# NOISE AND VIBRATION MONITORING REPORT MARCH 2025

LIVERPOOL HEALTH AND ACADEMIC PRECINCT - STAGE 2

LENDLEASE BUILDING PTY LTD





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### 1 INTRODUCTION

Property Risk Australia Pty Ltd (PRA) conducted construction noise and vibration monitoring on behalf of **Lendlease Construction Pty Ltd** (Lendlease, the 'Client') for the redevelopment works at Liverpool Health and Academic Precinct, Goulburn Street, Liverpool NSW 2170 (hereafter the 'site') throughout the duration of main stage 1 and 2 works. The Site and redevelopment locations are provided in **Appendix A – Figures 1 and 2**.

### 1.1 Scope

The objective of the noise and vibration monitoring is to assist with management during the works by providing ongoing unattended noise monitoring to assess compliance against the project Noise Management Levels (NMLs) and real-time vibration monitoring. Noise and vibration alerts are provided to the project team based on real time monitoring at sensitive receivers located at the site's periphery. This report will provide guidance to Lendlease regarding the noise and vibration levels present at Liverpool Hospital during March 2025.

### 2 GUIDELINES AND STANDARDS

The primary guidelines, specifications, and policy documents relevant to the monitoring include, but are not limited to:

- o Turner (2020). Noise and Vibration in the Vivarium: Recommendations for Developing a Measurement Plan. J Am Assoc Lab Anim Sci. 2020 Nov 1;59(6):665-672.
- o NSW DECC. (2009). Interim Construction Noise Guideline (ICNG).
- o NSW EPA. (2020). Draft Construction Noise Guideline (DCNG).
- o NSW DEC. (2006). Assessing Vibration: A Technical Guideline.
- o Australian Standard. (2010). AS 2436:2010: Acoustics Guide to Noise Control on Construction, Maintenance and Demolition Sites.
- o British Standards Institute. (2008).BS 6472-1:2008. *Guide to evaluation of human exposure to vibration in buildings, Part 1: Vibration sources other than blasting.*<sup>1</sup>
- o British Standards Institute. (1993). BS 7385-2:1993. *Evaluation and measurement of vibration in buildings Guide to damage levels from groundborne vibration.*
- o British Standards Institute. (2014). BS 5228-2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites Part 2: Vibration.
- DIN Standards Committee Building and Civil Engineering (DIN). (2016). *DIN 4150-3:2016-12. Vibration in buildings Part 3: Effects on structures.*

### 3 PROJECT OVERVIEW

### 3.1 Site Location and Existing Environment

Liverpool Hospital, located 26 kilometres south-west of the Sydney CBD, is part of the South-Western Sydney Local Health District. It is bound by Goulburn Street to the West, Elizabeth Street to the South and Campbell Street to the North and is bisected by the Sydney Trains Main South Railway Line.

The area immediately surrounding the hospital features a variety of usages including Bigge Park to the south, educational institutions such as Liverpool Boys and Girls High Schools to the North and TAFE

 $<sup>^{\</sup>rm 1}$  Together with BS 6472-2:2008 this part of BS 6472 supersedes BS 6472:1992, which is withdrawn.



NSW to the south. A variety of mixed use (MU1) and high-density residential properties (R4) are located to the west, whilst general industrial (E4) activity dominates the east.

### The Sites regional setting and stages of work are presented in **Appendix A – Figure 1**.

### **3.2** Summary of Works

The Liverpool Health and Academic Precinct (LHAP) is a significant \$830 million redevelopment of Liverpool Hospital, designed to enhance healthcare services and medical research capabilities. The project includes an integrated cancer centre, critical care services, maternity and paediatric facilities, an aged care and rehabilitation centre, ambulatory care services, and a new multi-storey car park.

The redevelopment is being delivered in two stages. Stage 1, now complete, included upgrades to the hospital's main entrance, maternity services, outpatient and support services, a new pathology department, and an expansion of the Emergency Department, which is set to open in 2025. The multi-storey car park was completed in 2022.

Stage 2, currently underway and scheduled for completion in 2027, includes the construction of a new Integrated Services Building (ISB), a wellness centre, and a loading dock. Refurbishment works across various hospital departments, including critical care areas, are also being undertaken to modernise facilities and improve patient care.

### 4 CONSTRUCTION NOISE MONITORING

### 4.1 Unattended Noise Monitoring

Four (4) NATA-calibrated unattended noise monitoring systems were deployed at Liverpool Hospital to conduct noise monitoring throughout March 2025. Monitoring was conducted using one (1) ARL NGARA 4G and three (3) Svan SV307 Class 1 sound level meters (SLMs). Each SLM was field calibrated prior to monitoring using a Pulsar Model 105 field calibrator for the ARL NGARA 4G and a Svan SV33B for the Svan SV307. Monitoring was continuous, covering day, evening, and night periods, with a trigger set at the project noise management levels to capture exceedances and alert the Client via email. The relevant NATA calibration certificates are provided in **Appendix D**.

The monitors were positioned at locations representative of ambient noise levels experienced by hospital occupants and neighbouring sensitive receivers, in general accordance with the DCNG (NSW EPA, 2020), ICNG (DECC, 2009), and AS 2436:2010. All noise loggers were securely mounted, with microphones positioned 1.5 m above ground level using windshields. Where possible, loggers were placed at least 3 m away from reflective surfaces (e.g., walls) to minimise interference.

**Residential Receiver (N1)-** A Svan SV307 SLM was installed on 14 January 2025 at 55-59 Goulburn Street, Liverpool, NSW 2170, positioned on the Level 1 balcony, approximately 10 m from the nearest residence. The monitor was set up 1.5 m above ground level with a direct line of sight to the LHAP construction site.

**Oncology Storeroom (N2)-** A noise monitor was installed within Storeroom G6192 of the Oncology Ward on 14 January 2025. This location was selected due to its proximity to the demolition cutline for Stage 2 main works, ensuring the most conservative vibration data is captured to protect sensitive equipment.

**Ingham Institute for Applied Medical Research (N3)-** A Svan SV307 SLM was installed within the Archive Storeroom of the Ingham Institute for Applied Medical Research on 14 January 2025. This location was selected to monitor construction noise impacts on the Animal Research Laboratory,



minimising potential disturbance to lab animals. Research indicates that construction noise and vibration can reduce breeding success and cause behavioural disturbances. Typical laboratory conditions should not exceed 55 dB(A), with rodents generally comfortable at levels below 50 dB(A). The storeroom was chosen as it is relatively unoccupied, reducing background noise from human activities. The Highly Noise Affected level for the N3 location has been set at 70 dB(A). Research on the impacts of noise and vibration on laboratory vivariums suggests that laboratory mice may be disturbed by sound levels exceeding 45 dB(A), with chronic noise exposure above 70 dB(A) potentially leading to negative effects on laboratory animals, including disruptions to sleep and impacts on the cardiovascular system (Turner 2020).

**Audiology Storeroom (N4)-** The ARL NGARA 4G SLM was installed within the Audiology storeroom, adjacent to the hearing assessment booths, in June 2023 during Stage 1 main works. This location was selected to minimise noise from office activities (e.g., staff talking) and better represent construction noise impacts on hearing assessments. The noise logger is positioned 1.5 m from the hearing assessment booth, separated by a sound-isolating wall, and approximately 2 m above ground level due to space constraints.

### 4.2 Noise Management Levels

The ICNG specifies Noise Management Levels (NMLs) that guide the need to apply work practices to minimise noise impacts. The ICGN recommends the following actions upon exceedance of NMLs.

### Exceedance of the Noise Affected NML:

The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

### Exceedance of the Highly Noise Affected NML:

The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:

- o times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences
- *if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times*

Background noise monitoring was undertaken by Acoustic Logic in June 2018 (EIS ref.: *Appendix A SSD Acoustic Assessment 4\_kh*) to establish rating background levels (RBLs) for the site. The RBLs were used to calculate the Noise Management Levels (NMLs) and Highly Affected Noise Management Levels (HNML) for the Site (**Table 1**) in accordance with the *ICNG* (DECC, 2009) and most relevant sources (Taylor, 2020).



<b>Table 1: Unattended Noise</b>	Monitor	Locations and	Noise N	Management Levels
		Locations and	1101501	

		Noise Man	Highly Affected Noise		
Monitor Number	Receiver	Day (7am–6pm)	Evening (6pm-10pm)	Night (10pm–7am)	Management Levels, L <sub>Aeq, 15min</sub> (dB)
N1	External, 55-59 Goulburn Street, residential balcony	52	47	44	75
N2	Internal, Oncology Department, Ground Level, Storeroom - G6192		75		
N3	Internal, Ingham Institute for Applied Medical Research Building, Basement, Archive Storeroom, southern wall		70 (Taylor, 2020)		
N4	Internal, Level 1, Audiology Department, storeroom	45			75

### 4.3 Unattended Noise Monitoring Results

**Table 2** contains a summary of the noise data by comparing the percentage of noise readings during construction that exceed the NMLs by various dB ranges in March 2025. **Appendix B** contain time history charts for noise results at each noise logging location during the monthly reporting period.

Criterion	Exceedance Category	N1: Residential Receiver	N2: Oncology Storeroom	N3: Ingham Institute	N4: Audiology
	≤0 dB(A)	64.71%	64.71%	64.71%	96.47%
	>0 and ≤5 dB(A)	3.06%	0.03%	34.69%	2.69%
Noise Affected NML,	>5 and ≤10 dB(A)	27.46%	30.45%	0.54%	0.44%
LAeq, 15min [dB]	>10 and ≤15 dB(A)	3.63%	3.73%	0.07%	0.07%
	>15 and ≤20 dB(A)	0.77%	0.47%	0.00%	0.00%
	>20 dB(A)	0.37%	0.61%	0.00%	0.34%
Highly Noise Affected NML, LAeq, 15min [dB]	Exceedance >75 dB(A)	0.20%	0.07%	0.00%	0.00%

 Table 2: Summary of Unattended Noise Monitoring During Construction Hours



### 4.4 Noise Monitoring Discussion

During the monthly reporting period, noise levels at all monitoring locations remained mostly below the Highly Affected Noise Management Level (NML) of 75 dB(A), except for two (2) locations:

- o Goulburn Street (6 events):
  - o Monday, 3 March @ 12:15 hrs 77.2 dB(A)
  - o Monday, 3 March @ 12:30 hrs 77.1 dB(A)
  - o Monday, 3 March @ 15:15 hrs 79.9 dB(A)
  - o Monday, 3 March @ 15:30 hrs 79.5 dB(A)
  - o Tuesday, 4 March @ 10:15 hrs 76.5 dB(A)
  - o Friday, 14 March @ 15:30 hrs 77.1 dB(A)
- o Oncology Storeroom (2 events):
  - o Wednesday, 26 March @ 14:00 hrs 75.4 dB(A)
  - o Wednesday, 26 March @ 14:15 hrs 76.3 dB(A)

Noise levels at N1 (a residential property opposite the Site on Goulburn Road) exceeded the Highly Affected NML on six (6) occasions during the reporting period, accounting for 0.20% of the approved site operational hours in March 2025. However, noise levels remained below the Noise Affected NML (<0 dB(A)) for approximately 64.71% of the Site's operating hours. This suggests that external noise sources—most notably road traffic on Goulburn Road—significantly influenced recorded noise levels and likely contributed to many of the NML exceedances observed during operational hours. Notably, noise levels did not exceed the Noise Affected NML by more than 10 dB for 95.23% of the time.

At N2 (Oncology Storeroom), noise levels remained below the Noise Affected NML for 64.31% of the Site's operating hours. Exceedances above the NML by more than 10 dB were minimal, occurring 4.81% of the time. Typical noise levels at this location appear to be around 55 dB, with exceedances above the 45 dB NML most likely attributed to human activity adjacent to the storeroom.

At N3 (Ingham Institute), noise levels remained below the Noise Affected NML for 64.71% of the Site's operating hours, with no exceedances of the Highly Affected NML recorded during the reporting period. Noise levels were minimal, with exceedances above the NML by more than 5 dB occurring only 0.61% of the time. Typical noise levels at the Ingham Institute were around 50 dB, which aligns with background noise levels and human activity near the monitoring location, likely influencing the recorded measurements.

At N4 (Audiology Storeroom), noise levels remained below the Noise Affected NML for 96.47% of the site's operating hours. There were no exceedances of the Highly Affected NML at any time during the reporting period. Noise levels exceeded the NML by more than 5 dB only 0.85% of the time. The rare instances where NML exceedances of 15–20 dB was recorded (0.34% of the reporting period) were likely caused by staff accessing the storeroom rather than construction activities.

The 45 dB LAeq, 15min NML is considered a low noise threshold. For context, AS 2822-1985 Acoustics – Methods of Assessing and Predicting Speech Privacy and Speech Intelligibility suggests that 45 dB is equivalent to conversational speech at 4 m. Based on this, speech within or near the Ingham Institute, Oncology, and Audiology monitoring locations could have contributed to the reported NML exceedances.



### 5 VIBRATION MONITORING

### 5.1 Vibration Criteria

Condition C20 of the Planning Approval (SSD 10389) states that vibration caused by construction must comply with the criteria set out in the latest version of DIN 4150-3:2016-12 – Vibration in Buildings – Part 3: Effects on Structures, published by the German DIN Standards Committee for Building and Civil Engineering (2016). This standard provides recommendations for vibration levels below which cosmetic or structural damage is unlikely. The vibration criteria are expressed in terms of Peak Particle Velocity (PPV) in millimetres per second (mm/s) across various frequency ranges for different types of building construction.

Criteria for assessing human response to vibration are specified in the NSW DEC (now NSW EPA) guidelines:

 Assessing Vibration: A Technical Guideline (2006), based on British Standard BS 6472:1992 – Evaluation of Human Exposure to Vibration in Buildings (1-80 Hz) (currently superseded by BS 6472-1:2008).

This standard evaluates the probability of adverse human responses to vibration in different building types using Vibration Dose Value (VDV). The VDV is a root-mean-quad average of frequency-weighted vibration acceleration measured on the floors of a building. Table C1.1 in Appendix C of the Assessing Vibration: A Technical Guideline (DEC, 2006) presents vibration criteria for exposure to continuous and impulsive vibration across different units.

For construction-related vibration, it is generally more appropriate to assess potential impacts using PPV, as this parameter is more commonly measured in practice and aligns with the primary concern of potential building damage. **Table 3** presents the vibration criteria adopted for this project, with guideline values for PPV derived from Appendix C of the DEC (2006) guidelines.

### 5.1.1 Hospital-Specific Vibration Considerations

According to the UK Hospitals Guide, different rooms and facilities within a hospital have varying sensitivity to vibration due to their use case and function. To account for this, a multiplication factor can be applied based on room type:

- o Operating theatres and medical imaging rooms: Response factor 1 (most sensitive)
- o Intensive care wards: Response factor 2
- o Offices: Response factor 4 (least sensitive)

### Table 3: Human Response to Vibration in Buildings Criteria

Place	Period	Preferred Value, PPV (mm/s)	Maximum Value, PPV (mm/s)
Critical Working Areas (e.g., hospital operating theatres, precision laboratories)	Day or Night- Time	0.14	0.28
Residences	Day Time	0.28	0.56
Residences	Night-Time	0.20	0.40
Offices	Day or Night- Time	0.56	1.1



For additional context, **Table 4** reproduces suggestions of expected community reactions to various levels of constriction vibration from British Standard *BS 5228-2:2009*.

Peak Vibration Level (mm/s)	Likely Stakeholder Response
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

### Table 4: Guidance on the Effects of Vibration Levels (BS 5228-2:2009, Annex B)

### 5.1.2 Structure Vibration Damage Criteria

The German Standard DIN 4150-3 provides guidelines for acceptable levels of vibration velocity in building foundations to assess the effects of vibration on structures. The standard outlines maximum acceptable velocity values at the foundation and at the highest floor level of various building types to prevent structural damage.

Table 5 presents the peak particle velocity (PPV), defined as the maximum absolute value of velocity signals for the three orthogonal axis components (x, y, and z axes). This is measured as:

- o The maximum value of any of the three orthogonal component particle velocities when measured at the foundation, and
- o The maximum levels measured in the x- and y-horizontal directions in the plane of the uppermost floor.

Since all vibration loggers installed on-site were positioned at foundation levels, we will consider the maximum value of all three orthogonal axes in our assessment.

It is noted that if measured vibration levels remain below the guidelines listed in **Table 3**, structural damage that reduces the serviceability of the building is unlikely to occur. If structural damage is observed despite compliance with these guidelines, it is assumed that other activities or sources may be responsible.

Furthermore, the DIN 4150-3 guidelines state the following regarding the limits presented in Table 1 of the standard:

 "Exceeding the guideline value does not necessarily lead to damage. Should they be exceeded, however, further investigations may be necessary, such as determining and evaluating the stresses as detailed in Sections 4.3 and 4.4."



