# Bethel Mar Thoma Church, 1650 The Horsley Drive, Horsley Park

# Environmental Noise Impact Assessment

SYDNEY
A: 9 Sarah St Mascot NSW 2020
T: (02) 8339 8000
F: (02) 8338 8399

SYDNEY MELBOURNE BRISBANE CANBERRA
LONDON DUBAI SINGAPORE GREECE

www.acousticlogic.com.au
ABN: 11 068 954 343

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# 1 INTRODUCTION

Acoustic Logic Consultancy have been engaged to conduct an acoustic assessment of noise impacts associated with the proposed Bethel Mar Thoma Church to be located at 1650 The Horsley Drive, Horsley Park. The proposal includes a church hall, multipurpose space, admin and ground carpark.

The major noise sources related to the proposed development are below:

- Amplified music noise with Church Hall and Assembly Hall;
- Noise generated by vehicle movements along carpark.
- Plant service project building.

Noise impacts have been assessed in accordance with the following regulations and Australian Standards.

- NSW Environment Protection Authority
  - EPA Noise Policy for Industry 2017
  - EPA Road Noise Policy
- Fairfield City Council Development Control Plan

Predicted noise levels from the operation of the facility as presented in this report indicate that the proposed development can comply with the afore mentioned authorities and regulations for all periods of the day.

The assessment is based on following architectural drawings provided to this office.

**Table 1 – Architectural Drawings used for Assessment**

| Drawing No | Issue | Date |
|---|---|---|
| DA001-M | M | 08/06/2017 |
| DA100-J | J | 08/06/2017 |
| DA101-B | B | 08/06/2017 |

## 2 PROPOSED DEVELOPMENT AND SITE LOCATION

The proposed site is to be located on the vacant parcel of land located at 1650 The Horsley Drive, Horsley Park. Site investigation indicates that the nearest noise receivers may be potentially impacted by the operation of the development include the following:

- 1662 The Horsley Drive. Residential dwelling to the West of the site. This dwelling is the closest to all Church activities and compliance at this receiver will indicate compliance at the Northern and Southern Receivers also.
- 1657-1671 The Horsley Drive. Residential dwellings to the North of the site.
- 1672 The Horsley Drive. Residential dwelling to the South of the site.

This locations will be used as a basis for this assessment.

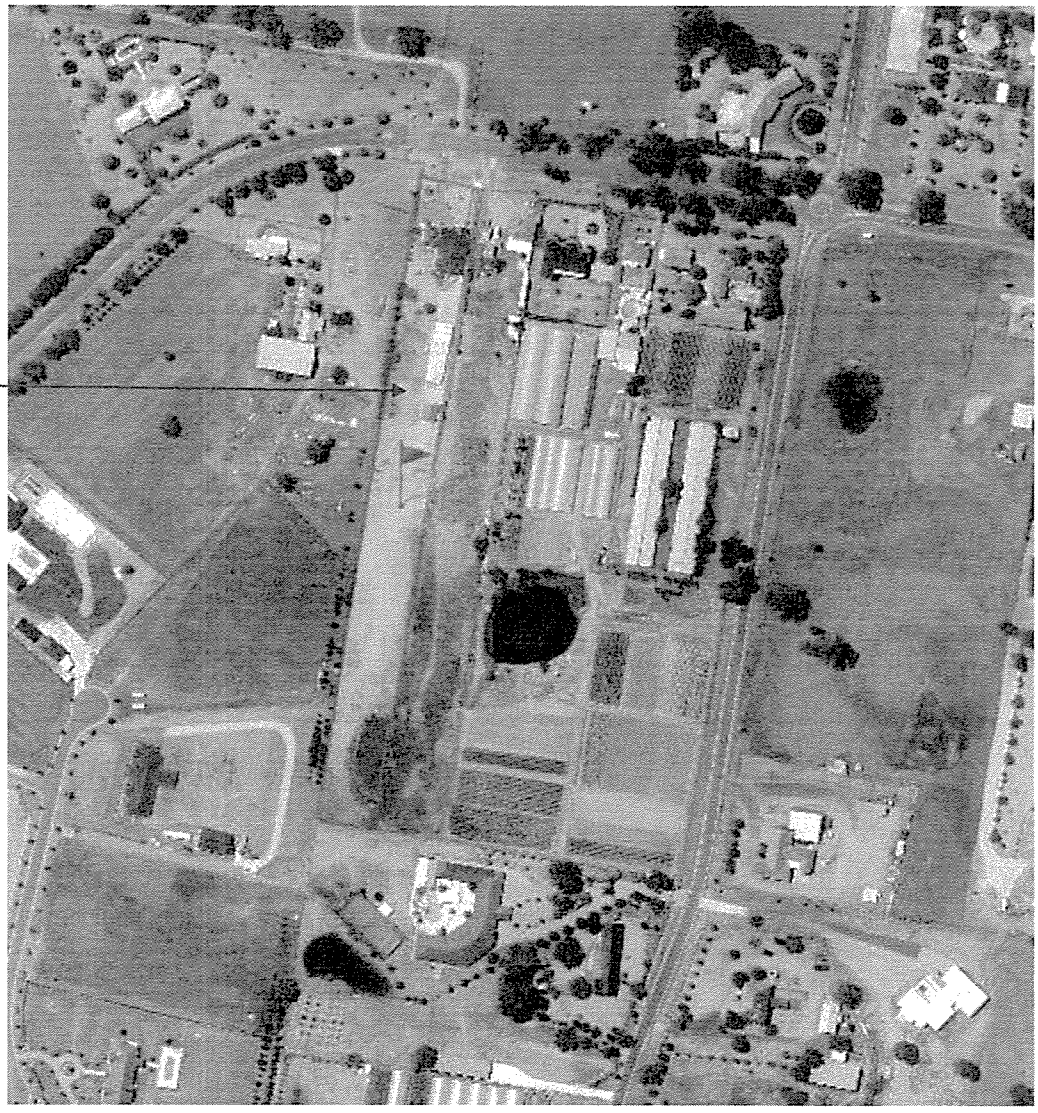



**Figure 1 Site Map**

This office has been advised that the operation of project site is 9am to 9pm, carpark will be possibly opened from 6:30am on Sunday morning and closed before 10pm.

# 3 EXISTING ACOUSTIC ENVIRONMENT

The acoustic environment is categorised by moderate traffic noise toward The Horsley Drive and low suburban background noise levels toward the Southern of the allotment.

Acoustic monitoring was conducted at the site to establish the background noise levels which will be used as basis for this assessment.

## 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 environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

## 3.2 BACKGROUND NOISE LEVELS

Background noise levels which will be used as a basis for this assessment are detailed in the following sections.

### 3.2.1 Measurement Equipment

Unattended noise monitoring was conducting using Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

### 3.2.2 Measurement Location

Monitoring was conducted along The Horsley Drive and toward the rear boundary of the development, to establish existing traffic noise levels and background noise levels respectively.

### 3.2.3 Measurement Period

Unattended noise monitoring was conducted from Wednesday 22 October to Monday 27 October, 2014.

### 3.2.4 Background Noise Levels

The background noise levels established from the unattended noise monitoring are detailed in the Table below.

**Table 2 – Rating Background Noise Level**

| Time of Day | Rating Background Noise Level dB(A) $L_{90}$ |
|---|---|
| Day | 42 |
| Evening | 41 |
| Night | 38 |

### 3.2.5 Existing Traffic Noise Levels

Existing traffic noise impacting the site established from the unattended noise monitoring are detailed in the Table below.

Table 3 – Existing Traffic Noise Levels – Northern Boundary

| Time of Day | Traffic Noise Level dB(A) $L_{eq}$ |
|---|---|
| 7am to 10pm | 75 |

# 4 NOISE EMISSION CRITERIA

The Fairfield Council Development Control Plan 2013 Section 10 Miscellaneous Developments limits noise emissions from the use to Background + 5dB(A). In addition to that limit, consideration will also be given to the NSW EPA Noise Policy for Industry 2017(NPfI) and the NSW Planning Road Noise Policy (RNP) which will be used for this assessment.

## 4.1 EPA - NOISE POLICY FOR INDUSTRY

The NPfI 2017 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 INP has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion.

### 4.1.1 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).

Rating background noise levels for the area have been established from long term unattended noise monitoring as detailed in Section 3.2. Intrusive criteria based on the noise monitoring conducted at the site are detailed in Table 4.

Table 4 – INP Intrusiveness Criteria

| Time of day | Background Noise Level dB(A)$L_{90}$ | Intrusiveness Criteria (Background+5dB(A)) dB(A)$L_{eq}$ |
|---|---|---|
| Day | 42 | 47 |
| Evening | 41 | 46 |
| Night | 38 | 43 |

### 4.1.2 Project 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 NPfI requires Project Amenity Noise Levels to be calculated below:

$L_{Aeq,\ 15\ min}$= *Recommended Amenity Noise Level – 5 dB(A) + 3 dB(A)*

Pursuant to the NPfI, the residential receivers in the vicinity would be considered Rural. Corresponding Project Amenity Criteria noise emission goals are presented below.

Table 5 –NPfI Project Amenity Criteria

| Type of Receiver | Time of day | Recommended Amenity Noise Level dB(A) $L_{eq}$ | Project Amenity Noise Level dB(A)$L_{eq,\ 15min}$ |
|---|---|---|---|
| Residential (Rural)* | Day | 50 | 48 |
| | Evening | 45 | 43 |
| | Night | 40 | 38 |

*Note: Assessment location is at the boundary unless the residence is greater than 30m from the boundary, in which case it is 30m from the residence.

