



# ESIA for ECR Lot 1: Ashaiman Roundabout to Akosombo Junction Project

Material Draft Report  
Final Version

2 October 2020

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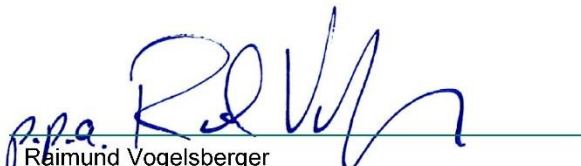
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## Signature Page

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## Acronyms and Abbreviations

Name	Description
Aol	Area of Influence
EBRD	European Bank for Reconstruction and Development
ECR	Eastern Corridor Road
EPA	Environmental Protection Agency of Ministry of Environment, Science, Technology and Innovation
E&S	Environmental and Social
ERT	Emergency Response Team
EHS	Environmental Health and Safety
ESAP	Environmental and Social Action Plan
ESDD	Environmental and Social Due Diligence
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GHA	Ghana Highway Authority (Project Owner)
GHPA	Ghana Ports and Harbours Authority
GWCL	Ghana Water Company Limited
IFC	International Finance Corporation
KfW	Kreditanstalt für Wiederaufbau (Project Lender – German Bank)
MRH	Ministry of Roads and Highways (Project Owner)
MoF	Ministry of Finance
PAP	Project Affected Party
PCB	Pedestrian Crossing Bridges
pESMP	Preliminary Environmental and Social Management Plan
Pre-ESIA	Preliminary Environmental and Social Impact Assessment
PS	Performance Standards
RAP	Resettlement Action Plan
RAP Framework	Resettlement Action Plan Framework
RoW	Right of Way
SEP	Stakeholder Engagement Plan

## 1. INTRODUCTION

This Material Draft Report (MDR) represents a preliminary impact assessment conducted for the Project "Reconstruction of Ashaiman Roundabout to Akosombo Junction, Eastern Corridor Road Lot 1, Ghana". The timing of the preparation of this MDR is subsequent to the Scoping Report, but prior to completion of the full Environmental and Social Impact Assessment (ESIA) - the ESIA is currently ongoing, and the initial findings of the ESIA are integrated into this MDR.

The objective of this MDR is to:

- Present the key E&S risks identified during ongoing ESIA studies;
- Take a proactive approach to managing those E&S risks;
- Guide the EPC Contractor's Design Team to consider E&S risks ("avoid/minimise");
- Outline how remaining risk related topics will be addressed ("mitigate"); and
- Facilitate the review of the full ESIA Report.

As such, the intention of the MDR is that readers will be able to understand how potential Project inherent risks have already been addressed, or how they will be appropriately handled in the ESIA and related documents such as the Environmental and Social Management Plan (ESMP) and Resettlement Action Plan Framework (RAP Framework).

### 1.1 Background to the Project

The Ghana Ministry of Roads and Highways (MRH), through the Ghana Highways Authority (GHA) is implementing its strategy to improve the investments along the existing 2-lane Eastern Corridor Road (ECR); the upgrade of the ECR will improve the connections within the country and increase the flux between Ghana and its neighboring land-locked countries. The ECR is classified as a National Route (N2), and starts from the Tema motorway roundabout in the Greater Accra Region and ends at Kulungugu, on the North-Eastern Border with Burkina Faso (approx. 773 Km).

The ECR is an important infrastructure especially for freight movement within Ghana and neighbouring countries such as Burkina Faso, Niger, Mali and beyond, and also plays an important role in the North-South trade corridor by providing a shorter access from the Port of Tema and improving mobility between the Volta, Northern and Upper East Regions of Ghana and between Ghana and neighboring countries.

The overall ECR was divided for construction purposes into seven (7) Lots. The promoter and initiator of the ECR rehabilitation works is the GHA who tendered the construction services under Engineering, Procurement and Construction (EPC) Contract models. The Contract for Lot 1 is about to be awarded to INZAG Germany GmbH (INZAG) as EPC Contractor (expected in September 2020).

GHA will be responsible to supervise the construction works, monitor and check the construction progress, and issue the Interim Payment Certificates that will guide the funding process. Upon the completion of the construction period, GHA will be responsible for the Operation/Maintenance of the roadway. GHA are experienced in managing the relevant Environmental and Social (E&S) requirements for such roads, as they have operated and maintained all public roads in Ghana for many years; during the past decade many road projects were funded under international agreements, thus international requirements and best practices were adopted.

The financing of the construction of the Lot 1 portion of the ECR (the "Project") was included in the national budget of the State of Ghana for the year 2020 in November 2019 and the Project was categorized as a "Priority Project". The exact location of Lot 1 is the N2 route between the Ashaiman Roundabout, in Tema, and Akosombo Junction prior to the bridge crossing the Volta River (approx. 64 km).



It is envisaged that the Project will be financed by international banks (KfW IPEX Bank backed by the German Export Credit Agency), which in turn results in the need for the Project to be compliant with the E&S requirements of the respective lenders – in addition to the national requirements. The Loan Agreement will be signed between the Ghana Government, through the Ministry of Finance.

This MDR (as well as the future ESIA Report) is focused solely on the rehabilitation works aimed to be performed by INZAG in Lot 1 that covers the road stretch from Ashaiman roundabout in the port town Tema and Akosombo Junction.

In short, the Project involves the improvement and partial widening of the existing 2-lane road to 4-lane and 6-lane width at different locations and related civil engineering tasks as shown in the table below.

**Table 1-1 Lot 1 Main Civil Engineering Tasks**

Task	Details
Length of New Road	64 Km <sup>1</sup>
Cross Sections	2x2 Lanes + Local Lane: Project kilometer (KP) 0+760 to 6+320; 2x3 Lanes: KP 6+320 to KP 13+430 2x2 Lanes: KP 13+430 to KP 53+700 2x1 Lanes: KP 53+700 to 64+700;
Roundabouts	2 (Ashaiman Roundabout and Kpong Roundabout)
Interchange	1 (Asutsuare Interchange)
Junctions	6 (at grade type)
Road Bridges	3 (next to existing bridges)
Fly-Over	1
Overpasses/Pedestrian Crossing Bridges	11 Steel structures with stairs and ramps designed in three different types according to the width of the road.
Toll Booth	1 Area x 4 Booths at KP: 11+400 (existing toll booth)
Underpasses	Not Applicable
Service Stations/Rest Areas	Not Applicable
Fencing	Not Applicable
Lighting	Applicable for urban and densely populated areas

The roadway design foresees the use of pedestrian crossing bridges in the urban areas (to reduce severance-related impacts) – 11 in total. Underpasses as a means of public crossing under the roadway are deemed to be inappropriate and none are foreseen. No new Project-related service stations/rest areas are foreseen in the design as this will not be a limited-access roadway, and there are numerous existing petrol/service stations along the existing N2 road that will remain in place and be integrated into the design. No fencing is foreseen along the sides of the roadway.

<sup>1</sup>Updated design information was relayed from GHA to INZAG on 29.09.2020, as a result of the final negotiations between both parties that lead to the Design and Build Contract Signature on the 18th of September 2020.

KP 14+925 to KP 15+925 and KP 61+225 to KP 62+225 were removed from the scope of the Project – These Stretches belong to the Scope of works for the Tema – Mpakadan Railway Project / Afcons Infrastructure Limited of India / EXIM Bank of India / Railway Development Authority - Under Construction.



Source: INZAG 2020

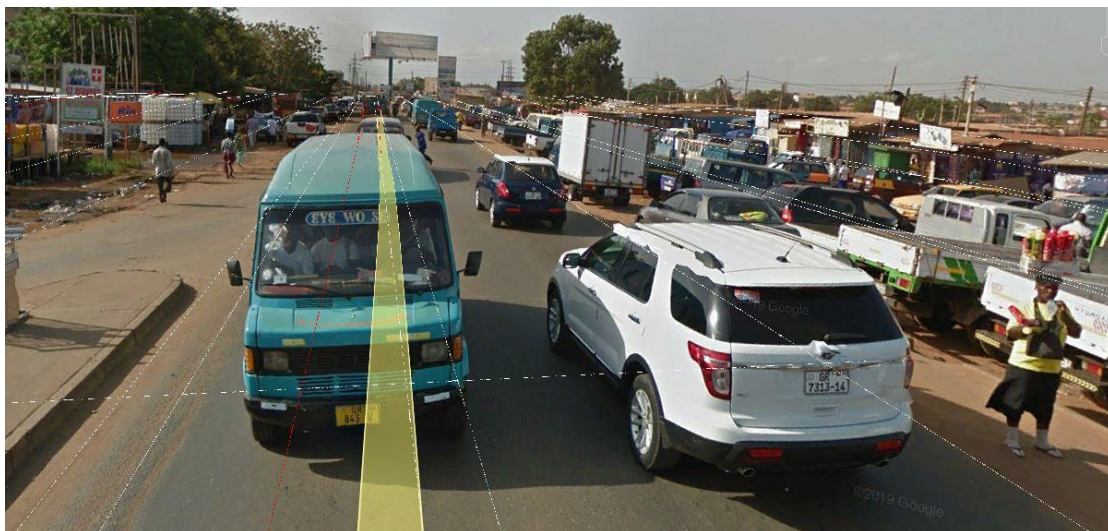
Figure 1-1 Project Area

## 1.2 Project Justification

### 1.2.1 Need for the Project

The Tema Container Port at Tema Harbour is currently being expanded by a consortium of Ghana Ports and Harbours Authority (GPHA), APM Terminals and Bollore Africa Logistics, who have signed a 35-year PPP in 2014 and will expand the port for approximately USD 1.5 billion. Capacity of the port facilities will increase roughly three-fold up to 3.5 million twenty-foot equivalent units (TEUs) per year. The current single-lane N2 national road (one lane each way) is simply too small, and without the appropriate road infrastructure to handle this additional freight volume, smooth logistics operations are not feasible. This would pose a bottleneck for the Port operations and lead to considerable traffic disruption around the Port and in the nearby suburbs of Accra. The proposed Project to expand the N2 will thus create a major road artery for shipment of goods from the new Tema Port through Accra and to the markets in the north of the country and beyond.

Examples of the existing conditions of the road stretches from Ashaiman Roundabout in Tema to Akosombo Junction are shown in the Figures below (all sources: *Google Earth retrieved August 2020*).



**Figure 1-2 Street view image from KM 1+200**



**Figure 1-3 Street view image from KM 3+100**





**Figure 1-4 Street view image from KM 4+500**



**Figure 1-5 Street view image from KM 8+900**



**Figure 1-6 Street view image from KM 15+000**





**Figure 1-7 Street view image from KM 25+400**



**Figure 1-8 Street view image from KM 54+200**



**Figure 1-9 Street view image from KM 55+800**

For this reason, in order to optimize the traffic situation, the current single-lane route (2x1) of Lot 1 will be extended to a three-lane road (2x3) for the first 14 km. This will be followed by a two-lane expansion (2x2) of approx. 40 km and finally 9 km of single-lane (2x1) rehabilitation (Kpong bypass).

As mentioned before, this first construction phase of the ECR Lot 1 is indispensable and an important driver for economic growth in the country and neighboring countries. The rehabilitation of the Lot 1 is also particularly urgent as the other construction lots on the ECR have already advanced and without the completion of Lot 1 the overall ECR route cannot be exploited to its full potential.

After its completion, the ECR will help Ghana to sustainably fulfil its role as an important logistics center for the land-locked countries in the north and for the regions in the hinterland. It is an alternative route to the Central Corridor Road, which is about 200 Km longer and passes through several small and medium-sized cities, which have expanded exponentially in the last decade due to the ECR itself (freight and heavy goods traffic). In consequence, particularly in the southern sections of the ECR Lot1, residential areas, formal and informal commercial infrastructures occupied the road safeguards corridors, which impose significant health and safety (among others) risks for those communities. In addition, the ECR offers multimodal connections at various points today and in the future:

- Container terminal at the port of Tema;
- Transport hub at Tema Roundabout (currently under expansion through Japan International Cooperation Agency financing) with connection to the West African East-West link from Lagos, Nigeria to Abidjan, Republic of Côte d'Ivoire; and
- The planned Eastern Railways railway line between Tema and Kumasi and intended inland waterway transport via Lake Volta (feasibility studies currently in preparation).

The implementation of the Project will have many positive effects in country, particularly boosting regional economy. The added value in Ghana during construction includes Project expenditures for running costs for the vehicles (fuel, lubricants, and additives) as well as materials such as aggregates, cement, chemicals, etc. Specific machines or equipment needed only on a daily basis will be rented on site.

The subsequent operations of the rehabilitated N2/ECR road will also help boost the already significant tourism related revenue.

The overall Project connects underdeveloped areas in Ghana's hinterland and thus enables the economic development of regions through logistical connections to the densely populated areas<sup>2</sup>. Ghana is logistically well connected to its eastern and north-eastern neighbors by road. Thus, the conditions for supra-regional trade are considerably improved. In 2017, Ghana exported goods worth a total of USD 789 million to Burkina Faso, Togo and Niger (World Integrated Trade Solution, World Bank (2017)). The volume of exports to the three neighboring countries contrasted with imports totaling only USD 108 million. It is expected that the new transport axis will significantly increase trade between the countries (especially food and perishable goods), which will have a significant employment effect in the region in the short to medium term. New transport axes will encourage the settlement of small businesses, and later also of small industrial and trading companies - in this way the improved infrastructure will make a sustainable contribution to the economic development of these regions.

The overall Project (Lots 1-7) will create several thousand jobs over the construction period.

In ECR Lot 1 alone, the creation of approximately 950 jobs at INZAG Ghana (fully consolidated unit of INZAG Germany GmbH) is expected. The construction workers will receive further training from INZAG and will thus be able to find further employment after completion of the work on ECR Lot 1

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<sup>2</sup> The recent (2015) rehabilitation of the Adomi Bridge (the longest bridge in the country with a free span of 245 m and a total length of approximately 336 m) was carried out based on the recognition of the importance of the ECR. Currently, a new additional Volta River Bridge is being planned at a different location.



either on a follow-up project of INZAG or elsewhere. They will be employed by means of formal employment contracts subject to social security contributions.

The ECR is currently a toll road (starting at Km 11+400) and will remain so. The concept of toll roads is accepted and established in Ghana (the Accra-Tema Motorway for example has always been a toll road). Tolling will create additional jobs (toll stations will be built at regular intervals where the toll must be paid) and generate revenue for the GHA which can be used for ongoing maintenance or further expansion of the road network.

Roads in Ghana are generally unsafe (2018: more than 1,600 road deaths with approx. 1.2 million registered vehicles). This is mainly due to overloaded or *de facto* unroadworthy vehicles and often leads to serious accidents, often involving personal injury (*Ghana Motor Traffic and Transport Department, 2019*). Lot 1 will be built entirely according to European safety standards, in alignment with country requirements. In the dark, clearly visible road markings and reflective edge markings will contribute to increased road safety and thus to the prevention of serious accidents.

### 1.2.2 Project Alternatives

Three alternatives were considered by GHA in the selection of the most sustainable option for the road Project as summarized below:

To identify a preferred alternative, an environmental/socio-economic analysis was carried out on three possible scenarios. These were:

- The “Do Nothing” scenario (Routine and Periodic Maintenance);
- Rehabilitation of existing road scenario; and
- Upgrading and Rehabilitation.

The scenarios above were assessed based on cost implications, engineering intervention, route alignment, maintenance policies and environmental/social assessments of impacts on rehabilitation and new construction.

- **“Do Nothing” scenario:** In this case, the road would only be subject to routine and periodic maintenance activities such as pothole patching, road side grass cutting and cleaning of drainage structures (culverts, ditches). These activities would be the least expensive of all interventions considered in this analysis. However, these maintenance activities cannot improve the riding quality or travel time nor reduce vehicle operating costs all year round with the existing and anticipated volume of traffic.

Environmental and social considerations: The paved road which has started experiencing distress in certain areas will continue to deteriorate and even faster during every season (dry and wet). Additionally, the direct impact of traffic congestion and road traffic accidents shall continue and likely to become a daily event with time.

In conclusion, the “do nothing” scenario was not considered an environmentally, socially and economically viable option.

- **Rehabilitation of existing road scenario:** Considering this scenario, the road would be rehabilitated to the existing capacity with safety improvements, which would improve riding comfort. The road would, however, continue to experience traffic congestion at Tema – Afariwa Junction as well as Michel Camp – Afienya and Kpong sections of the road. This congestion would worsen yearly with the introduction of new cars and new residents to these sprawling communities. This option is more viable than the maintenance (“do nothing”) scenario, but would not solve most of the existing problems that the corridor faces.

Environmental and social considerations: The impacts of the rehabilitation of the existing road would definitely be more negative compared to the “do nothing” scenario; especially dust and noise impacts would be significant during the construction phase. Additionally, the traffic

management during construction would bring substantial limitations to the already congested road. Diversions would need to be created on the road reservation resulting in vegetation clearance among others.

In conclusion, the “rehabilitation of existing road” scenario was not considered an environmentally, socially and economically viable option.

- **Upgrading and Rehabilitation of existing road scenario:** This alternative was considered on the basis that the existing capacity of this section of the road is inadequate to carry traffic daily. Subsequently, the objective of the Project would be to increase the existing capacity of the road to accommodate the existing and projected traffic and to meet the design standards of the N2<sup>3</sup> road in line with the other Lots currently under construction. The works would involve the upgrading of at least the first 53 Km of the ECR LOT1 road from a single carriageway to a dual carriageway using the cross sections. The remaining stretch would be rehabilitated by improving the drainage system, alignment, pavement and installation of road furniture to the standard of a National Road. This scenario would address the challenges faced by road users and with the well-defined road reservation along the initial stretch, the objectives of the Project shall be achieved.

Environmental and social considerations: Whereas the upgrading and rehabilitation of the existing road would improve the capacity, safety, riding comfort, time and vehicle operating cost, the impact on the natural and social environment would require effective mitigating measures and a comprehensive management and monitoring plan, both during construction and operation. The upgrading and rehabilitation of the road would require vegetation clearance, additional road construction materials from borrow pits and quarries, as well as would bring impacts such as noise and dust nuisance.

Economically, the current and forecasted traffic level requires an increase of the existing capacity of the road, since the benefit that would be accrued considering this option would be of major importance in the West African subregion. This option would ensure that the new carriageway is constructed and open to traffic before any work on the existing road commences.

From the above, the impact of upgrading and rehabilitating alternatives would require a detailed technical and financial assessment, but its social and economic advantages would outweigh the “No-Action Scenario”. The road, when upgraded would reduce the existing congestion to help reduce travel times and enhance accessibility to services. Moreover, implementing measures based on well known best practices would avoid and mitigate expected negative environmental impacts. An evaluation of the alternative actions indicated that the upgrading and rehabilitation option is considered more cost effective and sustainable based on the present environmental, social and economic analysis and projected over a period of 20 years.

**Overall, the Upgrading and Rehabilitation scenario of the ECR LOT1 road was considered as the preferred option.**

Additionally, as per the stakeholder engagement held so far as part of the ESIA process, this Project is welcomed by the consulted institutions and communities. The generic impacts were understood by these parties, including the need for resettlement (refer to Appendices C and D).

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<sup>3</sup> N2: The Ghana Eastern Corridor is a National Route which starts at Tema roundabout and ends at Kulungugu, on the North-Eastern Border with Burkina Faso.

