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Extended Construction Hours Noise Assessment

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1 EXECUTIVE SUMMARY

This report presents an assessment of noise impact associated with the proposed extended construction hours for the residential tower development located at 323 La Trobe Street, Melbourne. The study has been undertaken to determine the levels of noise emission which will impact noise sensitive premises are in close proximity to the site.

The construction activities during the proposed extended hours will be strictly limited to installation of precast panels and HBS modules. A critical component of this report is the formulation of noise control strategies for all the different construction processes. These strategies include the formulation of site management procedures, whether they can be operational or time based.

The objective of this study in all cases is to minimise noise emissions from the construction process.

In the report construction noise criteria are formulated based on the following factors;

- The sensitivity of the various receiver locations,
- City of Melbourne Noise and Vibration – For Demolition, Excavation and Construction Sites.
- A consideration of the procedures and requirements set out Australian Standard 2436-2010 *“Guide to Noise Control on Construction, Maintenance and Demolition Sites”*.
- The requirements to control noise emissions from the construction site to levels, which does not cause undue disturbance to the identified receiver locations.
- The noise mitigation measures available.

ALC confirm that noise impacts during the extended construction hour period will comply with the City of Melbourne construction noise criteria.

Noise impacts have been assessed using the SoundPlan™ noise modelling software which provides a detailed assessment model for evaluating noise associated with the extended hour construction works.

2 SITE DESCRIPTION

The project site is located at 323 La Trobe Street, Melbourne. The northern boundary adjoins La Trobe Street while the southern boundary is formed by Flanigan Lane. The eastern boundary of the site adjoins The Carlson Apartments construction site while the western boundary is formed by an existing 2 storey commercial building located at 333 La Trobe Street. Existing noise sensitive receivers are indicated in section 2.1 below. The proposed works during the extended construction hours will include:

- Delivering precast concrete panels and HBS modules using semi-trailers
- Lifting precast concrete panels and HBS modules using an electrical tower crane
- Installation of precast concrete panels and HBS modules using electric hydraulic torque wrench.

The proposed extended hours are as follows for installation of precast concrete panels and HBS modules:

- Monday to Wednesday, 7.00pm – 12.30am
- Thursday: 7pm -12.30am (larger deliveries to occur from 10pm when trams cease)
- Friday: 7pm – 1.30am (larger deliveries to occur from 10pm when trams cease)
- Saturday and Sunday: No after hours works

Following a consultation process with members of the neighboring residential community, Hickory have amended the timing of proposed after hours activity to ensure work finishes strictly at 12.30am Monday - Thursday and at 1.30am on Fridays.

All deliveries to site will be via La Trobe Street.

2.1 SENSITIVE RECEIVERS

The nearest sensitive receivers in the vicinity of the site which will be used as a basis for this assessment are:

- Location 1 - 316 La Trobe Street – Urbanest Student Accommodation
- Location 2 - 350 La Trobe Street – Centro Residential Apartment
- Location 3 - 318 Little Lonsdale Street – Elm Tower Residential Apartment
- Location 4 - 15 Guildford Lane – Three Storey Residential Apartment
- Location 5 - 16-18 Guildford Lane – Residential Apartment
- Location 6 - 299 Queen Street – Republic Tower Residential Apartment
- Location 7 - 8-10 Guildford Lane – Three Storey Residential Apartment
- Location 8 - 8 Sutherland Street – Melbourne Star Residential Apartment
- Location 9 - 290 Little Lonsdale Street – Melbourne Sky Residential Apartment

There are other commercial/retail receivers surrounding the site which are expected to be closed after business hours. The above identified receivers will be used as a basis for this assessment as it represents the nearest potentially affected receivers during the period of operation. Compliance at these locations will ensure compliance at any other location.

Aerial photo below shows the site and surroundings.

LEGEND

Project Site	
Potentially Affected Residential Receivers	
The Carlson Apartments – under construction – Hutchinson Builders	
Nearby Commercial/Retail Premises	
Noise Monitoring Locations Level 1 ● Level 12 ●	

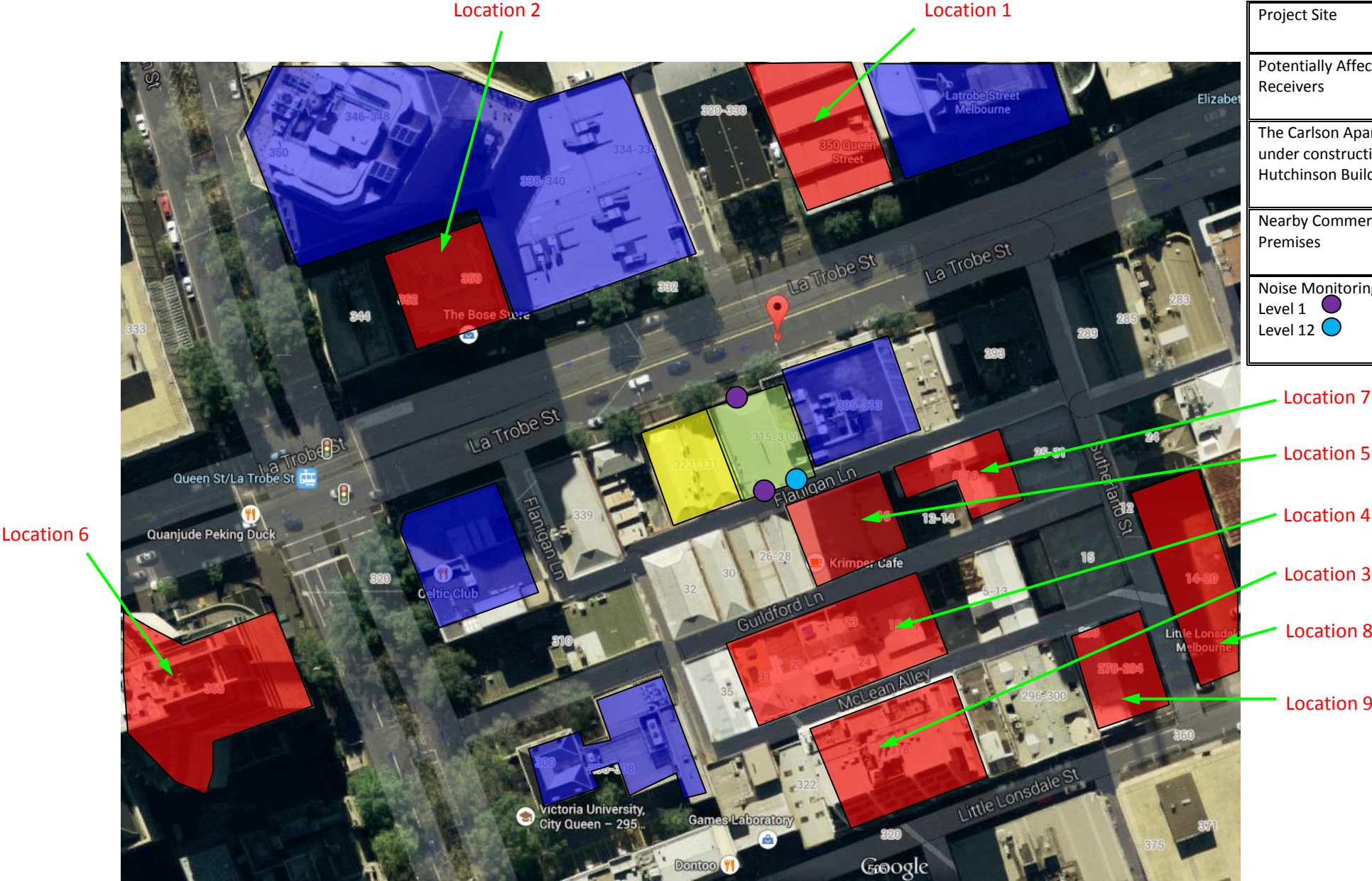


Figure 1: Site Map (Source: Google Map)

3 PROPOSED WORKS

This study includes works associated with the installation of the precast concrete panels and HBS modules at 323 La Trobe Street, Melbourne. It should be noted that no other works are proposed to be undertaken during extended construction period.

3.1 EXTENSION OF CONSTRUCTION HOURS PROPOSAL

The existing prescribed construction work hours in accordance with City of Melbourne Noise and Vibration – For Demolition, Excavation and Construction Sites are as follows:

- 7am and 7pm Monday to Friday; and
- 8am and 3pm on Sunday.

It is proposed to extend these hours to:

- Monday to Wednesday, 7.00pm – 12.30am
- Thursday: 7pm -12.30am (larger deliveries to occur from 10pm when trams cease)
- Friday: 7pm – 1.30am (larger deliveries to occur from 10pm when trams cease)
- Saturday and Sunday: No after hours works

Construction works during the above extended hours will be strictly limited to installation of precast panels and HBS modules.

3.2 INSTALLATION OF PRECAST CONCRETE PANELS AND HBS MODULES

The proposed works are describe below:

Table 1 – Proposed Fit-out Works

Activity	Task Description	Noise Sources
Delivering	Delivering precast concrete panels and HBS modules	Semi-Trailers
Worker Vertical Transportation	Workers will be transported to the appropriate floor via Electrical Hoist before 10pm. Electric hoist will be located within the building. After 10pm the hoist will not be operated unless an emergency occurs	Electrical Hoist
Lifting Goods	Lift precast panels and HBS modules to floors in according with building climbing schedule. After 10pm the crane may be used to lift/lower workers in a man box to eliminate use of the hoist during the night time period (i.e. after 10pm)	Electrical Tower Crane
Installation	Installing precast panels on façade and HBS modules within building	Hydraulic Torque Wrench

3.2.1 Deliveries

Deliveries to site are expected during the proposed extended construction hours. Due to the location of the site, deliveries will be via La Trobe Street.

3.3 SOUND POWER LEVELS

Noise impact will be determined from all processes and equipment, which are involved in the activities outlined above by defining the levels of sound, which they generate. The A-weighted sound power levels for all the component parts of the above-described activities are outlined in the tables below.

Table 2 – Construction Activities – Sound Power Levels

Construction Activity	Equipment / Process	Noise Level – dB(A)
Installation of Precast Panels and HBS Modules	Semi-Trailer	105 SWL – Engine 97 SWL – Exhaust
	Electrical Tower Crane	97 SWL
	Electrical Hoist	94 SWL
	Hydraulic Torque Wrench with plywood enclosure	87 SWL

The noise levels presented in the above table are derived from the following sources, namely:

1. On-site measurements
2. Data provided by manufacturer
3. Table D2 of Australian Standard 2436-2010
4. Data held by this office from other similar studies.

4 BACKGROUND NOISE MONITORING

Background noise monitoring has been conducted on site. Three monitors were installed on adjacent building located at 321 La Trobe Street at level 1 and level 12 respectively as indicated in section 4.1 below and in Figure 1.

4.1 MEASUREMENT LOCATIONS

Three unattended long-term noise monitors were installed on site, location as follows:

- Monitor 1: Level 1 of The Carlson Apartments (321 La Trobe Street) facing La Trobe Street
- Monitor 2: Level 1 of The Carlson Apartments (321 La Trobe Street) facing Flanigan Lane
- Monitor 3: Level 12 of The Carlson Apartments (321 La Trobe Street) facing Flanigan Lane

Note that The Carlson Apartment development is currently under construction by Hutchinson Builders.

4.2 MEASUREMENT PERIOD

Monitor 1 and Monitor 2 were installed on site on the 20th January 2015 and retrieved on the 28th January 2015. Monitor 3 was installed on site between 27th March and 1st April 2015.

4.3 MEASUREMENT EQUIPMENT

Monitors used consisted of three Rion NL-42 sound level analysers, the monitor was calibrated before and after the measurement using a Rion NC-74 sound calibrator. Refer to Appendix 2 for noise logging data.

4.4 MEASUREMENT RESULTS

Based on the background noise measurements conducted on site, the following noise level will be used for this assessment.

Table 3 - Measured Noise Levels (Unattended)

Location	Date	Time Period	8.00pm – 5.30am dB(A) L ₉₀ *
Facing La Trobe Street on First Level	Monday - Friday	7pm – 10pm	48
		10pm – 5.30am	45
Facing Flanigan Lane on First Level	Monday - Friday	7pm – 10pm	53
		10pm – 5.30am	48
Facing Flanigan Lane on Level 12	Monday - Friday	7pm – 10pm	55
		10pm – 5.30am	51

Note *: Noise levels have been corrected by -2.5 dB to account for façade reflection

5 CONTRUCTION NOISE GUIDELINES

This section details the suitable noise criteria applicable to the proposed extended construction hours.

5.1 SUITABLE NOISE STANDARD

5.1.1 Australian Standard AS2436

For the control and regulation of noise from demolition/construction sites the Australian Standard AS 2436 nominates the following:

1. That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes on parts of the site where they can be shielded, selecting less noisy processes.
2. The undertaking of noise monitoring to assist in the management and control of noise emission from the building site.
3. Those reasonable suitable noise criteria be established.

5.1.2 Melbourne City Council – Designated Sound Levels

Criteria for the assessment of potential noise impact to neighbouring premises are those required by the Melbourne City Council in the “Noise and Vibration Control Guideline for Construction and Demolition Sites”.

High-impact projects have the potential to generate greater levels of noise for a longer period of time.

Table 4 - Melbourne City Council Construction Noise Criteria

DAY	TIME ZONE	Zone	NOISE CRITERIA Leq ¹
Monday to Friday	7.00am to 10.00pm	1, 2 3, 4	L ₉₀ + 10dB(A) L ₉₀ + 15dB(A)
Saturday	3.00pm to 10.00pm	1, 2 3, 4	L ₉₀ + 10dB(A) L ₉₀ + 15dB(A)
Sundays and Public Holidays	9.00am to 6.00pm	1, 2 3, 4	L ₉₀ + 10dB(A) L ₉₀ + 15dB(A)
Monday to Friday	10.00pm to 7.00am	1,2	L ₉₀ + 5dB(A)
Saturday	10.00pm to 8.00am	1,2	L ₉₀ + 5dB(A)
Sundays and Public Holidays	6.00pm to 9.00am	1,2	L ₉₀ + 5dB(A)

1. Where the predicted or measured LAeq (30 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. (DECC CNG, 2008).

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

5.2 CONSTRUCTION NOISE OBJECTIVES

The construction noise objectives for this assessment have been established from the background noise monitoring in conjunction with the requirements of Melbourne City construction noise guidelines.

Table 5 – Construction Noise Objectives

Receiver	Zone	Time	Background Noise Level dB(A) L₉₀	Construction Noise Objective dB(A) L_{eq, 30min}
Residential receivers to the north of the site	1	7pm-10pm	48	58
		10pm-5.30am	45	50
Residential receivers to the south of the site (on lower levels)	1	7pm-10pm	53	63
		10pm-5.30am	48	53
Residential receivers to the south of the site (on higher levels)	1	7pm-10pm	55	65
		10pm-5.30am	51	56

6 CONSTRUCTION NOISE MODELLING

Construction noise emissions associated with the proposed extended hours construction works have been predicted using the SoundPlan™ modelling software.

6.1 SOUNDPLAN NOISE PREDICTIONS

Modelling was conducted to investigate the potential for noise impact from the proposed works during the extended construction period to the surrounding sensitive receivers of 323 La Trobe Street, Melbourne. It is noted that the building will be constructed conventionally during normal construction hours from ground to level 2. Extended hours works are limited to precast panel installation on the eastern and western facades and the building modules forming the remainder of the floor from the podium to level 42. Input information which has been used in the development of the model included the following:

1. The assessment has been based the on-site construction procedure based on the discussion with Hickory's site manager. Modification to the original proposed electric hoist and operation has been modified based on the recent community consultation meeting which expressed concerns over operation of the Alimak.
 - a. At the start of the night shift, the electric hoist (Alimak) will transport working crew to the level where the modules will be installed (starting from Level 2). **Note the electric hoist will only be used at the start of the night shift to transport staff (which will occur before 10pm)**, Amenities (toilet, catering, etc) will be provided in close proximity to the level where work is to take place so that staff do not need to travel off site. It is noted that in the advent of an emergency the Alimak may be required to operate to transport workers after 10pm.
 - b. Semi-trailer delivering precast concrete panels/HBS modules to site via La Trobe Street. The engine of the semi-trailer will be turned off during unloading. A maximum number of 4 trucks per hour is estimated by Hickory.
 - c. The precast panels along the eastern and western boundary will be installed on the proceeding level to the proposed module floor (they will be installed 1 day behind the modules). It is noted that The Carlson Apartment development will effectively screen the eastern boundary in any case with the existing precast concrete façade to the western boundary of the site.
 - d. When modules arrive on site and the semi-trailer has moved into the unloading location (in front of the site on La Trobe Street), the electric tower crane will lower the lifting jig in position to lift the modules from the trailer.
 - e. The crane will then lift the modules to the required level, and be guided by the installation crew to be inserted onto installation columns.
 - f. The sequence of the module installation dictates that the module along the southern boundary will be installed first. The modules will incorporate a 3.2m high external façade system already installed which will form a barrier along the southern boundary of the site for the remainder of the night time work.
 - g. Depending on how the module is seated, a hydraulic torque wrench (only one torque wrench will be used on site during night shift) will be used to bolt down the module. Note the hydraulic torque wrench will only be used if the module is not

levelled when seated on the slab and only one torque wrench will be used on site during night shift.

- h. A maximum of 8 modules will be installed per level per night. This equates to a maximum of 29 bolts which may require installation using a hydraulic torque wrench. It is estimated by Hickory that each bolt will take approximately 1 minute to be installed and meet the required torque setting.
2. The sound power levels detailed in Table 2 have been used to calculate noise levels impacting on receivers' façades.
3. Noise modelling was conducted over the entire façade to investigate noise impact on the potentially worst case locations of the neighbouring receivers. Details of the noise modelling are included in Appendix 1.
4. The ISO9613-3:1996 method was used in Soundplan™ to calculate noise propagation. Which is in-line with the method in AS2436-2010 as noted in City of Melbourne Noise and Vibration Control Guideline for Construction and Demolition Sites

6.2 CONSTRUCTION SCENARIOS

6.2.1 Semi-trailers arriving on site

Semi-trailers will arrive on site via La Trobe Street. Engines will be shut down apart from when the vehicle is required to move to the unloading bay and when it departs the site. The modelling assumes that a maximum of 4 trucks will arrive during one hour period

6.2.2 Transporting works to floors

The electric hoist (Alimak) will bring the workers to the floors where the scheduled work is to take place and will be located within the building and not external of the site. Use of the electric hoist will only be used at the start of the shift to transport workers to the floor associated with module installation. Movement of staff after 10pm will occur via a man box raised and lowered by the electric crane. Hickory will provide amenities for staff on an appropriate floor level near the module installation location so as the workers can remain on site. It is noted that in the advent of an emergency the electrical hoist may be required to be operated.

6.2.3 Lifting precast panels and HBS modules

The electrical tower crane will be used to lift precast concrete panels and HBS modules to desired levels while during the night time period (after 10pm) where staff are required to be moved from street level to the working area or vice versa they will be raised/lowered in a man box via the electric crane. The electric crane will lift at a maximum speed of 12m/min. It is assumed that the electric crane will operate longer duration when the construction occur at the higher level (Level 15 and above). Assessment has assumed that the electrical crane will operate for 10min per half an hour for construction works occur below level 15, and 15min per half an hour for construction works occur above level 15.

6.2.4 Installation

Workers on site using hydraulic torque wrench to install precast panels and HBS modules. Only one hydraulic torque wrench will be used throughout the night time period. The model assumes that hydraulic torque wrench will operate 7.5min per half an hour. It is expected that this is unlikely to ever eventuate as tightening of bolts will where possible be undertaken during normal construction hours. The hydraulic torque wrench will be housed in an enclosure to minimise noise emissions.

6.3 PREDICTED NOISE LEVELS

Noise emissions from the propose activities have been modelled using SoundPlan™ noise modelling software. Predicted noise levels are presented at the nearest potentially affected receivers. It is noted that if noise emissions comply at these locations they will comply at all locations.

- Location 1 - 316 La Trobe Street – Urbanest Student Accommodation
- Location 2 - 350 La Trobe Street – Centro Residential Apartment
- Location 3 - 318 Little Lonsdale Street – Elm Tower Residential Apartment
- Location 4 - 15 Guildford Lane – Three Storey Residential Apartment
- Location 5 - 16-18 Guildford Lane – Residential Apartment
- Location 6 -299 Queen Street – Republic Tower Residential Apartment

Table 6 – Predicted Construction Noise Levels

Activity	Receiver Location	Predicted Noise Level L _{Aeq,1hour}	Construction Noise Criteria L _{Aeq,1hour}	Complies	Additional Acoustic Treatments / Comments
Delivering of precast concrete panels and HBS modules	1	44	50	Yes	-
	2	46	50	Yes	-
	3	40	56	Yes	-
	4	44	53	Yes	-
	5	40	53	Yes	-
	6	40	56	Yes	-
Electric Hoist (Alimak) Movements	1	<30	50	Yes	-
	2	<30	50	Yes	-
	3	<30	56	Yes	-
	4	<30	53	Yes	-
	5	<30	53	Yes	-
	6	<30	56	Yes	-
Lift Modules and Installation -Level 2 to Level 5	1	<40	50	Yes	-
	2	42	50	Yes	-
	3	<40	56	Yes	-
	4	44	53	Yes	-
	5	40	53	Yes	-
	6	<40	56	Yes	-
Lift Modules and Installation -Level 6-10	1	<40	50	Yes	-
	2	42	50	Yes	-
	3	<40	56	Yes	-
	4	42	53	Yes	-

Activity	Receiver Location	Predicted Noise Level L _{Aeq,1hour}	Construction Noise Criteria L _{Aeq,1hour}	Complies	Additional Acoustic Treatments / Comments
	5	<40	53	Yes	-
	6	<40	56	Yes	-
Lift Modules and Installation -Level 11-15	1	42	50	Yes	-
	2	42	50	Yes	-
	3	40	56	Yes	-
	4	<40	53	Yes	-
	5	<40	53	Yes	-
	6	<40	56	Yes	-
Lift Modules and Installation -Level 16-24	1	40	50	Yes	-
	2	42	50	Yes	-
	3	40	56	Yes	-
	4	<40	53	Yes	-
	5	<40	53	Yes	-
	6	40	56	Yes	-
Lift Modules and Installation -Level 25 and above	1	40	50	Yes	-
	2	40	50	Yes	-
	3	40	56	Yes	-
	4	<40	53	Yes	-
	5	<40	53	Yes	-
	6	40	56	Yes	-

7 DISCUSSION

Noise associated with the works during the proposed extended hours of operation have been assessed, with the following conclusions:

- The assessment indicates that the noise emissions to the nearby sensitive receivers will comply with the night time criteria of City of Melbourne. Compliance at these receivers will result in compliance at any other surrounding residential receivers.
- It should be noted that the predicted noise levels listed in Table 6 are the typical worst case scenario with the noise sources at the closest possible location to the receivers.
- Commercial receivers in the vicinity of the site will generally be closed during night time operations.
- Recommendations outlined in section 8 below should be implemented.

8 RECOMMENDATIONS

The noise emissions from the proposed after hour construction work will comply with the noise criteria detailed in Section 5 provided the following recommendations are adopted.

8.1 MANAGEMENT CONTROLS

Applicable management controls are as follows:

- All construction staff working on site during the extended construction hours shall be formally inducted by Hickory. This includes truck drivers, crane operators, crane dogman, site management, module installation team and electric hoist operators.
- One truck movement per 15 minutes (and not more than 4 per hour). All truck drivers are to be inducted into the operational requirements with respect to delivery arrival, unloading and departure locations.
- Truck engines are to be turned off unless they are moving to deliver the modules or depart the site. Trucks are to be turned off at all other times
- Trucks are not allowed to use airbrakes during the extended construction hours.
- Truck reverse beepers will be disconnected and traffic management personnel are to ensure trucks are safely operated at the site.
- All chains associated with the modules should be rubber coated. Chains shall be placed into timber boxes which are rubber lined to minimise noise associated with chain removal from the modules delivered to site.
- Electrical hoist (Alimak) is only to be used at the start of the night shift to transport workers to the appropriate floor level. It is noted that the electric hoist may be operated in an emergency.

- The electric hoist will be located within the building.
- Plywood sheeting should be installed to the open sections of the building from ground to the underside of level 2 facing Flanigan lane.
- Radios for music will not be permitted to be operated on site during the extended working hours. It is noted that 2 way radios will be used as part of the construction operation (eg crane operation).

For this project, the above management controls will ensure compliance with the Melbourne City Construction criteria. The following sections present possible additional measures which could also be employed if necessary.

8.2 SELECTION OF ALTERNATE APPLIANCE OR PROCESS

Where a particular activity or construction appliance is found to generate noise levels that exceed the criteria, it may be possible to select an alternative approach or appliance.

8.3 BARRIERS

Localised barriers can be installed to reduce noise emissions to surrounding residents. It is proposed to install plywood screening to the rear of the site facing Flanigan Lane between the ground level and level 2 (to close the open sections in the conventional construction). As part of the construction process the existing Hutchinson building under construction provides an acoustic barrier to the eastern boundary, while the modules due to the incorporation of the façade system inherently provide localised screening to residents below the level of construction activity.

8.4 SILENCING DEVICES

Where construction process or appliances are noisy, the use of silencing devices may be possible. It is noted that all practical measures have been implemented in minimising noise emissions including limiting hoist operating hours, use of the electric crane with man box to raise and lower staff after 10pm, allowing trucks to only operate when they deliver or leave the site (no extended periods of idling), providing a localised enclosure around the the electric/hydraulic torque wrench to minimise noise and using an electric crane rather than a diesel crane.

8.5 MATERIAL HANDLING

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A). It is proposed that all chain boxes will incorporate rubber lining. In addition the only materials proposed to be used as part of the installation of modules during the extended construction hours are bolts to fix both precast and HBS modules. These will be already supplied to site on the appropriate construction level and in boxes rather.

8.6 TREATMENT OF SPECIFIC EQUIPMENT

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted. Examples include the localised enclosure around the electric/hydraulic torque wrench and relocation of the electric hoist to be located within the building.

8.7 ESTABLISHMENT OF SITE PRACTICES

This involves the formulation of work practices to reduce noise generation. This includes locating fixed plant items as far as possible from residents as well as rotating plant and equipment to provide respite to receivers.

8.8 STRATEGIC POSITIONING OF PROCESSES ON-SITE

Where practicable, particular processes of activities can be located in particular positions on site to minimise noise to surrounding sensitive receivers. For example, stationary plant may be positioned where direct line of sight shielding can be achieved using natural barriers, or may maximise the distance to the nearest sensitive receiver.

It is noted that this approach has been implemented as far as practically possible on the site to minimise noise emissions to surrounding residential receivers.

8.9 MANAGEMENT TRAINING

All staff and site managers working during the extended construction hours activities should be made aware of noise and vibration limits, applicable control measures and methods. They should ensure that all agreed noise and vibration measures are carried out by employees.

Acoustic Logic Consultancy has been advised by Hickory that all staff associated with the construction process including site management, electric crane/hoist operators, truck drivers and concrete precast/HBS module installation are all Hickroy employees. External sub-contractors will not be used during the extended construction hours works.

9 NOISE MONITORING, REPORTING AND RESPONSE PROCEDURES FOR COMPLAINTS

Noise monitoring will consist of unmanned noise monitoring while additional manned measurements may be used to supplement unmanned monitoring. Final noise monitoring locations will be determined with Council. In the event complaints are received from neighbours the following process will be followed:

- (1) Determining the time offending plant/equipment/process
- (2) Locating the plant/equipment/process further away from the affected receiver(s) if possible.
- (3) Implementing additional acoustic treatment in the form of localised barriers, silencers etc
- (4) Selecting alternative equipment/processes if possible.

9.1 REPORTING REQUIREMENTS

The following shall be kept on site.

A register of complaints received/communication with the local community shall be maintained with information as detailed below.

Where noise/vibration complaints require noise/vibration monitoring, results from monitoring shall be retained.

Any noise exceedances occurring including, the actions taken and results of follow up monitoring.

10 CONTINGENCY PLANS

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

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

- The name and address of the complainant (if provided).
- The time and date the complaint was received.
- The nature of the complaint and the time and date the noise was heard.
- The name of the employee who received the complaint.
- Actions taken to investigate the complaint, and a summary of the results of the investigation.
- Indicate what operations were occurring on site at the time of the complaint.
- Required remedial action, if required
- Monitoring conducted if required.
- Validation of the remedial action.
- Summary of feedback to the complainant.

11 STATEMENT OF INTENT TO COMPLY

An after hours contact number of the Site Manager will be advertised outside the building site, so that residents and other interested parties may contact him/her, should they believe a noise breach is occurring.

