ACOUSTICS AND AIR

SPARKE STREET, HEXHAM INFRABUILD RECYCLING FACILITY MODIFICATION

NOISE AND VIBRATION ASSESSMENT

REPORT NO. 20166
VERSION A

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PREPARED FOR

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DOCUMENT CONTROL

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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.

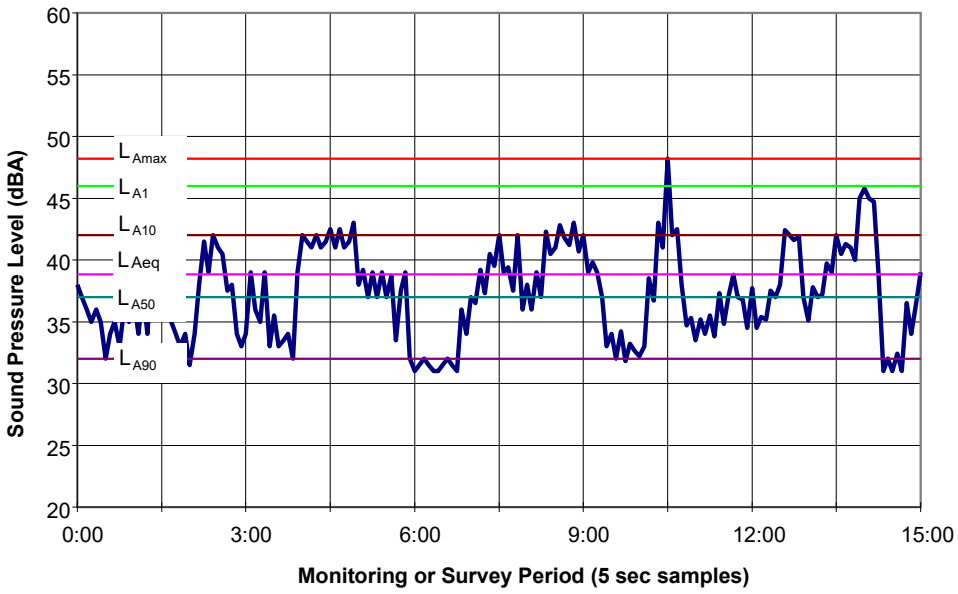
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

InfraBuild Recycling currently operate a metal recycling facility at Sparke Street, Hexham. It is proposed to modify the existing facility to develop the currently unused site at 8 Sparke Street and aim to improve traffic flow and ease congestion throughout the site.

Wilkinson Murray has been engaged by Ethos Urban of behalf of InfraBuild Recycling to prepare a noise and vibration impact assessment for the proposed development.

This report presents the findings of the assessment of potential construction, operational and transportation noise impacts, as well as operational vibration impacts associated with the proposed development. The assessment covers all relevant aspects as requested by the EPA and in the NSW Planning, Industry and Environment SEARs for the modification application (DA 345-7-2003-I MOD 6). Table 1-1 presents the EPA and SEAR requirements relevant to this report.

Table 1-1 SEAR Requirements

Key Issue	Description	Section
SEAR (Noise & Vibration)	• A quantitative assessment of potential construction, operational and transport noise and vibration impacts in accordance with relevant Environment Protection Authority guidelines and including details of the proposed on-going monitoring regime to be implemented	9
EPA	• Identify the existing noise environment (including any relevant noise assessment groupings) and identify applicable noise goals in line with relevant guidance/standards; • Identify potential noise and vibration sources and impacts during both construction and operational stages and identify best practice mitigation measures (pollution control) and strategies to be incorporated for both stages to minimise noise and vibration emissions/impacts (with proposed timing), including validation monitoring, in line with relevant guidance/standards; and • Propose representative noise monitoring locations for determining compliance with applicable noise goals and where relevant noise goals would be set as representative limits.	F (Appendix B)

This impact assessment has been carried out in accordance with the following guidelines:

- NSW *Noise Policy for Industry (NPfI)* (EPA, 2017);
- NSW *Road Noise Policy (RNP)* (DECCW, 2011);
- *Interim Construction Noise Guideline (ICNG)* (DECC, 2009); and
- *Assessing Vibration: A technical guideline* (DEC, 2006).

2 SITE & OPERATIONS DESCRIPTION

The existing site is located at 14 Sparke Street, Hexham (Lot 1 DP1176316). The proposed modification includes expanding the site onto 8 Sparke Street (Lot 1 DP1105761). An aerial overview of the site and surrounding area is presented in Figure 2-1. The location of the unattended noise monitoring is shown in yellow.

Figure 2-1 Aerial overview of the Site & Surrounding Area

The surrounding area is mostly undeveloped, with rail corridor to the west and Maitland Road to the east. The closest noise sensitive receivers are the residential properties on Shamrock Street approximately 500m to the north of the site and the St Josephs Aged Care Facility approximately 600m to the south.

The facility has approval for general operation 24 hours a day 7 days a week with shredder operation permitted from 7:00am to 6:00pm Monday to Saturday. The proposed modification does not involve any change in the total processing and storage capacity, which will continue to operate with a metal shredding capacity of 300,000 tonnes per annum and heavy metal cutting of approximately 24,000 tonnes per annum.

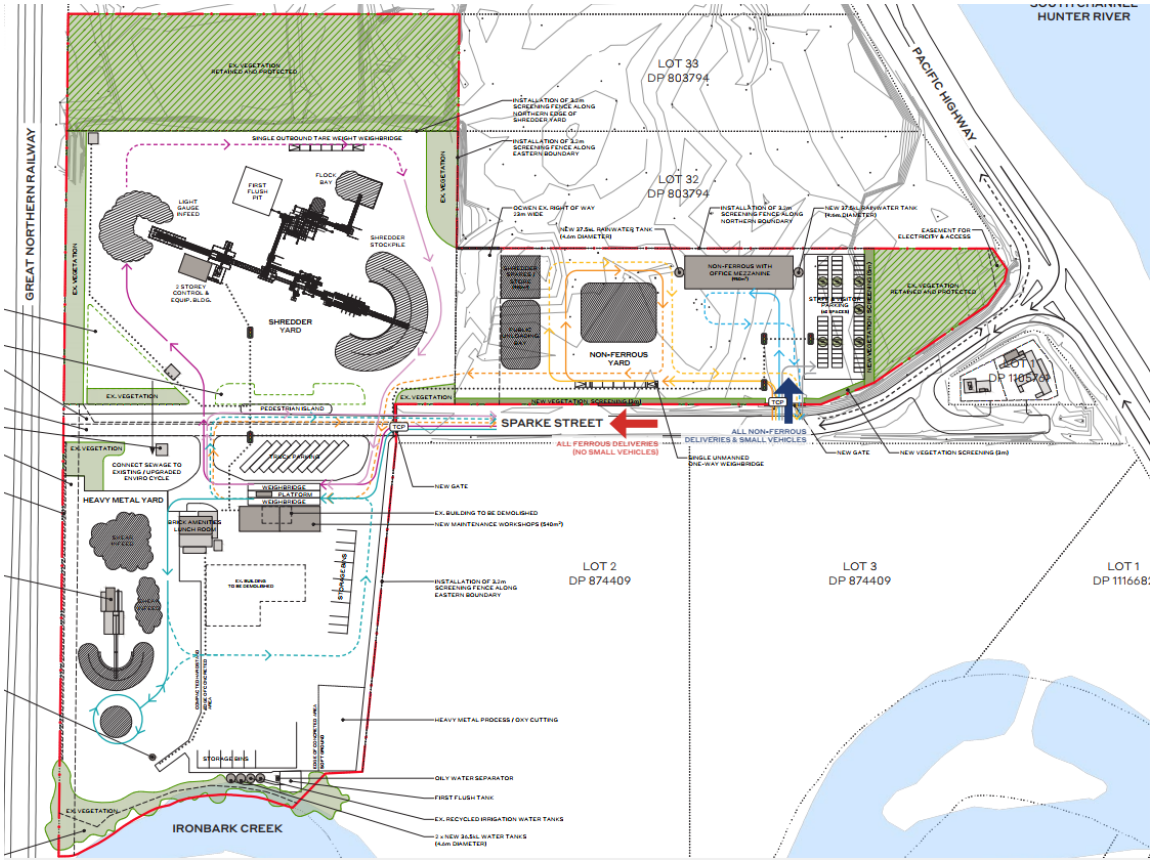
The modification application seeks approval for the following changes:

- Removal of existing remnant landscaping located within the northern portion of the site (Shredder Yard) to improve internal access arrangements;

- Demolition of existing brick administration and maintenance sheds within the southern portion of the site (Heavy Metal Yard);
- Construction of new non-ferrous facilities on 8 Sparke Street (Non-Ferrous Yard) including a new vehicle crossover, 59-space car park, non-ferrous building with office mezzanine and incoming single weighbridge;
- Construction of truck overflow parking area in the location of the existing staff carpark/weighbridge office;
- Construction of new maintenance workshops in the Heavy Metal yard in the position of the former Admin Building;
- Installation of a 3.2m high screening fence on the northern boundary of the site and the eastern boundary of Lot 1 DP1176316;
- Installation of static shear to replace the existing mobile shears in the existing Heavy Metal Yard;
- Installation of an unmanned secondary weighbridge in the Shredder Yard; and
- Vegetation planting and landscaping to provide screening to public areas.

The proposed layout for the site is presented in Figure 2-2.

Figure 2-2 Proposed site layout



3 NOISE CRITERIA

3.1 Existing Noise Environment

To determine the existing noise levels in the surrounding area, unattended noise monitoring was conducted. A monitor was located at 17 Shamrock Street, Hexham to the north of the site and at the northern boundary of the St Josephs Aged Care Facility (240 Maitland Road) to the south of the site (as shown in Figure 2-1). Monitoring took place from 28 September 2020 until 9 October 2020.

The noise monitoring equipment used for this measurement consisted of two ARL NGARA environmental noise loggers set to A-weighted, fast response, continuously monitoring in 15-minute intervals. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

The loggers determine L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels of the ambient noise. L_{A1}, L_{A10} and L_{A90} are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Glossary of Acoustic Terms for definitions). The L_{A90} level is normally taken as the background noise level during the relevant period. From the background noise levels (L_{A90}) the Rating Background Levels (RBLs) were determined using the methodology recommended in the NSW *Noise Policy for Industry* (NPfI).

Table 3-1 Existing ambient noise levels

Monitoring Location	Time of Day	Noise Levels (dBA)	
		RBL	L_{Aeq}
17 Shamrock Street	Day	46	65
	Evening	45	59
	Night	39	59
	15-hour	-	64
	9-hour	-	59
240 Maitland Road	Day	48	55
	Evening	48	57
	Night	43	55
	15-hour	-	56
	9-hour	-	55

Day = 7:00am – 6:00pm (8:00am – 6:00pm Sunday); Evening = 6:00pm – 10:00pm; Night = the remaining periods.

3.1.1 Recent compliance monitoring

InfraBuild have provided two recent noise compliance monitoring reports for the site undertaken by AECOM. Results from this monitoring indicate that the site is typically compliant, with potential exceedances during the day period at the Shamrock Street receivers.

The AECOM report for Q4 2019 discusses that the exceedance is potentially inaccurate do to the high extraneous noise in that area affecting measurement results. Further investigation into the exceedance revealed that while the site might be audible at this location it is not the dominant noise source due to road traffic and trains.

Table 3-2 presents the results from these monitoring reports.

Table 3-2 AECOM quarterly monitoring results

Receiver Location	Time	Calculated noise impact, dB(A)		EPL noise limit, dB(A)
		Q4 2019	Q2 2020	
15 Shamrock Street, Hexham	Day	55**	53	47
	Evening	29	29	48
	Night	24	27	45
Calvary St Joseph's Retirement Community	Day	48	37	53
	Evening	36	40	42
	Night	33	31	41

** Result not deemed to be representative.

3.2 Operational Noise Trigger Levels

The *Noise Policy for Industry* (*NPfI*) (EPA, 2017) provides a framework for assessing environmental noise impacts from industrial premises and industrial development proposals in New South Wales.

The *NPfI* recommends the development of project noise trigger levels, which provide a benchmark for assessing a proposal or site. The project noise trigger levels should not be interpreted as mandatory noise criteria but, rather, as noise levels that, if exceeded, would indicate a potential noise impact on the community.

The project noise trigger level is the lower value of the project intrusiveness noise level and the project amenity noise level. The project intrusiveness noise level assesses the likelihood of noise being intrusive above the ambient noise level and is applied to residential receivers only. The project amenity noise level ensures the total industrial noise from all sources in the area does not rise above a maximum acceptable level.

3.2.1 NPfI Project Intrusiveness Noise Levels

The intrusiveness noise level is the noise level 5 dBA above the background noise level (RBL) for each time period (daytime, evening or night time) of interest at a residential receiver. The RBL is derived from the measured L_{A90} noise levels.

The *NPfI* stipulates that project intrusiveness noise levels should not be set below 40 dBA during the daytime and 35 dBA in the evening and night time. Additionally, the *NPfI* recommends that the project intrusiveness noise level for evening is set at no greater than that for the daytime, and that the project intrusiveness level for night time is set at no greater than that for the evening and daytime.

