



Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley

Monthly Report 5

22.11.2022 - 23.12.2022

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Attention To	Hazell Bros

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# 1 INTRODUCTION

Acoustic Logic has been engaged to carry out noise, dust and vibration monitoring for the impacts associated with the upgrade the existing road infrastructure of Tweed Coast Road/Cudgen Road intersection to service increased demand following the completion of the Tweed Valley Hospital.

This report provides the results of the following monitoring items:

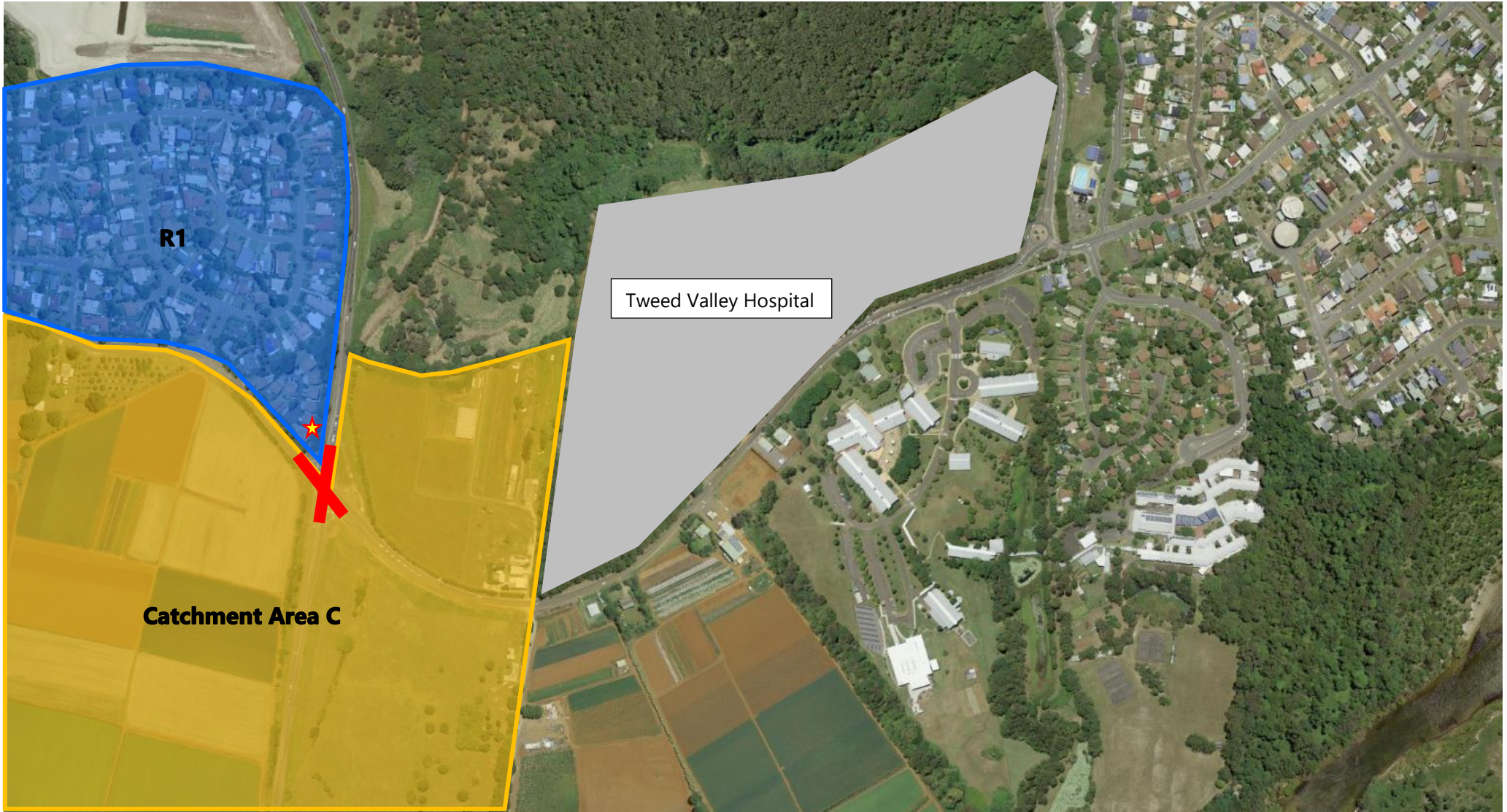
- Vibration Monitoring: 22<sup>nd</sup> of November to 23<sup>rd</sup> of December 2022
- Noise Monitoring: 22<sup>nd</sup> of November to 23<sup>rd</sup> of December 2022 (system malfunction between 22<sup>nd</sup> November to 7<sup>th</sup> of December), and
- Dust Monitoring: 22<sup>nd</sup> of November to 23<sup>rd</sup> of December 2022 (system malfunction between 22<sup>nd</sup> November to 7<sup>th</sup> of December).

Unattended noise, dust and vibration monitoring has been carried out with reference to the management levels identified in the *Construction Noise, Dust & Vibration Management Plan (CNVMP)* for Tweed Valley Hospital Carpark the site prepared by AL (ref: 20211491.1/2911A/R2/OB, dated 29/11/2021). The criteria set up in the above management plan will be adopted to the proposed intersection upgrade site.

## 1.1 SITE DESCRIPTION AND SENSITIVE RECEIVERS

The subject site is located at Tweed Coast Road/Cudgen Road intersection, Kingscliff as indicated in Figure 1-1. The land uses surrounding the intersection are existing residential and agricultural receivers. The nearest potentially most affected receivers are:

- **Residential Receiver R1:** Residential receivers at 6-30 John Robb Way to the north of the proposed construction site
- **Industrial/Agricultural Receiver 1:** Catchment Area C to the south of the proposed construction site



- Industrial/Agricultural
- Proposed road upgrade location
- Monitoring Location

**Figure 1-1 – Project Site and Sensitive Receiver Locations**

- Tweed Valley Hospital
- Residential Receiver

## 2 CONSTRUCTION NOISE, DUST & VIBRATION MANAGEMENT LEVELS

Noise, dust and vibration management levels which are presented below have been adopted from the following documents:

- Tweed Valley Hospital Carpark *Construction Noise, Dust and Vibration Management Plan (CNVMP)*, Acoustic Logic (ref: 20211491.1/2911A/R2/OB, dated 29/11/2021)
- For structural damage vibration, German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*, and
- For human exposure to vibration, the NSW EPA document *Assessing Vibration: A Technical Guideline*.

### 2.1 VIBRATION MONITORING OBJECTIVES

German Standard DIN 4150-3 provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 are presented in Table 2-1.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

**Table 2-1 – DIN4150-3 Safe Limits for Building Vibration**

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms <sup>-1</sup> )			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use <b>Receivers R1</b>	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

The surrounding residential properties are considered type 2 structures and are the most sensitive receivers as such vibration will be assessed to the Type 2 criteria.

## 2.2 NOISE MONITORING OBJECTIVES

Project specific noise construction noise management levels are outlined in the approved CNVMP and summarised in Table 2-2 below:

**Table 2-2 – Summarised Construction Noise Requirements During Proposed Hours**

“Noise Affected” Level - dB(A) <sub>Leq(15min)</sub> Standard Hours	“Highly Noise Affected” Level - dB(A) <sub>Leq(15min)</sub>
55 externally at façade	75

## 2.3 DUST MONITORING OBJECTIVES

Dust monitoring has been conducted to measure mechanically generated respirable PM<sub>2.5</sub> dust particles (< 2.5µm) and PM<sub>10</sub> dust particles (< 10µm), which are generally understood to be the main health concern in airborne dust. The air quality limits are based on the standards outlined in Department of the Environment’s *National Environment Protection (Ambient Air Quality) Measure* and NSW EPA’s air quality categories.

It should be noted that the dust monitoring results can be influenced by events such as fires and dust storms, thus the PM<sub>10</sub> limit has an allowance of 5 days per year to account for the effects of such events.

The PM<sub>2.5</sub> and PM<sub>10</sub> goals are summarised below.

**Table 3 – PM<sub>2.5</sub> and PM<sub>10</sub> Goals (24-Hour Average)**

Pollutant	Averaging Time	Maximum Concentration
PM <sub>2.5</sub>	24 hours	25 µg/m <sup>3</sup>
PM <sub>10</sub>	24 hours	50 µg/m <sup>3</sup>

The EPA has air quality categories based on particle concentration over a one hour average. As per the Construction Noise, Dust and Vibration management Plan, this project has targeted the ‘Poor’ category as a reference, **however, the assessment level is the 24-hour average.**

**Table 4 – PM<sub>2.5</sub> and PM<sub>10</sub> Goals (1-Hour Average)**

Pollutant	Air Quality Category	Maximum Concentration
PM <sub>2.5</sub>	Poor	62-97 µg/m <sup>3</sup>
PM <sub>10</sub>		80-120 µg/m <sup>3</sup>

### 3 MONITOR/MEASUREMENT EQUIPMENT AND LOCATIONS

#### 3.1 VIBRATION MONITOR

##### 3.1.1 Measurement Equipment

Vibration monitoring was conducted using Texcel ETM vibration monitors with external Tri-axial Geophones. The monitors are programmed to store statistical vibration data every 5-minute intervals, along with any 'triggered' events that occur throughout the monitoring period.

##### 3.1.2 Measurement Locations & Installation Dates

A vibration monitor (M7394) has been installed, representative of the potential impact for vibration transmission to surrounding residential houses, at the northern boundary of the construction site (at the ground level, also see Figure 3-1). The monitor was installed on Friday 22<sup>nd</sup> July 2022.

#### 3.2 NOISE AND DUST MONITRR

##### 3.2.1 Measurement Equipment

Unattended noise monitoring was conducted using a *SiteHive Hexanode 134* noise and dust monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the monitoring period. Measurements were taken on A-frequency weighting and fast time weighting.

##### 3.2.2 Measurement Locations & Installation Dates

A noise monitor has been installed, representative of the potential impact for noise transmission to surrounding residential houses, at the northern boundary of the construction site (at the ground level, also see Figure below). The monitor was installed on Friday 22<sup>nd</sup> July 2022.



**Figure 3-1 Noise, Dust and Vibration Monitor Installation Locations**



## 4 NOISE, DUST & VIBRATION MEASUREMENTS

### 4.1 MONITORING PERIOD

This report provides the available results of noise, dust and vibration monitoring between the 22<sup>nd</sup> of November to 23<sup>rd</sup> of December 2022. Note that noise and dust data is not available between 22<sup>nd</sup> November to 7<sup>th</sup> of December due to system malfunction.

### 4.2 VIBRATION MONITORING RESULTS

The highest axial (transverse / radial / vertical) vibration level, Peak Particle Velocity (PPV), during the monitoring period have been presented below. Graphs of the results are presented in Appendix A.

**Table 5 – Vibration Monitoring Results-M7394**

<b>Date</b>	<b>Maximum Measured Vibration Level mm/s</b>	<b>Structural Damage Criteria for Type 2 (DIN4150-3)</b>	<b>Comments</b>
Tuesday 2022-11-22	<3mm/s		Vibration levels satisfy DIN4150-3 Type 2 criteria
Wednesday 2022-11-23	<3mm/s		
Thursday 2022-11-24	<3mm/s		
Friday 2022-11-25	<3mm/s		
Saturday 2022-11-26	<3mm/s	5 mm/s (<10Hz)	
Sunday 2022-11-27	No work		
Monday 2022-11-28	<3mm/s	5-15 mm/s (10-50Hz)	
Tuesday 2022-11-29	<3mm/s	15-20mm/s (50-100Hz)	
Wednesday 2022-11-30	<3mm/s		
Thursday 2022-12-01	<3mm/s		
Friday 2022-12-02	<3mm/s		
Saturday 2022-12-03	<3mm/s		
Sunday 2022-12-04	No work		

<b>Date</b>	<b>Maximum Measured Vibration Level mm/s</b>	<b>Structural Damage Criteria for Type 2 (DIN4150-3)</b>	<b>Comments</b>
Monday 2022-12-05	<3mm/s		Vibration levels satisfy DIN4150-3 Type 2 criteria
Tuesday 2022-12-06	<3mm/s		
Wednesday 2022-12-07	<3mm/s		
Thursday 2022-12-08	<3mm/s		
Friday 2022-12-09	<3mm/s		
Saturday 2022-12-10	<3mm/s		
Sunday 2022-12-11	No work		
Monday 2022-12-12	<3mm/s	5 mm/s (<10Hz)	
Tuesday 2022-12-13	<3mm/s		
Wednesday 2022-12-14	<3mm/s	5-15 mm/s (10-50Hz)	
Thursday 2022-12-15	3mm/s		
Friday 2022-12-16	<3mm/s	15-20mm/s (50-100Hz)	
Saturday 2022-12-17	<3mm/s		
Sunday 2022-12-18	No work		
Monday 2022-12-19	<3mm/s		
Tuesday 2022-12-20	<3mm/s		
Wednesday 2022-12-21	<3mm/s		
Thursday 2022-12-22	<3mm/s		
Friday 2022-12-23	<3mm/s		

Vibration levels for monitor M7394 to the north of the construction site were within the nominated criteria for the whole monitoring period between 22<sup>nd</sup> October to 21<sup>st</sup> November 2022.

### 4.3 NOISE MONITORING RESULTS

The available measured noise levels have been analysed by this office and the graphed noise data presented in Appendix 1. Summarised results are also in Table 6 below.

**Table 6 – Measured Construction Noise Levels @ R1**

Date	Time Period	Percentage of Time that Measured Noise Level dB(A) <sub>Leq(15min)</sub> Exceeds			
		0-5 above Noise affected level 55 dB(A) <sub>Leq(15min)</sub>	5-10 above Noise affected level 55 dB(A) <sub>Leq(15min)</sub>	10-15 above Noise affected level 55 dB(A) <sub>Leq(15min)</sub>	Above Highly Noise affected level 75 dB(A) <sub>Leq(15min)</sub>
Thursday 2022-12-08	7am – 6pm	91.30%	4.35%	0.00%	0.00%
Friday 2022-12-09		100%	0.00%	0.00%	0.00%
Saturday 2022-12-10	8am – 1pm	90.48%	0.00%	0.00%	0.00%
Sunday 2022-12-11	No Works				
Monday 2022-12-12	7am – 6pm	100%	0.00%	0.00%	0.00%
Tuesday 2022-12-13		90.91%	9.09%	0.00%	0.00%
Wednesday 2022-12-14		100%	0.00%	0.00%	0.00%
Thursday 2022-12-15		93.18%	2.27%	4.55%	0.00%
Friday 2022-12-16		93.18%	6.82%	0.00%	0.00%
Saturday 2022-12-17	8am – 1pm	100%	0.00%	0.00%	0.00%
Sunday 2022-12-18	No Works				
Monday 2022-12-19	7am – 6pm	88.64%	11.36%	0.00%	0.00%
Tuesday 2022-12-20		95.45%	4.55%	0.00%	0.00%
Wednesday 2022-12-21		100%	0.00%	0.00%	0.00%
Thursday 2022-12-22		100%	0.00%	0.00%	0.00%

Friday 2022-12-23	7am – 6pm	56.76%	0.00%	0.00%	0.00%
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Noise levels were below the highly noise affected level (75dB(A)) during the whole monitoring period. Noise levels were normally between 5-10 dB higher than the noise affected level. This is expected to lower at the residential façade due to distance attenuation.

AL notes that data between 22<sup>nd</sup> November and 7th December is not available due to equipment malfunction.

#### 4.4 DUST MONITORING RESULTS

The daily average PM<sub>2.5</sub> and PM<sub>10</sub> concentration levels are presented below.

**Table 7 – 24hr Average PM<sub>2.5</sub> and PM<sub>10</sub> Concentration**

Date	24hr Average PM <sub>2.5</sub> and PM <sub>10</sub> Concentration					
	PM <sub>2.5</sub> Level (µg/m <sup>3</sup> )	PM <sub>2.5</sub> Limit (µg/m <sup>3</sup> )	Complies	PM <sub>10</sub> Level (µg/m <sup>3</sup> )	PM <sub>10</sub> Limit (µg/m <sup>3</sup> )	Complies
Thursday 2022-12-08	7	25	Yes	18	50	Yes
Friday 2022-12-09	13		Yes	32		Yes
Saturday 2022-12-10	9		Yes	23		Yes
Sunday 2022-12-11	No Works					
Monday 2022-12-12	10	25	Yes	25	50	Yes
Tuesday 2022-12-13	11		Yes	36		Yes
Wednesday 2022-12-14	11		Yes	42		Yes
Thursday 2022-12-15	5		Yes	19		Yes
Friday 2022-12-16	1		Yes	2		Yes
Saturday 2022-12-17	4		Yes	12		Yes
Sunday 2022-12-18	No Works					
Monday 2022-12-19	8	25	Yes	22	50	Yes
Tuesday 2022-12-20	11		Yes	28		Yes
Wednesday 2022-12-21	5		Yes	13		Yes
Thursday 2022-12-22	3		Yes	11		Yes
Friday 2022-12-23	3		Yes	11		Yes

Dust data recorded during the monitoring period were below the criteria. AL notes that data between 22<sup>nd</sup> November and 7<sup>th</sup> December is not available due to equipment malfunction.

The **daily maximum 1hour** PM<sub>2.5</sub> and PM<sub>10</sub> concentration levels are presented below.

**Table 8 – 1Hr Maximum PM<sub>2.5</sub> and PM<sub>10</sub> Concentration**

Date	Maximum 1hr Average PM <sub>2.5</sub> and PM <sub>10</sub> Concentration					
	PM <sub>2.5</sub> Level (µg/m <sup>3</sup> )	PM <sub>2.5</sub> Limit (µg/m <sup>3</sup> )	Complies	PM <sub>10</sub> Level (µg/m <sup>3</sup> )	PM <sub>10</sub> Limit (µg/m <sup>3</sup> )	Complies
Thursday 2022-12-08	17	62-97	Yes	50	80-120	Yes
Friday 2022-12-09	21		Yes	56		Yes
Saturday 2022-12-10	17		Yes	51		Yes
Sunday 2022-12-11	No Works					
Monday 2022-12-12	15	62-97	Yes	40	80-120	Yes
Tuesday 2022-12-13	22		Yes	95		Yes
Wednesday 2022-12-14	16		Yes	79		Yes
Thursday 2022-12-15	13		Yes	55		Yes
Friday 2022-12-16	4		Yes	13		Yes
Saturday 2022-12-17	10		Yes	33		Yes
Sunday 2022-12-18	No Works					
Monday 2022-12-19	20	62-97	Yes	55	80-120	Yes
Tuesday 2022-12-20	30		Yes	116		Yes
Wednesday 2022-12-21	7		Yes	20		Yes
Thursday 2022-12-22	5		Yes	18		Yes
Friday 2022-12-23	5		Yes	20		Yes

Dust data recorded during the monitoring period were below the criteria. AL notes that data between 22<sup>nd</sup> November and 7<sup>th</sup> December is not available due to equipment malfunction.

## 5 CONCLUSION

Acoustic Logic Consultancy has carried out noise, dust and vibration monitoring for the proposed intersection upgrade at Tweed Coast Road/Cudgen Road intersection, Tweed Valley.


This monitoring report presents the noise and vibration monitoring for the periods as follows:

- Vibration Monitoring: 22<sup>nd</sup> of November to 23<sup>rd</sup> of December 2022
- Noise Monitoring: 22<sup>nd</sup> of November to 23<sup>rd</sup> of December 2022 (system malfunction between 22<sup>nd</sup> November to 7<sup>th</sup> of December), and
- Dust Monitoring: 22<sup>nd</sup> of November to 23<sup>rd</sup> of December 2022 (system malfunction between 22<sup>nd</sup> November to 7<sup>th</sup> of December).

Vibration levels were below the criteria during the whole monitoring period. Noise levels were normally below 10dB(A) exceedance of noise affected level (55dB(A)). This is believed to be lower at the closet residential receiver due to distance attenuation. Dust levels recorded during the above monitoring period were below the criteria as per the results notes in this report.

Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'J. Smith', written in a cursive style.

Acoustic Logic Pty Ltd

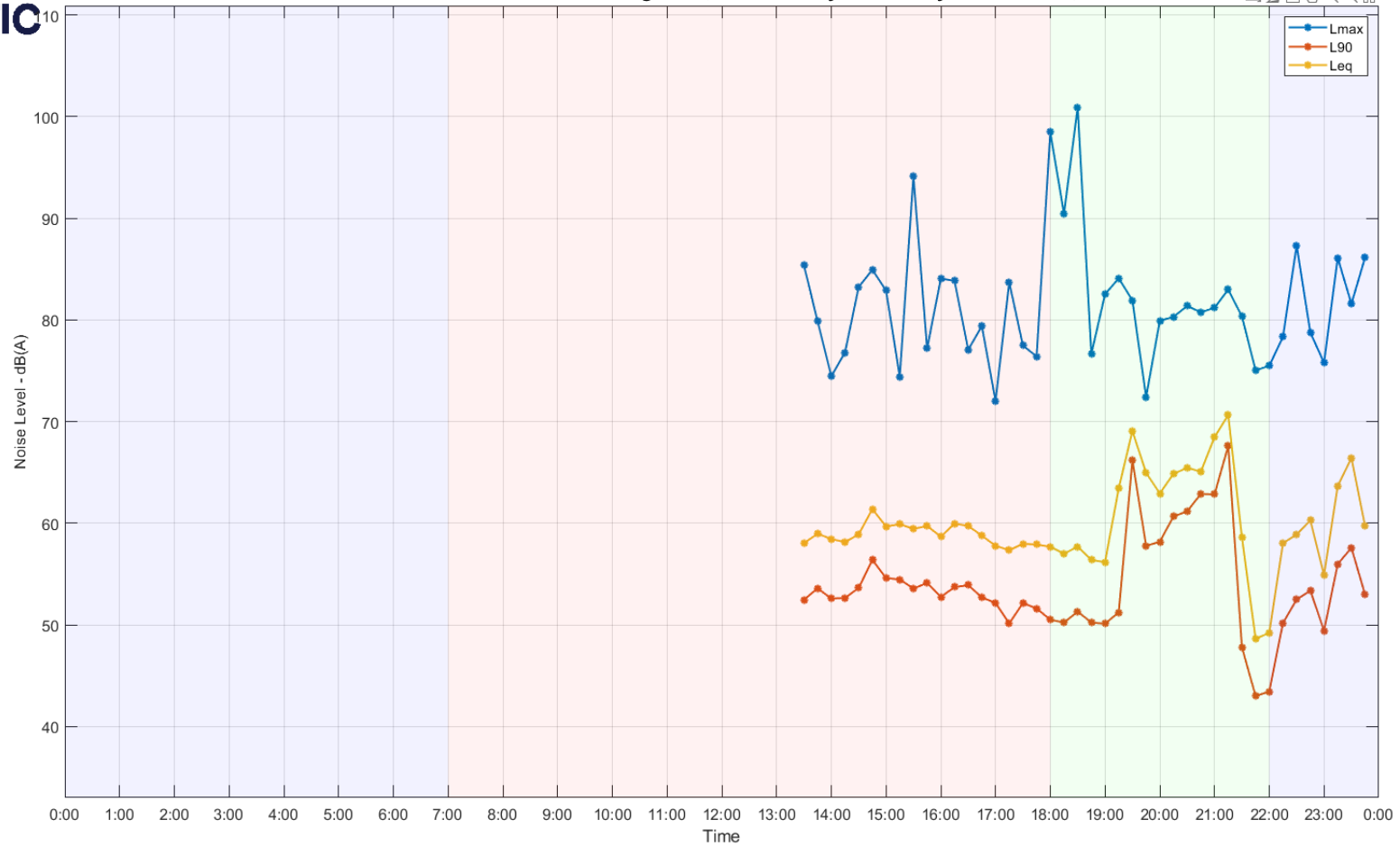


## **APPENDIX 1 – NOISE MONITORING RESULTS**

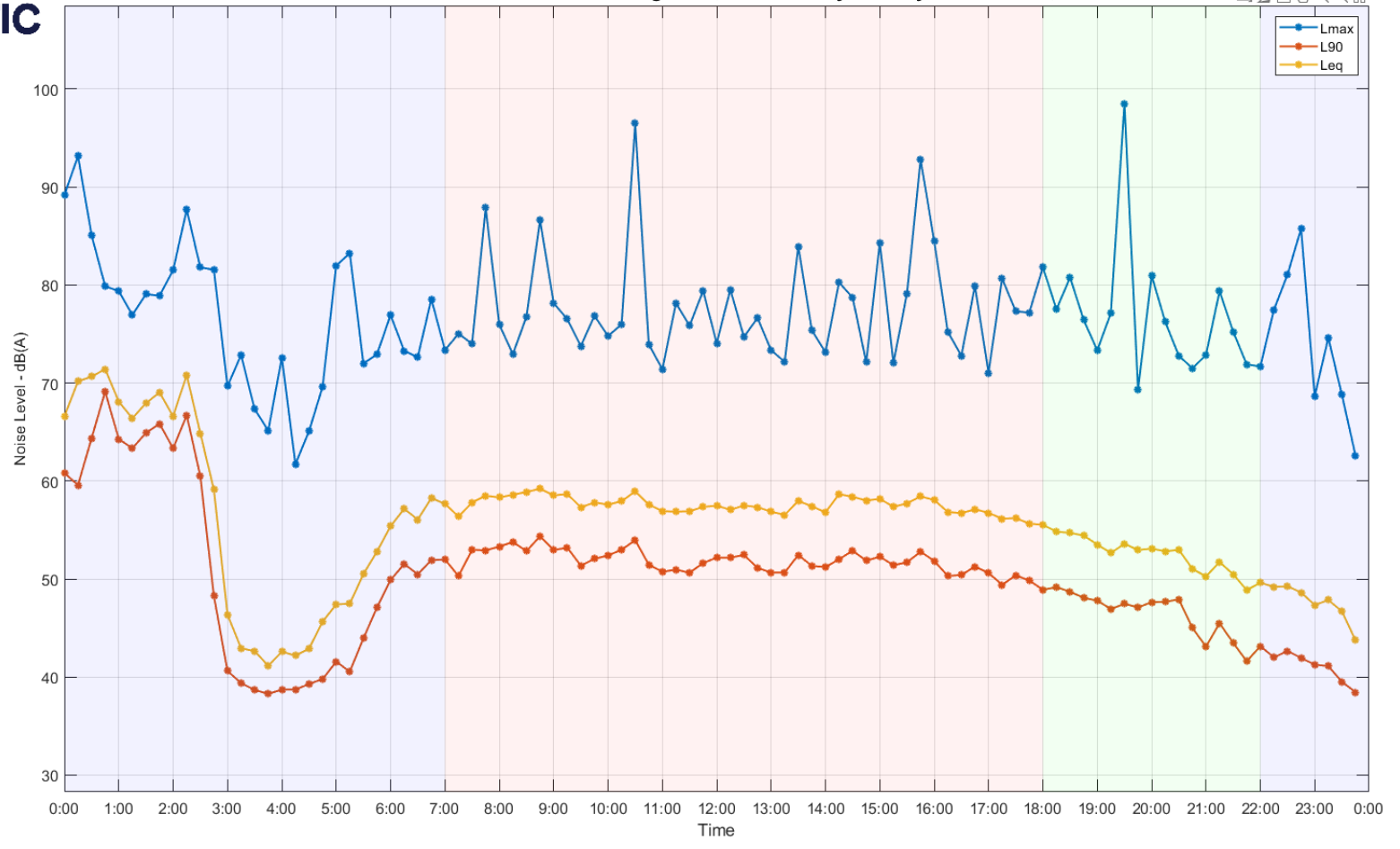




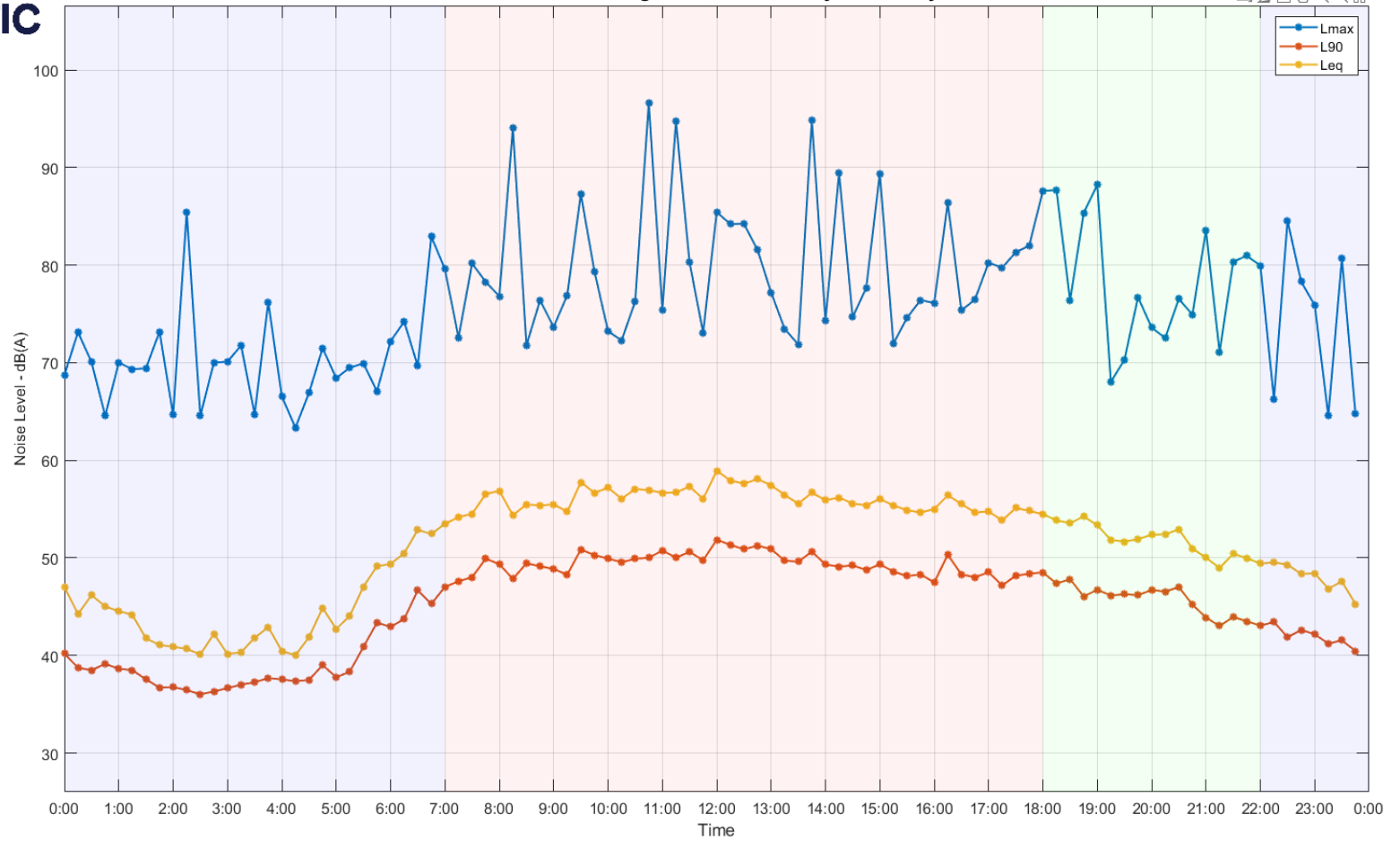
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Thursday 08 December, 2022



Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Friday 09 December, 2022

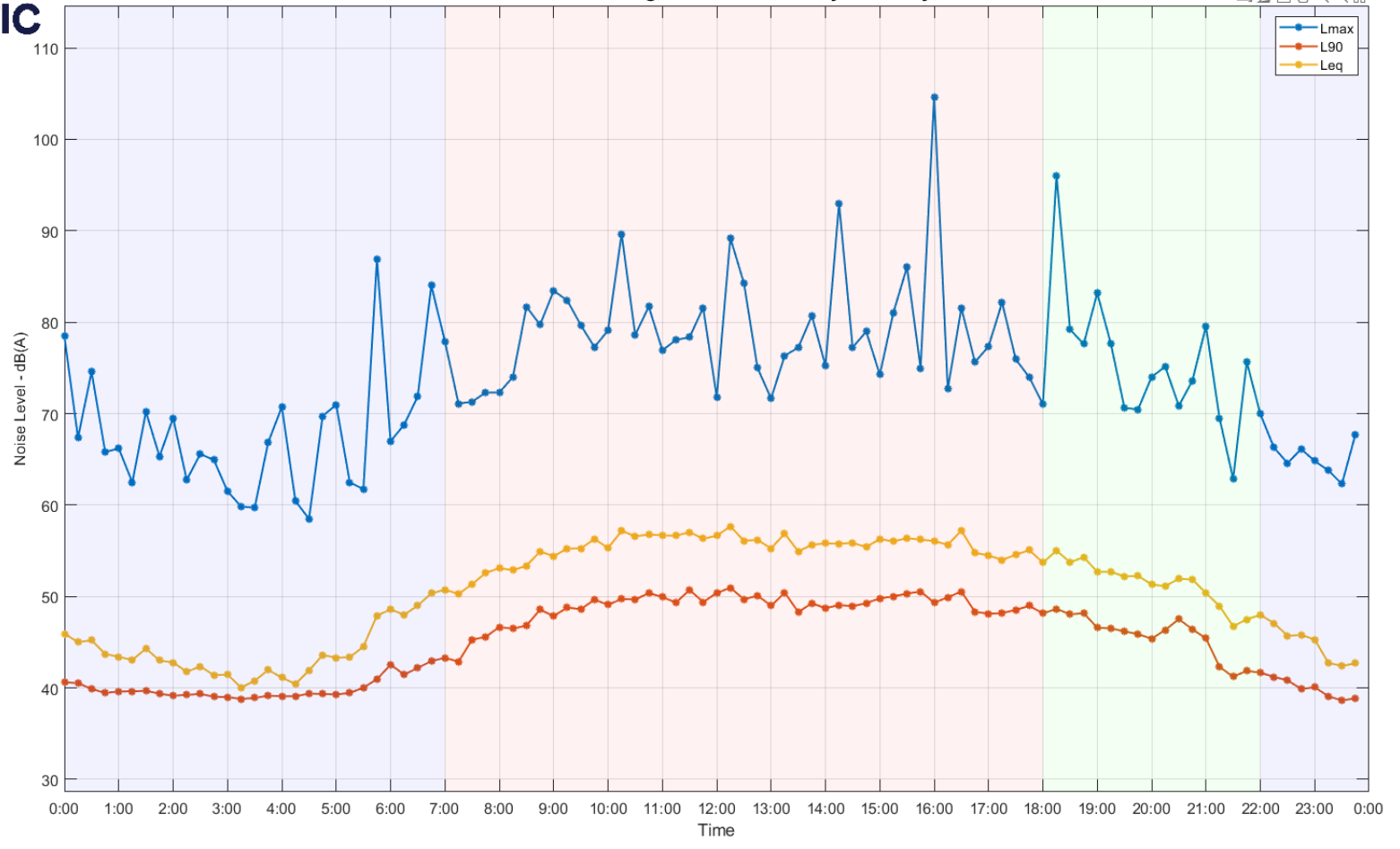


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Saturday 10 December, 2022



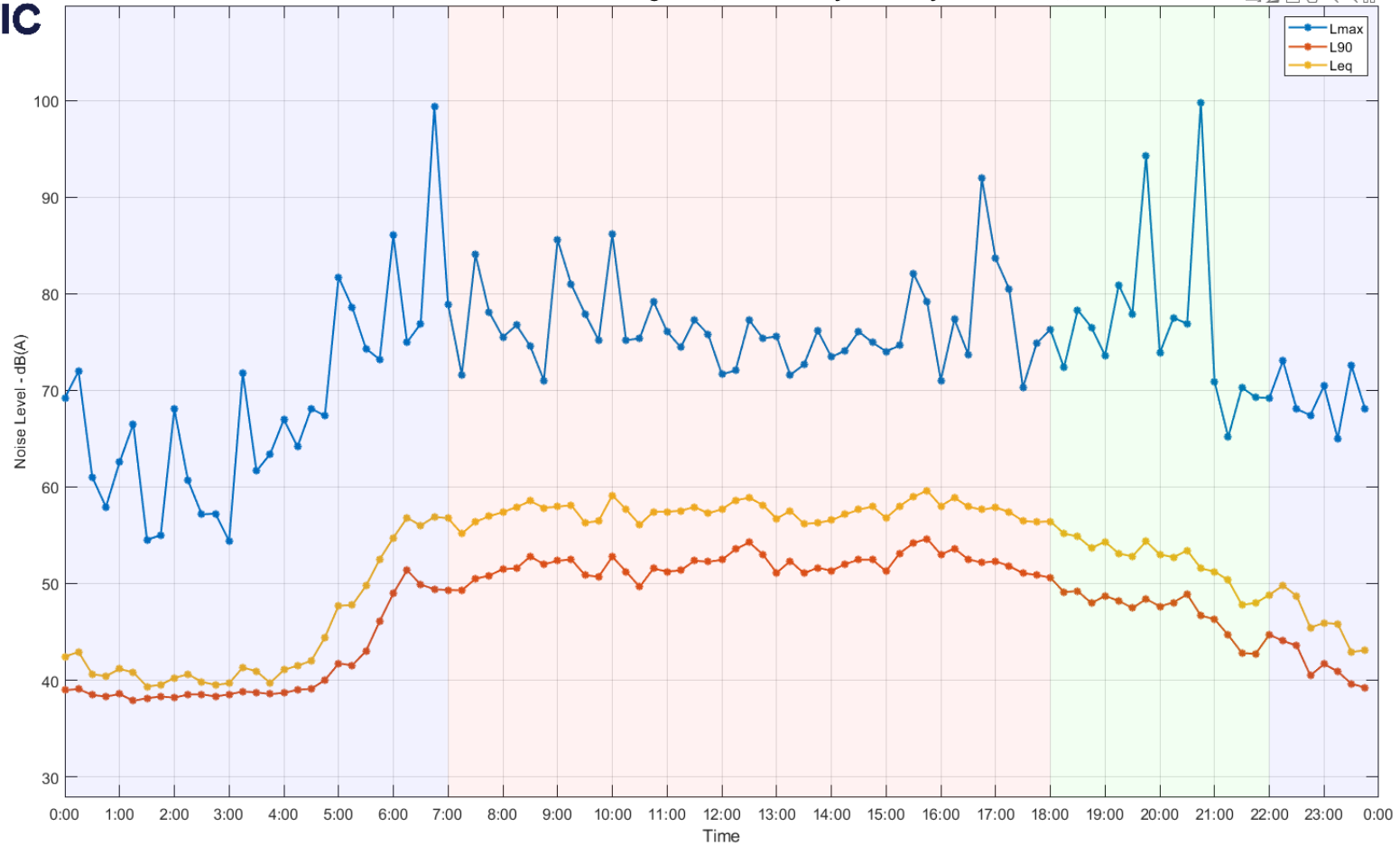


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Sunday 11 December, 2022



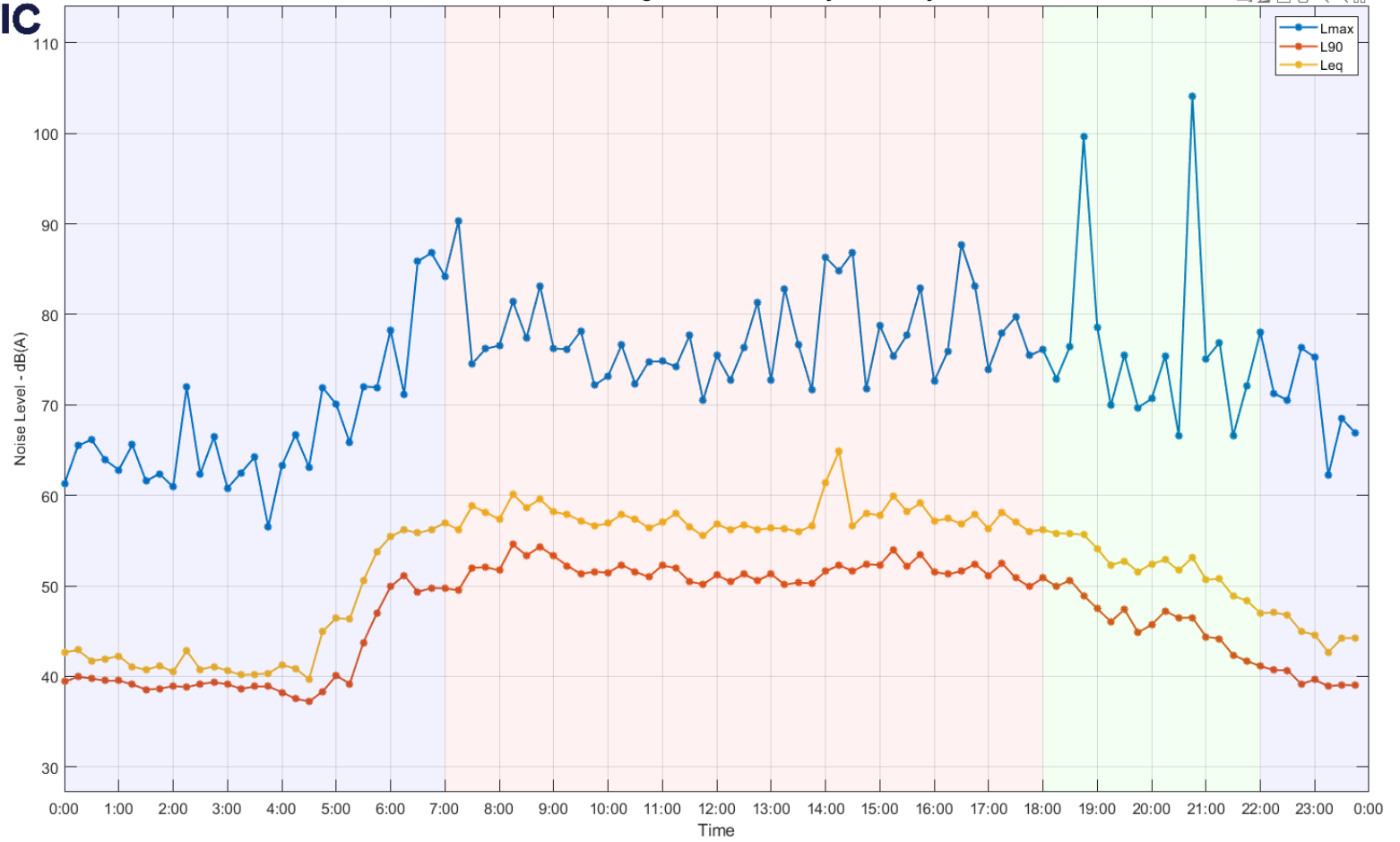


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Monday 12 December, 2022



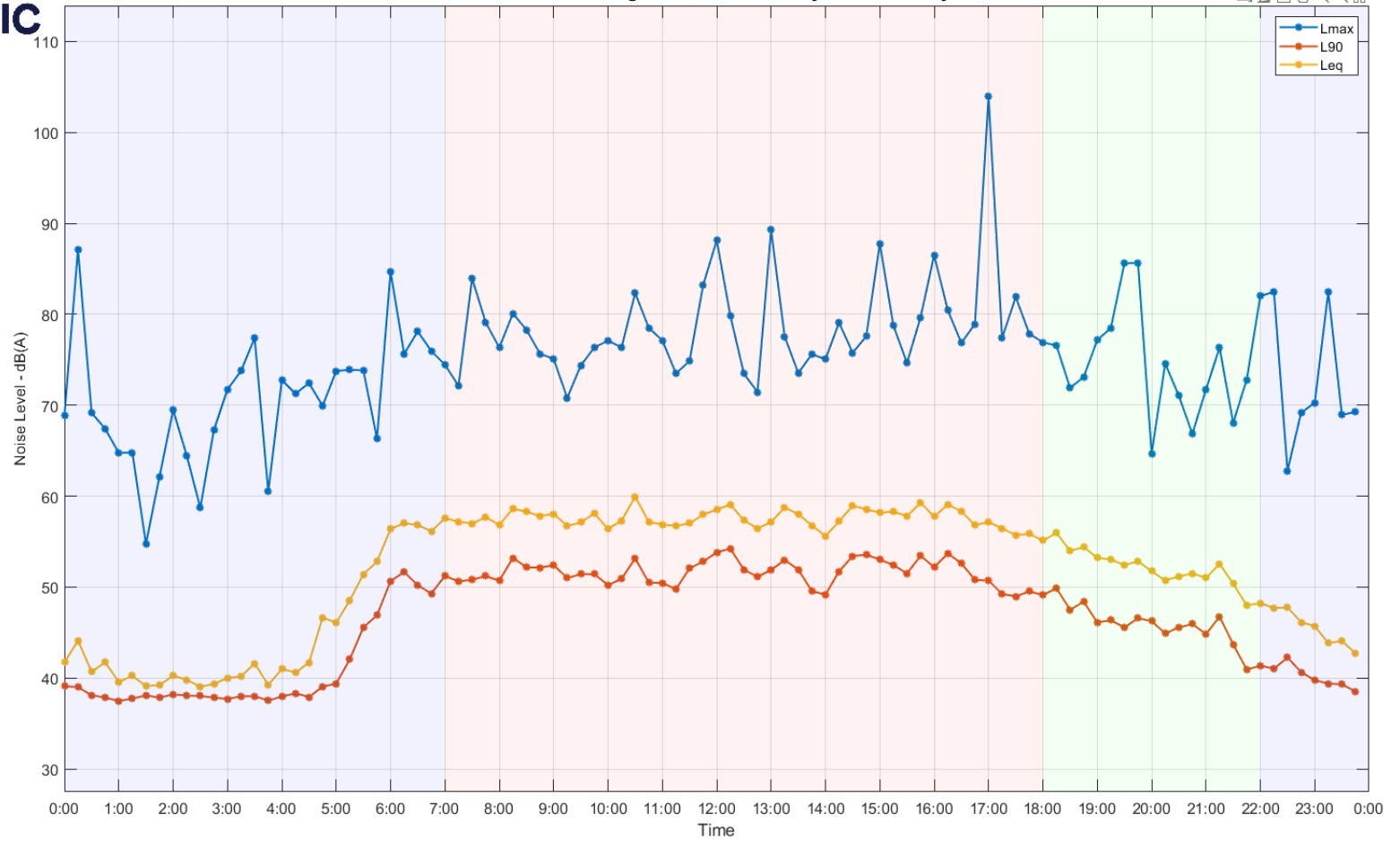


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Tuesday 13 December, 2022



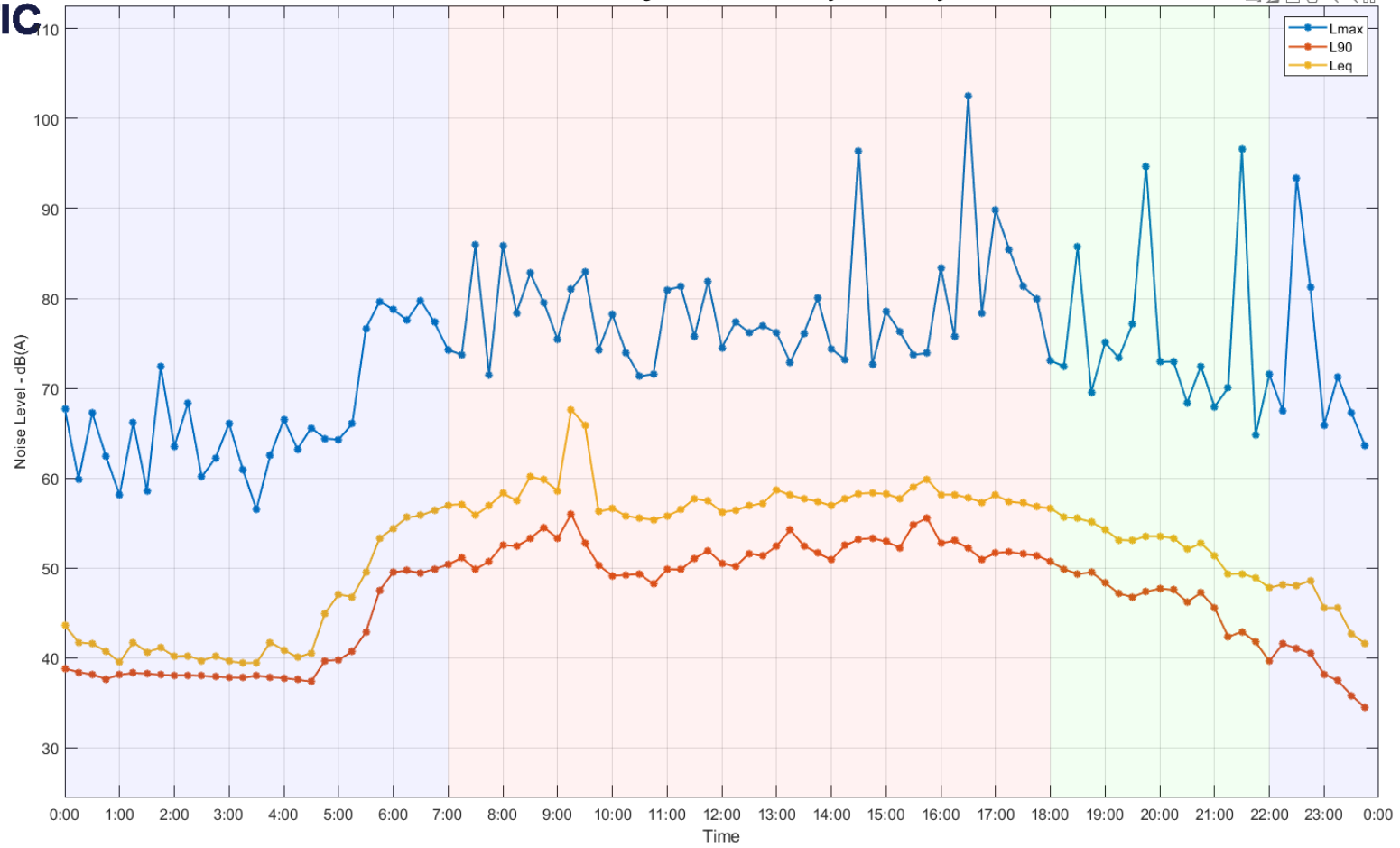


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Wednesday 14 December, 2022





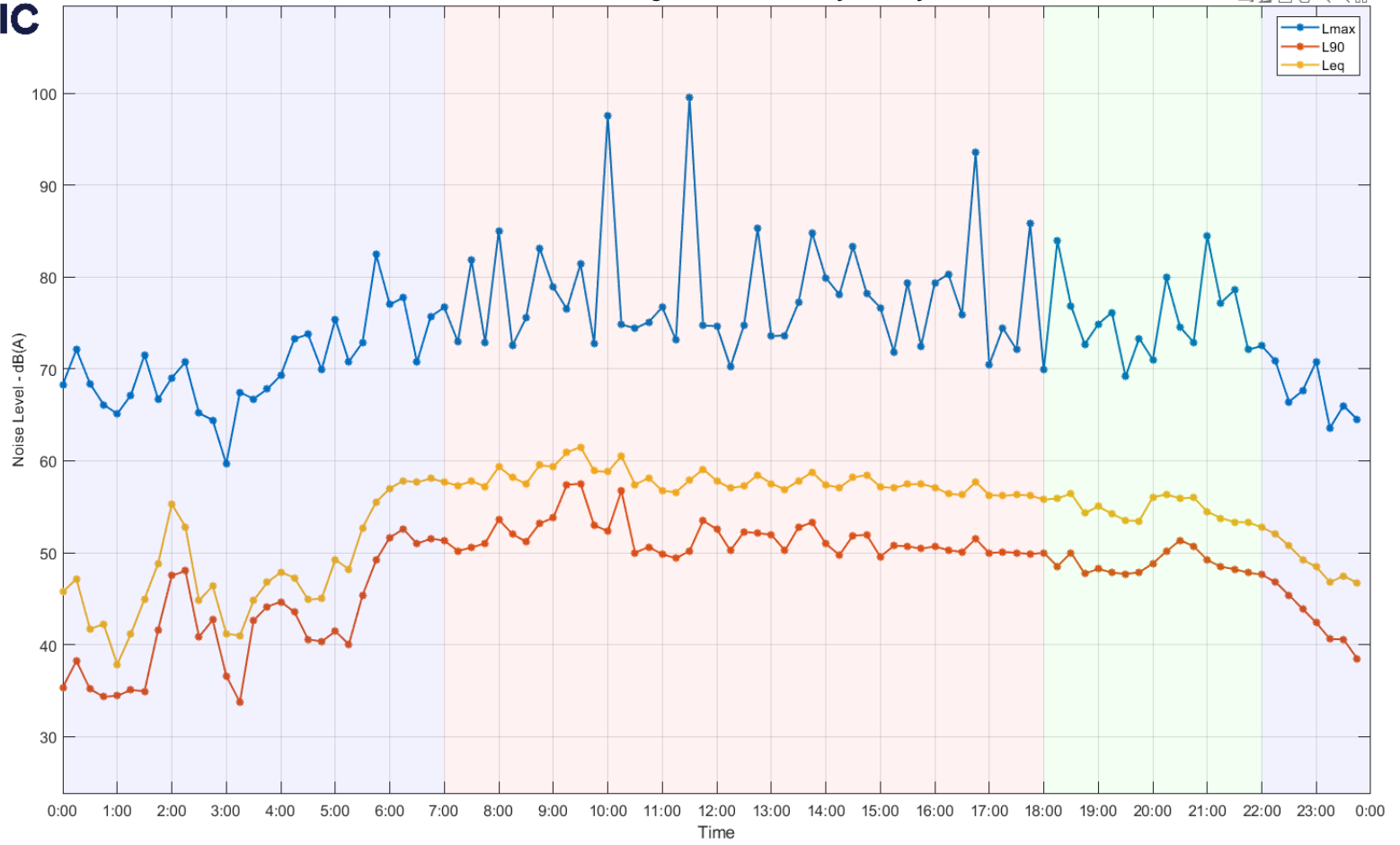
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Thursday 15 December, 2022





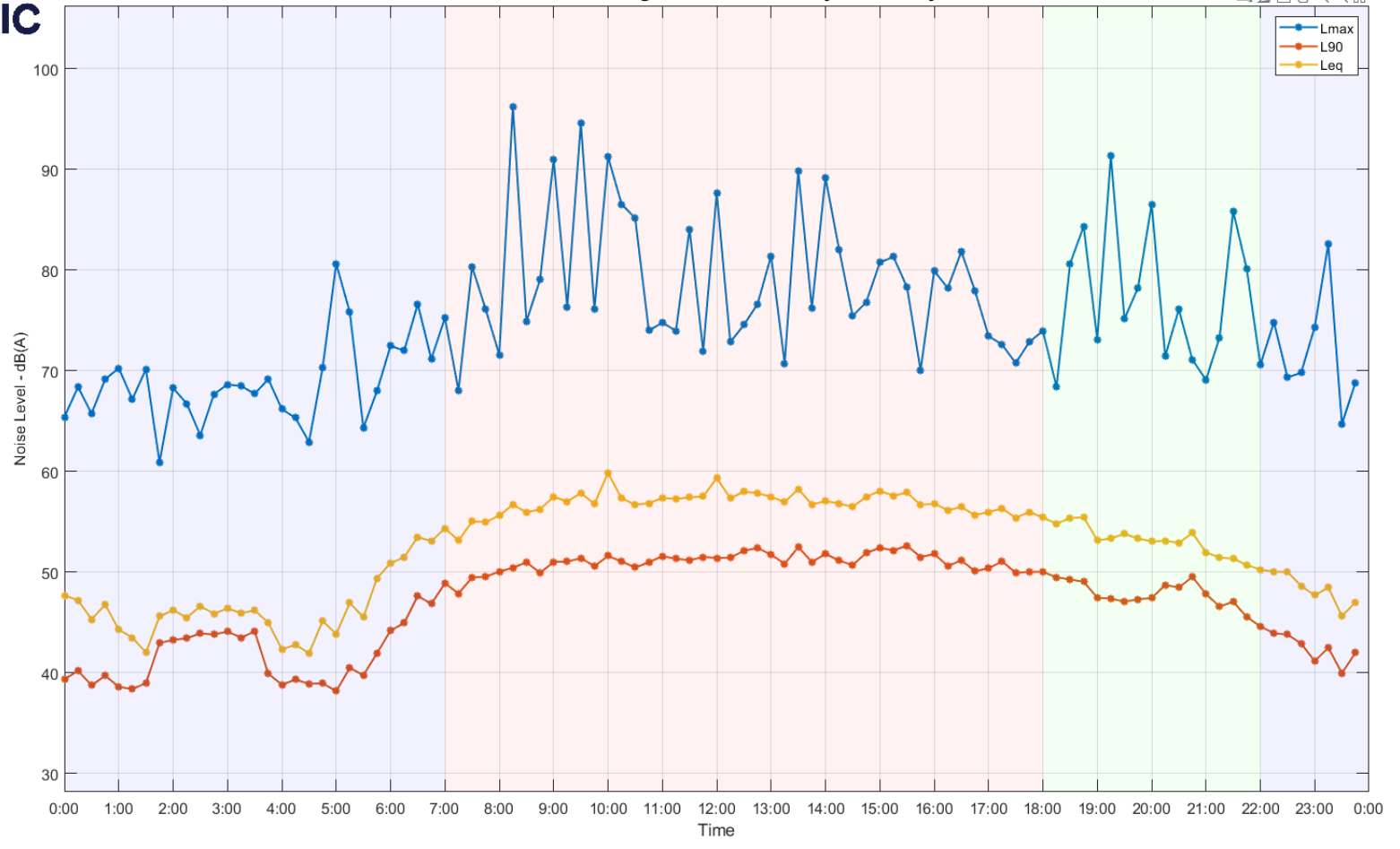


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Friday 16 December, 2022

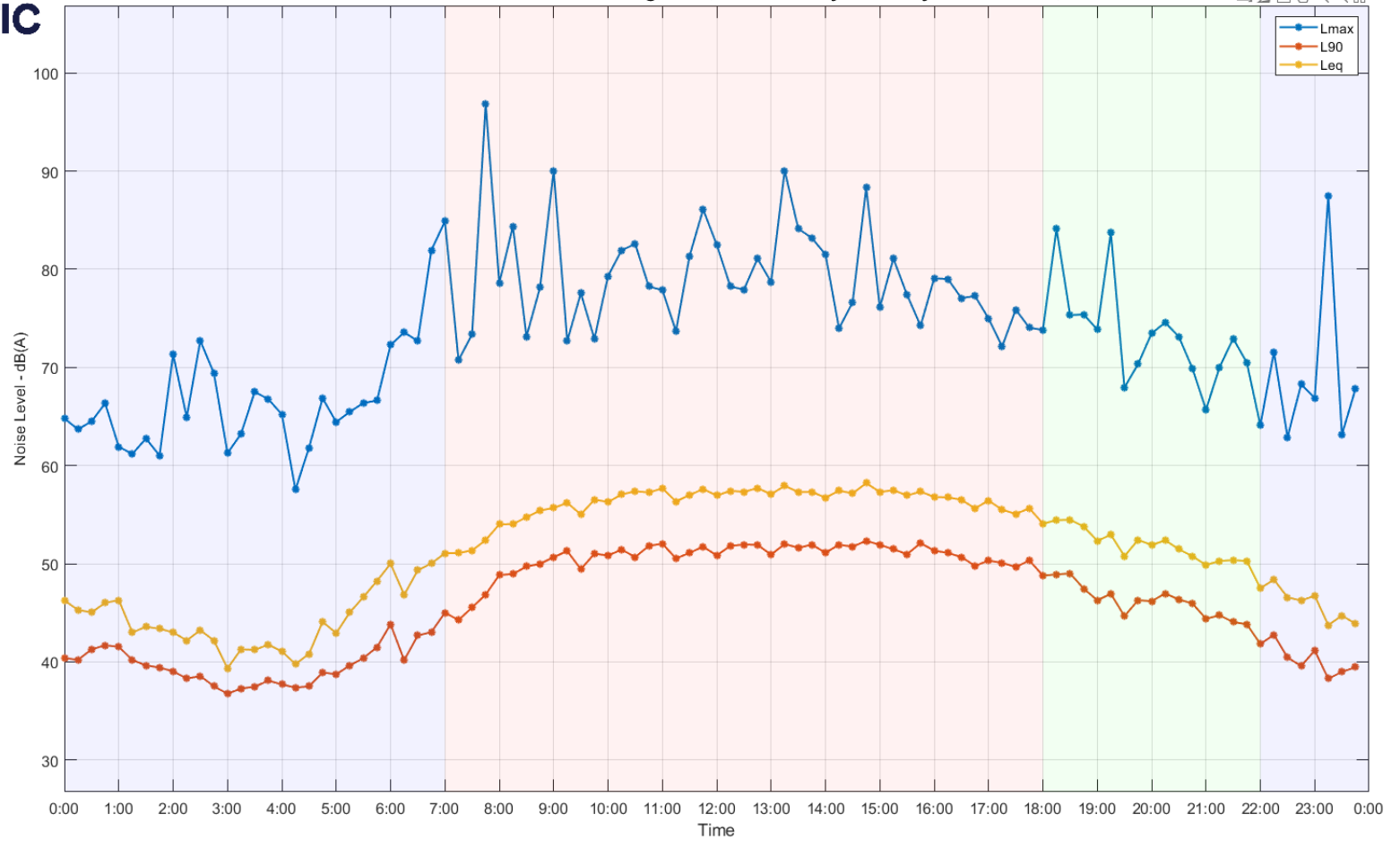




Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Saturday 17 December, 2022

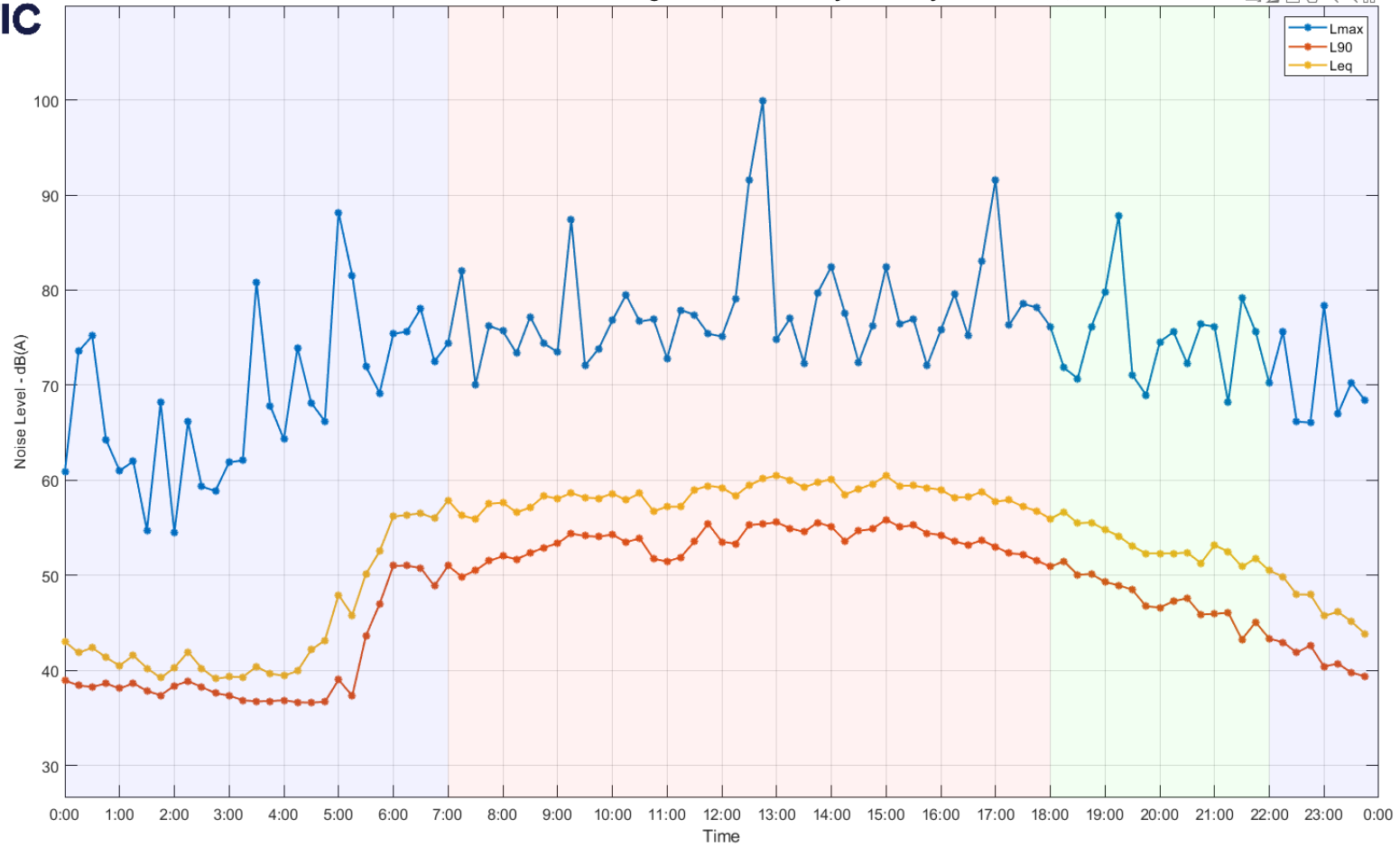


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Sunday 18 December, 2022

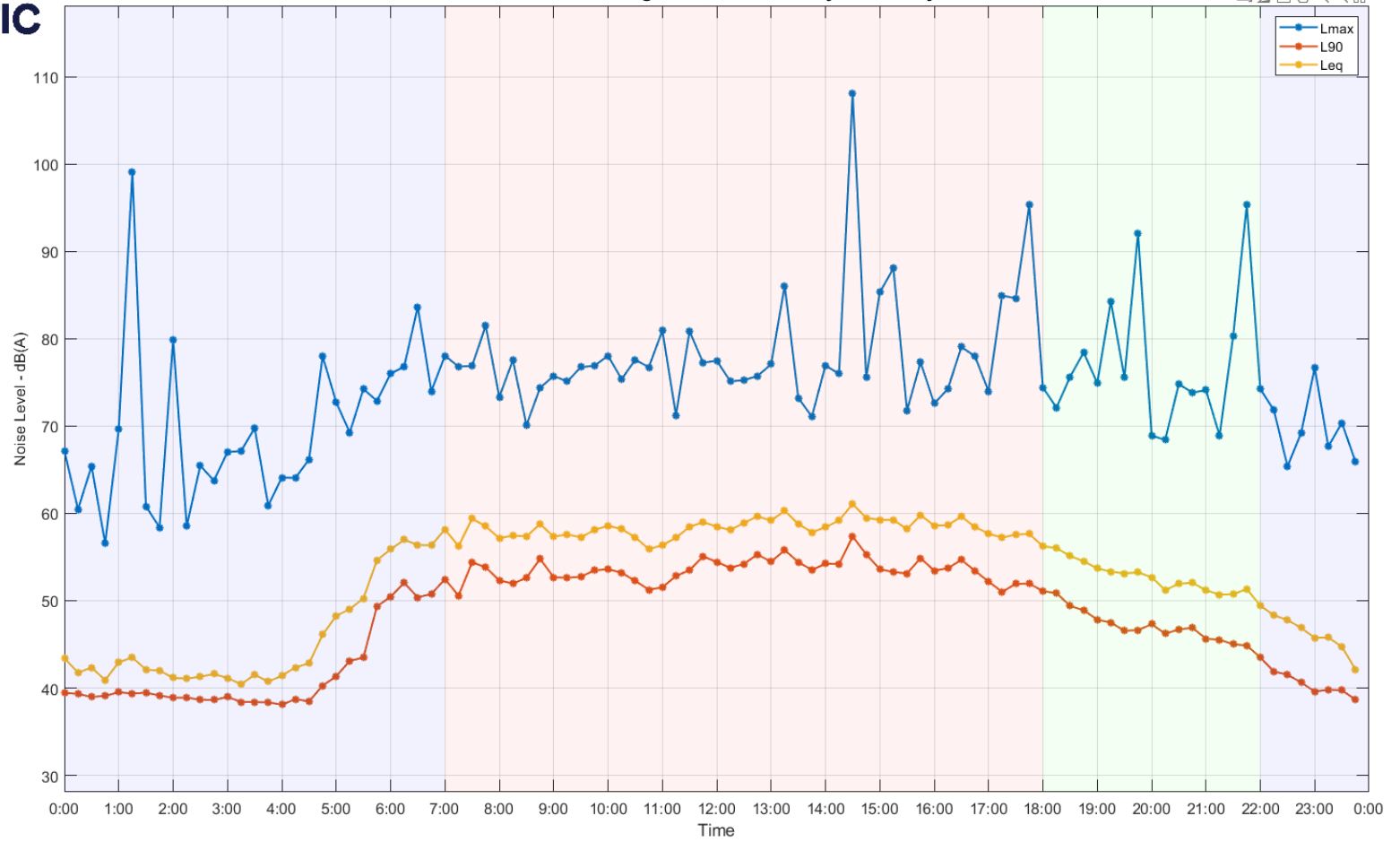




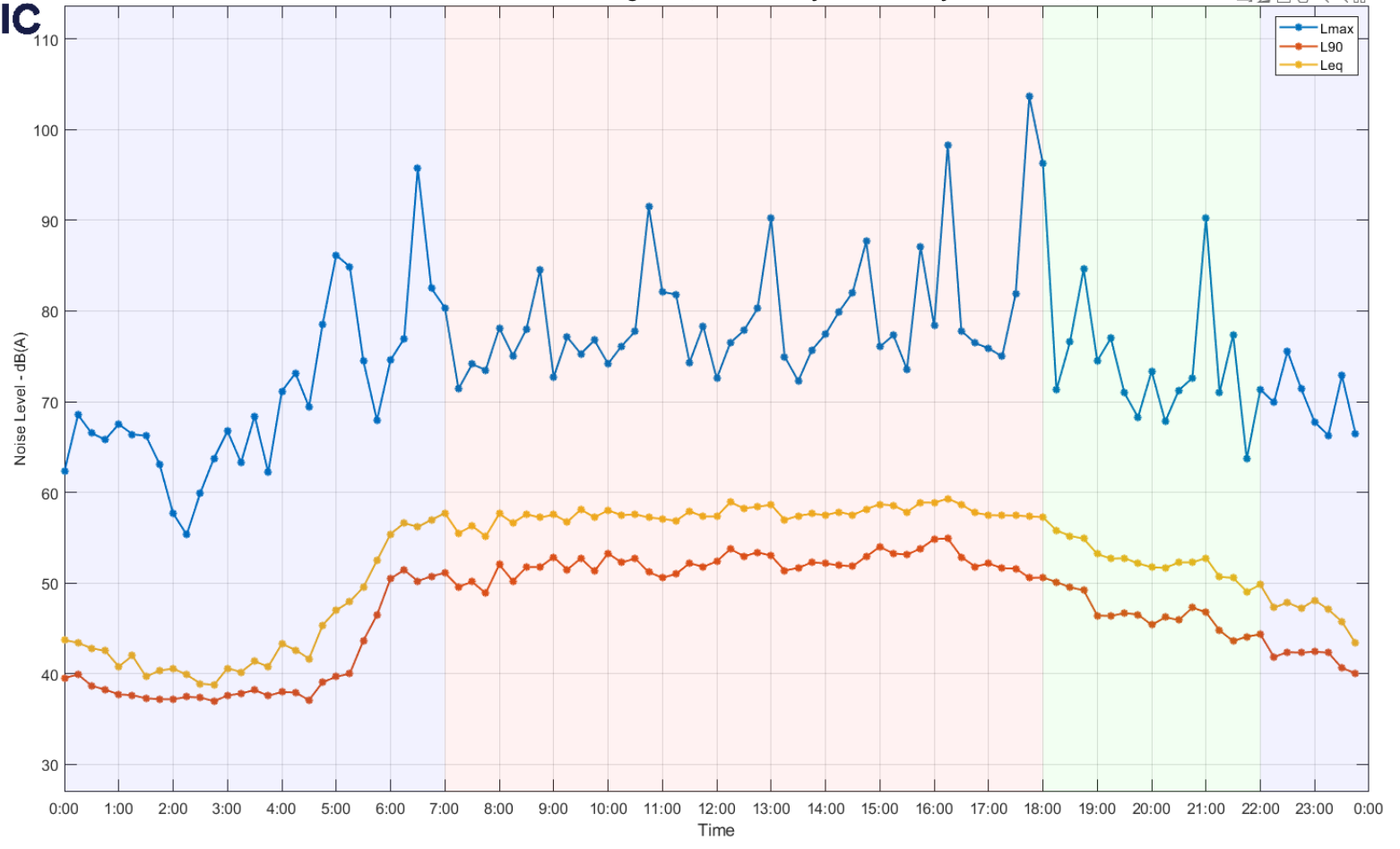
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Monday 19 December, 2022



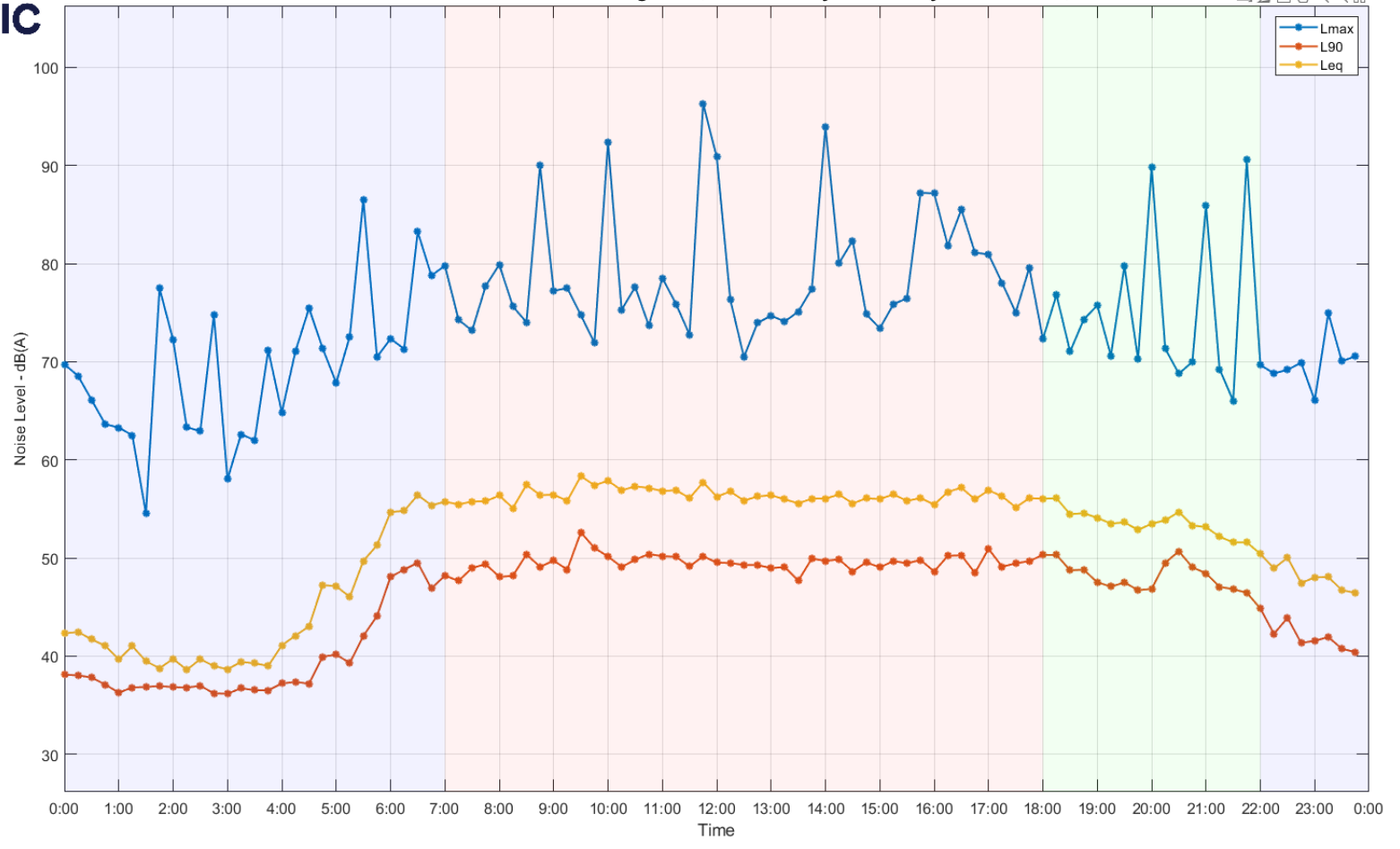
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Tuesday 20 December, 2022



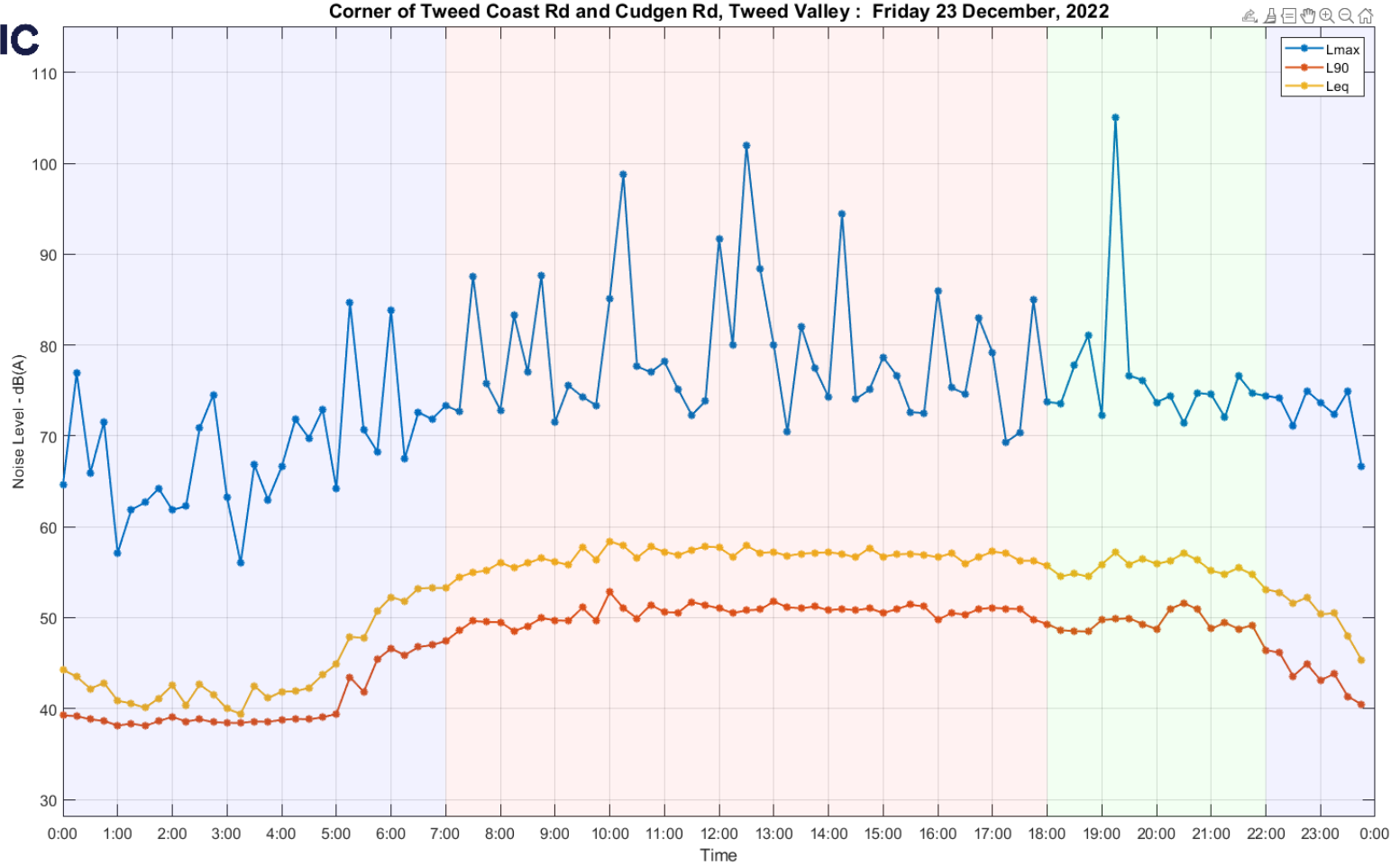
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Wednesday 21 December, 2022



Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Thursday 22 December, 2022



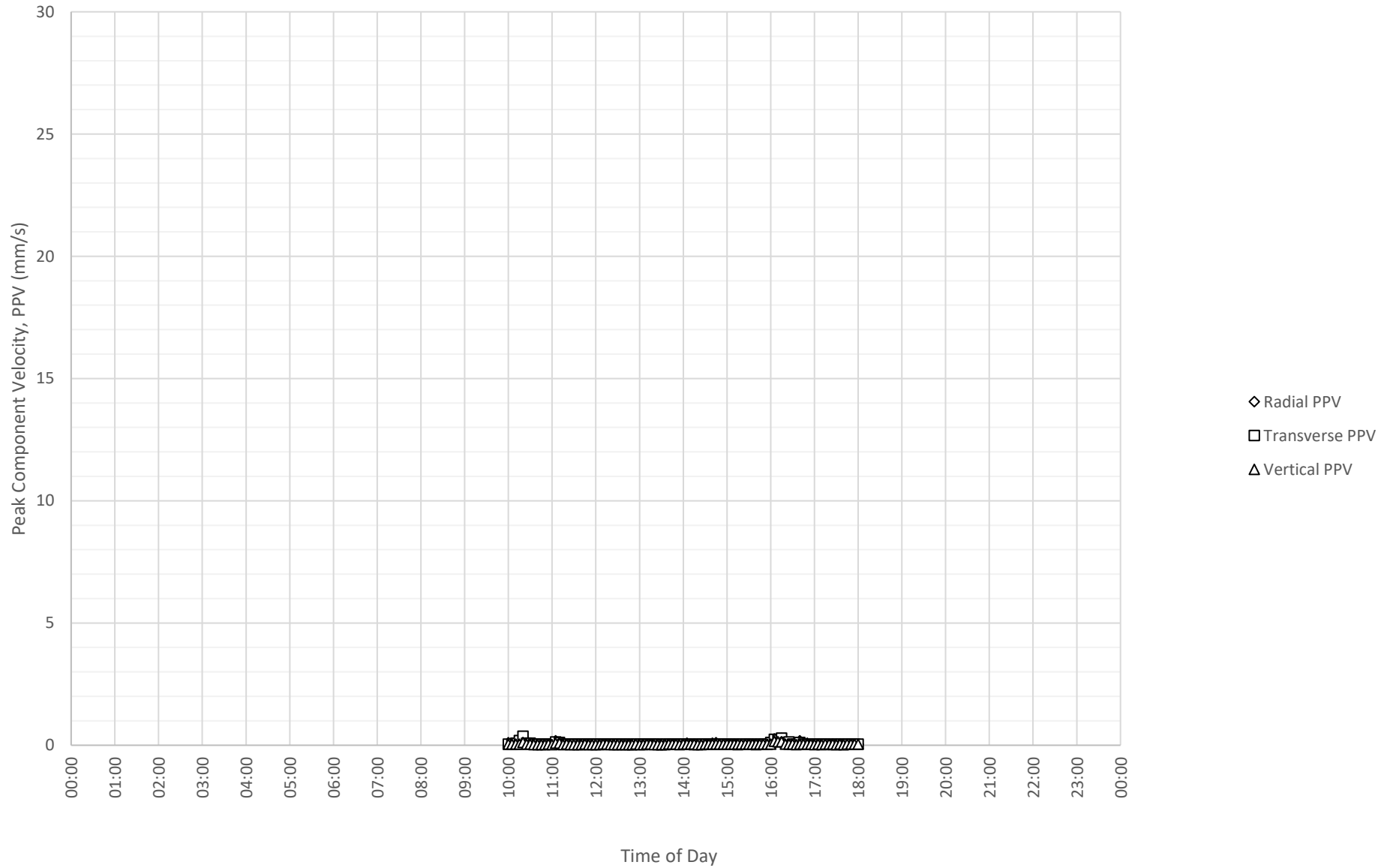
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Friday 23 December, 2022



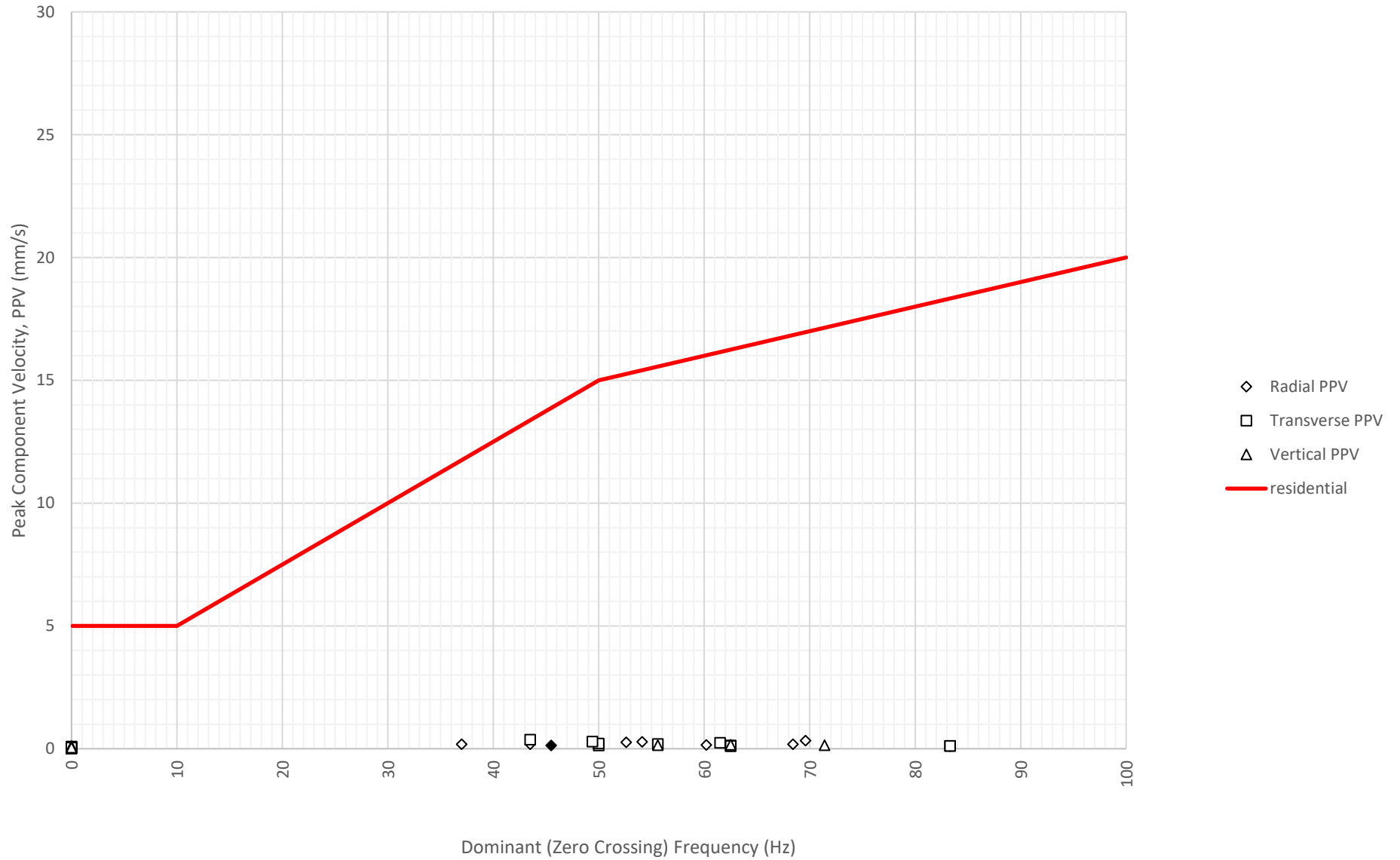


## **APPENDIX 2 – VIBRATION MONITORING RESULTS**

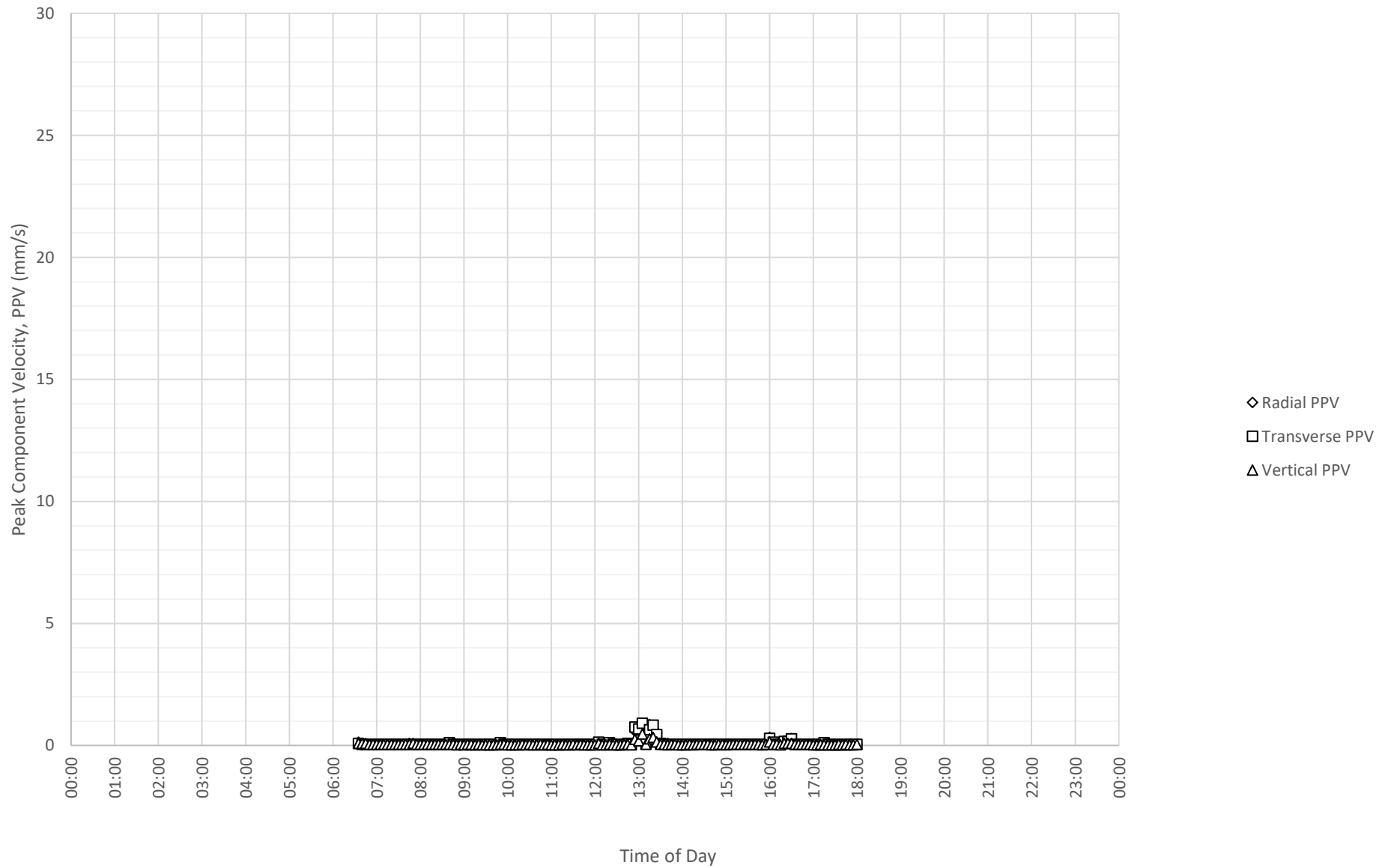
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 22-11-2022



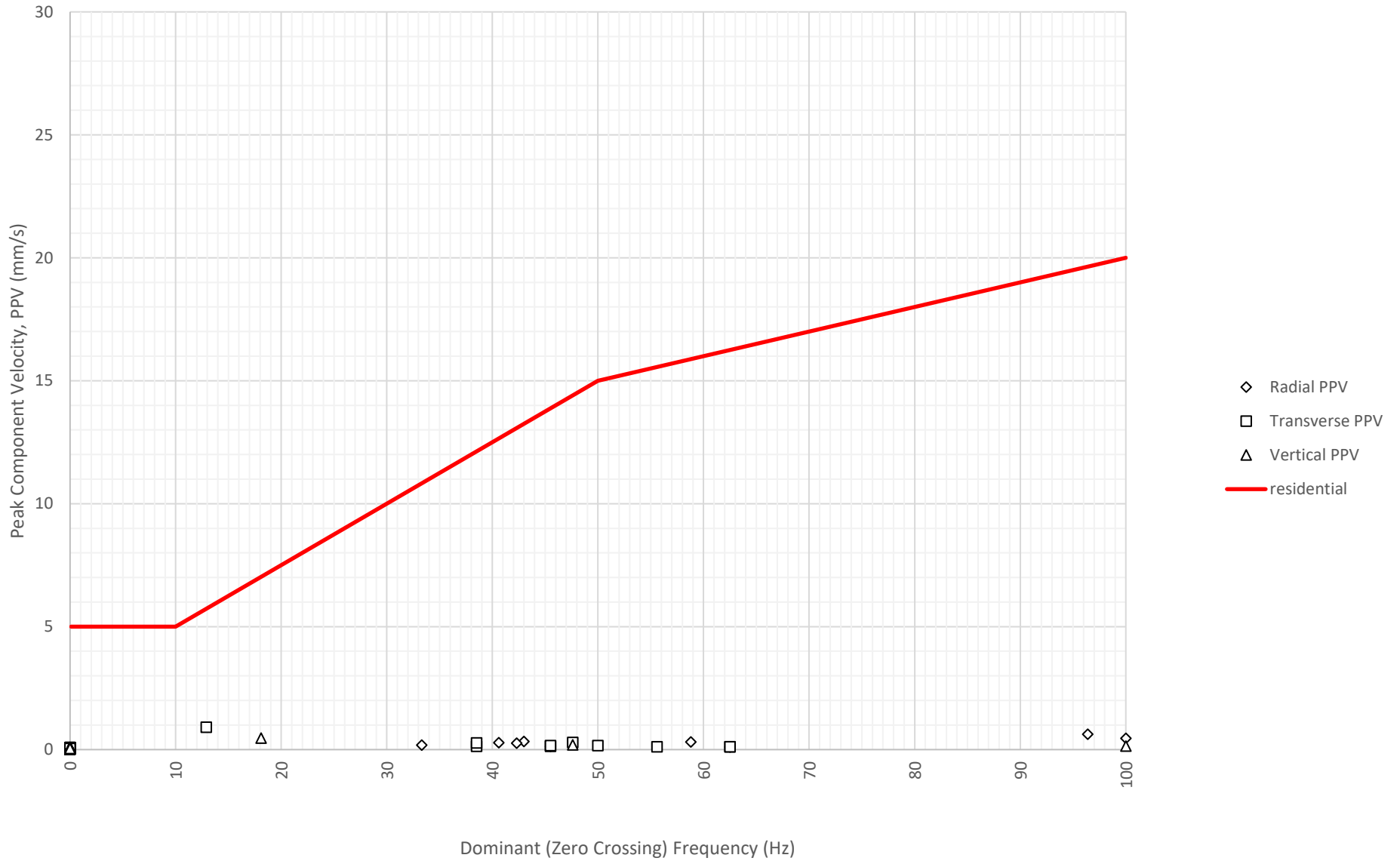
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 22-11-2022



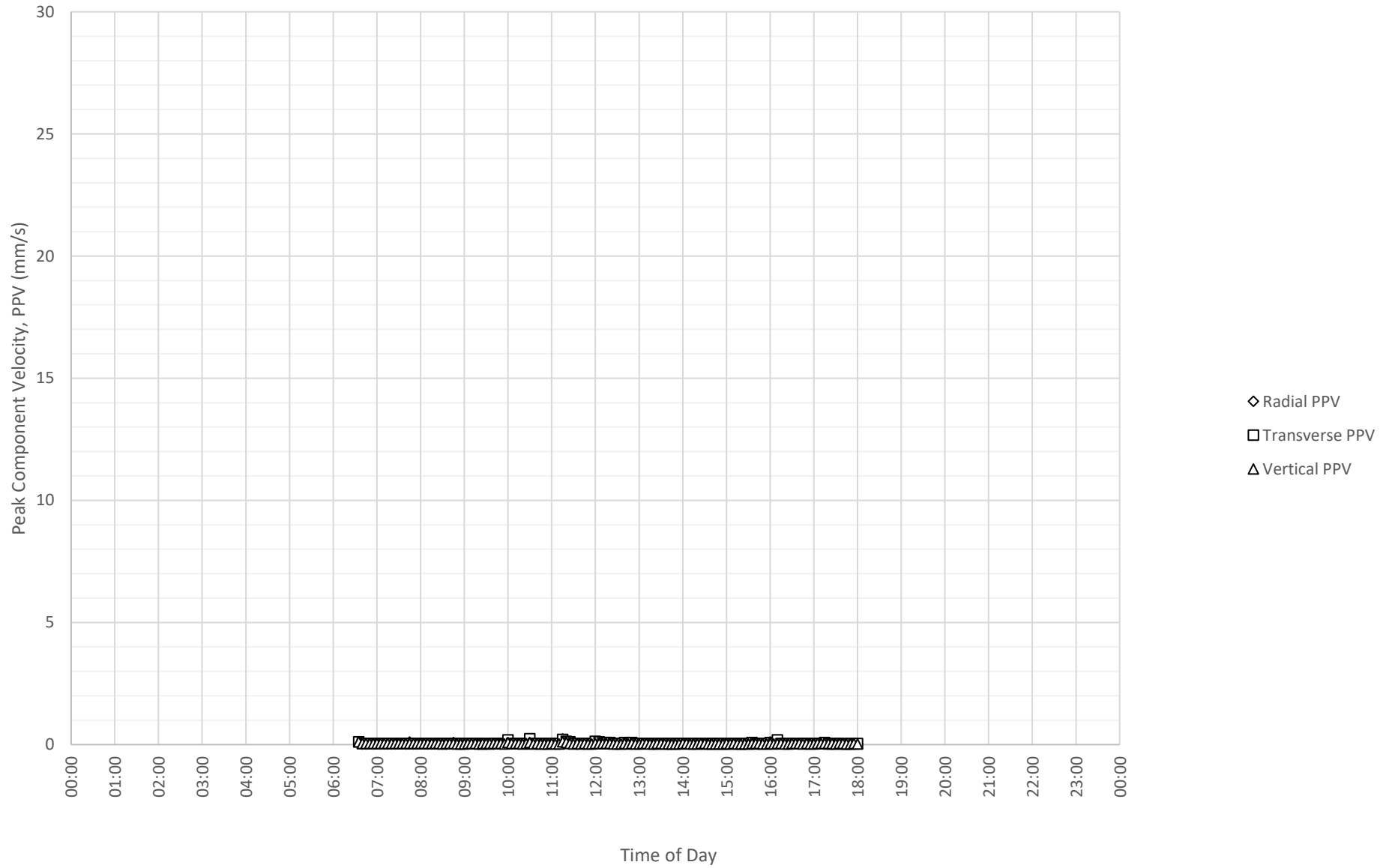
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 23-11-2022



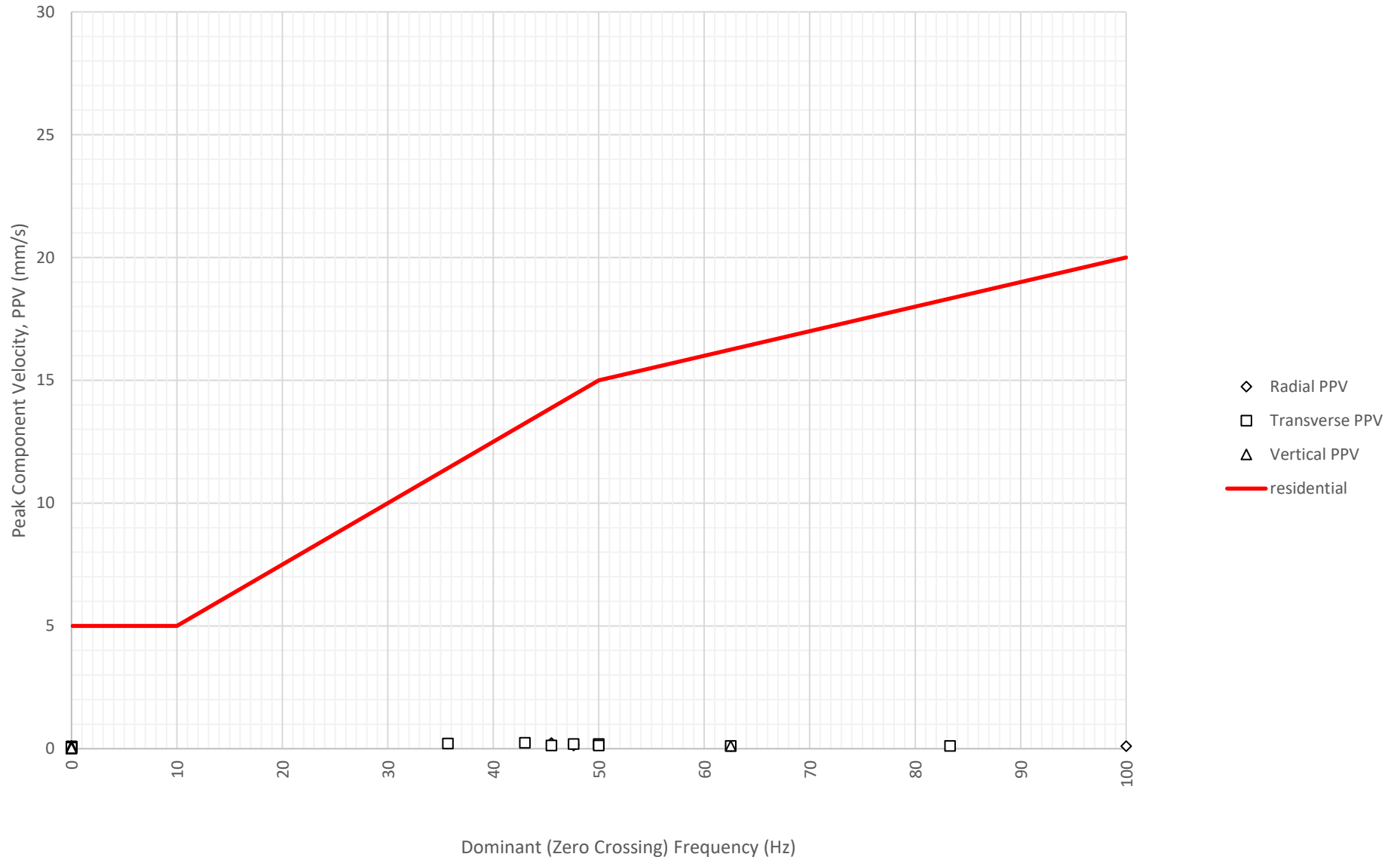
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 23-11-2022



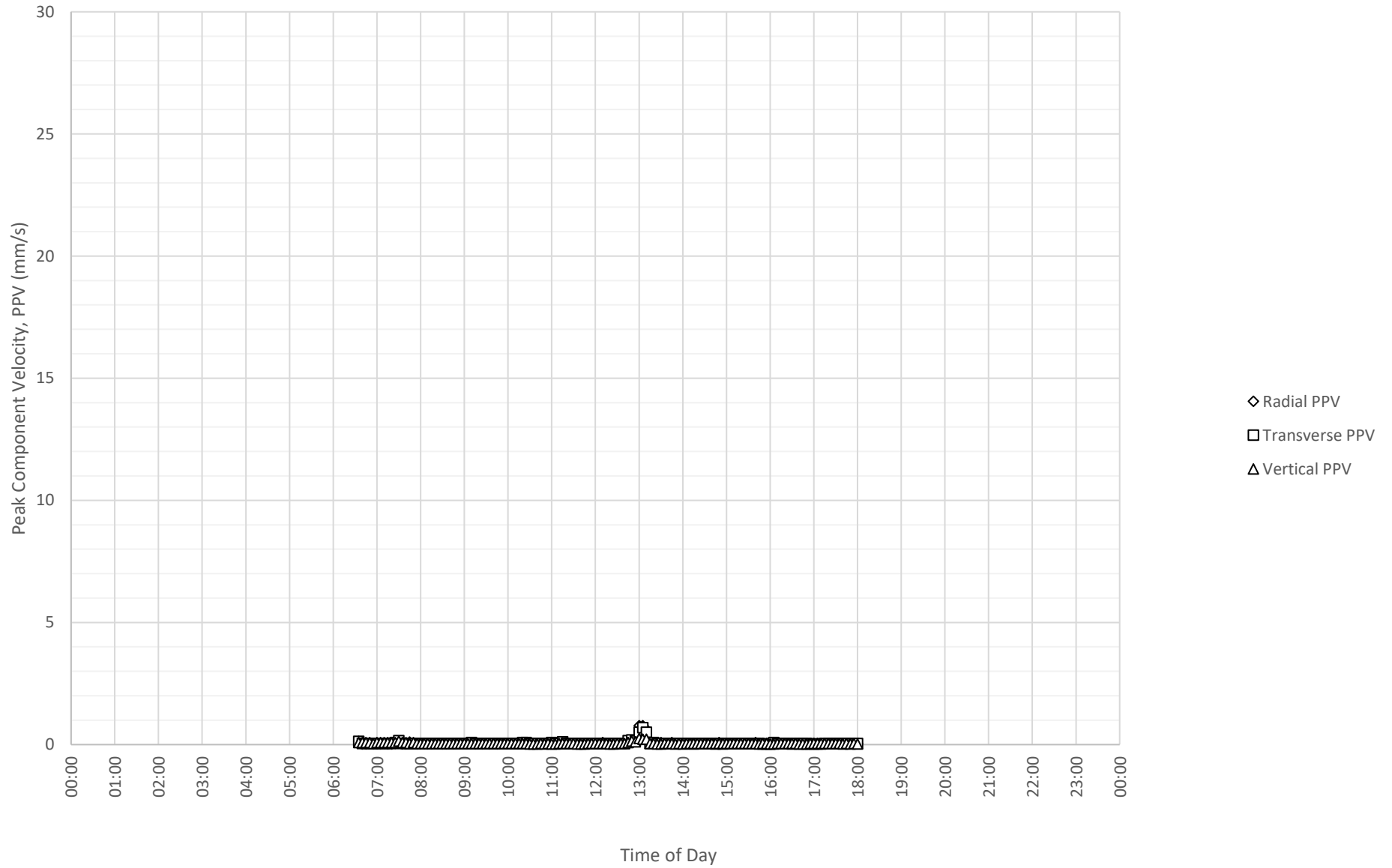
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 24-11-2022



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 24-11-2022

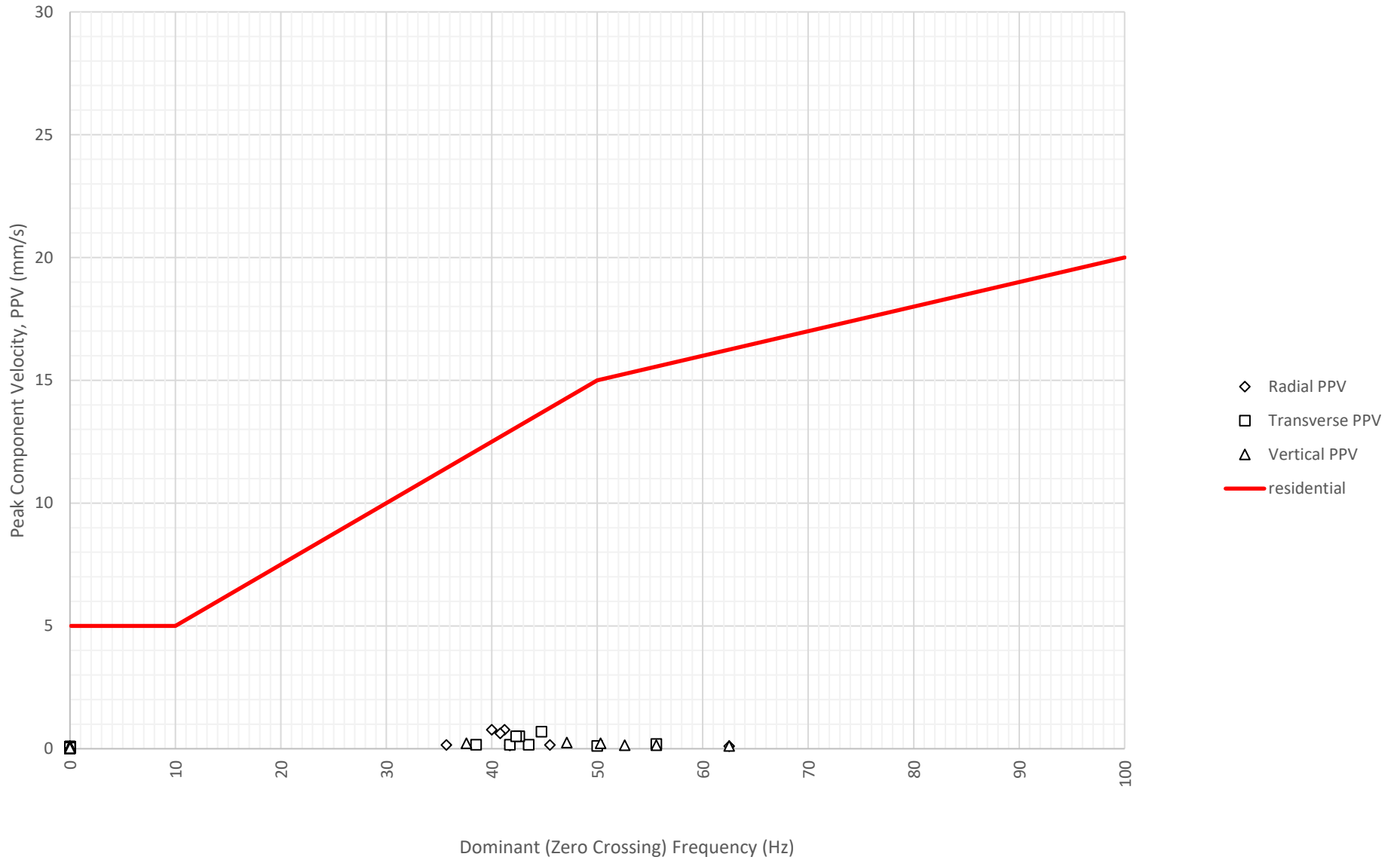


# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 25-11-2022

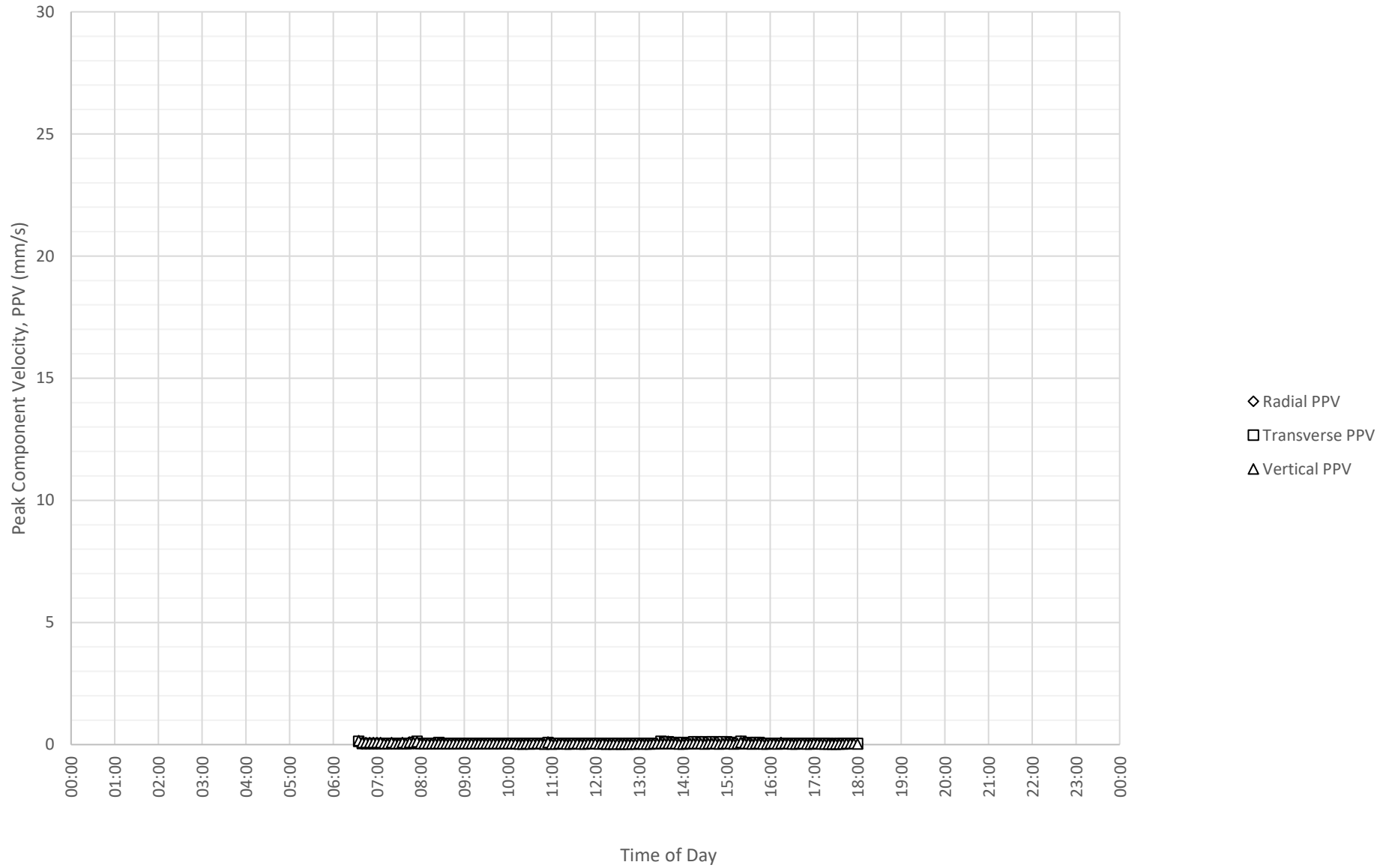




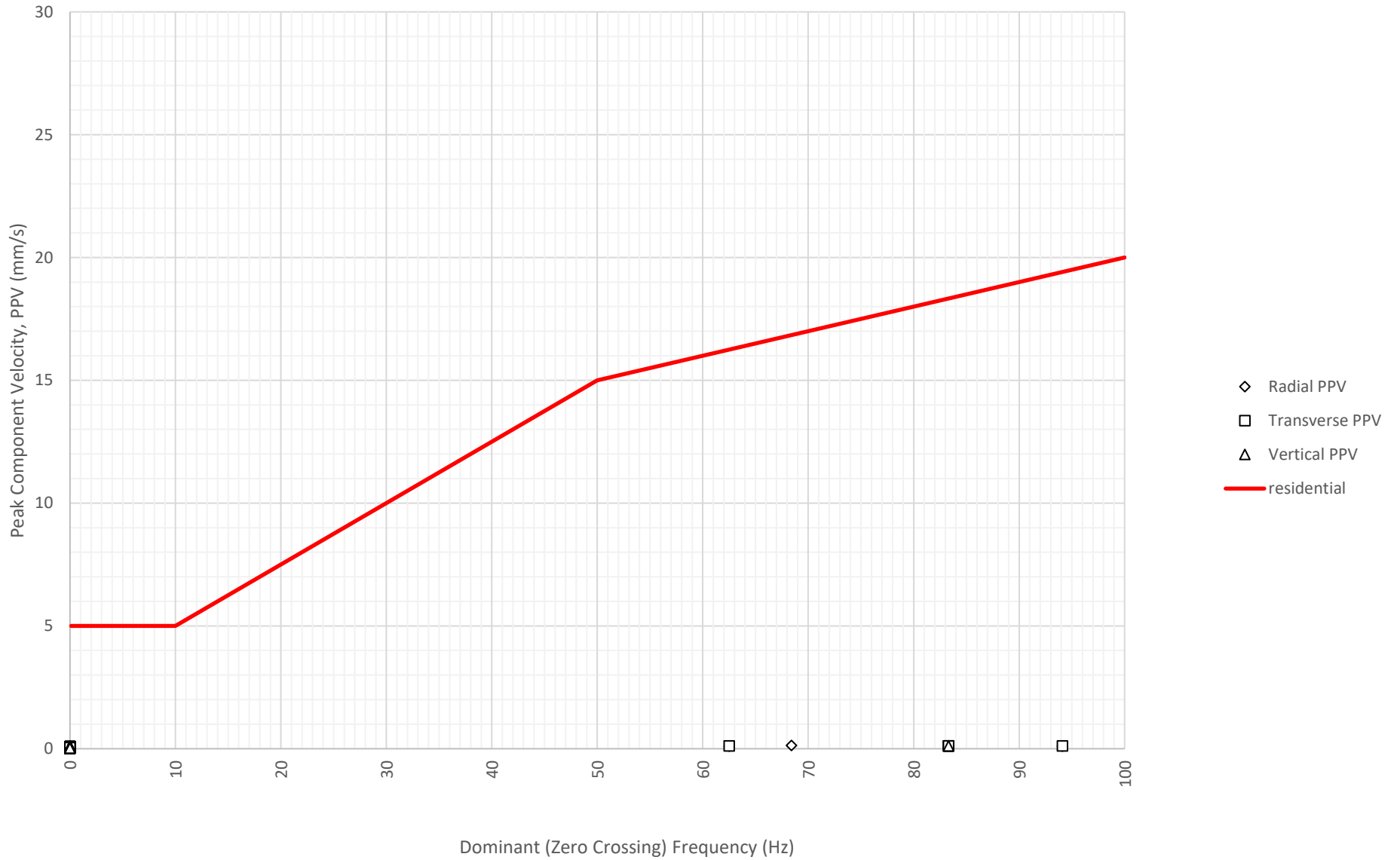
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 25-11-2022



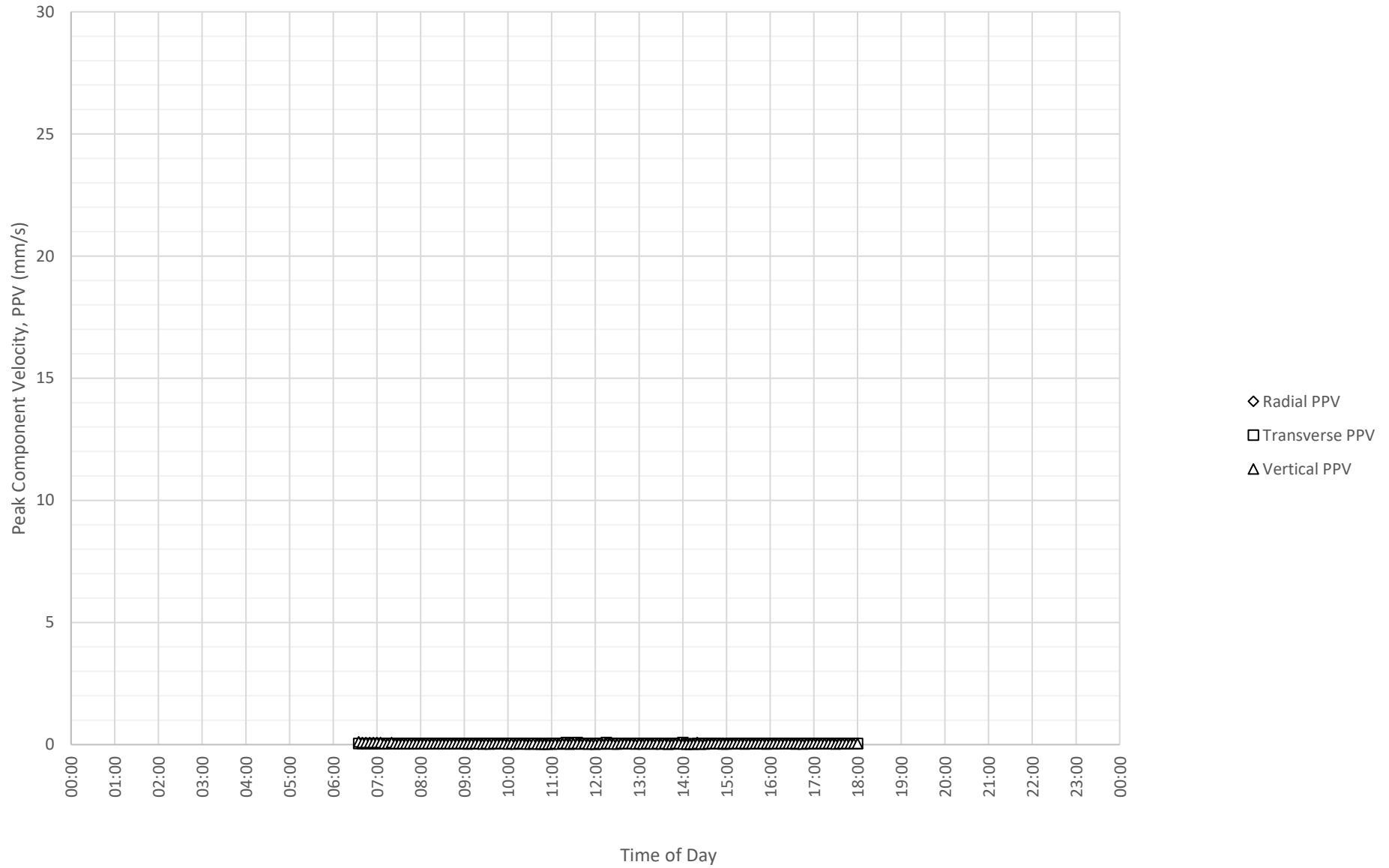
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 26-11-2022