It is acknowledged that in order for the site to successfully work during extended hours a careful and structured work methodology needs to be developed and implemented to ensure on site workers understand the conditions (such as keeping all external facade openings closed) which allow for works to be conducted during the extended hours periods. The calculated levels assume that such a noise management plan is implemented. The measures, which need to be observed and rigorously followed, are outlined clearly under each calculation table. A Noise and Vibration Management Plan will be developed, which will be used to manage extended hours works.

It is further acknowledged that a programme of liaison with representatives of the potentially affected receiver locations will need to be established and maintained throughout the duration of the project.

12 CONCLUSION

The report presents the assessment of noise emissions associated with the proposed extension hours of construction works to be carried out at the residential development at 323 La Trobe Street, Melbourne.

ALC confirm that noise emissions from the operation of the construction works will comply with the night time construction noise criteria detailed in City of Melbourne Noise and Vibration – For Demolition, Excavation and Construction Sites.

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 'Johnny Zhang', with a stylized flourish at the end.

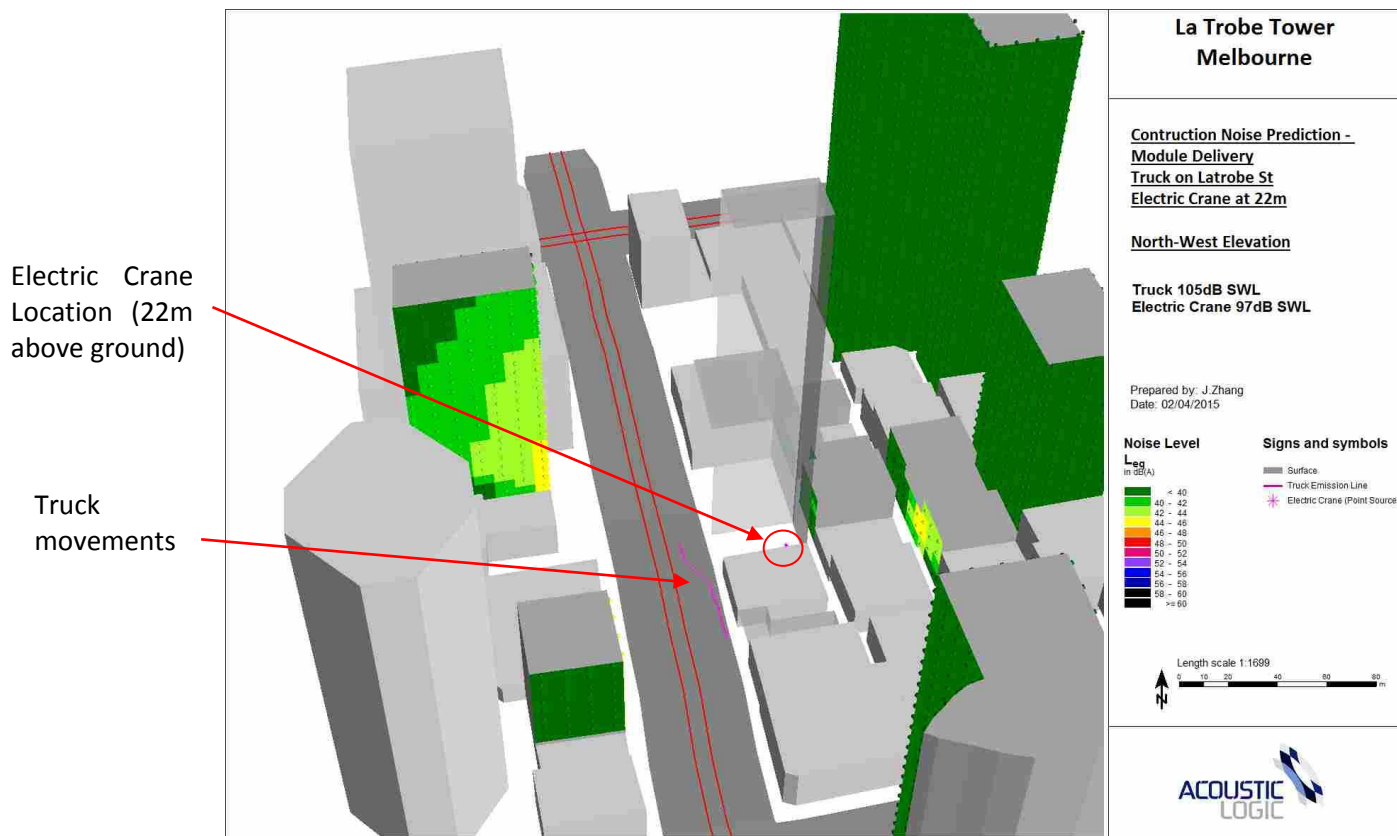
Acoustic Logic Consultancy Pty Ltd
Johnny Zhang

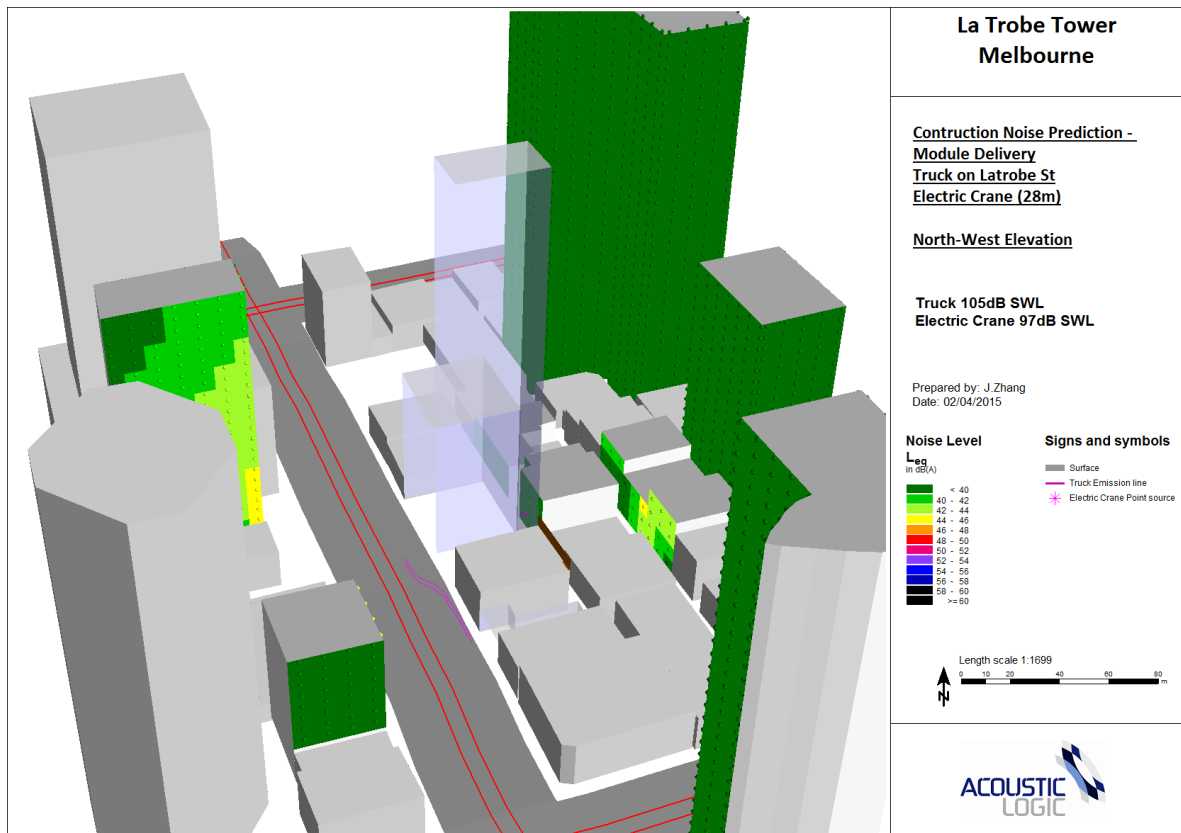
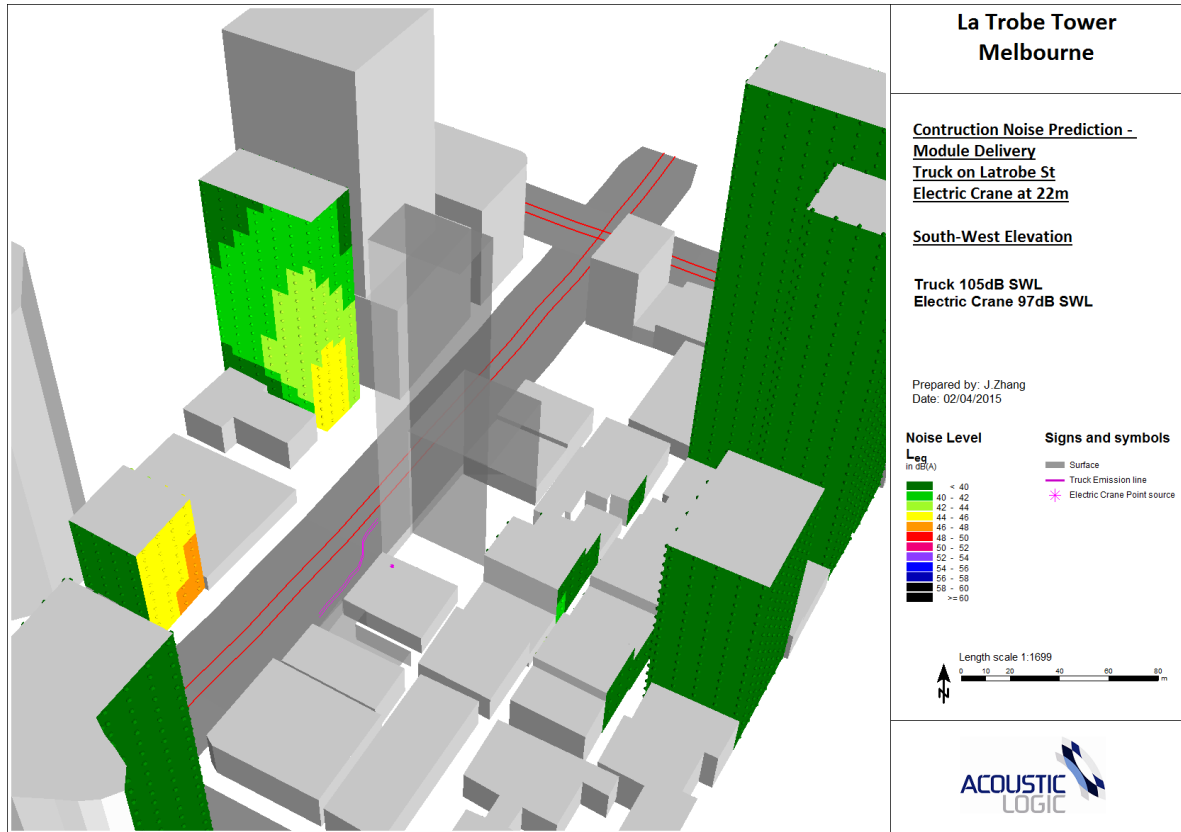
APPENDIX 1: SOUNDPLAN MODELS

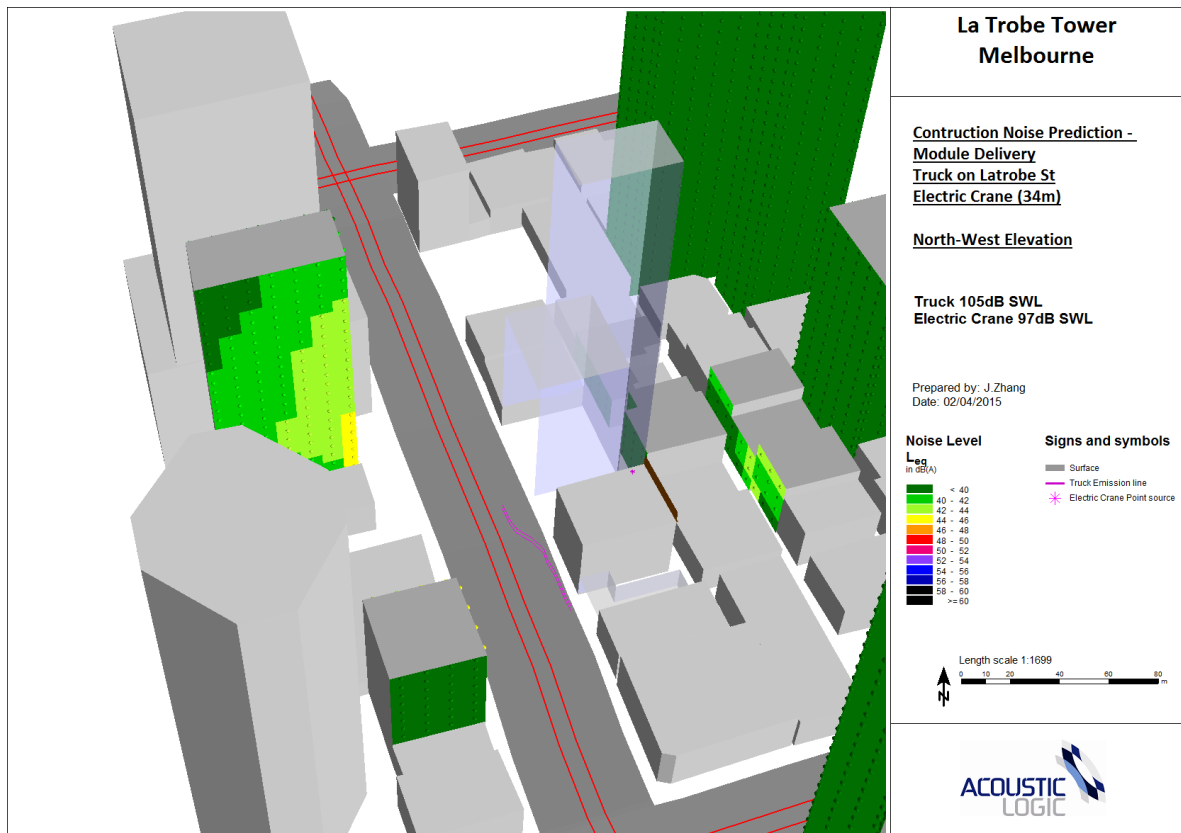
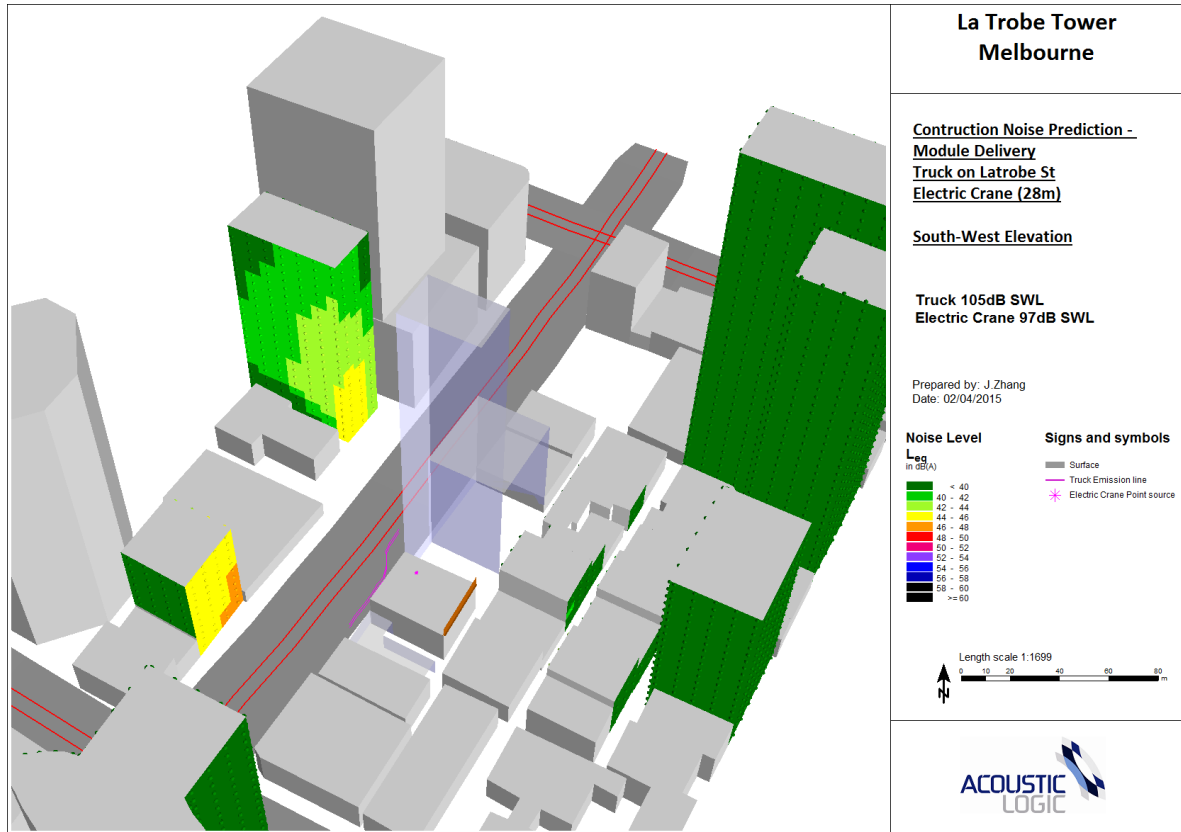
MODULE DELIVERY

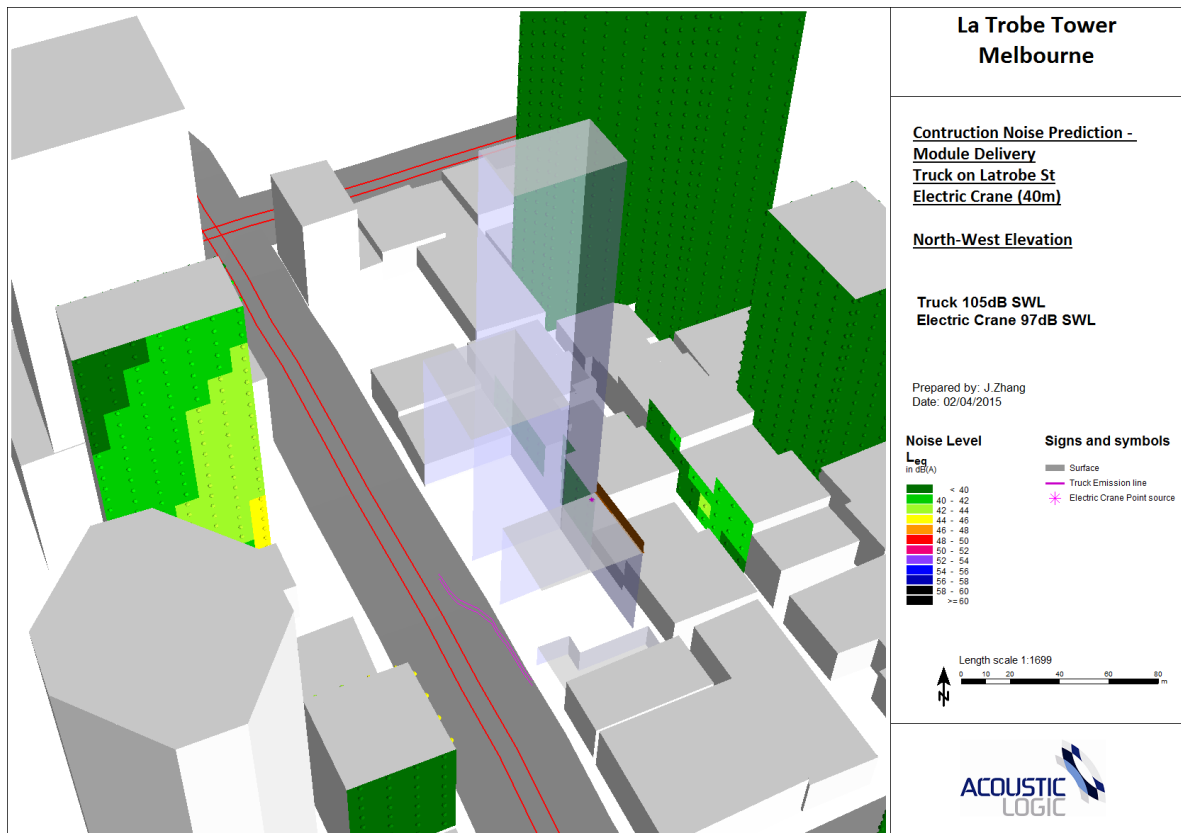
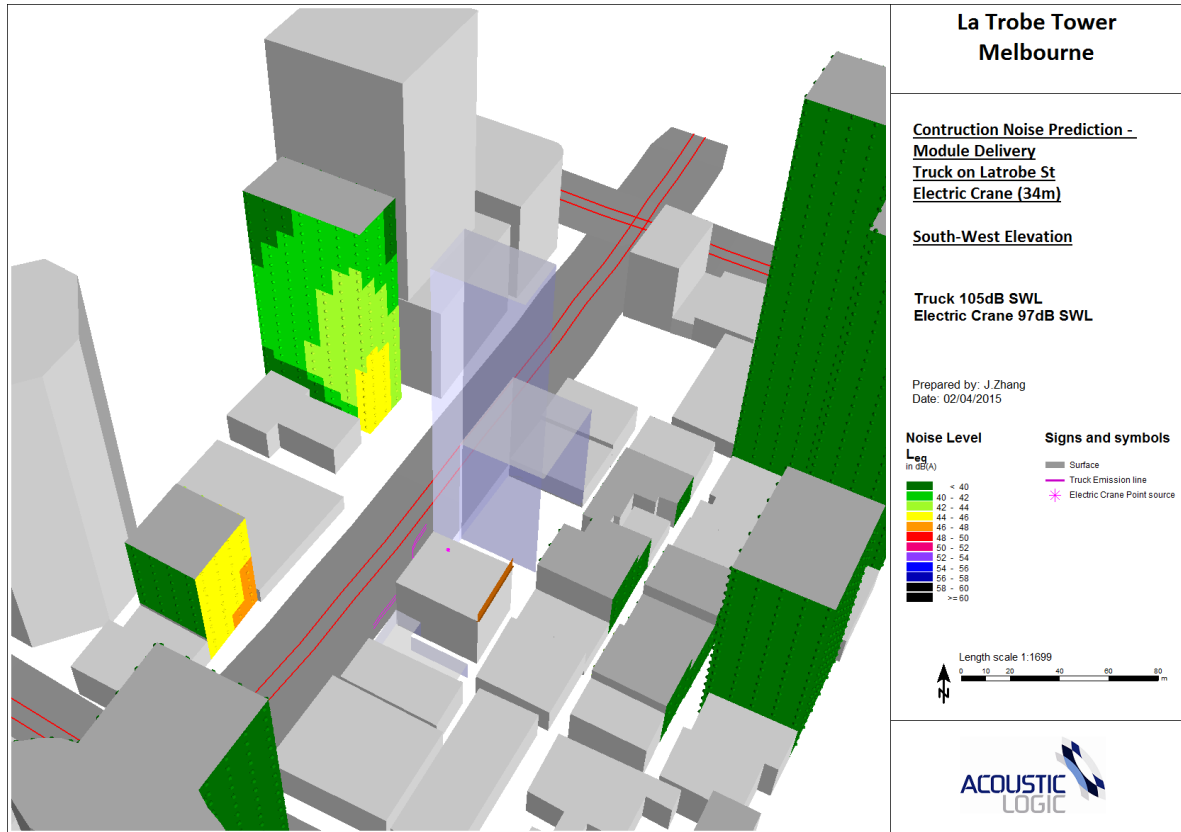
The following SoundPlan Models presents the predicted noise levels from truck arriving/leaving site and electric crane lifting modules as the building goes up.

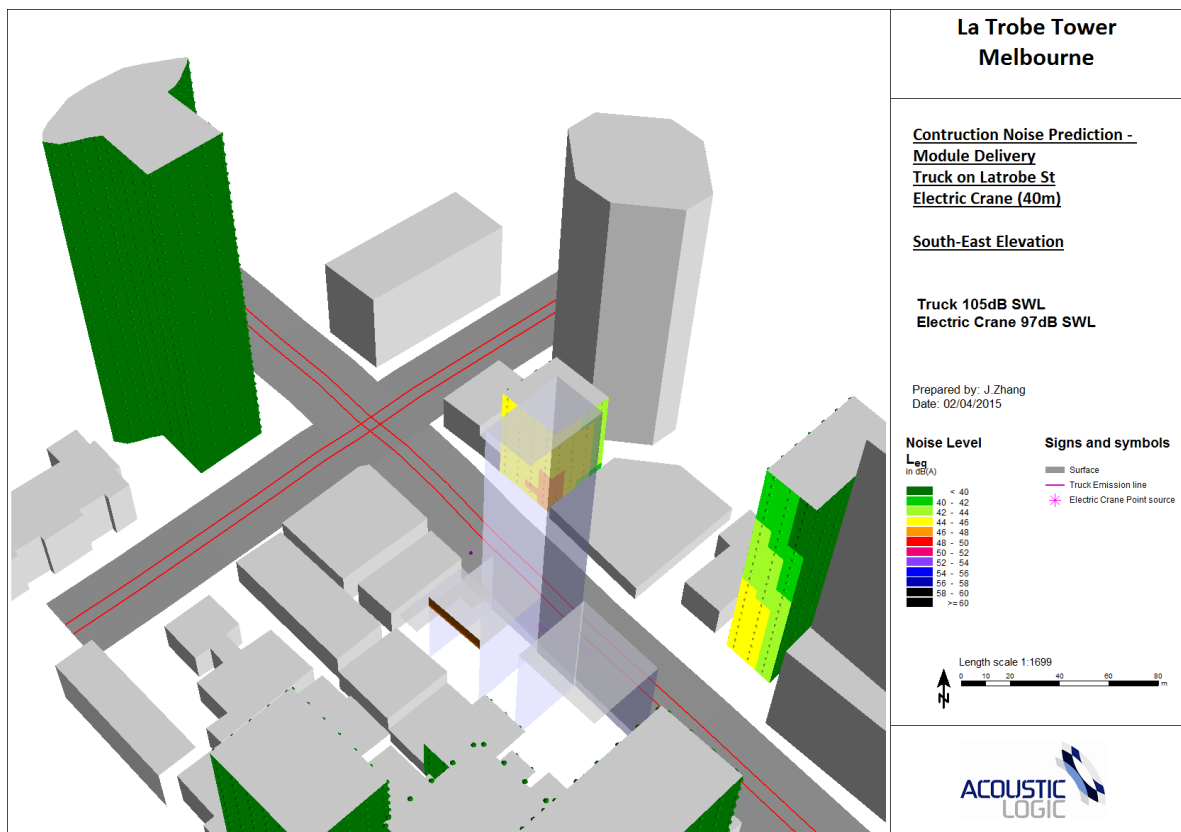
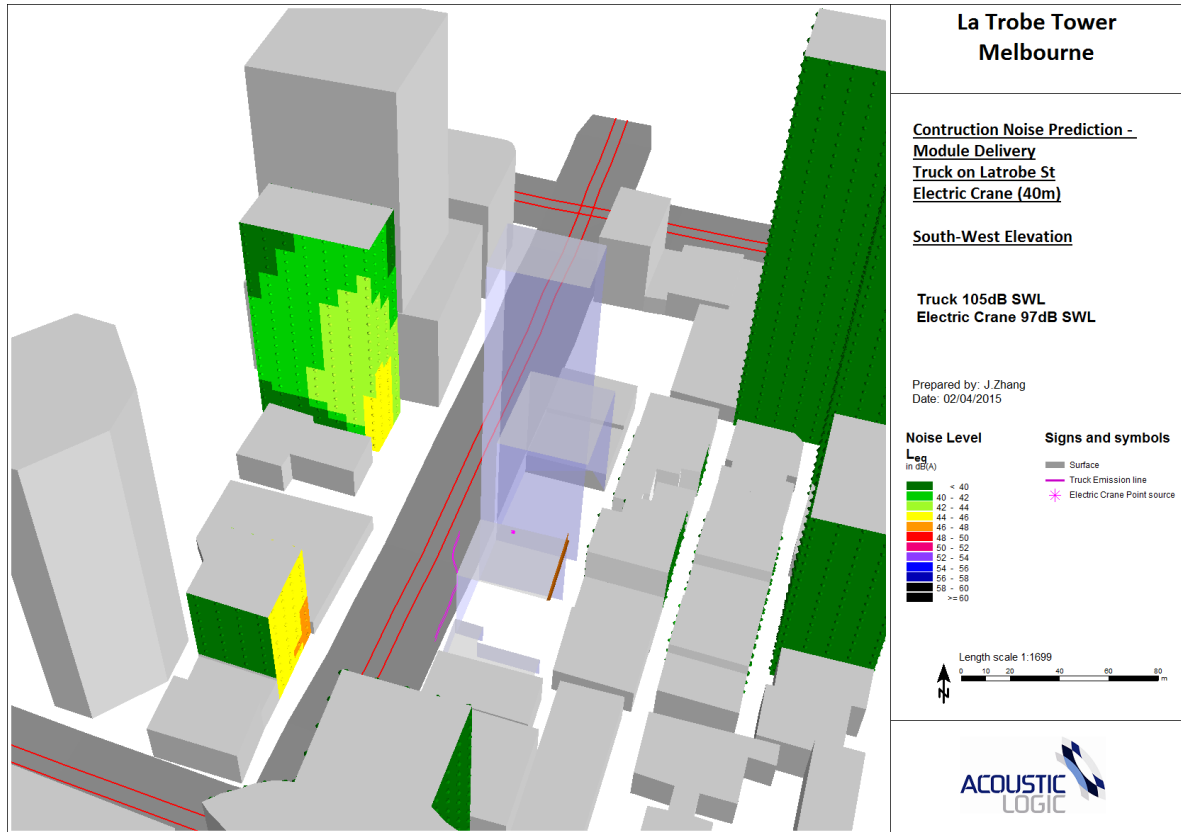
The noise source of the crane is represented by a point source and noise source of the truck movement is a line source, as indicated below.