The measured RBLs were below the minimum levels as stipulated in the NPfI. the site. The Project Intrusiveness Noise Levels are presented in Table 3-3.

Table 3-3 Project intrusiveness noise levels

Receiver	Time of Day	RBL	Project Intrusiveness Noise Level ($L_{Aeq,15min}$)
Residential receivers on Shamrock Street	Day	46	51
	Evening	45	50
	Night	39	44
St Josephs Aged Care Facility	Day	48	53
	Evening	48	53
	Night	43	48

Day = 7:00am – 6:00pm (8:00am – 6:00pm Sunday); Evening = 6:00pm – 10:00pm; Night = the remaining periods.

3.2.2 NPfI Project Amenity Noise Levels

Project amenity noise levels aim to set a limit on continuing increases in noise levels from all industrial noise sources affecting a variety of receiver types; that is, the ambient noise level in an area from all industrial noise sources remains below recommended amenity noise levels.

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include transportation noise (when on public transport corridors), noise from motor sport, construction noise, community noise, blasting, shooting ranges, occupational workplace noise, wind farms, amplified music/patron noise.

The amenity noise level aims to limit continuing increases in noise levels which may occur if the intrusiveness level alone is applied to successive development within an area.

The recommended amenity noise level represents the objective for total industrial noise at a receiver location. The project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To prevent increases in industrial noise due to the cumulative effect of several developments, the project amenity noise level for each new source of industrial noise is set at 5 dBA below the recommended amenity noise level.

The project amenity noise levels are calculated from the recommended amenity noise levels presented in Table 3-4.

Table 3-4 Recommended amenity noise levels

Receiver	Noise Amenity Area	Time of Day	Recommended Amenity Noise Level (dBA $L_{Aeq,period}$)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45

Day = 7:00am – 6:00pm (8:00am – 6:00pm Sunday); Evening = 6:00pm – 10:00pm; Night = the remaining periods.

Recommended amenity noise levels presented in Table 3-4 above represent the objective for total industrial noise at a receiver location. In the case of a single new noise source being proposed, the project amenity noise level represents the objective for noise from a single industrial development at the receiver location. This is calculated as the recommended amenity noise level minus 5 dBA.

Due to different averaging periods for the $L_{Aeq,15min}$ and $L_{Aeq,period}$ noise descriptors, the values of project intrusiveness and amenity noise levels cannot be compared directly when identifying noise trigger levels i.e.; the most stringent values of each category. In order to make a comparison between descriptors, the *NPfI* assumes that the $L_{Aeq,15min}$ equivalent of an $L_{Aeq,period}$ noise level is equal to the $L_{Aeq,15min}$ level plus 3 dB.

Based on the methodology for determining residential receiver category in the *NPfI*, the area surrounding the site can be classified as 'Urban' due to the ambient noise environment being dominated by traffic and a number of commercial and industrial facilities nearby These amenity noise levels have been adopted and are presented in Table 3-5.

Table 3-5 Project amenity noise levels

Noise Amenity Area	Time of Day	Recommended Amenity Noise Level ($L_{Aeq,period}$)	Project Amenity Noise Level ($L_{Aeq,15min}$ dBA)
Suburban	Day	60	58
	Evening	50	48
	Night	45	43

Day = 7:00am – 6:00pm (8:00am – 6:00pm Sunday); Evening = 6:00pm – 10:00pm; Night = the remaining periods.

3.2.3 Existing EPL Noise Limits

In addition to establishing noise criteria as required by the NPfI, there is existing limit conditions on the site through the EPL License. These noise limits are presented in Table 3-6.

Table 3-6 EPL limit conditions

Location	Time of Day	EPL Noise Limit ($L_{Aeq,15min}$)	
Any residence in Shamrock Street, Hexham	Day	$L_{Aeq, 15\ min}$	47
	Evening		48
	Night		45
	Night	$L_{A1, 1\ min}$	55
St Josephs Retirement Village and any residence in Old Maitland Road, Hexham	Day	$L_{Aeq, 15\ min}$	53
	Evening		42
	Night		41
	Night	$L_{A1, 1\ min}$	56
Any operating industrial premises	Day	$L_{Aeq, 15\ min}$	70
	Evening		70
	Night		70

3.2.4 NPfI Project Noise Trigger Levels

Table 3-7 below shows the project noise levels for sensitive receivers, with the project noise trigger levels shown in **bold**.

Table 3-7 NPfI project noise trigger levels

Receiver	Time of Day	Project Intrusiveness Noise Levels ($L_{Aeq,15min}$ dBA)	Project Amenity Noise Levels ($L_{Aeq,15min}$ dBA)
Residential receivers on Shamrock Street	Day	**51**	58
	Evening	50	**48**
	Night	44	**43**
St Josephs Aged Care Facility	Day	**53**	58
	Evening	53	**48**
	Night	48	**43**

Day = 7:00am – 6:00pm (8:00am – 6:00pm Sunday); Evening = 6:00pm – 10:00pm; Night = the remaining periods.

3.2.5 NPfI Maximum Noise Trigger Levels

Noise sources at night occurring over a short duration have the potential to cause sleep disturbance despite complying with project noise trigger levels. The site has approval to operate within the night period, therefore maximum noise level events need to be considered for potential sleep disturbance.

The *NPfI* recommends that, where the night time L_{Amax} receiver noise levels from a development exceeds 52 dBA or the RBL plus 15 dBA, whichever is the greater, then a more detailed assessment of potential sleep disturbance impacts is warranted. Table 3-8 presents the maximum

noise trigger levels for the receivers identified in this assessment. These noise levels are typically addressed at the facade of potentially affected dwellings.

Table 3-8 Maximum noise trigger levels

Receiver	Night RBL (dBA)	RBL + 15 dBA	Maximum Noise Trigger Level (dBA)	EPL Limit Conditions
Residential receivers on Shamrock Street	39	**54**	52	55
St Josephs Aged Care Facility	43	**58**	52	56

Additionally, in instances where night time $L_{Aeq,15min}$ noise levels exceed 40 dBA or the prevailing RBL plus 5 dBA, whichever is the greater, then a detailed assessment of potential sleep disturbance impacts is warranted.

3.3 Road Traffic Noise Criteria

The EPA's NSW *Road Noise Policy* (RNP) provides criteria for managing noise levels associated with a development that will increase traffic on a particular road.

The *RNP* assessment criteria for residential land uses are presented in Table 3-9. Maitland Road is classified as an arterial road.

Table 3-9 Road traffic noise assessment criteria for residential receivers

Road Category	Type of Proposal / Land Use	Noise Criteria (dBA)	
		Day (7am-10pm) (dBA)	Night (10pm-7am) (dBA)
Freeway / arterial / sub-arterial roads	Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use development	$L_{Aeq,15hr}$ 60 (external)	$L_{Aeq,9hr}$ 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use development	$L_{Aeq,1hr}$ 55 (external)	$L_{Aeq,1hr}$ 50 (external)

The *RNP* also offers the relative increase criteria to manage the permissible increase in road traffic noise from a land use development. This criteria states that:

> "*For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic*

noise level should be limited to 2 dB above that of the corresponding *'no build option'."*

3.4 Construction Noise Criteria

The NSW EPA's *Interim Construction Noise Guidelines (ICNG)* recommends noise management levels for construction activities to control the impact on the surrounding community. The *ICNG* noise management levels are presented in Table 3-10.

Table 3-10 *Interim Construction Noise Guidelines* Management Levels

Type of Receiver	Time of Day	Management Level $L_{Aeq,15min}$	Measurement Point
Residential	**Recommended construction hours** Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public Holidays	Noise affected RBL + 10dBA Highly noise affected 75dBA	Property boundary most exposed to construction noise. If the property boundary is more than 30m from the residence, the measurement point is the most noise affected point within 30m of the residence.
	Outside recommended standard hours	Noise affected RBL + 5dBA	
Industrial	**Any time**	75dBA	Most affected occupied point of the premises.

The noise affected level represents the point above which there may be some community reaction to noise. The highly noise affected level represents the point above which there may be strong community reaction to noise.

These criteria are used to determine the project-specific construction noise criteria, which are presented in Table 3-11.

Table 3-11 Project-Specific Construction Noise Criteria

Location	Acceptable $L_{Aeq,15min}$ Noise Level (Standard Daytime Construction Hours)	Highly Affected Noise Level (dBA)
Residential receivers on Shamrock Street	56dBA	75dBA
St Josephs Aged Care Facility	58dBA	75dBA

3.5 Vibration Criteria

3.5.1 Building Damage Criteria

There are no Australian Standards that address the potential for vibration to cause building damage.

Typically, either the German or British Standards are adopted. In this instance the more stringent German Standard *DIN 4150 – 1999 Structural vibration: Part 3: Effects of Vibration on Structures, (DIN 4150-3-1999)* Part 3 is to be adopted.

The vibration guide values for building damage for typical buildings as outline in *DIN 4150-3-1999* are provided in Table 3-12.

Table 3-12 Vibration Guide Values for Building Damage – DIN 4150-3

Guideline Values for Velocity – mm/s (peak)				
Structure	**At Foundation at a Frequency of**			**Top Storey (Horizontal)**
	1 to 10 Hz	**10 to 50 Hz**	**50 to 100 Hz[1]**	**All Frequencies**
Residential	5	5 to 15	15 to 20	15
Commercial/Industrial	20	20 to 40	40 to 50	40

3.5.2 Human Comfort Criteria

Vibration criteria for assessment of the effects of vibration on human comfort are set out in British Standard 6472-1992. Methods and criteria in that Standard are used to set "preferred" and "maximum" vibration levels in the document *Assessing Vibration: A technical guideline* (2006) produced by the NSW DECCW.

Acceptable values of human exposure to continuous vibration are dependent on the time of day and the activity taking place in the occupied space (e.g. workshop, office, residence or a vibration-critical area). Guidance on preferred values for vibration is set out in Table 3-13.

Table 3-13 Criteria for Exposure to Continuous & Impulsive Vibration

Place	**Time**	**Vibration Dose ($m/s^{1.75}$)**	
		Preferred	**Maximum**
Residences	Daytime	0.20	0.40
	Night time	0.13	0.26
Offices	Day or night time	0.40	0.80
Workshops	Day or night time	0.80	1.60

4 NOISE ASSESSMENT

4.1 Noise Modelling Methodology

4.1.1 Computer Noise Model

Operational noise emissions associated with the Project were modelled using the CadnaA acoustic noise prediction software implementing the CONCAWE predication algorithm. Factors addressed in the noise modelling are:

- Noise level emissions and locations;
- Shielding from ground topography and structures;
- Shielding from proposed screening fence;
- Noise attenuation due to geometric spreading;
- Ground absorption;
- Atmospheric absorption; and,
- Meteorologic conditions.

4.1.2 Ground Topography

Topographical data for the site and nearby surrounding area has been sourced from NSW Spatial Services as 1m contours and has been incorporated in the model.

4.1.3 Ground Absorption

A ground absorption factor of 0.5 has been applied to the entire model. This global ground absorption value conservatively represents the mix of hard ground (absorption = 0) and soft ground (absorption = 1) on and around the site.

4.1.4 Meteorologic 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 standardised neutral and worst-case weather conditions outlined in Section D of the NSW NPfI are used in the noise prediction model. A summary of the meteorological conditions is outlined in Table 4-1.

Table 4-1 Meteorological conditions adopted for the noise modelling

Meteorological Condition	Air Temperature	Relative Humidity	Wind Speed	Wind Direction	Stability Category
Neutral	10°C	70	0.5 m/s	Worst-case	D Class
Worst-case	10°C	70	3 m/s	Worst-case	D Class

4.2 Operational Noise Assessment

The proposed changes to the site are predominately layout based, with the only new plant being the static shear. This shear is however replacing multiple mobile shears and therefore not expected to cause a significant noise increase.

Noise from vehicle movements on site is also a significant source of noise. Transport analysis across the months of March and April 2020 show 140.2 average daily vehicle movements. Approximately 40 percent of these movements were semi-trailer and B-double movements with the remainder being smaller rigid vehicles. To determine vehicle movement numbers for modelling it has been assumed that the movements are spread evenly throughout the open for business period of the day (7:30am-3:30pm). A peak period of twice the average movements has been used to represent a typical busy period.

A breakdown of the plant and vehicles used in the noise model and their sound power levels (L_W) is presented in Table 4-2. Sound power level values have been sourced from Wilkinson Murray measurements of similar equipment.

Table 4-2 Operational noise sources and sound power levels

Item	Sound power level (dBA)	Number modelled per period		
		Day	Evening	Night
Excavator	107	4	4	1
Forklift	86	3	3	1
Front end loader	108	2	1	1
Shredder	115	1	1	0
Static shear	101	1	1	1
Light vehicle	98	14	0	0
Small truck	104	7	0	0
Large truck	107	14	0	0

The predicted noise levels at the surrounding receivers for each scenario are presented in Table 4-3 and Table 4-4.

Table 4-3 Predicted noise levels – neutral meteorological conditions

Receiver	Day period		Evening period		Night period	
	Predicted level	Criteria	Predicted level	Criteria	Predicted level	Criteria
Shamrock Street	46	51	41	48	37	43
St Josephs Aged Care Facility	45	53	39	48	37	43

Table 4-4 Predicted noise levels – worst-case meteorological conditions

Receiver	Day period		Evening period		Night period	
	Predicted level	Criteria	Predicted level	Criteria	Predicted level	Criteria
Shamrock Street	46	51	42	48	38	43
St Josephs Aged Care Facility	45	53	40	48	38	43

The predicted operational noise levels comply with the project noise trigger levels for each scenario. Additionally, the predicted noise levels comply with the existing EPL noise limits.

