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ADVANTAGED CARE AT EDENSOR PARK

Acoustic Assessment for Development Application

23 February 2016

Advantaged Care

TH627-01F02 Acoustic Assessment for Development Application (r3)

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1 Introduction

This report presents an assessment of noise intrusion into, and operational noise from the proposed aged care development known as Edensor Gardens located at 13 Booralla Road, Edensor Park, New South Wales.

This study examines the effects of external noise intrusion onto the proposed development from nearby ambient noise sources. Noise surveys have been conducted by Renzo Tonin & Associates between Wednesday 16th September and Wednesday 23rd September 2015 at the development site to determine the existing levels of ambient noise at the site. These levels were used to predict noise levels within the property, and then assessed against the recommended internal noise criteria for the project.

As a result of our assessment of the following potential acoustic items were identified;

- Existing and future traffic noise from extension of Scarcella Place and Sweethaven Road intruding into the development;
- Existing and future traffic noise from Booralla Road intruding into the development;
- Mechanical services noise emission from the proposed aged care facility; and
- Noise and vibration emission from construction activities and equipment.

This report presents an assessment of the above acoustic components in terms of Council's Development Control Plans, State Environmental Planning Policy (Infrastructure) 2007 and Australian Standards.

The measured traffic noise levels at the building facades were used to determine the sound insulation rating requirements for the external building elements in accordance with the acoustic criteria nominated for this development.

In regard to acoustic privacy, this is generally satisfied through the requirements of the Building Code of Australia which all new residential development would need to comply.

Further detailed discussion of the identified acoustic factors is set out within this report.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

The assessment has been undertaken based on the following plans prepared by Integrated Design Group

Drawing No.	Title	Revision
0101	site/roof plan	RevD
1000	basement plan	RevD
1100	lower ground floor plan	RevD
1101	upper ground floor plan	RevD
1102	first floor plan	RevD
2000	elevations	RevC
3000	sections	RevB

2 Site and surrounds

The proposed development at 13 Booralla Road, Edensor Park is to consist of an aged care facility consisting of basement car parking, upper and lower ground floor and level 1 care units and amenities. The development is to accommodate a total of 279 residences with access to the development is via the extension of Scarella Place and Sweethaven Road.

The site location is predominantly surrounded by residential homes, villas and townhouses, and parklands.

Long term noise monitoring has been undertaken at the site to determine the existing acoustic environment.

Figure 1: Site Location and Surrounds

3 Internal noise criteria

A number of documents were taken into consideration when determining suitable criteria for the proposed development site. These included:

- State Environment Planning Policy (Infrastructure) 2007 **["ISEPP"]**
- Department of Planning publication "Development Near Rail Corridors & Busy Roads – Interim Guideline" 2008 **["ISEPP Guideline"]**

The roads surrounding the site do not exceed an annual average daily traffic volume (AADT) of more than 20,000 vehicles per day, so therefore, the ISEPP is not invoked.

Nonetheless, the criteria determined in the Department of Planning's Guideline are considered the most appropriate criteria for this development site and is summarised in the table below.

Table 1 summarises the recommended design sound levels for building interiors in the proposed development.

Table 1: Recommended design sound levels for building interiors

Occupancy	Windows & Doors Condition	Design Noise Level	
		Day, $L_{Aeq\ (15hour)}$	Night, $L_{Aeq\ (9hour)}$
Sleeping areas	Closed	-	35 dB(A)
Living Areas	Closed	40 dB(A)	40 dB(A)
Apartment common areas	Closed	55 dB(A)	55 dB(A)

APPENDIX C presents results of the unattended ambient noise survey conducted on site.

4 Measured and predicted noise levels

4.1 Long-term noise survey

Two RTA Technology Environmental Noise Loggers were set up for the ambient noise survey Thursday 18th to Friday 26th September 2015. One logger was positioned at the West end of the site at the boundary looking onto Furci Avenue. A second logger was positioned at the South-East end of the site at the Booralla Road boundary of the site. (Refer to Appendix C for more detail).

The noise logger records noise levels on a continuous basis and stores data every fifteen minutes. The noise loggers were calibrated before and after measurements and no significant deviation in calibration was noted. The noise monitoring equipment used here complies with Australian Standard 1259.2-1990 "Acoustics - Sound Level Meters" and is designated as Type 2 instruments suitable for field use.

The dates of measurement and the results obtained from the logger survey are shown in APPENDIX C.

Section 5 of this report recommends acoustic performance requirements for the glazed facades of the development.

The design external traffic noise levels are presented below.

Table 2: Predicted external noise levels

Facade	Time Period	Design Noise Level LAeq,T
Western facade (Furci Avenue)	Day time (7am to 10pm)	59 dB(A)
	Night time (10pm to 7am)	53 dB(A)
South-Western facade (Booralla Road)	Day time (7am to 10pm)	56 dB(A)
	Night time (10pm to 7am)	48 dB(A)

Note: 1. at 1m from façade, centrally positioned along the façade width

Results from the noise surveys were used to calculate internal noise levels within the proposed development. Noise calculations were performed using glazing design software developed in this office which take into account external noise levels, facade transmission loss and room sound absorption characteristics.

5 Control of External noise – window glazing

5.1 Glazing

To achieve the criteria outlined in Table 1 with windows closed, the following table presents the recommended glazing acoustic performances for the proposed development.

Table 2: Recommended acoustic performance of glazing assembly

Facade	Level(s)	Occupancy	Required Acoustic Rating of Glazing Assembly, Rw
		Building 1	
All facades	All levels	Sleeping Areas	Rw 25
		Common living, dining and recreation areas	Rw 25

1. Notes:
2. The client is advised not to commence detailing or otherwise commit to partition construction systems which have not been tested in an approved laboratory or for which an opinion only is available. Testing of partition construction systems is a component of the quality control of the design process and should be viewed as a priority because there is no guarantee the forecast results will be achieved thereby necessitating the use of an alternative which may affect the cost and timing of the project. No responsibility is taken for use of or reliance upon untested partition construction systems, estimates or opinions. The advice provided here is in respect of acoustics only.
3. The information in this table is provided for the purpose of Council approvals process and cost planning and shall not be used for construction unless otherwise approved in writing by the acoustic consultant.
4. The design in this table is preliminary and a comprehensive assessment shall be conducted prior to Construction Certification.
5. Before committing to any form of construction or committing to any builder, advice should be sought from an acoustic consultant to ensure that adequate provisions are made for any variations which may occur as a result of changes to the form of construction where only an "estimate" is available for the sound insulation properties of recommended materials.
6. The glazing supplier shall ensure that installation techniques will not diminish the Rw performance of the glazing when installed on site.
7. All openable glass windows and doors shall incorporate full perimeter acoustic seals equivalent to Q-Lon, which enable the Rw rating performance of the glazing to not be reduced.
8. The above glazing thicknesses should be considered the minimum thicknesses to achieve acoustical ratings. Greater glazing thicknesses may be required for structural loading, wind loading etc.

5.2 Mechanical ventilation

In accordance with the Department of Planning's publication "Development Near Rail Corridors & Busy Roads – Interim Guideline" 2008, it states;

> *If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.*

It has long been industry standard to assume a 10dB loss of noise from external to internal through an opened window in a building facade. It is based on the average results of a number of test cases, experimental data and published papers. This assumption has been well documented in The Roads and Traffic Authority (RTA) publications, including the RTA's Environmental Noise Management Manual (ENMM), Table 4.2.

Based on this assumption, internal noise levels with windows opened can be achieved all areas of the development and do not require an alternative ventilation design.

6 External noise emission

6.1 EPA Requirements

The NSW Environment Protection Authority (EPA) sets out noise criteria in its Industrial Noise Policy (INP) to control the noise emission from industrial sources.

The NSW Industrial Noise Policy (INP) sets criteria to protect noise amenity for residential receivers. The basis for its policy relies on two components:

- controlling intrusive noise impacts in the short term for residences, and
- maintaining noise level amenity for particular land uses for residences and other land uses.

Noise intrusiveness ensures that industrial noise does not exceed the existing background noise level by an excessive margin. This is commonly referred to as the 'background plus 5' criterion, that is, that the noise level from the new industrial development should not exceed the existing background noise level (measured in the absence of that development) by more than 5dB(A).

Noise amenity ensures that industrial noise levels do not increase without limit, for if a number of industrial noise sources are permitted to increase the background noise level by 5dB(A), in turn there would be a point where the ultimate noise level is unacceptable. A limit on the ultimate acceptable noise level is therefore included in the INP as a way of ensuring that cumulative noise impact from industrial growth is curtailed. This limit is referred to as the amenity goal. The appropriate limit in any circumstance relates to the land use category, for example, there are different limits for rural, suburban and urban areas. The table below presents the amenity criteria relevant to the receivers surrounding the proposed development site.

Table 3: INP Amenity Criteria - Recommended LAeq Noise Levels from Industrial Noise Sources [NSW INP Table 2.1]

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended LAeq(Period) Noise Level	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50
	Urban/Industrial Interface - for existing	Day	65	70
		Evening	55	60

	situations only	Night	50	55
Area specifically reserved for passive recreation (e.g. National Park)	All	When in use	50	55
Active recreation area (e.g. school playground, golf course)	All	When in use	55	60
Commercial premises	All	When in use	65	70
Industrial premises	All	When in use	70	75

Note:

Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am

On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.

The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

The modification factors in Table 2.2 of the INP (summarised in the table below) are to be applied where the total existing LAeq noise level from *industrial* sources are within 6dB of the acceptable noise level (ANL) presented in the table above.

Table 4: Modification to Acceptable Noise Level (ANL)* to Account for Existing Level of Industrial Noise [NSW INP Table 2.2]

Total Existing LAeq noise level from Industrial Noise Sources	Maximum LAeq Noise Level for Noise from New Sources Alone, dB(A)
≥ Acceptable noise level plus 2	If existing noise level is likely to decrease in future: acceptable noise level minus 10 If existing noise level is unlikely to decrease in future: existing noise level minus 10
Acceptable noise level plus 1	Acceptable noise level minus 8
Acceptable noise level	Acceptable noise level minus 8
Acceptable noise level minus 1	Acceptable noise level minus 6
Acceptable noise level minus 2	Acceptable noise level minus 4
Acceptable noise level minus 3	Acceptable noise level minus 3
Acceptable noise level minus 4	Acceptable noise level minus 2
Acceptable noise level minus 5	Acceptable noise level minus 2
Acceptable noise level minus 6	Acceptable noise level minus 1
< Acceptable noise level minus 6	Acceptable noise level

* ANL = recommended acceptable LAeq noise level for the specific receiver, area and time of day from Table 2.1 (INP)

From observations at the proposed development site, the current LAeq noise level measured at the proposed development site are dominated by existing industrial noise, therefore the modifying factors in Table 2.2 above have been applied to the measured LAeq noise levels.

The following table presents the site specific noise production criteria from industrial noise sources, namely mechanical plant.

Table 5: LAeq design criterion for noise production from mechanical plant (EPA INP) on Furci Avenue

Time of Day	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
	Rating Background Level (RBL) LA90	Intrusiveness Criterion (RBL+5)	Amenity Criterion - Acceptable	Measured LAeq Ambient Noise Levels	LAeq exceed amenity criterion?	Existing noise level likely to decrease in future?	Relevant modification to ANL?	Project Specific Design Criterion LAeq
Day (7am to 6pm)	39	44	55	57	Yes -2dB	No	Existing LAeq minus 10dB - 47dB(A)	44
Evening (6pm to 10pm)	38	43	45	55	Yes 10dB	No	Existing LAeq minus 10dB - 45 dB(A)	43
Night (10pm to 7am)	32	37	40	51	Yes 6dB	No	Existing LAeq minus 10dB - 41dB(A)	37

Explanatory notes:

Column 3 – Recommended LAeq noise level based on 'Residence –Suburban' area in Section 2.2, Table 2.1 Amenity Criteria (Recommended LAeq noise levels from industrial noise sources) of the EPA's INP.

