Traffic Study Newmont

Traffic Study Report
[Final]

Report prepared for:

Social Solutions

Paramaribo, 24th of Oct 2024

ISO 9001: 2015 certified

Project title: Traffic Study Newmont

Project number: IS - 452
Document: Traffic Study Report

Version	Status	Compiled by	Validated by	Approved by	Document Date
1	Draft	S. Kishoen Misier G. Macnack A. Nakchedi S. Koenjbiharie	M. Blenman	M. Blenman	19 Apr 2024
2	Draft	S. Kishoen Misier G. Macnack A. Nakchedi S. Koenjbiharie	M. Blenman	M. Blenman	30 Apr 2024
3	Final Draft	S. Kishoen Misier G. Macnack A. Nakchedi S. Koenjbiharie	M. Blenman	M. Blenman	24 May 2024
4	Final	S. Kishoen Misier G. Macnack A. Nakchedi S. Koenjbiharie	M. Blenman	M. Blenman	8 Aug 2024
5	Final	S. Kishoen Misier G. Macnack A. Nakchedi S. Koenjbiharie	M. Blenman	M. Blenman	24 Oct 2024

CONTENTS **PAGE**

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

Abbreviation	Definition
%	Percentage
Air pollution	This means any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances
CSR	Corporate social responsibility
dB	Decibels
DC	Districts Commissioner
Dust	Solid materials suspended in the atmosphere in the form of small irregular particles, many of which are microscopic in size
EHS	Environment, Health, and Safety
GPS	Global Positioning System
Hz	Hertz
IFC	International Finance Cooperation
kHz	Kilohertz
Km	Kilometer.
KPS	Korps Politie Suriname (Police Force Suriname)
L_{10}	L10 is the level exceeded for 10% of the time. For 10% of the time, the sound or noise has a sound pressure level above L10. For the rest of the time, the sound or noise has a sound pressure level at or below L10.
L_{90}	See L_{10} but read 90% instead of 10% and L_{90} instead of L_{10}.
LAeq	Equivalent Sound Pressure Level using the A-weighting setting
LBB	Dienst Lands Bosbeheer (National Forestry Service)
Lmax	Maximum RMS (root mean squared) level of a sound source or environment.
Lmin	Minimum RMS (root mean squared) level of a sound source or environment.
M	Meter
m/s	Meter per second
NIMOS	National Institute for Environment and Development in Suriname (Nationaal Instituut voor Milieu en Ontwikkeling in Suriname)
NO_2	Nitrogen dioxide
OW	Ministerie van Openbare Werken (Ministry of Public Works)
Particulate Matter (PM)	These comprise a mixture of organic and inorganic substances, ranging in size and shape. These can be divided into coarse and fine particulate matter.
PCE	Passenger car equivalent
PM	Particulate Matter. These comprise a mixture of organic and inorganic substances, ranging in size and shape. These can be divided into coarse and fine particulate matter which can cause serious health problems (can get deep into the lungs and some may even get into the bloodstream) when inhaled. Fine particles can also cause reduced visibility (haze).
$PM_{1.0}$	Particulate Matter with aerodynamic diameters that are 1.0 micrometers and

Abbreviation	Definition
	smaller
PM_{10}	Particulate Matter with aerodynamic diameters that are 10 micrometers and smaller
$PM_{2.5}$	Particulate Matter with aerodynamic diameters that are 2.5 micrometers and smaller
POI	Points of Interest
PPE	Personal protective equipment
ROS	Ministerie van Regionale Ontwikkeling en Sport (Ministry of Regional Development and Sport)
SBB	Stichting voor Bosbeheer en Bostoezicht (Foundation for Forest Management and Production Control)
SIA	Social Impact Assessment
T	Traffic
TSF	Tailing storage facility
TSP	Total Suspended Particles
WAS	Wegenautoriteit Suriname (Road Authority)
WHO	World Health Organization
$\mu g/m^3$	micrograms per cubic meter air or µg/m3.

1 INTRODUCTION

1.1 Context of the project

This traffic study is conducted as part of the updated Social Impact Assessment for Newmont's operations at Merian and the new tailing storage facility (TSF), TSF-2, which is to be constructed near the current TSF-1. The study provides a baseline of the current impacts of traffic at nearby residents' areas and determines the potential impact of the expected changes in weekly traffic related to Newmont.

Advise and Engineering Consultant ILACO Suriname NV, has been selected for this assignment as a consultant by Social Solutions.

The **study area** is limited to the following roads being used for Newmont's operation (Figure 1):

- East West Connection Road (Meerzorg-Moengo),
- Road to Patamacca
- Granman Forster Road to the exit Merian mine (km 58),
- Forestry Road (Road to Merian mine),
- Road towards the harbor of Moengo.

1.2 Objectives

The traffic study involves an assessment of the road conditions, categorized traffic volumes, noise pollution and dust pollution. The objectives of each of these aspects are specified below:

- **Road conditions**: Inventory of the existing road infrastructure and its conditions.
- **Classified Traffic volumes**: Inventory of the classified traffic volumes on the Road to Patamacca and the East West Connection Road.
- **Noise**: Analyze the impact of traffic on noise levels along the East-West Connection Road and the Patamacca road nearby residents' areas.
- **Dust**: Analyze the impact of traffic on dust along the Patamacca road nearby residents' areas.

1.3 Aim and outline of this report

This "*Traffic Study Report*" aims to provide a baseline of the current impacts of traffic at nearby residents' areas and present the potential impact of expected changes in weekly traffic related to Newmont. This report provides:

- A description of the methodology used for the study including road conditions survey, traffic counts, noise and dust measurements [Section 2]
- A baseline of the current road infrastructure, traffic and its effect on nearby villages as a result of the desk and field surveys [Section 3]
- An indication of future developments to consider [Section 4]
- Conclusions including impact assessment and Recommendations [Section 5]

2 METHODOLOGY

The study consists of both desk research and field studies. The data of interest are described in this section.

2.1 Stakeholder scoping meeting

A stakeholder meeting with the villagers and representatives along the road to Patamacca was held on the 8th of December 2023 at Mora Kondre. During this meeting the villagers' main concerns related to the passing traffic on the road to Patamacca were discussed. These are discussed in Section 3.3. The planned field activities were also presented to the villagers and contact details were shared.

2.2 Desk research

The following data were collected (through the client) and analyzed as part of the desk research:

- **Land use & Points of Interest (POI):** Overview of land use, road network, villages, economic activities within the study area,
- **Road users:** Identification of road users and Newmont traffic operations (share of traffic, type of vehicles, contractors, etc.),
- **Traffic accidents:** Based on available data of the police (Korps Politie Suriname, KPS) & Newmont accidents registration.

2.3 Field study

The following data were collected and analyzed as part of the field study:

- **Road conditions**: Inventory of road infrastructure and its conditions (including lighting, pavement, width, speed limits, weight limit, road signage and drainage).
- **Traffic counts**: Traffic counts at 2 locations: Road to Patamacca & at Stolkertsijver.
- **Noise measurements:** Daytime and nighttime noise measurement along the East-West Connection road and the Patamacca road at 8 -10 locations at nearby residents' areas.
- **Dust measurements**: 7-day 24-hour measurements at 2 locations along the Patamacca road at nearby residents' areas. The measurements were conducted in the dry season.

An overview of the locations and the periods during which the surveys were conducted is presented in Table 1. Each survey methodology is elaborated upon in the following subsections.

Table 1: Overview of field activities.

Survey	Location	Date
Road Condition	All roads	19 Feb 2024
Traffic Counts	TC1: Junction Mora Kondre	26 Apr 2024
	TC2: Stolkertsijver	7 & 8 March 2024
Noise Measurements	N all - Daytime	27 Feb & 5 March 2024
	N all - Nighttime	27 Feb 2024
Dust Measurements	D1: Kraboe Olo	27 Feb – 5 March 2024
	D2: Leewani Kampoe	5 – 13 March 2024

2.3.1 Road Condition Survey

Data: Location and condition of roads and bridges including lighting, pavement, width, speed limits, weight limits, signage and drainage.

Methodology: 2 surveyors and a driver surveyed the roads by car. Each object of interest was pinpointed with a GPS device and its condition was marked on a survey sheet. The following roads were surveyed (as indicated in Figure 1):

- East West Connection Road (Meerzorg-Moengo),
- Road to Patamacca
- Granman Forster Road to the exit Merian mine (km 58),
- Forestry Road (Road to Merian mine),
- Road towards the harbor of Moengo.

Material: Road & Bridge Survey form, Maps, GPS device, Measuring wheel, Camera, Car beacon light, Pen and PPE.

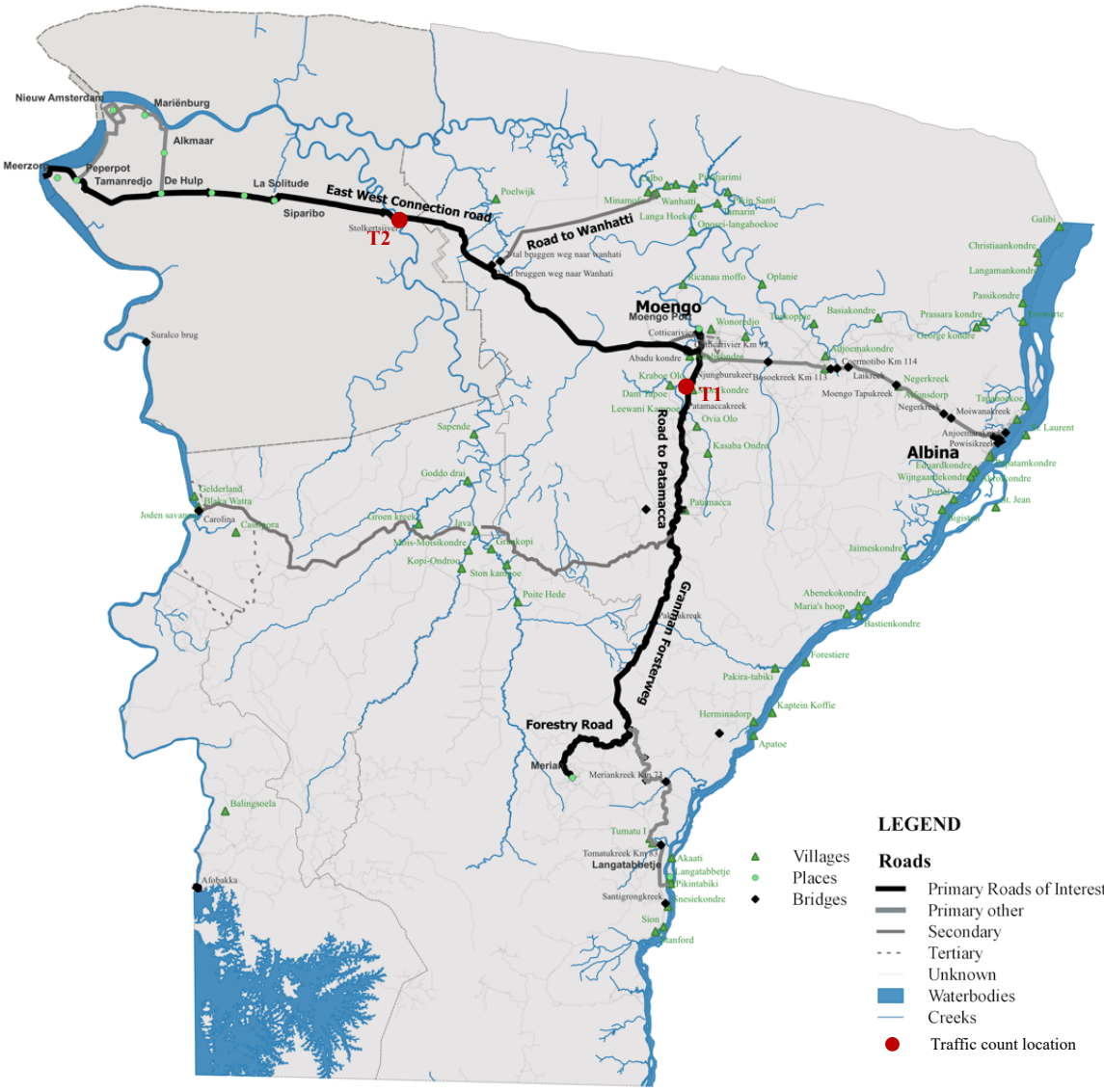


Figure 1: Overview of the roads of interest and traffic count locations.
Source: Own elaboration.

Primary roads out of the scope of this study are indicated as 'Primary other' in Figure 1. Secondary and Tertiary roads are also indicated and are also out of the scope.

2.3.2 Classified Traffic Counts

Data: Traffic volumes, vehicle type, direction/ turning movements. An indication of the speeds can be derived as well.

Methodology: 24 hours video recordings of passing traffic at 2 locations with the help of a camera system were manually processed to derive the required data. The survey locations were Kraboe Olo junction (T1) and Stolkertsijver (T2). The locations are indicated in Figure 1. Vehicles were categorized

visually as indicated in Table 2. Each vehicle category was assigned a passenger car equivalent (PCE) value as per Premcharan's (2019) Surinamese adaptation of the Dutch traffic guidelines (CROW). Larger and heavier vehicles take up more space, are slower and are more difficult to overtake and thus have a larger impact on the capacity of a road and therefore larger PCE values.

Material: 24h remote camera system.

Table 2. Vehicle visual categorization.

Vehicle Category	Example images	PCE value
Passenger car		1.0
Bus	 	1.5
Trailer truck	 	2.3
Heavy Truck	 	2.0
Light truck	 	1.5
Motorbike/ Moped		0.4

2.3.3 Noise Measurements

The noise measurements were carried out according to the General Environment, Health and Safety (EHS) Guidelines of the WHO/IFC for Noise monitoring (2007).

Noise instrument

Noise measurements were performed with a sound level meter and analyzer SVAN 977c (#98852) mounted on a tripod. The MK 255 pre-polarized microphone is provided with a SA22 windscreen, through which the measurements will be done. The measurements are done with Class 1 IEC 61672:2013 accuracy in the frequency range of 20 Hz to 20 kHz with an MK 255 microphone. A FAST detector is used for the measurements with A, C and Z filters. Also, an 1/1 OCTAVE analysis with 10 filters with center frequencies 31.5 Hz ÷ 16 kHz, Class 1 IEC 61260-1:2014, will be logged. Before each measurement period, a calibration will be done with an SV 33B Acoustic Calibrator (serial # 125676) with IEC 60942:2003 standard, Type 1 accuracy. The logged data was analyzed with the software SVANPC++ version 3.3.16. See Appendix A: Specifications of the SVAN 977c. The calibration overview of the SVAN 977c Sound Analyzer is described in Table 3.

Table 3: Dates of calibration.

Calibrated on	Measurement took place on
26th of February 2024	27th and 28th of February 2024
4th of March 2024	5th of March 2024
13th of March 2024	13th of March 2024

Measurement Parameters

At every measurement the following was recorded:

- Time and date;
- Location and GPS;
- Name of person carrying out the monitoring;
- Noted noise sources and noise levels, direction and frequency from source of interest;
- Duration of monitoring;
- Weather conditions such as wind direction, cloud cover etc.;
- Noise levels in LAeq, L_{10}, L_{50}, L_{90}, L_{max} and L_{min}, all provided in dBA, and
- Audio recordings.

The LAeq provides information on the nature and extent of the noise sources. The L_{10} represents the higher noise levels during the measurement period and together with L_{50} and L_{90} are generally utilized for traffic noise levels. The L_{90} gives an indication of the underlying noise level or the noise level that is present 90% of the measurement time. It is generally used to represent background noise levels i.e., the noise levels without the influence of infrequent transient sources.

Noise measurements locations

Noise measurements have been conducted at 8 locations during day and nighttime. When selecting the noise locations, consideration was given to identifying the residential areas that may experience traffic-related noise nuisance. A description of the noise measurement locations is provided in Table 4 below and presented in Figure 2.

Table 4: Overview of noise measurement locations.

Location	Location description	Daytime (7.00-22.00hrs.)	Nighttime (22.00-07.00 hrs.)
		Date/ Time	Date/ Time
Urban area			
N1	At the berm in front of a resident in Meerzorg, along the East West Connection Road. There was a gutter between the fence of the resident and the berm. The meter was placed approx. 8 m away from the axis, approx. and 1.5 m above surface level.	05th of March 2024/ 09:00 – 09:15 hrs.	28th of February 2024/ 02:34 - 02:49 hrs.
N2	At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	05th of March 2024/ 10:18 – 10:34 hrs.	28th of February 2024/ 02:02 – 02:17 hrs.
Rural area			
N3	At the berm in front of a resident in Orleane Kreek, along the East West Connection Road. There was a gutter between terrain of the resident and the berm. The meter was placed approx. 6 m away from the axis, approx. and 1.5 m above surface level.	05th of March 2024/ 10:56 – 11:11 hrs.	28th of February 2024/ 01:25 – 01:40 hrs.
N4	At the berm in front of a resident at Stolkertsijver, along the East West Connection Road. The meter was placed approx. 7 m away from the axis and 1.5 m above surface level.	05th of March 2024/ 11:34 – 11:49 hrs.	28th of February 2024/ 00:44 – 00:59 hrs.
N5	Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road. There is a gutter between the measurement location and the berm. The meter was placed approx. 20 m away from the axis and 1.5 m above surface level.	13th of March 2024/ 01:30 - 01:40 hrs.	27th & 28th of February 2024/ 23:53 –00:08 hrs.
N6	At an open terrain at the corner of the Kapitein Chris Silos Road and Berhardlaan, at Moengo. The meter was placed approx. 5m away from the axis of the road and 1.5 m above surface level.	05th of March 2024/ 15:03 – 15:19 hrs.	27th of February 2024/ 22:00 – 22:15 hrs.
N7	At a resident located in the community Kraboe Olo, along the Patamacca Road. The meter was placed approx. 40 m away from the axis and 1.5 m above surface level.	05th of March 2024/ 12:39 – 12:57 hrs.	27th of February 2024/ 23:00 – 23:15 hrs.
N8	At a resident in the community Lewani Kampoe, along the Patamacca Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	05th of March 2024/ 13:42 – 13:57 hrs.	27th of February 2024/ 22:42– 22:57 hrs.
Remark	*At location N5, the daytime measurement on the 13th of March 2024 was only carried out for 10 minutes due to rainfall.*		

Measurement Procedure

All measurements have been carried out by a survey team of two (2) persons, with the SVAN 977c meter placed on a tripod at approximately 1.5 m above the surface level and at least 3 m away from obstacles or reflecting surfaces. Audio recordings have also been made during all measurements by attaching an audio recorder to the sound meter. In case of rain, the measurements were stopped earlier or postponed. The noise measurements have been carried out for 10-15 minutes continuously during daytime (7:00 – 22:00 hrs.) and nighttime (22:00 – 7:00 hrs.).

Applicable noise standards

In the absence of specific national guidelines for noise levels, the international standards of the World Health Organization/ International Finance Corporation (WHO/IFC), also used by NIMOS, are applied (see Table 5).

Table 5: Applicable Outdoor Noise Standards for Community-based noise (WHO/IFC).

Receptor	Maximum Allowable Ambient Noise Levels 1-hour LAeq (dBA)	
	Daytime 07:00-22:00	Nighttime 22:00-07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

The IFC states that noise impacts should be limited to a maximum increase above background levels of 3dBA at the nearest receptor location off-site (IFC 2007). For a person with average hearing acuity an increase of less than 3 dBA in the general ambient noise level is not detectable.

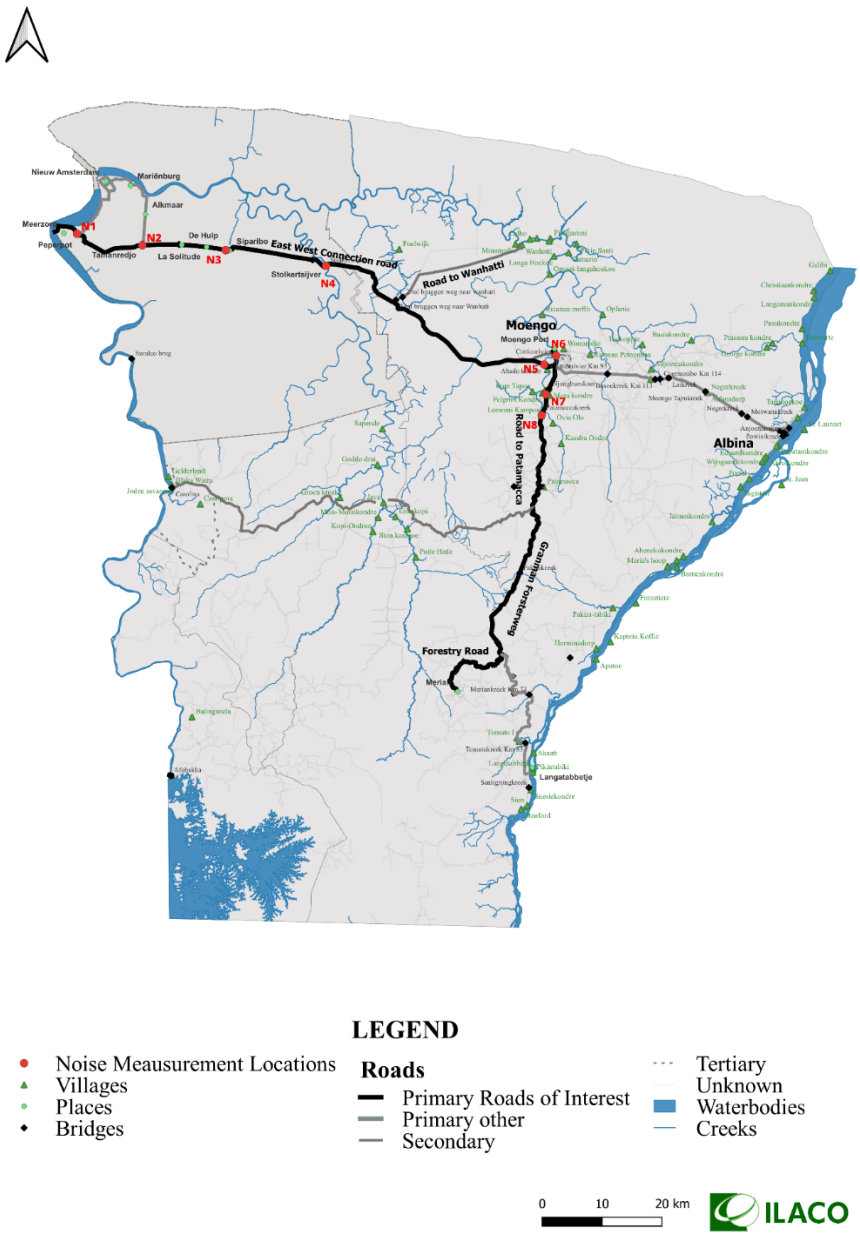


Figure 2: Actual noise measurement locations.

Source: Own elaboration.

2.3.4 Dust Measurements

The dust measurements were carried out according to the General Environment, Health and Safety (EHS) Guidelines of the WHO/IFC for air quality monitoring (2007).

Measurement instruments and procedure

Real-time dust measurements were conducted using an Aeroqual-AQS-1 Dust Profiler (AQS-1) with MET-ONE (weather) station. The parameters that were measured include:

- Time and Date
- Location and GPS
- Particulate Matter in several fractions (TSP, $PM_{1.0}$, $PM_{2.5}$, PM_{10});
- Meteorological parameters (temperature; humidity; wind direction and wind speed; and atmospheric pressure)

Prior to the measurement, maintenance of the instrument was carried out. Flow checks of the TSP inlet were carried out as well as checks on filters and cables. The flow checks of the Areoqual-AQS-1 Dust Profiler are presented in Annex B. The Areoqual-AQS-1 Dust Profiler was set up at approx. 1.5 m above ground level facing the true north.

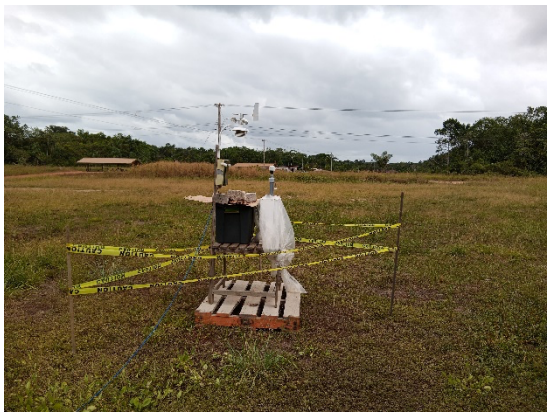
Dust measurement locations

The dust measurements have been carried out at two locations along the Patamacca Road. The locations for the dust measurement were selected based on the communities that are located downwind of the Patamacca road. This was also confirmed during the stakeholder engagement which was held on the 8th of Dec 2023. The measurement locations are presented in Figure 3.

The pictures below give an illustration of the measurements carried out.

Location D1

The Areoqual-AQS-1 Dust Profiler (AQS-1) with MET-ONE (weather) station was installed at a resident located in Kraboe Olo. The measurement was carried out from the 27th of February till the 5th of March 2024 (7 days continuously).



Location D2

The Areoqual-AQS-1 Dust Profiler (AQS-1) with MET-ONE (weather) station was installed at a resident located in Leewani Kampoe. The measurement was carried out from the 5th till the 13th of March 2024 (7 days continuously).

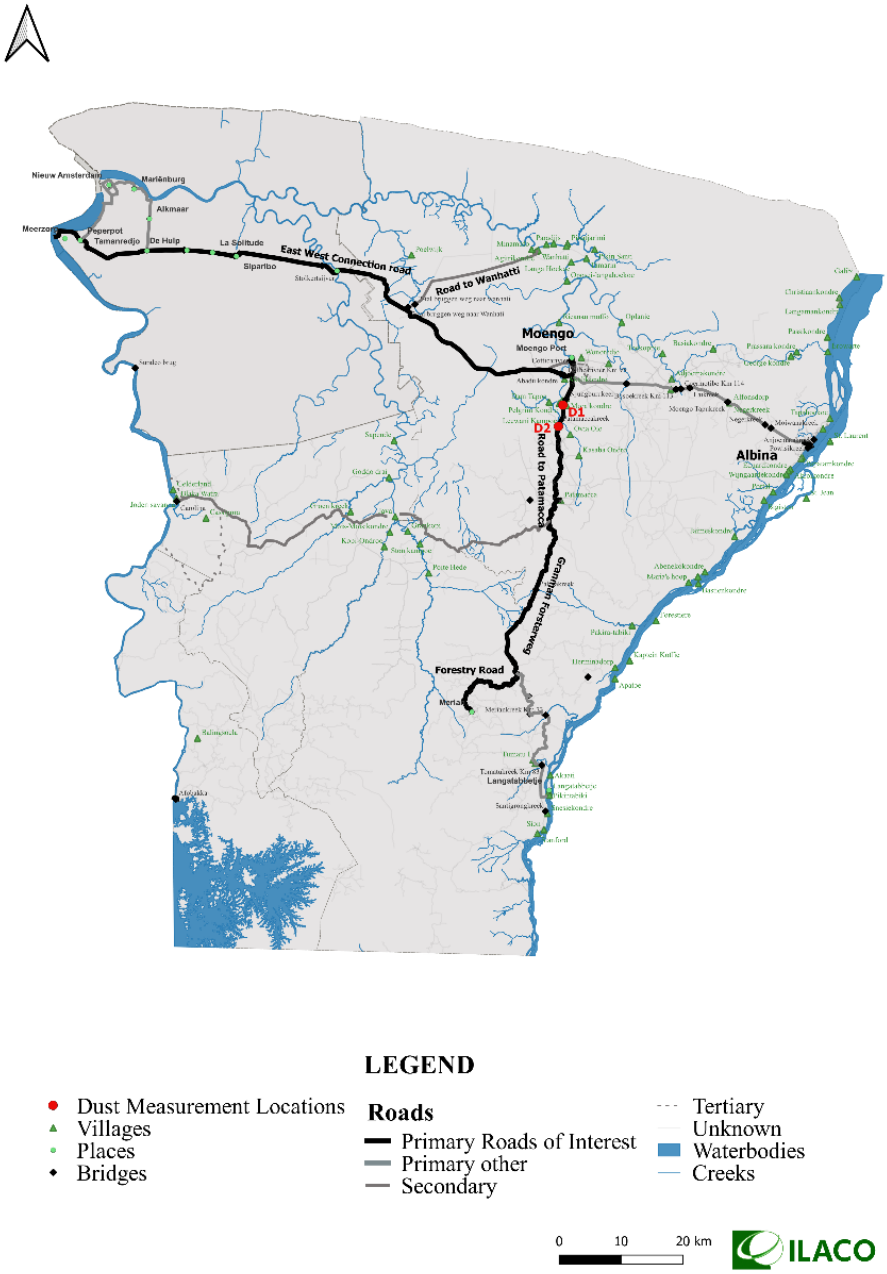


Figure 3: Actual dust measurement locations.
Source: Own elaboration.

Applicable standards for air quality

Air quality guidelines and standards are used for effective air quality management, providing the link between the source of atmospheric emissions and the user of that air at the downwind receptor site (or receptors).

Air quality guidelines and standards are normally given for specific averaging or exposure periods. The general Environmental Health and Safety (HSE) Guidelines from the International Finance Corporation (IFC) for ambient air quality guidelines refer to the World Health Organization (WHO) guidelines. These are typically used for long term impacts on health based on long periods of measurements and often applied off-site from industrial facilities.

In the absence of specific national guidelines for ambient air quality in Suriname, the international standards of the WHO/IFC, also used by NIMOS, are used (see Table 6) in this study. It is emphasized that these air quality values are applicable if measurements are taken over a long period. Typically, annual averaging time values are used when measurements of several years are available, while the 24-hour averaging time values are used for shorter measuring periods (often 2-4 weeks). The WHO has introduced "Interim targets", which are air pollutant levels that are higher than the ultimate desired air quality guideline levels. This provides authorities to develop pollution reduction policies in highly polluted areas that are achievable within a realistic time frame to reach the desired standards.

Note: Given the fact that the measuring period was only 7 days, the applicable WHO guidelines of 24-hour for particulate matter are used in this study.

Table 6: World Health Organization Ambient Air Quality Guidelines (2021)

Pollutant	Averaging Time	Interim target (µg/m^3)				Air quality guideline level (µg/m^3)
		1	2	3	4	
$PM_{2.5}$	Annual	35	25	15	10	5
	24-hour	75	50	37.5	25	15
PM_{10}	Annual	70	50	30	20	15
	24-hour	150	100	75	50	45

2.4 Impact rating methodology

In order to rate the significance of the impacts, the following methodology is used. The significance of key potential impacts is based on two key factors: severity and probability of occurrence. The severity of predicted impacts was determined based upon assessment of the following attributes as indicated in Table 7:

- Magnitude
- Geographical scale
- Duration

Each one of these factors was rated, on the basis of the research findings, as depicted in Table 8 below.

Table 8 also shows our categorization of probability. In our rating, "probability" refers to two concepts namely: (a) the likelihood that the potential impact will actually occur or has occurred, and (b) the likelihood that a predicted or observed impact is a consequence of the presence of Newmont.

Table 7: Severity ratings.

Defining **severity** of impact		***Magnitude***			
		High	**Medium**	**Low**	**Negligible**
Duration and/or Scale	**LT-LS, LT-MS, or MT-LS**	High	High	Moderate	Negligible
	LT-SS, MT-MS, MT-SS, ST-MS, or ST-LS	High	Moderate	Minor	Negligible
	ST-SS	Moderate	Minor	Negligible	Negligible

Table 8: Magnitude, duration, scale and probability ratings and their meaning.

Rating	Definition of Rating
Magnitude *– severity and reversibility of possible impact*	
Negligible	No or hardly any impact noticeable
Low	Low level, reversible damage to a small number of people
Medium	Significant yet reversible damage to a significant share of persons in the study area, or irreversible impact on lives and livelihoods of small population.
High	Severe irreversible damage to the lives and livelihoods of many people in the study area, or even (inter)nationally.
Duration*– the time frame for which the impact will be experienced*	
Short-term	Up to 1 year
Medium-term	1 to 5 years
Long-term	More than 5 years
Scale*– the area in which the impact will be experienced*	
Small	Localized spot (e.g. one village, stretch of road)
Medium	Study area
Large	Larger part of the country or beyond
Probability *– Likelihood that the impact will occur/has occurred AND can be attributed to Newmont.*	
Small	Small chance that this will happen/small chance that this happened as a result of presence of Newmont.
Fair	<50% possibility that this will happen/happened as a result of the presence of Newmont
Likely	Quit likely that this will happen, but not (nearly) certain
Certain	Has happened, is happening, or (nearly) certain that this will happen

Subsequently, the significance of negative project impacts was projected as a function of severity and probability, on a 4-point scale, as displayed in Table 9 below.

Table 9: Rating of negative project impacts.

		Severity				
		Negligible	Minor	Moderate	Major	Catastrophic
Probability	Certain	Low	Moderate	High	Major	Major
	Likely	Low	Low	Moderate	High	Major
	Fair	Negligible	Low	Low	Moderate	High
	Small	Negligible	Negligible	Low	Moderate	Moderate

Likewise, considering that the project also may have positive project benefits, the significance of potential project benefits was rated as in Table 10 below, as the product of gains and probability.

Table 10: Rating of positive project benefits.

		Gains				
		Benign	Minor	Moderate	Major	Enormous
Probability	Certain	Low	Moderate	High	Major	Major
	Likely	Low	Low	Moderate	High	Major
	Fair	Negligible	Low	Low	Moderate	High
	Small	Negligible	Negligible	Low	Moderate	Moderate

3 TRAFFIC BASELINE

The findings of the desk- and the field study are given in this section, forming a baseline of the condition of the road infrastructure and current traffic and its effect on nearby villages related to noise and dust.

3.1 Points of Interest (POI) & Land use

The roads of interest pass through the districts of Commewijne, Marowijne and Sipaliwini (resort Pamaka). A map with the roads, places, villages, production activities (including gold mining, protected areas, wood logging concessions and agriculture) is presented in Figure 4.

There are several major residential areas along the East West Connection Road including: Meerzorg, Peperpot and Tamanredjo. There are also minor residential areas such as: De Hulp, La Solitude, Siparibo, Stolkertsijver, etc.

Residential areas along the road to Patamacca, from large to small in terms of approximate number of households, include: Ovia Olo (40-60), Patamacca (30-40), Kraboe Olo (20-30), Dantapoe (20-25), Mora Kondre (15-25), Pelgrim Kondre (7) and Leewani Kampoe (4). In total there are around 450 permanent residents in the region and around 260 non-permanent residents that visit mostly during weekends and vacations (Social Solutions, 2019).

Marowijne can be reached via the East-West connection road from Paramaribo. There is a primary road towards the south (Road to Patamacca- Langatabiki) which leads to the Merian gold mines in the district of Sipaliwini. There is a ferry connection from Albina (Suriname) to the town of Saint-Laurent-du-Maroni in French Guiana. There are a lot of people traveling by boats crossing over from Albina to French Guiana and vice versa, for economical, recreational and personal reasons. In 2018, the total number of registered arrivals from Saint-Laurent-du-Maroni for residents was approximately 1,500 passengers and for non-residents 55,000 (ABS, 2021). This figure only includes people who travelled formally, that is, they stamped their passport entering Suriname through the custom officer. Additionally, there is also a significant amount of unregistered boat traffic between Albina and Saint-Laurent-du-Maroni as well as to the villages along the Marowijne river. There are no numbers available for the informal boat traffic from and towards Albina. There are 2 airstrips in this district, at Moengo and Albina, neither one of which is operational due to a lack of flight demand.

There are also villages and settlements towards the south along the Marowijne river such as Langatabiki, Snesiekondre, Zion, Stanford, etc. Commercial activities in terms of supermarkets, shops, restaurants, service stations, etc. are clustered in Meerzorg, Tamanredjo, Stolkertsijver, Moengo and Albina. Snesiekondre, Zion and Stanford are commercial centers where services catered to the goldmining activities are offered, such as fuel supply, transport and food. Outside of these locations there are barely any commercial activities.

