14-20 Eldridge Road, Bankstown Opal

Noise Impact Assessment

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1 INTRODUCTION

This report presents our assessment of potential noise impacts associated with the proposed 14-20 Eldridge Road, Bankstown Opal aged care development. In this report we will conduct an external noise impact assessment (primarily traffic noise) and recommend acoustic treatments to ensure that a reasonable level of amenity is achieved for future residents.

This report is based on architectural plans provided to this office from AJ + C Architects with job number 15026.

2 SITE DESCRIPTION

The proposal 14-20 Eldridge Road, Bankstown Opal development includes the construction of a three storey aged care development with one level of basement carparking. This report outlines an assessment of external noise intrusions only into the residential part of the development.

The site is bound to the north by Eldridge Road within the vicinity of the site to the south is and east is Canterbury Road.

Figure 1 below illustrates the site and measurement locations.

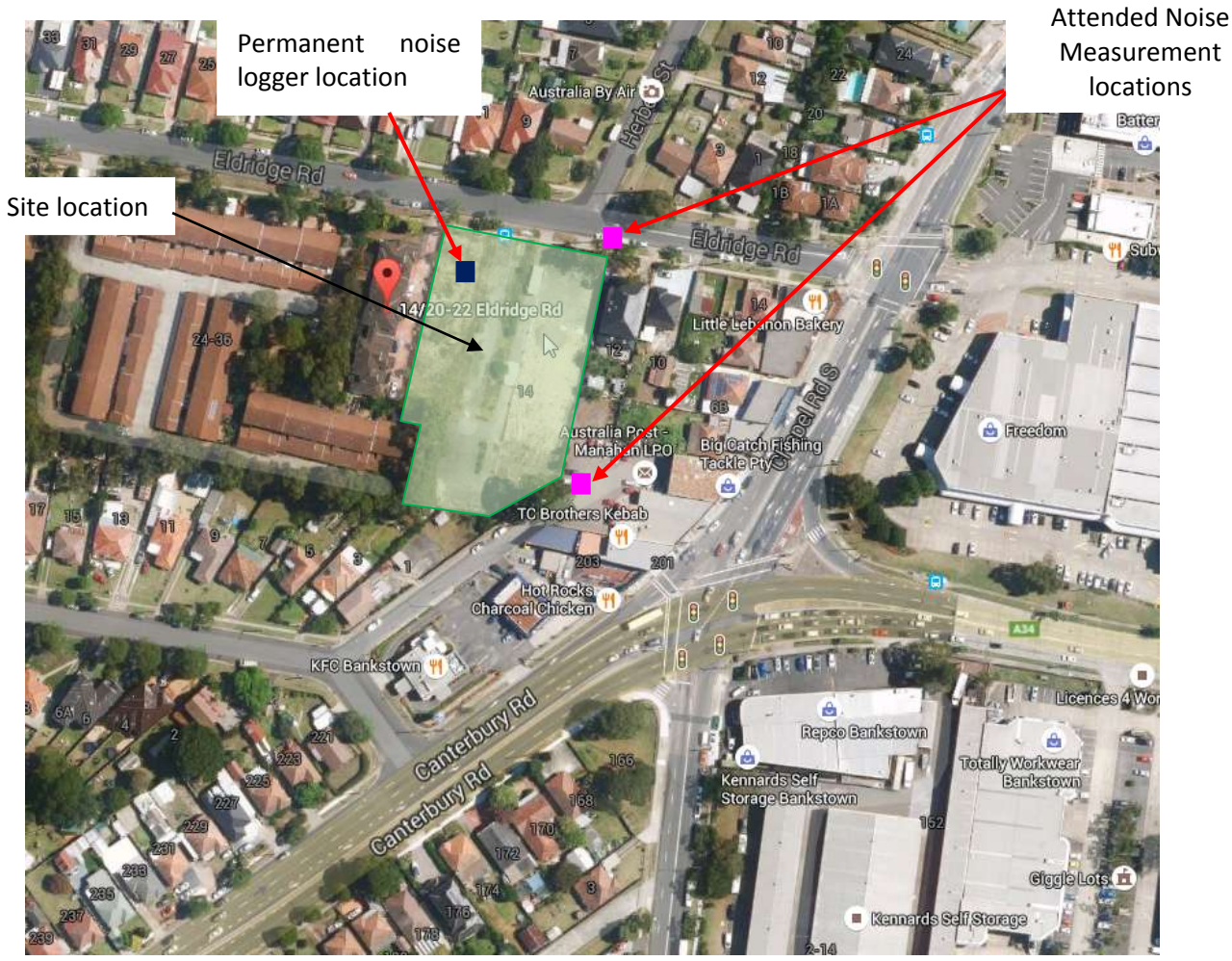


Figure 1 – Site Description

3 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 at the source.

Conversely, the L_{10} 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 measurement 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.

4 NOISE IMPACT ASSESSMENT

This section of the report details the acoustic assessment of traffic noise intrusions into the proposed development.

4.1 ACOUSTIC CRITERIA

In the absence of any relevant acoustic criteria within the local DCP, with regards to external noise impacts on proposed/future developments, the criteria outlined within Australian Standard 2107 – 2000 will be used as the basis of this assessment and the

4.1.1 Australian Standard AS 2107:2000

Australian Standard 2107 – "*Recommended Design Sound Levels and Reverberation Times for Building Interiors*", will be used to establish the suitable internal noise level criteria for the resident units within the proposed development.

Table 1 – Recommended Design Internal Noise Levels

Space /Activity Type		**Recommended maximum design sound level dB(A)$L_{eq(period)}$**
Houses and apartments near minor roads	Sleeping Areas (10pm – 7am)	35
	Living Areas (7am – 10pm)	40

4.1.2 NSW SEPP Infrastructure (2007) (Development near Rail Corridors and Busy Roads – Interim Guideline)

The NSW Department of Planning's policy, Development Near Rail Corridors And Busy Roads – Interim Guideline, sets out internal noise level criteria adapted from the State Environmental Planning Policy (Infrastructure) 2007 (the 'Infrastructure SEPP') for developments with the potential to be impacted by traffic or rail noise and vibration.

For rail noise and vibration, the following controls apply:

"87 Impact of rail noise or vibration on non-rail development

(1) This clause applies to development for any of the following purpose that is on land in or adjacent to a rail corridor and that the consent authority considers is likely to adversely affected by rail noise or vibration:

(a) a building for residential use,

(b) a place of public worship,

(c) a hospital,

(d) an educational establishment or child care centre.

(2) Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Director-General for the purpose of this clause and published in the Gazette.

(3) 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 LAeq levels are not exceed:

(a) in any bedroom in the building – 35 dB(A) at any time between 10.00 pm and 7.00 am,

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

4.1.3 Project Criteria

The subject site is affected by rail and traffic noise thus both of the noise criteria listed above will be applied. The governing project criteria are presented in Table 1.

Table 2 – Internal Noise Level Criteria

LOCATION	PERIOD	CRITERIA
		Average Noise Levels
Bedrooms	Night (10pm – 7am)	35 dB(A) $L_{eq(9hour)}$
Living Areas	All day (24 hrs)	40 dB(A) $L_{eq(24hour)}$

4.2 NOISE MEASUREMENTS

Measurements were performed generally in accordance with the Australian Standard AS 1055 - "Description and measurement of environmental noise - General Procedures". Attended noise measurements were utilised to obtain traffic noise levels at the existing site.

4.2.1 Attended Noise Measurements

Attended traffic noise measurements were obtained at the future façade location on as detailed in Figure 1 above.

4.2.1.1 Time of Measurements

Attended noise measurements were conducted between 4:30pm to 6pm, 29th October, 2015. The highest noise levels recorded on either test occasion has been used as part of this assessment.

