



NOISE IMPACT ASSESSMENT

PARK RIDGE SERVICE CENTRE - PROPOSED SERVICE STATION, FAST FOOD RESTAURANT AND CHILDCARE CENTRE

**17 – 25 PARK RIDGE ROAD
PARK RIDGE**

LOGAN CITY COUNCIL

APPROVED DOCUMENT

This is an approved document for Development Application

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1.0 INTRODUCTION

1.1 Scope of Assessment

MWA Environmental has been engaged to prepare a Noise Impact Assessment for the proposed Park Ridge Service Centre which will consist of a service station, food and drink outlet and childcare centre on land located at 17-25 Park Ridge Road, Park Ridge.

This report has been prepared to assess the potential noise impacts of the proposed development on nearby noise sensitive uses. The method of assessment has included site inspections, ambient noise measurements using attended and unattended noise logging, derivation of appropriate noise criteria and noise predictions on the basis of the proposed layout.

The impact of road traffic noise upon the proposed childcare centre is considered with respect to State-controlled roadway.

The scope of this report includes consideration of the impacts of on-site activities to determine compliance with relevant criteria and any necessary noise mitigation measures to achieve compliance with these criteria.

1.2 Site Description

The proposed development is located at 17 to 25 Park Ridge Road on land which is bound by Park Ridge Road to the north and the Mount Lindsay Highway service road to the west. The real property description for the site is Lot 16 SP119024.

The site currently has a detached residential dwelling located centrally on the site. The acoustic amenity of the site and surrounds is primarily affected by traffic noise from Mount Lindsay Highway and Park Ridge Road. The site location is shown on **Figure 1**.

The site is located within the Emerging Community zone, with surrounding land to the south zoned Community Facilities and to the east zoned Emerging Community under the Logan City Council Planning Scheme. An aerial photo showing the existing site and surrounding land uses is included as **Figure 2**.

1.3 Proposed Development

The proposed service station and childcare centre will comprise development of associated car parking areas, drive-thru, proposed buildings, servicing and loading areas and entry and exit. Vehicular ingress and egress will be via driveways from Park Ridge Road and Mount Lindsey Highway service road. Land located part of the eastern boundary of the site (1,122m²), is not subject to this development application.

The proposed site plan is provided as **Attachment 1**.

The development will incorporate appropriate amenity controls, in the form of site layout, acoustic treatment of fixed plant and equipment, acoustic barriers and/or screens to ensure that the proposal does not adversely impact on the amenity of the nearest sensitive surrounding land uses.

1.4 Amenity Issues

The proposed development has the potential to cause noise from the following sources:

- Plant and equipment noise, e.g. air-conditioning, refrigeration, exhaust vents;
- Service noise, e.g. goods delivery vehicles, loading / unloading impact noise; and,
- Site traffic and car parking noise, e.g. drive-thru order point, slow-speed traffic, car starts and door slams.
- Children playing in outdoor areas.

Noise impact upon the childcare centre includes traffic noise from adjacent roadways and the service station/fast food use proposed.

2.0 AMBIENT NOISE LEVELS

In order to characterise the existing noise environment and determine ambient background noise levels, noise measurements were undertaken at the site by MWA Environmental.

Ambient noise monitoring was undertaken at a location considered representative of the ambient noise levels at the nearest noise sensitive receptor. The noise measurement location is shown on **Figure 3**. Monitoring occurred continuously between Friday, 10 November and Friday, 17 November 2017.

The noise datalogger used was an Rion NL22 noise datalogger, pre-calibrated to 94 dB at 1kHz using a Sound Level Calibrator. At post-calibration, the datalogger exhibited less than ± 0.5 dB deviation. The microphone was positioned at a height of 1.2 metres above ground level and fitted with a windshield throughout the recording period. An averaging time of 15 minutes was adopted. The weather was mostly fine with periods of rainfall, however no significant rainfall event occurred during the noise measurement period.

Based on site observations the acoustic environment at the site and surrounding land uses is characterised by road traffic noise from surrounding streets and shopping centre operations to the north.

The recorded noise levels are presented as statistical components, which are described as:

- L₁: Noise level exceeded for 1 percent of the measurement period, referred to as the adjusted maximum sound pressure level.
- L₁₀: Noise level exceeded for 10 percent of the measurement period, referred to as the averaged maximum sound pressure level.
- L₉₀: Noise level exceeded for 90 percent of the measurement period. AS1055.1–1997¹ notes that the L₉₀ is described as the background sound pressure level.
- L_{eq}: An “average” measurement, and as per AS1055.1–1997 defined as the value of the sound pressure level of a continuous steady sound state, that within a measurement period, has the same mean square sound pressure as a sound under consideration whose level varies with time.

Table 1 presents a summary of the recorded noise levels for daytime (7am-6pm), evening (6pm-10pm) and night-time (10pm-7am) for parameters L₁, L₁₀, L₉₀ and L_{eq}. Graphical representation of noise level verses time is provided in **Attachment 2**.

¹ Australian Standard AS 1055.1-1997 Acoustics – Description and measurement of environmental noise, Part 1: General procedures

**Table 1: Recorded Noise Level Ranges (dB(A))
10 to 17 November 2017**

PARAMETER	PERIOD	RECORDED NOISE LEVELS - dBA		
		MINIMUM	MAXIMUM	AVERAGE
L ₁	Daytime (7am-6pm)	62.8	79.8	69.1
	Evening (6pm-10pm)	61.8	74.4	66.6
	Nighttime (10pm-7am)	47.8	75.9	63.4
L ₁₀	Daytime (7am-6pm)	58.1	71.0	62.3
	Evening (6pm-10pm)	53.2	64.3	59.7
	Nighttime (10pm-7am)	39.8	65.8	53.4
L ₉₀	Daytime (7am-6pm)	42.0	56.3	47.9
	Evening (6pm-10pm)	36.4	55.2	44.6
	Nighttime (10pm-7am)	30.0	52.5	39.8
L _{eq}	Daytime (7am-6pm)	54.1	70.7	59.4
	Evening (6pm-10pm)	50.9	64.8	56.7
	Nighttime (10pm-7am)	37.8	64.1	51.8

The statistical noise level parameters recorded at the noise data logger location included the following:

Avg. Recorded L ₁₀ (18 hour)	=	60.7 dB(A)
Avg. Recorded L _{eq} (24 hour)	=	56.0 dB(A)
Avg. Maximum L ₁₀ (1 hour) 6am to 6pm	=	64.3 dB(A)
Avg. Maximum L _{eq} (1 hour) 6am to 6pm	=	61.9 dB(A)

3.0 ASSESSMENT NOISE CRITERIA

3.1 Logan City Planning Scheme Policy 3 – Environmental Management

Under the Logan City Council Planning Scheme 2015 (LPS 2015) the subject site is zoned Emerging Community and shares a boundary with the Community Facility zone to the south and Emerging Community to the east. As such, the Residential Amenity Noise Criteria applies to the operations of the site as per Table 3.2.1.1 (below) of the Logan Planning Scheme 2015 Planning Scheme Policy 3 – Environmental Management for protection of residential amenity in following zones:

- (i) Community facilities zone;
- (ii) Emerging community zone;

Table 3.2.1.1—Noise emission standards for the protection of residential amenity

Noise level at the boundary of premises			
Noise type	Time period	Monday to Saturday	Sunday and public holidays
Non-steady sound*	Day 7:00am – 6:00pm	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$
	Evening 6:00pm to 10:00pm	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$
	Night 10:00 – 7:00am	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 0 \text{ dB(A)}$ and $L_{Amax} \leq 60\text{dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 0 \text{ dB(A)}$ and $L_{Amax} \leq 60\text{dB(A)}$
Continuous noise*	Anytime	$L_{A90,T} \text{ plus } 0\text{dB(A)}$	$L_{A90,T} \text{ plus } 0\text{dB(A)}$

Editor's note—* as defined in AS1055.1-1997 Acoustics –Description and measurement of environmental noise

Note—Adjustments for tonality and impulsiveness to be included in accordance with AS1055.1-1997 Acoustics— Description and measurement of environmental noise.

3.2 Road Traffic Noise Criteria for Childcare Centre

The subject site is located near a state-controlled road and is mapped as a Transport Noise Corridor. The noise impact assessment has been prepared in accordance with the SDAP version 2.0, State Code 1 requirements considering Mount Lindsay Highway. This requires the following Performance Outcome and Acceptable Outcomes to be met as per Table 1.2.2: Environmental Emissions for the proposed Childcare Centre.

Table 1.2.2: Environmental Emissions

Performance Outcomes	Acceptable Outcomes
Child care centres and educational establishments	
<p>PO25</p> <p>Development involving a:</p> <ol style="list-style-type: none"> 1. child care centre; or 2. educational establishment <p>minimises noise intrusion from a state-controlled road or type 1 multi-modal corridor in indoor education areas and indoor play areas.</p>	<p>AO25.1</p> <p>A noise barrier or earth mound is provided which is designed, sited and constructed:</p> <ol style="list-style-type: none"> 1. to meet the following external noise criteria at all facades of the building envelope: <ol style="list-style-type: none"> a) ≤ 58 dB(A) L10 (1 hour) façade corrected (maximum hour during normal opening hours) 2. in accordance with chapter 7 – Integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013. <p>Note: To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the State Development Assessment Provisions Supporting Information – Community Amenity (Noise), Department of Transport and Main Roads, 2013.</p> <p>If the building envelope is unknown, the deemed-to-comply setback distances for buildings stipulated by the local planning instrument or relevant building regulations should be used.</p> <p>OR all of the following acceptable outcomes apply:</p> <p>AO25.2 Buildings which include indoor education areas and indoor play areas are setback the maximum distance possible from a state-controlled road or type 1 multi-modal corridor.</p> <p>AND</p> <p>AO25.3 Buildings are designed and oriented so that indoor education areas and indoor play areas are located furthest from the state-controlled road or type 1 multi-modal corridor.</p> <p>AND</p> <p>AO25.4 Buildings are designed and constructed using materials which ensure indoor education areas and indoor play areas meet the following internal noise criteria:</p> <ol style="list-style-type: none"> 1. ≤ 35 dB(A) Leq (1 hour) (maximum hour during opening hours). <p>Statutory note: Noise levels from a state-controlled road or type 1 multi-modal corridor are to be measured in accordance with AS1055.1–1997 Acoustics – Description and measurement of environmental noise.</p>

<p>PO26</p> <p>Development involving a:</p> <ol style="list-style-type: none"> 1. child care centre; or 2. educational establishment <p>minimises noise intrusion from a state-controlled road or type 1 multi-modal corridor in outdoor education areas and outdoor play areas.</p>	<p>AO26.1</p> <p>A noise barrier or earth mound is provided which is designed, sited and constructed:</p> <ol style="list-style-type: none"> 1. to meet the following external noise criteria in each outdoor education area or outdoor play area: <ol style="list-style-type: none"> a) ≤ 63 dB(A) L10 (12 hour) free field (between 6am and 6pm) 2. in accordance with chapter 7 – Integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013. <p>Note: To demonstrate compliance with the acceptable outcome, it is recommended that a RPEQ certified noise assessment report is provided, prepared in accordance with the State Development Assessment Provisions Supporting Information – Community Amenity (Noise), Department of Transport and Main Roads, 2013.</p> <p>OR</p> <p>AO26.2</p> <p>Each outdoor education area and outdoor play area is shielded from noise generated from a state-controlled road or type 1 multi-modal corridor by a building, solid gap-free fence, or other solid gap-free structure.</p>
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4.0 NOISE IMPACT ASSESSMENT

4.1 Continuous Noise Sources - Plant and Equipment Noise

The noise criteria to be adopted for the new plant and equipment noise assessment is background plus excess criteria as outlined in *Table 3.2.1.1* for continuous noise. To provide a conservative assessment, the night-time background (L_{90}) noise levels recorded by the noise datalogger have been adopted for the purpose of this assessment:

Table 2: Adopted Continuous Noise Criteria – dB(A)

Time Period	Ambient Night-time L_{90} Noise Level – dB(A)	Adopted Continuous Noise Criterion L_{A90} – dB(A)
Anytime	40	40

These limits are appropriate for noise of plant and equipment such as air-conditioning units, refrigeration equipment, exhaust fans and similar equipment typical to a retail and childcare development.

The noise criteria adopted in **Table 2** require a maximum noise level at residential amenity zones to be **40 dB(A)** at any time throughout the day (using night-time background noise level as a conservative approach) from the proposed development plant and equipment. It is recognised that the retail shops (service station and food food) may trade 24hours.

As such, any air conditioning units and other mechanical plant and equipment associated with the proposed development should be located and acoustically treated and/or shielded to achieve the 40 dB(A) limit external to surrounding uses. This design standard is readily achievable considering the development layout and separation distance to surrounding uses.

The above noise limits do not necessarily apply to a single item of plant, but rather should constitute the additive noise component levels of all plant and equipment proposed and in operation during the assessed period, measured at the nearest residential receptor(s).

The detailed design of the plant area requirements has not yet been determined but experience with other similar developments provides a basis for assessment of the likely designs that may be used.

The proposed uses will likely require roof mounted mechanical plant, with perimeter acoustic screen shielding the west, east and south sides at a height of **200mm above the tallest plant for the service station and food and drink outlet and 500mm above the tallest plant for the childcare centre.**

Based upon typical requirements for mechanical plant for similar developments, and the proximity of the noise sensitive receptors, the following indicative plant items have been represented in the SoundPLAN model:

- 7 x package air-conditioning units - 78 dB(A) SWL
(3x Childcare centre, 2x for service station and food and drink outlet)
- 2 x package refrigeration unit - 83 dB(A) SWL
(1 each for service station and food and drink outlet)
- 3 x exhaust fans - 73 dB(A) SWL
(1 x service station and 2 x food and drink outlet)

Noise emissions from an air-compressor have not been represented in the model as the air-compressor should be located within a dedicated enclosure to minimise noise emissions. Tyre inflation station beepers are to be programmed to turn off during night-time period.

The predicted resultant continuous plant noise levels at the boundary of the nearest residential amenity zones are summarised in **Table 3** below.

The results of the continuous sources noise modelling as noise contour maps of the predicted L_{A90} and L_{Amax} noise levels across the model domain are presented in **Attachment 3**.

Table 3: Predicted Mechanical Plant L_{A90} Noise Levels

RECEPTOR	PREDICTED MECHANICAL PLANT NOISE LEVEL – L_{A90} dB(A) NIGHT-TIME	PREDICTED MECHANICAL PLANT NOISE LEVEL – L_{AMAX} dB(A) NIGHT-TIME
East (Emerging Community Zone)	37	36
South (Community Facilities Zone)	37	38
CRITERIA	40	60

The predicted noise levels demonstrate that the relevant noise criteria is achieved, considering attenuation due to distance from the sources and shielding provided by the recommended roof top acoustic screens.

The design requirement shall be to select plant based upon acoustic requirements in addition to appropriate location and acoustic shielding to achieve the design noise limit.

3.2 Non-Steady Noise Sources - Site Traffic, Servicing Arrangements and Carparking and Operational Noise Activities

This section addresses potential noise amenity impacts from the variable short duration noise sources due to vehicle movements, operational noise and carparking noise associated with the proposed service station, food and drink outlet and childcare centre uses. The noise sources are likely to include:

- slow-speed vehicle movements on-site;
- drive-thru ordering point activities;
- bowser use;
- carparking noise; and
- outdoor play area noise
- slow-speed truck movements (delivery vehicle, bulk refuel tanker); and
- servicing activities (airbrake, reversing beeper, refuse collection, unloading noise).

