



Noise & Vibration Impact Assessment

Strathfield South - Material Recovery Facility Proposed Expansion (SSD 55775721)

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Noise & Vibration Impact Assessment

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1 Introduction

1.1 Background

Re.Cycle Operations Pty Ltd [as owned by Re.Hold Pty Ltd (Re.Group)], owns and operates an existing Material Recovery Facility (MRF) at 40 - 42 Madeline Street, Strathfield South NSW.

Re.Cycle is seeking development consent to increase the receipt and process of co-mingled waste at the existing MRF by an additional throughput of 100,100 tpa. The additional co-mingled throughput will be processed through the existing approved facility. No additional buildings, plant or equipment, or changes to the site layout will be required. The Project will increase co-mingled recyclables by 101,000 tpa so that the facility would be approved to receive 170,000 tpa of co-mingled recyclables and 30,000 tpa of paper and cardboard.

The Project is classified as State Significant Development (SSD) under Section 23 of Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021* (the Planning Systems SEPP) and approval for the Project is required under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It is a requirement that the SSD application for the Project is accompanied by an Environmental Impact Statement (EIS).

The Project represents an intensification of operations utilising existing buildings, infrastructure, and site layout arrangement. Other than the additional co-mingled waste throughput, the Project will not involve any significant changes to the existing approved operations, site layout, or built form.

Notably:

- There will be no changes to the existing approved throughputs and processing activities for the other recyclable waste streams received at the site, being mixed metals, mixed plastics and paper/cardboard. The Project will only increase the throughput capacity for co-mingled waste.
- There will be no construction works or any additional buildings, plant, or equipment required to accommodate the additional waste processing capacity of the existing facility.
- While there will be an increase in traffic generation (58 additional trucks per day delivering co-mingled waste, 13 additional trucks per day transporting processed waste off site, plus 12 additional employee vehicles per day), there will not be any changes to the existing approved site access arrangements, on-site traffic circulation, or external transportation routes currently used by trucks/vehicles to and from the site.
- There will be a minor change to the existing approved hours of operation.
- There will not be any changes to existing off-street car parking requirements or arrangements. The existing approved car parking provision is sufficient to accommodate the proposed car parking needs.
- There will be no changes to existing customer/visitor access arrangements.

Waves Acoustic Consulting Pty Ltd (Waves Consulting) has been engaged by Re.Cycle to demonstrate the noise and vibration impacts associated with the Project. This report presents the results of the assessment and will form part of the EIS for the Project.

This report has been prepared to inform the NSW Department of Planning, Housing and Infrastructure (DPHI), the EPA and other relevant stakeholders. The aim of the report is to assess the potential noise and vibration impacts of the Project at all nearby sensitive receivers and has been prepared in accordance with the relevant guidelines and reference documents outlined in Section 1.2.

1.2 Relevant Guidelines and Reference Documents

- Background noise in the surrounding area has been measured in accordance with the EPA's NSW Noise Policy for Industry (NPI), 2017.
- Operational noise modelling and assessment in accordance with the 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 Department of Environment, Climate Change and Water' NSW Road Noise Policy (RNP), March 2011.
- Operational vibration modelling and analysis in accordance with the Department of Environment and Conservation's guideline Assessing Vibration: A Technical Guideline, 2009.
- Strathfield Council's Notice of Determination of Development Application 2015/177/3 (issued on 30 November 2023) and the recent Development Modification Application PAN-481412.

2 Development Description

2.1 Site Description

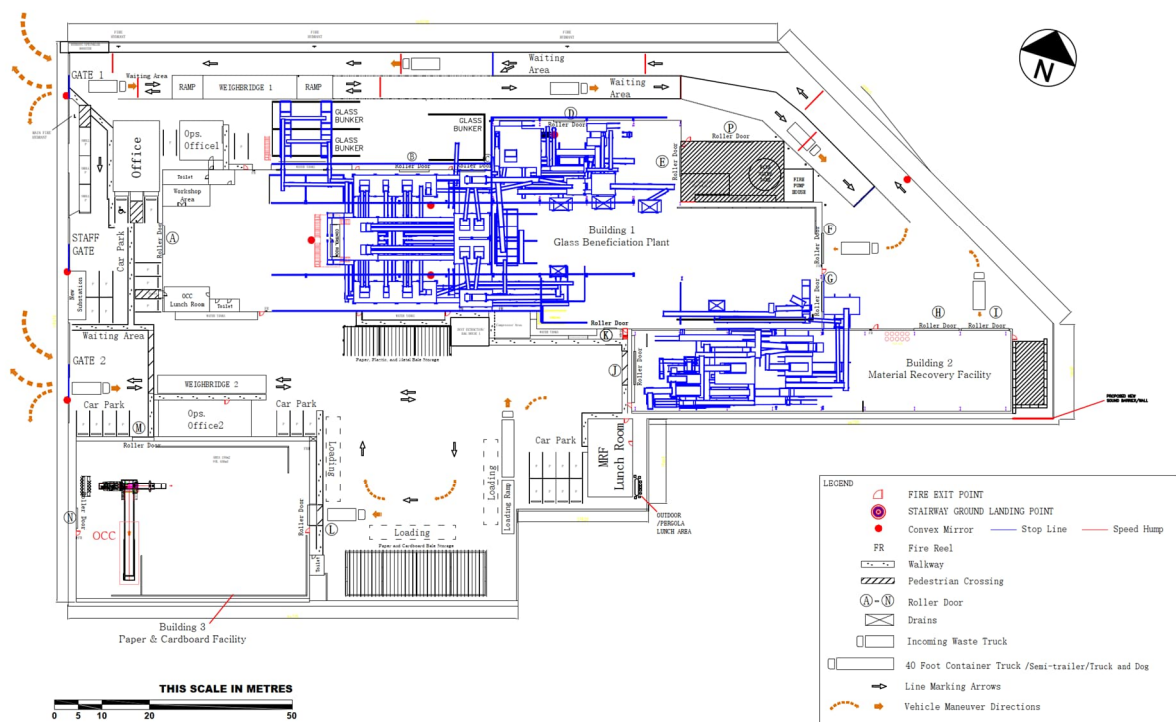
The site is located at 40 - 42 Madeline Street, Strathfield South, being Lot 24 in DP 1200563 with an area of approximately 19,000 sqm. The current built condition of the site includes the following key elements:

- Three large industrial sheds (Buildings 1-3).
- Several external storage bunkers.
- 2 weighbridges.
- Site entry / exit points.
- Car parking areas.
- 9,280 sqm hardstand area (excluding car parks).

The entrance to the site is located on the eastern side of Madeline Street. To the north and south of the site are industrial land uses. East of the site is vacant undeveloped land. The Cooks River flows in a concrete channel approximately 65 m to northeast of the site. Coxs Creek also flows in a concrete channel approximately 50 m to the south of the site.

The site is fully cleared of all native vegetation and has concrete hardstand on all external areas. Two weighbridges for weighing and recording incoming and outgoing trucks are situated inside the site at the main vehicle access points. The operations of the facility will not change in any substantial manner under this proposal. The current site layout (plan view) is shown in Figure 1 below.

Figure 1. Existing Site Layout (Plan View)



2.1.1 Existing Industrial Buildings

There are three (3) large existing industrial buildings on the site (refer to Figure 1 for door locations):

- Building 1 - in the centre of the site and approximately 139 m long by 35 m average width in size (4,800 sqm) and 11 m in height. Building 1 has seven roller doors that generally remain closed when not in use except for roller door F and K which are required to be kept open during normal daytime (5 am to 6 pm) and evening (6 pm to 10 pm) operations.
- Building 2 - is on the eastern corner of the site and is approximately 80 m long by 18 m wide (1,440 sqm) in size and 11 m in height and is constructed of sheet metal. Building 2 has three roller doors, of which roller doors H and I are kept open during daytime and evening operating hours (5 am to 10 pm) for safety in operations and truck access.
- Building 3 - is situated on the southern boundary of the site and is 50 m long by 32 m wide (1,600 sqm) in size and 11 m in height. It is constructed of metal sheeting. Front loaders and forklifts are the only plant that remain on the site on a permanent basis. Waste trucks are only permitted to visit the site for a short period of time in order to drop off waste or pick up finished products.

Maintenance of plant/machinery is carried out in a workshop located in the western end of Building 1.

2.1.2 Existing Office & Other Buildings

There are three (3) existing office buildings on the site:

- The office at the front of Building 1 comprises two storeys. It is constructed of brick and acts as a meeting area and for accommodating management staff.
- The office at the north-west side of Building 1 comprises one storey. It is constructed of brick and is utilised as the site operations office and administration centre (operations office 1).
- The office area adjacent to the second weighbridge next to Building 2. This building is built of brick and used for accommodating plant operators, sorting staff, administration and general storage (operations office 2)

There is one (1) other single-storey buildings on site:

- An existing shed to the south-east of the site, next to Building 2. It is constructed of brick and is used for accommodating plant operators, sorting staff, MRF lunch room and for general storage purposes (non-waste related).

2.2 Overview of the Surrounding Environment

Figure 2 below illustrates the proposed site and the proximity of the industrial and residential buildings in the surrounding area.

Figure 2. Site Location, Surrounding Area & Noise Logging Locations



Source: Aerial photography - NSW Imagery.

Figure 2 also shows key features labelled including the noise monitoring locations used for this assessment. The noise monitoring for this assessment was taken from a recent modification application for the site (i.e DA 2015/177/3). The noise monitoring results were originally included in the Noise and Vibration Impact Assessment (Report No. 60.00965.01.RPT1R3.pdf) prepared by Waves Consulting in September 2023, which accompanied that modification application.

There are two (2) residential zones located to the north-east and south-east of the site. The background noise levels affecting these residential zones are likely to be different, as they will be influenced by different sources of environmental noise. For this assessment it is appropriate to group the residential receivers into Noise Catchment Areas (NCAs). The NCAs have been defined to reflect receivers which are affected by similar environmental sources. Therefore, the receivers in each NCA will have similar background noise levels. The NCAs are identified in Figure 2 above.

Table 1 below describes the nearest noise sensitive receivers surrounding the development site.

Table 1. Nearest Noise Sensitive Receivers Surrounding the Development Site (from site boundary)

Receiver Type	Description	Distance (m)	Direction
Commercial	136 Deans Street	290	North
	Cooke Park	100	South
Active Recreation ¹	Begnell Field	280	South
	Bark Huts Reserve	360	Southeast
Passive Recreation ¹	Ford Park	300	East
	Dean Reserve	180	North
Industrial	-	5	North
	-	180	East
	-	5	South
	-	35	West
Residential	NCA01 Williams Street (closest)	235	Northeast
	NCA02 Chisholm Street (closest)	75	Southeast

Note: 1. Distance taken to the reasonably most affected point not unduly influenced by other nearby industrial sources or arterial roads.

2.3 Proposed Operational Hours

The Project proposes a slight variation to the existing approved hours of operation to allow materials to be received at the MRF from 4.30am to 6pm, Monday to Saturday. Currently, receipt of materials at the MRF must only take place between the hours of 4.30am and 3pm, with the roller doors to be closed at 3pm.

The proposed change will allow for the additional daily truck movements delivering the additional con-mingled waste to site. All other activities on the site will be undertaken within the hours currently imposed by Development Consent DA 2015/177/2.

The proposed hours of operation of the site are shown in Table 2.

Table 2. Proposed Hours of Operation for the MRF & PCR

Type of Activity	Hours Permitted	Days Permitted
PCR		
Receipt of incoming paper/cardboard, processing and dispatch	6:00am to 10:00pm Closed	Monday to Saturday 10:00pm to 6:00am and all day Sunday
MRF		
Receipt of incoming material	5:00am to 6:00pm (first delivery permitted from 4.30am) Closed	Monday to Saturday Sundays
Processing of material	5:00am to 10:00pm Closed	Monday to Saturday Sundays
Dispatch of sorted material	5:00am to 6:00pm Closed	Monday to Saturday Sundays
Cleaning & Conveyor maintenance	10:00pm to 5:00am Closed	Monday to Sunday 5:00am Sunday to 4:30am Monday

2.4 Proposed New Vehicle Movements

An additional fifty-eight (58) trucks would enter / exit the site per day to deliver the additional co-mingled waste, and a further thirteen (13) trucks for offtake of the processed waste. Up to six (6) additional light vehicles are proposed to accommodate the six new full-time positions generated by the project – generating an additional twelve (12) light vehicle movements per day. A comparison of the proposed vehicle numbers to existing vehicle numbers is provided in Table 3 below, which captures vehicle activity for the whole site (PCR and MRF). No changes to PCR vehicle movements are proposed.

Table 3. Existing and Proposed Vehicle Movements

Type of Movement	Existing	Proposed	Change
Delivery	78	136	+58
Offtake	14	27	+13
Light Vehicles	32	44	+12

Each truck typically spends between 15 and 30 minutes on site depending on whether it is unloading or loading respectively. To assess the worst-case noise levels this assessment has assumed that up to ten (10) trucks enter / exit the site within a 15-minute time window to simulate worst-case LAeq,15min noise emissions. This assumption is conservative and is greater than the typical hourly peak vehicle movements for the site.

2.5 Operational Noise Levels

Table 4 provides the overall and octave band sound power levels for all of the outdoor equipment proposed to operate on the site. These levels are derived from field measurements at the site on the mornings of 12 and 13 September 2022. The field measurements comprised all the plant / equipment that will be operational for the Project.

Table 4. Sound Power Levels of the Proposed Plant and Equipment

Noise Source	LAF _{Max} Sound Power Level	Overall L _{WA} Sound Power Level	Octave Band Centre Frequency (Hz) L _w Sound Power Level (dB re 1 pW)							
			63	125	250	500	1000	2000	4000	8000
Existing Noise Sources										
Building 1 – Compressors (south wall)	103	100	97	100	100	67	95	91	87	77
Building 3 – External Generator	107	102	104	113	101	98	94	93	89	84
B-Double / Semi Trailer – Unloading material at full engine revs	116	108	101	103	106	106	103	99	96	91
Large Front End Loader – Full load unloading and moving material in Building 2 bunker	113	104	105	104	99	100	98	97	96	90
Forklift Truck ¹	107	100	108	102	98	96	96	92	88	85
B-Double ¹ / Semi Trailer – Full load (28 to 38 tonnes)	113	106	108	109	104	103	101	98	95	92
B-Double ¹ / Semi Trailer - Reversing Beeper	102	102	102							
Light vehicle ¹ (ie staff car)	103	96	86	88	91	92	92	88	85	81
Duct Extraction Fans ²	99	97	94	94	95	93	93	90	87	78

Note: 1. Taken from the Waves Consulting noise database.
2. Provided by the Manufacturer with 8 dB silencer included. LAF_{Max} levels estimated from similar steady-state continuous noise sources.

Table 5 provides the overall and octave band sound pressure levels (reverberant) for the proposed indoor equipment associated with the proposal. These levels are derived from field measurements at the site on the mornings of 12 and 13 September 2022. The field measurements comprised all the plant / equipment that will be operational for the Project.

Table 5. Reverberant Sound Pressure Level of the Proposed Indoor Plant

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 (spatial average)	85	83	83	84	81	79	78	77	72
Building 2 (spatial average)	85	78	83	83	83	80	78	74	66
Building 3 (spatial average)	82	78	75	78	75	80	75	66	56

2.6 Potential Operational Noise Impacts

The potential operational noise impacts associated with the proposal will include the following:

- Processing operations from Buildings 1, 2 & 3.
- Front end loader and forklift movements around the site handling and moving materials and loading / unloading delivery trucks.
- Delivery trucks moving on the site.
- Delivery trucks loading / unloading on the site.
- Fixed outdoor sources such as the generator associated with Building 3 and the dual air compressors associated with Building 1.
- Additional noise emissions from vehicle movements on the adjacent roads to any nearby sensitive receivers.

2.7 Potential Vibration Impacts

The offset distances (in all directions) between the vibrationally intensive equipment and any sensitive receivers are large (> 70 m). The potential for vibration impacts due to the 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 are given in this assessment as a result.

3 Environmental Noise Measurements

3.1 Unattended Noise Monitoring

To characterise the existing acoustic environment in the area, several environmental noise level surveys have been used. Two (2) noise loggers were used for this assessment corresponding to the two (2) Noise Catchment Areas ie NCA01 and NCA02 (see Figure 2). The measurement locations, periods and equipment used are summarised as follows:

- **NCA01** - Monday 29 August 2022 to Thursday 08 September 2022. The noise logger was installed at 148 to 150 Deans Street, Strathfield, NSW (see Figure 2). Svan 979 - Serial No. 27144.
- **NCA02** - Monday 29 August 2022 to Thursday 08 September 2022. The noise logger was installed adjacent to 2 Chisholm Street, Belfield, NSW (see Figure 2). Svan 977 - Serial No. 45730.

The logger locations were 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. In addition, these logger locations are the same as used in the historical Noise Impact Assessment report for the site in November 2015 (by SLR Consulting 610.14992-R1). Instrumentation for the survey comprised Type 1 Sound Level Meters / Loggers each fitted with an environmental windshield.

The noise loggers were 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 loggers were 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) Canterbury (94766) 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 LAF_{max} , LAF_1 , LAF_{10} and LAF_{90} together with the LA_{eq} levels for the corresponding 15-minute periods, as well as relevant weather data.

3.2 Unattended Noise Monitoring Results

No significant change to the industrial use / development of the site has occurred since late 2022 and this current assessment. Therefore, the noise monitoring results from the previous Noise & Vibration Impact Assessment (Report No. 60.00903.02.RPT1R2.pdf) as prepared by Waves Consulting in November 2022 remain applicable to this assessment.

To define the applicable environmental noise targets at nearby sensitive receivers the historical measured data has been processed in accordance with the time periods stipulated by the NPI. The processed measurements results for Noise Catchment Areas NCA01 and NCA02 are summarised in the following sections.

3.2.1 Noise Catchment Area NCA01

Table 6 details the background and ambient noise levels recorded during the NPI daytime, evening and night-time assessment periods for NCA01.

Table 6. Measured Noise Levels Corresponding to NPI Assessment Periods for NCA01

Date	LAF90 Background Noise Levels			LAeq Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Monday, 29 August 2022	-	37	35	-	41	45
Tuesday, 30 August 2022	-	44	43	-	49	49
Wednesday, 31 August 2022	43	36	35	52	43	45
Thursday, 1 September 2022	39	38	37	48	45	46
Friday, 2 September 2022	46	44	40	52	49	47
Saturday, 3 September 2022	-	44	-	-	47	-
Sunday, 4 September 2022	44	-	43	50		48
Monday, 5 September 2022	46	44	43	51	47	48
Tuesday, 6 September 2022	44	41	37	49	45	46
Wednesday, 7 September 2022	39	38	38	48	44	47
Thursday, 8 September 2022	41	41	31	49	47	42
RBL	43	41	38	-	-	-
Log Ave	-	-	-	50	46	47
Total Valid Periods	8	10	10	8	10	10
Total Invalid Periods	3	1	1	3	1	1
Total Periods	11	11	11	11	11	11

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 LAeq 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 industrial noise, urban hum and distant road traffic noise from nearby roads. The noise characteristics and trend in the noise data as shown in Appendix A are typical of those found in *Urban* areas.

3.2.2 Noise Catchment Area NCA02

Table 7 details the background and ambient noise levels recorded during the NSW NPI daytime, evening and night-time assessment periods for NCA02.

Table 7. Measured Noise Levels Corresponding to NPI Assessment Periods for NCA02

Date	LAF90 Background Noise Levels			LAeq Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Monday, 29 August 2022	-	-	39	-	-	50
Tuesday, 30 August 2022	52	46	42	61	54	51
Wednesday, 31 August 2022	54	40	36	65	53	51
Thursday, 1 September 2022	55	42	40	64	51	48
Friday, 2 September 2022	54	44	39	65	50	56
Saturday, 3 September 2022	-	43	-	-	48	-
Sunday, 4 September 2022	45	-	42	54	-	49
Monday, 5 September 2022	53	44	42	65	51	50
Tuesday, 6 September 2022	52	44	37	63	51	49
Wednesday, 7 September 2022	55	43	41	65	54	51
Thursday, 8 September 2022	55	45	34	64	52	48
RBL	54	44	39	-	-	-
Log Ave	-	-	-	63	52	51
Total Valid Periods	9	9	10	9	9	10
Total Invalid Periods	3	2	1	3	2	1
Total Periods	12	11	11	12	11	11

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 LAeq is the *average sound level* over the measurement period (ie 15 minutes). 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 industrial noise, urban hum, local road traffic on the nearby Chisholm Street and active recreation noise at the nearby Cooke Park during the evening periods. The noise characteristics and trend in the noise data as shown in Appendix A are typical of those found in *Urban areas*.

3.3 Attended Noise Measurements

Attended measurements of ambient noise were taken at several representative locations as shown in Figure 2. Measurements were taken on Thursday 05 May 2022 during the day, evening and night-time periods. 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 977 Type 1 Sound Level Meter and Logger (Serial No. 45730) 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

Location	Period / Metric	Measured Noise Level (dB)	Noise Characteristics
17 Excelsior Avenue	Day LAeq,15min	56	Heavy excavator noise, metal / rock banging, reverse squawker alarm from industrial site (not Re.Cycle site). Sports noise in the adjacent park. Distant flora / fauna noise. Re.Cycle site not audible.
	Evening LAeq,period	47	Flora fauna, distant motorbike noise, general industrial hum and traffic noise. Distant sports noise in the adjacent park. Re.Cycle site not audible.
	Night LAeq,period	46	Local car starting and driving away, flora fauna, distant road noise, occasional industrial noise of dropping objects. Re.Cycle site not audible.
	Night LA1,1minute	52	
150 Dean Street	Day LAeq,15min	51	Flora and fauna, distant aircraft and traffic noise. Distant train horn. Conversations in industrial area, car door slams. Re.Cycle site not audible.
	Evening LAeq,period	47	Flora and fauna noise, distant traffic and aircraft noise. Re.Cycle site not audible.
	Night LAeq,period	49	Flora and fauna noise, distant traffic and aircraft noise. Re.Cycle site not audible.
	Night LA1,1minute	57	

Location	Period / Metric	Measured Noise Level (dB)	Noise Characteristics
79 Madeline Street	Day LAeq,15min	54	Heavy industrial noise such as sheet metal banging and reversing beeper. Local traffic on Madeline Street and flora / fauna noise. Distant road noise, aircraft flyover, and industrial noise. Children playing nearby. Re.Cycle site not audible.
	Evening LAeq,period	49	Local traffic on Madeline Street. Emergency siren, distant motorbike, non-specific industrial hum. Flora and fauna noise. Re.Cycle site not audible.
	Night LAeq,period	50	Train yard noise, general industrial hum, distant motorbike noise. Road traffic noise from Madeline Street and nearby arterial roads. Distant flora / fauna noise.
	Night LA1,1minute	62	Re.Cycle site not audible.

The environmental noise in the area is typically dominated by industrial noise, urban hum and local road traffic noise. Flora and fauna noise was also found to be contributing sources of noise in the environment.

4 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 NPI 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 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.

4.2 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:

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

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.

4.2.1 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

4.3 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:

$$\text{Project amenity noise level} = \text{recommended amenity noise level (from Table 10)} \text{ minus } 5 \text{ dB}$$

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	All	Noisiest 1-hour	35
internal		Noisiest 1-hour	50
external	All	Noisiest 1-hour	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

4.4 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 or industrial districts. - has any combination of the above.

4.4.1 Residential Receiver Classifications for Each NCA

This assessment has defined Noise Catchment Areas (NCAs) to cover the large number of receivers surrounding the development. Each NCA will have different criteria based on the background noise measurements as described in Section 3. As part of the definition of the NPI criteria, the residential receivers should be classified as either rural, suburban or urban in each NCA.

Table 12 below summarises the residential receiver classification for each NCA used in this assessment.

Table 12. Summary of the Residential Receiver Classifications for Each NCA

Noise Catchment Area	LAF90 Background Noise Levels			Residential Receiver Classification
	Day	Eve	Night	
NCA01	43	41	38	Urban
NCA02	54	44	39	Urban

4.5 Recommended Amenity Noise Level – Existing Background Noise Corrections

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

- a. 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.
- b. 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.
- c. As per the information given in Table 11 for residential receivers in the rural category.

Option b would normally be applicable to the residential receivers closest to this site. However, to provide a conservative assessment and to align the Recommended Amenity Noise Levels with those of the historical noise assessment undertaken for the site in November 2015 this adjustment to the amenity noise levels has not been used.

4.6 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:

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

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

4.7 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 the goal of achieving the above trigger levels.

4.8 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 13. 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 13. NPI Project Noise Trigger Levels

Receiver	Time of Day	RANL ¹ LAeq,period	Measured RBL ² LAF90,15min	Project Noise Trigger Levels			
				Intrusive LAeq,15min	Amenity LAeq,15min	Sleep Disturbance LAeq,15min	Sleep Disturbance LAFMax
NCA01 Urban Residential	Day	60	43	48	58	-	-
	Evening	50	41	46	48	-	-
	Night	45	38	43	43	43	53
NCA02 Urban Residential	Day	60	54	59	58	-	-
	Evening	50	44	49	48	-	-
	Night	45	39	44	43	44	54
Active Recreation	When in use	55	-	-	53	-	-
Passive Recreation	When in use	50	-	-	48	-	-
Commercial	All	65	-	-	63	-	-
Industrial	All	70	-	-	68	-	-

Note 1. RANL = Recommended Amenity Noise Level as per Table 10.

Note 2. RBL = Rating Background Level.

Note 3. 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.

