



**TOMINGLEY**

**GOLD OPERATIONS PTY LTD**

(A wholly owned subsidiary of Alkane Resources Ltd)

ABN 53 149 040 371



# Tomingley Gold Extension Project

## Noise and Blasting Impact Assessment

### Part 3

Major Project Application No. PA 09\_0155



Prepared by  *Muller Acoustic Consulting Pty Ltd*

December 2021

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# Noise and Blasting Impact Assessment

Tomingley Gold Extension Project  
Tomingley, NSW



# Document Information

## Noise and Blasting Impact Assessment

Tomingley Gold Extension Project

Tomingley, NSW

**Prepared for:** R.W. Corkery & Co. Pty Limited

62 Hill Street

ORANGE NSW 2800



**Prepared by:** Muller Acoustic Consulting Pty Ltd

PO Box 678, Kotara NSW 2289

ABN: 36 602 225 132

P: +61 2 4920 1833

[www.mulleracoustic.com](http://www.mulleracoustic.com)

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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by R.W. Corkery & Co. Pty Limited (RWC), on behalf Alkane Resources Ltd (Alkane) to prepare a Noise and Blasting Impact Assessment (NBIA) in relation to the Proposed Tomingley Gold Extension Project, Tomingley, NSW (the 'Project').

The NBIA was completed to quantify potential noise and vibration impacts associated with the Project construction, operation and road traffic noise on the surrounding community to accompany the Environmental Impact Statement (EIS) which is being prepared for the Project by RWC.

The NIA has been primarily prepared in accordance with the following policies and guidelines:

- NSW Environment Protection Authority's (EPA's), Noise Policy for Industry (NPI), 2017;
- NSW Department of Environment and Climate Change (DECC), Interim Construction Noise Guideline (ICNG), 2009;
- Department of Environment, Climate Change and Water NSW (DECCW), Road Noise Policy (RNP), 2011;
- NSW Government, Voluntary Land Acquisition and Mitigation Policy (VLAMP), September 2018;
- Roads and Transport Authority, Environmental Noise Management Manual (ENMM), 2000;
- Australian Standard AS 1055:2018 (AS 1055) – Description and Measurement of Environmental Noise;
- Australian Standard AS2187.2-2006 (AS2187.2) – Explosives—Storage and Use Part 2: Use of Explosives;
- Australian and New Zealand Environment Council (ANZEC) 1990, Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration; and
- German Institute for Standardisation – DIN 4150 (1999-02) Part 3 (DIN4150-3) – Structural Vibration - Effects of Vibration on Structures.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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## 2 Project Description

### 2.1 Background

Tomingley Gold Operation (TGO) currently operates under State Significant Development Consent MP 09\_0155 originally granted on 24 July 2012. MP 09\_0155 has been modified five times, most recently on 5 May 2021.

### 2.2 The Project

The Project proposes an extension to the existing Tomingley Gold Operations (TGO) Project located immediately south of the village of Tomingley, approximately 7.5km north of Peak Hill and approximately 38km south of Narromine, NSW. The Project Site comprises the combined area of the TGO and San Antonio and Roswell (SAR) Mine Sites as shown in **Figure 1**.

Approved TGO mining operations are undertaken in accordance with development consent MP 09\_0155. The approved activities would continue under the existing development consent, with MP 09\_0155 to be surrendered following receipt of the new development consent and all required approvals for the Project and involve the following activities.

#### **TGO Current Approved Operations.**

- Extraction of ore and waste rock from four open cut pits, with underground mining beneath three of those open cut pits. Extraction is currently from underground operations at the Wyoming 1 pit and the Caloma 1 Open Cut Cutback. Mining of the cutback will complete open cut mining within the Caloma 1 Open Cut. No other open cut mining operations are ongoing or are proposed within the TGO Mine Site.
- Construction of three out-of-pit Waste Rock Emplacements (WRE) and one in-pit emplacement. Currently waste rock is placed in-pit within the Caloma 2 Open Cut and stockpiled within WRE1 for use in Residue Storage Facility construction.
- Construction and use of haul roads, a Run of Mine (ROM) pad and associated stockpiles.
- Construction and use of a Processing Plant to process up to 1.5 million tonnes per annum (Mtpa).
- Construction and use of two residue storage facilities comprising Residue Storage Facility 1 (to Stage 9 or a maximum elevation of 286.5m AHD) and Residue Storage Facility 2 (to Stage 2 or a maximum elevation of 272m AHD).
- Construction and use of ancillary infrastructure.



#### **Additional or Modified TGO Operations.**

- Increased capacity for Residue Storage Facility 2, from Stage 2 to Stage 9, with a maximum elevation of 286m AHD).
- Establishment and use of ancillary infrastructure, including a ventilation rise.
- Development of the (underground) SAR Exploration Drive from the existing Wyoming 1 underground workings to an underground position to the west of the SAR deposits. This drive will be converted into a haulage drive between SAR and Wyoming 1 upon granting of development consent.
- Drilling of approximately 72,000m of exploration drill holes.
- Extraction of one or more bulk samples totalling no greater than 20,000t.
- Collection of data that for mine planning and environmental assessment purposes.

#### **Proposed San Antonio and Roswell (SAR) Operations.**

- Realigned Newell Highway and Kyalite Road and associated intersections with Back Tomingley West Road and McNivens Lane and Kyalite Road overpass.
- The SAR Open Cut and Underground Mine.
- Construction of two waste rock emplacements, namely the Caloma and SAR WRE and backfilling of the associated open cuts.
- The SAR Amenity Bund, Haul Road and Services Road between the SAR Open Cut and the Caloma 2 Open Cut.
- Processing of ore from the SAR deposits using the approved Processing Plant at a maximum rate of 1.75Mtpa.

In addition, the Project would include an extension of the approved mine life, from 31 December 2025 to 31 December 2032.

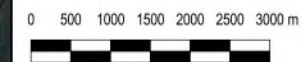
TGO operates up to 365 days per year and 24 hours per day using two 12 hour shifts and processes up to 1Mtpa of gold ore per annum.



FIGURE 1  
PROJECT LAYOUT  
MAC201136-01  
Tomingley Gold Extension  
Project

**KEY**

- TGO Approved Operations
- SAR Proposed Operations





## 2.3 Construction Activities & Site Preparation

The Project would involve the extension of operations from the existing TGO Mine Site to a greenfield area to the south. The following works are required to enable the Project:

- Key boundaries and locations would be marked on the ground for site establishment and construction;
- Existing infrastructure within the disturbance area, including communication lines, powerlines, fences and buildings would be progressively demolished and/or relocated;
- Additional services required for the Project, including powerlines, communication lines and pipelines would be established;
- Erosion and sediment control structures, including clean and dirty water structures and the Inundation Bund would be established;
- Suitable fences, including warning signs, would be established to separate active mining areas from areas that would continue to be used for agricultural purposes;
- Construction of laydown and equipment parking areas, as well as office/amenity buildings would be established;
- Vegetation clearing followed by stripping and stockpiling of soil would be undertaken;
- Borrow pits would be established within the footprint of the WRE and / or SAR Open Cut for the supply of construction materials; and
- Construction of the Haul Road, Services Road, SAR Amenity Bund, Administration Area, internal site roads, hard stands, explosives magazines, water storages and other site infrastructure.

## 2.4 Realignment of Public Roads

The Project would require the realignment of the following public roads:

- Newell Highway and intersections with Kyalite Road, McNivens Lane and Back Tomingley West Road; and
- Kyalite Road, including an overpass over the Haul Road and Services Road.

The current alignment of the Newell Highway is within the proposed SAR Open Cut mining area, requiring the Highway to be realigned approximately 1km to the west. Kyalite Road is also within the footprint of the SAR Open Cut mining area and realigned to the north including the construction of an overpass over the SAR Haul Road and Services Road. The realigned road would be sealed from the intersection with the Newell Highway to a point to the east of the SAR site access road.



## 2.5 Mining Operations

The Project would consist of the following major onsite activities.

### 2.5.1 Open Cut Mining

Open cut mining operations would commence in the southern section of the SAR Open Cut. Mining of near surface material would be undertaken using conventional free dig, load and haul techniques. Once more competent material is exposed, it would be extracted using conventional drill, blast, load and haul techniques.

Open cut ore would be transported to the TGO Mine Site via the proposed Haul Road. Alternatively, ore may be stockpiled within the Run-in-Min (RIM Pad) from where it would be transported to the TGO Mine Site via the proposed Haul Road.

Waste rock would be hauled to and placed in the SAR and Caloma WREs.

### 2.5.2 Underground Mining

Underground mining operations would be undertaken using the approved SARED. The SAR Exploration Drive would permit access from the Wyoming 1 underground workings to the SAR deposits.

Following receipt of development consent, the SAR Exploration Drive would become the SAR Production Drive, with additional development for production purposes undertaken using traditional jumbo-based drill, blast, load and haul techniques. Underground mining would occur within the Roswell and San Antonio deposits.

Ore would initially be transported to the TGO Mine Site via the underground drive and Wyoming 1 Portal. Ore transported via the Wyoming 1 Portal would be directly transferred to the ROM Pad using underground haul trucks.

Waste rock would be used to backfill completed stopes or would be transported to surface via the Wyoming 1 or SAR Portals and placed within surface WREs.

Underground mining operations would be supported by the following surface infrastructure:

- The approved SARED Ventilation Rise;
- Proposed Roswell (ROS) Ventilation Rise;
- Additional ventilation rises as required within disturbed sections of the SAR Mine Site;
- A Pastefill Plant; and
- Services including power, water and compressed air.

## 2.6 Transportation Operations

The SAR Haul Road and Services Road would be constructed between the Caloma 2 and SAR Open Cut pits. The SAR Haul Road would permit surface haul trucks to transport ore and waste rock from the SAR Open Cut pits to the TGO Mine Site.

Open Cut ore would be transported to the ROM Pad via the SAR Haul Road and existing Newell Highway Underpass using haul trucks or road trucks. Underground ore transported to the surface via the Wyoming 1 Portal would be transported directly to the ROM Pad using underground haul trucks.

A Services Road would be constructed adjacent to the SAR Haul Road to allow smaller vehicles including light vehicles, service vehicles and heavy vehicles transporting tailings/residue to the Pastefill Plant.

## 2.7 Waste Rock Management

Waste rock from the SAR Open Cut pits would initially be used for site establishment operations, including construction of the SAR Amenity Bund. Waste rock would also be transported to the TGO Mine Site and placed into the Caloma 1 and Caloma 2 Open Cut pits, which would be completely backfilled. Subsequent waste rock would be placed into the SAR WRE, initially in an out-of-pit location, with in-pit emplacement commencing following completion of the Southern and Central SAR Open Cut pits, which would also be completely backfilled to form an integrated SAR WRE.

## 2.8 Processing Operations and Residue Management

Ore would be processed using the existing Processing Plant. A second (primary) ball mill would be added between the existing crushing circuit and the existing (secondary) ball mill to enable the Processing Plant to achieve a production rate of 1.5Mtpa for hard rock, and 1.75Mtpa for softer material.

## 2.9 Hours of Operation

The Project would operate 24 hours, 7 days per week.

## 2.10 Final Landform, Rehabilitation and Mine Closure

The approved and proposed final landform would include the following:

- Two bunded and fenced final voids, namely the existing Wyoming 1 Open Cut and a proposed void within the northern section of the SAR Open Cut;
- Three fully backfilled open cuts, namely the approved Wyoming 3 and proposed Caloma and Caloma 2 Open Cuts;

- Three shaped and rehabilitated WREs, namely the approved and existing WRE2 and WRE3, and the proposed SAR WRE; and
- The realigned Newell Highway and Kyalite Road would be retained.

All infrastructure not required for the final land use would be removed or reduced in size. Rehabilitation would be undertaken progressively, with the outer face of the SAR WRE rehabilitated as each lift is established. Rehabilitation of other sections of the Project Site would be undertaken at the end of mine life.

## 2.11 Assessment Requirements

The NBIA has been prepared in accordance with the NSW DPIE's Secretary's Environmental Assessment Requirements (SEARs) for the Project, issued on 22 July 2021. The SEARs identify matters which must be addressed in the assessment and essentially form the Project's terms of reference. **Table 1** lists individual requirements relevant to this NBIA and where they are addressed in this report.

Table 1 Noise, Vibration and Blasting Related SEARs and Agency Requirements	
SEAR	Section
An assessment of the likely construction and operational noise impacts of the development in accordance with the <i>Noise Policy for Industry NSW</i> , and the <i>Voluntary Land Acquisition and Mitigation Policy</i>	7, 8
If a claim is made for specific construction noise criteria for certain activities, this claim must be justified and accompanied by an assessment of the likely construction noise impacts of these activities in accordance with the <i>Interim Construction Noise Guideline</i>	8
An assessment of the likely road noise impacts of the development in accordance with the <i>NSW Road Noise Policy</i>	9
An assessment of the likely blasting impacts of the development on people, animals, buildings and infrastructure, and significant natural features, having regard to the relevant ANZEC guidelines	10

## 2.12 Receiver Review

Receivers in the locality of the Project Site are predominantly residential receivers situated within the small village of Tomingley or rural residential properties surrounding the Project Site. Two commercial receivers are also located within Tomingley. Residential receivers are classified as:

- Project Related;
- Non-Project Related; and
- Non-Project Related Receivers with a Memorandum of Understanding (MOU) with TGO.

The receivers where a MOU is in place have mitigation measures (insulation, improved glazing, air conditioning) installed by TGO to reduce internal noise levels from previous iterations of the operation. Although not subject to the same assessment requirements (specifically VLAMP) as Non-Project related receivers, they have been included in the assessment for completeness. The receiver coordinates are presented in **Table 2**. **Figure 2** and **Figure 3** presents the receivers with respect to the site location.

Table 2 Receiver Locations			
Receiver ID	Status	(MGA55 GDA94)	
		Easting	Northing
R01	Project Related	614328	6396164
R02	MOU	611347	6395447
R03	MOU	614690	6395277
R04	MOU	617152	6393349
R06	Non-Project Related	611522	6392266
R08	Non-Project Related	612493	6398213
R09	Non-Project Related	614081	6398019
R10	Non-Project Related	615163	6396785
R11	Non-Project Related	615544	6396858
R12	Non-Project Related	616485	6397932
R13	MOU	614418	6396342
R16	Non-Project Related	614599	6395928
R17	MOU	614531	6395902
R18	Commercial	614672	6395866
R19	Non-Project Related	614673	6395820
R21	Commercial	614663	6395746
R22	MOU	614595	6395660
R23	MOU	614517	6395616
R24	MOU	614596	6395602
R25	MOU	614667	6395651
R26	Non-Project Related	614666	6395628
R27	Commercial (Not Operating)	614672	6395522

**Table 2 Receiver Locations**

Receiver ID	Status	(MGA55 GDA94)	
		Easting	Northing
R28	MOU	614682	6395389
R29	MOU	614686	6395301
R32	MOU	614886	6395411
R33	Commercial (Not Operating)	614763	6395439
R35	MOU	614735	6395783
R37	MOU	614878	6395835
R40	Non-Project Related	614637	6395729
R41	MOU	614593	6395525
R42 <sup>1</sup>	Lucky-Strike Motel - Non-Project Related	614655	6395936
R43	Non-Project Related	611517	6388826
R44	Project Related	615139	6387358
R45	Derelict Unoccupiable	611176	6389342
R47	Project Related	612741	6386408
R60	Non-Project Related	617341	6390550
R61	Derelict Unoccupiable	617374	6390378
R62	Project Related	617262	6390132
R63	Non-Project Related	619755	6390153
R64	Non-Project Related	616792	6386106
R65	Non-Project Related	620612	6387190
R66	Non-Project Related	619921	6386314
R67	Non-Project Related	619566	6385368
R68	Non-Project Related	617093	6383186
R69	Non-Project Related	615450	6382954
R70	Non-Project Related	620329	6391230
R71	Non-Project Related	614105	6385342
R72	Non-Project Related	618454	6393476
R73	Non-Project Related	614663	6395768
R74	MOU	615796	6395420
R75	Non-Project Related	612186	6382911
R76	Non-Project Related	611265	6381195
R78	Non-Project Related	618673	6397498
R79	MOU	614587	6395739
R80	MOU	614481	6395759
R81	Non-Project Related	614612	6395994
R82	Project Related	617147	6388305

Note 1: Assessed as a residential receiver as a conservative approach.



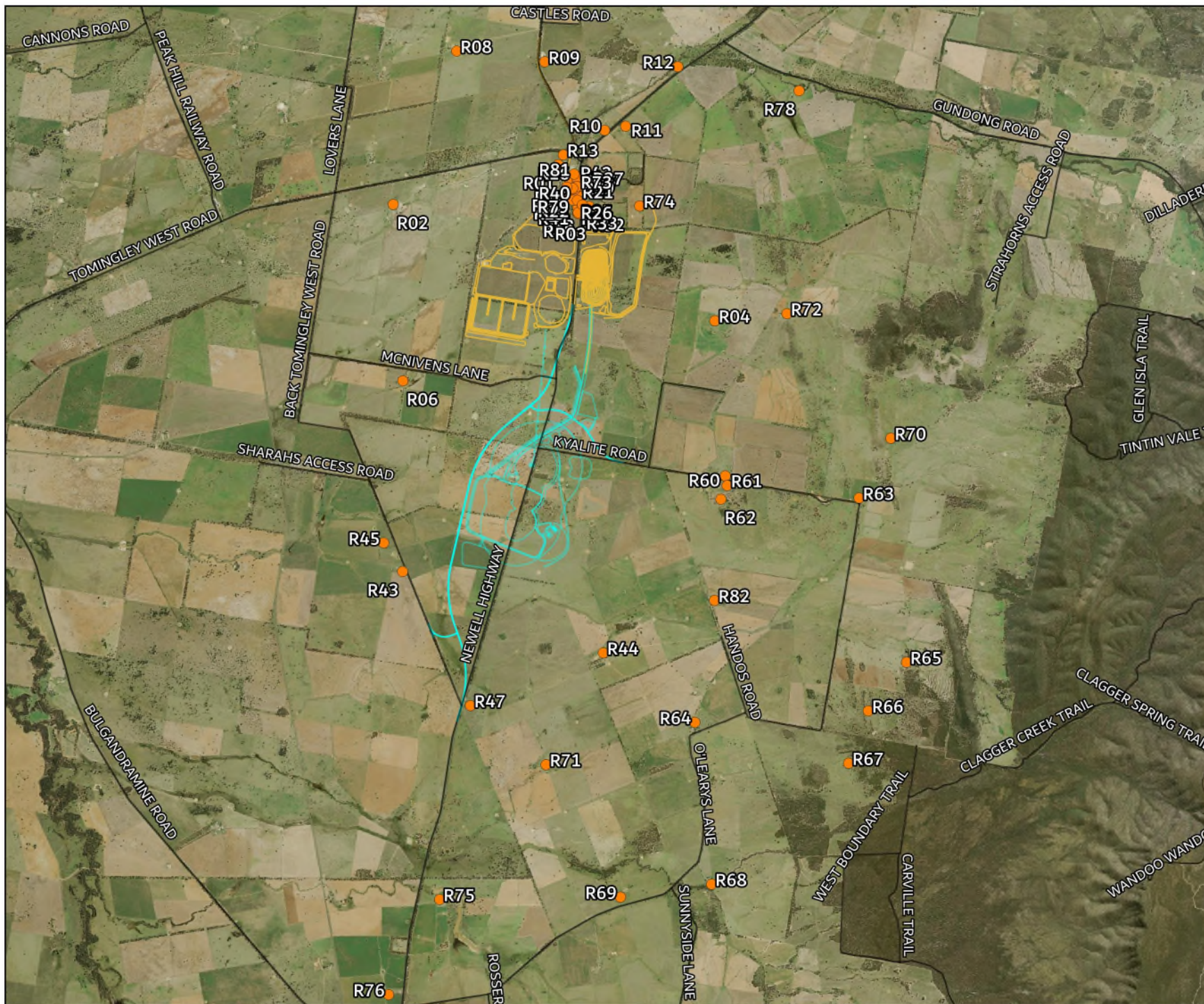


FIGURE 2  
Receiver Locations  
MAC201136-01  
Tomingley Gold Extension  
Project

# KEY

## Receivers

- TGO Approved Operations
- SAR Proposed Operations

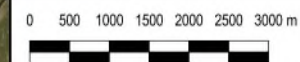






FIGURE 3  
Receiver Locations - Tomingley  
MAC201136-01  
Tomingley Gold Extension  
Project

# KEY

## Receivers

- TGO Approved Operations
- SAR Proposed Operations



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### 3 Noise Policy and Guidelines

#### 3.1 Noise Policy for Industry

The EPA released the Noise Policy for Industry (NPI) in October 2017 which provides a process for establishing noise criteria for consents and licenses enabling the EPA to regulate noise emissions from scheduled premises under the Protection of the Environment Operations Act 1997.

The objectives of the NPI are to:

- provide noise criteria that is used to assess the change in both short term and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;
- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified; and
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, considering the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy sets out a process for industrial noise management involving the following key steps:

1. Determine the Project Noise Trigger Levels (PNTLs) (ie criteria) for a development. These are the levels (criteria), above which noise management measures are required to be considered. They are derived by considering two factors: shorter-term intrusiveness due to changes in the noise environment; and maintaining the noise amenity of an area.
2. Predict or measure the noise levels produced by the development with regard to the presence of annoying noise characteristics and meteorological effects such as temperature inversions and wind.
3. Compare the predicted or measured noise level with the PNTL, assessing impacts and the need for noise mitigation and management measures.
4. Consider residual noise impacts - that is, where noise levels exceed the PNTLs after the application of feasible and reasonable noise mitigation measures. This may involve balancing economic, social and environmental costs and benefits from the proposed development against the noise impacts, including consultation with the affected community where impacts are expected to be significant.

5. Set statutory compliance levels that reflect the best achievable and agreed noise limits for the development.
6. Monitor and report environmental noise levels from the development.

### 3.1.1 Project Noise Trigger Levels (PNTL)

The policy sets out the procedure to determine the PNTLs relevant to an industrial development. The PNTL is the lower (ie, the more stringent) of the **Project Intrusiveness Noise Level (PINL)** and **Project Amenity Noise Level (PANL)** determined in accordance with Section 2.3 and Section 2.4 of the NPI.

### 3.1.2 Rating Background Level (RBL)

The Rating Background Level (RBL) is a determined parameter from noise monitoring and is used for assessment purposes. As per the NPI, the RBL is an overall single figure background level representing each assessment period (day, evening and night) over the noise monitoring period. The measured RBLs relevant to the project are contained in **Section 4**.

### 3.1.3 Project Intrusiveness Noise Level (PINL)

The PINL ( $L_{Aeq}(15min)$ ) is the  $RBL + 5dB$  and seeks to limit the degree of change a new noise source introduces to an existing environment. Hence, when assessing intrusiveness, background noise levels need to be measured.

Background noise levels need to be determined before intrusive noise can be assessed. The NPI states that background noise levels to be measured are those that are present at the time of the noise assessment and without the subject development operating. For the assessment of modifications to existing premises, the noise from the existing premises should be excluded from background noise measurements. It is noted that the exception is where the premises has been operating for a significant period of time and is considered a normal part of the acoustic environment; it may be included in the background noise assessment under the following circumstances:

- the development must have been operating for a period in excess of 10 years in the assessment period/s being considered and is considered a normal part of the acoustic environment; and,
- the development must be operating in accordance with noise limits and requirements imposed in a consent or licence and/or be applying best practice.



Where a project intrusiveness noise level has been derived in this way, the derived level applies for a period of 10 years to avoid continuous incremental increases in intrusiveness noise levels. This approach is consistent with the purpose of the intrusiveness noise level to limit significant change in the acoustic environment. The purpose of the project amenity noise level is to moderate against background noise creep.

### 3.1.4 Project Amenity Noise Level (PANL)

The PANL is relevant to a specific land use or locality. To limit continuing increases in intrusiveness levels, the ambient noise level within an area from all combined industrial sources should remain below the recommended amenity noise levels specified in Table 2.2 (of the NPI). The NPI defines two categories of amenity noise levels:

- **Amenity Noise Levels (ANL)** – are determined considering all current and future industrial noise within a receiver area; and
- **Project Amenity Noise Level (PANL)** – is the recommended level for a receiver area, specifically focusing the project being assessed.

Additionally, Section 2.4 of the NPI states: “to ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows”:

**PANL** for new industrial developments = recommended **ANL** minus 5dBA.

The following exceptions apply when deriving the PANL:

- areas with high traffic noise levels;
- proposed developments in major industrial clusters;
- existing industrial noise and cumulative industrial noise effects; and
- greenfield sites.

Where relevant this assessment has considered influences of traffic with respect to amenity noise levels (ie areas where existing traffic noise levels are 10dB greater than the recommended amenity noise level).

The recommended amenity noise levels as per Table 2.2 of the NPI are reproduced in **Table 3**.

**Table 3 Amenity Noise Levels**

Receiver Type	Noise Amenity Area	Time of day	Recommended amenity noise level dB LAeq(period)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks.	See column 4	See column 4	5dB above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School Classroom	All	Noisiest 1-hour period when in use	35 (internal) 45 (external)
Hospital ward			
- internal	All	Noisiest 1-hour	35
- external	All	Noisiest 1-hour	50
Place of worship			
- internal	All	When in use	40
Passive Recreation	All	When in use	50
Active Recreation	All	When in use	55
Commercial premises	All	When in use	65
Industrial	All	When in use	70

Notes: The recommended amenity noise levels refer only to noise from industrial noise sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as rural residential; suburban residential; urban residential; industrial interface; commercial; industrial – see Table 2.3 and Section 2.7 of the NPI.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

### 3.1.5 Determining the Significance of Residual Noise Impacts

Residual noise impacts are identified after all source and pathway feasible and reasonable noise mitigation measures have been considered. A residual noise impact may exist where the best-achievable noise level from a development, when assessed at a sensitive receiver location, is above the PNTLs.

Section 4 of the NPI outlines the process for determining the significance of residual noise impacts to ensure that effective and appropriate mitigation measures are implemented.

For developments where all feasible and reasonable noise mitigation measures have been applied, the significance of residual noise levels (that is, noise levels above the project noise trigger level) are assessed, in accordance with the matrix outlined in Table 4.1 of the NPI, reproduced in **Table 4**.

<b>Table 4 Significance of Residual Noise Impacts</b>		
If the predicted noise level minus the project noise trigger level is:	And the total cumulative industrial noise level is:	Then the significance of residual noise level is:
$\leq 2$ dB(A)	Not applicable	Negligible
$\geq 3$ but $\leq 5$ dB(A)	< recommended amenity noise level or > recommended amenity noise level, but the increase in total cumulative industrial noise level resulting from the development is less than or equal to 1dB	Marginal
$\geq 3$ but $\leq 5$ dB(A)	> recommended amenity noise level and the increase in total cumulative industrial noise level resulting from the development is more than 1 dB	Moderate
> 5 dB(A)	$\leq$ recommended amenity noise level	Moderate
> 5 dB(A)	> recommended amenity noise level	Significant

### 3.1.6 Maximum Noise Assessment Trigger Levels

The potential for sleep disturbance from maximum noise level events from a project during the night-time period needs to be considered. The NPI considers sleep disturbance to be both awakenings and disturbance to sleep stages.

Where night-time noise levels from a development/premises at a residential location exceed the following criteria, a detailed maximum noise level event assessment should be undertaken:

- LAeq(15min) 40dB or the prevailing RBL plus 5dBA, whichever is the greater, and/or
- LAmax 52dB or the prevailing RBL plus 15dBA, whichever is the greater.

A detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Other factors that may be important in assessing the impacts on sleep disturbance include:

- how often the events would occur;
- the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the development;
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods); and
- current understanding of effects of maximum noise level events at night.

### 3.2 Voluntary Land Acquisition and Mitigation Policy

The Voluntary Land Acquisition and Mitigation Policy (VLAMP, 2018) outlines methods to determine the significance of potential exceedances of relevant noise assessment criteria and identifies potential treatments for those exceedances (VLAMP Table 1) and has been reproduced in **Table 5**.

#### **Voluntary Mitigation Rights**

A consent authority should only apply voluntary land mitigation rights where, even with the implementation of best practice management at the mine site:

- the noise generated by the development would meet the requirements of Table 1 (VLAMP) such that the impacts would be characterised marginal, moderate or significant at any residence or privately owned land; or
- the development would increase the total industrial noise level at any residence on privately owned land by more than 1dBA and noise levels at the residence are already above the recommended amenity noise levels in Table 2.2 of the NPI; or
- the development includes a private rail line and the use of that private rail line would cause exceedances of the recommended acceptable levels in Table 6 of Appendix 3 of the RING by greater than or equal to 3dBA at any residences on privately owned land.



**Table 5 Characterisation of Noise Impacts and Potential Treatments (VLAMP Table 1)**

If the predicted noise level minus the project noise trigger level is:	And the total cumulative industrial noise level is:	Characterisation of impacts:	Potential treatment:
All time periods 0-2dBA	Not applicable	Impacts are considered to be <b>negligible</b>	The exceedances would not be discernible by the average listener and therefore would not warrant receiver based treatments or controls
All time periods 3-5dBA	< recommended amenity noise level in Table 2.2 of the NPI; or > recommended amenity noise level in Table 2.2 of the NPI, but the increase in total cumulative industrial noise level resulting from the development is >1dB	Impacts are considered to be <b>marginal</b>	Provide mechanical ventilation / comfort condition systems to enable windows to be closed without compromising internal air quality / amenity.
All time periods 3-5dBA	> recommended amenity noise level in Table 2.2 of the NPI, and the increase in total cumulative industrial noise level resulting from the development is >1dB	Impacts are considered to be <b>moderate</b>	As for marginal impacts but also upgraded facade elements like windows, doors or roof insulation, to further increase the ability of the building facade to reduce noise levels.
Day and evening >5dBA	< recommended amenity noise levels in Table 2.2 of the NPI	Impacts are considered to be <b>moderate</b>	As for marginal impacts but also upgraded facade elements like windows, doors or roof insulation, to further increase the ability of the building facade to reduce noise levels.
Day and evening >5dBA	> recommended amenity noise levels in Table 2.2 of the NPI	Impacts are considered to be <b>significant</b>	Provide mitigation as for moderate impacts and see voluntary land acquisition provisions above.
Night >5dBA	Not applicable	Impacts are considered to be <b>significant</b>	Provide mitigation as for moderate impacts and see voluntary land acquisition provisions above.

## Voluntary Acquisition Rights

A consent authority should only apply voluntary land acquisition rights where, even with the implementation of best practice management at the mine site:

- the noise generated by the development would be characterised as significant, according to Table 1 (VLAMP), at any residence on privately owned land; or
- the noise generated by the development would contribute to exceedances of the acceptable noise levels plus 5dB in Table 2.2 of the NPI on more than 25% of any privately owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls; or
- the development includes a private rail line and the use of that private rail line would cause exceedances of the recommended maximum criteria outlined in Table 6 of Appendix 3 of the RING by greater than or equal to 3dBA at any residences on privately owned land.

Impacts would be classified as significant where:

- During the **daytime** and **evening** periods, noise levels from the project are >5dBA above the PNTLs and the total cumulative industrial noise level is greater than the recommended amenity noise levels in Table 2.2 of the NPI; or
- During the **night time** period, noise levels from the project are >5dBA above the PNTLs.

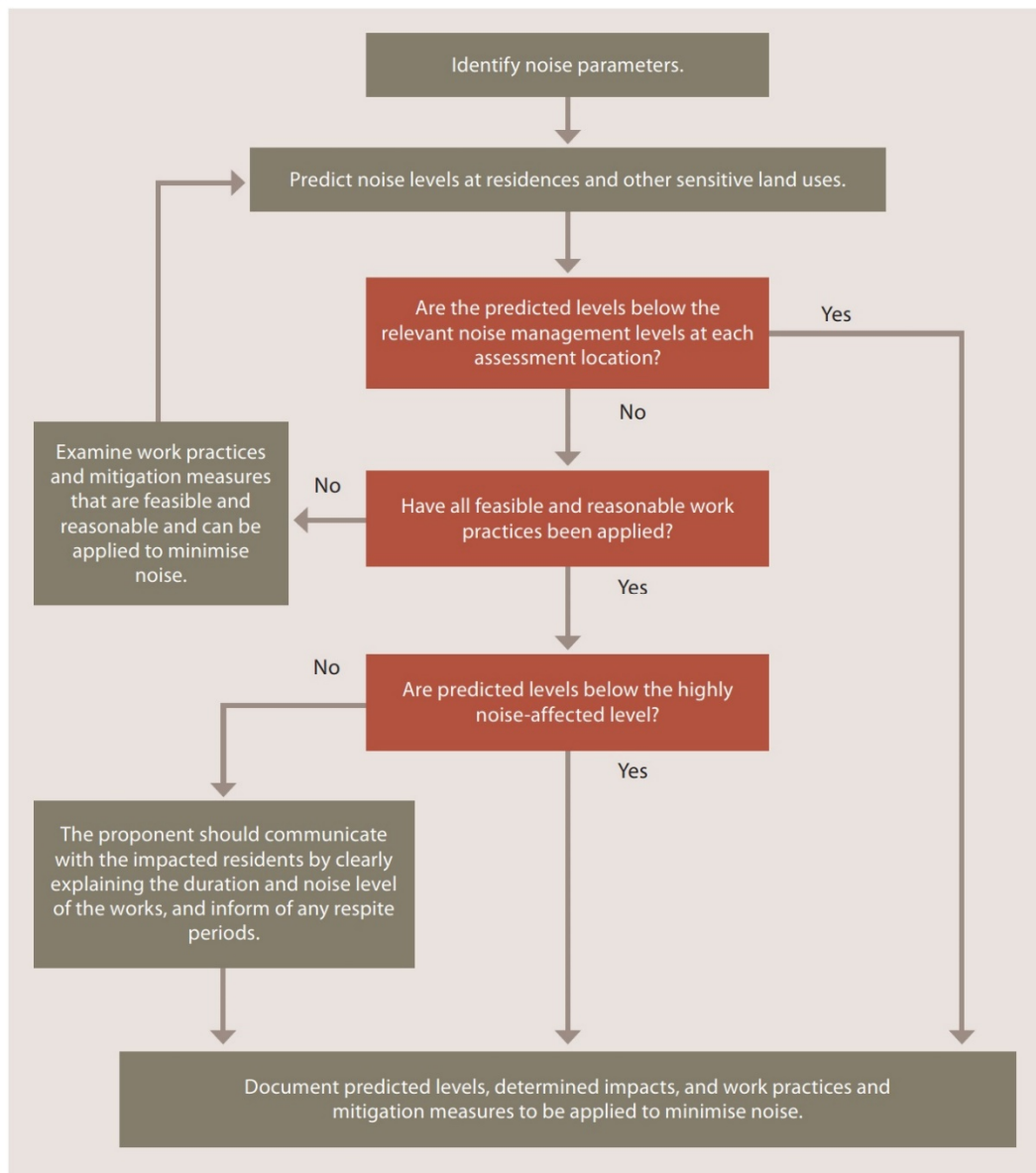
### 3.3 Interim Construction Noise Guideline

The ICNG sets out procedures to identify and address the impacts of construction noise on residences and other sensitive land uses. This section provides a summary of noise objectives that are applicable to the assessment. The ICNG provides two methodologies for the assessment of construction noise emissions:

- Quantitative, which is suited to major construction projects with typical durations of more than three weeks; and
- Qualitative, which is suited to short term infrastructure maintenance (< three weeks).

The qualitative assessment methodology is a more simplified approach that relies on noise management strategies. This study has adopted a quantitative assessment approach which is summarised in **Figure 4**. The quantitative approach includes identification of potentially affected receivers, derivation of the construction noise management levels, quantification of potential noise impact at receivers via predictive modelling and, provides management and mitigation recommendations.

Figure 4 Quantitative Assessment Processes for Assessing and Managing Construction Noise



Source: Department of Environment and Climate Change, 2009.

### 3.3.1 Standard Hours for Construction

**Table 6** summaries the ICNG recommended standard hours for construction works.

Table 6 Recommended Standard Hours for Construction	
Daytime	Construction Hours
Monday to Friday	7am to 6pm
Saturdays	8am to 1pm
Sundays or Public Holidays	No construction

These recommended hours do not apply in the event of direction from police, or other relevant authorities, for safety reasons or where required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

### 3.3.2 Out of Hours Construction

Works conducted outside of recommended standard hours are considered out of hours work (OOH). The ICNG suggests that any request to vary the hours of construction activities as identified above shall be:

- considered on a case by case basis or activity-specific basis;
- accompanied by details of the nature and need for activities to be undertaken during the varied construction hours;
- accompanied by written evidence that activities undertaken during the varied construction hours are strongly justified;
- appropriate consultation with potentially affected receivers and notification of the relevant regulatory authorities has occurred; and
- all practicable and reasonable mitigation measures will be put in place.

Construction activities are proposed to be undertaken between 7am and 10pm, Monday to Saturday.

### 3.3.3 Construction Noise Management Levels

Section 4 of the ICNG (DECC, 2009) details the quantitative assessment method involving predicting noise levels and comparing them with the Noise Management Level (NML) and are important indicators of the potential level of construction noise impact. **Table 7** reproduces the ICNG Noise Management Level (NML) for residential receivers. The NML is determined by adding 10dB (standard hours) or 5dB (OOH) to the Rating Background Level (RBL) for each specific assessment period.

**Table 7 Noise Management Levels**

Time of Day	Management Level LAeq(15min) <sup>1</sup>	How to Apply
Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or public holidays.	Noise affected  RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise.  Where the predicted or measured LAeq(15min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.  The proponent should also inform all potentially impacted residents of the nature of work to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected  75dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise.  Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account times identified by the community when they are less sensitive to noise such as before and after school for work near schools, or mid-morning or mid-afternoon for work near residences; and if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours.	Noise affected  RBL + 5dB	A strong justification would typically be required for work outside the recommended standard hours.  The proponent should apply all feasible and reasonable work practices to meet the noise affected level.  Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community.  For guidance on negotiating agreements see section 7.2.2.

Note 1: The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the construction noise management levels for noise assessment purposes and is the median of the ABL's.

### 3.3.4 Construction Sleep Disturbance

Section 4.3 of the ICNG (DECC, 2009) states that a sleep disturbance assessment is required where construction activities are planned to occur for more than two consecutive nights. Given that construction activities are not anticipated to occur during the night time period (10pm to 7am), sleep disturbance has not been considered in this assessment.

### 3.4 Road Noise Policy

The road traffic noise criteria are provided in the Department of Environment, Climate Change and Water NSW (DECCW), Road Noise Policy (RNP), 2011. The policy sets out noise criteria applicable to different road classifications for the purpose of quantifying traffic noise impacts. Road noise criteria relevant to this assessment are presented in detail in **Section 3.4**.

### 3.5 Blasting

The Project would be expected to operate within the limits provided in the Australian and New Zealand Environment Council (ANZEC) - Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration. Blasting criteria relevant to this assessment are presented in detail in **Section 5.4** and the assessment is presented in **Section 10**.

## 4 Existing Environment

### 4.1 Unattended Noise Monitoring

To quantify the existing background noise environment of the area, unattended noise monitoring was conducted at four locations to quantify the ambient environment surrounding the additional SAR project area and those receivers in proximity to the existing and realigned Newel Highway. The selected monitoring locations are shown in **Figure 5** and are considered representative of surrounding residential receivers as per Fact Sheet B1.1 of the NPI.

The unattended noise survey was conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics – Description and Measurement of Environmental Noise".

The measurements were carried out using four Svantek 977 noise analyser from 18 August 2020 to 26 August 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Observations on-site identified the surrounding locality was typical of a rural environment, with environmental noise sources including birds, livestock, dogs barking and wind in trees, and transportation sources including highway traffic and aircraft audible.

Data affected by adverse meteorological conditions have been excluded from the results in accordance with methodologies provided in Fact Sheet A4 of the NPI. Residential receivers situated in the surrounding area have been classified under the EPA's rural amenity category. These criteria are used in conjunction with the intrusiveness criteria to determine the limiting criteria. The results of long-term unattended noise monitoring are provided in **Table 8** to **Table 11**. The noise monitoring charts for the background monitoring assessment are provided in **Appendix B**.



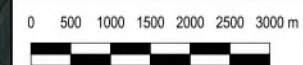


**FIGURE 5**  
**Noise Monitoring Locations**  
**MAC201136-01**  
**Tomingley Gold Extension**  
**Project**

# **KEY**

## **Receivers**

- TGO Approved Operations
- SAR Proposed Operations
- Noise Monitoring Location





**Table 8 Background Noise Monitoring Summary – L1 263 McNivens Lane**

Date	Measured Background Noise Level (LA90) dB ABL <sup>1</sup>			Measured Ambient Noise Level dB LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
Tuesday-18-Aug-20	--	36	26	--	38	40
Wednesday-19-Aug-20	36	26	20	52	36	40
Thursday-20-Aug-20	27	21	22	50	28	34
Friday-21-Aug-20	29	28	21	44	38	33
Saturday-22-Aug-20	29	21	21	51	45	39
Sunday-23-Aug-20	30	21	19	48	30	34
Monday-24-Aug-20	26	23	22	43	34	38
Tuesday-25-Aug-20	30	25	25	45	35	38
Wednesday-26-Aug-20	24	24	27	43	35	39
<b>L1 – RBL / Leq Overall</b>	<b>29</b>	<b>24</b>	<b>22</b>	<b>48</b>	<b>38</b>	<b>38</b>

Note 1: Assessment background level (ABL) – the single-figure background level representing each assessment period day, evening and night as per NPI Fact Sheet A.

Note 2: Excludes periods of wind or rain affected data. Meteorological data obtained from the Alkane Onesite Meteorological Station.

Note 3: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

**Table 9 Background Noise Monitoring Summary – L2 331 Kyalite Road**

Date	Measured Background Noise Level (LA90) dB ABL <sup>1</sup>			Measured Ambient Noise Level dB LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
Tuesday-18-Aug-20	--	32	27	--	41	37
Wednesday-19-Aug-20	38	32	26	53	41	40
Thursday-20-Aug-20	34	28	27	49	39	38
Friday-21-Aug-20	34	30	28	45	42	38
Saturday-22-Aug-20	35	30	25	53	40	45
Sunday-23-Aug-20	36	27	22	50	34	35
Monday-24-Aug-20	29	25	21	44	37	35
Tuesday-25-Aug-20	29	23	21	46	37	39
Wednesday-26-Aug-20	24	24	22	44	43	33
<b>L2 – RBL / Leq Overall</b>	<b>34</b>	<b>28</b>	<b>25</b>	<b>49</b>	<b>40</b>	<b>39</b>

Note 1: Assessment background level (ABL) – the single-figure background level representing each assessment period day, evening and night as per NPI Fact Sheet A.

Note 2: Excludes periods of wind or rain affected data. Meteorological data obtained from the Alkane Onesite Meteorological Station.

Note 3: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

**Table 10 Background Noise Monitoring Summary – L3 259 Back Tomingley West Road**

Date	Measured Background Noise Level			Measured Ambient Noise Level		
	(LA90) dB ABL <sup>1</sup>			dB LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
Tuesday-18-Aug-20	--	33	24	--	39	42
Wednesday-19-Aug-20	37	27	20	58	41	46
Thursday-20-Aug-20	30	22	21	52	35	39
Friday-21-Aug-20	30	24	21	49	43	45
Saturday-22-Aug-20	35	23	21	59	46	46
Sunday-23-Aug-20	36	21	19	52	33	48
Monday-24-Aug-20	26	24	20	44	38	44
Tuesday-25-Aug-20	30	24	21	48	39	43
Wednesday-26-Aug-20	24	23	22	46	40	45
<b>L3 – RBL / Leq Overall</b>	<b>30</b>	<b>24</b>	<b>21</b>	<b>53</b>	<b>41</b>	<b>45</b>

Note 1: Assessment background level (ABL) – the single-figure background level representing each assessment period day, evening and night as per NPI Fact Sheet A.

Note 2: Excludes periods of wind or rain affected data. Meteorological data obtained from the Alkane Onesite Meteorological Station.

Note 3: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

**Table 11 Background Noise Monitoring Summary – L4 5686 Newell Highway**

Date	Measured Background Noise Level			Measured Ambient Noise Level		
	(LA90) dB ABL <sup>1</sup>			dB LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
Tuesday-18-Aug-20	--	34	25	--	57	55
Wednesday-19-Aug-20	43	31	22	62	58	55
Thursday-20-Aug-20	42	25	22	61	57	54
Friday-21-Aug-20	37	28	24	58	57	55
Saturday-22-Aug-20	38	29	22	62	57	54
Sunday-23-Aug-20	38	29	20	59	56	52
Monday-24-Aug-20	33	25	20	56	58	56
Tuesday-25-Aug-20	36	24	21	57	58	56
Wednesday-26-Aug-20	29	24	22	55	58	56
<b>L4 – RBL / Leq Overall</b>	<b>38</b>	<b>28</b>	<b>22</b>	<b>59</b>	<b>57</b>	<b>55</b>

Note 1: Assessment background level (ABL) – the single-figure background level representing each assessment period day, evening and night as per NPI Fact Sheet A.

Note 2: Excludes periods of wind or rain affected data. Meteorological data obtained from the Alkane Onesite Meteorological Station.

Note 3: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

#### 4.1.1 Tomingley Township Receivers

##### Historic Data

The TGO EIS by RWC NIA (SLR) identified Noise Assessment Groups (NAG) for receivers with similar noise environments. The township of Tomingley was described as two NAG as follows:

- NAG C, where “ambient noise highly elevated due to the Newell Highway”; and
- NAG D, where “ambient noise elevated by the Newell Highway”.

Unattended noise monitoring conducted by SLR in 2009, prior to the introduction of TGO resulted in the following background noise levels presented in **Table 12**.

Table 12 Unattended Noise Monitoring Results 2009					
NAG	Receiver	Period	dB LA90(period)		
			Day	Evening	Night
A	R1	30 April to 15 May 2009	29	26	24
B	R2	29 April to 6 May 2009	31	33	35
C	R3	1 October to 8 October 2009	40	30	28
A	R4	29 April to 15 May 2009	29	24	23
A	R5	29 April to 6 May 2009	30	25	25
A	R6	29 April to 6 May 2009	28	24	23
D	R23	1 October to 8 October 2009	38	33	31

Source: SLR Consulting Report 10-7910R1D10 September 2011.

Review of the data in **Table 12** shows that RBLs in Tomingley (NAG C and NAG D) are above the minimum assumed RBLs of 35dBA for day and 30dBA for evening and night time.

##### Contemporary Data

In October 2017, TGO installed a permanent Noise Monitoring Terminal (NMT - Svantek 307 noise analyser) at “Brooklands” (near R23) approximately 300m west of the township to measure ambient noise levels, at a location that was not affected by extraneous noise sources in the township such as highway traffic and local activities from residents. Data for a period of 13 months from 1 September 2020 to 30 September 2021 from the Brooklands NMT was analysed to determine the RBLs and are presented in **Table 13**.

The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$ dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. Detailed results of daily Assessment Background Levels (ABLs) are presented in **Appendix B**.

**Table 13 Unattended Noise Monitoring Results 2020 - 2021**

Brooklands NMT	RBL dB LA90(period)		
	Day	Evening	Night
September 2020 – September 2021	33	32	32

The resultant RBL has been calculated from a total of 262 valid ABL results over the assessment period, providing a robust dataset representative of long term background levels including seasonal variations and meteorological conditions.

Comparison of the long term data with the pre-mining shows that background (LA90) noise levels are generally unchanged, providing additional confidence that the measured levels are representative of long term background noise levels in the township.

Therefore, the resulting RBLs presented in **Table 13** are considered conservatively representative of background noise levels for receivers in Tomingley township and have been adopted for all receivers in Tomingley.

#### 4.2 Thornycroft Background Noise Levels

TGO has an additional NMT at “Thornycroft”, situated to the east of WRE3 since the beginning of July 2021. Analysis of the background noise levels from September 2021 show that background noise levels are below the NPI minimum assumed RBLs of 35dBA daytime and 30dBA for evening and night time. Detailed results of daily Assessment Background Levels (ABLs) are presented in **Appendix B**.

### 4.3 Road Traffic Noise

Existing road traffic noise levels were measured at 5686 Newell Highway (L4) to inform the assessment of future road traffic noise levels from the Project.

**Table 14 Road Traffic Noise Levels – L4 5686 Newell Highway**

Date	Measured Road Traffic Noise Level	
	Day dB LAeq(15hr)	Night dB LAeq(9hr)
Tuesday-18-Aug-20	57	55
Wednesday-19-Aug-20	61	55
Thursday-20-Aug-20	60	54
Friday-21-Aug-20	58	55
Saturday-22-Aug-20	61	53
Sunday-23-Aug-20	58	52
Monday-24-Aug-20	56	56
Tuesday-25-Aug-20	58	56
Wednesday-26-Aug-20	56	56
Thursday-27-Aug-20	55	--
<b>Overall</b>	<b>59</b>	<b>55</b>

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## 5 Assessment Criteria

### 5.1 Operational Noise Criteria

#### 5.1.1 Intrusiveness Noise Levels

Review of the measured background noise levels shows that levels for all periods are below the NPI minimum assumed RBLs of 35dBA for the daytime and 30dBA for the night time, except for Location L4 (Newell Highway) during the daytime and Brooklands during the evening and night time periods – refer **Table 15**. Monitoring Location L4 was situated at 100m from the Newell Highway which has a signposted speed limit of 110km/h.

**Table 15 Background Noise Level Comparison**

Measurement Location	Receiver Type	Period <sup>1</sup>	Measured RBL dB LA90 <sup>2</sup>	NPI Minimum Assumed RBL dB LA90 <sup>2</sup>
L1 McNivens Lane	Rural Residential	Day	29	35
		Evening	23	30
		Night	22	30
L2 Kyalite Road	Rural Residential	Day	34	35
		Evening	28	30
		Night	25	30
L3 Back West Tomingley Road	Rural Residential	Day	30	35
		Evening	24	30
		Night	21	30
L4 Newell Highway	Rural/ Suburban Residential	Day	38	35
		Evening	28	30
		Night	22	30
Brooklands Tomingley Township	Suburban Residential	Day	33	35
		Evening	32	30
		Night	32	30

Note 1: Monday – Saturday, Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

Note 2: Where this level is less than 35dBA for the day period, the rating background noise level is set to 35dBA; where the noise level is less than 30dBA for the evening and night periods, the rating background noise level is set to 30dBA.

In consideration of the abovementioned, the NPI minimum assumed RBLs will be applied to all receivers, except those in the Tomingley township area which are categorised as suburban in accordance with the NPI receiver classifications. The PINL for the Project are presented in **Table 16** and have been determined based on the applicable RBLs +5dBA and only apply to residential receivers.

**Table 16 Project Intrusiveness Noise Levels**

Receiver Type	Period <sup>1</sup>	Measured RBL dB LA90 <sup>2</sup>	Adopted RBL dB LA90	PINL dB LAeq(15min)
Rural Residential	Day	<35	35	40
	Evening	<30	30	35
	Night	<30	30	35
Suburban Residential	Day	33	35	40
	Evening	32	32	37
	Night	32	32	37

Note 1: Monday – Saturday, Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

Note 2: Where this level is less than 35dBA for the day period, the rating background noise level is set to 35dBA; where the noise level is less than 30dBA for the evening and night periods, the rating background noise level is set to 30dBA.

### 5.1.2 Amenity Noise Levels and Project Amenity Noise Levels

The PANL for residential receivers and other receiver types (ie non-residential) potentially affected by the Project are presented in **Table 17**.