## 2. PROJECT DEVELOPMENT

### 2.1 Project Parties

The parties involved in the Project are listed in Table 2-1

**Table 2-1 Responsible parties for the Project**

Responsible Party	Role	Responsibilities
Republic of Ghana Ministry of Finance (MoF)	Project Borrower	Leading the Project Loan Agreement on behalf of Ghana Government with Lenders
Ministry of Roads and Highways/ Ghana Highway Authority	Project Owner	Land acquisition of the Project RoW alignment Approval of the design documents prepared by INZAG Supervision of the construction works carried out by INZAG, monitoring the construction progress, and approving the Interim Payment Certificates of the Project Operation and maintenance of the road
Environmental Protection Agency (EPA)	E&S Regulator	Review and approval of all Project's Environmental & Social (E&S) related documentation. Issuing of Environmental Permits and Licenses.
INZAG Germany GmbH	EPC Contractor	Development of Project design Procurement of Project components Construction of the Project (Note: will not be Operator)
KfW-IPEX Bank	Project Lender	Provision of Project fund to Ministry of Finance
Euler Hermes Aktiengesellschaft	Export Credit Agency (ECA)	Provision of Loan Guarantee to Project Lenders
Ramboll	Independent Environmental and Social consultancy company engaged by INZAG	Provision of support to Project Lenders in assessing Project's E&S aspects
ERM	Independent international sustainability consulting firm engaged by INZAG	Development of Scoping Report Development of ESIA Report Development of Resettlement Framework
PSS Urbania	Independent local E&S consulting firm subcontracted by ERM	Supporting ERM's tasks as defined above
LCW Consult	Engineering consultant company specialized in civil engineering design, especially in transportation infrastructures and hydraulic infrastructures	Provision of Project's engineering design

## 2.2 INZAG Project Team

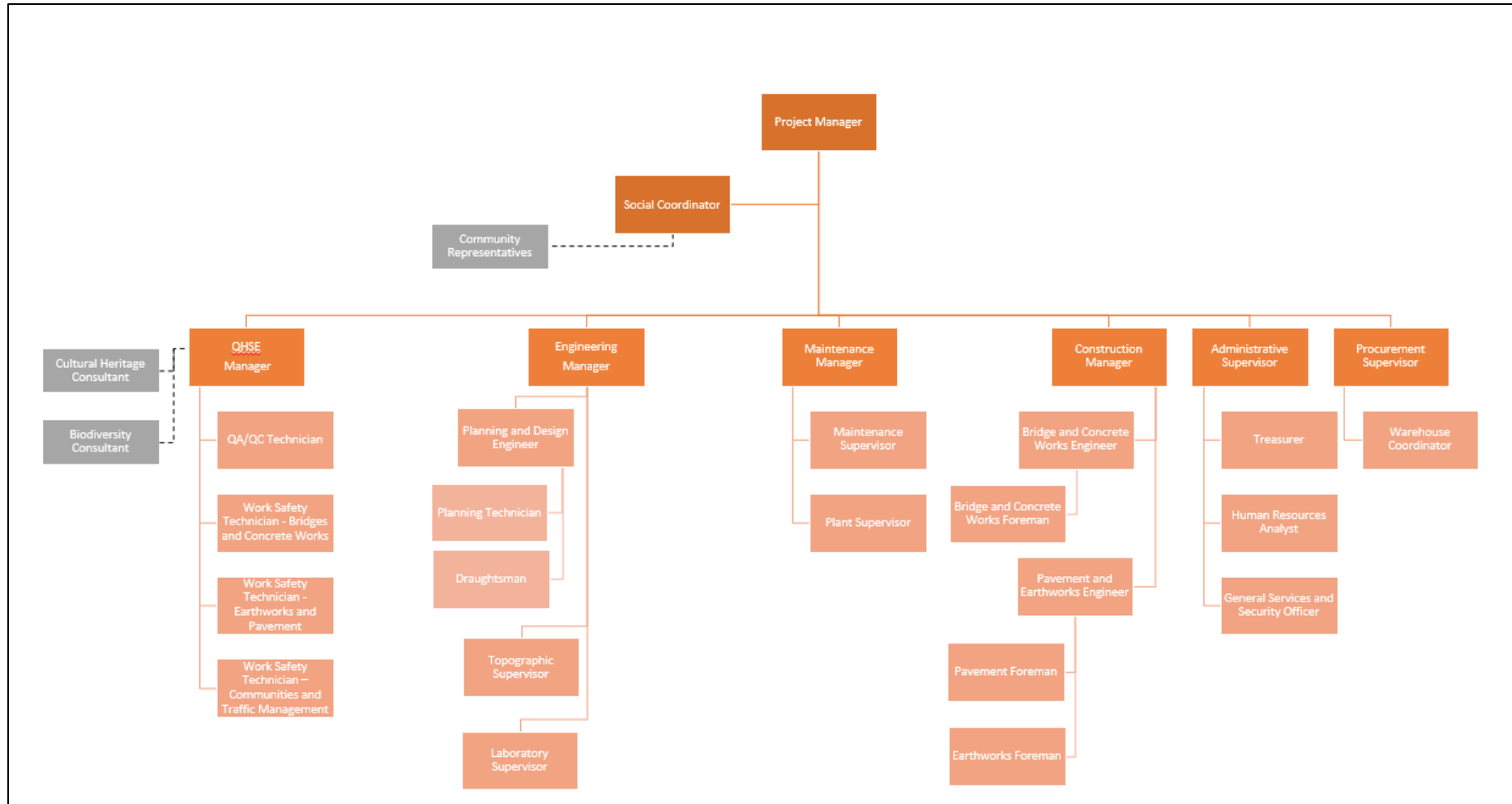
The Project will be led by an experienced team (based in both international and national experience), whose focus will be to attain the objectives of the Project. The Project Manager will receive the support of all the managers under his supervision and will be supported by GHA's and the engineer's staff, all working as one single Project Team.

The technical staff responsible for the coordination and implementation of this contract's works shall be headed by a Civil Engineer – Project Manager, accompanied by a multidisciplinary technical team, whose composition is described in the Workforce Plan – Schedule of Indirect Workforce.

Several of Inzag's team members have active experience in working in Ghana and working in ECR Lot 5 and Lot 6 Project, a similar road project to the ECR Lot 1, located further North in the Country.

The relationship and the description of the overall responsibilities of each manager are outlined in the following general Organizational Chart. The QHSE component is currently under discussion, and will be further shared in the ESIA, including related roles and responsibilities.





Source: INZAG 2020

Figure 2-1 INZAG’s Organizational Chart

## 2.3 Project Area

The definition of the Area of Influence (Aoi) given in IFC Performance Standard 1<sup>4</sup> is used during the impact assessment. The Aoi encompasses:

- The area likely to be affected by:
  - (i) the Project and INZAG's activities and facilities that are directly owned, operated or managed (including by subcontractors) and that are a component of the Project;
  - (ii) impacts from unplanned but predictable developments caused by the Project that may occur later or at a different location; or
  - (iii) indirect Project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.
- Associated facilities which are facilities that would not have been constructed or expanded if the Project did not exist and without which the Project would not be viable.
- Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The Project Aoi includes the footprint of all Project activities and a larger working strip typically of 500m either side of the corridor (in total 1000m) to include the areas in which a direct or indirect impact on the physical, biological, social or cultural environment might occur. For impacts on air quality and noise specifically, an Aoi within 200 m of the road alignment was considered because the Project will cause changes in traffic volume and speed in its operational phase.

## 2.4 Project Design And Land Restrictions

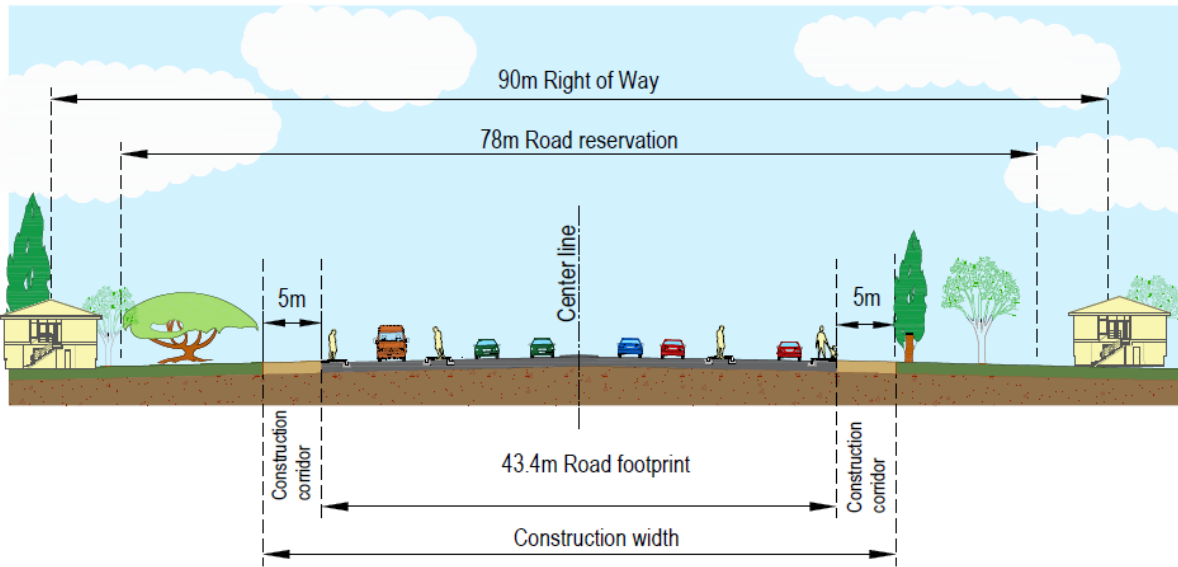
The alignment of the expanded roadway will be within the 90 m Right of Way (RoW) of the existing N2 route. A number of corridors are established within these 90 m that will have different restrictions with regard to land-use and access during construction and operation of the Project (as depicted below). Note the listed corridors and respective restrictions present the 'worst-case' scenario. To avoid, minimize and reduce environmental and social impacts, INZAG may reach specific agreements with GHA to modify the below listed restrictions. These negotiations are as yet to be arranged and will commence after signing of the contract between INZAG and GHA – assumed in September 2020.

An illustrative draft sketch of the RoW is given in Figure 2-2, Figure 2-3 and Figure 2-4. Restrictions associated with the different components of the roadway are further described in Table 2-2.

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<sup>4</sup> IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts, January 1, 2012.

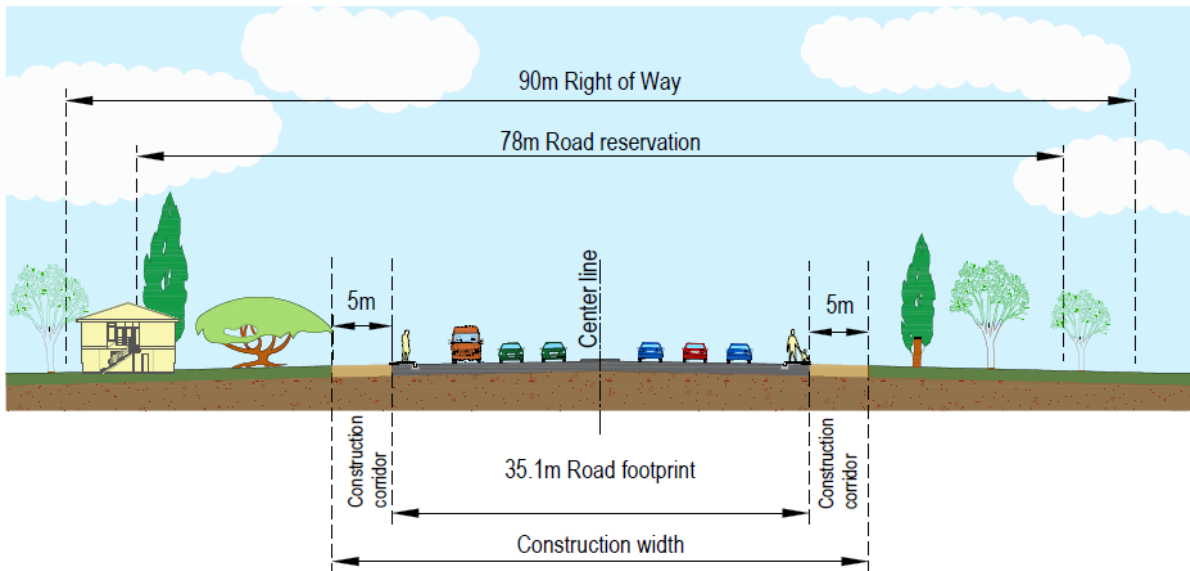
### 2x2 Lanes + Local Lane



Source: ERM 2020

**Figure 2-2 Cross Section of Stretch 1 – 2x2 Lanes + Local Lane**

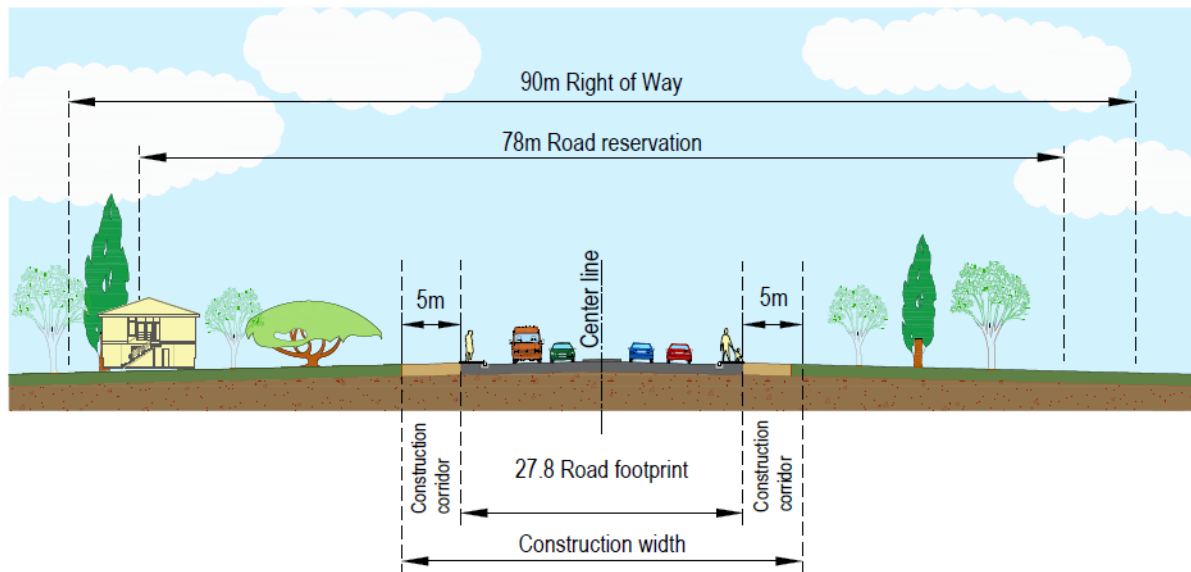
### 2x3 Lanes



Source: ERM 2020

**Figure 2-3 Cross Section of Stretch 2 – 2x3 Lanes**

## 2x2 Lanes



Source: ERM 2020

**Figure 2-4 Cross Section of Stretch 3 – 2x2 lanes**

**Table 2-2 Land Restrictions by the Project during Construction and Operation**

Component	Width	Description	Project Activities	Restrictions	
				Construction Phase	Operation Phase
<b>Right of Way (RoW)</b>	90 m (45 m either side of the road centreline)	Corridor established as required by the national planning standards for roads (refer to 'Zoning Guidelines and Planning Standards' 2011). The RoW of 45 m either side of the centreline. Acquisition of Land Rights by Ghana Highway Authority has been completed (for the development of the N2 route in the 1990s). This corridor is subdivided into <u>3 smaller</u> corridors each with different restrictions as follows:			
<b>A - Road Reservation</b>	78 m (39 m either side of the centreline)	Land corridor that is already under the ownership of GHA. It includes the Road Footprint and Construction Corridor. All construction activities will be implemented within this corridor. INZAG will try to limit the ground disturbance width to 60 m to the extent possible to avoid and to minimize the environmental and social impacts by implementing smart design solutions and construction techniques.			
<b>B - Construction Width</b>	Between 24 m and 55 m	The Construction Width includes : <ul style="list-style-type: none"> <li>the footprint of the road including the pavement layers, the sidewalk layers, the earthworks layers, the embankments and the drainages service lanes; and</li> <li>5 m on either side of the road footprint corridor which includes construction areas plus access roads. This is also to be temporarily cleared to facilitate the construction activities. In some areas (e.g. Shai Hills Resource Reserve), the centerline of the road can be changed or the construction corridor will occur only in one side of the road, in order to reduce the impact on the environment.</li> </ul> Details about the two components are included below:			
<b>- Road Footprint</b>	Between 14 m and 45 m	Between 14-45 m to establish the pavement layers, the sidewalk layers, the earthworks layers, the embankments and the drainages. The existing road will be extended and widened. Additional lanes will be added (max. width of 45 m in first 14 km, 2x2 lanes +2x1 Local Lane).	<u>Construction:</u> Land clearance. Removal of all trees and crops. Removal of all houses and structures. <u>Operation:</u> N/A (area will be paved/built)	No new trees or crops. No new houses / structures. No entry for pedestrians in areas under construction (for safety reasons.) Low speed limits for vehicles crossing sections	No new trees or crops. No new houses / structures.
<b>- Construction Corridor</b>	2 corridors of 5 m either side of the Road Footprint corridor.	In addition to the footprint of the road, a corridor of 5 m width on either side of the road will be needed during construction.	<u>Construction:</u> Land clearance. Removal of all trees and crops. Removal of all houses and structures. Trees and vegetation will be reinstated to its original status after construction completion. <u>Operation:</u> None.	No new trees or crops. No new houses / structures. No entry for pedestrians (for safety reasons.) No business activities. Low speed limits for vehicles crossing sections.	No construction of new permanent houses or structures. No new crops and permanent plantations. No permanent activities. Permits for temporary activities may be obtained (e.g. commercial activities, street vendors). Trees and vegetation will be reinstated to its original status or additionally planted to possibly use the corridor as recreational space and maintain the safety buffer.
<b>C - Remaining Right of Way area between the Construction corridor limits and the limits of the 90 m RoW.</b>	2 corridors of 33 m - 17.5 m (depending on width of the road footprint) either side of the Construction Corridor.	Remaining area of the right of way where both houses/structures and trees/crops are allowed.	<u>Construction:</u> ■ Existing buildings can remain provided these are outside the Construction Width. <u>Operation:</u> ■ None.	None.	None.



For establishing the detailed design, INZAG is considering both Ghanaian and international standards including the IFC EHS Guidelines for Toll Roads. The Guideline design and implementation recommendations will be taken in account when preparing the relevant management plans under Environmental and Social Management Plan (ESMP).

The Project's latest design dates in May 2020<sup>5</sup> and will likely not be ready as Final Design when the ESIA studies are completed. Therefore, the Design Change Management Procedure (DCMP) will be an integral part of the ESIA and used by INZAG to assess and mitigate all E&S risks in the case a change in the Final Design is required (refer to Appendix A).

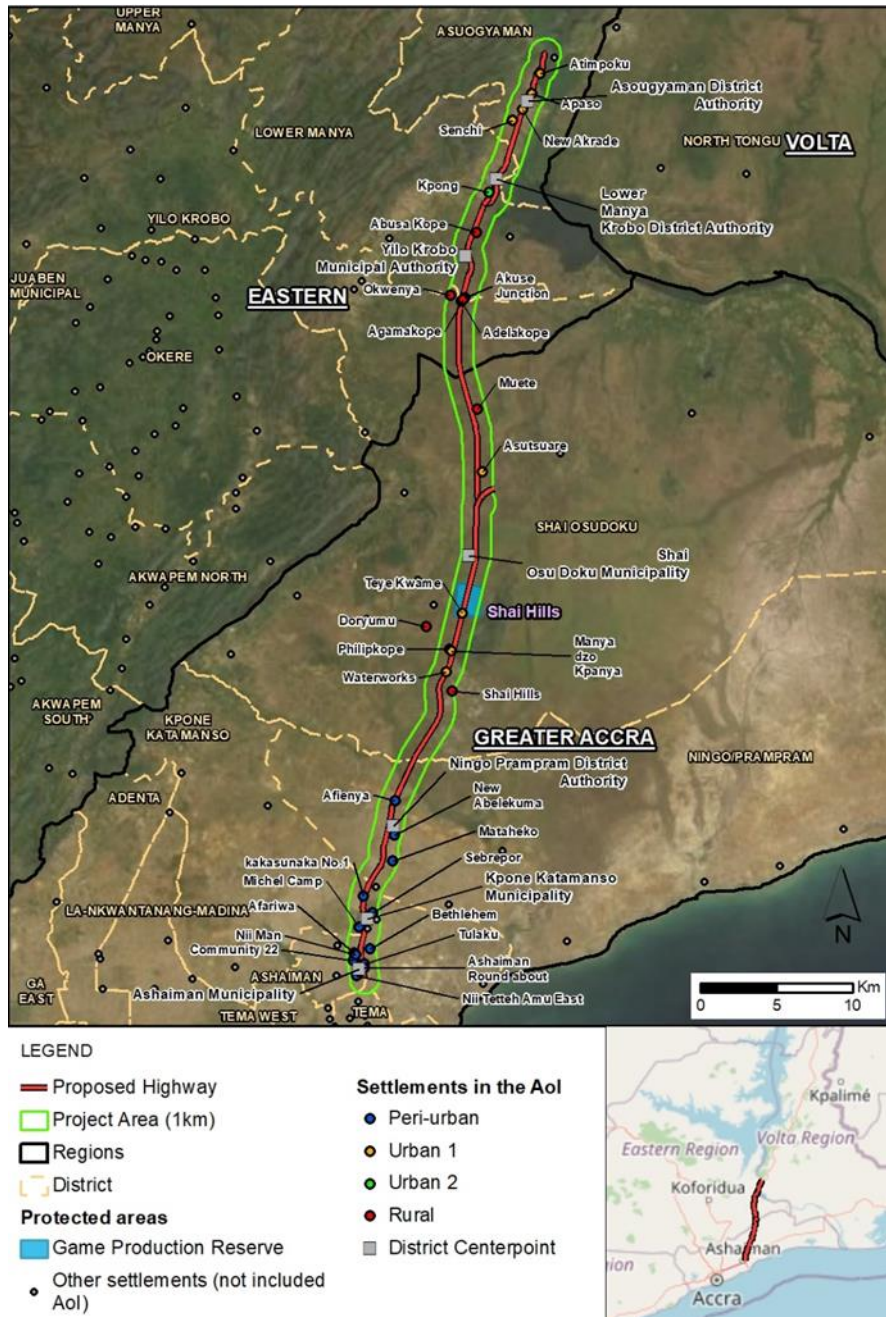
GHA and INZAG are committed to continue the process of working with environmental and social specialists during the detailed design and construction to keep the impacts as low as is reasonably practicable. The ESMP will have a standalone section including design requirements and will be kept up to date with any additional mitigation as the Project moves forward.

