Appendix 6 – Noise Impact Assessment

Stirches Renewable Energy Park

Stiches Solar Farm Limited

Prepared by:

SLR Consulting Limited

The Tun, 4 Jackson's Entry, Edinburgh, EH8 8PJ

SLR Project No.: 405.VT3215.00001

June 2025

Stirches Renewable Energy Park

Noise Impact Assessment

Stirches Solar Farm Limited

Prepared by:

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SLR Project No.: 405.VT3215.00001

Client Reference No: Stirches Solar & BESS

19 May 2025

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Revision	Date	Prepared By	Checked By	Authorised By
1.0	17 April 2025	Declan Logan	Simon Waddell	Alasdair Baxter
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Basis of Report

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1.0 Introduction

Stirches Solar Farm Limited ('the Applicant') proposes to develop a solar array and Battery Energy Storage System (BESS) with associated infrastructure, access, drainage, underground cable route and landscaping (the 'Proposed Development') on agricultural land south and east of Stirches Mains, TD9 7NR, approximately 300 metres (m) north-west of Hawick in the Scottish Borders Council (SBC) administrative area.

The Proposed Development will contain noise generating equipment comprising battery units, inverters and transformers. SLR Consulting has been appointed to undertake an assessment of potential noise impacts associated with operation of the Proposed Development in support of the Section 36 application.

1.1 Background

The Proposed Development lies approximately 300 m to the north-west of the town of Hawick and extends south and west from the edge of the A7 trunk road to Hawick substation. The surrounding area predominantly comprises open farmland and patches of woodland and has undulating topography.

Noise from BESS equipment arises primarily from the operation of cooling fans; these will typically work at their highest output when the BESS is either charging or discharging and when the ambient air temperature is elevated. BESS developments will typically operate a limited number of charge or discharge cycles at any time of day; outside of these cycles, noise from BESS plant will be negligible.

Noise from solar arrays arises from fans cooling the inverters and electrical plant. Noise from solar arrays will typically only occur during the daylight hours only and will be negligible during the hours of darkness.

1.2 Scope of Assessment

The scope of this assessment has comprised the following:

- Consultation with SBC Environmental Health Department to agree scope and approach to the noise assessment.
- Baseline survey to characterise the existing noise environment at the nearest Noise Sensitive Receptors (NSRs) to determine the representative background levels for the daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods.
- Prediction of operational noise from the solar array and BESS.
- Evaluation of noise impacts at NSRs in accordance with the method outlined in BS 4142:2014+A1: *2019 Methods for rating and assessing industrial and commercial sound.*
- Specification of outline mitigation (if required).

Additional traffic flows associated with the construction phase of the Proposed Development will be minimal and of short duration and will occur during weekday daytimes and Saturday mornings only ('weekday daytime' as defined in BS 5228). Noise generated during construction of the solar array, BESS and cable route can be minimised and managed through adoption of best practice methods and appropriate techniques, Incorporated within a Construction Environmental Management Plan (CEMP) which will be finalised prior to the commencement of construction. An Outline CEMP has been prepared to accompany the Proposed Development's Section 36 application, but a completed CEMP can be secured through a suitably worded planning condition. Consideration of noise associated with

construction and decommissioning of the Proposed Development has therefore been scoped out of the assessment.

Traffic movements associated with the operational phase of the Proposed Development will be negligible and consideration noise impacts arising from road traffic movements has also been scoped out.

No potentially cumulative developments were identified within the study area; cumulative effects are not considered further.

1.3 Study Area and Noise Sensitive Receptors

Maps and aerial imagery have informed the selection of an appropriate study area for the assessment. The closest NSRs are located to the west, east and south-east of the Proposed Development. The identified NSRs are provided in **Table 1** and shown in **Appendix A**.

Table 1 - OSGB coordinates for the NSRs considered in this assessment

NSR ID	OSGB Easting	OSGB Northing	Commentary
NSR1	349185	616026	Residential property to south-east of Proposed Development
NSR2	349528	616154	Two residential properties to the south of Proposed Development
NSR3	349549	616283	
NSR4	349516	616629	Residential property to west of Proposed Development
NSR5	350924	617728	Residential property to north-east of Proposed Development
NSR6	350113	617914	Residential property to north of Proposed Development
NSR7	349801	616282	Residential care home to south of Proposed Development

NSR4 is the closest NSR to the BESS component of the Proposed Development, located approximately 120 m from battery infrastructure.

NSR5 is the NSR closest to the solar array component of the Proposed Development, located approximately 280 m away.

2.0 Relevant Guidance and Advice

2.1 PAN1/2011 – Planning and Noise

PAN1/2011 and its accompanying Technical Advice Note (TAN) sets out a series of noise issues for planning authorities to consider when making decisions on planning applications.

The TAN recommends that the daytime period includes the hours 07:00 – 23:00 and the night-time period 23:00 – 07:00.

The TAN suggests that equivalent continuous noise level over a time period, T ($L_{Aeq,T}$), is a good general purpose index for environmental noise; this index is commonly referred to as the 'ambient' noise level. It further notes that road traffic noise is commonly evaluated using the $L_{A10,18hr}$ level, and the $L_{A90,T}$ index is used to describe the 'background' noise level.

Table 2.1 of the TAN (reproduced in Table 2) provides the criteria to define levels of sensitivity for each type of NSR.

Table 2: (TAN Table 2.1) Level of Sensitivity According to NSR Type

Sensitivity	Description	Example of NSR
High	Receptors where people or operations are particularly susceptible to noise	• Residential, including private gardens where appropriate • Quiet outdoor areas used for recreation • Conference facilities • Theatres/Auditoria/Studios • Schools during the daytime • Hospitals/residential care homes • Places of worship
Medium	Receptors moderately sensitive to noise, where it may cause some distraction or disturbance	• Offices • Bars/Cafes/Restaurants where external noise may be intrusive • Sports grounds when spectator noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf, bowls)
Low	Receptors where distraction or disturbance from noise is minimal	• Buildings not occupied during working hours • Factories and working environments with existing high noise levels • Sports grounds when spectator noise is a normal part of the event • Night Clubs

2.2 BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142)

BS 4142 describes methods for rating and assessing sound from industrial or commercial premises. The methods detailed in the standard use outdoor sound levels to assess the likely effects on people inside or outside a residential dwelling upon which sound is incident.

The standard provides methods for determining the following:

- Rating levels for sources of industrial and commercial sound;

- Ambient, background and residual sound levels; and
- The audibility of tones in sound: 1/3 octave method.

These may be used for assessing sound from proposed, new, modified or additional sources of sound of a commercial or industrial nature or to assess the suitability of introducing a receptor near an existing commercial or industrial site.

The standard makes use of the following terms:

- **Ambient sound level, La = $L_{Aeq,T}$** – the equivalent continuous sound pressure level of the totally encompassing sound in a given situation at a given time, usually from multiple sources, at the assessment location over a given time interval, T.
- **Background sound level, $L_{A90,T}$** – the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90 percent of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
- **Specific sound level, Ls = $L_{Aeq,Tr}$** – the equivalent continuous sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T.
- **Rating level, $L_{Ar,Tr}$** – the specific sound level plus any adjustment for the characteristic features of the sound.
- **Residual sound level, Lr = $L_{Aeq,T}$** – the equivalent continuous sound pressure level at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound, over a given reference time interval, T.

The standard determines the degree of noise impact by comparison of the background noise level at NSRs in the absence of the industrial or commercial facility (the specific source) with the ambient sound level when the specific source is operational.

Where particular characteristics such as tones, intermittency or impulsivity are present in the noise emissions of the specific source and perceptible at the receptor, the standard requires that 'penalties' be added to the specific sound level to account for the increased annoyance that these can cause.

The following evaluation impact significance identifiers are provided in the standard, in which the difference between the specific sound level and measured background level are considered:

- The greater the difference, the greater the magnitude of impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact;
- A difference of around + 5 dB is likely to be an indication of an adverse impact;
- The lower the rating level, relative to the measured background level, the less likely that the specific sound source will have an adverse (or significant adverse) impact; and
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

In each instance, the standard requires that consideration is given to the context in which the sound will occur, noting the following:

1 - "Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following:

i) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

ii) Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

iii) Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2 - The character and level of the residual sound compared to the character and level of the specific sound.

Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/ or commercial nature is likely to be perceived and how people react to it.

3 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

iv) facade insulation treatment;

v) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

vi) acoustic screening."

Earlier versions of the BS 4142 standard recommended that a background level of 30 dBL_{A90} (or lower) and a rating level of 35 $dBL_{Ar,Tr}$ (or lower) may be considered 'objectively low'. Numerous studies by Moorhouse, Berry, Flindell, etc for the Health Protection Agency and for DEFRA (referenced within the Further Reading Section of BS 4142) and supported by the recent Association of Noise Consultants Working Group report on BS4142 application conclude that impacts at rating levels below 35 dB are unlikely. At night, particularly, where potential sleep disturbance is the key issue, a rating level of below 35 dB results in internal levels significantly below the BS 8233 guideline values.

2.3 British Standard BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings[1] ('BS 8233')

BS 8233 provides guidance on the control of noise in and around buildings. The standard sets out acceptable noise levels for new and refurbished buildings and amenity areas according to their use.

[1] British Standard BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

For external amenity areas BS 8233 specifies a “desired” level of 50 $dBL_{Aeq,T}$ and an “upper guideline level” of 55 $dBL_{Aeq,T}$.

The standard provides noise limits for rooms within buildings by type of use; (bedroom, living room, office) and by time of day. Target noise levels within habitable rooms (bedrooms and living rooms) are 35 dB during the daytime period and 30 dB during the night-time period.

Methods are provided for simplified calculation of internal noise levels from external levels, and for detailed calculations. The simplified method relies on a reduction to façade levels provided either by open or closed windows, which are assumed to provide attenuation of approximately 15 dB and 33 dB respectively.

2.4 British Standard BS 7445:2003 Description and measurement of Environmental Noise (‘BS 7445’)

BS 7445 provides a minimum specification for instrumentation for surveys, along with recommendations for appropriate weather conditions and observations to note.

2.5 ISO 9613; Attenuation of sound during propagation outdoors, Part 1 and Part 2 (‘ISO 9613’)

ISO 9613 1&2 describe a method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level under meteorological conditions. The standard was updated in 2024 and this assessment has used the 2024 version of the standard within calculations.

3.0 Method

3.1 Consultation with Scottish Borders Council

SLR consulted with SBC Environmental Health in December 2024 to agree the scope and approach to the noise assessment. We proposed to assess operational noise from the Proposed Development against the criteria outlined in BS4142, whereby a rating level of up to 5 dB above the representative background level will be considered as indicative of no adverse impact.

Where the representative background level was determined to be 'very low' i.e. at or below 30 dBL_{A90}, SLR proposed to adopt the 'objectively low' rating level of 35 $dBL_{Ar,Tr}$ as an evaluation criterion referred to in supplementary guidance to BS 4142 (refer to **Section 2.2**).

At this time of reporting (May 2025), SBC had responded to confirm agreement with SLR's proposed survey method and approach to assessment but had not responded to confirm agreement regarding use of the 35 dB criterion where the background level is determined to be low.

3.2 Characterisation of Baseline Environment

Monitoring was undertaken at three noise monitoring positions representative of the closest NSRs to the Proposed Development. The survey was undertaken such that it met the requirements of BS 7445 and BS 4142, using two Rion NL-52 Class I integrating sound level meters (SLMs). Measurements were undertaken at a height of 1.3 m above ground level and were supplemented by simultaneous recording of rainfall data using a rain gauge. During the course of the survey, weather records from the nearest MET office weather station indicated that weather conditions were suitable for surveying.

Unattended measurements were taken over an extended period (Thursday 10th – Saturday 12th October 2024) and were supplemented by subjective observations of the noise environment recorded by the surveyor during setup and decommissioning. Monitoring was undertaken at the following noise monitoring positions (NMPs):

- NMP1 – Long-term measurement located within the red line boundary of the Proposed Development, considered representative of the noise environment at NSR4
- NMP2 – Short-term measurement located within the field where the BESS is proposed to be located, considered representative of the noise environment experienced at NSR2 and NSR3.
- NMP3 – Short-term measurement located by the roadside in front of NSR1, considered representative of the noise environment at NSR1.

At NMP1, the SLM was set to record the noise indices L_{Aeq}, L_{A90} and L_{Amax} on a 5-minute averaging period. At NMP2 and NMP3, L_{Aeq}, L_{A90} and L_{Amax} were recorded using a 10-second averaging period.

The NMPs are shown in **Drawing 1**.

At all NMPs the noise climate was quiet and rural in nature with livestock and agricultural activities the main noise sources. Occasional road traffic noise natural sounds such as rustling of vegetation and birdsong were also contributors to the noise climate.

Charts showing the variation in measured averaged noise levels at each of the NMPs over the course of the survey are included in **Appendix C**.

3.3 Prediction of Operational Noise Levels

3.3.1 General Prediction Method

SLR has predicted noise levels due to operation of the Proposed Development at representative NSRs within 3D noise modelling software CadnaA. The software uses the prediction method described in ISO 9613 (2024 version).

