

22 May 2022

Reference: 1021096 L03B 600 Woodstock Avenue Glendenning ENV EPA comments response.docx

Tim Greenway
Project Strategy
PO Box 271
Sutherland NSW 1499

Dear Tim,

RE: 600 Woodstock Avenue, Glendenning - Response to EPA comments

Acoustic Works was engaged by Project Strategy to prepare an environmental noise assessment for a proposed material recovery facility to be located at 600 Woodstock Avenue, Glendenning. This letter has been provided to outline the changes made in the updated acoustic report (ref: 1021096 R01D 600 Woodstock Avenue Glendenning ENV.docx dated 20/05/2022) in response to comments from the NSW EPA. The comments and changes made in response are provided below.

EPA Comment

"The Applicant has not provided an assessment of construction noise impacts, including construction traffic noise, from the proposal as required by the SEARs. Table 1 of the Acoustic Report (AR) prepared by Acoustic Works, dated 10 February 2022 and provided in Appendix M.1 states that 'construction work noise is assessed in a separate report and is typically assessed at a later stage in the development when construction methods are finalised.' The EIS for the proposal does not contain any further assessment of construction noise impacts, and it is unclear where this information has been provided. Construction noise impacts are routinely provided as part of the environmental assessment process and enable the consent authority to gauge the potential for impacts on the surrounding community, and what measures will be implemented to address any such impacts."

Response

An assessment of construction noise impacts including construction traffic has been provided with a site specific report (ref: 1021096 R02A 600 Woodstock Avenue Glendenning CNVMP.docx dated 20/05/2022).

EPA Comment

"Section 5.3 of the AR states the background noise monitoring was carried out between 5 and 13 October 2021, however data is only presented for a seven-day period between 6 and 12 October 2021 in Table 3. Furthermore, Table 2 shows that significant rainfall was recorded on Monday 11 October, and Table 3 shows that extraneous noise was present on Thursday 7 October. It is likely that the total duration of valid background noise data falls short of the minimum one week of valid data specified in Table A1 of the Noise Policy for Industry (NPII). Furthermore, the meteorological data in Table 2 shows only spot wind readings at 9am and 3pm, and no information to confirm the validity of readings at other times of each day is available.."

Response

Monitoring was conducted between the 5th and 13th October as stated. The daytime period for the 5th October was not used as only 2 hours of data were included at the start of the recording. The data for the 13th October was not used as the monitor was collected before a full day period could be recorded.

Average windspeeds exceeding 5m/s were recorded throughout the day and evening periods on the 7th October, these were only found to affect the RBL (lowest 10th percentile noise levels) during the evening period when the highest wind speed was reached and other extraneous noise was recorded. The affected time period was removed from the data. To ensure a minimum of 7 days, the evening period from the 5th of October was included in the data.

Rainfall recorded on the 11th October occurred in scattered showers of less than 2mm throughout the day, with most of the rain falling on the 10th October during the afternoon and night period. Where rainfall was recorded during the expected quieter times of each assessment period (see Fact Sheet B1.3 of the Noise Policy for Industry) the data was omitted, otherwise the rainfall was not found to affect the lowest 10th percentile background noise level. To ensure a minimum of 7 days, the night period from the 5th of October was included in the data.

In addition, the cumulative amenity criteria is lower than the lowest recorded RBLs for the daytime period, and lower than the minimum intrusiveness criteria for the evening and night-time periods, therefore the outcome of the assessment will not change based on changes to the data.

EPA Comment

"The Applicant must provide wind speed and rainfall data, ideally overlaid as traces on the daily noise logger charts, to confirm the validity or otherwise of each 15 minute data point in the background noise monitoring data. Any 15 minute periods affected by excessive rain or wind should be removed from the data set as per Fact Sheet A and Fact Sheet B of the NPfI. A minimum of 7 days' valid background noise monitoring data must be provided in the assessment."

Response

The updated report includes half-hourly weather data presented in the appendices. Measurement affected by wind speeds exceeding 5m/s (18km/h) or rainfall were reviewed to determine if the weather affected the overall RBL, as stated in the previous section if it was found to affected the recorded data it was omitted prior to determining the results from unattended noise monitoring.

EPA Comment

"The Applicant must review the LAeq(15minute) amenity noise levels for surrounding industrial receivers in Table 8 to ensure that these levels are in compliance with the recommended amenity noise level minus 5 dB(A) plus 3dB(A) in accordance with Sections 2.2 and 2.4 of the NPfI."

Response

As stated in section 2.1 of the policy, only the amenity noise levels in Table 2.2 apply to non-residential receivers, with no corrections or reductions required. The only time correction are applied is for residential receivers as clearly stated in the policy. This is typical for assessment of non-residential receivers in New South Wales and is clearly supported on previous state significant developments which have been reviewed by SEARS noise expert and independent acoustic review from other acoustic consultants.

EPA Comment

*"The Applicant must amend the 'project-specific criteria' in Table 10 so that the minimum applicable levels are 40 dB(A) during the daytime period, and 35 dB(A) during the evening and night-time periods.
The Applicant must clarify how the cumulative amenity criteria in Table 12 have been derived."*

Response

Based on a review of historical imagery of the surrounding area, the majority of surrounding developments have been operational for longer than 15 years and are therefore part of the existing acoustic environment. The number of proposed or new developments likely to contribute to the cumulative noise impact of the area has been reduced to 5 (based on review of new/approved applications) in the updated report, with the cumulative criteria changing accordingly. Therefore the above point is no longer relevant based on the new calculated criteria. The cumulative criteria has been determined in accordance with Section 2.4.2 of the Noise Policy for Industry, with the methodology outlined in Section 7.3.4

EPA Comment

"The applicant must clarify the time period applicable to the source noise levels in Table 15. Section 8.1 states that a +3dB correction was applied to all results to convert them to LAeq(15 minute) values. This suggests that the source noise levels in Table 15 have been set as LAeq(period) levels. The use of a 'per metre' sound power level for reversing alarms must also be explained in the text, as it suggests a reversing path being used by Rigid/B-double vehicles in the modelling.

Response

The updated report includes all relevant details pertaining to the calculation method. The source noise levels referenced in Table 15 are sound power levels, which are applied for the duration of each event for point sources. For line sources the duration of the event varies according to the length of the line source and the speed of the vehicle. As SoundPLAN does not directly calculate $L_{Aeq,15min}$ noise levels, the overall $L_{Aeq,period}$ was calculated for each period, with a +3dB correction added to this result in accordance with Section 2.2 of the Noise Policy for Industry. For 'per metre' sound power levels, the overall sound power level of a line source was calculated by:

$$L_{W/m} + 10\log(d)$$

Where:

$L_{W/m}$ is the sound power level per metre and;

d is the total length of the line source in metres (that is, the distance travelled by the vehicle in question)

EPA Comment

"The AR states in Section 11.1.2 that mechanical plant has not been finalised at the time of preparation of the AR.

The EPA requires the following to be addressed:

a) The Applicant must include the details of the preliminary assessment carried out to indicate that plant at similar developments would comply with the criteria nominated in the AR.

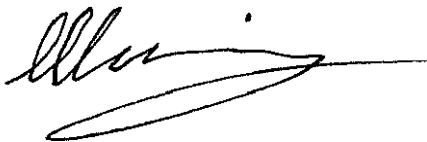
b) The Applicant must ensure that any mechanical plant is designed such that the overall premises noise emissions comply with the criteria set out in the AR."

Response

Mechanical plant details have become available since the previous revision of the report. The updated report now includes the plant specified in the preliminary mechanical drawings provided by Grosvenor Engineering Group (ref: GEG-MSK-02 dated 07/03/2022) and the corresponding mechanical specification (ref: C74296 dated 08/03/2022).

We trust this information meets with your current requirements. Should you have any queries please do not hesitate to contact us.

Regards,



Michael Gunning M.ArchSci
Acoustic Consultant

acousticworks)))



Proposed Material Recovery Facility
600 Woodstock Avenue
Glendenning

ACOUSTIC REPORT



Client:

Project Strategy
Attn: Stewart Johnson

Reference:

1021096 R01D 600 Woodstock Avenue Glendenning ENV.docx

Date Issued:

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1. Executive Summary

This report is in response to a request by Project Strategy for an environmental noise assessment for a State Significant Development Application for a proposed material recovery facility to be located at 600 Woodstock Avenue, Glendenning. The purpose of the assessment is to determine if the proposed development layout is acoustically viable and what acoustic measures, if any, are necessary.

The environmental noise assessment was conducted in accordance with Blacktown City Council requirements and the NSW Department of Planning and Environment's Secretary's Environmental Assessment Requirements (SEARs) (Application Reference: *SSD-29999239*) which requires the following matters to be addressed:

"Noise and Vibration - a quantitative noise and vibration impact assessment undertaken by a suitably qualified acoustic consultant in accordance with the relevant Environment Protection Authority guidelines and Australian Standards which includes:

- the identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours and a detailed sleep disturbance assessment*
- details of noise monitoring survey, background noise levels, noise source inventory and 'worst case' noise emission scenarios*
- consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area*
- a cumulative impact assessment inclusive of impacts from other developments*
- details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration following application of mitigation these measures and details of any proposed compliance monitoring programs."*

Table 1 provides a summary of the SEARs requirements and the locations within this report that they are addressed:

Table 1: SSD-29999239 SEARS requirements

Condition	Section References
§ the identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours and a detailed sleep disturbance assessment;	Sections 7-11 detail the impacts associated with operational emission and traffic generation, including a sleep disturbance assessment Construction work noise is assessed in a separate report (ref: <i>1021096 R02A 600 Woodstock Avenue Glendenning CNVMP.docx</i> dated 20/05/2022)
§ details of noise monitoring survey, background noise levels, noise source inventory and 'worst case' noise emission scenarios;	Provided in Sections 3-8
§ consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area;	Accounted for in the assessment in Section 8
§ a cumulative impact assessment inclusive of impacts from other developments;	Accounted for in the assessment in Section 8 in accordance with Section 2.4.2 Industrial Noise Policy
§ details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration following application of mitigation these measures and details of any proposed compliance monitoring programs.	Provided in Section 8 with regards to operational noise Construction noise is assessed in a separate report.

The acoustic assessment considers the cumulative impact of all stages of the proposed development to sensitive receivers in the vicinity of site and concludes that the proposed masterplan for the material recovery facility is satisfactory with the provided recommendations. The review indicates that the current stage proposed of the master plan is considered viable with recommendations provided in Section 11 for the 24 hour operation of the site.

2. Introduction

This report is in response to a request by Project Strategy for an environmental noise assessment for a State Significant Development Application for a proposed material recovery facility to be located at 600 Woodstock Avenue, Glendenning. The environmental noise assessment was conducted in accordance with Blacktown City Council requirements and the NSW Department of Planning, Industry and Environment's *Secretary's Environmental Assessment Requirements* (SEARs). To facilitate the assessment, unattended noise monitoring was conducted in the vicinity of nearby sensitive receivers to establish the criteria for onsite activities.

This report has been updated in response to comments received from the NSW EPA and now includes additional information about calculation methodology and modifications to the criteria applied in the assessment. Refer to the attached cover letter (ref: 1021096 L03A 600 Woodstock Avenue Glendenning ENV EPA comments response.docx dated 20/05/2022) for a detailed explanation of the changes made in this revision.

3. Site Description

3.1 Site Location

The site is described by the following:

600 Woodstock Avenue, Glendenning
Lot 67 in Deposited Plan DP804292

Refer to Figure 1 for site location.

Figure 1: Site Location (Not to Scale)



A comprehensive site survey was conducted on the 30th August 2021 which identified the following:

- The site is located in IN1 – General Industrial as defined in the Blacktown Local Environmental Plan 2015.
- An industrial premises currently occupies the site and will be demolished to make way for the development.
- The surrounding area consists of industrial land use.
- Residential receivers are located on the western side of the M7.

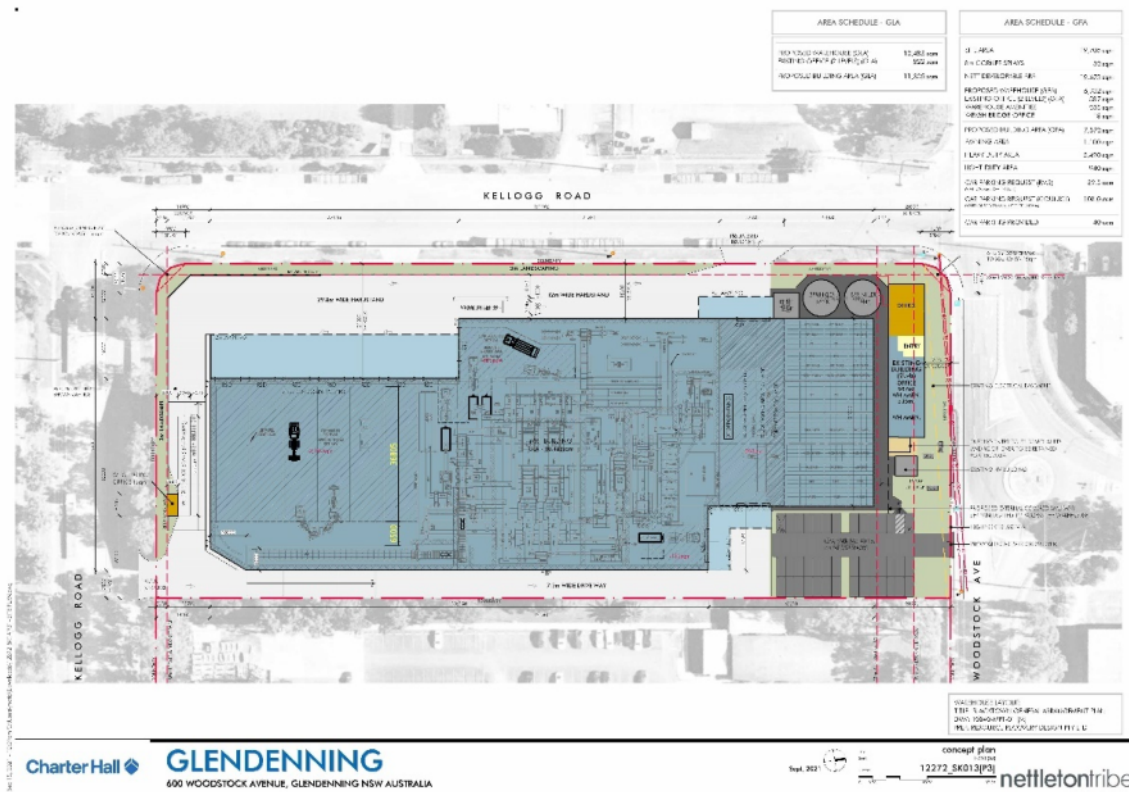
3.2 Proposal

The State Significant Development Application proposes to demolish existing onsite structures and construct a materials recycling facility with capacity to process up to 120,000 tonnes per annum (TPA), ancillary office space and facilities, on-site parking and associated works including excavation and landscaping. Specific details of the proposal are as follows:

- Total site area of 1.97Ha.
- Construction and operation of a purpose built MRF comprising a total of 7,572m² gross floor area, including:
 - Maximum building height of RL 57.83m.
 - Warehouse space: 6,732m²
 - Office space (across two levels) and amenities: 840m²
 - Capacity to process up to 120,000 TPA
- Car parking provided on-site: 40 car spaces
- Hard and soft landscaping
- Building identification and signage.

The proposed development plan for the site is shown in Figure 2.

Figure 2: Proposed Development Plan



Note if the site layout changes, further assessment may be required to determine the viability of the development site for 24-hour operation.

3.3 Acoustic Environment

The surrounding area is primarily affected by road traffic from the surrounding road network and existing industrial premises.

4. Equipment

The following equipment was used to record noise levels:

- 2x Rion NL42 Environmental Noise Monitors (SN# 00509258 and SN# 01259207)
- Pulsar Model 105 Ltd Sound Calibrator (SN # 57417)

The Environmental Noise Monitors hold current NATA Laboratory Certification and were field calibrated before and after the monitoring period, with no significant drift from the reference signal recorded.

5. Receivers and Noise Monitoring Locations

5.1 Receiver Locations

The nearest sensitive receiver locations were identified as follows;

1. The Westlink M7 Motorway separates the site from single and two storey residential dwellings to the north west.
2. The Westlink M7 Motorway separates the site from single and two storey residential dwellings to the west.
3. The Westlink M7 Motorway separates the site from single and two storey residential dwellings to the south west.
- A. Woodstock Avenue separates the site from industrial premises to the north.
- B. Kellogg Road separates the site from industrial premises to the west.
- C. Kellogg Road separates the site from industrial premises to the south.
- D. Industrial premises are located adjacent the eastern site boundary.

These locations were chosen as they are the nearest sensitive receivers to the proposed development. Refer to Figure 3 for these locations.

