Noise & Vibration Impact Assessment

Tomago Resource Recovery Facility & Truck Parking Depot

21D & 21F School Drive, Tomago, NSW

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REMONDIS Australia Pty Ltd
c/o Jackson Environment and Planning Pty Ltd
Suite 102, Level 1, 25 - 29 Berry Street
North Sydney
NSW 2060

Noise & Vibration Impact Assessment

Tomago Resource Recovery Facility & Truck Parking Depot

21D & 21F School Drive, Tomago, NSW

Prepared by:

Waves Acoustic Consulting Pty Ltd

Level 7, 1 York Street, Sydney, NSW 2000
ABN 80 610 696 449

T: +61 2 7900 5548
E: info@wavesconsulting.com.au
W: www.wavesconsulting.com.au

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1 Introduction

1.1.1 Background

The proposed project will involve the development of a Resource Recovery Facility and Truck Parking Depot. REMONDIS Australia Pty Ltd propose to relocate their existing truck depot and resource recovery facility in Thornton to the site located at 21D & 21F School Drive, Tomago, NSW to enable the growth of the business into the future.

REMONDIS is seeking approval for the receipt and processing of up to 98,200 tonnes of solid and liquid waste materials per annum. Waste materials include dry non-putrescible waste materials from domestic sources, commercial and industrial sources. It will also receive within this total a small amount of putrescible waste materials from the de-packaging of food, such as drinks and packaged food items. The facility will also receive and recycle liquid wastes such as drill muds from hydro-excavation and oily wastes from mining and industrial activities across the region.

The proposed operations will be established within three (3) existing buildings on 21D School Drive, Tomago, which were approved under Major Project MP 10_003: Two (2) buildings will be used for recycling operations and one (1) building will be used for vehicle maintenance. Each recycling operation will be established in discreet parts of the existing industrial warehousing, and collectively, the Tomago Resource Recovery Facility will provide a wide range of recycling services through:

- Materials Recovery Facility for sorting and processing commercial and industrial mixed general solid waste (non-putrescible) and construction building waste from residential and commercial construction.
- A Cardboard Baling Facility for source separated cardboard collected from businesses.
- A Drill Mud Recycling Facility for drill muds.
- A Packaged Food Recycling Plant, which will accept packaged foods and drinks, separating the food contents and packaging for recycling.
- A Garden Organics Primary Processing plant, which will receive, decontaminate and shred woody garden organics for off-site composting.
- A Hazardous Waste Recycling Facility, for sorting and aggregating a range of spent solid materials and liquids containing oils and chemicals.
- A Copper Processing area.
- A Metals Recycling Facility.

A truck parking depot will be established on the adjacent vacant lot at 21F School Drive. In April 2020, a Preliminary Environmental Assessment of the project was prepared as part of the request for the Secretary's Environmental Assessment Requirements (SEARs) from the Department of Planning, Industry and Environment (DPIE).

The Preliminary Environmental Assessment found that impacts on noise and vibration are expected to be minimised by maintaining operations wholly within the fully enclosed environment, however the SEARs issued on 24th April 2020 requests that a Noise and Vibration Impact Assessment (NVIA) is required as part of the Environmental Impact Statement and Development Application process. Note that the project is being assessed as a State Significant Development (SSD 10447).

The SEARs (SSD 10447) identifies the following requirements for noise and vibration impact assessment:

- Comprehensive background noise monitoring assessment at all nearby noise sensitive receivers.
- Operational noise modelling and assessment in accordance with the NSW Noise Policy for Industry (NPI) to include spectral data of proposed plant, noise modification factors and weather impacts on noise propagation.
- Operational traffic noise analysis in accordance with the NSW Road Noise Policy (RNP).
- Operational vibration modelling and analysis in accordance with the EPAs NSW Assessing Vibration: A Technical Guideline.
- Construction Noise and Vibration Assessment in accordance with the Interim Construction Noise Guideline (ICNG).

Waves Acoustic Consulting Pty Ltd (Waves Consulting) has been engaged by REMONDIS Australia Pty Ltd (through Jackson Environment and Planning Pty Ltd) to prepare a Noise and Vibration Impact Assessment (NVIA) to demonstrate the noise and vibration impacts associated with the project. This report presents the results of the assessment and forms part of the Environmental Impact Statement (EIS) for the proposal.

This report has been prepared to inform the EPA and the DIPE and all relevant stakeholders. The aim of the report is to assess the potential noise and vibration impacts of the proposed development on any nearby sensitive receivers and has been prepared in accordance with the guidelines outlined in Section 1.2.

1.2 Relevant Guidelines

Noise from the operation of the proposal has been assessed in accordance with the NSW Noise Policy for Industry (NPI) 2017.

Noise from additional traffic movements on the local road network has been assessed in accordance with the NSW Road Noise Policy (RNP), NSW EPA 2011.

Vibration from the operation and construction of the proposal has been assessed in accordance with Assessing Vibration: a technical guideline (DEC 2006).

Construction Noise Impacts have been assessed in accordance with the NSW Interim Construction Noise Guideline (ICNG).

2 Development Description

2.1 Overview of the Development Site

REMONDIS Australia Pty Ltd proposes to redevelop the three (3) existing industrial buildings at 21D & 21F School Drive, Tomago, NSW.

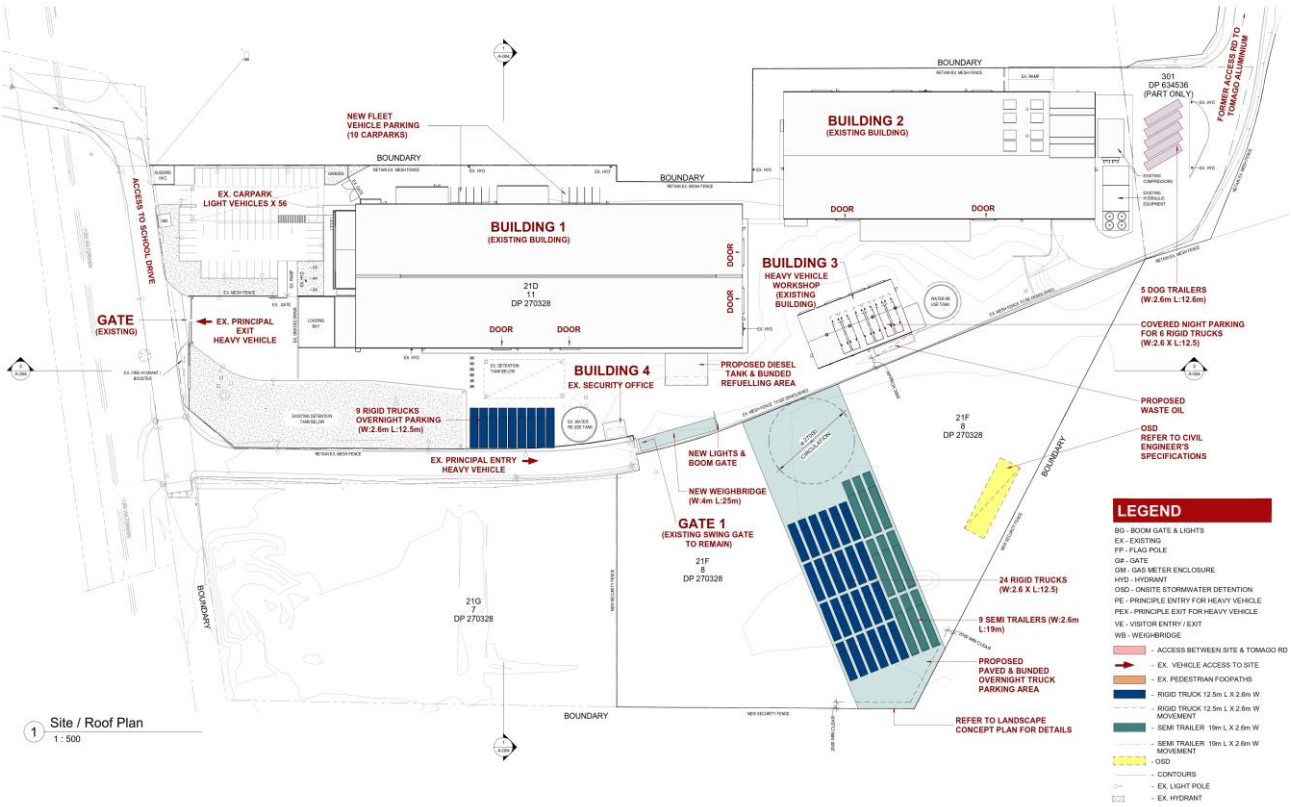
The buildings and activities proposed for the 21D School Drive area of the site are as follows:

- Building 1
  a. Materials Recovery Facility for sorting and processing commercial and industrial mixed general solid waste (non-putrescible) and construction building waste from residential and commercial construction.
  b. Cardboard Baling Facility for source separated cardboard collected from businesses.
- Building 2
  a. Drill Mud Recycling Facility for drill muds.
  b. Packaged Food Recycling Plant, which will accept packaged foods and drinks, separating the food contents and packaging for recycling.
  c. Garden Organics Primary Processing plant, which will receive, decontaminate and shred woody garden organics for off-site composting.
  d. Hazardous Waste Recycling Facility, for sorting and aggregating a range of spent solid materials and liquids containing oils and chemicals.
  e. Copper Processing area.
  f. Metals Recycling Facility
- Building 3
  a. Heavy Vehicle Maintenance Workshop

The proposal also intends to use approximately 2800 m^2 of the 21F School Drive site as a truck parking depot.

Figure 1 to Figure 4 below detail the site layout, vehicle movements and processing activities in each building at the site.

Figure 1. Overall Site Layout and Vehicle Movement Plan



Note: 1. Truck parking depot located towards the south using approximately 2800 m^2 of the 21F School Drive site (shown in blue).

Figure 2. Building 1: General Arrangement and Processing Activities

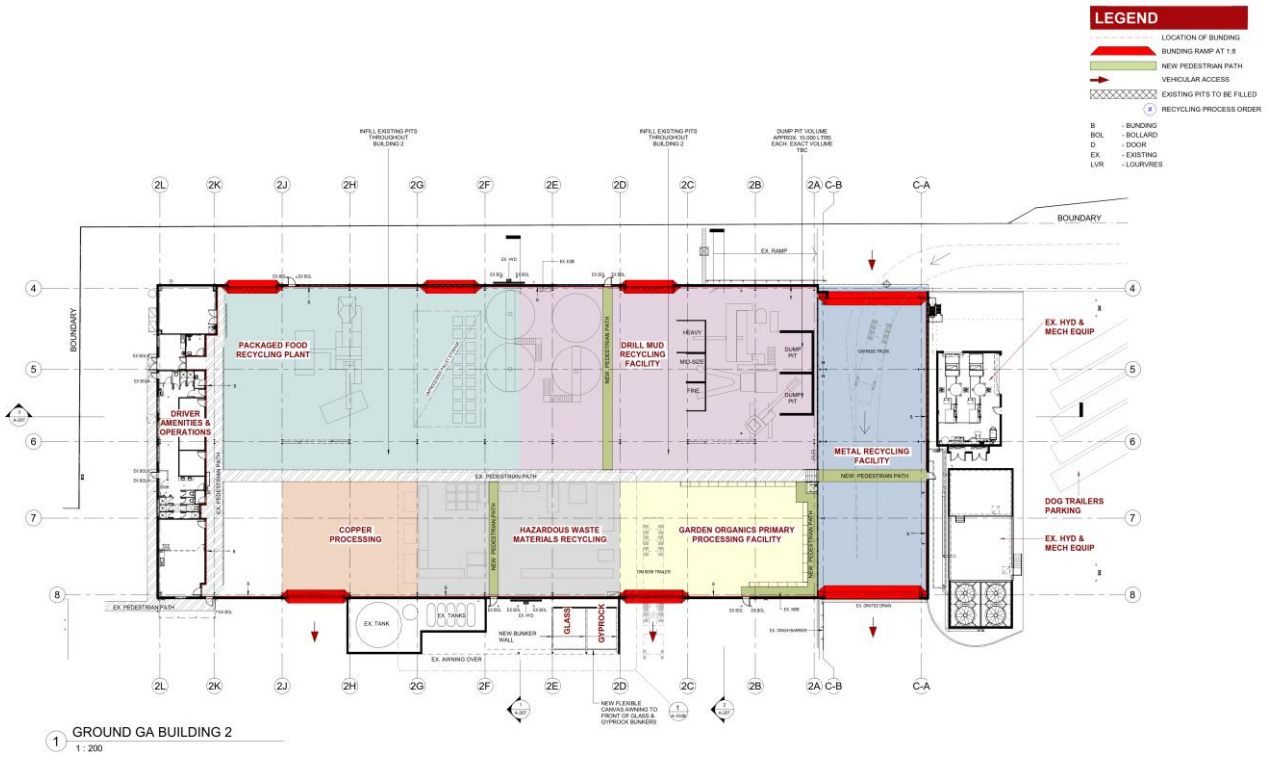


Figure 3. Building 2: General Arrangement and Processing Activities

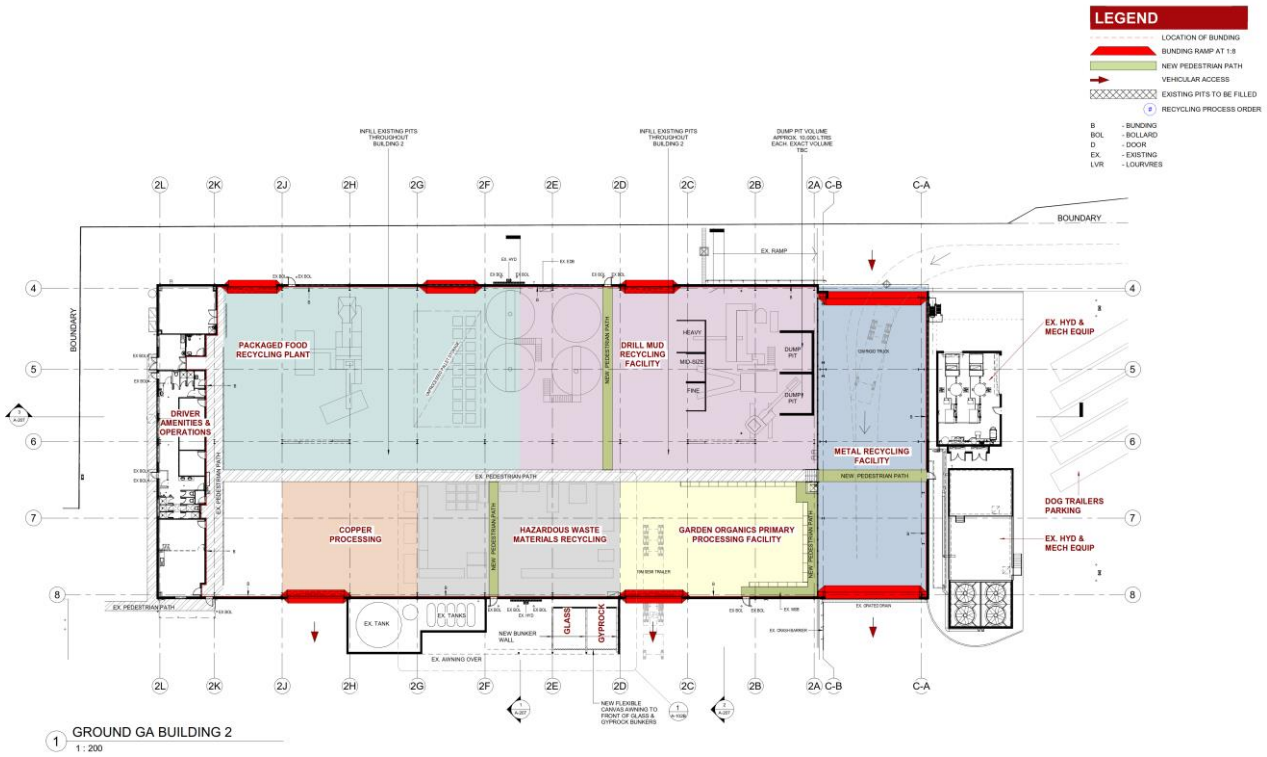
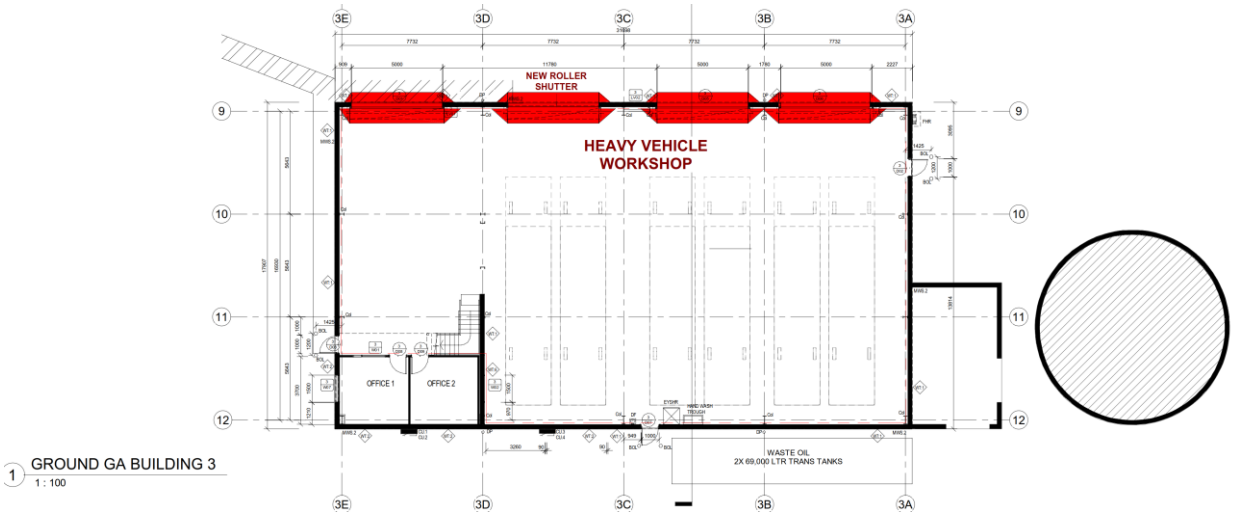