The model assumes soft ground conditions, with absorption set to G=1.0 and considers screening provided by local topography in the form of 50 m digital terrain mapping. Predictions assume a standard temperature and relative humidity of 10°C and 70% respectively.

The eventual model of battery and inverter plant installed will depend on the outcome of a commercial tendering process. This assessment therefore considers representative candidate plant, noting that the installed plant will likely be different. Battery and inverter technology is currently developing at a rapid pace and noise is often a primary constraint in the UK market. Technology providers are therefore delivering units with increasingly improved noise performance. It is therefore reasonable to assume that by the time the Proposed Development is ready to build following consent, a quieter plant than the candidate considered in this assessment will be available.

When modelling the BESS site, the Applicant has confirmed that the CATL EnerC+ battery unit, and associated Power Conversion Systems (PCS), which comprise two inverters (modelled as Power Electronics GEN3 inverters) and a single transformer per PCS, are appropriate for use as indicative items of plant for this assessment.

The Proposed Development includes a 4 m tall acoustic barrier on the western side of the BESS site, approximately 90 m in length. This mitigation measure has been included in the noise model.

The ‘Acoustic Barrier’ drawing submitted with the planning application provides an example of the type of acoustic barrier that could be installed, noting that the final detailed design of the acoustic barrier would be approved through a suitably worded planning condition.

Noise emissions from the solar site will come from Medium Voltage (MV) stations, which have been modelled using a single inverter and single transformer per MV station.

The EnerC+ has a standard version and a noise-attenuated version; data for the noise-attenuated version has been adopted for this assessment. The inverters for the PCS systems are also available with and without attenuation; the attenuated versions have been adopted for use within the BESS site, while the standard version has been used for the solar site.

The batteries and PCS inverters have been modelled as 3D objects, with their noise emissions coming from area sources and vertical area sources which represent the top and sides of the units respectively.

The PCS transformers and grid transformers present within the Proposed BESS site have been modelled using spectral data obtained by SLR during noise monitoring of an operational BESS site. The transformers have been modelled as point sources at a height of 3 m above local ground level.

NSRs have been modelled as receivers at a height of 4 m above local ground level, placed at the closest approach to the Proposed Development.

The sound power levels for the noise generating equipment are shown in Error! Reference source not found. as octave-band data. The reported spectra have been normalised to the A-weighted broad-band sound power levels within the noise model.

Table 3 - Sound power data for the BESS and Solar equipment

Item	Unweighted octave-band sound power level (centre frequency in Hz), dB								A-weighted broad-band sound power level, dBA
	63	125	250	500	1k	2k	4k	8k	
BESS Site									
CATL EnerC+ Battery (noise attenuated version, 80% fan speed)	90	81	82	83	82	81	77	73	75
PCS: Power Electronics GEN3 Inverter (attenuated version, 60% fan speed)	86	93	85	78	75	74	75	74	84
PCS: KNAN Transformer	79	86	70	62	58	52	42	32	72
Grid Transformer	79	83	77	72	66	62	60	56	75
Solar Site									
Power Electronics GEN3 Inverter (standard version, 80% fan speed)	90	91	95	87	85	83	81	78	90

4.0 Results

4.1 Summary of Baseline Noise Environment

The dominant contributor to the observed noise environment at NMP1 was livestock; cows were audible from where they were housed within the barn close to the measurement location. The surveyor noted that lesser contributors included infrequent passing road traffic, birdsong and wind-induced rustling of vegetation. Farm machinery was also occasionally audible.

During the survey there was no rainfall recorded, and the wind speed remained within the requirements of BS4142, such that the measured data can be considered appropriately representative.

Measured baseline noise levels at the long-term monitoring location NMP1 show a diurnal variation, with the typical background level observed to rise from around 30 dBL_{A90} to around 45 dBL_{A90} between 07:30 and 08:00, which coincided with sunrise. The measured daytime ambient level was predominantly consistent with the background level, indicating the presence of fairly continuous noise sources.

During the night-time period the measured background level dropped to around 25 dBL_{A90}, which is consistent with a quiet rural location. The measured background and ambient levels during the night-time period varied little, indicating a consistent noise environment.

The noise environment at spot measurement location NMP2 was described by the surveyor as also having livestock (cows) as the dominant contributor, with wind-induced noise from vegetation and distant road traffic. At NMP3 the noise environment was similar, with an additional low-level buzzing noise from Hawick substation.

As mentioned in **Section 3.2**, measurements at NMP1 were undertaken using a 5-minute averaging period. The background and ambient levels are fluctuating parameters, however; representative values for the daytime and night-time have been determined through analysis of the mean and modal values of the measured levels and accounting for temporal variation in noise levels, seeking to exclude short-duration and non-representative noise events.

A summary of the measured daytime (07:00 – 23:00) and night-time (23:00 – 07:00) noise levels over the monitoring period is provided in Error! Reference source not found.. Charts showing the measured noise levels are provided in **Appendix C**.

Table 4 - Results of the Baseline Noise Survey

NMP / period	Duration, T	Range of Ambient level, $dBL_{Aeq,T}$	Range of Background level, dBL_{A90}
Daytime period (07:00 – 23:00)			
NMP1	16 hr	30 – 63	24 – 57
NMP2	15 min	32 – 44	31 - 40
NMP3	15 min	29 – 63	27 - 55
Night-time period (23:00 – 07:00)			
NMP1	8 hr	26 – 53	23 - 41

SLR notes that the short-duration measurements at NMP2 and NMP3 are less reliable for determining the representative level than the longer-term measurement at NMP1 and are useful primarily for determining potential spatial variability in the noise environment.

Statistical data analysis has been undertaken on the measured data for NMP1 to determine the representative background level (see **Appendix C**). This assessment has adopted the following representative background noise levels within the study area:

- Daytime $L_{A90,16hr}$ = 33 dB
- Night-time $L_{A90,8hr}$ = 26 dB

4.2 Predicted Operational Noise Levels

4.2.1 Predicted Noise Levels from the BESS Site

Predicted external levels at identified representative NSRs due to operation of the BESS component of the Proposed Development are provided in Table 5Error! Reference source not found.Error! Reference source not found..

In accordance with the requirements of BS 4142, the predicted specific level has been rounded to the nearest integer dB.

Table 5 - Predicted operational noise levels from the Proposed BESS Site

NSR ID	Predicted external level, dBA
NSR1	19
NSR2	24
NSR3	27
NSR4	34
NSR5	7
NSR6	11
NSR7	15

4.2.2 Predicted Noise Levels from the Solar Site

Predicted external levels at identified representative NSRs due to operation of the solar component of the Proposed Development are provided in Error! Reference source not found..

In accordance with the requirements of BS 4142, the predicted specific level has been rounded to the nearest integer dB.

Table 6 - Predicted operational noise levels from the Proposed Solar Site

NSR ID	Predicted external level, dBA
NSR1	13
NSR2	14
NSR3	14
NSR4	16
NSR5	28
NSR6	22
NSR7	18

4.2.3 Predicted Noise Levels from the BESS Site and Solar Site (Combined)

Predicted external levels at identified representative NSRs due to operation of the BESS component and solar components of the Proposed Development operating together are provided in Error! Reference source not found..

In accordance with the requirements of BS 4142, the predicted specific level has been rounded to the nearest integer dB.

Table 7 - Predicted operational noise levels from the Proposed Development (Solar & BESS)

NSR ID	Predicted external level, dBA
NSR1	20
NSR2	24
NSR3	27
NSR4	35
NSR5	28
NSR6	22
NSR7	20

4.3 Evaluation of Impacts

In accordance with BS 4142, the acoustic character of the noise emitted by the Proposed Development has been considered and character corrections applied where appropriate. In that regard, this assessment notes the following:

- Predicted levels indicate no tonality at all NSRs, therefore no correction for tonality will apply.
- From SLR's experience of monitoring operational BESS sites, it is considered that the BESS is likely to operate primarily in discrete periods of greater than one hour. No intermittency corrections will therefore apply.
- When in operation, noise from the BESS is steady and continuous in nature. No impulsivity corrections will therefore apply; and
- The rating level is therefore equal to the specific level.

4.3.1 Limiting Values

Limiting values are derived for night-time, as compliance with these limiting values will entail compliance with daytime values (background noise levels are lower during night-time).

Night-time background levels are below 30 dB(A) for the majority of the measurement period and would be considered 'objectively low' in accordance with BS 4142 (see **Section 2.2**).

The limiting values, $L_{Ar,Tr}$, used within this assessment are as follows:

- All NSRs – 'Objectively low' rating level of 35 dB(A).

4.3.2 Evaluation

The predicted rating level of the Proposed Development at the worst-affected NSR, for each modelled scenario, is compared with the adopted criterion in **Table** .

Table 8 – Evaluation Against Adopted Criteria

NSR ID	Derived Rating Level, dBA	Adopted criterion, dB	Comparison of rating level with criterion (rating level minus criterion), dB
BESS Site Only (Daytime Operation)			
NSR4	34	35	-1
BESS Site Only (Night-time Operation)			
NSR4	34	35	-1
Solar Site Only (Daytime Operation)			
NSR5	28	35	-7
BESS + Solar Site (Daytime Operation)			
NSR4	35	35	0

The predicted operational noise level from the Proposed Development at the worst-affected NSR meets the criterion by a minimum margin of 0 dB during the daytime and night-time period. Noise from the solar inverters will be negligible during the night-time period.

This assessment therefore considers that predicted levels result in a 'not adverse' impact at all NSRs during the daytime and night-time periods.

5.0 Conclusion

SLR has undertaken a noise assessment of a proposed solar facility and battery energy storage system at land north of Hawick. The assessment has comprised consultation with SBC, characterisation of the baseline noise environment, prediction of operational noise levels and evaluation against appropriate criteria.

Based upon the assessment of the Proposed Development, which includes for embedded mitigation measures in the form of an acoustic barrier, predicted operational noise levels are at or below the adopted '35 dB' criteria. It is therefore considered that the Proposed Development will not result in any significant adverse noise effects or put receptors at risk from noise pollution.

6.0 Closure

The assessment has required a suitable level of technical ability and has been undertaken with oversight from a Suitably Qualified Person (SQP). An individual with all the following credentials has been considered a SQP for this assessment:

- Has a minimum of three years' verifiable experience (within the last five years) of providing noise impact assessments in planning. Such experience has clearly demonstrated a practical understanding of factors affecting acoustics in relation to the proposed development use and in the built environment in general, including acting in an advisory capacity to provide recommendations and design advice in planning, and;
- Holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK is the Institute of Acoustics.

Where some elements of the assessment have been carried out by an acoustician who does not meet the requirements above, this has been undertaken with the direct guidance and supervision of a SQP who has reviewed, agreed and overseen the work carried out.

The SQP confirms that the relevant measurements and calculations:

- Represent good industry practice in accordance with available guidance.
- Are appropriate given the development being assessed and scope of works proposed.
- Avoid invalid, biased and exaggerated claims.

Regards,

SLR Consulting Limited

[redacted]

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Technical Director

Appendix A Drawings

Stirches Solar & BESS

Noise Impact Assessment

Stirches Solar Farm Limited

SLR Project No.: 405.VT3215.00001

19 May 2025

N

NSR1
NSR2
NSR3
NSR4
NSR5
NSR6
NMP1
NMP2
NMP3

Drinkstone Hill
Sunnybank
Tandlaw Steading
Drinkstone Cottages
East Boonraw Farmhouse
Alton Pond
Camp Plantation
Alton House
Newhouses
Boonraw Burn
Appletree
Peta Cottages
Stouslie Covert
Stouslie
Fiddle Hill Cottage
Leahead Loch
Lea Head
Welsh's Hill
Birchlea Farm
Stirches Mains Hill
Stirches Burn
Stirches Rd
Help Hill
Whitehaugh Cottages
Gala Law
Burnhead
Sleepy Valley
Burnfoot
Burnfoot Rd
Stirches
Silverbuthall
Wilton Cemetery
Teviotdale
A7
B6359

KEY

- Noise Sensitive Receptors
- Noise Monitoring Location
- Site Boundary

Coordinate System: British National Grid
Projection: Transverse Mercator

0 0.05 0.1 0.2 0.3 0.4 0.5 Kilometres

1:11,737

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PART OF SLR

Stirches Solar & BESS / 405.VT3215.00001
Noise Impact Assessment

Figure 1.0
Site Boundary, NSRs and NMPs

Date:	Lead:	Review:	Version:
04/06/2025	CA	AB	1.0

Appendix B Correspondence with Environmental Health

Stirches Solar & BESS

Noise Impact Assessment

Stirches Solar Farm Limited

SLR Project No.: 405.VT3215.00001

19 March 2025

From:

Sent on: Tuesday, January 7, 2025 11:25:13 AM

To:

Subject: RE: [OFFICIAL] RE: Proposed Solar & BESS at land north-east of Hawick substation; Scope and Approach to Noise Assessment

Hi,

I hope you had a nice Christmas and New Year.

Have you had a chance to review the below?