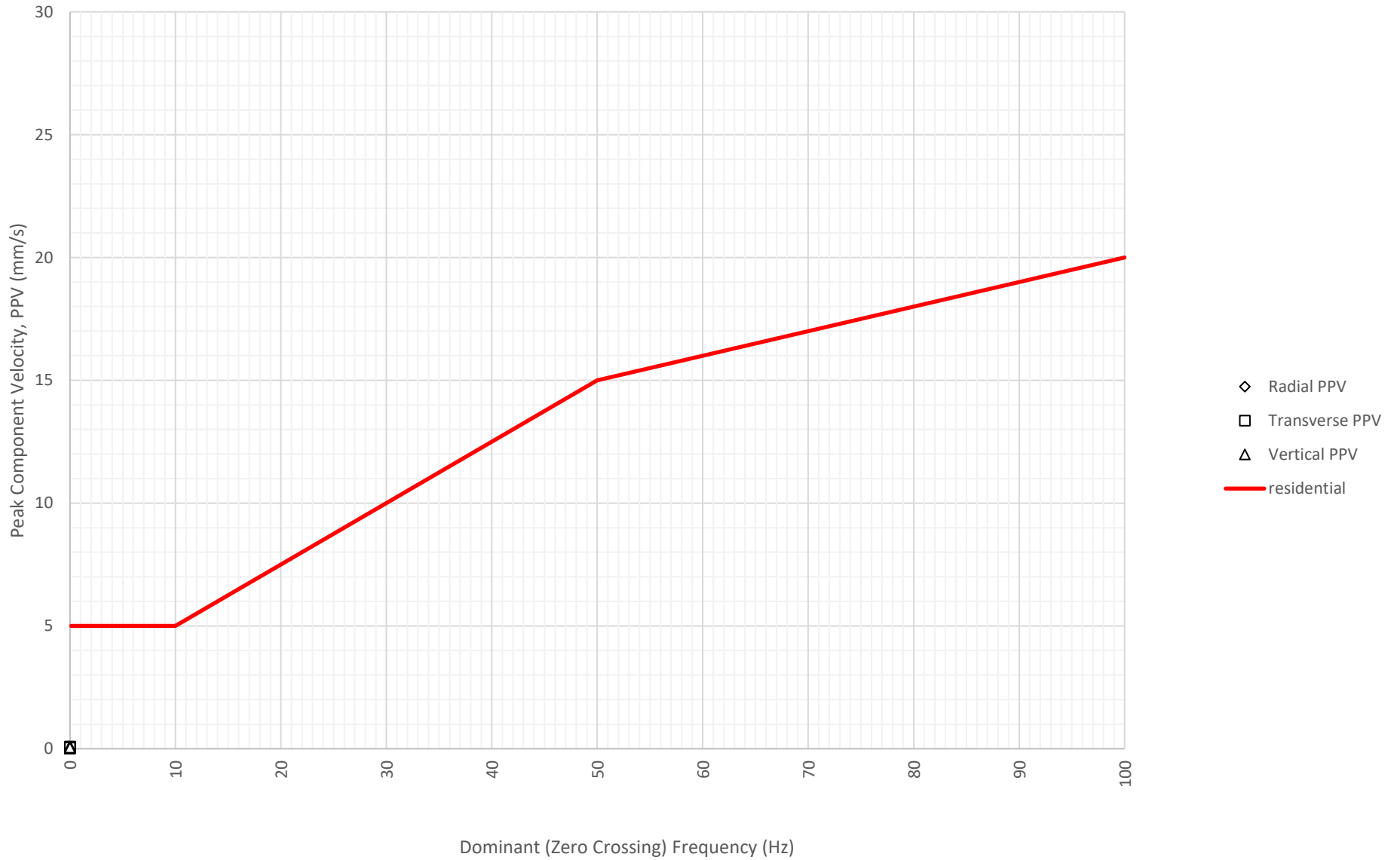
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 26-11-2022



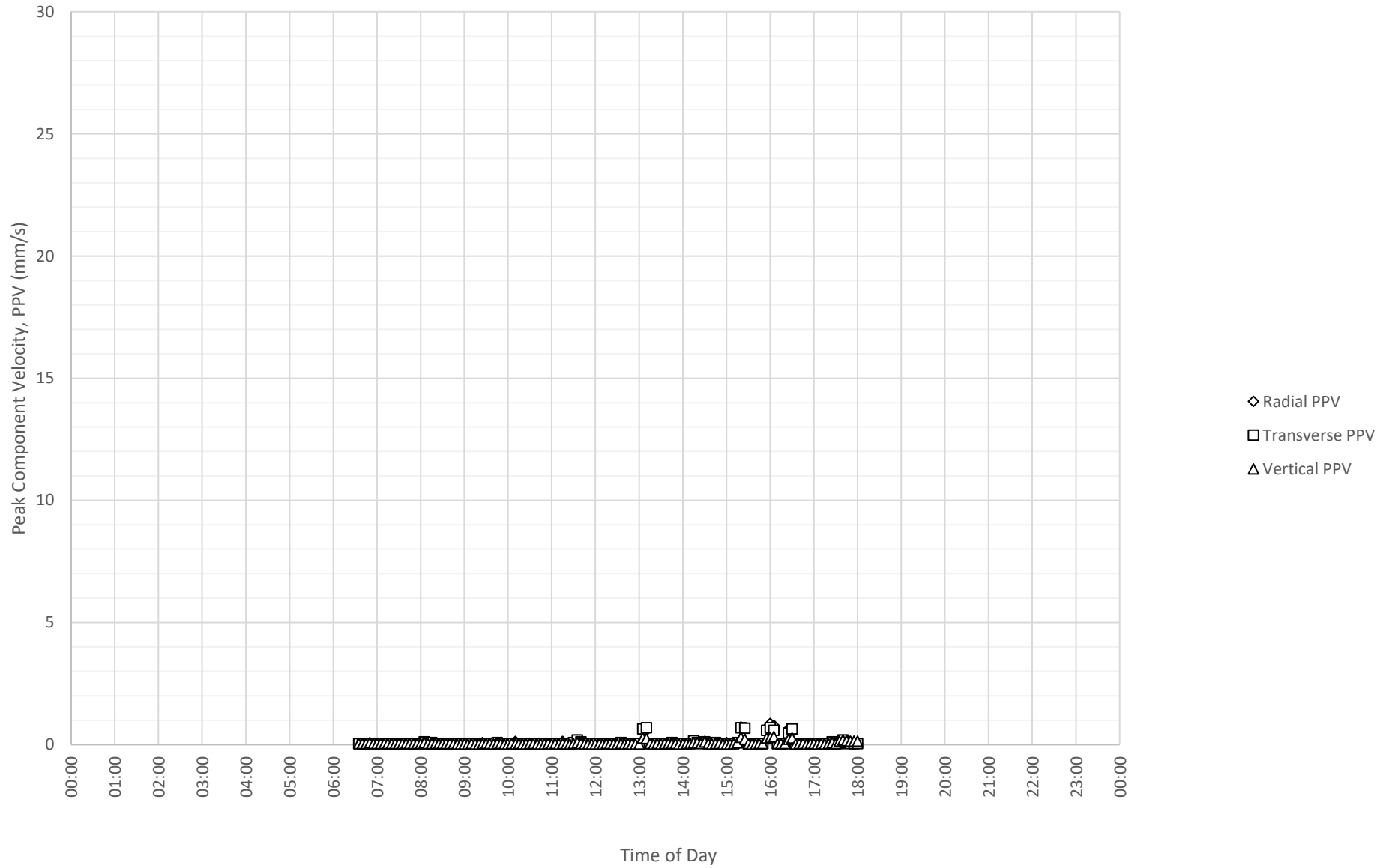
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 27-11-2022



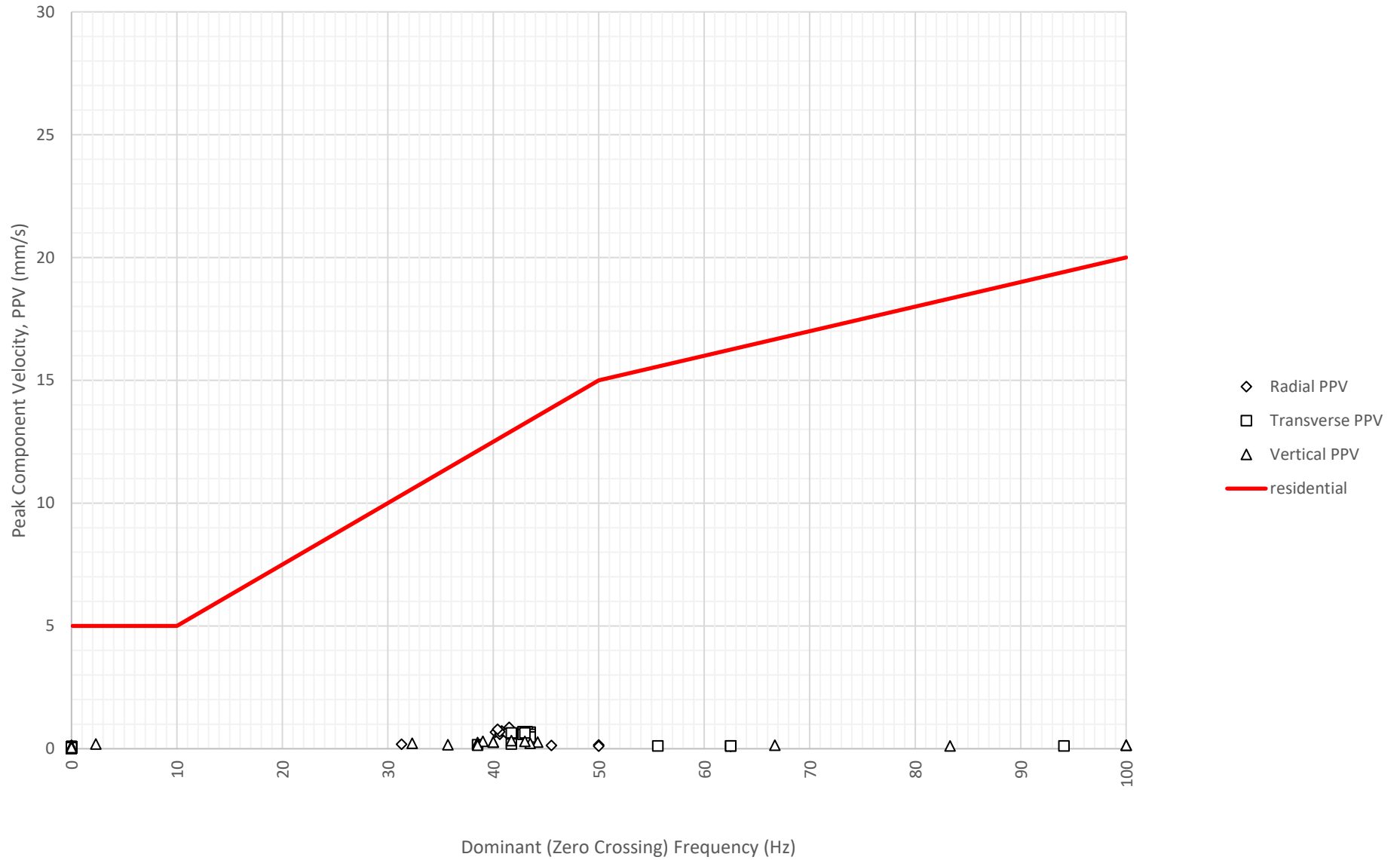
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 27-11-2022



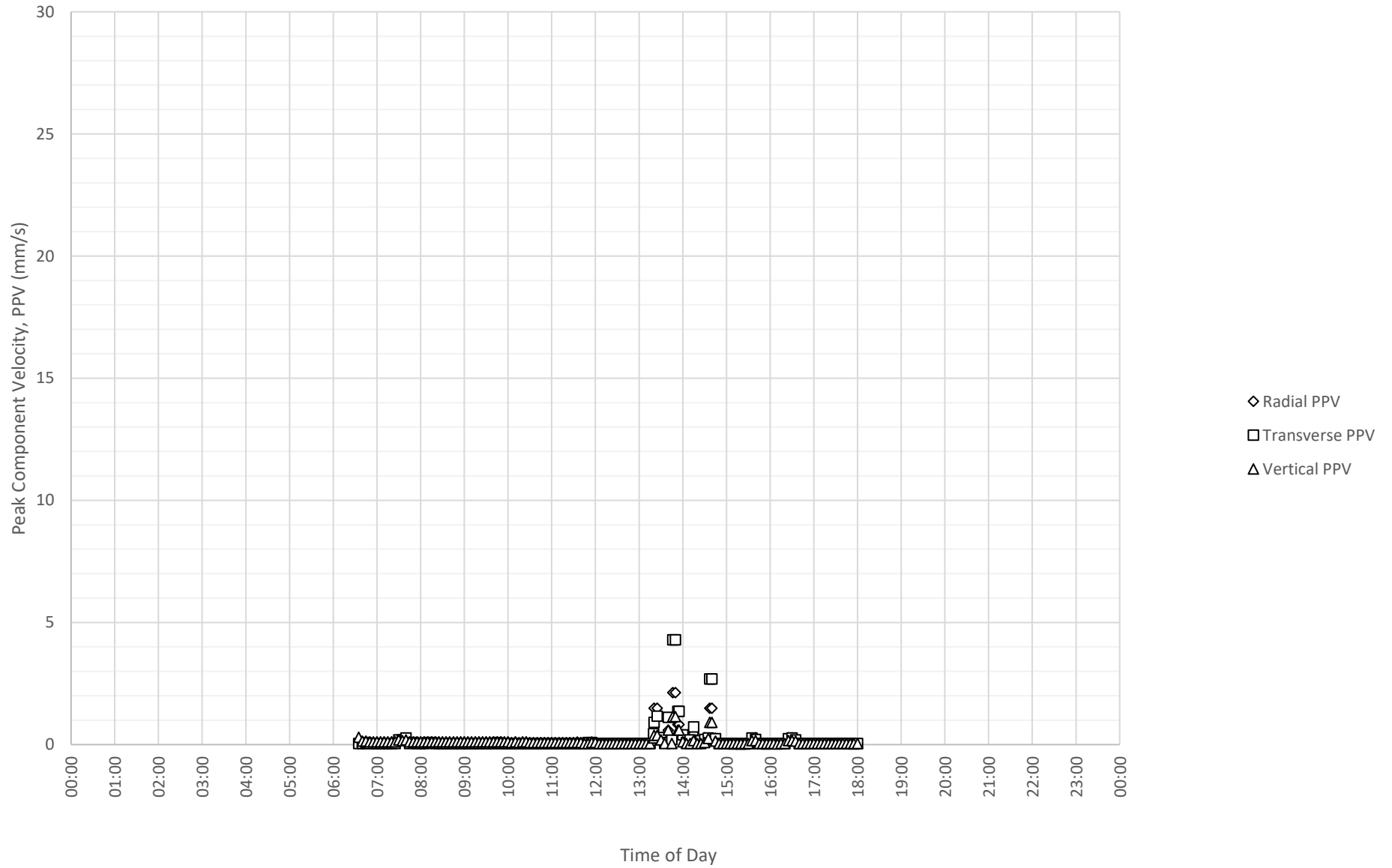
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 28-11-2022



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 28-11-2022

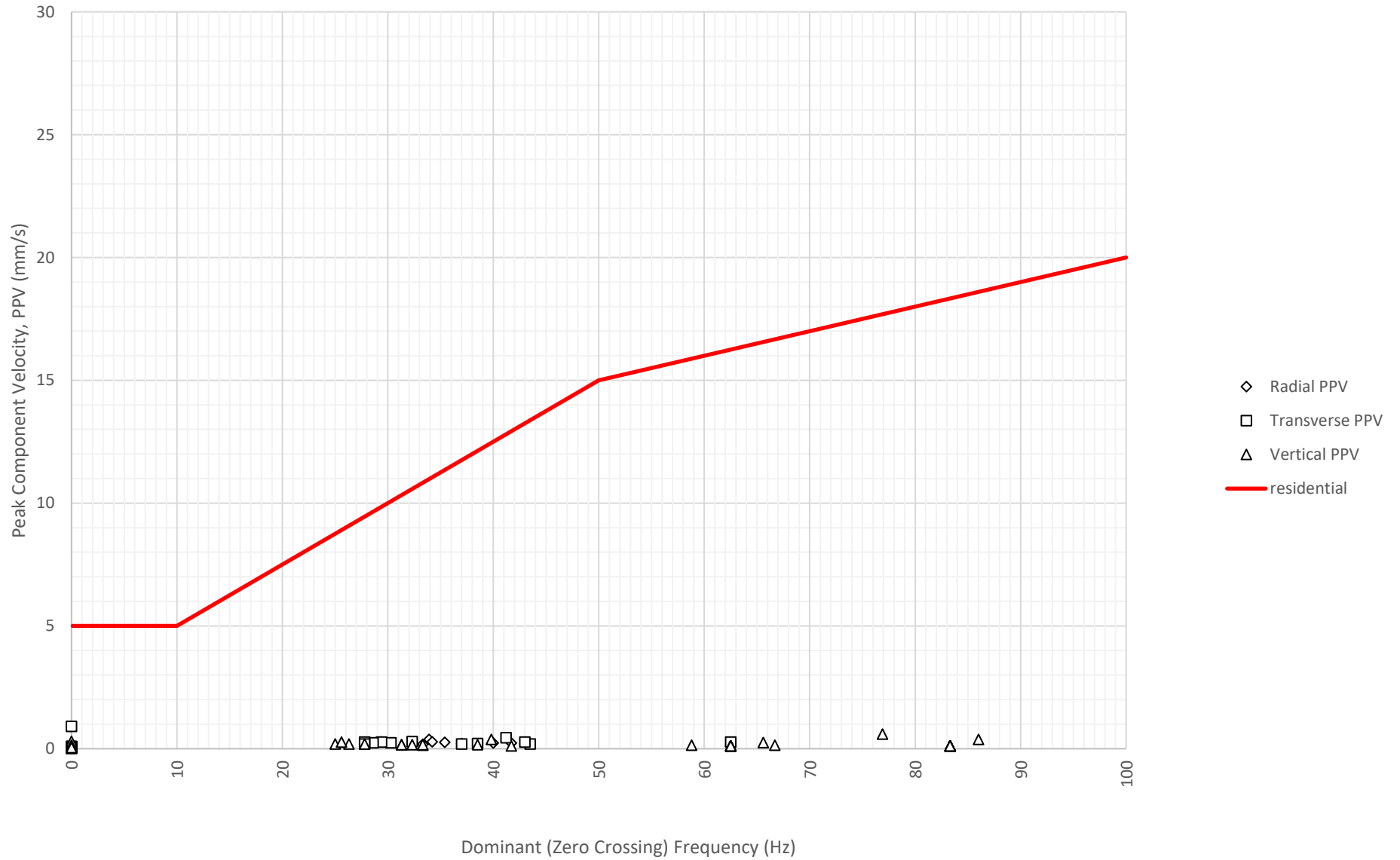


Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 29-11-2022

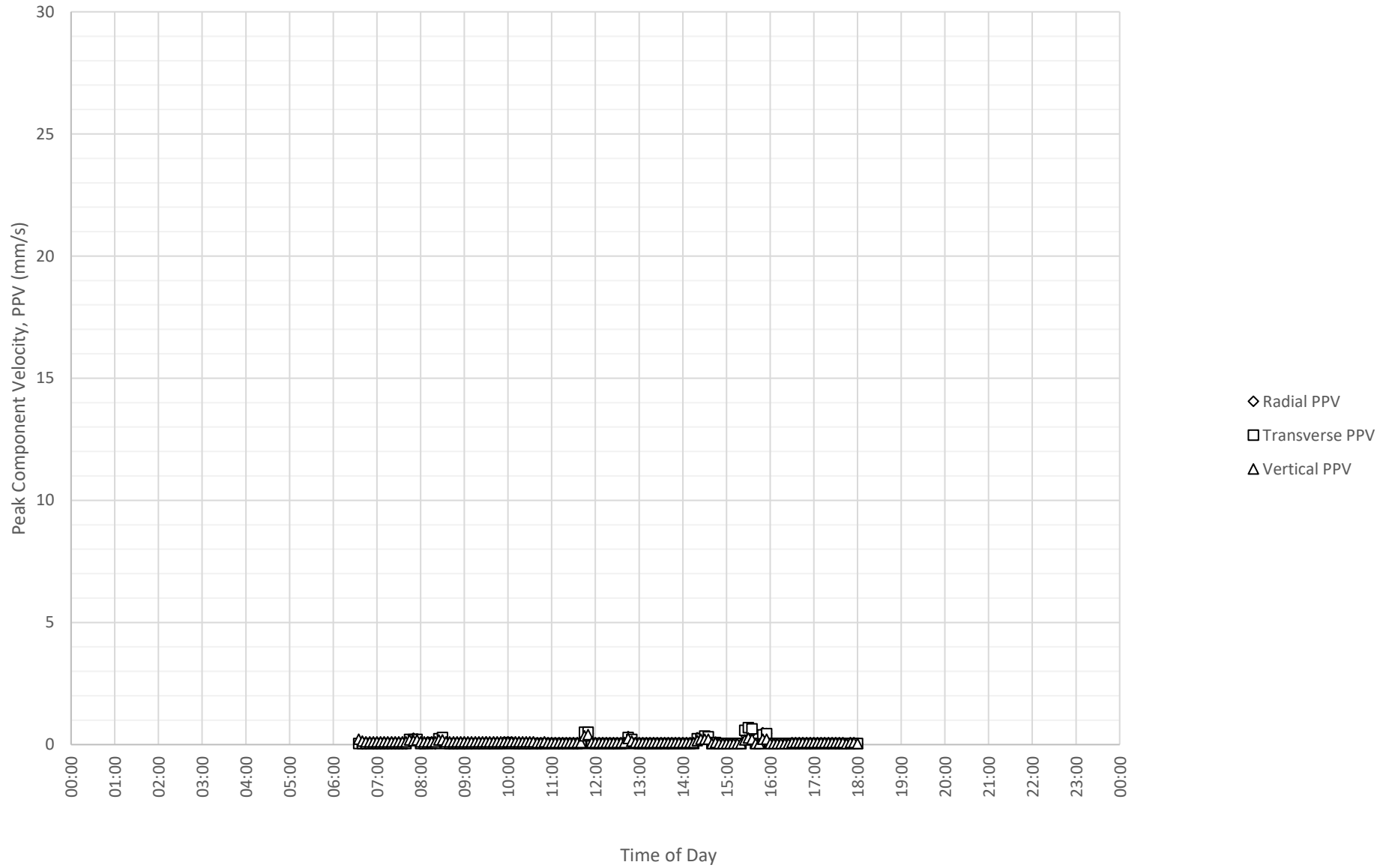




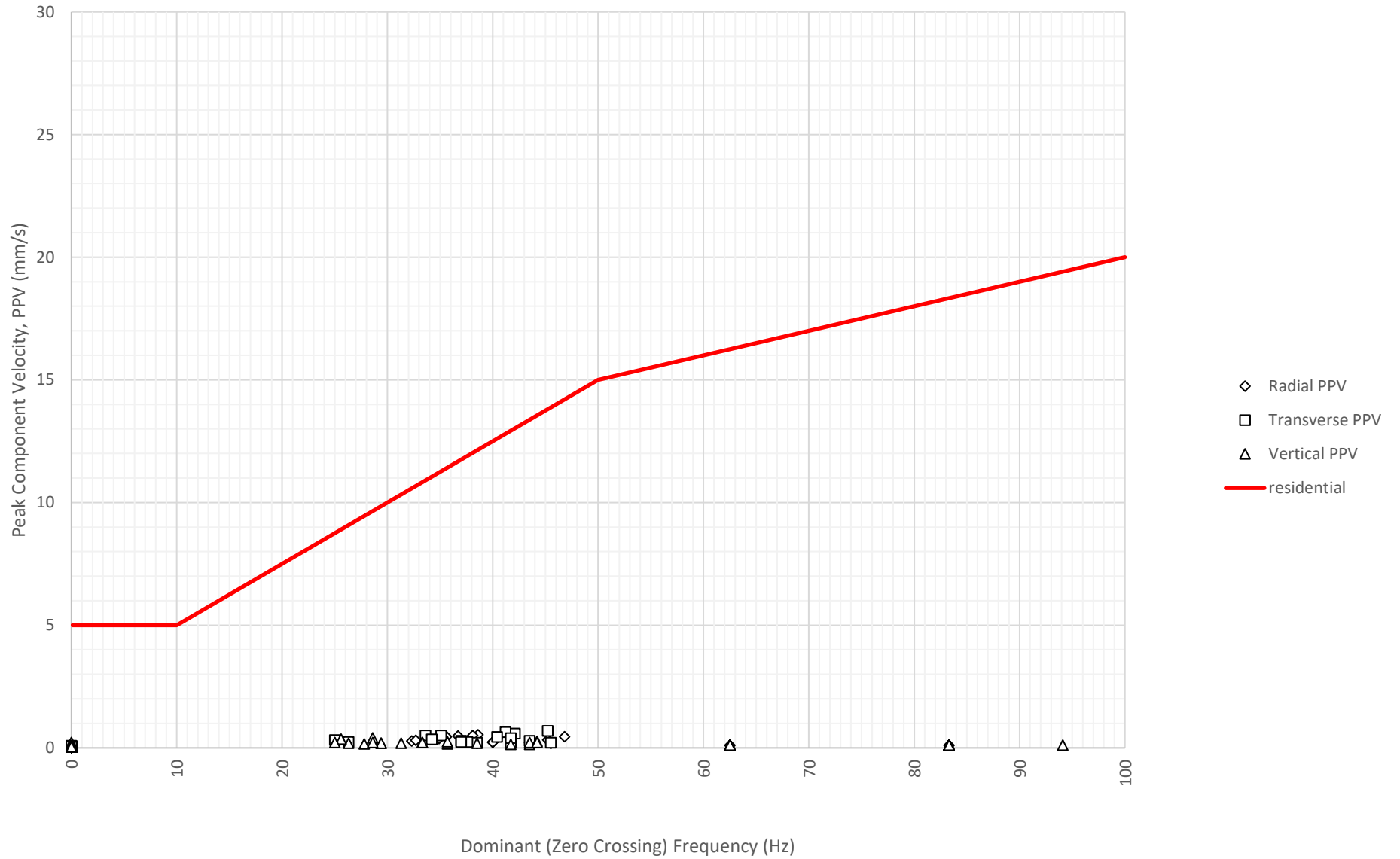
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 29-11-2022



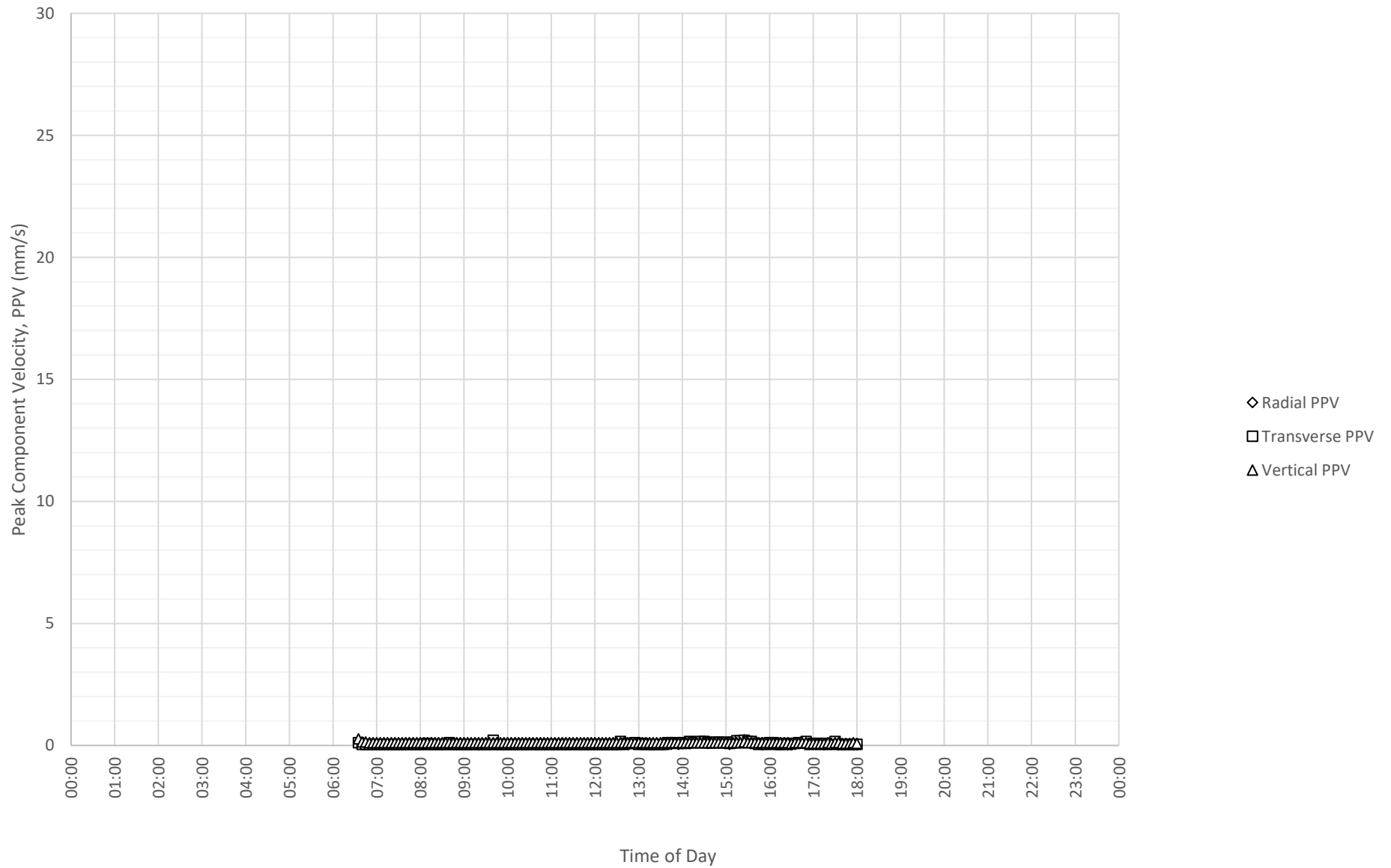
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 30-11-2022



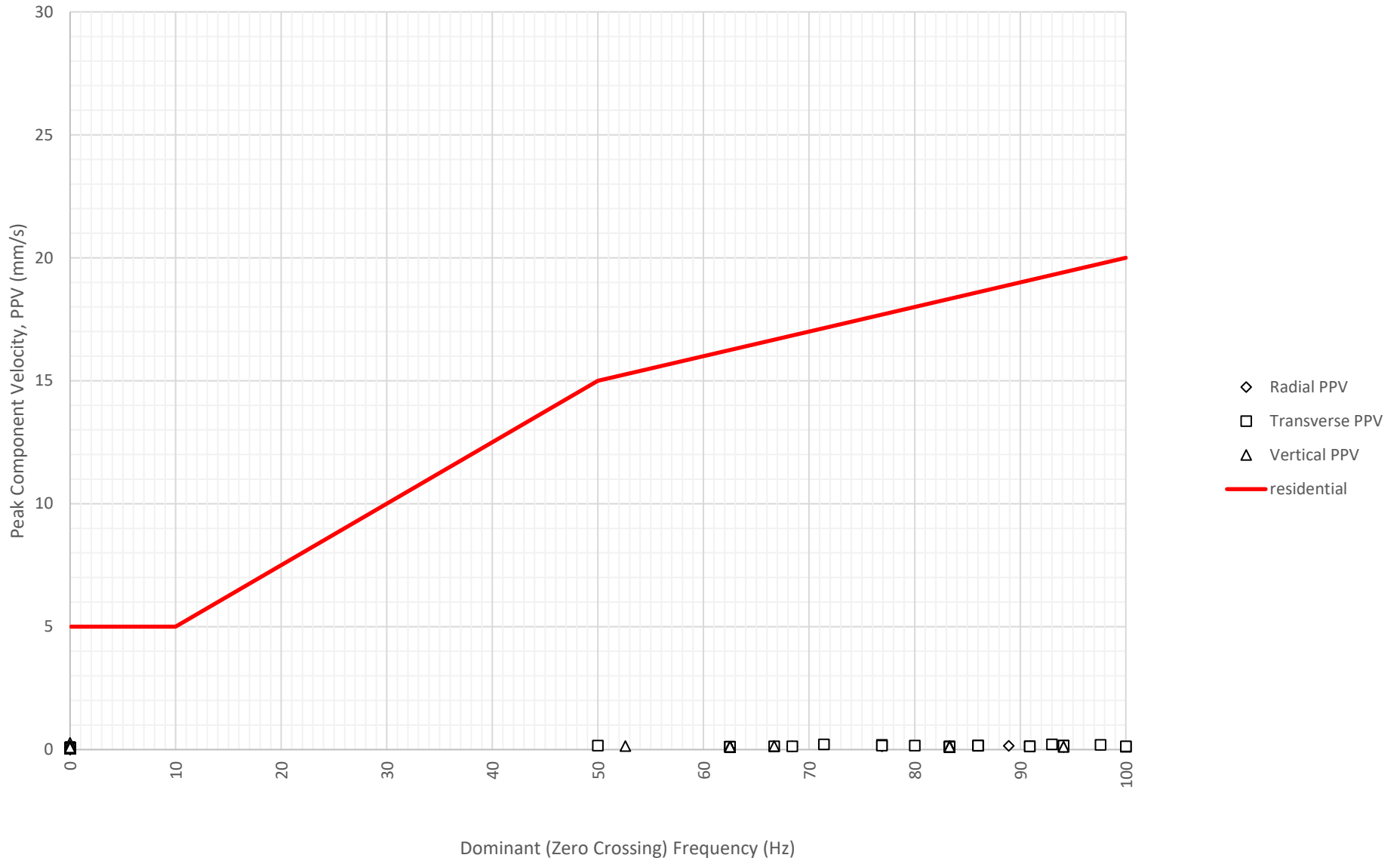
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 30-11-2022



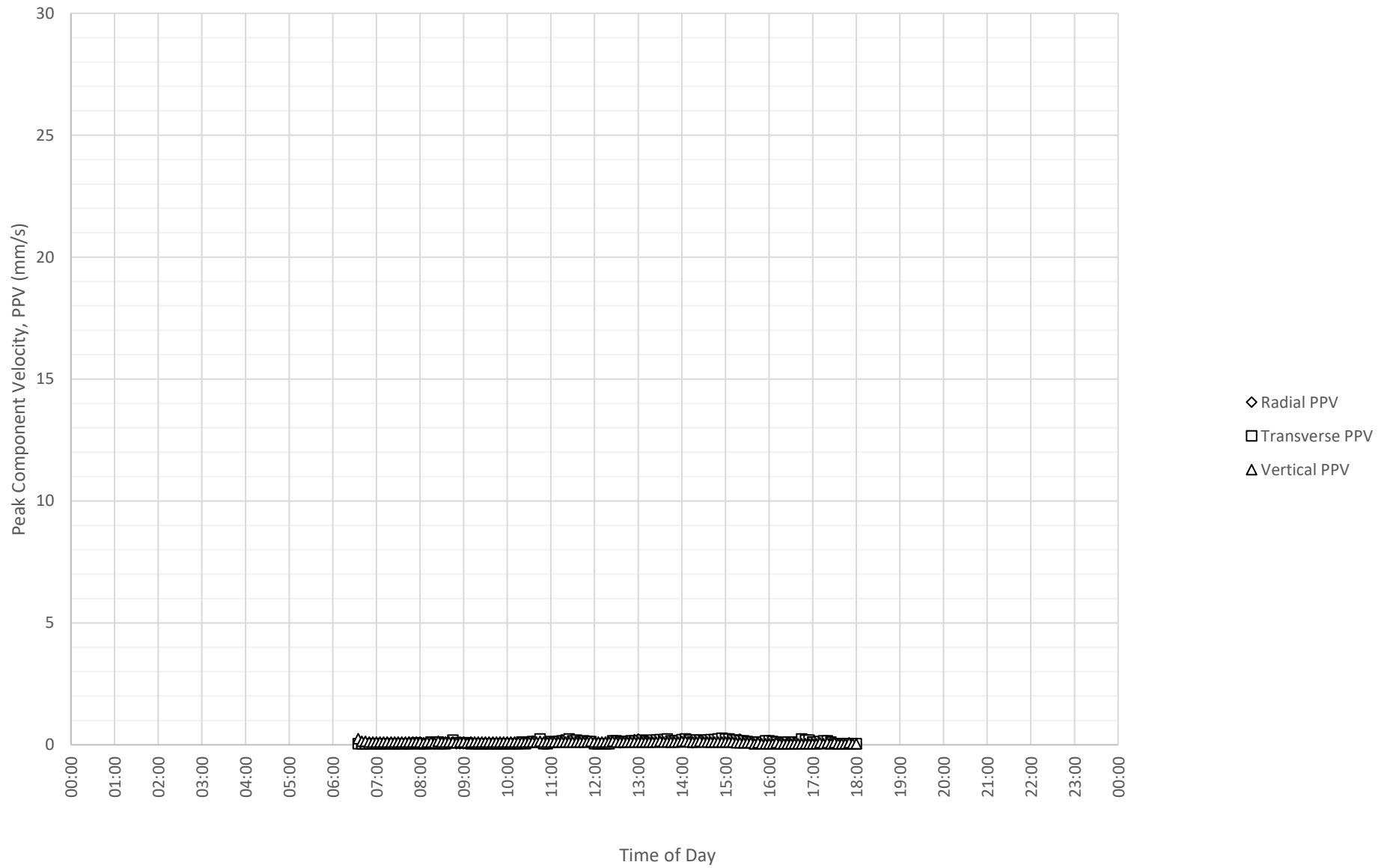
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 1-12-2022



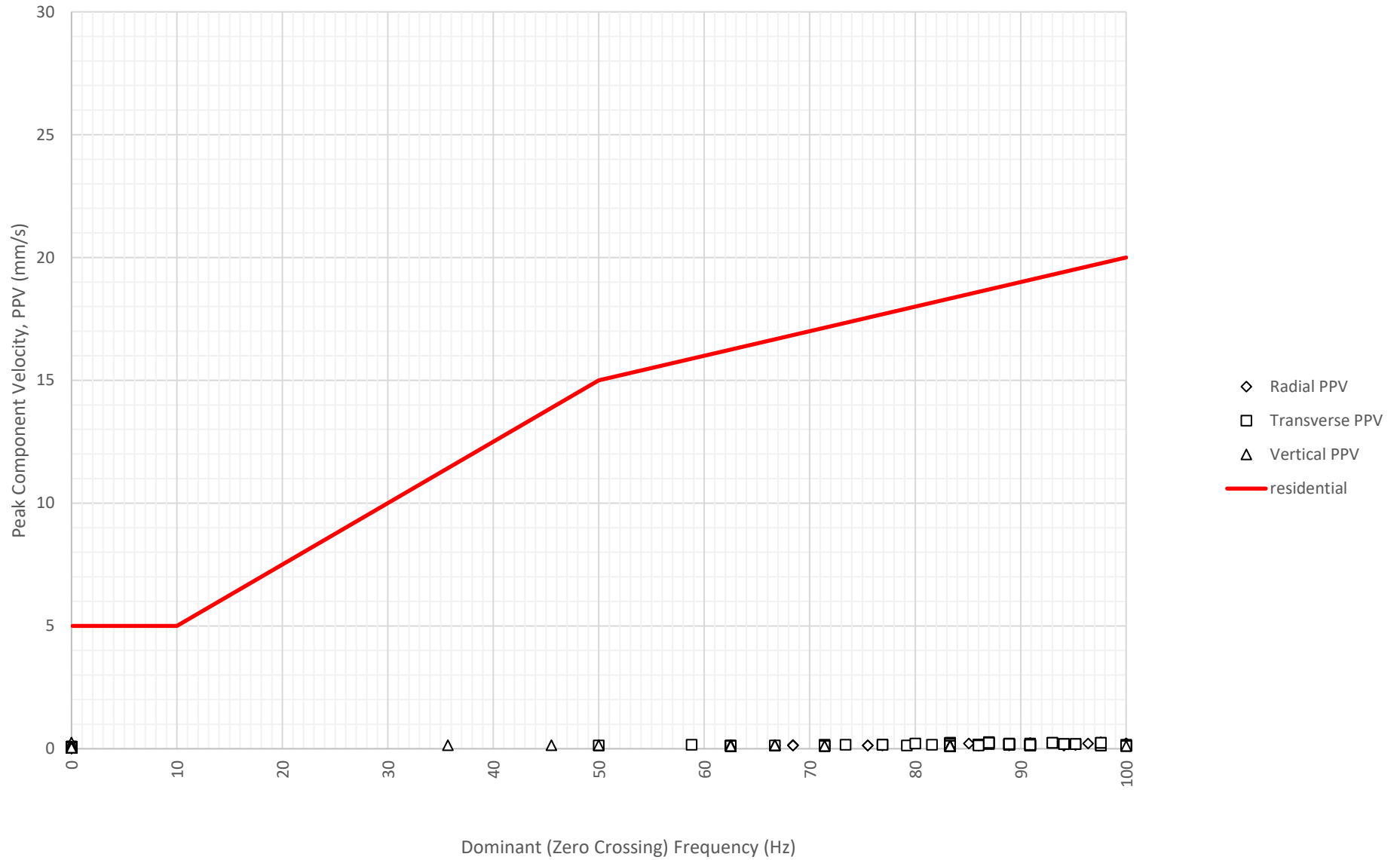
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 1-12-2022



