Northern Bus Garage
Noise, Vibration, and Dust Monitoring Report (December 2024)

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 2024.

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. Mic5 recorded its loudest exceedance outside of working hours. Mic1, Mic3, and Mic5 recorded over one quarter of their exceedances out 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.

There were 75 vibration exceedances in the month of December. Utility subcontractor is installing new water line. Installation includes hammering of roadway, excavating of trench, backfilling/vibratory rolling of new fill material. This operation took place in proximity to monitoring stations along 14th Street on most of the dates with exceedances (12/10, 12/12, 12/13, 12/16, 12/17, 12/18, 12/19, 12/20, 12/23, 12/30). There was an exceedance on 12/29, which was outside of working hours. It is important to note that this work is in immediate proximity to the vibration monitors and the tolerances at VM-1 and VM-2 are set at a lower vibration threshold due to their position near the historic façade. Given these circumstances, the utility work is not considered to be a threat to the historic structure.

- VM1 – Exceedance with a reading of 0.32 in/sec on December 10 at 11:08.
- VM1 – Exceedance with a reading of 0.23 in/sec on December 12 at 07:23.
- VM1 – Exceedance with a reading of 0.24 in/sec on December 12 at 07:24.
- VM1 – Exceedance with a reading of 0.34 in/sec on December 12 at 07:25.
- VM1 – Exceedance with a reading of 0.23 in/sec on December 12 at 07:27.
- VM1 – Exceedance with a reading of 0.78 in/sec on December 12 at 07:28.
- VM1 – Exceedance with a reading of 4.59 in/sec on December 12 at 07:30.
- VM1 – Exceedance with a reading of 0.35 in/sec on December 12 at 08:57.

- VM1 – Exceedance with a reading of 0.30 in/sec on December 12 at 09:14.
- VM1 – Exceedance with a reading of 0.63 in/sec on December 12 at 09:16.
- VM1 – Exceedance with a reading of 0.45 in/sec on December 12 at 09:17.
- VM1 – Exceedance with a reading of 0.22 in/sec on December 12 at 09:17.
- VM1 – Exceedance with a reading of 0.27 in/sec on December 12 at 09:19.
- VM1 – Exceedance with a reading of 0.22 in/sec on December 12 at 09:26.
- VM1 – Exceedance with a reading of 0.28 in/sec on December 12 at 10:44.
- VM1 – Exceedance with a reading of 0.21 in/sec on December 12 at 14:55.
- VM1 – Exceedance with a reading of 0.26 in/sec on December 12 at 14:58.
- VM1 – Exceedance with a reading of 0.21 in/sec on December 13 at 11:30.
- VM1 – Exceedance with a reading of 0.47 in/sec on December 13 at 11:31.
- VM1 – Exceedance with a reading of 1.78 in/sec on December 13 at 11:32.
- VM1 – Exceedance with a reading of 0.20 in/sec on December 16 at 15:05.
- VM1 – Exceedance with a reading of 0.21 in/sec on December 16 at 15:15.
- VM1 – Exceedance with a reading of 0.20 in/sec on December 16 at 15:55.
- VM1 – Exceedance with a reading of 1.67 in/sec on December 16 at 16:07.
- VM1 – Exceedance with a reading of 0.73 in/sec on December 16 at 16:10.
- VM1 – Exceedance with a reading of 0.22 in/sec on December 16 at 16:13.
- VM1 – Exceedance with a reading of 0.28 in/sec on December 17 at 08:09.
- VM1 – Exceedance with a reading of 0.48 in/sec on December 17 at 08:10.
- VM1 – Exceedance with a reading of 0.21 in/sec on December 17 at 12:33.
- VM1 – Exceedance with a reading of 0.22 in/sec on December 17 at 13:18.
- VM1 – Exceedance with a reading of 0.48 in/sec on December 18 at 07:16.
- VM1 – Exceedance with a reading of 0.21 in/sec on December 18 at 11:05.
- VM1 – Exceedance with a reading of 0.38 in/sec on December 18 at 11:24.
- VM1 – Exceedance with a reading of 0.27 in/sec on December 18 at 13:26.
- VM1 – Exceedance with a reading of 0.23 in/sec on December 18 at 14:02.
- VM2 – Exceedance with a reading of 0.26 in/sec on December 17 at 08:13.
- VM2 – Exceedance with a reading of 0.22 in/sec on December 17 at 10:41.
- VM2 – Exceedance with a reading of 0.43 in/sec on December 17 at 10:41.
- VM2 – Exceedance with a reading of 0.44 in/sec on December 17 at 10:43.
- VM2 – Exceedance with a reading of 1.30 in/sec on December 17 at 10:46.
- VM2 – Exceedance with a reading of 0.70 in/sec on December 17 at 10:47.
- VM2 – Exceedance with a reading of 0.24 in/sec on December 17 at 14:41.
- VM2 – Exceedance with a reading of 0.26 in/sec on December 17 at 14:49.
- VM2 – Exceedance with a reading of 0.27 in/sec on December 17 at 14:50.
- VM2 – Exceedance with a reading of 0.24 in/sec on December 18 at 08:57.
- VM2 – Exceedance with a reading of 0.40 in/sec on December 18 at 10:00.
- VM2 – Exceedance with a reading of 0.22 in/sec on December 18 at 17:26.
- VM2 – Exceedance with a reading of 0.30 in/sec on December 18 at 17:33.
- VM2 – Exceedance with a reading of 0.25 in/sec on December 19 at 08:20.
- VM2 – Exceedance with a reading of 0.25 in/sec on December 19 at 08:24.
- VM2 – Exceedance with a reading of 0.24 in/sec on December 19 at 08:25.
- VM2 – Exceedance with a reading of 0.24 in/sec on December 19 at 10:51.
- VM2 – Exceedance with a reading of 0.21 in/sec on December 20 at 10:42.
- VM2 – Exceedance with a reading of 0.21 in/sec on December 20 at 10:43.
- VM2 – Exceedance with a reading of 0.27 in/sec on December 20 at 10:44.
- VM2 – Exceedance with a reading of 0.27 in/sec on December 20 at 10:45.
- VM2 – Exceedance with a reading of 0.35 in/sec on December 20 at 10:51.
- VM2 – Exceedance with a reading of 0.20 in/sec on December 20 at 11:09.
- VM2 – Exceedance with a reading of 0.24 in/sec on December 20 at 11:20.
- VM2 – Exceedance with a reading of 0.25 in/sec on December 20 at 11:21.
- VM2 – Exceedance with a reading of 0.25 in/sec on December 20 at 11:23.
- VM2 – Exceedance with a reading of 0.20 in/sec on December 20 at 11:24.

- VM2 – Exceedance with a reading of 0.20 in/sec on December 20 at 11:25.
- VM2 – Exceedance with a reading of 0.26 in/sec on December 20 at 11:33.
- VM2 – Exceedance with a reading of 0.20 in/sec on December 20 at 11:35.
- VM2 – Exceedance with a reading of 0.26 in/sec on December 20 at 11:37.
- VM2 – Exceedance with a reading of 0.29 in/sec on December 20 at 11:43.
- VM2 – Exceedance with a reading of 0.24 in/sec on December 20 at 11:43.
- VM2 – Exceedance with a reading of 0.20 in/sec on December 20 at 11:44.
- VM2 – Exceedance with a reading of 0.27 in/sec on December 20 at 11:44.
- VM2 – Exceedance with a reading of 0.46 in/sec on December 20 at 11:47.
- VM2 – Exceedance with a reading of 0.28 in/sec on December 20 at 16:35.
- VM2 – Exceedance with a reading of 0.63 in/sec on December 23 at 09:45.
- VM2 – Exceedance with a reading of 0.34 in/sec on December 29 at 12:21.
- VM2 – Exceedance with a reading of 0.84 in/sec on December 30 at 08:59.

