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Prepared for: DEFINED DEVELOPMENTS

**ASSESSMENT OF ENVIRONMENTAL NOISE IMPACT**  
**FOR**  
**TOP RYDE CITY COMMERCIAL DEVELOPMENT**

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### **Appendix 1 - Ambient Noise Levels**

## 1. INTRODUCTION

This report presents our assessment of potential environmental noise impact from the proposed mixed use development; specifically commercial buildings within the Top Ryde Development.

The following have been addressed to determine the potential for adverse noise impacts to be produced internally and on nearby receivers:

- Potential noise impact associated with the surrounding streets as well as traffic generated internally with the development.
- Noise associated with future traffic generated by the development.
- Noise emanating from plant and equipment.
- Potential for traffic noise intrusion into subject commercial spaces.

Potential noise impact from these sources will be assessed based on Council, DECC and relevant Australian Standard guidelines as well as ambient noise measurements obtained from long-term unattended monitoring and manned measurements at the site. Indicative ameliorative measures will be recommended where potentially adverse impacts are identified.

We note that plant and equipment selections were not available at the time of assessment and thus a detailed design has not yet been completed. Notwithstanding, noise goals will be set and the future plant and equipment will be designed and selected so that noise levels at the nearest affected receivers comply with criteria nominated in this report.

## 2. SITE DESCRIPTION / PROPOSAL

The proposed development is located opposite the Ryde Civic Centre on Devlin Street. The site is bounded by Devlin Street to the west, Blaxland Road to the southwest, Pope Street to the northeast and Tucker Street to the southeast. Devlin Street is the continuation of Lane Cove Road which is a major road carrying high traffic volumes and Blaxland Road is a busy road carrying medium traffic volumes.

Pope Street is a mixture of commercial and residential landuses whilst Tucker Street includes the Ryde Public School, associated preschool and commercial landuses. Existing Top Ryde driveway access points are served off Pope and Tucker Streets with traffic accessing the subject commercial building to be served from Building Area D.

The location of the development and noise monitoring locations are indicated in Figure 1 below.

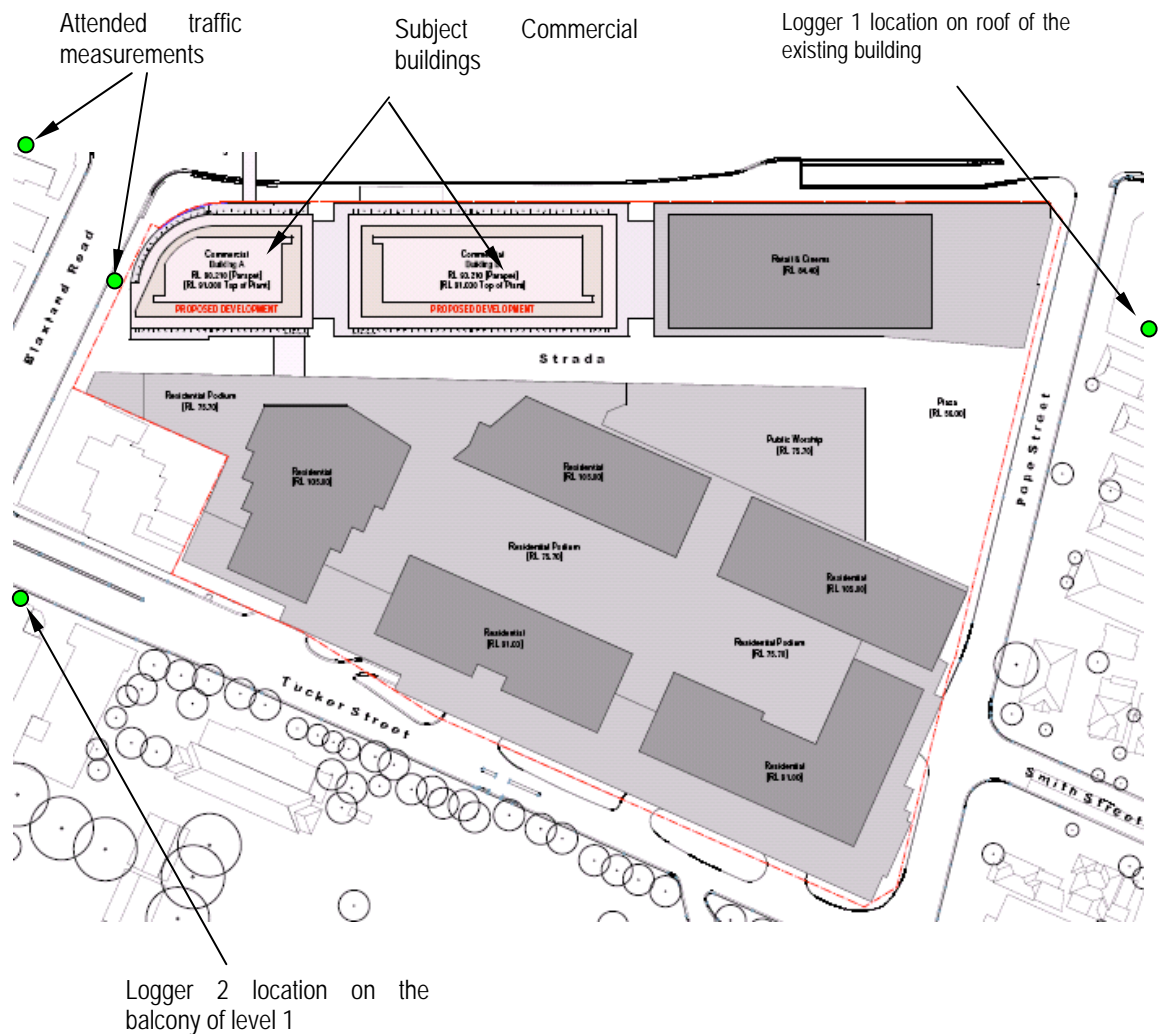


Figure 1 Site Map and Measurement Locations

### 3. DEFINITION OF TERMS

Environmental noise is complex in nature. The noise level fluctuates from moment to moment and the noise characteristic can vary depending on the particular noise source in the vicinity (for example road, railway, and factory).

For this reason, various terms and descriptors have been developed to quantify the noise environment in a way that reflects human perception. The terms used in this traffic noise assessment are described below:

#### dB(A)

Unit of loudness. The higher the number, the louder the noise. A change in noise level of up to 3 dB(A) is barely perceptible. A 5 dB(A) change is noticeable. A 10 dB(A) change is subjectively a doubling of noise.

#### Noise Descriptors

For time varying noise sources (such as traffic noise and general environmental noise) it is not possible to assess noise impacts based on a single instantaneous measurement. It is necessary to measure noise over a discrete period until a representative sample of noise has been obtained.

The descriptors used in this assessment are defined below.

#### $L_1$

The sound pressure level that is exceeded for 1 percent of the time for which the given sound is measured.

#### $L_{10}$

The sound pressure level that is exceeded for 10 percent of the time for which the given sound is measured.

#### $L_{90}$

The sound pressure level that is exceeded for 90 percent of the time for which the given sound is measured.

#### $L_{Aeq}$

Equivalent sound pressure level – steady sound level that, over a specified period, would produce the same energy equivalence as the fluctuating sound level actually occurring.

#### $L_{Aeq(1hr)}$

The LAeq noise level for a one hour period. It represents the highest tenth percentile hourly A-weighted  $L_{eq}$  during the period of 10pm to 7am for bedrooms and the during a 24 hour period (7am to 7am) for living areas.

## 4. NOISE MONITORING

### 4.1 UNMANNED LONG TERM NOISE MONITORING

Unattended ambient noise level measurements were conducted in the locations shown in Figure 1 and are provided in Appendix 1. Inspection on site indicated that the main environmental noises at the site are that of transportation noise associated with Devlin Street and Blaxland Road.

#### 4.1.1 Measurement Equipment

Unmanned noise monitoring was conducted using an Acoustic Research Laboratories Pty Ltd noise monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the monitoring period. The noise monitors were calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. Measurements were taken on A-frequency weighting and fast time weighting.

#### 4.1.2 Measurement Location

##### Location 1

Unattended noise monitoring was conducted on the rooftop of the commercial building on the corner of Pope and Devlin Street. The monitor was positioned on the south eastern corner of the roof overlooking the existing Top Ryde Centre.

##### Location 2

Unattended noise monitoring was conducted on an open balcony of the commercial building located on the eastern side of Blaxland Road and Tucker Street intersection. The monitor was positioned overlooking Tucker Street to the north west corner of the commercial building with direct line of sight to the existing Top Ryde Centre.

#### 4.1.3 Time of Measurements

The unmanned monitoring period was conducted between 24 April and 4 May 2006 for the corner of Pope and Devlin Street and up to the 10<sup>th</sup> May for Tucker Street. Unmanned noise monitoring data is presented in Appendix 1.

#### 4.1.4 Measured Noise Levels

As environmental noise is variable in nature, noise levels are described in terms of statistical descriptors. The  $L_{90}$  noise level is the level exceeded 90 per cent of the time and is approximately the average of the minimum noise levels. The  $L_{90}$  level is often referred to as the *background* noise level. The  $L_{eq}$  level represents the average noise energy during a measurement period. The monitored noise levels are provided in the Table 1. The unattended noise monitoring graphs are provided in Appendix 1 (uncorrected). The levels documented have been corrected by -2.5 dB(A) to account for façade reflection for monitoring location 2.

**Table 1 – Measured Unmanned Noise Levels**

Location	Time	L <sub>90</sub> dB(A)	L <sub>Aeq</sub> (1hr)
Cnr Devlin and Pope Street	Day (7am to 6pm)	59	65
	Evening (6pm to 10pm)	58	64
	Night (10pm to 7am)	56	62
Tucker Street	Day (7am to 6pm)	56	65
	Evening (6pm to 10pm)	53	63
	Night (10pm to 7am)	47	59

## 4.2 ATTENDED TRAFFIC MEASUREMENTS

Traffic measurements were undertaken along Devlin Street and Blaxland Road to assess the potential for traffic noise intrusion into the commercial office spaces. Measurement positions are outlined on Figure 1.

### 4.2.1 Measurement Equipment

Internal noise measurements were obtained using a CEL 593 Sound Level Analyser, set to A-weighted fast response. The sound level meter was calibrated before and after the measurements using a Rion NC73 Sound Level Calibrator. No significant drift was recorded.

### 4.2.2 Measurement Location

#### Location 1

Attended noise monitoring was conducted 2.5m from the curb along Devlin Street 30m to the South of the Devlin Street and Blaxland Road junction. Measurements were undertaken at this location to negate any latent construction noise emanating from the site. A correction of -2.5dB(A) has been assumed for façade reflection.

#### Location 2

Attended noise monitoring was conducted at the curb along Blaxland Road 30m from Devlin Street in line with the proposed Building A façade. A correction of -2.5dB(A) has been assumed for façade reflection due to hoarding along the construction site.

### 4.2.3 Time of Measurements

The monitoring period was conducted after 3pm extending into the afternoon peak on the 17<sup>th</sup> May, 2008. Traffic during this period represents the worst case noise level as it is still free flowing at maximum traffic volumes.

#### 4.2.4 Measured Noise Levels

The representative noise levels are presented in Table 2.

