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Rosemeadow Stage 3 - Seniors Housing, Lot 194, Road No 2

DA Acoustic Assessment

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3	26/04/2021	20200736.1/2604A/R3/HC	HC		HC

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1 INTRODUCTION

This report presents an acoustic assessment of potential noise impacts associated with the proposed seniors housing development to be constructed on the land of Lot 194, Road No 2, Rosemeadow, known as Rosemeadow – Stage 3.

This document addresses noise impacts associated with the following:

- Traffic noise impacts from surrounding roads;
- Operational noise impacts from surrounding industrial / commercial developments; and
- Noise emissions from future occupancy within the proposed development including mechanical plant servicing the project site;

AL have referenced the following documents and regulations in the noise and vibration assessment of the development:

- Campbelltown (Sustainable City) Development Control Plan 2015;
- NSW Department of Planning's '*Development Near Rail Corridors and Busy Roads (Interim Guideline)*';
- NSW Department of Planning and Environment's document – '*State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007*';
- Australian and New Zealand AS/NZS 2107:2016 *'Recommended design sound levels and reverberation times for building interiors';*
- NSW EPA Noise Policy for Industry (NPfI) 2017;

This assessment has been conducted using the architectural drawings provided by Mako Architecture, dated 17/12/2020, job number19062, revision E – Revised Pre DA.

2 SITE DESCRIPTION / PROPOSED DEVELOPMENT

The proposed development contains three residential buildings with a basement carpark.

The north facade, west facade and south façade of the proposed development is adjoined by residential zoned land undergoing redevelopment for residential subdivision and new dwelling construction. The east façade of the proposed development is bounded by Copperfield Drive, which carries medium to high traffic volume. Further to the east are existing commercial and industrial developments. Julius Avenue is located along the southern boundary of the project site, which carries low traffic volume. Further to the south are existing residential dwellings.

Site investigation indicates that the nearest noise receivers around project site are below:

- Receiver 1 (residential)- Residential zoned land undergoing redevelopment for residential subdivision and new dwelling construction, situated to the north of the proposed site.
- Receiver 2 (commercial) - Existing fire station Rosemeadow, situated to the northeast of the proposed site, at 1 Thomas Rose Drive, Rosemeadow.
- Receiver 3 (commercial) - Existing restaurant, situated to the east of the proposed site, at Copperfield Drive, Rosemeadow.
- Receiver 4 (residential) – Residential zoned land undergoing redevelopment for residential subdivision and new dwelling construction, situated to the south of the proposed site.
- Receiver 5 (residential) – Existing residential dwellings situated to the south of the proposed site, at 48-54 Julius Avenue, Rosemeadow;
- Receiver 6 (residential)- Residential zoned land undergoing redevelopment for residential subdivision and new dwelling construction, situated to the west of the proposed site.

A site map, measurement descriptions and surrounding receivers are presented in Figure 1 below.

Figure 1: SIX Maps

3 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20-minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15-minute period. L_{eq} is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

4 EXISTING ACOUSTIC ENVIRONMENT

The acoustic environment is categorised by moderate background noise levels during the day and medium background noise levels during the evening due to traffic movements and operating noise from the surrounding commercial and industrial developments. Low background noise levels during the night as most of the volume of traffic has finished for the day and most of the commercial and industrial developments are closed for the day.

Acoustic monitoring was conducted at the site to establish the background noise levels which will be used as basis for this assessment.

4.1 BACKGROUND NOISE LEVELS

Background noise levels which will be used as a basis for this assessment are detailed in the following sections.

4.1.1 Measurement Equipment

Unattended noise monitoring was conducting using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

4.1.2 Measurement Locations and Period

The measurement locations are shown in Figure 1 and discussed below.

4.1.2.1 Unattended Noise Monitoring

An unattended noise monitor was installed in street level at location 4 (refer to figure 1). The logger was on site from the 28th July 2020 to 6th August 2020. The measured background noise levels have been corrected for meteorological conditions (excessive wind and/or rain), as required by section 3.4 of the EPA Noise Policy for Industry. Weather zone data for observations recorded at Campbelltown (Mount Annan), periods of precipitation or extraneous wind conditions have been removed from the data and have not been used in the assessment of existing background noise levels as detailed in Appendix 1.

4.1.2.1.1 Measured Background Noise Levels

NSW EPA's RBL assessment procedure requires determination of background noise level for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

The processed Rating Background Noise Levels (lowest 10th percentile noise levels during operation time period) are presented in Table 1 below.

Table 1- Unattended Noise Monitor – Location 1 – Rating Background Noise Level

Date	Measured Rating Background Noise Level dB(A)L_{90}		
	Day(7am-6pm)	**Evening(6pm-10pm)**	**Night (10pm-7am Next Day)**
Tuesday 28th July 2020	-	43	-
Wednesday 29th July 2020	46	43	37
Thursday 30th July 2020	46	43	36
Friday 31st July 2020	46	46	36
Saturday 1st August 2020	47	49	39
Sunday 2nd August 2020	45	43	47
Monday 3rd August 2020	45	45	37
Tuesday 4th August 2020	47	44	38
Wednesday 5th August 2020	47	42	37
Thursday 6thAugust 2020	-	-	37
Median	**46**	**43**	**37**

Note*: Background noise levels have been corrected for meteorological conditions.

5 TRAFFIC NOISE DESCRIPTORS

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level.

To accurately determine the effects of traffic noise a 15-20-minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of environmental noise three principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15-minute period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of traffic noise.

Current practice favours the L_{eq} parameter as a means of measuring traffic noise, whereas the L_{10} parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the L_{90} parameter is not used to assess traffic noise.

6 TRAFFIC NOISE INTRUSION

AL has conducted an attended noise measurement on site in location 2, 3 and 4, as well as an unattended noise measurement on site in location 1 (see figure 1 above) to obtain traffic noise level.

6.1 ACOUSTIC CRITERIA

Traffic noise will be assessed to the following criteria:

- Campbelltown (Sustainable City) Development Control Plan 2015;
- NSW Department of Planning's '*Development Near Rail Corridors and Busy Roads (Interim Guideline)*';
- NSW Department of Planning and Environment's document – '*State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007*';
- Australian and New Zealand AS/NZS 2107:2016 *'Recommended design sound levels and reverberation times for building interiors';*

6.1.1 Campbelltown (Sustainable City) Development Control Plan 2015

Part 5 of Campbelltown (Sustainable City) Development Control Plan 2015, states the following:

"5.4.4 Acoustic Privacy

a) Residential flat buildings, and the residential component of a mixed-use development shall provide noise mitigation measures to ensure that the following L_{Aeq} levels are not exceeded:

i) in any bedroom in the building—35 dBA,

ii) anywhere else in the building (other than a garage, kitchen, bathroom or hallway) — 40 dBA

b) Residential flat buildings, and the residential component of a mixed-use development near railway corridors and major roads shall demonstrate to Council's satisfaction compliance with the requirements under the Guidelines entitled Development Near Rail Corridors and Busy Roads – Interim Guideline, 2008)

Note: This Guide is available for view/ download from the NSW Department of Planning & Environment website at: www. planning.nsw.gov.au.

Note: Noise mitigation measures for residential flat buildings and the residential component of a mixed-use development may include insulating building elements such as doors, walls, windows, floors, roof and ceilings. Options for window design include sealing air gaps around windows and doors, laminated or thick glass, and double glazing."

6.1.2 Australian and New Zealand AS/NZS 2107:2016 *'Recommended design sound levels and reverberation times for building interiors'*

Australian Standard AS 2107-2016: *Recommended design sound levels and reverberation times for building interiors* specifies allowable internal noise levels for internal spaces within residential and commercial buildings. Table 1, in Section 5 of AS 2107-2016, gives the following maximum internal noise levels for residential buildings near minor roads.