## 4.2 SLEEP AROUSAL CRITERIA

Section 2.5 of NPfI 2017 recommended the following noise limit to mitigate sleeping disturbance:

*Where the subject development/ premises night -time noise levels at a residential location exceed:*

- $L_{Aeq,\ 15min}$ *40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- $L_{AFmax}$ *52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*

*A detailed maximum noise level even assessment should be undertaken.*

Table 6 - Sleep Arousal Emergence Criteria (6am-7am)

| Location | Background Noise Level (6am-7am) - dB(A)$L_{90}$ | Emergence Level |
|---|---|---|
| All Potentially Affected Residential Properties | 38 | 40 dB(A)$L_{eq,\ 15min}$; 52 dB(A)$L_{max,\ F}$ |

## 4.3 NOISE FROM INCREASED TRAFFIC GENERATION ON PUBLIC STREETS

Council has no specific noise criteria with respect to traffic generation associated with developments. In the absence of this, EPA guidelines can be used for assistance.

For land use developments with the potential to create additional traffic the development should comply with the requirements for new developments detailed in the EPA Road Noise Policy, criteria as follows.

Table 7 - Criteria for Traffic Noise for New Developments

| Time of day | Criteria for Acceptable Traffic Noise Level Sub-arterial Roads - dB(A) |
|---|---|
| Day (7am to 10pm) | 60 $L_{Aeq\ (15hr)}$ |
| Night (10pm to 7am) | 55 $L_{Aeq\ (9hr)}$ |

However, if existing noise levels exceed those in the table above, the provisions of section 3.4 of the Road Noise Policy will apply.

If practicable, noise on public roads as a result of increased traffic generation should not result in an increase in traffic noise level of more than 2dB(A). In this regard, the Policy relevantly states "*an increase of up to 2dB represents a minor impact that is considered barely perceptible to the average person*".

# 5 ASSESSMENT OF NOISE IMPACTS

Noise impacts associated with the development have been assessed for the following:

- Loud music being played within the Church and Assembly Hall;
- Cars entering and exiting the parking lot;
- Emissions associated with mechanical plant in principle.

Each of these noise sources will be discussed in detail. Noise predictions are presented below.

## 5.1 CHURCH AUDITORIUM

Operation conditions during events are assumed as follows:

- During opening hours, capacity in the Church is up to 400 patrons.
- The latest proposed operation is up to 9pm in the evening and earliest 9am.
- Amplified live and pre-recorded music was assumed to be playing at a level not greater than 95 dB(A) $L_{eq\ (15min)}$ uniform sound pressure level within the space. Speakers are to be vibration isolated from the building structure to mitigate structure borne noise.
- Music in the Foyer to be background music only with a maximum Uniform Sound Pressure Level of 70dB(A) $L_{eq\ (15min)}$. Speakers are to be vibration isolated from the building structure to mitigate structure borne noise.
- Glazing to the Foyer to be 6.38mm Laminated. Doors to be closed except where required for patron access/egress.
- Church doors and windows are to be closed with minimum 10.38mm laminated glazing and full perimeter acoustic seals, during high noise events i.e. whenever amplified speech or music is played or more than 100 people are present in the Church.
- As the doors and windows to the Church are to be closed during a service, mechanical ventilation will be required. Such plant/equipment would be selected for CC, at which time an assessment of noise emissions from said equipment would need to be conducted. Noise transmission via the mechanical ventilation system must also be considered in that assessment for CC.
- Any external timber doors to the Church are to be minimum 40mm solid core timber doors with full perimeter acoustic seals and drop seals.
- External walls are assumed to be masonry or an acoustically equivalent light weight system (with the construction details to be confirmed for CC).
- Roof Ceiling construction to be concrete, or metal deck with an insulated cavity (minimum 75mm thick 11kg/m3 glasswool) and suspended 13mm plasterboard ceiling.

Noise emissions based on the operating conditions presented above are shown in the table overleaf, compared against acoustic requirements. The predicted level presented is for Peak Patron Noise

Levels at 30m from Facade of Nearest External Residential Receiver (as the nearest dwelling is greater than 30m from the boundary) with 400 people in the Church with amplified music playing and the doors and windows closed.

**Table 8 - Predicted Peak Patron Noise Levels At 30m from Facade of Nearest External Residential Receiver – 400 people in auditorium with music playing – doors and windows closed**

| Item | Noise Level dB(A) $L_{eq\ (15min)}$ |
|---|---|
| Predicted Level up to 9pm | ≤40dB(A) $L_{eq\ (15min)}$ |
| Criteria 6pm -10pm | 43dB(A) $L_{eq\ (15min)}$ |
| Exceedance (dB) | - |

Results presented above indicate that for worst case operation of amplified music playing in the Church with a Uniform Sound Pressure Level of up to 95dB(A) $L_{eq\ (15min)}$, noise emissions would comply with the project noise emission goals.

## 5.2 NOISE FROM ASSEMBLY HALL

- Amplified live and pre-recorded music to play at a level not greater than 95 dB(A) $L_{eq\ (15min)}$ uniform sound pressure level within the space. Speakers are to be vibration isolated from the building structure to mitigate structure borne noise.
- All doors and windows are to be closed with minimum 6.38mm laminated glazing and full perimeter acoustic seals.
- As the doors and windows are to be closed during intensive music/speech events, mechanical ventilation would be required. Such plant/equipment would be selected for CC, at which time an assessment of noise emissions from said equipment would need to be conducted. Noise transmission via the mechanical ventilation system must also be considered in that assessment for CC.

Noise emissions based on the operating conditions presented on the previous page are shown in the table below, compared against acoustic requirements.

**Table 9 – Amplified Music in Assembly Hall – 6.38mm glazing, all closed**

| Item | Noise Level dB(A) $L_{eq\ (15min)}$ |
|---|---|
| Predicted Level up to 9pm | 40dB(A) $L_{eq\ (15min)}$ |
| Criteria 6pm -10pm | 43dB(A) $L_{eq\ (15min)}$ |
| Exceedance (dB) | - |

Results presented above indicate that for worst case operation of amplified music playing in the Assembly Hall with a Uniform Sound Pressure Level of up to 95dB(A) $L_{eq\ (15min)}$, noise emissions would comply with the project noise emission goals provided that all external openings were closed and glazing 6.38mm laminated with seals.

## 5.3 USE OF THE CARPARK

A typical Sunday use of the carpark is proposed to be used from 6:30am (for the congregation arriving for the 7am service) in the morning and through to 4pm (for congregation leaving after a service concludes at 3pm). Typical peak use will occur before a Special Sunday Service, which are held once a month.

Occasional use of the carpark by the Church through the year would see these carpark usage times finish at around 10pm from services concluding at 9pm.

Varga Traffic have prepared a Revised Traffic and Parking Assessment Report, Ref 12341 dated 30.03.17. The predicted volumes from that assessment have been used in predicting noise impacts to surrounding receivers.

Minimum 1.8m high imperforated acoustic fence is recommended to be installed along western boundary.

Cars and heavy vehicle entering and exiting the facility have been based on the following noise levels as per measurements previously conducted by ALC.

Table 10 – Assumed Vehicle Operational Noise Levels

| Noise Source | Sound Power Level Driving dB(A) $L_{eq}$ | Sound Power Level Car Start / Door Close dB(A) $L_{max}$ |
|---|---|---|
| Cars/Light Vehicles | 84 at 10km/hr | 94 |

### 5.3.1 Early Sunday Service

#### 5.3.1.1 Average Noise

Varga conducted surveys of the modes of transport used to travel to the existing Church and determined that for the early service, there were 21 cars for 63 patrons. Using this ratio for capacity of 80 patrons for the early Sunday Service (predicted maximum), 27 cars are anticipated. Given the relatively small number of patrons expected to attend, it is assumed that all may arrive in the 15min prior to the service.

For the early Sunday Service, predicted noise emissions to 30m from the nearest dwelling is 37dB(A) $L_{eq(15min)}$. This complies with the project noise emission goals at all times.

#### 5.3.1.2 Assessment of Sleep Disturbance

For the early morning operation, it is necessary to assess possible sleep disturbance from cars starting/ doors closing. Considering the distance from the carpark to the nearest residential façade, the predicted noise level at that façade from a car start/door close is 48dB(A) $L_{max,}$ which is compliant with the Emergence Level and so is unlikely to result in sleep disturbance.

### 5.3.2 Special Family Sunday Service

A typical Sunday Service has approximately 150 Patrons in attendance. Once a Month, there is a Special Family Sunday Service where populations of approximately 300 Patrons can be expected.

Again, Varga conducted surveys of the modes of transport used to travel to the existing Church and determined that for the Special Family Sunday Service there were 61 cars for 317 patrons. Using that same vehicle generation rate for a total capacity of 400 Patrons (total capacity of Church), 77 vehicles would be predicted. It is conservatively assumed that these vehicles arrive in the 30min prior to the Service.

The predicted noise levels from the vehicles being driven on site, attending a Special Sunday Service are presented in the following Table.