**Table 17 Amenity Noise Levels and Project Amenity Noise Levels**

Receiver Type	Noise Amenity Area	Assessment Period <sup>1</sup>	NPI Recommended		PANL dB LAeq(15min) <sup>3</sup>
			ANL dB LAeq(period)	ANL dB LAeq(period) <sup>2</sup>	
Residential	Rural	Day	50	45	48
		Evening	45	40	43
		Night	40	35	38
Residential	Suburban	Day	55	50	53
		Evening	45	40	43
		Night	40	35	38
Hotels Motels	Rural/Urban/ Suburban	Day	ANL +5dB	ANL +5dB	ANL +5dB
		Evening	ANL +5dB	ANL +5dB	ANL +5dB
		Night	ANL +5dB	ANL +5dB	ANL +5dB
Educational	All	When in use	35 (internal 1 hr)	30 (internal 1 hr)	33 (internal 1 hr) 43 (external 1 hr) <sup>4</sup>
Hospital Wards	All	When in use	35 (internal 1 hr)	30 (internal 1 hr)	33 (internal 1 hr)
			50 (external 1 hr)	45 (external 1 hr)	48 (external 1 hr)
Place of worship	All	When in use	40 (internal)	35 (internal 1 hr)	38 (internal 1 hr) 48 (external 1 hr) <sup>4</sup>
Passive Recreation	All	When in use	50	45	48
Active Recreation	All	When in use	55	50	53
Commercial	All	When in use	65	60	63
Industrial	All	When in use	70	65	68

Note 1: Monday – Saturday, Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

Note 2: Project Amenity Noise Level equals the Amenity Noise Level -5dB as there is other industry in the area.

Note 3: Includes a +3dB adjustment to the amenity period level to convert to a 15-minute assessment period as per Section 2.2 of the NPI.

Note 4: External level based on 10dB loss through partially open window.

Note 5: LAeq,period (traffic) as per section 2.4.1 of the NPI (i.e. existing LAeq Traffic -15dB).

### 5.1.3 Project Noise Trigger Levels

The PNTL are the lower of either the PINL or the PANL. **Table 18** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

<b>Table 18 Project Noise Trigger Levels</b>				
Receiver Type	Period <sup>1</sup>	PINL dB LAeq(15min)	PANL dB LAeq(15min)	PNTL, dB LAeq(15min)
Rural Residential	Day	40	48	40
	Evening	35	43	35
	Night	35	38	35
Suburban Residential	Day	40	53	40
	Evening	37	43	37
	Night	37	38	37
Commercial	When in Use	--	63	63

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

### 5.1.4 Maximum Noise Assessment Trigger Levels

The maximum noise trigger levels shown in **Table 19** are based on night time RBLs and trigger levels as per Section 2.5 of the NPI. The trigger levels will be applied to transient noise events that have the potential to cause sleep disturbance.

<b>Table 19 Maximum Noise Trigger Level</b>			
Rural Residential Receivers			
LAeq(15min)		LAmax	
40dB LAeq(15min) or RBL + 5dB		52dB LAmax or RBL + 15dB	
Trigger	40	Trigger	52
RBL +5dB	35	RBL +15dB	45
<b>Highest</b>	<b>40</b>	<b>Highest</b>	<b>52</b>
Suburban Residential Receivers			
LAeq(15min)		LAmax	
40dB LAeq(15min) or RBL + 5dB		52dB LAmax or RBL + 15dB	
Trigger	40	Trigger	52
RBL +5dB	37	RBL +15dB	47
<b>Highest</b>	<b>40</b>	<b>Highest</b>	<b>52</b>

Note: Monday to Saturday; Night 10pm to 7am. On Sundays and Public Holidays Night 10pm to 8am.

Note: NPI identifies that maximum of the two values is to be adopted which is shown in bold font.

## 5.2 Construction Noise Criteria

The relevant Noise Management Levels (NMLs) for standard construction hours are presented in Table 20.

Table 20 Construction Noise Management Levels			
Receiver Type	Assessment Period <sup>1</sup>	Adopted RBL dB LA90	NML dB LAeq(15min)
Residential	Standard Hours	35	45 (RBL+10dBA)
Educational	When in use	N/A	45 (internal) 55 (external) <sup>1</sup>
Hospital Wards	When in use	N/A	45 (internal) 55 (external) <sup>1</sup>
Place of Worship	When in use	N/A	45 (internal) 55 (external) <sup>1</sup>
Active Recreation Areas	When in use	N/A	65 (external)
Passive Recreation Areas	When in use	N/A	60 (external)
Industrial Premises	When in use	N/A	75 (external)
Community Centres	When in use	N/A	Refer to AS2107 for maximum internal levels and specific use
Commercial Premises	When in use	N/A	70 (external)

Note 1: See Table 6 for Standard Recommended Hours for Construction.

Note 2: External level based on 10dB with windows open for adequate ventilation (ICNG).

### 5.3 Road Traffic Noise Criteria

**Table 21** presents the road traffic noise assessment criteria reproduced from the RNP relevant to this assessment.

Table 21 Road Traffic Noise Assessment Criteria			
Road category	Type of project/development	Assessment Criteria – dBA	
		Day (7am to 10pm)	Night (10pm to 7am)
Freeways/arterial/ sub-arterial Roads	Existing residences affected by additional traffic on freeways/arterial/sub- arterial roads generated by land use developments	60dB LAeq(15hr)	55dB LAeq(9hr)
	Existing residences affected by additional traffic on local roads generated by land use developments	55dB LAeq(1hr)	50dB LAeq(1hr)
School Classrooms	Proposed road projects and traffic generating developments	40dB LAeq(1hr) (internal) when in use	N/A
Hospital Wards		35dB LAeq(1hr) (internal)	35dB LAeq(1hr) (internal)
Places of Worship		40dB LAeq(1hr) (internal)	40dB LAeq(1hr) (internal)
Open Space (active use)		60dB LAeq(1hr)	N/A
Open Space (passive use)		55dB LAeq(1hr)	N/A
Isolated residences in commercial or industrial zones		Refer to AS2107 for internal levels	
Mixed Use development		Each component to be considered separately	
Childcare Facilities		Sleeping rooms 35dB LAeq(1hr) (internal) Indoor play areas 40dB LAeq(1hr) (internal) Outdoor play areas 55dB LAeq(1hr) (external)	

Additionally, the RNP states where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2dBA, which is generally accepted as the threshold of perceptibility to a change in noise level.

In addition to meeting the assessment criteria, any significant increase in total traffic noise at receivers must be considered. Receivers experiencing increases in total traffic noise levels above those presented in **Table 22** due to the addition of Mine Development road traffic should be considered for mitigation.



**Table 22 Increase Criteria for Residential Land Uses**

Road Category	Type of Project/Development	Total Traffic Noise Level Increase, dBA	
		Day (7am to 10pm)	Night (10pm to 7am)
Freeway/arterial/sub-arterial roads and transitways	New road corridor/redevelopment of existing	Existing traffic	Existing traffic
	road/land use development with the potential	L <sub>Aeq</sub> ,15hr	L <sub>Aeq</sub> ,9hr
	to generate additional traffic on existing road.	+12dB (external)	+12dB (external)

#### 5.4 Blasting Criteria

The Project would be expected to operate within the overpressure and ground vibration limits stipulated in ANZEC guidelines which are reproduced in **Table 23**.

**Table 23 Blasting Emissions Criteria**

Receiver	Airblast Overpressure (dBZ Peak)	Ground Vibration (mm/s)	Allowable Exceedance
Any Residences on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

##### 5.4.1 Cosmetic Damage Criteria

The DIN 4150-3 provides safe limit values (maximum levels measured in any direction at the foundation, or maximum levels measured in (x) or (y) horizontal directions, in the plane of the uppermost floor) are summarised in **Table 24** and presented in **Figure 6**.

**Table 24 Structural Damage Safe Limit Values (DIN 4150-3)**

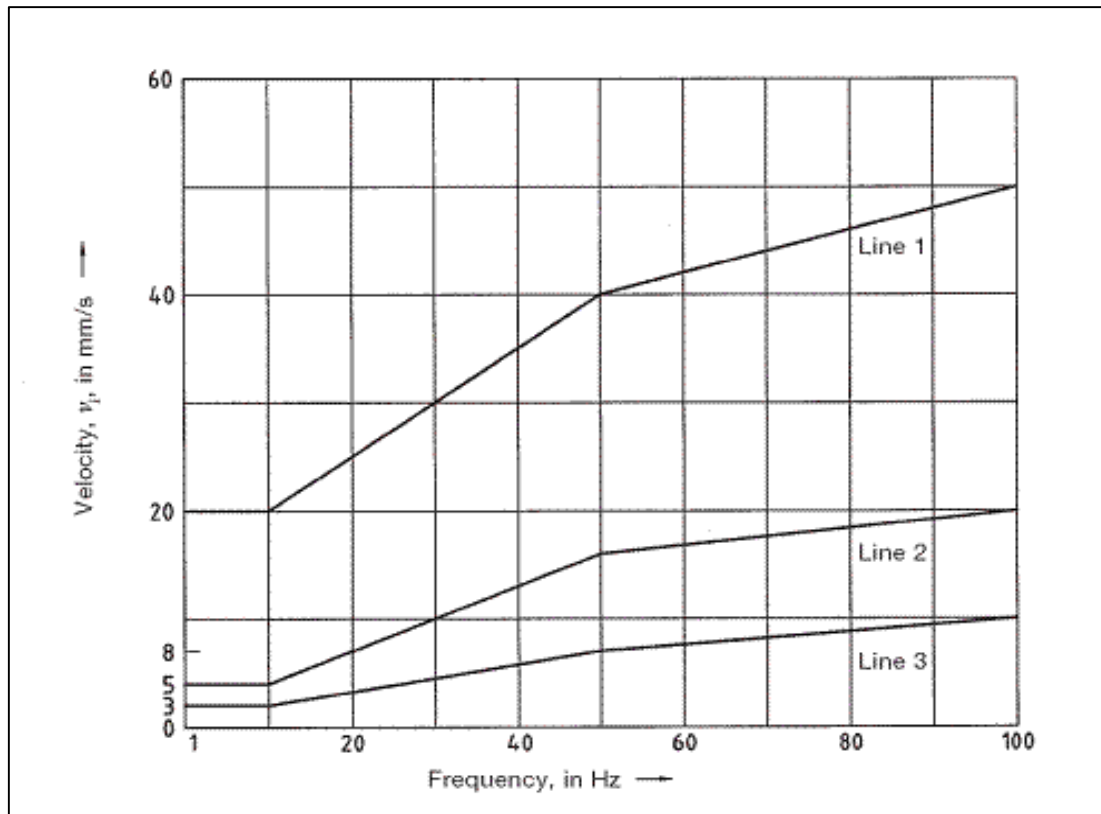
Line	Type of Structure	Vibration Velocity in mm/s			
		Vibration at foundation at a Frequency of:			Plane of Floor of Uppermost Storey at all Frequencies
		Less than 10Hz	10Hz to 50Hz	50Hz to 100Hz <sup>1</sup>	
1	Buildings used for commercial purposes, industrial buildings, and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	
3	Sensitive Buildings: Structures that because of their particular sensitivity to vibration do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8
At frequencies above 100Hz, the values given in this column may be used as a minimum.					

*Guidance Note*

*These levels are safe limits, for which damage due to vibration is unlikely to occur. Damage is defined in DIN 4150 to include minor non-structural effects such as superficial cracking in cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls. Should such damage be observed without vibration levels exceeding the safe limits then it is likely to be attributable to other causes. DIN 4150 also states that when vibration levels higher than the safe limits are present, it does not necessarily follow that damage will occur.*

As indicated by the criteria from DIN 4150 high frequency vibration has less potential to cause damage than that from lower frequencies. DIN 4150 safe limit curves are presented in **Figure 6**.

Figure 6 – DIN-4150-3 Structural Damage Safe Limits for a variety of building types



#### 5.4.2 Other Blasting Criteria

Typically, infrastructure such as pipelines, power transmission lines, railways and roads are less sensitive to vibration than residential buildings due to the nature of their construction and purpose. Vibration criteria for these infrastructure range from 50mm/s to 100mm/s depending on the item and purpose as shown for pipelines in **Table 25**.

**Table 25 Blasting Emissions Criteria**

Description	Guideline Values mm/s	Guideline Source
Public Roads	100	AS2187.2
Concrete Bridges	100	
Power Transmission Lines	50 - 100	Bulga Optimisation Project (SSD-4960 (2014)
Communications Towers	100	AS2187
Pipe - Steel (including welded pipes)	100	DIN 4150-3
Pipe - Clay, concrete, reinforced concrete, pre stressed concrete, metal (with or without flange)	80	DIN 4150-3
Pipe - Masonry, plastic	50	DIN 4150-3

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## 6 Modelling Methodology

A computer model was developed to quantify Project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2021.1) noise modelling software. iNoise is an intuitive and quality assured software for industrial noise calculations in the environment. 3D noise modelling is considered industry best practice for assessing noise emissions from projects.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613:1 and ISO 9613:2 including corrections for meteorological conditions using CONCAWE<sup>1</sup>. The ISO 9613 standards are the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

### 6.1 Assessment Scenarios

#### 6.1.1 SAR Mine Construction

Construction will involve the development of the SAR Haul Road, Services Road and SAR Amenity Bund. (refer EIS Figure 3.3.3) The SAR Haul Road would permit surface haul trucks to transport ore and waste rock from the SAR Open Cut to the TGO Mine Site.

The Services Road would be constructed adjacent to the Haul Road and would permit use by smaller vehicles, including light vehicles and service vehicles

A bunded pipeline corridor would be installed between the Haul Road and Services Road. The pipeline corridor would permit the installation of a range of infrastructure to facilitate transfer of water and potentially residue between the SAR Mine Site and TGO Mine Site.

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<sup>1</sup> Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

The SAR Amenity Bund would be constructed on the western side of the SAR Haul Road and would be approximately 7m high. The SAR Amenity Bund would tie into the SAR Waste Rock Emplacement at the southern end and the rehabilitated McPhail Tailings Storage Facility at the northern end. It would also tie into the proposed embankment for the Kyalite Road overpass.

The Administration Area would include the following.

- A range of hardstand and laydown areas suitable for all weather access by light and heavy vehicles.
- An unsealed carpark for employees and visitors.
- An office and associated crib or break room.
- Load and haul workshop and drillers workshop.
- A fuel store and bunded refueling area.
- A wash bay, including a concrete sealed washdown area.
- A substation and associated SAR Mine Site electrical distribution network.
- Ablutions facilities would be installed as required within the office and workshops.

### 6.1.2 Public Road Construction

Construction of the proposed realigned public roads would be undertaken concurrently with site establishment within the SAR Mine Construction activities. Construction operations would initially be undertaken off-line, with those sections of the realigned public roads largely completed before undertaking works within the existing road reserves.

The following activities would be undertaken during road construction:

- Establish a works compound on each side of the existing Newell Highway within areas of proposed mining-related disturbance.
- Excavations along the proposed road alignment for:
  - The road
  - Culverts and drains
  - Cut and fill and shaping
- Material movements by truck along the road alignment for cut, fill and road base.



- Compaction of the road base and fill material.
- Establish the Kyalite Road overpass.
- Re-route rural property entrances to the public road network.
- Establish the pavement treatment, including sealed and unsealed surfaces.
- Establish line marking, signage and road safety infrastructure as required.
- Fence the proposed road reserves
- Remove traffic controls, works compounds, stockpile areas and erosion and sediment controls.
- Commission the realigned roads and close and decommission the existing alignment.
- Remove relevant sections of the existing road formations as required.

The following construction noise assessment scenarios have been developed:

- Sc1A – Road construction activities for the southern portion of the realigned Newell Highway.
- Sc1B – Road construction activities for the northern portion of the realigned Newell Highway.
- Sc1C - Road construction activities for the northern portion of the realigned Newell Highway including the piling required for the bridge/overpass construction.

### 6.1.3 Mining - Dig, Load and Haul Operations

Following removal of vegetation and soil, mining would commence with the removal of alluvium and saprolite using an excavator or ripped and pushed up using a bulldozer and loaded into haul trucks using an excavator or front-end loader. Extracted material would be transported to the relevant in-pit or out-of-pit WRE, low grade ore stockpile or other locations where waste rock is being used for construction of infrastructure. Where the material becomes too competent to be extracted by free digging or ripping methods, it would be extracted using traditional drill and blast methods.

Ore would be loaded into haul trucks using an excavator and transported the ROM pad at the TGO processing plant. Waste rock, initially, would be used to construct on-site and off-site infrastructure, including the Haul Road, Services Road, SAR Amenity Bund and Administration Area as well as sections of the formation of the proposed public roads. Once that infrastructure has been established, waste rock will be transported to the Caloma and SAR WRE. Material placed into the Caloma and SAR Waste Rock Emplacements would be placed using a combination of in-pit and out-of-pit placement techniques.

#### 6.1.4 In-pit Waste Rock Emplacement Operations

The Project proposes to backfill the Caloma 1, Caloma 2, SAR South and SAR Central open cut pits with waste rock – ie an in-pit WRE. No backfilling of the SAR North pit is proposed. Initially, waste rock would be placed on natural ground adjacent to the open cut pit to be backfilled. A bulldozer would push the waste rock into the void, resulting in a rill surface within the open cut. Once sufficient material has been pushed into the open cut to ensure stability, haul trucks will then dump material onto the backfilled surface. This process will continue until the void is filled.

#### 6.1.5 Out-of-pit Waste Rock Emplacement Operations

For the SAR out-of-pit WRE, waste rock would initially be placed around the perimeter to create a 10m high perimeter Amenity Bund. Once the perimeter bund has been established, waste rock would be placed behind the bund and levelled with a bulldozer. As the elevation of the inner section of the waste rock emplacement increases, the perimeter bund would be extended upwards (nominally in 10m lifts), shaped, topsoiled and revegetated. A minimum 10m high bund is retained on all sides of the upper surface of the waste rock emplacement to minimise the potential for off site noise impacts. The outer lifts would only be conducted during the daytime, allowing for a shielded dumping location during the evening and night time. **Table 26** presents the anticipated mining sequence and backfilling schedule for each void for the life of the Project.

Scenarios FY24, FY25, FY 27 and FY30 have been selected as representative worst case noise emissions scenarios and are presented graphically in **Figure 7** to **Figure 10**.

Table 26 Mining and Waste Sequence												
	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
Mining Sequence												
Caloma 1 Cutback												
TGO underground					Projected							
SAR underground							Projected					
SAR South Pit												
SAR Central Pit												
SAR North Pit												
Waste Sequence												
SAR WRE												
Caloma 1 & 2												
South Pit												
Central Pit												

Source: Tomingley Gold Operations Pty Ltd

## Underground Mining

In the context of modelling airborne noise emissions, the operation of the Pastefill Plant on the surface to support underground mining has been included in all operational assessment scenarios. Pastefill comprises a mixture of finely crushed rock or residue and cement that is pumped underground and used to backfill completed stopes. Supply of the finely crushed rock would come from either RSF1 or RSF2, loaded into trucks and transported via mine roads to the Roswell Pastefill Plant.

The Pastefill Plant would indicatively comprise the following components.

- Cement/binder silo.
- A residue feed hopper with belt feeder.
- A paste mixer, including feed and discharge chutes.
- Paste distribution infrastructure, including pumps, pipeline and boreholes into the underground workings.

Cement/binder would be delivered to the SAR Mine Site in bulk via Kyalite Road.

During paste manufacture, residue material is combined with cement/binder and mixed with water to produce a paste fill mix which is then distribution to the relevant underground stopes via the underground mining infrastructure. The Paste Fill Plant would operate 24-hours per day, 7-days per week on an ad hoc basis as pastefill is required.

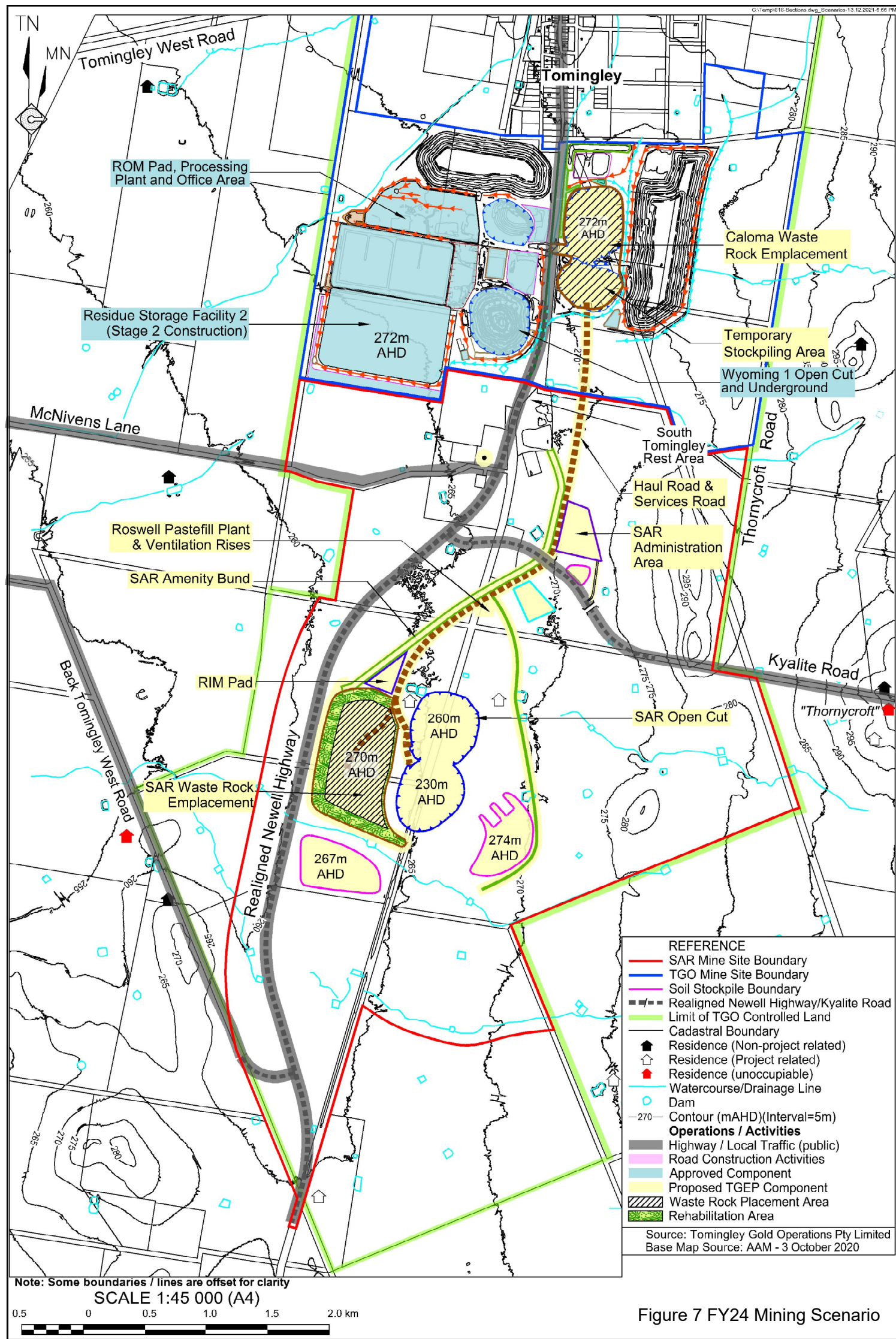
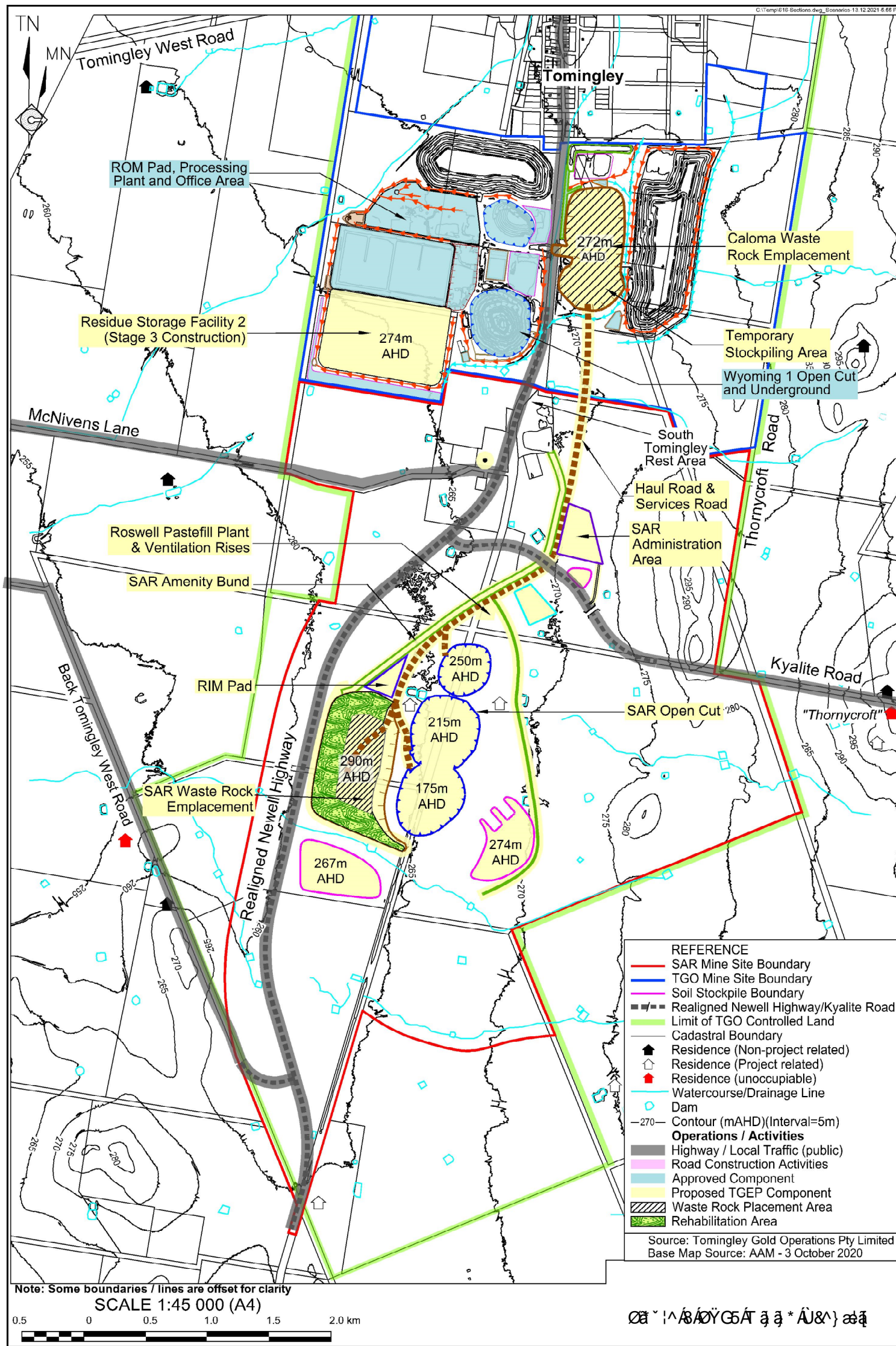
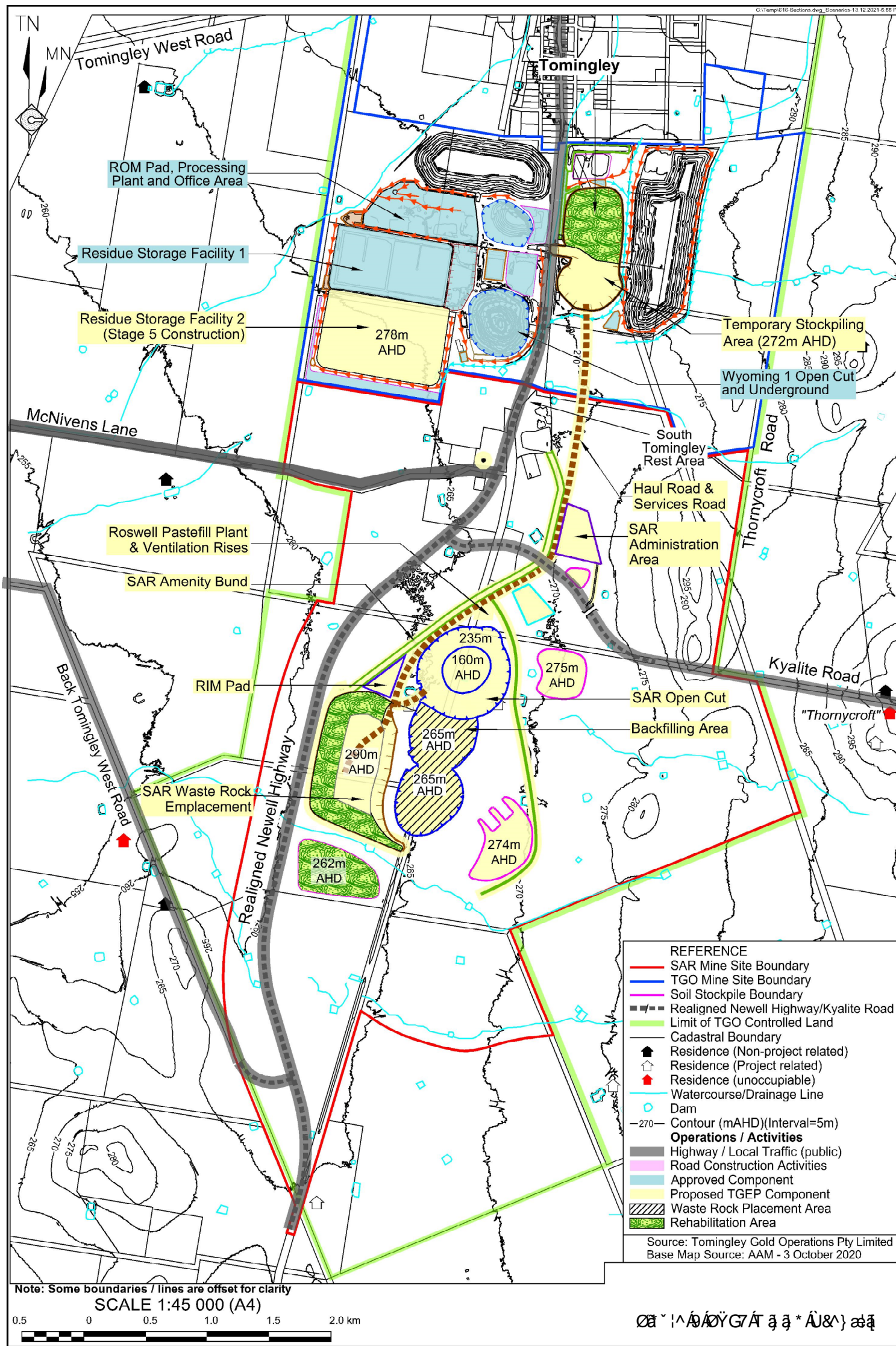


Figure 7 FY24 Mining Scenario

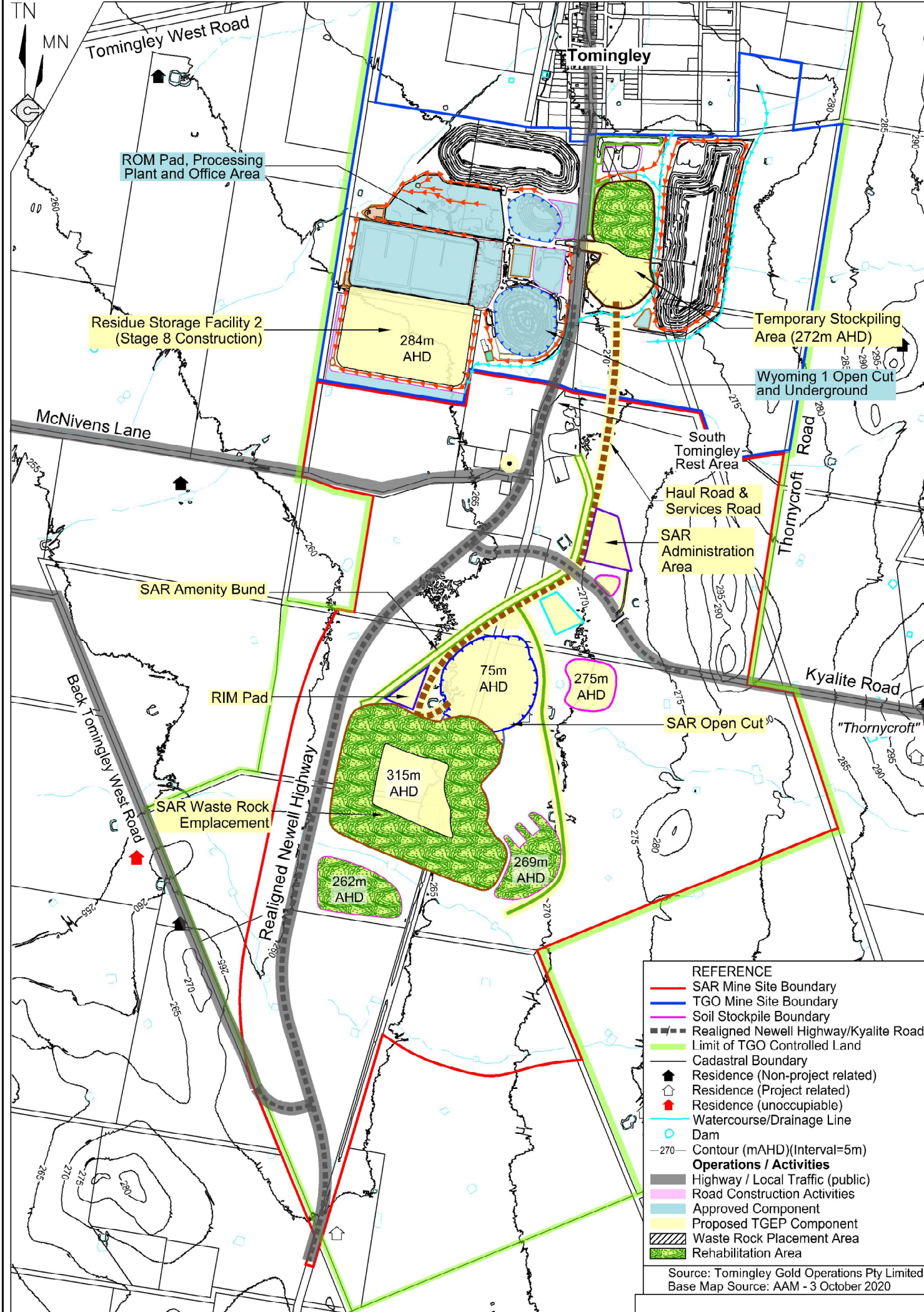












Note: Some boundaries / lines are offset for clarity

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## 6.1.6 Mining Equipment

**Table 27** presents the mobile open cut mining equipment, the anticipated models and indicative numbers that would be used throughout the life of the Project.

Table 27 Open Cut Mining Equipment										
Type Indicative Model/Capacity <sup>1</sup>	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
<b>TGO Open Cut Mining Fleet</b>										
Front End Loader Komatsu WA700	1	1	1	1	1	1	1	1	1	1
Underground Haul Truck <sup>2</sup> CAT AD55	1	1	1	1	1	1	1	1	1	1
<b>SAR Open Cut Mining Fleet</b>										
Excavator Hitachi EX1200	2	2	2	1	1	1	1	1	-	-
Excavator Hitachi EX1900	1	1	1	1	1	1	-	-	-	-
Excavator Hitachi EX2600	1	1	1	-	-	-	-	-	-	-
Haul Truck CAT785/789	7	7	3	-	-	-	-	-	-	-
Haul Truck CAT 777F	18	10	13	11	11	10	7	7	-	-
Artic Haul Truck CAT 740	2	2	2	2	2	2	2	2	-	-
Bulldozer Komatsu D475	1	1	1	1	1	1	1	1	-	-
Bulldozer CAT D10	4	4	4	3	3	3	2	2	-	-
Wheel Dozer CAT 854K	1	1	1	1	1	1	1	1	-	-
Front End Loader CAT 988H	1	1	1	1	1	1	1	1	-	-
Grader CAT 16M	3	3	3	2	2	2	2	2	-	-
Water Cart CAT 773WC	2	2	2	2	2	2	2	2	-	-
Drill Rig 45T	1	5	14	3	4	8	2	2	-	-

Note 1: Equipment models and numbers are indicative only.

Note2: Underground haul truck surface operations would be limited to transporting ore from the Wyoming 1 Portal to the ROM Pad and return and unloading operations within the Wyoming 1 Open Cut.

Source: Tomingley Gold Operations Pty Ltd.

## 6.1.7 Mitigation Measures

**Table 28** presents several examples of Best Management Practice (BMP), Best Available Technology Economically Achievable (BATEA) and reasonable and feasible measures considered in the mitigation process and the justification of the resulting noise management measures adopted into the Project. This format is consistent with the decision making matrix provided in Table 3.1 of the NPI.

<b>Table 28 – Reasonable and Feasible Mitigation Measures Matrix</b>			
<b>Mitigation Option</b>	<b>Feasible mitigation test</b>	<b>Reasonable mitigation test</b>	<b>Justification for adopting or disregarding this option</b>
Implement a 10m high bund on the eastern side of the SAR Haul Road within the backfilled Caloma 2 Open Cut.	To reduce overall off site noise emissions	Attenuation levels achieved by this noise control achieves a moderate reduction for a significant period	<b>Adopted</b> - the overall cost is not onerous compared to attenuation achieved over a longer period of the Project life
Alternative Haul Trucks	To reduce overall off site noise emissions	Attenuation levels achieved by this noise control achieves a moderate reduction	<b>Rejected</b> - the overall cost is onerous to replace over 20 haul trucks
WRE design – working face 10m minimum	To reduce overall off site noise emissions from WRE operations	Attenuation levels achieved by this noise control achieves a moderate reduction for a significant period	<b>Adopted</b> - the overall cost is not onerous compared to attenuation achieved over a longer period of the Project life
Alternative Heavy Bulldozer that has a Lw of 112dBA or lower.	To reduce overall off site noise emissions from WRE operations	Attenuation levels achieved by this noise control achieves a significant reduction over the Project	<b>Adopted</b> - the overall cost is not onerous compared to attenuation achieved over a longer period of the Project life
Noise Monitoring Terminal (NMT)	A NMT will alert operators when noise levels exceed trigger levels	Predictions show that PNTLs may be exceeded at times during normal extraction and processing.	<b>Adopted</b> - the overall cost is not onerous and allows for operations to work within approved PNTLs
Existing Permanent Weather Station	The existing weather station, integrated with the NMT will alert operators when noise enhancing winds are present	Predictions show that PNTLs may be exceeded under noise enhancing conditions.	<b>Adopted</b> - the overall cost is not onerous and provides real time data, allowing for operational flexibility

Therefore, the following mitigation measures are included in the operation and the assessment scenarios:

- Out-of-pit waste rock emplacement procedures at the SAR WRE described in **Section 6.1.5**.
- Operation of a low noise emission bulldozer at the Caloma WRE for Scenario FY24 and FY25.
- Operation of D10/D11 bulldozer limited to daytime and evening periods on the SAR WRE.
- Operation of alternative, lower noise emission bulldozer SAR WRE during the night time – ie a wheeled dozer track dozer with a sound power level less than 112dBA.

## 6.2 Sound Power Levels

**Table 29** presents the sound power level for each noise source modelled in this assessment. It is noted that sound power levels were sourced from manufacturer's specifications or from in-field measurements at similar project sites. Detailed octave data is presented in **Appendix C**.

**Table 29 Acoustically Significant Sources - Sound Power Levels dBA (re 10<sup>-12</sup> Watts)**

Item <sup>1</sup>	Sound Power Level dBA	Quantity <sup>2</sup>	Source Height <sup>3</sup>
<b>Processing Plant</b>			
TGO Primary and Secondary Crusher	115	1	5
Ballmill	112	1	5
Front End Loader (WA 700)	112	1	2
<b>RSF</b>			
40t Articulated Haul Truck	108	2	2
Grader 16M	113	1	2
Water Cart (Road Tanker)	107	1	2
Excavator (80t)	113	1	2
CAT D10 Bulldozer	115	1 - 2	2
Padfoot Roller (18t)	108	1	2
<b>Underground Mining</b>			
UG Mine Truck CAT AD55	114	4	2
Ventilation fans (underground)	109	2	2
Ventilation Fan ( at surface inlet/outlet)	90	2	2
Paste Plant	105	1	2
<b>Open Cut Mining</b>			
CAT D10 Bulldozer	115	2	2
Komatsu D475 Bulldozer	110	1	2
CAT854 Wheel Dozer	112	1	2
Drill	114	1 - 5	2
Grader 16M	113	1	2
Hitachi Ex1200 Excavator	110	1 - 3	2
Hitachi Ex1900 Excavator	113	1	2
Hitachi Ex2600 Excavator	115	1	2
CAT 777 Haul Truck	118	10 - 18	2
CAT 789 Haul Truck	116	6 - 9	2
Water Cart CAT 773WC	114	1	2
<b>Roads</b>			
Grader 16M	113	1	2
Water Cart (Road truck)	104	1	2
Water Cart (CAT 740WC)	114	1	2

Note 1: Equipment types are indicative.

Note 2: Quantities vary from year to year throughout Project

Note 2: Height in metres above the relative ground or building below source.

## 6.3 Meteorological Analysis

Noise emissions can be influenced by prevailing weather conditions. Light stable winds (<3m/s) and temperature inversions have the potential to increase noise at a receiver.

Fact Sheet D of the NPI provides two options when considering meteorological effects:

- adopt the noise enhancing conditions for all assessment periods without an assessment of how often the conditions occur – a conservative approach that considers a source to receiver winds for all receivers and F class temperature inversions with wind speeds up to 2m/s at night; or
- determine the significance of noise enhancing conditions. This requires assessing the significance of temperature inversions (F and G Class stability categories) for the night time period and the significance of light winds up to 3m/s for all assessment periods during stability categories other than E, F or G.

Standard meteorological conditions and noise-enhancing meteorological conditions as defined in Table D1 of the NPI are reproduced in **Table 30**.

Table 30 Standard and Noise-Enhancing Meteorological Conditions	
Meteorological Conditions	Meteorological Parameters
Standard Meteorological Conditions	Day/evening/night: stability categories A–D with wind speed up to 0.5m/s at 10m AGL.
Noise Enhancing Meteorological Conditions	Daytime/evening: stability categories A–D with light winds (up to 3 m/s at 10m AGL). Night-time: stability categories A–D with light winds (up to 3m/s at 10m AGL) and/or stability category F with winds up to 2m/s at 10 m AGL.

A detailed analysis of the significance of noise enhancing conditions has not been undertaken and hence, the NPI noise enhancing meteorological conditions have been applied to the noise modelling assessment are presented in **Table 31**.

Table 31 Modelled Meteorological Parameters				
Assessment Condition <sup>1</sup>	Temperature	Wind Speed <sup>2</sup> / Direction	Relative Humidity	Stability Class <sup>2</sup>
Day	20°C	3m/s all directions	50%	D
Evening	10°C	3m/s all directions	50%	D
Night	10°C	2m/s all directions	50%	F

Note 1: Day 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening 6pm to 10pm; Night - the remaining periods.

Note 2: Implemented using CONCAWE meteorological corrections.



## 6.4 NPI Very Noise Enhancing Conditions

Fact Sheet D of the NPI also states:

*'Noise limits derived for consents and licences will apply under the meteorological conditions used in the environmental assessment process, that is, standard or noise-enhancing meteorological conditions. For 'very noise-enhancing meteorological conditions' (see glossary<sup>2</sup>) a limit is set based on the limit derived under standard or noise-enhancing conditions (whichever is adopted in the assessment) plus 5dB. In this way a development is subject to noise limits under all meteorological conditions.'*

Essentially, this means a limiting criterion of PNTL +5dB is applicable for meteorological conditions outside that adopted in the assessment. In the context of TGO, this means that the operation would need to comply with PNTL +5dB for any prevailing wind or temperature inversion conditions.

## 6.5 Blasting Assessment Methodology

An estimation of air-blast overpressure and ground-borne vibration levels has been conducted in accordance with methods in AS2187.2. The estimation adopted a MIC of 400kg with blasting locations assumed to be at the extremities of the extraction areas, which is a worst case scenario.

### 6.5.1 Air-Blast Overpressure

Calculations of overpressure have been completed using the following AS2187.2 equation:

Where:

$$P = K_a \left( \frac{R}{(Q^{1/3})} \right)^a$$

P = Pressure, in kilopascals;

Q = Effective explosives charge mass, in kilograms (MIC);

R = Distance from charge, in metres;

K<sub>a</sub> = Site constant, a value of 20 was adopted; and

a = Site exponent, a value of -1.45 was adopted.

The conversion of 'P' to unweighted decibels (dBZ) is completed using the following formula:

$$SPL = 10 \times \log \left( \frac{P}{P_0} \right)^2$$

---

<sup>2</sup> Meteorological conditions outside of the range of either standard or noise-enhancing meteorological conditions as adopted in the noise impact assessment following the procedures in Fact Sheet D.

### 6.5.2 Ground-Borne Vibration

Preliminary estimations for vibration have been completed using the following AS2187.2 equation:

$$V = K_g \left( \frac{R}{(Q^{1/2})} \right)^{-B}$$

Where:

V = ground vibration as vector peak particle velocity, in mm/s;

R = distance between charge and point of measurement, in m;

Q = maximum instantaneous charge (effective charge mass per delay, MIC), in kg;

K<sub>g</sub> = a constant related to site and rock properties, a value of 1140 was adopted; and

B = a constant related to site and rock properties for estimation purposes, a value of 1.6 was adopted.

## 7 Operational Noise Assessment

### 7.1 Predicted Operational Noise Levels

Noise predictions from all sources have been quantified at all surrounding Non Project related residential and commercial receivers are presented **Table 32** and **Table 33**. Predicted noise level for all receivers including those that are Project related or have a MOU with TGO are presented in **Appendix E**. Noise contours are presented in **Appendix D** and detailed tabulated results for all scenarios.

Predicted noise levels from FY24 operations are expected to satisfy the PNTLs at all Non Project related receivers for all assessment periods except at R06, R26, R40 and R43 where noise levels are expected to be up to 2dB over the PNTLs.

Predicted noise levels from FY25 operations are expected to satisfy the PNTLs at all Non Project related receivers for all assessment periods except at R26, R40 and R43 where noise levels are expected to be up to 2dB over the PNTLs.

Predicted noise levels from the FY27 and FY30 operations are expected to satisfy the PNTLs at all Non Project related receivers for all assessment periods.

In accordance with NPI assessment methodology, the expected exceedances of the PNTLs of up to 2dB are considered negligible<sup>3</sup> residual impacts and would not be discernible by most receivers. Notwithstanding, noise mitigation measures have been considered for the Project and are presented in **Section 11**.

Decommissioning and final rehabilitation activities are expected to require a significantly reduced mobile equipment fleet, to that used for mining operations and would only work during the daytime period. Whilst noise levels have not been calculated for this stage of the Project, noise levels are expected to be below the daytime criteria of 40dB LAeq(15min) at all receivers.

**Table 32 Operational Noise Levels FY24 and FY25**

Receiver	PNTL			FY24			FY25			FY24			FY25		
	dB LAeq(15min)			Predicted Noise Level			Predicted Noise Level			Predicted Level - PNTL			Predicted Level - PNTL		
				dB LAeq(15min)			dB LAeq(15min)								
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
R02-MOU	40	35	35	33	29	29	33	29	29	-7	-6	-6	-7	-6	-6
R03-MOU	40	37	37	38	39	38	38	38	38	-2	2	1	-2	1	1
R04-MOU	40	35	35	32	33	33	32	33	33	-8	-2	-2	-8	-2	-2
R06	40	35	35	36	36	35	35	35	35	-4	1	0	-5	0	0
R08	40	35	35	26	23	23	26	23	23	-14	-12	-12	-14	-12	-12
R09	40	35	35	27	24	24	27	25	24	-13	-11	-11	-13	-11	-11
R10	40	35	35	30	29	29	30	29	28	-10	-6	-7	-10	-6	-7
R11	40	35	35	29	28	28	29	28	28	-11	-7	-7	-11	-7	-8
R12	40	35	35	26	23	23	26	23	23	-15	-12	-12	-14	-12	-12
R13-MOU	40	35	35	33	32	32	33	32	32	-8	-3	-3	-8	-3	-4
R16	40	37	37	35	35	34	34	34	34	-6	-2	-3	-6	-3	-3
R17-MOU	40	37	37	35	35	34	35	35	34	-5	-2	-3	-6	-3	-3
R18-COMM	63	63	63	35	35	34	34	34	34	-28	-28	-29	-29	-29	-29
R19	40	35	35	35	35	34	35	35	34	-5	0	-1	-5	0	-1
R21-COMM	63	63	63	35	36	35	35	35	35	-28	-27	-28	-28	-28	-28
R22-MOU	40	37	37	36	37	36	36	36	36	-4	-1	-1	-4	-1	-1
R23-MOU	40	37	37	36	37	36	36	36	36	-4	0	-1	-4	-1	-1
R24-MOU	40	37	37	36	37	36	36	36	36	-4	0	-1	-4	-1	-1

**Table 32 Operational Noise Levels FY24 and FY25**

Receiver	PNTL			FY24			FY25			FY24			FY25		
	dB LAeq(15min)			Predicted Noise Level			Predicted Noise Level			Predicted Level - PNTL			Predicted Level - PNTL		
				dB LAeq(15min)			dB LAeq(15min)								
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
R25-MOU	40	37	37	36	37	36	36	36	36	-4	-1	-1	-4	-1	-2
R26	40	35	35	36	37	36	36	36	36	-4	2	1	-4	1	1
R27-COMM	63	63	63	37	38	37	36	37	36	-26	-26	-26	-27	-26	-27
R28-MOU	40	37	37	38	38	38	37	38	37	-3	1	1	-3	1	0
R29-MOU	40	37	37	38	39	38	38	38	38	-2	2	1	-2	1	1
R32-MOU	40	37	37	37	38	37	37	37	36	-3	1	0	-4	0	-1
R33	63	63	63	37	38	37	36	37	36	-26	-26	-26	-27	-26	-27
R35-MOU	40	37	37	35	35	35	35	35	34	-5	-2	-3	-5	-2	-3
R37-MOU	40	37	37	35	35	34	34	34	34	-6	-2	-3	-6	-3	-3
R40	40	35	35	36	36	35	35	36	35	-5	1	0	-5	1	0
R41-MOU	40	35	35	37	38	37	37	37	36	-3	2	2	-4	2	1
R42	40	35	35	34	34	34	34	34	34	-6	-1	-1	-6	-1	-2
R43	40	35	35	35	37	36	34	36	34	-5	2	1	-6	1	-1
R45-UNOCC	40	35	35	34	36	35	34	35	33	-6	1	0	-7	0	-2
R60	40	35	35	32	32	32	32	32	32	-8	-3	-4	-8	-3	-3
R61-UNOCC	40	35	35	32	32	31	32	32	32	-9	-4	-4	-8	-3	-3
R63	40	35	35	24	23	23	24	22	22	-16	-12	-13	-17	-13	-13
R64	40	35	35	26	25	25	26	25	25	-14	-10	-10	-14	-10	-11

**Table 32 Operational Noise Levels FY24 and FY25**

Receiver	PNTL			FY24			FY25			FY24			FY25		
	dB LAeq(15min)			Predicted Noise Level			Predicted Noise Level			Predicted Level - PNTL			Predicted Level - PNTL		
				dB LAeq(15min)			dB LAeq(15min)								
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
R65	40	35	35	21	19	19	21	19	19	-19	-16	-16	-19	-16	-16
R66	40	35	35	23	20	19	23	20	20	-17	-15	-16	-17	-15	-15
R67	40	35	35	22	19	19	23	19	19	-18	-16	-16	-17	-16	-16
R68	40	35	35	20	18	18	20	18	18	-20	-17	-17	-20	-17	-17
R69	40	35	35	22	19	19	22	19	19	-18	-16	-16	-18	-16	-16
R70	40	35	35	23	21	21	23	20	20	-17	-14	-14	-18	-15	-15
R71	40	35	35	26	26	26	25	26	25	-15	-9	-9	-15	-9	-10
R72	40	35	35	28	27	27	27	27	26	-13	-8	-8	-13	-8	-9
R73	40	35	35	35	35	35	35	35	34	-5	0	0	-5	0	-1
R74-MOU	40	35	35	34	35	34	34	34	33	-6	0	-1	-6	-1	-2
R75	40	35	35	20	19	19	21	19	19	-20	-16	-16	-19	-16	-16
R76	40	35	35	18	15	15	18	16	16	-22	-20	-20	-22	-19	-19
R78	40	35	35	23	20	20	23	20	20	-17	-15	-15	-17	-15	-15
R79-MOU	40	35	35	36	36	35	35	36	35	-5	1	0	-5	1	0
R80-MOU	40	35	35	36	36	35	35	35	35	-5	1	0	-5	0	0
R81	40	35	35	34	34	34	34	34	33	-6	-1	-1	-6	-1	-2

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.