4.2.1.2 Measurement Equipment

Noise measurements were obtained using a Norsonics NOR118 precision sound level analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonics Sound Calibrator type 1251. No significant drift was noted.

4.2.2 Unattended Noise Logging

An unattended long-term measurement was carried out along the western boundary of the site to determine noise exposure on the façades as detailed in Figure 1 above.

4.2.2.1 Measurement position

A noise monitor was located approximately 1.5m above the ground and the approximate future building façade.

4.2.2.2 Time of measurements

The long-term monitoring is conducted from 22nd to the 29th October, 2015.

4.2.2.3 Measurement equipment

Equipment used consisted of an Acoustic Research Laboratories Pty Ltd noise logger. The logger was set to A-weighted fast response and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data is provided in Appendix 1.

4.3 MEASURED NOISE LEVELS

The Day Time L_{Aeq} noise levels were derived by test data to the peak hour noise level measured on site and presented in Table 2.

Table 2 – Day Time Traffic Noise Levels

Location	Measured Noise Level dB(A) $L_{eq\ (15\ min)}$
Eldridge Road	63
The south of the site	54

4.4 EVALUATION OF NOISE INTRUSIONS

Internal noise levels will primarily be as a result of noise transfer through the windows, doors and roof; as these are relatively light building elements that offer less resistance to the transmission of sound.

The recommended treatment outlined below are based on calculations, taking into account the orientation of windows, barrier effects (where applicable), the total area of glazing, facade transmission loss and the likely room sound absorption characteristics. In this way the likely internal noise levels can be predicted.

In all cases, the selected glazing type (refer below) reduces internal noise levels to within the nominated criteria for the various space types.

4.4.1 Recommended Glazing

The following tables list the recommended glazing assemblies for this project to achieve the internal traffic noise requirements. All external windows and doors listed are required to be fitted with Q-lon type acoustic seals.

The glazing thicknesses recommended are those needed to satisfy acoustic requirements and do not take into account other requirements such as structural, safety or other considerations. These additional considerations may require the glazing thickness to be increased beyond the acoustic requirement.

Table 3 – Recommended Glazing Construction

Levels	Façade Location	Space	Recommended Glazing	Acoustic Seals
All Levels	Northern Façade (Eldridge Road)	Sleeping Areas	6.38mm laminate	Yes
		Living Areas	6mm toughened	
	Southern Façade	Sleeping Areas	6.38mm laminate	Yes
		Living Areas	6mm toughened	
	Eastern façade	Sleeping Areas	6.38mm laminate	Yes
		Living Areas	6mm toughened	
	Western Façade	Sleeping Areas	6mm toughened	Yes
		Living Areas	6mm toughened	
	Other facdes not facing onto roadway	Sleeping Areas	6mm toughened	Yes
		Living Areas	6mm toughened	Yes

In addition to meeting the minimum glazing thickness requirements given, the design of the window mullions, perimeter seals and the installation of the windows/doors in the building openings shall not reduce the STC rating of the glazing assembly below the values nominated in the table above. **Note that mohair type seals will not be acceptable for the windows requiring acoustic seals.**

The window/door suppliers should provide evidence that the systems proposed have been tested in a registered laboratory with the recommended glass thicknesses and comply with the minimum listed STC requirements. Also, the glazing installer should certify that the window/doors have been constructed and installed in a manner equivalent to the tested samples.

Table 4 – Minimum STC of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum STC of Installed Window
4mm float	27
6mm toughened	29
6.38mm laminated	31

4.4.2 Roof / Ceiling

The proposed roof is acoustically acceptable without additional acoustic treatments.

4.4.3 External Walls

External walls composed of concrete or masonry elements are acoustically acceptable and do not require upgrading.

5 NOISE EMISSION ASSESSMENT

Noise emissions from the site should be assessed to ensure that the amenity of nearby land users is not adversely affected.

Potential noise sources which should be assessed are:

- Noise generated by mechanical plant.

The nearest potentially effected residential receivers are located within proximity to the site.

5.1 BACKGROUND NOISE MONITORING

Measured background noise levels are presented below

Table 5 – Measured Background Noise Levels

Location	Background noise level dB(A)L90		
	Daytime (7am-6pm)	Evening (6pm-10pm)	Night time (10pm-7am)
Fernleigh, Aged Care Facility	45	40	30

5.2 ACOUSTIC OBJECTIVES

As the Local Council does not set out any specific noise emission criteria, the external noise emission from the project site shall be assessed to the requirements of the Environmental Protection Authority (EPA) Industrial Noise Policy guidelines. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The EPA Industrial Noise Policy has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion.

5.2.1 Intrusiveness Criterion

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 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 5.1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

5.2.2 Amenity Criterion

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 EPA Industrial noise policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface. This site is categorised by the surrounding residential receivers as suburban.

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.

Noise emissions to Residential Receivers within the development are to be assessed using the Industrial Noise Policy Amenity and Intrusiveness criteria, as set out below.

Table 6 - Noise Emission Requirements – Surrounding Residential Receivers

Receiver Type	Time of Day	Intrusiveness Noise Objective dB(A)$L_{eq(15min)}$	Amenity Noise Objective dB(A)$L_{eq(Lt)}$
Suburban	Day	**50**	55
	Evening	45	**45**
	Night	**35**	40

Note: Noise levels underlined in the table above will be used as the noise level criteria for the site.

5.2.3 Plant Noise Emissions

A detailed review of all external mechanical plant has not been undertaken at present due to plant selection not currently being available. A fully detailed assessment of treatments will be conducted once plant selections are finalised.

Acoustic treatments should be determined in order for plant noise emissions to comply with requirements outlined in the EPA's INP as detailed in Sections above. Where required, it is envisaged that acoustic treatments could include acoustic barriers, lined ducting and attenuators on any intake or discharge louvers or openings.

6 CONSTRUCTION NOISE IMPACT

This section of the report presents a specification for the processes, which will be followed to manage noise and vibration associated with the proposed construction activities which are required as part of the Project and the potential for noise and vibration impact to receivers within close proximity to the site.

To minimise noise and vibration emissions from the site to adjacent uses during the construction periods this assessment has been undertaken. The principal objective of this study is to undertake an evaluation of works to be performed during the operation of the various activities during the construction (including demolition and excavation) and develop a management plan to ensure noise and vibration is:

1. Minimised to all surrounding receivers.

2. Does not exceed OH&S standards at surrounding receivers.

This assessment will formulate/present the relevant noise and vibration criteria which construction activities are required to comply.

The principal issues, which will be addressed in this report, are:

- Identification of the noise and vibration standards which will be applicable to this project.

- Formulation of a strategy for construction activities to comply with the standards identified in the above point.

- Development at demolition and excavation methods which will minimise the impact on surrounding receivers.

6.1 PROJECT OBJECTIVES

The objective of this management plan is to set up a protocol to ensure noise and vibration emissions from the construction works associated with the Project comply with applicable standards, recommend required management controls and treatments are adopted where required and detail the required monitoring to ensure standards are met.

6.2 PROJECT DESCRIPTION

The project includes the demolition of a portion of the existing building and excavation of material including infill and stone. The expected activities can be expected to include:

1. Demolition of existing buildings.

2. Removal of infill material.

3. Excavation of soft materials and stone.

6.3 CONSTRUCTION NOISE CRITERIA

It is proposed to utilise Australian Standard AS2436:1981 *"Guide to noise control on construction, maintenance and demolition sites"*, which is the standard commonly applied by Councils for the regulation of construction noise, the New South Wales Construction Noise Guideline developed by The NSW Environmental Protection Authority (EPA) and OH&S requirements are presented in this section of the report.

6.3.1 Australian Standard AS2436:1981 "Guide to Noise Control on Construction, Maintenance and Demolition sites

The Australian Standard AS2436 states that where all reasonable and available measures have been taken to reduce construction noise, mitigation strategies may be put in place to reduce levels noise levels to within a reasonable and acceptable level.