The main production activities in Marowijne are gold mining in the south of the district along the Marowijne river and wood logging in the south-western area and in Wanhatti. Bauxite mining used to be the main production activity in the district, however since Suralco stopped its operations in Suriname in 2014 the bauxite mines near Moengo have been closed. Transport of the wood from logging concessions takes place via the Road to Patamacca and East-West Connection Road. Furthermore, area inhabitants are involved in agriculture to meet the needs for the local communities as well as for sale to Newmont (e.g. Leewanie Kampoe), in Paramaribo and in French Guiana.

There is a hospital in Albina, Streekziekenhuis Marwina, which has a building but is not fully operational. The hospital hosts a couple of clinics per year with specialists and also some beds for people to stay. There are also several medical centers in the villages along the Marowijne river. Most commercial activities, public services and schools are located in Albina.

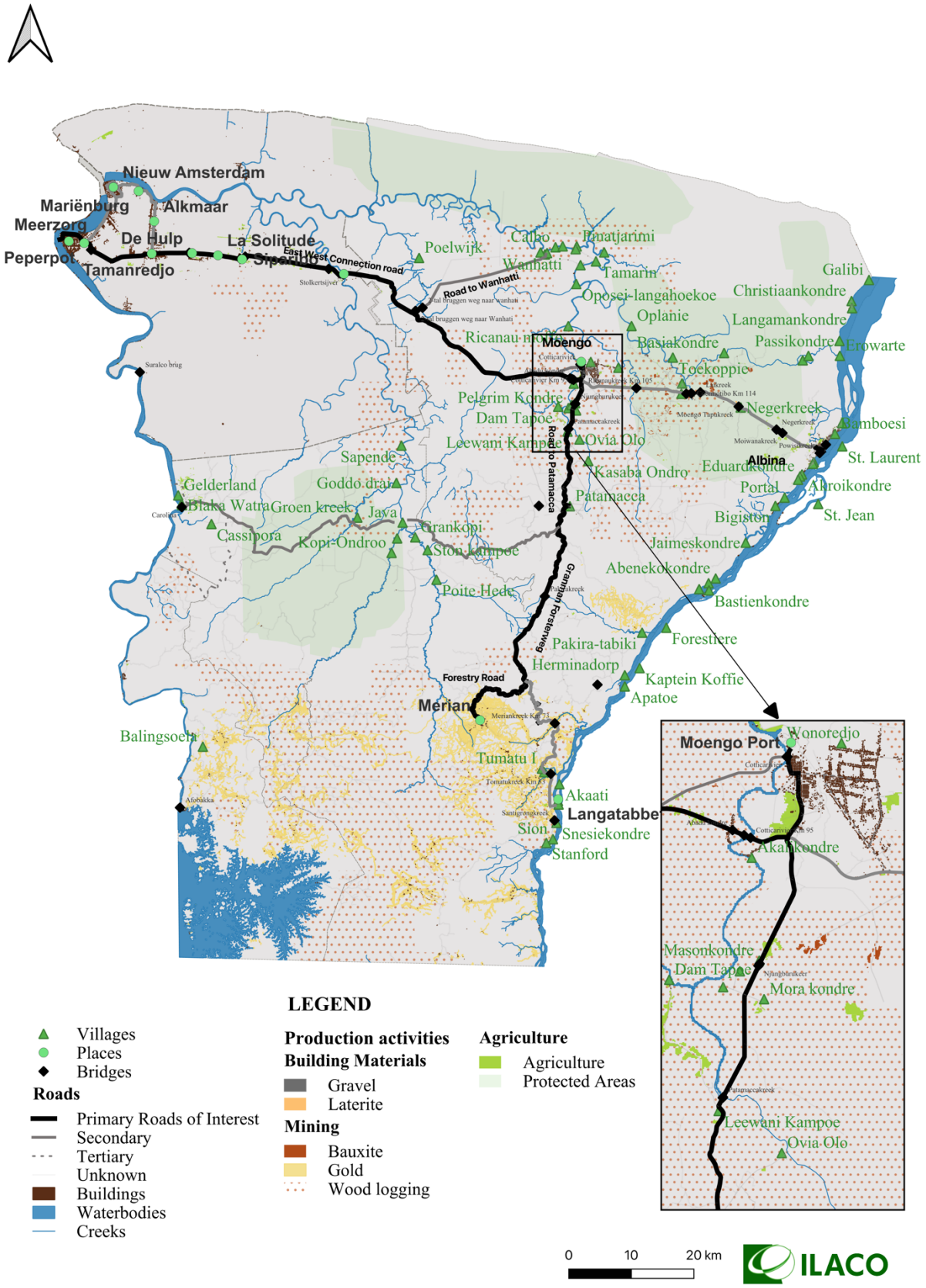


Figure 4: Overview of study area.

Source: Own elaboration based on Genivar & ILACO (2011), Gonini (2024, July) and OpenStreetMaps (2023, July).

3.2 Road users

The various road users for the two main road sections are identified and grouped below. Most traffic that uses the road between Moengo and Merian makes use of the road section between Paramaribo and Moengo. Based on Badjalala's (2024) traffic counts conducted on the 23rd of Jun 2023 between 6:00 and 18:00 on the intersection of the Road to Patamacca and the East West Connection Road, all freight trucks coming from the Road to Patamacca are turning towards the West.

The road users for the road section between Moengo and Merian are the following:

- Traffic from & to Newmont including staff, supply and contractors
- Villagers living along the road to Patamacca and their visitors (Mora Kondre, Kraboe Olo, Pelgrim Kondre, Dantapoe, Leewani Kampoe, Ovia Olo, Kasaba Ondro and Patamacca)
- Wood loggers near the road to Langatabiki
- Traffic from & to Langatabiki and southern villages (villagers, freight, etc.)
- Artisanal and small-scale mining (ASM)-related traffic to Tumatu and other gold mining areas

The road users for the road section between Paramaribo and Moengo are the following:

- Traffic from & to Newmont including staff, supply and contractors.
- Villagers living along the road to Patamacca and their visitors (Mora Kondre, Kraboe Olo, Pelgrim Kondre, Dantapoe, Leewani Kampoe, Ovia Olo, Kasaba Ondro and Patamacca)
- Wood loggers near the road to Langatabiki
- Traffic from & to Langatabiki and southern villages (villagers, freight, etc.)
- Traffic from & to Moengo
- Traffic from & to Albina & St. Laurent (incl. freight, tourists and inhabitants of Albina)
- Traffic from & to Commewijne (incl. freight, tourists and inhabitants of Commewijne)
- Traffic from & to the settlements and businesses along the East-West Connection Road
- ASM-related traffic: Both Albina/Papatam and Snesi kondre are hubs for ASM miners working in the Tumatu region,ASM areas further south, and French Guiana.

3.3 Main traffic-related concerns and nuisances according to the local communities

The following concerns were discussed during the stakeholder meeting held at Mora Kondre on the 8th of Dec 2023 & individual discussions with residents of Kraboe Olo and Leewani Kampoe:

- The villagers insisted that Newmont and/or the government should pave the road, at least the section between Moengo and Kraboe Olo or Leewani Kampoe (5-9 km).
- During the dry periods, traffic on the Langatabiki road generates a lot of dust causing hindrance for villagers living down-wind of the road and villagers walking on the road. The villagers are afraid that it might impact their health condition in the future.
- Traffic passing by at high speeds makes the villagers feel unsafe when making use of the road. One villager mentioned being hit by a bus while riding her moped. Also, they are afraid of being hit by loose stones from the road, especially the parts covered with gravel.
- The coarse gravel and ripples created by repeated traffic (washboarding) are a cause for discomfort and higher vehicle maintenance cost for the villagers driving on the road.
- During rainy season, part of the road gets rutted and muddy, making it difficult to drive on.
- One resident of Kraboe Olo mentioned that he often hears heavy traffic passing by early in the morning, before sunrise.

3.4 Traffic related to Newmont's operations

The Merian mine has two gates, a north- and south gate. Newmont logs the vehicles entering through the gates. The north gate is the formal access to the mine, almost all transportation comes in and out of the north gate. Workers in buses and light vehicles, fuel, chemicals (reagent) and freight generally come from Paramaribo and enter through the north gate (Figure 5). On average there are 1600 vehicles entering the north gate monthly. Considering Newmont's 24/7 operations, this averages to 400 vehicles entering weekly and 50-60 vehicles entering daily.

The south gate is closest to the Pamaka communities and is mainly used to drive to these communities by Newmont's social team, but it's also used for exploration- and security purposes. Most vehicles entering through the south gate are light vehicles/ passenger cars (Figure 6). On average there are 100 vehicles entering the south gate monthly. Considering Newmont's 24/7 operations, this averages to 25 vehicles entering weekly and 3-5 vehicles entering daily.

It seems there is a decrease in the number of light vehicles entering through the north gate in the last 5 months of 2023, however there is an increase in light vehicles entering through the south gate in the same period.

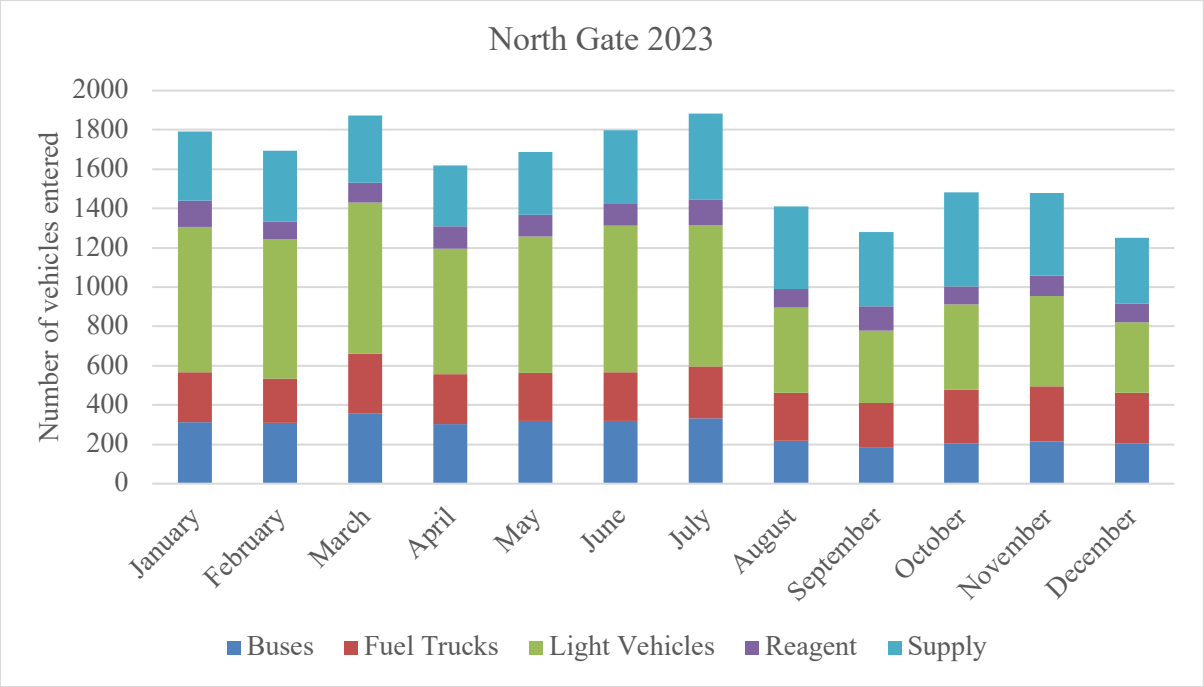


Figure 5: Monthly number of vehicles entering through the north gate in 2023.
Source: Newmont.

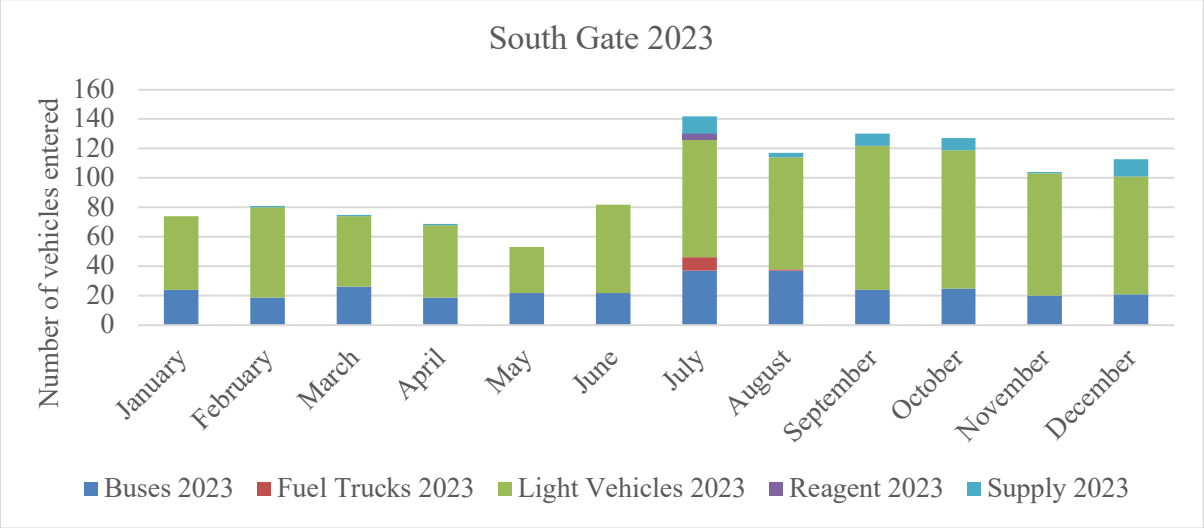


Figure 6: Monthly number of vehicles entering through the south gate in 2023.
Source: Newmont.

Newmont works with multiple contractors for their transport and mining operations. Haukes N.V. transports most of Newmont's freight, fuel and chemical transport, while Badjalala N.V. transports the workers by bus.

Cyanide is transported in ISO Tank Containers locked with security padlocks to the Port of Moengo from where it is further transported over the road to Merian by Haukes N.V. There are specific cyanide transport protocols in place, which involve a chain of custody.

Newmont does not allow transport between 18:00 and 06:00, with an exception for the Haukes' fuel truck, which comes in early in the morning.

3.5 Road infrastructure

A summary of the roads of interest is given in Table 11 and of the bridges in Table 12. The management and condition of roads and bridges including pavement, markings, width, lighting, speed limits, weight limits and drainage are discussed in this section.

Table 11: Summary of the roads of interest.

Road name	Surface	Length (km)	Manage-ment	Category	Condition
East West Connection road (Meerzorg - Moengo)	asphalt	95	WAS	primary	good
Kapitein Chris Silos Road	asphalt	2.1	WAS	primary	good
Road to Patamacca (Moengo-Patamacca)	laterite & gravel	18	WAS	primary	good
Granman Forster Road (Patamacca-Merian)	laterite & gravel	40	unknown	primary	good
Forestry Road (Road to Merian)	laterite	9.4	unknown	secondary	good

Source: own elaboration based on OW (2023a) and WAS (2023).

Table 12: List of the main bridges on the roads of interest.

Bridge Name	Length (m)	Width (m)	Load Class	Construction type	Condition
Commetewanekreek	26	7.3	45	Concrete	good
Cotticarivier	90	7.5	60	Steel	fair
Cotticarivier Km 95	80	7.5	60	Concrete	good
Njungburukreek	5	17.5	unknown	Culvert	good
Orleanekreek	23	7.3	30	Concrete	good
Pakirakreek	25	6	unknown	Steel/wood	good
Patamaccakreek			unknown	Concrete	good
Peperpot	5	10	30	Concrete	good
Sinabo	12	8	30	Concrete	good
Siparibo	22	7.5	30	Concrete	good
Stolkertsijver	120	8	30	Steel/ Concrete	good

Source: own elaboration based on OW (2023b).

3.5.1 Road Management

The roads of interest are formally managed by the Road Authority Suriname (WAS), except for the Granman Forster Road and the Forestry Road. The latter are suspected to formally fall under the management of the Ministry of Regional Development and Sports (ROS), however, it is unclear. In practice Newmont, with the help of its contractor Haukes Construction N.V., maintains the Road to Patamacca, Granman Forster Road and the Forestry Roads. A local Pamaka contractor maintains the Granman Forster Road between the crossroad with the Forestry road and Snesi Kondre/Langatabiki.

As per the state decree (S.B. 1991 no. 58)[1], the Ministry of Public Works (*Openbare Werken*, OW) has the task of preparation, implementation and maintenance of all civil engineering works, with the exception of secondary and tertiary works in the districts and in the interiors. ROS has the task of managing all secondary and tertiary civil engineering facilities throughout Suriname, with the exception of the Paramaribo district. The primary road Infrastructure is clearly defined in the State decree (SB 9 October 2001 no. 61).

Most main roads in the interiors are forest access roads ('Bos ontsluitingswegen'), which were developed between 1950-1984 for wood logging and mining, as well as for development of the rural communities (OW, 2022). These were 1,500 km of initially non-public roads and 22 wooden/ bailey bridges developed, managed and maintained by the National Forestry Service (LBB). LBB's main task is the sustainable management of forests. However, after the country's independence in 1975 and the Interior War around 1986-1992, LBB lost most of its financial support and employees (Government of the Republic of Suriname, 2022). Road and bridge maintenance were afterwards done by OW and ROS, including the District Commissioners in collaboration with the local private sector.

In 2000, many of LBB's tasks were mandated to the newly founded Foundation for Forest Management and Forest Supervision (SBB). The task of construction and maintenance of roads and bridges was not mandated to SBB. The management of the forest access roads was officially transferred to OW, ROS and WAS. The division of the management of the rural roads is unclear for the different institutions and OW is often involved. There is also a very small percentage (approximately 2 %) of lower-class roads managed by the Ministries of Agriculture (LVV) and – Natural Resources (NH) (source: NEA, GOPA and STC, 2011).

OW and WAS have lists of the roads which they are responsible for, however these seem to overlap and are frequently updated. ROS is responsible for maintenance of the secondary roads in the rural districts however there is no clear list of roads that fall within this ministry. Even though both WAS and ROS have a legal responsibility for managing part of the road network, in practice they do not have sufficient budget to maintain the roads.

The District Commissioners (DCs) also have an important role in the management of rural infrastructure. Local communities communicate their complaints regarding poor infrastructure to the DCs. In some cases, if the complaints are about small dirt roads, the DCs intervene using their own budget and capacity. However, in most cases the complaints are passed on to OW, especially if they are about primary roads and bridges. The DC's ask the local private sector for aid in some cases, however private companies are typically only willing to aid local communities as part of their corporate social responsibility (CSR) and not to take over government responsibilities.

SBB has an important role in the development of roads in the interior as well. Whenever an entrepreneur obtains a wood or mining concession, he/ she has to develop the access road him/herself. SBB does not provide the technical requirements for the road design and does not have the technical capacity to assess the design. SBB also does not consult OW, who has the technical capacity to assess the design and might be able to provide technical requirement. Logging concession title holders are thus currently developing the rural road network without technical guidelines to comply with.

3.5.2 Road characteristics

The East-West Connection Road and the Kapitein Chris Silos Road are paved with asphalt, while the other roads in the target area are unpaved with laterite and/or gravel (Figure 7). The roads generally have a width of 11.5 m (Figure 8), with the exception of a narrow (uninhabited) section between the Road to Wanhati and the Road to Patamacca. The Kapitein Chris Silos Road has a width of 10 m and the Juliana Weyne Road has a width of 13 m.

[1] STAATSBESLUIT of October 10, 1991, establishing and describing tasks Departments of General Administration ("Besluit Taakomschrijving Departementen 1991") (S.B. 1991 no. 58)

There are open drainage channels along the Road to Patamacca, the Granman Forster Road and the Forestry Road. Along the East West Connection Road rainwater is drained towards the gravel shoulders, which are mostly vegetated.

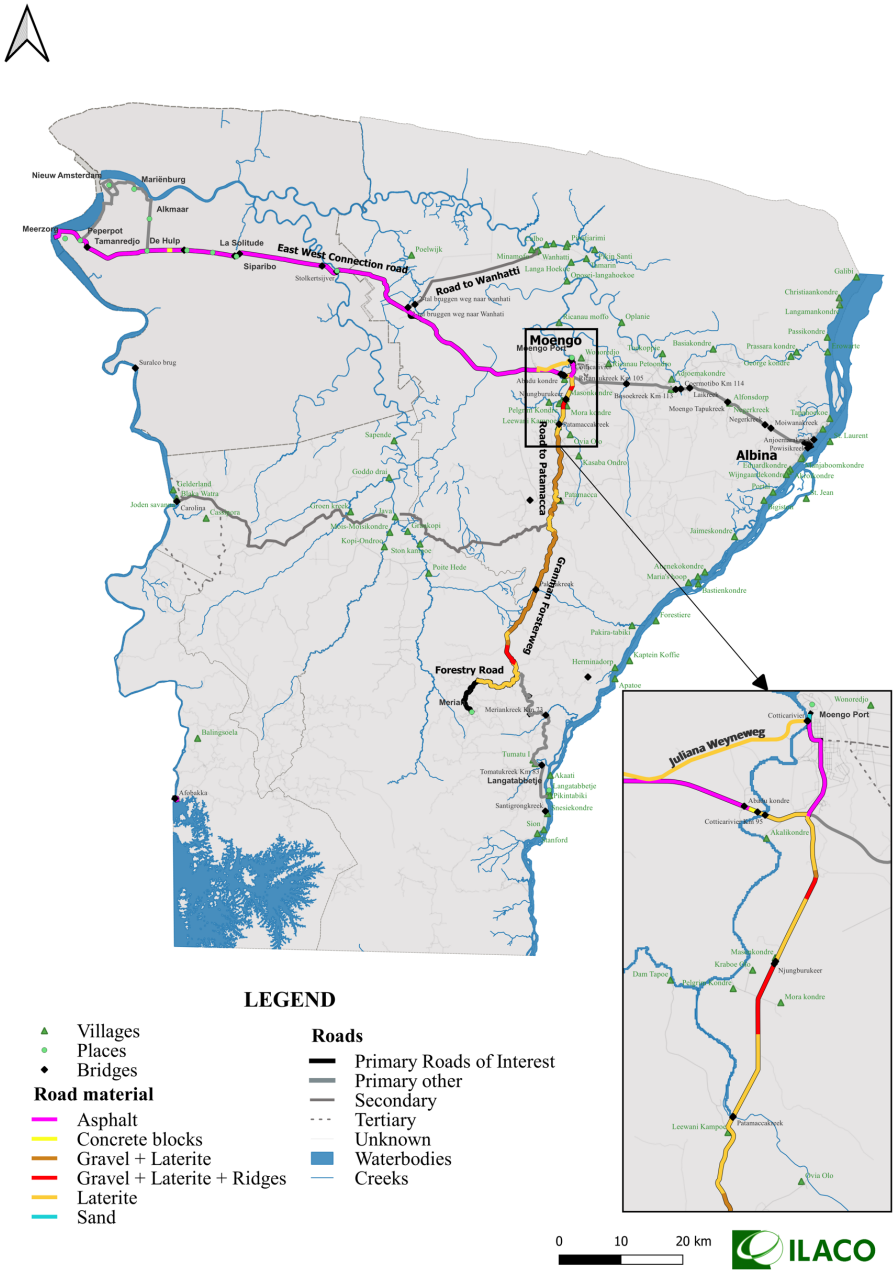


Figure 7: Overview of road materials.

Source: Own elaboration

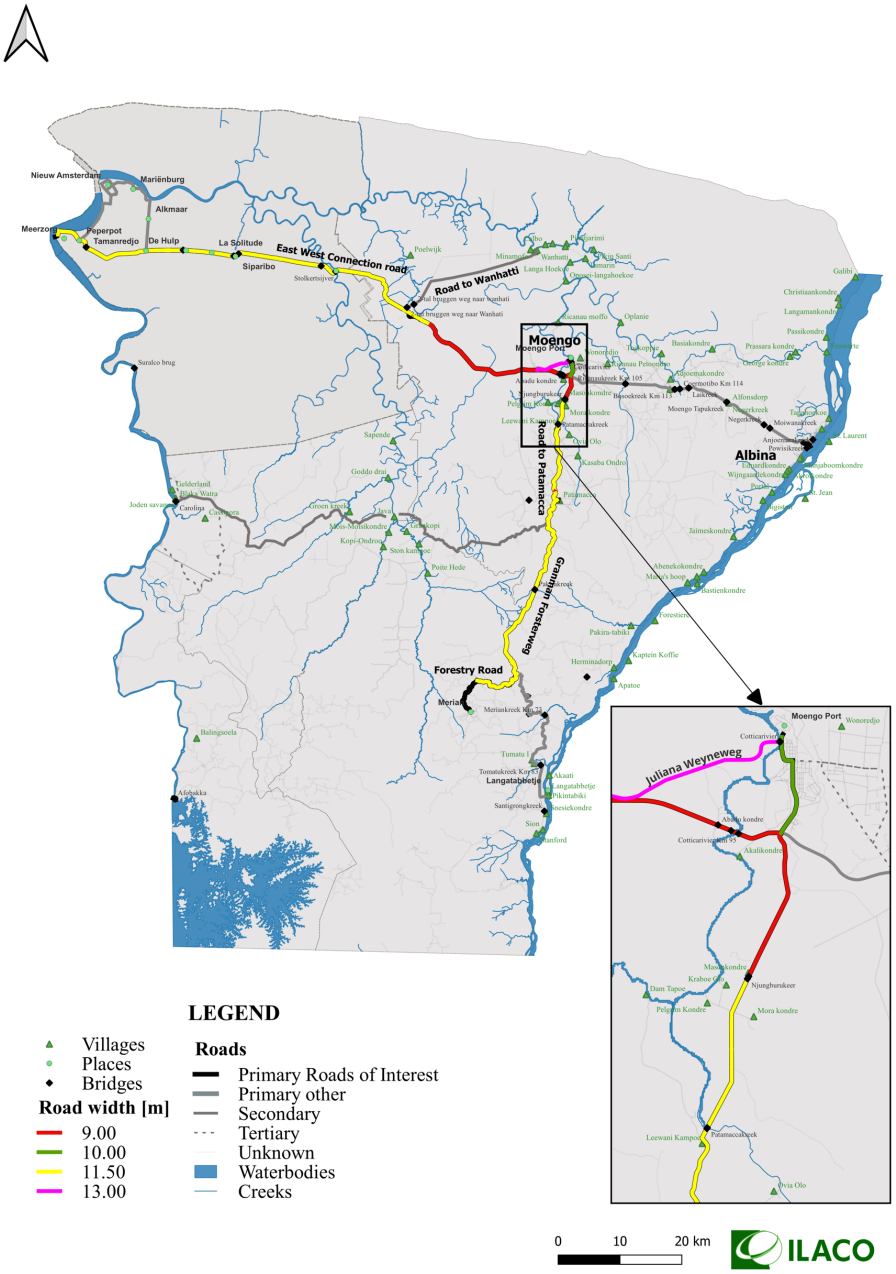


Figure 8: Overview of road widths.
Source: Own elaboration

3.5.3 Road conditions

The roads are generally in good condition, except for some sections that are in fair condition (Figure 9). Generally, all necessary traffic signs are present, however they require cleaning/maintenance. A critical note is that the traffic signs on the road to Patamacca-Forestry Road are too small and do not adhere to standards used by OW. Many of the speed bumps along the East West Connection Road are deformed by heavy vehicles and require rehabilitation.

All bridges are in good condition, based on limited visual assessment, with the exception of the 2nd Cottica river bridge near the port of Moengo, which is partly overgrown with grass.

Generally, clearance along the road is good, especially on the section from Moengo to Merian. However, the shoulders of the section between Stolkertsijver- Moengo (which is mostly uninhabited) are overgrown with high vegetation, resulting in poor visibility in curves, poor walkability and poor visibility of traffic signs. The road markings are also faded or missing.

A 200 m section of the East West Connection Road between Abadu Kondre and the Cotticariver is in very poor condition due to erosion. There were rehabilitation works underway at this section, at the time of inspection. Sheet piles are added along the road section and the section is paved with concrete bricks. Truck drivers avoided the section by making use of the Kapitein Chris Silos Road- Gouverneur van Asbecklaan (towards the port of Moengo)-Cotticariver bridge and the Juliana Weyne Road (haul road towards the former bauxite mines also called Bushman hill road). The Gouverneur van Asbecklaan leading to the port of Moengo is in poor conditions due to potholes.

The Road to Patamacca, Granman Forster – and Forestry Roads are unpaved and made up of laterite and covered with gravel at certain rehabilitated sections. These gravel sections often include heavy ripples (washboarding/ ridges), especially on the busiest section, north of Mora Kondre. There are barriers of laterite and tree trunks placed along road sections along ravines and creeks to prevent cars from falling into them. There is heavy dust formation on the unpaved road, especially on the gravel covered sections. Newmont is spraying water 2-3 times per day on the road near the villages of Mora Kondre and Leewani Kampoe during dry seasons. Villagers mentioned that spraying only helps temporarily and indicated that the road dries within 30 minutes after spraying and dust is generated again. See Appendix C: Impressions of the road to Patamacca.

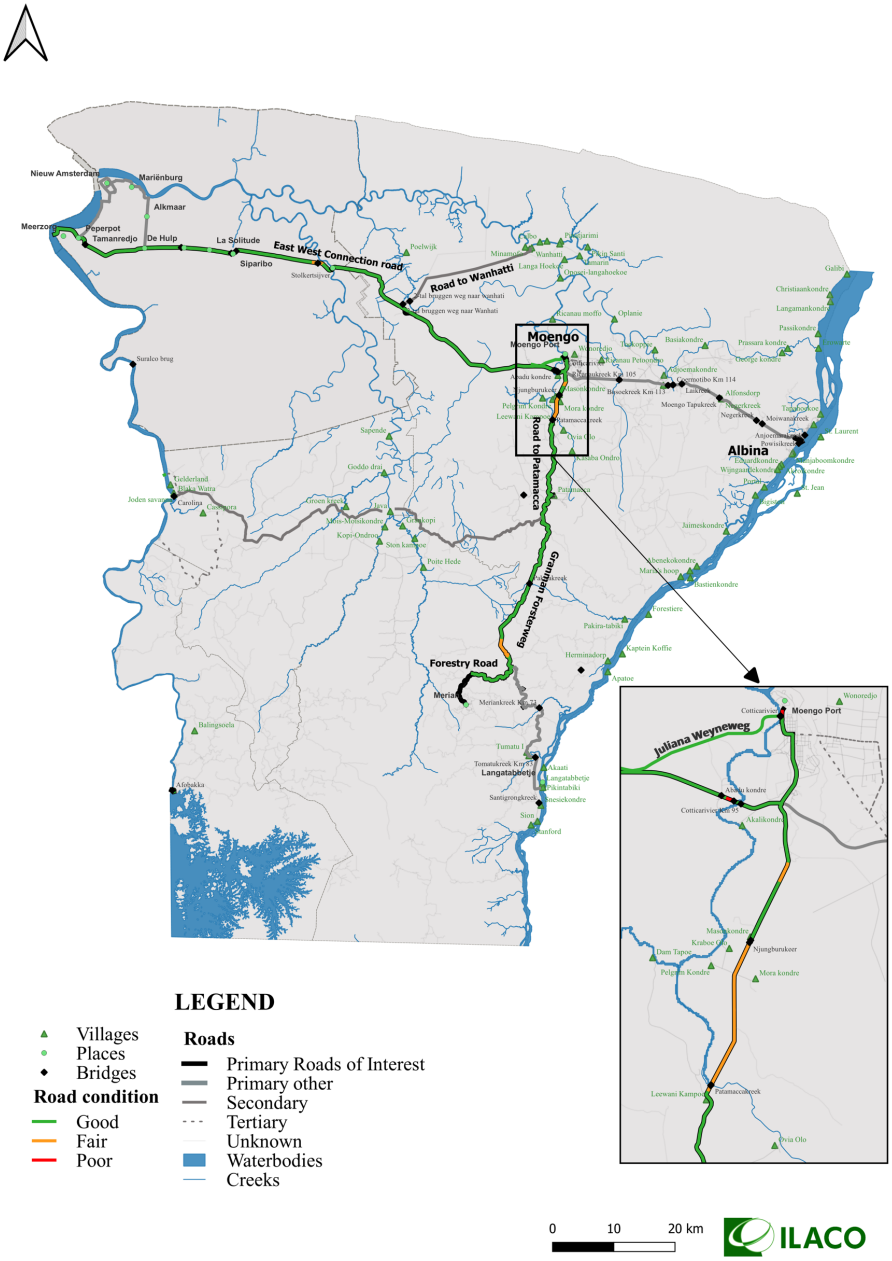


Figure 9: Overview of road conditions.
Source: Own elaboration

3.5.4 Lighting

Lighting is installed along the East West Connection Road, except for two uninhabited sections between Peperpot- Tamanredjo and part of the section between Road to Wanhatti and Abadu Kondre (Figure 10). The lighting poles shift sides along the East West Connection Road. The road to Patamacca and further on has no lights, however there are electricity poles towards Patamacca placed since November 2022.

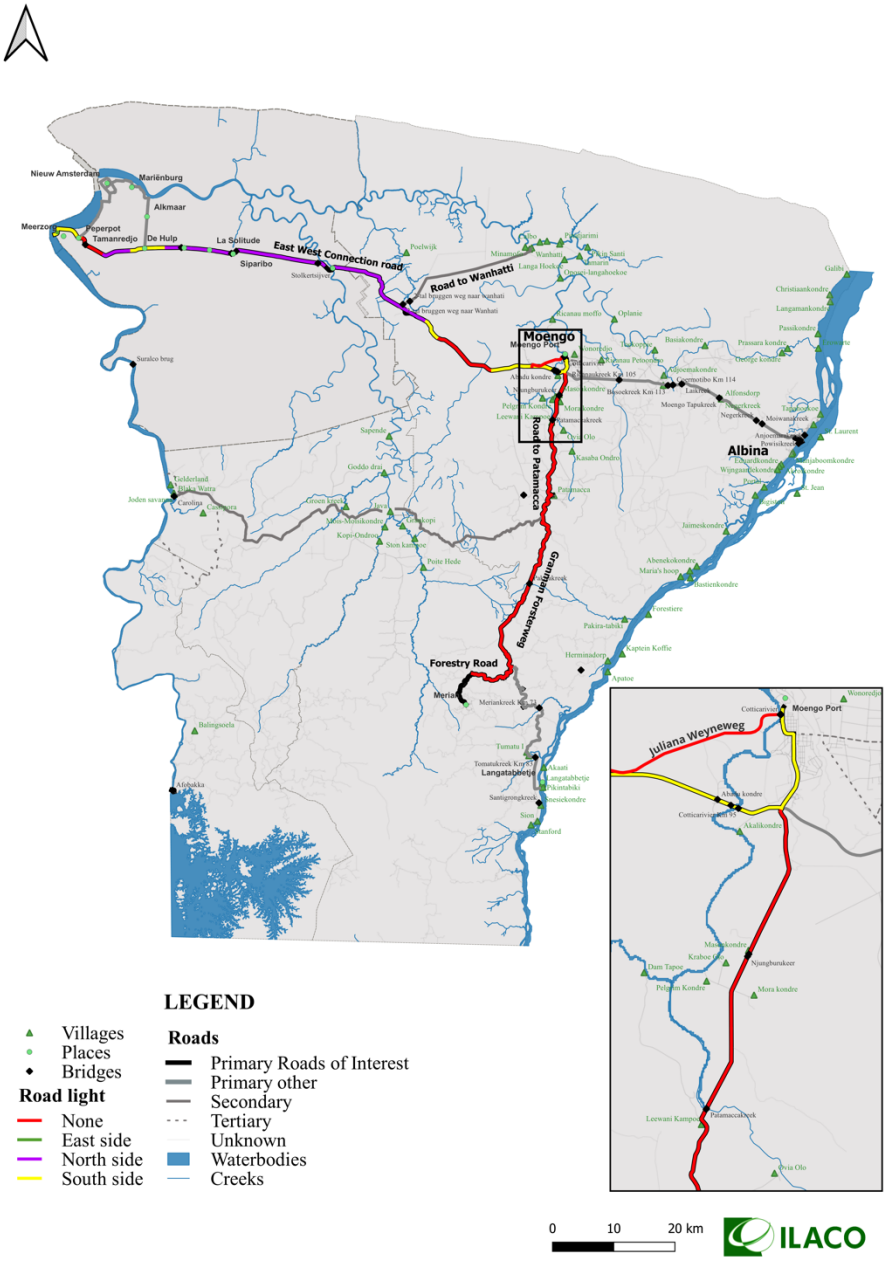


Figure 10: Overview of road lighting.
Source: Own elaboration

3.5.5 Speed limits

Based on the registered speed limit signs, the speed limit on the East West Connection Road is by driving regulation 80 km/h, however it is lowered to 60 or 50 km/h and sometimes even 30 km/h on sections near sharp curves and settlements (Figure 11). At settlements the lower speeds are further enforced with the help of speed bumps, plateaus, rumble strips and raised crossings, especially near schools, churches and medical centers.

