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Manly Wharf Upper Level

DA Noise Assessment

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1 INTRODUCTION

This report examines potential environmental noise impacts from the proposed operation of Manly Wharf Upper Level.

The report:

- Discusses and assesses the proposed plant noise impact upon the nearest residential buildings. The potential impacts are assessed against criteria determined using the NSW DECCW Industry Noise Policy and the measured existing ambient noise conditions
- Identifies potential sources of noise during operation of the proposed development.
- Assesses the predicted activities' impacts against criteria determined using the NSW Office of Liquor, Gaming and Racing (OLGR) and the measured existing ambient noise conditions.
- Identifies potential increase of traffic noise on neighbouring streets. The impacts are assessed against criteria determined by NSW DECCW "Environmental Criteria for Road Traffic Noise"(1999) (ECTRAN)
- Discusses the appropriate management and noise control measures that should be adopted to minimise adverse impacts during the operation of the proposed facility.

2 PROPOSED DEVELOPMENT

2.1 THE PROPOSAL

The proposed upper level including four restaurants and the upgraded plant serving the project site. The proposed hours of operation are as follows:

Table 2 – Operation Hours

Date	Operation Hours
Mon - Thu	8am - 11pm
Fri - Sat	8am - 1am
Sunday	8am - 12am
Outdoor Area	To close at 10pm every day

2.2 POTENTIALLY AFFECTED PROPERTIES

The nearest residential noise receivers are multi storey residential/commercial mixed use buildings located immediately across Eastern Esplanade. Detailed site map and noise receiver locations refer to Figure 1 below.



Figure 1 Site Map and Noise Receiver Location

3 AMBIENT NOISE MONITORING

Attended and unattended ambient noise monitoring has been conducted around the project site to characterise the existing noise environment. The measured background noise levels will be used to set noise objectives for the various noise sources.

3.1 ENVIRONMENTAL NOISE DESCRIPTORS

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

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

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

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

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

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

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

3.2 NOISE MEASUREMENT POSITION AND EQUIPMENT USED

Manned and unmanned background noise measurements have been conducted around the project site and the detailed measurement locations are as below:

Unmanned background noise monitoring

Two unattended noise monitors were set on top of the existing awning of the project site facing Eastern Esplanade. The measurements were obtained using two Acoustic Research monitors set to A-weighted fast response mode. The monitors were calibrated before and after the measurements using a Rion Type NC-73 calibrator. No significant drift was recorded. Appendix 1 shows the measured noise levels. Detailed measurement locations are as below:

Background noise monitor location 1- Background noise monitor was located on the awning facing East Esplanade. It was noticed that the noise generated by the existing roof plant was not audible at this location.

Background noise monitor location 2- Background noise monitor was located on the awning at north eastern corner. It was noticed that the noise generated by the existing roof plant was not audible at this location.

Manned background noise recording

To check the background noise around the nearest residential receivers a manned background noise measurement were conducted between 10:30pm and midnight on Monday 16th August 2010. The manned background noise measurements were carried along the front yard or building facades of the residential buildings immediately across Eastern Esplanade.

A Norsonics type SA110 Sound Analyser was used for the noise measurements. The analyser was set to fast response and calibrated before and after the measurements using a Rion NC-73 calibrator. No significant drift was noted.

3.3 MEASURED BACKGROUND NOISE LEVELS

Unmanned background noise monitoring results

The representative A-weighted background noise levels obtained from for the monitored noise levels are given below. In all cases the typical averaged minimum noise level was used to determine the representative background noise level. This will give the most conservative estimate of noise impact, and exclude the effect of periods of raised background noise levels due to carpark, or traffic noise. Weather affected noise data has been excluded for the noise assessment.

Table 3 - Monitored Background Noise Level

LOCATION	PERIOD	NOISE LEVEL L _{A90} dB(A)
Background Noise Monitor Location 1	Day (7am-6pm)	54
	Evening (6pm-10pm)	50
	Night (10pm – midnight)	48
	Night (Midnight- 7am)	42
Background Noise Monitor Location 2	Day (7am-6pm)	54
	Evening (6pm-10pm)	53
	Night (10pm – midnight)	49
	Night (Midnight- 7am)	43

Note: The lowest background noise levels of each time period will be used to setup the noise emission criteria.

Manned background noise measurement results

Manned background noise measurements were conducted in front of residential building at 41-42 Eastern Esplanade and the measured background noise levels are as below.

Table 4 - Background Noise Spectrum

31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A Weight
51	52	51	50	49	50	47	41	30	55

4 NOISE EMISSION OBJECTIVE

4.1 ACTIVITIES NOISE EMISSION CRITERIA

The OLGR provides guidelines for assessing noise emissions due to activity noise including people talking, functions and music. The guidelines are:

- *Before midnight, the L_{10} noise emissions should not exceed background noise level by more than 5 dB in the octave bands from 31.5Hz to 8k Hz at any residential premises.*
- *After midnight, the L_{10} noise emissions should not exceed background noise level in the octave bands from 31.5Hz to 8k Hz at any residential premises.*
- *After midnight, noise emissions are to be inaudible within any residential premises.*

The following assessment criteria have been determined based on the noise levels measured. These apply when measured outside the open window of a residential facade. The most sensitive period will be before midnight as this is the quietest period in which the premises will operate.

It is noted that higher levels of noise emissions will be permitted at other times as background noise levels are higher.

Table 5 -- OLGR Noise Objectives – Before Midnight Criterion

Time	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Before Midnight (BG+5 dB(A))	50	51	50	49	48	50	46	40	29

4.2 PLANT NOISE EMISSION OBJECTIVE

The DECCW Industrial Noise Policy provides guidelines for assessing noise impacts from industrial developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The DECCW Industrial Noise Policy has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion. In addition, the DECCW in its Environmental Noise Control Manual states that noise controls should be applied with the general intent to protect residences from sleep arousal.

4.2.1 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 5 dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

4.2.2 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 DECCW's 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.

Table 6 provides the recommended ambient noise levels for the urban residential receivers for the day, evening and night periods. 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; and
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

Table 6 - DECCW Recommended Acceptable Noise Levels

Type of Receiver	Time of day	Recommended Acceptable Noise Level dB(A) L_{eq}
Residential Urban	Day	60
	Evening	50
	Night	45

4.2.3 Sleep Arousal

To minimise the potential for sleep arousal the $L_{1(1\text{ minute})}$ noise level of any specific noise source does not exceed the background noise level (L_{90}) by more than 15 dB(A) outside a resident's bedroom window between the hours of 10pm and 7am. The L_1 noise level is the level exceeded for 1 per cent of the time and approximates the typical maximum noise level from a particular source. Where the typical repeatable existing L_1 levels exceed the above requirement then the existing L_1 levels form the basis for, sleep disturbance criteria.

4.2.4 Project Specific Plant Noise Objectives

Table 7 below provides a summary of our recommended assessment criteria applicable to the nearest residential receiver. The intrusiveness and amenity criteria for this project have been determined using the DECC guidelines, and measured lowest background noise levels and assuming that the plant operates continuously.

Table 7 – Plant Noise Objectives for Residential Receivers, dB(A)

Time of day	Measured Background Noise Level L ₉₀	Amenity Criteria L _{eq}	Intrusiveness Criteria L _{eq}	Objective
Day	54	60	59	59 dB(A) L _{eq}
Evening	50	50	55	50 dB(A) L _{eq}
Night - Before Mid night	48	45	53	45 dB(A) L _{eq} and 63 dB(A) L ₁
Night- After midnight	42	45	47	45 dB(A) L _{eq} and 57 dB(A) L ₁

5 NOISE SOURCES

This section examines the potential noise impacts from the proposed development. The main potential sources of noise are patron's talk, music activities within restaurants and from mechanical plant serving the building.

5.1 MUSIC ACTIVITIES NOISE - RESTAURANT

The assessment has been based on noise levels that occur during the worst-case situation. This event would correspond to maximum use periods e.g. Friday, Saturday nights.

Scenario 1 – Background music only.

Table 8 - Typical Worst Case Music Internal Noise Levels

Music Type	Sound Pressure Level dB(A) L ₁₀
Background music within restaurants	Up to 70

Table 9 - Maximum Internal Noise Level in Function Rooms, dB L₁₀

	OCTAVE BAND CENTRE FREQUENCY (Hz)									
	31.5	63	125	250	500	1000	2000	4000	8000	A-wt
DJ Music	94.5	98.5	98.5	90.1	90.4	90.6	88.3	84.1	76.9	95
Ambient Music	69.5	73.5	73.5	65.1	65.4	65.6	63.3	59.1	51.9	70

5.2 PATRON NOISE

The typical patron noise source is with a sound power level of L₁₀ 77 dB(A). Noise from patrons using the restaurant has been predicted at the nearest residences. The noise level predicted at each receiver is based on proposed number of people that may access the restaurant with up to 1 in 2 people talking at any one time.