For the control and regulation of noise from construction sites AS2436:1981 *"Guide to noise control on construction, maintenance and demolition sites"* nominates the following:

a. That reasonable suitable noise criterion is established,

b. That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes to locations of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours, and

c. The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the demolition, excavation and construction site.

6.3.2 EPA Construction Noise Guideline

The EPA in their recognition that previous construction noise criteria used by the former NSW Environmental Protection Authority (EPA) was unworkable, have developed a specific construction noise guideline in the aid of reducing the impact of construction associated noise.

The guideline reflects on feasible and reasonable mitigation strategies, management controls and public liaising in the effort to reach realistic comprises between construction sites and potential noise affected receivers.

6.3.3 EPA Construction Noise Guideline - Qualitative Assessment Method

The guideline refers to a qualitative assessment method in which construction noise is assessed on a case by case basis with regard to various activities to be conducted on site. This assessment method was developed to smaller scale projects.

Essentially this method of assessment requires that the proponent take into consideration and employ all reasonable and feasible measures to ensure that the impact on noise receivers is minimised. This is generally conducted in the following manner:

- The drafting of a noise management plan outlining all reasonable and feasible mitigation methods for the reduction of noise impact;
- The assessment of high impact equipment such as rock-hammers and piling equipment for lower noise producing methods of construction/excavation;
- The implementation of a complaints handling register and community consultation system;
- Employee (builders, contractors etc) education in effective noise reducing techniques and site etiquette; and
- The operation of plant in a quiet and efficient manner (i.e. turning off machinery when not in use).

This qualitative assessment method has been used for the basis of this report and has been used as the basis for the development of acoustic management and treatments of proposed construction activities.

In addition, the guideline specifies goals which can be used in the effort of minimising noise from construction related activities. These noise goals are presented within the table below.

Table 7 – DECC Recommended Construction Noise Goals

Governing Body	Receiver Type	External sound level Goal, $L_{eq\ 15\ min}$ dB(A)
EPA	Residential (also adopted for school receivers)	Background + 10 dB(A)[1]
		75 dB(A)[2]

1: Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. (DECC CNG, 2008).

2: Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided. (DECC CNG, 2008).

These criteria for resultant noise from construction activities are aimed at maintaining comfort levels within the surrounding residential dwellings. Additionally, noise mitigation techniques as discussed in this report should be used if noise emissions exceed the above criteria. All work is to be carried out in accordance with AS 2436:1981 *"Guide to noise control on construction, maintenance and demolition sites"*.

6.3.4 OH&S guidelines

Regulation 49 of the Occupational Health and Safety Regulation specifies maximum levels of noise which a 'worker' may be exposed to. Acoustic treatment to the work environment or hearing protection is recommended for workers exposed to higher noise levels. These maximum OH&S noise levels are presented in the table below.

Table 8 – OH&S Maximum Noise Level Exposure

	Energy Averaged Over 8 Hour Day	**Maximum Noise Level During Day**
OH&S maximum noise level exposure	85 dB(A) L_{eq}	140 dB(C)$_{Peak}$

6.4 CONSTRUCTION VIBRATION CRITERIA

Construction vibration criteria associated with works on the Project when measured at the potentially affected receivers should not exceed the following sets of vibration criteria to ensure no architectural or structural damage to surrounding buildings and human comfort is maintained. These standards have been selected as they are widely used in the assessment of vibration associated with construction activities within Australia, namely:

- German Standard DIN 4150-3 (1999-02): *"Structural Vibration – Effects of Vibration on Structures"*; and
- British Standard BS 6472:1992 *"Guide to Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)*.

The criteria and the application of these Standards are discussed in separate sections below.

6.4.1 German Standard DIN 4150-3 (1999-02)

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in the Table below.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 9 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			**Plane of Floor of Uppermost Storey**
		< 10Hz	**10Hz to 50Hz**	**50Hz to 100Hz**	**All Frequencies**
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (eg buildings that are under a preservation order)	3	3 to 8	8 to 10	8

6.4.2 British Standard BS 6472:1992

British Standard BS 6472:1992 develops criteria relating to levels of building vibration that may be expected to give rise to *"adverse comment"*, in the frequency range most applicable to impacts associated with construction, which is 1 to 80Hz. These threshold values are used as criteria for assessing the loss of amenity and are presented below in Table 3.

Table 10 – BS 6472:1992 Criteria to Avoid *"Adverse Comment"*

Type of Occupancy	Time of Day	Peak Particle Velocity (mms^{-1}) between 1Hz to 80Hz Likely to Cause *"Adverse Comment"*			
		Continuous Vibration		Intermittent Vibration and Impulsive Vibration Excitation with Several Occurrences per day	
		Vertical	Horizontal	Vertical	Horizontal
Residential	Day	0.3 to 0.6	0.8 to 0.6	8.4 to 12.6	24 to 36
	Night	0.2	0.6	2.8	8
Offices	Day	0.6	1.6	18	51
	Night	0.6	1.6	18	51
Workshops	Day	1.2	3.2	18	51
	Night	1.2	3.2	18	51

The limits indicate that people in buildings are significantly less susceptible to horizontal vibration than to vertical vibration. Furthermore, Section 4.1 of BS 6472 notes that situations can exist where vibration magnitudes above those generally corresponding to minimal *"adverse comment"* levels can be tolerated, particularly for temporary disturbances and infrequent and intermittent events such as those associated with construction projects.

6.5 MINIMISING NOISE AND VIBRATION IMPACT

In addition to the noise and vibration standards presented in this report, demolition and excavation activities are to be selected and managed with the aim of minimising the impact on the animal research facility.

As there are no standards or criteria for noise and vibration which will negatively impact the research animals it is proposed that noise and vibration be managed to limit impact on the facility. Based on discussions with research staff and a site inspection management controls presented within this report are those which represent the possible and practical methods for limiting noise and vibration impact on the facility.

During the construction phase of the project it is important that ongoing consultation and communication between Richard Crooks Constructions, Acoustic Logic Consultancy and the surrounding users is maintained.

6.6 CONSTRUCTION HOURS

Woking hours are subject to planning approval conditions.

6.7 CONTROL OF CONSTRUCTION NOISE AND VIBRATION

As a part of the noise management of noise and vibration on each site the following process should be conducted when investigating the impact and construction activities.

