

Noise Impact Assessment

for the

Proposed DAI Cashew Nut Processing Plant

Report Prepared for



Report Prepared by



2022

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ACRONYMS AND SYMBOLS

ALARP	As Low as Reasonably practicable
IA	Impact Assessment
DAI	Diaoune Agro-Industrie
dB	Decibel
EIA	Environmental Impact Assessment
EHS	Environmental, Health and Safety
ESIA	Environmental and Social Impact Assessment
IFC	International Finance Corporation
ISO	International Organization for Standardization
WHO	World Health Organisation
WBG	World Bank Group

1 Introduction

In a bid to harness the promising prospect of the agro-business sector in Guinea, Diaoune Agro-Industrie Sarl (“DAI or the Company”) intends to construct and operate a Cashew nut processing factory (10,000 metric tons per annum) in Boké, which is considered the largest cashew production basin in Guinea. The project will involve sourcing raw cashew nuts from licensed brokers and smallholder farmers in the Boke region and processing them into unflavoured cashew kernels majorly for export and a smaller percentage of local consumption.

Hence, Richflood International Limited was appointed by Diaoune Agro-Industrie Sarl to conduct an Environmental and Social Impact Assessment (ESIA) for the Cashew nut Processing Plant in Boke Region, Republic of Guinea. In executing this assignment, the studies will assess the impacts associated with the construction, and operation of the proposed project. The Environmental and Social Impact Assessment (ESIA) study has been conducted for the project in line with Presidential Decree No.199/PRG/SGG/89 of 18th November, 1989, made under Articles 82 and 83 of the Environmental Code which sets out the projects requiring an Environmental Impact Assessment (EIA) study.

1.1 Objectives

As part of the ESIA, an assessment of current ambient noise conditions in the area was carried out and this report has been prepared to:

- Determine the location and nature of noise-sensitive receptors in proximity to the proposed project site
- Establish a baseline for noise impact assessment
- Investigate and assess the noise level impacts of the proposed project on identified receptors;
- Develop a noise management plan detailing any recommendations for noise mitigation or management in line with the World Bank Environmental Health and Safety Guidelines (EHS).

The assessment is based on measurement data from a noise survey undertaken by Richflood in October 2022, and the baseline ratings used as references in the impact assessment were derived from noise surveys carried out in the proposed project area. The noise footprints and impact ranges of the proposed DAI operations were determined. The area of influence map was used to identify communities located within the impact zones and to assess the magnitude and severity of impacts on them.

2 Project Description

2.1 Project Location

The proposed Cashew nut processing project facility will be located in Boke prefecture, which is one of the prefectures in the Boke region of Guinea. The project will be situated in Kataba village on a land area of 30,000sq m along the major Boke-Kalaboui Road. The site is situated approximately 14.3km due west along the main road, outskirts of the main Boke town. Accessibility by road through the project site to Boke town from Conakry is through the Boke-Kalaboui Road which serves as the only access to the part of Guinea. A map showing the project site with the entire Boke region is shown in Figure 1. Furthermore, the project site boundary coordinates are as indicated below:

- SW corner: 10° 50' 11.1"N, 14° 21' 23.2"W
- SE corner: 10° 50' 11.8"N, 14° 21' 25.2"W
- NE corner: 10° 50' 4.3"N, 14° 21' 28.2"W
- NW corner: 10° 50' 3.9"N, 14° 21' 24.4"W