The noise emission levels were corrected for distance attenuation, façade reflection and the number of patrons to determine the resultant noise level. The L₁₀ sound power level spectrum used in the calculations to predict the impact of patrons utilising the restaurants is presented below in Table 10. Predicted noise levels have also taken into account the effect of noise attenuation treatments recommended in Section 7.

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6.3 MECHANICAL PLANT

Mechanical plant would consist of air conditioning units, general ventilation plant and refrigeration equipment.

Majority of the existing mechanical plant will be remained. Noise emissions with the plant in the final equipment locations will be assessed and the specific requirements for this treatment determined once plant selections/locations are known to meet the noise objectives determined for plant noise.

7 TRAFFIC NOISE GENERATED BY THE PROPOSED DEVELOPMNET

7.1 TRAFFIC NOISE ASSESSMENT CRITERIA

Council's DCP provides no guidance as to the method of assessment of noise impact from traffic generated by the development. Given this, I have adopted the guidelines contained in NSW EPA "Environmental Criteria for Road Traffic Noise"(1999) (ECTRN).

The ECTRN guidelines for "land use developments with potential to create additional traffic on local roads" are presented in Table 14.

Table 14 - Goals for Traffic Noise from New Developments, $L_{Aeq(1hr)}$ *

Type of Development	Day (7am to 10pm)	Night (10pm to 7am)	Where Criteria Are Already Exceeded
Land use developments with potential to create additional traffic on local road	55	50	In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB

*Measured outside residential façade containing a window

7.2 TRAFFIC NOISE ASSESSMENT

Section 4 of TMG Transport Assessment Report dated October 2010 states as below:

Most restaurant patrons would leave over a two to three hour period. Allowing for some overlap between late or second session patron arrivals and departures that combined vehicle movements late in the evening would also be 100 veh/hr.

This traffic would be spread between the four Manly Public Car Parks. As such the additional traffic at any one car park would be considerably less then 100 veh/hr. Having regard to this spreading of traffic and the fact that the car parks are not operating at their design parking accommodation and hence traffic generating capacity, it is concluded that the effects of the additional traffic would be minimal.

As the additional traffic is predicted as “minimal” therefore additional traffic noise arising from the development shall be imperceptible which complies with the requirements of ECTRN.

8 RECOMMENDED TREATMENT

The following building and management controls are recommended to comply with the nominated noise objectives.

8.1 SCENARIO 1- BACKGROUND MUSIC ONLY WITHIN RESTAURANT

- Ambient music in restaurant areas not to exceed 70 dB(A) Sound Pressure Level.
- The proposed outdoor seatings shall be closed after 10pm. No music is allowed for outdoor seatings.

Figure 3 - Roof / Ceiling Construction For Restaurants Generally

Penetrations in ceilings (such as for light fittings etc.) must be sealed gap free with a flexible sealant. Any ventilation openings in the ceilings would need to be acoustically treated to maintain the acoustic performance of the ceiling construction.

- It is recommended that the management keep a complaint register on site and that noise complaints are registered and what course of remedial action has been taken. This register should be stored on site and be accessible at all times.
- Prominent notices shall be placed within Restaurants to remind patrons that a minimum amount of noise is to be generated at all times.
- All garbage shall be retained within the premises and removed after 7am on the following day.
- Management controls should be utilised to manage patron departure particularly at night and at closing times to ensure that patrons leaving development in a prompt and orderly manner

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9 CONCLUSION

External noise emission from for the proposed operation of Manly Wharf Upper Level has been assessed based on the background noise measurement on site and the requirements of OLGR and NSW DECC Industry Noise Policy. Provided acoustic treatment in Section 8 the external noise emissions will comply with all requirements.

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

Yours faithfully,

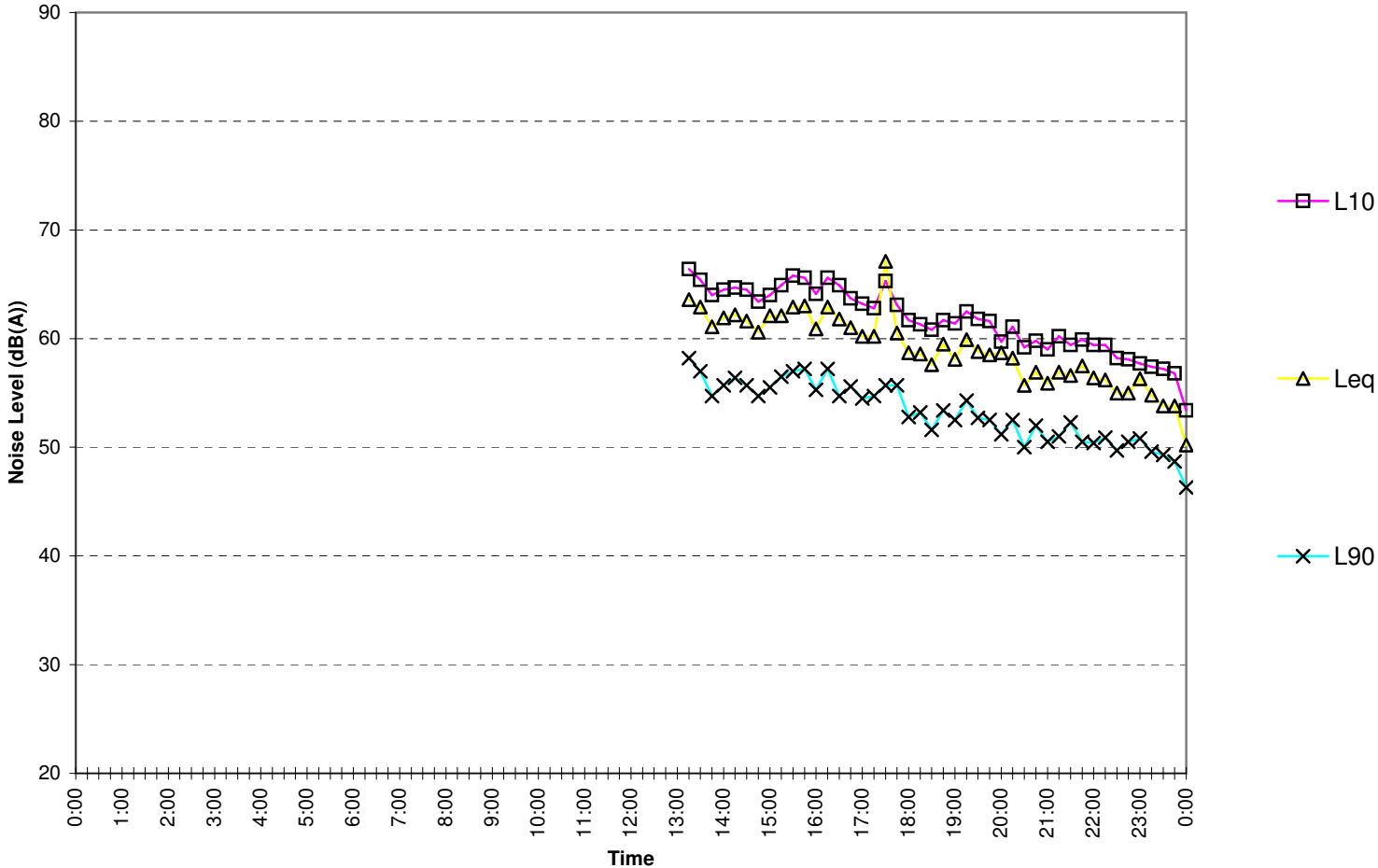
A handwritten signature in black ink, appearing to read "George Wei". The signature is written in a cursive, flowing style with a prominent loop at the end.