**Table 33 Operational Noise Levels FY27 and FY30**

Receiver	PNTL			FY27			FY30			FY27			FY30		
	dB LAeq(15min)			Predicted Noise Level			Predicted Noise Level			Predicted Level - PNTL			Predicted Level - PNTL		
				dB LAeq(15min)			dB LAeq(15min)								
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
R02-MOU	40	35	35	33	28	28	33	28	28	-7	-7	-7	-2	-5	-1
R03-MOU	40	37	37	37	37	37	37	37	37	-3	0	0	0	-2	-3
R04-MOU	40	35	35	30	30	30	30	29	29	-10	-5	-5	-5	-3	-4
R06	40	35	35	34	33	33	33	32	31	-6	-2	-2	-2	-4	-4
R08	40	35	35	26	22	22	25	22	22	-14	-13	-13	-10	-4	-1
R09	40	35	35	27	24	24	26	23	23	-13	-12	-12	-9	-4	-2
R10	40	35	35	29	27	27	29	27	27	-11	-8	-8	-6	-3	-2
R11	40	35	35	29	26	26	28	26	26	-11	-9	-9	-7	-4	-2
R12	40	35	35	25	22	22	25	21	21	-15	-13	-13	-10	-4	-2
R13-MOU	40	35	35	32	31	31	32	30	30	-8	-4	-4	-3	-2	-2
R16	40	37	37	34	33	33	33	33	33	-6	-4	-4	-4	-2	-2
R17-MOU	40	37	37	34	33	33	34	33	33	-6	-4	-4	-3	-2	-2
R18-COMM	63	63	63	34	33	33	34	33	33	-29	-30	-30	-30	-2	-2
R19	40	35	35	34	33	33	34	33	33	-6	-2	-2	-1	-2	-2
R21-COMM	63	63	63	34	34	34	34	34	34	-29	-29	-29	-29	-2	-2
R22-MOU	40	37	37	35	35	35	35	35	35	-5	-2	-2	-2	-2	-2
R23-MOU	40	37	37	35	35	35	35	35	35	-5	-2	-2	-2	-1	-2
R24-MOU	40	37	37	35	35	35	35	35	35	-5	-2	-2	-2	-1	-2

**Table 33 Operational Noise Levels FY27 and FY30**

Receiver	PNTL			FY27			FY30			FY27			FY30		
	dB LAeq(15min)			Predicted Noise Level			Predicted Noise Level			Predicted Level - PNTL			Predicted Level - PNTL		
				dB LAeq(15min)			dB LAeq(15min)								
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
R25-MOU	40	37	37	35	35	35	35	34	34	-5	-2	-2	-2	-2	-2
R26	40	35	35	35	35	35	35	35	35	-5	0	0	0	-2	-2
R27-COMM	63	63	63	36	36	36	36	35	35	-27	-27	-27	-28	-1	-2
R28-MOU	40	37	37	36	36	36	36	36	36	-4	-1	-1	-1	-2	-2
R29-MOU	40	37	37	37	37	37	37	36	36	-3	0	0	-1	-2	-3
R32-MOU	40	37	37	36	35	35	35	35	35	-5	-2	-2	-2	-2	-3
R33	63	63	63	36	36	36	36	35	35	-27	-27	-27	-28	-1	-2
R35-MOU	40	37	37	34	33	33	34	33	33	-6	-4	-4	-3	-2	-2
R37-MOU	40	37	37	34	33	33	33	33	33	-7	-4	-4	-4	-2	-2
R40	40	35	35	35	34	34	34	34	34	-5	-1	-1	-1	-2	-2
R41-MOU	40	35	35	36	36	36	36	35	35	-4	1	1	1	-1	-2
R42	40	35	35	33	33	33	33	32	32	-7	-2	-2	-2	-2	-2
R43	40	35	35	30	30	29	29	30	27	-10	-5	-6	-6	-5	-11
R45-UNOCC	40	35	35	30	30	29	29	30	27	-10	-5	-6	-6	-4	-9
R60	40	35	35	31	30	30	29	27	27	-9	-5	-5	-6	-5	-5
R61-UNOCC	40	35	35	31	30	30	29	27	26	-10	-5	-5	-6	-5	-5
R63	40	35	35	22	20	20	22	18	18	-18	-15	-15	-13	-6	-5
R64	40	35	35	25	22	22	24	18	18	-15	-13	-13	-12	-8	-8

**Table 33 Operational Noise Levels FY27 and FY30**

Receiver	PNTL			FY27			FY30			FY27			FY30		
	dB LAeq(15min)			Predicted Noise Level			Predicted Noise Level			Predicted Level - PNTL			Predicted Level - PNTL		
				dB LAeq(15min)			dB LAeq(15min)								
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
R65	40	35	35	20	17	17	19	14	14	-20	-18	-18	-16	-7	-5
R66	40	35	35	23	18	18	22	16	16	-17	-17	-17	-13	-7	-4
R67	40	35	35	22	18	17	22	16	15	-18	-17	-18	-13	-7	-4
R68	40	35	35	19	16	16	18	14	14	-21	-19	-19	-17	-6	-5
R69	40	35	35	21	17	17	21	15	14	-19	-18	-18	-14	-7	-5
R70	40	35	35	22	18	18	21	17	17	-18	-17	-17	-14	-6	-4
R71	40	35	35	23	22	22	21	19	18	-17	-13	-13	-14	-6	-8
R72	40	35	35	26	24	24	26	24	23	-14	-11	-11	-9	-4	-4
R73	40	35	35	34	34	34	34	33	33	-6	-1	-1	-1	-2	-2
R74-MOU	40	35	35	32	32	32	32	31	31	-8	-4	-4	-3	-3	-4
R75	40	35	35	19	16	16	18	15	14	-21	-19	-19	-17	-6	-5
R76	40	35	35	17	13	13	16	12	11	-23	-22	-22	-19	-6	-4
R78	40	35	35	23	19	19	22	17	17	-17	-16	-17	-13	-6	-3
R79-MOU	40	35	35	35	34	34	34	34	34	-5	-1	-1	-1	-2	-2
R80-MOU	40	35	35	35	34	34	35	34	34	-5	-1	-1	-1	-2	-2
R81	40	35	35	33	33	33	33	32	32	-7	-2	-3	-2	-2	-2

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

### 7.1.1 Maximum Noise Level Assessment

In assessing maximum noise events, typical  $L_{Amax}$  noise levels from transient events were assessed at the nearest residential receivers from maximum noise level events at the SAR Open Cut pits, SAR WRE, SAR Haul Road, Paste Fill Plant, Caloma 1 WRE, TGO Processing Plant and the RSF.

Predicted noise levels from  $L_{Amax}$  events with a sound power level of 120dBA (re  $10^{-12}$  Watts) for assessed receivers will satisfy the maximum noise trigger levels of 52dB  $L_{Amax}$  at all receivers. Detailed  $L_{Amax}$  levels are presented in **Appendix E**.

### 7.1.2 Low Frequency Noise Assessment

For receivers that are greater than 3km from the Project, the C Weighted noise level minus the A weighted noise level (C-A value) exceed the 15dB threshold. For these receivers, the Low Frequency noise (LFN) penalty has not been applied as noise levels are below 30dBA and 60dBC, as the C-A parameter is overstated due to the propagation of the lower frequencies over distances greater than 3km as the absolute C weighted noise levels are below the 60dB  $L_{Ceq}(5min)$  to a maximum of 65dB  $L_{Ceq}(5min)$  as suggested by Broner, and would be considered as a negligible<sup>4</sup> impact and is likely to be imperceptible, as the absolute C weighted noise level is below 65dB  $L_{Ceq}(15min)$ .

Results show that calculated C weighted noise levels are below 60dB  $L_{Ceq}(15min)$  at all receivers for all assessed scenarios and the difference between C weighted and A weighted noise levels are generally less than 15dB for receivers within 3 km.

Detailed A weighted and C weighted noise levels for all receivers are presented in **Appendix E**.

#### *Technical Note*

*The guidance provided in Fact Sheet C is primarily aimed at measured levels from industrial noise sources. Also, the criteria is less effective as distance increases (ie greater than 3km<sup>5</sup>) due to atmospheric absorption of higher frequencies. The octave thresholds are derived from the DEFRA (UK) procedure for the assessment of low frequency noise complaints within an occupied room with an adjustment for application to external level. Where levels exceed the thresholds, this indicates the potential for low frequency noise to be subjectively classed as a nuisance.*

*Additionally, Broner<sup>6</sup> provides absolute level criteria for low frequency noise and recommends a criterion of 60dB  $L_{Ceq}(5min)$  to a maximum of 65dB  $L_{Ceq}(5min)$  for sensitive receivers.*

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<sup>4</sup> Section 4 NPI Determining the significance of residual impacts.

<sup>5</sup> Low Frequency Noise and Environmental Assessment – Najah Ishac (Acoustics 2015).

<sup>6</sup> Broner, N. "A simple outdoor criterion for assessment of low frequency noise emission", Acoustics Australia, 39(1), 7-14, (2011).

## 7.2 NPI Very Noise Enhancing Conditions

During the occurrence of very noise enhancing conditions (refer **Section 6.4**), the use of the permanent and Noise Monitoring Terminals (NMT) will be utilised to quantify overall ambient noise levels from mining operations to provide real time noise monitoring data. The NMT will be programmed to alarm when at pre-determined Trigger Action Response Levels (TARL) are reached to provide warning of potential exceedances or continued exceedances. In addition, TARL would also be set to notify when noise levels return to relevant compliance thresholds (PNTL, TARL).

If a trigger is detected, an alert would be sent automatically to the Environmental Coordinator and Operations Manager or their delegate who will implement the corrective actions to reduce noise emissions.

Depending on the conditions present – ie wind direction, inversion strength and location of trigger the following operation restrictions or corrective actions may be implemented:

- Discontinue bulldozer and/or haul truck operations on WRE;
- Reduce the number of haul trucks in circulation on haul roads to WRE, ROM.
- Reduce the amount of equipment operating in the open cut pits, processing area or RSF.

Operations will continually monitor noise levels to ensure the mine noise contribution remain below the PNTL as well as weather conditions to forecast additional operational changes depending on the likelihood of changes in wind direction or magnitude and temperature inversion strength.

Data from NMT would also allow trends to be identified in ambient noise levels surrounding the mine and their correlation with noise enhancing meteorological conditions, allowing refinement of the trigger levels and effectiveness of operational noise reduction strategies.

## 7.3 VLAMP Assessment

A review of noise contours (**Appendix D**) demonstrates that predicted Project noise levels do not exceed the VLAMP criteria (45dB LAeq(15min) daytime or 40dB LAeq(15min) night time) at any receiver location. Additionally, predicted Project noise levels do not exceed the VLAMP criteria (55dB LAeq(period) daytime and 45dB LAeq(period) night time) on any privately owned vacant lands. Hence, mitigation and/or acquisition rights are not applicable.

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## 8 Construction Noise Assessment

### 8.1.1 SAR Mine

Predicted noise levels from the construction activities associated with SAR mining are expected to satisfy the NMLs for standard construction hours and out of hours periods at all identified receivers. Detailed tabulated results for all scenarios are presented in **Appendix E**.

### 8.1.2 Highway Realignment

Predicted noise levels from the construction activities associated with road construction for the realignment of the Newell Highway are expected to satisfy the NMLs for standard construction hours at all identified receivers. Detailed tabulated results for all scenarios are presented in **Appendix E**.

## 8.2 Construction Vibration Assessment

Department of Environment and Conservation (DEC) 2006, *Assessing Vibration: A Technical Guideline* (the 'Guideline') provides guidance on determining effects of vibration on buildings occupants. The guideline does not address vibration induced damage to structures, blast induced vibration effects or structure borne noise effects.

A qualitative assessment of potential vibration impacts has been completed. Due to the nature of the works proposed and distances to potential vibration sensitive receivers, vibration impacts from the Project would be negligible.

The Construction Noise & Vibration Strategy (V4.1 Transport for NSW, 2019) sets out safe working distances to achieve the human response criteria for vibration. The key vibration generating source proposed to be used is a vibratory roller used for road construction. For a large vibratory roller, the Construction Noise Strategy sets a safe working distance of 100m to achieve the residential human response criteria for continuous vibration. Therefore, as the nearest receivers to the Project are greater than 100m, human exposure to vibration is anticipated to be minimal. Furthermore, where the human response criteria are satisfied, the structural or cosmetic criteria for sensitive receivers will be achieved. Therefore, vibration impacts are not considered to be a significant issue and have not been considered further in this assessment.



**Table 34** provides the minimum working distances from the CNVS for the use of various vibration intensive sources to nearby receivers to meet cosmetic damage and human response criteria. The minimum offset distance to the nearest residential receivers is between 850m (R43). As the offset distance is greater than the minimum offset distance for even the largest item of plant, and hence vibration impacts are not expected at any dwelling.

**Table 34 Minimum Working Distances or Vibratory Plant (m)**

Plant item	Rating / Description	Minimum working distance	
		Cosmetic damage (BS 7385)	Human response (OH&E Vibration guideline)
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	4 m
Jackhammer	Hand held	1 m (nominal)	2 m

Note: Source, CNVG (Roads and Maritime, 2016)

## 9 Operational Road Traffic Noise Assessment

### 9.1 Noise Modelling Parameters

The operational road traffic assessment has been completed utilising the Calculation of Road Traffic Noise (CoRTN) developed by the United Kingdom Department of Environment. The modelling methodology is widely accepted in Australia and the preferred method for assessing operational road traffic emissions by the NSW Environmental Protection Agency (EPA) and Transport for NSW.

Brüel and Kjær Predictor Type 7810 (Version 11.10) noise modelling software was used to assess operational traffic noise impacts from the proposal. The model incorporated three-dimensional ground contours and relevant features adjacent to the Newell Highway. **Table 35** presents the parameters utilised in the modelling process.

**Table 35 Road Traffic Noise Assessment Parameters**

Parameter	Adopted Value	
	Existing Conditions	Proposal Conditions
Road Surface	Standard dense grade asphalt	
Source Height	0.5m cars	
	0.5m truck tyres	
	3.6m truck exhaust	
Speed Limit	110km/h	100km/h
Receiver Height	1.5m above ground level	
Receiver Location	1m from building facade	
Receiver Façade Reflection	+2.5dB as per CoRTN	
Receiver Façade Correction	-1.7dB as per ARRB	

### 9.2 Model Validation

The noise model was validated using the results of the unattended noise monitor at 5686 Newell Highway (L4) adjacent to the existing highway. **Table 36** summaries the results of the validation modelling, outlining the modelled traffic noise levels for existing conditions compared to the measured traffic noise levels at location L4 (free field), with the relevant receiver facade reflection and correction applied as per **Table 35**.

**Table 36 Road Traffic Noise Model Validation**

Location	dB LAeq(15hr) Daytime Noise Level			dB LAeq(9hr) Night-time Noise Level		
	Measured	Predicted	Variance	Measured	Predicted	Variance
	Level	Level		Level	Level	
5686 Newell Highway (L4)	58.7	59.7	+1.0	55.0	53.9	-1.1

### 9.3 Comparison of Existing and Future Road Traffic Noise Levels

In accordance with the Procedure for Preparing an Operational Traffic and Construction Noise and Vibration Assessment Report (Roads and Maritime, 2016), an assessment of road traffic noise has been carried out for the existing and future road alignment. It is reiterated that the proposal is not expected to increase traffic volumes or change the traffic mix.

Noise levels for existing and future traffic on the proposed alignment were quantified by direct calculation from the proposed highway alignment to each of the nearby sensitive receiver locations.

A comparison of the existing and future (ie post proposal) road traffic noise levels indicate that received noise levels are anticipated to generally remain unchanged at most receivers. The maximum predicted increase in road traffic noise levels is 0.5dBA. For receivers that are in proximity to the existing alignment, road traffic noise levels are anticipated to reduce by up to 6dBA for the proposed alignment being considerably further away. The noise level changes are therefore within the 2dBA increase criteria and ameliorative measures are not required.

## 10 Blasting Assessment

Airblast overpressure and ground vibration levels are predicted to meet the criteria at the closest ten receivers for blasts up to 400kg MIC from the three SAR Open Cut pits and are presented in **Table 37**.

Table 37 Blasting Emissions			
Receiver ID	Distance to Charge, m	Airblast Overpressure dBZ Peak	Ground Vibration mm/s
<b>North Pit</b>			
R04	3952	107	0.3
R43	3275	109	0.4
R44	3761	107	0.3
R45	3259	109	0.4
R47	4713	105	0.2
R06	2818	111	0.5
R60	3352	109	0.4
R63	4099	106	0.3
R64	5581	103	0.2
R70	6322	101	0.1
Newell Highway	750	N/A	4.1
Kyalite Road	900	N/A	3.1
<b>Central Pit</b>			
R04	4624	105	0.2
R43	2632	112	0.6
R44	3175	110	0.4
R45	2720	112	0.5
R47	3938	107	0.3
R06	3031	110	0.4
R60	3604	108	0.3
R63	3894	107	0.3
R64	5110	104	0.2
R70	6654	100	0.1
<b>South Pit</b>			
R04	5355	103	0.2
R43	2077	115	0.8
R44	2638	112	0.6
R45	2330	114	0.7
R47	3115	110	0.4
R06	3462	109	0.4
R60	3997	107	0.3

**Table 37 Blasting Emissions**

Receiver ID	Distance to Charge, m	Airblast Overpressure dBZ Peak	Ground Vibration mm/s
R63	3812	107	0.3
R64	4674	105	0.2
R70	7058	100	0.1

### 10.1 Effects of Vibration on Infrastructure from Blasting

The nearest infrastructure to blasting is the Newell Highway and newly constructed Kyalite Road overpass bridge, where vibration levels are calculated to be below 5mm/s. Hence there are no significant vibration effects from blasting on infrastructure which are typically less sensitive to vibration than residential receivers.

### 10.2 Effects of Blasting on Animals and Livestock

Blast effects resulting from the Mine Development are predicted to be, at worst for overpressure up to 115dBZ, and for vibration between 0.1mm/s and 1.3mm/s. These levels are well below the regulatory criteria and considerably lower than other sources of overpressure that horses or livestock are likely to be already subjected to such as lightning strikes which are typically between 120dBZ and 130dBZ<sup>7</sup>.

<sup>7</sup> Equine Health Impact Statement – Drayton South Coal Project (2015)

## 11 Mitigation

### 11.1 Mine Design Optimisation

During the detail design phase of the Project, further design options may be evaluated to minimise noise emissions, optimise equipment utilisation and noise mitigation measures to comply with the PTNLs.

Further potential design options that may be considered are:

- alternative equipment selection;
- additional haul road barriers and pit ramp locations;
- locations of night and daytime dumps and;
- scheduling of noise intensive works at times when there is less likelihood of noise enhancing conditions.

### 11.2 Noise Monitoring and Management

The noise measurement procedures employed throughout the monitoring program shall be guided by the requirements of AS 1055:2018 “Acoustics - Description and Measurement of Environmental Noise” and the EPA’s Noise Policy for Industry (NPI), 2017. Noise monitoring shall be undertaken by a suitably qualified acoustic specialist or suitably qualified and trained environment officer.

A noise monitoring program will be developed by TGO as part of the overall site Noise Management Plan (NMP) to guide, manage, quantify and control noise emissions from the Project. It is envisaged that the NMP would require a combination of (unattended) real time Noise Monitoring Terminals, meteorological data and operator attended monitoring.

The objectives of the noise monitoring program are as follows:

- measure noise levels from the Project operations providing real time data to a central location (such as the control centre) and warnings to operators when noise levels are approaching PNTLs and/or exceeding them;
- the noise monitoring system will need to assess Project noise levels and non-site related ambient and background noise;
- identify potential noise sources and their relative contribution to noise impacts;
- specify appropriate intervals for noise monitoring to evaluate, assess and report the noise contribution due to construction;

- outline the methodologies to be adopted for monitoring construction and operations noise, including justification for monitoring intervals or triggers, weather conditions, monitoring location selection and timing; and
- incorporate noise management and mitigation strategies to be outlined in the NMP.

### 11.3 Noise Monitoring Terminals

It is envisaged that two NMT would be required – one would be situated to the east of the site and one would be situated to the west of the SAR. The NMT should meet the following technical specifications:

- measure A, C and Z weighting filters, 1/3 octaves, LAeq, LAmin, LAmax and statistical parameters (LA1 - LA99);
- capable of recording and storing audio files that can be used to identify noise sources;
- communications with the existing mine control centre control to enable access to real time noise metrics and audio; and
- be capable of sending alarms/alerts to relevant personnel when noise levels exceed warning/trigger levels, when noise levels are approaching the PNTLs or indicating exceedances such that additional mitigation measures and controls can be implemented to minimise impacts to nearby sensitive receivers.

### 11.4 Operator Attended Noise Monitoring

Operator attended noise measurements and recordings shall be conducted to quantify the intrusive noise emissions from the Project noise sources as well as the overall level of ambient noise. Attended noise monitoring would typically be conducted for regular compliance monitoring and in response to complaints, or other investigations.

When required, the operator shall quantify and characterise the maximum (LAmax) and the energy equivalent (LAeq) intrusive noise level from construction over a 15-minute measurement period. In addition, the operator shall quantify and characterise the overall levels of ambient noise over the 15-minute measurement interval. It is recommended that instrumentation used during the monitoring is to be equivalent to a Type 1 meter with 1/3 octave band analysis and have audio recording functionality for post processing source identification. It is noted that 1/3 octave band analysis is required to establish whether modification factors in accordance with the NPI are to be applied.



All acoustic instrumentation used as part of the attended monitoring program must be designed to comply with the requirements of AS IEC 61672.1-2019, Electroacoustics - Sound level meters - Specifications and shall have current calibration certificates. All instrumentation shall be programmed to record statistical noise level indices in 15-minute intervals including L<sub>Amax</sub>, L<sub>Amin</sub> and L<sub>Aeq</sub>.

Instrument calibration shall be checked before and after each measurement survey, with the variation in calibrated levels not exceeding  $\pm 0.5$  dBA. The measurement position(s) should be selected considering:

- weather conditions such as rain and wind, insect noise;
- the location and direction of any noise source/s;
- the most sensitive position at the affected receiver; and
- the need to avoid reflecting surfaces (where possible).

## 11.5 Data Presentation and Reporting

The measured L<sub>Aeq</sub>(15min) noise level contributions from construction operations as well as the overall ambient noise levels together with the weather and operations at the time of the measurement shall be reported.

In the event of an exceedance of the relevant PNTLs, the relevant environmental personnel shall be informed of the location, the margin of exceedance and the source of emission (where possible). The noise level, meteorological conditions at the time of the survey and plant operating data shall be documented and forwarded to the relevant environmental personnel so that an appropriate response can be made with respect to conformance.

Reporting of monitoring should include the following:

- monitoring location(s);
- list of operating plant and equipment;
- measured noise and/or vibration levels from construction;
- overall ambient noise levels;
- comparison of results with relevant PNTLs;
- monitoring equipment details;
- weather conditions; and
- comments specific to each site.

Compliance reports, discussing compliance against the PNTLs, will be prepared and submitted to the relevant environmental personnel as required. Compliance reports should include a summary of the information listed in the preceding sections, specifically issues or non-compliances and the response or management of the issues and non-compliances. Exceedances and outcomes of incident investigations are expected to be reported to the relevant regulators and stakeholders.

#### Complaints Handling

- Provide a readily accessible contact point, for example, through a toll-free information and complaints line and give complaints a fair hearing.
- Have a documented complaints process, including an escalation procedure so that if a complainant is not satisfied there is a clear path to follow.
- Records of all community complaints will be maintained on an up-to-date complaints register. The records will include:
  - date and time of the complaint;
  - the means by which the complaint was made (telephone, mail or email);
  - any personal details of the complainant that were provided, or if no details are provided, a note to that effect;
  - the nature of the complaint;
  - any actions taken by the site supervisor in relation to the complaint, including any follow up contact with the complainant and the timing for implementing action; and
  - if no action was taken by site supervisor/construction contractor in relation to the complaint, the reason why no action was taken.
- Community complaints will be allocated to the relevant company representative immediately to facilitate the implementation of corrective actions. The details of the complaint will also be circulated to the applicable operations personnel for action, where required.
- Procedures, roles and responsibilities will be outlined in the Noise Management Plan.

## 11.6 Blasting

Some general blast management practices may reduce overpressure are discussed below.

### 11.6.1 Blast Design

The most effective method of reducing the airblast level is to stem all blastholes with an appropriate packing material in order to contain the explosives gases as it is understood that exploding this unconfined explosive product would increase the airblast levels significantly. This also results in a much more efficient blast and better fragmentation of the rock.

The Maximum Instantaneous Charge (MIC) is the maximum mass of explosive detonated in any 8ms period throughout the blast. A reduction in the MIC would correspondingly result in a reduction of the airblast level. The MIC may easily be reduced by reducing the number of holes fired at any one time. Halving the MIC would typically reduce the airblast level by 1dB to 3dB.

### 11.6.2 Blast Monitoring

It is recommended that test blasts be conducted prior to production blasting to collect data to validate calculated blast emissions in the NBIA to develop preliminary blast emission site laws for airblast overpressure and vibration.

It is recommended that all blasts be monitored. Monitors should be located at various distances from the open pit, representative of the emissions received at residential receptor, occupied buildings, and infrastructure.

Each blast monitor should be configured as follows:

- Ideally, the blast monitor microphone should be in a free field environment so that the microphone should be orientated so that it is facing the blast.
- The geophone (or vibration monitoring unit) should be orientated so that the longitudinal axis is directed towards the blast.
- The date and time on each blast monitor should be synchronised with the download computer after each blast (or at least once a week as the clock speed varies between the units).
- The ground vibration arrives at the monitor before the airblast. Therefore, if the geophone is triggered both the ground vibration levels and the airblast levels would be recorded.

## Blast Monitoring Log

Blast design records should be maintained for all individual blast events. The purpose of the record is to assist in the design and optimisation of future events, planning and control of blasting emissions and to provide a traceable system of documentation in case of incident or complaint.

For the purposes of blast emission monitoring, the mine should be guided by the requirements of AS 2187.2 2006, "Explosive Storage, Transport and Use - Appendix J" to maintain a Blast Design and Emissions Record for each blast event. To maximise the benefits of the blast monitoring process, the significant design parameters, emission levels and meteorological data should be collated on a concise Blast Emissions Summary Record, with the following data recorded for each blast:

- Blast Number;
- Block or Area ID;
- Date and Time of blast;
- Shot Type;
- Centroid of Blast (X,Y,Z coordinates in a referenced mapping system);
- Distance from the blast to the monitoring locations;
- MIC (kg);
- Peak Airblast Level; and
- Peak Vibration Level, ie Peak Vector Sum (PVS).

Blast records would form the basis for developing and continually updating the blast emission site laws for vibration and airblast for the site and would provide the ability to provide more accurate blast predictions as data from each blast is collected.

## 12 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise and Blasting Impact Assessment (NBIA) for the Proposed Tomingley Gold Extension Project, Tomingley, NSW (the 'Project').

This NBIA has identified the closest and/or potentially most affected receivers situated within the area of influence to the Project and determined noise (and blasting) emissions over the Project life. Predicted noise levels from construction, operation and road traffic have been used to determine potential noise impacts associated with the Project via comparison with impact assessment noise criteria taking into account modifying factors in accordance with the NPI and EARs for the Project. Where required, noise mitigation and management measures have been identified that may be implemented to effectively manage noise emissions at off-site receivers.

The results of the NBIA demonstrate that emissions from the Project would generally satisfy the relevant PNTLs at all assessed receivers for all meteorological conditions throughout all stages of the Project including very noise enhancing meteorological conditions. Notwithstanding, over the first two to three years (up to FY25), noise levels from typical operations are expected to exceed the PNTLs by up to 2dB at up to four Non Project related receivers nearest to the Project during the evening and night time periods. Similar exceedances are expected to occur at receivers with a MOU with TGO, which have had mitigation measures (insulation, improved glazing, air conditioning) installed by TGO to reduce internal noise levels from previous iterations of the operation. Exceedances of the PNTLs of up to 2dB are considered negligible in accordance with NPI assessment methodology for residual noise impacts and would not be discernible by most receivers to compliant emission level of 35dB LAeq(15min).

The Project has adopted several mitigation and management measures into the Project design such as noise suppression for mobile equipment, in particular large bulldozers to be used on the waste emplacements and operational measures for out-of-pit dumping. These mitigation measures combined with pro active noise management via a real time noise monitoring and notification systems will minimise the potential for the exceedances as the operation will have the ability to manage noise levels within criteria.

Therefore, whilst there is potential for exceedance of the relevant criteria, TGO is committed to implement the relevant noise mitigation and management measures described in this NBIA to minimise noise impacts and to remain within the relevant noise impact criteria.

Furthermore, sleep disturbance is not anticipated, as predicted maximum noise levels from the Project are expected to satisfy the EPA maximum noise level screening criteria at all receivers and a detailed maximum noise level assessment is not required.

Predicted noise levels are expected to comply with the VLAMP criteria and hence further mitigation and/or acquisition rights are not applicable.

The low frequency noise assessment shows that there is potential for low frequency noise emissions from the Project, however, in consideration of the distance that receivers are from the Project, the magnitude of the C weighted noise levels and mitigation measures to be implemented, it is unlikely that noise frequency noise impacts would occur.

Predicted noise levels from the construction activities associated with SAR mining are expected to satisfy the NMLs for standard construction hours and out of hours periods at all identified receivers. Similarly, construction activities associated with realignment of the Newell Highway expected to satisfy the NMLs for standard construction hours at all identified receivers.

A qualitative assessment of potential vibration impacts from construction activities has been completed. Due to the nature of the works proposed and distances to potential vibration sensitive receivers, vibration impacts from the Project would be negligible.

Road traffic noise levels resulting from the realignment of the Newell Highway are predicted to meet the requirements of the RNP for the daytime and night time as noise levels will not increase by more than 2dB.

Airblast overpressure and vibration levels are predicted to meet the relevant ANZEC criteria at all assessed receivers for blasts up to 400kg MIC.

# Appendix A – Glossary of Terms



A number of technical terms have been used in this report and are explained in **Table A1**.

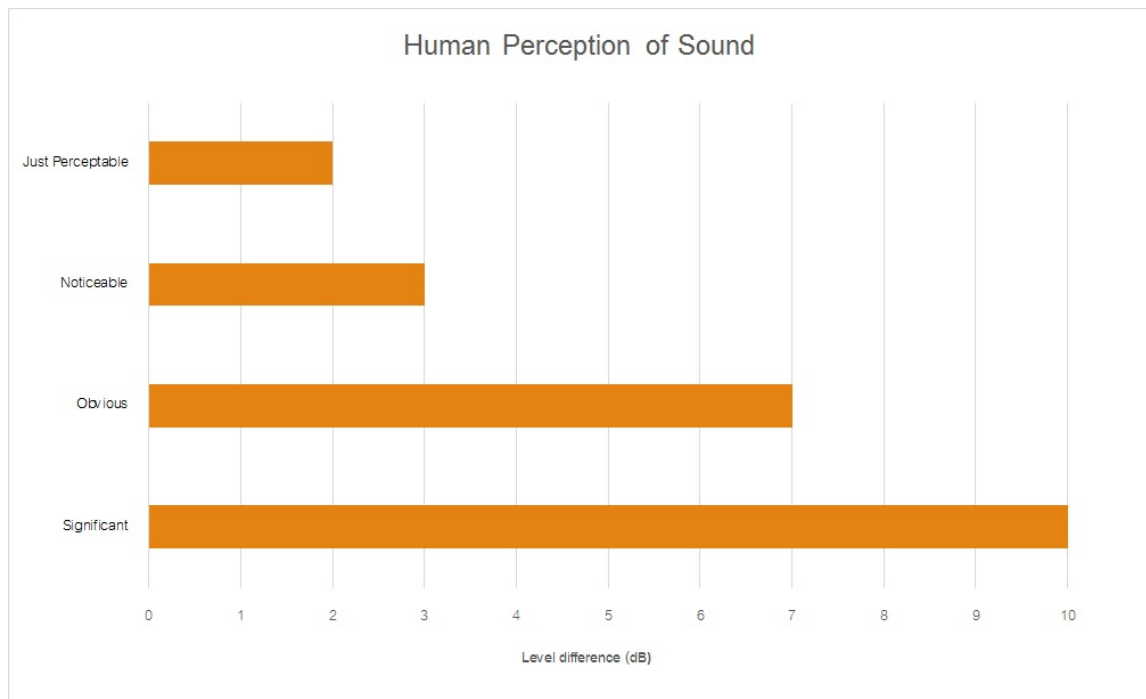
Table A1 Glossary of Acoustical Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmx	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$ . Where W is the sound power in watts to the reference level of $10^{-12}$ watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

**Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA**

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

**Figure A1 – Human Perception of Sound**

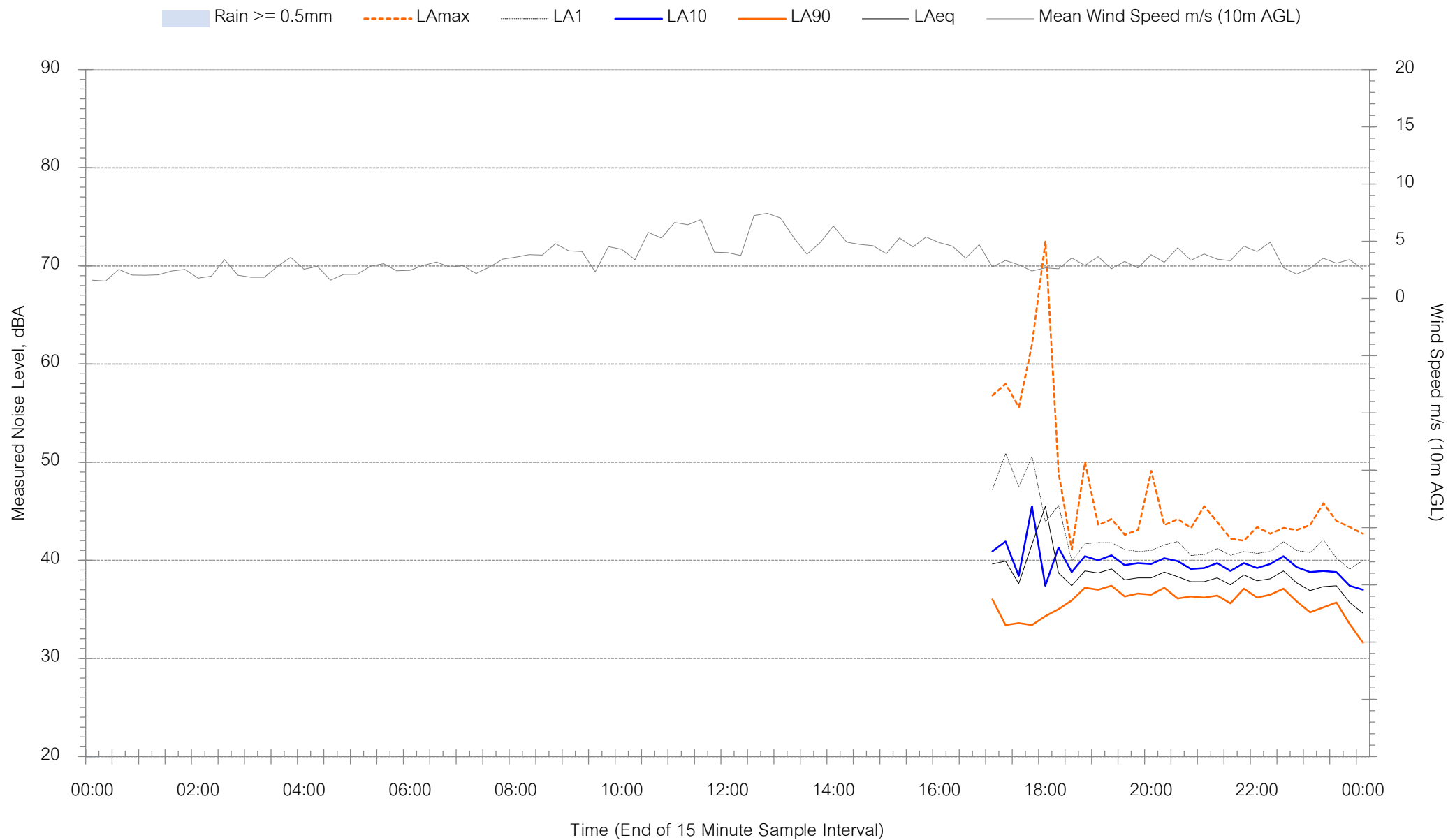


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## Appendix B – Noise Monitoring Charts

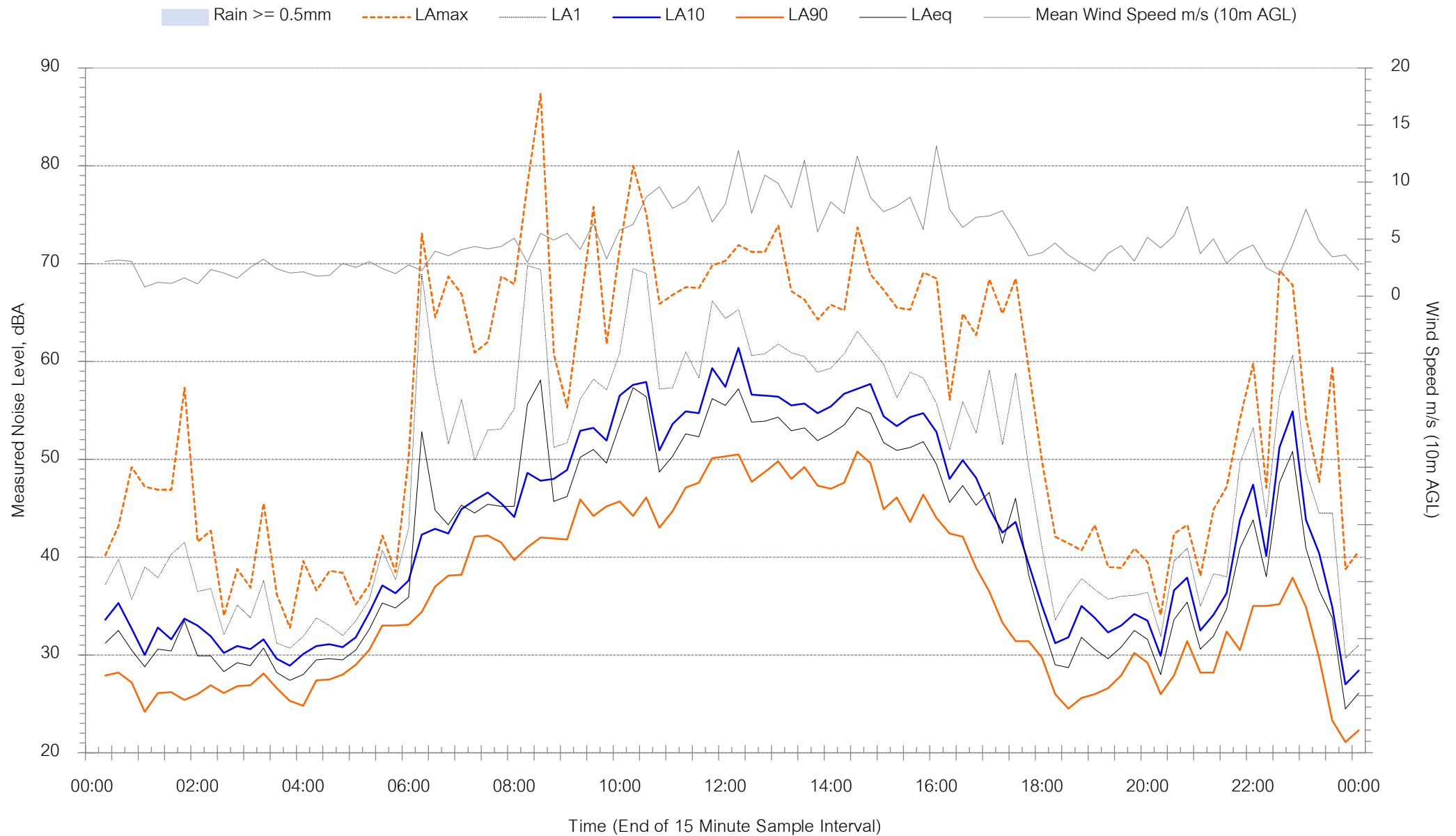
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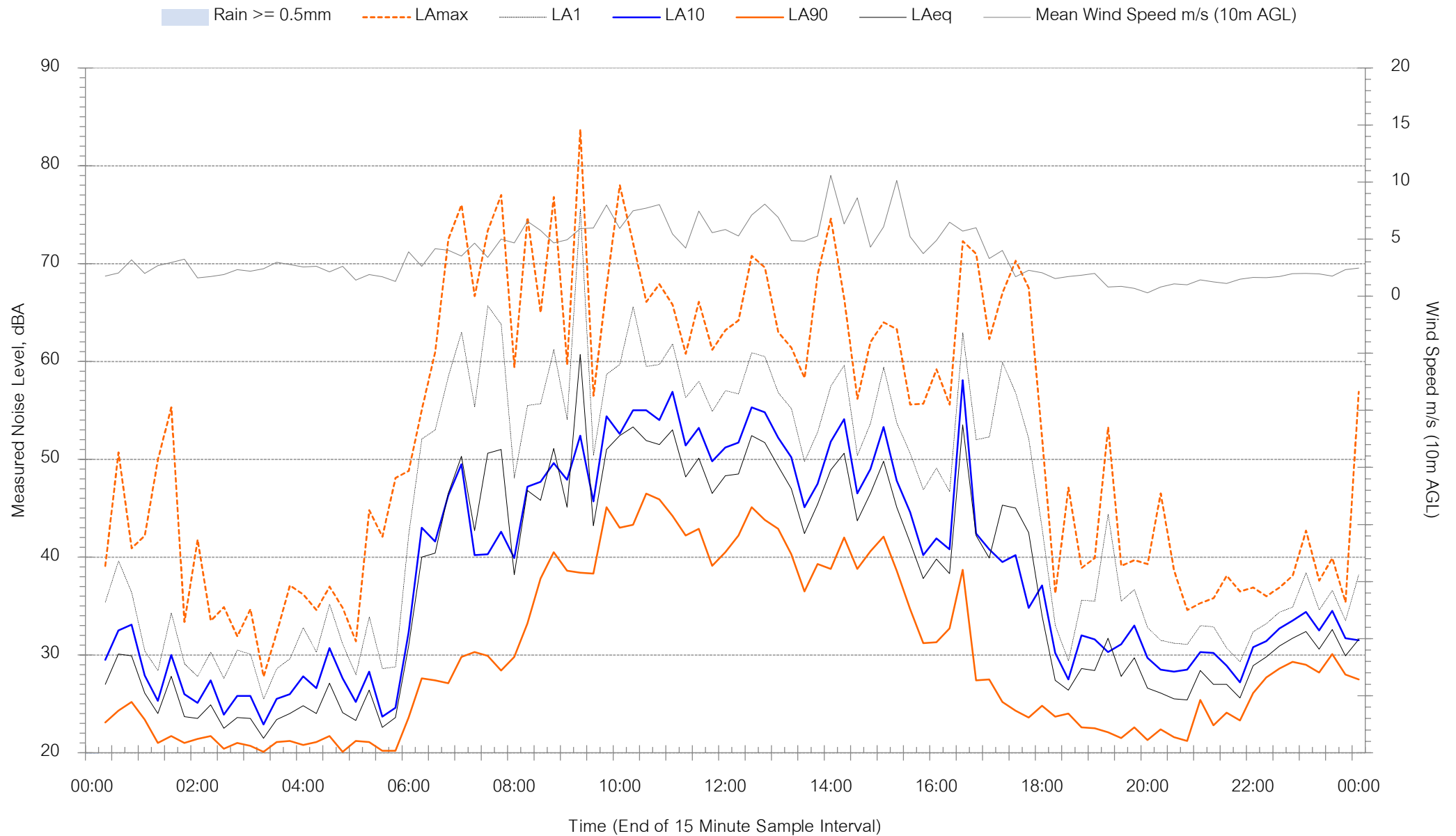
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# Background Noise Levels

