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22 January 2019

Chris Schneider
Managing Director
National Ceramic Industries Australia
PO Box 765
Maitland NSW 2320

Dear Chris,

Environmental Monitoring for National Ceramic Industries Australia - December 2019

Please find enclosed the documentation for the environmental monitoring carried out for National Ceramic Industries Australia during December 2019. 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 (PM_{10}) 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 – PM_{10} 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 (2016) – *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(R2016) *Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*; and
  - AS/NZS 5667.4:1998(R2016) *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 PM_{10} (particulate matter with an aerodynamic diameter of less than 10 μm) are:

- 50 $\mu g/m^3$ over a 24-hour period; and
- 30 $\mu g/m^3$ 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 $\mu g/m^3$ over a 24-hour period; and
- 1.7 $\mu g/m^3$ 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* (ANZG, 2018). 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 µS/cm (Table 3.3.3 - NSW Lowland River).

3.0 Monitoring Results

Monitoring results for the month of December 2019 are presented in the attachments to this letter. Monitoring results for the preceding two months are also presented to demonstrate quarterly trends in results.

The December 2019 monitoring results show that the following ambient PM_{10} results were above the short-term impact assessment criterion (50µg/m^3) as defined in the DPIE Project Approval (Schedule 3, Condition 15, Table 2):

- 4 December 2019, North West monitoring station (101 µg/m^3);
- 4 December 2019, South East monitoring station (77.7 µg/m^3);
- 10 December 2019, North West monitoring station (114 µg/m^3);
- 10 December 2019, South East monitoring station (106 µg/m^3); and
- 16 December 2019, North West monitoring station (56.0 µg/m^3).

On 4, 10 and 16 December 2019 bushfire smoke was prevalent across the region as indicated by elevated results at the EPA Beresfield and Singleton South sites as well as the NCIA facility.

Onsite monitoring locations recorded similarly elevated results comparable to the regional EPA station results suggesting a regional dust source, in this case bushfire smoke, as the primary source.

An Environmental Incident Report detailing these exceedances was submitted to the Department of Planning, Industry and Environment on 15 January upon AECOM receiving the laboratory analysis results.

The PM_{10} rolling annual average concentration at the South East site remains below the Project Approval annual criterion of 30 µg/m^3 with an average of 24.7 µg/m^3 following the December monitoring period. The North West annual average is currently above the criteria at 36.6 µg/m^3 following the completion of the December monitoring period.

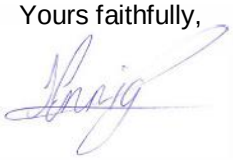
Fluoride results for December remain below the relevant assessment criteria at both the North West and South East monitoring sites with no exceedances of either the 24 hour or 7 day criteria this month.

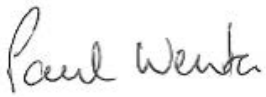
The adopted ANZG 2018 guidelines for pH and conductivity are the default trigger values for slightly disturbed aquatic ecosystems in NSW lowland rivers. pH measurements for December were recorded within the ANZG guidelines with the exception of the measurement taken on 12 December which was above the 8.5 upper limit. Importantly, Pond 4 was not observed to be discharging on any sampling occasions during December. All conductivity measurements were within the relevant ANZG guidelines for December. Water temperature was also measured weekly however no guideline is available for assessment.

The monitoring locations, monitoring results and plots can be found attached including the wind rose for December. 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 Cye Buckland on 0488 777 160.

Yours faithfully,





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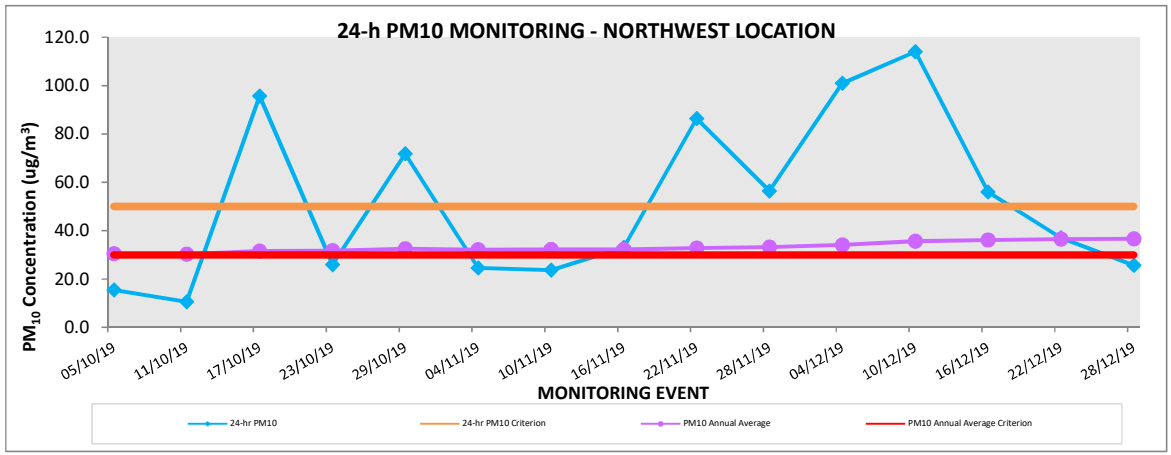
encl: Monitoring data tables and charts, monitoring locations, wind roses