Acoustic Logic Consultancy Pty Ltd
George Wei

Appendix 1- Background Noise at Monitor Location 1

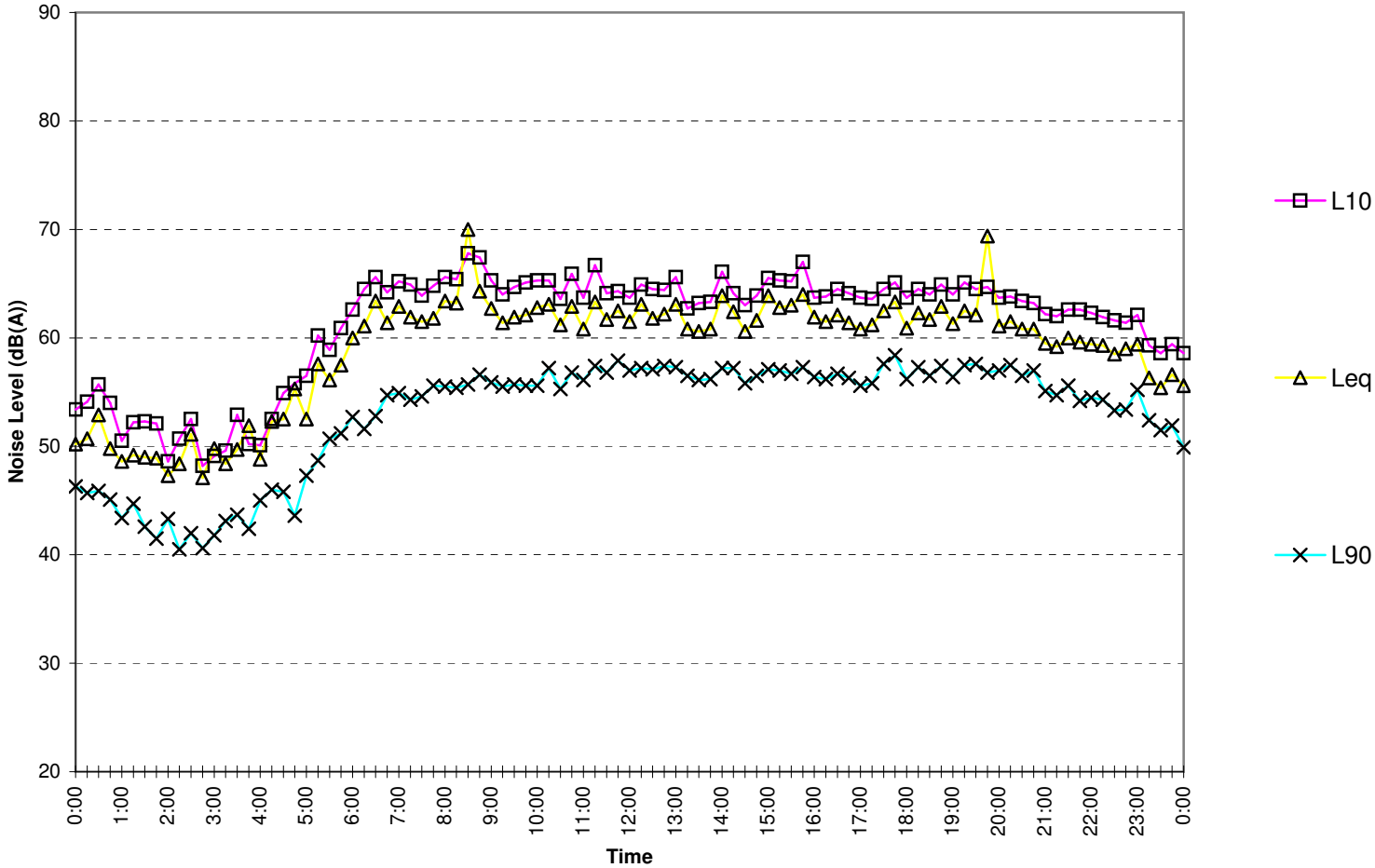
Manly Wharf- Logger Location 1

Tuesday August 10,2010



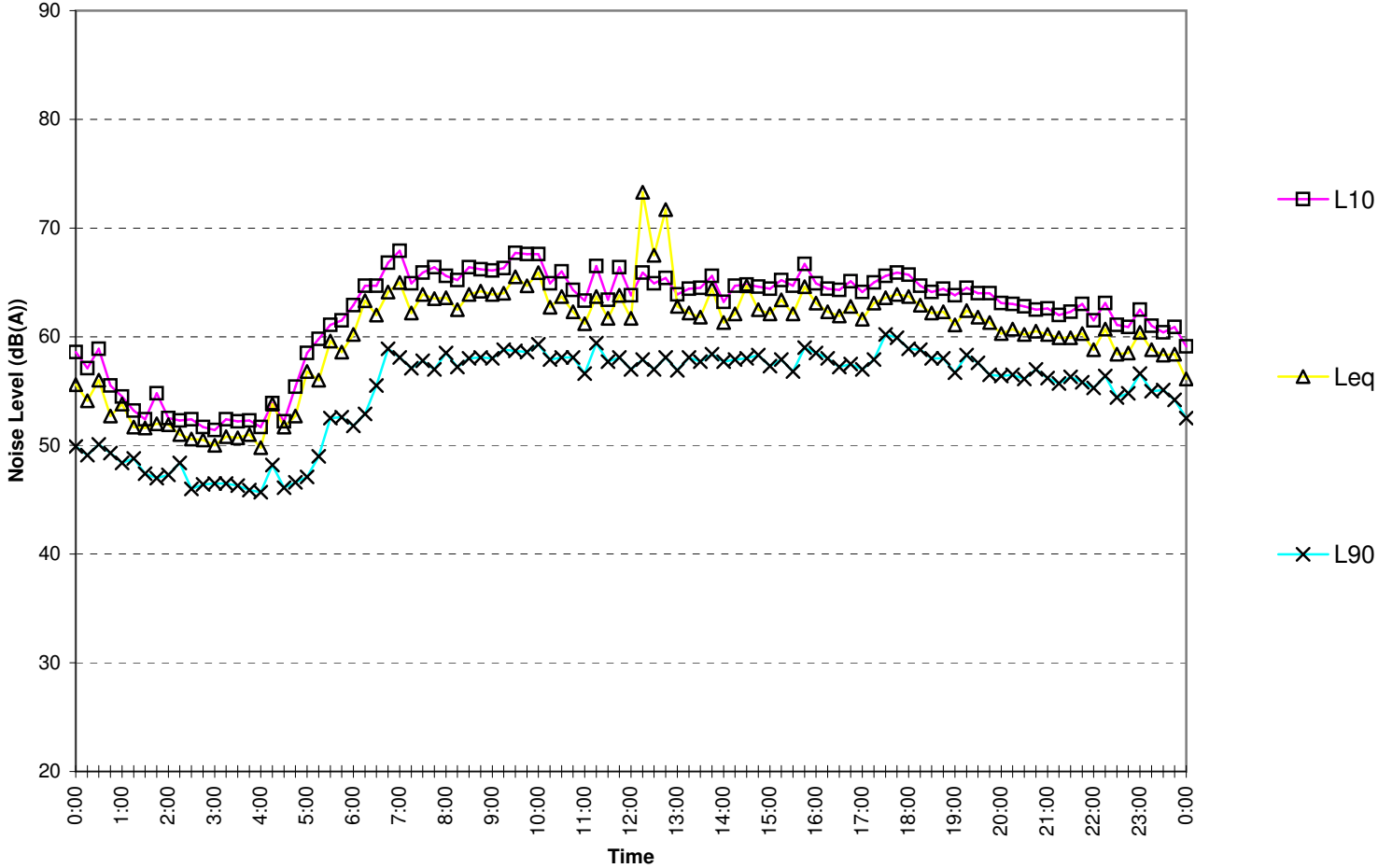
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Wednesday August 11,2010