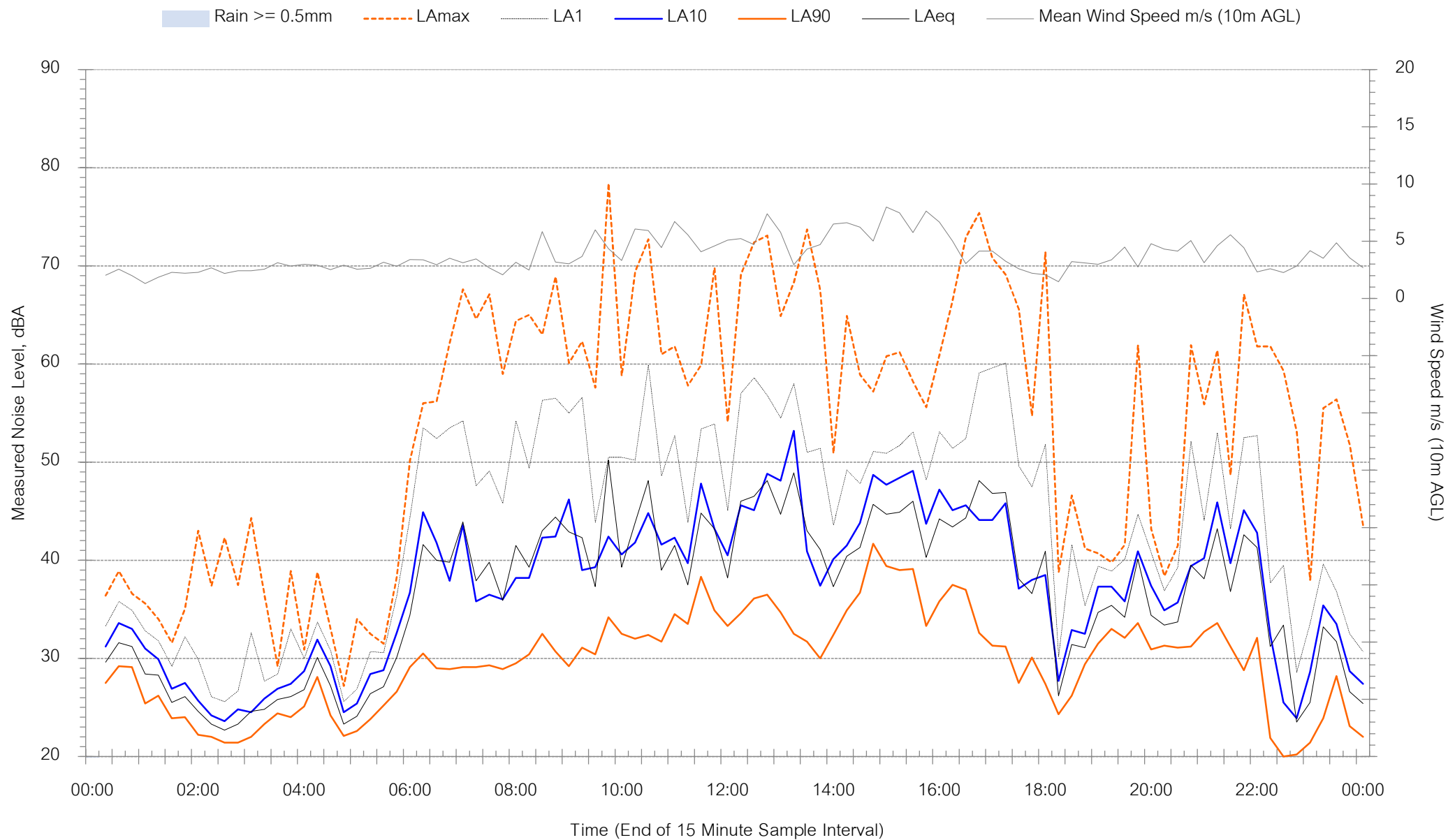
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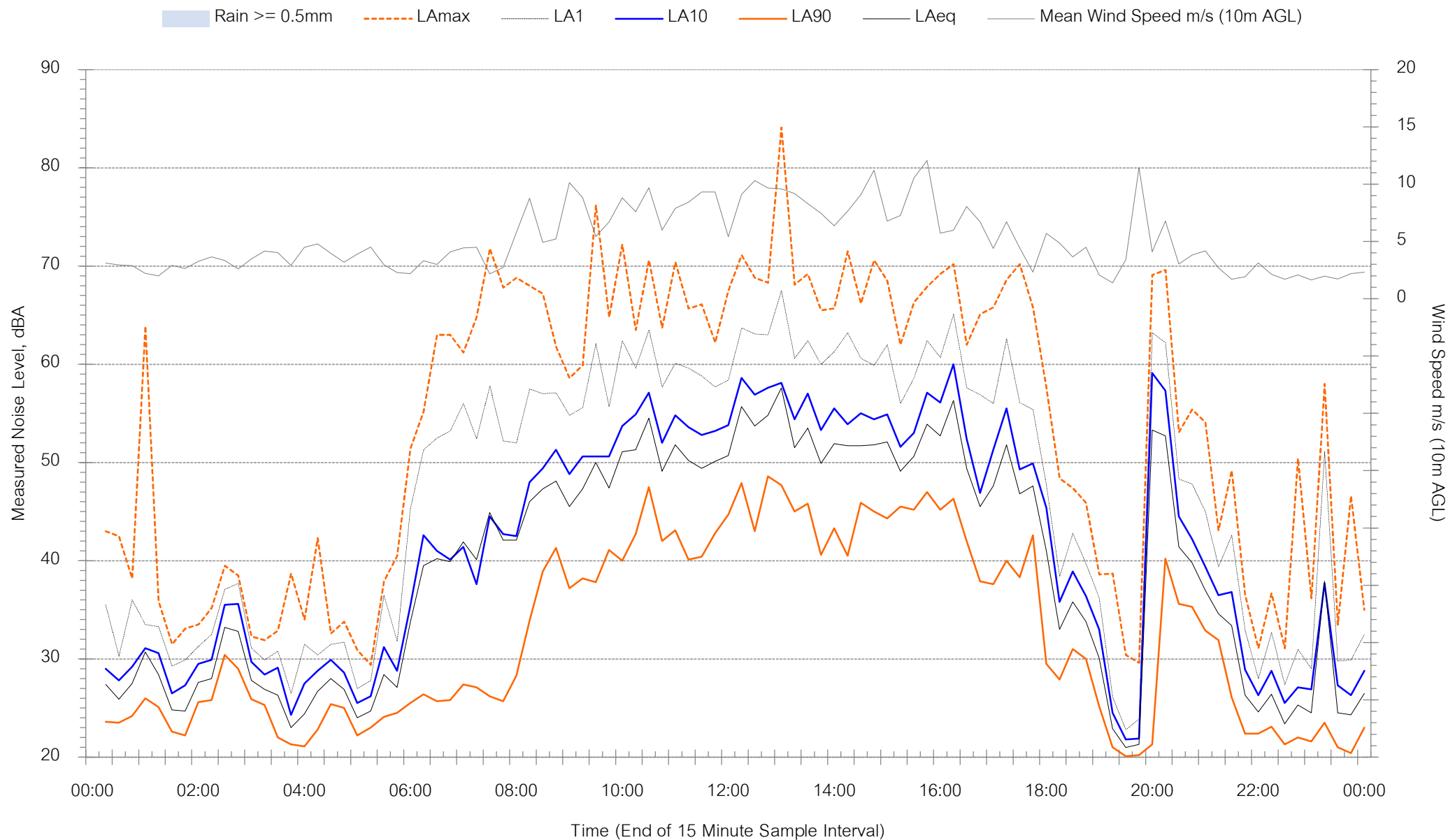
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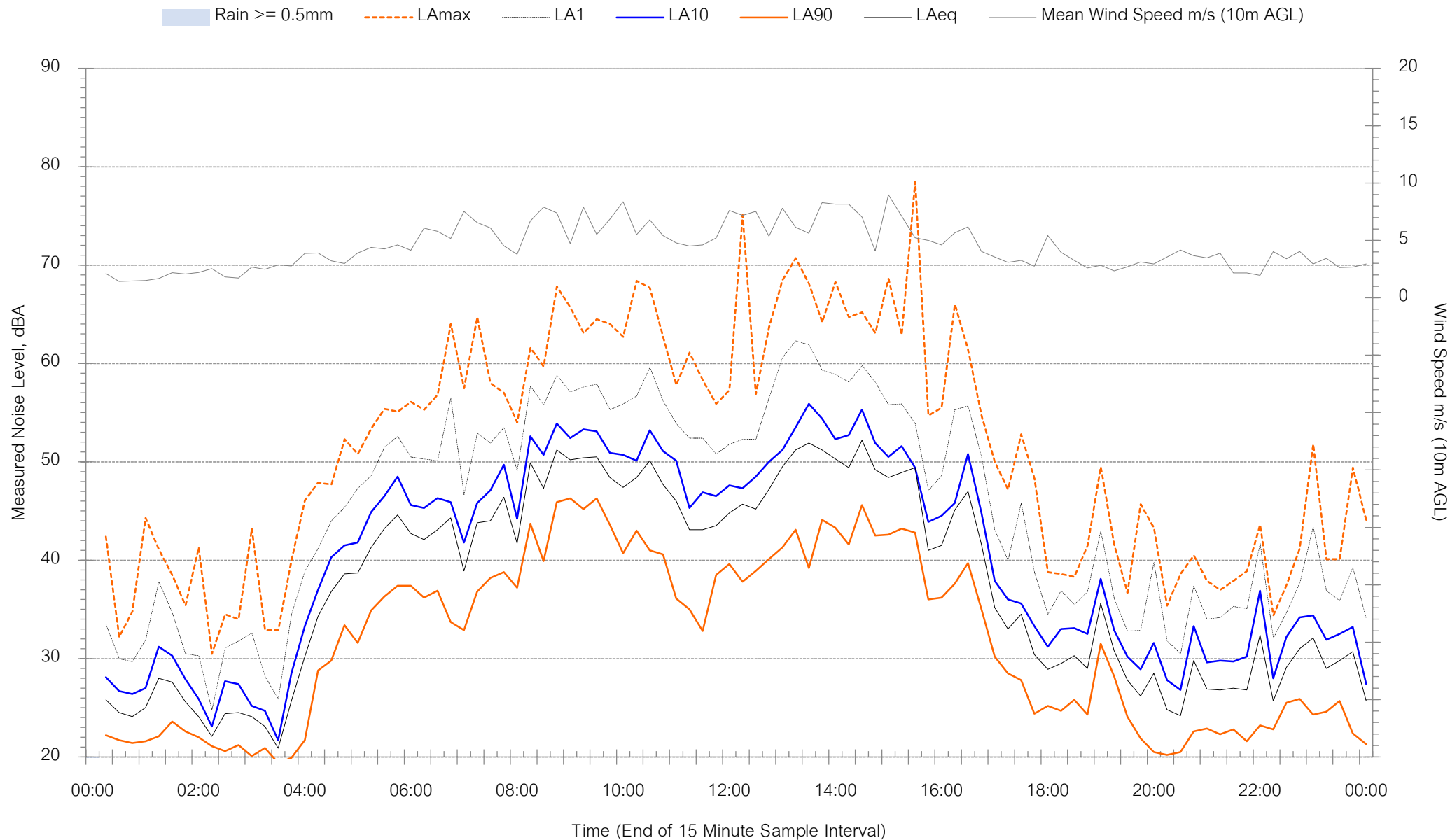
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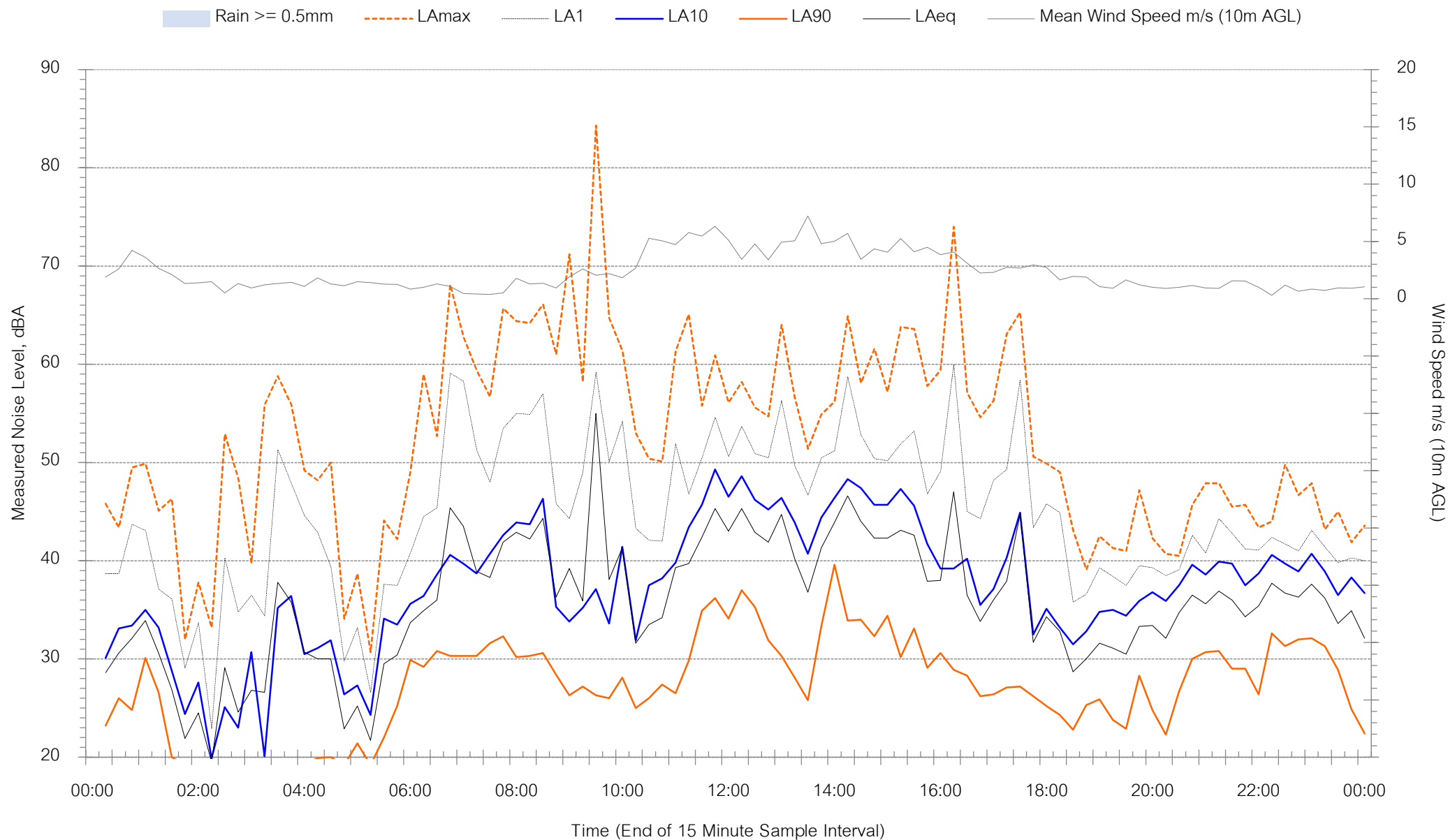
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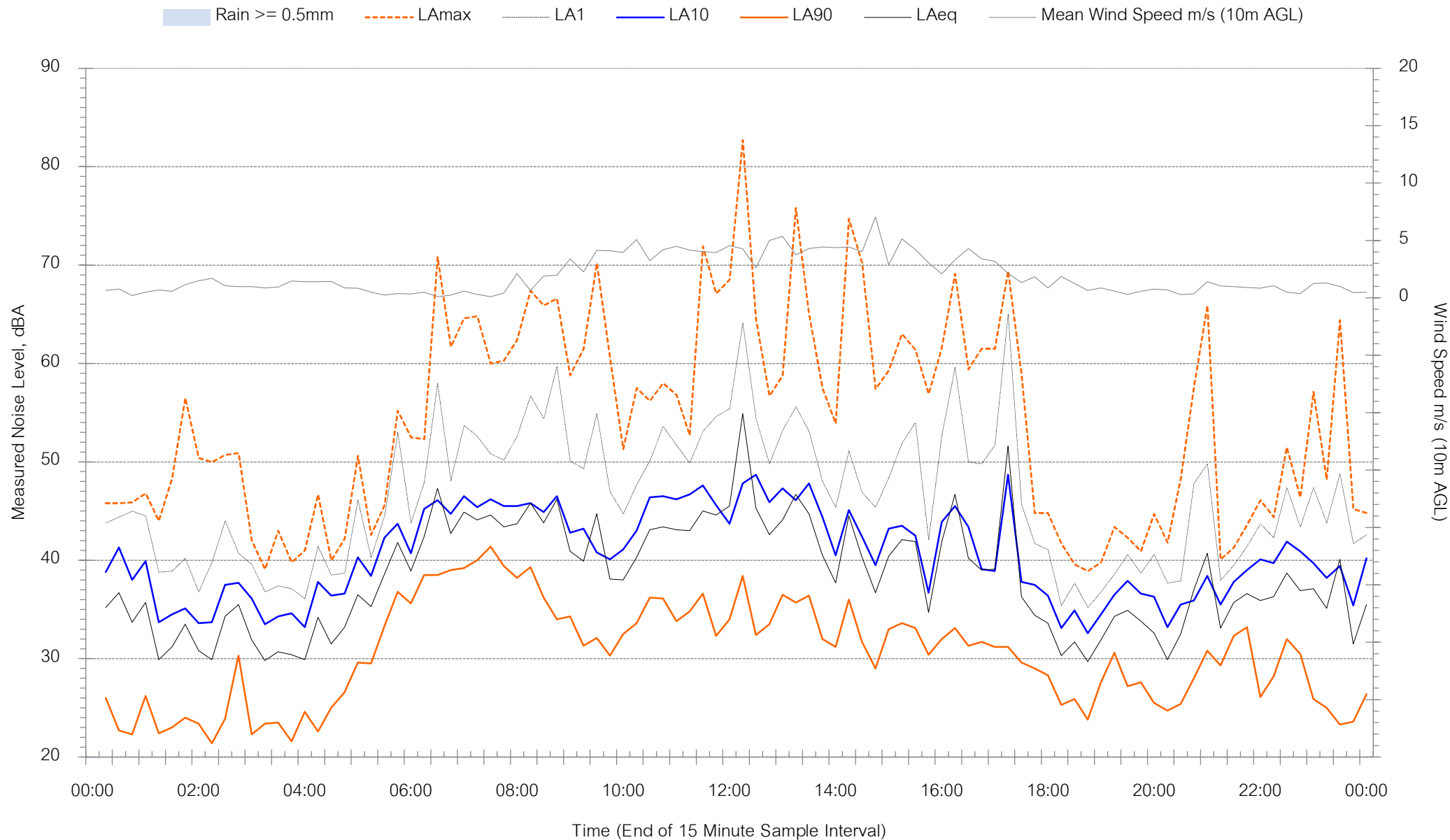
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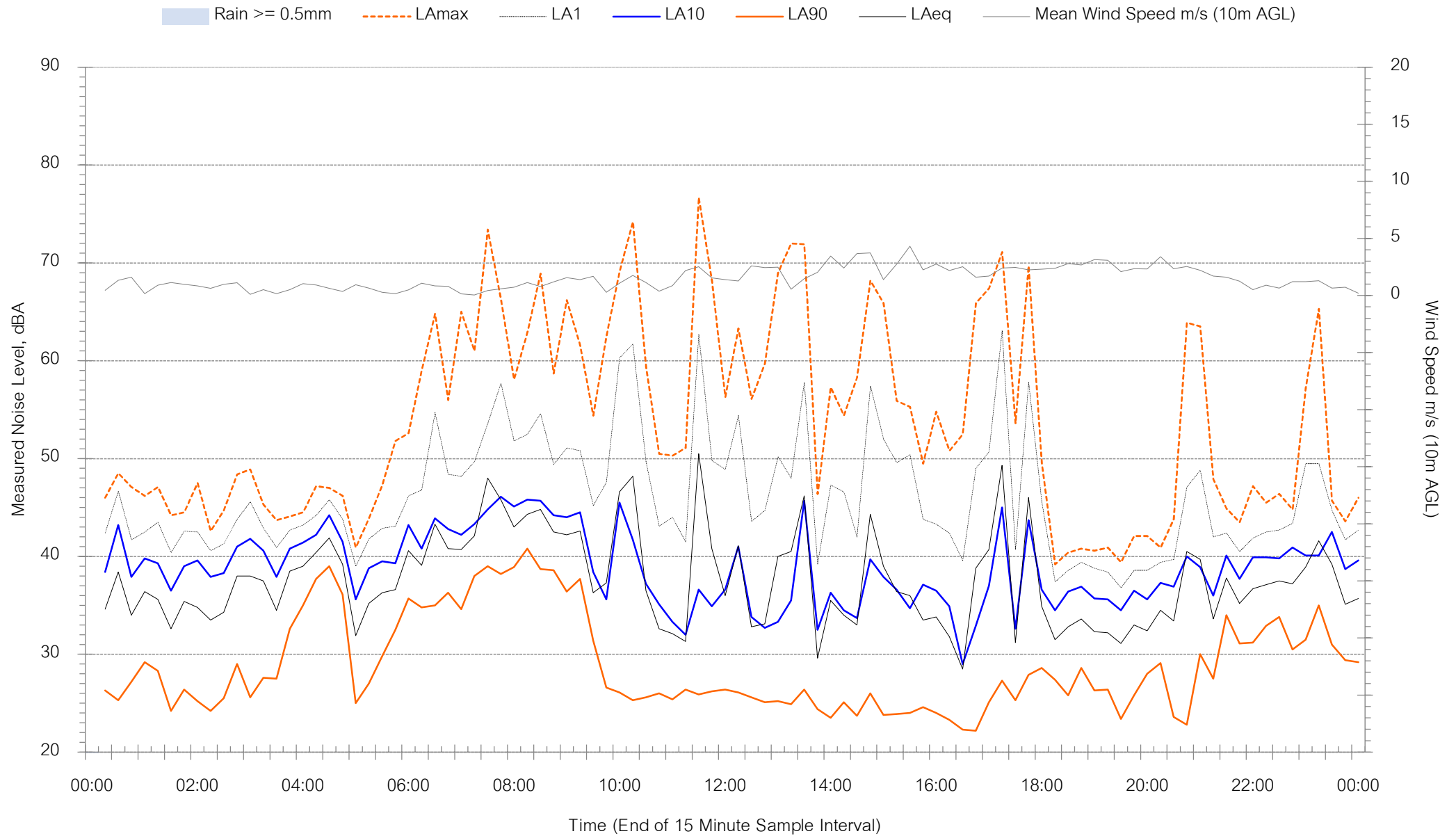
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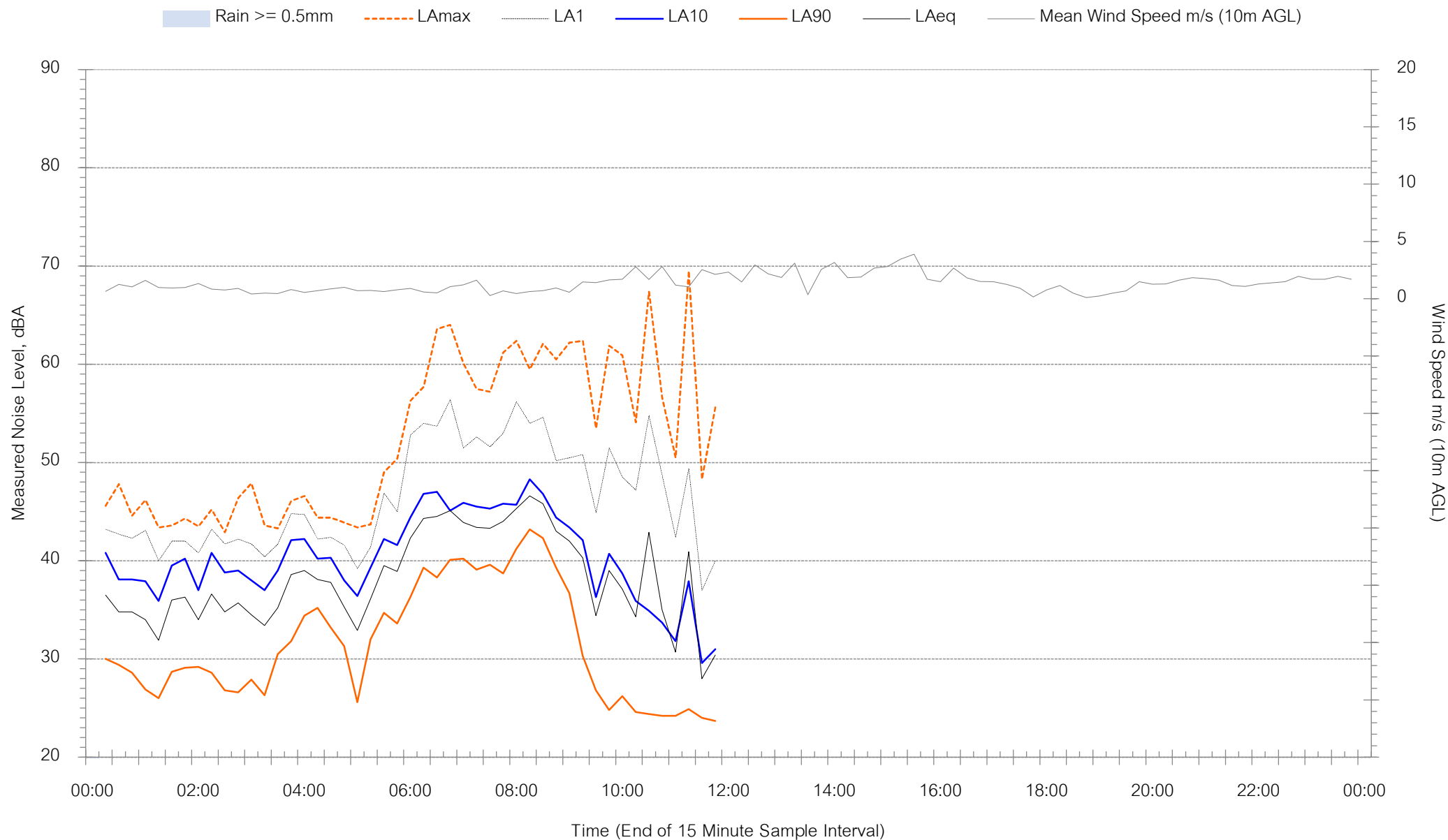
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# Background Noise Levels

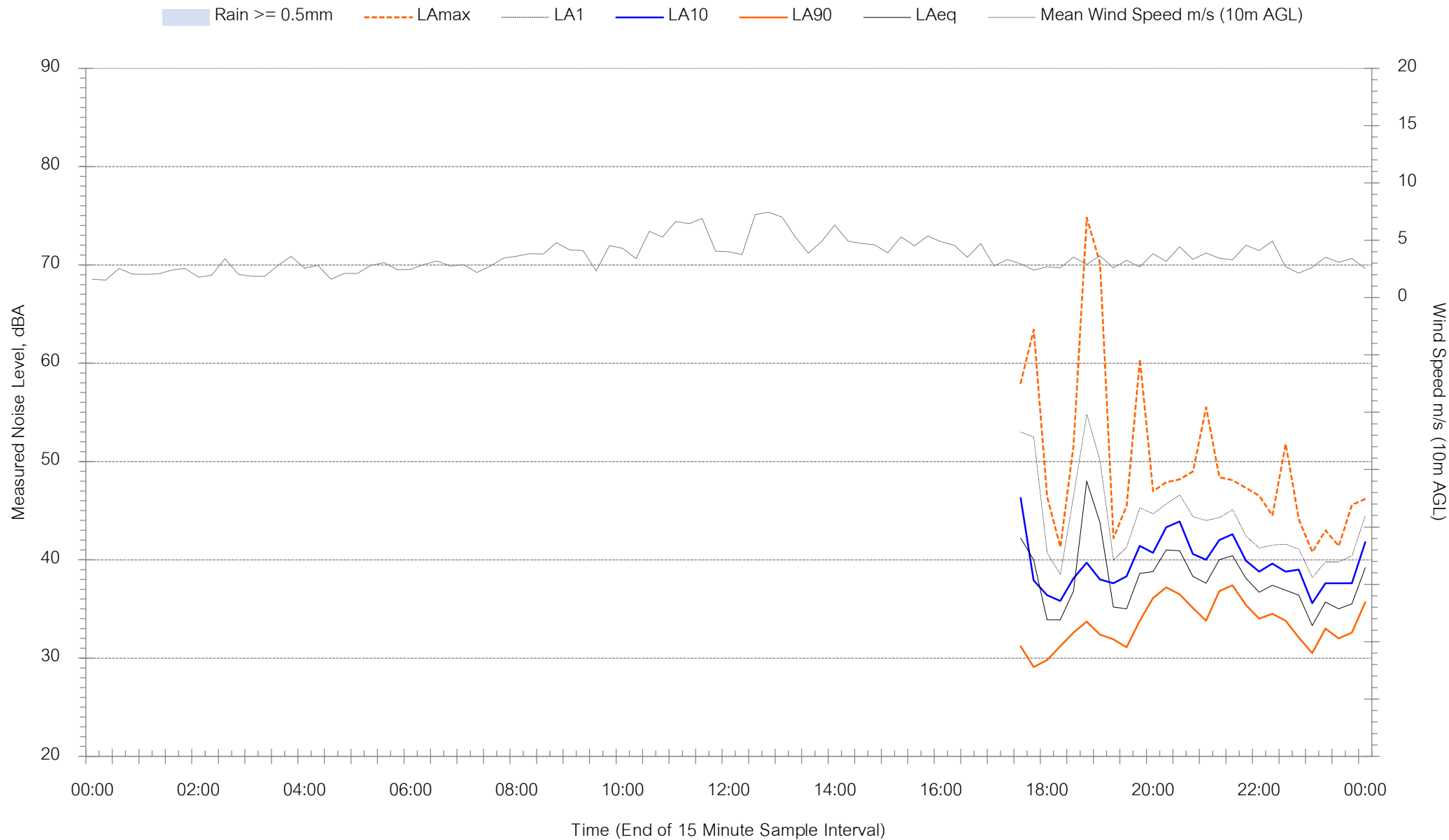
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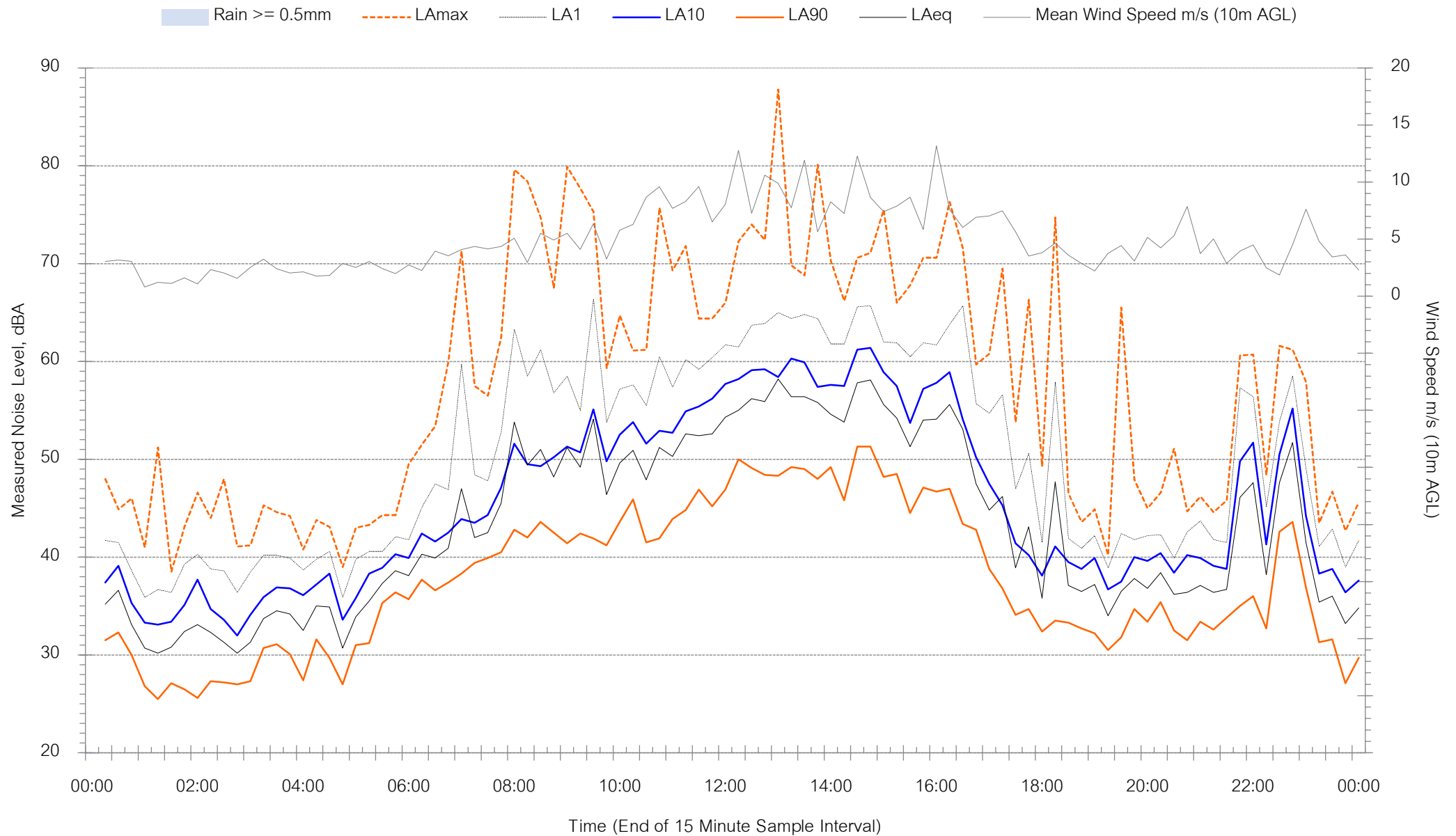
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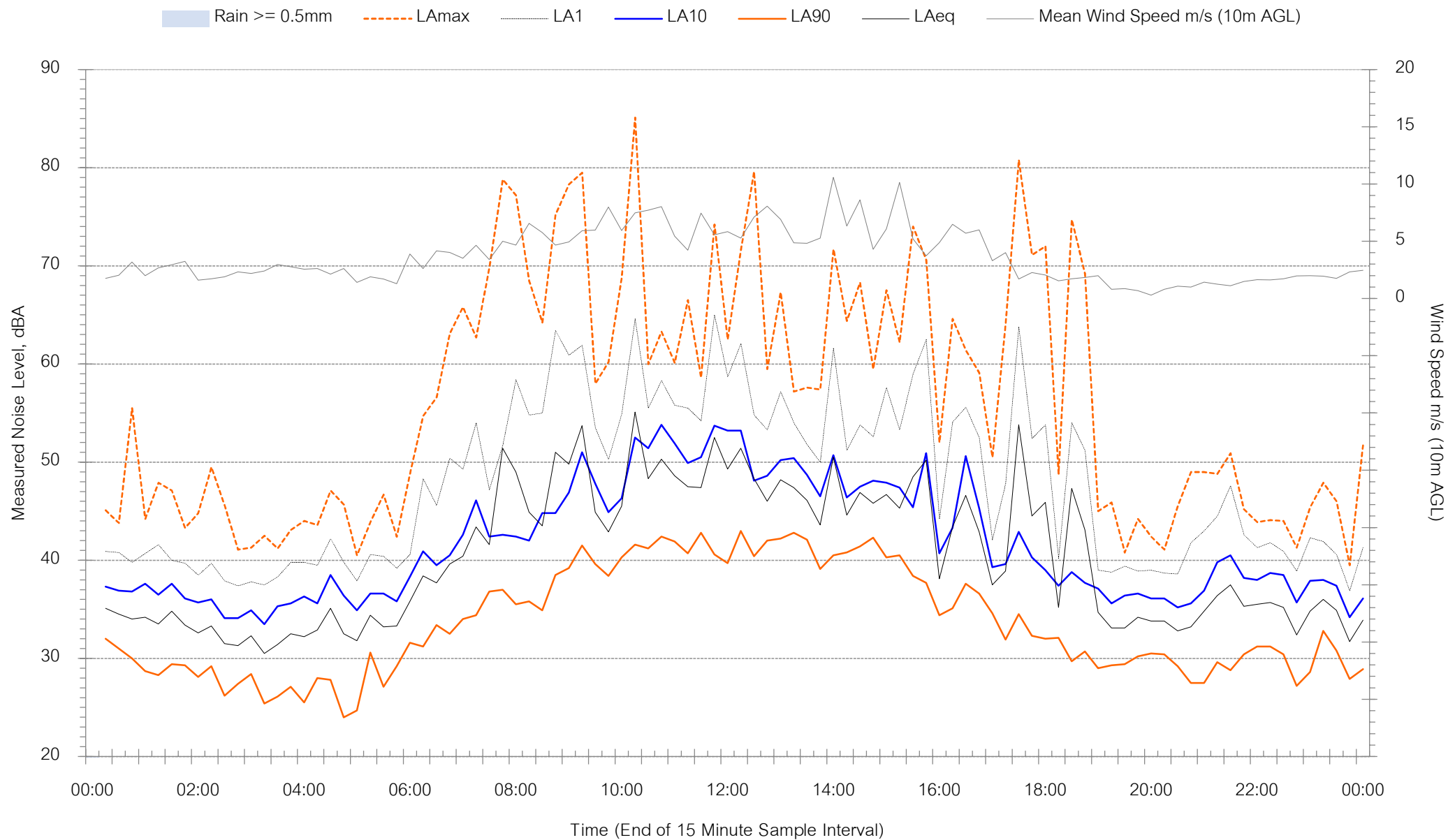
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L2 - 331 Kyalite Road - Wednesday 19 August 2020



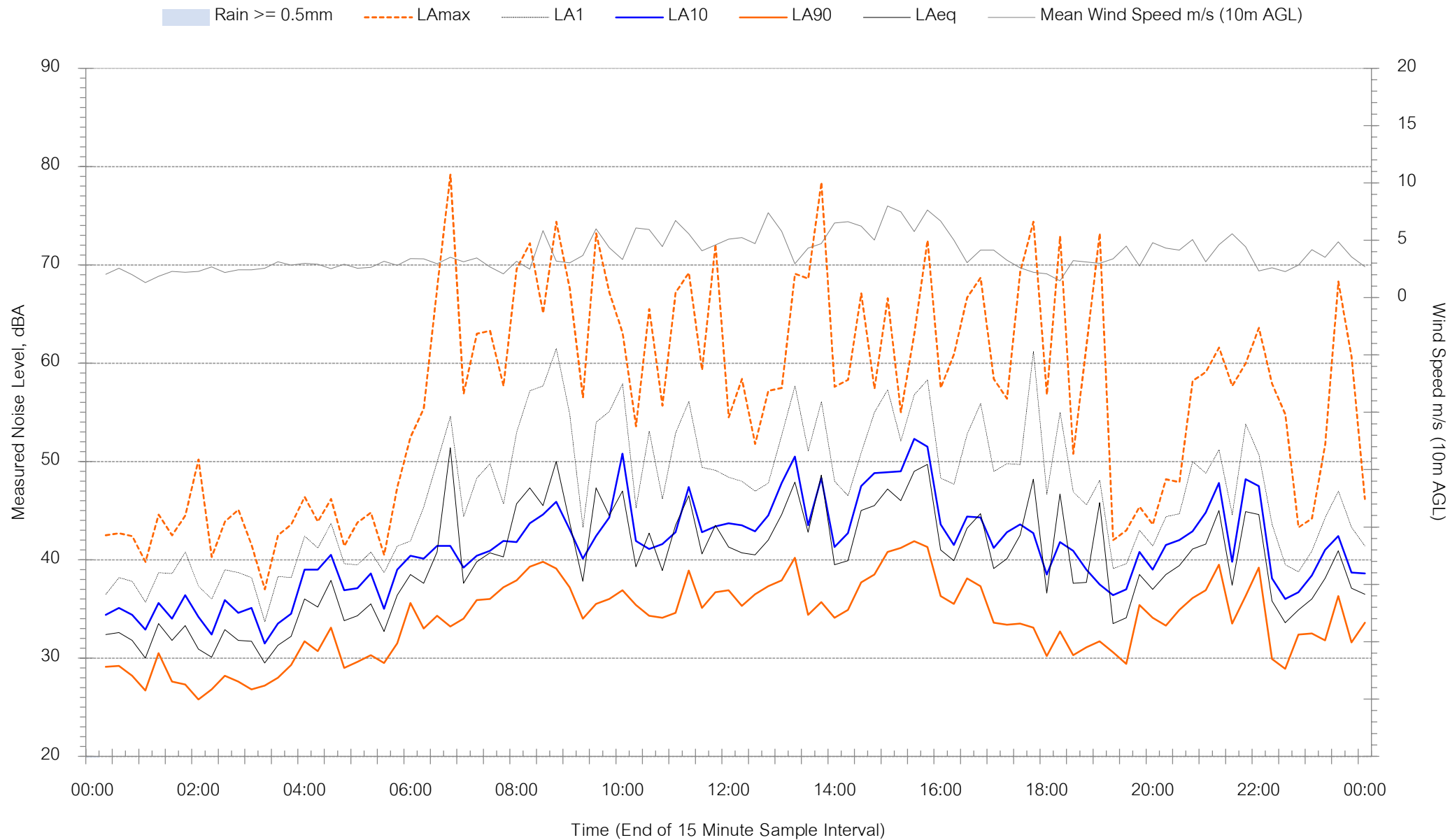
# Background Noise Levels

L2 - 331 Kyalite Road - Thursday 20 August 2020



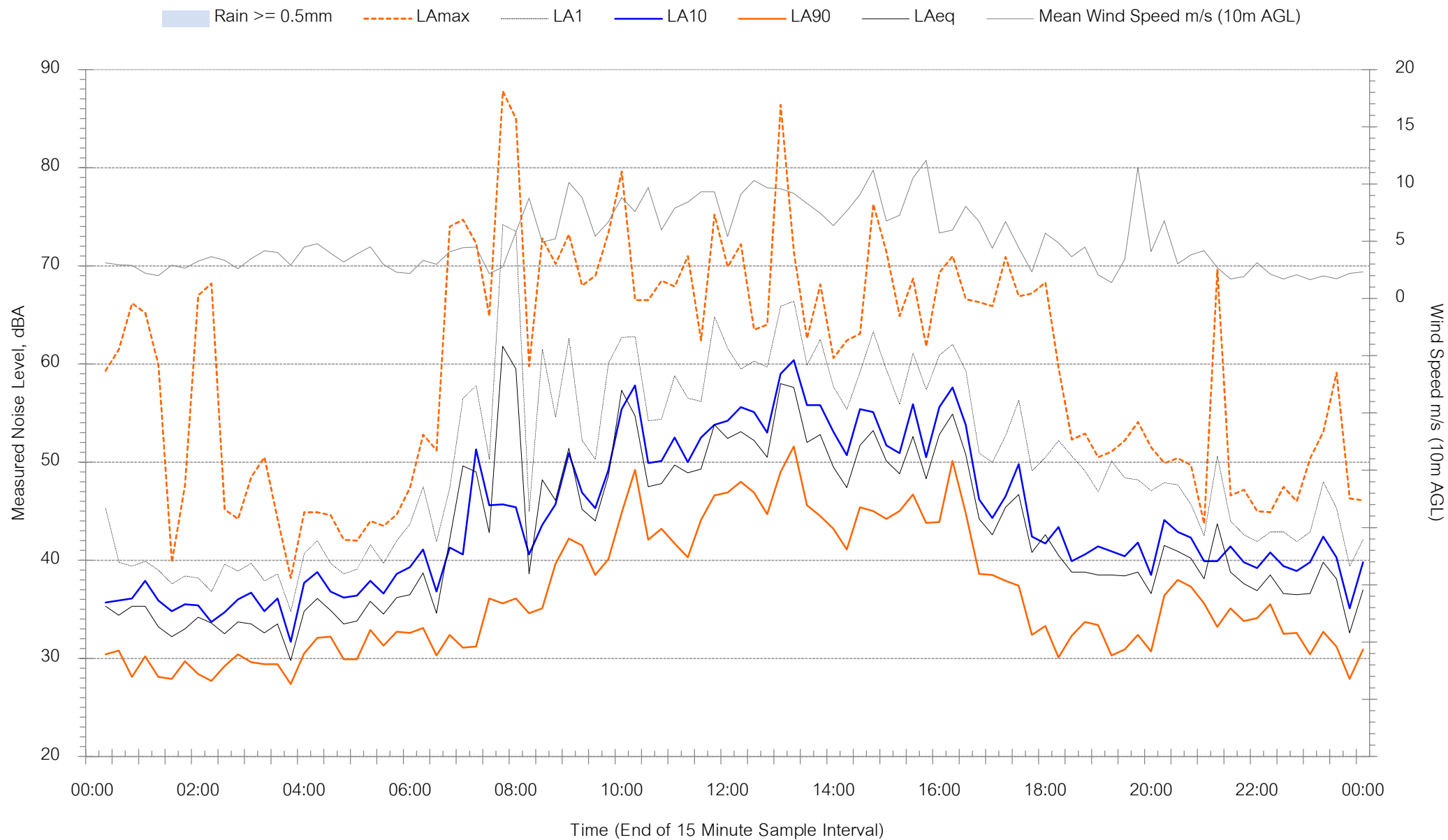
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## L2 - 331 Kyalite Road - Friday 21 August 2020



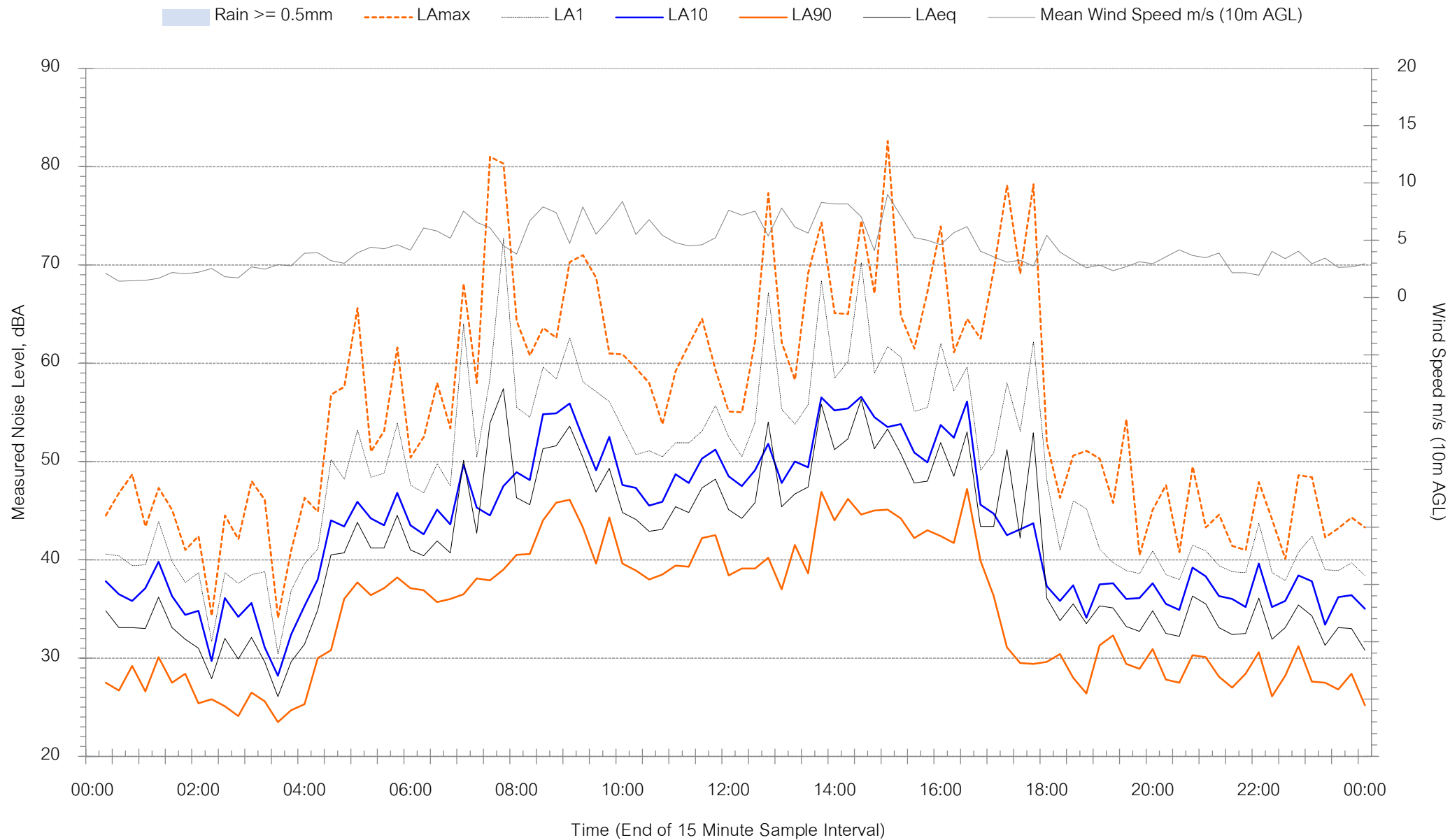
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L2 - 331 Kyalite Road - Saturday 22 August 2020



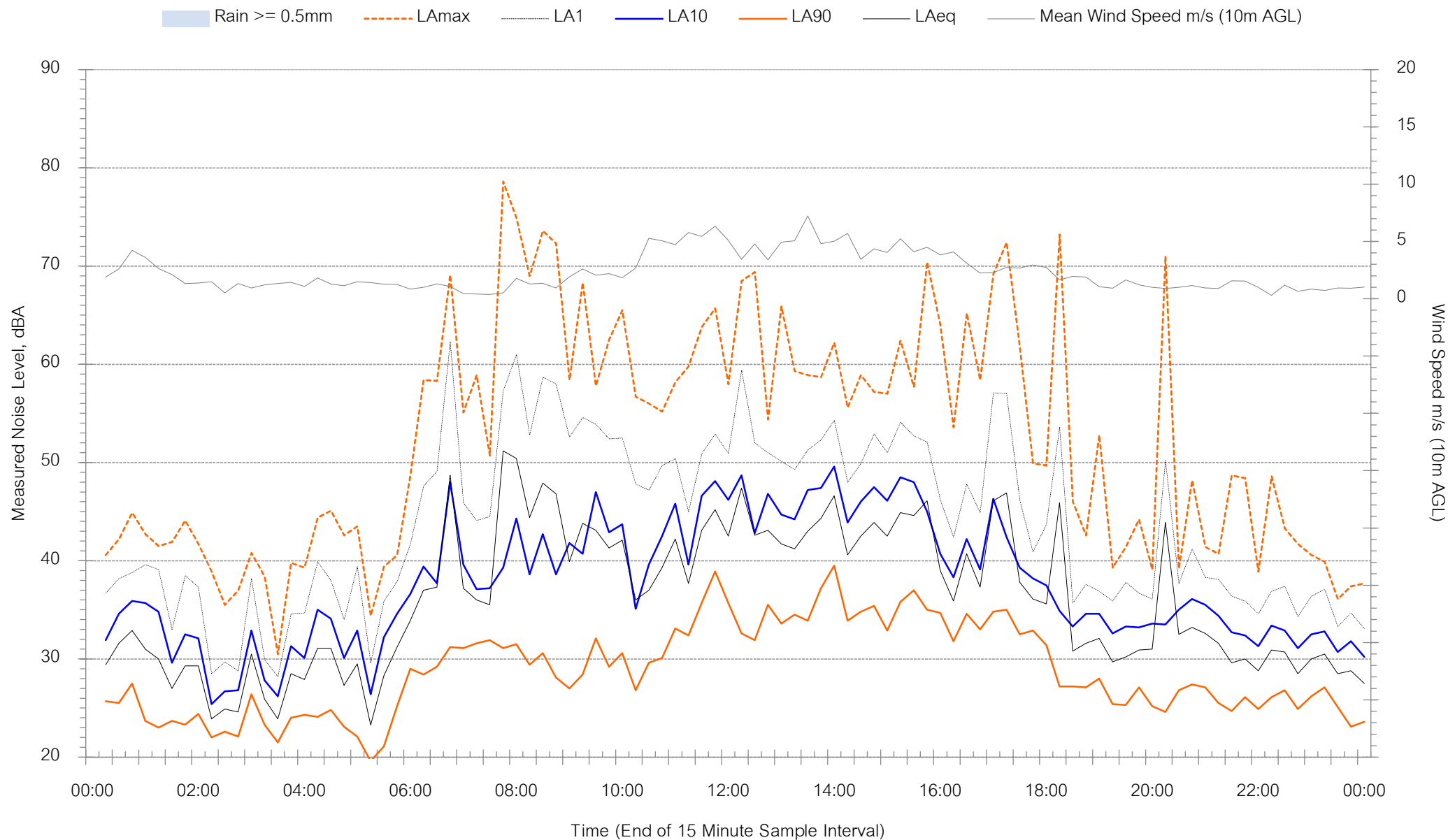
# Background Noise Levels

## L2 - 331 Kyalite Road - Sunday 23 August 2020



# Background Noise Levels

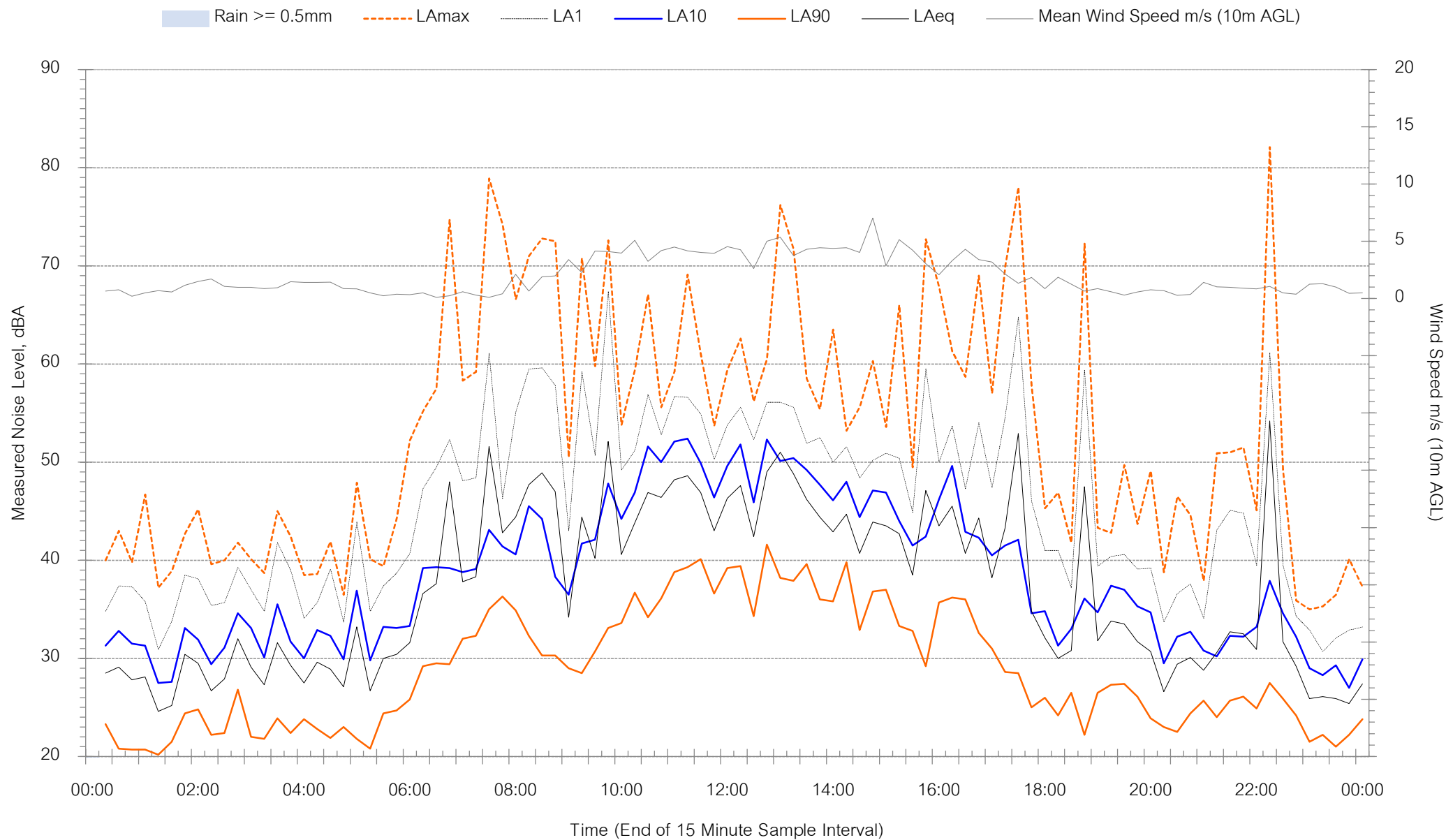
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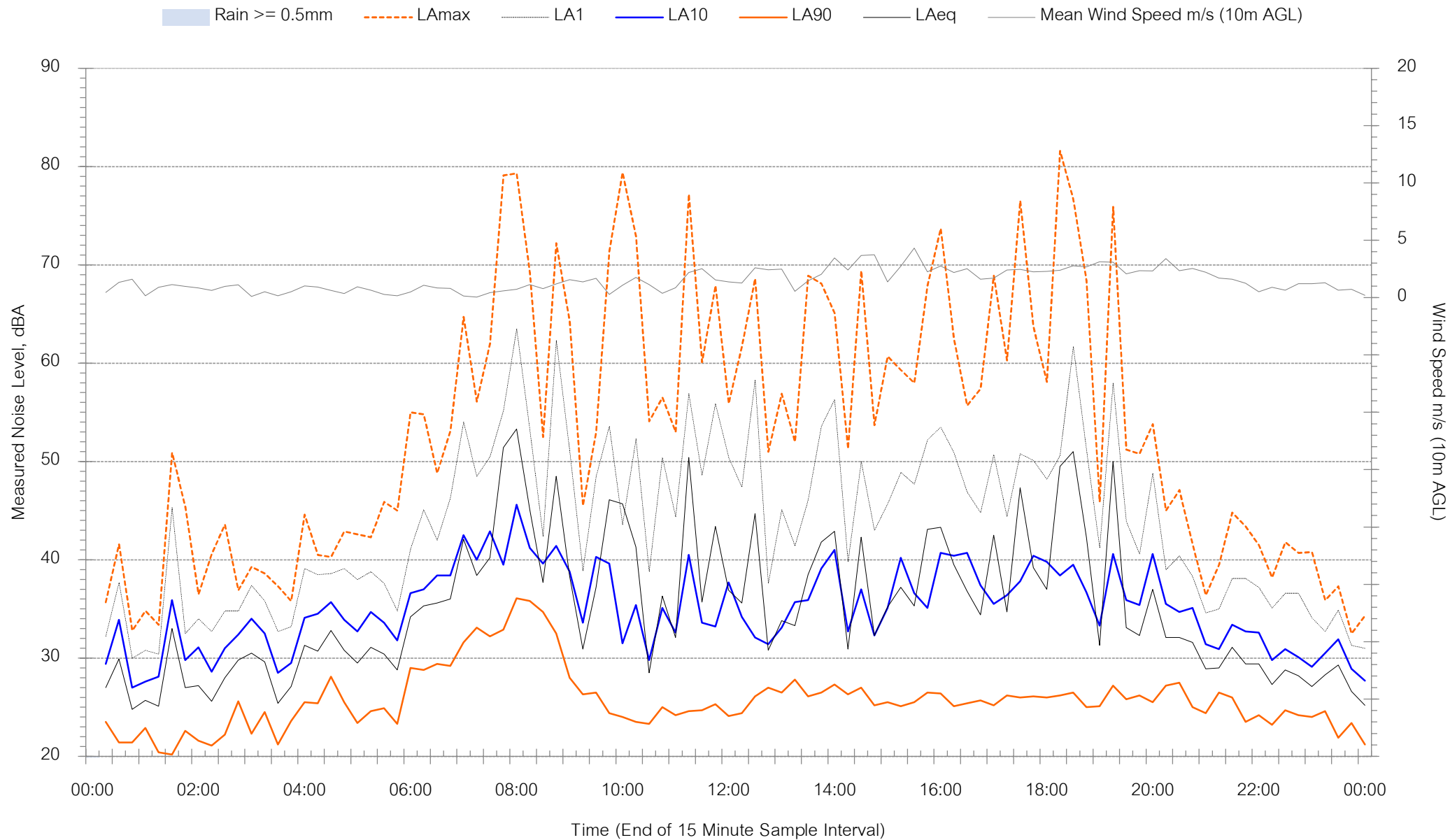
# Background Noise Levels

