

Stephen Parry
Chief Executive
Gore District Council
PO Box 8
Gore, 9740

8th May 2020

Dear Stephen

RE: NH₃ Monitoring Report 01 – 30 April 2020

Background

Gore District Council (GDC) engaged Land and Water Science to conduct continuous monitoring of ammonia (NH₃) gas emissions from the Mataura Mill dross storage site (121 Kana Street, Mataura) from April 2018. GDC require emission values to comply with consent conditions that specify a limit of 5 ppm NH₃ discharged to air.

In April 2017, Photonic Innovations (PI) installed two NH₃ sensors for comparison of the indoor and outdoor ammonia levels. Measurements were recorded continuously and reported as a 5-minute average for both the outdoor and indoor sensors. In April 2020, Photonic Innovations ceased operating, resulting in the loss of the dashboard functionality to access sensor data via the web. Land and Water Science have devised a means to retrieve the outdoor sensor data and continue to monitor and report on the ammonia emission at the site.

April Summary

Weekly summaries of outdoor emission results from monitoring between 01 April and 30 April are presented in this report. During this period the maximum NH₃ concentration detected by the outdoor sensor was 6.7 ppm (Figure 1 and Table 1). Maximum mean and median NH₃ concentrations during this period were 0.8ppm and 0.7ppm for the outdoor sensor. The maximum ammonia concentration exceeded the consented amount of 5.0 ppm on two occasions.

Daily (diurnal) variation in NH₃ concentration shows a consistent pattern in the data. Specifically, NH₃ concentration is strongly correlated with air temperature, reaching maximum values as air temperatures peak during the day and minimum values at night when air temperatures are at their lowest. Although diurnal variation is evident in the data, average air temperature is a greater control over the absolute concentration with maximum concentrations recorded during the warmest months of the year and minimum concentrations recorded during the coolest months of the year. The correlation between air temperature and NH₃ concentration for this reporting period is displayed in Figure 1.

Table 1. Summary statistics for the Outdoor NH₃ sensor, 01 April – 30 April 2020. NH₃ measured in parts per million (ppm).

Date	01-04 Apr	05-11 Apr	12-18 Apr	19-25 Apr	26-30 Apr
Mean	0.7	0.8	0.8	0.7	0.8
Std Dev	0.4	0.4	0.4	0.3	0.3
Median	0.7	0.7	0.7	0.7	0.7
Minimum	0.4	0.4	0.4	0.4	0.4
Maximum	5.4	4.3	4.8	6.7	4.0

01 - 04 Apr 2020

Outdoor NH₃ concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 5.4 ppm for this period. Outdoor mean and median values were 0.7 and 0.7 ppm respectively.

05 – 11 Apr 2020

Outdoor NH₃ concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 4.3 ppm for this period. Outdoor mean and median values were 0.8 and 0.7 ppm respectively.

12 – 18 Apr 2020

Outdoor NH₃ concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 4.8 ppm for this period. Mean and median values were 0.8 ppm and 0.7 ppm respectively.

19 – 25 Apr 2020

Outdoor NH₃ concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 6.7 ppm for this period. Mean and median values were 0.7 and 0.7 ppm respectively.

26 – 30 Apr 2020

Outdoor NH₃ concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 4.0 ppm for this period. Mean and median values were 0.8 and 0.7 ppm respectively.

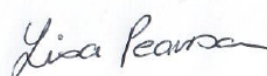
Summary

During the monitoring period (01 – 30 April) Outdoor NH₃ concentrations reached a maximum of 6.7 ppm, while maximum mean and median concentrations were 0.8 and 0.7 ppm respectively. The outdoor sensor exceeded the consent conditions of 5.0 ppm twice during the month of April. These values are consistent with warmer outdoor temperatures and minimal wind. Overall, temperature continues to be the most dominant control over NH₃ concentration.