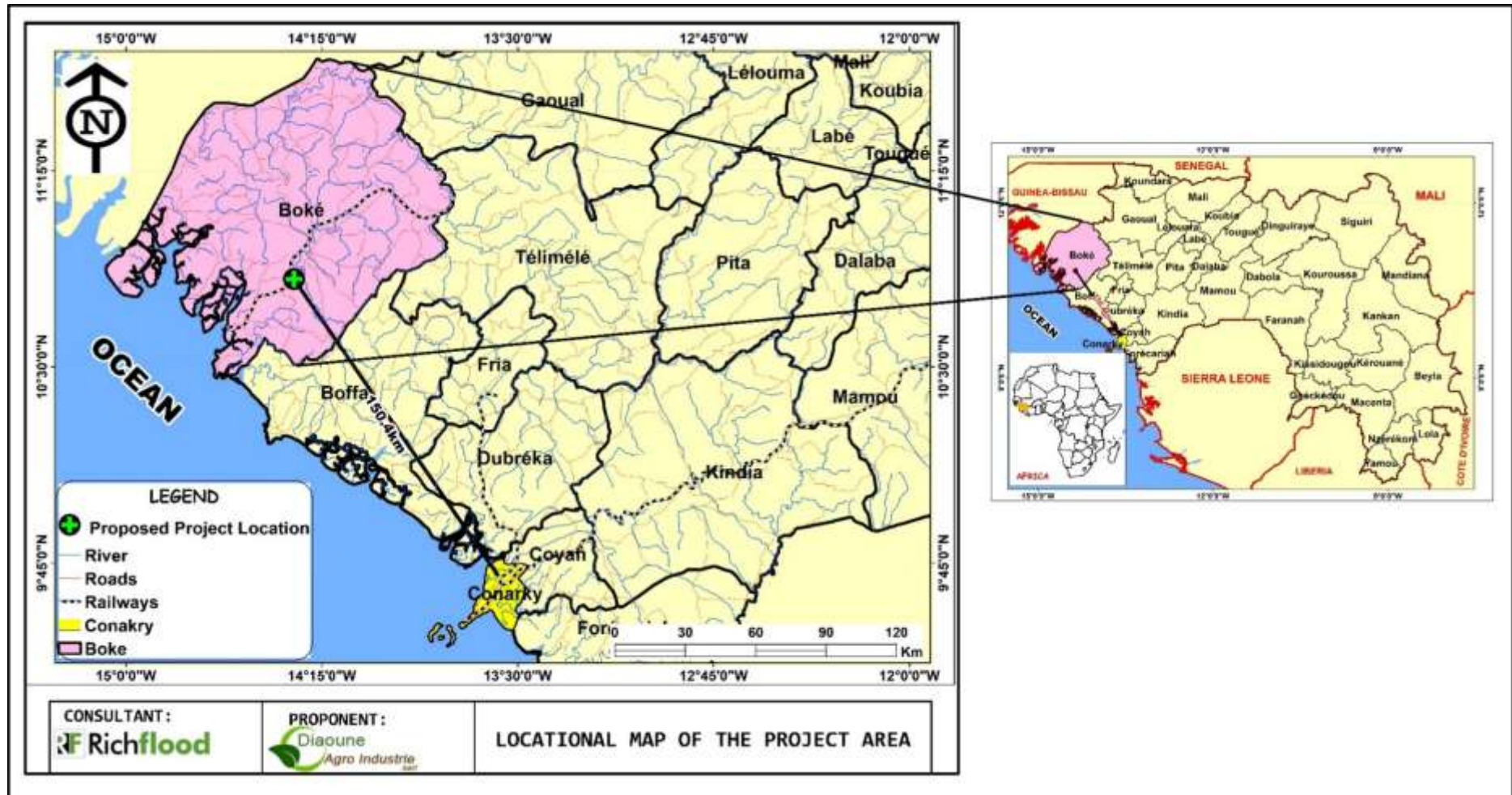


Figure 1: Location of the Proposed Project

Source: Richflood, 2022

2.2 Project Phases

2.2.1 Pre-construction Phase

This stage involves carrying out various studies to ascertain the economic, financial and environmental viability of the proposed Cashew processing project. Also, included in this stage are designing, feasibility studies, socio-economic surveys and community engagement etc. for the proposed project. More so, the construction of residential camps and offices for the contraction workers and provision of associated facilities.

2.2.2 Construction Phase

The construction phase will involve works such as project site fencing, surface run-off channelization, drilling borehole water source, excavation and foundation work as well as factory and warehouse structure erection and installation. Construction-related nuisances such as noise and dust will be very limited given the temporary nature of the works.

The construction works for the cashew nut processing plant and the various activities will include:

- Vegetation clearance, surface stripping and topsoil stockpiling;
- Excavation works for structural foundation;
- Channelling and installation of site drainage;
- Establishment of hard standing for laydown areas, roads, paths;
- Laying of concrete;
- Vegetation landscaping

2.2.3 Operational Phase

Activities during the operational phase, the project will mainly focus on the following points:

- Sourcing and supply of raw cashew nuts to the factory;
- Processing of raw cashew nut into kernels;
- Distribution and export of finished raw cashew kernel

The cashew nut processing plant will include the associated infrastructure required to effectively process all the materials. These include different infrastructures such as drying spaces, warehouse, processing factory etc. The non-processing area of the site includes technical room, office space, reception and exhibition hall etc. The plant also includes greenery and open spaces. Figure 2a, b &c provides layout of the proposed master plan of the DAI Cashew-nut Processing Plant.