L2 - 331 Kyalite Road - Tuesday 25 August 2020



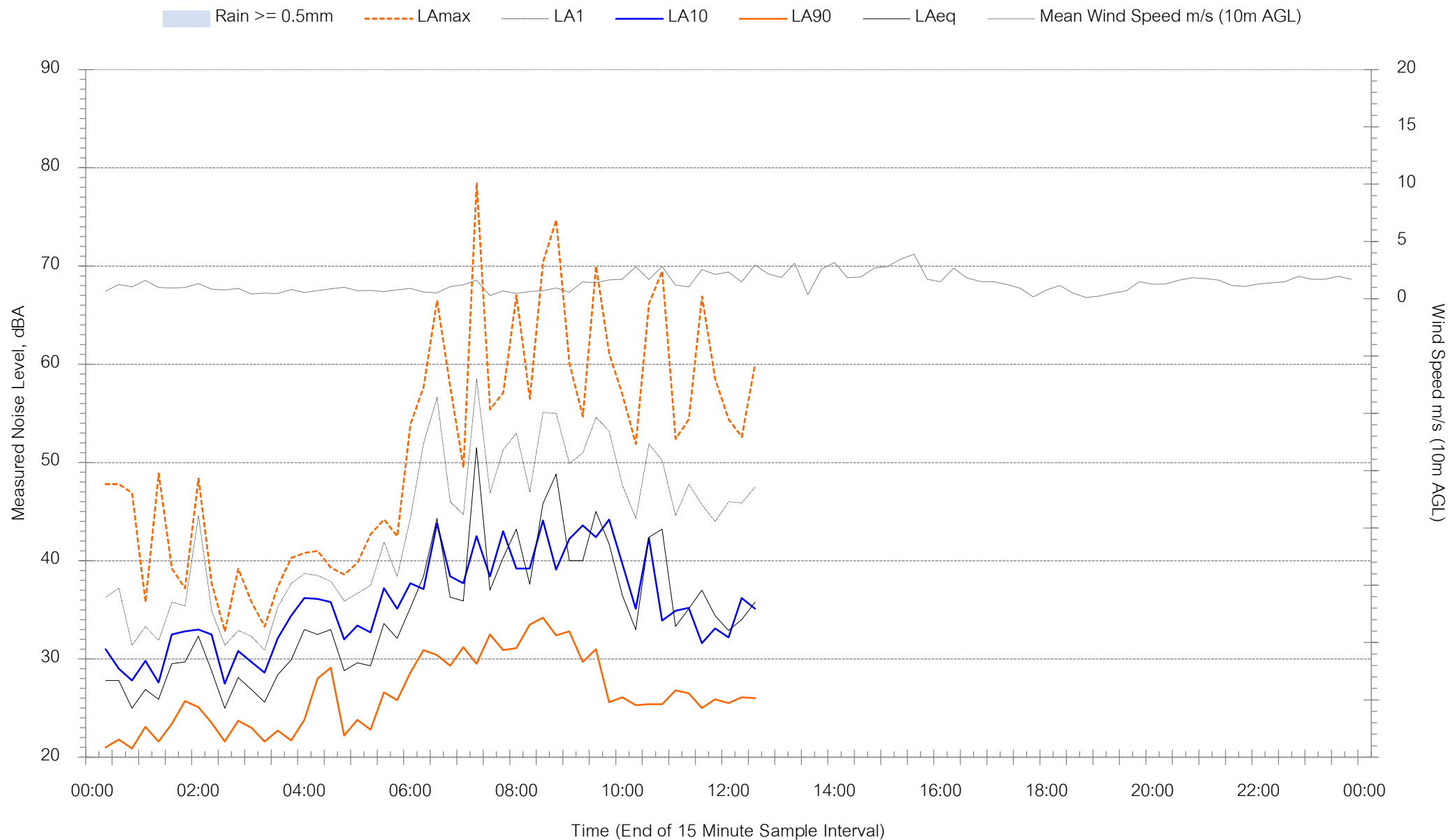
# Background Noise Levels

L2 - 331 Kyalite Road - Wednesday 26 August 2020



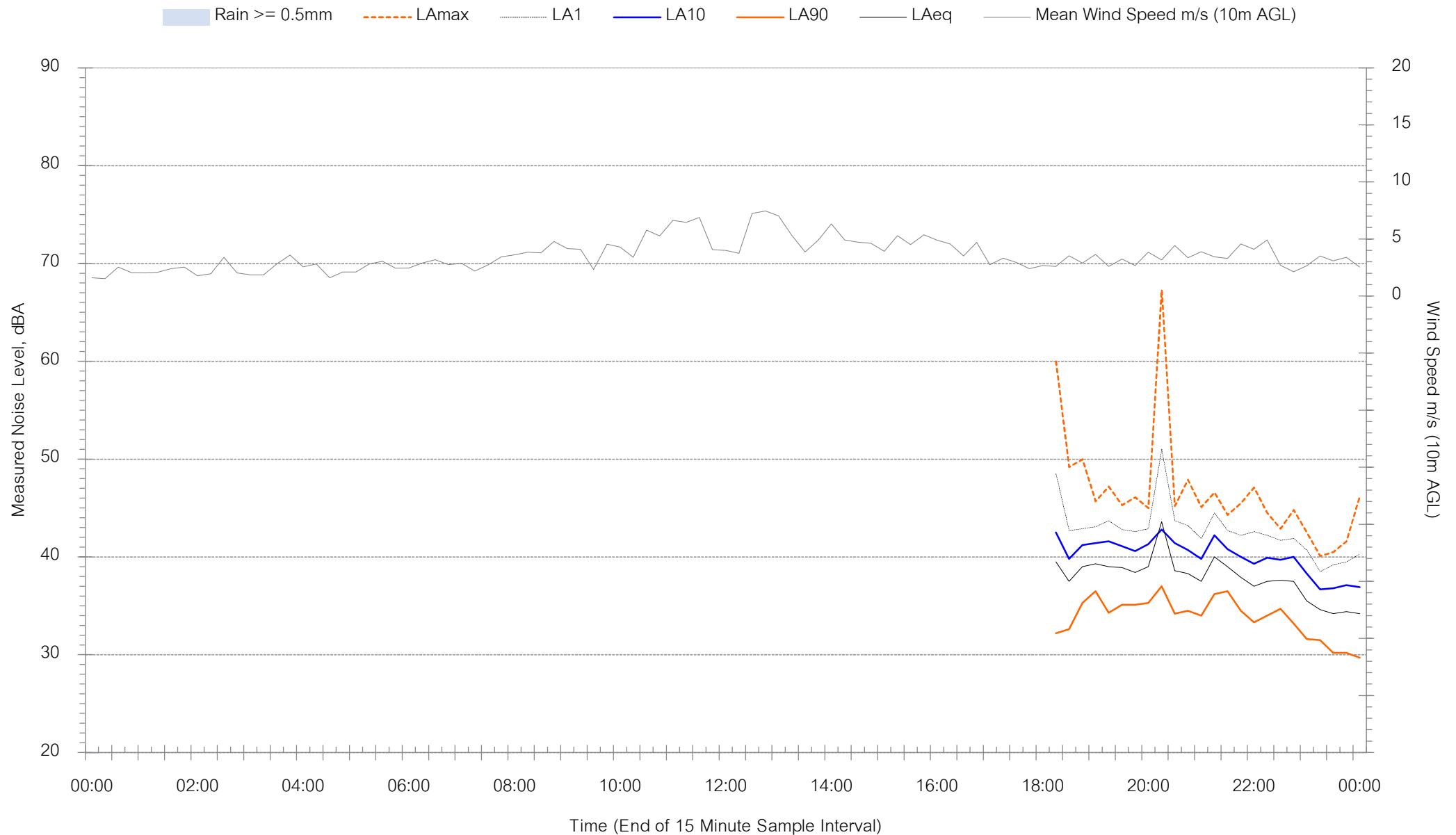
# Background Noise Levels

L2 - 331 Kyalite Road - Thursday 27 August 2020



# Background Noise Levels

L3 - 2703 Thornycroft Road - Tuesday 18 August 2020



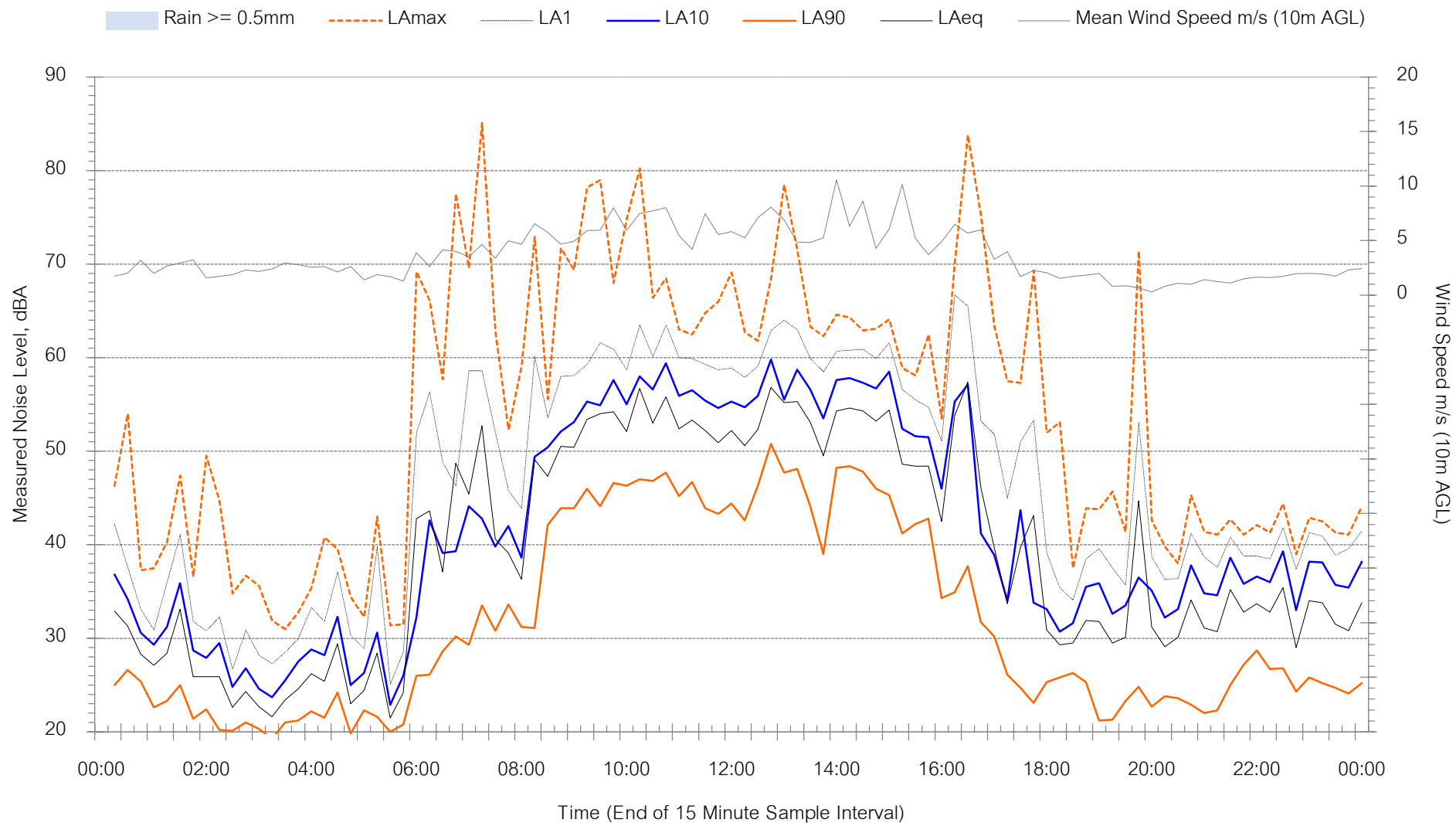
# Background Noise Levels

L3 - 2703 Thornycroft Road - Wednesday 19 August 2020



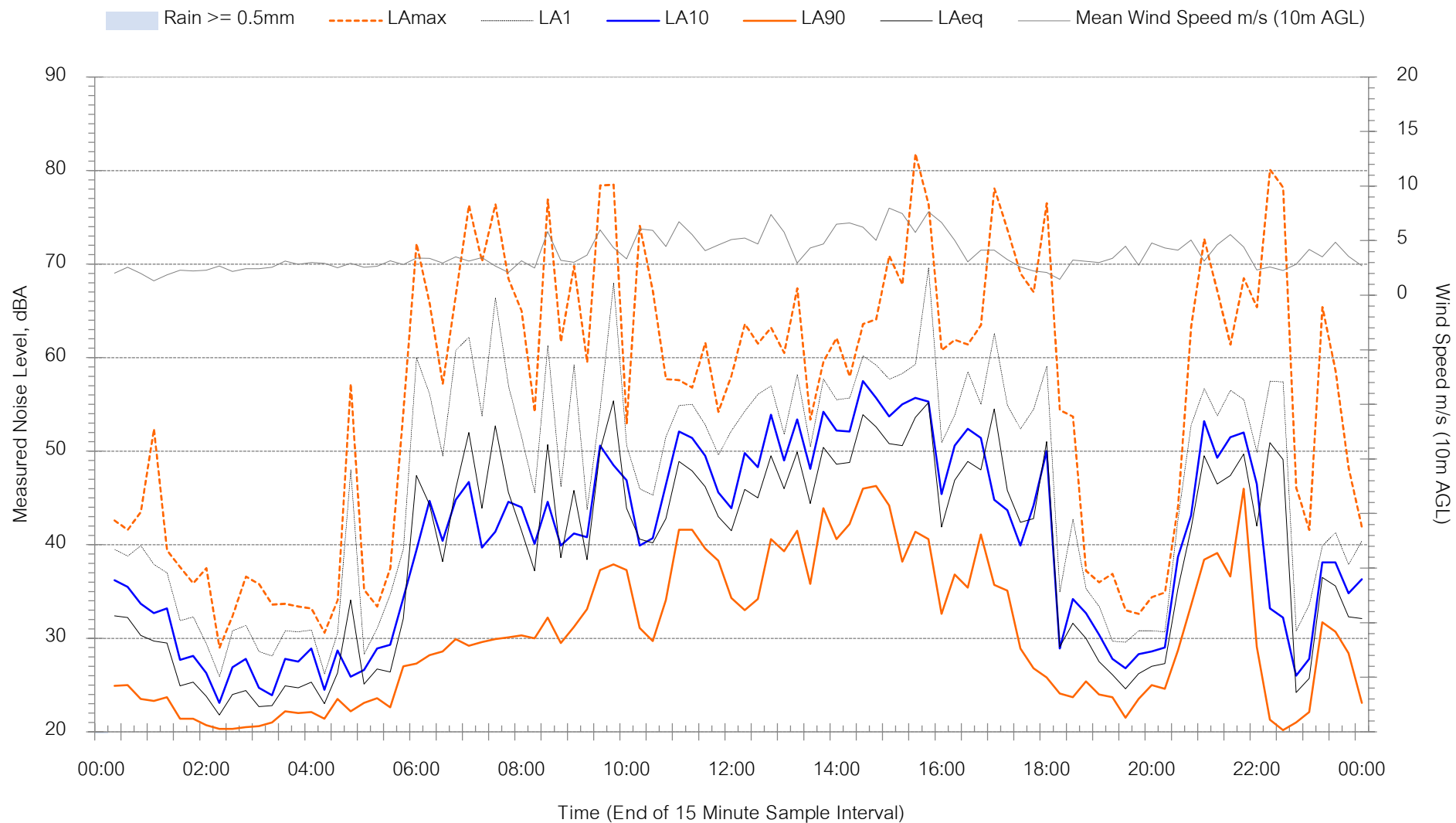
# Background Noise Levels

L3 - 2703 Thornycroft Road - Thursday 20 August 2020



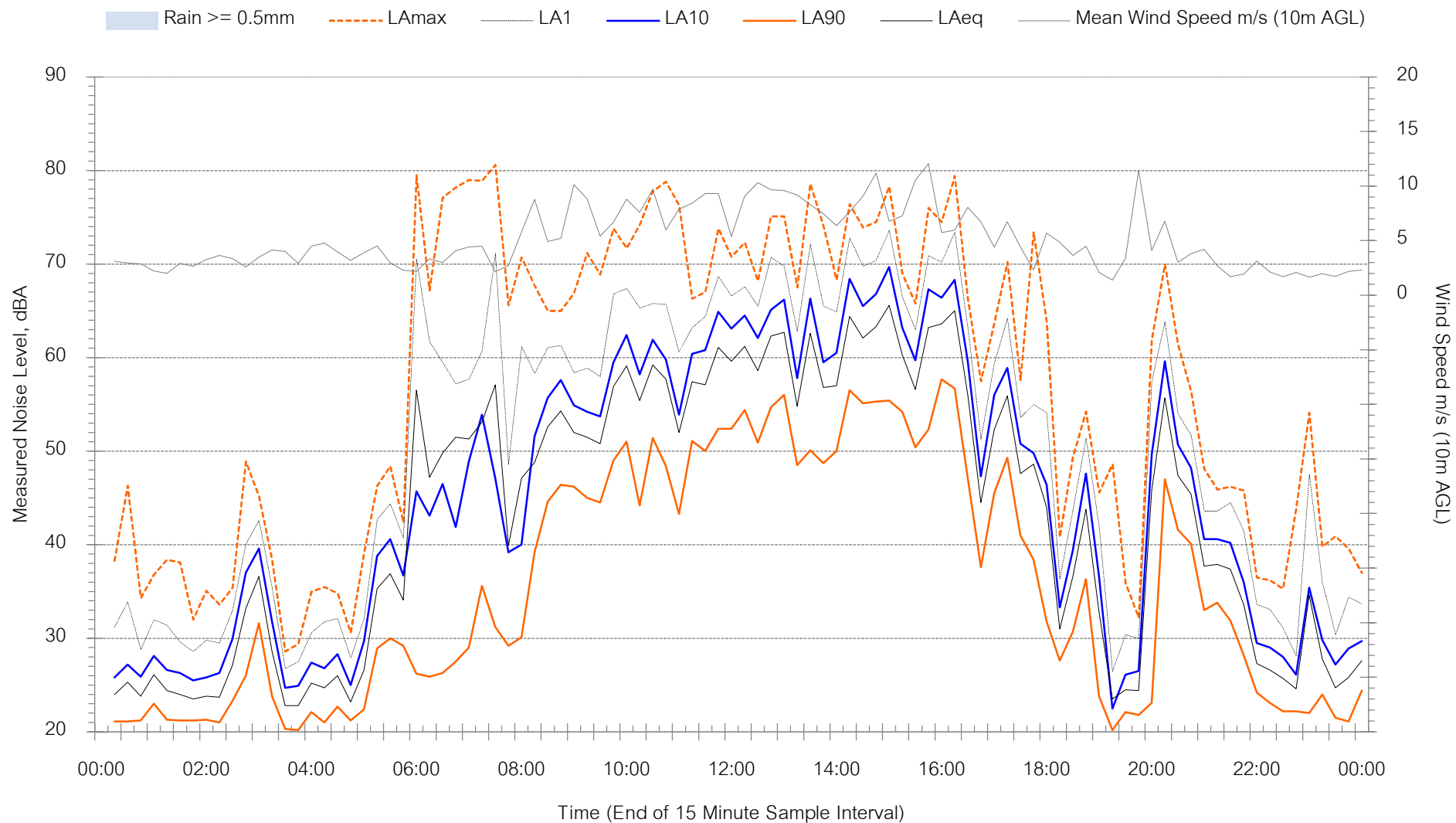
# Background Noise Levels

L3 - 2703 Thornycroft Road - Friday 21 August 2020



# Background Noise Levels

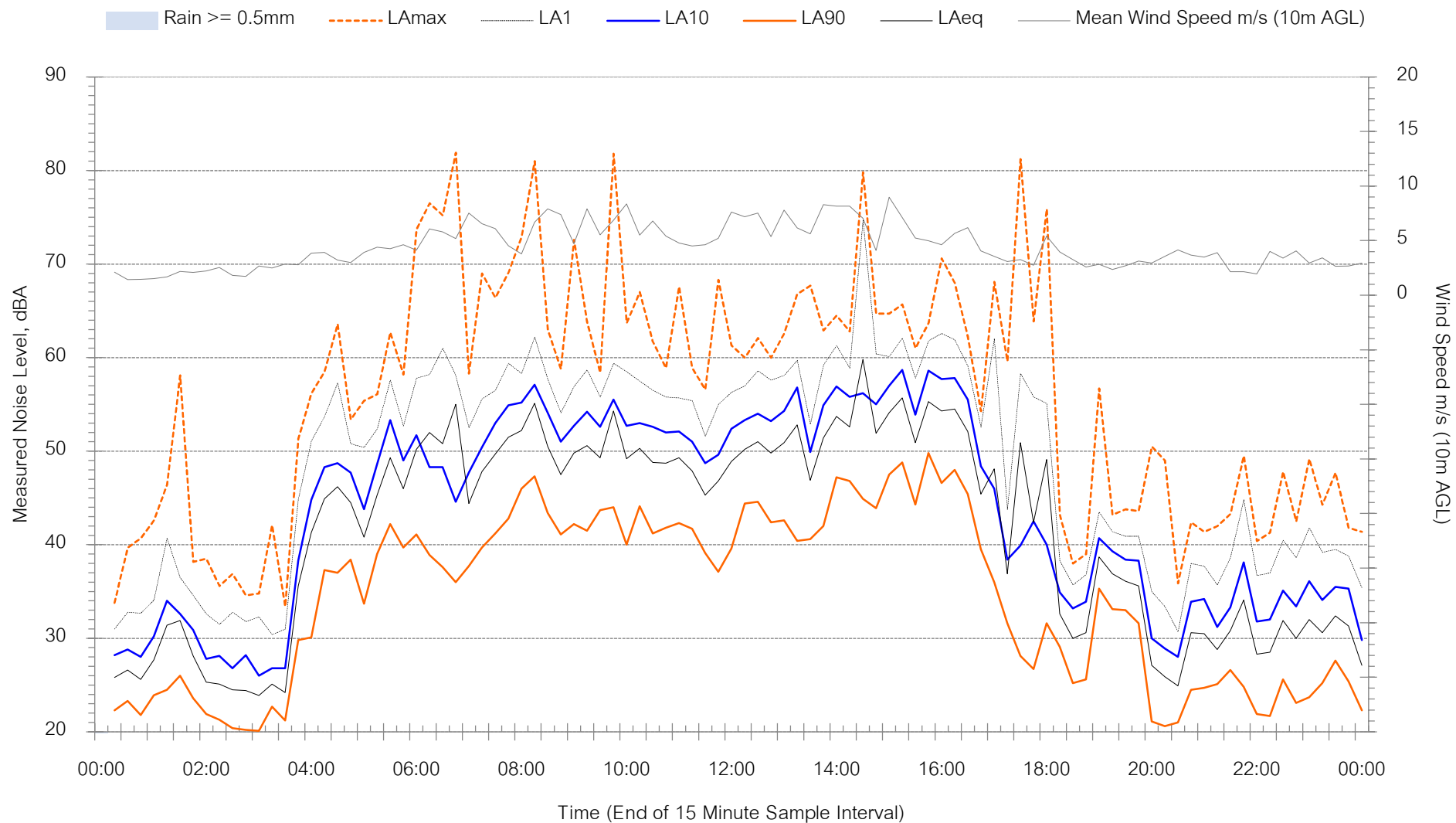
L3 - 2703 Thornycroft Road - Saturday 22 August 2020





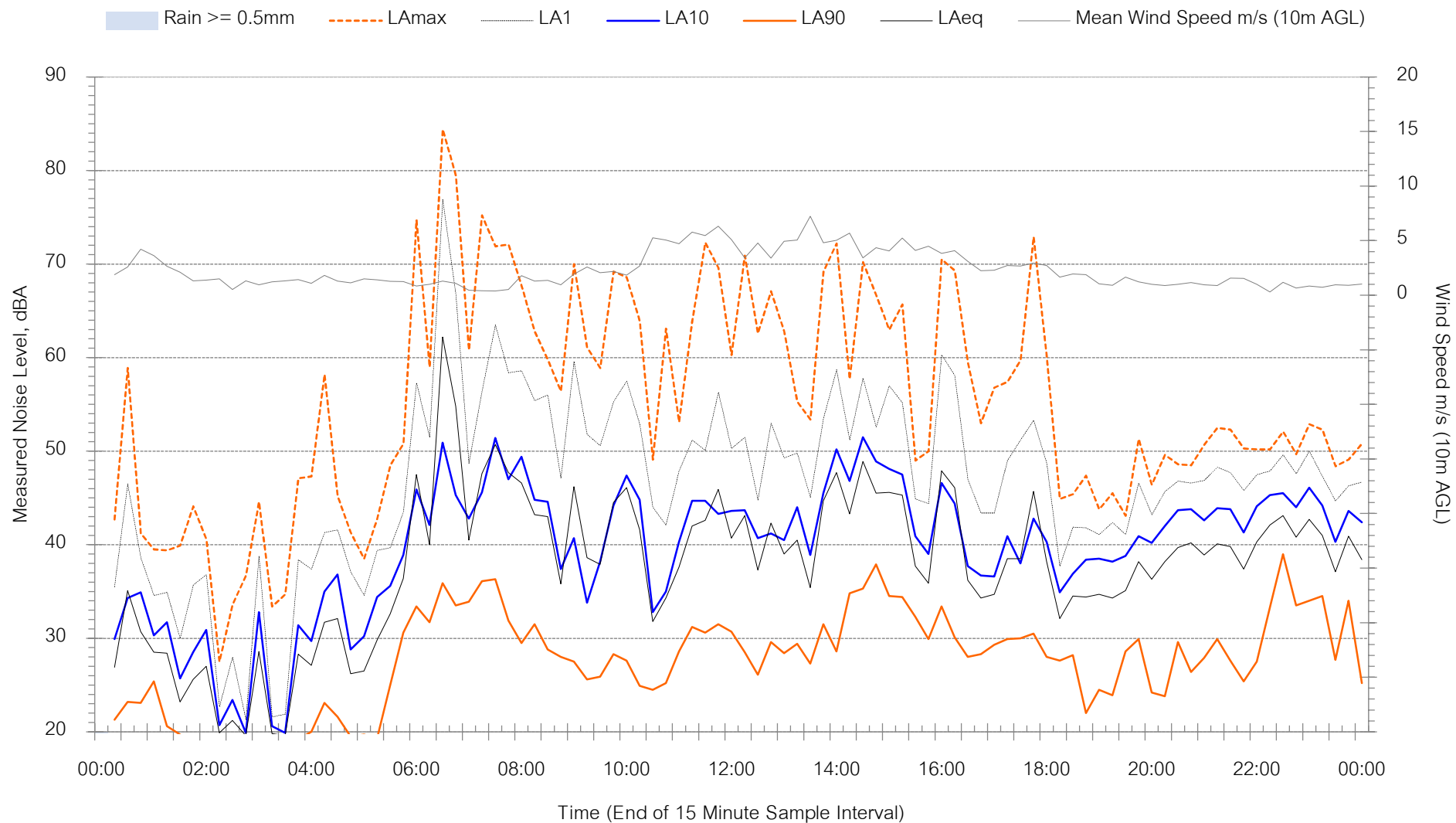
# Background Noise Levels

L3 - 2703 Thornycroft Road - Sunday 23 August 2020



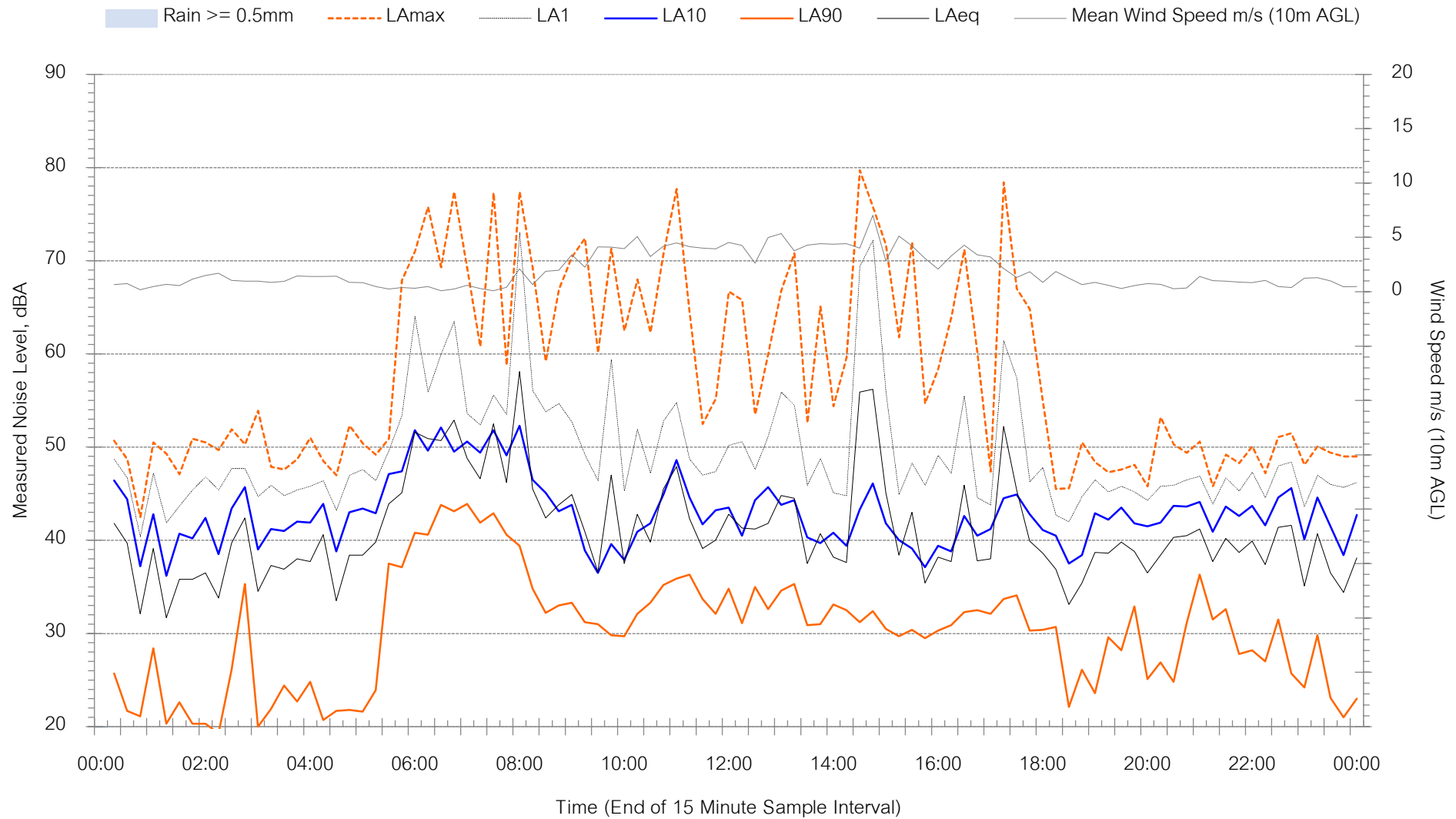
# Background Noise Levels

L3 - 2703 Thornycroft Road - Monday 24 August 2020



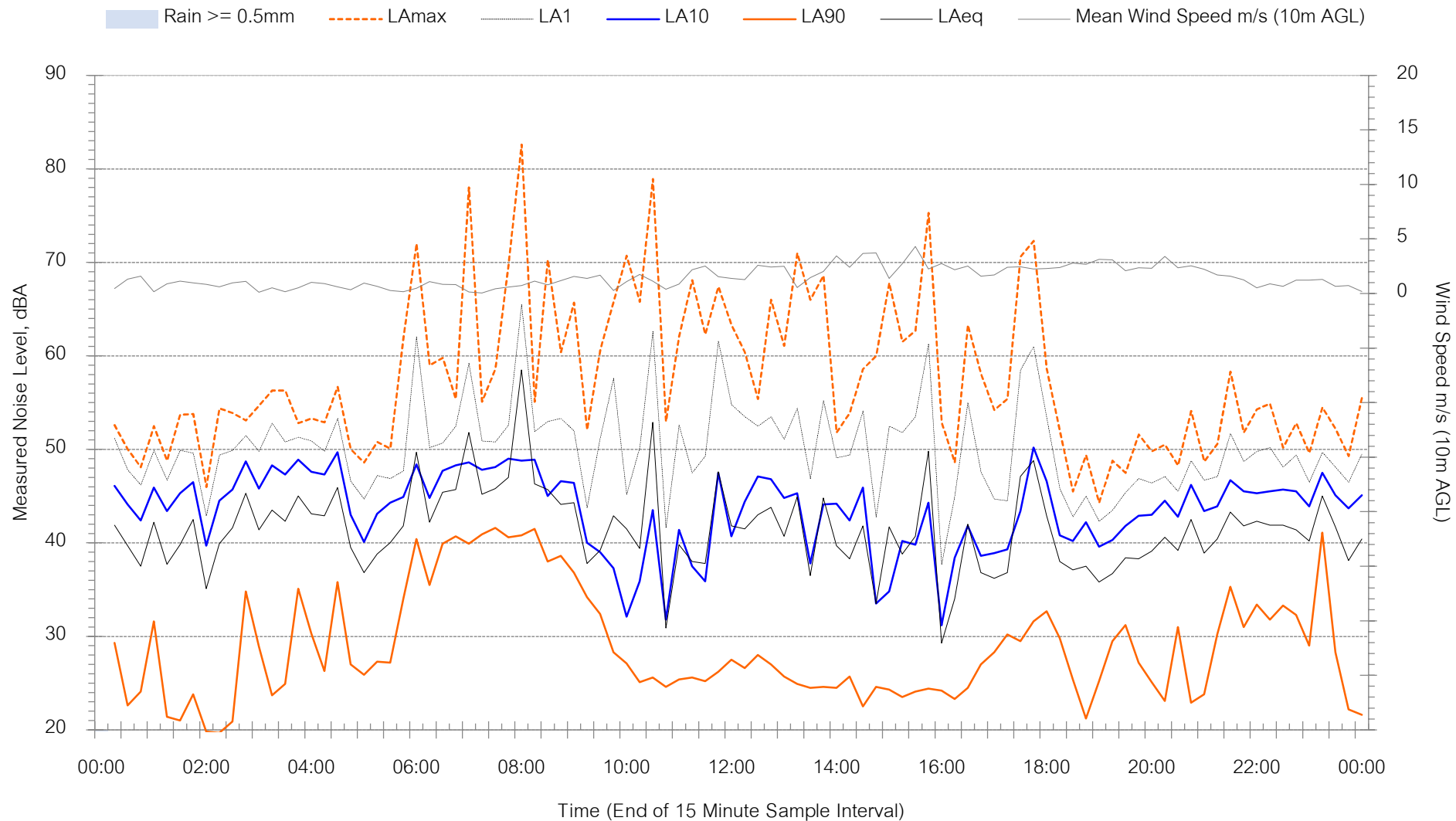
# Background Noise Levels

L3 - 2703 Thornycroft Road - Tuesday 25 August 2020



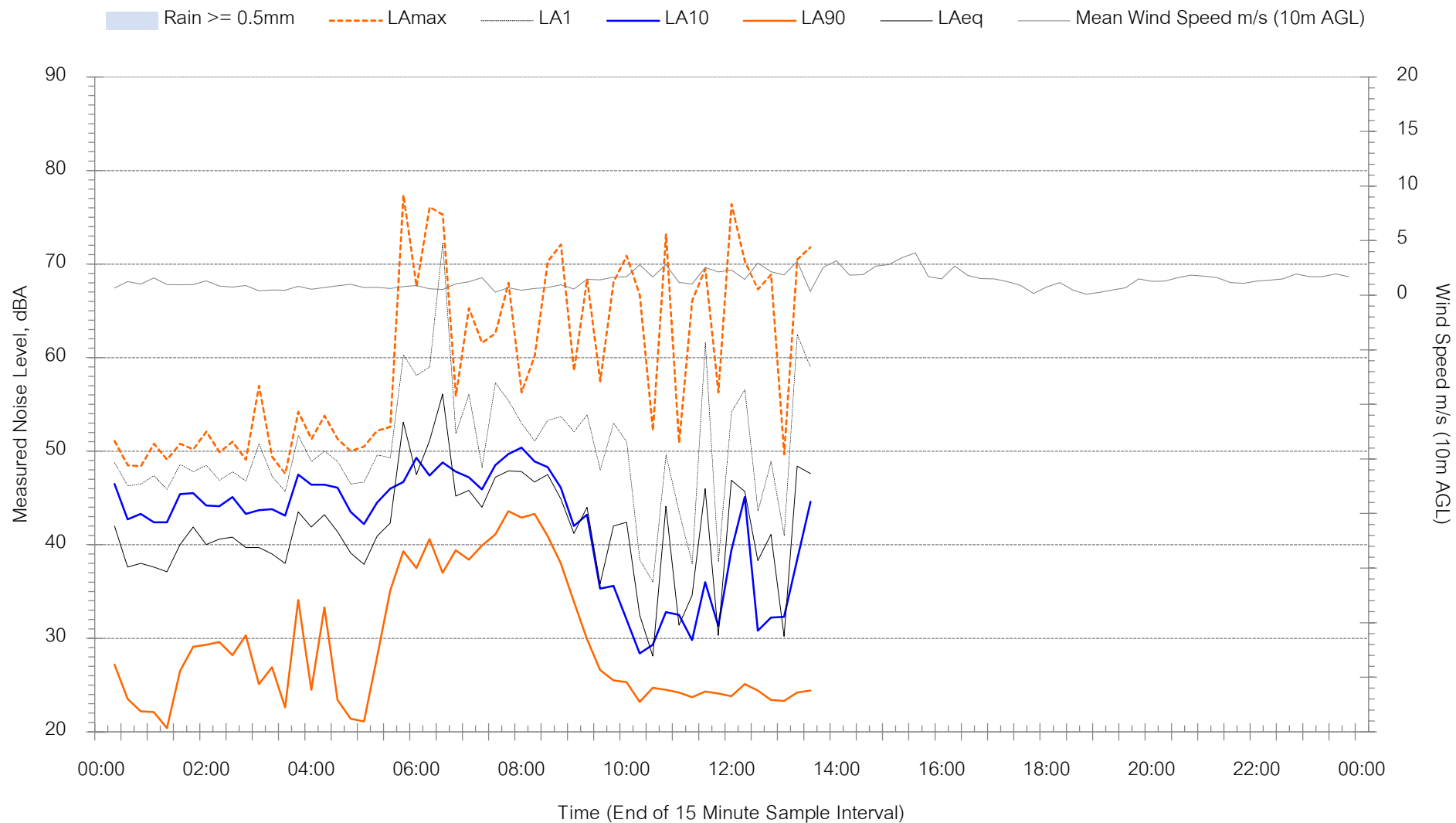
# Background Noise Levels

L3 - 2703 Thornycroft Road - Wednesday 26 August 2020



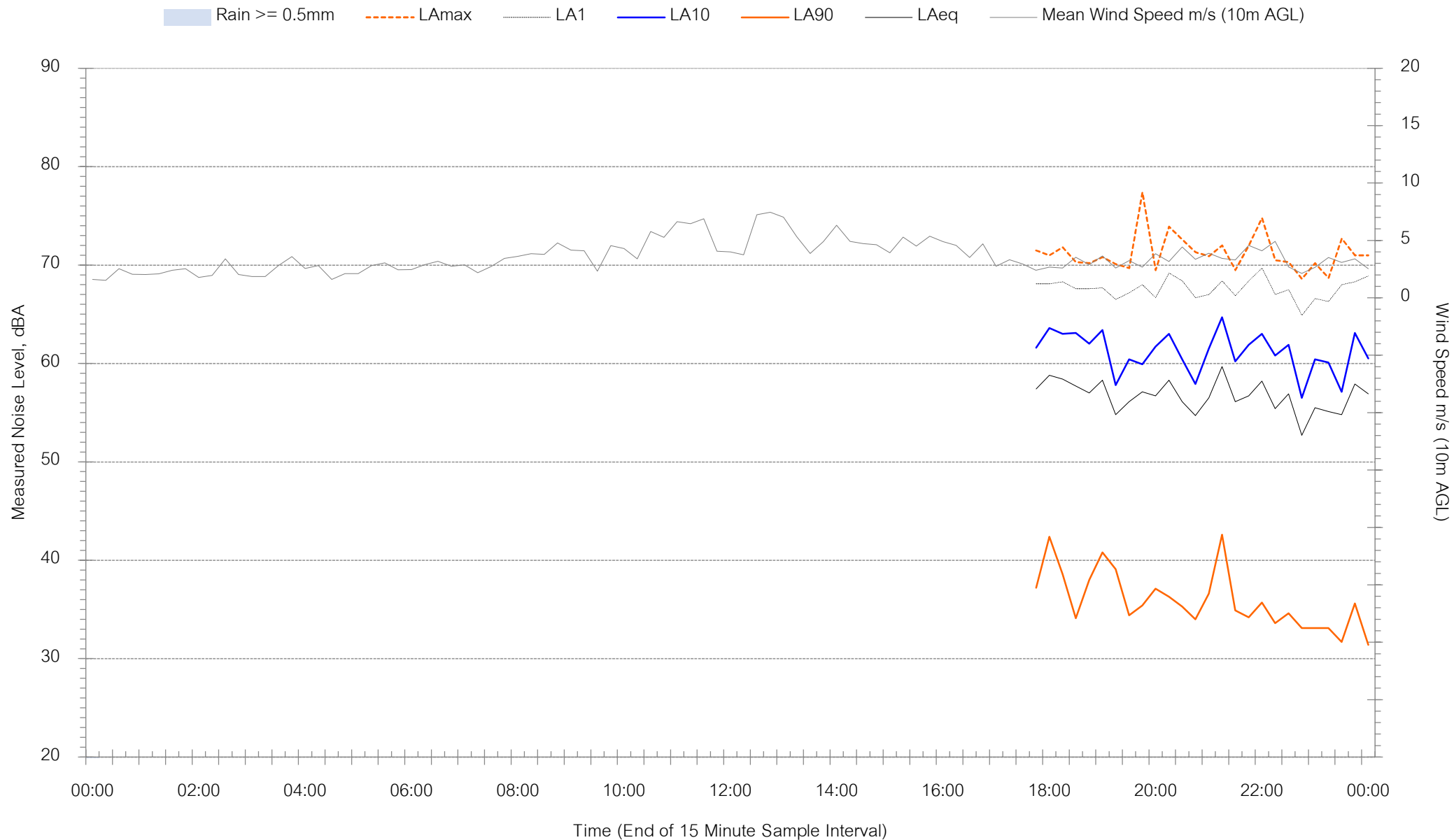
# Background Noise Levels

L3 - 2703 Thornycroft Road - Thursday 27 August 2020



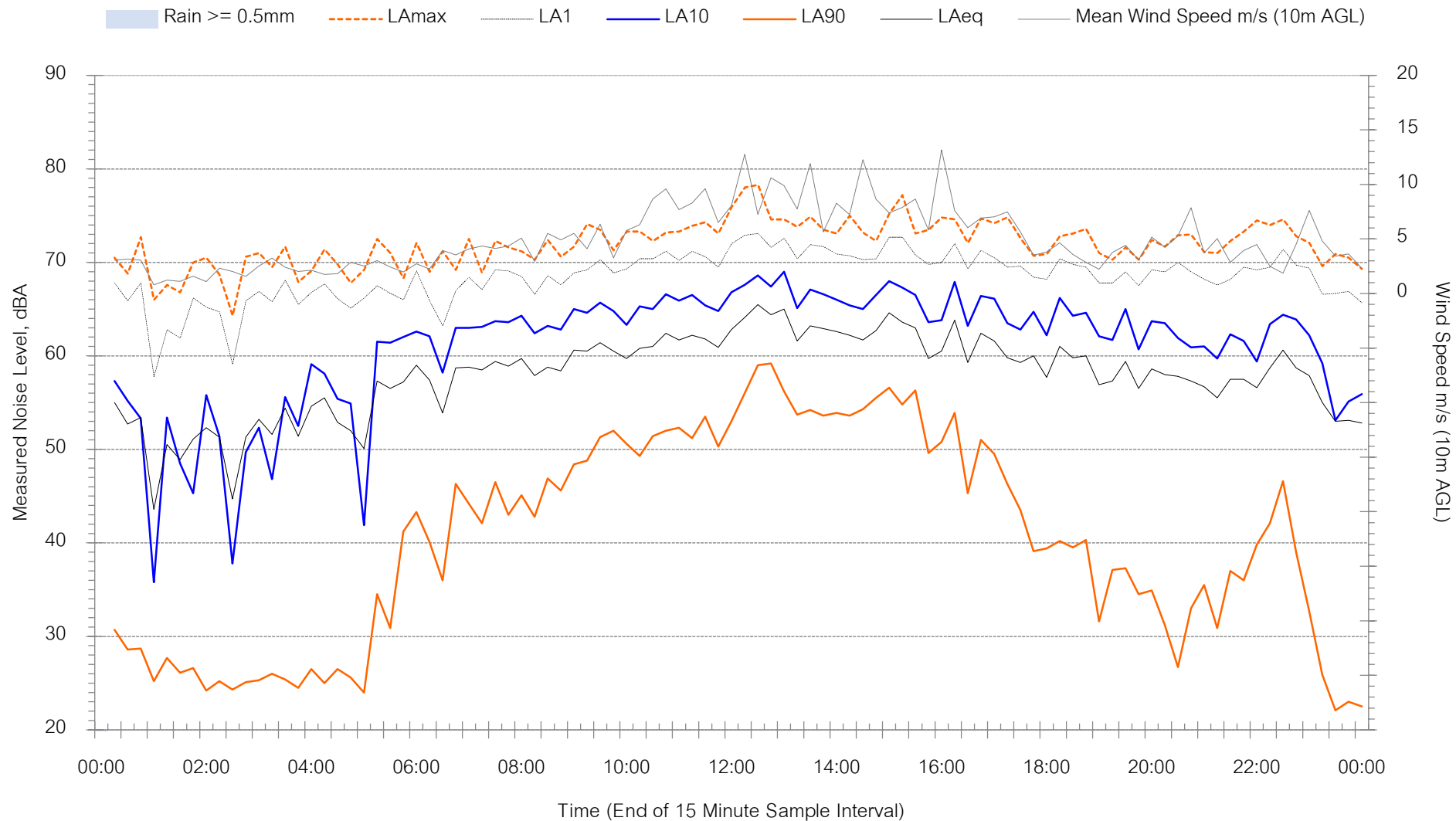
# Background Noise Levels

L4 - 5686 Newell Highway - Tuesday 18 August 2020



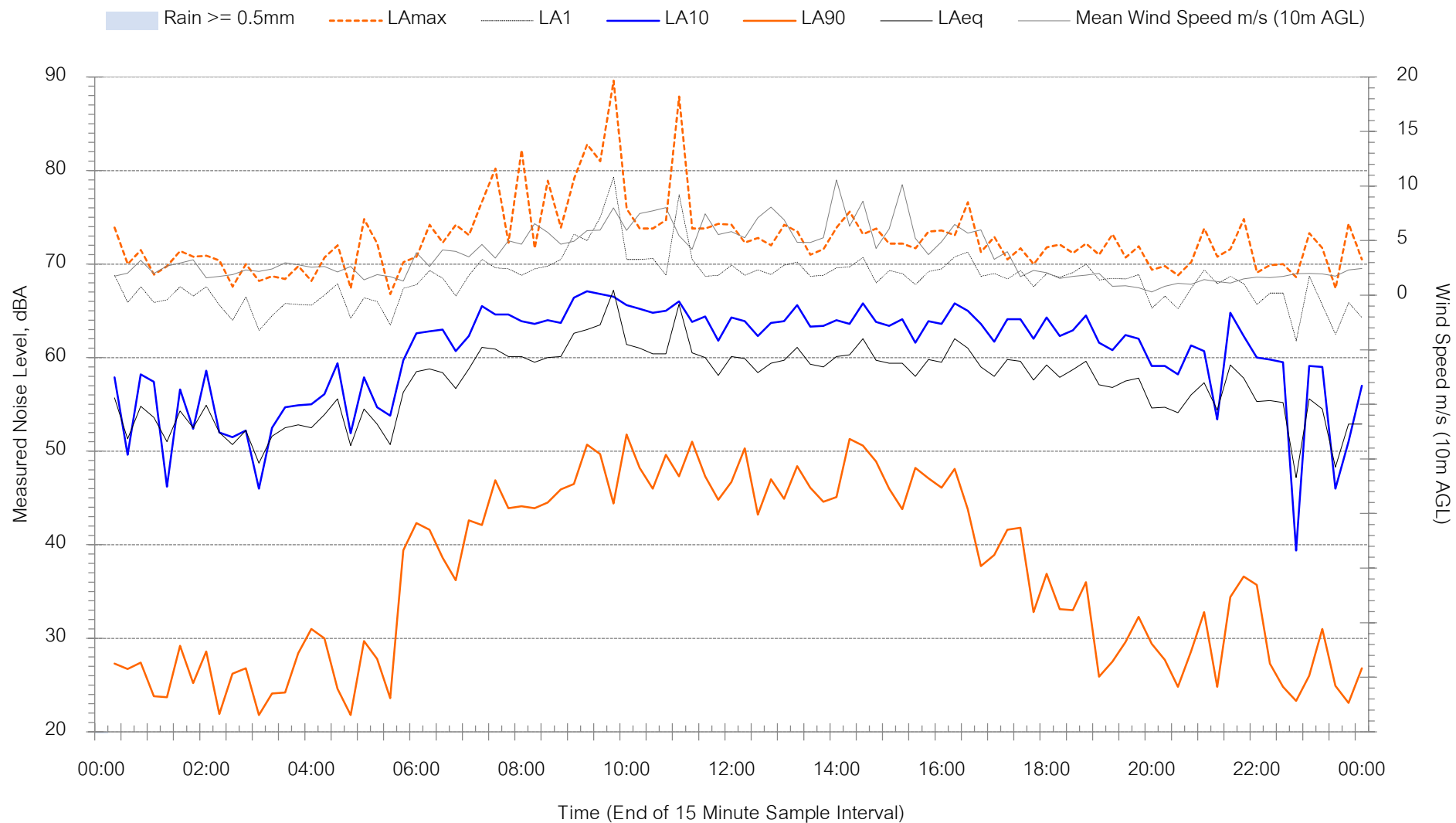
# Background Noise Levels

L4 - 5686 Newell Highway - Wednesday 19 August 2020



# Background Noise Levels

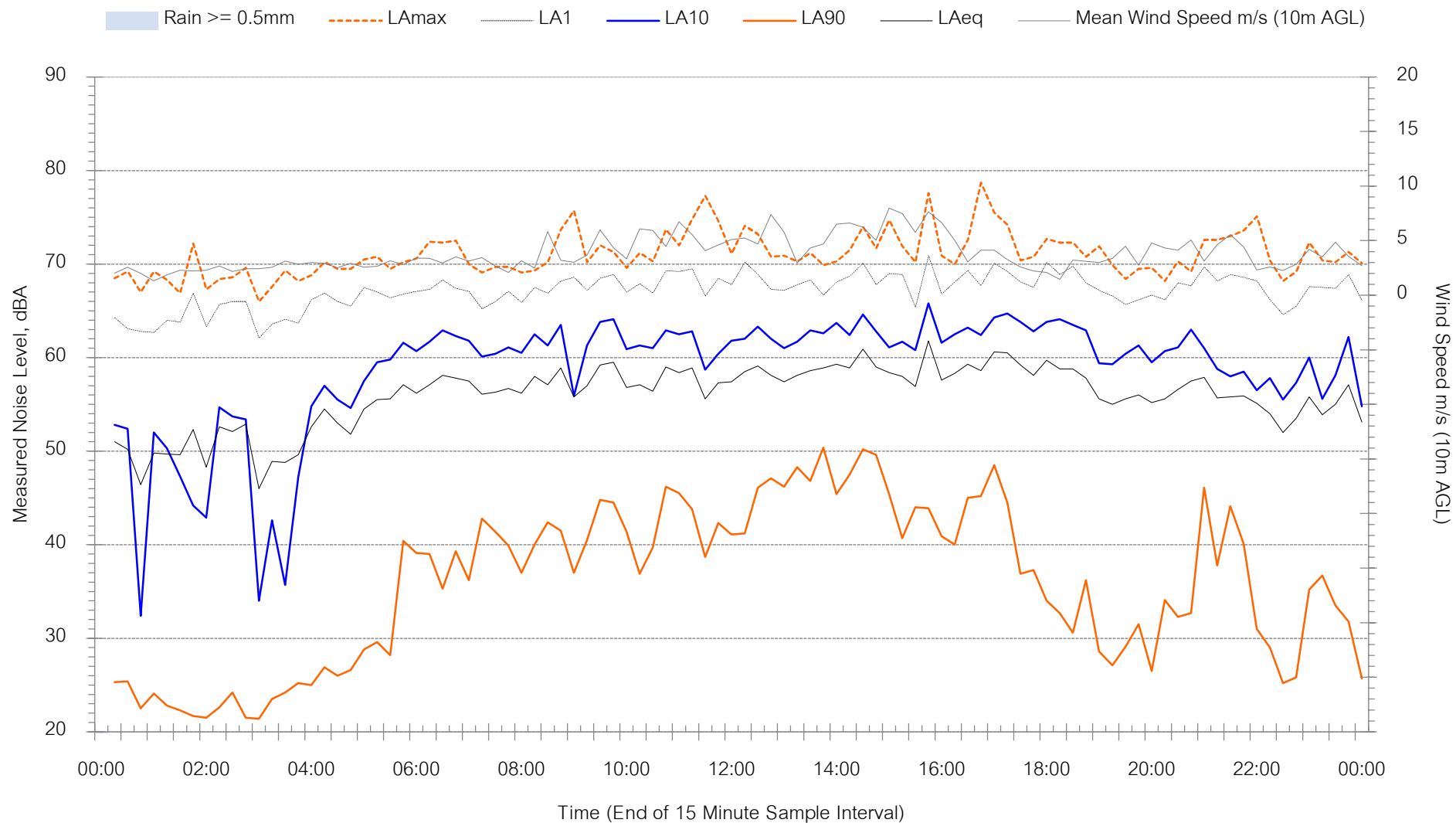
L4 - 5686 Newell Highway - Thursday 20 August 2020