**Table 2 – Traffic Noise Levels on Surrounding Streets**

Measurement Location	Traffic Noise Level dB(A) $L_{eq}$ 15min
Devlin Street 2.5m from curb	76
Blaxland Road at the curb	72

Note: Traffic noise levels include façade reflection reduction of 2.5dB(A)

### 5. TRAFFIC NOISE INTRUSION

Internal noise levels within the commercial spaces shall be designed to comply with recommendations outlined within Australia and New Zealand Standard AS2107-2000 "*Acoustics – Recommended design sound levels and reverberation times for building interiors*".

**Table 3 – AS2107 Recommended Internal Design Levels**

Type of occupancy/activity	Recommended design sound level, $L_{Aeq}$ , dB(A)	
	Satisfactory	Maximum
General office areas	40	45
Private office	35	40
Board conference rooms	30	40

#### 5.1 EVALUATION OF TRAFFIC NOISE INTRUSION

The potential for traffic noise intrusion into the subject commercial buildings will be refined against recommended internal design levels once more detailed plans and documentation become available. It should be noted that due to high traffic noise levels along Devlin Street and Blaxland Road upgraded glazing thicknesses will be necessary for noise attenuation to spaces within the development.

Indicatively the following glass thicknesses are required to control external noise intrusion.



**Table 4 -- Indicative Glazing Constructions**

Building	Facade	Glazing Thickness	Acoustic seals
A	West	10.38mm laminated	Yes
	South	10.38mm laminated	Yes
	North <sup>1</sup>	10.38mm laminated	Yes
	North <sup>2</sup>	6.38mm laminated	Yes
	All others	6.38mm laminated	Yes
B	West	10.38mm laminated	Yes
	North/South <sup>1</sup>	10.38mm laminated	Yes
	North/South <sup>2</sup>	6.38mm laminated	Yes
	East	6.38mm laminated	Yes

Note 1: Glazing to be returned a minimum of two bays back from Devlin Street.

Note 2: Remainder of glazing back to Strada.

## 6. NOISE ASSOCIATED WITH ELEVATED TRAFFIC MOVEMENTS

Traffic to the subject commercial buildings will enter from Building Area D. Traffic noise as a result of car movements to and from the site Top Ryde development as a whole within the original DA and outlined within the Traffic Impact Study, conducted by Mark Waugh Pty Ltd using FHWA and CORTN traffic noise prediction models.

### 6.1 TRAFFIC NOISE ON LOCAL STREETS

Traffic noise generated by the proposed redevelopment was assessed using information provided by Mark Waugh Pty Ltd. The predicted worst case noise increases on each of the streets surrounding the development are summarised in the following table.

**Table 5 – Noise Associated with Traffic Generation**

Location	% Increase In Traffic AM Peak	% Increase In Traffic PM Peak	Increase in Noise Level dB(A) AM Peak	Increase in Noise Level dB(A) PM Peak
Pope Street	+ 6%	- 9%	+ 0.5 dB(A)	- 0.8 dB(A)
Tucker Street	- 4%	+ 1%	- 0.3 dB(A)	+ 0.1 dB(A)
Blaxland Road	+ 3%	- 4%	+0.2 dB(A)	- 0.3 dB(A)
Devlin Street	+ 3%	- 3%	+ 0.2 dB(A)	- 0.3 dB(A)

The investigation revealed that any increased traffic flows will cause an unperceivable increase in noise level and in half of the scenarios will result in a reduction of noise from traffic movements.

## 7. PLANT NOISE AND VIBRATION – RECOMMENDED CONDITIONS

A detailed design for the services plant is not available at this stage. Noise emissions from all services plant to any adjacent properties and to future residential as part of DA Masterplan should comply with the following requirements outlined within the Council's general conditions.

Condition 1. All noise emission from the mechanical plant shall comply with DECC Industry Policy requirements.

Condition 2. External noise levels at the property boundaries should not exceed the levels given in AS 1055.

AS 1055 nominates typical background noise levels that would occur, considering the general activities in the vicinity. Given the levels of road traffic and the existence of commercial activities in the area, the appropriate ambient noise category given in AS 1055 applying to the development would be R4. The corresponding night-time background noise levels for the R4 category are 45 dB(A) at night and 55 dB(A) during the day.

Condition 3. Use of the premises shall not create an offensive noise as defined in the Protection of the Environment Operations Act 1997.

Condition 4. Vibration from plant should not be perceptible within an adjacent property.

The required treatment in the form of enclosures, silencers, lined ducting, etc would be determined during the design process to meet the stated noise objectives.

## 8. CONCLUSION

This report presents an assessment of potential environmental noise impact from the proposed Commercial Buildings as part of the Redevelopment of the Top Ryde Shopping Centre at Top Ryde. The assessment included:

- Potential noise impact associated with the redevelopment on the surrounding streets
- Potential noise intrusion into commercial spaces as a result of traffic noise along Devlin Street and Blaxland Road.
- Noise emanating from plant and equipment. Noise from proposed plant and equipment associated with the development has not been assessed as a detailed plant design on which to base an assessment is not available. For this reason noise limits should comply with DECC requirements and be tested when constructed.

Provided the recommendations in the report are implemented then potential adverse impact will be ameliorated and as such the development will be acceptable acoustically.

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

Report prepared by



ACOUSTIC LOGIC CONSULTANCY PTY LTD

Matthew Carter

# **APPENDIX 1**

## **UNATTENDED MONITORED AMBIENT NOISE LEVELS**

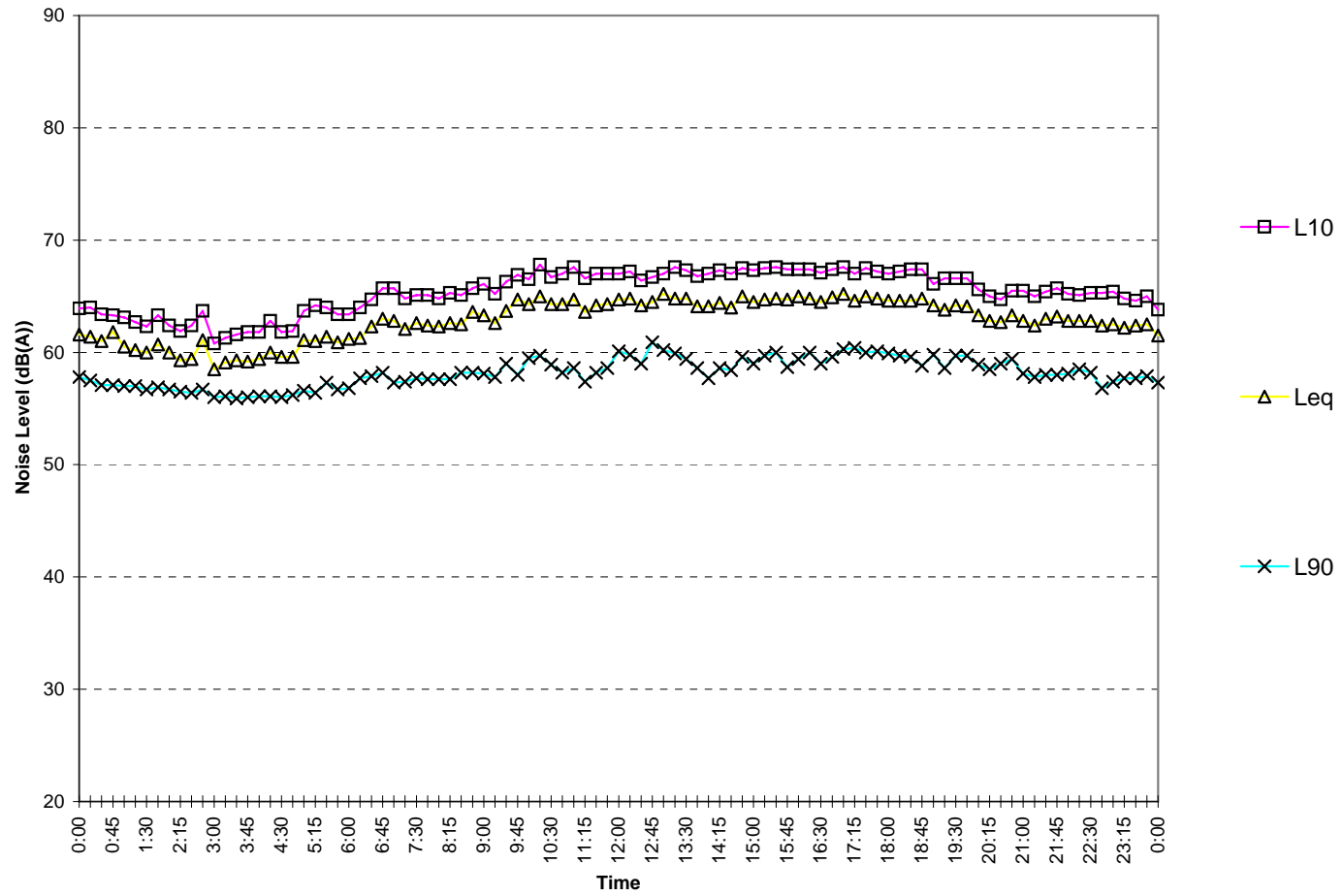
# Corner Devlin and Pope Street Top Ryde