Column 4 - Measured in accordance with the INP

Column 7 - Determined from Table 2.2 of the INP

Column 8 – Project Specific Design Criterion based on EPA's INP - lesser of modified ANL and Intrusiveness Criterion.

Table 6: LAeq design criterion for noise production from mechanical plant (EPA INP) on Booralla Road

Time of Day	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
	Rating Background Level (RBL) LA90	Intrusiveness Criterion (RBL+5)	Amenity Criterion - Acceptable	Measured LAeq Ambient Noise Levels	LAeq exceed amenity criterion?	Existing noise level likely to decrease in future?	Relevant modification to ANL?	Project Specific Design Criterion LAeq
Day (7am to 6pm)	42	47	55	55	No 0dB	No	Acceptable LAeq minus 8dB - 47dB(A)	47
Evening (6pm to 10pm)	41	46	45	49	Yes -4dB	No	Existing LAeq minus 10dB - 39dB(A)	39
Night (10pm to 7am)	34	39	40	45	Yes 5dB	No	Existing LAeq minus 10dB - 35dB(A)	35

Explanatory notes:

Column 3 – Recommended LAeq noise level based on 'Residence –Suburban' area in Section 2.2, Table 2.1 Amenity Criteria (Recommended LAeq noise levels from industrial noise sources) of the EPA's INP.

Column 4 - Measured in accordance with the INP

Column 7 - Determined from Table 2.2 of the INP

Column 8 – Project Specific Design Criterion based on EPA's INP - lesser of modified ANL and Intrusiveness Criterion

Where necessary, noise amelioration treatment will be incorporated in the design to ensure that noise levels comply with the recommended EPA's INP noise emission criteria noted above.

At this stage details of mechanical plant have not been finalised, however it is understood that the plant is to be located centrally to reduce impacts on neighbouring residential receivers. The following in-principal recommendations are provided.

Acoustic assessment of mechanical services equipment will need to be undertaken during the detail design phase of the development to ensure that they shall not either singularly or in total emit noise levels which exceed the noise limits in EPA's Industrial Noise Policy or Council's requirements;

As noise control treatment can affect the performance of the mechanical services system, it is recommend that consultation with an acoustic consultant be made during the initial phase of mechanical services system design in order to reduce the need for revision of mechanical plant and noise control treatment;

Mechanical plant noise emission can be controllable by appropriate mechanical system design and implementation of common engineering methods that may include any of the following:

- procurement of 'quiet' plant,
- strategic positioning of plant away from sensitive neighbouring premises, maximising the intervening shielding between the plant and sensitive neighbouring premises,
- commercially available silencers or acoustic attenuators for air discharge and air intakes of plant;
- acoustically lined and lagged ductwork;
- acoustic screens and barriers between plant and sensitive neighbouring premises; and/or
- Partially-enclosed or fully-enclosed acoustic enclosures over plant.

Mechanical plant shall have their noise specifications and their proposed locations checked prior to their installation on site; and

Fans shall be mounted on vibration isolators and balanced in accordance with Australian Standard 2625 "Rotating and Reciprocating Machinery – Mechanical Vibration".

7 Traffic Noise Generation

7.1 Traffic Noise Generated by the Site

7.1.1 Road Traffic Noise Criteria

The Leq noise level or the "equivalent continuous noise level" correlates best with the human perception of annoyance associated with traffic noise. The NSW Road Noise Policy 2011 uses the LAeq(15hr), LAeq(9hr) and LAeq(1hr) to assess traffic noise impact. The Road Noise Policy is used to assess the potential traffic noise impact from the site onto residential receivers only.

Table 3 in the Road Noise Policy, 'Road Traffic Noise Assessment Criteria for Residential Land Uses', divides land use developments into different categories and lists the respective noise criteria for each case.

The car park entry to the development site is via Sweethaven Drive with the loading docks and service bay areas via the extension of Scarcella Place, however, an assessment has also been undertaken in the event that all car park traffic enters the site via Scarcella Place. The applicable criteria for the day and night periods are summarised in Table 7 below.

Table 7: Applicable Road Traffic Noise Criteria, dB(A)

Type of Development	Day (7am-10pm)	Night (10pm-7am)
3. Existing residences affected by additional traffic on existing local roads generated by land use developments.	LAeq(1hr) 55	LAeq(1hr) 50

7.1.2 Predicted Road Traffic Noise - Sweethaven Drive

Traffic movements in and out of the development driveway from Sweethaven Drive will be the main source of traffic generated by the site. It has been estimated by McLaren Traffic Engineering that there will be approximately 86 additional peak hour movements generated by the proposed development site along Sweethaven Drive.

As indicated in Section 5.1 of the Traffic Report prepared by McLaren Engineering, given that the development is an aged care facility, it is unlikely that the residences will drive and therefore it is expected that the majority of movements would be the result of staff and visitors entering and exiting the site. It is expected that there would be restrictions put in place relating to visiting hours, thus traffic generated during the night time period is expected to be negligible. As such, only the day time traffic generated noise has been assessed.

The existing traffic noise levels which represent residential receivers along Sweethaven Drive are presented in Table 8 below, along with the predicted traffic noise generated directly from the proposed development site.

Table 8: Traffic Noise Levels at Residences along Sweethaven Drive, dB(A)

Facade	Period	Existing Traffic Noise Level LAeq (1 hr)	Peak Traffic Noise Generated from Site LAeq (1 hr)	Cumulative Traffic Noise Level LAeq (1 hr)
Sweethaven Drive	Day time (1.30pm - 2.30pm)	61	52	61.5

Notes: Existing traffic noise levels based on lower levels during the period as measured at the long term monitoring location. This is considered to be conservative

Traffic noise levels along Sweethaven Drive already exceed the criteria stipulated for local roads determined in accordance with the NSW RNP 2011.

Based on the results presented in the above table, it is predicted that overall traffic noise levels along Sweethaven Drive will increase by less than 1dB which is considered undetectable to the human ear. Therefore additional management or treatment is not required as part of the development.

7.1.3 Predicted Road Traffic Noise - Scarcella Place

In the event that all traffic movements enter and exit the site via the Scarcella Place entrance, noise levels have been predicted at the nearest residential receivers. This assessment has also been based on approximately 86 additional peak hour movements generated by the proposed development site along Scarcella Place.

As indicated in Section 5.1 of the Traffic Report prepared by McLaren Engineering, given that the development is an aged care facility, it is unlikely that the residences will drive and therefore it is expected that the majority of movements would be the result of staff and visitors entering and exiting the site. It is expected that there would be restrictions put in place relating to visiting hours, thus traffic generated during the night time period is expected to be negligible. As such, only the day time traffic generated noise has been assessed. The assessed peak period is 1.30pm-2.30pm as identified in the Traffic Report.

The existing traffic noise levels which represent residential receivers along Scarcella Place are presented in Table 8 below, along with the predicted traffic noise generated directly from the proposed development site.

Table 9: Traffic Noise Levels at Residences along Scarcella Place , dB(A)

Facade	Period	Existing Traffic Noise Level LAeq (1 hr)	Peak Traffic Noise Generated from Site LAeq (1 hr)	Cumulative Traffic Noise Level LAeq (1 hr)
Scarcella Place	Day time (1.30pm-2.30pm)	55	52	56.8

Notes: Existing traffic noise levels based on lower levels during the period as measured at the long term monitoring location. This is considered to be conservative

Based on the results presented in the above table, it is predicted that overall traffic noise levels along Scarcella Place will increase by less than 2dB which is considered negligible.

7.2 Service Bays/ Loading Docks - Scarcella Place

Access to the service area for the development is to be via the extension of Scarcella Place. Movements in the service bay area will include the use of mini buses, deliveries from small rigid trucks and delivery vans, garbage services, and will also be the entry point for ambulances.

Noise generated by loading dock activities which may contribute to the overall LAeq noise level emission from the site includes vehicle doors closing, vehicle engines starting, vehicles accelerating, vehicles moving and beeping reverse signals. Ambulances are not likely to enter the site with sirens sounding.

To assess noise from truck movements, the LAeq noise level was determined based on the number of delivery vehicles expected to use the driveway. Traffic information provided by McLaren Traffic Engineering indicate that deliveries/ servicing will likely be undertaken by small trucks and light vehicles (eg. delivery vans). Based on the traffic information, a worst case scenario of two light rigid trucks entering or leaving the loading dock, via the driveway, in a 15 minute period has been assessed.

The Sound Exposure Level (SEL) measurement from our database and library files for truck movements were used for the purpose of this assessment and is presented in Table 10 below.

Table 10 – Loading Dock/ Service area Activities, dB(A) re 1pW

Activity	SEL Sound Power Level
Small truck or light vehicle moving (10-30km/hr)	93
Vehicle door closing	84
Vehicle engine starting	94

7.2.1 Predicted Service Area Noise and Recommendations

Based on the source SEL noise level for a truck activities above, and the distance from the driveway of the development to the nearest affected receiver location at 39 Furci Avenue; the predicted noise level at the receiver due to noise associated with the loading dock is presented in the table below.

Table 11 – Predicted Loading Dock Noise Levels

Receiver Location	Criteria LAeq,(15min)	Predicted Noise Level LAeq,(15min)	Comply?
39 Furci Avenue	55	48	YES

Criteria based on day time Amenity Criteria in the EPA's INP.

In the event that the car park entry also adjoins the residential home at 39 Furci Avenue, it is recommended that the following noise management measures and treatments are provided as follows to maintain noise compliance.

- Construct a noise barrier at the boundary separating the car park entry of the development from 39 Furci Ave. The barrier wall should be a minimum of 2m high and of solid construction. This may include lapped and capped timber, Colourbond, masonry or plywood.

- Management procedures for the retail operation should be put in place to prevent delivery vehicles waiting in Scarcella Place. This may be managed by allocating book-in times for all deliveries for the development; and
- Deliveries/ Services should be restricted to between the hours of 7am to 6pm Monday to Saturdays and 8am to 6pm Sundays to allow for deliveries to only occur during the day period.

8 Internal sound insulation

As a minimum requirement, walls and floors and separation of services shall comply with the Building Code of Australia 2015 (BCA).

8.1 NCA BCA 2015 - Class 9C

The National Construction Code Series (NCC) 2015 - Volume 1, Building Code of Australia sets out the following acoustic provisions for Class 9c buildings:

F5.4 Sound insulation rating of floors

a. A floor in a Class 9C aged care building separating sole-occupancy units must have an R_w not less than 45.

FP5.4 Floors separating sole occupancy units must provide insulation against the transmission of airborne and impact generated sound sufficient to prevent illness or loss of amenity to the occupants.

