

20 December 2017

Chris Schneider
Managing Director
National Ceramic Industries Australia
PO Box 765

Maitland NSW 2320

Dear Chris

Environmental Monitoring for National Ceramic Industries Australia - November 2017

Please find enclosed the documentation for the environmental monitoring carried out for National Ceramic Industries Australia during November 2017. Sampling methodology and adopted assessment criteria are detailed below.

1.0 Sampling Methodology

Sampling was performed by AECOM Australia Pty Ltd (AECOM) and sample analysis was carried out by ALS NATA accredited laboratory. All sampling and analysis was carried out in accordance with Environmental Protection Authority (EPA) approved methods with reference to the following Australian Standards:

- Monitoring of fine suspended particulates (PM₁₀) on the EPA six day cycle in accordance with:
 - AS/NZS 3580.9.6 (2015) *Methods for the Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – PM₁₀ High Volume Sampler with Size Selective Inlet - Gravimetric Method.*
- Monitoring of fluorides in ambient air in accordance with:
 - AS/NZS 3580.13.2 (2013) *Determination of fluorides—Gaseous and acid-soluble particulate fluorides—Manual, double filter paper sampling.*
- Meteorological monitoring in accordance with:
 - AS 3580.1.1 (2007) – *Methods for sampling and analysis of ambient air – Part 1.1 – Guide to siting air monitoring equipment; and*
 - AS 3580.14 (2014) – *Methods for sampling and analysis of ambient air – Part 14: Meteorological monitoring for ambient air quality monitoring.*
- Monitoring of surface water quality in accordance with:
 - AS/NZS 5667.1 (1998) *Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples; and*
 - AS/NZS 5667.4 (1998) *Guidance on sampling from lakes, natural and manmade.*

2.0 Assessment Criteria

Suspended particulate loads are assessed against the impact assessment criteria defined in the Project Approval conditions (09_0006 – National Ceramic Industries Australia Tile Manufacturing Facility Expansion Project, 19 January 2012). The assessment criteria for PM₁₀ (particulate matter with an aerodynamic diameter of less than 10 µm) are:

- 50 µg/m³ over a 24-hour period; and
- 30 µg/m³ as an annual average.

Ambient fluoride concentrations are assessed against the guidelines defined in NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA (2016)). The NSW EPA impact assessment criteria for ambient fluoride are:

- 2.9 µg/m³ over a 24-hour period; and
- 1.7 µg/m³ over a 7-day period.

Surface waters are assessed in accordance with default trigger values for physical and chemical stressors for southeast Australia in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000). These values are:

- pH in the range of 6.5 - 8.5 (Table 3.3.2 - NSW Lowland River); and
- Electrical conductivity (EC) in the range of 125 – 2200 $\mu\text{S}/\text{cm}$ (Table 3.3.3 - NSW Lowland River).

3.0 Monitoring Results

Monitoring results for the month of November 2017 are presented in the attachments to this letter. Monitoring results for the preceding two months are also presented to demonstrate quarterly trends in results.

During the month of November, all individual PM_{10} monitoring results were below the Project Approval 24 hour criterion of $50\mu\text{g}/\text{m}^3$. The PM_{10} rolling annual average concentrations at both the North West and South East sites remain below the Project Approval annual criterion of $30\mu\text{g}/\text{m}^3$. The North West annual average sits at $26.3\mu\text{g}/\text{m}^3$ following the completion of the November monitoring period while the South East average is $16.9\mu\text{g}/\text{m}^3$.

Fluoride results for November remain below the relevant assessment criteria at both the North West and South East monitoring sites with no exceedances of either the 24 hour or 7 day criteria this month.

The adopted ANZECC 2000 guidelines for pH and conductivity are the default trigger values for slightly disturbed aquatic ecosystems in NSW lowland rivers. All Pond 4 pH readings during November were within the ANZECC 2000 pH guidelines with the exception of pH measurements taken on 9, 16 and 30 November where the pH was above the guideline limit of 8.5. The pond was not discharging at the time of these readings. All Pond 4 EC readings taken during the November monitoring period were within the ANZECC guidelines. Water temperature was also measured weekly however no guideline is available for assessment. Pond 4 was not observed to be discharging during any of the November site visits.

Monitoring results and plots can be found attached including the wind rose for November. Laboratory certificates, field sheets and calibration data along with relevant meteorology data can be provided on request.

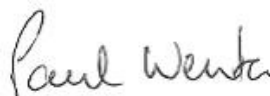
If you require any further information, please contact James McIntyre on 0407 456 232.