The predicted daytime levels are lower than the measured results from the quarterly monitoring. This is potentially due to the addition of the 3.2m screen in the noise model, which resulted in a significant reduction in predicted levels, particularly for receivers on Shamrock Street.

The predicted evening and night levels are typically higher than the results of the quarterly monitoring, except for the evening period at St Josephs Aged Care Facility, which were similar. This is potentially due to the noise modelling being conservative and including a large portion of the plant on site operating throughout the entire period, whereas in reality operations in the evening and night are significantly reduced.

4.3 L_{Amax} Operational Noise Levels

The site has approval to operate at any time of the day, other than the operation of the shedder which is restricted to daytime operation only. A typical L_{Amax} sound power level can be up to 10dBabove the operational L_{Aeq} sound power level. Modelling has considered each of the scenarios, using a L_W sound power level of 10dB greater than the L_{Aeq} sound power levels nominated in Table 4-2.

The predicted maximum noise levels at the surrounding receivers for each scenario are presented in Table 4-5.

Table 4-5 Predicted L_{Amax} noise levels

Receiver	Predicted L_{Amax} noise level		Maximum noise trigger level
	Neutral	Worst-case	
Residential receivers on Shamrock Street	45	47	54
St Josephs Aged Care Facility	46	47	58

The predicted L_{Amax} noise levels are below the relevant maximum noise trigger levels.

4.4 Road Traffic Noise Assessment

Traffic access to the site is via Maitland Road, which is a major arterial road with a significant proportion of heavy vehicles.

The proposed modifications to the site do not change the permitted processing capacity and are not expected to result in an increase in traffic generation. The improvements to efficiency have the potential to reduce the number of heavy vehicles that queue off site and therefore could potentially reduce the traffic impact on the surrounding road network.

For these reasons, a detailed road traffic noise assessment has not been undertaken.

4.5 Construction Noise Assessment

At this phase of the proposed modifications, detailed construction plans have not been produced. Assumptions have therefore been made on the likely plant and equipment required to undertake the construction. Potential noise intensive construction activities associated with proposed modifications are as follows:

- Demolition of existing brick administration and maintenance sheds within the southern portion of the site (Heavy Metal Yard);
- Construction of new non-ferrous facilities on 8 Sparke Street (Non-Ferrous Yard) including a new vehicle crossover, 59-space car park, non-ferrous building with office mezzanine and incoming single weighbridge; and
- Construction of new maintenance workshops in the Heavy Metal yard in the position of the former Admin Building.

The expected sources of significant noise emissions from the construction, as well as the assumed sound power level (SWL) used for the assessment are as follows:

- Truck to transport building material – 107dBA
- Crane – 102dBA
- Hand tools – 107dBA
- Excavator – 107dBA
- Excavator with hammer attachment – 116dBA

It is expected that all construction activities would be undertaken during standard construction hours, and no out-of-hours works would be required. As a conservative approach all activities have been modelled together. Table 4-6 presents the predicted construction noise levels.

Table 4-6 Predicted construction noise levels

Location	Predicted noise level (dBA)	Acceptable $L_{Aeq,15min}$ Noise Level (Standard Daytime Construction Hours)	Highly Affected Noise Level (dBA)
Residential receivers on Shamrock Street	43	56dBA	75dBA
St Josephs Aged Care Facility	45	58dBA	75dBA

Predicted construction noise levels are below the acceptable noise level for all receivers.

4.6 Operational Vibration Assessment

The main sources of vibration from the site are the shredder and loads being dumped onto the ground from trucks unloading or excavators moving waste around. Neither of these vibration sources would typically be of concern, particularly at distances of greater than 500m, and have not resulted in any prior vibration related issues.

No change to the shredder is proposed and the distances between dump locations on site and surrounding receivers is not changing significantly. No adverse vibration impacts on surrounding receivers is therefore expected and a more detailed assessment of vibration impacts is not required.

5 CONCLUSION

Wilkinson Murray Pty Limited has been engaged by Ethos Urban on behalf of InfraBuild to conduct a Noise and Vibration Impact Assessment for the proposed modification to the Hexham metal recycling facility.

This report provides a detailed assessment of potential operational, construction and traffic noise and vibration impacts associated with the facility and will accompany the development application.

$L_{Aeq,15min}$ operational noise levels have been predicted at sensitive receivers. The predicted noise levels comply with the established project noise trigger levels. In accordance with the *Noise Policy for Industry*, no additional treatments or controls are warranted. The modifications to the site, particularly the construction of a screening fence along the northern and eastern boundaries, have the potential to reduce the noise level currently experienced at nearby residential receivers.

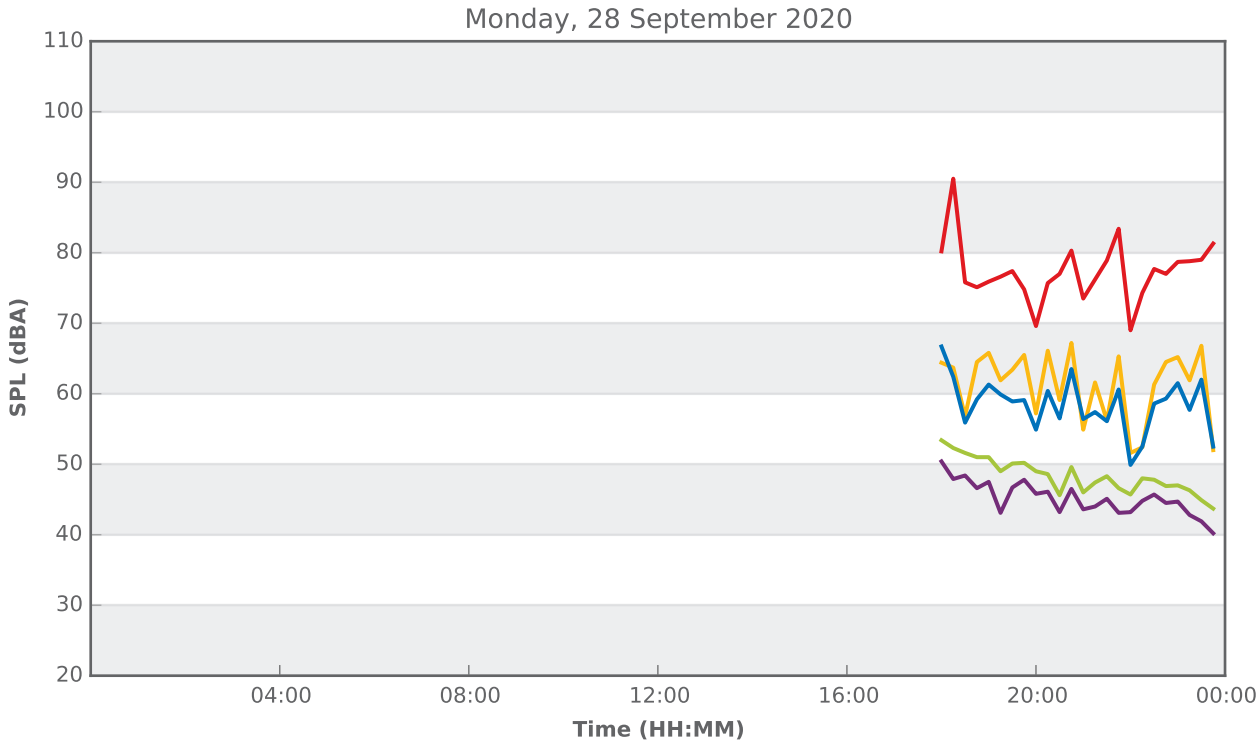
Construction noise levels have also been predicted at sensitive receivers. The predicted noise levels are below the acceptable levels established in accordance with the *Interim Construction Noise Guideline*.

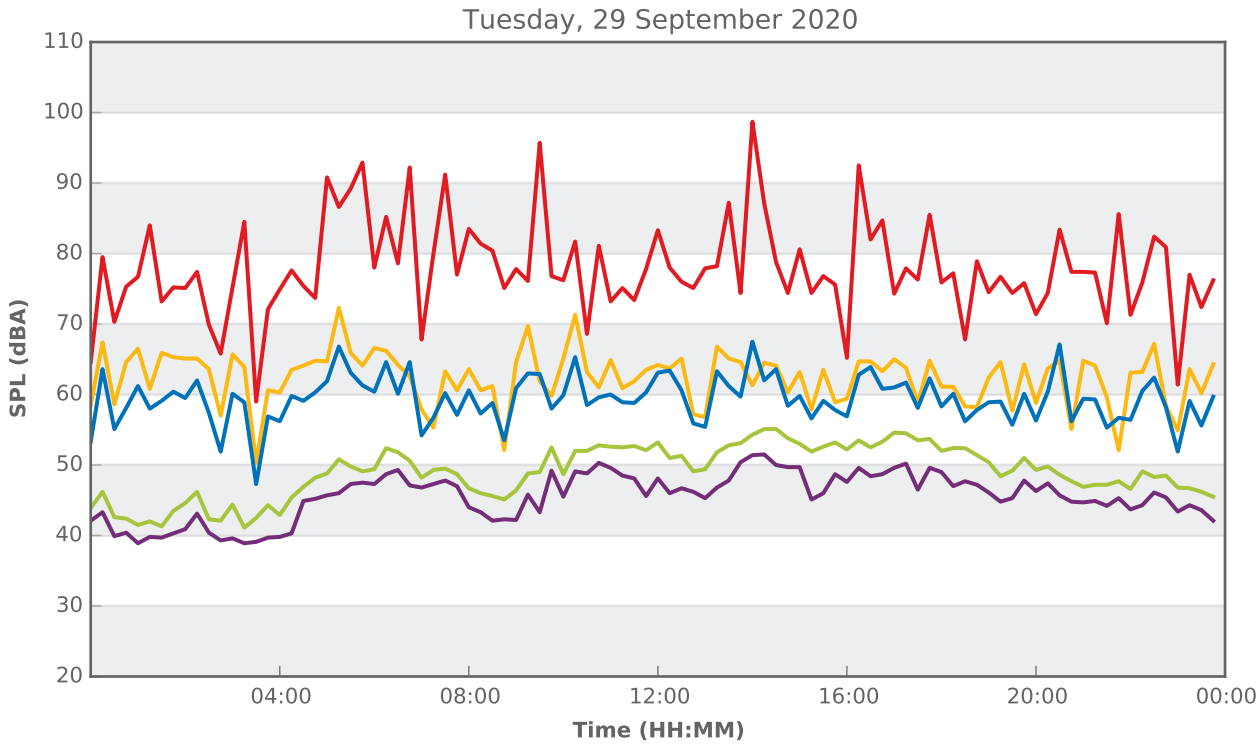
Noise impacts due to vehicle movements on the surrounding road network are not expected to increase as there is no change to the processing limit of the facility. The improvements in efficiency of the site has the capacity to reduce the number of heavy vehicles that queue off site, potentially resulting in a small improvement in road noise impacts.