### **Table 5 Structural Building Vibration Criteria**

		Peak Particle Velocity (mm/s)				
	Type of Structure	At Found	dation at a F	Plane of Floor of Uppermost Storey		
		<10 HZ	10 Hz to 50 Hz	50 Hz to 100 Hz	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	5	5 to 15	15 to 20	15	
3	Structures that because of their sensitivity to vibration, do not correspond to those listed in Lines 1 and 2 and have intrinsic values (e.g. buildings that are under preservation order)	3	3 to 8	8 to 10	8	

The most conservative and sensitive **Type 3** criteria will be adopted for each vibration logger Site location.

### 5.2 Unattended Vibration Monitoring

Three (3) NATA-calibrated unattended vibration monitors were deployed to monitor projectassociated vibrations during the Liverpool Health and Academic Precinct Stage 2 main works. Vibration monitoring was conducted using a Svantek SV 803, which records Peak Particle Velocity (PPV) over time. The NATA-accredited calibration certificate is provided in **Appendix C**.

### 5.2.1 Sensitive Receiver Locations

Two (2) sensitive receiver locations—the Oncology Bunker and the Ingham Institute—were selected for monitoring to ensure protection against sensitive equipment. Given the nature of these locations, we have adopted the critical working area criteria (e.g. hospital operating theatres, precision laboratories) as outlined in **Table 3**.

- The Oncology vibration monitor was installed vertically within the Oncology Ward, inside a fire hose reel cupboard, adjacent to Treatment Room 7.
- o The Ingham Institute vibration monitor was installed vertically within the internal southern fire stair, at the basement level of the Ingham Institute for Applied Medical Research, located at 1 Campbell St, Liverpool, NSW 2170.



### 5.2.2 General Hospital Location

One (1) additional vibration monitor was installed at the Integrated Services Building (ISB) location, where the Site-adopted criteria classify it as an "Offices" location. This corresponds to a response factor of four (4), as referenced in **Table 3**.

 The monitor was installed horizontally to the floor surface adjacent to the Stage 2 main works demolition cut line, making it representative of vibration impacts on offices and general hospital rooms. Specifically, the monitor was placed near the Lift F demolition cut line, within the northern redundant toilet location.

### 5.3 Vibration Results

The tables below provide a summary of the measured maximum vibration levels, recorded as Peak Particle Velocity (PPV) in mm/s, during the March 2025 assessment period. These results have been assessed against the Site-adopted criteria for:

- o Human Response to Vibration
- o Structural Building Vibration



PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Vibration Monitoring Summary Chart -Ingham Institute



Date	Daily SOH Exceedance >0.28 PPV [%]	Daily PPV Max [mm/s]	PPV Max Recorded Time	Max Orthogonal Direction	Human Vibration Compliance	Structural Building Vibration Compliance
Saturday, 1 March 2025	0.00	0.04	12:16:58 PM	Y	Compliant	Compliant
Monday, 3 March 2025	0.00	0.19	8:44:16 AM	Y	Compliant	Compliant
Tuesday, 4 March 2025	0.00	0.18	1:12:03 PM	Y	Compliant	Compliant
Wednesday, 5 March 2025	0.00	0.08	1:12:25 PM	Y	Compliant	Compliant
Thursday, 6 March 2025	0.00	0.18	8:03:54 AM	Y	Compliant	Compliant
Friday, 7 March 2025	0.00	0.12	11:25:27 AM	Х	Compliant	Compliant
Saturday, 8 March 2025	0.00	0.05	10:22:27 AM	Y	Compliant	Compliant
Monday, 10 March 2025	0.00	0.39	11:12:46 AM	Y	Non-Compliant	Compliant
Tuesday, 11 March 2025	0.00	0.11	10:25:58 AM	Y	Compliant	Compliant
Wednesday, 12 March 2025	0.00	0.41	9:49:39 AM	Y	Non-Compliant	Compliant
Thursday, 13 March 2025	0.00	0.09	9:58:46 AM	Y	Compliant	Compliant
Friday, 14 March 2025	0.00	0.15	7:18:39 AM	Y	Compliant	Compliant
Saturday, 15 March 2025	0.00	0.05	12:56:47 PM	Y	Compliant	Compliant
Monday, 17 March 2025	0.00	0.46	1:23:56 PM	Y	Non-Compliant	Compliant
Tuesday, 18 March 2025	0.00	0.76	3:44:46 PM	Y	Non-Compliant	Compliant
Wednesday, 19 March 2025	0.00	0.50	11:06:05 AM	Y	Non-Compliant	Compliant
Thursday, 20 March 2025	0.00	0.17	4:06:21 PM	Y	Compliant	Compliant
Friday, 21 March 2025	0.00	0.11	11:16:22 AM	Y	Compliant	Compliant
Saturday, 22 March 2025	0.00	0.06	12:08:21 PM	Y	Compliant	Compliant
Monday, 24 March 2025	0.00	0.10	10:16:37 AM	Y	Compliant	Compliant
Friday, 28 March 2025	0.00	0.11	4:43:52 PM	Y	Compliant	Compliant
Saturday, 29 March 2025	0.00	0.14	11:57:45 AM	Y	Compliant	Compliant
Monday, 31 March 2025	0.00	0.15	8:02:50 AM	Y	Compliant	Compliant



PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Monthly Vibration Monitoring Summary Chart -Integrated Service Building



Date	Daily SOH Exceedance >1.1 PPV [%]	Daily PPV Max [mm/s]	PPV Max Recorded Time	Max Orthogonal Direction	Human Vibration Compliance	Structural Building Vibration Compliance
Saturday, 1 March 2025	0.00	0.31	10:05:27 AM	Х	Compliant	Compliant
Monday, 3 March 2025	0.00	0.57	8:29:14 AM	Х	Compliant	Compliant
Tuesday, 4 March 2025	0.00	0.49	11:53:13 AM	Z	Compliant	Compliant
Wednesday, 5 March 2025	0.00	0.16	9:06:14 AM	Z	Compliant	Compliant
Thursday, 6 March 2025	0.00	0.28	2:33:08 PM	Z	Compliant	Compliant
Friday, 7 March 2025	0.00	0.27	2:47:00 PM	Z	Compliant	Compliant
Saturday, 8 March 2025	0.00	0.16	8:42:28 AM	Z	Compliant	Compliant
Monday, 10 March 2025	0.00	0.12	10:09:51 AM	Z	Compliant	Compliant
Tuesday, 11 March 2025	0.00	0.18	11:51:51 AM	Z	Compliant	Compliant
Wednesday, 12 March 2025	0.00	0.76	9:21:53 AM	Z	Compliant	Compliant
Thursday, 13 March 2025	0.00	0.55	9:19:59 AM	Z	Compliant	Compliant
Friday, 14 March 2025	0.00	0.37	12:03:28 PM	Z	Compliant	Compliant
Saturday, 15 March 2025	0.00	0.13	8:28:04 AM	Z	Compliant	Compliant
Monday, 17 March 2025	0.00	0.34	1:13:21 PM	Z	Compliant	Compliant
Tuesday, 18 March 2025	0.00	0.18	2:08:24 PM	Z	Compliant	Compliant
Wednesday, 19 March 2025	0.00	0.17	2:15:17 PM	Z	Compliant	Compliant
Thursday, 20 March 2025	0.00	0.62	7:15:54 AM	Z	Compliant	Compliant
Friday, 21 March 2025	0.00	0.65	9:31:40 AM	Z	Compliant	Compliant
Saturday, 22 March 2025	0.00	0.13	11:52:01 AM	Z	Compliant	Compliant
Monday, 24 March 2025	0.00	0.26	12:46:15 PM	Z	Compliant	Compliant
Tuesday, 25 March 2025	0.00	0.36	11:07:33 AM	Z	Compliant	Compliant
Wednesday, 26 March 2025	0.00	0.29	9:15:26 AM	Z	Compliant	Compliant
Thursday, 27 March 2025	0.00	0.70	7:10:23 AM	Z	Compliant	Compliant
Friday, 28 March 2025	0.00	0.10	10:38:38 AM	Z	Compliant	Compliant
Saturday, 29 March 2025	0.00	0.13	11:24:49 AM	Z	Compliant	Compliant
Monday, 31 March 2025	0.00	0.52	2:44:24 PM	Z	Compliant	Compliant



PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Vibration Monitoring Summary Chart -Oncology Bunker



Date	Daily SOH Exceedance >0.28 PPV [%]	Daily PPV Max [mm/s]	PPV Max Recorded Time	Max Orthogonal Direction	Human Vibration Compliance	Structural Building Vibration Compliance
Tuesday, 4 March 2025	0.00	0.25	12:39:34 PM	Z	Compliant	Compliant
Wednesday, 5 March 2025	0.00	0.19	3:29:00 PM	Х	Compliant	Compliant
Thursday, 6 March 2025	0.00	0.10	5:14:14 PM	Z	Compliant	Compliant
Friday, 7 March 2025	0.00	0.10	1:52:25 PM	Х	Compliant	Compliant
Saturday, 8 March 2025	0.00	0.09	10:10:56 AM	Z	Compliant	Compliant
Monday, 10 March 2025	0.00	0.42	2:11:35 PM	Z	Non-Compliant	Compliant
Tuesday, 11 March 2025	0.00	0.10	8:30:19 AM	Х	Compliant	Compliant
Wednesday, 12 March 2025	0.00	0.15	9:23:31 AM	Z	Compliant	Compliant
Thursday, 13 March 2025	0.00	0.26	2:09:30 PM	Y	Compliant	Compliant
Friday, 14 March 2025	0.00	0.25	9:08:52 AM	Х	Compliant	Compliant
Saturday, 15 March 2025	0.00	0.14	10:53:52 AM	Z	Compliant	Compliant
Monday, 17 March 2025	0.00	0.27	7:11:20 AM	Z	Compliant	Compliant
Tuesday, 18 March 2025	0.00	0.14	10:50:14 AM	Z	Compliant	Compliant
Wednesday, 19 March 2025	0.00	0.23	1:12:04 PM	Z	Compliant	Compliant
Thursday, 20 March 2025	0.00	0.13	10:04:06 AM	Х	Compliant	Compliant
Friday, 21 March 2025	0.00	0.38	2:57:12 PM	Z	Non-Compliant	Compliant
Saturday, 22 March 2025	0.00	0.25	10:17:00 AM	Z	Compliant	Compliant
Monday, 24 March 2025	0.00	0.18	12:03:35 PM	Z	Compliant	Compliant
Tuesday, 25 March 2025	0.00	0.18	12:07:24 PM	Z	Compliant	Compliant
Wednesday, 26 March 2025	0.00	0.18	3:20:31 PM	Х	Compliant	Compliant
Thursday, 27 March 2025	0.00	0.85	3:31:59 PM	Х	Non-Compliant	Compliant
Friday, 28 March 2025	0.00	0.46	1:47:54 PM	Y	Non-Compliant	Compliant
Saturday, 29 March 2025	0.02	0.96	10:57:14 AM	Y	Non-Compliant	Compliant
Monday, 31 March 2025	0.00	0.20	9:38:51 AM	Z	Compliant	Compliant



### 5.4 Vibration Discussion

### Ingham Institute (Internal):

Vibration levels were generally higher, with five (5) non-compliant days recorded where vibration exceeded the site-adopted human comfort criteria during the monitoring period. These exceedances occurred on:

- Monday, 10 March 2025 measured at PPV 0.39 mm/s measured at 11:12 hrs, on the y -axis; and
- o Wednesday, 12 March 2025 measured at PPV 0.41 mm/s measured at 09:49 hrs, on the y axis
- Monday, 17 March 2025 measured at PPV 0.46 mm/s measured at 13:23 hrs, on the y -axis; and
- o Tuesday, 18 March 2025 measured at PPV 0.76 mm/s measured at 15:44 hrs, on the y -axis
- Wednesday, 19 March 2025 measured at PPV 0.50 mm/s measured at 11:06 hrs, on the y axis

It was noted that unrelated works, not part of the LHAP Stage 2 main works, were occurring within the Ingham Institute Building at the times these exceedances were recorded.

### **ISB Building (Internal):**

Vibration levels remained within the Site-adopted criteria throughout the monitoring period.

### **Oncology Bunker (Internal):**

Vibration levels were generally within the site-adopted criteria, except for five (5) exceedance events:

- Monday, 10 March 2025 measured at PPV 0.42 mm/s measured at 14:11 hrs, on the z -axis; and
- o Friday, 21 March 2025 measured at PPV 0.38 mm/s measured at 14:57 hrs, on the z -axis
- o Thursday, 27 March 2025 measured at PPV 0.85 mm/s measured at 15:31 hrs, on the x -axis; and
- o Friday, 28 March 2025 measured at PPV 0.46 mm/s measured at 13:47 hrs, on the y -axis
- o Saturday, 29 March 2025 measured at PPV 0.96 mm/s measured at 10:57 hrs, on the y -axis

These exceedances coincided with the commencement of hard demolition works in the final week of March 2025, occurring adjacent to the monitoring location within the Oncology/Radiology wards.

It should be noted that structural vibration limits were not exceeded at any time during the monitoring period. Each recorded exceedance was related to human comfort criteria, with vibration levels marginally surpassing the threshold of 0.28 mm/s. These values align with expectations for office environments, and no complaints were received regarding the events.

Additionally, hard demolition works were ongoing during the morning period.

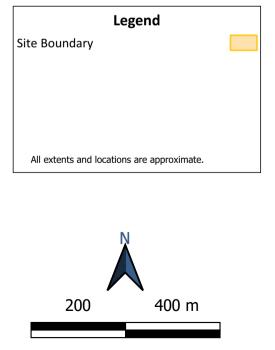
Page 12

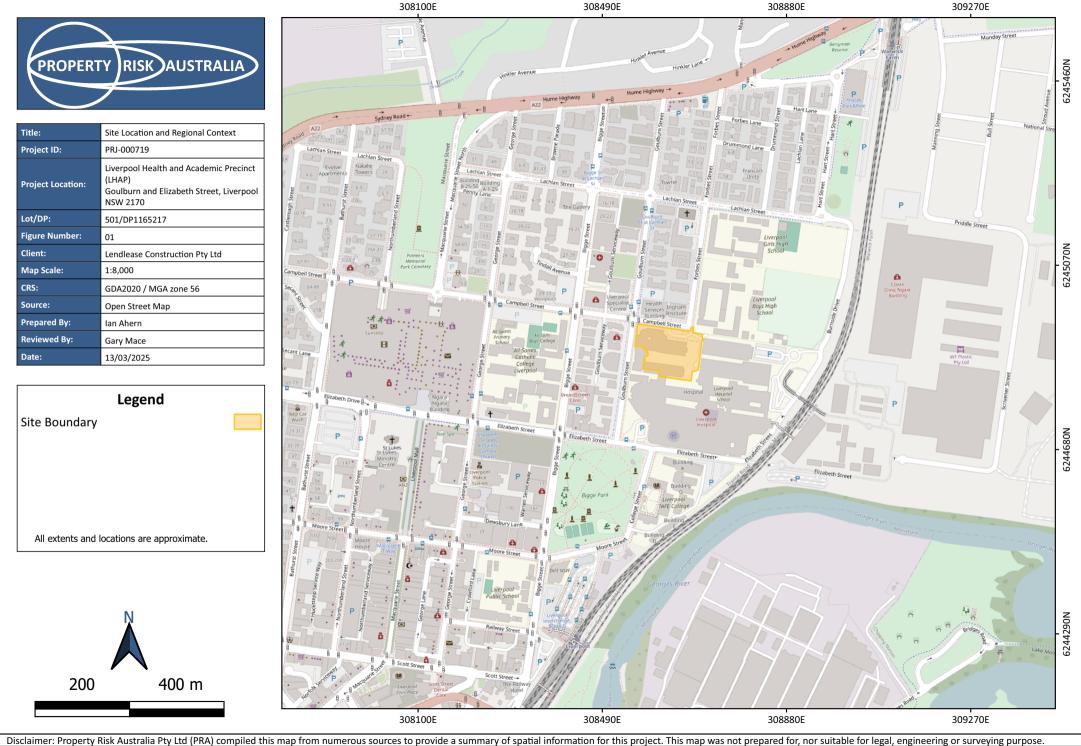


APPENDIX A FIGURES



Title:	Site Location and Regional Context	
Project ID:	PRJ-000719	
Project Location:	Liverpool Health and Academic Precinct (LHAP) Goulburn and Elizabeth Street, Liverpool NSW 2170	
Lot/DP:	501/DP1165217	
Figure Number:	01	
Client:	Lendlease Construction Pty Ltd	
Map Scale:	1:8,000	
CRS:	GDA2020 / MGA zone 56	
Source:	Open Street Map	
Prepared By:	lan Ahern	
Reviewed By:	Gary Mace	
Date:	13/03/2025	



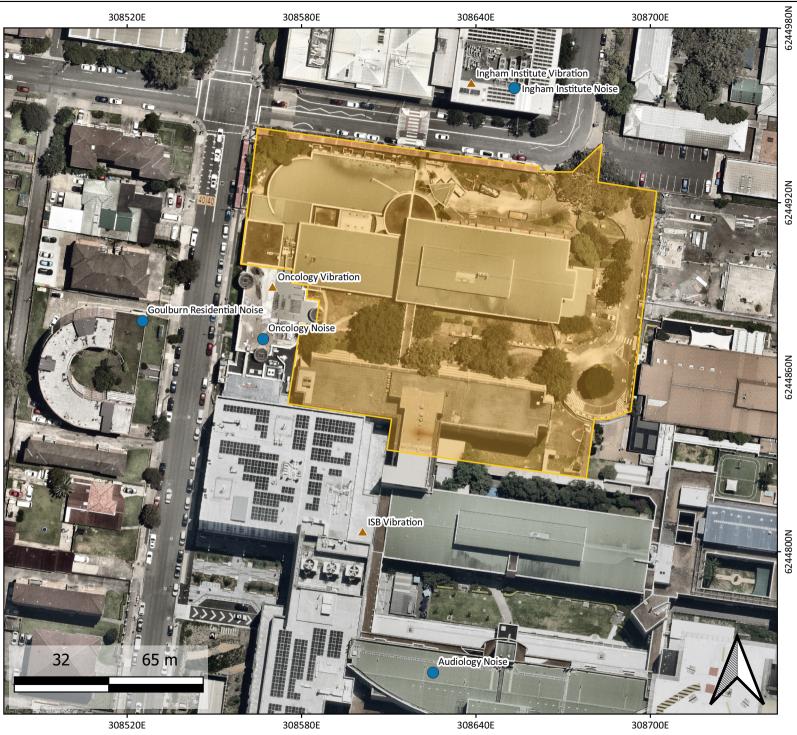




Title:	LHAP Stage 2 Noise and Vibration Monitoring	
Project ID:	PRJ-000719	
Project Location:	Goulburn and Elizabeth Street, Liverpool NSW 2170	
Figure Number:	02	
Client:	Lendlease Construction Pty Ltd	
Map Scale:	1:1,300	
CRS:	GDA2020 / MGA zone 56	
Source:	Nearmap (28 Jan 2025)	
Prepared By:	lan Ahern	
Reviewed By:	Gary Mace	
Date:	13/03/2025	
Revision:	V1	

Legend	
Site Boundary	
Environmental Monitoring Locations Vibration Monitor	
Noise Monitor	

All extents and locations are approximate.