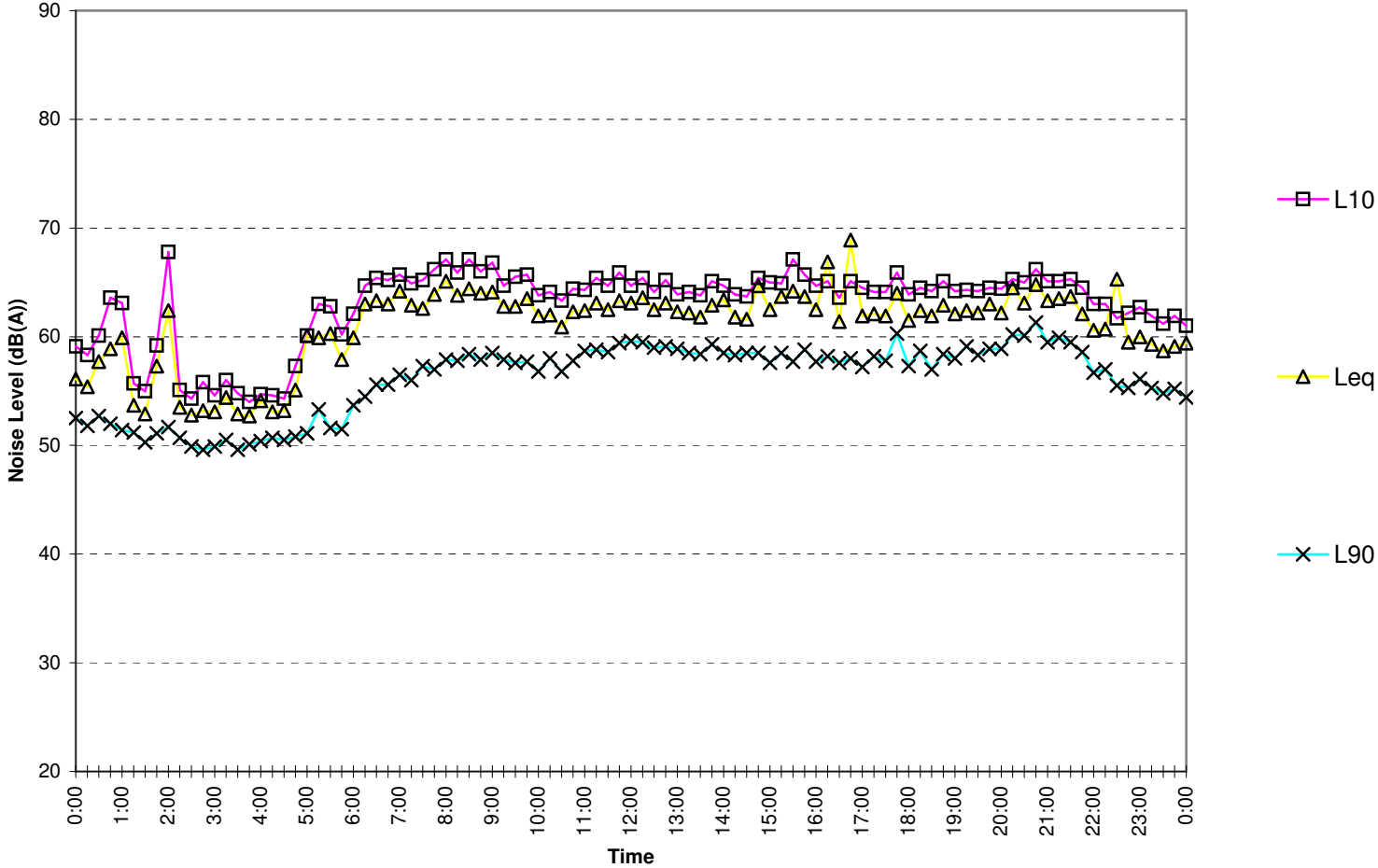
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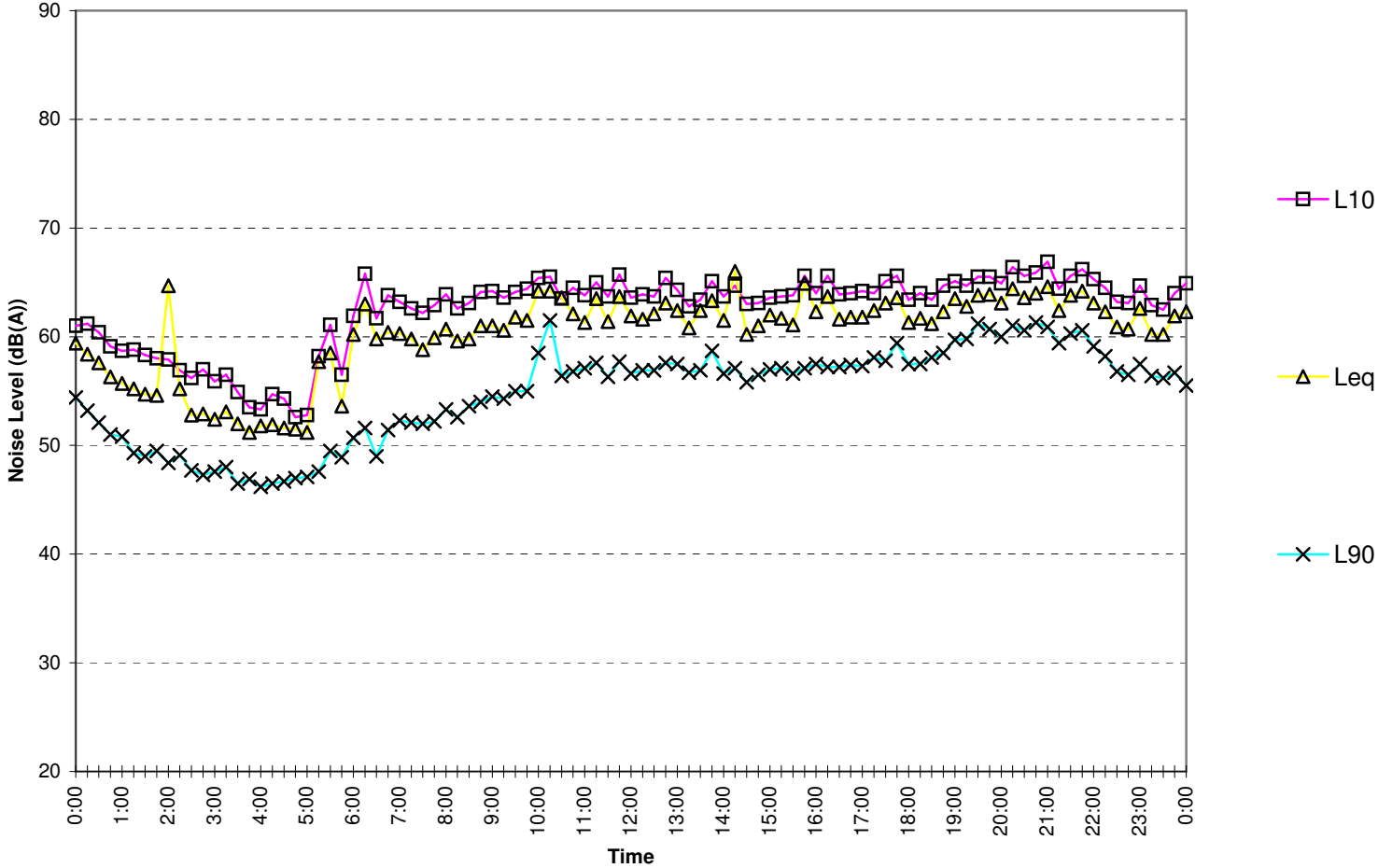
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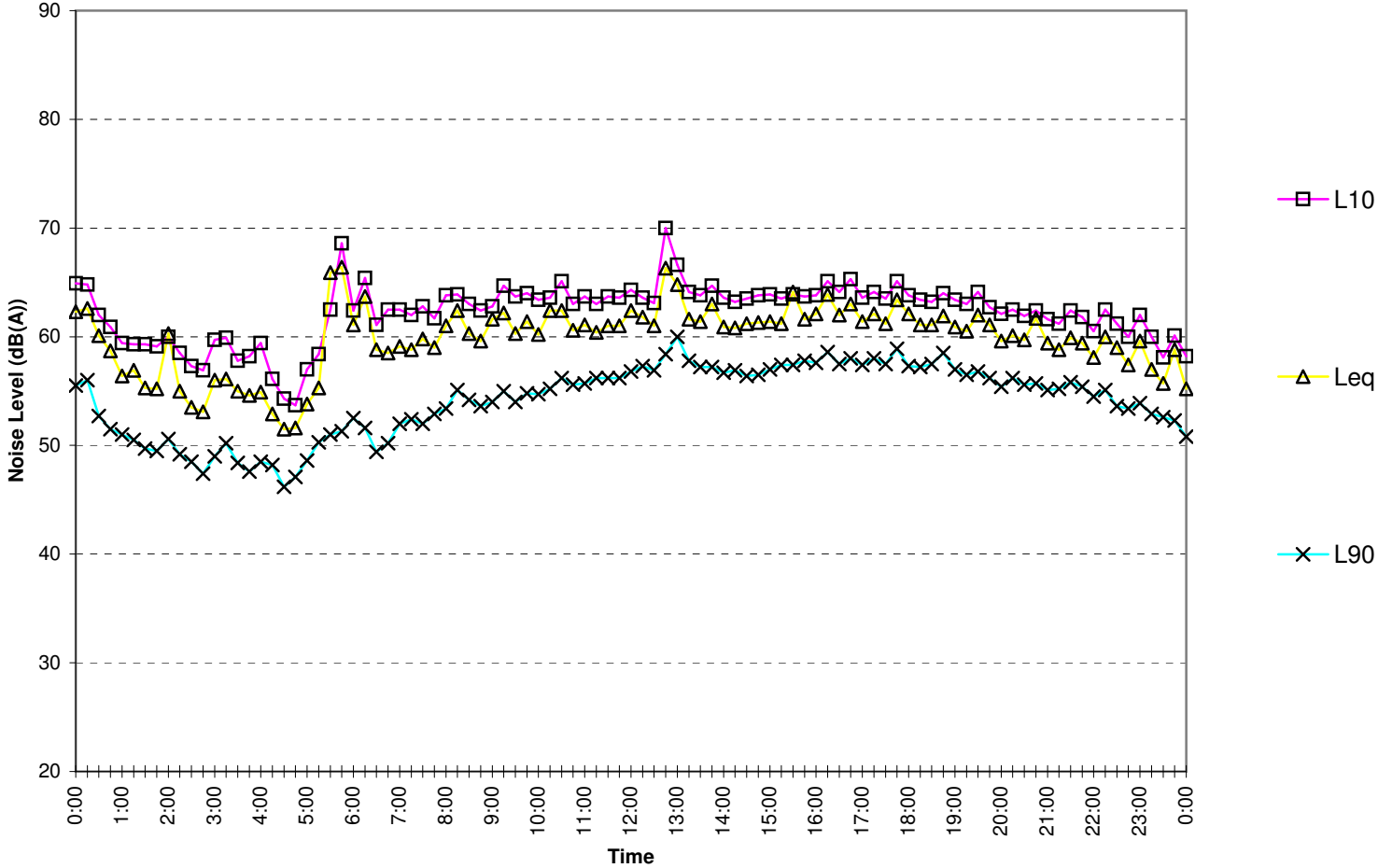
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Saturday August 14, 2010