Yours faithfully



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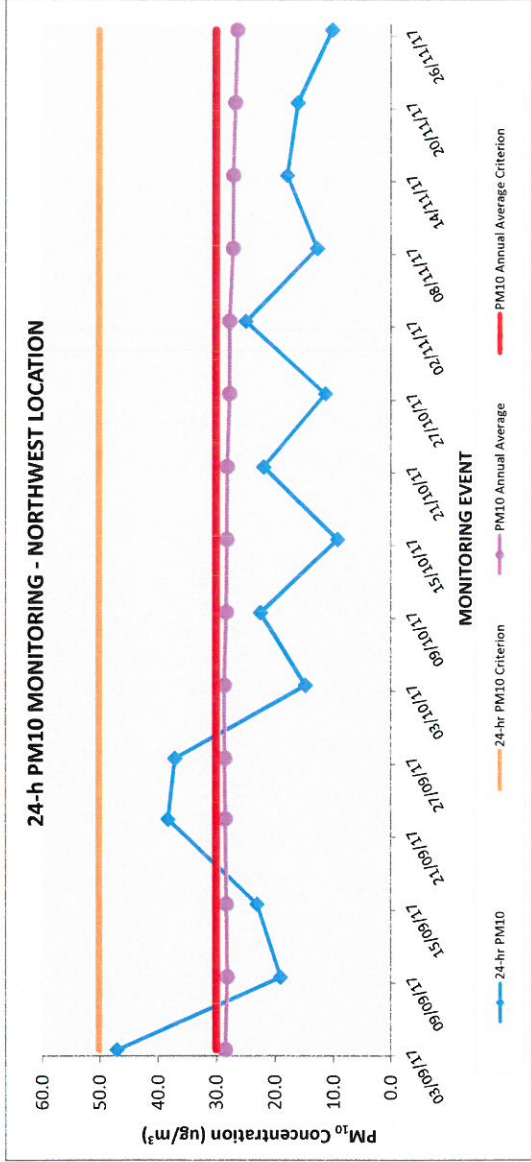
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encl: Monitoring data tables and charts, wind rose

North West Monitoring Location - 24 hour PM10 Monitoring

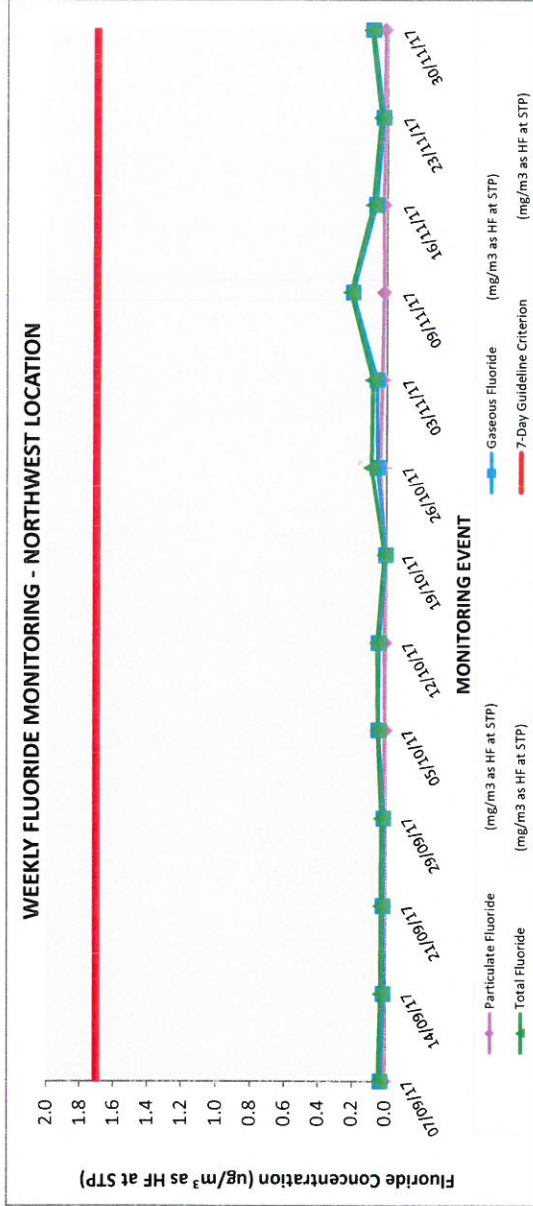
North West - 24 hour PM10 Monitoring				
September 2017 to November 2017				
Monitoring Event	24-hr PM ₁₀ (µg/m ³)	24-hr PM ₁₀ Criterion (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	PM ₁₀ Annual Average Criterion
3-Sep-17	47.1	50	28.4	30
9-Sep-17	19.1	50	28.1	30
15-Sep-17	23.1	50	28.3	30
22-Sep-17	38.3	50	28.5	30
27-Sep-17	37.1	50	28.5	30
3-Oct-17	14.8	50	28.6	30
9-Oct-17	22.5	50	28.3	30
15-Oct-17	9.3	50	28.1	30
21-Oct-17	22.0	50	28.1	30
27-Oct-17	11.4	50	27.7	30
2-Nov-17	25.0	50	27.7	30
8-Nov-17	12.8	50	27.1	30
14-Nov-17	17.9	50	27.1	30
20-Nov-17	16.1	50	26.7	30
26-Nov-17	10.2	50	26.3	30