4.9 Comparison to the Previous RBLs & PNTLs

This section is provided so that the background noise levels and PNTLs from this assessment can be compared against the historical Noise Impact Assessment for the site from November 2015 (as provided by SLR Consulting 610.14992-R1).

Table 14 below illustrates a comparison of the RBLs and PNTLs from this assessment and the historical assessment in November 2015.

Table 14. Comparison of Historical and Current RBLs and PNTLs

Location	Period	RBLs			PNTLs		
		Historical	Current	Difference	Historical	Current	Difference
NCA01 150 Deans Street	Day	44	43	-1	49	48	-1
	Evening	44	41	-3	49	46	-3
	Night	42	38	-4	42	43	+1
NCA02 2 Chisholm Street	Day	48	54	+6	53	58	+5
	Evening	44	44	0	49	48	-1
	Night	41	39	-2	43	43	0

Table 14 shows that the current assessment has the same or lower RBLs for all periods except for NCA02 during the daytime which shows a +6 dB increase in the background noise levels. This is most likely due to the redevelopment of the site to the south of the Re.Cycle site (84 Madeline Street) which now operates heavy machinery throughout the day and has changed the noise environment at this location.

A similar trend is shown when the PNTLs are compared, with a difference of +5 dB at NCA02 during the daytime.

To provide the most conservative assessment and to acknowledge the historical Noise Impact Assessment at this site, this report will adopt the daytime PNTL for NCA02 as per the historical Noise Impact Assessment ie a PNTL of 53 dB LAeq will be adopted. Overall, the PNTLs for each NCA are summarised in Table 15 below.

Table 15. Overall NPI Project Noise Trigger Levels

Receiver	Time of Day	Project Noise Trigger Levels		
		PNTLs LAeq,15min	Sleep Disturbance LAeq,15min	Sleep Disturbance LAFMax
NCA01 Urban Residential	Day	48	-	-
	Evening	46	-	-
	Night	43	43	53
NCA02 Urban Residential	Day	53	-	-
	Evening	48	-	-
	Night	43	44	54
Active Recreation	When in use	53	-	-
Passive Recreation	When in use	48	-	-
Commercial	All	63	-	-
Industrial	All	68	-	-

5 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 16 below.

Where the existing noise levels due to traffic already exceed the assessment criteria given in Table 16 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 16. RNP Road Traffic Noise Criteria for Residential Land Uses.

Road Category	Type of Project / Land Use	External Assessment Criteria (dB re 20 μ Pa)	
		LAeq,15hr (Day)	LAeq,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	60 LAeq,15hr (Day)	55 LAeq,9hr (Night)
Local roads		55 LAeq,1hr (Day)	50 LAeq,1hr (Night)

6 Operational Noise Modelling

6.1 Model Inputs & Parameters

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

A detailed 3D noise model was constructed from a combination of aerial photography, existing ground topography and designs 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 17 were defined in the noise model to calculate noise levels at all nearby noise sensitive receivers.

Table 17. Noise Model Parameters

Variable	Parameter
Calculation Standard	CONCAWE
Topography	Surrounding Area – 1 m resolution
Ground Absorption	0.50 (urban environment)
Receivers	Facade receivers at varying height / multiple stories for all surrounding noise sensitive receivers Additional property boundary receivers for all residential receivers The worst-case noise from all facades, levels or boundary locations was used in the assessment
Mobile Sources	100% load for 50% of the time on average
Fixed Sources	100% load for 100% of the time
Source Levels	As per Tables 4 and 5

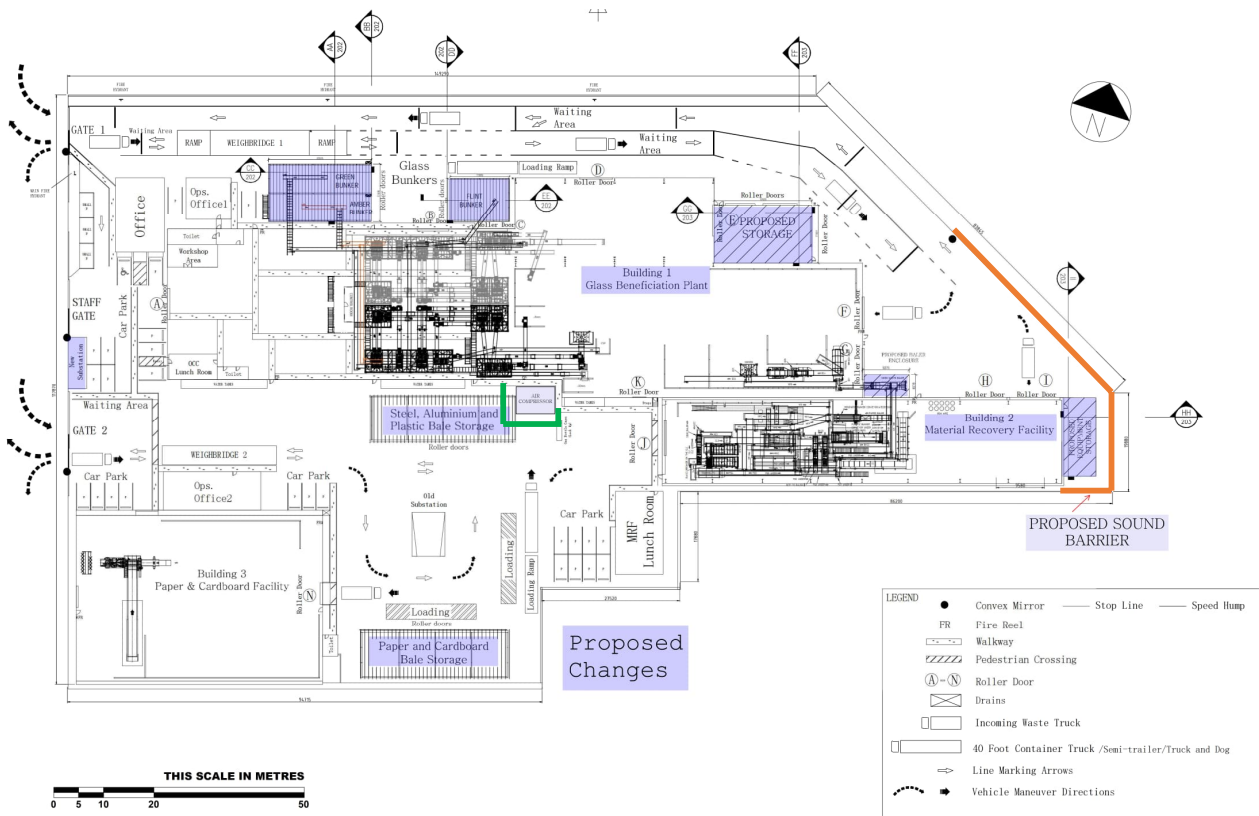
6.2 Existing Noise Control Measures

Table 18 summarises the existing noise control measures, which were required to be implemented as per the consent conditions for DA 2015/177/3.

Table 18. Noise Control Measure Summary

ID	Location	Description
MM01		Close all access doors during the evening and night-time.
MM02		Install a noise wall around the air compressors adjacent to the southern wall of Building 1. The noise wall should be 0.5 m above the height of the existing compressor roof structure and the internal face of the noise wall should be lined with an acoustic material with an NRC of not less than 0.75. See Figure 3 below for indicative location of the noise wall (green line).
MM03	Building 1	Line the underside of the roof above the air compressors with an acoustic material with an NRC of not less than 0.75.
MM04		During the night-time reduce the duty of the air compressors to 80%.
MM05		Install a minimum of 1500 sqm of acoustic material on the inside of the building, to line the walls and the upper part of the walls. The lining should provide an NRC of not less than 0.75.
MM06		Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.
MM07		Close all access doors except for doors H & I during the evening and night-time.
MM08	Building 2	Increase the noise wall to the East of Building 2 to 5.5 m. The internal face of the noise wall should be lined with an acoustic material with an NRC of not less than 0.75. The noise wall should also be extended to wrap around the southern boundary of the site to connect with the corner of Building 2. See Figure 3 below for indicative location of the noise wall (orange line).
MM09		Install a minimum of 1000 sqm of acoustic material on the inside of the building, to line the walls and the upper part of the walls. The lining should provide an NRC of not less than 0.75.
MM10		Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.
MM11	Building 3	Remove the generator that operates adjacent to Building 3.
MM12		Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.
MM13	Duct Extraction Fans (adjacent to Building 1 and S1)	Operate dust extraction fans with an exhaust silencer, so the overall Sound Power Level of each fan is no greater than 97 dB LwA as per Table 4.

Figure 3. Noise Wall Locations



6.3 Proposed Alternative Noise Control Measures

Development Consent DA 2015/177, as modified, requires a number of noise control measures to be implemented on-site, as per the conditions of consent. Some of these measures have already been implemented on-site and some are still in the process of being implemented. However, since the last DA modification was approved (and the last NVIA was carried out), the environmental / site conditions have changed significantly. These changes include:

- New site enclosure for the adjacent site to the south, 84 Madeline Street - Aussie Skips (under construction, site plans taken from DA 2020/250).
- New noise wall at the adjacent site to the south, 84 Madeline Street - Aussie Skips (built).
- The compressors associated with Building 1 have been fully enclosed inside a heavy-duty acoustic enclosure.

Figure 4 and Figure 5 below illustrate the surrounding environment and the changes to the adjacent Aussie Skips site which have reduced the noise emissions from the Re.Cycle site.

Accordingly, Re.Cycle has engaged Waves Consulting to investigate the implementation of several alternative, more cost-effective, noise control measures. At the time of writing this EIS, Re.Cycle has submitted an application to Strathfield Council seeking a Section 4.55(1A) modification to DA 2015/177 to amend the conditions of consent to refer to these alternative noise control measures.

These alternative noise mitigation measures have been included in the noise modelling for the Project and are detailed in Table 19 below.

Figure 4. Aussie Skips Site Prior to DA 2015/177/3



Figure 5. Aussie Skips Site Now



Table 19. Proposed Alternative Mitigation Noise Control Measures

ID	Location	Previous Mitigation Recommendations	Alternative Mitigation Due to Changed Site Conditions	Status
MM01		Close all access doors during the evening and night-time.	No change.	Completed
MM02		Install a noise wall around the air compressors adjacent to the southern wall of Building 1. The noise wall should be 0.5 m above the height of the existing compressor roof structure and the internal face of the noise wall should be lined with an acoustic material with an NRC of not less than 0.75. See Figure 3 below for indicative location of the noise wall (green line).	Air compressors now completely enclosed inside an acoustic enclosure. This mitigation measure has been installed on site.	Completed
MM03	Building 1	Line the underside of the roof above the air compressors with an acoustic material with an NRC of not less than 0.75.		
MM04		During the night-time reduce the duty of the air compressors to 80%.	No change.	Completed
MM05		Install a minimum of 1500 sqm of acoustic material on the inside of the building, to line the walls and the upper part of the walls. The lining should provide an NRC of not less than 0.75.	No longer required as noise emissions from the site have been reduced due to the changes at the adjacent Aussie Skips site.	Not required
MM06		Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.	No change.	Completed
MM07		Close all access doors except for doors H & I during the evening and night-time.	No change.	Completed
MM08	Building 2	Increase the noise wall to the East of Building 2 to 5.5 m. The internal face of the noise wall should be lined with an acoustic material with an NRC of not less than 0.75. The noise wall should also be extended to wrap around the southern boundary of the site to connect with the corner of Building 2. See Figure 3 below for indicative location of the noise wall (orange line).	Do not increase the noise wall height but keep the internal face lining with acoustic material with NRC not less than 0.75. Extend the existing noise wall at 4.5 m to wrap around the southern boundary to connect to Building 2.	Completed
MM09		Install a minimum of 1000 sqm of acoustic material on the inside of the building, to line the walls and the upper part of the walls. The lining should provide an NRC of not less than 0.75.	No longer required as noise emissions from the site have been reduced due to the changes at the adjacent Aussie Skips site.	Not required
MM10		Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.	No change.	Completed
MM11		Remove the generator that operates adjacent to Building 3.	No change.	Completed
MM12	Building 3	Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.	No change.	Completed
MM13	Duct Extraction Fans (adjacent to Building 1 and S1)	Operate dust extraction fans with an exhaust silencer, so the overall Sound Power Level of each fan is no greater than 97 dB LwA as per Table 4.	No change.	Completed

Overall, the noise emissions from the Re.Cycle site have been reduced due to the following factors:

- Adjacent site is constructing a large building / enclosure across most of the site which acts to shield the noise emission from the Re.Cycle site.
- Adjacent site noise wall is significantly higher and longer than previous assessments thereby providing additional shielding for the Re.Cycle site.
- The air compressors are now fully enclosed in a heavy-duty acoustic enclosure.

6.4 Noise Enhancing Meteorological Conditions

Noise model predictions were performed using 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 20 below. For all conditions the worst-case wind direction (source to receiver) for each receiver was assessed.

Table 20. 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.

6.5 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 criteria. All of the noise sources in this report have been assessed for annoying noise characteristics as per Fact Sheet C of the NPI as discussed in the following sections.

6.5.1 Low Frequency Noise

The measured noise sources at the site, from Section 2.5, have been assessed for potential low frequency noise as illustrated in Table 21 and Table 22 below.

Table 21. Low Frequency Noise Assessment of the Proposed Plant and Equipment

Noise Source	LWC Sound Power Level	LWA Sound Power Level	LWC minus LWA	Low Frequency Penalty Applies	Octave Band Centre Frequency (Hz) Lw Sound Power Level (dB re 1 pW)							
					63	125	250	500	1000	2000	4000	8000
Building 1 – Compressors (south wall)	105	100	5	No	97	100	100	67	95	91	87	77
Building 3 – External Generator	114	102	12	No	104	113	101	98	94	93	89	84
B-Double / Semi Trailer – Unloading material at full engine revs	111	108	3	No	101	103	106	106	103	99	96	91
Large Front End Loader – Full load unloading and moving material in Building 2 bunker	109	104	5	No	105	104	99	100	98	97	96	90
Forklift Truck ¹	109	100	9	No	108	102	98	96	96	92	88	85
B-Double ¹ / Semi Trailer – Full load (28 to 38 tonnes)	113	106	7	No	108	109	104	103	101	98	95	92
B-Double ¹ / Semi Trailer - Reversing Beeper	102	102	0	No					102			
Light vehicle ¹ (ie staff car)	98	96	2	No	86	88	91	92	92	88	85	81
Duct Extraction Fans	101	97	4	No	94	94	95	93	93	90	87	78

Note: 1. Taken from the Waves Consulting noise database
2. Provided by the Manufacturer with 8 dB silencer included.

Table 22. Low Frequency Noise Assessment of the Reverberant Sound Pressure Levels Inside Buildings

Description	LCeq (dB re 20 μPa)	LAeq (dB re 20 μPa)	LCeq minus LAeq	Low Frequency Penalty Applies	Octave Band Centre Frequency (Hz) Leq (dB re 20 μPa)							
					63	125	250	500	1000	2000	4000	8000
Building 1 (spatial average)	90	85	5	No	83	83	84	81	79	78	77	72
Building 2 (spatial average)	89	85	4	No	78	83	83	83	80	78	74	66
Building 3 (spatial average)	85	82	3	No	78	75	78	75	80	75	66	56

Table 21 and Table 22 illustrate that the measured noise sources do not have noise characteristics associated with low frequency noise. The risk of propagation effects changing the spectrum of the noise emissions such that the L_{Ceq} minus L_{Aeq} exceeds 15 dB (and therefore triggers the low frequency penalty) is low. Based on these results no low frequency noise penalty has been applied to the predicted results.

6.5.2 Intermittent Noise

The dominant noise sources associated with the site (the processing buildings) are generally broadband and continuous in nature. This assessment has predicted the worst-case noise levels when all potential noise sources are active simultaneously. For the worst-case noise emissions, the potential risk for intermittent noise characteristics are considered low. Based on the continuous operation and worst-case L_{Aeq} assessment for the site (ie all sources operational simultaneously) no intermittent noise penalty has been applied to the predicted results.

6.5.3 Tonal Noise

All of the noise sources measured at the site have been assessed for tonal noise objectively and subjectively. Only one (1) source of noise was found to be tonal. This was a safety alarm which sounds inside Building 2 before the machinery restarts. This alarm sounds for a few seconds and has a tonal component at 2000 Hz.

However, the alarm occurs infrequently and when averaged over a typical 15-minute period when the processing machines inside Building 2 are operating at full load (worst-case), the tonal component is no longer present. The risk of tonal noise characteristic due to the alarm event are low. Based on these results no tonal noise penalty has been applied to the predicted results.

6.6 Operational Scenarios

With reference to Section 2 the proposed operational scenarios can be summarised as per Table 23 below.

Table 23. Proposed Operational Scenarios

Activity	Operational Hours	Operational Noise Sources
PCR		
Receipt of incoming material, processing and dispatch	6:00am to 10:00pm – Monday to Saturday	Building 3 – internal processing at full capacity.
		Forklift operating on the hardstand between Building 3 and Buildings 1 / 2.
		Delivery vehicles accessing site via Gate 2 and manoeuvring around the site to deliver / receive materials via door L.
		Roller doors to be closed from 6pm and only opened when required for deliveries.
Closed	10:00pm to 6:00am – Monday to Saturday and closed all day Sunday.	-
MRF		
Receipt of incoming material	4:30am to 6:00pm – Monday to Saturday Closed on Sundays.	Delivery vehicles accessing site via Gate 1 and manoeuvring around the site to deliver materials at doors H & I. Co-mingled waste is deposited directly in the MRF building at door F.
		Front End Loader handling material around doors F, H & I.
Processing of material	5:00am to 10:00pm – Monday to Saturday Closed on Sundays	Buildings 1 & 2 – internal processing at full capacity.
		Dual air compressors operating at 100% load adjacent to the south wall of Building 1.
Dispatch of material	5:00am to 6:00pm – Monday to Saturday Closed on Sundays.	Delivery vehicles accessing site via Gate 1 and manoeuvring around the site to receive materials adjacent to door B (the glass bunkers).
		Delivery trucks receiving processed and baled materials - glass, mixed plastics, paper and cardboard - enter the site via gate to load bales from the bunkers to the south of the site.
Cleaning & Conveyor maintenance	10:00pm to 5:00am – Monday to Sunday	Buildings 1 & 2 maintenance operations.

The existing operational noise levels given in Table 4 and Table 5 were used as source levels in the noise model to simulate worst-case $L_{Aeq,15min}$ noise emissions.

Each truck typically spends between 15 and 30 minutes on site depending on whether it is unloading or loading respectively. To assess the worst-case noise levels this assessment has assumed that up to ten (10) trucks enter / exit the site within a 15-minute time window to simulate worst-case $L_{Aeq,15min}$ noise emissions. This assumption is conservative and is likely above the typical hourly peak vehicle movements for the site. Each truck is modelled as line-source with an overall Sound Power Level, L_{WA} of 106 dB as per Table 4.

7 Operational Noise Impacts

7.1 Predicted Operational Noise Impacts (With Alternative Mitigation)

A selection of the predicted worst-case operational noise levels due to onsite noise sources with the alternative mitigation measures are summarised and compared against the NPI project noise trigger levels in Table 24 and Sleep Disturbance targets in Table 25.

In addition, noise contour maps for the day, evening and night-time periods are provided in Appendix B. The noise levels presented are taken at 1.5 m elevation to simulate ground floor 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 24. Predicted Operational Noise Levels Compared to PNTLs (with Alternative Mitigation)

Receiver	NCA	Day			Evening			Night		
		LAeq	PNTL	Ex ¹	LAeq	PNTL	Ex ¹	LAeq	PNTL	Ex ¹
1 Birrowa Ave, Belfield	NCA02	38	53	-	35	48	-	35	43	-
1 Excelsior Ave, Belfield	NCA02	40	53	-	38	48	-	38	43	-
2 Chisholm St, Belfield	NCA02	44	53	-	40	48	-	40	43	-
2 Williams St, Strathfield South	NCA01	37	48	-	29	46	-	29	43	-
3 Birrowa Ave, Belfield	NCA02	39	53	-	36	48	-	36	43	-
3 Excelsior Ave, Belfield	NCA02	42	53	-	39	48	-	39	43	-
4 Chisholm St, Belfield	NCA02	40	53	-	36	48	-	36	43	-
4 Williams St, Strathfield South	NCA01	39	48	-	32	46	-	32	43	-
5 Birrowa Ave, Belfield	NCA02	37	53	-	35	48	-	35	43	-
5 Excelsior Ave, Belfield	NCA02	43	53	-	40	48	-	40	43	-
6 Chisholm St, Belfield	NCA02	40	53	-	36	48	-	36	43	-
6 Williams St, Strathfield South	NCA01	41	48	-	34	46	-	34	43	-
6A Chisholm St, Belfield	NCA02	36	53	-	33	48	-	33	43	-
7 Birrowa Ave, Belfield	NCA02	39	53	-	36	48	-	36	43	-
7 Excelsior Ave, Belfield	NCA02	45	53	-	41	48	-	41	43	-
8 Chisholm St, Belfield	NCA02	41	53	-	37	48	-	37	43	-
8 Williams St, Strathfield South	NCA01	45	48	-	38	46	-	38	43	-
9 Birrowa Ave, Belfield	NCA02	40	53	-	35	48	-	35	43	-
9 Excelsior Ave, Belfield	NCA02	42	53	-	38	48	-	38	43	-
10 Chisholm St, Belfield	NCA02	40	53	-	37	48	-	37	43	-
10 Williams St, Strathfield South	NCA01	44	48	-	35	46	-	35	43	-
11 Birrowa Ave, Belfield	NCA02	43	53	-	37	48	-	37	43	-
11 Excelsior Ave, Belfield	NCA02	42	53	-	38	48	-	38	43	-
11 Williams St, Strathfield South	NCA01	45	48	-	38	46	-	38	43	-
12 Chisholm St, Belfield	NCA02	40	53	-	37	48	-	37	43	-
12 Williams St, Strathfield South	NCA01	44	48	-	36	46	-	36	43	-
13 Birrowa Ave, Belfield	NCA02	41	53	-	36	48	-	36	43	-
13 Williams St, Strathfield South	NCA01	44	48	-	38	46	-	38	43	-

Receiver	NCA	Day	Evening			Night			PNTL	Ex ¹
		LAeq	PNTL	Ex ¹	LAeq	PNTL	Ex ¹	LAeq		
13A Excelsior Ave, Belfield	NCA02	43	53	-	38	48	-	38	43	-
14 Chisholm St, Belfield	NCA02	40	53	-	36	48	-	36	43	-
14 Williams St, Strathfield South	NCA01	45	48	-	39	46	-	39	43	-
15 Excelsior Ave, Belfield	NCA02	40	53	-	37	48	-	37	43	-
15 Williams St, Strathfield South	NCA01	46	48	-	37	46	-	37	43	-
16 Chisholm St, Belfield	NCA02	38	53	-	35	48	-	35	43	-
16 Water St, Belfield	NCA01	43	48	-	39	46	-	39	43	-
16 Williams St, Strathfield South	NCA01	38	48	-	32	46	-	32	43	-
17 Excelsior Ave, Belfield	NCA02	45	53	-	39	48	-	39	43	-
17 Williams St, Strathfield South	NCA01	41	48	-	32	46	-	32	43	-
18 Chisholm St, Belfield	NCA02	38	53	-	35	48	-	35	43	-
18 Water St, Belfield	NCA01	39	48	-	32	46	-	32	43	-
18 Williams St, Strathfield South	NCA01	42	48	-	31	46	-	31	43	-
19 Williams St, Strathfield South	NCA01	39	48	-	32	46	-	32	43	-
20 Chisholm St, Belfield	NCA02	38	53	-	35	48	-	35	43	-
20 Excelsior Ave, Belfield	NCA02	40	53	-	36	48	-	36	43	-
20 Water St, Belfield	NCA01	36	48	-	30	46	-	30	43	-
20 Williams St, Strathfield South	NCA01	39	48	-	32	46	-	32	43	-
22 Excelsior Ave, Belfield	NCA02	42	53	-	35	48	-	35	43	-
22 Water St, Belfield	NCA01	36	48	-	31	46	-	31	43	-
24 Excelsior Ave, Belfield	NCA02	44	53	-	38	48	-	38	43	-
24 Water St, Belfield	NCA01	38	48	-	33	46	-	33	43	-
26 - 28 Water St, Belfield	NCA01	37	48	-	32	46	-	32	43	-
30 Water St, Belfield	NCA01	44	48	-	40	46	-	40	43	-
37 James St, Belfield	NCA01	38	48	-	35	46	-	35	43	-
39 James St, Belfield	NCA01	35	48	-	31	46	-	31	43	-
39 Water St, Belfield	NCA01	39	53	-	37	48	-	37	43	-
75 Madeline St, Belfield	NCA02	41	53	-	37	48	-	37	43	-
77 Madeline St, Belfield	NCA02	41	53	-	37	48	-	37	43	-
79 Madeline St, Belfield	NCA02	42	53	-	37	48	-	37	43	-
81 Madeline St, Belfield	NCA02	40	53	-	36	48	-	36	43	-
83 Madeline St, Belfield	NCA02	41	53	-	36	48	-	36	43	-
85 Madeline St, Belfield	NCA02	42	53	-	37	48	-	37	43	-
87 Madeline St, Belfield	NCA02	42	53	-	37	48	-	37	43	-
89 Madeline St, Belfield	NCA02	40	53	-	36	48	-	36	43	-
91 Madeline St, Belfield	NCA02	39	53	-	35	48	-	35	43	-
110 Madeline St, Belfield	NCA02	44	53	-	36	48	-	36	43	-

Receiver	NCA	Day	Evening			Night			PNTL	Ex ¹
		LAeq	PNTL	Ex ¹	LAeq	PNTL	Ex ¹	LAeq		
112 Madeline St, Belfield	NCA02	46	53	-	37	48	-	37	43	-
114 Madeline St, Belfield	NCA02	42	53	-	37	48	-	37	43	-
116 Madeline St, Belfield	NCA02	43	53	-	37	48	-	37	43	-
118 Madeline St, Belfield	NCA02	41	53	-	36	48	-	36	43	-
120 Madeline St, Belfield	NCA02	43	53	-	36	48	-	36	43	-
126 Dean St, Strathfield South	NCA01	35	48	-	31	46	-	31	43	-
128 Dean St, Strathfield South	NCA01	39	48	-	36	46	-	36	43	-
130 Dean St, Strathfield South	NCA01	43	48	-	39	46	-	39	43	-
138 Dean St, Strathfield South	NCA01	35	48	-	28	46	-	28	43	-
140 Dean St, Strathfield South	NCA01	34	48	-	29	46	-	29	43	-
142 - 144 Dean St, Strathfield South	NCA01	36	48	-	35	46	-	35	43	-
146 Dean St, Strathfield South	NCA01	41	48	-	39	46	-	39	43	-
148 Dean St, Strathfield South	NCA01	42	48	-	39	46	-	39	43	-
150 Dean St, Strathfield South	NCA01	42	48	-	40	46	-	40	43	-
Bark Huts Reserve		36	53	-	35	53	-	35	53	-
Begnell Field		35	63	-	32	63	-	32	63	-
Commercial		43	53	-	37	53	-	37	53	-
Cooke Park		44	53	-	37	53	-	37	53	-
Dean Reserve		43	48	-	40	48	-	40	48	-
Ford Park		32	48	-	28	48	-	28	48	-
Industrial		67	68	-	66	68	-	66	68	-

Note: 1. Ex = Exceedance of the PNTLs

The results from Table 24 and Appendix B demonstrate that the noise emissions from the site to the surrounding environment (with the alternative mitigation measures) are low. The proposed development satisfies the PNTLs at all nearby receivers during all time periods.