2.3 Sensitive Receptors

Sensitive receptors are identified as areas that may be impacted negatively due to noise associated with the construction and operation of the proposed cashew-nut processing site. Examples of receptors include, but are not limited to, schools, shopping centres, hospitals, office blocks and residential areas. The nearest village of Kataba is located approximately 0.3km to the east of the cashew-nut processing site. Other sensitive receptors located close to the cashew-nut processing site include subsistence farming and small homesteads. Table 1 identifies receptors surrounding the project site together with the distance from the site. As noise is greatly attenuated over distance, those receptors located further than 1 km from the site will not be impacted by activities at the cashew-nut processing site. In terms of this Noise Impact Assessment, impacts on the surrounding homesteads located within 300 m to 1 km of the site are a focus.

Table 1: Sensitive receptors surrounding the Cashew-nut Processing Plant

Receptor (Villages)	Distance
Kataba	0.3km
Fodecontea	0.5km
Kareki Madina	2.3km
Tambouni	2.8km
Tambobo	3.0km
Kataba Foulatah	4.1km
Tamaransi	4.5km

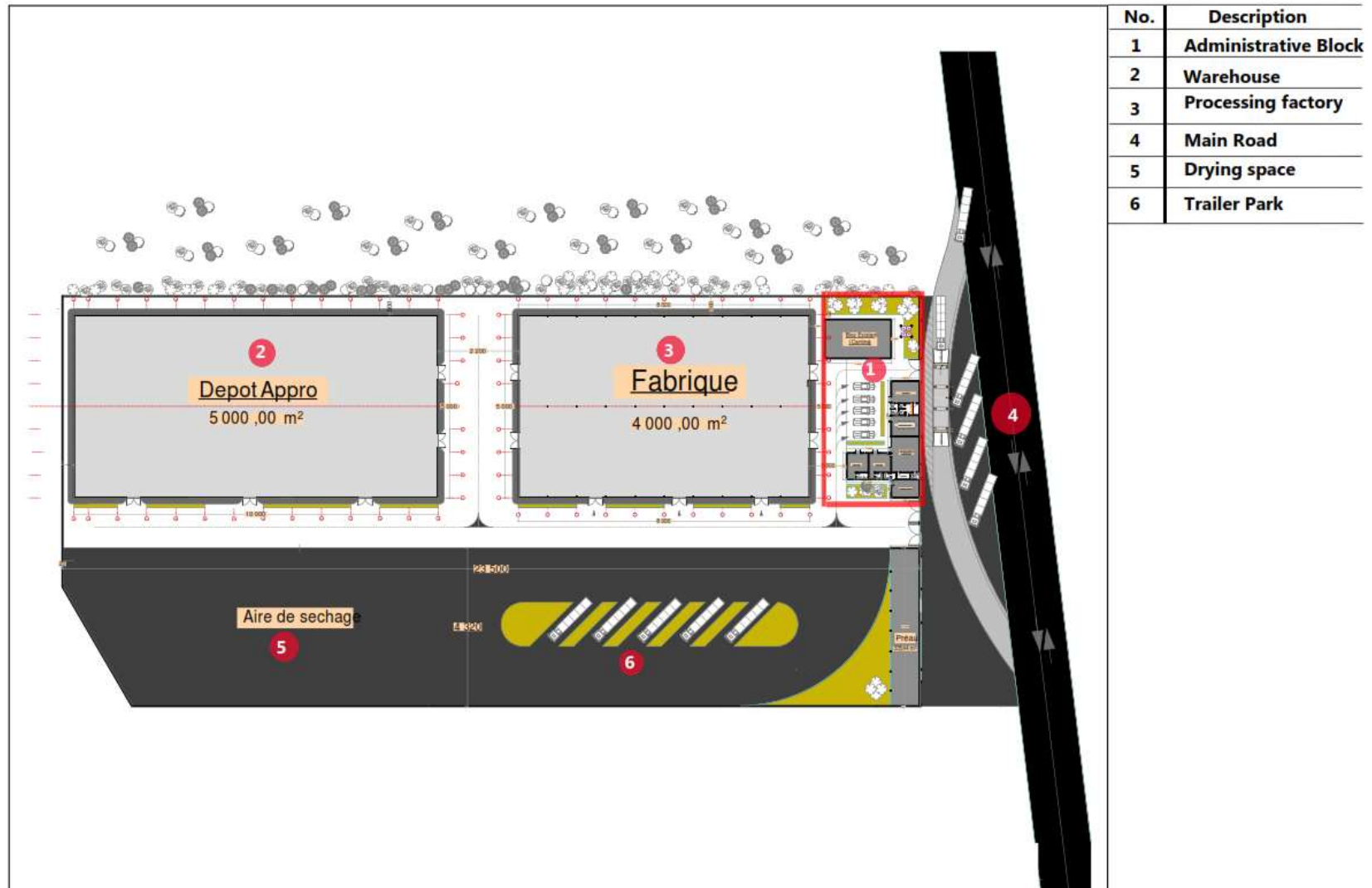


Figure 2a: Layout Plan of the cashew nut processing plant showing the different sections of the facility