North West Monitoring Location - 7 Day Fluoride Monitoring

North West - 7 Day Fluoride Monitoring
September 2017 to November 2017

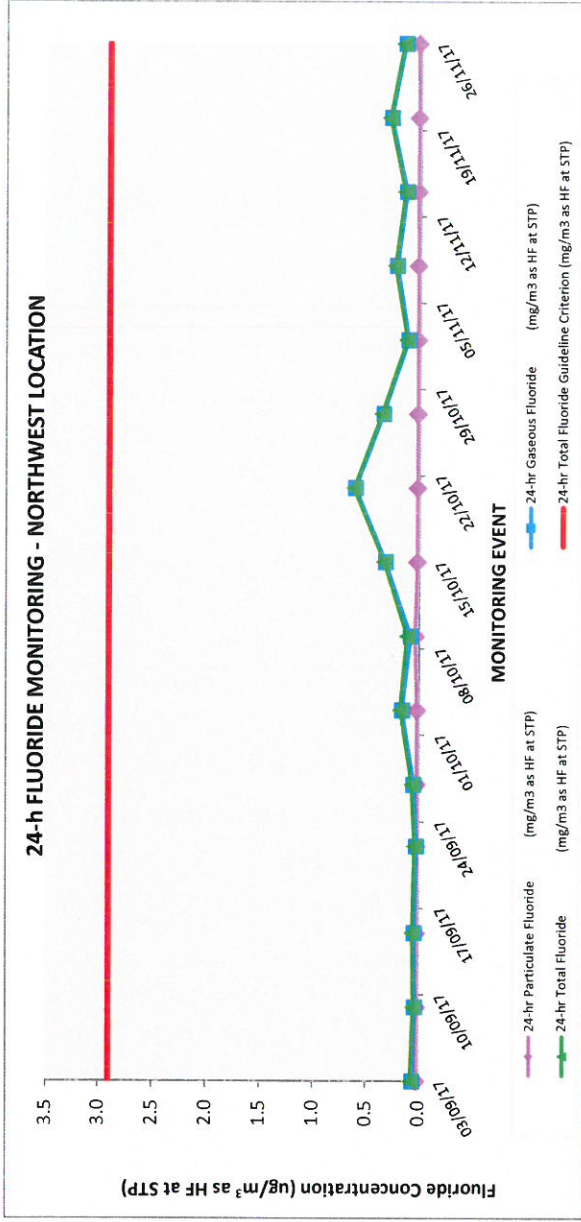
Monitoring Event	Particulate Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	Gaseous Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	Total Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	7-Day Guideline Criterion
07/09/17	0.009	0.033	0.042	1.7
14/09/17	0.015	0.016	0.031	1.7
21/09/17	0.010	0.019	0.029	1.7
29/09/17	0.013	0.014	0.027	1.7
05/10/17	0.004	0.046	0.050	1.7
12/10/17	0.008	0.045	0.053	1.7
19/10/17	0.010	0.003	0.013	1.7
26/10/17	0.036	0.055	0.091	1.7
03/11/17	0.025	0.058	0.083	1.7
09/11/17	0.015	0.202	0.217	1.7
16/11/17	0.018	0.065	0.083	1.7
23/11/17	0.013	0.024	0.037	1.7
30/11/17	0.011	0.085	0.096	1.7