# APPENDIX B NOISE CHARTS



**PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Noise Monitoring Summary Chart - Residential (Goulburn Street)** 

<b>Overall Project Perf</b>	ormance within a	approved operating hours	Monthly Performance
Highly Noise Affecte	ed NML - LAeq, 1	5min [dB]	Highly Noise Affected N
Category	Percentage [%]		Category Per
Non-exceedance	99.82		Non-exceedance
Exceedance	0.18		Exceedance
Noise Affected NML	LAeq, 15min [d	IB]	Noise Affected NML - LA
Category	Percentage [%]		Category Per
≤0 dB	63.95		≤0 dB
>0 and ≤5 dB	3.33		>0 and ≤5 dB
>5 and ≤10 dB	28.15		>5 and ≤10 dB
>10 and ≤15 dB	3.23		>10 and ≤15 dB
>15 and ≤20 dB	0.96		>15 and ≤20 dB
>20 dB	0.38		>20 dB
		—— LAeq, 15 m	nin [dB] — NML — HNA
80 <u> </u>	1		
Noise Level LAeq, 15 min [dB]			
02 Mar		09 Mar	16 Mar Date/Time

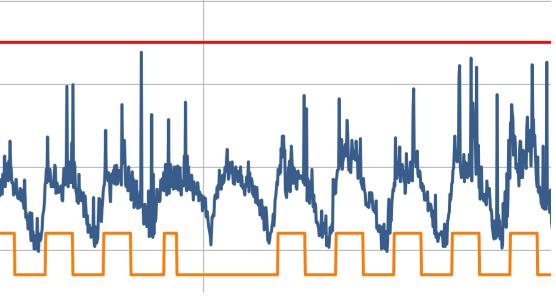


within approved operating hours

# NML - LAeq, 15min [dB] ercentage [%]

99.8 0.2 LAeq, 15min [dB] ercentage [%]  $C \downarrow 71$ 

64.71	
3.06	
27.46	
3.63	
0.77	
0.37	





**PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Noise Monitoring Summary Chart - Oncology Storeroom** 

<b>Overall Project Perf</b>	<b>formance</b> within ap	oproved ope	erating hours	<b>Monthly Perfe</b>	ormance
Highly Noise Affect	ed NML - LAeq, 15	min [dB]		Highly Noise A	Affected N
Category	Percentage [%]			Category	Per
Non-exceedance	99.9			Non-exceeda	nce
Exceedance	0.1			Exceedance	
Noise Affected NML	- LAeq, 15min [dE	3]		Noise Affected	INML – L
Category	Percentage [%]			Category	Per
≤0 dB	65.05			≤0 dB	
>0 and ≤5 dB	7.61			>0 and ≤5 dB	3
>5 and ≤10 dB	21.45			>5 and ≤10 c	IB
>10 and ≤15 dB	4.94			>10 and ≤15	dB
>15 and ≤20 dB	0.45			>15 and ≤20	dB
>20 dB	0.5			>20 dB	
			— LAeq, 15 mi	n [dB] — NML — HNA	۱.
80 <u> </u>					
[gp] mim 70					
1					
. FAec	·				
Level Level	h labor de rel		d	hell which we	Julie
Noise Level LAeq,					
02 Mar		09 Mar		16 Mar	
				Date/Time	

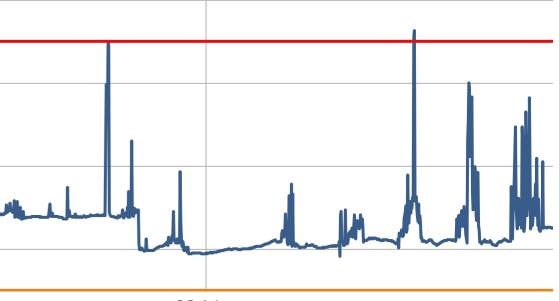


within approved operating hours

# NML - LAeq, 15min [dB] ercentage [%]

99.93 0.07 LAeq, 15min [dB] ercentage [%]

64.71	
0.03	
30.45	
3.73	
0.47	
0.61	

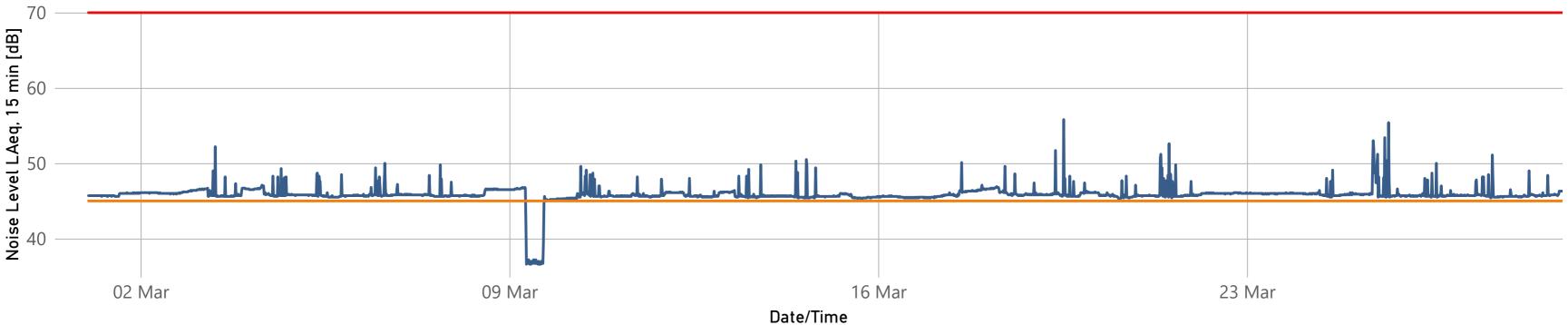




**PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Noise Monitoring Summary Chart - Ingham Institute** 

<b>Overall Project Perf</b>	<b>Overall Project Performance</b> within approved operating hours		<b>Monthly Performance</b>	
Highly Noise Affecte	ed NML - LAeq, 1	5min [dB]	Highly Noise Af	fected N
Category	Percentage [%]		Category	Per
Non-exceedance	99.89		Non-exceedan	се
Exceedance	0.11		Exceedance	
Noise Affected NML	. – LAeq, 15min [d	B]	Noise Affected	NML - L
Category	Percentage [%]		Category	Per
≤0 dB	71.58		≤0 dB	
>0 and $\leq 5 \text{ dB}$	27.13		>0 and ≤5 dB	
>5 and ≤10 dB	0.75		>5 and ≤10 dE	3
>10 and ≤15 dB	0.23		>10 and ≤15 c	B
>15 and $\leq$ 20 dB	0.14			
>20 dB	0.16			

– LAeq, 15 min [dB] — NML — HNA





within approved operating hours

# NML - LAeq, 15min [dB] ercentage [%]

100 0 LAeq, 15min [dB] ercentage [%]

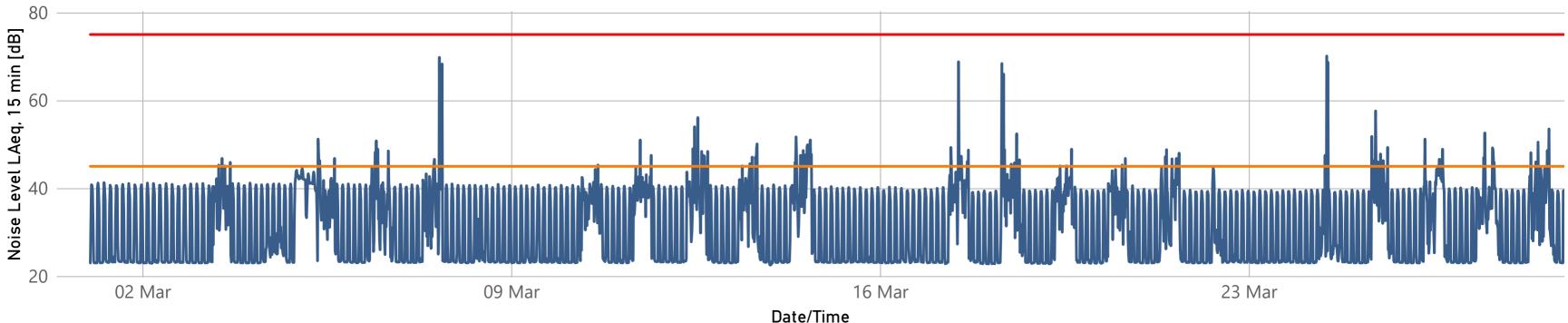
64.71	
34.69	
0.54	
0.07	



**PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Noise Monitoring Summary Chart - Audiology** 

<b>Overall Project Per</b>	formance within a	approved operating hours	<b>Monthly Performance</b>	
Highly Noise Affect	ed NML - LAeq, 1	5min [dB]	Highly Noise Af	fected N
Category	Percentage [%]		Category	Per
Non-exceedance	99.99		Non-exceedan	се
Exceedance	0.01		Exceedance	
Noise Affected NML - LAeq, 15min [dB]		Noise Affected	NML - L	
Category	Percentage [%]		Category	Per
≤0 dB	96.71		≤0 dB	
>0 and ≤5 dB	2.69		>0 and $\leq 5 \text{ dB}$	
>5 and ≤10 dB	0.43		>5 and ≤10 dE	3
>10 and ≤15 dB	0.02		>10 and ≤15 c	B
>15 and ≤20 dB	0.01		>20 dB	
>20 dB	0.14			

– LAeq, 15 min [dB] — NML — HNA





within approved operating hours

# NML - LAeq, 15min [dB] ercentage [%]

100 0 LAeq, 15min [dB] ercentage [%]