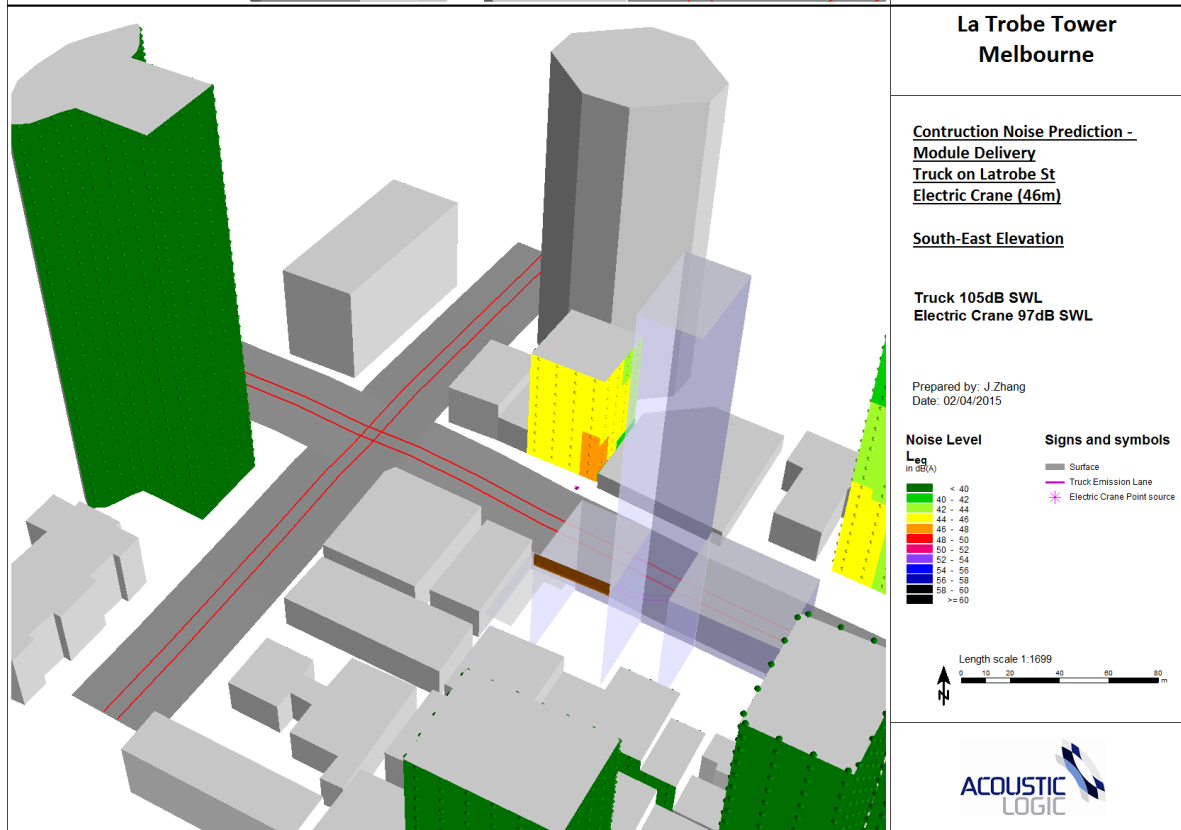
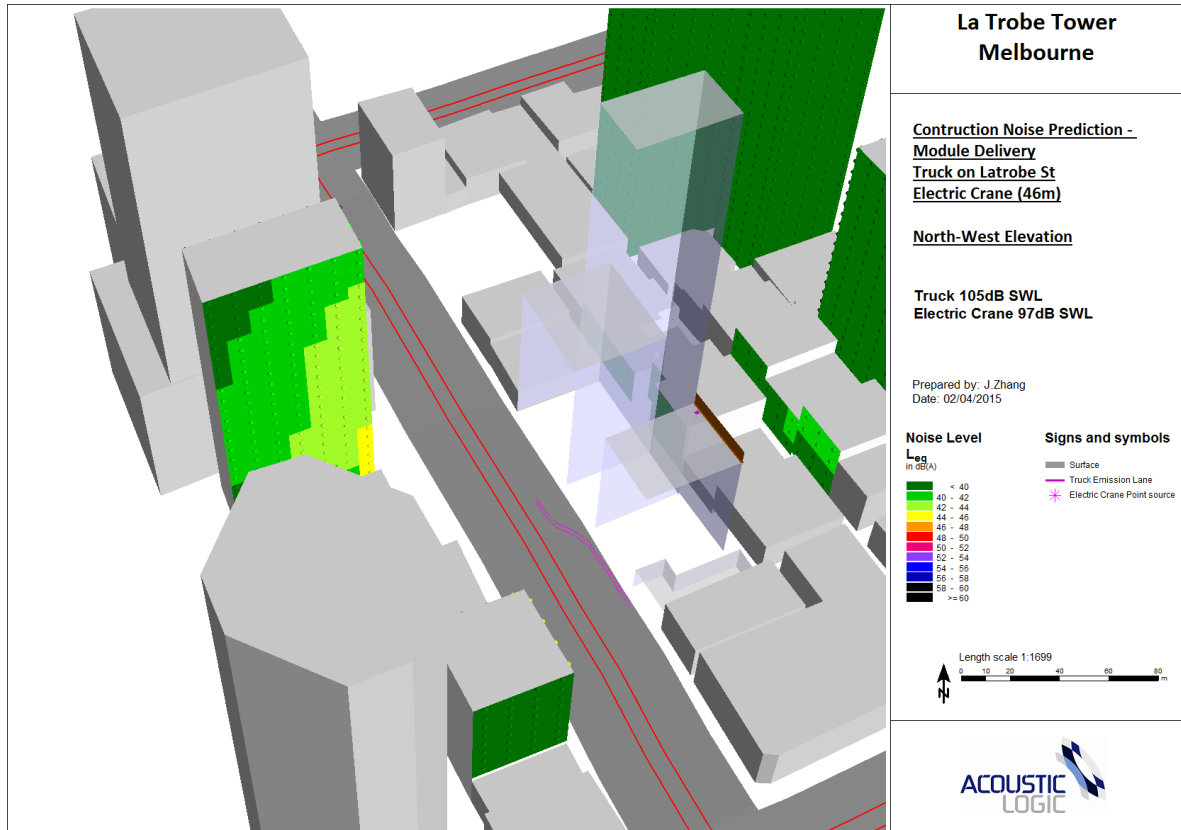


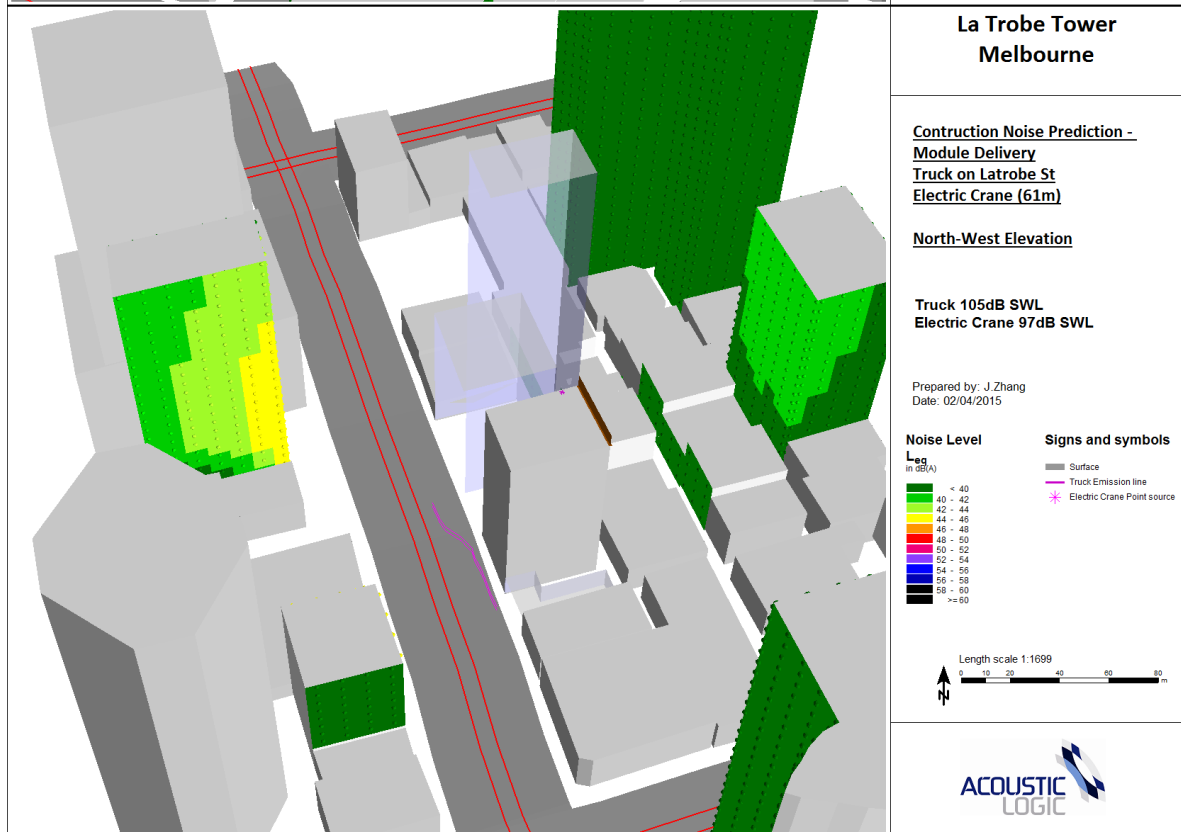
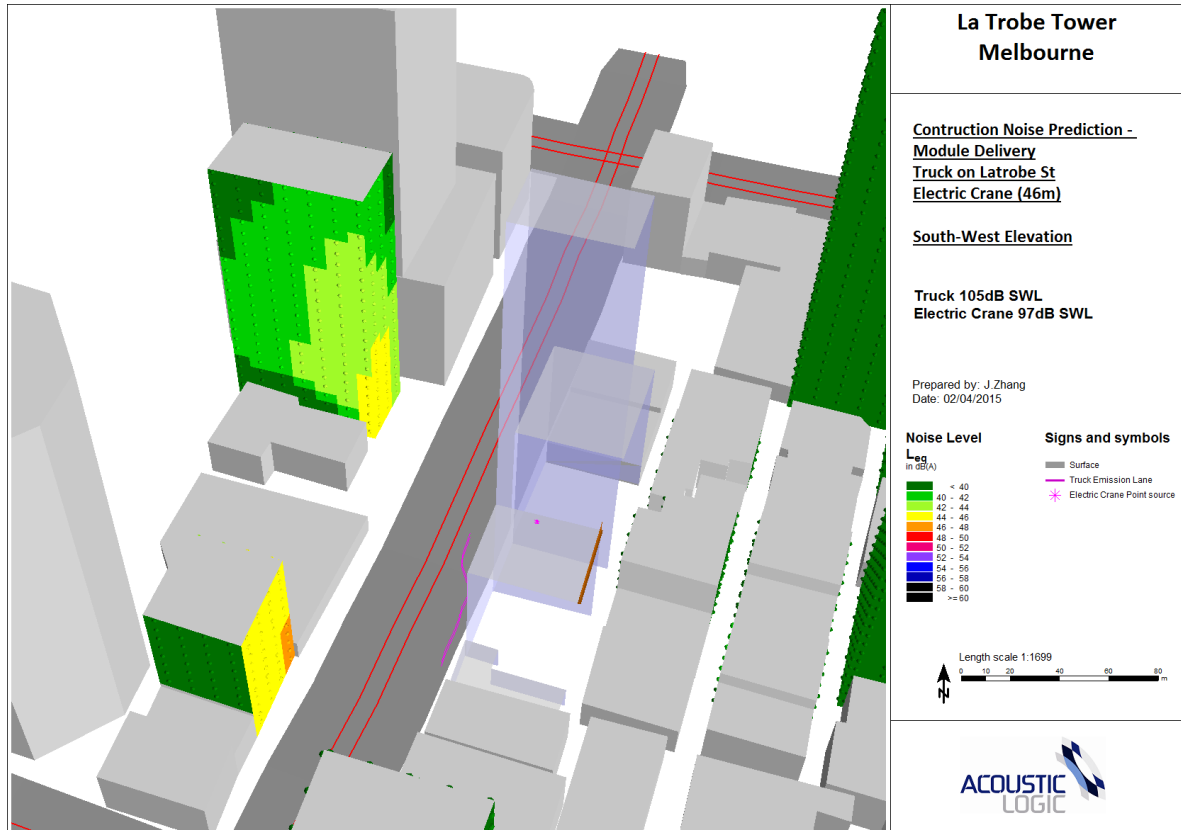


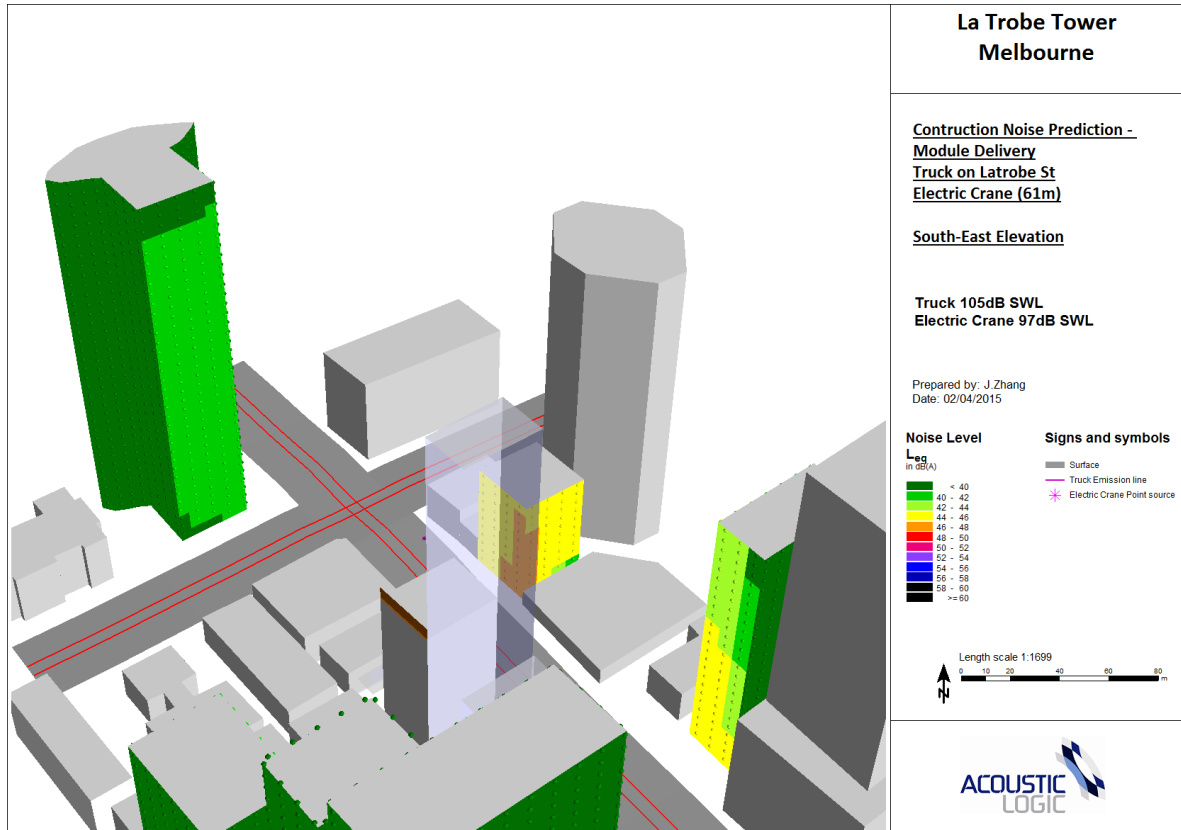


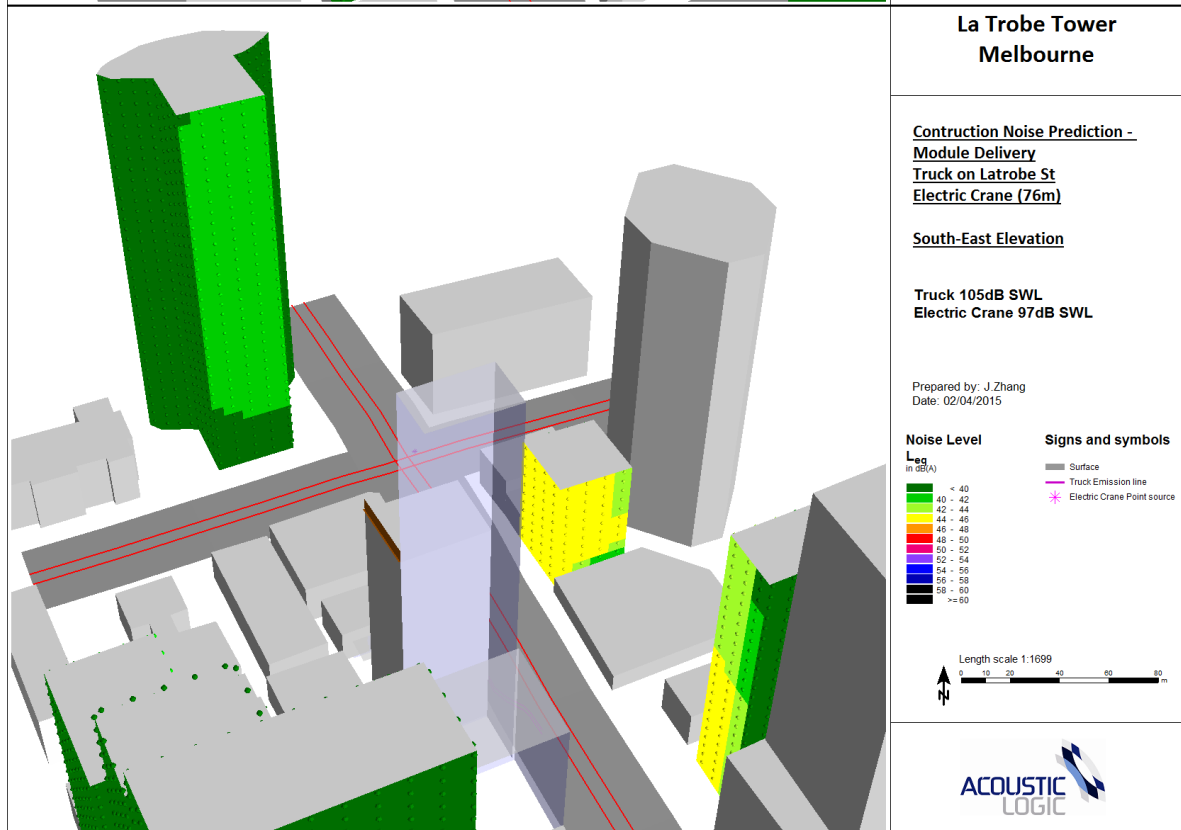
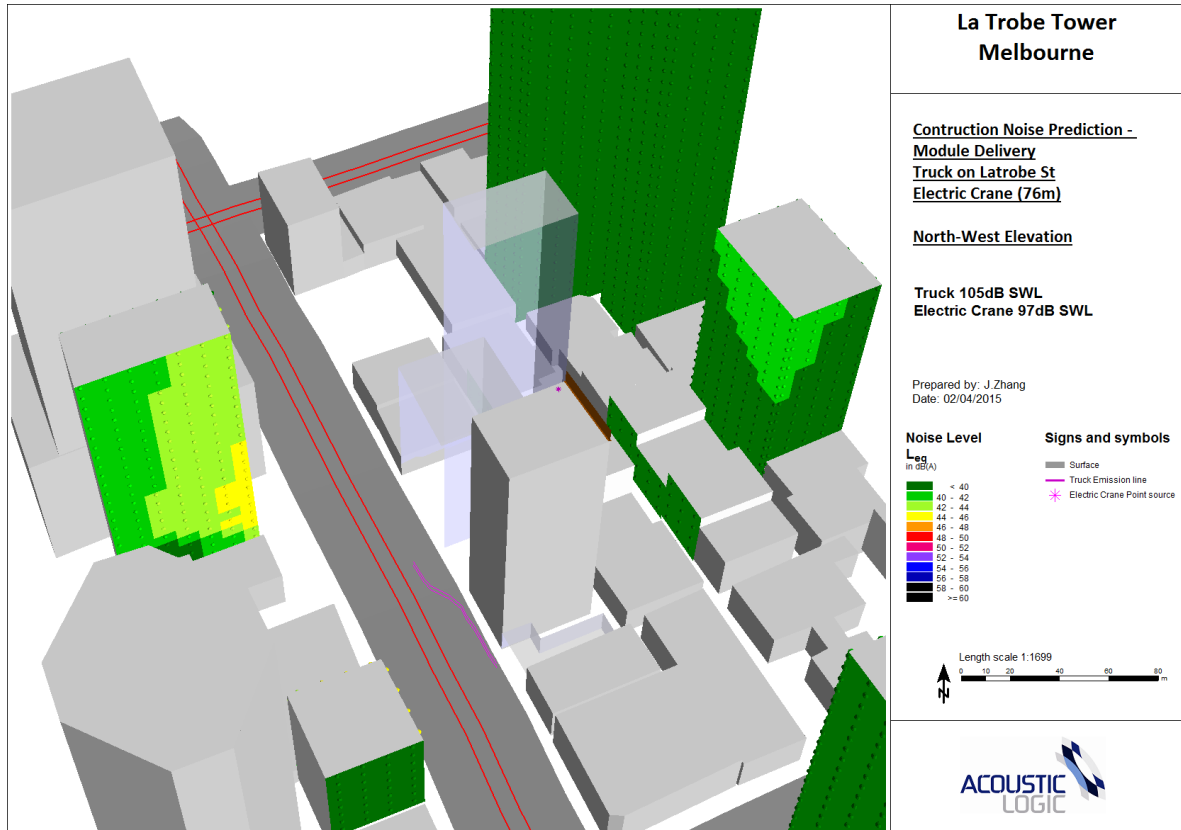


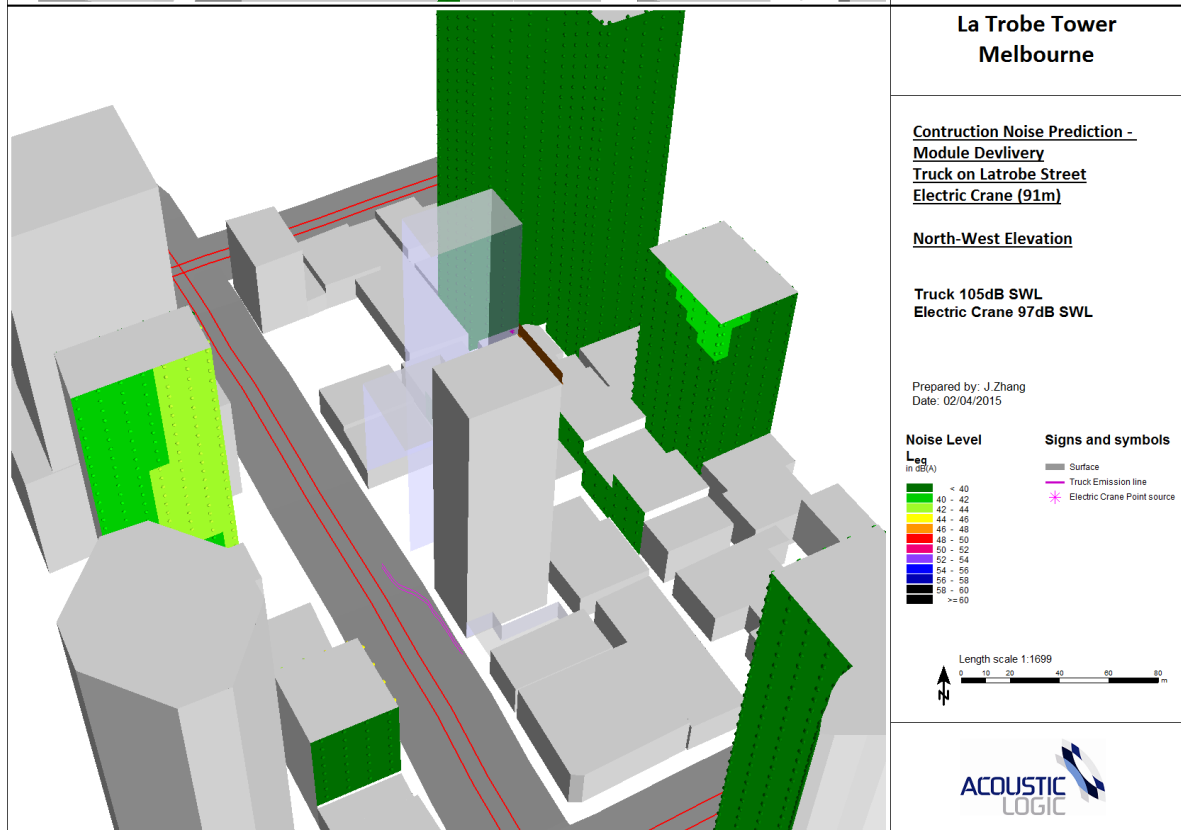
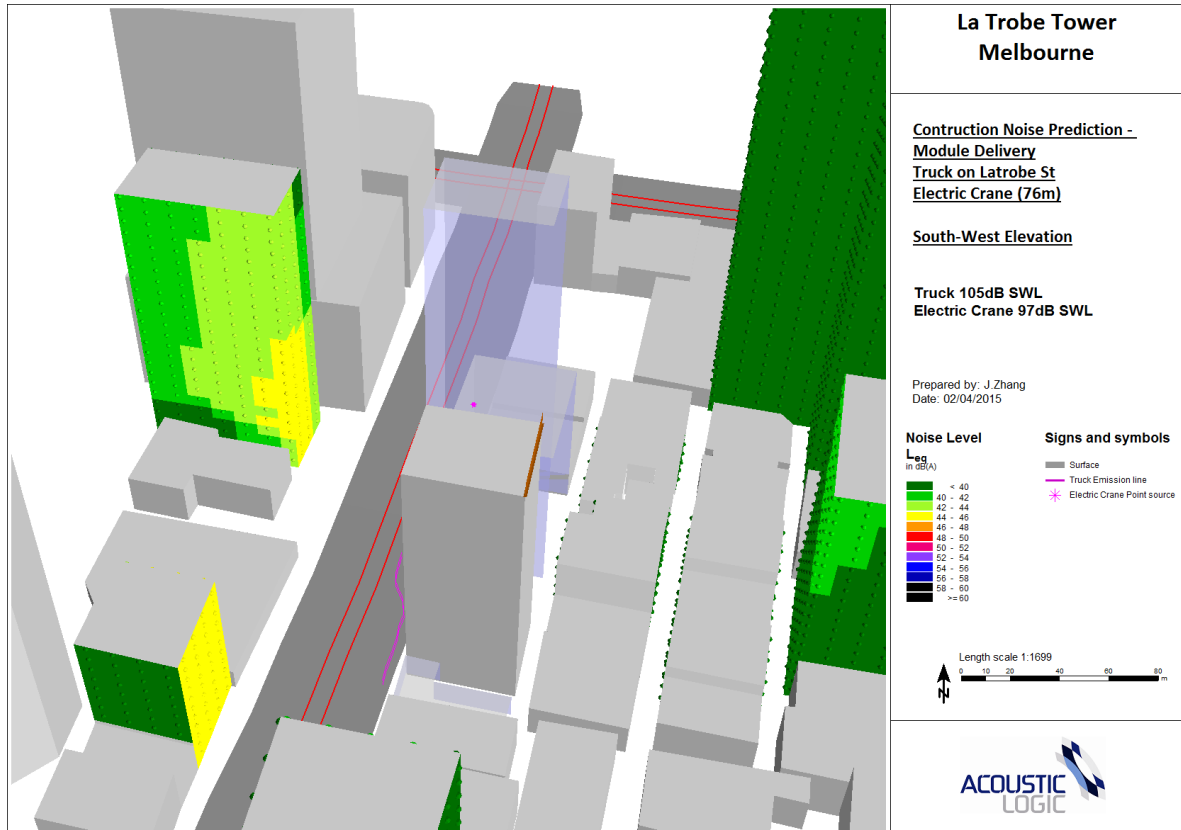