Figure 4. Building 3: General Arrangement and Heavy Vehicle Maintenance Activities



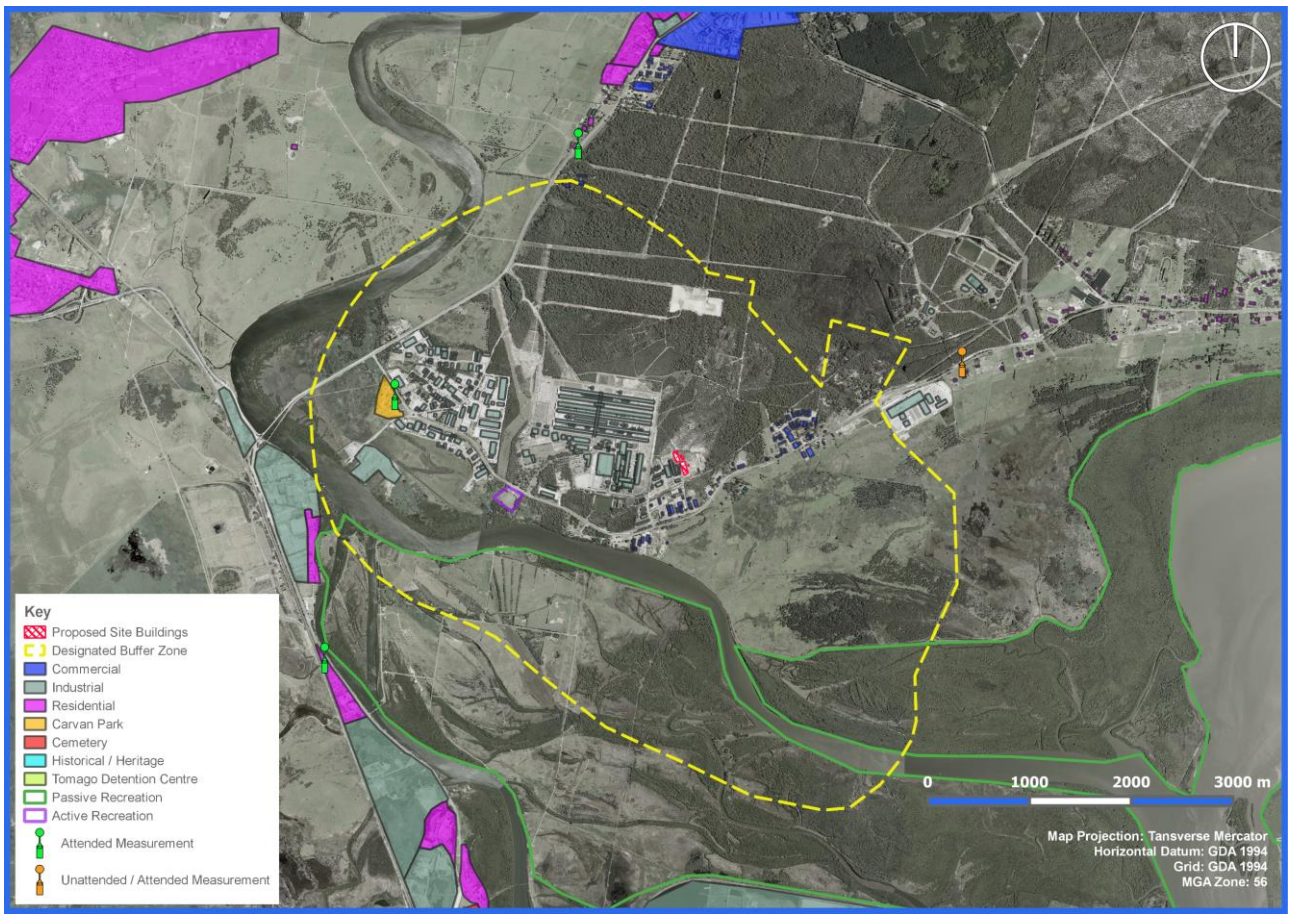
The main operational noise and vibration sources from the proposed facility will include:

- External:
  a. Offsite vehicle movements on the nearby road network.
  b. Onsite vehicle movements ie mainly delivery trucks.
- Internal
  a. Material processing / screening / sorting / shredding.
  b. Vehicle movements to load and manoeuvre materials ie loaders, material handlers and excavators.
  c. Stockpiling of refined products.
  d. Repair and maintenance activities.

2.2 Overview of the Surrounding Area

Figure 5 below illustrates the proposed Tomago Resource Recovery Facility & Truck Parking Depot site and the proximity of the industrial, commercial, and residential buildings in the surrounding area. Figure 5 also shows key features labelled including the noise monitoring locations used for this assessment.

Figure 5. Site Location, Surrounding Area & Noise Logging Location



Aerial photography courtesy of NSW Imagery

2.2.1 Environmental Buffer Zone & Noise Sensitive Receivers

The proposed Tomago Resource Recovery Facility & Truck Parking Depot site is located inside the Tomago Aluminium Smelter Environmental Buffer Zone. This zone was established around the Smelter as a special environmental management zone where ambient levels of environmental impacts may be above OEH guideline values. The buffer zone boundaries lie at a radius of approximately 2 km to 4 km from the centre of the Smelter as indicated by the *yellow-dashed* line in Figure 5 above.

The buffer zone contains a large number of noise-generating industrial and commercial sites. In addition, there are some noise sensitive receivers such as residential, active recreation, passive recreation and a caravan park. Receivers inside and outside the buffer zone will have different existing industrial noise impacts; therefore, this report will classify and assess receivers depending on whether they are located inside or outside the buffer zone.

Table 1 below describes the nearest noise sensitive receivers inside and outside the Environmental Buffer Zone.

Table 1. Nearest Noise Sensitive Receivers – Inside and Outside the Environmental Buffer Zone

Receiver Type	Description	Distance (m)	Direction
Inside the Environmental Buffer Zone			
Industrial	21 I School Drive, Tomago	15	West
	Tomago Smelter	220	North West
Commercial	21 B School Drive, Tomago	130	South West
	23 School Drive, Tomago	220	South
	37 School Drive, Tomago	230	South East
	47 School Drive, Tomago	430	East
Active Recreation	Tomago Bowling Club, 657 Tomago Road, Tomago	1530	South West
Passive Recreation	Hunter Wetlands National Park	1150	South
	Tomago House, Tomago Road, Tomago	450	South
	Tomago House Chapel, 423 Tomago Road, Tomago	430	South
Residential	Tomago Village Caravan Park, 819 Tomago Road, Tomago	2700	West
	Tomago Detention Centre, 587 Tomago Road, Tomago	1130	South West
	374 Tomago Road, Tomago	760	East
	362 Tomago Road, Tomago	890	East
	308 Tomago Road, Tomago	1400	East
	5 Graham Drive, Tomago	1860	North East
Outside the Environmental Buffer Zone			
Commercial	2137 Pacific Highway, Heatherbrae	3400	North West
Passive Recreation	Botanic Gardens, 2100 Pacific Highway, Heatherbrae	3000	North West
	Sandgate Cemetery, 116 Maitland Road, Sandgate	4900	South West
	Hunter Wetlands National Park	2700	South
Residential	175 Tomago Road, Tomago	2700	East
	2139 Pacific Highway, Heatherbrae	3400	North West
	Old Maitland Road, Hexham	3600	West
	Pacific Highway, Hexham	3900	South West
	Pacific Highway, Sandgate	4000	South West

2.3 Operational Activities / Equipment

Table 2 provides the proposed indoor operational activities and equipment for each building which have been used in this assessment (data provided by Jackson Environment and Planning).

Table 2. Proposed Indoor Operational Activities and Equipment

Building No.	Operational Activities	Equipment Item	Make	Model	Capacity
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Loader	Liebherr	L514	6 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Loader	Caterpillar	IT38G	7.6 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Material Handler	Liebherr	LH22	22 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Excavator	Caterpillar	319D	23 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Forklift	Toyota		2.5 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Forklift	Linde	H25D	2.5 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Forklift	Nissan	FD25T	2.5 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Pre-shredder	Metso	M&J 4000S	17.0 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Screen	Binder Bivitec	KRL/EDS 16600	16.8 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Windshifter	Redox	RSB 1600	11.1 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Fine-shredder	Metso	M&J 1550	10.0 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Magnet	Steinert	MAGZ-55-CB1PC	20 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Conveyors	Brentwood	Various	20 tonne
Building 1	Materials Recovery Facility - MRF sorting and RDF production	Near-Infrared	MSS	Sapphire	20 tonne
Building 1	Materials Recycling Facility - Cardboard baling	Baler	Bollegraf	HBC120S	22 tonne
Building 2	Food Depackaging Plant	Feed hopper and conveyor into separator	-	-	-
Building 2	Food Depackaging Plant	Separator unit	-	-	-
Building 2	Food Depackaging Plant	Conveyor for emptied packaging	-	-	-
Building 2	Food Depackaging Plant	Conveyor for solid foods	-	-	-
Building 2	Food Depackaging Plant	Pump for liquids	-	-	-
Building 2	Drill Mud Recycling Facility	Initial pit	-	-	-
Building 2	Drill Mud Recycling Facility	Pump or filter press	-	-	-
Building 2	Drill Mud Recycling Facility	Bunkers	-	-	-
Building 2	Drill Mud Recycling Facility	Buffer tanks	-	-	-
Building 2	Drill Mud Recycling Facility	Centrifuge	-	-	-

Building No.	Operational Activities	Equipment Item	Make	Model	Capacity
Building 2	Garden Organics Primary Processing	Bunker storage walls (blocks)	-	-	-
Building 2	Garden Organics Primary Processing	Loader (share with Building 1)	Liebherr	L514	6 tonne
Building 2	Garden Organics Primary Processing	Material Handler (share with Building 1)	Liebherr	LH22	22 tonne
Building 2	Garden Organics Primary Processing	Shredder (share with Building 1)	Metso	M&J 4000S	
Building 2	Hazardous Waste Recycling Facility	Pallet racking	N/A	N/A	N/A
Building 2	Hazardous Waste Recycling Facility	Pallet scales	Wedderburn	WS004S BH	N/A
Building 2	Hazardous Waste Recycling Facility	Elephants Foot Baler	Elephants Foot	Drum Crusher	N/A
Building 2	Hazardous Waste Recycling Facility	Forklift as per previous plant list	Toyota		2.5 tonne
Building 2	Copper Processing Area	Sorting table			
Building 2	Copper Processing Area	Storage bins			
Building 2	Copper Processing Area	Hydraulic cable shear	Daia	CR-100	N/A
Building 2	Copper Processing Area	Electric cable stripper	Diebels	RMH 30	N/A
Building 2	Copper Processing Area	Forklift and Material Handler as per previous plant list.	Toyota		2.5 tonne
Building 2	Metals Recycling Facility	Overhead crane (existing)	Demag	32/10T	32 tonne
Building 2	Metals Recycling Facility	Material Handler with magnet/shear (share with Building 1)	Liebherr	LH22	22 tonne
Building 2	Metals Recycling Facility	Forklift (share with Building 1)	Toyota		2.5 tonne
Building 2	Metals Recycling Facility	Bale press (share with Building 1)	Elephants Foot	Drum Crusher	N/A
Building 2	Metals Recycling Facility	Hook lift bins (share with Building 1)	Astec	15 cbm	N/A
Building 2	Metals Recycling Facility	Front end loader (share with Building 1)	Liebherr	L514	6 tonne
Building 3	Heavy Vehicle Repair and Maintenance	Variety of drills, grinders, welders, hoists, pneumatic tools and hand tools	-	-	-

Table 3 provides the (estimated) overall and octave band sound pressure levels (reverberant) for the proposed indoor equipment associated with each building. These levels have been based on the Waves Consulting noise database for similar equipment and activities.

Table 3. Estimated Reverberant Sound Pressure Level of the Proposed Indoor Equipment

Description	Overall L_{Aeq} (dB re 20 µPa)	Octave Band Centre Frequency (Hz) L_{eq} (dB re 20 µPa)							
		63	125	250	500	1000	2000	4000	8000
Building 1	85	81	78	77	76	83	76	74	70
Building 2	89	91	90	87	84	85	82	78	70
Building 3	85	81	78	77	76	83	76	74	70

2.4 Operational Hours

The proposed operational hours were provided by Jackson Environment and Planning and are summarised in Table 4.

Table 4. Summary of Operational Hours

Operational Activity	Hours
Opening hours (staffed)	24 hrs / 7 days a week
Waste deliveries	
Waste processing	
Product transferred off-site	

The proposed operational hours means that all noise generating activities at the site occur during the night-time period as per the NSW NPI assessment periods. The worst-case noise impacts will therefore occur during the night-time periods when the operational noise criteria are at their lowest.

2.5 Operational Traffic Generation

The proposed traffic movements for receival / removal of material at the site were provided by Jackson Environment and Planning. The maximum future operation of the site is estimated to generate up to 348 vehicle trips per day ie 174 inbound and 174 outbound trips. Averaged over an 24-hour working day this equates to 15 vehicle movements (in or out) per hour. The breakdown of vehicle movements is summarised in Table 5 below.

Table 5. Summary of Vehicle Movements

Vehicle Type	Number of Vehicle Movements (inbound / outbound)
Front lift trucks	30
Hook lift trucks	60
Rear lift trucks	9
Tanker trucks	20
SuperVac trucks	9
Walking floor trucks	6
Tautliner trucks	2
Hiab trucks	4
Merrell trucks	10
Workshop truck	10
Cardboard bale trucks - semi-trailers	10
Depackaging plant and Garden Organics	4
Total	**174**

Vehicles accessing and egressing the site will travel to and from the Pacific Highway via Tomago Road and School Drive.

2.6 Potential Operational Noise Impacts

Potential noise impacts from operation of the proposed development which will be assessed in this report include:

- Noise emission from the fixed noise sources associated with the development to any nearby sensitive receivers ie mechanical services and processing activities noise emission through the facade of the buildings.
- Noise emission from vehicle movements on site to any nearby sensitive receivers ie delivery trucks and forklifts.
- Additional noise emission from vehicle movements on the adjacent roads to any nearby sensitive receivers.

2.7 Construction Equipment / Activities

The construction required at the site to prepare the development for operation is minimal. The construction scenarios provided by Jackson Environment and Planning include:

- Parking depot hardstand at the 21F School Drive site
- Minor works to install the weighbridge at the 21D School Drive site.
- Excavation of the OSD basin at the 21F School Drive site.

The overall time period for construction is anticipated to be 4 to 6 weeks. Table 6 illustrates the anticipated construction activities / plant items proposed during the construction works at the site.

Table 6. Proposed Construction Plant Information and Sound Power Levels L_{WA}

Construction Item	Make / Model	Capacity	Estimated Sound Power Level L_{WA} (dB re 1pW)	No. of Days	Construction Scenario
Excavator	CAT 329F	~35 tonnes	105	45	OSD basin construction, drainage infrastructure
Front end loader	Volvo L150	~35 tonnes	108	45	Bulk movement of soil and loading trucks
Grader	-	~35 tonnes	108	45	Truck depot pad bulk earthworks
Bull dozer	-	~35 tonnes	110	45	Truck depot pad grading
Dump truck	-	~25 tonnes	100	45	Import of road base and transport of excavated material off-site
Roller	-	~ 35 tonnes	109	45	Truck depot pad construction

2.8 Potential Construction Noise Impacts

Potential noise impacts from construction of the proposed development which will be assessed in this report include:

- Noise emission from vehicle movements on site to any nearby sensitive receivers ie delivery trucks, bulldozers, loaders and excavators.
- Additional noise emission from construction vehicle movements on the adjacent roads to any nearby sensitive receivers.

2.9 Potential Construction & Operational Vibration Impacts

The offset distances (in all directions) between any vibrationally intensive equipment and any sensitive receivers is large (> 100 m). The potential for vibration impacts due to the construction or operation of the development are effectively nil. All vibration criteria with respect to cosmetic damage to buildings and human comfort impacts will be satisfied as a result.

No further consideration of vibration impacts is given in this assessment as a result.

3 Noise Measurements

3.1 Unattended Noise Monitoring

To characterise the existing acoustic environment in the area, a survey of environmental noise levels was conducted from Thursday 11 June to Saturday 20 June 2020. The noise logger was installed adjacent to the residential property at 159 Tomago Road, Tomago, NSW (see Figure 1).

The logger location was selected with consideration of other noise sources which may have influenced the measurements, security issues for the equipment and access permission from residents and landowners. Since noise measurements inside the Environmental Buffer Zone (EBZ) would be unduly influenced by noise levels from the existing heavy industry in the area the location selected was representative of the nearest residential receivers that are outside of the (EBZ).