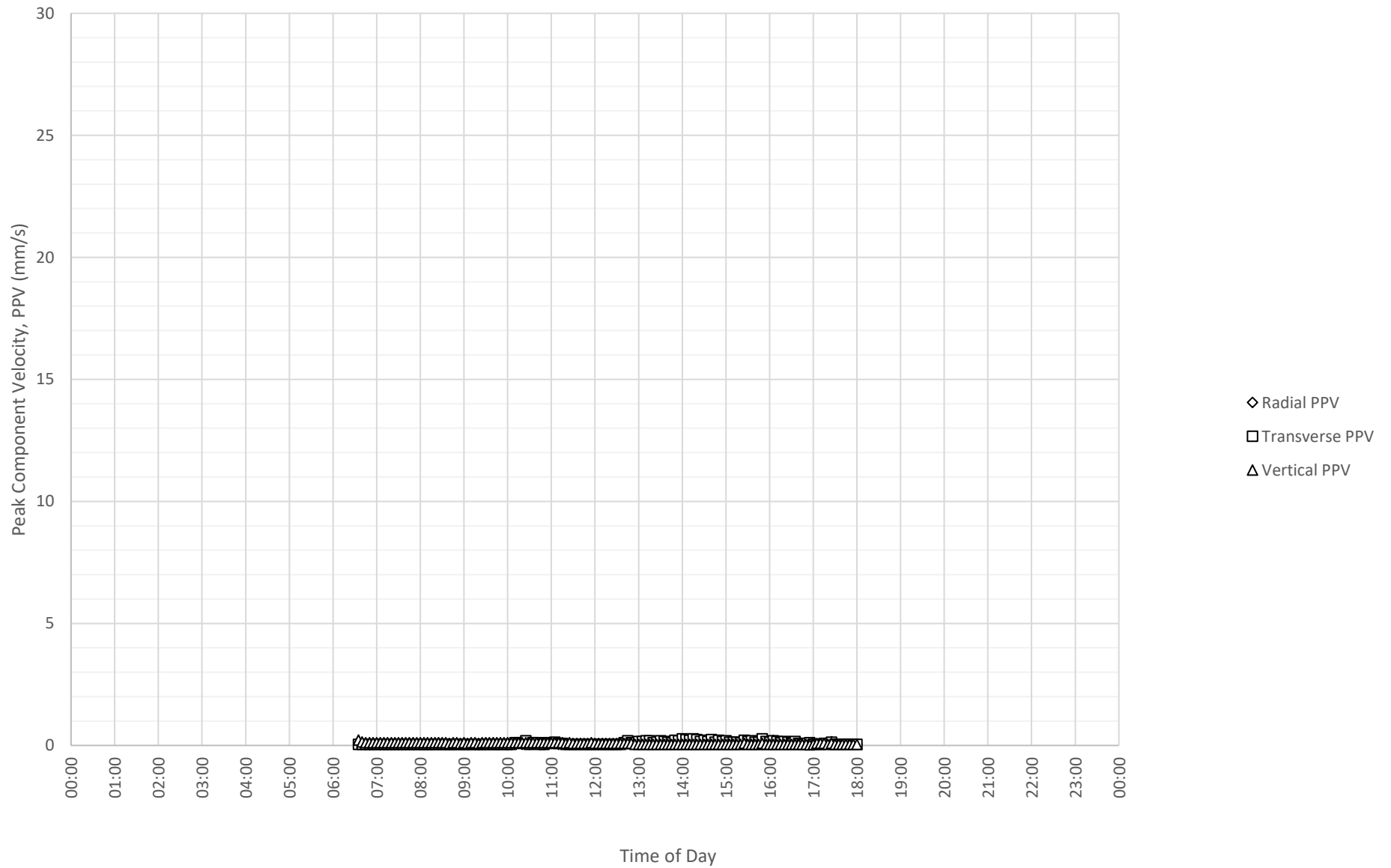
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 2-12-2022



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 2-12-2022

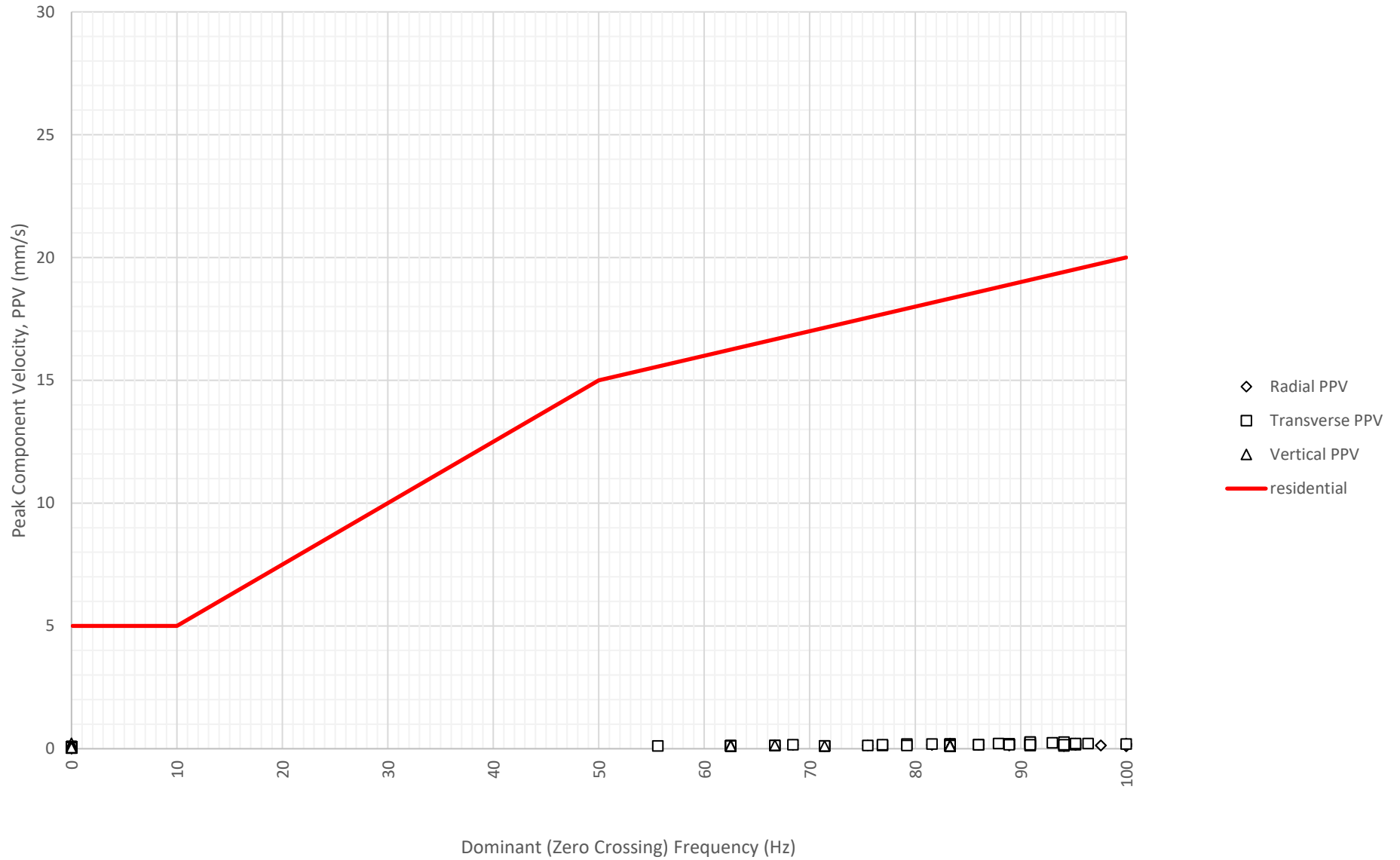


# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 3-12-2022

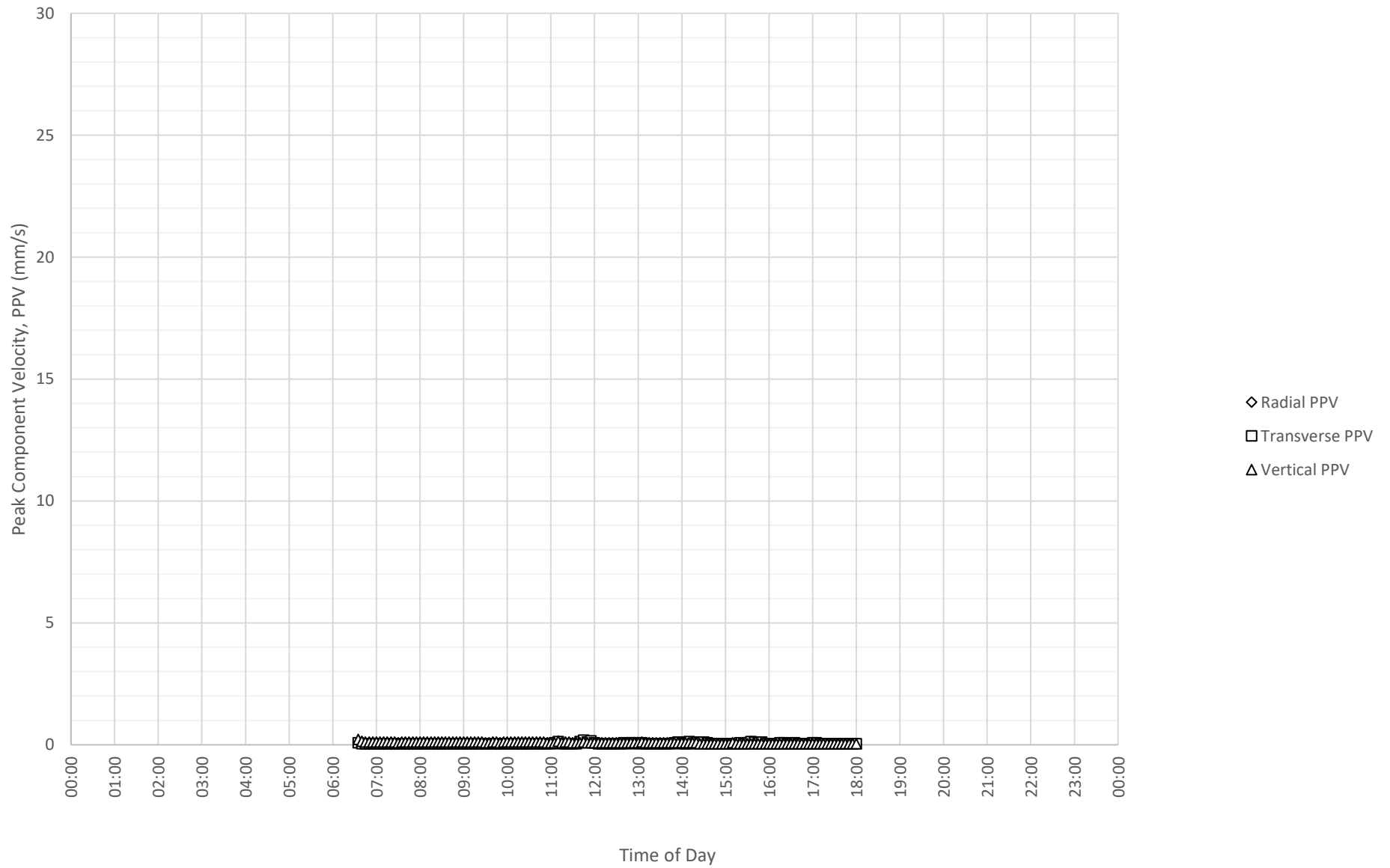




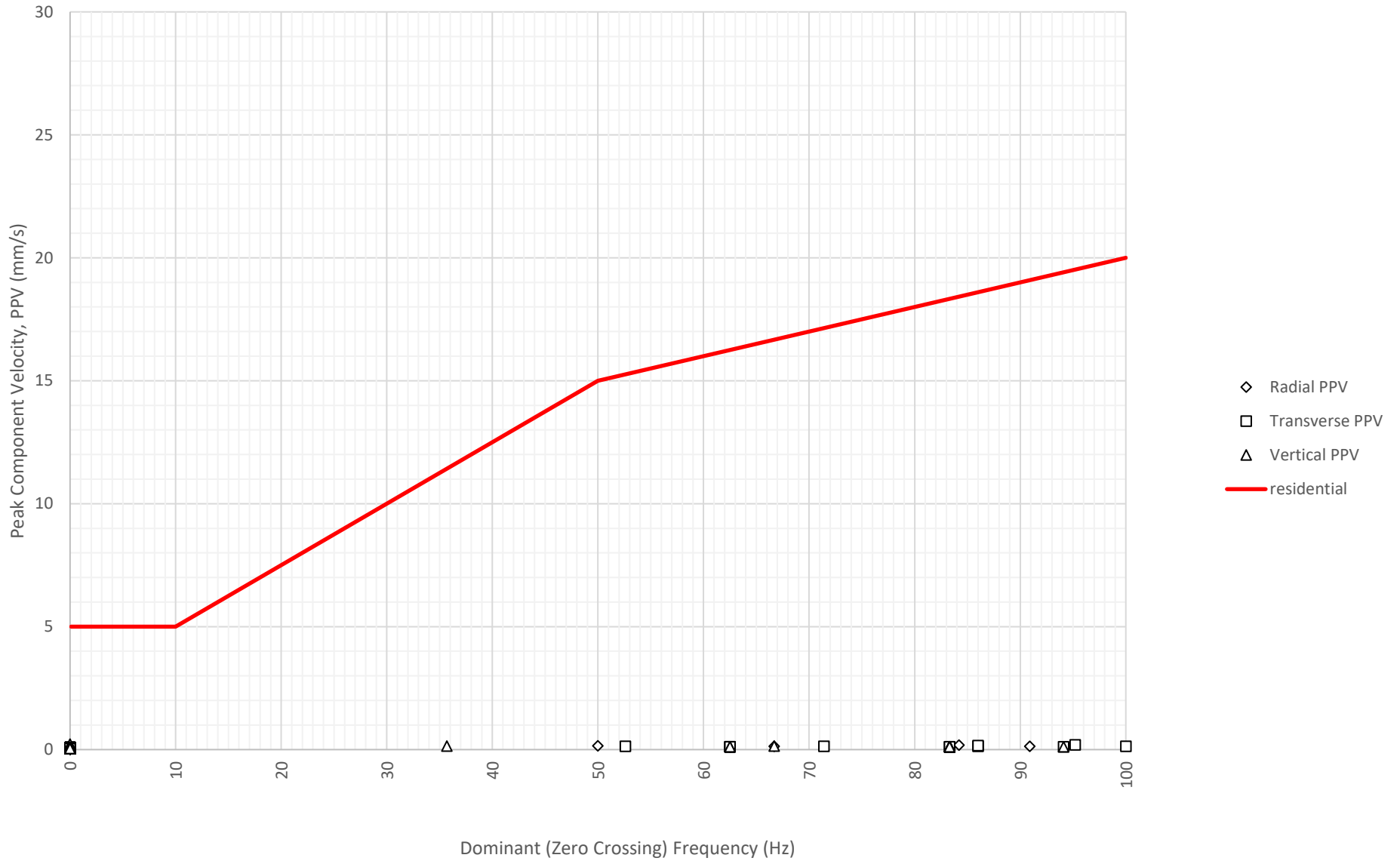
### Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 3-12-2022



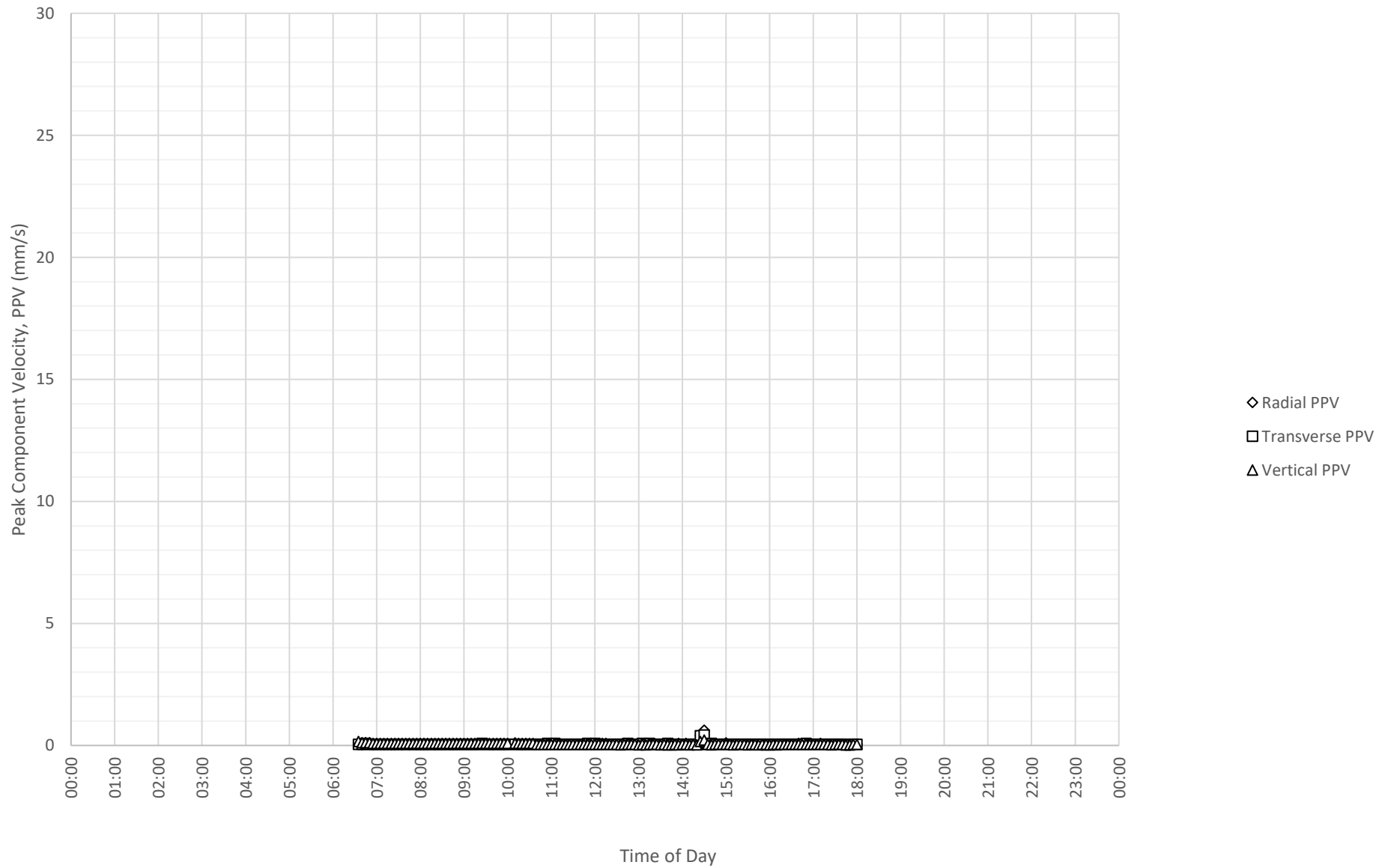
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 4-12-2022



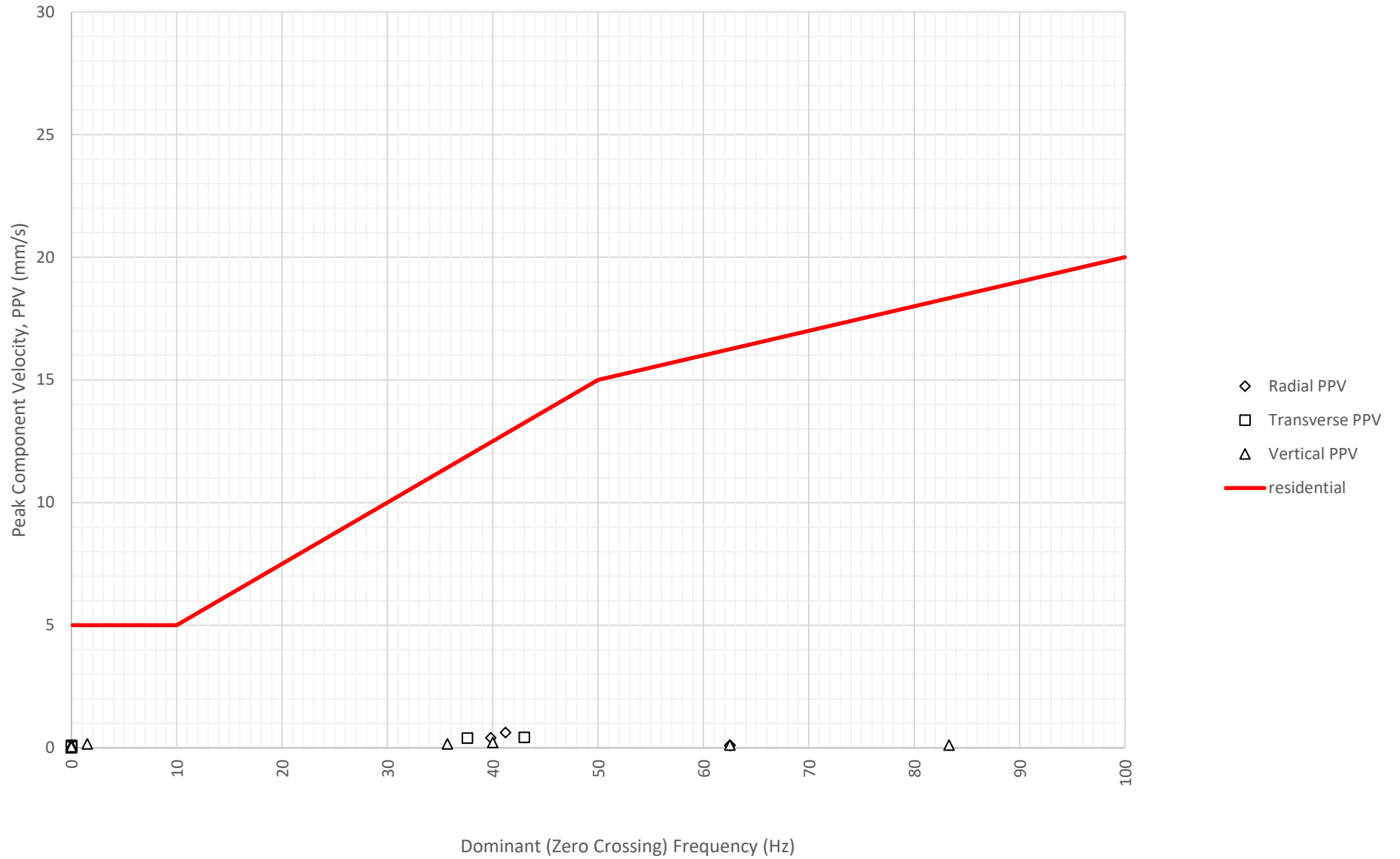
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 4-12-2022



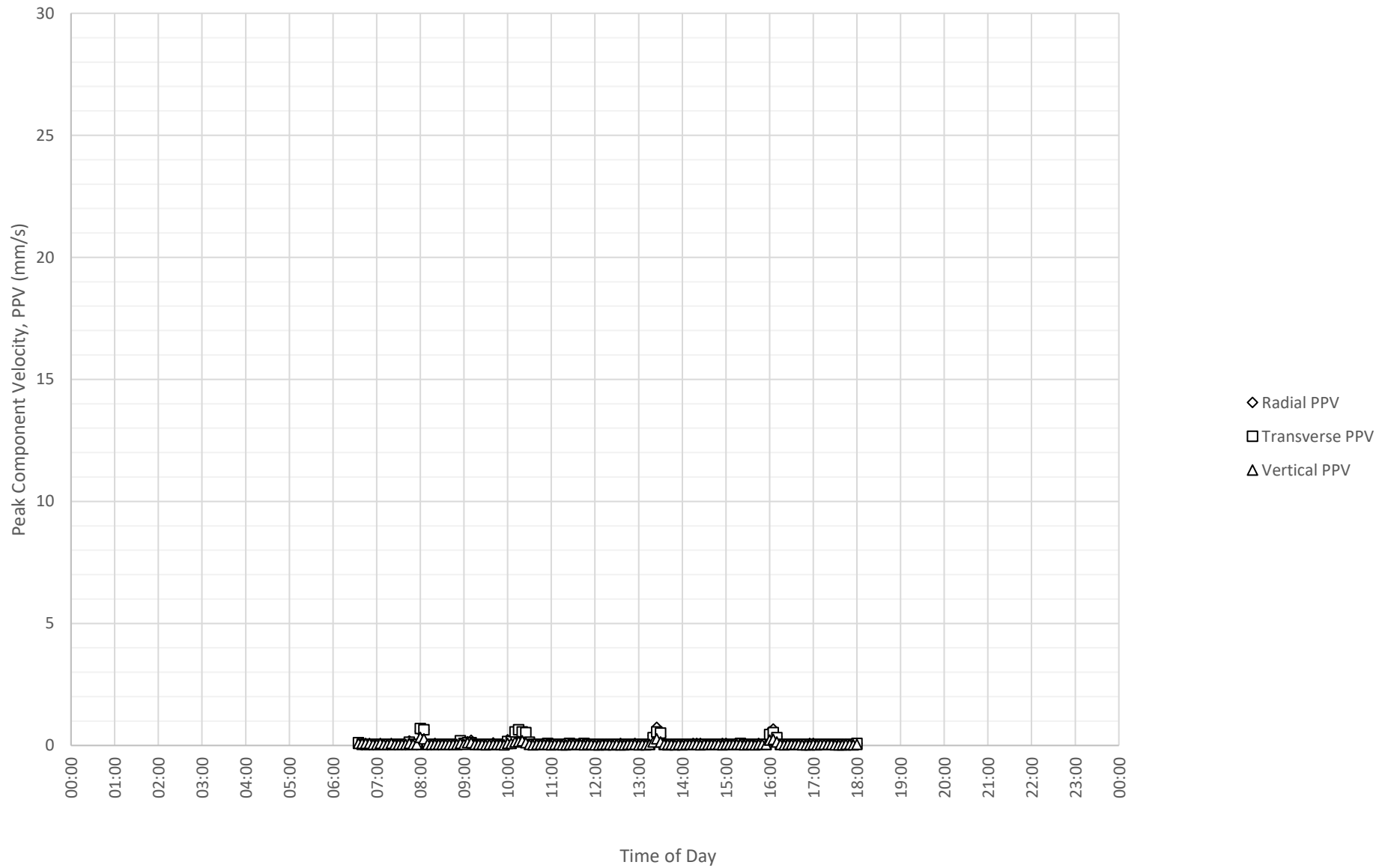
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 5-12-2022



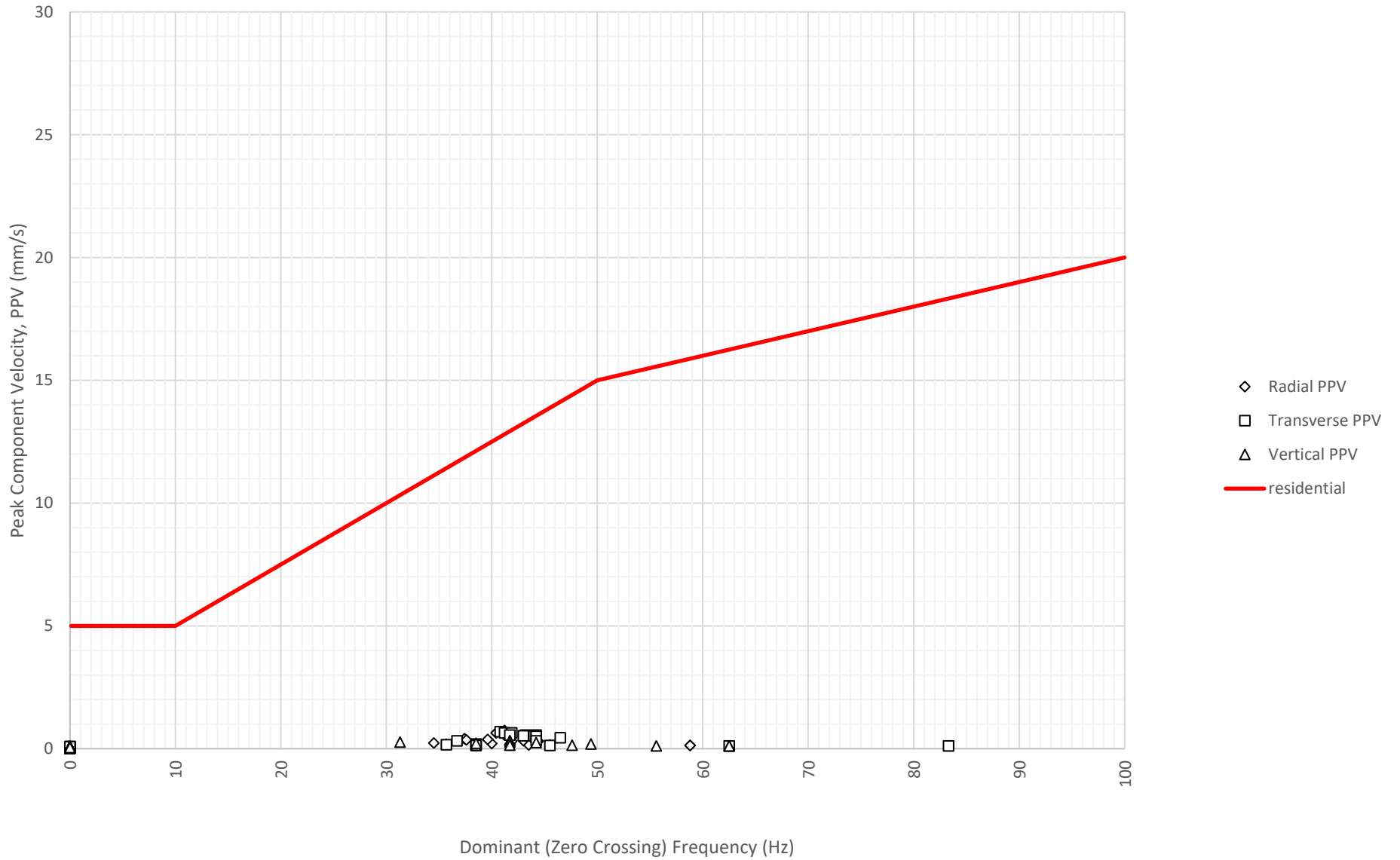
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 5-12-2022



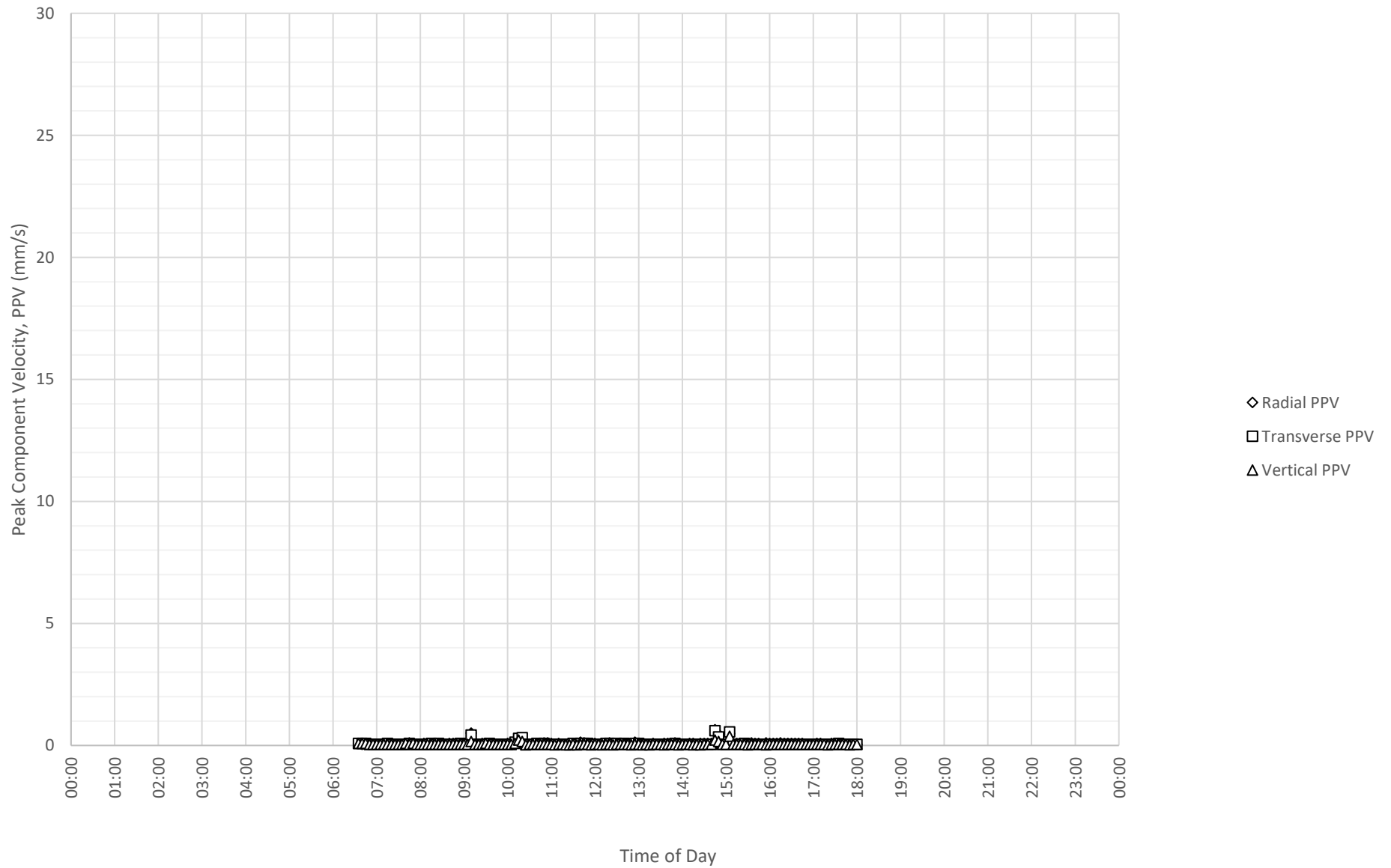
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 6-12-2022



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 6-12-2022

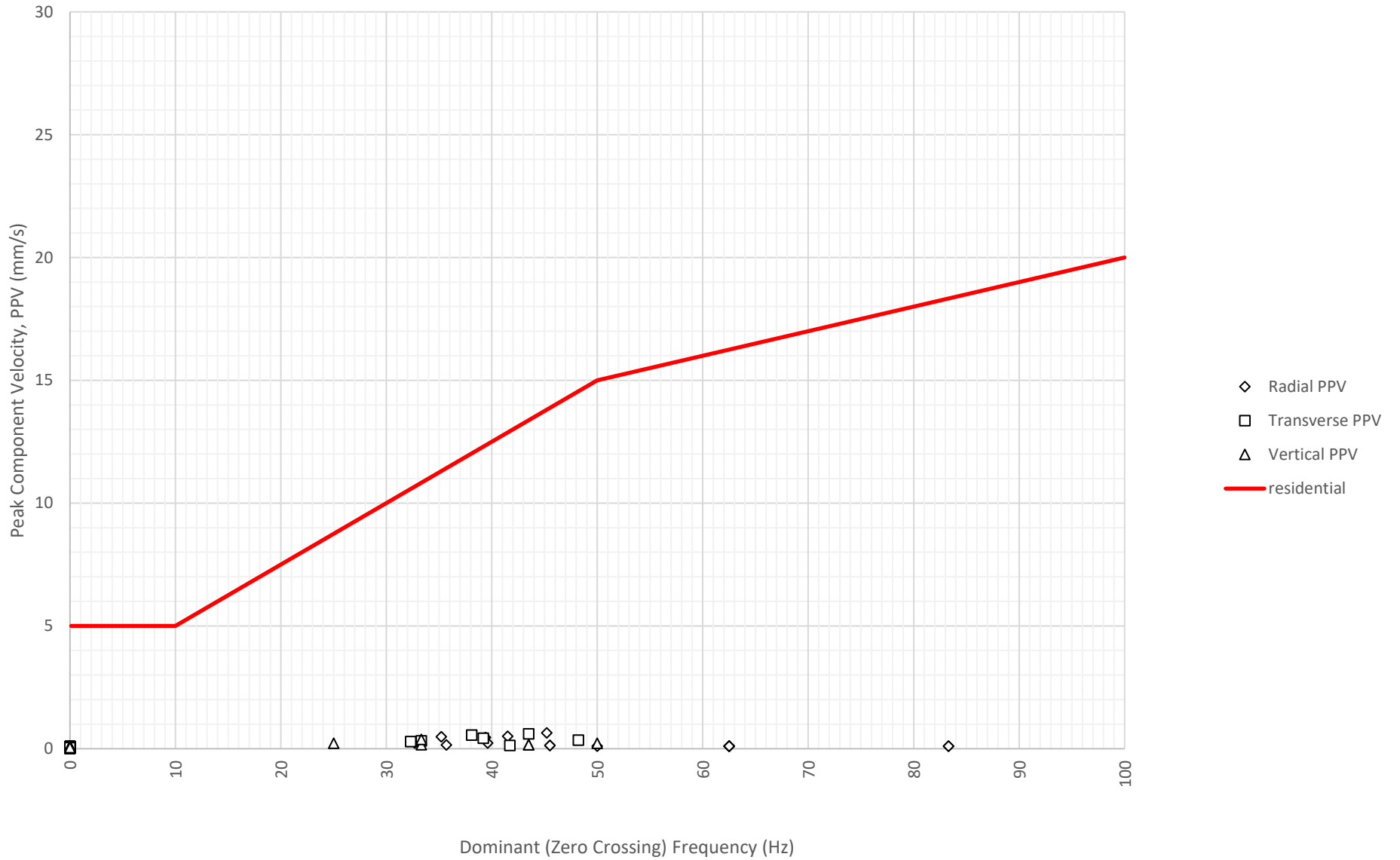


# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 7-12-2022

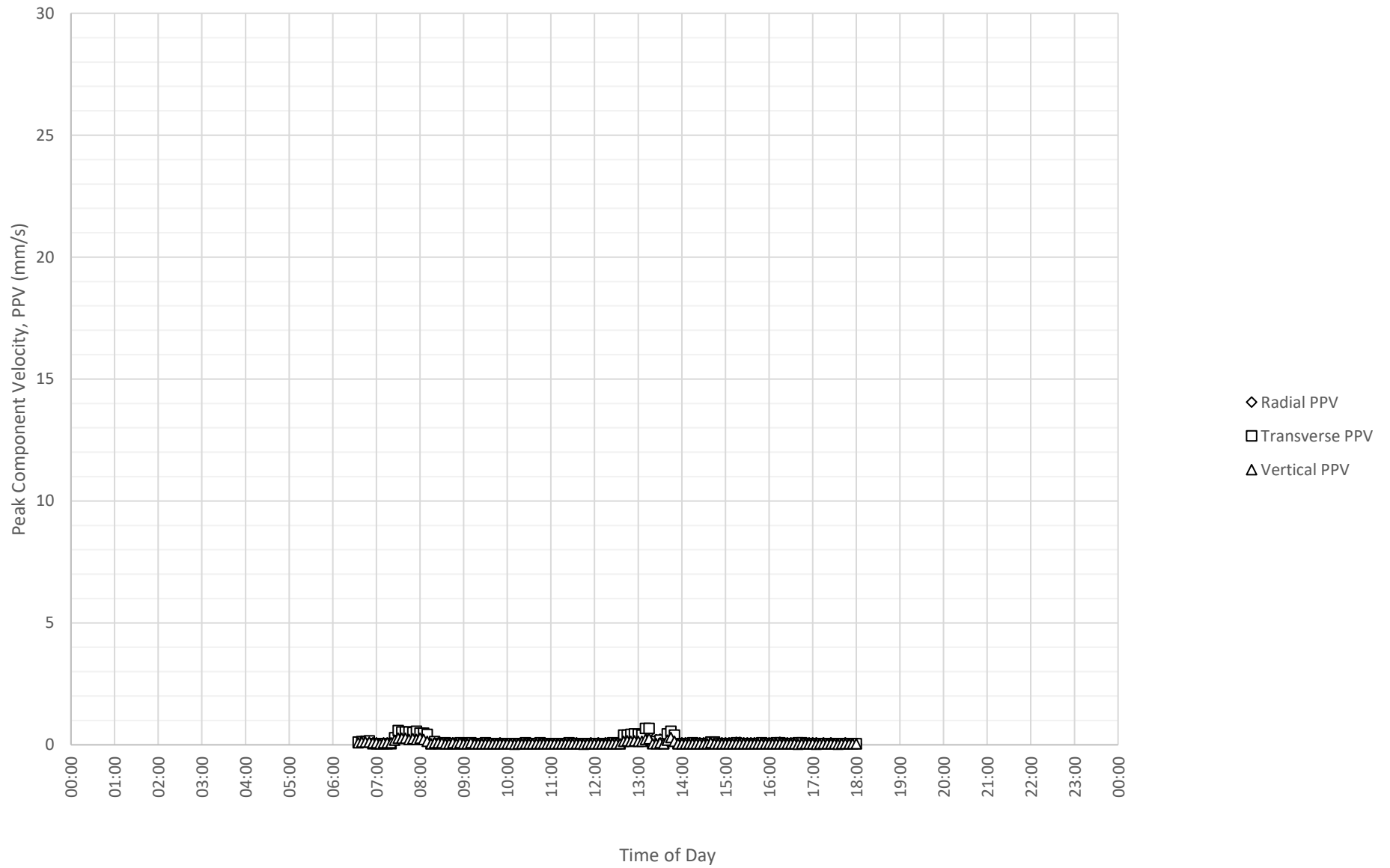




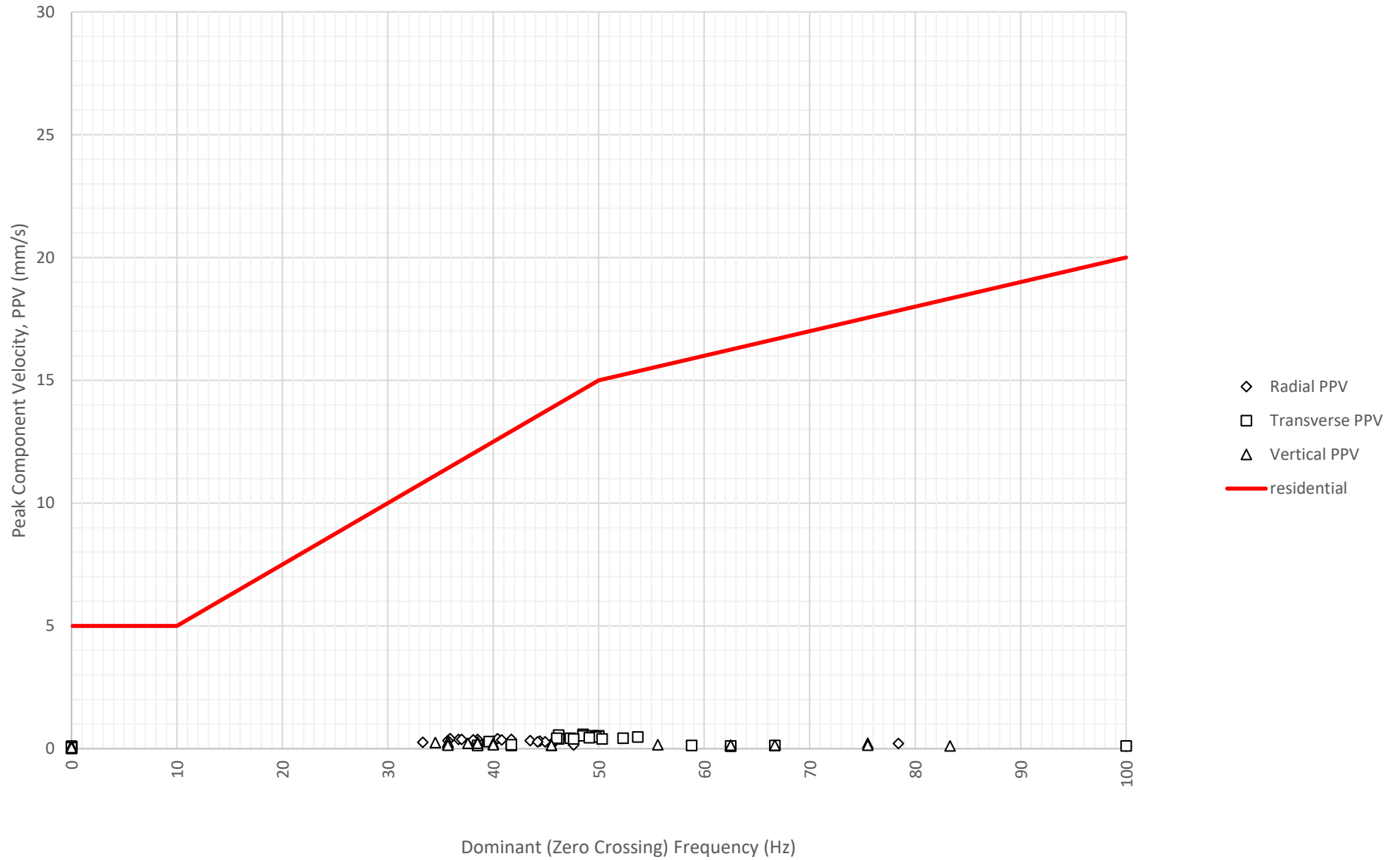
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 7-12-2022