Figure 3: Receiver and noise monitoring locations



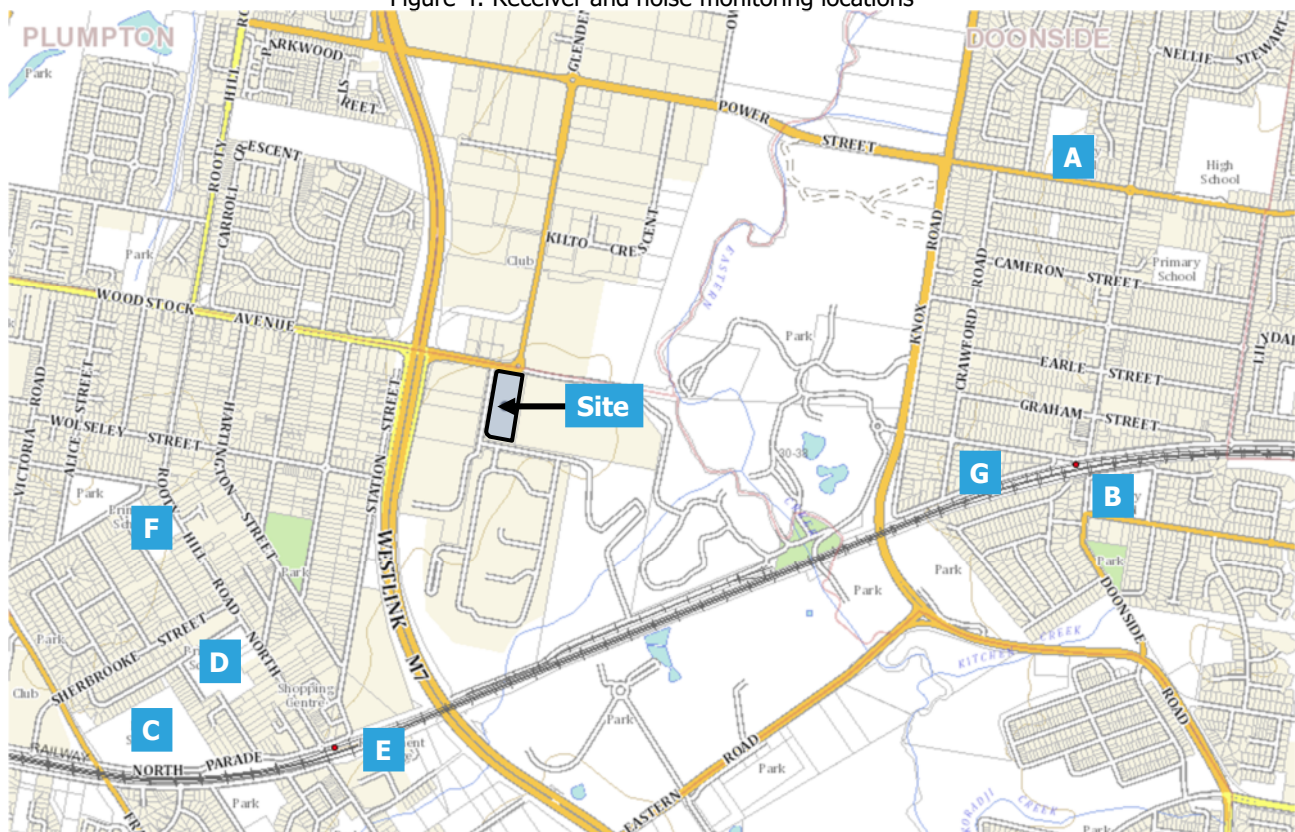
Although multiple dwellings are grouped for receivers 1, 2 and 3, to ensure a conservative assessment all calculation of noise impacts were assessed to the nearest dwelling within the nominated area. The receivers nominated in Figure 3 are the nearest and worst-affected sensitive receivers to the site.

5.2 Distant Receivers

Distant sensitive receivers with the potential to be affected by cumulative noise from the site were identified as follows:

- A. Crawford Public School is located to the north east of the site.
- B. Doonside Public School is located to the east of the site.
- C. Rooty Hill High School is located to the south west of the site.
- D. Rooty Hill Public School is located to the south west of the site.
- E. Melva McDonald Lodge, a retirement village, is located to south of the site.
- F. St Aidan's Primary School is located to the west of the site.
- G. Doonside Christadelphian Church is located to the east of the site.

Figure 4: Receiver and noise monitoring locations



The above receivers were nominated as the distant receivers with the most potential to be adversely affected by noise impacts from the site. Other receivers not mentioned are predicted to be less affected than those nominated.

5.3 Unattended Noise Monitoring

Rion NL42 environmental noise monitors were placed at 2 Wolseley Street (Monitor A) and 540 Woodstock Avenue (Monitor B) as shown in Figure 3 to measure ambient and traffic noise levels respectively. These locations were chosen as they were considered representative of the nearest residential receivers. The monitors were located in free field positions with the microphones approximately 1.4 metres above ground surface level. The monitors were set to record noise levels between the 5th to 13th of October 2021.

The environmental noise monitors were set to record noise levels in "A" weighting, Fast response using 15 minute statistical intervals. Ambient noise monitoring was conducted in accordance with Australian Standard AS1055:2018 *Acoustics – Description and measurement of environmental noise*. For the unattended noise monitoring locations refer to Figure 3.

6. Existing background noise levels

The following tables present the measured existing ambient noise levels from the unattended noise survey and meteorological conditions. Any periods of inclement weather or extraneous noise are omitted from the measured data prior to determining the overall results.

6.1 Meteorological conditions

Meteorological observations during the unattended noise monitoring survey were obtained from the Bureau of Meteorology website (<http://www.bom.gov.au/climate/data/>), shown in Table 2 below.

Table 2: Meteorological conditions – Horsley Park

Day	Date	Rainfall (mm)	Wind			
			9am		3pm	
			Speed (km/h)	Direction	Speed (km/h)	Direction
Wednesday	06/10/21	0	9	W	2	S
Thursday	07/10/21	0	6	NNW	20	WNW
Friday	08/10/21	0	6	NE	17	E
Saturday	09/10/21	0	2	WNW	4	N
Sunday	10/10/21	0	4	N	15	SE
Monday	11/10/21	11.8	13	SSW	6	SSE
Tuesday	12/10/21	2.4	13	S	2	SE

6.1.1 Ambient Noise Monitoring (Noise Monitor A)

The measured rating background noise levels (RBL) were determined in accordance with the NSW Noise Policy for Industry, with levels for the monitoring location presented in Table 3.

Table 3: Measured RBL noise levels – Noise Monitor A

Day	Date	RBL dB(A)		
		Day	Evening	Night
Tuesday	05/10/21	x	40	39
Wednesday	06/10/21	47	44	40
Thursday	07/10/21	47	*46	38
Friday	08/10/21	49	43	37
Saturday	09/10/21	42	40	36
Sunday	10/10/21	42	43	40*
Monday	11/10/21	50	44	41
Tuesday	12/10/21	50	44	39
RBL		47	44	39

*Note high wind speeds and extraneous noise recorded on the 7th of October and rainfall recorded during the night time period on Sunday 10th October were found to affect the measurements during the evening period. Therefore, the data was omitted for the affected time periods.

6.1.2 Road Traffic Noise Monitoring (Noise Monitor B)

The measured road traffic noise levels at the monitoring location are as follows:

Table 4: Measured Road Traffic Noise Levels – Noise Monitor B

Day	Date	LA10(18h) 6am-12am	LAeq(15h) 7am-10pm	LAeq(9h) 10pm-7am
Wednesday	06/10/21	69.6	67.1	63.5
Thursday	07/10/21	69.8	67.4	63.2
Friday	08/10/21	70.3	67.8	61.5
Saturday	09/10/21	68.8	66.3	58.9
Sunday	10/10/21	68.1	64.7	64.9
Monday	11/10/21	72.2	69.3	64.6
Tuesday	12/10/21	72.3	69.8	64.7
Overall		70.2	67.5	63.0

Note data for weekends was not utilised as it was not considered relevant to the assessment.

Refer to the appendix for graphical representation of the measured noise levels.

7. Noise Criteria

The relevant noise criteria were determined in accordance with the issued SEARs, NSW DECC's *Assessing Vibration: A Technical Guideline 2006* and the NSW Noise Policy for Industry 2017.

7.1 Secretary's Environmental Assessment Requirements (SEARs)

The Secretary's Environmental Assessment Requirements (SEARs) outline the requirements for the construction and operational use of the proposed development. The issued SEARs specifies the following (ref: SSD-29999239):

"6. Noise and Vibration

A quantitative noise and vibration impact assessment undertaken by a suitably qualified acoustic consultant in accordance with the relevant Environment Protection Authority and Australian Standards which includes:

- *The identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours and a detailed sleep disturbance assessment.*
- *Details of noise monitoring survey, background noise levels, noise source inventory and 'worst case' noise emission scenarios.*
- *Consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area.*
- *A cumulative impact assessment inclusive of impacts from other developments.*
- *Details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration following application of mitigation these measures and details of any proposed compliance monitoring programs.*

As a specific criterion for vibration is not specified, further reference was made to *Assessing Vibration: A Technical Guide 2006*, the *NSW Noise Policy for Noise*, *NSW Road Noise Policy* and the *NSW Interim Construction Guideline*.

7.2 Assessing Vibration: A Technical Guideline 2006

7.2.1 Types of vibration

There are three types of vibration as classified in the guide;

- Continuous - vibration continues uninterrupted for a defined period (usually throughout daytime and/or night-time). This type of vibration is assessed on the basis of weighted RMS (root mean squared) acceleration values.
- Impulsive - rapid build up to a peak followed by a damped decay that may or may not involve several cycles. The duration is short, typically less than 2 seconds. Impulsive vibration (no more than three occurrences in an assessment period) is assessed on the basis of acceleration values.
- Intermittent - interrupted periods of continuous (e.g. a drill) or repeated periods of impulsive vibration (e.g. a pile driver), or continuous vibration that varies significantly in magnitude. Assessed on the basis of vibration dose values.

7.2.2 Acceptable values for continuous and impulsive vibration (1-80Hz)

The relevant criteria for continuous and impulsive vibration are as follows;

Table 5: Preferred weighted RMS vibration acceleration values

Type	Location	Assessment period	Preferred values m/s ²		Maximum values m/s ²	
			z-axis	x- and y-axes	z-axis	x- and y-axes
Continuous vibration	Critical areas	Day or night time	0.005	0.0036	0.01	0.0072
	Residences	Day time	0.01	0.0071	0.02	0.014
		Night time	0.007	0.005	0.014	0.01
	Offices, schools, educational institutions and places of worship	Day or night time	0.02	0.014	0.04	0.028
	Workshops	Day or night time	0.04	0.029	0.08	0.058
Impulsive vibration	Critical areas	Day or night time	0.005	0.0036	0.01	0.0072
	Residences	Day time	0.3	0.21	0.6	0.42
		Night time	0.1	0.071	0.2	0.14
	Offices, schools, educational institutions and places of worship	Day or night time	0.64	0.46	1.28	0.92
	Workshops	Day or night time	0.64	0.46	1.28	0.92

7.2.3 Acceptable values for intermittent vibration

Intermittent vibration is assessed using the vibration dose value (VDV) root-mean-quad method. VDV accumulates the vibration energy received over the daytime and night-time periods. The vibration dose methodology is as per standard BS 6472–1992.

7.3 Noise Policy for Industry

Assessment of noise in accordance with NSW EPA Noise Policy for Industry (2017) has two main components: intrusiveness and amenity criteria. These are compared to each other (after conversion of amenity noise level to LAeq,15min equivalent level) to determine the overall project noise trigger level.

7.3.1 Intrusiveness noise level

The intrusiveness noise level is based on the $L_{Aeq}(15 \text{ min})$ associated with commercial activity being less than or equal to the measured L_{A90} Rating Background Level + 5dB as per section 2.3 of the policy.

7.3.2 Amenity noise level

The amenity noise level is determined in accordance with Section 2.4 of the policy based on the land use and relevant noise criteria specified in Tables 2.2 and 2.3. The Noise Policy for Industry sets out acceptable noise levels for various locations. Determination of which residential receiver category applies is described in Table 2.3 of the policy.

Table 6: Receiver Category

Receiver category	Typical planning zoning – standard instrument	Typical existing background noise levels	Description
Rural residential	RU1 – primary production RU2 – rural landscape RU4 – primary production small lots R5 – large lot residential E4 – environmental living	Daytime RBL <40 dB(A) Evening RBL <35 dB(A) Night RBL <30 dB(A)	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 – village RU6 – transition R2 – low density residential R3 – medium density residential E2 – environmental conservation E3 – environmental management	Daytime RBL <45 dB(A) Evening RBL <40 dB(A) Night RBL <35dB(A)	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 – general residential R4 – high density residential B1 – neighbourhood centre (boarding houses and shop-top housing) B2 – local centre (boarding houses) B4 – mixed use	Daytime RBL > 45 dB(A) Evening RBL > 40 dB(A) Night RBL >35 dB(A)	Urban – an area with an acoustical environment that: <ul style="list-style-type: none"> 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.

To determine the appropriate receiver category, the following observations were made:

- The surrounding residential receivers are zoned - IN1 Industrial
- The surrounding acoustic environment for all receivers has through traffic with characteristically heavy and continuous traffic flows during peak periods, is near an industrial district, and has evening ambient noise levels defined by the natural environment and human activity, consistent with the description of the 'urban' category.

Therefore, all nearby receivers would be assessed against the 'urban' criteria.

7.3.3 Amenity noise levels in areas of high traffic

Areas affected by a certain level of traffic noise may be high enough to make noise from an industrial source effectively inaudible. In such cases the project amenity noise level may be derived from the $L_{Aeq, period}$ minus 15 dBA on the condition all of the following apply:

- Traffic noise is identified as the dominant noise source at the site

- The existing traffic noise level is 10 dB or more above the recommended amenity noise level for the area
- It is highly unlikely traffic noise levels will decrease in the future.

Applicability is to be determined for each assessment period.

7.3.4 Amenity noise levels in areas near an existing or proposed cluster of industry

To account for the cumulative impacts from multiple industrial noise sources (new and proposed) to sensitive receivers near an existing or proposed cluster of industry, and it can be demonstrated that existing levels of industrial noise are more than 5dB below the relevant recommended amenity noise level, the following equation can be used to determine the project amenity level for an individual project:

$$\text{Individual project amenity noise level} = 10\log((10^{(\text{ANL}-5\text{dB}/10)}) \div N)$$

Where

ANL = relevant recommended amenity noise level

N = number of proposed additional premises

To determine the cumulative criteria for the proposed development, the following must be considered:

Based on the review of the area, there is the potential for up to 5 new or proposed sites to impact the receivers considered in this assessment. This number will increase for receivers located at greater distances, but it should also be understood that noise from the sites will be further attenuated due to screening and increased separation distances, making noise impacts from the sites imperceptible.

7.3.5 Modifying factors

The Noise Policy for Industry includes correction factors such as tonal noise, low-frequency noise, intermittent noise and duration. Where two or more modifying factors are present, the maximum adjustment to a noise source level is 10dBA (excluding duration correction).

7.4 Project noise trigger level

To determine the project trigger noise level, the amenity noise level must first be standardised to an equivalent LAeq 15min in order to compare to the intrusiveness noise level. This is done in accordance with Sections 2.2 and 2.4 of the policy as follows;

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

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. Project amenity noise level for industrial developments = recommended amenity noise level minus 5dB(A).

Therefore, based on the measured data presented in Section 5.2, the project specific noise limits are determined.

7.4.1 Sleep disturbance noise level

Sleep disturbance is based on the maximum noise level of events from premises during the night-time period. The Noise Policy for Industry defines sleep disturbance as a noise from a premise at a residential location that exceeds:

- LAeq,15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- LAFmax 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

7.4.2 Intrusiveness noise criteria

The intrusiveness noise levels are as follows;

Table 7: Intrusiveness noise levels

Time period	Criteria L _{eq} (15min) dB(A)	
	Receivers 1 to 3	Receivers A to D
Day (7am-6pm Mon-Sat; 8am-6pm Sun)	52	N/A
Evening (6pm-10pm)	49	N/A
Night (10pm-7am Sun-Fri, 10pm-8am Sat)	44	N/A

7.4.1 Amenity Noise Criteria - Industrial

The industrial amenity noise criteria are as follows;

Table 8: Intrusiveness noise levels

Time period	Criteria L _{eq} (15min) dB(A)
	Receivers A to D
Day (7am-6pm Mon-Sat; 8am-6pm Sun)	70
Evening (6pm-10pm)	70
Night (10pm-7am Sun-Fri, 10pm-8am Sat)	70

7.4.2 Cumulative Amenity criteria

Based on Sections 2.4 and Section 2.4.2 of the policy, the recommended amenity noise criteria and adjusted amenity criteria are shown in Table 9.

Table 9: Amenity noise levels – Residential Receivers

Time period	Recommended Amenity Noise Level	Adjusted (Cumulative) Amenity Criteria
	Criteria L _{eq} (period) dB(A)	Criteria L _{eq} (15min)* dB(A)
Day	60	51
Evening	50	41
Night	45	36

To account for the cumulative impact of the multiple existing industrial premises in the surrounding area, the adjusted amenity criteria would apply.

*Note In accordance with Sections 2.2 and 2.4 of the policy, a +3dBA correction was added to convert L_{Aeq,period} to L_{Aeq,15min}.