Instrumentation for the survey comprised a Svan 979 Type 1 Sound Level Meter and Logger (Serial No. 27144) fitted with an environmental windshield. The noise logger was programmed to continuously record the ambient noise levels. The sample time interval was set at 15 minutes with a Fast (125 ms) time weighting function. Calibration of the logger was checked prior to and after the measurements. Drift in calibration did not exceed ±0.5 dB. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

The measured noise data has been filtered to remove erroneous data and any data measured during adverse weather conditions following review of historical weather reports from the Bureau of Meteorology (BOM) Williamtown weather station (nearest weather station).

Daily graphs for the noise logger are attached in Appendix A. The graphs represent each 24-hour period of the L_{AF1}, L_{AF10} and L_{AF90} together with the L_{Aeq} levels for the corresponding 15-minute periods, as well as relevant weather data.

3.2 Unattended Noise Monitoring Results

To define the applicable environmental criteria at nearby noise sensitive receivers the measured data has been processed in accordance with the time periods stipulated by the EPA NSW Noise Policy for Industry (NPI). Table 7 details the background and ambient noise levels recorded during the NSW NPI daytime, evening and night-time assessment periods.

Table 7. Measured Noise Levels Corresponding to NSW NPI Assessment Periods

Date	L_{AF90} Background Noise Levels			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Thursday, 11 June 2020		42	38		59	58
Friday, 12 June 2020	41	40	37	64	60	56
Saturday, 13 June 2020	34	36	30	61	57	51
Sunday, 14 June 2020	40	36	35	62	58	59
Monday, 15 June 2020	43	38	37	64	67	60
Tuesday, 16 June 2020	40	36	37	63	59	58
Wednesday, 17 June 2020	40	39	36	62	59	58
Thursday, 18 June 2020	41	40	35	62	59	58
Friday, 19 June 2020	39	36	31	63	61	56
Saturday, 20 June 2020	37	32	31	62	57	52
RBL	**40**	**37**	**35**	**-**	**-**	**-**
Log Ave	**-**	**-**	**-**	**63**	**61**	**57**
Total Valid Periods	**9**	**10**	**10**	**9**	**10**	**10**
Total Invalid Periods	**1**	**0**	**0**	**1**	**0**	**0**
Total Periods	**10**	**10**	**10**	**10**	**10**	**10**

Note 1. For Monday to Saturday, Daytime 0700 to 1800 hrs, Evening 1800 to 2200 hrs, Night-time 2200 to 0700 hrs.
For Sundays and Public Holidays, Daytime 0800 to 1800 hrs, Evening 1800 to 2200 hrs, Night-time 2200 to 0800 hrs.

Note 2. The RBL noise level is representative of the *median background sound level* (in the absence of the source under consideration), or simply the background level.

Note 3. The L_{Aeq} is essentially the *average sound level*. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound of the same duration.

The environmental noise in the area is typically dominated by road traffic on the surrounding local roads and distant industrial hum. Flora and fauna noise were also found to be contributing sources of noise in the environment. The noise characteristics and trend in the noise data as shown in Appendix A are typical of those found in rural areas.

3.3 Attended Noise Measurements

Attended measurements of ambient noise were taken at several representative locations on 11 June 2020. These have been used to determine the various noise sources that influence the existing noise environment. During each measurement, the observer noted the various noise sources and the contributing noise level.

At each location, the attended measurements were performed for up to 15 minutes using a calibrated Svan 979 Type 1 Sound Level Meter and Logger (Serial No. 27144) fitted with an environmental windshield. Wind speeds were less than 5 m/s and all measurements were performed at a height of 1.5 metres above ground level.

Calibration of the logger was checked prior to and after the measurements. Drift in calibration did not exceed ±0.5 dB. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. The noise environment at each of the attended monitoring locations is described Table 8.

Table 8. Attended Noise Monitoring Results

Measurement Location	Measured Noise Levels (dB re 20 µPa)			Character of the Ambient Noise
	L_{Aeq}	L_{AFMax}	L_{AF90}	
Unattended Logger Location as per Figure 1. Adjacent to 159 Tomago Road, Tomago	64	80	46	Traffic noise from the Tomago Road, distant industrial noise and flora and fauna noise.
Adjacent to 2139 Pacific Highway, Heatherbrae.	68	75	61	Local traffic movements, traffic noise from the Pacific Highway, industrial noise and flora and fauna noise.
Adjacent to Old Maitland Road, Hexham.	72	81	61	Local traffic movements, traffic noise from the Pacific Highway, industrial noise and flora and fauna noise.
Adjacent to the Caravan Park at 819 Tomago Road, Tomago	66	77	53	Traffic noise from the Tomago Road, local industrial noise and flora and fauna noise.

The environmental noise in the area is typically dominated by industrial noise and road traffic on the nearby Tomago Road and the Pacific Highway and other surrounding local roads. Flora and fauna noise were also found to be contributing sources of noise in the environment.

4 Operational Noise Assessment Guidelines

4.1 NSW Noise Policy for Industry (NPI)

Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the NSW Environment Protection Authority (EPA).

The EPA oversees the NSW Noise Policy for Industry (NPI) 2017 which provides a framework and process for deriving noise trigger levels. The NPI replaced the Industrial Noise Policy (INP) at the end of October 2017.

The NPI sets out the procedure to determine the *project noise trigger levels* relevant to a particular industrial development. The project noise trigger level applies to existing noise-sensitive receivers; however, it may also be used in strategic planning processes for proposed land uses.

If it is predicted that the development is likely to cause the project noise trigger level to be exceeded at existing noise-sensitive receivers, management measures are required to reduce the predicted noise level.

4.1.1 Project Noise Trigger Level - Introduction

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so *trigger* a management response; for example, further investigation of mitigation measures.

The project noise trigger level, feasible and reasonable mitigation, and consideration of residual noise impacts are used together to assess noise impact and manage the noise from a proposal or site. It is the combination of these elements that is designed to ensure that acceptable noise outcomes are determined by decision makers.

The trigger level is tailored for each specific circumstance to take into account a range of factors that may affect the level of impact, including:

- Background noise environment.
- Time of day of the activity.
- Character of the noise.
- Type of receiver and nature of the area.

The scientific literature indicates that both the increase in noise level above background levels (that is, intrusiveness of a source), as well as the absolute level of noise are important factors in how a community will respond to noise from industrial sources. The project noise trigger level established in the NPI addresses each of these components of noise impact.

The project noise trigger level is the lower (that is, the more stringent) value of the *project intrusiveness noise level* and the *project amenity noise level*. The project intrusiveness noise level aims to protect against significant changes in noise levels, whilst the project amenity noise level seeks to protect against cumulative noise impacts from industry and maintain amenity for particular land uses.

Applying the most stringent requirement as the project noise trigger level ensures that both intrusive noise is limited and amenity is protected and that no single industry can unacceptably change the noise level of an area. Typically, the intrusiveness level will inform the project noise trigger level in areas with little industry (and/or ambient noise levels), whereas the amenity level will inform the project noise trigger level in areas with higher existing background noise levels. Intrusive noise levels are only applied to residential receivers (residences). For other receiver types only the amenity levels apply.

4.1.1 Project Intrusiveness Noise Level

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.

The project intrusiveness noise level is determined as follows:

$L_{Aeq,15min}$ = rating background noise level + 5 dB

where:

- $L_{Aeq,15m}$ - represents the equivalent continuous (energy average) A-weighted sound pressure level of the source over 15 minutes.
- Rating Background Noise Level (RBL) - represents the background level to be used for assessment purposes, as determined by the methodology in Factsheets A & B of the NPI.

Intrusiveness noise levels are not used directly as regulatory limits. They are used in combination with the amenity noise level to assess the potential impact of noise, assess reasonable and feasible mitigation options and subsequently determine achievable noise requirements.

Minimum Project Intrusiveness Noise Levels

The NPI applies minimum RBLs to any project. These result in minimum intrusiveness noise levels as follows:

Table 9. Minimum RBLs and Project Intrusiveness Noise Levels

Time of Day	Minimum RBL (dB)	Minimum Project Intrusiveness Noise Level $L_{Aeq,15min}$ (dB)
Day	35	40
Evening	30	35
Night	30	35

4.1.2 Project Amenity Noise Level

To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 10 where feasible and reasonable.

The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance. The *recommended amenity noise levels* represent the objective for total industrial noise at a receiver location, whereas the *project amenity noise level* represents the objective for noise from a single industrial development at a receiver location.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows:

Project amenity noise level = recommended amenity noise level (from Table 10) minus 5 dB

Table 10. Recommended Amenity Noise Level as per Table 2.2 of the NPI

Receiver Type	Noise Amenity Area	Time of Day	Recommended Amenity Noise Level $L_{Aeq,period}$ (dB)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dB above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom – internal	All	Noisiest 1-hour period when in use	35
Hospital ward internal external	 All All	 Noisiest 1-hour Noisiest 1-hour	 35 50
Place of worship – internal	All	When in use	40
Area specifically reserved for passive recreation (eg national park)	All	When in use	50
Active recreation area (eg school playground, golf course)	All	When in use	55
Commercial premises	All	When in use	65
Industrial premises	All	When in use	70
Industrial interface (applicable only to residential noise amenity areas)	All	All	Add 5 dB to recommended noise amenity area

4.1.3 Recommended Amenity Noise Level – Residential Receiver Classification

Residential receivers must have the area type defined in order to select the applicable recommended amenity noise level. Table 11 below illustrates how the NPI classifies the rural, suburban and urban noise amenity area categories.

Table 11. Residential Receiver Category as per Table 2.3 of the NPI

Receiver Category	Typical Planning Zone	Typical Background Noise Levels (RBL)			Description
		Day	Eve	Night	
Rural residential	RU1, RU2, RU4, R5, E4	<40	<35	<30	**Rural** – an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse. Note: Where background noise levels are higher than those presented in column 3 due to existing industry or intensive agricultural activities, the selection of a higher noise amenity area should be considered.
Suburban residential	RU5, RU6, R2, R3, E2, E3	<45	<40	<35	**Suburban** – an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.
Urban residential	R1, R4, B1, B3, B4	>45	>40	>35	**Urban** – an area with an acoustical environment that: ▪ is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources ▪ has through-traffic with characteristically heavy and ▪ continuous traffic flows during peak periods ▪ is near commercial districts o**r** industrial districts ▪ has any combination of the above

For this development the *rural* classification will apply to the residential receivers when defining the recommended amenity noise level.

4.1.4 Recommended Amenity Noise Level – Existing Background Noise Corrections

The recommended amenity noise level applicable to residential receivers can be changed in the following circumstances:

- When existing traffic noise levels are dominant, are 10 dB above the recommended noise amenity level and are unlikely to decrease, then the project amenity noise levels become the $L_{Aeq,period(traffic)}$ – 15 dB.
- At industrial / residential interfaces where a project seeks to make minor changes to an existing development. In this case, the recommended amenity noise levels can be increased by 5 dB in the region that is in close proximity to existing industrial premises and that extends out to a point where the existing industrial noise from the source has fallen by 5 dB or an area defined in a planning instrument.
- As per the information given in Table 11 for residential receivers in the rural category.

In this case, the industrial interface adjustments to the amenity noise level are applicable inside the Environmental Buffer Zone which was defined in an earlier planning instrument. Therefore, for residential receivers inside the Environmental Buffer Zone the Recommended Amenity Noise Levels (RANL) in each period will be increased by 5 dB.

4.1.5 Recommended Amenity Noise Level - Time Period Correction

The L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, the NPI assumes the following conversion:

$L_{Aeq,15min} = L_{Aeq,period}$ + 3 dB

(unless robust evidence is provided for an alternative approach for the particular project being considered)

4.1.6 Maximum Noise Level Assessment - Sleep Disturbance

The potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

Where the subject development / premises night-time noise levels at a residential location exceed:

- $L_{Aeq,15min}$ 40 dB or the prevailing RBL plus 5 dB, whichever is the greater.

and/or

- L_{AFmax} 52 dB or the prevailing RBL plus 15 dB, whichever is the greater.

a detailed maximum noise level event assessment should be undertaken.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Other factors that may be important in assessing the extent of impacts on sleep include:

- How often high noise events will occur.
- The distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the subject development.
- Whether there are times of day when there is a clear change in the noise environment (such as during early-morning shoulder periods).
- Current scientific literature available at the time of the assessment regarding the impact of maximum noise level events at night.

Maximum noise level event assessments should be based on the L_{AFmax} descriptor on an event basis under *fast* time response. The detailed assessment should consider all feasible and reasonable noise mitigation measures with a goal of achieving the above trigger levels.

4.1.7 NPI Project Noise Trigger Levels (PNTL)

Having defined the area type, the processed results of the unattended noise monitoring have been used to determine project noise trigger levels. The intrusive and amenity noise levels for nearby noise-sensitive receivers are presented in Table 12. These criteria are nominated for the purpose of assessing potential noise impacts from the onsite sources of noise associated with the proposed development.

For each assessment period, the lower (ie the more stringent) of the amenity or intrusive trigger levels are adopted (if applicable), as marked in **bold**, as the project noise trigger levels (PNTL).

Table 12. NPI Project Noise Trigger Levels

Receiver	Time of Day	RANL[1] $L_{Aeq,period}$	Measured RBL[2] $L_{AF90,15min}$	Project Noise Trigger Levels		
				Intrusive $L_{Aeq,15min}$	Amenity $L_{Aeq,15min}$	Sleep Disturbance $L_{Aeq,15min}$
Inside the Environmental Buffer Zone						
Rural Residential[4]	Day	55[3]	40	**45**	53	-
	Evening	50[3]	37	**42**	48	-
	Night	45[3]	35	**40**	43	**40**
Outside the Environmental Buffer Zone						
Rural Residential	Day	50	40	**45**	48	-
	Evening	45	37	**42**	43	-
	Night	40	35	40	**38**	**40**
Passive Recreation[5]	When in use	50	-	-	**48**	-
Active Recreation	When in use	55	-	-	**53**	-
Commercial	When in use	65	-	-	**63**	-
Industrial	When in use	70	-	-	**68**	-

Note 1. RANL = Recommended Amenity Noise Level for residences in Rural areas.
Note 2. RBL = Rating Background Level.
Note 3. RANL increased by 5 dB as per the NSW NPI and discussion in Section 4.1.4.
Note 4. Includes receivers at the Tomago Detention Centre and the Tomago Village Caravan Park.
Note 5. Includes the Cemetery in Sandgate, Tomago House and Tomago House Chapel.

4.2 NSW Road Noise Policy (RNP)

Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the NSW Environment Protection Authority (EPA). The EPA oversees the Road Noise Policy (RNP, January 2011) which provides a framework and process for deriving traffic noise criteria. The RNP criteria applicable to this development are given in Table 13 below.

Where the existing noise levels due to traffic already exceed the assessment criteria given in Table 13 then the RNP requires that the total traffic noise level increase should be limited to 2 dB for situations where additional traffic is generated on existing roads by changes to land use developments.

Table 13. RNP Road Traffic Noise Criteria for Residential Land Uses.

Road Category	Type of Project / Land Use	External Assessment Criteria (dB re 20 µPa)	
		$L_{Aeq,15hr}$ (Day)	$L_{Aeq,9hr}$ (Night)
Freeway / arterial / sub-arterial roads	Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use developments	55	50

5 Operational Noise Modelling

5.1 Noise Model Details

Noise modelling of the site was undertaken using SoundPLAN v7.4 modelling software.

The noise model was constructed from a combination of aerial photography, existing ground topography and design masterplans for the development. The local terrain, design of the development, receiver buildings and structures have been digitised in the noise model to develop a three-dimensional representation of the operations of the development and surrounding environment. The parameters in Table 14 were defined in the noise model to calculate noise levels at sensitive receivers.

Table 14. Noise Model Parameters

Variable	Parameter
Calculation Standard	CONCAWE
Topography	Surrounding Area – 5m resolution
Ground Absorption	0.75 (mainly soft vegetation surrounding the site)
Receiver Height	1.5 m (mainly first storey receivers)

5.2 Noise Enhancing Meteorological Conditions

Noise model predictions were performed using the noise enhancing meteorological conditions given in the NSW Noise Policy for Industry (NPI).

The noise enhancing meteorological conditions used in this assessment are given in Table 15 below. For all conditions the worst-case wind direction (source to receiver) for each receiver was assessed.

Table 15. Noise Enhancing Meteorological Conditions Used in the Noise Assessment

Period	Meteorological Parameters
Day / Evening	Stability categories A-D with light winds up to 3 m/s at 10 m AGL
Night	Stability category F with winds up to 2 m/s at 10 m AGL

Note 1. AGL = Above Ground Level.
Note 2. Stability categories are based on the Pasquill–Gifford stability classification scheme.
Note 3. Worst-case stability category D taken for Day / Evening periods.

This provides a conservative prediction of the potential noise impacts from the development at the surrounding sensitive receivers.

5.3 Operational Scenarios

With reference to Section 2.4 the proposed operational scenarios can be summarised as per Table 16 below. We note that all noise generating activities at the site occur during the night-time period (ie between 2200 hr and 0700 hrs) as per the NSW NPI assessment periods. The worst-case noise impacts will therefore occur during the night-time periods when the operational noise criteria are at their lowest.