The speed limit along the Road to Patamacca and the Granman Forster Road is expected to be set to 50 km/h as is the case in the northern section, with lower speeds of 25-30 km/h enforced on the northern sections near the settlements. In Figure 11 the majority of these roads are registered with a speed limit of 25 km/h. We suspect that there might be a missing 50 km/h speed limit sign or the sign being missed during the survey. Based on observations on the Granman Forster Road, vehicles are generally driven at much higher speeds than 30 km/h. At settlements and sharp/ dangerous curves the lower speeds are also further enforced with the help of speed bumps or plateaus. There were no speed measurements

conducted, however based on visual observation of camera footage at the junction of Road to Patamacca near Kraboe Olo, the plateau at the junction is quite effective in lowering speeds below 30km/h. However, after passing the plateau, vehicles quickly accelerate to higher speeds, especially the non-Newmont passenger cars.

Speed limits at the Forestry Road and Kapitein Chris Silos Road are set to 40 km/h.

There are fixed police traffic control locations at Meerzorg, Tamanredjo, Stolkertsijver, Moengo and the intersection of the Granman Forster Road and the Forestry Road. At the last location, according to Newmont, there has not been fixed police traffic control even though the location is designated with a sign. There is also a fixed weight bridge along the road near Peperpot for enforcing axle loads, however it is not operated. There are two designated truck resting areas, one near Patamacca and the other one on the Forestry Road near the intersection with the Granman Forster Road.

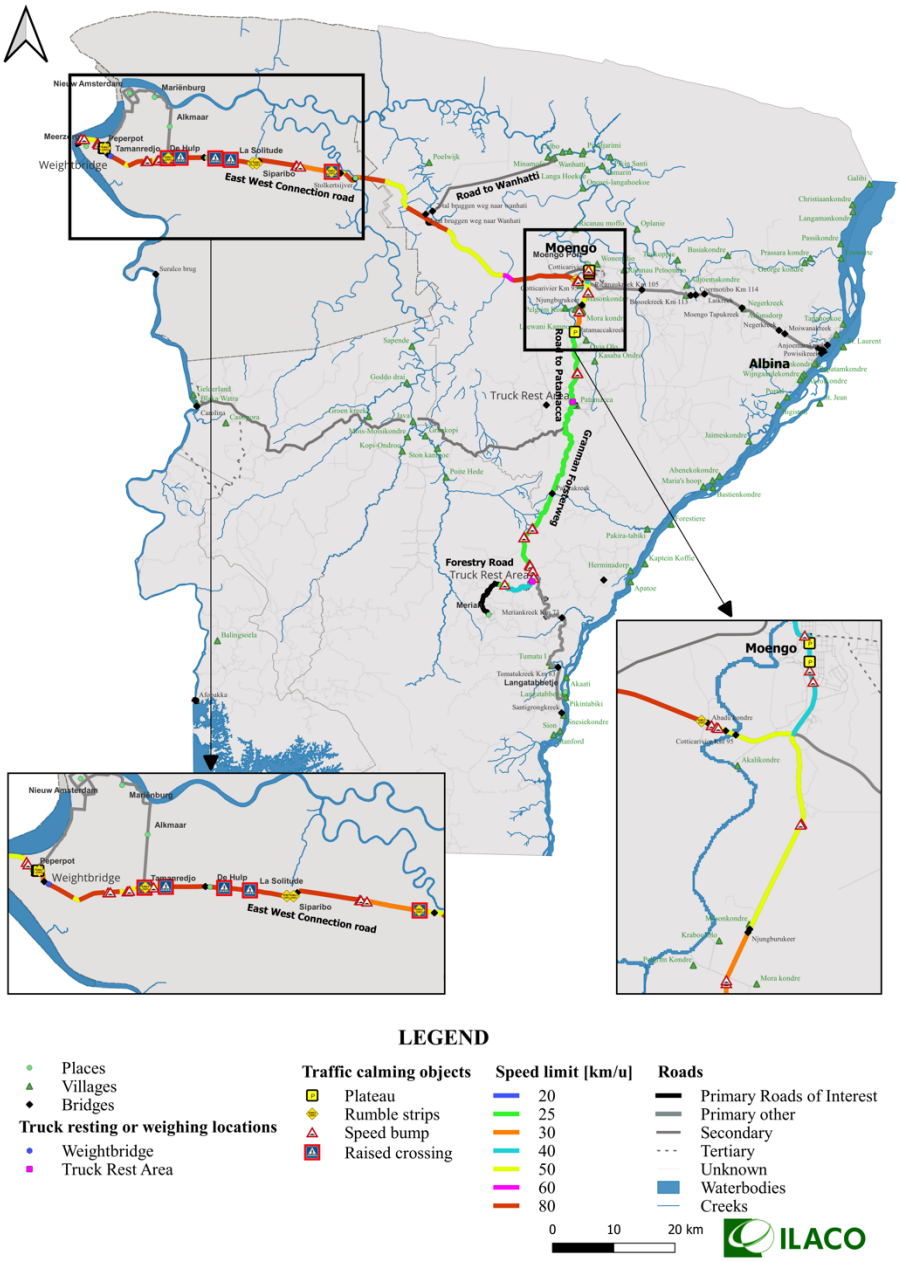


Figure 11: Overview of speed limits and traffic calming objects.
Source: Own elaboration

3.6 Traffic volumes

The classified traffic volumes were measured at the following two locations: at Stolkertsijver and at Kraboe Olo/ Mora Kondre. Congestions rarely occur on the roads of interest, except for the section of the East West Connection Road in Meerzorg, where there is a lot of traffic interchange and a traffic bottleneck in Paramaribo.

3.6.1 Location Stolkertsijver

Hourly classified traffic volumes over a 24 hour-period on Friday 8th of March 2024 for both directions are visualized in Figure 13 and Figure 14. The hourly Passenger Car Equivalent (PCE) values for both directions are visualized in Figure 12, which includes the share of traffic related to Newmont.[2] The total amounts of traffic over the 24 hour-period from West to East and East to West respectively are 960 PCE and 780 PCE. Newmont's share of the daily weekday traffic is estimated at 6%, with around 30 vehicles passing by in each direction. This is quite a bit lower than the daily 50-60 vehicles entering the North gate of Merian. The lower measured volumes are mostly related to the uncertainty and/or unrecognizability of other contractors working for Newmont. Moreover, there is Newmont related traffic that goes to the communities and other locations around the mine.

For traffic on the East-West Connection Road towards the East there is a sharp morning peak observed around 6:00 and in the afternoon there is a wider peak in-between 16:00 - 18:00. A small peak is observed around 11:00 in the morning. There is a sharp reduction of traffic after 18:00, with barely any traffic during the night, between 21:00 - 4:00. The majority of traffic passing by are passenger cars. There is a relatively large share of trailer- and heavy trucks between 5:00 - 7:00 in the morning going toward the East. Newmont's share of traffic in this direction is at least 17% in the morning peak and is mostly related to fuel, supply and employee buses.

For traffic towards the West there is no morning peak observed, however there is an afternoon peak around 15:00. There is a peak for buses towards the West around 15:00 and towards the East there are bus peaks around 6:00 and 13:00. Up to 15% of the hourly traffic towards the West is related to Newmont's operations in the morning and 10-12% in the afternoon peak.

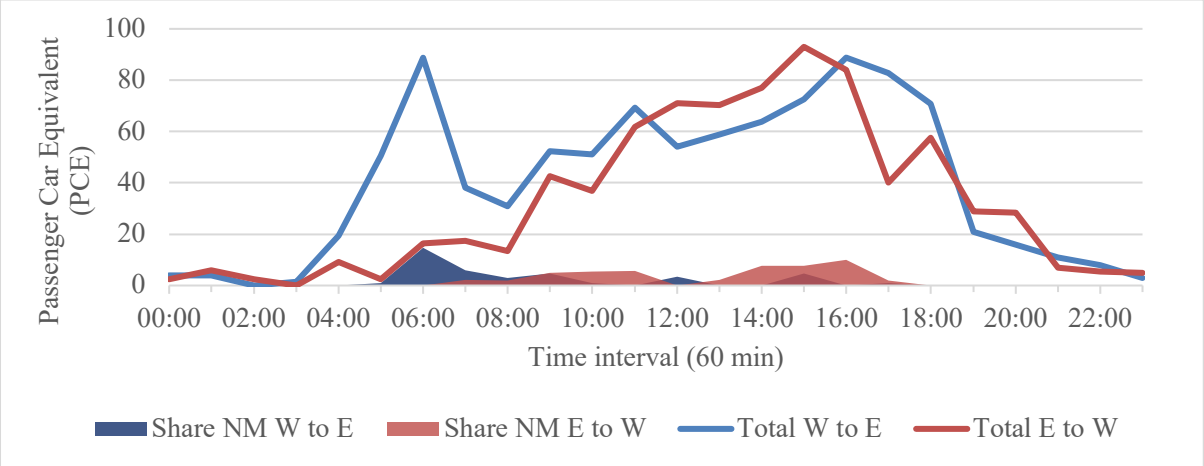


Figure 12: Hourly traffic volumes in PCE for both traffic flows from West (W) to East (E) and East to West including the shares of Newmont (NM) related traffic for each direction.
Source: own elaboration

[2] Vehicles related to Newmont operations are visually determined as vehicles belonging to Haukes, Badjalala and Newmont, which are easy to recognize. The actual traffic related to Newmont is expected to be higher, as not all contractors are known, recognizable and/or known to have Merian as destination.

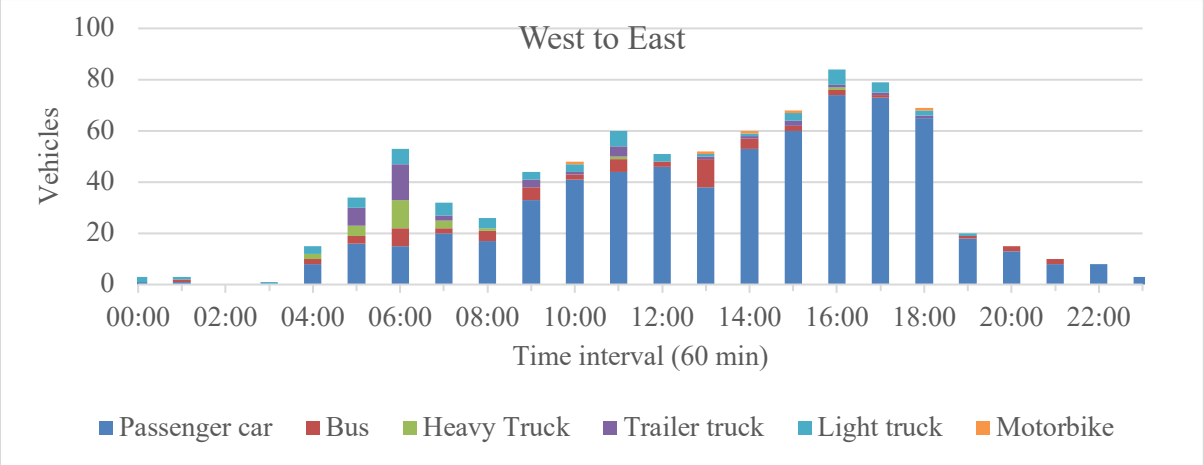


Figure 13: Hourly classified traffic volumes for traffic from West to East.
Source: own elaboration

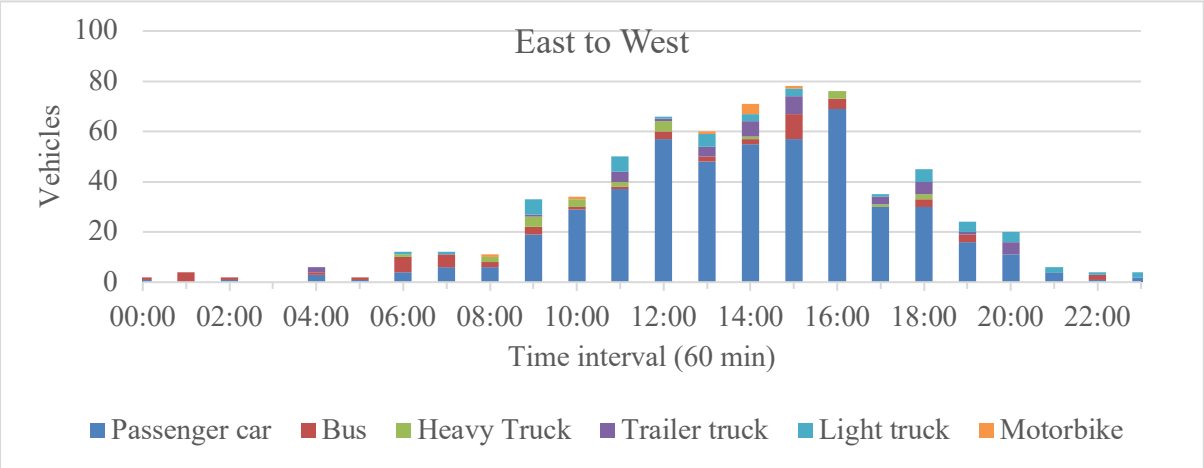


Figure 14: Hourly classified traffic volumes for traffic from East to West.
Source: own elaboration

3.6.2 Location Kraboe Olo

Hourly classified traffic volumes over a 24 hour-period on Friday 26th of April 2024 for the North-South and South -North directions are visualized in Figure 16 and Figure 17. The hourly Passenger Car Equivalent (PCE) values for both directions are visualized in Figure 15, which includes the share of traffic related to Newmont.[3] The total amounts of traffic over the 24 hour-period from North to South and South to North respectively are 195 PCE and 200 PCE. Newmont's share of the daily weekday traffic is estimated at 40%, with around 50 vehicles passing by in each direction. This is in line with the daily 50-60 vehicles entering the North gate of Merian.

For traffic on the Road to Patamacca towards the South there is a morning peak observed around 6:00 – 7:00 with a small peak at 9:00 and in the afternoon there is a small peak at 13:00 with barely any traffic after 16:00. The majority of traffic passing by are passenger cars. There is a relatively large share of trailer trucks between 4:00 - 7:00 in the morning going toward the South. There is also a relatively large share of buses around 8:00-9:00, related to public transport and Newmont's personnel transport. Newmont's share of traffic in this direction is over 75% in the morning peak and is mostly related to fuel, supply and employee buses.

[3] Vehicles related to Newmont operations are visually determined as vehicles belonging to Haukes, Badjalala, Newmont as well as Kuldipsingh trailer trucks, which are easy to recognize. The actual traffic related to Newmont is expected to be higher, as not all contractors are known, recognizable and/or known to have Merian as destination.

For traffic towards the North there is no morning peak observed, however there is a wide afternoon peak between 13:00-17:00. There are peaks for buses towards the North around 6:00, 8:00-9:00 and around 13:00-14:00. The latter two peaks are mostly related to students going towards and coming back from school. There is a relatively large share of trailer trucks going towards the North at 15:00. Up to 70% of the hourly traffic towards the North is Newmont's operations in the morning and 30-60% in the afternoon peak.

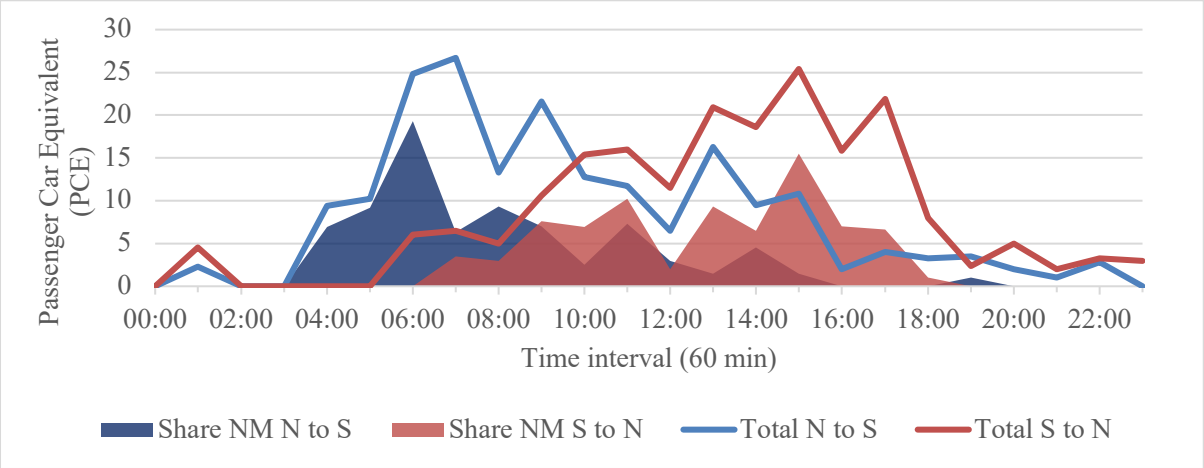


Figure 15: Hourly traffic volumes in PCE for both traffic flows from North (N) to South (S) and South to North including the shares of Newmont (NM) related traffic for each direction.

Source: own elaboration

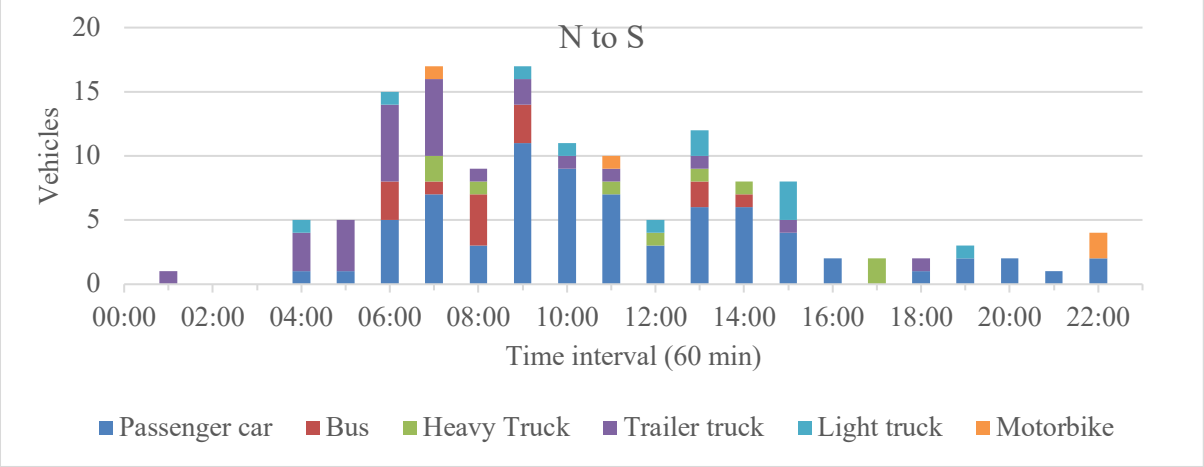


Figure 16: Hourly classified traffic volumes for traffic from North to South.

Source: own elaboration

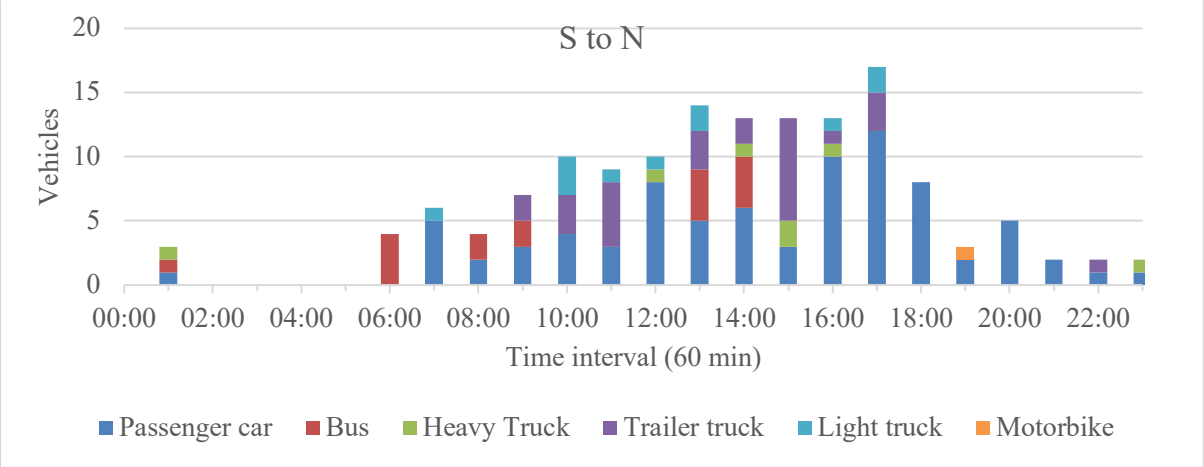


Figure 17: Hourly classified traffic volumes for traffic from South to North.
Source: own elaboration

Figure 18 gives an overview of the daily traffic flows in PCE on the intersection. The majority of traffic flows from South to North (202 PCE) and North to South (195 PCE). There is a relatively large flow of traffic between Kraboe Olo and the North (28-30 PCE in each direction), but there is barely any traffic to and from Mora Kondre.

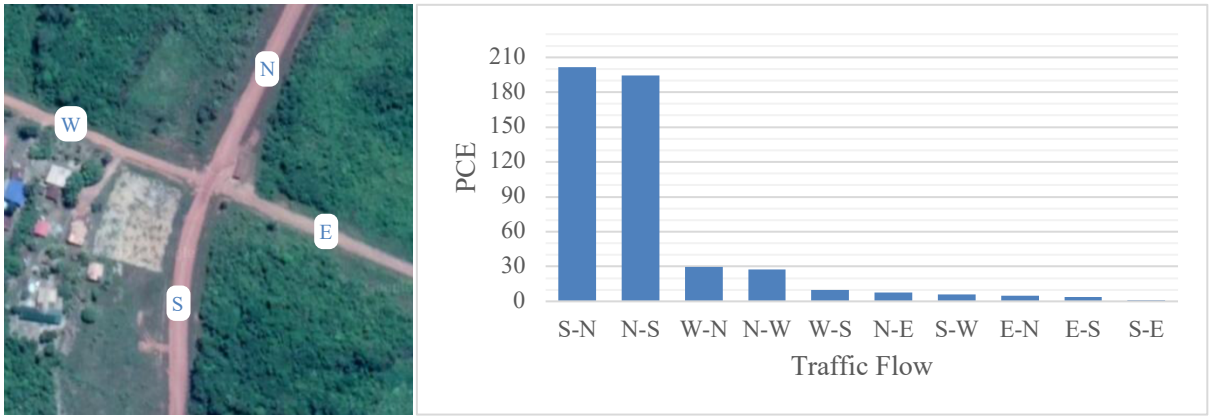


Figure 18: Daily traffic flows in PCE on the intersection of the Road to Patamacca with Kraboe Olo (W) and Mora Kondre (E).
Source: own elaboration

3.7 Traffic Safety

Below are statistics related to fatal traffic accidents from 2012-2023 (ILACO, 2024) for which the locations and clusters are indicated in Figure 19:

- In 44% of the 45 fatal traffic accidents which have occurred on the East West Connection Road (section Meerzorg- Moengo), car drivers were responsible for the accident. Twenty-two accidents, or 47%, were one-sided accidents and only 15% of the accidents occurred on intersections. Of all accidents, 20% of the incidents involved pedestrians or cyclists being hit by a car and 15-20% involved a moped. The typical cause involved speeding and 23% of accidents occurred during the night (18:00-24:00). It is unknown whether Newmont-related vehicles were involved in any of these accidents.
- During the assessed period, no fatal traffic accidents occurred on the Road to Patamacca and Kapitein Chris Silos Road.
- Two fatal accidents occurred on the Granman Forster Road around km 55, in 2016 and 2019. Both accidents were one-sided. Records suggest that one of these accidents was related to the slope. Newmont-related vehicles were not involved in these accidents.

In 2023, six traffic related accidents were logged by Newmont. Two of these accidents were related to vehicles losing control and going off the road; two were related to windshields being cracked by stones from the road; one was related to a mechanical failure; and one involved a load falling off a trailer. The incidents had minor to insignificant impact. See Appendix D for an overview of the incident log of Newmont.

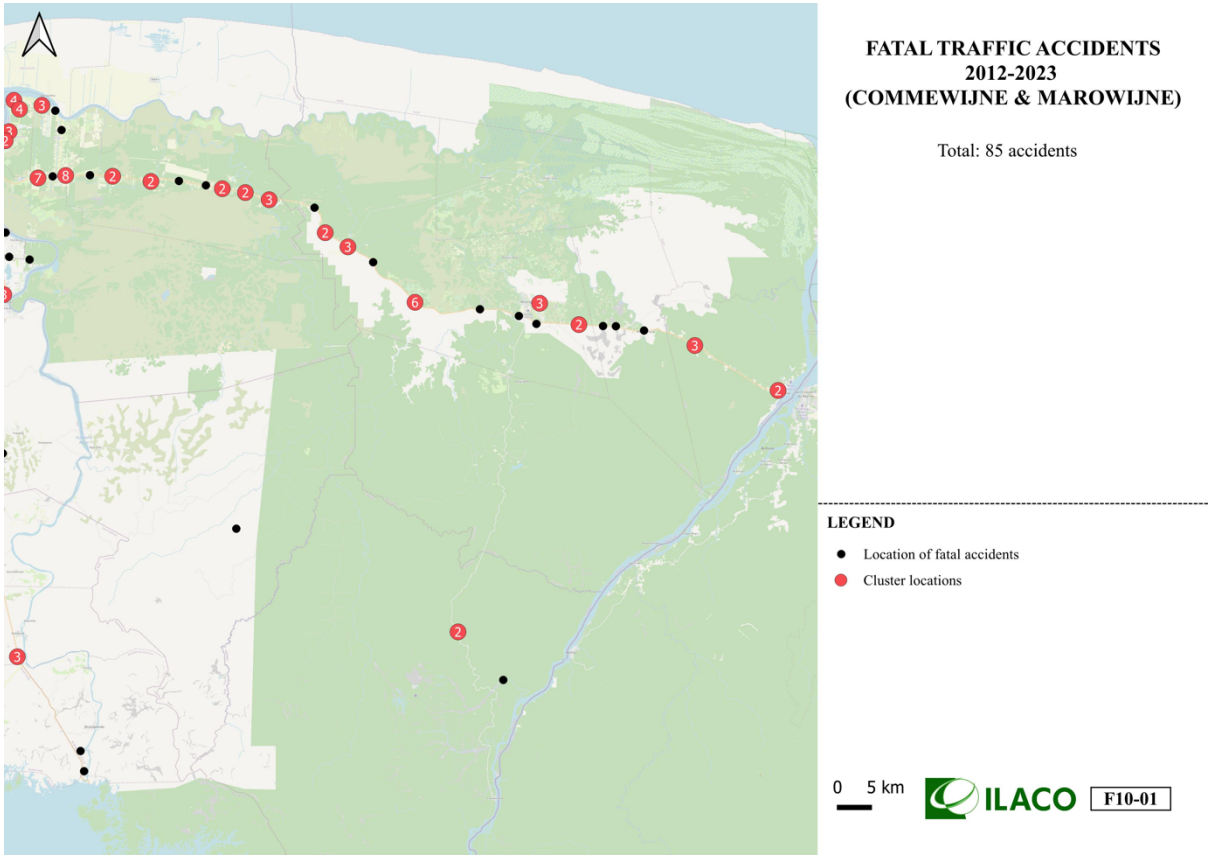


Figure 19: Overview of fatal traffic accidents 2012-2024 in Commewijne and Marowijne.
Source: ILACO (2024)

3.8 Noise

The noise measurement results are described in the section below. During the noise measurements all noise sources were recorded in a field observation sheet presented in Appendix E. The logger results of all measurements are presented in Appendix F.

Weather Conditions

Noise measurements have been carried out in the short dry season during daytime (7:00 – 22:00 hrs.) and nighttime (22:00 – 7:00 hrs.). The weather conditions during the daytime measurements varied between sunny and sunny with cloud cover. The wind speed varied from light air (0.3–1.5 m/s) to light breeze (1.5–3.3 m/s). A north-east wind direction was mainly observed.

The weather conditions during nighttime measurements were a clear sky with visible stars. The wind speeds were calm (<0.3 m/s). No wind direction could be observed. No measurements were conducted during rainfall.

Noise Levels

The results of the day and nighttime measurements, including count of motorized traffic, are summarized in Table 13.

Table 13: Daytime and nighttime measurement results

ID #	Location	Distance to axis of the road (m)	Daytime (07:00-22:00)				Nighttime (22:00- 07:00)			
			Motorized traffic intensity per 15 min	L10	L90	LAeq	Motorized traffic intensity per 15 min	L10	L90	LAeq
				dB(A)				dB(A)		
Urban area										
N1	At the berm in front of a resident in Meerzorg, along the East West Connection Road. There was a gutter between the fence of the resident and the berm.	8	220	75.1	59.1	71.9	17	60.9	39.6	62.1
N2	At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road.	12	149	69.6	54.9	67.3	7	53.0	37.0	51.2
Rural area										
N3	At the berm in front of a resident in Orleane Kreek, along the East West Connection Road. There was a gutter between the terrain of the resident and the berm.	6	48	69.3	42.8	66.7	1	56.7	41.3	61.2
N4	At the berm in front of the fence of a resident in Stolkertsijver, along the East West Connection Road.	7	31	64.7	40.1	63.9	3	46.7	41.0	57.0

N5	Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road	20	19	54.9	44.3	51.9	2	43.9	41.1	44.4
N6	At an open terrain at the corner of the Kapitein Chris Silos Road and Berhardlaan, at Moengo	6	31	59.2	40.7	58.3	22	55.7	45.5	54.7
N7	At a resident located in the community Kraboe Olo, along the Patamacca Road	40	4	49.8	39.0	46.6	1	42.8	37.0	40.9
N8	At a resident in the community Leewani Kampoe, along the Patamacca Road	29	3	47.1	32.1	45.1	2	39.9	34.6	43.1
xx	Exceeds the IFC noise standard of 55 dBA for residential areas at daytime (7:00-22:00)									
xx	Exceeds the IFC noise standard of 45 dBA for residential areas at nighttime (22.00-07.00)									

Urban Area

The measurements conducted at locations N1 in Meerzorg and N2 in Tamanredjo were taken at the plots of residents along the densely populated section of the East-West Connection Road. Both locations are urban areas characterized by a dense population and various commercial activities interspersed throughout.

Analysis of the recorded noise levels indicates that the LAeq levels surpassed the WHO/IFC standards of 55 dBA during the daytime and 45 dBA during the nighttime. Traffic emerges as the primary noise source at both sites. N1 exhibits higher LAeq levels due to intensified daytime traffic and its closer proximity to the road. Conversely, N2 registers lower noise levels owing to reduced traffic intensity, coupled with measurements taken further away from the road axis (12 m compared to N1's 8 m).
It is anticipated that noise levels will diminish with distance, suggesting that residents farther from the road will experience reduced noise levels compared to recorded values. Background levels (L_{90})during the daytime fluctuated between 54.9 and 59.1 dBA, indicative of sustained traffic noise presence. Conversely, nighttime background noise levels (L_{90}) ranged from 37.0 to 39.6 dBA, suggesting quiet natural conditions unaffected by traffic.

Rural area

The noise measurements conducted at locations N3 in Orleanekreek, N4 in Stolkertsijver, and N5 in Abadoe Kondre were situated near residents residing along the less densely populated stretch of the East-West Connection Road. These areas are characterized by small to large scale agricultural activities interspersed throughout, marking them as rural.

Analysis of the recorded noise levels reveals that LAeq levels at both N3 and N4 exceeded the WHO/IFC standards of 55 dBA during the daytime and 45 dBA during the nighttime. The primary contributor to heightened LAeq levels during the daytime is traffic, corroborated by recorded L_{10} levels indicating transient traffic noise. During nighttime measurements, a frequent dog barking contributed to elevated LAeq levels at N3, while a heavy truck, car passing by, and barking dog affected N4 (see logger results in Appendix F)

Background noise levels (L_{90}) ranged from 40.1 to 42.8 dBA during the daytime and from 41 to 41.3 dBA during nighttime, indicative of natural conditions unaffected by traffic.

At N5, recorded noise levels remained below WHO/IFC standards during both daytime and nighttime. Although traffic was observed as the primary noise source, lower noise levels were attributed to reduced traffic intensity and the distance of the measurement location from the road axis (20 m away). Transient noise from traffic, as indicated by L_{10} levels, resulted in slightly elevated LAeq levels. Background noise levels (L_{90}) suggested natural conditions unaffected by traffic.

In Moengo's residential area (N6), noise levels exceeded WHO/IFC standards during both daytime and nighttime, primarily due to traffic. Transient traffic noise, reflected in L_{10} levels, contributed to elevated LAeq levels. Background noise levels (L_{90}) indicated natural conditions without the influence of traffic.

The noise measurements at location N7 at Kraboe Olo and N8 at Leewani Kampoe were conducted along the Patamacca Road, which is a laterite mixed with gravel road.

From the recorded noise levels, it can be concluded that the LAeq levels were below the WHO/IFC standards of 55 dBA during daytime and 45 dBA during nighttime. The main noise sources during daytime were: noise of talking persons; noise of hammering at distance; and noise of birds. The noise sources during nighttime consisted mainly of insects, with occasional noise from residents, dogs and vehicles passing by. It should be noted that the traffic intensity during the measurements were very low. The noise measurements were conducted 40 m (N7) and 20 m (N8) away from the road axis, where traffic noise is experienced to be lower but still audible. The background noise level (L_{90}) indicates quiet natural conditions without any man-made noise sources.

3.9 Dust

Dust measurements were carried out during the short dry season in two communities, namely at Kraboe Olo and Leewani Kampoe, which are both located 45 m downwind from the axis of the Patamacca Road. The real-time measurements were conducted between the 27th of February and the 13th of March 2024.

Weather conditions

Temperature

The daily (24-hr average) temperature data from the AQS-1 is presented in Figure 20. From the graph it can be seen that the temperature varied between 25 and 27.8 °C. The average temperature of the whole measurement period is 26.4 °C.

