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BANK STREET MARINA

Operational Noise and Vibration Management Plan

22 May 2020

(AOC)All Occasions Cruses Pty Ltd and (BBM) Blackwattle Bay Marina Pty Ltd

TJ524-07F01 NVMP (r2)

35 1982-2017 ACOUSTIC ENGINEERING EXCELLENCE

Sydney Melbourne Brisbane Gold Coast Kuwait Singapore
Renzo Tonin & Associates ABN 29 117 462 861
Level 1/418A Elizabeth St SURRY HILLS NSW 2010 | PO Box 877 STRAWBERRY HILLS NSW 2012
P (02) 8218 0500 F (02) 8218 0501 sydney@renzotonin.com.au www.renzotonin.com.au

aaac Association of Australian Acoustical Consultants

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Attention:	Joe Goddard

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Contents

List of tables

List of figures

1 Introduction

Renzo Tonin & Associates was engaged to prepare an Operational Noise and Vibration Management Plan (NVMP) for Bank Street Marina (the Facility), located at 5-11 Bank Street, Pyrmont. Renzo Tonin have previously prepared an acoustic assessment which addressed operational and construction noise and vibration impacts from the development [ref: *TJ524-01F02 (r5) Acoustic Assessment*, dated 24 November 2017] (*Acoustic Assessment*).

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

2 Ministers Conditions

This NVMP has been prepared in accordance with the EPA's Industrial Noise Policy (INP) to meet the Ministers Approval (MP 11_0001) conditions D5, E3, E4, E5, E6 and E7. Compliance with the conditions is outlined in Table 2.1.

Table 2.1: Existing and proposed modified conditions

Condition	Requirement	Reference
Ministers Approval (MP 11_0001)		
D5	**Operational Noise and Vibration Management Plant**	
	Prior to occupation or commencement of the use, an Operational Noise and Vibrations Management Plan (NVMP) prepared by a suitably qualified persons shall be submitted to the Secretary for approval. The NVMP must be prepared in consultation with Council and the EPA. The NVMP shall include (but not be limited to):	Renzo Tonin & Associates is AAAC accredited and the author(s) of this plan are current Members of the Australian Acoustic Society.
	a) Be prepared to accordance with the EPA's Industrial Noise Policy;	This plan and noise limits (Section 3.4) has been prepared in accordance with INP.
	b) Identify nearby sensitive receivers and land uses;	Section 3.3 and Figure 1
	c) Identify the noise limits applying to the development;	Section 3.4
	d) Identify all key sources of operational noise and vibration;	Section 3.5
	e) Details of all reasonable and feasible management and mitigation measures to be implemented to minimise noise and vibration;	Section 4.1
	f) Be consistent with and incorporate all relevant recommendations and mitigation measures outlines in the Acoustics report (Ref: TJ524-01F02 (r5)), dated 24 November 2017, and the Response to comments dated 12 February 2018, both prepared by Renzo Tonin & Associates;	Section 4.1
	g) Include a suitable proactive noise and vibration monitoring program which aims to ensure the noise and vibrations criteria in this approval are not exceeded.	Section 4.2
	Prior to commencement of use, a copy of the approved NVMP must be submitted to Council, the Secretary and the EPA.	Noted