Table 16. Proposed Operational Scenarios

Time of Day	Description of Operational Noise Sources in Worst-Case 15-minute Period
Day (0700 to 1800 hrs) Evening (1800 to 2200 hrs) Night-time (2200 to 0700 hrs)	**Materials Handling / Stockpiling** – Front end loader and excavator full load (ie max engine revs) operation for 50% of the time. Moving throughout the site between processing and stockpiling zones. **Processing**– constant processing activities inside the buildings with all facades and openings (louvres and doors) OPEN. **Deliveries / Truck Movements** – Up to three (3) B-Doubles / Semi articulated trucks and two (2) lift trucks moving throughout the site. Full load (ie max engine revs) operation for 50% of the time

5.4 Fixed Operational Noise Source Levels

The simulated worst-case fixed operational noise sources include:

- Processing activities inside the new buildings comprise:
  a. Internal reverberant sound pressure levels as per Table 3 occur for up to 50% of the time in each building.
  b. The metal recycling facility in Building 2 has the sides of the canopy (to the east and west) permanently OPEN.
  c. All doors are OPEN during processing activities.
  d. All louvres are OPEN during processing activities.
  e. The minimum sound insulation performance of the building facade is assumed to be at least 25 dB R_w. This is a conservative assumption based on the 1 mm corrugated steel facade construction of all buildings on site.
- Mechanical services plant (medium sized AC plant) associated with the building offices operates 24 hrs a day 7 days a week with an estimated Sound Power Level of 80 dB L_{WA}.

5.5 Mobile Operational Noise Source Levels

Mobile operational noise sources include:

- Delivery vehicles were modelled entering the site from School Drive and then moving around the site as per the site roads shown in Figure 1. For a worst-case noise assessment, the loudest vehicle has been assessed which is the B-Double truck with a typical Sound Power Level of 106 dB L_{WA}. Delivery trucks were assumed to operate at full load (ie max engine revs) for 50% of the time while manoeuvring around the site.
- Permanent onsite vehicles which move between buildings 1 and 2 on the site. The vehicles were assumed to operate at full load (ie max engine revs) for 50% of the time. The permeant onsite vehicles include:
  a. Loader.
  b. Excavator.
  c. Materials Handler.
  d. Forklift.

5.6 Corrections for Annoying Noise Characteristics

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level. On the other hand, some sources may cause less annoyance where only a single event occurs for a limited duration.

The NPI identifies correction factors for annoying noise characteristics which must be applied to the predicted noise levels before assessing against the PNTLs. All of the noise sources in this report have been assessed, based on the noise data available, for annoying noise characteristics. The proposed operational noise sources are generally broadband in nature and have not demonstrated any annoying characteristics as per the definitions in Fact Sheet C of the NPI.

6 Predicted Operational Noise Impacts

6.1 Predicted Operational Noise Impacts - NPI

Noise modelling of the fixed and mobile noise sources has been used to predict the noise emissions from the typical operation of the facility to the surrounding sensitive receivers.

A selection of the predicted worst-case operational noise levels due to onsite noise sources are summarised and compared against the NPI project noise trigger levels in Table 17 below.

In addition, noise contour maps for the day, evening and night-time periods are provided in Appendix B. The noise contours presented are taken at 1.5 m elevation to simulate first storey receivers (ie typical residential receivers in the area). The noise contours show how the noise emission from the proposed development propagates into the surrounding environment.

Table 17. Predicted Operational Noise Levels Compared to PNTLs

Location	Worst-Case $L_{Aeq,15m}$			PNTLs Exceedance $L_{Aeq,15m}$			$L_{Aeq,15m}$ Sleep Disturbance
	Day	Eve	Night	Day	Eve	Night	
Industrial Inside EBZ				68	68	68	-
21 I School Drive, Tomago	<60	<60	<60	0	0	0	0
Tomago Smelter	<60	<60	<60	0	0	0	0
Commercial Inside EBZ				63	63	63	-
21B School Drive, Tomago	<50	<50	<50	0	0	0	0
23 School Drive, Tomago	<50	<50	<50	0	0	0	0
37 School Drive, Tomago	<50	<50	<50	0	0	0	0
49 School Drive, Tomago	<50	<50	<50	0	0	0	0
Passive Recreation Inside EBZ				48	48	48	-
Tomago House, Tomago Road, Tomago	<40	<40	<40	0	0	0	0
Tomago House Chapel, 423 Tomago Road, Tomago	<40	<40	<40	0	0	0	0
Hunter Wetlands National Park	<40	<40	<40	0	0	0	0
Active Recreation Inside EBZ				53	53	53	-
Tomago Bowling Club, 657 Tomago Road, Tomago	<40	<40	<40	0	0	0	0
Residential Inside EBZ				45	42	40	40
Tomago Detention Centre, 587 Tomago Road, Tomago	<30	<30	<30	0	0	0	0
Tomago Village Caravan Park, 819 Tomago Road, Tomago	<30	<30	<30	0	0	0	0
374 Tomago Road, Tomago	≤37	≤37	≤37	0	0	0	0
362 Tomago Road, Tomago	≤36	≤36	≤36	0	0	0	0
308 Tomago Road, Tomago	<30	<30	<30	0	0	0	0
5 Graham Drive, Tomago	<30	<30	<30	0	0	0	0
Passive Recreation Outside EBZ				48	48	48	-
Hunter Wetlands National Park	<30	<30	<30	0	0	0	0
Botanic Gardens 2100 Pacific Highway, Heatherbrae	<30	<30	<30	0	0	0	0
Sandgate Cemetery	<30	<30	<30	0	0	0	0

Location	Worst-Case $L_{Aeq,15m}$			PNTLs Exceedance $L_{Aeq,15m}$			$L_{Aeq,15m}$ Sleep Disturbance
	Day	Eve	Night	Day	Eve	Night	
Residential Outside EBZ				42	40	38	40
175 Tomago Road, Tomago	<30	<30	<30	0	0	0	0
2139 Pacific Highway, Heatherbrae	<30	<30	<30	0	0	0	0
Old Maitland Road, Hexham	<30	<30	<30	0	0	0	0
Pacific Highway, Hexham	<30	<30	<30	0	0	0	0
Pacific Highway, Sandgate	<30	<30	<30	0	0	0	0

The results from Table 17 and Appendix B demonstrate that the noise emissions from the site to the surrounding environment are low. The proposed development satisfies the PNTLs at all nearby residential receivers.

Table 17 also demonstrates that the potential for noise impacts during the night-time which have potential for sleep disturbance events are nil. The sleep disturbance PNTLs are satisfied as result.

The PNTLs at all nearby passive recreational, active recreational, commercial and industrial receivers are also satisfied.

Since the PNTLs are satisfied at all nearby noise-sensitive receivers no mandatory operational noise mitigation measures are required as a result. However, to reduce the potential noise impacts even further, we recommend that existing doors are closed during the waste processing whenever practicable (note this recommendation is not required to achieve the PNTLs for the project and is at the discretion of the proponent).

6.2 Predicted Operational Noise Impacts – RNP

Any vehicles associated with the development will exit the site and join School Drive to travel through the industrial zone. At the end of School Drive the vehicles will join Tomago Road and continue to the Pacific Highway. Noise impacts inside the industrial zone due to these vehicle movements are negligible. However, as the vehicles exit the industrial zone, they may connect with the other transport routes along the Tomago Road and the Pacific Highway.

Comparing the applicable RNP criteria from Table 13 to the measured traffic noise along Tomago Road and the Pacific Highway from Table 8 we find that the RNP criteria are already likely to be exceeded. Based on this, the allowable increase in noise due to traffic from the proposed site must not exceed 2 dB as per the RNP requirements.

To calculate the traffic noise impacts generated by the operation of the development the existing road traffic volumes for Tomago Road and Pacific Highway (nearest impacted roads) are required. Existing traffic data for Tomago Road was supplied via the traffic assessment report by SECA solution. Existing traffic data for the Pacific Highway was obtained from the Roads and Maritimes Services (RMS) website *Traffic Volume Viewer*. The increase in traffic volumes due to proposed operation of the site are taken from Table 5.

Table 18 summarises the predicted increase in noise levels on the nearest affected roads due to the traffic generated by the proposed development site.

Table 18. Summary of Traffic Noise Increases on Surrounding Roads (from available traffic data)

Road	Existing Traffic		Increase in Traffic (due to site)		Increase in Noise Levels dB
	Volume per Day	Percentage Heavy Vehicles %	Volume per Day	Percentage Heavy Vehicles %	
Tomago Road[1]	~9,320	12	348	100	<0.5
Pacific Highway[2]	42,589	4			<0.1

Note: 1. As per Seca peak hourly data with a conservative x10 factor to convert to estimated daily volumes.
2. 2020 data set taken 100 m south of Tomago Road / Pacific Highway junction.

Since the existing traffic noise levels on Tomago Road and the Pacific Highway already exceed the RNP criteria, all new traffic noise increases must satisfy the 2 dB increase criteria. Table 18 shows that the proposed development generates negligible additional traffic noise. The RNP criteria are satisfied as a result.

7 Construction Noise & Vibration Assessment Guidelines

People are typically more tolerant to noise and vibration during the construction phase of proposals than during normal operation. This response results from recognition that the construction emissions are of a temporary nature – especially if the most noise-intensive construction impacts occur during the less sensitive daytime period. For these reasons, acceptable noise and vibration levels are normally higher during construction than during operations.

Construction often requires the use of heavy machinery which can generate high noise and vibration levels at nearby buildings and receivers. For some equipment, there is limited opportunity to mitigate the noise and vibration levels in a cost-effective manner and hence the potential impacts should be minimised by using feasible and reasonable management techniques.

At any particular location, the potential impacts can vary greatly depending on factors such as the relative proximity of sensitive receivers, the overall duration of the construction works, the intensity of the noise and vibration levels, the time at which the construction works are undertaken, and the character of the noise or vibration emissions.

7.1 Construction Hours

For this project the construction works would be undertaken in accordance with the Interim Construction Noise Guideline (DECCW 2009) and would typically occur during the standard working hours between:

- 0700 to 1800 hrs Monday to Friday.
- 0800 to 1300 hrs on Saturdays.

There will be no construction works on Sundays or public holidays.

Where Out-of-Hours Works (OOHWs) are required (for emergency works, oversized equipment delivery, etc) they would be subject to separate approval on a case-by-case basis.

7.2 Noise Management Levels for Construction Activities

The ICNG requires proposal specific Noise Management Levels (NMLs) to be established for noise affected receivers. In the event construction noise levels are predicted to be above the NMLs, all feasible and reasonable work practices are investigated to minimise noise emissions.

Having investigated all feasible and reasonable work practices, if construction noise levels are still predicted to exceed the NMLs then the potential noise impacts would be managed via site specific construction noise management plans, to be prepared in the detailed design phase.

The ICNG provides an approach for determining $L_{Aeq,15min}$ NMLs at residential receivers by applying the measured $L_{AF90,15min}$ rating background noise levels (RBL), as described in Table 19.

Table 19. Determination of NMLs for Residential Receivers

Time of Day	NML $L_{Aeq,15min}$	Time of Day
Standard hours Monday to Friday 0700 to 1800 hrs Saturday 0800 to 1300 hrs No work on Sundays or public holidays	RBL + 10 dB	The **noise affected level** represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq,15min}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practises 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.
	≥ 75 dB (Highly Noise Affected)	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 restructuring the hours that the very noisy activities can occur, taking into account: ▪ 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.
Outside recommended hours	RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practises have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Note 1: Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Note 2: The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Noise Policy for Industry (NPI).

Adopting the measured background noise levels in Table 7 the NMLs derived for the proposal are detailed in Table 20. In addition, Table 20 includes the applicable fixed NMLs for the other noise sensitive receivers which are potentially affected by construction on the site.

Table 20. Construction NMLs for Residential Receivers

Receiver	Time of Day	Construction NMLs $L_{Aeq,15min}$ (dB)		
		Standard Hours	Out-of-Hours	Highly Noise Affected
Residential	Day	50	45	75
	Evening	N/A	42	75
	Night-time	N/A	40	75
Passive Recreation	Day	60	60	75
	Evening	N/A	60	75
	Night-time	N/A	60	75
Active Recreation	Day	65	65	75
	Evening	N/A	65	75
	Night-time	N/A	65	75
Commercial	Day	65	65	75
	Evening	N/A	65	75
	Night-time	N/A	65	75
Industrial	Day	75	75	75
	Evening	N/A	75	75
	Night-time	N/A	75	75

Where construction would be undertaken during the night-time period the potential for sleep disturbance should be assessed. However, this project will not conduct any construction works during the night-time period. Therefore, construction related sleep disturbance impacts will be nil and considered no further in this assessment.

7.3 Construction Traffic Noise

When trucks and other vehicles are operating within the boundaries of the various construction sites, road vehicle noise contributions are included in the overall predicted $L_{Aeq,15min}$ construction site noise emissions and then compared against the NMLs. When construction related traffic moves onto the public road network a different noise assessment methodology is appropriate, as vehicle movements would be regarded as 'additional road traffic' rather than as part of the construction site.

The ICNG does not provide specific guidance in relation to acceptable noise levels associated with construction traffic. For assessment purposes, guidance is taken from the RNP; however, it is noted that these are taken as noise goals only and are not mandatory.

One of the objectives of the RNP is to apply relevant permissible noise increase criteria to protect sensitive receivers against excessive decreases in amenity as the result of a proposal. In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

On this basis, construction traffic NMLs set at 2 dB above the existing road traffic noise levels during the daytime and night-time periods are considered appropriate to identify the onset of potential noise impacts. For any increase of more than 2 dB then consideration should be given to applying feasible and reasonable noise mitigation measures to reduce the noise impacts and preserve acoustic amenity.

7.4 Construction Vibration

An example of the recommended safe working distances for vibrationally intensive plant is provided in Table 21.

Table 21. Recommended Safe Working Distances for Vibration Intensive Plant

Plant Item	Rating / Description	Safe Working Distance	
		Cosmetic Damage[1]	Human Response[2]
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5 m	15 m to 20 m
	< 50 kN (Typically 2-4 tonnes)	6 m	20 m
	< 50 kN (Typically 4-6 tonnes)	12 m	40 m
	< 50 kN (Typically 7-13 tonnes)	15 m	100 m
	< 50 kN (Typically 13-18 tonnes)	20 m	100 m
	< 50 kN (Typically > 18 tonnes)	25 m	100 m
Large Hydraulic Hammer	1600 kg – 18 to 34t excavator	22 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	N/A
Jackhammer	Hand held	1 m (nominal)	Avoid contact with structure

Note 1: Referenced from British Standard BS 7385 Part 2-1993.
Note 2: Referenced from Assessing Vibration: A Technical Guideline.

The typical offset distance between any vibrationally intensive construction plant and the nearest residential receivers is > 100 m. Comparing the residential offset distance to the safe working distances shows that all residential receivers are located much further away than the safe working distances. Therefore, the potential for vibration impacts due to the construction of the development is effectively nil. All vibration criteria with respect to cosmetic damage to buildings and human comfort impacts will be satisfied. No further consideration of vibration impacts is given in this assessment as a result.

8 Construction Noise Modelling

The same noise model as described in Section 5 (operation noise model) was used as the basis of the construction noise model with the necessary modifications to the noise sources (ie construction activities) and construction scenarios.

8.1 Construction Scenarios & Noise Sources

The construction required at the site to prepare the development for operation is minimal. The construction scenarios provided by Jackson Environment and Planning include:

- Parking depot hardstand at the 21F School Drive site
- Minor works to install the weighbridge at the 21D School Drive site.
- Excavation of the OSD basin.

The overall time period for construction is anticipated to be 4 to 6 weeks. Table 22 illustrates the anticipated construction activities / plant items proposed during the construction works at the site.

Table 22. Proposed Construction Plant Information and Sound Power Levels L_{WA}

Construction Item	Capacity	Estimated Sound Power Level L_{WA} (dB re 1pW)	No. of Days	Construction Scenario
Excavator	~35 tonnes	105	45	OSD basin construction, drainage infrastructure
Front end loader	~35 tonnes	108	45	Bulk movement of soil and loading trucks
Grader	~35 tonnes	108	45	Truck depot pad bulk earthworks
Bull dozer	~35 tonnes	110	45	Truck depot pad grading
Dump truck	~25 tonnes	100	45	Import of road base and transport of excavated material off-site
Roller	~ 35 tonnes	109	45	Truck depot pad construction

The ICNG recommends that the realistic worst-case or conservative noise levels from the source should be predicted for assessment locations representing the most noise-exposed residences or other sensitive land uses. For most construction activities, it is expected that the construction noise levels would frequently be lower than predicted as the intensity of use and location of the construction equipment will vary throughout the site and throughout the day.

To simulate a realistic worst-case construction scenario the model will assume that all equipment is present on site and that each piece of equipment is operating at full load for 50% of the time.

8.2 Construction Traffic Volumes

The proposed construction traffic movements were provided by Jackson Environment and Planning and are summarised in Table 23.

Table 23. Summary of Construction Traffic Volumes

Type of Vehicle	Total Vehicles per Day
B - Double Truck	4

9 Predicted Construction Noise Impacts

The following section details the assessment of potential airborne noise impacts associated with the construction of the proposal. Construction noise goals have been determined based on the relevant government guidelines and industry standards. Potential noise levels have been predicted at sensitive receivers for the proposed construction activities and where levels are above the goals, feasible and reasonable impact mitigation measures are considered.

9.1 Construction Noise Impacts from Onsite Noise Sources

The typical $L_{Aeq,15m}$ noise levels at the surrounding noise sensitive receivers are provided in Table 24 and are representative of the 'noisiest' construction periods allowing for the simultaneous operation of noise intensive construction equipment.