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

No operating issue with the monitoring instruments was identified.

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

There were three (3) Air Quality exceedances in the month of December.

- DM1 – Exceedance of the PM2.5 limit on 12/3 at 14:46 with a reading of 50 µg/m^3.
    - Weather history shows sustained wind and gusts of 25 MPH during this period.
- DM1 – Exceedance of the PM2.5 limit on 12/25 at 01:48 with a reading of 47 µg/m^3.
    - Site was closed at this time.
- DM1 – Met the PM10 limit on 12/3 at 14:46 with a reading of 50 µg/m^3.
    - Weather history shows sustained wind and gusts of 25 MPH during this period.

Figure 1: Vibration and Noise Monitor Location Plan

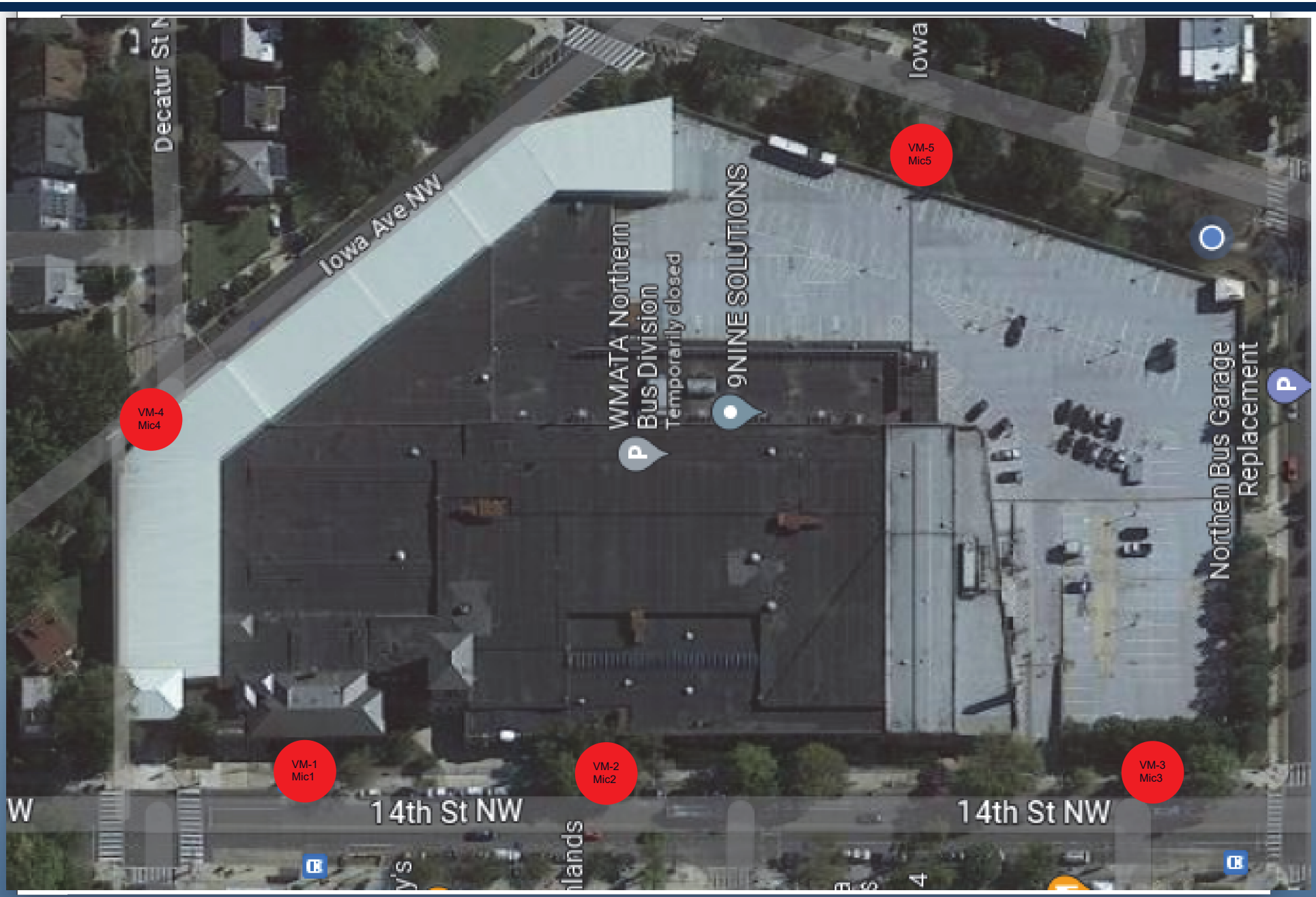


Figure 2: Dust Monitor Location Plan

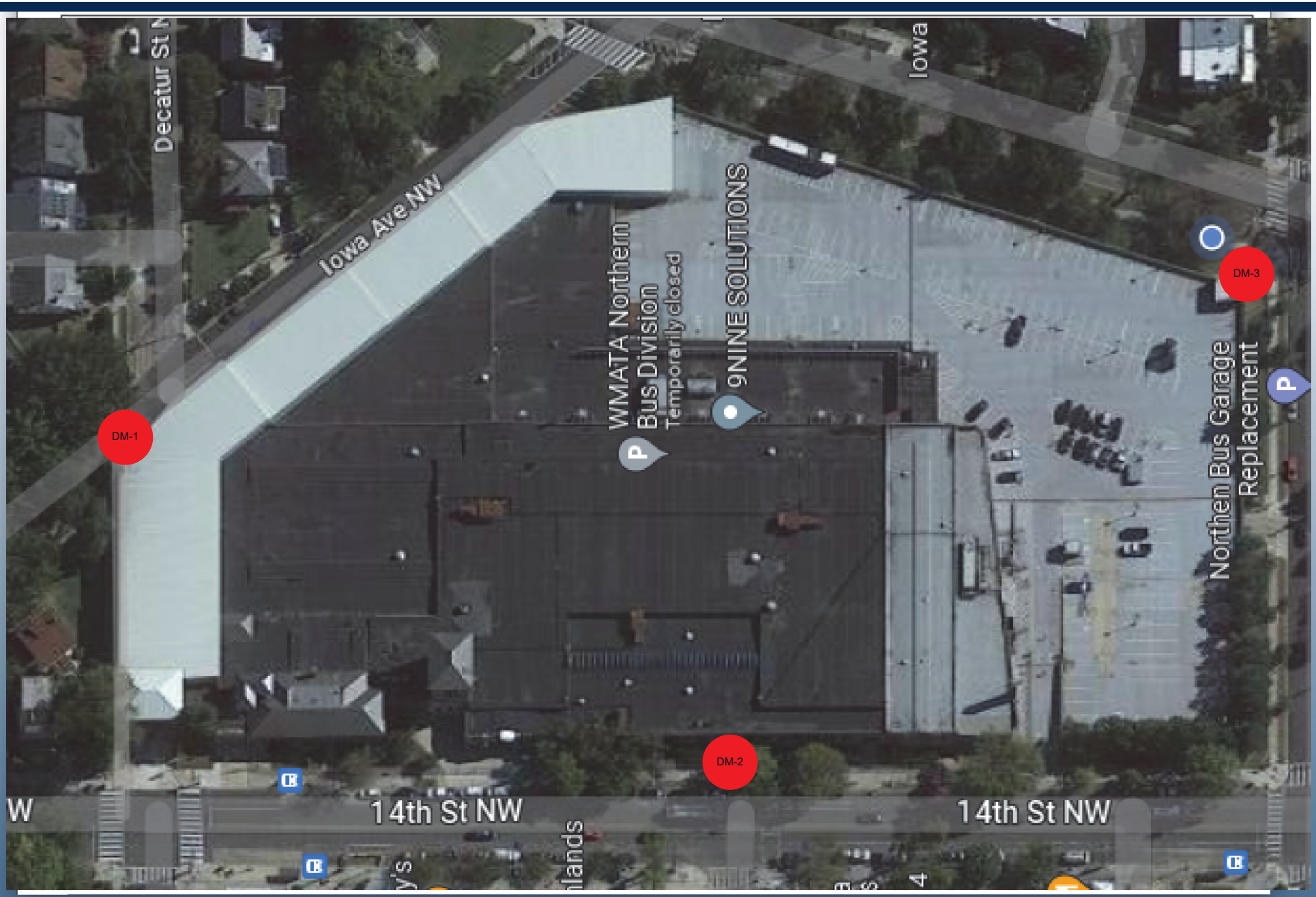


Table 1: Noise Summaries

VM1-MIC		
	Exceedance	Percentage
Work hours	484	68.65%
After hours	116	16.45%
Weekends	105	14.89%
Total	705	100%

VM1-MIC			
	Work hours	After hours	Weekends
Lmax (dBA)	116.7	112.7	106.4
Lmin (dBA)	92.8	50.8	50.7
L10 (dBA)	101	78	76
L90 (dBA)	94	55	65