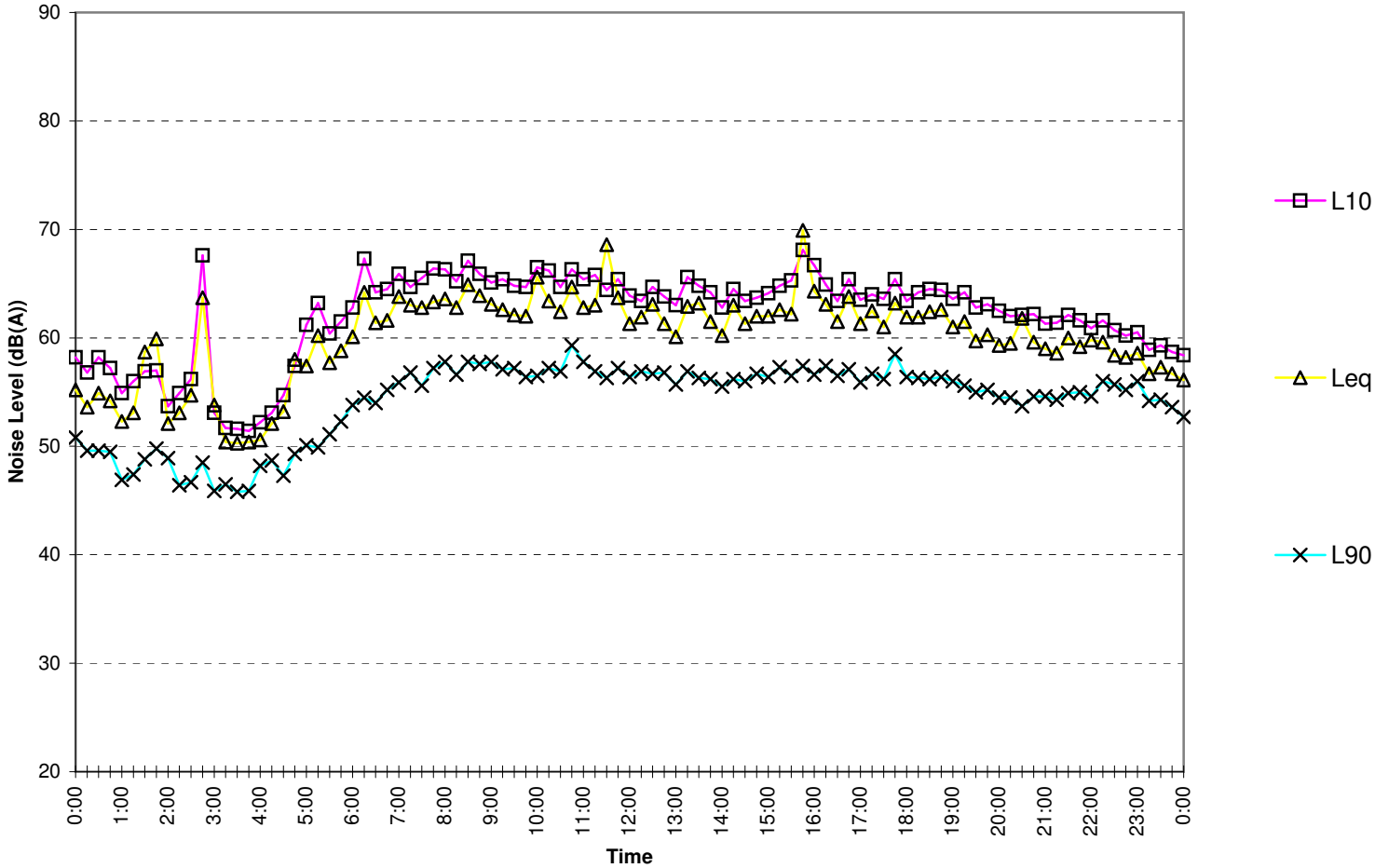
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Sunday August 15, 2010