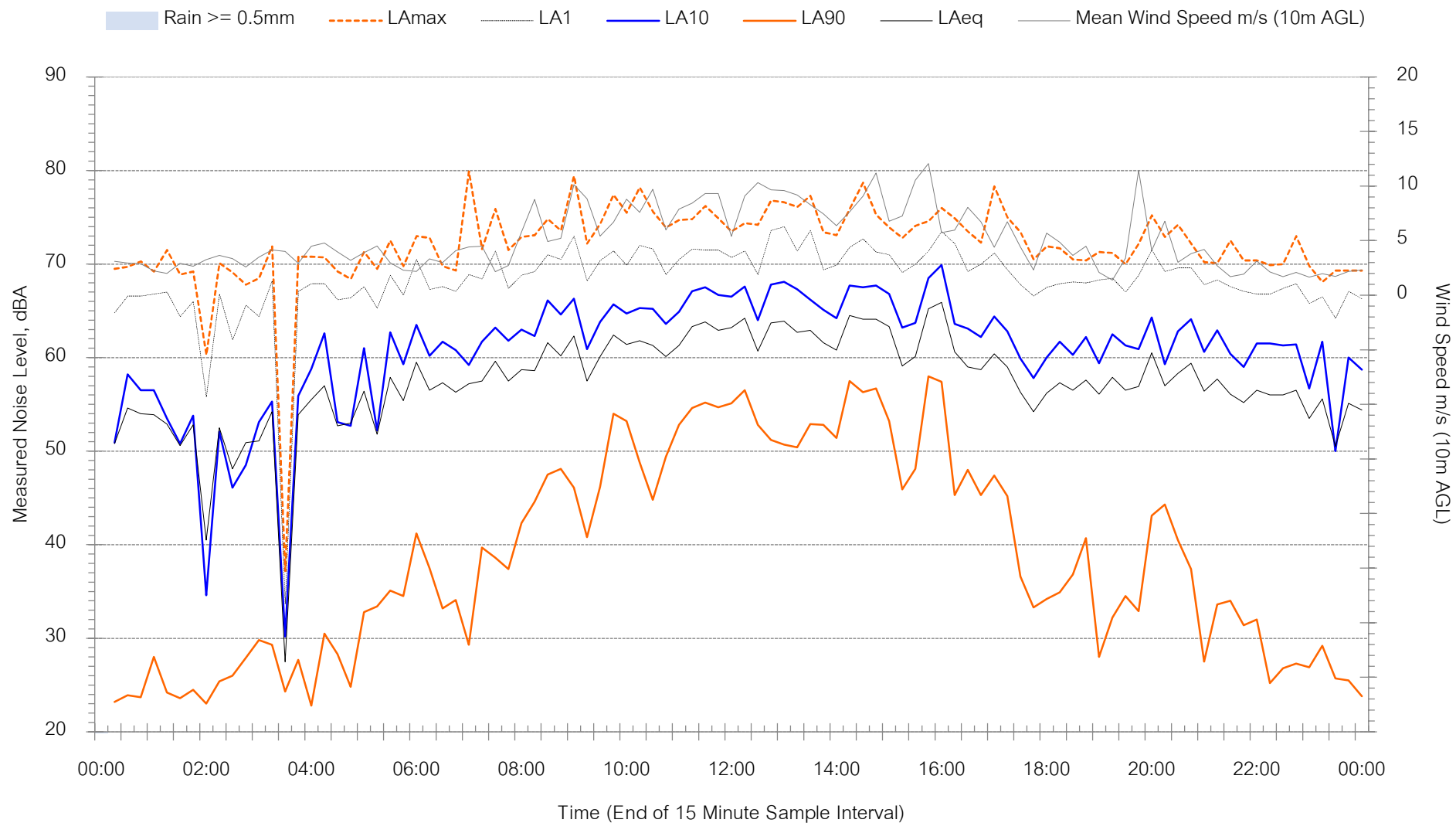
# Background Noise Levels

L4 - 5686 Newell Highway - Friday 21 August 2020



# Background Noise Levels

L4 - 5686 Newell Highway - Saturday 22 August 2020



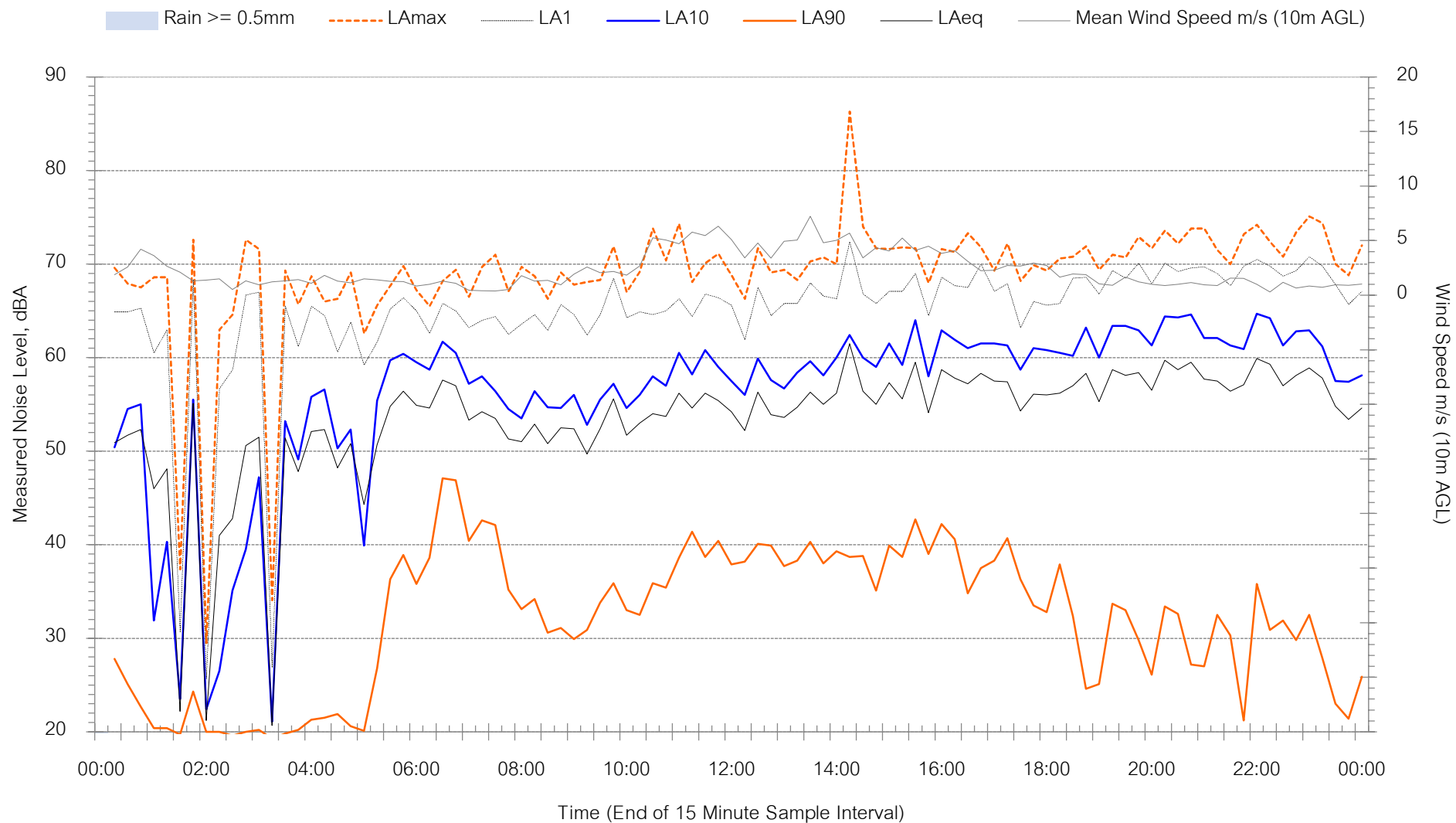
# Background Noise Levels

L4 - 5686 Newell Highway - Sunday 23 August 2020



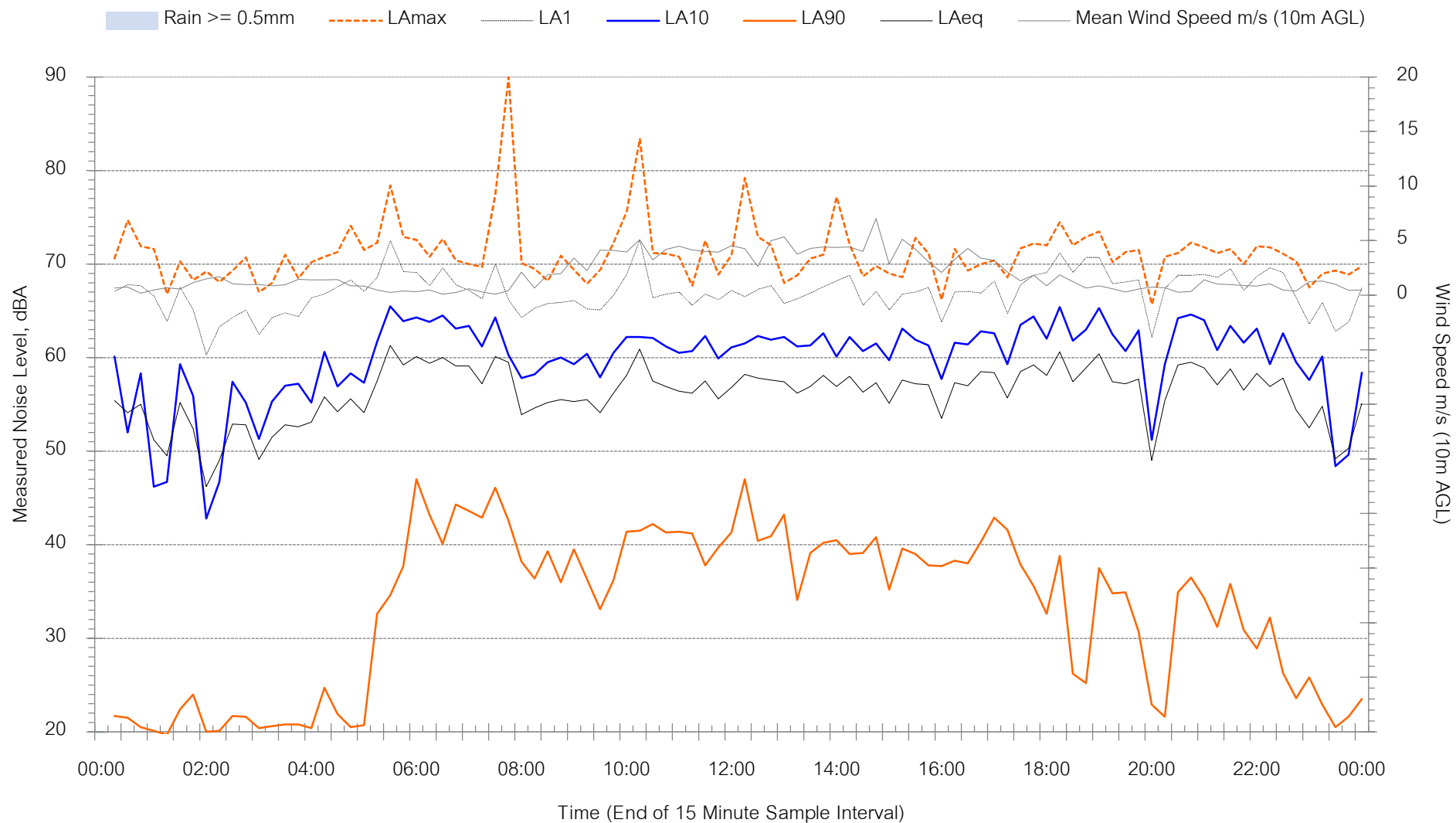
# Background Noise Levels

L4 - 5686 Newell Highway - Monday 24 August 2020



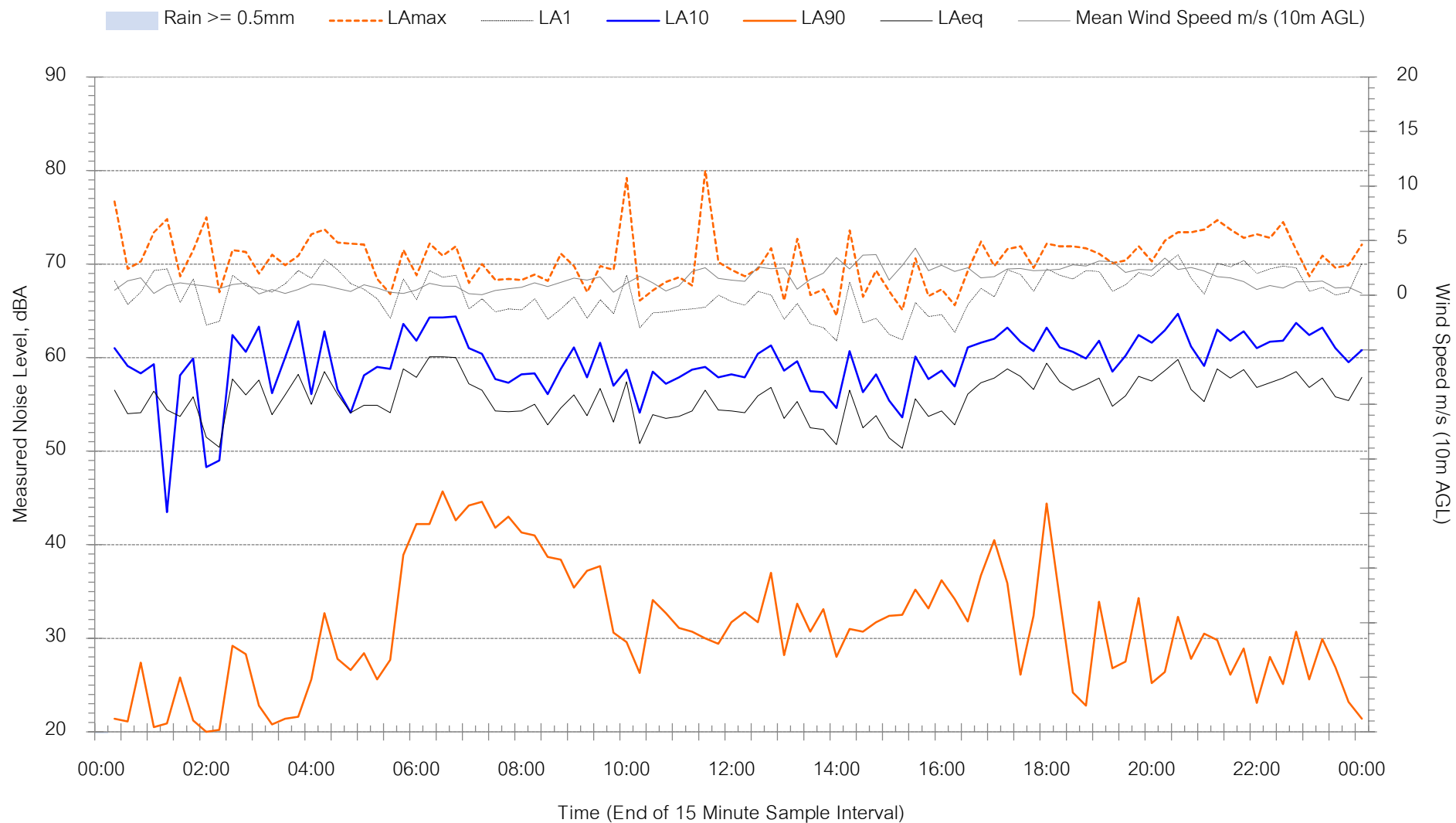
# Background Noise Levels

L4 - 5686 Newell Highway - Tuesday 25 August 2020



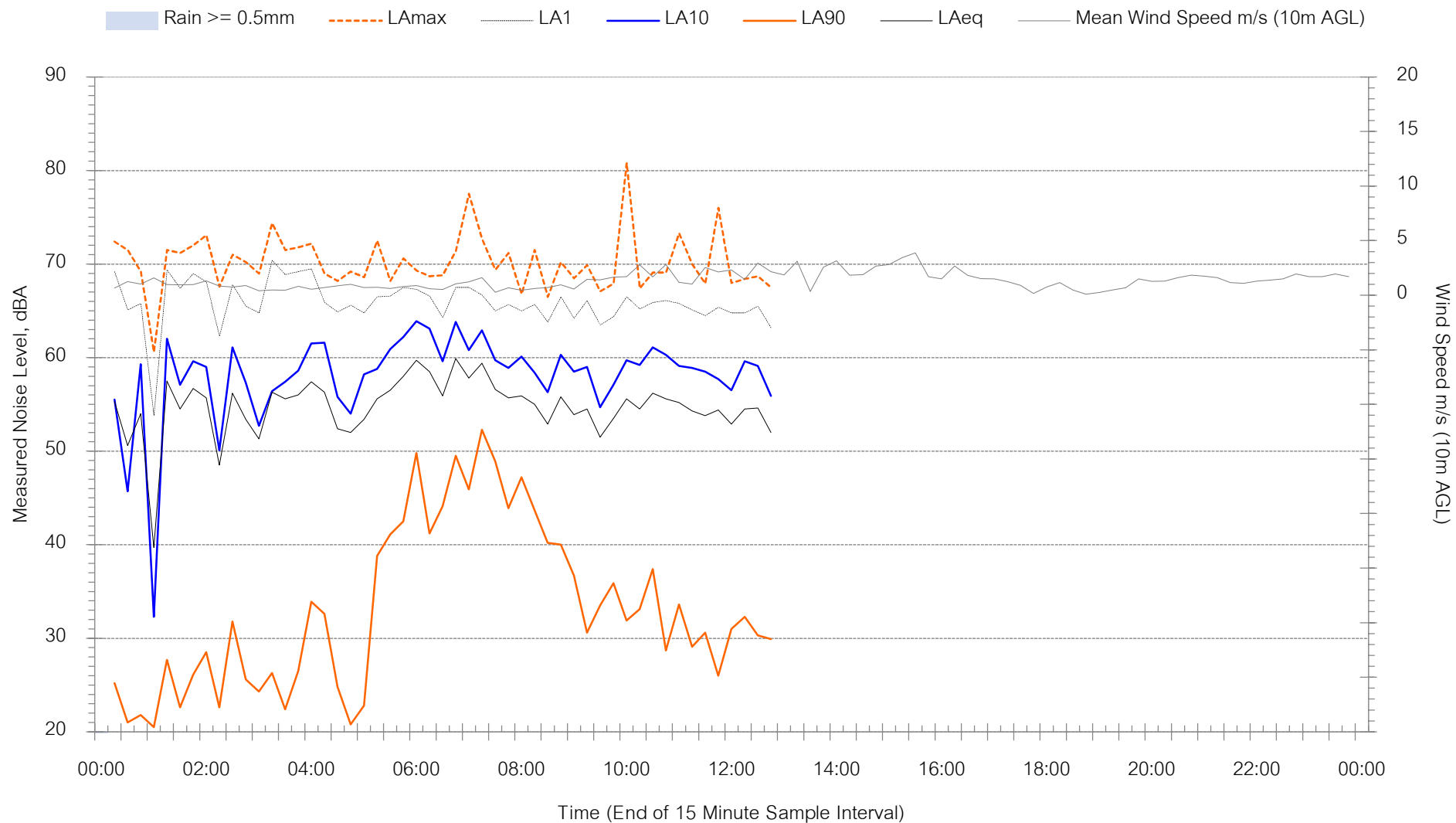
# Background Noise Levels

L4 - 5686 Newell Highway - Wednesday 26 August 2020



# Background Noise Levels

L4 - 5686 Newell Highway - Thursday 27 August 2020



Brooklands NMT

Brooklands NMT						
Date	ABL Day L90	ABL Evening L90	ABL Night L90	Leq Day	Leq Evening	Leq Night
Tuesday-1-Sep-20	34	31	30	61	45	48
Wednesday-2-Sep-20	36	31	34	61	44	43
Thursday-3-Sep-20	35	34	21	58	43	41
Friday-4-Sep-20	26	32	31	54	41	56
Saturday-5-Sep-20	32	33	34	52	43	55
Sunday-6-Sep-20	31	29	28	54	42	42
Monday-7-Sep-20	32	29	33	55	45	44
Tuesday-8-Sep-20	32	32	29	54	45	43
Wednesday-9-Sep-20	38	30	26	53	45	43
Thursday-10-Sep-20	38	33	26	48	45	43
Friday-11-Sep-20	37	30	29	60	44	44
Saturday-12-Sep-20	25	31	27	62	44	48
Sunday-13-Sep-20	26	28	27	53	44	44
Monday-14-Sep-20	31	34	28	48	42	44
Tuesday-15-Sep-20	30	31	30	48	42	45
Wednesday-16-Sep-20	31	30	27	46	44	43
Thursday-17-Sep-20	33	31	28	46	43	47
Friday-18-Sep-20	40	38	37	61	45	55
Saturday-19-Sep-20	33	32	34	61	44	59
Sunday-20-Sep-20	29	29	26	64	43	49
Monday-16-Nov-20		30	33		38	41
Tuesday-17-Nov-20	33	31	23	42	40	44
Wednesday-18-Nov-20	30	34	40	45	45	47
Thursday-19-Nov-20	30	28	30	44	43	43
Friday-20-Nov-20	26	25	25	43	42	45
Saturday-21-Nov-20	33	25	29	49	41	42
Sunday-22-Nov-20	29	29	28	42	41	42
Monday-23-Nov-20		27	28		41	45
Tuesday-24-Nov-20	31	33	32	42	47	45
Wednesday-25-Nov-20	28	32	30	47	44	44
Thursday-26-Nov-20	29	32	31	39	43	45
Friday-27-Nov-20	27	33	35	48	41	43
Saturday-28-Nov-20	38	36	34	48	53	49
Sunday-29-Nov-20	35	30	31	48	40	45
Monday-30-Nov-20		36			48	
Tuesday-1-Dec-20	33	33	34	52	44	43
Wednesday-2-Dec-20	36	32	23	45	40	44
Thursday-3-Dec-20	29	32	24	44	41	42
Friday-4-Dec-20	28	29	29	38	41	45
Saturday-5-Dec-20	37	32	27	48	47	42
Sunday-6-Dec-20	33	30	29	43	39	43
Monday-7-Dec-20	32	34	34	45	48	43
Tuesday-8-Dec-20	33	30	28	43	40	50
Wednesday-9-Dec-20	27	28	30	38	40	46
Thursday-10-Dec-20	29	31	46	39	47	55
Friday-11-Dec-20	38	45	32	52	53	48
Saturday-12-Dec-20	36	38	38	48	48	49
Sunday-13-Dec-20	38	33	24	48	47	44
Monday-14-Dec-20	36	33	29	48	44	46
Tuesday-15-Dec-20	38	29	26	48	43	44
Wednesday-16-Dec-20	33	34	29	50	45	43
Thursday-17-Dec-20	31	30	28	41	39	40
Friday-18-Dec-20	33	33	35	43	41	42
Saturday-19-Dec-20	31	31	32	43	42	42
Sunday-20-Dec-20	29	32	31	41	40	43
Monday-21-Dec-20	37	36	30	46	44	39
Tuesday-22-Dec-20	35	32	34	48	47	40
Wednesday-23-Dec-20	35	31	29	49	40	42
Thursday-24-Dec-20	30	30	28	41	38	37
Friday-25-Dec-20	28	27	37	37	38	48
Saturday-26-Dec-20	34	34	32	47	43	41
Sunday-27-Dec-20	35	29	30	45	40	42
Monday-28-Dec-20	35	34	29	53	48	56
Tuesday-29-Dec-20	29	32	37	41	43	44
Wednesday-30-Dec-20	37	37	40	48	45	48
Thursday-31-Dec-20	35	37	38	48	48	50
Friday-1-Jan-21	44	38	39	52	46	47
Saturday-2-Jan-21	37	39	30	47	54	50
Sunday-3-Jan-21	30	29	32	41	40	43
Monday-4-Jan-21	34	31	30	51	39	42
Tuesday-5-Jan-21	32	32	34	42	40	42



Brooklands NMT

Date	ABL Day L90	ABL Evening L90	ABL Night L90	Leq Day	Leq Evening	Leq Night
Wednesday-6-Jan-21	31	32	38	43	42	46
Thursday-7-Jan-21	39	34	29	47	45	41
Friday-8-Jan-21	38	38	36	45	45	46
Saturday-9-Jan-21	36	33	33	48	54	44
Sunday-10-Jan-21	33	32	31	44	43	42
Monday-11-Jan-21	33	31	35	45	46	44
Tuesday-12-Jan-21	32	31	34	45	44	44
Wednesday-13-Jan-21	33	32	31	46	45	43
Thursday-14-Jan-21	33	33	32	46	44	40
Friday-15-Jan-21	33	40	34	45	47	41
Saturday-16-Jan-21	36	33	33	45	39	44
Sunday-17-Jan-21	34	29	29	44	43	40
Monday-18-Jan-21	30	31	31	42	40	41
Tuesday-19-Jan-21	32	31	39	40	41	46
Wednesday-20-Jan-21	35	34	43	49	46	50
Thursday-21-Jan-21	35	31	28	48	54	49
Friday-22-Jan-21	31	29	27	43	43	40
Saturday-23-Jan-21	29	29	32	40	45	46
Sunday-24-Jan-21	29	29	28	40	42	41
Monday-25-Jan-21	32	29	31	41	42	42
Tuesday-26-Jan-21	34	31	32	47	41	41
Wednesday-27-Jan-21	30	31		40	53	
Thursday-28-Jan-21	47	48	35	56	58	57
Friday-29-Jan-21	36	34	32	47	43	41
Saturday-30-Jan-21	29	33	34	45	50	42
Sunday-31-Jan-21	29	37		48	46	
Monday-1-Feb-21	32	39	28	49	49	43
Tuesday-2-Feb-21	33			40		
Wednesday-3-Feb-21		30	35		43	44
Thursday-4-Feb-21	39			48		
Friday-5-Feb-21		34	34		47	44
Saturday-6-Feb-21	30	29	35	45	40	44
Sunday-7-Feb-21	33	33	31	41	40	40
Monday-8-Feb-21	31	31	34	45	43	44
Tuesday-9-Feb-21	37	32	37	49	44	45
Wednesday-10-Feb-21	33	31	32	65	43	45
Thursday-11-Feb-21	31	30	32	45	41	43
Friday-12-Feb-21	37	30	29	47	43	41
Saturday-13-Feb-21	36	35	35	44	46	43
Sunday-14-Feb-21	32	32	33	44	41	41
Monday-15-Feb-21	33	34	33	44	44	42
Tuesday-16-Feb-21	37	33	34	46	45	43
Wednesday-17-Feb-21	37	36	32	47	45	44
Thursday-18-Feb-21	40	37	40	49	46	47
Friday-19-Feb-21	34	33	30	48	44	43
Saturday-20-Feb-21	31	30	32	43	41	42
Sunday-21-Feb-21	30	32	31	41	39	41
Monday-22-Feb-21	29	33	33	47	41	40
Tuesday-23-Feb-21	32	32	34	41	45	45
Wednesday-24-Feb-21	35	35	36	50	50	46
Thursday-25-Feb-21	33	30	27	45	43	42
Friday-26-Feb-21	31	32	33	43	39	42
Saturday-27-Feb-21	30	30	31	42	50	43
Sunday-28-Feb-21	29	32	34	37	40	42
Monday-1-Mar-21	30	34	34	46	44	41
Tuesday-2-Mar-21	34	33	33	43	39	44
Wednesday-3-Mar-21	31	32	31	43	41	43
Thursday-4-Mar-21	31	32	31	41	52	42
Friday-5-Mar-21	37	34	33	45	40	42
Saturday-6-Mar-21	29	29	37	49	42	48
Sunday-7-Mar-21	32	30	31	46	41	42
Monday-8-Mar-21	30	34	28	43	41	41
Tuesday-9-Mar-21	29	34	32	42	41	43
Wednesday-10-Mar-21	29	32	34	47	46	45
Thursday-11-Mar-21	37	32	33	51	48	42
Friday-12-Mar-21	30	30	31	40	46	42
Saturday-13-Mar-21	34	31	33	44	42	42
Sunday-14-Mar-21	38	35	28	44	42	40
Monday-15-Mar-21	32	32	33	40	41	45
Tuesday-16-Mar-21	39	35	32	50	45	43
Wednesday-17-Mar-21	36	36	34	47	47	49
Thursday-18-Mar-21	35	37	37	49	45	46

Brooklands NMT

Date	ABL Day L90	ABL Evening L90	ABL Night L90	Leq Day	Leq Evening	Leq Night
Friday-19-Mar-21	40	37	35	52	46	42
Saturday-20-Mar-21	36	36	40	46	50	48
Sunday-21-Mar-21	41	41	39	49	47	46
Monday-22-Mar-21	44	48	45	53	55	52
Tuesday-23-Mar-21	33	37	33	47	44	38
Wednesday-24-Mar-21	32	34	32	43	43	39
Thursday-25-Mar-21	34	33	33	42	41	43
Friday-26-Mar-21	30	31	31	52	40	42
Saturday-27-Mar-21	30	29	32	42	41	43
Sunday-28-Mar-21	32	32	32	41	40	40
Monday-29-Mar-21	36	33	32	43	42	44
Tuesday-30-Mar-21	37			47		44
Wednesday-31-Mar-21	34	34		45	48	
Thursday-1-Apr-21	32	36	33	44	44	43
Friday-2-Apr-21	33	31	29	45	43	40
Saturday-3-Apr-21	32	30	34	43	52	43
Sunday-4-Apr-21	29	30	34	42	41	43
Monday-5-Apr-21	31	31	35	44	43	44
Tuesday-6-Apr-21	38	34	34	48	46	44
Wednesday-7-Apr-21	29	31	31	46	48	44
Thursday-8-Apr-21	30	32	30	45	45	43
Friday-9-Apr-21	33	34	32	43	41	40
Saturday-10-Apr-21	33	32	32	49	41	42
Sunday-11-Apr-21	41	33	31	49	41	41
Monday-12-Apr-21	34	33	31	43	43	45
Tuesday-13-Apr-21	32	28	27	45	44	42
Wednesday-14-Apr-21	30	33	31	43	45	44
Thursday-15-Apr-21	34	34	32	44	42	42
Friday-16-Apr-21	34	32	27	44	44	42
Saturday-17-Apr-21	31	35	32	42	42	44
Sunday-18-Apr-21	29	31	31	39	41	43
Monday-19-Apr-21	29	32	31	42	43	45
Tuesday-20-Apr-21	31	31	30	43	43	40
Wednesday-21-Apr-21	33	30	31	41	42	44
Thursday-22-Apr-21	31	33	30	44	43	45
Friday-23-Apr-21	32	33	33	42	42	44
Saturday-24-Apr-21	33	34	34	41	42	43
Sunday-25-Apr-21	36	33	31	43	42	42
Monday-26-Apr-21	30	30	30	41	42	43
Tuesday-27-Apr-21	32	30	33	45	46	45
Wednesday-28-Apr-21	29	31	30	45	46	45
Thursday-29-Apr-21	30	32	28	44	46	44
Friday-30-Apr-21	32	32		45	46	43
Saturday-1-May-21	31	30	31	44	45	43
Sunday-2-May-21	33	30	28	44	46	44
Monday-3-May-21	29	29	35	42	46	44
Tuesday-4-May-21	32	32	29	41	39	38
Wednesday-5-May-21	36	32	31	43	41	40
Thursday-6-May-21	37	32	28	44	41	42
Friday-7-May-21	33	28	28	42	42	44
Saturday-8-May-21	29	31	28	41	40	40
Sunday-9-May-21	29	28	26	40	40	42
Monday-10-May-21	30	27	28	41	44	38
Tuesday-11-May-21	31	30	29	40	38	38
Wednesday-12-May-21	30	33	33	41	43	45
Thursday-13-May-21	31	31	31	42	42	41
Friday-14-May-21	37	31	30	43	40	38
Saturday-15-May-21	36	34	33	51	42	42
Sunday-16-May-21	33	32	33	40	41	43
Monday-17-May-21	34	36		42	45	45
Wednesday-26-May-21		35	32	44	43	40
Thursday-27-May-21	38	36	32	44	42	42
Friday-28-May-21	40	34	33	47	42	42
Saturday-29-May-21	30	33	32	40	42	43
Sunday-30-May-21	31	33	28	42	42	42
Monday-31-May-21	30	33	31	44	47	48
Monday-14-Jun-21	29	33	31	41	46	45
Tuesday-15-Jun-21	30	35	32	43	47	46
Wednesday-16-Jun-21	36	33	32	47	48	44
Thursday-17-Jun-21	30	27	27	42	41	39
Friday-18-Jun-21	31	33	32	44	41	39
Saturday-19-Jun-21	37	35	33	43	42	42

Date	ABL Day L90	ABL Evening L90	ABL Night L90	Leq Day	Leq Evening	Leq Night
Sunday-20-Jun-21	31	32	29	42	43	44
Monday-21-Jun-21	34	32	34	46	46	46
Tuesday-22-Jun-21	38	34	35	49	47	45
Wednesday-23-Jun-21	39	33	31	49	44	43
Thursday-24-Jun-21	34	29	29	53	41	41
Friday-25-Jun-21	34	31	33	43	46	44
Saturday-26-Jun-21	32	36	34	41	42	41
Sunday-27-Jun-21	38	35	33	43	42	43
Monday-28-Jun-21	36	34	34	46	47	46
Tuesday-29-Jun-21	42	36	38	50	47	46
Wednesday-30-Jun-21	37	36	35	48	47	45
Thursday-1-Jul-21	41	35	31	50	46	38
Friday-2-Jul-21	31	36	33	41	47	43
Saturday-3-Jul-21	30	37	35	42	43	46
Sunday-4-Jul-21	30	34	34	49	46	45
Monday-5-Jul-21	34	36	32	43	46	43
Saturday-10-Jul-21	37	35	31	43	43	43
Sunday-11-Jul-21	36	30	32	62	46	43
Monday-12-Jul-21	32	34	31	45	48	46
Tuesday-13-Jul-21	33	29	31	45	45	44
Wednesday-14-Jul-21	38	37	32	48	46	42
Thursday-15-Jul-21	31	30	30	42	43	42
Friday-16-Jul-21	34	29	30	54	41	49
Saturday-17-Jul-21	36	31	34	53	41	40
Sunday-18-Jul-21	31	32	28	43	40	42
Monday-19-Jul-21	30	30	30	42	40	42
Tuesday-20-Jul-21	32	36	41	44	46	49
Wednesday-21-Jul-21	39	37	34	53	45	46
Thursday-22-Jul-21	38	31	31	47	46	45
Friday-23-Jul-21	41	34	28	49	45	38
Saturday-24-Jul-21	30	31	31	47	47	40
Sunday-25-Jul-21	34	33	29	48	44	41
Monday-26-Jul-21	30	30	29	49	45	44
Tuesday-27-Jul-21	36	34	33	48	46	44
Wednesday-28-Jul-21	35	29	33	48	44	42
Thursday-29-Jul-21	35	35	33	49	47	46
Friday-30-Jul-21	35	30	30	46	46	44
Saturday-31-Jul-21	37	30		48	43	
Sunday-1-Aug-21	32	33	35	43	41	44
Monday-2-Aug-21	36	35	31	48	52	44
Tuesday-3-Aug-21	35			49		
Wednesday-4-Aug-21			33			44
Thursday-5-Aug-21	37	35	34	52	42	42
Friday-6-Aug-21	36	34	34	47	42	38
Wednesday-8-Sep-21		34	32		42	46
Thursday-9-Sep-21	28	27	27	58	46	43
Friday-10-Sep-21	28	27	31	40	46	44
Saturday-11-Sep-21	32	27	25	49	43	45
Sunday-12-Sep-21	28	31	30	46	44	40
Monday-13-Sep-21	32	34	30	62	41	42
Tuesday-14-Sep-21	33	37	30	43	43	45
Wednesday-15-Sep-21	29	32	30	60	43	44
Thursday-16-Sep-21	30	28	27	43	44	44
Friday-17-Sep-21	34	32	28	53	43	43
Saturday-18-Sep-21	28	25	31	44	42	44
Sunday-19-Sep-21	27	25	21	44	44	43
Monday-20-Sep-21	26	39	31	54	42	41
Tuesday-21-Sep-21	36	37	30	47	42	42
Wednesday-22-Sep-21	33	34	32	47	43	46
Thursday-23-Sep-21	29	30	28	56	45	56
Friday-24-Sep-21	31	28	27	47	42	42
Saturday-25-Sep-21	33	34	32	49	42	44
Sunday-26-Sep-21	35	35	35	46	44	45
Monday-27-Sep-21	34	32	33	48	46	44
Tuesday-28-Sep-21	35	34	27	47	44	43
Wednesday-29-Sep-21	35	38	22	49	44	43
Thursday-30-Sep-21	29	34	33	57	54	41
<b>RBL and Leq Overall</b>	<b>33</b>	<b>32</b>	<b>32</b>	<b>51</b>	<b>46</b>	<b>46</b>

Thornycroft NMT

Thornycroft NMT						
Date	ABL Day L90	ABL Evening L90	ABL Night L90	Leq Day	Leq Evening	Leq Night
Wednesday-1-Sep-21	26	25	33	54	34	63
Thursday-2-Sep-21	31	28	31	66	36	61
Friday-3-Sep-21	32	28	35	69	58	68
Saturday-4-Sep-21			34			62
Sunday-5-Sep-21	42	30	25	75	42	38
Monday-6-Sep-21	41	26	20	72	50	51
Tuesday-7-Sep-21	32	25	20	66	34	39
Wednesday-8-Sep-21	29	26	22	57	44	43
Thursday-9-Sep-21	26	28	27	48	35	40
Friday-10-Sep-21	27	28	26	48	39	44
Saturday-11-Sep-21	29	30	29	54	38	54
Sunday-12-Sep-21	31	27	19	57	74	46
Monday-13-Sep-21	35	22	20	66	50	46
Tuesday-14-Sep-21	31	20	19	72	38	46
Wednesday-15-Sep-21	25	19	19	56	32	52
Thursday-16-Sep-21	24	20	23	60	33	60
Friday-17-Sep-21	27	26	26	62	40	61
Saturday-18-Sep-21	27	22	22	64	38	45
Sunday-19-Sep-21	25	25	26	57	33	57
Monday-20-Sep-21	32	29	28	74	60	58
Tuesday-21-Sep-21	38	23	19	71	35	37
Wednesday-22-Sep-21	27	20	20	63	36	39
Thursday-23-Sep-21	25	21	25	65	43	61
Friday-24-Sep-21	29	23	20	67	48	54
Saturday-25-Sep-21	30	21	18	65	35	59
Sunday-26-Sep-21	30	34	45	68	67	71
Monday-27-Sep-21	26	23	37	70	50	65
Tuesday-28-Sep-21	34	28	27	71	52	62
Wednesday-29-Sep-21		32	33		64	61
Thursday-30-Sep-21	28	28		61	53	
RBL and Leq Overall	29	26	25	68	61	61

# Appendix C – Sound Power Data

**Table C1 – Sound Power Data Mining Operations**

			A Weighted Octave Level (dBA re 10 <sup>-12</sup> W)									
Area	Description	Height,m	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Total
Processing	TGO Primary and Secondary Crusher	5	--	88	98	101	108	110	111	106	95	115
	Ballmill	5	--	88	99	102	108	105	105	98	88	112
	Front End Loader (WA 700)	2	--	94	99	104	107	105	107	98	93	112
Residue Storage facility	40t Articulated Mine Truck	2	71	92	96	102	102	103	100	93	84	108
	Grader 16M	2		78	94	101	105	110	107	103	98	113
	Water Cart (Road Tanker)	2	70	86	87	87	93	106	96	91	82	107
	Excavator (80t)	2		107	100	101	103	105	107	103	97	113
	Articulated Haul Truck	2	67	83	84	84	90	103	93	88	79	104
	CAT D10 Bulldozer	2	75	86	104	103	108	110	107	103	94	115
	Padfoot Roller (18t)	2	57	76	91	101	102	103	101	93	87	108
Underground Mining	UG Mine Truck CAT AD55	2	--	97	101	105	109	106	108	101	98	114
	Ventilation fans (underground)	2	73	78	84	98	103	105	102	97	86	109
	Ventilation Fan (at surface inlet/outlet)	2	0	66	74	84	87	81	79	71	56	90
	Paste Plant	2	5	88	98	98	99	99	93	87	82	105
Open Cut Mining	CAT D10 Bulldozer	2	75	86	104	103	108	110	107	103	94	115
	KOMATSU D475 Bulldozer	2	--	81	98	97	100	103	102	96	89	108
	CAT854 Wheel Dozer	2	63	81	96	101	107	108	104	98	92	112
	Drill	2	--	81	103	104	106	109	108	100	92	114
	Grader 16M	2	62	84	84	86	98	104	103	93	84	107

**Table C1 – Sound Power Data Mining Operations**

A Weighted Octave Level (dBA re 10 <sup>-12</sup> W)												
Area	Description	Height,m	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Total
	Hitachi Ex1200 Excavator	2	5	85	99	101	106	105	100	88	77	110
	Hitachi Ex1900 Excavator	2	8	88	102	104	109	108	103	91	80	113
	Hitachi Ex2600 Excavator	2	63	86	102	107	109	109	107	102	96	115
	CAT 777 Haul Truck	2	--	79	100	102	110	110	115	103	94	118
	CAT 789 Haul Truck	2	--	72	97	104	113	110	107	104	97	116
Roads	Water Cart CAT 773WC	2	65	83	98	103	109	110	106	100	94	114
	Grader 16M	2		78	94	101	105	110	107	103	98	113
	Water Cart (Road truck)	2	67	83	84	84	90	103	93	88	79	104
	Water Cart (CAT 740WC)	2		83	98	103	109	110	106	100	94	114

Note: Equipment types and models are indicative only.