Best regards,

Consultant

SLR Consulting Ltd

The Tun, 4 Jackson's Entry, Edinburgh, United Kingdom EH8 8PJ

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at https://cdn.sanity.io/files/b0ecix6u/production/4d538364442e7636de2570fe5250279f1970d95e.pd

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SLR Consulting Limited. A company incorporated in England and Wales with registered number 03880 its registered office at 1 Bartholomew Lane, London EC2N 2AX.

From:
Sent: 12 December 2024 12:50
To:
Subject: RE: [OFFICIAL] RE: Proposed Solar & BESS at land north-east of Hawick substation; Scope and Approach to Noise Assessment

Hi,

I was wondering if you've had a chance to look over the below and whether you would accept the use of the 35 dB fixed limit for the night-time period?

Best regards,

Consultant

SLR Consulting Ltd

The Tun, 4 Jackson's Entry, Edinburgh, United Kingdom EH8 8PJ

From:
Sent: 21 November 2024 09:42
To:
Subject: RE: [OFFICIAL] RE: Proposed Solar & BESS at land north-east of Hawick substation; Scope and Approach to Noise Assessment

Hi,

Many thanks for your time on the phone yesterday. As discussed, while there was periodic noise from livestock at NMP1, there has been sufficient periods where livestock has not contributed to the noise environment and therefore we have been able to derive background levels for the daytime and night-time periods which are representative of the quieter times during both periods. We have also supplemented the long-term measurement at NMP1 with short-term attended measurements at NMP2 and NMP3, as shown below.

Our derived representative background levels are as follows:

- Daytime LA90,16hr = 33 dB
- Night-time LA90,8hr = 26 dB

Previous versions of BS4142 and current guidance documents to its application advise that background levels below 30 dB may be considered ‘objectively low’, and rating levels of 35 dB or below may be considered objectively low accordingly. Considering this, we propose that our assessment may be completed by demonstrating compliance with a fixed criteria of 35 dB at the closest NSR, during the night-time period. To supplement this approach, we would demonstrate that internal noise levels during the night-time period will comply with the BS8233 internal target level of 30 dB.

Please can you confirm that you accept this approach?

Best regards,

Consultant

ITPEnergised

The Tun, 4 Jackson's Entry, Edinburgh, United Kingdom EH8 8PJ

From:
Sent: 16 October 2024 16:55
To:
Subject: [OFFICIAL] RE: Proposed Solar & BESS at land north-east of Hawick substation; Scope and Approach to Noise Assessment

Hi

Thanks for consulting us on your approach to the noise assessment. The only point I had was whether the use of the agricultural buildings might mean the location isn't representative e.g. if they are used for animal housing. Any thoughts?

Regards

Environmental Health Officer

Protective Services (Amenity & Pollution)

Scottish Borders Council

How are you playing #yourpart to help us keep the Borders thriving?

From:
Sent: 11 October 2024 17:19
To:
Cc:
Subject: RE: Proposed Solar & BESS at land north-east of Hawick substation; Scope and Approach to Noise Assessment

Hi

has passed on your email as the site falls within my area. I'll get back to you by Wednesday with a response.

Regards

Environmental Health Officer

Protective Services (Amenity & Pollution)

Scottish Borders Council

How are you playing #yourpart to help us keep the Borders thriving?

From:
Sent: Wednesday, October 9, 2024 8:59 AM
To:
Cc:
Subject: Proposed Solar & BESS at land north-east of Hawick substation; Scope and Approach to Noise Assessment

CAUTION: External Email

Dear,

ITPEnergised has been appointed to conduct the noise impact assessment in support of the planning application for a proposed solar farm (30MW) and associated battery energy storage system (BESS, 30MW) at land north-east of Hawick substation; south-west and north-east of Stirches House, Hawick Scottish Borders, TD9 7NR. We wish to agree with you the scope and approach to the noise assessment.

Overall Approach

Our proposed scope includes the following:

- A baseline noise survey will be undertaken to determine the representative background level;
- Prediction of operational noise levels from the proposed solar farm and BESS in accordance with ISO 9613;
- Evaluation of predicted noise levels in accordance with British Standard BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound, with supplementary reference to other relevant guidance, as required;
- Specification of outline mitigation where necessary; and

- Report on findings.

We consider that construction noise impacts may be minimised by appropriate controls on working hours, specification of appropriate plant and methods and implementation of best practices. On this basis and given that the construction schedule is unlikely to be available at this stage, we propose to scope out prediction and evaluation of construction noise. No significant sources of vibration are expected, and we propose to scope out further consideration of vibration during the construction phase.

Baseline Noise Survey

Long-term unattended monitoring will be undertaken at a single noise monitoring position (NMP1), representative of the closest noise sensitive receptors (NSRs) to the proposed BESS. The survey will be undertaken following the method outlined in BS7445 and BS4142. Unattended measurements will be taken over at least a full weekend and 1 weekday 24-hour period. The long-term measurements will be supplemented by subjective observations of the noise environment by the surveyor during setup and decommissioning.

The NMP and NSRs are shown in Figure 1 below.

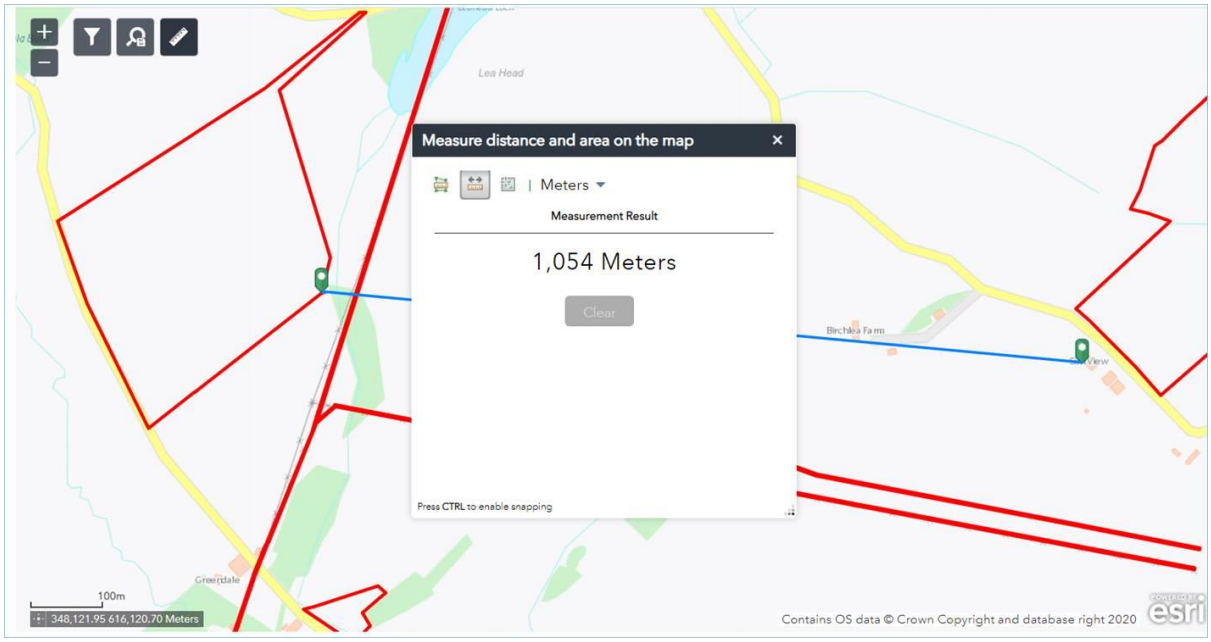
Figure 1 - Noise sensitive receptors and proposed noise monitoring position

Prediction of Operational Noise

Operational noise from the proposed solar farm & BESS site will be predicted using noise modelling software CadnaA and assessed against measured background levels in accordance with the method provided in BS4142, whereby a rating level of up to 5 dB above the representative background level will be considered as indicative of no adverse impact. Noise impacts will be assessed at the NSRs shown in Figure 1.

We note that there is currently a planning application (24/00461/SCR) for a 90MW BESS scheme located approximately 1 km west of NSR1, as shown in Figure 2. At this distance, and given the smaller scale of our BESS development, we do not expect any cumulative impacts between the developments; furthermore, there is currently no noise assessment for the 90 MW scheme available for review at this time. Therefore, we propose to scope out further consideration of cumulative noise impacts in our assessment.

Figure 2 - Distance from NSR1 to proposed BESS scheme



Request for Comment

Please can you confirm if you agree with our proposed scope and methodology?

I hope the above is clear, however if you have any questions or concerns, I am more than happy to discuss over the phone – I can be reached on .

Best regards,

| Consultant | ITPEnergised

4th Floor | Centrum House | 108-114 Dundas Street | Edinburgh | EH3 5DQ

www.itpenergised.com

ITPEnergised is part of SLR Consulting Limited and incorporates Energised Environments Limited, ITPE Ltd & Xero Energy Limited.