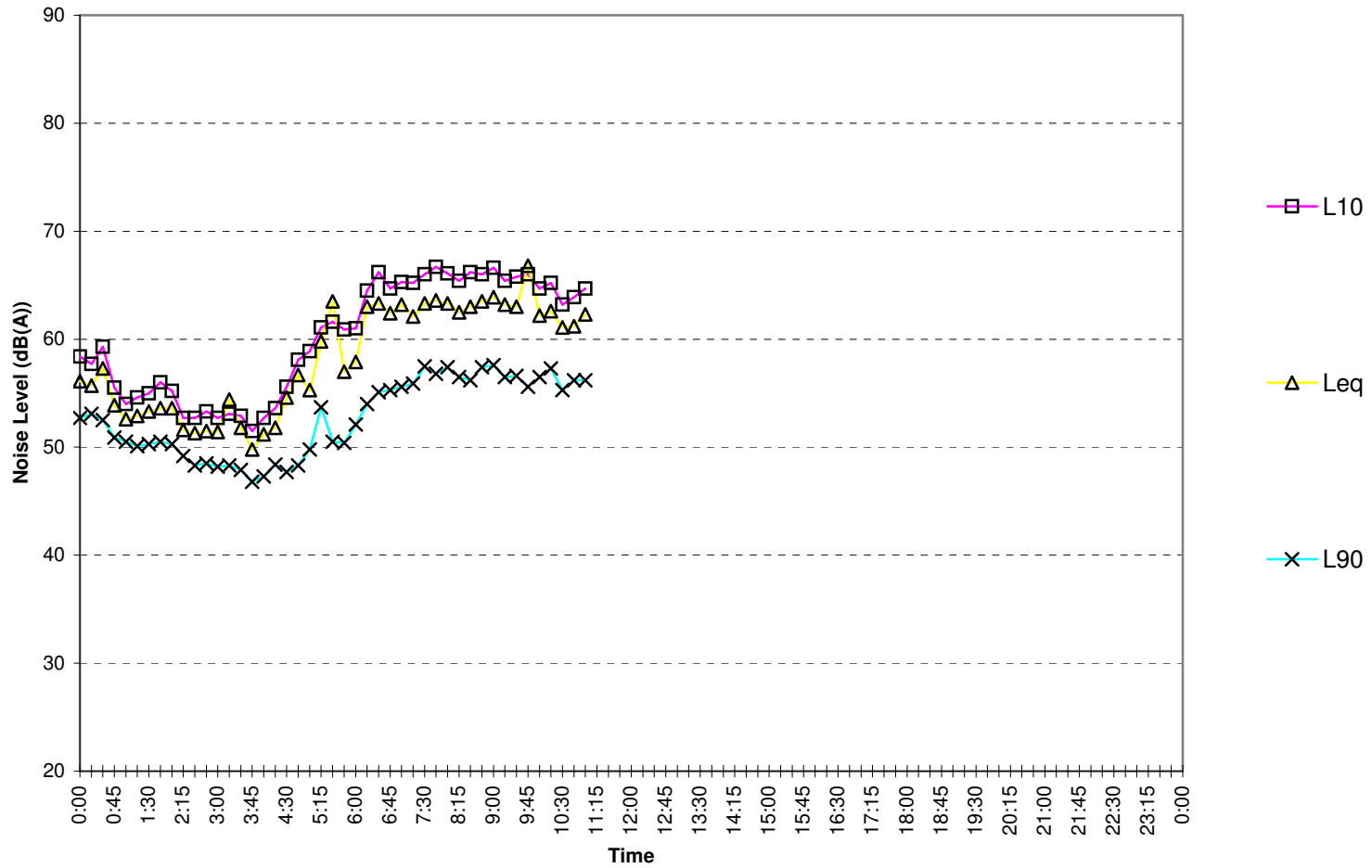
Manly Wharf- Logger Location 1

Monday August 16,2010



Manly Wharf- Logger Location 1

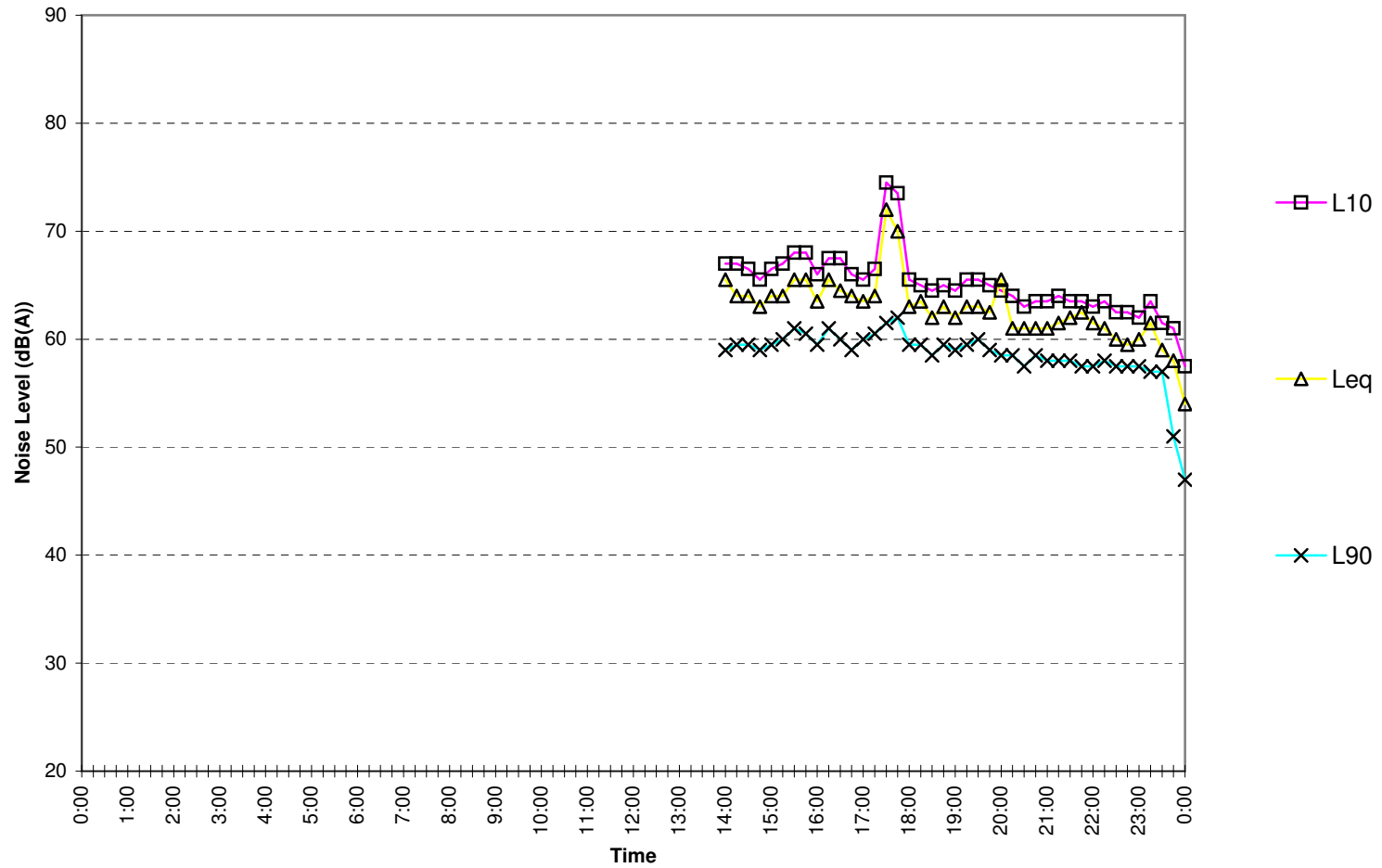
Tuesday August 17, 2010



Appendix 2- Background Noise at Monitor Location 2

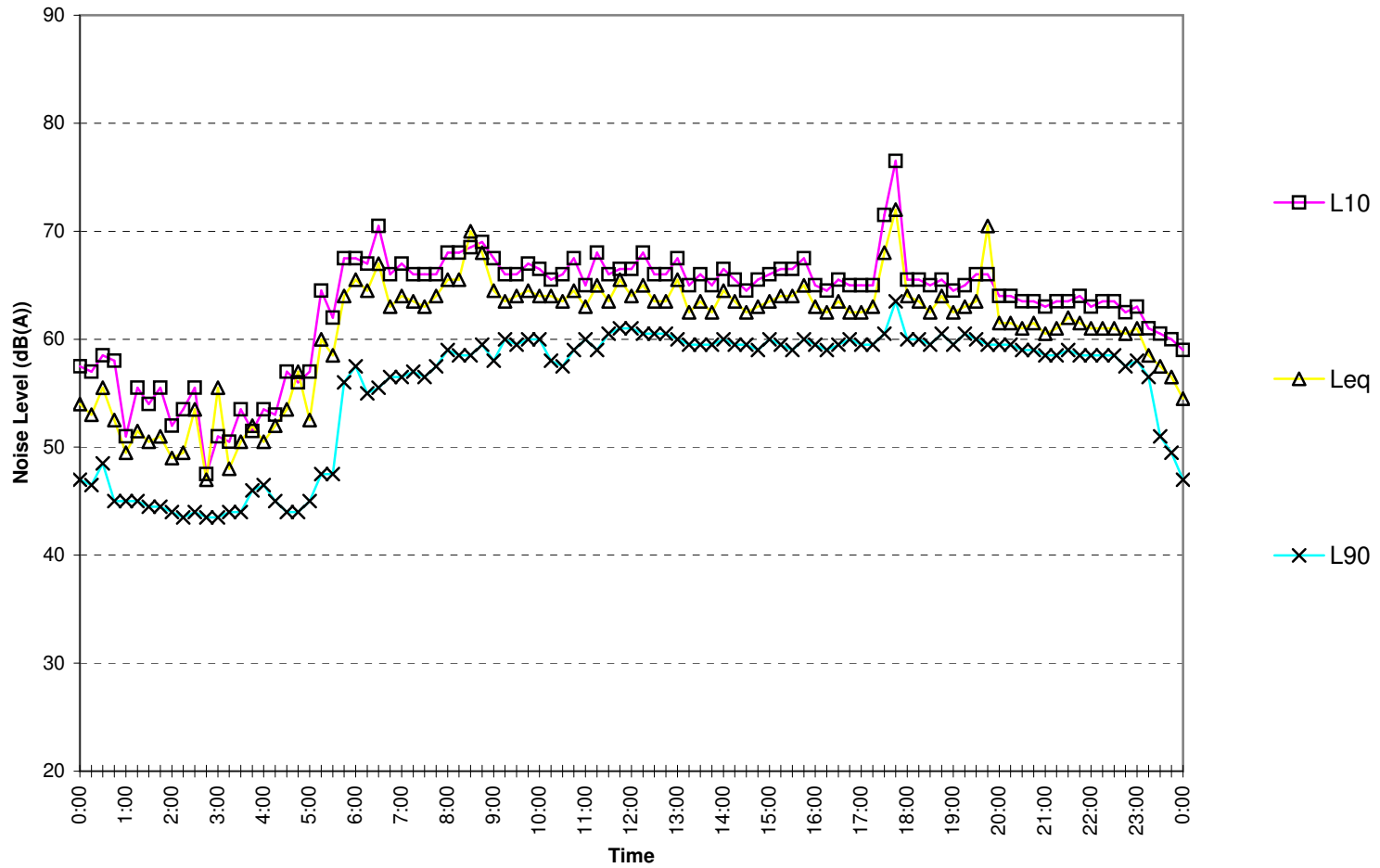