Monday April 24,2006



# Corner Devlin and Pope Street Top Ryde

Tuesday April 25, 2006



# Corner Devlin and Pope Street Top Ryde

Wednesday April 26, 2006



# Corner Devlin and Pope Street Top Ryde

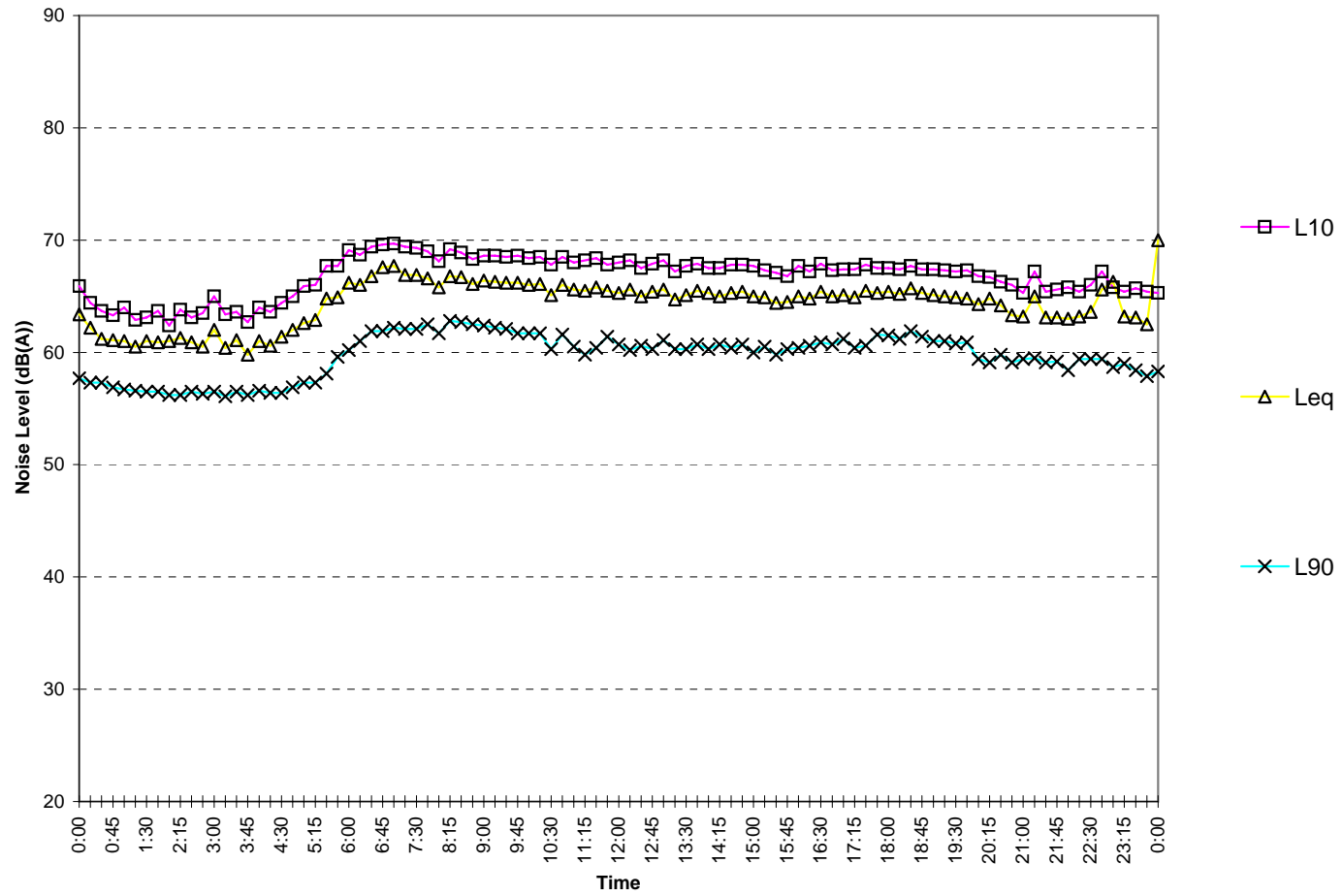
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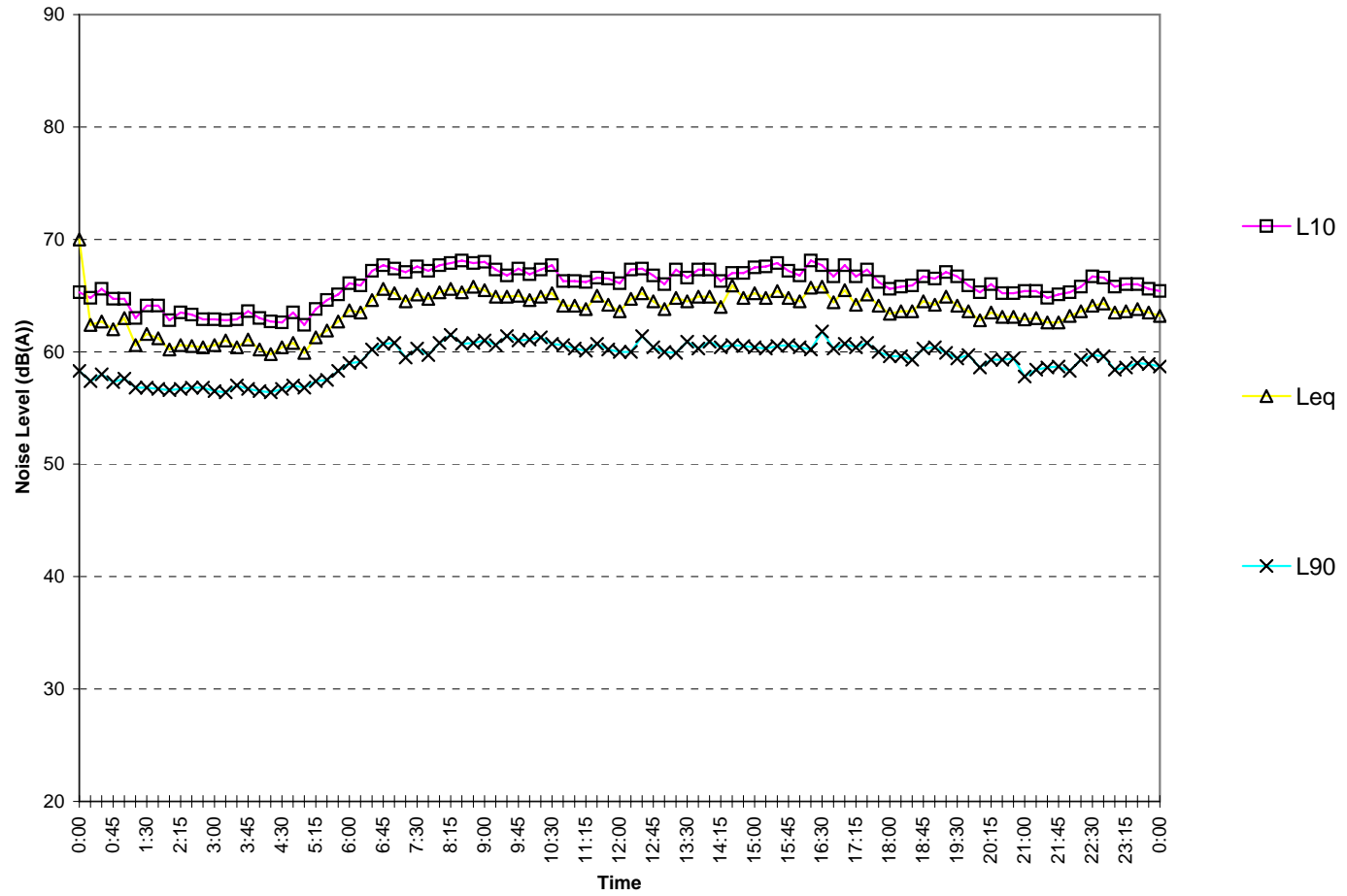
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Friday April 28, 2006



# Corner Devlin and Pope Street Top Ryde

Saturday April 29,2006



# Corner Devlin and Pope Street Top Ryde

Sunday April 30,2006



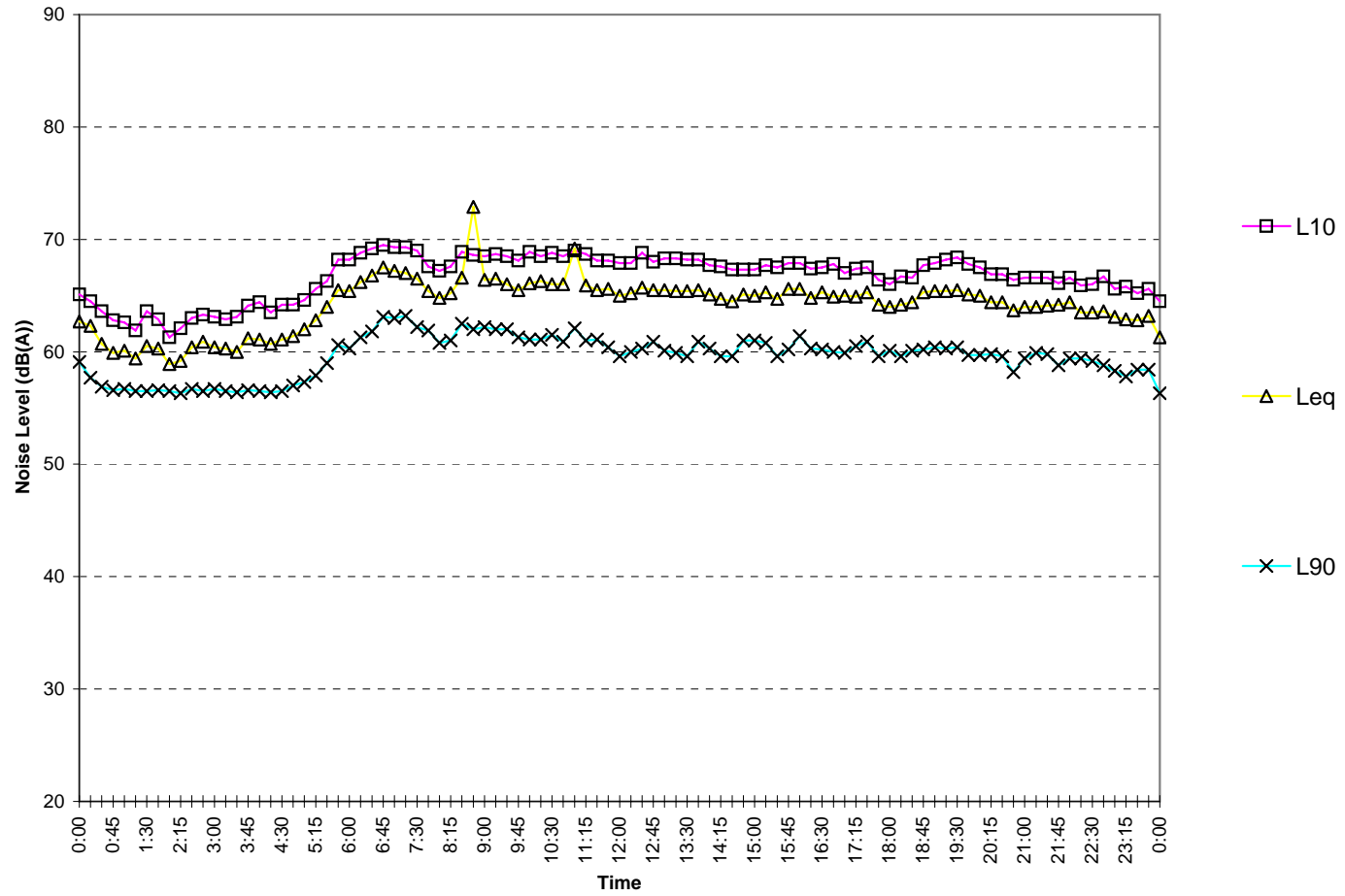
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Monday May 1, 2006