APPENDIX A

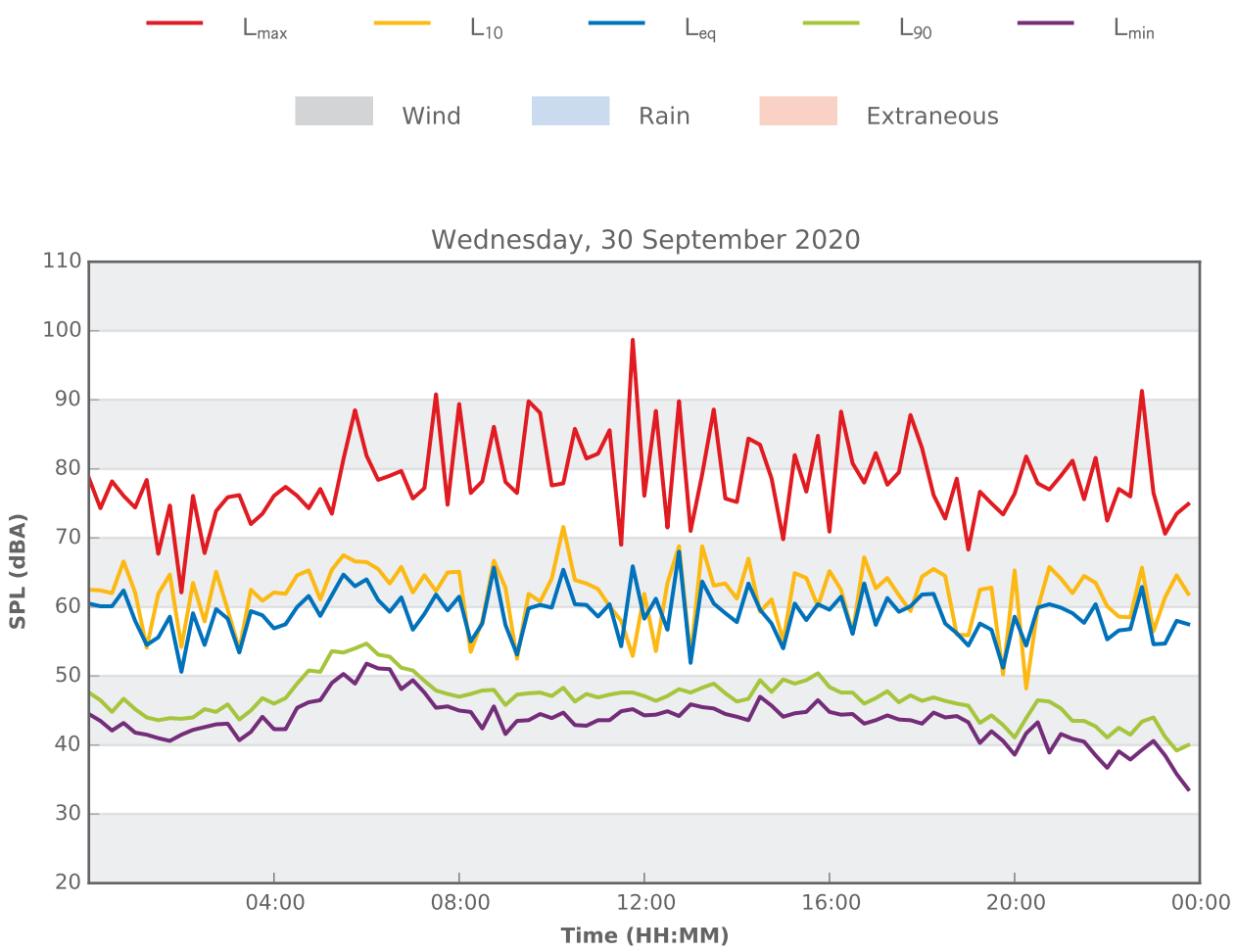
NOISE MEASUREMENT RESULTS

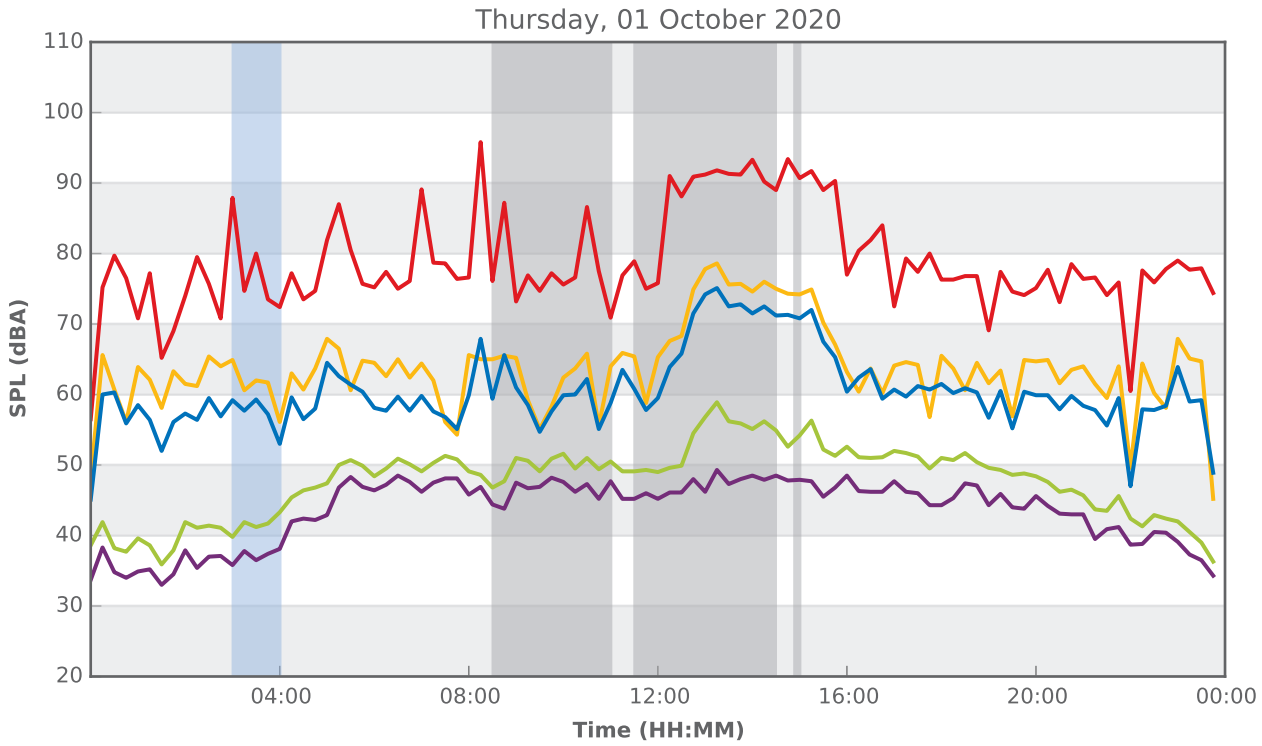
Sparke Street Hexham Nsw





Sparke Street Hexham Nsw





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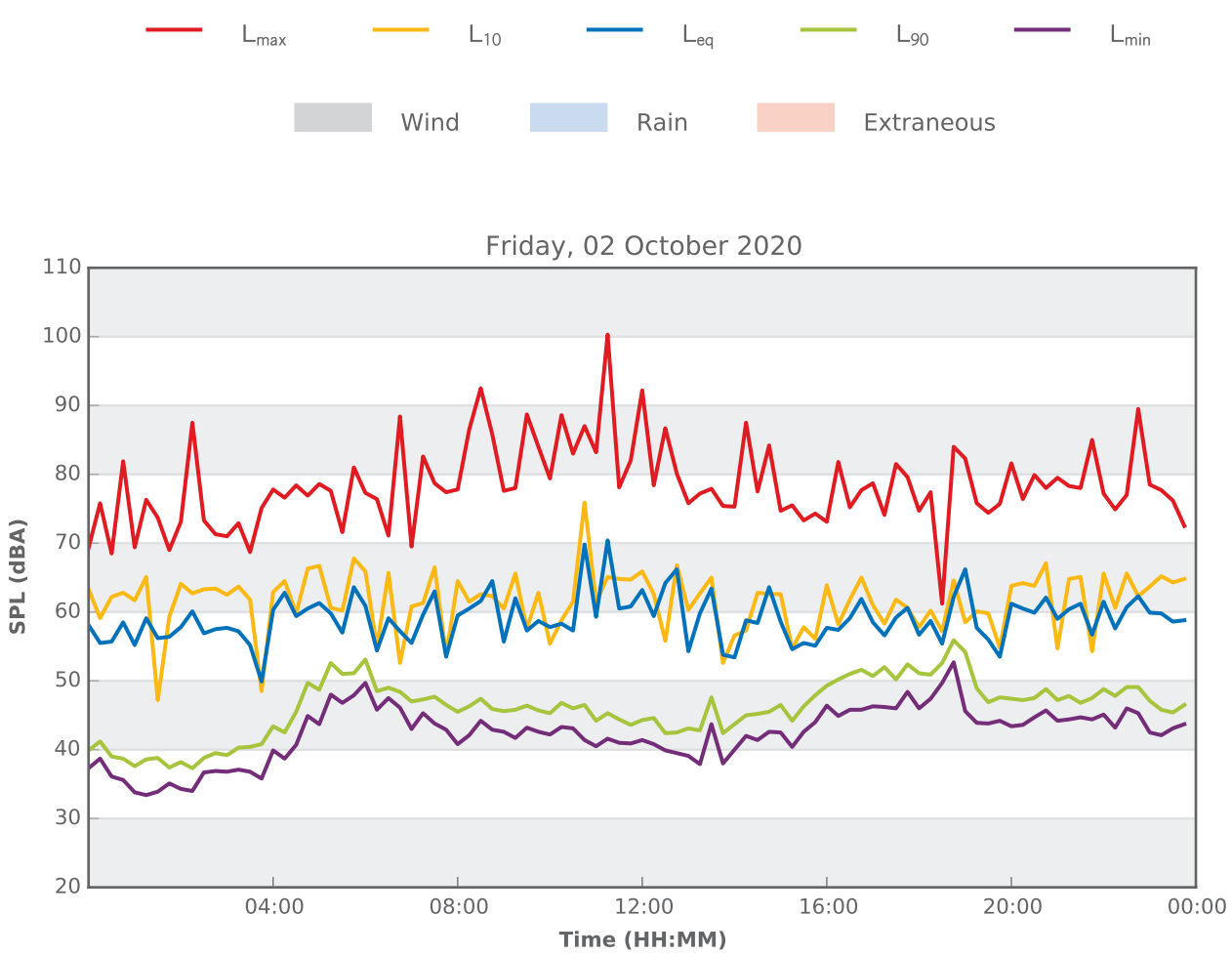