**Table 11 – Predicted Noise Levels**

| Noise Source | Time of Day | Receiver | Predicted Noise Level, dB(A) $L_{eq\ 15min}$ | Noise Criteria dB(A) $L_{eq\ 15min}$ | Complies |
|---|---|---|---|---|---|
| Cars entering / exiting | Day/Evening | 30m from the dwelling to the west | 39 | 43 | Yes |

It is expected that when the carpark is emptying, noise associated with the church hall and multipurpose hall will be finished. On this basis, worst case noise levels are assessed separately.

### 5.3.3 Full use of carpark and overflow

Assuming all the 102 formal and 55 overflow carparking spaces were to be occupied (e.g. at Easter time), it is assumed that Patrons would likely arrive a little earlier than usual to secure their favourite seats in the Church. On that basis, it is assumed that for Festival days, it will take one hour for the carpark to fill.

The predicted noise levels from the vehicles being driven on site, attending a Festival Service are presented in the following Table.

Table 12 – Predicted Noise Levels

| Noise Source | Time of Day | Receiver | Predicted Noise Level, dB(A) $L_{eq\ 15min}$ | Noise Criteria dB(A) $L_{eq\ 15min}$ | Complies |
|---|---|---|---|---|---|
| Cars entering / exiting | Day/Evening | 30m from the dwelling to the west | 39 | 43 | Yes |

## 5.4 TRAFFIC NOISE GENERATION

For traffic generation on The Horsley, ALC have assumed that the car park will empty within a 1 hour period as a worst case.

Table 13 – Traffic Noise Generation

| Road | Development Generated Volume | Existing Traffic Noise Level at Site Boundary dB(A) $L_{eq\ (15hour)}$ | Predicted Increase in Traffic Noise |
|---|---|---|---|
| The Horsley Drive | 80 vehicles worst 1hr | 75 | Imperceptible |

On this basis, ALC conclude the traffic noise generated by the development will be compliant with the requirements of the Road Noise Policy.

### 5.4.1 Generated Traffic Noise on Local Roads

The Revised Varga Traffic Report notes the existing flows on The Horsley drive as 500 vehicles per hour each way during the Sunday morning peak period 8:30am -9:30am. On that basis, an additional 77 vehicles in that one hour period would result in an imperceptible increase in the existing traffic noise. Compliance with the NSW Road Noise Policy is therefore achieved.

The Revised Varga Traffic Report has also noted a "statistically insignificant" projected increase in the traffic generation potential of the site during commuter peak periods as a result of the development. On that basis, the acoustic impact would also be imperceptible.

## 5.5 MECHANICAL PLANT

The proposal will include ancillary mechanical services plant *(e.g. condensing units, exhaust fans, etc).* As detailed plant selections and plans are not available at this stage, it is not possible to carry out a detailed examination of the ameliorative measures that may be required in order to achieve the project acoustic objectives.

# 6 NOISE INTRUSION ASSESSMENT

As the site fronts to a classified road, the development requires assessment against the SEPP (Infrastructure) 2007 Clause 102.

## 6.1 INTERNAL NOISE GOALS

### 6.1.1 Church and Assembly Hall

Whilst the SEPP (Infrastructure) does note Places of Public Worship as being a noise sensitive use, it does not nominate particular internal noise goals. The Department of Planning Development Near Busy Roads and Rail Corridors– Interim Guideline presents an interpretation of the SEPP (Infrastructure) 2007 and nominates an internal noise goal of 40dB(A) $L_{eq\ (15hour)}$ for Places of Public Worship. That goal will be used for this project.

### 6.1.2 Office Spaces

In accordance with Australian Standard AS2107:2000, the Design Internal Noise Goal for the office spaces are as follows:

Meeting rooms: 40dB(A) $L_{eq\ (15hour)}$;

General offices: 45dB(A) $L_{eq\ (15hour)}$;

Foyer: 50dB(A) $L_{eq\ (15hour)}$.

## 6.2 EXTERNAL NOISE LEVELS

The external traffic noise levels were measured on the Northern boundary of the site. These were presented in section 3.2.5, but are repeated below for ease of reference.

Existing traffic noise impacting the site established from the unattended noise monitoring are shown in the Table below.

Table 14 – Existing Traffic Noise Levels – Northern Boundary

| Time of Day | Traffic Noise Level dB(A) $L_{eq}$ | |
|---|---|---|
| | Measured at Boundary | Predicted at Northern Facade |
| Day - 7am to 10pm | 75 | 69 |

## 6.3 RECOMMENDED TREATMENTS

The following glazing thicknesses are nominated for noise intrusion only, thicker glazing may be required for structural or other concerns.

Church, Meeting Rooms, Admin: 10.38mm Laminated Glazing with full perimeter acoustic seals in a commercial frame system with a certified performance of STC 35 or greater.

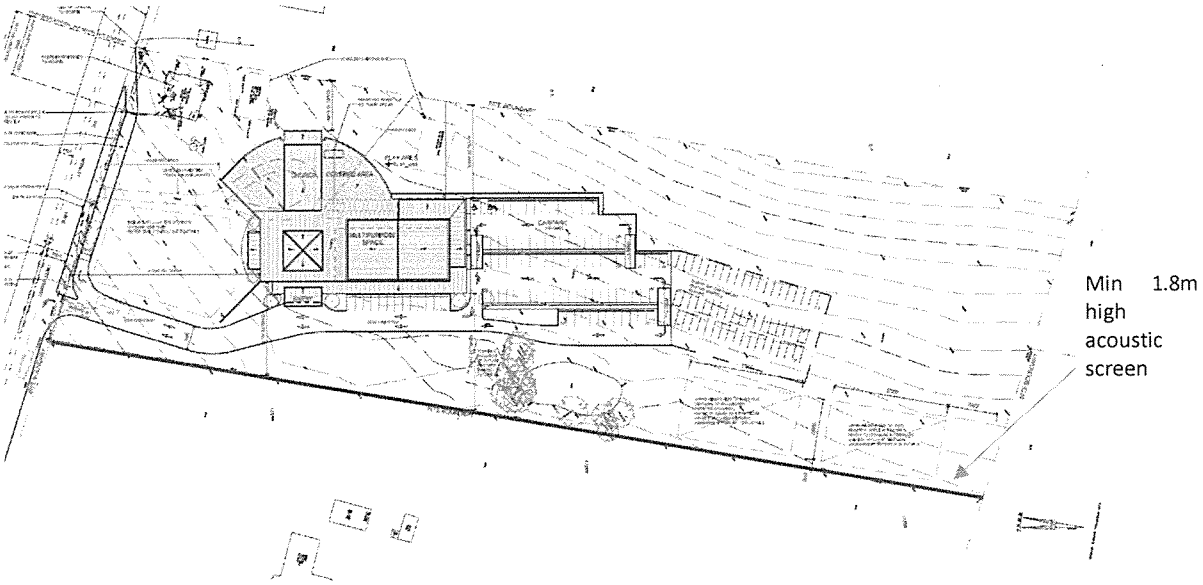
Assembly Hall: 6.38mm Laminated Glazing with full perimeter acoustic seals in a commercial frame system with a certified performance of STC 31 or greater.

Ancillary spaces: to architect's nomination.

# 7 SUMMARY OF ACOUSTIC TREATMENTS

## 7.1 ACOUSTIC BARRIER

It is recommended to install minimum 1.8m high imperforated fence (colorbond or lapped and capped timber fence) along the western boundary of project site, detailed acoustic screen location refer to mark up below.




## 7.2 FACADE- GLAZING

**Table 15 -Glazing Specification**

| Room | Glazing Thickness | STC/Rw |
|---|---|---|
| Church | 10.38mm | 35 |
| Meeting Rooms | 10.38mm | 35 |
| Admin | 10.38mm | 35 |
| Assembly Hall | 6.38mm | 31 |

All glazing shall remain closed except patrons in/out during music or amplified speech.

### 7.3 ROOF/CEILING

Roof Ceiling construction to be concrete, or metal deck with an insulated cavity (minimum 75mm thick 11kg/$m^3$ glasswool) and suspended 13mm plasterboard ceiling.

## 8 CONCLUSION

This report presents an assessment of noise emissions form the use of the proposed Bethel Mar Thoma Church at 1650 The Horsley Drive, Horsley Park. Noise emissions from the use of the Church and assembly hall will comply with the project noise emission goals, provided the treatments and management controls outlined in Section 7 are followed.

As the site is exposed to road traffic noise from The Horsley Drive, a noise intrusion assessment has been conducted and treatments recommended for compliance with the SEPP (Infrastructure) 2007 and Australian Standard AS2107:2000 as appropriate.