North West Monitoring Location - 24 hour PM10 Monitoring

North West - 24 hour PM10 Monitoring October 2019 to December 2019				
Monitoring Event	24-hr PM_{10} (µg/m3)	24-hr PM_{10} Criterion (µg/m^3)	PM_{10} Annual Average (µg/m^3)	PM_{10} Annual Average Criterion
5-Oct-19	15.5	50	**30.5**	30
11-Oct-19	10.6	50	**30.3**	30
17-Oct-19	**95.7**	50	**31.6**	30
23-Oct-19	25.9	50	**31.7**	30
29-Oct-19	**71.8**	50	**32.5**	30
4-Nov-19	24.6	50	**32.2**	30
10-Nov-19	23.7	50	**32.2**	30
16-Nov-19	33.1	50	**32.2**	30
22-Nov-19	**86.4**	50	**32.8**	30
28-Nov-19	**56.4**	50	**33.2**	30
4-Dec-19	**101**	50	**34.1**	30
10-Dec-19	**114**	50	**35.6**	30
16-Dec-19	**56.0**	50	**36.1**	30
22-Dec-19	37.0	50	**36.5**	30
28-Dec-19	25.6	50	**36.6**	30

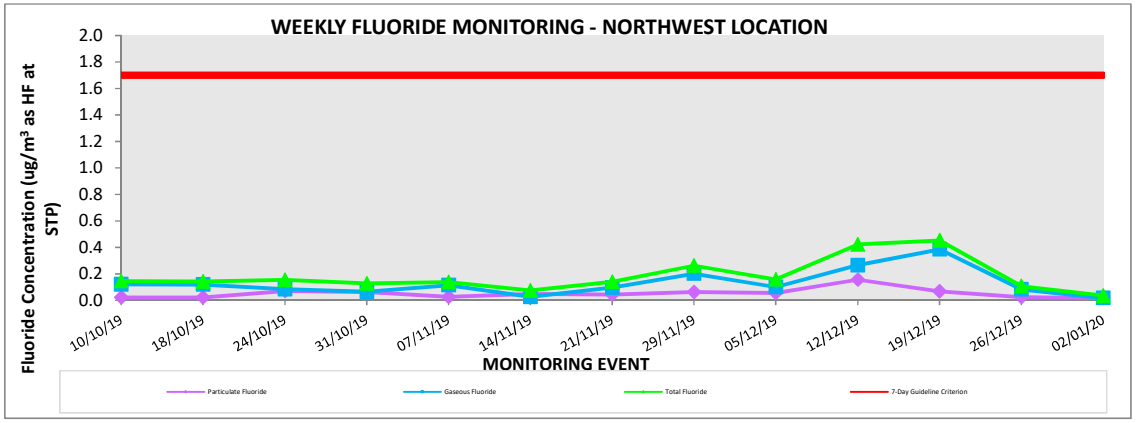
***Bold denotes exceedance**



North West Monitoring Location - 7 Day Fluoride Monitoring

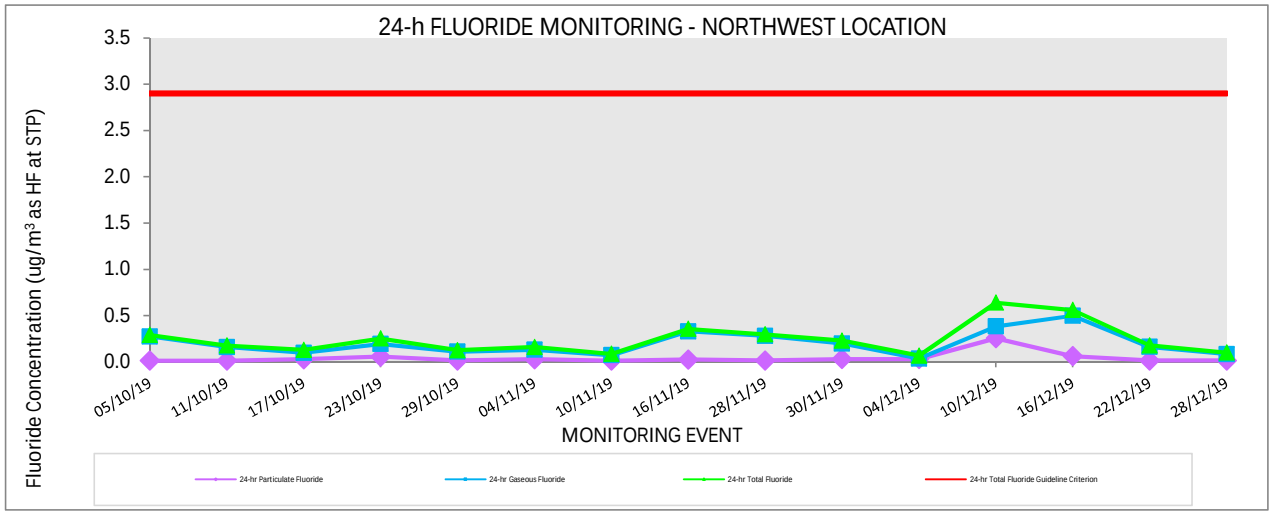
North West - 7 Day Fluoride Monitoring
October 2019 to December 2019

Monitoring Event		Particulate Fluoride	Gaseous Fluoride	Total Fluoride	7-Day Guideline Criterion
Start Date	End Date	($\mu g/m^3$ as HF at STP)	($\mu g/m^3$ as HF at STP)	($\mu g/m^3$ as HF at STP)	($\mu g/m^3$ as HF at STP)
3-Oct-19	10-Oct-19	0.023	0.122	0.145	1.7
10-Oct-19	18-Oct-19	0.023	0.120	0.143	1.7