Leq (dBA)	98.3	81.7	76.3

VM2-MIC		
	Exceedance	Percentage
Work hours	352	75.37%
After hours	64	13.70%
Weekends	51	10.92%
Total	467	100%

VM2-MIC			
	Work hours	After hours	Weekends
Lmax (dBA)	118.2	113.5	106
Lmin (dBA)	90.5	79	49.2
L10 (dBA)	87	89	73
L90 (dBA)	92	80	57
Leq (dBA)	94	89.6	77.1

VM3-MIC		
	Exceedance	Percentage
Work hours	409	55.35%
After hours	183	24.76%
Weekends	147	19.89%
Total	739	100%

VM3-MIC			
	Work hours	After hours	Weekends
Lmax (dBA)	114	106.6	108.7
Lmin (dBA)	78.3	63.3	51.1
L10 (dBA)	107	72	71
L90 (dBA)	89	66	62
Leq (dBA)	102.6	79	76.5

VM4-MIC		
	Exceedance	Percentage
Work hours	423	84.26%
After hours	46	9.16%
Weekends	33	6.57%
Total	502	100%

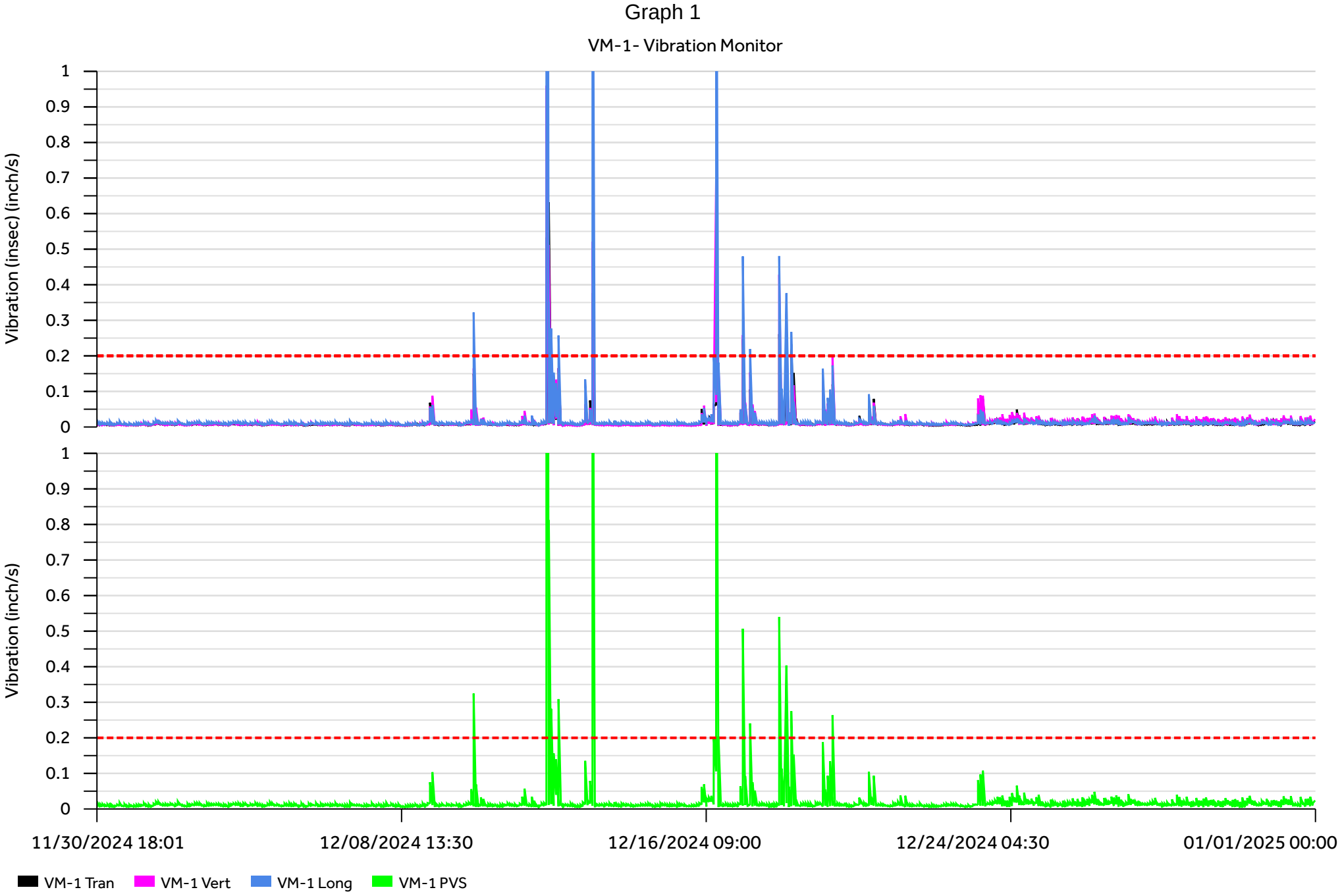
VM4-MIC			
	Work hours	After hours	Weekends
Lmax (dBA)	103.7	97.7	100.7
Lmin (dBA)	66.9	56.2	51.6
L10 (dBA)	89	74	65
L90 (dBA)	69	63	54
Leq (dBA)	85.9	69.6	71.7

VM5-MIC		
	Exceedance	Percentage
Work hours	299	72.75%
After hours	64	15.57%
Weekends	48	11.68%
Total	411	100%

VM5-MIC			
	Work hours	After hours	Weekends
Lmax (dBA)	107	107.1	107
Lmin (dBA)	63.9	53.1	51.4
L10 (dBA)	98	70	71
L90 (dBA)	67	56	55
Leq (dBA)	93	76	76.1

