REPORT

SYDNEY BUSINESS PARK STAGE 3 WAREHOUSE 2

MODIFICATION 3

NOISE IMPACT ASSESSMENT
RWDI # 2200062.02
27 September 2022

SUBMITTED TO

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

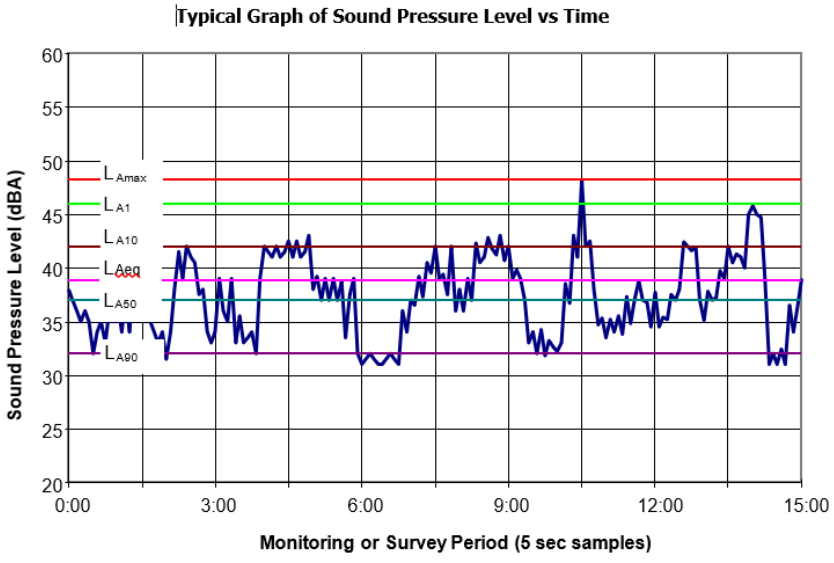
L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.



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GLOSSARY OF ACOUSTIC TERMS

1 INTRODUCTION

RWDI Australia has been commissed by Sydney Business Park to prepare a noise impact assessment (NIA) to support a proposal to modify Development Consent SSD-10477 relating to Sydney Business Park Stage 3. Sydney Business Park Stage 3 (SSD-10477) was approved on 28 Janurary 2022.

1.1 Approved Development

The key components of the approved Sydney Business Park Stage 3 (SSD-10477) include:

- site subdivision;
- vegetation clearing and earthworks;
- construction of two estate roads and associated intersections;
- construction and operation of four warehouse and distribution facilities with ancillary offices, including:
    - Warehouse 1 (TJX Facility) – 44,560 m2 total building area;
    - Warehouse 2 (unidentified end user) – 16,835 m2 total building area;
    - Warehouse 3 (unidentified end user) – 3,860 m2 total building area;
    - Warehouse 4 (API Facility) – 34,201 m2 total building area; and
- ancillary development including car parking, infrastructure provision and landscaping.

Sydney Business Park has since been approved for two modifications:

- **MOD1**, approved 20 August 2021: Minor archictural amendments to Warehouse 1
- **MOD2**, approved 9 February 2022: Modify condition B5(c) of the development consent to alter the timing for entering into the WAD for the upgrade works to the intersection of Hollinsworth Road and Richmond Road.

Figure 1-1 presents the layout of Stage 3 and surrounding receivers.

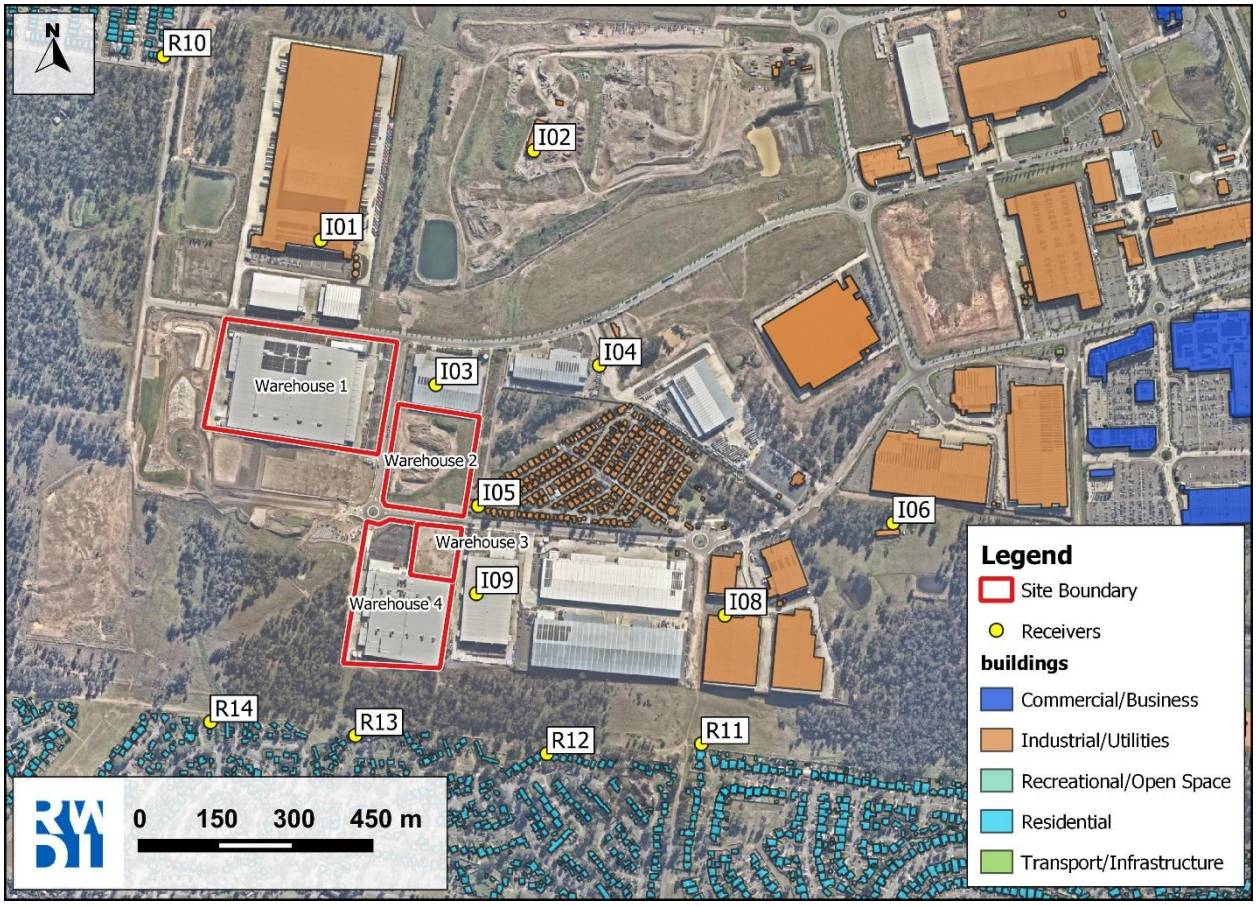


Figure 1-1: Sydney Business Park Stage 3 (SSD-10477)

1.2 Noise Limits

Table 2 of the Sydney Business Park Stage 3 (SSD-10477) Conditions of Approval provides operational noise limits and is reproduced below.

Table 1-1 Operational Noise limits

Location	Day $L_{Aeq(period)}$	Evening $L_{Aeq(period)}$	Night $L_{Aeq(period)}$	Night L_{AFmax}
I5 – 140 Hollinsworth Road, Marsden Park[1]	46	46	43	N/A
All residential properties to the north of the site[1]	40	35	35	52
All residential properties to the south of the site[1]	40	38	35	52

Note 1: Noise generated by the development is to be measured and assessed in accordance with the provisions of the EPA Noise Policy for Industry (2017), including noise-enhancing meteorological conditions and corrections for annoying noise characteristics. Refer to the plan in Appendix 2 for the location of residential sensitive receivers.

Note 2: Noise limit applies where an existing residence is affected by an increase in traffic noise generated by the development of greater than 2.0dBA. Additional road traffic noise emitted from public roads is to be measured and assessed in accordance with the provisions of the EPA NSW Road Noise Policy

No sleep disturbance noise limits are provided for Receiver I5 in Table 2 of the Conditions of Approval. In this instance RWDI has referred to the NSW EPA's *Noise Policy for Industry* (*NPfI*).

The approach recommended by the *NPfI* is to apply the following initial screening noise levels:

- $L_{Aeq,15min}$ 40dBA or the prevailing RBL + 5dB, whichever is the greater; and/or
- L_{AFmax} 52dBA or the prevailing RBL + 15dB, whichever is the greater.

As such, an sleep disturbance screening level of L_{AFmax} 52dBA will be applied for the receivers at I5. The sleep disturbance screening noise levels apply outside bedroom windows during the night period.

Where the screening noise levels cannot be met, a detailed maximum noise level event assessment should be undertaken. It may also be appropriate to consider other guidelines including the NSW *Road Noise Policy* (RNP) which contains additional guidance relating to potential sleep disturbance impacts.

1.3 Proposed Modification

The proposed Modification has been initiated after a committed tenant has confirmed their interest for Warehouse 2. It is proposed to modify Conditions B8(i) and B8(j) to allow 24 hour operation of Warehouse 2. Conditions B8(i) and B8(j) are as follows:

B8(i): there shall be no heavy vehicle movements along the driveway between Warehouse 2 and the eastern boundary between the hours of 10:00 pm and 7:00 am; and

B8(j): all roller doors/shutters on the eastern elevation of Warehouse 2 shall be closed between the hours of 10:00 pm and 7:00 am.

These conditions were introduced to manage noise impacts to receiver I5, which is a caravan park adjacent to the eastern boundary of Warehouse 2. It should be noted that the the EIS considered night time noise impacts to this receiver with 24 hour operation of Warehouse 2. The noise limits for this receiver in the Conditions of Approval were based on the noise modelling results of the EIS which includes contribution from Warehouse 2.

This NIA will present results of revised noise modelling based on the operational requirements of the committed tenant. It is noted that the night time operational requirements of the committed tenant is less than the assumed operations applied in the EIS noise modelling. Specifically, a reduction in heavy vehicle movements (two to one per hour) and removal of forklifts operating on the loading dock.

Figure 1-2 provides a detailed plan for Warehouse 2

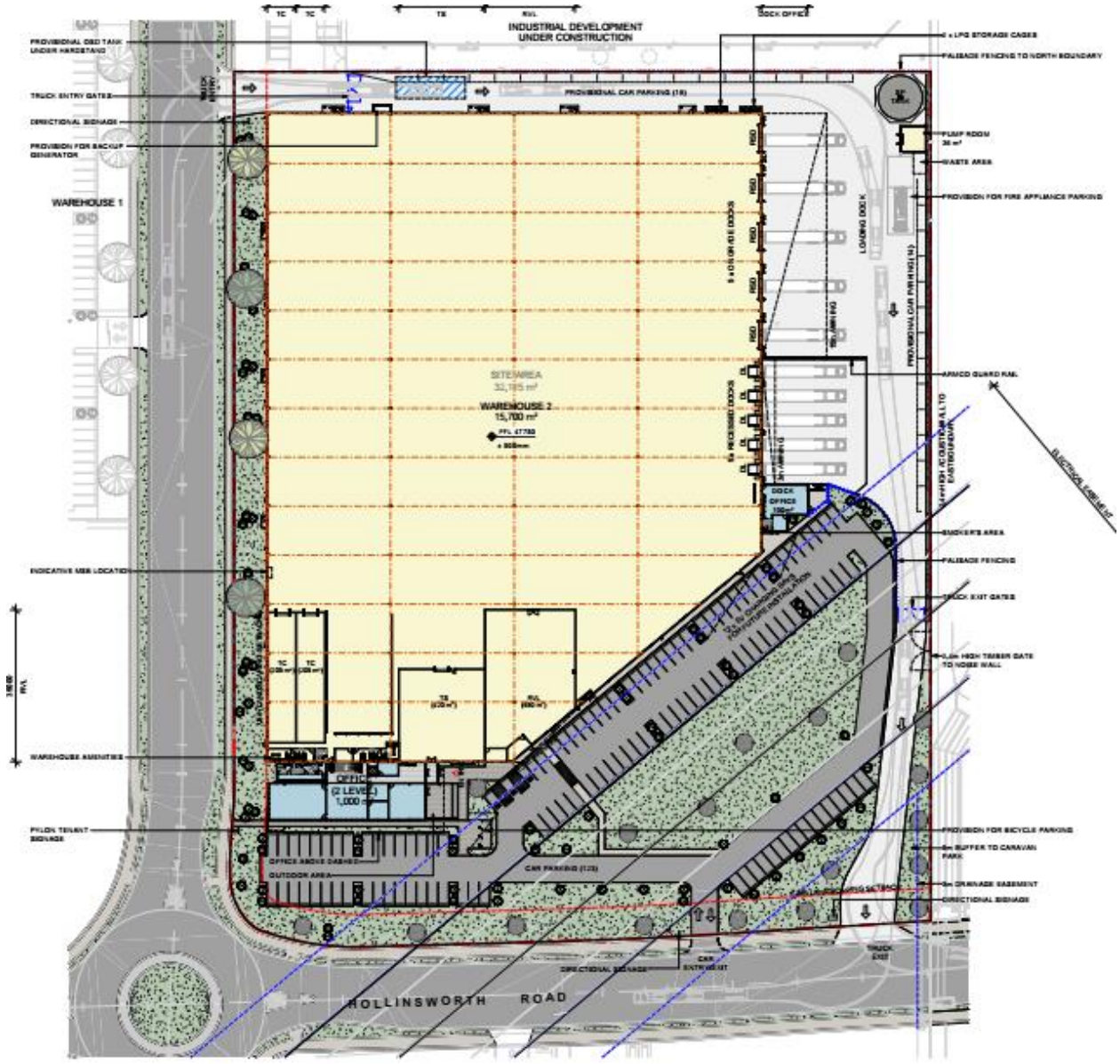


Figure 1-2: Warehouse 2

2 NOISE ASSESSMENT

2.1 Noise Modelling

Noise modelling of the development site was undertaken using the CONCAWE noise prediction algorithm in CadnaA modelling software. CONCAWE and CadnaA have both been accepted by the NSW EPA for use in previous environmental noise assessments and has been widely used in Australia. CONCAWE is explicitly recommended in the SA EPA and VIC EPA technical guidelines for noise assessments.