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Appendix C Measured Data

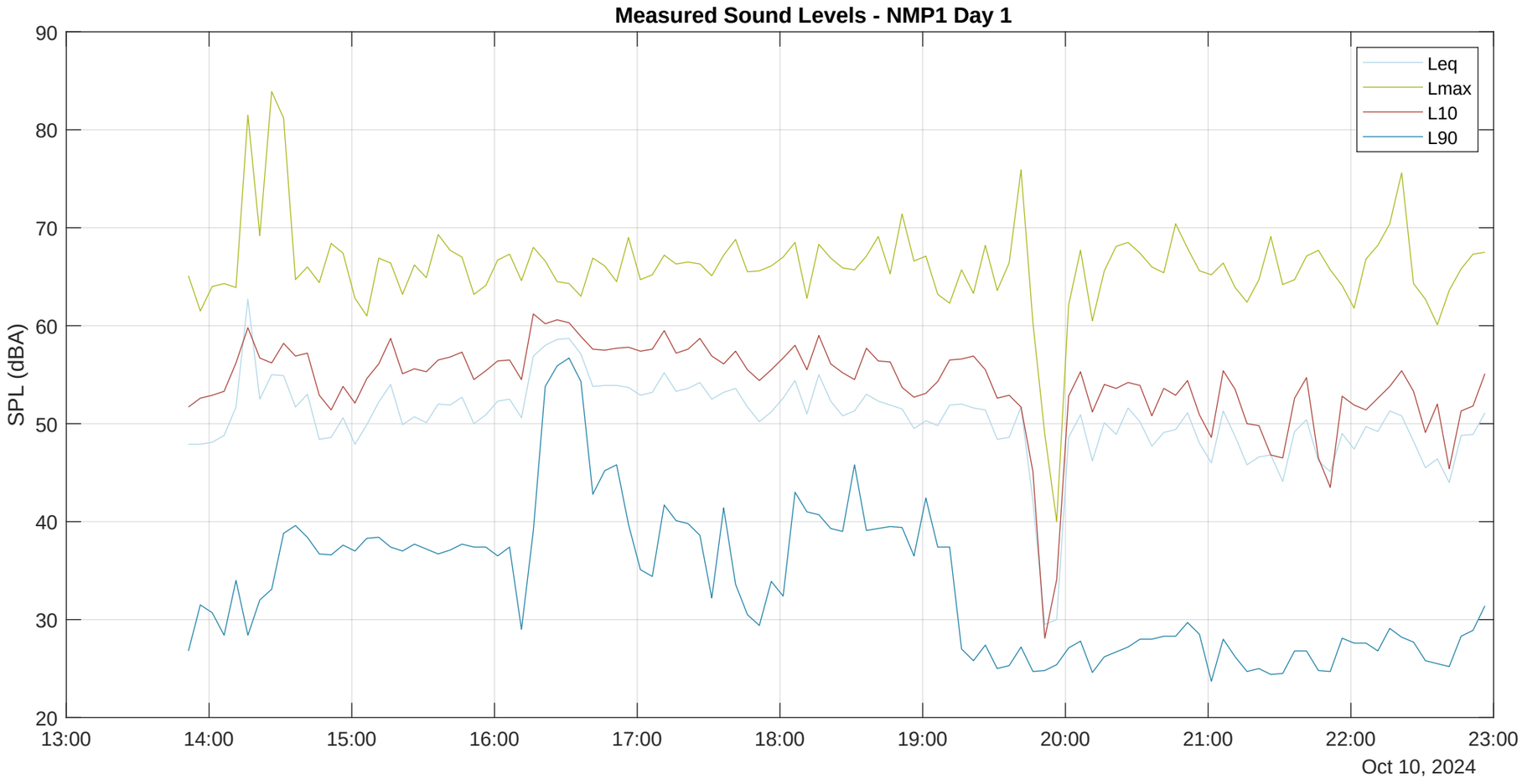
Stirches Solar & BESS

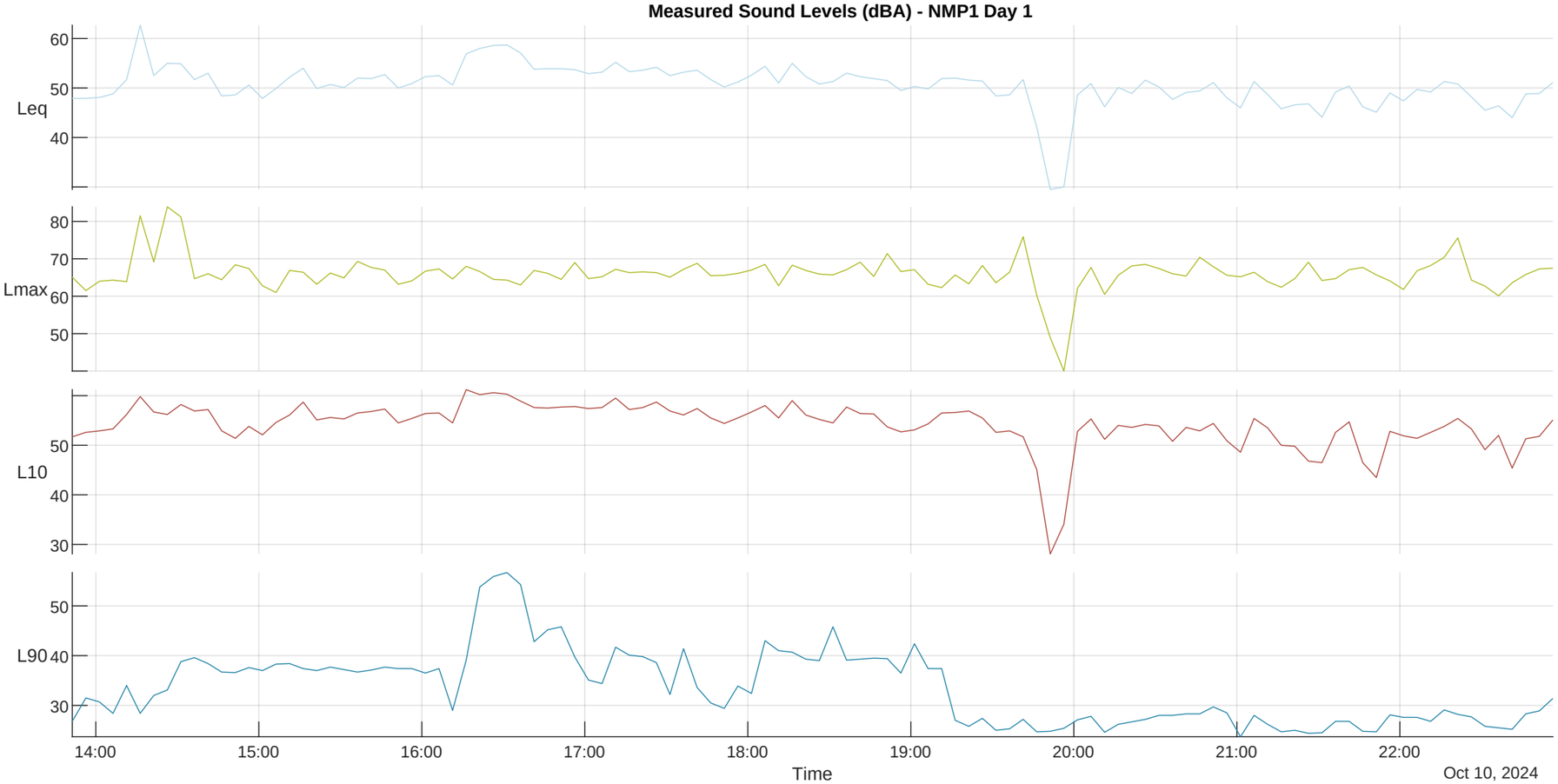
Noise Impact Assessment

Stirches Solar Farm Limited

SLR Project No.: 405.VT3215.00001

19 May 2025


Measured Sound Levels - NMP1 Day 1
SPL (dBA)
90
80
70
60
50
40
30
20
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
Oct 10, 2024
Leq
Lmax
L10
L90


Measured Sound Levels (dBA) - NMP1 Day 1
Leq
60
50
40
Lmax
80
70
60
50
L10
50
40
30
L90
50
40
30
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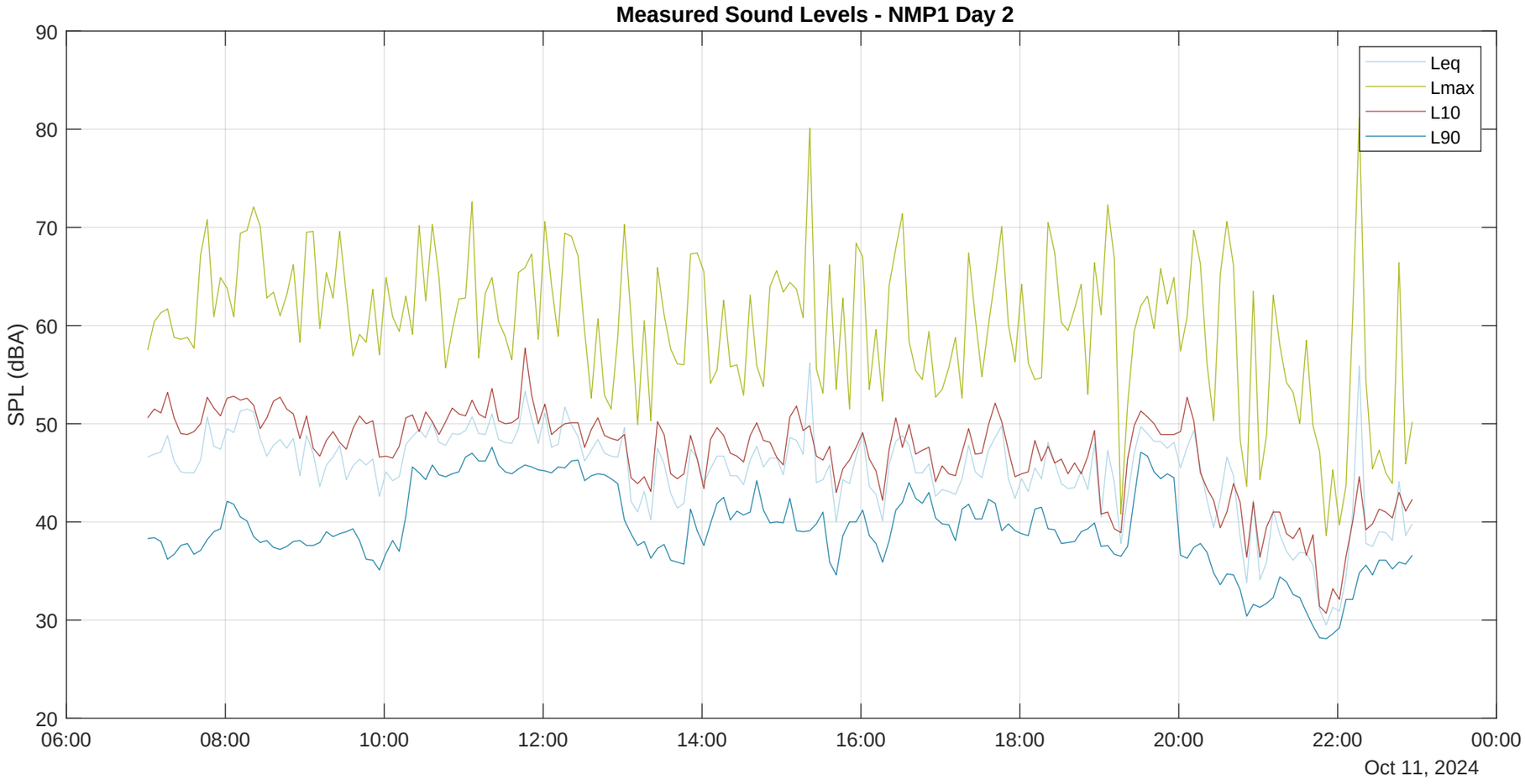
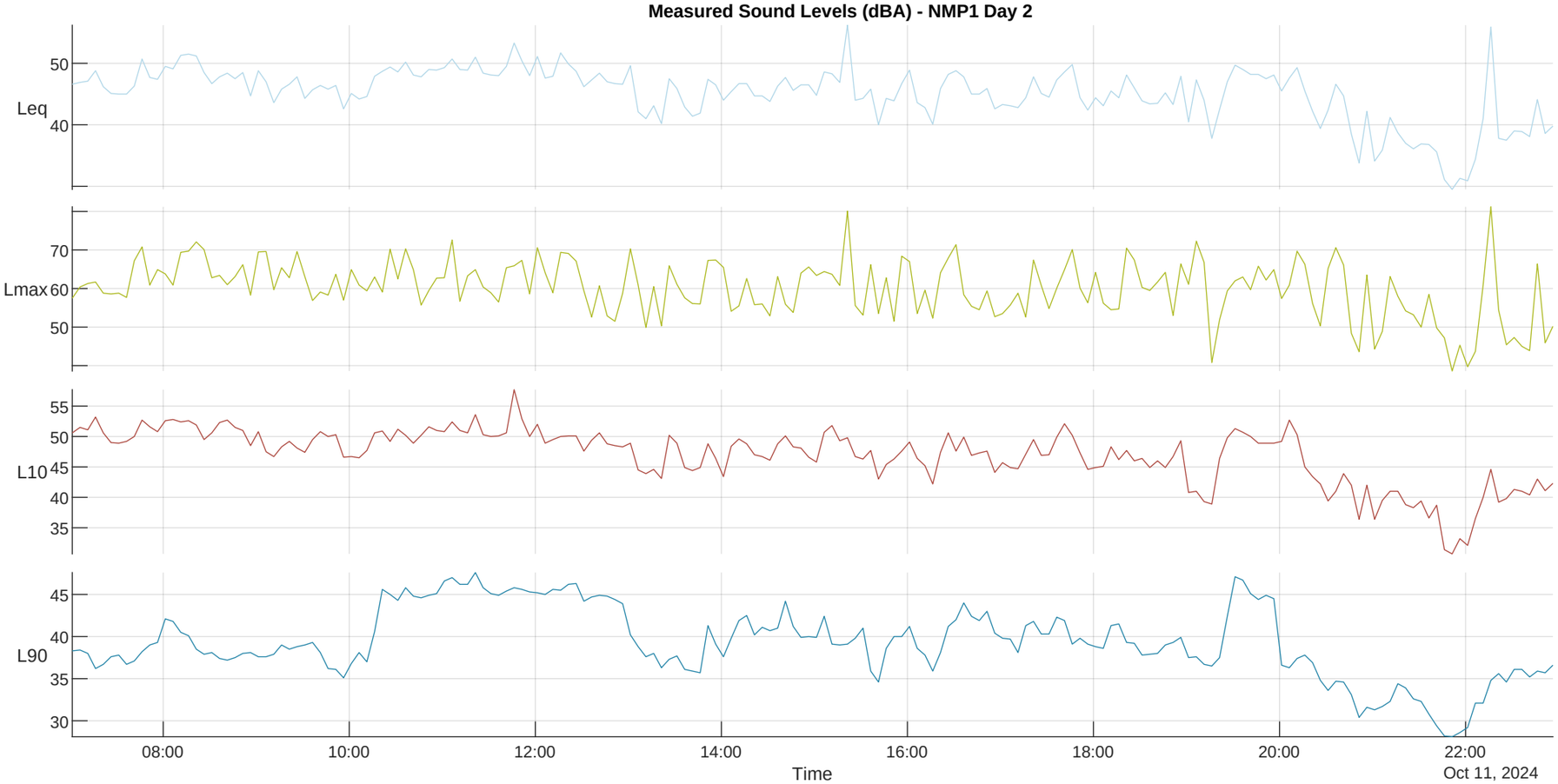
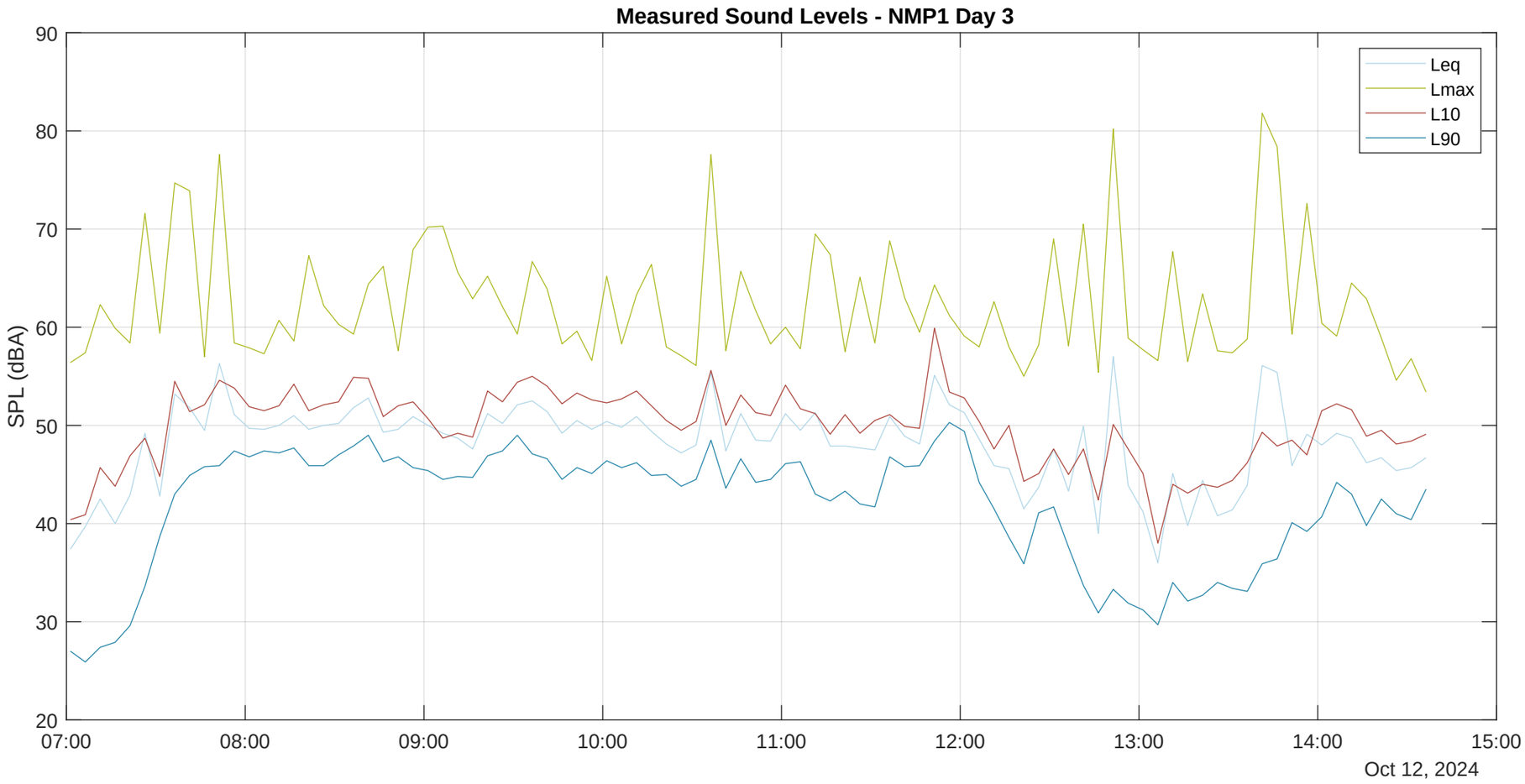
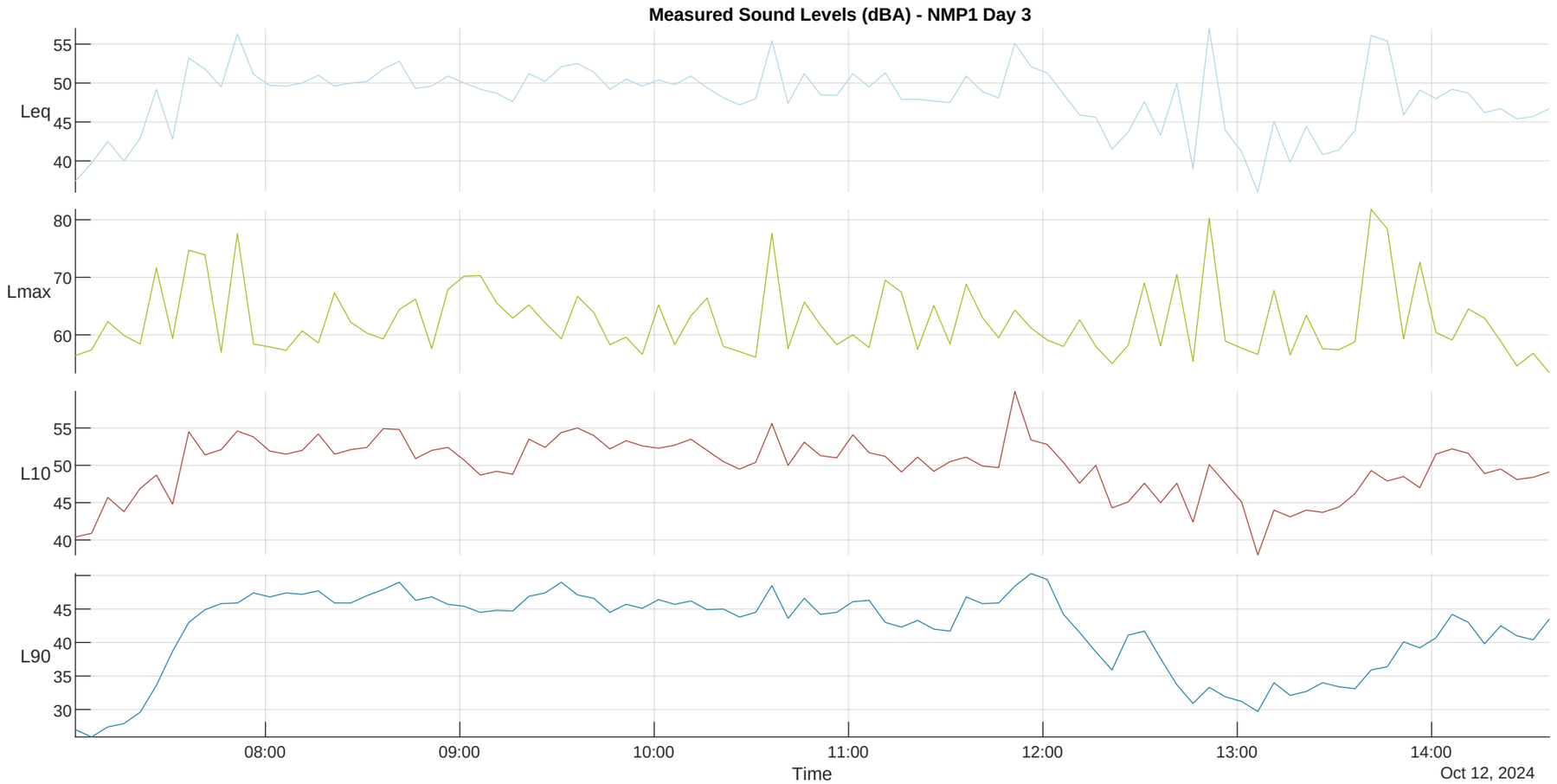
17:00
18:00
19:00
20:00
21:00
22:00
Time
Oct 10, 2024