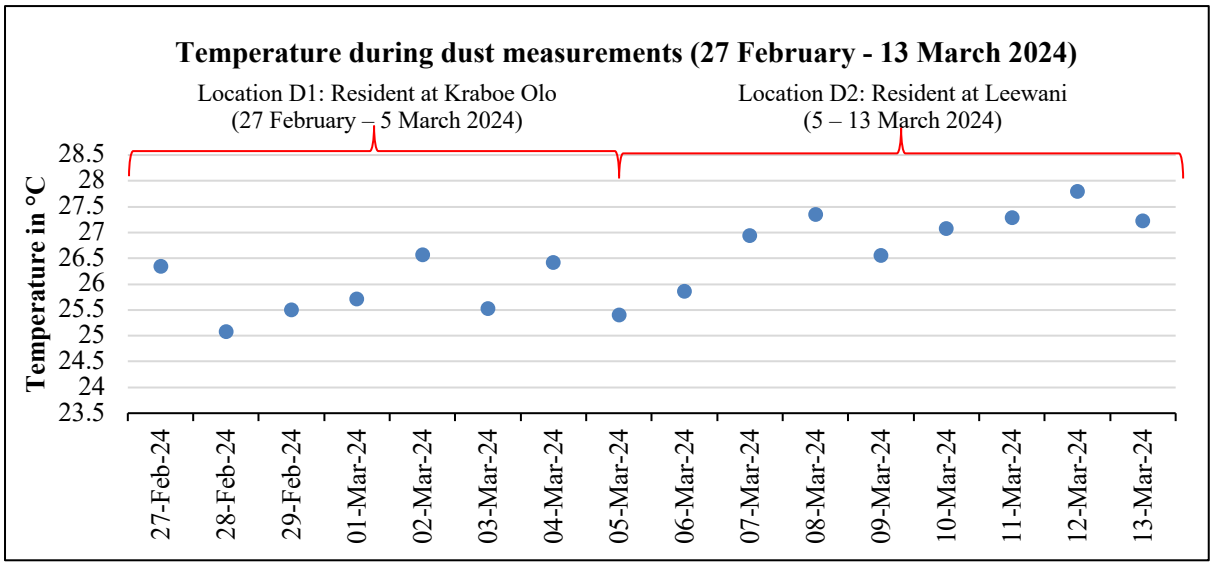


Figure 20: Daily (24-hr average) temperature during the dust measurements.

Rainfall

Rainfall data from Ventusky (www.ventusky.com) has been used due to the absence of local data (see Figure 21). From the Ventusky data it can be concluded that there was rainfall between the 5th and the 8th of March 2024.

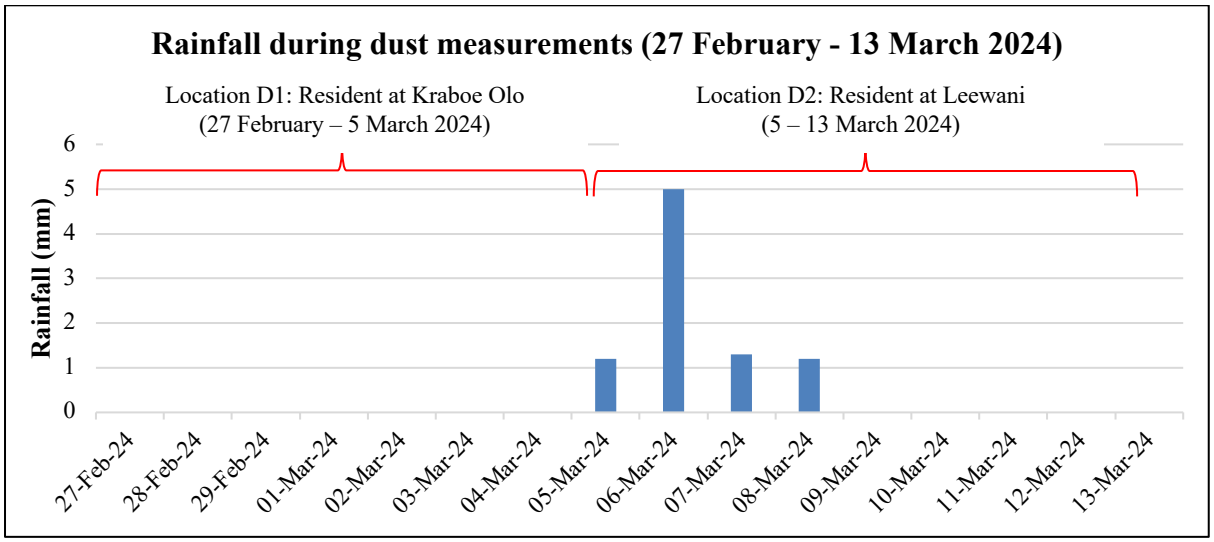
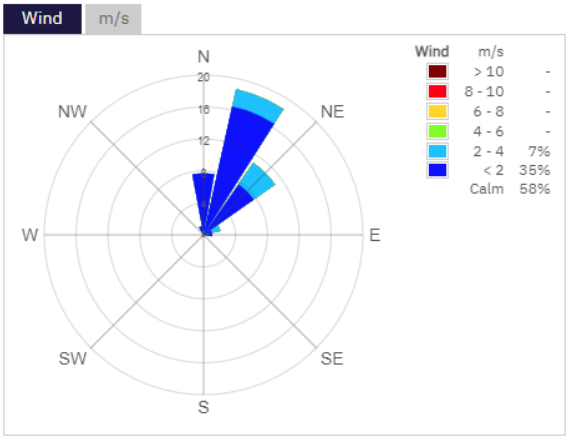
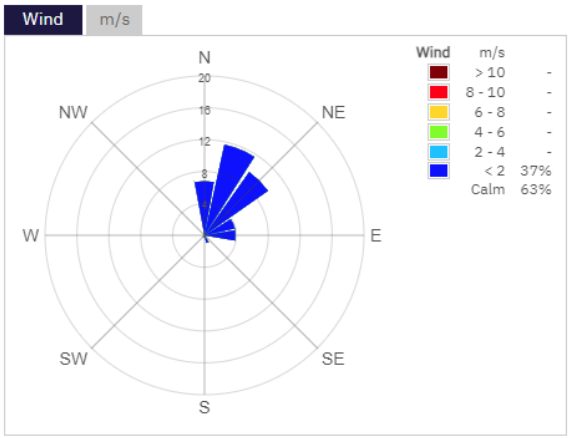


Figure 21: Daily total rainfall during the dust measurements.

Wind direction

The wind data of the AQS-1 consisted of 2-hour registrations and is presented in Table 14 by means of wind roses. The dark blue color in the wind roses represent wind speeds below 2 m/s and the light blue color presents wind speeds between 2 – 4 m/s. The dominant wind direction was from the northeast.

Table 14: Overview of wind speed and wind direction data during dust measurements.

Location D1 **Resident at Kraboe Olo (27 February – 5 March 2024)**	**Location D2** **Resident at Leewani Kampoe (5 – 13 March 2024)**
	
The wind direction varied from the north to northeast. The wind speeds varied between below 2 m/s and 2 – 4 m/s, with 58% of the time calm winds.	The wind direction varied from the north to east. The wind speeds were below 2 m/s, with 63% of the time calm winds.

Location D1 Resident at Kraboe Olo

The measurement was carried out at the nearest resident at Kraboe Olo, 45 m downwind from the axis of the Patamacca Road. The measurement instrument was placed at an open field consisting of low vegetation (grass). There were no obstructions, such as buildings or trees, between the measurement location and the road.

The hourly (1-hour averages) real time measurement results for fine particulate matter ($PM_{2.5}$ and PM_{10}) are presented in Figure 22. The 24-hr averages for fine particulate matter ($PM_{2.5}$ and PM_{10}) are presented in Table 15.

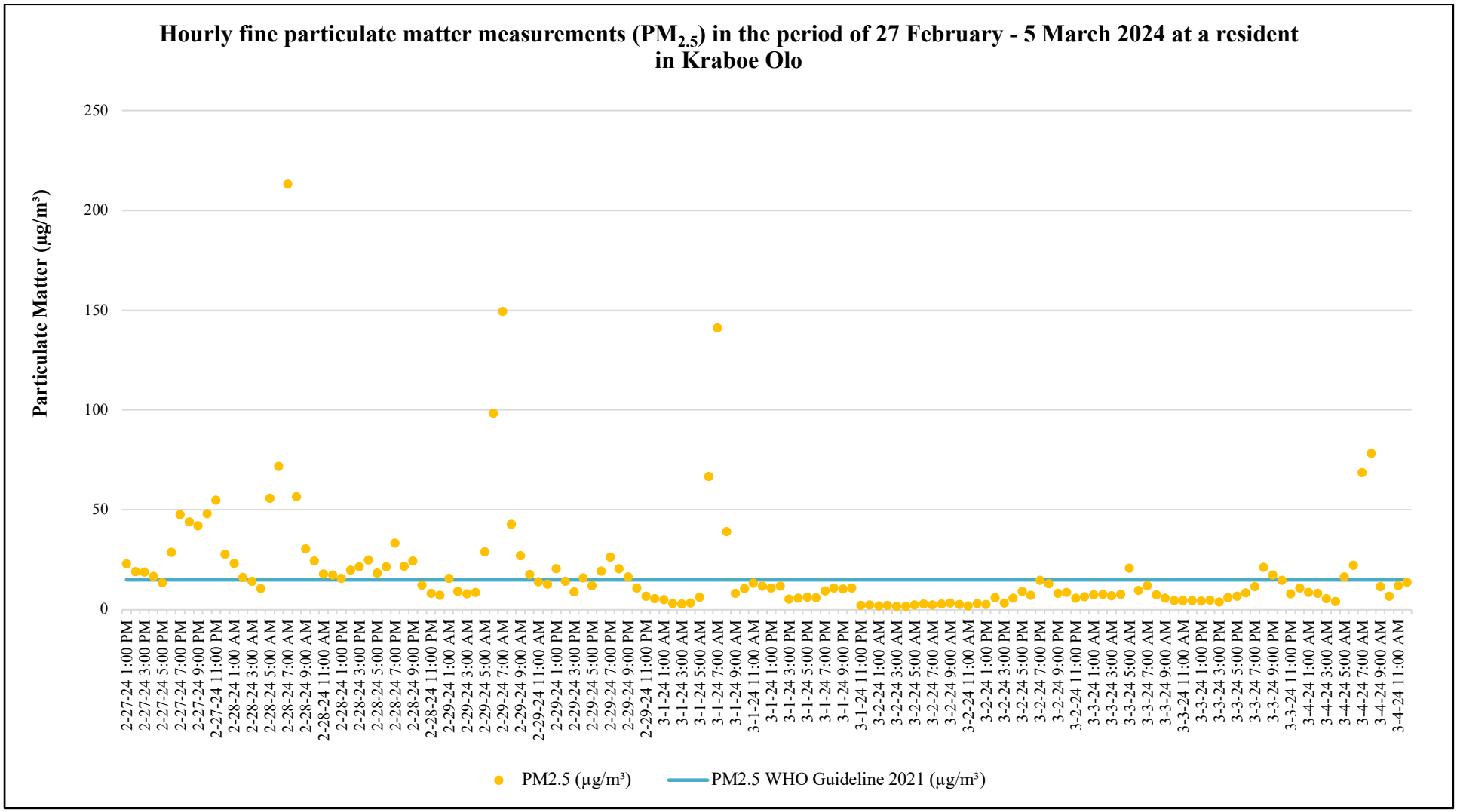


Figure 22: 1-hour average for $PM_{2.5}$ at the resident in Kraboe Olo

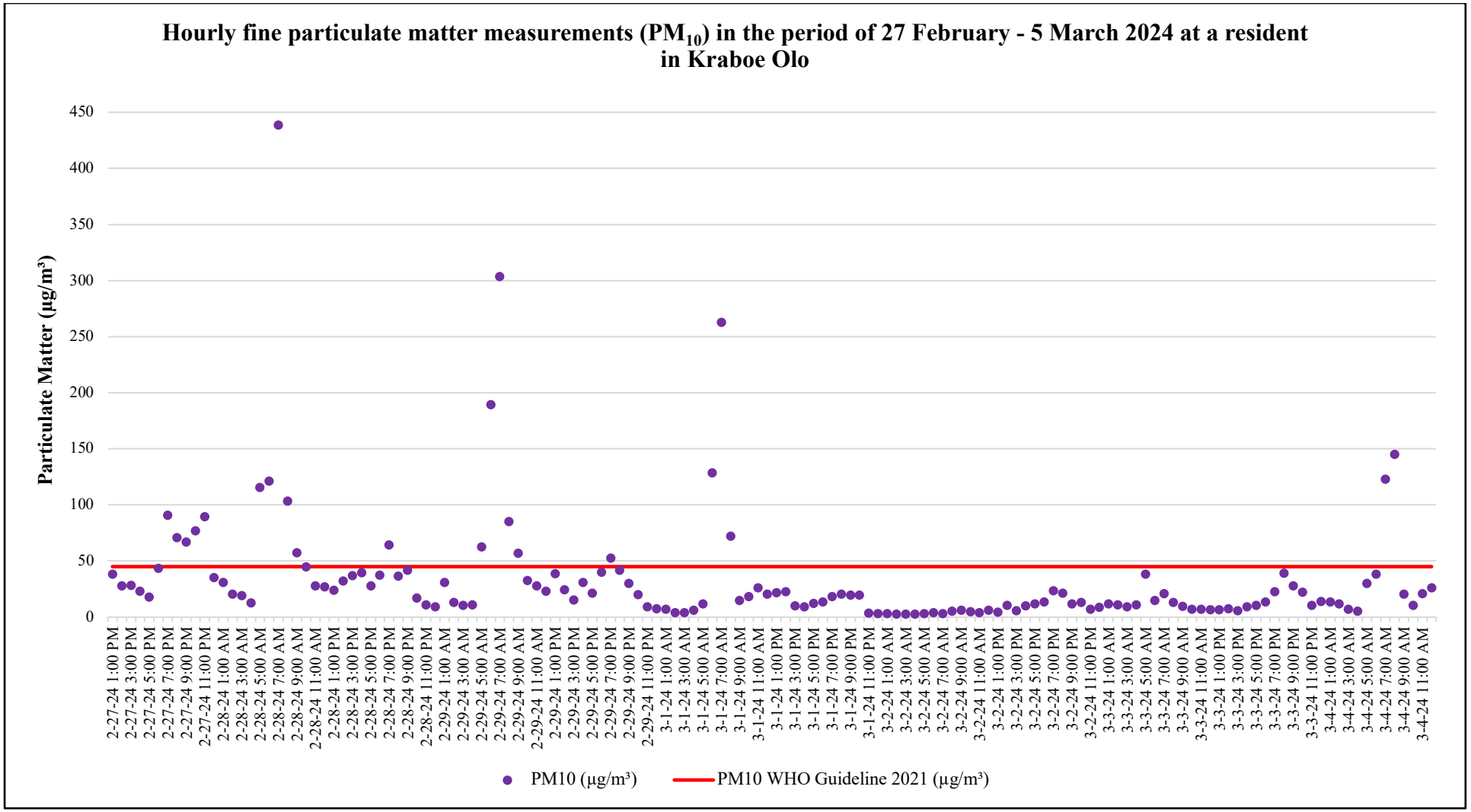


Figure 23: 1-hour average for PM_{10} at the resident in Kraboe Olo

Table 15: 24-hour average results of $PM_{2.5}$ and PM_{10} at the resident in Kraboe Olo

Pollutant	Measured values at location D1 (27th of February – 5th of March 2024)								AQG level 24-hour averages (µg/m³)
	27 Feb	28 Feb	29 Feb	1 Mar	2 Mar	3 Mar	4 Mar	5 Mar	
$PM_{2.5}$ (µg/m³)	32	33	25	17	5	9	16	9	15
PM_{10} (µg/m³)	53	59	49	31	8	14	28	18	45
	Exceeded the WHO ambient air quality guideline level (24-hour averages)								

The following can be concluded from the measured air quality data:

- The 24hr averages for $PM_{2.5}$ are 63 % of the measurement period above the applicable WHO/IFC guidelines of 15 µg/m³ for $PM_{2.5}$ on the 27th of February till the 1st of March and the 4th of March 2024.
- The 24hr averages for PM_{10} are 38 % of the measurement period above the applicable WHO/IFC guidelines of 45 µg/m³ for PM_{10} on the 27th till the 29th of February 2024.
- During the measurement period (hourly measurements) several peaks are observed daily, mainly between 5:00 AM till 9:00 PM. The highest values for $PM_{2.5}$ and PM_{10} are recorded at 7:00 AM.
- The highest peak values were recorded on:
  - The 28th of February 2024 with a $PM_{2.5}$ value of 213.11 µg/m³ which is 14 times higher than the WHO/IFC guidelines of 15 µg/m³ for $PM_{2.5}$ and a PM_{10} value of 438.68 µg/m³ which is 9 times higher than the WHO/IFC guidelines of 45 µg/m³ for PM_{10}.
  - The 29th of February 2024 with a $PM_{2.5}$ value of 149.39 µg/m³ which is 10 times higher than the WHO/IFC guidelines of 15 µg/m³ for $PM_{2.5}$ and a PM_{10} value of 303.49 µg/m³ which is 7 times higher than the WHO/IFC guidelines of 45 µg/m³ for PM_{10}.
  - The 1st of March 2024 with a $PM_{2.5}$ value of 128.77 µg/m³ which is 9 times higher than the WHO/IFC guidelines of 15 µg/m³ for $PM_{2.5}$ and a PM_{10} value of 262.58 µg/m³ which is 6 times higher than the WHO/IFC guidelines of 45 µg/m³ for PM_{10}.
  - The 4th of March 2024 with a $PM_{2.5}$ value of 78.37 µg/m³ which is 5 times higher than the WHO/IFC guidelines of 15 µg/m³ for $PM_{2.5}$ and a PM_{10} value of 145 µg/m³ which is 3 times higher than the WHO/IFC guidelines of 45 µg/m³ for PM_{10}.

The movement of traffic upwind along the Patamacca Road may have contributed to the elevated PM levels measured and the observed peaks.

Location D2 Resident at Leewani Kampoe

The measurement was carried out at the nearest resident at Leewani Kampoe, 45 m downwind from the axis of the Patamacca Road. The measurement instrument was placed at an open field consisting of low vegetation (grass). No obstructions, such as buildings or trees, were observed on the northwest side of the community between the measurement location and the road. While on the northeast side small trees were observed between the house and the road. See Figure 26 for an illustration.

The hourly (1-hour averages) real time measurement results for fine particulate matter ($PM_{2.5}$ and PM_{10}) are presented in Figure 24. The 24-hr averages for fine particulate matter ($PM_{2.5}$ and PM_{10}) are presented in Table 16.

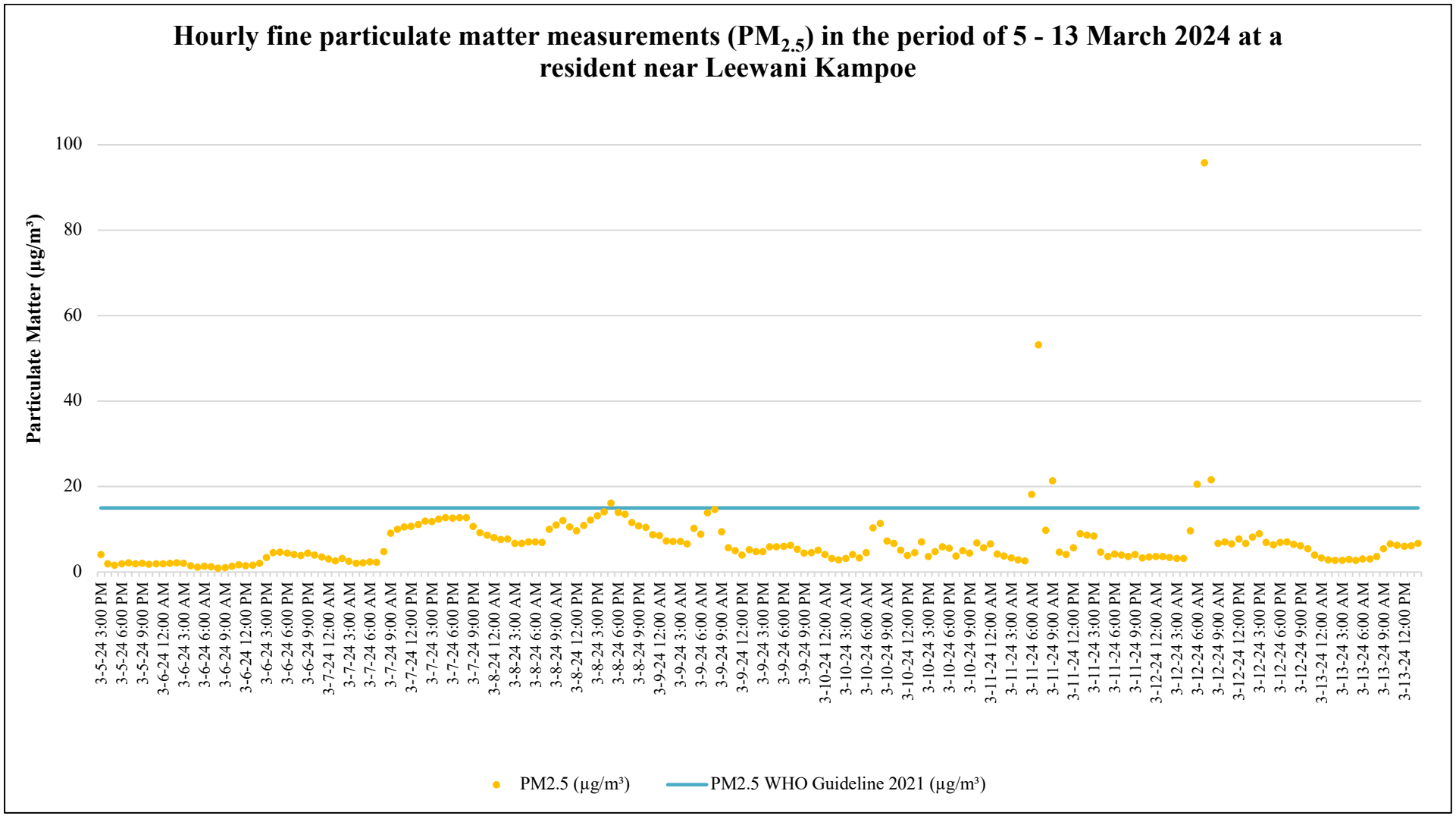


Figure 24: 1-hour average for $PM_{2.5}$ at the resident in Leewani Kampoe.

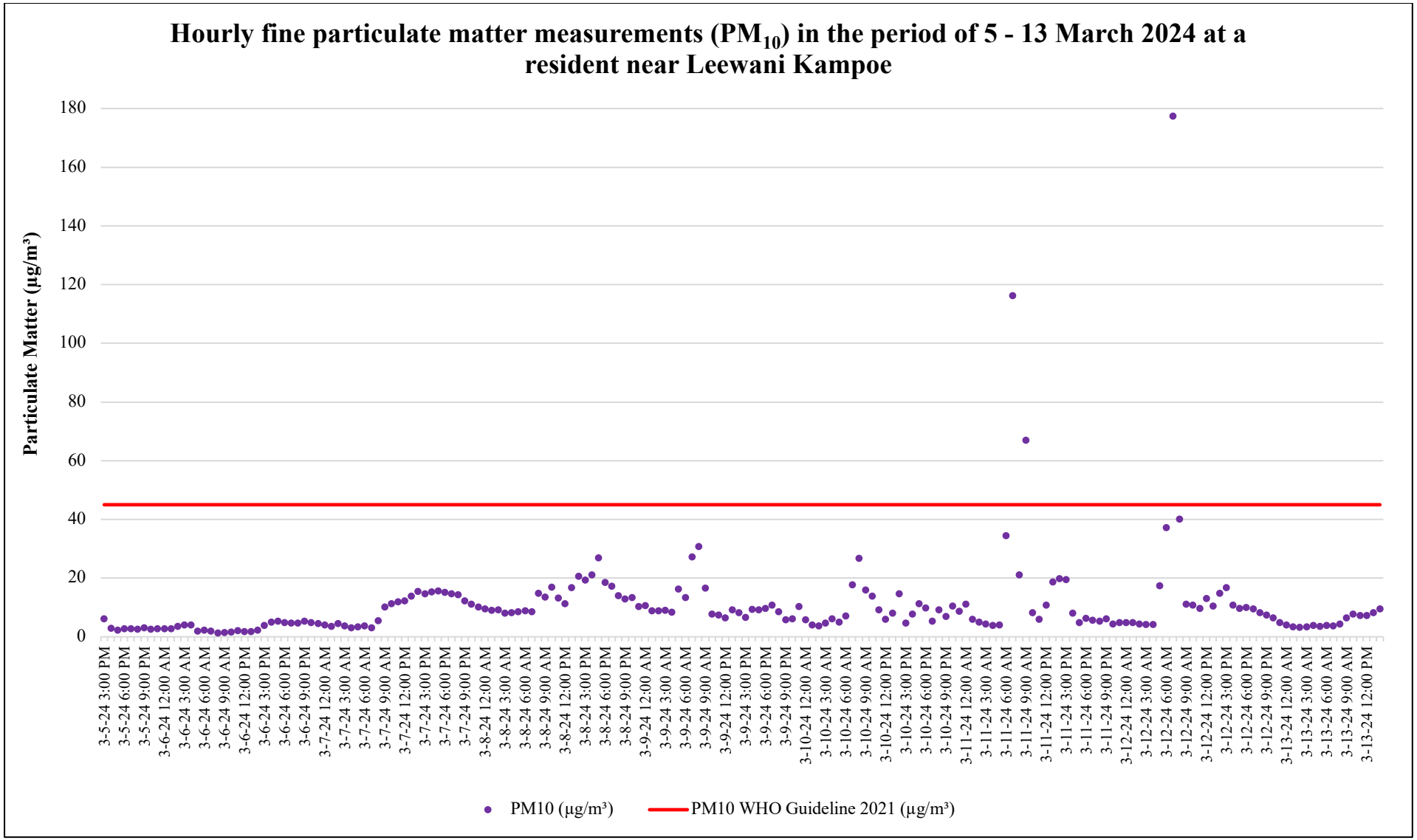


Figure 25: 1-hour average for PM_{10} at the resident in Leewani Kampoe

Table 16: 24-hour average results of $PM_{2.5}$ and PM_{10} at the resident in Leewani Kampoe.

Pollutant	Measured values at location D2 (5th – 13th of March 2024)									AQG level 24-hour averages (µg/m³)
	5 Mar	6 Mar	7 Mar	8 Mar	9 Mar	10 Mar	11 Mar	12 Mar	13 Mar	
$PM_{2.5}$ (µg/m³)	2	2	8	10	7	5	8	11	4	15
PM_{10} (µg/m³)	3	3	10	14	11	9	17	19	5	45
	Exceeded the WHO ambient air quality guideline level (24-hour averages)									

The following can be concluded from the measured air quality data:

- The 24hr averages for $PM_{2.5}$ and PM_{10} are below the applicable WHO/IFC guidelines of respectively 15 µg/m³ for $PM_{2.5}$ and 45 µg/m³ for PM_{10}.
- During the measurement period several peaks are observed daily, mainly between 5:00 AM till 9:00 PM. The highest values for $PM_{2.5}$ and PM_{10} are recorded at 7:00 AM.
- The highest peak values were recorded on:
  - The 11th of March 2024 with a $PM_{2.5}$ value of 53.19 µg/m³ which is 4 times higher than the WHO/IFC guidelines of 15 µg/m³ for $PM_{2.5}$ and PM_{10} value of 116.27 µg/m³ which is 3 times higher than the WHO/IFC guidelines of 45 µg/m³ for PM_{10}.
  - The 12th of March 2024 with a $PM_{2.5}$ value of 95.75 µg/m³ which is 6 times higher than the WHO/IFC guidelines of 15 µg/m³ for $PM_{2.5}$ and PM_{10} value of 177.39 µg/m³ which is 4 times higher than the WHO/IFC guidelines of 45 µg/m³ for PM_{10}.
- The movement of traffic upwind along the Patamacca Road may have contributed to the elevated PM levels measured and the observed peaks.

From the results of the dust measurements, it is evident that both communities experience dust nuisance. The comparatively lower dust concentration recorded at location D2 may be attributed to rainfall between the 5th and 8th of March 2024, causing the dust particles from the Patamacca Road to settle down or perhaps there was less traffic passing by during this period. However, as observed from the measurements between 7th and 12th of March 2024 once the weather changes to dryer conditions, the dust particles start to rise again.

Kraboe Olo is situated near a slight bend in the road, with speed limits of 30 km/h, a plateau and two speed bumps northeast and southeast of the community (see Figure 26). Moreover, the area features more openness with less tall vegetation, coupled with higher wind conditions. These factors can contribute to elevated dust levels when traffic moves from the north to the south especially given the prevailing northeast wind direction, which tends to carry dust particles towards the community.

On the other hand, Leewani Kampoe is situated between two bends in the road, with speed limits of 25 km/h, a plateau on the northeast and southeast of the community and a speed bump at the bend northeast of the community (see Figure 26**)**. These measures are conducive to vehicles slowing down, thus reducing dust production. Furthermore, there is denser vegetation along the road, particularly in the dominant northeast wind direction. Additionally, at the residence (northeast side of the community) where the measurement instrument was stationed, small trees were observed between the house and the road further mitigating dust dispersion. Moreover, calmer wind conditions were recorded which also contribute to diminished dust production.

Based on an analysis of the traffic data in chapter 3.6.2, it appears that during the morning peak approx. 70 % and during the afternoon peak up to 60 % of the traffic within the measurements period can be attributed to Newmont traffic.

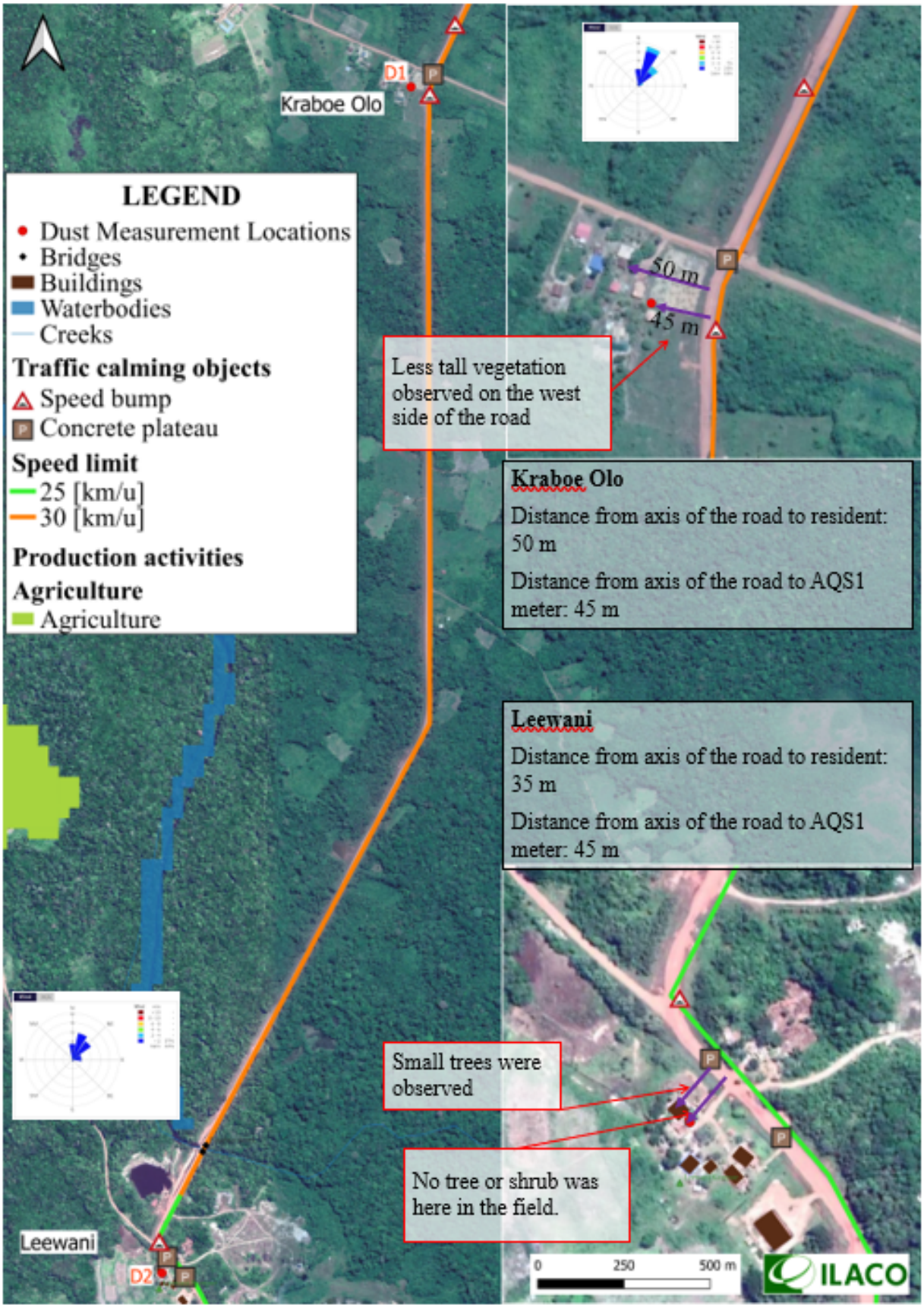


Figure 26: Overview of traffic sings, speed limits, type of vegetation and wind condition at Kraboe Olo and Leewani Kampoe.

The pictures below give an illustration of the dust pollution caused by traffic movement.


Dust plume caused by car


Dust plume caused by light truck


Dust plume caused by heavy truck


Dust cloud


Dust plume observed by two heavy trucks passing by each other


Water tanker truck observed spraying water on the laterite (unpaved) Patamacca Road

4 FUTURE DEVELOPMENTS

The future expected developments in Newmont's operations and regional developments are discussed in this section.

4.1 Mining expansions Newmont

Newmont is planning to construct a new tailing storage facility (TSF-2) near the current TSF-1. This involves deforestation and earthworks during the construction phase and therefore minimal material is expected to be transported towards the TSF. Newmont expects around 100 additional workers compared to current operations to come on site during the construction phase. These workers will make use of Newmont's or Haukes's existing bus transport connection. It is expected that the construction activities will cause a minimal increase of up to 2 extra buses and 4 light vehicles travelling to and from Merian per week compared to current operations. Heavy equipment is mostly available on site and minimal movements of heavy equipment to and from Paramaribo are expected.

4.2 Developments and plans for the region

Infrastructure development in the Marowijne district was previously related to forestry and mining activities, as well as large-scale agricultural projects such as the Patamacca oil industry. The developed access roads then had an added benefit for the local communities in those areas. Nowadays, development focuses mostly on improving living and working conditions in the resorts and further development of access roads within the district. In the District Plan 2025 for Marowijne there are no concrete development projects planned for the next service year that are significant for this project. An indication of the type of projects by the different Ministries is given below:

1. Infrastructure Development:
   - Routine maintenance of secondary - and tertiary roads.
   - Rehabilitation of connecting and interior roads
   - Construction of new access roads for various villages
   - Paving of interior roads in Moengo and Albina
   - Maintenance of bridges at secondary and tertiary roads.
2. Agricultural Development:
   - Initiatives to enhance agricultural productivity through modernization, training, and technology transfer.
3. Tourism Development:
   - Ecotourism projects aimed at promoting Marowijne's natural attractions, including rainforests, rivers, and wildlife.
   - Infrastructure development to support tourism activities such as lodging facilities, trails, and visitor centers.
4. Renewable Energy Projects:
   - Implementation of solar, wind, to reduce reliance on fossil fuels and promote sustainability.
   - Rural electrification initiatives to improve access to electricity in remote areas of Marowijne.
5. Education and Healthcare:
   - Construction of schools and healthcare facilities to improve access to education and healthcare services for residents.
   - Training programs and capacity-building initiatives to enhance skills and expertise in various sectors.

These project ideas or wishes have not yet been developed though, and it is uncertain if and when any or all of these development projects will be realized. Given the current financial conditions in Suriname, these projects will probably only be developed if outside financing from institutions such as the Interamerican Development Bank (IDB) or Agence Française de Développement (AFD) becomes available.

In the Multi-Year Development Plan 2022 - 2026 for the Republic of Suriname (Stg. Planbureau Suriname, 2021), one of the activities regarding Roads and Drainage involves updating and

implementing the ISTS Transport Master Plan (NEA, GOPA and STC, 2011). This plan contains a transport sector infrastructure investment plan with a 20-year horizon, i.e. for the period until 2030. The following relevant projects were identified for developments in the district of Marowijne:

- Construction of a bridge across the Marowijne river to French Guyana at Albina
- Construction of a new two-lane road connecting Moengotapu- Patamacca- Java- Carolina – Zanderij.