F5.5 Sound insulation rating of walls

c. A wall in a Class 9c aged care building must have an Rw not less than 45 if it separates –

i. *sole-occupancy units; or*

ii. *a sole-occupancy unit from a kitchen, bathroom, sanitary compartment (not being an associated ensuite), laundry, plantroom or utilities room.*

d. In addition to c), a wall separating a sole-occupancy unit in a Class 9c aged care building from a kitchen or laundry must comply with F5.3(b) [impact sound insulation]

e. Where a wall required to have sound insulation has a floor above, the wall must continue to –

i. *the underside of the floor above; or*

ii. *a ceiling that provides the sound insulation required for the wall.*

f. Where a wall required to have sound insulation has a roof above, the wall must continue to –

i. *the underside of the roof above; or*

ii. *A ceiling that provides the sound insulation required for the wall.*

F5.6 Sound insulation rating of internal services

a. If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or

pipe must be separated from the rooms of any sole-occupancy unit by construction with an Rw+Ctr (airborne) not less than –

i. *40 if the adjacent room is a habitable room (other than a kitchen); or*

ii. *25 if the adjacent room is a kitchen or non-habitable room.*

b. If a storm water pipe passes through a sole-occupancy unit it must be separated in accordance with (a)(i) and (ii).

FP5.6 The required sound insulation of a floor or a wall must not be compromised by the incorporation or penetration of a pipe or other service element.

F5.3 Determination of impact sound insulation ratings

b. A wall in a building required to have an impact sound insulation rating for a Class 9c aged care building must-

ii. *for a Class 9c aged care building, must-*

- *For other than masonry, be two or more separate leaves without rigid mechanical connection except at the periphery; or*
- *Be identical to a prototype that is no less resistant to the transmission of impact sound when tested in accordance with Specification F5.5 than a wall listed in Table 2 of Specification F5.2*

F5.7 Sound isolation of pumps

A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump.

9 Construction noise

9.1 Environmental protection authority's construction noise guidelines

The Environmental Protection Authority (EPA) released its Interim Construction Noise Guideline (ICNG) in 2009. This document is being referred to as EPA's standard policy for assessing construction noise on new projects.

The key components of the ICNG that can be incorporated into this assessment include:

1. Use of LAeq as the descriptor for measuring and assessing construction noise.

In recent years NSW noise policies including EPA's NSW Industrial Noise Policy (INP) and the NSW Environmental Criteria for Road Traffic Noise (ECRTN) have moved to the primary use of LAeq over any other descriptor. As an energy average, LAeq provides ease of use when measuring or calculating noise levels since a full statistical analysis is not required as when using, for example, the LA10 descriptor.

Consistent with the latest guideline (ICNG) the use of LAeq as the key descriptor for measuring and assessing construction noise may follow a 'best practice' approach.

2. Application of feasible and reasonable noise mitigation measures

As stated in the ICNG, a noise mitigation measure is feasible if it is capable of being put into practice, and is practical to build given the project constraints.

Selecting reasonable mitigation measures from those that are feasible involves making a judgement to determine whether the overall noise benefit outweighs the overall social, economic and environmental effects, including the cost of the measure.

3. Quantitative and qualitative assessment

The ICNG provides two methods for assessment of construction noise, being either a quantitative or a qualitative assessment.

A quantitative assessment is recommended for major construction projects of significant duration, and involves the measurement and prediction of noise levels, and assessment against set criteria.

A qualitative assessment is recommended for small projects with a short-term duration where works are not likely to affect an individual or sensitive land use for more than three weeks in total. It focuses on minimising noise disturbance through the implementation of feasible and reasonable work practices, and community notification.

Given the significant scale of the construction works proposed for this Project, a quantitative assessment is carried out herein, consistent with the ICNG's requirements.

4. Management Levels

Residences

Table 12 below (reproduced from Table 2 of the ICNG) sets out the noise management levels and how they are to be applied. The guideline intends to provide respite for residents exposed to excessive construction noise outside the recommended standard hours whilst allowing construction during the recommended standard hours without undue constraints.

The rating background level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours).

Table 12: Noise at residences using quantitative assessment

Time of Day	Management Level LAeq (15 min)*	How to Apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10dB(A)	The noise affected level represents the point above which there may be some community reaction to noise. 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 meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5dB(A)	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2.

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

Sensitive Land Use

Table 13 below (reproduced from Table 2 of the ICNG) sets out the noise management levels for various sensitive land use developments.

Table 13: Noise at other sensitive land uses using quantitative assessment

Land use	Management level, LAeq (15 min) – applies when land use is being utilised
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)
Hospital wards and operating theatres	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreation areas	External noise level 65 dB(A)
Passive recreation areas	External noise level 60 dB(A)
Community centres	Depends on the intended use of the centre. Refer to the 'maximum' internal levels in AS2107 for specific uses.

10 Conclusion

Renzo Tonin & Associates have completed an acoustic assessment of the potential noise impacts to and from the proposed aged care facility 'Edensor Gardens' at 13 Booralla Rd, Edensor Park, New South Wales.

The primary assessment related to road traffic noise on the proposed residential building. The study of external noise intrusion into the subject development has found that appropriate controls can be incorporated such as acoustic glazing into the building design to achieve compliance with acoustic requirements of SEPP (Infrastructure) 2007.

In addition, an assessment of any noise from mechanical plant equipment servicing the buildings shall be undertaken during the detailed design and equipment selection stages to ensure that plant and equipment is designed in accordance with the relevant acoustic criteria.

APPENDIX A Glossary of Terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment Period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A)	A-weighted decibels. The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.

L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound Absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Pressure Level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound Power Level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Criteria and design methodology

B.1 State Environment Planning Policy (ISEPP)

The State Environment Planning Policy – Infrastructure 2007, Clause 102 states:

102 Impact of road noise or vibration on non-road development

(1) This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 40,000 vehicles (based on the traffic volume data published on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road 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 purposes 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 exceeded:

(a) in any bedroom in the building—35 dB(A) at any time between 10 pm and 7am,

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

(4) In this clause, freeway, tollway and transitway have the same meanings as they have in the Roads Act 1993.

B.2 Department of Planning – Development near Rail Corridors and Busy Roads

The Guideline provides direction for developments that may be impacted by rail corridors and/or busy roads and consideration for the Guideline is a requirement for development specified under the Infrastructure SEPP.

The Guideline recommends an acoustic traffic assessment be undertaken for roads having an AADT of greater than 20,000 and less than 40,000 vehicles per day and states an assessment is mandatory for roads having an AADT of greater than 40,000 vehicles per day.

Table 3.1 of the Guideline summaries noise criteria for noise sensitive developments

Residential Buildings		
Type of occupancy	**Noise Level dBA**	**Applicable time period**
Sleeping areas (bedroom)	35	Night 10 pm to 7 am
Other habitable rooms (excl. garages, kitchens, bathrooms & hallways	40	At any time
Non–Residential Buildings		
Type of occupancy		**Recommended Max Level dBA**
Educational Institutions including child care centres		40
Places of Worship		40
Hospitals	- wards	35
	-other noise sensitive areas	35

Note: airborne noise is calculated as Leq (9h) (night) and Leq (15h)(day). Ground-borne noise is calculated as Lmax (slow) for 95% of rail pass-by events.

APPENDIX C Location and results of the noise surveys

C.1 Long-term monitoring details

Location 1 - Furci Avenue Boundary

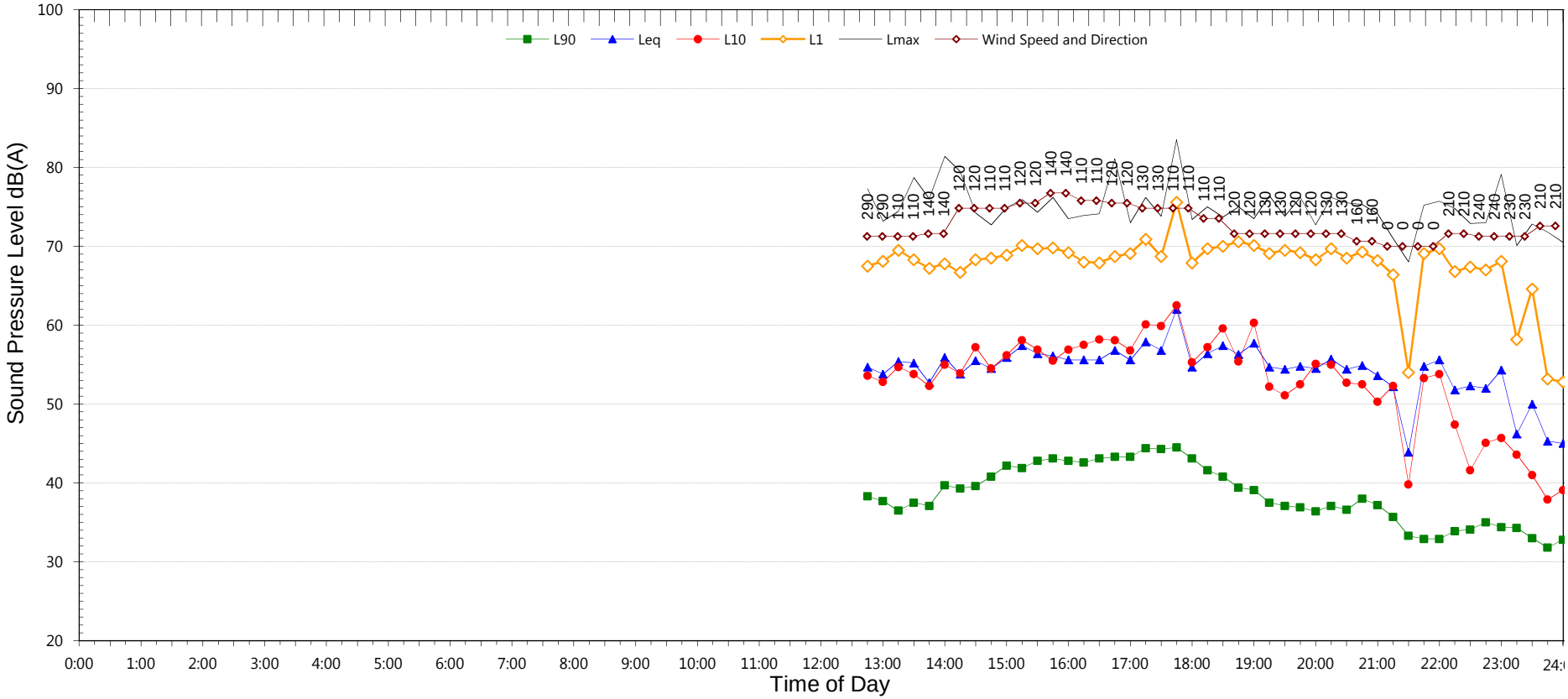
Location 2 - Booralla Road Boundary

Figure 2: Monitoring locations

Unattended Noise Monitoring Results

Advantaged Care, Edensor Gardens RTA07-008 Furci Avenue

Wednesday, 16 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	32.9	31.5
LAeq	-	55.1	50.8

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	69.8	to	82.2
L_{Max} - L_{eq} (Range)	17.3	to	29.4

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	58.3	53.3
$L_{eq\ 1hr}$ upper 10 percentile	61.2	58.4
$L_{eq\ 1hr}$ lower 10 percentile	55.8	39.7