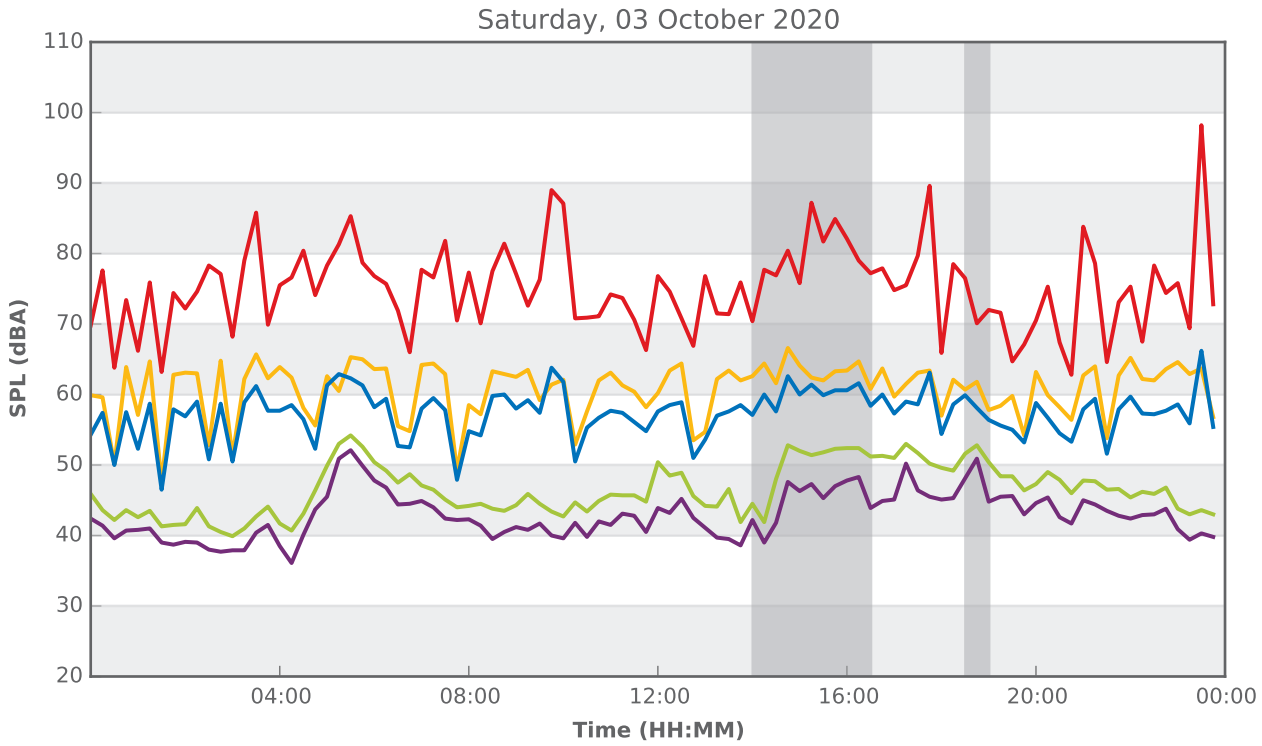

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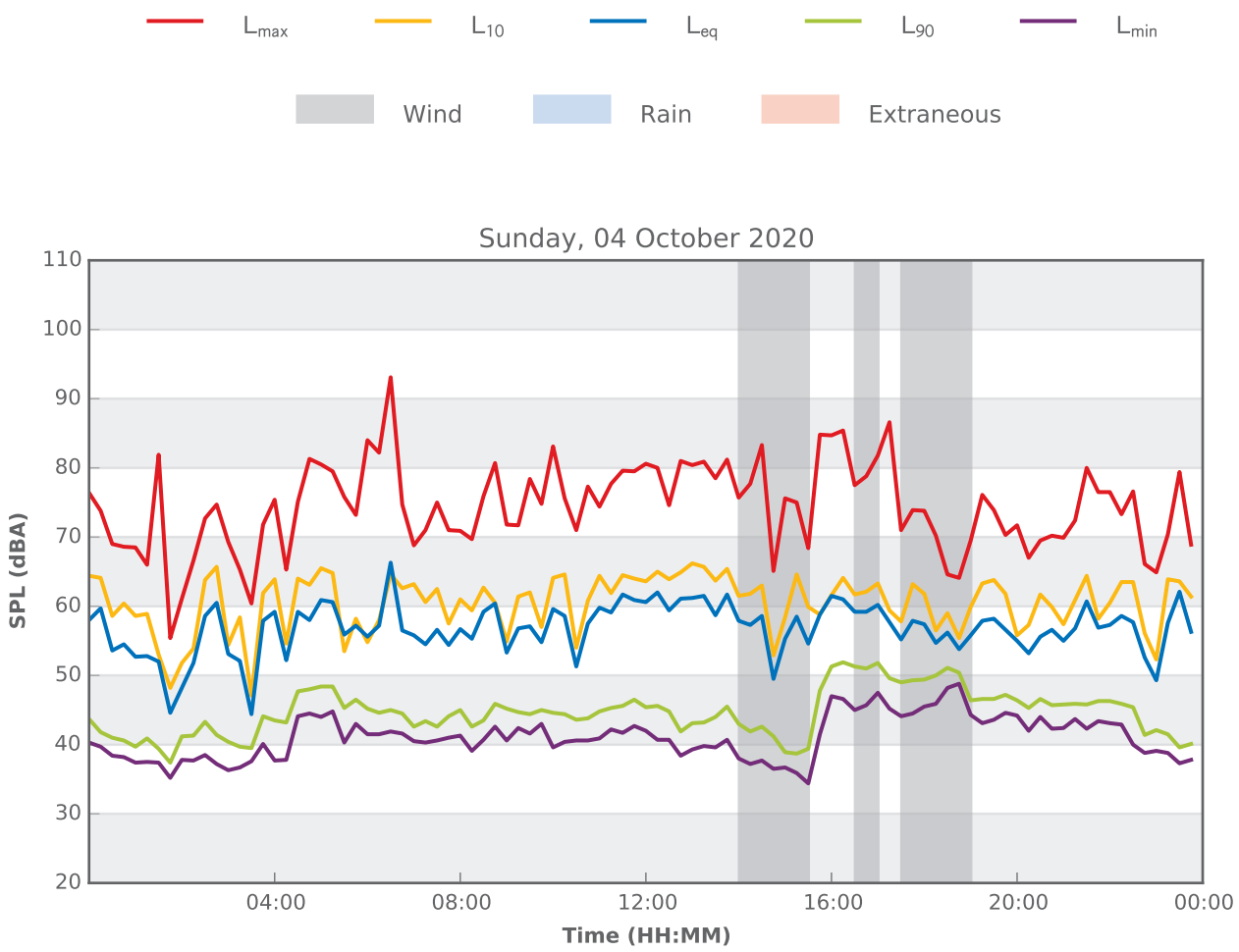

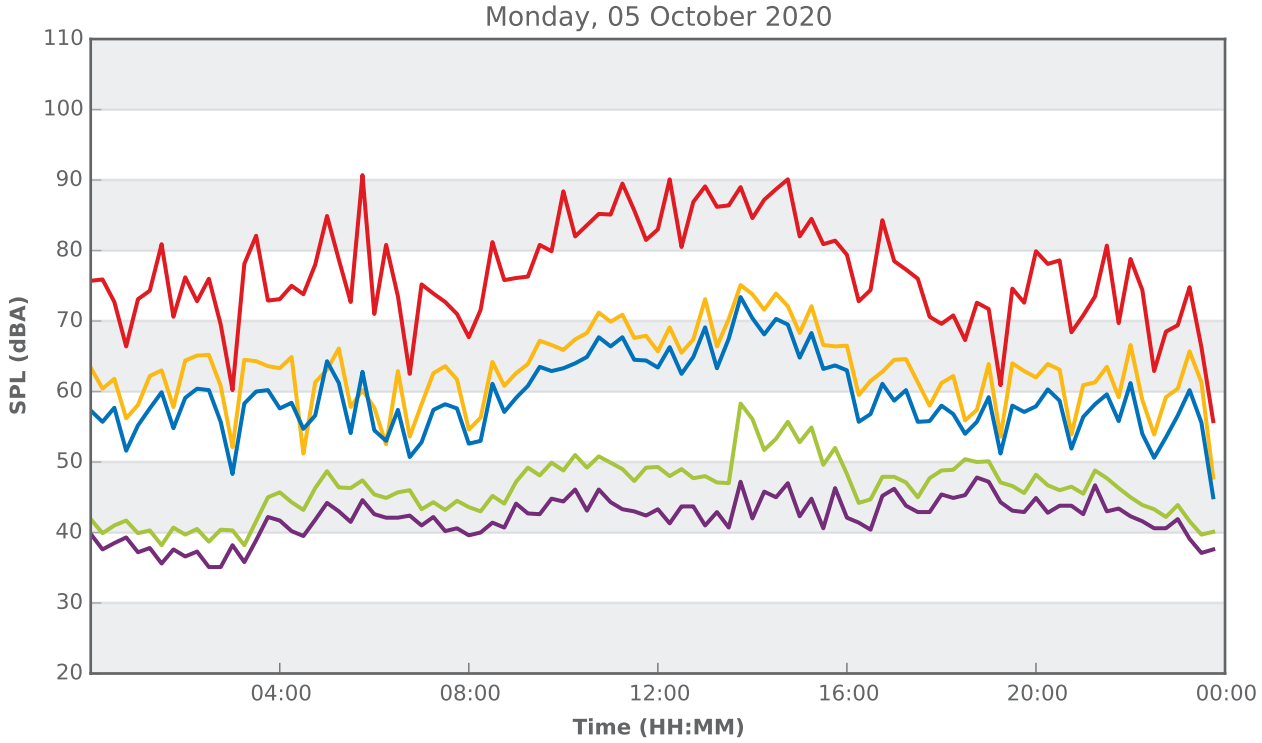

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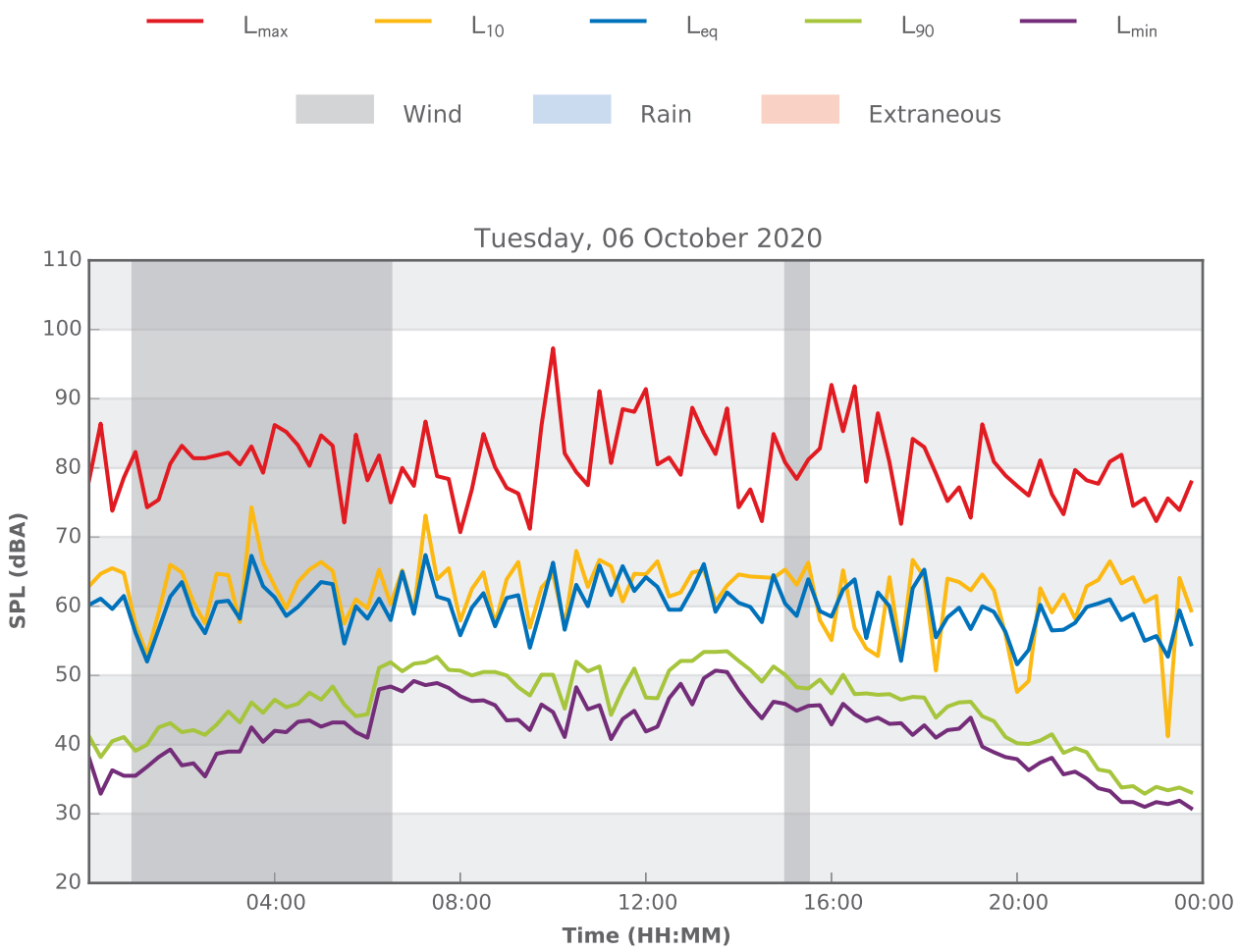