7.4.3 Project specific noise criteria

The project noise trigger levels accounting for the cumulative effective of the site and surrounds are as follows:

Table 10: Project-specific criteria

Time period	Criteria $L_{eq}(15min)$ dB(A)	
	Receivers 1 to 3	Receivers A to D
Day	51	70
Evening	41	70
Night	36	70

*Minimum project intrusiveness noise level applied

7.4.4 Sleep disturbance

The sleep disturbance noise levels are as follows;

Table 11: Sleep disturbance criteria

Time period	Receivers 1 to 3	
	Criteria $L_{eq}(15min)$ dBA	Criteria L_{AFmax} dBA
Night	44	54

7.4.5 Long-term cumulative noise impacts to distant sensitive receivers in the area

The receivers nominated in Section 5.1 are the nearest sensitive receivers in the with other sensitive receivers located further away and in locations screened from the site. The applicable criteria are as follows:

Table 12: Cumulative Amenity Criteria (Distant Receivers)

Receiver	Amenity Criteria $L_{eq}(period)$ dB(A)	Cumulative Amenity Criteria $L_{eq}(15min)$ dB(A)
A - Crawford Public School	35 internal / 45 external	28 internal / 38 external
B - Doonside Public School	35 internal / 45 external	28 internal / 38 external
C - Rooty Hill High School	35 internal / 45 external	28 internal / 38 external
D - Rooty Hill Public School	35 internal / 45 external	28 internal / 38 external
E – Melva McDonald Lodge	35 internal / 50 external	28 internal / 43 external
F - St Aidan's Primary School	35 internal / 45 external	28 internal / 38 external
G - Doonside Christadelphian Church	40 internal / 50 external	28 internal / 43 external

It is anticipated that compliance with the above criteria would be difficult to certify through measurements due to existing ambient noise levels within the area, therefore the criteria would only be used to assess predicted contributions from the development site to distant receivers.

7.5 NSW Road Noise Policy 2011

The NSW Road Noise Policy outlines the criteria for any increase in the total traffic noise level at the location due to a proposed project or traffic generating development. Therefore the following criteria applies:

Table 13: Road traffic noise assessment criteria for residential land uses

Road Category	Type of project/development	Total traffic noise level – dB(A)	
		Day (7am to 10pm)	Night (10pm to 7am)
Local roads	Existing Residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,15hr}$ 55 (external)	$L_{Aeq,9hr}$ 50 (external)

In addition to the assessment criteria outlined in Tables 3-5 of the NSW Road Noise Policy, any increase in the total traffic noise level at a location due to a proposed project or traffic-generating development must be considered. Residences experiencing increases in total traffic noise level above the relative increase criteria in Table 6 of the policy should also be considered for mitigation as described in Section 3.4 of the policy. Table 6 of the Road Noise Policy is presented below:

Table 14: Relative increase criteria for residential land uses

Road Category	Type of project/development	Total traffic noise level increase – dB(A)	
		Day (7am to 10pm)	Night (10pm to 7am)
Freeway/arterial/sub-arterial roads and transitways	New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road	Existing traffic $L_{Aeq(15hr)} + 12dB$ (external)	Existing traffic $L_{Aeq(9hr)} + 12dB$ (external)

For other existing sensitive land uses (as outlined in Table 4 of the policy) the relative increase criteria should be applied to the respective $L_{Aeq,period}$ for that land use type, except for open space. For projects where the main subject is a local road, the relative increase criterion does not apply.

8. Environmental Assessment

8.1 Onsite activities

Noise associated with the development was assessed using 3D SoundPLAN modelling, showing the predicted worst-case 15 minute noise impacts associated with typical onsite activities such as trucks, forklifts, reverse alarms, mechanical plant and carpark activities. As SoundPLAN calculations return results in $L_{Aeq,period}$ format, a +3dB correction was applied to all results to convert them to $L_{Aeq,15min}$ in accordance with Section 2.2 of the Noise Policy for Industry (2017).

8.1.1 Itemised Noise Sources

Noise levels were based on information from the Operational Summary for the development provided by Cleanaway (dated July 2021), with a daily volume of 75 rigid trucks and 25 B-double trucks. Car park activities were calculated in accordance with the ISO-9613-2:1996 (Parkplatzlärmstudie 2007) methodology. Predictions include corrections for the prevailing meteorological conditions in accordance with the ISO-9613-2:1996. Mechanical Plant locations and models were obtained from the preliminary mechanical drawings provided by Grosvenor Engineering Group (ref: GEG-MSK-01 and GEG-MSK-02, dated 07/03/2022). Mechanical plant sound power levels were obtained from the manufacturer's data. No other mechanical plant is proposed for use in the development.

Table 15: Itemised Noise Sources

Source Description	Source type	Sound Power	Duration (s)
Rigid Truck Accelerated Passby (20km/h)	Line	60.1dBA/m	Varies**
B-Double Truck Accelerated Passby (20km/h)	Line	68.0dBA/m	Varies**
Rigid/B-Double Reverse Alarm (<15km/h)	Line	61.0dBA/m	Varies**
Rigid/B-Double Engine Starting	Point	100.0dBA	2
Rigid/B-Double Engine Idling	Point	98.0dBA	900
Rigid/B-Double Manoeuvring (<15km/h)	Line	62.0dBA/m	Varies**
Rigid/B-Double Truck Venting Airbrake	Point	110dBA	1
Rigid/B-Double Truck Door Closure	Point	99dBA	2
Rooftop Ventilation / Smoke Exhaust Fan Outlet (Model: Fantech AP1258FP6/28)	Point	86dBA	Continuous
Forklift (Average Work over 240 seconds)	Point	90dBA	240
Indoor Industrial Activities	Point*	121dBA*	Continuous
Car starting	Point	84dBA	2
Car door closure	Point	83dBA	2
Car driving on asphalt <30km/h	Line	47dBA/m	Varies**

*Note indoor activities were calculated using a reverberant SPL of 97.5, with composite transmission loss calculated for the building based on the building elevations provided by Charter Hall (ref: 12272_DA021, dated 21/09/2021). As no measurements of specific equipment were used, typical industrial noise spectra were used.

**Note the duration of line source events varies depending on the length of the individual line source and the speed of the corresponding vehicle. For a rigid truck travelling 100m at 20km/h the duration would be 18 seconds.

8.2 Cumulative Noise Impact Assessment (Nearest Receivers)

The following assessment of noise impacts to sensitive receivers is based on the criteria established using the cumulative criteria specified in Section 2.4.2 of the Noise Policy for Industry, which takes into account the potential impacts from multiple sources within the site and surrounding area and the current SEAR's specified requirements (ref: SSD-29999239). The noise source levels at the receiver locations are shown in Table 16. LAeq results are not shown where the calculated total is less than 0dBA.

Table 16: Project specific noise levels (Nearest receivers)

Receiver	Project Specific Criteria Leq,15min dBA			Predicted Noise Impacts Leq,15min dBA			Complies (Yes/No)		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1	51	41	36	37	34	33	Yes	Yes	Yes
2	51	41	36	36	34	32	Yes	Yes	Yes
3	51	41	36	37	34	32	Yes	Yes	Yes
A	70	70	70	48	46	43	Yes	Yes	Yes
B	70	70	70	58	54	51	Yes	Yes	Yes
C	70	70	70	63	59	55	Yes	Yes	Yes
D	70	70	70	53	51	47	Yes	Yes	Yes

Compliance with the cumulative impact criteria is predicted for all onsite activities at the receiver locations during the proposed operating hours with no need for further treatment. Figures 6 to 8 present a graphical representation of the predicted noise levels.

Figure 5: L_{Aeq,15min} noise contours (Day)



Figure 6: $L_{Aeq,15min}$ noise contours (Evening)

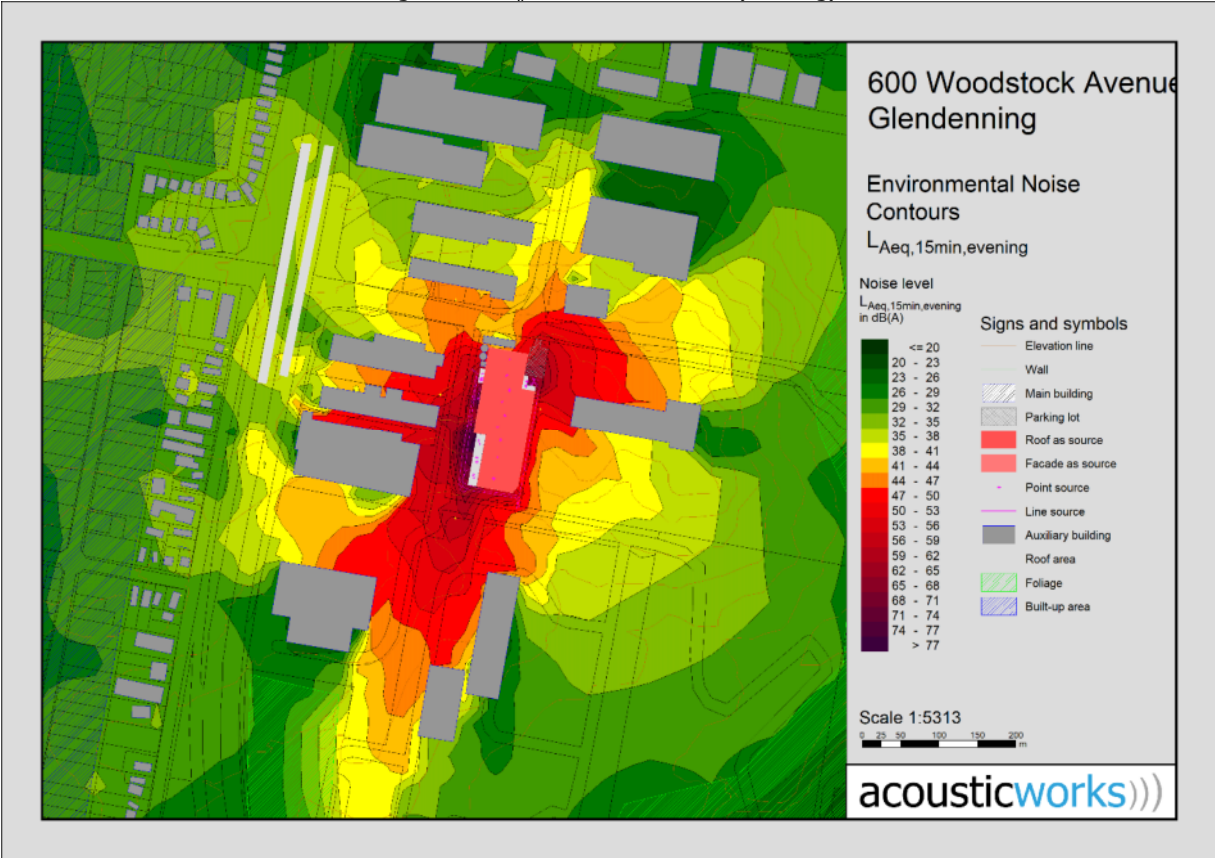


Figure 7: $L_{Aeq,15min}$ noise contours (Night)



8.3 Cumulative Noise Impact Assessment (Distant Receivers)

The predicted cumulative noise impacts to receivers A to F is shown in Table 17. LAeq results are not shown where the calculated total is less than 0dBA.

Table 17: Project specific noise levels (Receivers A to F)

Receiver	Project Specific Criteria Leq,15min dBA	Predicted Noise Impacts Leq,15min dBA internal/external			Complies (Yes/No)		
		Day	Evening	Night	Day	Evening	Night
Crawford Public School	28 internal / 38 external	6/16	4/14	0/10	Yes	Yes	Yes
Doonside Public School	28 internal / 38 external	7/17	4/14	0/10	Yes	Yes	Yes
Rooty Hill High School	28 internal / 38 external	17/27	15/25	11/21	Yes	Yes	Yes
Rooty Hill Public School	28 internal / 38 external	19/29	17/27	15/25	Yes	Yes	Yes
Melva McDonald Lodge	28 internal / 43 external	18/28	14/24	10/20	Yes	Yes	Yes
St Aidan's Primary School	28 internal / 38 external	20/30	15/25	11/21	Yes	Yes	Yes
Doonside Christadelphian Church	28 internal / 43 external	8/18	5/15	1/11	Yes	Yes	Yes

Compliance with the cumulative impact criteria is predicted for all onsite activities at distant sensitive receivers during the proposed operating hours without the need for further treatment.

8.4 Sleep disturbance criteria

The noise source levels and predicted levels of noise at the receiver locations are shown in Table 18. The calculations were undertaken to determine if noise impacts are predicted to comply with the sleep disturbance criteria for 24/7 operation.

Table 18: Sleep Disturbance noise levels (Receivers 1 to 3)

Receiver	Receivers 1. North west residential 2. West residential 3. South west residential	Source Lwmax dB(A)	Correction dB(A)*	Corrected dB(A)	Lmax adj,T ext., dB(A)	Complies Lmax dB(A)
	Description					
1						54
	Rigid Truck Passby	100		100	20	Yes
	B-Double Truck Passby	106		106	26	Yes
	Rigid/B-Double Reverse Alarm	112	5	117	37	Yes
	Rigid/B-Double Engine Starting	104		104	24	Yes
	Rigid/B-Double Truck Venting Airbrake	118	5	123	43	Yes
	Rigid/B-Double Truck Door Closure	102		102	22	Yes
	Rooftop Fan (Fantech AP1258FP6/28)	86		86	6	Yes
	Internal activities	106		106	26	Yes
2						54
	Rigid Truck Passby	100		100	22	Yes
	B-Double Truck Passby	106		106	28	Yes
	Rigid/B-Double Reverse Alarm	112	5	117	39	Yes
	Rigid/B-Double Engine Starting	104		104	26	Yes
	Rigid/B-Double Truck Venting Airbrake	118	5	123	45	Yes
	Rigid/B-Double Truck Door Closure	102		102	24	Yes
	Rooftop Fan (Fantech AP1258FP6/28)	86		86	7	Yes
	Internal activities	106		106	27	Yes
3						54
	Rigid Truck Passby	100		100	19	Yes
	B-Double Truck Passby	106		106	25	Yes
	Rigid/B-Double Reverse Alarm	112	5	117	36	Yes
	Rigid/B-Double Engine Starting	104		104	23	Yes
	Rigid/B-Double Truck Venting Airbrake	118	5	123	42	Yes
	Rigid/B-Double Truck Door Closure	102		102	21	Yes
	Rooftop Fan (Fantech AP1258FP6/28)	86		86	6	Yes
	Internal activities	106		106	26	Yes

Compliance is predicted for all onsite activities at the receiver locations during the proposed operating hours on the condition the recommendations detailed in Section 11 are implemented.

9. Vibration Predictions

Potential vibration and acceleration impacts were assessed to determine typical levels within a set distance of the activity to the receiver with a maximum combined Peak Particle Velocity of level less than 1mm/s predicted based on the equipment in operation and the separation distances. The level of impact may change depending on the ground composition, example stone/rock or concrete will allow higher levels of ground vibration than soft soil. It is recommended a strict management plan is implemented to allow a proactive approach to addressing complaints including vibration monitoring of activities if complaints are received.

After review of the proposal in relation to vibration impacts, we provide the following recommendations:

- The surrounding residential receivers located in proximity to the site are separated from the roads and site by soil and the M7 motorway, with reasonable separation distances from onsite activities and local roads. The human exposures and Peak Particle levels are predicted to be below the criteria nominated in section 7.6 with no further treatments required.
- The surrounding industrial lots are predicted to comply with the criteria based on the proposed activities, with nearby industrial sites predicted to generate more vibration than the proposal.
- If complaints are received for onsite activities from any of the sensitive receiver, we recommend that compliance monitoring is undertaken as detailed in Section 12.3.

10. Road Traffic Noise

The existing annual average daily traffic volume for the M7 Motorway is approximately 192,000 vehicles per day. Based on the traffic survey prepared by Traffix (file ref: AUNSW1482, dated 10/12/2019) the average volume for Woodstock Avenue is approximately 13,000 vehicles per day. In accordance with the RMS *Guide to Traffic Generating Developments* version 2.2, the site is predicted to generate approximately 300 additional vehicle trips per day, with 100 of these being heavy vehicles, which would correspond to a relative increase of less than 1dBA for the M7 Motorway and Woodstock Avenue.

Existing road traffic noise levels exceed the criteria at the façade of residences located closer to the road. When accounting for the additional trips predicted to be generated by the development, no additional exceedances are predicted at the façade of residences along Woodstock Avenue or M7 Westlink.

For a visual representation of the existing and predicted road traffic noise levels, refer to Figures 8 to 11.