Kind regards



Richard Dean
Consultant Engineer
Land and Water Science Ltd



Dr Lisa Pearson
Lead Earth and Environmental Scientist
Land and Water Science Ltd

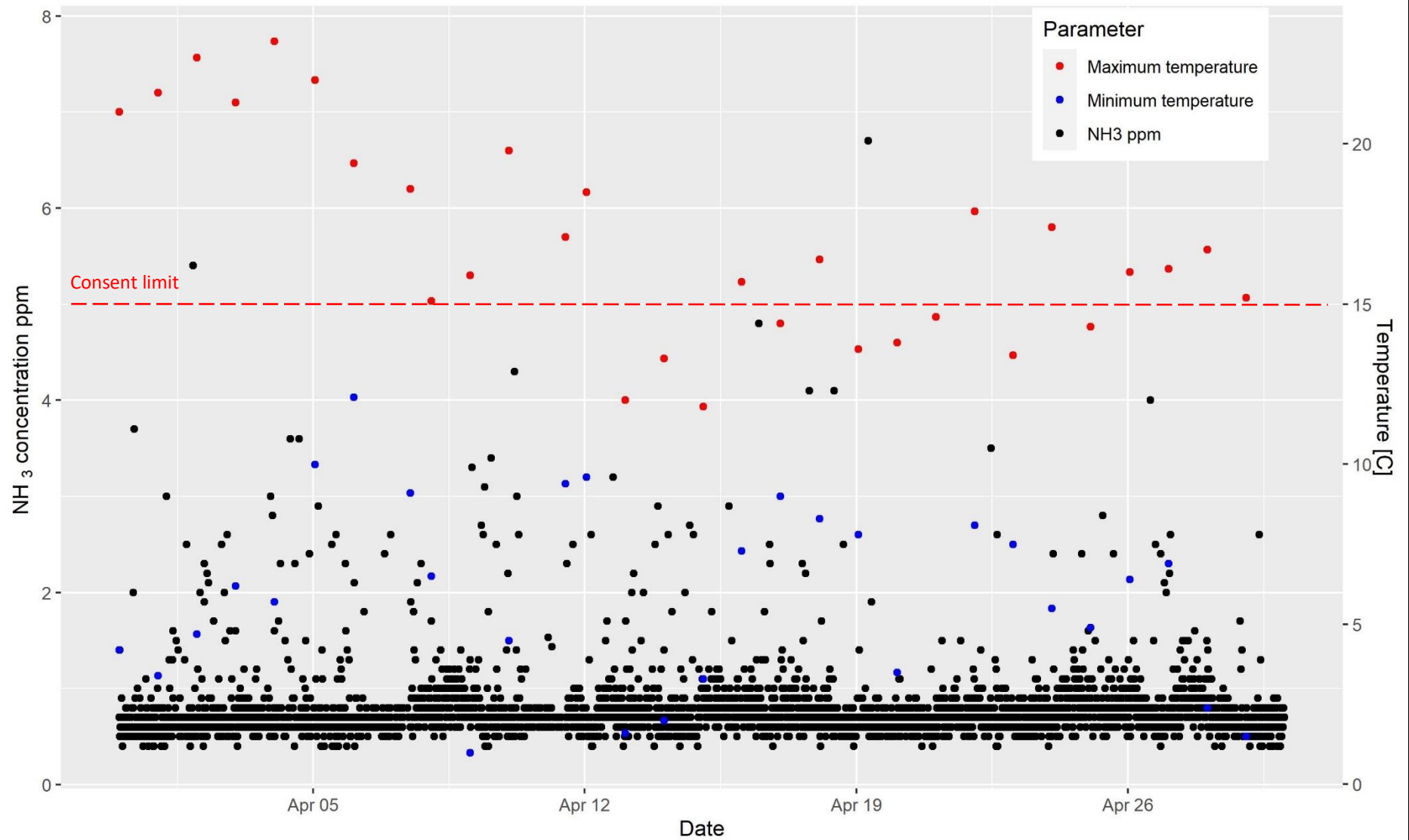


Figure 1: Continuous outdoor NH₃ concentration and maximum daily temperature.