Table 24. Predicted Construction Noise Levels

Location	Worst-Case $L_{Aeq,15m}$			NMLs Exceedance $L_{Aeq,15m}$		
	Day	Eve	Night	Day	Eve	Night
Industrial Inside EBZ				**75**	**75**	**75**
21 I School Drive, Tomago	<50	<50	<50	0	0	0
Tomago Smelter	<50	<50	<50	0	0	0
Commercial Inside EBZ				**65**	**65**	**63**
21B School Drive, Tomago	<50	<50	<50	0	0	0
23 School Drive, Tomago	<50	<50	<50	0	0	0
37 School Drive, Tomago	<50	<50	<50	0	0	0
49 School Drive, Tomago	<50	<50	<50	0	0	0
Passive Recreation Inside EBZ				**60**	**60**	**60**
Tomago House, Tomago Road, Tomago	<40	<40	<40	0	0	0
Tomago House Chapel, 423 Tomago Road, Tomago	<40	<40	<40	0	0	0
Hunter Wetlands National Park	<40	<40	<40	0	0	0
Active Recreation Inside EBZ				**65**	**65**	**63**
Tomago Bowling Club, 657 Tomago Road, Tomago	<40	<40	<40	0	0	0
Residential Inside EBZ				**50**	**50**	**50**
Tomago Detention Centre, 587 Tomago Road, Tomago	<40	<40	<40	0	0	0
Tomago Village Caravan Park, 819 Tomago Road, Tomago	<40	<40	<40	0	0	0
374 Tomago Road, Tomago	<40	<40	<40	0	0	0
362 Tomago Road, Tomago	<40	<40	<40	0	0	0
308 Tomago Road, Tomago	<40	<40	<40	0	0	0
5 Graham Drive, Tomago	<40	<40	<40	0	0	0
Passive Recreation Outside EBZ				**60**	**60**	**60**
Hunter Wetlands National Park	<40	<40	<40	0	0	0
Botanic Gardens 2100 Pacific Highway, Heatherbrae	<40	<40	<40	0	0	0
Sandgate Cemetery	<40	<40	<40	0	0	0

Location	Worst-Case $L_{Aeq,15m}$			NMLs Exceedance $L_{Aeq,15m}$		
	Day	Eve	Night	Day	Eve	Night
Residential Outside EBZ				50	50	50
175 Tomago Road, Tomago	<40	<40	<40	0	0	0
2139 Pacific Highway, Heatherbrae	<40	<40	<40	0	0	0
Old Maitland Road, Hexham	<40	<40	<40	0	0	0
Pacific Highway, Hexham	<40	<40	<40	0	0	0
Pacific Highway, Sandgate	<40	<40	<40	0	0	0

During standard construction hours no exceedances of the NMLs are predicted at all the noise sensitive receivers surrounding the site both inside and outside the Environmental Buffer Zone. This assessment has only considered construction activities inside standard construction hours. Where this is not possible then any OOHWs would be subject to separate approval on a case-by-case basis.

Noise levels are not predicted to exceed 75 dB $L_{Aeq,15m}$ at any receivers. Therefore, no receivers are found to be highly noise affected as per the ICNG.

9.1.1 Standard Mitigation Measures

When construction noise levels are predicted to exceed the NMLs the ICNG recommends that construction noise mitigation measures should be considered, where reasonable and feasible. Standard construction noise mitigation measures include the following:

- Avoiding the coincidence of noisy plant working simultaneously close together would result in reduced noise emissions.
- Equipment which is used intermittently is to be shut down when not in use.
- Where possible, equipment with directional noise emissions should be oriented away from sensitive receivers.
- Regular compliance checks on the noise emissions of all plant and machinery used for the proposal would indicate whether noise emissions from plant items were higher than predicted. This also identifies defective silencing equipment on the items of plant.
- Non-tonal reversing alarms should be used on all items of plants and heavy vehicles used for construction.

This assessment found no exceedances of the NMLs surrounding the site. However, we note that the above standard mitigation measures are good practise and should be implemented whenever practicable.

9.2 Construction Noise Impacts from Construction Traffic

To calculate the traffic noise impacts generated by the construction of the development the existing road traffic volumes for Tomago Road and Pacific Highway (nearest impacted roads) are required. Existing traffic data for Tomago Road was supplied via the traffic assessment report by SECA solution. Existing traffic data for the Pacific Highway was obtained from the Roads and Maritimes Services (RMS) website *Traffic Volume Viewer*. The increase in traffic volumes due to proposed construction are provided in Table 23.

Table 25 summarises the predicted increase in noise levels on Tomago Road and the Pacific Highway due to the construction traffic generated by the proposed development site.

Table 25. Summary of Construction Traffic Noise Increases on Surrounding Roads (from available traffic data)

Road	Existing Traffic		Increase in Traffic (due to site)		Increase in Noise Levels dB
	Volume per Day	Percentage Heavy Vehicles %	Volume per Day	Percentage Heavy Vehicles %	
Tomago Road[1]	~9,320	12	4	100	<0.1
Pacific Highway[2]	42,589	4			<0.1

Note: 1. As per Seca peak hourly data with a conservative x10 factor to convert to estimated daily volumes.
2. 2020 data set taken 100 m south of Tomago Road / Pacific Highway junction.

Table 25 shows that the proposed development generates negligible additional traffic noise. The RNP 2 dB increase criteria are satisfied as a result.

10 Conclusion

Waves Consulting has conducted a noise and vibration impact assessment of the proposed development at 21D & 21F School Drive, Tomago, NSW. The proposal seeks to redevelop the existing industrial site to create a Resource Recovery Facility and Truck Parking Depot. This assessment has investigated the worst-case noise emissions associated with the construction and operation of the facility.

This assessment has demonstrated that the predicted noise emissions from the site to the surrounding environment are low. The proposed development satisfies the Project Noise Trigger Levels (PNTLs) of the NSW Noise Policy for Industry (NPI) during all time periods at all nearby noise-sensitive receivers. No operational mitigation measures are required at the site.

The sleep disturbance impacts from the operational noise events generated by the site where investigated in this assessment. The proposed development satisfies the sleep disturbance trigger levels at all nearby sensitive receivers.

The existing traffic noise levels on the nearby affected roads already likely exceed the RNP criteria. Therefore, all new traffic noise increases must satisfy the RNP 2 dB increase criteria. Table 18 of this assessment shows that the proposed development generates negligible additional traffic noise. The NSW Road Noise Policy (RNP) criteria are satisfied as a result.

The construction noise impacts have been assessed in accordance with the NSW Interim Construction Noise Guidelines (ICNG). During standard construction hours no exceedances of the NMLs are predicted at the closest residential receivers. No receivers were found to be 'highly noise affected' as per the ICNG. Standard noise mitigation measures are not required for the construction phase.

Construction traffic noise levels must satisfy the RNP 2 dB increase criteria. Table 25 of this assessment shows that the construction traffic generates negligible additional traffic noise. The NSW Road Noise Policy (RNP) criteria are satisfied as a result.

The offset distances (in all directions) between the vibrationally intensive equipment and any sensitive receivers is large (> 100 m). The potential for vibration impacts due to the construction or operation of the development are effectively nil. All vibration criteria with respect to cosmetic damage to buildings and human comfort impacts will be satisfied as a result.

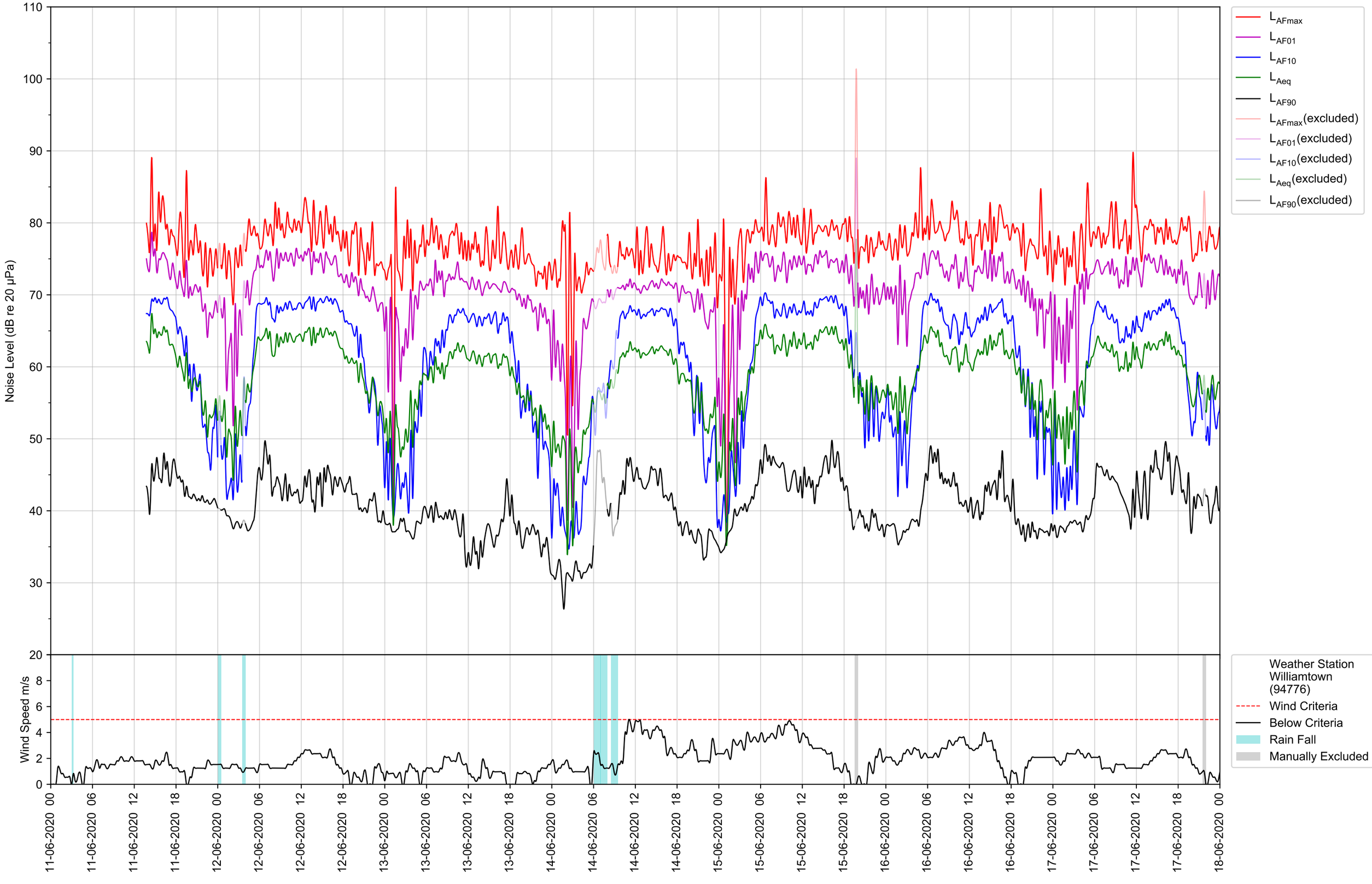
It is concluded that the proposed Resource Recovery Facility and Truck Parking Depot is a complying development with respect to noise and vibration impacts and is therefore suitable for construction and operation.

APPENDIX A:
GRAPHICAL NOISE LOGGER DATA

Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Week 1: 11-06-2020 to 18-06-2020

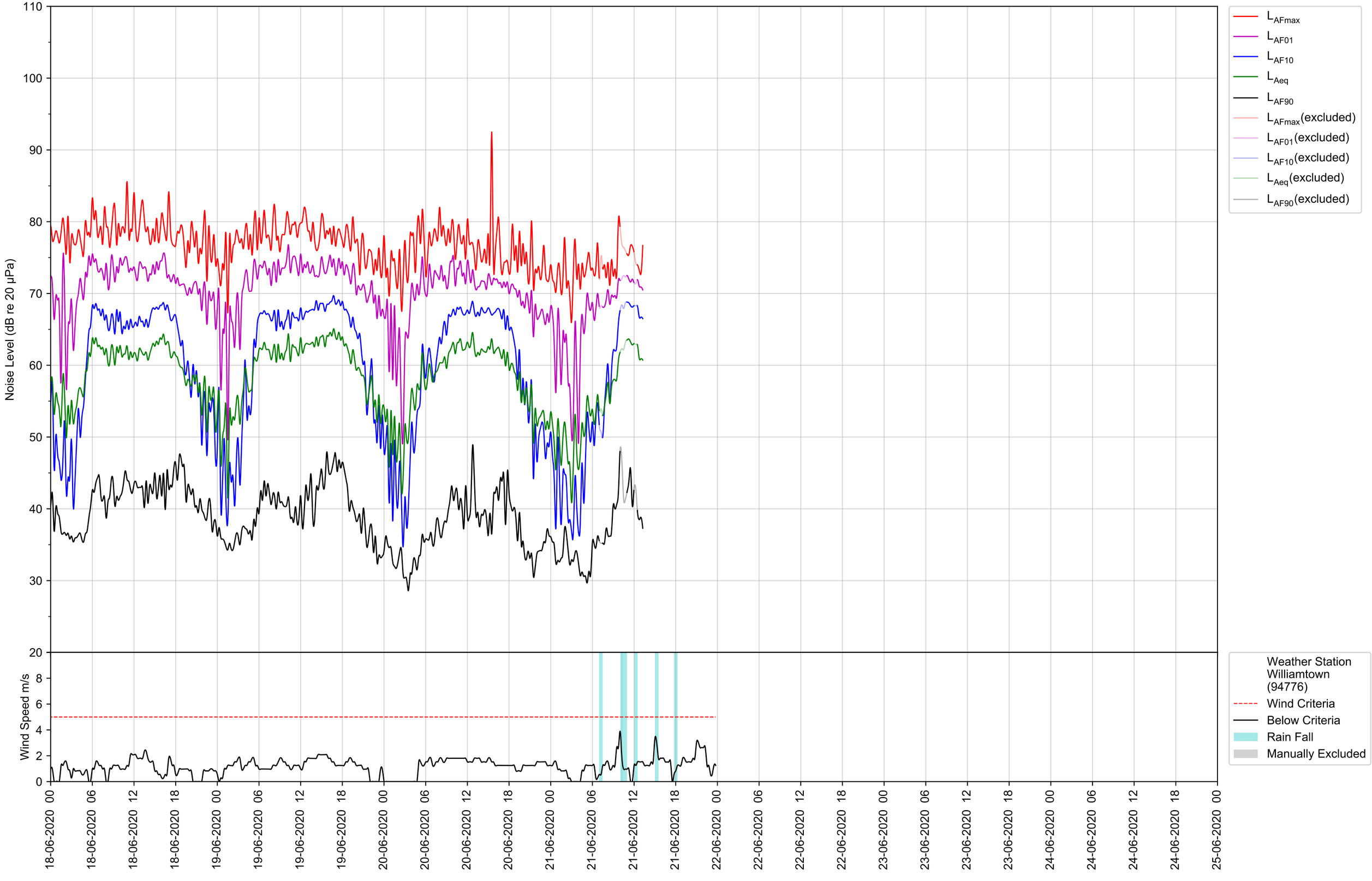
Waves CONSULTING



Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

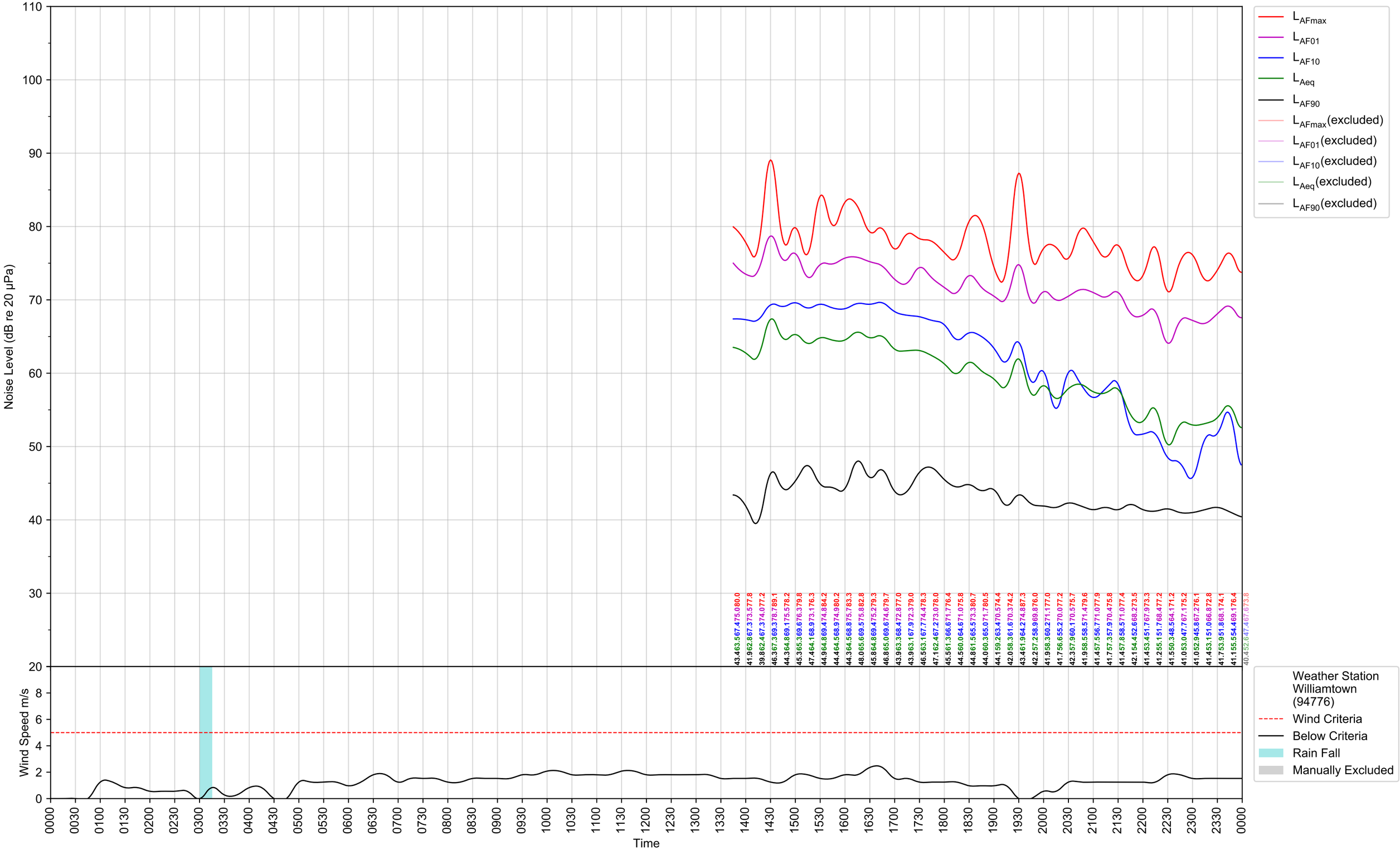
Graphical Noise Logger Data
Week 2: 18-06-2020 to 25-06-2020