#### **2.4.1 The Overall Road Alignment**

The existing Ashaiman Roundabout - Kpong - Atimpoku - Akosombo Junction has a total length of about 64 km. The road is located on the south-eastern part of Ghana and is a part of the ECR, connecting the towns of Tema with Kulungugu on the border with Burkina Faso. This road connection presents, in general, a South/North direction as presented in Figure 2-5:

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<sup>5</sup> Advance Design Report dated 18.05.2020 prepared by LCW on behalf of INZAG



Source: ERM 2020

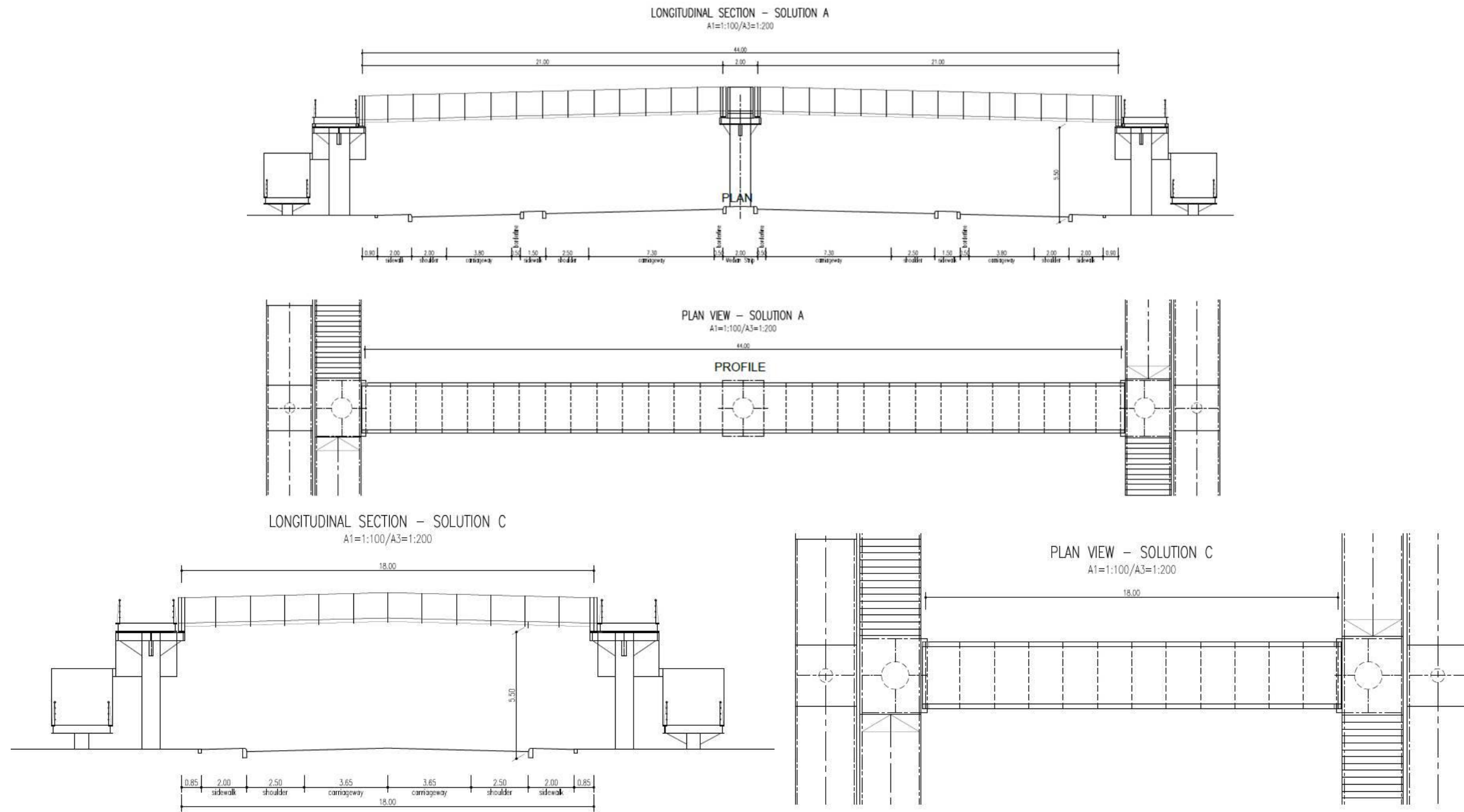
**Figure 2-5 Overall Road Alignment**

An overview of the key road elements is given below. This includes design descriptions and specifications based on the latest information provided by INZAG and as the ESIA process progresses.

### *2.4.1.1 Cross Sections*

The rehabilitation of the N2 between PK 0+760 and PK 64+700 shows a variable cross section, regarding its geometry, namely the number of road platforms which constitute it, the platform width and the number of lanes per platform summarized as follows:

- 2x2 Lanes + Local Lane: PK 0+760 to 6+320;
- 2x3 Lanes: PK 6+320 to PK 13+430;
- 2x2 Lanes: PK 13+430 to PK 53+700;
- 2x1 Lanes: PK 53+700 to PK 64+700;



Source: INZAG 2020

Figure 2-6 Typical Cross Sections



### 2.4.1.2 Junctions, Exits and Entrances

Along the 64 km of this stretch of the N2, several urban areas are crossed, as per the different needs. To preserve the articulation with the existing network and minimize disturbances in this national road, the design includes two roundabouts, one interchange and six at-grade intersections:

- The Ashaiman Roundabout is located at the initial part of the alignment, and is planned without at-grade intersections. For this purpose, there is one fly-over at this intersection.
- Asutsuare Interchange provides the efficient and safe ECR connection with the other new Ghana Government planned road, between Odumase Krobo and Asutsuare.
- The Kpong roundabout, located around 53,7 km, provides the connection towards Odumase Krobo.
- The six at-grade intersections are located at the major junctions and provide left-turn lane, to prevent accidents and minimize interfering with N2 capacity. Where feasible based on the roadside developments, the design provides deceleration and acceleration lanes.

Table 2-3 indicates the approximate location of the roundabouts, the interchange and the at-grade junctions.

**Table 2-3 Roundabouts and Junctions**

Designation	Chainage
Ashaiman Roundabout	1+400
Sebrepur Junction	3+725
Gbetsile Junction	6+347
Afiencya Junction	13+293
Doryum Junction	23+463
Asutsuare Interchange	33+500
Akuse Junction	46+940
Kpong Roundabout	53+700
Akosombo Junction	64+300

Source: Advance Design Report dated 18.05.2020 prepared by LCW on behalf of INZAG

### 2.4.1.3 Bridges

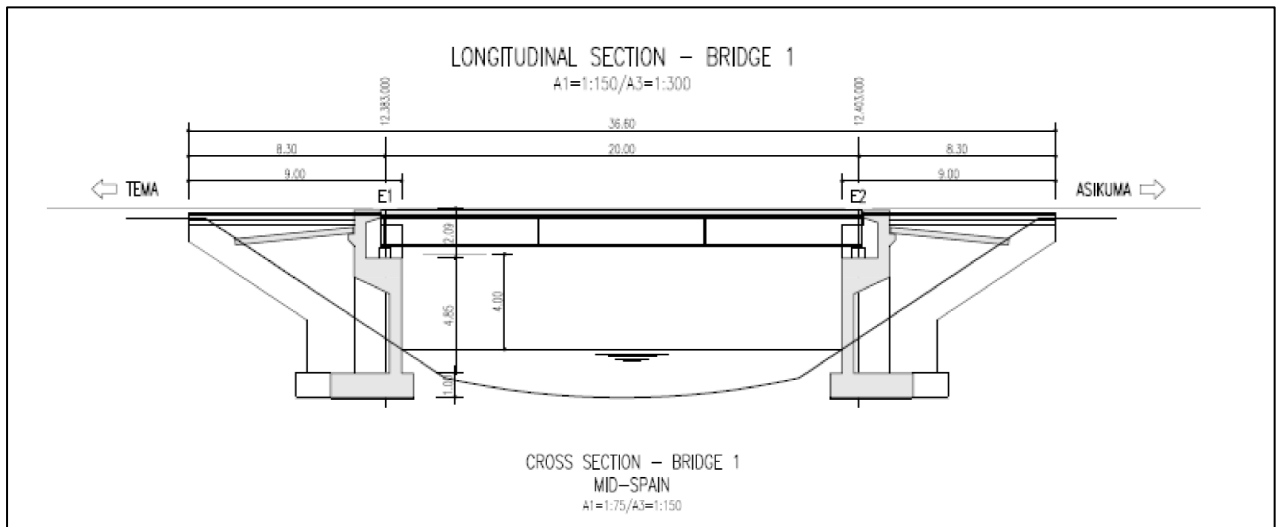
The three bridges to be built are simple supported composite steel-concrete decks formed by a multi-girder deck and a reinforced composite steel-concrete slab. The new bridges will be constructed at the same locations/adjacent to the existing two-lane bridges. The length of the bridges and the widths are presented in Table 2-4:

**Table 2-4 Bridges 1,2,3**

Bridge	km	Length (m)	Number of decks	Total width (m)
Bridge 1	12+393	20	2	31.70
Bridge 2	14+608	60	2	24.40
Bridge 3	49+713	40	2	24.40

Source: Advance Design Report dated 18.05.2020 prepared by LCW on behalf of INZAG

Typical longitudinal and cross sections of Bridge 1 are presented in Figure 2-7.



Source: Advance Design Report dated 18.05.2020 prepared by LCW on behalf of INZAG

**Figure 2-7 Cross section Bridge 1**

#### 2.4.1.4 Fly-Over 3

The current design includes one fly-over over the first roundabout and one bridge over the planned road at Asutsuare (Km 33+500), in order to prevent at-grade intersections.

Each deck has an overall width of 15.6 m, which comprises two longitudinal “I” girders spaced by 6.50m. Transversally to these beams there are ribs/crossframes with “I” section across all the deck width, spaced 4 m. The cantilevers of these ribs have variable height (see Figure 2-8).

The piers for each deck have two circular sections supported by shallow foundations. The abutments are counterfort type with shallow foundations and wingwalls with mechanically stabilized earth walls.

The positioning of the steel deck will be carried out by heavy lifting and the concrete slab will be executed using steel decks panels and an in-situ pouring. The connection of the slab and the girders is achieved with shear studs.



Source: Advance Design Report dated 18.05.2020 prepared by LCW on behalf of INZAG

**Figure 2-8 Similar Deck of the Fly-Over 3**

### 2.4.1.5 Overpasses (Pedestrian Crossing Bridges)

Several pedestrian crossing bridges (PCBs) are proposed along the roadway to allow pedestrians to safely cross the road without vehicle interference. The span of these pedestrian bridges varies depending on the cross-section width of the road. For this reason, there are three different solutions for the proposed pedestrian bridges.

All PCBs are planned as steel structures with three different types according to the width of the road that they shall have to cross at the place of their corresponding implantation as defined in Table 2-5.

**Table 2-5 Types of PCBs**

Types of Pedestrian Crossing Bridges	
Type	Length (m)
A	44
B	36
C	18

Source: Advance Design Report dated 18.05.2020 prepared by LCW on behalf of INZAG

In both sides of the overpass there are stairs and ramps with steel decks and piers as shown in below exemplary in Source: *Google Earth*

Figure 2-9. The support of the piers of the main girder, stairs and ramps are accomplished with reinforced concrete shallow foundations.

At this stage, PCBs are proposed to be built at the most urban regions of the road alignment. The exact quantity and locations will only be defined at executive design stage, where also input from local communities will be taken in consideration. Additionally, INZAG is liaising with GHA in assessing the feasibility of using traffic lights and speed bumps, as a preferred option by the stakeholders. The locations of the proposed PCBs and/or traffic lights, speed bumps will be decided based on the discussions among the community, community assemblies and GHA and INZAG.

INZAG will design and construct the proposed PCBs after receiving approval of GHA. PCBs will be built within the approved RoW alignment, therefore no additional land or resettlement will be required.

Furthermore, design and construction of the proposed PCBs will include ramps in order to facilitate access by physically impaired persons, bicyclists or local vendors with pushcarts or prams.





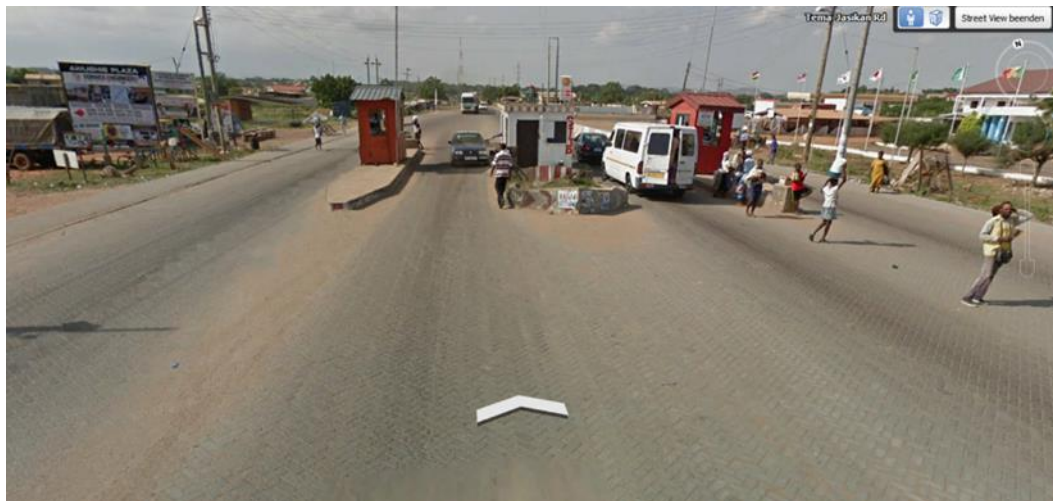
Source: Google Earth

**Figure 2-9 Similar PCB**

#### 2.4.1.6 Toll Stations

At this stage, the Project design foresees only one toll booth station located near the existing one, at 11+400 Km (see Figure 2-10).

The number of tollbooths at this station in the future will depend on the flow of vehicles as well as of the service rate of each tollbooth.



Source: Google Earth

**Figure 2-10 Existing Toll Booth**

At the time that the existing toll station on the N2 was built, the location was essentially at the northern outskirts of Greater Accra.. However, constant development and expansion of settlements in this part of Accra in recent years means that the toll station is now in close proximity to the urban areas.

The standard toll booth module is 5.0 m wide and it encompasses a 3.0 lane width and a toll island 2.0 m wide. An extra 3.0 m shoulder is recommended on the periphery of the toll lanes to accommodate abnormal vehicles or for future plaza expansion.

The table below describes the current toll amounts as specified by the operator of the N2 road, GHA<sup>6</sup>.

**Table 2-6 Toll road fees**

Class	Type of Vehicle	Existing Fee of the Road as of September 2020
1	Motorcycles	50 Pcs (0.5 GHS)
2	Small Vehicles (2 Axles)	1 GHS
3	Large Vehicles (3-4 Axles)	2 GHS
4	Trailers (Long Heavy Vehicles – 4+Axles )	2.5 GHS

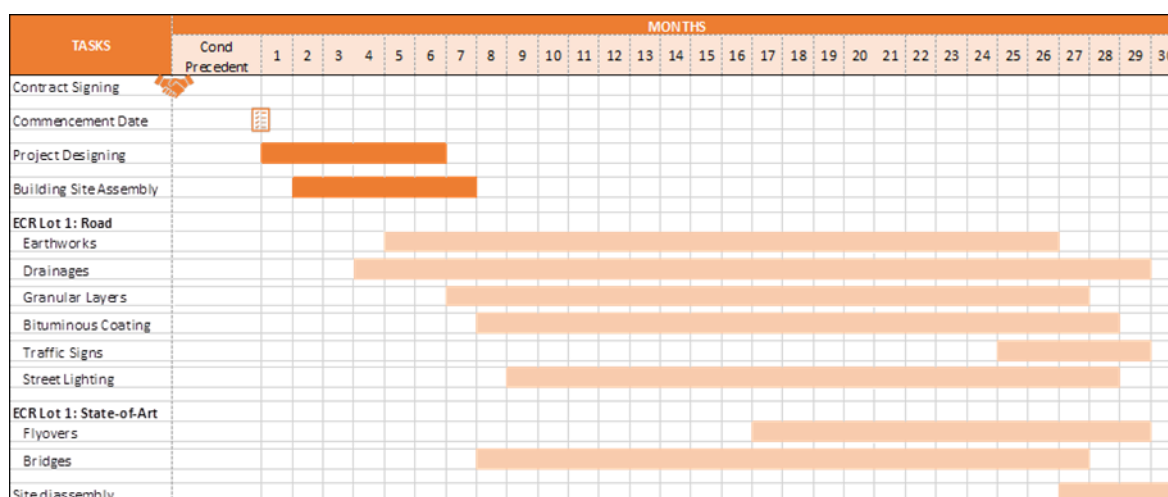
Source: Information Pannel at Toll Gate

The above table does not reflect the fees of the new road since they have not been defined by GHA.

### 2.4.2 Overall Approach and Programme

The Construction period is planned for 30 months (Figure 2-11), based on 8-hours daily shift, from Monday to Friday, plus 4 working hours on Saturdays. The outline of construction programme considers the following aspects:

- As the existing road is already being actively used by vehicles and pedestrians, INZAG will schedule and implement the construction programme in such a way to enable continuous vehicle and pedestrian traffic flow at all times;
- Optimizing the resources existing at the construction works, creating work-fronts which enable reduced downtime and make the best use of production rates; and
- Optimizing transport distances of the excavated materials and their placement in landfills by combining these two activities appropriately.



Source: INZAG 2020

**Figure 2-11 Draft Construction Programme**

<sup>6</sup> Note: approximate exchange rate as of September 2020: (using NEW currency) 1 GHS = 0.15 EUR).

### 2.4.3 Construction Activities and Sequencing

INZAG envisages the execution of the road works by two different teams in 2 sections equipped with all the necessary resources regarding both workforce and equipment, as follows:

- Section 1 or the “Urban Section” extends from KM 0+760 to KM 13+500; and
- Section 2 or the “Rural Section” extends KM 13+500 to KM 64+440.

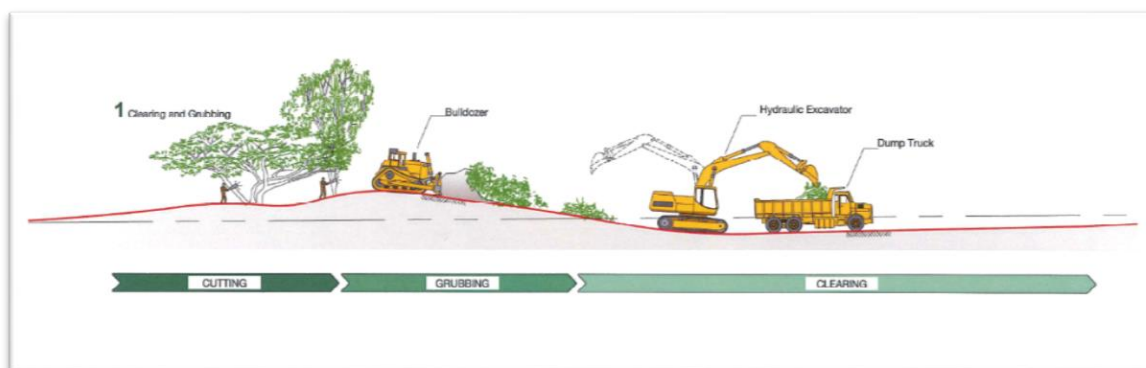
Each Section shall be built according to its specificities with regards to safety conditions, particularly for the users of the more urbanised stretches, and generally mitigating the interference and disturbance caused by construction works to the infrastructure’s daily use by the local population.