Measured Sound Levels - NMP1 Day 2
SPL (dBA)
90
80
70
60
50
40
30
20
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
Oct 11, 2024
Leq
Lmax
L10
L90


Measured Sound Levels (dBA) - NMP1 Day 2
Leq
50
40
Lmax
70
60
50
L10
55
50
45
40
35
L90
45
40
35
30
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Time
Oct 11, 2024


Measured Sound Levels - NMP1 Day 3
SPL (dBA)
90
80
70
60
50
40
30
20
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
Oct 12, 2024
Leq
Lmax
L10
L90


Measured Sound Levels (dBA) - NMP1 Day 3
Leq
55
50
45
40
Lmax
80
70
60
L10
55
50
45
40
L90
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08:00
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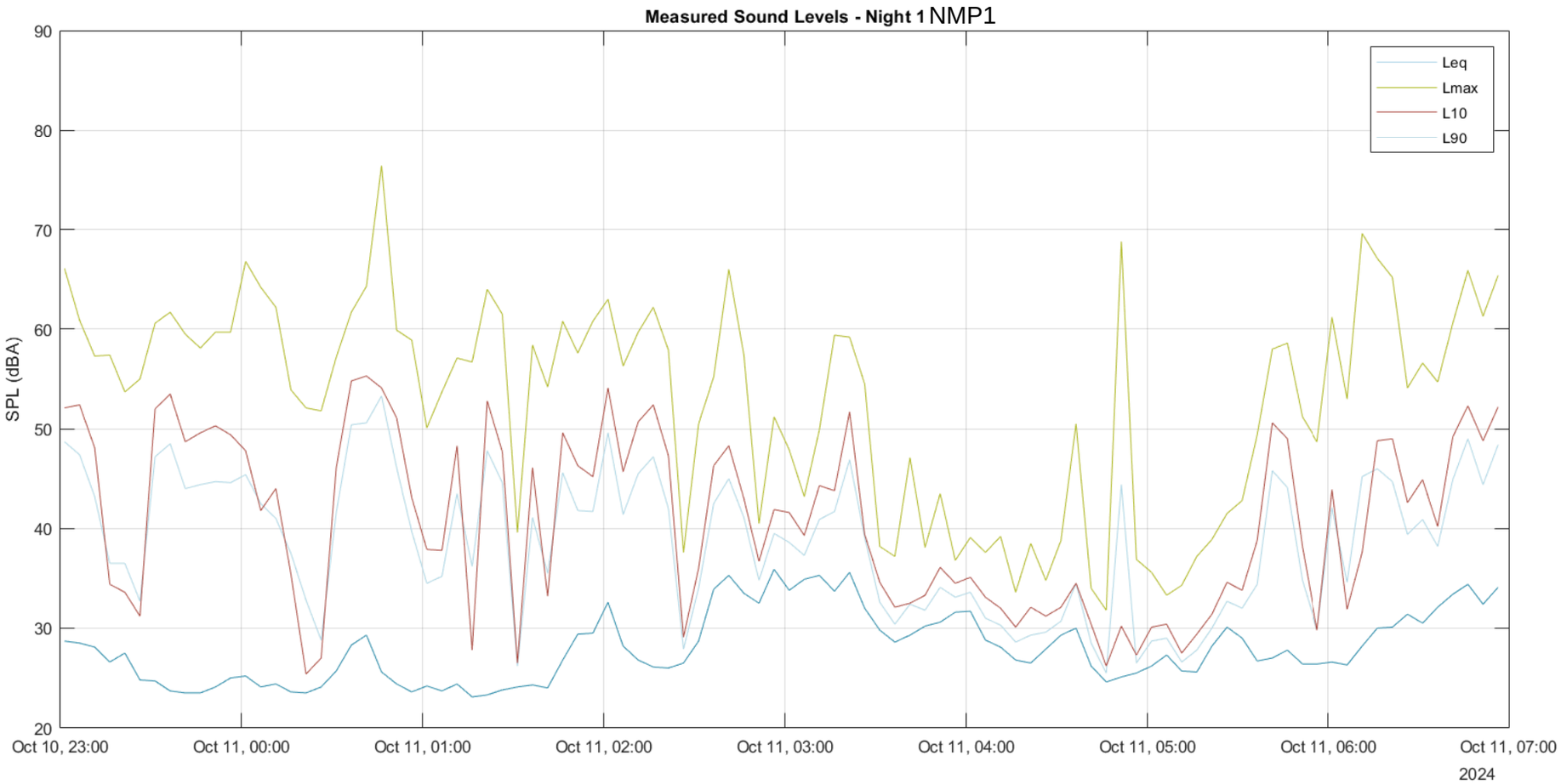
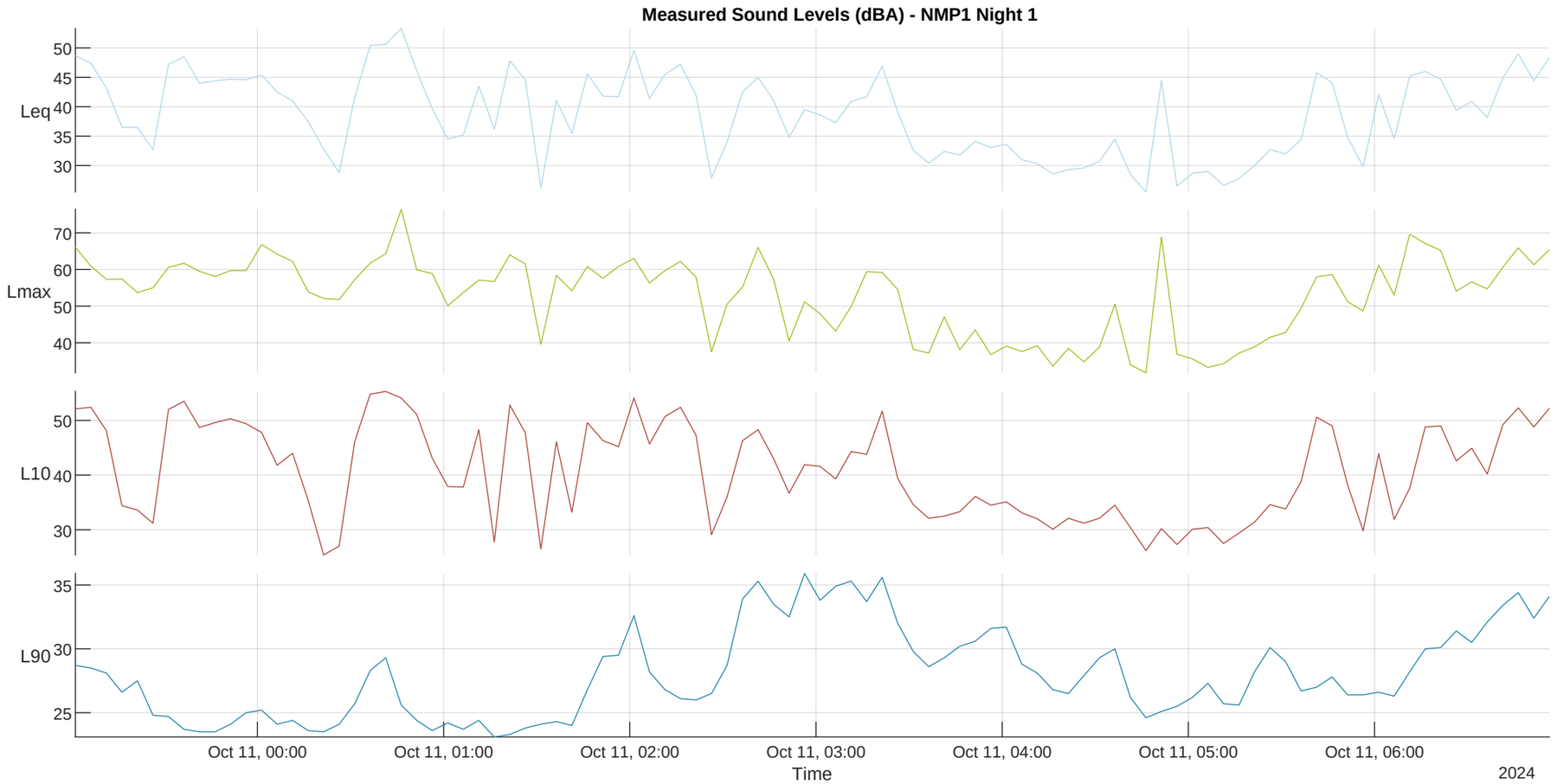
11:00
12:00
13:00
14:00
Time
Oct 12, 2024