18-Oct-19	24-Oct-19	0.071	0.084	0.155	1.7
24-Oct-19	31-Oct-19	0.062	0.066	0.128	1.7
31-Oct-19	7-Nov-19	0.025	0.114	0.139	1.7
7-Nov-19	14-Nov-19	0.049	0.026	0.075	1.7
14-Nov-19	21-Nov-19	0.043	0.097	0.140	1.7
21-Nov-19	29-Nov-19	0.062	0.201	0.263	1.7
29-Nov-19	5-Dec-19	0.056	0.101	0.157	1.7
5-Dec-19	12-Dec-19	0.156	0.266	0.422	1.7
12-Dec-19	19-Dec-19	0.068	0.385	0.453	1.7
19-Dec-19	26-Dec-19	0.024	0.083	0.107	1.7
26-Dec-19	2-Jan-20	0.018	0.018	0.036	1.7



North West Monitoring Location - 24 hour Fluoride Monitoring

North West - 24 hour Fluoride Monitoring				
October 2019 to December 2019				
Monitoring Event	**24-hr Particulate Fluoride**	**24-hr Gaseous Fluoride**	**24-hr Total Fluoride**	**24-hr Total Fluoride Guideline Criterion**
	(µg/m^3 as HF at STP)	**(µg/m^3 as HF at STP)**	**(µg/m^3 as HF at STP)**	**(µg/m^3 as HF at STP)**
5-Oct-19	0.014	0.276	0.290	2.9
11-Oct-19	0.014	0.162	0.176	2.9
17-Oct-19	0.030	0.099	0.129	2.9
23-Oct-19	0.058	0.194	0.252	2.9
29-Oct-19	0.015	0.111	0.126	2.9
4-Nov-19	0.030	0.131	0.161	2.9
10-Nov-19	0.014	0.073	0.087	2.9
16-Nov-19	0.026	0.330	0.356	2.9
28-Nov-19	0.016	0.282	0.298	2.9
30-Nov-19	0.031	0.199	0.230	2.9
4-Dec-19	0.032	0.036	0.068	2.9
10-Dec-19	0.256	0.384	0.640	2.9
16-Dec-19	0.062	0.499	0.561	2.9
22-Dec-19	0.015	0.163	0.178	2.9
28-Dec-19	0.015	0.085	0.100	2.9