Typical construction activities will include site clearance works, excavation and movement of soil, embankment construction, construction of the various elements of the road (main road, access roads, viaducts, bridges, tunnels, culverts etc.) and their associated sub-elements (e.g. sub-base, road surface, pavements, concrete and steel works, retaining walls, drainage infrastructure and features etc.), soft and hard landscaping features, and finish works (lighting, signs, road markings, etc.).

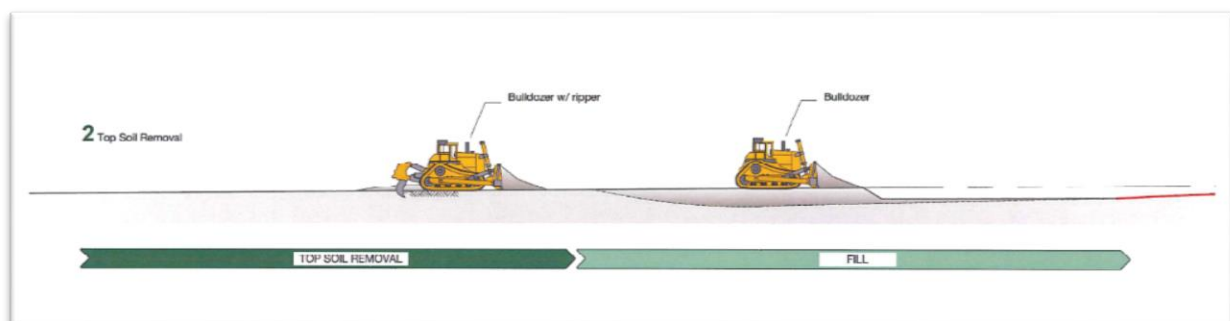
#### 2.4.3.1 Road Construction

The main activities of the road construction will follow these steps (INZAG, 2020):

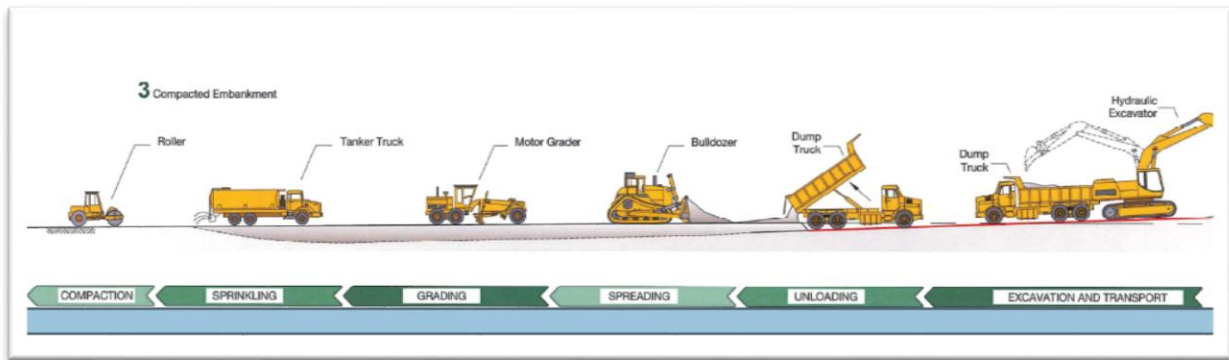
- **Step 1 - Clearing:** Clearing of vegetation and the cleaning of all the intervention area necessary to the road widening.



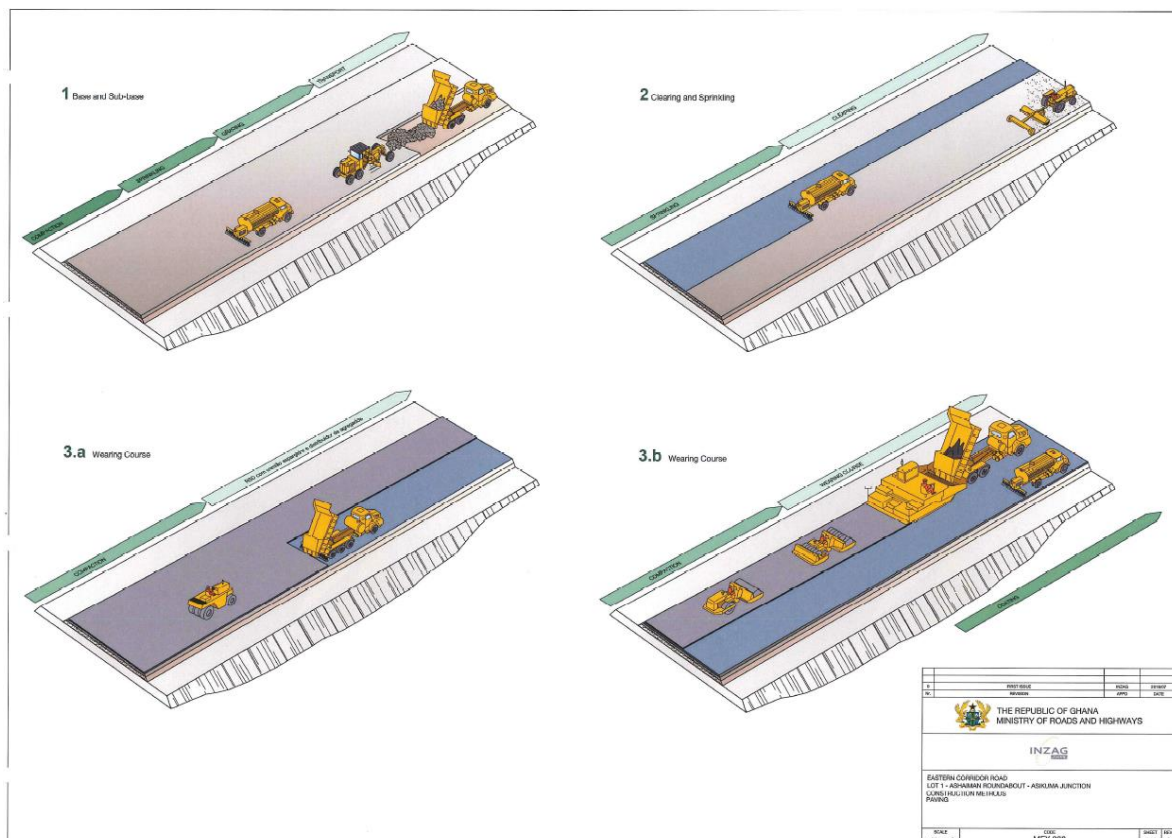
- **Step 2 - Topsoil Stripping and Filling:** After vegetation clearing, the same team shall perform the stripping of the soil, in order to remove the topsoil layer.



- **Step 3 - Excavation:** After preparing the soil, INZAG shall start the excavation works, which, in this case, refers to the road platform and its drainage system of the landfill bases necessary to establish the Project levels. All this excavated material shall be carried to designated dumpsites while the landfills to be performed shall be made with earth originating from borrow pits situated in the region.



- **Step 4 - Granular Layers:** After earth-moving works and once the pavement crowning level is established, the layers which shall compose the pavement shall be launched. Over the pavement crowning layer, it is planned to apply a 20 cm sub-base layer in lateritic material. Over it, a base layer in graded crushed stone with a thickness of 15 cm shall be performed.
- **Step 5 – Pavement Layers** - After the execution of the base layer, Inzag shall execute the edge kerbs and the ditches, which will enable the future execution of the sidewalks and of the thin layers of pavement in bituminous materials - the binder and wear layer, in compliance with the execution project to be approved by the Employer.



- **Step 6 - Drainages:** Depending on the draining elements of the road, cross drainage elements or longitudinal drainage elements, the drainage construction will follow the earth levelling works.

### 2.4.3.2 Engineering Structures – Bridges

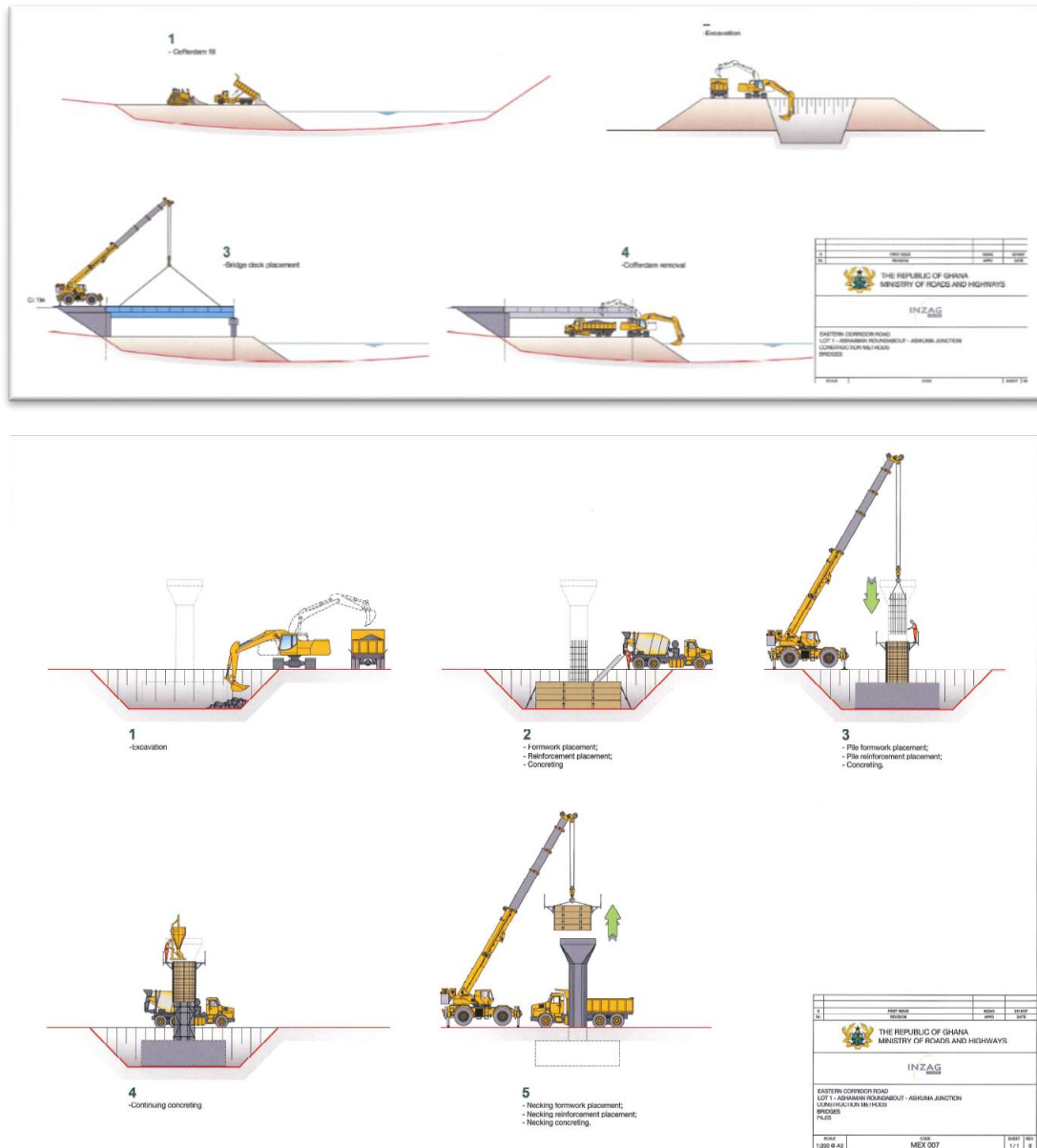
Part of the Project’s Scope is to replace existing bridges so that they can integrate the larger new road profile.



INZAG's approach will be the non-interruption of the traffic flow of the existing N2. To achieve this, the new bridges are composed of two road platforms and INZAG will use the existing bridge while one of the platforms of the new bridge is being built. Once the new platform has been built, traffic shall be directed to the new platform, and the existing bridge will be dismantled. Afterwards, in that same place, the second road platform of the new bridge shall be built.

The steps planned for the construction of the new bridges and the fly-over on the N2 are as follows and illustrated with construction methodology shown in Figure 2-12:

- Clearance of vegetation and cleaning;
- Earth-moving to open foundations;
- Infrastructure – abutment and column direct foundations, in the bridges where they exist;
- Mesostructure – elevation of the abutments and pillars, in the bridges where they exist;
- Superstructure – deck, including support devices and expansion joints; and
- Finishing – drainage, sidewalks and kerbs, cornices and guard-rails.



Source: INZAG, 2020

**Figure 2-12 Bridge Construction Methodology**

Given the execution time and the amount of work involved in each engineering work, INZAG plans to execute all the road engineering works following a specified sequence and by making the best use of each team's work specialty. This means that for the construction of the engineering works, INZAG plans to have 4 teams in charge, respectively, for:

- Earth-moving;
- Concrete works (concrete, steel, formwork);
- Steel structure works; and
- Finishing (sidewalks, rails, etc.).

Thus, the earth-moving team shall start the work in bridge *i*, and then shall move to the following bridge *i*+1. During this time, the concrete works team shall start in bridge *i*. Once the works are finished, the earth-moving team shall perform the works in bridge *i*+2, the concrete works bridge shall

move to bridge i+1 and the metal structures team shall start in bridge i. Team rotation shall proceed according to this sequence.

#### **2.4.4 Utilities Relocation**

The key existing infrastructures and services where displacement will be needed will include the following:

- Irrigation infrastructures;
- Water supply infrastructures;
- Electricity supply infrastructures;
- Telecommunication infrastructures,
- Railway infrastructures; and
- The infrastructures and services identified based on the stakeholder feedback and concerns raised during the stakeholder engagements.

There are two major lines of the Ghana Water Company Limited (GWCL) from the Kpong waterworks that run through the communities on the right side (west side) from Kpong to Tema.

The GWCL raised their concerns during the scoping meeting conducted on 10<sup>th</sup> January, 2020 since there are several pipelines, different sizes and made of different materials along the proposed road corridor. Their main concerns are as follows:

- Road construction has a high potential to damage the pipeline infrastructure, and any interruptions may be very significant to the consumers, especially the industrial users. A one-hour service interruption can take 24 hours to reconnect because the entire system has to be shut down and restarted;
- GWCL cannot afford to take the line off for more than a day. Where there will be a relocation of a pipeline, the contractor will have to undertake all the preparatory works so that the necessary connections can be made without much delay;
- The areas closest to the water supply points have the highest pressures which could go up to 30 bars. This pressure could kill/injury workers (or public) close to the broken pipeline; and
- The contractor will encounter many PVC pipelines during construction works.

There are also electricity pylons carrying power from the Akosombo Dam along the road, as well as fibre optic cables belonging to the telecommunication companies buried along the road.

Displacement necessities of infrastructures will be surveyed, budgeted and executed by respective companies, with INZAG's supervision and approval from GHA.

#### **2.4.5 Construction Equipment**

Typical construction equipment planned to be used respectively at different stages of the Project is provided in Table2-7.

**Table 2-7 Construction equipment**

Earthwork Equipment	Roadwork Equipment	Engineering Structures Equipment
Backhoe	Hydraulic Driller	Mixer
Bull Dozer	Crawler excavator	Concrete Pump
Wheel Loader	Generator	Mobile Crane
Truck	Truck	Crane mounted on a truck
Hydraulic driller	Finisher	Vibrator
Steam Roller	Tandem roller	Motor pump
Grinder	Wheel roller	Wheel loader
Sprinkler	Sweeper	Backhoe
Grader	Distributor	Bull dozer
Compactor	Sprinkler	Truck
Roller	Grinder	Grinder
Water Tanker	Wheel loader	Roller
	Compressor	
	Asphalt milling machine	

Source: INZAG, 2020

### 2.4.6 Construction Employment

The Project plans foresee a total of 967 workers during the construction peak, 95% of which will be locals (Figure 2-13). Expatriate workers will come mostly from Germany, including for the following roles: Project Director, Production Managers, Engineering Managers, Planning Engineers, Equipment Manager, Environmental and Social Specialists, topography and laboratory Engineers (whose skills are not easily available in-country), some of which participated in the renovation of Lots 5 and 6, and therefore acquired valuable experience regarding local specificities.



Source: INZAG, 2020

**Figure 2-13 Workforce Planner**



## 2.5 Associated Facilities

### 2.5.1 Overview

The Associated Facilities are the (often third-party) facilities which are not funded as part of the Project and that would not have been constructed or expanded if the Project did not exist and without which the Project would not be viable.

Activities associated with constructing and operating these facilities are considered associated components of the Project for the purpose of the ESIA<sup>7</sup>.

Among others, the main Associated Facilities to be considered in ESIA are:

- Quarries and Borrow Pits;
- Dumpsites;
- Construction Camps;
- Access Roads; and
- Batch and Asphalt Plants.

The following table provides a list of Project Facilities and respective details:

**Table 2-8 Project Facilities**

PROJECT FACILITIES			
	Facility	Details	Associated Facility/Supplier
1	Third Party Fuel Stations along the RoW	The few Fuel Stations that need to be demolished and potentially rebuilt elsewhere	Associated Facility
2	Third Party Fuel Stations along the RoW	The Fuel Stations that can remain in RoW alignment by SMART design	Associated Facility
3	Existing Access Roads	Not Applicable	Not Applicable
4	New Access Roads	In case new access road construction is needed	Associated Facility
5	Third Party Quarries	Not Applicable	Local Supplier
6	New Quarries (if needed)	In case new quarries are to be opened and operated by INZAG and GHA	Associated Facility
7	Borrow Pits	In case they are located <u>inside</u> of the RoW alignment	Not Applicable
8	Borrow Pits	In case they are located <u>outside</u> of the RoW alignment	Associated Facility
9	Campsites	KM 17+290 and at KM 47+175	Associated Facility
11	Dumpsites	In case they are located outside of the RoW alignment	Associated Facility
12	Batch Plant	Located within the Campsite at KM 17+290	Associated Facility
13	Asphalt Plant	Located within the Campsite at KM 17+290	Associated Facility

<sup>7</sup> For this MDR and ESIA, the IFC definition of Associated Facilities is used per IFC Performance Standard 1: "Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable". The ESIA will further elaborate on how these are defined by the OECD Common Approaches.

## 2.5.2 Quarries, Borrow Pits and Dumpsites

INZAG plans to procure the aggregates from the existing quarries in the region and open the borrow pits within the RoW alignment when/if needed.

Based on the review of INZAG's Advance Design Report (dated 18.05.2020 prepared by LCW), the potential list of quarries were identified - although have not been confirmed yet since it will be subject to the Contract agreement with INZAG and GHA (refer to Section 6.5).

The EHS considerations that will need to be taken into account in the selection of appropriate quarry sites and access routes will be based on IFC General EHS Guidelines. At a minimum, INZAG will:

- Check if the permits and license are in place;
- Avoid using the quarries which have negative impacts on designed naturally or culturally valuable areas (such as the Shai Hills Resource Reserve);
- Prioritize the already opened and permitted quarries;
- Consider the distance to the road alignment; and
- Consider the community health and safety risks.

It is estimated that approximately 1 170 000 tons of aggregates will be used during Construction Stage, which are planned to be procured from five quarries in the Project vicinity. These quarries in Project vicinity have production quantities ranging from 600.000 tons to 1.000.000 tons/year, resulting in an average production of 800.000 tons/quarry/year. Based on INZAG's calculations, they will only use 15% of all five quarries' yearly production.

The existing capacity of the quarries within the Project vicinity is assumed to be adequate to cater to the aggregate requirements of the Project. However, in case INZAG decides not to use an existing quarry but to open up a new one, the application and approval procedures for acquiring a quarry license will be in line with Ghana regulations and Project E&S requirements, including implementation of Design Change Management Procedure.

