Northern Bus Garage
Noise, Vibration, and Dust Monitoring Report (September 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 September 2023.

The following memorandum identifies the monitoring points and instruments, presents the data, and provides a brief analysis of the results per the Geo Instruments monthly monitoring report attached. 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.

Numerous noise level exceedances were observed during the monitoring period. Exceedances were reported in the evening and on weekends when the project site was not active. These sources are not construction related. Mic2 recorded the highest noise levels of any location which were highest on weekends outside of working hours. In addition, Mic1, Mic2, Mic3, and Mic5 reported similar levels, with approximately 39% of the exceedances coming outside of working hours. Mic4 had 25% 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.

No vibration exceedance was reported during the month.

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 $\mu g/m^3$
Particulates (PM10)	50 $\mu g/m^3$

No operating issue with the monitoring instruments was identified.

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

No dust monitoring exceedance was reported during the month.

GEO INSTRUMENTS

Monitoring Report

WMATA Bus Garage Monthly Report

September 2023

Figure 1: Vibration and Noise Monitor Location Plan

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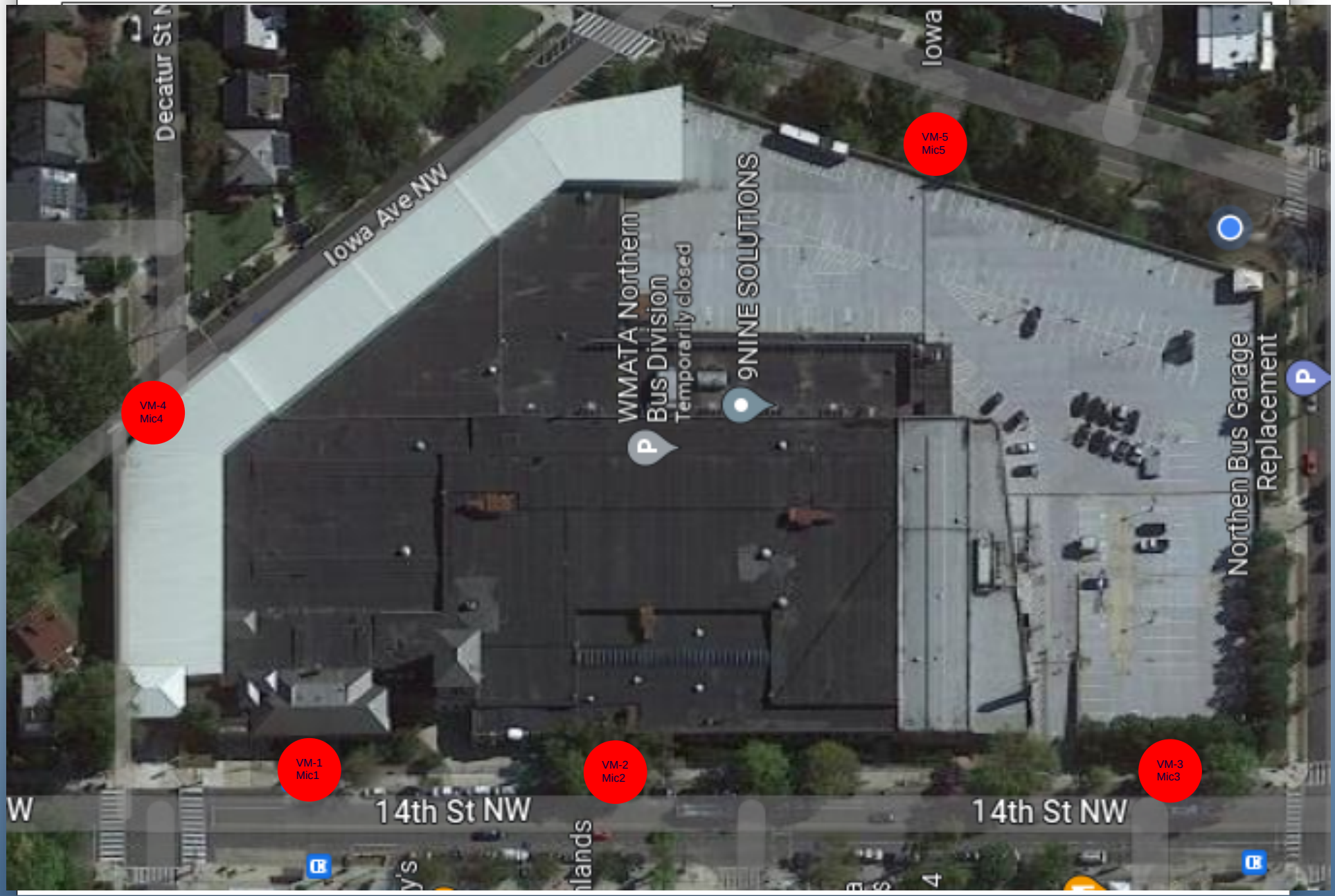