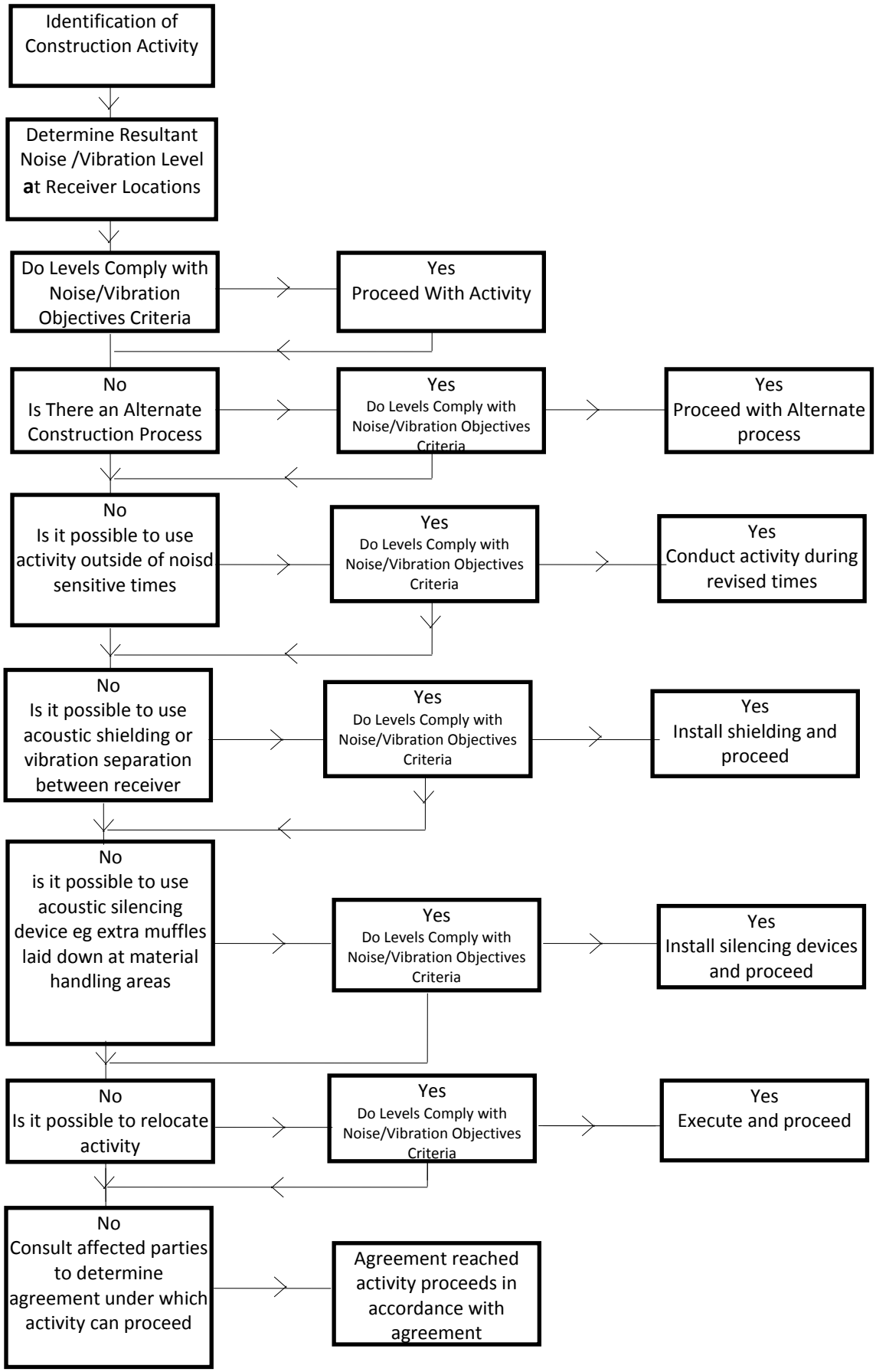


Figure 1 – Process Flowchart

6.8 NOISE AND VIBRATION CONTROL METHODS

The determination of appropriate noise control measures will be dependant on the particular activities and construction appliances. This section provides an outline of available methods.

6.8.1 Selection of alternate appliance or process

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance. For example; the use of a hydraulic hammer on certain areas of the site may potentially generate high levels of noise. By carrying this activity by use of pneumatic hammers, bulldozers ripping and/or milling machines lower levels of noise will result.

6.8.2 Acoustic Barrier

Barriers or screens can be an effective means of reducing noise. Barriers can be located either at the source or receiver.

The placement of barriers at the source is generally only effective for static plant (tower cranes). Equipment which is on the move or working in rough or undulating terrain cannot be effectively attenuated by placing barriers at the source.

Barriers can also be placed between the source and the receiver.

The degree of noise reduction provided by barriers is dependant on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15dB(A) can be effected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8dB(A) may be achieved. Where no line of sight is obstructed by the barrier, generally no noise reduction will occur.

As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance that is approximately 10dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10mm or 15mm thick plywood (radiata plywood) would be acceptable for the barriers.

6.8.3 Silencing devices

Where construction process or appliances are noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

6.8.4 Material handling

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

6.8.5 Treatment of specific equipment

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

6.8.6 Establishment of Site Practices

This involves the formulation of work practices to reduce noise generation. A noise plan will be developed for this project outlining work procedures and methods for minimising noise.

6.8.7 Regular noise checks of equipment

To determine the requirement for silencing devices on machinery it is proposed to undertake fortnightly noise check. Noise levels of all machines on site will be measured and if they are found to be higher than nominated for that equipment type, items such as mufflers and engine shrouds will be examined to ensure they are in good working order.

A record of these measurements will be kept on a form similar to that shown in Appendix 1. This measure is expected to maintain noise at constant levels, and prevent any increases.

6.8.8 Treatment of Existing Equipment

An effective method of mitigating vibration on existing equipment would be to vibration isolated mounts to existing equipment and installations. Vibration isolation would be required to be investigated on a case by case basis and consist of neoprene mounts as specified (such as waffle pads, supershear flex or the like).

Based on investigations conducted at the site the areas which may be suitable for treatment include tables with sensitive equipment such as microscopes and the like.

6.8.9 Noise and vibration Monitoring

Noise and vibration monitoring will be undertaken to determine the effectiveness of measures which are been implemented. The results of monitoring can be used to devise further control measures.

6.8.10 Combination of methods

In some cases it may be necessary that two or more control measures be implemented to minimise noise.

6.8.11 Saw cutting

Introduction of a saw cut to manage vibration impacting on surrounding receivers from construction activities.

6.9 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

6.9.1 Establishment of Direct Communication with Affected Parties

In order for any construction noise management programme to work effectively, continuous communication is required between all parties, which may be potentially impacted upon including the builder and neighbours. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation processes is to:

- Inform and educate the groups about the project and the noise controls being implemented;
- Increase understanding of all acoustic issues related to the project and options available;
- Identify group concerns generated by the project, so that they can be addressed; and
- Ensure that concerned individuals or groups are aware of and have access to the Richard Crooks Complaints Register which will be used to address any construction noise related problems should they arise.

To ensure that this process is effective, regular information regarding the proposed works and period when they will be required to be conducted should be provide to neighbouring receivers, until all issues have been addressed and the evidence of successful implementation is embraced by all parties.

6.9.2 Dealing with Complaints

Should ongoing complaints of excessive noise or vibration criteria occur measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices. In the case of exceedances of the vibration limits all work potentially producing vibration shall cease until the exceedance is investigated.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and location of the complainant (if provided);
- The time and date the complaint was received;
- The nature of the complaint and the time and date the noise was heard;
- The name of the employee who received the complaint;
- Actions taken to investigate the complaint, and a summary of the results of the investigation;
- Required remedial action, if required;
- Validation of the remedial action by a consultant or as detailed in this report; and
- Summary of feedback to the complainant.

A permanent register of complaints should be held.

All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable;

- noise measurements at the affected receiver;
- an investigation of the activities occurring at the time of the incident;
- inspection of the activity to determine whether any undue noise is being emitted by equipment; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

Where an item of plant is found to be emitting excessive noise or vibration, the cause is to be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines should be modified so as to reduce noise emissions to acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees should be carried out.

Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable.

7 CONTINGENCY PLANS

Where non-compliances or noise complaints are raised the following methodology will be implemented.

1. Determine the offending plant/equipment/process

2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.

3. Implement additional acoustic treatment in the form of localised barriers, silencers, vibration separation etc where practical.

4. Selecting alternative equipment/processes where possible

Complaints associated with noise and vibration generated by site activities shall be recorded on a Noise Complaint Form. The person(s) responsible for complaint handling and contact details for receiving of complaints shall be established on site prior to construction works commencing. A sign shall be displayed at the site indicating the Site Manager to the general public and their contact telephone number.

8 CONCLUSION

Traffic noise intrusions into the resident units of the proposed 14-20 Eldridge Road, Bankstown Opal aged care development have been assessed in this report.

The acoustic assessment has revealed that it is both possible and practical to acoustically treat the proposed development such that internal noise level comply with the relevant noise level criterion.