It is estimated that approximately 850.000 m<sup>3</sup> of borrow material will be used during the Construction Stage. INZAG will prioritize to use the borrow pits located within the RoW alignment after receiving relevant permits where required. In case new borrow pits outside of the RoW alignment are needed, then the same application and approval process will need to be implemented as defined in above paragraph for the quarries (refer to Section 6.5).

Estimated amount of excavation will be in a range between 600 000 m<sup>3</sup> to 1 200 000 m<sup>3</sup> and excavated material will be reused as backfill wherever possible. To achieve this, INZAG considers "0" net surplus material target during design to avoid waste generation.

In case the Project activities end up with net surplus material, the priority will be reusing the surplus material to reinstate the borrow pits along the RoW alignment. In case this option is not applicable, INZAG will use dumpsites to store the surplus material and implement the Design Change Management Procedure during the selection and approval process to comply with Project E&S requirements (refer to Appendix A).

In case new quarries, new borrow pits and new dumpsites outside of the RoW alignment are needed, the application and approval procedures will be in line with Ghana regulations and Project E&S requirements. The following actions that will be taken by INZAG within the approval process to avoid potential E&S risks:

- INZAG will develop an Aggregate and Surplus Material Management Plan (AgSMMP) which will include:
  - Development of site selection plan in line with IFC General EHS Guidelines (IFC, 2007) as well as guidelines for IFC EHS Guidelines for Construction Materials Extraction (IFC, 2007). The site selection plan will include the requirements related with the noise, air quality,

proximity to sensitive receptors, community HS, vibration issues (blasting), habitat and biodiversity among other considerations for the selection and use of these quarries.

- Design aspects that reduces additional work / excavation required for rehabilitation of the quarries and borrow pits and dumpsites.
  - The resultant shaping / forms of the benches and walls are appropriate to the surrounding natural landform.
  - Development of rehabilitation plan.
  - Development of risk assessment including the expected traffic volumes and affected routes.
- INZAG and GHA will obtain all necessary permits in line with applicable Ghanaian regulations
  - INZAG will implement E&S studies in accordance with Design Change Management Procedure.
  - Additional E&S Studies will be conducted where needed to comply with the E&S Requirements. The results of these studies will be communicated to the stakeholders and the Lenders for review.

These above requirements will be included in the final ESIA and will also be a part of the Project ESMP.

### **2.5.3 Construction Camps**

Two campsites are foreseen by INZAG at KM 17+290 and at KM 47+175 (Figure 2-14), which are expected to accommodate approximately 100 workers. The housed workers will include both expatriates and Ghanaian Nationals who do not live close to the project area. Based on the current understanding of the scale of the project, and the available workforce, and the local labour market, it is expected that the vast majority of the required workers are available from the existing labour pool.



Source: INZAG, 2020

Figure 2-14 Campsites

All temporary site offices, warehouses, workshops, worker camps, dining halls and surrounding fences around respective facilities will be constructed in accordance with the specifications and regulations of occupational health and safety. Required facilities for accommodation, meals, sanitation and welfare will be provided in camps in accordance with local requirements and in line with Workers' Accommodation Processes and Standards IFC & EBRD Guidance Note. Campsites will have special Female Accommodation Blocks separated from Male Accommodation Blocks.

A General Layout of the Main Campsite at KM 17+920 is given below in Source: *INZAG, 2020*

Figure 2-15, which also includes Batch Plant and Asphalt Plant as shown.





Source: INZAG, 2020

Figure 2-15 Main Campsite at KM 17+920

## 2.5.4 Access Roads

INZAG plans to use the existing N2 and other adjacent access roads, and at the moment there is no plan in place for the construction of any new access roads.

The maximum daily contribution of Project-related construction traffic to the actual N2 Road Traffic Volume is estimated to be less than 1,5% considering the below figures:

- INZAG's total construction traffic: 390 vehicles /day (including transportation of removed bitumen and asphalt, earthworks, quarry material, asphalt and concrete)
- Tema Akosombo Road daily traffic 28.680 vehicles /day<sup>1</sup>

INZAG will apply best practices to avoid and minimize the potential E&S impacts caused by access roads. The mitigation measures will be incorporated within the Traffic Management Plan, which will take the following key issues in consideration:

- Arrangements and routes for unusual/ wide loads (if required) to be agreed in advance with the relevant authorities, and the appropriate permit to be obtained for the use of public roads.
- Consultation with relevant authorities to agree on specific routes for use by construction traffic to avoid any sensitive residential areas and unsuitable parts of the road network.
- Communication with authorities and affected communities (including emergency services and public transport providers) about road closures, diversions.
- Consideration of environmental and social requirements in line with Project requirements and implementation of Design Change Management Procedure in case any new access road construction will be required.
- Establishment of RoW site speed limits, vehicle inspection requirements, operating rules and procedures.
- Development of a plan for checking and training truck drivers regarding speed limits routing rules, duration of driving.
- Improvement of local traffic signage (where necessary). Usage of signs (reflective signs and/or flashing lights for night) and traffic cones and positioning of flag persons to indicate road work in progress and to inform and warn equipment operators and workers.
- Training of pedestrian workers to work safely around trucks and operating equipment and provide constant warnings to each other in the event of being in risky locations or conditions.
- Training of drivers and operators to obey signals, be aware about blind spots and other pedestrian workers while sharing the same working site, and check their vehicles or equipment whenever needed.
- Informing drivers (and any site visitors) about the site traffic rules including speed limits, approved access routes, etc. A map that shows all the access roads that exist or to be constructed for the project will be prepared and distributed to relevant drivers.
- Restricting the circulation of delivery and private vehicles to defined routes and areas, giving preference to 'one-way' circulation, where appropriate.
- Implementation of Community Traffic Safety Awareness Campaign during the construction period, particularly in those communities where construction vehicles will be most active. The awareness training will be repeated in villages as construction moves into their areas.
- Prevention and control of construction traffic related injuries and fatalities by adoption of safety measures that are protective of project workers and of road users, including those who are most

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<sup>1</sup> Source: Preparatory survey on the project for the improvement of the tema motorway roundabout in the republic of Ghana Final Report /Japan International Cooperation Agency (JICA) / CTI Engineering International Co., Ltd. / February 2017

vulnerable to road traffic accidents, as required by the IFC General EHS Guidelines: Community Health and safety.

- Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present..

There is a possibility of significant environmental and social impacts associated with the construction of new access roads if not managed properly. In case the construction of the new access roads is required, in minimum the following environmental and social aspects shall be considered in determining the location of the access roads by implementation of Design Change Management Procedure:

- Legal compliance;
- Archaeology;
- Nature reserves;
- Environmentally sensitive areas;
- River crossings;
- Social aspects;
- Stakeholder engagement;
- Community safety.

All temporary newly built roads will be removed and reinstated to the satisfaction of the community, except where local communities or landowners request that a new road be left in place.

These requirements will be a part of the Project ESMP and Traffic Management Plan.

## 2.6 Operations and Maintenance

The operation and maintenance of the new road will be carried out by GHA like the other roads in Ghana in line with GHA's operation manuals and plans. These plans include, or will be amended to include, the following topics:

- Traffic and Safety operation;
- Route patrolling;
- Emergency operations and traffic management after accident and incident;
- Road closure management for maintenance activities;
- Routine maintenance, cleaning and limited repair of the road, interchanges and connecting roads including the related structures, infrastructures, ancillaries, drainage system (asphalt and concrete pavement patching and crack filling, repair and replacement of curbs, repair of fences, repair of guardrails, repair of horizontal and vertical signage, unblocking of drainages system);
- Maintenance, including watering, trimming and mowing of non-decorative green areas ;
- Operation and routine maintenance, cleaning and repair of the toll related structures, infrastructures, building, facilities, ancillaries;
- Maintenance of infrastructure (including bridges and viaduct); and
- Maintenance of energised equipment.

### 3. SUMMARY OF STAKEHOLDER ENGAGEMENT

#### 3.1 Introduction

This Section provides a summary of the stakeholder engagement disclosure activities undertaken during the ESIA process so far. This includes a description of stakeholder mapping, consultation undertaken during the ESIA, and development of a grievance mechanism. An overview of the key issues raised by stakeholders during both scoping and ESIA phase is also provided.

It also includes an outline of stakeholder engagement activities that will be undertaken in future by the Project owners during Project construction and operations. Full description/details will be given in the separate SEP to be included in the ESIA.

All engagements have been conducted in a culturally appropriate manner, by involving the representatives of each community in the preparation of the meetings and accounting for the participation of women.

#### 3.2 Objectives

Stakeholder engagement is a key component of sustainable development and the ESIA process. It involves those stakeholders interested in, or affected by, a proposed development working to actively identify opportunities, risks and issues of concern. The primary objectives of stakeholder engagement are as follows:

- ensure that adequate and timely information about the Project is provided to stakeholders;
- provide sufficient opportunity to stakeholders to voice their opinions and concerns, and to ensure that these concerns influence Project decisions;
- establish a relationship and form of communication between the GHA/INZAG and affected communities in particular during the construction phase of the Project; and
- Stakeholder engagement is a requirement of the Ghana EIA regulations. It is also a requirement of international lenders as it is recognised that failure to engage stakeholders can create significant risks to a project development.

#### 3.3 Stakeholder Identification

The objective of stakeholder identification is to establish which organisations and individuals may be directly or indirectly affected (positively and negatively) by, or have an interest in, the Project. Stakeholder identification is an on-going process, involving regular review and the updating of the stakeholder register as the Project proceeds. The following sections will provide an overview of stakeholder groups that were identified for the purpose of ESIA development and consultation.

As part of ESIA scoping, a stakeholder mapping exercise was undertaken to identify key stakeholder groups and organisations. This mapping exercise drew on knowledge of the Project area of INZAG and from other ESIA's in Ghana.

Stakeholders identified for inclusion in engagement activities meet one of the following criteria:

- Have an interest in the Project;
- Would potentially be impacted by or have an influence on the Project (negatively or positively); and/or; and
- Could provide commentary on issues and concerns related to the Project.

Table 3-1 presents an overview of the main stakeholder groups of relevance to the Project as per engagement conducted during the ESIA Field Survey.

**Table 3-1 Stakeholder Category List**

Stakeholder Categories & Groups	Connection to the Project	Stakeholders
<p>Central Government Authorities (Ministries and Government Agencies in Accra)</p>	<p>Central Government is of primary political importance to the Project in terms of establishing policy, granting permits or other approvals, and monitoring and enforcing compliance with Ghanaian Law throughout all stages of the Project life-cycle. Of critical importance are the Ministry of Roads and Highways, the Ghana Highway Authority (GHA) and the Ghana Environmental Protection agency (EPA Ghana).</p>	<p>Relevant National Authorities:</p> <ul style="list-style-type: none"> <li>■ Environmental Protection Agency (EPA)</li> <li>■ Lands Commission - Land Valuation Division</li> <li>■ Ghana Police Services</li> <li>■ 1st Battalion of Infantry</li> <li>■ National Road Safety Authority (NRSA)</li> <li>■ Ghana Tourism Authority (GTA)</li> <li>■ Wildlife Division of the Forestry Commission</li> <li>■ Ghana Railway Development Authority (GRDA)</li> <li>■ Ghana Highway Authority (GHA)</li> <li>■ Land use and Spatial Planning Authority (LUSPA)</li> </ul> <p>Utilities Companies:</p> <ul style="list-style-type: none"> <li>■ GRIDCO</li> <li>■ Chamber of Telecommunications (Telcos)</li> <li>■ Electricity Company of Ghana (ECG)</li> <li>■ Ghana Water Company Limited (GWCL)</li> <li>■ Afcons Infrastructure</li> </ul>
<p>District and Municipal Authorities</p>	<p>Both municipalities and districts provide basic infrastructural, collect taxes and execute plans and programmes for effective district development. Each district has an Assembly with members elected by citizens within their area, with the aim of making them directly accountable to the people they serve (National Public Administration, 2015).</p>	<ul style="list-style-type: none"> <li>■ Ashaiman Municipality</li> <li>■ Kpone Katamanso Municipality</li> <li>■ Ningo Prampram District Authority</li> <li>■ Shai Osu Doku Municipality</li> <li>■ Yilo Krobo Municipal Authority</li> <li>■ Lower Manya Krobo District Authority</li> <li>■ Asogyaman District Authority</li> </ul>



Stakeholder Categories & Groups	Connection to the Project	Stakeholders
<p>Local Community Representatives (Paramount Chiefs, Chiefs and Council of Elders)</p>	<p>These are representatives of their local community (at settlement level). They are key leadership figures at local level.</p>	<p>Traditional Authorities (south to north along the N2)</p> <ul style="list-style-type: none"> <li>■ Tema Paramountcy</li> <li>■ Kpone Traditional council</li> </ul> <p>Afienya traditional council under Prampram Paramountcy                      Mataheko Traditional council under Prampram Paramountcy</p> <ul style="list-style-type: none"> <li>■ Ablekuma Traditional council Prapram Paramountcy</li> </ul> <p>Doryumu traditional authority under Osudoku Traditonal Authority</p> <ul style="list-style-type: none"> <li>■ Osu Doku Traditional Authority</li> <li>■ Shai Traditional Authority</li> <li>■ Okwenya traditional authority under Konor paramountcy</li> <li>■ Adelakope traditional authority under Konor paramountcy</li> <li>■ Agamakope Traditional Authority under Konor paramountcy</li> <li>■ Odumase Krobo Paramountcy</li> <li>■ Akuse traditional Authority under the Odumase Krobo Paramountcy</li> <li>■ Kpong Traditional Authority under the Odumase Krobo Paramountcy</li> <li>■ Atimpoku traditional authority under Akwamufie Paramountcy</li> <li>■ Apaso traditional authority under the Akwamufie paramountcy</li> <li>■ Senchi Traditional authority under Akwamufie paramountcy</li> <li>■ Akrade traditional authority under Akwamufie paramountcy</li> <li>■ Youth leaders;</li> <li>■ Women’s group leaders;</li> <li>■ Local Assembly Representatives (LAR);</li> <li>■ Religious leaders;</li> <li>■ Landlords/tenants association representatives; and</li> </ul>

Source: ERM, 2020

## 3.4 Stakeholder Engagement in the ESIA Process

### 3.4.1 Scoping Consultation Activities

A total of 22 scoping consultation meetings were organised, 14 with government officials and 8 with local communities. In total, approximately 700 persons attended those meetings.

At the initial scoping stage most of the identified stakeholders were engaged, at the exception of some utility companies (namely GRIDCO, the Chamber of Telecommunications (Telcos) and Electricity Company of Ghana), Kpone Katamanso Municipality and Local Community Representatives. Those stakeholders have been engaged with during the subsequent ESIA consultation activities.

The meetings began with a project introduction and purpose of the meeting and followed with discussions to collect feedback. All meeting were attended and lead by a representative of INZAG, together with a team of experts from ERM and PSS Urbania. Attendees were able to raise any concerns related to the Project's potential impacts.

#### 3.4.1.1 Meetings with National and Local Government Stakeholders

A total of 14 meetings were organised with national and local government representatives. Key concerns raised during those engagement are exposed in Table 3-7 of Appendices D and E for the complete list of MoMs and main outcomes of each meetings.

**Table 3-2 List of Scoping Meetings with National and Local Government**

Date	Location	Activity	Venue	Participants
<b>National Government (Accra)</b>				
06-Jan-20	Accra	Meeting with Environmental Protection Agency (EPA) and Wildlife Division of the Forestry Commission	Forestry Commission Head office	<ul style="list-style-type: none"> <li>■ Director of the EPA</li> <li>■ CPO of the EPA</li> <li>■ Wildlife division of the Forestry Commission</li> <li>■ Public Relations Officer</li> <li>■ 2 Others</li> </ul>
08-Jan-20	Accra	Second meeting with Wildlife Division of the Forestry Commission	FC Head Office	<ul style="list-style-type: none"> <li>■ Executive Director</li> <li>■ Public Relations Officer</li> </ul>
10-Jan-20	Accra	Meeting with Ghana Water Company Limited	GWCL Office, Adjacent 37 Military Hospital	<ul style="list-style-type: none"> <li>■ Production Manager</li> <li>■ Chief Production Manager</li> </ul>
10-Jan-20	Accra	Meeting with National Road Safety Authority	Head Office	<ul style="list-style-type: none"> <li>■ Executive Director</li> <li>■ Director Research and M&amp;E</li> <li>■ Director Planning;</li> <li>■ Deputy Director Planning</li> <li>■ Other officials</li> </ul>
10-Jan-20	Accra	Meeting with Ghana Highway Depart. Authority	Head Office	<ul style="list-style-type: none"> <li>■ Ghana Director of Planning</li> </ul>
17-Jan-20	Accra	Meeting with Ghana Armed Forces of Ministry of Defence	Ministry of Defence	<ul style="list-style-type: none"> <li>■ Head</li> <li>■ Engineers Services</li> </ul>

Date	Location	Activity	Venue	Participants
17-Jan-20	Accra	Meeting with Land Valuation Division of Lands Commission	LVD Office	<ul style="list-style-type: none"> <li>■ Head - Compensation II</li> <li>■ Others</li> </ul>
24-Jan-20	Cantonments	Meeting with Ghana Tourism Authority	Office of Ghana Tourism Authority	<ul style="list-style-type: none"> <li>■ PDI</li> </ul>
<b>Local Government:</b> Municipal/District Coordinating Director; Development and physical Planners, Works and Urban Roads Engineers, Gender Desk Officers; NADMO; Public Health officers				
07-Jan-20	New Akraide	Meeting with Traditional Authorities – New Akraide and Senchi	n/a	<p><b>Senchi</b></p> <ul style="list-style-type: none"> <li>■ Nana– Adontenghene-</li> <li>■ Nana– Amankrado</li> <li>■ Nana– Sanahene</li> <li>■ Nana-Okyeame Obuopong</li> <li>■ Other representatives</li> </ul> <p><b>New Akraide</b></p> <ul style="list-style-type: none"> <li>■ Nana (chief)</li> <li>■ Nana– Ahenenaasehene</li> <li>■ Other representatives</li> </ul>
08-Jan-20	Dodowa	Meeting with Shai Osudoku District Assembly	District Assembly Office	<ul style="list-style-type: none"> <li>■ District Assabley representatives</li> </ul>
08-Jan-20	Somanya	Meeting with Yilo Krobo Municipal Assembly	Assembly Office	<ul style="list-style-type: none"> <li>■ Municipal Chief Executive</li> <li>■ Municipal Coordinating Director</li> <li>■ Municipal Planning Officer</li> <li>■ Urban Roads Engineer</li> </ul>
09-Jan-20	Ashaiman	Meeting with Ashaiman Municipal Assembly	Office of the Office, Ashaiman Municipal Assembly	<ul style="list-style-type: none"> <li>■ Local representatives (6)</li> </ul>
09-Jan-20	Odumase Krobo	Meeting with Lower Manya Krobo Municipal Authorities	Municipal Assembly Office	<ul style="list-style-type: none"> <li>■ MCE</li> <li>■ MCD</li> <li>■ MPO</li> <li>■ Others</li> </ul>
09-Jan-20	Atimpoku	Meeting with Asuogyaman District Assembly	Assembly Office	<ul style="list-style-type: none"> <li>■ District Chief Executive</li> <li>■ District Coordinating Director</li> <li>■ District Development Planning Officer</li> </ul>

### 3.4.1.2 Consultation Meetings with Communities in the Project Area

A total of 8 meetings were held with representatives of the 33 communities in the Project Area (Table 3-3). Participants to these community meetings included:

- Traditional authorities;
- Local Assembly representatives;
- Women and youth groups;

- Farmers and transport/drivers associations/unions; and
- Market women association.

The gender ratio observed at the above meetings was 35% females against 65% males. The reason for the male dominance was that most of the local representatives are men. These are elected by the communities. Women participants represented groups of women in the community, including women that were purposely identified by the Local Councils at the request of the ESIA Team/PSSU to ensure women participation.

Meetings were conducted in a mix of English and local languages as appropriate. All English statements were duly translated to ensure culturally appropriate engagement.