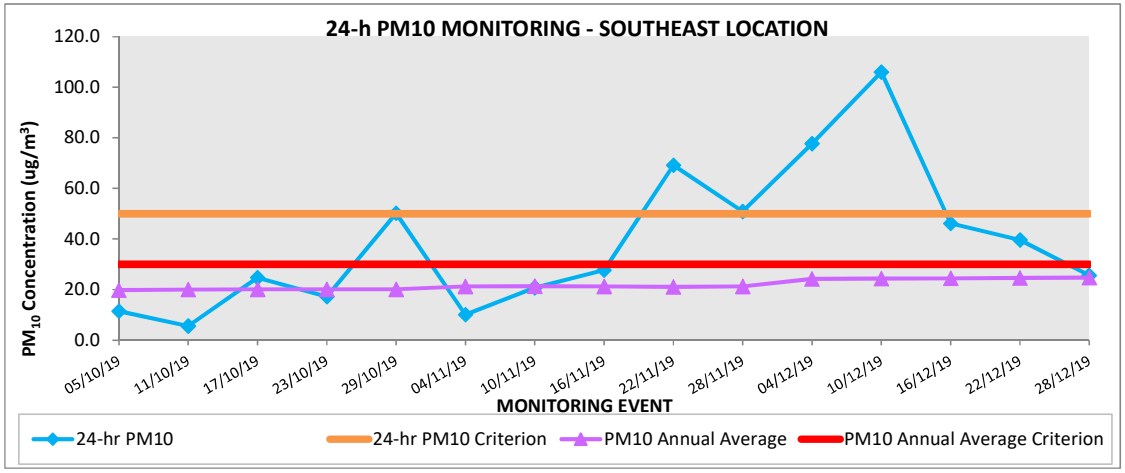


South East Monitoring Location - 24 hour PM10 Monitoring

South East - 24 hour PM10 Monitoring
October 2019 to December 2019

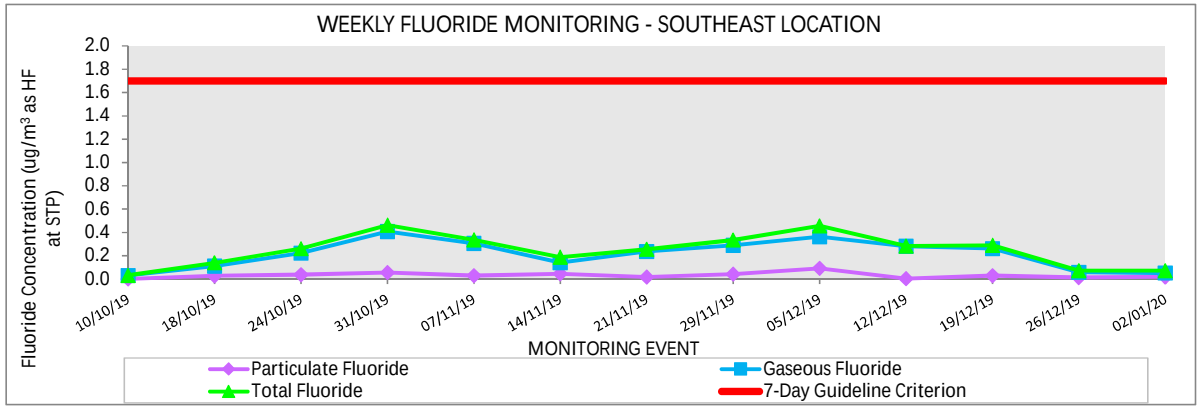
Monitoring Event	24-hr PM_{10} ($\mu g/m^3$)	24-hr PM_{10} Criterion ($\mu g/m^3$)	PM_{10} Annual Average ($\mu g/m^3$)	PM_{10} Annual Average Criterion
05-Oct-19	11.5	50	19.8	30
11-Oct-19	5.6	50	20.0	30
17-Oct-19	24.7	50	20.2	30
23-Oct-19	17.2	50	20.2	30
29-Oct-19	**50.2**	50	20.2	30
04-Nov-19	10.1	50	21.3	30
10-Nov-19	20.8	50	21.4	30
16-Nov-19	27.7	50	21.3	30
22-Nov-19	**69.2**	50	21.1	30
28-Nov-19	**50.9**	50	21.3	30
04-Dec-19	**77.7**	50	24.3	30
10-Dec-19	**106**	50	24.3	30
16-Dec-19	46.2	50	24.5	30
22-Dec-19	39.7	50	24.6	30
28-Dec-19	25.6	50	24.7	30