Source: DAI, 2022

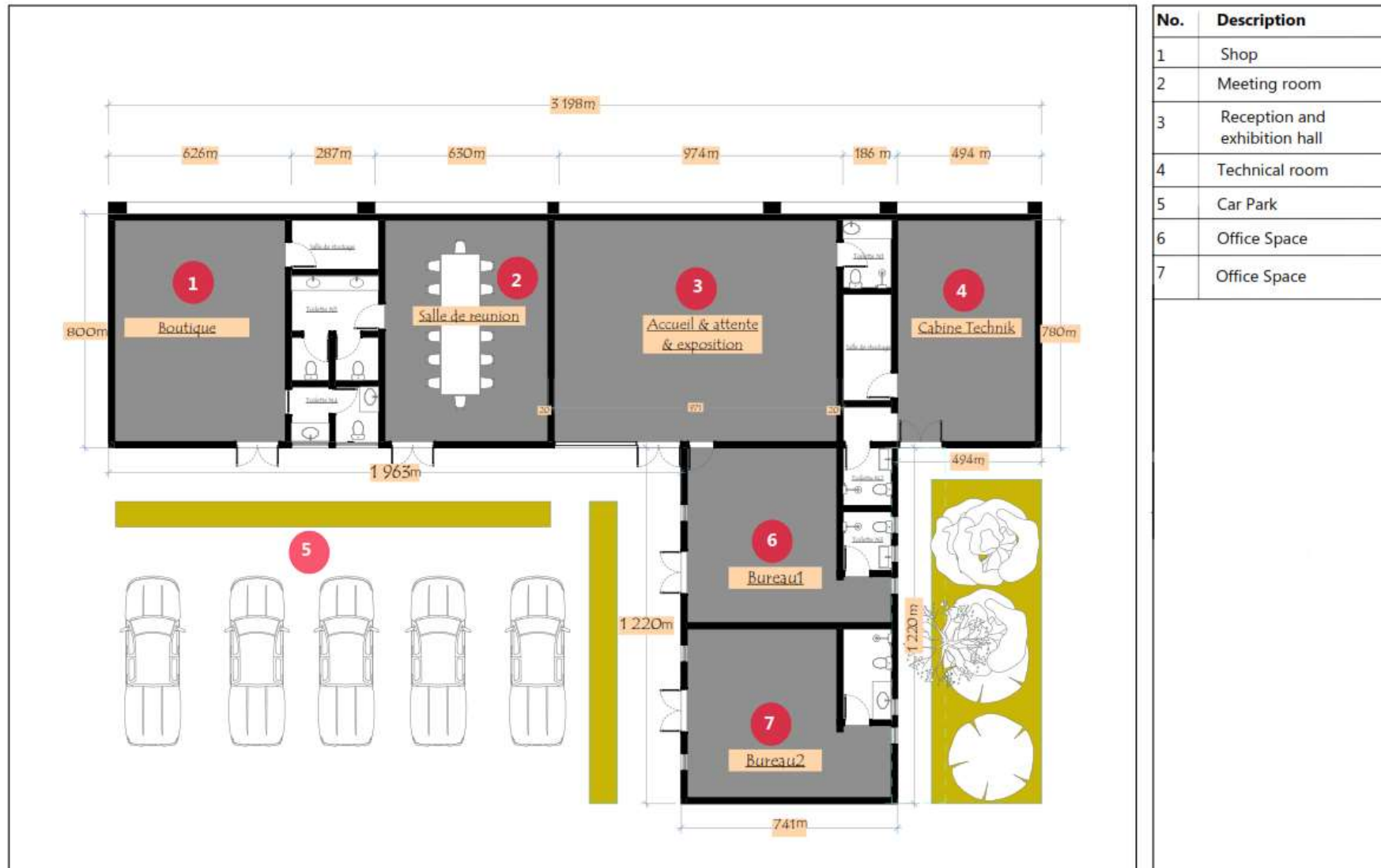


Figure 2b: Layout Plan of the cashew nut processing plant showing the different sections of the facility
Source: DAI, 2022



Figure 2c: 3D Virtual Plan of the proposed process factory

Source: DAI, 2022

3 Legal Framework

3.1 International Standards

Measurement of environmental noise levels in baseline surveys must comply with standards ISO 1996-1 (Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment) and ISO 1996-2 (Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels). ISO 1996 gives guidelines in respect of basic quantities and procedures; acquisition of data pertinent to land use; and the principles of application to noise limits but does not define or prescribe any limits. Therefore, the environmental noise study for the DAI Cashew nut processing plant was carried out in accordance with the World Bank Group (WBG) and IFC PS (WBG / IFC General EHS Guidelines).