**Table C1 – Sound Power Data Construction Activities**

A Weighted Octave Level (dBA re 10 <sup>-12</sup> W)													
Area	Description	Quantity	Height,m	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Total
SAR Construction	Excavator Hitachi EX1200	1	2	--	99	101	104	107	110	111	106	102	116
	CAT 777 Haul Truck	3	2	--	97	101	105	109	106	108	101	98	114
	CAT D10 Bulldozer	1	2	--	86	103	102	105	108	107	101	94	113
	Grader CAT 16M	1	2	--	78	94	101	105	110	107	103	98	113
	Water Cart (CAT 740WC)	1	2	--	83	98	103	109	110	106	100	94	114
Road Construction	Scraper CAT637	3	2	68	89	98	100	103	105	104	95	90	110
	Articulated Haul Truck CAT740	4	2	61	80	83	89	102	107	93	88	76	108
	Front End Loader CAT988	1	2	67	88	97	100	105	106	101	96	89	110
	Excavator 30t	3	2	64	85	94	97	102	103	98	93	86	107
	Grader CAT 14M	3	2	63	82	94	103	104	105	102	94	81	110
	Vibratory Roller (18t)	6	1.5	57	76	91	101	102	103	101	93	87	108
	Soil stabiliser (pulvi mixer)	1	1.5	58	77	80	86	99	104	90	85	73	105
	Water Cart (Road Tanker)	3	1.5	70	86	87	87	93	106	96	91	82	107
	Piling rig (driven concrete piles)	1	1.5	87	102	126	125	126	129	128	118	112	134



# Appendix D – Noise Contours

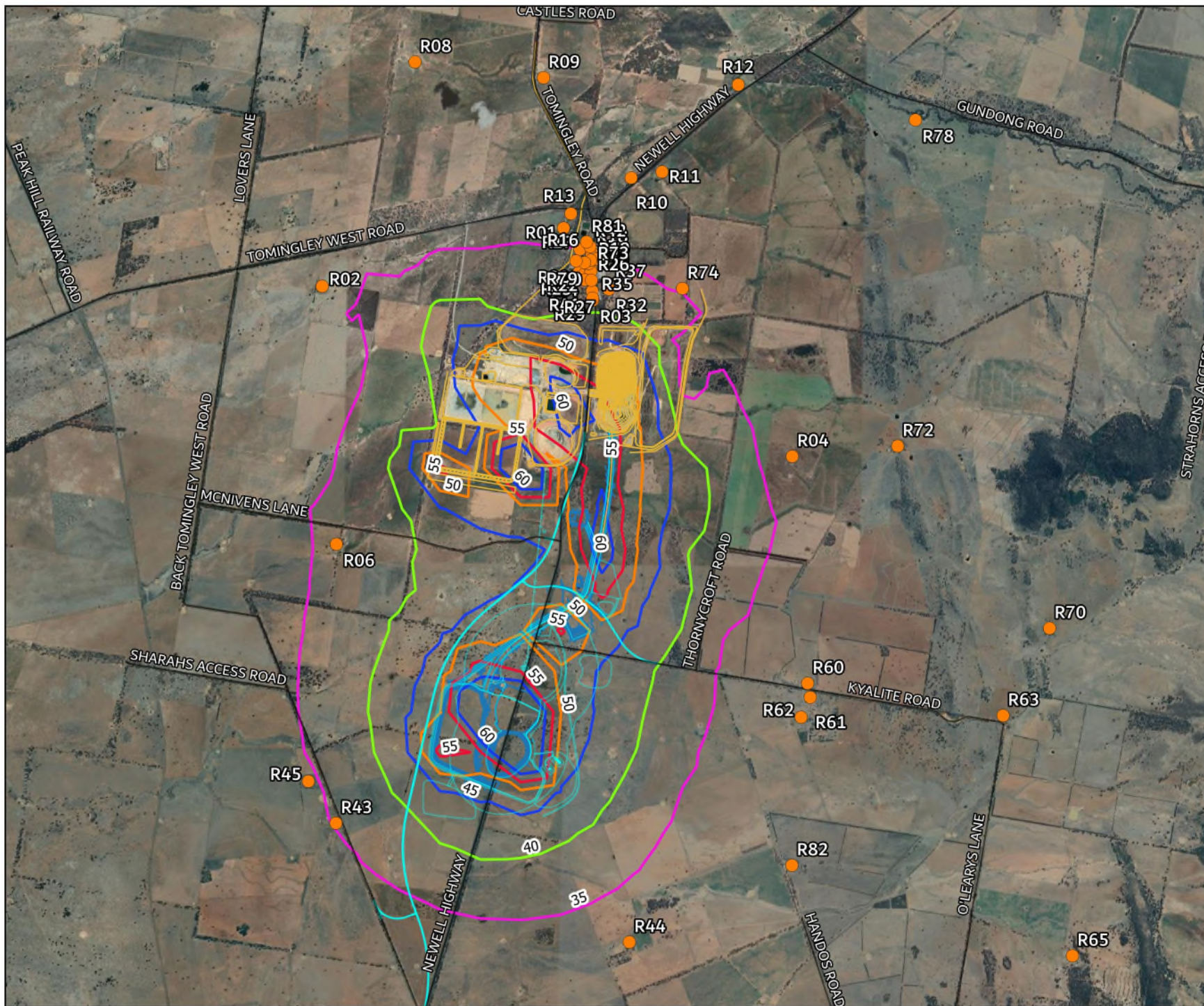
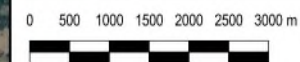


FIGURE D1  
Scenario FY24  
Predicted Noise Levels  
Daytime Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

# KEY

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





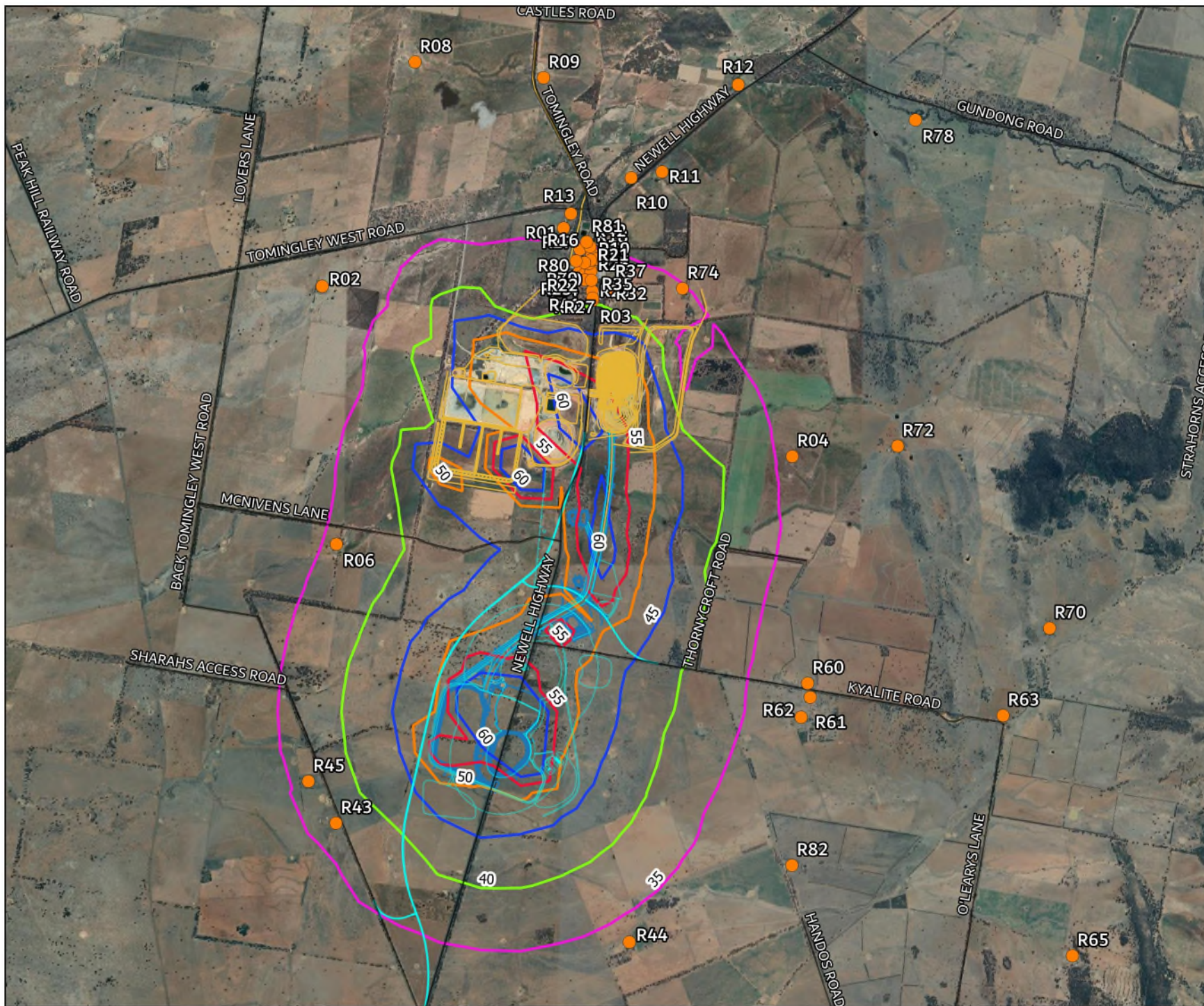


FIGURE D2  
 Scenario FY24  
 Predicted Noise Levels  
 Evening Operations  
 MAC201136-01  
 Tomingley Gold Extension  
 Project

**KEY**

- Receivers
- TGO Approved Operations
- SAR Proposed Operations

**Noise Level dB LAeq(15min)**

- 35
- 40
- 45
- 50
- 55
- 60
- 65

0 500 1000 1500 2000 2500 3000 m



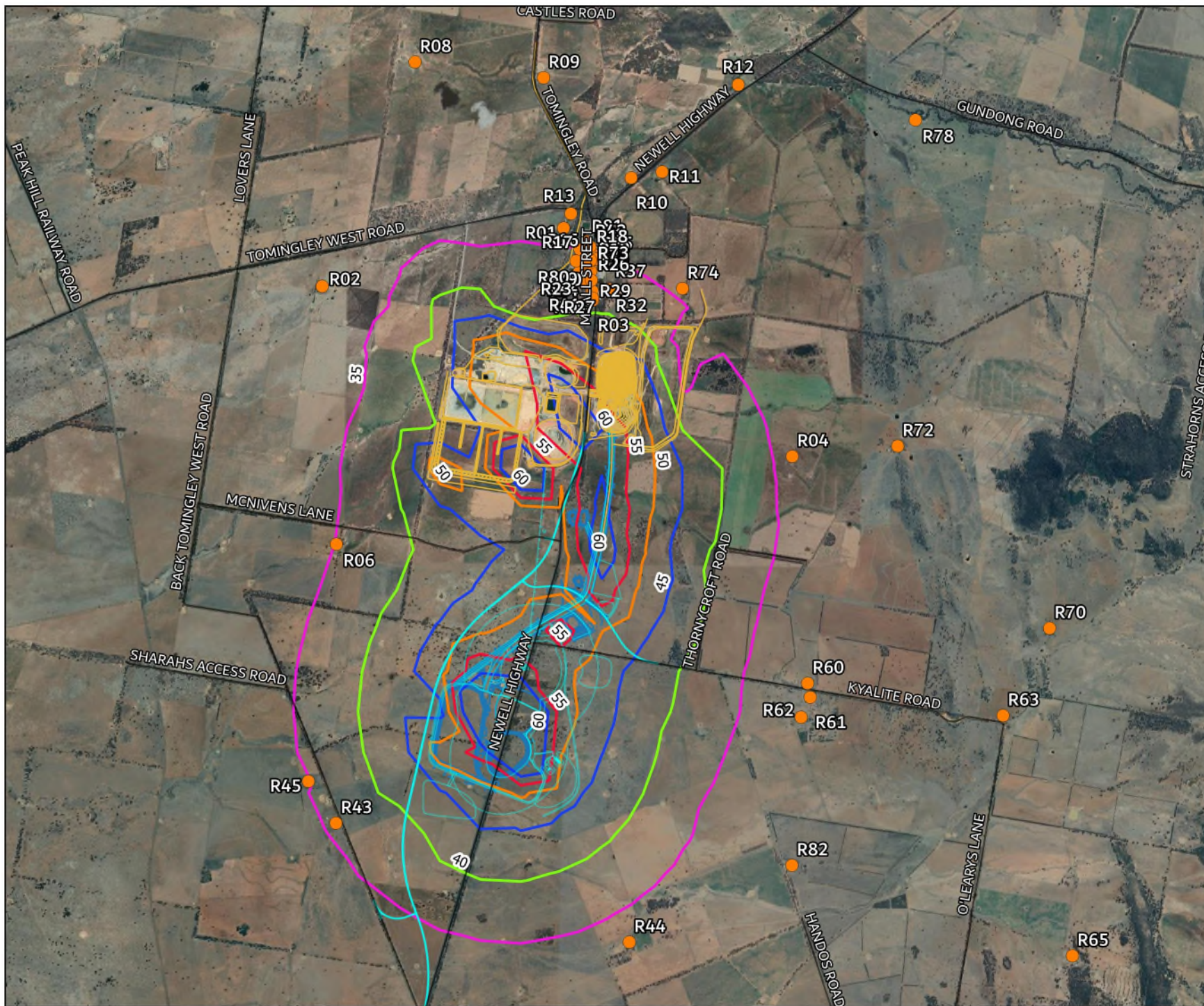
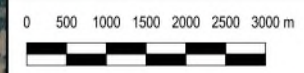


FIGURE D3  
Scenario FY24  
Predicted Noise Levels  
Night Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

**KEY**

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)**
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





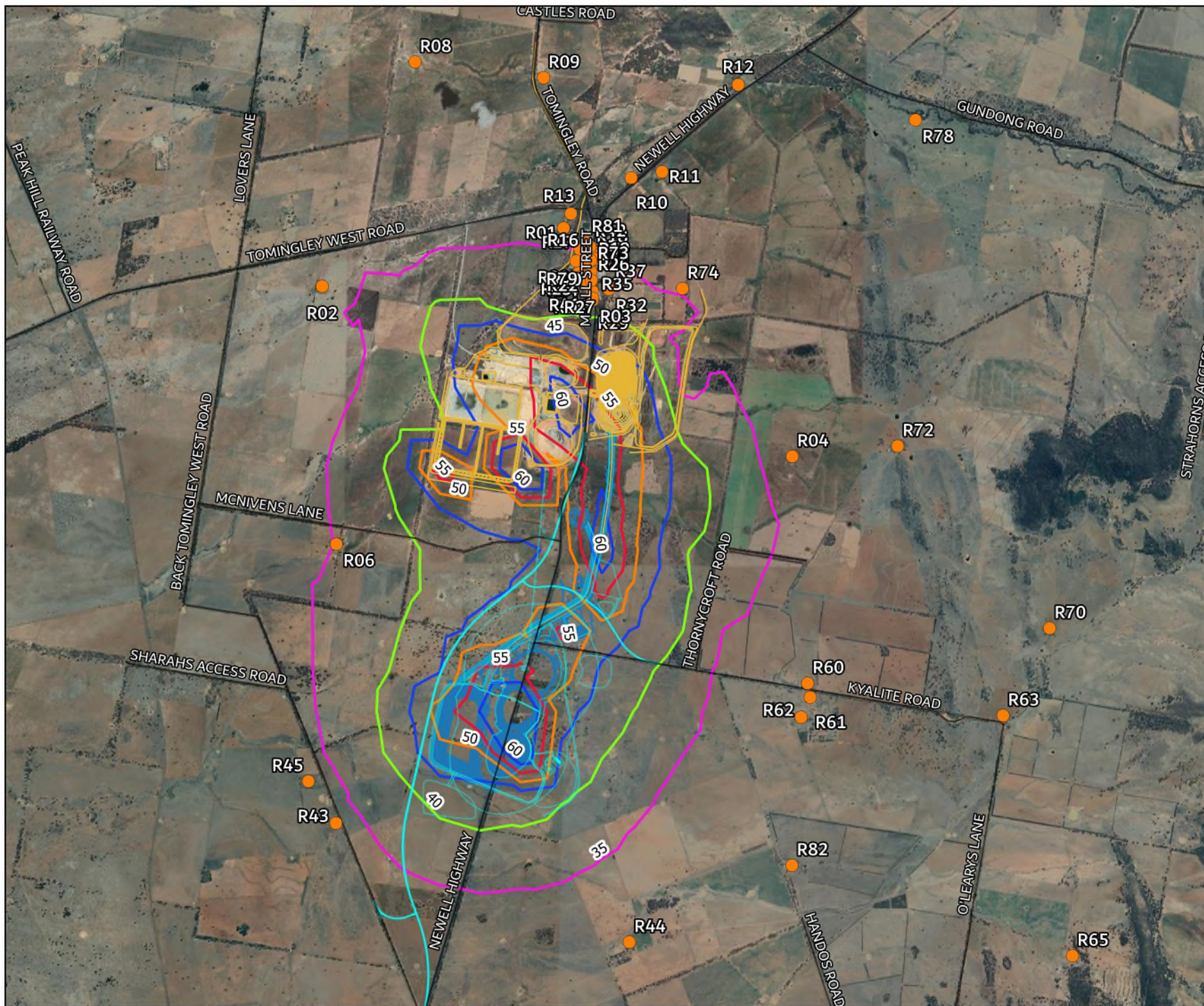


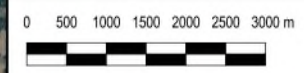
FIGURE D4  
Scenario FY25  
Predicted Noise Levels  
Daytime Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

**KEY**

- Receivers
- TGO Approved Operations
- SAR Proposed Operations

**Noise Level dB LAeq(15min)**

- 35
- 40
- 45
- 50
- 55
- 60
- 65





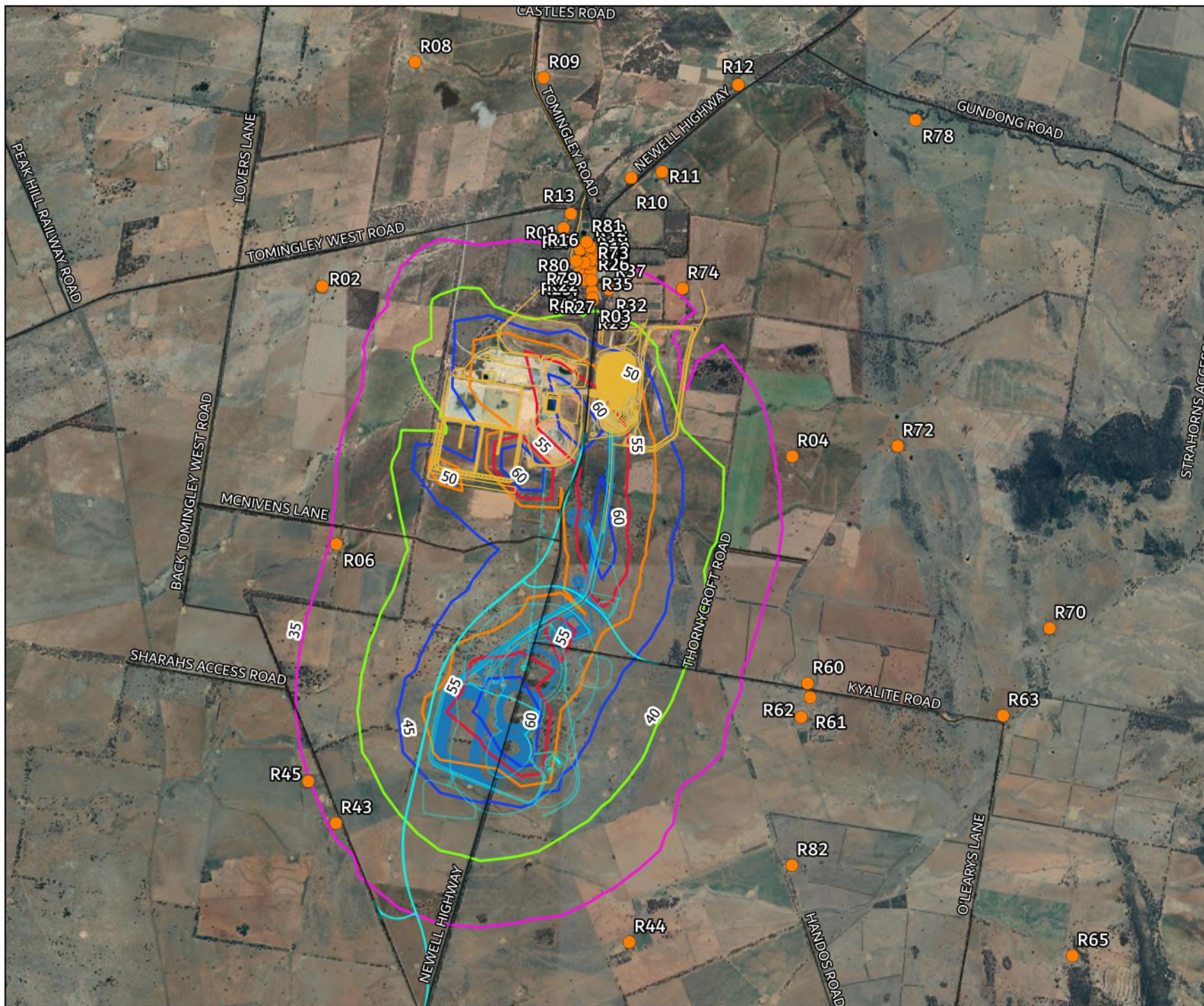
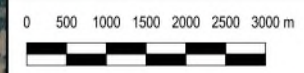


FIGURE D5  
Scenario FY25  
Predicted Noise Levels  
Evening Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

# KEY

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





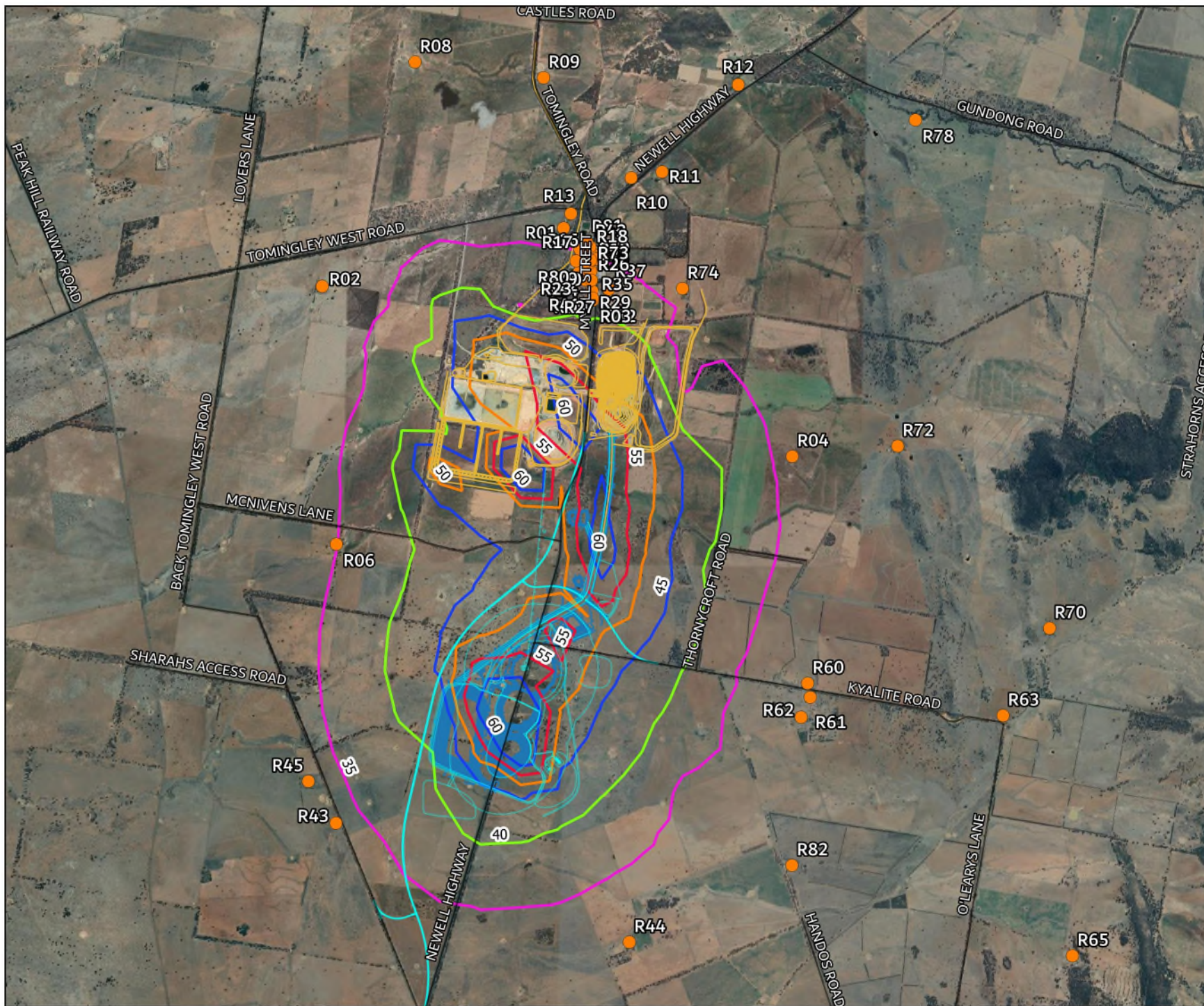
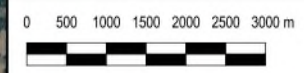


FIGURE D6  
Scenario FY25  
Predicted Noise Levels  
Night Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

**KEY**

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)**
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





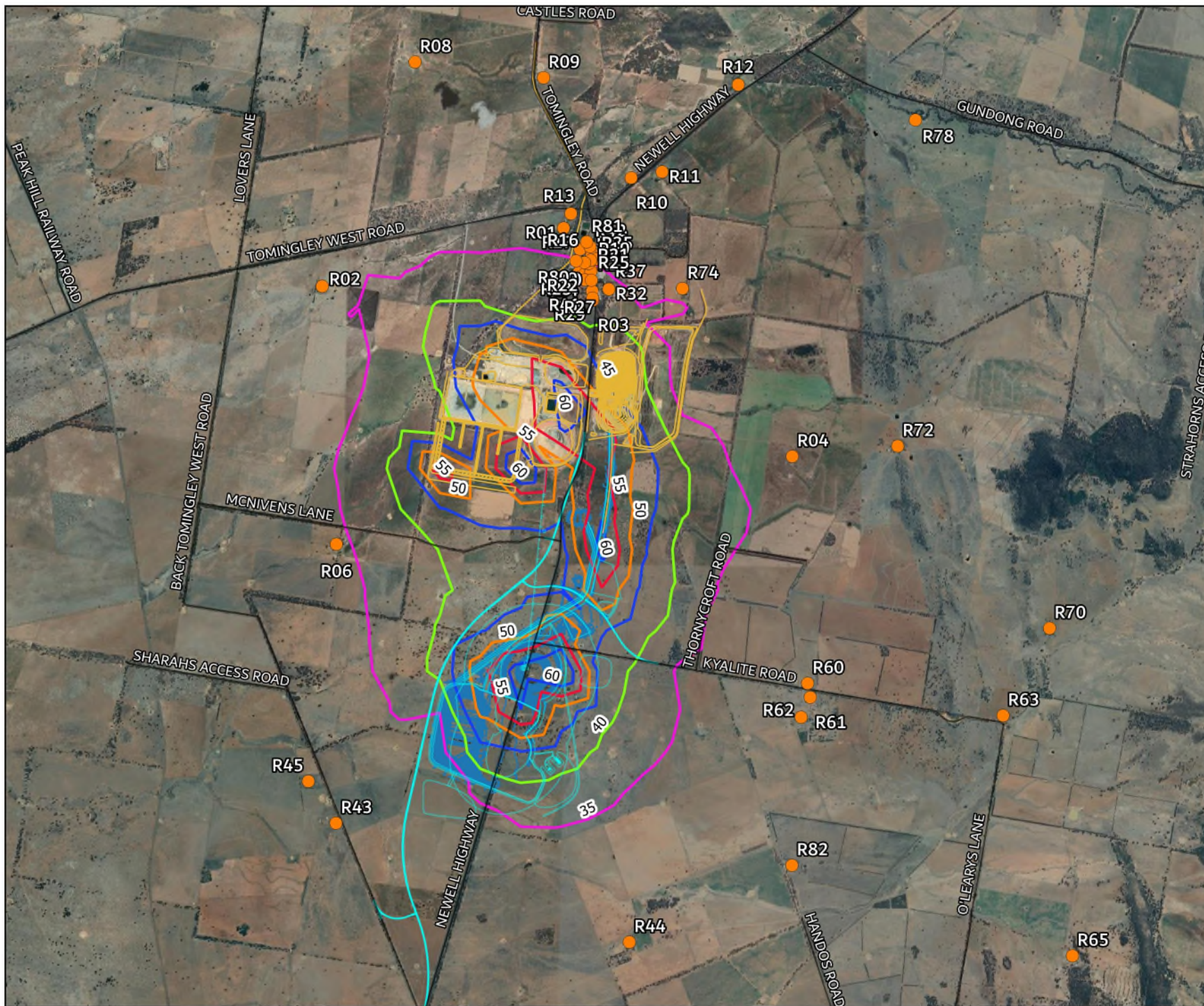
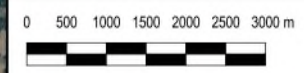


FIGURE D7  
Scenario FY27  
Predicted Noise Levels  
Daytime Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

**KEY**

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)**
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





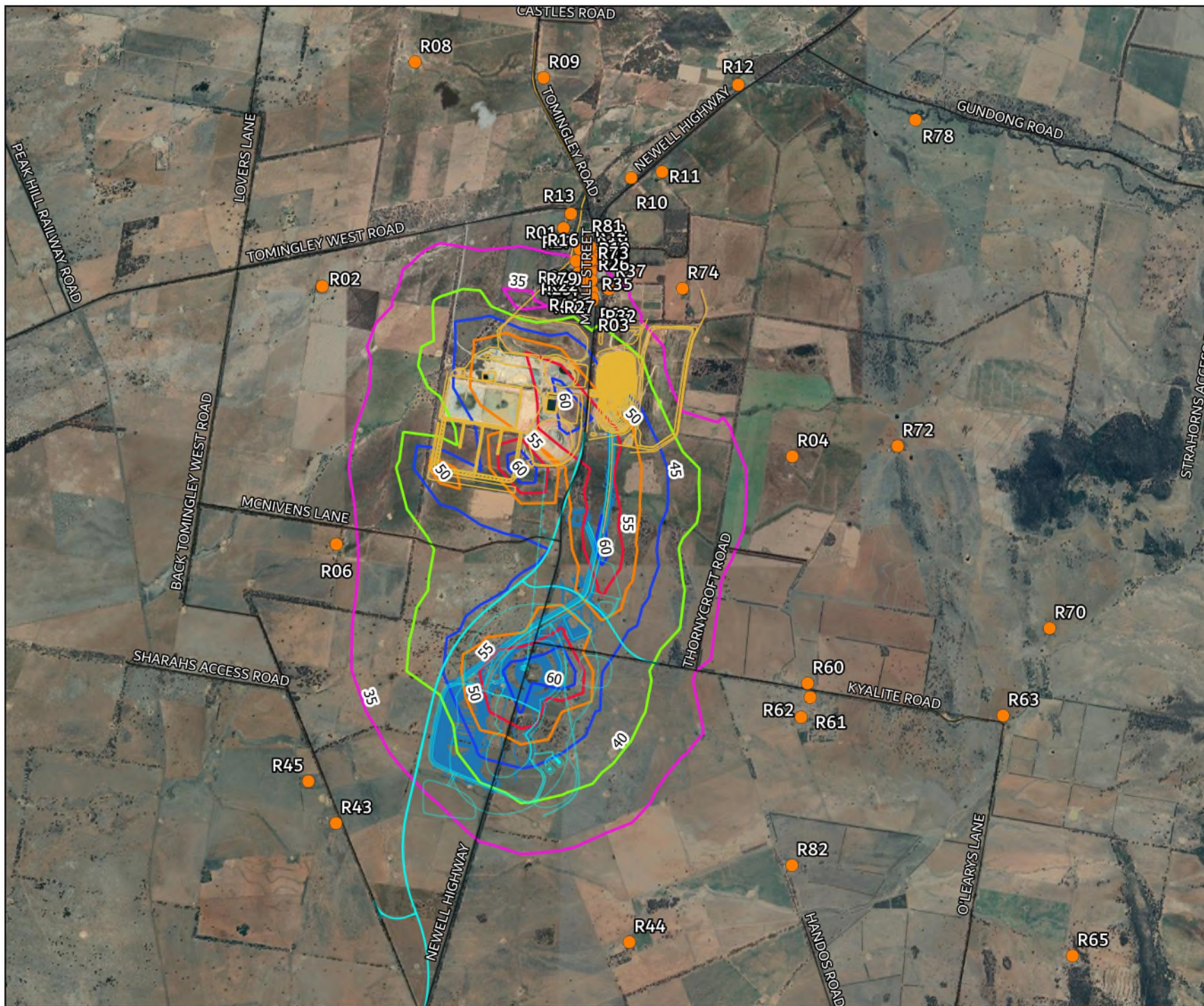
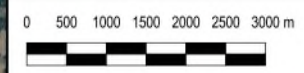


FIGURE D8  
Scenario FY27  
Predicted Noise Levels  
Evening Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

**KEY**

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)**
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





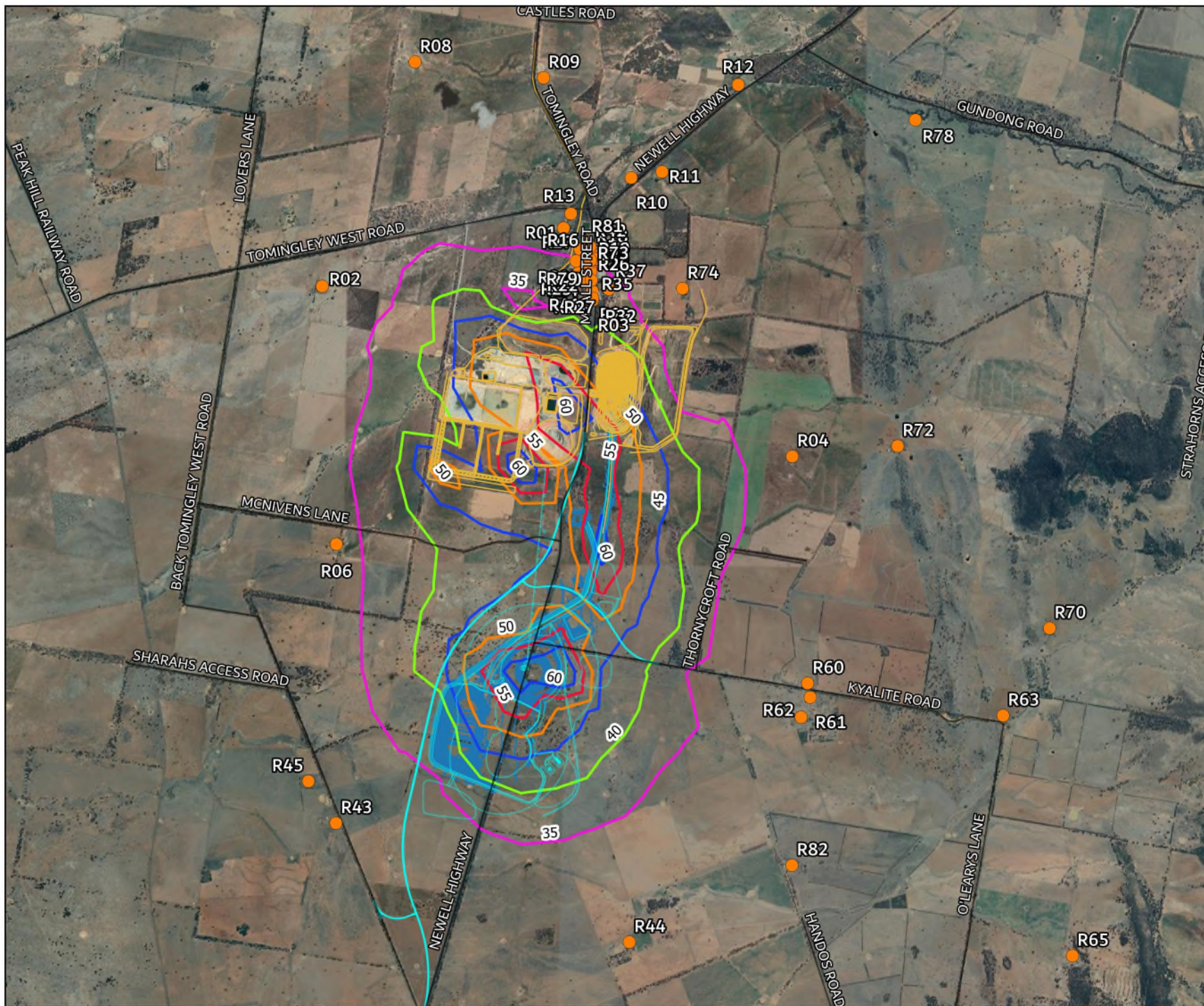
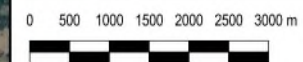


FIGURE D9  
Scenario FY27  
Predicted Noise Levels  
Night Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

# KEY

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





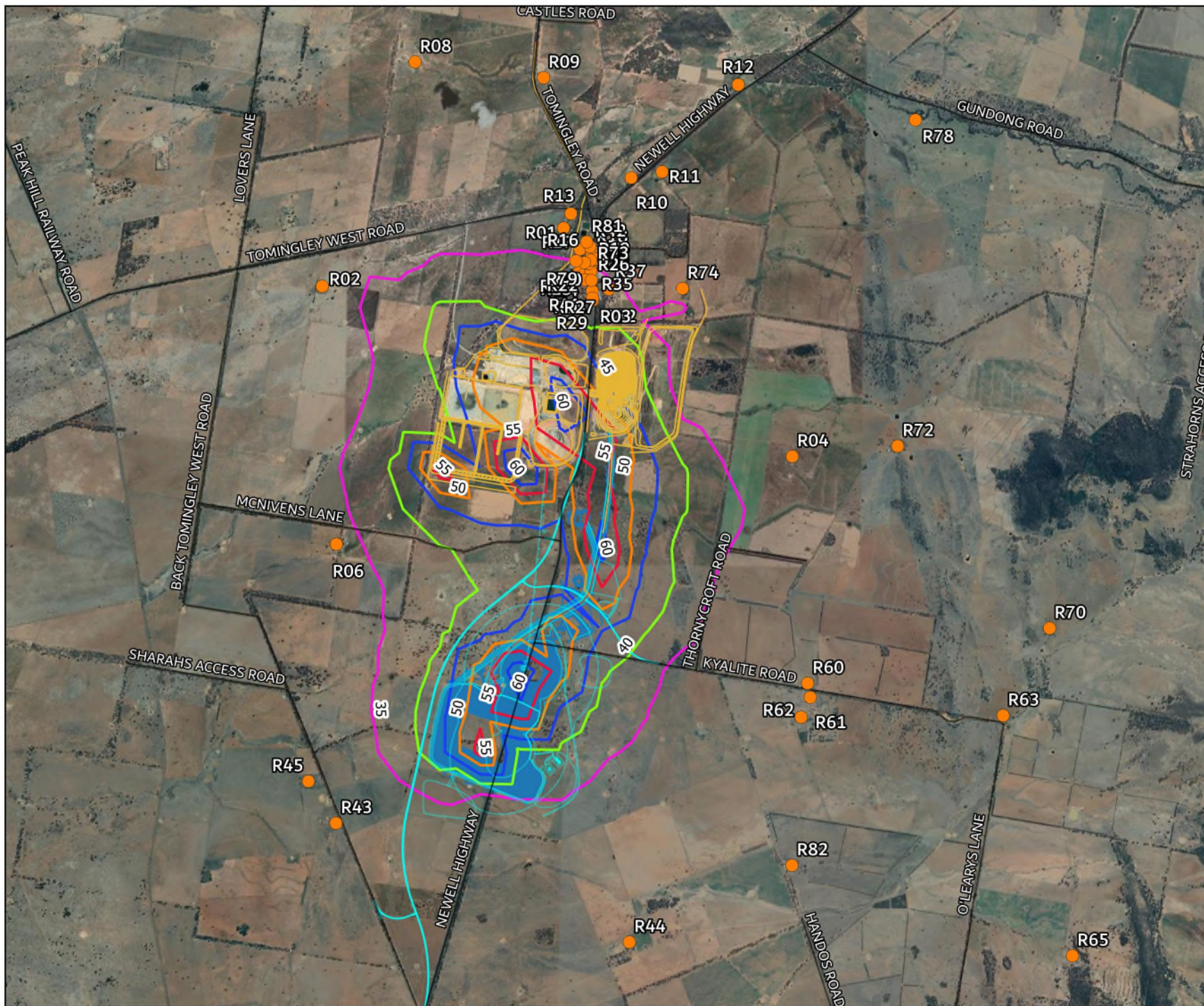
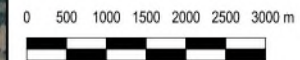


FIGURE D10  
Scenario FY30  
Predicted Noise Levels  
Daytime Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

# KEY

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





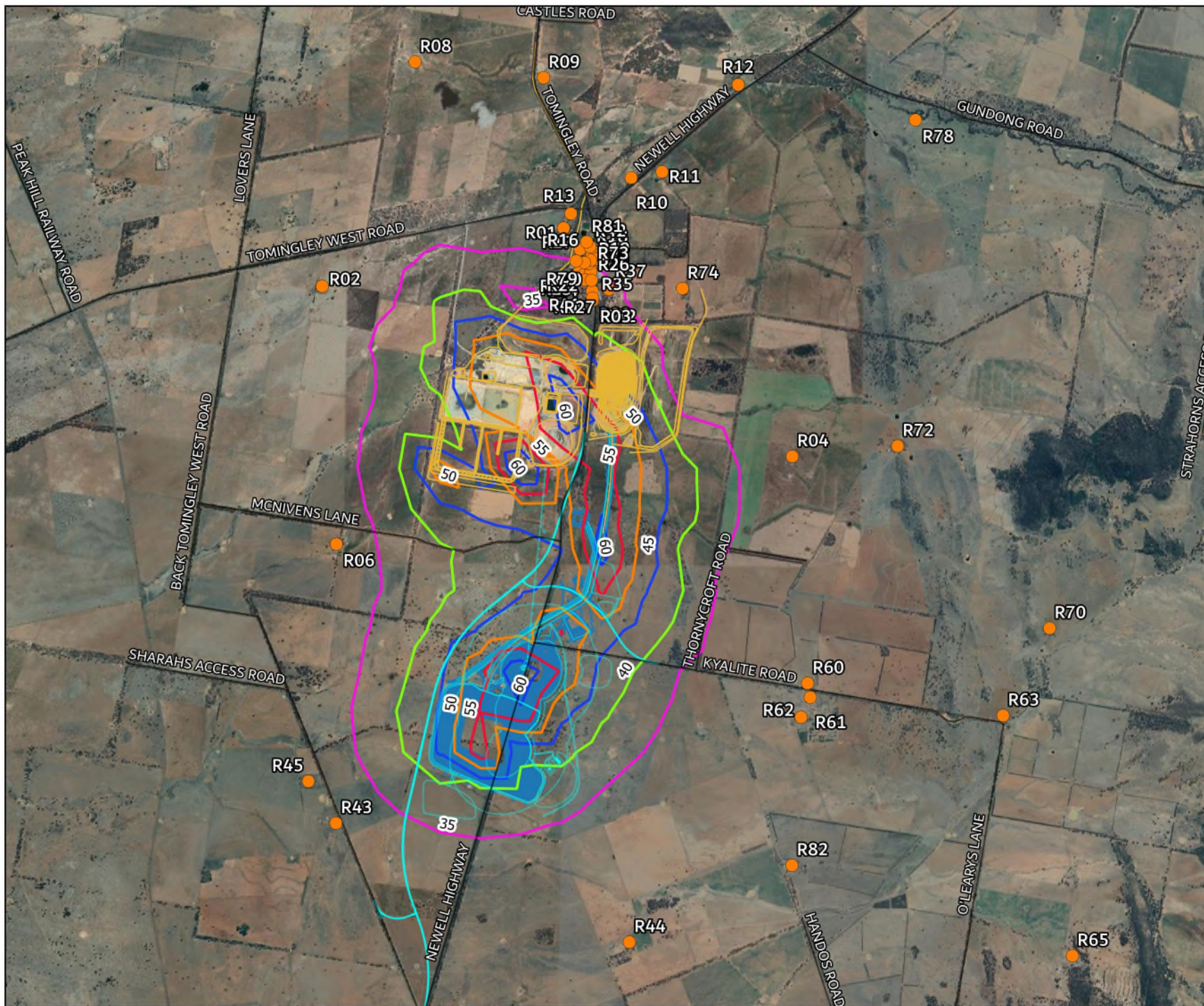
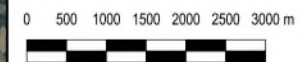


FIGURE D11  
Scenario FY30  
Predicted Noise Levels  
Evening Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

#### KEY

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65





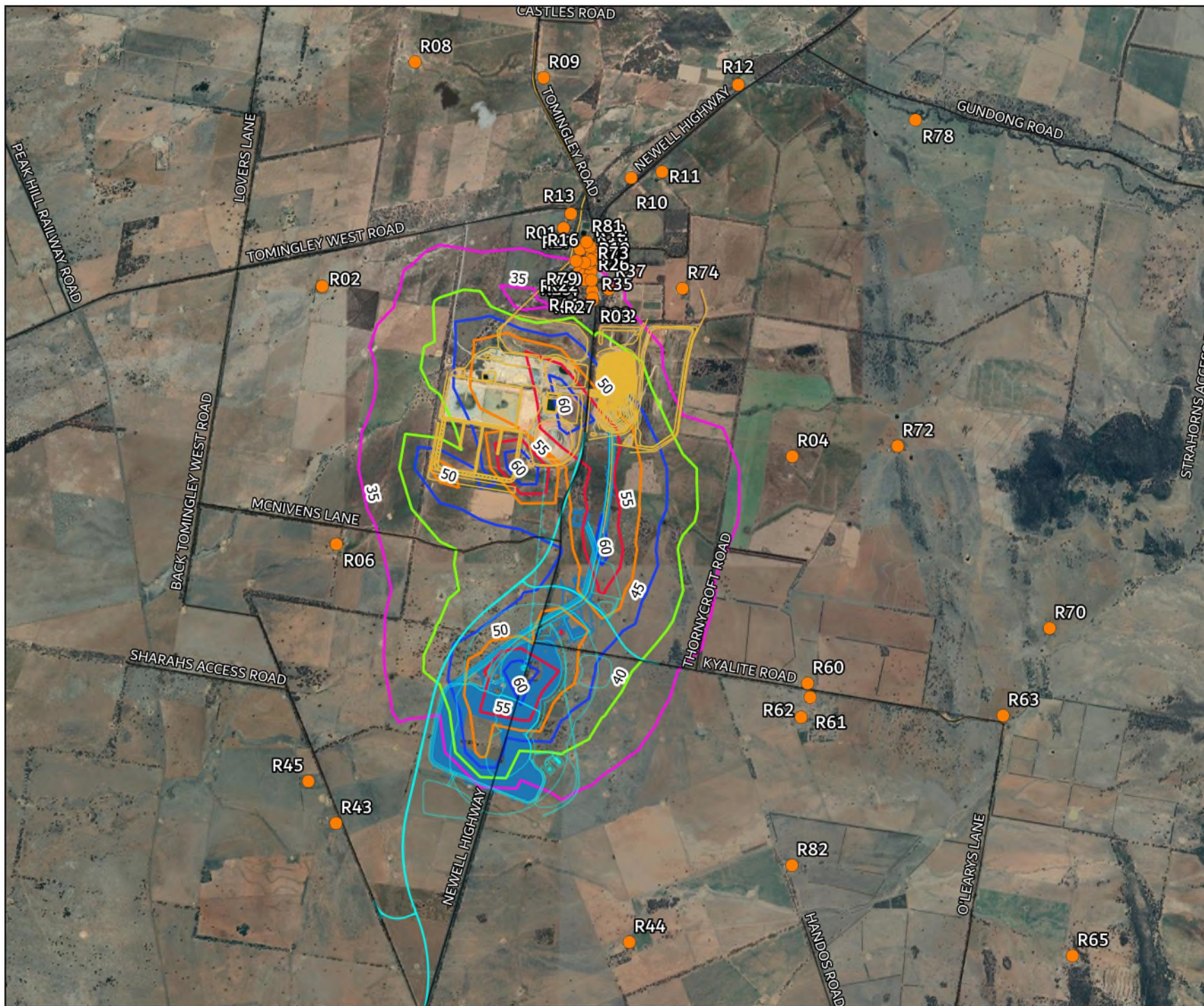
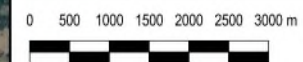


FIGURE D12  
Scenario FY30  
Predicted Noise Levels  
Night Operations  
MAC201136-01  
Tomingley Gold Extension  
Project

#### KEY

- Receivers
  - TGO Approved Operations
  - SAR Proposed Operations
- Noise Level dB LAeq(15min)
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65



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# Appendix E – Detailed Tabulated Results

Name	Desc.	PNTL Day	PNTL Eve	PNTL Night	FY24			FY25		
					FY24 Day	FY24 Eve	FY24 Night	FY25 Day	FY25 Eve	FY25 Night
R01-PR	Project Related	40	35	35	33	33	33	33	33	33
R02-MOU	Non-project Related - Memorandum of Understan	40	35	35	33	29	29	33	29	29
R03-MOU	Non-project Related - Memorandum of Understan	40	37	37	38	39	38	38	38	38
R04-MOU	Non-project Related - Memorandum of Understan	40	35	35	32	33	33	32	33	33
R06	Non-project Related	40	35	35	36	36	35	35	35	35
R08	Non-project Related	40	35	35	26	23	23	26	23	23
R09	Non-project Related	40	35	35	27	24	24	27	25	24
R10	Non-project Related	40	35	35	30	29	29	30	29	28
R11	Non-project Related	40	35	35	29	28	28	29	28	28
R12	Non-project Related	40	35	35	26	23	23	26	23	23
R13-MOU	Non-project Related - Memorandum of Understan	40	35	35	33	32	32	33	32	32
R16	Non-project Related	40	37	37	35	35	34	34	34	34
R17-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	34	35	35	34
R18-COMM	Commercial - Operating	63	63	63	35	35	34	34	34	34
R19	Non-project Related	40	35	35	35	35	34	35	35	34
R21-COMM	Commercial - Operating	63	63	63	35	36	35	35	35	35
R22-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	37	36	36	36	36
R23-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	37	36	36	36	36
R24-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	37	36	36	36	36
R25-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	37	36	36	36	36
R26	Non-project Related	40	35	35	36	37	36	36	36	36
R27-COMM	Commercial - Non-operational	63	63	63	37	38	37	36	37	36
R28-MOU	Non-project Related - Memorandum of Understan	40	37	37	38	38	38	37	38	37
R29-MOU	Non-project Related - Memorandum of Understan	40	37	37	38	39	38	38	38	38
R32-MOU	Non-project Related - Memorandum of Understan	40	37	37	37	38	37	37	37	36
R33	Commercial - Non-operational	63	63	63	37	38	37	36	37	36
R35-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	35	34
R37-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	34	34	34	34
R40	Non-project Related	40	35	35	36	36	35	35	36	35
R41-MOU	Non-project Related - Memorandum of Understan	40	35	35	37	38	37	37	37	36
R42	Non-project Related	40	35	35	34	34	34	34	34	34
R43	Non-project Related	40	35	35	35	37	36	34	36	34
R44-PR	Project Related	40	35	35	32	33	33	31	32	31
R45-UNOCC	Unoccupiable	40	35	35	34	36	35	34	35	33
R47-PR	Project Related	40	35	35	29	30	30	29	30	29
R60	Non-project Related	40	35	35	32	32	32	32	32	32
R61-UNOCC	Unoccupiable	40	35	35	32	32	31	32	32	32
R62-PR	Project Related	40	35	35	32	32	32	32	32	32
R63	Non-project Related	40	35	35	24	23	23	24	22	22
R64	Non-project Related	40	35	35	26	25	25	26	25	25
R65	Non-project Related	40	35	35	21	19	19	21	19	19
R66	Non-project Related	40	35	35	23	20	19	23	20	20
R67	Non-project Related	40	35	35	22	19	19	23	19	19
R68	Non-project Related	40	35	35	20	18	18	20	18	18
R69	Non-project Related	40	35	35	22	19	19	22	19	19
R70	Non-project Related	40	35	35	23	21	21	23	20	20
R71	Non-project Related	40	35	35	26	26	26	25	26	25
R72	Non-project Related	40	35	35	28	27	27	27	27	26
R73	Non-project Related	40	35	35	35	35	35	35	35	34
R74-MOU	Non-project Related - Memorandum of Understan	40	35	35	34	35	34	34	34	33
R75	Non-project Related	40	35	35	20	19	19	21	19	19
R76	Non-project Related	40	35	35	18	15	15	18	16	16
R78	Non-project Related	40	35	35	23	20	20	23	20	20
R79-MOU	Non-project Related - Memorandum of Understan	40	35	35	36	36	35	35	36	35
R80-MOU	Non-project Related - Memorandum of Understan	40	35	35	36	36	35	35	35	35
R81	Non-project Related	40	35	35	34	34	34	34	34	33
R82-PR	Project Related	40	35	35	28	29	29	28	29	29