The noise criteria applied by Logan City Council in assessing noise impact of a development with ***non-steady noise plus excess limits***. The non-steady noise criteria will be not to exceed the existing ambient background noise levels at sensitive land uses by no more than 5 dB(A) during the daytime and evening periods and by no more than 0 dB(A) during the night-time period. The adopted noise criteria are listed in **Table 4** below:

Table 4: **L₉₀ Noise Levels and Associated L_{Aeq} and L_{Amax} Criterion Noise Levels – dB(A)**

Time Period	Ambient L ₉₀ Noise Level – dB(A)	Criterion Noise Level – dB(A) as L _{Aeq,T}	Criterion Noise Level – dB(A) as L _{Amax,T}
Daytime (7am to 6pm)	48	53	-
Evening (6pm to 10pm)	45	50	-
Night-time (10pm to 7am)	40	40	60

The projected peak hour traffic volumes through the site have been based on traffic engineering advice provided to MWA Environmental by Lambert and Rehbein traffic engineers as summarised in **Table 5**.

Table 5: Peak Hour On-Site Traffic Generation

USE	TRAFFIC GENERATION RATE	QUANTITY	TOTAL TRAFFIC GENERATED
Service Station	66 trips/hour/100m2 GFA	210m2	139
Food and Drink	100 trips/hour	1 tenancy	100
Long Day Childcare	0.8 trips/child/hour	112 Children	90
Total Trip Generation – Peak Hour			329

The directional split for ingress and egress of vehicles on site are presented in **Table 6** below based upon data provided by Lambert and Rehbein.

Table 6: Traffic Directional Split

USE	PARK RIDGE ROAD ACCESS		MT LINDESAY SERVICE ROAD ACCESS	
	IN	OUT	IN	OUT
Service Station	50%	100%	50%	0%
Food and Drink	50%	100%	50%	0%
Long Day Child Care	50%	50%	50%	50%

Servicing and deliveries will be conducted by HRV for the service station and food and drink outlets and smaller SRV for the childcare centre, in addition to bulk refuelling tankers which will be conducted by AV as per advice from Lambert and Rehbein.

For the purpose of this assessment, all servicing activities are conducted by MRV or larger vehicles, including refuse collection. The SoundPLAN model was conservatively setup to consider servicing activities for the site as 2 heavy service vehicle movements (i.e. 1 load) per hour for each of the service station, food and drink outlet and childcare centre with 1 fuel tanker delivery concurrent with peak passenger vehicle traffic.

Servicing arrangements for the proposed food and drink and childcare centre are required to be limited to day and evening (7am to 10pm) use only which includes refuse collection. Servicing for the service station can occur at anytime during the day.

Source noise levels for vehicle movements, operational activities, car parking and servicing activities have been recorded by MWA Environmental and others and the sound power levels (SWLs) are summarised in **Table 7** below for each of the day, evening and night periods.

Table 7: Summary of Variable Noise Sources

Period	Noise Source	SWL – dB(A)		Source Height (m)
		L _{max}	L _{eq}	
Day (7am-6pm)	Slow moving car	89	68.5-73.4/m ²	0.5
	Car Parking	89	84-86 ³	0.5
	Bowser Pumps	67.5	62.5	1
	Slow moving MRV	96	59-66/m ⁴	2
	Refuel Tanker	101	67/m ⁵	2
	Truck air line bleed	110	79.2 ⁶	1
	Truck loading bay	101	85	2
	Reversing beeper	103	80.4 ⁷	1
	Drive-thru order point	86.6	81.6	1
	Drive-thru pay booth	82.9	77.9	1
Evening (6pm-10pm)	Slow moving car	89	68.5-73.4/m	0.5
	Car Parking	89	81-83 ⁸	0.5
	Bowser Pumps	67.5	62.5	1
	Slow moving MRV	96	59-66/m	2
	Refuel Tanker	101	67/m	2
	Truck air line bleed	110	79.2	1
	Truck loading bay	101	85	2
	Reversing beeper	103	80.4	1
	Drive-thru order point	86.6	81.6	1
	Drive-thru pay booth	82.9	77.9	1
Night 10pm-7am)	Slow moving car	89	68.5-73.4/m	0.5
	Car Parking	89	78-80 ⁹	0.5
	Bowser Pumps	67.5	62.5	1
	Slow moving MRV	96	62/m	2
	Drive-thru order point	86.6	81.6	1
	Truck loading bay	101	85	2
	Reversing beeper	103	80.4	1
	Drive-thru pay booth	82.9	77.9	1

² Based on peak hour traffic generation as per Traffic Engineers report which is reduced based on traffic distribution from a typical service station daily profile as per documentation from Brisbane City Council. This is considered a reasonable basis for the distribution of daily traffic from the proposed uses.

³ Represents 4 carparking bay movements per bay per hour during day period

⁴ Based on 1 to 5 truck movement per hour.

⁵ Based on 2 truck movement per hour.

⁶ 3 second noise event per hour

⁷ 20 second noise event per hour

⁸ Represents 2 carparking bay movements per bay per hour during evening period

⁹ Represents 1 Carparking bay movement per hour during night period

The childcare centre design allows for children to access the outdoor play areas on the southern portion of the building. Noise from children playing in the outdoor play areas has been represented using the SoundPLAN computer model. The noise source levels for the childcare centre are based on the *Association of Australian Acoustical Consultants Technical Guideline Child Care Centre Noise Assessment* dated May 2008.

As per the guideline, the noise levels of children playing can vary widely depending on the age of the children and the type of activity. Sound power levels of children are presented in the guideline as per **Table 8** below.

Table 8: Typical Range of Sound Power Level for Children Playing as per AAC Technical Guideline

AGE GROUP	NUMBER OF CHILDREN	SOUND POWER LEVEL DB(A) ($L_{EQ\ 15MIN}$)
0 to 2 years	10	77 to 80
2 to 3 years	10	83 to 87
3 to 6 years	10	84 to 90

For purpose of this assessment, the sound power levels at the middle of each of the ranges were used. The above noise source levels are similar to measurements conducted by MWA Environmental of children at existing childcare centre outdoor play areas. The proposed outdoor play areas will generally operate during the daytime period once all children are present.

It is assumed that the number of children proposed for the centre will be distributed equally between the different ages groups. A conservative estimate is that half the children from each age group will use the play area for one hour and the second half will use the outdoor play areas for the following hour for morning, midday and evening session during daytime period.

For modelling purpose, outdoor play area is divided into three separate sections for each age group with the maximum noise emission generated as L_{eq} used, summarised below:

- Outdoor Play Area 0 to 2 years – 40 children – **85 dB(A) SWL**
- Outdoor Play Area 2 to 3 years – 40 children – **91 dB(A) SWL**
- Outdoor Play Area 3 to 6 years – 40 children – **93 dB(A) SWL**

The SoundPLAN noise prediction model has been utilised to determine appropriate noise barrier heights to achieve the adopted noise criteria. Based upon the modelling undertaken it is recommended that a **2.0 to 2.4 metre high acoustic barrier** be constructed along the eastern boundary of the service station and fast food area with a **2.0 metre high acoustic barrier** be constructed along the eastern and southern boundaries of the childcare lot.

The location and alignment of the recommend acoustic barrier are presented in **Figure 4**.

The SoundPLAN model predicted the resultant noise levels of the above commercial and childcare centre noise sources at the nearest boundary receptors, with the inclusion of the recommended acoustic barriers and operational noise control measures i.e. no servicing to be conducted for the childcare centre and food and drink outlet during night-time.

The predicted L_{Aeq} and L_{Amax} noise levels at the nearest noise sensitive receptors during the day (7am to 6pm) evening (6pm to 10pm) and night period (10pm – 7am) are summarised in **Table 9** below for compliance with the adopted noise criteria.

The results of the non-steady source noise modelling are presented in **Attachment 4** as contours of the predicted L_{Aeq} and L_{Amax} noise levels across the model domain.

Table 9: Predicted Non-steady L_{Aeq} Noise Levels

Receptor	Predicted Noise Level			
	L_{Aeq} dB(A) Day	L_{Aeq} dB(A) Evening	L_{Aeq} dB(A) Night-time	L_{Amax} dB(A) Night-time
East (Emerging Community Zone)	47	45	39	49
South (Community Facilities Zone)	48	32	28	37
CRITERIA	53	50	40	60

The predicted daytime, evening and night-time noise levels satisfy the adopted noise limits at all surrounding noise sensitive uses with the recommended noise control measures (i.e. acoustic barriers and limited servicing hours).

4.0 ROAD TRAFFIC NOISE IMPACT ASSESSMENT

4.1 Traffic Data

The 2016 traffic data for Mount Lindsay Highway (state-controlled road) was obtained from Queensland Government Traffic census for the Queensland state-declared road network. A conservative growth rate of 3% was applied to the measured traffic census volume to predict the current traffic volume for Year 2017 and an ultimate 10 year planning horizon (Year 2029).

The daily traffic flow data (AADT) has been scaled down to 10% to represent the 1 hour traffic flow data necessary to predict the external L₁₀ (1 hour) and 75% to represent the 12 hour traffic flow data necessary to predict the L₁₀ (12 hour) traffic noise levels for the outdoor play areas of the childcare centre.

The traffic volumes are summarised in **Table 10** below.

Table 10: Existing and Ultimate Traffic Volumes used for Assessment

ROADWAY	EXISTING AND ULTIMATE TRAFFIC			SPEED LIMIT	CV%
	Current AADT	Year 2029 1 Hour	Year 2029 12 Hour Volume		
Mount Lindsay North of Park Ridge Road Overpass	41,462	5,911	44,336	80	9.2
Mount Lindsay South of Park Ridge Road Overpass	29,024	4,138	31,036	80	11.9

4.2 Predicted Traffic Noise Levels – Childcare Centre

Traffic noise predictions have been made external to the proposed childcare centre building and at outdoor play areas for a Year 2029 design horizon. The future traffic noise modelling has considered the proposed childcare centre building and other proposed commercial uses within the subject site.

Preliminary road traffic noise modelling indicated that AO25.1 of the state code cannot be achieved as the external noise criteria at all facades of the childcare building are above the required ≤ 58 dB(A) L₁₀ (1 hour) façade corrected (maximum hour during normal opening hours).

Therefore, the assessment is required to demonstrate compliance with AO25.2 to AO25.4 of the State Code. Given that the proposed child care centre boundary is approximately 195 metres from Mount Lindsay Highway, AO25.2 and AO25.3 is required to be achieved by providing the indoor education areas and indoor play areas at maximum setback distance from the state-controlled road.

To achieve AO25.4, a SoundPLAN 7.4 model was setup to predict the external $L_{eq(1hour)}$ traffic noise levels under ultimate design horizon (Year 2029) traffic flow conditions for Mount Lindsay Highway.

As SoundPLAN predicts traffic noise levels as $L_{10(1 hour)}$, predictions were converted to the relevant $L_{eq(1 hour)}$ noise levels by the application of the following conversion factor based on recorded noise level statistics detailed in **Section 2.0** of this report.

$$L_{eq(1 hour)} = L_{10(1 hour)} - 2.4 \text{ dB(A)}$$

A summary of the predicted traffic noise levels external to the representative most exposed childcare facade is provided in **Table 11** below with the predicted noise level at the outdoor play area presented in **Table 12**. The graphical noise contour of the predicted Year 2029 traffic noise levels are presented in **Attachment 5**.

**Table 11: Design Horizon Traffic Noise Level Predictions
Childcare Façade (Includes Façade Reflection)**

Receptor	Predicted Noise Level $L_{Aeq,1hr}$ dB(A)	Façade Sound Transmission Loss Required To Achieve Criteria at Indoor Education/Play Areas dB(A)
South Façade	55	20
North Façade	54	19
West Façade	58	23
Criteria		35

**Table 12: 10 Year Horizon Traffic Noise Level Predictions
Childcare Outdoor Play Area**

Area	$L_{10(12hr)}$ *	$L_{10(12hr)}$ Criteria
Outdoor Play Area	50	63

*free-field

The road traffic noise modelling and assessment demonstrates that:

1. In order to achieve the Acceptable Outcome 25.4 as per the SDAP requirements within indoor educational and play rooms, the proposed childcare building will need to be acoustically treated. Acoustic treatment is required for all building facades to achieve sound transmission losses of **19 to 23 dB(A)**, which in accordance with QDC MP4.4 is up to Noise Category 1 for façade closest to the road transport corridor.
2. The location of the outdoor play area and the recommended **acoustic barrier along southern boundary of the childcare centre site** as per requirement determined in **Section 3.2 (see Figure 4)** will mitigate the road traffic noise impacts at the outdoor play area to within the relevant criteria.

Thus, with the provision of appropriate acoustic barriers and building façade treatments the proposed child care centre will experience acceptable noise amenity considering future road traffic noise from Mount Lindsay Highway.

5.0 CONCLUSION

MWA Environmental has been engaged to prepare a Noise Impact Assessment for the proposed Park Ridge Service Centre which consists of service station, fast food restaurant and childcare centre located at 17-25 Park Ridge Road, Park Ridge.

This report has been prepared to assess the potential noise impacts of the proposed development on nearby noise sensitive uses. The scope of this report includes consideration of the impacts of on-site activities to determine compliance with relevant criteria and any necessary noise mitigation measures to achieve compliance with these criteria.

The assessment has determined the appropriate noise limits for plant and equipment associated with the proposed development. Calculations have concluded that likely plant and equipment will require acoustic treatment to achieve the noise limits at the surrounding noise amenity. The required levels of noise reduction are readily achievable through the selection of quiet plant items, appropriate location and the provision of acoustic screens around roof level plant items as follows:

- The service station and food and drinks outlets requires roof top acoustic screen shielding the west, east and south sides at a height of **200mm above the tallest plant**; and
- The childcare centre requires roof top acoustic screens shielding the west, east and south sides at a height of **500mm above the tallest plant**.

Assessment of the impact of noise from car parking activities, service vehicles and loading activities has determined that the appropriate noise limits during the daytime, evening and night-time periods are achievable at the surrounding noise sensitive amenities.

It is a recommendation of this report that the following noise control measures be provided to mitigate the noise impacts from non-steady activities associated with the proposed development:

- **2.0 to 2.4 metre high acoustic barrier** be constructed along the eastern boundary;
- **2.0 metre high acoustic barrier** be constructed along part of the southern boundary of the subject site; and
- Servicing arrangement for the childcare centre and food and drink outlet be limited to day and evening hours only i.e. between 7am and 10pm.

The extents of the proposed acoustic barriers are provided in **Figure 4**.

Any acoustic barrier constructed should be gap free and constructed of materials achieving a minimum surface density of 12.5 kg/m².

In addition, the assessment has considered potential noise impact from the State-controlled road (Mount Lindsay Highway) in accordance with *State Code 1* of the *State Development Assessment Provisions, Version 2.0 (“SDAP”)* upon the proposed Childcare Centre.

The following has been concluded:

- The road traffic noise assessment has concluded that acoustic treatment is required to achieve the internal and external noise limits for road traffic noise.
- Acoustic treatment is required for all building facades to achieved sound transmission losses of **19 to 23 dB(A)**, which in accordance with QDC MP4.4 is up to Noise Category 1 for façades closest to the road transport corridor.
- The location of the outdoor play area and the recommended **acoustic barrier along southern boundary of the childcare centre site** as per requirement determined in **Section 3.2 (see Figure 4)** will mitigate the road traffic noise impacts at the outdoor play area to within the relevant criteria.

In summary the assessment undertaken demonstrates that the proposed development can operate in accordance with the relevant amenity standards and is recommended for approval with reasonable and relevant conditions.

MWA Environmental
18 January 2018

FIGURES



DRAWING REFERENCE
 UBD : AUSTRALIAN CITY STREETS 2016

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PARK RIDGE 88 PTY LTD

PROJECT
ROAD TRAFFIC NOISE ASSESSMENT
 PARK RIDGE SERVICE CENTRE
 17-25 PARK RIDGE ROAD
 PARK RIDGE QLD


TITLE
SITE LOCATION

JOB	PARK RIDGE	FIGURE 1
JOB NO.	17-158	
DATE	19/01/18	DWG NUMBER
SCALE	NOT TO SCALE	17-158-1
REV.		

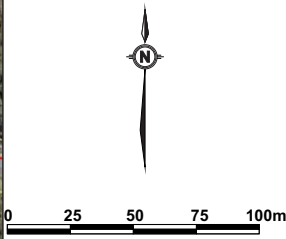


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 P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au
 W www.mwaenviro.com.au
 ABN 94 010 833 084



LEGEND
 SITE BOUNDARY

DRAWING REFERENCES
 - © THE STATE OF QUEENSLAND 2017 QLDGLOBE
 - GOOGLE EARTH PRO 2016.