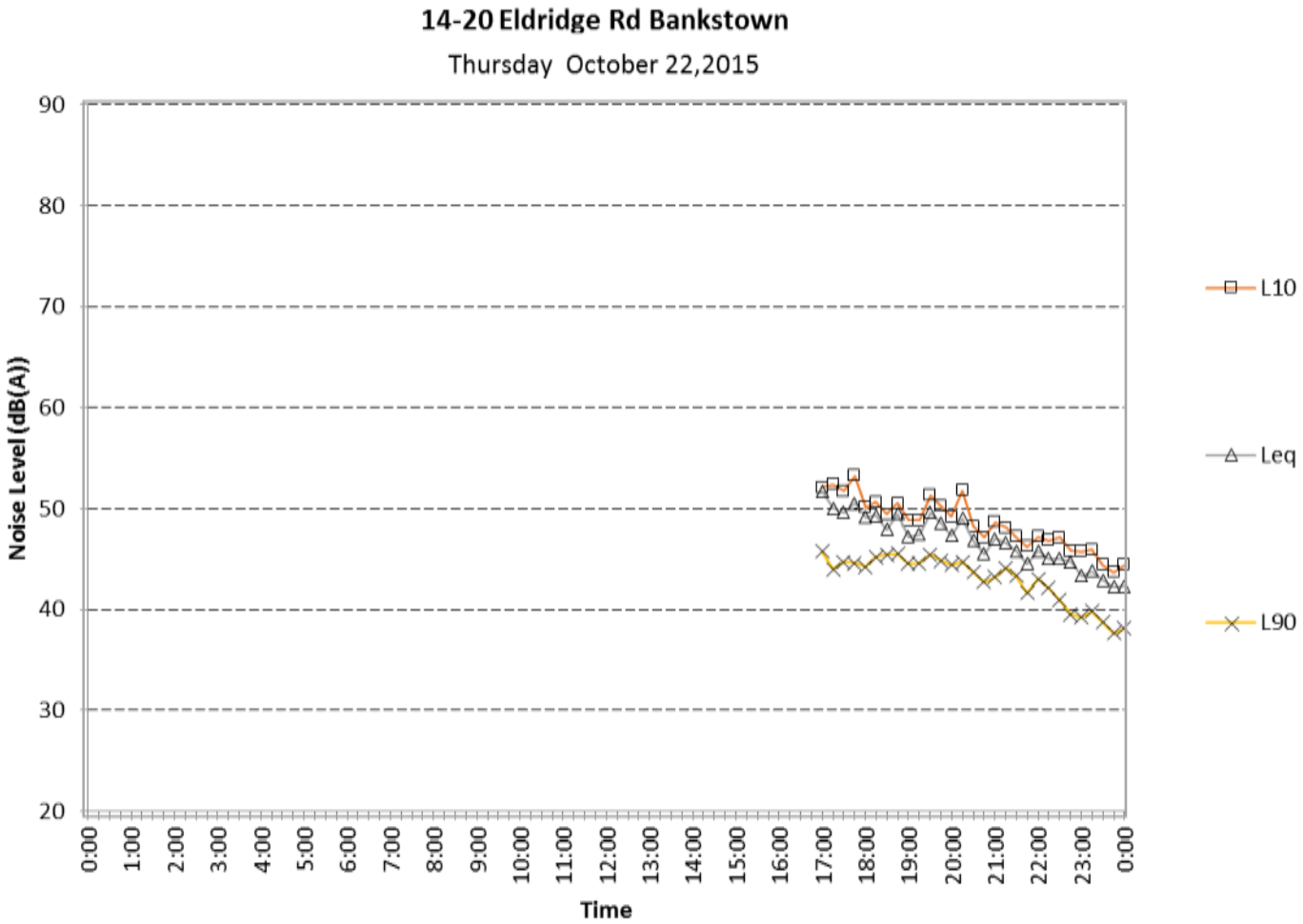
Noise emissions objectives for the site has been determined based on on-site noise measurements and noise emission guidelines as per the EPA's industrial noise policy, and have been presented.

The proposed acoustic mitigation of noise and vibration generated during the construction of the project has also been presented in Section 7, based on the requirements of the Australian Standard AS2436 and the EPA's Construction Noise Guildline.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Ben White

