total		19.7	43.9	25.1	8.9	2.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	722.0

Calm Readings (<0.5 mps):	14	WIND SPEED (m/sec)		TEMPERATURE (°C)		RAINFALL (mm)	
Calm Readings %:	1.9	Average:	3.2	Ave Daily Max:	27.9	Total Month:	95.00
Tot. Readings Expected (ALL):	2976	Maximum:	9.0	Ave Daily Min:	18.0	Max. Daily:	20.00
Tot. Readings Accepted (ALL):	2961	Not Validated:	8	Not Validated:	8	Not Validated:	8
Percent Accepted (ALL):	99.5	Accepted:	736	Accepted:	736	Accepted:	736
Wind Direction Accepted:	722	% Accepted:	98.9	% Accepted:	98.9	% Accepted:	98.9
Wind Direction % Accepted:	97.0						

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height: Units:	10 Meters	30 Meters	10 Meters	30 Meters	5 Meters	5 - 30M Degrees	MM. /Day
1 AVE	2.06	4.48	223.91	182.95	23.79	0.25	0.00
1 MIN	0.40	0.80	150.80	127.20	20.10	-0.70	0.00
1 MAX	4.20	8.00	340.80	261.20	31.20	1.20	0.00
2 AVE	1.58	3.07	124.05	122.90	21.50	-0.70	0.00
2 MIN	0.40	0.60	2.60	5.90	16.00	-3.00	0.00
2 MAX	3.40	5.50	341.10	284.20	27.00	1.20	0.00
3 AVE	1.37	2.90	108.35	92.76	20.61	-1.32	0.00
3 MIN	0.40	0.40	20.70	19.80	14.40	-4.00	0.00
3 MAX	3.30	5.20	338.50	349.90	26.90	1.20	0.00
4 AVE	1.34	2.57	161.93	108.87	21.25	-0.65	0.00
4 MIN	0.40	0.40	43.50	20.80	16.50	-3.10	0.00
4 MAX	2.90	4.30	354.10	342.00	26.10	1.90	2.50
5 AVE	1.60	2.86	102.02	91.48	21.95	-0.79	0.00
5 MIN	0.40	0.40	8.80	10.40	13.10	-3.60	0.00
5 MAX	3.50	5.10	358.80	324.30	30.30	1.50	0.00
6 AVE	1.36	3.78	261.51	247.46	27.06	0.65	0.00
6 MIN	0.40	1.50	20.90	11.20	17.40	-2.30	0.00
6 MAX	3.40	7.10	359.40	352.50	37.50	4.60	0.00
7 AVE	1.44	3.79	253.43	233.33	25.99	-1.56	0.00
7 MIN	0.40	1.60	0.00	113.70	19.10	-5.30	0.00
7 MAX	3.20	6.30	336.60	287.10	37.10	1.20	0.00
8 AVE	1.21	3.04	213.90	196.18	21.59	-1.58	0.00
8 MIN	0.40	2.20	3.10	66.30	13.60	-3.90	0.00
8 MAX	2.90	4.60	356.80	296.10	30.20	0.90	0.00
9 AVE	1.27	3.18	227.84	184.58	18.99	-1.93	0.00
9 MIN	0.40	1.60	10.20	73.20	11.40	-4.70	0.00
9 MAX	2.90	5.10	348.30	262.20	28.20	1.00	0.00

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height: Units:	10 Meters	30 Meters	10 Meters	30 Meters	5 Meters	5 - 30M Degrees	MM. /Day
10 AVE	2.23	4.10	96.28	77.15	22.24	-0.33	0.00
10 MIN	0.40	0.70	8.00	32.90	15.60	-3.60	0.00
10 MAX	4.60	6.90	356.50	346.40	27.80	1.40	0.00
11 AVE	1.36	2.86	188.82	166.82	22.79	-0.71	0.00
11 MIN	0.40	0.40	7.90	5.20	14.90	-4.10	0.00
11 MAX	2.90	4.40	351.50	355.60	31.50	1.10	0.00
12 AVE	1.80	3.84	192.25	177.36	22.39	-0.36	0.00
12 MIN	0.40	0.90	3.40	111.10	17.90	-2.60	0.00
12 MAX	4.00	7.20	358.80	286.50	27.40	0.60	0.00
13 AVE	2.00	4.54	124.31	104.65	21.57	0.34	0.00
13 MIN	0.50	1.50	89.70	93.20	19.70	-0.70	0.00
13 MAX	3.00	6.00	135.60	113.30	23.60	1.00	8.00
14 AVE	0.78	2.27	143.51	113.23	20.56	0.23	0.00
14 MIN	0.40	1.40	55.20	38.30	19.00	-1.20	0.00
14 MAX	2.20	3.80	224.90	165.70	23.60	2.10	16.50
15 AVE	0.89	1.89	211.51	175.71	21.38	-0.39	0.00
15 MIN	0.40	0.50	2.50	65.60	17.90	-2.10	0.00
15 MAX	2.20	3.70	346.30	282.00	27.30	0.60	0.00
16 AVE	0.97	3.01	309.01	265.65	24.11	-1.61	0.00
16 MIN	0.40	0.40	3.40	135.50	16.60	-6.60	0.00
16 MAX	2.20	5.00	359.10	339.70	35.00	1.70	0.00
17 AVE	1.44	3.59	188.57	168.24	22.98	-2.02	0.00
17 MIN	0.40	2.20	5.30	70.40	14.50	-6.50	0.00
17 MAX	3.40	5.80	356.20	263.60	32.10	0.80	0.00
18 AVE	1.13	2.44	136.27	154.04	22.97	-0.39	0.00
18 MIN	0.40	1.40	2.60	18.90	15.40	-3.00	0.00
18 MAX	2.40	4.10	348.50	359.10	32.30	1.40	0.00

ENVIRONMENT SYSTEM
METEOROLOGICAL MONITORING FOR MARCH 2023

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
19 AVE	1.07	2.36	195.40	187.67	24.87	1.68	0.00
19 MIN	0.40	0.40	4.30	35.90	16.90	0.00	0.00
19 MAX	2.40	3.80	358.80	326.40	36.60	4.00	0.00
20 AVE	2.43	5.17	164.66	138.16	22.58	0.46	0.00
20 MIN	0.60	2.60	110.30	93.10	19.40	0.10	0.00
20 MAX	4.60	9.00	192.90	165.00	24.90	2.00	0.50
21 AVE	1.69	3.58	130.14	94.94	20.57	-0.04	0.00
21 MIN	0.40	0.90	41.30	38.40	17.40	-2.00	0.00
21 MAX	2.80	5.20	336.60	120.50	22.40	0.50	0.00
22 AVE	1.47	2.95	117.64	98.56	20.92	-0.35	0.00
22 MIN	0.40	1.30	12.00	16.60	13.40	-3.10	0.00
22 MAX	3.30	4.70	321.40	303.50	27.30	1.30	0.00
23 AVE	1.25	3.10	214.71	213.90	21.18	-0.07	0.00
23 MIN	0.40	1.50	5.20	12.60	17.00	-1.50	0.00
23 MAX	3.70	5.80	357.20	347.20	30.50	0.60	20.00
24 AVE	1.09	2.57	184.03	156.95	20.83	-0.11	0.00
24 MIN	0.40	1.10	26.90	1.10	17.00	-0.80	0.00
24 MAX	2.70	4.80	352.00	290.50	25.50	0.70	11.00
25 AVE	1.03	2.29	95.57	74.91	19.29	0.08	0.00
25 MIN	0.40	0.60	9.30	14.40	17.20	-1.70	0.00
25 MAX	2.40	4.20	210.10	162.70	21.40	0.60	9.00
26 AVE	1.44	2.66	123.85	103.32	20.67	-0.16	0.00
26 MIN	0.40	0.50	45.70	31.50	17.60	-1.30	0.00
26 MAX	3.30	5.00	356.60	349.60	24.50	0.60	0.50
27 AVE	0.74	2.60	257.82	222.80	18.71	-0.11	0.00
27 MIN	0.40	0.40	0.30	10.20	15.80	-2.00	0.00
27 MAX	1.70	5.10	345.60	358.50	21.20	0.80	20.00

AVERAGE DAILY READINGS FROM DATA LOGGER (RAINFALL IS ACTUAL) - all times are EASTERN STANDARD TIME (EST)

Parameter:	Wind Speed	Wind Speed	Wind Direct'n	Wind Direct'n	Dry B Temp.	Delta T	Rainfall
Height:	10	30	10	30	5	5 - 30M	
Units:	Meters	Meters	Meters	Meters	Meters	Degrees	MM. /Day
28 AVE	0.68	2.36	238.39	228.17	20.40	0.03	0.00
28 MIN	0.40	1.00	3.60	0.60	17.70	-0.90	0.00
28 MAX	1.80	4.20	349.40	354.30	26.30	0.80	4.50
29 AVE	0.89	2.99	305.62	261.42	20.43	-0.18	0.00
29 MIN	0.40	0.60	61.30	42.50	17.30	-3.00	0.00
29 MAX	2.10	5.10	354.70	336.70	26.20	1.20	2.50
30 AVE	1.29	3.96	282.81	230.63	18.38	-0.18	0.00
30 MIN	0.40	2.00	0.70	193.10	13.20	-3.80	0.00
30 MAX	2.50	5.70	344.40	255.10	24.60	2.60	0.00
31 AVE	1.55	3.49	243.89	190.12	18.25	-0.75	0.00
31 MIN	0.40	2.60	66.60	17.20	11.30	-2.90	0.00
31 MAX	2.20	4.90	352.40	284.60	23.80	1.00	0.00

Readings Not Validated: 248

END OF DATA LOGGER DAILY AVERAGES
REPORT

APPENDIX 5 -

VEGETATION MONITORING DATA

100 - OVERSTOREY

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	006	AVICENNIA MARINA	FLUORIDE (ug/g)	22	18	25	20	10									
2	111	ANGOPHORA COSTATA	FLUORIDE (ug/g)	1412	1247	1725	1455	560									
3	112	ANGOPHORA COSTATA	FLUORIDE (ug/g)	707	473	660	580	180									
4	113	EUCALYPTUS MACULATA	FLUORIDE (ug/g)	178	205	nra	130	280									
5	114	MELALEUCA QUINQUENERVIA	FLUORIDE (ug/g)	777	217	215	280	155									
6	115	EUCALYPTUS PARRAMATENSIS	FLUORIDE (ug/g)	176	157	160	280	30									
7	116	ANGOPHORA COSTATA	FLUORIDE (ug/g)	84	140	295	65	60									
8	117	ANGOPHORA COSTATA	FLUORIDE (ug/g)	267	108	30	265	30									
9	118	MELALEUCA QUINQUENERVIA	FLUORIDE (ug/g)	364	225	140	325	210									
10	119	ANGOPHORA FLORIBUNDA	FLUORIDE (ug/g)	178	122	95	195	75									
11	120	EUCALYPTUS MACULATA	FLUORIDE (ug/g)	75	68	80	105	20									
12	121	EUCALYPTUS PILULARIS	FLUORIDE (ug/g)	47	33	30	55	15									
13	122	ANGOPHORA FLORIBUNDA	FLUORIDE (ug/g)	26	33	35	nra	30									
14	123	EUCALYPTUS HAEMASTOMA	FLUORIDE (ug/g)	30	17	15	25	10									
15	124	ANGOPHORA COSTATA	FLUORIDE (ug/g)	27	22	35	10	20									
16	126	CASUARINA GLAUCA	FLUORIDE (ug/g)	60	27	20	20	40									
17	128	EUCALYPTUS ROBUSTA	FLUORIDE (ug/g)	34	17	30	15	5									
18	129	ANGOPHORA COSTATA	FLUORIDE (ug/g)	19	10	15	10	5									
19	130	AVICENNIA MARINA	FLUORIDE (ug/g)	31	12	10	15	10									
20	131	AVICENNIA MARINA	FLUORIDE (ug/g)	7	7	5	10	5									
21	132	AVICENNIA MARINA	FLUORIDE (ug/g)	7	10	10	10	10									
22	133	CASUARINA GLAUCA	FLUORIDE (ug/g)	20	15	15	20	10									
23	134	CASUARINA GLAUCA	FLUORIDE (ug/g)	20	13	10	15	15									
24	136	EUCALYPTUS HAEMASTOMA	FLUORIDE (ug/g)	8	15	q	15	q									
25	137	ANGOPHORA COSTATA	FLUORIDE (ug/g)	17	8	10	10	5									
26	138	AVICENNIA MARINA	FLUORIDE (ug/g)	8	5	q	5	q									
27	139	EUCALYPTUS MACULATA	FLUORIDE (ug/g)	11	5	q	5	q									
28	141	EUCALYPTUS MACULATA	FLUORIDE (ug/g)	31	5	q	5	q									
29	142	CASUARINA GLAUCA	FLUORIDE (ug/g)	10	10	q	10	q									
30	144	EUCALYPTUS HAEMASTOMA	FLUORIDE (ug/g)	15	15	q	15	q									
31	147	AVICENNIA MARINA	FLUORIDE (ug/g)	6	5	q	5	q									
32	149	EUCALYPTUS MACULATA	FLUORIDE (ug/g)	5	5	q	5	q									
33	151	EUCALYPTUS PILULARIS	FLUORIDE (ug/g)	9	10	q	10	q									
34	168	EUCALYPTUS ROBUSTA	FLUORIDE (ug/g)	166	227	260	315	105									
35	169	EUCALYPTUS GLOBOIDEA	FLUORIDE (ug/g)	23	17	15	25	10									
36	170	EUCALYPTUS PILULARIS	FLUORIDE (ug/g)	11	8	10	10	5									
37	171	CASUARINA GLAUCA	FLUORIDE (ug/g)	13	10	5	5	20									
38	172	CASUARINA GLAUCA	FLUORIDE (ug/g)	11	10	5	5	20									
39	173	CASUARINA GLAUCA	FLUORIDE (ug/g)	9	7	10	5	5									
40	174	CASUARINA GLAUCA	FLUORIDE (ug/g)	40	40	85	20	15									
41	175	CASUARINA GLAUCA	FLUORIDE (ug/g)	38	38	55	40	20									
42	190	ANGOPHORA COSTATA	FLUORIDE (ug/g)	22	12	10	10	15									
43	191	CASUARINA GLAUCA	FLUORIDE (ug/g)	14	23	10	10	50									