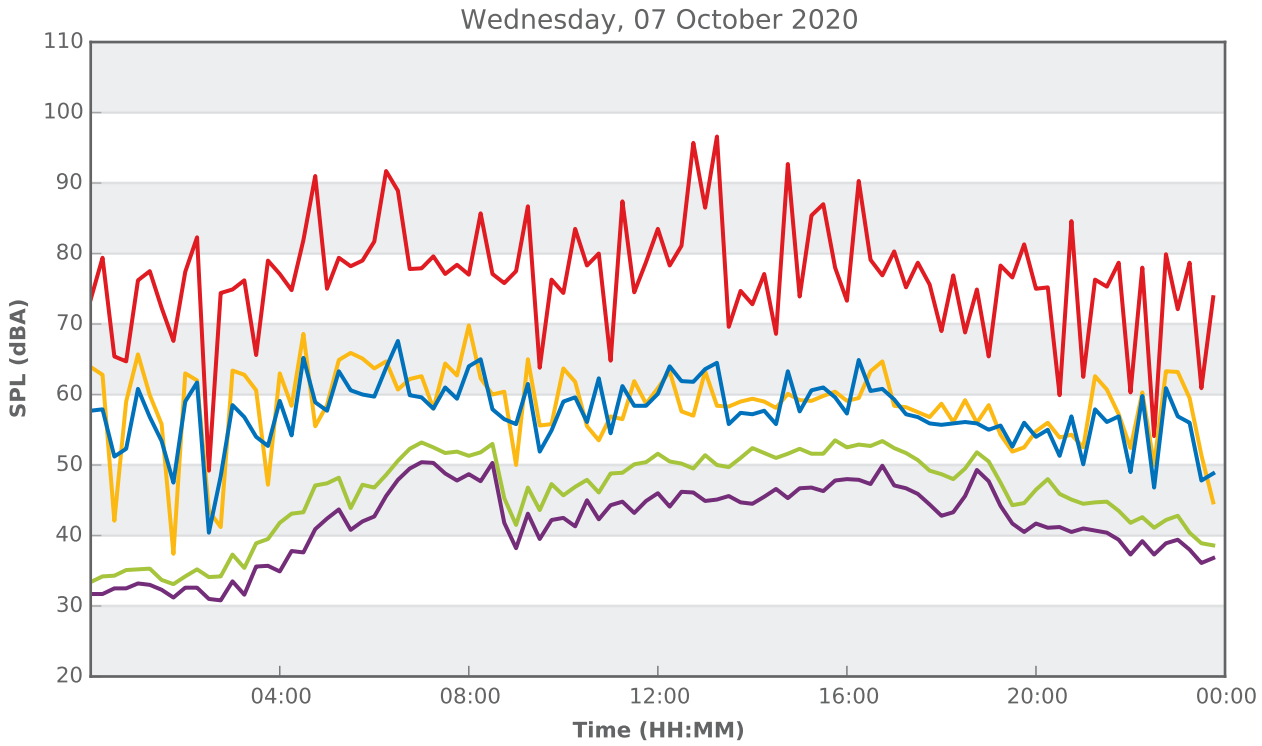

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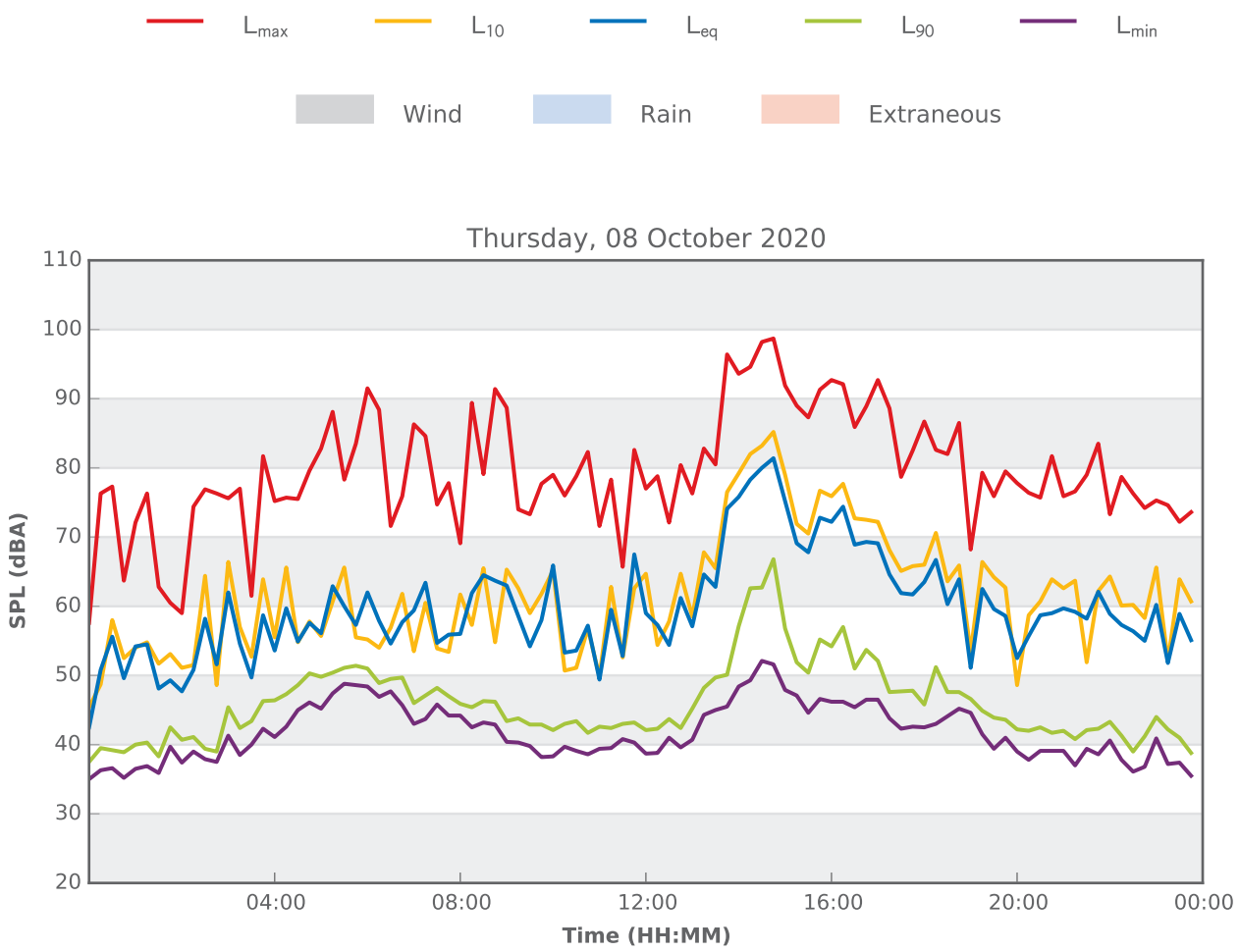

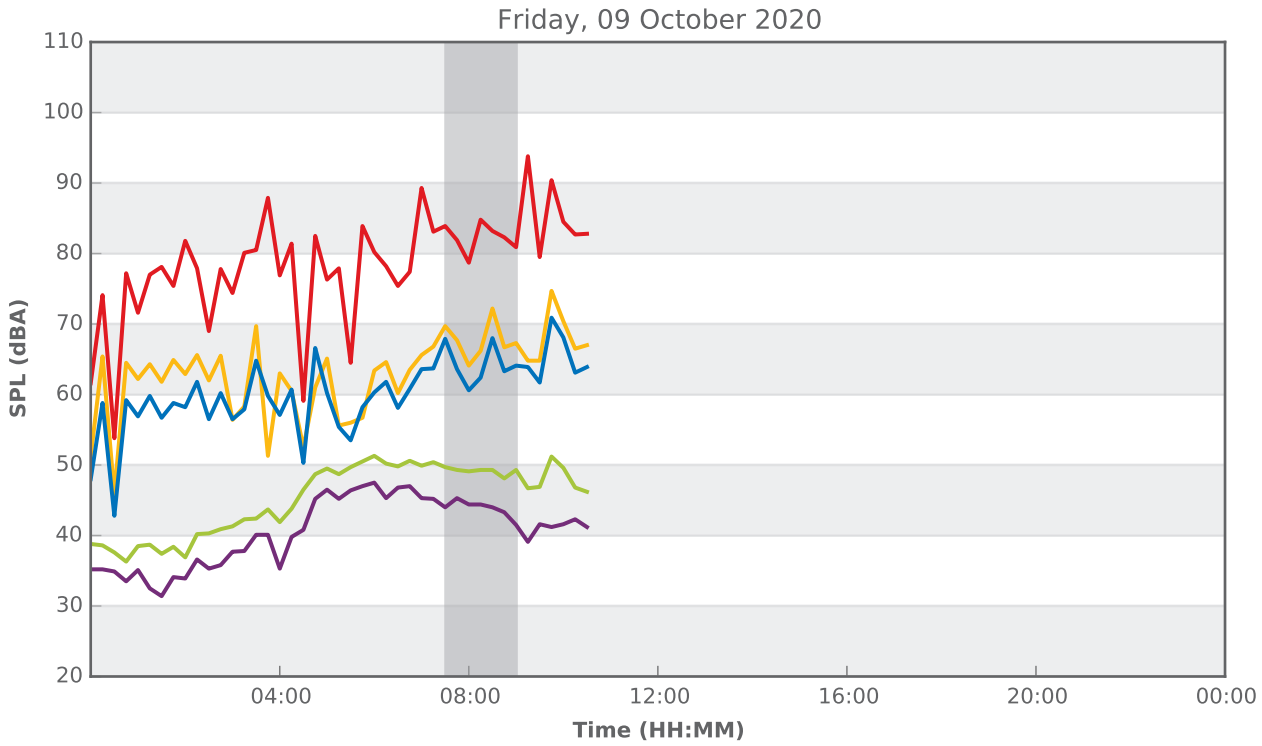

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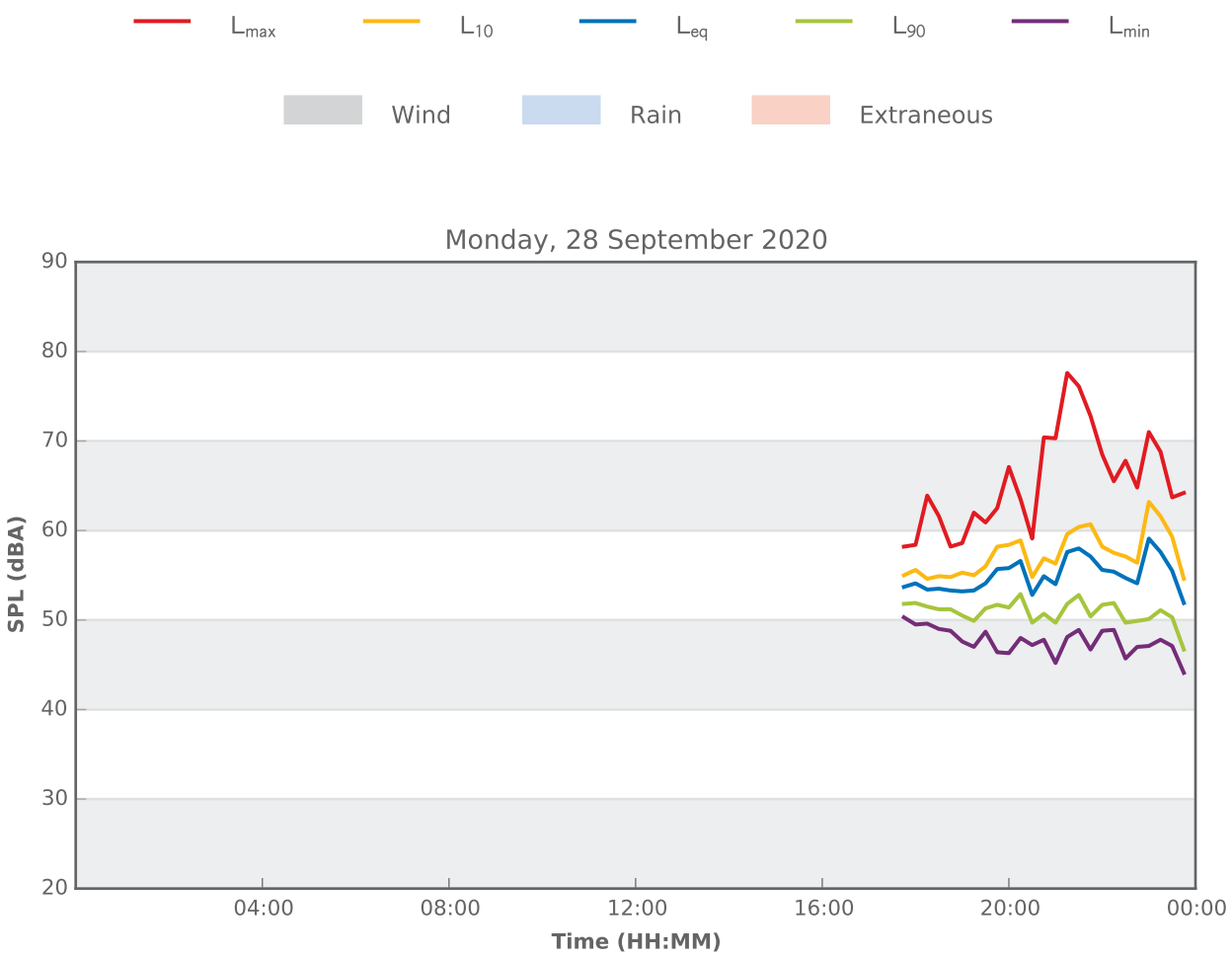