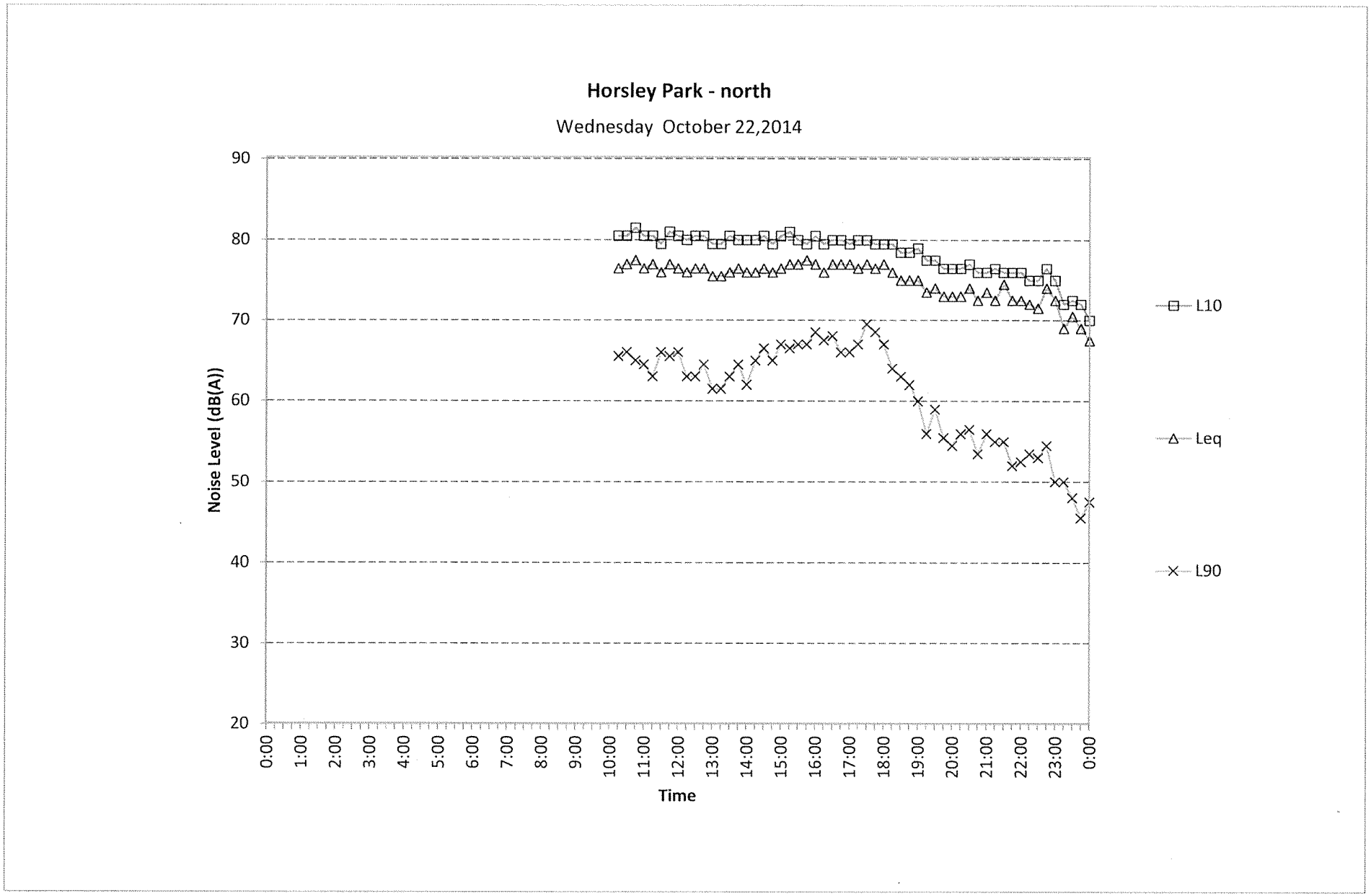
We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
George Wei

Associate Director

# Appendix 1 Unattended Background Noise Data


Horsley Park - north
Wednesday October 22,2014
Noise Level (dB(A))
90
80
70
60
50
40
30
20
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
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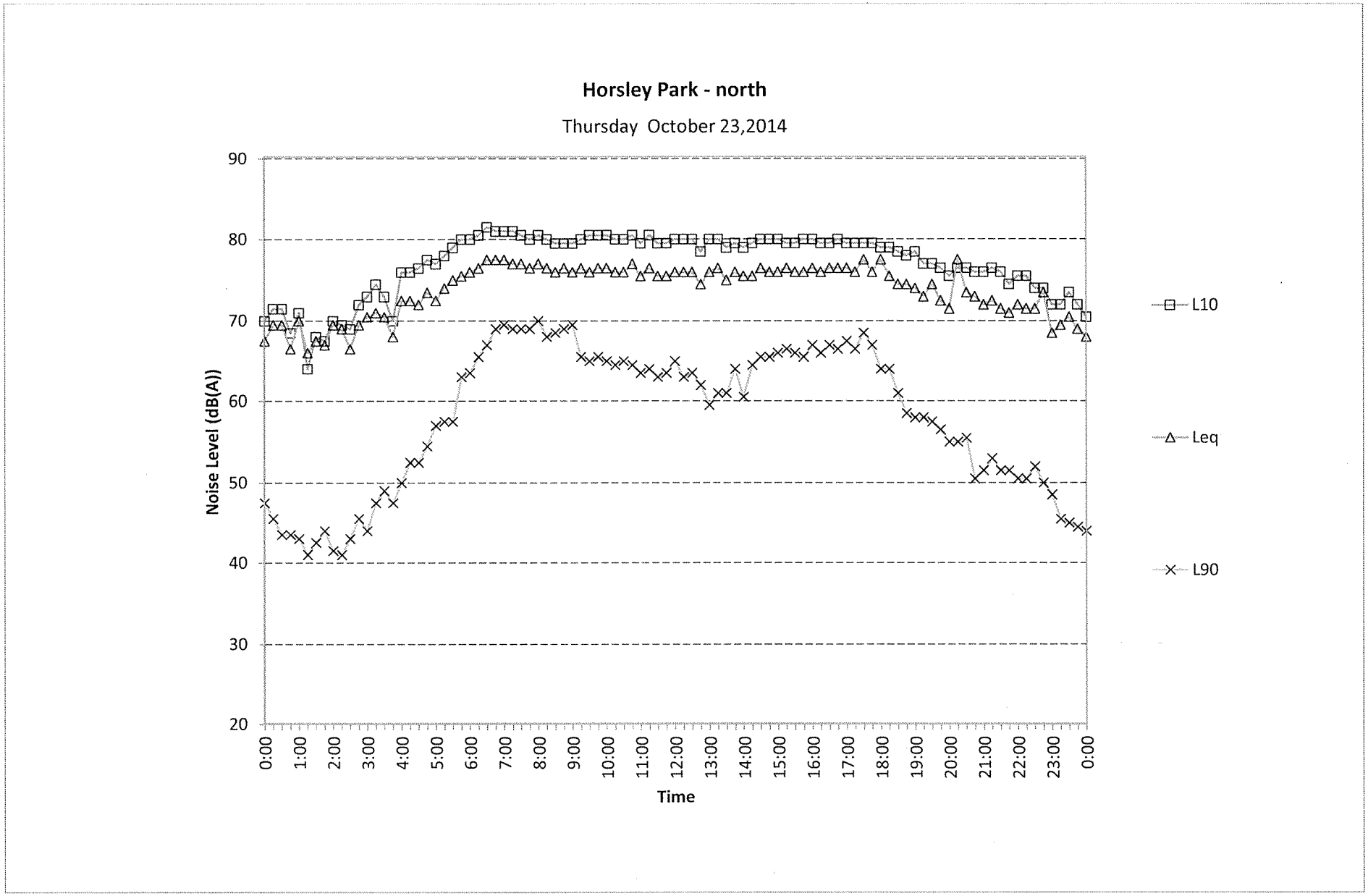
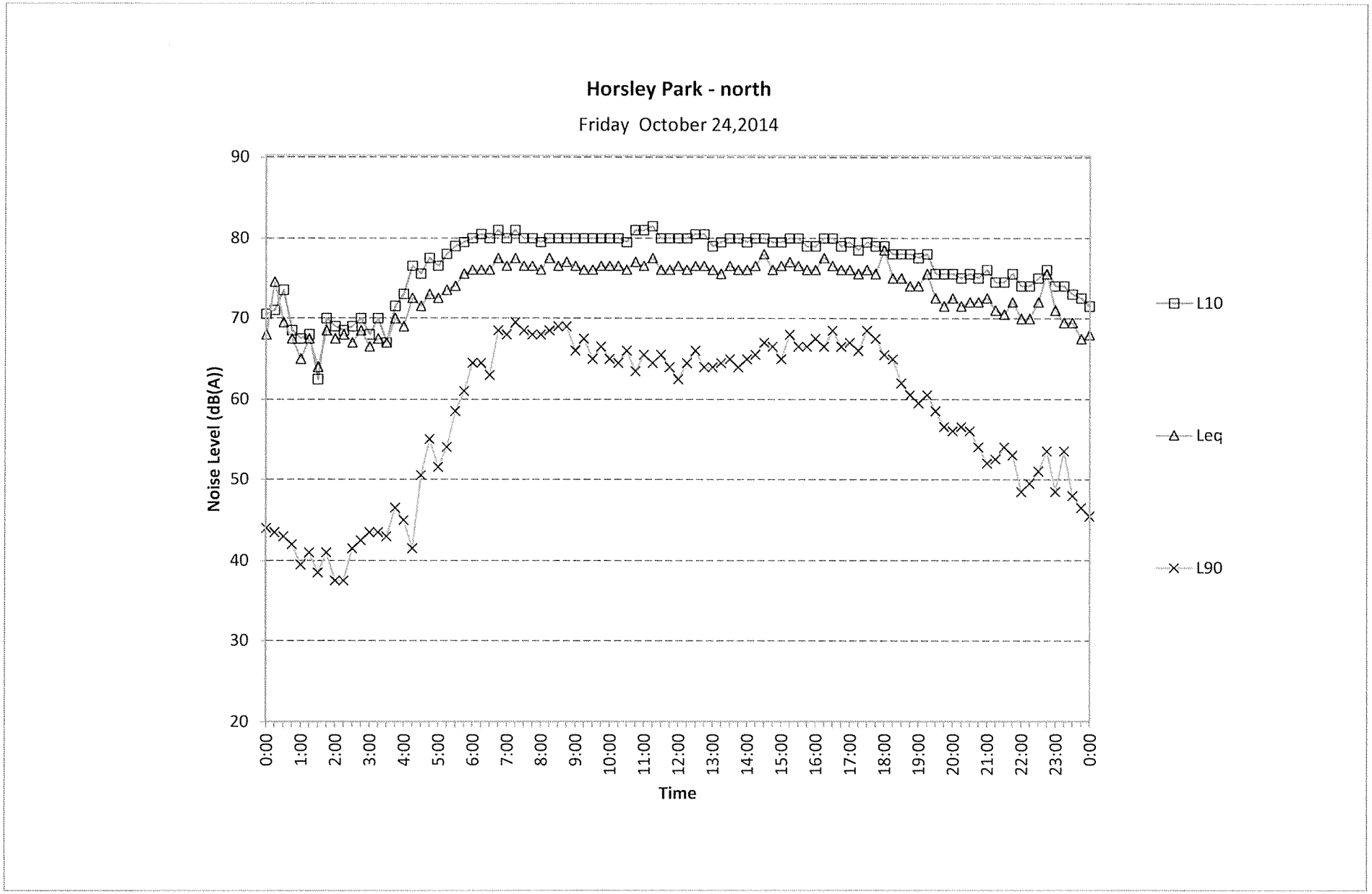
Time
L10
Leq
L90