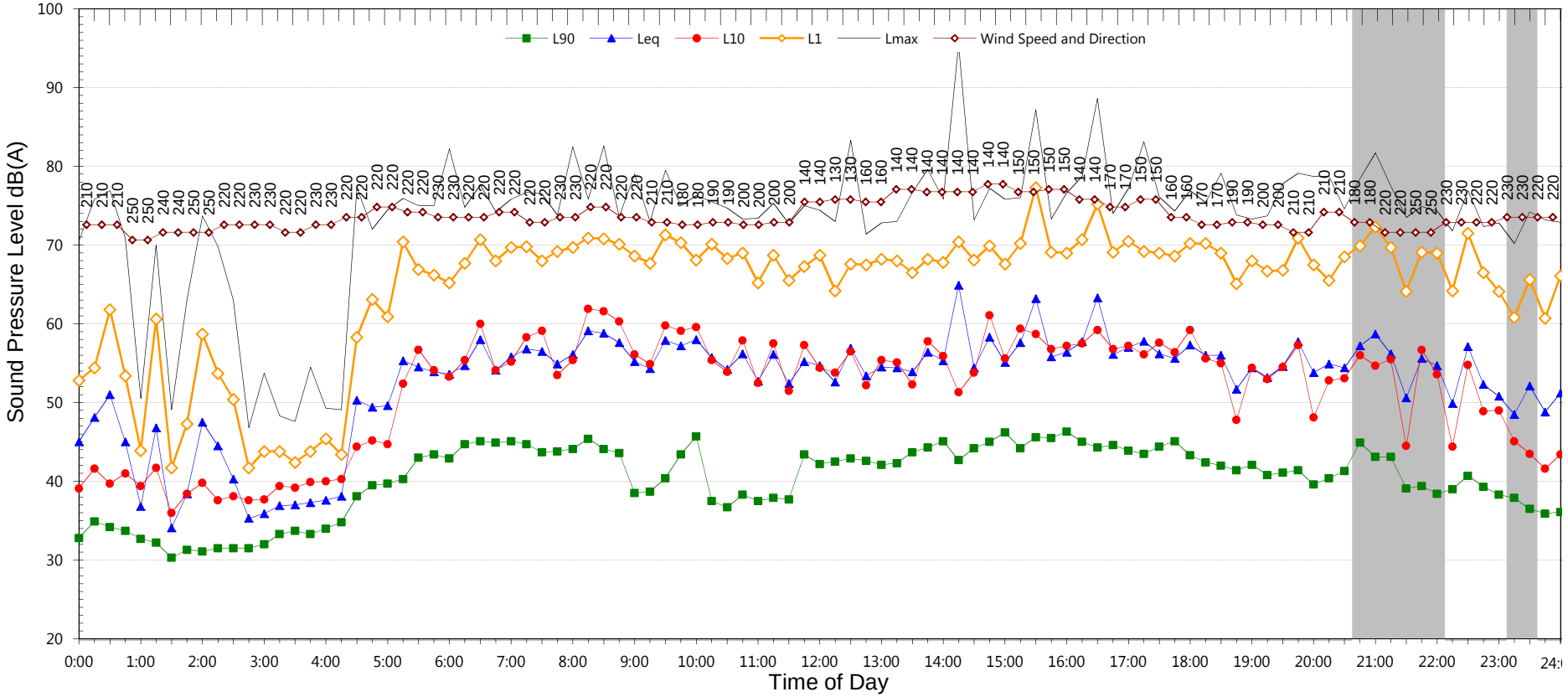
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Gardens RTA07-008 Furci Avenue

Thursday, 17 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	37.9	-	32.3
LAeq	57.5	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	69.4	to	81.5
L_{Max} - L_{eq} (Range)	23.0	to	30.0

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.6	53.7
$L_{eq\ 1hr}$ upper 10 percentile	62.6	57.4
$L_{eq\ 1hr}$ lower 10 percentile	57.2	42.2

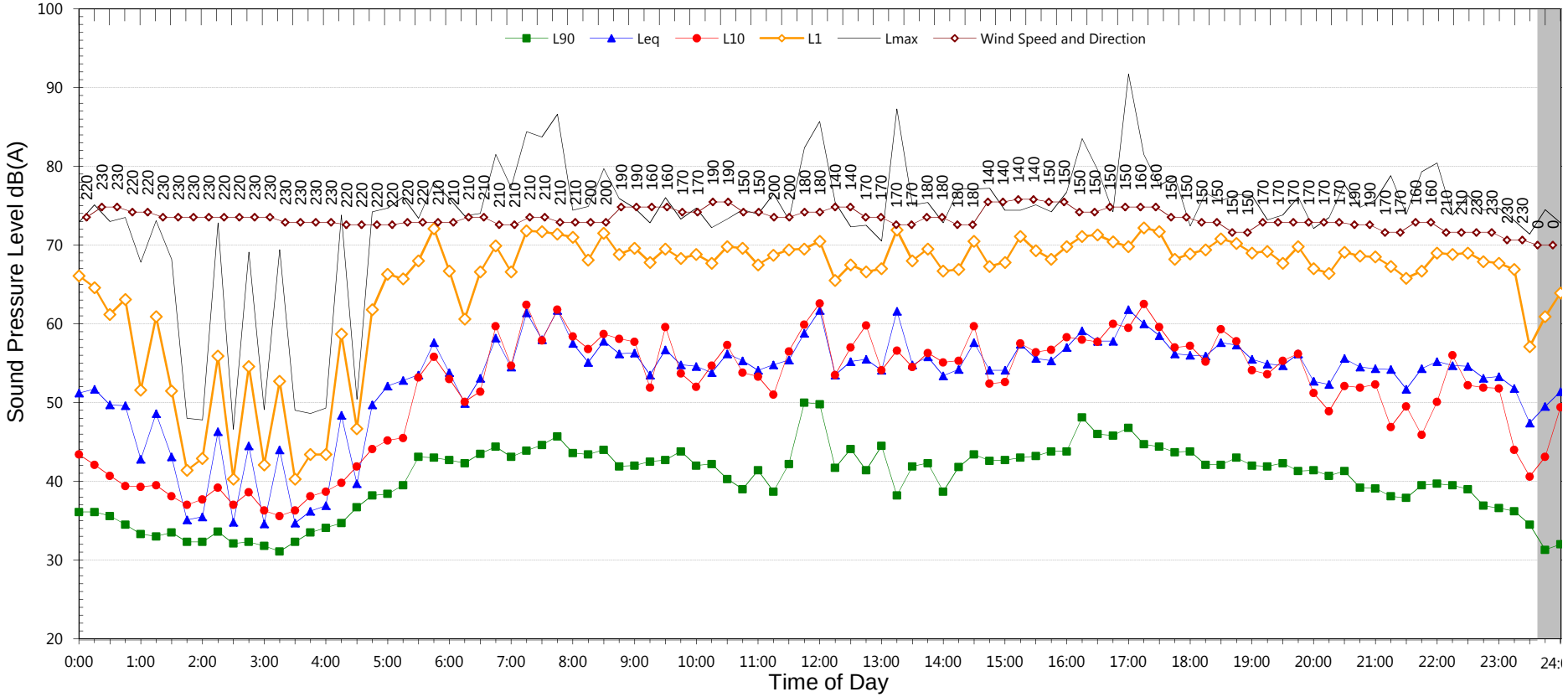
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Gardens RTA07-008 Furci Avenue

Friday, 18 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	40.3	38.1	-
LAeq	57.4	55.1	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	73.1	to	77.0
L_{Max} - L_{eq} (Range)	17.4	to	25.8

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.4	54.2
$L_{eq\ 1hr}$ upper 10 percentile	62.3	56.5
$L_{eq\ 1hr}$ lower 10 percentile	56.7	40.1

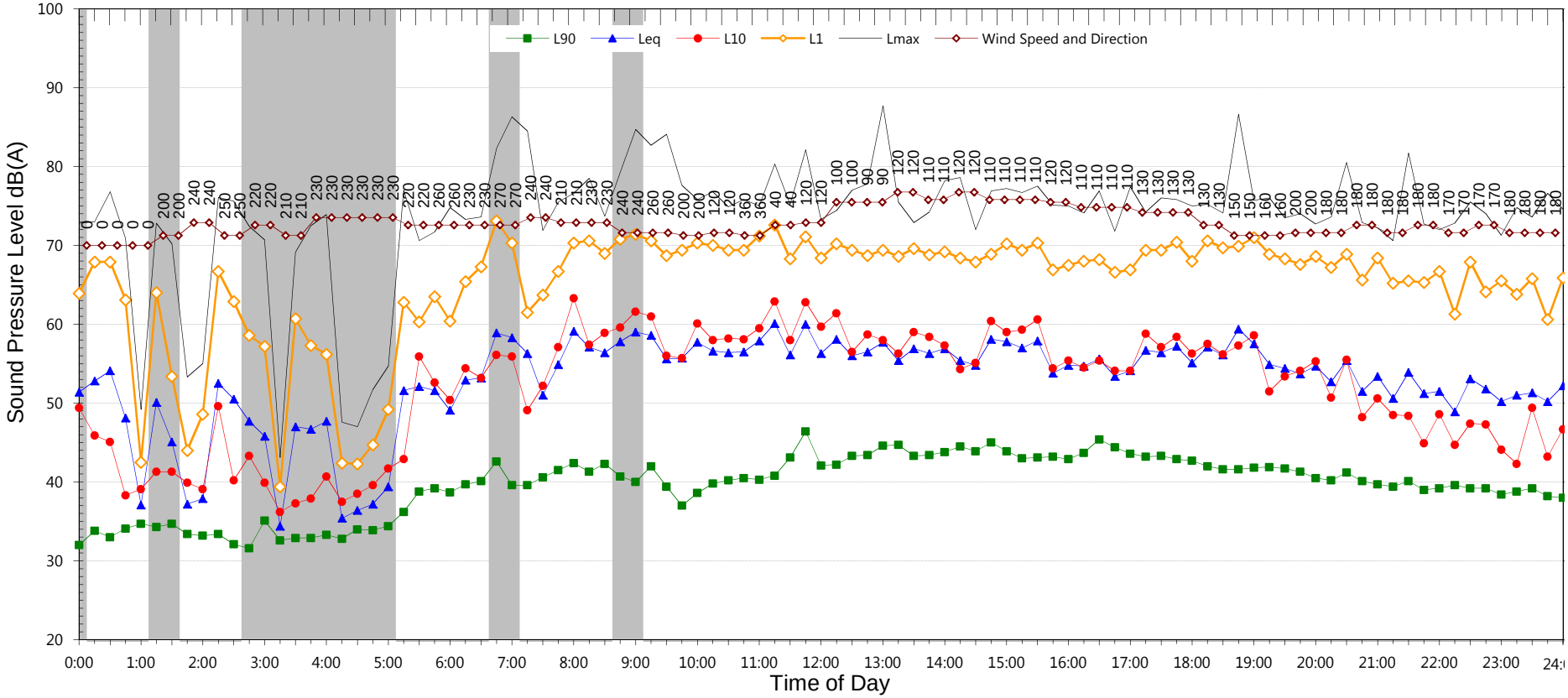
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Gardens RTA07-008 Furci Avenue

Saturday, 19 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	39.8	39.2	32.0
LAeq	56.7	54.9	51.0

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	72.7	to	86.6
L_{Max} - L_{eq} (Range)	23.0	to	35.6

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	58.8	52.5
$L_{eq\ 1hr}$ upper 10 percentile	60.6	54.7
$L_{eq\ 1hr}$ lower 10 percentile	55.3	44.9