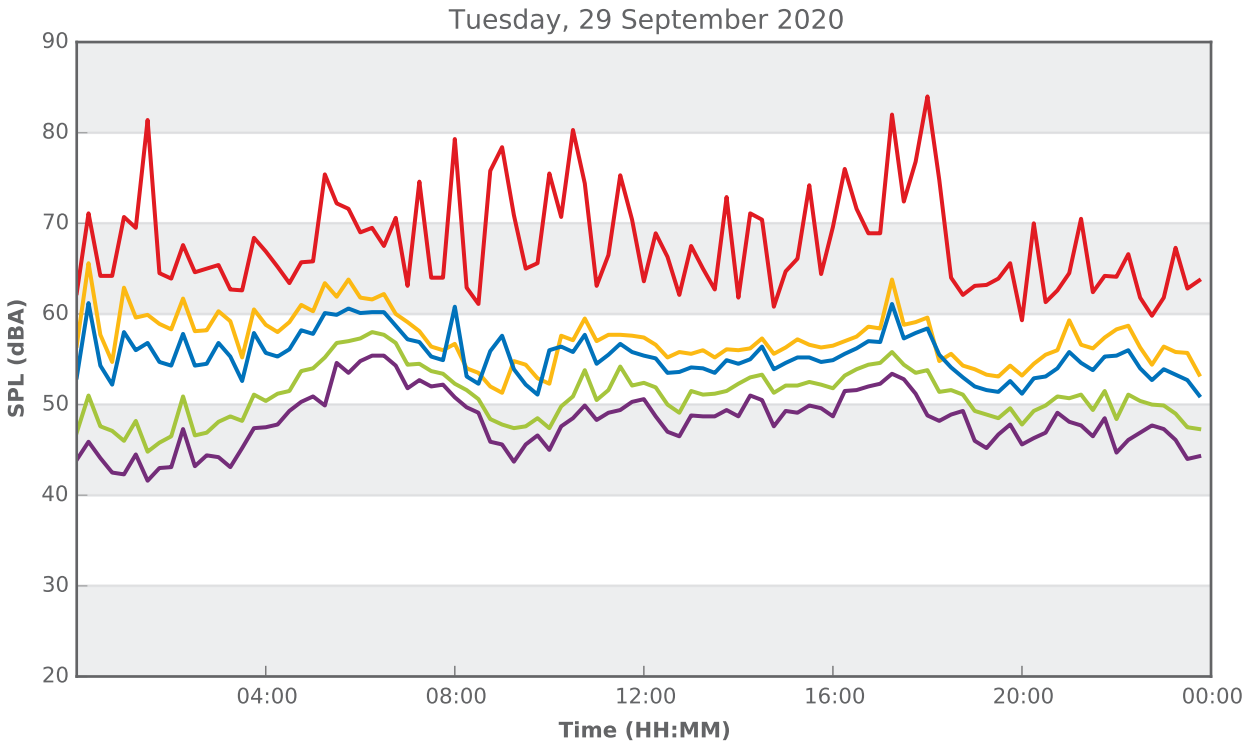

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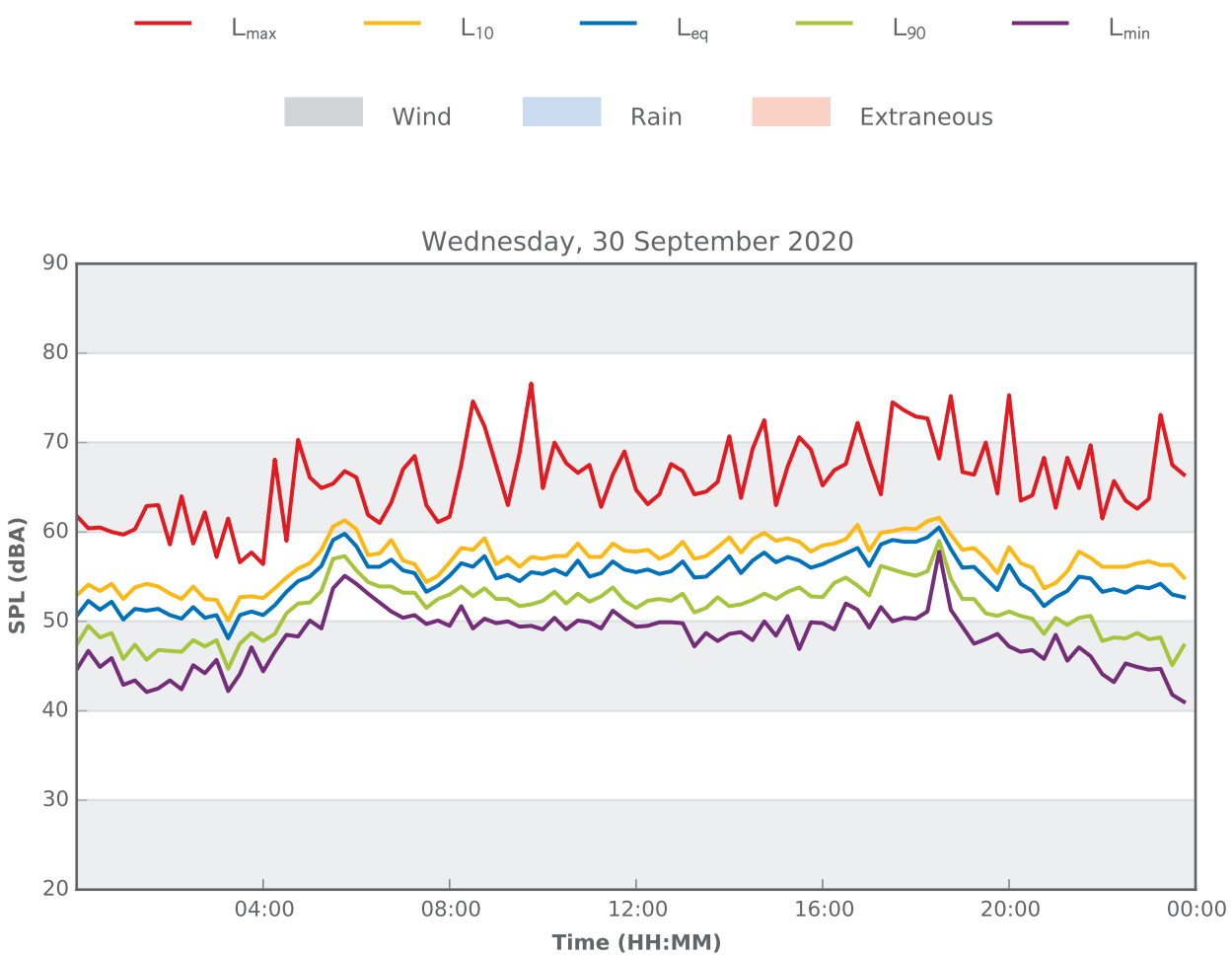

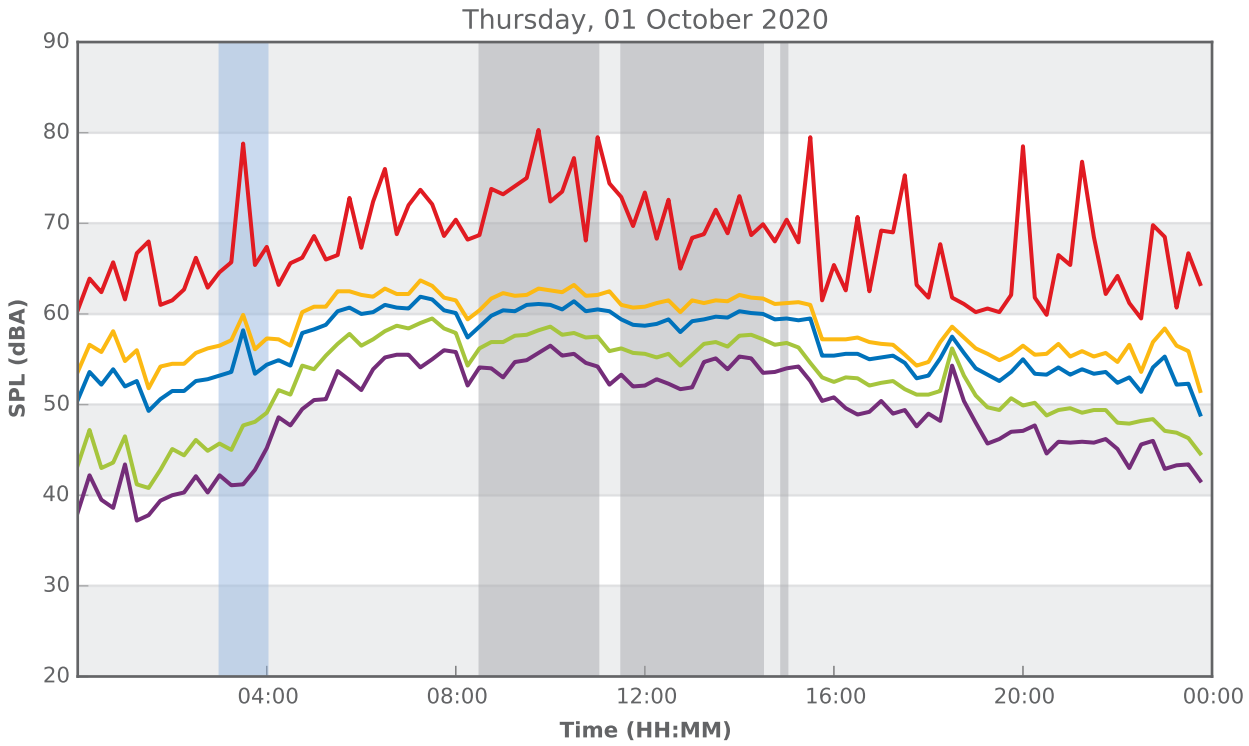

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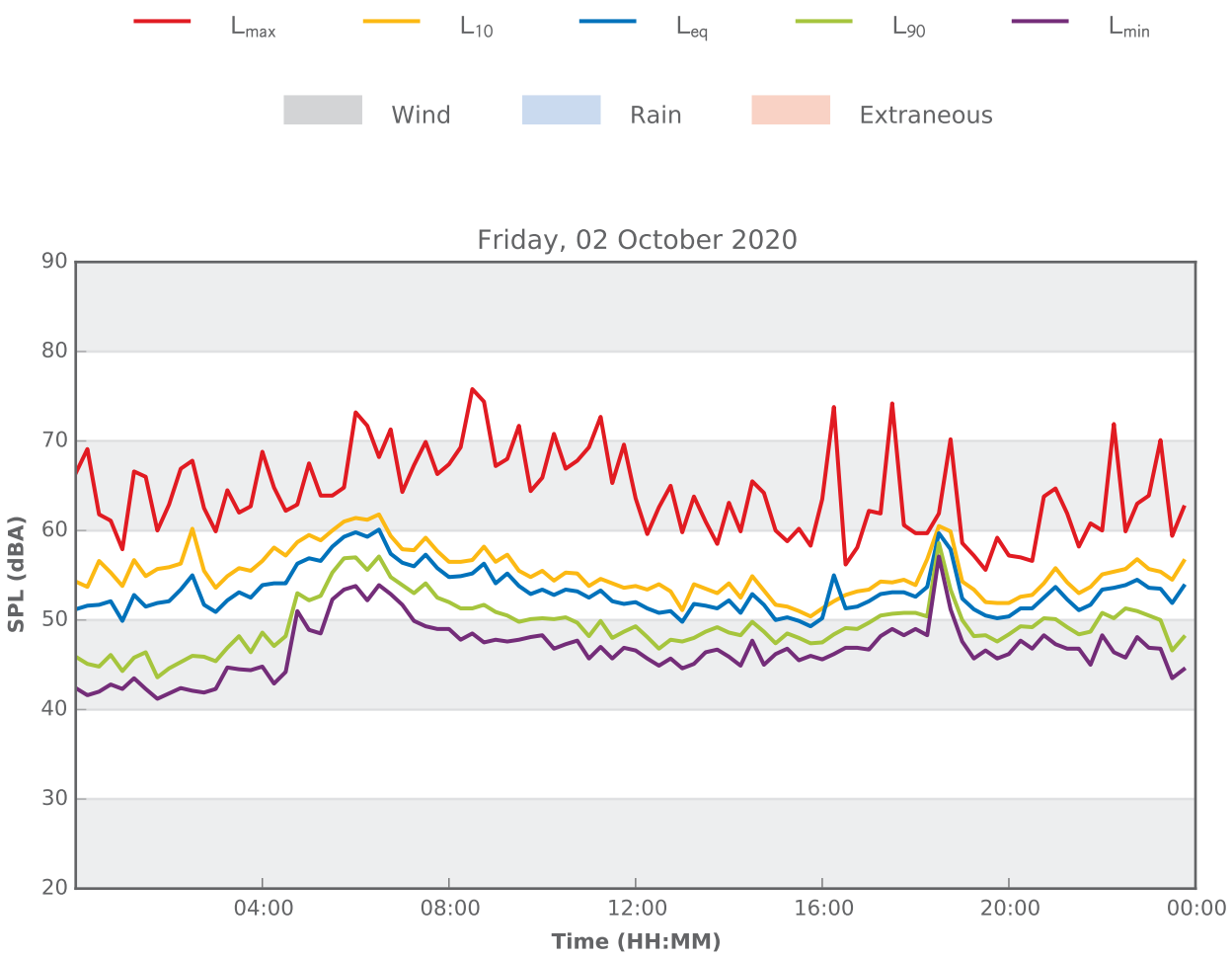