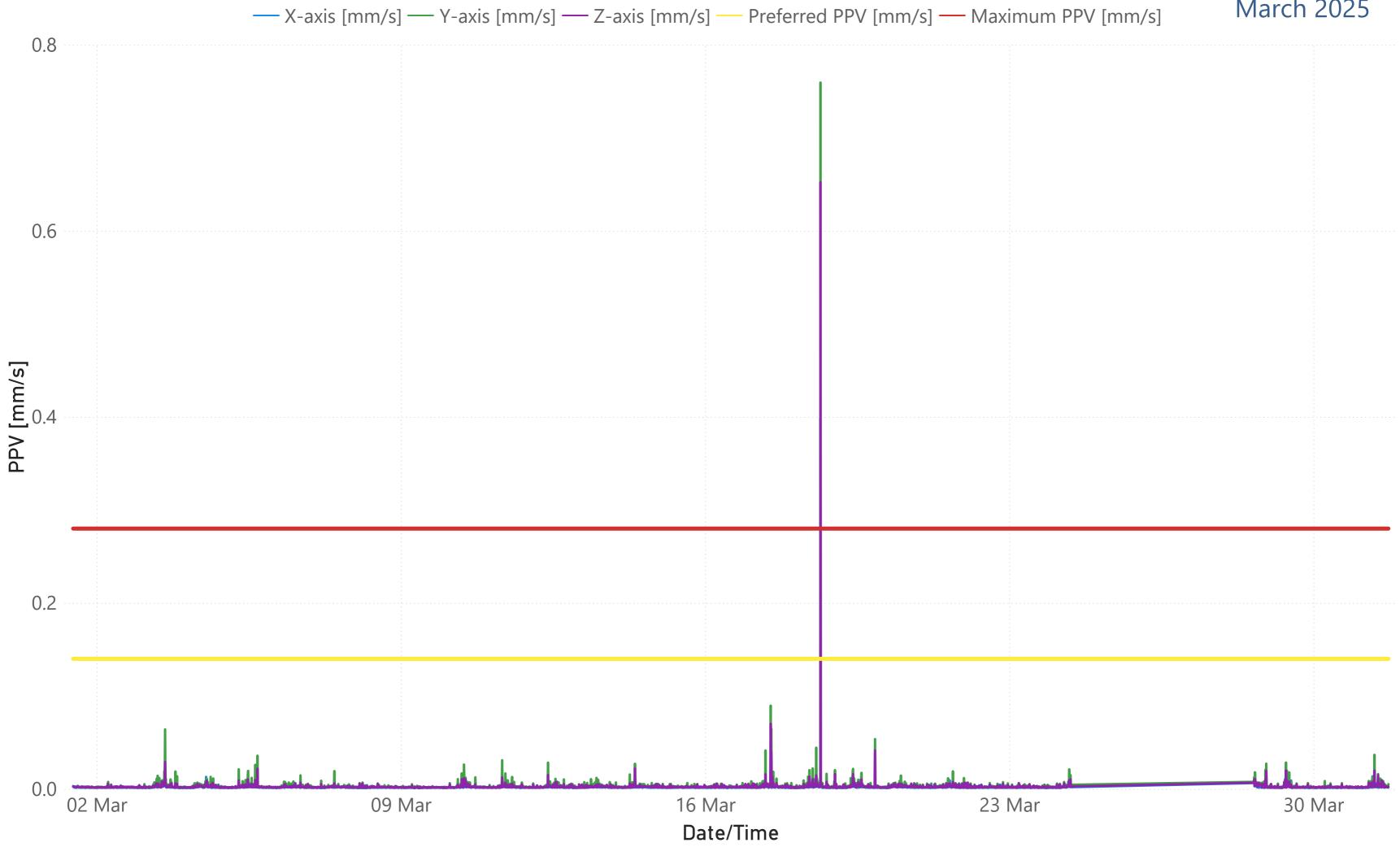
> 96.47 2.69 0.44 0.07 0.34



# APPENDIX C VIBRATION CHARTS

# **PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Vibration Monitoring Summary Chart - Ingham Institute**

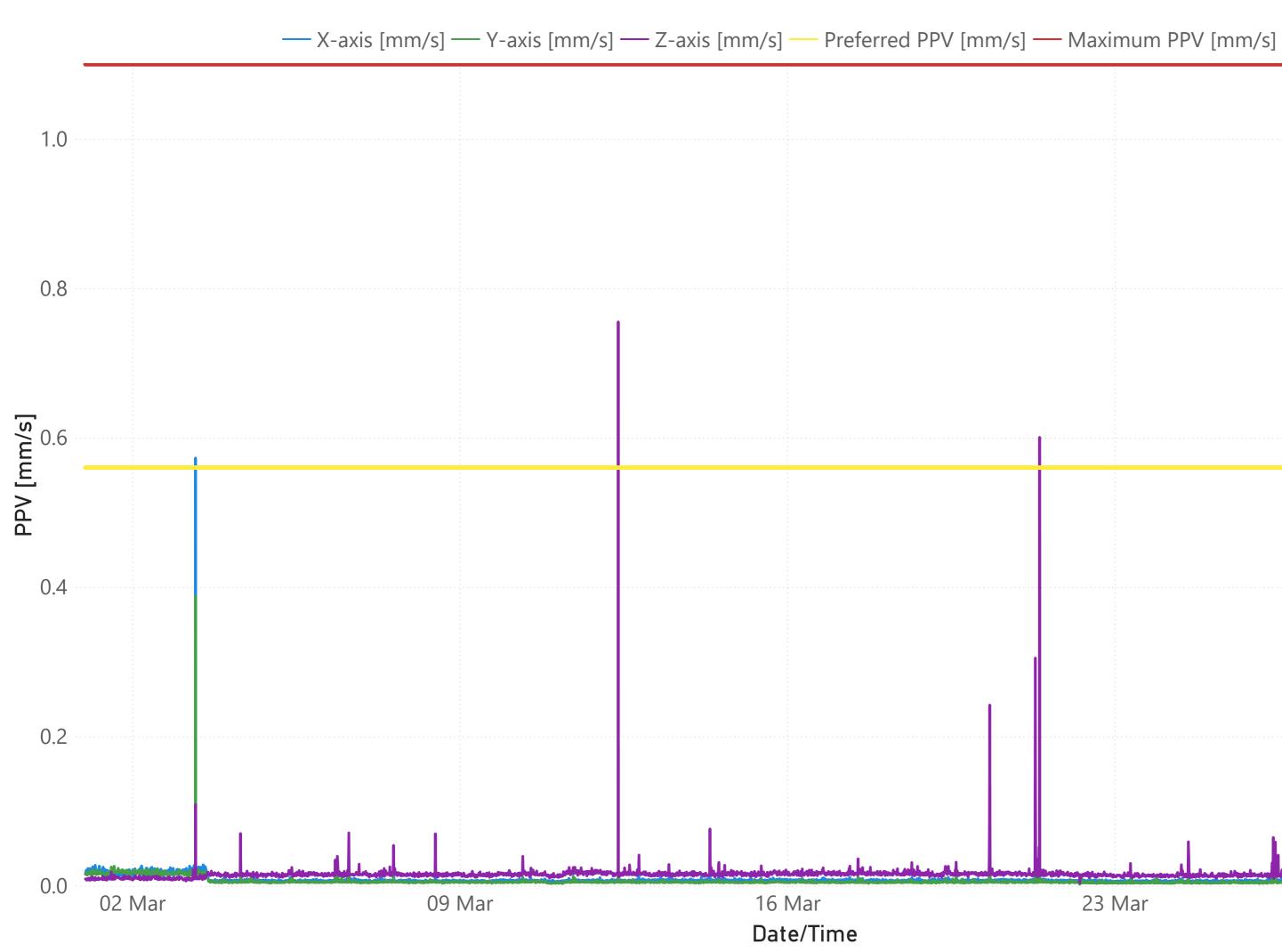








# PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Vibration Monitoring Summary Chart - Integrated Service Building

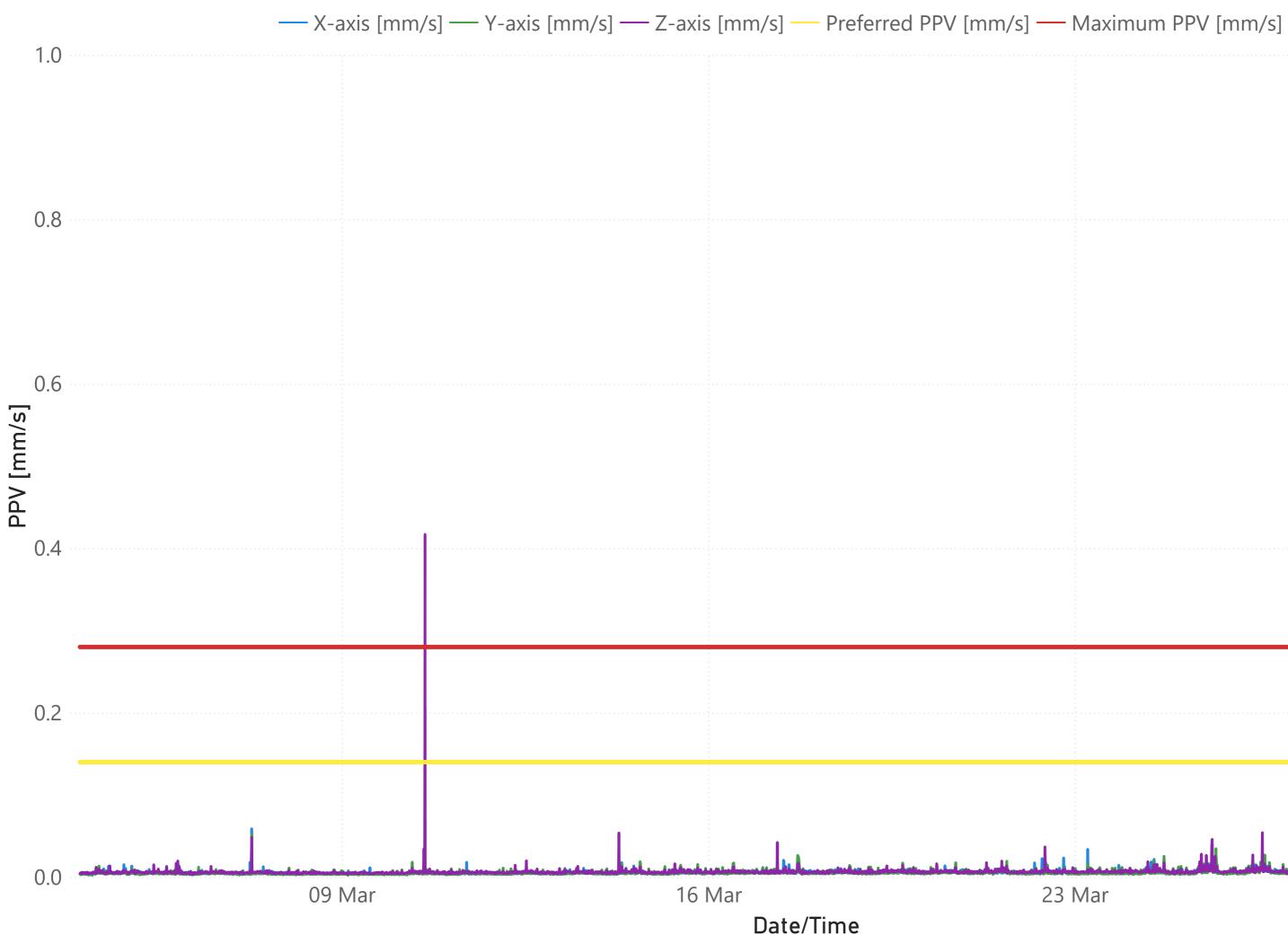




# March 2025 23 Mar 30 Mar



# PRJ-000719 - Lendlease Construction Liverpool Health and Academic Precinct - Stage 2 Vibration Monitoring Summary Chart - Oncology Bunker





# March 2025 23 Mar 30 Mar



# APPENDIX D CALIBRATION CERTIFICATES

# CERTIFICATE OF CALIBRATION

**CERTIFICATE NO: G52355** 

**EQUIPMENT TESTED:** Vibration Measuring System

Manufacturer: Svantek Meter Type: SV 803

Serial No: 160000

**Owner:** Property Risk Australia 34-36 Ralph Street Alexandria, NSW 2015

**Tests Performed:** 

Measured Frequency response, Correct level display. Linearity display Detailed overleaf. **Comments:** 

**CONDITION OF TEST:** Temperature **Relative Humidity** 

23 °C ±1° C 57 % ±5%

Date of Receipt: 07/01/2025 Date of Calibration: 07/01/2025 Date of Issue : 08/01/2025

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Procedure: Transducer)

CHECKED BY:

AUTHORISED SIGNATURE:

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability

This report applies only to the item identified in the report and may not be reproduced in part. The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



Head Office & Calibration Laboratory Unit 14, 22 Hudson Avenue, Castle Hill NSW 2154 (02) 9680 8133 www.acu-vib.com.au

> Page 1 of 5 Calibration Certificate AVCERT15 Rev.2.0 14.04.2021



WORLD RECOGNISED ACCREDITATION Accredited Laboratory No. 9262 Acoustic and Vibration Measurements

Test No: G 52355	Test date: 7/01/2025
Calibration Method	The method is described in ACU-VIB procedure AVP15, Calibration of Ground Vibration Monitors and Low Frequency Transducers, Revision 1.5 Authorised or 19th October 2023.
Test Description	Each sensor of the triaxial vibration measuring system is calibrated using the back-to-back method as described in ISO 16063-21 to provide a response according to the DIN 45669-1:2020 Standard.
Electron	The Sensor is excited using a horizontally oriented and/or a vertically oriented simple harmonic motion shaker, at listed frequencies and amplitudes.
Calibration Results	This report applies only to the item identified in the report and may not be reproduced in part. The Results are provided on pages 3 - 5 of this report including the uncertainity of measurements.
Metrological Traceability Statement	Acu-Vib Electronics has accreditation under ISO/IEC 17025 from NATA for calibrations at frequencies from 0.8 Hz to 10000 Hz.
The Electronic	Results of the tests, calibration and/or measurements included in this document are traceable to the SI units system through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.
Measurement Uncertainty Statement	The uncertainties quoted are estimated at a confidence level of 95% and a coverage factor of $k=2$ applies unless otherwise stated. The uncertainty only applies at the time of measurement and takes no account of any drift, environmental effects or other conditional effects that may apply afterwards. Estimation of uncertainty at any later time should consider the historical performance of the transducer and the manufacture's specifications.
Sensor Sensitivity or Calibration Factor	Where possible and permissible, the transducer sensitivity or calibration factor before and after calibration at reference conditions is noted from the system and tabulated below. The values reported here are indicative for information only as seen from the meter display.
	Reference conditions are at 15.915 Hz with excitation levels of 10mms <sup>-1</sup>

Reported units are in volts per meter per second.

Channel	Before Calibration	After Calibration
L (X)	27.38	27.63
T (Y)	26.97	27.22
V (Z)	26.91	26.91

**Additional Notes** 

NA\*, Not Applicable, values left as found.

Unless otherwise stated, all measurements of velocity are in Peak.

m	T	0		
Test ]	10.	(÷	574	55
ICSU	NU.	U	240	22

## Frequency response and linearity characteristics for **SVANTEK**

# SV 803

Type: Type:

Serial No: Horizontal Geophone Serial No:

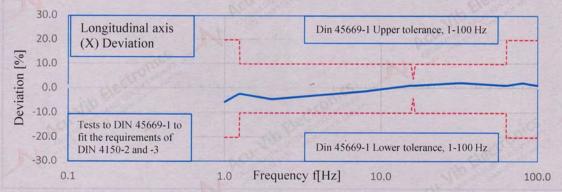
160000 3240000208

Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	X- Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.4	-5.6%	1 700/	1 20.0/
1.25	10.0	9.8	-2.3%	1.70%	± 20 %
2.00	10.0	9.6	-4.5%	1.00%	C.
4.00	10.0	9.2	-7.8%	A MARINE AND A MAR	± 10 %
8.00	10.0	9.9	-1.2%	1105	
15.92	0.10	0.11	10.0%		. the
15.92	0.20	0.22	10.0%		online.
15.92	0.50	0.52	4.0%		alection
15.92	1.00	1.02	2.0%		
15.92	2.00	2.04	2.0%		±4%
15.92	5.00	5.07	1.4%	0.90%	±4 %
15.92	10.0	10.1	1.2%	N	
15.92	20.0	20.2	1.0%	169 a	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.2%		THE
32.00	10.0	10.2	2.3%		± 10 %
63.00	10.0	10.1	1.2%		± 10 %
80.00	10.0	10.2	2.3%		Server.
100.00	10.0	10.1	1.2%	N. P.	. 20.0/
125.00	10.0	10.0	0.0%	1.10%	± 20 %
250.00	1.0	0.9	-10.0%	NCS.	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 3 of 5 pages

TT /	3 T	0	200		
Pet	NO	1 +	514	25	
Test	INU.	U	545	55	

# Frequency response and linearity characteristics for SVANTEK

### SVANIER

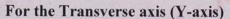
Type:SV 803Serial No:160000Type:Horizontal GeophoneSerial No:3240000207

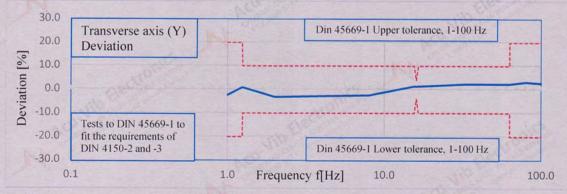
Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	<b>Y-Deviation</b>	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
1.00	10.0	9.8	-2.3%	1 700/	1 20.0/
1.25	10.0	10.1	0.9%	1.70%	± 20 %
2.00	10.0	9.7	-3.1%	1.00%	
4.00	10.0	9.1	-8.7%	1	± 10 %
8.00	10.0	9.8	-2.4%	alest .	
15.92	0.10	0.11	10.0%		and the second
15.92	0.20	0.22	10.0%		
15.92	0.50	0.51	2.0%		
15.92	1.00	1.04	4.0%		
15.92	2.00	2.03	1.5%		±4%
15.92	5.00	5.08	1.6%	0.90%	± 4 %
15.92	10.0	10.2	1.5%		
15.92	20.0	20.3	1.6%	and the	
15.92	50.0	50.7	1.4%	and the second	
16.00	10.0	10.1	1.4%		The
32.00	10.0	10.2	2.3%		± 10 %
63.00	10.0	10.2	2.4%		± 10 %
80.00	10.0	10.3	3.2%		No.
100.00	10.0	10.3	2.7%	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	1 20 0/
125.00	10.0	10.2	2.1%	1.10%	± 20 %
250.00	1.0	1.0	-5.0%	114	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%





UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 4 of 5 pages

The second	T.T.	0	200	
Test	NO.	( T	523	11
rest	110.	0	242.	15

## Frequency response and linearity characteristics for SVANTEK

SV 803

Vertical Geophone

Type:
Type:

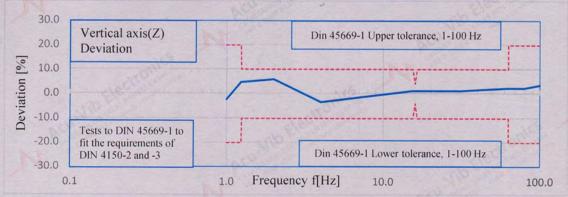
Serial No: Serial No: 160000 2240000314

Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

For the Vertical axis (Z-axis)							
Frequency	Reference	Indication	Z-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06		
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%		
1.00	10.0	9.8	-2.3%	1 700/	1 00 04		
1.25	10.0	10.5	4.7%	1.70%	± 20 %		
2.00	10.0	10.6	5.9%	1.00%	and the second		
4.00	10.0	9.7	-3.4%	1	± 10 %		
8.00	10.0	9.9	-1.1%	10			
15.92	0.10	0.11	10.0%		a she		
15.92	0.20	0.21	5.0%		onic		
15.92	0.50	0.51	2.0%				
15.92	1.00	1.03	3.0%				
15.92	2.00	2.04	2.0%		± 4 %		
15.92	5.00	5.07	1.4%	0.90%	±4%		
15.92	10.0	10.1	1.2%				
15.92	20.0	20.0	0.2%	CIC2			
15.92	50.0	50.7	1.4%	1.00			
16.00	10.0	10.1	1.2%		- Allton		
32.00	10.0	10.1	1.2%		± 10 %		
63.00	10.0	10.2	2.3%		± 10 %		
80.00	10.0	10.2	2.3%		NOVE ST.		
100.00	10.0	10.4	3.5%	her	± 20 %		
125.00	10.0	10.2	2.3%	1.10%	± 20 %		
250.00	1.00	1.0	-2.0%	me			
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%		



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 5 of 5 pages

# CERTIFICATE OF CALIBRATION

**CERTIFICATE NO: G52355** 

**EQUIPMENT TESTED:** Vibration Measuring System

Manufacturer: Svantek Meter Type: SV 803

Serial No: 160000

**Owner:** Property Risk Australia 34-36 Ralph Street Alexandria, NSW 2015

**Tests Performed:** 

Measured Frequency response, Correct level display, Linearity display **Comments:** Detailed overleaf.