The IFC EHS guidelines stipulate that noise monitoring may be carried out to establish the existing ambient noise levels in the area of a proposed facility. Noise monitoring should be conducted during representative timeframes to account for the noise sources in question. Monitoring should be carried out using a Type 1 or 2 sound level meter, located approximately 1.5 m above the ground and no closer than 3 m from any reflecting surfaces.

3.2 Guinean Legislation Relevant to Noise Assessment

Guinea currently does not have any specific national standards and procedures for the regulation of noise. However, there is a Ministerial Order on noise regulation (Arrêté Ministériel fixant la réglementation du bruit en République de Guinée) currently under development. This ministerial order on noise regulation defines different noise levels for a specific period of the day and type of areas, as detailed in Table 2.

The Guinean regulation recalls the IFC noise limits for night time, 45 dB(A) for residential areas and 70 dB(A) for industrial areas. For daytime, instead, it establishes a more stringent limit of 50 dB(A), and also defines an additional sensitive time between 13:00 and 15:00, for which a 5 dB(A) lower threshold is recommended (45 dB(A)).

Table 2: Ambient noise levels: Proposed Guinean standards and IFC guidelines

Period	Maximum Ambient Noise Level 1-hour Leq [dB(A)]				
	Guinean standards			WHO/IFC Guidelines	
	Class 1 Residential area	Class 2 Commercial area	Class 3 Industrial area	Residential Institutional, Educational	Industrial, Commercial
6:00 – 13:00	50	55	70	55	70
13:00 – 15:00	45	50			
15:00 – 22:00	50	55			
22:00 - 6:00	45	50		45	

4 Baseline Assessment

4.1 Noise Monitoring

To assess the current noise level at the proposed project area, ambient environmental noise monitoring was undertaken between the 2nd and 7th of October, 2022 at nine locations in and around the proposed site (*See coordinates on Table 3*). All sound level measurements were free-field measurements (i.e. at least 3.5 m away from any vertical reflecting surfaces). Sound level measurements were taken with an Exect II Sound Level Meter. The sound level meter was calibrated before and after measurements were conducted and no significant drifts (differences greater than 0.5 dB(A)) were found to occur. The sound level meter was programmed to run for 10mins at each monitoring point. The readings were stored in the memory of the meter and recorded on a field sheet

The main aim of the baseline noise assessment was to ascertain typical levels of pre-development ambient noise in the DAI noise study area. Locations where measurements were taken and the parameters recorded in the DAI surveys were based on a noise monitoring plan and guidelines prepared by Richflood. The plan was adapted as necessary during the survey. As planned, two surveys were carried out. The main survey was the Project baseline environmental noise survey required to establish the levels of noise currently experienced by communities near and far (the Community Survey). The second survey was source-oriented and was conducted at the proposed DAI Cashew nut processing Plant site. Measurement locations for the two surveys are indicated on the map in Figure 3.

4.2 Community Survey

The Community Survey comprised measurements taken at the external surroundings of the proposed DAI Cashew nut processing plant. The purpose of the Community Survey was to obtain the measurement of ambient noise levels currently experienced by communities located within the potential audible range of the DAI plant;

A total of Nine (9) monitoring stations were established within and around the project area. Three (3) monitoring stations (N₁ to N₃) are located within the proposed project boundary area while six (6) monitoring stations (N₄ to N₉) are located in the surrounding communities.

Table 3: Noise monitoring locations

Code	Location Description	Coordinates		
		Latitude (N)	Longitude (E)	Elev. (m)
N ₁	Project Location	10° 50' 7.8"	14° 21' 23.8"	11
N ₂	Project Location	10° 50' 2.0"	14° 21' 25.2"	27
N ₃	Project location Entrance	10° 50' 3.9"	14° 21' 24.5"	13
N ₄	Kataba Village	10° 50' 10"	14° 21' 6.4"	66
N ₅	Fodecontea Village	10° 49' 59.7"	14° 21' 55.2"	21
N ₆	Tambouni Village	10° 48' 59.6"	14° 22' 44.1"	41
N ₇	Tambobo Village	10° 50' 12.0"	14° 23' 13.9"	22
N ₈	Kataba Fula	10° 48' 47.8"	14° 20' 2.3"	33
N ₉	Tamaransi Village	10° 52' 29.0"	14° 18' 38.6"	18