WATER AND VEGETATION MONITORING FOR MARCH 2023

RESULTS BY SAMPLING GROUP

130 - POTLINE 3 VEGETATION

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	182	CASUARINA GLAUCA	FLUORIDE (ug/g)	40	48	75	30	40									
2	183	CASUARINA GLAUCA	FLUORIDE (ug/g)	38	27	30	20	30									
3	184	CASUARINA GLAUCA	FLUORIDE (ug/g)	60	30	40	20	30									
4	185	ANGOPHORA COSTATA	FLUORIDE (ug/g)	30	33	10	40	50									
5	193	ANGOPHORA COSTATA	FLUORIDE (ug/g)	14	12	10	15	10									
6	194	ROUGH BARK APPLE	FLUORIDE (ug/g)	43	43	40	35	55									

nra = No Result Available

tba = To Be Analysed

c = Result Being Checked

q = Samples collected quarterly

ALY = Average Last Year

AYTD = Average Year To Date

WATER AND VEGETATION MONITORING FOR MARCH 2023

RESULTS BY SAMPLING GROUP

350 - FORAGE

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	004	FORAGE	FLUORIDE (ug/g)	152	58	60	35	80									
2	031	FORAGE	FLUORIDE (ug/g)	10	5	q	5	q									
3	032	FORAGE	FLUORIDE (ug/g)	10	10	20	5	5									
4	034	FORAGE	FLUORIDE (ug/g)	19	10	nra	15	5									
		FODDER FEED MIX	FLUORIDE (ug/g)	24	8	nra	10	5									
5	087	FORAGE	FLUORIDE (ug/g)	62	118	195	135	25									
6	126	FORAGE	FLUORIDE (ug/g)	18	15	q	15	q									
7	130	FORAGE	FLUORIDE (ug/g)	37	30	30	10	50									
8	131	FORAGE	FLUORIDE (ug/g)	16	5	q	5	q									
9	133	FORAGE	FLUORIDE (ug/g)	36	5	q	5	q									
10	134	FORAGE	FLUORIDE (ug/g)	21	8	10	5	10									
11	141	FORAGE	FLUORIDE (ug/g)	9	5	q	5	q									
12	142	FORAGE	FLUORIDE (ug/g)	18	8	10	5	10									
13	143	FORAGE	FLUORIDE (ug/g)	15	5	q	5	q									
14	160	FORAGE	FLUORIDE (ug/g)	23	5	q	5	q									
15	166	FORAGE	FLUORIDE (ug/g)	14	10	nra	5	15									
16	167	FORAGE	FLUORIDE (ug/g)	27	18	25	10	20									
17	176	FORAGE	FLUORIDE (ug/g)	17	7	10	5	5									
18	178	FORAGE	FLUORIDE (ug/g)	10	18	15	5	35									
19	211	FORAGE	FLUORIDE (ug/g)	20	15	15	20	10									
20	307	FORAGE	FLUORIDE (ug/g)	9	12	10	5	20									
21	308	FORAGE	FLUORIDE (ug/g)	10	12	25	5	5									

nra = No Result Available

tba = To Be Analysed

c = Result Being Checked

q = Samples collected quarterly

ALY = Average Last Year

AYTD = Average Year To Date

 *** END OF WATER AND VEGETATION BY GROUP REPORT ***

APPENDIX 6 –

WATER MONITORING DATA

- 1. Sewer Treatment Works and Irrigation System Report**
- 2. Stormwater Drain Monitor Report**
- 3. Surface Water and Groundwater Reports**

TOMAGO ALUMINIUM COMPANY PTY. LIMITED (A.C.N. 001 862 228)
 ENVIRONMENT SYSTEM 08:31:51 04-05-23 Page 1
 SEWAGE TREATMENT WORKS MONITORING RESULTS
 FOR JANUARY 2023

Day	S.P Hours	Settleable Solids ml		Pasveer pH	Effl. pH	MLSS Wkly. mg/l	Ammonia Wkly. mg/l	Nitrate Wkly. mg/l	Volat SS mg/l	D.O Effl.	BOD Effl. mg/l	Colour	Condition
		.5hr	1hr										
1													
2													
3	0.50	200	150	6.5	6.6	1930	0.53	25	1250	4.1		BROWN	CLEAR
4	0.13	200	160	6.6	6.6					3.9		BROWN	CLEAR
5													
6	0.23	180	140	6.4	6.6					4.2		BROWN	CLEAR
7													
8													
9	0.36	200	160	6.6	6.7	1810	0.56	25		5.2		BROWN	CLEAR
10													
11	0.21	180	140	6.5	6.6					5.0		BROWN	CLEAR
12													
13	0.22	160	140	6.4	6.5					3.8		BROWN	CLEAR
14													
15													
16	0.35	220	180	6.5	6.6	2325	0.74	50		4.8		BROWN	CLEAR
17													
18	0.22	200	160	6.4	6.5					4.2		BROWN	CLEAR
19													
20	0.20	180	140	6.5	6.6					4.5		BROWN	CLEAR
21													
22													
23	0.35	160	130	6.4	6.4	2560	0.30	50		5.0		BROWN	CLEAR
24													
25	0.24	180	140	6.5	6.6					4.9		BROWN	CLEAR
26													
27	0.20	180	140	6.4	6.6					4.2		BROWN	CLEAR
28													
29													
30	0.36	200	160	6.5	6.5	1520	0.45	50		3.6		BROWN	CLEAR
31													

Comments

End of report

EVR860

TOMAGO ALUMINIUM COMPANY PTY. LIMITED (A.C.N. 001 862 228)
 ENVIRONMENT SYSTEM
 MATURATION POND AND IRRIGATION SYSTEM REPORT
 FOR JANUARY 2023

08:29:02 04-05-23 Page 1

EPA point 17

	Maturation Pond						Irrigation System		
	pH	Cond uS/cm	Fluoride mg/L	BOD Effl. mg/L	Suspend. Solids mg/L	E-Coli Count/ 100mL	Avg kL/day to sewer	Total kL Irrigated	mm/week Irrigated
1								0	
2								0	
3	6.7	730	4.6			435		1321	
4							10	682	26
5								0	
6								1288	
7								0	
8								0	
9	7.2	820	4.5			340		426	
10								0	
11							8	1193	20
12								0	
13								1230	
14								0	
15								0	
16	7.0	770	4.6			385		951	
17								0	
18							8	797	20
19								0	
20								1410	
21								0	
22								0	
23	7.1	920	5.0			290		1340	
24								0	
25							8	748	24
26								0	
27								1430	
28								0	
29								0	
30	7.2	830	5.1			543		1618	
31								0	
Total								14434.00	

BOD = Biological Oxygen Demand
 nra = No result available

End of report

TOMAGO ALUMINIUM COMPANY PTY. LIMITED (A.C.N. 001 862 228)
 ENVIRONMENT SYSTEM 07:26:42 05-05-23 Page 1
 SEWAGE TREATMENT WORKS MONITORING RESULTS
 FOR FEBRUARY 2023

Day	S.P	Settleable		Pasveer	Effl.	MLSS	Ammonia	Nitrate	Volat	D.O	BOD	Colour	Condition
	Hours	Solids ml		pH	pH	Wkly.	Wkly.	Wkly.	SS	Effl.	Effl.		
		.5hr	1hr			mg/l	mg/l	mg/l	mg/l		mg/l		
1	0.25	200	180	6.3	7.4					4.0		BROWN	CLEAR
2													
3	0.22	180	170	6.8	7.0					5.9		BROWN	CLEAR
4													
5													
6	0.00												
7	0.38	180	160	7.1	7.3	3030	0.45	50	2015	5.5		BROWN	CLEAR
8	0.08	150	100	6.3	6.3					7.4		BROWN	CLEAR
9													
10	0.27	100	90	6.5	6.7					2.8		BROWN	CLEAR
11													
12													
13	0.32	100	80	6.8	6.7	440	0.45	25		5.1		BROWN	CLEAR
14													
15	0.19	110	90	6.4	6.4					3.7		BROWN	CLEAR
16													
17	0.23	100	90	6.6	6.6					1.5	12	BROWN	CLEAR
18													
19													
20	0.28	11	100	6.6	6.7	1690	0.36	25		2.7		BROWN	CLEAR
21													
22	0.19	80	70	6.7	6.6					3.7		BROWN	CLEAR
23													
24	0.21	150	130	6.8	6.8					3.0		BROWN	CLEAR
25													
26													
27	0.00	150	140	6.6	6.7	1010	0.43	25		2.3		BROWN	CLEAR
28													

Comments

End of report

EVR860

TOMAGO ALUMINIUM COMPANY PTY. LIMITED (A.C.N. 001 862 228)
 ENVIRONMENT SYSTEM
 MATURATION POND AND IRRIGATION SYSTEM REPORT
 FOR FEBRUARY 2023

08:29:33 04-05-23 Page 1

EPA point 17

	Maturation Pond						Irrigation System		
	pH	Cond uS/cm	Fluoride mg/L	BOD Effl. mg/L	Suspend. Solids mg/L	E-Coli Count/ 100mL	Avg kL/day to sewer	Total kL Irrigated	mm/week Irrigated
1							8	1076	28
2								0	
3								744	
4								0	
5								0	
6						550		0	
7	7.6	870	4.8					1523	
8							418	852	21
9								0	
10								683	
11								0	
12								0	
13	7.6	820	4.6			1075		1540	
14								0	
15								395	18
16								0	
17				4	35			1397	
18								0	
19								0	
20	7.5	870	4.8			505		496	
21								0	
22							7	1263	21
23								0	
24								1236	
25								0	
26								0	
27	7.1	800	4.5			0		503	
28								0	
Total								11708.00	

BOD = Biological Oxygen Demand
 nra = No result available

End of report

TOMAGO ALUMINIUM COMPANY PTY. LIMITED (A.C.N. 001 862 228)
 ENVIRONMENT SYSTEM 08:32:11 04-05-23 Page 1
 SEWAGE TREATMENT WORKS MONITORING RESULTS
 FOR MARCH 2023

Day	S.P Hours	Settleable Solids ml		Pasveer pH	Effl. pH	MLSS Wkly. mg/l	Ammonia Wkly. mg/l	Nitrate Wkly. mg/l	Volat SS mg/l	D.O Effl. mg/l	BOD Effl. mg/l	Colour	Condition
		.5hr	1hr										
1	0.52	180	140	6.5	6.6					3.2		BROWN	CLEAR
2													
3	0.23	180	150	6.4	6.5					3.6		BROWN	CLEAR
4													
5													
6	0.28	180	140	6.6	6.7	1800	0.22	50	1505	4.2		BROWN	CLEAR
7													
8	0.21	170	140	6.6	6.8					3.8		BROWN	CLEAR
9													
10	0.21	180	150	6.5	6.7					3.1		BROWN	CLEAR
11													
12													
13	0.34	200	160	6.3	6.6	2180	2.54	25		2.0		BROWN	CLEAR
14													
15	0.23	200	150	6.5	6.6					2.8		BROWN	CLEAR
16	0.11	180	140	6.4	6.5					3.9		BROWN	CLEAR
17													
18													
19													
20	0.47	220	160	6.5	6.7	2090	0.74	25		4.1		BROWN	CLEAR
21													
22	0.24	200	150	6.4	6.5					4.8		BROWN	CLEAR
23													
24	0.28	180	150	6.6	6.6					3.6		BROWN	CLEAR
25													
26													
27	0.34	180	140	6.7	6.8	1625	0.32	25		2.7		BROWN	CLEAR
28													
29	0.28	180	150	6.6	6.8					3.4		BROWN	CLEAR
30													
31	0.29	200	160	6.5	6.7					3.6		BROWN	CLEAR