Figure 8: Existing $L_{Aeq,15h}$ noise levels

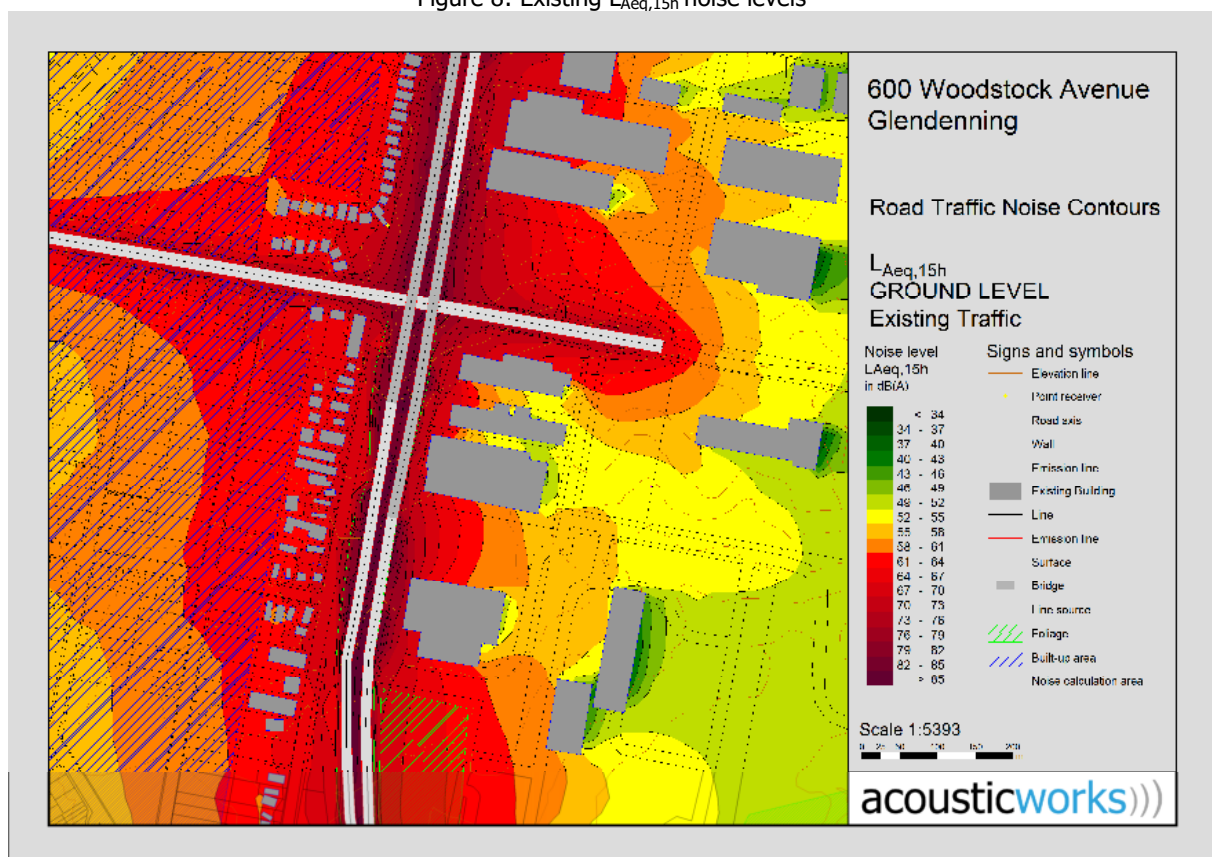


Figure 9: Existing $L_{Aeq,9h}$ noise levels

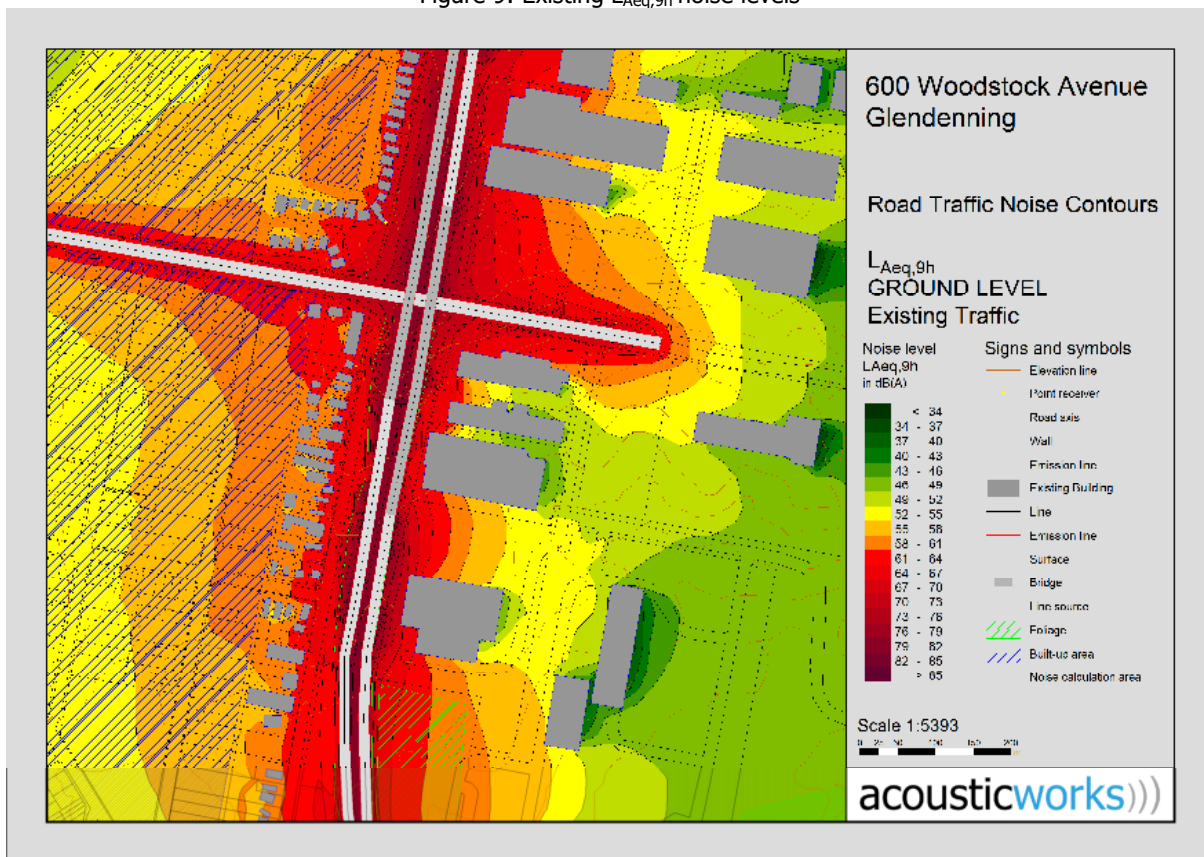


Figure 10: Predicted $L_{Aeq,15h}$ noise levels

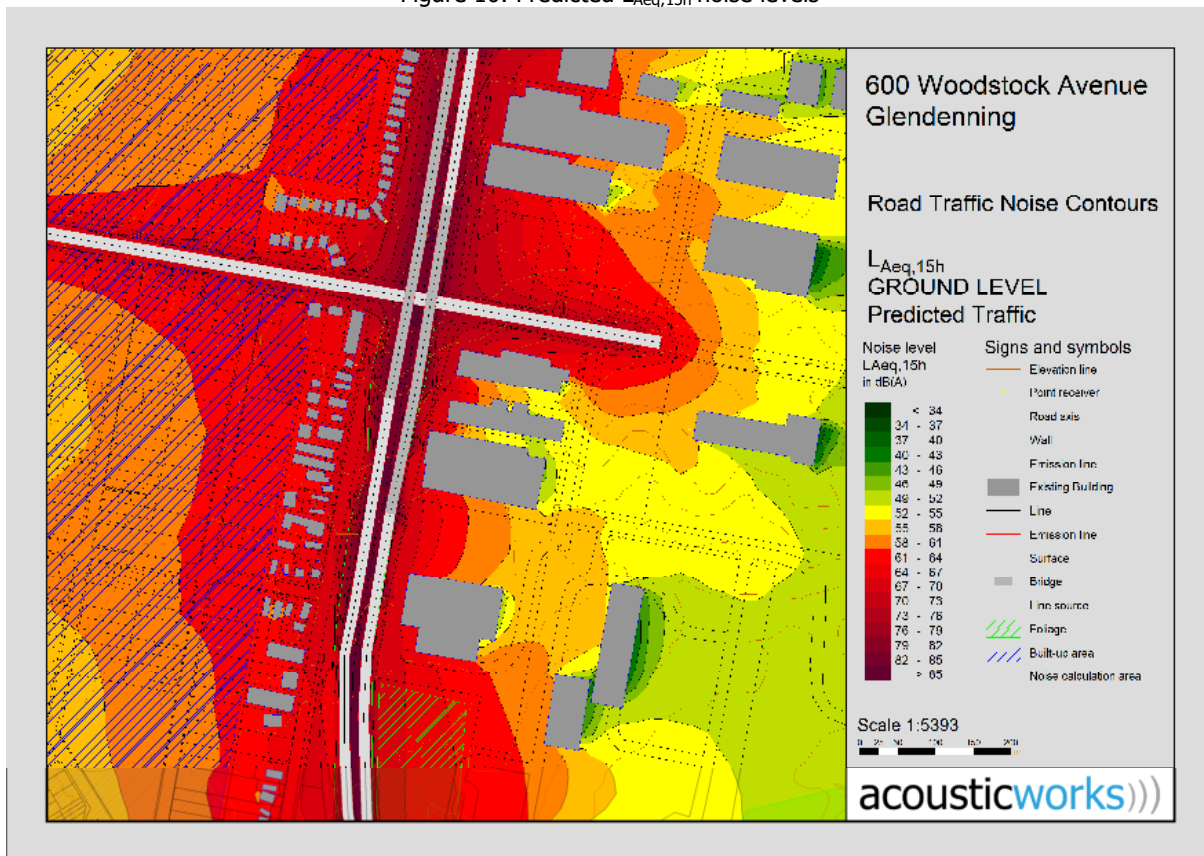
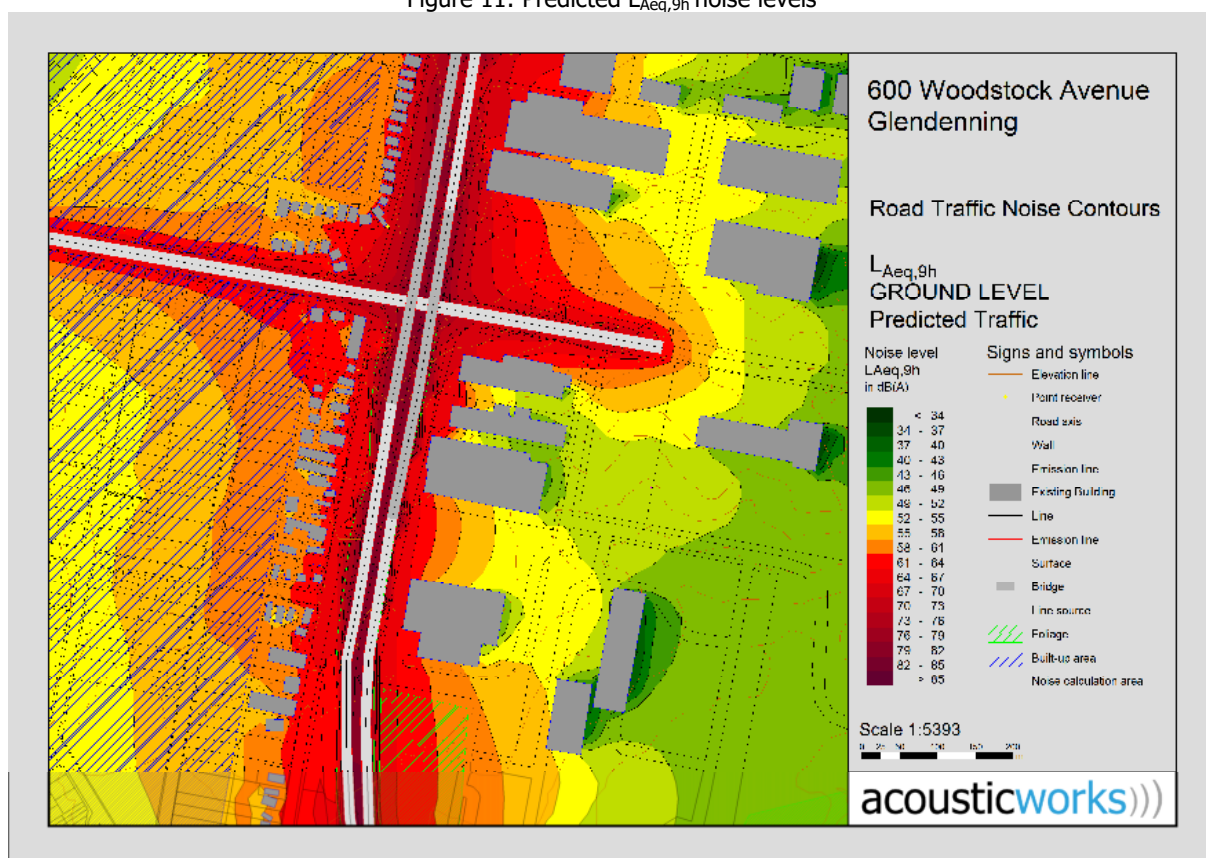


Figure 11: Predicted $L_{Aeq,9h}$ noise levels

Traffic generated by the development is predicted to comply with the NSW Road Noise Policy criteria at all nearby residences except for those where the criteria are exceeded by existing traffic noise levels. Compliance is predicted with the Relative increase criteria for residential land uses.

11. Recommendations

11.1 Operational Noise

The noise assessment indicates that 24 hour operation of the site is predicted to comply with the assessment criteria without the need for further treatment.

11.1.1 NSW Road Noise Policy – Traffic Generation

The traffic generation from the proposed development is not predicted to cause exceedances of the criteria nominated in Section 7.5 at any additional residences along Woodstock Avenue or M7 Westlink.

11.1.2 Onsite Mechanical Plant

Compliance of mechanical plant is predicted based on the preliminary mechanical drawings. If changes are proposed, any new mechanical plant shall be designed such that the overall development would comply with the criteria nominated in Section 7 of this report.

Acoustic Works recommends that once mechanical plant selection is finalised, an assessment by a qualified acoustic consultant is conducted prior to installation to determine any requirements for acoustic treatments.

11.2 Vibration

Vibration associated with truck activity and onsite activities is predicted to comply with the relevant NSW guidelines at the nearest sensitive receivers. We recommend that any vibrating equipment used onsite is adequately isolated to prevent vibration issues to nearby receivers and is reviewed by a qualified acoustic consultant. If complaints are received for vibration, we recommend the management controls nominated in Section 12.3 are implemented.

11.2.1 Compliance Vibration Monitoring Procedure

To ensure the vibration monitoring is effective, we recommend the following:

- All vibration monitors will be set to a maximum measurement interval of 5 minutes and record over the period commencing over the entire day and be located onsite and at the sensitive receiver location.
- The client shall provide a list of relevant management staff (including mobile phone numbers) working on the project to be notified of exceedance of the nominated vibration levels.
- All vibration monitors will be fitted with an internal SMS warning system (allow the unit to send SMS notification of vibration levels when the nominated level is exceeded). The SMS warning from the vibration monitors will go out to all staff who have provided their mobile numbers for use for notifications from the vibration monitor.
- The vibration monitor will be set to provide vibration impact warnings at 2/3 of the criteria for human exposure and peak particle velocity, this will allow staff to be notified of vibration levels and take a proactive approach before the criteria is exceeded. The Acoustic consultant will also have a minimum of 2 staff nominated on the warning system.
- The vibration monitors will be installed with additional battery packs to extend the operation of the monitor to a minimum of 6 weeks without recharge.
- Attended vibrations measurement will be undertake for the affected site to determine existing levels of specific equipment to help identify Regardless of warning or notification, the

vibration monitor will be downloaded on a monthly basis with a monthly report provided to the client, the report will be suitable for submission to council.

11.2.2 Procedure for measuring Vibration

11.2.2.1 Where to measure vibration for complaints

Vibration is required to be measured at complainants location and onsite simultaneously with the geophone located at the nearest point to the dwelling for the sensitive receiver and onsite where the source of the complaint originated. The geophone can be fixed to the ground using mounting spikes in line with the nearest point of the site or fixed directly to building elements, note that relocation of the geophone may be required to be representative of the nearest location of works being conducted onsite. Note multiple vibration monitors (two) are recommended to avoid the need for relocating the geophone multiple times.

11.2.2.2 Information to be reported

Any reporting should be concise. The minimum requirements to be included in a report are;

- Date and duration of measurements.
- Time of measurements or measurement period.
- Person(s) performing measurements or placing equipment used for long term monitoring.
- Equipment used for measurements.
- Location of measurements including photos.
- Measured values including graphed PPV for the period of monitoring.
- Corrected values (where applicable).
- Notes regarding vibrating sources.
- Notes regarding any extraneous sources that may have influenced measurements.
- Detail of instrumentation and calibration.
- Meteorological conditions.
- Explanation of any high levels below the criteria including exceedances
- Action taken for any exceedance including changes to site operations

11.3 Noise Management Plan

If noise complaints are received from nearby receivers, noise monitoring with audio shall be conducted for a period of 7 weeks, with a monitor placed onsite and at the receiver from which the complaint was received. The monitors shall record simultaneously, with attended measurements also conducted onsite and at the complaining receiver. The monitoring data and audio shall be examined by a suitably qualified person to verify that the offending noise originated at the site.

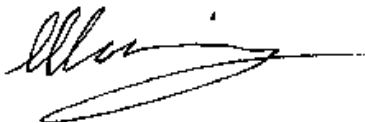
If noise generated by the site has resulted in complaints, we recommend an acoustic assessment is conducted to determine suitable mitigation strategies and/or acoustic treatments.

12. Conclusion

A noise assessment was conducted for a State Significant Development Application for a proposed material recovery facility to be located at 600 Woodstock Avenue, Glendenning. Based on the results of the investigation, the application for the masterplan is predicted to be acoustically satisfactory for the 24 hour operation of the site, on the condition the recommendations detailed in Section 11 are implemented.

If you should have any queries, please do not hesitate to contact us.