<table>
<tr><th>Condition</th><th>Requirement</th><th>Reference</th></tr>
<tr><td>E3</td><td>Noise Limits – General Operation – Intrusiveness</td><td></td></tr>
<tr><td></td><td>The proponent must ensure that the noise generated by the development does not exceed the noise limits at the residential receivers identified in the table below:
<table>
<tr><th>Residential Receiver Number and Location*</th><th>Noise limit (7 am to 6 pm) LAeq(15 minute) dB(A)</th><th>Noise limit (6 pm to 10 pm) LAeq(15 minute) dB(A)</th><th>Noise limit (10 pm to 1 am) LAeq(15 minute) dB(A)</th></tr>
<tr><td>2 Bowman Street, Pyrmont</td><td>63</td><td>61</td><td>57</td></tr>
<tr><td>1 Distillery Drive, Pyrmont</td><td>63</td><td>61</td><td>57</td></tr>
<tr><td>2 Distillery Drive, Pyrmont</td><td>63</td><td>61</td><td>57</td></tr>
<tr><td>120 Saunders Street, Pyrmont</td><td>63</td><td>61</td><td>57</td></tr>
</table>
Note: Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.</td><td>Section 3.4 and Section 4.2</td></tr>
<tr><td>E4</td><td>Noise Limits – General Operation – Amenity</td><td></td></tr>
<tr><td></td><td>The proponent must ensure that the noise generated by the development does not exceed the noise limits at the residential receivers identified in the table below:
<table>
<tr><th>Residential Receiver Number and Location*</th><th>Noise limit (7 am to 6 pm) LAeq dB(A)</th><th>Noise limit (6 pm to 10 pm) LAeq dB(A)</th><th>Noise limit (10 pm to 1 am) LAeq dB(A)</th></tr>
<tr><td>2 Bowman Street, Pyrmont</td><td>60</td><td>50</td><td>45</td></tr>
<tr><td>1 Distillery Drive, Pyrmont</td><td>60</td><td>50</td><td>45</td></tr>
<tr><td>2 Distillery Drive, Pyrmont</td><td>60</td><td>50</td><td>45</td></tr>
<tr><td>120 Saunders Street, Pyrmont</td><td>60</td><td>50</td><td>45</td></tr>
</table>
Note: Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.</td><td>Section 3.4 and Section 4.2</td></tr>
<tr><td>E5</td><td>Noise Control – Plant and Machinery</td><td></td></tr>
<tr><td></td><td>Noise associated with the operation of any plant, machinery or other equipment on the site, shall not give rise to any one or more of the following:
a) Transmission of ‘offensive noise’ as defined in the Protection of the Environment Operations Act 1997 to any place of different occupancy;
b) A sound pressure level at any affected residential property that exceeds the background (LA90, 15 minute) noise level by more than 5dB(A). The background noise level must be measured in the absence of noise emitted from the premises. The source noise level must be assessed as a LAeq, 15 minute; or
c) Exhibit tonal, impulsive or other annoying characteristics.</td><td>Section 3.4 and Section 4.2</td></tr>
<tr><td>E6</td><td>Noise Monitoring</td><td></td></tr>
<tr><td></td><td>During general operations, the Proponent shall undertaken noise monitoring to confirm compliance with the noise limits in Conditions E3 and E4 of this Approval. In the event that compliance with the noise limits is not achieved, suitable attenuation measures must be implemented to achieve compliance and the NVMP required under Condition D5 be updated to include such measures.</td><td>Section 4.2</td></tr>
<tr><td>E7</td><td>Amplified Music</td><td></td></tr>
<tr><td></td><td>Amplified music from vessels is prohibited at all times when vessels are berthed at the marina.</td><td>Section 4.1</td></tr>
</table>

3 Project operation, sensitive receivers & compliance standards

3.1 Project operation

Figure 1 shows an aerial photograph of the site and surrounding areas. The Facility includes berths for 22 vessels, as well as offices, goods storage areas, waste disposal areas, and a carpark with two car spaces. Figure 2 shows the proposed layout of the site.

The primary use of the site will be the mooring of charter vessels and land-based storage of associated provisions. Only minor maintenance and cleaning works will occur at the site. No embarkation or disembarkation of patrons will occur at the site. The main pick up points are at Star City, King Street Wharf, and the Opera House.

3.2 Hours of operation

The site's hours of operation will vary depending on cruise bookings, but during peak periods will generally be from 7:00am to 1:00am Monday to Sunday. Hours of operation is further summarised in the table below:

Table 3.1: Facility hours of operation

Activity	Time
General activities (offices, marina, boat movements etc)	7am to 1am, 7 days per week.
Waste Collection	7am to 6pm Monday to Friday. 8am to 1pm on Saturday and Sunday.
Minor servicing, maintenance of Vessels and sewerage pump out	7am to 6pm 7 days and week.
Loading dock, deliveries and on-site vehicle movements	7am to 6pm Monday to Friday. 8am to 1pm Saturday and Sunday.
Forklift activities (for waste removal)	7am to 8pm Monday to Friday. 7am to 1pm Saturday and Sundays.

3.3 Identified receivers

The nearest receivers to the project are listed in Table 3.2 and shown in Figure 1.