Name	Desc.	PNTL Day	PNTL Eve	PNTL Night	FY27			FY30		
					FY27 Day	FY27 Eve	FY27 Night	FY30 Day	FY30 Eve	FY30 Night
R01-PR	Project Related	40	35	35	33	32	32	33	32	32
R02-MOU	Non-project Related - Memorandum of Understan	40	35	35	33	28	28	33	28	28
R03-MOU	Non-project Related - Memorandum of Understan	40	37	37	37	37	37	37	37	37
R04-MOU	Non-project Related - Memorandum of Understan	40	35	35	30	30	30	30	29	29
R06	Non-project Related	40	35	35	34	33	33	33	32	31
R08	Non-project Related	40	35	35	26	22	22	25	22	22
R09	Non-project Related	40	35	35	27	24	24	26	23	23
R10	Non-project Related	40	35	35	29	27	27	29	27	27
R11	Non-project Related	40	35	35	29	26	26	28	26	26
R12	Non-project Related	40	35	35	25	22	22	25	21	21
R13-MOU	Non-project Related - Memorandum of Understan	40	35	35	32	31	31	32	30	30
R16	Non-project Related	40	37	37	34	33	33	33	33	33
R17-MOU	Non-project Related - Memorandum of Understan	40	37	37	34	33	33	34	33	33
R18-COMM	Commercial - Operating	63	63	63	34	33	33	34	33	33
R19	Non-project Related	40	35	35	34	33	33	34	33	33
R21-COMM	Commercial - Operating	63	63	63	34	34	34	34	34	34
R22-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	35	35
R23-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	35	35
R24-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	35	35
R25-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	34	34
R26	Non-project Related	40	35	35	35	35	35	35	35	35
R27-COMM	Commercial - Non-operational	63	63	63	36	36	36	36	35	35
R28-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	36	36	36	36	36
R29-MOU	Non-project Related - Memorandum of Understan	40	37	37	37	37	37	37	36	36
R32-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	35	35	35	35	35
R33	Commercial - Non-operational	63	63	63	36	36	36	36	35	35
R35-MOU	Non-project Related - Memorandum of Understan	40	37	37	34	33	33	34	33	33
R37-MOU	Non-project Related - Memorandum of Understan	40	37	37	34	33	33	33	33	33
R40	Non-project Related	40	35	35	35	34	34	34	34	34
R41-MOU	Non-project Related - Memorandum of Understan	40	35	35	36	36	36	36	35	35
R42	Non-project Related	40	35	35	33	33	33	33	32	32
R43	Non-project Related	40	35	35	30	30	29	29	30	27
R44-PR	Project Related	40	35	35	29	28	28	27	25	23
R45-UNOCC	Unoccupiable	40	35	35	30	30	29	29	30	27
R47-PR	Project Related	40	35	35	25	25	25	23	22	21
R60	Non-project Related	40	35	35	31	30	30	29	27	27
R61-UNOCC	Unoccupiable	40	35	35	31	30	30	29	27	26
R62-PR	Project Related	40	35	35	31	30	30	29	27	26
R63	Non-project Related	40	35	35	22	20	20	22	18	18
R64	Non-project Related	40	35	35	25	22	22	24	18	18
R65	Non-project Related	40	35	35	20	17	17	19	14	14
R66	Non-project Related	40	35	35	23	18	18	22	16	16
R67	Non-project Related	40	35	35	22	18	17	22	16	15
R68	Non-project Related	40	35	35	19	16	16	18	14	14
R69	Non-project Related	40	35	35	21	17	17	21	15	14
R70	Non-project Related	40	35	35	22	18	18	21	17	17
R71	Non-project Related	40	35	35	23	22	22	21	19	18
R72	Non-project Related	40	35	35	26	24	24	26	24	23
R73	Non-project Related	40	35	35	34	34	34	34	33	33
R74-MOU	Non-project Related - Memorandum of Understan	40	35	35	32	32	32	32	31	31
R75	Non-project Related	40	35	35	19	16	16	18	15	14
R76	Non-project Related	40	35	35	17	13	13	16	12	11
R78	Non-project Related	40	35	35	23	19	19	22	17	17
R79-MOU	Non-project Related - Memorandum of Understan	40	35	35	35	34	34	34	34	34
R80-MOU	Non-project Related - Memorandum of Understan	40	35	35	35	34	34	35	34	34
R81	Non-project Related	40	35	35	33	33	33	33	32	32
R82-PR	Project Related	40	35	35	26	26	26	24	23	22

Name	Desc.	PNTL Day	PNTL Eve	PNTL Night	FY24			FY25		
					FY24 Day	FY24 Eve	FY24 Night	FY25 Day	FY25 Eve	FY25 Night
R01-PR	Project Related	40	35	35	33	33	33	33	33	33
R02-MOU	Non-project Related - Memorandum of Understan	40	35	35	33	29	29	33	29	29
R03-MOU	Non-project Related - Memorandum of Understan	40	37	37	38	39	38	38	38	38
R04-MOU	Non-project Related - Memorandum of Understan	40	35	35	32	33	33	32	33	33
R06	Non-project Related	40	35	35	36	36	35	35	35	35
R08	Non-project Related	40	35	35	26	23	23	26	23	23
R09	Non-project Related	40	35	35	27	24	24	27	25	24
R10	Non-project Related	40	35	35	30	29	29	30	29	28
R11	Non-project Related	40	35	35	29	28	28	29	28	28
R12	Non-project Related	40	35	35	26	23	23	26	23	23
R13-MOU	Non-project Related - Memorandum of Understan	40	35	35	33	32	32	33	32	32
R16	Non-project Related	40	37	37	35	35	34	34	34	34
R17-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	34	35	35	34
R18-COMM	Commercial - Operating	63	63	63	35	35	34	34	34	34
R19	Non-project Related	40	35	35	35	35	34	35	35	34
R21-COMM	Commercial - Operating	63	63	63	35	36	35	35	35	35
R22-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	37	36	36	36	36
R23-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	37	36	36	36	36
R24-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	37	36	36	36	36
R25-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	37	36	36	36	36
R26	Non-project Related	40	35	35	36	37	36	36	36	36
R27-COMM	Commercial - Non-operational	63	63	63	37	38	37	36	37	36
R28-MOU	Non-project Related - Memorandum of Understan	40	37	37	38	38	38	37	38	37
R29-MOU	Non-project Related - Memorandum of Understan	40	37	37	38	39	38	38	38	38
R32-MOU	Non-project Related - Memorandum of Understan	40	37	37	37	38	37	37	37	36
R33	Commercial - Non-operational	63	63	63	37	38	37	36	37	36
R35-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	35	34
R37-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	34	34	34	34
R40	Non-project Related	40	35	35	36	36	35	35	36	35
R41-MOU	Non-project Related - Memorandum of Understan	40	35	35	37	38	37	37	37	36
R42	Non-project Related	40	35	35	34	34	34	34	34	34
R43	Non-project Related	40	35	35	35	37	36	34	36	34
R44-PR	Project Related	40	35	35	32	33	33	31	32	31
R45-UNOCC	Unoccupiable	40	35	35	34	36	35	34	35	33
R47-PR	Project Related	40	35	35	29	30	30	29	30	29
R60	Non-project Related	40	35	35	32	32	32	32	32	32
R61-UNOCC	Unoccupiable	40	35	35	32	32	31	32	32	32
R62-PR	Project Related	40	35	35	32	32	32	32	32	32
R63	Non-project Related	40	35	35	24	23	23	24	22	22
R64	Non-project Related	40	35	35	26	25	25	26	25	25
R65	Non-project Related	40	35	35	21	19	19	21	19	19
R66	Non-project Related	40	35	35	23	20	19	23	20	20
R67	Non-project Related	40	35	35	22	19	19	23	19	19
R68	Non-project Related	40	35	35	20	18	18	20	18	18
R69	Non-project Related	40	35	35	22	19	19	22	19	19
R70	Non-project Related	40	35	35	23	21	21	23	20	20
R71	Non-project Related	40	35	35	26	26	26	25	26	25
R72	Non-project Related	40	35	35	28	27	27	27	27	26
R73	Non-project Related	40	35	35	35	35	35	35	35	34
R74-MOU	Non-project Related - Memorandum of Understan	40	35	35	34	35	34	34	34	33
R75	Non-project Related	40	35	35	20	19	19	21	19	19
R76	Non-project Related	40	35	35	18	15	15	18	16	16
R78	Non-project Related	40	35	35	23	20	20	23	20	20
R79-MOU	Non-project Related - Memorandum of Understan	40	35	35	36	36	35	35	36	35
R80-MOU	Non-project Related - Memorandum of Understan	40	35	35	36	36	35	35	35	35
R81	Non-project Related	40	35	35	34	34	34	34	34	33
R82-PR	Project Related	40	35	35	28	29	29	28	29	29

Name	Desc.	PNTL Day	PNTL Eve	PNTL Night	FY27			FY30		
					FY27 Day	FY27 Eve	FY27 Night	FY30 Day	FY30 Eve	FY30 Night
R01-PR	Project Related	40	35	35	33	32	32	33	32	32
R02-MOU	Non-project Related - Memorandum of Understan	40	35	35	33	28	28	33	28	28
R03-MOU	Non-project Related - Memorandum of Understan	40	37	37	37	37	37	37	37	37
R04-MOU	Non-project Related - Memorandum of Understan	40	35	35	30	30	30	30	29	29
R06	Non-project Related	40	35	35	34	33	33	33	32	31
R08	Non-project Related	40	35	35	26	22	22	25	22	22
R09	Non-project Related	40	35	35	27	24	24	26	23	23
R10	Non-project Related	40	35	35	29	27	27	29	27	27
R11	Non-project Related	40	35	35	29	26	26	28	26	26
R12	Non-project Related	40	35	35	25	22	22	25	21	21
R13-MOU	Non-project Related - Memorandum of Understan	40	35	35	32	31	31	32	30	30
R16	Non-project Related	40	37	37	34	33	33	33	33	33
R17-MOU	Non-project Related - Memorandum of Understan	40	37	37	34	33	33	34	33	33
R18-COMM	Commercial - Operating	63	63	63	34	33	33	34	33	33
R19	Non-project Related	40	35	35	34	33	33	34	33	33
R21-COMM	Commercial - Operating	63	63	63	34	34	34	34	34	34
R22-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	35	35
R23-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	35	35
R24-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	35	35
R25-MOU	Non-project Related - Memorandum of Understan	40	37	37	35	35	35	35	34	34
R26	Non-project Related	40	35	35	35	35	35	35	35	35
R27-COMM	Commercial - Non-operational	63	63	63	36	36	36	36	35	35
R28-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	36	36	36	36	36
R29-MOU	Non-project Related - Memorandum of Understan	40	37	37	37	37	37	37	36	36
R32-MOU	Non-project Related - Memorandum of Understan	40	37	37	36	35	35	35	35	35
R33	Commercial - Non-operational	63	63	63	36	36	36	36	35	35
R35-MOU	Non-project Related - Memorandum of Understan	40	37	37	34	33	33	34	33	33
R37-MOU	Non-project Related - Memorandum of Understan	40	37	37	34	33	33	33	33	33
R40	Non-project Related	40	35	35	35	34	34	34	34	34
R41-MOU	Non-project Related - Memorandum of Understan	40	35	35	36	36	36	36	35	35
R42	Non-project Related	40	35	35	33	33	33	33	32	32
R43	Non-project Related	40	35	35	30	30	29	29	30	27
R44-PR	Project Related	40	35	35	29	28	28	27	25	23
R45-UNOCC	Unoccupiable	40	35	35	30	30	29	29	30	27
R47-PR	Project Related	40	35	35	25	25	25	23	22	21
R60	Non-project Related	40	35	35	31	30	30	29	27	27
R61-UNOCC	Unoccupiable	40	35	35	31	30	30	29	27	26
R62-PR	Project Related	40	35	35	31	30	30	29	27	26
R63	Non-project Related	40	35	35	22	20	20	22	18	18
R64	Non-project Related	40	35	35	25	22	22	24	18	18
R65	Non-project Related	40	35	35	20	17	17	19	14	14
R66	Non-project Related	40	35	35	23	18	18	22	16	16
R67	Non-project Related	40	35	35	22	18	17	22	16	15
R68	Non-project Related	40	35	35	19	16	16	18	14	14
R69	Non-project Related	40	35	35	21	17	17	21	15	14
R70	Non-project Related	40	35	35	22	18	18	21	17	17
R71	Non-project Related	40	35	35	23	22	22	21	19	18
R72	Non-project Related	40	35	35	26	24	24	26	24	23
R73	Non-project Related	40	35	35	34	34	34	34	33	33
R74-MOU	Non-project Related - Memorandum of Understan	40	35	35	32	32	32	32	31	31
R75	Non-project Related	40	35	35	19	16	16	18	15	14
R76	Non-project Related	40	35	35	17	13	13	16	12	11
R78	Non-project Related	40	35	35	23	19	19	22	17	17
R79-MOU	Non-project Related - Memorandum of Understan	40	35	35	35	34	34	34	34	34
R80-MOU	Non-project Related - Memorandum of Understan	40	35	35	35	34	34	35	34	34
R81	Non-project Related	40	35	35	33	33	33	33	32	32
R82-PR	Project Related	40	35	35	26	26	26	24	23	22

Name	Desc.	Dist from Pit	C-wt FY24			C-wt FY25			C-wt FY27			C-wt FY30		
			Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
R01-PR	Project Related	5671	58	49	49	56	49	49	58	49	49	58	49	49
R02-MOU	Non-project Related - Memorandum of Understan	5008	60	48	47	57	48	47	60	47	47	60	48	47
R03-MOU	Non-project Related - Memorandum of Understan	4939	60	53	53	59	53	53	60	53	53	60	53	53
R04-MOU	Non-project Related - Memorandum of Understan	5035	55	48	48	53	48	48	55	47	47	55	48	48
R06	Non-project Related	2089	60	51	50	56	51	50	57	49	49	60	51	50
R08	Non-project Related	7543	52	43	43	50	43	43	52	43	43	52	43	43
R09	Non-project Related	7436	53	44	44	50	44	44	53	44	44	53	44	44
R10	Non-project Related	6517	55	47	46	53	47	46	55	46	46	55	47	46
R11	Non-project Related	6726	55	46	46	52	46	46	55	46	46	55	46	46
R12	Non-project Related	8097	51	43	42	49	43	43	51	42	42	51	43	42
R13-MOU	Non-project Related - Memorandum of Understan	5866	57	49	48	55	49	49	57	49	49	57	49	48
R16	Non-project Related	5521	59	50	50	56	50	50	59	50	50	59	50	50
R17-MOU	Non-project Related - Memorandum of Understan	5476	59	50	50	56	50	50	59	50	50	59	50	50
R18-COMM	Commercial - Operating	5486	59	50	50	56	50	50	59	50	50	59	50	50
R19	Non-project Related	5442	59	50	50	56	50	50	59	50	50	59	50	50
R21-COMM	Commercial - Operating	5369	59	51	50	57	51	50	59	51	51	59	51	50
R22-MOU	Non-project Related - Memorandum of Understan	5266	60	51	51	57	51	51	60	51	51	60	51	51
R23-MOU	Non-project Related - Memorandum of Understan	5199	60	52	51	58	52	51	60	52	52	60	52	51
R24-MOU	Non-project Related - Memorandum of Understan	5211	60	52	51	58	51	51	60	51	51	60	52	51
R25-MOU	Non-project Related - Memorandum of Understan	5281	60	51	51	57	51	51	60	51	51	60	51	51
R26	Non-project Related	5259	60	51	51	57	51	51	60	51	51	60	51	51
R27-COMM	Commercial - Non-operational	5161	60	52	51	58	52	52	60	52	52	60	52	51
R28-MOU	Non-project Related - Memorandum of Understan	5041	60	52	52	58	52	52	60	52	52	61	52	52
R29-MOU	Non-project Related - Memorandum of Understan	4960	61	53	52	59	53	52	61	53	53	60	53	52
R32-MOU	Non-project Related - Memorandum of Understan	5137	60	52	51	58	52	51	60	51	51	60	52	51
R35-MOU	Non-project Related - Memorandum of Understan	5428	59	50	50	57	50	50	59	50	50	59	50	50
R37-MOU	Non-project Related - Memorandum of Understan	5527	59	50	50	56	50	50	59	50	50	59	50	50
R40	Non-project Related	5345	59	51	51	57	51	51	59	51	51	59	51	51
R41-MOU	Non-project Related - Memorandum of Understan	5138	60	52	52	58	52	52	60	52	52	60	52	52
R42	Non-project Related	5546	59	50	50	56	50	50	59	50	50	59	50	50
R43	Non-project Related	2303	56	53	50	54	52	49	51	45	44	56	53	50
R44-PR	Project Related	4016	53	49	48	51	49	48	53	43	42	53	49	48
R45-UNOCC	Unoccupiable	2169	56	52	49	54	51	49	51	45	44	56	52	49
R47-PR	Project Related	4275	49	47	46	48	47	46	47	41	40	49	47	46
R60	Non-project Related	4461	56	49	48	54	49	49	56	46	46	56	49	48
R61-UNOCC	Unoccupiable	4502	56	49	48	53	49	49	55	46	46	56	49	48
R62-PR	Project Related	4413	56	49	48	53	49	49	55	46	45	56	49	48
R63	Non-project Related	6893	48	42	41	46	42	41	48	39	39	48	42	41
R64	Non-project Related	6018	51	44	43	49	44	43	51	39	39	51	44	43
R65	Non-project Related	8481	46	40	39	44	40	39	45	37	36	46	40	39
R66	Non-project Related	8283	49	40	40	47	41	40	49	38	38	49	40	40
R67	Non-project Related	8538	49	40	39	47	40	39	49	37	37	49	40	39
R68	Non-project Related	8597	44	39	38	43	39	38	44	36	35	44	39	38
R69	Non-project Related	8142	48	40	39	46	40	39	48	36	36	48	40	39
R70	Non-project Related	7467	48	41	40	46	40	39	48	38	38	48	41	40
R71	Non-project Related	5477	48	45	44	46	44	43	46	39	39	48	45	44
R72	Non-project Related	6233	52	45	44	50	45	44	52	44	44	52	45	44
R73	Non-project Related	5390	59	51	50	57	51	50	59	50	50	59	51	50
R74-MOU	Non-project Related - Memorandum of Understan	5563	57	49	49	55	49	49	57	49	49	57	49	49
R75	Non-project Related	7800	44	40	38	43	40	38	44	35	35	44	40	38
R76	Non-project Related	9622	43	37	35	41	37	36	42	33	33	43	37	35
R78	Non-project Related	8944	49	40	40	47	40	40	49	39	39	49	40	40
R79-MOU	Non-project Related - Memorandum of Understan	5338	59	51	51	57	51	51	59	51	51	59	51	51
R80-MOU	Non-project Related - Memorandum of Understan	5324	59	51	51	57	51	51	59	51	51	59	51	51
R81	Non-project Related	5588	58	50	50	56	50	50	58	50	50	58	50	50
R82-PR	Project Related	4882	50	47	46	48	47	46	49	42	41	50	47	46

Name	Desc.	A-wt FY24			A-wt FY25			A-wt FY27			A-wt FY30		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
R01-PR	Project Related	33	33	33	33	33	33	33	32	32	33	32	32
R02-MOU	Non-project Related - Memorandum of Understan	33	29	29	33	29	29	33	28	28	33	28	28
R03-MOU	Non-project Related - Memorandum of Understan	38	39	38	38	38	38	37	37	37	37	37	37
R04-MOU	Non-project Related - Memorandum of Understan	32	33	33	32	33	33	30	30	30	30	29	29
R06	Non-project Related	36	36	35	35	35	35	34	33	33	33	32	31
R08	Non-project Related	26	23	23	26	23	23	26	22	22	25	22	22
R09	Non-project Related	27	24	24	27	25	24	27	24	24	26	23	23
R10	Non-project Related	30	29	29	30	29	28	29	27	27	29	27	27
R11	Non-project Related	29	28	28	29	28	28	29	26	26	28	26	26
R12	Non-project Related	26	23	23	26	23	23	25	22	22	25	21	21
R13-MOU	Non-project Related - Memorandum of Understan	33	32	32	33	32	32	32	31	31	32	30	30
R16	Non-project Related	35	35	34	34	34	34	34	33	33	33	33	33
R17-MOU	Non-project Related - Memorandum of Understan	35	35	34	35	35	34	34	33	33	34	33	33
R18-COMM	Commercial - Operating	35	35	34	34	34	34	34	33	33	34	33	33
R19	Non-project Related	35	35	34	35	35	34	34	33	33	34	33	33
R21-COMM	Commercial - Operating	35	36	35	35	35	35	34	34	34	34	34	34
R22-MOU	Non-project Related - Memorandum of Understan	36	37	36	36	36	36	35	35	35	35	35	35
R23-MOU	Non-project Related - Memorandum of Understan	36	37	36	36	36	36	35	35	35	35	35	35
R24-MOU	Non-project Related - Memorandum of Understan	36	37	36	36	36	36	35	35	35	35	35	35
R25-MOU	Non-project Related - Memorandum of Understan	36	37	36	36	36	36	35	35	35	35	34	34
R26	Non-project Related	36	37	36	36	36	36	35	35	35	35	35	35
R27-COMM	Commercial - Non-operational	37	38	37	36	37	36	36	36	36	36	35	35
R28-MOU	Non-project Related - Memorandum of Understan	38	38	38	37	38	37	36	36	36	36	36	36
R29-MOU	Non-project Related - Memorandum of Understan	38	39	38	38	38	38	37	37	37	37	36	36
R32-MOU	Non-project Related - Memorandum of Understan	37	38	37	37	37	36	36	35	35	35	35	35
R35-MOU	Non-project Related - Memorandum of Understan	35	35	35	35	35	34	34	33	33	34	33	33
R37-MOU	Non-project Related - Memorandum of Understan	35	35	34	34	34	34	34	33	33	33	33	33
R40	Non-project Related	36	36	35	35	36	35	35	34	34	34	34	34
R41-MOU	Non-project Related - Memorandum of Understan	37	38	37	37	37	36	36	36	36	36	35	35
R42	Non-project Related	34	34	34	34	34	34	33	33	33	33	32	32
R43	Non-project Related	35	37	36	34	36	34	30	30	29	29	30	27
R44-PR	Project Related	32	33	33	31	32	31	29	28	28	27	25	23
R45-UNOCC	Unoccupiable	34	36	35	34	35	33	30	30	29	29	30	27
R47-PR	Project Related	29	30	30	29	30	29	25	25	25	23	22	21
R60	Non-project Related	32	32	32	32	32	32	31	30	30	29	27	27
R61-UNOCC	Unoccupiable	32	32	31	32	32	32	31	30	30	29	27	26
R62-PR	Project Related	32	32	32	32	32	32	31	30	30	29	27	26
R63	Non-project Related	24	23	23	24	22	22	22	20	20	22	18	18
R64	Non-project Related	26	25	25	26	25	25	25	22	22	24	18	18
R65	Non-project Related	21	19	19	21	19	19	20	17	17	19	14	14
R66	Non-project Related	23	20	19	23	20	20	23	18	18	22	16	16
R67	Non-project Related	22	19	19	23	19	19	22	18	17	22	16	15
R68	Non-project Related	20	18	18	20	18	18	19	16	16	18	14	14
R69	Non-project Related	22	19	19	22	19	19	21	17	17	21	15	14
R70	Non-project Related	23	21	21	23	20	20	22	18	18	21	17	17
R71	Non-project Related	26	26	26	25	26	25	23	22	22	21	19	18
R72	Non-project Related	28	27	27	27	27	26	26	24	24	26	24	23
R73	Non-project Related	35	35	35	35	35	34	34	34	34	34	33	33
R74-MOU	Non-project Related - Memorandum of Understan	34	35	34	34	34	33	32	32	32	32	31	31
R75	Non-project Related	20	19	19	21	19	19	19	16	16	18	15	14
R76	Non-project Related	18	15	15	18	16	16	17	13	13	16	12	11
R78	Non-project Related	23	20	20	23	20	20	23	19	19	22	17	17
R79-MOU	Non-project Related - Memorandum of Understan	36	36	35	35	36	35	35	34	34	34	34	34
R80-MOU	Non-project Related - Memorandum of Understan	36	36	35	35	35	35	35	34	34	35	34	34
R81	Non-project Related	34	34	34	34	34	33	33	33	33	33	32	32
R82-PR	Project Related	28	29	29	28	29	29	26	26	26	24	23	22



Name	Desc.	C-A Day	Evening	Night	C-A Day	Evening	Night	C-A Day	Evening	Night	C-A Day	Evening	Night
R01-PR	Project Related	25	16	16	22	16	17	25	17	17	25	18	18
R02-MOU	Non-project Related - Memorandum of Understan	27	18	18	24	18	18	27	19	19	27	20	19
R03-MOU	Non-project Related - Memorandum of Understan	22	14	14	21	14	15	23	16	16	23	16	16
R04-MOU	Non-project Related - Memorandum of Understan	23	15	15	21	15	15	25	18	18	25	19	19
R06	Non-project Related	24	16	16	21	16	16	23	16	16	27	19	19
R08	Non-project Related	26	20	20	24	20	20	26	21	21	27	21	21
R09	Non-project Related	26	20	20	23	20	20	26	20	20	26	21	21
R10	Non-project Related	25	18	18	23	18	18	26	19	19	26	20	19
R11	Non-project Related	25	18	18	23	18	18	26	19	19	26	20	20
R12	Non-project Related	26	20	20	23	20	20	26	20	20	27	22	21
R13-MOU	Non-project Related - Memorandum of Understan	25	17	17	22	17	17	25	18	18	26	18	18
R16	Non-project Related	24	15	16	22	16	16	25	17	17	25	17	17
R17-MOU	Non-project Related - Memorandum of Understan	24	15	16	22	16	16	25	17	17	25	17	17
R18-COMM	Commercial - Operating	24	15	16	22	16	16	25	17	17	25	18	17
R19	Non-project Related	24	15	16	22	16	16	25	17	17	25	17	17
R21-COMM	Commercial - Operating	24	15	16	22	16	16	25	17	17	25	17	17
R22-MOU	Non-project Related - Memorandum of Understan	24	15	15	21	15	15	25	16	16	25	17	16
R23-MOU	Non-project Related - Memorandum of Understan	24	15	15	21	15	15	25	16	16	25	17	16
R24-MOU	Non-project Related - Memorandum of Understan	24	15	15	21	15	15	25	16	16	25	17	16
R25-MOU	Non-project Related - Memorandum of Understan	24	15	15	21	15	15	25	16	16	25	17	17
R26	Non-project Related	24	15	15	21	15	15	25	16	16	25	17	16
R27-COMM	Commercial - Non-operational	24	14	15	21	15	15	25	16	16	25	16	16
R28-MOU	Non-project Related - Memorandum of Understan	23	14	15	21	15	15	24	16	16	25	16	16
R29-MOU	Non-project Related - Memorandum of Understan	23	14	14	21	14	15	24	16	16	24	16	16
R32-MOU	Non-project Related - Memorandum of Understan	23	14	15	21	15	15	25	16	16	25	17	17
R35-MOU	Non-project Related - Memorandum of Understan	24	15	16	22	16	16	25	17	17	25	17	17
R37-MOU	Non-project Related - Memorandum of Understan	24	15	16	22	16	16	25	17	17	25	18	17
R40	Non-project Related	24	15	15	22	15	16	25	17	17	25	17	17
R41-MOU	Non-project Related - Memorandum of Understan	24	14	15	21	15	15	25	16	16	25	16	16
R42	Non-project Related	24	16	16	22	16	16	25	17	17	25	18	17
R43	Non-project Related	20	16	14	20	16	16	21	16	15	26	22	24
R44-PR	Project Related	22	16	16	20	17	16	24	14	14	27	25	25
R45-UNOCC	Unoccupiable	21	16	15	20	17	16	21	16	15	27	22	23
R47-PR	Project Related	20	17	17	19	17	17	22	15	15	26	25	25
R60	Non-project Related	24	17	17	22	17	17	25	16	16	27	22	22
R61-UNOCC	Unoccupiable	24	17	17	22	17	17	25	16	16	27	22	22
R62-PR	Project Related	24	17	17	22	17	17	25	16	16	27	22	22
R63	Non-project Related	24	19	19	23	19	19	26	19	19	27	24	24
R64	Non-project Related	25	19	18	23	19	18	26	17	17	27	26	26
R65	Non-project Related	25	21	20	23	21	20	25	20	19	27	26	25
R66	Non-project Related	26	21	21	24	20	20	27	20	20	27	24	24
R67	Non-project Related	26	21	20	24	21	20	27	20	20	27	24	24
R68	Non-project Related	25	21	20	23	21	20	25	19	19	26	25	25
R69	Non-project Related	26	21	20	24	20	20	26	19	19	27	25	24
R70	Non-project Related	25	20	19	23	20	19	26	20	20	27	24	23
R71	Non-project Related	22	19	18	21	19	18	24	17	17	26	25	25
R72	Non-project Related	24	18	18	22	18	18	26	20	20	26	21	21
R73	Non-project Related	24	15	16	22	16	16	25	17	17	25	17	17
R74-MOU	Non-project Related - Memorandum of Understan	23	14	15	21	15	16	25	17	17	25	18	18
R75	Non-project Related	24	21	20	22	20	19	25	19	19	26	25	24
R76	Non-project Related	25	21	21	23	21	20	25	20	20	27	25	24
R78	Non-project Related	26	20	20	24	20	20	26	21	21	27	23	23
R79-MOU	Non-project Related - Memorandum of Understan	24	15	15	22	15	16	25	17	17	25	17	17
R80-MOU	Non-project Related - Memorandum of Understan	24	15	15	22	16	16	25	17	17	25	17	17
R81	Non-project Related	24	16	16	22	16	16	25	17	17	25	18	17
R82-PR	Project Related	21	17	17	20	18	17	23	15	15	26	24	24

Name	Desc.	NML Day	NML Eve	NML Night	South			North		
					South Day	South Eve	South Night	North Day	North Eve	North Night
R01-PR	Project Related	45	35	35	13	13	3	16	16	2
R02-MOU	Non-project Related - Memorandum of Understan	45	35	35	13	13	5	15	15	4
R03-MOU	Non-project Related - Memorandum of Understan	45	37	37	15	15	5	18	18	4
R04-MOU	Non-project Related - Memorandum of Understan	45	35	35	17	17	6	20	20	5
R06	Non-project Related	45	35	35	22	22	19	22	22	16
R08	Non-project Related	45	35	35	8	8	-1	12	12	-2
R09	Non-project Related	45	35	35	9	9	-1	12	12	-2
R10	Non-project Related	45	35	35	11	11	1	14	14	0
R11	Non-project Related	45	35	35	11	11	1	14	14	0
R12	Non-project Related	45	35	35	9	9	-2	12	12	-2
R13-MOU	Non-project Related - Memorandum of Understan	45	35	35	12	12	3	15	15	2
R16	Non-project Related	45	37	37	14	14	3	16	16	3
R17-MOU	Non-project Related - Memorandum of Understan	45	37	37	14	14	3	16	16	3
R18-COMM	Commercial - Operating	70	70	70	14	14	3	16	16	3
R19	Non-project Related	45	35	35	14	14	4	17	17	3
R21-COMM	Commercial - Operating	70	70	70	14	14	4	17	17	3
R22-MOU	Non-project Related - Memorandum of Understan	45	37	37	-3	-3	-14	-3	-3	-15
R23-MOU	Non-project Related - Memorandum of Understan	45	37	37	-3	-3	-14	-3	-3	-16
R24-MOU	Non-project Related - Memorandum of Understan	45	37	37	-2	-2	-12	-2	-2	-12
R25-MOU	Non-project Related - Memorandum of Understan	45	37	37	-3	-3	-14	-3	-3	-15
R26	Non-project Related	45	35	35	-3	-3	-14	-3	-3	-16
R27-COMM	Commercial - Non-operational	70	70	70	15	15	4	17	17	3
R28-MOU	Non-project Related - Memorandum of Understan	45	37	37	15	15	5	18	18	4
R29-MOU	Non-project Related - Memorandum of Understan	45	37	37	15	15	5	18	18	4
R32-MOU	Non-project Related - Memorandum of Understan	45	37	37	15	15	4	18	18	4
R33	Commercial - Non-operational	70	70	70	15	15	4	17	17	3
R35-MOU	Non-project Related - Memorandum of Understan	45	37	37	14	14	4	17	17	3
R37-MOU	Non-project Related - Memorandum of Understan	45	37	37	14	14	3	17	17	3
R40	Non-project Related	45	35	35	14	14	4	17	17	3
R41-MOU	Non-project Related - Memorandum of Understan	45	35	35	15	15	4	17	17	3
R42	Non-project Related	45	35	35	13	13	3	16	16	2
R43	Non-project Related	45	35	35	25	25	25	27	27	26
R44-PR	Project Related	45	35	35	17	17	14	20	20	17
R45-UNOCC	Unoccupiable	45	35	35	24	24	24	25	25	24
R47-PR	Project Related	45	35	35	13	13	7	20	20	18
R60	Non-project Related	45	35	35	19	19	10	21	21	11
R61-UNOCC	Unoccupiable	45	35	35	19	19	10	21	21	11
R62-PR	Project Related	45	35	35	19	19	10	21	21	11
R63	Non-project Related	45	35	35	11	11	2	15	15	3
R64	Non-project Related	45	35	35	12	12	6	15	15	8
R65	Non-project Related	45	35	35	8	8	-1	11	11	0
R66	Non-project Related	45	35	35	8	8	-1	12	12	1
R67	Non-project Related	45	35	35	7	7	-1	11	11	1
R68	Non-project Related	45	35	35	7	7	-1	10	10	1
R69	Non-project Related	45	35	35	7	7	0	11	11	2
R70	Non-project Related	45	35	35	10	10	0	14	14	1
R71	Non-project Related	45	35	35	12	12	8	15	15	10
R72	Non-project Related	45	35	35	14	14	2	16	16	2
R73	Non-project Related	45	35	35	14	14	4	17	17	3
R74-MOU	Non-project Related - Memorandum of Understan	45	35	35	14	14	4	17	17	3
R75	Non-project Related	45	35	35	7	7	1	10	10	3
R76	Non-project Related	45	35	35	4	4	-3	8	8	-1
R78	Non-project Related	45	35	35	8	8	-4	11	11	-4
R79-MOU	Non-project Related - Memorandum of Understan	45	35	35	14	14	4	17	17	3
R80-MOU	Non-project Related - Memorandum of Understan	45	35	35	14	14	4	17	17	3
R81	Non-project Related	45	35	35	13	13	3	16	16	2
R82-PR	Project Related	45	35	35	16	16	9	18	18	11

Name	Desc.	NML Day	NML Eve	NML Night	North incl bridge		
					North incl bridge Day	North incl bridge Eve	North incl bridge Night
R01-PR	Project Related	45	35	35	17	17	3
R02-MOU	Non-project Related - Memorandum of Understan	45	35	35	17	17	5
R03-MOU	Non-project Related - Memorandum of Understan	45	37	37	19	19	5
R04-MOU	Non-project Related - Memorandum of Understan	45	35	35	19	19	5
R06	Non-project Related	45	35	35	24	24	19
R08	Non-project Related	45	35	35	12	12	-1
R09	Non-project Related	45	35	35	13	13	-1
R10	Non-project Related	45	35	35	15	15	1
R11	Non-project Related	45	35	35	15	15	1
R12	Non-project Related	45	35	35	12	12	-2
R13-MOU	Non-project Related - Memorandum of Understan	45	35	35	16	16	2
R16	Non-project Related	45	37	37	17	17	3
R17-MOU	Non-project Related - Memorandum of Understan	45	37	37	17	17	3
R18-COMM	Commercial - Operating	70	70	70	17	17	3
R19	Non-project Related	45	35	35	18	18	4
R21-COMM	Commercial - Operating	70	70	70	18	18	4
R22-MOU	Non-project Related - Memorandum of Understan	45	37	37	18	18	4
R23-MOU	Non-project Related - Memorandum of Understan	45	37	37	18	18	4
R24-MOU	Non-project Related - Memorandum of Understan	45	37	37	18	18	4
R25-MOU	Non-project Related - Memorandum of Understan	45	37	37	18	18	4
R26	Non-project Related	45	35	35	18	18	4
R27-COMM	Commercial - Non-operational	70	70	70	18	18	4
R28-MOU	Non-project Related - Memorandum of Understan	45	37	37	19	19	5
R29-MOU	Non-project Related - Memorandum of Understan	45	37	37	19	19	5
R32-MOU	Non-project Related - Memorandum of Understan	45	37	37	19	19	5
R33	Commercial - Non-operational	70	70	70	18	18	4
R35-MOU	Non-project Related - Memorandum of Understan	45	37	37	18	18	4
R37-MOU	Non-project Related - Memorandum of Understan	45	37	37	17	17	3
R40	Non-project Related	45	35	35	18	18	4
R41-MOU	Non-project Related - Memorandum of Understan	45	35	35	18	18	4
R42	Non-project Related	45	35	35	17	17	3
R43	Non-project Related	45	35	35	28	28	28
R44-PR	Project Related	45	35	35	18	18	14
R45-UNOCC	Unoccupiable	45	35	35	28	28	28
R47-PR	Project Related	45	35	35	17	17	14
R60	Non-project Related	45	35	35	20	20	8
R61-UNOCC	Unoccupiable	45	35	35	13	13	4
R62-PR	Project Related	45	35	35	19	19	9
R63	Non-project Related	45	35	35	14	14	2
R64	Non-project Related	45	35	35	-6	-6	-12
R65	Non-project Related	45	35	35	11	11	-1
R66	Non-project Related	45	35	35	11	11	-1
R67	Non-project Related	45	35	35	10	10	-1
R68	Non-project Related	45	35	35	10	10	0
R69	Non-project Related	45	35	35	10	10	1
R70	Non-project Related	45	35	35	13	13	0
R71	Non-project Related	45	35	35	14	14	8
R72	Non-project Related	45	35	35	16	16	2
R73	Non-project Related	45	35	35	18	18	4
R74-MOU	Non-project Related - Memorandum of Understan	45	35	35	18	18	3
R75	Non-project Related	45	35	35	10	10	2
R76	Non-project Related	45	35	35	8	8	-3
R78	Non-project Related	45	35	35	11	11	-3
R79-MOU	Non-project Related - Memorandum of Understan	45	35	35	18	18	4
R80-MOU	Non-project Related - Memorandum of Understan	45	35	35	18	18	4
R81	Non-project Related	45	35	35	17	17	3
R82-PR	Project Related	45	35	35	17	17	8

Name	Desc.		South	North
		NML Day	South Day	North Day
R01-PR	Project Related	45	14	26
R02-MOU	Non-project Related - Memorandum of Understan	45	16	26
R03-MOU	Non-project Related - Memorandum of Understan	45	16	30
R04-MOU	Non-project Related - Memorandum of Understan	45	17	30
R06	Non-project Related	45	25	35
R08	Non-project Related	45	11	20
R09	Non-project Related	45	12	21
R10	Non-project Related	45	13	24
R11	Non-project Related	45	13	23
R12	Non-project Related	45	11	20
R13-MOU	Non-project Related - Memorandum of Understan	45	14	26
R16	Non-project Related	45	15	27
R17-MOU	Non-project Related - Memorandum of Understan	45	15	27
R18-COMM	Commercial - Operating	70	15	28
R19	Non-project Related	45	15	28
R21-COMM	Commercial - Operating	70	15	28
R22-MOU	Non-project Related - Memorandum of Understan	45	1	9
R23-MOU	Non-project Related - Memorandum of Understan	45	-2	9
R24-MOU	Non-project Related - Memorandum of Understan	45	4	10
R25-MOU	Non-project Related - Memorandum of Understan	45	0	9
R26	Non-project Related	45	-3	9
R27-COMM	Commercial - Non-operational	70	15	29
R28-MOU	Non-project Related - Memorandum of Understan	45	16	30
R29-MOU	Non-project Related - Memorandum of Understan	45	16	30
R32-MOU	Non-project Related - Memorandum of Understan	45	16	30
R33	Commercial - Non-operational	70	15	29
R35-MOU	Non-project Related - Memorandum of Understan	45	15	28
R37-MOU	Non-project Related - Memorandum of Understan	45	15	28
R40	Non-project Related	45	15	28
R41-MOU	Non-project Related - Memorandum of Understan	45	15	29
R42	Non-project Related	45	15	27
R43	Non-project Related	45	41	35
R44-PR	Project Related	45	30	25
R45-UNOCC	Unoccupiable	45	37	34
R47-PR	Project Related	45	49	25
R60	Non-project Related	45	20	27
R61-UNOCC	Unoccupiable	45	20	26
R62-PR	Project Related	45	21	27
R63	Non-project Related	45	15	20
R64	Non-project Related	45	23	20
R65	Non-project Related	45	14	17
R66	Non-project Related	45	17	17
R67	Non-project Related	45	16	17
R68	Non-project Related	45	18	16
R69	Non-project Related	45	21	16
R70	Non-project Related	45	14	19
R71	Non-project Related	45	30	21
R72	Non-project Related	45	15	24
R73	Non-project Related	45	15	28
R74-MOU	Non-project Related - Memorandum of Understan	45	15	28
R75	Non-project Related	45	21	17
R76	Non-project Related	45	17	14
R78	Non-project Related	45	10	18
R79-MOU	Non-project Related - Memorandum of Understan	45	15	28
R80-MOU	Non-project Related - Memorandum of Understan	45	15	28
R81	Non-project Related	45	15	27
R82-PR	Project Related	45	22	23

Name	Desc.	NML Day	North incl bridge
			North incl bridge Day
R01-PR	Project Related	45	28
R02-MOU	Non-project Related - Memorandum of Understan	45	28
R03-MOU	Non-project Related - Memorandum of Understan	45	35
R04-MOU	Non-project Related - Memorandum of Understan	45	27
R06	Non-project Related	45	40
R08	Non-project Related	45	21
R09	Non-project Related	45	22
R10	Non-project Related	45	25
R11	Non-project Related	45	25
R12	Non-project Related	45	21
R13-MOU	Non-project Related - Memorandum of Understan	45	27
R16	Non-project Related	45	29
R17-MOU	Non-project Related - Memorandum of Understan	45	29
R18-COMM	Commercial - Operating	70	29
R19	Non-project Related	45	29
R21-COMM	Commercial - Operating	70	30
R22-MOU	Non-project Related - Memorandum of Understan	45	30
R23-MOU	Non-project Related - Memorandum of Understan	45	31
R24-MOU	Non-project Related - Memorandum of Understan	45	31
R25-MOU	Non-project Related - Memorandum of Understan	45	30
R26	Non-project Related	45	30
R27-COMM	Commercial - Non-operational	70	31
R28-MOU	Non-project Related - Memorandum of Understan	45	34
R29-MOU	Non-project Related - Memorandum of Understan	45	32
R32-MOU	Non-project Related - Memorandum of Understan	45	34
R33	Commercial - Non-operational	70	31
R35-MOU	Non-project Related - Memorandum of Understan	45	29
R37-MOU	Non-project Related - Memorandum of Understan	45	29
R40	Non-project Related	45	30
R41-MOU	Non-project Related - Memorandum of Understan	45	31
R42	Non-project Related	45	29
R43	Non-project Related	45	33
R44-PR	Project Related	45	23
R45-UNOCC	Unoccupiable	45	36
R47-PR	Project Related	45	23
R60	Non-project Related	45	25
R61-UNOCC	Unoccupiable	45	20
R62-PR	Project Related	45	24
R63	Non-project Related	45	19
R64	Non-project Related	45	0
R65	Non-project Related	45	16
R66	Non-project Related	45	16
R67	Non-project Related	45	15
R68	Non-project Related	45	15
R69	Non-project Related	45	15
R70	Non-project Related	45	19
R71	Non-project Related	45	20
R72	Non-project Related	45	24
R73	Non-project Related	45	30
R74-MOU	Non-project Related - Memorandum of Understan	45	28
R75	Non-project Related	45	16
R76	Non-project Related	45	14
R78	Non-project Related	45	18
R79-MOU	Non-project Related - Memorandum of Understan	45	30
R80-MOU	Non-project Related - Memorandum of Understan	45	30
R81	Non-project Related	45	29
R82-PR	Project Related	45	22

		Day dB LAeq(15hour)		
Name	Description	Existing	Proposed	Change
R01-PR_A	Project Related	56.2	56.2	0
R02-MOU_A	Non-project Related - Memorandum of Understan	42.7	42.6	-0.1
R03-MOU_A	Non-project Related - Memorandum of Understan	63.1	63.1	0
R04-MOU_A	Non-project Related - Memorandum of Understan	43.6	43.6	0
R05-PR_A	Project Related	49.9	43.1	-6.8
R06_A	Non-project Related	35	33.3	-1.7
R08_A	Non-project Related	45	45	0
R09_A	Non-project Related	49.7	49.7	0
R10_A	Non-project Related	66.7	66.7	0
R11_A	Non-project Related	63.8	63.8	0
R12_A	Non-project Related	65.5	65.5	0
R13-MOU_A	Non-project Related - Memorandum of Understan	56.9	56.9	0
R16_A	Non-project Related	61.4	61.4	0
R17-MOU_A	Non-project Related - Memorandum of Understan	59.6	59.6	0
R18-COMM_A	Commercial - Operating	65.7	65.7	0
R19_A	Non-project Related	59	58.8	-0.2
R21-COMM_A	Commercial - Operating	65.5	65.5	0
R22-MOU_A	Non-project Related - Memorandum of Understan	56	56	0
R23-MOU_A	Non-project Related - Memorandum of Understan	58.3	58.3	0
R24-MOU_A	Non-project Related - Memorandum of Understan	60.9	60.9	0
R25-MOU_A	Non-project Related - Memorandum of Understan	66.3	66.3	0
R26_A	Non-project Related	63.6	63.6	0
R27-COMM_A	Commercial - Non-operational	61.3	61.3	0
R28-MOU_A	Non-project Related - Memorandum of Understan	62	62	0
R29-MOU_A	Non-project Related - Memorandum of Understan	62.6	62.6	0
R32-MOU_A	Non-project Related - Memorandum of Understan	54.6	54.6	0
R33	Commercial - Non-operational	61.3	61.3	0
R35-MOU_A	Non-project Related - Memorandum of Understan	67.6	67.6	0
R37-MOU_A	Non-project Related - Memorandum of Understan	60.1	60.1	0
R40_A	Non-project Related	63.6	63.6	0
R41-MOU_A	Non-project Related - Memorandum of Understan	57.1	57.1	0
R42_A	Non-project Related	64.1	64.1	0
R43_A	Non-project Related	37.3	36.2	-1.1
R44-PR_A	Project Related	40	39.7	-0.3
R45-UNOCC_A	Unoccupiable	36.2	34.6	-1.6
R46-PR_A	Project Related	51.3	45.1	-6.2
R47-PR_A	Project Related	57.3	57	-0.3
R60_A	Non-project Related	39.9	39.9	0
R61-UNOCC_A	Unoccupiable	39.9	40	0.1
R62-PR_A	Project Related	38.9	39	0.1
R63_A	Non-project Related	32.8	33	0.2
R64_A	Non-project Related	39.3	39.4	0.1
R65_A	Non-project Related	33.2	33.6	0.4
R66_A	Non-project Related	36.8	37.1	0.3
R67_A	Non-project Related	36.5	36.8	0.3
R68_A	Non-project Related	38.5	38.8	0.3
R69_A	Non-project Related	42.2	42.3	0.1
R70_A	Non-project Related	30.5	30.7	0.2
R71_A	Non-project Related	47.9	48	0.1
R72_A	Non-project Related	40.9	41	0.1
R73_A	Non-project Related	65.4	65.4	0
R74-MOU_A	Non-project Related - Memorandum of Understan	50.9	50.9	0
R75_A	Non-project Related	51.4	51.3	-0.1
R76_A	Non-project Related	40.3	40.4	0.1
R78_A	Non-project Related	47.8	47.8	0
R79-MOU_A	Non-project Related - Memorandum of Understan	61.6	61.6	0
R80-MOU_A	Non-project Related - Memorandum of Understan	58.7	58.7	0
R81_A	Non-project Related	61.8	61.8	0
R82-PR_A	Project Related	36.8	36.7	-0.1



Night dB LAeq(9hour)				
Name	Description	Existing	Proposed	Change
R01-PR_A	Project Related	50.3	50.3	0
R02-MOU_A	Non-project Related - Memorandum of Understan	36.8	36.7	-0.1
R03-MOU_A	Non-project Related - Memorandum of Understan	57.2	57.2	0
R04-MOU_A	Non-project Related - Memorandum of Understan	37.7	37.7	0
R05-PR_A	Project Related	44	37.2	-6.8
R06_A	Non-project Related	29.1	27.4	-1.7
R08_A	Non-project Related	39.1	39.1	0
R09_A	Non-project Related	43.7	43.8	0.1
R10_A	Non-project Related	60.8	60.8	0
R11_A	Non-project Related	57.9	57.9	0
R12_A	Non-project Related	59.6	59.6	0
R13-MOU_A	Non-project Related - Memorandum of Understan	51	51	0
R16_A	Non-project Related	55.7	55.5	-0.2
R17-MOU_A	Non-project Related - Memorandum of Understan	53.8	53.7	-0.1
R18-COMM_A	Commercial - Operating	60.4	59.8	-0.6
R19_A	Non-project Related	60.5	60.2	-0.3
R21-COMM_A	Commercial - Operating	59.6	59.6	0
R22-MOU_A	Non-project Related - Memorandum of Understan	56.1	56.1	0
R23-MOU_A	Non-project Related - Memorandum of Understan	52.4	52.4	0
R24-MOU_A	Non-project Related - Memorandum of Understan	55	55	0
R25-MOU_A	Non-project Related - Memorandum of Understan	60.5	60.4	-0.1
R26_A	Non-project Related	57.8	57.7	-0.1
R27-COMM_A	Commercial - Non-operational	55.5	55.4	-0.1
R28-MOU_A	Non-project Related - Memorandum of Understan	56.1	56.1	0
R29-MOU_A	Non-project Related - Memorandum of Understan	56.7	56.7	0
R32-MOU_A	Non-project Related - Memorandum of Understan	48.7	48.7	0
R33	Commercial - Non-operational	55.5	55.4	-0.1
R35-MOU_A	Non-project Related - Memorandum of Understan	61.5	61.7	0.2
R37-MOU_A	Non-project Related - Memorandum of Understan	54.2	54.2	0
R40_A	Non-project Related	57.8	57.7	-0.1
R41-MOU_A	Non-project Related - Memorandum of Understan	51.2	51.2	0
R42_A	Non-project Related	58.7	58.2	-0.5
R43_A	Non-project Related	31.4	30.3	-1.1
R44-PR_A	Project Related	34.2	33.8	-0.4
R45-UNOCC_A	Unoccupiable	30.3	28.7	-1.6
R46-PR_A	Project Related	45.4	39.2	-6.2
R47-PR_A	Project Related	51.6	51.1	-0.5
R60_A	Non-project Related	33.9	34	0.1
R61-UNOCC_A	Unoccupiable	33.9	34.1	0.2
R62-PR_A	Project Related	32.9	33.1	0.2
R63_A	Non-project Related	26.9	27.1	0.2
R64_A	Non-project Related	33.3	33.5	0.2
R65_A	Non-project Related	27.3	27.7	0.4
R66_A	Non-project Related	30.8	31.2	0.4
R67_A	Non-project Related	30.4	30.9	0.5
R68_A	Non-project Related	32.5	32.9	0.4
R69_A	Non-project Related	36.2	36.4	0.2
R70_A	Non-project Related	24.6	24.8	0.2
R71_A	Non-project Related	42	42.1	0.1
R72_A	Non-project Related	35	35.1	0.1
R73_A	Non-project Related	59.5	59.5	0
R74-MOU_A	Non-project Related - Memorandum of Understan	45	45	0
R75_A	Non-project Related	45.4	45.4	0
R76_A	Non-project Related	34.3	34.5	0.2
R78_A	Non-project Related	41.9	41.9	0
R79-MOU_A	Non-project Related - Memorandum of Understan	55.7	55.7	0
R80-MOU_A	Non-project Related - Memorandum of Understan	52.9	52.8	-0.1
R81_A	Non-project Related	56.1	55.9	-0.2
R82-PR_A	Project Related	30.9	30.8	-0.1

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Muller Acoustic Consulting Pty Ltd

PO Box 678, Kotara NSW 2289

ABN: 36 602 225 132

Ph: +61 2 4920 1833

[www.mulleracoustic.com](http://www.mulleracoustic.com)