The noise model was constructed from a combination of aerial photography, existing ground topography, and design ground topography for the development. The local terrain, design of the development, receiver buildings and structures have been digitised in the noise model to develop a three-dimensional representation of the operations of the development and surrounding environment.

The noise model includes a 2.4 m noise barrier on the eastern boundary of Warehouse 2, which was recommended in the EIS.

2.2 Meteorological conditions

The meteorological effects on noise propagation such as temperature inversion and wind are considered in the noise prediction model. Two meteorological scenarios are considered, one is under neutral conditions where temperature inversion and wind have minimal effect on the noise. The second is a worst-case scenario, where temperature inversion and wind affect the noise emissions.

The meteorological conditions applied for noise modelling are consistent with the EIS and is outlined in **Table 2-1**.

Table 2-1 Meteorological conditions adopted for the noise modelling

Assessment period	Meteorological condition	Wind speed (m/s)	Wind direction (°)	Stability category (A to G)
Day/Evening	Standard	0	N/A	D Class
	Noise Enhancing (wind)	3	Worst-Case	D Class
Night	Standard	0	N/A	D Class
	Noise Enhancing (wind)	3	Worst-Case	D Class
	Noise Enhancing (temperature inversion with drainage flow wind)	2	Worst-Case	F Class

2.3 Modelled Noise Sources

Night time operational information has been provided by the tenant. Operations would consists of 1 truck movement per hour (in or out) with trucks reversing into the doors, which will substantially close the door and effectively close the noise source. All doors would remain closed when not in use. Therefore, internal noise from the operation of the warehouse is not considered. It has been assumed that truck reversing includes beeper reversing alarms.

Trucks will enter from the north western entrance of the site and leave via the south eastern exit. No forklift operation is expected outside of the warehouse as trucks load directly into the roller shutter doors. It has been assumed that there would be 32 light vehicle movements during the worst case hour, consistent with the EIS. The noise model also includes a backgup diesel generator. It should be noted that this generator would only be operational during power outages and not part of standard operation.

Noise modelling also includes all other existing noise sources from Warehouses 1, 3, and 4 as modelled in the EIS.

A sleep disturbance assessment has been completed for reversing alarms from trucks on site.

Table 2-2 presents the sound power levels applied in noise modelling and **Figure 2-1** presents the location of modelled noise sources. A detailed breakdown of movements is provided in **Appendix B**.

Table 2-2 Noise Source Sound Power Levels – dBA

Noise Source	Noise Characteristic	Sound Power Level
Heavy Vehicle[1] @ 10 km/h	Quasi-steady	106 L_{Aeq}
Heavy Vehicle Reversing @ 5 km/h	Quasi-steady	111 L_{Aeq}
Light Vehicles on site, up to speed of 40 km/h	Quasi-steady	90 L_{Aeq}
Backup Diesel Generator	Quasi-steady	93 L_{Aeq}
Reversing Alarm	Instantaneous	110 L_{Amax}

Note 1: Heavy vehicle defined as any cargo vehicle with three or more axles with gross vehicle weight > 12,000 kg.

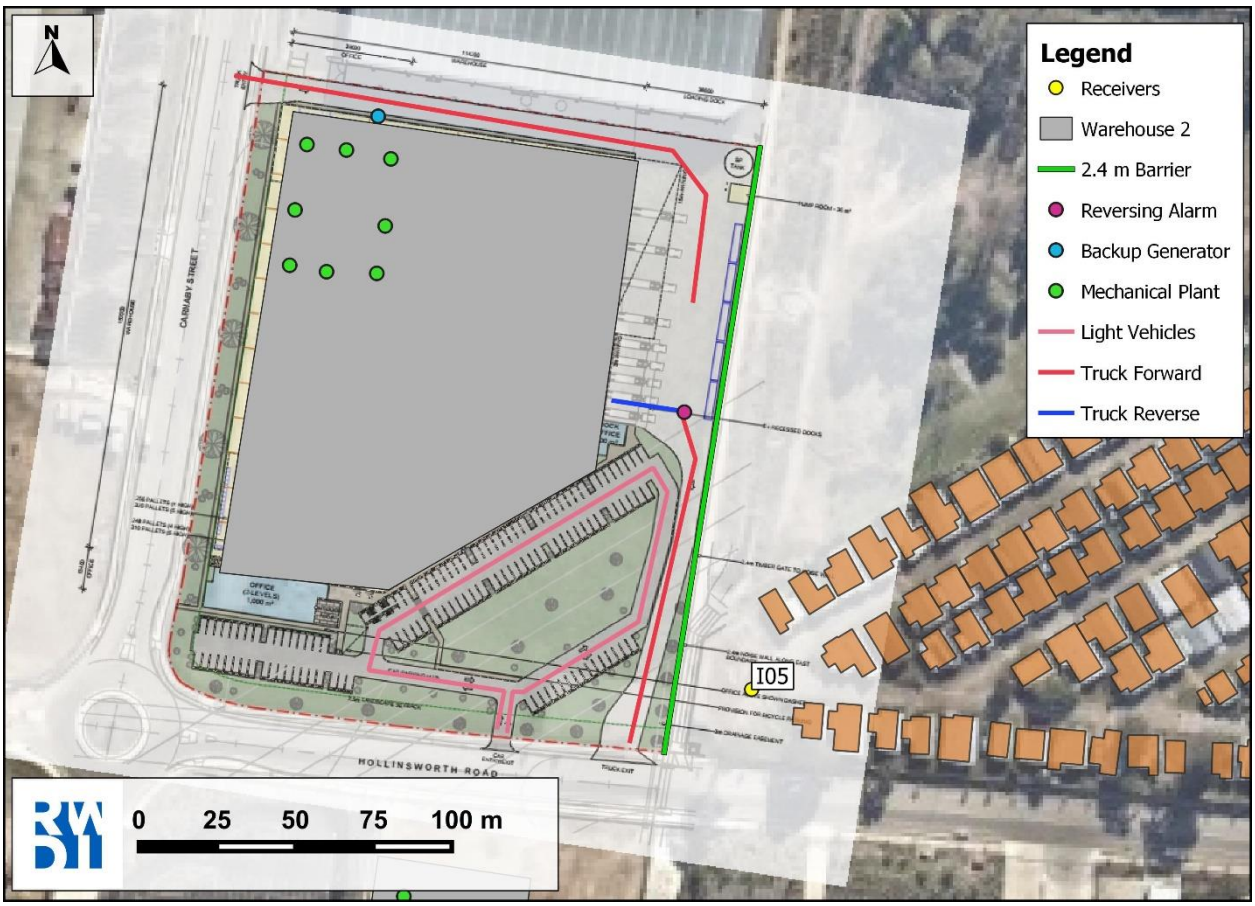


Figure 2-1 Modelled Noise Sources Warehouse 2

2.4 Predicted Noise Levels

2.4.1 Operational Noise

Table 2-3 below presents the predicted noise levels. The predicted noise levels comply with the relevant noise limits at all residential receivers. **Figure 2-2** presents the noise contour under adverse meteorological conditions.

Table 2-3 Predicted Noise Levels – $L_{Aeq,15min}$ dBA

ID	Address	Predicted level		Noise Limit	Compliance
		Standard Met	Adverse Met		
I5	140 Hollinsworth Rd, Marsden Park	42	42	43	Yes
R10	372 Dortmund Cres, Marsden Park	24	25	35	Yes
R11	67B Amelia Way Bidwill	21	22	35	Yes
R12	11 Pine Cres, Bidwill	28	29	35	Yes
R13	15 Loranthus Cres, Bidwill	30	30	35	Yes
R14	8 Amaryllis Way, Bidwill	30	31	35	Yes

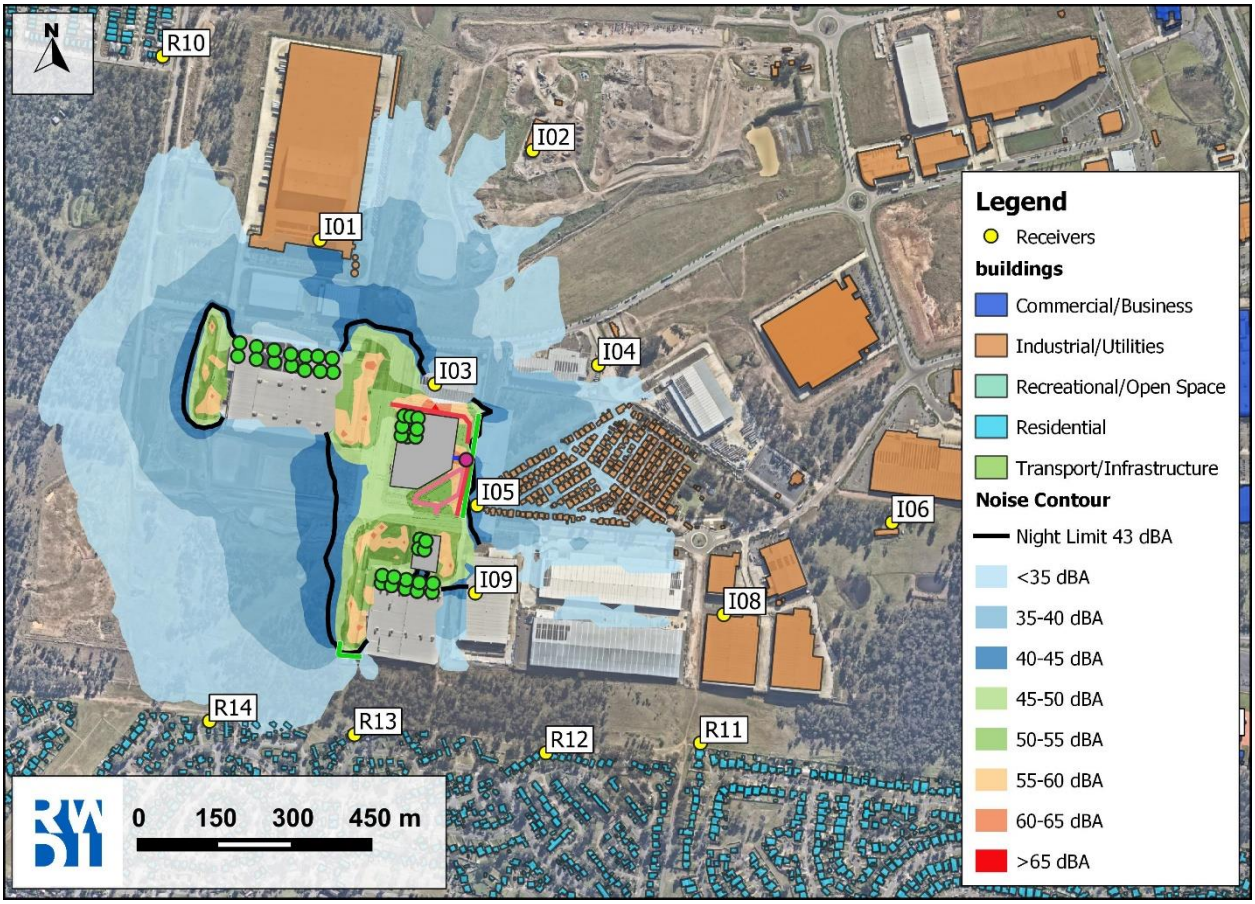


Figure 2-2 Night Adverse Met Noise Contour

2.4.2 Sleep Disturbance

Table 2-4 presents the predicted L_{AFMax} noise levels from reversing alarms. Where the screening criteria is exceed, the value is presented in **BOLD**.

Table 2-4 Predicted Noise Levels – L_{AFMax} dBA

ID	Address	Predicted level		Screening Criteria	Compliance
		Standard Met	Adverse Met		
I5	140 Hollinsworth Rd, Marsden Park	**55**	**55**	52	No
R10	372 Dortmund Cres, Marsden Park	12	12	52	Yes
R11	67B Amelia Way Bidwill	25	25	52	Yes
R12	11 Pine Cres, Bidwill	23	23	52	Yes
R13	15 Loranthus Cres, Bidwill	25	25	52	Yes
R14	8 Amaryllis Way, Bidwill	37	37	52	Yes

The additional guidance relating to potential sleep disturbance impacts contained in the NSW *Road Noise Policy* (RNP) was reviewed to quantify the significance of the potential residual exceedance of the sleep disturbance screening levels at Receciver I5.

According to the RNP, research on sleep disturbance indicates that in some circumstances, higher noise levels may occur without significant sleep disturbance. Based on currently available research results, the RNP concludes that:

- "Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions."
- "One or two noise events per night, with maximum internal noise levels of 65 dBA to 70 dBA, are not likely to affect health and wellbeing significantly."

Based on the predicted external levels, internal noise levels of around 45dBA can be expected within the most exposed dwellings at I5 with windows open. On this basis, sleep disturbance appears unlikely.