North West Monitoring Location - 24 hour Fluoride Monitoring

North West - 24 hour Fluoride Monitoring
September 2017 to November 2017

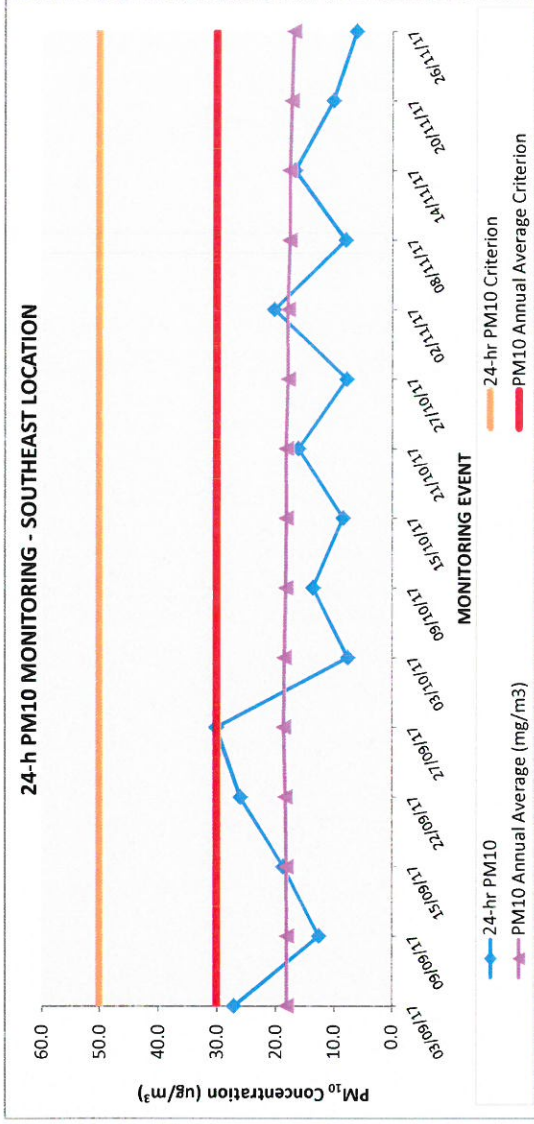
Monitoring Event	24-hr Particulate Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	24-hr Gaseous Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	24-hr Total Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	24-hr Total Fluoride Guideline Criterion ($\mu\text{g}/\text{m}^3$ as HF at STP)
03-Sep-17	0.017	0.058	0.075	2.9
09-Sep-17	0.016	0.036	0.052	2.9
15-Sep-17	0.019	0.042	0.061	2.9
22-Sep-17	0.017	0.025	0.042	2.9
27-Sep-17	0.018	0.050	0.068	2.9
03-Oct-17	0.017	0.161	0.178	2.9
09-Oct-17	0.034	0.083	0.117	2.9
15-Oct-17	0.018	0.320	0.338	2.9
21-Oct-17	0.018	0.606	0.624	2.9
27-Oct-17	0.018	0.344	0.362	2.9
02-Nov-17	0.018	0.109	0.127	2.9
08-Nov-17	0.018	0.221	0.239	2.9
14-Nov-17	0.019	0.131	0.150	2.9
20-Nov-17	0.018	0.277	0.295	2.9
26-Nov-17	0.020	0.143	0.163	2.9



South East Monitoring Location - 24 hour PM10 Monitoring

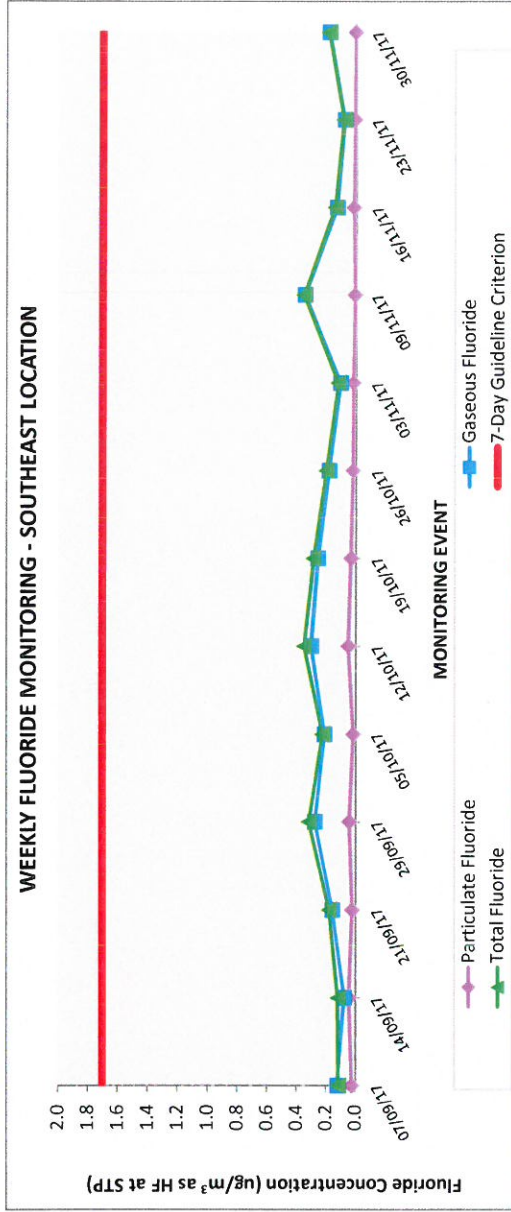
South East - 24 hour PM10 Monitoring
September 2017 to November 2017