HORSELY_North LoggerGraphed


Horsley Park - north
Friday October 24,2014
Noise Level (dB(A))
90
80
70
60
50
40
30
20
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
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15:00
16:00
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19:00
20:00
21:00
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23:00
0:00
Time
L10
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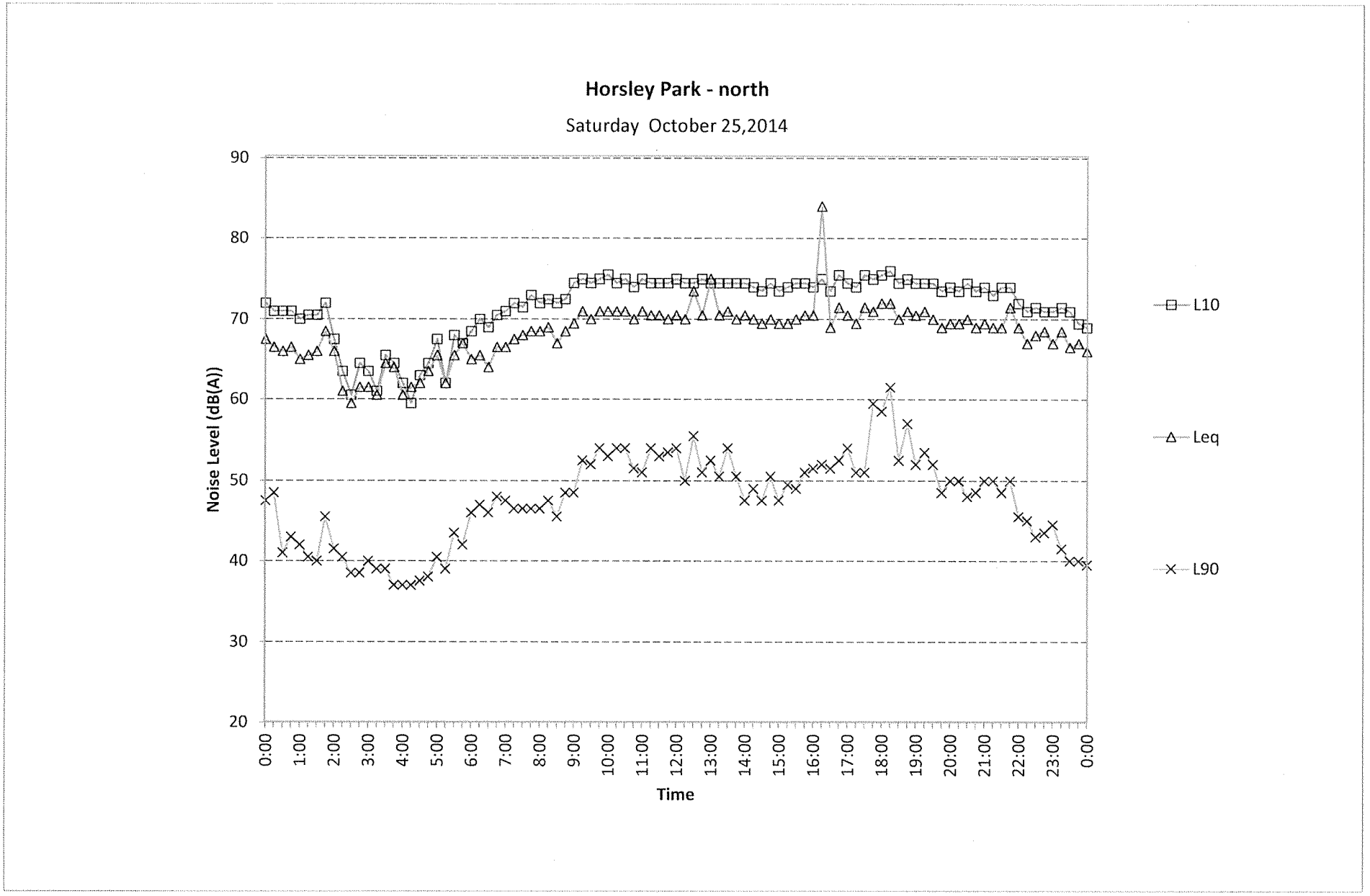
HORSELY_North LoggerGraphed


Horsley Park - north
Saturday October 25,2014
Noise Level (dB(A))
90
80
70
60
50
40
30
20
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
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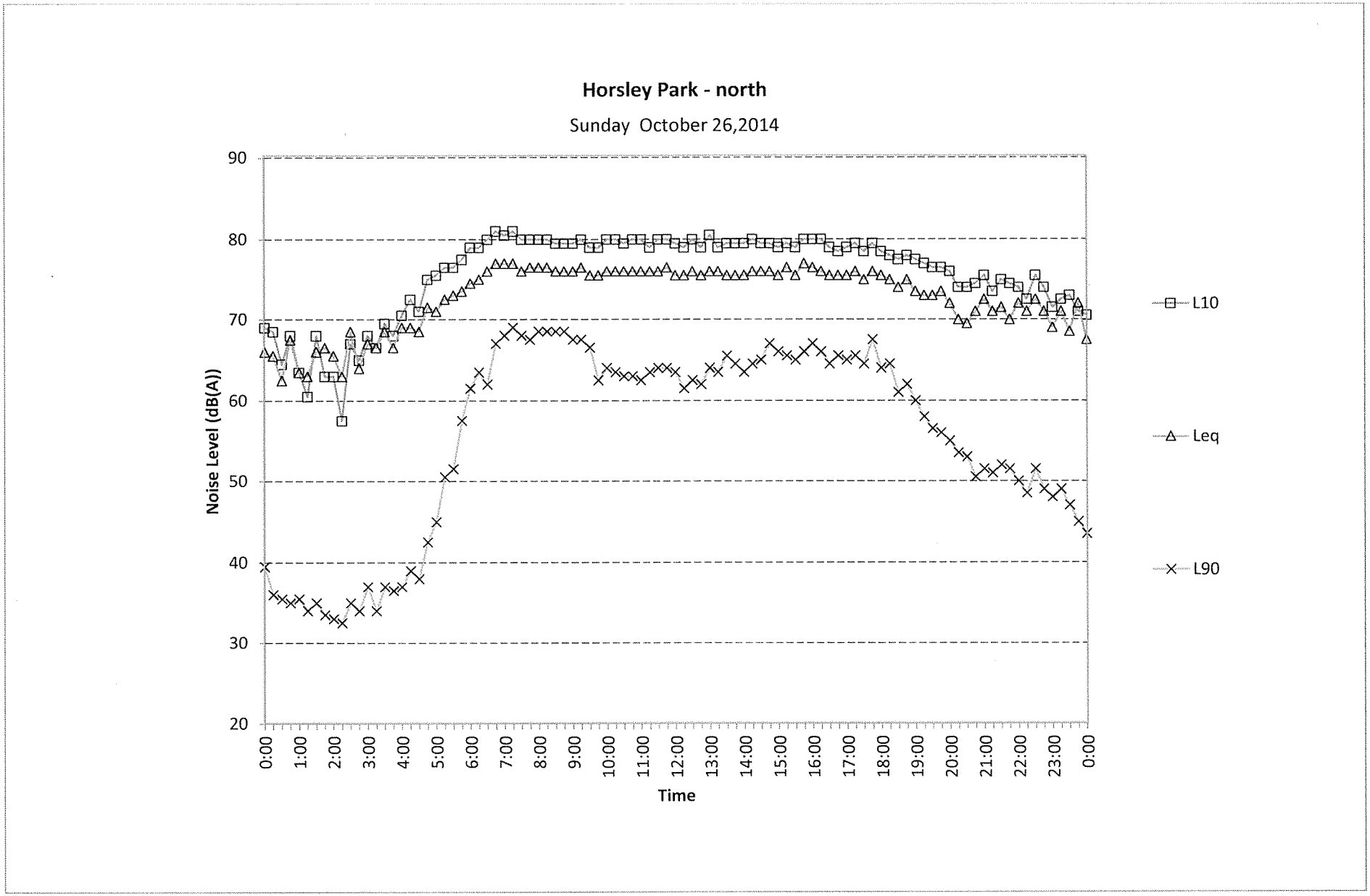
22:00
23:00
0:00
Time
L10
Leq
L90