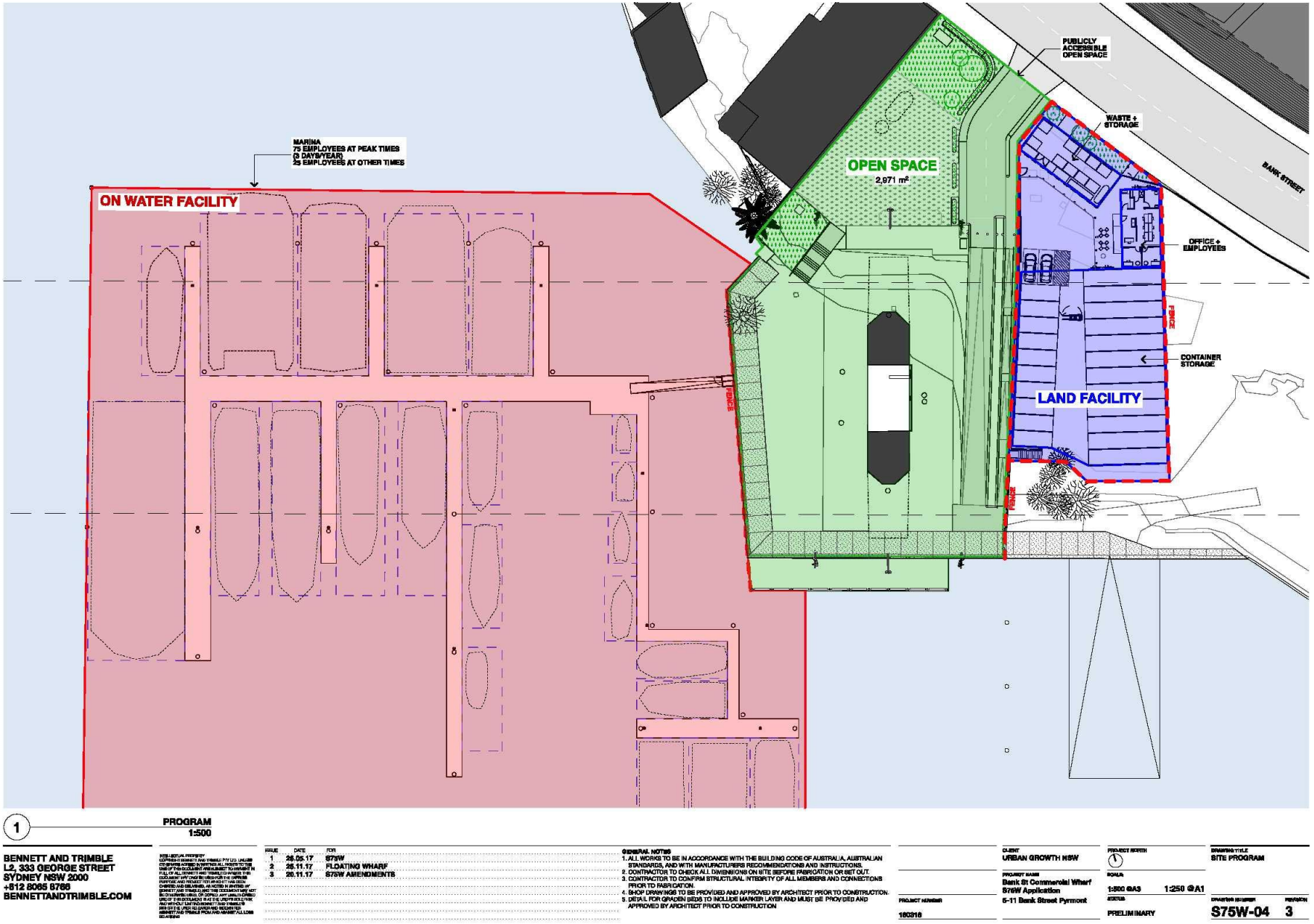
Table 3.2: Assessment locations

ID	Receiver address	Assessment location	Receiver type
R1	2 Bowman Street, Pyrmont	Nearest balcony	Residential
R2	1 Distillery Drive, Pyrmont	Nearest balcony	Residential
R3	2 Distillery Drive, Pyrmont	Nearest balcony	Residential
R4	120 Saunders Street, Pyrmont (Bayview Towers)	Nearest balcony	Residential

ID	Receiver address	Assessment location	Receiver type
R5	21-19 Bank Street, Pyrmont	Site boundary	Industrial
R6	Blackwattle Bay Park, Glebe	Park boundary	Passive recreation
R7	Glebe Point, Glebe	Park boundary	Passive recreation

Figure 1: Bank Street Marina site locality map

Figure 2: Bank Street Marina layout



3.4 Project specific noise criteria

The project specific noise criteria for the Facility was established in the *Acoustic Assessment*, which was in accordance with the INP. The criteria for the Facility is presented in Table 3.3.

Table 3.3: Project specific criteria, dB(A)

Receiver type	Time period	$L_{Aeq(15min)}$ Intrusiveness criteria[1]	$L_{Aeq(Period)}$ Amenity criteria[2]	Sleep disturbance criteria, 10pm - 7am, $L_{A1,1min}$ (or L_{Amax})[1]
Residential (R1-R4)	Day	63	60	67
	Evening	61	50	67
	Night	57	45	67
Industrial (R5)	All	-	70	-
Passive recreation (R6-R7)	All	-	50	-

Note:

1 Conservatively based on Renzo Tonin and Associates established criteria / measured background noise levels

2 Conservatively based on SLR established criteria

Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am

On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.