Monitoring Event	24-hr PM ₁₀	24-hr PM ₁₀ Criterion	PM ₁₀ Annual Average	PM ₁₀ Annual Average Criterion
	(µg/m ³)	(µg/m ³)	(µg/m ³)	
03/09/17	27.2	50	18.1	30
09/09/17	12.7	50	18.1	30
15/09/17	18.8	50	18.2	30
22/09/17	26.1	50	18.3	30
27/09/17	30.2	50	18.6	30
03/10/17	7.7	50	18.5	30
09/10/17	13.7	50	18.3	30
15/10/17	8.5	50	18.2	30
21/10/17	16.2	50	18.2	30
27/10/17	7.9	50	17.9	30
02/11/17	20.3	50	17.9	30
08/11/17	8.1	50	17.6	30
14/11/17	16.8	50	17.6	30
20/11/17	10.2	50	17.3	30
26/11/17	6.2	50	16.9	30



South East Monitoring Location - 7 Day Fluoride Monitoring

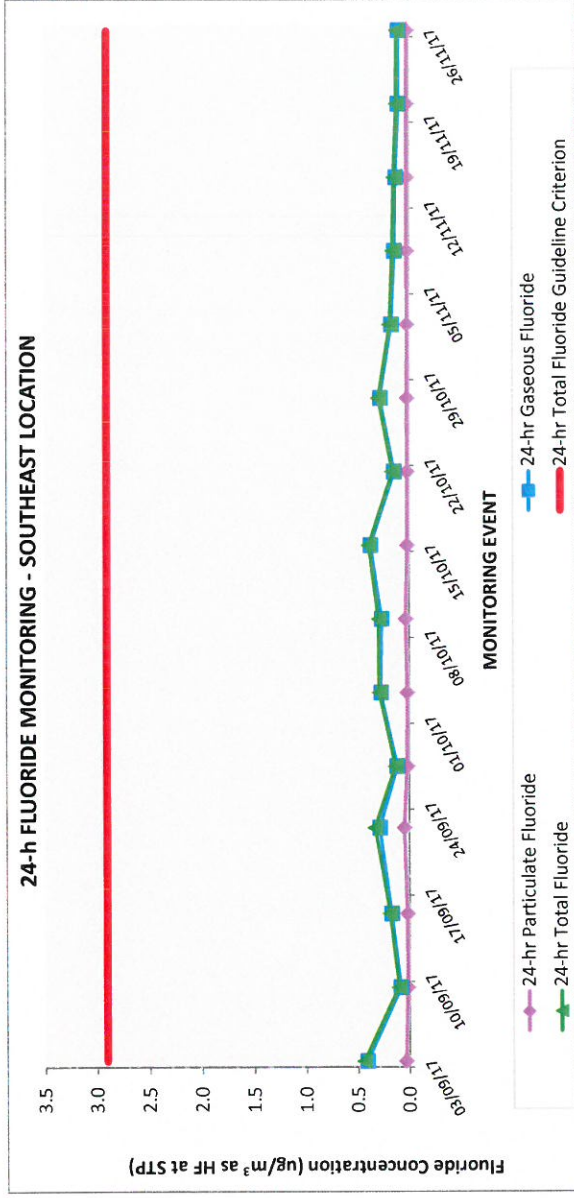
South East - 7 Day Fluoride Monitoring				
September 2017 to November 2017				
Monitoring Event	Particulate Fluoride	Gaseous Fluoride	Total Fluoride	7-Day Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
07/09/17	0.024	0.125	0.117	1.7
14/09/17	0.043	0.078	0.121	1.7
21/09/17	0.022	0.159	0.181	1.7
29/09/17	0.041	0.278	0.319	1.7
05/10/17	0.015	0.213	0.228	1.7
12/10/17	0.048	0.304	0.352	1.7
19/10/17	0.031	0.258	0.289	1.7
26/10/17	0.018	0.183	0.201	1.7
03/11/17	0.016	0.106	0.122	1.7
09/11/17	0.005	0.348	0.353	1.7
16/11/17	0.014	0.130	0.144	1.7
23/11/17	0.007	0.079	0.086	1.7
30/11/17	0.004	0.183	0.187	1.7