Source: Richflood field survey, 2022

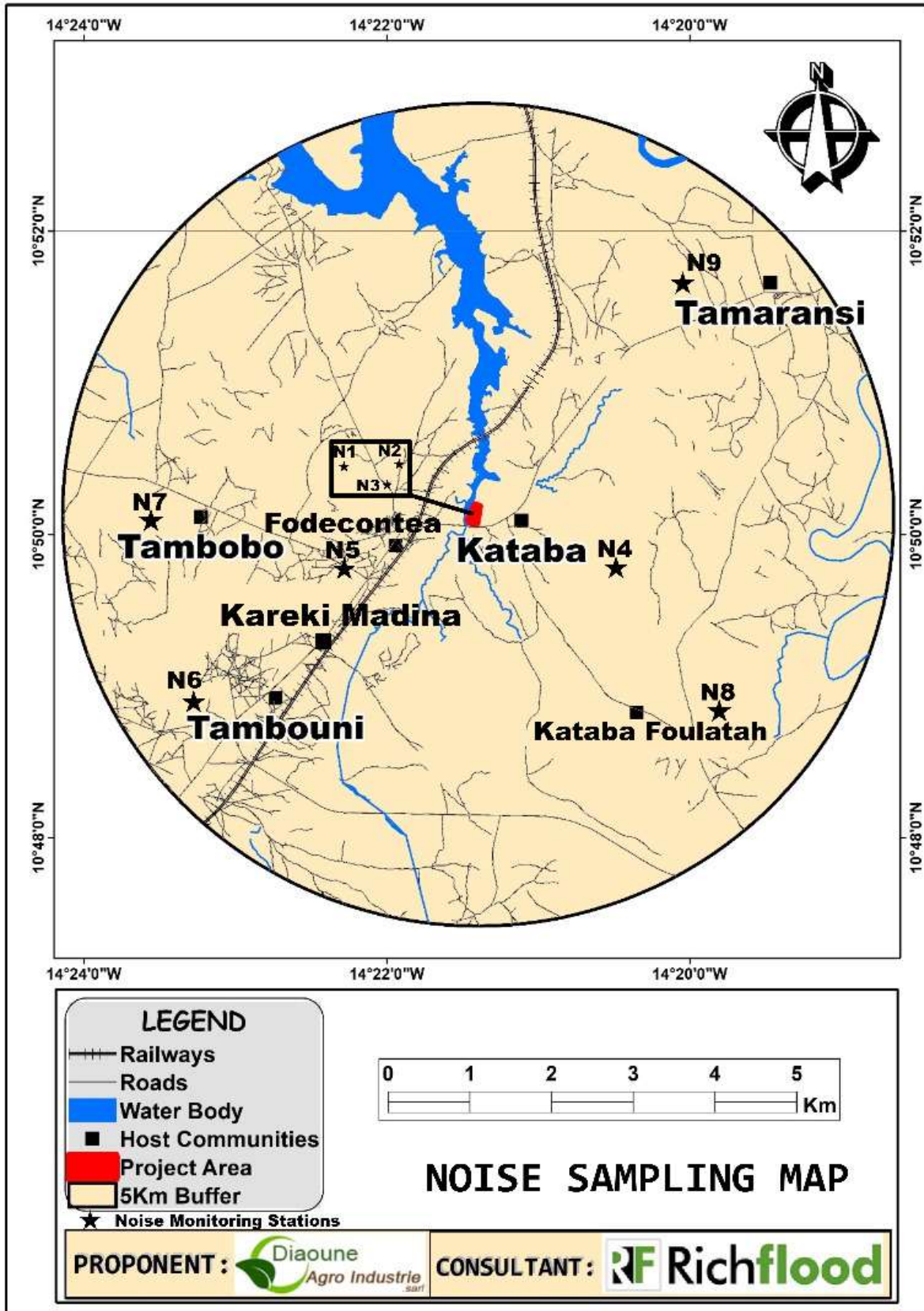


Figure 3: Area of Influence map indicating noise monitoring locations

Source: Richflood, 2022

4.3 Noise Survey Results

The current noise climate is typically rural, with very limited anthropogenic influences. The surveyed area currently consists of agricultural activities, mixed vegetation and low-density settlements, all of which do not generate significant levels of noise.