3.5 Operational sources

3.5.1 Noise

The operational noise sources and associated sound power levels for the INP intrusive/amenity assessment and sleep disturbance assessment are respectively shown in Table 3.4 and Table 3.5.

Table 3.4: Time-weighted intrusive and amenity assessment sound power levels

Plant item	Sound Power Level $L_{Aeq(15min)}$	Intrusive Adjusted $L_{Aeq(15min)}$	Amenity Adjusted $L_{Aeq(Period)}$		
			Day	Evening	Night
Seven Star engines	83	83	73 (1 hr)	74 (0.5 hrs)	67 (0.25hrs)
Sunseeker engines	89	89	79 (1 hr)	80 (0.5 hrs)	73 (0.25hrs)
Bella Vista engines	97	97	87 (1 hr)	88 (0.5 hrs)	81 (0.25hrs)
Bella Vista reverse thrusters	104	92 (1 min)	70 (4 mins)	71 (2mins)	65 (1mins)
Aussie Magic engines	94	94	84 (1 hr)	85 (0.5 hrs)	78 (0.25hrs)
Sewage pump	83	83	83 (11hr)	83 (4 hrs)	83 (9 hrs)
Refrigeration unit	85	85	85 (11hr)	85 (4 hrs)	85 (9 hrs)
Forklift	88	88	88 (11hr)	85 (2 hrs)	N/A (not in use)
Car	89	89	81 (44 movements)	77 (16 movements)	71 (4 movements)

Plant item	Sound Power Level $L_{Aeq(15min)}$	Intrusive Adjusted $L_{Aeq(15min)}$	Amenity Adjusted $L_{Aeq(Period)}$		
			Day	Evening	Night

Note:

Daytime 7.00 am to 6.00 pm (11 hour period); Evening 6.00 pm to 10.00 pm (4 hour period); Night-time 10.00 pm to 7.00 am (9 hour period);

On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.

Information in brackets ( ) indicates the operation duration per period or the number of movements for the period.

It has been assumed that a boat could move up to four times during the day, twice during the evening, and once at night

Table 3.5: Sleep disturbance sound power levels

Noise source description	Metric	Overall dB(A)
Vehicle door closing, Lw	L_{A1}	100
Metal clang	L_{Amax}	116
Bella Vista Reverse Thrusters	L_{Amax}	105

3.5.2 Vibration

As per the *Acoustic Assessment* there are no items of equipment capable of generating high levels of vibration and given the distance to the nearest sensitive receiver (35 metres), vibration impacts are not expected to be an issue for the Facility. Nevertheless, in the unlikely event that a vibration complaint will arise, the complaint management procedure within APPENDIX C has included vibration so that potential impacts can be managed.

4 Management Plan

4.1 Management procedure

The following mitigation measures will be implemented and managed by the facility manager to mitigate potential impacts:

Physical and equipment control measures

1. A roof over waste enclosure area will be maintained.
2. The sewage pump has been fitted with an acoustic shield/enclosure, which has been designed to achieve the noise levels in Table 3.4.
3. No use of the forklift after 8:00pm.
4. Delivery and waste trucks limited to daytime hours only and must not idle at Bank Street entrance.
5. Machinery used to handle waste shall emit low level noise at all times.
6. Vessels will minimise use of horns, vehicles will minimise reversing indicators.

Management measures

1. Noise policy is to be displayed and demonstrated by Facility.
2. Strict compliance with Facility Hours of Operations shown in Table 3.1.
3. Employees shall monitor noise levels from all possible sources at the Facility.
4. No passengers are permitted to embark or disembark from vessels at any time at the Facility.
5. Vessels returning late at night shall comply with waste management procedures.
6. Amplified music from vessels shall not be permitted at the Facility or navigating near the Facility.
7. All persons attending the Facility will be Inducted and instructed not to use loud or unacceptable language.
8. The Facility manager is to establish a complaints program, utilising the Noise and Vibration Complaint Management Procedure identified in APPENDIX C of this report.

No operational vibration mitigation measures are necessary other than having the documentation in place to address any vibration complaints.

4.2 Noise monitoring program

The following approach will be adopted with regard to noise monitoring during the operation of the Facility. Details of the procedures for noise monitoring are presented in APPENDIX B.