Comments

End of report

EVR860

TOMAGO ALUMINIUM COMPANY PTY. LIMITED (A.C.N. 001 862 228)
 ENVIRONMENT SYSTEM
 MATURATION POND AND IRRIGATION SYSTEM REPORT
 FOR MARCH 2023

08:29:34 04-05-23 Page 1

EPA point 17

	Maturation Pond						Irrigation System		
	pH	Cond uS/cm	Fluoride mg/L	BOD Effl. mg/L	Suspend. Solids mg/L	E-Coli Count/ 100mL	Avg kL/day to sewer	Total kL Irrigated	mm/week Irrigated
1							8	1161	20
2								0	
3								1310	
4								0	
5								0	
6	7.1	860	4.8			140		1099	
7								0	
8							7	989	23
9								0	
10								894	
11								0	
12								0	
13	7.0	890	5.0			340		1172	
14								0	
15							8	1347	23
16								544	
17								0	
18								0	
19								0	
20	7.0	860	4.8			570		764	
21								0	
22							8	1554	19
23								0	
24								1014	
25								0	
26								0	
27	6.8	800	4.3			20		1956	
28								0	
29							9	291	22
30								0	
31								1750	
Total								15845.00	

BOD = Biological Oxygen Demand
 nra = No result available

End of report

TOMAGO ALUMINIUM COMPANY PTY. LTD.
DRAIN TO HUNTER RIVER
MONITORING REPORT
Jan 2023 (Point 35)

DATE	pH Ave	Cond uS/cm Av.	SoL F mg/L Av.	PAH mg/L	TRH mg/L	FLOW (to Hunter River)		Rainfall mm
						L/sec Av.	kL/day Av.	
1-Jan	NF	NF	NF	NF	NF	0	0	0.0
2-Jan	NF	NF	NF	NF	NF	0	0	0.0
3-Jan	NF	NF	NF	NF	NF	0	0	0.0
4-Jan	NF	NF	NF	NF	NF	0	0	2.0
5-Jan	NF	NF	NF	NF	NF	0	0	5.5
6-Jan	6.1	270	50	NRA	NRA	112	9714	10.0
7-Jan	6.0	270	51	NR	NR	147	12683	14.0
8-Jan	5.9	270	60	NR	NR	24	2038	0.0
9-Jan	6.0	270	41	NR	NR	5	396	0.0
10-Jan	NF	NF	NF	NF	NF	0	0	0.0
11-Jan	NF	NF	NF	NF	NF	0	0	0.0
12-Jan	NF	NF	NF	NF	NF	0	0	0.0
13-Jan	NF	NF	NF	NF	NF	0	0	0.0
14-Jan	NF	NF	NF	NF	NF	0	0	0.0
15-Jan	NF	NF	NF	NF	NF	0	0	0.0
16-Jan	NF	NF	NF	NF	NF	0	0	0.0
17-Jan	NF	NF	NF	NF	NF	0	0	0.0
18-Jan	NF	NF	NF	NF	NF	0	0	0.0
19-Jan	NF	NF	NF	NF	NF	0	0	9.5
20-Jan	NF	NF	NF	NF	NF	0	0	2.5
21-Jan	NF	NF	NF	NF	NF	0	0	0.0
22-Jan	6.0	270	64	NR	NR	128	11020	10.5
23-Jan	5.9	270	65	0.0005	0.05	23	1954	0.0
24-Jan	NF	NF	NF	NF	NF	0	0	0.0
25-Jan	NF	NF	NF	NF	NF	0	0	0.0
26-Jan	NF	NF	NF	NF	NF	0	0	2.0
27-Jan	NF	NF	NF	NF	NF	0	0	0.5
28-Jan	NF	NF	NF	NF	NF	0	0	0.0
29-Jan	NF	NF	NF	NF	NF	0	0	3.0
30-Jan	5.9	380	73	NR	NR	116	10024	15.0
31-Jan	5.9	380	69	0.0005	0.05	53	4590	0.0
Monthly Av.	5.9	298	60	<0.001	<0.1	76	6552	74.5 (total)

NF = No Flow Over Weir
 NRA = No Result Available
 NR = Not Required

Indicates 1/2 LOR used
 Volume weighted average

Days of overflow

8

TOMAGO ALUMINIUM COMPANY PTY. LTD.
DRAIN TO HUNTER RIVER
MONITORING REPORT
Feb 2023 (Point 35)

DATE	pH Ave	Cond uS/cm Av.	SoL F mg/L Av.	PAH mg/L	TRH mg/L	FLOW (to Hunter River)		Rainfall mm
						L/sec Av.	kL/day Av.	
1-Feb	NF	NF	NF	NF	NF	0	0	0.0
2-Feb	NF	NF	NF	NF	NF	0	0	0.0
3-Feb	NF	NF	NF	NF	NF	0	0	0.0
4-Feb	NF	NF	NF	NF	NF	0	0	0.0
5-Feb	NF	NF	NF	NF	NF	0	0	0.0
6-Feb	NF	NF	NF	NF	NF	0	0	0.0
7-Feb	NF	NF	NF	NF	NF	0	0	0.0
8-Feb	NF	NF	NF	NF	NF	0	0	0.0
9-Feb	NF	NF	NF	NF	NF	0	0	0.0
10-Feb	NF	NF	NF	NF	NF	0	0	0.0
11-Feb	NF	NF	NF	NF	NF	0	0	0.0
12-Feb	NF	NF	NF	NF	NF	0	0	0.0
13-Feb	NF	NF	NF	NF	NF	0	0	0.0
14-Feb	NF	NF	NF	NF	NF	0	0	6.0
15-Feb	NF	NF	NF	NF	NF	0	0	0.0
16-Feb	NF	NF	NF	NF	NF	0	0	0.0
17-Feb	NF	NF	NF	NF	NF	0	0	0.0
18-Feb	NF	NF	NF	NF	NF	0	0	2.0
19-Feb	NF	NF	NF	NF	NF	0	0	0.5
20-Feb	NF	NF	NF	NF	NF	0	0	0.0
21-Feb	NF	NF	NF	NF	NF	0	0	0.0
22-Feb	5.9	260	39	0.0005	0.2	657	56788	81.5
23-Feb	5.8	260	26	NR	NR	31	2653	3.5
24-Feb	5.8	260	43	NR	NR	3	237	1.5
25-Feb	NF	NF	NF	NF	NF	0	0	0.0
26-Feb	NF	NF	NF	NF	NF	0	0	0.0
27-Feb	NF	NF	NF	NF	NF	0	0	0.0
28-Feb	NF	NF	NF	NF	NF	0	0	0.0
Monthly Av.	5.8	260	38	<0.001	0.2	230	19893	95.0 (total)

NF = No Flow Over Weir
 NRA = No Result Available
 NR = Not Required

Indicates 1/2 LOR used
 Volume weighted average

Days of overflow 3

TOMAGO ALUMINIUM COMPANY PTY. LTD.
DRAIN TO HUNTER RIVER
MONITORING REPORT
Mar 2023 (Point 35)

DATE	pH Ave	Cond uS/cm Av.	SoL F mg/L Av.	PAH mg/L	TRH mg/L	FLOW (to Hunter River)		Rainfall mm
						L/sec Av.	kL/day Av.	
1-Mar	6.3	320	53	NR	NR	0	2	0.0
2-Mar	6.3	320	56	NR	NR	0	11	0.0
3-Mar	6.4	320	48	NR	NR	0	26	0.0
4-Mar	6.4	320	50	NR	NR	0	22	2.5
5-Mar	6.4	320	54	NR	NR	0	10	0.0
6-Mar	6.3	320	56	NR	NR	0	7	0.0
7-Mar	6.3	400	55	NR	NR	0	3	0.0
8-Mar	6.4	400	54	NR	NR	0	5	0.0
9-Mar	6.4	400	52	NR	NR	0	8	0.0
10-Mar	6.4	400	49	NR	NR	0	5	0.0
11-Mar	6.4	400	54	NR	NR	0	2	0.0
12-Mar	NF	NF	NF	NF	NF	0	0	0.0
13-Mar	6.2	400	78	NR	NR	2	198	8.0
14-Mar	6.2	400	63	NR	NR	52	4486	16.5
15-Mar	6.2	400	57	0.0005	0.05	47	4088	0.0
16-Mar	6.1	400	62	NR	NR	7	616	0.0
17-Mar	NF	NF	NF	NF	NF	0	0	0.0
18-Mar	NF	NF	NF	NF	NF	0	0	0.0
19-Mar	NF	NF	NF	NF	NF	0	0	0.0
20-Mar	NF	NF	NF	NF	NF	0	0	0.5
21-Mar	NF	NF	NF	NF	NF	0	0	0.0
22-Mar	NF	NF	NF	NF	NF	0	0	0.0
23-Mar	6.8	250	48	NR	NR	88	7579	20.0
24-Mar	6.8	250	55	0.0005	0.1	24	2088	11.0
25-Mar	6.8	250	46	NR	NR	162	14035	9.0
26-Mar	6.9	250	53	NR	NR	17	1504	0.5
27-Mar	6.5	250	48	0.0005	0.05	175	15092	20.0
28-Mar	6.3	260	49	NR	NR	29	2491	4.5
29-Mar	6.3	260	56	NR	NR	24	2112	2.5
30-Mar	6.3	260	59	NR	NR	11	986	0.0
31-Mar	6.5	260	55	NR	NR	5	454	0.0
Monthly Av.	6.4	325	50	<0.001	<0.1	50	2326	95.0 (total)

NF = No Flow Over Weir
 NRA = No Result Available
 NR = Not Required

Indicates 1/2 LOR used
 Volume weighted average

Days of overflow 24

Q1 2023 Stormwater Discharge Data (EPA Point 16)

Discharge Date	pH	F (mg/L)	Cond. (uS/cm)	Suspended Solids (mg/L)	kL	PAH (mg/L)	TRH (mg/L)
23/02/2023	6.7	27	110	10	1694	NR	NR
24/02/2023	6.6	37	160	10	2935	<0.001	0.17

ENVIRONMENT SYSTEM
WATER AND VEGETATION MONITORING FOR MARCH 2023

PAGE: 1

RESULTS BY SAMPLING GROUP

500 - SURFACE WATER

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	001	Surface Water	PH	6.2	5.7	nra	nra	5.7									
		Surface Water	SOL F mg/L	4.27	7.63	nra	nra	7.63									
		Surface Water	COND uS/cm	337	57	nra	nra	57									
2	002	Surface Water	PH	6.1	nra	nra	nra	nra									
		Surface Water	SOL F mg/L	0.99	nra	nra	nra	nra									
		Surface Water	COND uS/cm	290	nra	nra	nra	nra									
3	003	Surface Water	PH	5.5	5.0	5.0	nra	nra									
		Surface Water	SOL F mg/L	1.44	0.57	0.57	nra	nra									
		Surface Water	COND uS/cm	236	97	97	nra	nra									
4	004	Surface Water	PH	6.7	6.4	nra	nra	6.4									
		Surface Water	SOL F mg/L	2.86	3.53	nra	nra	3.53									
		Surface Water	COND uS/cm	289	3800	nra	nra	3800									
5	005	Surface Water	PH	7.5	8.1	8.0	8.0	8.2									
		Surface Water	SOL F mg/L	0.54	0.75	1.21	0.63	0.42									
		Surface Water	COND uS/cm	4362	20033	28000	21000	11100									
6	006	Surface Water	PH	7.6	8.2	8.2	8.3	8.1									
		Surface Water	SOL F mg/L	0.36	0.58	0.84	0.48	0.41									
		Surface Water	COND uS/cm	2029	15033	18000	15900	11200									
7	007	Surface Water	PH	6.9	7.5	7.2	7.5	7.7									
		Surface Water	SOL F mg/L	1.03	1.30	1.49	1.21	1.19									
		Surface Water	COND uS/cm	538	477	620	360	450									
8	009	Surface Water	PH	4.8	5.1	4.8	5.3	5.1									
		Surface Water	SOL F mg/L	0.23	0.22	0.37	0.14	0.14									
		Surface Water	COND uS/cm	155	157	160	160	150									
9	011	Surface Water	PH	6.5	6.7	6.5	6.9	6.8									
		Surface Water	SOL F mg/L	0.41	0.39	0.57	0.33	0.26									
		Surface Water	COND uS/cm	229	377	270	520	340									
10	017	Surface Water	PH	7.2	6.5	q	6.5	q									
		Surface Water	SOL F mg/L	0.21	0.12	q	0.12	q									
		Surface Water	COND uS/cm	233	210	q	210	q									
11	034	Surface Water	PH	7.5	7.0	nra	6.9	7.0									
		Surface Water	SOL F mg/L	0.29	0.10	nra	0.10	0.10									
		Surface Water	COND uS/cm	309	320	nra	330	310									
12	178	Surface Water	PH	8.3	9.3	9.3	9.2	nra									
		Surface Water	SOL F mg/L	0.77	1.15	1.29	1.01	nra									
		Surface Water	COND uS/cm	190	150	150	150	nra									