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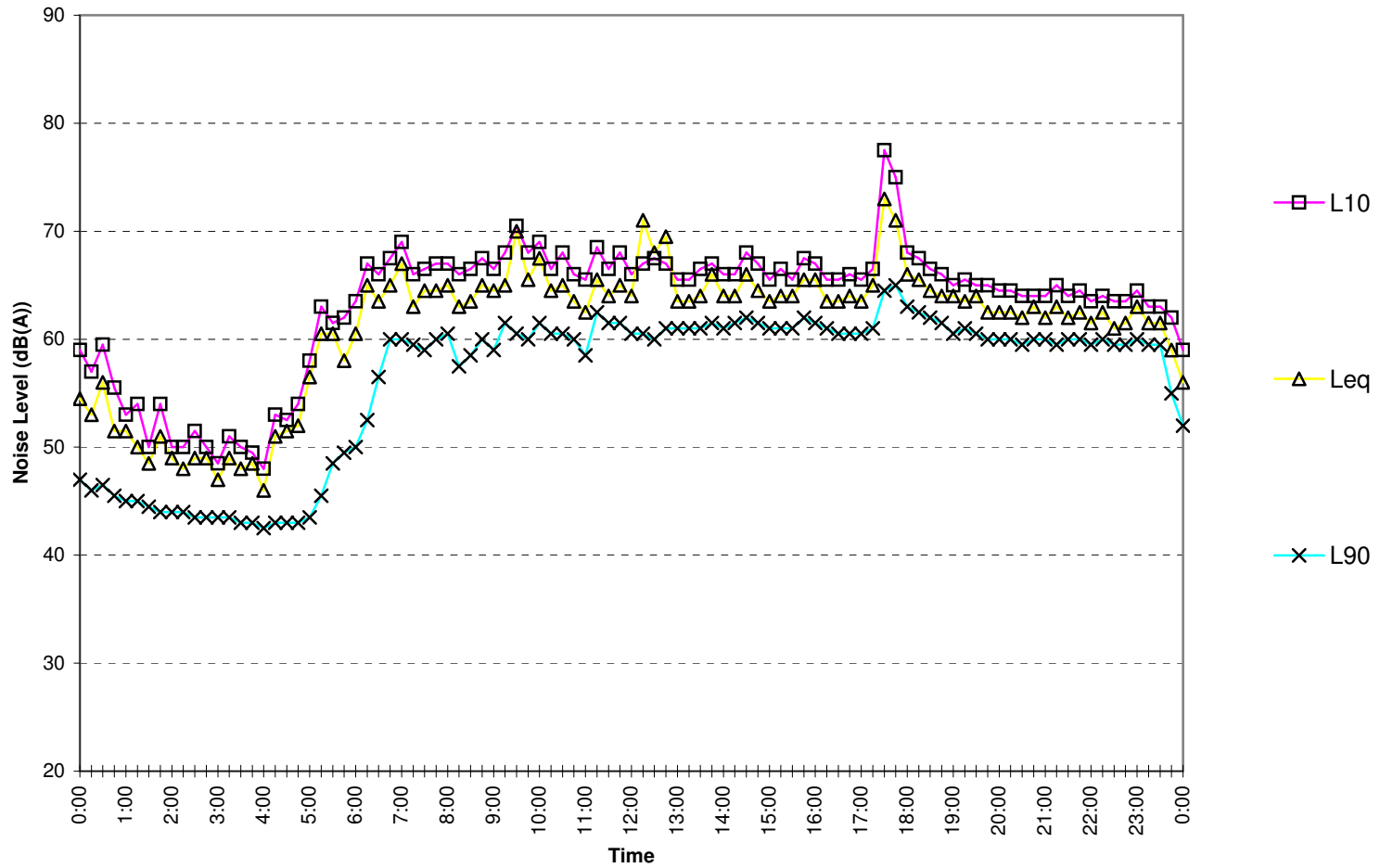
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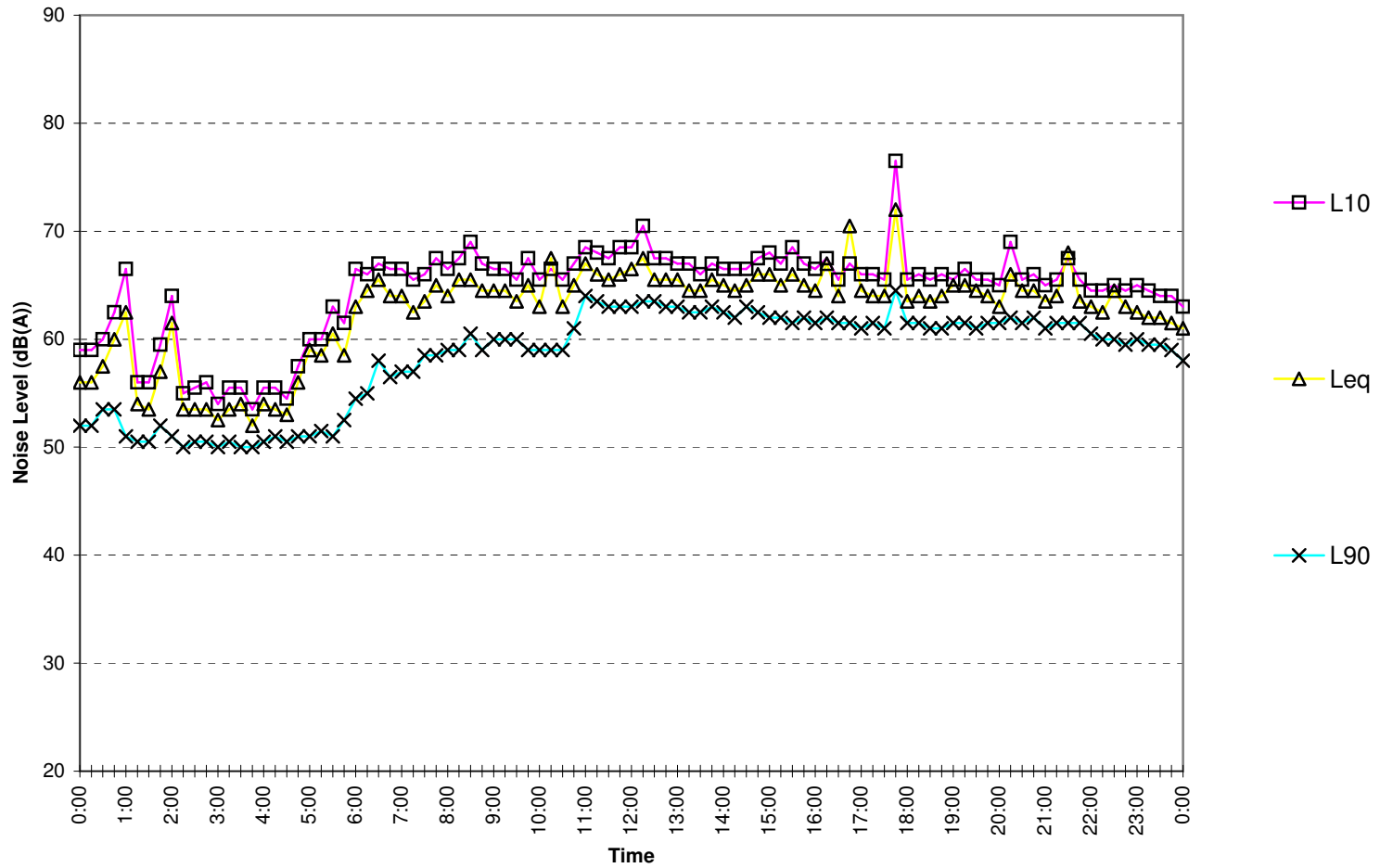
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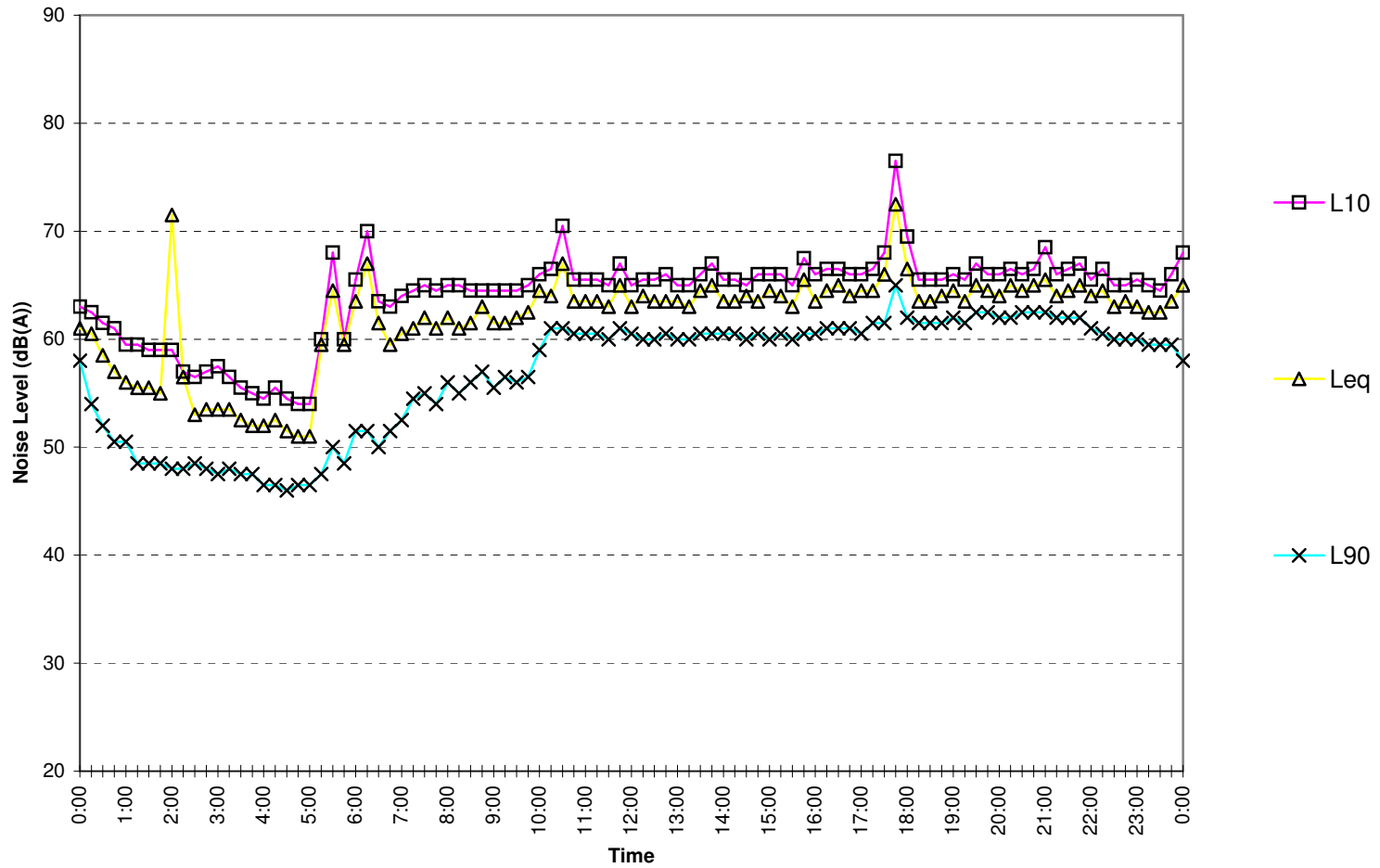
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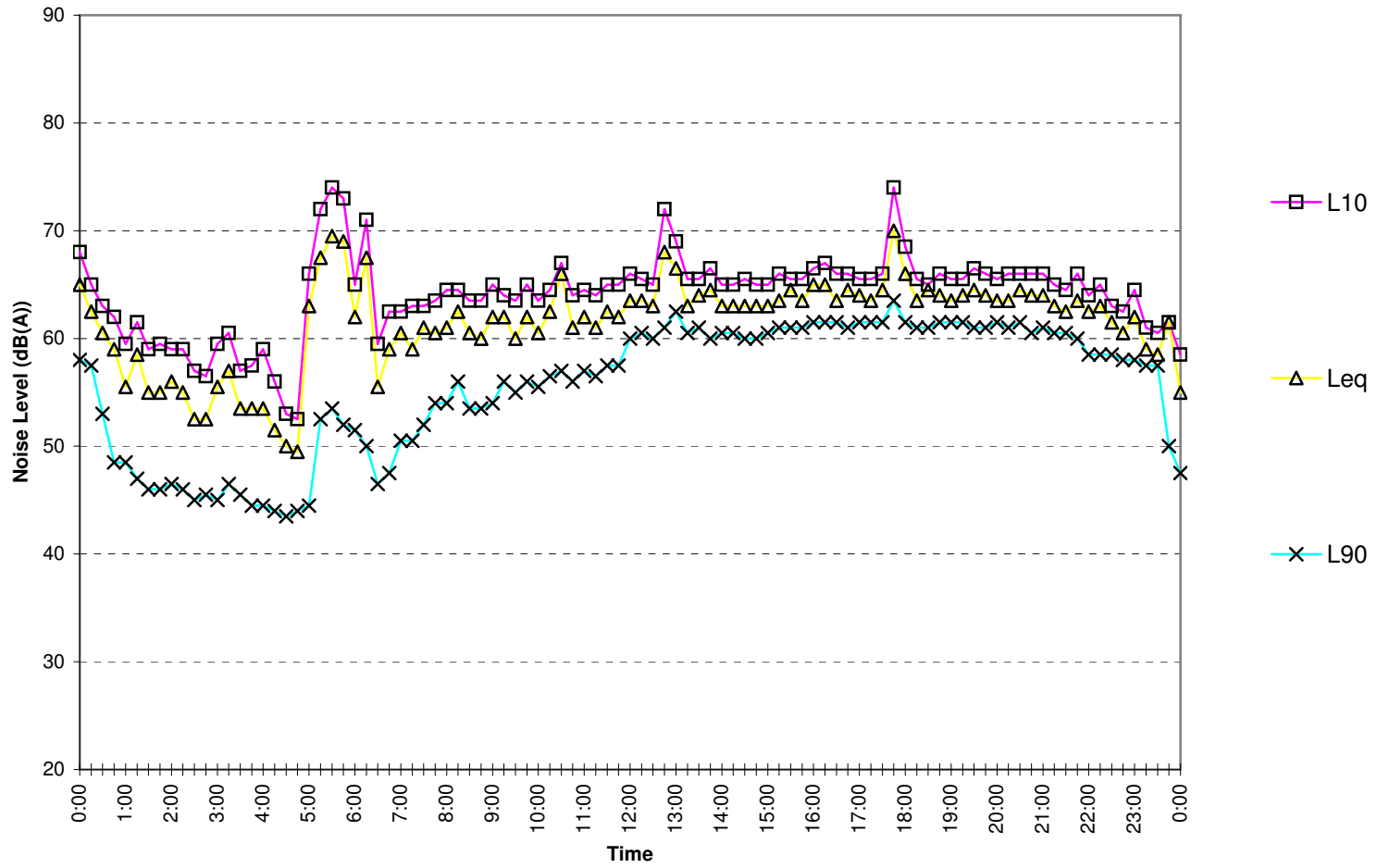