3 CONCLUSION

RWDI has completed this noise impact assessment to support a proposed modification application for Sydney Business Park Stage 3 (SSD-10477). The proposed modification relates to removing Conditions Conditions B8(i) and B8(j) of the Conditions of Approval which limits the night time operation of Warehouse 2.

Noise modelling was completed based on provided information from a committed tenant of Warehouse 2. Noise modelling confirmed that noise emissions from the proposed night time operations will comply with the night time noise limits stipulated in Table 2 of the Conditions of Approval for all residential receivers.

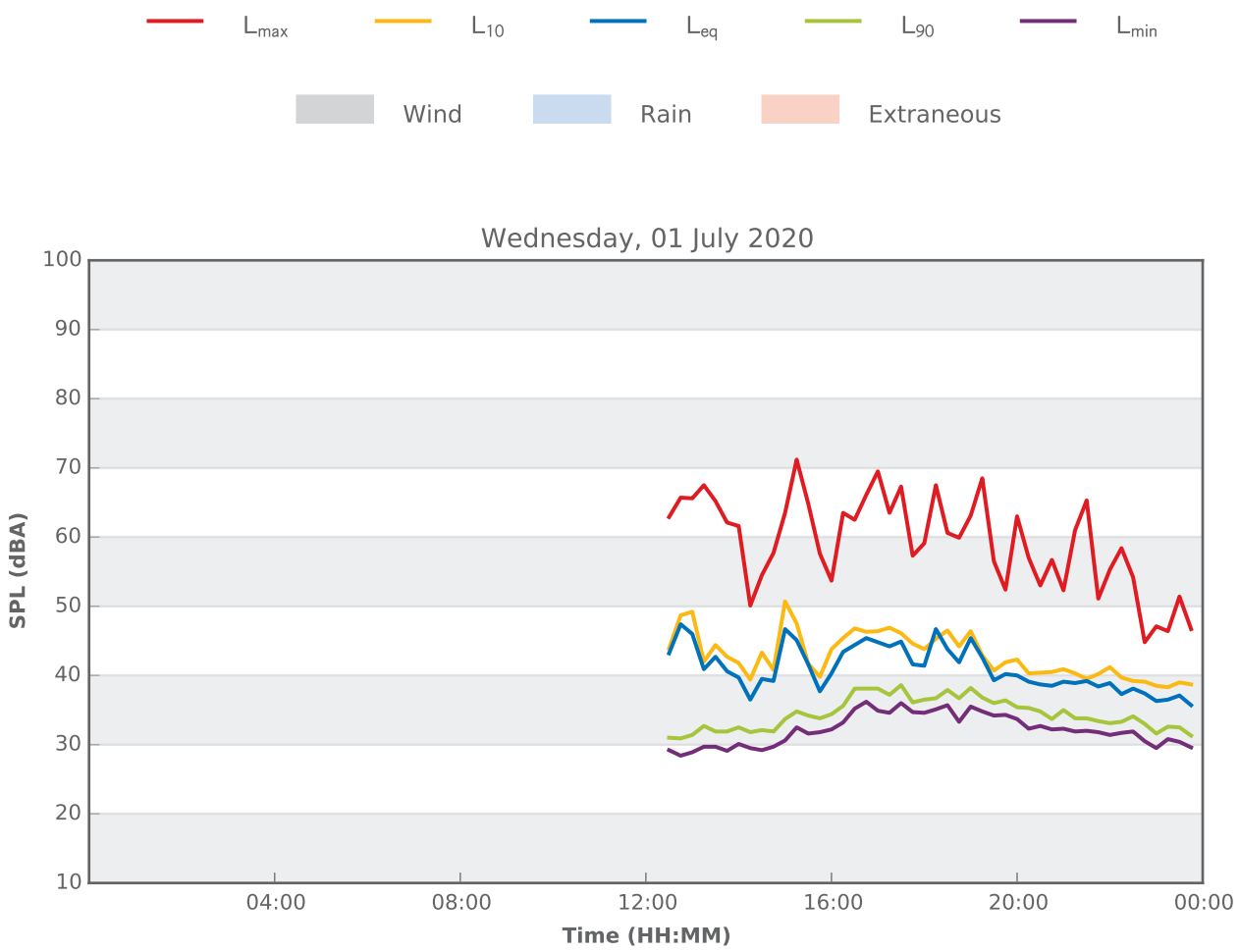
It is therefore concluded that the proposed modification will have no adverse noise impact on the nearest sensitive receivers.

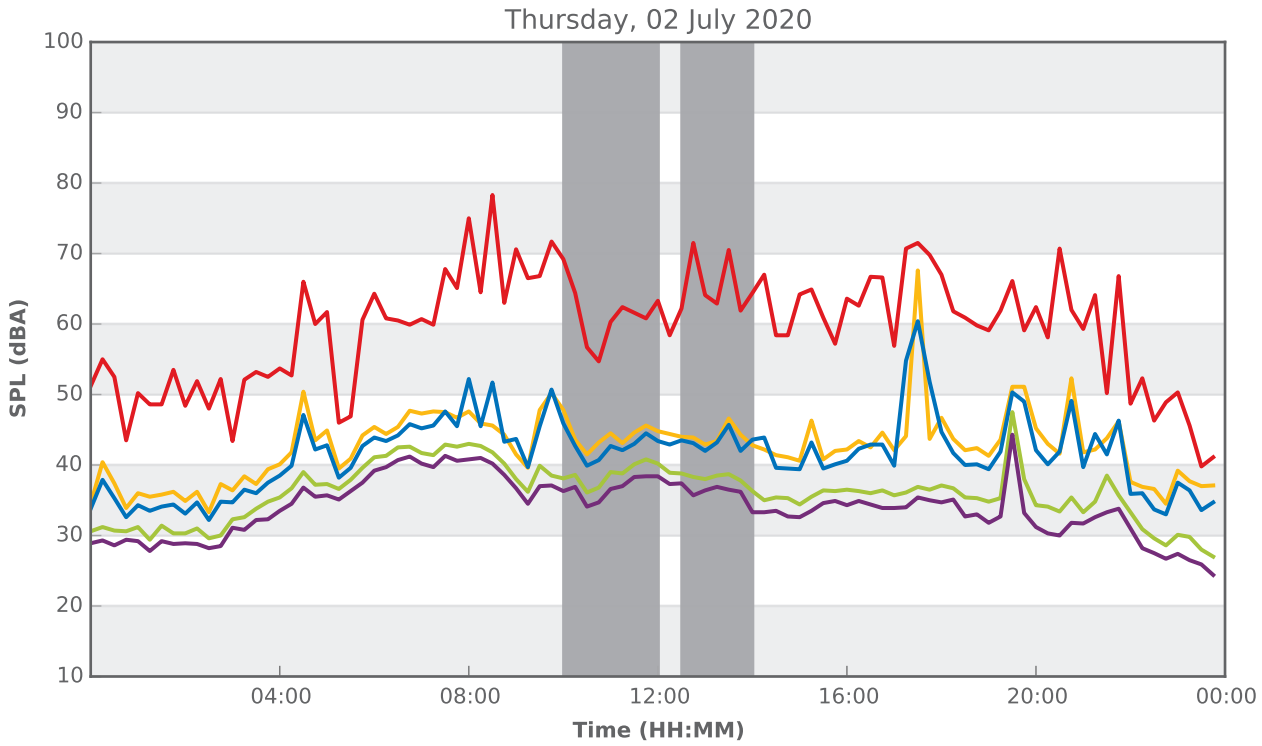
As required by Conditions B22(a) and B23 of the Consent, a noise verification report should be completed post occupancy to confirm operational noise from Warehouse 2 and 3 are acceptable at surrounding sensitive receivers.

APPENDIX A

UNATTENDED NOISE MEASUREMENT GRAPHS

18 Aubusson Street, Marsden Park





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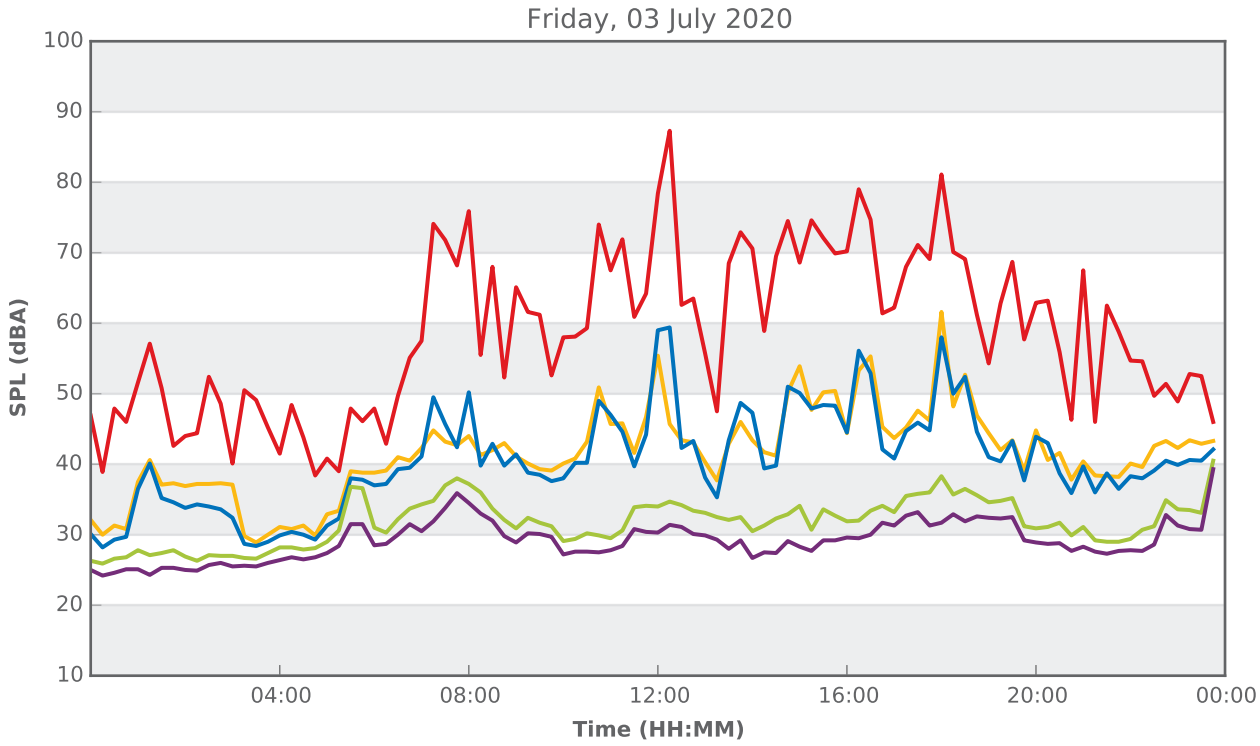