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PARK RIDGE 88 PTY LTD

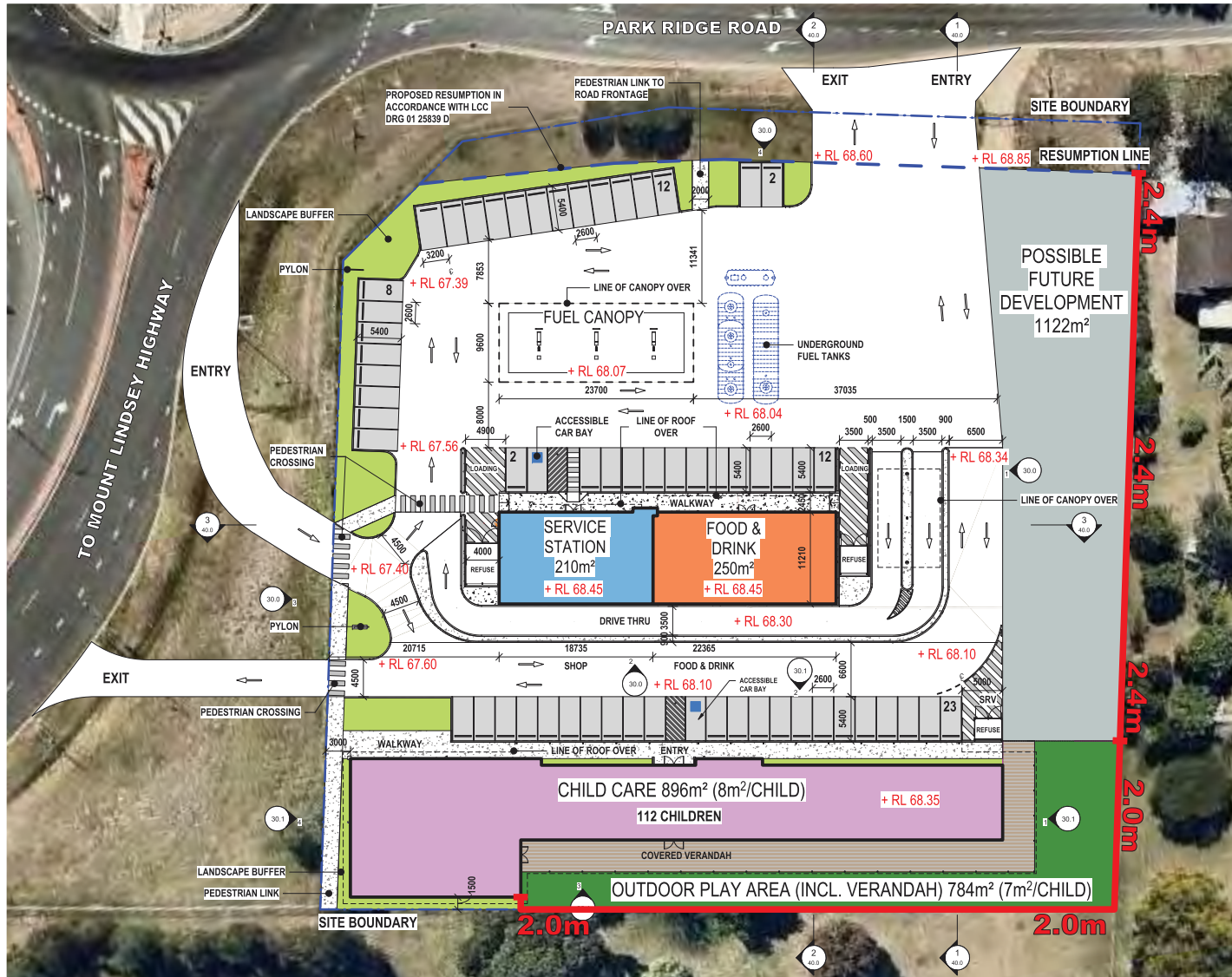
PROJECT
ROAD TRAFFIC NOISE ASSESSMENT
 PARK RIDGE SERVICE CENTRE
 17-25 PARK RIDGE ROAD
 PARK RIDGE QLD

TITLE
SURROUNDING LAND USES

JOB	PARK RIDGE	FIGURE 2
JOB NO.	17-158	
DATE	19/01/18	DWG NUMBER
SCALE	1:3000 (A4)	17-158-2
REV.		



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DEVELOPMENT APPLICATION

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SITE PLAN

As indicated @ A1

A10.0

16/01/2018

rev. 9

LEGEND

2.4m BARRIER HEIGHT
ACOUSTIC BARRIER

GFA AREA		CAR REQ.
BUILDING	AREA	
SERVICE STATION SHOP	210 m ²	11
FOOD & DRINK	250 m ²	25
CHILDCARE CENTRE	896 m ²	23
TOTAL GFA	1357 m ²	56
CARS PROVIDED		59

SITE COVER	
	AREA
SITE COVER (ROOFED)	1941 m ²
	25.7%

LANDSCAPING RATIO		
SURFACE TYPE	AREA	% OF DEVELOPMENT SITE COVERAGE
IMPERVIOUS	6615 m ²	87%
LANDSCAPE	952 m ²	13%
TOTAL AREA	7567 m ²	

EXISTING LEVELS:

ALL LEVELS ARE INDICATIVE ONLY & SUBJECT TO FURTHER DESIGN ADVICE

GFA DEFINITION

GROSS FLOOR AREA (GFA) FOR A BUILDING, MEANS THE TOTAL FLOOR AREA OF ALL STOREYS OF THE BUILDING, MEASURED FROM THE OUTSIDE OF THE EXTERNAL WALLS AND THE CENTRE OF ANY COMMON WALLS OF THE BUILDING, OTHER THAN THE AREAS USED FOR -

- BUILDING SERVICES, PLANT OR EQUIPMENT, OR
- ACCESS BETWEEN LEVELS, OR
- A GROUND FLOOR PUBLIC LOBBY, OR
- A MALL, OR
- PARKING, LOADING OR MANOEUVRING VEHICLES, OR
- UNENCLOSED PRIVATE BALCONIES WHETHER ROOFED OR NOT

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PROJECT
ROAD TRAFFIC NOISE ASSESSMENT
PARK RIDGE SERVICE CENTRE
17-25 PARK RIDGE ROAD
PARK RIDGE QLD

TITLE
ACOUSTIC BARRIER LOCATIONS

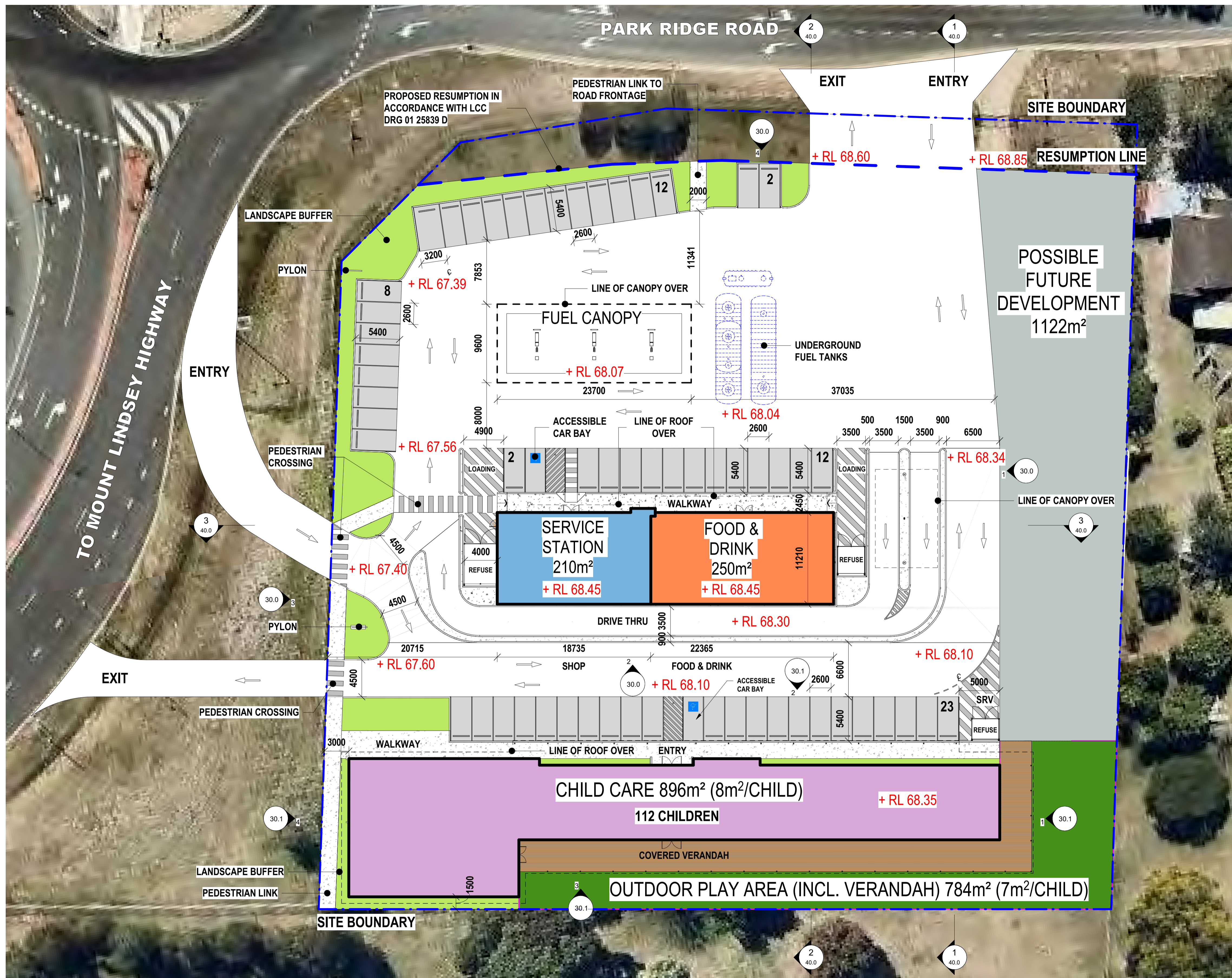
JOB	PARK RIDGE	FIGURE 4
JOB NO.	17-158	
DATE	19/01/18	DWG NUMBER
SCALE	1:800 (A4)	
REV.		17-158-4



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ABN 94 010 833 084

Attachment 1

Development Site Plans



GFA AREA		CAR REQ.
BUILDING	AREA	
SERVICE STATION SHOP	210 m ²	11
FOOD & DRINK	250 m ²	25
CHILDCARE CENTRE	896 m ²	23
TOTAL GFA	1357 m ²	56
CARS PROVIDED		59

SITE COVER		
	AREA	
SITE COVER (ROOFED)	1941 m ²	25.7%

LANDSCAPING RATIO		
SURFACE TYPE	AREA	% OF DEVELOPMENT SITE COVERAGE
IMPERVIOUS	6615 m ²	87%
LANDSCAPE	952 m ²	13%
TOTAL AREA	7567 m ²	

EXISTING LEVELS:

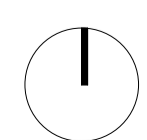
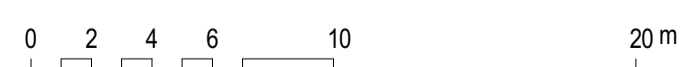
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1 SITE PLAN
1:250



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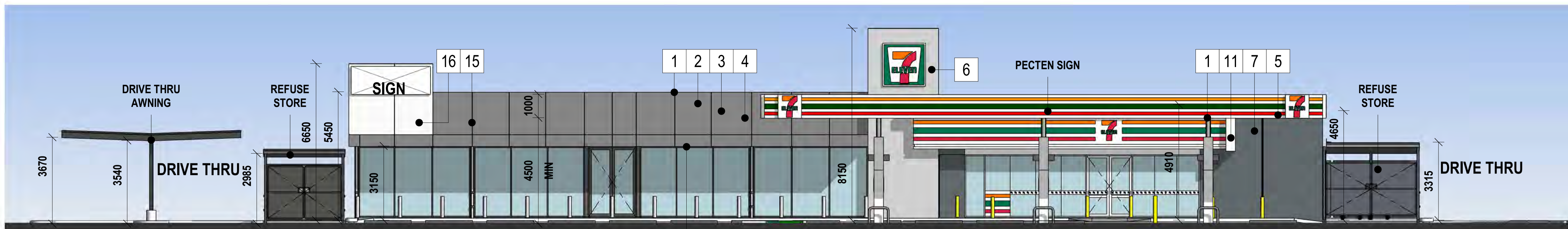
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As indicated @ A1

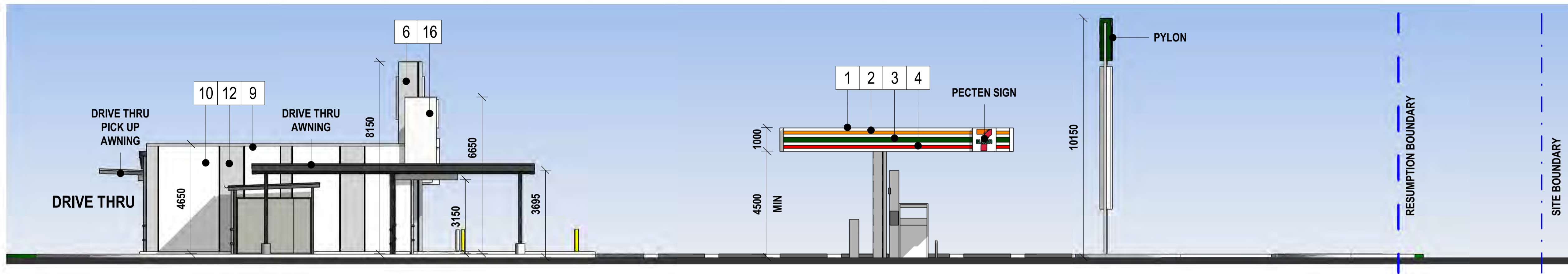
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16/01/2018

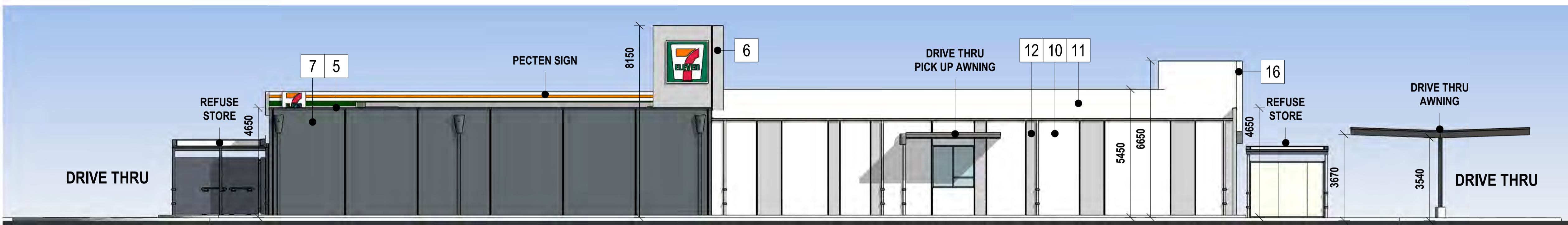
rev. 9



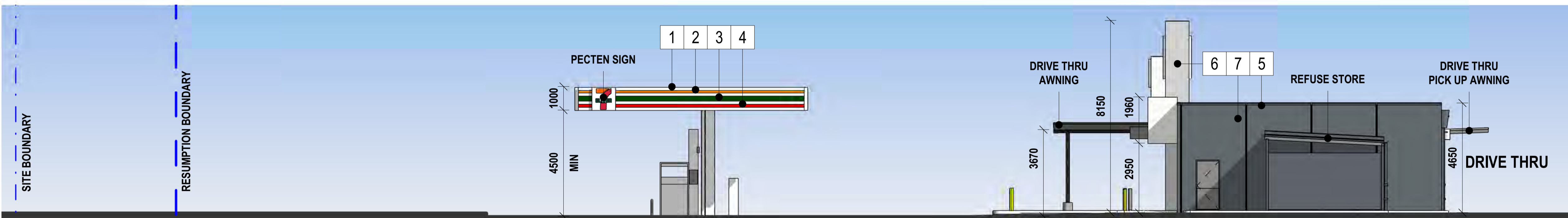
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1 RETAIL EAST ELEVATION
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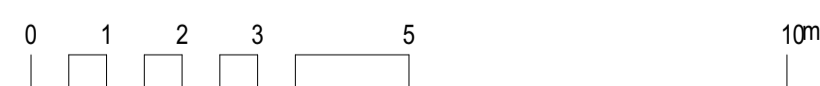