Table 2 - Recommended Design Sound Level

Space /Activity Type	Recommended Maximum Design Sound Level
Residential, Near Minor Roads - Sleeping Areas (Night-time)	30 to 35 dB(A)$L_{eq(night\ time)}$
Residential, Near Minor Roads - Living Areas	30 to 40 dB(A)$L_{eq,\ (24\ hours)}$

6.1.3 NSW Department of Planning's 'Development Near Rail Corridors and Busy Roads (Interim Guideline)'

Section 3.5 of the NSW Department of Planning's 'Development Near Rail Corridors and Busy Roads (Interim Guideline)' states:

"The following provides an overall summary of the assessment procedure to meet the requirements of clauses 87 and 102 of the Infrastructure SEPP. The procedure covers noise at developments for both Road and Rail.

- *If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded:*
  - *in any bedroom in the building: 35dB(A) at any time 10pm-7am*
  - *anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time."*

6.1.4 State Environmental Planning Policy (SEPP Infrastructure) 2007

The road traffic noise intrusion criteria, as specified in the Infrastructure SEPP, additionally applies to this site as the development lies adjacent to a major roadway.

Clause 102 & Clause 87 of the SEPP states:

> *"This clause applies to development for any of the following purposes that is on land in or adjacent to, a rail corridor (Clause 87) OR a road corridor for a freeway, a tollway or a transit way or any other road with an annual average daily traffic volume of more than 40,000 vehicles (based on the traffic volume data published on the website of the RTA) (Clause 102) and that the consent authority considers is likely to be adversely affected by road noise or vibration:*
>
> *(a) a building for residential use,*
>
> *If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded:*
>
> *(a) in any bedroom in the building – 35 dB(A) at any time between 10 pm and 7am,*

(b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway) – 40 dB(A) at any time."

Map 17 of the traffic volume maps for the Infrastructure SEPP on the RTA website classifies the Copperfield Drive as a local road, hence a noise intrusion assessment is not necessary.

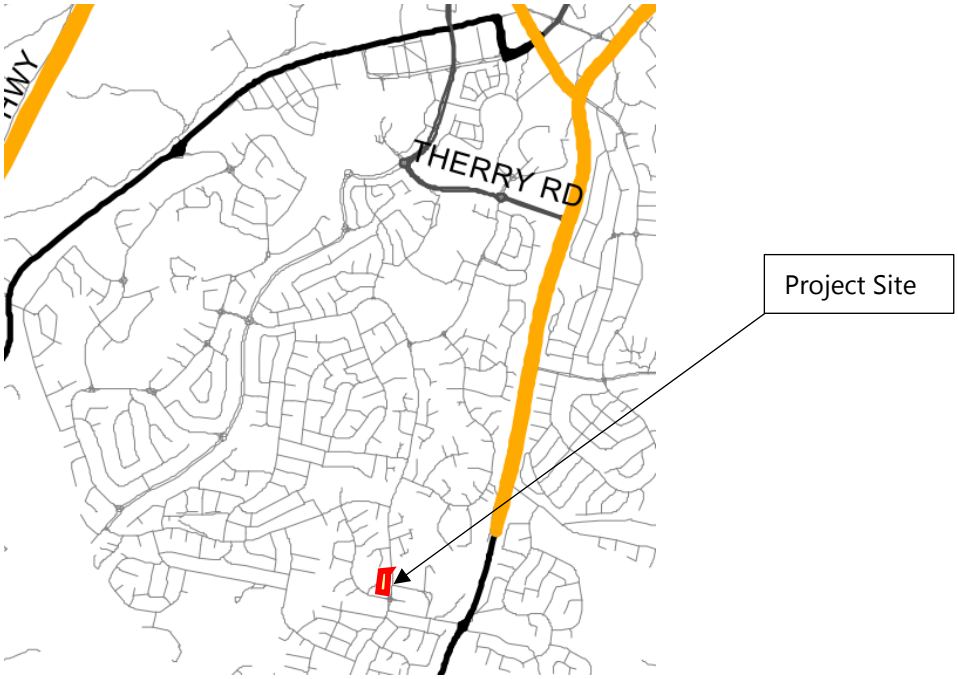


Figure 2: SEPP Map 17

6.1.5 Summary of Noise Intrusion Criteria

This assessment for residential use of the proposed development shall be conducted in accordance with the most stringent criteria specified above. This is presented in Table 3 below:

Table 3 – Summary of Noise Intrusion Criteria

Space /Activity Type	Maximum Design Sound Level
Residential - Sleeping Areas	35dB(A)$L_{eq(9hour)}$
Residential - Living Areas	40 dB(A)$L_{eq(24\ hour)}$

6.2 TRAFFIC NOISE MEASUREMENTS

Existing traffic noise levels impacting the site were determined by attended and unattended noise measurements. Site investigation indicated that traffic noise impacts from Copperfield Drive is primary noise source (traffic) from the vicinity of the project site.

6.2.1 Unattended Noise Measurements

Unattended noise measurements were obtained using an Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The noises monitor was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator. No significant drift was detected. All measurements were taken on A-weighted fast response mode. There were no significant periods of adverse weather conditions during the measurement period.

An unattended noise monitor was installed street level at location 1 (refer to figure 1), which is 60m away from the road kerb of Copperfield Drive.

The logger was on site from the Tuesday 28th July 2020 to Thursday 6thAugust 2020.Refer to Appendix 1 for unattended noise monitoring data. Unattended traffic noise measurements are summarised below:

Table 4 – Unattended Traffic Noise Measurement Levels

Location	Time of Day	Traffic Noise Level
Location 1 60m from road kerb of Copperfield Drive; with 180 degrees of view on Copperfield Drive	Day	53dB(A) $L_{eq(15hr)}$
	Night	49dB(A) $L_{eq(9hr)}$

6.2.2 Attended Noise Measurements

Attended noise monitoring were conducted on site on Tuesday 28th July 2020 between 4:00pm and 5:00pm. Measurements were conducted using a Norsonic 140 Type 1 sound analyser set on A-weighted fast response mode. Calibration of the meter was checked at the beginning and end of the measurement period, and no significant drift was noted. Attended traffic noise measurements are summarised below:

Table 5 – Attended Traffic Noise Measurement Levels

Location	Traffic Noise Level $L_{Aeq(15min)}$
Location 2 2m from road kerb of Julius Road; with 180 degrees of view on Julius Road	60
Location 3 4m from road kerb of Copperfield Drive; with 180 degrees of view on Copperfield Drive	66
Location 4 2m from road kerb of Julius Road; with 180 degrees of view on Julius Road and 90 degrees of view on Julius Road	63

6.2.3 Resultant Traffic Noise Levels

The following table presents the resultant noise levels at the proposed façades of the development. The noise levels are based on the attended traffic noise measurement results adjusted by the difference with the noise monitor results of time periods and distance attenuation.

The resultant traffic noise levels are listed in Table 6 below.

Table 6 – Resultant Traffic Noise Levels

Location	Time of Day	Traffic Noise Level $L_{eq((9hr/15hr)}$
At the south façade of the proposed development	Day	58dB(A) $L_{eq(15hr)}$
	Night	54dB(A) $L_{eq(9hr)}$
At the west façade of the proposed development	Day	55dB(A) $L_{eq(15hr)}$
	Night	51dB(A) $L_{eq(9hr)}$
At the east façade of the proposed development	Day	61dB(A) $L_{eq(15hr)}$
	Night	57dB(A) $L_{eq(9hr)}$

6.3 RECOMMENDED CONSTRUCTIONS

Traffic noise intrusion into the proposed development was assessed using the measured external noise levels reported above as a basis.