nra = No Result Available

tba = To Be Analysed

c = Result Being Checked

q = Samples collected quarterly

ALY = Average Last Year

AYTD = Average Year To Date

ENVIRONMENT SYSTEM
BORE WATER REPORTING FOR 2023

PAGE: 1

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	054	DEPTH 6M	PH	4.9	nra	s	s	s									
		DEPTH 6M	COND US/CM	131.5	nra	s	s	s									
		DEPTH 6M	SOL F MG/L	0.05	nra	s	s	s									
		DEPTH 10M	PH	5.0	nra	s	s	s									
		DEPTH 10M	COND US/CM	128.5	nra	s	s	s									
		DEPTH 10M	SOL F MG/L	0.05	nra	s	s	s									
		DEPTH 14M	PH	5.0	nra	s	s	s									
		DEPTH 14M	COND US/CM	129.5	nra	s	s	s									
		DEPTH 14M	SOL F MG/L	0.05	nra	s	s	s									
2	055	DEPTH 7M	PH	6.0	nra	s	s	s									
		DEPTH 7M	COND US/CM	725.0	nra	s	s	s									
		DEPTH 7M	SOL F MG/L	0.05	nra	s	s	s									
3	056	DEPTH 6M	PH	5.2	nra	s	s	s									
		DEPTH 6M	COND US/CM	74.0	nra	s	s	s									
		DEPTH 6M	SOL F MG/L	0.05	nra	s	s	s									
4	057	DEPTH 7M	PH	6.4	nra	s	s	s									
		DEPTH 7M	COND US/CM	280.0	nra	s	s	s									
		DEPTH 7M	SOL F MG/L	0.05	nra	s	s	s									
5	062	DEPTH 6M	PH	5.7	5.7	5.6	5.7	s									
		DEPTH 6M	COND US/CM	474.8	291.0	299.0	283.0	s									
		DEPTH 6M	SOL F MG/L	0.13	0.05	0.05	0.05	s									
6	063	DEPTH 5M	PH	4.9	4.8	4.8	4.8	s									
		DEPTH 5M	COND US/CM	150.5	132.0	129.0	135.0	s									
		DEPTH 5M	SOL F MG/L	0.86	0.95	0.90	1.00	s									
		DEPTH 10M	PH	5.0	4.7	4.7	4.7	s									
		DEPTH 10M	COND US/CM	151.5	132.0	129.0	135.0	s									
		DEPTH 10M	SOL F MG/L	0.78	0.95	0.90	1.00	s									

nra = No Result Available

tba = To Be Analysed

c = Result Being Checked

s = Samples collected six-monthly

ALY = Average Last Year

AYTD = Average Year To Date

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	254	REDUCED LEVEL TOP OF PIPE 7.29m															
		REDUCED LVL GROUNDWATER m		4.5	4.21	4.22	4.23	4.19									
		DEPTH TOP	PH	5.2	5.3	5.3	5.3	5.4									
		DEPTH TOP	COND US/CM	100.4	91.3	92	86	96									
		DEPTH TOP	SOL F mg/L	9.63	8.32	8.97	7.48	8.52									
2	255	REDUCED LEVEL TOP OF PIPE 7.36m															
		REDUCED LVL GROUNDWATER m		4.3	3.96	4.01	4.06	3.80									
		DEPTH TOP	PH	5.4	5.3	5.2	5.4	5.2									
		DEPTH TOP	COND US/CM	301.6	310.7	302	308	322									
		DEPTH TOP	SOL F mg/L	4.98	5.40	5.09	5.14	5.98									
3	256	REDUCED LEVEL TOP OF PIPE 5.82m															
		REDUCED LVL GROUNDWATER m		4.0	3.79	3.72	3.87	3.78									
		DEPTH TOP	PH	6.1	6.1	5.9	6.3	6.0									
		DEPTH TOP	COND US/CM	493.6	557.0	532	532	607									
		DEPTH TOP	SOL F mg/L	4.28	4.46	4.79	4.14	4.44									
4	258	REDUCED LEVEL TOP OF PIPE 4.04m															
		REDUCED LVL GROUNDWATER m		2.5	2.38	2.17	2.48	2.48									
		DEPTH TOP	PH	5.8	5.6	5.4	5.6	5.7									
		DEPTH TOP	COND US/CM	234.8	351.7	302	357	396									
		DEPTH TOP	SOL F mg/L	4.67	6.60	6.13	6.53	7.13									
5	259	REDUCED LEVEL TOP OF PIPE 4.44m															
		REDUCED LVL GROUNDWATER m		2.4	2.33	2.26	2.36	2.38									
		DEPTH TOP	PH	5.3	5.2	5.2	5.2	5.3									
		DEPTH TOP	COND US/CM	468.1	388.0	445	394	325									
		DEPTH TOP	SOL F mg/L	0.12	0.16	0.16	<0.10	0.22									
6	260	REDUCED LEVEL TOP OF PIPE 4.25m															
		REDUCED LVL GROUNDWATER m		2.3	2.20	2.15	2.24	2.22									
		DEPTH TOP	PH	5.6	5.6	5.6	5.7	5.6									
		DEPTH TOP	COND US/CM	655.6	711.7	734	737	664									
		DEPTH TOP	SOL F mg/L	17.17	15.97	18.1	14.9	14.9									
7	261	REDUCED LEVEL TOP OF PIPE 5.22m															
		REDUCED LVL GROUNDWATER m		2.9	2.82	2.72	2.92	2.82									
		DEPTH TOP	PH	5.8	6.0	6.4	5.9	5.6									
		DEPTH TOP	COND US/CM	408.8	300.0	314	299	287									
		DEPTH TOP	SOL F mg/L	1.56	1.62	1.61	1.42	1.82									
8	262	REDUCED LEVEL TOP OF PIPE 3.20m															
		REDUCED LVL GROUNDWATER m		2.5	2.41	2.37	2.48	2.37									
		DEPTH TOP	PH	6.3	6.3	6.4	6.3	6.3									
		DEPTH TOP	COND US/CM	275.7	272.0	271	275	270									
		DEPTH TOP	SOL F mg/L	50.78	50.43	55.5	47.3	48.5									

nra = No Result Available

Reduced Level = Level Relative to Australian Height Datum

tba = To Be Analysed

Pipe = P.V.C. Pipe in Borehole

c = Result Being Checked

ALY = Average Last Year

AYTD = Average Year To Date

N.B. Reduced Level Groundwater correct to 0.1 prior to June 1985

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
9	263	REDUCED LEVEL TOP OF PIPE 4.08m															
		REDUCED LVL GROUNDWATER m		2.3	2.22	2.13	2.36	2.17									
		DEPTH TOP	PH	6.1	6.1	5.9	6.2	6.1									
		DEPTH TOP	COND US/CM	398.8	293.3	352	265	263									
		DEPTH TOP	SOL F mg/L	40.39	39.53	40.1	34.5	44.0									
10	264	REDUCED LEVEL TOP OF PIPE 6.40m															
		REDUCED LVL GROUNDWATER m		3.3	3.12	3.10	3.17	3.10									
		DEPTH TOP	PH	5.7	5.5	5.7	5.5	5.4									
		DEPTH TOP	COND US/CM	279.5	275.3	283	287	256									
		DEPTH TOP	SOL F mg/L	0.52	0.24	0.26	0.20	0.26									
11	266	REDUCED LEVEL TOP OF PIPE 6.85m															
		REDUCED LVL GROUNDWATER m		4.5	4.40	q	4.40	q									
		DEPTH TOP	PH	5.6	5.7	q	5.7	q									
		DEPTH TOP	COND US/CM	290.0	264.0	q	264	q									
		DEPTH TOP	SOL F mg/L	0.24	0.10	q	<0.10	q									
12	268	REDUCED LEVEL TOP OF PIPE 7.44m															
		REDUCED LVL GROUNDWATER m		5.5	5.12	5.03	5.18	5.16									
		DEPTH TOP	PH	6.6	6.6	6.6	6.6	6.5									
		DEPTH TOP	COND US/CM	532.8	586.3	540	595	624									
		DEPTH TOP	SOL F mg/L	9.50	10.93	12.1	10.6	10.1									

nra = No Result Available

Reduced Level = Level Relative to Australian Height Datum

tba = To Be Analysed

Pipe = P.V.C. Pipe in Borehole

c = Result Being Checked

ALY = Average Last Year

AYTD = Average Year To Date

N.B. Reduced Level Groundwater correct to 0.1 prior to June 1985

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2	218	REDUCED LEVEL TOP OF PIPE 6.57m															
		REDUCED LVL GROUNDWATER m		4.0	3.85	3.85	3.88	3.82									
		PH		5.6	5.3	5.1	5.6	5.3									
		COND US/CM		422.9	387.0	275.0	295.0	591.0									
		SOL F mg/L		0.17	0.13	0.17	0.10	0.11									
3	219	REDUCED LEVEL TOP OF PIPE 6.75m															
		REDUCED LVL GROUNDWATER m		5.9	5.62	5.64	5.49	5.73									
		PH		4.4	4.1	3.8	4.3	4.2									
		COND US/CM		192.4	200.7	206.0	190.0	206.0									
		SOL F mg/L		0.71	0.27	0.32	0.19	0.29									
4	220	REDUCED LEVEL TOP OF PIPE 7.03m															
		REDUCED LVL GROUNDWATER m		5.7	5.46	5.46	5.36	5.56									
		PH		5.0	4.7	4.4	5.0	4.6									
		COND US/CM		178.0	153.0	156.0	148.0	155.0									
		SOL F mg/L		3.19	3.44	3.69	3.19	3.44									
5	221	REDUCED LEVEL TOP OF PIPE 8.73m															
		REDUCED LVL GROUNDWATER m		6.1	6.01	6.02	5.97	6.04									
		PH		5.1	4.8	4.5	5.2	4.8									
		COND US/CM		177.5	158.3	155.0	160.0	160.0									
		SOL F mg/L		7.62	7.15	6.73	8.13	6.58									
6	224	REDUCED LEVEL TOP OF PIPE 9.54m															
		REDUCED LVL GROUNDWATER m		5.3	5.07	q	5.07	q									
		PH		5.7	6.0	q	6.0	q									
		COND US/CM		275.5	309.0	q	309.0	q									
		SOL F mg/L		8.02	3.69	q	3.69	q									
7	227	REDUCED LEVEL TOP OF PIPE 9.88m															
		REDUCED LVL GROUNDWATER m		5.5	5.43	q	5.43	q									
		PH		5.7	5.7	q	5.7	q									
		COND US/CM		614.5	551.0	q	551.0	q									
		SOL F mg/L		1.20	0.72	q	0.72	q									
8	228	REDUCED LEVEL TOP OF PIPE 10.09m															
		REDUCED LVL GROUNDWATER m		5.1	5.04	q	5.04	q									
		PH		5.8	5.8	q	5.8	q									
		COND US/CM		290.0	248.0	q	248.0	q									
		SOL F mg/L		7.65	5.78	q	5.78	q									