**CONDITION OF TEST:** Temperature **Relative Humidity** 

23 °C ±1° C 57 % ±5%

Date of Receipt : 07/01/2025 Date of Calibration: 07/01/2025 Date of Issue : 08/01/2025

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Procedure: Transducer)

CHECKED BY:

AUTHORISED SIGNATURE:

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part. The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

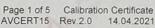


NATA

WORLD RECOGNISED ACCREDITATION Accredited Laboratory No. 9262 Acoustic and Vibration Measurements

Head Office & Calibration Laboratory Unit 14, 22 Hudson Avenue, Castle Hill NSW 2154

(02) 9680 8133 www.acu-vib.com.au



Test No: G 52355			Test date:	7/01/2025	
Calibration Method		described in ACU-VIB procedu titors and Low Frequency Transc 2023.	*****	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Test Description	back-te-back n	the triaxial vibration measuring nethod as described in ISO 1606 ne DIN 45669-1.2020 Standard.			
		excited using a horizontally orier ic motion shaker, at listed freque			
Calibration Results	This report applies only to the item identified in the report and may not be reproduced in part. The Results are provided on pages 3 - 5 of this report including the uncertainity of measurements.				
Metrological Traceability Statement	y Acu-Vib Electronics has accreditation under ISO/IEC 17025 from NATA for calibrations at frequencies from 0.8 Hz to 10000 Hz.				
	Results of the tests, calibration and/or measurements included in this document are traceable to the SI units system through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.				
Measurement Uncertainty Statement	coverage factor applies at the ti environmental Estimation of u	es quoted are estimated at a cont r of k=2 applies unless otherwise me of measurement and takes no effects or other conditional effec incertainty at any later time shou f the transducer and the manufact	stated. The uncerta account of any dri ts that may apply a ld consider the hist	iinty only fl. fterwards orical	
Sensor Sensitivity or Calibration Factor	before and afte	and permissible; the transducer r calibration at reference condition v. The values reported here are in neter display.	ms is noted from t	he system and	
		litions are at 15.915 Hz with exe		ms <sup>1</sup>	
		are in volts per meter per second Before Calibration	After Ca	libration	
	L (X)	27.38	27		
	T(Y)	26.97	27.	22	
	Y (Z)	26.91	26	91	

Additional Notes

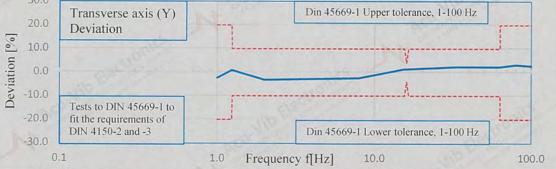
NA\*, Not Applicable, values left as found.

Unless otherwise stated, all measurements of velocity are in Peak.

	Freque	ncy respons	e and linearity SVANTEK	characteristi	es for
Type:		SV 803	SVIIVILIC	Serial No:	160000
Type:		izontal Geo	phone	Serial No:	3240000208
- J I			mm/sec (Pea		
			otherwise ind		
For an	plitude linea				(100 radians/sec)
			ngitudial axi		
requency	Reference		X- Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.4	-5.6%	1.70%	± 20 %
1.25	10.0	9.8	-2.3%		± 20 /0
2.00	10.0	9.6	-4.5%	1.00%	
4.00	10.0	9.2	-7.8%	1.5	± 10 %
8.00	10.0	9.9	-1.2%		
15.92	0.10	0.11	10.0%		
15.92	0.20	0.22	10.0%		
15.92	0.50	0.52	4.0%		
15.92 15.92	2.00	1.02 2.04	2.0% 2.0%		
15.92	5.00	5.07	1.4%	0.90%	± 4 %
15.92	10.0	10.1	1.4%	0.9070	
15.92	20.0	20.2	1.0%	10	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.2%		
32.00	10.0	10.2	2.3%		10.0/
63.00	10.0	10.1	1.2%		± 10 %
80.00	10.0	10.2	2.3%		See The
100.00	10.0	10.1	1.2%	5 P	1 20.0/
125.00	10.0	10.0	0.0%	1.10%	± 20 %
250.00	1.0	0.9	-10.0%	115	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
20.0 Lo	ongitudinal axis () Deviation		Din	45669-1 Upper tole	rance, 1-100 Hz
. 10.0 0.0 -10.0		-		Y	
-20.0 fit	sts to DIN 45669-1 the requirements of N 4150-2 and -3		Din	45669-1 Lower tole	rance 1-100 Hz

Page 3 of 5 pages

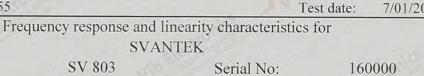
	Freque	ncy respons	e and linearity SVANTEK	v characteristi	cs for
Type:		SV 803	2 THUER	Serial No:	160000
Type:		izontal Geo	phone	Serial No:	3240000207
For an		(unless arity, applied	otherwise inc	at 15.915 Hz	response (100 radians/sec)
Frequency	Reference	Indication	<b>Y-Deviation</b>	Expanded uncertainty	Tolerance, (DIN 45669 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.8	-2.3%	1.70%	+ 20.0/
1.25	10.0	10.1	0.9%	1.70%	± 20 %
2.00	10.0	9.7	-3.1%	1.00%	
4.00	10.0	9.1	-8.7%		± 10 %
8.00	10.0	9.8	-2.4%		
15.92	0.10	0.11	10.0%		
15.92	0.20	0.22	10.0%		
15.92	0.50	0.51	2.0%		
15.92	1.00	1.04	4.0%		
15.92	2.00	2.03	1.5%		± 4 %
15.92	5.00	5.08	1.6%	0.90%	± + /0
15.92	10.0	10.2	1.5%		
15.92	20.0	20.3	1.6%	20	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.4%		and a second
32.00	10.0	10.2	2.3%		± 10 %
63.00	10.0	10.2	2.4%		
80.00	10.0	10.3	3.2%		
100.00	10.0	10.3	2.7%	Int	± 20 %
125.00	10.0	10.2	2.1%	1.10%	1 20 70
250.00	1.0	1.0	-5.0%		
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%



Page 4 of 5 pages

Test No: G 52355

Type:



2240000314

Vertical Geophone Type: Serial No: Constant velocity of 10 mm/sec (Peak) applied for response

SV 803

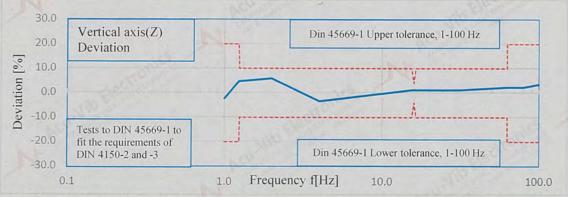
(unless otherwise indicated)

**SVANTEK** 

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

For the Vertical axis (Z-axis)

Frequency	Reference	Indication	Z-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.8	-2.3%	1 700/	± 20 %
1.25	10.0	10.5	4.7%	1.70%	± 20 %
2.00	10.0	10.6	5.9%	1.00%	and the second second
4.00	10.0	9.7	-3.4%	and the second	$\pm 10 \%$
8.00	10.0	9.9	-1.1%	35	
15.92	0.10	0.11	10.0%		
15.92	0.20	0.21	5.0%		
15.92	0.50	0.51	2.0%		
15.92	1.00	1.03	3.0%		
15.92	2.00	2.04	2.0%		± 4 %
15.92	5.00	5.07	1.4%	0.90%	± 4 70
15.92	10.0	10.1	1.2%	1	
15.92	20.0	20.0	0.2%	119	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.2%		- OPIN
32.00	10.0	10.1	1.2%		± 10 %
63.00	10.0	10.2	2.3%		± 10 70
80.00	10.0	10.2	2.3%		
100.00	10.0	10.4	3.5%	n n	+ 20.0/
125.00	10.0	10.2	2.3%	1.10%	± 20 %
250.00	1.00	1.0	-2.0%	JIC .	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 5 of 5 pages -00000 End of report 00000----- 7/01/2025

**CERTIFICATE NO: G52356** 

**EQUIPMENT TESTED:** Vibration Measuring System

Manufacturer: Svantek Meter Type: SV 803

Serial No: 160001

**Owner:** Property Risk Australia 34-36 Ralph Street Alexandria, NSW 2015

Tests Performed: Measured Frequency response, Correct level display, Linearity display Comments: Detailed overleaf.

**CONDITION OF TEST:** Temperature **Relative Humidity** 

23 °C ±1° C 57 % ±5%

Date of Receipt : 07/01/2025 Date of Calibration: 07/01/2025 Date of Issue : 08/01/2025

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Procedure: Transducer)

CHECKED BY: ...

AUTHORISED SIGNATURE:

Hein Sal

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute of other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part. The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



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> Page 1 of 5 Calibration Certificate AVCERT15 Rev.2.0 14.04.2021



WORLD RECOGNISED ACCREDITATION Accredited Laboratory No. 9262 Acoustic and Vibration Measurements

Test No: G 52356	Test date: 7/01/202:				
Calibration Method	The method is described in ACU-VIB procedure AVP15, Calibration of Ground Vibration Monitors and Low Frequency Transducers, Revision 1.5 Authorised or 19th October 2023.				
Test Description	Each sensor of the triaxial vibration measuring system is calibrated using the back-to-back method as described in ISO 16063-21 to provide a response according to the DIN 45669-1:2020 Standard.				
	The Sensor is excited using a horizontally oriented and/or a vertically oriented simple harmonic motion shaker, at listed frequencies and amplitudes.				
Calibration Results	This report applies only to the item identified in the report and may not be reproduced in part. The Results are provided on pages 3 - 5 of this report including the uncertainity of measurements.				
Metrological Traceability Statement	Acu-Vib Electronics has accreditation under ISO/IEC 17025 from NATA for calibrations at frequencies from 0.8 Hz to 10000 Hz.				
No Begront	Results of the tests, calibration and/or measurements included in this document are traceable to the SI units system through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.				
Measurement Uncertainty Statement	The uncertainties quoted are estimated at a confidence level of 95% and a coverage factor of k=2 applies unless otherwise stated. The uncertainty only applies at the time of measurement and takes no account of any drift, environmental effects or other conditional effects that may apply afterwards. Estimation of uncertainty at any later time should consider the historical performance of the transducer and the manufacture's specifications.				
Sensor Sensitivity or Calibration Factor	Where possible and permissible, the transducer sensitivity or calibration factor before and after calibration at reference conditions is noted from the system and tabulated below. The values reported here are indicative for information only as seen from the meter display.				
	Reference conditions are at 15.915 Hz with excitation levels of 10mms <sup>-1</sup>				

Reported units are in volts per meter per second.

Channel	Before Calibration	After Calibration
L (X)	26.21	26.48
T (Y)	26.73	27.00
V (Z)	26.79	26.91

### **Additional Notes**

NA\*, Not Applicable, values left as found.

Unless otherwise stated, all measurements of velocity are in Peak.

T	1 DI		0 0	-00	51
les	st N	0.1	T	1/1	20
		· · ·	0.		20

160001

### Frequency response and linearity characteristics for SVANTEK

Serial No:

	DVAN
SV 803	00
DV 005	

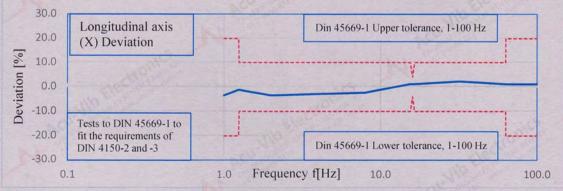
Туре: Туре:

Horizontal GeophoneSerial No:3240000211Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	X- Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.7	-3.4%	1 700/	1 20.0/
1.25	10.0	9.9	-1.2%	1.70%	± 20 %
2.00	10.0	9.7	-3.4%	1.00%	Superior States
4.00	10.0	9.2	-7.8%	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	± 10 %
8.00	10.0	9.8	-2.3%	nich.	
15.92	0.10	0.11	10.0%		
15.92	0.20	0.22	10.0%		onica
15.92	0.50	0.51	2.0%		dect
15.92	1.00	1.03	3.0%		1022
15.92	2.00	2.03	1.5%	19.00	±4%
15.92	5.00	5.04	0.8%	0.90%	±4 %
15.92	10.0	10.1	1.2%	N.	
15.92	20.0	20.4	2.1%	AV.2	
15.92	50.0	50.7	1.4%	State State	
16.00	10.0	10.1	1.2%		antes .
32.00	10.0	10.2	2.3%		± 10 %
63.00	10.0	10.1	1.2%	100	± 10 %
80.00	10.0	10.1	1.2%		10°
100.00	10.0	10.1	1.2%	The second second	1 20 0/
125.00	10.0	10.0	0.0%	1.10%	± 20 %
250.00	1.0	0.9	-9.0%	acs.	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 3 of 5 pages

The state of the s	NI	0	200	
Test	NO.	( 1	7/1	26
rest	140.	U	240	50

160001

#### Frequency response and linearity characteristics for **SVANTEK**

### SV 803

Type: Type:

Serial No: Horizontal Geophone Serial No: Constant velocity of 10 mm/sec (Peak) applied for response

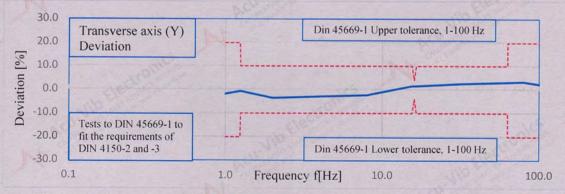
3240000353

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	Y-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
1.00	10.0	9.8	-1.9%	1 700/	1 20.0/
1.25	10.0	9.9	-0.8%	1.70%	± 20 %
2.00	10.0	9.6	-3.6%	1.00%	Ser.
4.00	10.0	9.2	-8.4%		± 10 %
8.00	10.0	9.8	-2.4%		
15.92	0.10	0.11	12.0%		and the second
15.92	0.20	0.22	10.0%		. Only
15.92	0.50	0.52	4.0%		
15.92	1.00	1.02	2.0%		
15.92	2.00	2.04	2.0%		±4%
15.92	5.00	5.04	0.8%	0.90%	± 4 %
15.92	10.0	10.1	1.3%		
15.92	20.0	20.3	1.3%	MC	
15.92	50.0	50.8	1.6%	and the second	
16.00	10.0	10.1	1.4%		-opic-
32.00	10.0	10.2	2.4%		± 10 %
63.00	10.0	10.3	3.0%		± 10 %
80.00	10.0	10.3	3.2%		a Charles .
100.00	10.0	10.2	2.2%	-	. 20.0/
125.00	10.0	10.2	2.0%	1.10%	± 20 %
250.00	1.0	1.0	-5.0%	10-	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%

For the Transverse axis (Y-axis)



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 4 of 5 pages

- T	3.7	0 0	00-1	
Pet	NO	( + -	2356	
rust	INU.	U .	2550	

Type:

Type:

#### Frequency response and linearity characteristics for **SVANTEK**

SV 803 Serial No: 160001 Vertical Geophone Serial No: 2240000315

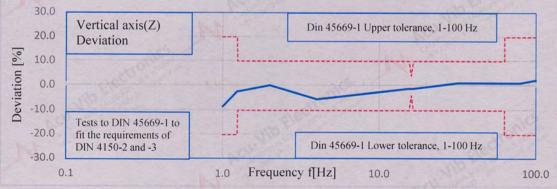
Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	<b>Z-Deviation</b>	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
1.00	10.0	9.2	-8.5%	1 709/	+ 20.0/
1.25	10.0	9.8	-2.4%	1.70%	± 20 %
2.00	10.0	10.0	0.2%	1.00%	and the second s
4.00	10.0	9.5	-5.5%	2	± 10 %
8.00	10.0	9.6	-3.6%		
15.92	0.10	0.11	10.0%		115
15.92	0.20	0.22	10.0%		
15.92	0.50	0.54	8.0%		
15.92	1.00	1.08	8.0%		
15.92	2.00	2.03	1.5%		±4 %
15.92	5.00	5.02	0.4%	0.90%	± + /0
15.92	10.0	10.0	0.0%	1	
15.92	20.0	20.0	0.0%	oll's	
15.92	50.0	50.0	0.0%	Set and	· · · · · · · · · · · · · · · · · · ·
16.00	10.0	9.9	-1.1%		and the second
32.00	10.0	10.1	1.2%		± 10 %
63.00	10.0	10.1	1.2%		± 10 /0
80.00	10.0	10.1	1.2%		Para .
100.00	10.0	10.2	2.4%	p.t	± 20 %
125.00	10.0	10.1	0.8%	1.10%	± 20 %
250.00	1.00	0.9	-6.0%	THE .	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%

For the Vertical axis (Z-axis)



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 5 of 5 pages ooooo End of report ooooo----

**CERTIFICATE NO: G52356** 

EQUIPMENT TESTED: Vibration Measuring System

Manufacturer: Svantek Meter Type: SV 803

Serial No: 160001

**Owner:** 

Property Risk Australia 34-36 Ralph Street Alexandria, NSW 2015

Tests Performed: Measured Frequency response, Correct level display, Linearity display Detailed overleaf. **Comments:** 

**CONDITION OF TEST:** Temperature **Relative Humidity** 

23 °C ±1° C 57 % ±5%

Date of Receipt: 07/01/2025 Date of Calibration: 07/01/2025 Date of Issue : 08/01/2025

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Procedure: Transducer)

CHECKED BY:

AUTHORISED SIGNATURE:

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

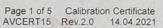
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The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



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www.acu-vib.com.au





WORLD RECOGNISED ACCREDITATION Accredited Laboratory No. 9262 Acoustic and Vibration Measurements

Test No: G 52356			Test date:	7/01/2025	
Calibration Method		escribed in ACU-VIB procedure ors and Low Frequency Transdu 23.			
Test Description	back-to-back me	te triaxial vibration measuring s thod as described in 18O 16063 DIN 45669-1:2020 Standard.			
		cited using a horizontally orient motion shaker, at listed frequer			
Calibration Results	reproduced in pa	es only to the item identified in rt. The Results are provided on certainity of measurements.			
Metrological Traceability Statement		nics has accreditation under ISC equencies from 0.8 Hz to 10000		NATA for	
	are traceable to the calibrated by the	ts. calibration and/or measurem he SI units system through refer Australian National Measurems dories demonstrating traceability	ence equipment th ent Institute or oth	at has been	
Measurement Uncertainty Statement	coverage factor c applies at the tim environmental ef Estimation of un	a quoted are estimated at a confi of k=2 applies unless otherwise a c of measurement and takes no fects or other conditional effects certainty at any later time should be transducer and the manufact.	stated. The uncert: account of any dri s that may apply a I consider the hist	ainty only fi, fterwards. orical	
Sensor Sensitivity or Calibration Factor	hefore and after a	nd permissible, the transducer s alibration at reference condition The values reported here are ind ter display.	is is noted from t	he system and	
	Reference conditions are at 15.915 Hz with excition levels of 10mms <sup>-1</sup>				
	-	e in volts per meter per second.	(		
	Channel L (X)	Before Calibration 26.21	After Ca 26		
	T.M.	26.73	27		
	N (Z)	26.79	26.		
Additional Notes		able; values left as found. stated, all measurements of vel-	ocity are in Peak.		