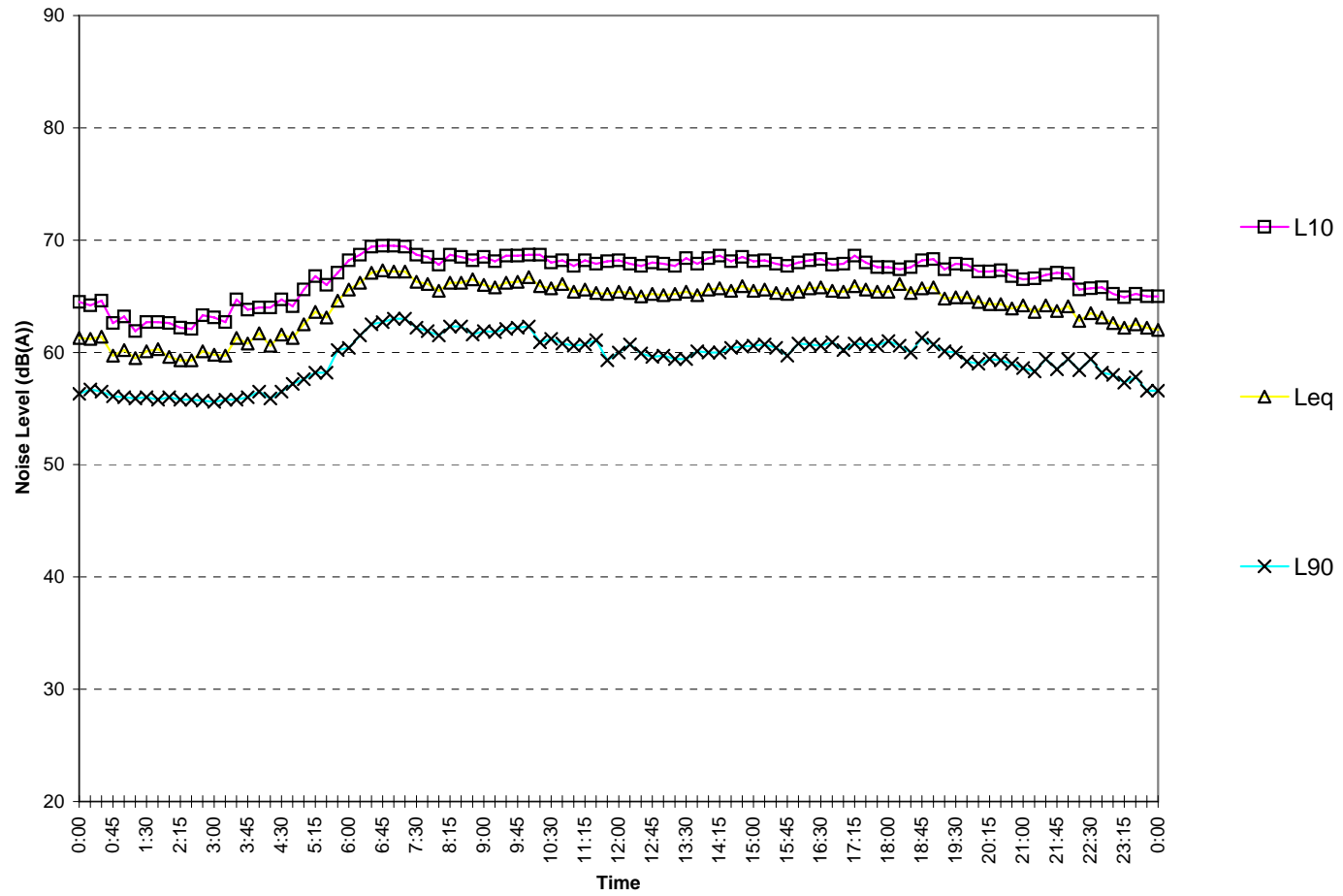
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Tuesday May 2, 2006



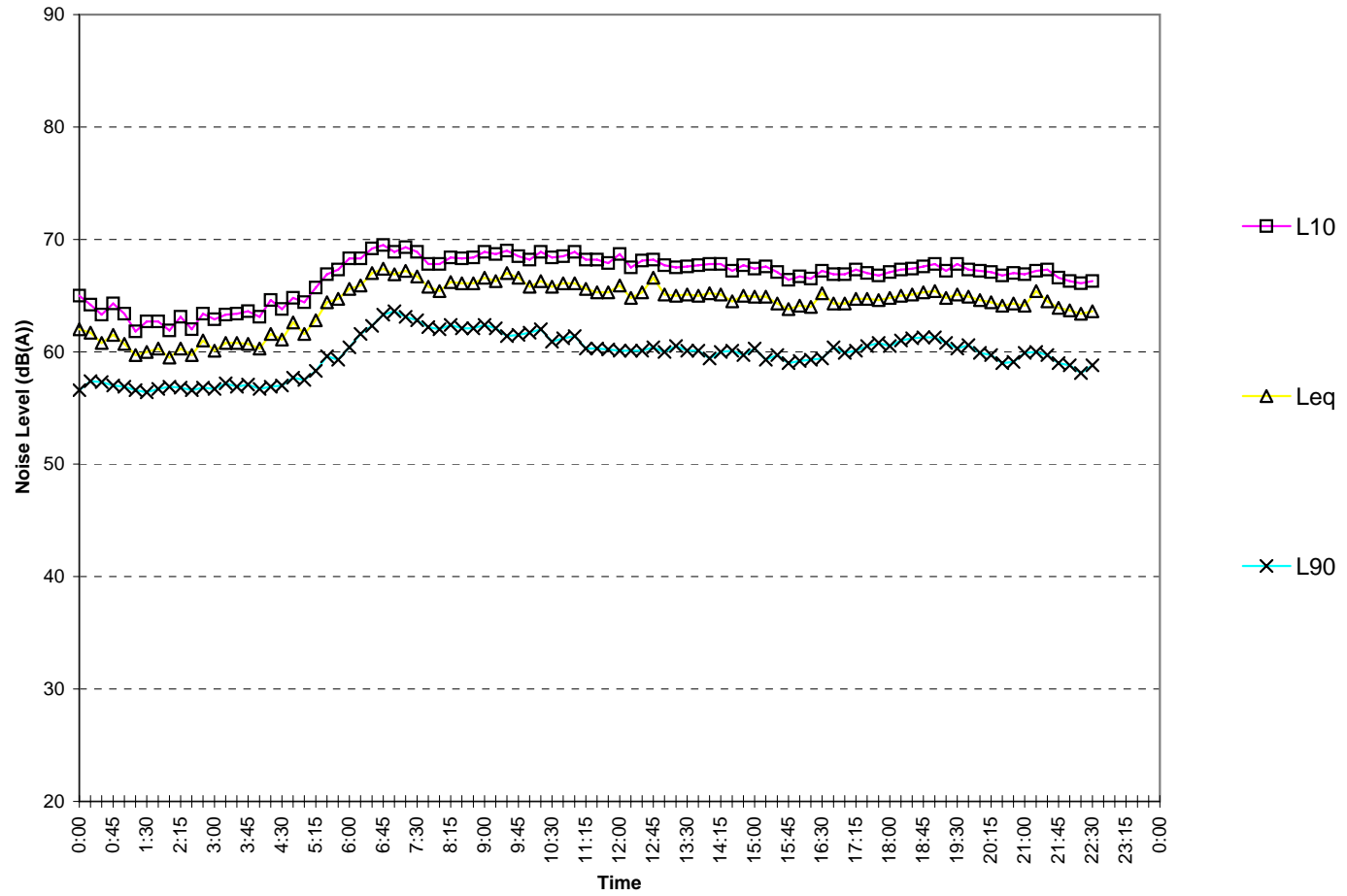
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Wednesday May 3, 2006



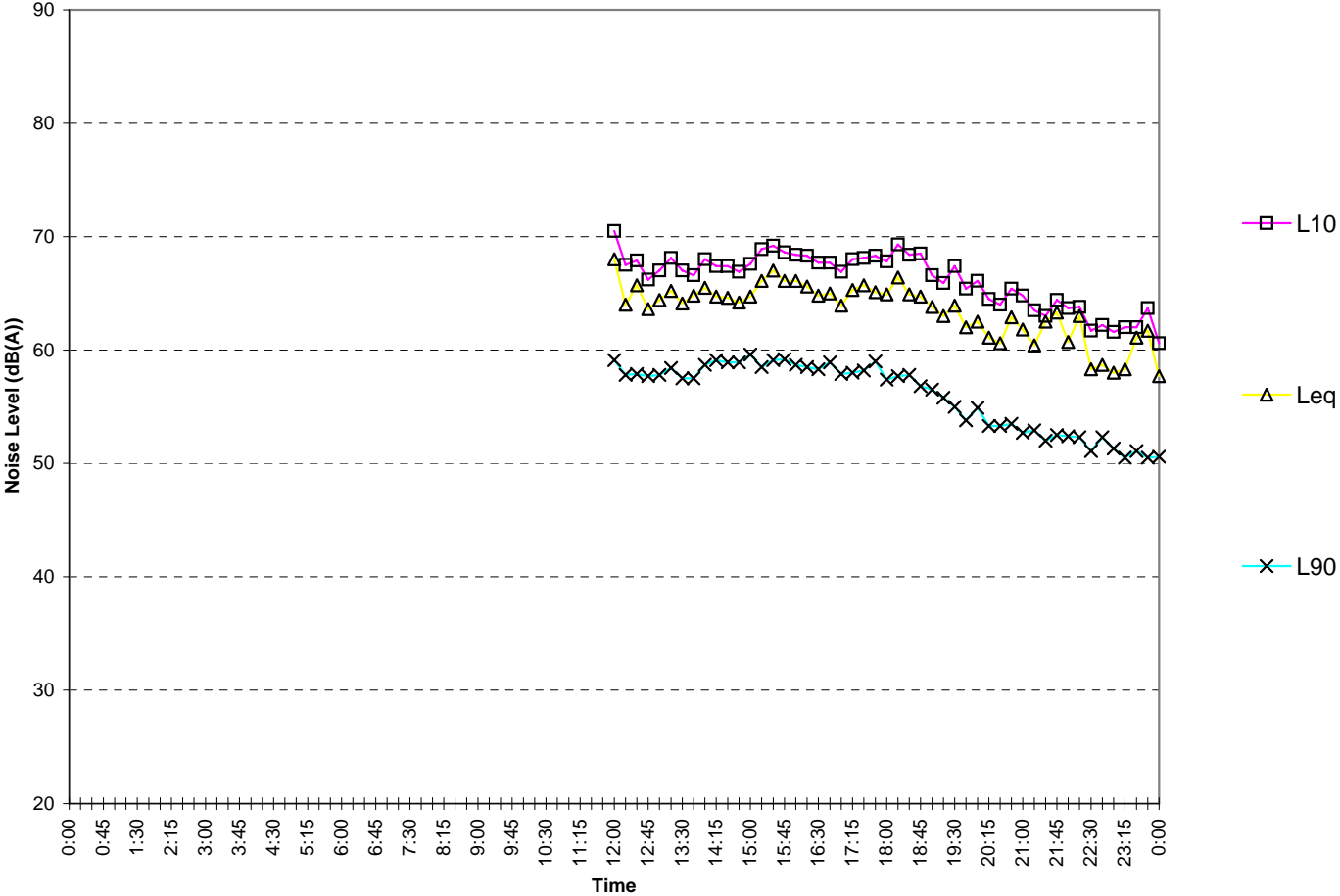
# Corner Devlin and Pope Street Top Ryde