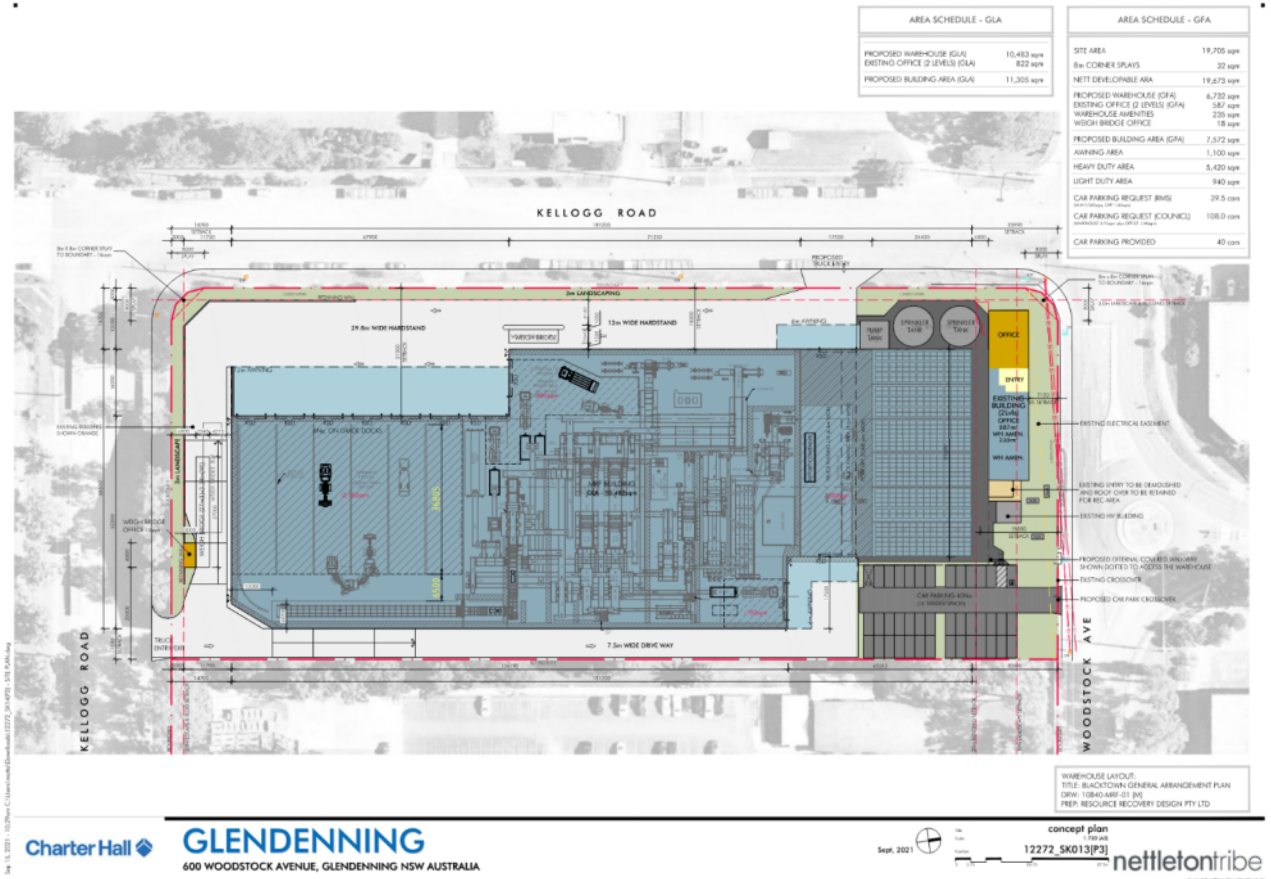
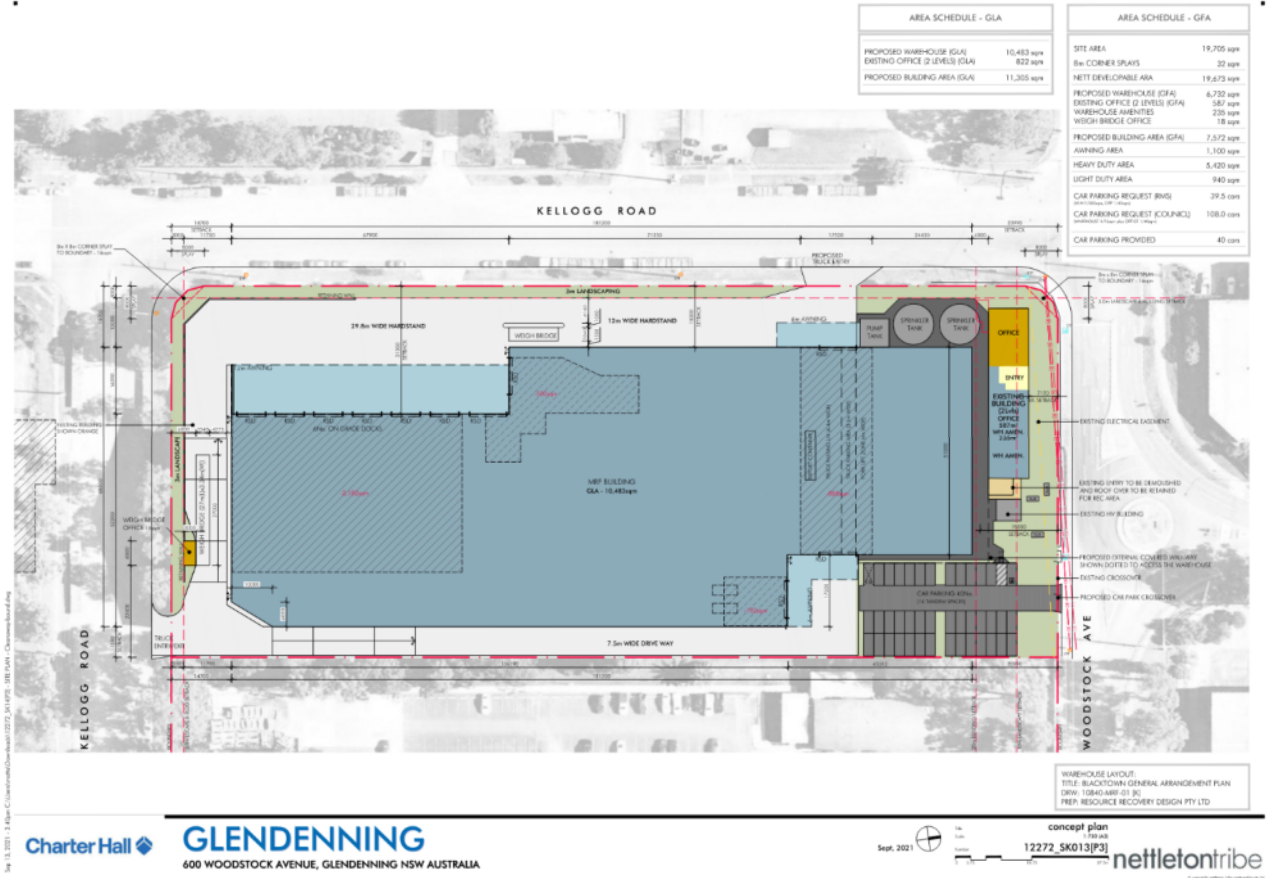
Report Prepared By

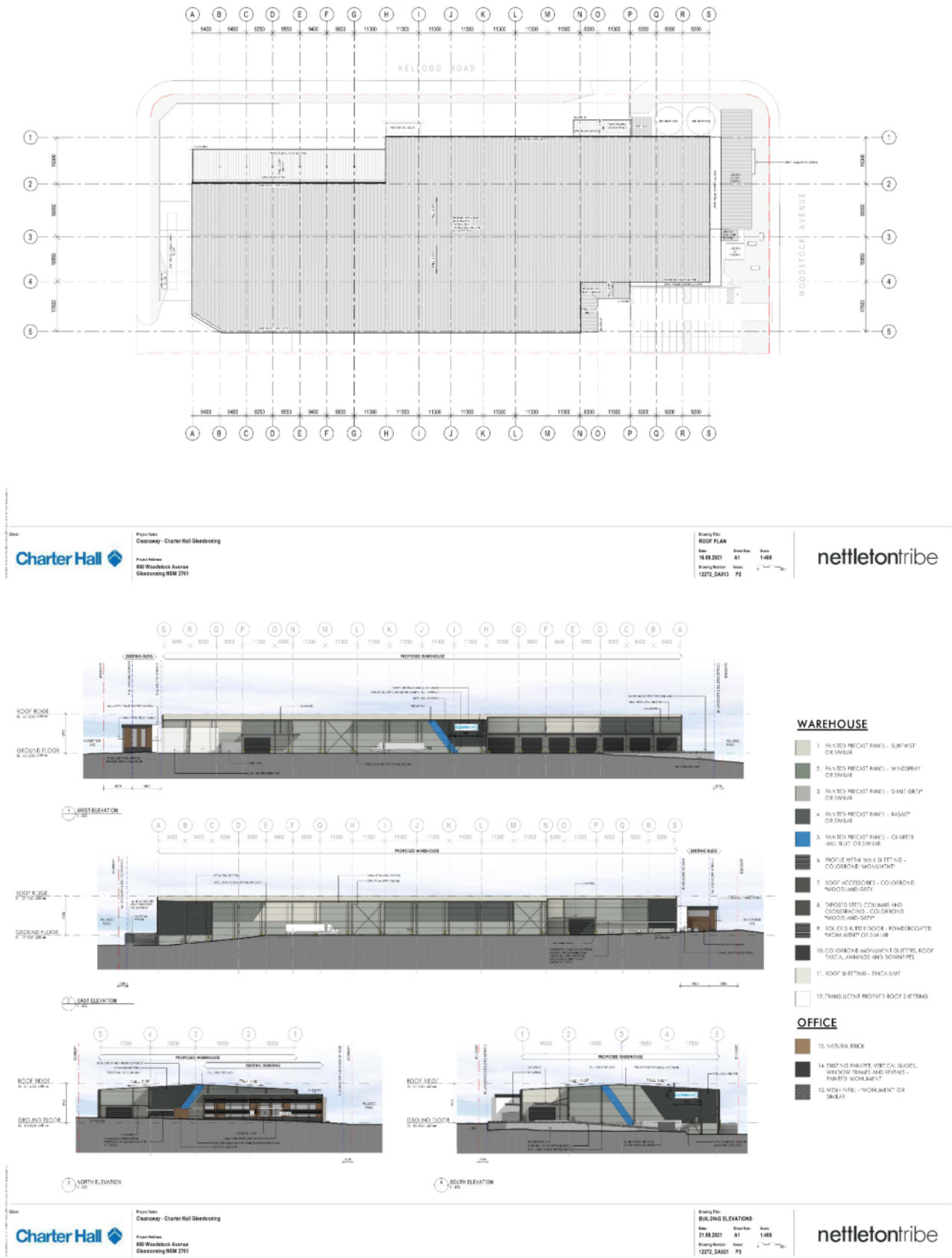


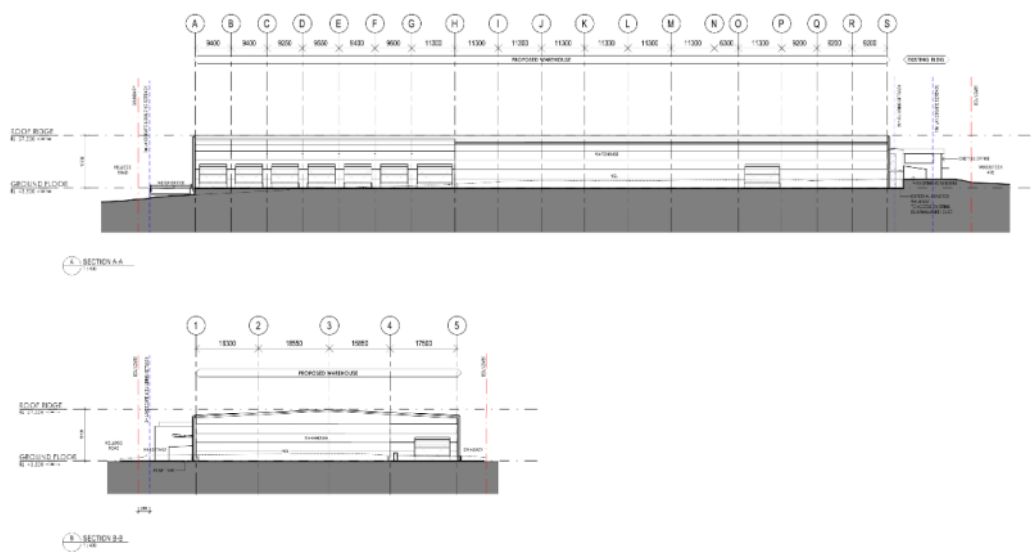
Michael Gunning M.ArchSci
Acoustic Consultant
acousticworks)))

13. Appendices

13.1 Development Plans









Project Name
Charter Hall Gleadowing

Project Address
600 Woodstock Avenue
Gleadowing NSW 2161

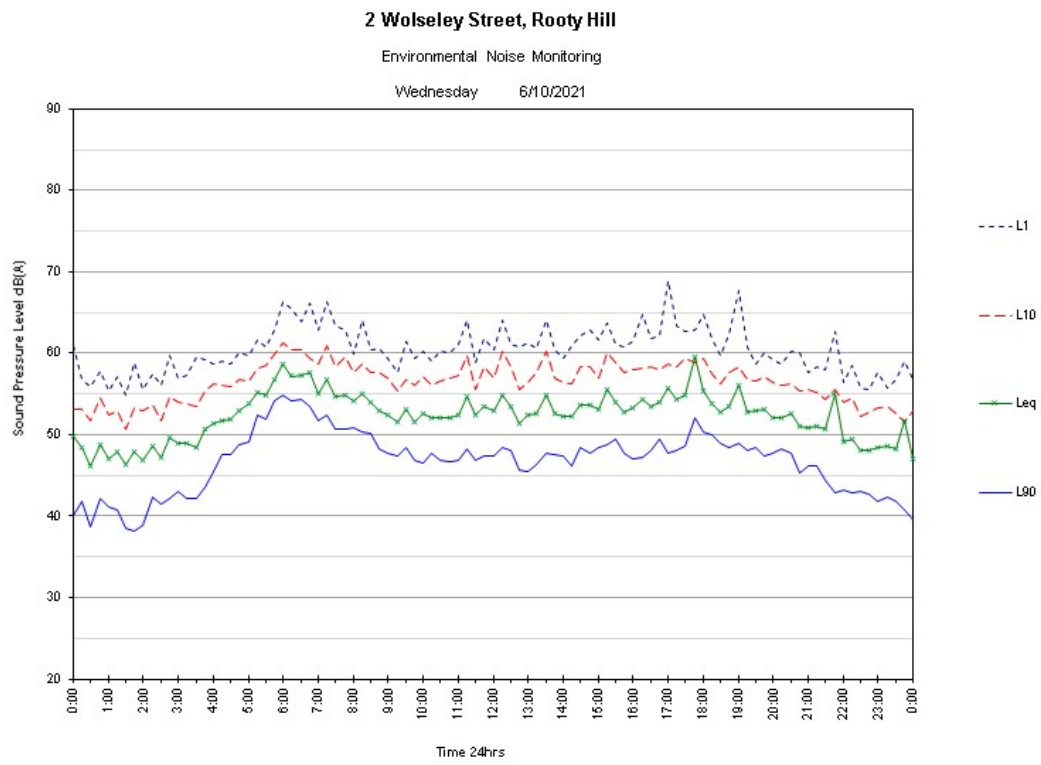
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BUILDING SECTIONS