Calculations were performed taking into account the orientation of windows, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted.

Internal noise levels will primarily be as a result of noise transfer through the windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound. Noise transfer through the masonry elements will not be significant and need not be considered further.

The constructions necessary to achieve the noise levels are detailed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

6.3.1 Glazed Windows and Doors

The following constructions are recommended to comply with the traffic noise objectives stated in Section 6.1. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria listed below.

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable. Glazing to bedrooms or living areas not nominated in the Table are to be minimum 4mm float.

Table 7 – Glazing Recommendations

Building No.	Space	Façade	Glazing Thickness	Acoustic Seals
Any	Any	Any	6mm Float	Yes

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into operable frames and fixed into the building opening should not be lower than the values listed in the Table below.

Where nominated, this will require the use of acoustic seals equal to Schlegel Q-lon series *(acoustic bulb seal)* around the full perimeter of operable frames. The frame will need to be sealed into the building opening using a flexible 100% polyurethane sealant equal to Selly's Pro Series Fireblock. Note that mohair seals and/or mohair/plastic fin combination seals in windows and doors are **not** acceptable where acoustic seals are required.

It is recommended that only window systems have test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

Table 8 – Minimum R_w of Glazing Requirements

Glazing Assembly	Minimum R_w of Installed Window	Acoustic Seals
6mm float	29	Yes

6.3.2 External Walls

The proposed concrete/ masonry elements external wall construction will be acoustically acceptable and will not require any acoustic treatment. There should not be vents on the internal skin of external walls. All penetrations in the internal skin of external walls should be acoustically sealed.

6.3.3 Roof/Ceiling

The proposed external roof of second floor is a mainly concrete construction, this will not require further acoustic upgrading to ensure compliance with project criteria. All penetrations in all area ceilings (such as for light fittings etc.) must be acoustically treated and sealed gap free with a flexible sealant.

The recommended roof/ceiling construction for rooms with light-weight external roof is shown in table below. Penetrations in all ceilings (such as for light fittings etc.) must be acoustically treated and sealed gap free with a flexible sealant.

Table 9 – Recommended Roof/Ceiling Constructions

Space	External Lining	Insulation	Ceiling Lining
Any	0.5mm Sheet Metal	Minimum 75mm thick 11kg/m^3 insulation With 250mm airgap	Minimum 1x13mm plasterboard

7 NOISE EMISSION ASSESSMENT

The noise emissions from the project site shall comply with the requirements of the following;

- Campbelltown (Sustainable City) Development Control Plan 2015; and
- NSW EPA Industrial Noise Policy for Industry 2017.

7.1 NOISE CRITERIA

7.1.1 Campbelltown (Sustainable City) Development Control Plan 2015

Campbelltown (Sustainable City) Development Control Plan 2015 does not contain any numerical acoustic criteria with respect for noise emissions(residential). Therefore, we use the typically adopted Industrial Noise Policy.

7.1.2 NSW EPA Industrial Noise Policy for Industry 2017

The NSW EPA Noise Policy for Industry 2017 has two criteria which need to be satisfied; namely the Intrusiveness noise level criteria and the Project amenity noise level criteria. The project noise trigger level is then established based on the lower of the intrusiveness and project amenity levels.

7.1.2.1 Intrusiveness Noise Level Criteria

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor do not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in Section 3. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

Table 10 – Intrusiveness Noise Level Criteria

Location	Period/Time	Intrusiveness Noise Level Criteria dB(A) $L_{eq(15min)}$
Nearby Residences	Day (7am-6pm)	46
	Evening (6pm-10pm)	43
	Night (10pm-7am)	37

7.1.2.2 Project Amenity Noise Level Criteria

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The NSW EPA Industrial noise policy sets out acceptable noise levels for various localities. Table 2.2 on page 11 of the policy indicates 3 categories to distinguish different residential areas. They are rural, suburban, urban. This site is categorised by suburban receivers.

For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening is defined as the period from 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

The project amenity noise level is calculated by taking the recommended amenity noise level (as presented in table 2.2 of the policy), subtracting 5dB(A) and then adding 3dB(A) to convert from $L_{Aeq,\ period}$ to a $L_{Aeq,\ 15\ minute}$ descriptor. The project amenity noise level criteria are presented in the table below.

Table 11 – Project Amenity Noise Level Criteria

Location	Period/Time	Project Amenity Noise Level Criteria dB(A) $L_{eq(15min)}$
Nearby Residences – suburban Receiver	Day (7am-6pm)	53
	Evening(6pm-10pm)	43
	Night(10pm-7am)	38
Commercial	When in use	63

7.1.3 Resultant Project Noise Emission Criteria

Based on the requirements stated in the sections above, table below provides a summary of the assessment criteria applicable to the future residential development at the project site. The assessment criteria are also based on the background noise monitoring data conducted at the proposed development location.

Table 12 – Environmental Noise Emission Criteria

Location	Time Period	Assessment Background Noise Level dB(A)L_{90}	Project Amenity Criteria dB(A) L_{eq}	Intrusiveness Criteria Background + 5 dB(A) $L_{eq(15min)}$	Resultant criteria
Nearby Residences	Day	46	53	51	51
	Evening	43	43	48	43
	Night	37	38	42	38
Commercial	When in use	-	63	-	63

7.2 MECHANICAL PLANT

Mechanical plant items are not typically selected at selected at DA stage.

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised). Based on the measured noise levels at the site acoustic screens may be recommended for the plant on the roof.

Summary for noise emission criteria associated with the development has been summarised in Section 6.1 of this report. All plant can be satisfactorily attenuated to levels complying with noise emission criteria through appropriate location and (if necessary) standard acoustic treatments such as noise screens to roof top plant, enclosures, in-duct treatments (silencers/lined ducting) or similar.

8 CONCLUSION

This report presents an analysis of the acoustic impacts associated with the proposed seniors housing development to be constructed at the land at the Lot 194 Road No 2, Rosemeadow, known as Rosemeadow – Stage 3.

The internal noise assessment was made in reference to the following documents:

- Campbelltown (Sustainable City) Development Control Plan 2015;
- NSW Department of Planning's '*Development Near Rail Corridors and Busy Roads (Interim Guideline)*';
- NSW Department of Planning and Environment's document – '*State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007*'; and
- Australian and New Zealand AS/NZS 2107:2016 *'Recommended design sound levels and reverberation times for building interiors';*

External noise emission criteria have been setup in this report to satisfy the requirements below;

- Campbelltown (Sustainable City) Development Control Plan 2015;
- NSW EPA Noise Policy for Industry (NPfI) 2017.

Detailed acoustic control measures for the plant servicing the proposed development will be determined at CC stage.