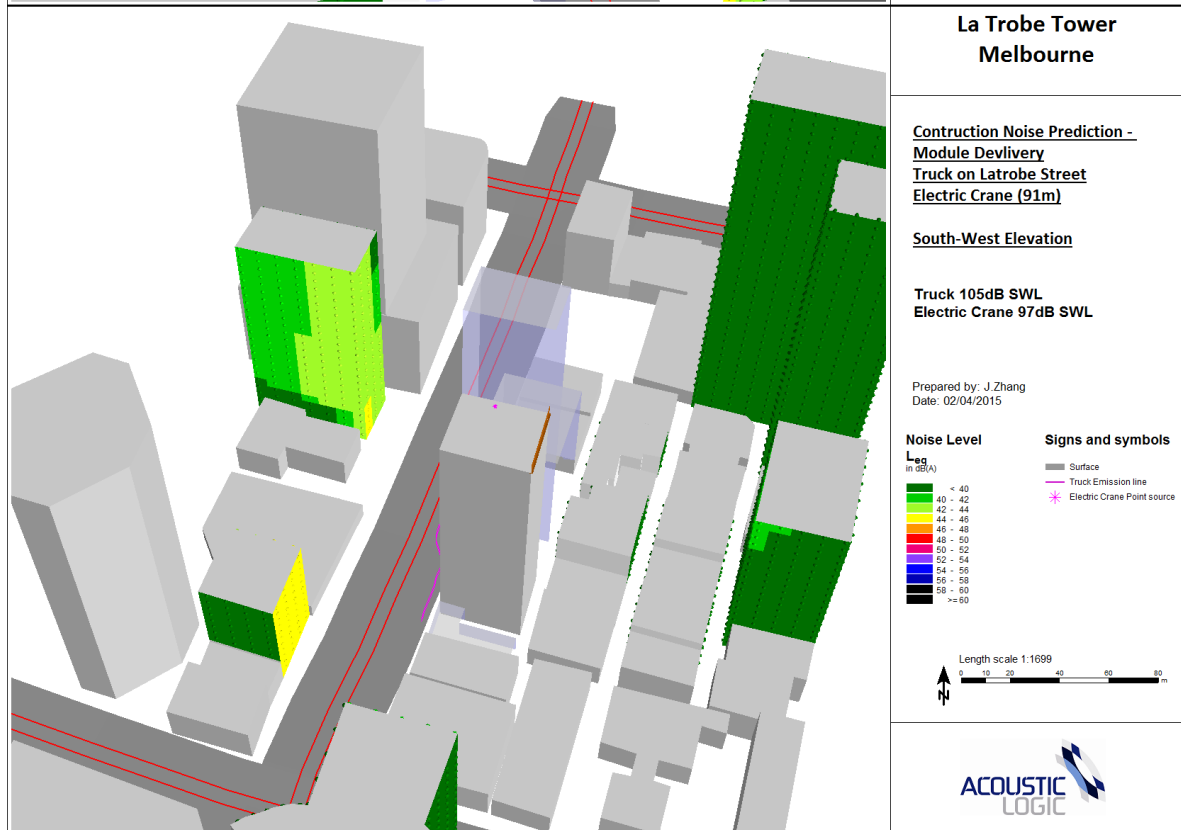
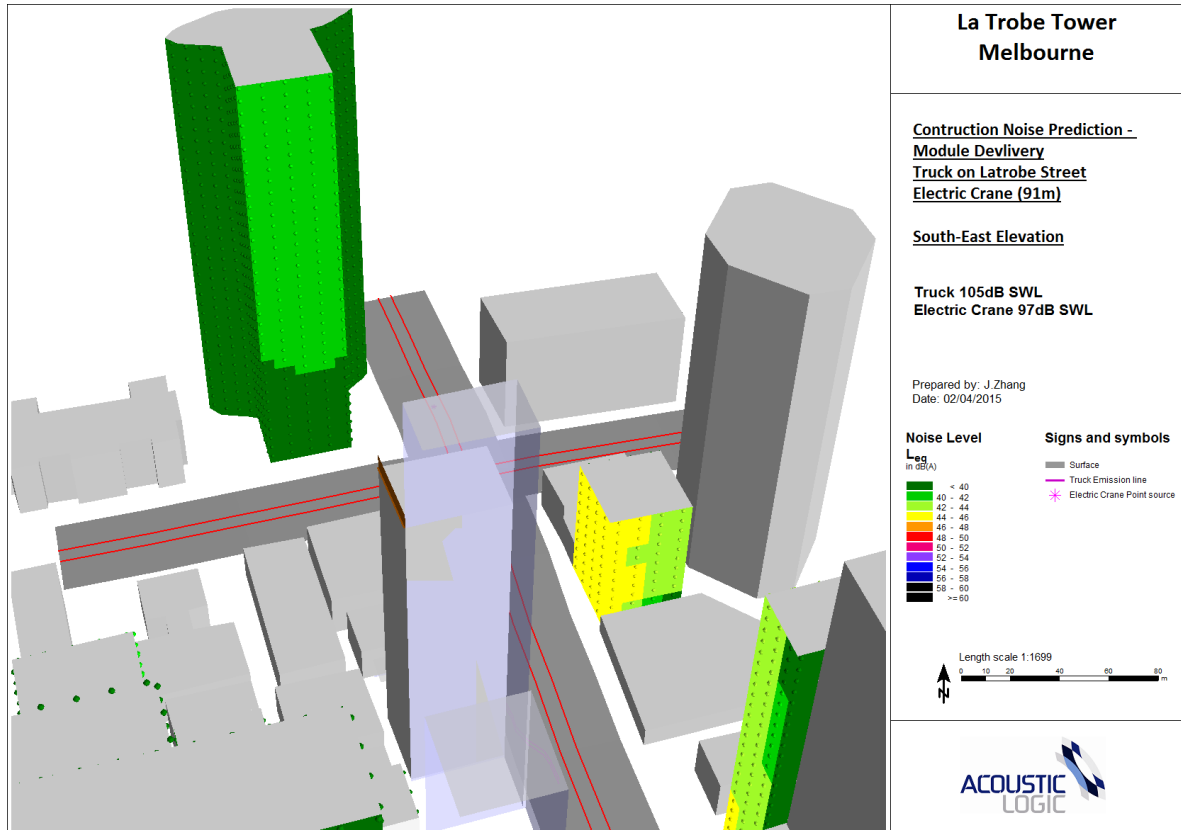






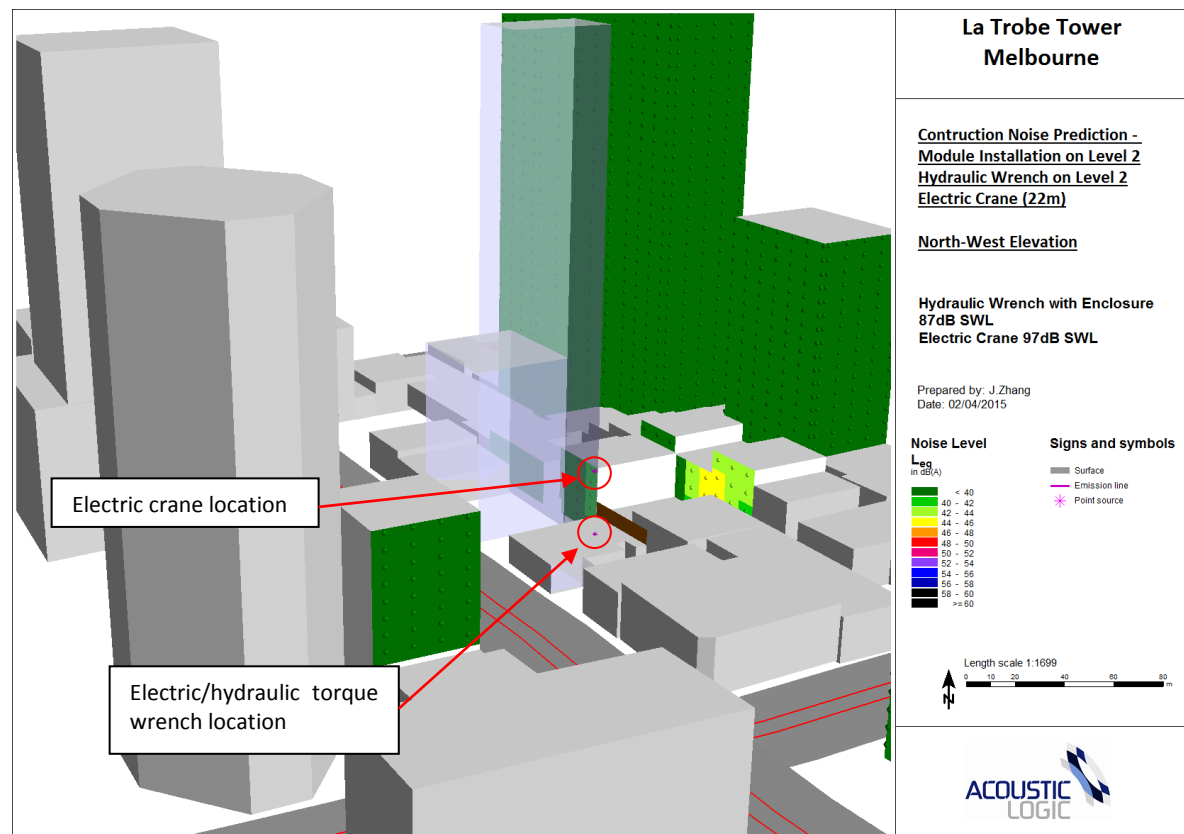


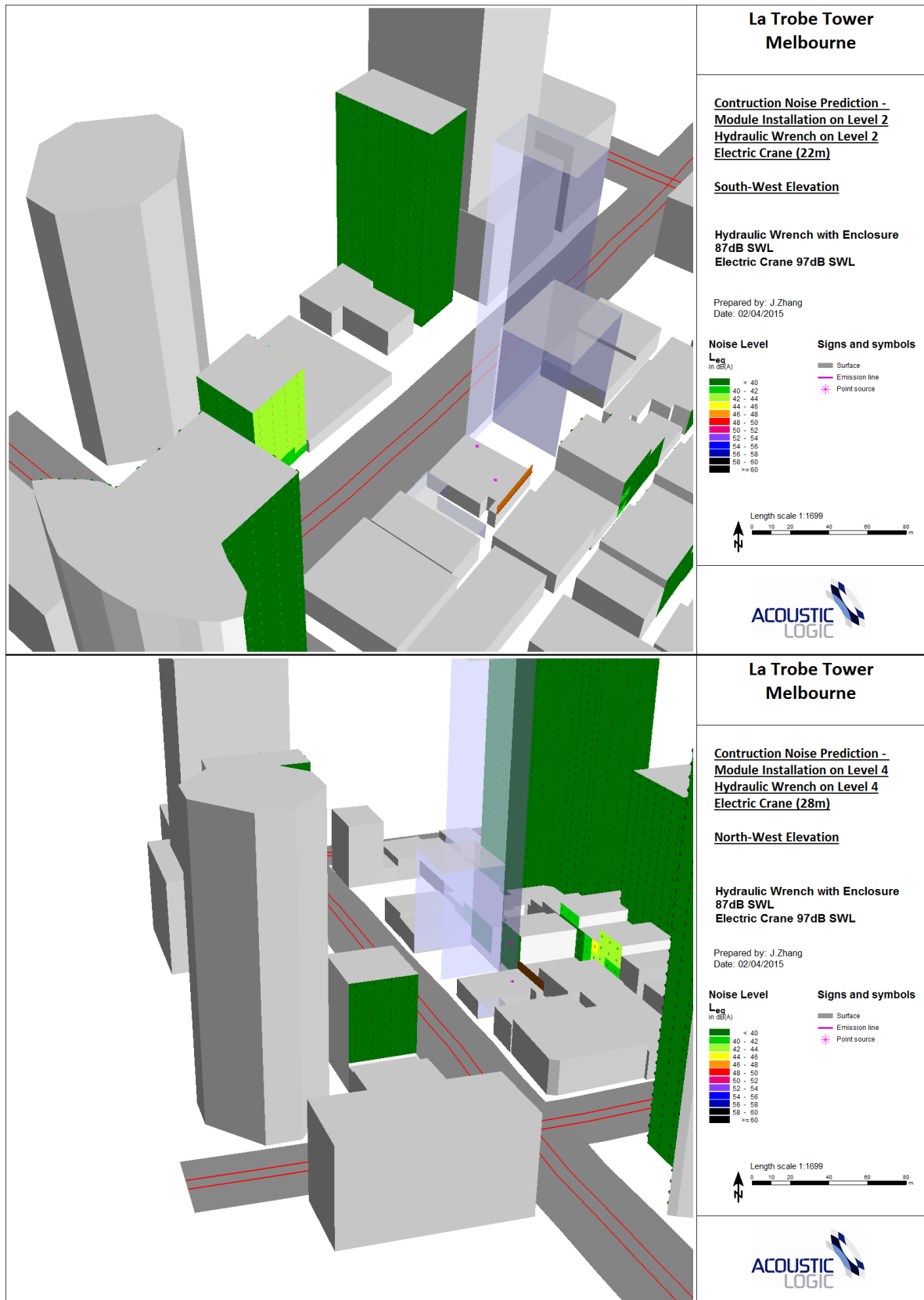


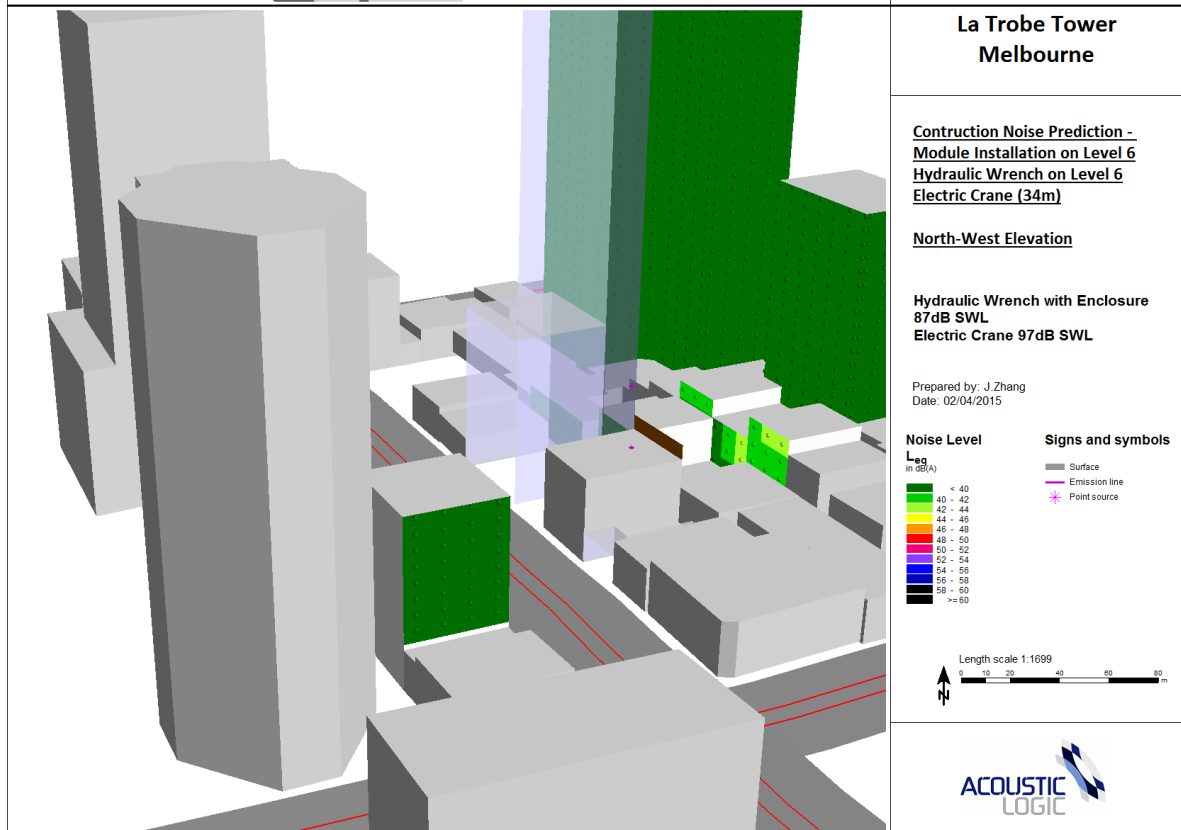
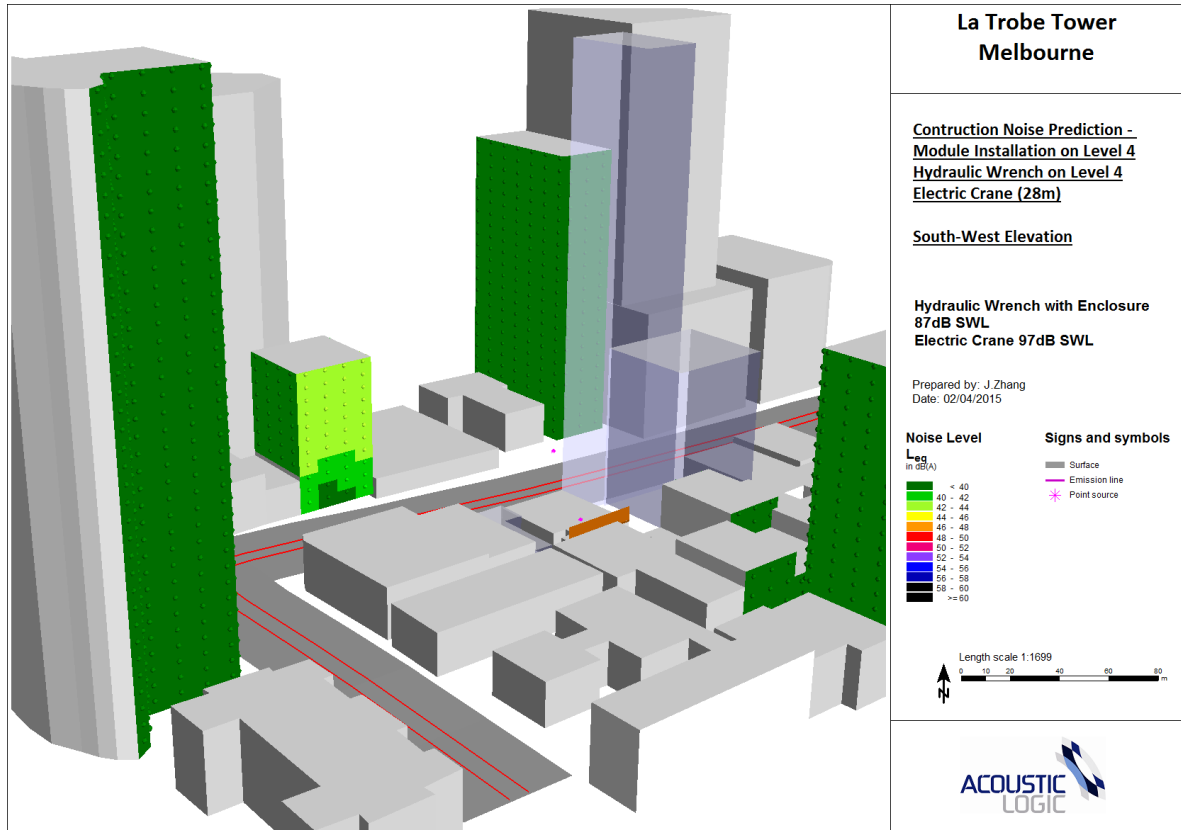


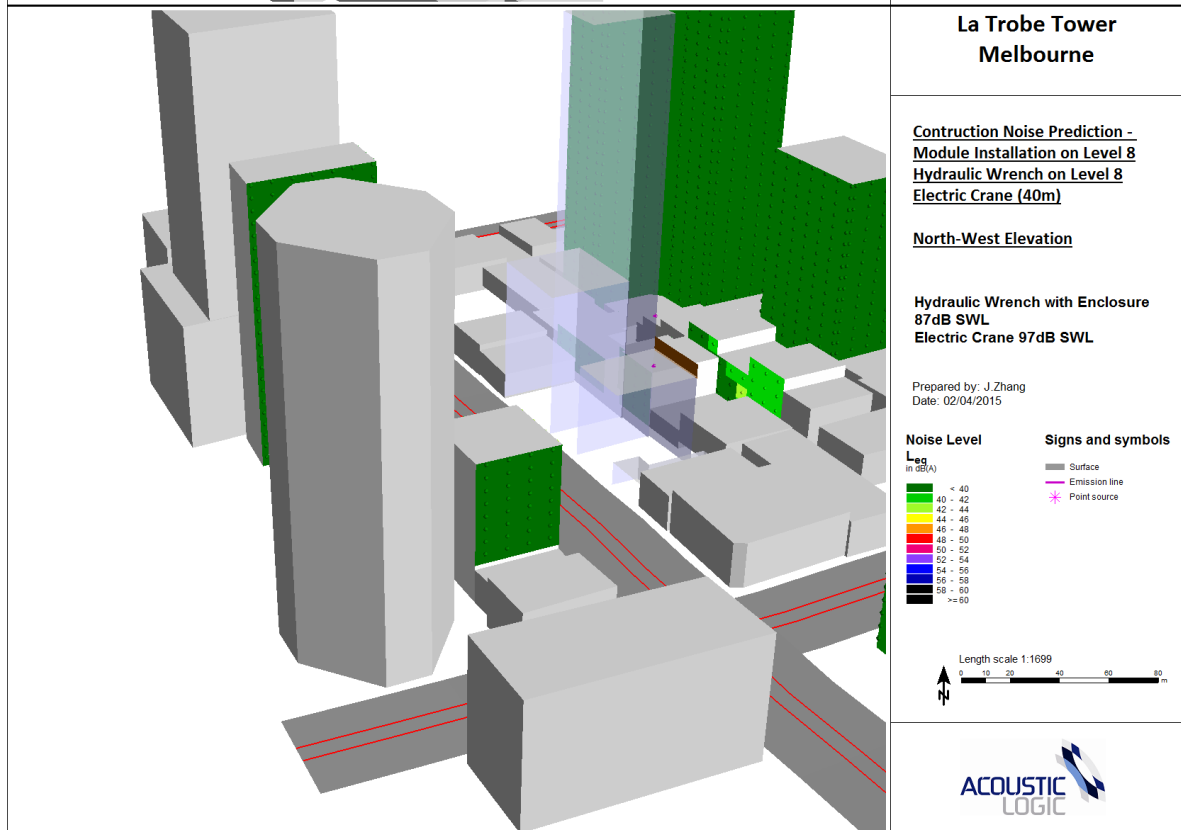
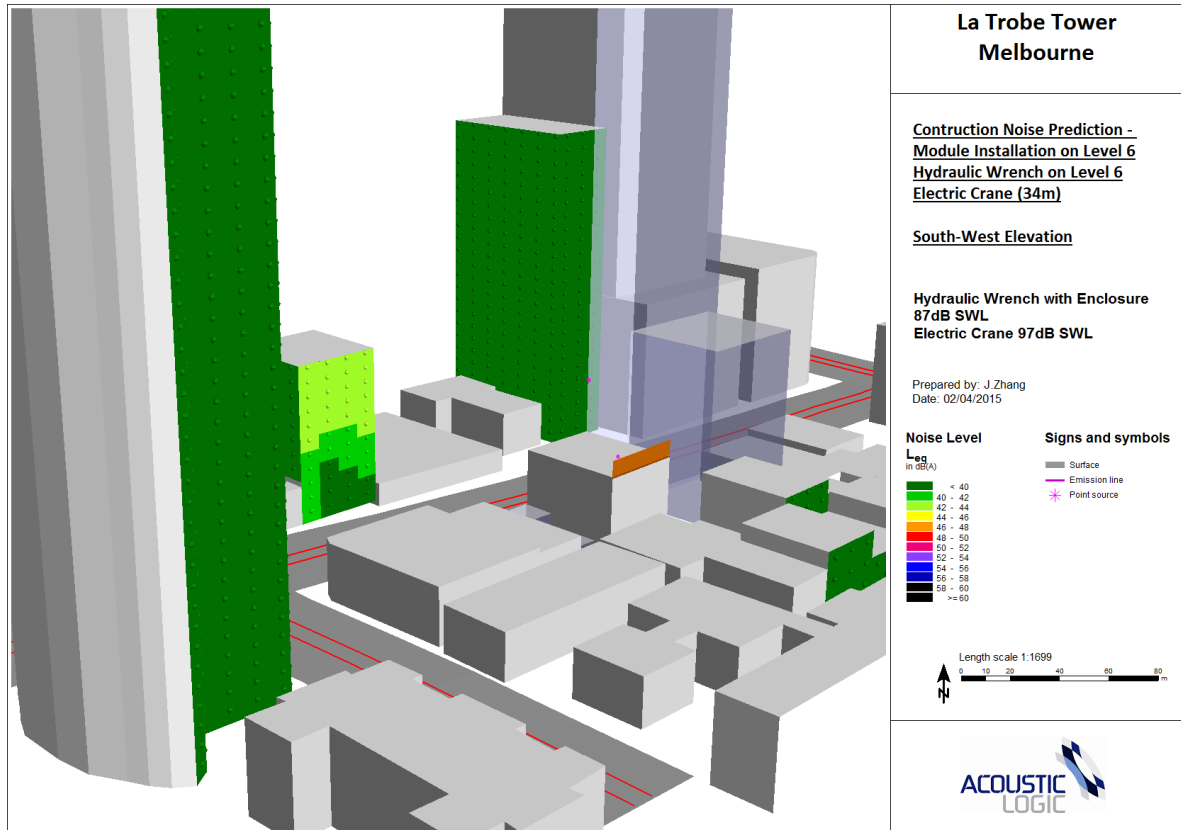
MODULE INSTALLATION

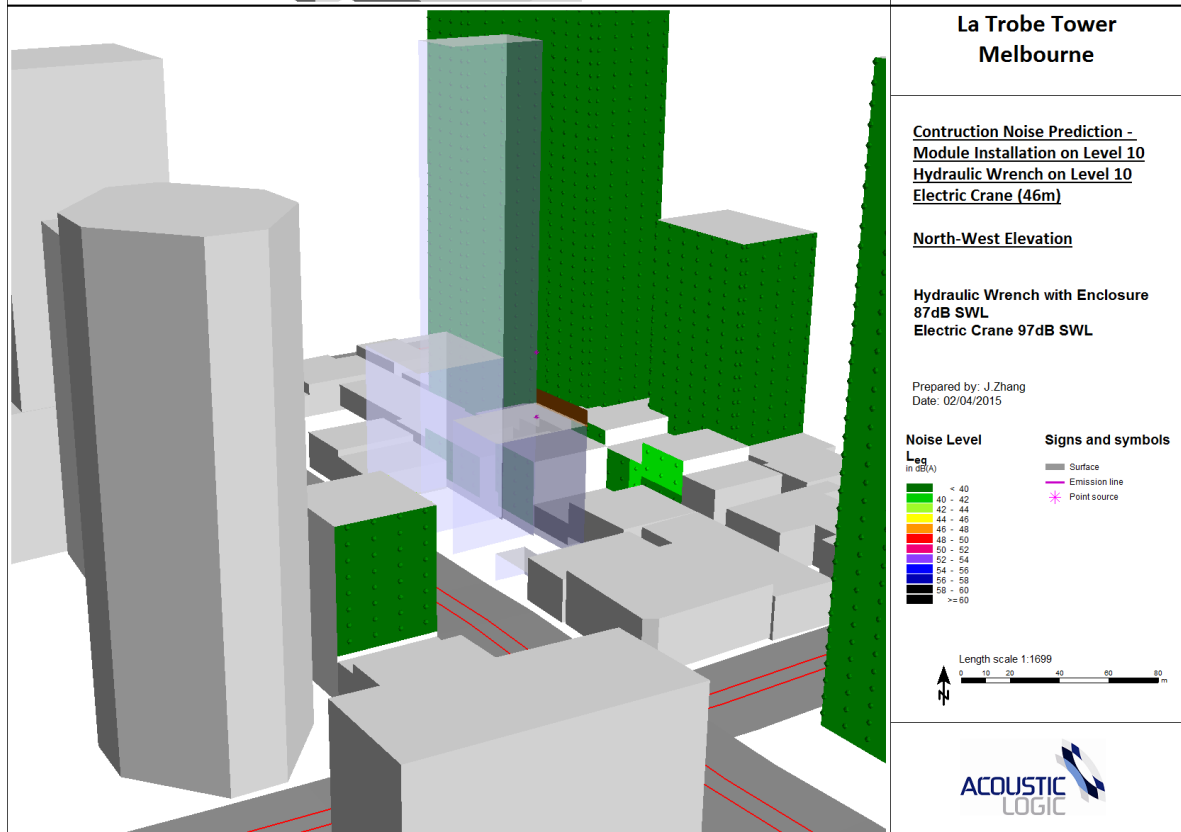
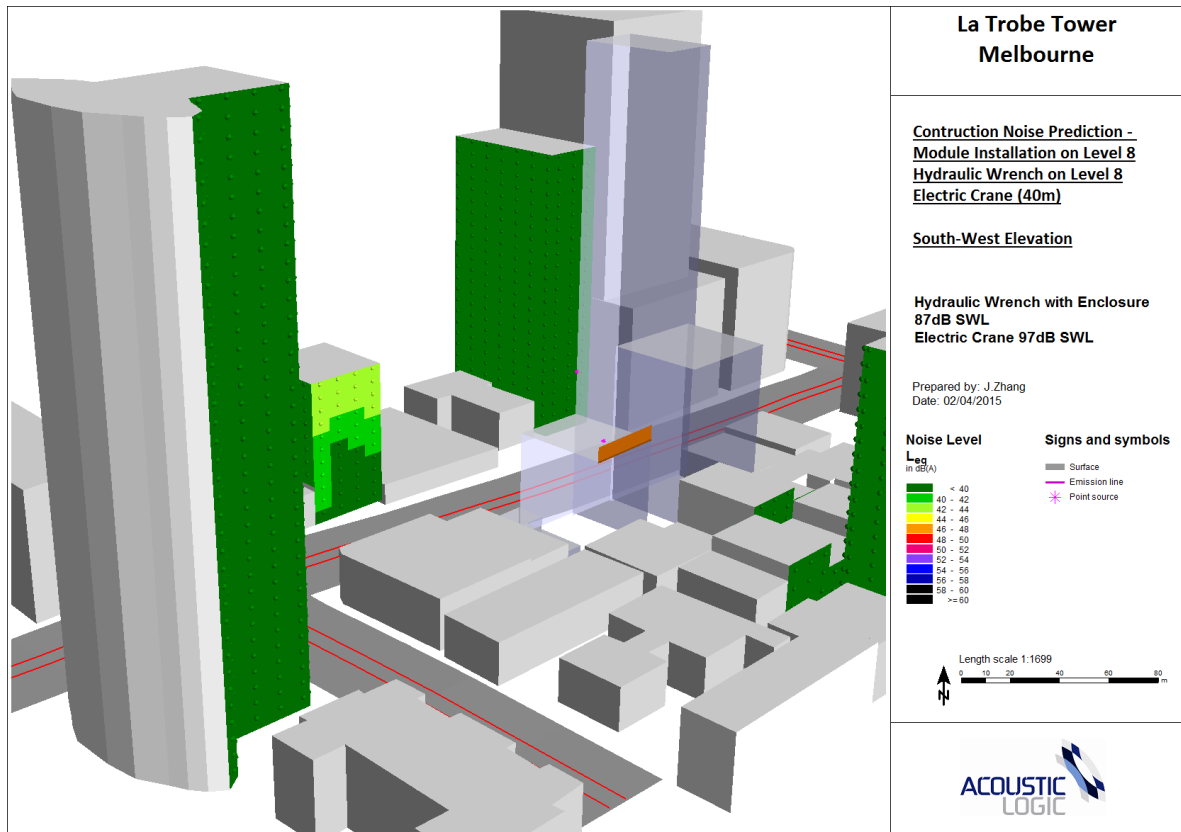
The following SoundPlan models present the predicted noise levels from electric crane lifting modules and installation procedure using an electric/hydraulic torque wrench as the building goes up. The noise sources of the electric crane and the electric/hydraulic torque wrench are represented by the point sources as indicated in drawings below.