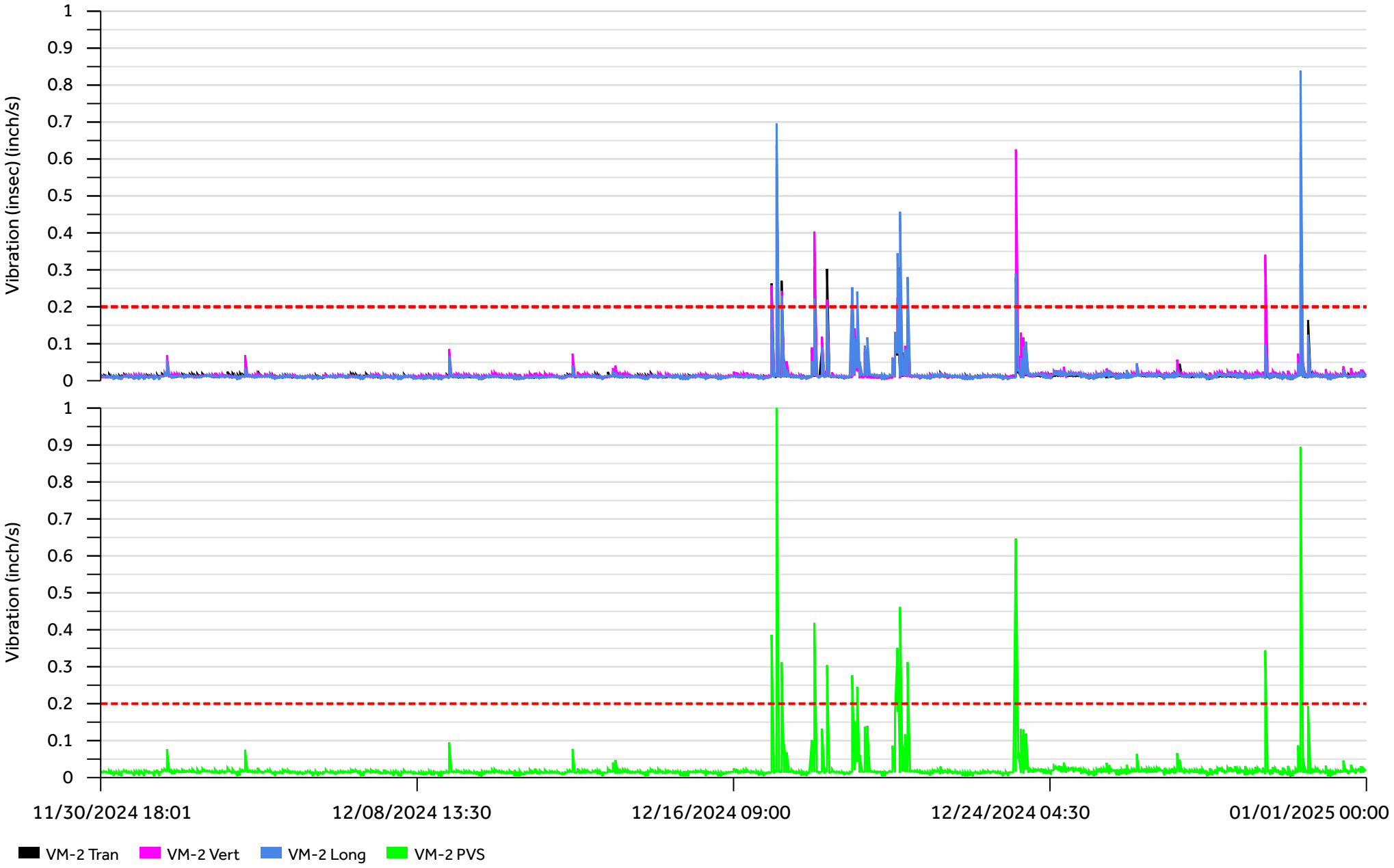
Summary tables contain values for working hours, after hours, and weekend time periods:

- Lmax: Highest Maximum Noise Level recorded for the month, in dBA.
- Lmin: Highest Minimum Noise Level recorded for the month, in dBA.
- L10: Highest noise level that was exceeded 10% of the time of all recording periods this month, in dBA.
- L90: Highest noise level that was exceeded 90% of the time of all recording periods this month, in dBA.
- Leq: Highest Equivalent Continuous Sound Level, or 'average' of all recording periods this month, in dBA.


Graph 1
VM-1- Vibration Monitor
Vibration (insec) (inch/s)
Vibration (inch/s)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
11/30/2024 18:01
12/08/2024 13:30
12/16/2024 09:00
12/24/2024 04:30
01/01/2025 00:00
VM-1 Tran
VM-1 Vert
VM-1 Long
VM-1 PVS