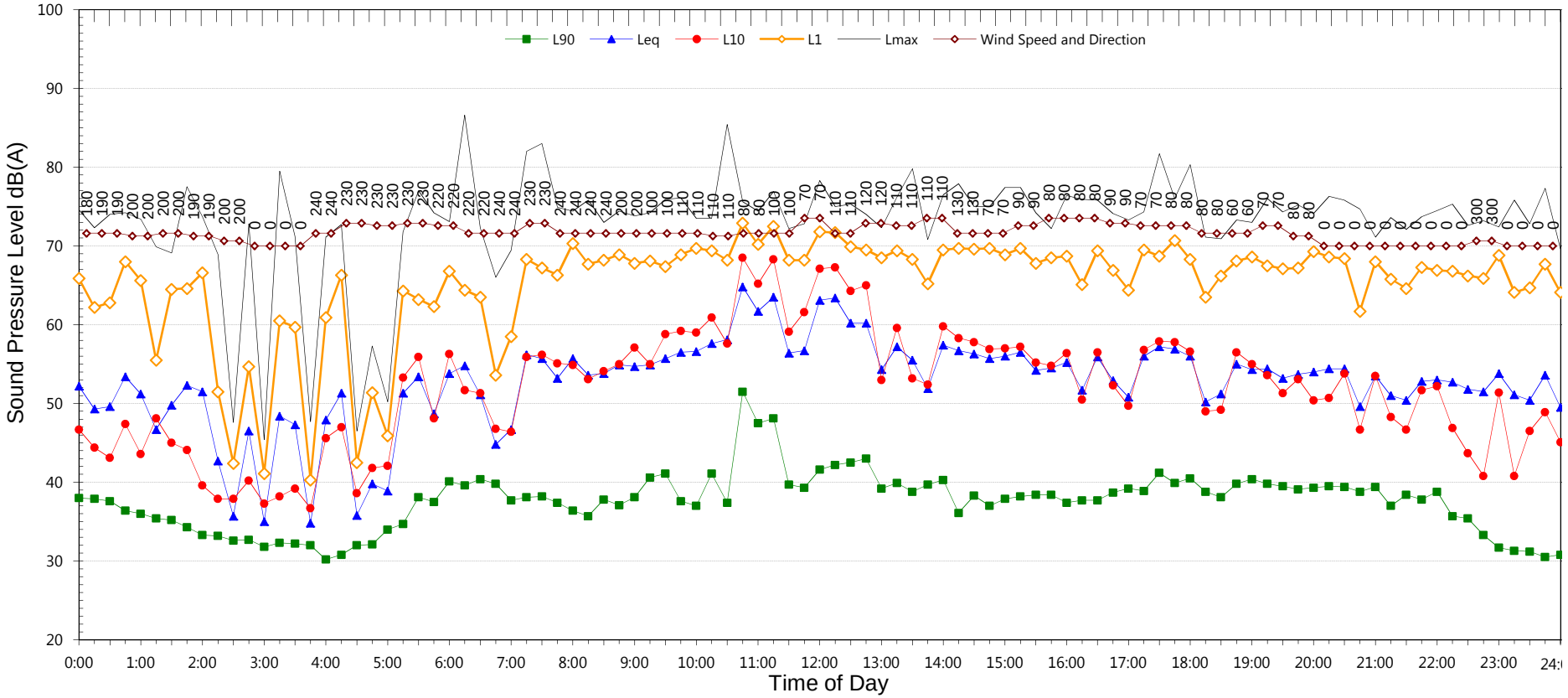
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Gardens RTA07-008 Furci Avenue

Sunday, 20 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	37.1	37.8	28.1
LAeq	58.0	53.1	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	70.6	to	77.3
L_{Max} - L_{eq} (Range)	15.8	to	30.5

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.5	52.1
$L_{eq\ 1hr}$ upper 10 percentile	63.8	56.0
$L_{eq\ 1hr}$ lower 10 percentile	55.1	35.4

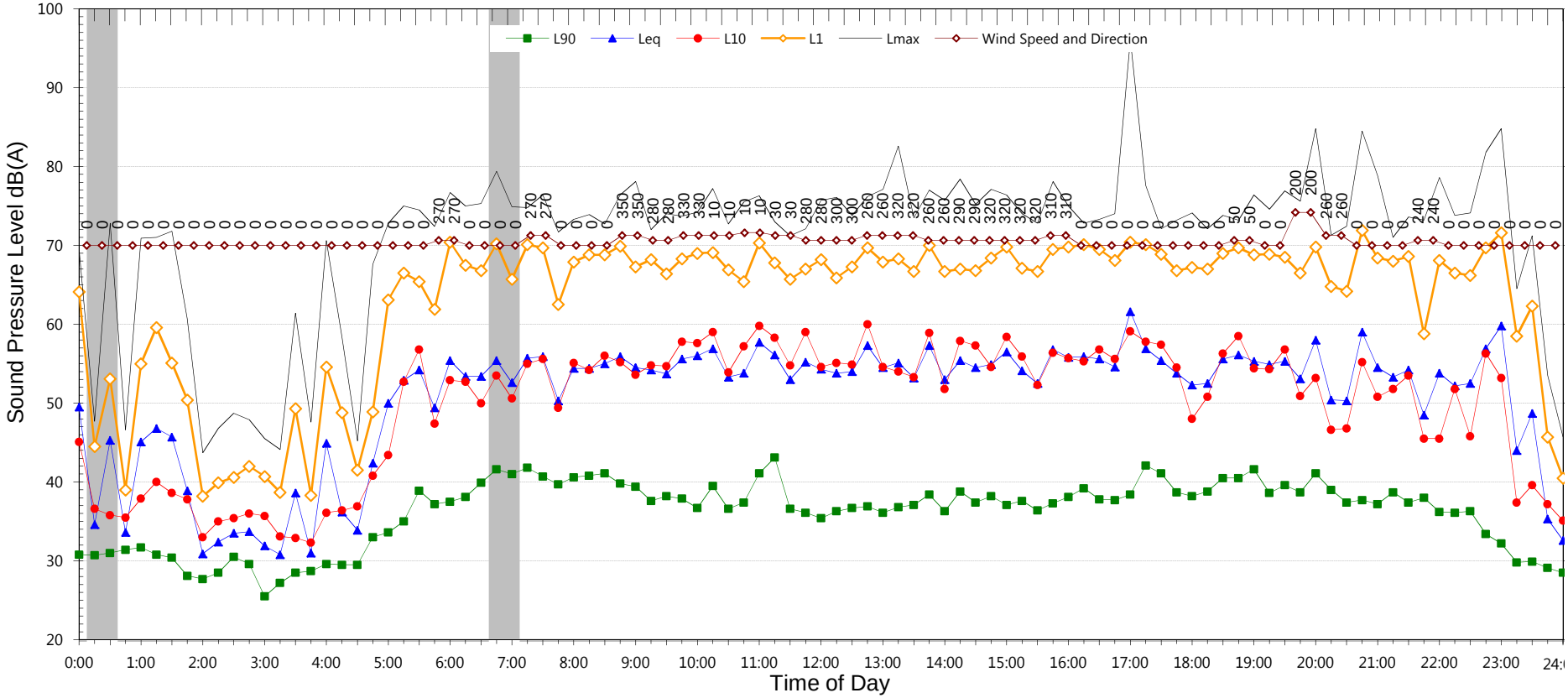
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Gardens RTA07-008 Furci Avenue

Monday, 21 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	36.3	37.2	28.5
LAeq	55.4	54.8	51.1

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	69.8	to	86.8
L_{Max} - L_{eq} (Range)	23.8	to	33.0

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	57.8	53.6
$L_{eq\ 1hr}$ upper 10 percentile	59.5	59.0
$L_{eq\ 1hr}$ lower 10 percentile	56.3	41.8

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
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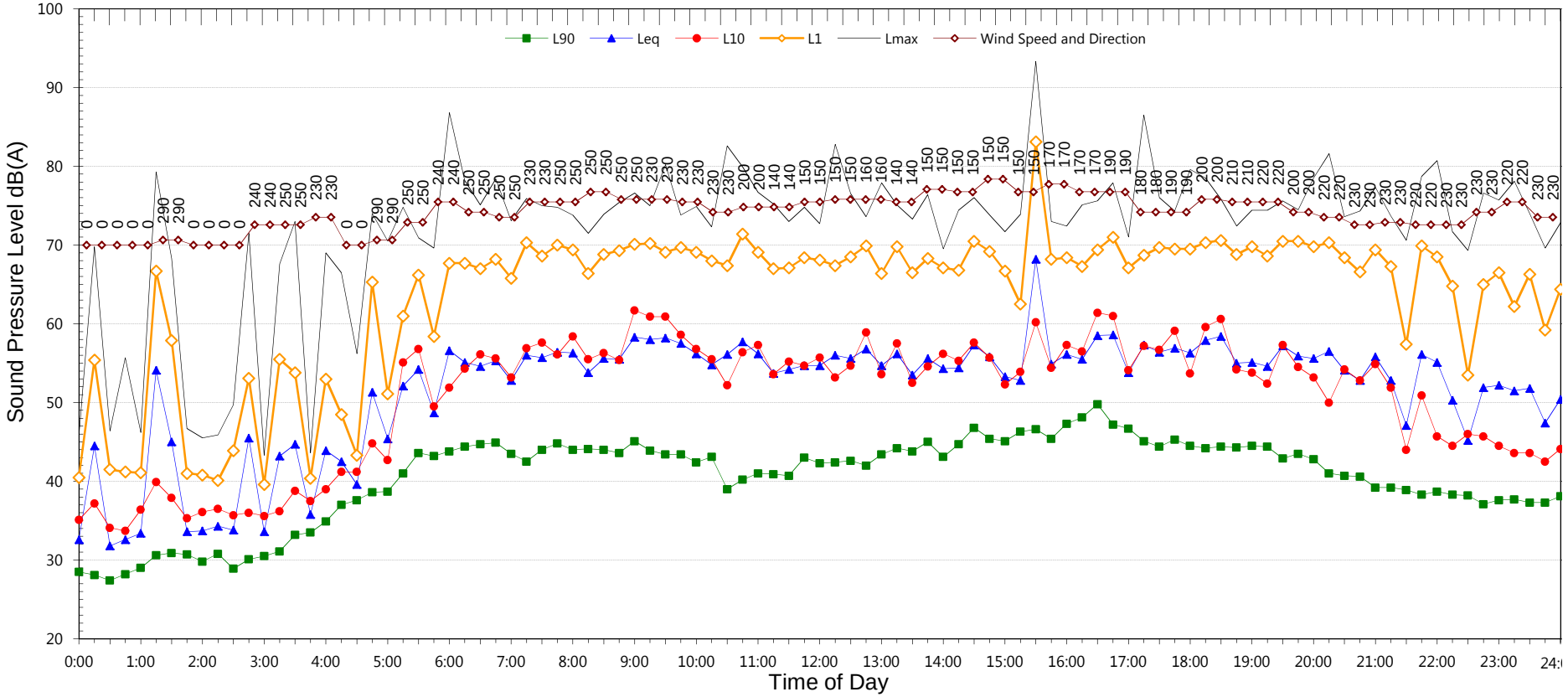
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Gardens RTA07-008 Furci Avenue

Tuesday, 22 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	41.0	38.7	33.0
LAeq	57.4	55.6	50.7

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	69.0	to	78.1
L_{Max} - L_{eq} (Range)	17.7	to	30.9

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.5	53.2
$L_{eq\ 1hr}$ upper 10 percentile	63.4	58.0
$L_{eq\ 1hr}$ lower 10 percentile	56.6	38.6

Notes:

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3. "Evening" is the period from 6pm till 10pm
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5. "Night" relates to period from 10pm on this graph to morning on the following graph.
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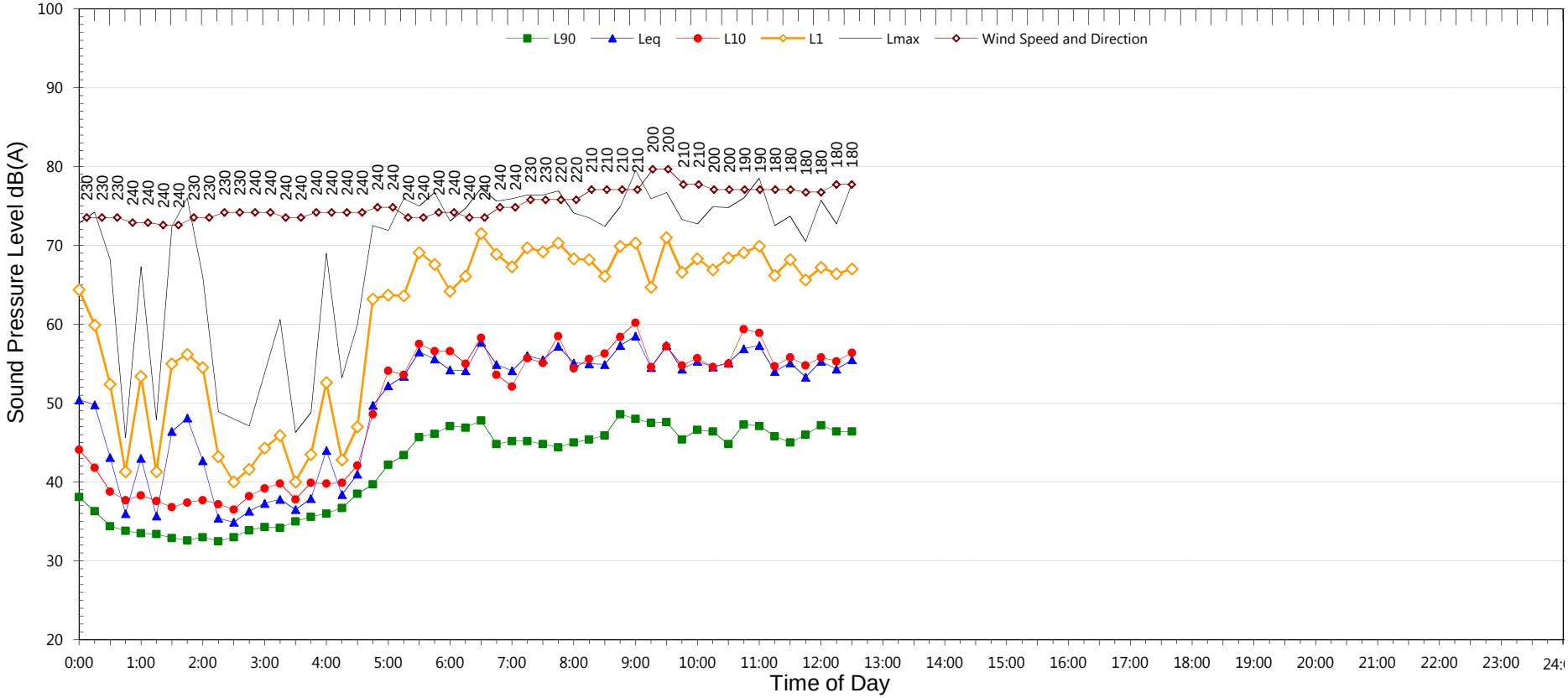
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Gardens RTA07-008 Furci Avenue

Wednesday, 23 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	-	-
LAeq	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	-	to	-
L_{Max} - L_{eq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	58.3	-
$L_{eq\ 1hr}$ upper 10 percentile	59.2	-
$L_{eq\ 1hr}$ lower 10 percentile	57.0	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
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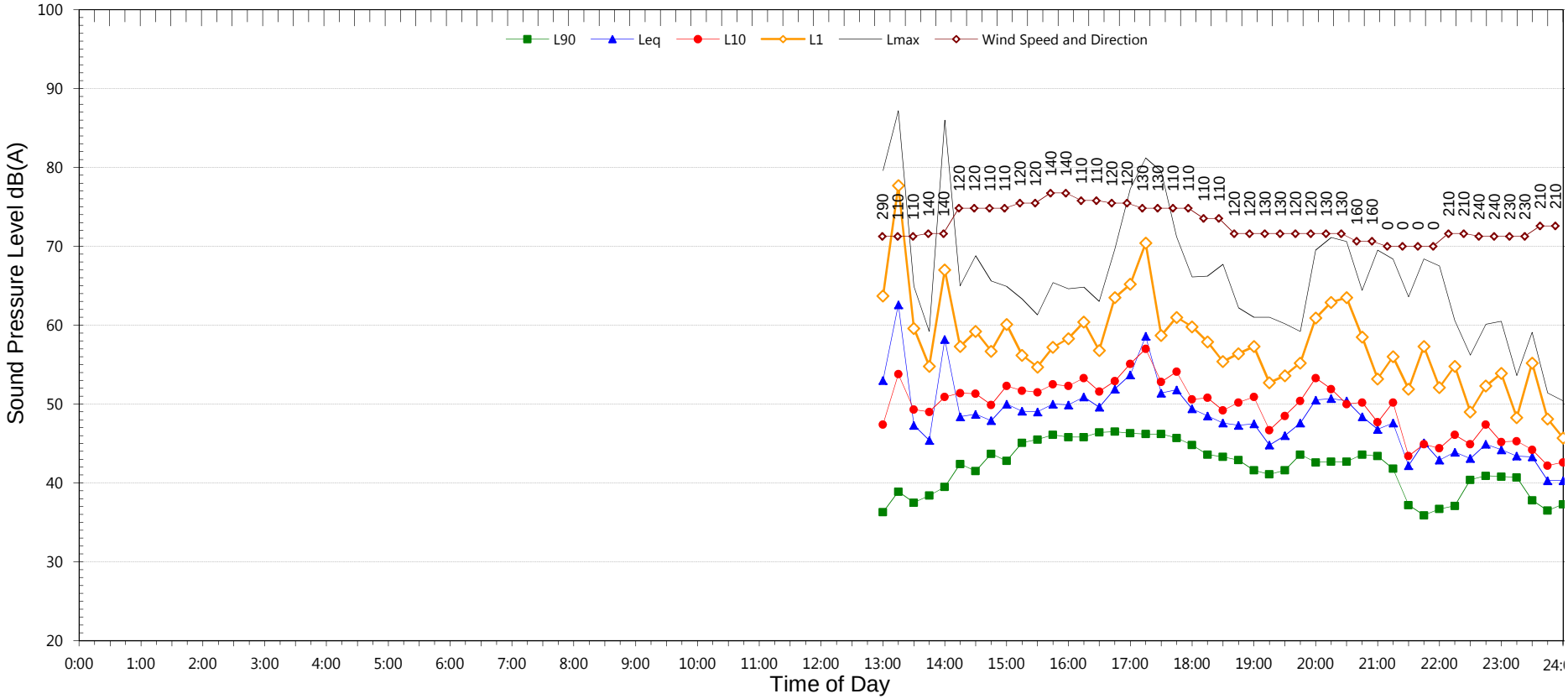
Unattended Noise Monitoring Results

Advantaged Care, Edensor Park RTA07-009 Sweethaven Drive

Wednesday, 16 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	36.7	34.3
LAeq	-	47.7	46.4

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	67.9	to	75.6
L_{Max} - L_{eq} (Range)	16.5	to	22.4

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	54.7	48.9
$L_{eq\ 1hr}$ upper 10 percentile	60.6	55.7
$L_{eq\ 1hr}$ lower 10 percentile	47.5	40.3

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
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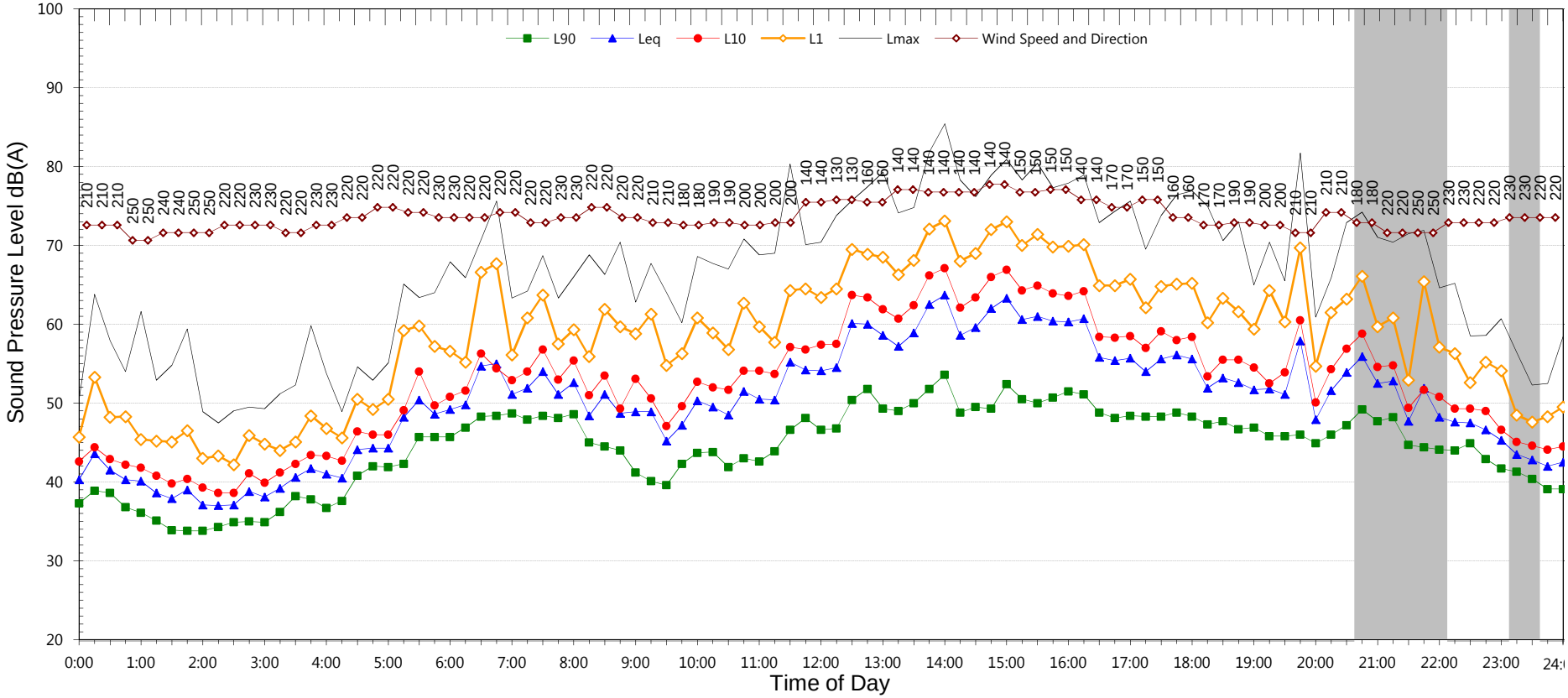
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Park RTA07-009 Sweethaven Drive

Thursday, 17 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	42.3	-	35.1
LAeq	57.5	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	65.2	to	77.6
L_{Max} - L_{eq} (Range)	15.1	to	24.5

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.5	50.3
$L_{eq\ 1hr}$ upper 10 percentile	63.8	55.6
$L_{eq\ 1hr}$ lower 10 percentile	51.3	40.8