Waves CONSULTING



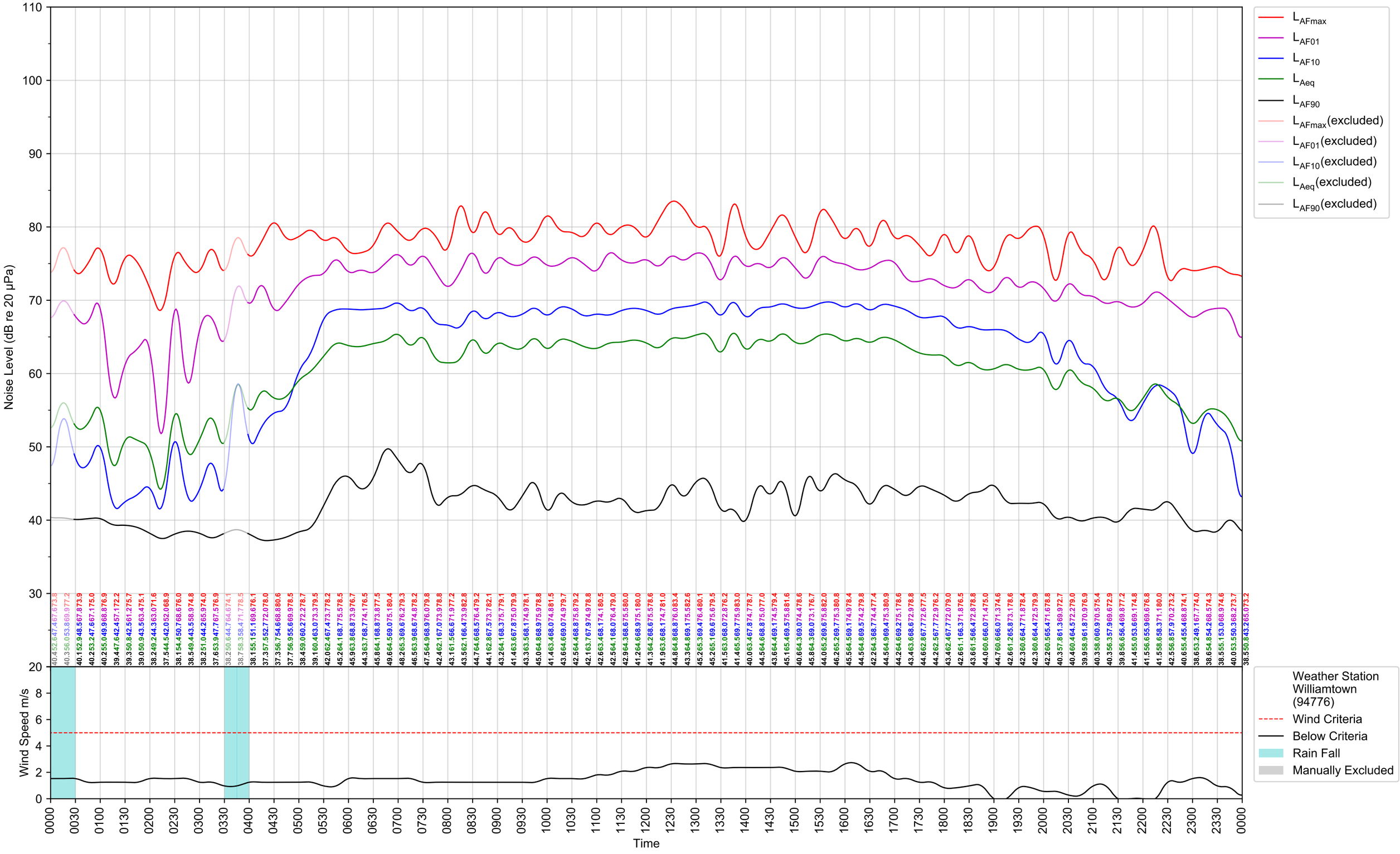
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Thursday 11 June 2020



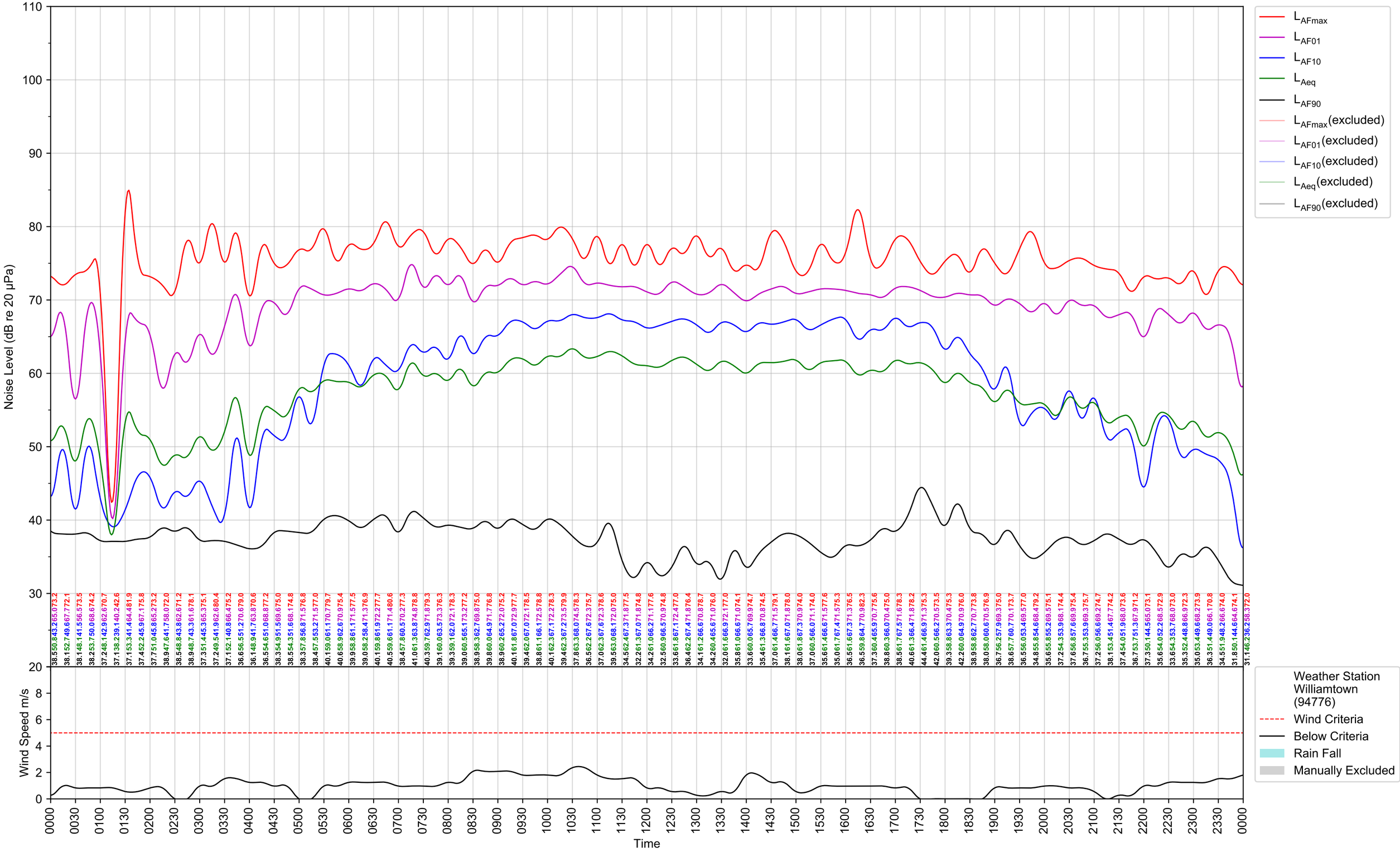
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Friday 12 June 2020



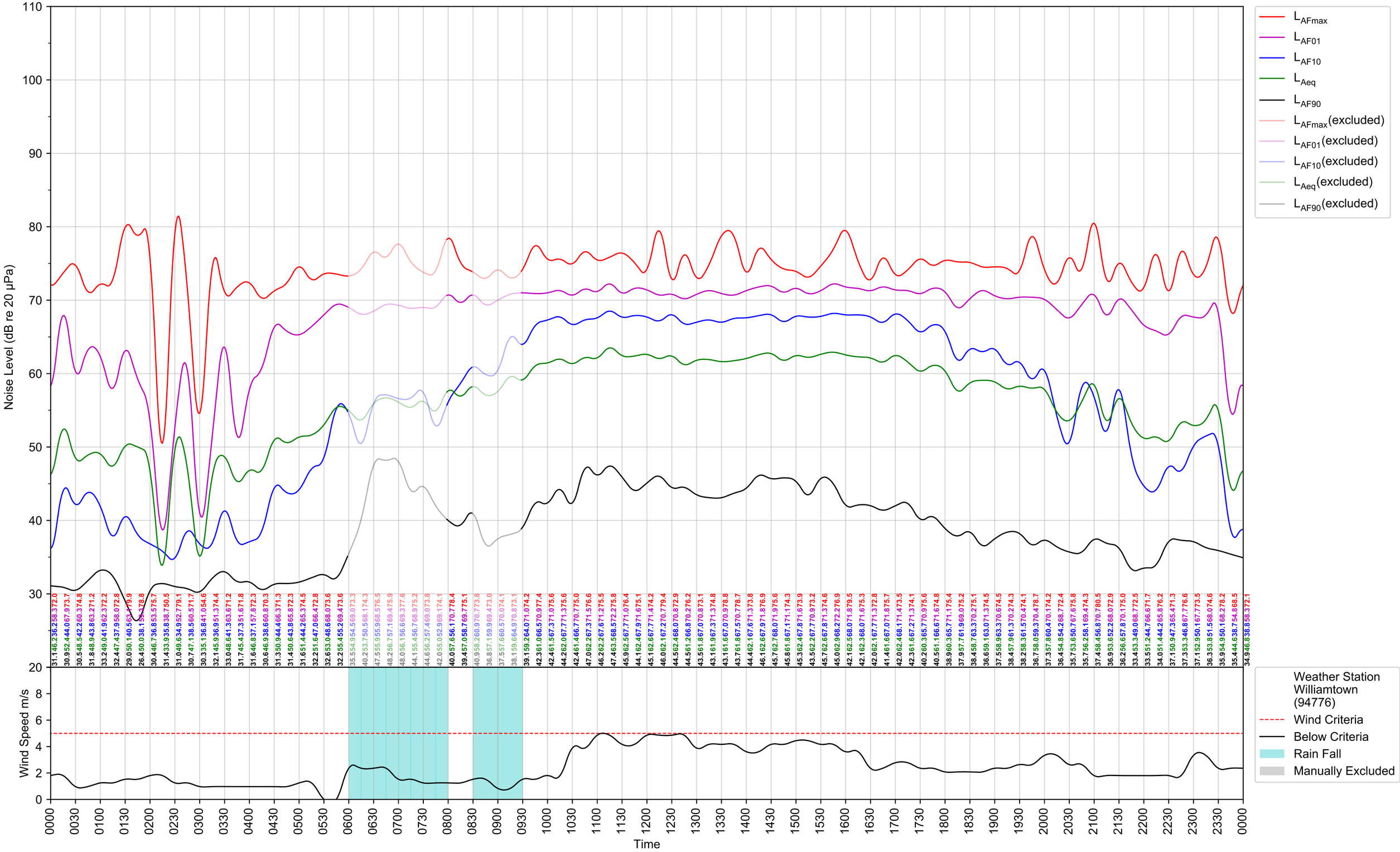
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Saturday 13 June 2020



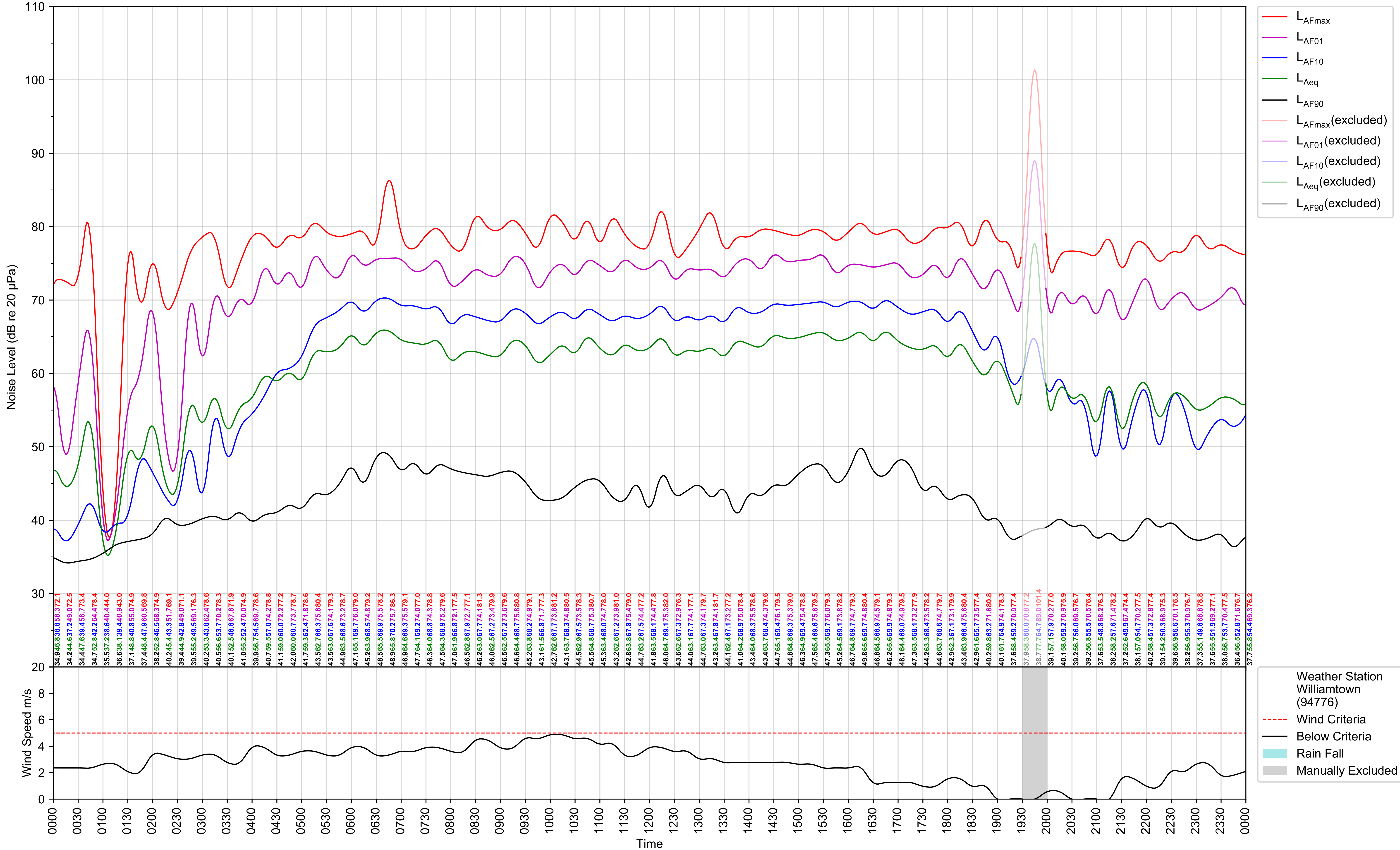
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Sunday 14 June 2020