Other than the rehabilitation and upgrade of the East West Connection Road, there are no visible efforts made to realize these plans to the knowledge of the author. The first project could increase the amount of traffic over the East West Connection Road significantly and therefore increase traffic congestion, traffic unsafety and pollution. The second could relieve the East West Connection Road from traffic significantly, especially freight related traffic from and to the port of Paramaribo. It is unlikely that either of these projects will be executed in the upcoming five years, and hence we expect no significant changes in traffic safety and pollution along the East West Connection Road in years to come.

5 CONCLUSIONS AND RECOMMENDATIONS

This traffic study is conducted as part of the updated Social Impact Assessment for Newmont's operations at Merian and the new tailing storage facility (TSF), TSF-2, which is to be constructed near the current TSF-1. A baseline of the current road conditions, traffic safety and impacts of traffic, in terms of noise - and dust nuisance, at nearby residents' area along the primary roads of interest between Paramaribo and Merian is provided in this report. The main findings for each aspect are discussed below.

Based on gate entry registration data of 2023, Newmont's operations require 400 vehicles entering the Merian operations weekly on average, which is roughly 60 vehicles daily. These vehicles include light vehicles, supply trucks, buses, fuel trucks and chemical transport vehicles. Transport is generally only allowed between 6:00 and 18:00. Based on traffic counts conducted on the East West Connection Road at Stolkertsijver and on the Road to Patamacca at Kraboe Olo, Newmont's share of daily traffic is estimated at 6% and 40% respectively.

It is expected that the construction activities related to the new TSF will cause a minimal increase of up to 2 extra buses and 4 light vehicles travelling to and from Merian per week compared to current operations. This increase of 1.5% of weekly traffic is negligible. Heavy equipment is mostly available on site and minimal movements of heavy equipment to and from Paramaribo are expected. During the operation of the new TSF, minimal additional movements are expected. Nonetheless, an overview of the impacts of the current operations (including the expected operations related to the new TSF) and the expected impacts after mitigation measures are indicated in Table 17.

Road Conditions

The roads and bridges are generally in good condition. Along the East West Connection Road the shoulders are mostly vegetated. Part of the section between Stolkertsijver- Moengo (which is mostly uninhabited) is overgrown with high vegetation, resulting in poor visibility in curves, poor walkability and poor visibility of traffic signs. The road markings are also faded. A 200 m section of the East West Connection Road between Abadu Kondre and the Cottica River is in a poor condition. The Gouverneur van Asbecklaan leading to the port of Moengo is in poor conditions with potholes.

The Road to Patamacca, Granman Forster – and Forestry Roads are unpaved and made up of laterite, covered with gravel at certain rehabilitated sections and have no lighting. Newmont is actively maintaining these roads. There are multiple sections where washboarding occurs during dry seasons, especially on the busiest section, north of Mora Kondre. The coarse gravel and ripples created by repeated traffic (washboarding) cause discomfort and damage cars, which subsequently elevates vehicle maintenance cost for traffic driving on the roads.

There is heavy dust formation on the unpaved roads in dry seasons. The local communities on the road to Patamacca have complained about the dust nuisance. During rainy seasons, the unpaved roads become muddy and rutting occurs reducing the accessibility of the road.

A short-term mitigation measure for the washboarding, potholes and loose gravel is regular or periodic maintenance of the road, as is already being done by Haukes. Paving of the road by Newmont and/ or the Government is a long-term measure as is repetitively asked by the local communities to Newmont and/or the government. At least the section between Moengo and Kraboe Olo or Leewani Kampoe (5-9 km) can be paved. A cost-effective method of improving the surface condition of unpaved roads and extend their service life is the 'chip and seal' method. It involves treating the gravel surface of the unpaved road with a bitumen sealant, such that it can withstand heavy traffic and harsh weather conditions. Sealing the road surface is expected to drastically reduce dust generation by traffic.

Traffic Safety

In terms of traffic fatalities, the East West Connection Road is much more dangerous than the unpaved roads of interest. Almost half of the fatal accidents are one-sided, indicating that the infrastructure and environment are not aligned with the driving behavior. Furthermore, there is a high total share of pedestrian, cyclists and moped accidents. The lack of separate facilities for pedestrians and cyclists/

mopeds on the East West Connection Road certainly contributes to this traffic unsafety. The lack of lighting and insufficient clearance in certain sections are also expected to contribute to the nighttime accidents.

Traffic on the Road to Patamacca passing by at high speeds makes the villagers feel unsafe when making use of the road. Loose gravel also increases the risk of being hit by shooting stones from traffic passing by. According to Newmont's accident data of 2023, the incidents had minor to insignificant impact,

Even though the Road to Patamacca is unpaved and is equipped with speedbumps and speed limit signs, the villagers indicate that speeding still is an issue on the road. The lack of traffic fatalities in the last 12 years on the Road to Patamacca indicates that the road is not unsafe.

The traffic signs on the Road to Patamacca, Granman Forster- and Forestry Roads are small and are advised to be replaced with larger sized signs as per the standards for category 1 roads used by the Ministry of Public Works. Separate sidewalks for pedestrians and proper lighting should further improve traffic safety.

Paving (part of) the Road to Patamacca is expected to encourage speeding and reduce traffic safety. Traffic calming measurements such as speedbumps, are to be included. Newmont can encourage their contractors to prevent speeding even more.

Noise

Urban area

From the noise measurements it can be concluded that the noise levels along the East West Connection Road in the urban area, at location N1 and N2, exceeded the WHO/IFC standards of 55 dBA during daytime and 45 dBA during nighttime. The main noise source for the higher LAeq levels is caused by traffic along the East West Connection Road. An estimated 6% of this traffic is Newmont related.

Rural area

The noise measurements at location N3 at Orleanekreek, N4 at Stolkertsijver and N5 at Abadoe Kondre were conducted near the residents, who are located along the less densely populated East-West Connection Road. Small to large scale agricultural activities are practiced in between.

The noise levels at the residents at locations N3, N4 and N6 along the East-West Connection Road experience noise levels which exceeds the WHO/IFC standards of 55 dBA during daytime and 45 dBA during nighttime. N5, N7 and N8 are below the WHO/IFC standards of 55 dBA during daytime and 45 dBA during nighttime. The main noise source for the higher LAeq levels during daytime is traffic; during nighttime noise was mainly caused by barking dogs and heavy trucks passing by. It is expected that noise levels will attenuate with distance and thus that residents who are further away (20 – 40 m) from the road will experience lower noise levels than recorded.

The background noise level (L_{90}) gives a good indication what the noise levels are without the presence of traffic or other man-made noise sources.

Dust

From the dust measurement carried out in the communities along the Patamacca Road it can be concluded that the main source of dust nuisance is traffic. Based on an analysis of the traffic data in chapter 3.6.2, it appears that during the morning peak approx. 70 % and during the afternoon peak upto 60 % of the traffic within the measurements period can be attributed to Newmont traffic. Higher dust levels were recorded at Kraboe Olo in comparison to Leewani Kampoe. Rainfall in the first measurement days (5th till the 8th of March 2024) at Leewani Kampoe may have contributed to settling of the dust particles. As soon as it gets drier the dust particles rise again. The presence of vegetation can help to prevent the dust from blowing up and minimize the impact on the residents. Despite mitigation measures; such as the placement of traffic signs, speed bumps and the use of a water tanker truck for spraying/dust suppression; dust nuisance still exceeds WHO safe levels, especially during the dry seasons. It is recommended that speed limits are strictly enforced along the unpaved roads where communities are present. As previously mentioned, paving the road is expected to reduce dust nuisance from traffic drastically.

Table 17: Impacts, excising and proposed mitigation measures, efficiency of mitigation measures, and impact rating after mitigation and optimization.

Impact	#	Impact description (new impacts in blue)	Impact rating - severity	Mitigation / optimization measures in place or completed	Proposed mitigation/ optimization measures	Efficiency of mitigation / optimization measures	Impact rating after proposed mitigation
Traffic and transportation safety impacts	1	Speeding and reckless driving behavior of Newmont-related vehicles causes irritation and a feeling of unsafety among inhabitants of communities along the Road to Patamacca.	Magnitude: Low Duration: Long-term Scale: Small Severity: Minor Probability: Certain Significance: Moderate	▪ Drivers' code of conduct/training ▪ Speed bumps ▪ Letters to contractors ▪ Training for all employees who drive (Practice, classroom, online) ▪ Meetings with contractors, quarterly ▪ GPS tracking of vehicles to monitor speed of trucks and contractors. ▪ Security, in collaboration with police randomly control speed (with handheld radar). ▪ Warnings to people who are caught speeding ▪ Sessions about complaints and grievances with contractors	▪ Increase size of traffic signs on the Road to Patamacca, Granman Forster- and Forestry Roads ▪ Create separate sidewalks near communities	Most mitigation measures unknown to local inhabitants; Speed bumps and other measures have limited effect in the perception of TC communities.	Moderate
	2	Increase in accidents and injuries along the Transport Corridor. No known accidents and injuries have been caused by Newmont - related vehicles.	Magnitude: Medium Duration: Long-term Scale: Small Severity: Moderate Probability: Small (none to date) Significance: Low			Effect on impact cannot be measured.	Low
Noise nuisance caused by traffic urban area	3a	Increase in noise nuisances along the urban regions of Meerzorg and Tanmanredjo along the East West Connection Road.	Magnitude: Low Duration: Long-term Scale: Small (stretch of the road) Severity: Minor Probability: Likely Significance: Low	▪ Traffic calming measures as described above	-	Monitoring of speed; Maintaining complaints register	Low to negligible
Noise nuisance caused by traffic rural area	3b	Increase in noise nuisances along the rural regions along the East West Connection Road and Road to Patamacca.	Magnitude: Low Duration: Long-term Scale: Small (stretch of the road) Severity: Minor Probability: Likely Significance: Low	▪ Traffic calming measures as described above	▪ Use of vegetation as barrier between road and communities	Monitoring of speed; Maintaining complaints register	Negligible
Dust nuisance caused by traffic	4	Increase in dust nuisances at the communities Leewani Kampoe and Kraboe Olo.	Magnitude: Medium Duration: Long-term Scale: Small (localized spot) Severity: Moderate Probability: Certain Significance: High	▪ Traffic calming measures as described above ▪ Moistening the road surface with water tanks	▪ Use of vegetation as barrier between road and communities ▪ Pavement of part of the road	Monitoring of dust (particulate matter); Maintaining complaints register	Moderate to low (in case of pavement of road sections)

BIBLIOGRAPHY

Badjalala (2023). *Plan voor de controle op aslasten van vrachtwagens op de nationale verbindingswegen*. B.Tech. thesis report. Polytechnic College Suriname.

Genivar & ILACO (2011). *Suriname Water Supply Master Plan*. Ministry of Natural Resources and N.V. Surinaamsche Waterleiding Maatschappij.

ILACO (2024). *Verkeersveiligheidsstudie- Verkeersongevallen Database*. Ministerie van Openbare Werken.

Stg. Planbureau Suriname (2021). *Multi-Year Development Plan 2022 – 2026 of the Republic of Suriname.* Planning Office Suriname.

NEA, GOPA and STC (2011). Suriname: Institutional strengthening of the transport sector (ISTS)- Transport Master Plan. Government of Suriname and the European Commission.

OW (2023a). *Wegenlijst onder beheer van Ministerie van Openbare Werken*. Ministerie van Openbare Werken- Afdeling Wegen.

OW (2023b). *Overzicht bruggen*. Ministerie van Openbare Werken- Afdeling Bruggen.

Premcharan (2014). Ontwikkeling van een model voor inrichting en herinrichting van wegen en kruispunten in Suriname. Anton de Kom Universiteit van Suriname.

SBB (2020). *Overzicht Status Bosbouwterreinen, Februari 2020*. Ministerie van Ruimtelijke Ordening, Grond- en Bosbeheer.

Social Solutions (2020). Merian Social Impact Assessment- 2019 Update.

WAS (2023). *Lijst van wegen onder beheer van de Wegenautoriteit (update april 2023).* Wegenautoriteit Suriname.

Online resources:

Gonini (n.d.). Retrieved July, 2024, from www.gonini.org

Government of the Republic of Suriname. (2022, Jul 28). *De Dienst 's Lands Bosbeheer (LBB) - Overheid van de Republiek Suriname*. Overheid Van De Republiek Suriname. Retrieved from: https://gov.sr/ministeries/ministerie-van-grondbeleid-en-bosbeheer/de-dienst-s-lands-bosbeheer-lbb/#

OpenStreetMap (n.d.). Retrieved July, 2023, from www.openstreetmap.org

COLOPHON

Client	: Social Solutions
Project	: Traffic Study Newmont
Subject	: Traffic Study Report
File	: IS-452
Author	: S. Kishoen Misier
Contributions	: G. Macnack; A. Nakchedi; S. Koenjbiharie
Approved	: M. Blenman
Date	: 24 Oct 2024

APPENDICES

Appendix A: Specifications of the SVAN 977c

SVAN 977C

Sound & Vibration Level Meter and Analyser

SVANTEK

sound and vibration

SVAN 977C Sound & Vibration Level Meter

SVAN 977C Class 1 **SOUND & VIBRATION** Level Meter and Analyser is designed to meet the needs of both environmental monitoring and occupational health and safety monitoring specialists.

SVAN 977W **TYPE APPROVED WELMEC** version is available.

If you disconnect the microphone preamplifier, you can use the instrument to take **VIBRATION** measurements - simply by connecting a cable and a vibration sensor.

The microphone preamplifier has been **REINFORCED** with a metal collar to protect it against mechanical damage.

The **TIME HISTORY LOGGING** of results such as Leq, Max, Min and Peak with two simultaneous logging steps is saved on a 16 GB **microSD** card (upgradeable to 128 GB).

Large **OLED DISPLAY** is a full color and **HIGH CONTRAST** so it can be used in a sunlight or night. The OLED technology doesn't use back-light giving SVAN 977C more battery operating time.

With a special microphone the meter provides measurement range of the **ULTRASOUNDS** up to 40 kHz.

The **Bluetooth®** interface connects the meter with the Building Acoustics Assistant and SvanMobile application that allows the user to trigger measurements, edit settings, rename files and view the results remotely.
Anyone who makes measurements in the environment will appreciate the ability of SvanMobile to automatically add weather data and **GPS** position to the measurement report.
SvanMobile also allows to link measurement files from the sound level meter to media files from the smartphone such as photos, videos or audio recordings.

RT 60 reverberation time measurement in 1/1 or 1/3-octave bands in accordance to ISO 3382 supported by the Building Acoustics Assistant mobile application (optional).

About SVAN 977C

The SVAN 977C is a Class 1 Sound and Vibration meter designed for occupational and environmental measurement applications. The meter is a successor of SVAN 977A offering new 1/2" microphone MK255 providing designed for acoustical measurements in research and development and also for industrial use. It is designed and very carefully constructed to ensure excellent long-time stability of the electroacoustical parameters.
One unique feature of the SVAN 977C is ultrasound measurement band up to 40 kHz. The ultrasound band is normally considered as the frequency range above 20 kHz. Ultrasound is used in a number of industrial processes such as cleaning, drilling or welding as well as hospitals for medical procedures.
The built-in Bluetooth® interface together with smart-phone applications like Building Acoustics App and SvanMobile, extends measurement capabilities with all the features offered by smartphones including text/voice comments, photo, video, GPS position etc.

Software for SVAN 977C

SvanPC++ is a PC software supporting functions such as measurement data downloading from instruments to PC, measurement setups creation, basic Leq/RMS recalculation, measurement results in text, table and graphical form of presentation, export data to a spread sheet or text editor applications. New version of SvanPC++ software also supports analysis of wave files from Svantek's instruments (for example calculation of tonality).

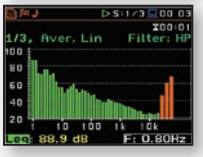
Supervisor is a dedicated software for determination of occupational noise & vibration exposure. It supports data download, instrument configuration and provides tools for reporting. The data files from the SVAN 977C can be used for calculation of all required measurement results and uncertainties in accordance to measurement strategies described in ISO 9612.

SvanMobile is an application for Android devices that uses the Bluetooth® connection to control the SVAN 977C. It allows the user to trigger measurements, edit settings, rename files and view the results remotely. Anyone who makes measurements in the environment will appreciate the ability of SvanMobile to automatically add weather data and GPS position to the measurement report. SvanMobile also allows to link measurement files from the sound level meter to media files from the smartphone such as photos, video or audio recordings.

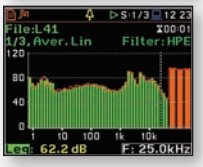
One big advantage of SVANTEK instruments is their ability to make building acoustics measurements. Their high accuracy along with millisecond spectra logging allows users to perform all the measurements necessary to obtain facade, airborne or impact sound insulation results. **The Building Acoustics Assistant** smartphone application guides the user through the sound insulation measurement procedure in accordance with ISO 16283.

Optional functions

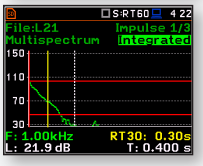
TIME DOMAIN SIGNAL RECORDING means recording the raw signal samples with defined frequency up to 48 kHz. Analysis of the raw signal is used whenever frequency analysis is not sufficient. Post-processing of high quality wave files (48 kHz, 24 bit) such as calculation of tonality is available in SvanPC++ program. Time domain signal is recorded in a wave format which means that it can be played back in the PC software and used for noise source recognition (audio recording).



FREQUENCY ANALYSIS of the signal in 1/1 or 1/3 octave bands allows to determine the influence of high or low frequencies on overall values. The 1/3 octave can be also used for the assessment of tonality in accordance to ISO 1996-2 (simplified method). It can be activated at any time by ordering the activation code.



With an optional microphone and 1/3 octave or FFT analysis SVAN 977C provides analysis of the **ULTRASOUNDS** up to 40 kHz. The ultrasound band is normally considered as the frequency range above 20 kHz. Limits of permissible ultrasound levels are usually expressed in terms of Leq and Max values specified in 1/3 octave bands for 20 kHz, 25 kHz, 31.5 kHz and 40 kHz.



RT60 ANALYSIS provides reverberation time calculation for 1/1 octave bands (from 63 Hz to 8 kHz) or 1/3-octave bands (from 50 Hz to 10 kHz) and three total RMS levels (A, C and Z weighted). Whole measurement process and calculations implemented in SV 973 fulfil the ISO 3382 standard. It can be activated at any time by ordering the activation code.

Optional accessories to SVAN 977C

SC 26
Extension Cable
for Preamplifier

SA 277C
Microphone
Outdoor
Protection Kit

SM 277 PRO
Outdoor
Monitoring
Case

SV 36
Class 1 Acoustic
Calibrator
94 dB / 114 dB
at 1 kHz

SV MK202E
Ultrasound
Microphone up to
40 kHz band

What's inside the SVAN 977C kit?

The kit consists of SVAN 977C Class 1 sound & vibration level meter with a detachable preamplifier SV 12L and high quality MK 255 microphone. The list of accessories includes: SA 143 carrying case, SA 22 windscreen, 16 GB microSD card, four AA batteries, USB cable, and CD with user manual. Each SVAN 977C has its factory calibration certificate and 36 months warranty card.

SVAN 977C Technical Specifications

Sound Level Meter & Analyser

Standards	Class 1: IEC 61672-1:2013; Class 1: IEC 61260-1:2014
Weighting Filters	A, B, C, Z, LF, U, AU
Time Constants	Slow, Fast, Impulse
Microphone	Microtech Gefell MK 255, 50 mV/Pa, prepolarised 1/2" condenser microphone
Preamplifier	SV 12L detachable (TNC)
Linear Operating Range	23 dBA RMS ÷ 140 dBA Peak (in accordance to IEC 61672)
Total Dynamic Measurement Range	16 dBA RMS ÷ 140 dBA Peak (typical from noise floor to the maximum level)
Internal Noise Level	Less than 16 dBA RMS
Dynamic Range	>110 dB
Frequency Range	3 Hz ÷ 20 kHz with Microtech Gefell MK 255
Meter Mode Results	Elapsed time, Lxy, Leqx (LEQ), Lxpeak (PEAK), Lxymax (MAX), Lxymin (MIN), LR (ROLLING LEQ), Ovl (OVERLOAD), Lxye (SEL), LN (LEQ STATISTICS), Lden, LEPd, Ltm3, Ltm5
Measurement Profiles	Simultaneous measurement in three profiles with independent set of filters (x) and detectors (y)
Analyser[1] (optional)	1/1 octave or optional 1/3 octave real-time analysis, up to 40.0 kHz band meeting Class 1: IEC 61260-1 FFT analysis 1600 lines, up to 40.0 kHz band (optional) RPM rotation speed measurement parallel to the vibration measurement (optional) RT60 reverberation time measurement (optional)
Statistics	L_n (L_1-L_{99}), complete histogram in meter mode and 1/1 or 1/3 octave analysis
Data Logger[1]	Time-history logging of summary results, spectra with adjustable double logging steps down to 2 ms
Audio Recording[1] (optional)	Audio records to time-history data or WAV format with selectable band and recording period

Vibration Level Meter & Analyser

Standards	ISO 20816-1
Meter Mode	RMS, Max, Peak, Peak-Peak Simultaneous measurement in three profiles with independent filter sets and detectors
Filters	HP1, HP3, HP10, Vel1, Vel3, Vel10, VelMF, Dil1, Dil3, Dil10, Wh
Accelerometer	SV 80 (100 mV/g) or any IEPE accelerometer (optional)
Analyser[1] (optional)	1/1 octave or optional 1/3 octave real-time analysis, up to 40.0 kHz band meeting Class 1: IEC 61260-1 FFT analysis 1600 lines, up to 40.0 kHz band (optional) RPM rotation speed measurement parallel to the vibration measurement (optional)
Data Logger	Time-history logging of summary results, spectra with two adjustable logging steps
Time-domain Signal Recording[1]	Continuous or triggered time-domain signal recording to WAV format (optional)

General information

Input	IEPE with TNC connector	
Memory	MicroSD card 16 GB (removable & upgradeable)	
Display	Super contrast (10000:1) OLED 2.4" colour display (320 x 240 pixels)	
Interfaces	USB 2.0 Client, Bluetooth®, RS 232 (with optional SV 55)	
	External I/O - AC output (1 V Peak) or Digital Input/Output (Trigger – Pulse)	
Power Supply	Four AA batteries	operation time > 12 h (6 V / 2 Ah)[2]
	Four rechargeable AA batteries	operation time > 16 h (4.8 V / 2.6 Ah)[2] (not included)
	External power supply	6 V/500 mA DC ÷ 15 V/250 mA DC
	USB interface	500 mA HUB
Environmental Conditions	Temperature	from -10 °C to 50 °C
	Humidity	up to 90 % RH, non-condensed
Dimensions	343 x 79 x 39 mm (with microphone and preamplifier)	
Weight	Approx. 0.6 kg with batteries	

[1]works together with the meter mode
[2]dependent on instrument operation mode

The policy of our company is to continually innovate and develop our products. Therefore, we reserve the right to change the specifications without prior notice.

SVANTEK Sp. z o. o.
ul. Strzygłowska 81, 04-872 WARSAW, POLAND
phone/fax (+48) 22 51 88 320, (+48) 22 51 88 312
http://www.svantek.com e-mail: office@svantek.com.pl

Proudly distributed by:

SVANTEK

EU Declaration of Conformity

No. SVAN977C-CE-EN/07/2020

Manufacturer:	**SVANTEK Sp. z o. o**
Address:	Strzygłowska 81 04-872 Warszawa Poland
Kind of product:	SOUND LEVEL METER – ANALYSER, VIBRATION LEVEL METER – ANALYSER
Type:	**SVAN 977C**
Directive:	**Low Voltage Directive** (LVD) 2014/35/EU
Standard:	EN 61010-1: 2010 *Safety requirements for electrical measurement equipment*
Directive:	**Electromagnetic Compatibility Directive** (EMC) 2014/30/EU
Standards:	EN 61326-1:2006 *Measurement equipment: EMC emission and immunity*
Directive:	**Radio and Telecommunication Directive** (RTTE) 1999/5/EC
Standards:	
a.3.1a: SAFETY	EN 61010-1: 2010 *Information technology equipment*
art.3.1b: EMC	ETSI EN 301 489-1 V1.9.2:2011 *Radio transmission systems* ETSI EN 301 489-17 V2.2.1:2012 *Broadband transmission systems*
art.3.2: RADIO	ETSI EN 300 328 V1.9.1:2015 *Wideband transmission systems (2.4 GHz)*

Auxiliary industry standards:

EN 61672-1:2013	*Electroacoustics - Sound level meters: Class 1*
EN 61260-1:2014	*Octave-band filters*
EN ISO 8041:2005	*Human response to vibration - Measuring instrumentation*

I, the undersigned authorized manufacturer representative, declare that this declaration is issued under the sole responsibility of the manufacturer, and that the object of the declaration described above is in conformity with the relevant Union harmonization legislation.

Place of issue: **Warsaw, Poland**

Date of issue: **01. 07. 2020**

Bogdan Żmuda, CEO

.....
(signature)

SVANTEK Sp. z o. o.
Strzyglowska 81
04-872 Warsaw, Poland
tel.: 22 518 83 20
e-mail: office@svantek.com.pl

Registered in
the Warsaw District Court
XIII Economic Department
Initial Capital 100 000 zł

KRS 0000192065
REGON 002175672
VAT PL 5270105272

Appendix B: Flow checks of the Areoqual-AQS-1 Dust Profiler

Appendix B

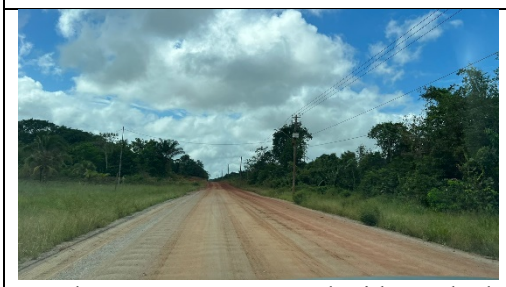
Flow check

Location/ Period	Coordinates (UTM21N/ WGS84)	Installation Date/ Time	TSP Flowcheck (950 – 1050 LPM)/Time		Gas Flowcheck (0.175 – 0.205 LPM/Time		Download Date/ Time	Remarks
			Before	After	Before	After		
Location D1: Resident at Kraboe Olo (27 February – 5 March 2024)	21 N 785957 614944	27th of February 2024/ 01:20 PM	1.007 (01:20 PM)	No adjustment was required	0.189 (01:20 PM)	No adjustment was required	5th of March 2024/ 02:00 PM	
Location D2: Resident at Leewani (5 – 13 March 2024)	21 N 785234 611507	5th of March 2024/ 03:00 PM	0.977 (03:00 PM)	No adjustment was required	0.181 (03:00 PM)	No adjustment was required	13th of March 2024/ 01:00 PM	

Appendix C: Impressions of the road to Patamacca

Junction of East West Connection Road at Moengo. Right side Road to Patamacca.

Road to Patamacca near Moengo



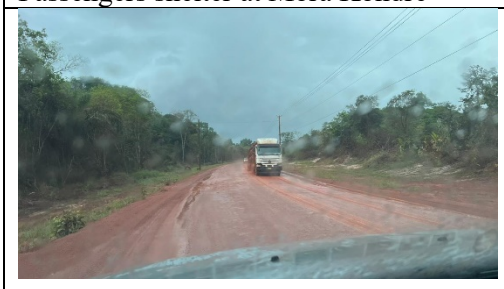
Road to Patamacca capped with crushed rock with washboarding

Road to Patamacca at Mora Kondre

Road to Patamacca near Njungburukreek

Road to Patamacca junction Mora Kondre

Passengers shelter at Mora Kondre



Appendix D: Traffic Incidents Logged by Newmont in 2023

Record ID	Departments	Event Title	Event Date	Impact Category	Impact Subcategory	Fatigue Related?	Significant Potential Event (SPE)	Description	Property Type	Actual Impact	Potential Impact
INC-6663	Logistics	(Offsite) Business Partner Tractor Trailer went of the road on its way to Paramaribo on the Langa Tabiki Road	15/02/23 04:00 pm	Operational	Property Damage	No	No	On 15th of February 2023 around 16:15hr SCC was informed of an incident of a tractor trailer from business partner Kuldipsing that went off the road. The tractor trailer was on his return trip to Paramaribo, without any loads. All was well with the driver and till now report of very minor damages to the tractor and trailer. Kuldipsing has been informed by the drivers that the road is very slippery, which causes the Trailor to go off course.		1 - Insignificant	1 - Insignificant
INC-8512	Supply Chain	Component fell off Trailer	02/06/23 09:00 am	Operational	Property Damage	No	No	A contracted transporter was transporting a wheel group component for a CAT 785 Haul truck, which was loaded the day prior, when the fastening chains loosened. This resulted in the component falling of the trailer at km19 of the Langa Tabiki dirt road and ending up on the left side beside the road into the canopy. The component was reloaded and transport continued on the site. The next procedural checkpoint was at km21. The business partner reported visual insignificant damage to the component, however a proper assessment to be completed.	Mobile Equipment - Heavy	1 - Insignificant	1 - Insignificant
INC-9137	Facilities/Camp Services	Cracked windshield of bus coming from Paramaribo	17/07/23 09:50 am	Operational	Process Loss	No	No	A contractor bus with passengers from Paramaribo had suffered a cracked front windshield when a BP truck coming from the opposite direction had past them.	Mobile Equipment - Support	1 - Insignificant	1 - Insignificant

Record ID	Departments	Event Title	Event Date	Impact Category	Impact Subcategory	Fatigue Related?	Significant Potential Event (SPE)	Description	Property Type	Actual Impact	Potential Impact
INC-9983	Supply Chain	TRANSPORT Minivan Losing Control, Offsite	05/09/23 04:30 pm	Operational	Property Damage	No	No	On the unpaved Langa Tabiki (LT) road at kilometer 34 from Moengo on the way to Merian the driver of Business Partner minivan #207 lost control of the vehicle on the left side of the road while going into a slight righthand curve, overcorrecting, losing control, crossing the road, and rolling onto its right side on the side of the road. This event occurred offsite. A Newmont vehicle on the way to Merian arrived at the scene minutes later, assisted the driver, who was the sole person in the vehicle, and reported the incident to the Security Control Center by satellite telephone. The driver reported some pain in hands and legs. The van sustained minor damage.	Mobile Equipment - Light	1 - Insignificant	1 - Insignificant
INC-10555	Community Relations	Oil leak on engine compartment LV 2068 along the East-West Corridor	11/10/23 02:49 pm	Operational	Property Damage	No	No	At around 15.30 the SR team driving to Parbo with LV 2068 noticed that the LV was slowing down. They parked the car along the road at KM 63. That area is inhabited. The event was immediately reported to SCC, Department lead and Maintenance. Since the location was closer to the city, SEMC Parbo supported with towing services. The LV has been towed to SEMC Parbo for repair.	Mobile Equipment - Light	1 - Insignificant	1 - Insignificant
INC-10932	Lab	Rock chip on LV2066 windshield	26/10/23 07:22 am	Operational	Property Damage	No	No	On the way to Paramaribo , Windshield of LV 2066 got chip by a rock at +/- km45. The small rock (2-3 cm) erupted from the dust generated by a small hauling truck (HAUKES) travelling in the opposite direction. LV2066 was brought to SEMC in Paramaribo the have the windshield repair.	Mobile Equipment - Light	1 - Insignificant	1 - Insignificant

Appendix E: Noise field observation sheet

Daytime Baseline Measurements

Measuring date:	5 March 2024 & 13 March 2024	**Legend**	
Number of measurements:	8	1x	Counts of observations
Measured by:	Nakchedi A./ Aroeman H.	x	Observed noise (not countable)
Noise measurement locations:	See below	**Remarks**	

No #	Locations	Coordinates (UTM21N/ WGS84)	Time/ Weather	Provide numbers								Birds	Insects	Leaves/ Grass	Dogs	Music	Claxon	Alarm	Talking	Wind speed (m/s) See wind scale table	Wind direction	Remarks
				Cars	Light truck	Bus	Heavy truck	Moped	Bike	E-Bike	Overfly											
N1	At the berm in front of a resident in Meerzorg, along East West Connection Road. There was a gutter between the fence of the resident and the berm. The meter was placed approx. 8 m away from the axis, approx. and 1.5 m above surface level.	21 N 707655.26 641824.74	09:00 – 09:15 hrs. (15 min) / Sunny with clouds	157x	22x	4x	4x	33x								x				0.3–1.5 m/s (Light air)	North-East	Continuous noise of traffic. Noise of person walking; noise of claxon and noise of car with music passing by.
N2	At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	21 N 718583.02 639900.25	10:18 – 10:34 hrs. (16 min) / No sun/ Cloud cover	98x	10	4x	11x	8x		1x		x				x		x	x	0.3–1.5 m/s (Light air)	North-East	Continuous noise of traffic. Noise of talking person across the street; noise of flying birds; car passing by with music; noise of heavy truck door closing; noise of stationary heavy truck; noise of heavy truck unloading; noise of claxon; noise of car alarm at distance and noise heavy truck reversing alarm.
N3	At the berm in front of a resident in Orleane Kreek, along the East West Connection Road. There was a gutter between terrain of the resident and the berm. The meter was placed approx. 6 m away from the axis, approx. and 1.5 m above surface level.	21 N 732467.29 639084.12	10:56 – 11:11 hrs. (15 min) / No sun/ Cloud cover	33x	13x	3x	1x					x		x	x	x	x		x	1.5–3.3 m/s (Light breeze)	North-East	Continuous noise of traffic. Occasional noise of birds chirping; noise of dog barking; noise of person talking; noise of stationary light truck; noise of birds flying; noise of light truck door closing and driving away; noise of leaves rustlings by the wind and noise of rattling sound from heavy truck.
N4	At the berm in front of a resident at Stolkertsijver, along the East West Connection Road. The meter was placed approx. 7 m away from the axis and 1.5 m above surface level.	21 N 749249.08 636455.06	11:34 – 11:15 hrs. (16 min) / No sun/ Cloud cover	24x	1x	1x	4x							x						1.5–3.3 m/s (Light breeze)	North-East	Continuous noise of traffic. Occasional noise of leaves rustling by the wind; noise of chicken; noise of birds chirping and noise of object at resident house.
N5	Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road. There is a gutter between the measurement location and the berm. The meter was placed approx. 20 m away from the axis and 1.5 m above surface level.	21 N 785675.43 619970.31	01:30 - 01:40 hrs. (10 min) Sunny/cloudy	16x	1x	1x	1x						x	x					x	1.5–3.3 m/s (Light breeze)	North-East	Continuous noise of traffic. Frequent noise of crickets and insects. Occasional noise of person yelling; noise of person talking; noise of vehicle engine at distance and noise of leaves rustling by the wind.
N6	At an open terrain at the corner of the Kapitein Chris Silosweg and Berhardlaan, at Moengo. The meter was placed approx. 5m away from the axis of the road and 1.5 m above surface level.	21 N 787644.38 621477.92	15:03 – 15:19 hrs. (16 min) / No sun/ Cloud cover	26x	4x		1x		2x			x				x	x		x	0.3–1.5 m/s (Light air)	North-East	Continuous noise of traffic. Occasional noise of bird chirping; noise of person talking at distance; noise of car alarm; noise of yelling child at distance and noise of claxon at distance.
N7	At a resident located in the community Kraboe Olo, along the Patamacca Road. The meter was placed approx. 40 m away from the axis and 1.5 m above surface level.	21 N 785965.21 614962.17	12:39 – 12:57 hrs. (18 min) / No sun/ Cloud cover	1x	3x									x			x		x	1.5–3.3 m/s (Light breeze)	North-East	Continuous noise of television. Frequent noise of children talking. Occasional noise of chicken; noise of hammering at distance; noise of people walking at distance; noise of leaves rustling by the wind and noise of children ticking.
N8	At a resident in the community Leewani, along the Patamacca Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	21 N 785257.82 611502.41	13:42 – 13:57 hrs. (15 min) / No sun/ Cloud cover	1x	1x	2x						x							x	0.3–1.5 m/s (Light air)	North-East	Frequent noise of birds chirping; noise of person talking; noise of person yelling; noise of bus passing by; noise of light truck passing by and noise of car passing by.