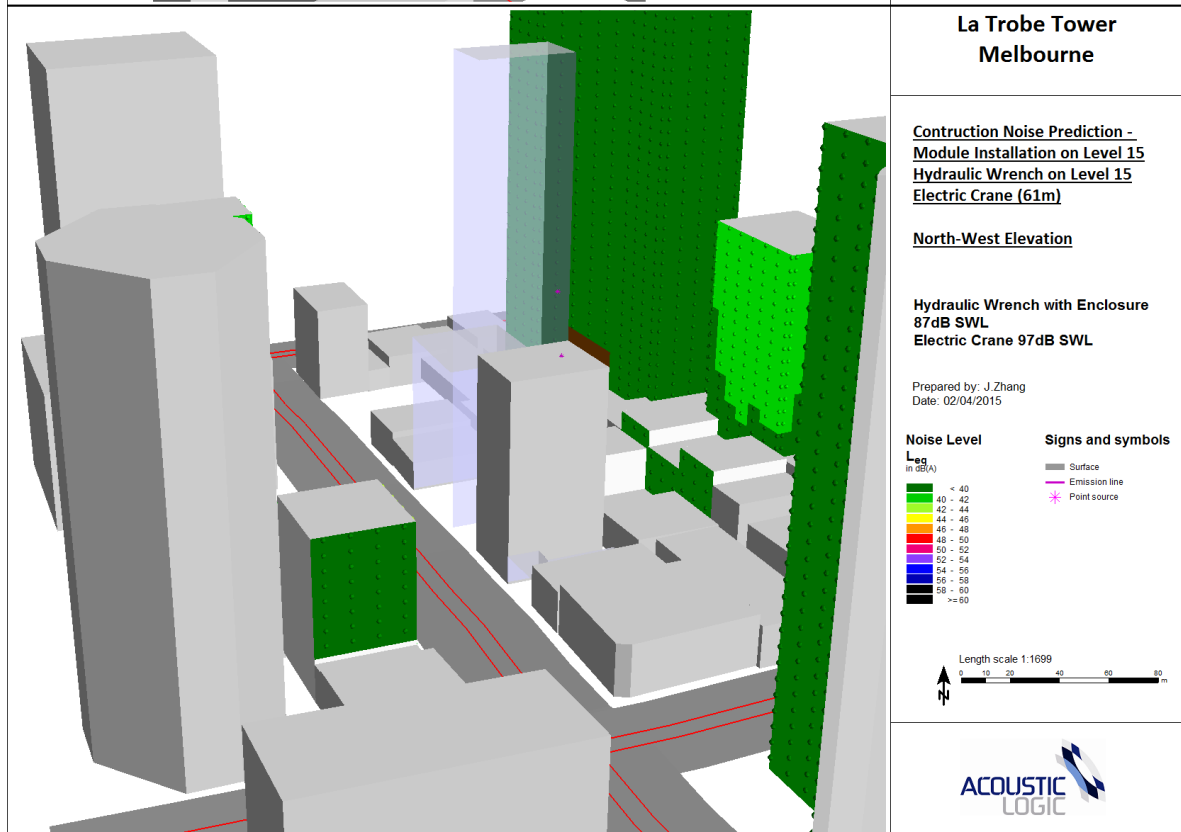
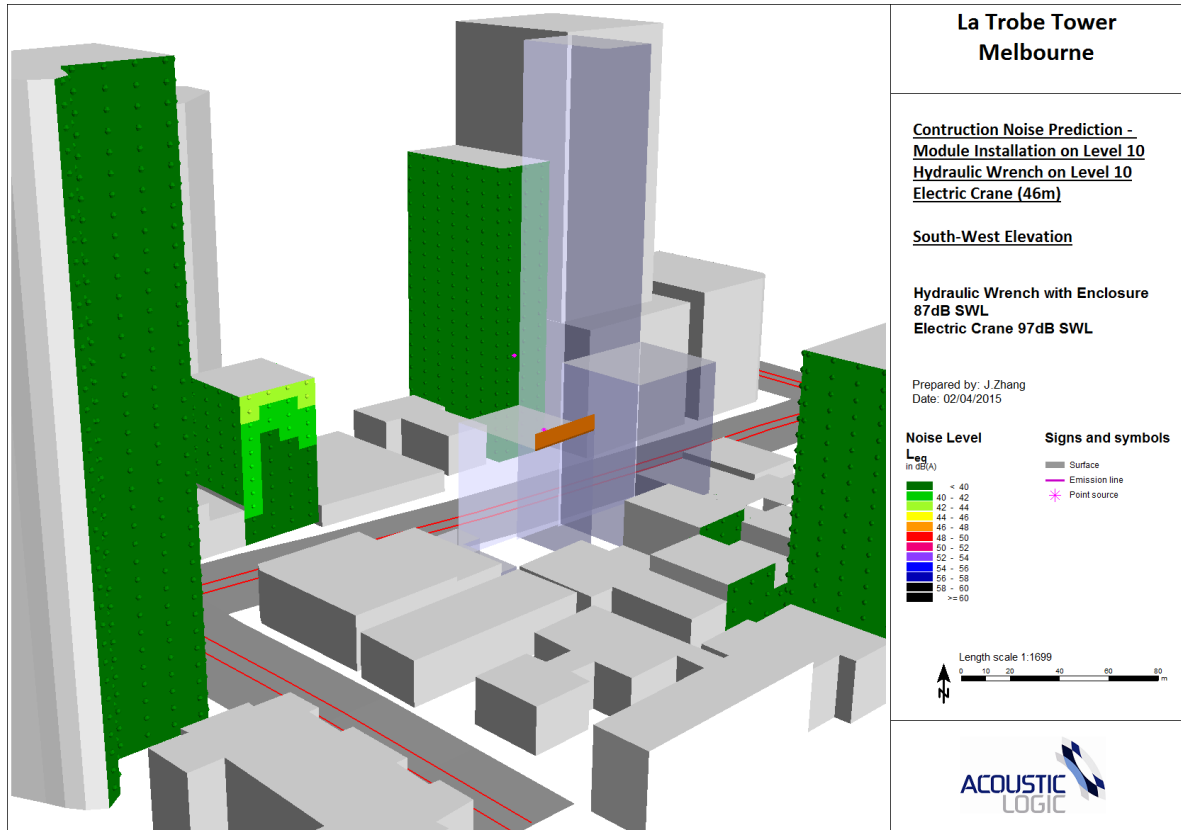


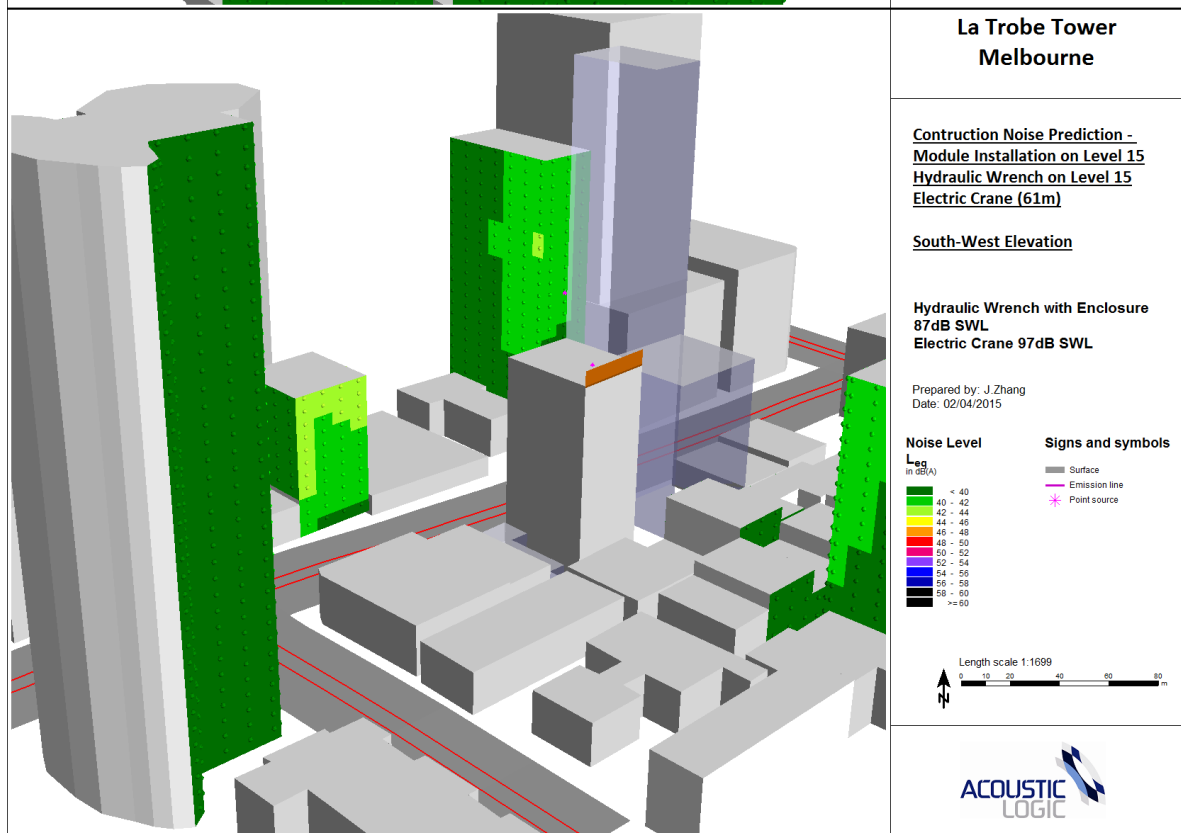
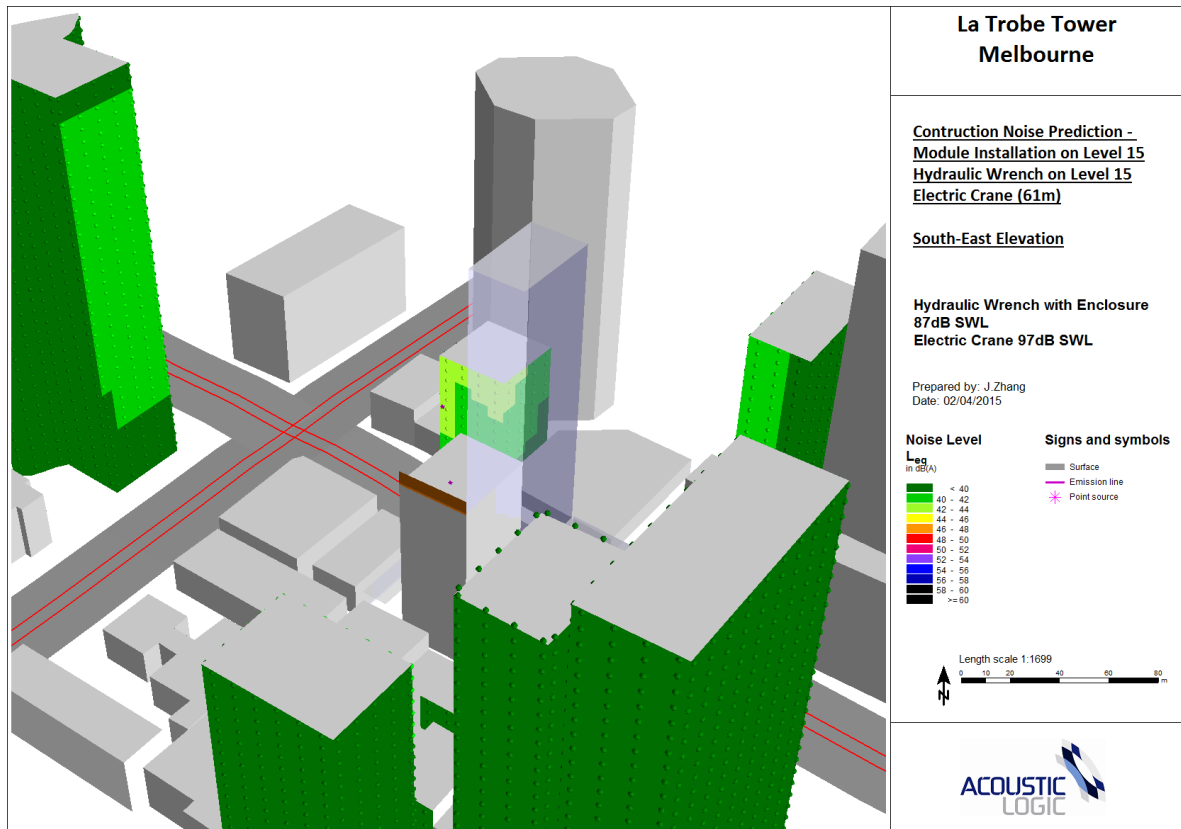


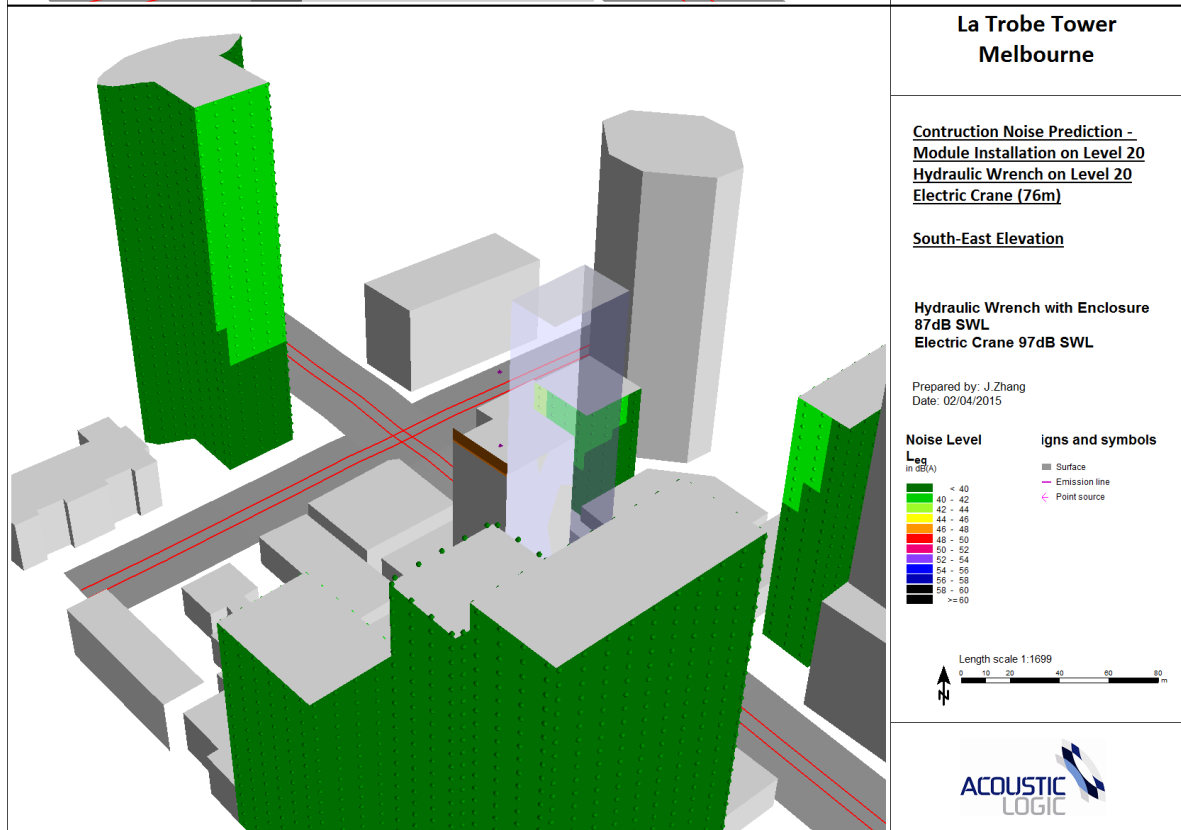
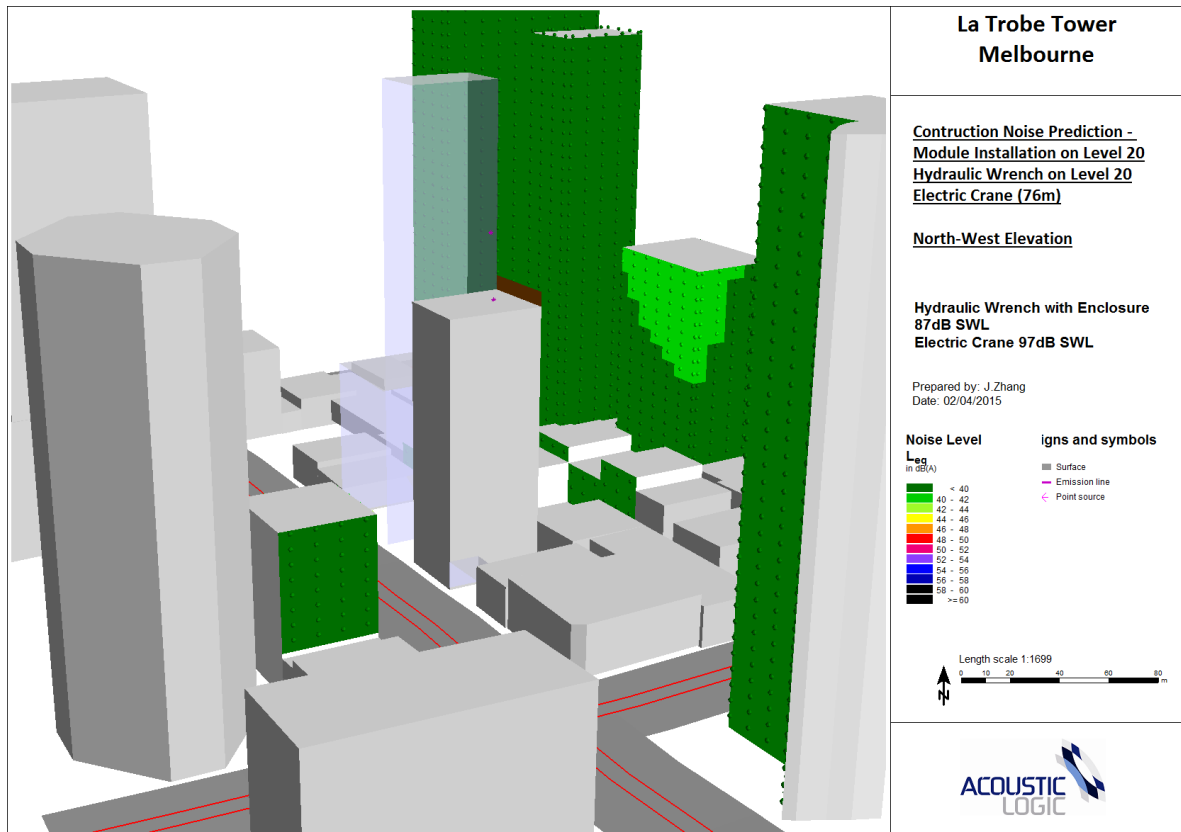


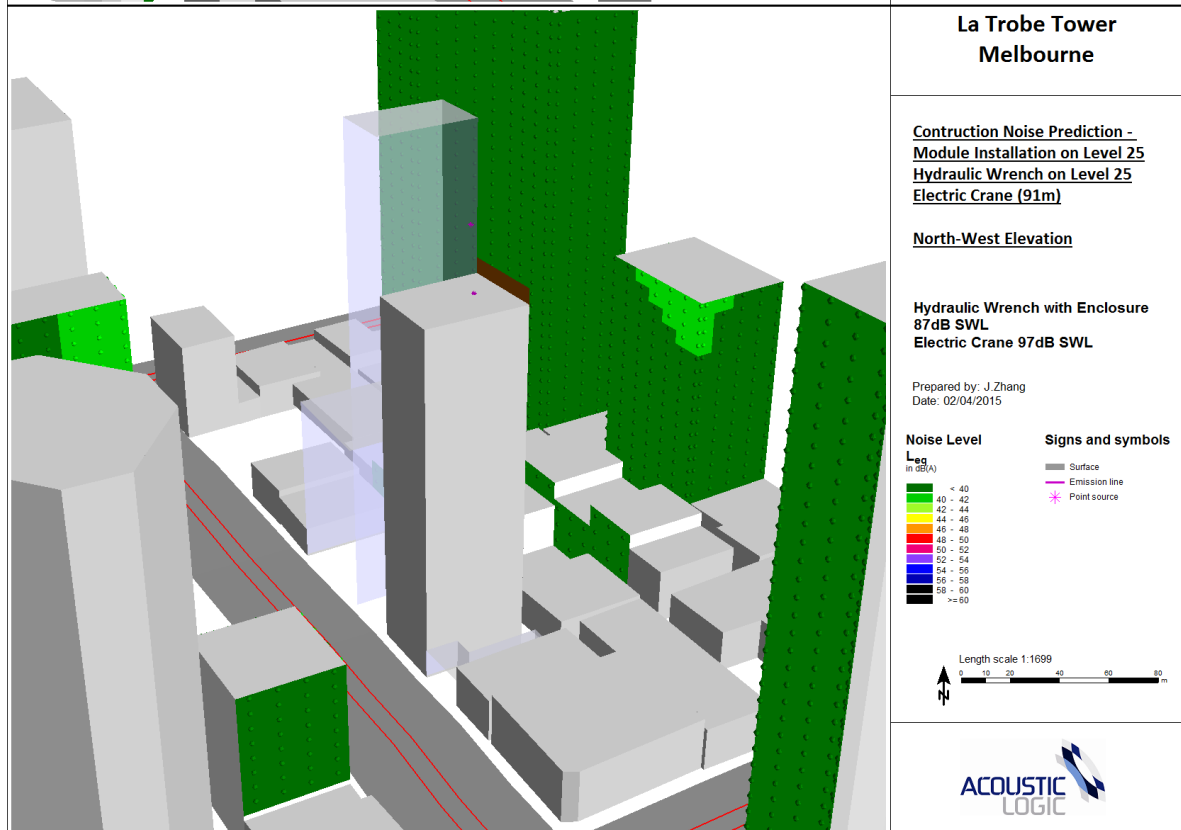
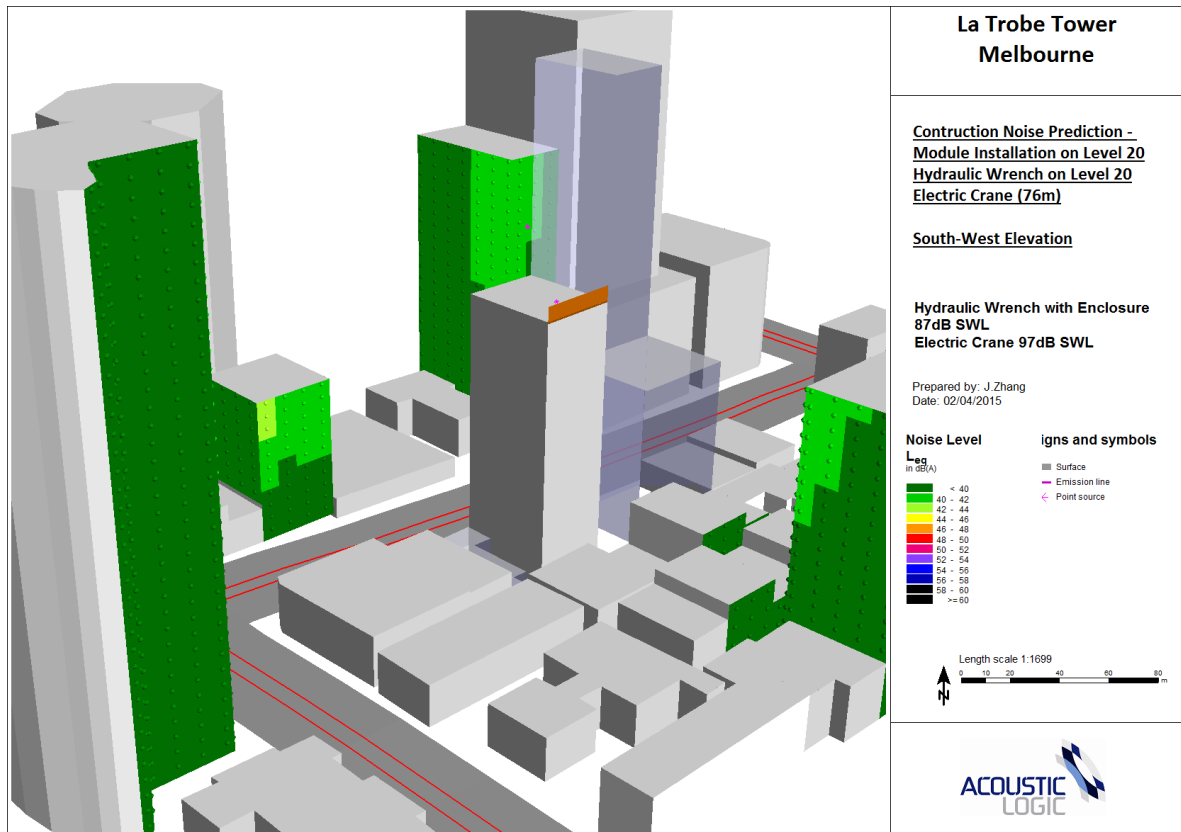