The results from the day-time noise monitoring conducted are presented in Table 4 below. Noise levels were compared to the typical day-time guideline level for noise in residential areas for Guinean Noise Limits (50 dB(A)) and IFC Noise Limits (55 dB(A)). Noise levels at all nine monitoring locations were below the IFC Noise Limits guideline level. However, the noise levels at some of the locations are higher than the Guinean Noise Limits. Such locations include: Within the Project location (N₁ and N₂), Kataba Village (N₄), Fodecontea Village (N₅), Tambouni Village (N₆), Kataba Fula (N₈), Tamaransi Village (N₉). Dominant noise sources at these locations included livestock, noises from community activities, loud talking, noisy crowds and other background sources of noise like distant traffic.

Table 4: Results of the Noise Monitoring

Code	Monitoring Location	Average Noise [dB (A)]
N ₁	Project Location	53.60
N ₂	Project Location	51.80
N ₃	Entrance	49.50
N ₄	Kataba Village	53.60
N ₅	Fodecontea Village	53.90
N ₆	Tambouni Village	54.90
N ₇	Tambobo Village	48.80
N ₈	Kataba Fula	53.20
N ₉	Tamaransi Village	51.80
Guinean Noise Limit		50
WHO/IFC Guidelines (Noise Limits)		55

Source: Richflood Fieldsurvey, 2022

5 Noise Impact Assessment

5.1 Assessment of Impact Significance

The purpose of this noise impact assessment is to identify the potential impacts and associated risks posed by the construction and operation of the proposed cashew nut processing plant on the noise climate of the area. The outcomes of the impact assessment will provide a basis to identify the key risk drivers and make informed decisions on the way forward to ensure that these risks do not result in unacceptable social or environmental risks.

Evaluation of significance takes into account the magnitude of the impact and the quality, importance or sensitivity of the affected resource or receptor. Magnitude and receptor quality/importance/sensitivity are assessed in combination to evaluate whether an impact is, or is not, significant and if so its degree of significance (defined in terms of Minor, Moderate or Major). Impacts ranked as Negligible include those that are slight or transitory and those that are within the range of natural environmental and social change.

The key elements used to assess impact significance are described in Table 5 below.

Table 5: Significance Matrix

Sensitivity / Vulnerability / Importance	Magnitude of Impact			
	Negligible	Small	Medium	Large
Low	<i>Negligible</i>	<i>Negligible</i>	<i>Minor</i>	<i>Moderate</i>
Medium	<i>Negligible</i>	<i>Minor</i>	<i>Moderate</i>	<i>Major</i>
High	<i>Negligible</i>	<i>Moderate</i>	<i>Major</i>	<i>Major</i>

- An impact of **negligible** significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be ‘imperceptible’ or is indistinguishable from natural background variations.
- An impact of **minor** significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.
- An impact of **moderate** significance has an impact magnitude that is within

applicable standards but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Designing an activity so that its effects only just avoid breaking a law and/or causing a major impact is not the best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to a minor, but that moderate impacts are being managed effectively and efficiently.

- An impact of **major** significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resources/receptors. Impact assessment aims to ensure that Project does not have any major residual impacts, however, for some aspects, there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied).

All impacts of the proposed project were evaluated using a risk matrix, which is a semi-quantitative risk assessment methodology. This system derives an environmental impact level based on the extent, duration, severity and probability of potentially significant impacts. The overall risk level is determined using professional judgement based on a clear understanding of the nature of the impact, potential mitigatory measures that can be implemented and changes in risk profile as a result of the implementation of these mitigatory measures. Key localised noise impacts associated with the proposed project include:

- Construction phase impacts of noise on residential receptors; and
- Operational phase impacts of noise on residential receptors.

Outcomes of the noise impact assessment are contained within Table 6 outlining the impact of each parameter and the resulting significance rating level.

Table 6: Potential risks associated with the construction and operation of the Cashew nut processing plant

Description	Without Mitigation			With Mitigation		
	Probability	Severity	Significance	Probability	Severity	Significance
Construction phase impacts of noise on residential receptors within 500 m of the site boundary	4	3	Major	4	2	Moderate
Construction phase impacts of noise on residential receptors beyond 500 m of the site boundary	3	2	Moderate	3	1	Minor
Operational phase impacts of noise on residential receptors within 200 m of the site boundary	3	2	Moderate	2	2	Minor
Operational phase impacts of noise on residential receptors beyond 200 m of the site boundary	2	2	Minor	1	1	Negligible

5.2 Construction Phase Impact

Noise levels near construction activities are predicted to be high, as would be expected. From 50 m from the source, noise levels will reduce considerably, with noise levels at around 78 m from the source dropping to below the industrial guideline rating level of 70 dB(A). From 438 m from the construction activities, noise levels will decrease to below the residential guideline level of 55 dB(A). Therefore, noise during this phase will not impact communities in the area of influence, which are all located greater than 500m from the site (as identified in Table 1) except Kataba, which is located 300m away from the site.