nra = No Result Available

Reduced Level = Level Relative to Australian Height Datum

tba = To Be Analysed

Pipe = P.V.C. Pipe in Borehole

c = Result Being Checked

ALY = Average Last Year

AYTD = Average Year To Date

N.B. Reduced Level Groundwater correct to 0.1 prior to June 1985

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
9	230	REDUCED LEVEL TOP OF PIPE 10.14m															
		REDUCED LVL GROUNDWATER m		5.3	5.26	q	5.26	q									
		PH		6.0	5.8	q	5.8	q									
		COND US/CM		338.0	318.0	q	318.0	q									
		SOL F mg/L		3.66	2.19	q	2.19	q									
10	231	REDUCED LEVEL TOP OF PIPE 9.53m															
		REDUCED LVL GROUNDWATER m		4.8	4.63	q	4.63	q									
		PH		5.8	5.7	q	5.7	q									
		COND US/CM		393.3	375.0	q	375.0	q									
		SOL F mg/L		11.52	12.60	q	12.60	q									
11	233	REDUCED LEVEL TOP OF PIPE 9.22m															
		REDUCED LVL GROUNDWATER m		4.7	4.53	q	4.53	q									
		PH		5.9	5.8	q	5.8	q									
		COND US/CM		430.5	448.0	q	448.0	q									
		SOL F mg/L		41.98	22.40	q	22.40	q									
12	234	REDUCED LEVEL TOP OF PIPE 7.60m															
		REDUCED LVL GROUNDWATER m		4.6	4.48	q	4.48	q									
		PH		5.7	5.6	q	5.6	q									
		COND US/CM		291.5	246.0	q	246.0	q									
		SOL F mg/L		3.58	1.33	q	1.33	q									
13	236	REDUCED LEVEL TOP OF PIPE 9.05m															
		REDUCED LVL GROUNDWATER m		5.6	5.39	5.41	5.41	5.36									
		PH		5.6	5.6	5.5	5.8	5.4									
		COND US/CM		191.8	168.3	175.0	154.0	176.0									
		SOL F mg/L		7.48	4.96	5.29	4.79	4.79									
14	237	REDUCED LEVEL TOP OF PIPE 7.94m															
		REDUCED LVL GROUNDWATER m		5.3	4.76	4.94	4.75	4.60									
		PH		5.7	5.6	5.5	5.9	5.5									
		COND US/CM		260.8	251.0	264.0	234.0	255.0									
		SOL F mg/L		0.23	0.25	0.30	0.21	0.24									
15	238	REDUCED LEVEL TOP OF PIPE 6.54m															
		REDUCED LVL GROUNDWATER m		5.1	4.71	4.79	4.71	4.64									
		PH		5.5	5.0	5.1	5.4	4.6									
		COND US/CM		426.6	270.0	285.0	280.0	245.0									
		SOL F mg/L		4.35	3.28	4.74	2.84	2.26									

nra = No Result Available

Reduced Level = Level Relative to Australian Height Datum

tba = To Be Analysed

Pipe = P.V.C. Pipe in Borehole

c = Result Being Checked

ALY = Average Last Year

AYTD = Average Year To Date

N.B. Reduced Level Groundwater correct to 0.1 prior to June 1985

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
24	269	REDUCED LEVEL TOP OF PIPE 7.285m															
		REDUCED LVL GROUNDWATER m		5.4	5.02	4.91	5.04	5.11									
		PH		6.2	6.1	6.1	6.3	6.0									
		COND US/CM		587.0	580.7	498.0	468.0	776.0									
		SOL F mg/L		4.69	6.73	7.73	6.98	5.48									
25	272	REDUCED LEVEL TOP OF PIPE 6.910m															
		REDUCED LVL GROUNDWATER m		5.4	5.04	4.96	5.00	5.16									
		PH		5.6	5.7	5.7	5.8	5.5									
		COND US/CM		369.8	434.7	402.0	433.0	469.0									
		SOL F mg/L		9.60	8.30	8.03	10.40	6.48									
26	274	REDUCED LEVEL TOP OF PIPE 6.785m															
		REDUCED LVL GROUNDWATER m		5.0	4.66	4.49	4.76	4.73									
		PH		6.2	6.5	6.4	6.7	6.5									
		COND US/CM		559.5	410.7	422.0	423.0	387.0									
		SOL F mg/L		1.00	1.50	1.65	1.52	1.34									
27	276	REDUCED LEVEL TOP OF PIPE 6.272m															
		REDUCED LVL GROUNDWATER m		4.5	4.20	4.08	4.30	4.21									
		PH		6.1	6.3	6.2	6.4	6.3									
		COND US/CM		438.3	426.0	426.0	481.0	371.0									
		SOL F mg/L		1.30	1.83	1.48	1.29	2.72									
28	279	REDUCED LEVEL TOP OF PIPE 8.46m															
		REDUCED LVL GROUNDWATER m		5.5	5.19	5.29	5.21	5.07									
		PH		6.8	6.8	6.8	6.9	6.7									
		COND US/CM		1245	1218	1371	1205	1078									
		SOL F mg/L		57.95	57.60	73.80	50.10	48.90									
29	280	REDUCED LEVEL TOP OF PIPE 7.89m															
		REDUCED LVL GROUNDWATER m		5.4	5.19	5.11	5.08	5.39									
		PH		6.7	6.2	6.7	6.6	5.2									
		COND US/CM		363.1	832.7	653.0	714.0	1131									
		SOL F mg/L		14.83	16.33	20.80	12.20	16.00									
30	305	REDUCED LEVEL TOP OF PIPE 8.94m															
		REDUCED LVL GROUNDWATER m		5.6	5.40	q	5.40	q									
		PH		5.5	5.9	q	5.9	q									
		COND US/CM		250.3	210.0	q	210.0	q									
		SOL F mg/L		5.46	3.84	q	3.84	q									

nra = No Result Available

Reduced Level = Level Relative to Australian Height Datum

tba = To Be Analysed

Pipe = P.V.C. Pipe in Borehole

c = Result Being Checked

ALY = Average Last Year

AYTD = Average Year To Date

N.B. Reduced Level Groundwater correct to 0.1 prior to June 1985

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
31	306	REDUCED LEVEL TOP OF PIPE	9.27m														
		REDUCED LVL GROUNDWATER	m	5.4	5.36	q	5.36	q									
			PH	5.7	5.8	q	5.8	q									
			COND US/CM	264.5	285.0	q	285.0	q									
			SOL F mg/L	11.98	9.67	q	9.67	q									
32	309	REDUCED LEVEL TOP OF PIPE	5.07m														
		REDUCED LVL GROUNDWATER	m	2.6	2.82	3.27	2.58	2.60									
			PH	5.2	5.4	5.4	5.5	5.4									
			COND US/CM	136.8	83.7	79.0	84.0	88.0									
			SOL F mg/L	5.33	4.21	4.49	3.79	4.34									
33	310	REDUCED LEVEL TOP OF PIPE	7.42m														
		REDUCED LVL GROUNDWATER	m	5.3	5.00	4.90	4.88	5.22									
			PH	4.6	4.4	4.3	4.5	4.3									
			COND US/CM	6504	2182	1551	3620	1375									
			SOL F mg/L	0.53	0.50	0.70	0.16	0.65									
34	311	REDUCED LEVEL TOP OF PIPE	7.69m														
		REDUCED LVL GROUNDWATER	m	4.9	4.56	4.58	4.60	4.51									
			PH	5.6	5.3	5.2	5.5	5.1									
			COND US/CM	145.2	132.3	138.0	141.0	118.0									
			SOL F mg/L	15.98	21.50	24.50	22.40	17.60									
35	312	REDUCED LEVEL TOP OF PIPE	4.42m														
		REDUCED LVL GROUNDWATER	m	3.3	3.24	3.02	3.45	3.25									
			PH	6.0	5.7	5.5	5.9	5.8									
			COND US/CM	291.4	446.7	344.0	725.0	271.0									
			SOL F mg/L	9.45	14.20	18.10	13.60	10.90									
36	313	REDUCED LEVEL TOP OF PIPE	3.29m														
		REDUCED LVL GROUNDWATER	m	1.5	1.68	1.41	2.13	1.51									
			PH	5.6	5.7	5.6	6.0	5.6									
			COND US/CM	272.8	266.3	270.0	264.0	265.0									
			SOL F mg/L	0.13	0.15	0.23	0.10	0.12									
37	314	REDUCED LEVEL TOP OF PIPE	3.18m														
		REDUCED LVL GROUNDWATER	m	1.2	0.95	0.46	1.21	1.18									
			PH	6.4	6.5	6.3	6.5	6.7									
			COND US/CM	216.9	289.7	341.0	332.0	196.0									
			SOL F mg/L	0.58	0.66	0.60	0.51	0.87									
38	315	REDUCED LEVEL TOP OF PIPE	4.98m														
		REDUCED LVL GROUNDWATER	m	1.5	1.38	1.26	1.44	1.43									
			PH	5.6	5.5	5.4	5.7	5.5									
			COND US/CM	203.8	310.0	301.0	286.0	343.0									
			SOL F mg/L	0.12	0.12	0.15	0.10	0.10									

				BORE WATER REPORTING FOR 2023													
#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
39	316	REDUCED LEVEL TOP OF PIPE 7.64m															
		REDUCED LVL GROUNDWATER m		5.7	5.34	5.37	5.29	5.35									
		PH		5.3	5.4	5.4	5.5	5.2									
		COND US/CM		756.1	831.3	758.0	851.0	885.0									
		SOL F mg/L		0.12	0.10	0.10	0.10	0.10									

nra = No Result Available
tba = To Be Analysed
c = Result Being Checked
ALY = Average Last Year
N.B. Reduced Level Groundwater correct to 0.1 prior to June 1985

Reduced Level = Level Relative to Australian Height Datum
Pipe = P.V.C. Pipe in Borehole

AYTD = Average Year To Date

*** END OF WATER AND VEGETATION BY GROUP REPORT ***

APPENDIX 7 –

SAMPLING PROCEDURES

The following procedures have been used by Tomago Aluminium for the sampling and/or analysis data contained in this report:

Stack Fluoride	ES.ESM.0001 LMM0006, LMM0026
Roof Vent Fluoride	ES.ESM.0002 LMM0034, LMM0026
Stack Sulfur Dioxide	ES.ESM.0011 LMM0105
Continuous stack gaseous fluoride	ES.ESM.0024
Ambient Fluoride	ES.ESM.0004 LMM0033
Stormwater monitoring	ES.ESM.0009, ES.ESM.0019 LMM0124, LMM0116, LMM0043, LMM0121
**Sewerage	ES.ESM.0021 LMM0132, LMM0043, LMM0116, LMM0124
Vegetation	ES.ESM.0010 LMM0010
Groundwater	ES.ESM.0014 LMM0116, LMM0096
Surface Water	ES.ESM.0008 LMM0116, LMM0096
***Meteorological monitoring	ES.ESM.0023
Ambient Sulfur Dioxide	ES.ESM.0031

NATA Accreditation No. 1904

**NATA accreditation does not cover the performance of the following services contained in this method:

- Ammonia
- Nitrate
- Dissolved Oxygen
- E.coli

*** NATA accreditation does not cover the performance of this service

APPENDIX 8 -

CUSTOMER FEEDBACK FORM

Customer Feedback Survey

Receiving regular feedback from our customers is important to us. It helps us understand if our environmental reporting is presented in a meaningful and clear manner.

Name.....

Organisation.....

Report this feedback relates to.....

Does this report contain all the information required?

.....

.....

.....

Is the report format logical and easy to follow?

.....

.....

.....

Any other comments and / or suggestions?

.....

.....

.....

Please complete the form and either fax to Environment Services Department on 0249 669100 or email robyn.parker@tomago.com.au

APPENDIX 9 -

ECOSYSTEM REPORT 2022

ECOSYSTEM MONITORING AROUND THE TOMAGO SMELTER 2022

1. INTRODUCTION

An ecosystem monitoring program is conducted by Tomago Aluminium Company in accordance with the conditions set out in Licence No. 6163 under the Protection of the Environment Operations Act, 1997. This report details the results for 2022 and focuses on the impact of fluoride emissions on a dry sclerophyll community.

Any further enquiries should be directed to Ms Robyn Parker (robyn.parker@tomago.com.au) in the first instance.

2. BACKGROUND

Ecological monitoring has been conducted around the smelter site since May 1982, 15 months prior to smelter start-up. The original program involved monitoring nine sites that contained major communities near the smelter. After 3 years of monitoring it was recommended that the program focus on the cycling of fluoride through a dry sclerophyll community. By developing an understanding of the cycling of fluoride within the community an assessment of the impact of atmospheric fluoride emissions can be made. The program currently attempts to trace the pathway of fluoride emissions from their initial release point through the various structural layers of the dry sclerophyll community and to detect any changes in the structure or composition of the community.

3. METHODOLOGY

The program involves the monthly sampling of four sites (213, 214, 215 & 216) that are situated at varying distances from the smelter (see Figure 1). It should be noted that Site 215 is directly behind the perimeter fence on the Northern side of the smelter, approximately 100 metres from the nearest potline. At these sites the various structural layers are sampled to determine the concentration of fluoride. The layers and species sampled in each layer are:

Overstorey	<i>Angophora costata</i>
Understorey	<i>Leptospermum floescens</i> , <i>Banksia serrata</i> , <i>Persoonia levis</i>
Groundcover	<i>Pteridium esculantum</i> , <i>Dianella caerulea</i>
Leaf litter	Divided into leaf litter and miscellaneous litter including twigs, seeds, buds and bark.
Soil	From the soil horizon below the litter and humic layer

It should also be noted that not all species are available at Site 215.

Litter boxes are also maintained at each site enabling annual litter fall data to be calculated.