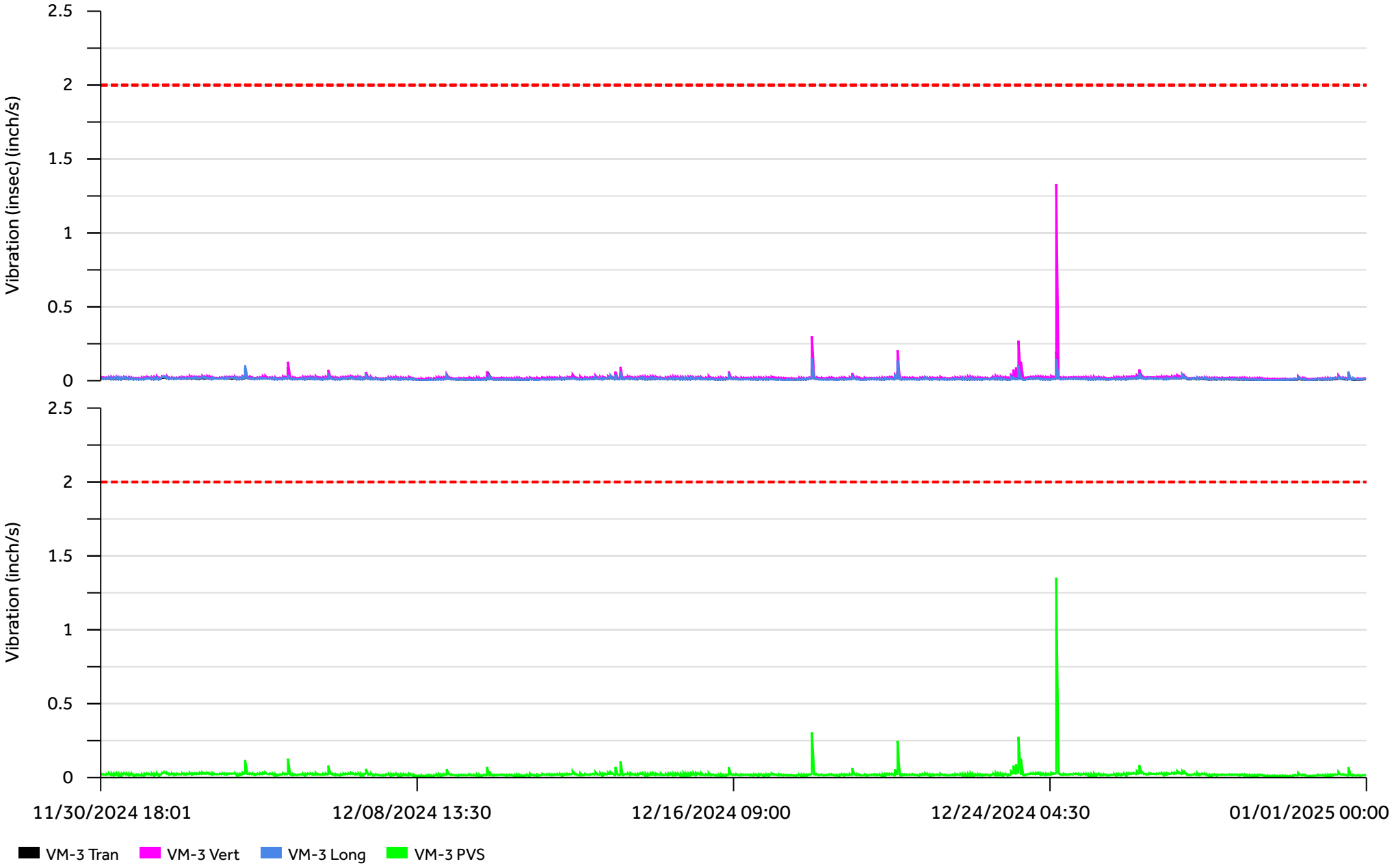
Graph 2

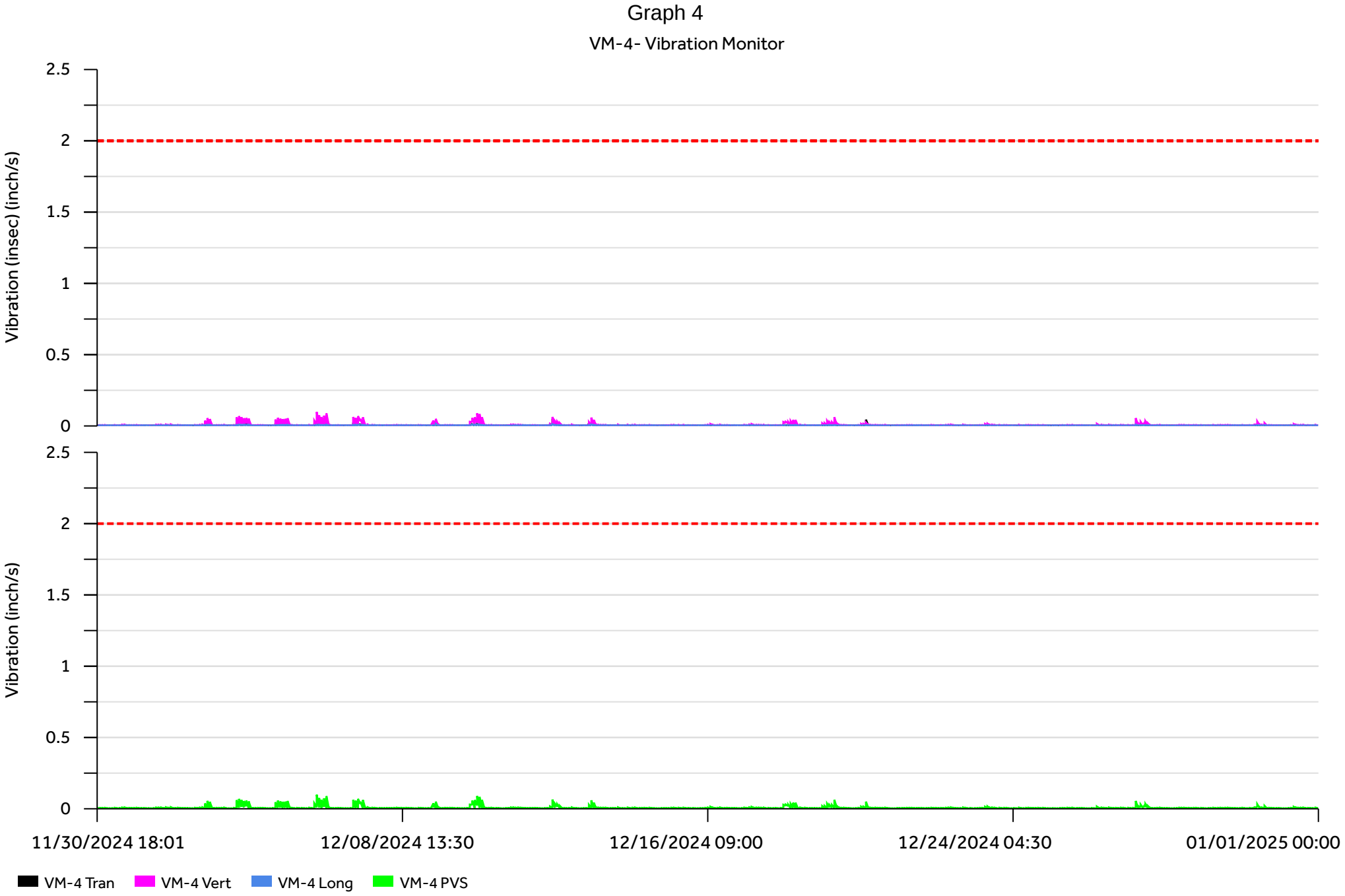
VM-2- Vibration Monitor



Graph 3

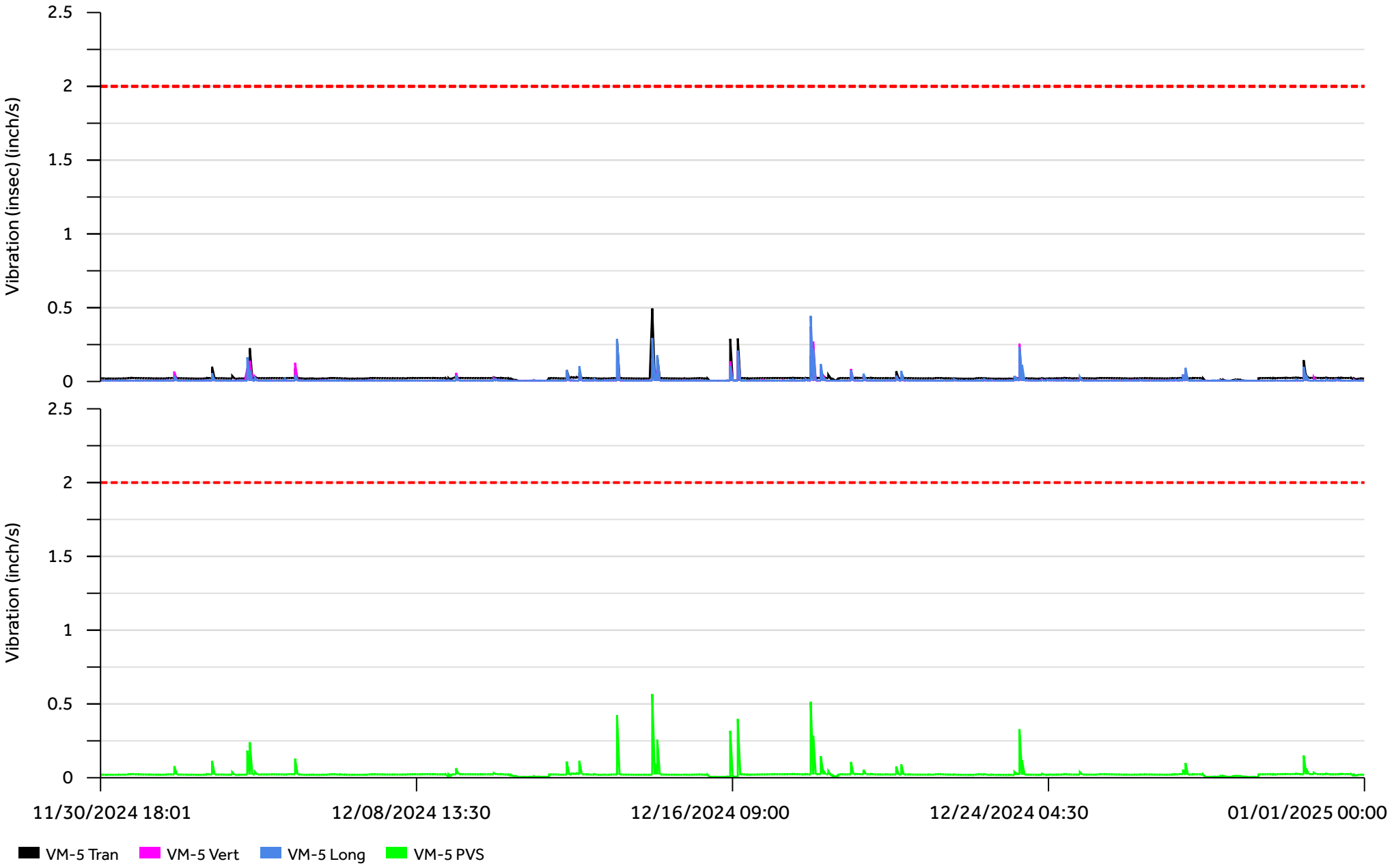
VM-3- Vibration Monitor



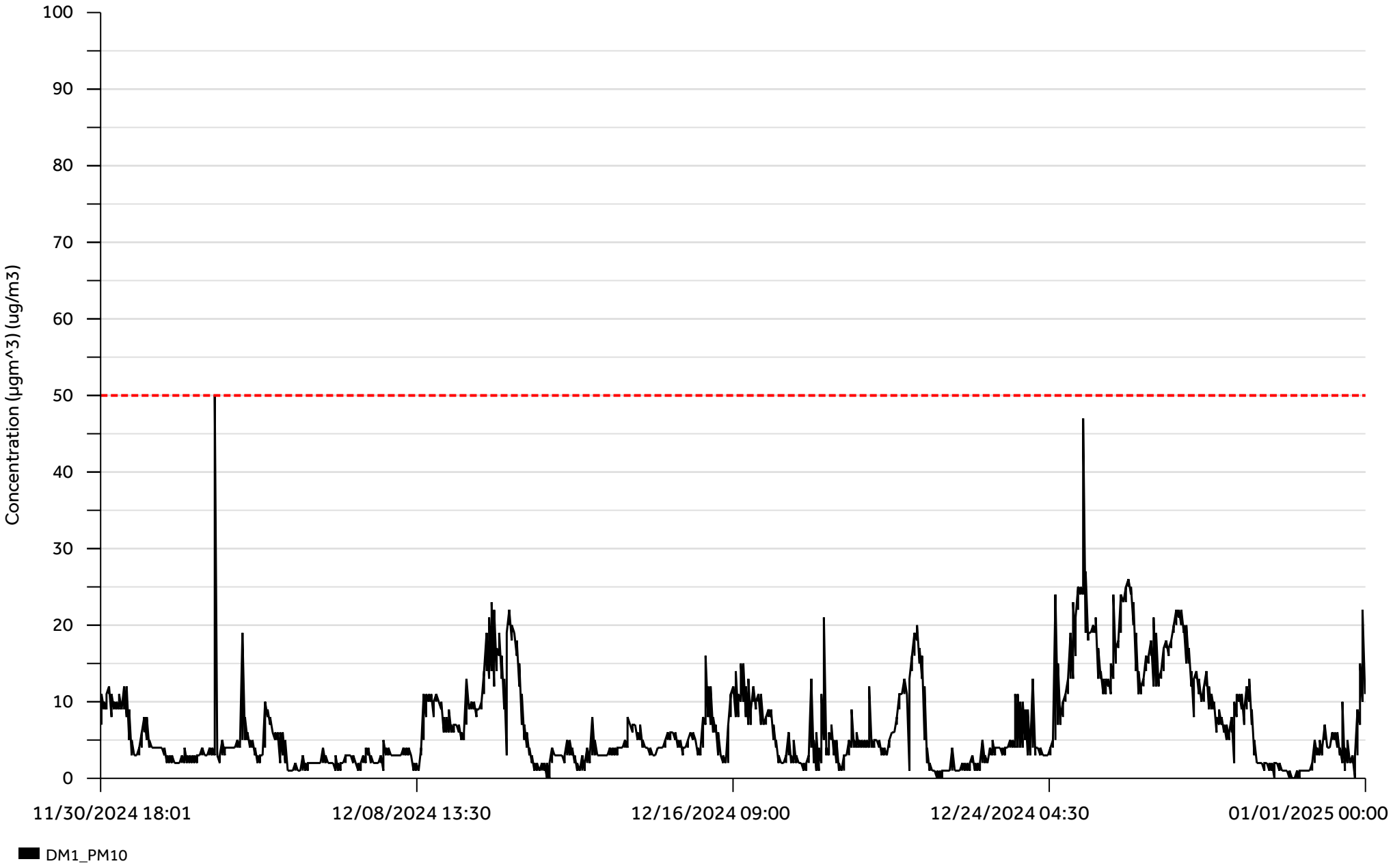

Graph 4
VM-4- Vibration Monitor
Vibration (insec) (inch/s)
2.5
2
1.5
1
0.5
0
Vibration (inch/s)
2.5
2
1.5
1
0.5
0
11/30/2024 18:01
12/08/2024 13:30
12/16/2024 09:00
12/24/2024 04:30
01/01/2025 00:00
VM-4 Tran
VM-4 Vert
VM-4 Long
VM-4 PVS