Thursday May 4, 2006



# Tucker Street Top Ryde

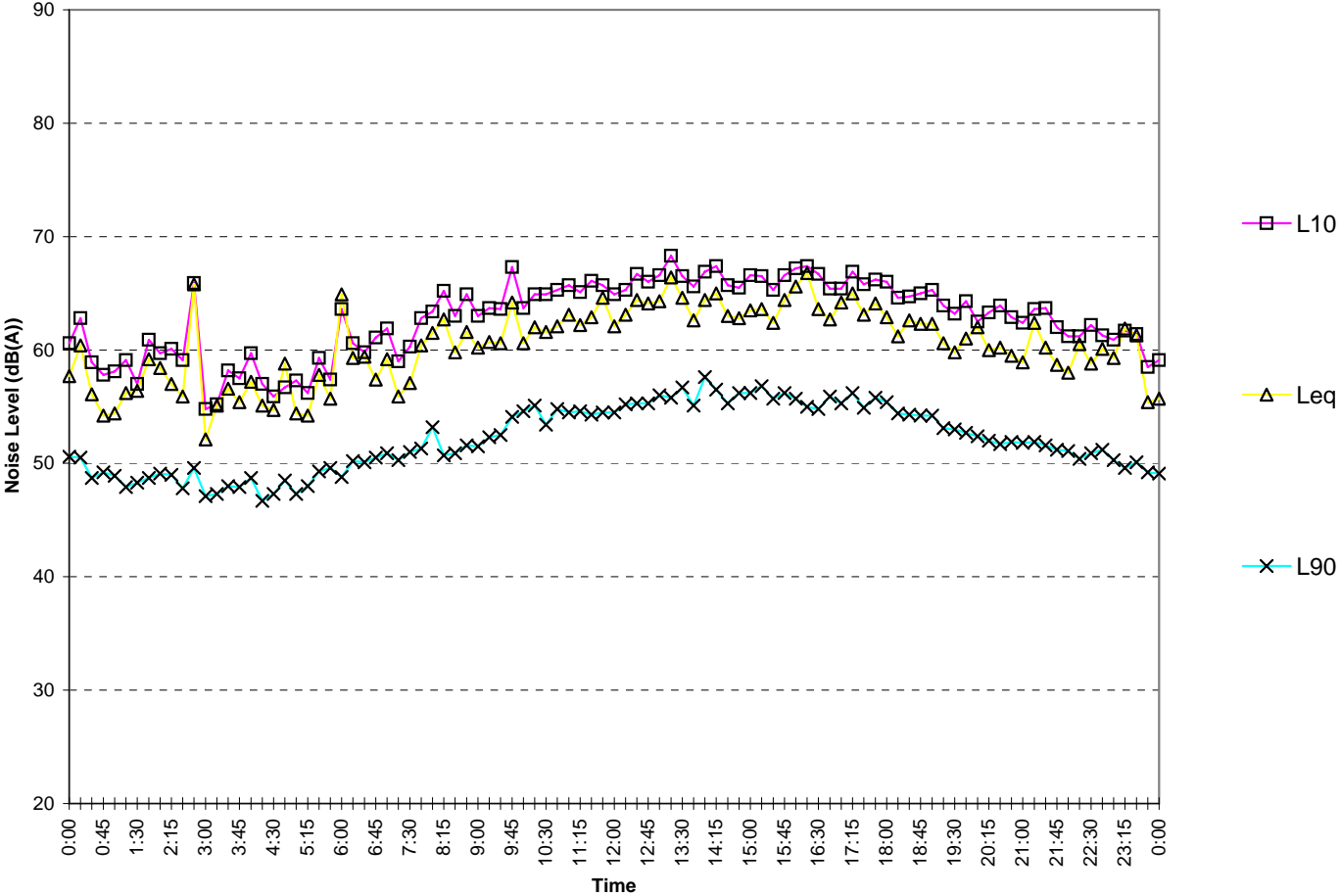
Monday April 24, 2006





# Tucker Street Top Ryde

Tuesday April 25, 2006



# Tucker Street Top Ryde

Wednesday April 26, 2006



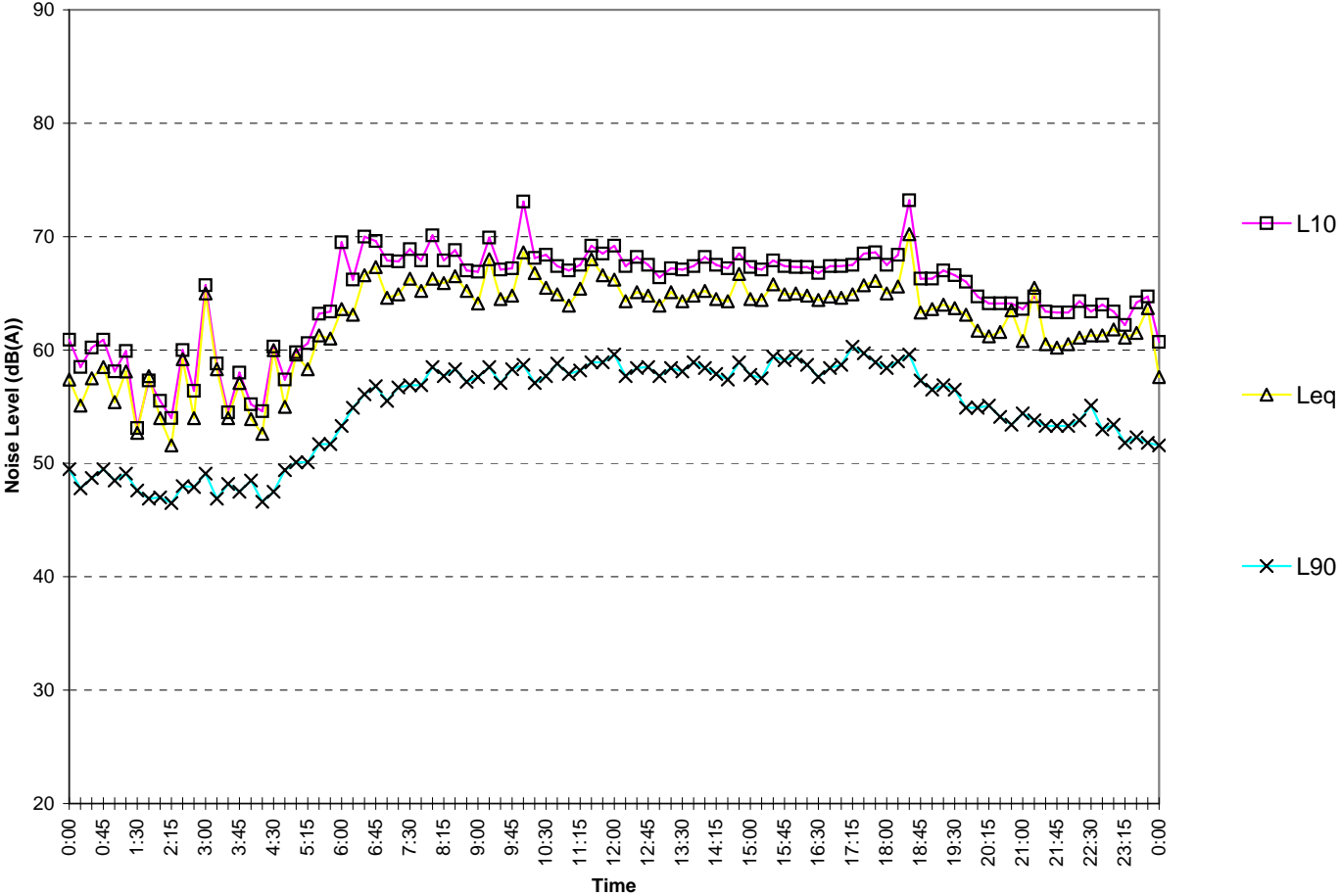
# Tucker Street Top Ryde

Thursday April 27, 2006



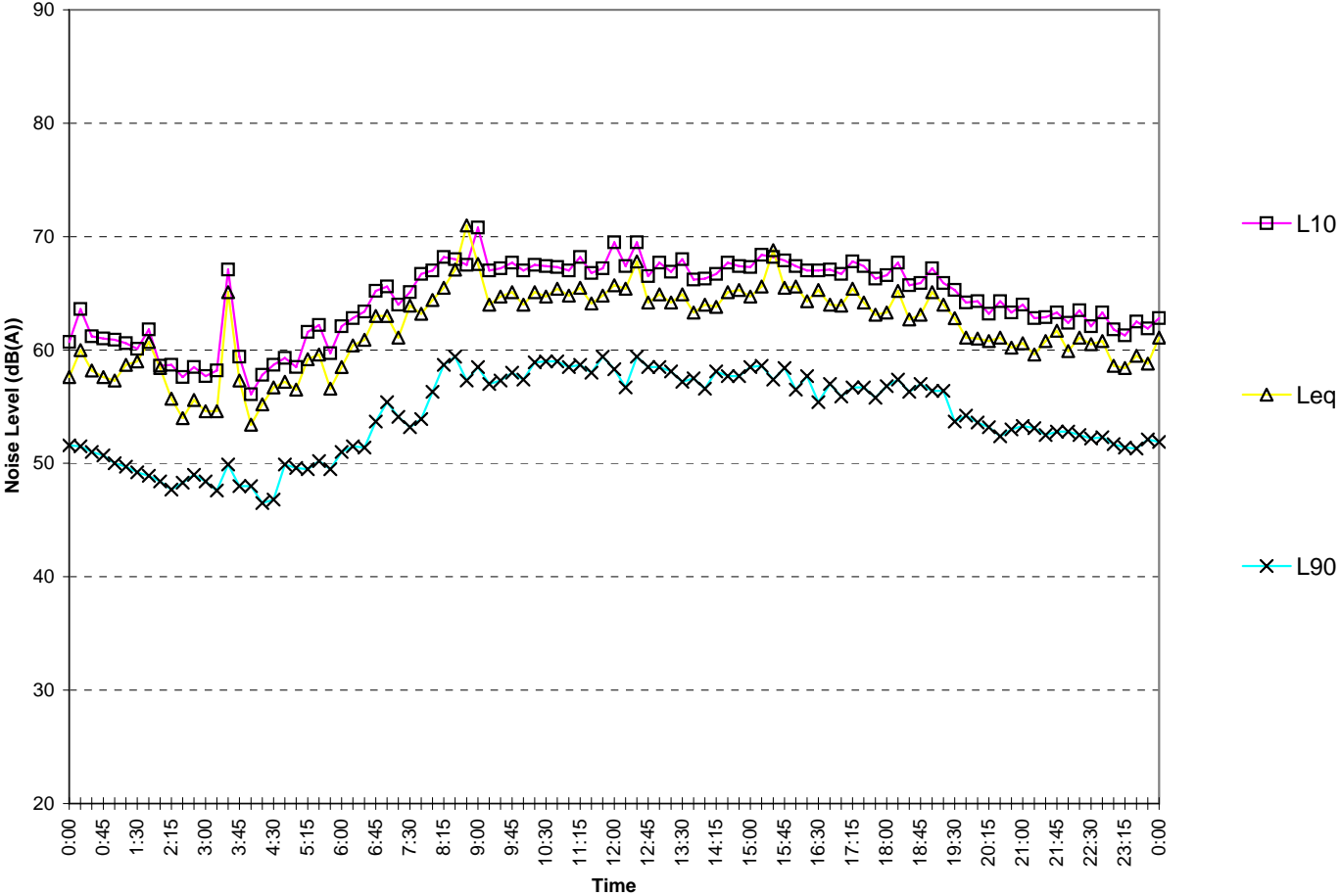
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Friday April 28, 2006