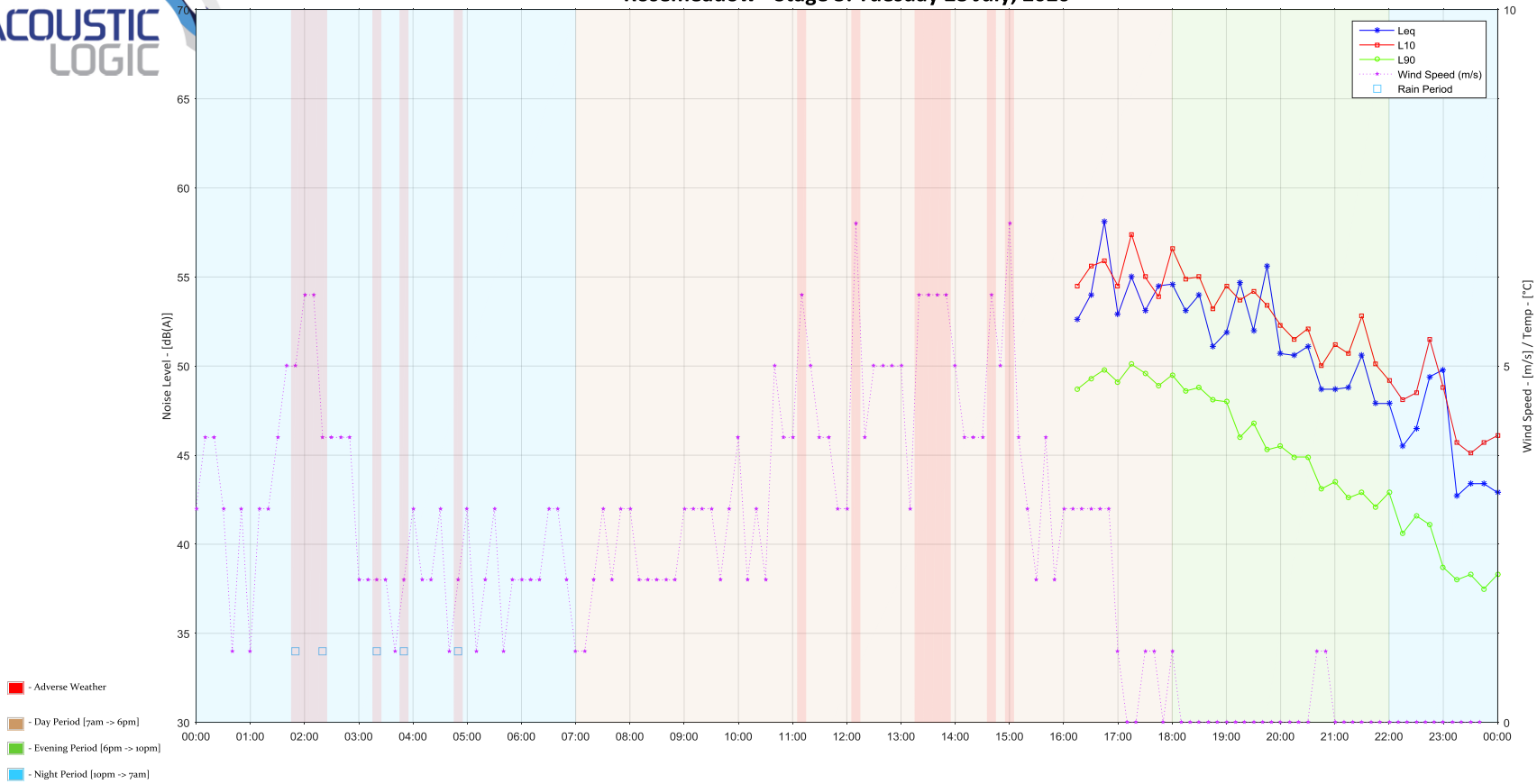
We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