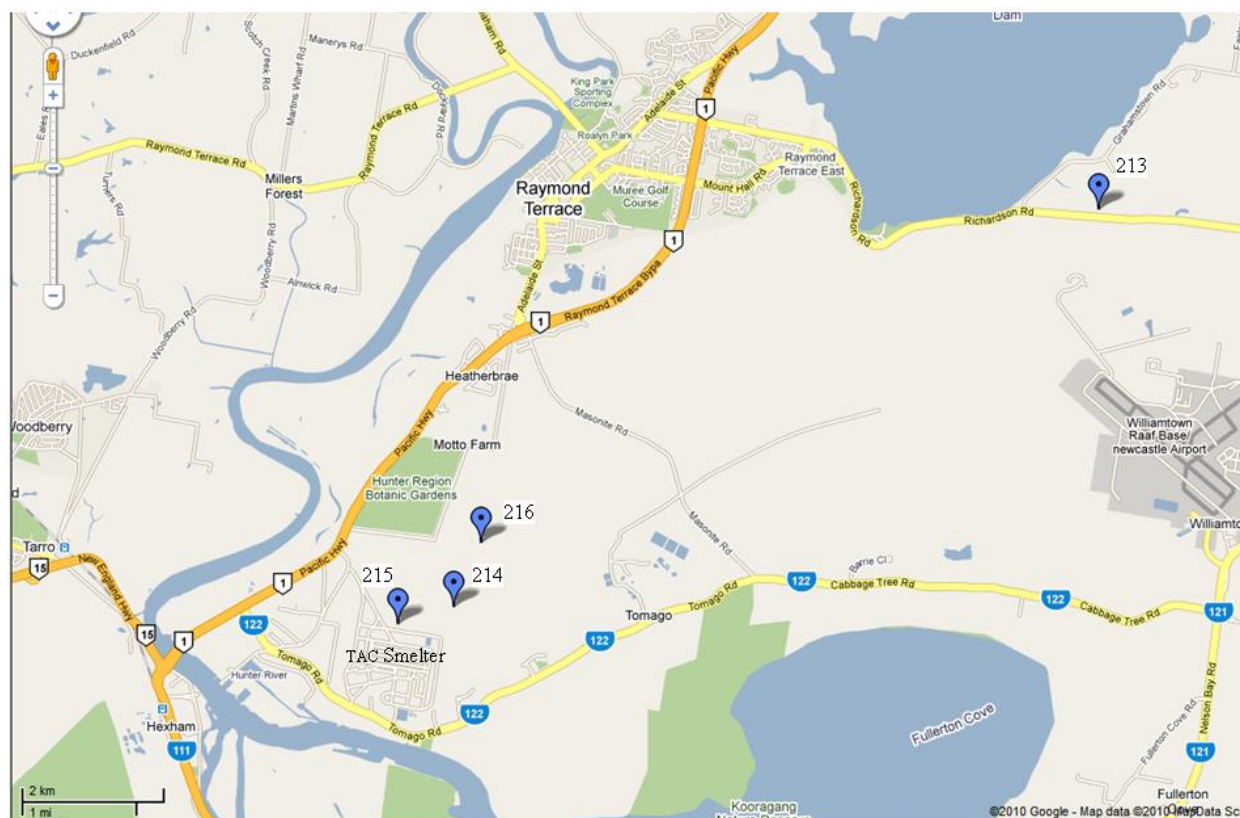


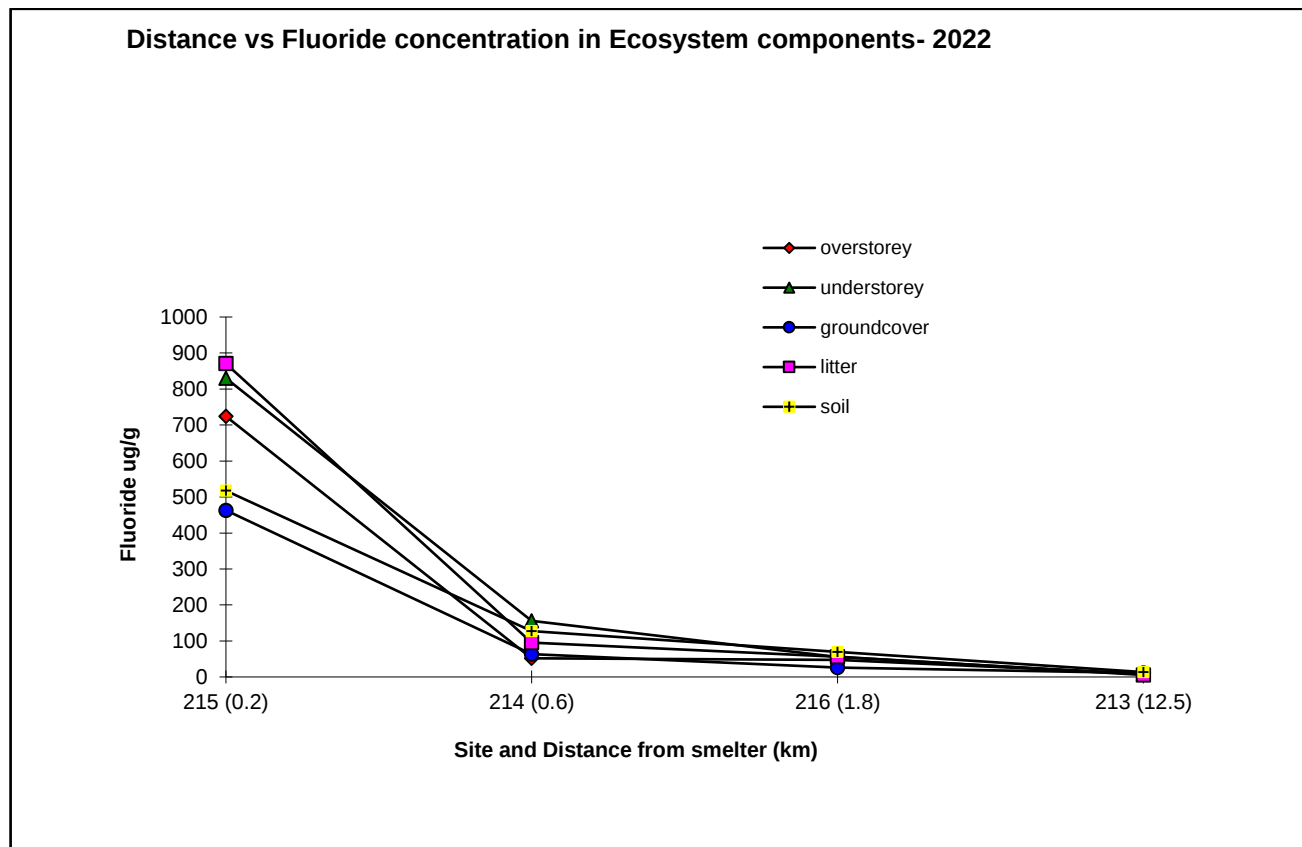
Figure-1 Monitoring Sites.

4. RESULTS

1. FLUORIDE CONCENTRATIONS

i) Distance Vs Fluoride Concentration in Ecosystem

The following graph displays the annual average fluoride concentrations of various ecosystem components as a function of distance from the smelter.

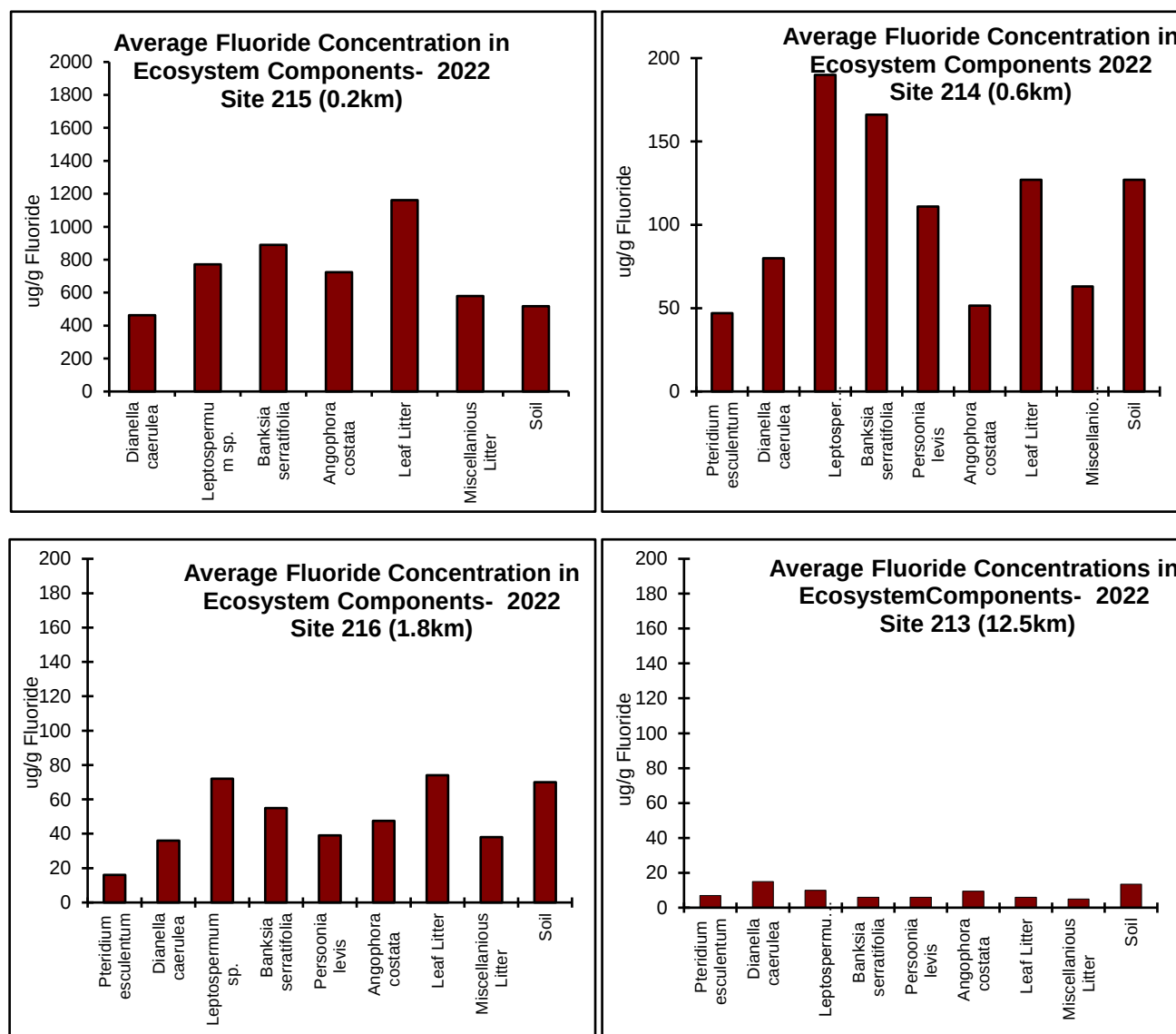


Graph 1

The results highlight that foliar fluoride concentration in the sclerophyll communities around the smelter decreases rapidly with distance from the point source. At site 214 (0.6 km) fluoride concentrations are significantly lower (between 4 and 14 times) than at site 215 (0.2 km), and fluoride concentration levels in vegetation at site 216 (1.8km) are only marginally higher than the background site 213 (12.5km).

ii) Fluoride Concentrations within the Ecosystem

The following graphs display the annual average fluoride concentrations in various species and components found within the dry sclerophyll forest sites sampled during 2022. Fluoride concentrations are found to vary through the vegetation layers with by far the greater concentration found in all components at the site closest to the smelter.