Table 25. Predicted Operational Noise Levels Compared to Sleep Disturbance Targets (with Alternative Mitigation)

Receiver	NCA	Night			Night		
		LAeq	PNTL	Ex ¹	LAFMax	PNTL	Ex ¹
1 Birrowa Ave, Belfield	NCA02	35	44	-	39	54	-
1 Excelsior Ave, Belfield	NCA02	38	44	-	47	54	-
2 Chisholm St, Belfield	NCA02	40	44	-	46	54	-
2 Williams St, Strathfield South	NCA01	29	43	-	33	53	-
3 Birrowa Ave, Belfield	NCA02	36	44	-	39	54	-
3 Excelsior Ave, Belfield	NCA02	39	44	-	47	54	-
4 Chisholm St, Belfield	NCA02	36	44	-	41	54	-
4 Williams St, Strathfield South	NCA01	32	43	-	37	53	-
5 Birrowa Ave, Belfield	NCA02	35	44	-	38	54	-
5 Excelsior Ave, Belfield	NCA02	40	44	-	48	54	-
6 Chisholm St, Belfield	NCA02	36	44	-	41	54	-
6 Williams St, Strathfield South	NCA01	34	43	-	38	53	-
6A Chisholm St, Belfield	NCA02	33	44	-	40	54	-
7 Birrowa Ave, Belfield	NCA02	36	44	-	39	54	-
7 Excelsior Ave, Belfield	NCA02	41	44	-	48	54	-
8 Chisholm St, Belfield	NCA02	37	44	-	40	54	-
8 Williams St, Strathfield South	NCA01	38	43	-	39	53	-
9 Birrowa Ave, Belfield	NCA02	35	44	-	37	54	-
9 Excelsior Ave, Belfield	NCA02	38	44	-	44	54	-
10 Chisholm St, Belfield	NCA02	37	44	-	39	54	-
10 Williams St, Strathfield South	NCA01	35	43	-	37	53	-
11 Birrowa Ave, Belfield	NCA02	37	44	-	37	54	-
11 Excelsior Ave, Belfield	NCA02	38	44	-	44	54	-
11 Williams St, Strathfield South	NCA01	38	43	-	41	53	-
12 Chisholm St, Belfield	NCA02	37	44	-	39	54	-
12 Williams St, Strathfield South	NCA01	36	43	-	40	53	-
13 Birrowa Ave, Belfield	NCA02	36	44	-	38	54	-
13 Williams St, Strathfield South	NCA01	38	43	-	41	53	-
13A Excelsior Ave, Belfield	NCA02	38	44	-	45	54	-
14 Chisholm St, Belfield	NCA02	36	44	-	39	54	-
14 Williams St, Strathfield South	NCA01	39	43	-	42	53	-
15 Excelsior Ave, Belfield	NCA02	37	44	-	42	54	-
15 Williams St, Strathfield South	NCA01	37	43	-	41	53	-
16 Chisholm St, Belfield	NCA02	35	44	-	38	54	-
16 Water St, Belfield	NCA01	39	43	-	42	53	-
16 Williams St, Strathfield South	NCA01	32	43	-	36	53	-

Receiver	NCA	Night			Night		
		LAeq	PNTL	Ex ¹	LA _F Max	PNTL	Ex ¹
17 Excelsior Ave, Belfield	NCA02	39	44	-	45	54	-
17 Williams St, Strathfield South	NCA01	32	43	-	38	53	-
18 Chisholm St, Belfield	NCA02	35	44	-	37	54	-
18 Water St, Belfield	NCA01	32	43	-	35	53	-
18 Williams St, Strathfield South	NCA01	31	43	-	37	53	-
19 Williams St, Strathfield South	NCA01	32	43	-	38	53	-
20 Chisholm St, Belfield	NCA02	35	44	-	38	54	-
20 Excelsior Ave, Belfield	NCA02	36	44	-	41	54	-
20 Water St, Belfield	NCA01	30	43	-	34	53	-
20 Williams St, Strathfield South	NCA01	32	43	-	37	53	-
22 Excelsior Ave, Belfield	NCA02	35	44	-	41	54	-
22 Water St, Belfield	NCA01	31	43	-	35	53	-
24 Excelsior Ave, Belfield	NCA02	38	44	-	43	54	-
24 Water St, Belfield	NCA01	33	43	-	39	53	-
26 - 28 Water St, Belfield	NCA01	32	43	-	36	53	-
30 Water St, Belfield	NCA01	40	43	-	44	53	-
37 James St, Belfield	NCA01	35	43	-	35	53	-
39 James St, Belfield	NCA01	31	43	-	32	53	-
39 Water St, Belfield	NCA01	37	44	-	46	54	-
75 Madeline St, Belfield	NCA02	37	44	-	43	54	-
77 Madeline St, Belfield	NCA02	37	44	-	42	54	-
79 Madeline St, Belfield	NCA02	37	44	-	42	54	-
81 Madeline St, Belfield	NCA02	36	44	-	41	54	-
83 Madeline St, Belfield	NCA02	36	44	-	39	54	-
85 Madeline St, Belfield	NCA02	37	44	-	39	54	-
87 Madeline St, Belfield	NCA02	37	44	-	40	54	-
89 Madeline St, Belfield	NCA02	36	44	-	39	54	-
91 Madeline St, Belfield	NCA02	35	44	-	37	54	-
110 Madeline St, Belfield	NCA02	36	44	-	42	54	-
112 Madeline St, Belfield	NCA02	37	44	-	41	54	-
114 Madeline St, Belfield	NCA02	37	44	-	38	54	-
116 Madeline St, Belfield	NCA02	37	44	-	40	54	-
118 Madeline St, Belfield	NCA02	36	44	-	38	54	-
120 Madeline St, Belfield	NCA02	36	44	-	39	54	-
126 Dean St, Strathfield South	NCA01	31	43	-	35	53	-
128 Dean St, Strathfield South	NCA01	36	43	-	42	53	-
130 Dean St, Strathfield South	NCA01	39	43	-	42	53	-

Receiver	NCA	Night			Night		
		LAeq	PNTL	Ex ¹	LAFMax	PNTL	Ex ¹
138 Dean St, Strathfield South	NCA01	28	43	-	34	53	-
140 Dean St, Strathfield South	NCA01	29	43	-	36	53	-
142 - 144 Dean St, Strathfield South	NCA01	35	43	-	39	53	-
146 Dean St, Strathfield South	NCA01	39	43	-	41	53	-
148 Dean St, Strathfield South	NCA01	39	43	-	44	53	-
150 Dean St, Strathfield South	NCA01	40	43	-	45	53	-

Note: 1. Ex = Exceedance of the PNTLs

The results from Table 25 and Appendix B demonstrate that the noise emissions from the site to the surrounding environment (with the alternative mitigation measures) are low. The proposed development satisfies the Sleep Disturbance targets at all nearby residential receivers during all time periods.

7.2 Predicted Operational Noise Impacts – RNP

7.2.1 Traffic Routes

Traffic to and from the site will use the following roads:

Madeline Street

Madeline Street is a sub-arterial road that runs in a northerly direction along the western boundary of the site and continues through the industrial zoned area to the north. Madeline Street has been constructed as a single carriageway with a single travel lane and parking lane in each direction. The posted speed limit on Madeline Street is 50 km/h. No residential receivers are located to the north of the site along Madeline Street.

To the south of the site, Madeline Street passes through traffic calming concrete bollards, which make it impossible for heavy vehicles to access / exit the site in the southerly direction.

Since no residential receivers will be impacted by site traffic on Madeline Street no assessment of road traffic noise is required.

Cosgrove Road

Cosgrove Road is a sub-arterial road that runs parallel to the west of Madeline Street. It has been constructed as a single carriageway, typically with a single travel lane and parking lane in each direction. The posted speed limit on Cosgrove Road is 60 km/h. Residential receivers have the potential to be impacted by changes to road traffic noise on this road.

Punchbowl Road

Punchbowl road is an arterial road approximately 500 m to the south of the Project site. Punchbowl Road has been constructed as a single carriageway with two travel lanes in each direction. The posted speed limit on Punchbowl Road in the vicinity of the site is 60 km/h. Residential receivers have the potential to be impacted by changes to road traffic noise on this road.

Liverpool Road

Liverpool Road (which forms part of the Hume Highway) is an arterial road approximately one (1) kilometre to the north of the Project site. Liverpool Road has been constructed as a single carriageway and typically provides three travel lanes in each direction. The posted speed limit on Liverpool Road in the vicinity of the site is 60 km/h. Residential receivers have the potential to be impacted by changes to road traffic noise on this road.

7.2.2 Traffic Noise Predictions

To calculate the predicted traffic noise impacts generated by the Project the existing road traffic volumes for Cosgrove Road, Punchbowl Road and Liverpool Road are required. The traffic data used in this assessment was taken from NSW Traffic Volume Viewer website and historical traffic reports as appropriate.

Table 26 summarises the predicted existing traffic noise levels on the nearest affected roads.

Table 26. Summary of Traffic Noise Levels on Surrounding Roads (from available traffic data)

Road	Distance to Nearest Residential Receiver (m)	Existing Traffic				RNP Criteria (LAeq dB)	Exceedance Yes / No	Comment
		Time Period	Volume Day	Percentage Heavy Vehicles %	Road Traffic Noise Level			
Cosgrove ¹ Road	7	Day	5514	13	>60	60	Yes	RNP criteria exceeded. Proposed site must not exceed 2 dB increase criteria.
		Night	379	13	>55	55	Yes	
Punchbowl Road ²	13	Day	32104	0.4	>60	60	Yes	RNP criteria exceeded. Proposed site must not exceed 2 dB increase criteria.
		Night	2049	0.4	>55	55	Yes	
Liverpool Road ³	26	Day	47456	4	>60	60	Yes	RNP criteria exceeded. Proposed site must not exceed 2 dB increase criteria.
		Night	3029	4	>55	55	Yes	

Notes: 1. As per SLR noise report 610.14992-R1 November 2015.
2. NSW Traffic Volume Viewer from 2018.
3. NSW Traffic Volume Viewer from 2023. Heavy vehicle percentage estimated from surrounding roads.

All the potentially impacted roads show existing traffic noise levels which are above the RNP criteria. Therefore, the traffic noise increases on these roads should not exceed 2 dB due to the additional traffic generated by the Project.

Table 27 summarises the predicted increase in noise levels due to the additional traffic generated by the Project.

Table 27. Summary of Traffic Noise Increases on Surrounding Roads (from available traffic data)

Road	Existing Traffic			Increase in Traffic (due to the Project)		Increase in Noise Levels dB
	Time Period	Daily Volume	Percentage Heavy Vehicles %	Daily Volume	Percentage Heavy Vehicles %	
Cosgrove Road	Day	5514	13.0	5567	14	0.2
	Night	379	13.0	397	16	0.7
Punchbowl Road	Day	32104	0.4	32157	0.5	0.0
	Night	2049	0.4	2067	1.1	0.3
Liverpool Road	Day	47456	4.0	47509	4	0.0
	Night	3029	4.0	3047	4	0.0

Since the existing traffic noise levels of the surrounding roads exceed the RNP criteria, all new traffic noise increases must satisfy the 2 dB increase criteria. Table 27 shows that the Project generates negligible additional traffic noise. The RNP 2 dB increase criteria are satisfied for all surrounding roads. No further measures are required as a result.

8 Conclusion

Waves Consulting has conducted a noise & vibration impact assessment for the proposed increase in the co-mingled waste throughput capacity at the Strathfield South MRF located 40 - 42 Madeline Street, Strathfield South, NSW. This report has investigated the worst-case noise emissions associated with the proposed operational changes at the facility.

In addition, this report has investigated alternative noise mitigation measures due to changed noise conditions around the site. With the alternative noise control measures, the results from Table 24 and Table 25 of this report demonstrate that the noise emissions from the site to the surrounding environment are low. The proposed development satisfies the PNTLs and Sleep Disturbance targets at all nearby residential receivers during all time periods.

The PNTLs at all other nearby noise sensitive receivers such as active / passive recreation areas, commercial and industrial receivers are also satisfied.

The noise control measures that have been assessed for this site are summarised in Table 28 below.

Table 28. Summary of the Alternative Noise Control Measures

ID	Location	Previous Mitigation Recommendations	Alternative Mitigation Due to Changed Site Conditions	Status
MM01	Building 1	Close all access doors during the evening and night-time.	No change.	Completed
MM02		Install a noise wall around the air compressors adjacent to the southern wall of Building 1. The noise wall should be 0.5 m above the height of the existing compressor roof structure and the internal face of the noise wall should be lined with an acoustic material with an NRC of not less than 0.75. See Figure 3 below for indicative location of the noise wall (green line).	Air compressors now completely enclosed inside an acoustic enclosure. This mitigation measure has been installed on site.	Completed
MM03		Line the underside of the roof above the air compressors with an acoustic material with an NRC of not less than 0.75.		
MM04		During the night-time reduce the duty of the air compressors to 80%.	No change.	Completed
MM05	Building 2	Install a minimum of 1500 sqm of acoustic material on the inside of the building, to line the walls and the upper part of the walls. The lining should provide an NRC of not less than 0.75.	No longer required as noise emissions from the site have been reduced due to the changes at the adjacent Aussie Skips site.	Not required
MM06		Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.	No change.	Completed
MM07		Close all access doors except for doors H & I during the evening and night-time.	No change.	Completed
MM08		Increase the noise wall to the East of Building 2 to 5.5 m. The internal face of the noise wall should be lined with an acoustic material with an NRC of not less than 0.75. The noise wall should also be extended to wrap around the southern boundary of the site to connect with the corner of Building 2. See Figure 3 below for indicative location of the noise wall (orange line).	Do not increase the noise wall height but keep the internal face lining with acoustic material with NRC not less than 0.75. Extend the existing noise wall at 4.5 m to wrap around the southern boundary to connect to Building 2.	Completed
MM09	Building 3	Install a minimum of 1000 sqm of acoustic material on the inside of the building, to line the walls and the upper part of the walls. The lining should provide an NRC of not less than 0.75.	No longer required as noise emissions from the site have been reduced due to the changes at the adjacent Aussie Skips site.	Not required
MM10		Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.	No change.	Completed
MM11		Remove the generator that operates adjacent to Building 3.	No change.	Completed
MM12		Review and repair all facade and roof elements. All gaps, cracks and damaged facade elements should be made good.	No change.	Completed
MM13	Duct Extraction Fans (adjacent to Building 1 and S1)	Operate dust extraction fans with an exhaust silencer, so the overall Sound Power Level of each fan is no greater than 97 dB LwA as per Table 4.	No change.	Completed

The operational traffic noise levels on the nearby affected roads have been assessed. Table 26 and Table 27 of this assessment show that the Project generates negligible operational traffic noise. The NSW Road Noise Policy (RNP) criteria will be satisfied as a result.

The offset distances (in all directions) between the vibrationally intensive equipment and any sensitive receivers is large (> 70 m). The potential for vibration impacts due to the 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.

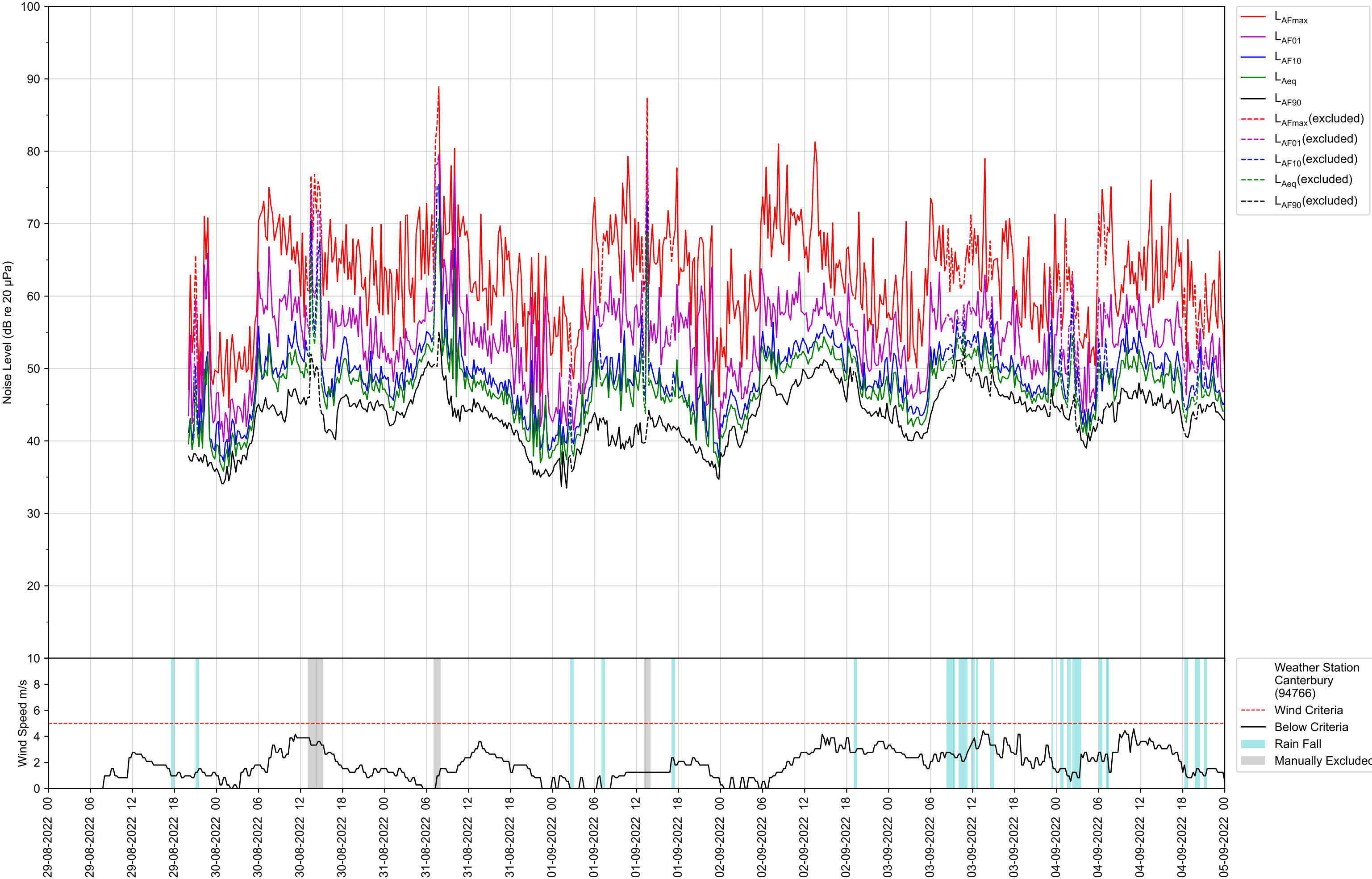
Overall, the Project (with the alternative noise control measures) is compliant with the NPI and RNP noise targets during all time periods at all nearby receivers. It is concluded that the Project is a complying development with respect to noise impacts and is therefore suitable for operation.



APPENDIX A: GRAPHICAL NOISE LOGGER DATA

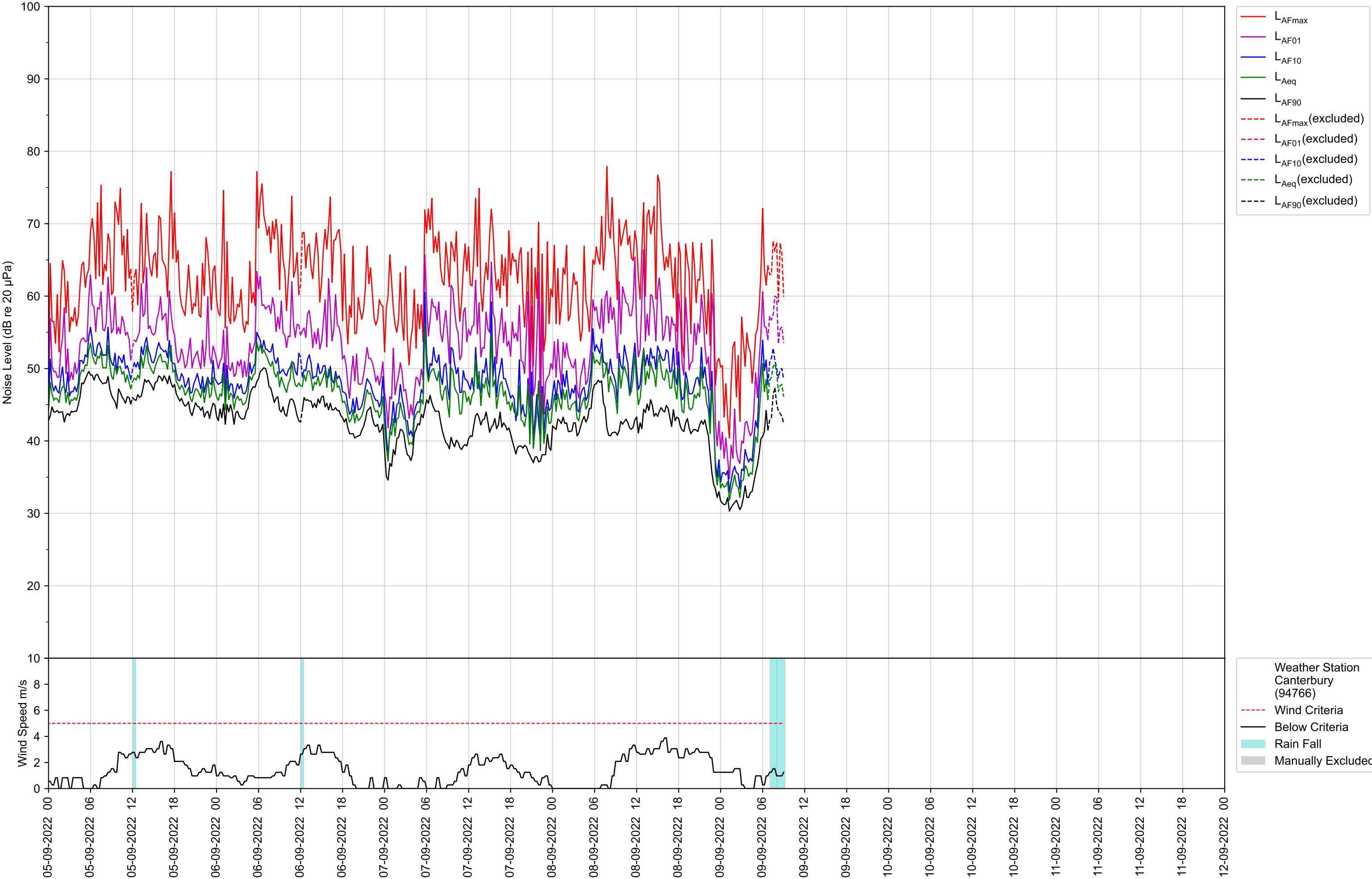
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