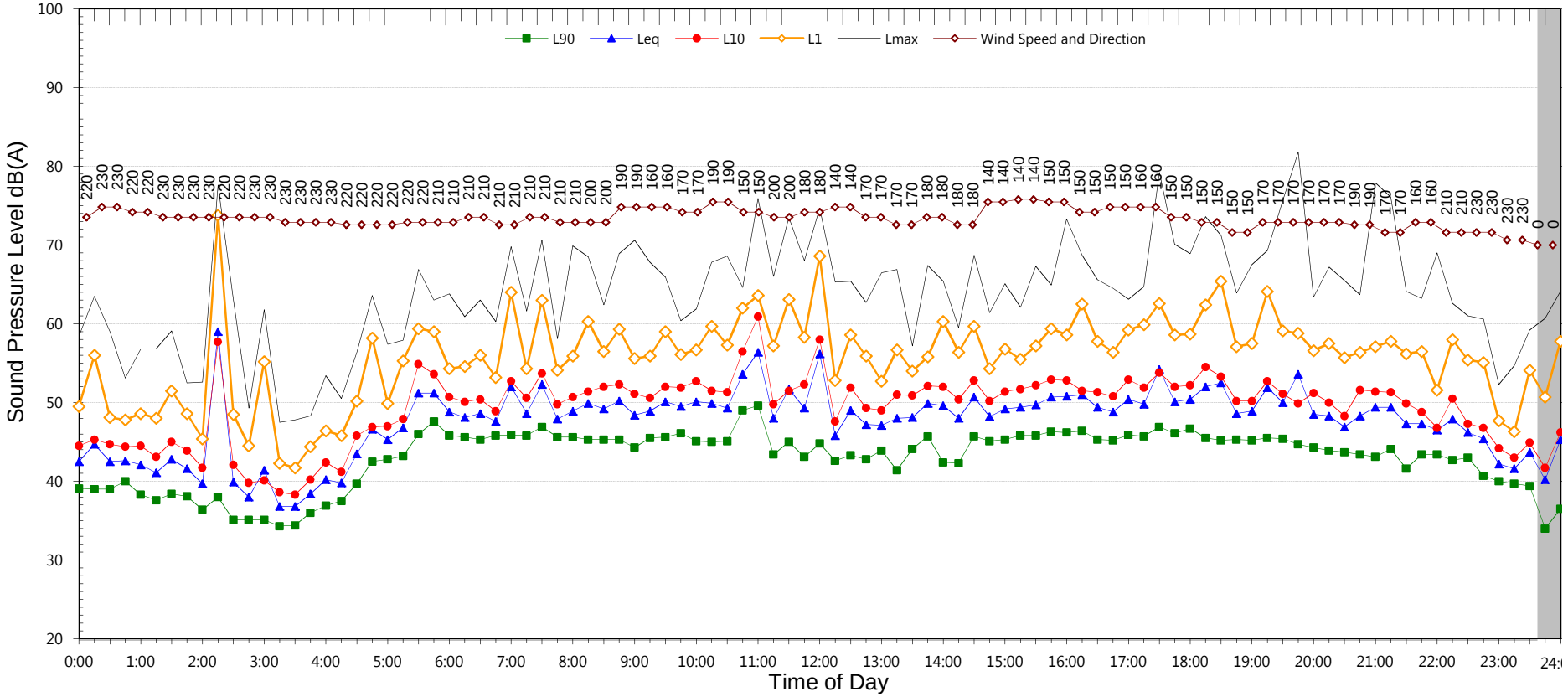
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Park RTA07-009 Sweethaven Drive

Friday, 18 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	42.8	43.1	-
LAeq	50.5	49.9	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	71.7	to	71.7
L_{Max} - L_{eq} (Range)	16.0	to	24.5

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	52.8	47.6
$L_{eq\ 1hr}$ upper 10 percentile	55.4	49.7
$L_{eq\ 1hr}$ lower 10 percentile	50.1	44.7

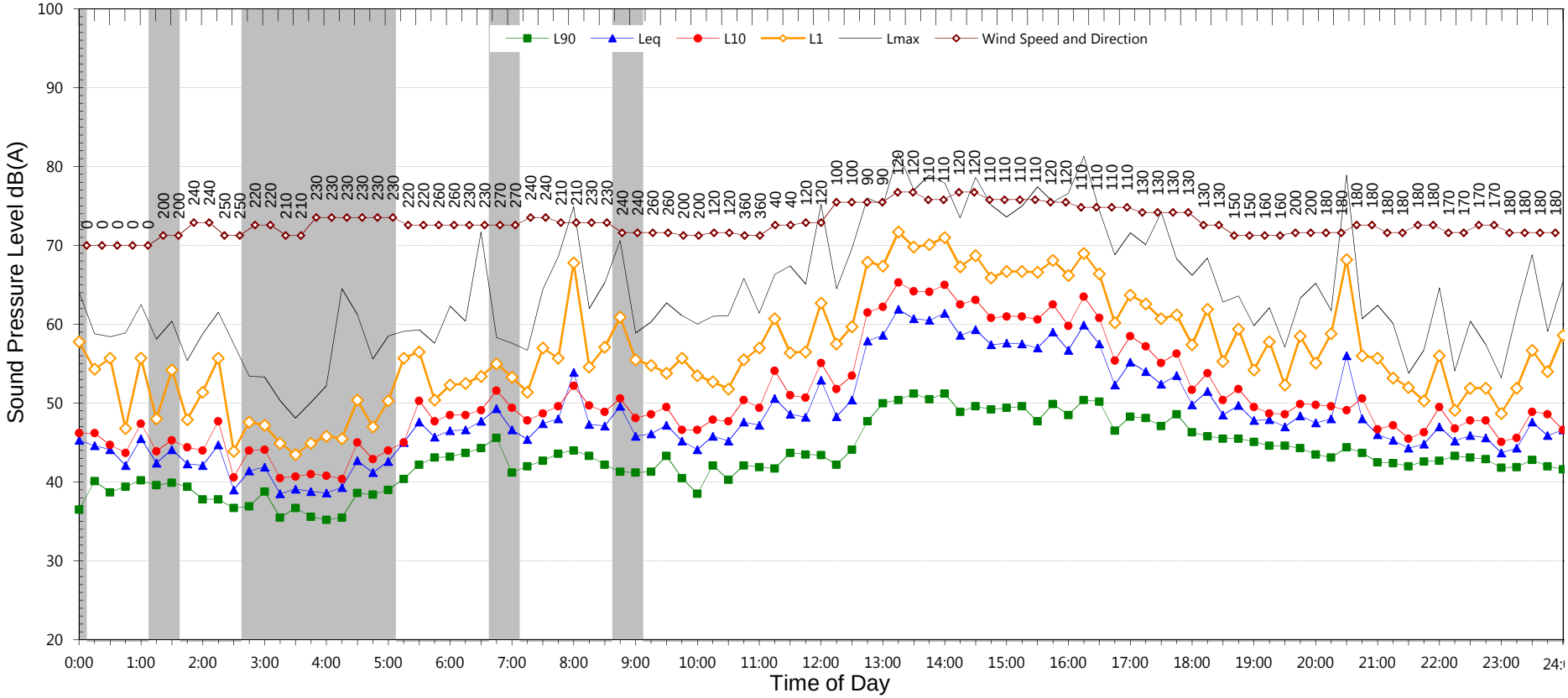
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Park RTA07-009 Sweethaven Drive

Saturday, 19 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	41.7	42.4	34.4
LAeq	55.8	49.1	44.0

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	67.2	to	68.8
L_{Max} - L_{eq} (Range)	15.2	to	22.5

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	57.2	46.0
$L_{eq\ 1hr}$ upper 10 percentile	62.5	48.8
$L_{eq\ 1hr}$ lower 10 percentile	48.1	40.1

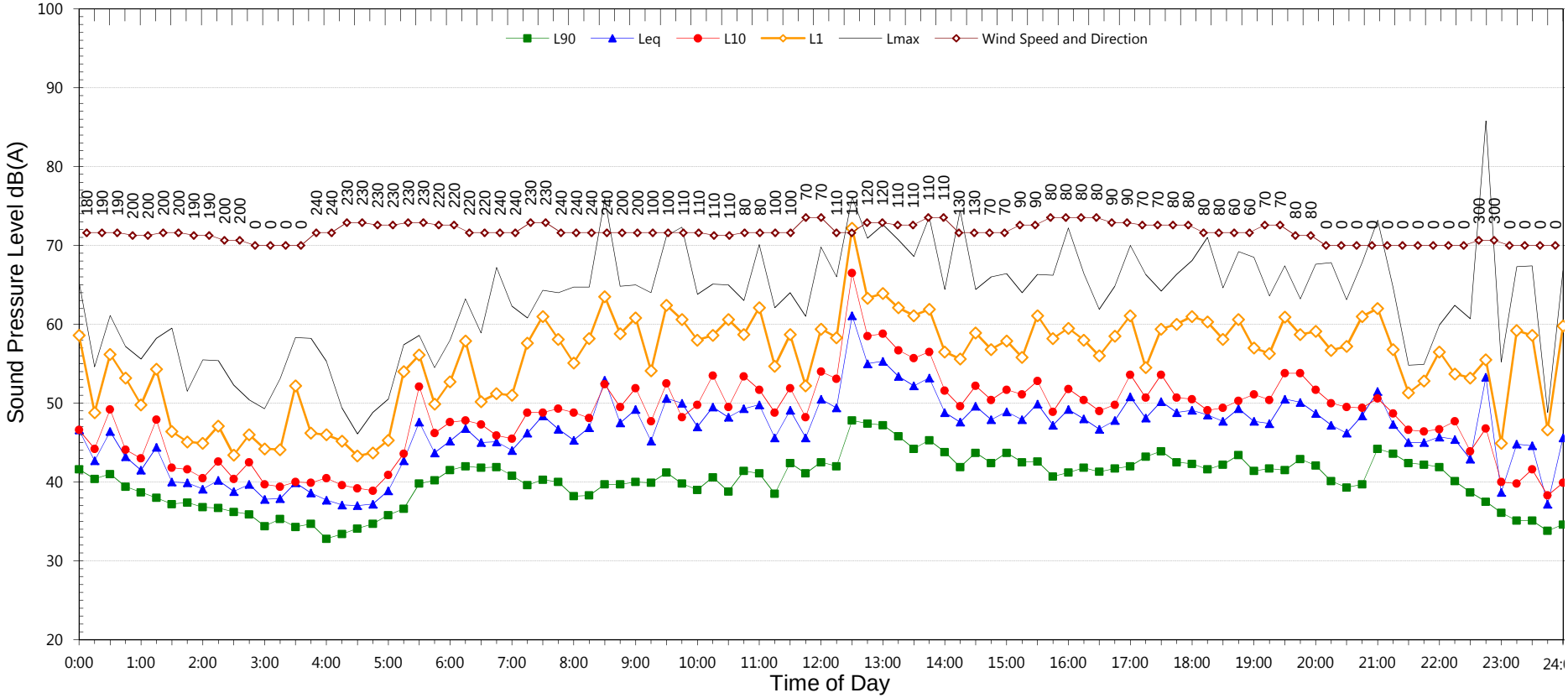
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Park RTA07-009 Sweethaven Drive

Sunday, 20 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	39.4	39.7	28.9
LAeq	51.1	48.3	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	67.4	to	85.8
L_{Max} - L_{eq} (Range)	16.2	to	37.4

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	52.8	46.1
$L_{eq\ 1hr}$ upper 10 percentile	57.8	50.9
$L_{eq\ 1hr}$ lower 10 percentile	48.9	35.6