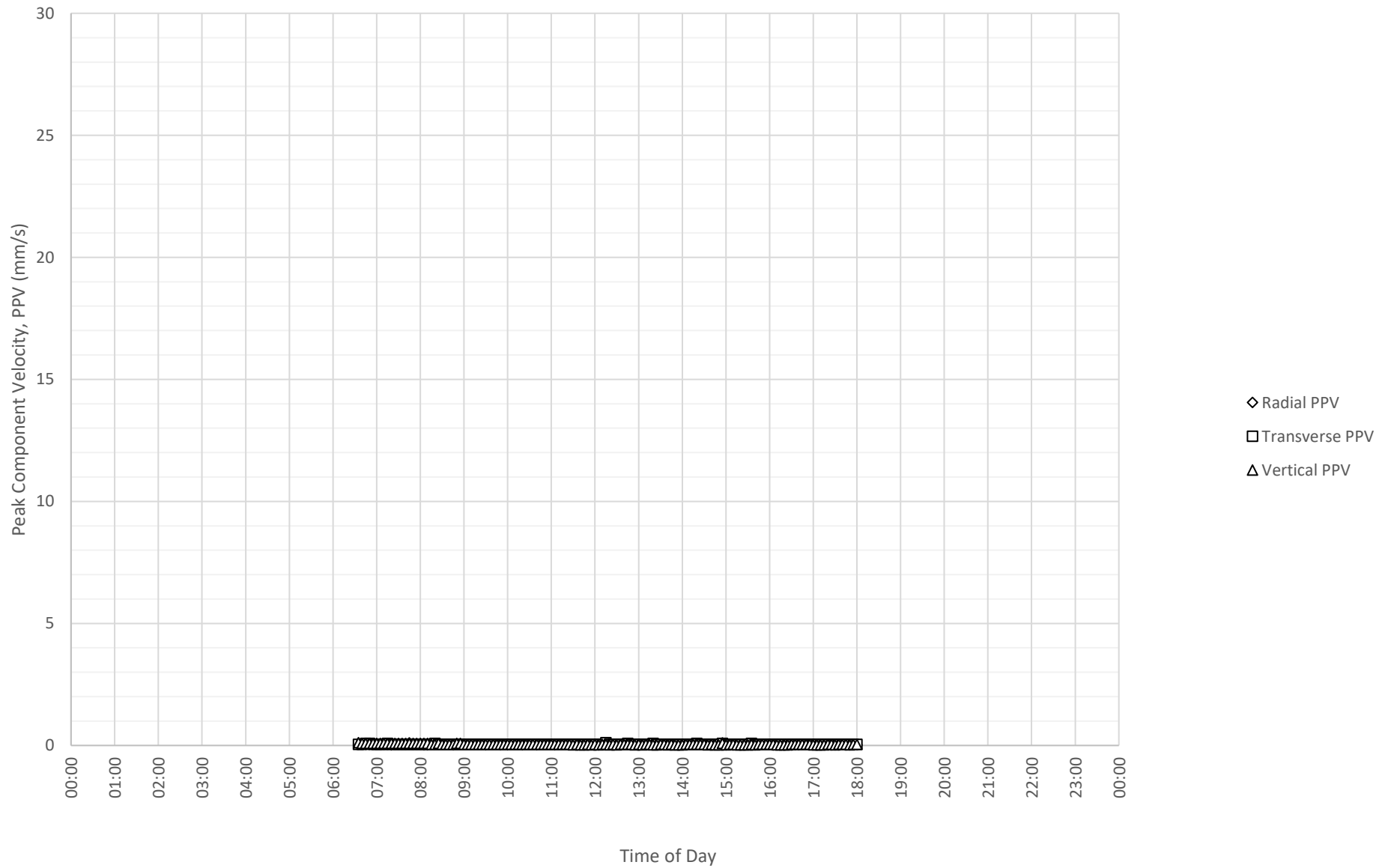
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 8-12-2022



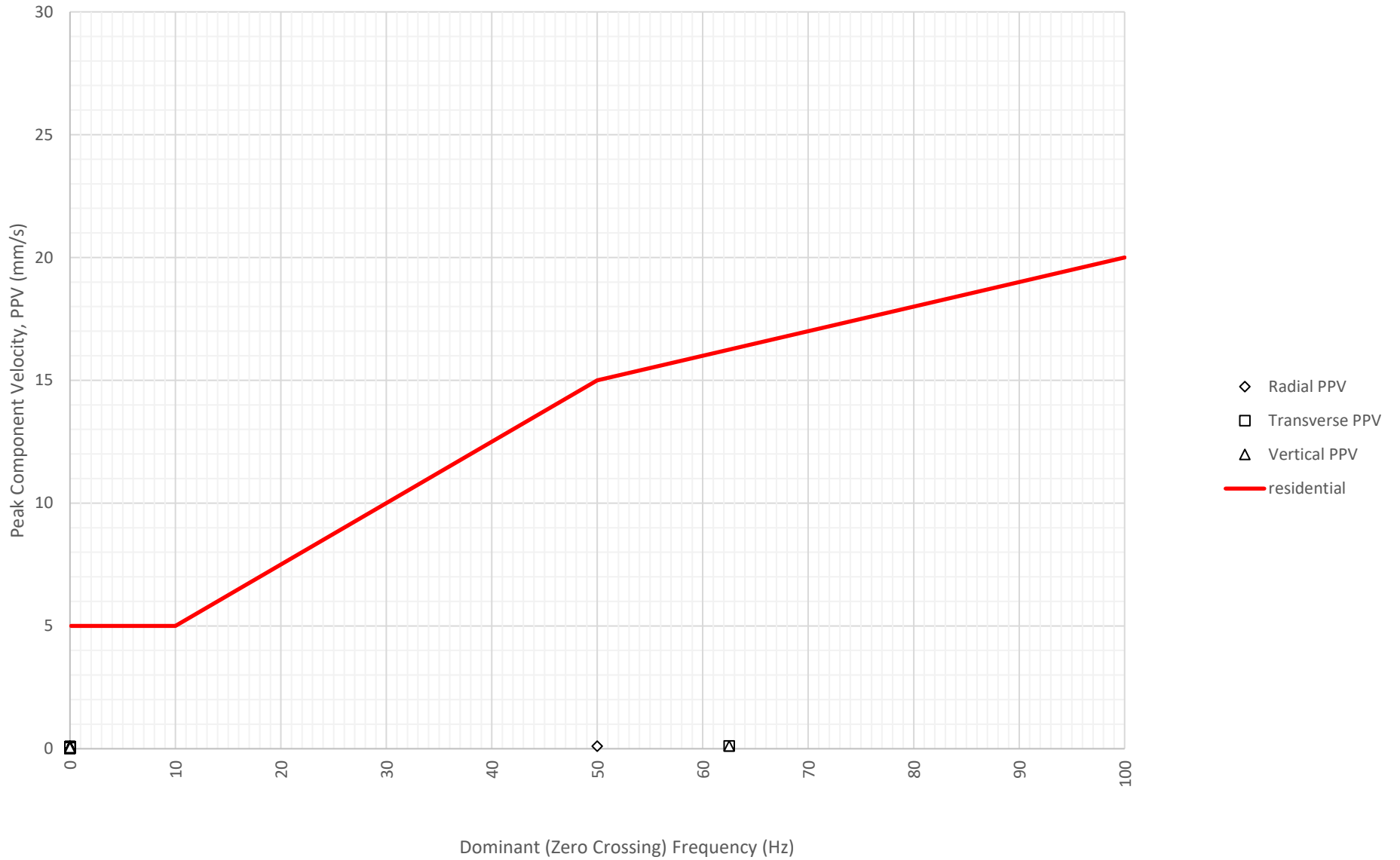
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 8-12-2022



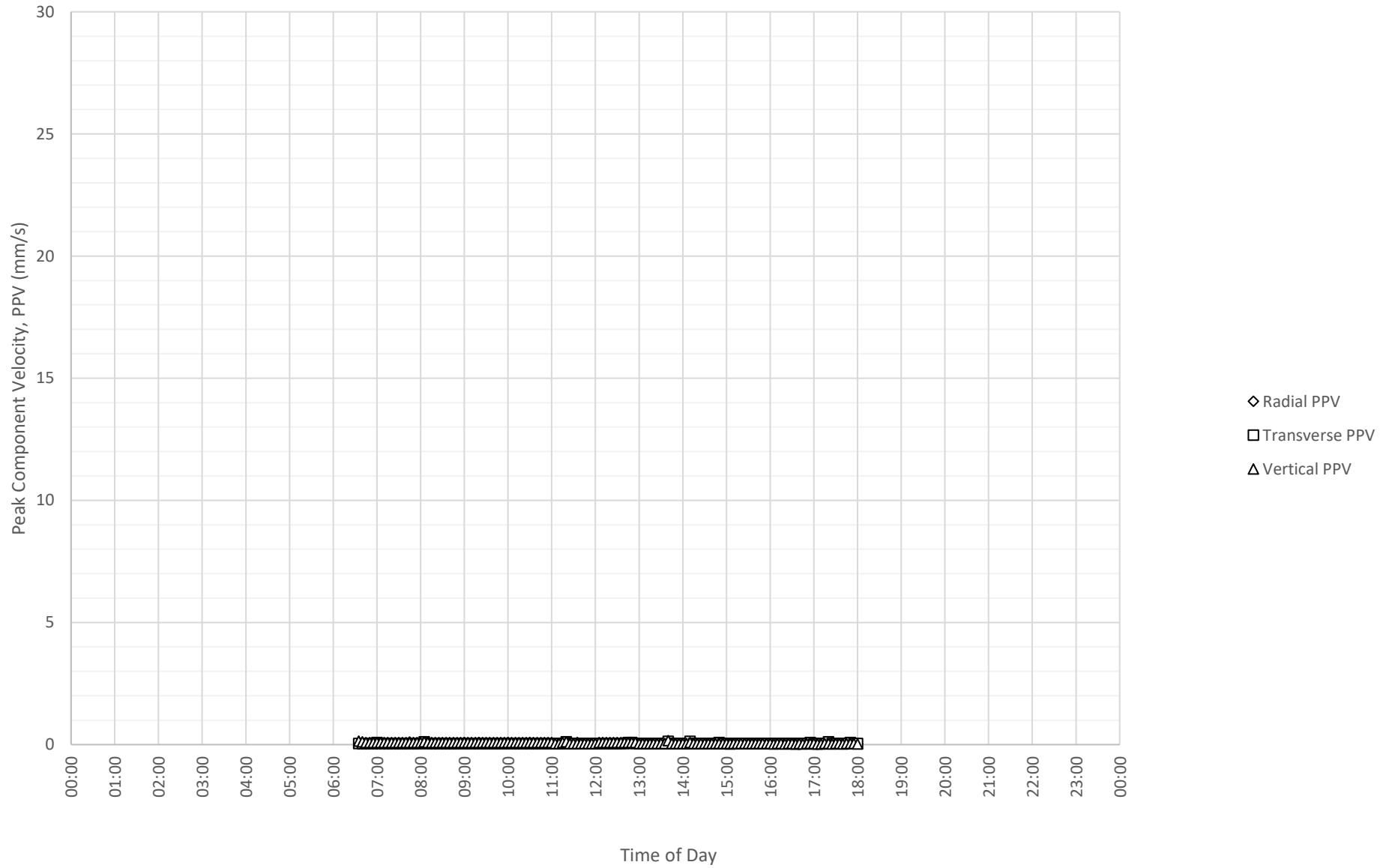
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 9-12-2022



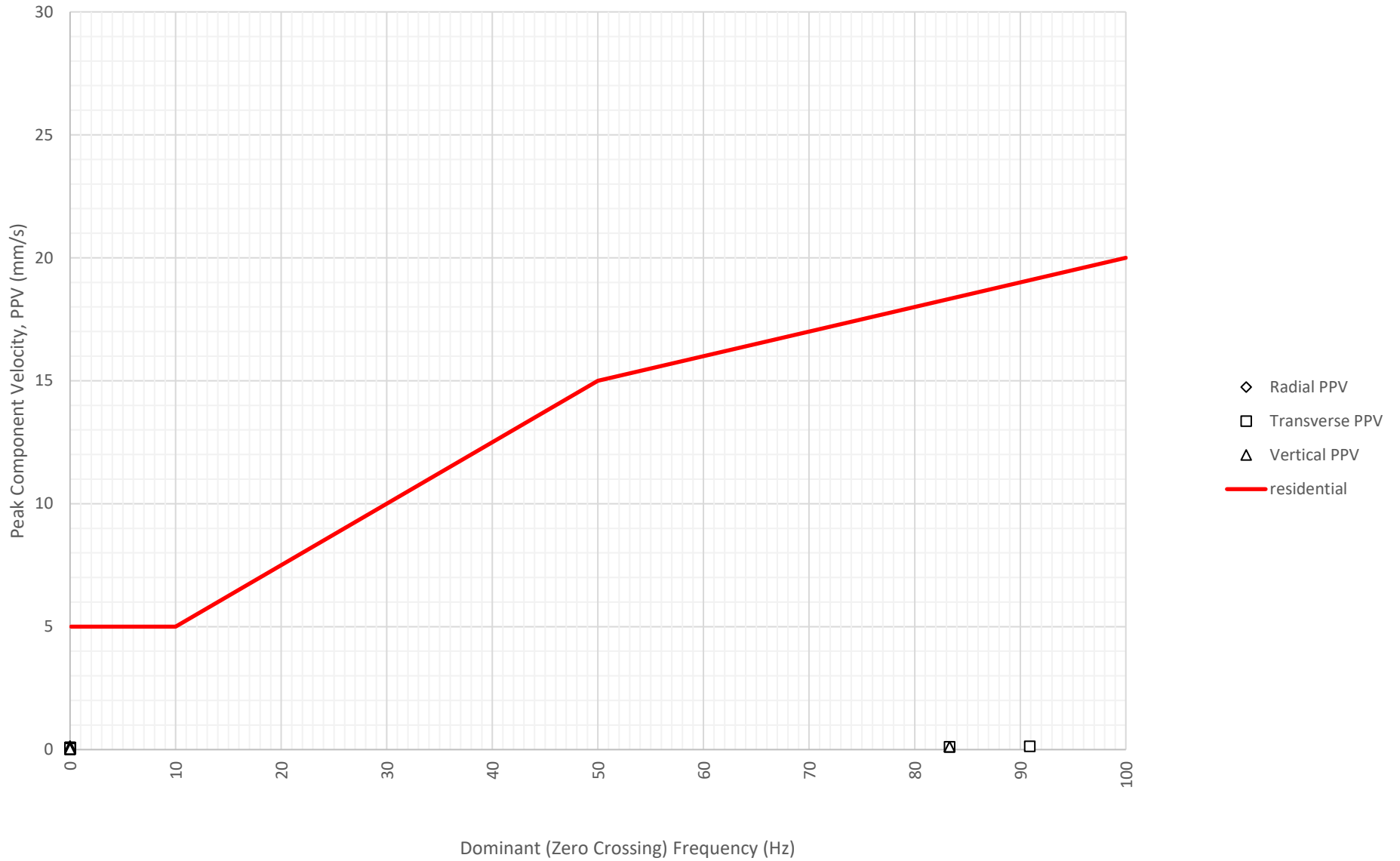
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 9-12-2022



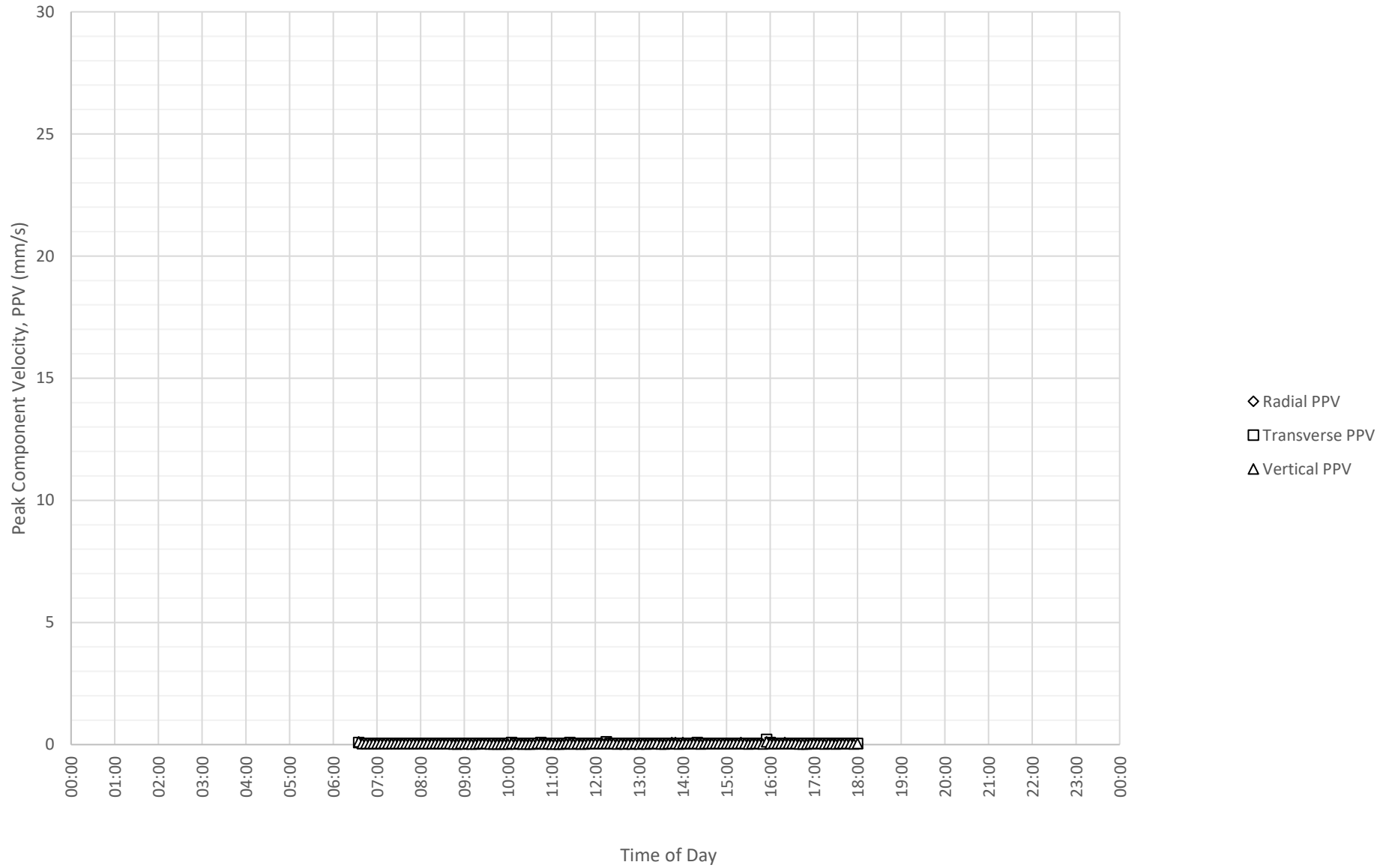
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 10-12-2022



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 10-12-2022

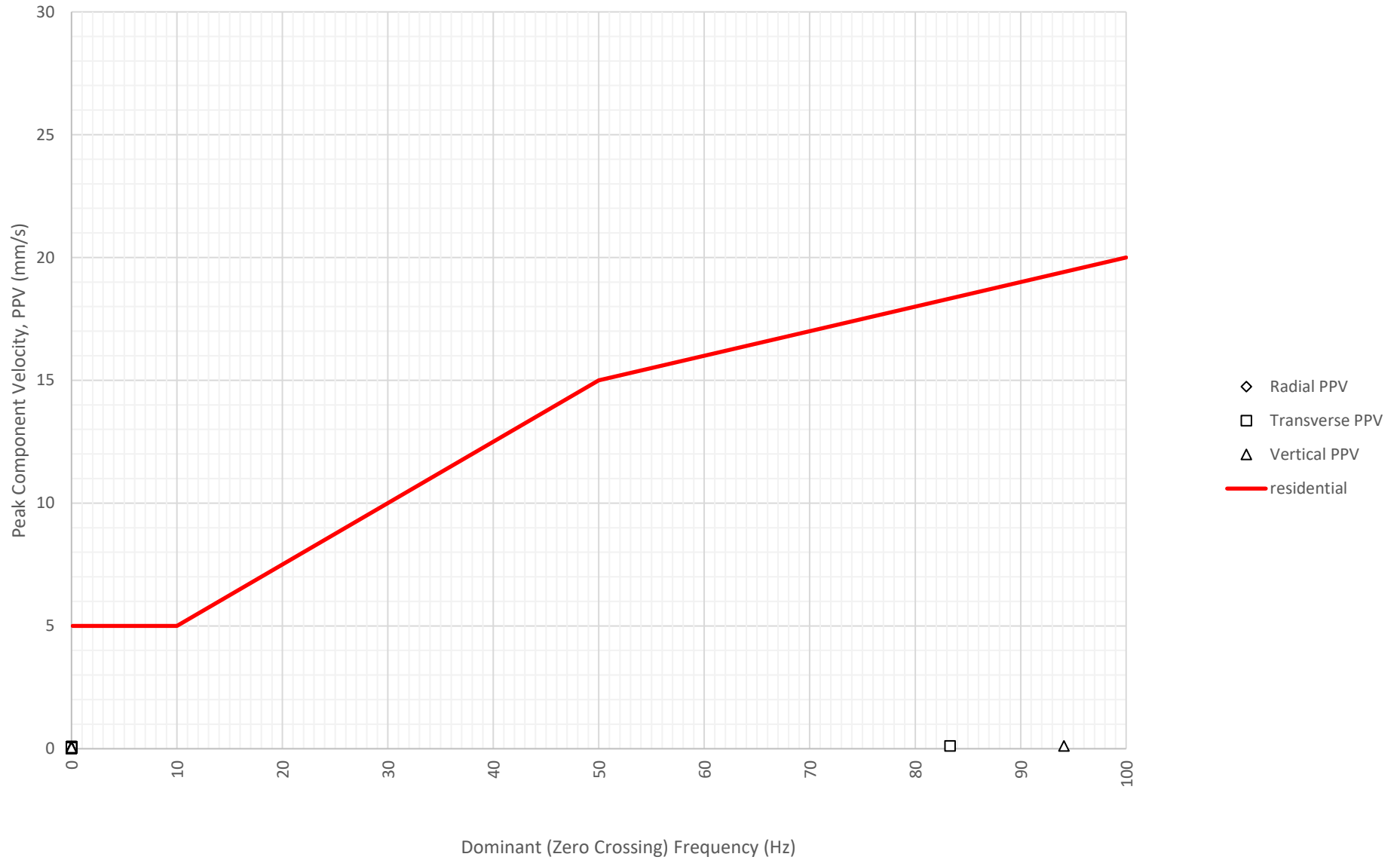


# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 11-12-2022

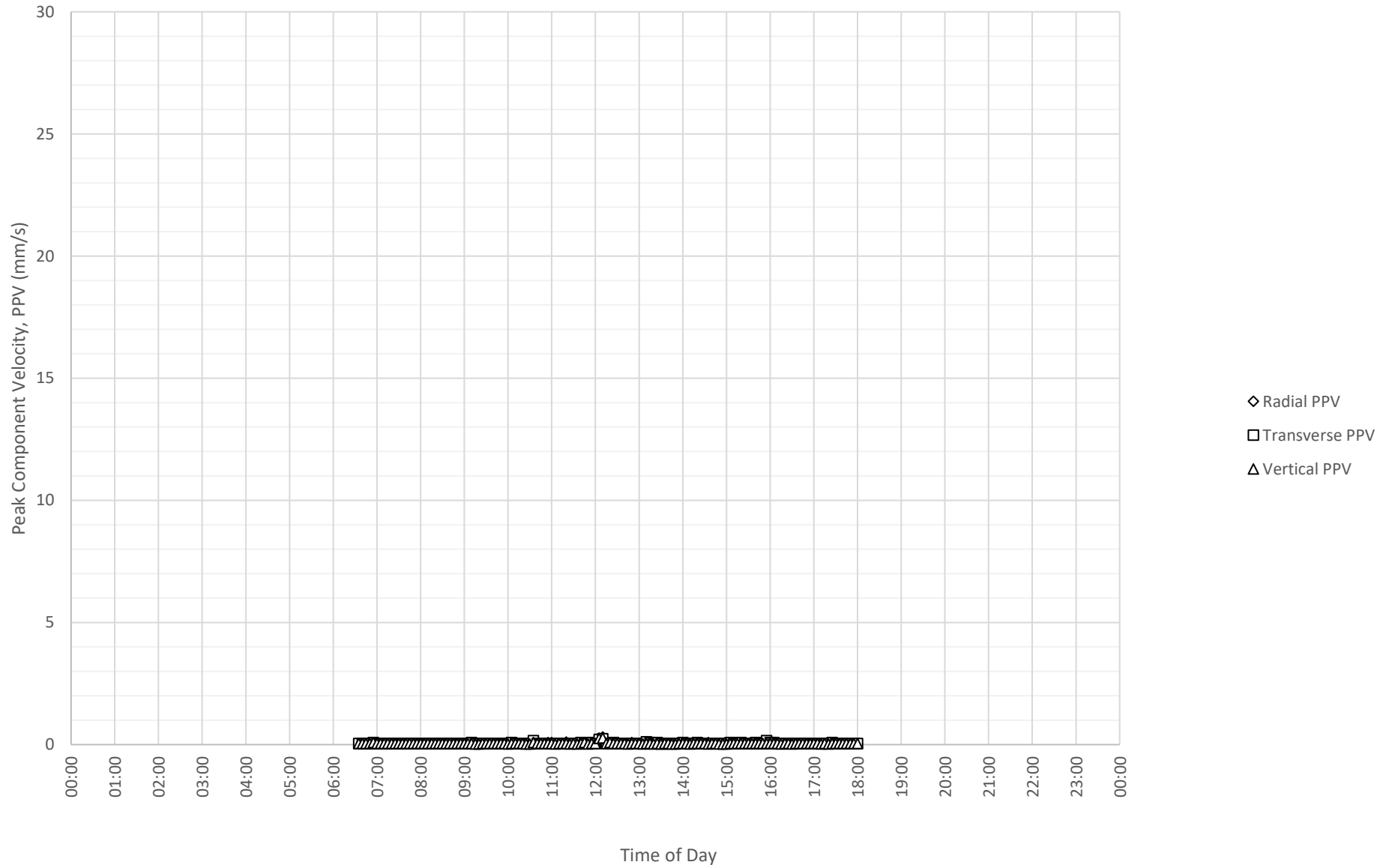




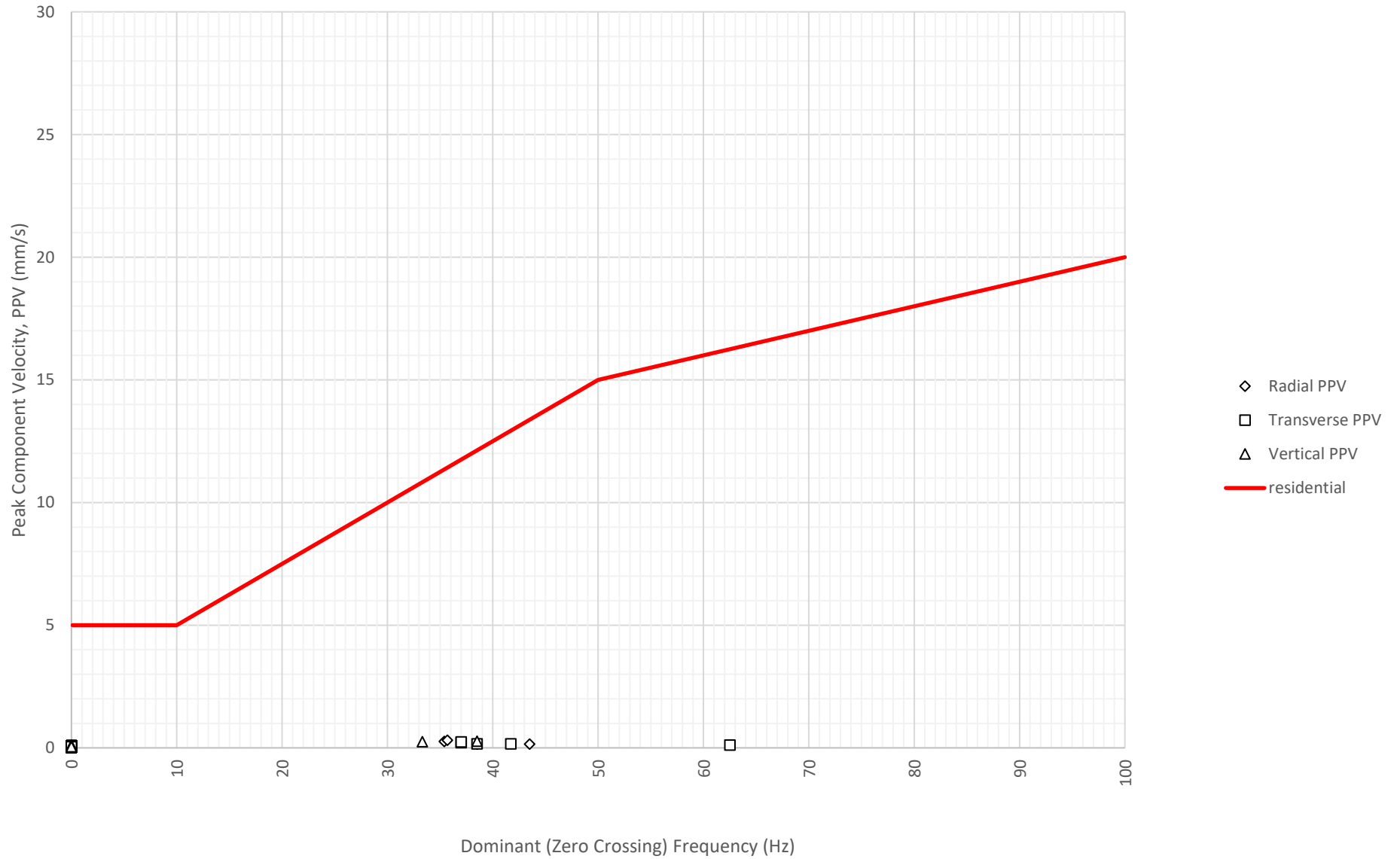
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 11-12-2022



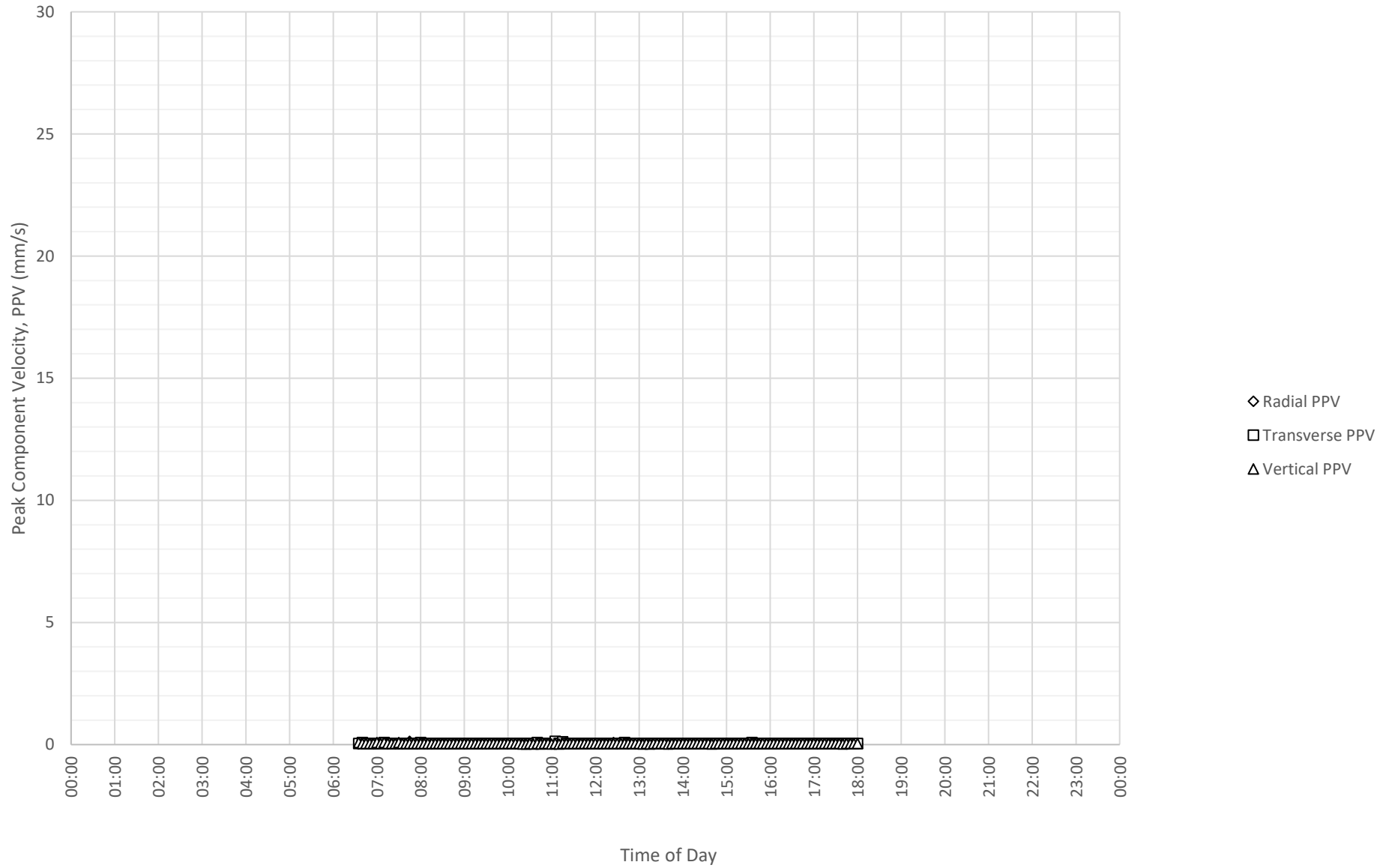
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 12-12-2022



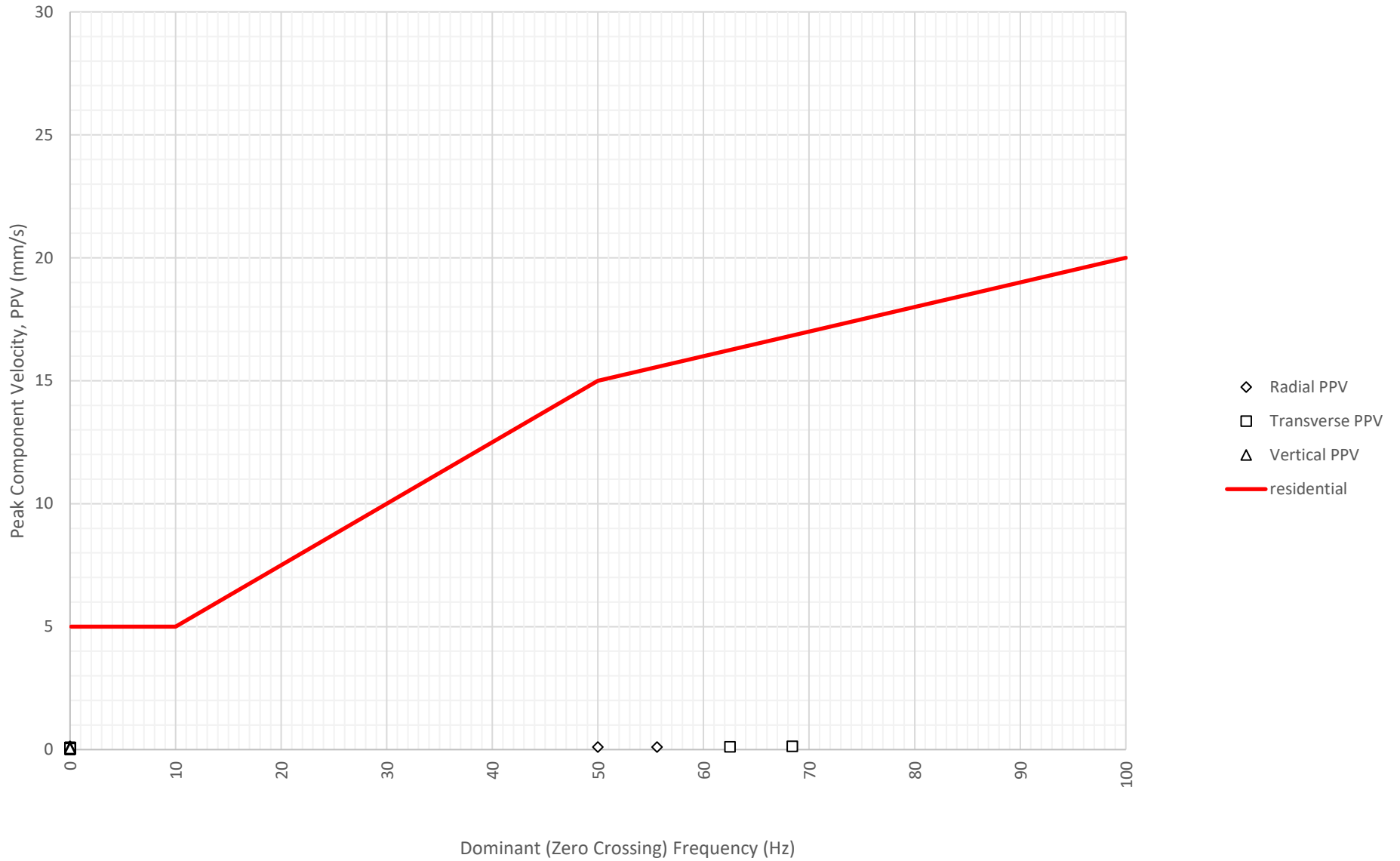
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 12-12-2022