Graphical Noise Logger Data
Week 1: 29-08-2022 to 05-09-2022



Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

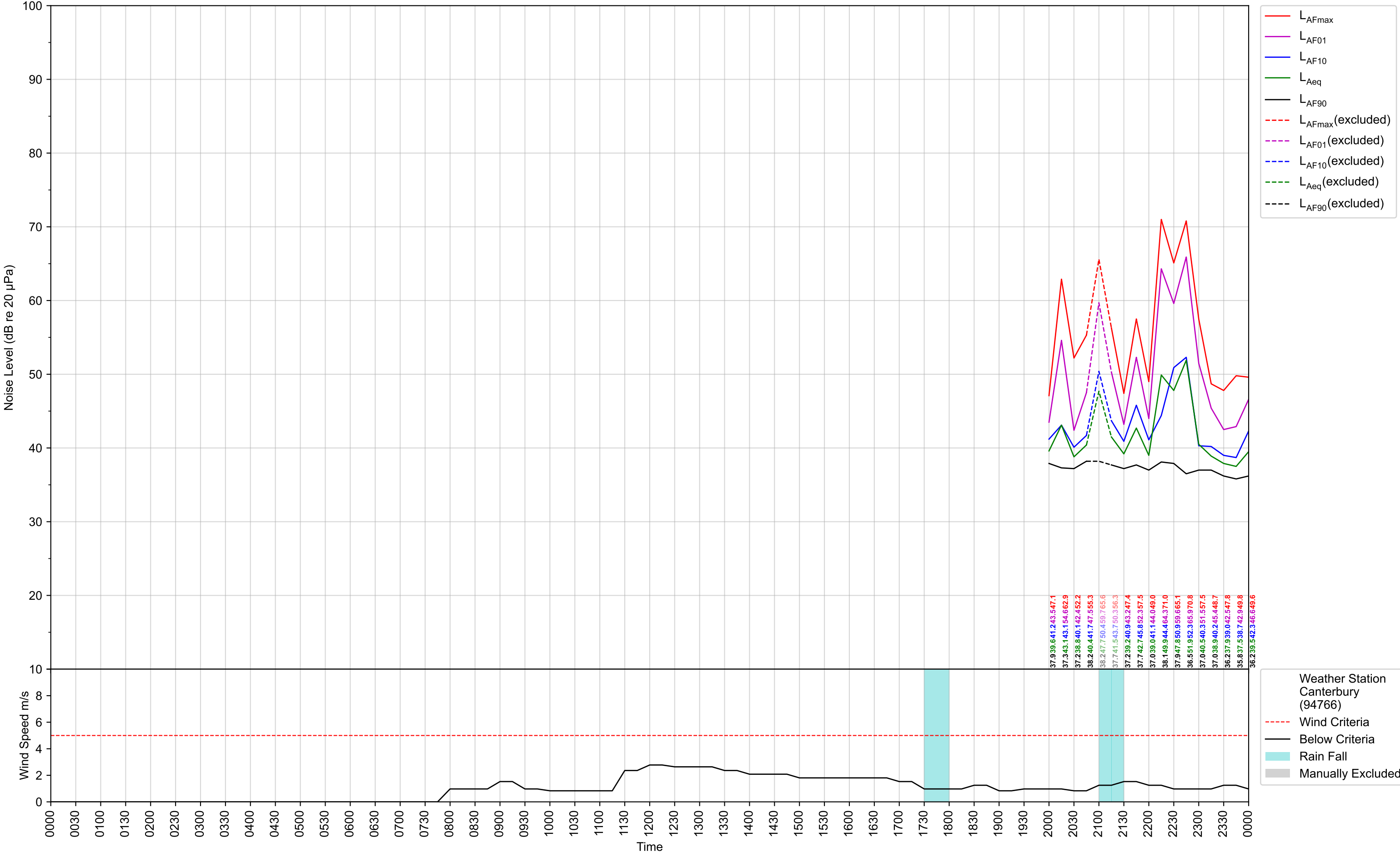
Graphical Noise Logger Data
Week 2: 05-09-2022 to 12-09-2022



Graphical Noise Logger Data
Date: Monday 29 August 2022

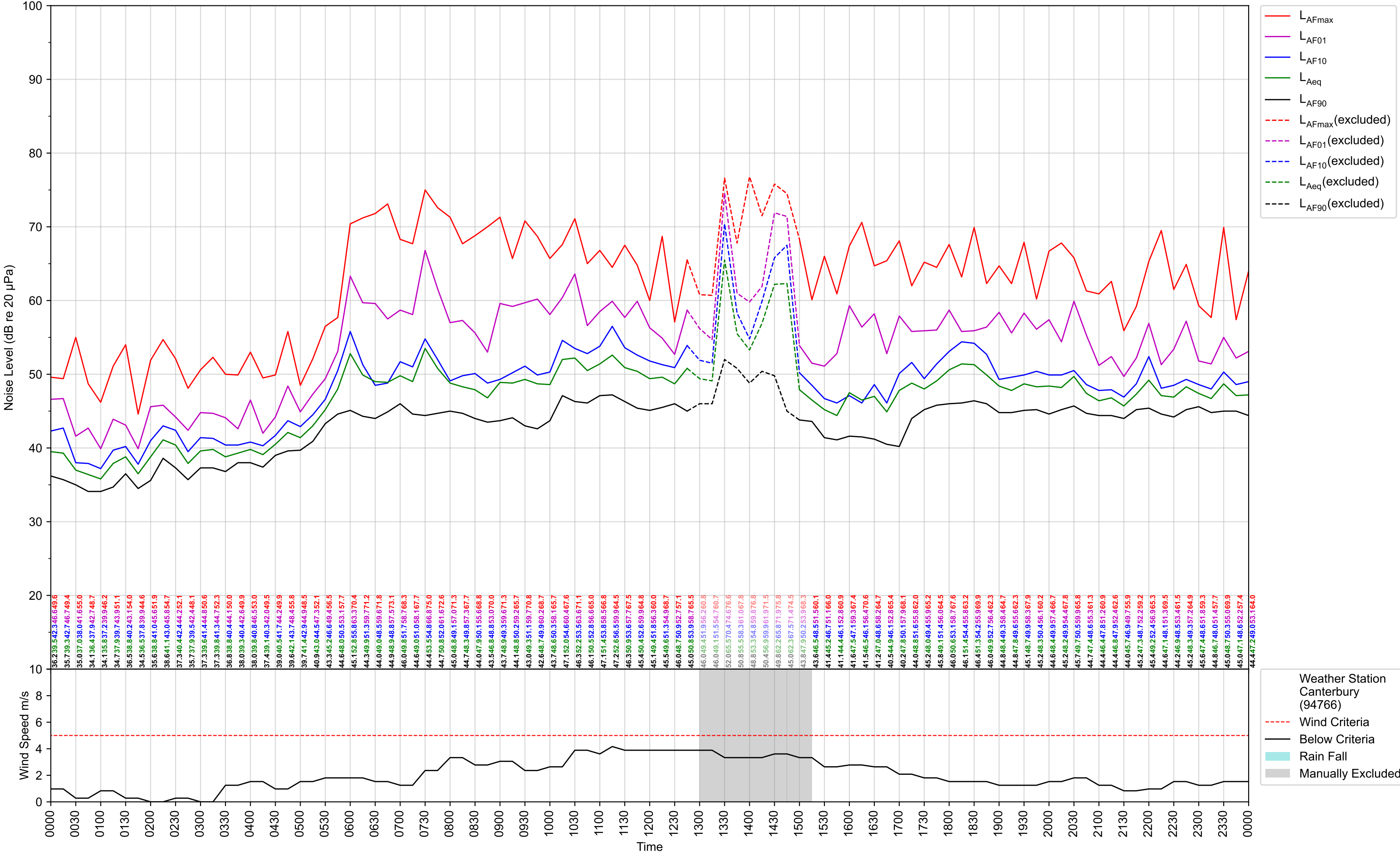


Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield



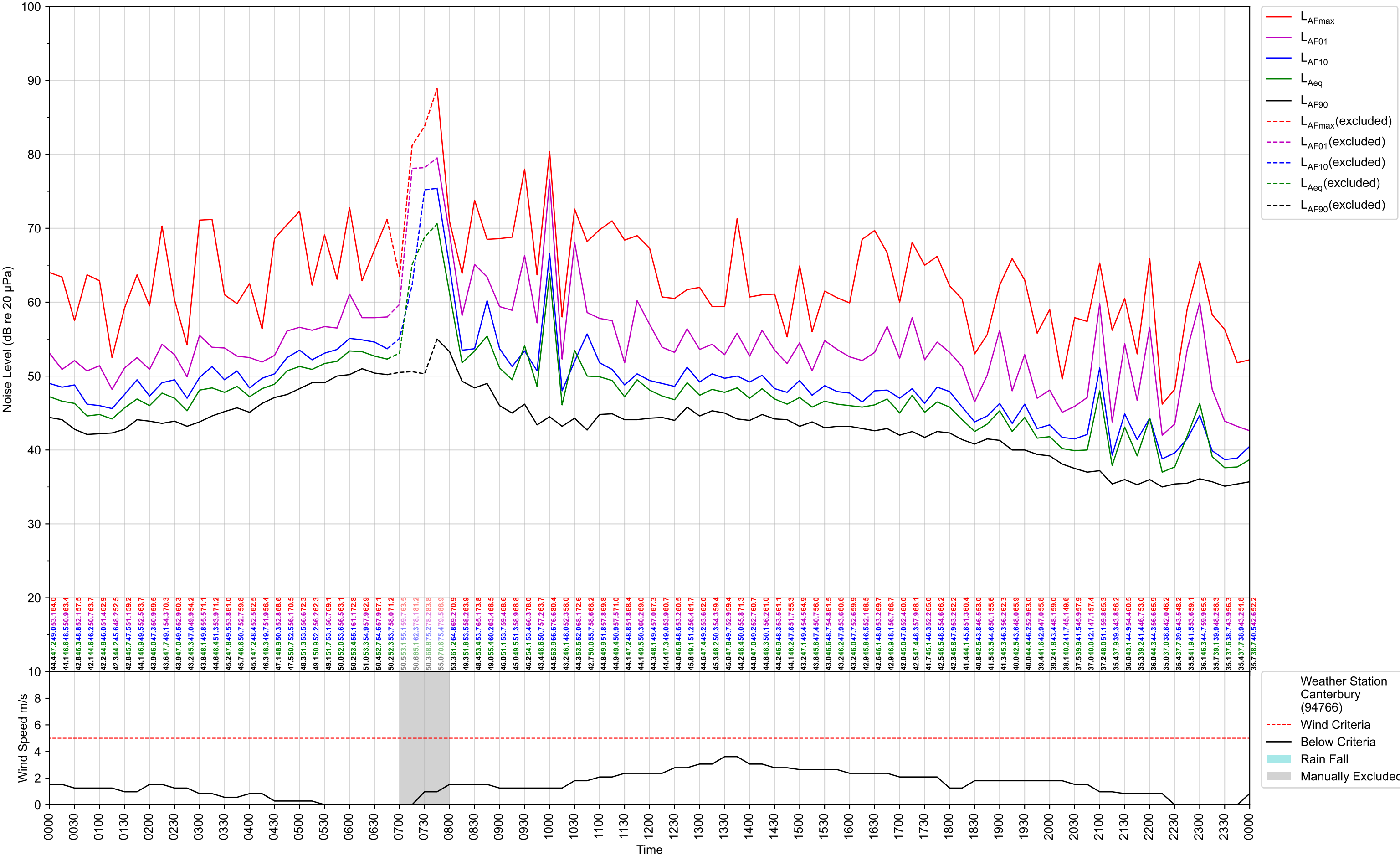
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

Graphical Noise Logger Data
Date: Tuesday 30 August 2022



Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

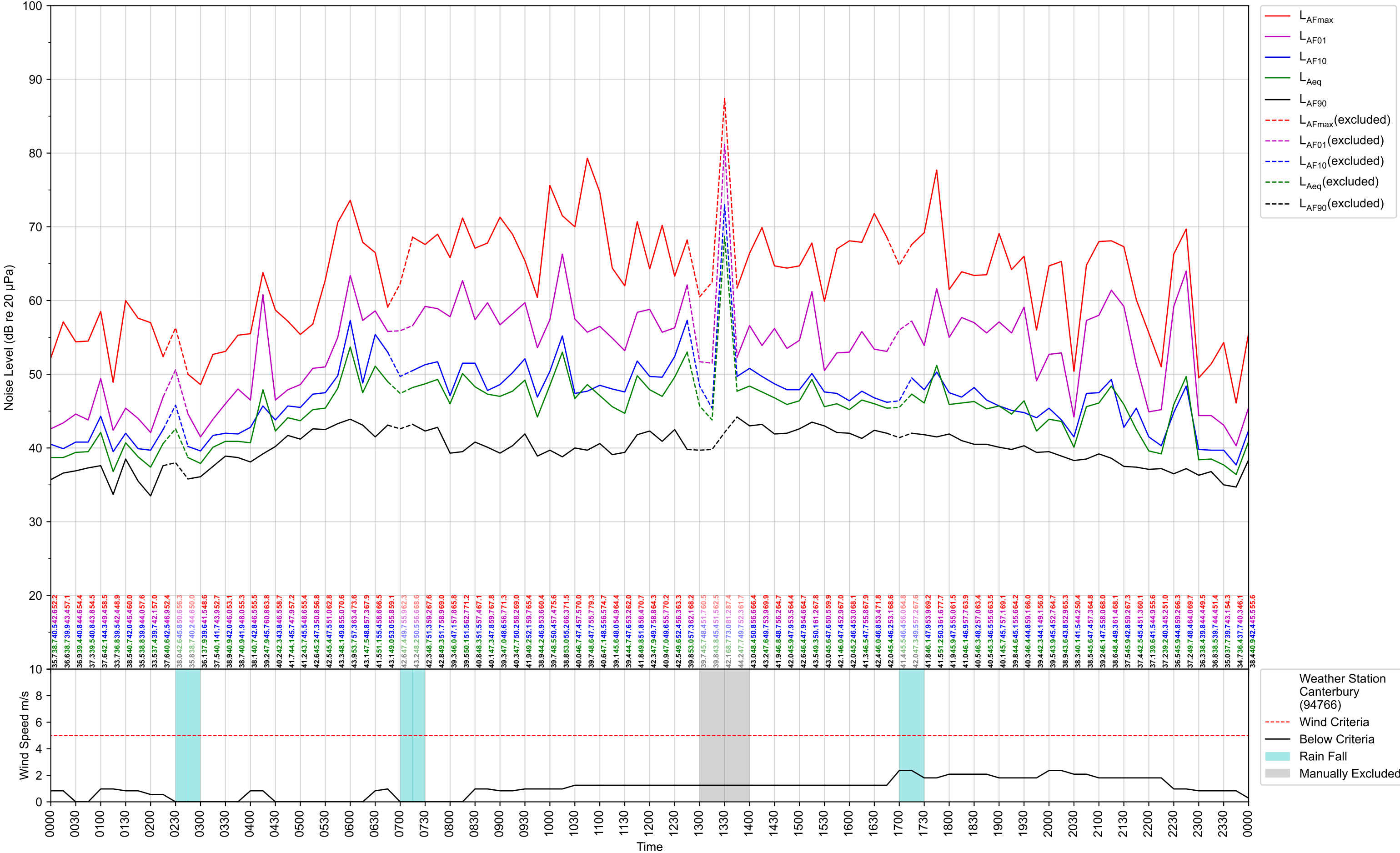
Graphical Noise Logger Data
Date: Wednesday 31 August 2022