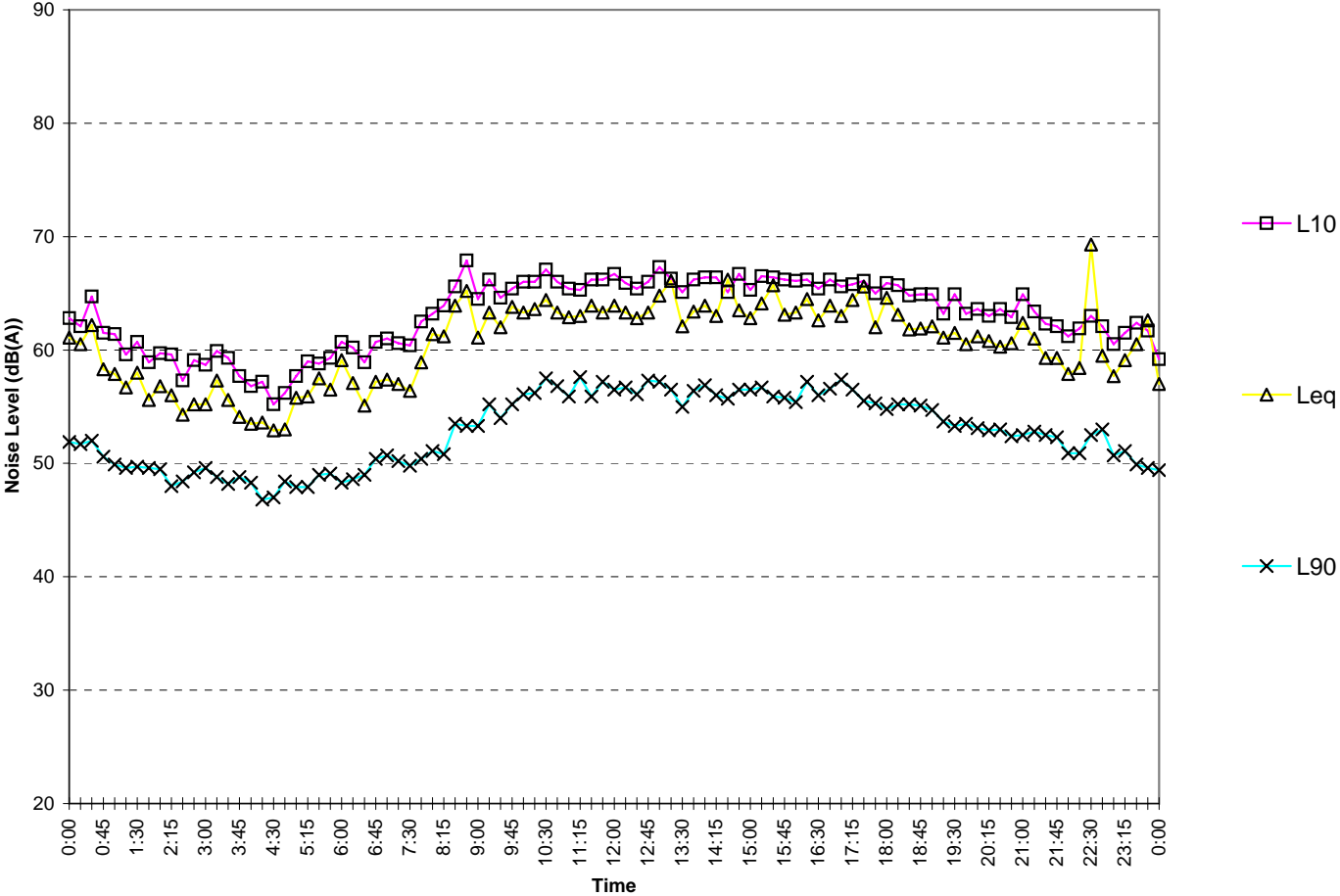
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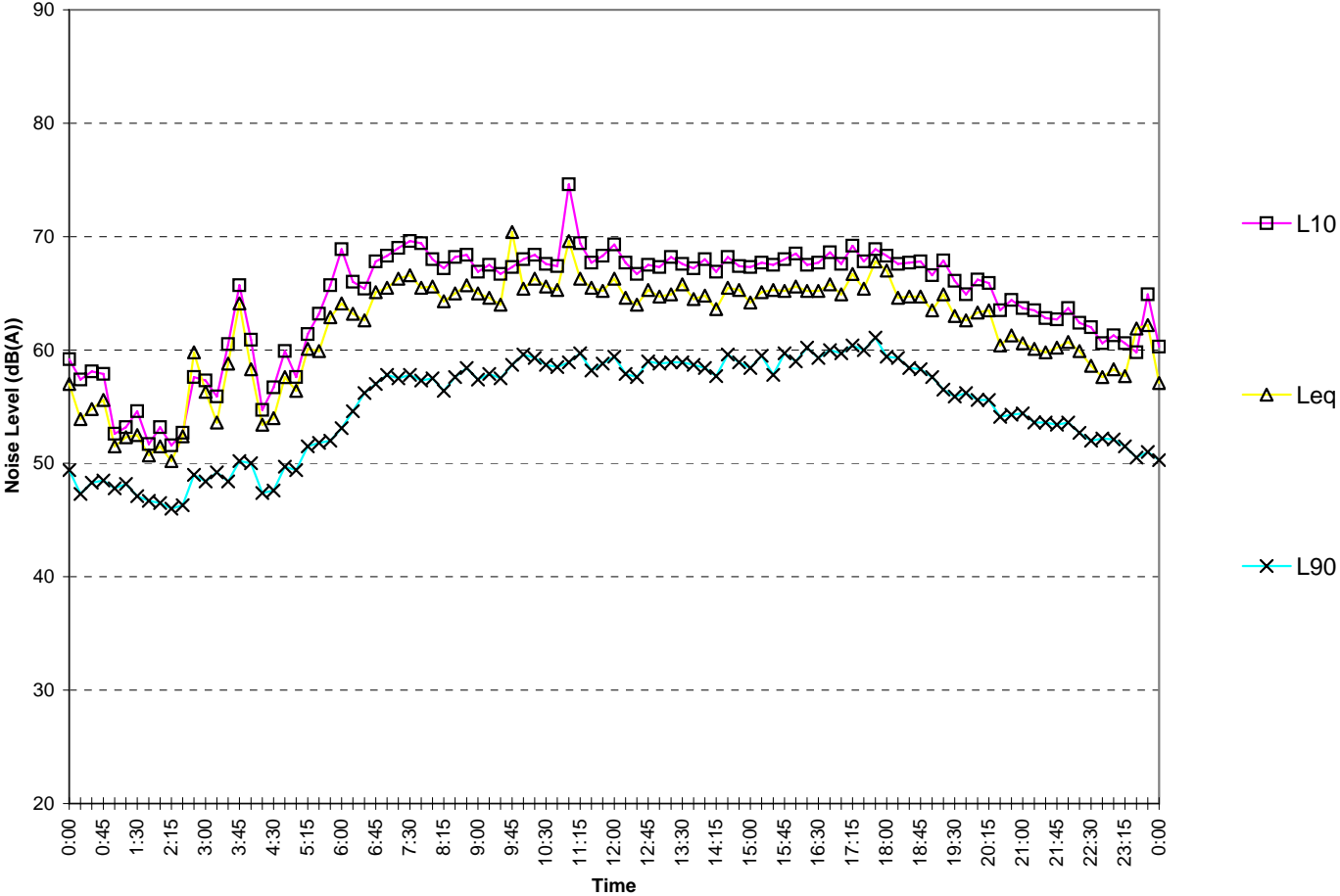
# Tucker Street Top Ryde

Sunday April 30,2006



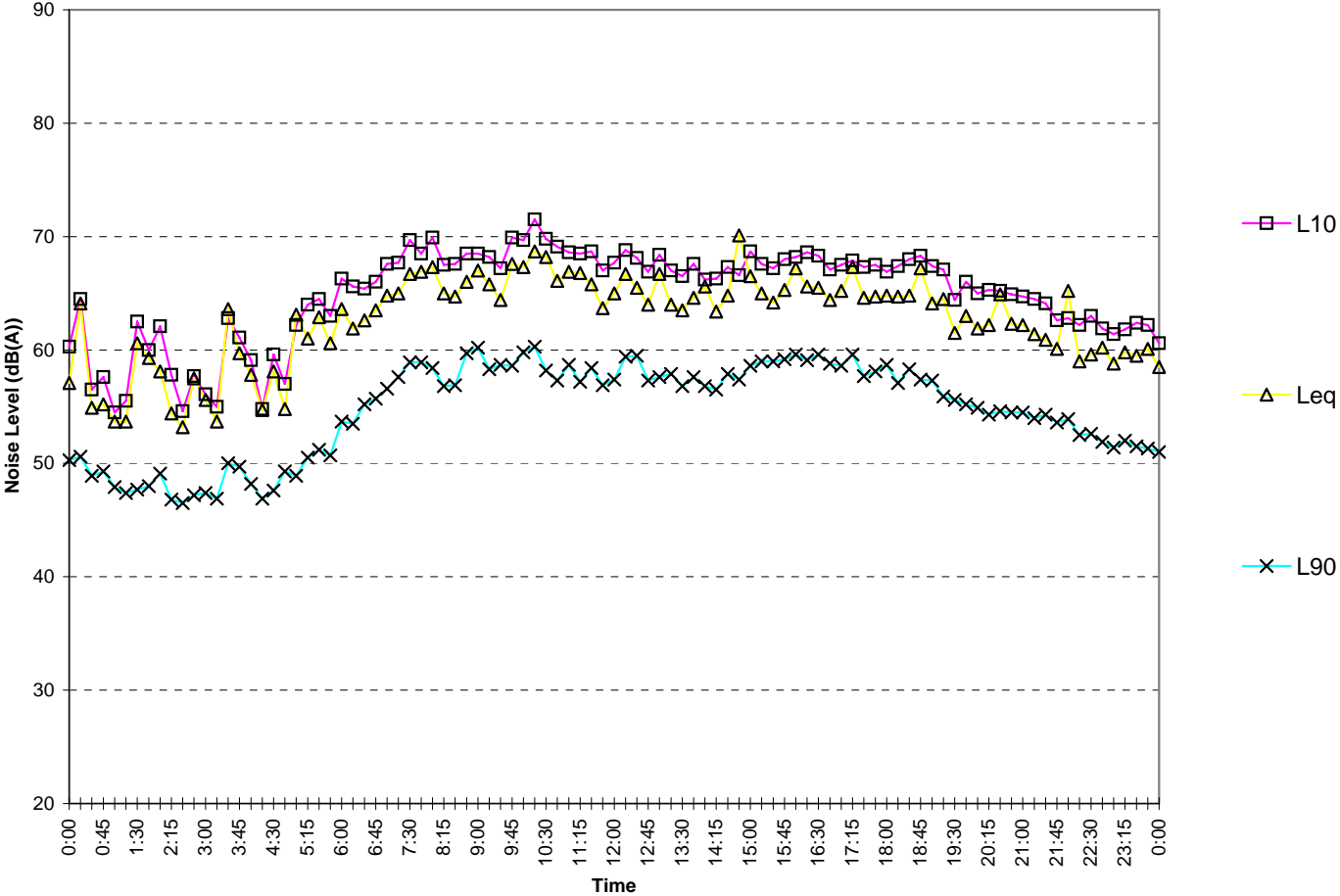
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Monday May 1, 2006



