

Northern Bus Garage

Noise, Vibration, and Dust Monitoring Report (December 2023)

Noise, Vibration, and Dust levels were monitored as part of the reconstruction of Northern Bus Garage, 4615 14th Street, NW, Washington, DC, for the month of December 2023.

The following memorandum identifies the monitoring points and instruments, presents the data, and provides a brief analysis of the results per monthly monitoring report attached by Geo Instruments for Clark Construction. The report is organized by medium: noise, vibration, and dust. Figures and graphs are attached. The red dashed line on each of the graphs represents the monitoring thresholds, which are summarized below for each instrument.

Noise Monitoring

Five noise monitors are positioned around the perimeter of the project site. (See Figure 1) Under DC regulations, the regulatory standard is 80 dBA, measured 25 ft from the property line (20 DCMR 2802.1). Because the noise monitoring devices are placed on the property line (rather than a 25 ft offset), the monitoring threshold for site activities is adjusted to 85 dBA (assuming the noise level will dissipate). Noise levels and vibration levels were measured automatically with Micromate and Geophone Instrument.

No operating issue with the monitoring instruments was identified.

Numerous noise level exceedances at all hours of the day and all days of the week. Mic1 recorded the highest noise levels of any location after working hours and on weekends. In addition, Mic1 and Mic5 were similar to one another with 66% of the exceedances coming outside of working hours. Mic2 had 46% of its exceedances outside of working hours. Mic3 recorded 50% of its exceedances during nights and weekends. Mic4 had 17% of its exceedances outside of working hours. Please see table 1 (The "Work Hours" category includes all weekend shifts and evening shifts that were worked during the month).

Vibration Monitoring

Five vibration monitors are positioned around the perimeter of the project site. (See Figure 1) Vibration thresholds are based the WMATA Design Criteria. Monitors VM-1 and VM-2 are set at a lower vibration threshold due to their proximity to the historic façade, which is more sensitive to any movement. Noise levels and vibration levels were measured automatically with Micromate and Geophone Instrument.

Table 2

Instrument Type	Monitoring Threshold
Vibration Monitor (VM-1)	0.2 in/sec
Vibration Monitor (VM-2)	0.2 in/sec
Vibration Monitor (VM-3)	2.0 in/sec
Vibration Monitor (VM-4)	2.0 in/sec
Vibration Monitor (VM-5)	2.0 in/sec

No operating issue with the monitoring instruments was identified.

Graphs showing monitoring results are presented in Graphs 1 to 5.

A single vibration spike of 0.34 in/sec occurred at the VM2 location on December 6 at 09:25 am due to the monitor being bumped by a piece of equipment.

Dust Monitoring Threshold Values and Exceedances:

Three dust monitors are positioned at the project site. (See Figure 2) EPA regulatory thresholds are based on a 24-hour monitoring period; the project has adopted thresholds to monitor site levels and provide an indication of when EPA standards might be exceeded. (See Table 3) Dust measurements were monitored using Aeroqual Dust Sentry Pro.

Table 3

Dust Monitoring Measurement	Monitoring Threshold
Particulates (PM2.5)	40 µg/m ³
Particulates (PM10)	50 µg/m ³

DM1 began experiencing power interruptions on November 30, 2023. The battery was exchanged but the modem would not power up. A replacement unit was installed on December 8. All three of the units have been fitted with hardware that allows tracking and alarming upon low voltage. Due to site restrictions, DM1 cannot be plugged into main power so continued battery swaps will be the interim solution until site conditions change.

Graphs showing monitoring results are presented in Graphs 6-11.

Higher winds in the evening of December 2 caused exceedances from 9:36pm to 9:47 pm. DM2 recorded a PM2.5 of 41. DM3 recorded a PM2.5 of 51 and a PM10 of 53. More winds on the evening of December 16 caused an exceedance at 11:12 pm. DM1 recorded a PM2.5 of 65 and a PM10 of 89.