Measured Sound Levels - Night 1 NMP1
Leq
Lmax
L10
L90
SPL (dBA)
90
80
70
60
50
40
30
20
Oct 10, 23:00
Oct 11, 00:00
Oct 11, 01:00
Oct 11, 02:00
Oct 11, 03:00
Oct 11, 04:00
Oct 11, 05:00
Oct 11, 06:00
Oct 11, 07:00
2024


Measured Sound Levels (dBA) - NMP1 Night 1
Leq
50
45
40
35
30
Lmax
70
60
50
40
L10
50
40
30
L90
35
30
25
Oct 11, 00:00
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Oct 11, 03:00
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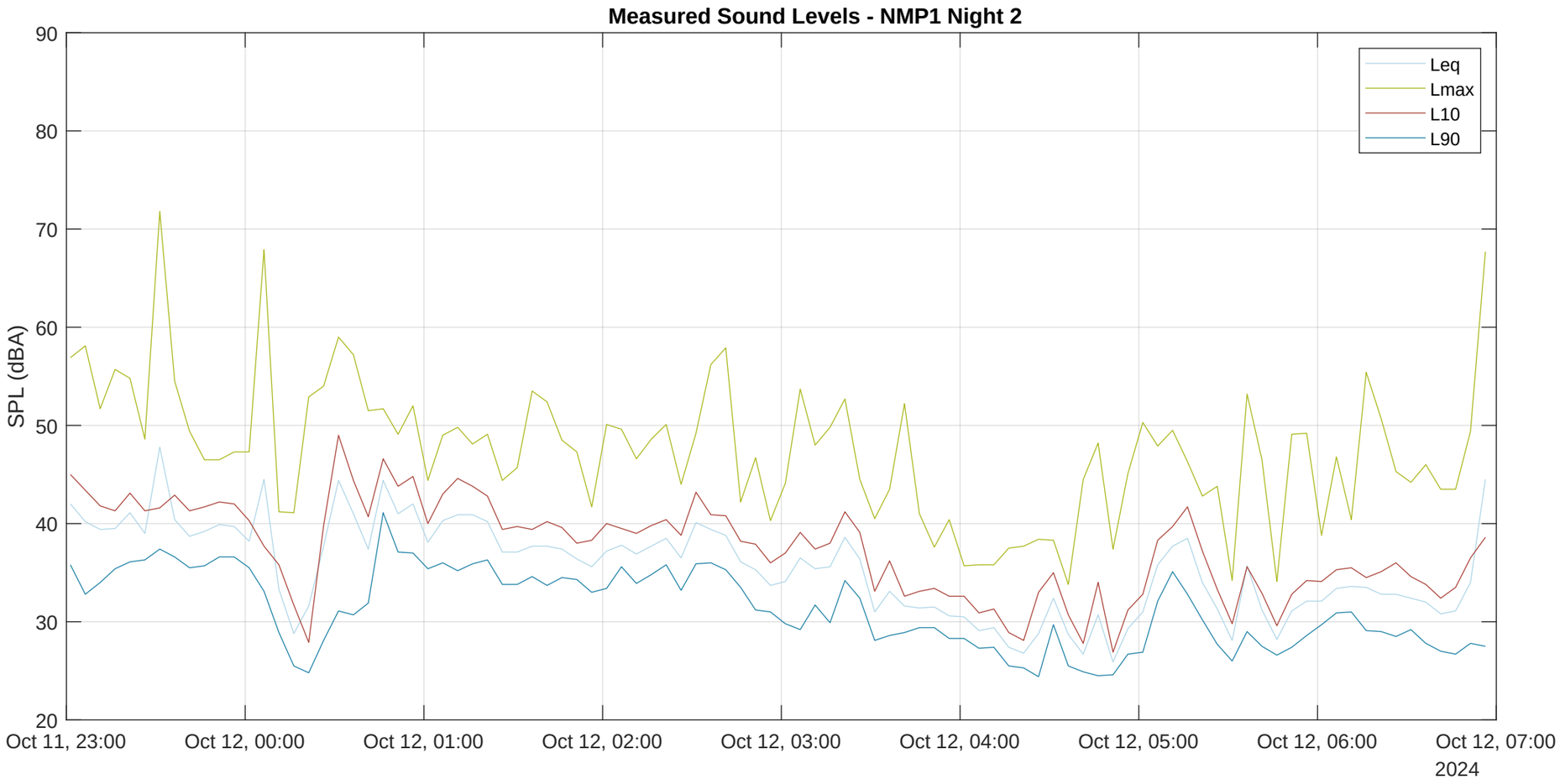
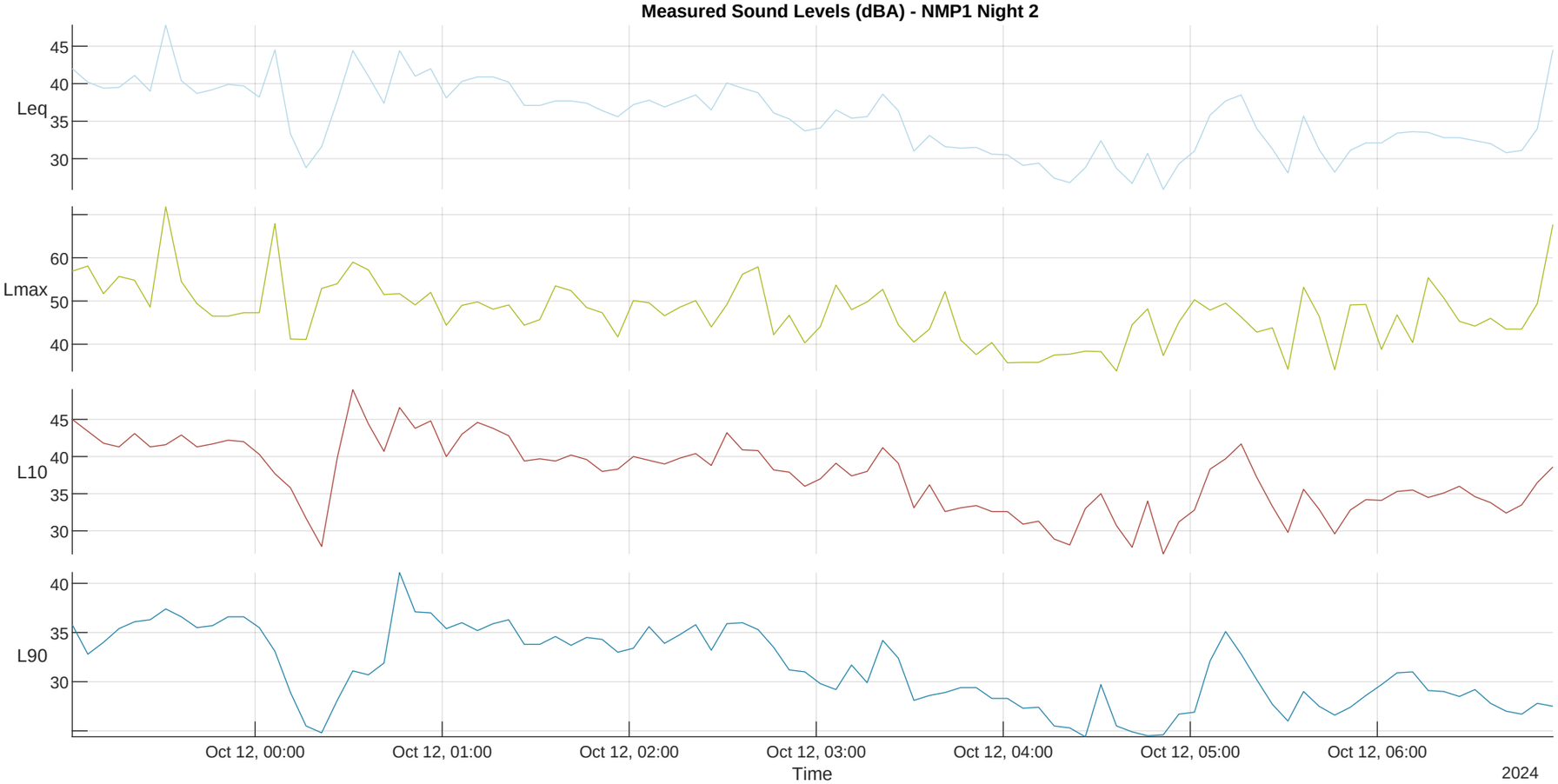
Oct 11, 05:00
Oct 11, 06:00
Time
2024


Measured Sound Levels - NMP1 Night 2
SPL (dBA)
90
80
70
60
50
40
30
20
Leq
Lmax
L10
L90
Oct 11, 23:00
Oct 12, 00:00
Oct 12, 01:00
Oct 12, 02:00
Oct 12, 03:00
Oct 12, 04:00
Oct 12, 05:00
Oct 12, 06:00
Oct 12, 07:00
2024