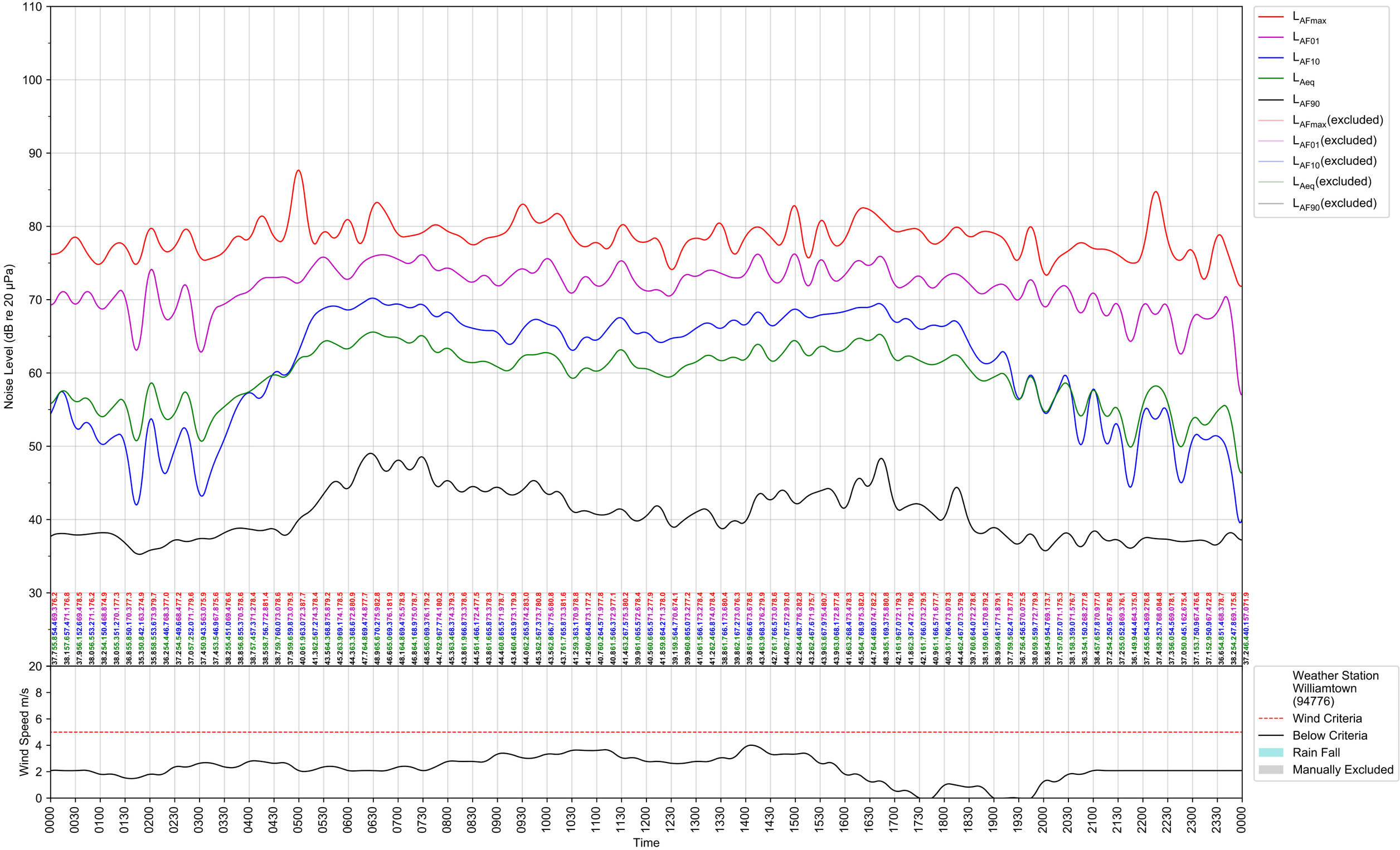
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Monday 15 June 2020



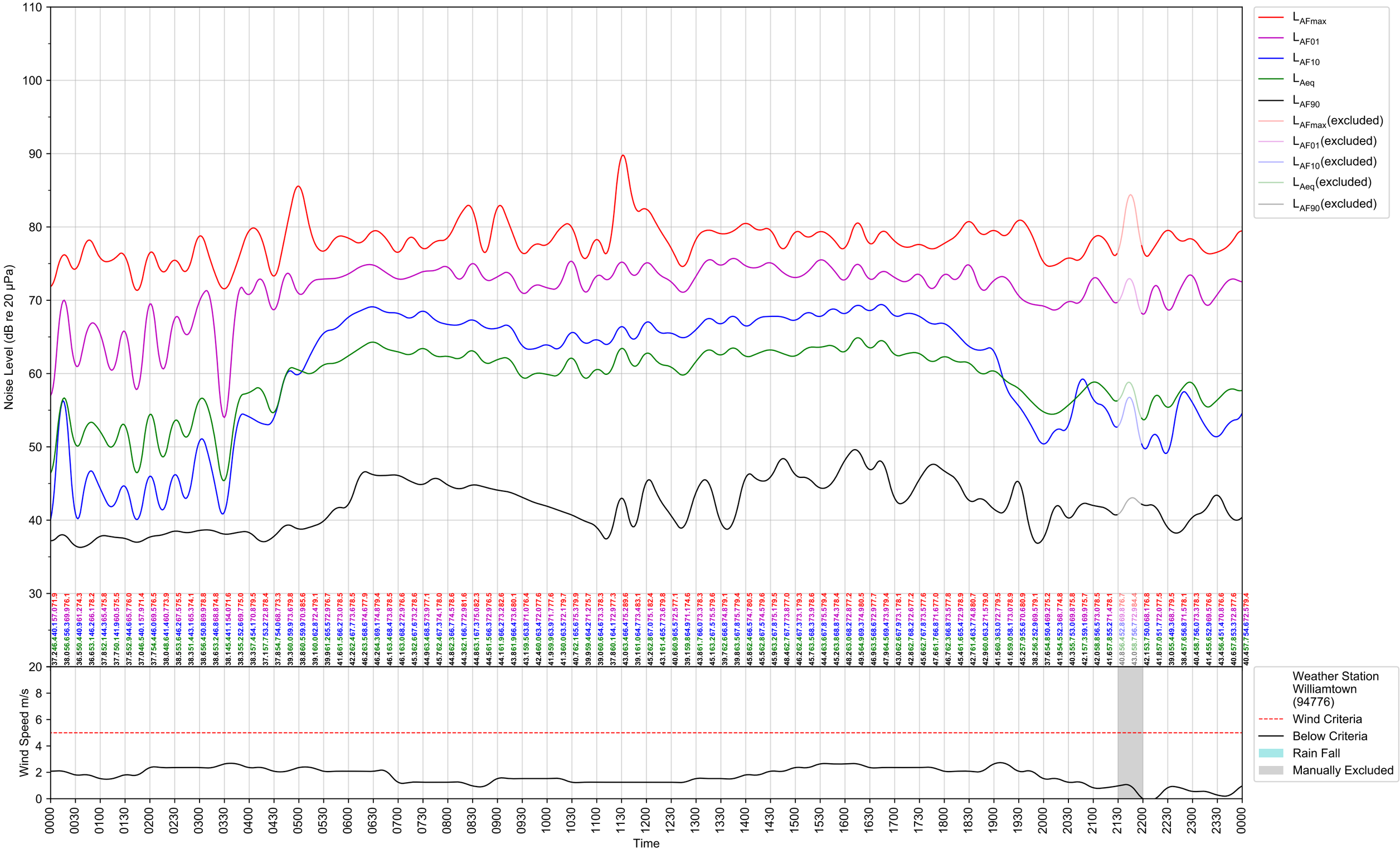
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Tuesday 16 June 2020



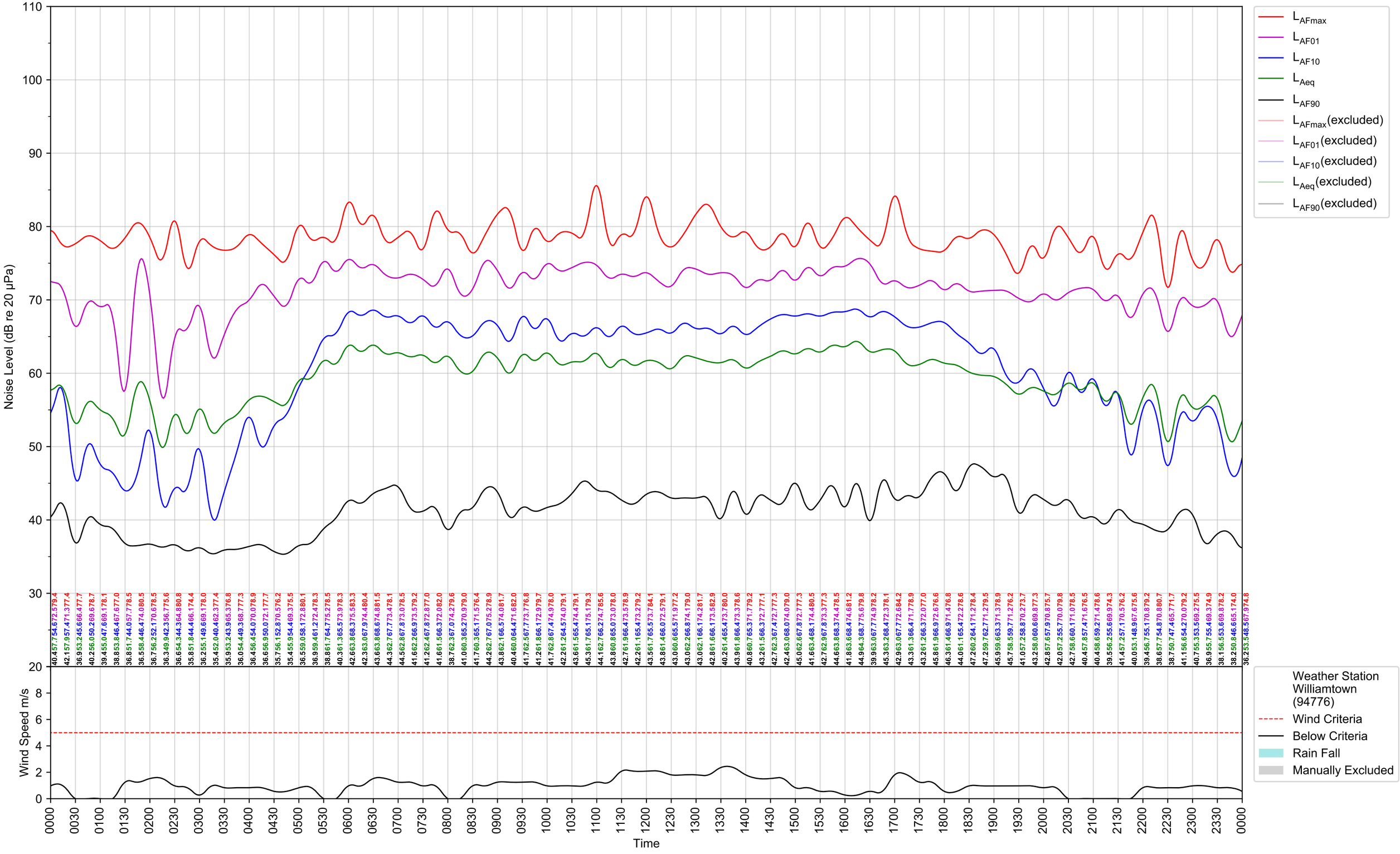
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Wednesday 17 June 2020



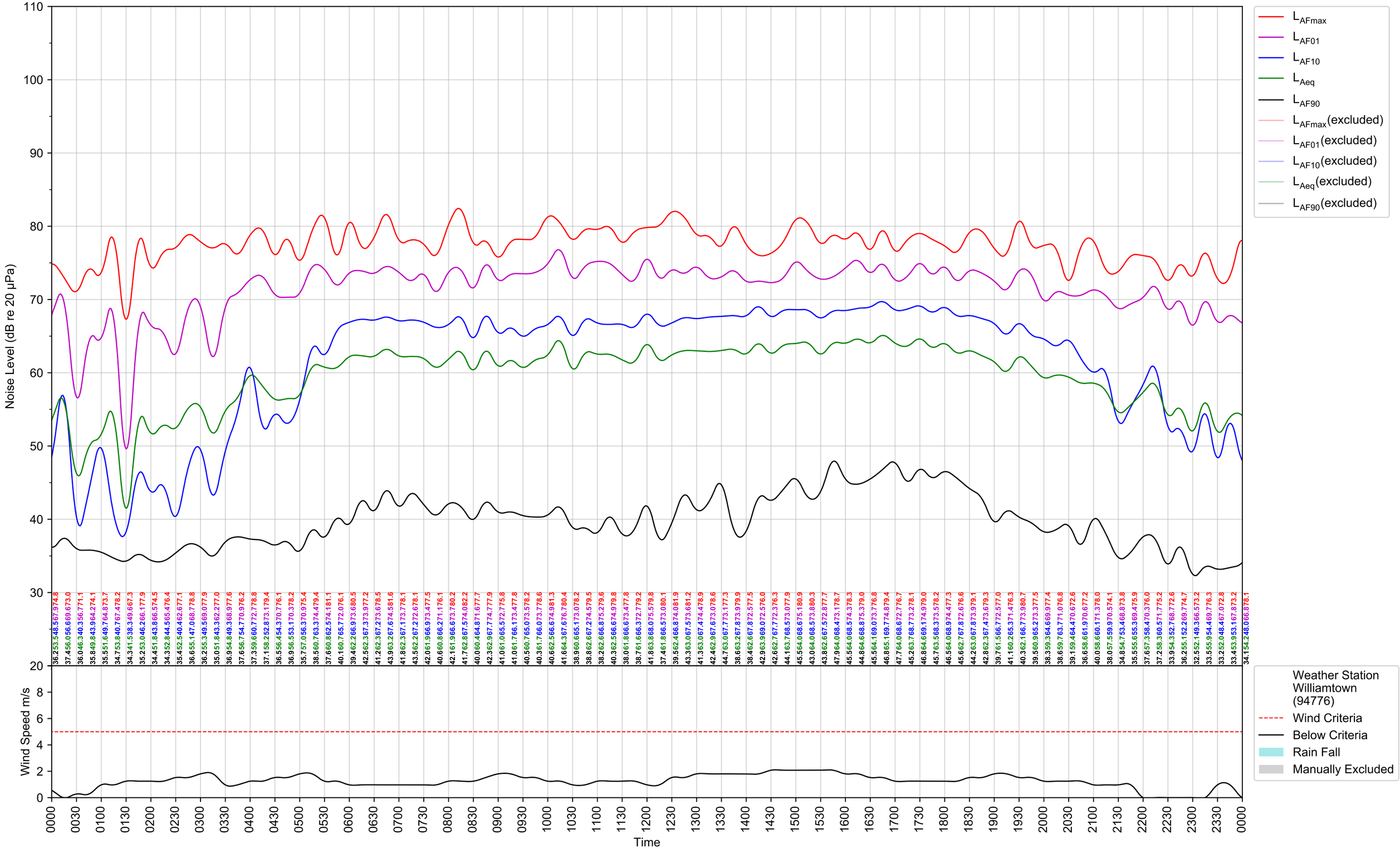
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Thursday 18 June 2020



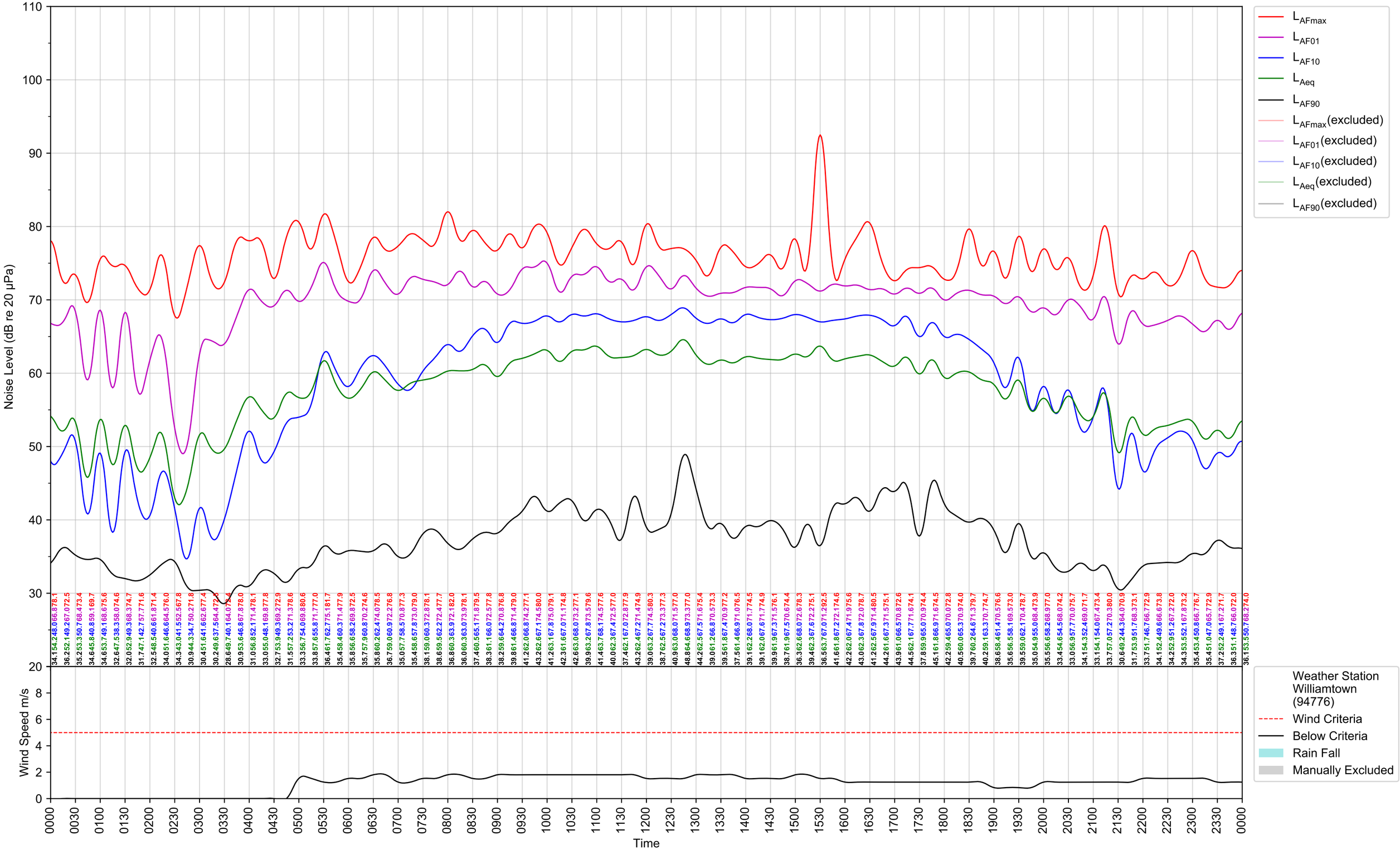
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Friday 19 June 2020