Within three months of the facility operating and at periodic times during the first 12 months of operations, noise monitoring will be undertaken by a qualified acoustic engineer to verify that the Facility is complying with the noise criteria set within Table 3.3. A mixture of long-term (unattended) and short-term attended monitoring will be undertaken. Given the amount of extraneous noise sources in the vicinity of the site (i.e. road traffic and other unrelated commercial/industrial noise), primarily short-term attended noise monitoring will be undertaken, so that Facility noise emission can be more readily quantified. Details of the procedures for noise monitoring are presented in APPENDIX B, which outlines both long-term and short-term methodologies.

The noise monitoring program is outlined in Table 4-1 and the noise monitoring locations are identified in Table 4 2.

Table 4-1: Nominated monitoring program

Period	Frequency / type of monitoring	Location	Personal	Equipment	Documentation
Within 3 months of facility operating	2 nights of short-term attended 2 weeks of unattended long-term[1]	3 locations identified in Table 4-2	Qualified Acoustic engineer	Type 1 instrument	Prepare a noise compliance report
Month 3-6	1 night of short-term attended				
Month 6-9	1 night of short-term attended				
Month 9-12	1 night of short-term attended				
Month 0-12	A monthly basis		Marine Supervisor	Type 2 instrument	Document findings

Notes 1 Where access for long-term noise monitoring cannot be obtained short-term monitoring will be conducted

The noise monitoring locations are identified in Table 4-2. These locations have been selected as they present the best opportunity to determine compliance, as predicted noise levels within the *Acoustic Assessment* were highest at these locations. Noise monitoring shall be undertaken when the Facility is running at or near full capacity and should be undertaken at night-time (i.e. between 11pm and 1am) when background noise levels are lowest, and emissions can be more readily quantified.

Attended monitoring on private property is subject to obtaining the property owner/occupier's consent (where required). In cases, where access isn't possible, alternative measurement locations have been provided.

Table 4-2: Nominated monitoring locations

ID	Receiver address	Possible Monitoring location	Receiver type
R1	2 Bowman Street, Pyrmont	Nearest operable window[1]	Residential
		Alternative: At ground level adjacent to the southern façade of the building (a pole is to be used to maximise microphone height)	

ID	Receiver address	Possible Monitoring location	Receiver type
R2	1 Distillery Drive, Pyrmont	Nearest balcony	Residential
		Alternative: On the public stairs adjacent to the eastern facade of the building	
R4	120 Saunders Street, Pyrmont (Bayview Towers)	Nearest balcony	Residential
		Alternative: At the edge of the rock wall, behind the fence, overlooking Bank Street	

Note:

1 This property has no balconies overlooking the facility

Monitoring on private property is subject to owner consent and where relevant, occupier consent

If compliance monitoring shows that the external noise levels are above the noise criteria set within Table 3.3, investigation will be undertaken to understand the cause of the exceedance and additional mitigation and management measures will be implemented.

In addition, in the event of a complaint or at the request of the regulatory authorities, attended noise monitoring will be undertaken to verify that the Facility is complying with the noise criteria set within Table 3.3. As well as monitoring at the property of the complaintive, additional nominated monitoring locations are identified in Table 4-2. In the event of a complaint, the Complaint Management Procedure identified in APPENDIX C of this report will be adopted.

Vibration monitoring is not required unless in the event of a complaint. In which case, the Noise and Vibration Complaint Management Procedure identified in APPENDIX B will be adopted.