Graphical Noise Logger Data
Date: Thursday 01 September 2022

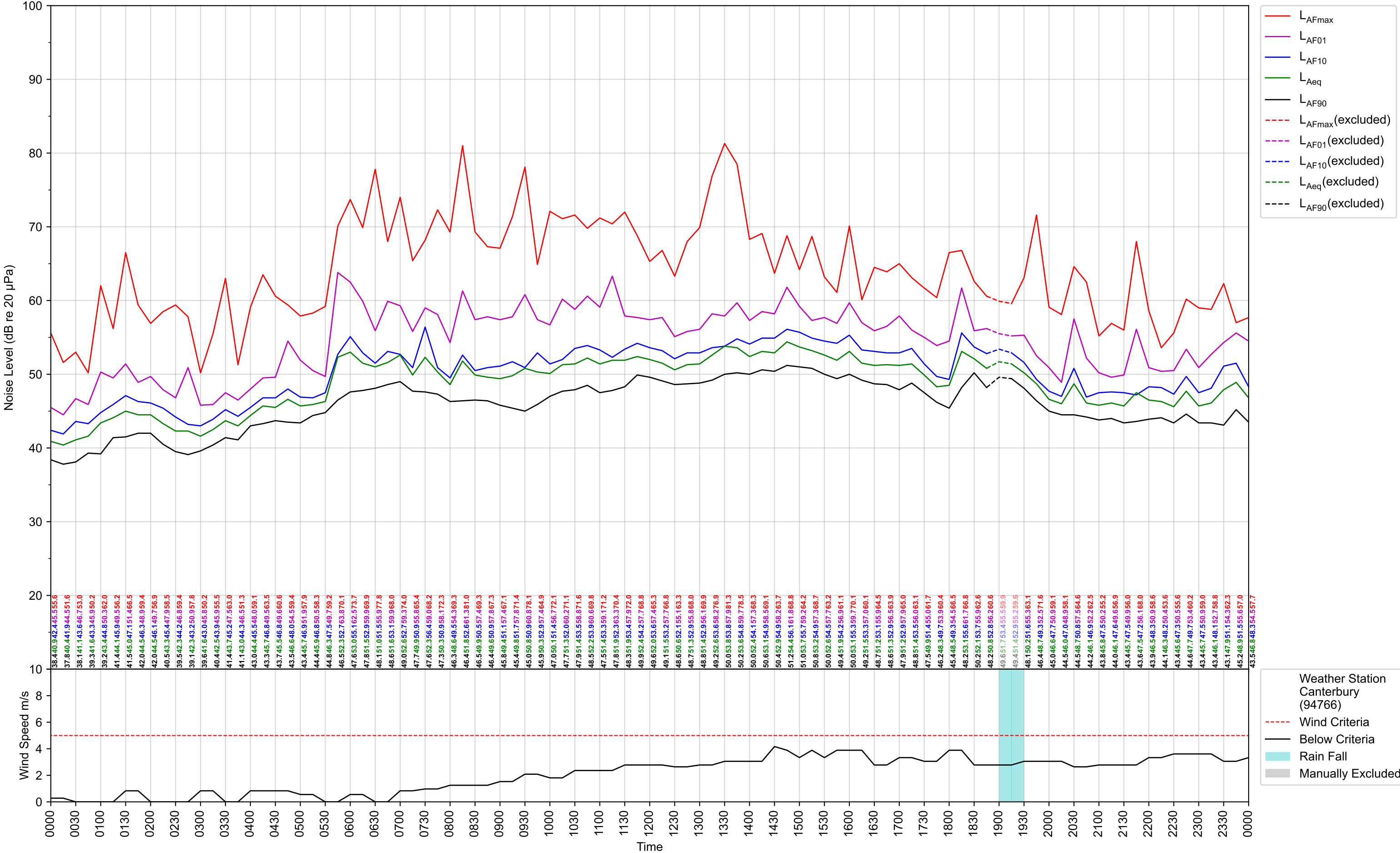


Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

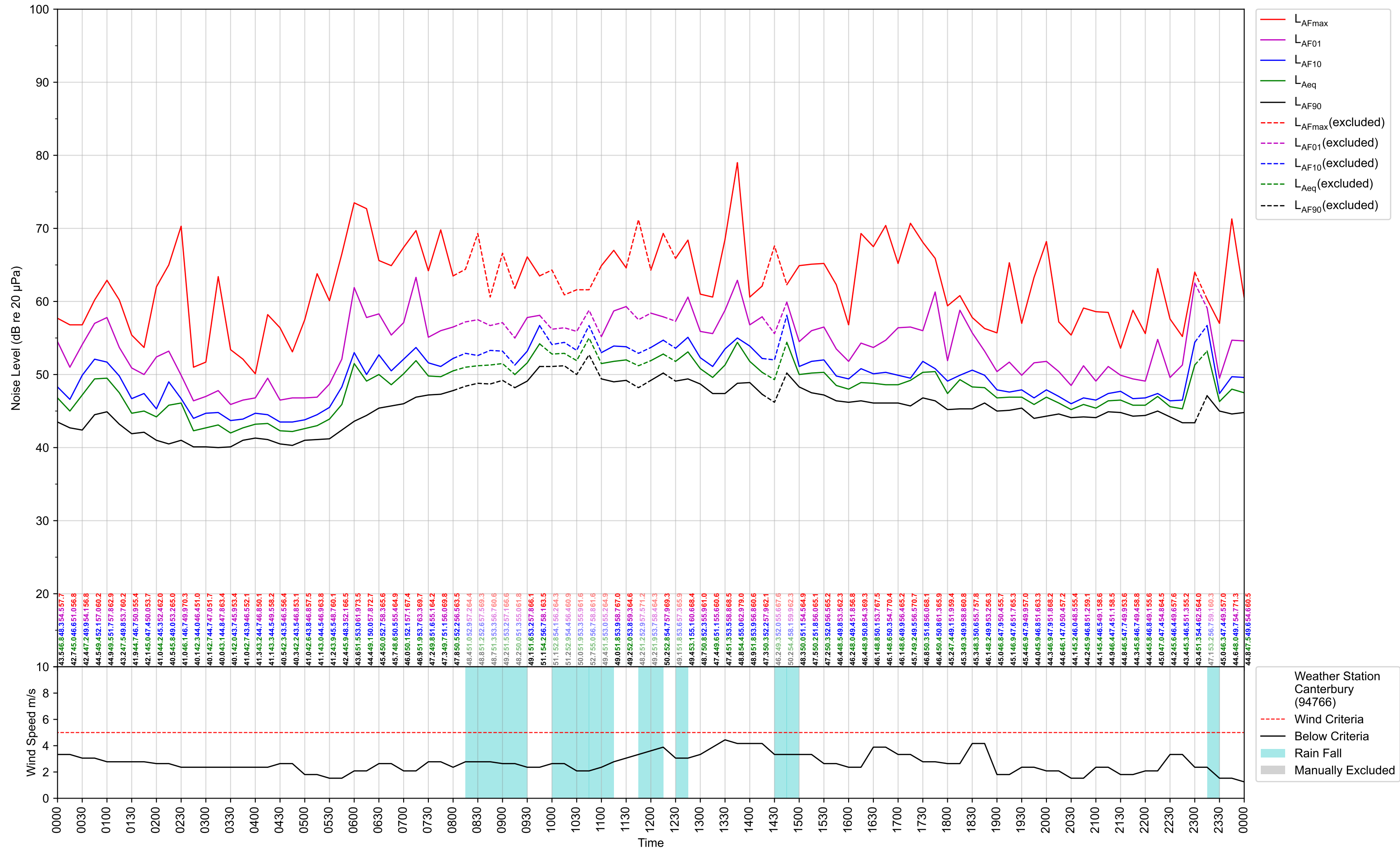


Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

Graphical Noise Logger Data
Date: Friday 02 September 2022

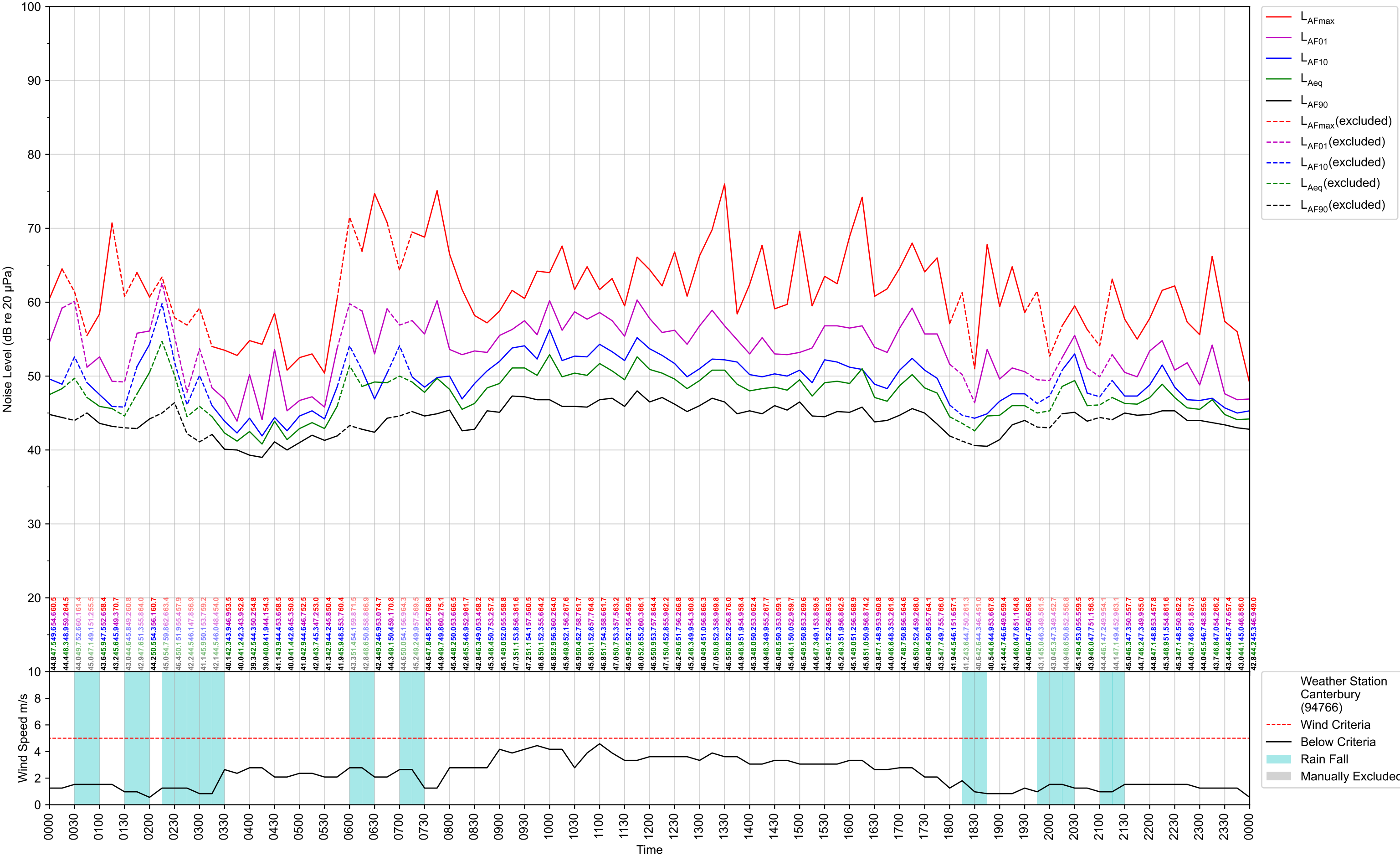


Graphical Noise Logger Data
Date: Saturday 03 September 2022

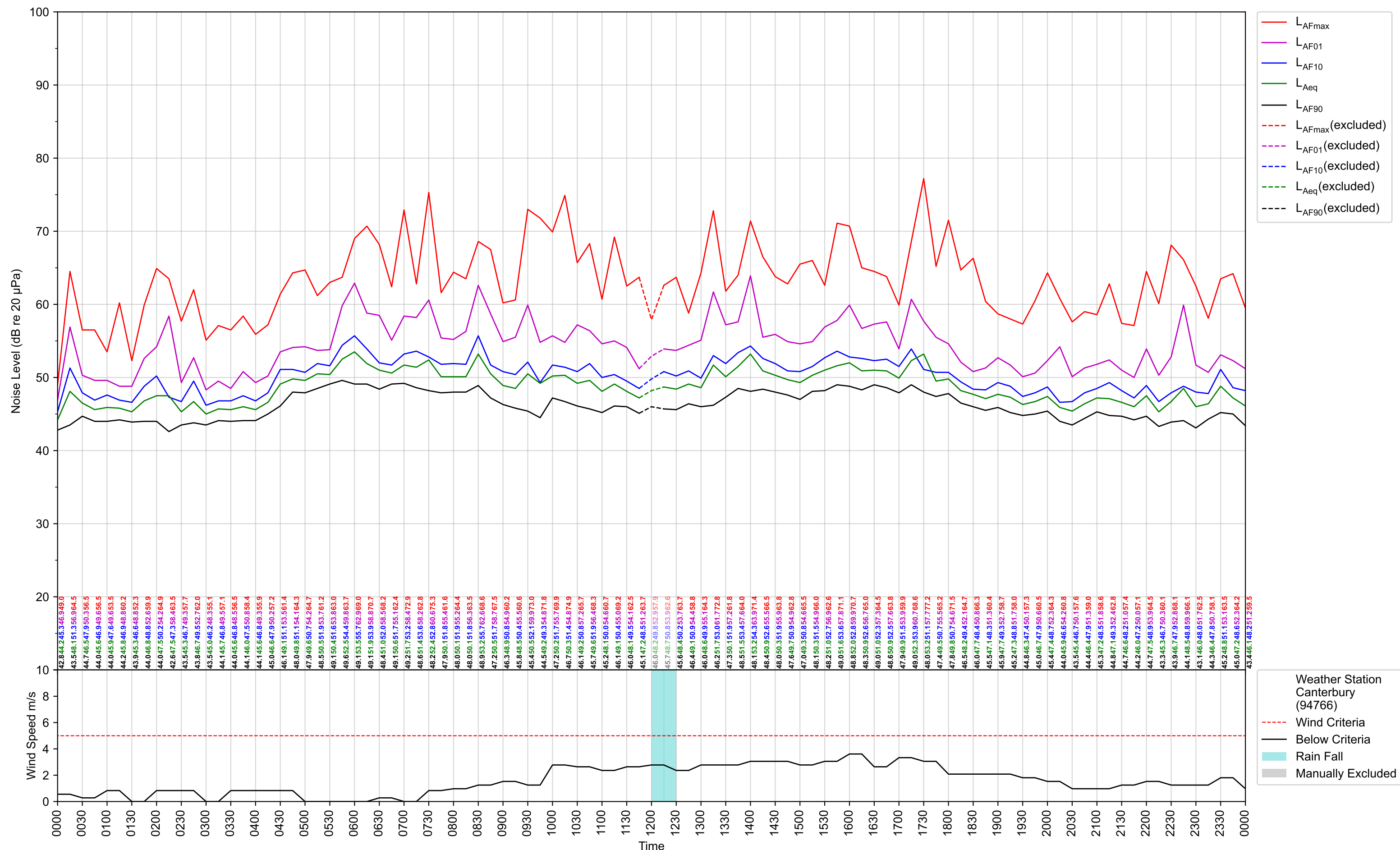


Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

Graphical Noise Logger Data
Date: Sunday 04 September 2022



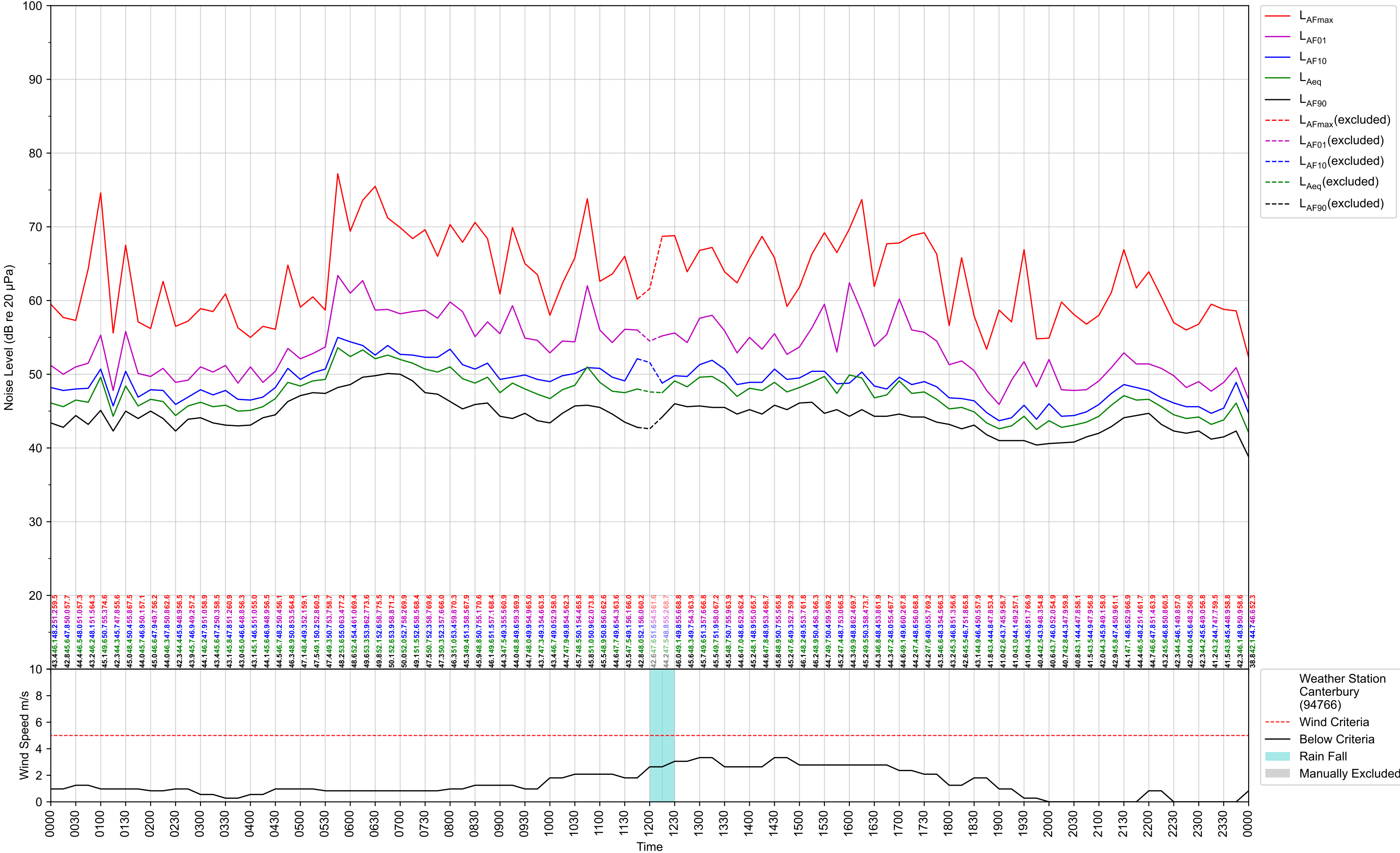
Graphical Noise Logger Data
Date: Monday 05 September 2022



Graphical Noise Logger Data
Date: Tuesday 06 September 2022

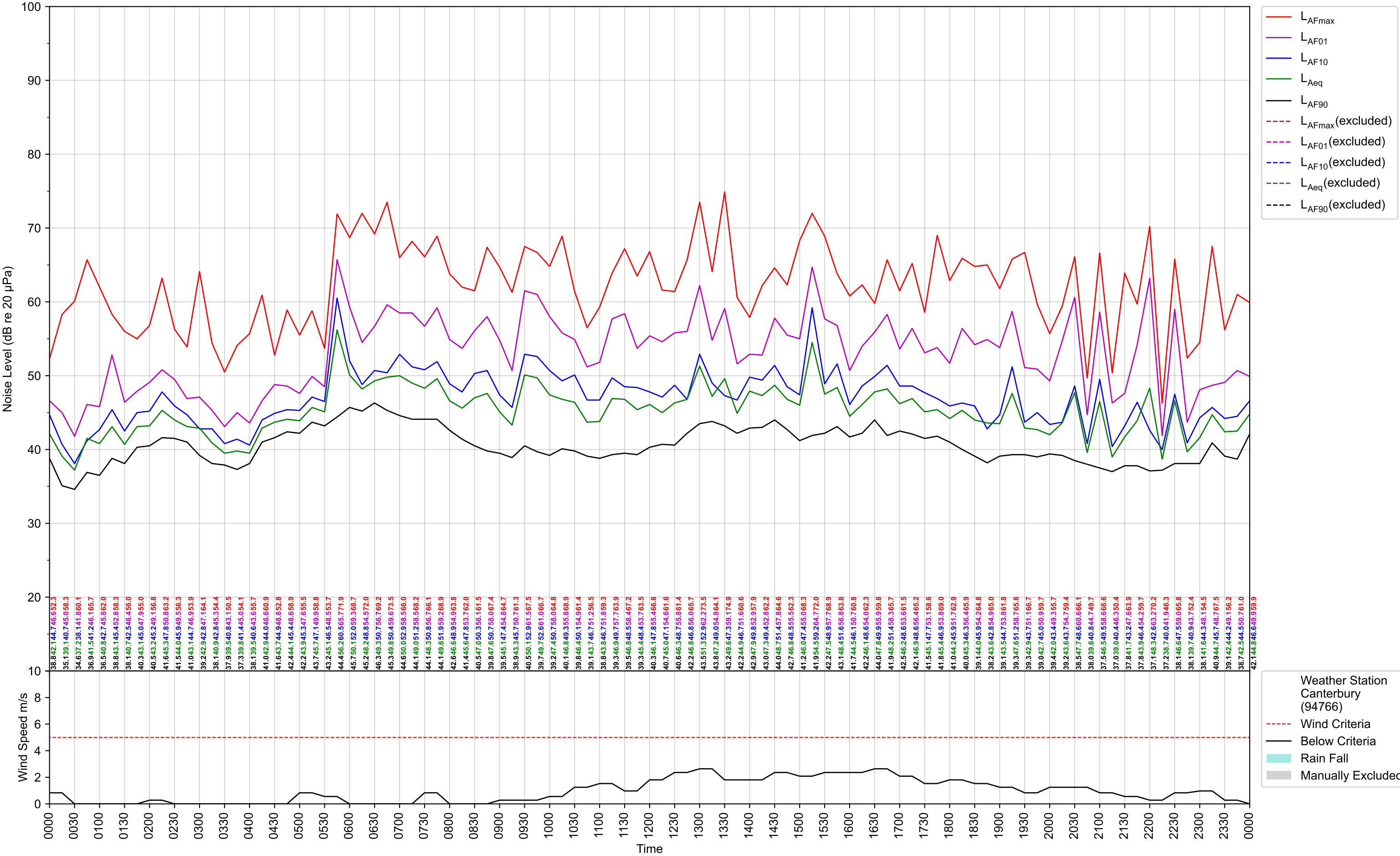


Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield



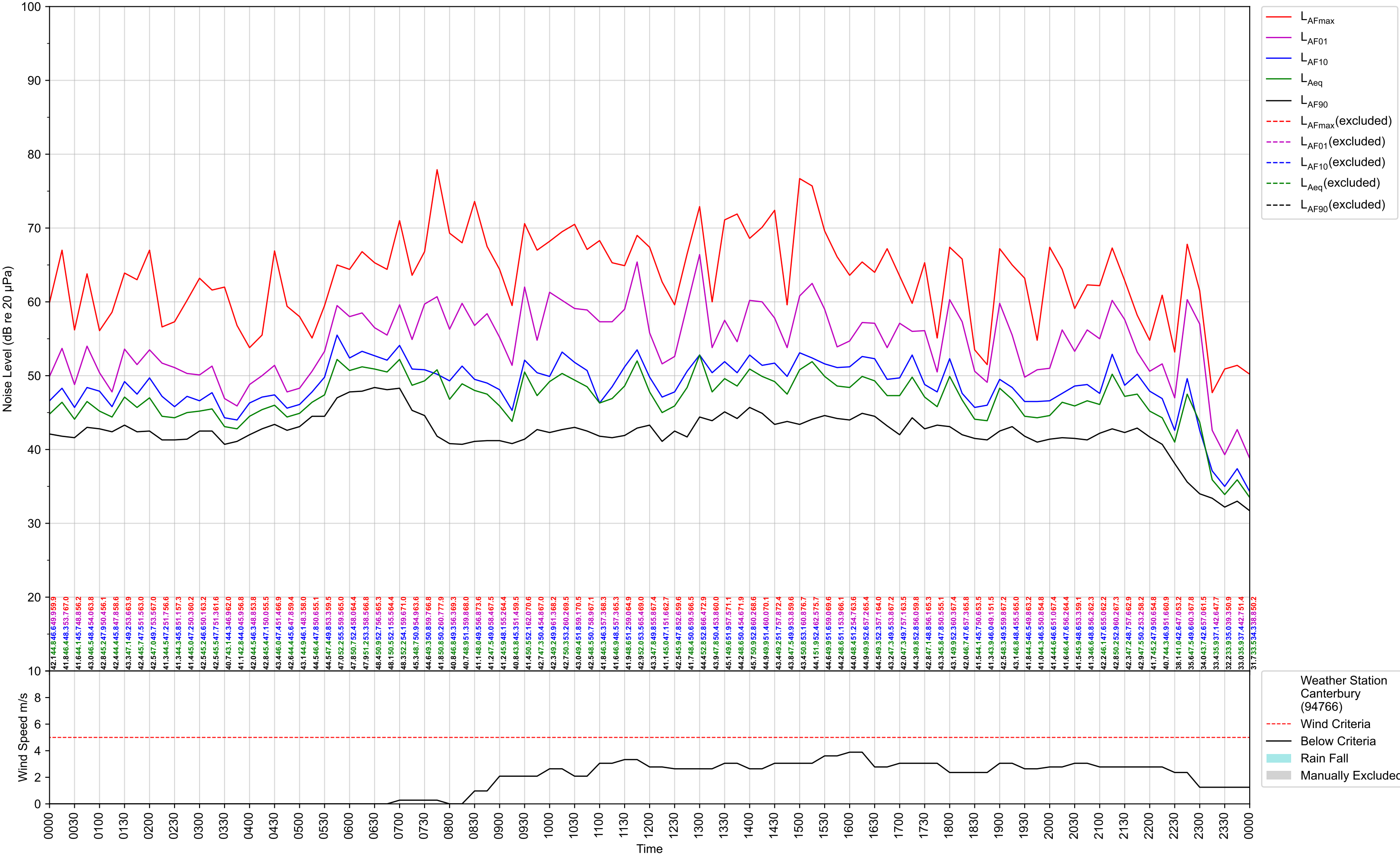
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

Graphical Noise Logger Data
Date: Wednesday 07 September 2022



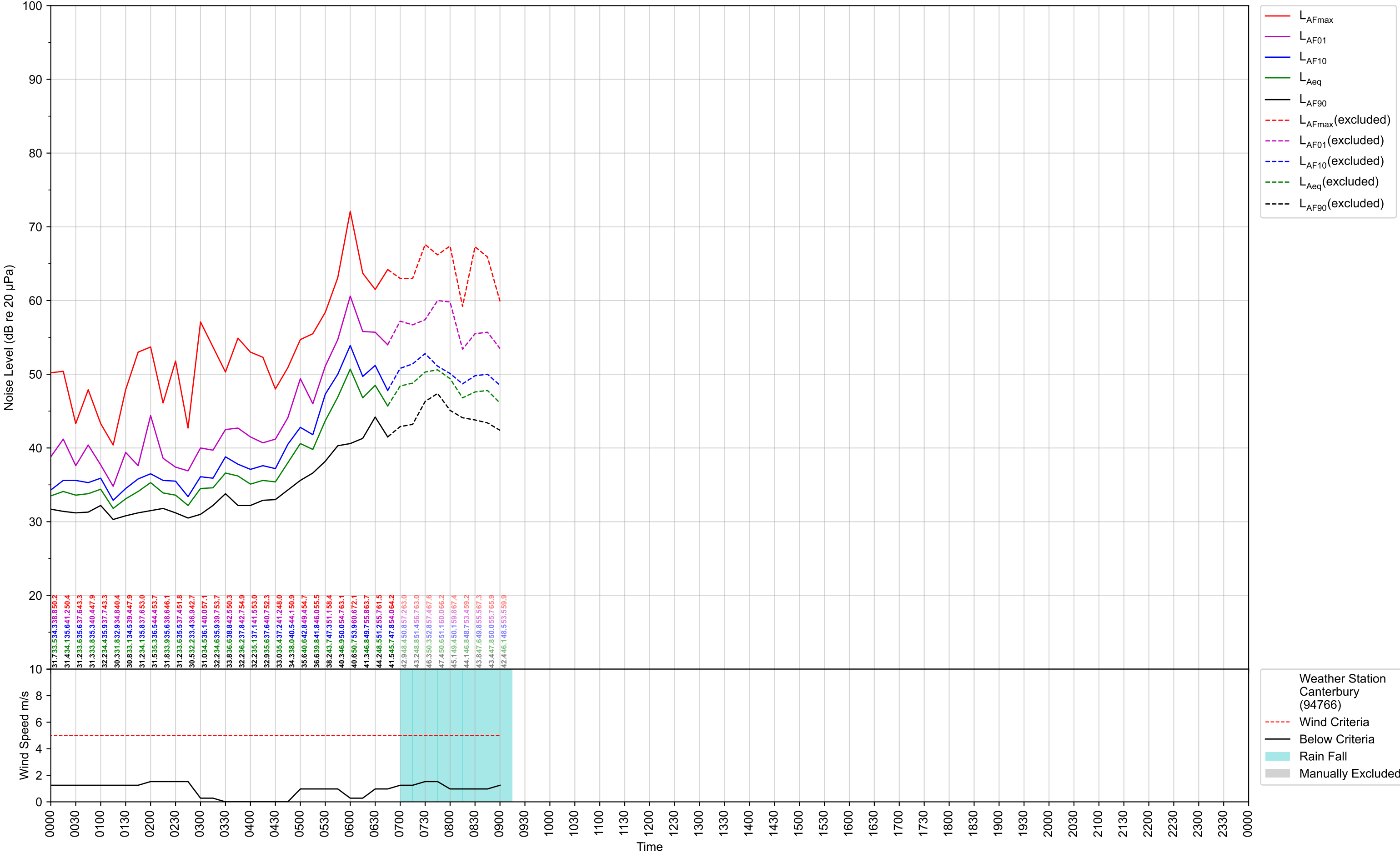
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

Graphical Noise Logger Data
Date: Thursday 08 September 2022



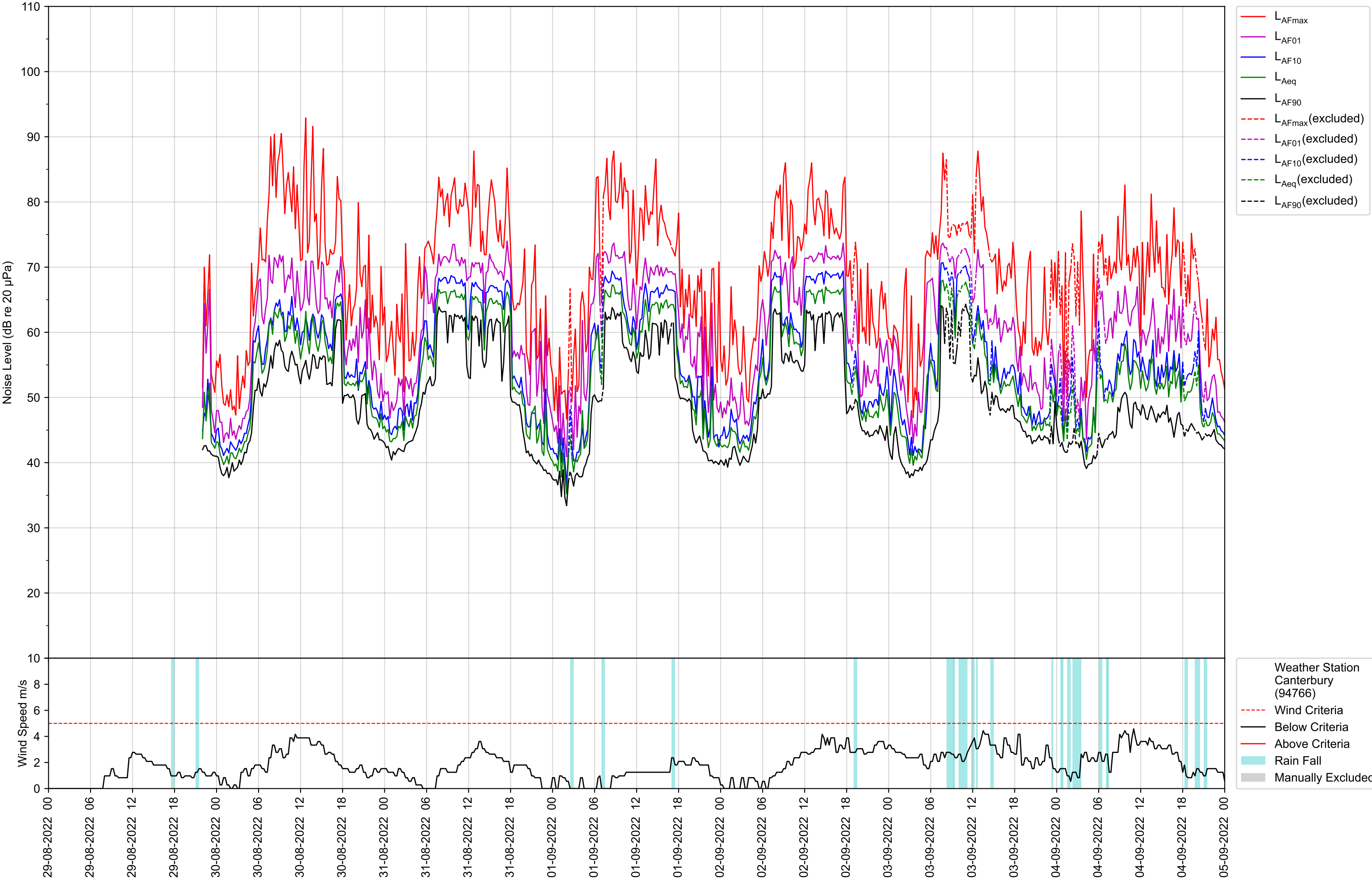
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 979
Serial Number: 27144
Pre Calibration: -0.13 dB
Post Calibration: -0.02 dB
Location: 148 - 150 Deans Street, Strathfield