Graph 5

VM-5- Vibration Monitor

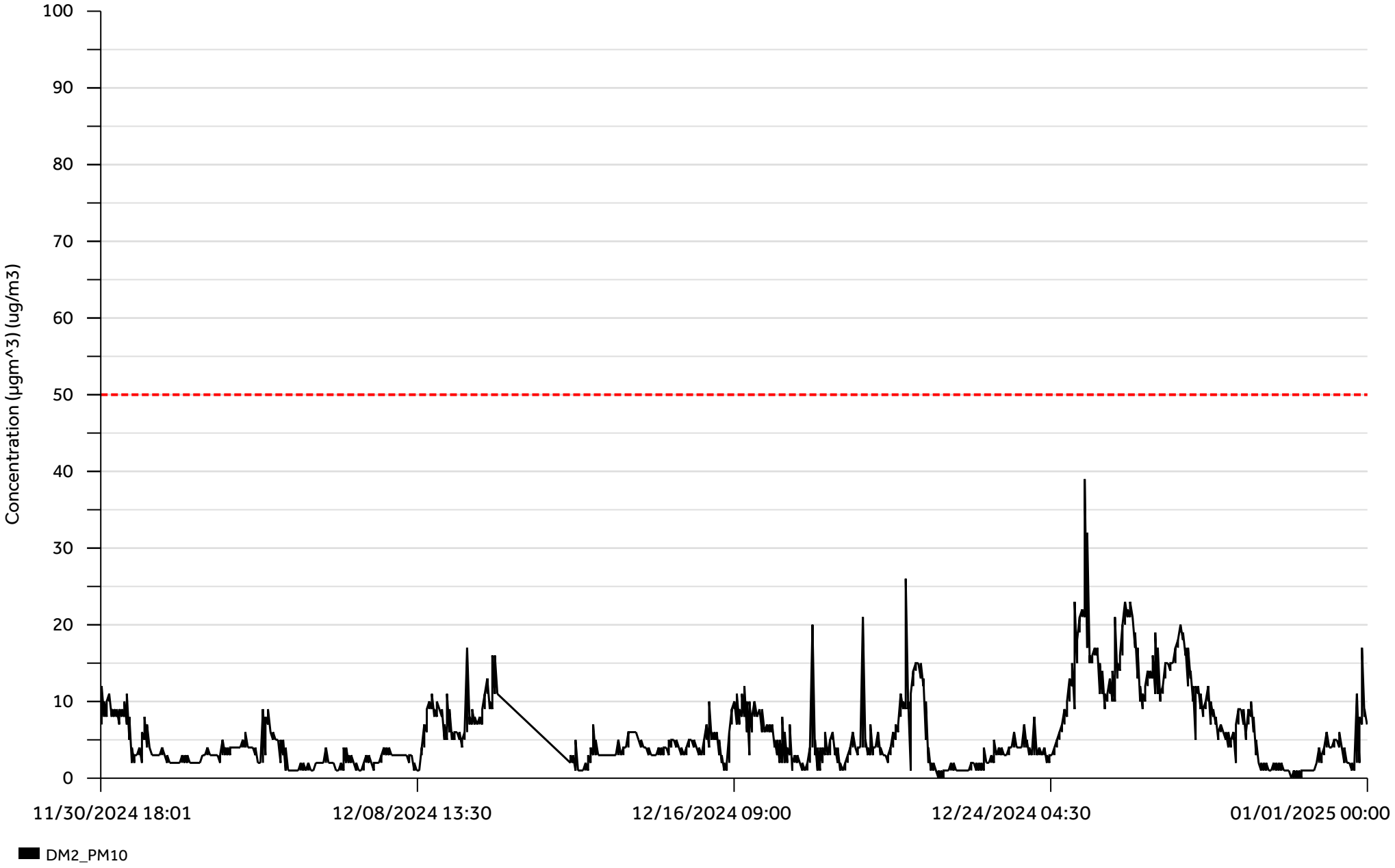


Graph 6


DM1 - PM10
Concentration (µgm^3) (ug/m3)
100
90
80
70
60
50
40
30
20
10
0
11/30/2024 18:01
12/08/2024 13:30
12/16/2024 09:00
12/24/2024 04:30
01/01/2025 00:00
DM1_PM10