Figure 2: Dust Monitor Location Plan

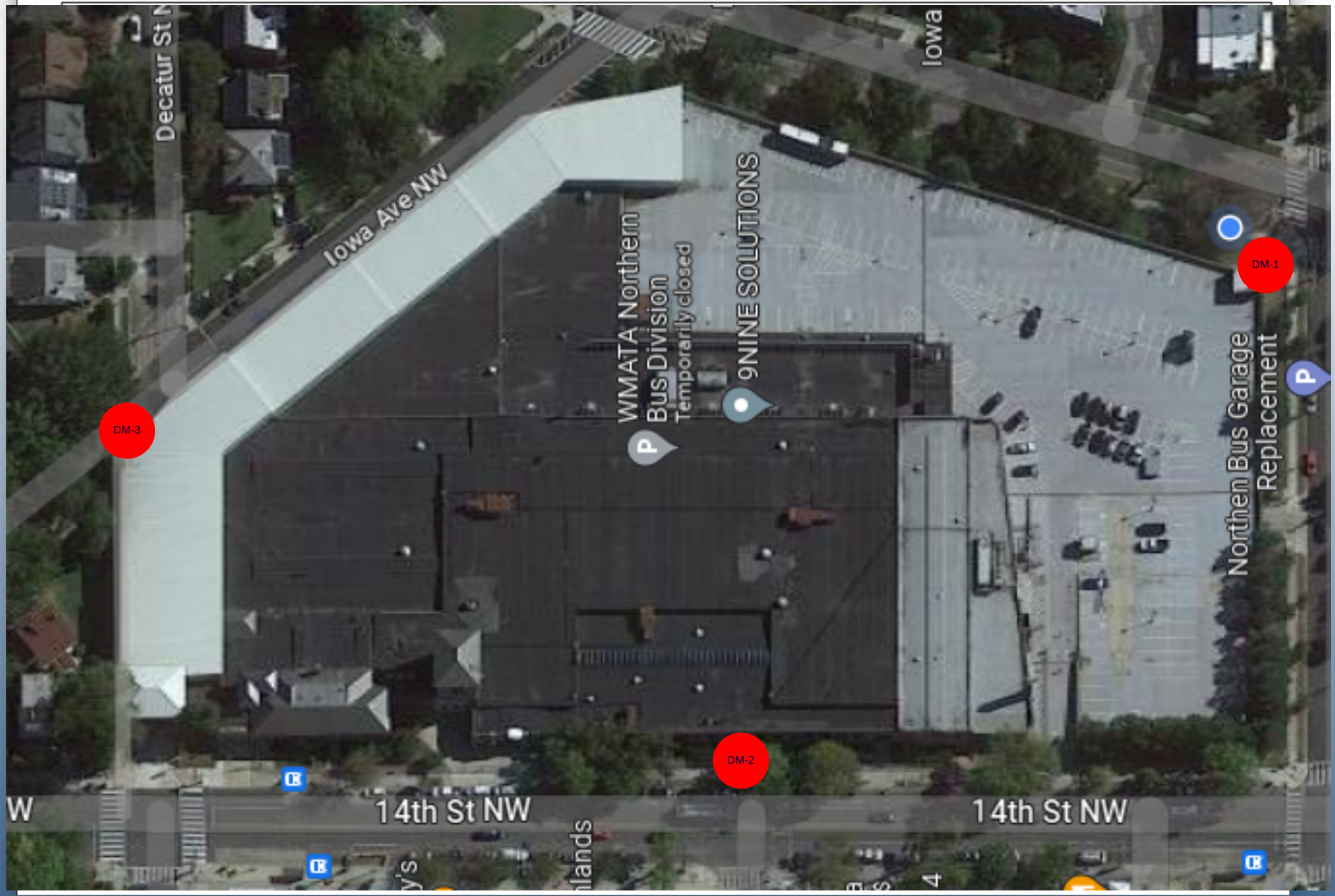


Table 1: Noise Exceedance Summaries

VM1-MIC		
	Exceedance	Percentage
Work hours	642	60.97%
After hours	123	11.68%
Weekends	288	27.35%
Total	1053	100%

	Work hours	After hours	Weekends
Lmax	112.1	115.7	109.1
Lmin	74	61.9	69.3
L10	86	76	76
L90	76	66	71
Leq	81.8	83.9	80.8

VM2-MIC		
	Exceedance	Percentage
Work hours	152	61.54%
After hours	29	11.74%
Weekends	66	26.72%
Total	247	100%

	Work hours	After hours	Weekends
Lmax	116	111	116.5
Lmin	64.9	45.2	50.1
L10	77	66	72
L90	69	49	56
Leq	77.4	72.8	78.4

VM3-MIC		
	Exceedance	Percentage
Work hours	356	61.70%
After hours	93	16.12%
Weekends	128	22.18%
Total	577	100%

	Work hours	After hours	Weekends
Lmax	109.3	111.5	110.8
Lmin	65.3	56.5	57.6
L10	77	73	75
L90	70	62	63
Leq	79.5	80.7	80.4

VM4-MIC		
	Exceedance	Percentage
Work hours	59	76.62%
After hours	9	11.69%
Weekends	9	11.69%
Total	77	100%

	Work hours	After hours	Weekends
Lmax	102.6	95.5	92.6
Lmin	60	53.8	53.4
L10	70	72	72
L90	65	63	58
Leq	77.5	70.6	69

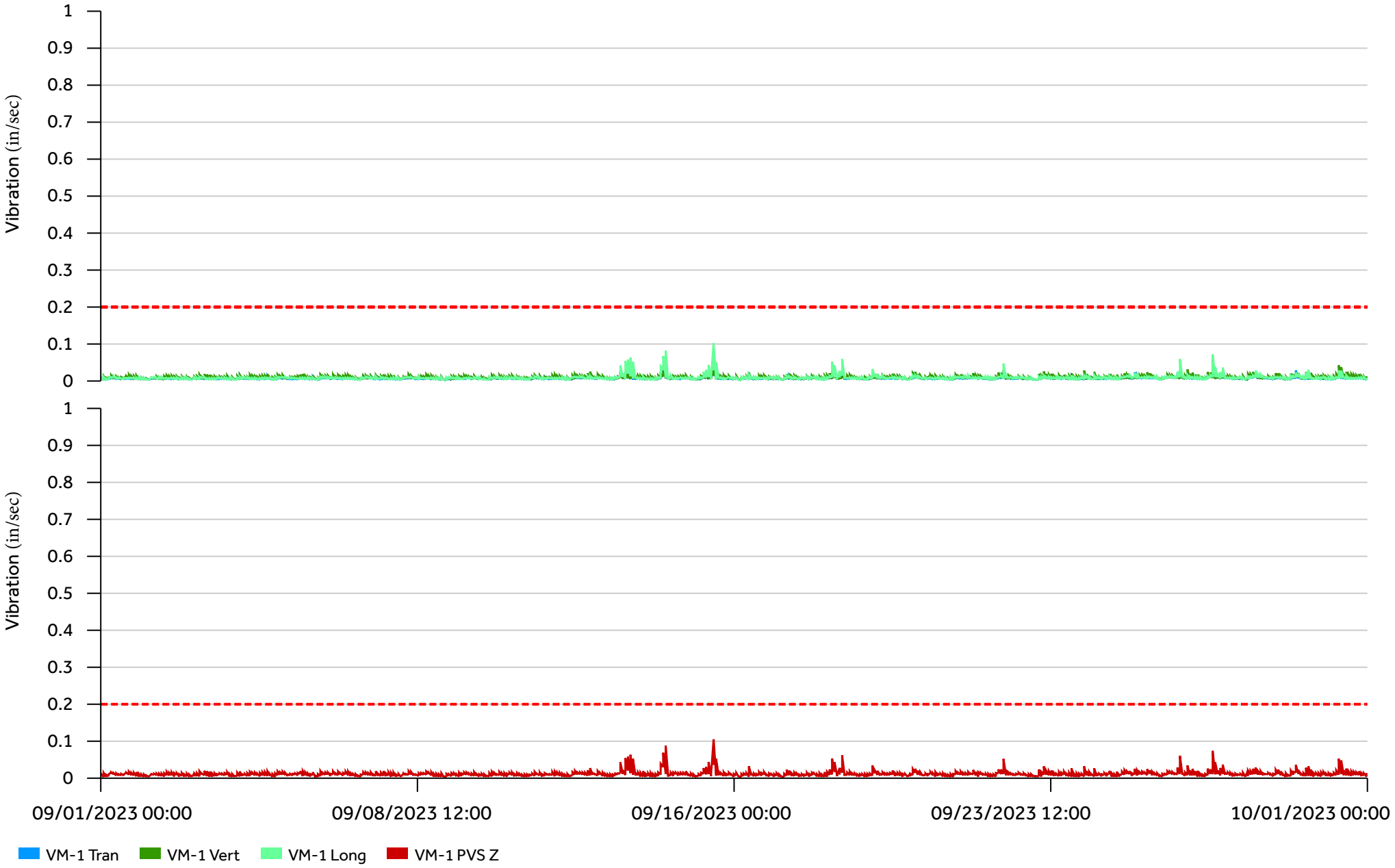
VM5-MIC		
	Exceedance	Percentage
Work hours	156	62.40%
After hours	35	14.00%
Weekends	59	23.60%
Total	250	100%