Baseline daytime measurements										
ID #	**Location**	**Date**	**Time**	**LAeq**	**L10**	**L50**	**L90**	**Lmax**	**Lmin**	**Lpeak**
N1	At the berm in front of a resident in Meerzorg, along East West Connection Road. There was a gutter between the fence of the resident and the berm. The meter was placed approx. 8 m away from the axis, approx. and 1.5 m above surface level.	5-Mar-24	9:00 AM	71.9	75.1	68.7	59.1	88.4	47.7	103.5
N2	At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	5-Mar-24	10:18 AM	67.3	69.6	62.0	54.9	83.3	46.6	95.9
N3	At the berm in front of a resident in Orleane Kreek, along the East West Connection Road. There was a gutter between terrain of the resident and the berm. The meter was placed approx. 6 m away from the axis, approx. and 1.5 m above surface level.	5-Mar-24	10:56 AM	66.7	69.3	54.5	42.8	89.8	38.6	101.2
N4	At the berm in front of a resident at Stolkertsijver, along the East West Connection Road. The meter was placed approx. 7 m away from the axis and 1.5 m above surface level.	5-Mar-24	11:34 AM	63.9	64.7	47.0	40.1	85.2	36.7	97.0
N5	Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road. There is a gutter between the measurement location and the berm. The meter was placed approx. 20 m away from the axis and 1.5 m above surface level.	5-Mar-24	1:30 PM	63.9	64.7	47.0	40.1	85.2	36.7	97.0
N6	At an open terrain at the corner of the Kapitein Chris Silosweg and Berhardlaan, at Moengo. The meter was placed approx. 5m away from the axis of the road and 1.5 m above surface level.	5-Mar-24	3:03 PM	58.3	59.2	46.5	40.7	84.5	36.5	94.2
N7	At a resident located in the community Kraboe Olo, along the Patamacca Road. The meter was placed approx. 40 m away from the axis and 1.5 m above surface level.	5-Mar-24	12:39 PM	46.6	49.8	42.7	39.0	64.2	35.5	80.5
N8	At a resident in the community Leewani, along the Patamacca Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	5-Mar-24	1:42 PM	45.1	47.1	37.8	32.1	61.6	25.1	83.0

Nighttime Baseline Measurements

Measuring date:	27 - 28 February 2024	**Legend**	
Number of measurements:	8	1x	Counts of observations
Measured by:	Nakchedi A./ Aroeman H.	x	Observed noise (not countable)
Noise measurement locations:	See below	**Remarks**	

No #	Locations	Coordinates (UTM21N/ WGS84)	Time/ Weather	Provide numbers							Birds	Insects	Leaves/ Grass	Dogs	Music	Claxon	Alarm	Talking	Wind speed (m/s) See wind scale table	Wind direction	Remarks
				Cars	Light truck	Bus	Heavy truck	Moped	Bike	Overfly											
N1	At the berm in front of a resident in Meerzorg, along East West Connection Road. There was a gutter between the fence of the resident and the berm. The meter was placed approx. 8 m away from the axis, approx. and 1.5 m above surface level.	21 N 707655.26 641824.74	02:34 - 02:49 hrs. (15 min) / Clear sky with visible stars	12x	2x		1x	2x				x							<0.3 m/s (Calm)	-	Continuous noise of insects. Frequent noise of traffic passing by.
N2	At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	21 N 718583.02 639900.25	02:02 – 02:17 hrs. (15 min) / Clear sky with visible stars	6x	1x										x				<0.3 m/s (Calm)	-	Frequent noise of traffic passing by. Occasional noise of coughing person and car passing by with music.
N3	At the berm in front of a resident in Orleane Kreek, along the East West Connection Road. There was a gutter between terrain of the resident and the berm. The meter was placed approx. 6 m away from the axis, approx. and 1.5 m above surface level.	21 N 732467.29 639084.12	01:25 – 01:40 hrs. (15 min) / Clear sky with visible stars	1x										x					-	-	Frequent noise of dogs barking. Noise of howler monkeys. Noise of car passing by.
N4	At the berm in front of a resident at Stolkertsijver, along the East West Connection Road. The meter was placed approx. 7 m away from the axis and 1.5 m above surface level.	21 N 749249.08 636455.06	00:44 – 00:59 hrs. (15 min) / Clear sky with visible stars	1x			1x					x		x					<0.3 m/s (Calm)	-	Continuous noise of insect. Noise of barking dog. Noise of traffic passing by.
N5	Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road. There is a gutter between the measurement location and the berm. The meter was placed approx. 20 m away from the axis and 1.5 m above surface level.	21 N 785675.43 619970.31	23:53 –00:08 hrs. (15 min) / Clear sky with visible stars	2x								x		x	x				<0.3 m/s (Calm)	-	Continuous noise of frogs and insects. Noise of traffic passing by and noise of coughing person and noise of barking dog at distance and noise of car passing by with music.
N6	At an open terrain at the corner of the Kapitein Chris Silosweg and Berhardlaan, at Moengo. The meter was placed approx. 5m away from the axis of the road and 1.5 m above surface level.	21 N 787644.38 621477.92	22:00 – 22:15 hrs. (15 min) / Clear sky with visible stars	18x	1x			2x				x			x	x		x	<0.3 m/s (Calm)	-	Continuous noise of insects and noise of yelling and talking persons. Noise of traffic passing by. Noise of car door closing; noise of claxon and noise of car with music.
N7	At a resident located in the community Kraboe Olo, along the Patamacca Road. The meter was placed approx. 40 m away from the axis and 1.5 m above surface level.	21 N 785965.21 614962.17	23:00 – 23:15 hrs. (15 min) / Clear sky with visible stars	1x								x		x					<0.3 m/s (Calm)	-	Continuous noise of insects. Noise of car passing by; noise of coughing person and noise of dog shaking its fur.
N8	At a resident in the community Leewani, along the Patamacca Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	21 N 785257.82 611502.41	22:42– 22:57 hrs. (15 min) / Clear sky with visible stars	1x	1x		1x					x						x	<0.3 m/s (Calm)	-	Continuous noise of insects. Noise of traffic passing by. Noise from resident; noise of door opening and noise of talking person.

Baseline nighttime measurements										
ID #	**Location**	**Date**	**Time**	**LAeq**	**L10**	**L50**	**L90**	**Lmax**	**Lmin**	**Lpeak**
N1	At the berm in front of a resident in Meerzorg, along East West Connection Road. There was a gutter between the fence of the resident and the berm. The meter was placed approx. 8 m away from the axis, approx. and 1.5 m above surface level.	28-Feb-24	2:34 AM	62.1	60.9	43.8	39.6	81.4	37.6	93.6
N2	At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	28-Feb-24	2:02 AM	51.2	53.0	39.8	37.0	69.1	34.4	86.7
N3	At the berm in front of a resident in Orleane Kreek, along the East West Connection Road. There was a gutter between terrain of the resident and the berm. The meter was placed approx. 6 m away from the axis, approx. and 1.5 m above surface level.	28-Feb-24	1:25 AM	61.2	56.7	42.7	41.3	84.5	40.1	97.0
N4	At the berm in front of a resident at Stolkertsijver, along the East West Connection Road. The meter was placed approx. 7 m away from the axis and 1.5 m above surface level.	28-Feb-24	12:44 AM	57.0	46.7	42.0	41.0	80.5	40.2	92.2
N5	Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road. There is a gutter between the measurement location and the berm. The meter was placed approx. 20 m away from the axis and 1.5 m above surface level.	27-Feb-24	11:52 PM	44.4	43.9	42.1	41.1	61.6	39.9	76.6
N6	At an open terrain at the corner of the Kapitein Chris Silosweg and Berhardlaan, at Moengo. The meter was placed approx. 5m away from the axis of the road and 1.5 m above surface level.	27-Feb-24	10:00 PM	54.7	55.7	47.5	45.5	77.1	44.0	88.1
N7	At a resident located in the community Kraboe Olo, along the Patamacca Road. The meter was placed approx. 40 m away from the axis and 1.5 m above surface level.	27-Feb-24	11:12 PM	40.9	42.8	40.2	37.0	53.6	36.6	73.1
N8	At a resident in the community Leewani, along the Patamacca Road. The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.	27-Feb-24	10:42 PM	43.1	39.9	35.7	34.6	63.3	33.7	81.2

Wind Beaufort scale			
#	**Description**	**Conditions**	**Wind speed**
0	Calm	Calm. Smoke rises vertically.	<0.3 m/s
1	Light air	Smoke drift indicates wind direction. Leaves and wind vanes are stationary.	0.3–1.5 m/s
2	Light breeze	Wind felt on exposed skin. Leaves rustle. Wind vanes begin to move.	1.5–3.3 m/s
3	Gentle breeze	Leaves and small twigs constantly moving, light flags extended.	3.3–5.5 m/s
4	Moderate breeze	Dust and loose paper raised. Small branches begin to move.	5.5–8 m/s
5	Fresh breeze	Branches of a moderate size move. Small trees in leaf begin to sway.	8–10.8 m/s
6	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic bins tip over.	10.8–13.9 m/s
7	High wind	Whole trees in motion. Effort needed to walk against the wind.	49.9–61.8 km/h

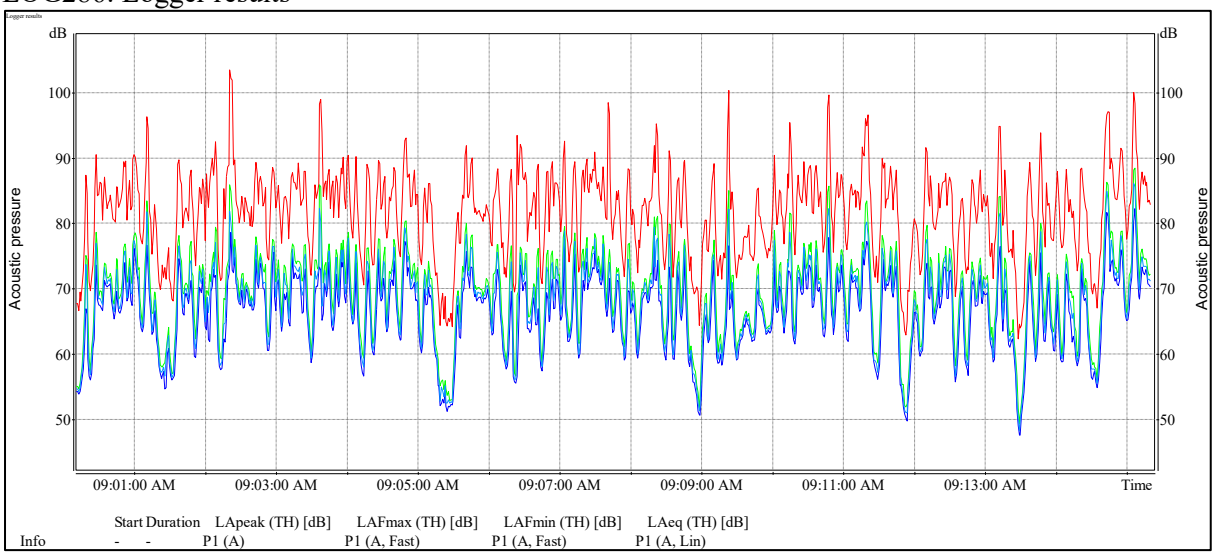
Appendix F: Noise log results

Daytime Distance Noise Measurements (N1-N8)
07.00 – 22:00 hrs.

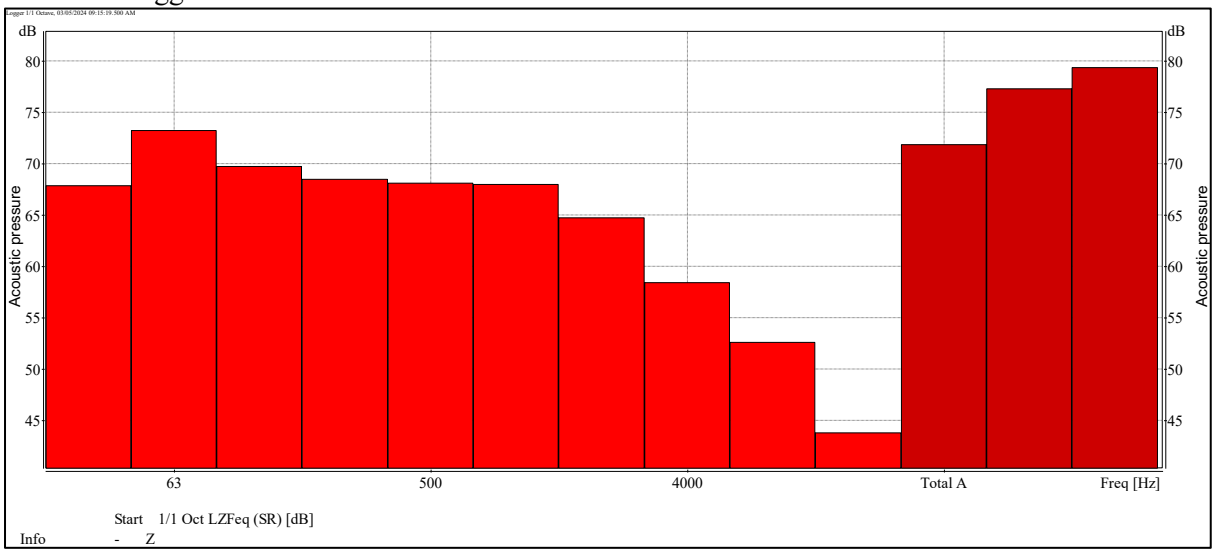
Location N1

Log number:	LOG286
Date:	5 March 2024
Time:	9:00 - 9:15 hrs. (15 min)
Description of the location:	At the berm in front of a resident in Meerzorg, along East West Connection Road. There was a gutter between the fence of the resident and the berm.
Observation during measurement:	Continuous noise of traffic. Noise of person walking; noise of claxon and noise of car with music passing by. Wind speed: 0.3–1.5 m/s (Light air) Wind direction: North-East
Position of the noise meter:	The meter was placed approx. 8 m away from the axis, approx. and 1.5 m above surface level.

LOG286: Logger results



LOG286: Logger 1/1 Octave



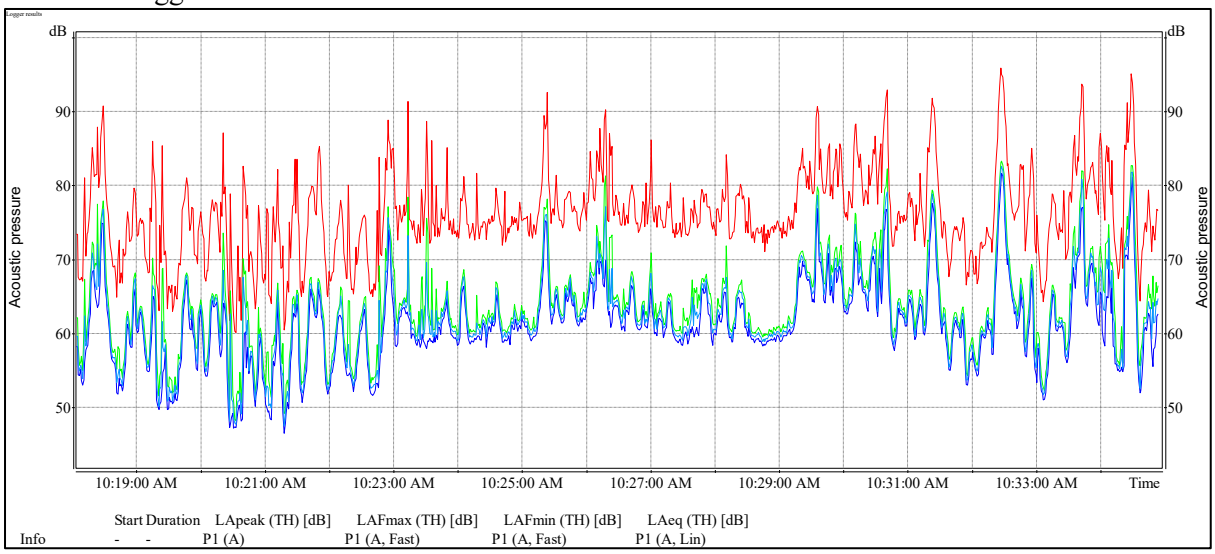
Causes of exceedance of the background level.

Nr.	Time	Cause
1	9:00 – 9:01 hrs.	Noise of car passing by (6x) and noise of moped passing by (3x).
2	9:01 – 9:02 hrs.	Noise of car passing by (3x); noise of light truck passing by (2x) and noise of moped passing by (1x).
3	9:02 – 9:03 hrs.	Noise of car passing by (12x); noise of light truck passing by (5x) and noise of moped passing by (3x).
4	9:03 – 9:04 hrs.	Noise of car passing by (16x); noise of light truck passing by (2x) and noise of moped passing by (2x).
5	9:04 – 9:05 hrs.	Noise of car passing by (10x); noise of heavy truck passing by(1x); noise of light truck passing by (1x) and noise of walking person.
6	9:05 – 9:06 hrs.	Noise of car passing by (10x); noise of claxon; noise of light truck passing by (2x) and noise of moped passing by (1x).
7	9:06 – 9:07 hrs.	Noise of car passing by (10x) and noise of moped passing by (4x).
8	9:07 – 9:08 hrs.	Noise of car passing by (7x); noise of light truck passing by and noise of moped passing by.
9	9:08 – 9:09 hrs.	Noise of car passing by (9x); noise of light truck passing by and noise of moped passing by (2x).
10	9:09 – 9:10 hrs.	Noise of car passing by (15x); noise of light truck passing by (2x) and noise of moped passing by (2x).
11	9:10 – 9:11 hrs.	Noise of bus passing by (2x); noise of car passing by (15x); car with loud music (1x) and noise of moped passing by (3x).
12	9:11 – 9:12 hrs.	Noise of bus passing by; noise of car passing by (10x); noise of heavy truck passing by; noise of light truck passing by and noise of moped passing by (4x).
13	9:12 – 9:13 hrs.	Noise of bus passing by (1x); noise of car passing by (16); noise of light truck passing by and noise of moped passing by (2x).
14	9:13 – 9:14 hrs.	Noise of car passing by (7x); noise of light truck passing by (2x) and noise of moped passing by (2x).
15	9:14 – 9:15 hrs.	Noise of car passing by (11x); noise of heavy truck passing by (2x); noise of light truck passing by (2x) and noise of moped passing by (3x).

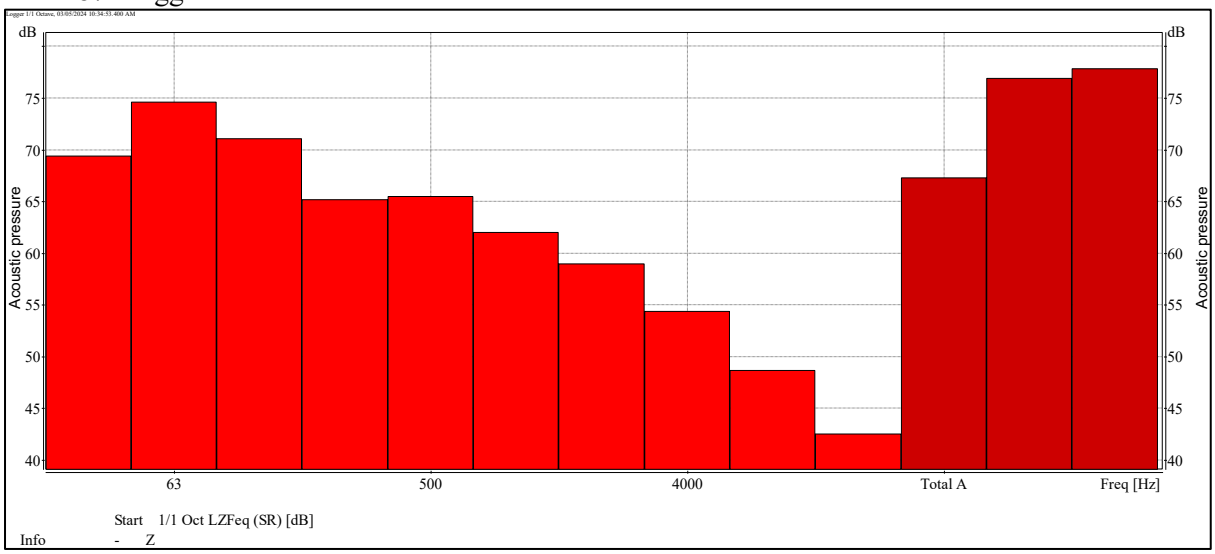
Location N2

Log number:	LOG287
Date:	5 March 2024
Time:	10:18 - 10:35 hrs. (17 min)
Description of the location:	At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road.
Observation during measurement:	Continuous noise of traffic. Noise of talking person across the street; noise of flying birds; car passing by with music; noise of heavy truck door closing; noise of stationary heavy truck; noise of heavy truck unloading; noise of claxon; noise of car alarm at distance and noise heavy truck reversing alarm. Wind speed: 0.3–1.5 m/s (Light air) Wind direction: North-East
Position of the noise meter:	The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.

LOG287: Logger results



LOG287: Logger 1/1 Octave



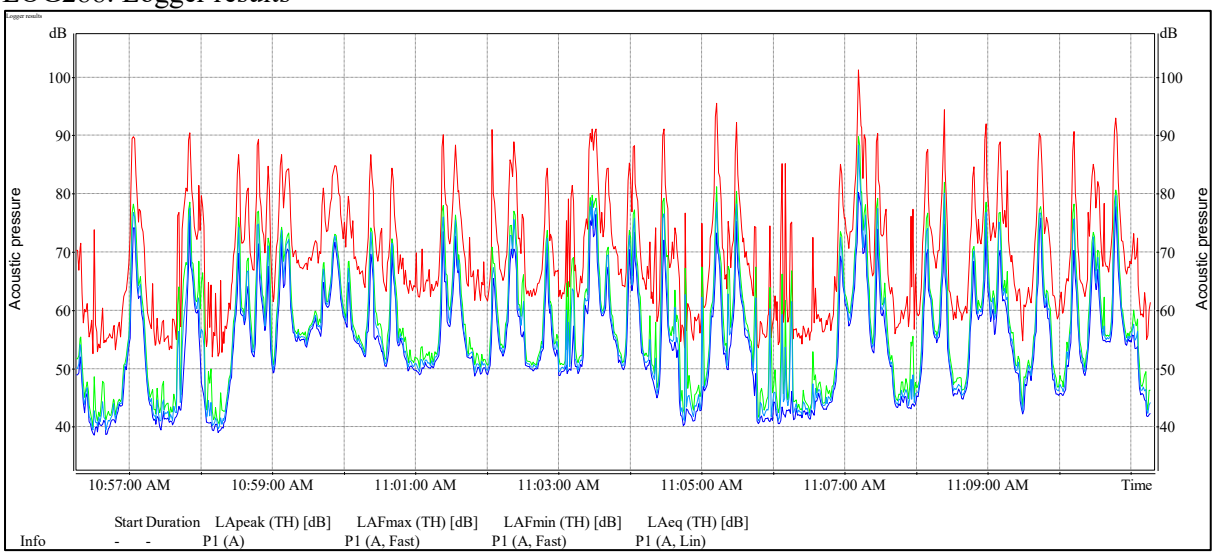
Causes of exceedance of the background level.

Nr.	Time	Cause
1	10:18 – 10:19 hrs.	Noise of bus passing by; noise of car passing by (4x) and noise of heavy truck passing by (3x).
2	10:19 – 10:20 hrs.	Noise of car passing by (5x); noise of people across the street talking.
3	10:20 – 10:21 hrs.	Noise of car passing by (7x); noise of birds flying and noise of people talking.
4	10:21 – 10:22 hrs.	Noise of birds chirping; noise of car passing by (5x); sound of car with music and noise of moped passing by.
5	10:22 – 10:23 hrs.	Noise of car passing by (7x); noise of heavy truck door closing and noise of heavy truck passing by.
6	10:23 – 10:24 hrs.	Noise of car passing by (4x); noise of claxon; noise of stationary heavy truck and noise of heavy truck unloading.
7	10:24 – 10:25 hrs.	Noise of car passing by (5x); noise of heavy truck passing by; noise of light truck passing by and noise of heavy truck unloading.
8	10:25 – 10:26 hrs.	Noise of car passing by (4x); noise of light truck passing by and noise of heavy truck unloading.
9	10:26 – 10:27 hrs.	Noise of bus passing by; noise of car passing by (8x); noise of claxon; noise of heavy truck passing by and noise of light truck passing by.
10	10:27 – 10:28 hrs.	Noise of heavy truck alarm at distance; noise of car passing by (5x) and noise of moped passing by.
11	10:28 – 10:29 hrs.	Noise of car passing by (8x); noise of container truck door closing; noise of light truck passing by and noise of moped passing by.
12	10:29 – 10:30 hrs.	Noise of bus passing by; noise of car passing by (10); noise of heavy truck passing by; noise of light truck passing by (2x) and noise of light truck with music passing by.
13	10:30 – 10:31 hrs.	Noise of car passing by (10); noise of heavy truck driving away; noise of heavy truck passing by (2x) and noise of moped passing by (2x).
14	10:31 – 10:32 hrs.	Noise of car passing by (7x); noise of heavy truck passing by and noise of light truck passing by (2x).
15	10:32 – 10:33 hrs.	Noise of car passing by (8x); noise of heavy truck passing by; noise of light truck passing by and noise of moped passing by (3x).
16	10:33 – 10:34 hrs.	Noise of bus passing by; noise of heavy truck passing by; noise of light truck passing by and noise of heavy truck reversing.
17	10:34 – 10:35 hrs.	Noise of car with music (1x) and noise of heavy truck passing by.

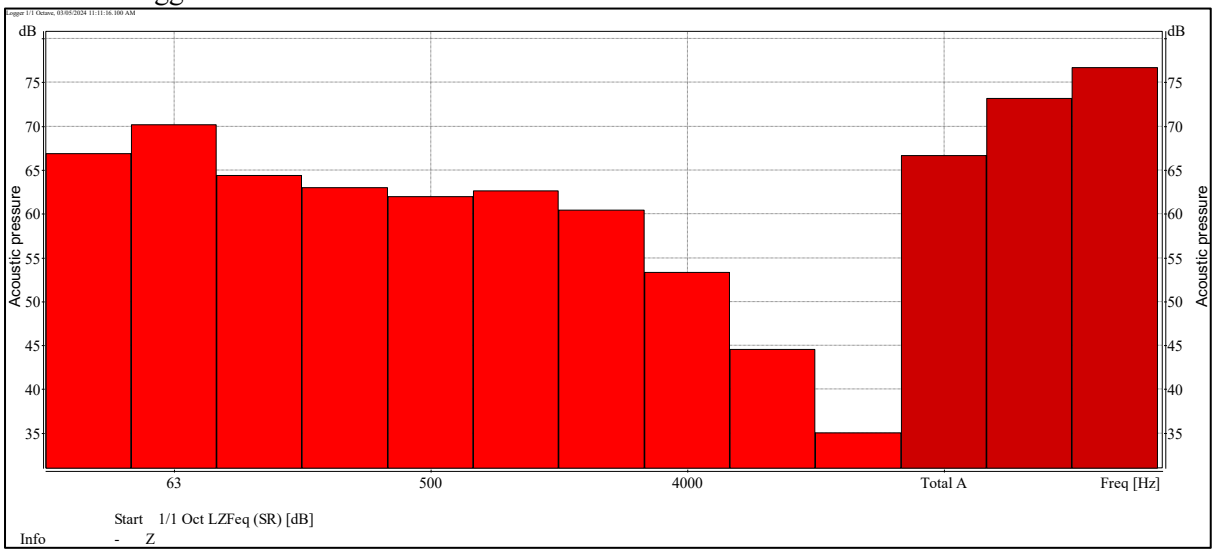
Location N3

Log number:	LOG288
Date:	5 March 2024
Time:	10:56 - 11:11 hrs. (15 min)
Description of the location:	At the berm in front of a resident in Orleane Kreek, along the East West Connection Road. There was a gutter between terrain of the resident and the berm.
Observation during measurement:	Continuous noise of traffic. Occasional noise of birds chirping; noise of dog barking; noise of person talking; noise of stationary light truck; noise of birds flying; noise of light truck door closing and driving away; noise of leaves rustlings by the wind and noise of rattling sound from heavy truck. Wind speed: 1.5–3.3 m/s (Light breeze) Wind direction: North-East
Position of the noise meter:	The meter was placed approx. 6 m away from the axis, approx. and 1.5 m above surface level.

LOG288: Logger results



LOG288: Logger 1/1 Octave



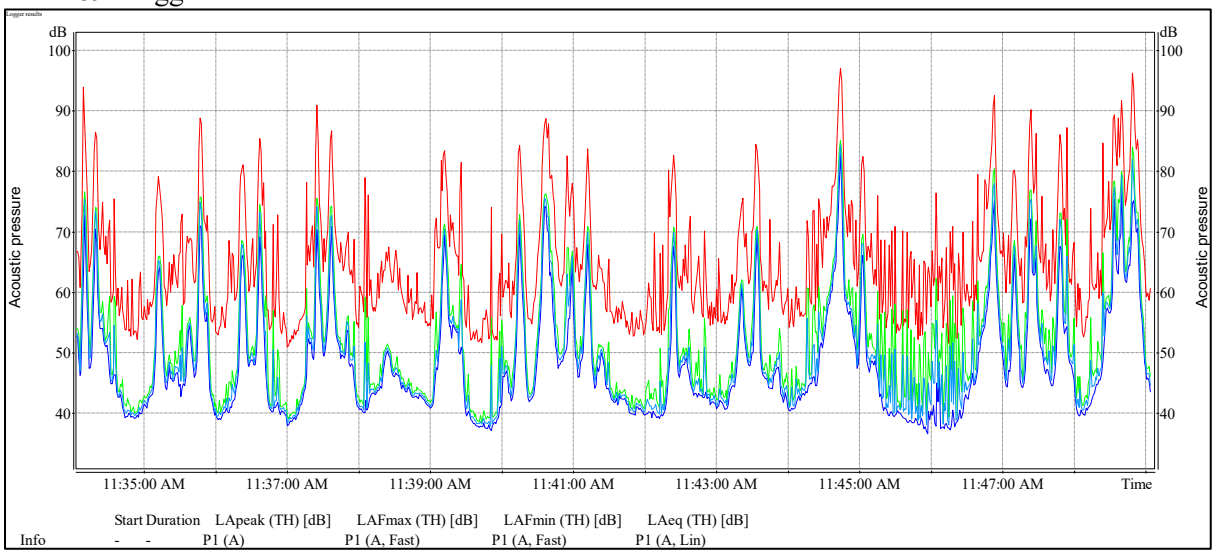
Causes of exceedance of the background level.

Nr.	Time	Cause
1	10:56 – 10:57 hrs.	Noise of car passing by (2x).
2	10:57 – 10:58 hrs.	Noise of birds chirping; noise of car passing by (3x) and noise of dogs barking.
3	10:58 – 10:59 hrs.	Noise of birds chirping; noise of car passing by (2x); noise of container truck passing by; noise dogs barking; noise of light truck passing by and noise of moped passing by.
4	10:59 – 11:00 hrs.	Noise of car passing by (2x) and noise of light truck passing by
5	11:00 – 11:01 hrs.	Noise of car passing by (3x) and noise of light truck passing by, noise of people talking loudly.
6	11:01 – 11:02 hrs.	Noise of car passing by; noise of stationary light truck and noise of light truck passing by (2x).
7	11:02 – 11:03 hrs.	Noise of car passing by (4x); noise birds chirping; noise of birds flying and noise of a person talking.
8	11:03 – 11:04 hrs.	Noise of birds chirping; noise of bus passing by; noise of car passing by (3x); noise of light truck passing by (3x); noise of truck door closing and driving away; noise of a person speaking loudly and noise of moped passing by.
9	11:04 – 11:05 hrs.	Noise of birds chirping; noise of car passing by and noise of a person speaking loudly.
10	11:05 – 11:06 hrs.	Noise of birds chirping; noise of light truck passing by and noise of moped passing by.
11	11:06 – 11:07 hrs.	Noise of birds chirping and noise of car passing by.
12	11:07 – 11:08 hrs.	Noise of bus passing by; noise of car passing by (3x); noise of claxon; noise of leaves rustling by the wind and noise of light truck passing by.
13	11:08 – 11:09 hrs.	Noise of birds chirping; noise of car passing by (2x); noise of claxon; noise of leaves whistling by the wind and noise of light truck passing by.
14	11:09 – 11:10 hrs.	Noise of birds chirping; noise of car passing by (3x); noise of leaves rustling by the wind and noise of light truck passing by.
15	11:10 – 11:11 hrs.	Noise of car passing by (2); noise of bus passing by; noise of heavy truck passing by; noise of light truck passing by and rattling sound of heavy truck.

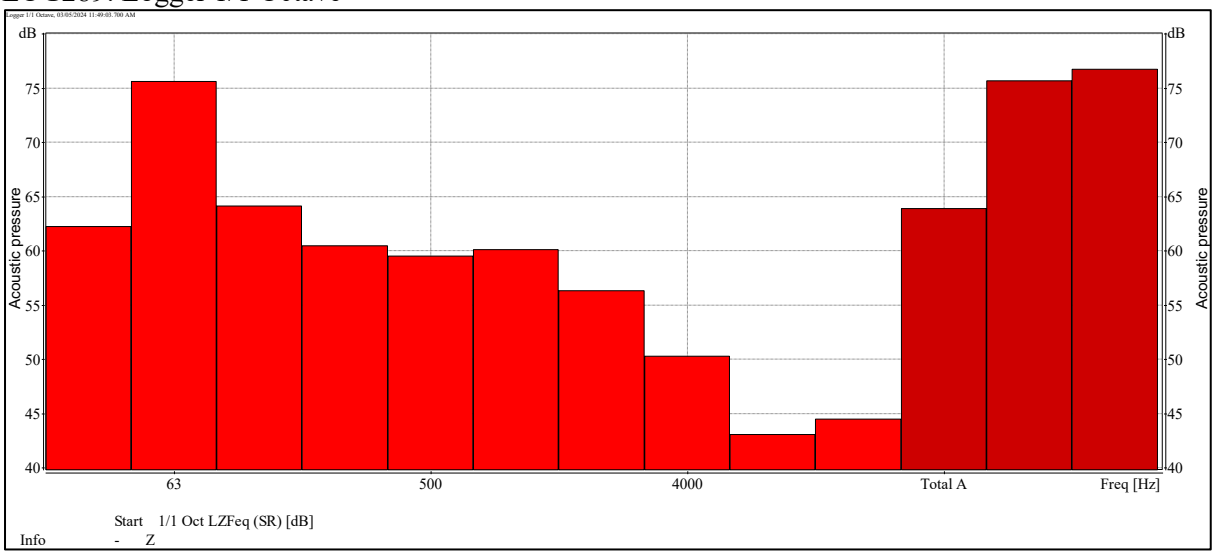
Location N4

Log number:	LOG289
Date:	5 March 2024
Time:	11:34 - 11:49 hrs. (15 min)
Description of the location:	At the berm in front of a resident at Stolkertsijver, along the East West Connection Road.
Observation during measurement:	Continuous noise of traffic. Occasional noise of leaves rustling by the wind; noise of chicken; noise of birds chirping and noise of object at resident house. Wind speed: 1.5–3.3 m/s (Light breeze) Wind direction: North-East
Position of the noise meter:	The meter was placed approx. 7 m away from the axis and 1.5 m above surface level.