HORSELY_North LoggerGraphed


Horsley Park - north
Monday October 27,2014
Noise Level (dB(A))
90
80
70
60
50
40
30
20
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
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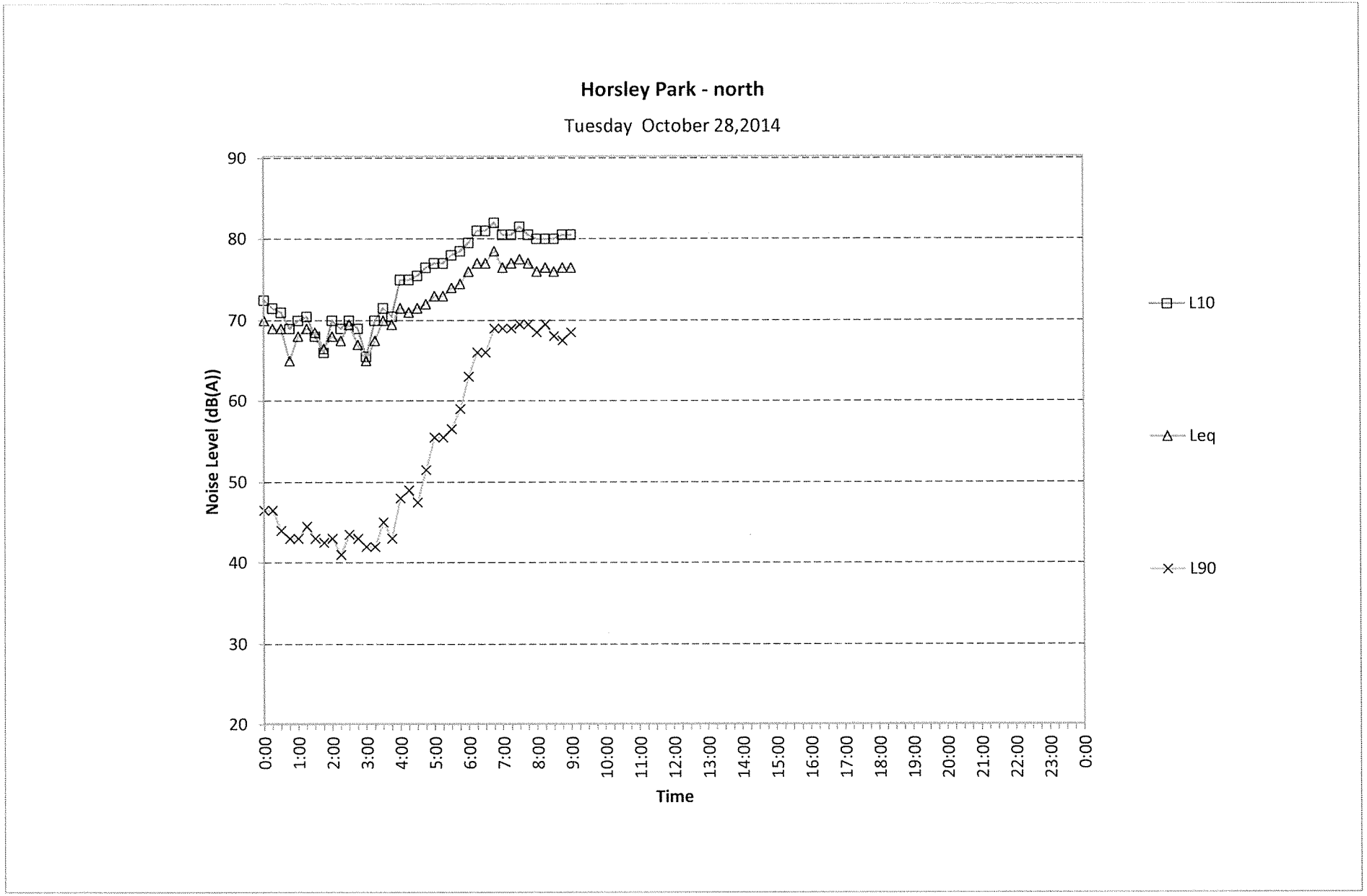
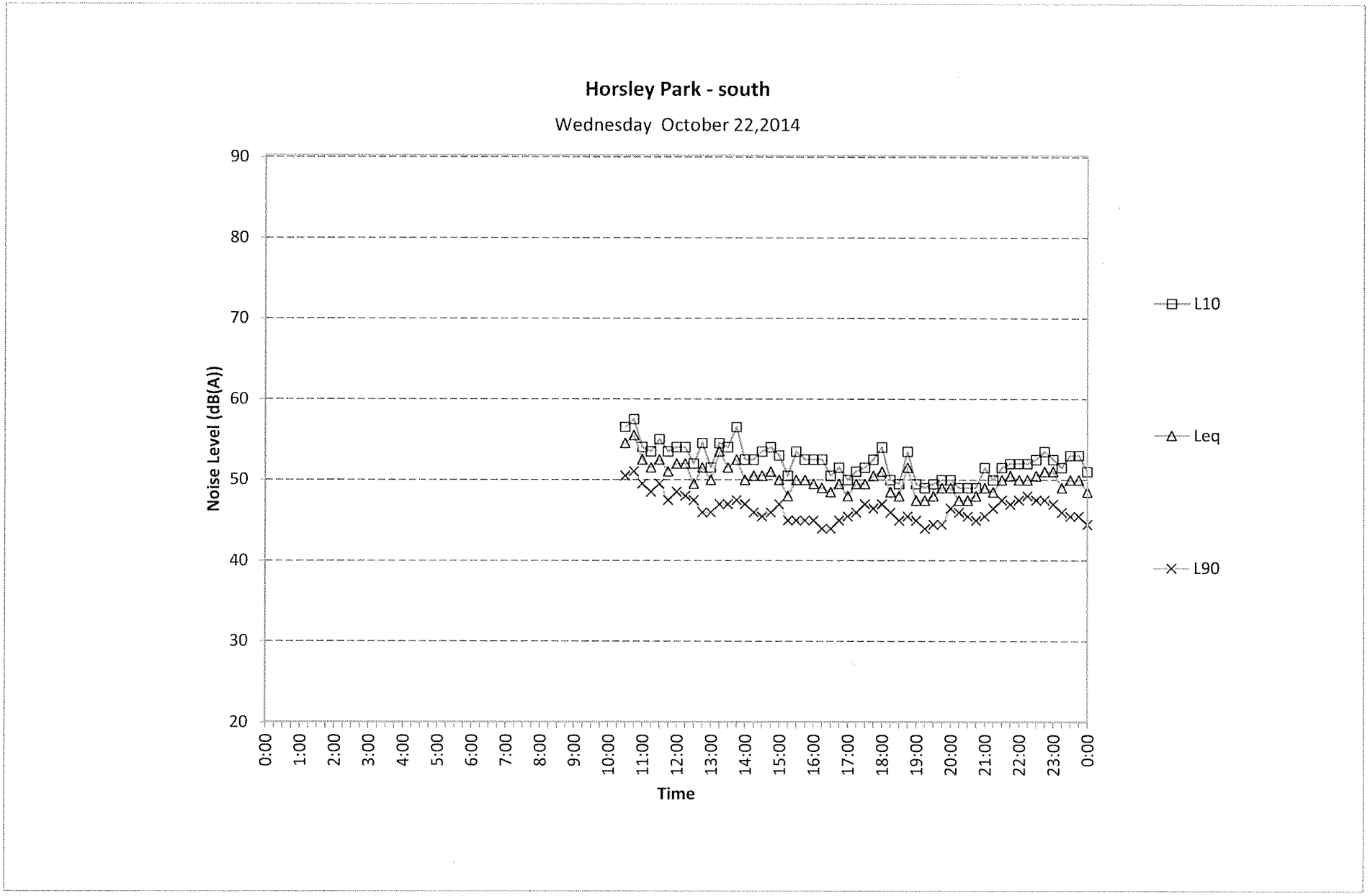
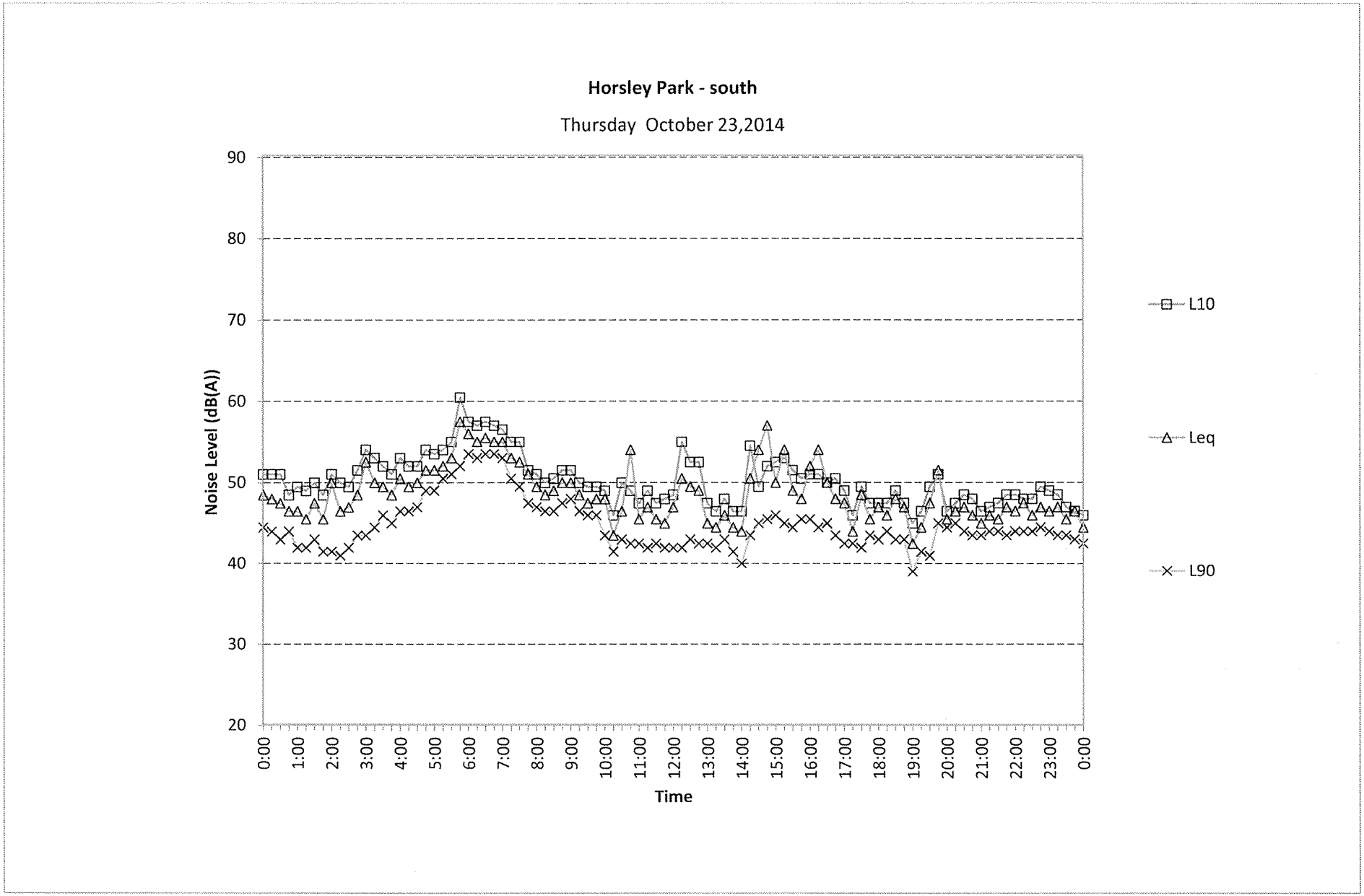
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time
L10
Leq
L90