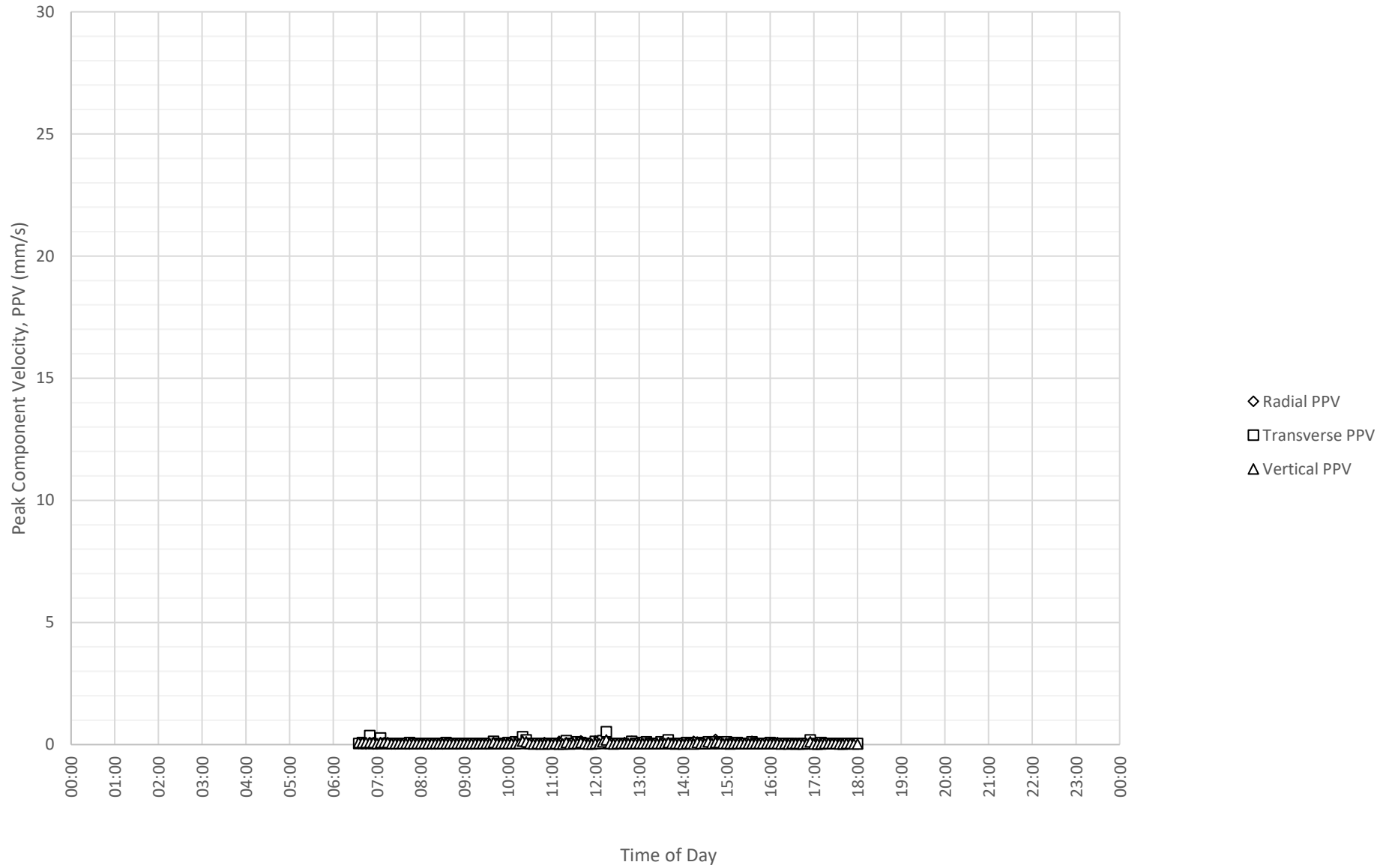
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 13-12-2022



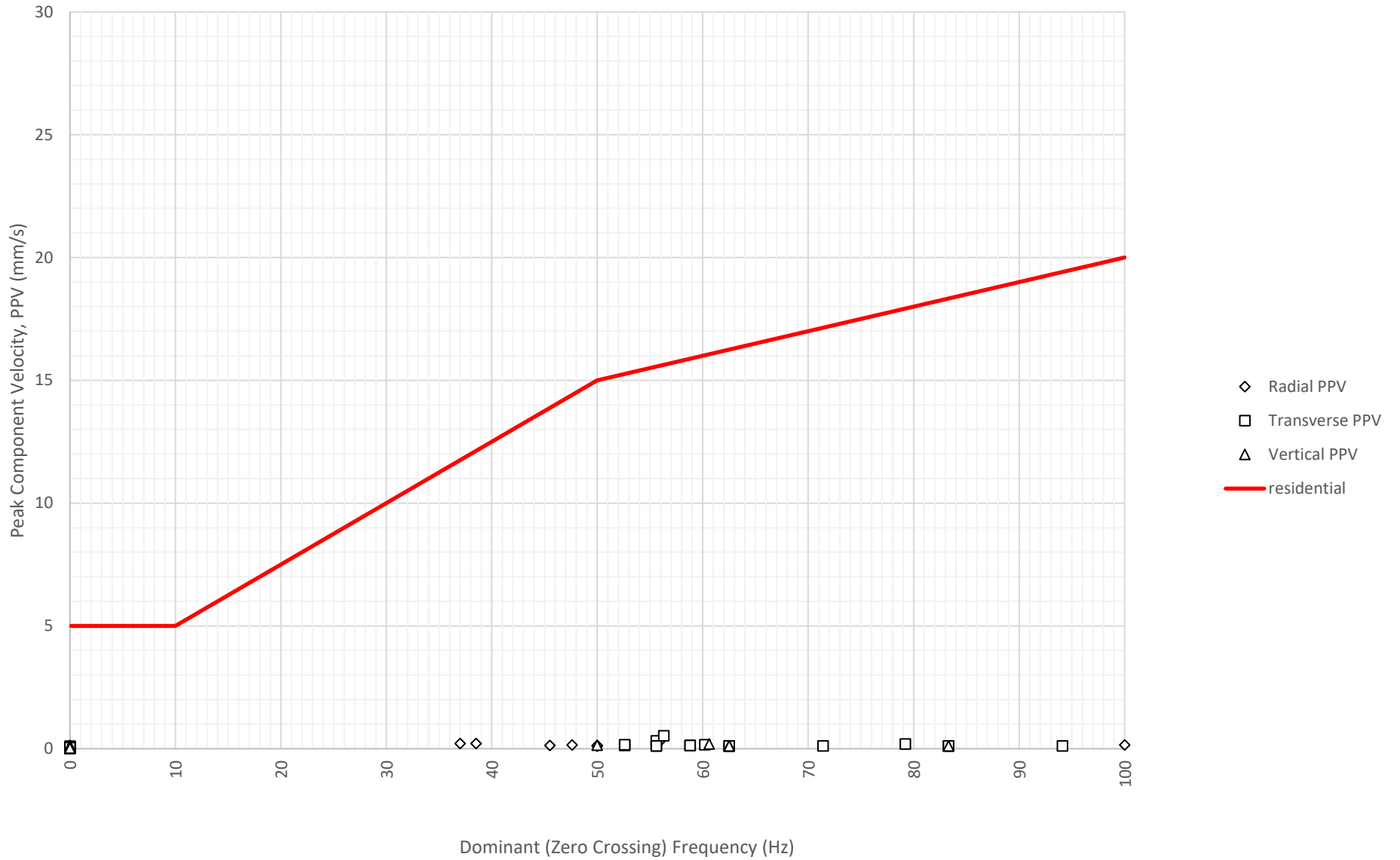
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on  
13-12-2022



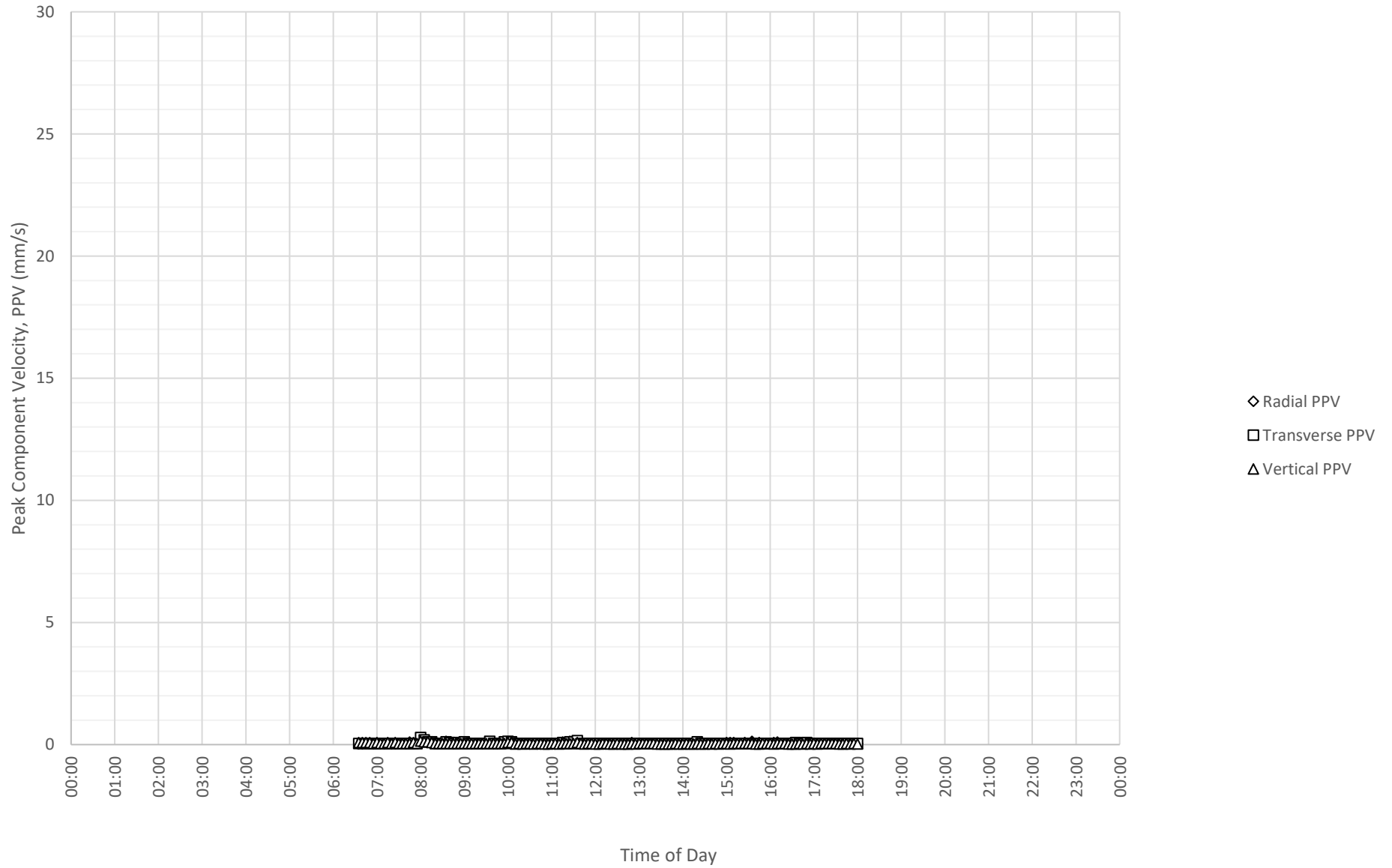
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 14-12-2022



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 14-12-2022

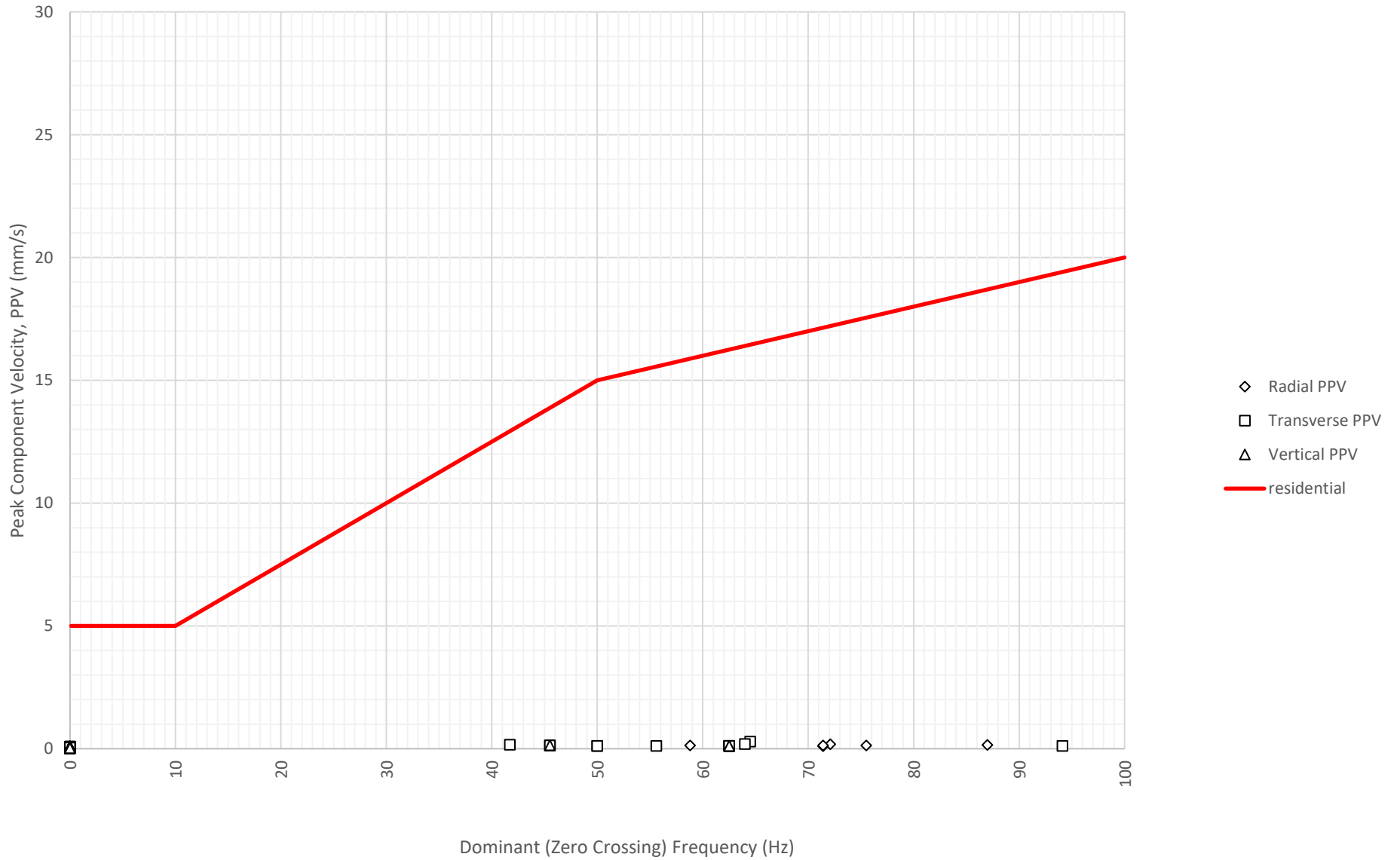


# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 15-12-2022

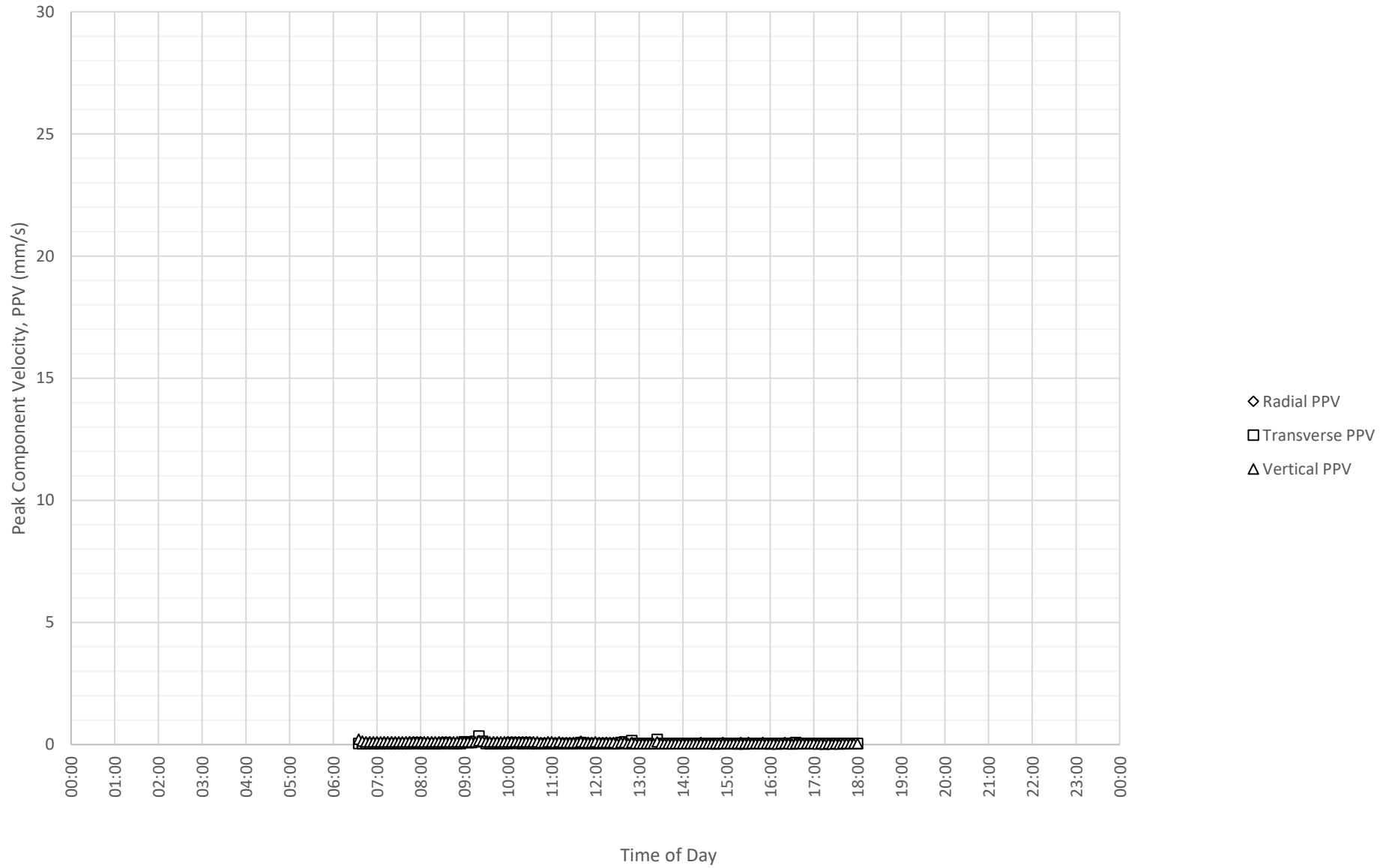




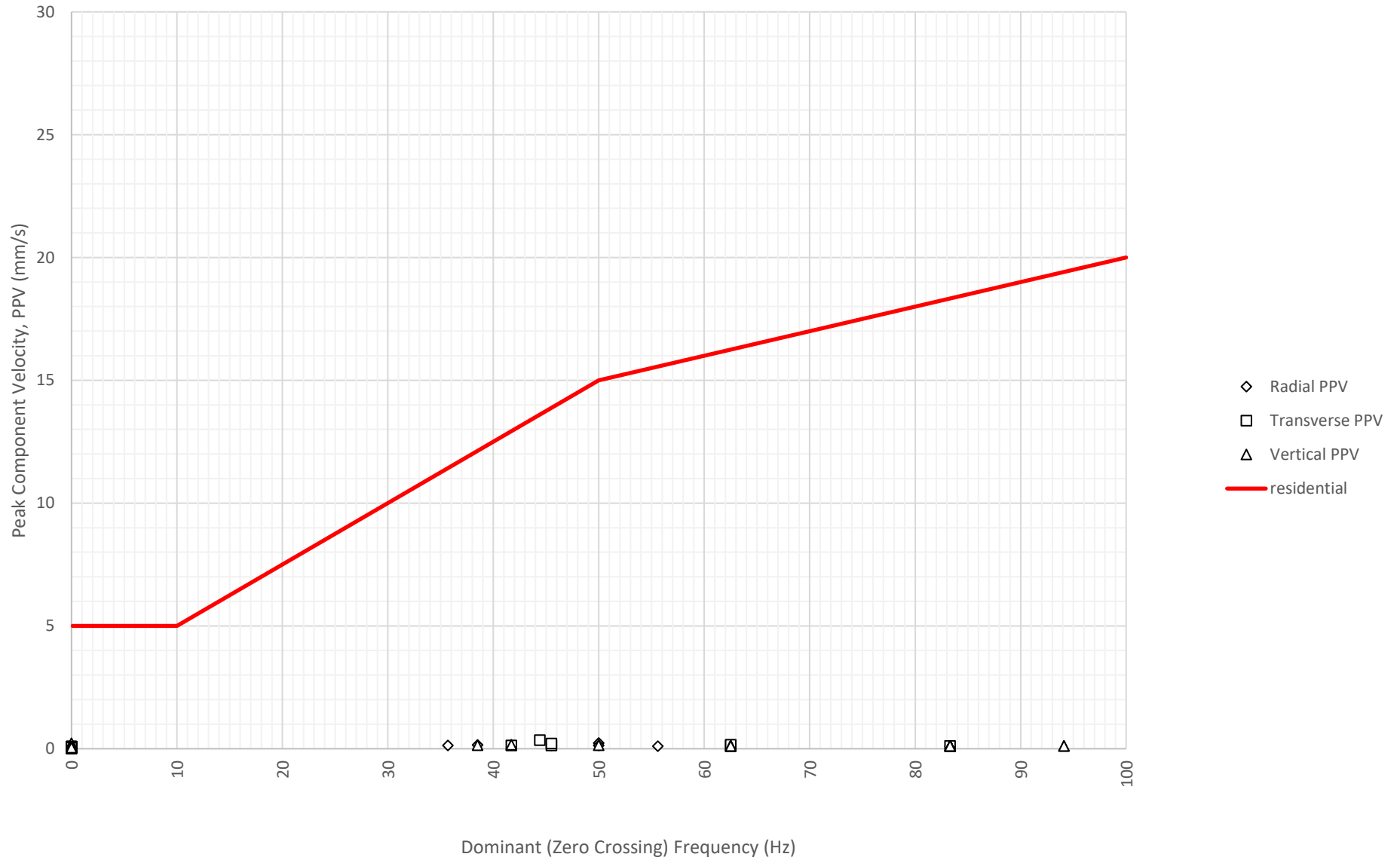
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 15-12-2022



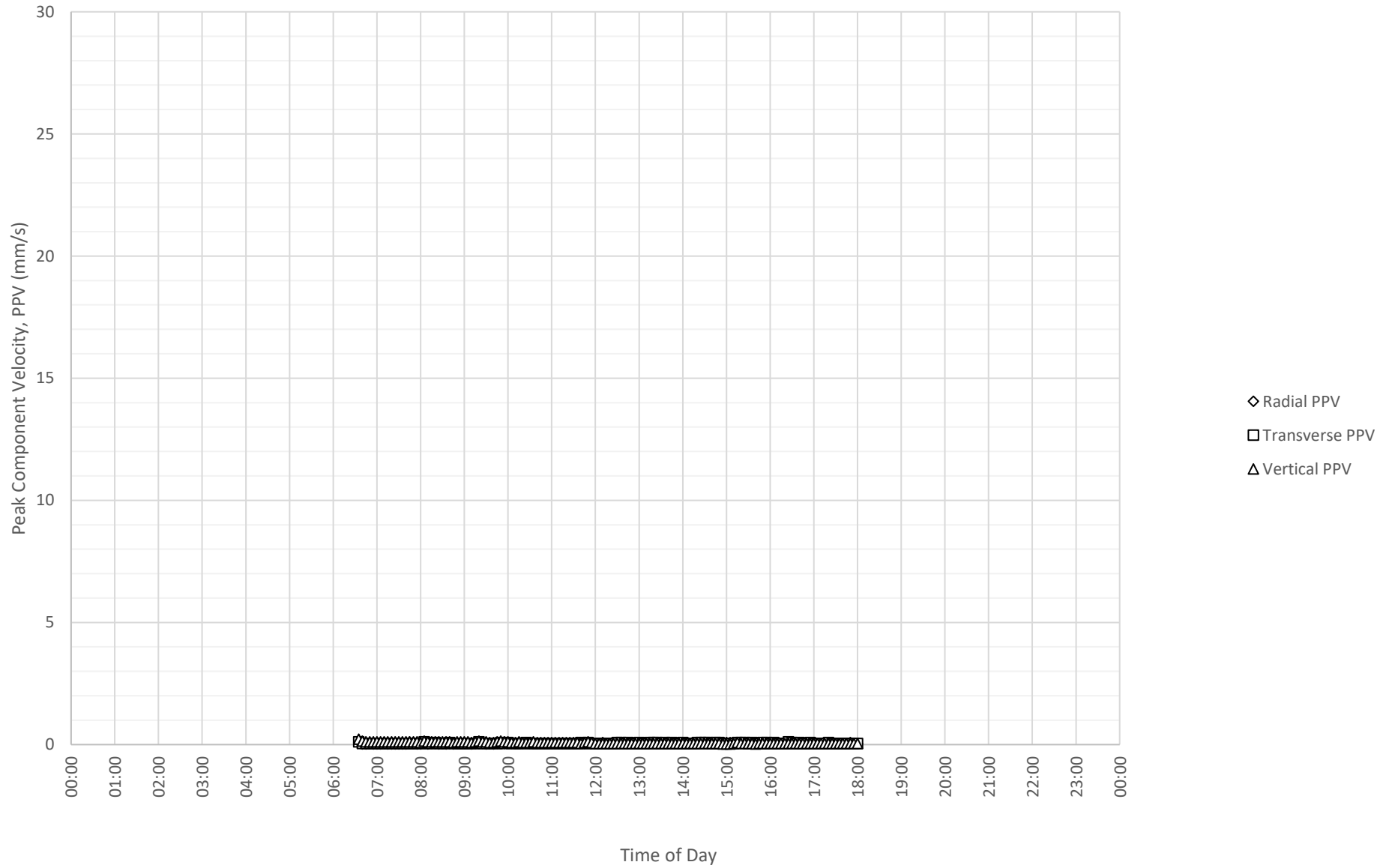
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 16-12-2022



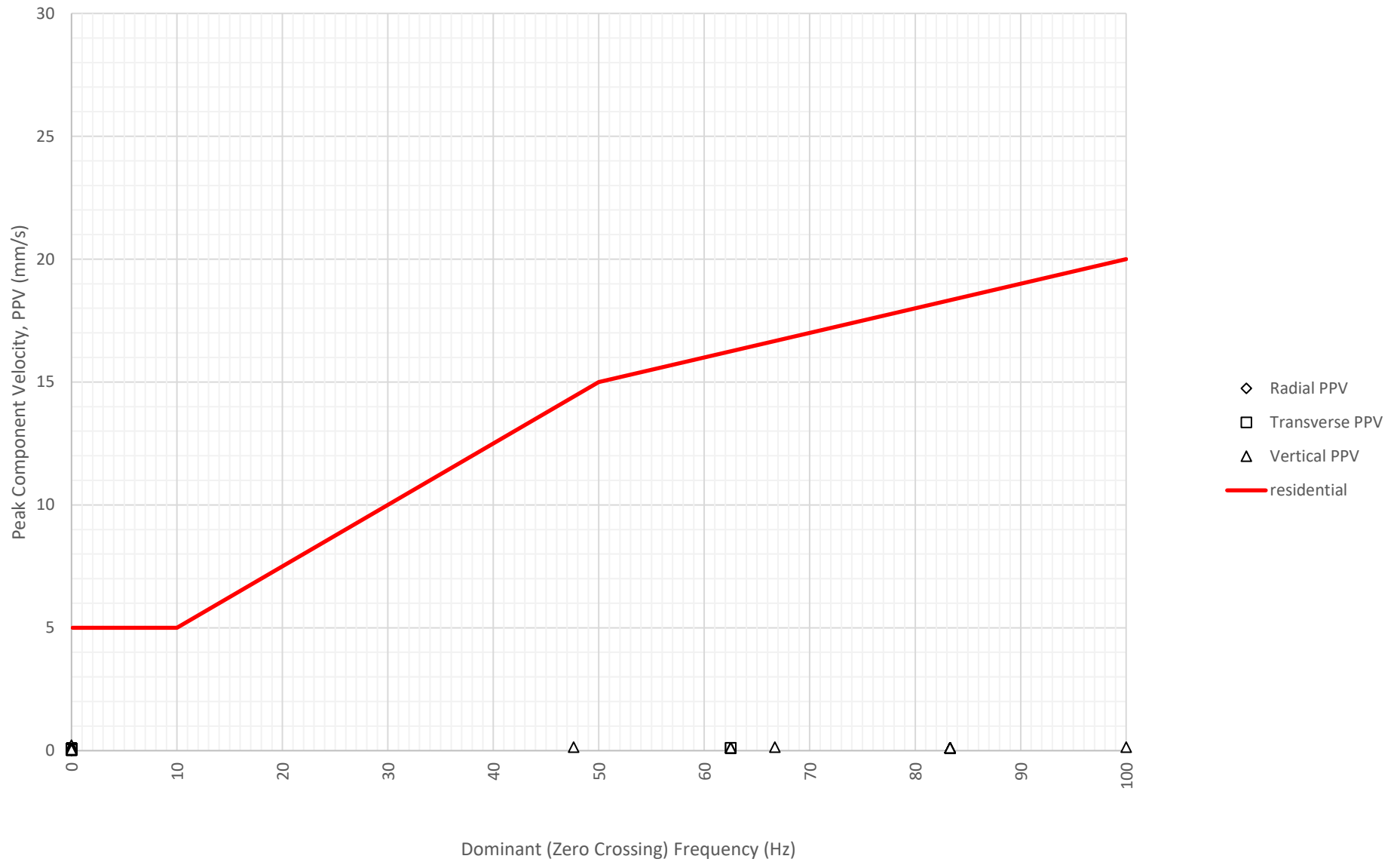
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 16-12-2022



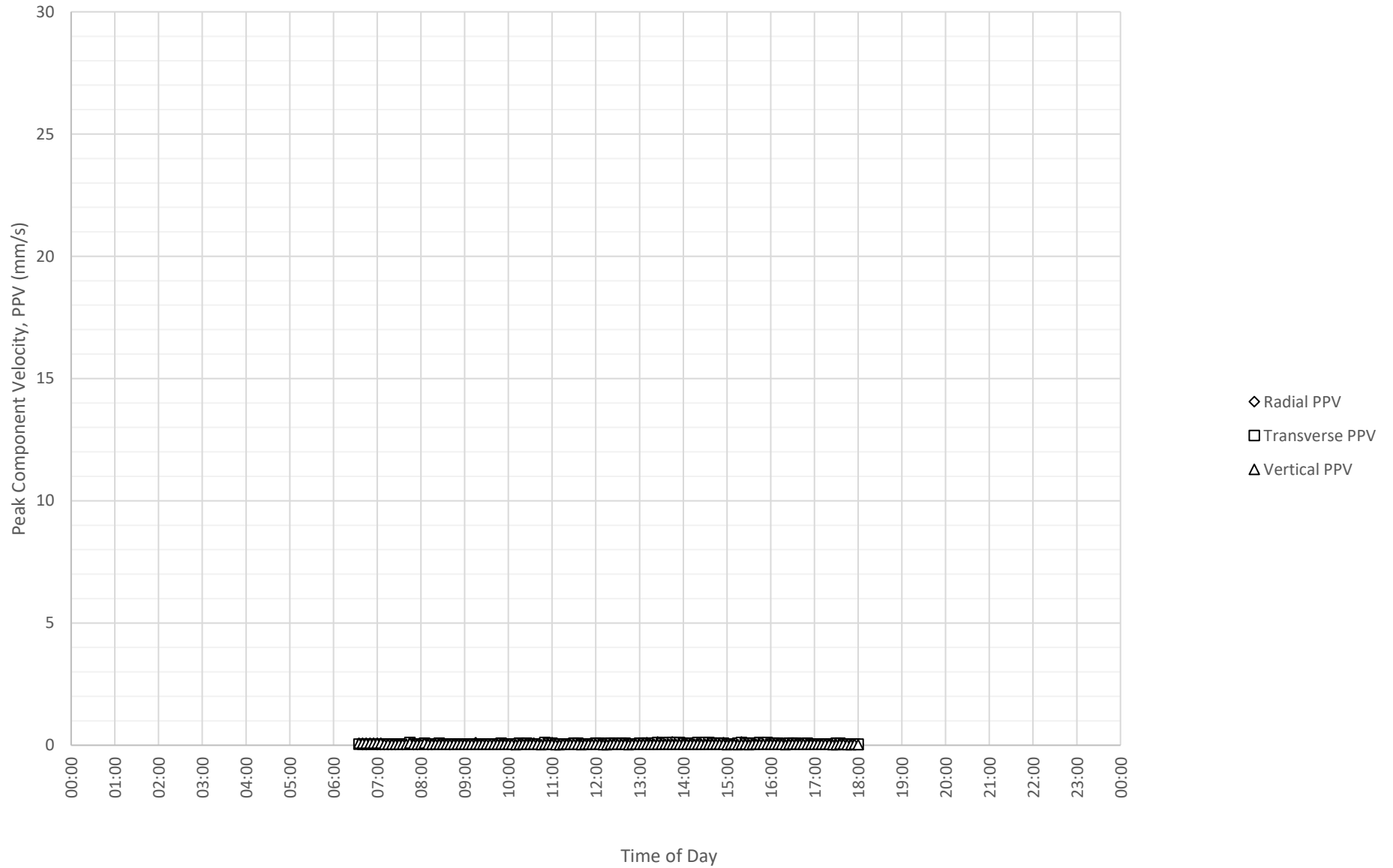
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 17-12-2022



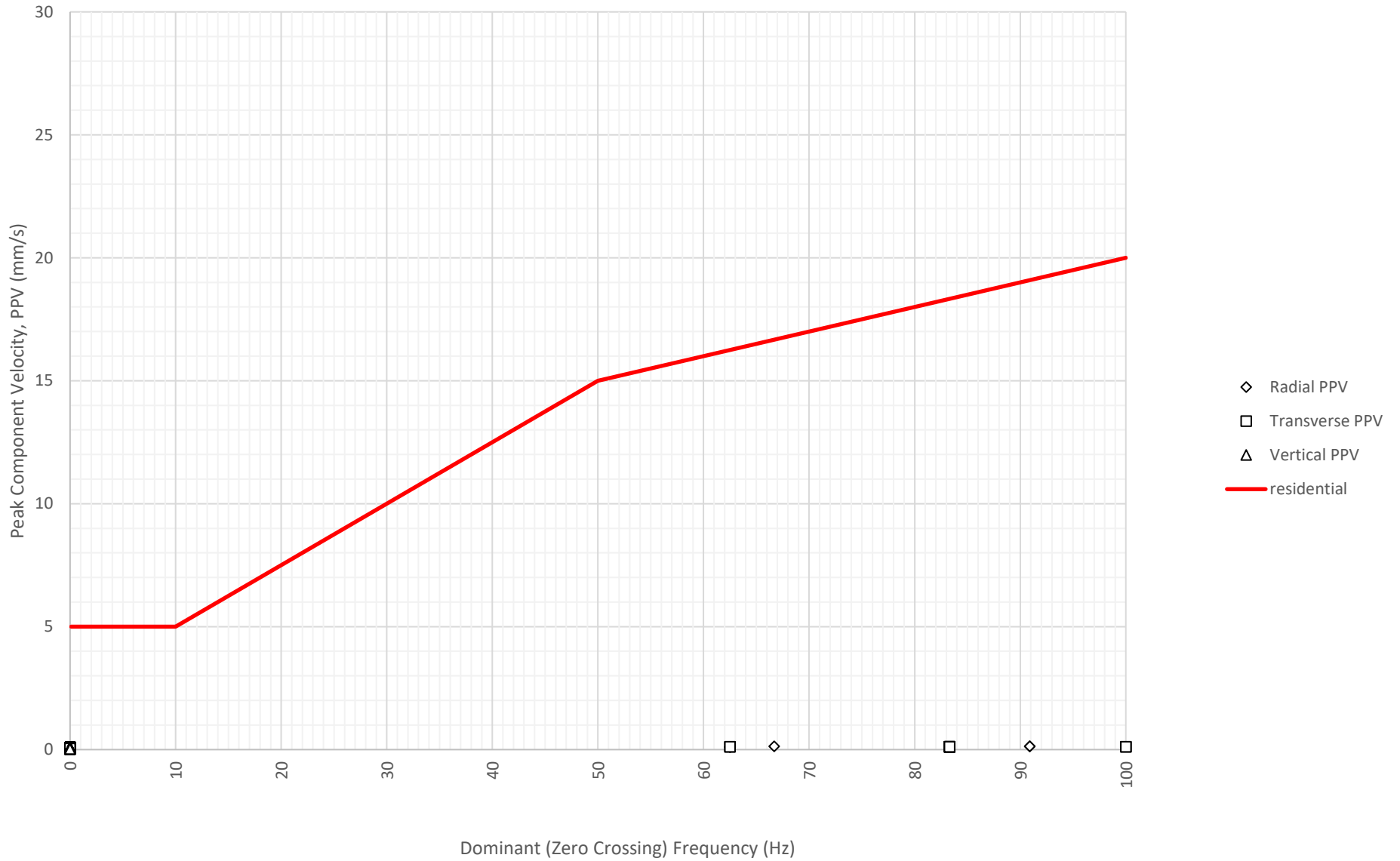
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 17-12-2022



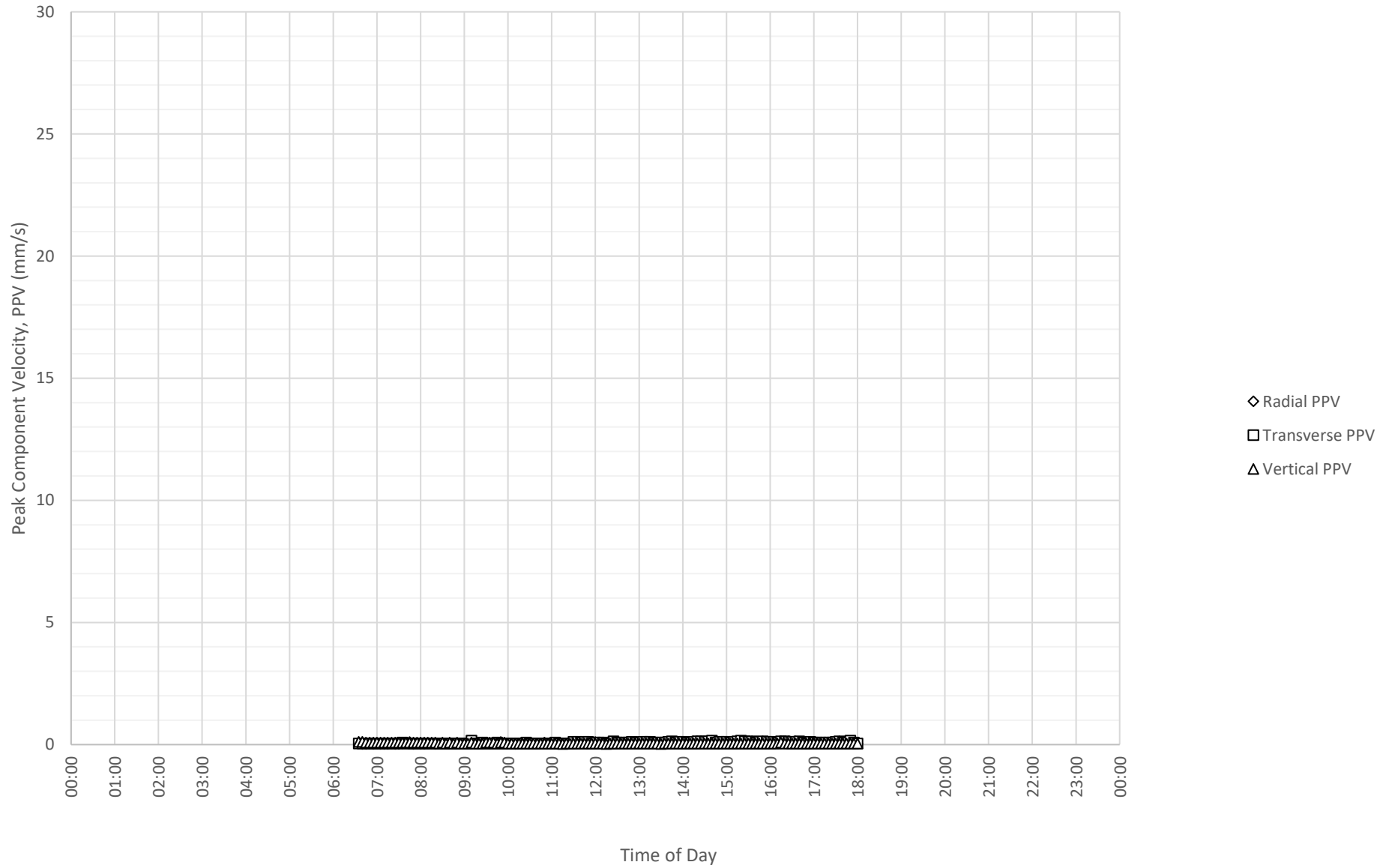
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 18-12-2022