APPENDIX 1: NOISE LOGGING DATA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Thursday October 22,2015
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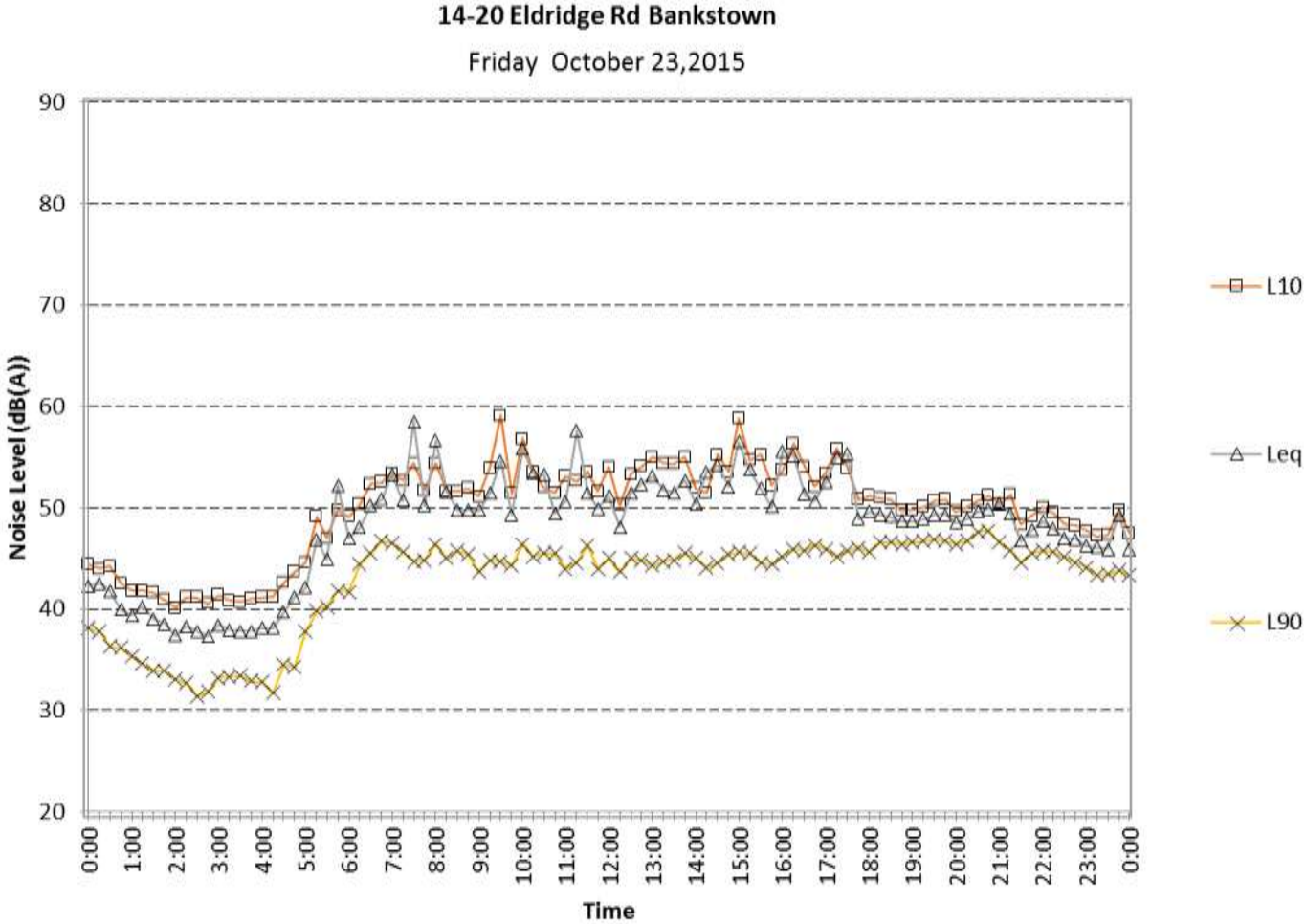
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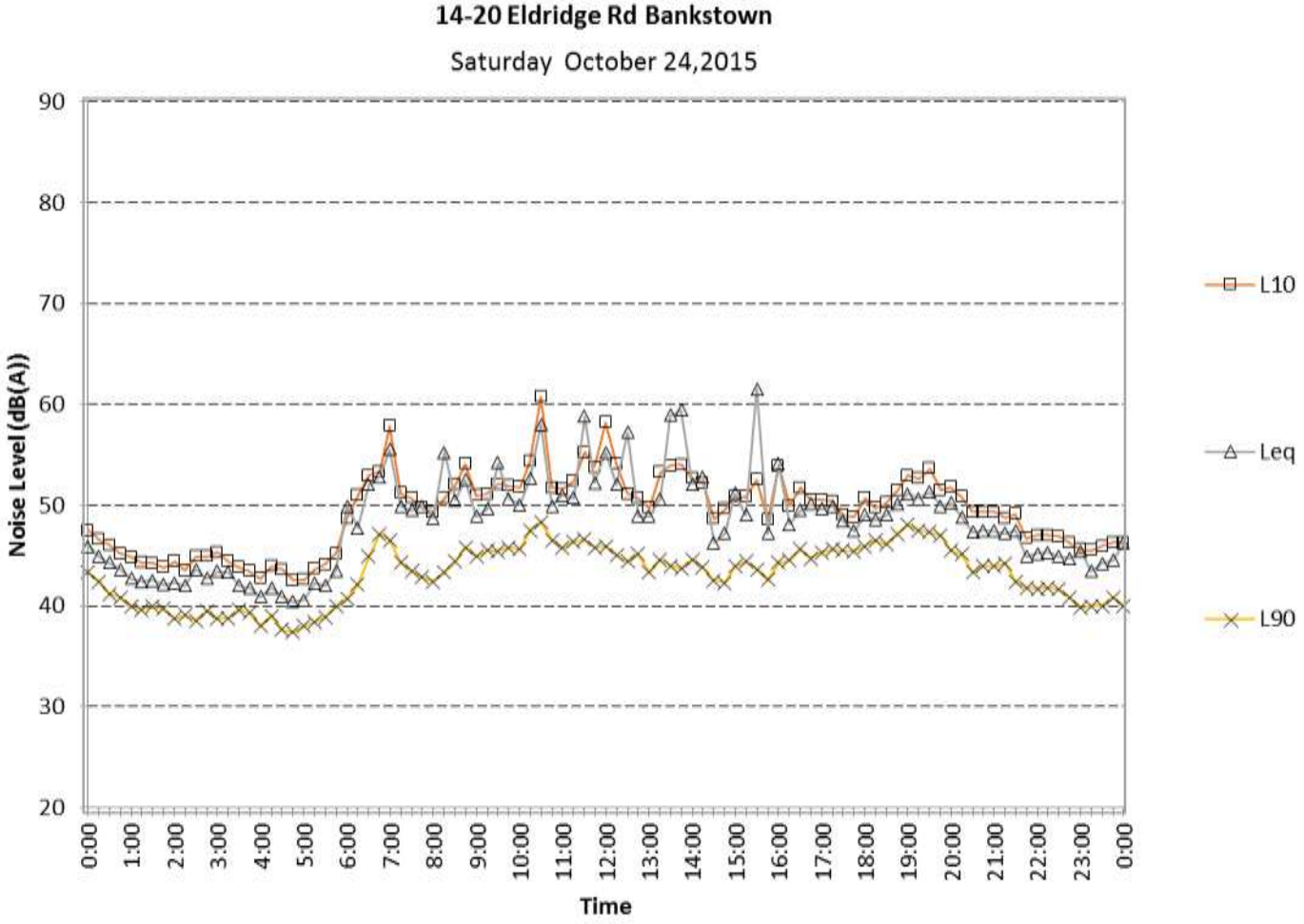