Graphical Noise Logger Data
Date: Friday 09 September 2022



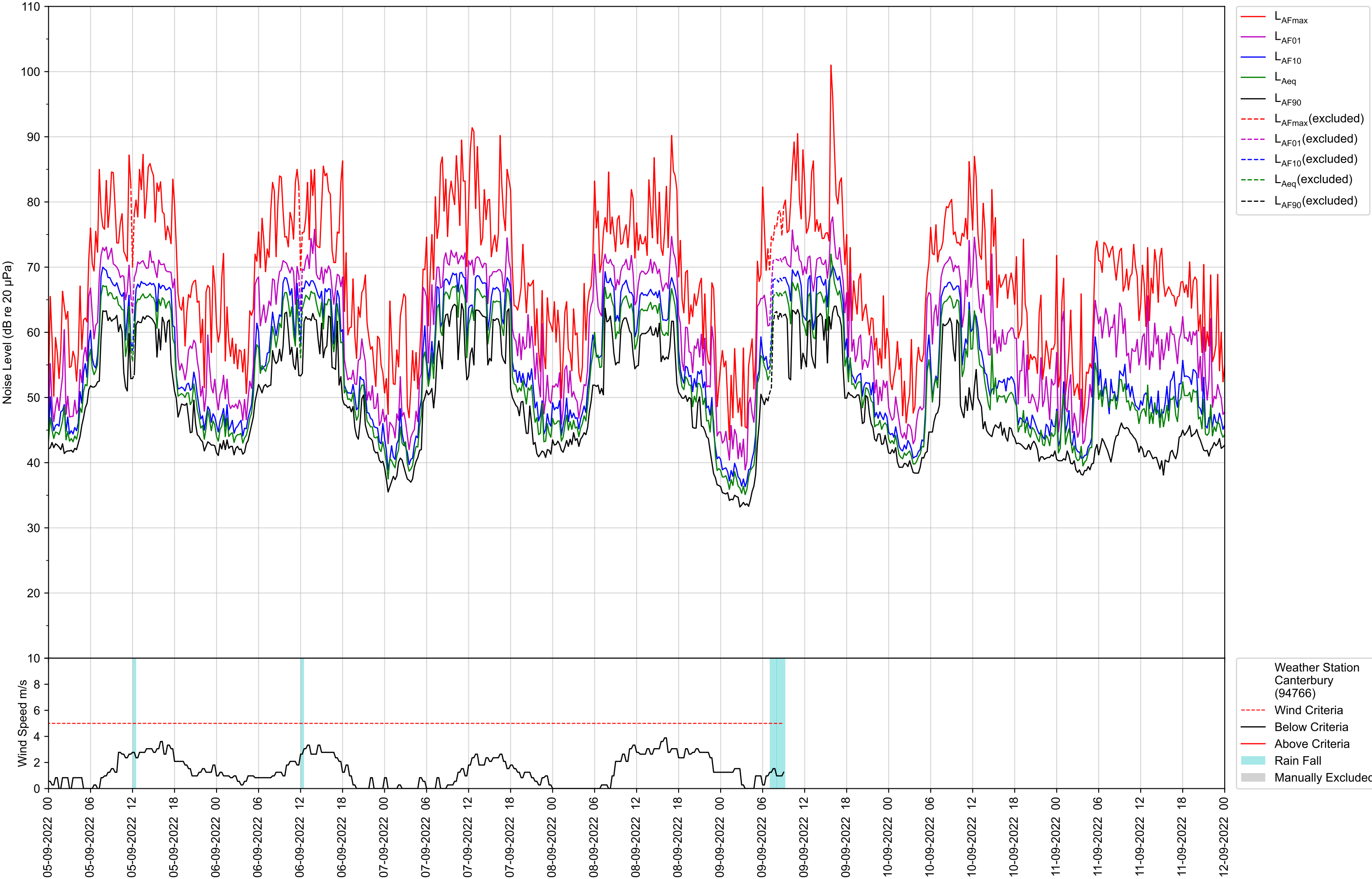
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Week 1: 29-08-2022 to 05-09-2022



Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

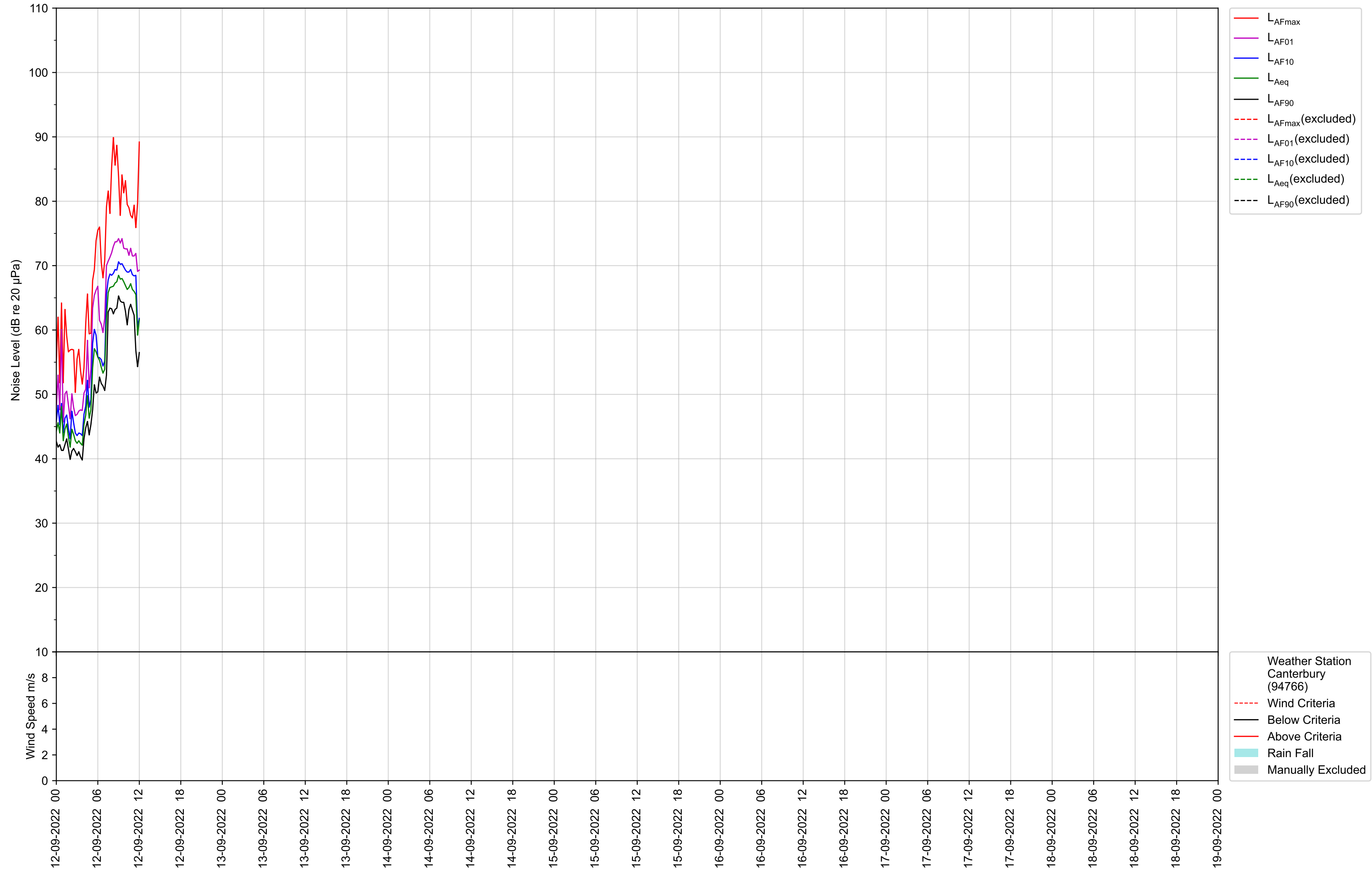
Graphical Noise Logger Data
Week 2: 05-09-2022 to 12-09-2022



Graphical Noise Logger Data
Week 3: 12-09-2022 to 19-09-2022

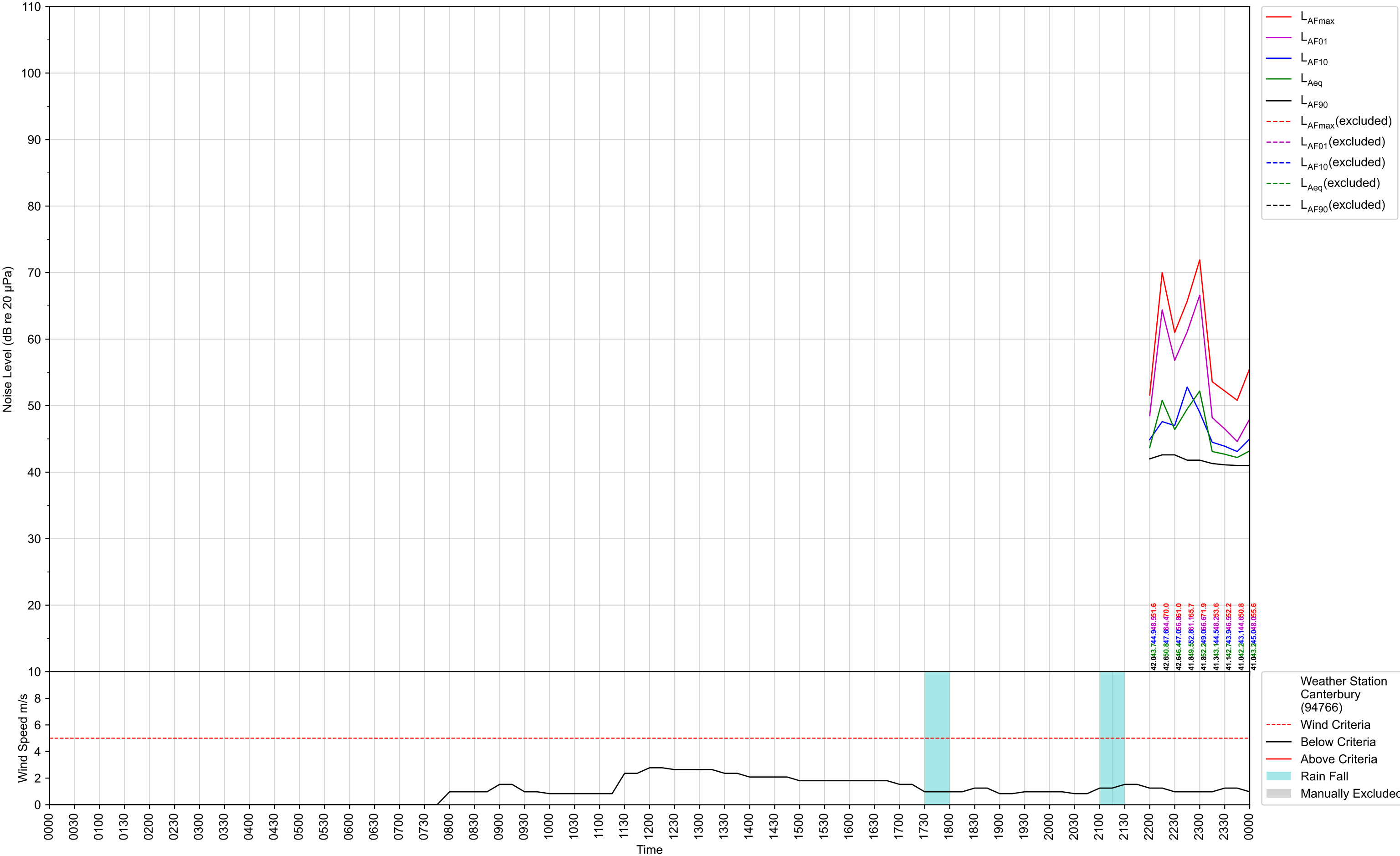


Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW



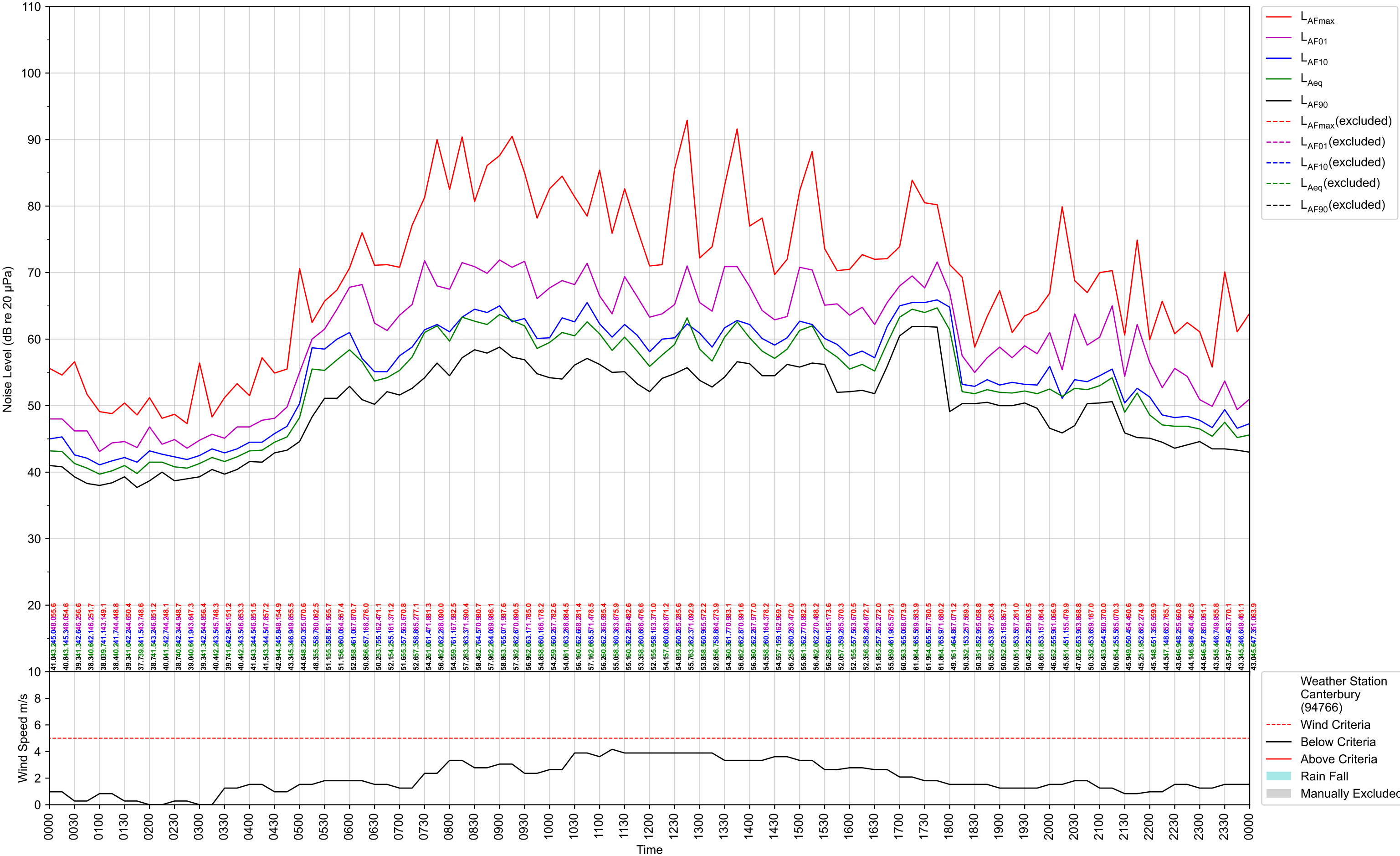
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Monday 29 August 2022



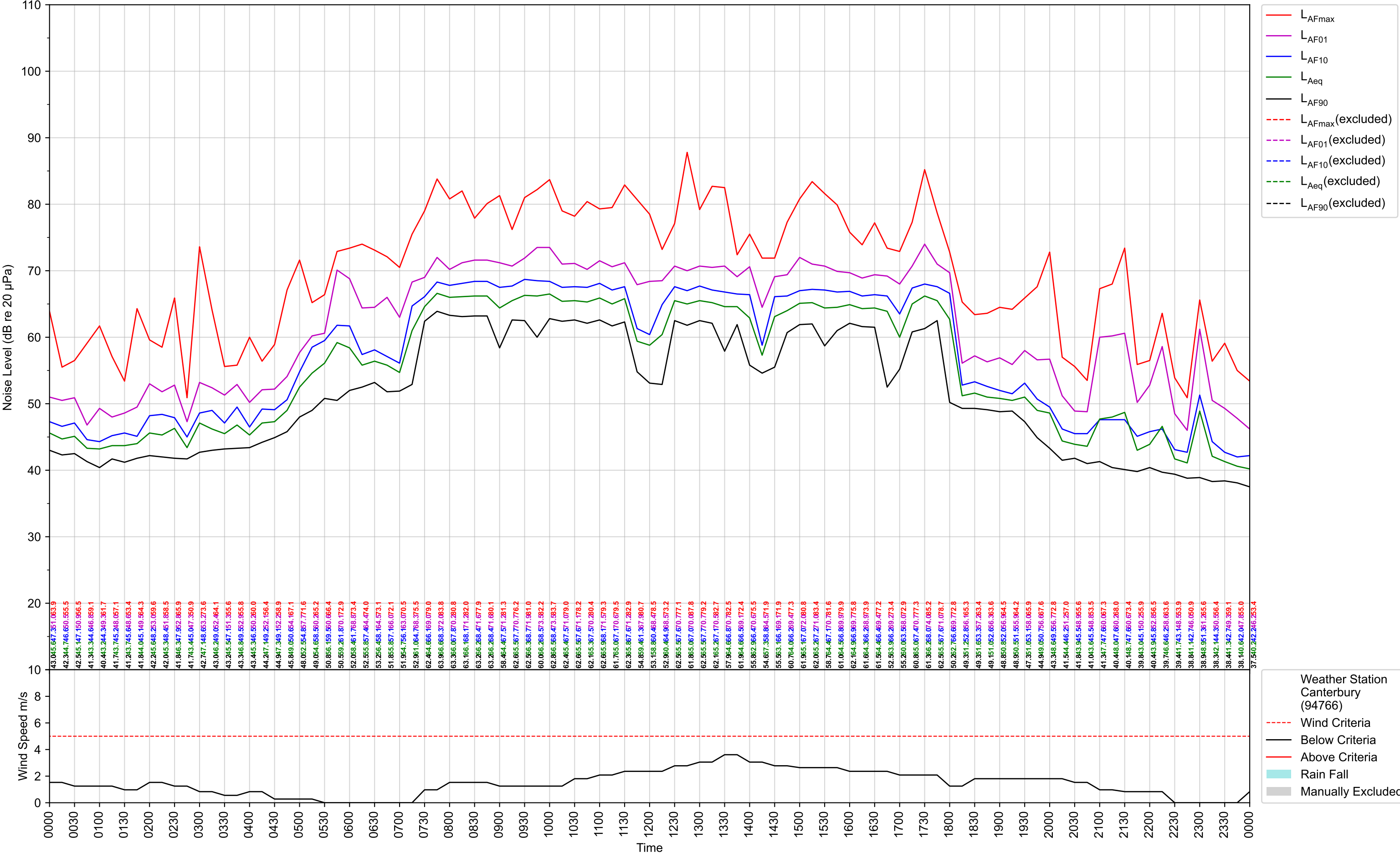
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Tuesday 30 August 2022



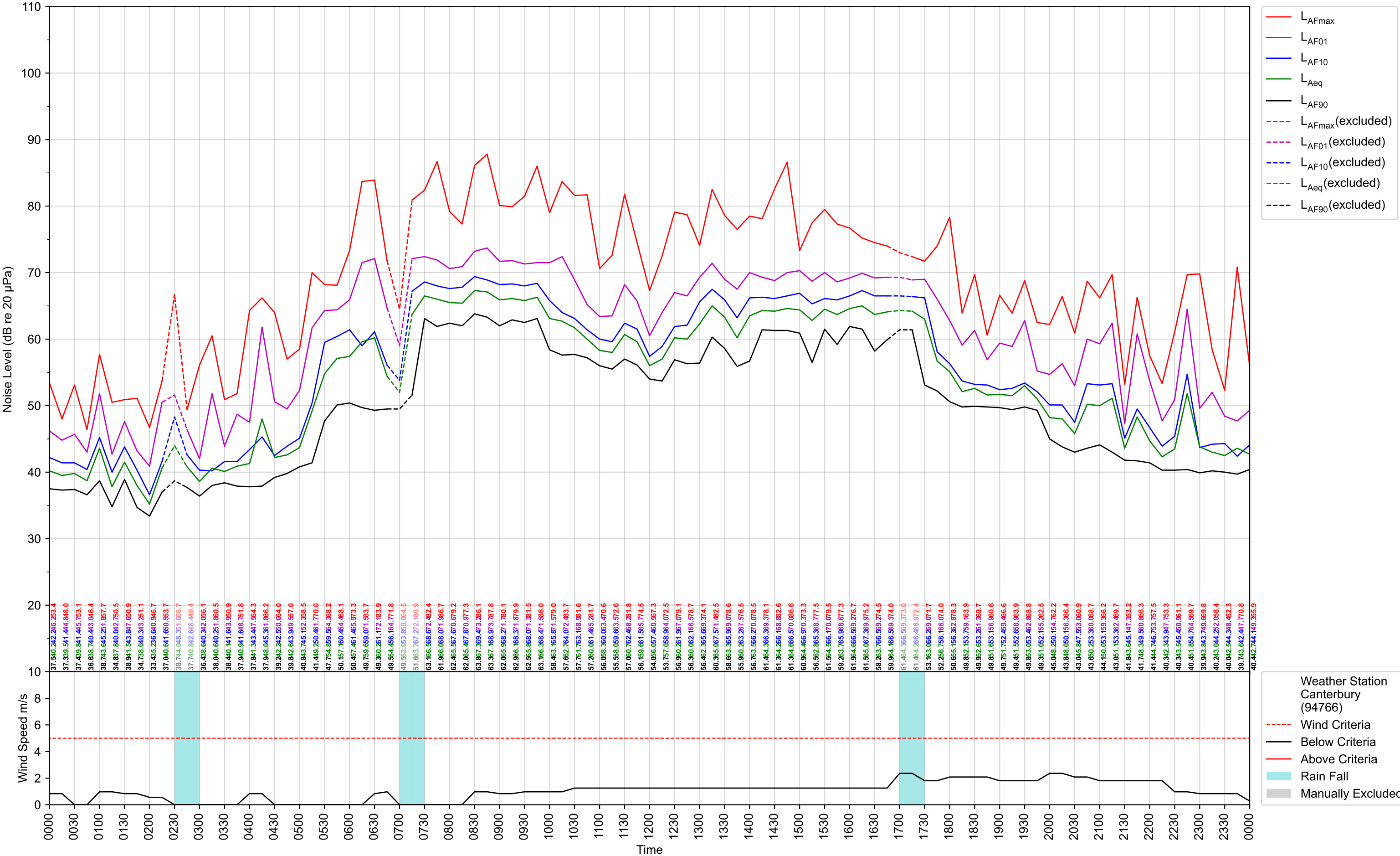
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Wednesday 31 August 2022



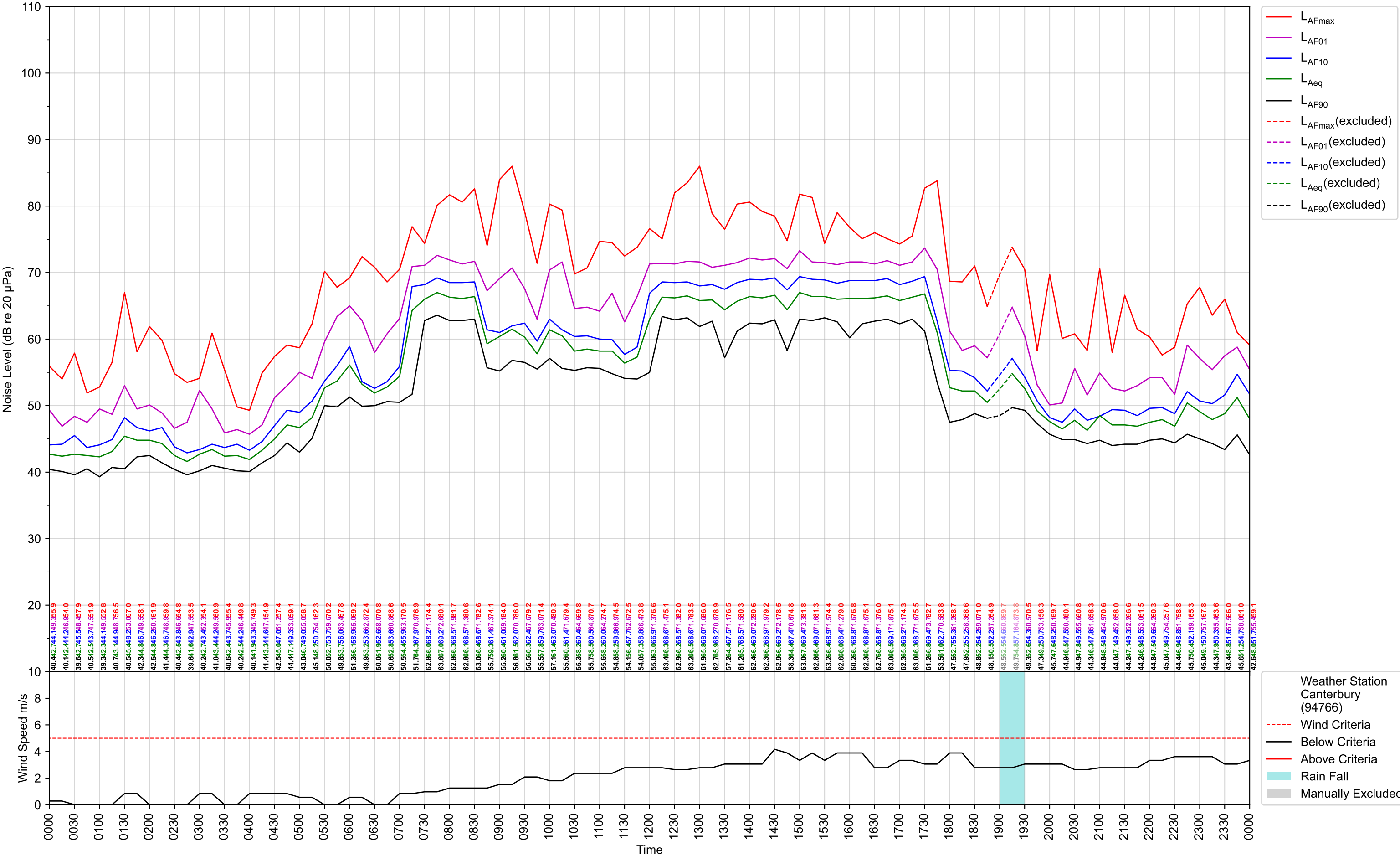
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Thursday 01 September 2022



Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

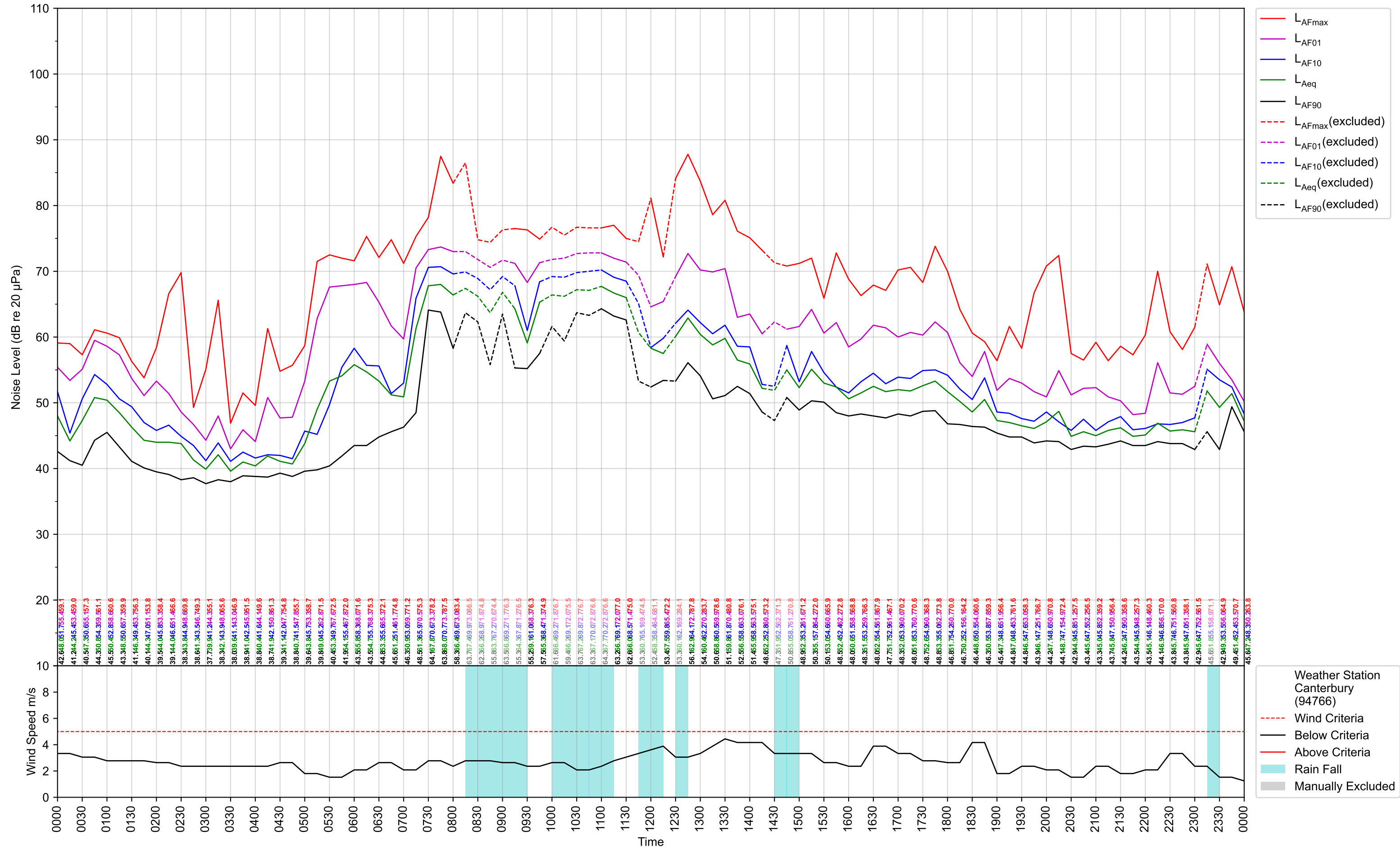
Graphical Noise Logger Data
Date: Friday 02 September 2022



Graphical Noise Logger Data
Date: Saturday 03 September 2022

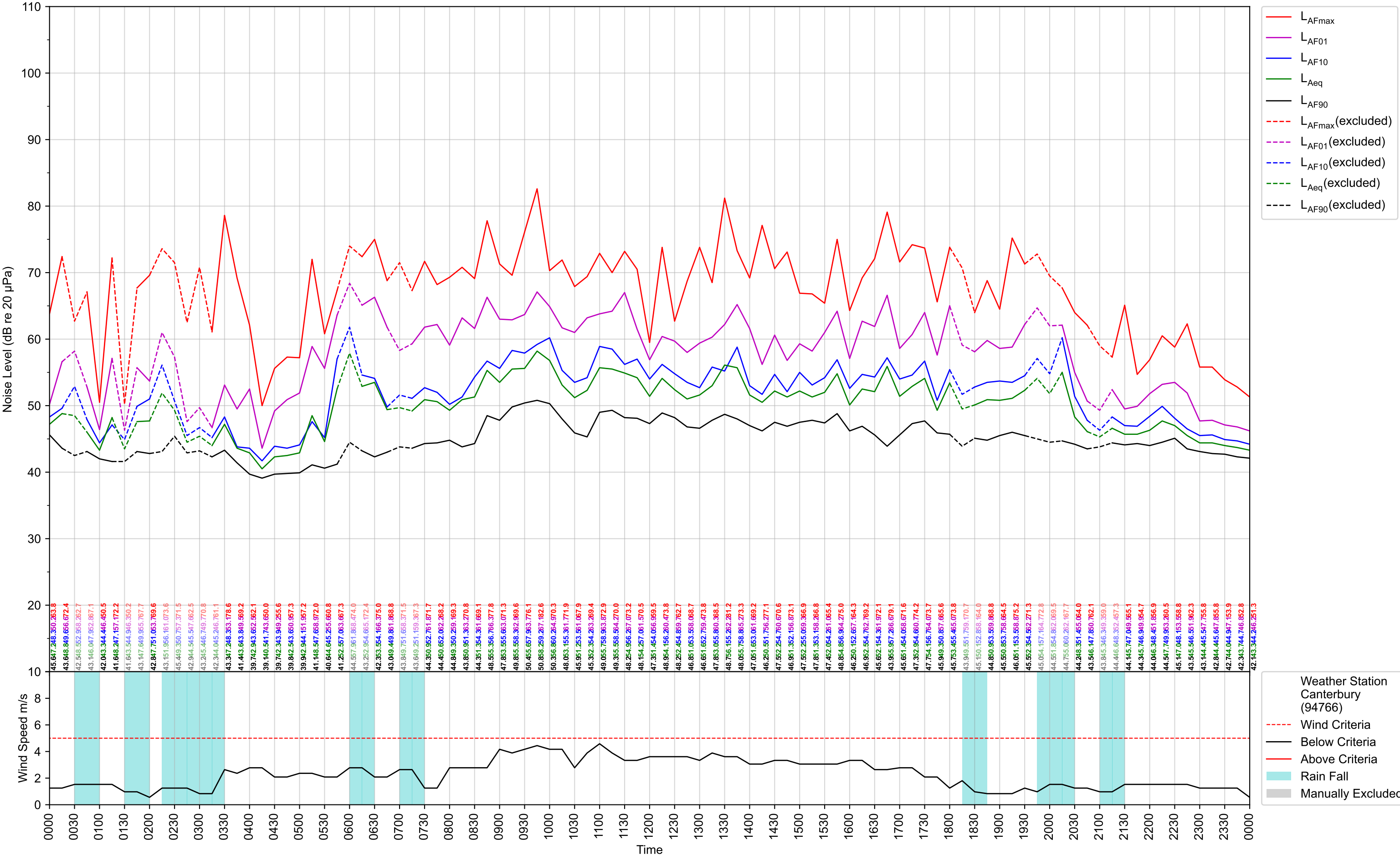


Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW



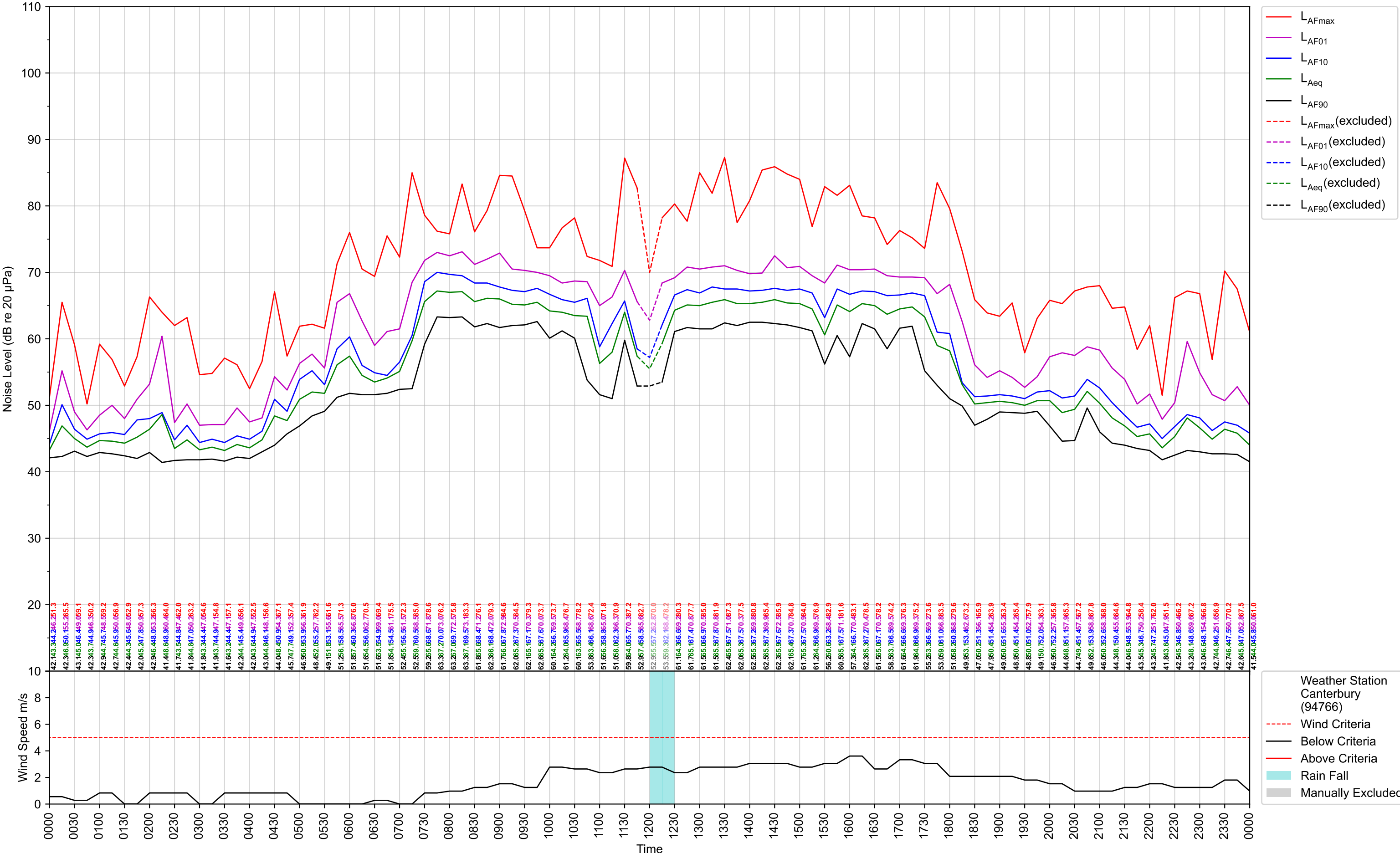
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Sunday 04 September 2022



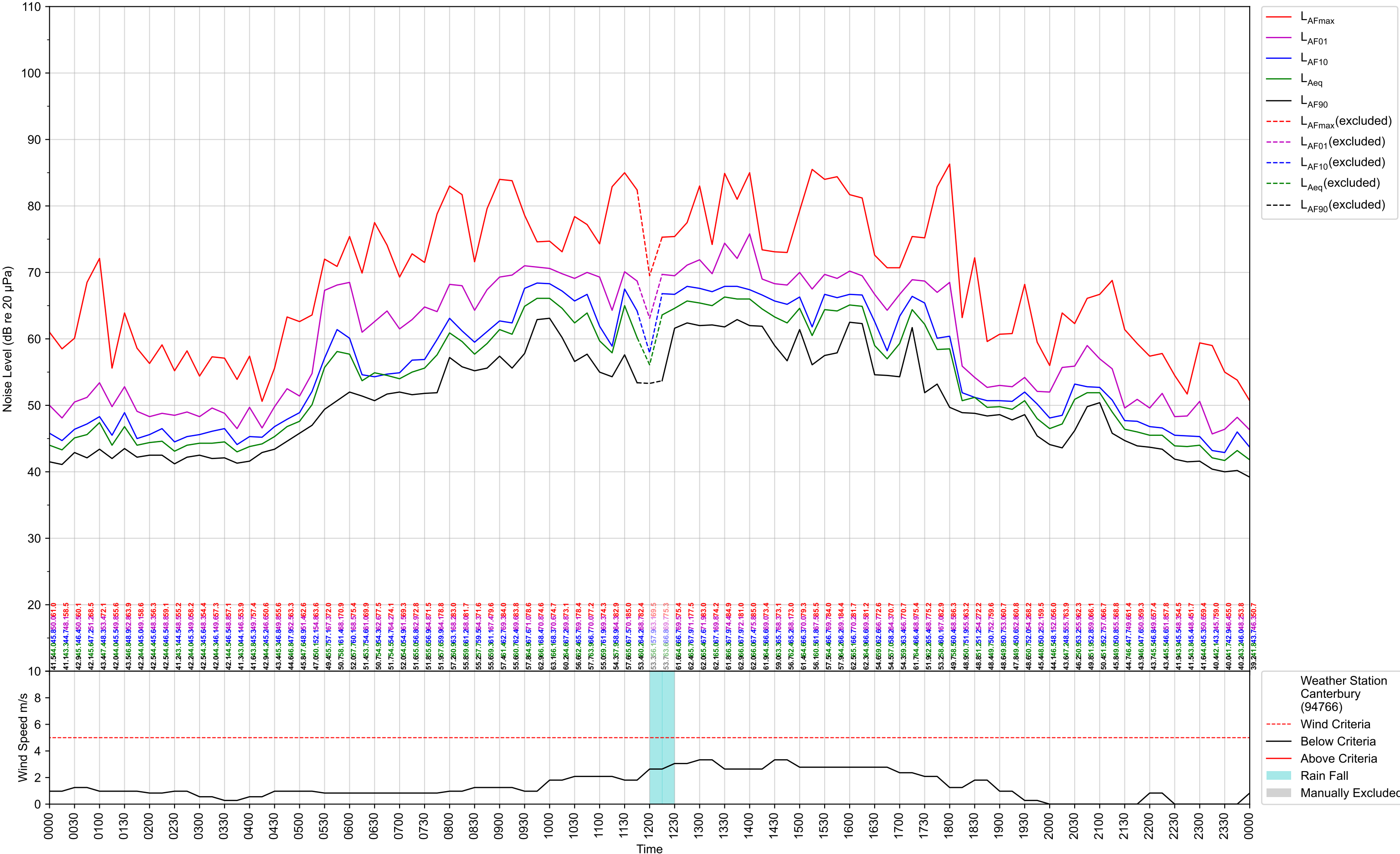
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Monday 05 September 2022



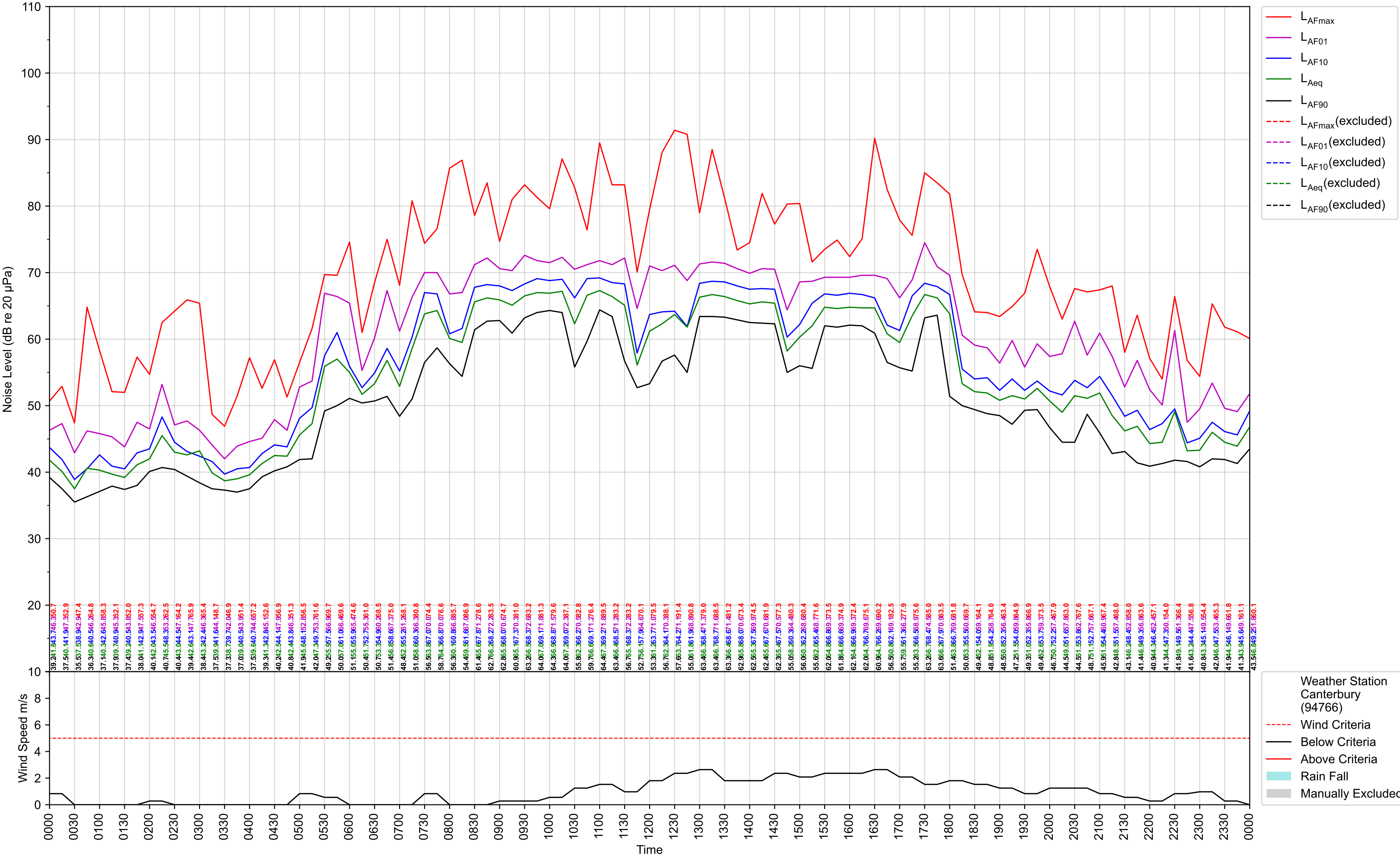
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Tuesday 06 September 2022



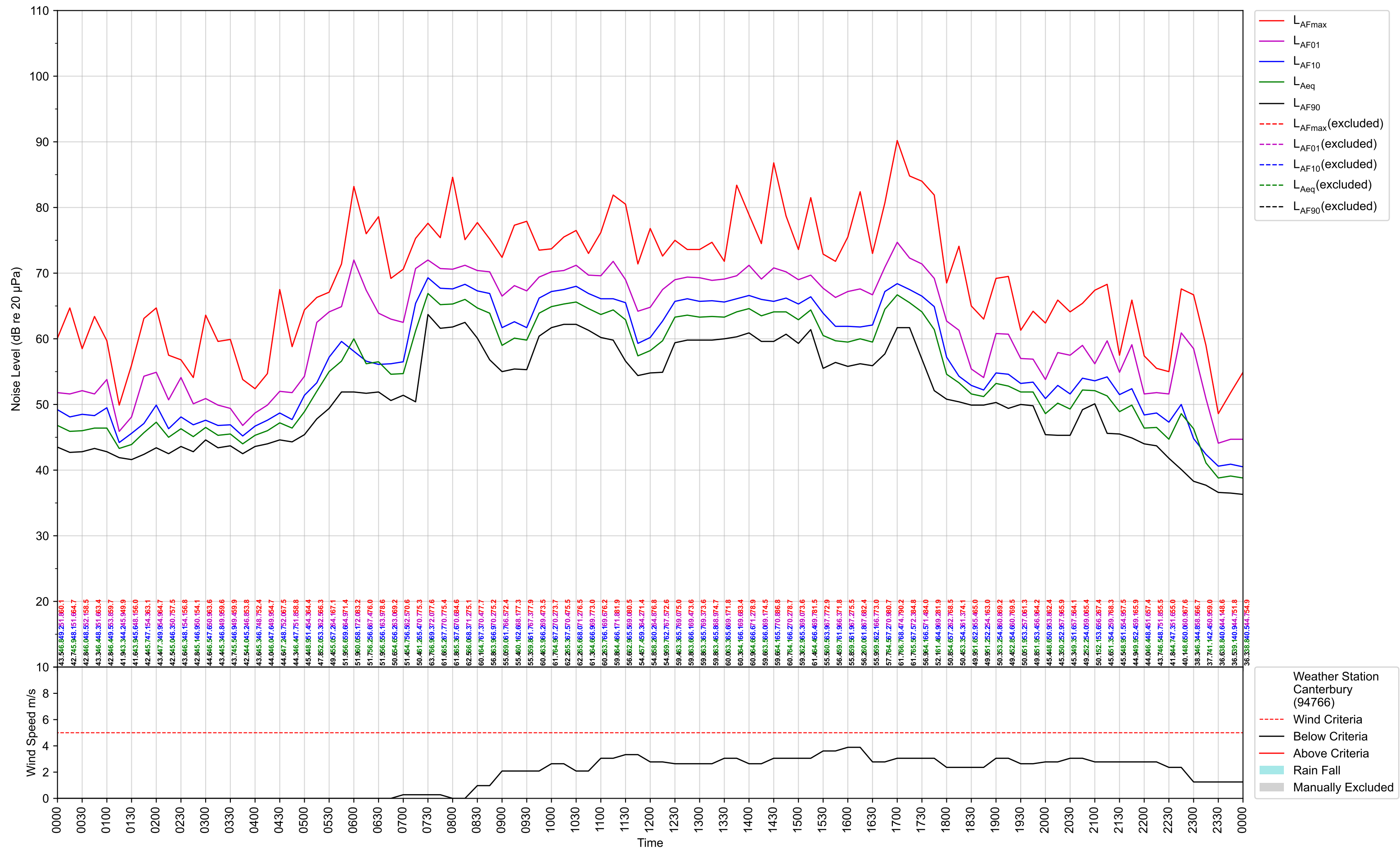
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Wednesday 07 September 2022



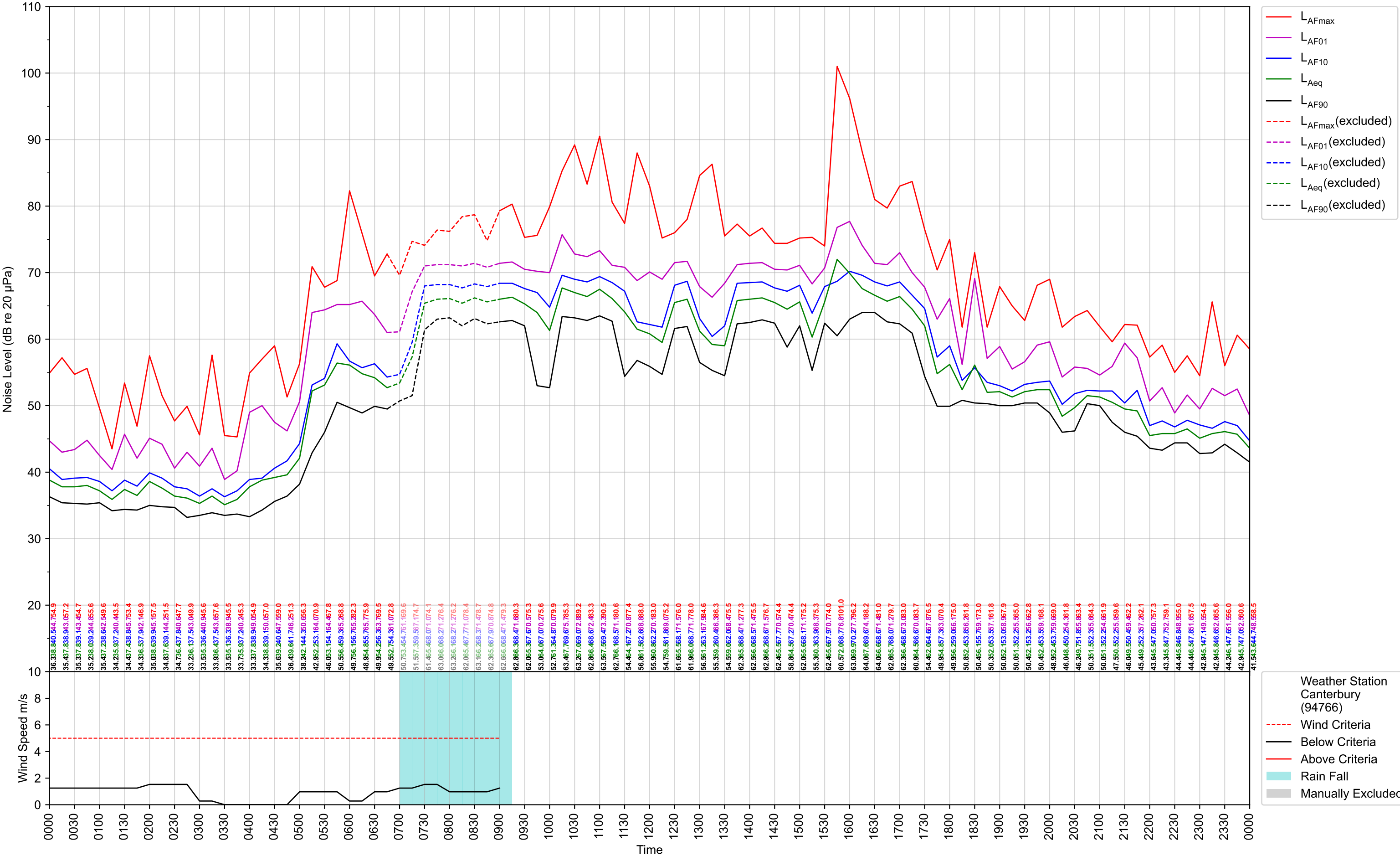
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Thursday 08 September 2022