•

Ty		ency respons	se and linearity SVANTEK	characteristi	cs for
	ne.	SV 803	SVANIEK	Serial No:	160001
Ty		rizontal Geo	nhone	Serial No:	3240000211
I yj			0 mm/sec (Pea		
For		(unless arity, applie	s otherwise ind	licated) at 15.915 Hz	(100 radians/sec)
Frequenc	y Reference	Indication	X- Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.7	-3.4%	1.70%	± 20 %
1.25	10.0	9.9	-1.2%	1./0/0	± 20 70
2.00	10.0	9.7	-3.4%	1.00%	
4.00	10.0	9.2	-7.8%	100	± 10 %
8.00	10.0	9.8	-2.3%	COL.	
15.92	0.10	0.11	10.0%		
15.92	0.20	0.22	10.0%		
15.92	0.50	0.51	2.0%		
15.92	1.00	1.03	3.0%		
15.92	2.00	2.03	1.5%		± 4 %
15.92	5.00	5.04	0.8%	0.90%	
15.92	10.0	10.1	1.2%	15 2	
15.92	20.0	20.4	2.1%	6.5	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.2%	237	and the second
32.00	10.0	10.2	2.3%		± 10 %
63.00 80.00	10.0	10.1 10.1	1.2% 1.2%		A CONTRACTOR OF CONTRACTOR
100.00	10.0	10.1	1.2%		
125.00	10.0	10.1	0.0%	1.10%	± 20 %
250.00	1.0	0.9	-9.0%	1.10%	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%

1.0

Tests to DIN 45669-1 to fit the requirements of DIN 4150-2 and -3

-20.0

-30.0

0.1

Page 3 of 5 pages

Frequency f[Hz]

Din 45669-1 Lower tolerance, 1-100 Hz

100.0

10.0

	Freque	ncy respons	e and linearity SVANTEK	characteristi	cs for
Тур	e.	SV 803	SVANIEK	Serial No:	160001
Тур		izontal Geo	nhone	Serial No:	3240000353
Typ			mm/sec (Pea		
	Constant v		otherwise ind		response
For a	mplitude line				(100 radians/sec)
101 a	implitude inter		ransverse axi		(100 factalis/sec)
Frequency	Reference		Y-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.8	-1.9%		70
1.25	10.0	9.9	-0.8%	1.70%	± 20 %
2.00	10.0	9.6	-3.6%	1.00%	
4.00	10.0	9.2	-8.4%		± 10 %
8.00	10.0	9.8	-2.4%	10-	
15.92	0.10	0.11	12.0%	Sugar 1	
15.92	0.20	0.22	10.0%		
15.92	0.50	0.52	4.0%		
15.92	1.00	1.02	2.0%		
15.92	2.00	2.04	2.0%	2	±4%
15.92	5.00	5.04	0.8%	0.90%	±4 %
15.92	10.0	10.1	1.3%	1	
15.92	20.0	20.3	1.3%	Choose and	
15.92	50.0	50.8	1.6%		
16.00	10.0	10.1	1.4%		. Martine
32.00	10.0	10.2	2.4%	2	± 10 %
63.00	10.0	10.3	3.0%		20 /0
80.00	10.0	10.3	3.2%		
100.00	10.0	10.2	2.2%	1 AN	± 20 %
125.00	10.0	10.2	2.0%	1.10%	
250.00	1.0	1.0	-5.0%	Courses of the second	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1000	1.0 mms <sup>-1</sup>	1.0 mms <sup>-1</sup>		U <sub>95</sub> %	%
30.0	Francisco estis (	V)	Din	45669-1 Upper tolera	ance   100 Hz
20.0 I	Transverse axis ( Deviation	1)	Din	obber opper toter	ance, 1-100 HZ
10.0					
10.0 0.0 -10.0				A CONTRACTOR	
10.0				3	
	ests to DIN 45669-1		10-10	31	
-20.0 fi	it the requirements of		Die	15660 11 amontal	
-30.0 L	DIN 4150-2 and -3		Din	45669-1 Lower toler	ance, 1-100 Hz

Frequency f[Hz] 1.0

100.0

10.0

UR\* indicates the results are non-linear and the insturment readings are under linear range

0.1

Page 4 of 5 pages

Test No: C		1			Test date: 7/01/202	
	Freque	ncy respons	e and linearity SVANTEK	y characteristi	cs for	
Туре	:	SV 803		Serial No:	160001	
Туре	: Ve	rtical Geopl	hone	Serial No:	2240000315	
	Constant ve	locity of 10	mm/sec (Pea	k) applied for	r response	
		(unless	otherwise inc	licated)		
For an	nplitude linea	rity, applied	d level varied	at 15.915 Hz	(100 radians/sec)	
		For the	Vertical axis	(Z-axis)		
Frequency	Reference	Indication	Z-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%	
1.00	10.0	9.2	-8.5%	1.70%	± 20 %	
1.25	10.0	9.8	-2.4%		1 20 70	
2.00	10.0	10.0	0.2%	1.00%		
4.00	10.0	9.5	-5.5%	15 19	$\pm 10 \%$	
8.00	10.0	9.6	-3.6%			
15.92	0.10	0.11	10.0%	100		
15.92	0.20	0.22	10.0%			
15.92	0.50	0.54	8.0%			
15.92	1.00	1.08	8.0%			
<u>15.92</u> 15.92	2.00 5.00	2.03 5.02	1.5%	0.90%	±4 %	
15.92	10.0		0.4%	0.90%		
15.92	20.0	<b>10.0</b> 20.0	<b>0.0%</b>	20. 1		
15.92	50.0	50.0	0.0%			
16.00	10.0	9.9	-1.1%			
32.00	10.0	10.1	1.2%		Netro	
63.00	10.0	10.1	1.2%		± 10 %	
80.00	10.0	10.1	1.2%		Charley	
100.00	10.0	10.2	2.4%	h h	Carl and the second	
125.00	10.0	10.1	0.8%	1.10%	± 20 %	
250.00	1.00	0.9	-6.0%	19		
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%	
112	mms	mms	70	095 70	/0	
30.0 V	ertical axis(Z)	- 1-1-2	Din 4	5669-1 Upper tolera	ance, 1-100 Hz	
20.0 D	eviation					
10.0 0.0				Y		
0.0 10.0 0.0 -10.0 To	P KESSEL	1	$\sim$	٨		
10	sts to DIN 45669-1 the requirements of					
	N 4150-2 and -3		Din	45669-1 Lower tole	rance, 1-100 Hz	

Page 5 of 5 pages

**CERTIFICATE NO: G36473** 

**EQUIPMENT TESTED:** Ground Vibration Monitor

Manufacturer:	Svantek
Meter Type:	SV-803
Transducers A:	Triaxial

Serial No: 141562 Serial No: 141562

**Owner:** 

Property Risk Australia (ACT) Pty Ltd U2, 5-7 Kemble Court Mitchell, ACT 2911

Tests Measured Frequency response, Correct level display, **Performed: Comments:** 

Linearity display Detailed overleaf.

**CONDITION OF TEST:** Temperature **Relative Humidity** 

22 °C ±1° C 38 % ±5%

Date of Receipt : 14/08/2023 Date of Calibration: 14/08/2023 Date of Issue : 14/08/2023

Hein Soe

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Transducer) based on AS2187.2 & DIN45669-1 **Procedure:** 

**CHECKED BY:** 

**AUTHORISED SIGNATURE:** 

Accredited for compliance with ISO/IEC 17025 - Calibration Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part. The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



WORLD RECOGNISED Accredited Lab No. 9262 Acoustic and Vibration Measurements

Acu-Vib Electronics CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory Unit 14, 22 Hudson Ave. Castle Hill NSW 215-(02) 9680 8133 www.acu-vib.com.au

Page 1 of 2 **Calibration Certificate** AVCERT15 Rev.2.0 14.04.2021

Frequency response and linearity characteristics for l Vibration Monitor type SV 803 Serial No. 141562 Geophone Type Triaxial Serial No. 141562 Constant velocity of 10 mm/sec Peak applied for response (Except at 250.0 Hz where applied level limited to 1.0 mm/s peak) For amplitude linearity applied level varied at 15.915 Hz

Free	quency	Expected indication mm/sec	Indication mm/sec Peak			Expanded uncertainty
Hz	Radians/se c	Peak	X Channel	Y Channel	Z Channel	U <sub>95</sub> %
0.796	5.0	10	NA	NA	NA	1.25%
1.592	10.0	10	10.6	10.8	10.7	1.25%
3.183	20.0	10	10.2	10.4	10.6	1.00%
4.775	30.0	10	10.0	10.1	10.4	0.90%
7.958	50.0	10	10.0	10.1	10.2	0.90%
15.915	100.0	0.5	0.52	0.53	0.55	0.90%
15.915	100.0	0°6° 1	1.04	1.04	1.05	0.90%
15.915	100.0	5	5.07	5.06	5.12	0.90%
15.915	100.0	10	10.2	10.1	10.2	0.90%
15.915	100.0	20	20.4	20.3	20.7	0.90%
15.915	100.0	50	50.7	50.6	51.3	0.90%
15.915	100.0	100	102.3	101.5	103.5	0.90%
31.831	200.0	10	10.2	10.2	10.4	0.50%
79.577	500.0	10	10.4	10.3	10.4	0.50%
159.16	1000.0	10	10.5	10.7	10.8	0.50%
250.00	2000.0	1	1.09	1.19	1.07	0.50%

Note1:

The laboratory has accreditation under ISO/IEC 17025 from NATA for calibration to ISO 16063-21 at frequencies from 0.5 Hz to 5kHz. Measurements at all frequencies and levels shown in the table above are made using reference equipment traceably calibrated to Australian National Standards.

Note2:

The uncertainties quoted are estimated at a confidence level of 95% and a coverage factor of k=2 applies unless otherwise stated.

> Page 2 of 2 End of Certificate

**CERTIFICATE NO: G52355** 

**EQUIPMENT TESTED:** Vibration Measuring System

Manufacturer: Svantek Meter Type: SV 803

Serial No: 160000

**Owner:** Property Risk Australia 34-36 Ralph Street Alexandria, NSW 2015

**Tests Performed:** 

Measured Frequency response, Correct level display. Linearity display Detailed overleaf. **Comments:** 

**CONDITION OF TEST:** Temperature **Relative Humidity** 

23 °C ±1° C 57 % ±5%

Date of Receipt: 07/01/2025 Date of Calibration: 07/01/2025 Date of Issue : 08/01/2025

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Procedure: Transducer)

CHECKED BY:

AUTHORISED SIGNATURE:

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability

This report applies only to the item identified in the report and may not be reproduced in part. The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



Head Office & Calibration Laboratory Unit 14, 22 Hudson Avenue, Castle Hill NSW 2154 (02) 9680 8133 www.acu-vib.com.au

> Page 1 of 5 Calibration Certificate AVCERT15 Rev.2.0 14.04.2021



WORLD RECOGNISED ACCREDITATION Accredited Laboratory No. 9262 Acoustic and Vibration Measurements

Test No: G 52355	Test date: 7/01/2025				
Calibration Method	The method is described in ACU-VIB procedure AVP15, Calibration of Ground Vibration Monitors and Low Frequency Transducers, Revision 1.5 Authorised or 19th October 2023.				
Test Description	Each sensor of the triaxial vibration measuring system is calibrated using the back-to-back method as described in ISO 16063-21 to provide a response according to the DIN 45669-1:2020 Standard.				
Electron	The Sensor is excited using a horizontally oriented and/or a vertically oriented simple harmonic motion shaker, at listed frequencies and amplitudes.				
Calibration Results	This report applies only to the item identified in the report and may not be reproduced in part. The Results are provided on pages 3 - 5 of this report including the uncertainity of measurements.				
Metrological Traceability Statement	Acu-Vib Electronics has accreditation under ISO/IEC 17025 from NATA for calibrations at frequencies from 0.8 Hz to 10000 Hz.				
The Electronic	Results of the tests, calibration and/or measurements included in this document are traceable to the SI units system through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.				
Measurement Uncertainty Statement	The uncertainties quoted are estimated at a confidence level of 95% and a coverage factor of $k=2$ applies unless otherwise stated. The uncertainty only applies at the time of measurement and takes no account of any drift, environmental effects or other conditional effects that may apply afterwards. Estimation of uncertainty at any later time should consider the historical performance of the transducer and the manufacture's specifications.				
Sensor Sensitivity or Calibration Factor	Where possible and permissible, the transducer sensitivity or calibration factor before and after calibration at reference conditions is noted from the system and tabulated below. The values reported here are indicative for information only as seen from the meter display.				
	Reference conditions are at 15.915 Hz with excitation levels of 10mms <sup>-1</sup>				

Reported units are in volts per meter per second.

Channel	Before Calibration	After Calibration
L (X)	27.38	27.63
T (Y)	26.97	27.22
V (Z)	26.91	26.91

**Additional Notes** 

NA\*, Not Applicable, values left as found.