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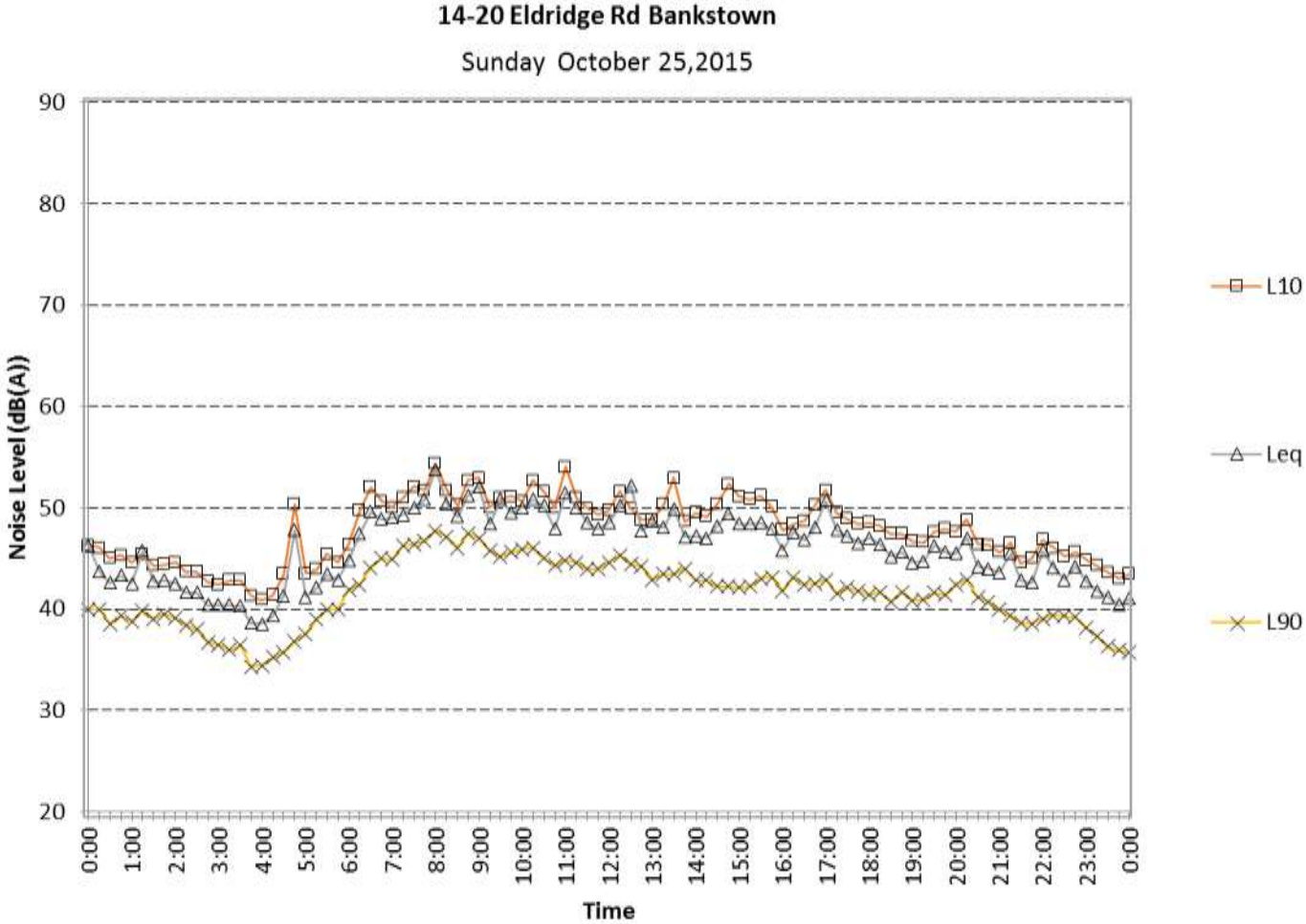
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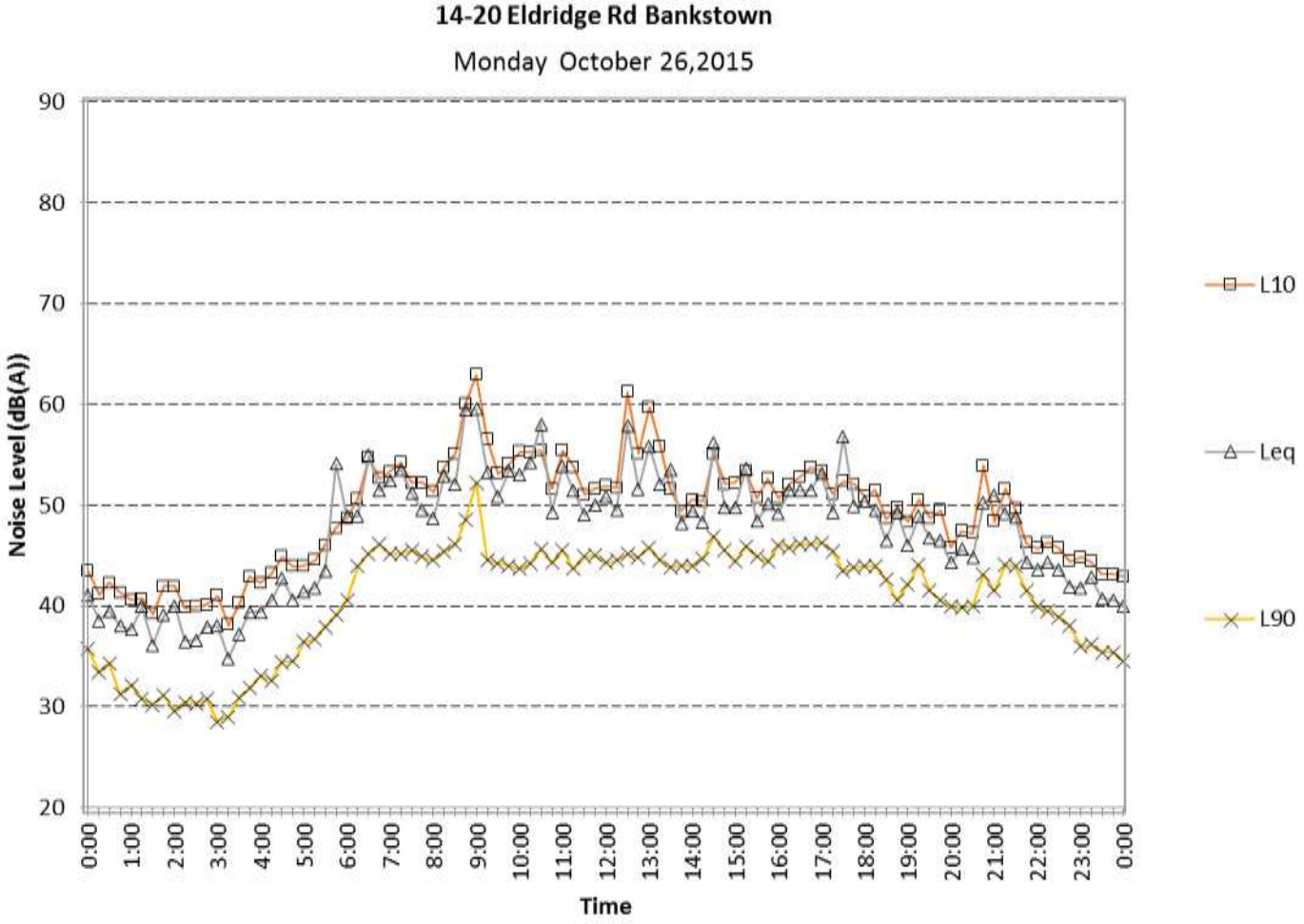
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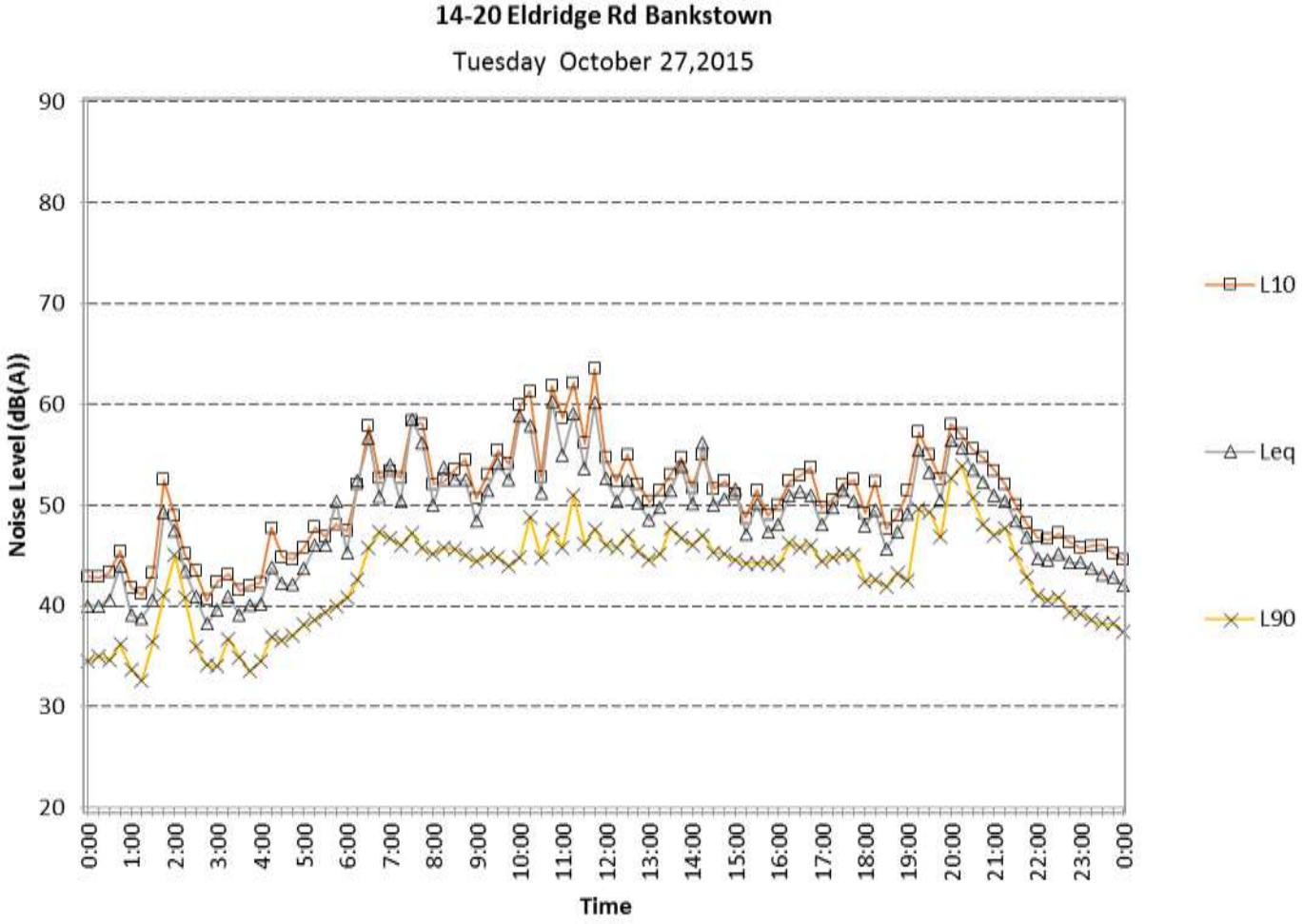