Date	Sheet No.	Scale
13.09.2021	A1	1:400
Working Model:	12072_24001	P2



13.2 Noise Monitoring Charts

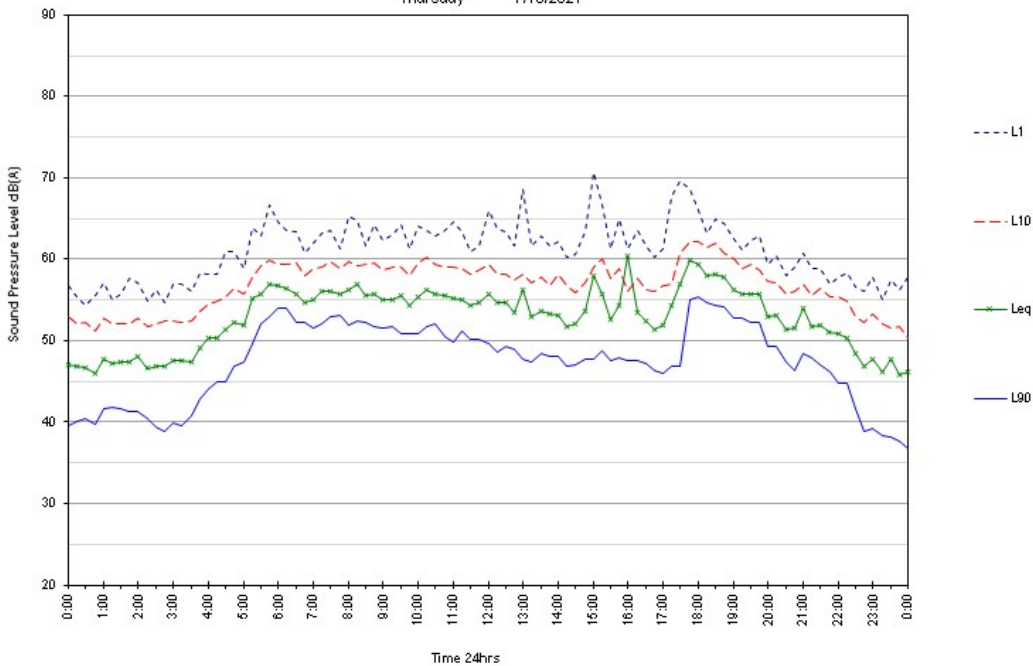
13.2.1 Noise Monitor A



2 Wolseley Street, Rooty Hill

Environmental Noise Monitoring

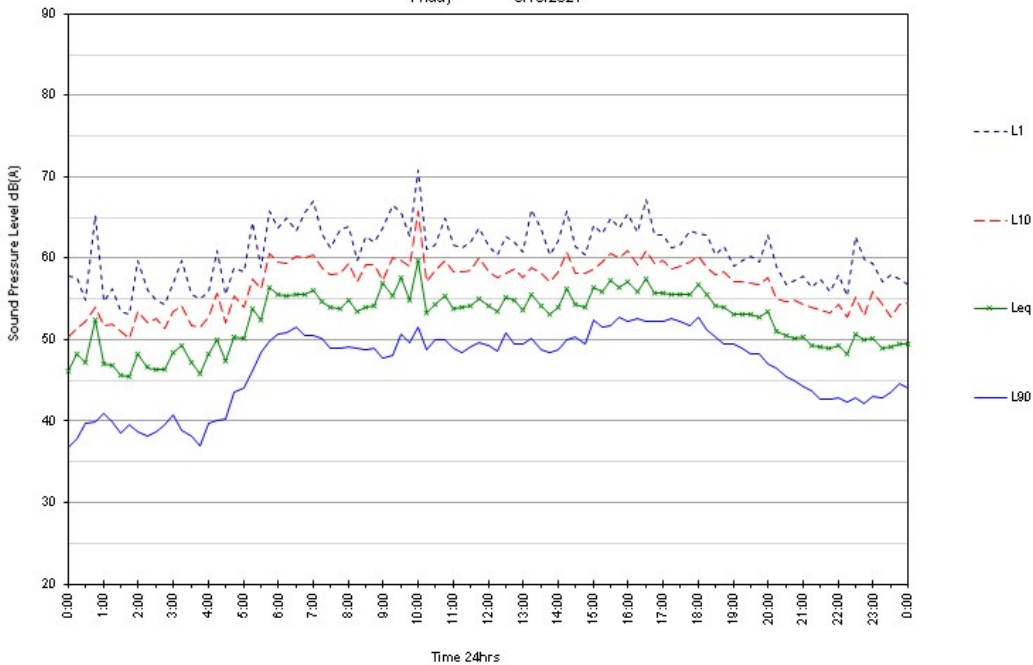
Thursday 7/10/2021



2 Wolseley Street, Rooty Hill

Environmental Noise Monitoring

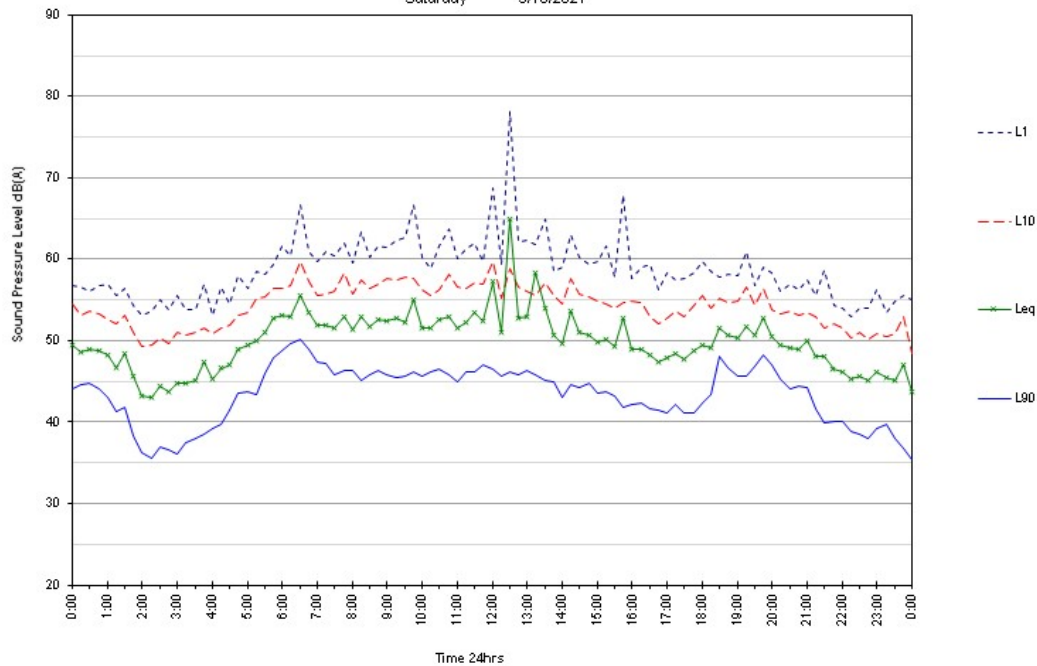
Friday 8/10/2021



2 Wolseley Street, Rooty Hill

Environmental Noise Monitoring

Saturday 9/10/2021



2 Wolseley Street, Rooty Hill

Environmental Noise Monitoring

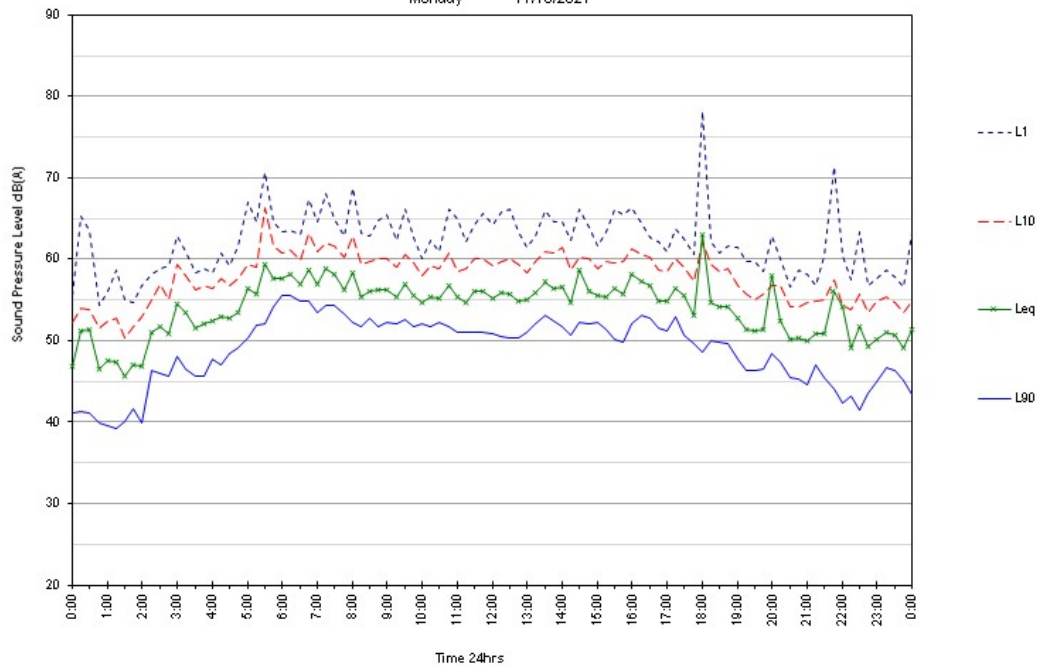
Sunday 10/10/2021



2 Wolseley Street, Rooty Hill

Environmental Noise Monitoring

Monday 11/10/2021



2 Wolseley Street, Rooty Hill

Environmental Noise Monitoring

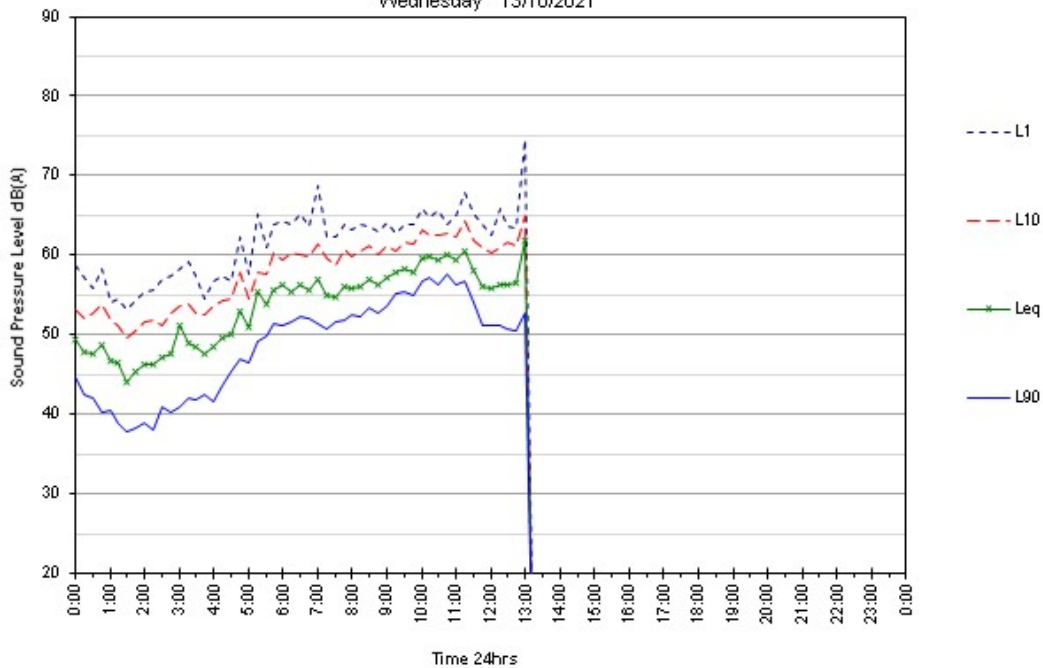
Tuesday 12/10/2021



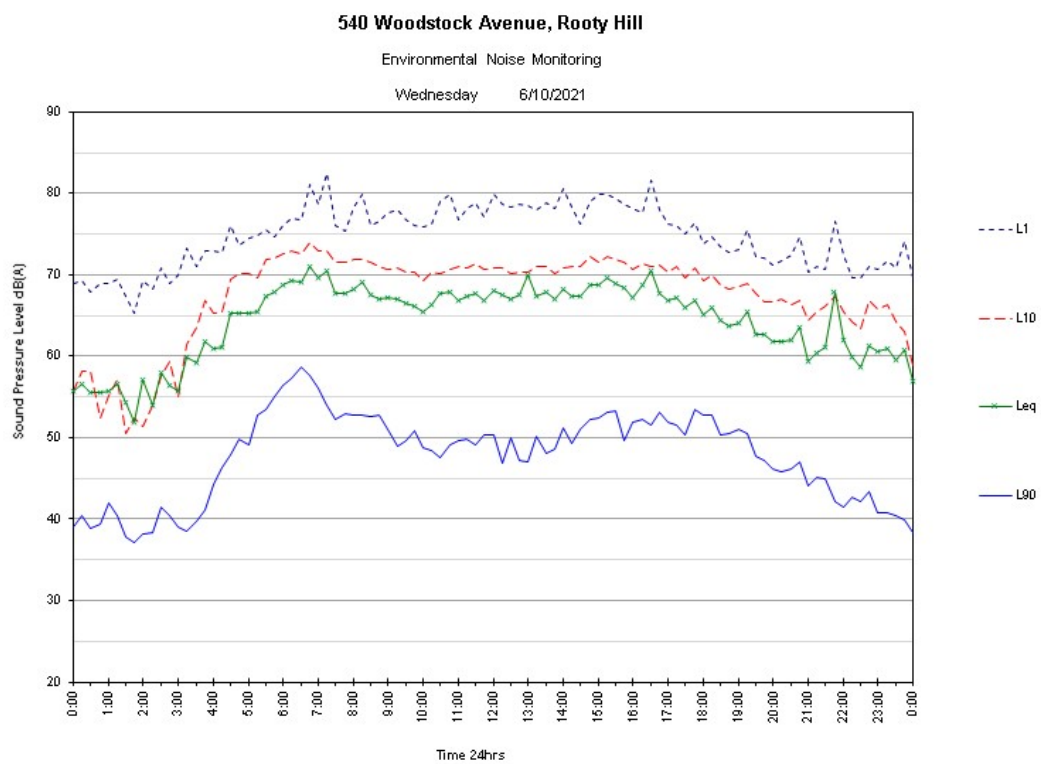
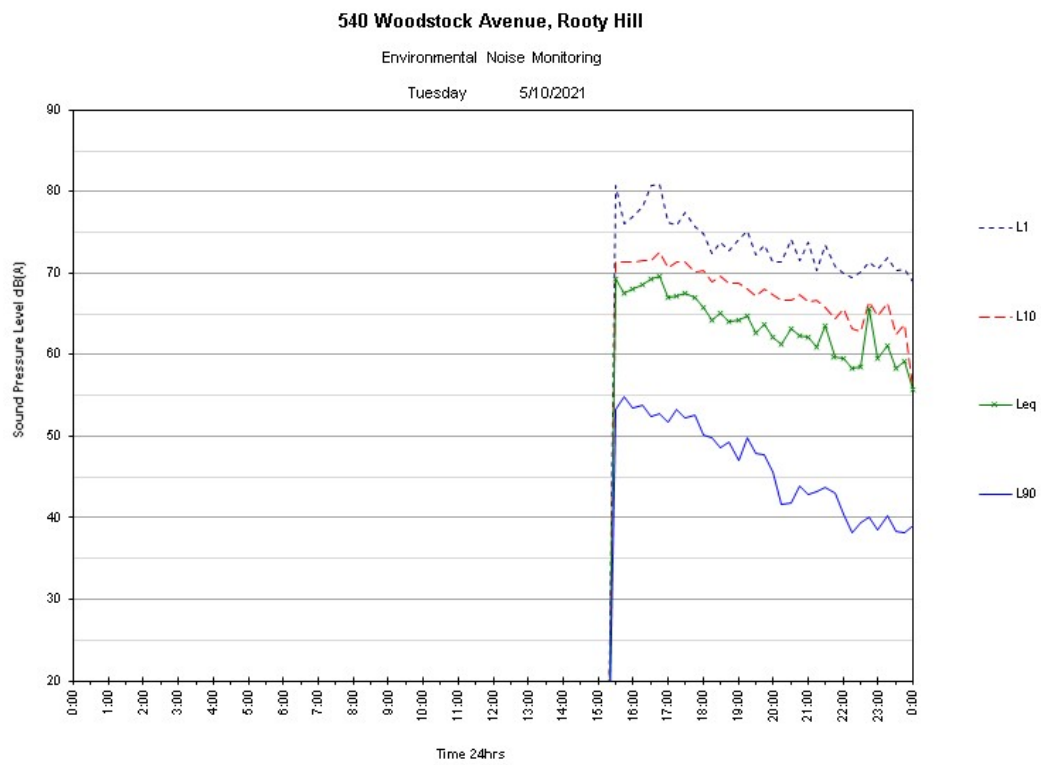
2 Wolseley Street, Rooty Hill