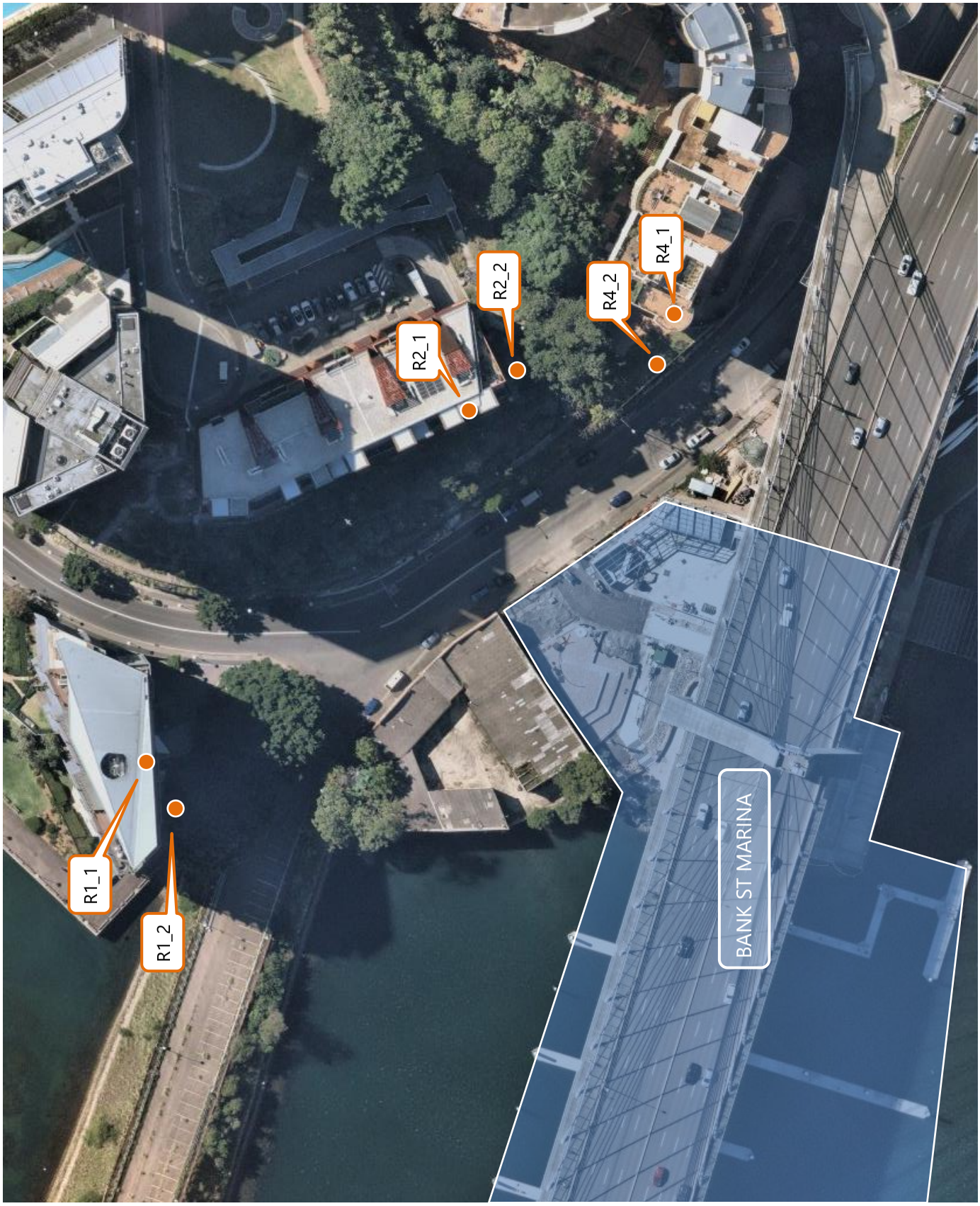


Figure 3: Bank Street Marina noise monitoring locations

4.3 Complaints management

Noise and vibration levels generated by the operation of the Facility must aim to comply with the noise criteria set within the NVMP and any vibration goals set be the relevant regulations and guidelines.

The Facility manager is responsible for implementing this NVMP and ensuring that all mitigation measures are implemented such as the provision of a complaints program, to minimise the generation of excessive noise and/or vibration levels from the site to nearby sensitive areas.

Owners and occupants of nearby affected properties are to be informed, by direct mail, of a direct telephone line and contact person where any noise and/or vibration complaints related to the operation of the Facility can be reported.

All noise and/or vibration complaints shall be investigated in accordance with the Noise and Vibration Complaint Management Procedure identified in APPENDIX C of this report.

5 Conclusion

The Operational Noise and Vibration Management (NVMP) has been prepared to address operational of the Bank Street Marina, located at 5-11 Bank Street, Pyrmont. The purpose of the plan is to demonstrate to council, the Secretary and the EPA that the facility is capable of achieving compliance with the relevant noise objective and therefore minimise disturbance to neighbours.

The plan provides the mitigation measures that are to be implemented and managed by the facility manager, a noise monitoring program and a complaints procedure to minimise the generation of excessive noise and/or vibration levels from the site to nearby sensitive areas.

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 110dB Operating a chainsaw or jackhammer 120dB Deafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.

L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Specification for noise monitoring

B.1 Scope

This document specifies methods for undertaking noise monitoring during Facility operation.

B.2 Referenced Standards and Guidelines

- Australian Standard AS IEC 61672.1 2004 '*Electroacoustics - Sound Level Meters - Specifications*'
- Australian Standard AS 1259.2-1990 '*Acoustics - Sound Level Meters*'
- Australian Standard AS 1055-1997 '*Acoustics - Description and Measurement of Environmental Noise*'
- NSW '*Industrial Noise Policy*' (Environment Protection Authority 2000)

B.3 Testing Procedures

The following procedures are to be followed by personnel suitably qualified and experienced in undertaking acoustic measurements.