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Noise Level (dB(A))
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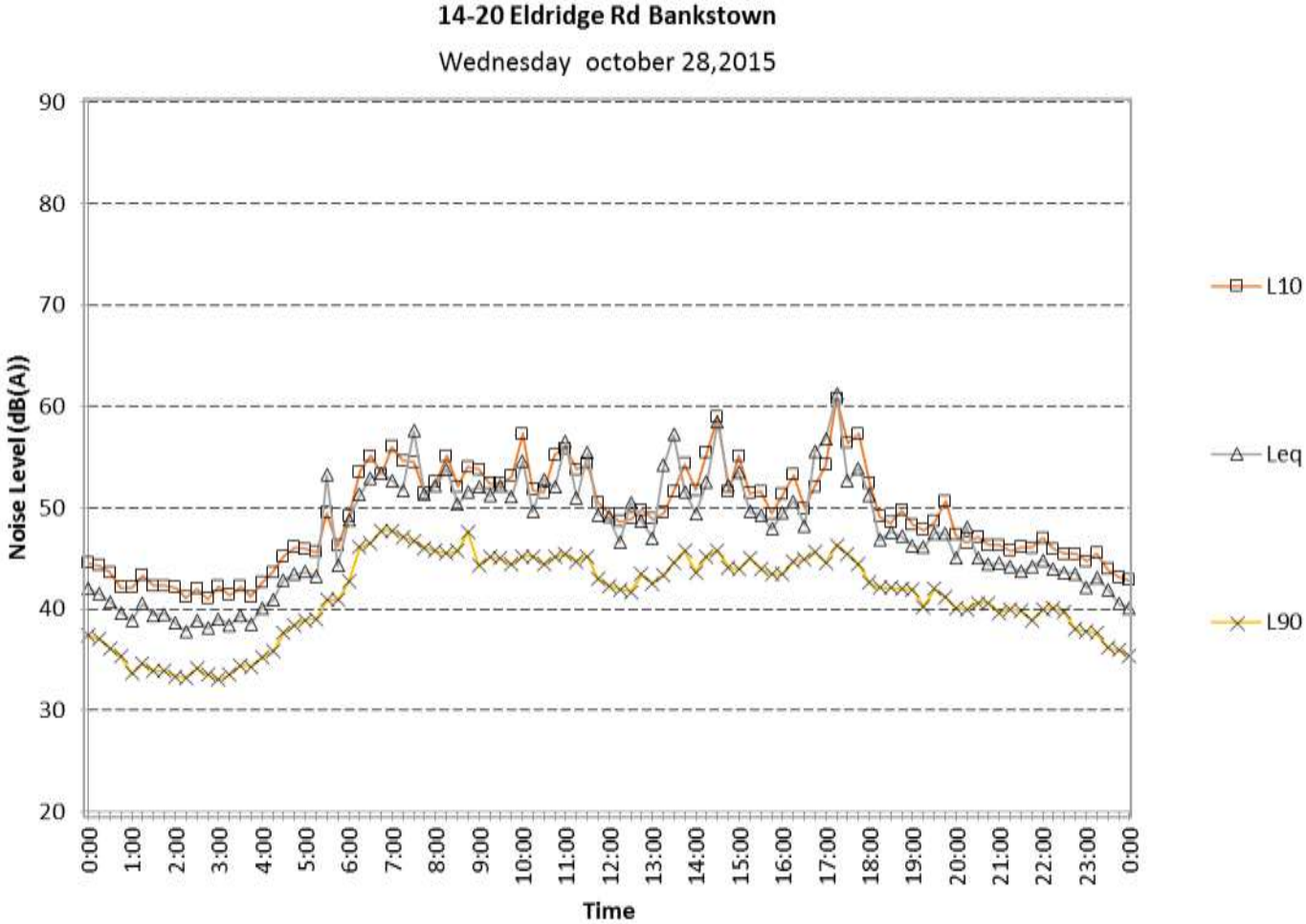
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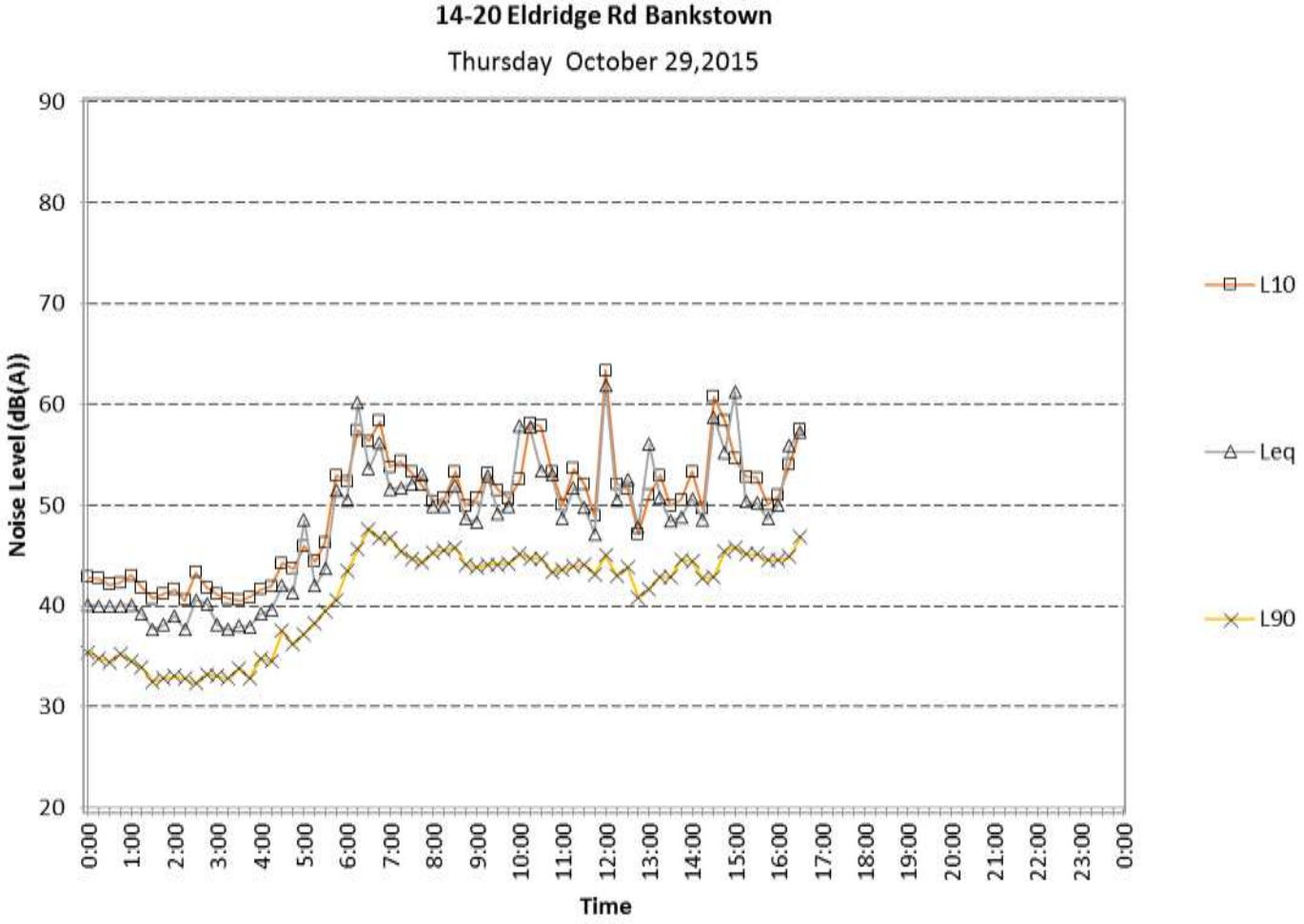
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