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3 RETAIL WEST ELEVATION
1 : 100

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3	7-11 GREEN
4	7-11 RED
5	COLORBOND IRONSTONE
6	SILVER GREY PAINT FINISH
7	PAINT FINISH GONDOLA GREY
8	TIMBER EFFECT HPL CLADDING
9	COLORBOND CAPPINGS & FLASHINGS
10	PLAIN GREY CONCRETE
11	COLORBOND SURFMIST
12	TEXTURED CONCRETE FINISH
15	ACM CLADDING CHARCOAL GREY
16	ACM CLADDING OFF WHITE
17	LIGHT BLUE LOUVRES
18	PAINTED GREY HORIZONTAL CLADDING
19	ORANGE HPL CLADDING
20	CFC SHEET CLADDING EXPRESSED JOINT PAINTED WHITE
21	PAINTED WHITE VERTICAL CLADDING
23	MASONRY BRICK



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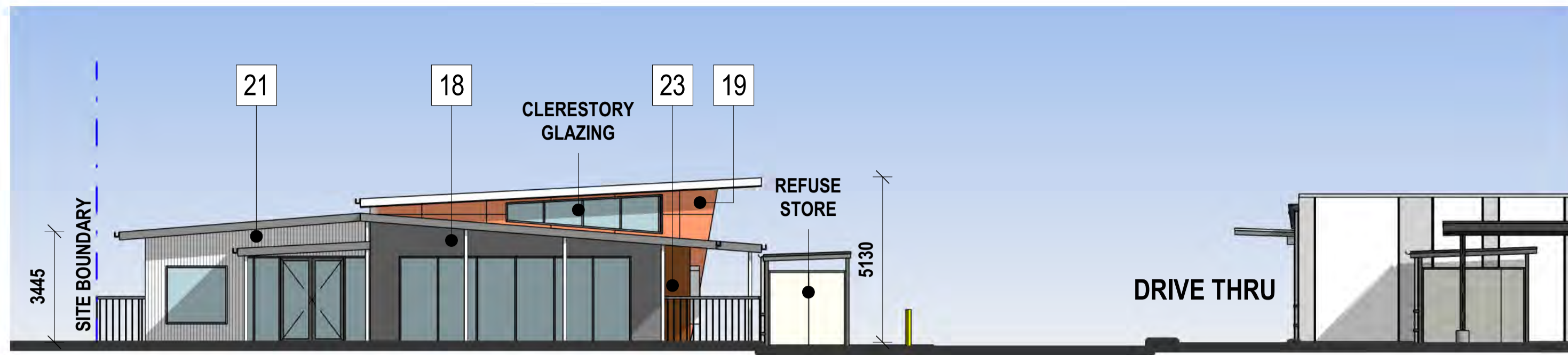
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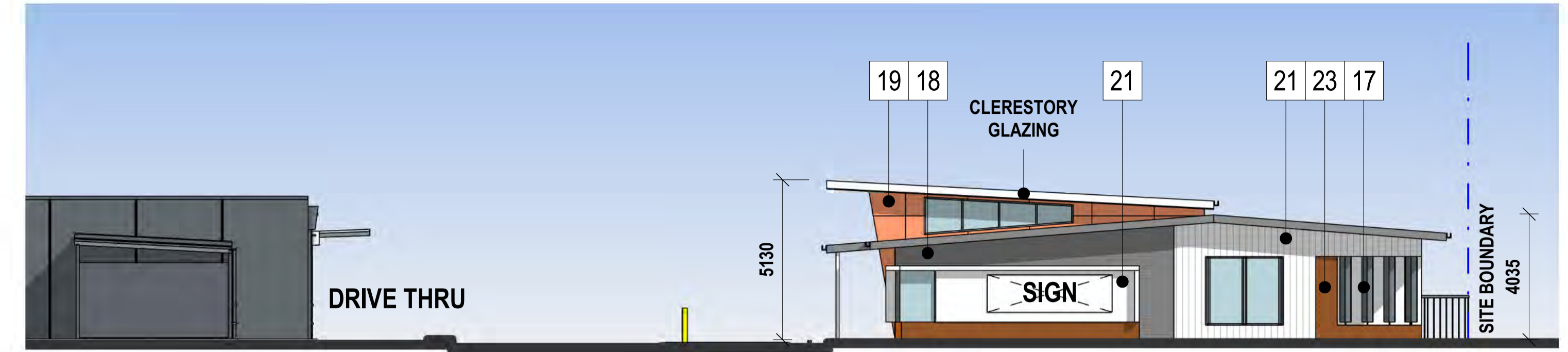
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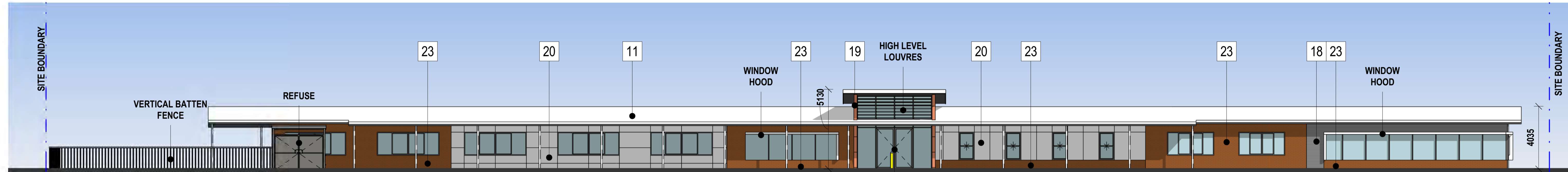
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15/01/2018
A30.0
rev. 4



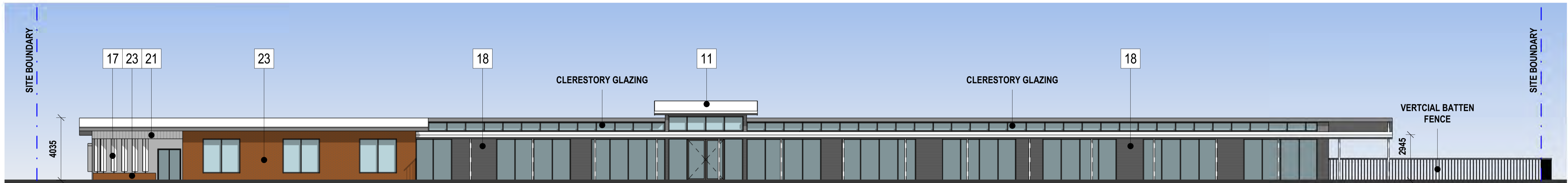
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4 CHILD CARE WEST ELEVATION
1: 125



2 CHILD CARE NORTH ELEVATION
1: 125



3 CHILD CARE SOUTH ELEVATION
1: 125

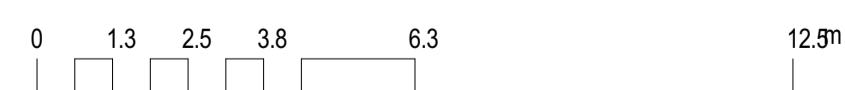
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3	7-11 GREEN
4	7-11 RED

FINISHES LEGEND	
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6	SILVER GREY PAINT FINISH
7	PAINT FINISH GONDOLA GREY
8	TIMBER EFFECT HPL CLADDING

FINISHES LEGEND	
9	COLORBOND CAPPINGS & FLASHINGS
10	PLAIN GREY CONCRETE
11	COLORBOND SURFMIST
12	TEXTURED CONCRETE FINISH

FINISHES LEGEND	
15	ACM CLADDING CHARCOAL GREY
16	ACM CLADDING OFF WHITE
17	LIGHT BLUE LOUVRES
18	PAINTED GREY HORIZONTAL CLADDING

FINISHES LEGEND	
19	ORANGE HPL CLADDING
20	CFC SHEET CLADDING EXPRESSED JOINT PAINTED WHITE
21	PAINTED WHITE VERTICAL CLADDING
23	MASONRY BRICK



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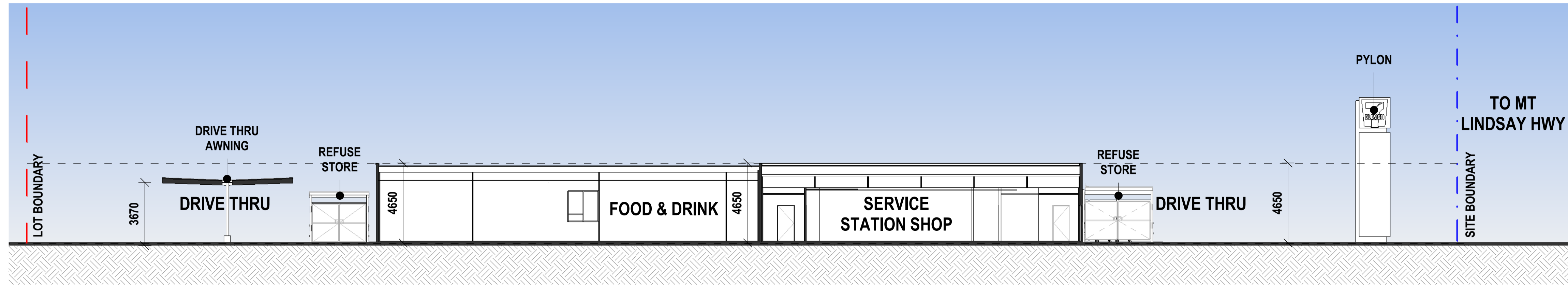
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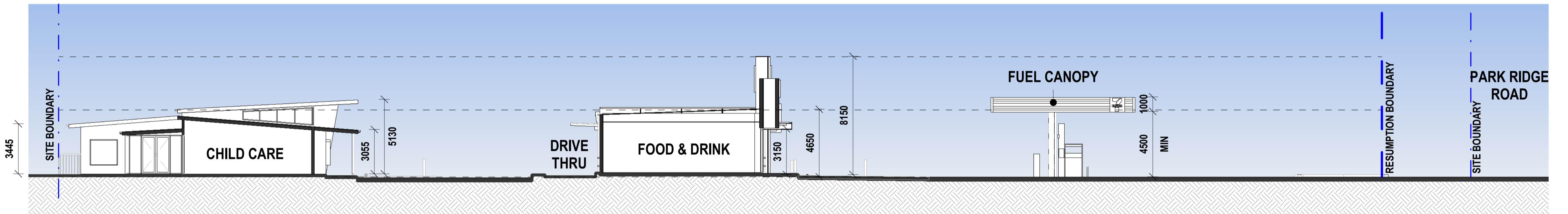
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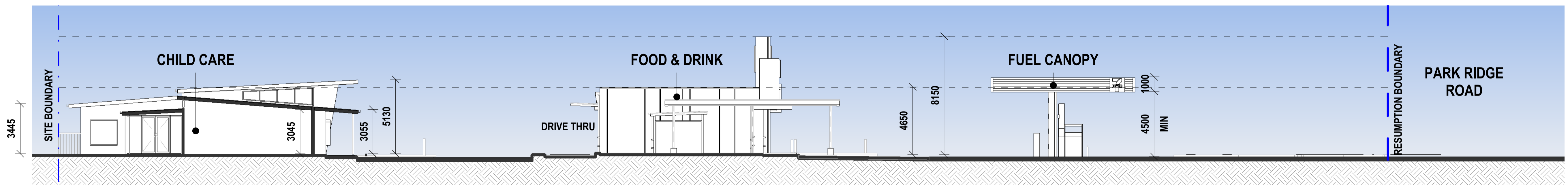
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A30.1
15/01/2018
rev. 4