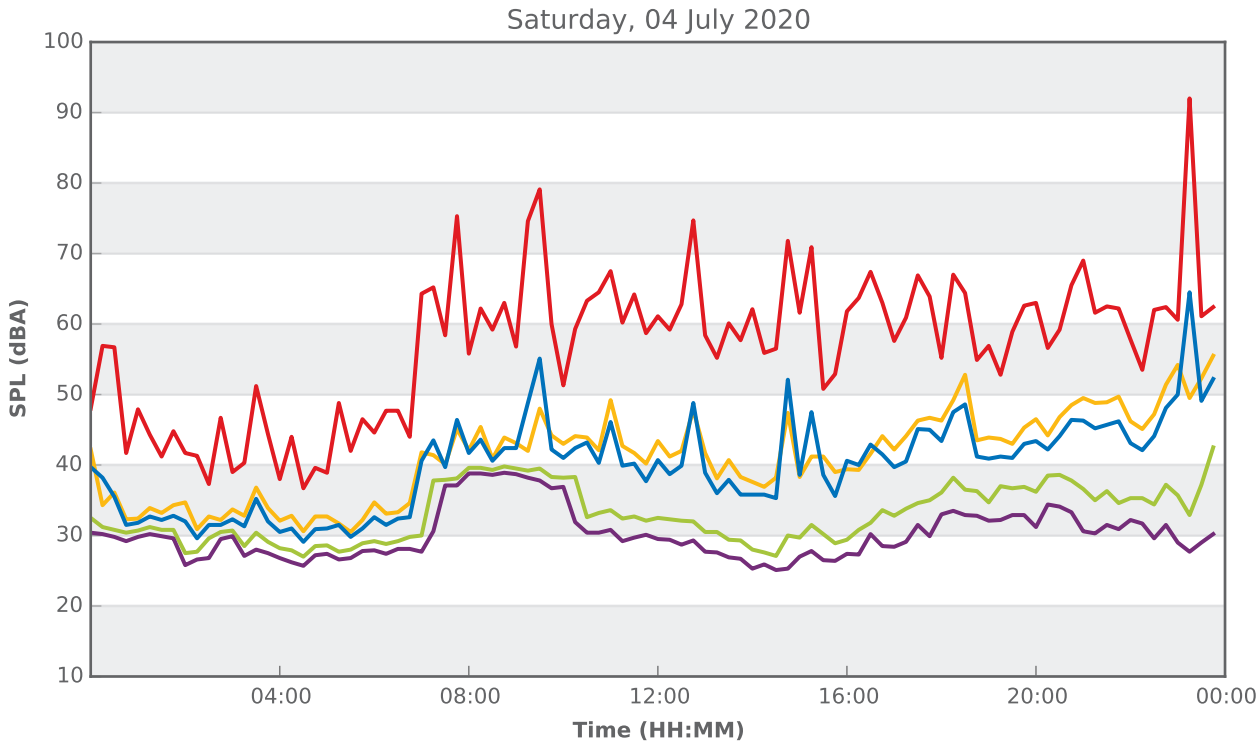

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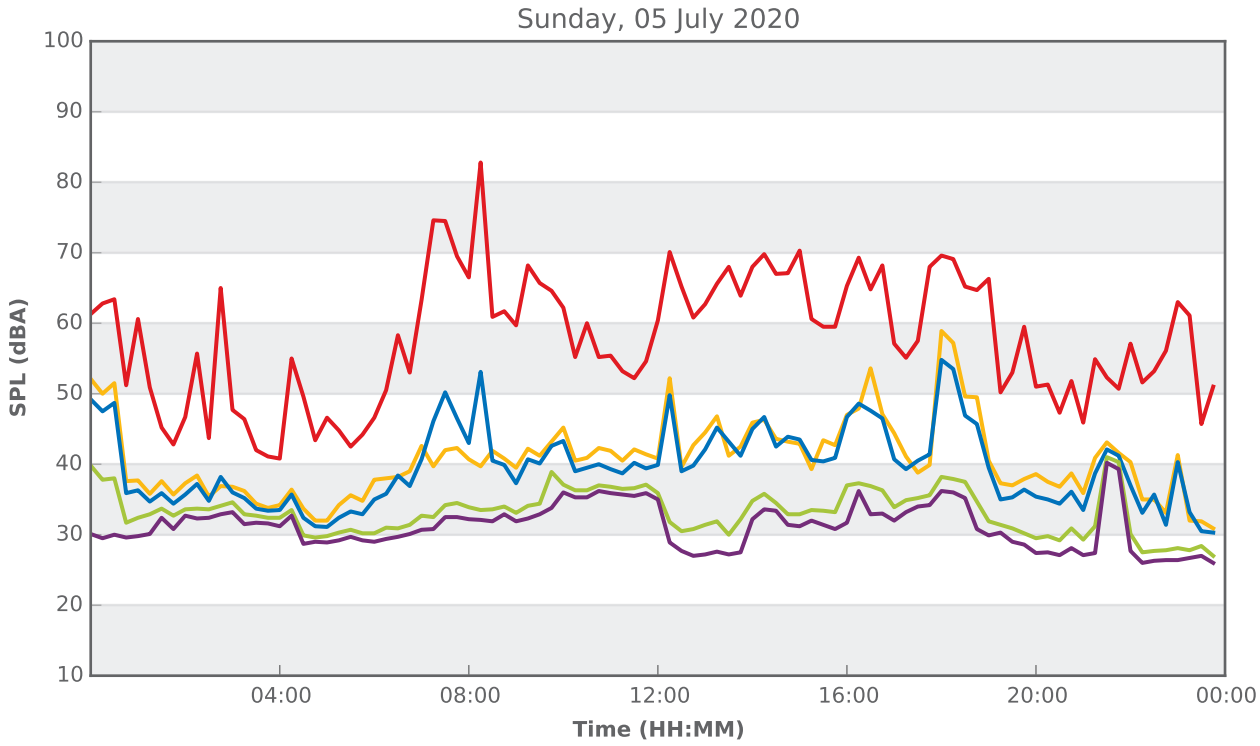

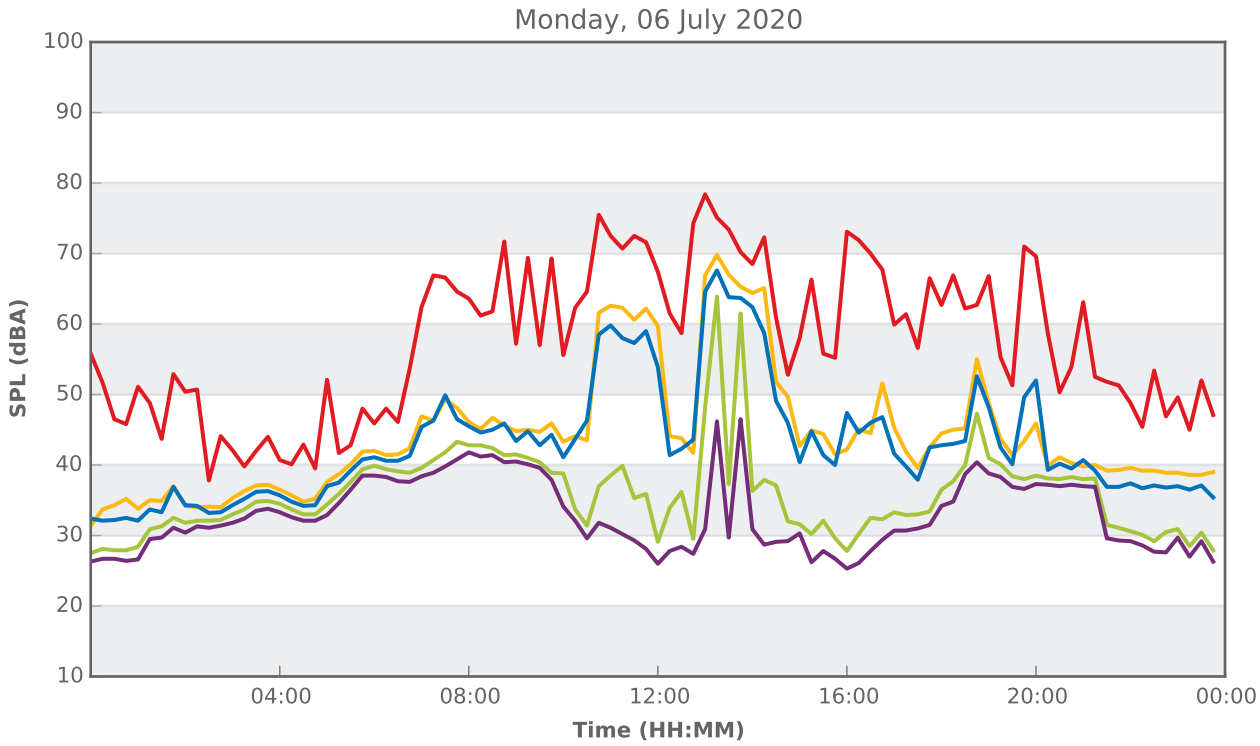

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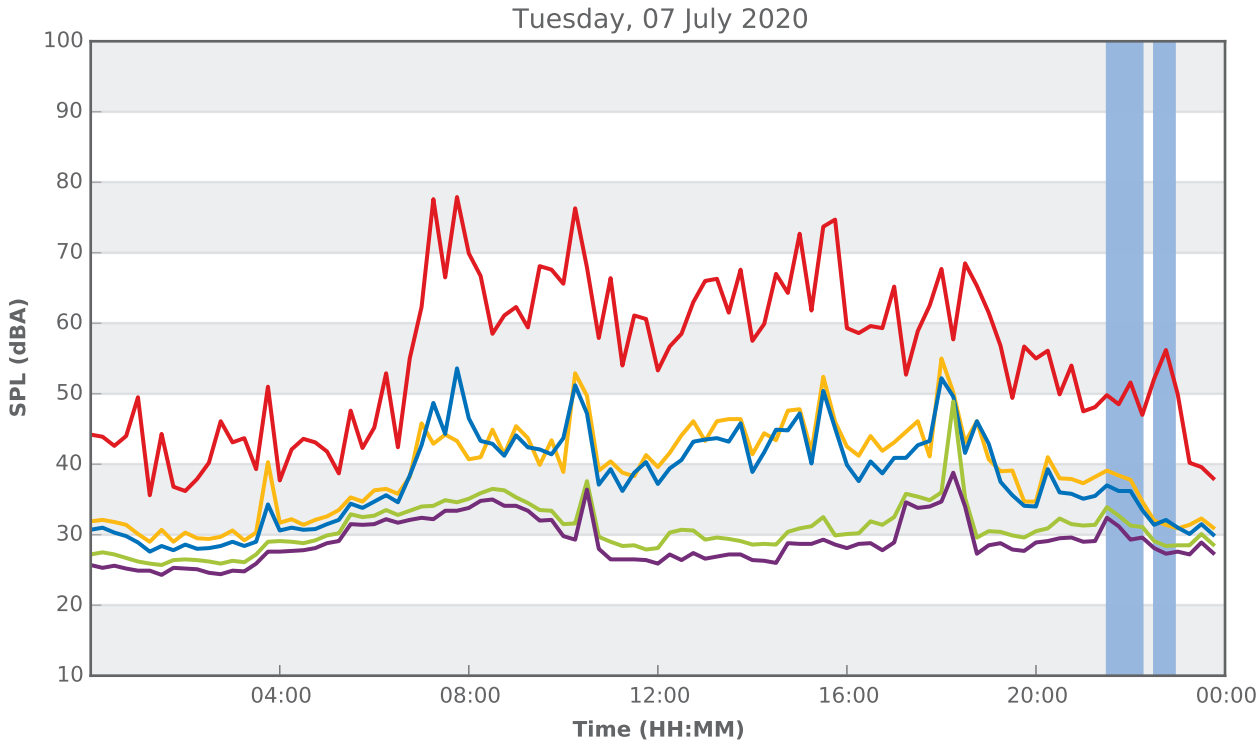