Bold denotes exceedance



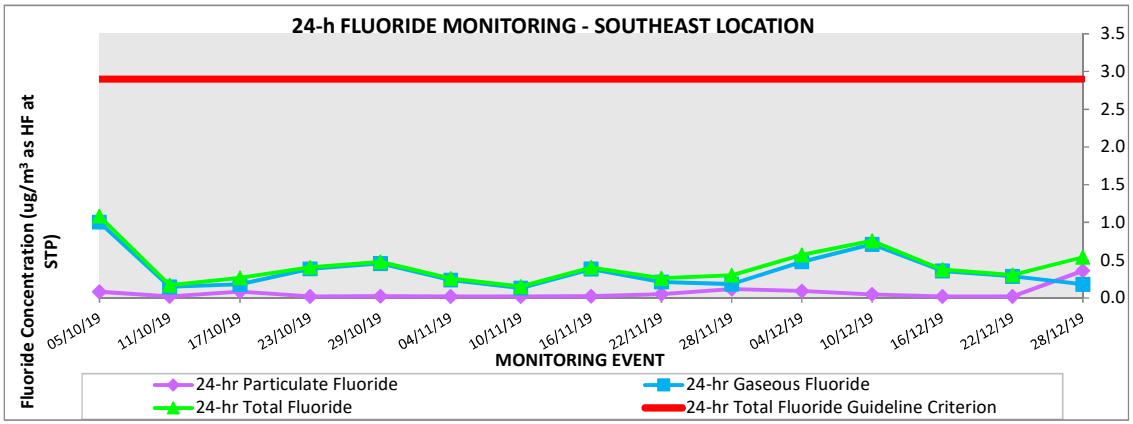
South East Monitoring Location - 7 Day Fluoride Monitoring

South East - 7 Day Fluoride Monitoring					
October 2019 to December 2019					
Monitoring Event		**Particulate Fluoride**	**Gaseous Fluoride**	**Total Fluoride**	**7-Day Guideline Criterion**
Start Date	**End Date**	**(µg/m³ as HF at STP)**	**(µg/m³ as HF at STP)**	**(µg/m³ as HF at STP)**	**(µg/m³ as HF at STP)**
3-Oct-19	10-Oct-19	0.002	0.031	0.033	1.7
10-Oct-19	18-Oct-19	0.028	0.111	0.139	1.7
18-Oct-19	24-Oct-19	0.038	0.224	0.262	1.7
24-Oct-19	31-Oct-19	0.056	0.407	0.463	1.7
31-Oct-19	7-Nov-19	0.031	0.306	0.337	1.7
7-Nov-19	14-Nov-19	0.046	0.142	0.188	1.7
14-Nov-19	21-Nov-19	0.018	0.237	0.255	1.7
21-Nov-19	29-Nov-19	0.043	0.291	0.334	1.7
29-Nov-19	5-Dec-19	0.092	0.364	0.456	1.7
5-Dec-19	12-Dec-19	0.003	0.281	0.284	1.7
12-Dec-19	19-Dec-19	0.029	0.261	0.290	1.7
19-Dec-19	26-Dec-19	0.014	0.059	0.073	1.7
26-Dec-19	2-Jan-20	0.019	0.053	0.072	1.7



South East Monitoring Location - 24 hour Fluoride Monitoring

South East - 24 hour Fluoride Monitoring				
October 2019 to December 2019				
Monitoring Event	24-hr Particulate Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Gaseous Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Total Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Total Fluoride Guideline Criterion ($\mu g/m^3$ as HF at STP)
5-Oct-19	0.081	1.003	1.084	2.9
11-Oct-19	0.021	0.147	0.168	2.9
17-Oct-19	0.085	0.182	0.267	2.9
23-Oct-19	0.020	0.386	0.406	2.9
29-Oct-19	0.022	0.457	0.479	2.9
4-Nov-19	0.020	0.238	0.258	2.9
10-Nov-19	0.019	0.132	0.151	2.9
16-Nov-19	0.022	0.383	0.405	2.9
22-Nov-19	0.050	0.212	0.262	2.9
28-Nov-19	0.118	0.185	0.303	2.9
4-Dec-19	0.092	0.479	0.571	2.9
10-Dec-19	0.047	0.71	0.757	2.9
16-Dec-19	0.021	0.356	0.377	2.9
22-Dec-19	0.021	0.285	0.306	2.9
28-Dec-19	0.360	0.180	0.540	2.9