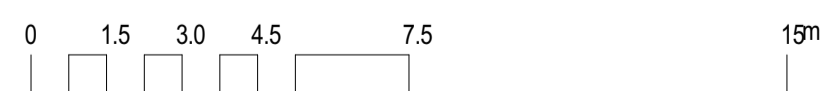
3 SITE SECTION 3
10.0 1: 150



2 SITE SECTION 2
10.0 1: 150



1 SITE SECTION 1
10.0 1: 150



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SECTIONS

1: 150 @ A1

A40.0

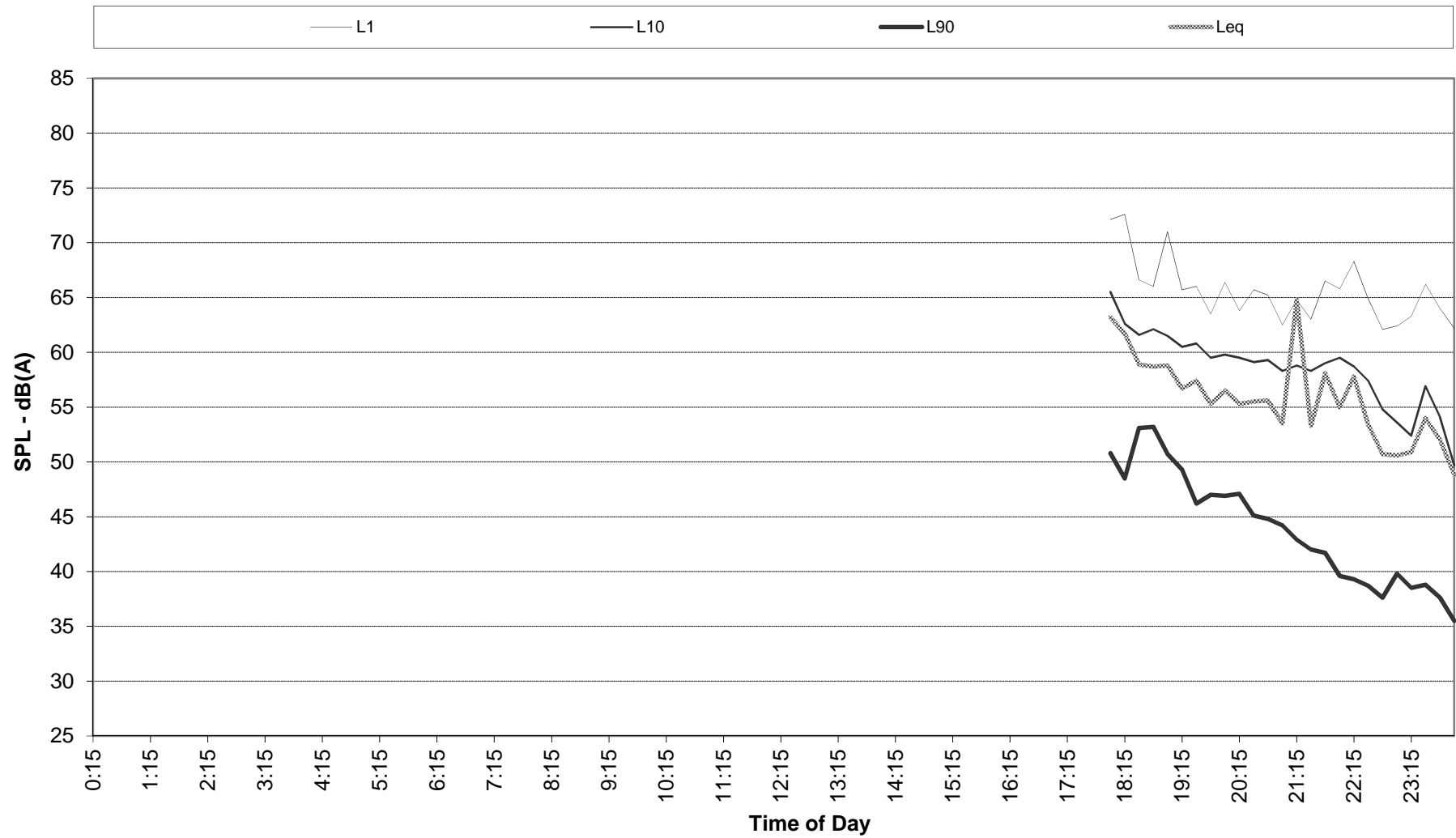
15/01/2018

rev. 4

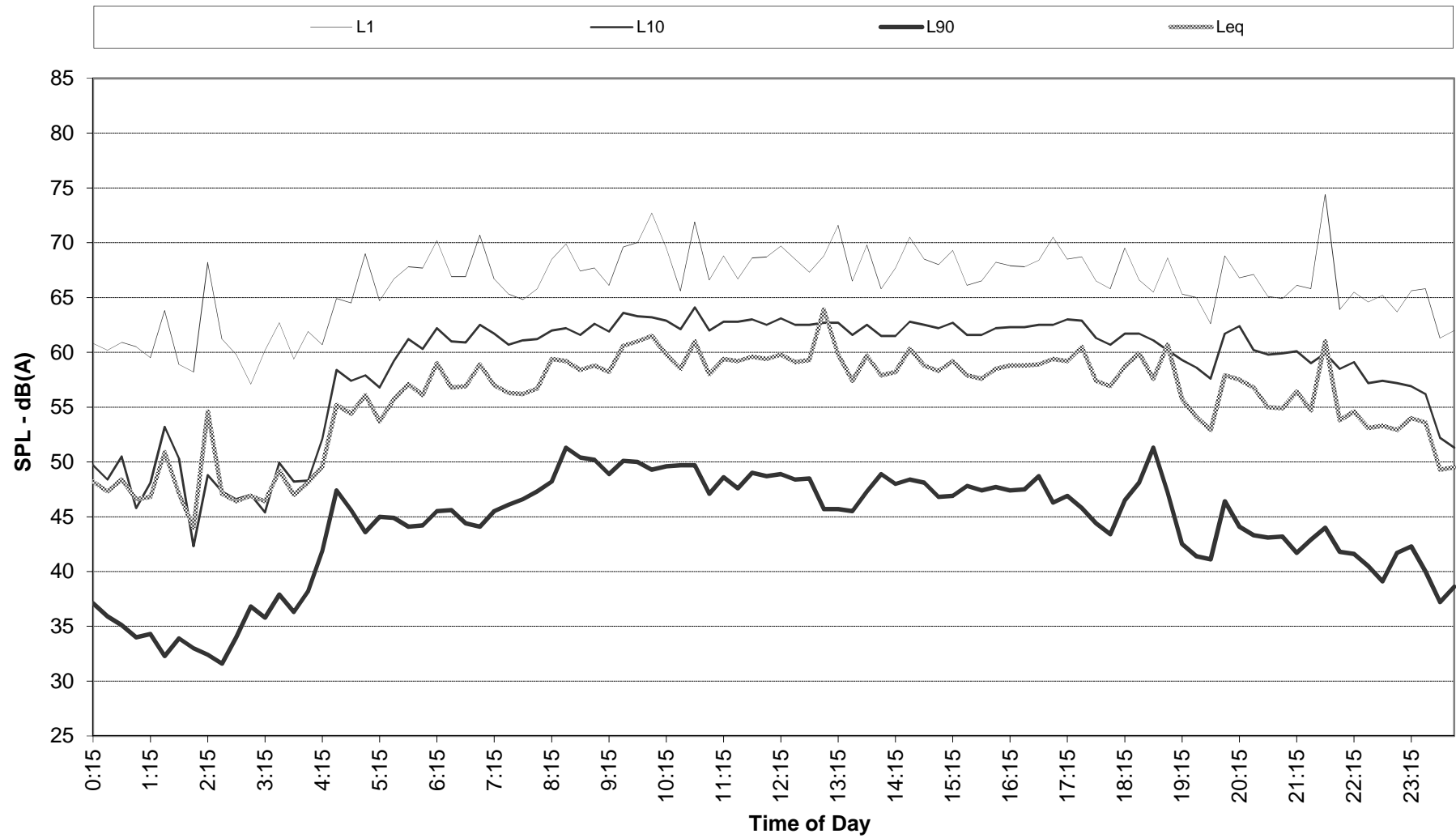
Attachment 2

Noise Datalogger Plots

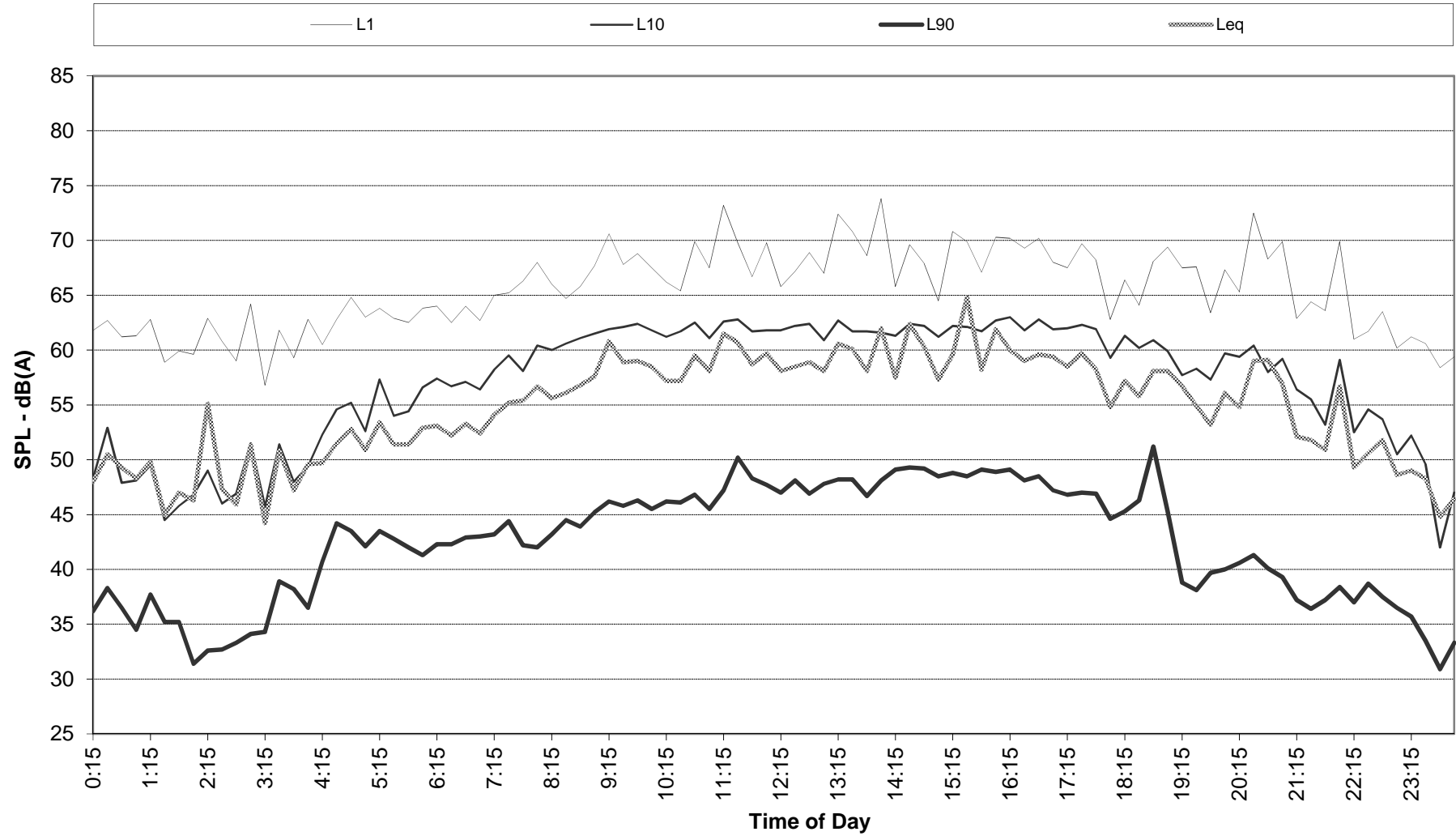
Recorded Statistical Noise Levels for Park Ridge 17-158 - 17-25 Park Ridge Road - 10-Nov-2017 - Friday



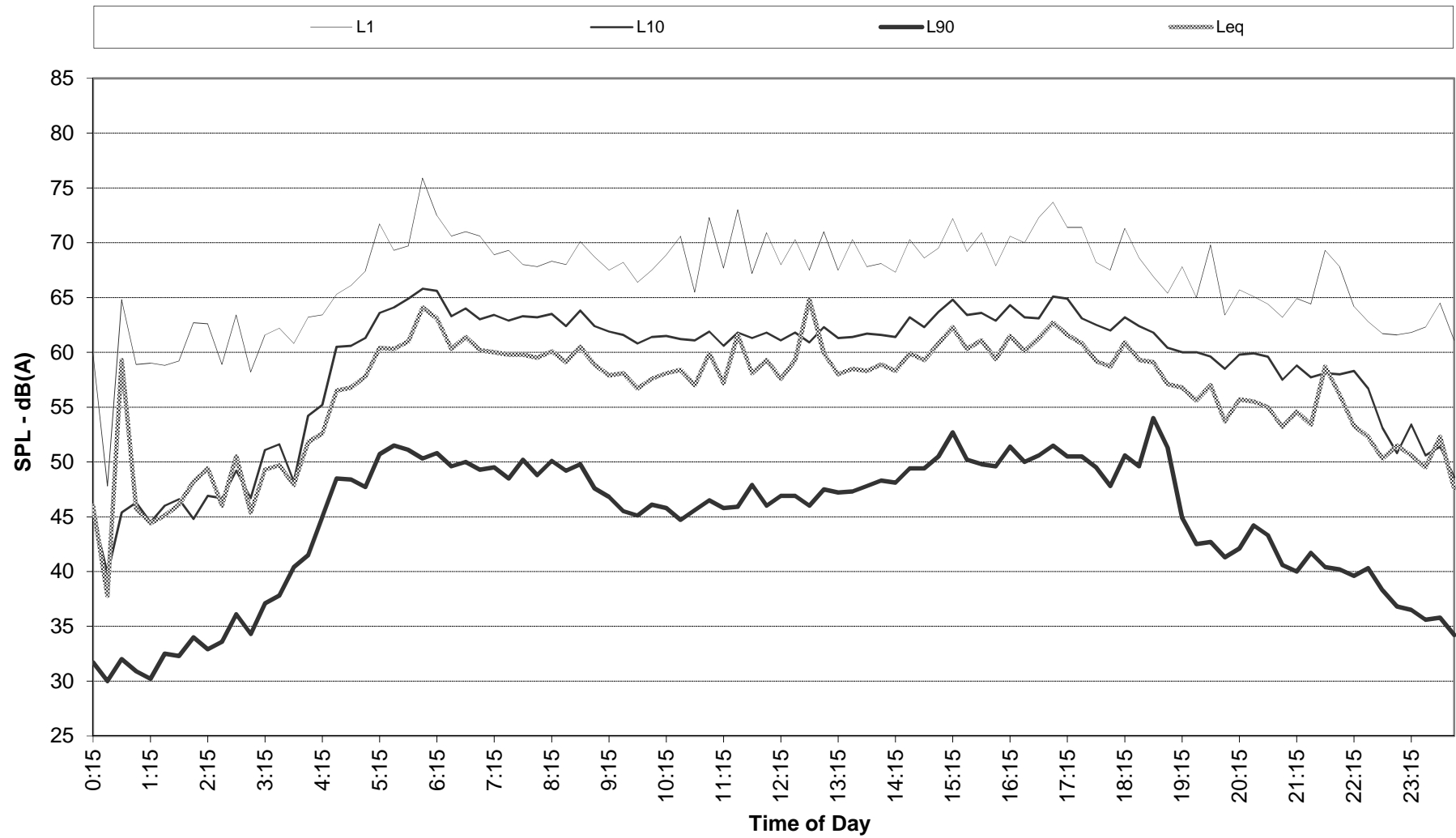
Recorded Statistical Noise Levels for Park Ridge 17-158 - 17-25 Park Ridge Road - 11-Nov-2017 - Saturday



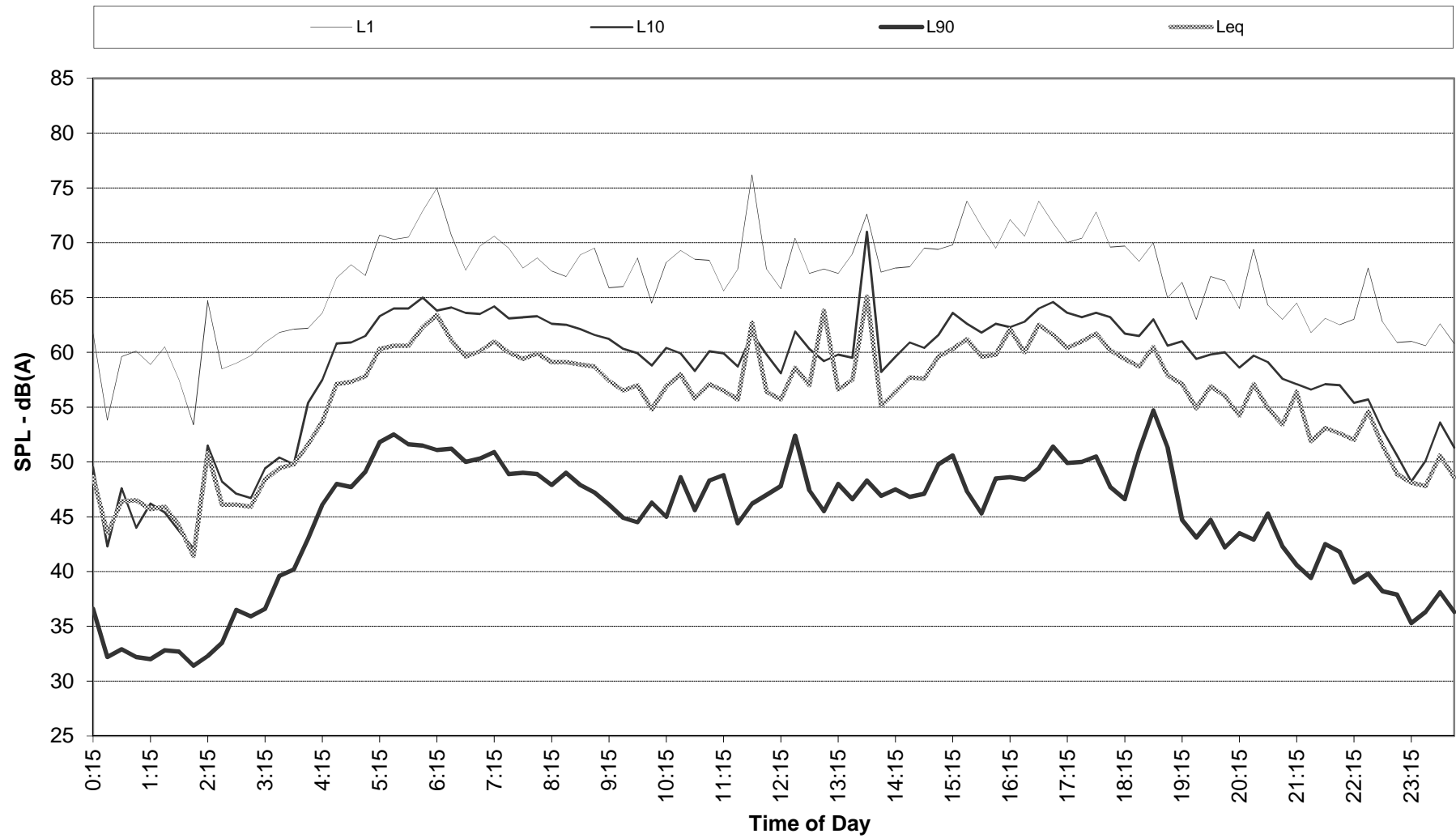
Recorded Statistical Noise Levels for Park Ridge 17-158 - 17-25 Park Ridge Road - 12-Nov-2017 - Sunday