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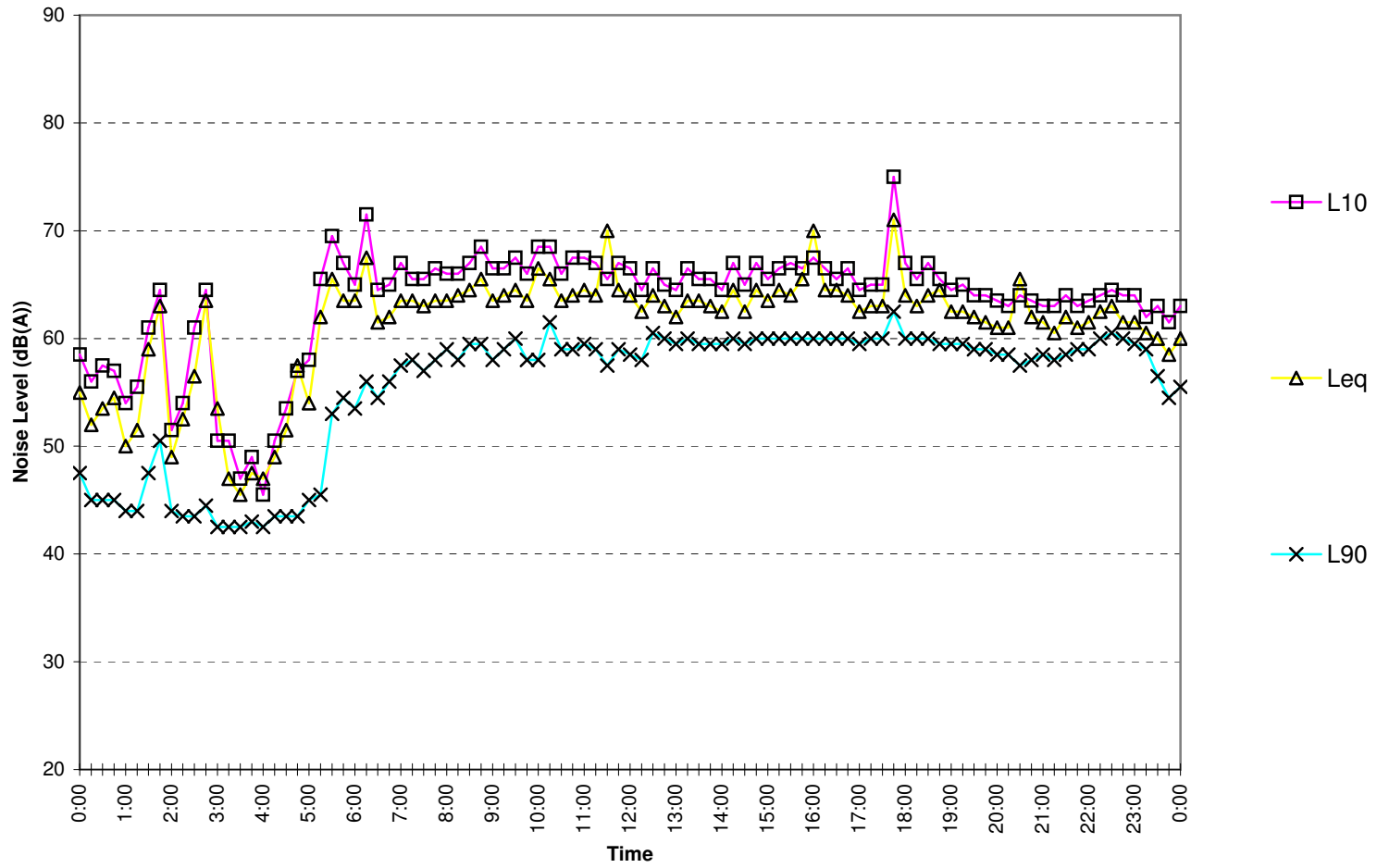
Manly Wharf - Logger Location 2

Sunday August 15, 2010



Manly Wharf - Logger Location 2

Monday August 16, 2010



Manly Wharf - Loger Location 2

Tuesday August 17, 2010