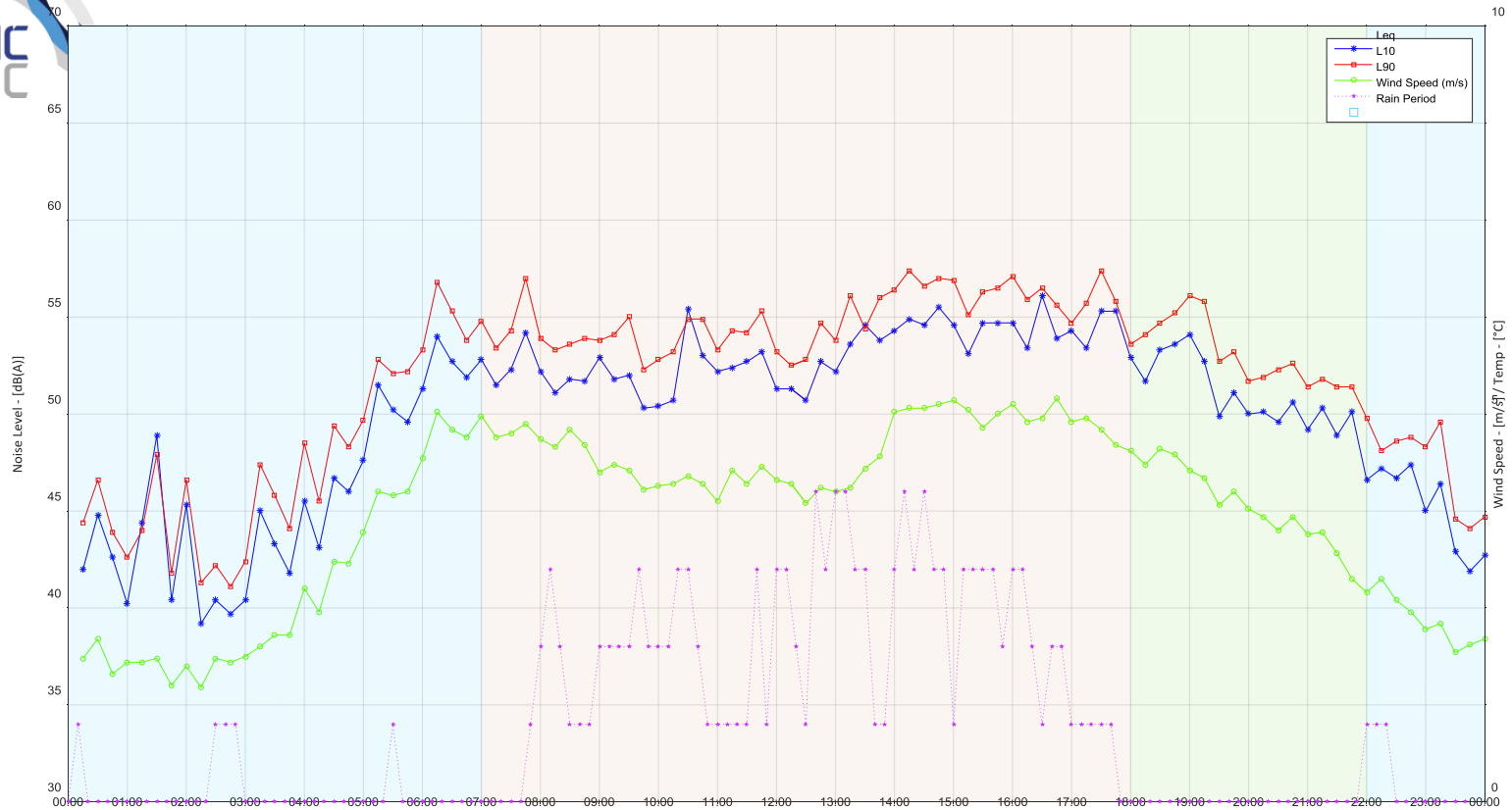
Acoustic Logic Pty Ltd
Hugh Cao

APPENDIX 1: UNATTENDED NOISE MONITORING DATA

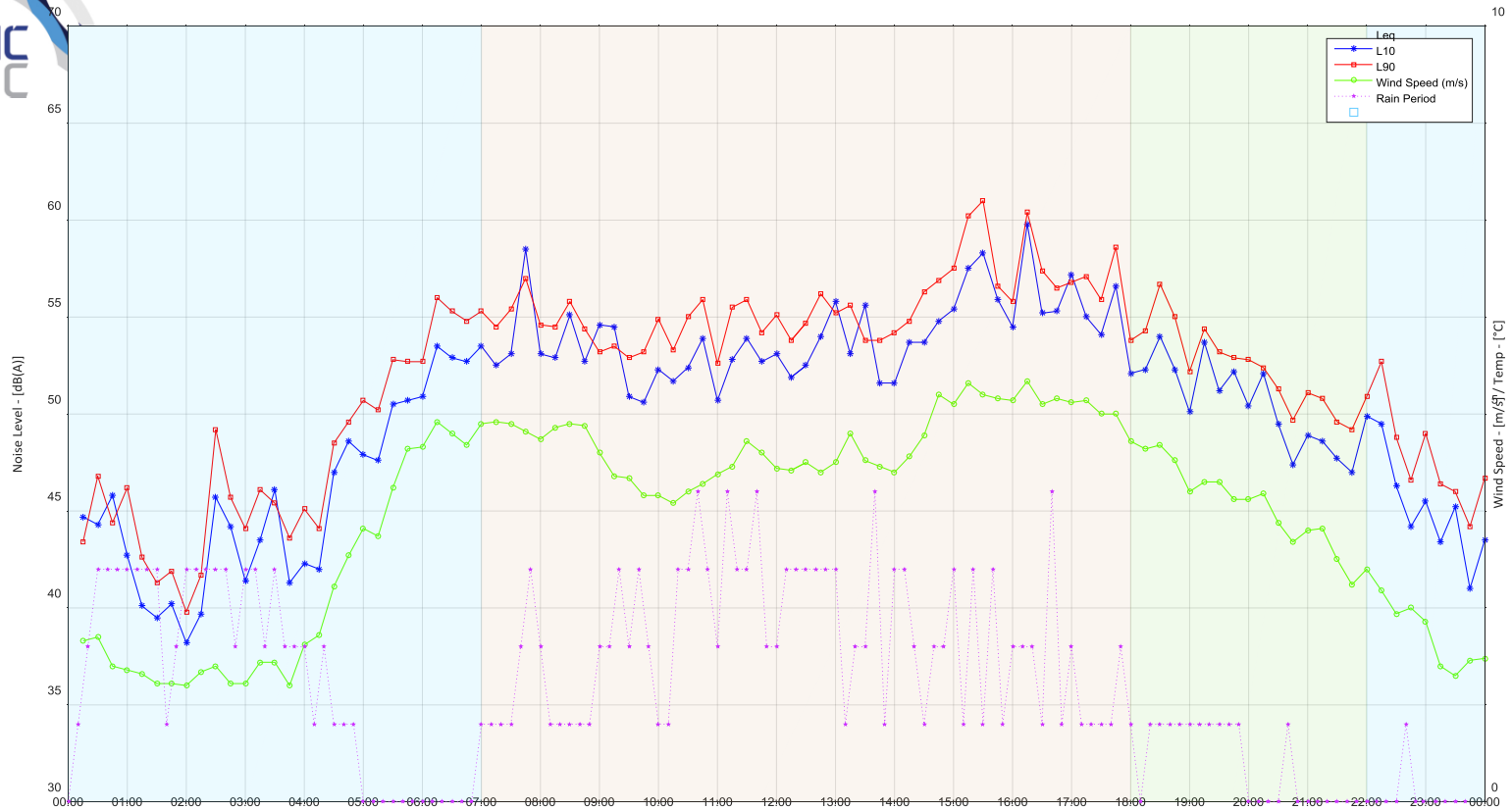
Rosemeadow - Stage 3: Tuesday 28 July, 2020



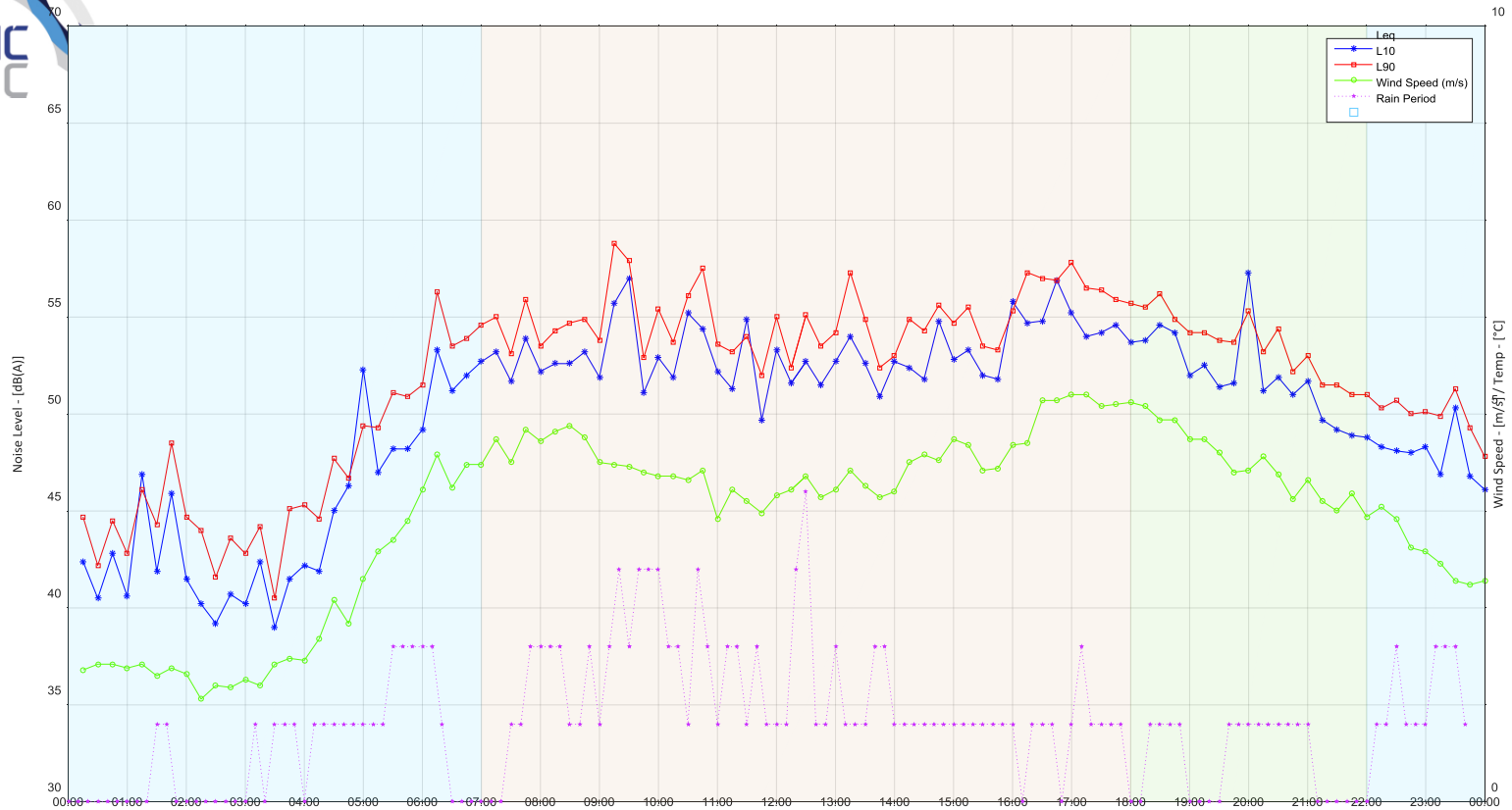
Rosemeadow - Stage 3: Wednesday 29 July, 2020