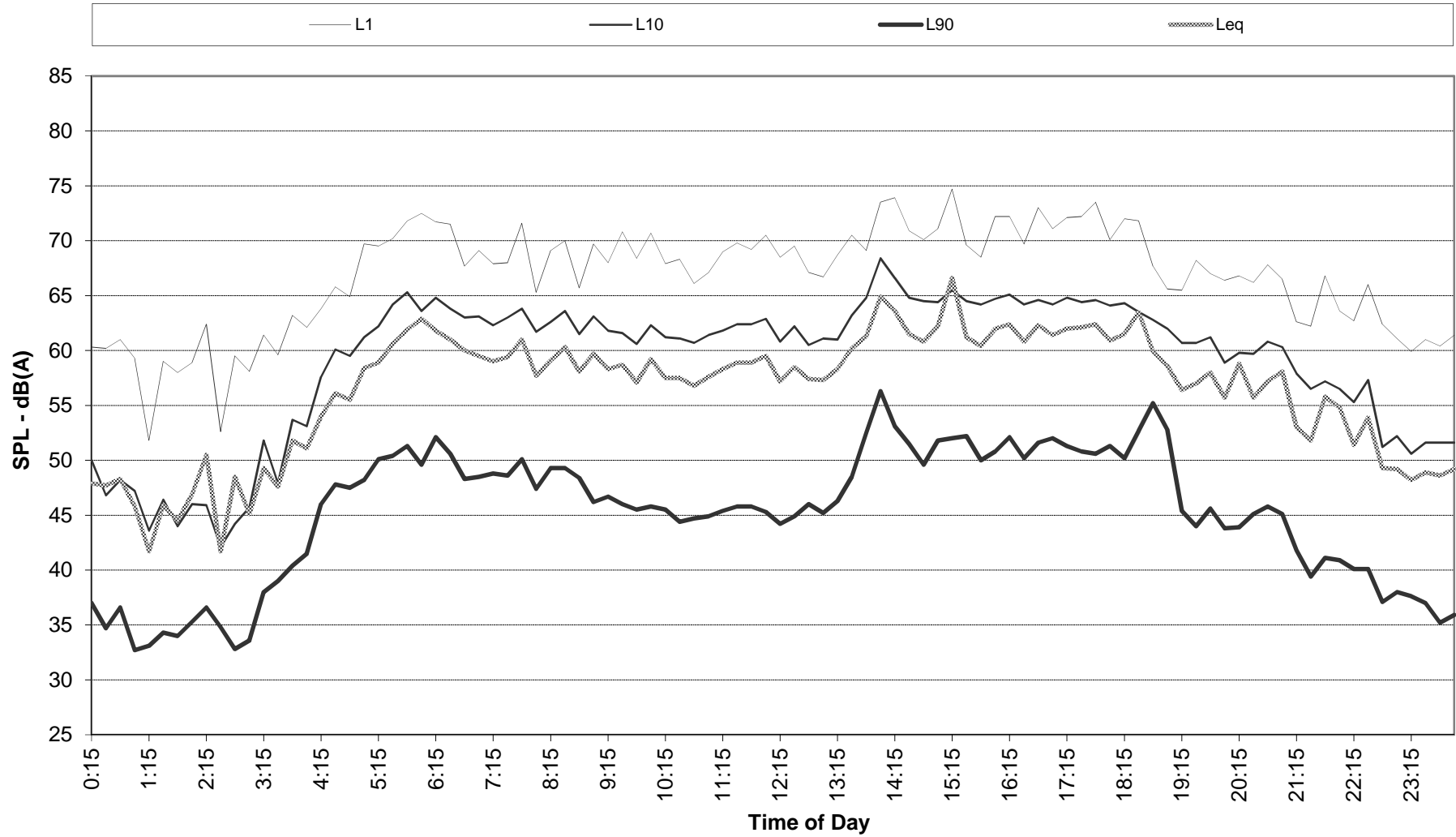
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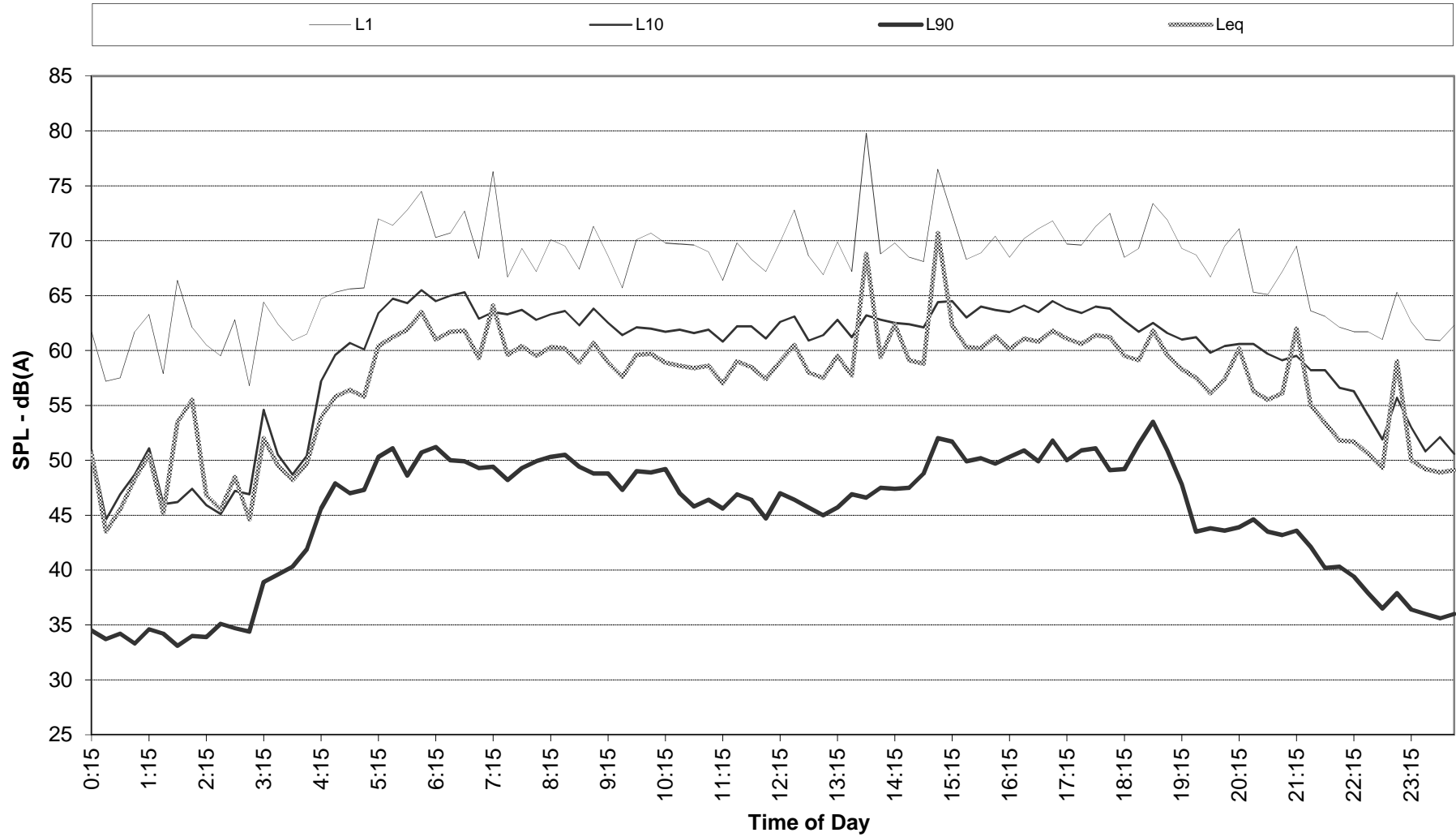
Recorded Statistical Noise Levels for Park Ridge 17-158 - 17-25 Park Ridge Road - 14-Nov-2017 - Tuesday



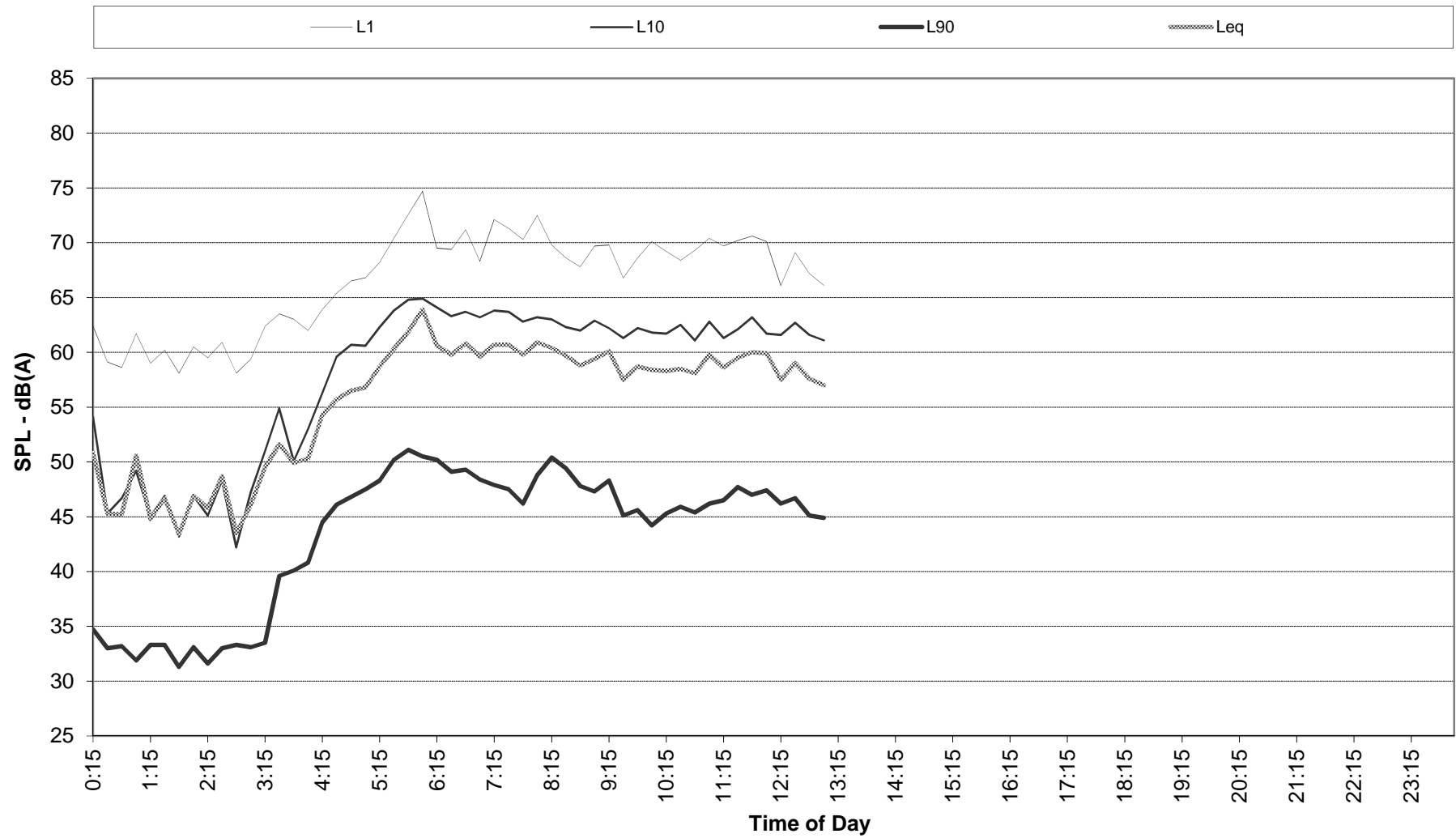
Recorded Statistical Noise Levels for Park Ridge 17-158 - 17-25 Park Ridge Road - 15-Nov-2017 - Wednesday



Recorded Statistical Noise Levels for Park Ridge 17-158 - 17-25 Park Ridge Road - 16-Nov-2017 - Thursday

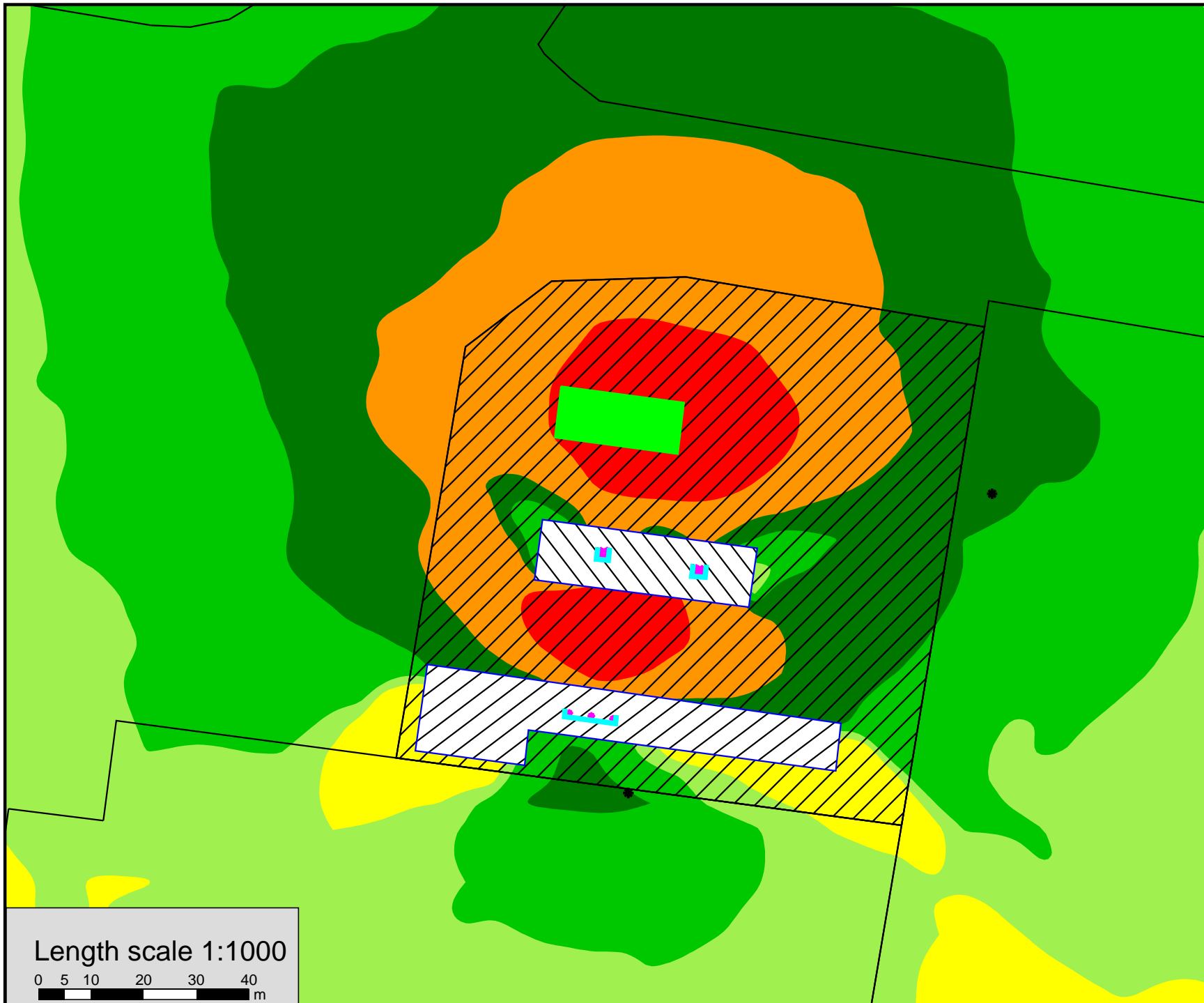


Recorded Statistical Noise Levels for Park Ridge 17-158 - 17-25 Park Ridge Road - 17-Nov-2017 - Friday