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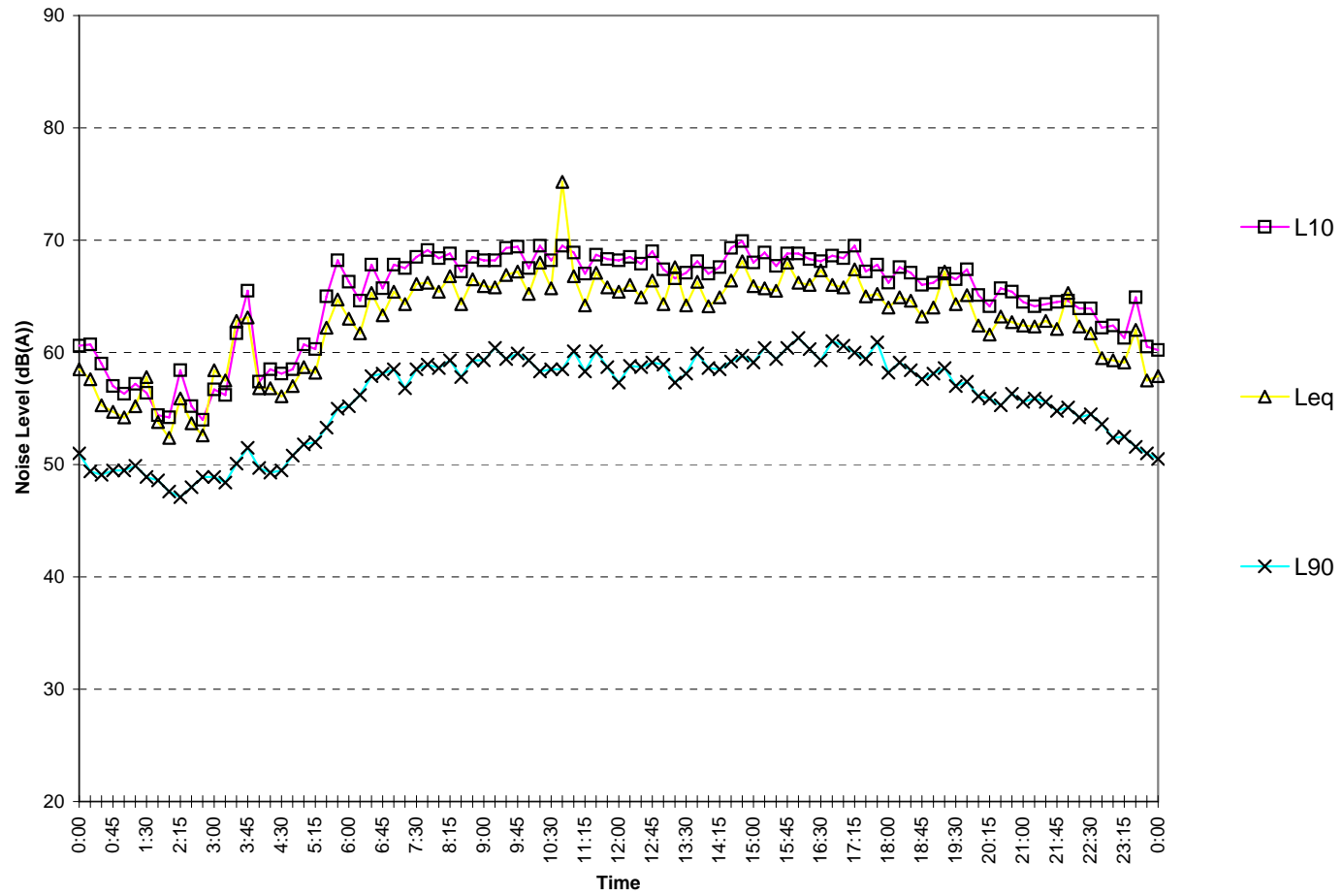
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Wednesday May 3, 2006



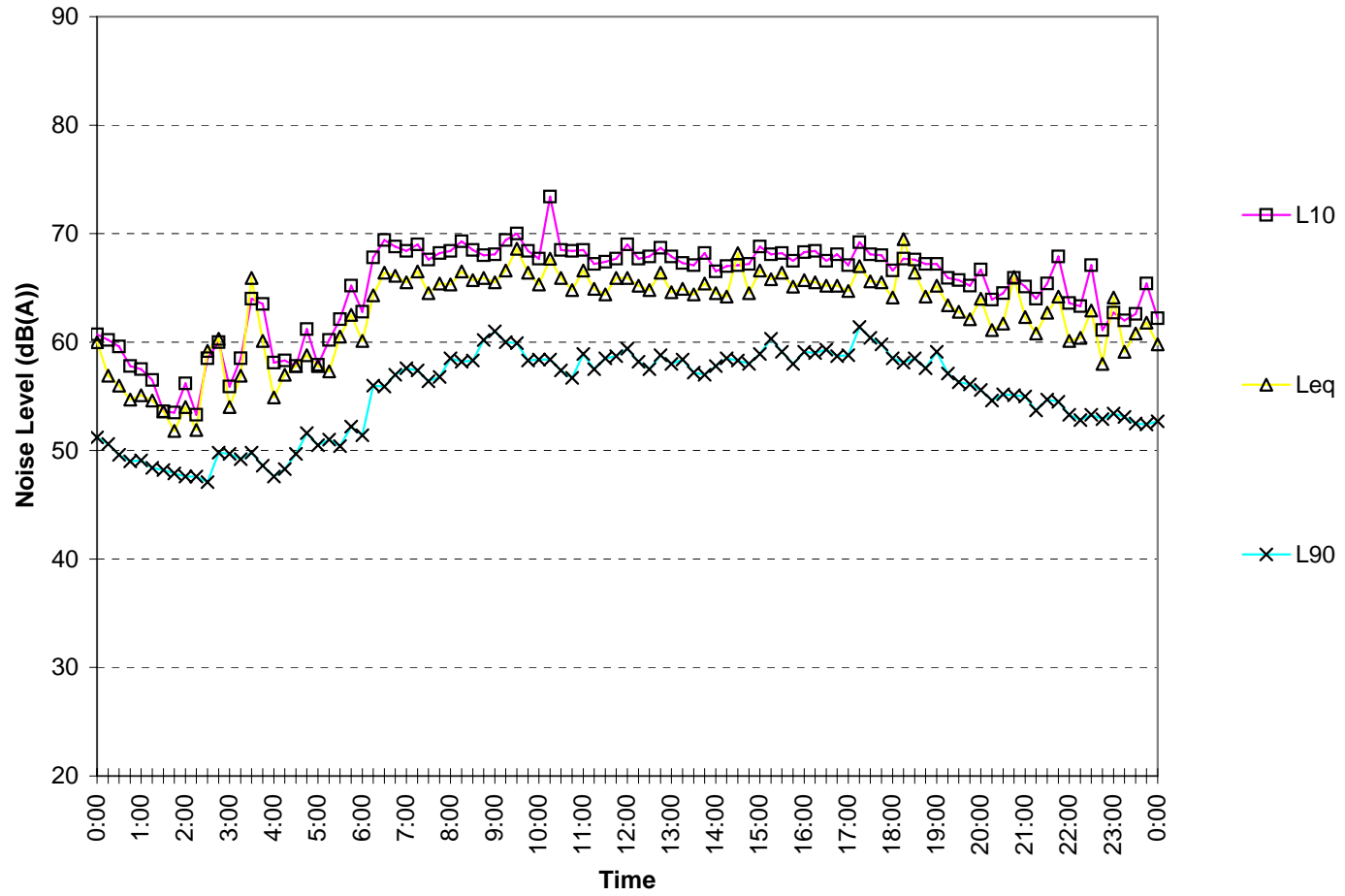
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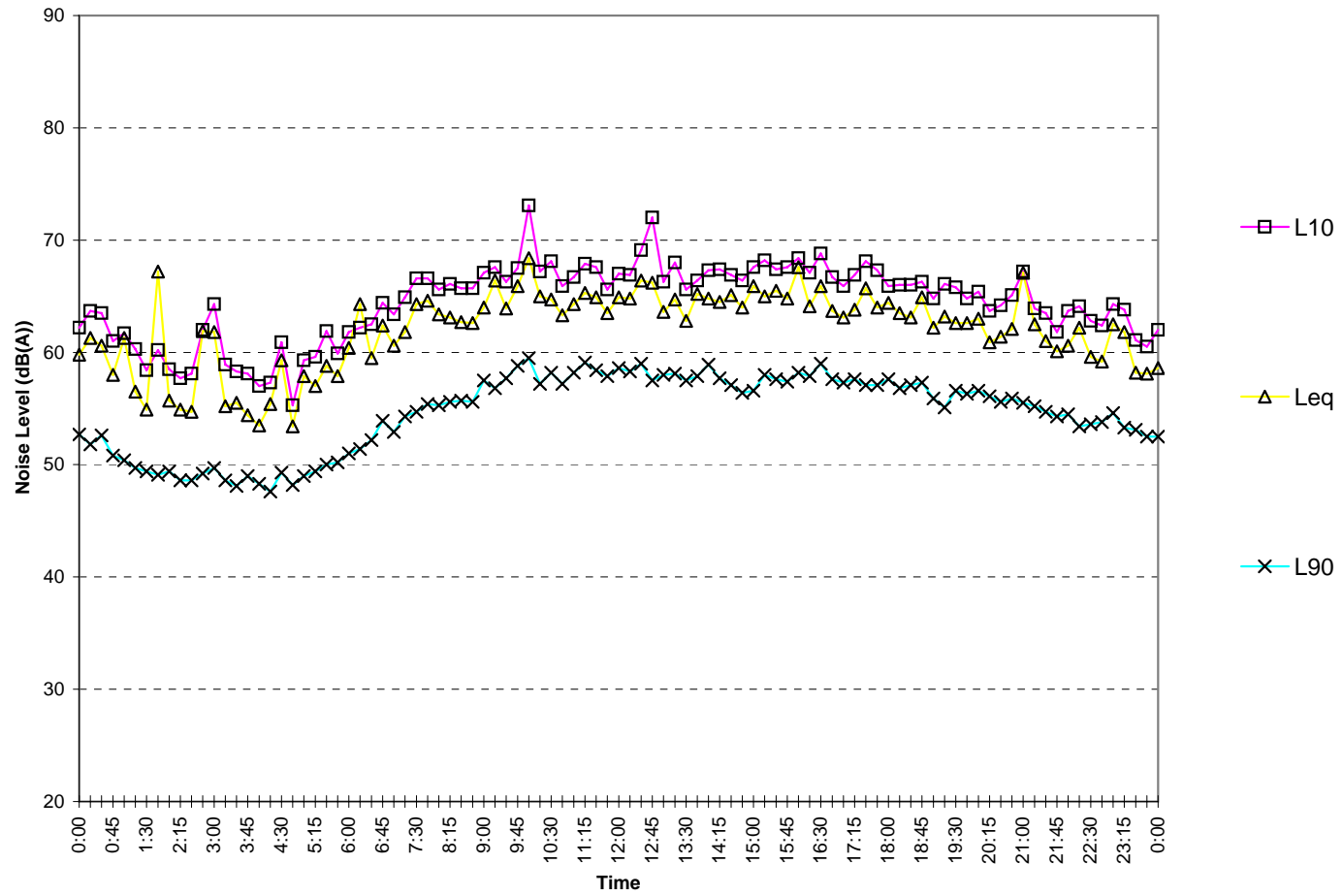
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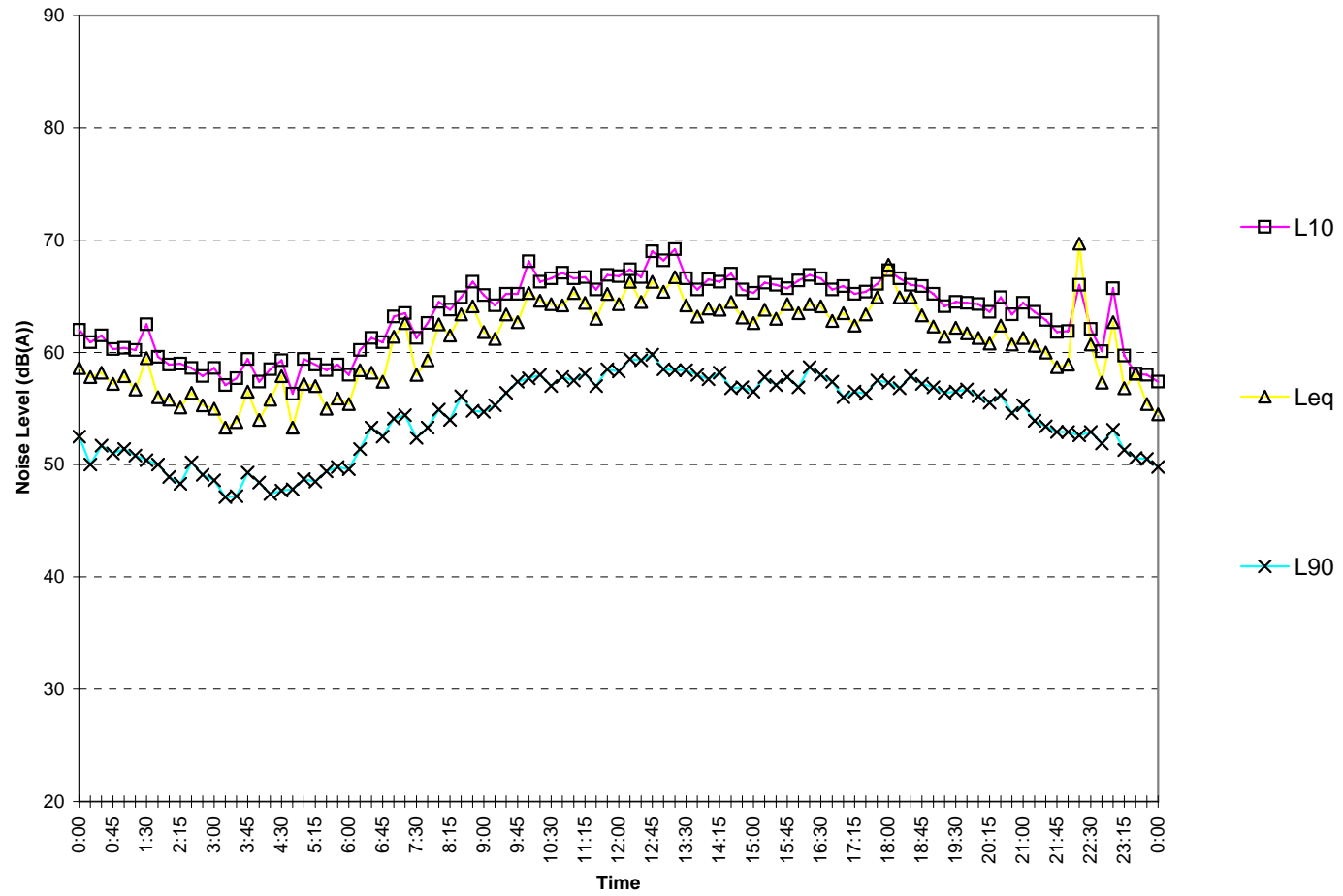
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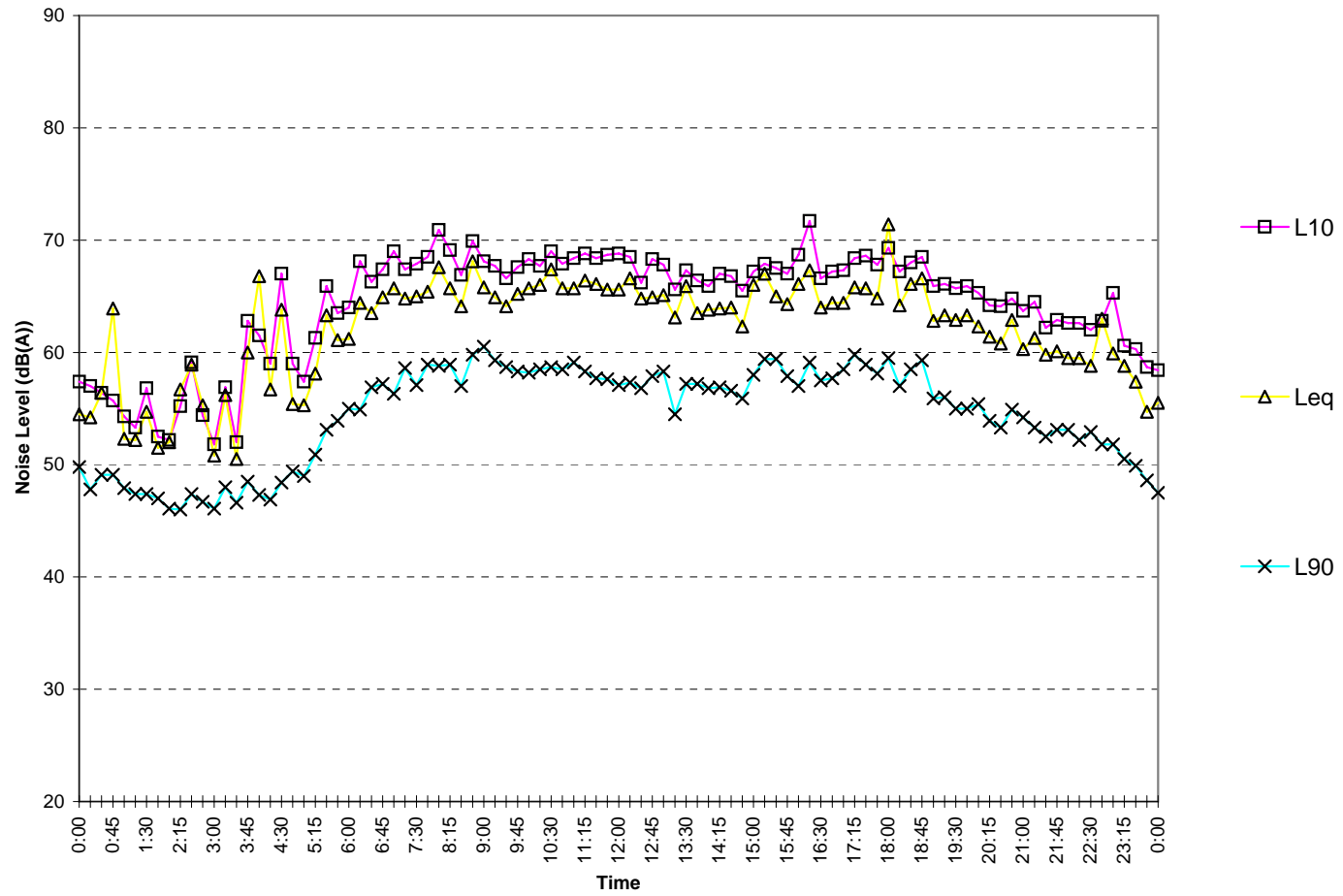
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Sunday May 7, 2006