Based on this worst-case assessment, there will be no resultant acoustic impacts on the surrounding towns, Neighbouring homesteads (up to 500m from the site boundary) will be directly impacted by construction activities, particularly when construction is occurring on the nearest site boundary to a receptor in question. Receptors further than 500 m from the cashew-nut processing site will be minimally impacted by construction activities and owing to the low current background noise levels may experience slight increases in existing noise levels as a

result of the construction activities. It is envisaged that the construction of the cashew-nut processing plant will only occur during the daytime hours and as such no project-related acoustic impacts are anticipated at night.

5.3 Operational Phase Impact

Based on a worst-case assessment, noise levels near the cashew-nut processing unit are predicted to be high, as would be expected. At further distances from the source, noise levels will reduce considerably, with noise levels at around 30 m from the source dropping to below the industrial guideline rating level of 70 dB(A). From 160 m from the processing activities, noise levels will decrease to below the residential guideline level of 55 dB(A). It is understood that the operation of the cashew-nut processing plant will only occur during the daytime hours and as such no project-related acoustic impacts are anticipated at night.

It is most likely that most units and processes will be enclosed within buildings with particular reference to the boiler and cashew nut processing units. Boilers are generally enclosed within boiler houses. This will result in significantly lower noise levels experienced in the ambient environment. Overall, the impact of noise during the operational phase is not expected to exceed the Guinean Class 3 and WHO/IFC permissible limits of 70 dB(A) for the industrial guideline rating level.

6 Mitigation

6.1 Construction Noise

Since the levels of the cashew-nut processing plant will be relatively low compared to operation noise, construction on the Plant site (see Table 6) is not expected to have any significant noise implications in the external surroundings during daytime or night-time. However, to minimise the noise impacts from the construction phase of the proposed Project, especially in the immediate vicinity, various mitigation techniques can be employed. These options include both management and technical options:

- ❖ Planning construction activities in consultation with local communities in the AOI so that activities with the greatest potential to generate noise are planned during periods of the day that will result in the least disturbance. Information regarding construction activities should be provided to all local communities. Such information includes:
 - Proposed working times;
 - Anticipated duration of activities;
 - Explanations of activities to take place and reasons for activities; and
 - Contact details of a responsible person on site should complaints arise.
- ❖ When working near a potentially sensitive receptor, limit the number of simultaneous activities to a minimum as far as possible;
- ❖ Using noise control devices, such as temporary noise barriers and deflectors for high-impact activities, and exhaust muffling devices for combustion engines;
- ❖ Selecting equipment with the lowest possible sound power levels;
- ❖ Ensuring equipment is well-maintained to avoid additional noise generation; and
- ❖ The use of ear protection equipment for personnel working onsite close to noise sources

6.2 Operation Noise

Within the scope of an ESIA assessment, recommendations in this report are at a conceptual level. It describes the broad options and the type of measures deemed to be practically viable and potentially effective. Development of specific solutions, especially for the mitigation of Plant noise, requires comprehensive investigations and design work by a team of acoustical engineers in collaboration with various other disciplines. However, noise levels during the operational phase are not envisaged to have significant impacts. Units with significant noise-generating potential should be housed within closed-wall buildings to limit the transmission of noise to

surrounding receptors. As per the IFC EHS Guidelines for Noise Management, the following noise reduction options should also be considered:

- ❖ Selecting equipment with lower sound power levels;
- ❖ Installing silencers for fans;
- ❖ Installing suitable mufflers on engine exhausts and compressor components;
- ❖ Installing acoustic enclosures for equipment casing radiating noise e.g. power-generating set;
- ❖ Improving the acoustic performance of constructed buildings by applying sound insulation;
- ❖ Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m² to minimize the transmission of sound through the barrier. Barriers should be located as close to the source or the receptor location as to be effective;
- ❖ Installing vibration isolation for mechanical equipment;
- ❖ Providing workers in the noise-generating area with ear muffs
- ❖ Re-locating noise sources to less sensitive areas to take advantage of distance and shielding;
- ❖ Siting permanent facilities away from community areas if possible;
- ❖ Taking advantage of the natural topography as a noise buffer during facility design;
- ❖ Reducing project traffic routing through community areas wherever possible; and
- ❖ Developing a mechanism to record and respond to complaints.

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