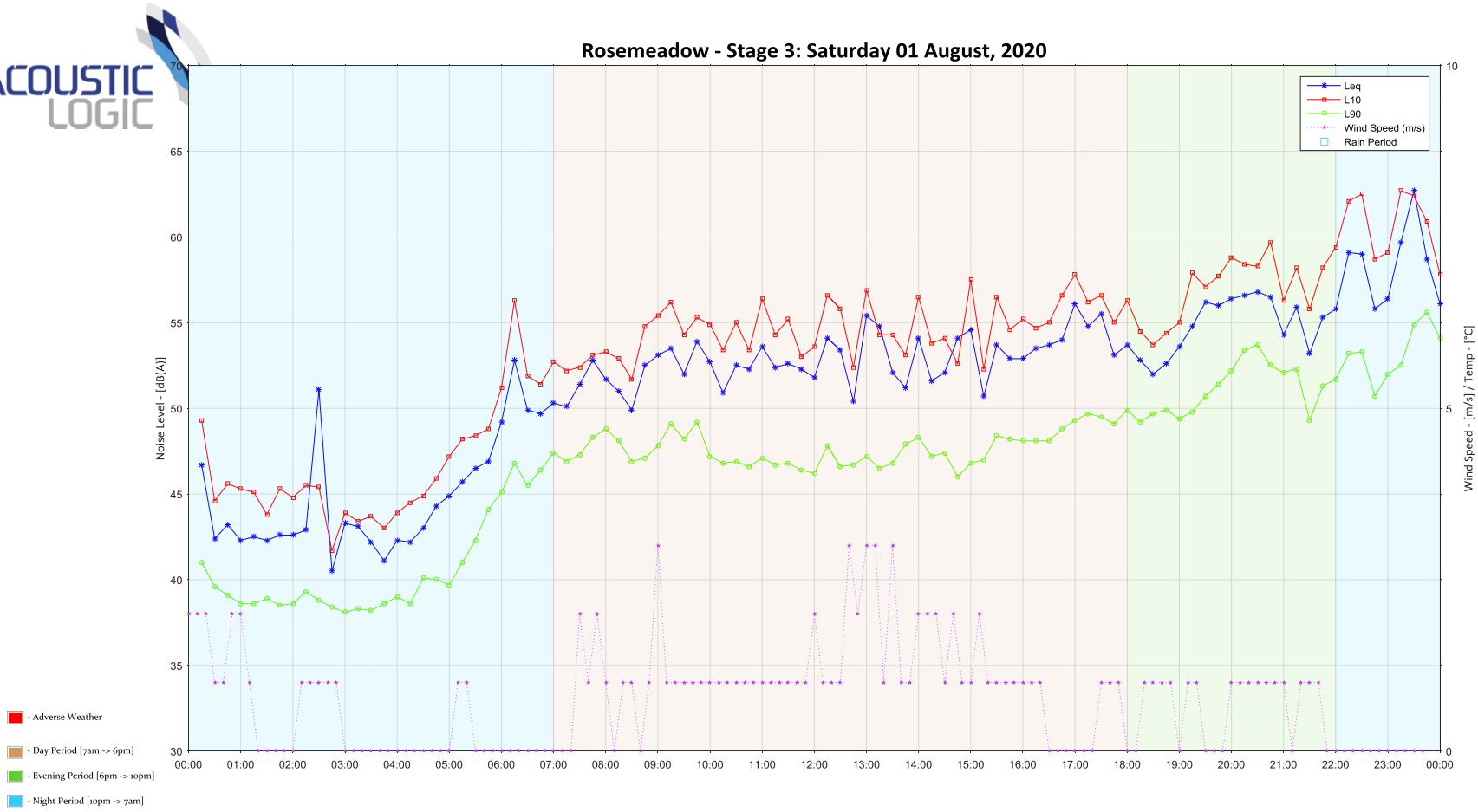


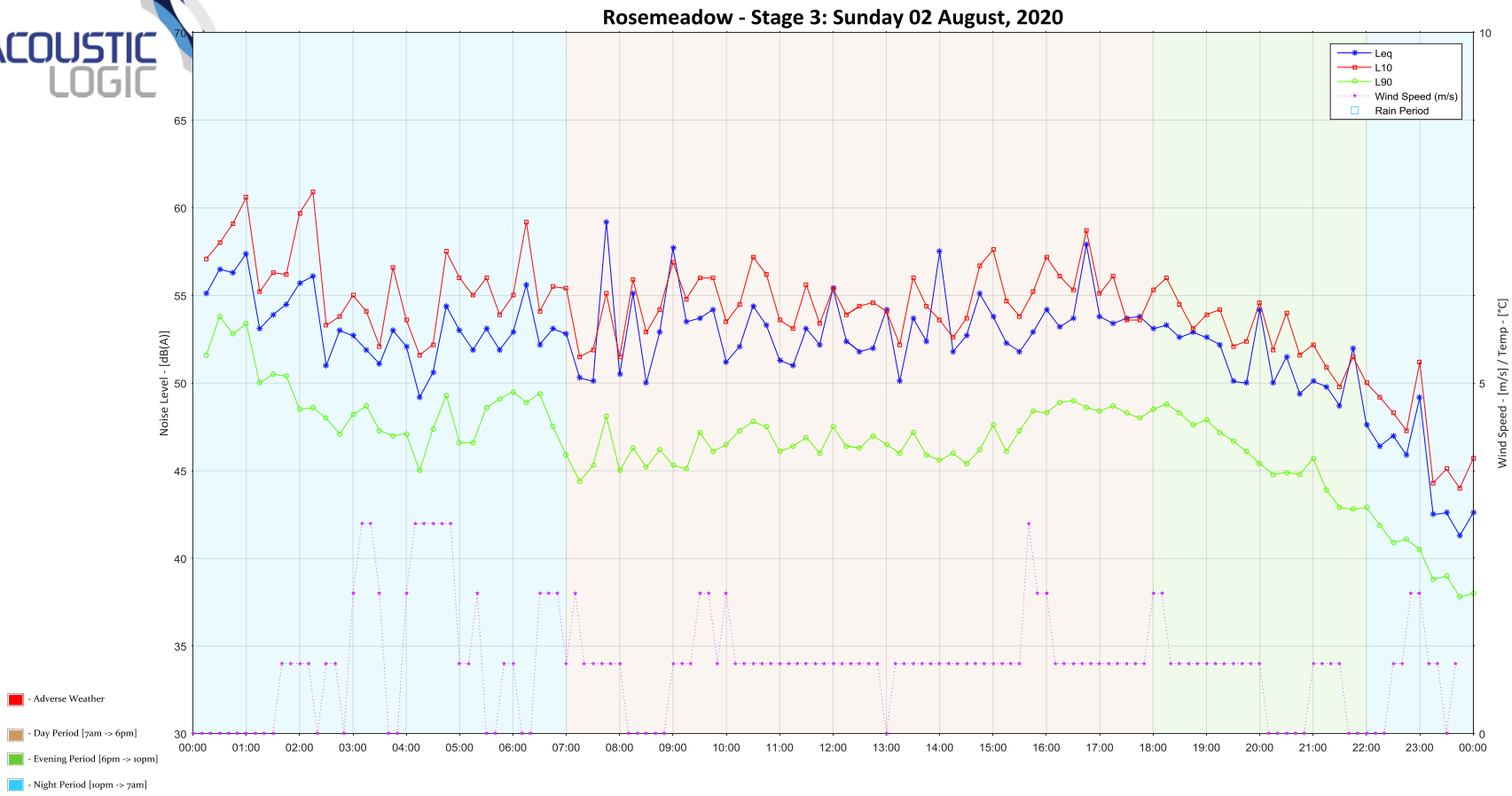
Rosemeadow - Stage 3: Thursday 30 July, 2020