**Table 3-3 List of Scoping Meetings with Community Representatives in Settlements in the Project Area**

Date	Location	Activity	Venue
07-Jan-20	Atimpoku (Asuogyaman)	Consultation with Atimpoku Community	n/a
07-Jan-20	New Akraide (Asuogyaman)	Consultation with New Akraide and Senchi Communities	New Akraide Community centre
07-Jan-20	Yilo Krobo	Consultation with Yilo Krobo Community	Chief's Palace
07-Jan-20	Kpong (Lower Manya)	Consultation Kpong Community	Community forum
09-Jan-20	Okwenya (Ylo Krobo)	Consultation with Okwenya community	Taxi station
10-Jan-20	Ashaiman (Ashmian)	Consultation with Community 22, New Town, Official Town, Christian Village, Valco Flat and Middle East Communities consultation	Volta catch
10-Jan-20	Doryumu (Shai Osu Doku)	Consultation with Doryumu Community	Doryumu Methodist Church
16-Jan-20	Sebrepur (Kpone Katamanso)	Consultation with Ebrepur, Kakasananka, Gbetsele, Afiencya Communities	Sebrepur Presby School

### 3.4.2 Baseline Surveys and Project Disclosure

In addition to the engagements performed during scoping phase, extensive stakeholder engagement was undertaken as part of the Project disclosure and social baseline data collection for the ESIA.

Engagement as part of the ESIA process was conducted between July 20<sup>th</sup> and August 7<sup>th</sup> 2020 and was led by a team of specialists from PSS Urbania. A representative from INZAG participated in some of the activities, namely meetings with national authorities and Community Representative Forums.

The purpose of the field survey was:

- To collect specific socioeconomic, health, and human rights data at the local level to the extent available and at the District level; and
- To re-engage with with key stakeholders and local community representatives to provide updates on the Project and collect feedback.

A total of 26 meetings were organised, 13 with 13 national government institutions, 6 with District and Municipal Authorities and 7 with representatives of the 33 settlements in the area of influence of the Project. In total, approximately 280 persons attended the meetings including 194 community representatives.

The meetings began with a project introduction and purpose of the meeting and followed with discussions to collect feedback. Concerns related to the Project impacts were also raised during the meetings. These mainly consisted in a general discussion on the Project's potential impacts. Detailed minutes of the meetings, attendance list and pictures for each meeting are presented in Appendices D and E.

### 3.4.2.1 National Authorities Meetings

Field survey activities also encompassed engagement meetings with National authorities for the purposes of project disclosure and data collection. A total of 14 meetings with 14 government institutions were held, during which 54 government representatives assisted.

Table 3-4 shows the information on the date, location, stakeholder groups and participation for each of the meetings, as well as main topics discussed (Table 3-4).

**Table 3-4 ESIA Meetings with National Stakeholders**

Date	Location	Venue	Stakeholder	Attendees (number)
07/07/2020	Accra	EPA Office	EPA	EPA GHA
20/07/2020	Virtual	Bluejeans	Chamber of Telecommunications (Telcos)	DUR Comsys, members of Telcos Csquared, member of Telcos
21/07/2020	Accra	LVD Office	Lands Commission - Land Valuation Division (*)	Director Chief Valuers Price Valuer Consultant
21/07/2020	Ashaiman	Divisional Police HQ	Ghana Police Services	Div. Police Commodor Municipal Police Commodor Crime Division MTTD Commodor
21/07/2020	Michel Camp	n/a	1st Battalion of Infantry	Commanding Officer Engr. Officer Engr. WO LIC
22/07/2020	Tema	Regional Office	Electricity Company of Ghana (ECG)	Ag. RE P.E Safety Officer
22/07/2020	Accra	Regional Office	National Road Safety Authority (NRSA) (*)	NRSA Dep. Director NRSA NRSA NRSA NRSA
24/07/2020	Accra	GTA Conference Room, Ridge	Ghana Tourism Authority (GTA)	Ghana Tourism Authority]
24/07/2020	Accra	Westlands, Legon	Wildlife Division of the Forestry Commission	Director of Operation



Date	Location	Venue	Stakeholder	Attendees (number)
27/07/2020	Accra	Head Office	Ghana Railway Development Authority (GRDA) (*)	Chief Technician GRDA PDRME Assistant Manager GRDA Chief Technician GRDA PM PDRME GRDA
28/07/2020	Accra	Ministry	Ghana Highway Authority (GHA) (*)	–GHA Director –other GHA representatives
28/07/2020	Accra	Head Office	Land use and Spatial Planning Authority (LUSPA) (*)	Senior Officer LUSPA
05/08/2020	Virtual	Blue Jeans	GRIDCO	Manager, Lands and Environmental Management Principal Geodetic Engineer Principal Environmental Officer Senior Geodetic Engineer
17/08/2020	Tema	GWCL Regional Office	Ghana Water Company Limited (GWCL)	DG GIS Assistant Assistant Distribution Officer ICT IoT officer ADO GIS

### 3.4.2.2 District Authorities Meeting

Baseline data collection meetings were also held with District Authorities belonging to the 6 districts crossed by the existing road alignment. PSS Urbania organized 6 meetings reuniting about 38 representatives of the 6 concerned districts.

Table 3-5 shows the information on the date, location, stakeholder groups and participation for each of the meetings, as well as project-related feedback.

**Table 3-5 Meetings with District Authorities**

Date	Location	Venue	Stakeholder	Attendees
28/07/2020	Odumase	Municipal Assembly Conference Room	Lower Manya Krobo Municipal Assembly	<ul style="list-style-type: none"> <li>■ District Chief Executive and Coordinating Director</li> <li>■ Heads of Works</li> <li>■ Physical Planning DEpartment</li> <li>■ Planning Department</li> <li>■ Director of Agriculture Department</li> <li>■ Head of Roads Department</li> <li>■ C. Administrator</li> </ul>
28/07/2020	Somanya	MCE's Office	Yilo Krobo Municipal Assembly	<ul style="list-style-type: none"> <li>■ Municipality Chief Executive</li> <li>■ Municipality Coordinating Director</li> <li>■ URD</li> <li>■ MPU</li> <li>■ Head of Works</li> <li>■ PPD</li> </ul>
29/07/2020	Kpone	Municipal Office	Kpone Katamanso	<ul style="list-style-type: none"> <li>■ Municipality Chief Executive</li> <li>■ Municipality Coordinating Director</li> </ul>

Date	Location	Venue	Stakeholder	Attendees
			Municipal Assembly	<ul style="list-style-type: none"> <li>■ MDPO</li> <li>■ Urban Roads Engineer</li> <li>■ Physical Planning Officer</li> <li>■ HOW</li> <li>■ MEHA</li> </ul>
29/07/2020	Atimpoku	Office of the District Chief Executive (DCE)	Asuogyaman District Assembly	<ul style="list-style-type: none"> <li>■ District Chief Executive</li> <li>■ District Coordinating Director</li> <li>■ Head of urban roads</li> <li>■ ISD</li> </ul>
30/07/2020	Ashaiman	Municipal Assembly Hall	Ashaiman Municipal Assembly	<ul style="list-style-type: none"> <li>■ Municipality Chief Executive</li> <li>■ Director of Planning</li> <li>■ Director of MRE</li> <li>■ CDO Unit representative</li> <li>■ JTO</li> <li>■ MPO</li> </ul>
30/07/2020	Dodowa	District Office	Shai Osudoku District Assembly	<ul style="list-style-type: none"> <li>■ SOBA – District Chief Executive</li> <li>■ District Coordinating Director</li> <li>■ DNE</li> <li>■ SOBA Deputy District Planning Officer</li> <li>■ Dep. Roads</li> <li>■ Presiding Member</li> <li>■ HADMODistrict Plannin Officer</li> </ul>

### 3.4.2.3 Community Representative Forums

A total of seven meetings were held in key locations along the road alignment with representatives of the 32 communities in the Area of Influence (AoI). The goal of the meeting was to update stakeholders about the Project status and collect their feedback and concerns. The Community Representative Forums took place between the 3<sup>rd</sup> and the 7<sup>th</sup> of August 2020 and included representatives of the following groups.

- Traditional authorities;
- Youth leaders;
- Women’s group leaders;
- Local Assembly Representatives (LAR) or Assemblymen;
- Religious leaders;
- Landlords/tenants association representatives; and
- Representatives deemed critical by local assembly members.

It should be noted that due to COVID restrictions face to face engagement was kept to a minimum. Engagements with communities have been limited to representatives, not with communities at large. Meetings were advertised through broadcasting of public announcements using municipal vans to inform the local population about the ESIA process and the ongoing consultation.

Table 3-6 shows information on the Community Representative Forums and meetings with Traditional Authorities. A total of 194 community representatives from 32 communities participated in the meetings. Appendix D provides the Minutes of Meetings as well as key outcomes of the meetings and a list of the feedback and concerns received by stakeholders.

**Table 3-6 Community Representative Forums and Meetings with Traditional Authorities**

Date	Location	Stakeholder	Participants (number)	Total No. of participants
03/08/2020	Doryumu	Doryumu and surrounding communities ( <i>Shai Osudoku Municipality</i> )	Traditional Authority (20) Assemblymen and Assembly members (7)	27
03/08/2020	Akuse Junction	Okwenya, Adelokope ( <i>Yilo Krobo Municipality</i> ) Agamakope and Akuse communities ( <i>Lower Manya Krobo District</i> )	Drivers Livelihood Representatives (16) Farmers Livelihood Representatives (3) Carpenter Livelihood Representative (1) Assemblyman (1) and Communication Unit (3) Trader and Seller Livelihood Representatives (2)	26
05/08/2020	Afienea Junction	Afienea ( <i>Ningo Prampram District</i> ), Mataheko and Sebepor communities ( <i>Kpone Katamanso Municipality</i> )	Traditional Authority (4) Drivers Livelihood Representatives (2) Hairdresser Livelihood Representative (1) Assemblyman (2) and Communication Unit (4) Trader and Seller Livelihood Representatives (65)	78
05/08/2020	Kpong	Kpong and surrounding communities ( <i>Lower Manya Krobo District</i> )	Traditional Authority (11) Opinion leaders (3) Head of fish sellers (1) Head of aboll+o sellers (1)	16
06/08/2020	Atimpoku	Atimpoku and Bodukrom Communities ( <i>Asuogyaman District</i> )	Assemblyman (1) and Organiser Unit Communitte (3) Traditional Authority (9)	13
07/08/2020	Ashaiman	Ashaiman Communities : Nii Tetteh Amu East (Middle East), Naa Amerley (Ashaiman Round about), Nii Man and Community 22 ( <i>Ashaiman District</i> )	Traditional Authority and Unit Committee (16)	16
07/08/2020	New Akrade and Senchi	New Akrade and Senchi Communities ( <i>Asuogyaman District</i> )	Assemblyman and Committee members (18)	18

## 3.5 Stakeholder Issues

This Section provides an overview of the key issues raised by stakeholders during the Scoping and baseline studies phases.

The specific issues raised in each meeting have been recorded and are presented in Appendix D. An account of issues and how these are being incorporated in the Project design, and in the development of mitigation measures will be presented in the ESIA.

Feedback on key issues will be provided to stakeholders through the disclosure of the ESIA (see Section 3.6.1) and through ongoing stakeholder engagement as outlined in the SEP. These issues have been reflected in the present MDR. A project response section addressing those concerns will be presented in the final ESIA.

### 3.5.1 Scoping Issues

Table 3-7 presents a summary of concerns and issues raised by community representatives during the Scoping meetings organised between December 2019 and January 2020.

**Table 3-7 Overview of Concerns and Issues Raised by Community Representatives during the Scoping Field Survey**

Subject	Key outcomes and concerns
<b>Environmental change</b>	<p>Potential Project impacts, dust, noise, solid and liquid waste should be well managed to prevent further pollution of the project environment.</p> <p>Suggestion to ensure drainages constructed are of appropriate sizes to prevent flooding. Closed drainages strongly encouraged.</p>
<b>Local economy and livelihoods</b>	<p>Access to employment opportunities for population from the local area and especially the youth.</p> <p>Importance of providing specialized training opportunities, especially for vulnerable groups, as part of livelihood enhancement.</p> <p>Recommendation to give the due recognition to Traditional authority and to involve them in resettlement planning and compensation process.</p> <p>Recommendation to involve the youth leaders and local assembly members in the implementation (project committees).</p> <p>The road expansion could affect the taxi station and women who sell fruits and vegetables by the roadside. Suggestion to create a new station, new space/market developed and bus stops to ensure women continue to trade along the road comfortably.</p> <p>Suggestion to use locally sourced material for the Project, such as quarries some of which are located along the project corridor. These sources must, however, be EPA compliant and ready to be audited.</p>
<b>Land, resettlement and compensation</b>	<p>Repeated concerns regarding resettlement and compensation. Previous compulsory land acquisition for the Akosombo Dam by the state left several inhabitants worse off. Resettlement planning must consider the specific needs of PAPs. Involvement of Lands Commission throughout the resettlement planning process is critical.</p> <p>The movement of their temporary structures along the proposed RoW could disrupt economic activities and livelihood. Affected persons expect adequate resettlement assistance covering the period of this disruption.</p> <p>Communities expect help to develop alternative route in the community during the construction period to ease traffic in the main township.</p> <p>There are conflicting interests in land in the road corridor in Yilo Krobo. Certain lands are captured as state land at the Lands Commission but they are not properly registered because the chiefs during the colonial days did not agree to sign the documents with the British governor. Due diligence is required to verify land ownership claims during resettlement planning and compensation payments.</p> <p>Doryumu community specified that a site camp that was once used by WF (previous contractor) is available for this project's use. The traditional landowners (Chief) and the people are willing to negotiate with INZAG to make the site available for use. Also, a good number of quarry sites exist within the corridor which can provide material for the project.</p>



Subject	Key outcomes and concerns
<p><b>Community health, safety and development</b></p>	<p>Repeated suggestion to provide safety and traffic calming facilities (such as underground crossways or pedestrian footbridge) to avoid accidents, and the construction of alternative routes demarcated and developed to decongest traffic during construction phase of project.</p> <p>Recommendation to consider some complementary interventions (community projects) such as boreholes, schools, clinic, improvement of local access roads as Corporate Social Responsibility of the contractor.</p> <p>Repeated concerns regarding the influx of migrant workers and recommendation to manage community relations and effects emanating from labour influx properly to avoid spread of communicable diseases and distortion of culture.</p> <p>Recommendation to reduce noise at certain periods during festivals as they are taboo days requiring less noise. Progress of civil works would not be affected unless the activities involve heavy impacts e.g. blasting of material.</p>
<p><b>Cultural heritage</b></p>	<p>There are two sacred hills in the area. The one on the approach from Afienea “belongs” to the Yilo krobo people and the one on the Akuse side is for Lower Many Krobo. Both hills are sacred places for the people and they hold annual festivals there. The hills must therefore be respected as such. The chiefs and elders will ask for resources for the conduct of traditional rituals before commencement of the project. The Shai Hills is of ecological, tourism development and research value not only to Ghana but to the international community.</p> <p>The Krobo Mountains are a key archaeological site. Any development within 1km of the site should be avoided.</p>

Source: ERM, 2020

### **3.5.2 Baseline Survey Issues**

A total of 305 feedbacks, issues and concerns were collected during the ESIA Baseline Survey engagements, of which 190 were formulated by national level stakeholders, 75 by District Authorities and 240 by community representatives. A log of all issues is presented in Appendix D.

Table 3-8 presents an overview of concerns and issues raised by government stakeholders and community representatives.

**Table 3-8 Overview of Concerns and Issues Raised by Community Representatives during the Baseline Field Survey**

Subject	Key outcomes and concerns
<b>Environmental Considerations</b>	<p>The ESIA should consider the impact of the project on climate change and vice versa.</p> <p>Where possible, salvage trees along the construction route. If trees have to be cut down, count them and replace them at some other nearby location, such as a schools.</p> <p>Consider tree planting as part of landscaping on the road corridor.</p>
<b>Labour and community Health &amp; Safety</b>	<p>Labour influx and related issues are widely known and remains a major concern among the communities. It is expected however that the project adheres to its code of conducts that ensures workers are responsible and refrain from vices such as sexual promiscuity, unwanted pregnancies and crime among others.</p> <p>Road and pedestrian safety as well as security are held in high esteem among the communities. Contractor is expected to adhere to strict health and safety plan and protocols during construction especially in the night and at the campsite; and also educate both workers and community on STDs, HIV and COVID-19.</p> <p>Appropriate and safe traffic management systems such as mobile traffic lights, road diversions etc. should be put in place during construction to ensure free flow of traffic.</p> <p>Contractor is expected to engage the security agents on the ground to support with maintaining security throughout the project.</p> <p>Engage community stakeholders and local authorities in exploring possible access routes as bypasses/diversions.</p>
<b>Land acquisition, restrictions on land use and resettlement/compensation</b>	<p>Lands are mostly vested in stools<sup>1</sup> and families. There is also military land around Michel Camp. Portions of land around Kpong and Senchi are however owned by the Volta River Authority .</p> <p>The Lands Commission cannot confirm any past acquisitions of the RoW at this time. An executive instrument by government is therefore needed to acquire the land needed for the project.</p> <p>Residential and commercial properties as well as social facilities and farms will be impacted by the project and would require resettlement and compensations.</p> <p>To avoid project delays, RAP must be prepared immediately and project affected persons duly compensated prior to the commencement of works</p> <p>It is recommended that the payment for land and structures should be done simultaneously to avoid delays. Also, to speed up the compensation process an independent consultant could be engaged to resolve all conflicting claims prior to payments.</p> <p>Livelihood restoration should be considered an integral part of the resettlement package</p>

<sup>1</sup> The traditional chiefs in Ghana are the custodians of stool land. A stool in Ghana refers to the office of the traditional chief. The stools have the ultimate right to allocate land. Individuals only have usufructuary rights to land.

Subject	Key outcomes and concerns
	<p>Project is expected to bear the cost of relocation of utility infrastructure as part of its compensation package. Relocation of these facilities are to be done in collaboration with the stakeholders and concurrently with construction to avoid disruption in services</p>
<b>Biodiversity Conservation</b>	<p>The Shai Hills Resource Reserve (SHRR) is a protected nature reserve within the project corridor that houses baboons and other tree species for plant medicine.</p> <p>The Shai people worship the baboons in the reserve as a totem species, and the reserve is regarded as a spiritual and cultural embodiment of the Shai people.</p> <p>The project should therefore consider noise reduction and safety measures that will not impact negatively on the mammals.</p>
<b>Cultural Heritage</b>	<p>The Shai Hills is an ancestral home to many communities on the corridor and should be provided with necessary accesses.</p> <p>The Ghana Tourism Authority and the Forestry Commission have plans for an Eco Heritage Development Project in the Shai Hills Resource Reserve. Pedestrian and vehicular accesses to the park and rest stops are therefore needed to be considered by the Project. Consider bi-lingual signages as well.</p> <p>There are small streams and rivers running across sections of the road. These water bodies are considered deities and will require rituals to be performed by the traditional authorities before road or bridges could pass on them.</p> <p>Communities on the corridor celebrate various festivals mostly in the last half of the year; and have taboo or special days that work cannot be done on the land or the rivers. Rituals will have to be performed to allow project to work on such days.</p>
<b>Socio-economic Aspects</b>	<p>As the road will impact several businesses and street traders, restoration of livelihoods and promotion of social development such as improving community access roads, markets and lorry stations, provision of toilets and schools as part of project's social responsibility is anticipated by the project communities.</p> <p>As there is high youth unemployment across all communities, the employment of local skilled and unskilled labour is highly anticipated also. A quota for local content across communities should be considered.</p>
<b>Stakeholder Engagement information disclosure and dispute resolution</b>	<p>Effective stakeholder engagements is at the heart of the project. Both key institutions and communities expect disclosure of final project design and other useful project information.</p> <p>Continuous engagement of communities and their leadership is also expected throughout the life of the project, for example in selecting camp sites, obtaining locally available resources and hiring local labour. There are existing and recognized local information dissemination channels such as the chiefs, Assembly Members, Municipal Assemblies notice boards, information centres and radio stations where applicable.</p> <p>The local assembly representatives, traditional authority systems and local government structures in the communities provide a good mechanism for dispute resolution for civic cases, while criminal cases are handled by the police.</p>

Source: ERM, 2020.

## 3.6 Considerations for Future Stakeholder Engagement

### 3.6.1 ESIA and Resettlement Framework Disclosure

Following the compilation and submission of the ESIA to the EPA for their consideration, the ESIA will be subject to public comment through disclosure. Consultation will take place through an EPA-led disclosure process, and the availability of ESIA will be published in mass media and announced in local media of the seven districts in the Aol, namely Ashaiman, Kpone Katamanso, Ningo Prampram, Shai Osudoku, Yilo Krobo, Lower Manya Krobo and Asuogyaman Districts. In addition of the EPA-led activities, GHA/INZAG will organise Public Meetings in all the settlements in the Project area to also disclose the Resettlement Framework.<sup>10</sup>

Prior to commencement of the ESIA disclosure process all engaged stakeholders will be informed of the EPA-led public hearings and community meetings venues and where they can access the copies of the ESIA. The ESIA will be made available in public places such as District Assembly offices, Regional EPA offices, and Public Libraries. All meetings will be conducted in English and local language. Translation will be available in all meetings.