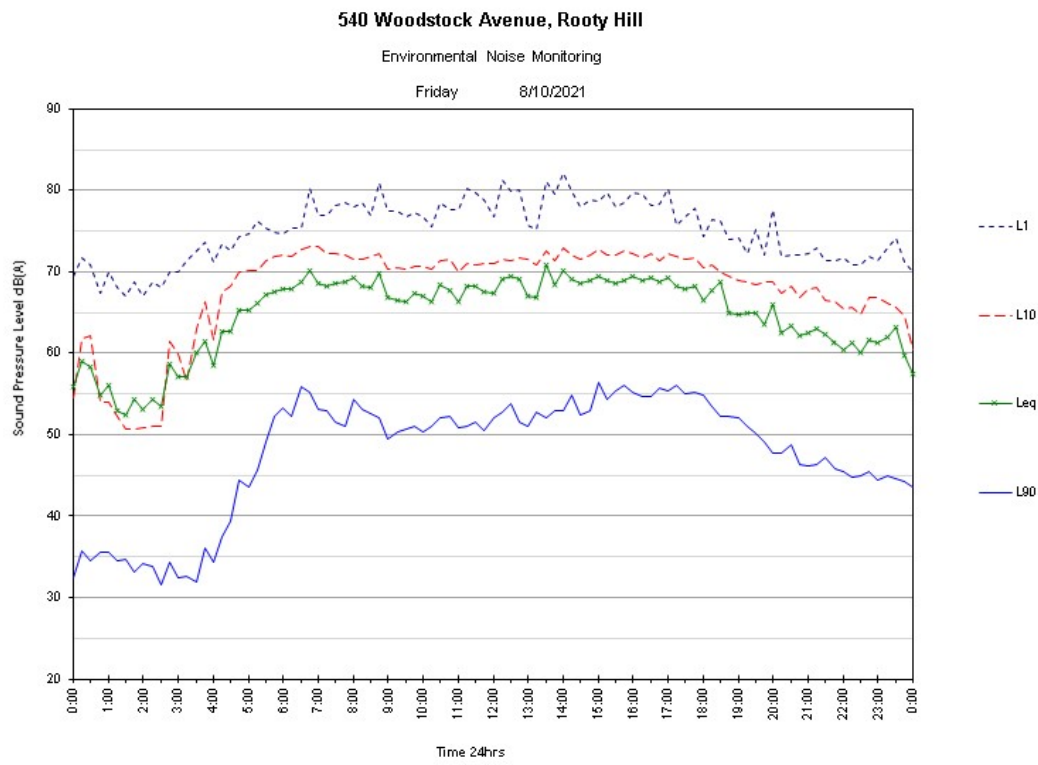
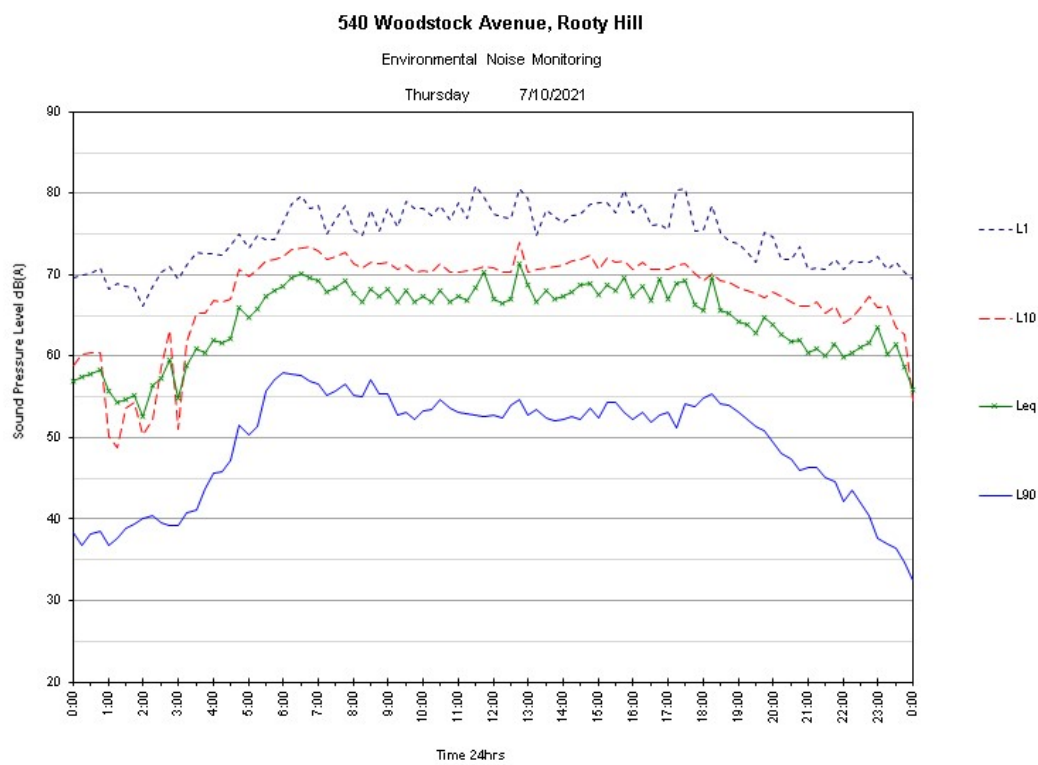
Environmental Noise Monitoring

Wednesday 13/10/2021



13.2.2 Noise Monitor B

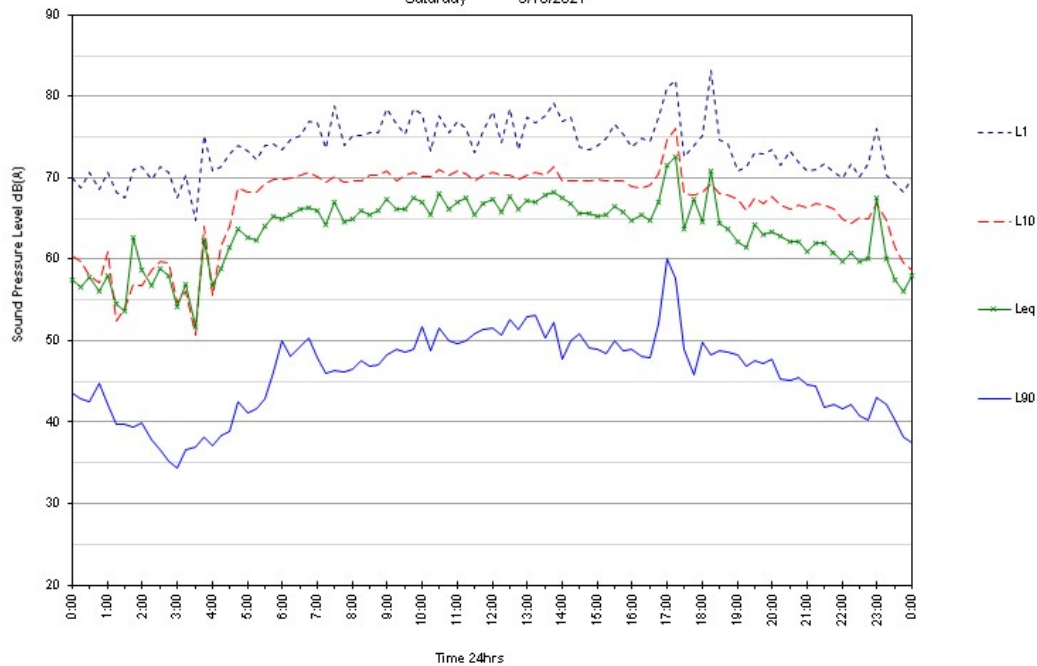




540 Woodstock Avenue, Rooty Hill

Environmental Noise Monitoring

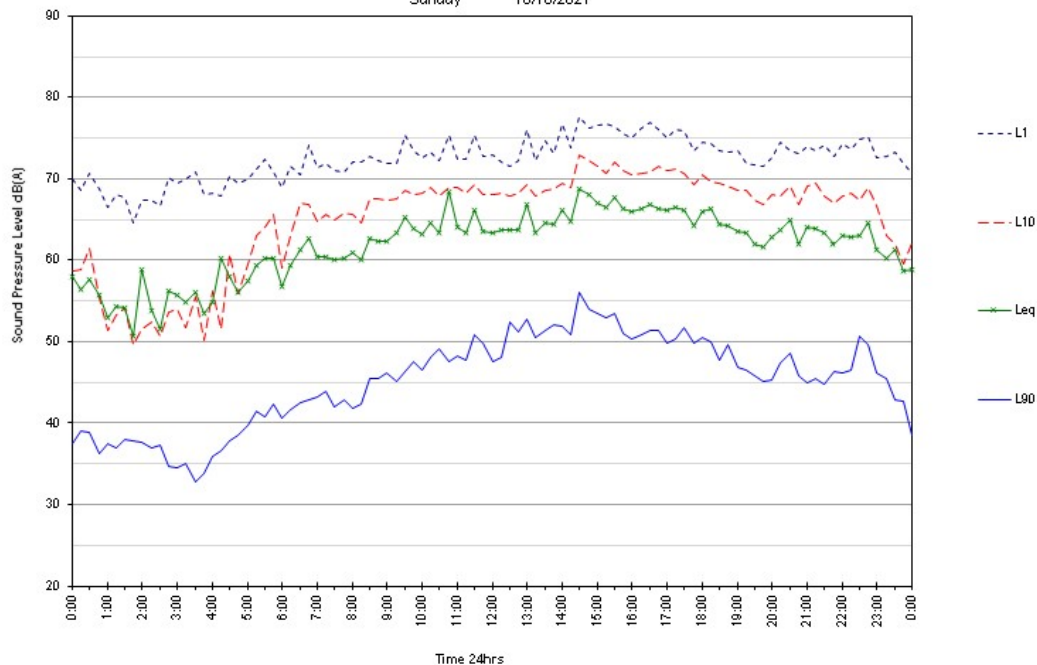
Saturday 9/10/2021

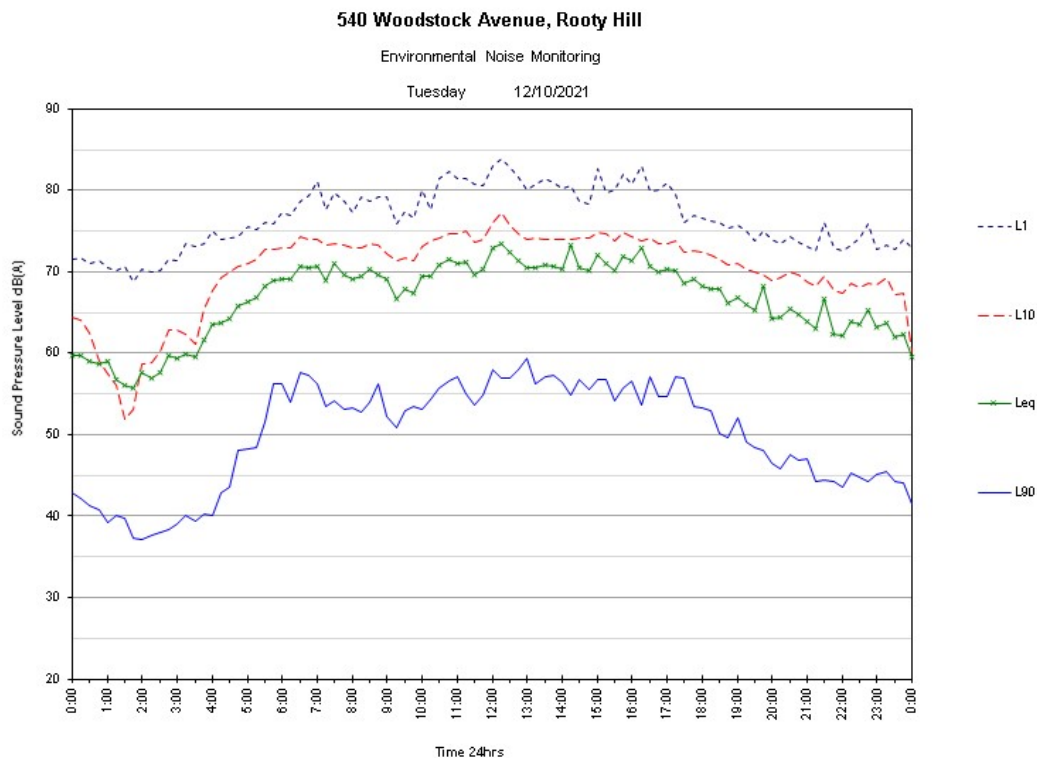
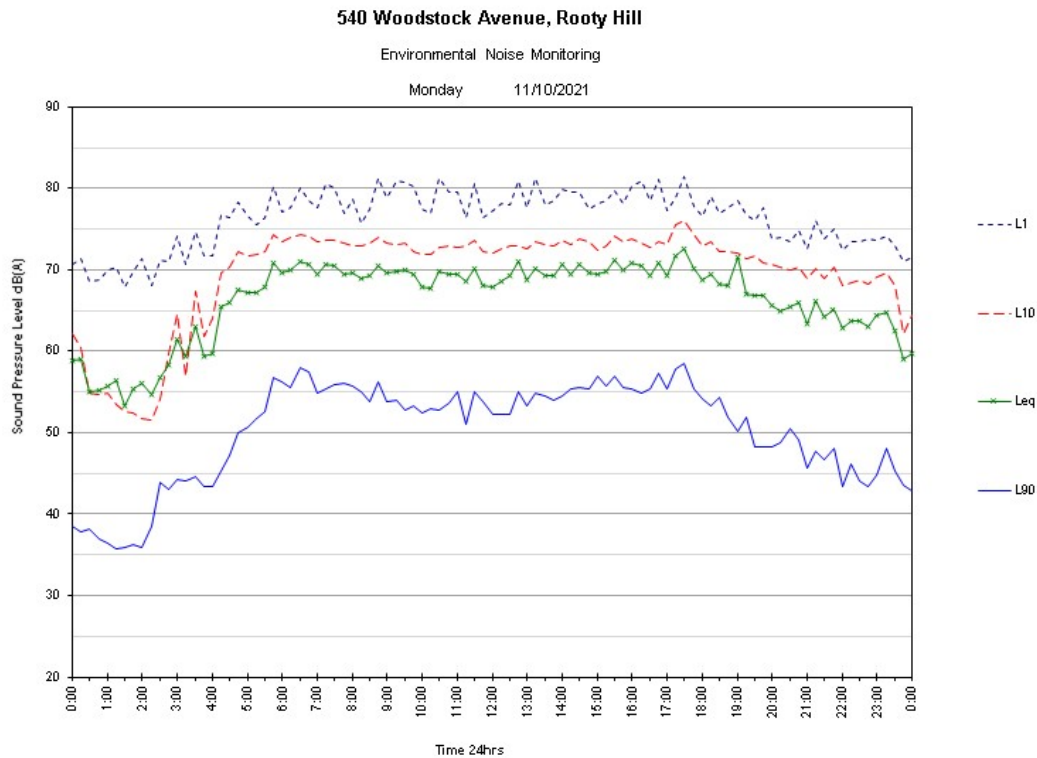


540 Woodstock Avenue, Rooty Hill

Environmental Noise Monitoring

Sunday 10/10/2021

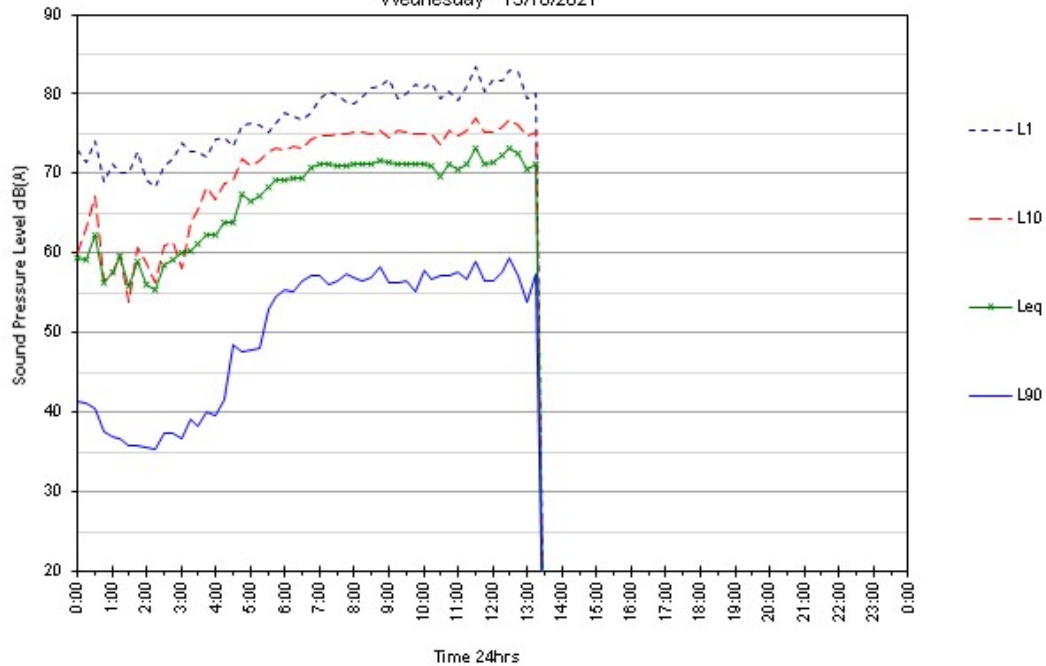




540 Woodstock Avenue, Rooty Hill

Environmental Noise Monitoring

Wednesday 13/10/2021

**13.3 Detailed Meteorological Data**

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
05/04:00pm	0	0	W	22
05/04:30pm	0	0	W	20
05/05:00pm	0	0	W	15
05/05:30pm	0	0	WSW	17
05/06:00pm	0	0	W	20
05/06:30pm	0	0	W	19
05/07:00pm	0	0	WSW	15
05/07:30pm	0	0	W	15
05/08:00pm	0	0	W	7
05/08:30pm	0	0	WSW	7
05/09:00pm	0	0	WSW	7
05/09:30pm	0	0	WSW	9
05/10:00pm	0	0	WSW	11
05/10:30pm	0	0	WSW	11
05/11:00pm	0	0	W	9
05/11:30pm	0	0	W	7
06/12:00am	0	0	NW	4
06/12:30am	0	0	W	4

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
06/01:00am	0	0	WSW	7
06/01:30am	0	0	WSW	4
06/02:00am	0	0	WSW	9
06/02:30am	0	0	WSW	7
06/03:00am	0	0	WSW	7
06/03:30am	0	0	SW	9
06/04:00am	0	0	SW	11
06/04:30am	0	0	SW	7
06/05:00am	0	0	WSW	4
06/05:30am	0	0	WSW	6
06/06:00am	0	0	WNW	2
06/06:30am	0	0	CALM	0
06/07:00am	0	0	W	2
06/07:30am	0	0	WNW	2
06/08:00am	0	0	W	6
06/08:30am	0	0	W	4
06/09:00am	0	0	W	9
06/09:30am	0	0	WNW	7
06/10:00am	0	0	W	7
06/10:30am	0	0	WSW	7
06/11:00am	0	0	WSW	9
06/11:30am	0	0	W	9
06/12:00pm	0	0	WNW	7
06/12:30pm	0	0	SW	9
06/01:00pm	0	0	W	6
06/01:30pm	0	0	NW	4
06/02:00pm	0	0	SW	4
06/02:30pm	0	0	NNW	4
06/03:00pm	0	0	S	2
06/03:30pm	0	0	NE	4
06/04:00pm	0	0	ENE	6
06/04:30pm	0	0	NNW	2
06/05:00pm	0	0	NNE	2
06/05:30pm	0	0	ENE	13
06/06:00pm	0	0	ENE	13
06/06:30pm	0	0	ENE	13
06/07:00pm	0	0	NE	9
06/07:30pm	0	0	ESE	7
06/08:00pm	0	0	SE	6
06/08:30pm	0	0	SE	9
06/09:00pm	0	0	SE	11