Monitoring Report

WMATA Bus Garage Monthly Report

December 2023

Figure 1: Vibration and Noise Monitor Location Plan

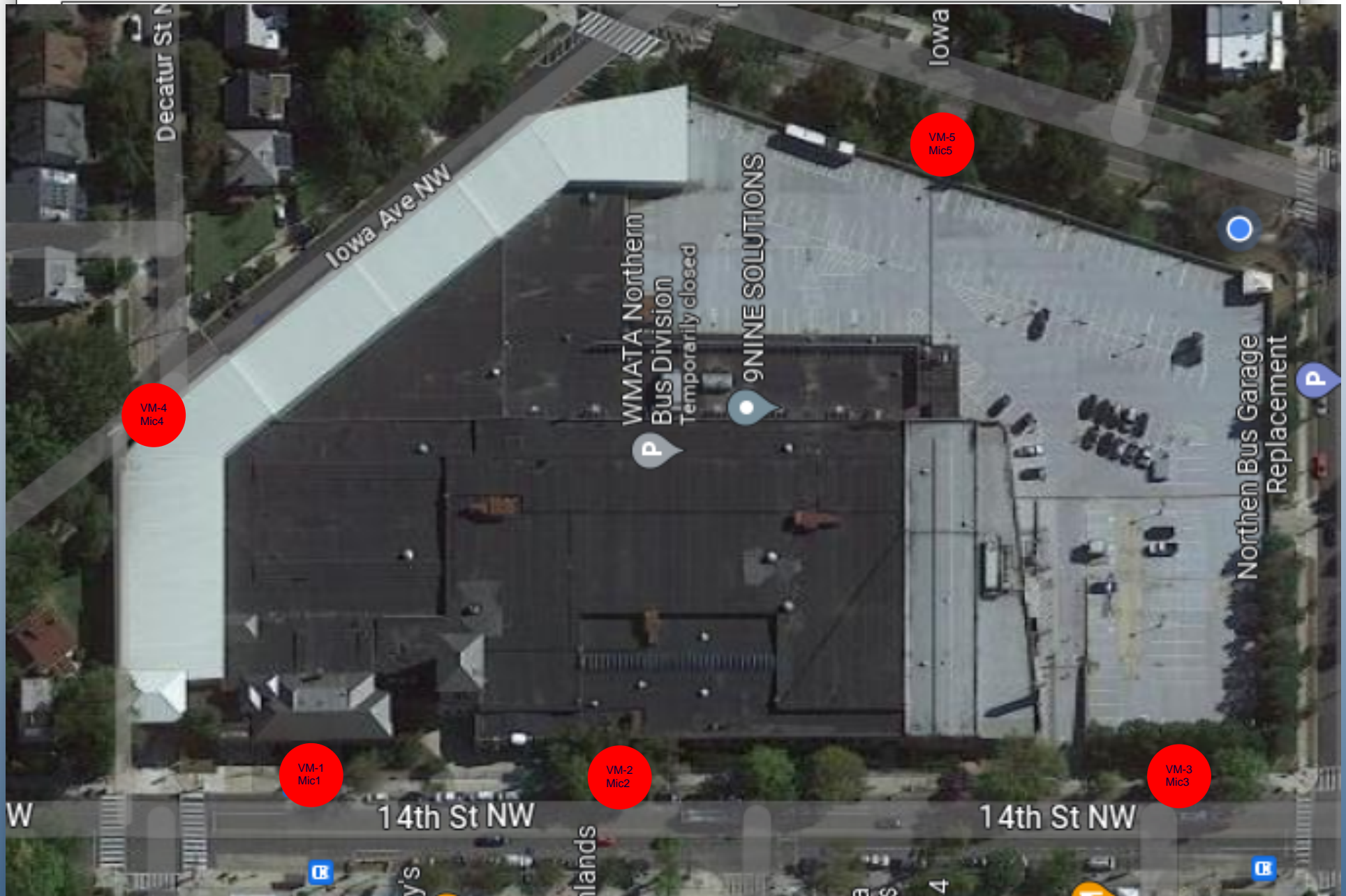


Figure 2: Dust Monitor Location Plan

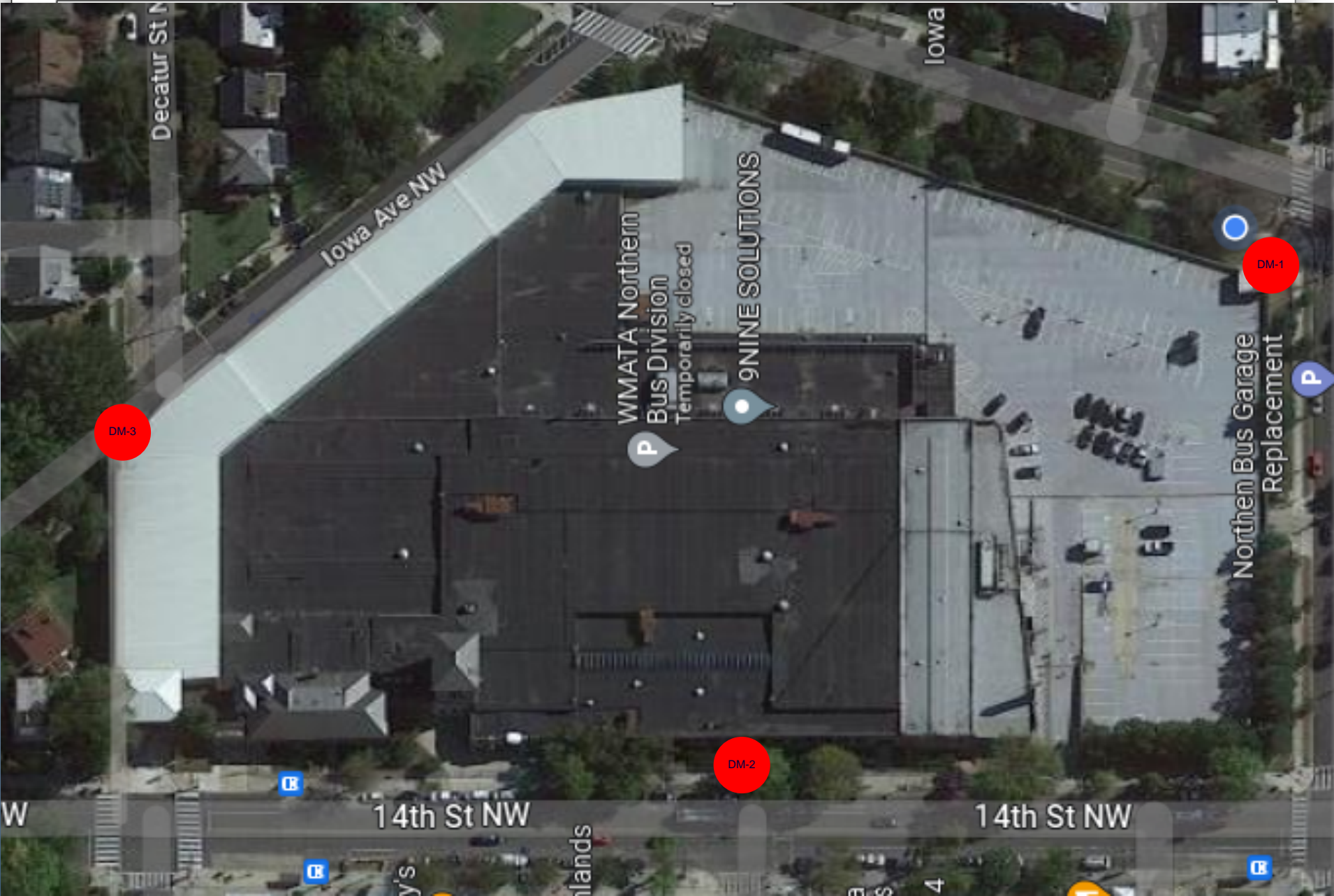


Table 1: Noise Summaries

VM-1 Mic

VM1-MIC		
	Exceedance	Percentage
Work hours	348	44.22%
After hours	191	24.27%
Weekends	248	31.51%
Total	787	100%

	Work hours	After hours	Weekends
Lmax	114.7	114.7	118.4
Lmin	66.2	55.2	60.9
L10	84	78	76
L90	69	62	63
Leq	84.2	83.9	86.9

VM-2 Mic

VM2-MIC		
	Exceedance	Percentage
Work hours	254	54.39%
After hours	114	24.41%
Weekends	99	21.20%
Total	467	100%

	Work hours	After hours	Weekends
Lmax	115.1	112.7	112.5
Lmin	73	50.7	48.7
L10	82	72	73
L90	75	54	51
Leq	79.1	77.3	78.1

VM-3 Mic

VM3-MIC		
	Exceedance	Percentage
Work hours	277	50.36%
After hours	121	22.00%
Weekends	152	27.64%
Total	550	100%

	Work hours	After hours	Weekends
Lmax	105	112	119.2
Lmin	72	65.7	62.5
L10	79	75	79
L90	74	69	67
Leq	76.8	80.2	85.2

VM-4 Mic

VM4-MIC		
	Exceedance	Percentage
Work hours	144	83.72%
After hours	18	10.47%
Weekends	10	5.81%
Total	172	100%

	Work hours	After hours	Weekends
Lmax	109.8	99.2	91.6
Lmin	70.3	45	50.8
L10	95	80	57
L90	73	61	54
Leq	89.8	77.1	64.7