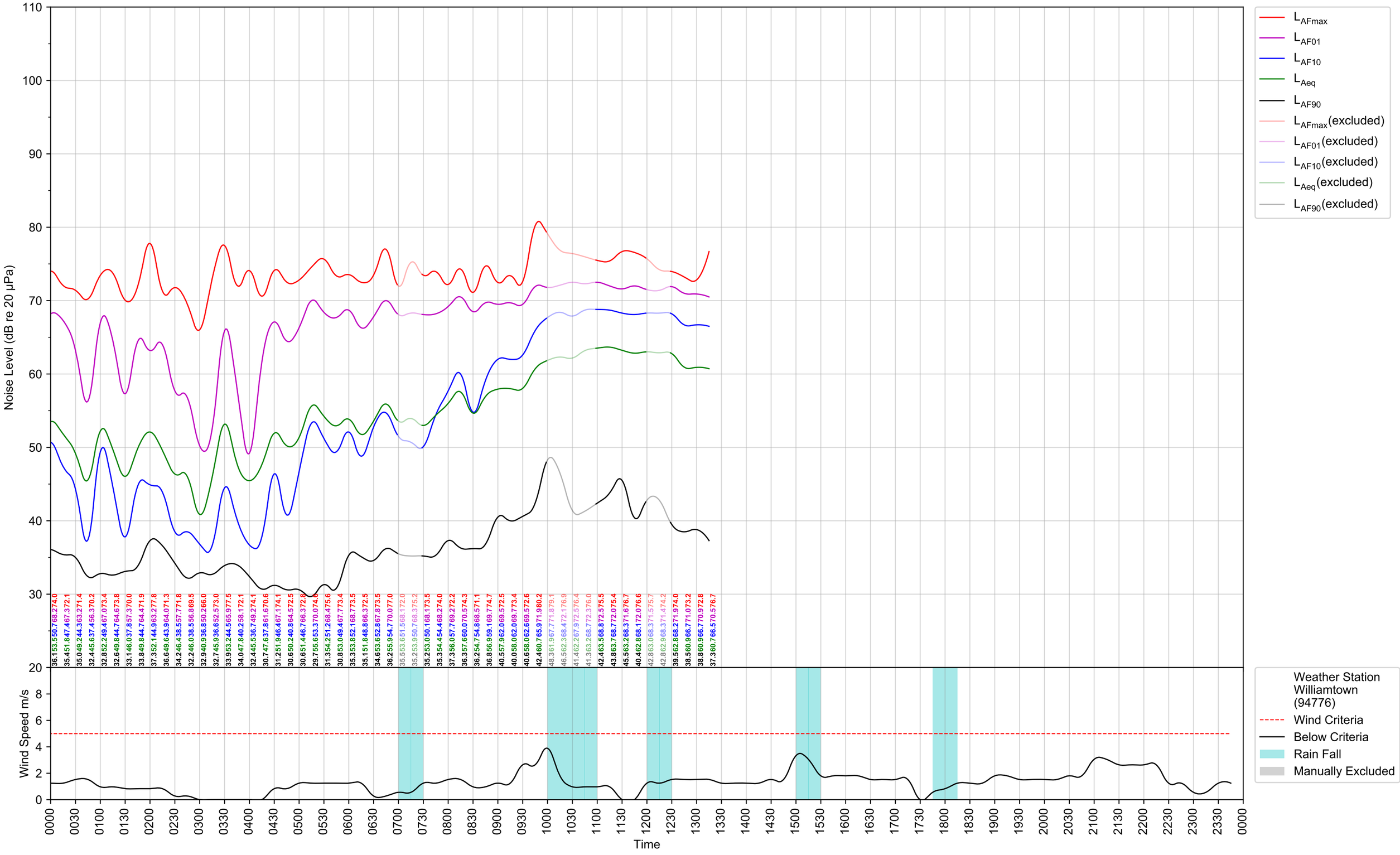
Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Saturday 20 June 2020

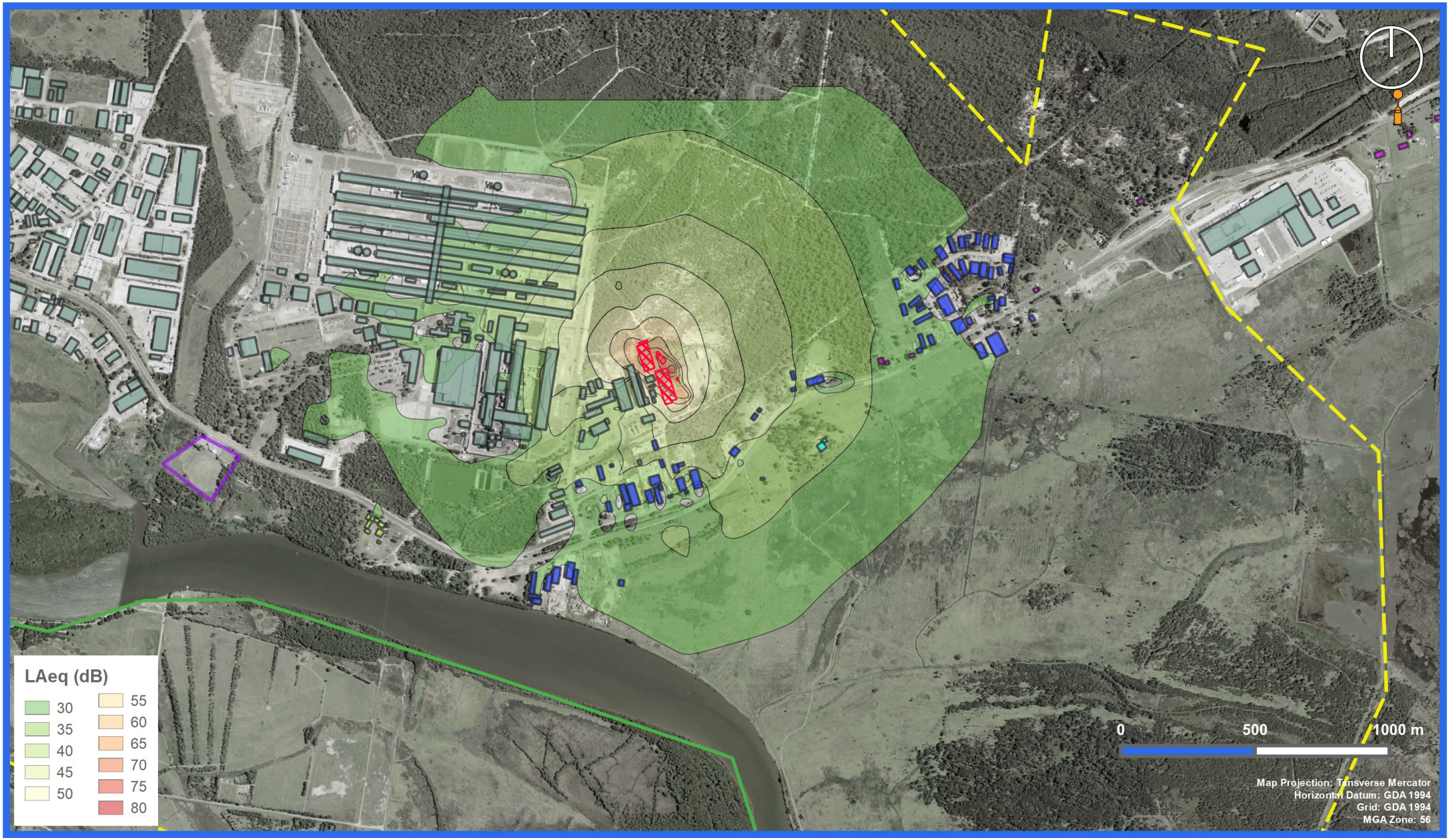


Project: Tomago Resource Recovery Facility & Truck Parking Depot
Project Number: 60.00848.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.25 dB
Post Calibration: -0.17 dB
Location: 159 Tomago Road, Tomago, NSW 2322

Graphical Noise Logger Data
Date: Sunday 21 June 2020



APPENDIX B:
NOISE CONTOUR MAPS



Key

- Site Buildings
- Environmental Buffer Zone
- Commercial
- Industrial
- Residential
- Carvan Park
- Cemetery
- Historical / Heritage
- Tomago Detention Centre
- Passive Recreation
- Active Recreation

*Images courtesy of NSW Imagery

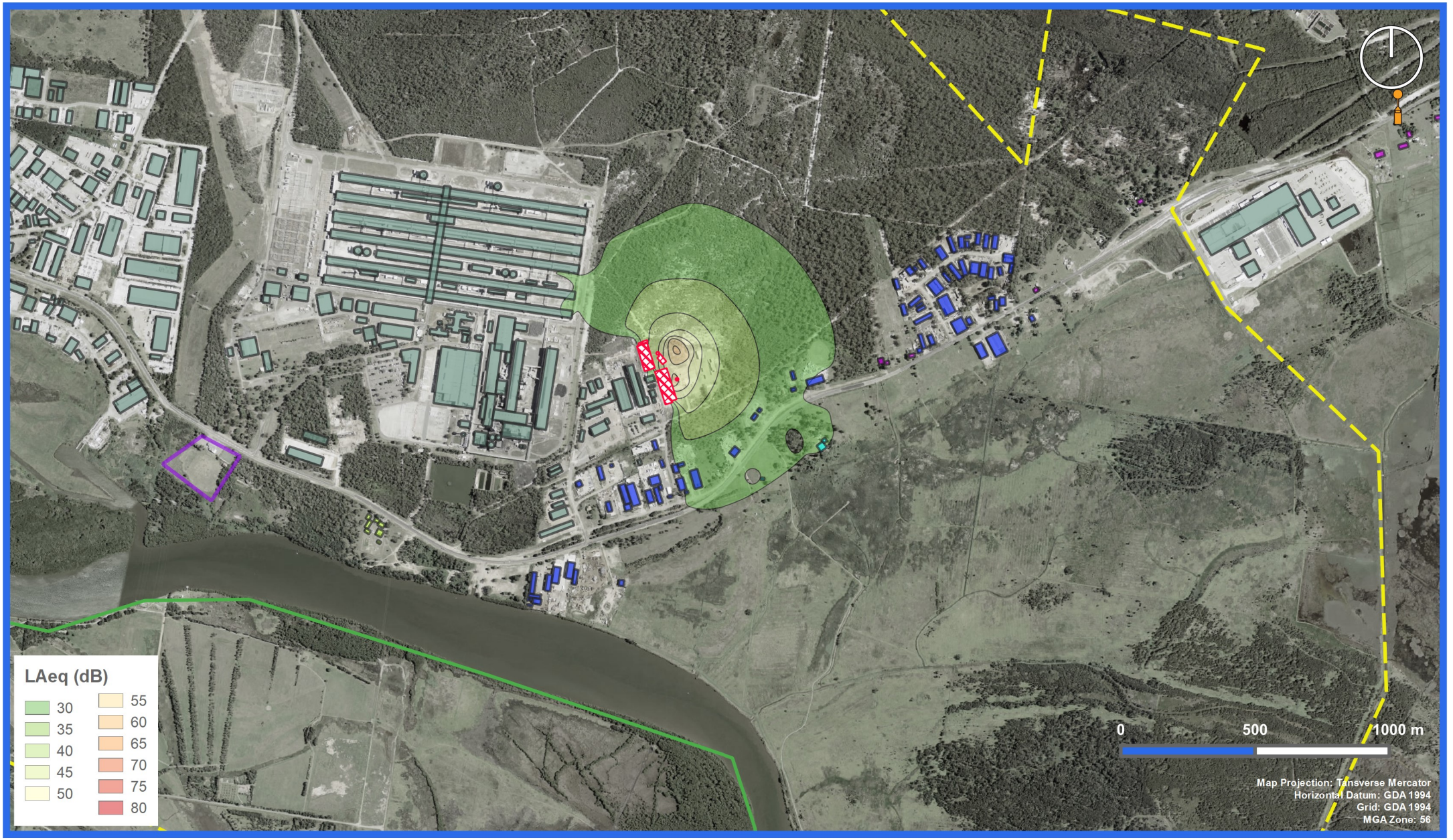
Tomago Resource Recovery Facility & Truck Parking Depot
21D & 21F School Drive, Tomago, NSW

NOISE IMPACT ASSESSMENT

Operational Noise Levels - Day / Evening / Night-time

Waves CONSULTING

Project Number: 60.00848.01
Date: 08 July 2020
Revision: 01
Prepared by: TC



Key

- Site Buildings
- Environmental Buffer Zone
- Commercial
- Industrial
- Residential
- Carvan Park
- Cemetery
- Historical / Heritage
- Tomago Detention Centre
- Passive Recreation
- Active Recreation

*Images courtesy of NSW Imagery

Tomago Resource Recovery Facility & Truck Parking Depot
21D & 21F School Drive, Tomago, NSW

NOISE IMPACT ASSESSMENT

Construction Noise Levels - Standard Hours

Waves CONSULTING

Project Number: 60.00848.01
Date: 08 July 2020
Revision: 01
Prepared by: TC

APPENDIX C:
SEARS 10447 - Requirements Summary (Noise)

SEARS Page No.	SEARS Requirement	Addressed in this Report
Page 6	7. Noise and Vibration – including: · a quantitative assessment of potential construction, operational and transport noise and vibration impacts in accordance with relevant Environment Protection Authority guidelines. This is to include the identification of existing and potential future sensitive receivers and consideration of approved and/or proposed developments in the vicinity, including current and future rail traffic	Section 2.2
	details and justification of the proposed noise mitigation and monitoring measures.	Section 6.1
	specified times of operation for all phases of the development and for all noise producing activities.	Section 2.4 and 5.2
Page 22	Outline construction works including: a) actions to address any existing soil contamination b) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on-site) c) construction timetable and staging; hours of construction; proposed construction methods d) environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures.	Item d) addressed in Section 9.1
Page 25	3. Noise and vibration Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically, the location of any noise sensitive locations in relation to the site should be included on a map of the locality.	Section 2.2
	Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.	Section 2.2, 2.2.1 & 4.1.3
Page 30	5. Noise and vibration Describe baseline conditions Determine the existing background (LA90) and ambient (LAeq) noise levels, as relevant, in accordance with the NSW Noise Policy for Industry. Determine the existing road traffic noise levels in accordance with the NSW Road Noise Policy, where road traffic noise impacts may occur. The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including: a) details of equipment used for the measurements b) a brief description of where the equipment was positioned c) a statement justifying the choice of monitoring site(s), including the procedure used to choose the site(s), having regards to Fact Sheets A and B of the NSW Noise Policy for Industry. d) details of the exact location of the monitoring site and a description of land uses in surrounding areas e) a description of the dominant and background noise sources at the site f) day, evening and night assessment background levels for each day of the monitoring period g) the final Rating Background Level (RBL) value	Section 3
	h) graphs of the measured noise levels for each day should be provided i) a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring.	Appendix A

SEARS Page No.	SEARS Requirement	Addressed in this Report
Page 31	Assess impacts The environmental outcome of the project should be to minimise adverse impacts due to noise from the project. The EIS must clearly outline the noise mitigation, monitoring and management measures the proponent intends to apply to the project to minimise noise pollution. A noise assessment should be undertaken in accordance with the New South Wales Noise Policy for Industry (EPA 2017). Determine the project noise trigger levels for the site.	Section 4.1.7
	Determine expected noise level and noise character likely to be generated from noise sources during: a) site establishment b) construction c) operational phases d) transport including traffic noise generated by the proposal e) other services.	Operational Noise – Section 6.1 Operational Traffic Noise – Section 6.2 Construction Noise – Section 9.1 Construction Traffic Noise – Section 9.2
	The noise impact assessment report should include: a) a plan showing the assumed location of each noise source for each prediction scenario	Section 2.1 & 5.1
	b) a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site	Section 2.3
	c) any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc	Section 5.1
	d) methods used to predict noise impacts including identification of any noise models used.	Section 5.1
	e) the weather conditions considered for the noise predictions	Section 5.2
	f) the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario	Section 6.1
	g) for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived	Section 6.1 & Appendix B
	h) an assessment of the need to include modification factors as detailed in Fact Sheet C of the NSW Noise Policy for Industry.	Section 5.6
	Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional feasible and reasonable mitigation measures.	Section 6.1
	The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation. a) Where relevant noise/vibration levels cannot be met after application of all feasible and reasonable mitigation measures the residual level of noise impact needs to be quantified	N/A for this development as no mitigation measures required.
	For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.	Section 2.5 & 6.2

SEARS Page No.	SEARS Requirement	Addressed in this Report
Page 32	Describe management and mitigation measures Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc.	N/A for this development as no mitigation measures required.
	For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include: a) use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage b) control of traffic (eg: limiting times of access or speed limitations) c) resurfacing of the road using a quiet surface d) use of (additional) noise barriers or bunds e) treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern f) more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension g) driver education h) appropriate truck routes i) limit usage of exhaust brakes j) use of premium muffles on trucks k) reducing speed limits for trucks l) ongoing community liaison and monitoring of complaints m) phasing in the increased road use.	N/A for this development as no traffic impacts found.