Attachment 3

*SoundPLAN 7.3 Noise Model Results
Plant & Equipment Noise Prediction*



Noise level
LA90(9hour)
in dB(A)

<= 30	<= 30
30 <	<= 33
33 <	<= 36
36 <	<= 39
39 <	<= 42
42 <	<= 45
45 <	<= 48
48 <	<= 51
51 <	<= 51

Legend

- Cadastral
- ▨ Main building
- Roof area
- Point receiver
- Wall
- Point source

Park Ridge 17-158

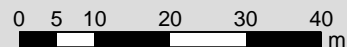
**Mechanical Plant
Noise Impact**

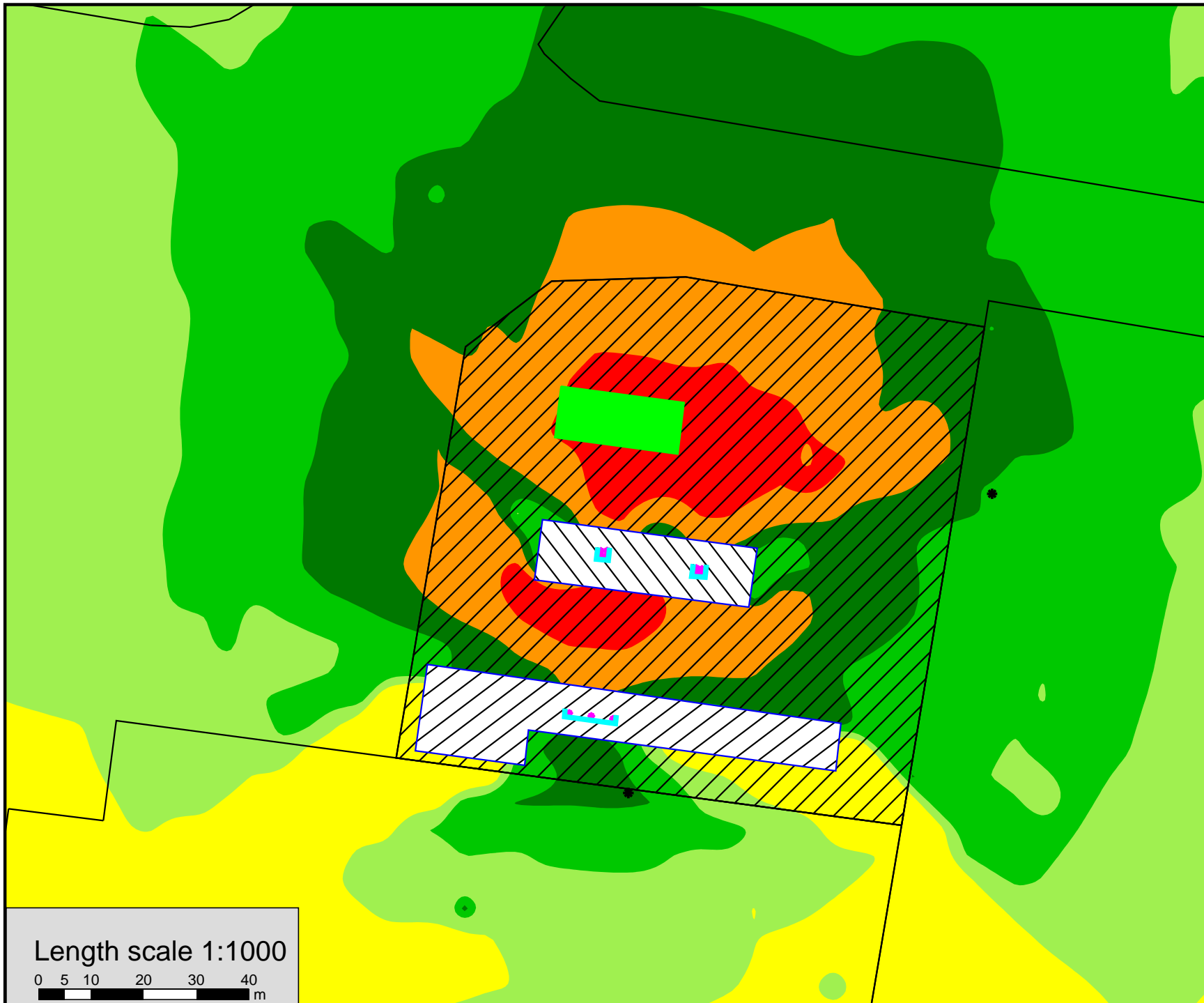
Night-time Period

January 2018



Length scale 1:1000





Noise level
LAm_{ax}
in dB(A)

<= 30	<= 30
30 <	<= 33
33 <	<= 36
36 <	<= 39
39 <	<= 42
42 <	<= 45
45 <	<= 48
48 <	<= 51

Legend

- Cadastral
- ▨ Main building
- Roof area
- * Point receiver
- Wall
- Point source

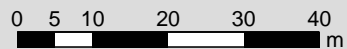
Park Ridge 17-158

Mechanical Plant
Noise Impact

Night-time L_{max}

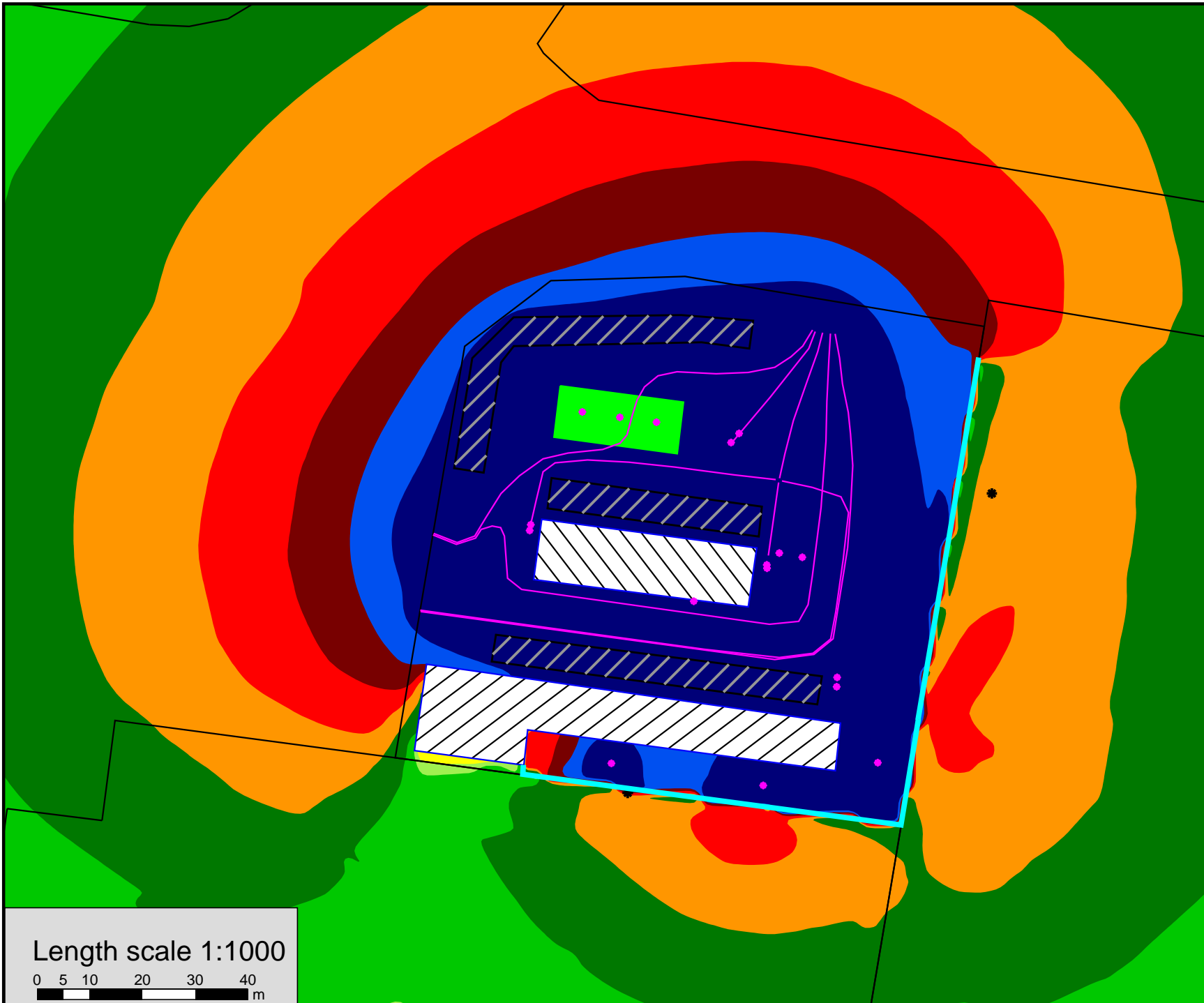
January 2018

Length scale 1:1000



Attachment 4

*SoundPLAN 7.3 Noise Model Results
Site Traffic, Servicing and Car Parking Noise Prediction*



Noise level
L_{Aeq}(11hour)
in dB(A)

	<= 36
	36 < <= 39
	39 < <= 42
	42 < <= 45
	45 < <= 48
	48 < <= 51
	51 < <= 54
	54 < <= 57
	57 <

Legend

- Cadastral
- Main building
- Roof area
- Point receiver
- Wall
- Point source
- Parking lot
- Line source

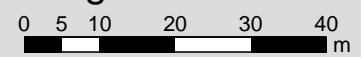
Park Ridge 17-158

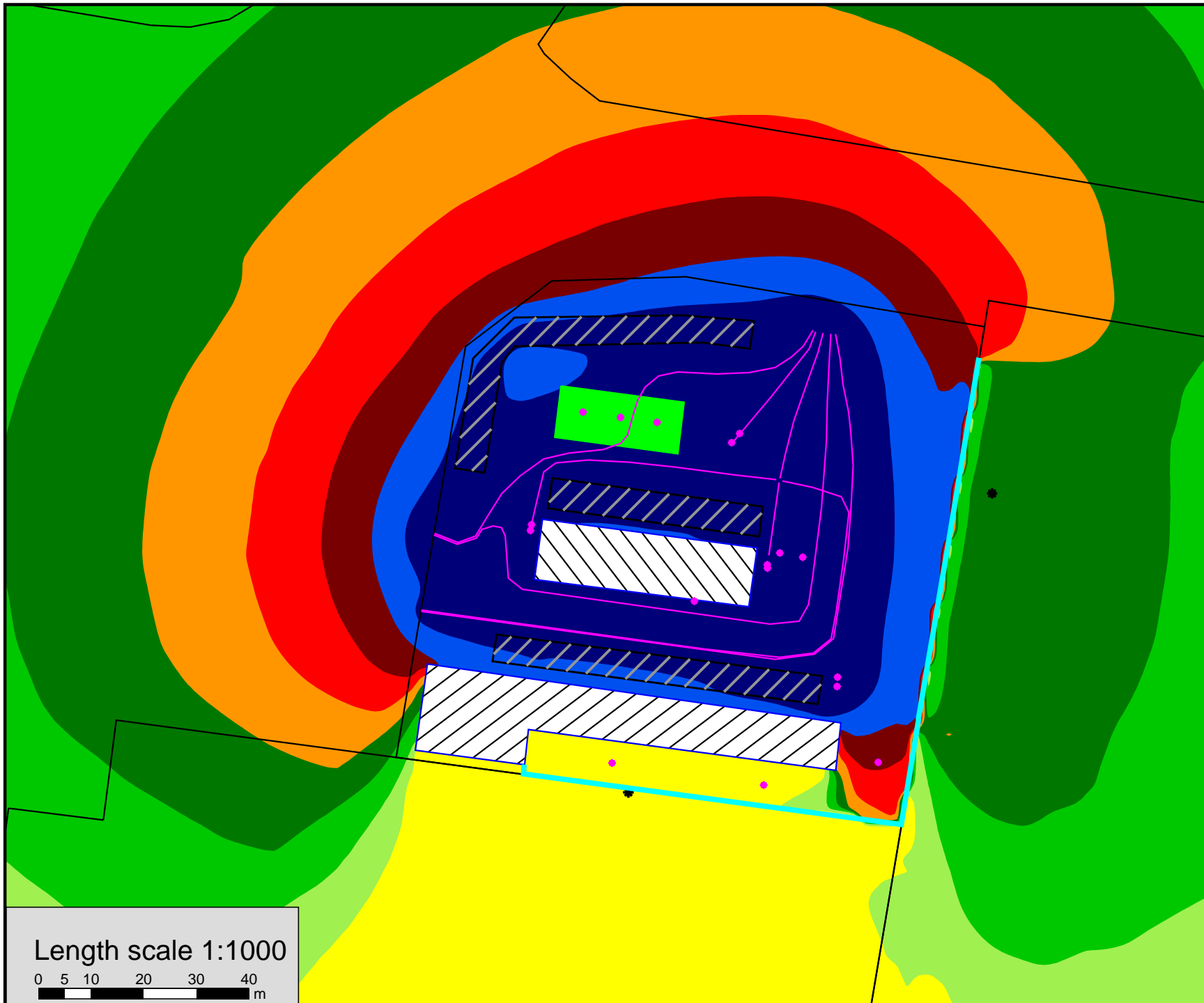
**Non-steady Operational
Noise Impact**

Day time period

January 2018

Length scale 1:1000












Noise level
L_{Aeq}(4hour)
in dB(A)

<= 36	Yellow
36 < <= 39	Light Green
39 < <= 42	Green
42 < <= 45	Dark Green
45 < <= 48	Orange
48 < <= 51	Red
51 < <= 54	Dark Red
54 < <= 57	Blue
> 57	Dark Blue

Legend

- Cadastral
-  Main building
-  Roof area
-  Point receiver
-  Wall
-  Point source
-  Parking lot
-  Line source