Measured Sound Levels (dBA) - NMP1 Night 2
Leq
45
40
35
30
Lmax
60
50
40
L10
45
40
35
30
L90
40
35
30
Oct 12, 00:00
Oct 12, 01:00
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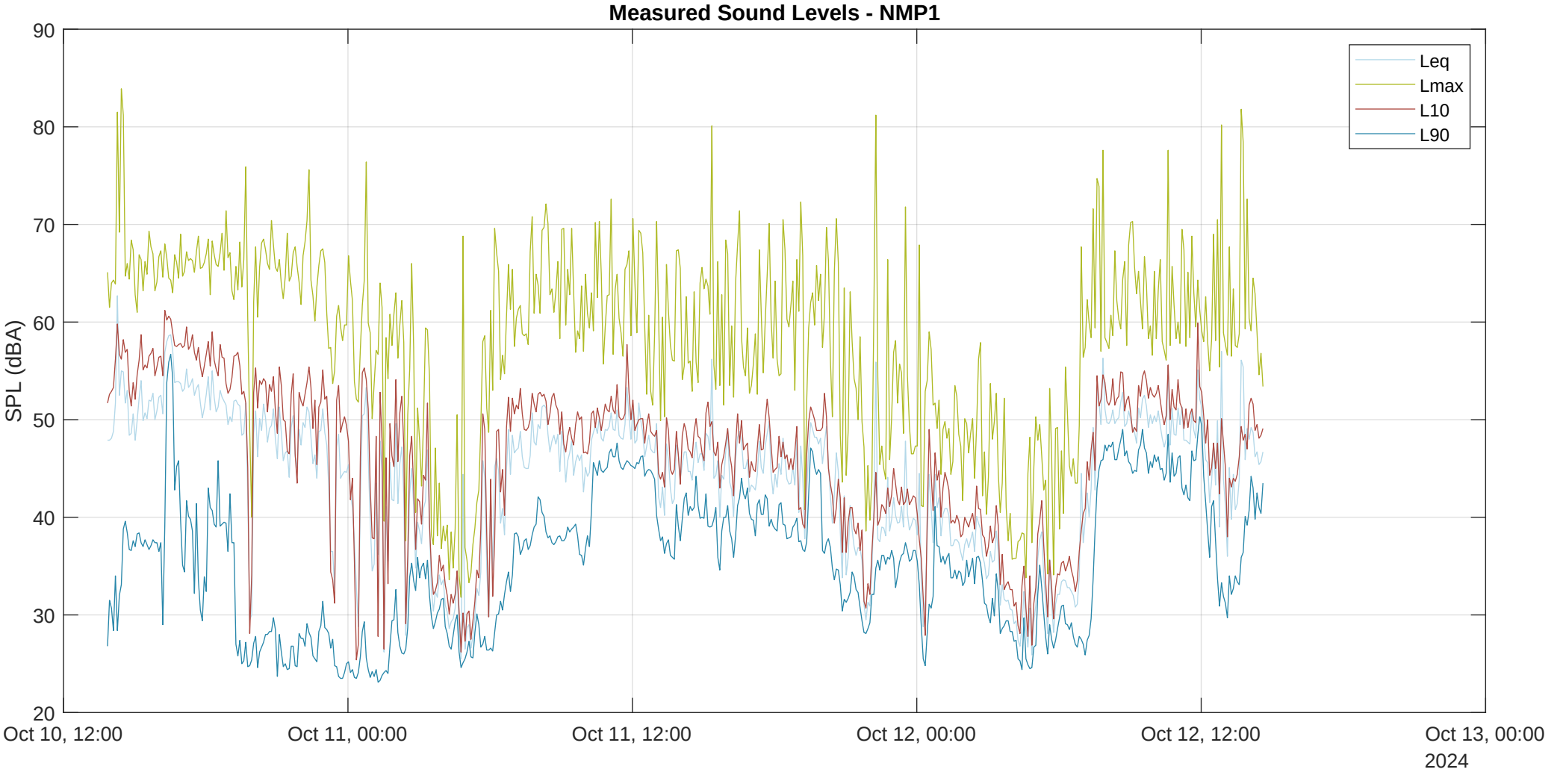
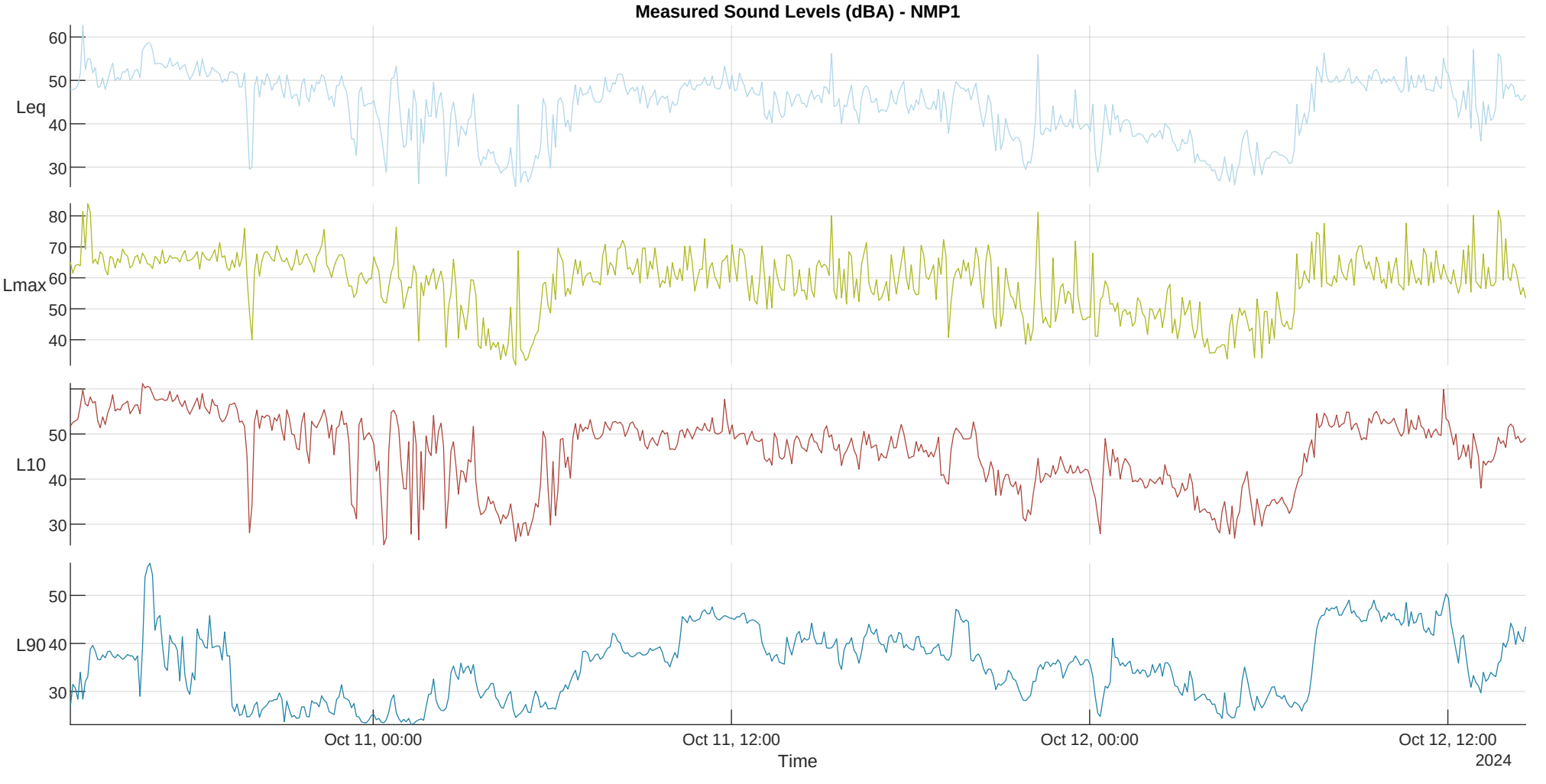
Oct 12, 03:00
Oct 12, 04:00
Oct 12, 05:00
Oct 12, 06:00
Time
2024


Measured Sound Levels - NMP1
SPL (dBA)
90
80
70
60
50
40
30
20
Oct 10, 12:00
Oct 11, 00:00
Oct 11, 12:00
Oct 12, 00:00
Oct 12, 12:00
Oct 13, 00:00
2024
Leq
Lmax
L10
L90


Measured Sound Levels (dBA) - NMP1
Leq
60
50
40
30
Lmax
80
70
60
50
40
L10
50
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L90
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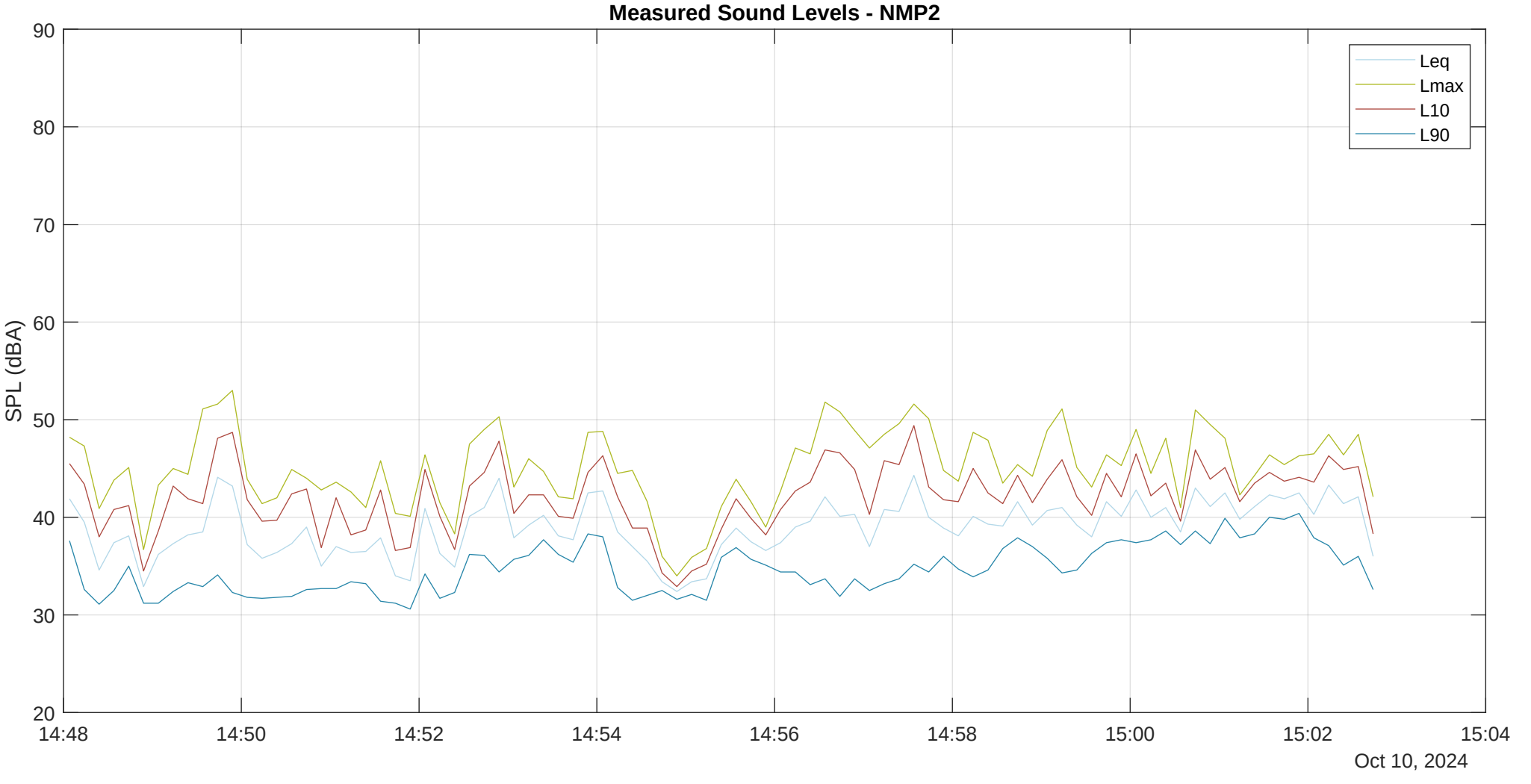
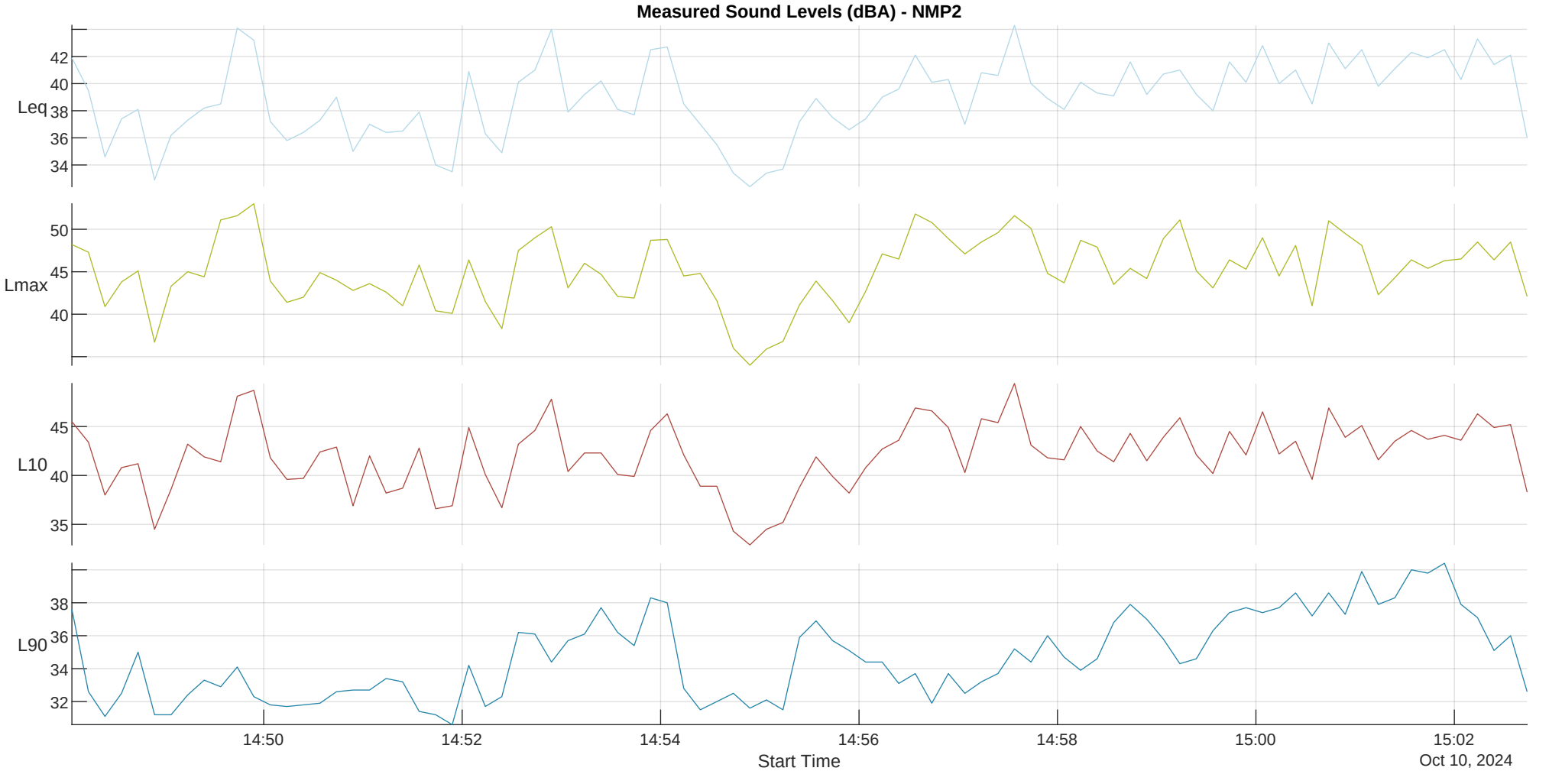
Oct 12, 00:00
Oct 12, 12:00
2024
Time