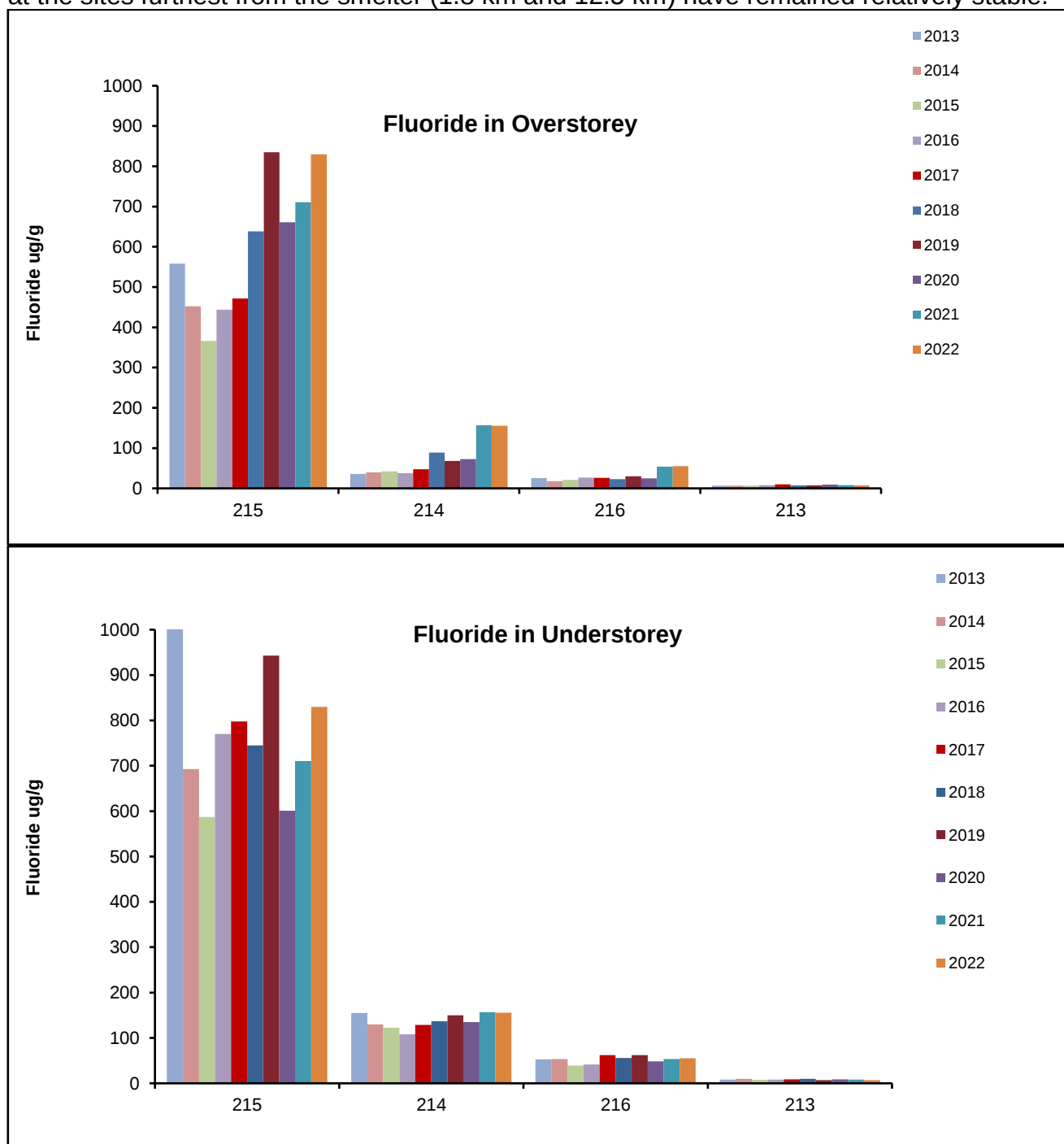


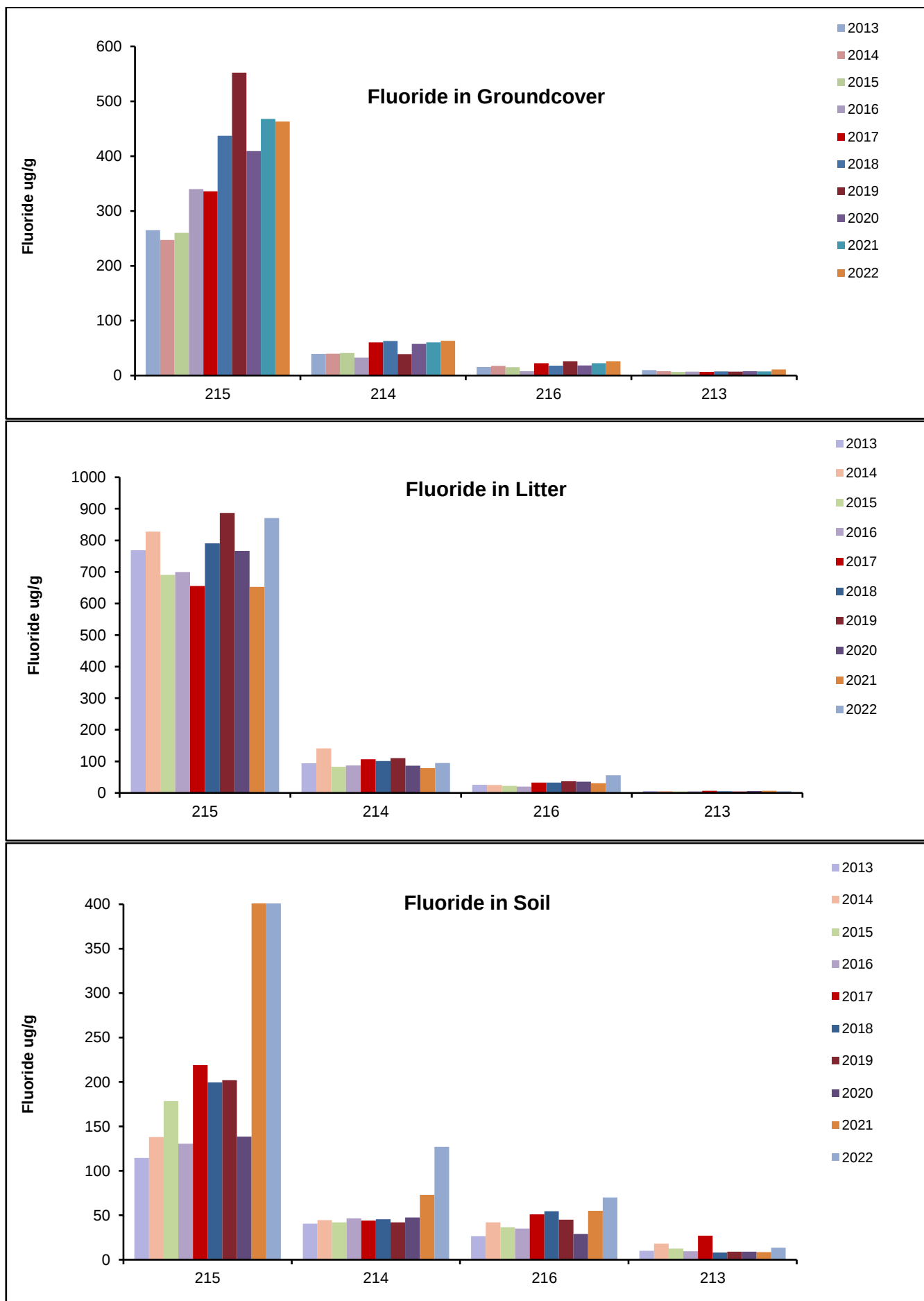
Graph 2 (Please note scale change for Site 215 graph)

iii) Comparison of Fluoride Concentrations for last 10 years

The following graphs display the annual average fluoride concentrations of the various dry sclerophyll layers at each site since 2013. The species are divided into overstorey (*Angophora costata*), understorey (*Banksia serratifolia*, *Persoonia levis* and *Leptospermum*), groundcover (*Pteridium esculentum*, *Dianella caerulea*), litter (leaf and miscellaneous) and soil.

Overstorey concentrations have increased at sites 214, 215 and 216 in 2021 and 2022, however this is not reflected in the other layers. Soil concentrations have spiked in 2021 and 2022 at the closest sites to the smelter. This may be due to a sampling anomaly. Other layers at the sites furthest from the smelter (1.8 km and 12.5 km) have remained relatively stable.



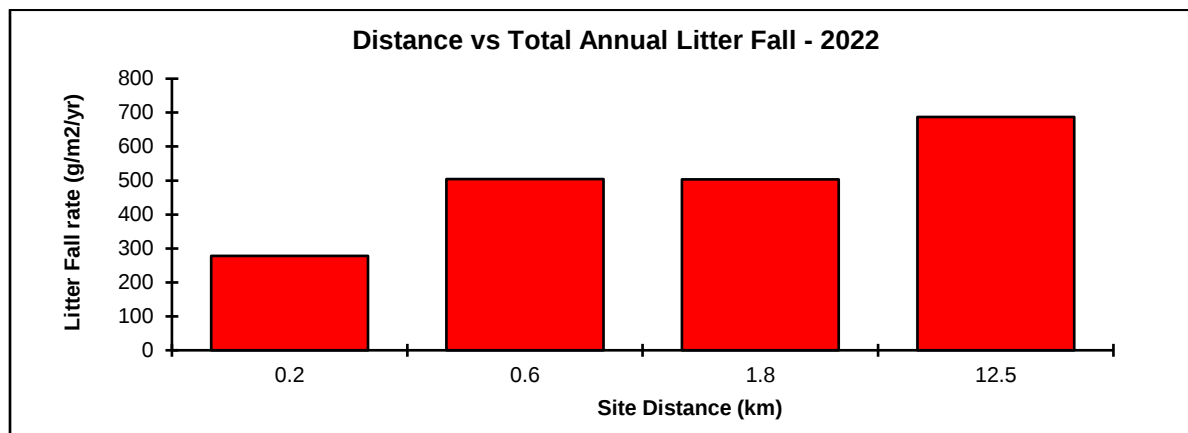


Graph 3 – Comparison of fluoride levels over time

2. LITTERFALL RATES

i) Litterfall vs Distance from Smelter

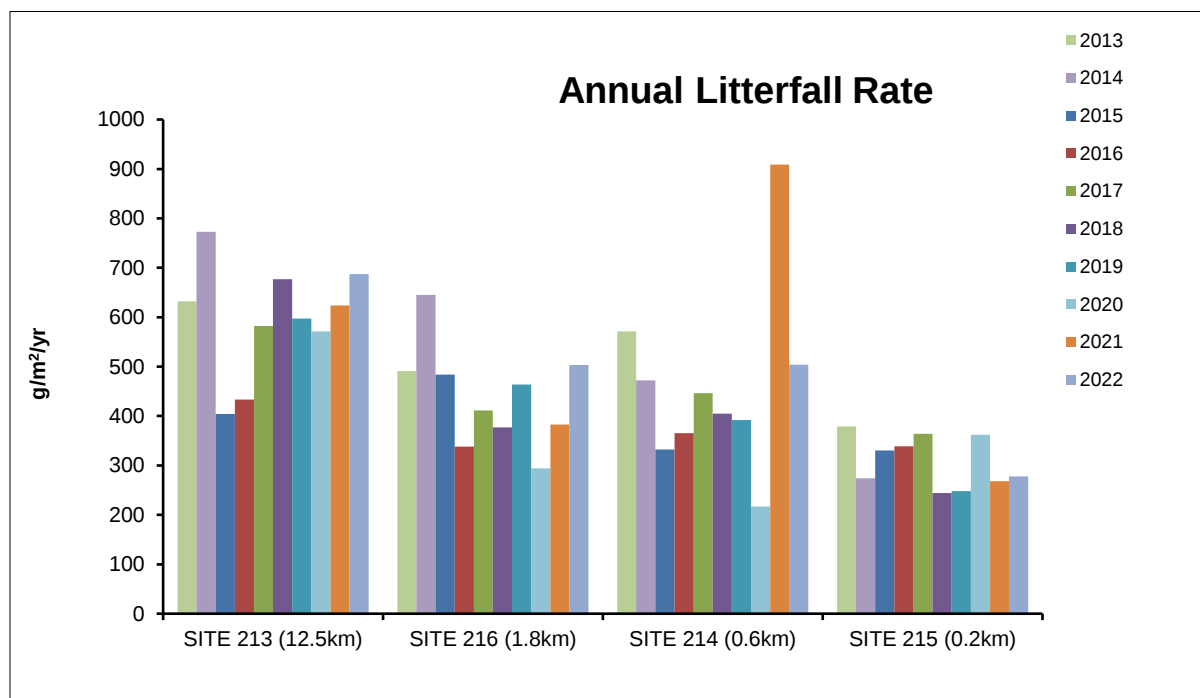
The following graph presents the total annual litterfall rates for the sites sampled during 2022.



Graph 4

ii) Annual Litter Fall Rates 2013 – 2022

The following graph presents the annual litterfall at the sites since 2013.



Graph 5

Litterfall rates for 2022 have maintained the general pattern of previous years, where generally increased litterfall rate coincides with increased distance from the smelter. The sites closer to the smelter generally have steady litterfall rates over time, maintaining the general pattern of previous years.

5. DISCUSSION

5.1 Distance Vs Fluoride Concentration in Vegetation

The concentration of a gaseous pollutant at a particular location will depend upon the source concentrations, the direction from the source, atmospheric stability, wind direction and speed. These conditions are subject to considerable variation. By measuring the level of foliar fluoride concentrations it is possible to assess the impact of the ambient concentrations of fluoride over a period of time. The results from this monitoring program highlight that foliar concentrations decrease rapidly with distance from the smelter (Graph 1).

Vegetation species' response to fluoride in air pollution may be assessed in several ways, such as different types of visible injury or changes in various growth characteristics. While environmental conditions associated with the appearance of visible injury due to fluoride may result in very different apparent susceptibilities in different field situations the following classification system is generally used. Tolerant species have been defined as those showing visible injuries at foliar fluoride concentrations in excess of $200 \mu\text{g F g}^{-1}$ dry weight (Weinstein 1977). Evidence of visible injury in very sensitive species may not necessarily result in reduced plant growth.