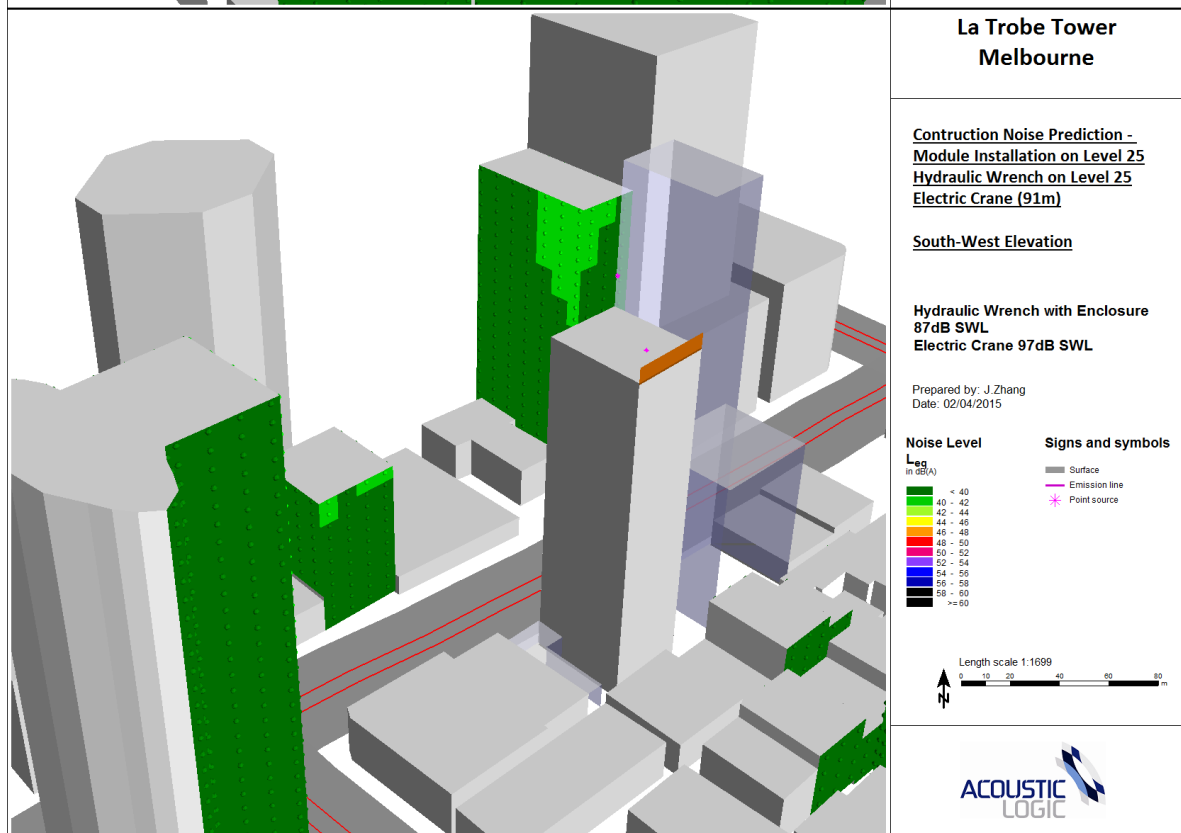
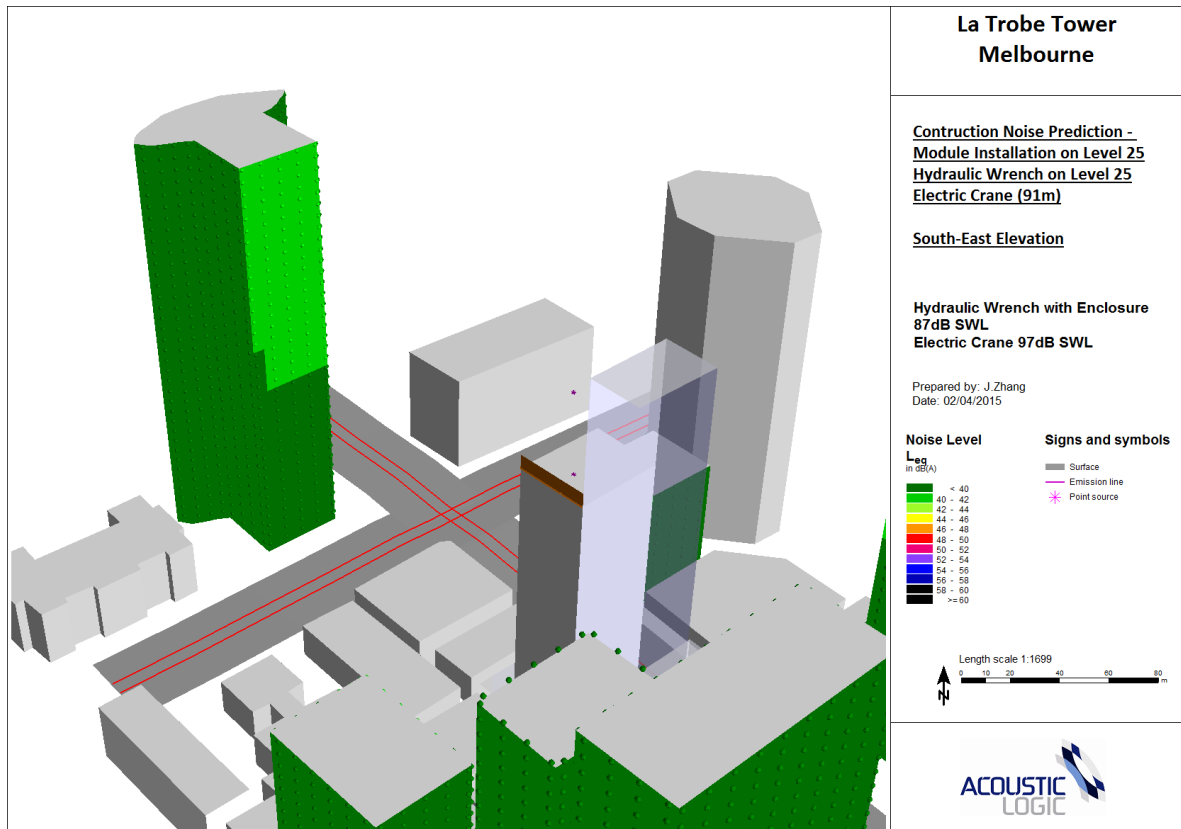






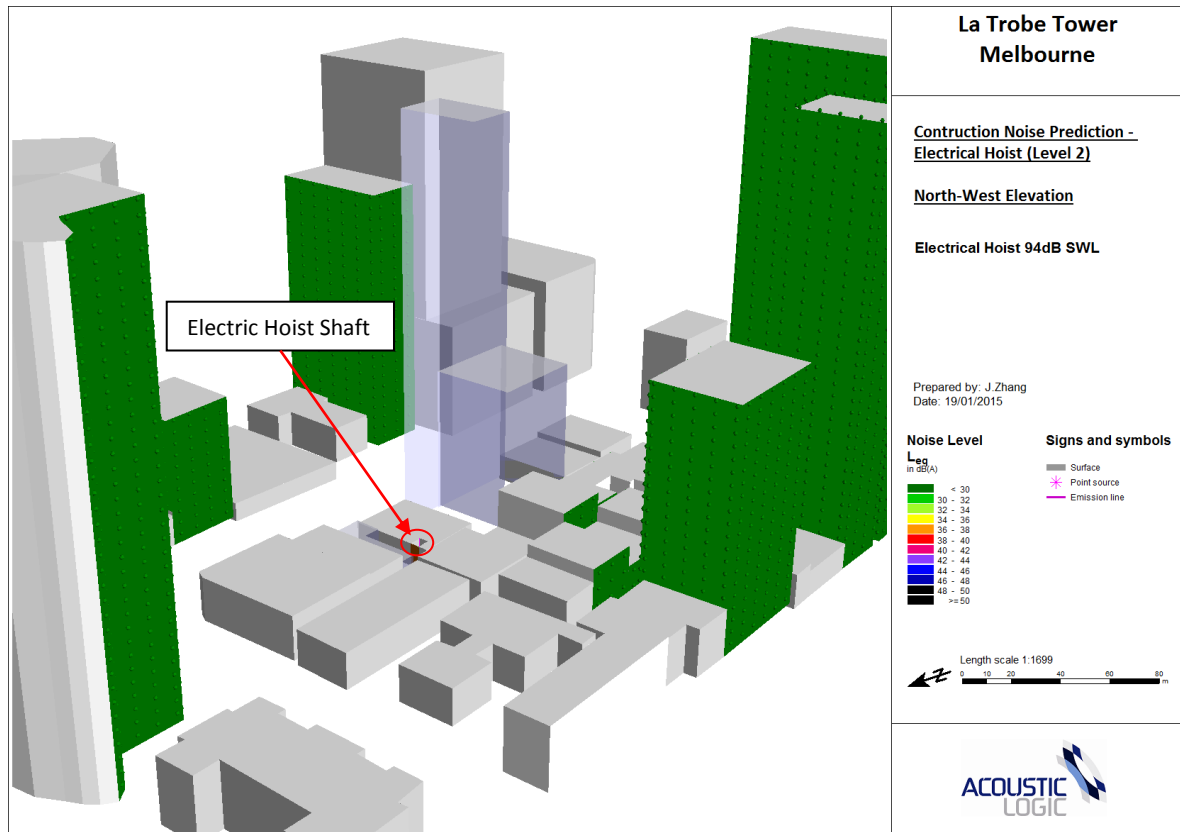


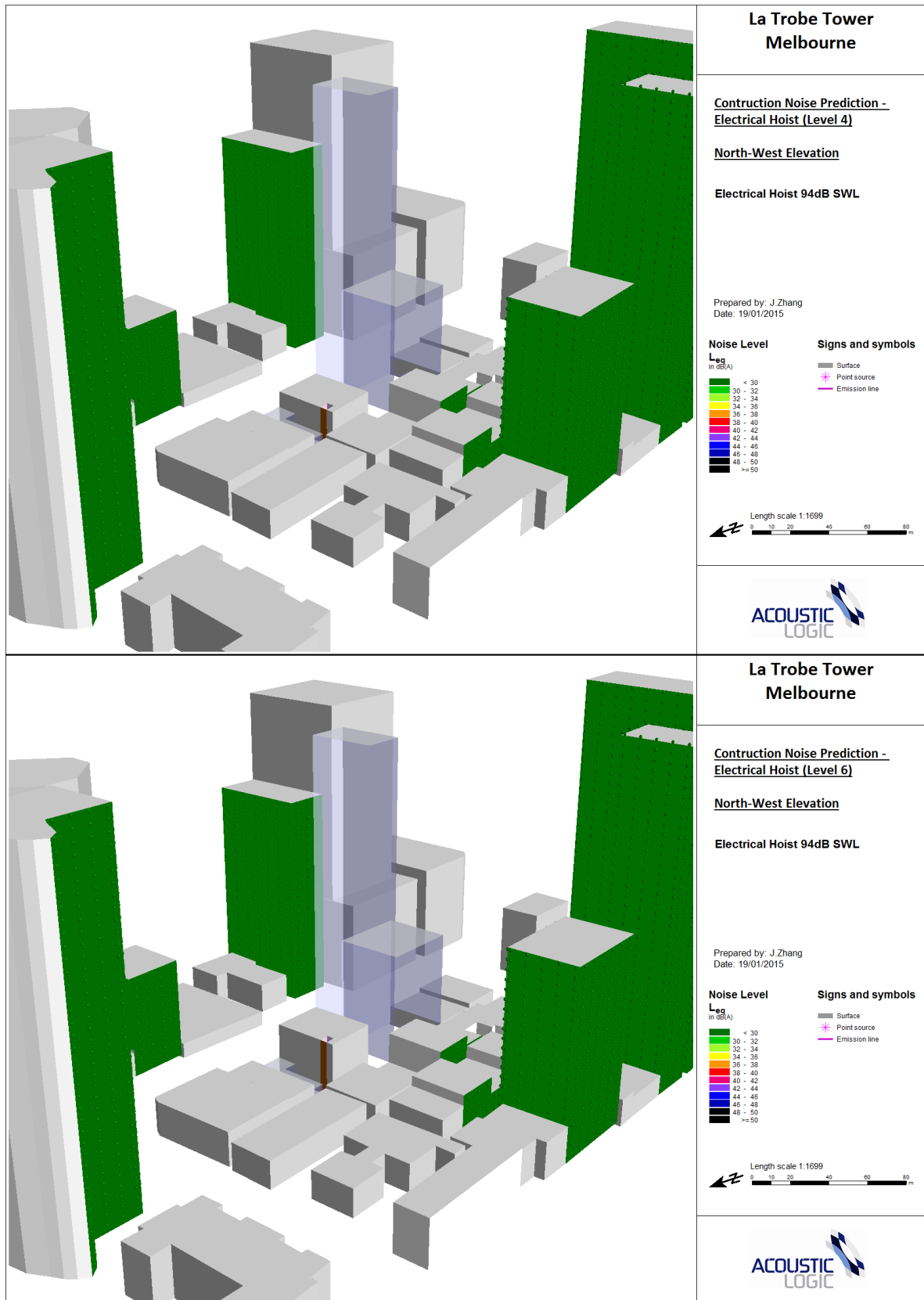


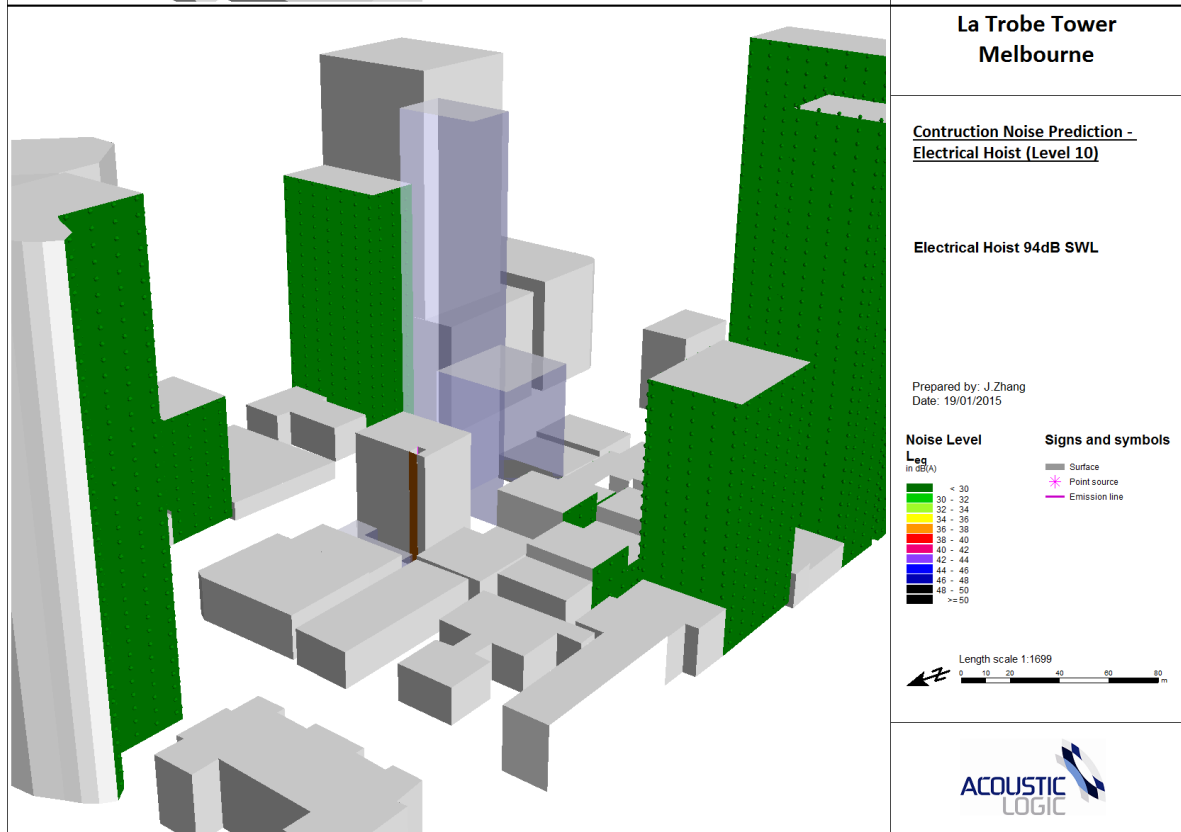
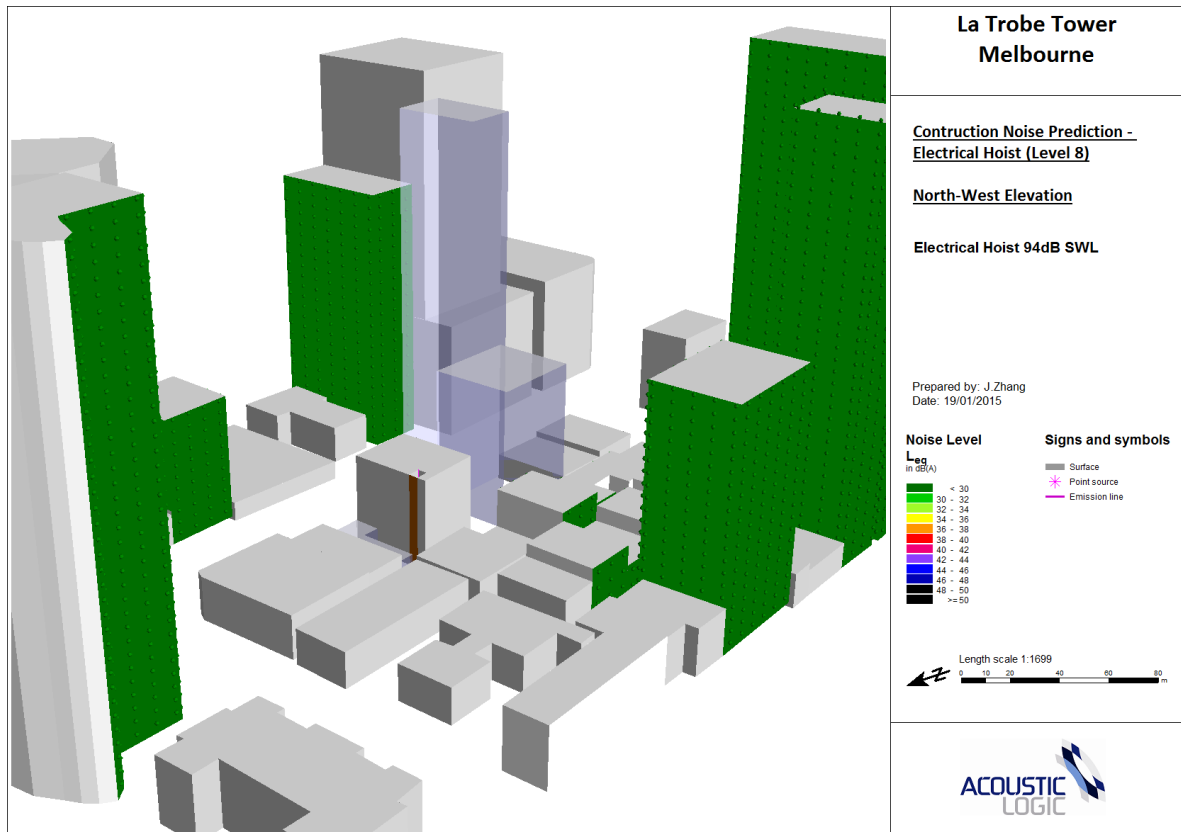


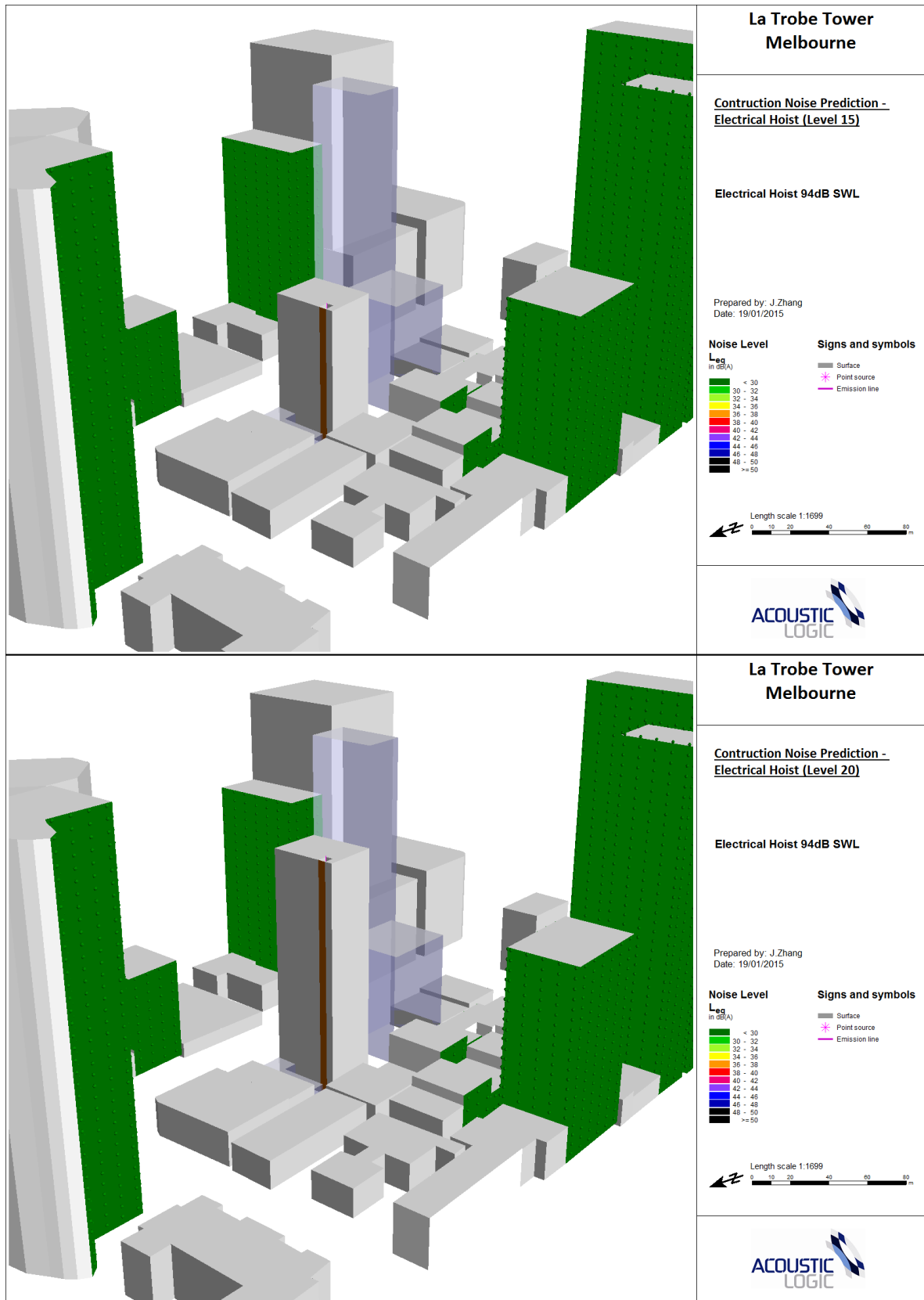
ELECTRIC HOIST

The following Soundplan Models show the noise prediction from the operation of the internal electric hoist as the building goes up. Note the predicted noise levels at all receiver locations are less than 30dB(A)_{Leq}.







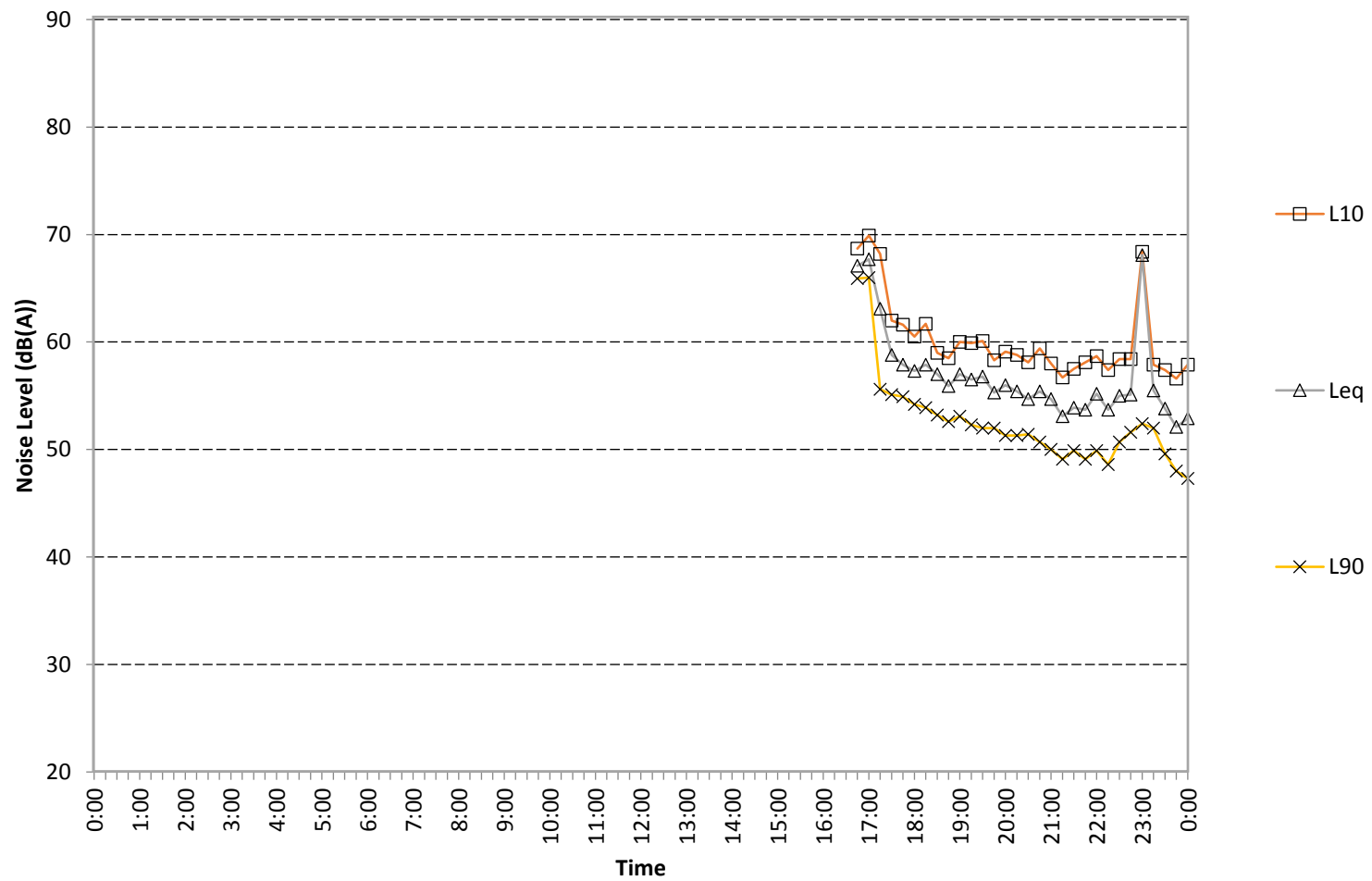




APPENDIX 2: NOISE LOGGING DATA

321 Latrobe St, Level 1, facing Latrobe St

Tuesday January 20, 2015



321 Latrobe St, Level 1, facing Latrobe St

Wednesday January 21, 2015



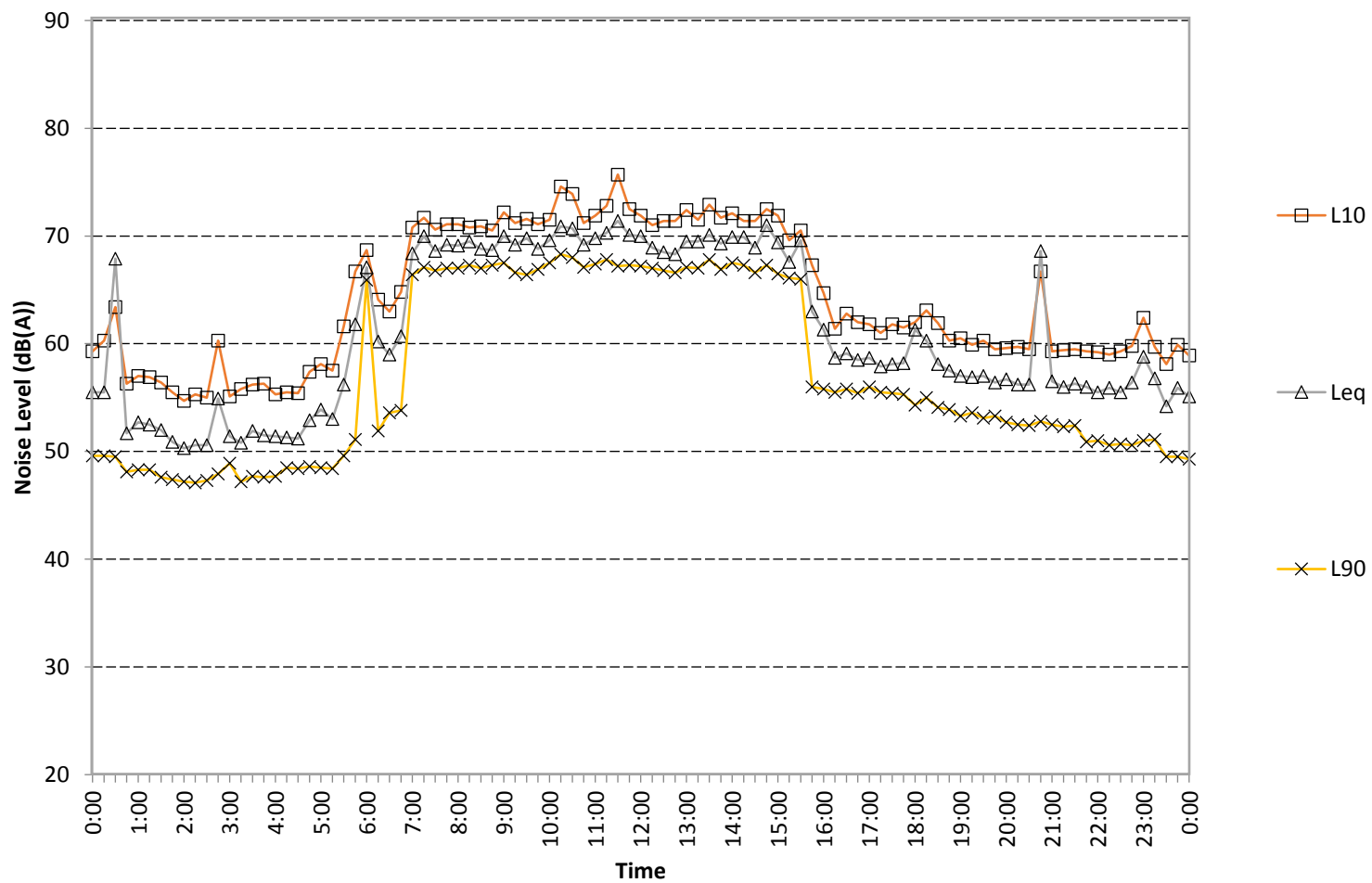
321 Latrobe St, Level 1, facing Latrobe St