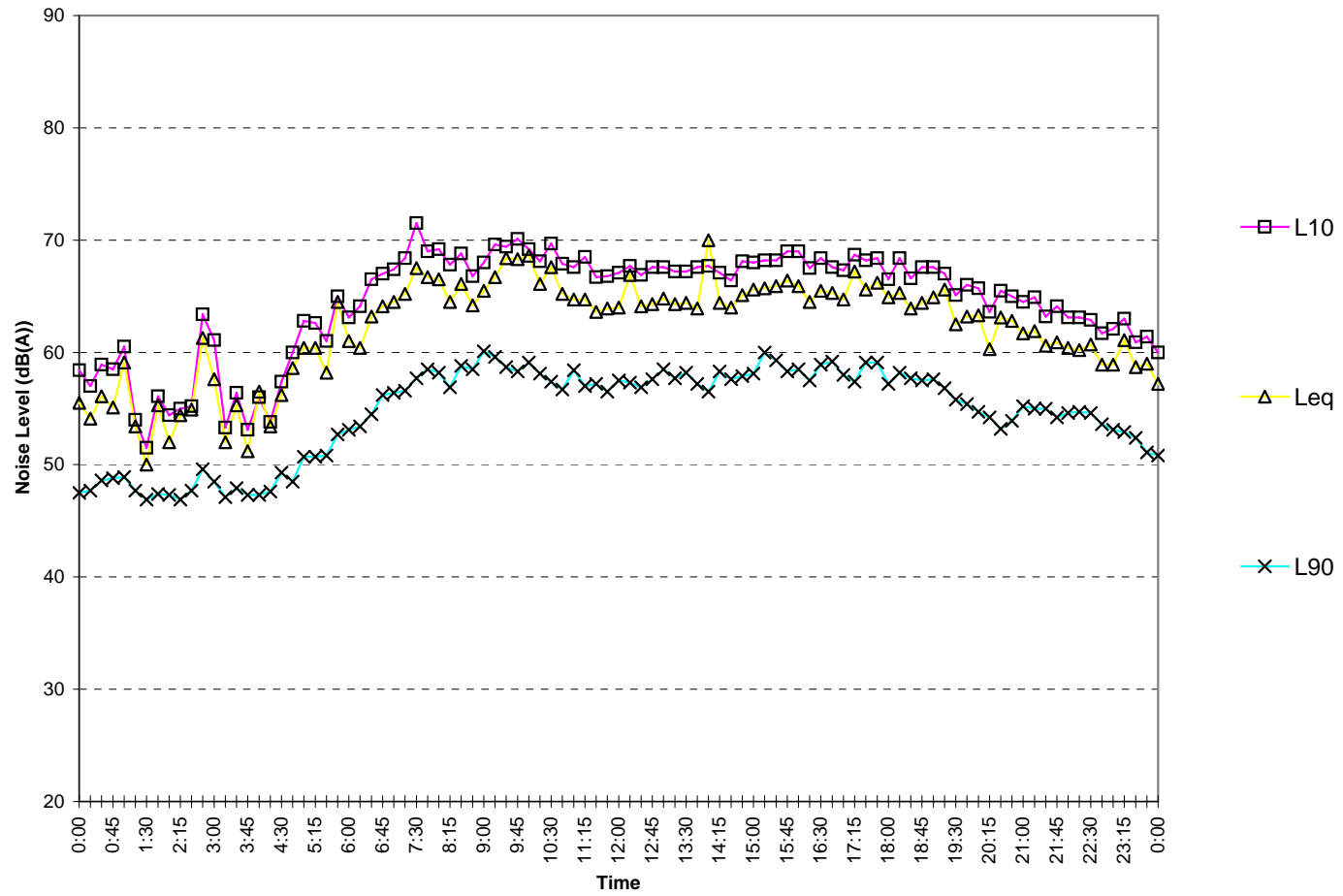
# Tucker Street Top Ryde

Monday May 8, 2006



# Tucker Street Top Ryde

Tuesday May 9, 2006



# Tucker Street Top Ryde

Wednesday May 10, 2006