South East Monitoring Location - 24 hour Fluoride Monitoring

South East - 24 hour Fluoride Monitoring
September 2017 to November 2017

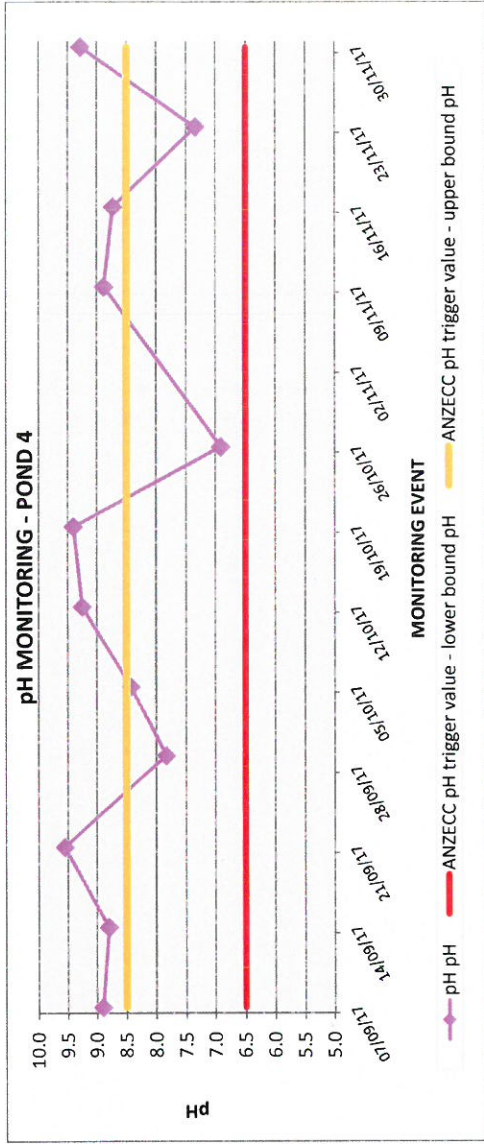
Monitoring Event	24-hr Particulate Fluoride	24-hr Gaseous Fluoride	24-hr Total Fluoride	24-hr Total Fluoride Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
03-Sep-17	0.031	0.412	0.443	2.9
09-Sep-17	0.016	0.087	0.102	2.9
15-Sep-17	0.016	0.173	0.189	2.9
22-Sep-17	0.046	0.288	0.334	2.9
27-Sep-17	0.016	0.119	0.135	2.9
03-Oct-17	0.014	0.275	0.289	2.9
09-Oct-17	0.03	0.266	0.296	2.9
15-Oct-17	0.015	0.376	0.391	2.9
21-Oct-17	0.015	0.145	0.160	2.9
27-Oct-17	0.016	0.281	0.297	2.9
02-Nov-17	0.015	0.171	0.186	2.9
08-Nov-17	0.016	0.14	0.156	2.9
14-Nov-17	0.016	0.126	0.142	2.9
20-Nov-17	0.016	0.101	0.117	2.9
26-Nov-17	0.015	0.099	0.114	2.9