	Work hours	After hours	Weekends
Lmax	111	104.9	109.8
Lmin	68.6	54.9	53.2
L10	77	68	74
L90	70	57	62
Leq	79.2	73.6	81

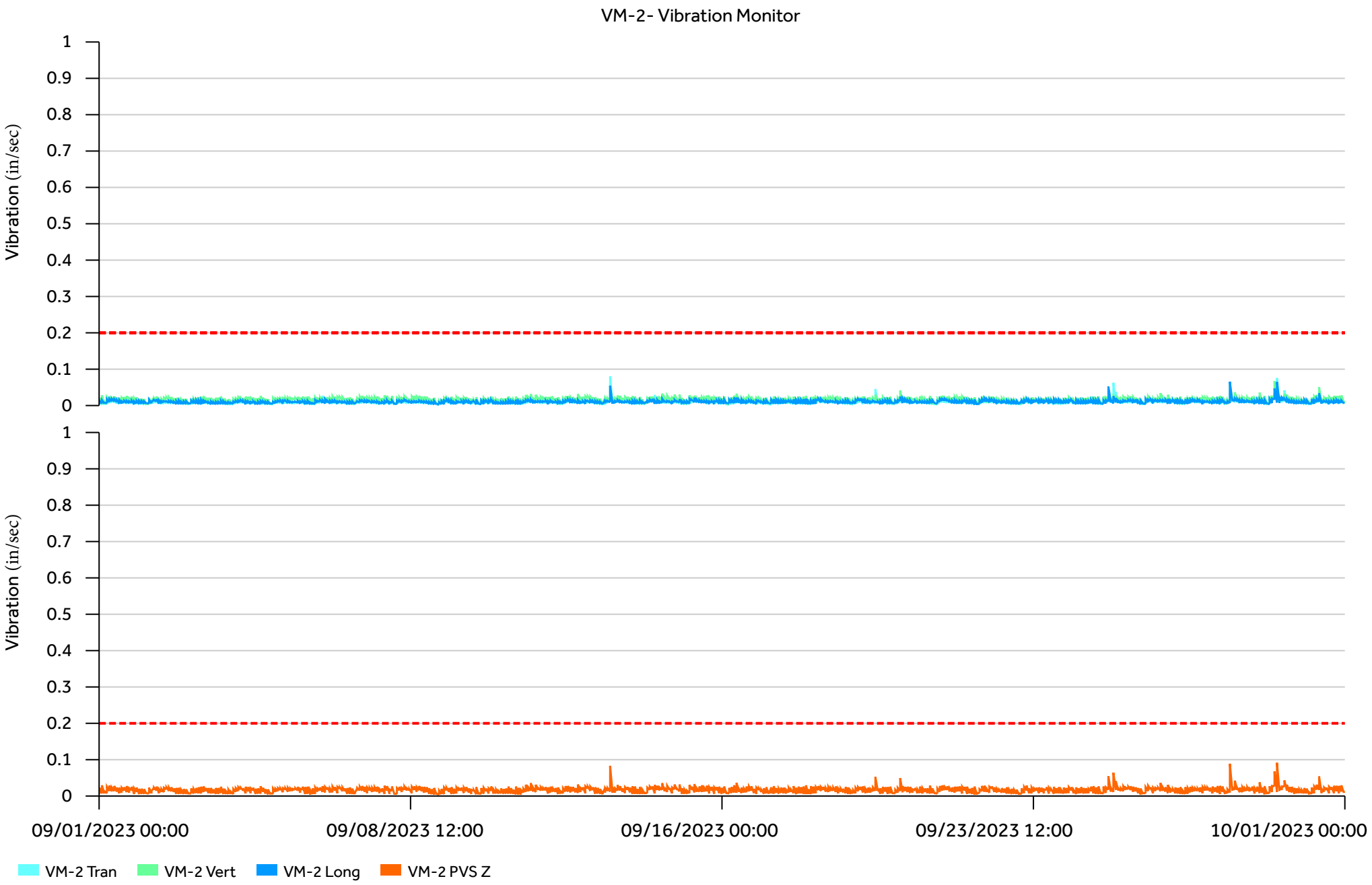
Lmax: Maximum Noise Level (for the month, in dBA)
Lmin: Maximum Noise Level (for the month, in dBA)
L10: The noise level exceeded 10% of the time (for the month, in dBA)
L90: The noise level exceeded 90% of the time (for the month, in dBA)
Leq: Equivalent Continuous Sound Level, an 'average' (for the month, in dBA)

Graph 1:

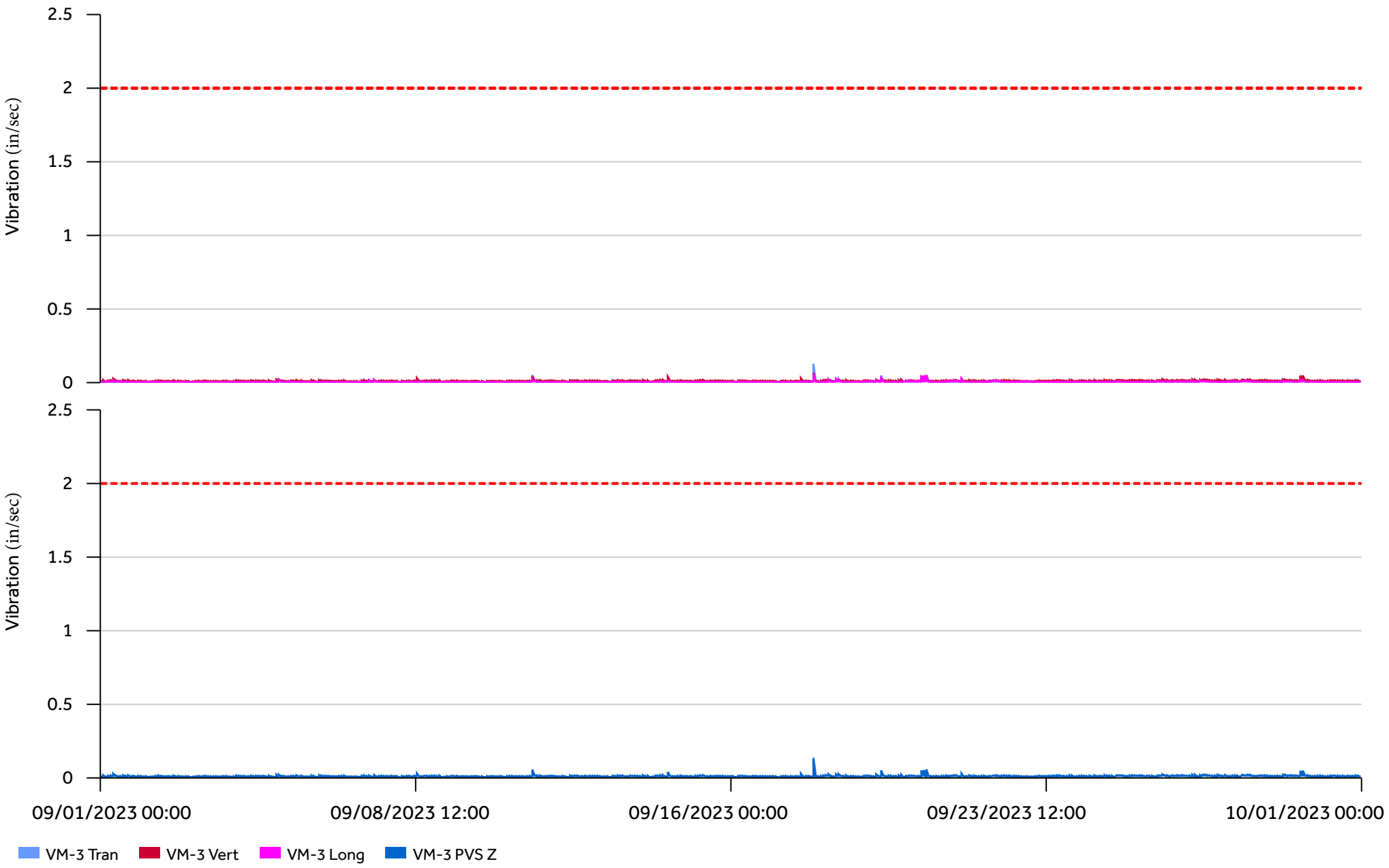
VM-1- Vibration Monitor



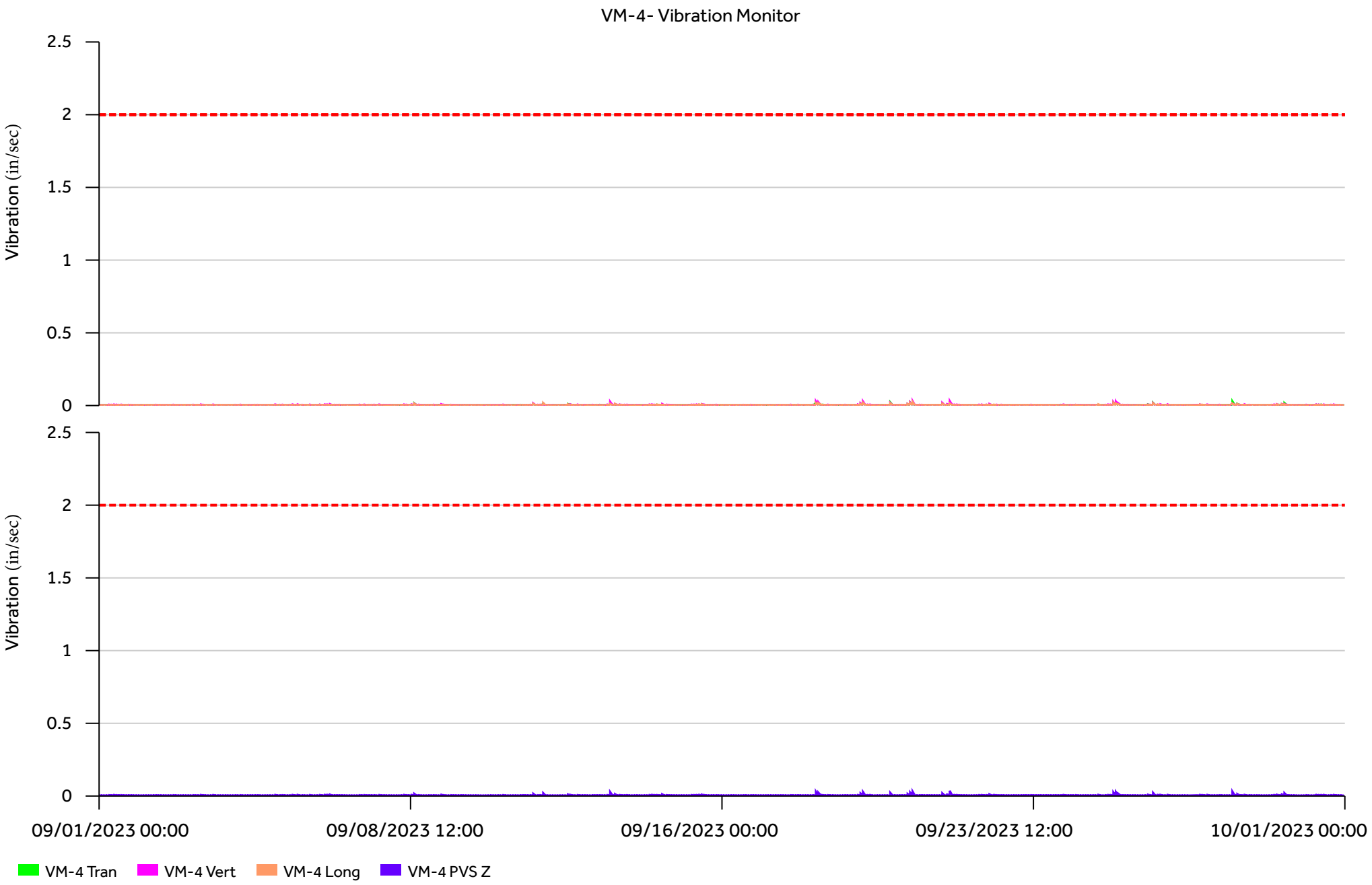
Graph 2:


VM-2- Vibration Monitor
Vibration (in/sec)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Vibration (in/sec)
09/01/2023 00:00
09/08/2023 12:00
09/16/2023 00:00
09/23/2023 12:00
10/01/2023 00:00
VM-2 Tran
VM-2 Vert
VM-2 Long
VM-2 PVS Z

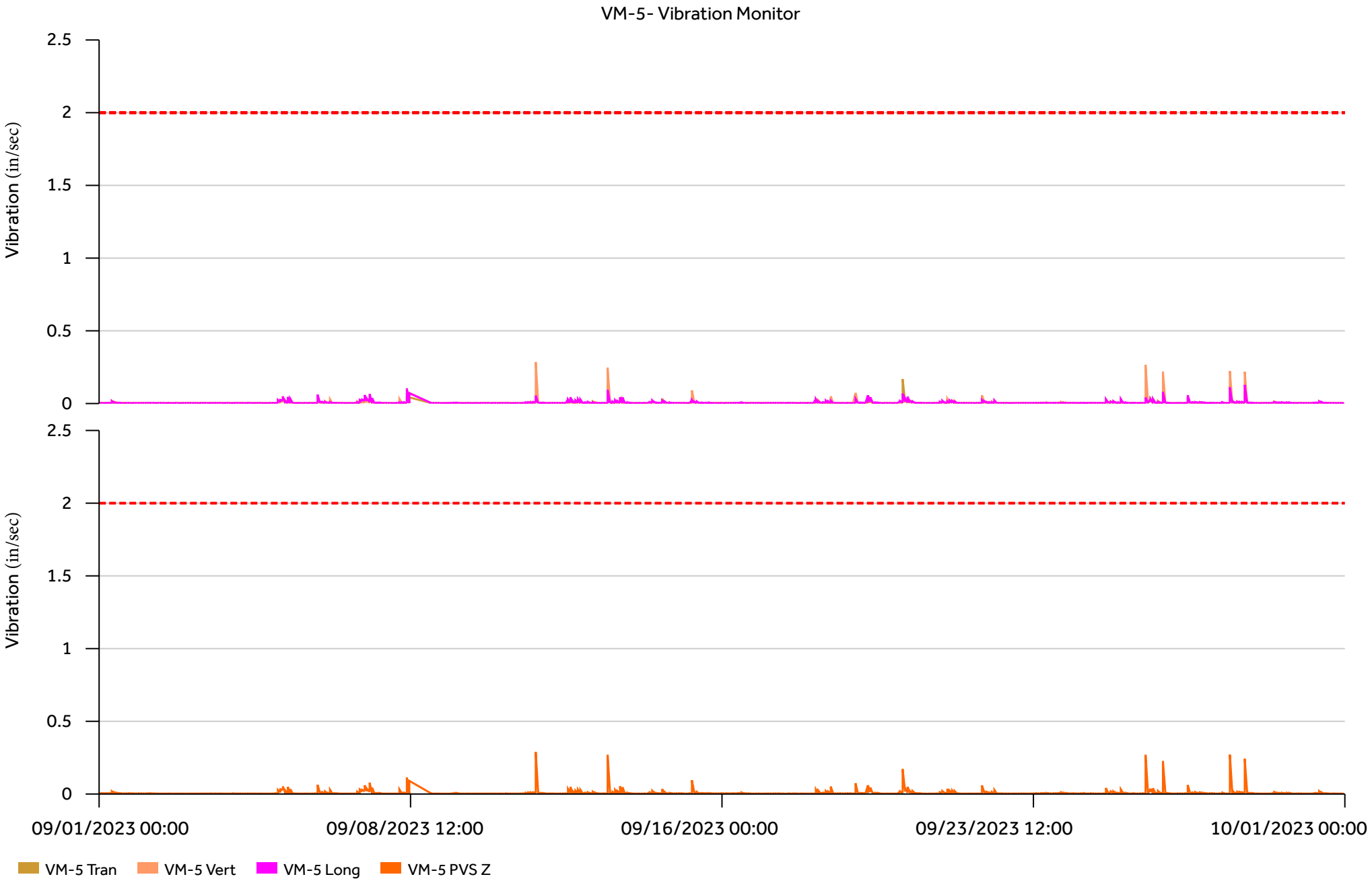
Graph 3:


VM-3- Vibration Monitor
Vibration (in/sec)
2.5
2
1.5
1
0.5
0
Vibration (in/sec)
2.5
2
1.5
1
0.5
0
09/01/2023 00:00
09/08/2023 12:00
09/16/2023 00:00
09/23/2023 12:00
10/01/2023 00:00
VM-3 Tran
VM-3 Vert
VM-3 Long
VM-3 PVS Z