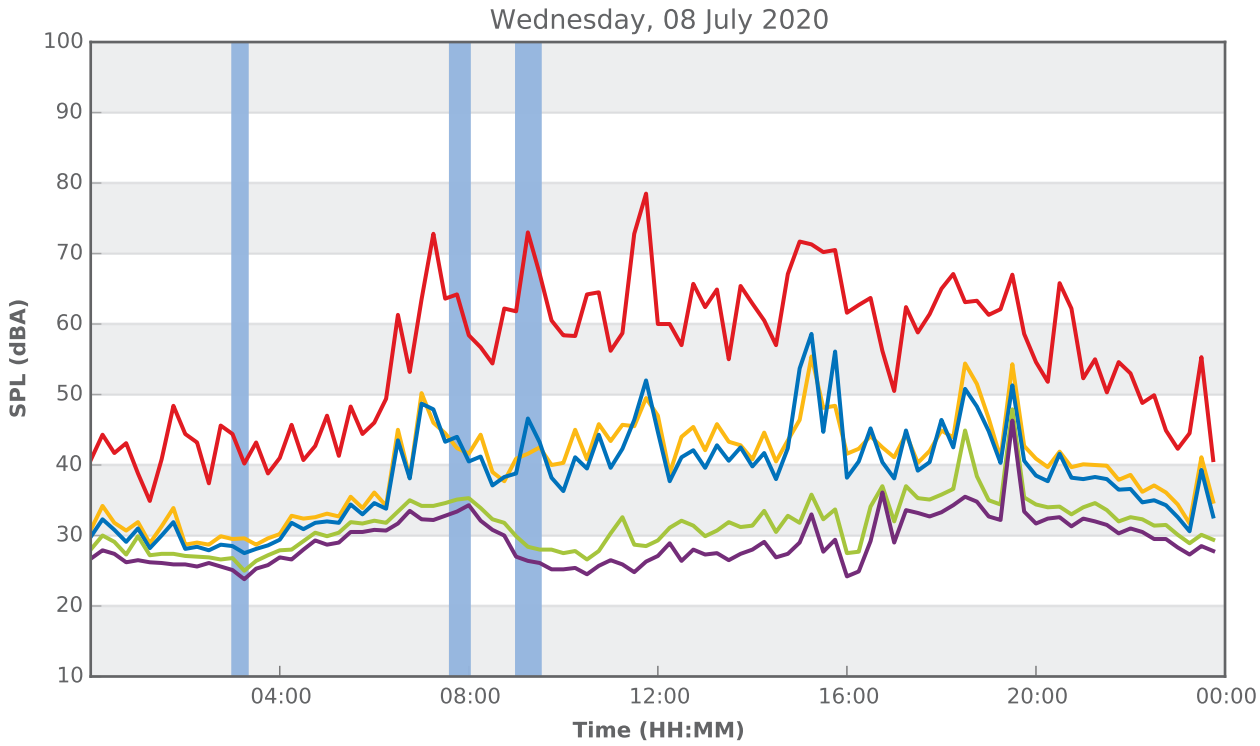

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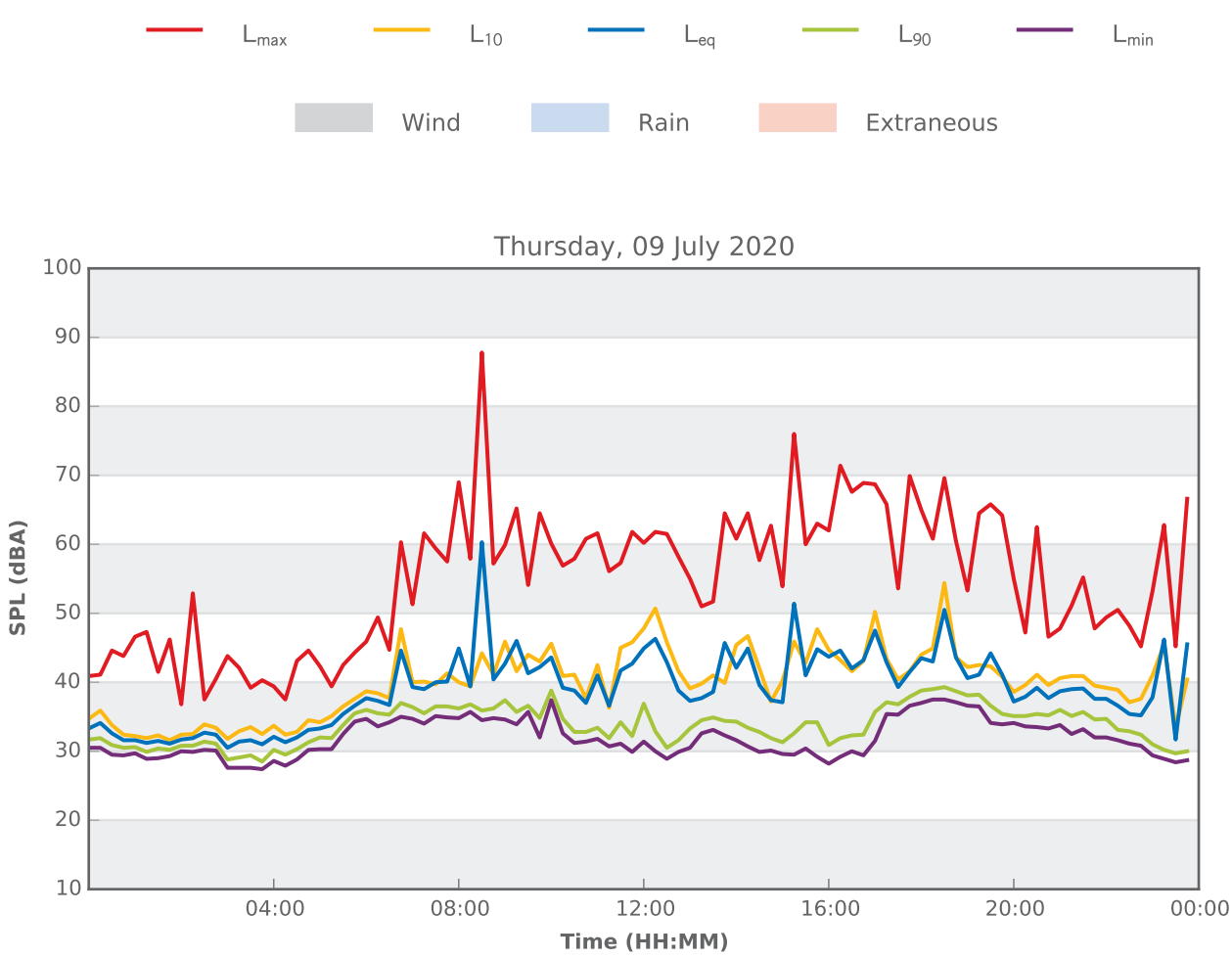

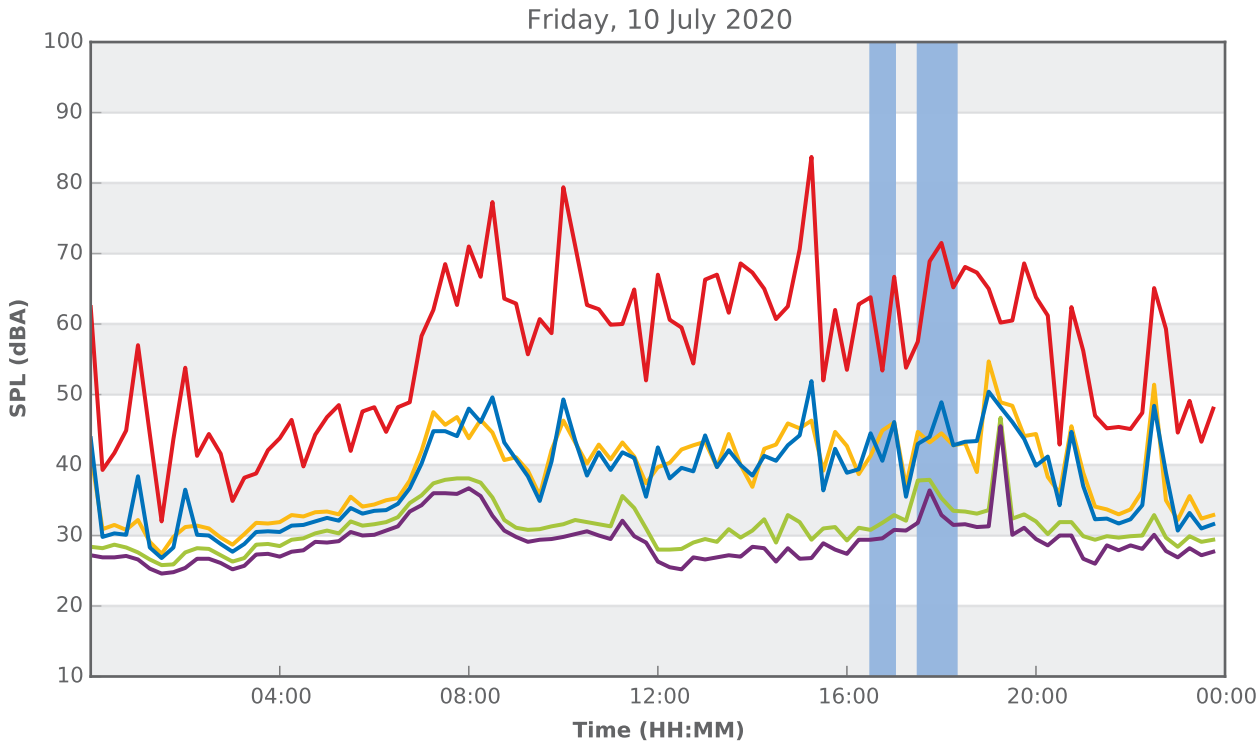

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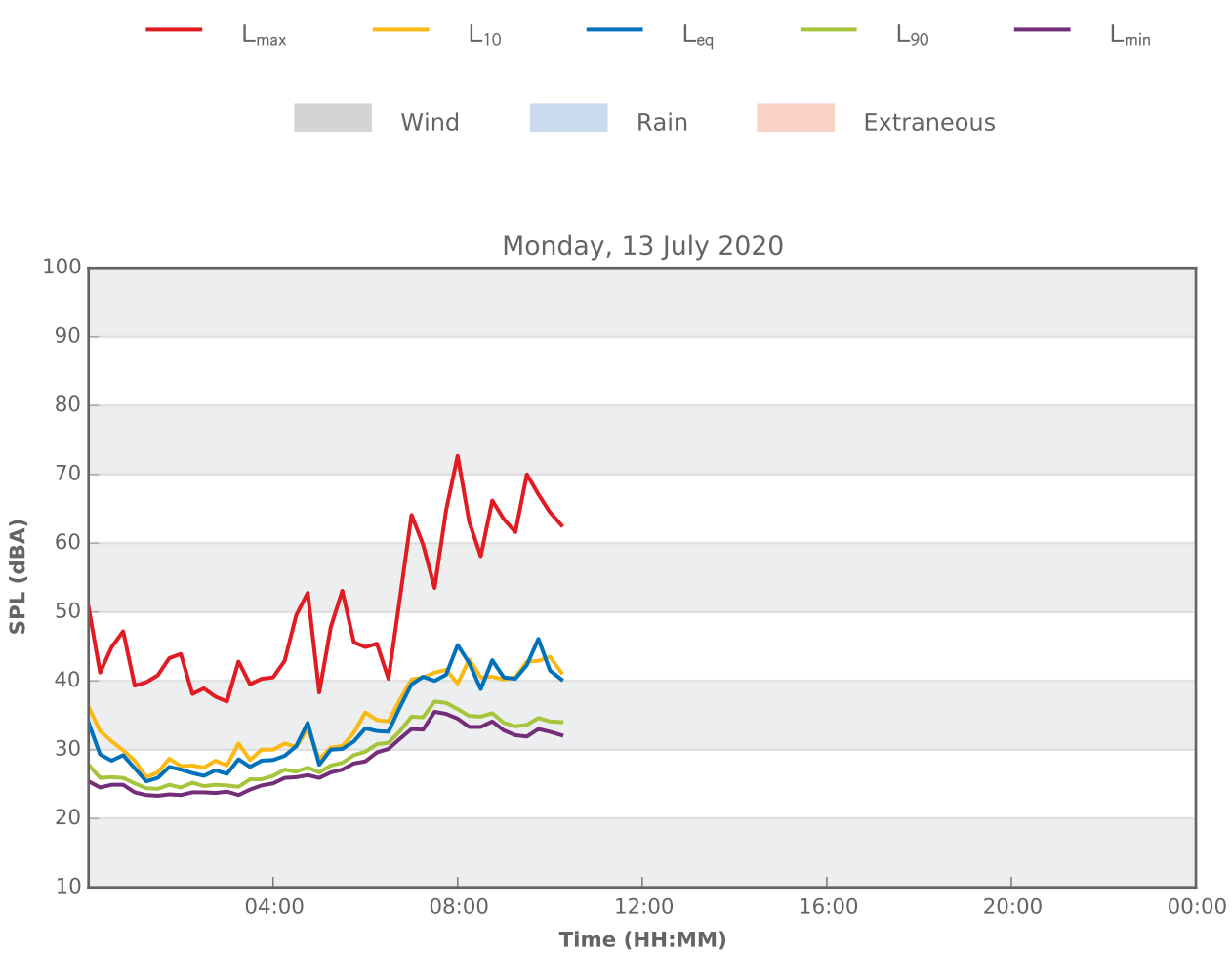

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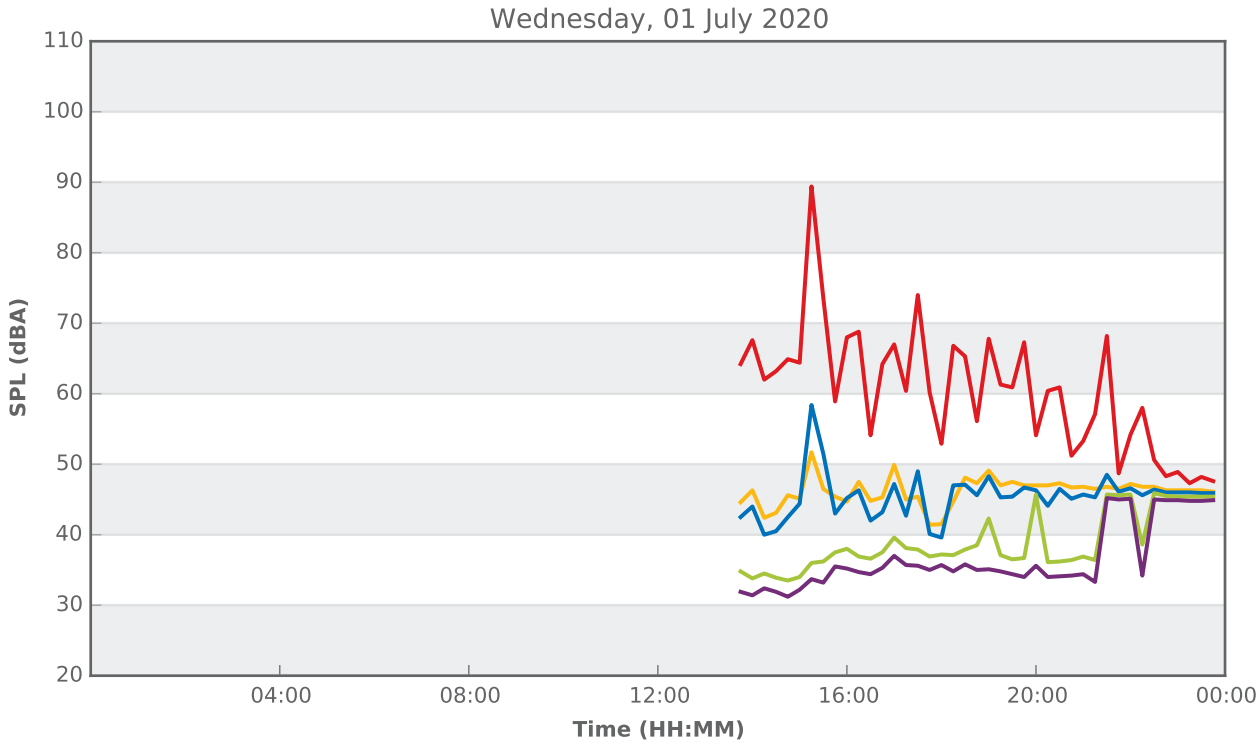