Park Ridge 17-158

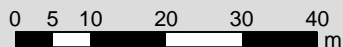
**Non-steady Operational
Noise Impact**

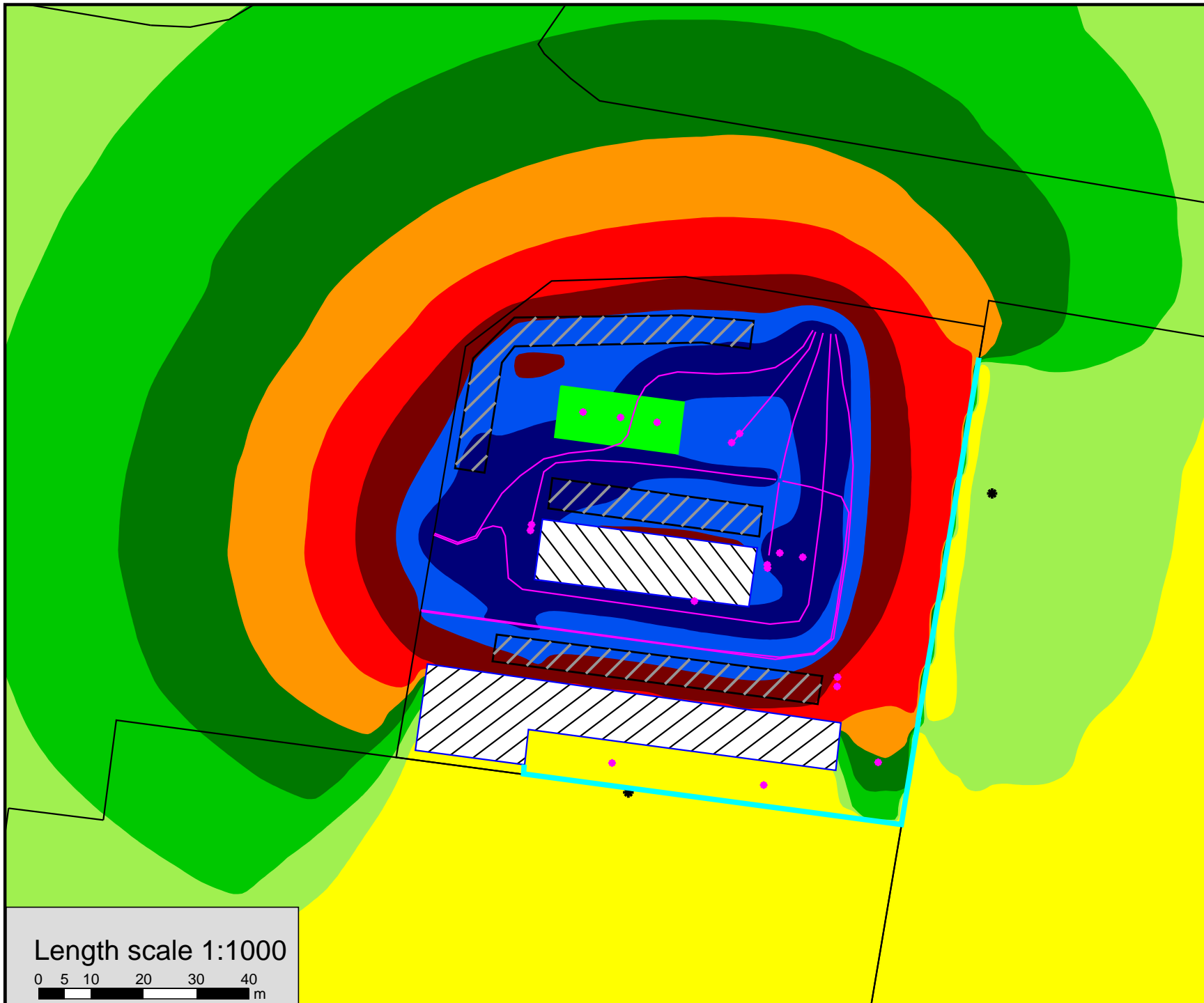
Evening period

January 2018



Length scale 1:1000





Noise level
L_{Aeq}(9hour)
in dB(A)

<= 36	Yellow
36 < <= 39	Light Green
39 < <= 42	Green
42 < <= 45	Dark Green
45 < <= 48	Orange
48 < <= 51	Red
51 < <= 54	Dark Red
54 < <= 57	Blue
> 57	Dark Blue

Legend

- Cadastral
- Main building
- Roof area
- Point receiver
- Wall
- Point source
- Parking lot
- Line source

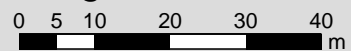
Park Ridge 17-158

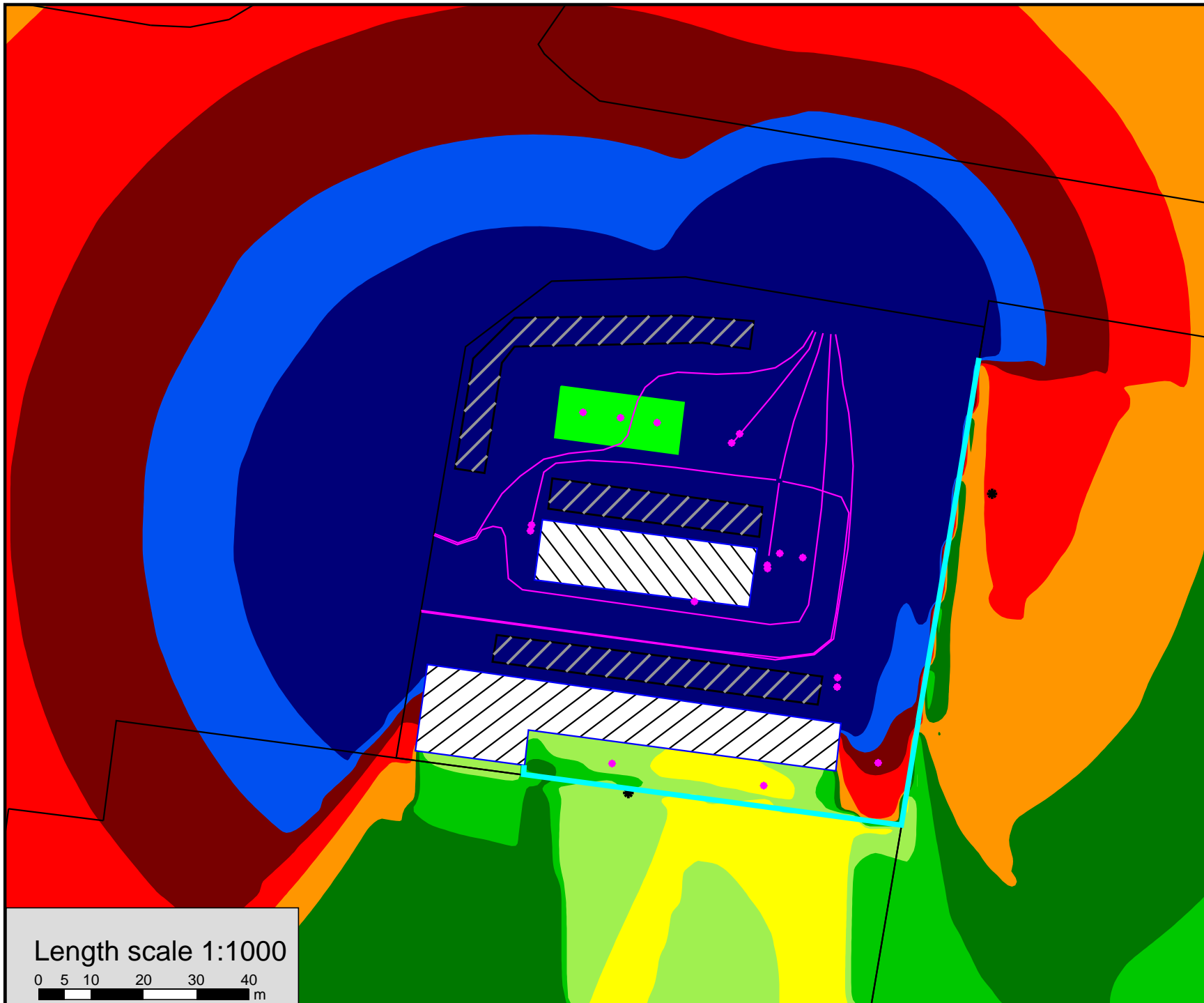
**Non-steady Operational
Noise Impact**

Night-time period

January 2018

Length scale 1:1000





Noise level
L_{Amax}
in dB(A)

<= 36	Yellow
36 < <= 39	Light Green
39 < <= 42	Green
42 < <= 45	Dark Green
45 < <= 48	Orange
48 < <= 51	Red
51 < <= 54	Dark Red
54 < <= 57	Blue
> 57	Dark Blue

Legend

- Cadastral
- Main building
- Roof area
- Point receiver
- Wall
- Point source
- Parking lot
- Line source

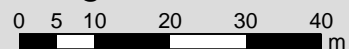
Park Ridge 17-158

**Non-steady Operational
Noise Impact**

Night-time L_{max}

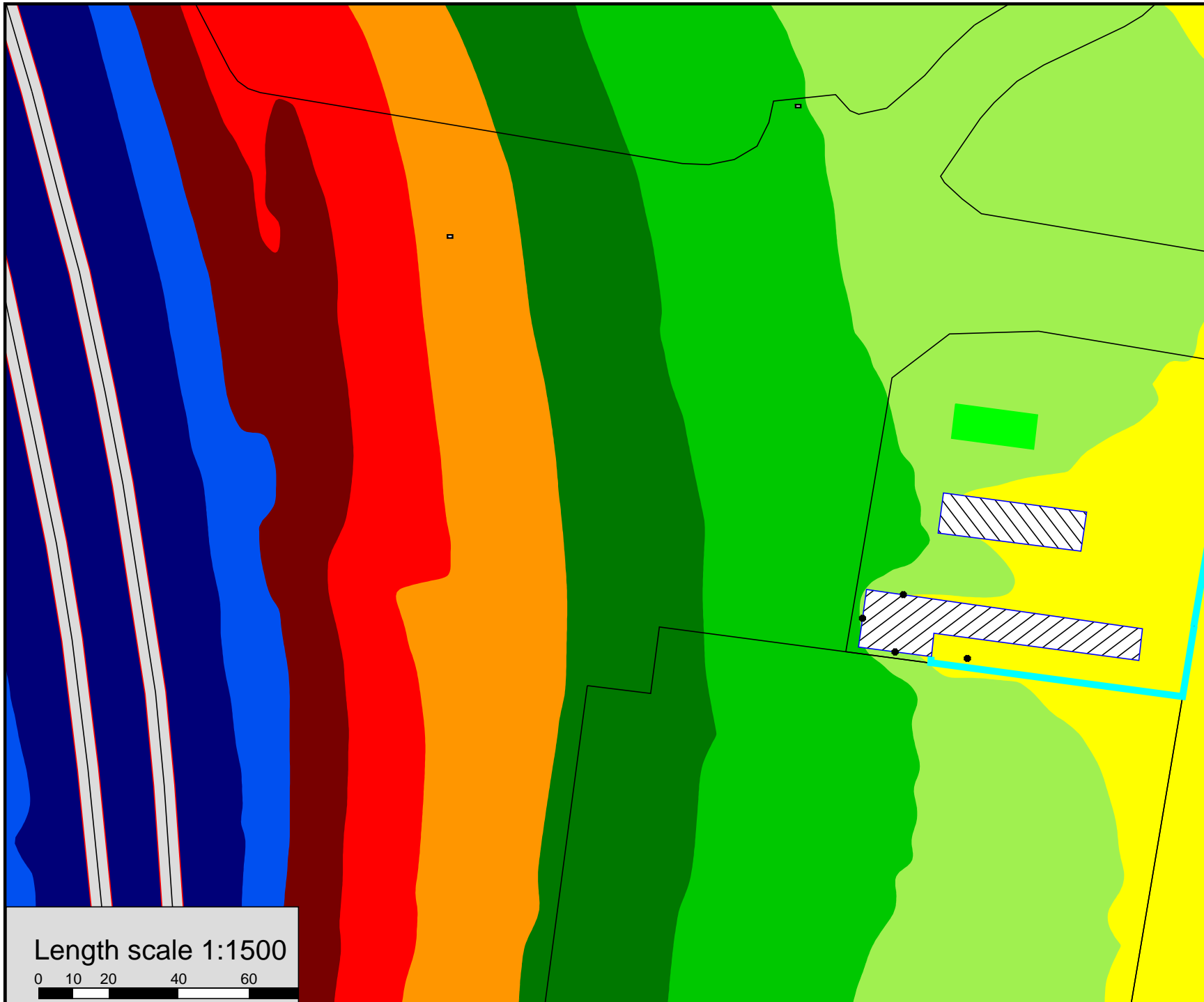
January 2018

Length scale 1:1000



Attachment 5








*SoundPLAN 7.3 Noise Model Results
Traffic Noise Impact Upon Childcare Centre*



Noise level
 Leq(1hr)
 incl. facade reflection
 in dB(A)

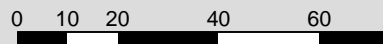
Yellow	<= 54
Light Green	54 < <= 57
Green	57 < <= 60
Dark Green	60 < <= 63
Orange	63 < <= 66
Red	66 < <= 69
Dark Red	69 < <= 72
Blue	72 < <= 75
Dark Blue	75 <

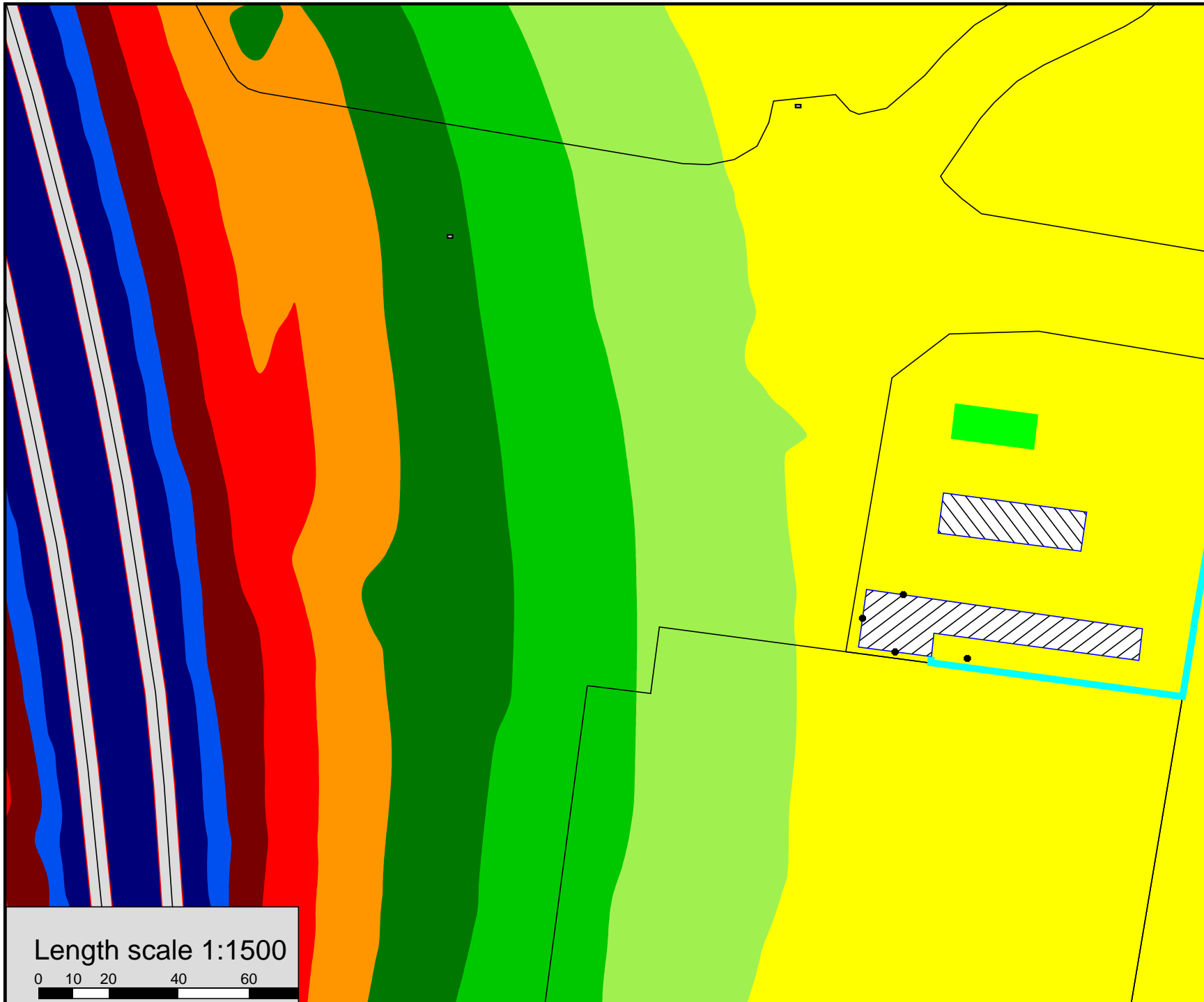
Legend

-  Road
-  Cadastral
-  Surface
-  Wall
-  Main building
-  Roof area
-  Point receiver

Park Ridge 17-182
Year 2029 Traffic Noise Impact
External Noise Impact
January 2018

Length scale 1:1500












Noise level
L10(12hr)
in dB(A)

<= 54	Yellow
54 <	Light Green
57 <	Green
60 <	Dark Green
63 <	Orange
66 <	Red
69 <	Dark Red
72 <	Blue
75 <	Dark Blue

Legend

-  Road
-  Cadastral
-  Surface
-  Wall
-  Main building
-  Roof area
-  Point receiver

Park Ridge 17-182
Year 2029 Traffic Noise Impact
Outdoor Play Area
January 2018

Length scale 1:1500

0 10 20 40 60