VM-5 Mic

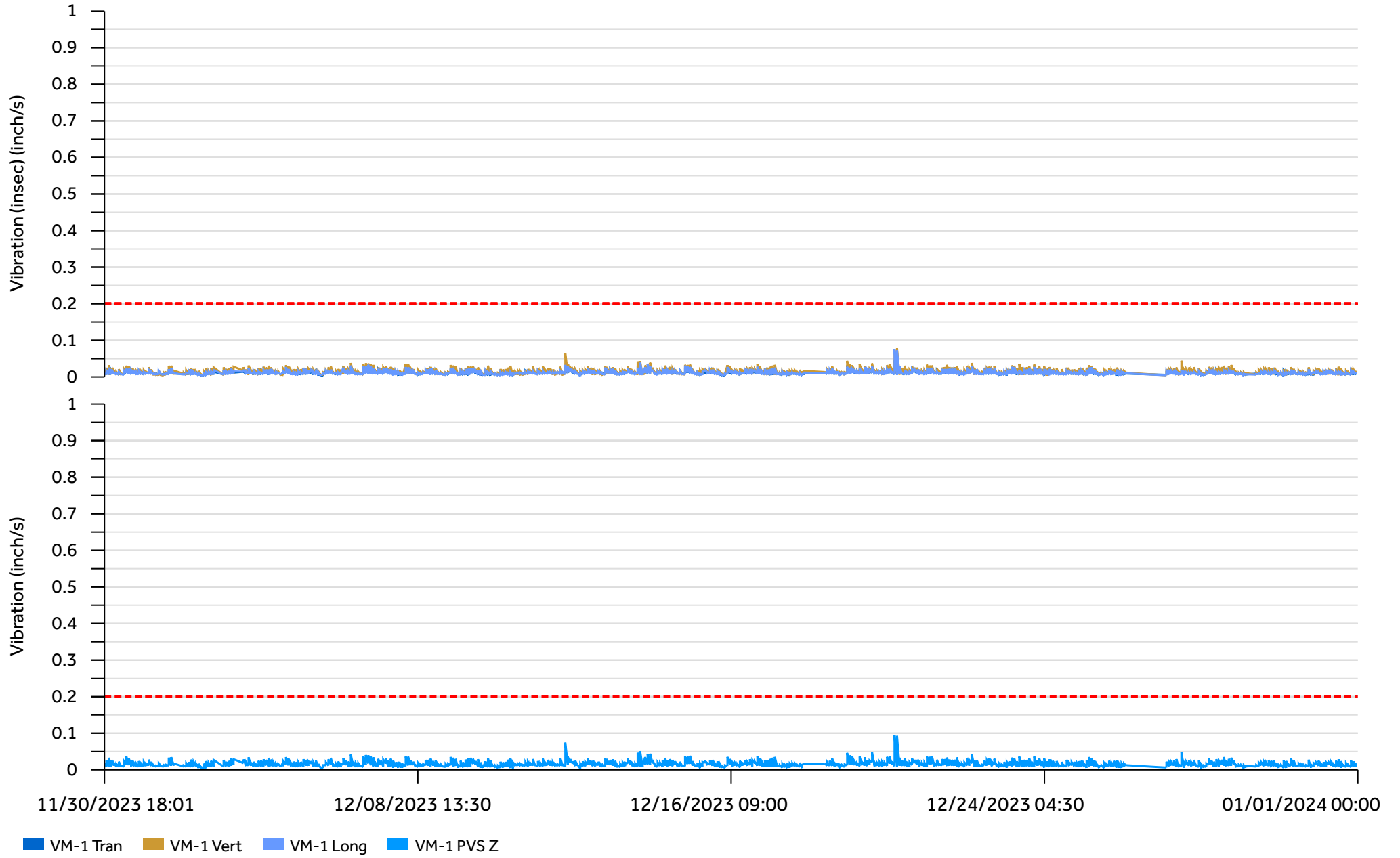
VM5-MIC		
	Exceedance	Percentage
Work hours	101	44.49%
After hours	52	22.91%
Weekends	74	32.60%
Total	227	100%

	Work hours	After hours	Weekends
Lmax	112.4	110.3	107.3
Lmin	60.6	47.9	60.6
L10	82	72	79
L90	65	57	63
Leq	79	81.5	79.1

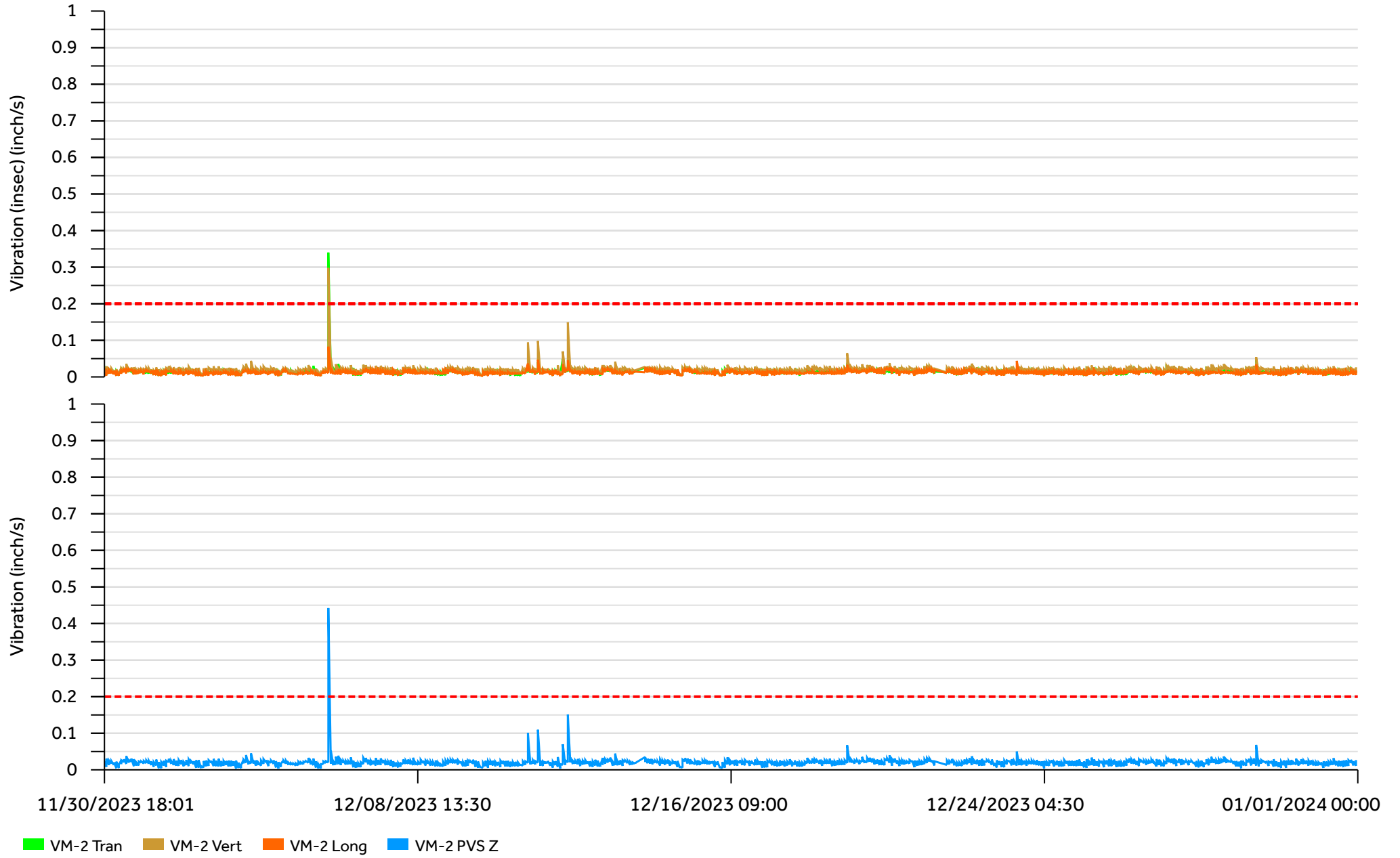
NOTES:

- Exceedance analyses are presented in the left table. Noise level summaries are presented in the right table.
- Measurements and Key:
 Lmax: Maximum Noise Level (for the month, in dBA)
 Lmin: Minimum Noise Level (for the month, in dBA)
 L10: The noise level exceeded 10% of the time (for the month, in dBA)
 L90: The noise level exceeded 90% of the time (for the month, in dBA)
 Leq: Equivalent Continuous Sound Level, an 'average' (for the month, in dBA)

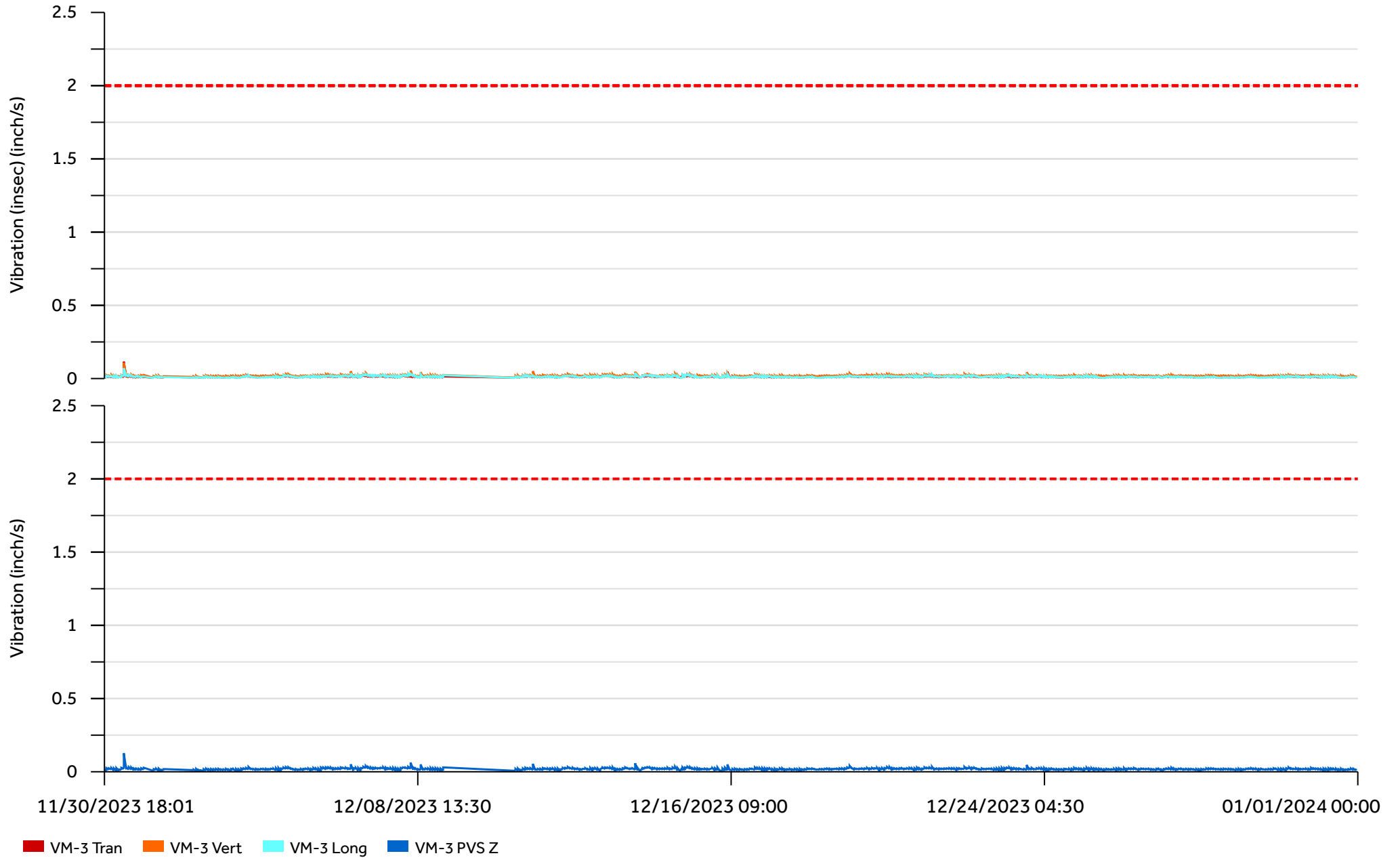
Graph 1:
VM-1- Vibration Monitor



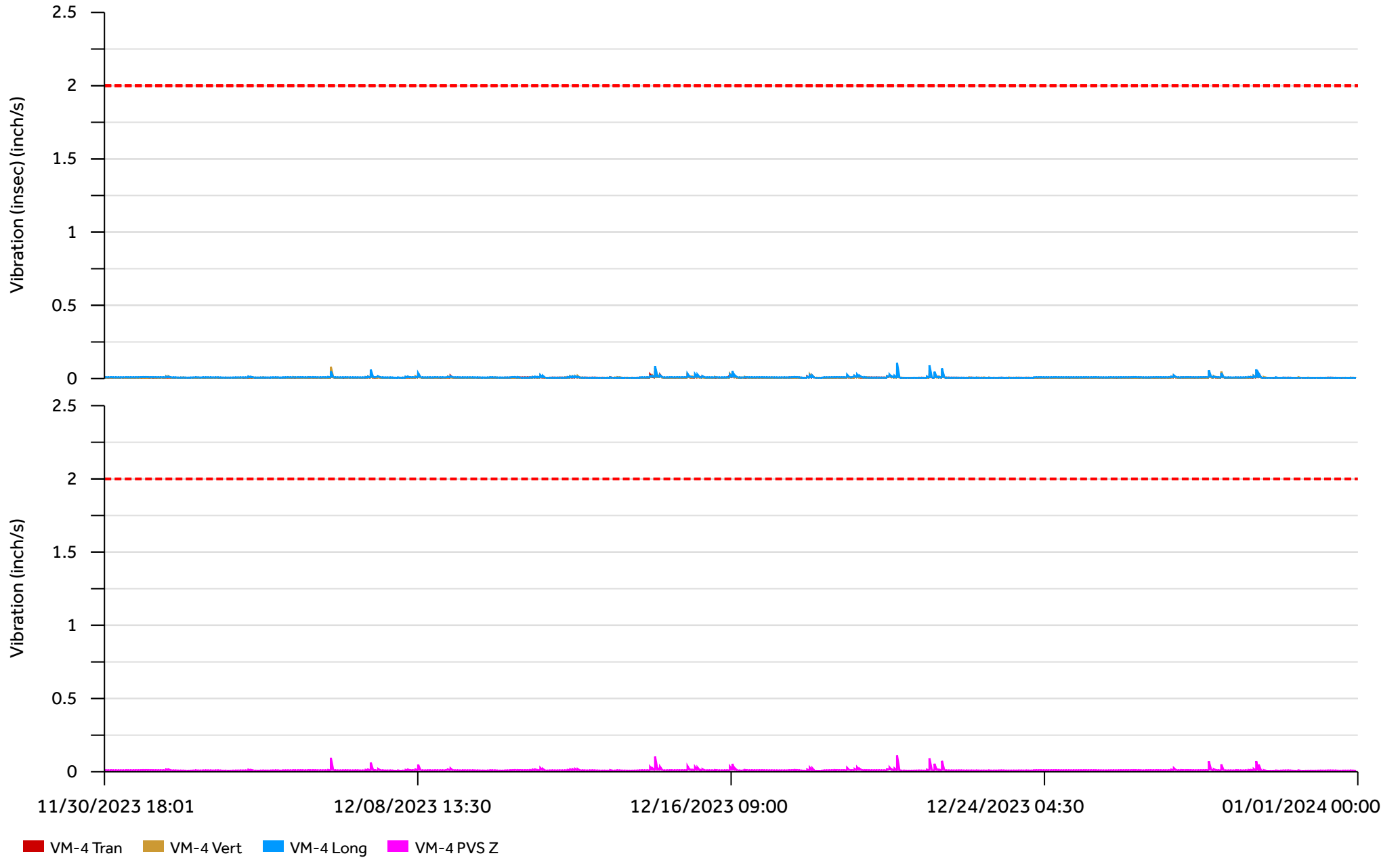
Graph 2:
VM-2- Vibration Monitor



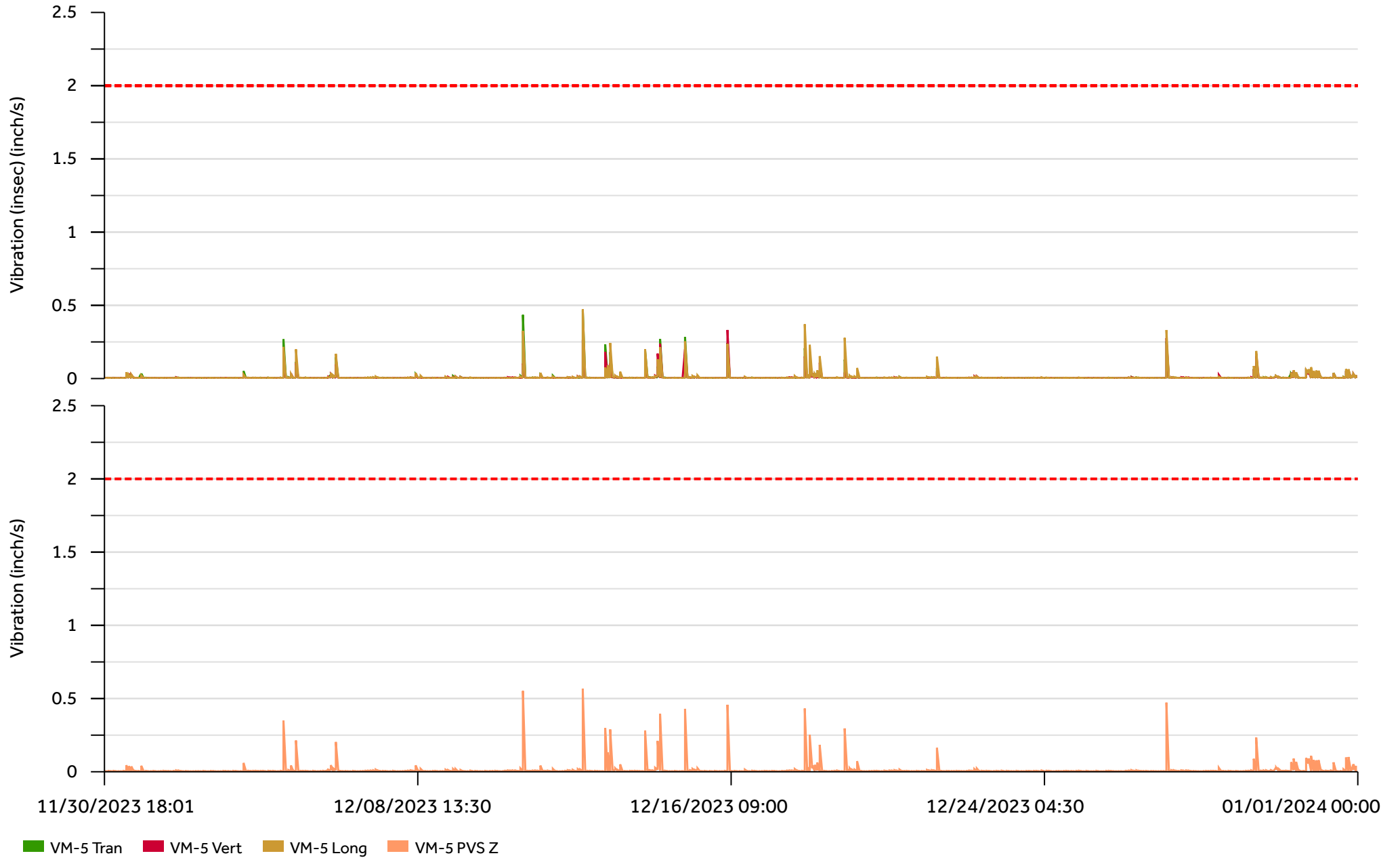
Graph 3:
VM-3- Vibration Monitor



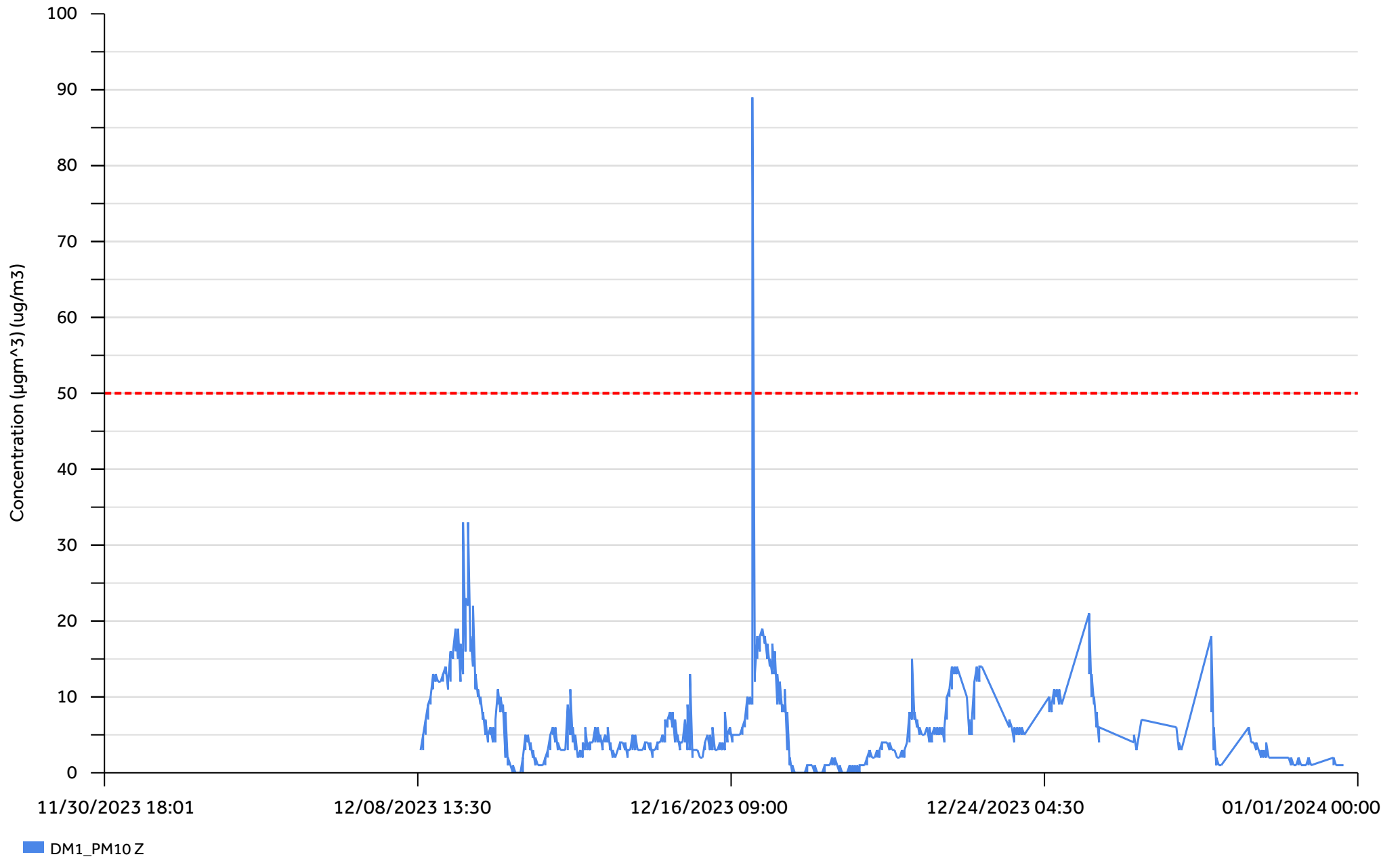
Graph 4:
VM-4- Vibration Monitor



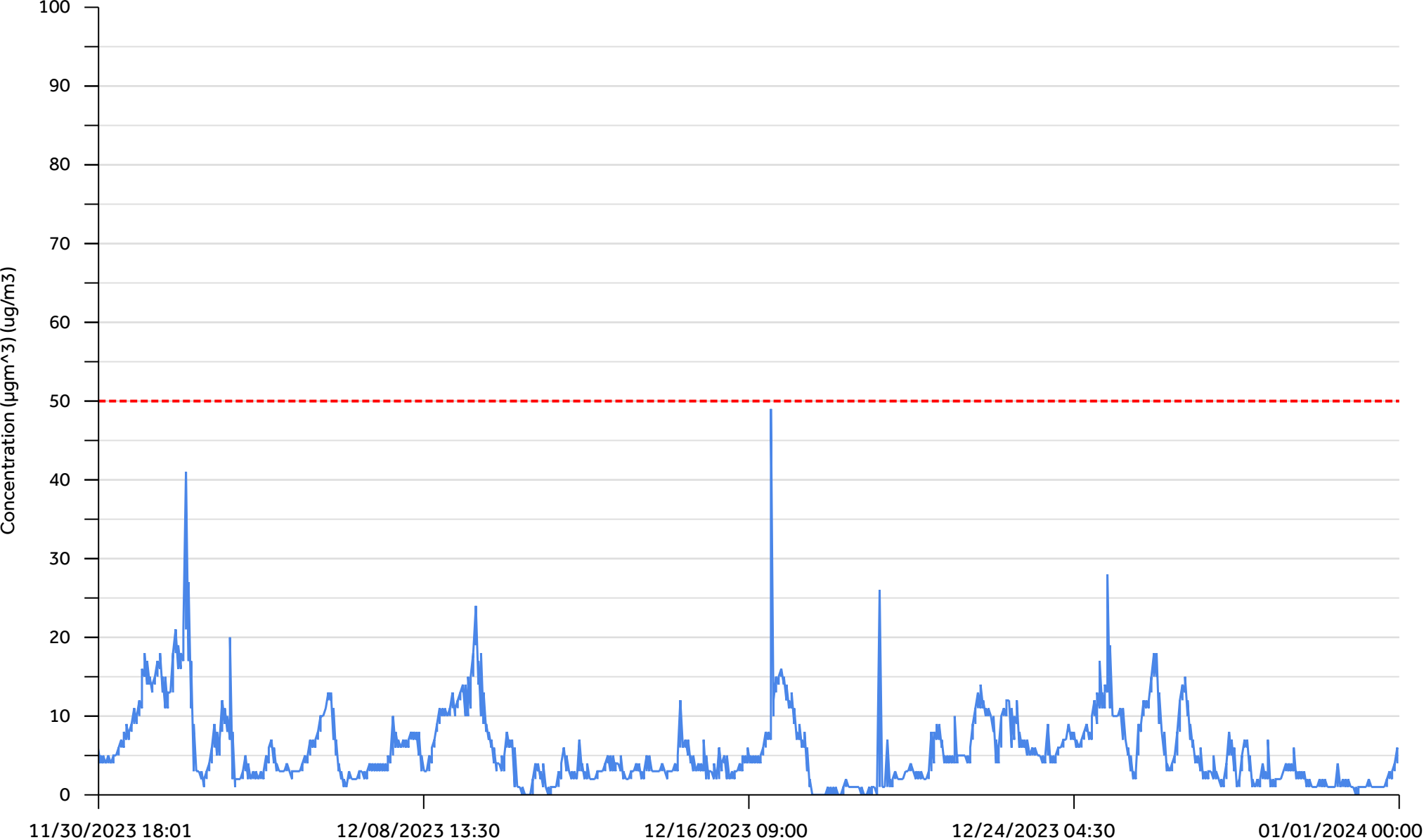
Graph 5:
VM-5- Vibration Monitor



Graph 6:
DM1 - PM10

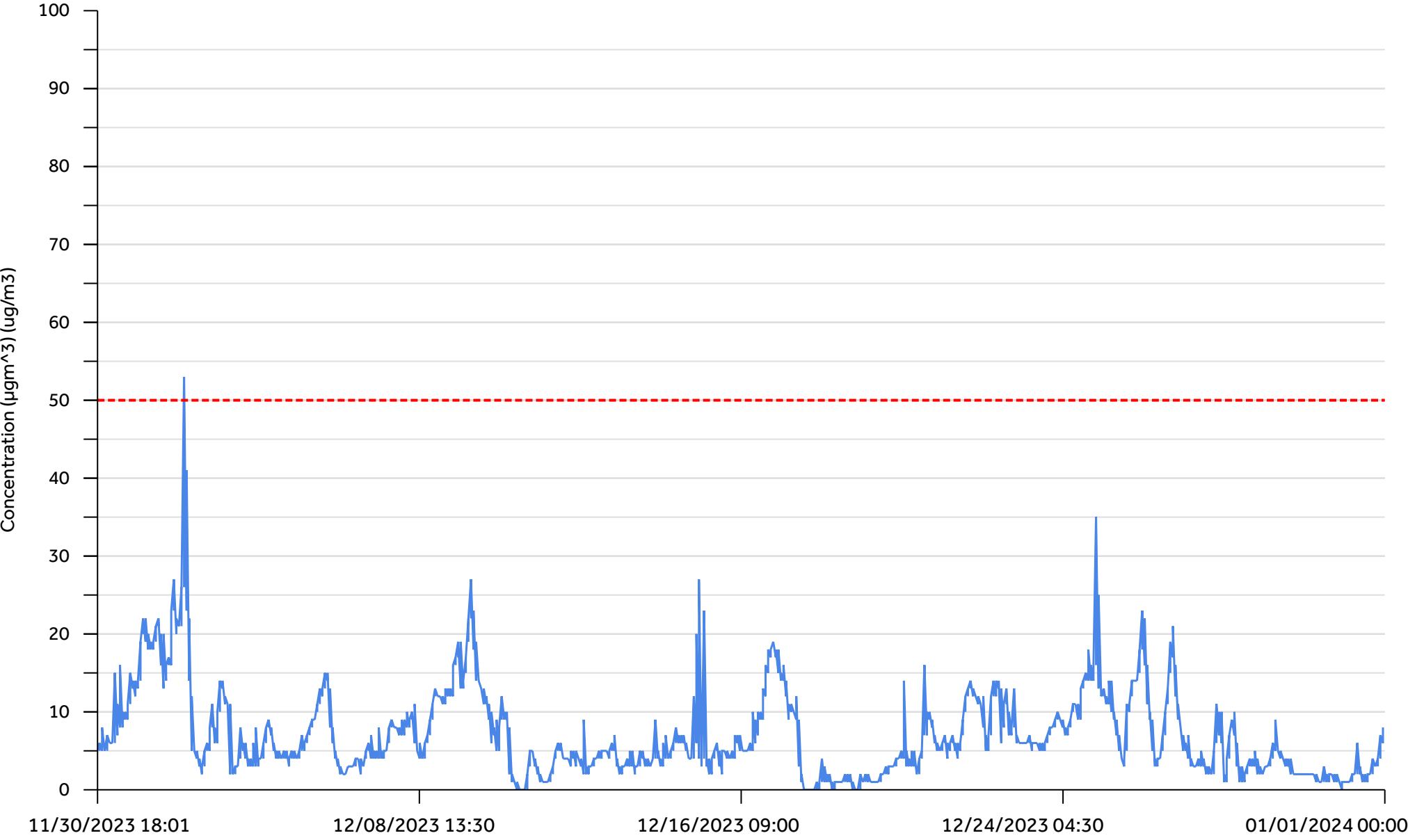