### 3.6.2 Project Execution

An output of the ESIA process is the development of ESMMPs for Project construction and operations. Information on the contents and implementation of the ESMMP will be presented through a number of briefing sessions and on-going meetings with local communities. These will take place at different levels within the Greater Accra and Eastern Region, seven Districts and in affected communities of the Aol.

In addition, the grievance mechanism will be implemented to be effective throughout the Project lifecycle.

### 3.6.3 Resettlement Engagement

The resettlement and livelihood restoration activities will involve significant engagement with affected people along the road including announcement of cut-off date, census of population affected by resettlement activities, asset inventories and household surveys. These activities will be presented to affected stakeholders through specific engagement activities which will be detailed in the RAP and will include:

- Resettlement and livelihood restoration options disclosure;
- RAP/LRP report disclosure;
- Ongoing information sharing on the RAP/LRP implementation;
- RAP/LRP implementation monitoring; and
- The RAP/LRP activities will be carried out sequentially in line with the construction schedule.

### 3.6.4 On-going Engagement During Construction

INZAG will be continuing engagement with stakeholders on a regular and ad hoc basis. Meetings between the Traditional Authorities and INZAG regarding access to land for the Project's development are planned.

In the same way, INZAG will continue to meet with interest groups in affected communities through community meetings engaging 32 settlements of the Aol. These interactions, together with the outcomes of Scoping and baseline data activities, are influencing the design of the Project on a day-

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<sup>10</sup> The Proposed plan to organise public meetings in each settlement in the project area is subject to COVID-19 restrictions. If the organisation of such public meetings is not considered appropriate due to safety considerations the approach will be redefined.



to-day basis. This will continue until the submission of the ESIA, at which point the design will be finalised in order for environmental permitting, on a set Project design, to take place.

Throughout the construction phase, INZAG will continue to engage with individuals and communities affected by land easement and acquisition as part of the implementation of its Resettlement Action Plan. This includes monitoring the execution of land entry and exit protocols by INZAG parties and subcontractors, overseeing any necessary additional land take undertaken by contractors, and follow-up monitoring with PAPs to document the effectiveness of livelihoods restoration. INZAG will undertake stakeholder engagement activities. Its goal is to ensure that those people whose land, properties and business are temporarily or permanently acquired are able to restore their livelihoods to pre-project levels or improve where possible.

## 3.7 Grievance Mechanism

### 3.7.1 Overview

Grievances are complaints or comments (or questions/suggestions) concerning the way in which a Project is being implemented. A grievance mechanism provides a formal and on-going avenue for stakeholders to engage with the Project proponents and contractors, whilst the monitoring of grievances provides signals of any escalating conflicts or disputes. The establishment of a Grievance Mechanism is a requirement by EPA and Environmental Impact Assessment rules and IFC Performance Standards.

Identifying and responding to grievances supports the development of positive relationships between the Project proponent and the communities, and other stakeholders. An effective grievance management process should include the components described in Box 3.1 below. A Grievance Mechanism has been developed for the Project and is structured according to recommended good practice.

The Community Grievance Mechanism enables any stakeholder to make a complaint or a suggestion about the way the Project is being implemented. Grievances may take the form of specific complaints for damages/injury, concerns about routine Project activities, or perceived incidents or impacts. The presence of workers in the area and the likely interaction with local population requires that the Grievance Mechanism provides a response to Gender Based Violence (GBV) related complaints. In this regard the Grievance Mechanism will ensure capacity to handle these complaints and support the victims.<sup>11</sup>

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<sup>11</sup> The ESIA will consider the following guidance note:

<http://documents1.worldbank.org/curated/en/399881538336159607/Environment-and-Social-Framework-ESF-Good-Practice-Note-on-Gender-based-Violence-English.pdf>

### Box 3.1 Key Components of an Effective Grievance Mechanism

**Simple and Culturally appropriate Process:** It should be convenient to submit complaints. There should be several appropriate channels through which community stakeholders can submit complaints free of charge, and without retribution to the party that originated the issue or concern..

**Simple Internal Procedure:** A simple and consistent procedure is required to record grievances, identify those responsible for addressing them and ensure that they are resolved.

**Staff Arrangements:** Roles & responsibilities in the grievance management process to be defined and agreed.

**Training:** The launch or modification of the grievance management process should include internal induction and/or training for operational staff and a Community Representative.

**A Set Timeframe:** The grievance process should set a timeframe within which complainants can expect acknowledgement of receipt of grievance and a response and/or resolution of grievance. **Sign Off:** Actions planned to resolve grievances considered to be of significant concern by the Grievance Officer should be signed-off by a member of the senior management, suitably qualified to assess the effectiveness of the response.

**System of Response:** A clear system of response is required to identify who should respond to the complainant and how. Response to the complainant should be provided in a timely and transparent manner.

**Appeal process:** An appeal process with the involvement of third parties should be in place in case the complaint is not resolved to satisfaction of the party originating the grievance.

**Disclosure:** The grievance mechanism should be clearly and widely disclosed to affected communities.

**Access to Legal Remedies:** The mechanism should not impede access to judicial or administrative systems.

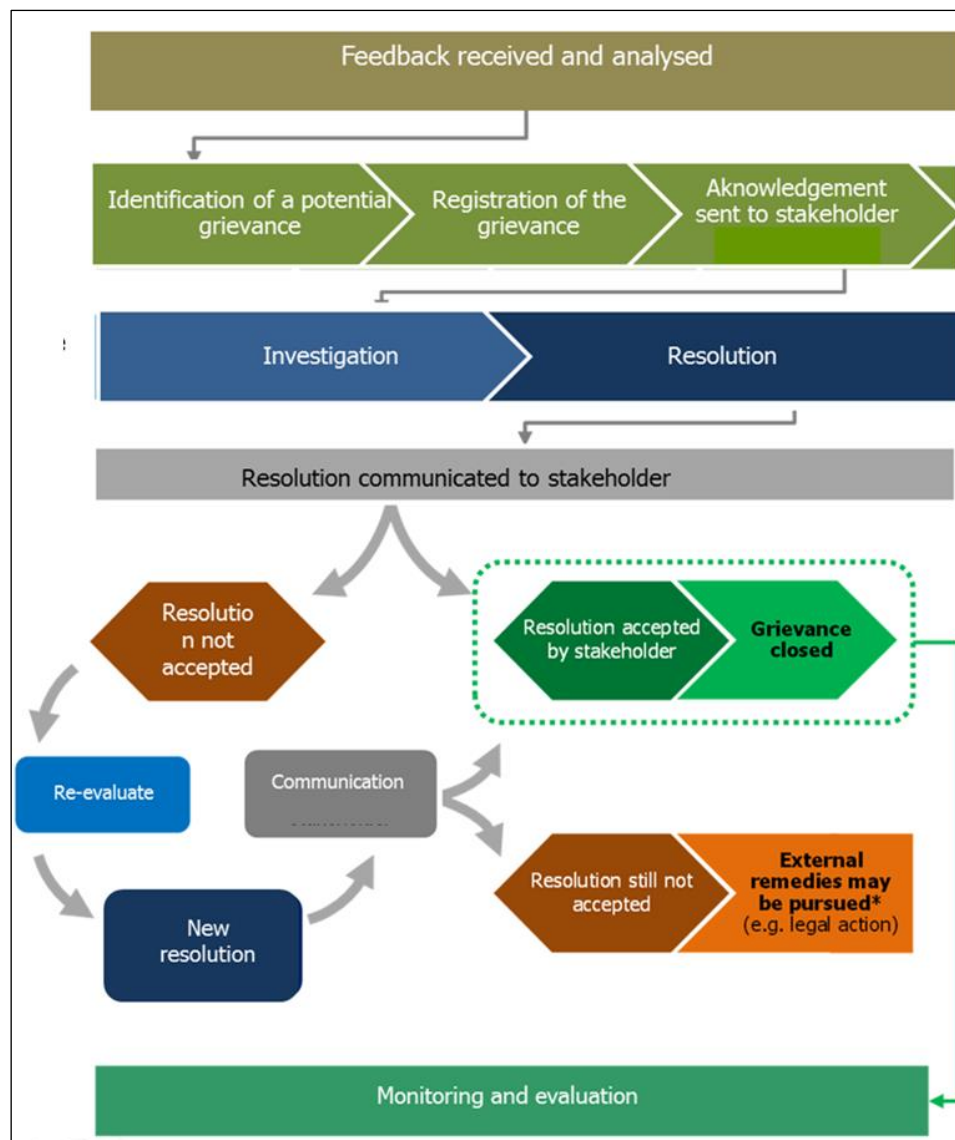
**Monitoring Effectiveness:** Mechanisms should be set in place for monitoring the effectiveness with which complaints are being recorded and resolved.

Source: ERM, 2020

#### 3.7.2 Detailed Grievance Procedure

Figure 3-1 below has been developed to ensure an effective and timely response to community complaints and maintain good community and stakeholder relations. The mechanism is part of INZAG's broader process of stakeholder engagement and quality assurance.

A detailed description of the procedure is also presented in the SEP for the Project (including grievance forms), and updated as appropriate.



Source: ERM, 2020

**Figure 3-1 Grievance Mechanism**

**Step 1 – Grievance reception and registration**

Grievances may be reported through a series of reporting channels for INZAG’s consideration. Grievances or complaints shall be received through different channels including INZAG’s Community Representatives (CR), other INZAG’s or Contractor Project workers in the course of their duties as well as through the District / Local Assembly representatives. Other designated access points will include a dedicated phone number, email and post address.

The reporting channels that are considered appropriate for the Project area’s cultural context are detailed below.

Grievances may be identified through the following reporting channels:

- Through face-to-face visits;
- Mobile telephone;
- Community Representative’s team Email;
- Telephone;

- Letter; and
- Visits or letters to/at the District and Local Assembly offices

In either case, the received grievances as well as the details of the complainants shall be noted down and passed on to the person in charge or grievance manager for registration within the day of receipt. These grievances may be in written form or verbal complaints and shall be treated with equal respect. Anonymous grievances will be given the same due process.

Once received, the grievance will be reviewed and the complaint registered. This activity shall entail capture of complete details of the complaint and may involve phone calls or meeting with the complainant, review of records of previous similar incidents or occurrences, any available evidence, supporting documents or statements. The details of the complaint shall be recorded in the grievance database for follow-up and future reference. During this process, the INZAG shall also acknowledge receipt of the complaint within a standardised time period (ideally at reception or within 12 hours) and explain to the complainant the process including timelines of the remaining steps in the procedure.

### **Step 2 – Screening**

All grievances will need to undergo some degree of screening and prioritisation. INZAG will be responsible for managing the grievance resolution process. Management of the grievance will entail determining the nature of the investigation considering the type of grievance and the potential risk attached to it. Prior to the start of the investigation process, INZAG shall establish the nature of the grievance to determine the measures needed for review and investigation. Depending on the circumstances of the complaint, various units or departments may need to get involved, including contractors and superior management function if their input is required.

Following this preliminary assessment, INZAG will organize the process of review and investigation of each grievance received.

### **Step 3 – Investigation**

INZAG will organize telephone or face-to-face meetings to investigate the complainant's allegations, verify the validity and gravity of the grievance. If necessary, if the grievance relates to a given site or location, INZAG along with the local authority representative will organize a site inspection.

INZAG will investigate the grievance and identify corrective or preventive measures to properly address the grievance.

The resolution of a grievance may require additional information to clarify the situation and/or improve communication between the stakeholder and INZAG, or to implement mitigation or reparation measures caused by financial or in-kind compensation, but also to introduce mitigation measures to prevent the recurrence of the problem.

### **Step 4 – Resolution and communication to stakeholder**

Once grievance investigations are completed, INZAG shall draft a formal communication to the complainant, advising of findings and the outcome. INZAG communicates the response, stipulate mutual commitments, and ask for the complainants' agreement. If the complainant is not satisfied with the resolution, or the outcome of the agreed corrective actions the response should be reviewed and if appropriate amended in light of any discussions or negotiations. If the complainant is still not satisfied, they should be free to take their grievances to a dispute resolution mechanism outside of the company grievance mechanism.

Proposed resolution actions may be of the following types:

- Unilateral: INZAG addresses the source of the problem directly (e.g. reducing noise or dust);
- Bilateral: INZAG convenes a meeting with the complainant, and appropriate management levels (according to the complaint category) to reach a resolution through discussion or negotiation. As during the evaluation process, INZAG is committed to considering all the evidence and meeting

with all the relevant parties, in an effort to give complainants every opportunity to present their views; and

- Third party: Informally or through mediation.

While collating and communicating the response to the complainant, INZAG shall:

- Take photos or collect other documentary evidence to form a comprehensive record of the grievance and how it was resolved;
- Create a record of resolution internally, with the date and time it took place, and have responsible staff sign off;
- Have a meeting with the complainants to get a collective agreement to close out the claim; and
- If the issue was resolved to the satisfaction of the complainants, get a confirmation and file it along with the case documentation.

Grievance resolution should be provided to complainants within the period predicted in INZAG's Grievance Database Template, and responses will be treated within a reasonable period of time.

### ***Step 5 – Grievance close-out and register update***

Where the stakeholder is satisfied with the responses provided to their grievances, the specific grievances will be concluded and the register updated to indicate as much. All correspondences will be filed and the corrective actions clearly updated against the grievances.

As stated in the previous section, if the complainant is not satisfied with the resolution, or the outcome of the agreed corrective actions, they should be free to take their grievances to a dispute resolution mechanism outside of the company grievance mechanism.

The Social Coordinator shall be in permanent communication with the grievance manager to be informed about the critical grievances resolution status.

INZAG will ensure that all grievances raised by all Project stakeholders are treated impartially, respectfully and confidentially.



## 4. ADMINISTRATIVE FRAMEWORK

This Section presents the legislative and administrative framework for the ESIA and the Project as a whole. In addition to applicable national regulations, the Project Owners are committed to align to the requirements of IFC PS as well as other applicable international standards and guidelines.

Appendix E provides further information on the legislation and standards upon which this ESIA study is based both national and international.

### 4.1 Applicable Ghanaian Environmental and Social Legislation

The principal national environmental and social requirements for road construction upon which the study has been anchored are presented in Table 4-1.

**Table 4-1 Relevant National Legislation**

Legislation	Implementing Agency	Relevance to the Project
Ghana's Environmental Policy	EPA	Presents the Environmental Impact Assessment procedure conducted for this Project
The Environmental Assessment Regulation, 1999 (L. I. 1652)	EPA	Presents the Environmental Impact Assessment procedure conducted for this Project
Environmental Assessment (Amendment) Regulations, 2015 (LI 2228)	EPA	Establishes environmental permit fees associated with the EIA of the Project
Resettlement Policy Framework	Ministry of Roads & Highways	Describes the assessment for eligibility and compensation amounts to the Project Affected Parties (PAPs)
Factories, Offices and Shops Act, 1970 (Act 328)	Factories Inspectorate Department	Presents the standards of Health & Safety for Project's Associated Facilities
Occupational Health and Safety Policy of Ghana (Draft), 2004	Ministry of Employment and Labour Relations	Presents the Occupational Health and Safety requirements for Project activities
National Workplace HIV/AIDS Policy	Ghana AIDS Commission	Presents the requirements for protection against discrimination and spread of STDs during the course of works
Labour Act, 2003 (Act 651)	Ministry of Employment and Labour Relations / Labour Office	Presents the labour requirements for the Project
National Water Policy, 2005	Ministry of Water Resources, Works and Housing	Presents the requirements for protection of water resources during the road construction
Forestry and Wildlife Conservation Policy, 1994	Ministry of Lands and Natural Resources, Forestry Commission	Presents the requirements for protection and management of forest resources and protected areas encountered during the road construction
Water Use Regulations, 2001 (LI 1692)	Water Resources Commission	Presents the requirements for water use permits during the road construction
Ghana Landfill Guidelines, 2002	EPA	Provides practical information on licensed waste disposal companies to be contracted for the Project

Legislation	Implementing Agency	Relevance to the Project
The Forest and Wildlife Policy, 2012	Game and Wildlife Division of the Forestry Commission.	Presents the requirements for sustainable use of forest and wildlife resources during the road construction
Wetland Management (RAMSAR sites) Regulation, 1999	Game and Wildlife Division of the Forestry Commission	Presents the requirements for protection of mangroves and wetlands within the Project area
The Co-ordinated Programme of Economic and Social Development Policies (2017-2024)	Republic of Ghana, Ghana Highway Authority	Provides policy guidelines on Ghana's strategy to supporting PPPs, which also includes the Project
Land Bill, 2019 <sup>12</sup>	Various national authorities	Incorporates various legislations related to land use, land acquisition and disbursement applicable to the Project

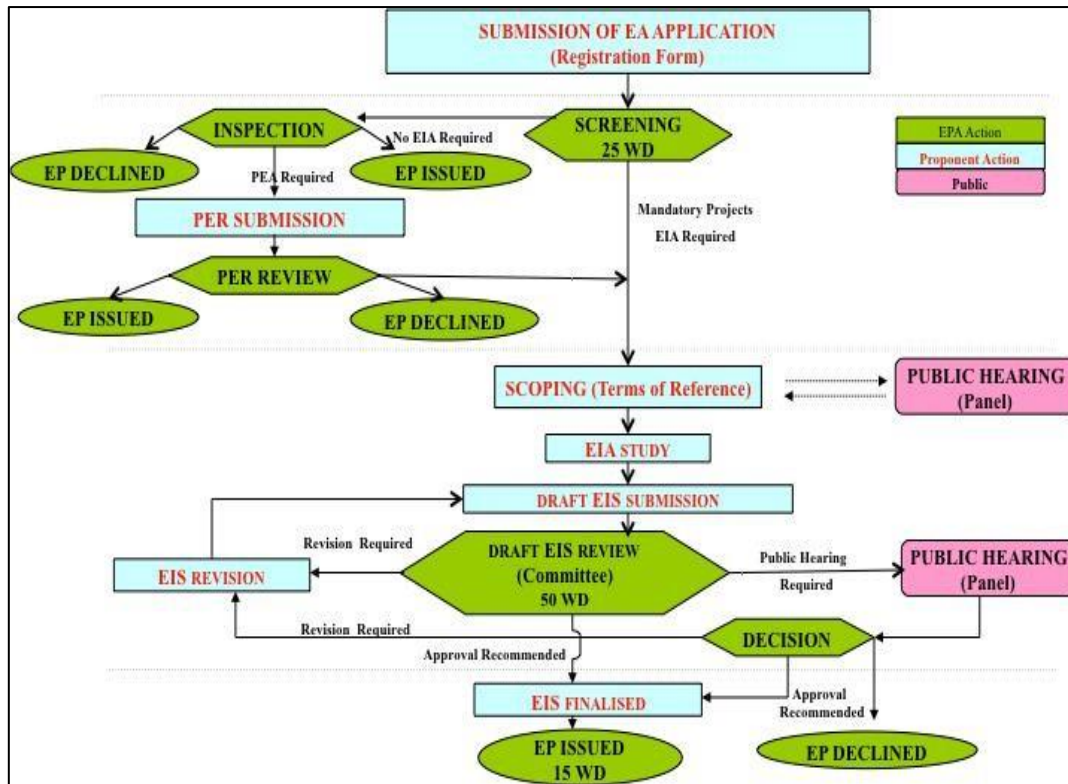
#### 4.1.1 EIA Process under Ghanaian Regulation

Road developments in Ghana must undergo environmental impact assessment (see section below) and be in receipt of an Environmental Permit before construction starts, under the Environmental Assessment Regulations 1999, LI 1652. These regulations and the Ghana Environmental Protection Agency Act 1994 Act 490 provide the framework for undertaking environmental impact assessment.

An overview of the Ghana EIA process is shown in Figure 4-1, including the key steps and the working days (WD) foreseen for review by the EPA. The main stages in the EIA process include screening, scoping and the actual EIA, accompanied by the public hearings<sup>13</sup>.