From an environmental management perspective, the data collected historically and in 2022 confirms the adequacy of the buffer zone managed by the company. This program is further enhanced by the annual buffer zone vegetation inspection carried out by a botanist each year. This buffer zone encloses an area with a radius of approximately 2 kilometres around the smelter and was acquired to reduce the impact of smelter emissions on neighbouring landholders.

5.2 Fluoride Cycling Within the Ecosystem

5.2.1 Overstorey

In 2022, fluoride levels at site 215 increased to an average of 830 $\mu\text{g/g}$, similar to 2019 levels. These levels decrease rapidly with distance from the source, with results approaching background levels at site 216 (1.8 km), although overstorey at sites 214 and 216 have also shown an increase in the last 2 years. There is negligible impact outside the buffer zone area.

5.2.2 Understorey

Understorey results have shown reasonable consistency over the last 10 years, with Site 215 hovering between 600 and 800 ug/g, decreasing to around 50 ug/g 1.8 km from the smelter.

5.2.3 Groundcover

Groundcover species are also showing relatively stable trends, with lower fluoride concentrations found in the groundcover species, indicating the filtering of fluoride by the upper storeys in the ecosystem. Results for 2022 show the same general trends as the overstorey and understorey layers.

5.2.4 Litter Layer and Soil

The highest levels of fluoride in the ecolayers are often found in the litter, reflective of the levels found in the upper layers. While this is understandable given the desiccation of leaf litter on the forest floor, the relatively lower levels of fluoride in soil suggests that the fluoride contained in the litter layer is well bound and does not undergo rapid leaching.

6. CONCLUSION

Results from the 2022 ecosystem monitoring program continue to confirm that fluoride emissions from the smelter yield very localised effects in vegetation with foliar fluoride concentrations decreasing rapidly with distance. This program is further enhanced by the annual buffer zone vegetation inspection carried out by a botanist each year, where visible vegetation impact is shown to be confined to within 1.5 km of the smelter, with the buffer zone encompassing an area of 2 km radius from the smelter.

Fluoride concentrations in the forest layers have remained relatively stable with the exception of overstorey very close to the smelter, and continue to display a filtering effect through the vegetation layers. The transfer of fluoride from the leaf litter to the soil is slow suggesting that the fluoride has been primarily converted to insoluble forms in the leaf absorption processes.

7. REFERENCES

- Doley, D (1986) Plant -fluoride Relationships. An Analysis with Particular Reference to Australian Vegetation. Inkata Press Melbourne.
- Weinstein, L.H. (1977). Fluoride and plant life. Journal of Occupational Medicine, 19, pp 49-78.
- Doley, D. (1981). Fluoride and the Australian flora. In Proceedings of the Seventh International Clean Air Conference, (Eds K.A. Webb and A.J. Smith), pp 463-477. Ann Arbor Science Publishers, Ann Arbor.
- Mitchell, A.D., Dowling, B.J. and Scheltema, J.H. (1981b) Effects of fluoride on Australian vegetation. In Proceedings of the Seventh International Clean Air Conference, (Eds K.A. Webb and A.J. Smith), pp 479-493. Ann Arbor Science Publishers, Ann Arbor.
- Horning, D.S and Mitchell, A.D. (1982). Relative resistance of Australian native plants to fluoride. In Fluoride Emissions: Their monitoring and Effects on vegetation and Ecosystems, (Ed Murray), pp 157-176. Academic Press, Sydney.
- Treshow, M. and Pack, M.R. (1970) Fluoride. In Recognition of Air Pollution Injury to Vegetation: A Pictorial Atlas, (Eds J.S. Jacobson and A.C. Hill), pp D1-D17. Informative Report 1, TR-7 Agricultural Committee. Air Pollution Control Association, Pittsburgh

APPENDIX 1

SAMPLING AND ANALYSIS PROCEDURES

Samples are collected and analysed monthly from all sites using procedures accredited under NATA accreditation number 1904. Below is a brief description of the procedures. Sample collection and analysis are performed according to procedures ES.ESM.0007, LMM-0024, LMM-0073 and LMM-0117.

1. OVERSTOREY

Samples of *Angophora costata* are washed in an Alkanox/EDTA solution and dried for 72 hours at 50°C. The sample is ground to a powder. The sample portion undergoes an alkali fusion and the resulting solution is distilled to remove interferents. The total fluoride is determined by colorimetric detection.

2. UNDERSTOREY AND GROUND COVER

Vegetative samples of understorey and groundcover are dried for 72 hours at 50°C. The sample is then ground to a powder. A sample portion undergoes an alkali fusion and the resulting solution is distilled to remove interferents. The total fluoride is determined by colorimetric procedures.

3. LITTER

A litter sample from a 1m² section is collected and divided into leaf litter and miscellaneous litter (sticks, fruits, buds, stems, seeds). These two samples are then dried and analysed by the procedures used for understorey and groundcover samples.

4. SOIL SAMPLES

Two soil samples are collected from each site. The leaf litter is cleared away and the soil is sampled below the humic layer at a depth of approximately 10 centimetres. The sample is dried at 50°C and ground using a ball mill grinder. The soil samples are analysed for total fluoride by subjecting the sample to an alkali fusion. After pH adjustment and filtration the resulting solution is analysed for fluoride by ion selective electrode techniques.

5. LEAF LITTER FALL RATE

The leaf litter rate can be determined through the maintenance of 4 litter boxes (total area of 1 square metre) at each of the sites. The contents of the litter boxes are collected monthly, dried at 50°C for 24 hours and weighed. The litterfall rate is calculated using the following formula:

$$\text{Litterfall Rate} = \frac{\text{Weight of Litter Component (g)} \times \text{Number days in a month}}{\text{Total area of collection boxes (m}^2\text{)} \times \text{No. days litter boxes out}}$$

APPENDIX 2

MONTHLY ECOSYSTEM RESULTS

ENVIRONMENT SYSTEM
WATER AND VEGETATION MONITORING FOR DECEMBER 2022

PAGE: 1

RESULTS BY SAMPLING GROUP

210 - ECOSYSTEM SAMPLES

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

1	213	PTERIDIUM ESCULENTUM	FLUORIDE (ug/g)	5	7	5	10	5	5	5	5	5	5	20	5	5	5
		LEPTOSPERMUM	FLUORIDE (ug/g)	13	10	5	10	5	10	10	10	5	25	25	5	5	5
		DIANELLA CAERULEA	FLUORIDE (ug/g)	10	15	5	20	30	15	10	10	20	5	15	10	30	5
		BANKSIA SERRATIFOLIA	FLUORIDE (ug/g)	6	6	5	5	10	5	5	5	5	5	10	5	5	5
		PERSOONIA LEVIS	FLUORIDE (ug/g)	6	6	5	5	5	5	5	10	5	5	10	5	5	10
		ANGOPHORA COSTATA (A)	FLUORIDE (ug/g)	8	9	20	10	5	10	10	10	10	10	10	5	5	5
		LEAF LITTER (A)	FLUORIDE (ug/g)	8	6	5	5	5	10	5	5	5	5	10	5	5	5
		MISCELLANEOUS LITTER (A)	FLUORIDE (ug/g)	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		SOIL (A)	FLUORIDE (ug/g)	9	15	10	10	70	10	10	10	10	15	15	5	10	5
		LITTER BOX	LEAF LITTER WEI	44	57	180	47	39	38	24	57	19	8	30	31	123	91
		ANGOPHORA COSTATA (B)	FLUORIDE (ug/g)	7	10	10	15	5	5	10	10	10	10	20	15	5	5
		SOIL (B)	FLUORIDE (ug/g)	8	12	10	5	35	10	5	10	10	20	15	10	10	5

2	214	PTERIDIUM ESCULENTUM	FLUORIDE (ug/g)	54	47	10	10	35	45	50	25	100	185	40	10	25	30
		LEPTOSPERMUM	FLUORIDE (ug/g)	122	190	270	90	200	180	65	545	155	220	65	265	85	145
		DIANELLA CAERULEA	FLUORIDE (ug/g)	67	80	50	20	110	35	35	105	110	65	85	65	130	145
		BANKSIA SERRATIFOLIA	FLUORIDE (ug/g)	206	166	160	60	195	140	195	100	215	100	275	130	265	160
		PERSOONIA LEVIS	FLUORIDE (ug/g)	143	111	155	40	100	85	90	100	120	155	180	60	190	55
		ANGOPHORA COSTATA (A)	FLUORIDE (ug/g)	65	48	35	65	20	20	65	75	75	60	55	60	30	15
		LEAF LITTER (A)	FLUORIDE (ug/g)	116	127	90	65	100	180	145	105	135	150	160	90	120	180
		MISCELLANEOUS LITTER (A)	FLUORIDE (ug/g)	41	63	50	25	140	45	60	60	60	70	90	25	70	65
		SOIL (A)	FLUORIDE (ug/g)	65	132	195	85	465	90	130	65	65	55	195	50	150	40
		LITTER BOX	LEAF LITTER WEI	29	42	84	25	47	11	73	9	41	30	42	18	86	38
		ANGOPHORA COSTATA (B)	FLUORIDE (ug/g)	40	55	35	50	45	20	60	85	90	60	120	45	35	20
		SOIL (B)	FLUORIDE (ug/g)	81	122	105	75	465	85	250	70	50	50	120	35	125	35

3	215	LEPTOSPERMUM	FLUORIDE (ug/g)	640	771	695	880	765	955	405	1090	695	940	205	1200	335	1085
		DIANELLA CAERULEA	FLUORIDE (ug/g)	468	463	640	350	735	295	480	365	470	380	385	445	235	780
		BANKSIA SERRATIFOLIA	FLUORIDE (ug/g)	781	889	1140	470	1950	1920	365	425	800	1200	305	nra	310	nra
		ANGOPHORA COSTATA (A)	FLUORIDE (ug/g)	665	777	1580	940	730	970	855	730	295	510	1320	375	200	820
		LEAF LITTER (A)	FLUORIDE (ug/g)	1045	1161	1290	970	1040	800	735	1475	1880	1060	1140	1365	825	1350
		MISCELLANEOUS LITTER (A)	FLUORIDE (ug/g)	260	580	515	490	585	570	275	435	425	900	750	795	305	910
		SOIL (A)	FLUORIDE (ug/g)	597	420	120	290	850	120	745	195	215	235	820	125	1200	120
		LITTER BOX	LEAF LITTER WEI	18	23	32	12	19	8	18	4	21	15	34	17	78	20
		ANGOPHORA COSTATA (B)	FLUORIDE (ug/g)	627	671	1155	785	790	910	495	745	250	575	860	520	200	765
		SOIL (B)	FLUORIDE (ug/g)	543	615	180	220	370	95	1885	145	1430	160	1625	130	935	210

#	SITE	SPECIES	TEST	ALY	AYTD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

4	216	PTERIDIUM ESCULENTUM	FLUORIDE (ug/g)	22	16	5	5	25	30	15	10	30	25	15	10	5	20
		LEPTOSPERMUM	FLUORIDE (ug/g)	62	72	35	20	50	70	55	65	135	195	90	90	25	30
		DIANELLA CAERULEA	FLUORIDE (ug/g)	23	36	20	10	40	40	30	45	95	45	45	20	25	20
		BANKSIA SERRATIFOLIA	FLUORIDE (ug/g)	58	55	45	20	60	55	25	50	95	60	50	55	100	50
		PERSOONIA LEVIS	FLUORIDE (ug/g)	41	39	10	25	25	40	55	35	85	85	45	20	25	20
		ANGOPHORA COSTATA (A)	FLUORIDE (ug/g)	29	54	100	80	30	45	25	35	40	115	35	50	65	25
		LEAF LITTER (A)	FLUORIDE (ug/g)	42	74	65	80	45	50	45	110	90	120	75	45	85	80
		MISCELLANEOUS LITTER (A)	FLUORIDE (ug/g)	20	38	40	50	15	30	20	35	70	90	35	10	35	20
		SOIL (A)	FLUORIDE (ug/g)	55	71	95	50	60	55	85	60	30	40	125	65	170	20
		LITTER BOX	LEAF LITTER WEI	27	42	86	26	21	9	78	25	64	14	32	12	103	33
		ANGOPHORA COSTATA (B)	FLUORIDE (ug/g)	23	41	30	60	35	35	30	35	30	100	35	50	35	15
		SOIL (B)	FLUORIDE (ug/g)	55	69	90	65	40	65	105	50	20	45	135	45	150	20

nra = No Result Available
tba = To Be Analysed
c = Result Being Checked
q = Samples collected quarterly
ALY = Average Last Year
AYTD = Average Year To Date

*** END OF WATER AND VEGETATION BY GROUP REPORT ***

End of Report

Tomago Aluminium Company