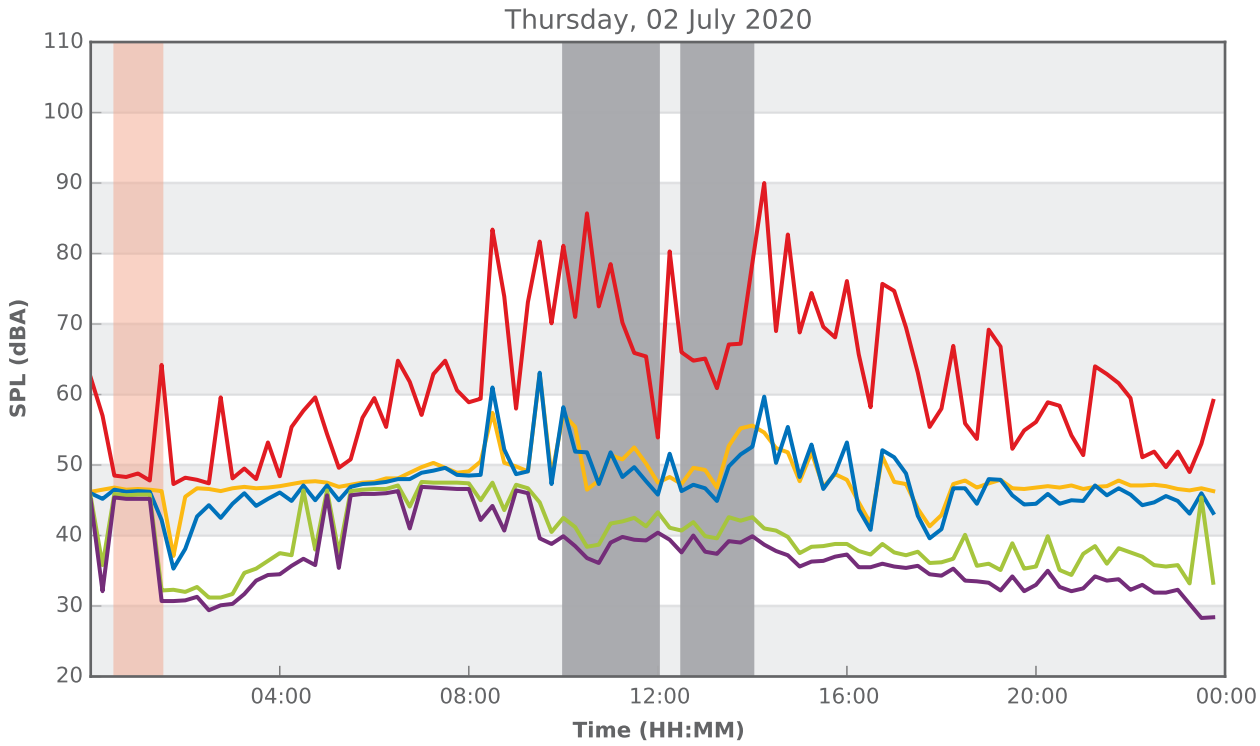

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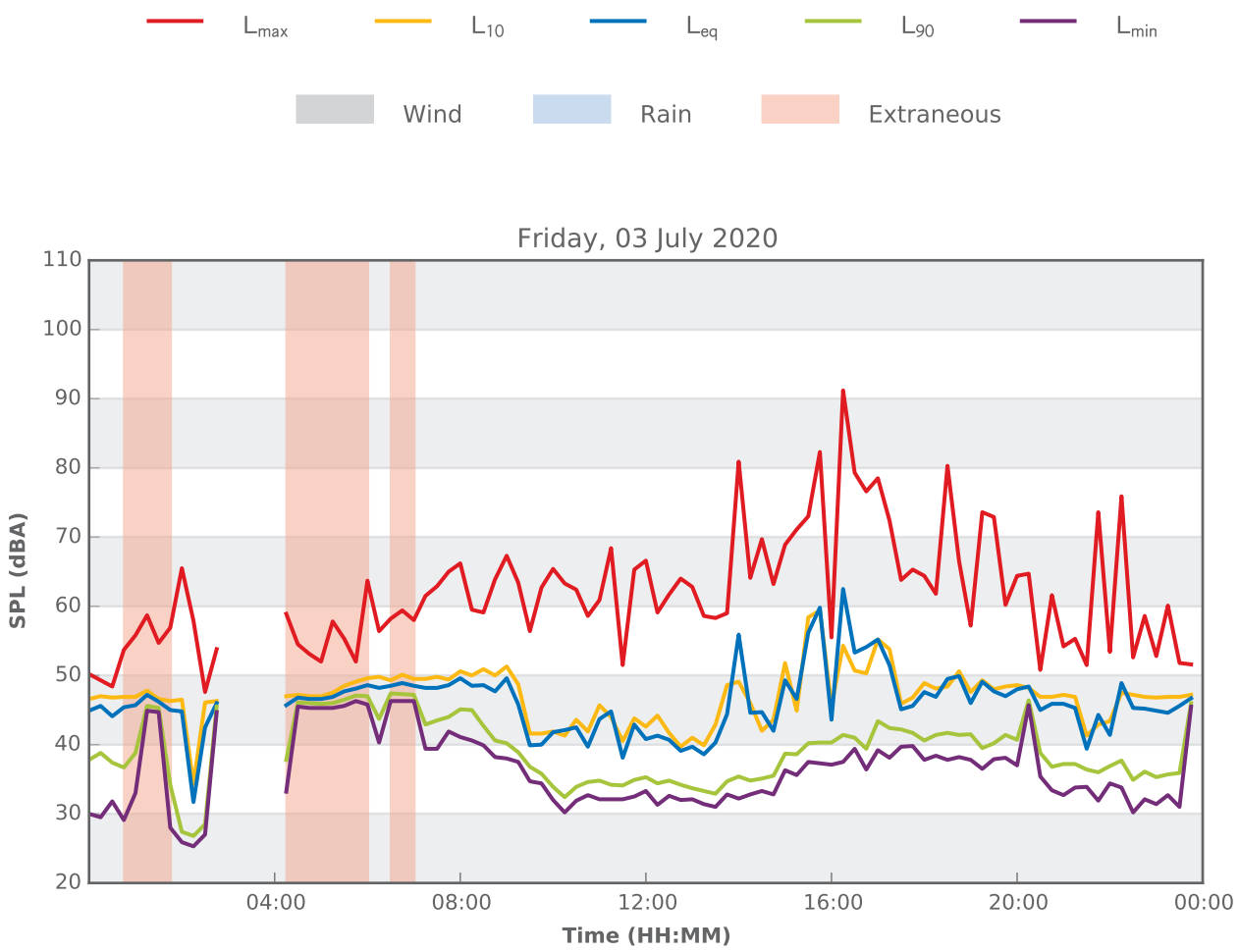

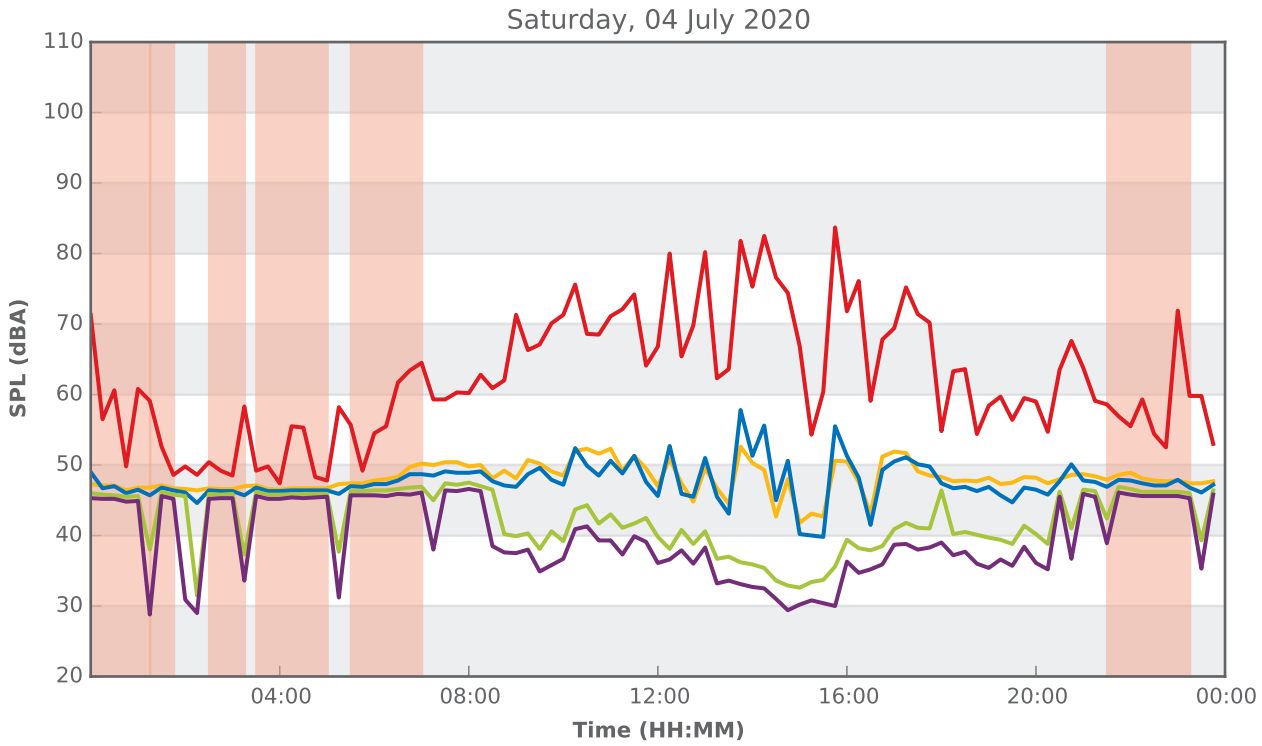

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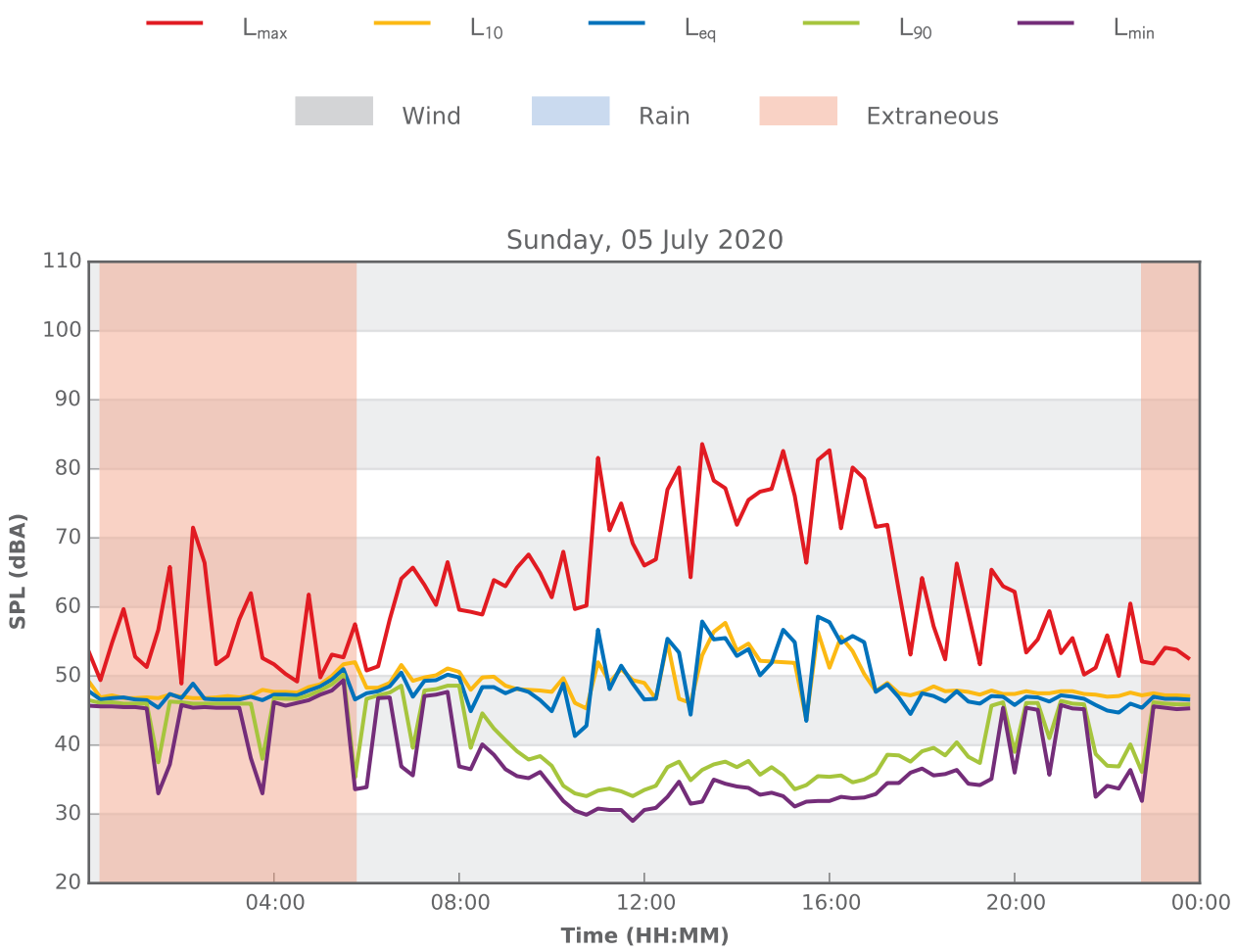