Pond 4 Monitoring Location - Weekly pH Monitoring

Pond 4 - Weekly pH Monitoring
September 2017 to November 2017

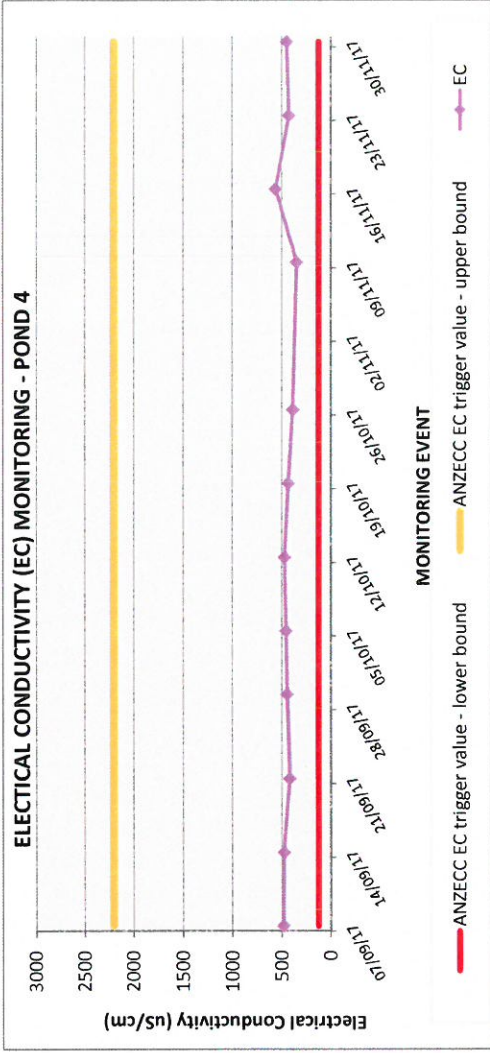
Monitoring Event	pH	ANZECC pH trigger value - lower bound pH	ANZECC pH trigger value - upper bound pH	Unable to Sample
	pH	pH	pH	
7/09/2017	8.90	6.5	8.5	
14/09/2017	8.80	6.5	8.5	
21/09/2017	9.55	6.5	8.5	
29/09/2017	7.83	6.5	8.5	
5/10/2017	8.42	6.5	8.5	
12/10/2017	9.25	6.5	8.5	
19/10/2017	9.40	6.5	8.5	
26/10/2017	6.91	6.5	8.5	
9/11/2017	8.88	6.5	8.5	
16/11/2017	8.73	6.5	8.5	
23/11/2017	7.34	6.5	8.5	
30/11/2017	9.28	6.5	8.5	



Pond 4 Monitoring Location - Weekly EC Monitoring

Pond 4 - Weekly EC Monitoring
September 2017 to November 2017

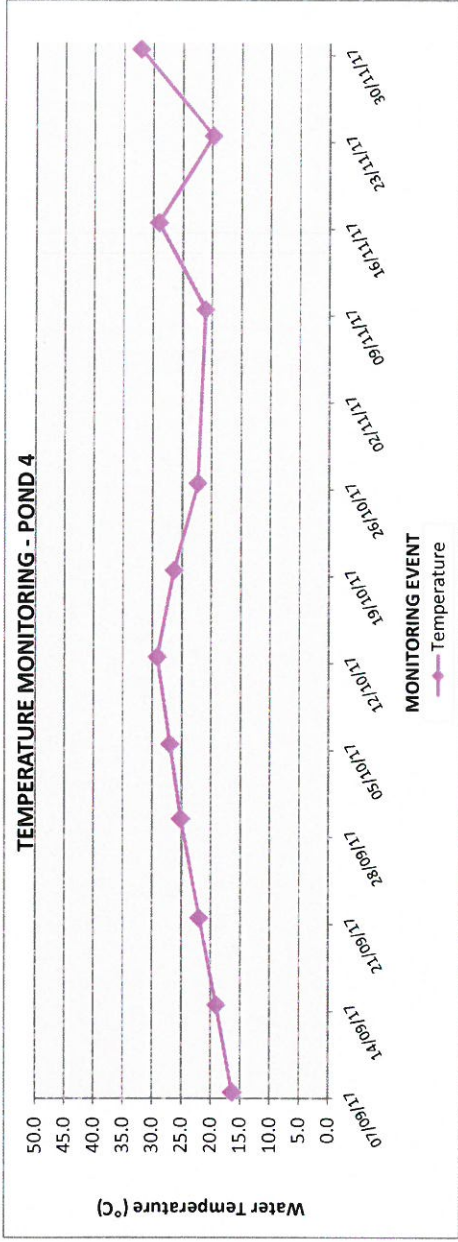
Monitoring Event	EC µS/cm	ANZECC EC trigger value - lower bound µS/cm	ANZECC EC trigger value - upper bound µS/cm	Unable to Sample
7/09/2017	478	125	2200	
14/09/2017	474	125	2200	
21/09/2017	415	125	2200	
29/09/2017	440	125	2200	
5/10/2017	452	125	2200	
12/10/2017	469	125	2200	
19/10/2017	431	125	2200	
26/10/2017	385	125	2200	
9/11/2017	345	125	2200	
16/11/2017	560	125	2200	
23/11/2017	425	125	2200	
30/11/2017	445	125	2200	



Pond 4 Monitoring Location - Weekly Temperature Monitoring

Pond 4 - Weekly Temperature Monitoring
September 2017 to November 2017

Monitoring Event	Temperature °C	Unable to Sample
7/09/2017	16.3	
14/09/2017	19.0	
21/09/2017	22.0	
29/09/2017	25.1	
5/10/2017	26.9	
12/10/2017	29.1	
19/10/2017	26.3	
26/10/2017	22.3	
9/11/2017	21.1	
16/11/2017	29.0	
23/11/2017	19.8	
30/11/2017	32.1	