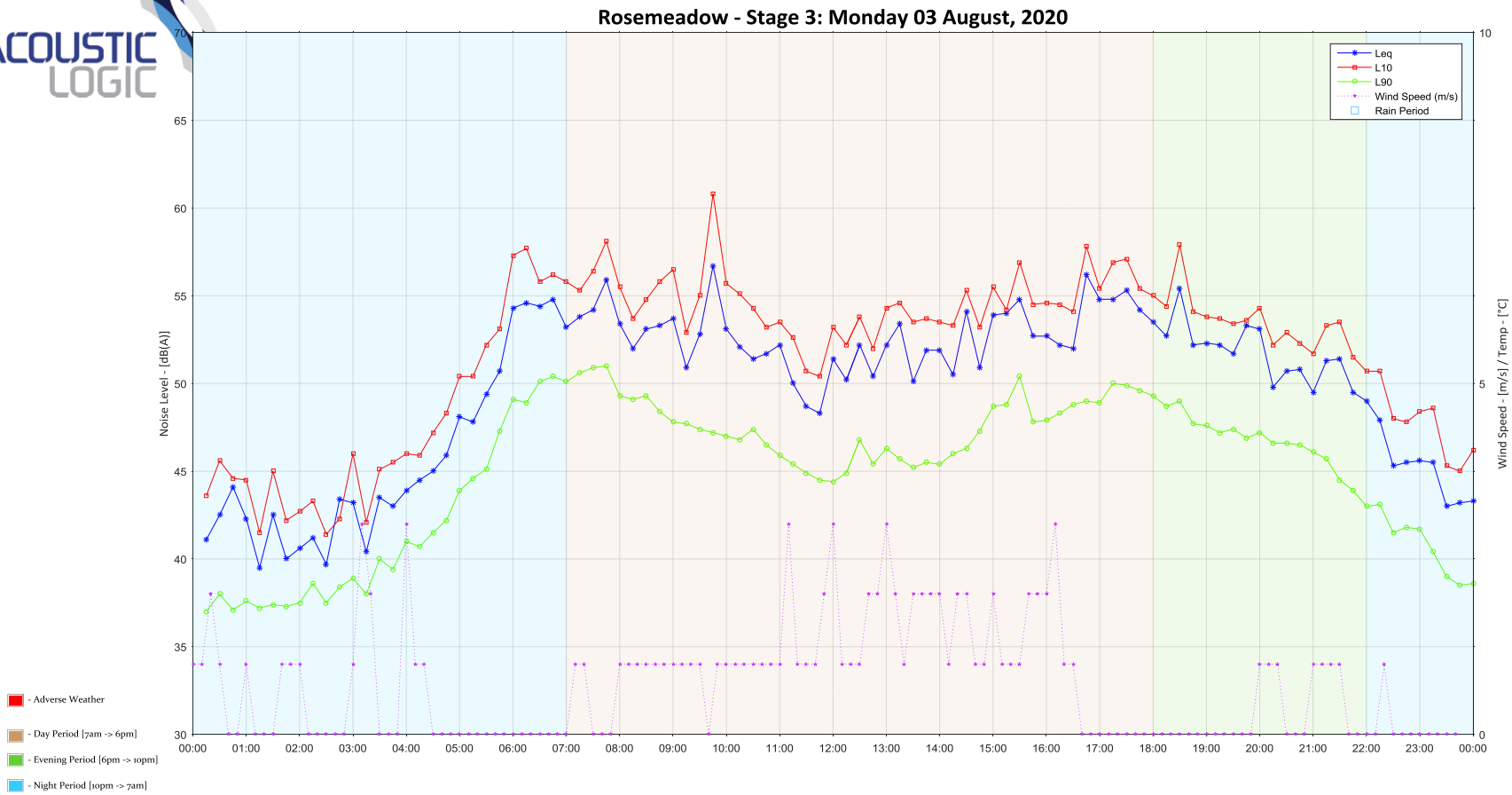


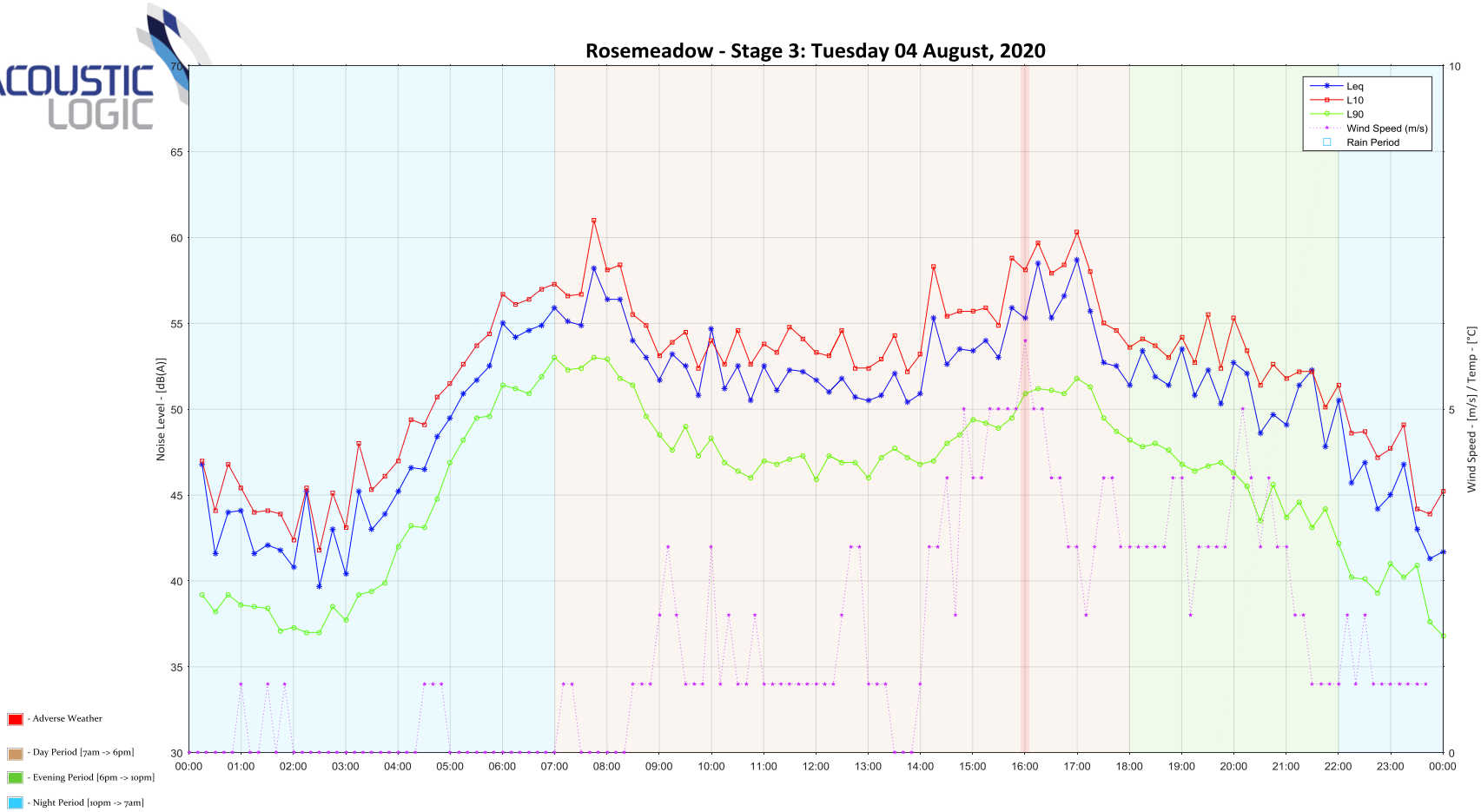
Rosemeadow - Stage 3: Friday 31 July, 2020