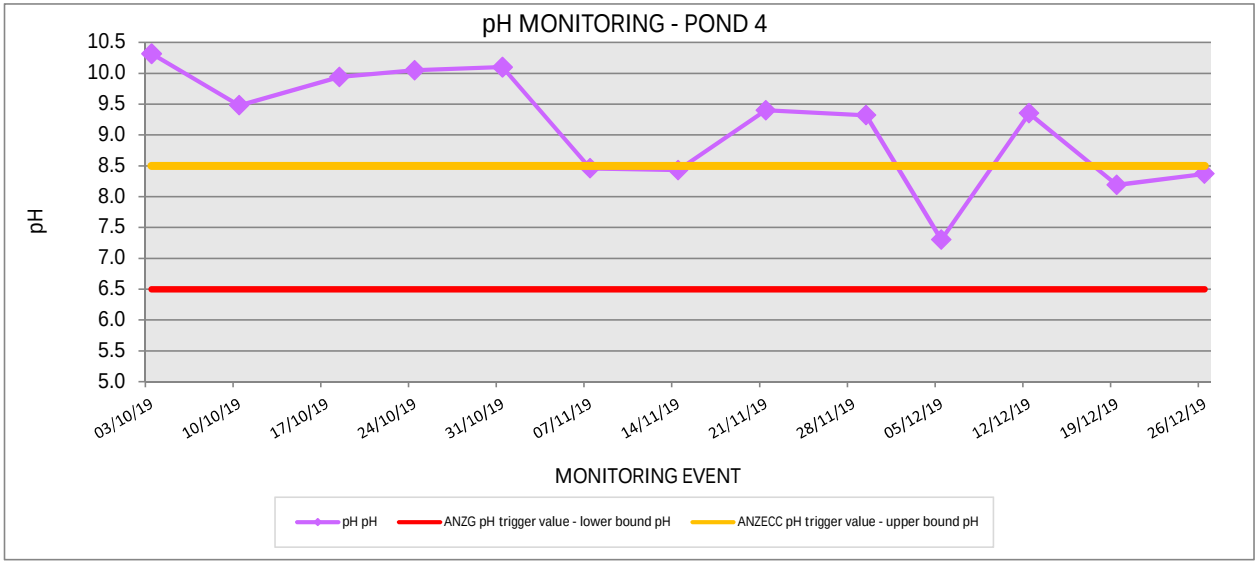


Pond 4 Monitoring Location - Weekly pH Monitoring

Pond 4 - Weekly pH Monitoring
October 2019 to December 2019

Monitoring Event	pH	ANZG pH trigger value - lower bound	ANZECC pH trigger value - upper bound	Unable to Sample
	pH	pH	pH	
3-Oct-19	**10.32**	6.5	8.5	
10-Oct-19	**9.48**	6.5	8.5	
18-Oct-19	**9.94**	6.5	8.5	
24-Oct-19	**10.05**	6.5	8.5	
31-Oct-19	**10.10**	6.5	8.5	
7-Nov-19	8.46	6.5	8.5	
14-Nov-19	8.43	6.5	8.5	
21-Nov-19	**9.40**	6.5	8.5	
29-Nov-19	**9.32**	6.5	8.5	
5-Dec-19	7.30	6.5	8.5	
12-Dec-19	**9.35**	6.5	8.5	
19-Dec-19	8.19	6.5	8.5	
26-Dec-19	8.37	6.5	8.5	