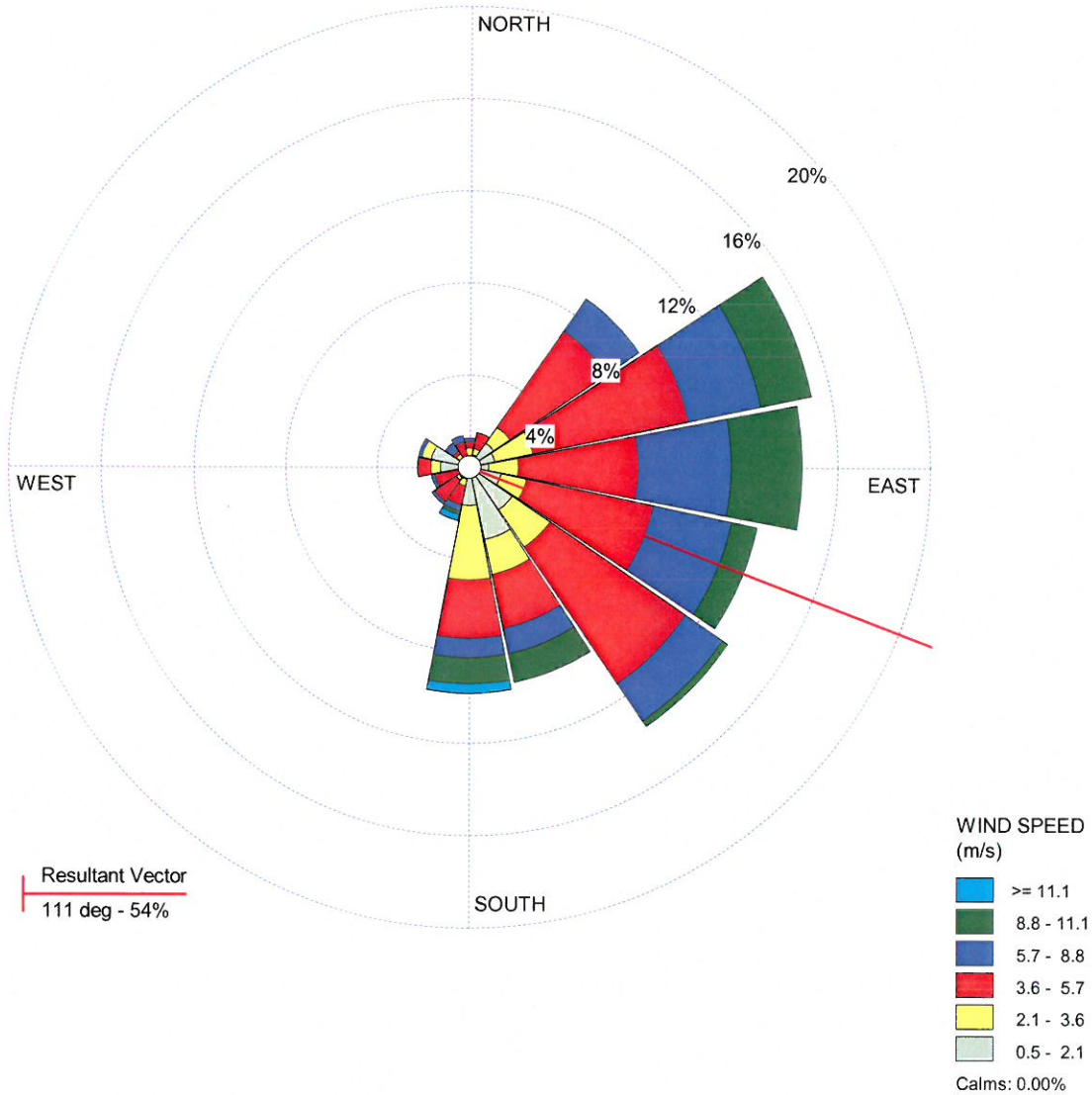


WIND ROSE PLOT:

NCIA - Meteorological Data
November Sampling Period - November 2017

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 1/11/2017 - 00:00
End Date: 30/11/2017 - 23:00

COMPANY NAME:

MODELER:

CALM WINDS:

0.00%

TOTAL COUNT:

714 hrs.

AVG. WIND SPEED:

4.77 m/s

DATE:

12/12/2017

PROJECT NO.:

60551495