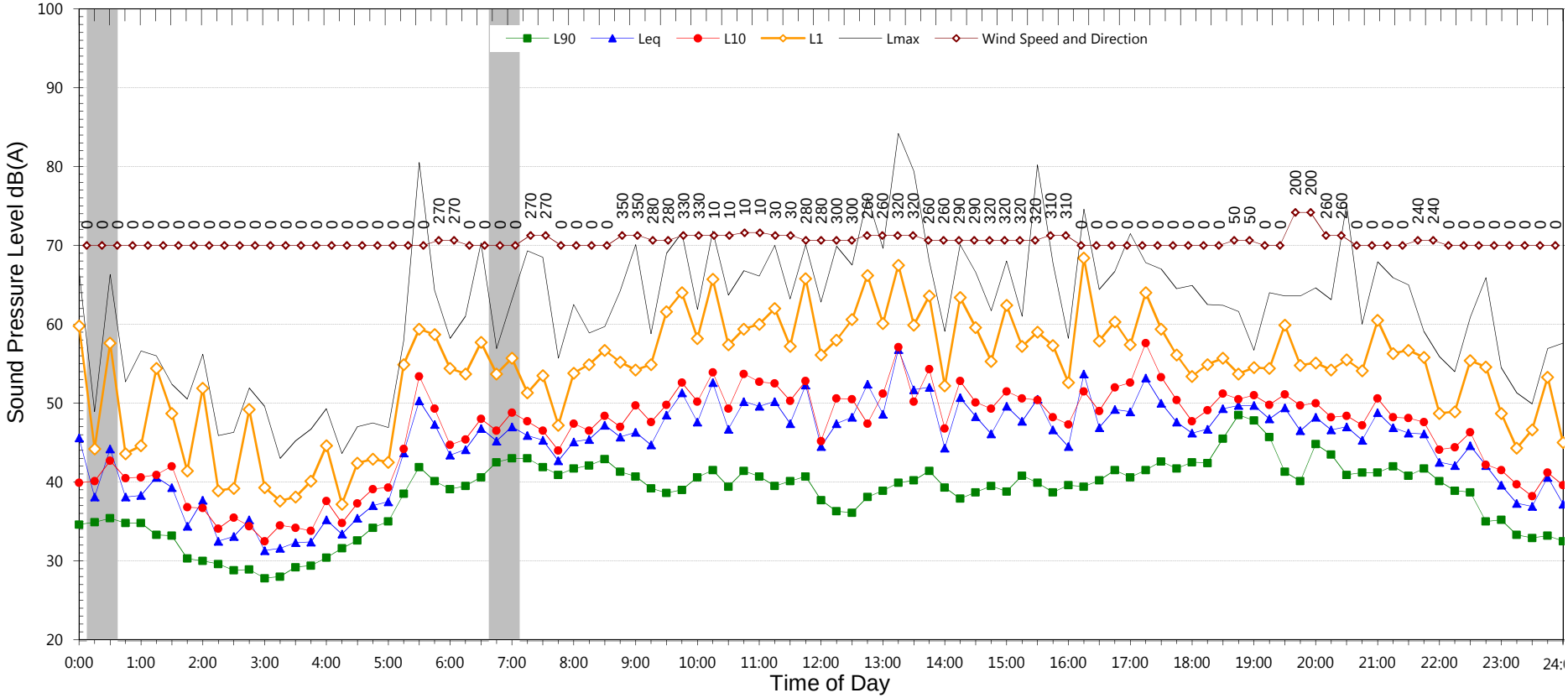
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Park RTA07-009 Sweethaven Drive

Monday, 21 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	38.1	40.1	32.2
LAeq	49.5	47.7	44.8

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	65.9	to	71.4
L_{Max} - L_{eq} (Range)	16.8	to	28.1

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	51.6	47.3
$L_{eq\ 1hr}$ upper 10 percentile	54.5	53.1
$L_{eq\ 1hr}$ lower 10 percentile	47.8	40.1

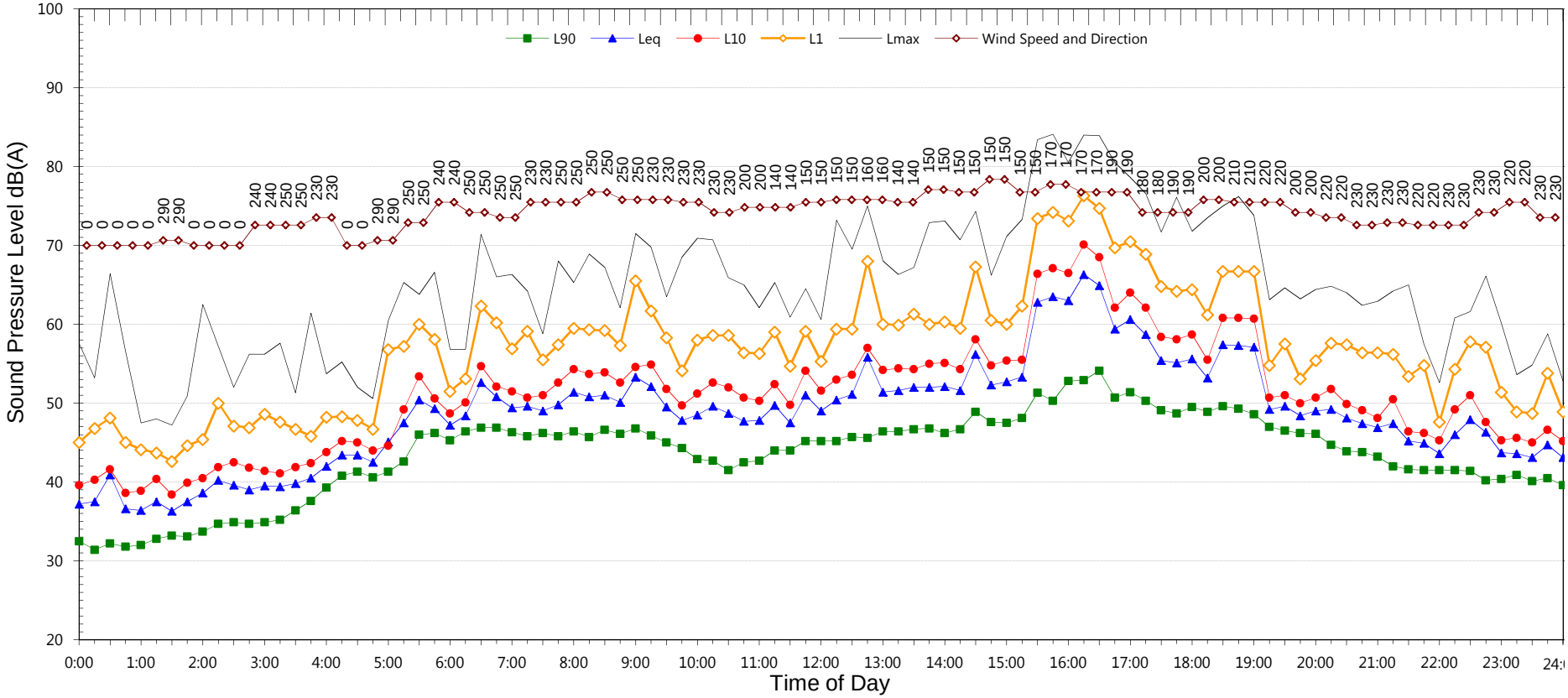
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Park RTA07-009 Sweethaven Drive

Tuesday, 22 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	42.9	41.5	35.9
LAeq	56.9	52.0	46.1

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	66.1	to	76.5
L_{Max} - L_{eq} (Range)	15.1	to	24.9

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	58.6	48.6
$L_{eq\ 1hr}$ upper 10 percentile	65.4	54.1
$L_{eq\ 1hr}$ lower 10 percentile	49.4	41.8

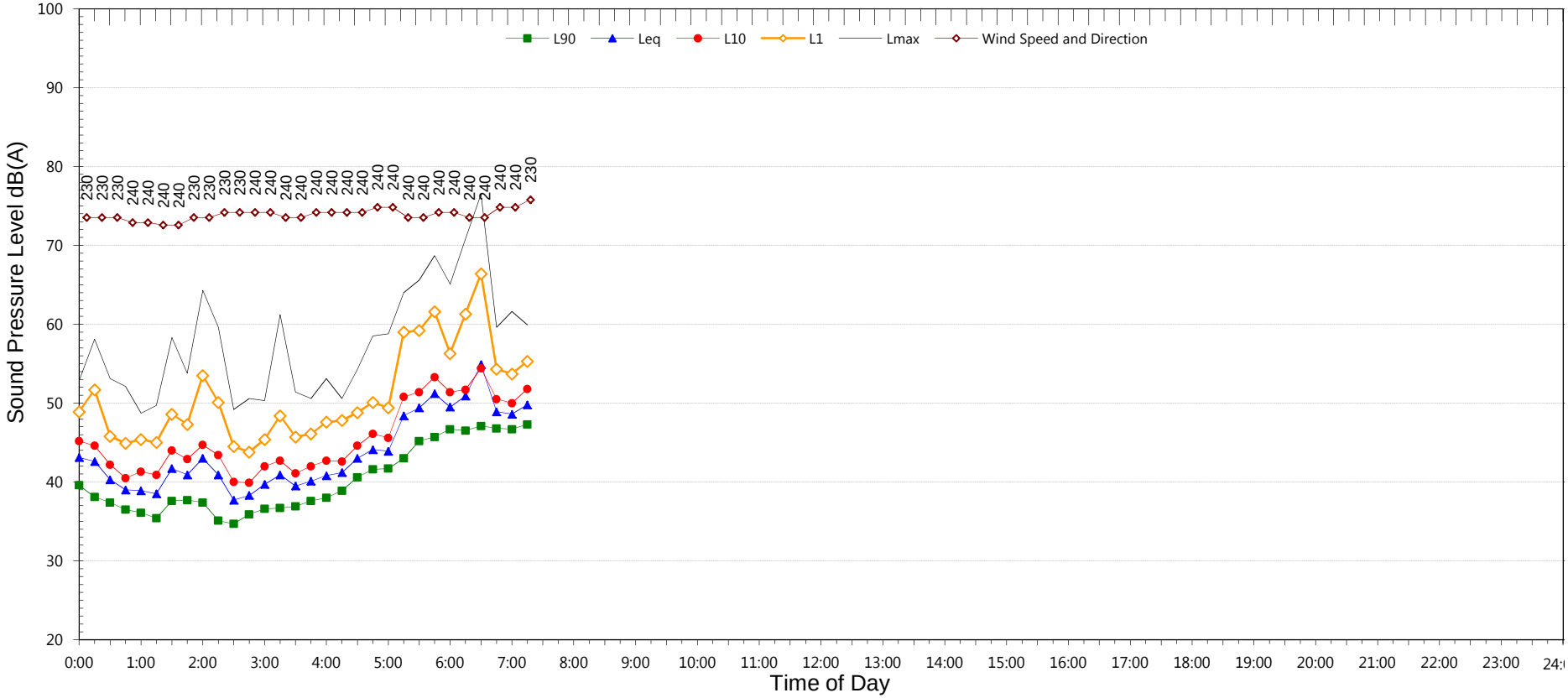
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Advantaged Care, Edensor Park RTA07-009 Sweethaven Drive

Wednesday, 23 September 2015



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	-	-
LAeq	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	-	to	-
L_{Max} - L_{eq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	52.3	-
$L_{eq\ 1hr}$ upper 10 percentile	52.3	-
$L_{eq\ 1hr}$ lower 10 percentile	52.3	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
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7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)