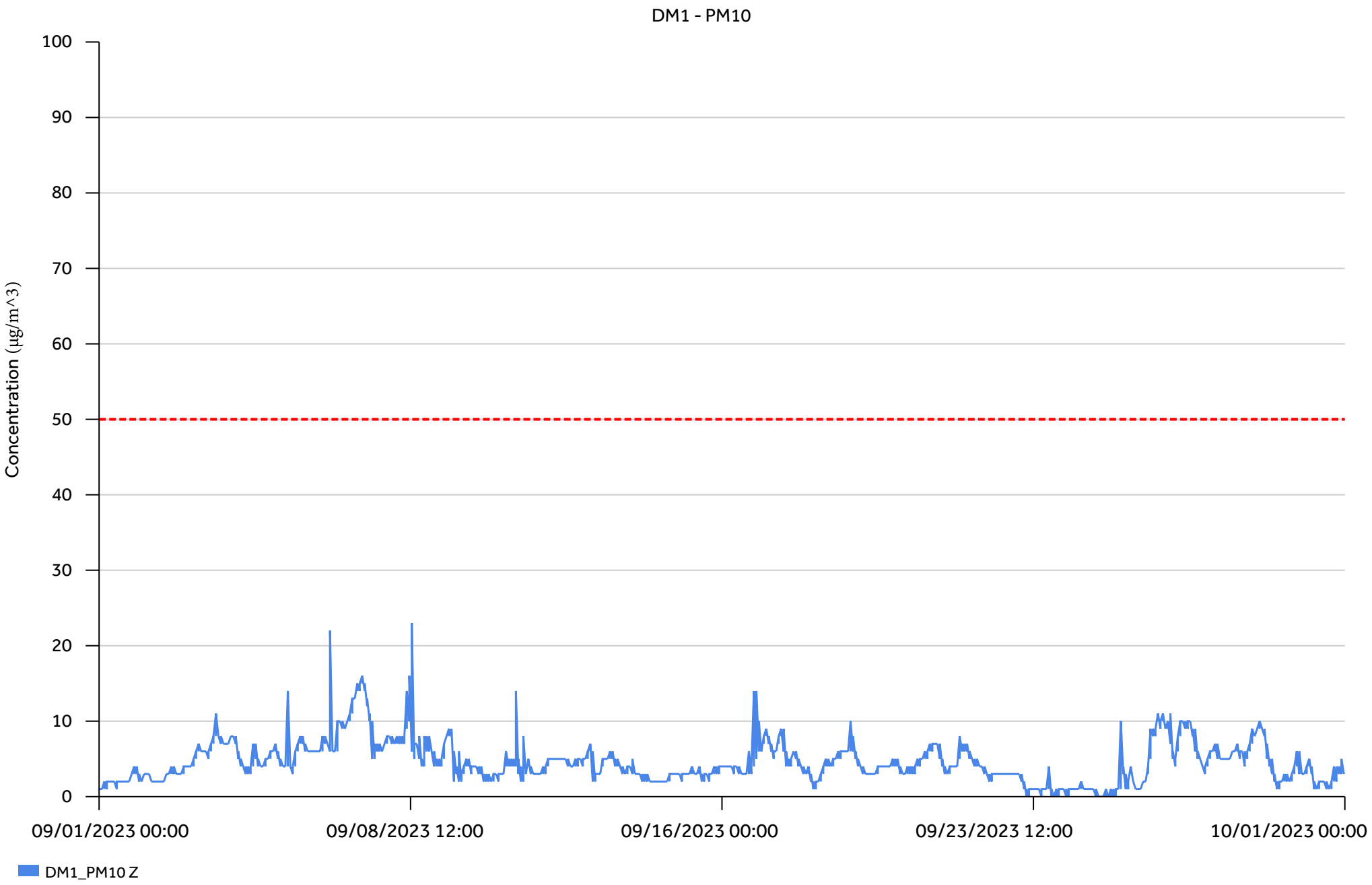
Graph 4:


VM-4- Vibration Monitor
Vibration (in/sec)
2.5
2
1.5
1
0.5
0
Vibration (in/sec)
2.5
2
1.5
1
0.5
0
09/01/2023 00:00
09/08/2023 12:00
09/16/2023 00:00
09/23/2023 12:00
10/01/2023 00:00
VM-4 Tran
VM-4 Vert
VM-4 Long
VM-4 PVS Z

Graph 5:

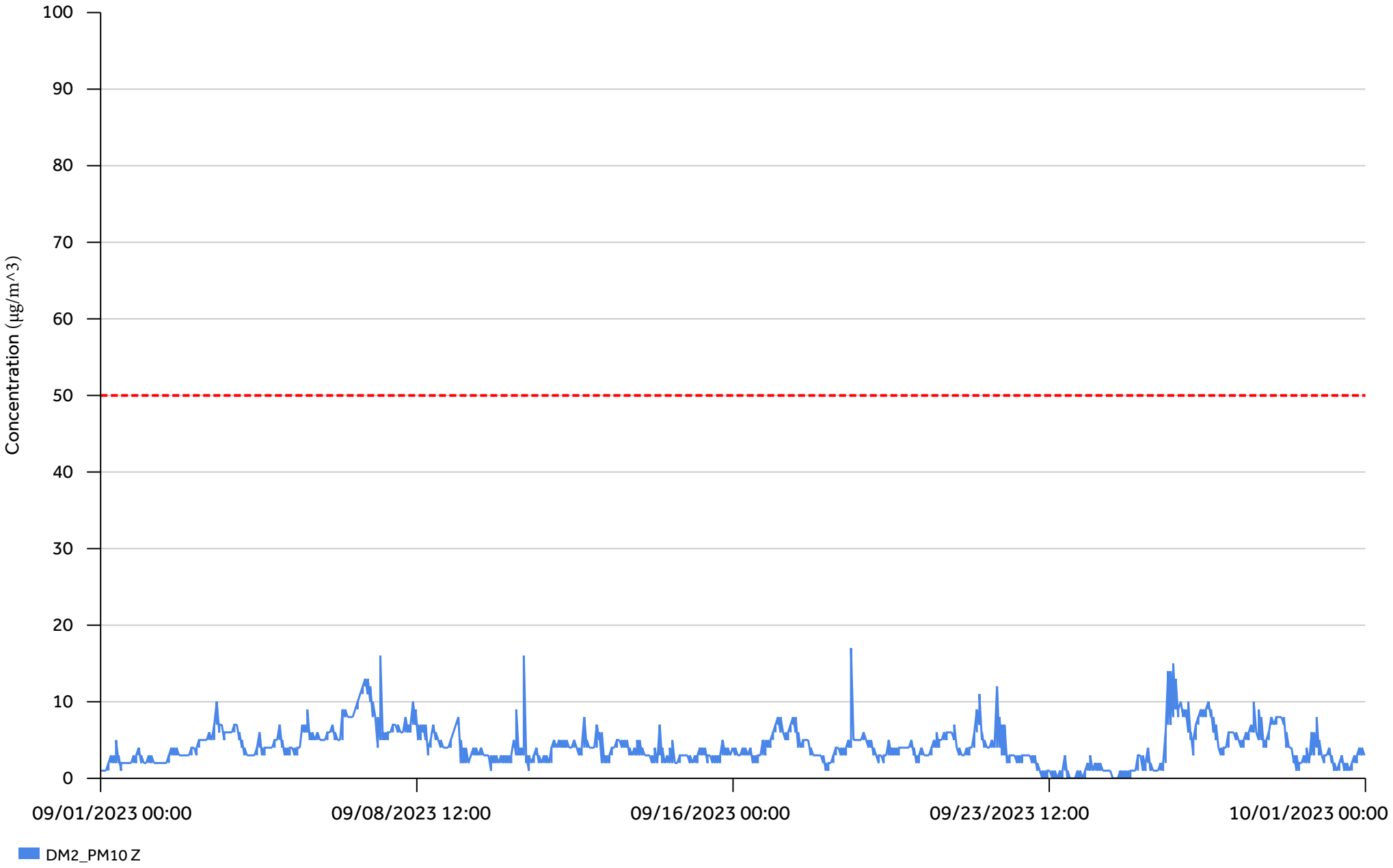

VM-5- Vibration Monitor
Vibration (in/sec)
2.5
2
1.5
1
0.5
0
Vibration (in/sec)
2.5
2
1.5
1
0.5
0
09/01/2023 00:00
09/08/2023 12:00
09/16/2023 00:00
09/23/2023 12:00
10/01/2023 00:00
VM-5 Tran
VM-5 Vert
VM-5 Long
VM-5 PVS Z