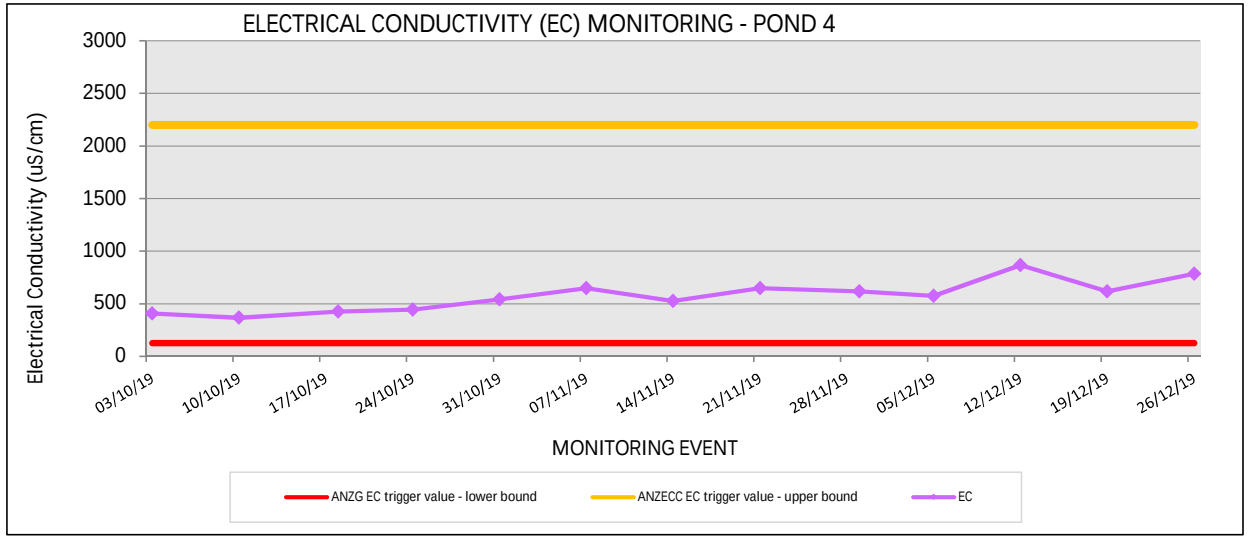
Bold denotes guidline exceedance



Pond 4 Monitoring Location - Weekly EC Monitoring

Pond 4 - Weekly EC Monitoring
October 2019 to December 2019

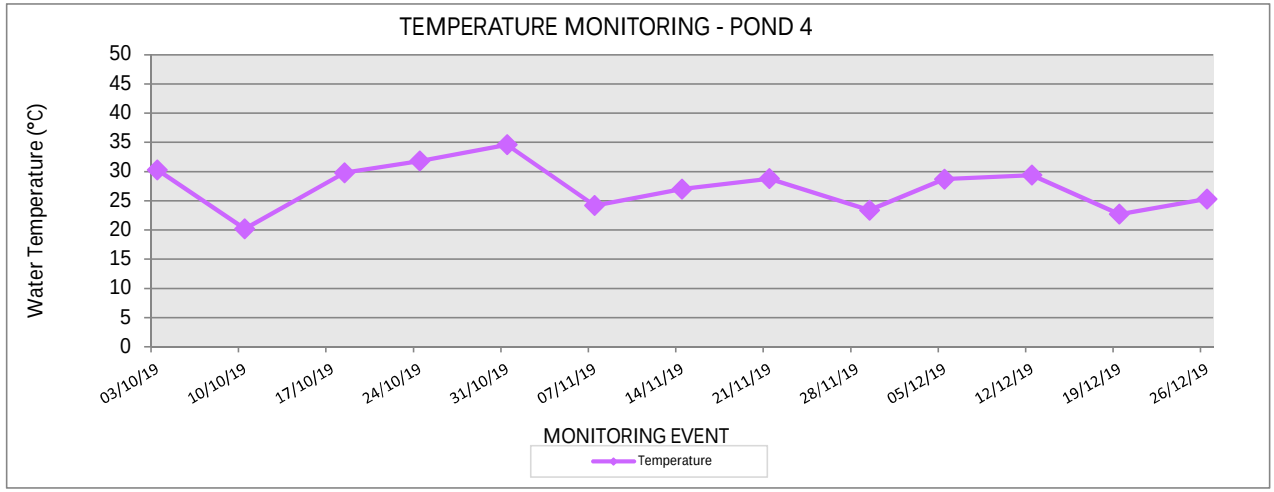
Monitoring Event	EC	ANZG EC trigger value - lower bound	ANZECC EC trigger value - upper bound	Unable to Sample
	µS/cm	µS/cm	µS/cm	
3-Oct-19	409	125	2200	
10-Oct-19	367	125	2200	
18-Oct-19	426	125	2200	
24-Oct-19	444	125	2200	
31-Oct-19	543	125	2200	
7-Nov-19	647	125	2200	
14-Nov-19	527	125	2200	
21-Nov-19	647	125	2200	
29-Nov-19	617	125	2200	
5-Dec-19	576	125	2200	
12-Dec-19	868	125	2200	
19-Dec-19	617	125	2200	
26-Dec-19	786	125	2200	



Pond 4 Monitoring Location - Weekly Temperature Monitoring

Pond 4 - Weekly Temperature Monitoring
October 2019 to December 2019

Monitoring Event	Temperature °C	Unable to Sample
3-Oct-19	30.3	
10-Oct-19	20.2	
18-Oct-19	29.8	
24-Oct-19	31.8	
31-Oct-19	34.6	
7-Nov-19	24.2	
14-Nov-19	27.0	
21-Nov-19	28.8	
29-Nov-19	23.4	
5-Dec-19	28.7	
12-Dec-19	29.4	
19-Dec-19	22.7	
26-Dec-19	25.3	