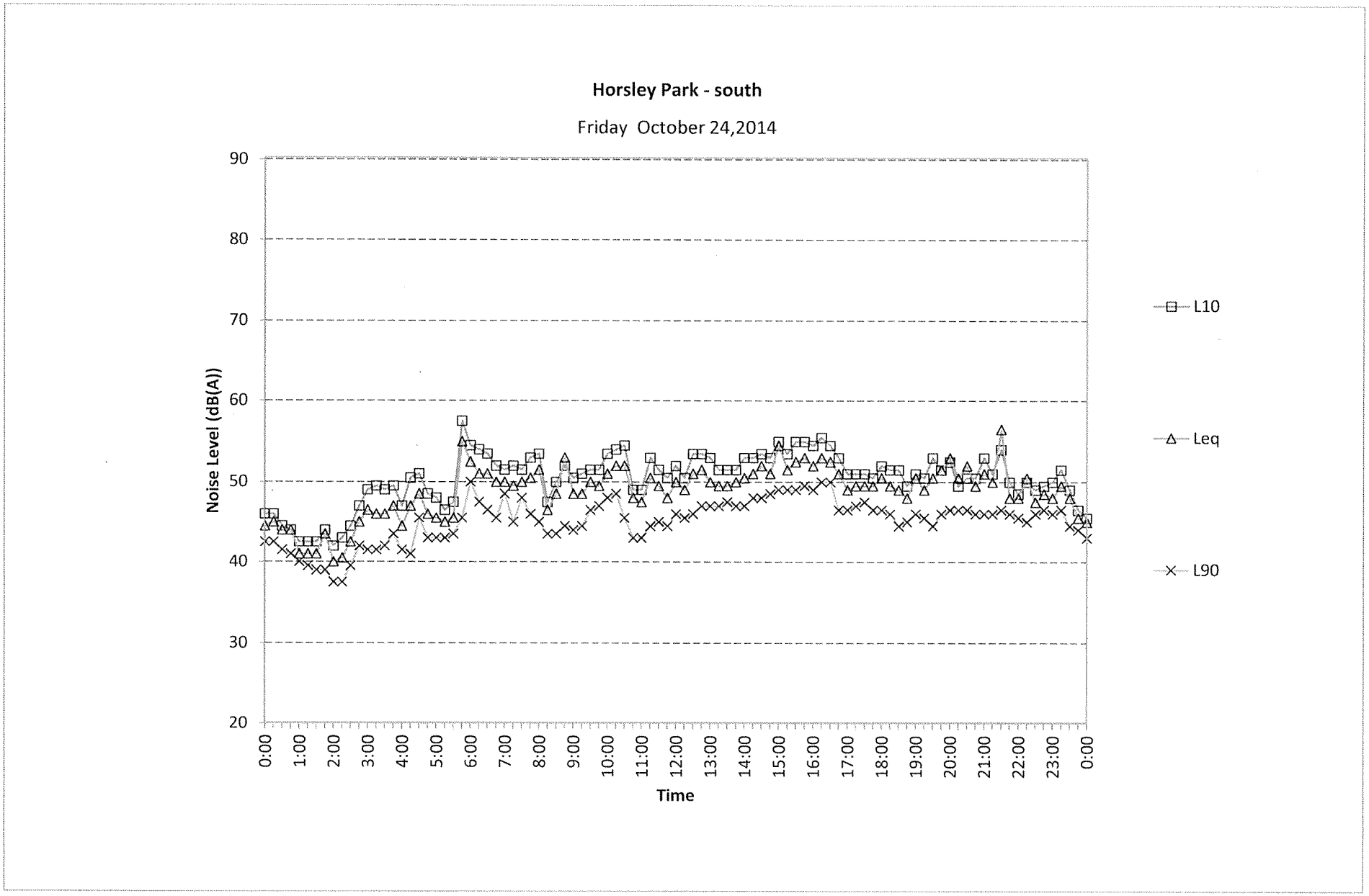

HORSELY_North LoggerGraphed

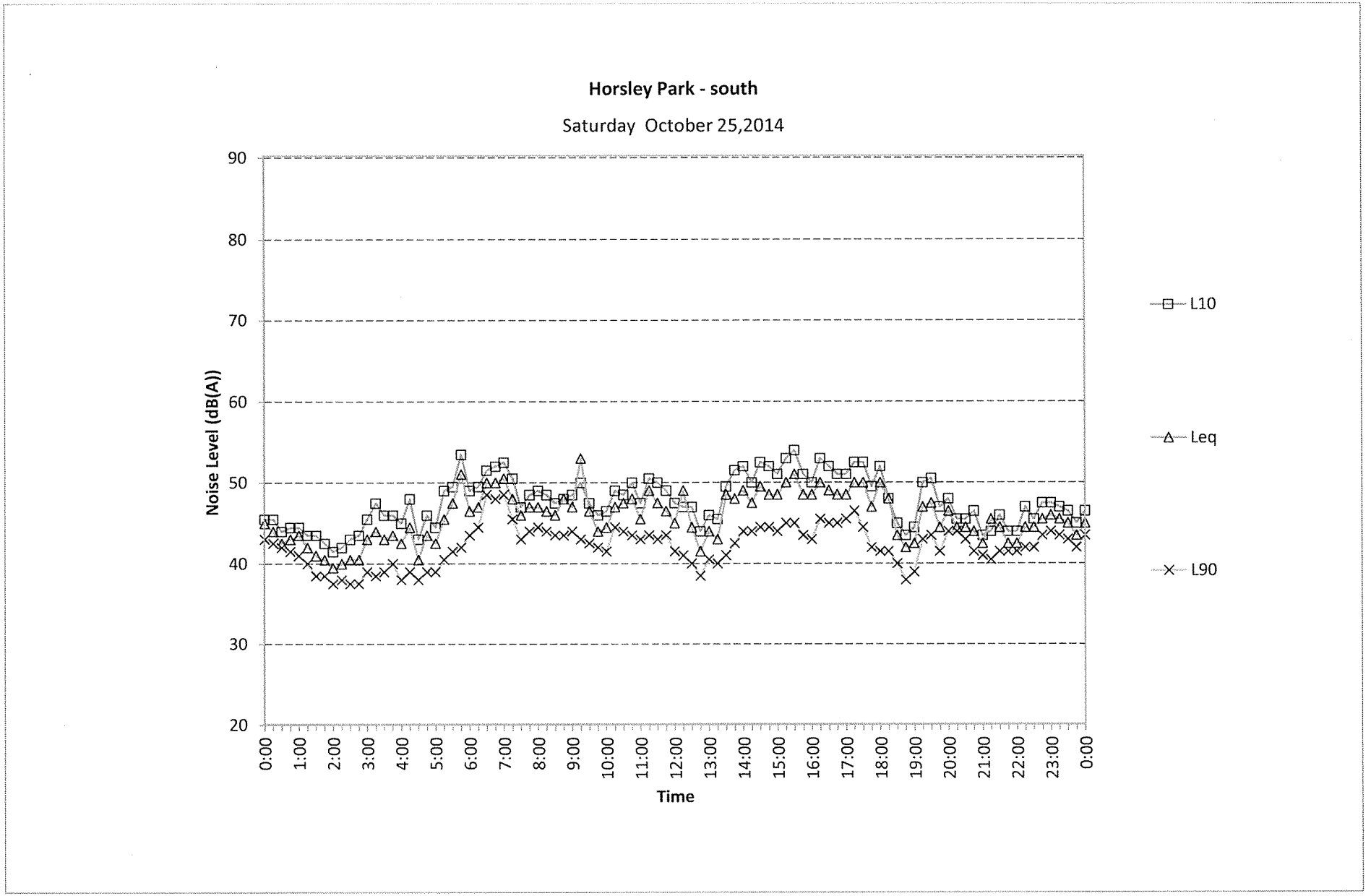



HORSELY_South LoggerGraphed

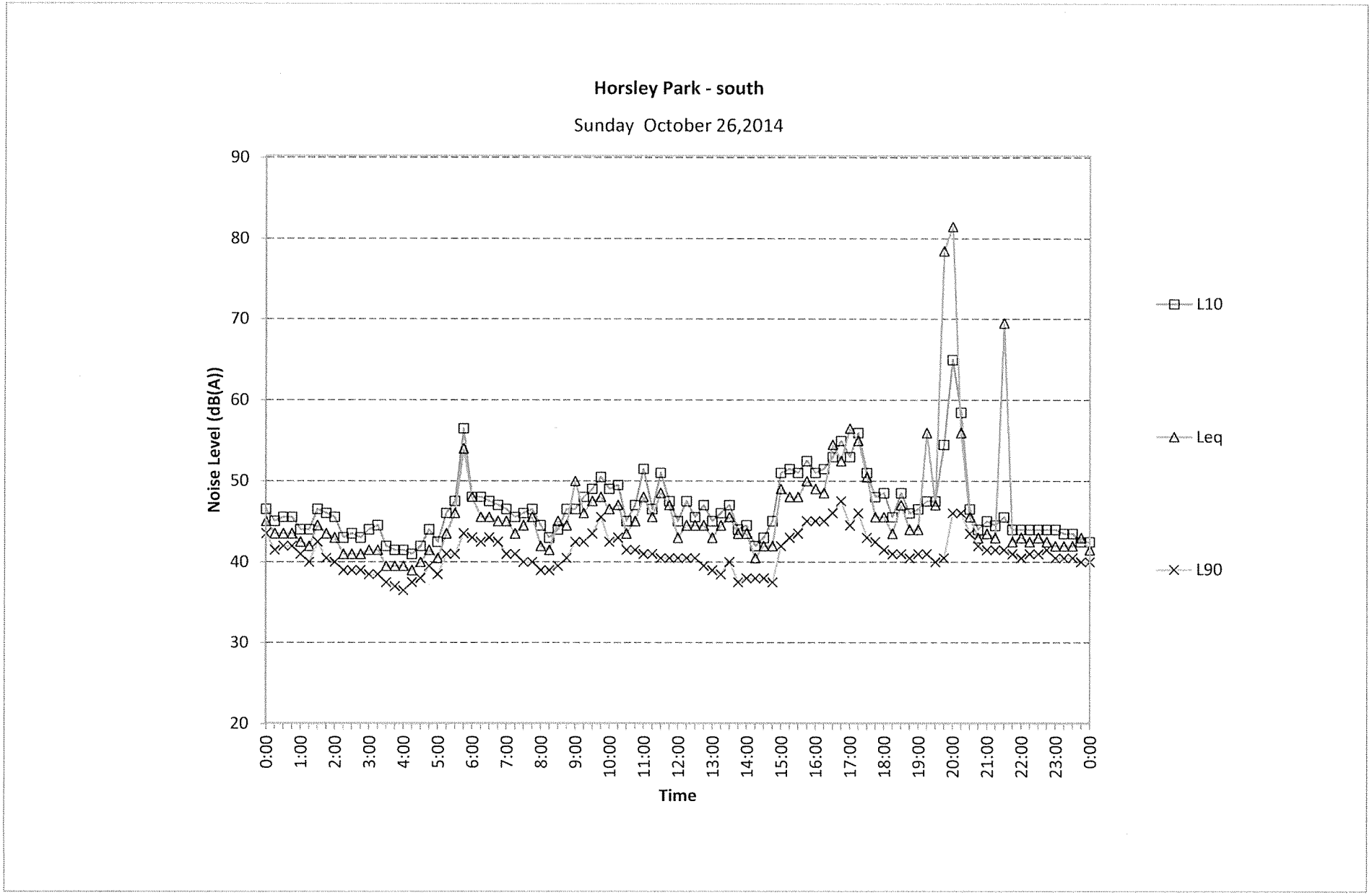


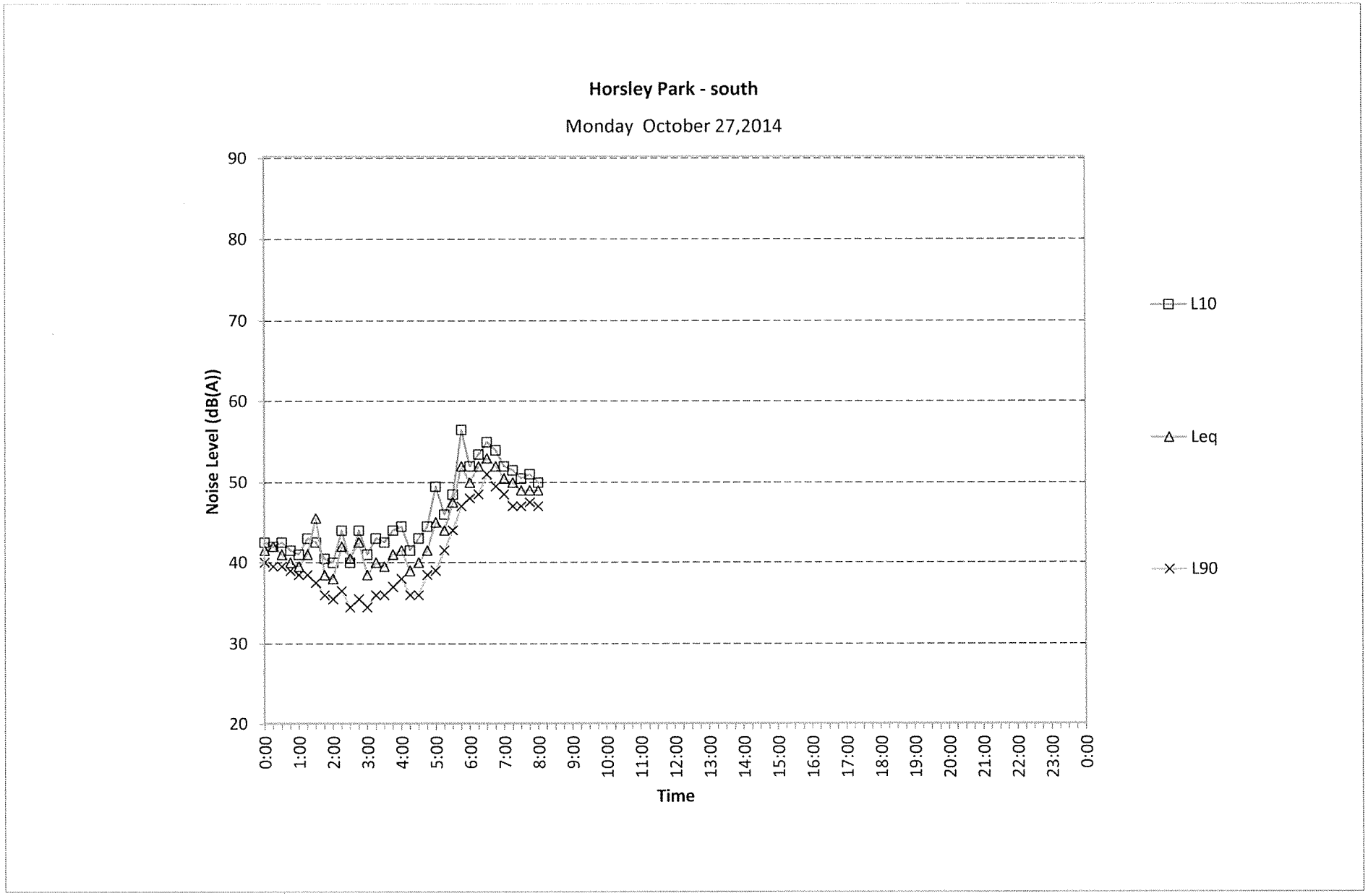

HORSELY_South LoggerGraphed


Horsley Park - south
Friday October 24,2014
Noise Level (dB(A))
90
80
70
60
50
40
30
20
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time
L10
Leq
L90




HORSELY_South LoggerGraphed


Horsley Park - south
Sunday October 26,2014
Noise Level (dB(A))
90
80
70
60
50
40
30
20
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time
L10
Leq
L90




HORSELY_South LoggerGraphed