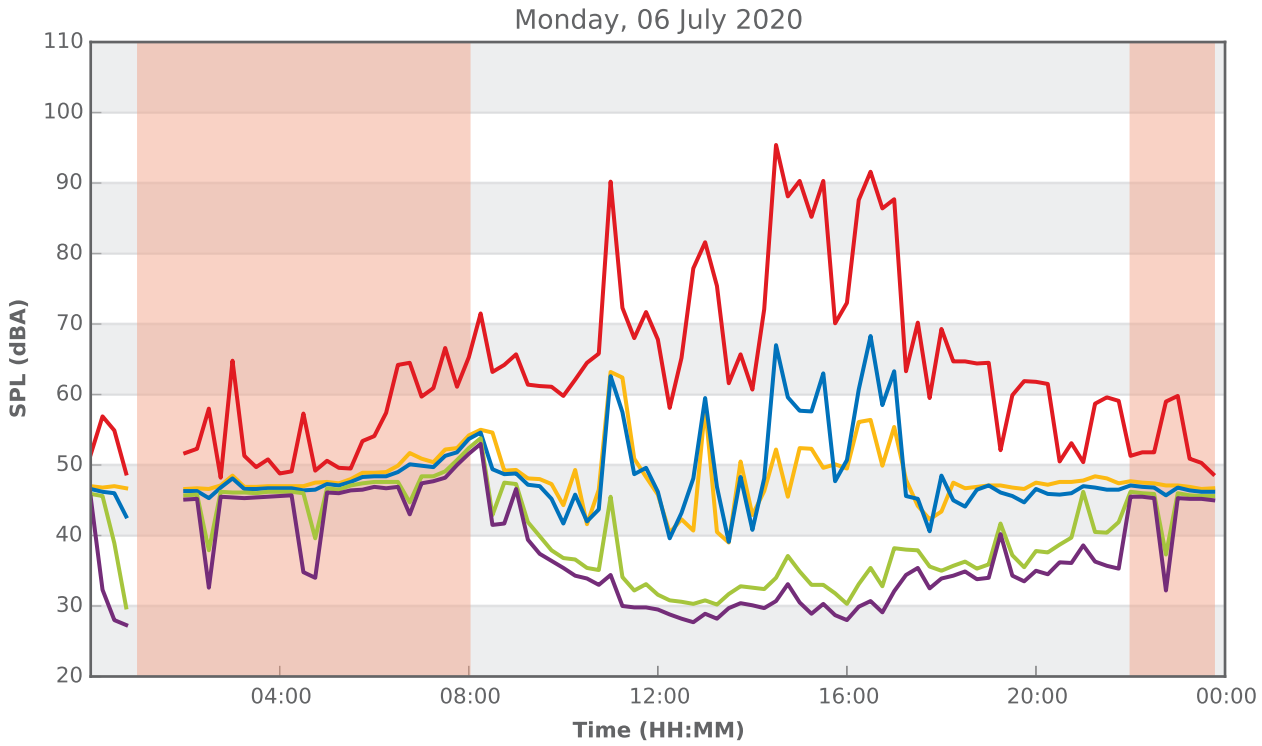

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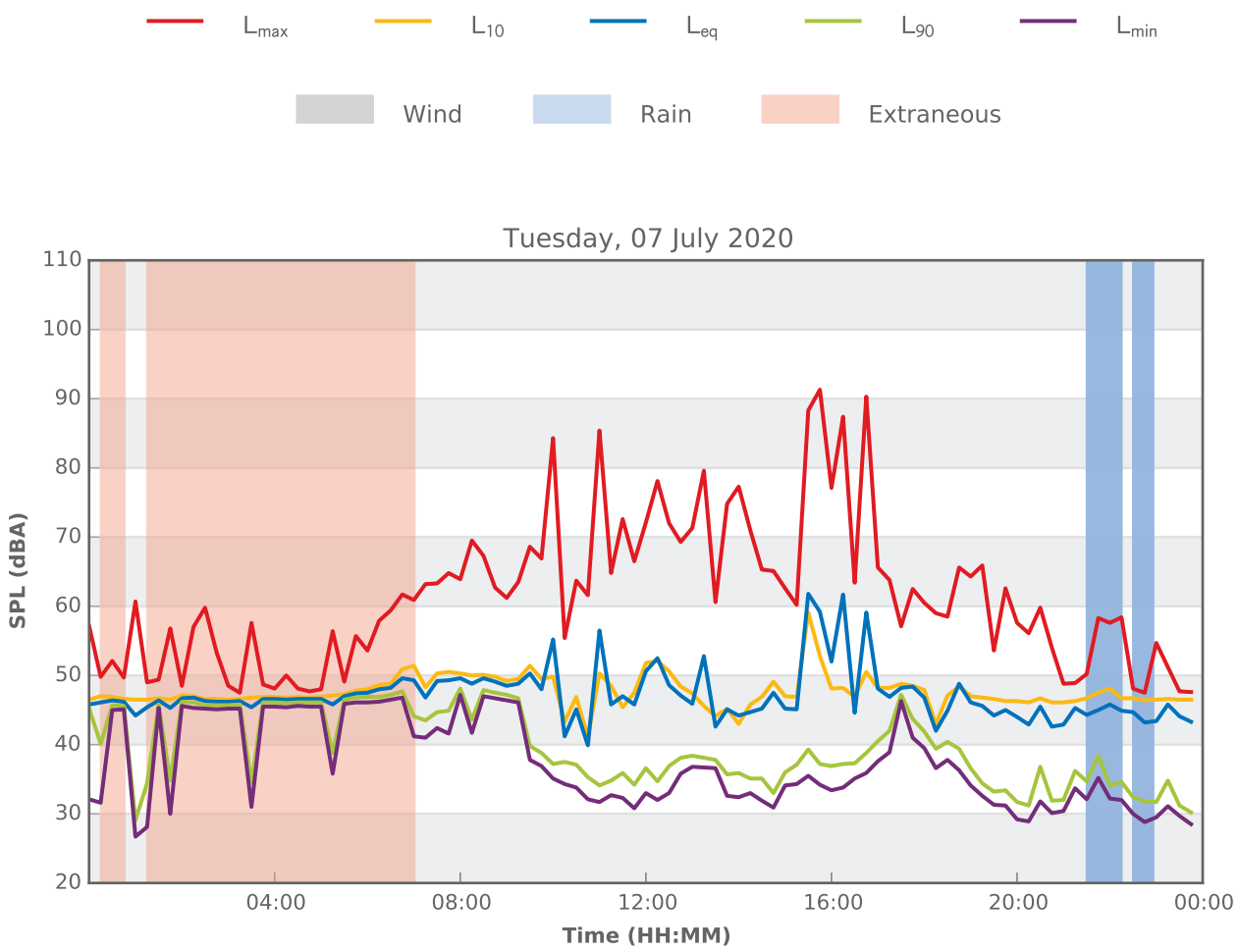

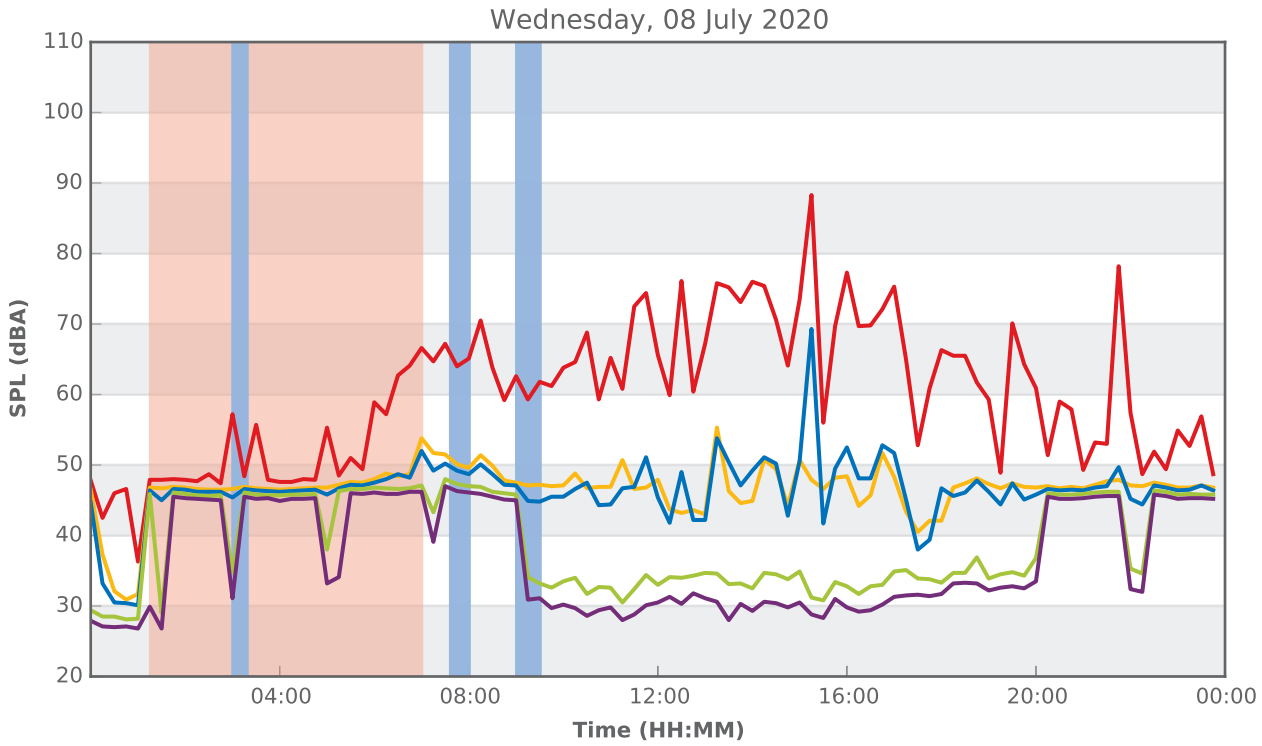

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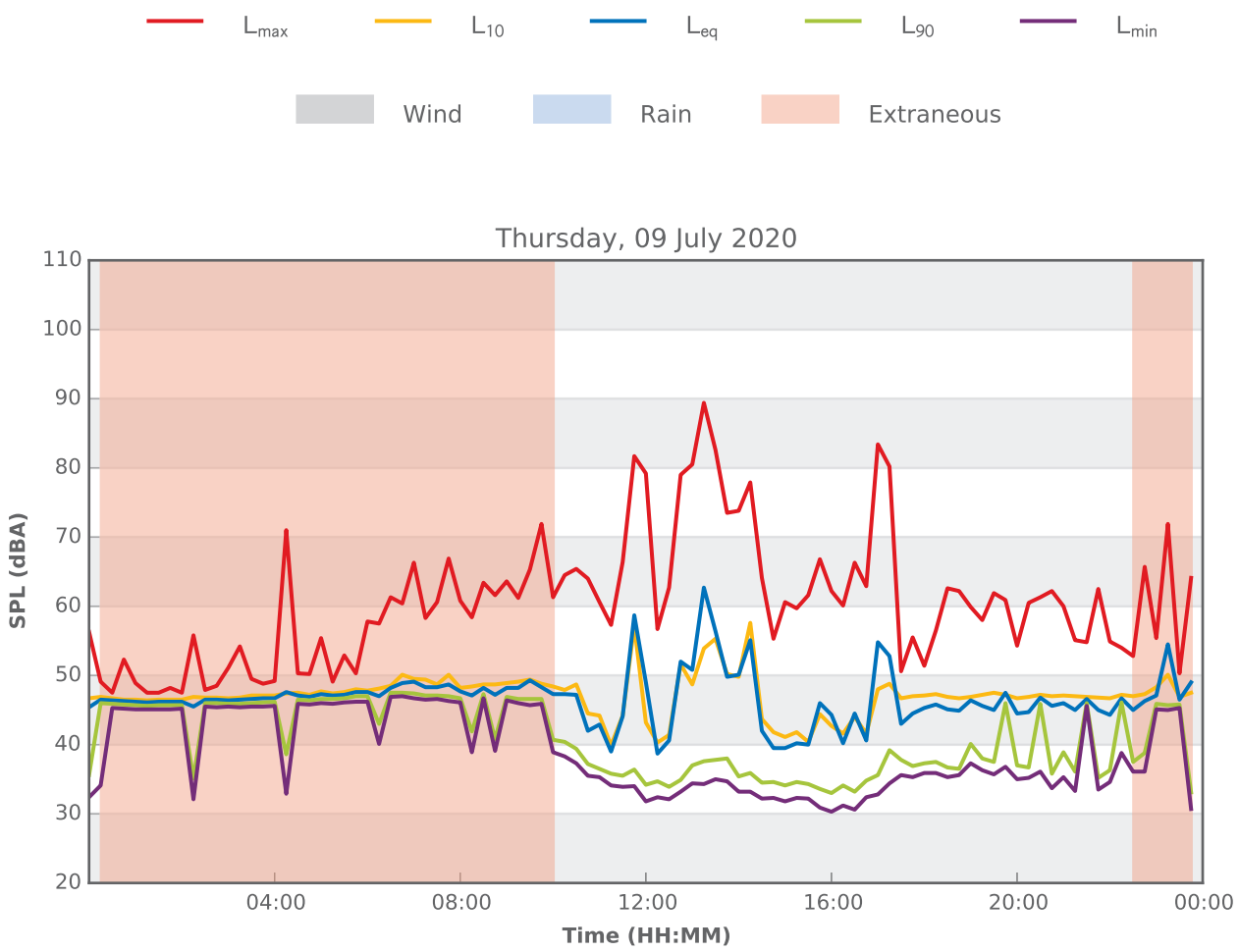