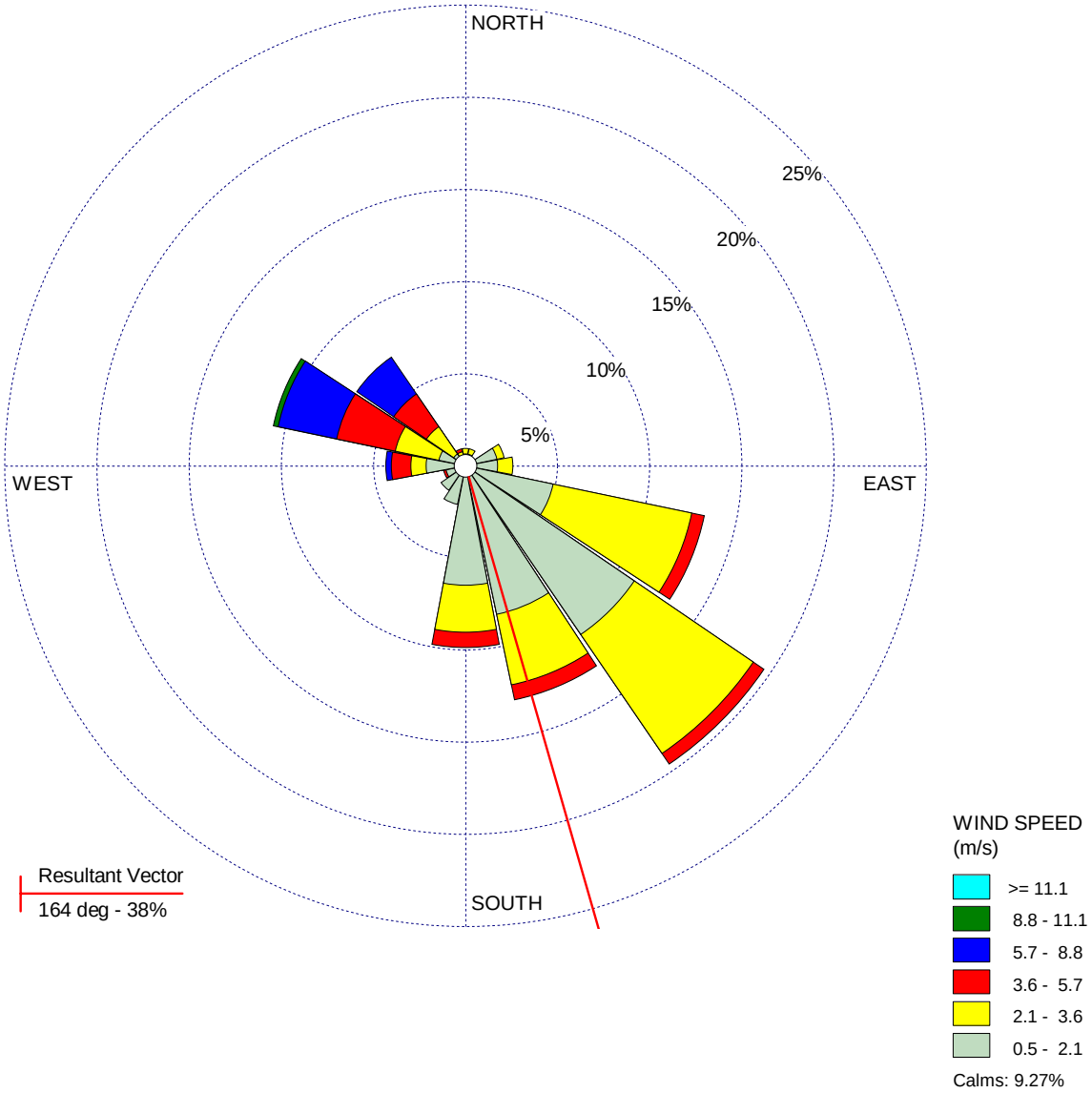


WIND ROSE PLOT:

NCIA - Meteorological Data
December Monitoring Period - December 2019

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/12/2019 - 01:00** **End Date: 31/12/2019 - 23:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **9.27%**	TOTAL COUNT: **742 hrs.**	
	AVG. WIND SPEED: **2.25 m/s**	DATE: **15/01/2020**	PROJECT NO.: **60613063**