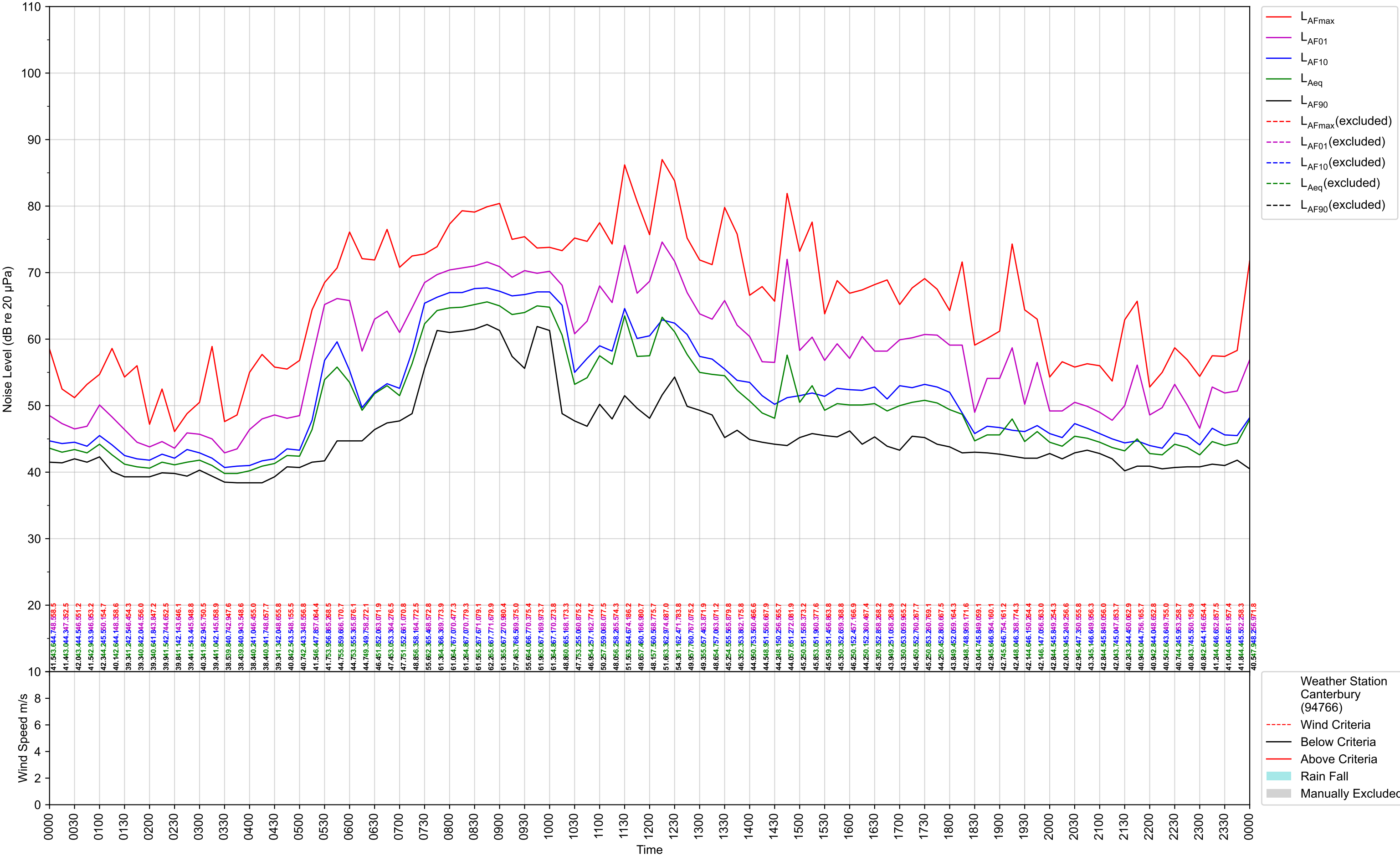
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Friday 09 September 2022



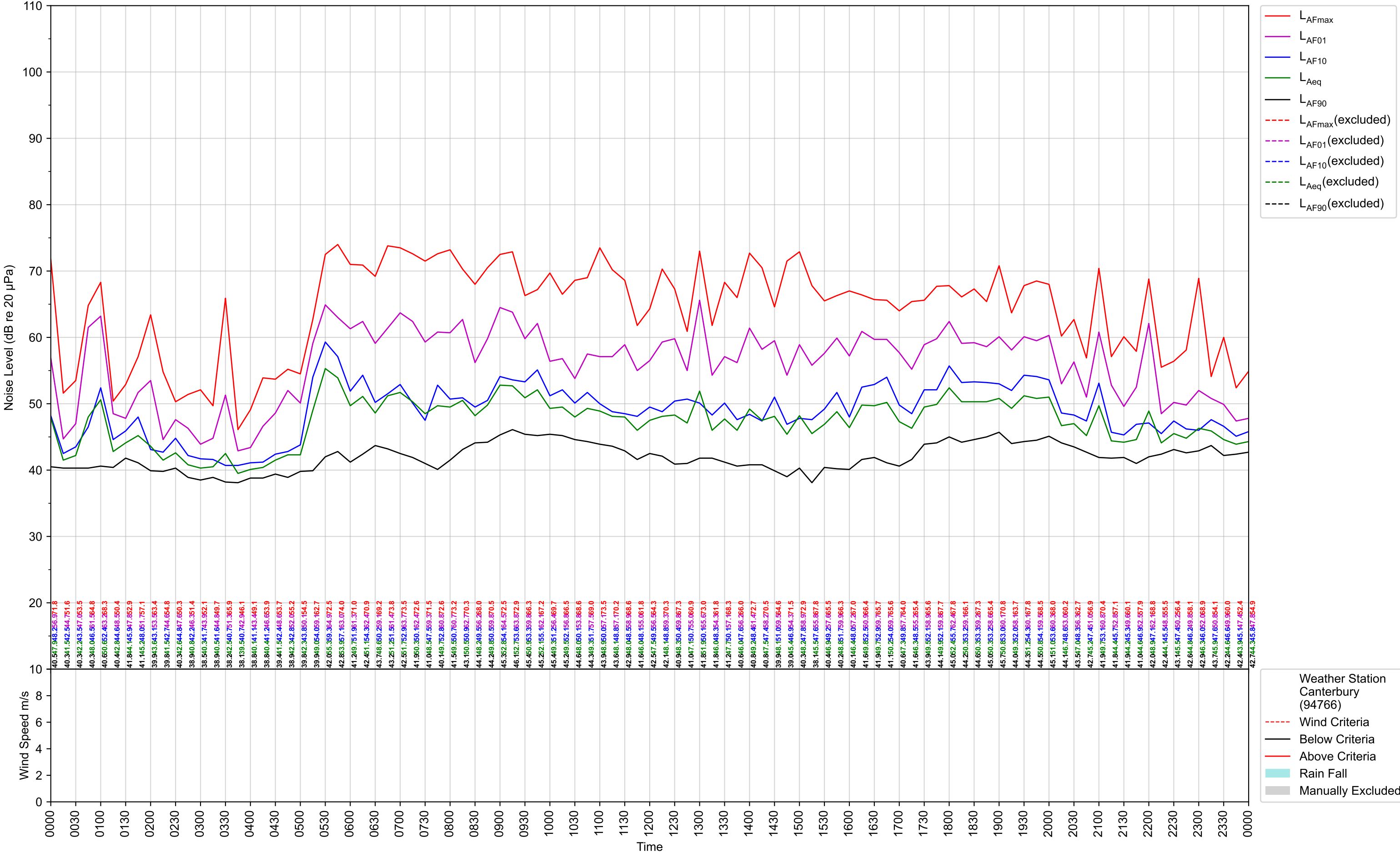
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Saturday 10 September 2022



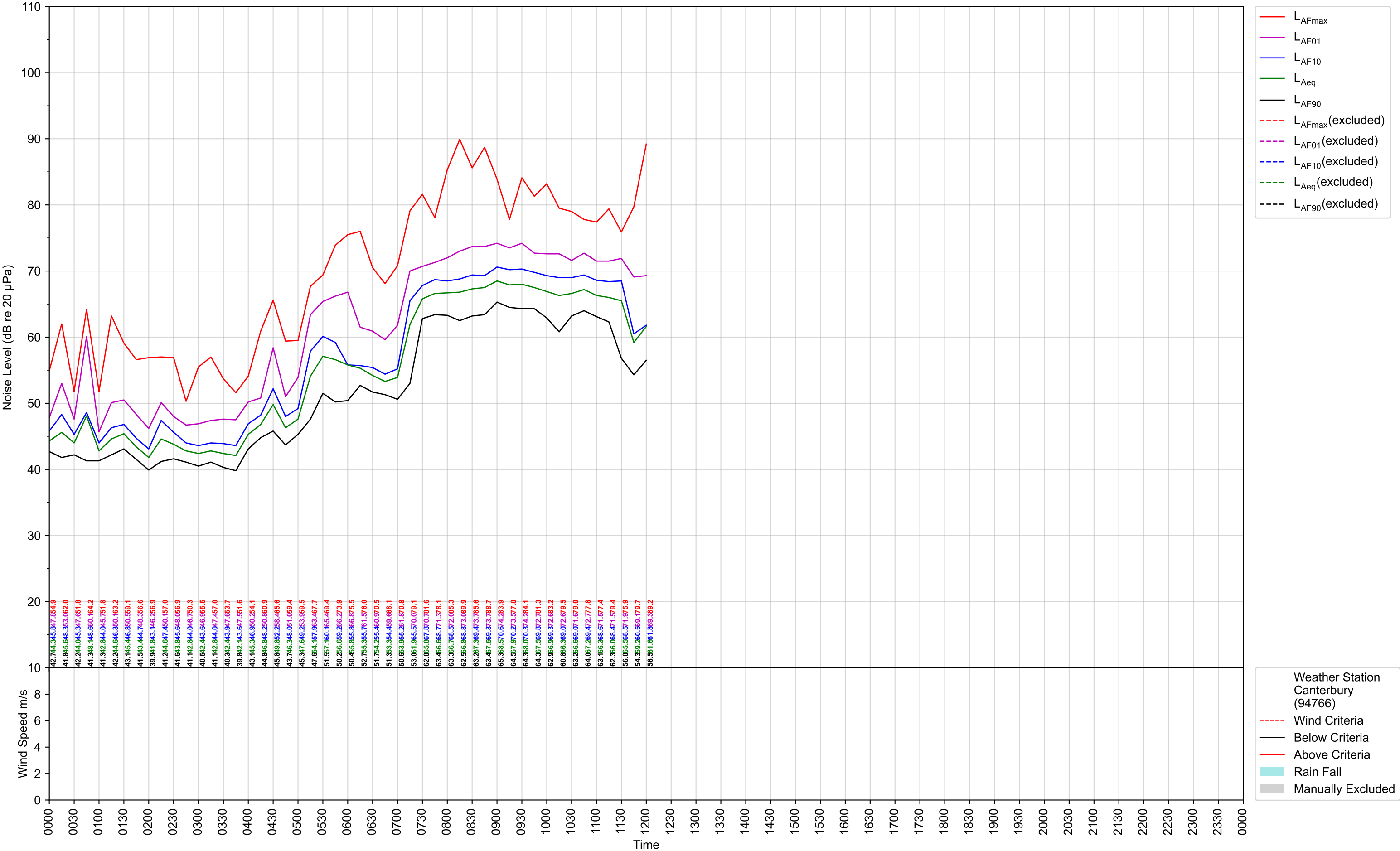
Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Sunday 11 September 2022



Project: Polytrade - Materials Recovery Facility
Project Number: 60.00903.01
Equipment: Svan 977
Serial Number: 45730
Pre Calibration: 0.50 dB
Post Calibration: 0.54 dB
Location: Adj 2 Chrisholm Street, Belfield, NSW

Graphical Noise Logger Data
Date: Monday 12 September 2022





APPENDIX B: NOISE LEVEL MAPS



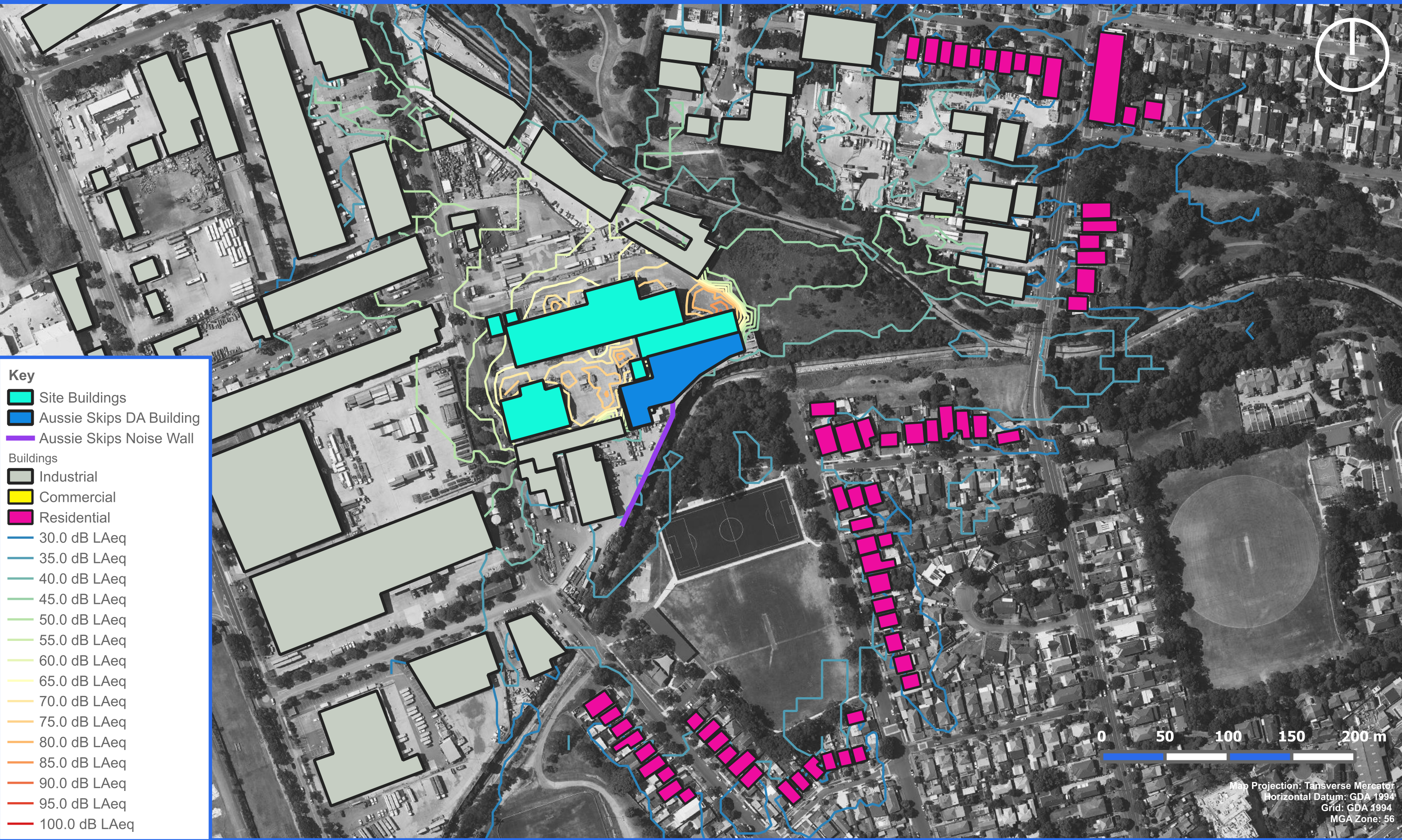
Imagery courtesy of NSW Imagery

Re.Cycle Operations Pty Ltd - Material Recovery Facility
40 Madeline Street, Strathfield South, NSW

Daytime Operational Noise Levels - LAeq,15min
(with Alternative Mitigation Measures)

Waves
CONSULTING

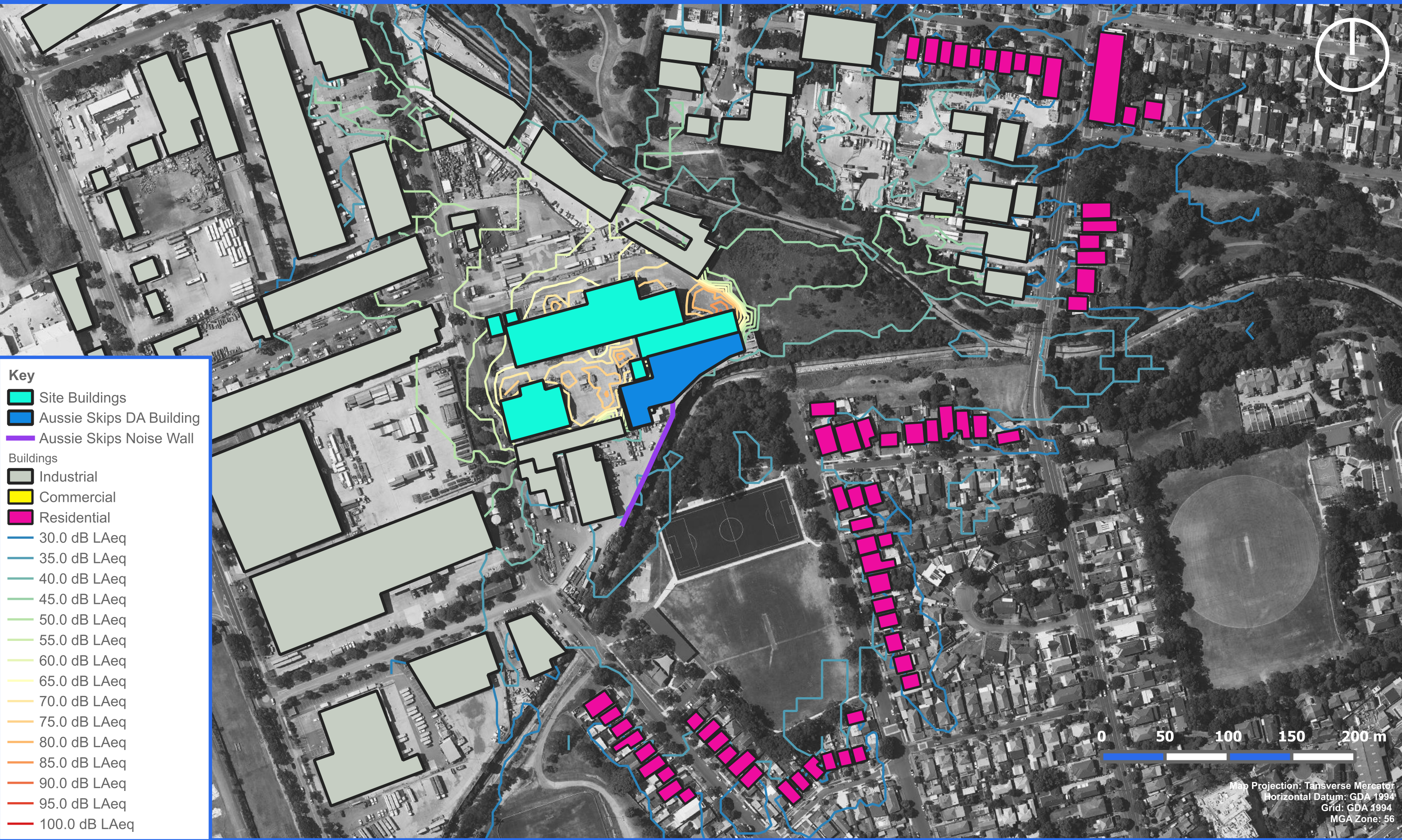
Project Number: 60.00920.01
Date: 31 October 2024
Revision: 01
Prepared by: TC



Imagery courtesy of NSW Imagery

Re.Cycle Operations Pty Ltd - Material Recovery Facility
40 Madeline Street, Strathfield South, NSW

Evening Operational Noise Levels - LAeq,15min
(with Alternative Mitigation Measures)



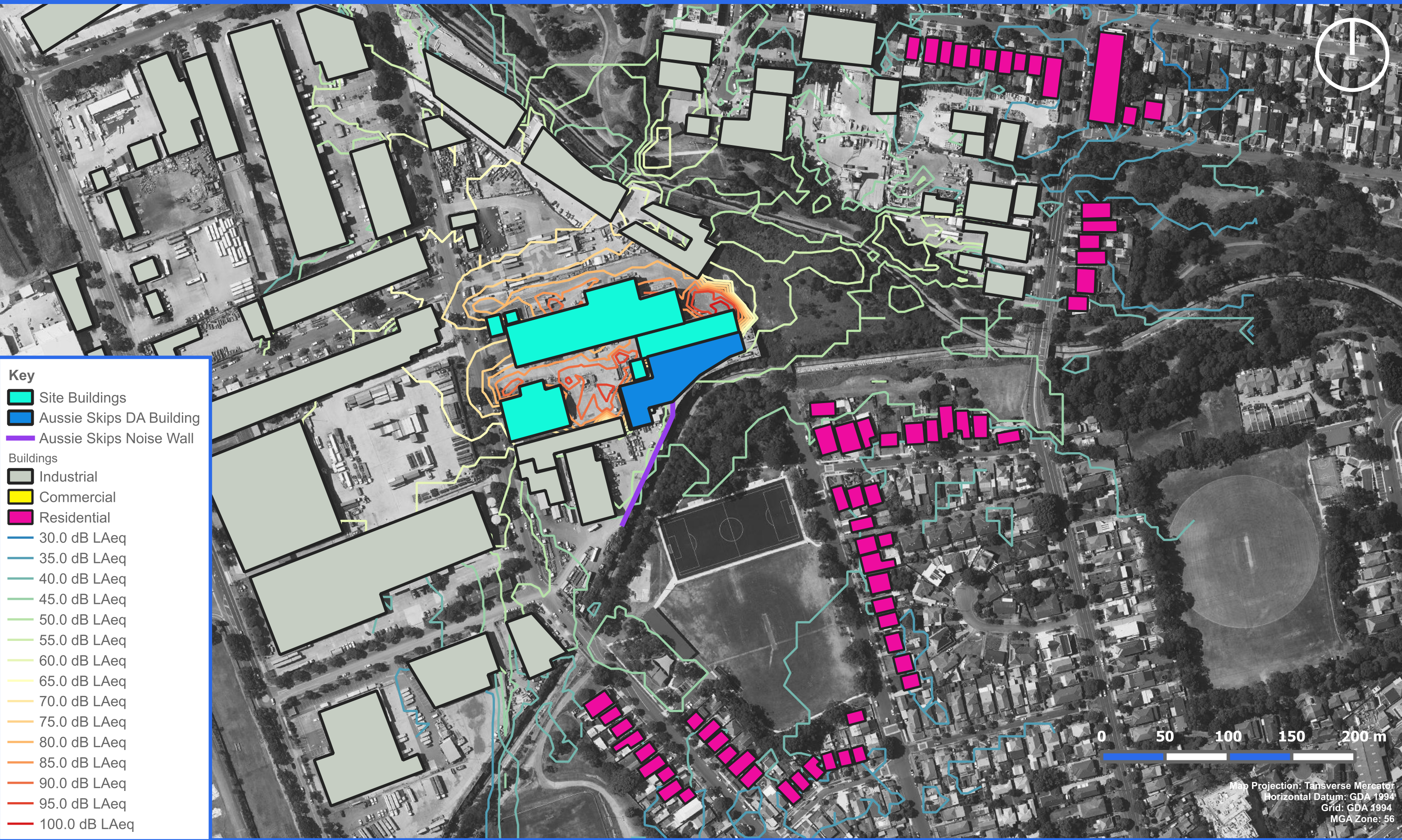
Imagery courtesy of NSW Imagery

Re.Cycle Operations Pty Ltd - Material Recovery Facility
40 Madeline Street, Strathfield South, NSW

Nighttime Operational Noise Levels - LAeq,15min
(with Alternative Mitigation Measures)

Waves
CONSULTING

Project Number: 60.00920.01
Date: 31 October 2024
Revision: 01
Prepared by: TC



Imagery courtesy of NSW Imagery

Re.Cycle Operations Pty Ltd - Material Recovery Facility
40 Madeline Street, Strathfield South, NSW

Nighttime Operational Noise Levels - L_AF_{max}
(with Alternative Mitigation Measures)

Waves
CONSULTING

Project Number: 60.00920.01
 Date: 31 October 2024
 Revision: 01
 Prepared by: TC