All noise monitoring equipment used must be at least Type 2 instruments as described in AS 1259.2-1990 and calibrated to standards that are traceable to Australian Physical Standards held by the National Measurement Laboratory (CSIRO Division of Applied Physics). The calibration of the monitoring equipment shall also be checked in the field before and after the noise measurement period, and in the case of long-term noise monitoring, calibration levels shall be checked at minimum weekly intervals.

Long-term noise monitoring equipment or Noise Loggers, consist of sound level meters housed in weather resistant enclosures. The operator may retrieve the data at the conclusion of each monitoring period in person or remotely if the logger is fitted with mobile communications.

All environmental noise measurements shall be taken with the following meter settings:

- Time constant: FAST (ie 125 milliseconds)
- Frequency weightings: A-weighting
- Sample period: 15 minutes

All outdoor noise measurements shall be undertaken with a windscreen over the microphone. Windscreens reduce wind noise at the microphones.

Measurements of noise should be disregarded when it is raining and/or the wind speed is greater than 5m/s (18km/h).

B.4 Long-Term (Unattended) Noise Monitoring

Noise monitoring shall be undertaken in accordance with the environmental noise measurement requirements stipulated in the reference standards and documents listed above.

Noise monitoring equipment should be placed at positions which have unobstructed views of general site activities, while acoustically shielded as much as possible from non-site noise (eg. road traffic and other unrelated commercial/industrial noise).

Noise levels are to be recorded at a minimum rate of 10 samples per second. Every 15 minutes, the data is to be processed statistically and stored in memory. The minimum range of noise metrics to be stored in memory for later retrieval is the following A-weighted noise levels: L_{min}, L_{90}, L_{eq}, L_{10}, L_1 and L_{max}.

Where the noise monitors are placed within 3.5 metres of building facades, walls or cliffs, then a reflection correction of up to -2.5dB(A) shall be applied to remove the effect of increased noise due to sound reflections from such structures. Presence of impulsive and tonal noise, and subsequent penalty, is to be determined in accordance with the provisions of Table 4.1 Modifying Factor Corrections of INP. Attended measurements may be required to determine modifying factor corrections in the first instance.

Meteorological conditions including wind velocity, wind direction and rainfall shall be monitored over the entire noise monitoring period, either on site or recorded from the nearest weather station to the project site.

B.5 Short-Term (Attended) Monitoring

Where noise complaints or requests from relevant authorities are received, attended short-term noise monitoring may be conducted at the requested location and at any other relevant noise receiver location with closest proximity to the facility activities.

Short-term noise monitoring could be used to supplement long-term noise monitoring undertaken at nearby locations, and to establish whether noise levels measured by the long-term noise monitors are determined by facility activities.

All attended short-term noise monitoring shall be recorded over 15 minute sample intervals. Noise levels are to be recorded at a minimum rate of 10 samples per second. Every 15 minutes, the data is to be processed statistically and stored in memory. The minimum range of noise metrics to be stored in memory and reported is the following A-weighted noise levels: L_{min}, L_{90}, L_{eq}, L_{10}, L_1 and L_{max}.

In addition to measuring and reporting overall A-weighted noise levels, statistical L_{90}, L_{eq}, L_{10} noise levels shall be measured and reported in third-octave band frequencies from 31.5Hz to 8kHz.

Where the noise monitors are placed within 3.5 metres of building facades, walls or cliffs, then a reflection correction of up to -2.5dB(A) shall be applied to remove the effect of increased noise due to sound reflections from such structures. Presence of impulsive and tonal noise, and subsequent penalty, is to be determined in accordance with the provisions of Table 4.1 Modifying Factor Corrections of INP.

Outdoor noise monitoring is to be undertaken with the microphone at a height of 1.2 – 1.5m from the ground, unless noise measurements are taken from a balcony or veranda, in which case the same microphone height shall apply off the floor.