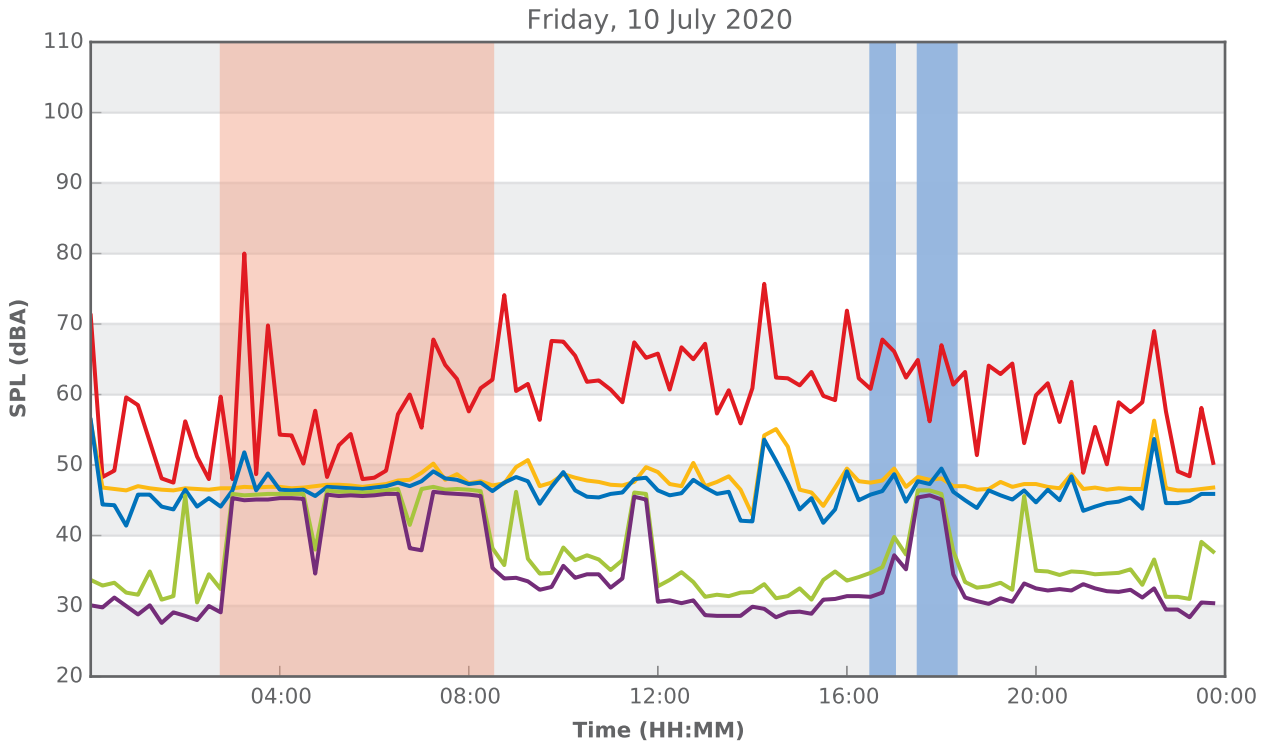

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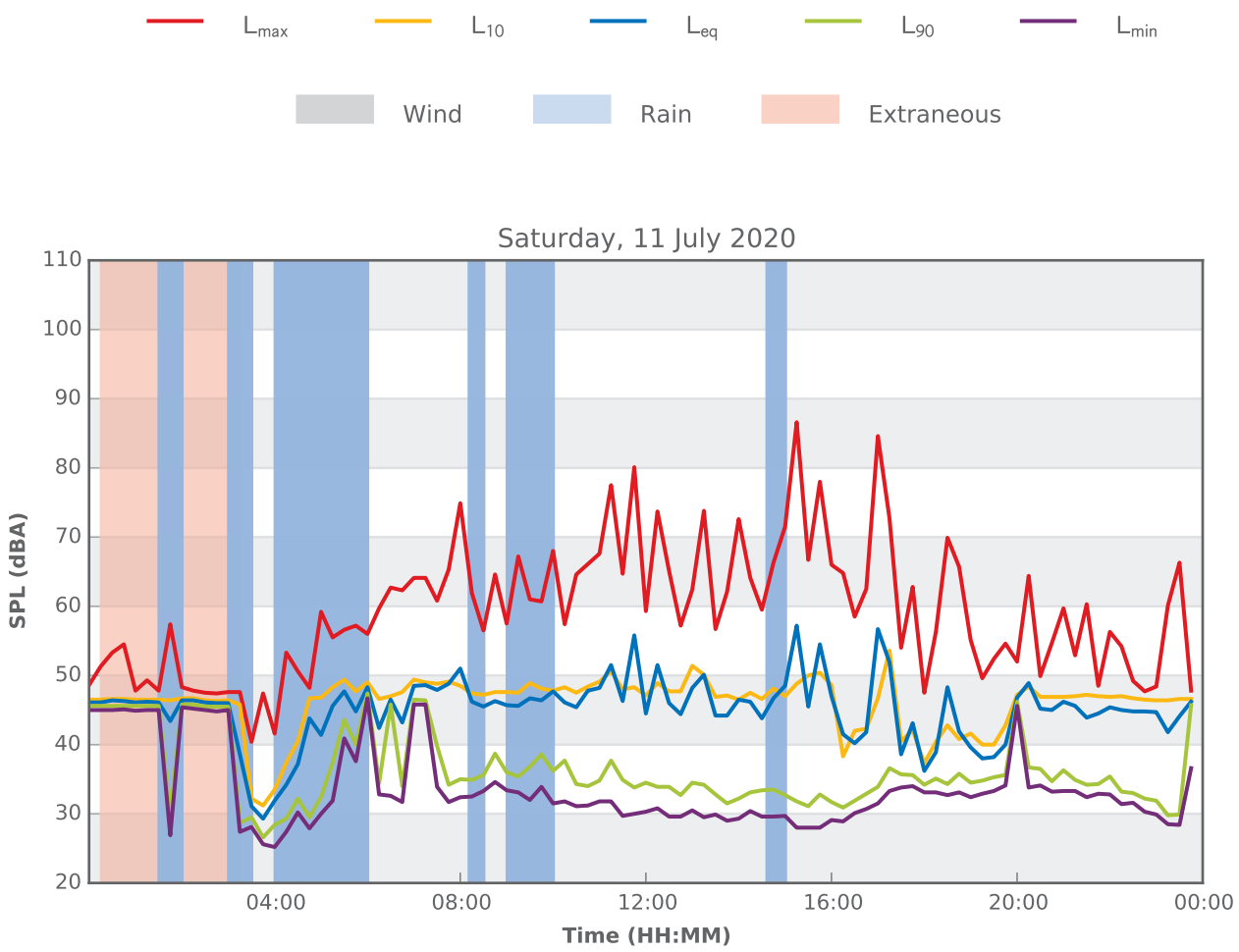
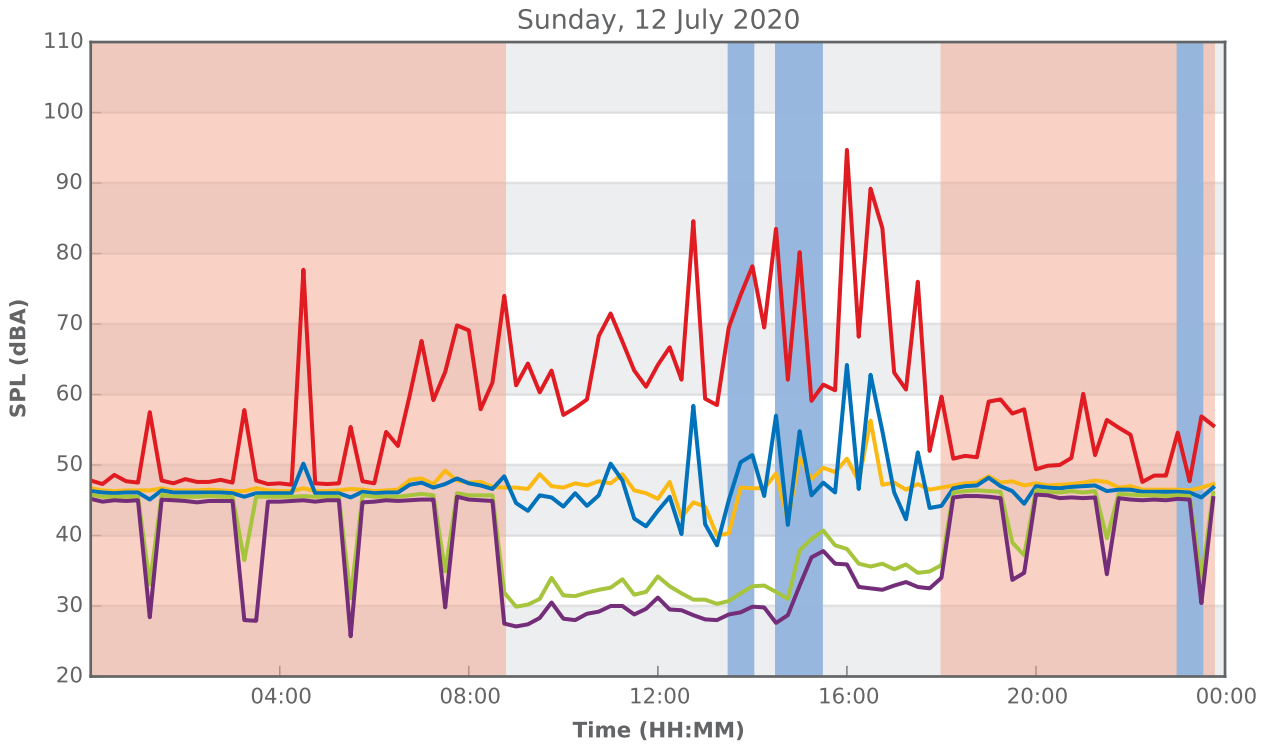
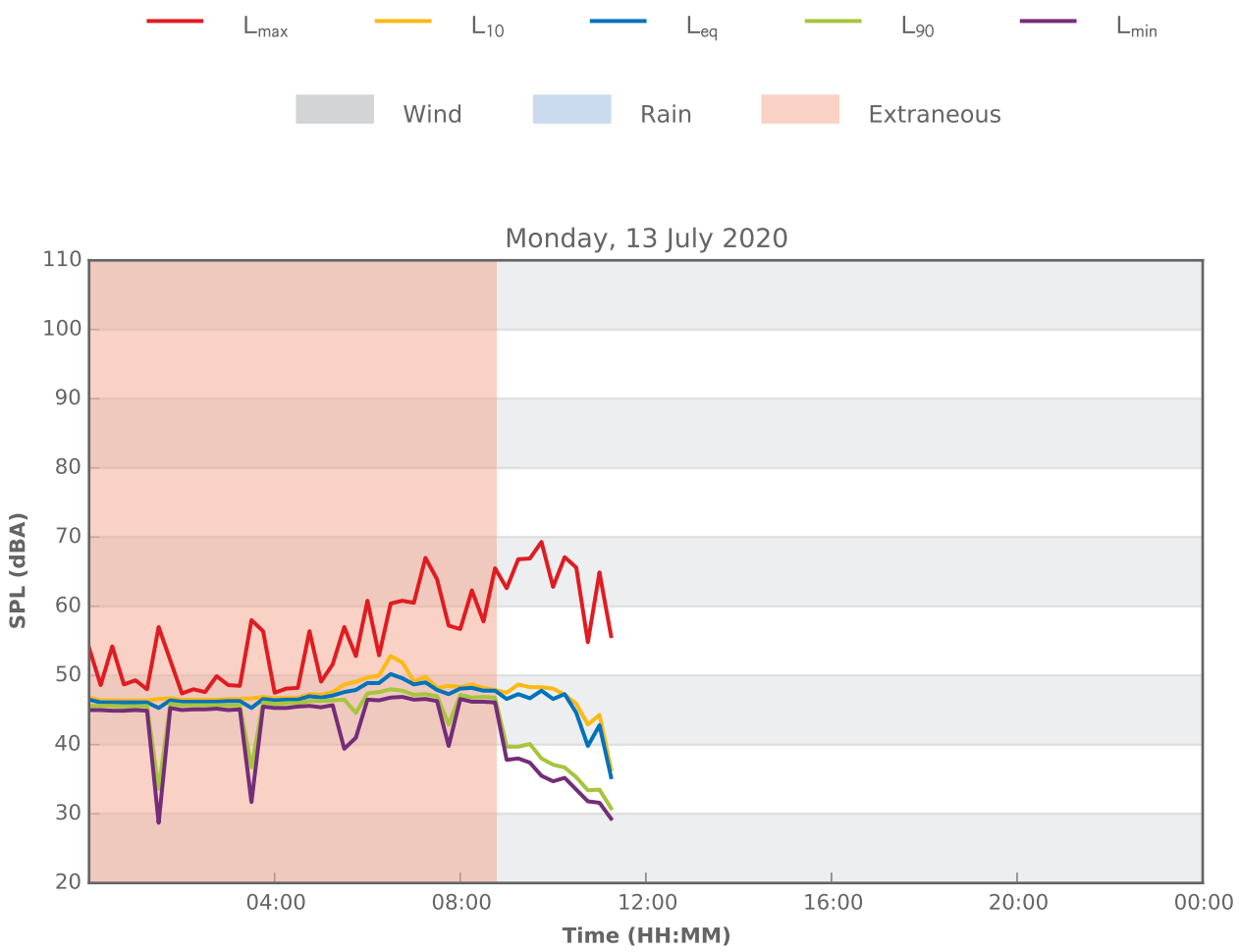




15 Roche Grove, Shalvey



APPENDIX B

DETAILED ON SITE TRAFFIC

Movement	Inbound				Outbound			
Unload Method	1-2 T Van	Small Truck 6-14 Pallets	Semi 40' Container	Semi Refrigerated 20' Container	1-2 T Van	Small Truck 6-14 Pallets	Semi 40' Container	Semi Refrigerated 20' Container
	Dock Rear and Side unload by Hand and Forklift	Side Unload in Dock with forklift	Recessed Dock (Internally unload within warehouse)	Recessed Dock (Internally unload within warehouse)	Dock Rear and Side unload by Hand and Forklift	Side Unload in Dock with forklift	Recessed Dock (Internally unload within warehouse)	Recessed Dock (Internally unload within warehouse)
Day 7am-10pm	7	5	2	2		3	6	
10pm-11pm			1					
11pm-12am							1	
12am-1am			1					
1am-2am							1	
2am-3am			1					
3am-4am							1	
4am-5am			1					
5am-6am							1	
6am-7am			1					
Total								