Graph 7:
DM2-PM10



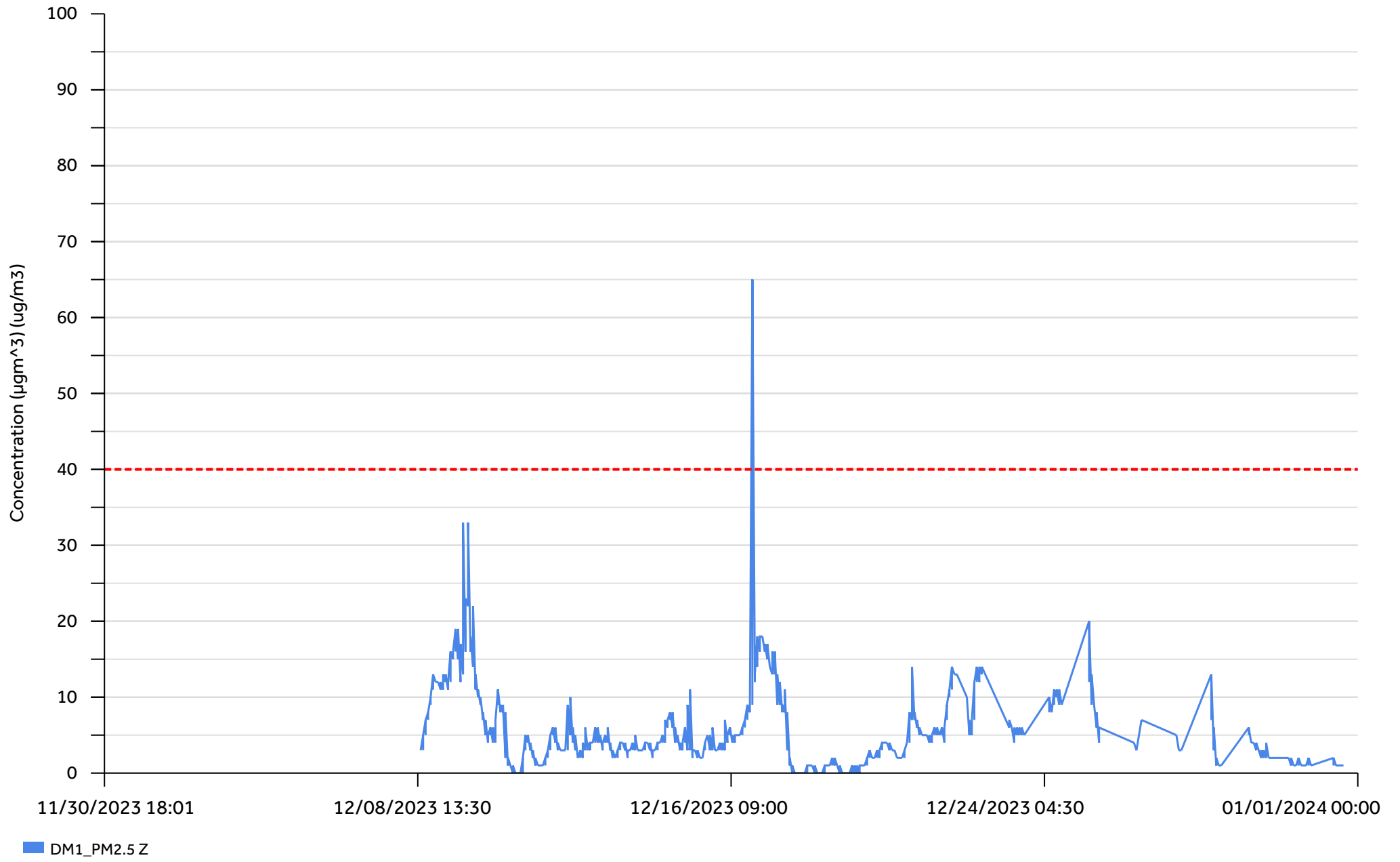
DM2_PM10 Z

Graph 8:
DM3-PM10

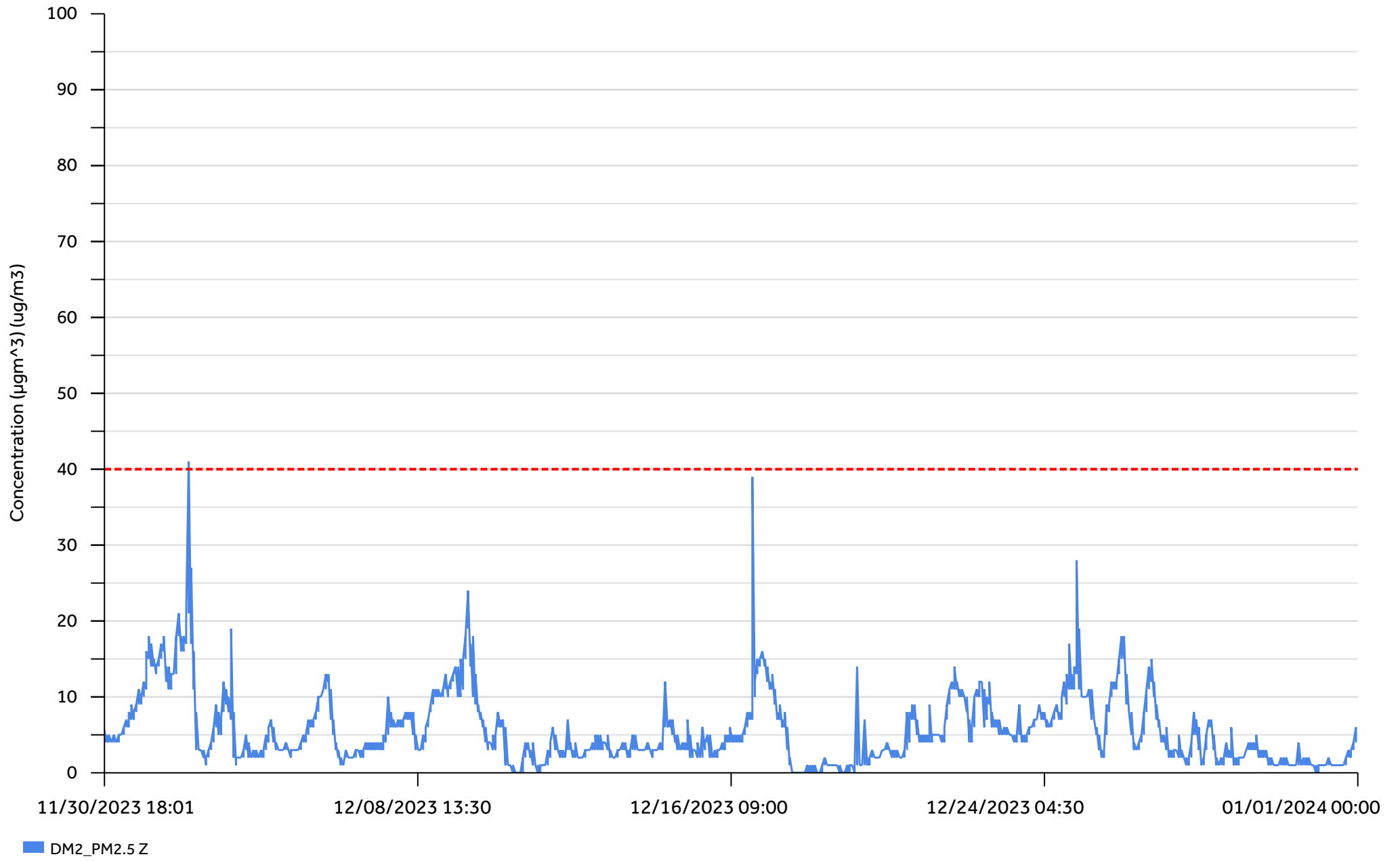


DM3_PM10 Z

Graph 9:
DM1-PM2.5



Graph 10:
DM2-PM2.5



Graph 11:
DM3-PM2.5