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 18-12-2022

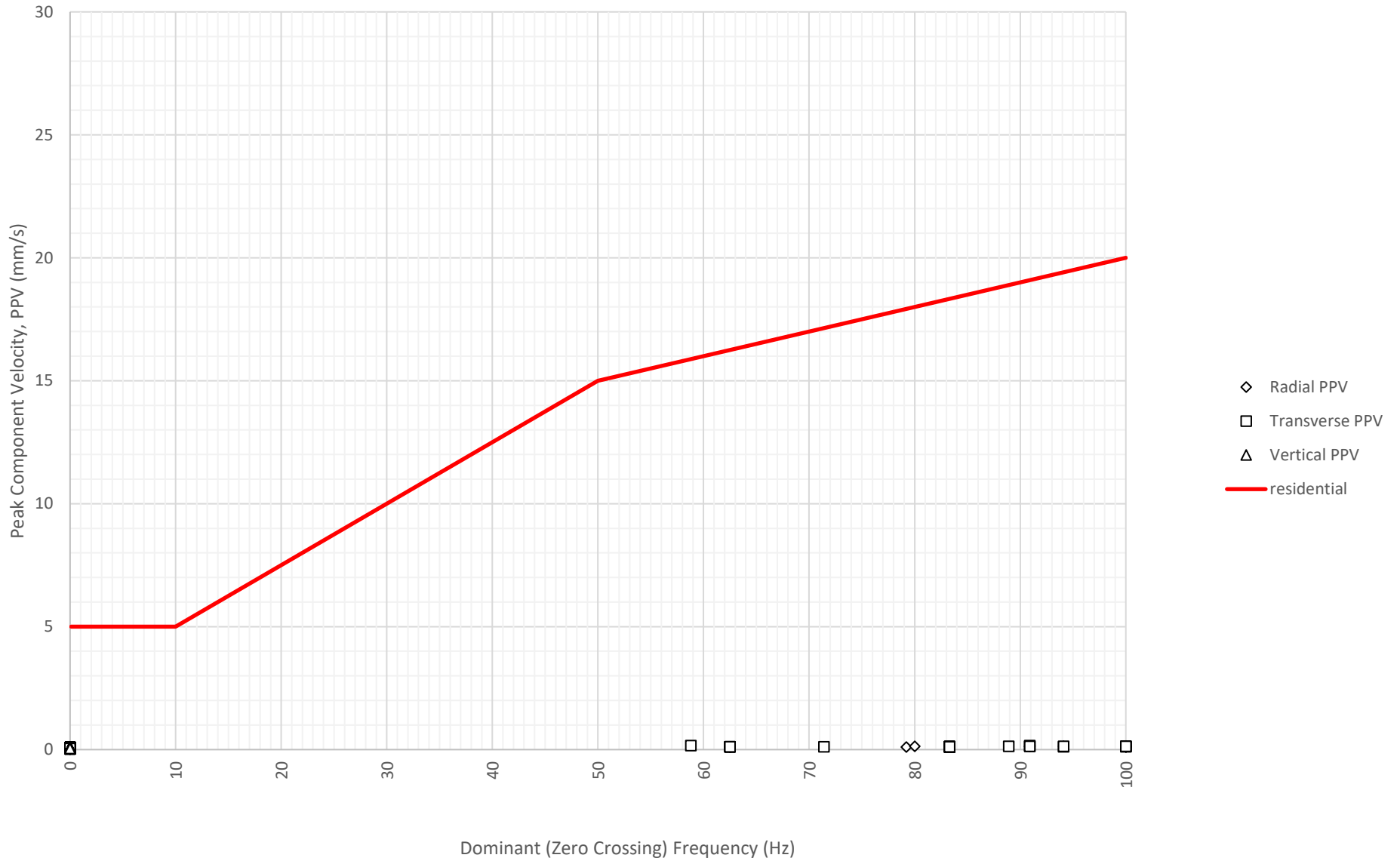


# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 19-12-2022

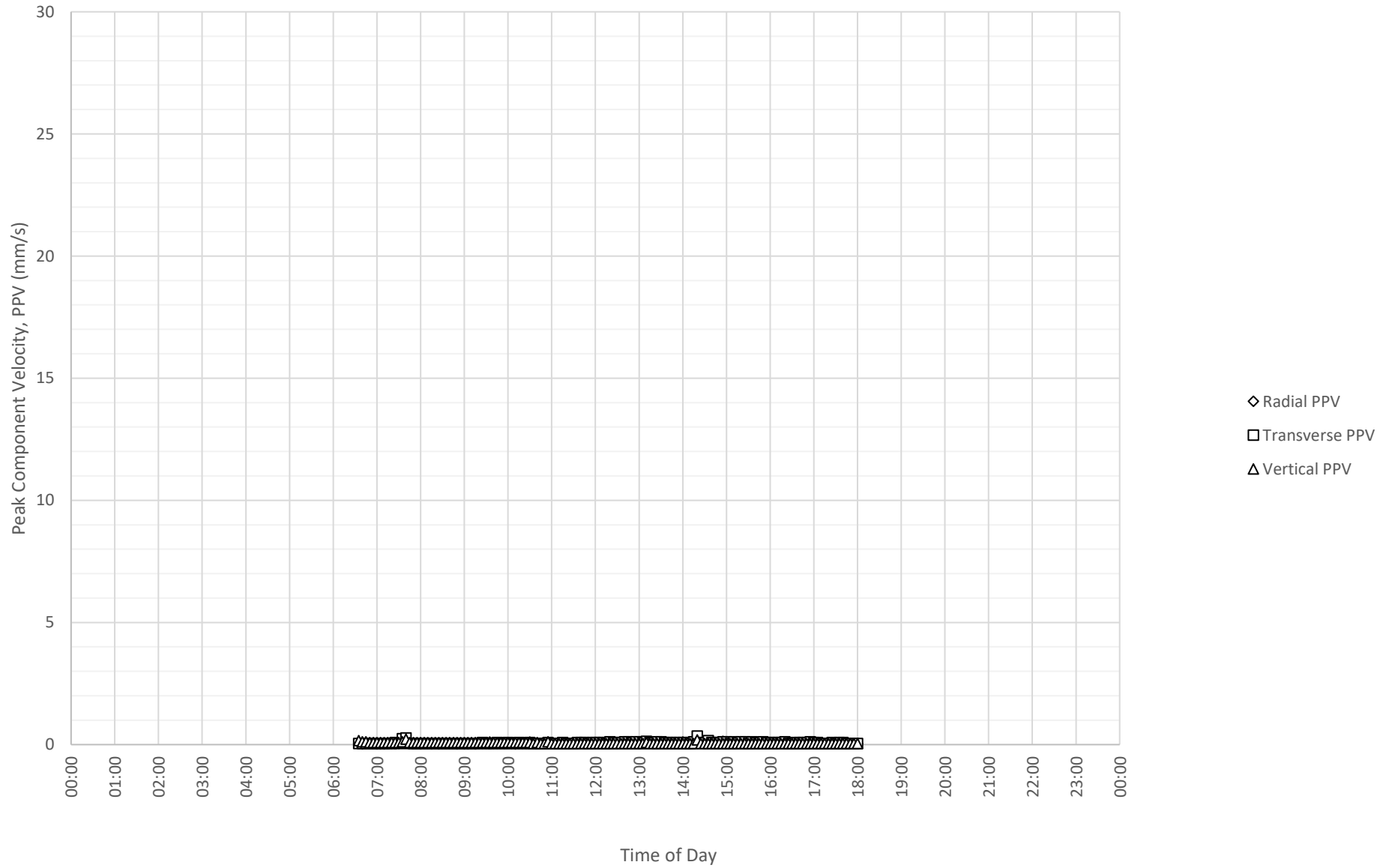




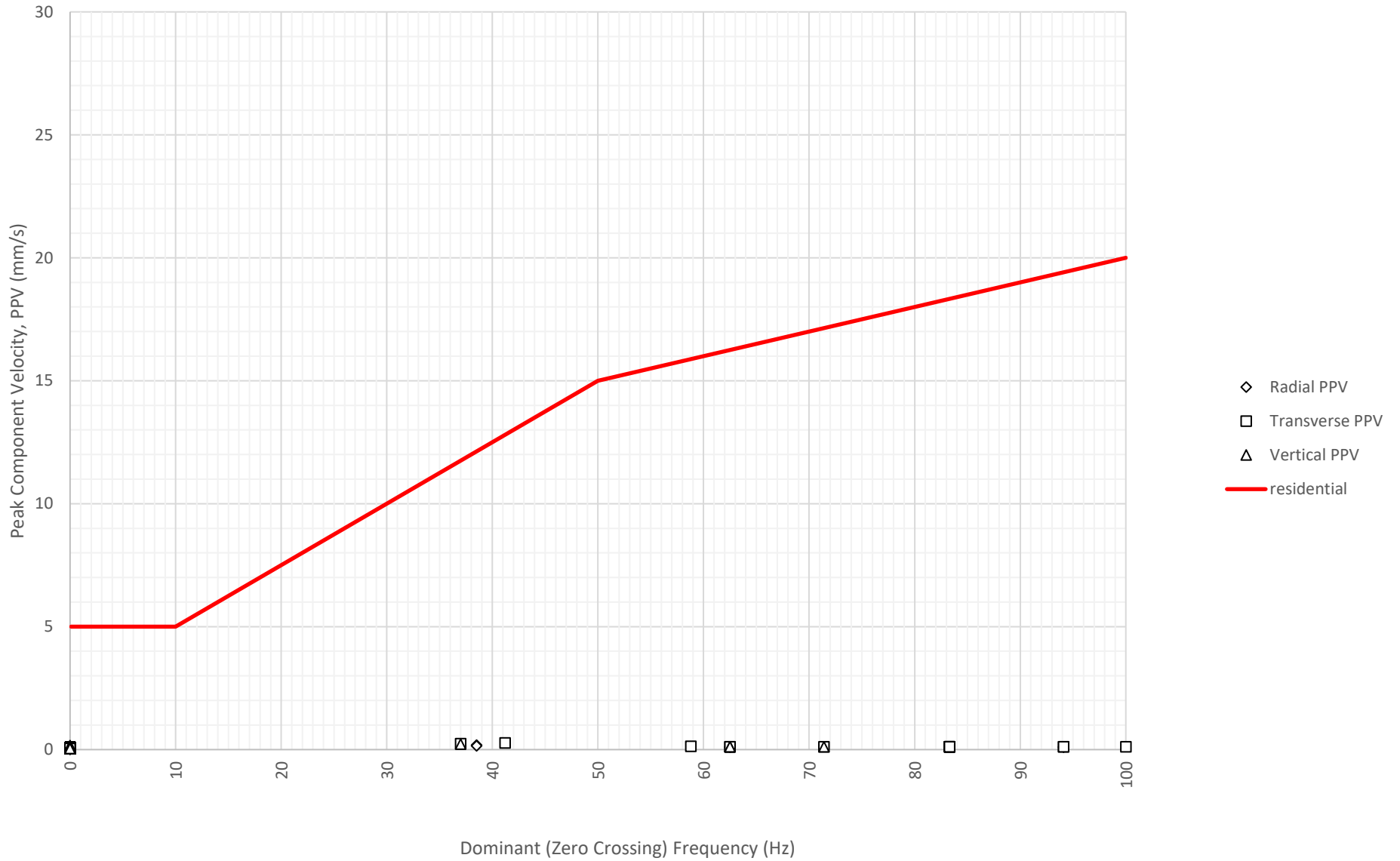
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 19-12-2022



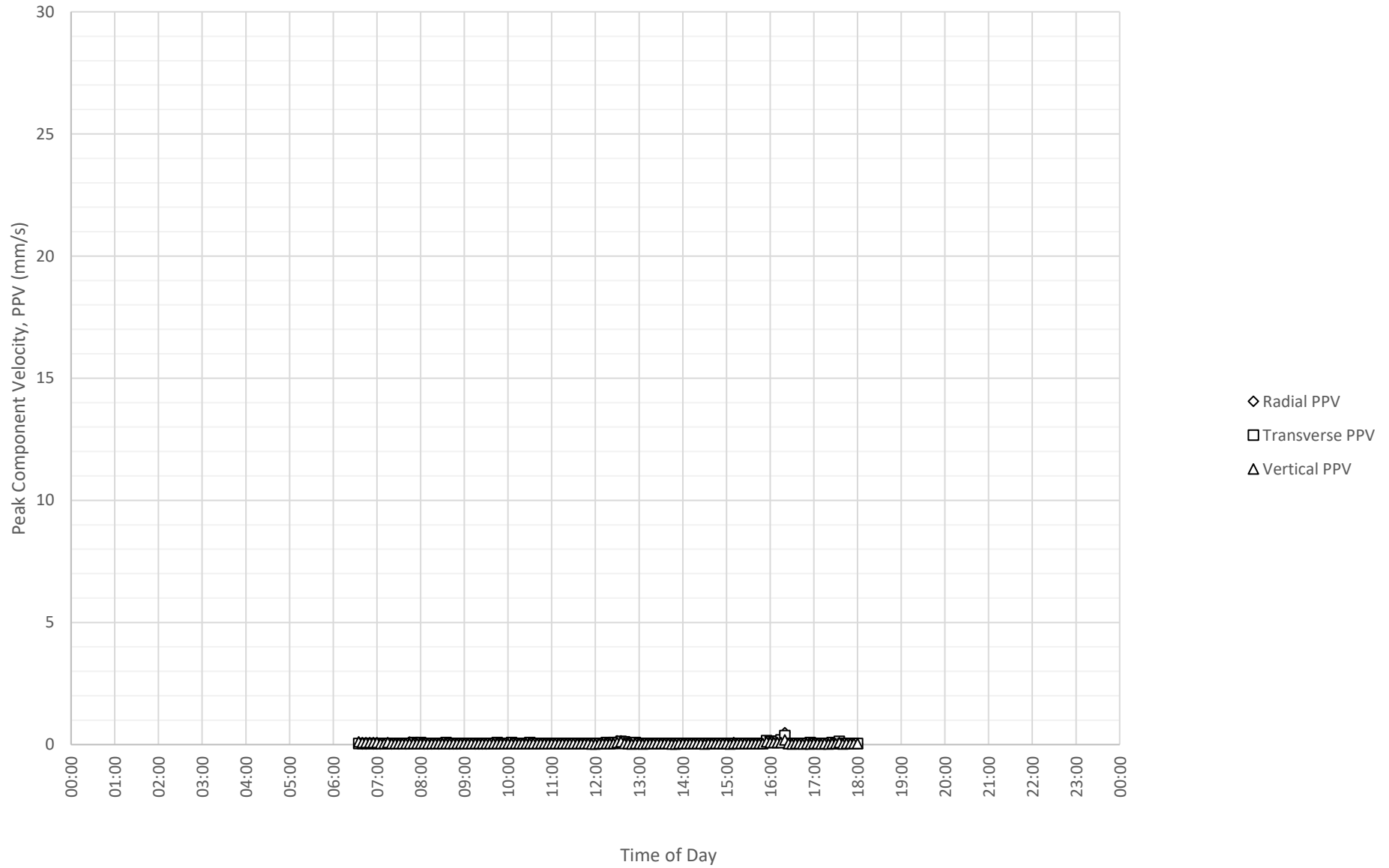
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 20-12-2022



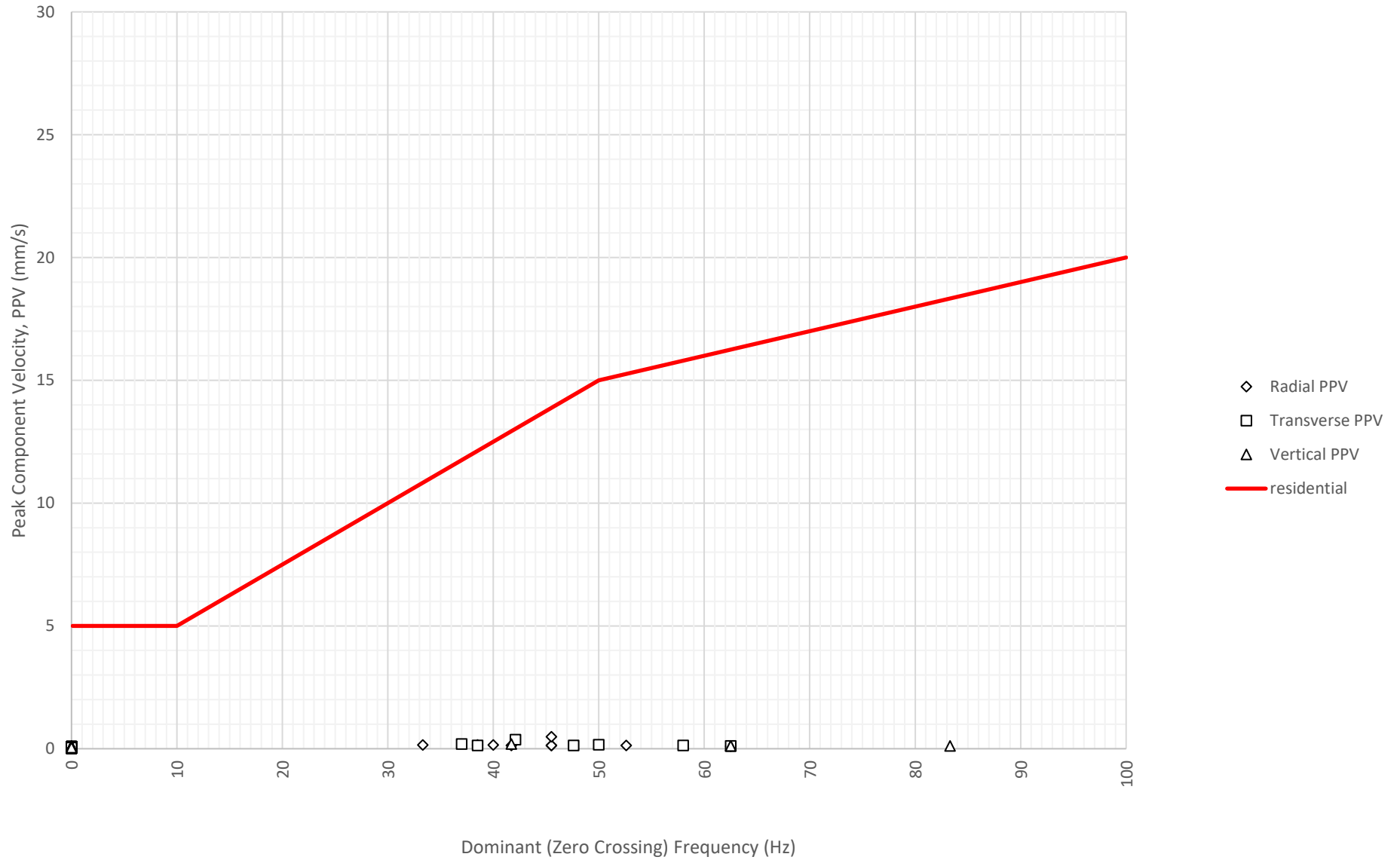
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 20-12-2022



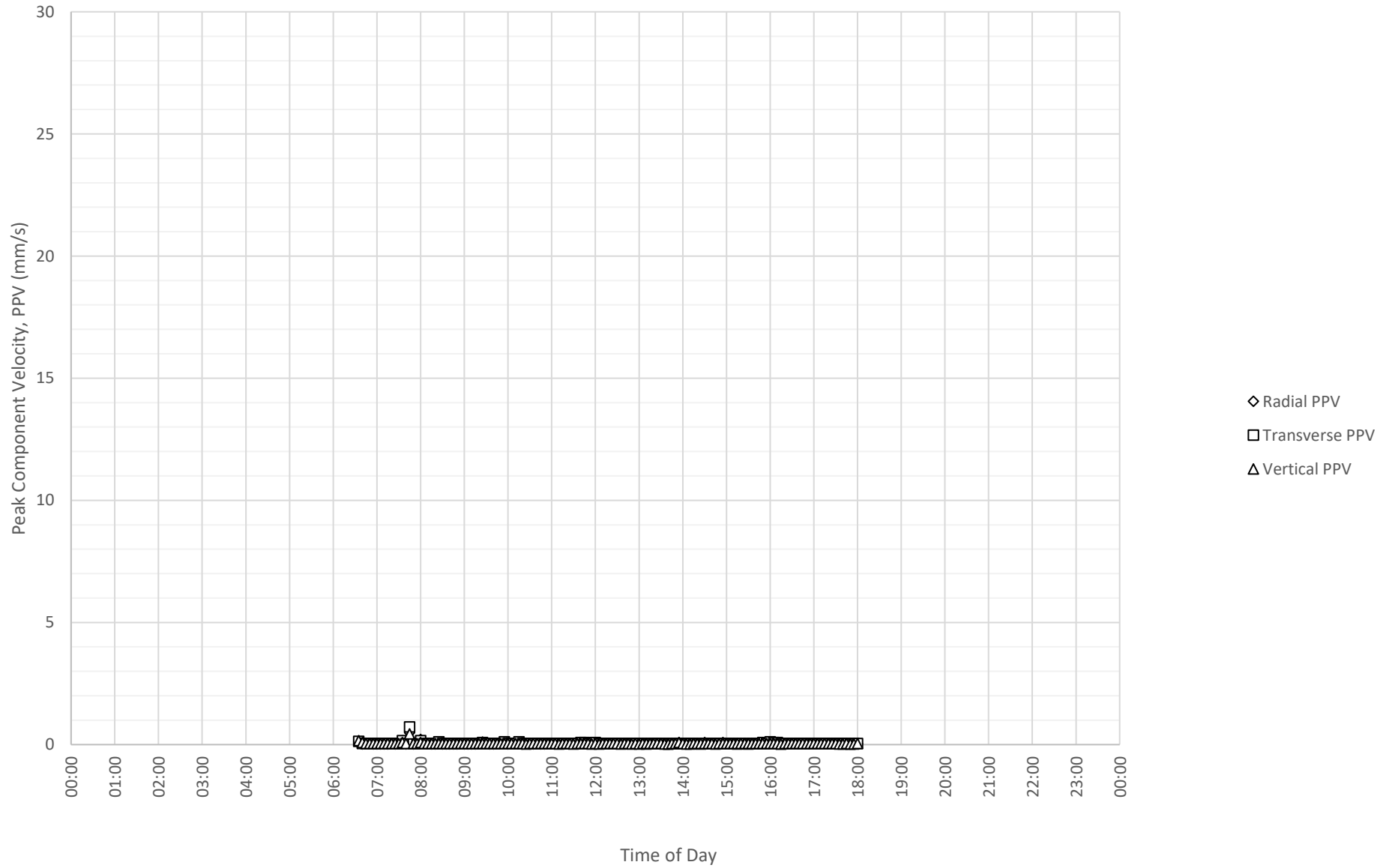
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 21-12-2022



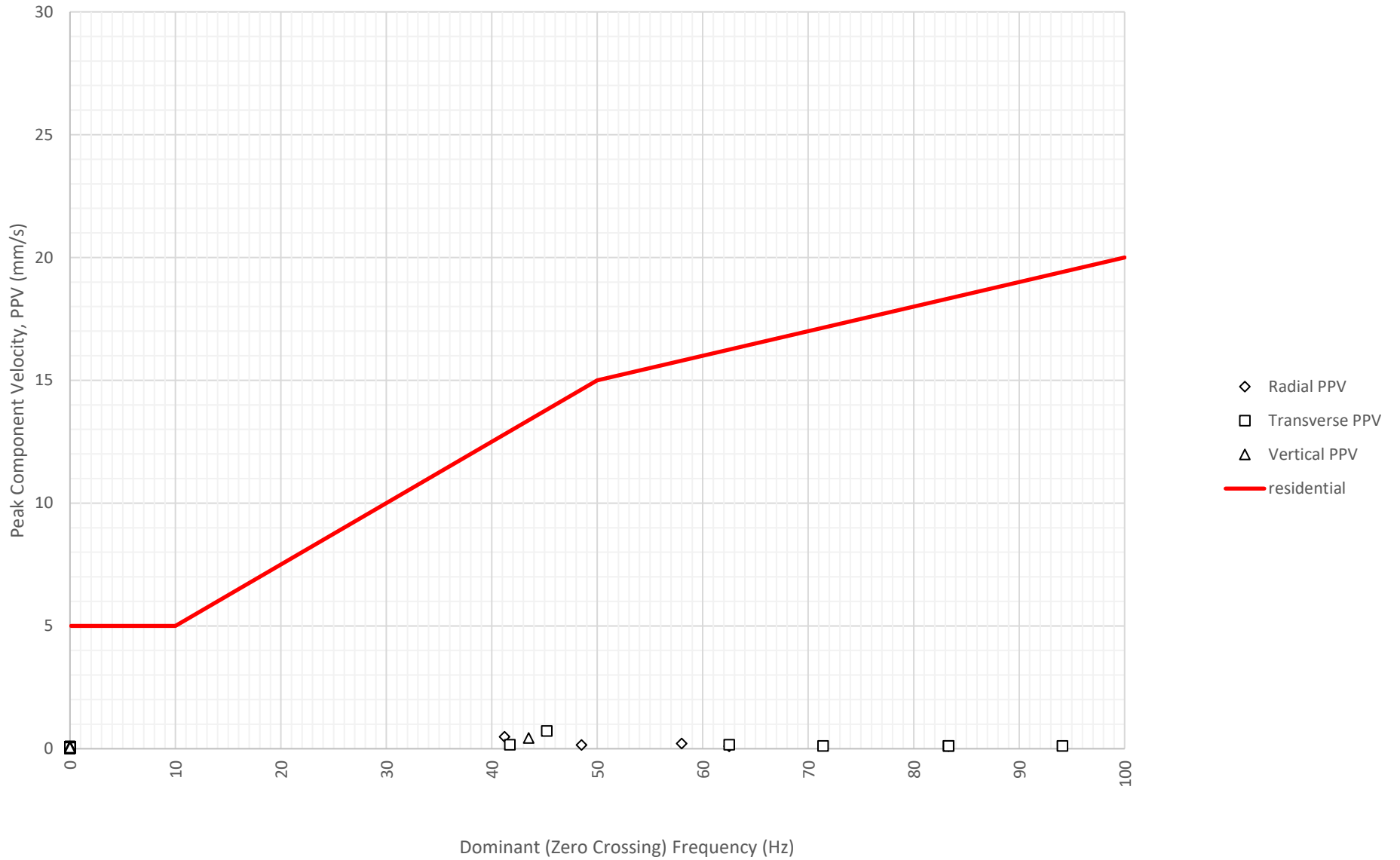
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 21-12-2022



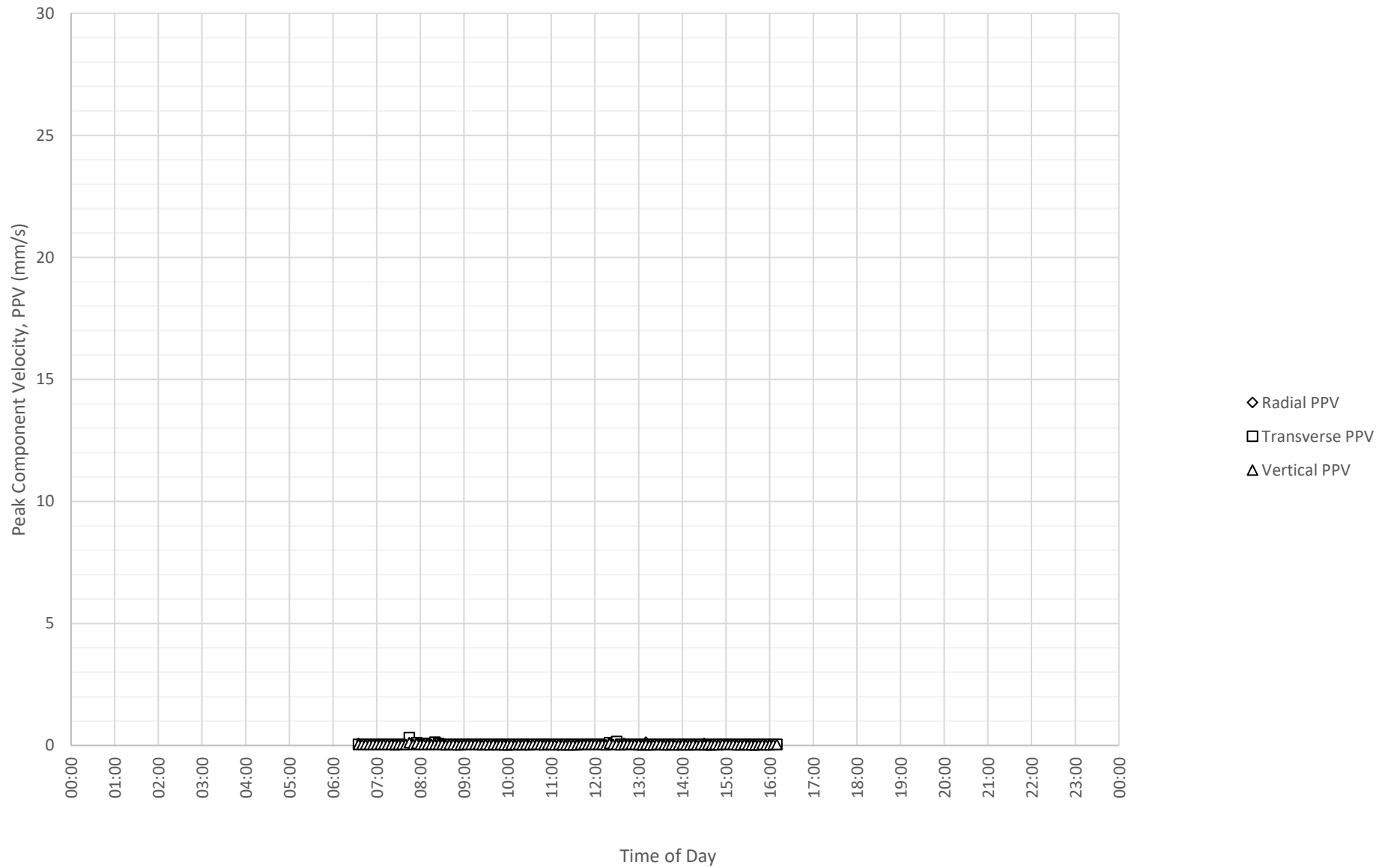
# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 22-12-2022



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on  
22-12-2022

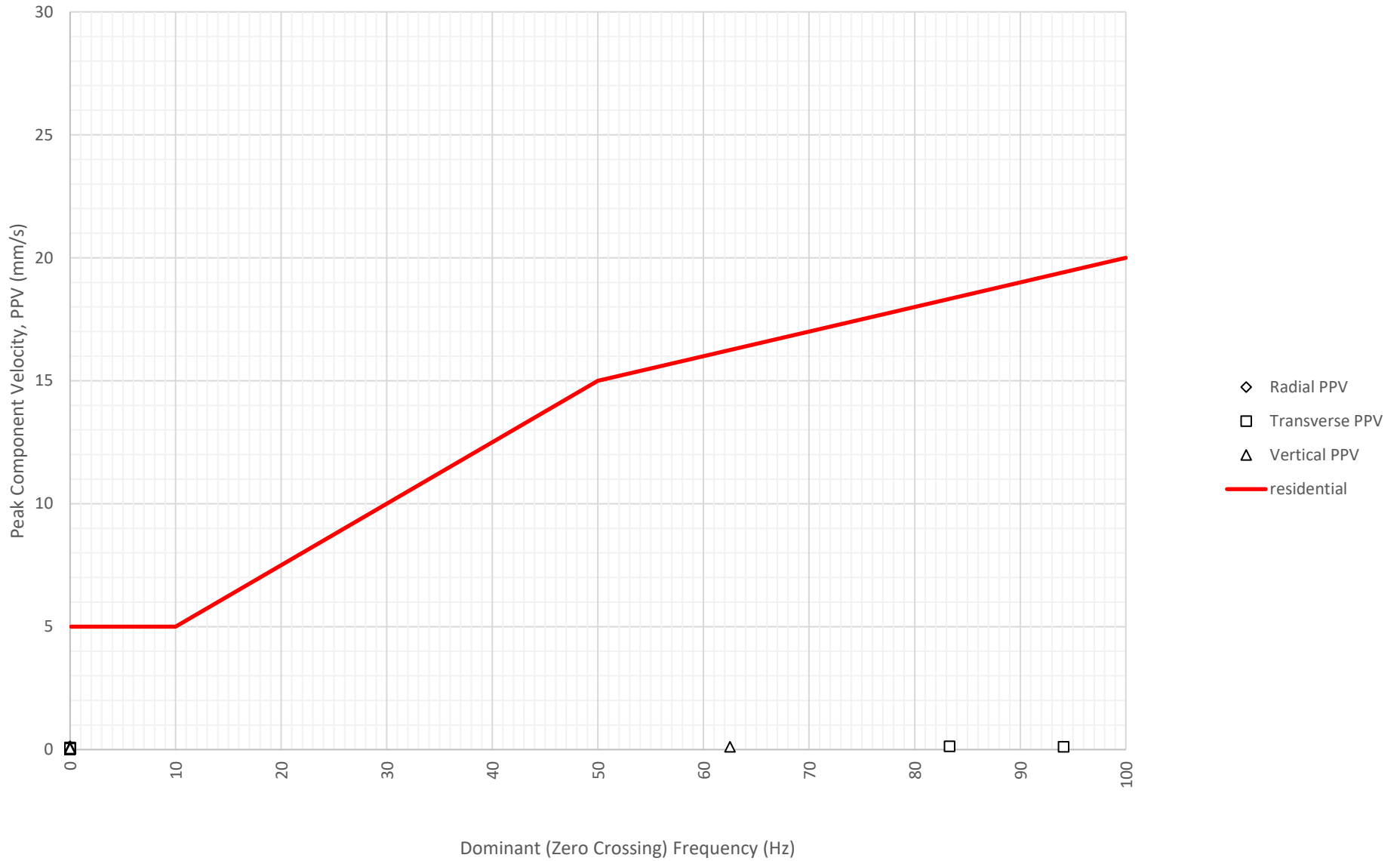


# Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 23-12-2022





Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on  
23-12-2022

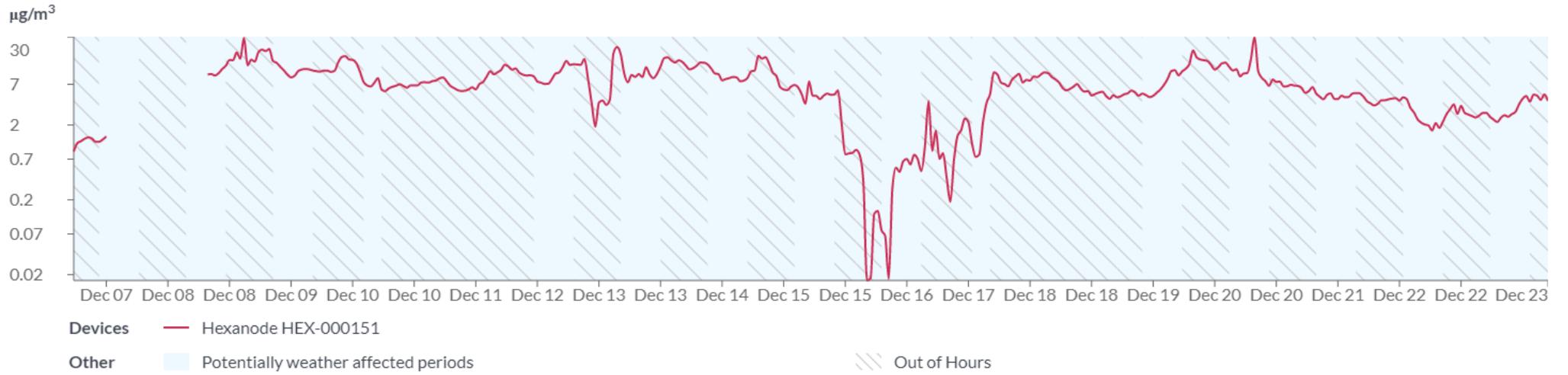


## APPENDIX 3 – DUST MONITORING RESULTS

# Hourly Average

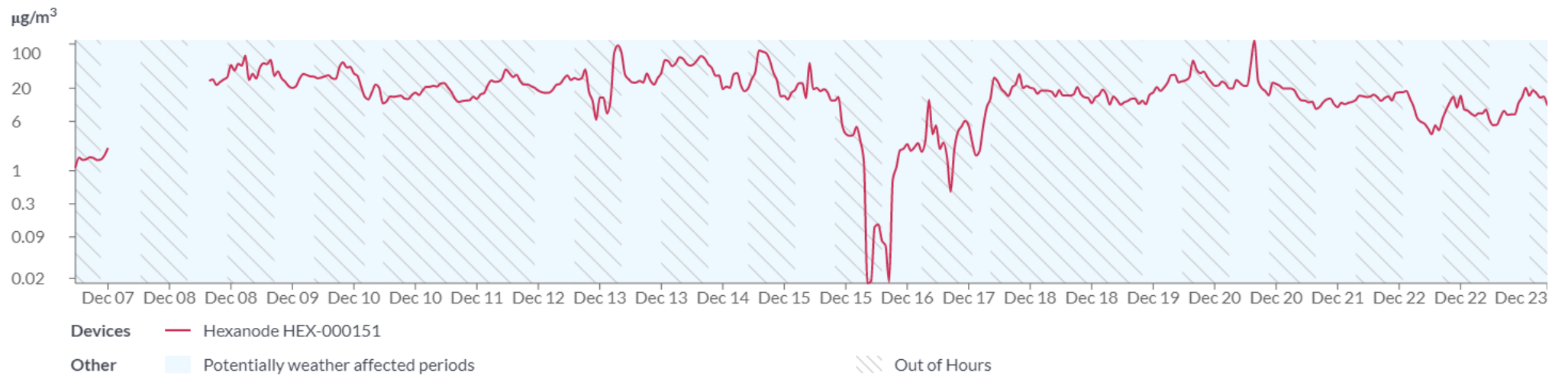
PM2.5

Dec 7 2022 - Dec 23 2022



PM10

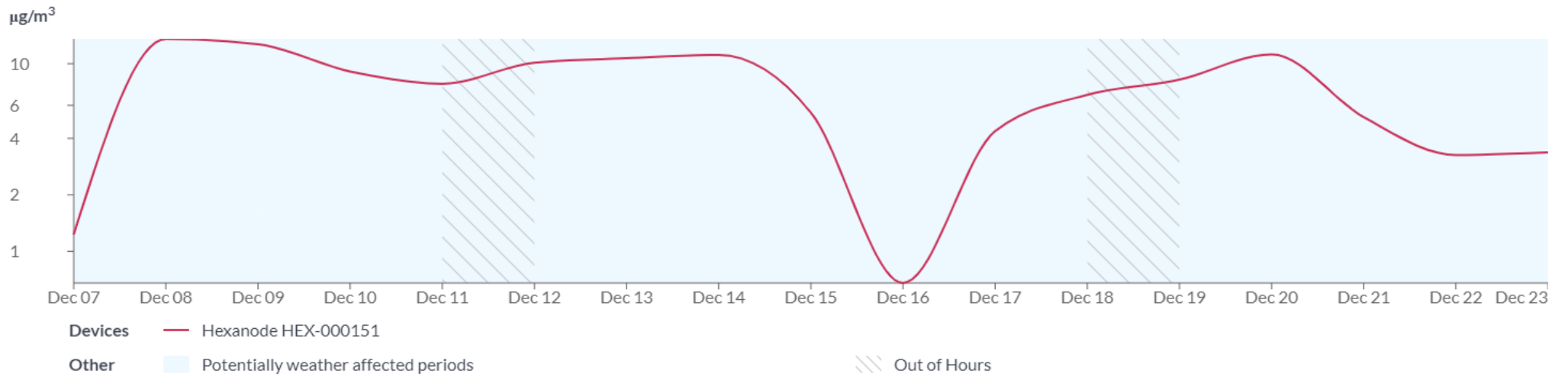
Dec 7 2022 - Dec 23 2022



## Daily average

PM2.5

Dec 7 2022 - Dec 23 2022



PM10

Dec 7 2022 - Dec 23 2022