LOG289: Logger results



LOG289: Logger 1/1 Octave



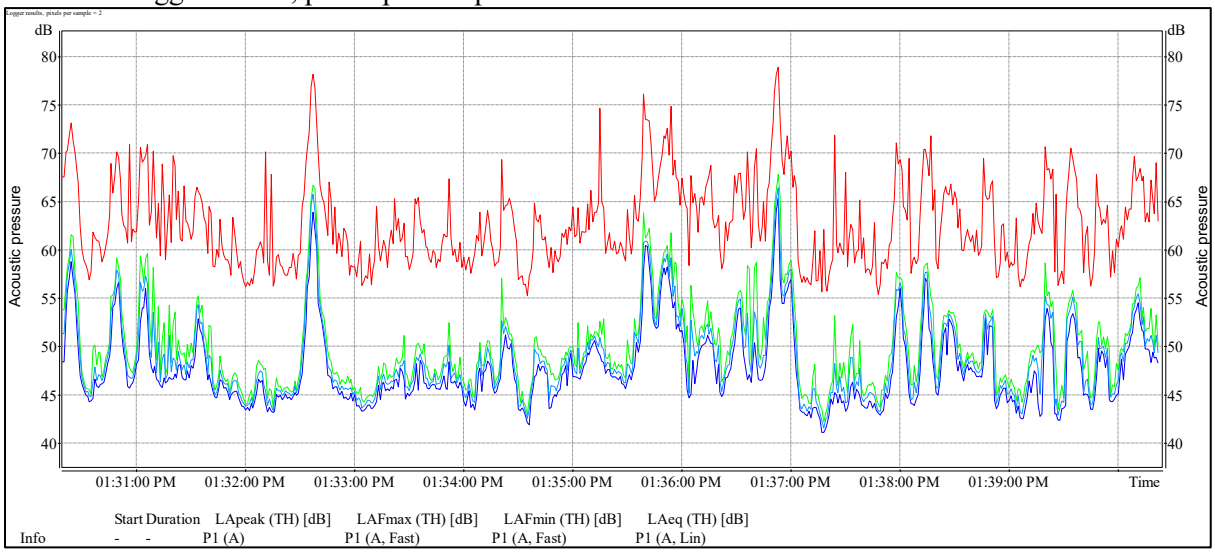
Causes of exceedance of the background level.

Nr.	Time	Cause
1	11:34 – 11:35 hrs.	Noise of car passing by (2x).
2	11:35 – 11:36 hrs.	Noise of car passing by (2x).
3	11:36 – 11:37 hrs.	Noise of car passing by (2x) and noise of leaves rustling by the wind.
4	11:37 – 11:38 hrs.	Noise of car passing by (3x).
5	11:38 – 11:38 hrs.	Noise of car passing by (2x) and noise of leaves rustling by the wind.
6	11:39 – 11:40 hrs.	Noise of bus passing by (1x).
7	11:40 – 11:41 hrs.	Noise of car passing by (2x); noise of chicken and noise of heavy truck passing by (1x).
8	11:41 – 11:42 hrs.	Noise of leaves rustling by the wind and noise of light truck passing by (1x).
9	11:42 – 11:43 hrs.	Noise of car passing by (1x).
10	11:43 – 11:44 hrs.	Noise of birds chirping and noise of car passing by (2x).
11	11:44 – 11:45 hrs.	Noise of birds chirping; noise of car passing by and noise of heavy truck passing by (1x).
12	11:45 – 11:46 hrs.	Noise of car passing by (1x) and noise of object at resident's house.
13	11:46 – 11:47 hrs.	Noise of heavy truck passing by (1x).
14	11:47 – 11:48 hrs.	Noise of car passing by (4x); noise of object at resident's house and noise of turkey.
15	11:48 – 11:49 hrs.	Noise of car passing by (2x); noise of heavy truck passing by (2x) and noise of turkey.

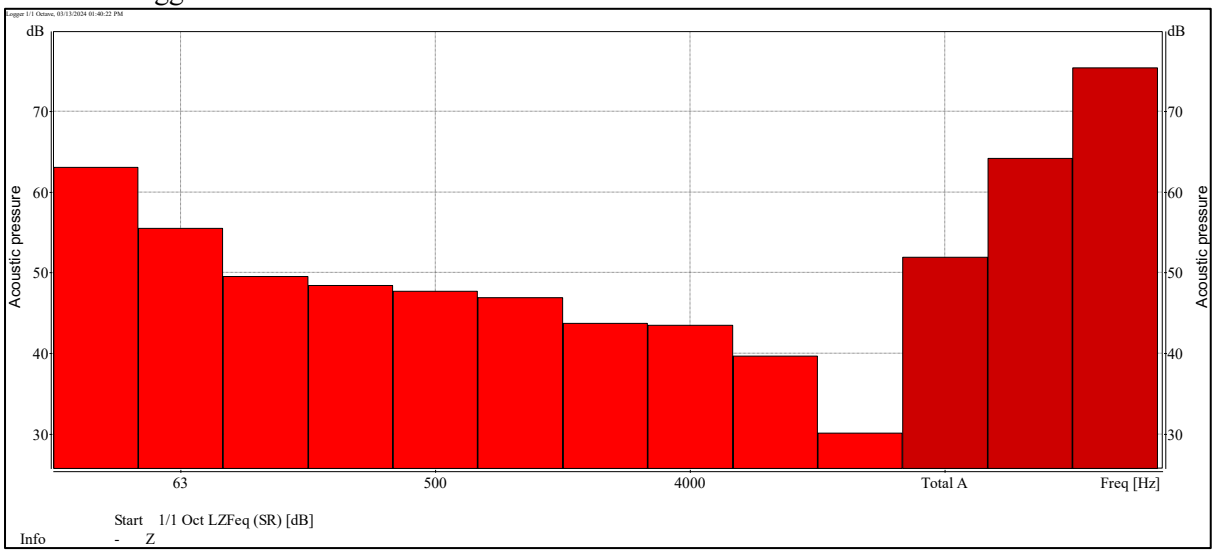
Location N5

Log number:	LOG299
Date:	13 March 2024
Time:	13:30 - 13:40 hrs. (10 min)
Description of the location:	Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road. There is a gutter between the measurement location and the berm.
Observation during measurement:	Continuous noise of traffic. Frequent noise of crickets and insects. Occasional noise of person yelling; noise of person talking; noise of vehicle engine at distance and noise of leaves rustling by the wind. Wind speed: 1.5–3.3 m/s (Light breeze) Wind direction: North-East
Position of the noise meter:	The meter was placed approx. 20 m away from the axis and 1.5 m above surface level.

LOG299: Logger results, pixels per sample = 2



LOG299: Logger 1/1 Octave



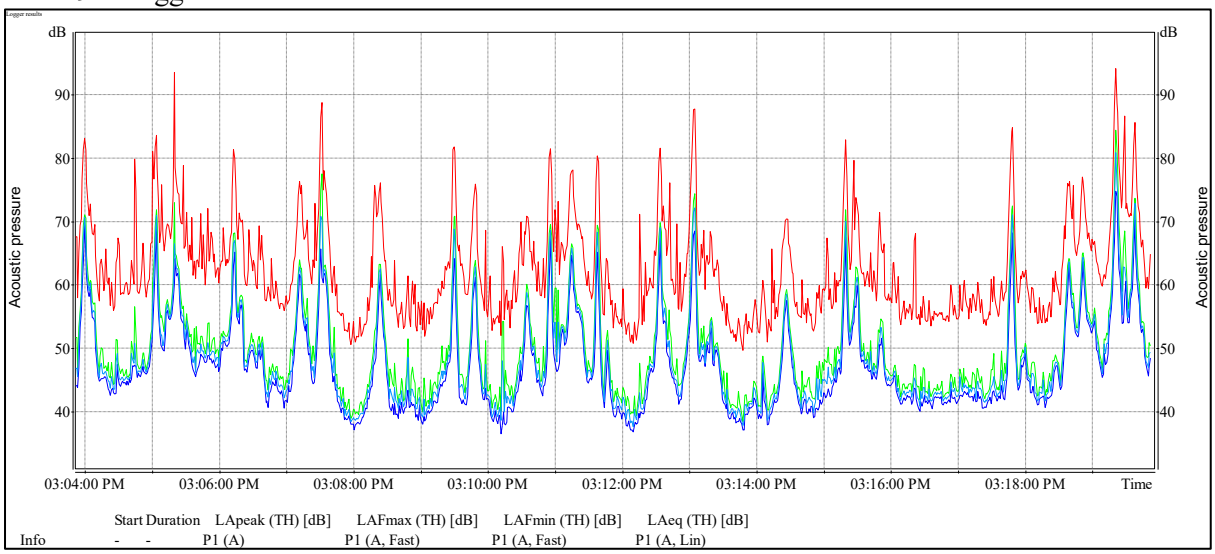
Causes of exceedance of the background level.

Nr.	Time	Cause
1	13:30 - 13:40 hrs.	Frequent noise of crickets and insects)
2	13:30 – 13:31 hrs.	Noise of car passing by (1x) and noise of person yelling.
3	13:31 – 13:32 hrs.	Noise of bus passing by (1x) and noise of car passing by (1x).
4	13:32 – 13:33 hrs.	Noise of car passing by (2x) and noise of heavy truck passing by (1x).
5	13:33 – 13:34 hrs.	Noise of car passing by (1x) and noise of person yelling.
6	13:35 – 13:36 hrs.	Noise of car passing by (6x) and noise of person talking.
7	13:36 – 13:37 hrs.	Noise of car passing by (1x); noise of light truck passing by (1x) and noise of person talking.
8	13:37 – 13:38 hrs.	Noise of car passing by (1x).
9	13:38 – 13:39 hrs.	Noise of car passing by (2x); noise of car passing by at distance (1x); noise of insect.
10	13:39 – 13:40 hrs.	Noise of insects; noise of vehicle engine at distance; noise of people jogging.
11	13:40 – 13:41 hrs.	Noise of car passing by (1x); noise of insects; noise of leaves rustling by the wind.
Note: Measurement was postponed due to rainfall.		

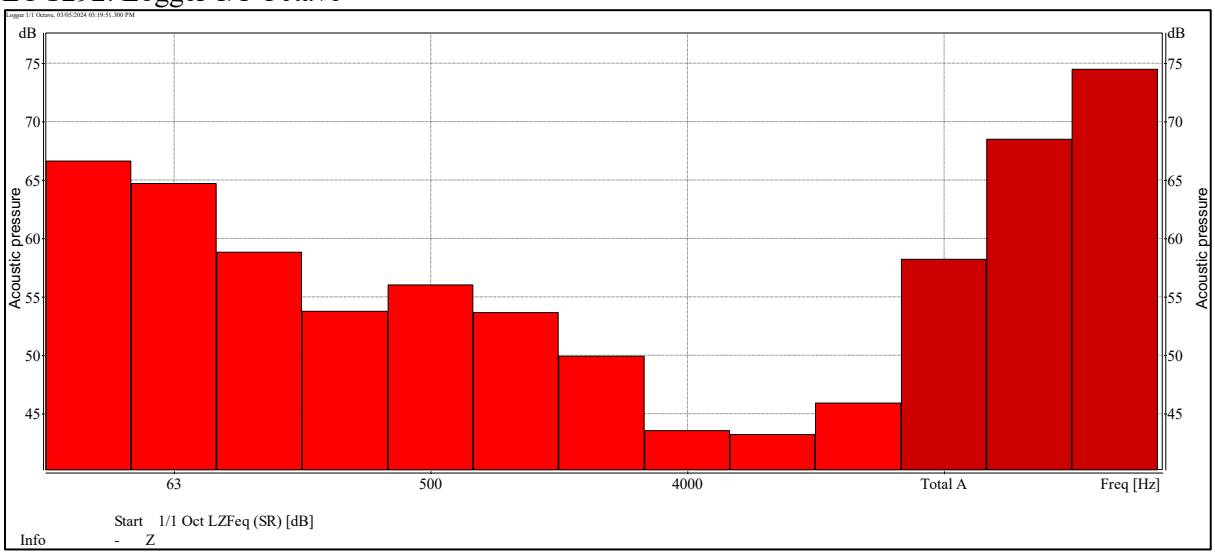
Location N6

Log number:	LOG292
Date:	5 March 2024
Time:	15:03 - 15:20 hrs. (17 min)
Description of the location:	At an open terrain at the corner of the Kapitein Chris Silosweg and Berhardlaan, at Moengo.
Observation during measurement:	Continuous noise of traffic. Occasional noise of bird chirping; noise of person talking at distance; noise of car alarm; noise of yelling child at distance and noise of claxon at distance. Wind speed: 0.3–1.5 m/s (Light air) Wind direction: North-East
Position of the noise meter:	The meter was placed approx. 5m away from the axis of the road and 1.5 m above surface level.

LOG292: Logger results



LOG292: Logger 1/1 Octave



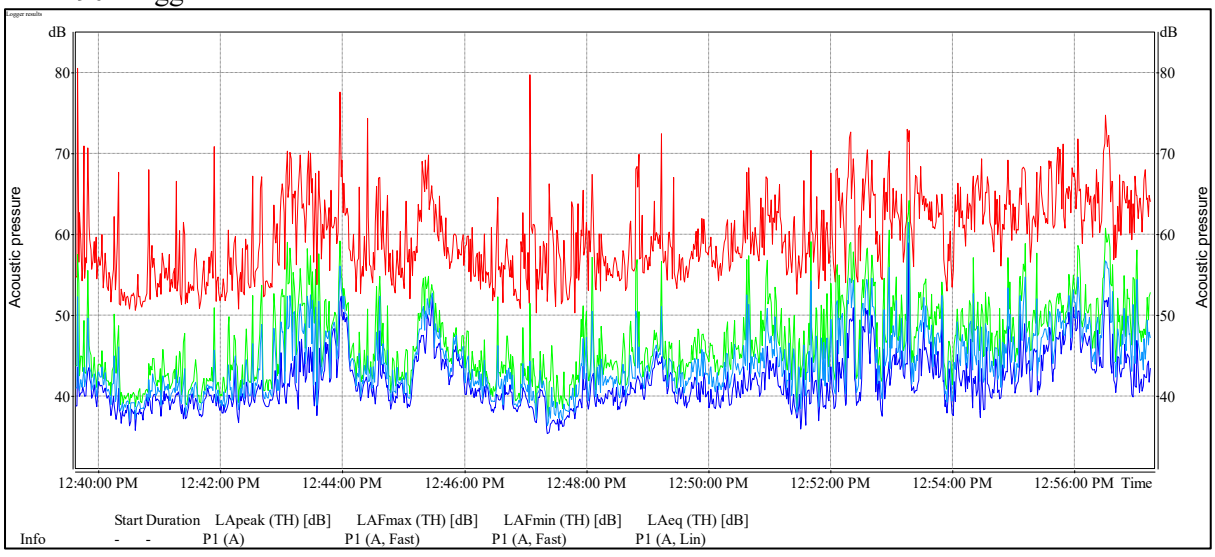
Causes of exceedance of the background level.

Nr.	Time	Cause
1	15:03 – 15:04 hrs.	Noise of light truck passing by (1x).
2	15:04 – 15:05 hrs.	Noise of car passing by (5x).
3	15:05 – 15:06 hrs.	Noise of bird chirping and noise of car passing by (2x).
4	15:06 – 15:07 hrs.	Noise of bird chirping; noise of car passing by (2x) and noise of people in distance.
5	15:07 – 15:08 hrs.	Noise of bike passing by (1x); noise of car passing by (1x); noise of car alarm; noise of light truck passing by (1x) and noise of person talking.
6	15:08 – 15:09 hrs.	Noise of car passing by (1x) and noise of people talking.
7	15:09 – 15:10 hrs.	Noise of car passing by (2x); noise pedestrian and noise of child at distance yelling.
8	15:10 – 15:11 hrs.	Noise of car passing by (2x) and noise of claxon at distance.
9	15:11 – 15:12 hrs.	Noise of car passing by (2x) and noise of car with music.
10	15:12 – 15:13 hrs.	Noise of car passing by (1x) and noise of claxon at distance.
11	15:13 – 15:14 hrs.	Noise of light truck passing by (1x).
12	15:14 – 15:15 hrs.	Noise of car passing by (1x) and noise of people talking.
13	15:15 – 15:16 hrs.	Noise of bike passing (1x); noise of car passing by (3x) and noise of child in distance yelling.
14	15:16 – 15:17 hrs.	Noise of claxon at distance and noise of person in distance talking.
15	15:17 – 15:18 hrs.	Noise of car passing by (1x)
16	15:18 – 15:19 hrs.	Noise of car passing by (3x); noise of claxon at distance and noise of child at distance yelling.
17	15:19 – 15:20 hrs.	Noise of heavy truck passing by (1x) and noise of light truck passing by (1x).

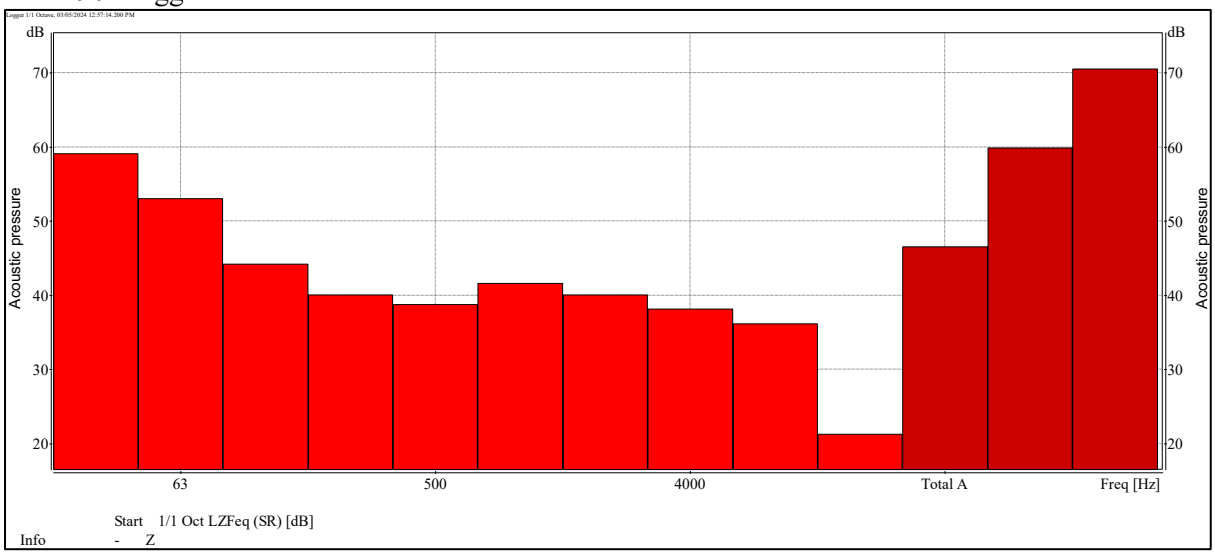
Location N7

Log number:	LOG290
Date:	5 March 2024
Time:	12:39 - 12:57 hrs. (18 min)
Description of the location:	At a resident located in the community Kraboe Olo, along the Patamacca Road.
Observation during measurement:	Continuous noise of television. Frequent noise of children talking. Occasional noise of chicken; noise of hammering at distance; noise of people walking at distance; noise of leaves rustling by the wind and noise of children ticking. Wind speed: 1.5–3.3 m/s (Light breeze) Wind direction: North-East
Position of the noise meter:	The meter was placed approx. 40 m away from the axis and 1.5 m above surface level.

LOG290: Logger results



LOG290: Logger 1/1 Octave



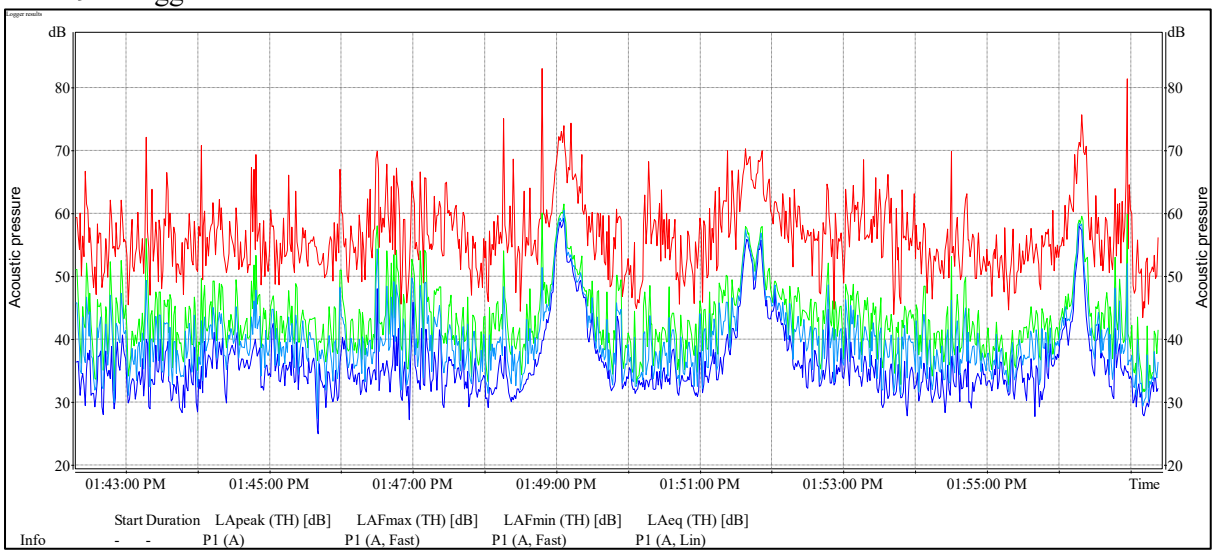
Causes of exceedance of the background level.

Nr.	Time	Cause
1	12:39 - 12:57 hrs.	Continues noise of TV from resident
2	12:39 – 12:40 hrs.	Noise of car passing by; noise of chicken; noise of claxon and noise of TV from resident.
3	12:40 – 12:41 hrs.	Noise of hammering at distance.
4	12:41 – 12:42 hrs.	Noise of children walking and talking.
5	12:42 – 12:43 hrs.	Noise of children walking and talking.
6	12:43 – 12:44 hrs.	Noise of chicken; noise of light truck passing by (1x) and noise of children walking and talking.
7	12:44 – 12:45 hrs.	Noise of children talking at bus stop and noise of people talking.
8	12:45 – 12:46 hrs.	Noise of light truck passing by (1x).
9	12:46 – 12:47 hrs.	Noise of children talking at bus stop.
10	12:47 – 12:48 hrs.	Noise of children talking at bus stop.
11	12:48 – 12:49 hrs.	Noise of leaves rustling by the wind and noise of people talking.
12	12:49 – 12:50 hrs.	Noise of leaves rustling by the wind and noise of people talking.
13	12:50 – 12:51 hrs.	Noise of children talking at bus stop and noise of children yelling.
14	12:51 – 12:52 hrs.	Noise of children talking at bus stop and noise of children yelling.
15	12:52 – 12:53 hrs.	Noise of children talking at bus stop and noise of children yelling.
16	12:53 – 12:54 hrs.	Noise of chicken; noise of children making ticking; noise of leaves rustling by the wind and noise of person from resident.
17	12:54 – 12:55 hrs.	Noise of chicken; noise of children making ticking; noise of leaves rustling by the wind and noise of person at resident talking.
18	12:54 – 12:55 hrs.	Noise of chicken; noise of children ticking; noise of leaves rustling by the wind and noise of person at resident talking.
19	12:55 – 12:56 hrs.	Noise of chicken; noise of children ticking; noise of leaves rustling by the wind and noise of person at resident talking.
20	12:56 – 12:57 hrs.	Noise of light truck passing by; noise of person talking; drizzling of rain drops started and measurement stopped.

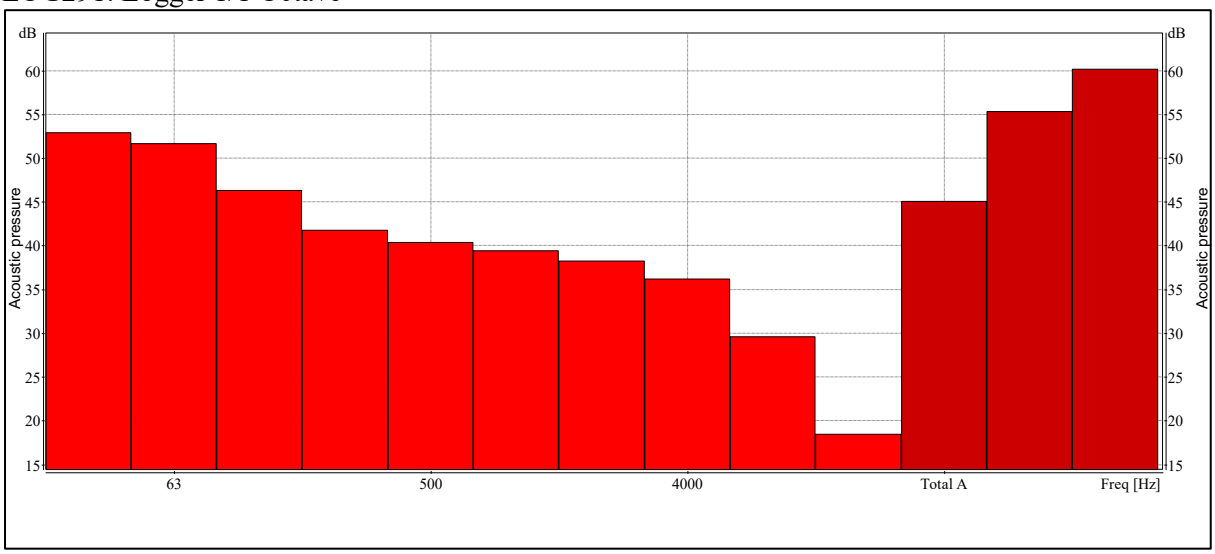
Location N8

Log number:	LOG291
Date:	5 March 2024
Time:	13:42 - 13:57 hrs. (15 min)
Description of the location:	At a resident in the community Leewani, along the Patamacca Road.
Observation during measurement:	Frequent noise of birds chirping; noise of person talking; noise of person yelling; noise of bus passing by; noise of light truck passing by and noise of car passing by. Wind speed: 0.3–1.5 m/s (Light air) Wind direction: North-East
Position of the noise meter:	The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.

LOG291: Logger results



LOG291: Logger 1/1 Octave



Causes of exceedance of the background level.

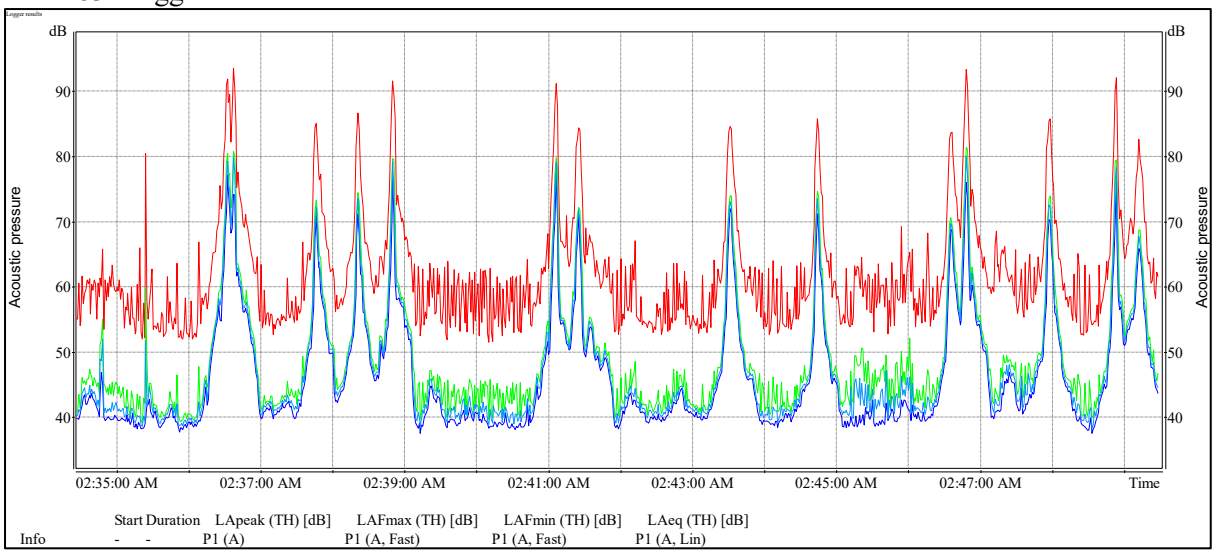
Nr.	Time	Cause
1	13:42 - 13:57 hrs.	Noise of chainsaw at distance
2	13:42 – 13:43 hrs.	Noice of birds chirping and noise of talking person.
3	13:43 – 13:44 hrs.	Noice of birds chirping and noise of talking person.
4	13:44 – 13:45 hrs.	Noice of birds chirping and noise of talking person.
5	13:45 – 13:46 hrs.	Noice of birds chirping and noise of talking person.
6	13:46 – 13:47 hrs.	Noice of birds chirping and noise of talking person.
7	13:47 – 13:48 hrs.	Noice of birds chirping and noise of talking person.
8	13:48 – 13:49 hrs.	Noise of person yelling.
9	13:49 – 13:50 hrs.	Noise of bus passing by (1x).
12	13:51 – 13:52 hrs.	Noise of bus passing by (1x) and noise of light truck passing by (1x).
15	13:54 – 13:55 hrs.	Noise of person yelling.
17	13:56 – 13:57 hrs.	Noise of car passing by (1x) and noise of person yelling.

Nighttime Baseline Noise Measurements (N1-N8)
22:00 – 07:00 hrs.

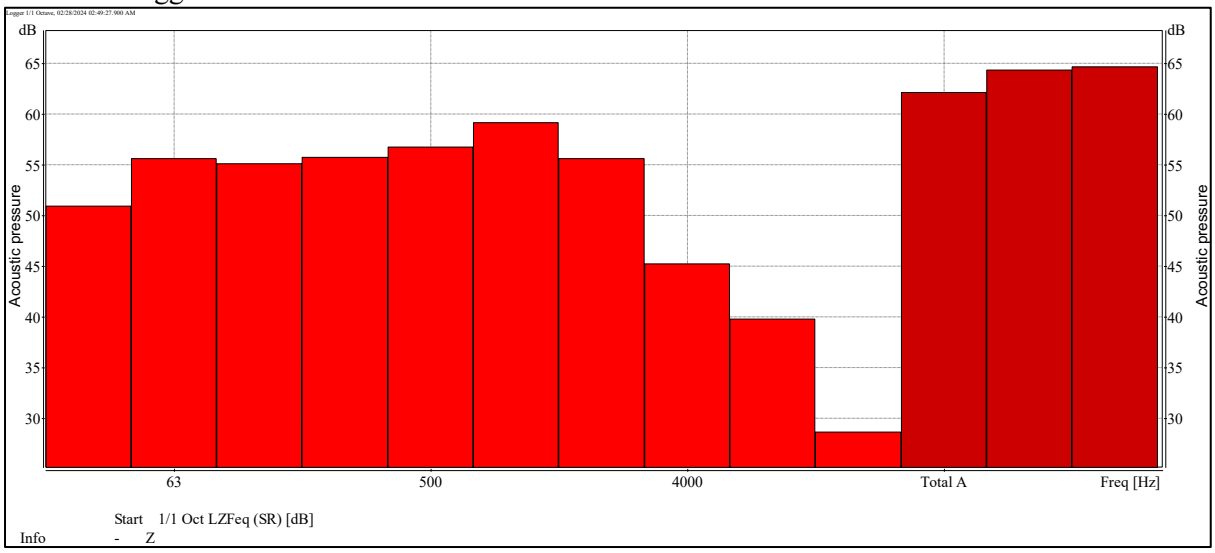
Location N1

Log number:	Log 283
Date:	28 February 2024
Time:	02:34 - 02:49 hrs. (15 min.)
Description of the location:	At the berm in front of a resident in Meerzorg, along the East West Connection Road. There was a gutter between the fence of the resident and the berm.
Observation during measurement:	Continuous noise of insects. Frequent noise of traffic passing by. Wind speed: <0.3 m/s (Calm) Wind direction: -
Position of the noise meter:	The meter was placed approx. 8 m away from the axis, approx. and 1.5 m above surface level.

LOG283: Logger results



LOG283: Logger 1/1 Octave



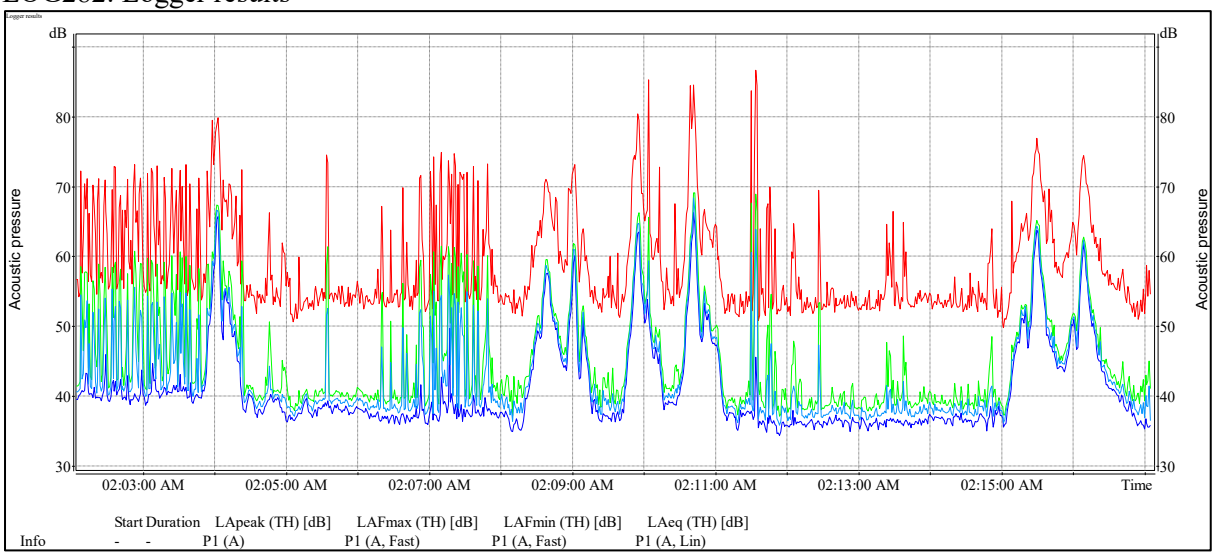
Causes of exceedance of the background level.