Graph 6:


DM1 - PM10
Concentration (µg/m^3)
100
90
80
70
60
50
40
30
20
10
0
09/01/2023 00:00
09/08/2023 12:00
09/16/2023 00:00
09/23/2023 12:00
10/01/2023 00:00
DM1_PM10 Z

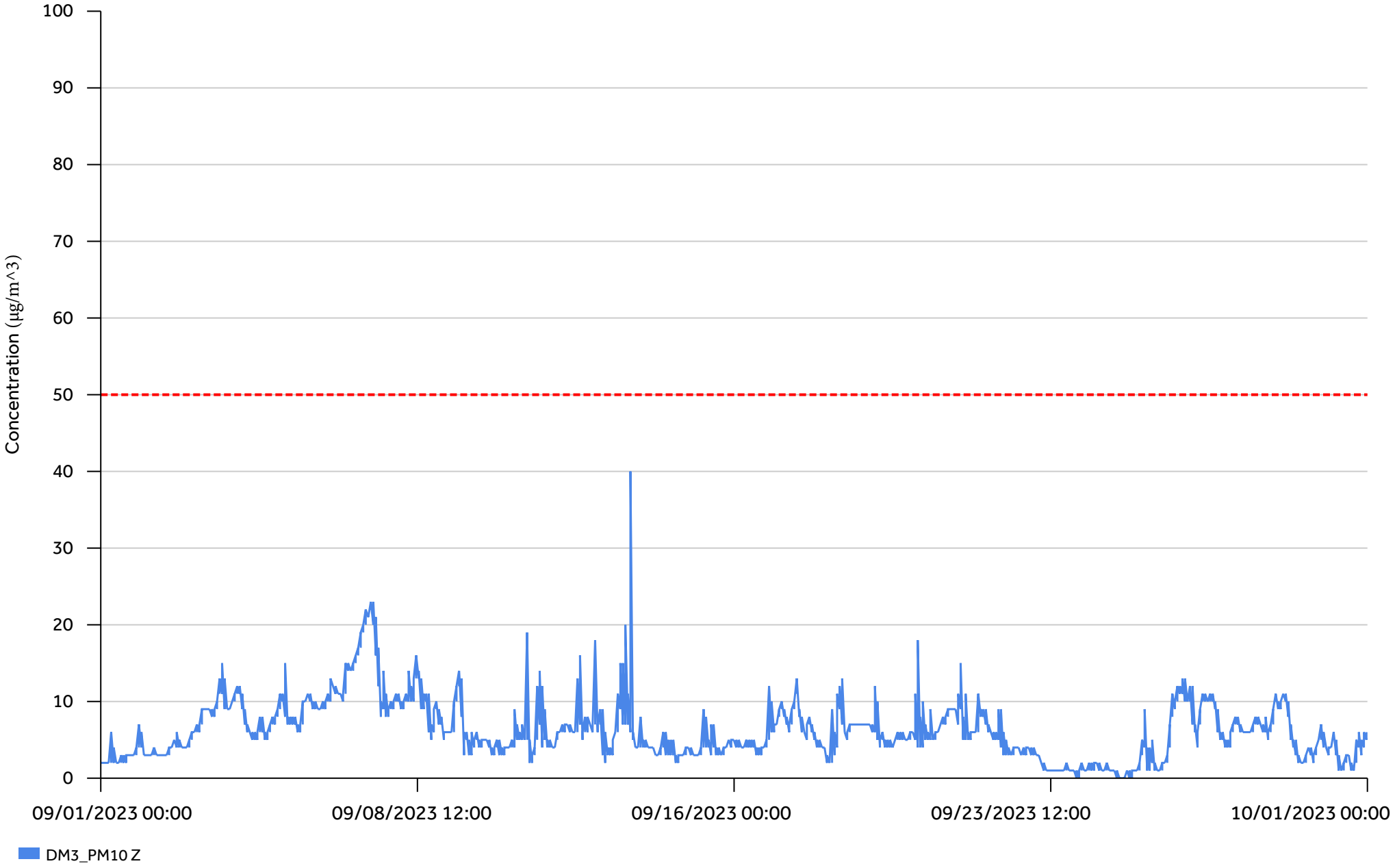
Graph 7:

DM2-PM10



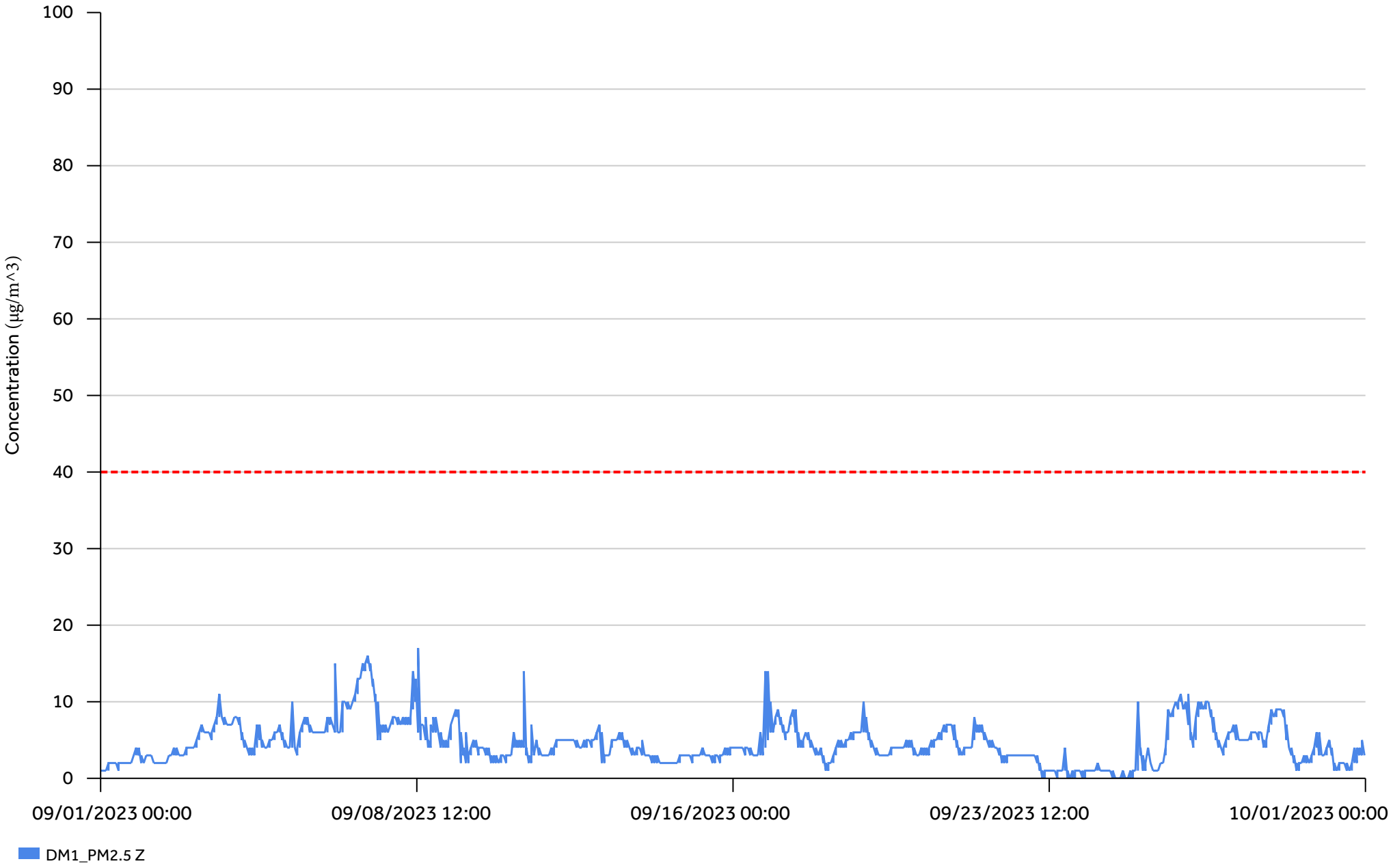
Graph 8:

DM3-PM10



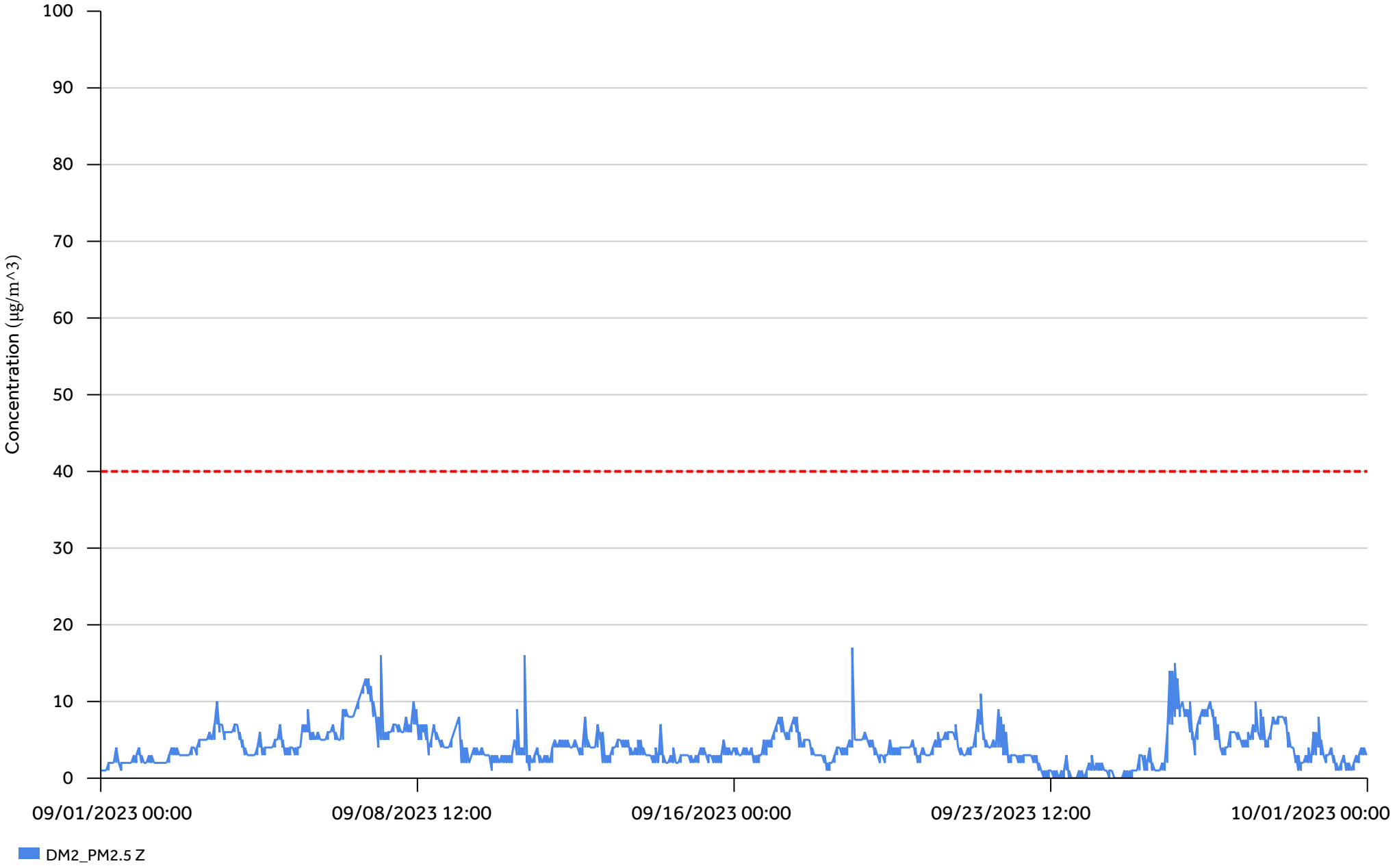
Graph 9:

DM1-PM2.5



Graph 10:

DM2-PM2.5



Graph 11:

DM3-PM2.5