Thursday January 22, 2015



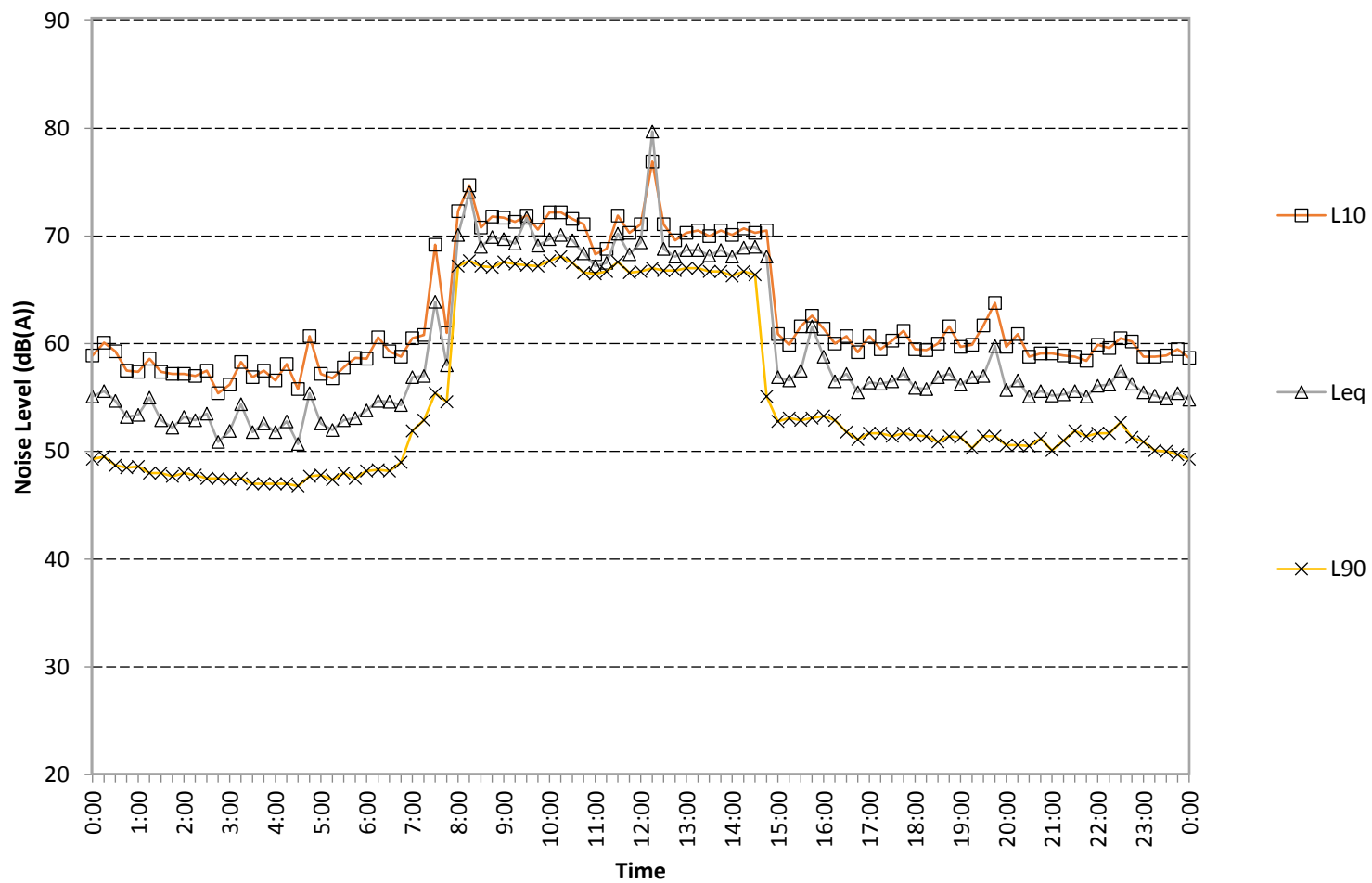
321 Latrobe St, Level 1, facing Latrobe St

Friday January 23, 2015



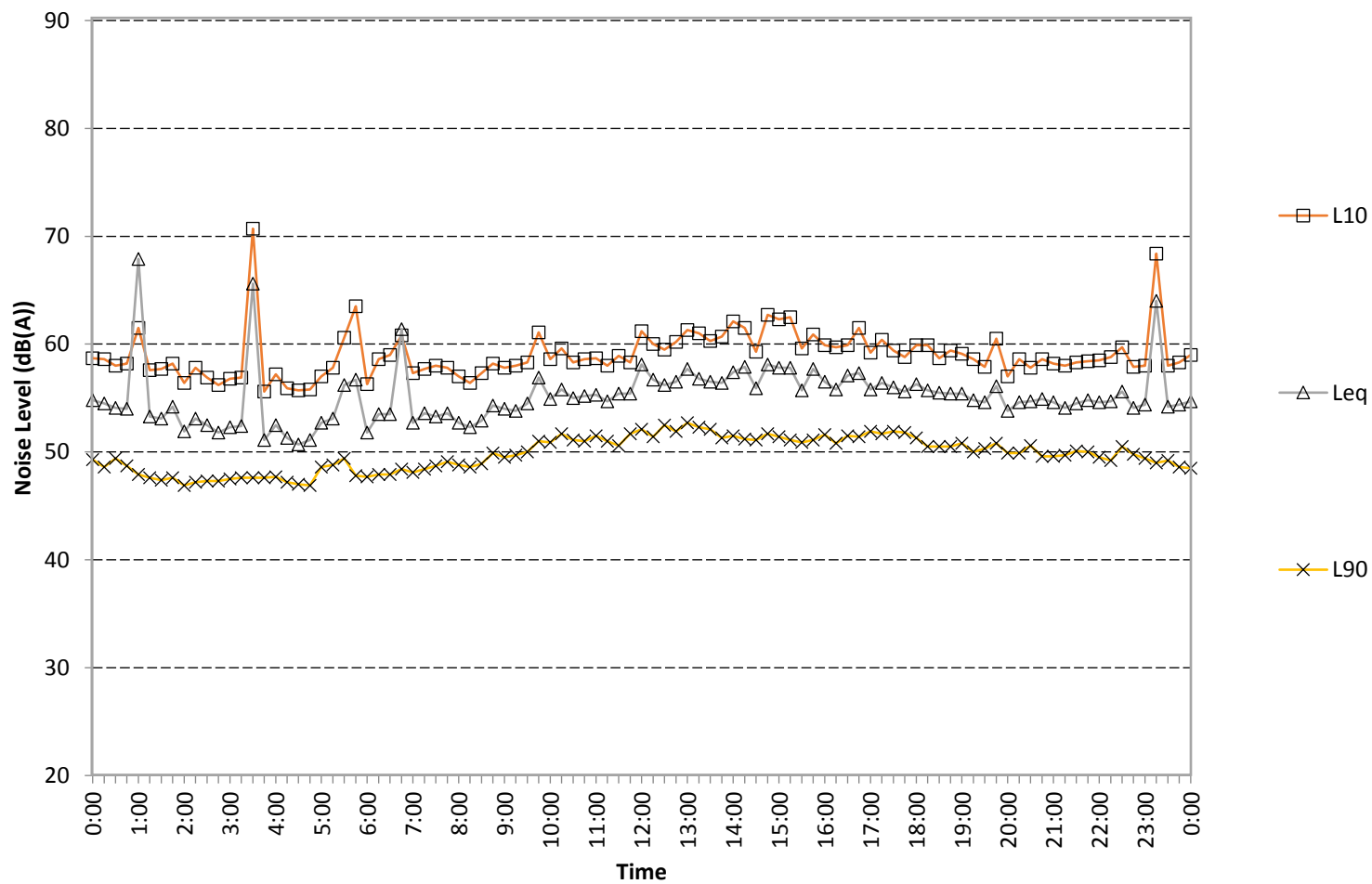
321 Latrobe St, Level 1, facing Latrobe St

Saturday January 24, 2015



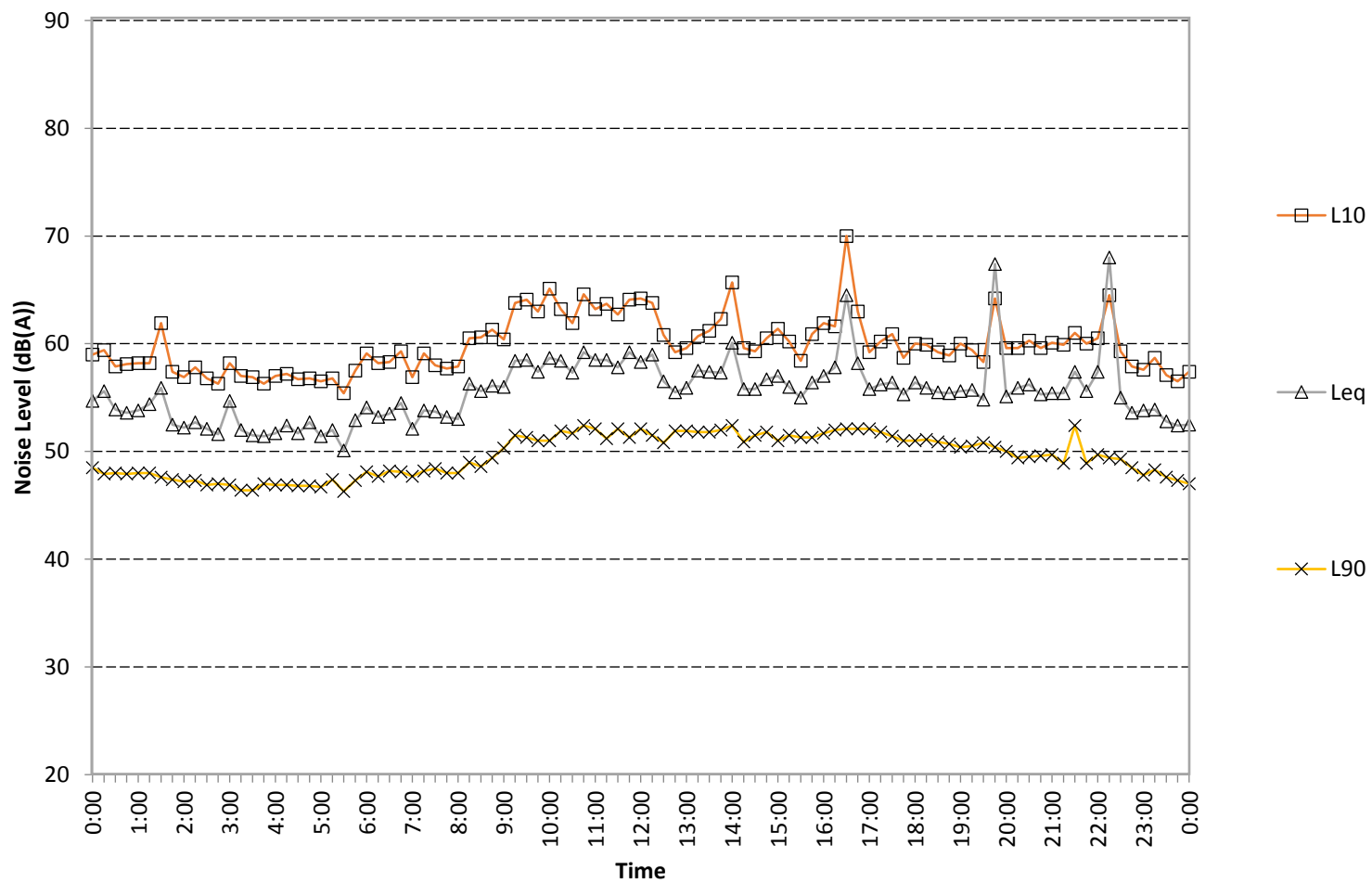
321 Latrobe St, Level 1, facing Latrobe St

Sunday January 25,2015



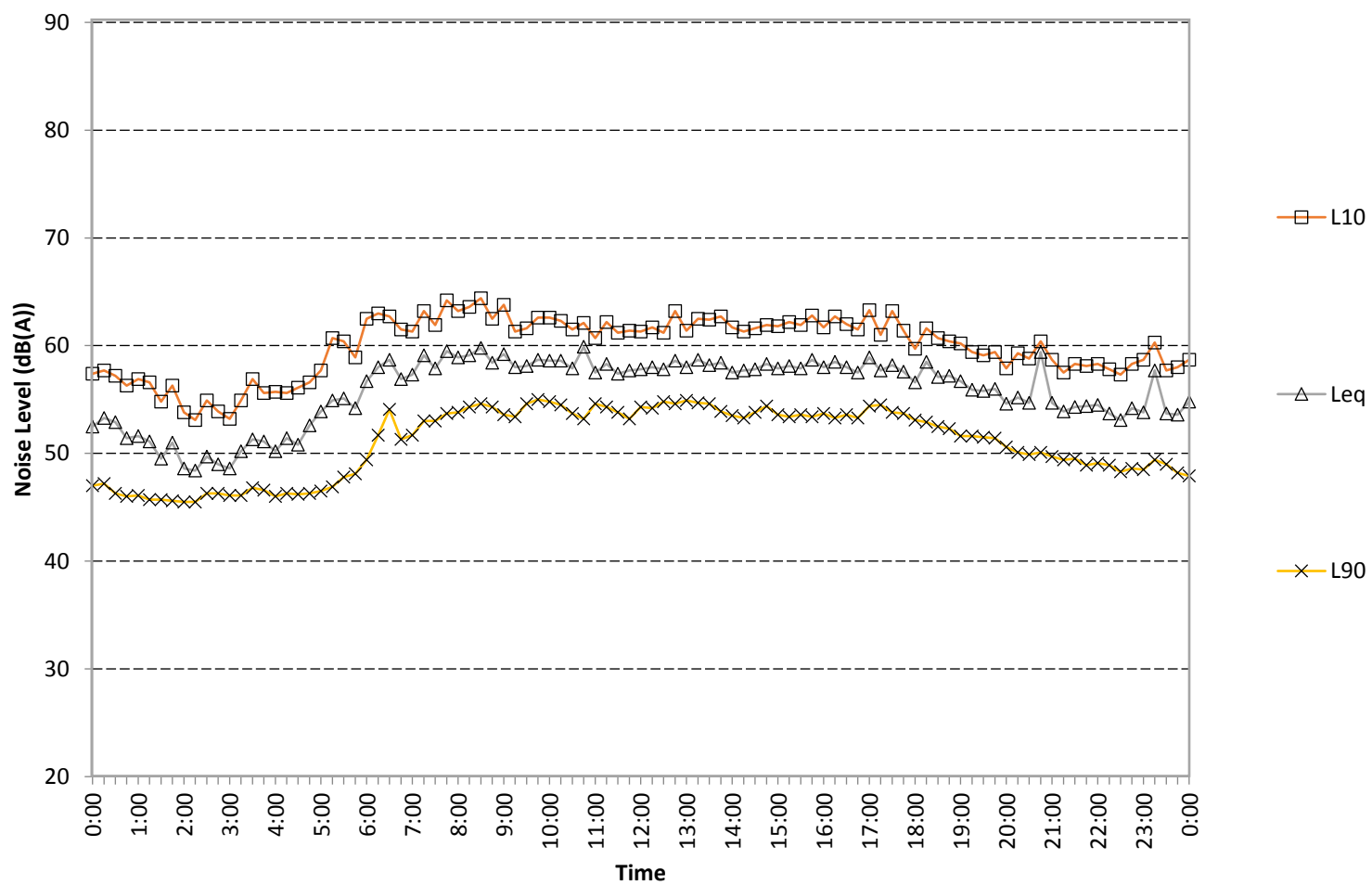
321 Latrobe St, Level 1, facing Latrobe St

Monday January 26, 2015



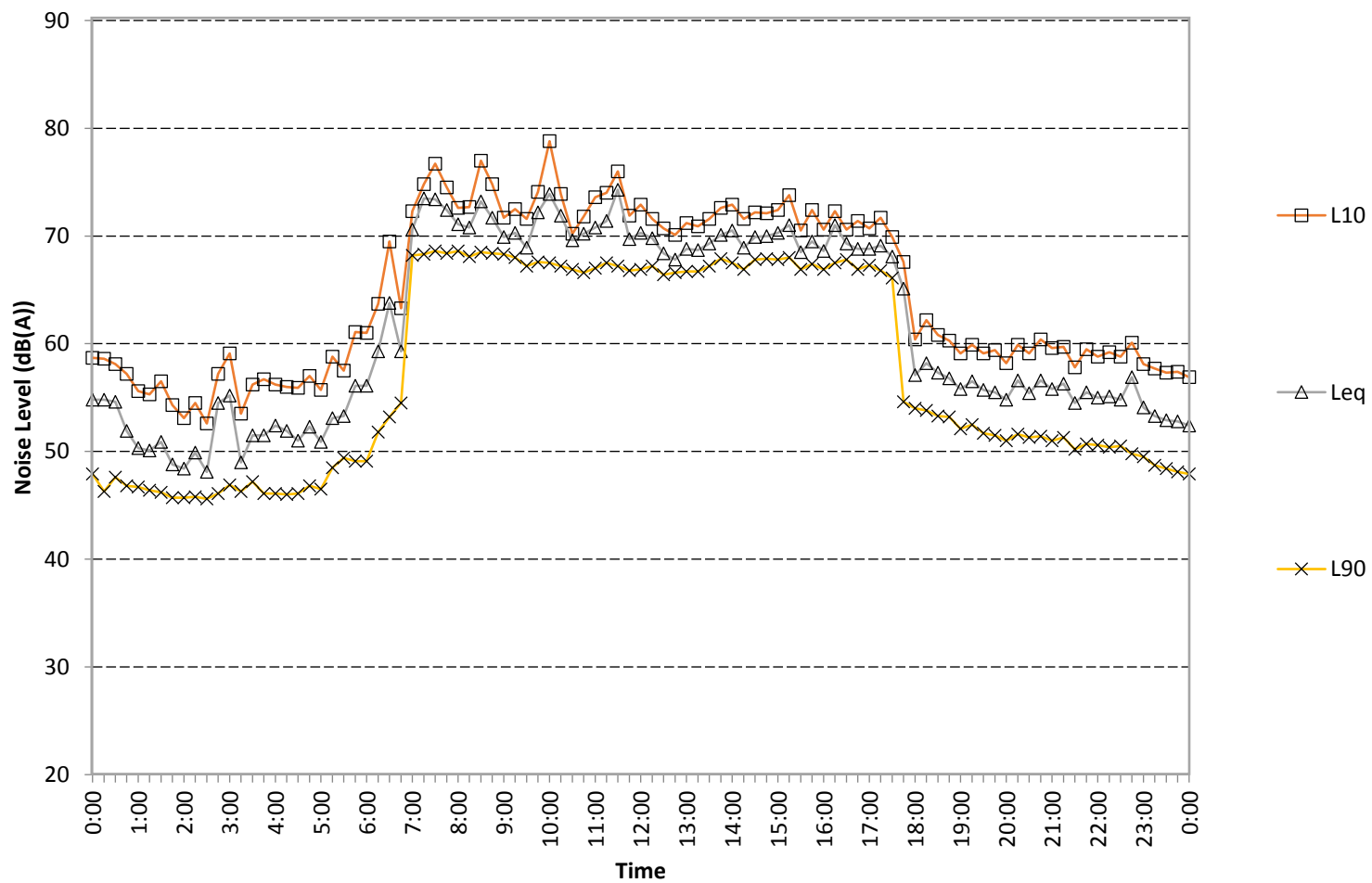
321 Latrobe St, Level 1, facing Latrobe St

Tuesday January 27, 2015



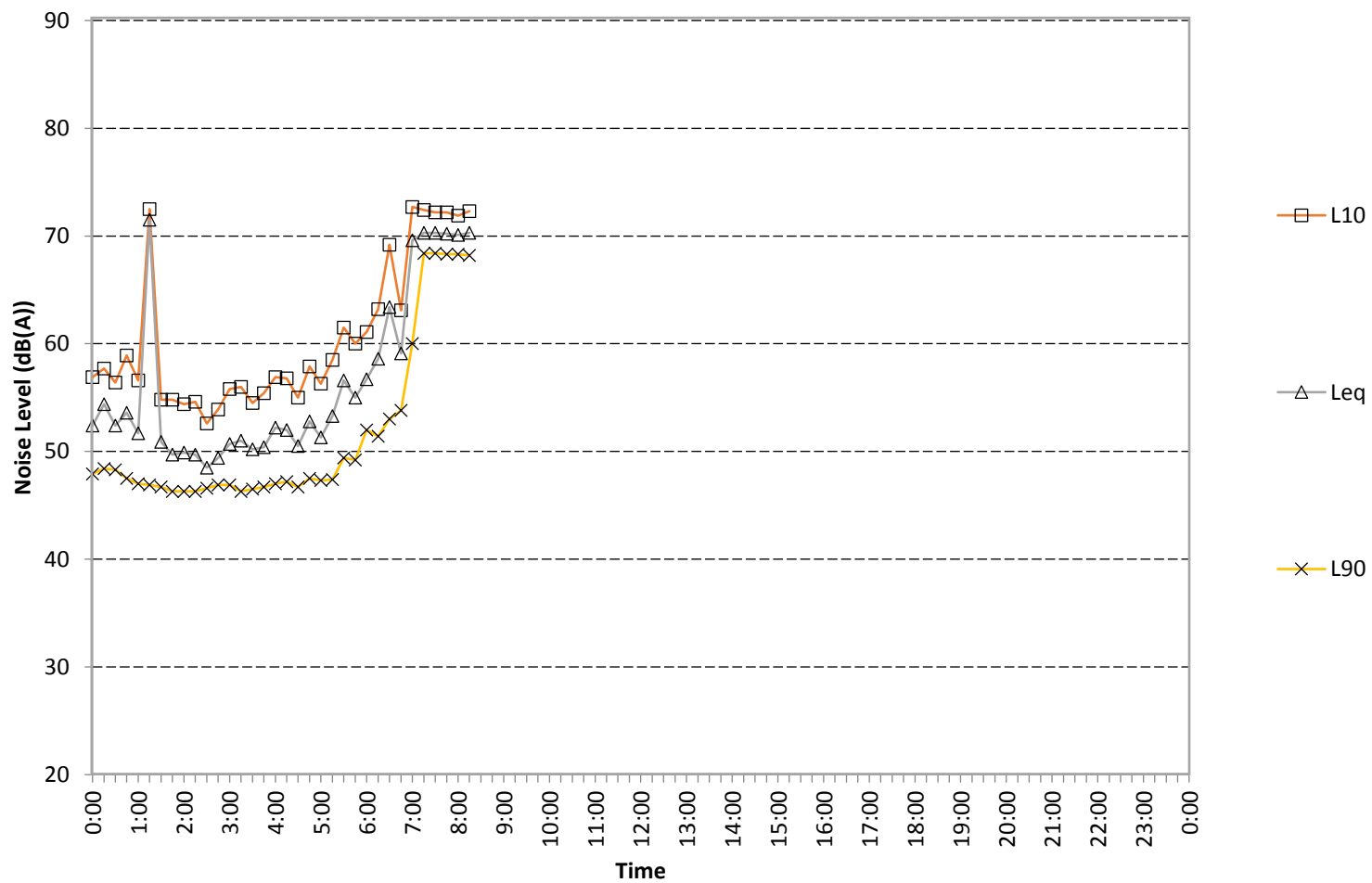
321 Latrobe St, Level 1, facing Latrobe St

Wednesday January 28, 2015



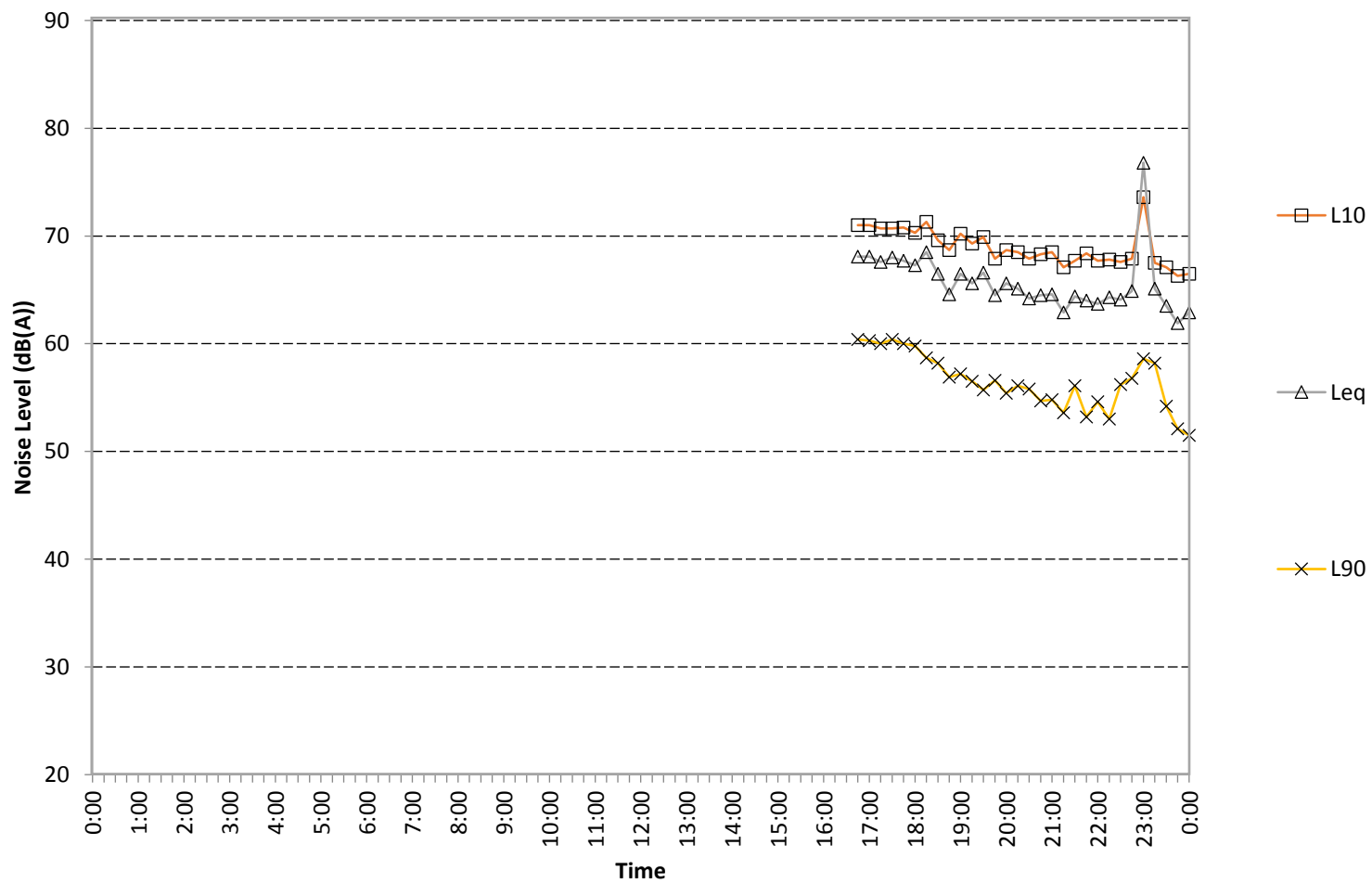
321 Latrobe St, Level 1, facing Latrobe St