Measured Sound Levels - NMP2
SPL (dBA)
90
80
70
60
50
40
30
20
14:48
14:50
14:52
14:54
14:56
14:58
15:00
15:02
15:04
Oct 10, 2024
Leq
Lmax
L10
L90


Measured Sound Levels (dBA) - NMP2
Leq
42
40
38
36
34
Lmax
50
45
40
L10
45
40
35
L90
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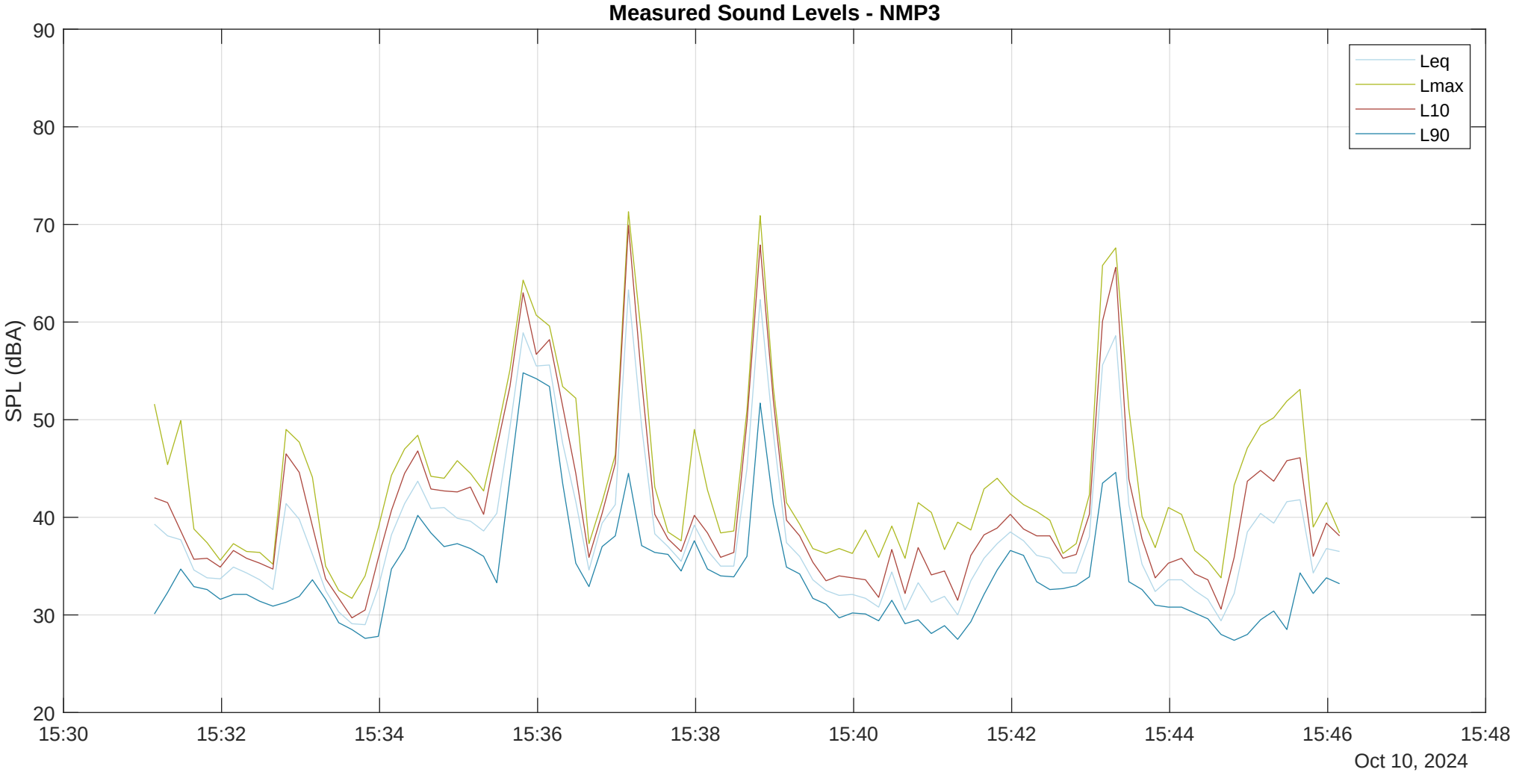
14:58
15:00
15:02
Start Time
Oct 10, 2024


Measured Sound Levels - NMP3
SPL (dBA)
90
80
70
60
50
40
30
20
15:30
15:32
15:34
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15:40
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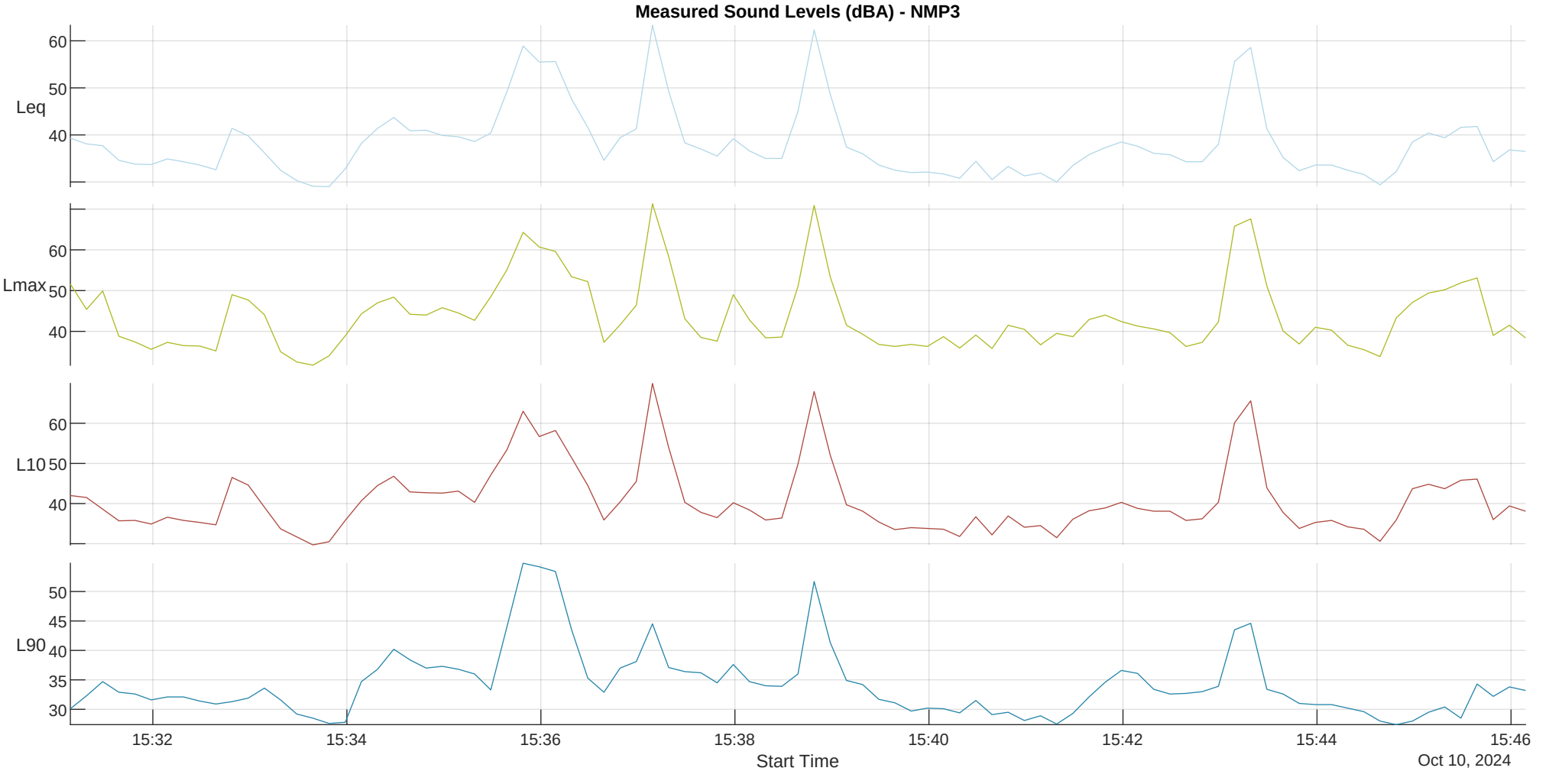
15:48
Oct 10, 2024
Leq
Lmax
L10
L90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Leq
60
50
40
Lmax
60
50
40
L10
60
50
40
L90
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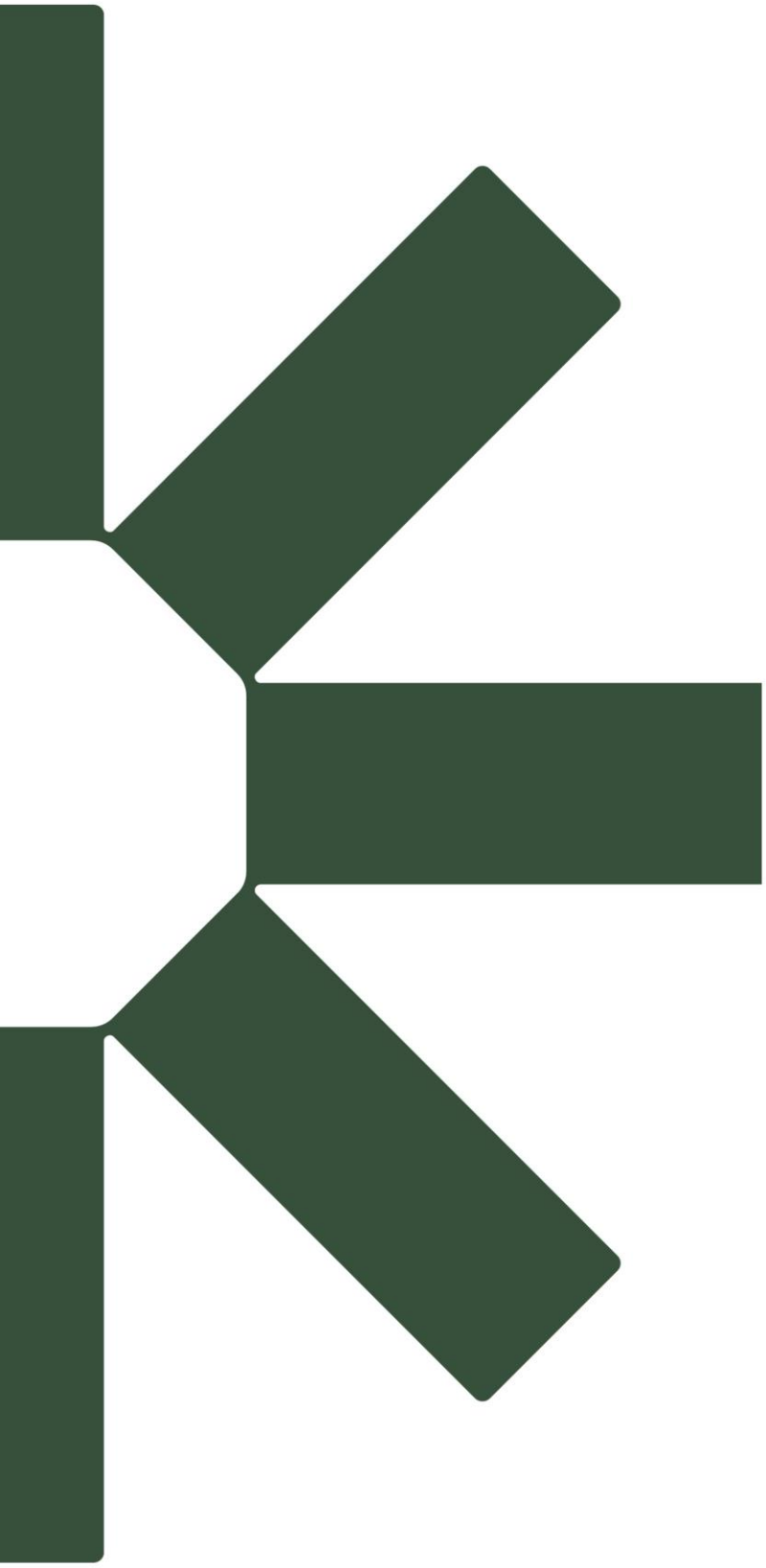
15:42
15:44
15:46
Start Time
Oct 10, 2024



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