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
06/09:30pm	0	0	SE	4
06/10:00pm	0	0	SSE	6
06/10:30pm	0	0	SSE	2
06/11:00pm	0	0	S	2
06/11:30pm	0	0	SW	7
07/12:00am	0	0	SW	2
07/12:30am	0	0	SW	6
07/01:00am	0	0	SW	7
07/01:30am	0	0	CALM	0
07/02:00am	0	0	CALM	0
07/02:30am	0	0	CALM	0
07/03:00am	0	0	CALM	0
07/03:30am	0	0	NW	4
07/04:00am	0	0	CALM	0
07/04:30am	0	0	NW	4
07/05:00am	0	0	NNW	2
07/05:30am	0	0	N	6
07/06:00am	0	0	N	6
07/06:30am	0	0	NNW	7
07/07:00am	0	0	NNW	7
07/07:30am	0	0	NNW	9
07/08:00am	0	0	N	6
07/08:30am	0	0	N	7
07/09:00am	0	0	NNW	6
07/09:30am	0	0	NNW	7
07/10:00am	0	0	NNW	13
07/10:30am	0	0	N	15
07/11:00am	0	0	N	19
07/11:30am	0	0	N	13
07/12:00pm	0	0	N	17
07/12:30pm	0	0	N	11
07/01:00pm	0	0	NNW	9
07/01:30pm	0	0	NW	13
07/02:00pm	0	0	WNW	20
07/02:30pm	0	0	NW	19
07/03:00pm	0	0	WNW	20
07/03:30pm	0	0	NW	20
07/04:00pm	0	0	NW	20
07/04:30pm	0	0	WNW	17
07/05:00pm	0	0	WNW	13
07/05:30pm	0	0	WNW	13

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
07/05:40pm	0	0	SSE	26
07/06:00pm	0	0	SE	26
07/06:30pm	0	0	SE	30
07/06:45pm	0	0	SE	28
07/07:00pm	0	0	SE	26
07/07:30pm	0	0	SE	24
07/08:00pm	0	0	SSE	15
07/08:30pm	0	0	SSE	13
07/09:00pm	0	0	SSE	13
07/09:30pm	0	0	SSE	13
07/10:00pm	0	0	SSE	9
07/10:30pm	0	0	S	7
07/11:00pm	0	0	SSE	7
07/11:30pm	0	0	WSW	4
08/12:00am	0	0	WSW	4
08/12:30am	0	0	SW	6
08/01:00am	0	0	SSW	4
08/01:30am	0	0	SW	4
08/02:00am	0	0	WSW	6
08/02:30am	0	0	WSW	4
08/03:00am	0	0	W	4
08/03:30am	0	0	W	4
08/04:00am	0	0	W	4
08/04:30am	0	0	W	4
08/05:00am	0	0	WNW	4
08/05:30am	0	0	CALM	0
08/06:00am	0	0	W	2
08/06:30am	0	0	WSW	4
08/07:00am	0	0	SW	6
08/07:30am	0	0	WSW	4
08/08:00am	0	0	SW	4
08/08:30am	0	0	NNW	2
08/09:00am	0	0	NE	6
08/09:30am	0	0	N	6
08/10:00am	0	0	N	2
08/10:30am	0	0	NE	4
08/11:00am	0	0	NE	4
08/11:30am	0	0	NE	7
08/12:00pm	0	0	NNE	7
08/12:30pm	0	0	WNW	2
08/01:00pm	0	0	NNW	9

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
08/01:30pm	0	0	N	7
08/02:00pm	0	0	ENE	11
08/02:30pm	0	0	ENE	17
08/03:00pm	0	0	E	17
08/03:30pm	0	0	E	17
08/11:30am	0	0	NE	7
08/12:00pm	0	0	NNE	7
08/12:30pm	0	0	WNW	2
08/01:00pm	0	0	NNW	9
08/01:30pm	0	0	N	7
08/02:00pm	0	0	ENE	11
08/02:30pm	0	0	ENE	17
08/03:00pm	0	0	E	17
08/03:30pm	0	0	E	17
08/04:00pm	0	0	E	17
08/04:30pm	0	0	E	17
08/05:00pm	0	0	ENE	17
08/05:30pm	0	0	NE	15
08/06:00pm	0	0	NE	17
08/06:30pm	0	0	ENE	13
08/07:00pm	0	0	ENE	15
08/07:30pm	0	0	ENE	11
08/08:00pm	0	0	NE	9
08/08:30pm	0	0	NE	6
08/09:00pm	0	0	NE	7
08/09:30pm	0	0	NNE	6
08/10:00pm	0	0	NNE	6
08/10:30pm	0	0	NE	2
08/11:00pm	0	0	NE	4
08/11:30pm	0	0	CALM	0
09/12:00am	0	0	ENE	4
09/12:30am	0	0	ENE	6
09/01:00am	0	0	E	6
09/01:30am	0	0	E	6
09/02:00am	0	0	CALM	0
09/02:30am	0	0	CALM	0
09/03:00am	0	0	CALM	0
09/03:30am	0	0	SW	7
09/04:00am	0	0	CALM	0
09/04:30am	0	0	CALM	0
09/05:00am	0	0	CALM	0

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
09/05:30am	0	0	CALM	0
09/06:00am	0	0	CALM	0
09/06:30am	0	0	CALM	0
09/07:00am	0	0	CALM	0
09/07:30am	0	0	CALM	0
09/08:00am	0	0	CALM	0
09/08:30am	0	0	WSW	2
09/09:00am	0	0	WNW	2
09/09:30am	0	0	NW	4
09/10:00am	0	0	WSW	2
09/10:30am	0	0	WNW	4
09/11:00am	0	0	NNW	4
09/11:30am	0	0	NNE	6
09/12:00pm	0	0	NNE	6
09/12:30pm	0	0	ENE	7
09/01:00pm	0	0	N	4
09/01:30pm	0	0	NNE	6
09/02:00pm	0	0	N	2
09/02:30pm	0	0	SW	2
09/03:00pm	0	0	N	4
09/03:30pm	0	0	NW	6
09/04:00pm	0	0	WNW	17
09/04:30pm	0	0	NW	13
09/05:00pm	0	0	WNW	9
09/05:30pm	0	0	ESE	11
09/06:00pm	0	0	E	11
09/06:30pm	0	0	E	9
09/07:00pm	0	0	E	11
09/07:30pm	0	0	E	7
09/08:00pm	0	0	E	6
09/08:30pm	0	0	ESE	4
09/09:00pm	0	0	ESE	4
09/09:30pm	0	0	WSW	2
09/10:00pm	0	0	SW	4
09/10:30pm	0	0	CALM	0
09/11:00pm	0	0	CALM	0
09/11:30pm	0	0	CALM	0
10/12:00am	0	0	CALM	0
10/12:30am	0	0	CALM	0
10/01:00am	0	0	SW	2
10/01:30am	0	0	SW	4

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
10/02:00am	0	0	SSW	2
10/02:30am	0	0	CALM	0
10/03:00am	0	0	CALM	0
10/03:30am	0	0	SW	13
10/04:00am	0	0	SW	2
10/04:30am	0	0	CALM	0
10/05:00am	0	0	CALM	0
10/05:30am	0	0	WSW	6
10/06:00am	0	0	CALM	0
10/06:30am	0	0	CALM	0
10/07:00am	0	0	CALM	0
10/07:30am	0	0	NW	2
10/08:00am	0	0	CALM	0
10/08:30am	0	0	NNE	2
10/09:00am	0	0	N	4
10/09:30am	0	0	N	2
10/10:00am	0	0	N	2
10/10:30am	0	0	N	7
10/11:00am	0	0	N	2
10/11:30am	0	0	CALM	0
10/12:00pm	0	0	SE	20
10/12:30pm	0	0	SE	22
10/01:00pm	0	0	SE	20
10/01:30pm	0	0	SE	19
10/02:00pm	0	0	SE	20
10/02:30pm	1.6	1.6	SE	22
10/03:00pm	2.8	1.2	SE	15
10/03:30pm	2.8	0	SE	15
10/04:00pm	2.8	0	SSE	7
10/04:30pm	3.4	0.6	SE	11
10/05:00pm	4.2	0.8	E	7
10/05:30pm	4.2	0	SE	7
10/06:00pm	4.2	0	SSE	7
10/06:30pm	4.4	0.2	SE	9
10/07:00pm	4.4	0	SSE	7
10/07:30pm	4.4	0	S	7
10/08:00pm	4.6	0.2	SE	11
10/08:30pm	5	0.4	SE	7
10/09:00pm	5	0	ESE	6
10/09:30pm	5.4	0.4	WSW	2

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
10/10:00pm	6	0.6	CALM	0
10/10:30pm	7.4	1.4	ESE	2
10/11:00pm	8.8	1.4	E	2
10/11:30pm	8.8	0	S	4
11/12:00am	8.8	0	SSW	2
11/12:30am	8.8	0	SSE	4
11/01:00am	8.8	0	S	4
11/01:30am	8.8	0	S	6
11/02:00am	8.8	0	SSE	11
11/02:30am	9.2	0.4	S	13
11/03:00am	9.6	0.4	SSE	9
11/03:30am	9.8	0.2	SSE	9
11/04:00am	10	0.2	S	9
11/04:30am	10.2	0.2	SSW	9
11/05:00am	10.6	0.4	SSW	11
11/05:30am	11	0.4	SSW	9
11/06:00am	11.4	0.4	SSW	13
11/06:30am	11.8	0.4	SW	13
11/07:00am	11.8	0	SSW	11
11/07:30am	11.8	0	SSW	13
11/08:00am	11.8	0	SW	9
11/08:30am	11.8	0	SW	7
11/09:00am	11.8	0	SSW	13
11/09:30am	0	0	SW	11
11/10:00am	0	0	SW	15
11/10:30am	0.2	0.2	SW	9
11/11:00am	0.2	0	SSW	9
12/10:30am	1.2	1	SSE	7
12/11:00am	2	0.8	S	6
12/11:30am	2	0	SSE	7
12/12:00pm	2	0	S	6
12/12:30pm	2.4	0.4	E	2
12/01:00pm	2.4	0	NE	9
12/01:30pm	2.4	0	SSE	15
12/02:00pm	2.4	0	SE	11
12/02:30pm	2.4	0	S	2
12/03:00pm	2.4	0	SE	2
12/03:30pm	2.4	0	NE	2
12/04:00pm	2.4	0	NW	4
12/04:30pm	2.4	0	W	4
12/05:00pm	2.4	0	SE	9

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
12/05:30pm	2.4	0	ESE	13
12/06:00pm	2.4	0	ESE	9
12/06:30pm	2.4	0	ESE	7
12/07:00pm	2.4	0	ESE	7
12/07:30pm	2.4	0	ESE	9
12/08:00pm	2.4	0	ESE	6
12/08:30pm	2.4	0	SE	6
12/09:00pm	2.4	0	SSE	4
12/09:30pm	2.4	0	S	6
12/10:00pm	2.4	0	S	6
12/10:30pm	2.4	0	S	6
12/11:00pm	2.4	0	SSE	6
12/11:30pm	2.4	0	S	6
13/12:00am	2.4	0	S	4
13/12:30am	2.4	0	S	6
13/01:00am	2.4	0	S	6
13/01:30am	2.4	0	S	6
13/02:00am	2.4	0	CALM	0
13/02:30am	2.4	0	CALM	0
13/03:00am	2.4	0	CALM	0
13/03:30am	2.4	0	WSW	4
13/04:00am	2.4	0	SW	6
13/04:30am	2.4	0	SW	4
13/05:00am	2.4	0	CALM	0
13/05:30am	2.4	0	SW	2
13/06:00am	2.4	0	SSW	4
13/06:30am	2.4	0	CALM	0
13/07:00am	2.4	0	CALM	0
13/07:30am	2.4	0	SW	4
13/08:00am	2.6	0.2	SW	7
13/08:30am	3.2	0.6	SE	6
13/09:00am	3.4	0.2	SSE	7
13/09:30am	0.6	0.6	S	9
13/10:00am	1	0.4	SE	9
13/10:30am	1.8	0.8	ESE	11
13/11:00am	2.2	0.4	E	13
13/11:30am	2.4	0.2	ESE	15
13/12:00pm	3	0.6	E	13
13/12:30pm	5	2	NE	6
13/01:00pm	6.8	1.8	CALM	0
13/01:30pm	7.8	1	CALM	0

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
13/02:00pm	8.4	0.6	CALM	0
13/02:30pm	8.6	0.2	N	4
13/03:00pm	9.6	1	N	6
13/03:30pm	10	0.4	WNW	4
13/04:00pm	10.6	0.6	NW	2
13/04:30pm	11.2	0.6	CALM	0
13/05:00pm	11.4	0.2	ENE	4
13/05:30pm	11.4	0	NE	9
13/06:00pm	11.4	0	NE	7
13/06:30pm	11.4	0	ENE	9
13/07:00pm	11.4	0	ENE	9
13/07:30pm	11.4	0	ENE	7
13/08:00pm	11.4	0	NE	7
13/08:30pm	11.4	0	NE	11
13/09:00pm	11.4	0	NE	7
13/09:30pm	11.4	0	NE	7
13/10:00pm	11.4	0	NE	11
13/10:30pm	11.4	0	NNE	4
13/11:00pm	11.4	0	NNE	6
13/11:30pm	11.4	0	NE	7
14/12:00am	11.4	0	NE	6
14/12:30am	11.4	0	NE	4
14/01:00am	11.4	0	CALM	0
14/01:30am	11.4	0	CALM	0
14/02:00am	11.4	0	CALM	0
14/02:30am	11.4	0	WNW	6
14/03:00am	11.4	0	ENE	4
14/03:30am	11.4	0	NNE	6
14/04:00am	11.4	0	NNE	4
14/04:30am	11.4	0	CALM	0
14/05:00am	11.4	0	NNE	4
14/05:30am	11.4	0	NNE	6
14/06:00am	11.4	0	NNE	2
14/06:30am	11.4	0	NNE	2
14/07:00am	11.4	0	CALM	0
14/07:30am	11.4	0	CALM	0
14/08:00am	11.4	0	CALM	0
14/08:30am	11.4	0	NNE	2
14/09:00am	11.4	0	NE	6
14/09:30am	0	0	N	6

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
14/10:00am	0	0	ENE	7
14/10:30am	0	0	ENE	7
14/11:00am	0	0	NW	6
14/11:30am	0	0	N	4
14/12:00pm	0	0	NE	6
14/12:30pm	0	0	N	9
14/01:00pm	0	0	N	11
14/01:30pm	0	0	NNE	13
14/02:00pm	0	0	NNE	15
14/02:30pm	0	0	E	15
14/03:00pm	0	0	ESE	13
14/03:30pm	0	0	ENE	20
14/04:00pm	0.6	0.6	SSE	6
14/04:30pm	2.8	2.2	ENE	19
14/05:00pm	4.4	1.6	E	11
14/05:30pm	5.2	0.8	E	9
14/06:00pm	5.2	0	ESE	9
14/06:30pm	5.2	0	ENE	13
14/07:00pm	5.2	0	E	11
14/07:30pm	5.2	0	E	9
14/08:00pm	5.2	0	SSW	2
14/08:30pm	5.2	0	WSW	2
14/09:00pm	5.2	0	CALM	0
14/09:30pm	5.2	0	CALM	0
14/10:00pm	5.2	0	SE	2
14/10:30pm	5.2	0	SW	6
14/11:00pm	5.2	0	ESE	2
14/11:30pm	5.2	0	CALM	0
15/12:00am	5.2	0	CALM	0
15/12:30am	5.2	0	CALM	0
15/01:00am	5.2	0	NNE	2
15/01:30am	5.2	0	SW	4
15/02:00am	5.4	0.2	WNW	2
15/02:30am	5.4	0	WSW	4
15/03:00am	5.4	0	W	2
15/03:30am	5.4	0	WNW	2
15/04:00am	5.4	0	W	6
15/04:30am	5.4	0	SW	17
15/05:00am	5.4	0	SW	13
15/05:30am	5.4	0	SW	17

Date/Time	Rain Total (mm)	Rain difference (mm)	Wind Direction	Wind Speed (km/h)
15/06:00am	5.4	0	SW	17
15/06:30am	5.4	0	WSW	13
15/07:00am	5.4	0	SW	9
15/07:30am	5.4	0	SW	7
15/08:00am	5.4	0	S	6
15/08:30am	5.4	0	SW	4
15/09:00am	5.4	0	WNW	9
15/09:30am	0	0	WNW	11
15/10:00am	0.2	0.2	CALM	0