Thursday January 29, 2015



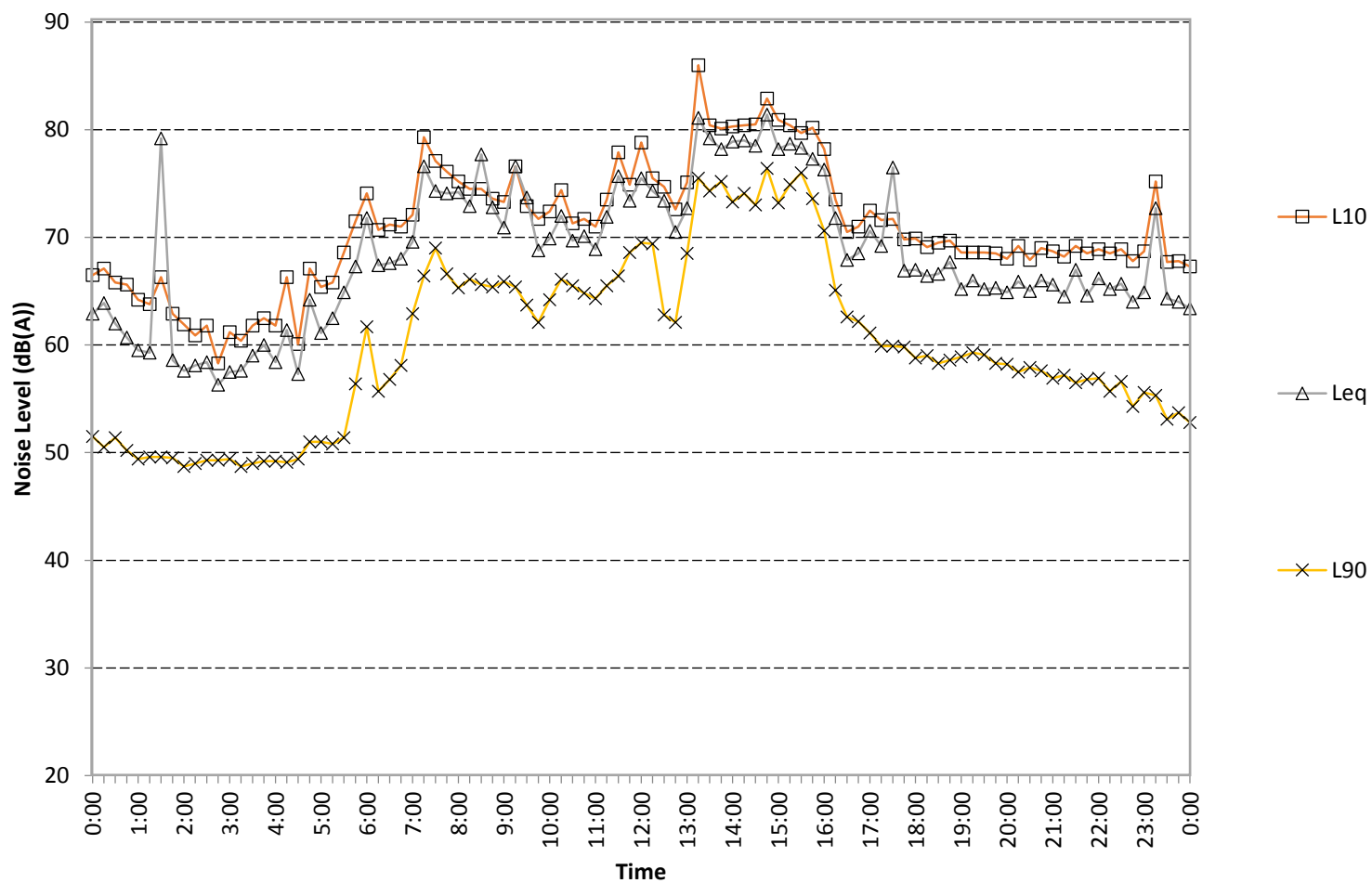
321 Latrobe St, Level 1, Facing Flanigan Ln

Tuesday January 20, 2015



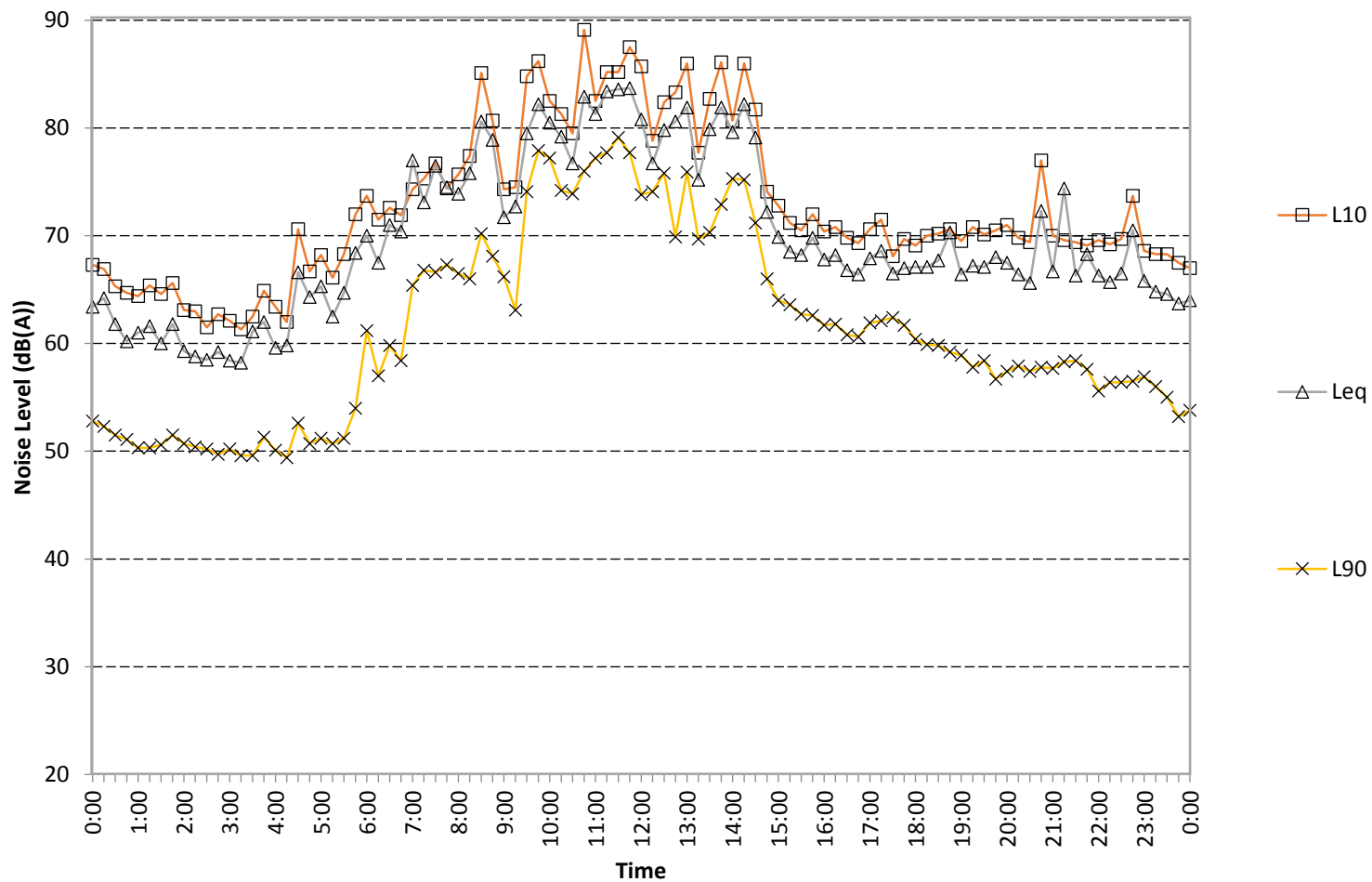
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Wednesday January 21, 2015



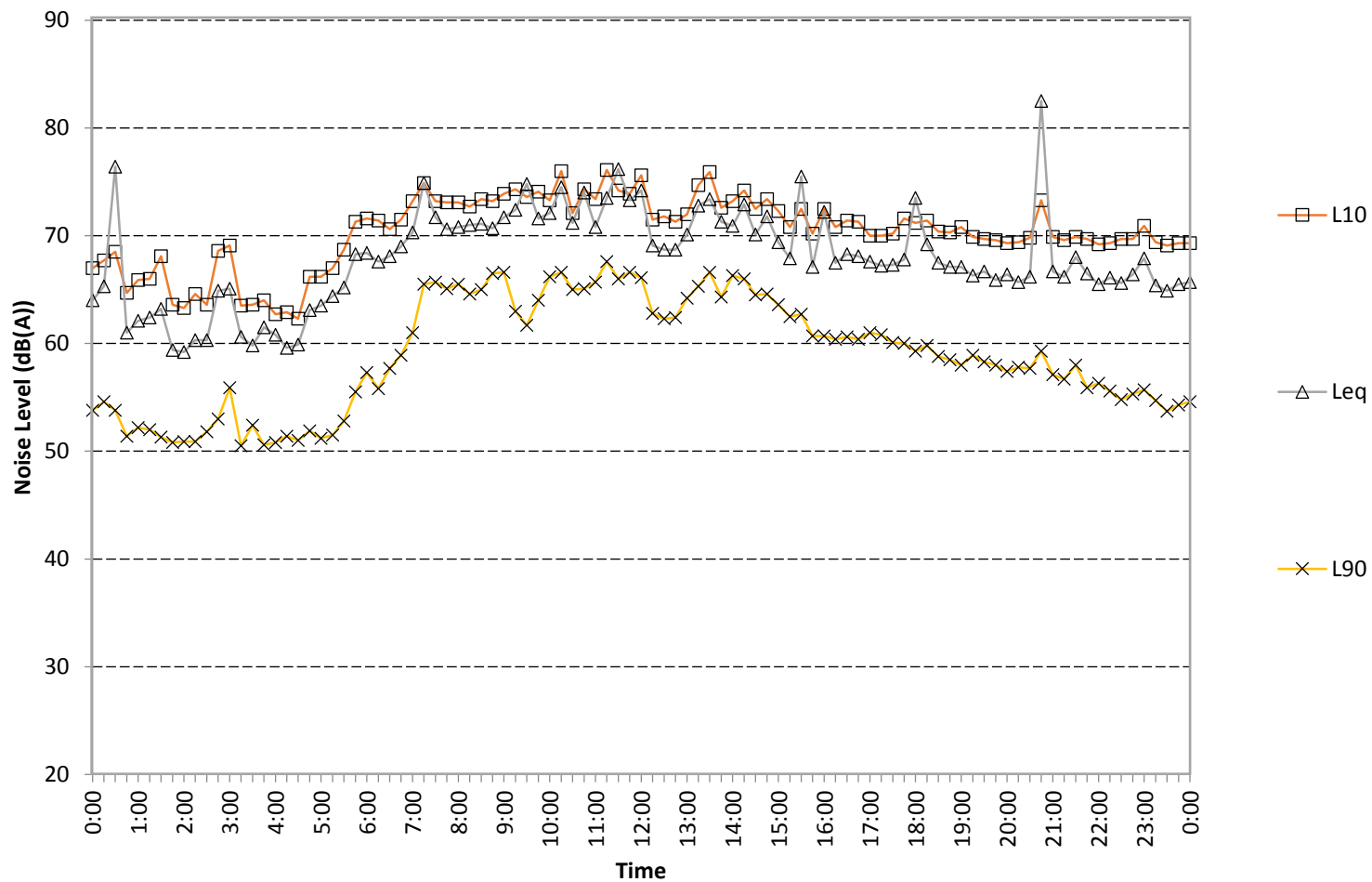
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Thursday January 22, 2015



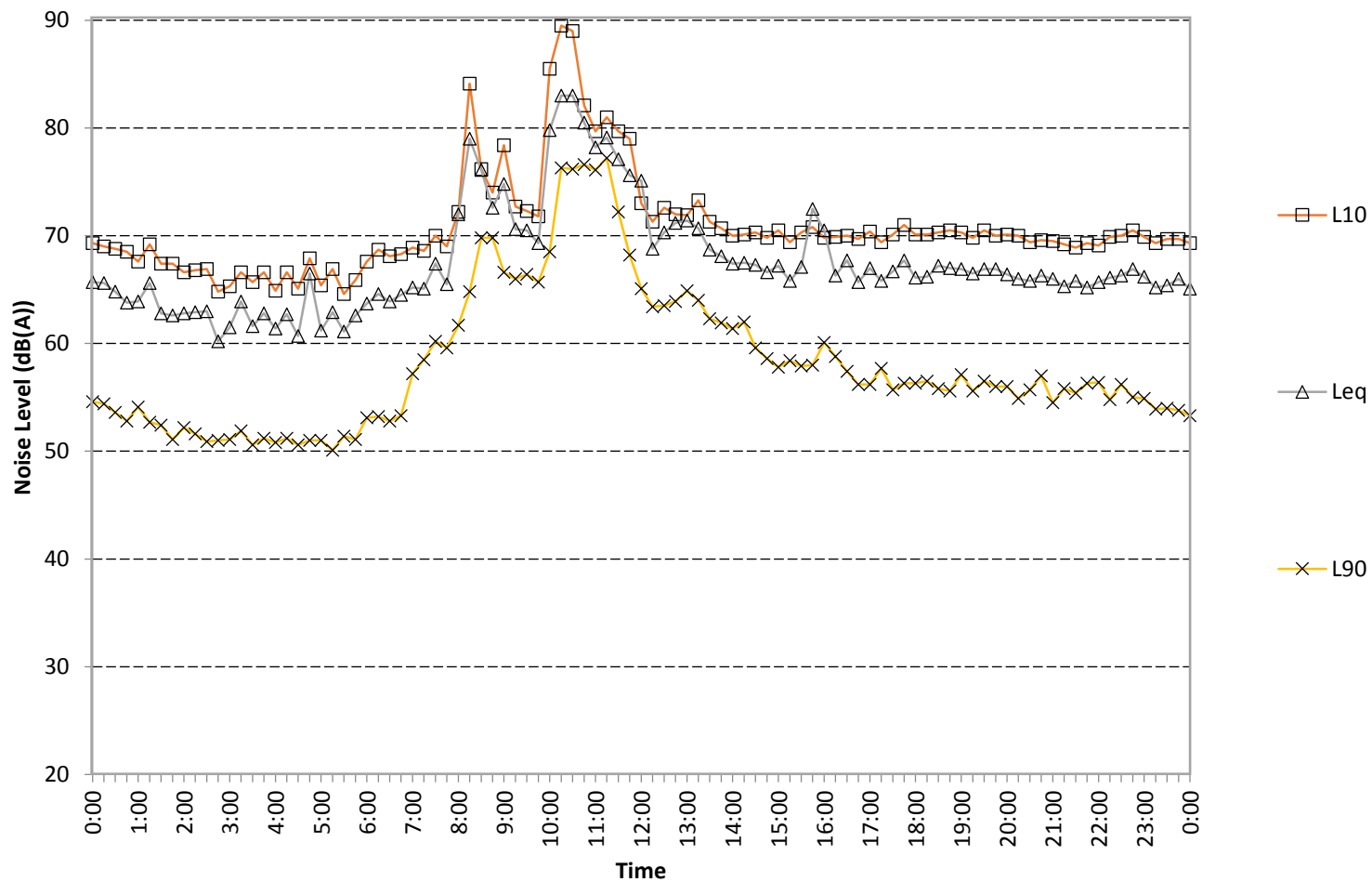
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Friday January 23, 2015



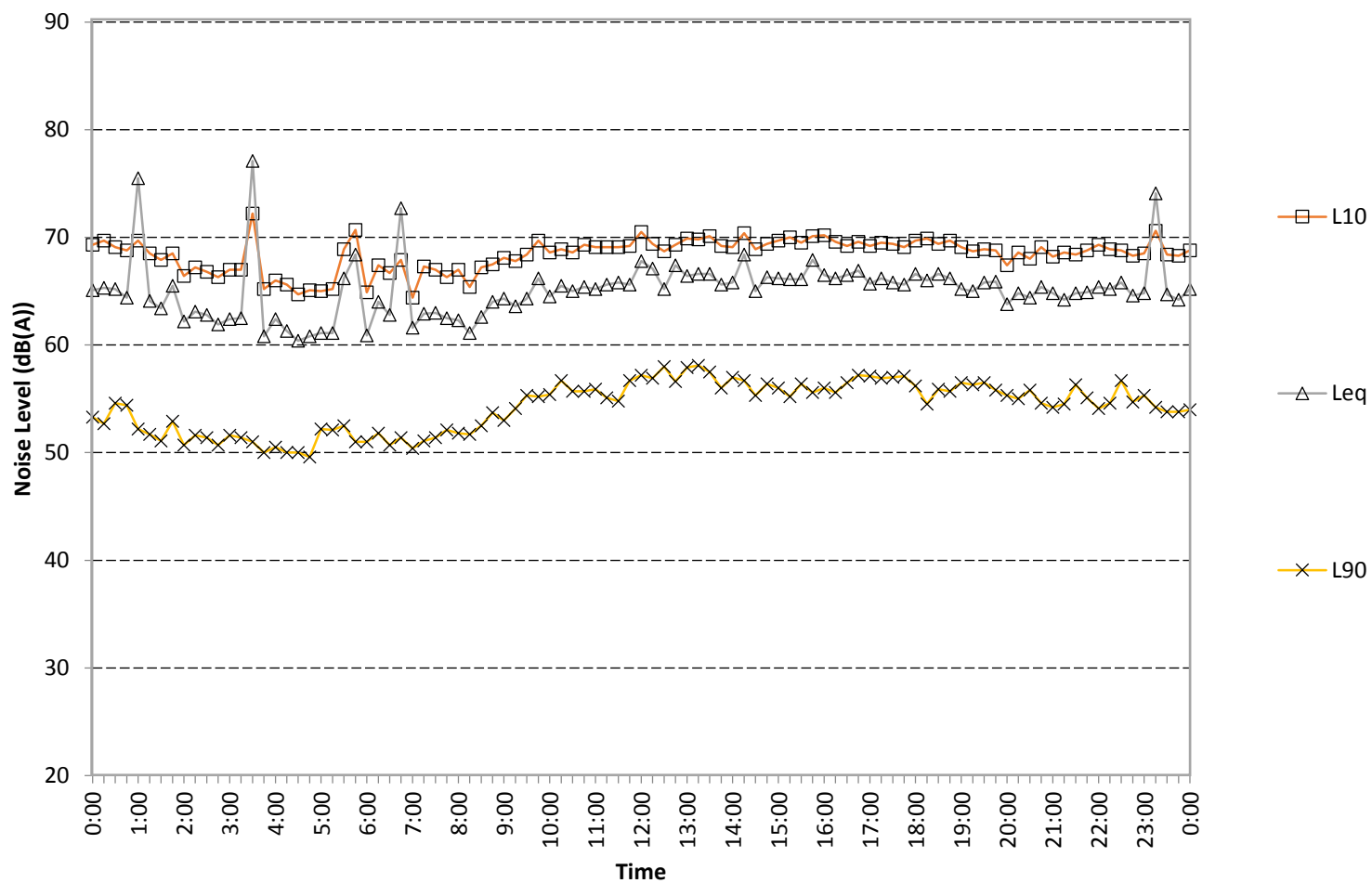
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Saturday January 24, 2015



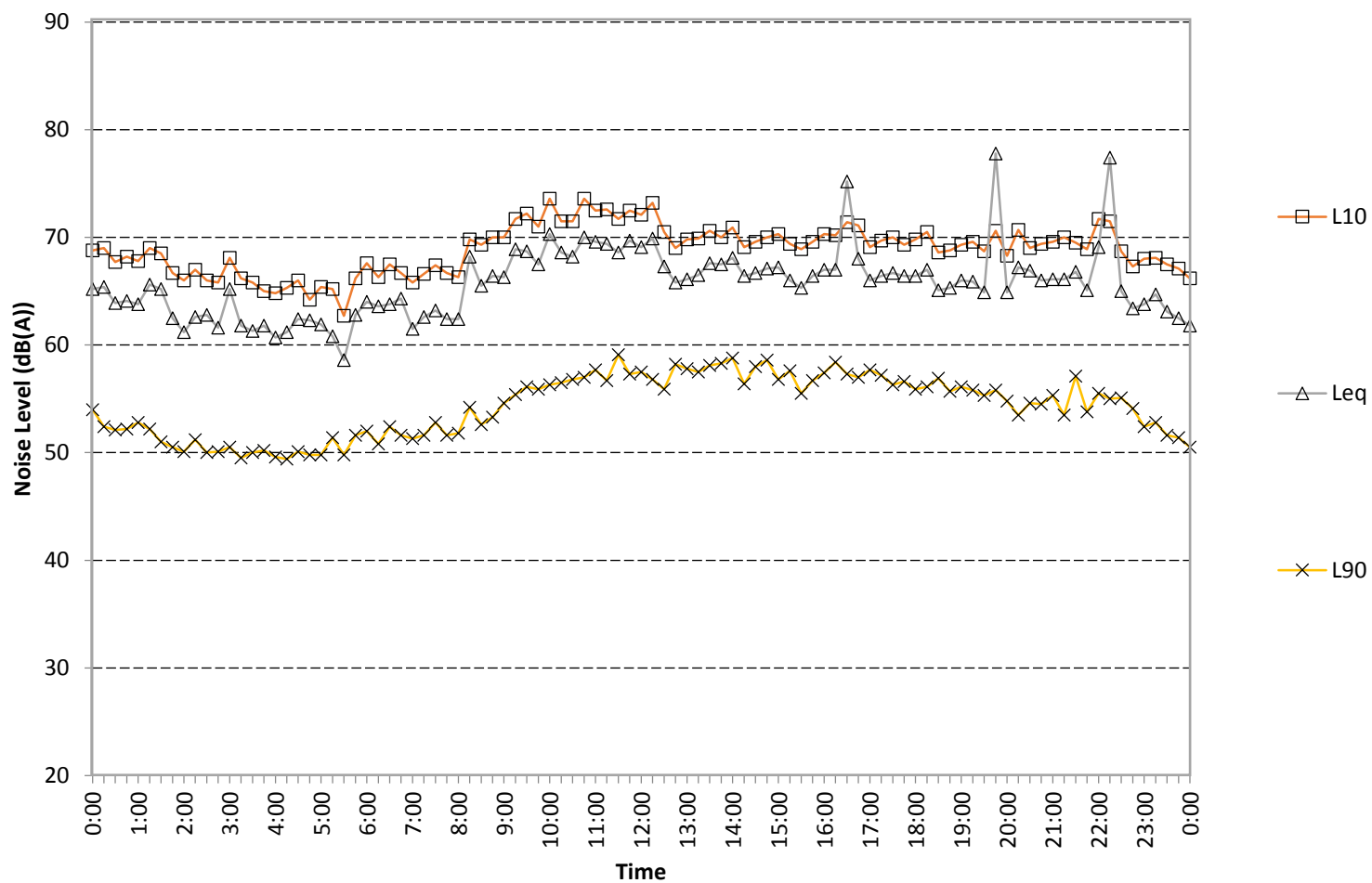
321 Latrobe St, Level 1, Facing Flanigan Ln

Sunday January 25, 2015



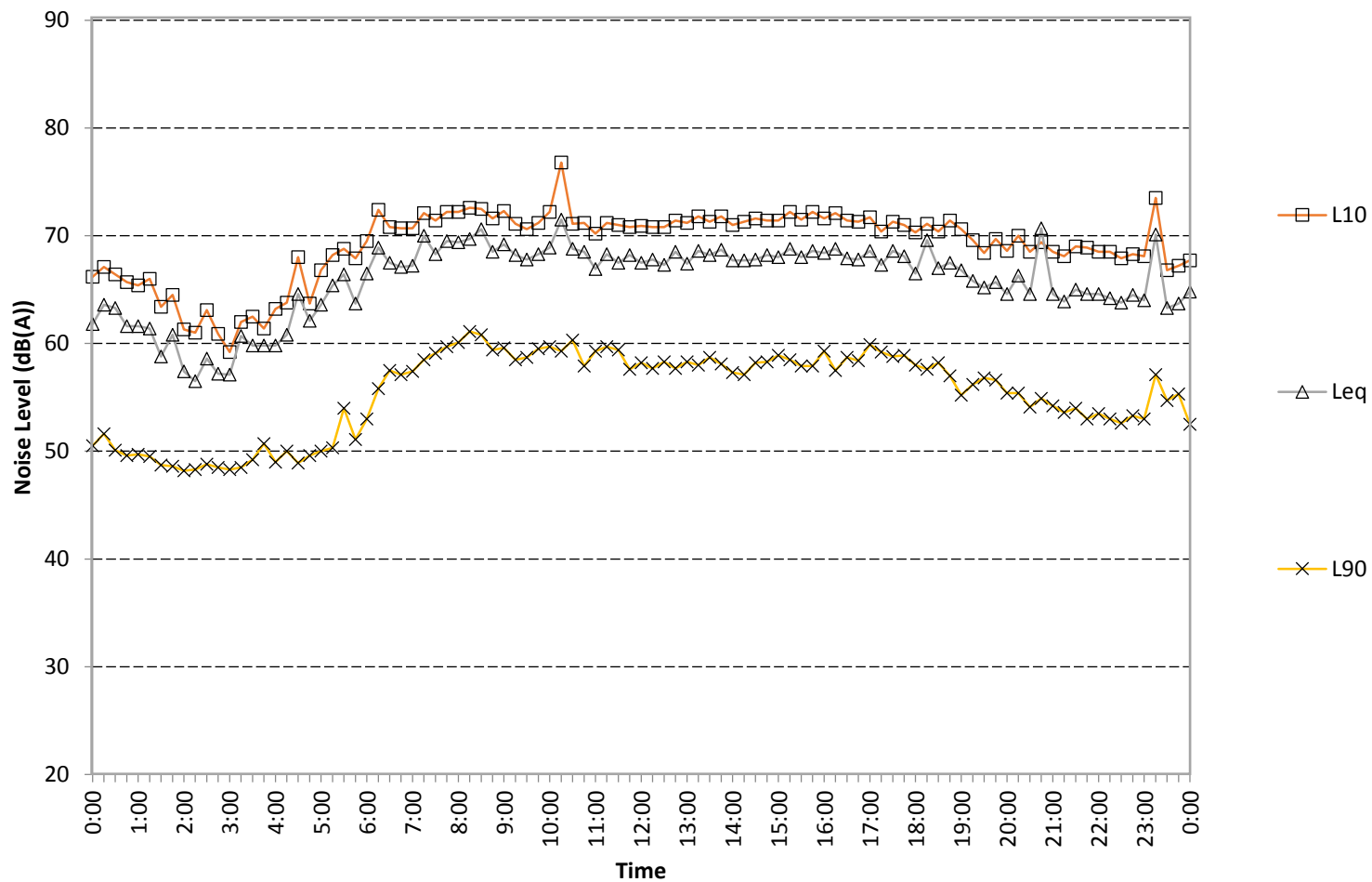
321 Latrobe St, Level 1, Facing Flanigan Ln

Monday January 26, 2015



321 Latrobe St, Level 1, Facing Flanigan Ln

Tuesday January 27, 2015



321 Latrobe St, Level 1, Facing Flanigan Ln

Wednesday January 28, 2015