Unless otherwise stated, all measurements of velocity are in Peak.

m	T	0		
Test ]	10.	(÷	574	55
ICSU	NU.	U	240	22

#### Frequency response and linearity characteristics for **SVANTEK**

### SV 803

Type: Type:

Serial No: Horizontal Geophone Serial No:

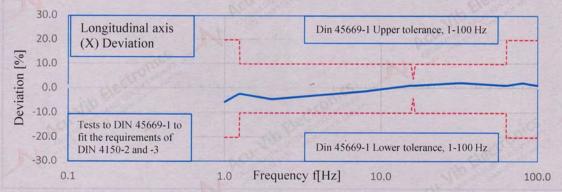
160000 3240000208

Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	X- Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.4	-5.6%	1 700/	1 20.0/
1.25	10.0	9.8	-2.3%	1.70%	± 20 %
2.00	10.0	9.6	-4.5%	1.00%	C. S.
4.00	10.0	9.2	-7.8%	A MARINE AND A MAR	± 10 %
8.00	10.0	9.9	-1.2%	1105	
15.92	0.10	0.11	10.0%		
15.92	0.20	0.22	10.0%		online.
15.92	0.50	0.52	4.0%		
15.92	1.00	1.02	2.0%		
15.92	2.00	2.04	2.0%		±4%
15.92	5.00	5.07	1.4%	0.90%	±4 %
15.92	10.0	10.1	1.2%	N.	
15.92	20.0	20.2	1.0%	169 a	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.2%		THE
32.00	10.0	10.2	2.3%		1 10.0/
63.00	10.0	10.1	1.2%		± 10 %
80.00	10.0	10.2	2.3%		State.
100.00	10.0	10.1	1.2%	N. P.	
125.00	10.0	10.0	0.0%	1.10%	± 20 %
250.00	1.0	0.9	-10.0%	NCS.	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 3 of 5 pages

TT /	3 T	0	200		
Pet	NO	1 +	514	22	
Test	INU.	U	545	55	

### Frequency response and linearity characteristics for SVANTEK

#### SVANIER

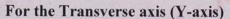
Type:SV 803Serial No:160000Type:Horizontal GeophoneSerial No:3240000207

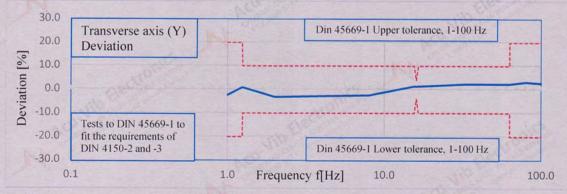
Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	<b>Y-Deviation</b>	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
1.00	10.0	9.8	-2.3%	1 700/	1 20.0/
1.25	10.0	10.1	0.9%	1.70%	± 20 %
2.00	10.0	9.7	-3.1%	1.00%	
4.00	10.0	9.1	-8.7%	1	± 10 %
8.00	10.0	9.8	-2.4%		
15.92	0.10	0.11	10.0%		a since
15.92	0.20	0.22	10.0%		
15.92	0.50	0.51	2.0%		
15.92	1.00	1.04	4.0%		
15.92	2.00	2.03	1.5%		±4%
15.92	5.00	5.08	1.6%	0.90%	± 4 %
15.92	10.0	10.2	1.5%		
15.92	20.0	20.3	1.6%	and the	
15.92	50.0	50.7	1.4%	and the second	·
16.00	10.0	10.1	1.4%		The
32.00	10.0	10.2	2.3%		± 10 %
63.00	10.0	10.2	2.4%		± 10 %
80.00	10.0	10.3	3.2%		No.
100.00	10.0	10.3	2.7%	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	1 20 0/
125.00	10.0	10.2	2.1%	1.10%	± 20 %
250.00	1.0	1.0	-5.0%	114	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%





UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 4 of 5 pages

The second	T.T.	0	200	
Test	NO.	( T	523	11
rest	110.	0	242.	15

#### Frequency response and linearity characteristics for SVANTEK

SV 803

Vertical Geophone

Type:
Type:

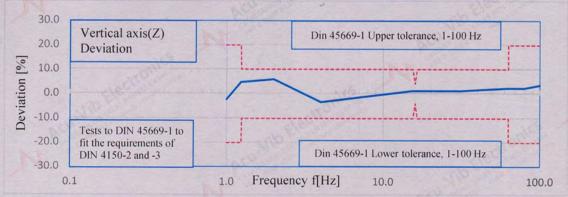
Serial No: Serial No: 160000 2240000314

Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

For the Vertical axis (Z-axis)							
Frequency	Reference	Indication	Z-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06		
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%		
1.00	10.0	9.8	-2.3%	1 700/	1 00 04		
1.25	10.0	10.5	4.7%	1.70%	± 20 %		
2.00	10.0	10.6	5.9%	1.00%	and the second		
4.00	10.0	9.7	-3.4%	1	± 10 %		
8.00	10.0	9.9	-1.1%	10			
15.92	0.10	0.11	10.0%				
15.92	0.20	0.21	5.0%		onicit		
15.92	0.50	0.51	2.0%				
15.92	1.00	1.03	3.0%				
15.92	2.00	2.04	2.0%		± 4 %		
15.92	5.00	5.07	1.4%	0.90%	±4 %		
15.92	10.0	10.1	1.2%	N			
15.92	20.0	20.0	0.2%	CI CP			
15.92	50.0	50.7	1.4%				
16.00	10.0	10.1	1.2%		in linds		
32.00	10.0	10.1	1.2%		± 10 %		
63.00	10.0	10.2	2.3%		± 10 %		
80.00	10.0	10.2	2.3%	E-	SPACE.		
100.00	10.0	10.4	3.5%	De Pr	± 20 %		
125.00	10.0	10.2	2.3%	1.10%	± 20 %		
250.00	1.00	1.0	-2.0%	112			
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%		



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 5 of 5 pages

**CERTIFICATE NO: G52355** 

**EQUIPMENT TESTED:** Vibration Measuring System

Manufacturer: Svantek Meter Type: SV 803

Serial No: 160000

**Owner:** Property Risk Australia 34-36 Ralph Street Alexandria, NSW 2015

**Tests Performed:** 

Measured Frequency response, Correct level display, Linearity display **Comments:** Detailed overleaf.

**CONDITION OF TEST:** Temperature **Relative Humidity** 

23 °C ±1° C 57 % ±5%

Date of Receipt : 07/01/2025 Date of Calibration: 07/01/2025 Date of Issue : 08/01/2025

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Procedure: Transducer)

CHECKED BY:

AUTHORISED SIGNATURE:

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part. The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

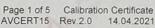


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WORLD RECOGNISED ACCREDITATION Accredited Laboratory No. 9262 Acoustic and Vibration Measurements

Head Office & Calibration Laboratory Unit 14, 22 Hudson Avenue, Castle Hill NSW 2154

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Test No: G 52355			Test date:	7/01/2025		
Calibration Method		described in ACU-VIB procedu ittors and Low Frequency Transc 2023.	****	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Test Description	back-te-back n	the triaxial vibration measuring nethod as described in ISO 1606 ie DIN 45669-1.2020 Standard.				
		excited using a horizontally orier ic motion shaker, at listed freque				
Calibration Results	This report applies only to the item identified in the report and may not be reproduced in part. The Results are provided on pages 3 - 5 of this report including the uncertainity of measurements.					
Metrological Traceability Statement		ronics has accreditation under IS frequencies from 0.8 Hz to 1000		NATA for		
	are traceable to calibrated by th	ests, calibration and/or measurer the SI units system through refe the Australian National Measuren ratories demonstrating traceabili	rence equipment th ient Institute or oth	at has been		
Measurement Uncertainty Statement	coverage factor applies at the ti environmental Estimation of u	es quoted are estimated at a cont of k=2 applies unless otherwise me of measurement and takes no effects or other conditional effec incertainty at any later time shou the transducer and the manufact	stated. The uncerta account of any dri ts that may apply a ld consider the hist	iinty only fl. fterwards orical		
Sensor Sensitivity or Calibration Factor	before and afte	and permissible, the transducer r calibration at reference conditions. The values reported here are in neter display.	ms is noted from t	he system and		
		litions are at 15.915 Hz with exe		ms <sup>1</sup>		
		are in volts per meter per second Before Calibration	After Ca	libration		
	L (X)	27.38	27			
	T (Y)	26.97	27.	22		
	V (Z)	26.91	26	91		

Additional Notes

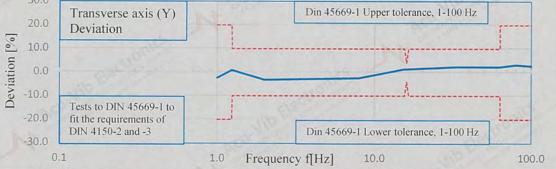
NA\*, Not Applicable, values left as found.

Unless otherwise stated, all measurements of velocity are in Peak.

	Freque	ncy respons	e and linearity SVANTEK	/ characteristi	es for
Type:		SV 803	SVIIVILIC	Serial No:	160000
Type:		izontal Geo	phone	Serial No:	3240000208
- J I			mm/sec (Pea		
			otherwise ind		
For an	plitude linea				(100 radians/sec)
			ngitudial axi		
requency	Reference		X- Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.4	-5.6%	1.70%	± 20 %
1.25	10.0	9.8	-2.3%		± 20 /0
2.00	10.0	9.6	-4.5%	1.00%	
4.00	10.0	9.2	-7.8%	1.5	± 10 %
8.00	10.0	9.9	-1.2%		
15.92	0.10	0.11	10.0%		
15.92	0.20	0.22	10.0%	1.	
15.92	0.50	0.52	4.0%		
15.92 15.92	2.00	1.02 2.04	2.0% 2.0%		
15.92	5.00	5.07	1.4%	0.90%	± 4 %
15.92	10.0	10.1	1.4%	0.9070	
15.92	20.0	20.2	1.0%	10	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.2%		
32.00	10.0	10.2	2.3%		10.0/
63.00	10.0	10.1	1.2%		± 10 %
80.00	10.0	10.2	2.3%		See the
100.00	10.0	10.1	1.2%	N 10	1 20.0/
125.00	10.0	10.0	0.0%	1.10%	± 20 %
250.00	1.0	0.9	-10.0%	115	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
20.0 Lo	ongitudinal axis () Deviation		Din	45669-1 Upper tole	rance, 1-100 Hz
. 10.0 0.0 -10.0		-		Y	
-20.0 fit	sts to DIN 45669-1 the requirements of N 4150-2 and -3		Din	45669-1 Lower tole	rance 1-100 Hz

Page 3 of 5 pages

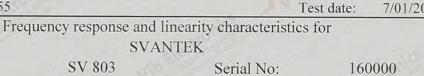
	Freque	ncy respons	e and linearity SVANTEK	v characteristi	cs for
Type:		SV 803	2 THUER	Serial No:	160000
Type:		izontal Geo	phone	Serial No:	3240000207
For an		(unless arity, applied	otherwise inc	at 15.915 Hz	response (100 radians/sec)
Frequency	Reference	Indication	<b>Y-Deviation</b>	Expanded uncertainty	Tolerance, (DIN 45669 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.8	-2.3%	1 700/	+ 20.0/
1.25	10.0	10.1	0.9%	1.70%	± 20 %
2.00	10.0	9.7	-3.1%	1.00%	
4.00	10.0	9.1	-8.7%	315	± 10 %
8.00	10.0	9.8	-2.4%		
15.92	0.10	0.11	10.0%		
15.92	0.20	0.22	10.0%		
15.92	0.50	0.51	2.0%		
15.92	1.00	1.04	4.0%		
15.92	2.00	2.03	1.5%		± 4 %
15.92	5.00	5.08	1.6%	0.90%	± + /0
15.92	10.0	10.2	1.5%		
15.92	20.0	20.3	1.6%	20	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.4%		and a second
32.00	10.0	10.2	2.3%		± 10 %
63.00	10.0	10.2	2.4%		
80.00	10.0	10.3	3.2%		
100.00	10.0	10.3	2.7%	Int	± 20 %
125.00	10.0	10.2	2.1%	1.10%	1 20 70
250.00	1.0	1.0	-5.0%		
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%



Page 4 of 5 pages

Test No: G 52355

Type:



2240000314

Vertical Geophone Type: Serial No: Constant velocity of 10 mm/sec (Peak) applied for response

SV 803

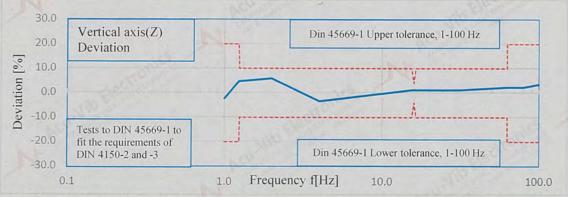
(unless otherwise indicated)

**SVANTEK** 

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

For the Vertical axis (Z-axis)

Frequency	Reference	Indication	Z-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.8	-2.3%	1.70%	± 20 %
1.25	10.0	10.5	4.7%	1.70%	± 20 %
2.00	10.0	10.6	5.9%	1.00%	and the second second
4.00	10.0	9.7	-3.4%	and the second	$\pm 10 \%$
8.00	10.0	9.9	-1.1%	35	
15.92	0.10	0.11	10.0%		
15.92	0.20	0.21	5.0%	0.90%	
15.92	0.50	0.51	2.0%		
15.92	1.00	1.03	3.0%		
15.92	2.00	2.04	2.0%		± 4 %
15.92	5.00	5.07	1.4%		± 4 70
15.92	10.0	10.1	1.2%	1	
15.92	20.0	20.0	0.2%	119	
15.92	50.0	50.7	1.4%		
16.00	10.0	10.1	1.2%		- OPIN
32.00	10.0	10.1	1.2%		± 10 %
63.00	10.0	10.2	2.3%		± 10 70
80.00	10.0	10.2	2.3%		
100.00	10.0	10.4	3.5%	n n	+ 20.0/
125.00	10.0	10.2	2.3%	1.10%	± 20 %
250.00	1.00	1.0	-2.0%	JIC .	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 5 of 5 pages -00000 End of report 00000----- 7/01/2025

**CERTIFICATE NO: G52356** 

**EQUIPMENT TESTED:** Vibration Measuring System

Manufacturer: Svantek Meter Type: SV 803

Serial No: 160001

**Owner:** Property Risk Australia 34-36 Ralph Street Alexandria, NSW 2015

Tests Performed: Measured Frequency response, Correct level display, Linearity display Comments: Detailed overleaf.

**CONDITION OF TEST:** Temperature **Relative Humidity** 

23 °C ±1° C 57 % ±5%

Date of Receipt : 07/01/2025 Date of Calibration: 07/01/2025 Date of Issue : 08/01/2025

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Procedure: Transducer)

CHECKED BY: ...

AUTHORISED SIGNATURE:

Hein Sal

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute of other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part. The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



Head Office & Calibration Laboratory Unit 14, 22 Hudson Avenue, Castle Hill NSW 2154 (02) 9680 8133 www.acu-vib.com.au

> Page 1 of 5 Calibration Certificate AVCERT15 Rev.2.0 14.04.2021



WORLD RECOGNISED ACCREDITATION Accredited Laboratory No. 9262 Acoustic and Vibration Measurements

Test No: G 52356	Test date: 7/01/202:					
Calibration Method	The method is described in ACU-VIB procedure AVP15, Calibration of Ground Vibration Monitors and Low Frequency Transducers, Revision 1.5 Authorised or 19th October 2023.					
Test Description	Each sensor of the triaxial vibration measuring system is calibrated using the back-to-back method as described in ISO 16063-21 to provide a response according to the DIN 45669-1:2020 Standard.					
	The Sensor is excited using a horizontally oriented and/or a vertically oriented simple harmonic motion shaker, at listed frequencies and amplitudes.					
Calibration Results	This report applies only to the item identified in the report and may not be reproduced in part. The Results are provided on pages 3 - 5 of this report neluding the uncertainity of measurements.					
Metrological Traceability Statement	Acu-Vib Electronics has accreditation under ISO/IEC 17025 from NATA for calibrations at frequencies from 0.8 Hz to 10000 Hz.					
No Begront	Results of the tests, calibration and/or measurements included in this document are traceable to the SI units system through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.					
Measurement Uncertainty Statement	The uncertainties quoted are estimated at a confidence level of 95% and a coverage factor of $k=2$ applies unless otherwise stated. The uncertainty only applies at the time of measurement and takes no account of any drift, environmental effects or other conditional effects that may apply afterwards. Estimation of uncertainty at any later time should consider the historical performance of the transducer and the manufacture's specifications.					
Sensor Sensitivity or Calibration Factor	Where possible and permissible, the transducer sensitivity or calibration factor before and after calibration at reference conditions is noted from the system and tabulated below. The values reported here are indicative for information only as seen from the meter display.					
	Reference conditions are at 15.915 Hz with excitation levels of 10mms <sup>-1</sup>					

Reported units are in volts per meter per second.

Channel	Before Calibration	After Calibration
L (X)	26.21	26.48
T (Y)	26.73	27.00
V (Z)	26.79	26.91

### **Additional Notes**

NA\*, Not Applicable, values left as found.

Unless otherwise stated, all measurements of velocity are in Peak.