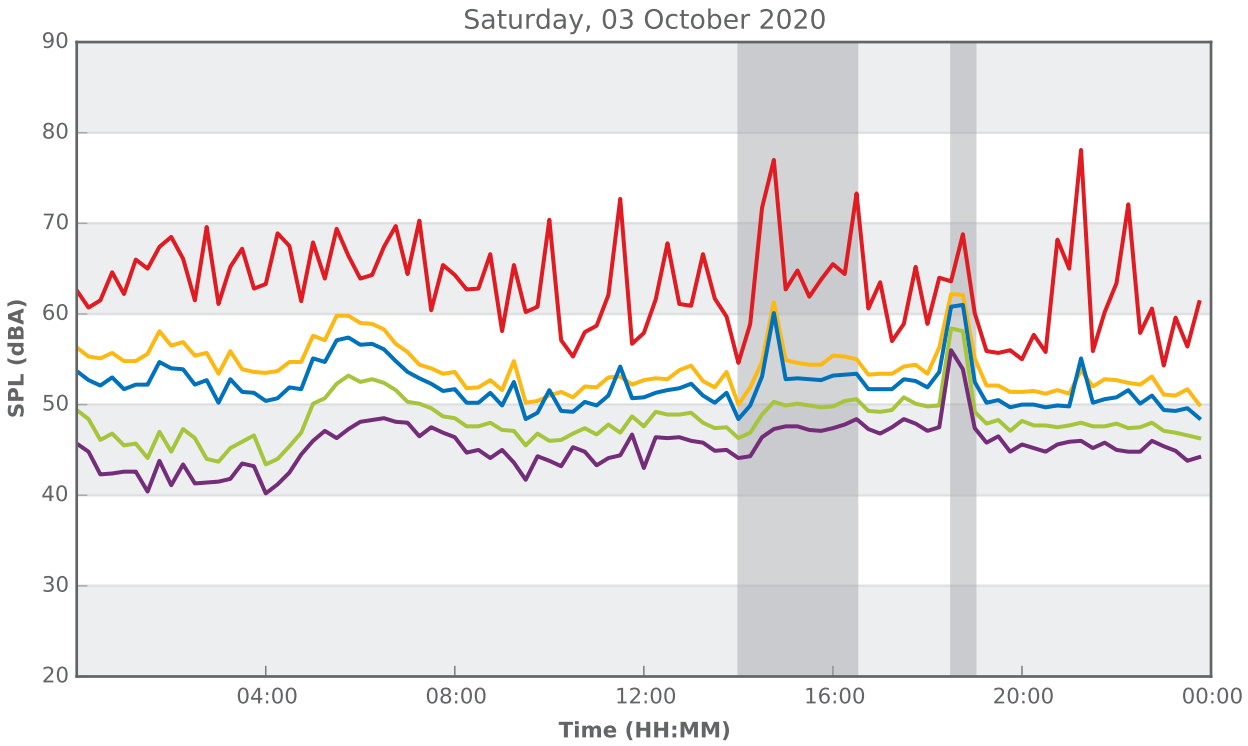

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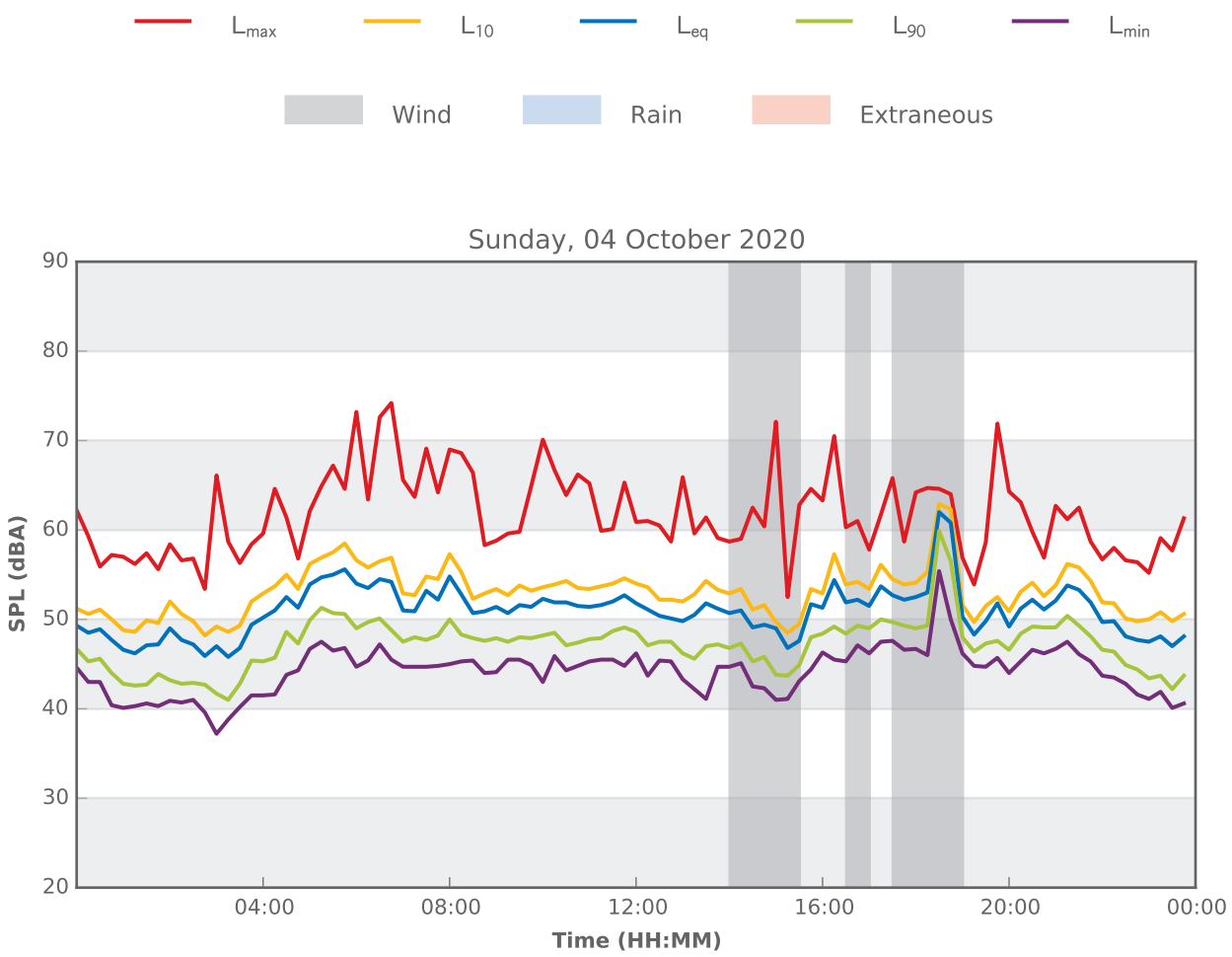

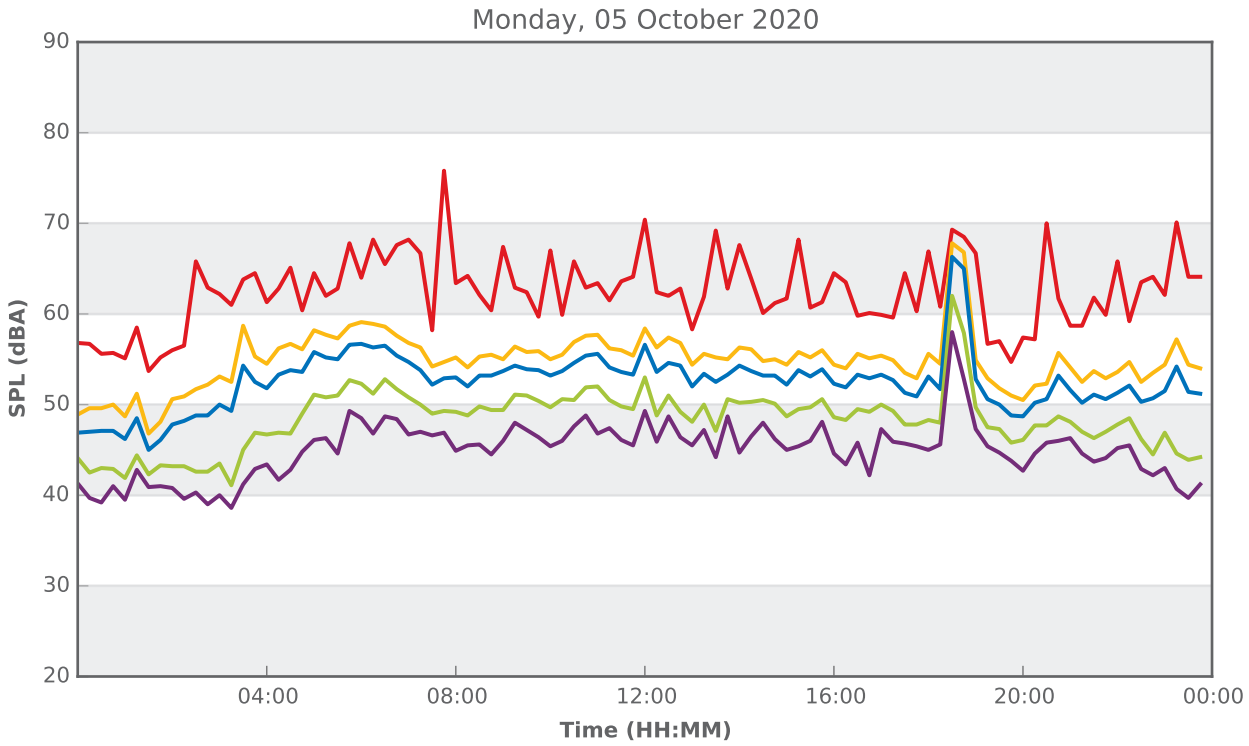

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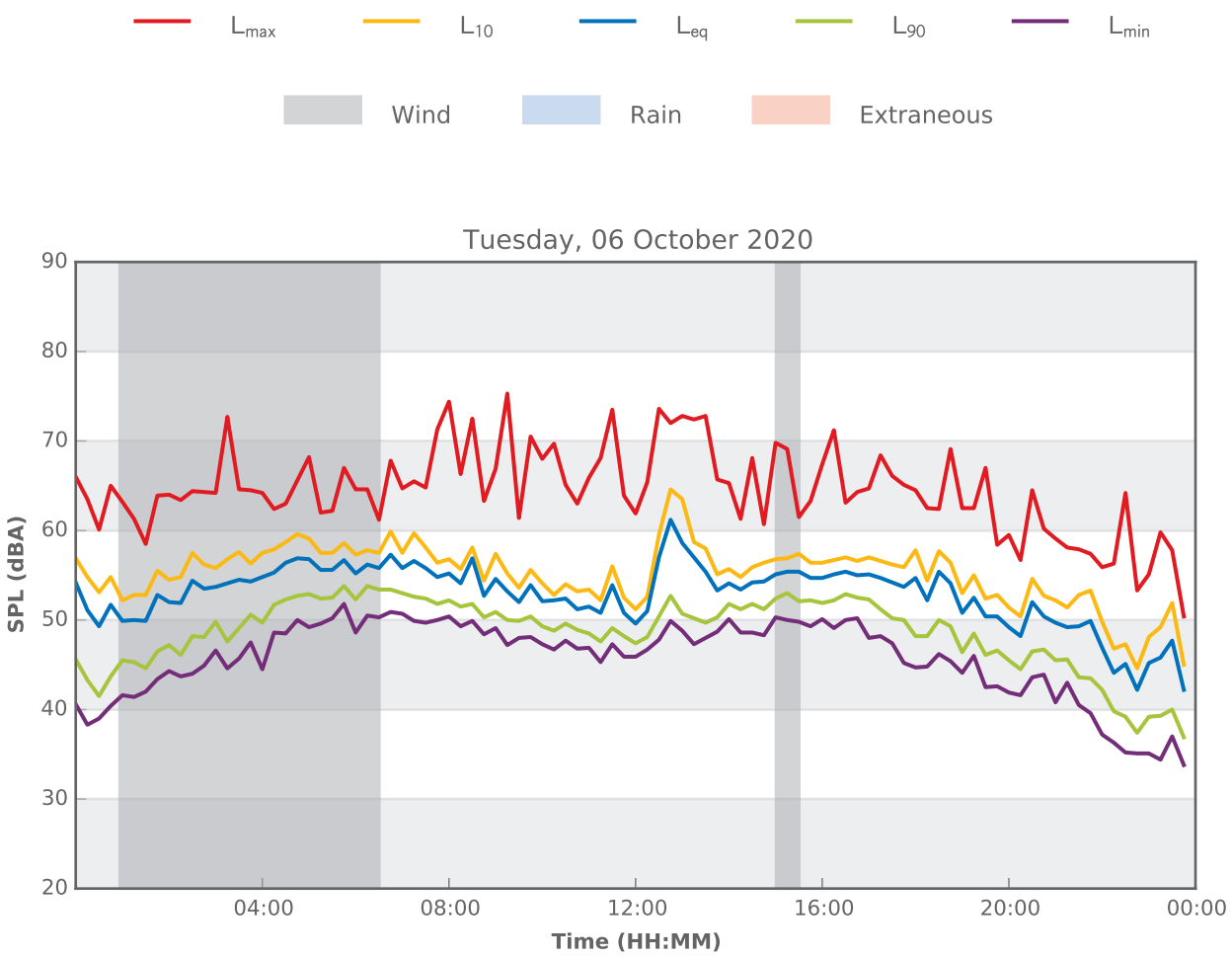

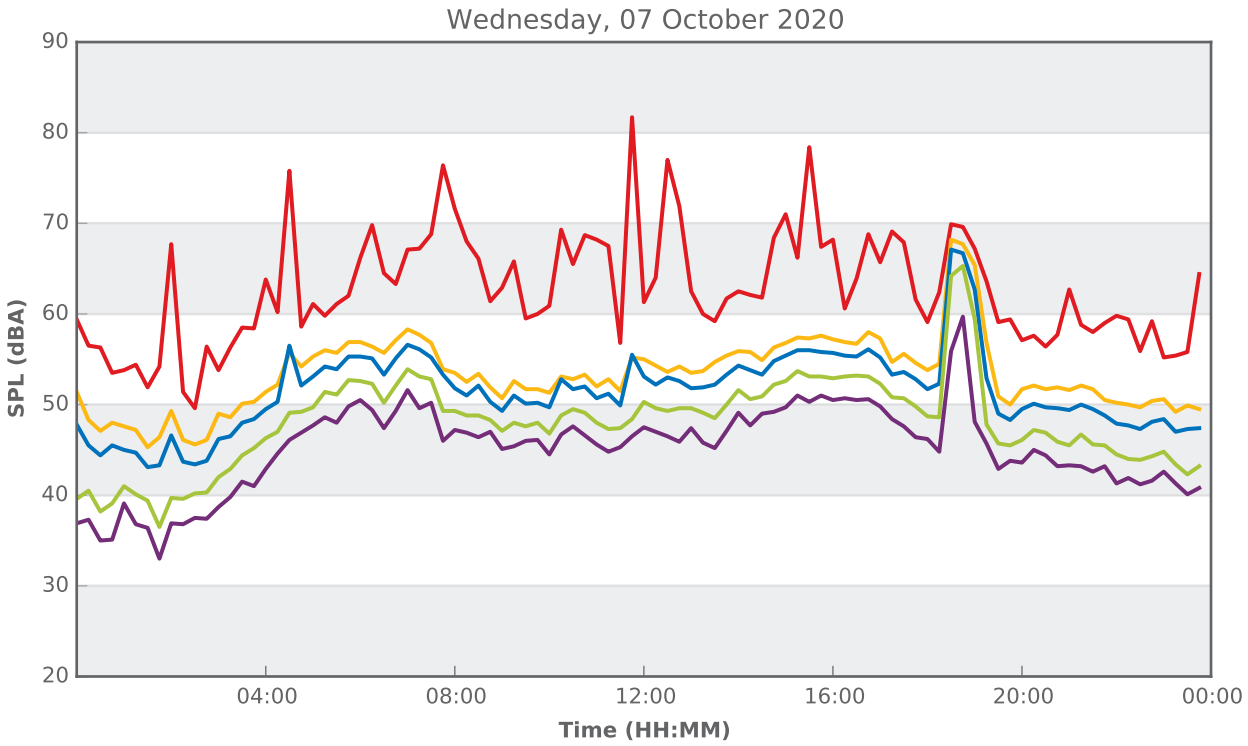

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