Nr.	Time	Cause
1	02:34 – 02:49 hrs.	Continuous noise of insects.
2	02:36 – 02:37 hrs.	Noise of car passing by (3x)
3	02:37 – 02:38 hrs.	Noise of car passing by (1x)
4	02:38 hrs.	Noise of car passing by (2x)
5	02:41 hrs.	Noise of light truck (1x) and noise of car passing by (1x)
6	02:43 hrs.	Noise of light truck (1x) and noise of car passing by (1x)
7	02:44 hrs.	Noise of heavy truck (1x)
8	02:46 – 02:47 hrs.	Noise of moped passing by (2x) and noise of car passing by (1x)
9	02:47 – 02:48 hrs.	Noise of car passing by (1x)
10	02:48 – 02:49 hrs.	Noise of car passing by (1x)
11	02:49 – 02:50 hrs.	Noise of car passing by (1x)

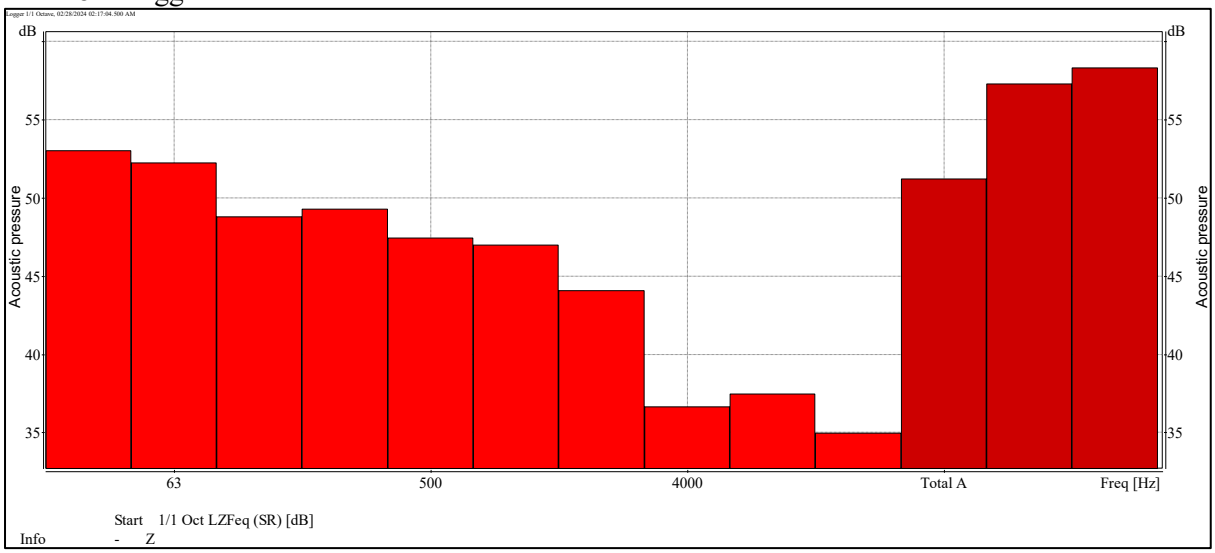
Location N2

Log number:	LOG282
Date:	28 February 2024
Time:	02:02 – 02:17 hrs. (15 min)
Description of the location:	At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road.
Observation during measurement:	Frequent noise of traffic passing by. Occasional noise of coughing person and car passing by with music. Wind speed: <0.3 m/s (Calm) Wind direction: -
Position of the noise meter:	The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.

LOG282: Logger results



LOG282: Logger 1/1 Octave



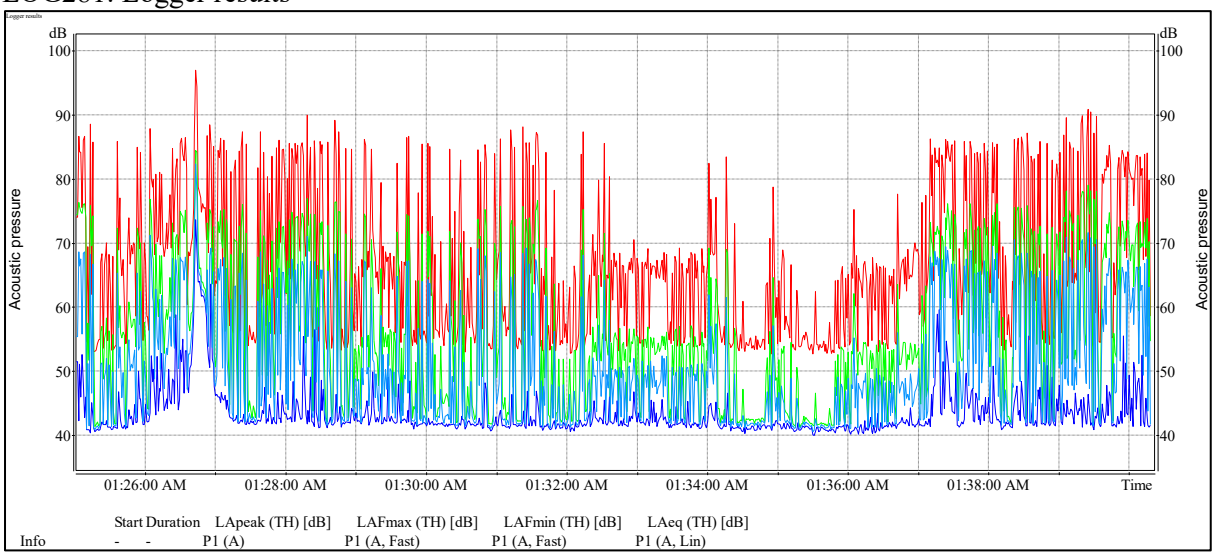
Causes of exceedance of the background level.

Nr.	Time	Cause
1	02:04 hrs.	Noise of light truck passing by (1x)
2	02:08 hrs.	Noise of coughing person and noise of car passing by (1x)
3	02:09 hrs.	Noise of car passing by (1x)
4	02:10 hrs.	Noise of car passing by with music (1x) and noise of car passing by (1x).
5	02:11 hrs.	Noise of coughing person
6	02:15 hrs.	Noise of car passing by (1x)
7	02:16 hrs.	Noise of car passing by (1x)

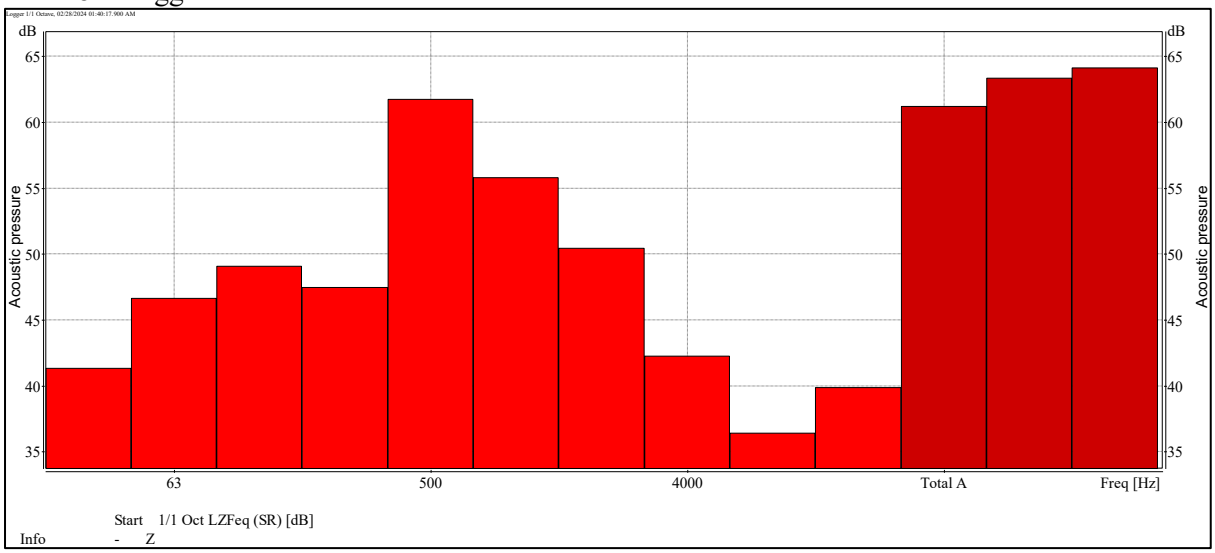
Location N3

Log number:	LOG281
Date:	28 February 2024
Time:	01:25 – 01:40 hrs. (15 min)
Description of the location:	At the berm in front of a resident in Orleane Kreek, along the East West Connection Road. There was a gutter between terrain of the resident and the berm.
Observation during measurement:	Frequent noise of dogs barking. Noise of howler monkeys. Noise of car passing by. Wind speed: - Wind direction: -
Position of the noise meter:	The meter was placed approx. 6 m away from the axis, approx. and 1.5 m above surface level.

LOG281: Logger results



LOG281: Logger 1/1 Octave



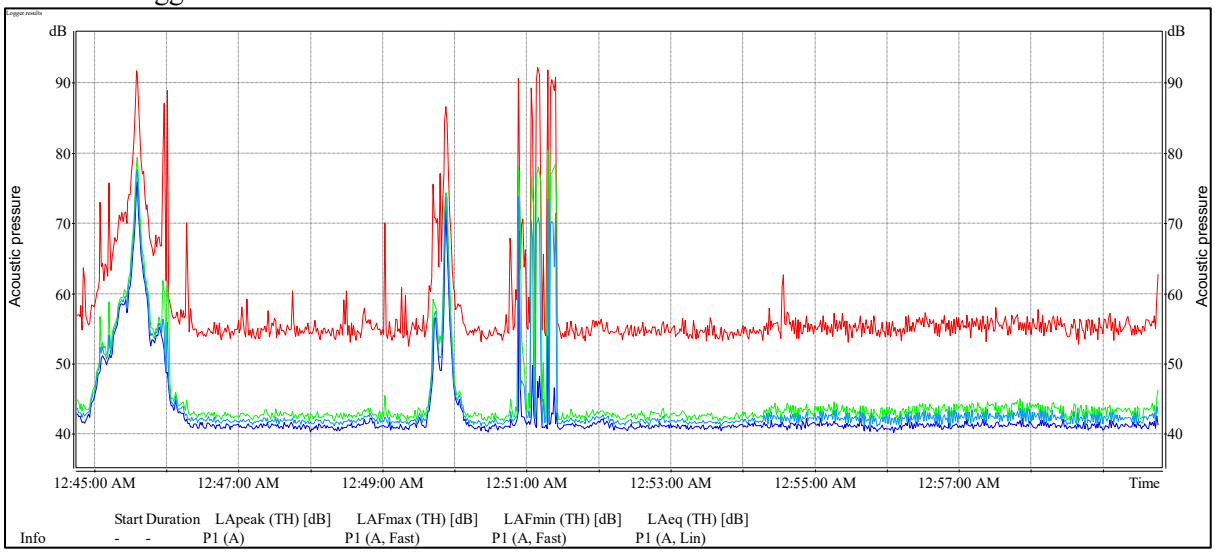
Causes of exceedance of the background level.

Nr.	Time	Cause
1	01:25 – 01:40 hrs.	Frequent noise of dog barking
2	01:25 – 01:26 hrs.	Noise of car passing by (1x)
3	01:32 hrs.	Noise of howler monkey

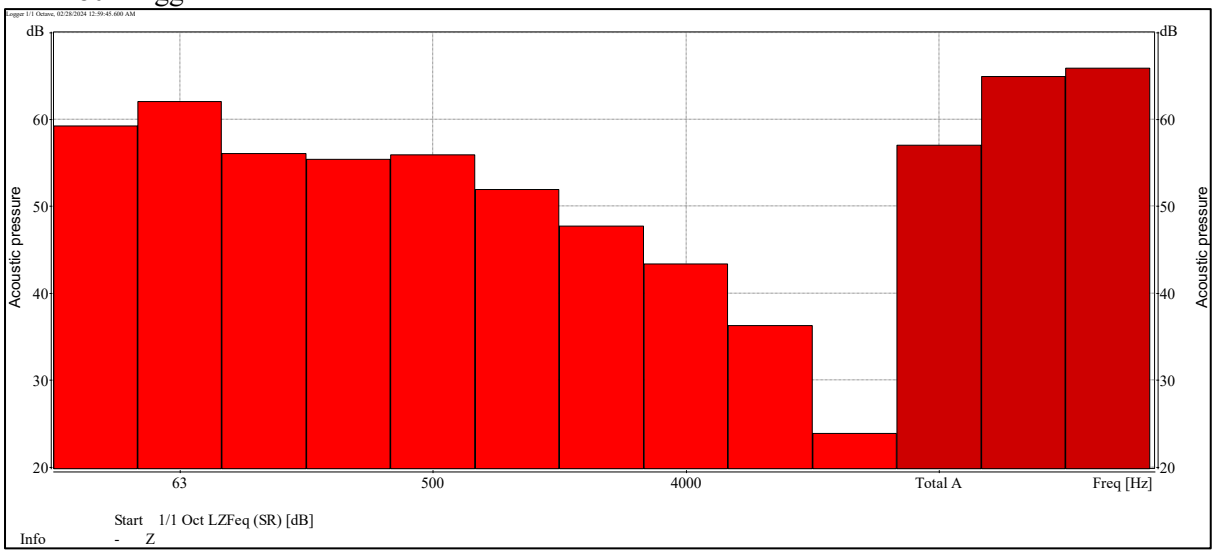
Location N4

Log number:	LOG280
Date:	28 February 2024
Time:	00:44 – 00:59 hrs. (15 min)
Description of the location:	At the berm in front of a resident at Stolkertsijver, along the East West Connection Road.
Observation during measurement:	Continuous noise of insect. Noise of barking dog. Noise of traffic passing by. Wind speed: <0.3 m/s (Calm) Wind direction: -
Position of the noise meter:	The meter was placed approx. 7 m away from the axis and 1.5 m above surface level.

LOG280: Logger results



LOG280: Logger 1/1 Octave



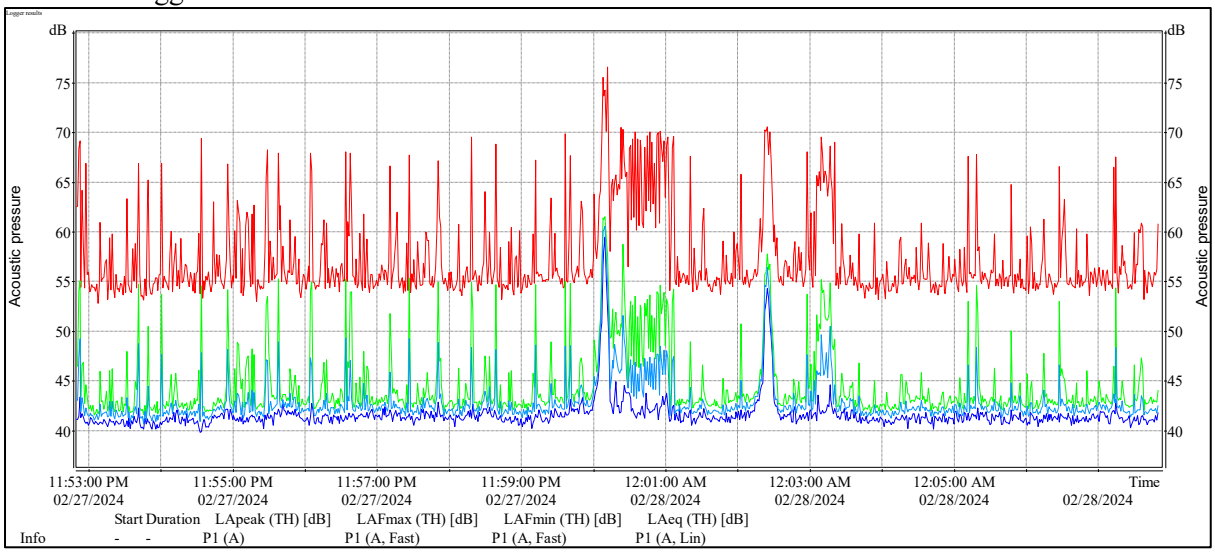
Causes of exceedance of the background level.

Nr.	Time	Cause
1	00:44 – 00:59 hrs.	Continuous noise of insects
2	00:44 – 00:45 hrs.	Noise of heavy truck passing by (1x)
3	00:49 hrs.	Noise of car passing by (1x)
4	00:51 hrs.	Noise of barking dog (1x)

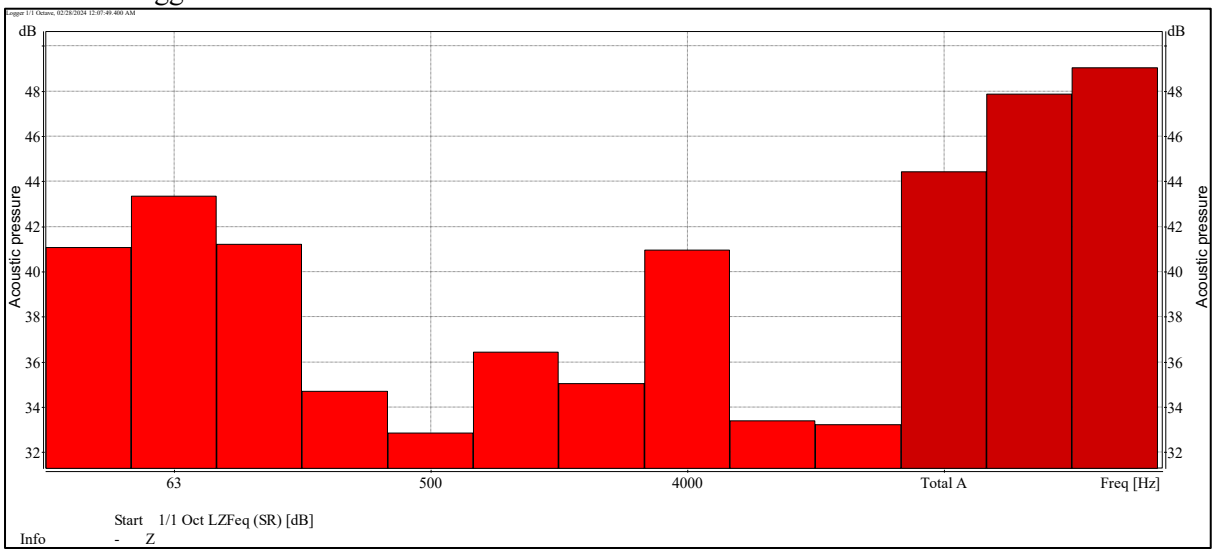
Location N5

Log number:	LOG279
Date:	27 February 2024
Time:	23:53 –00:08 hrs. (15 min)
Description of the location:	Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road. There is a gutter between the measurement location and the berm.
Observation during measurement:	Continuous noise of frogs and insects. Noise of traffic passing by and noise of coughing person and noise of barking dog at distance and noise of car passing by with music. Wind speed: <0.3 m/s (Calm) Wind direction: -
Position of the noise meter:	The meter was placed approx. 20 m away from the axis and 1.5 m above surface level.

LOG279: Logger results



LOG279: Logger 1/1 Octave



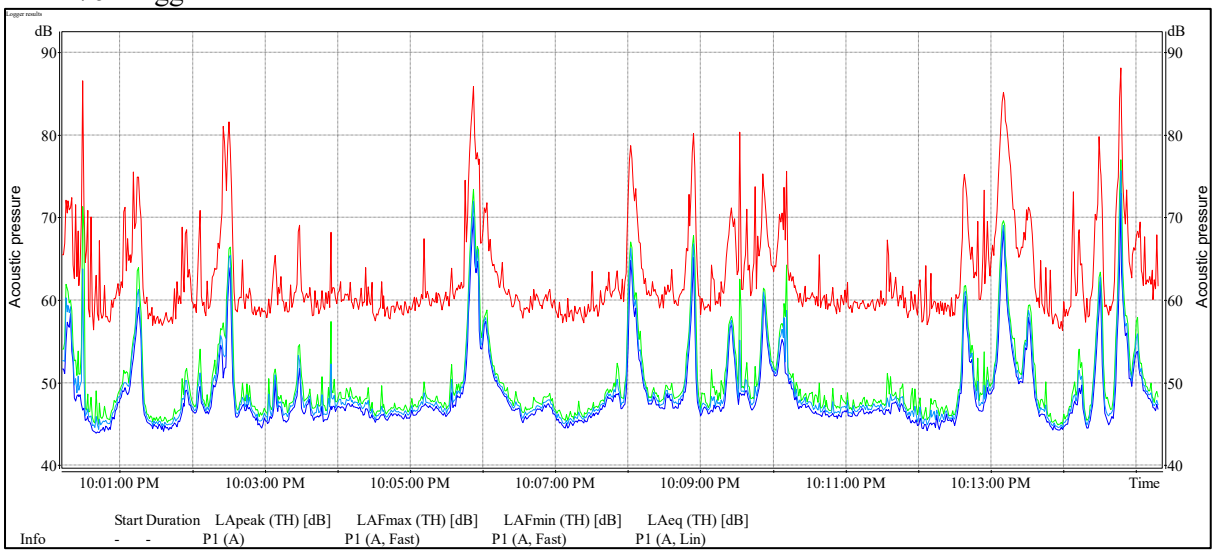
Causes of exceedance of the background level.

Nr.	Time	Cause
1	23:53 –00:08 hrs.	Continuous noise of frogs and insects.
2	23:54 – 23:55 hrs.	Noise of barking dog at distance
3	00:00 hrs.	Noise of car passing by (1x)
4	00:02 hrs.	Noise of car passing by with music (1x)
5	00:03 hrs.	Noise of coughing person

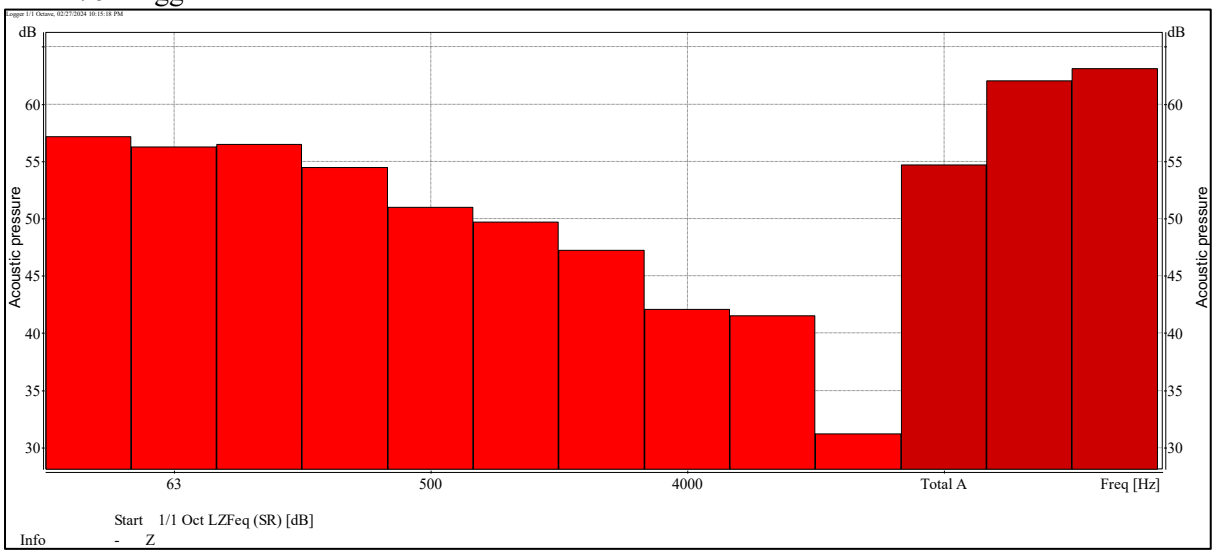
Location N6

Log number:	LOG276
Date:	27 February 2024
Time:	22:00 – 22:15 hrs. (15 min)
Description of the location:	At an open terrain at the corner of the Kapitein Chris Silosweg and Berhardlaan, at Moengo
Observation during measurement:	Continuous noise of insects and noise of yelling and talking persons. Noise of traffic passing by. Noise of car door closing; noise of claxon and noise of car with music. Wind speed: <0.3 m/s (Calm) Wind direction: -
Position of the noise meter:	The meter was placed approx. 5m away from the axis of the road and 1.5 m above surface level.

LOG276: Logger results



LOG276: Logger 1/1 Octave



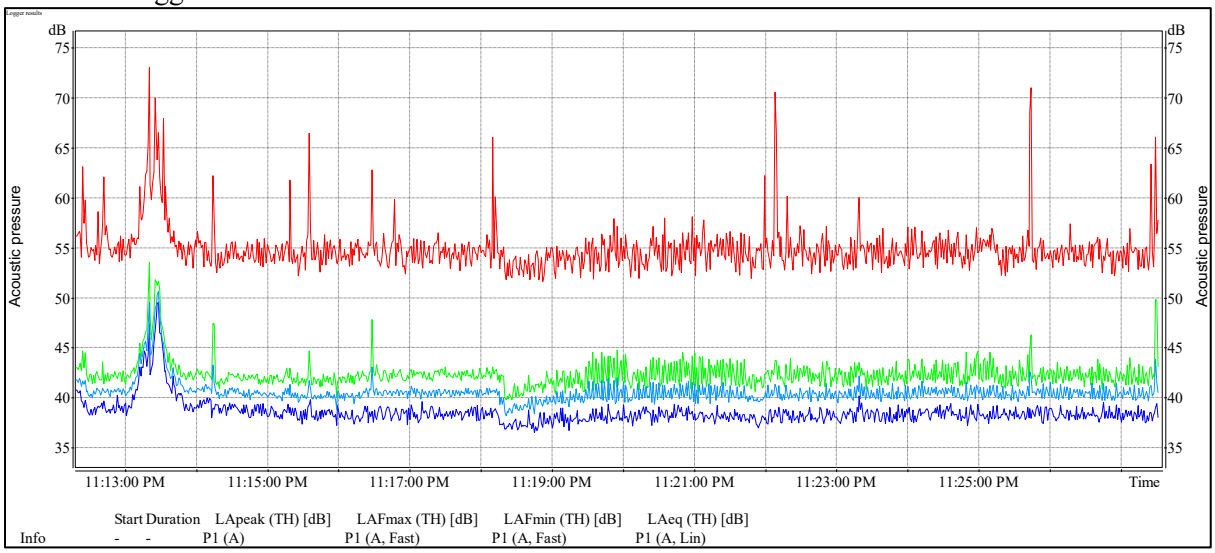
Causes of exceedance of the background level.

Nr.	Time	Cause
1	22:00 – 22:15 hrs.	Continuous noise of insects and noise of yelling and talking persons
2	22:01 hrs.	Noise of car passing by (3x) and noise of talking person (1x).
3	22:02 hrs.	Noise of car passing by (1x)
4	22:03 hrs.	Noise of car passing by (1x)
5	22:04 hrs.	Noise of coughing person
6	22:05 hrs.	Noise of car passing by (2x)
7	22:06 hrs.	Noise of car passing by (1x)
8	22:07 hrs.	Noise of car passing by (1x)
9	22:08 hrs.	Noise of car passing by (1x) and noise of car passing by with music.
10	22:09 hrs.	Noise of car passing by (2x); noise of light truck passing by and noise of claxon.
11	22:10 hrs.	Noise of car claxon(3x) and noise of moped passing by (1x) and noise of door closing.
12	22:11 hrs.	Noise of car door closing (1x) and noise of coughing person and noise of yelling person.
13	22:12 hrs.	Noise of car passing by (1x) and noise of car at distance and noise of door closing and driving away.
14	22:13 hrs.	Noise of car with soft music passing by (1x) and noise of moped passing by (1x) and noise of claxon.
15	22:14 hrs.	Noise of car passing by (3x)
16	22:15 hrs.	Noise of car passing by (1x)

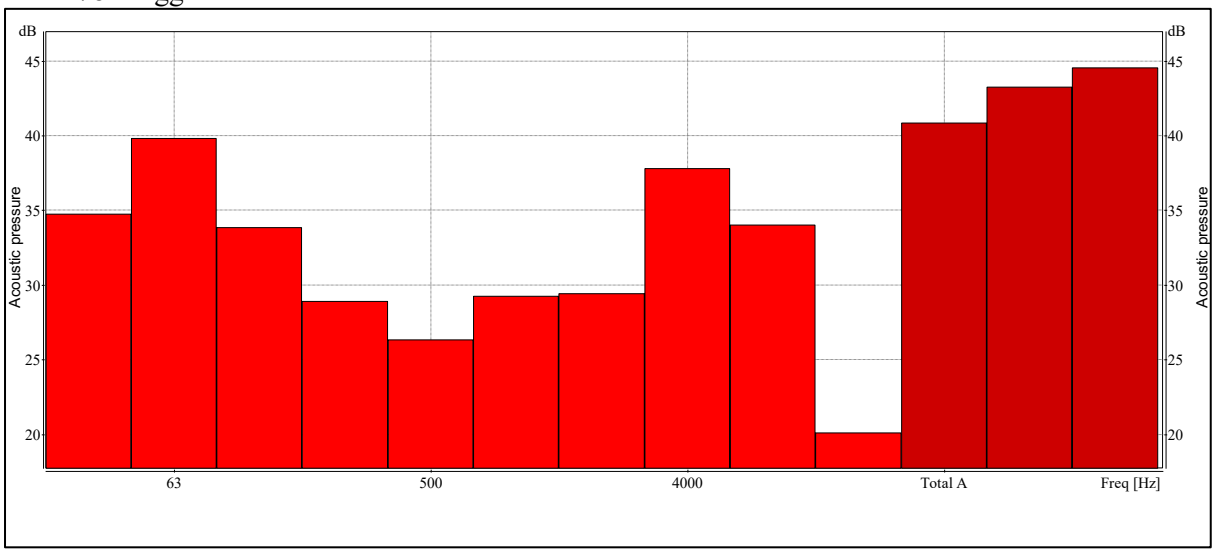
Location N7

Log number:	Log 278
Date:	27 February 2024
Time:	23:00 – 23:15 hrs. (15 min)
Description of the location:	At a resident located in the community Kraboe Olo, along the Patamacca Road.
Observation during measurement:	Continuous noise of insects. Noise of car passing by; noise of coughing person and noise of dog shaking its fur. Wind speed: <0.3 m/s (Calm) Wind direction: -
Position of the noise meter:	The meter was placed approx. 40 m away from the axis and 1.5 m above surface level.

LOG278: Logger results



LOG278: Logger 1/1 Octave



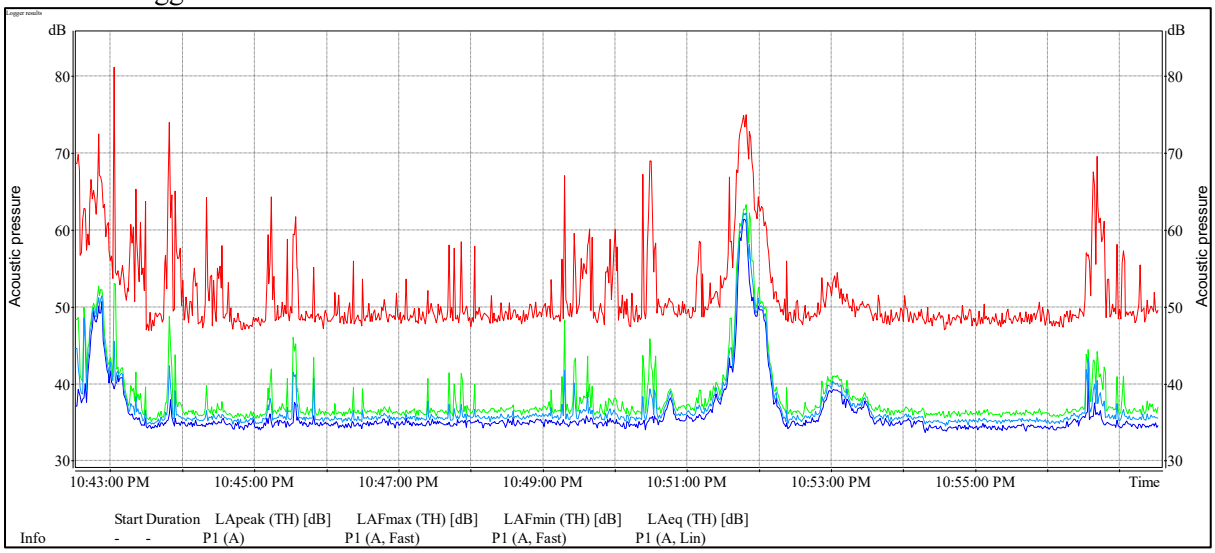
Causes of exceedance of the background level.

Nr.	Time	Cause
1	23:13 – 23:15 hrs.	Continuous noise of insects.
2	23:13 hrs.	Noise of car passing by (1x)
3	23:14 hrs.	Noise of coughing person
4	23:25 hrs.	Noise of dog shaking its fur

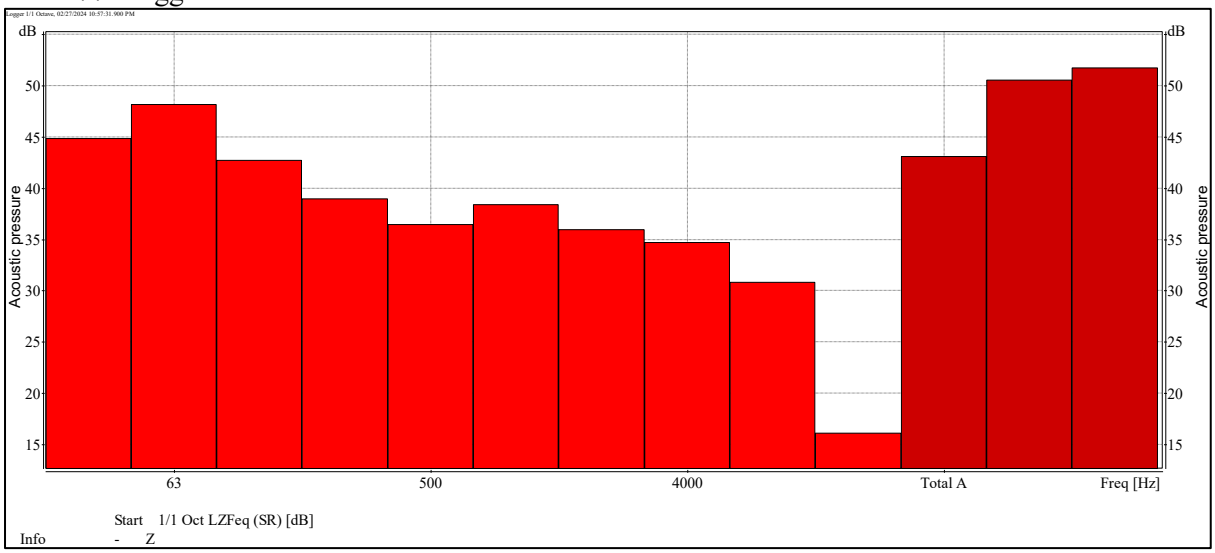
Location N8

Log number:	Log 277
Date:	27 February 2024
Time:	22:42– 22:57 hrs. (15 min)
Description of the location:	At a resident in the community Leewani, along the Patamacca Road.
Observation during measurement:	Continuous noise of insects. Noise of traffic passing by. Noise from resident; noise of door opening and noise of talking person. Wind speed: <0.3 m/s (Calm) Wind direction: -
Position of the noise meter:	The meter was placed approx. 12 m away from the axis, approx. 20 m from speed bump and 1.5 m above surface level.

LOG277: Logger results



LOG277: Logger 1/1 Octave



Causes of exceedance of the background level.

Nr.	Time	Cause
1	22:42 – 22:57 hrs.	Continuous noise of insects
2	22:42 hrs.	Noise of light truck passing by (1x)
3	22:45 hrs.	Noise from resident
4	22:47 hrs.	Noise from resident
5	22:49 hrs.	Noise of door opening and noise of talking person
6	02:15 hrs.	Noise of car passing by (1x)
7	02:16 hrs.	Noise of heavy truck passing by (1x)

Daytime (5 March 2024)	**Nighttime (27 - 28 February 2024)**
Location N1: At the berm in front of a resident in Meerzorg, along East West Connection Road. There was a gutter between the fence of the resident and the berm.	
	
	
Location N2: At the berm in front of the fence of a resident in Tamanredjo, along East West Connection Road.	
	
	

Daytime (5 March 2024)	Nighttime (27 - 28 February 2024)
Location N3: At the berm in front of a resident in Orleane Kreek, along the East West Connection Road.	
	 
Location N4: At the berm in front of a resident at Stolkertsijver, along the East West Connection Road.	
	 

Daytime (13 March 2024)	**Nighttime (27 - 28 February 2024)**
Location N5: Near the entrance, approx. 26 m away from the wooden bridge along the East West Connection Road.	
 	 
Daytime (5 March 2024)	**Nighttime (27 - 28 February 2024)**
Location N6: At an open terrain at the corner of the Kapitein Chris Silosweg and Berhardlaan, at Moengo.	
	 

Daytime (5 March 2024)	**Nighttime (27 - 28 February 2024)**
Location N7: At a resident located in the community Kraboe Olo, along the Patamacca Road.	
	 
Location N8: At a resident in the community Leewani, along the Patamacca Road.