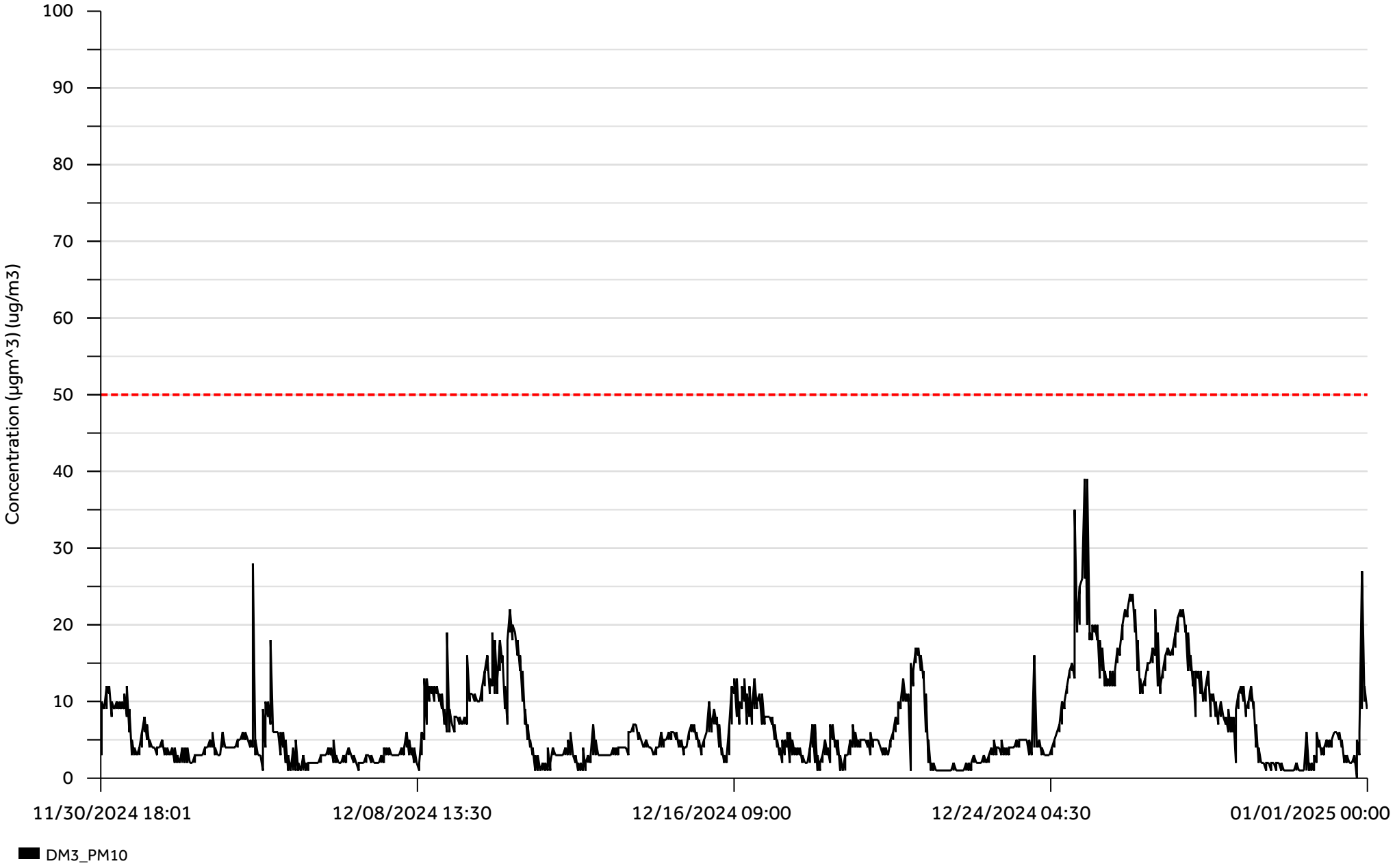
Graph 7

DM2-PM10

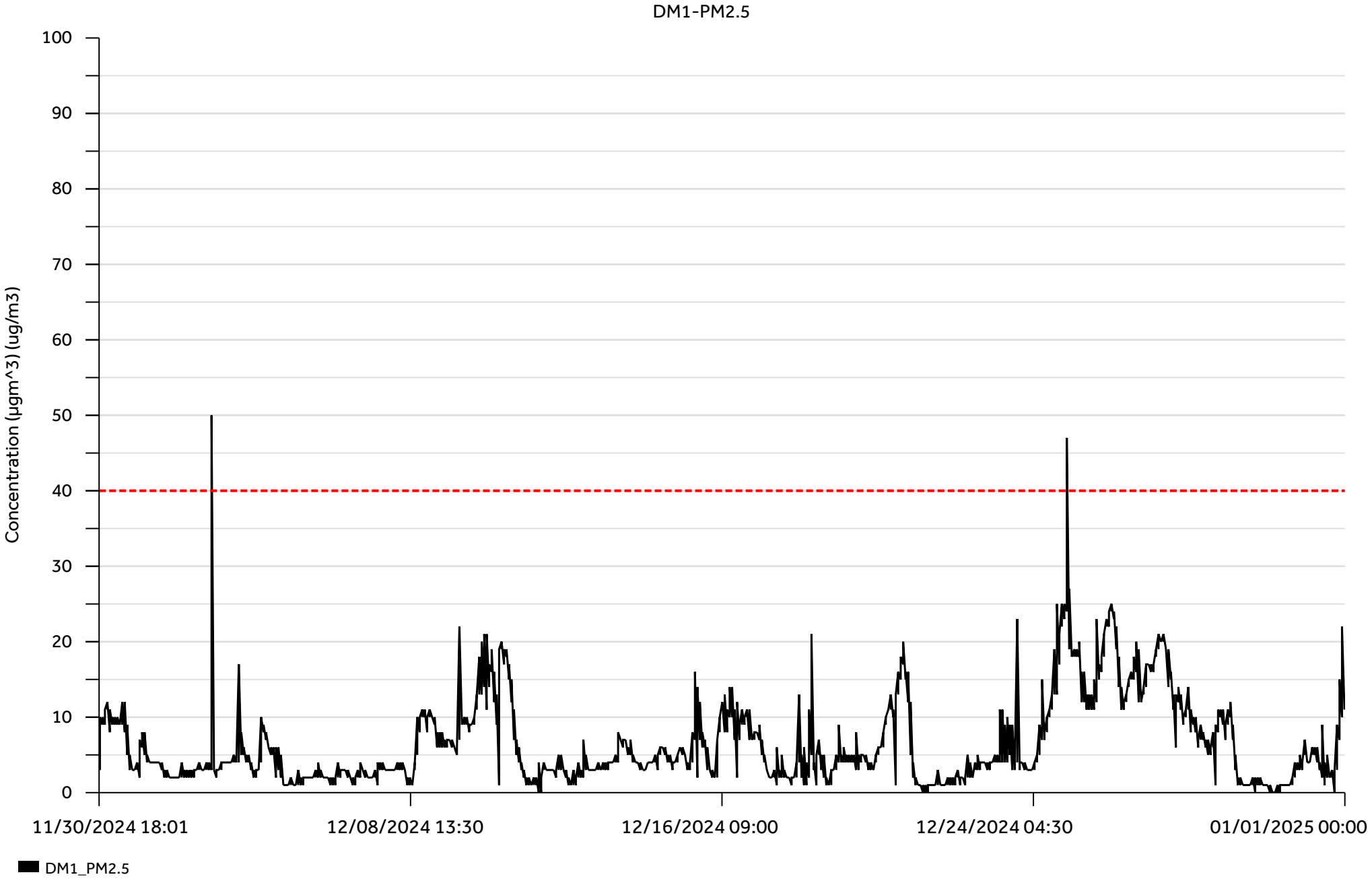


Graph 8

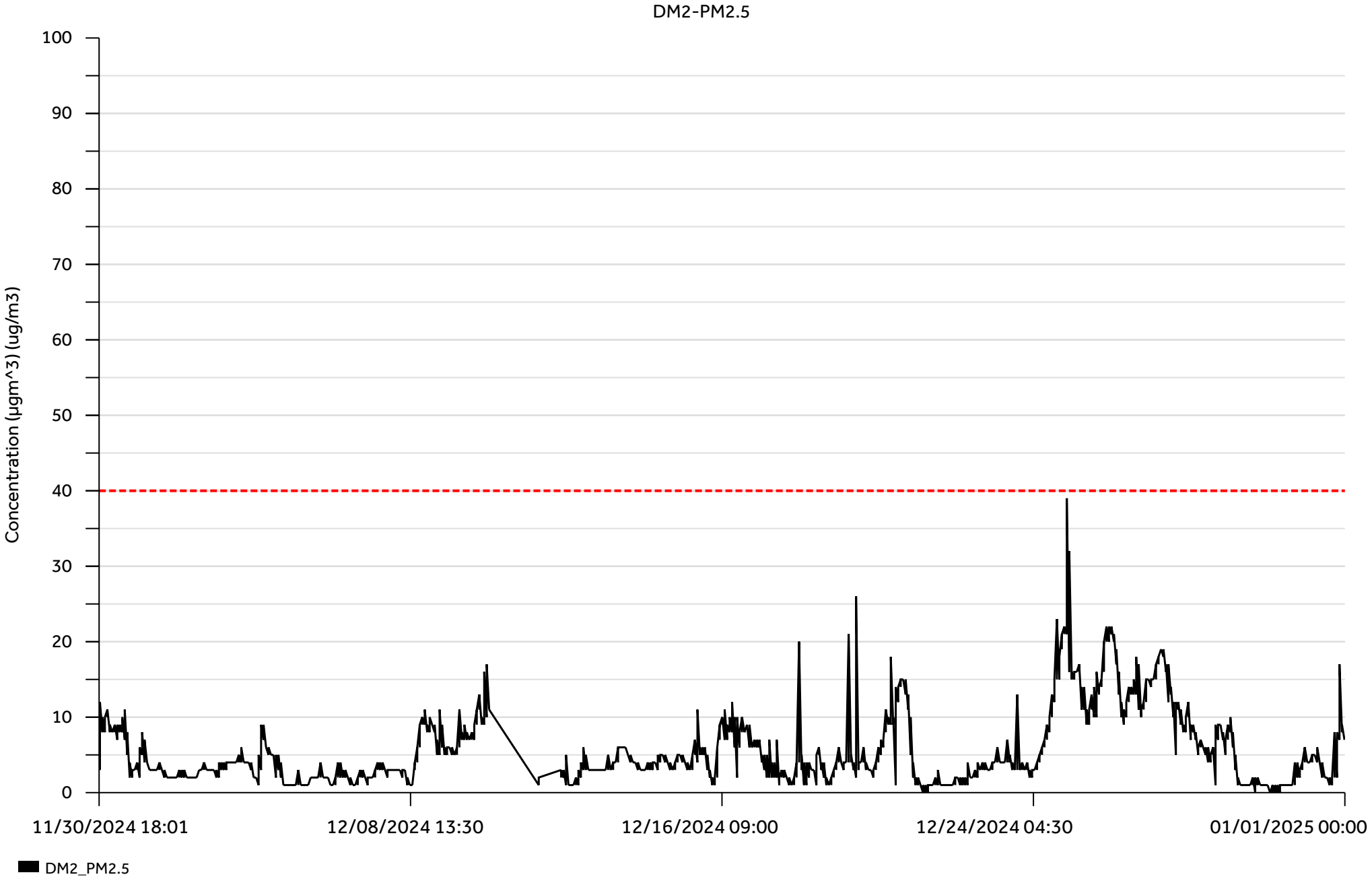
DM3-PM10



Graph 9


DM1-PM2.5
Concentration (µgm^3) (ug/m3)
100
90
80
70
60
50
40
30
20
10
0
11/30/2024 18:01
12/08/2024 13:30
12/16/2024 09:00
12/24/2024 04:30
01/01/2025 00:00
DM1_PM2.5

Graph 10


DM2-PM2.5
Concentration (µgm^3) (ug/m3)
100
90
80
70
60
50
40
30
20
10
0
11/30/2024 18:01
12/08/2024 13:30
12/16/2024 09:00
12/24/2024 04:30
01/01/2025 00:00
DM2_PM2.5

Graph 11

DM3-PM2.5