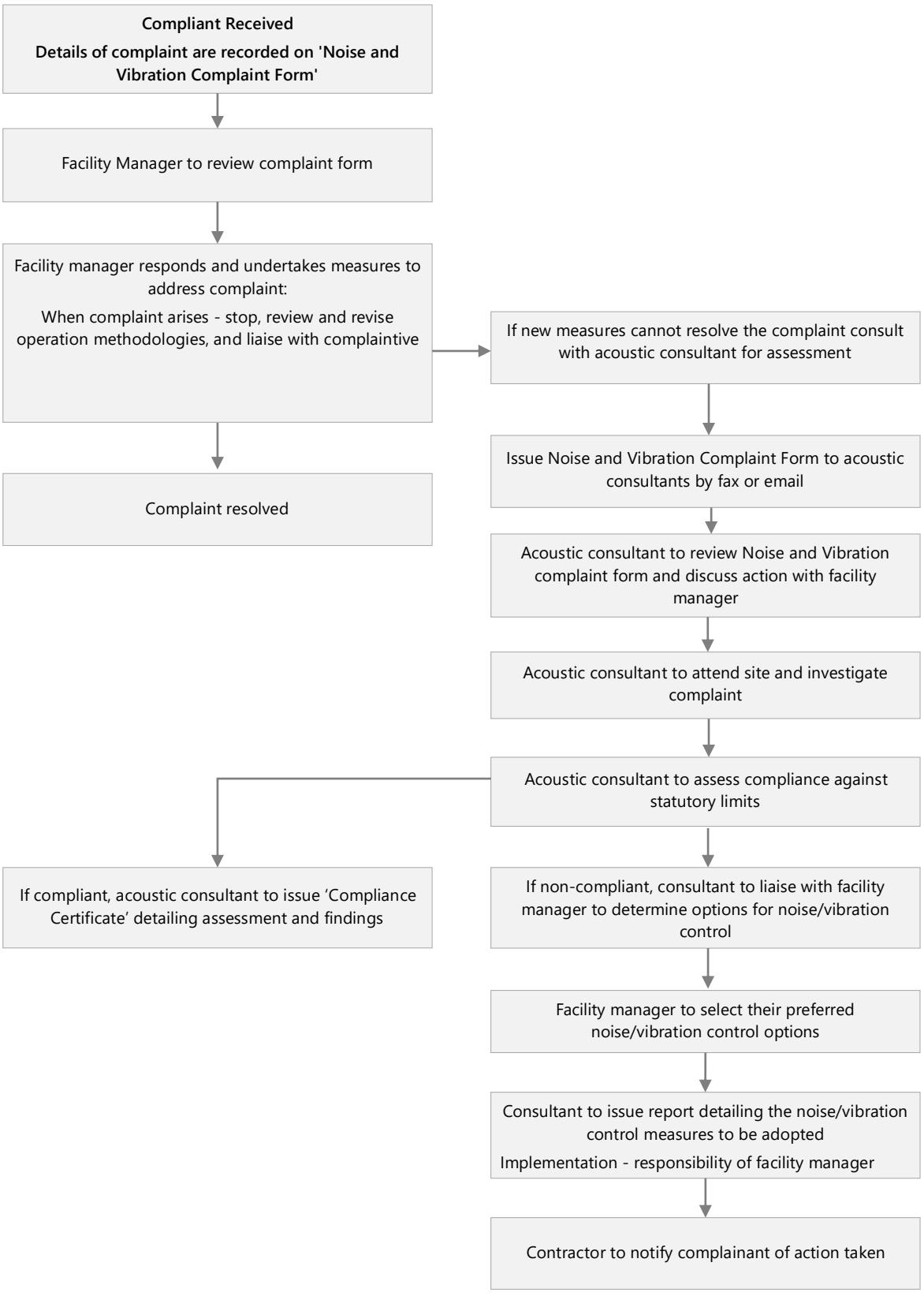
Noise measurements inside buildings should be at least 1m from the walls or other major reflecting surfaces, 1.2 m to 1.5m above the floor, and 1.5m from windows.

Noise monitoring shall be undertaken in accordance with the environmental noise measurement requirements stipulated in the reference standards and documents listed above.

The following information shall be recorded:

- Date and time of measurements;
- Type and model number of instrumentation;
- Results of field calibration checks before and after measurements;
- Description of the time aspects of each measurement (ie sample times, measurement time intervals and time of day);
- Sketch map of area;
- Measurement location details and number of measurements at each location;
- Weather conditions during measurements, including wind velocity, wind direction, temperature, relative humidity and cloud cover;
- Operation and load conditions of the noise sources under investigation;
- Any adjustment made for presence or absence of nearby reflecting surfaces; and
- Noise due to other sources (eg. traffic, aircraft, trains, dogs barking, insects, etc.).

APPENDIX C Noise/Vibration Complaint Management Procedure



NOISE and VIBRATION COMPLAINT FORM

Facility: **Bank Street Marina** **Date:**

Site contact: **Phone:**

Email:

Complaint details

Received by (circle): Phone / Email / In person / Other:

Name: H Ph:

Address: W Ph

Email: M Ph

Describe when the problem occurred (date and time), what equipment caused the complaint (if known) and where person was standing when he/she experienced the noise/vibration:

Investigation

Question facility manager / supervisor and obtain information on what equipment or processes would most likely have caused the complaint:

Following approval from the Facility Manager, email/fax this form to Renzo Tonin & Associates