T	1 DI		0 0	-00	51
les	st N	0.1	T	1/1	20
		· · ·	0.		20

160001

### Frequency response and linearity characteristics for SVANTEK

Serial No:

	DVAN
SV 803	00
DV 005	

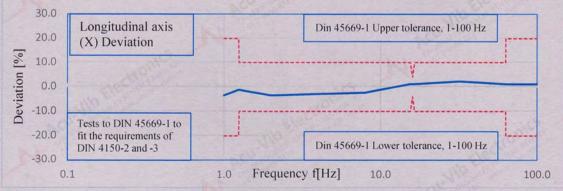
Туре: Туре:

Horizontal GeophoneSerial No:3240000211Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	X- Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.7	-3.4%	1 700/	1 20.0/
1.25	10.0	9.9	-1.2%	1.70%	± 20 %
2.00	10.0	9.7	-3.4%	1.00%	Superior States
4.00	10.0	9.2	-7.8%	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	± 10 %
8.00	10.0	9.8	-2.3%	nich.	
15.92	0.10	0.11	10.0%		
15.92	0.20	0.22	10.0%		onica
15.92	0.50	0.51	2.0%		dect
15.92	1.00	1.03	3.0%		1022
15.92	2.00	2.03	1.5%		±4%
15.92	5.00	5.04	0.8%	0.90%	±4 %
15.92	10.0	10.1	1.2%	N.	
15.92	20.0	20.4	2.1%	AV2	
15.92	50.0	50.7	1.4%	State State	
16.00	10.0	10.1	1.2%		antes .
32.00	10.0	10.2	2.3%		± 10 %
63.00	10.0	10.1	1.2%	100	± 10 %
80.00	10.0	10.1	1.2%		10°
100.00	10.0	10.1	1.2%	The second second	1 20 0/
125.00	10.0	10.0	0.0%	1.10%	± 20 %
250.00	1.0	0.9	-9.0%	acs.	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 3 of 5 pages

The state of the s	NI	0	200	-1
Test	NO.	( 1	7/1	26
rest	140.	U	240	50

160001

#### Frequency response and linearity characteristics for **SVANTEK**

### SV 803

Type: Type:

Serial No: Horizontal Geophone Serial No: Constant velocity of 10 mm/sec (Peak) applied for response

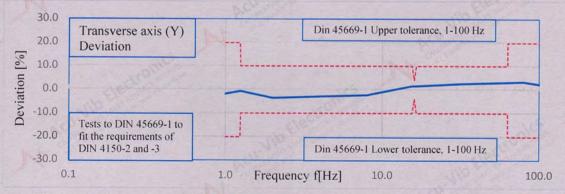
3240000353

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	Y-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
1.00	10.0	9.8	-1.9%	1 700/	1 20.0/
1.25	10.0	9.9	-0.8%	1.70%	± 20 %
2.00	10.0	9.6	-3.6%	1.00%	Ser.
4.00	10.0	9.2	-8.4%		± 10 %
8.00	10.0	9.8	-2.4%		
15.92	0.10	0.11	12.0%		and the second
15.92	0.20	0.22	10.0%		. Only
15.92	0.50	0.52	4.0%		
15.92	1.00	1.02	2.0%		
15.92	2.00	2.04	2.0%		±4%
15.92	5.00	5.04	0.8%	0.90%	± 4 %
15.92	10.0	10.1	1.3%	N.	
15.92	20.0	20.3	1.3%	MC	
15.92	50.0	50.8	1.6%	and the second	
16.00	10.0	10.1	1.4%		-opic-
32.00	10.0	10.2	2.4%		± 10 %
63.00	10.0	10.3	3.0%		± 10 %
80.00	10.0	10.3	3.2%		o Charles
100.00	10.0	10.2	2.2%		. 20.0/
125.00	10.0	10.2	2.0%	1.10%	± 20 %
250.00	1.0	1.0	-5.0%	115	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%

For the Transverse axis (Y-axis)



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 4 of 5 pages

- T	3.7	0 0	00-1	
Pet	NO	( + -	52356	
rust	INU.	U .	2550	

Type:

Type:

#### Frequency response and linearity characteristics for **SVANTEK**

SV 803 Serial No: 160001 Vertical Geophone Serial No: 2240000315

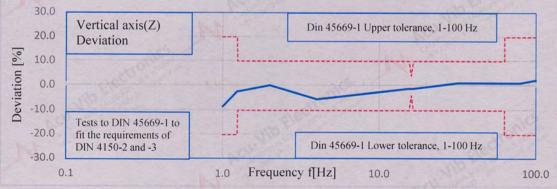
Constant velocity of 10 mm/sec (Peak) applied for response

(unless otherwise indicated)

For amplitude linearity, applied level varied at 15.915 Hz (100 radians/sec)

Frequency	Reference	Indication	Z-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
1.00	10.0	9.2	-8.5%	1.70%	+ 20.0/
1.25	10.0	9.8	-2.4%	1.70%	± 20 %
2.00	10.0	10.0	0.2%	1.00%	and the second s
4.00	10.0	9.5	-5.5%	2	± 10 %
8.00	10.0	9.6	-3.6%		
15.92	0.10	0.11	10.0%		115
15.92	0.20	0.22	10.0%		
15.92	0.50	0.54	8.0%		
15.92	1.00	1.08	8.0%		
15.92	2.00	2.03	1.5%		±4 %
15.92	5.00	5.02	0.4%	0.90%	± + /0
15.92	10.0	10.0	0.0%	1	
15.92	20.0	20.0	0.0%	oll's	
15.92	50.0	50.0	0.0%	Sec.	· · · · · · · · · · · · · · · · · · ·
16.00	10.0	9.9	-1.1%		and the second
32.00	10.0	10.1	1.2%		± 10 %
63.00	10.0	10.1	1.2%		± 10 /0
80.00	10.0	10.1	1.2%		Para .
100.00	10.0	10.2	2.4%	6.9	± 20 %
125.00	10.0	10.1	0.8%	1.10%	± 20 %
250.00	1.00	0.9	-6.0%	THE .	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%

For the Vertical axis (Z-axis)



UR\* indicates the results are non-linear and the insturment readings are under linear range

Page 5 of 5 pages ooooo End of report ooooo----

**CERTIFICATE NO: G52356** 

EQUIPMENT TESTED: Vibration Measuring System

Manufacturer: Svantek Meter Type: SV 803

Serial No: 160001

**Owner:** 

Property Risk Australia 34-36 Ralph Street Alexandria, NSW 2015

Tests Performed: Measured Frequency response, Correct level display, Linearity display Detailed overleaf. **Comments:** 

**CONDITION OF TEST:** Temperature **Relative Humidity** 

23 °C ±1° C 57 % ±5%

Date of Receipt: 07/01/2025 Date of Calibration: 07/01/2025 Date of Issue : 08/01/2025

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Procedure: Transducer)

CHECKED BY:

AUTHORISED SIGNATURE:

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

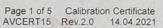
This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



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WORLD RECOGNISED ACCREDITATION Accredited Laboratory No. 9262 Acoustic and Vibration Measurements

Test No: G 52356			Test date:	7/01/2025				
Calibration Method		escribed in ACU-VIB procedure ors and Low Frequency Transdu 23.						
Test Description	back-to-back me	te triaxial vibration measuring s thod as described in 18O 16063 DIN 45669-1:2020 Standard.						
		cited using a horizontally orient motion shaker, at listed frequer						
Calibration Results	reproduced in pa	This report applies only to the item identified in the report and may not be reproduced in part. The Results are provided on pages 3 - 5 of this report including the uncertainity of measurements.						
Metrological Traceability Statement	Acu-Vib Electronics has accreditation under ISO/IEC 17025 from NATA for calibrations at frequencies from 0.8 Hz to 10000 Hz.							
	are traceable to the calibrated by the	ts. calibration and/or measurem he SI units system through refer Australian National Measurems dories demonstrating traceability	ence equipment th ent Institute or oth	at has been				
Measurement Uncertainty Statement	coverage factor c applies at the tim environmental ef Estimation of un	a quoted are estimated at a confi of k=2 applies unless otherwise a c of measurement and takes no fects or other conditional effects certainty at any later time should be transducer and the manufact.	stated. The uncert: account of any dri s that may apply a I consider the hist	ainty only fi, fterwards. orical				
Sensor Sensitivity or Calibration Factor	hefore and after a	nd permissible, the transducer s alibration at reference condition The values reported here are ind ter display.	is is noted from t	he system and				
	Reference conditions are at 15.915 Hz with excitation levels of 10mms <sup>-1</sup>							
	-	e in volts per meter per second.	(					
	Channel L (X)	Before Calibration 26.21	After Ca 26					
	T.(Y)	26.73	27					
	N (Z)	26.79	26.					
Additional Notes		able; values left as found. stated, all measurements of vel-	ocity are in Peak.					

•

Typ Typ	ne.		<b>SVANTEK</b>	characteristi	65 101	
		SV 803	SVANIEK	Serial No:	160001	
1 1 1		rizontal Geo	nhone	Serial No:	3240000211	
1			0 mm/sec (Pea			
For		(unless arity, applie	s otherwise ind	licated) at 15.915 Hz	(100 radians/sec)	
Frequenc	y Reference	Indication	X- Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06	
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%	
1.00	10.0	9.7	-3.4%	1.70%	± 20 %	
1.25	10.0	9.9	-1.2%	1./0/0	± 20 70	
2.00	10.0	9.7	-3.4%	1.00%		
4.00	10.0	9.2	-7.8%	100	± 10 %	
8.00	10.0	9.8	-2.3%	01		
15.92	0.10	0.11	10.0%			
15.92	0.20	0.22	10.0%			
15.92	0.50	0.51	2.0%			
15.92	1.00	1.03	3.0%			
15.92	2.00	2.03	1.5%		± 4 %	
15.92	5.00	5.04	0.8%	0.90%		
15.92	10.0	10.1	1.2%	15 27		
15.92	20.0	20.4	2.1%	25		
15.92	50.0	50.7	1.4%			
16.00	10.0	10.1	1.2%			
32.00 63.00	10.0	10.2 10.1	2.3% 1.2%		± 10 %	
80.00	10.0	10.1	1.2%		A STATE OF S	
100.00	10.0	10.1	1.2%			
125.00	10.0	10.1	0.0%	1.10%	± 20 %	
250.00	1.0	0.9	-9.0%	1.1070		
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%	

1.0

Tests to DIN 45669-1 to fit the requirements of DIN 4150-2 and -3

-20.0

-30.0

0.1

Page 3 of 5 pages

Frequency f[Hz]

Din 45669-1 Lower tolerance, 1-100 Hz

100.0

10.0

	Freque	ncy respons	e and linearity SVANTEK	y characteristi	cs for
Тур	<b>.</b> .	SV 803	SVANIEK	Serial No:	160001
Тур		izontal Geo	nhone	Serial No:	3240000353
Type			mm/sec (Pea		
	Constant v		otherwise ind		response
For a	mplitude line				(100 radians/sec)
101 a	inpittude inter		ransverse axi		(100 faulalis/sec)
Frequency	Reference		Y-Deviation	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.8	-1.9%	095 70	70
1.25	10.0	9.9	-0.8%	1.70%	± 20 %
2.00	10.0	9.6	-3.6%	1.00%	1982
4.00	10.0	9.2	-8.4%	1.0070	± 10 %
8.00	10.0	9.8	-2.4%	ale.	
15.92	0.10	0.11	12.0%	Martine 1	
15.92	0.20	0.22	10.0%		
15.92	0.50	0.52	4.0%		
15.92	1.00	1.02	2.0%		
15.92	2.00	2.04	2.0%	0.90%	±4%
15.92	5.00	5.04	0.8%		± 4 %
15.92	10.0	10.1	1.3%	24	
15.92	20.0	20.3	1.3%	00	
15.92	50.0	50.8	1.6%		
16.00	10.0	10.1	1.4%		
32.00	10.0	10.2	2.4%	2	± 10 %
63.00	10.0	10.3	3.0%		
80.00	10.0	10.3	3.2%		
		10.2	2.2%	1.100/	± 20 %
125.00	10.0	10.2	2.0%	1.10%	
100 20					
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
250.00 Hz	1.0 mms <sup>-1</sup>	1.0 mms <sup>-1</sup>	-5.0% %	U <sub>95</sub> %	%
30.0	ransverse axis (`		Din	45669-1 Upper toler	ance 1-100 Hz
<sup>20.0</sup> E	Deviation	1)	Dill	totor i opper toter	
10.0 0.0 -10.0	- All				
0.0				Y	
-10.0			0	Å	
	ests to DIN 45669-1		018-11		
	t the requirements of IN 4150-2 and -3	· · · · ·	Din	45669-1 Lower toler	ance 1-100 Hz
-30.0	111 +150-2 and -5		Dill	10009-1 Lower toler	

Frequency f[Hz] 1.0

100.0

10.0

UR\* indicates the results are non-linear and the insturment readings are under linear range

0.1

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Test No	: G 52356	16			Test date: 7/01/202
	Freque	ency respons	e and linearity SVANTEK	y characteristi	cs for
Ty	pe:	SV 803		Serial No:	160001
Ty	pe: Ve	ertical Geop	hone	Serial No:	2240000315
	Constant v	elocity of 10	mm/sec (Pea	(k) applied for	
			otherwise inc		D.G.W. S. P.
For	amplitude line	arity, applied	d level varied	at 15.915 Hz	(100 radians/sec)
	and the second		Vertical axis		
	- 5 0 Table 1			Ernandad	Talamanaa (DINI 45660
Frequenc	y Reference	Indication	<b>Z-Deviation</b>	Expanded uncertainty	Tolerance, (DIN 45669- 1:2020-06
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U <sub>95</sub> %	%
1.00	10.0	9.2	-8.5%	1.70%	± 20 %
1.25	10.0	9.8	-2.4%	1.70%	± 20 %
2.00	10.0	10.0	0.2%	1.00%	
4.00	10.0	9.5	-5.5%		± 10 %
8.00	10.0	9.6	-3.6%		
15.92	0.10	0.11	10.0%	1- 133	
15.92	0.20	0.22	10.0%	-	
15.92	0.50	0.54	8.0%		
15.92	1.00	1.08	8.0%	1	
15.92	2.00	2.03	1.5%		±4 %
15.92	5.00	5.02	0.4%	0.90%	- 1 /0
15.92	10.0	10.0	0.0%	a P	
15.92	20.0	20.0	0.0%	at a	
15.92	50.0	50.0	0.0%		
16.00	10.0	9.9	-1.1%		10
32.00	10.0	10.1	1.2%		± 10 %
63.00	10.0	10.1	1.2%		100
80.00	10.0	10.1	1.2%		
100.00	10.0	10.2	2.4%	h.	± 20 %
125.00	10.0	10.1	0.8%	1.10%	- 20 /0
250.00	1.00	0.9	-6.0%	Sec.	1
Hz	mms <sup>-1</sup>	mms <sup>-1</sup>	%	U95 %	%
M		hi	1. N. T. T.		Clean and
30.0	Vertical axis(Z)	IL Nº	Din 4	5669-1 Upper tolera	ance 1-100 Hz
20.0	Deviation		Din 4	- opper totel	
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		1.		Y	
0.0		1	~	Å	
-10.0	Tests to DIN 45669-	to	0.022		
-20.0	fit the requirements of DIN 4150-2 and -3		Din	45669-1 Lower tole	rance, 1-100 Hz
-30.0 L			Frequency f[Hz		

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**CERTIFICATE NO: G36473** 

**EQUIPMENT TESTED:** Ground Vibration Monitor

Manufacturer:	Svantek
Meter Type:	SV-803
Transducers A:	Triaxial

Serial No: 141562 Serial No: 141562

**Owner:** 

Property Risk Australia (ACT) Pty Ltd U2, 5-7 Kemble Court Mitchell, ACT 2911

Tests Measured Frequency response, Correct level display, **Performed: Comments:** 

Linearity display Detailed overleaf.

**CONDITION OF TEST:** Temperature **Relative Humidity** 

22 °C ±1° C 38 % ±5%

Date of Receipt : 14/08/2023 Date of Calibration: 14/08/2023 Date of Issue : 14/08/2023

Hein Soe

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency Transducer) based on AS2187.2 & DIN45669-1 **Procedure:** 

**CHECKED BY:** 

**AUTHORISED SIGNATURE:** 

Accredited for compliance with ISO/IEC 17025 - Calibration Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part. The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



WORLD RECOGNISED Accredited Lab No. 9262 Acoustic and Vibration Measurements

Acu-Vib Electronics CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory Unit 14, 22 Hudson Ave. Castle Hill NSW 215-(02) 9680 8133 www.acu-vib.com.au

Page 1 of 2 **Calibration Certificate** AVCERT15 Rev.2.0 14.04.2021

Frequency response and linearity characteristics forI Vibration Monitor typeSV 803Serial No.141562Geophone TypeTriaxialSerial No.141562Constant velocity of 10 mm/sec Peak applied for responseConstant velocity of 10 mm/sec Peak applied for response141562(Except at 250.0 Hz where applied level limited to 1.0 mm/s peak)For amplitude linearity applied level varied at 15.915 Hz15.915 Hz

Free	quency	Expected indication mm/sec	Indication mm/sec Peak			Expanded uncertainty
Hz	Radians/se c	Peak	X Channel	Y Channel	Z Channel	U <sub>95</sub> %
0.796	5.0	10	NA	NA	NA	1.25%
1.592	10.0	10	10.6	10.8	10.7	1.25%
3.183	20.0	10	10.2	10.4	10.6	1.00%
4.775	30.0	10	10.0	10.1	10.4	0.90%
7.958	50.0	10	10.0	10.1	10.2	0.90%
15.915	100.0	0.5	0.52	0.53	0.55	0.90%
15.915	100.0	6.62 1	1.04	1.04	1.05	0.90%
15.915	100.0	5	5.07	5.06	5.12	0.90%
15.915	100.0	10	10.2	10.1	10.2	0.90%
15.915	100.0	20	20.4	20.3	20.7	0.90%
15.915	100.0	50	50.7	50.6	51.3	0.90%
15.915	100.0	100	102.3	101.5	103.5	0.90%
31.831	200.0	10	10.2	10.2	10.4	0.50%
79.577	500.0	10	10.4	10.3	10.4	0.50%
159.16	1000.0	10	10.5	10.7	10.8	0.50%
250.00	2000.0	1	1.09	1.19	1.07	0.50%

Note1: The laboratory has accreditation under ISO/IEC 17025 from NATA for calibration to ISO 16063-21 at frequencies from 0.5 Hz to 5kHz. Measurements at all frequencies and levels shown in the table above are made using reference equipment traceably calibrated to Australian National Standards.

Note2:

2: The uncertainties quoted are estimated at a confidence level of 95% and a coverage factor of k=2 applies unless otherwise stated.

Page 2 of 2 End of Certificate