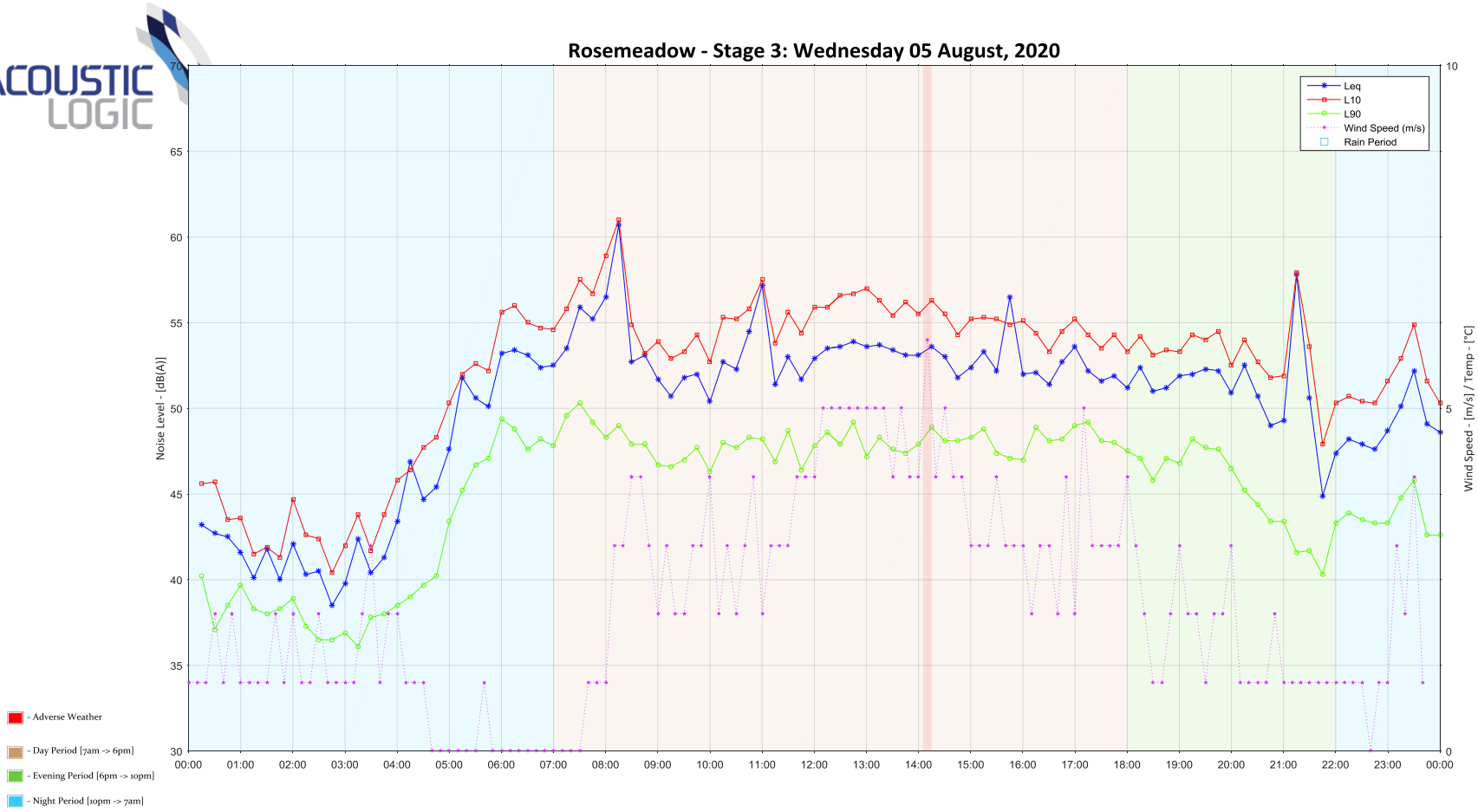


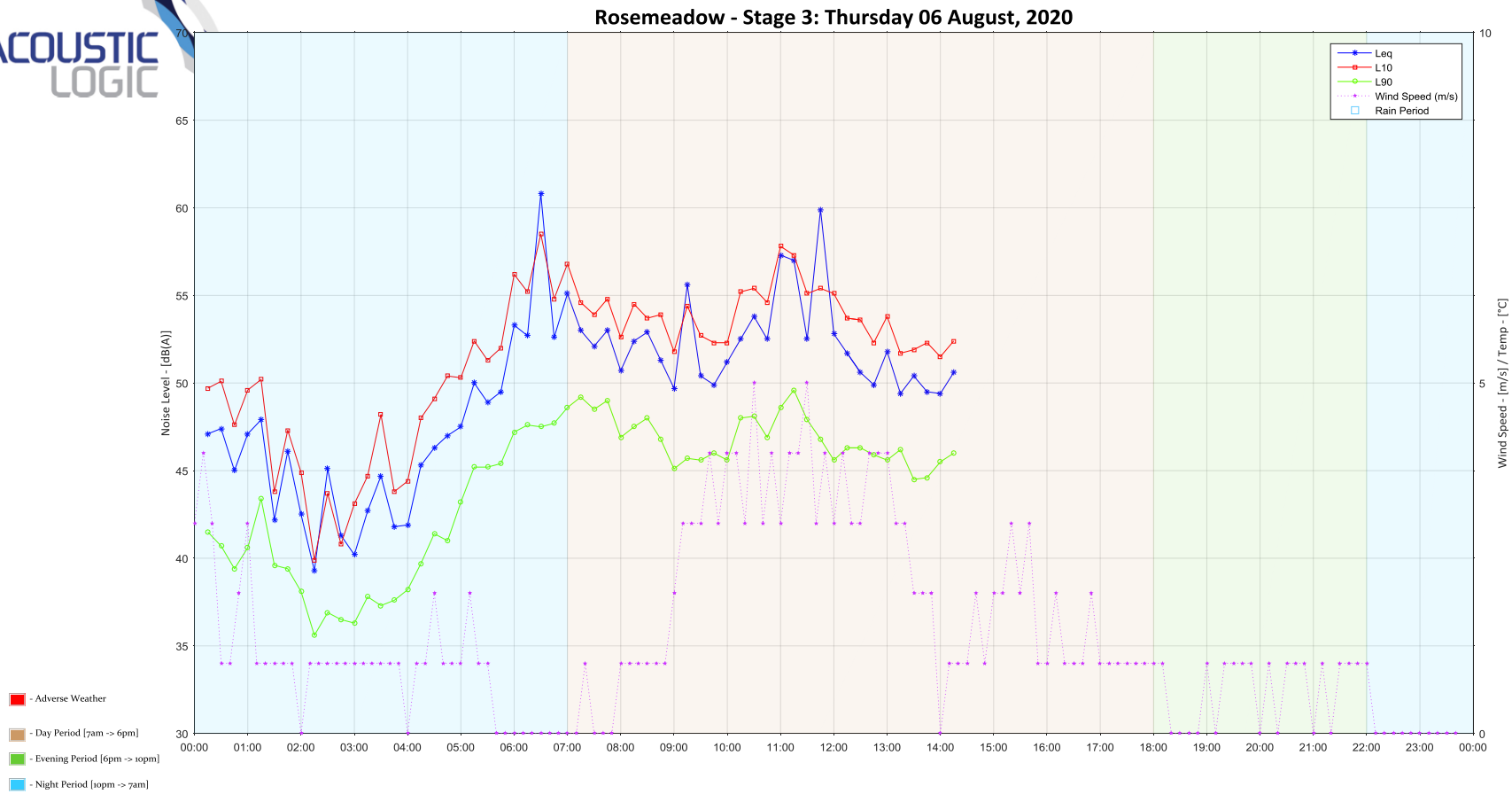

Rosemeadow - Stage 3: Saturday 01 August, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Rosemeadow - Stage 3: Sunday 02 August, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Rosemeadow - Stage 3: Monday 03 August, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Rosemeadow - Stage 3: Tuesday 04 August, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Rosemeadow - Stage 3: Wednesday 05 August, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Rosemeadow - Stage 3: Thursday 06 August, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]