<sup>12</sup> It is noted that the new Land Bill has not yet entered into force. Its publication in the national gazette is expected in the coming months (ie by end of 2020). At present, the new Land Bill is thus not applicable to the project. Nevertheless, regardless of the Land Bill status, the Project Owner will take cognisance of any changes that may be required by the new Bill where applicable. This applies as well to any additional legal requirements should the Bill enter into force.

<sup>13</sup> For some projects involving minor/moderate potential impacts, the screening process can include the preparation of a Preliminary Environmental Report (PER) to provide adequate information to decide if a full EIA is required. However, in the case of this ECR1 Project the EPA directly issued the Scoping Requirements on the basis of the EA Application, and hence there was no PER.



Source: EPA, 1999.

**Figure 4-1 Ghana ESIA Regulation**

**Legend:**

- EIA: Environmental Impact Assessment
- EA: Environmental Assessment
- EIS: Environmental Impact Statement
- EP: Environmental Permit
- PER: Preliminary Environmental Report
- PEA: Preliminary Environmental Assessment
- WD: Working Days for Review

Based on the Project’s categorization, an Environmental Permit (EP) must be obtained to commence or implement an undertaking in Ghana. An EP is an evidence of compliance with the Environmental Assessment Regulations, 1999 (LI 1652) and the Ghana EIA Procedures, in accordance with the Environmental Protection Agency Act, 1994 (Act 490).

**4.2 International Conventions**

Ghana is signatory to a number of international conventions and agreements relating to industry, development and environmental management. In certain cases, conventions and agreements have influenced policy, guidelines and regulations and therefore are relevant to planning, construction and operation of the Project.

A list of the relevant international conventions and protocols to which Ghana is signatory is provided below:

- International Labour Organization Convention 182, Geneva, 1999;
- International Labour Organization Convention 138, Geneva, 1973;
- United Nations Convention on Biological Diversity (CBD), Rio, June 1992;
- Basel Convention on the control of transboundary movements of hazardous wastes and their disposal, March 22, 1989;

- Bamako Convention on the Ban of the import into Africa and the control of transboundary movement and management of hazardous wastes within Africa, January 31, 1991;
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), also known as the Washington Convention, March 3, 1973;
- International Union for Conservation of Nature and Natural Resources (IUCN); and
- Agenda 2063, African Union, 31 January 2015.

Many of these conventions are incorporated into national law and/or are reflected in the IFC PS. By conforming to the Relevant Standards as defined in the following section, the Project will comply with the requirements of the above international conventions.

### 4.3 Relevant Standards of the ESIA

Alongside Ghana's Environmental and Social regulations, ERM based its assessment of the Project in terms of its alignment with a defined reference framework of international standards. The combined national/international "Applicable Standards" for the ESIA are listed below:

- Ghana's laws, regulations, and permits (including regional/local directives) that pertain to environmental and social issues (including expropriation/compensation);
- Equator Principles – version IV (EP)<sup>14</sup>;
- OECD Common Approaches;
- International Finance Corporation (IFC) Performance Standards (PSs) (2012);
- IFC Environmental Health and Safety Guidelines (IFC EHS Guidelines);
- Good International Industry Practices;
- World Bank Group and IFC Environmental, Health, and Safety General Guidelines (2007);
- World Bank Group and IFC Environmental, Health and Safety Guidelines for Toll Roads (2007).

The IFC PSs form the "backbone" of the international portion of the above-listed Relevant Standards that apply to the ESIA. An overview of how/where the various IFC PSs are addressed in this MDR is provided in the summary table in Appendix B.

## 4.4 Expropriation Process under Ghanaian Expropriation Law

### 4.4.1 Overview of Expropriation Process

In Ghana, RoW acquisition for road projects follows a three-stage process namely, Before Approval; Approval Processing; and After Approval - Field Implementation.

#### i) Before Approval

This stage involves the preparation of site plan(s) of the intended acquisition area, preparation of feasibility report, preparation of interim valuation report, gathering of evidence of ability to pay compensation, and conduction and compilation of report on consultations with stakeholders (including Project-Affected Persons - PAPs) on the acquisition.

The above package is submitted in the form of an application to the Lands Commission (LC) office in the region where the Right-of-Way (ROW) to be acquired is located.

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<sup>14</sup> The initial date was June 2020 but due to the unprecedented circumstances caused by the global Covid-19 pandemic, the EP Association has granted an extension to allow EPFIs a 3-month grace period on the transition. All EPFIs must implement EP4 by 1 October 2020. The Association continues to work to develop guidance and will make this available to EPFIs and wider stakeholders at the earliest opportunity.

## ii) Approval Processing

This stage encompasses the submission of the application package by the Regional Lands Commission (RLC) for the consideration of the Site Advisory Committee (SAC), approval of the decision of the SAC by the Regional Minister, submission of the approved plan to the RLC office for processing and preparation of draft Executive Instrument (EI), the approval of plan and draft EI by the Ministry responsible for Lands, submission of plan and draft EI to the Attorney-General's office for legal clearance, submission of EI to Assembly Press for gazetting, and publication of EI by the LC in the national dailies.

## iii) After Approval – Field Implementation

This stage entails the setting out of the acquired RoW by the Survey and Mapping Division (SMD) of the Lands Commission (LC) or a licensed Surveyor, measurements of affected properties by the Land Valuation Division (LVD) of same Commission for the assessment of compensation, and other processes leading to payment of due compensation and the eventual demolition of properties within the acquisition corridor.

### 4.4.2 Key Legislation

The key legislation relevant in the consideration of land, land tenure, right of way and acquisition is listed below:<sup>15</sup>

- The Administration of Lands Act, 1962 (Act 123);
- State Lands Act, 1962 (Act 125);
- State Lands Regulations 1962 (LI 230);
- State Lands (Amendment) (No. 2) Regulations 1963 (LI 285);
- Lands (Statutory Way Leaves) Act, 1963 (Act 186);
- Office of the Administrator of Stool Lands Act, 1994 (Act 481); and
- The Lands Commission Act, 2008 (Act 767).

## 4.5 Resettlement Process under Ghanaian Resettlement Law

The legal framework upon which any Resettlement Action Plan hinges on is primarily the Constitution of Ghana. All power and authority to evoke the various documents is vested in the National Constitution, which gives authority for the actions taken.

The Constitution of the Republic of Ghana (1992) upholds the principle of private ownership of lands. Adequate safeguards from deprivation of private property rights have been provided for. The state's inherent powers to compulsorily acquire private property rights have been reconsidered and somewhat controlled. Article 20 of the Constitution prescribes that under no circumstance should private properties be compulsorily taken unless there are weighty and justifiable grounds for such acquisition, which invariably must be in the public interest. It is expressly provided in article 20 that "No property of any description or interest in or right over any property shall be compulsorily taken possession of or acquired by the state unless:

- Section 1(a) The taking of possession or acquisition is necessary in the interest of defense, public safety, public morality, public health, town and country planning or the development or utilization of property in such a manner as to promote public benefit; and
- Section 1(b) the necessity for the acquisition is clearly stated and is such as to provide reasonable justification for causing any hardship that may result to any person who has an interest in or right over the property."

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Section 2(a) states that sufficient provision must be made for the prompt payment of fair and adequate compensation and Section 2(b) states that aggrieved persons must have right of access to the High Court for redress.

Article 20 (2) expressly stipulates that where the compulsory acquisition involves the displacement of any inhabitants the state shall resettle them on suitable alternative site having regard to their socio-cultural values and economic wellbeing. An important provision in the Constitution includes the giving back of lands to the owners when such lands are not used for the purpose for which they were compulsorily acquired in the public interest.

Article 20 (3) provides that where a compulsory acquisition or possession of land effected by the State in accordance with Article 20 (1) involves displacement of any inhabitants, the State shall resettle the displaced inhabitants on suitable alternative land with due regard for their economic well-being and social and cultural values. In compliance with the Constitution of Ghana, article 20 (3), INZAG on behalf of GHA is preparing a resettlement Framework and following a RAP to ensure adequate management of resettlement impacts.

In addition to the requirements set out in the Constitution of Ghana, the Project fully applies the Ghana Resettlement Policy Framework for Road Sector Operations: The Resettlement Policy Framework (RPF) for Road Sector Operations<sup>16</sup> has been prepared and disclosed in March 2017 under the Ministry of Roads & Highways, Ghana Highway Authority, Department of Urban and Feeder Roads. The RPF outlines relevant roles and responsibilities within the national institutional framework. Furthermore, the RPF includes specific measures to ensure adequate resettlement management. All provisions from the RPF are respected and incorporated under the Project resettlement planning and implementation arrangements (refer to Resettlement Framework, which will be addressed in the full ESIA study).

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<sup>16</sup> <http://documents1.worldbank.org/curated/en/971831491459138212/pdf/SFG3238-RP-P151026-Box402900B-PUBLIC-Disclosed-4-5-2017.pdf>

## 5. ESIA METHODOLOGY

### 5.1 Overview

The overall ESIA process for the Project has followed the obligatory stages required by the Ghana EPA and as is customary in international practice.

In accordance with the EIA methodology of Ghana (as shown above in Figure 4-1), the initial step in the EIA/ESIA process was the submission to the EPA of the Environmental Assessment (EA) Application for the Project. This was completed on 10 July 2020 and on 26 July 2020 the EPA approved the Application and issued the Terms of Reference (ToR) for the obligatory Scoping Study.

For this Project, a separate Screening Study was not required because by the nature of the Project and its categorisation (eg a Category EA2 per Ghana EPA and a Category A per IFC), it is clear that a Scoping is needed followed by a full ESIA.

The Scoping Study was undertaken in accordance with the EPA requirements and per good international practice (whilst subject to certain limitations due to the COVID Pandemic). The Scoping Report was submitted to the EPA on 07 September 2020, and is currently under review by the EPA as of the date of this report's writing (11 September 2020). The key findings of the Scoping are presented in the following section.

### 5.2 Limitations

The following limitations have been considered during the preparation of this report:

- This MDR represents a preliminary impact assessment conducted for the Project and the intention of the MDR is that readers will be able to understand how potential Project risks have already been addressed, or how they will be appropriately handled in the ESIA and the related documents such as the ESMP.
- The Final Project design is currently at preliminary stage, and this MDR is based largely on the Advance Design Report dated May 2020. Hence, the Project footprint is subject to potential changes as well as the definition of restrictions within the various corridors (e.g. construction footprint, road reserve, right of way). Therefore, a general classification of the types and extent of displacement and livelihood impacts is included based on the initial remote sensing exercise through GIS as well as the outcomes of stakeholder engagement activities undertaken to date. The identification of structures at risk of being displaced is tentative as it relies primarily on Google Earth satellite imagery which range between 2018 and Q1 of 2020. In this regard the number of interferences will be confirmed and finalised by INZAG during the topographic survey before the start of construction. The outlined displacement will need to be further understood and quantified after finalisation of Project design through the asset survey inventory and household survey, to be undertaken as part of the Resettlement and Action Plan (RAP) development and implementation. At this stage therefore, it is not possible to determine the number of Project affected people (PAPs), households, and land plots (agricultural, residential, or other) that will be affected.

In addition, ERM has developed this assessment based on reviewing legislation and secondary baseline data, complemented by data collection and consultation with local stakeholders undertaken as part of the ESIA development. As mentioned, at this stage, no detailed community consultation, socio-economic household surveys and asset inventory were foreseen. Therefore, no detailed feedback or opinion of the impacted groups is included regarding the entitlements and compensation measures. Likewise the baseline and displacement impacts assessment was developed desktop based and including information from the stakeholder engagements conducted. Details on household economics and similar will have to be included at a later stage after the RAP studies have been concluded. Further consultations, community opinion/feedback

and completion of a land and asset inventory survey covering the entire Project footprint will be subject to the next project phase.

- Identification of the associated facilities (access roads, , , surplus material dumpsites, etc.) are still ongoing, therefore the locations and maps were not included.
- Two campsites are foreseen by INZAG (KM 17+000 and KM 47+000), however the exact location of campsite at KM 47+000 will be defined after cultural heritage surveys.
- Despite the stakeholder engagement with different Authorities/Service providers, the exact location of public infrastructures was not made available at this stage.
- A number of data limitation were identified and should be considered when reading this Section.
- Due to COVID restrictions face to face engagement was kept to a minimum. Engagements with communities have been limited to representatives, not with communities at large. Field survey data collection was streamined, and only limited settlement profile information was collected with support of the district authorities. Only 6 settlement profiles were successfully completed out of the 24 main settlements identified.
- Information gaps were addressed using desktop sources such as the 2018-2021 Midterm District Development Plans (MTDP) and complemented with livelihood information collected through the Key Informant Interviews with livelihood groups representatives and with information collected during the community forum meetings. However detailed settlement level information remains limited.
- Due to the ongoing COVID pandemic and related restrictions, focus-group discussions (FGD) with community groups could not be conducted and instead, Key Informant Interviews (KII) were held with representatives of livelihood associations in the different settlements.
- Considering the limited availability of settlement-level information, and the understanding that most economic activities and basic infrastructures and services are generally concentrated along the main road networks, the main socioeconomic trends observed at the district level have been considered representative of the local Aol context. It is noted however that, the quality of the baseline information available in each MTDP is variable between Districts. This is particularly true for the Districts of Lower Manya Krobo and Shai Osudoku, where information was most limited.
- Several operational topics including “Traffic Forecast After Project Implementation”, and“Operational Employment” have not been included in MDR, but will be a part of ESIA.
- Waste disposal facilities (e.g. sanitary landfills, waste recycling facilities) have not been selected yet by INZAG.

### 5.3 Results of Scoping

The centrepiece of the scoping process is the Scoping Matrix (presented in Appendix G). The Matrix allowed a comprehensive and systematic initial review of the potential interactions of the key Project activities during construction and operation stages (listed in first main column) against the relevant environmental and social receptors (listed in the first main row across the top).

For each potential interaction (ie square/box) in the Matrix, an indication is given as to the potential severity of the impact and the potential need for supplemental data and/or mitigation measures:

- Blank/white means no interaction is reasonably expected (and this interaction is no longer considered in the report);
- White with “O” means the potential impacts are expected to be avoided via compliance with the normal Ghana legal requirements and the embedded measures in the Project design;

- Yellow with “I” means interaction is likely but these are expected to be insignificant (usually no specific mitigation measures warranted, but corresponding commitments may be made in the respective management plans of the ESIA);
- Orange with “S” means interaction is likely and some of these may be significant (specific mitigation measures will be warranted, and possibly additional baseline information may be needed);
- Green means that the likely interaction will have a positive impact to the receptor (mitigation measures may be warranted to further enhance the positive impact).

The Scoping Matrix remains a dynamic tool throughout the ESIA process, as for example any key concerns raised by stakeholders will be added to the receptors/topic list of the scoping, if not already included.

As a result of this scoping process to date, the following potential issues of the Project were identified that will require thorough consideration and additional studies during the ESIA and development of appropriate mitigation:

- **Geology, Soils and Contaminated land:** In particular, over 40 fueling stations were identified in the RoW which contain underground storage tanks. Many of these stations will be able to remain in place, but a few may need to be cleared for Project construction. Prior to clearance, these locations need to be assessed during ESIA in terms of any existing hydrocarbon contamination, permit requirement for relocation, etc. Remediation of any contamination is not necessarily in the responsibility of the EPC Contractor, but any contaminated materials excavated as part of construction will require appropriate safe disposal.
- **Biodiversity & Nature Conservation:** Site preparation activities (particularly vegetation clearance), construction of access roads, earthworks (embankments and trenching construction), assembling and welding (including bridges over water courses, viaducts etc.) and use of asphalt plants and exploration of borrow pits/quarry mining will result in the removal, fragmentation or severance of habitat and impacts on the species that depend on that habitat.

Assuming that the road expansion will not occupy Shai Hills Reserve area (although some of the proposed quarries are located close to this area), there are no protected areas identified in the Project area. However, Critically (CR) and Endangered (EN) species are present and as such further assessment is required to understand their extent and sensitivity to the Project. There were no habitats of high importance observed during the January 2020 scoping visit, except in the area where the Shai Hills Reserve confronts with the N2 (approx. 8 km). As per the discussion held with the Forestry Commission during this Scoping phase, the Project proponent was firmly not encouraged to expand the road towards the Reserve, i.e. the expansion should be considered only towards West.

Particularly in the Shai Hills region, the fauna that is present in the area may be affected by a loss of habitat and possible disturbance due to the presence of vehicles, machinery and the workforce. Additional elements that should be considered are the impact on the movement of species to/from the Reserve (western flank), as well as the effect on the expansion of the neem tree (as an effect of perturbation of birds and baboons). A preliminary biodiversity assessment was performed, and is included in Appendix C of this Report. A critical habitat screening assessment will need to be developed to satisfy IFC PS6 requirements, including a desk based fauna assessment will be undertaken, the results of which will feed into the ESIA. Further, wet seasons biodiversity surveys will be undertaken to provide additional information on birds and mammals within the Project site (in line with IFC requirements) in the Shai Hills Reserve.

- **Resources and Wastes:** Significant quantities of various types of construction materials will be needed such as concrete, prefabricated segments, aggregates, asphalt, together with construction plant, vehicles and machinery. In accordance with international good practice, environmental and social implications need to be considered in the selection, sourcing and

transport of materials from quarries and borrow pits will be assessed in the ESIA. The main principle is to source the materials locally where possible and feasible.

- **The Water Environment:** In total, six watercourse crossings have been identified during the scoping assessment. The construction activities may have potential impacts on the hydrology or quality of the water environment from physical intervention and intentional and accidental discharges to water during construction; and potential impacts may occur on the water environment during operation of the road including at bridges, underpasses, viaducts and culverts. The main purpose of the ESIA studies will be to identify the hydrological and hydrogeological features within the zone of influence of the Project. Once the baseline information is gathered, the detailed potential impacts will be formulated that might occur during the construction and operational phases of the upgraded road (eg runoff of silty drainage). Mitigation measures for each of the identified impacts will be developed and residual impacts will be identified. In any case, these types of impacts to surface waters and corresponding mitigation measures are typical for such road projects.

The water supply for construction will be one of the main subjects to be assessed during the ESIA, since significant amount of water will be needed during construction (such as for camps, compaction, dust control, etc.). It has been stated in INZAG's Advance Design Report (May 2020 that "*with the exception of the Volta river, the water courses along the corridor are generally small and of the torrential type, thus unable as well to provide the needed demands for construction activities*". According to this report, the demand for large quantities of water during the construction works should be met primarily with the construction of new deep wells along the road (exploring the fractured zone aquifers), as well as with the construction of ponds for the catchment of stormwaters during the rainfall season. Additionally, transboundary issues relating to the Volta River are not applicable because (i) the Volta River in the Project Area is entirely within Ghana and does not form an international border; and (ii) the volume of water that the Project might draw from the Volta River is negligible compared to the large size of the River.

- **Air Quality:** The construction of the Project will generate dust and particulate matter as PM<sub>10</sub> from earthworks, construction and track-out of mud and dirt onto public roads. This will also include dust emissions associated with the use of non-road mobile plant. The scheme will be undertaken with embedded mitigation such as compliance with local regulations and international good practices. The impact assessment will identify whether there are significant residual impacts and identify any additional mitigation is required to mitigate dust/PM<sub>10</sub>. Impacts of dust/PM<sub>10</sub> will be assessed at human receptors, and dust only at ecological receptors. The assessment will consider impacts at receptors within 350m of the construction route. The construction phase will also generate construction traffic on public roads. The impacts of these vehicles will be considered qualitatively, as they are transient and short term.

The operational phase of the Project will impact on air quality. Impacts may be both positive and negative (compared to the current situation), due to changes in traffic volume, traffic speed, road alignment and proximity of receptors. Impacts will be considered within 200m of the road alignment. Pollutants of interest will be PM<sub>10</sub> and nitrogen dioxide (NO<sub>2</sub>) at sensitive human receptors, and oxides of nitrogen (NO<sub>x</sub>) at sensitive ecological receptors. The impacts of traffic exhaust emissions on air quality will be assessed using the ADMS-Roads dispersion model. The emissions will be established for the Ghanaian vehicle fleet as far as practicable. Modelling will be undertaken for the existing road and the future road to provide net change at sensitive human and ecological receptors.

- **Noise:** Potential likely significant noise impacts may affect Noise Sensitive Receptors (residential properties, schools, health facilities and places of worship), as a result of the construction and operation phases. Construction of the Project has the potential to result in significant noise and vibration impacts at nearby Noise sensitive receptors (NSRs), from the use of mobile and stationary construction plant and from an increase in traffic on the road network. Noise assessment will be carried out by predicting noise levels from potential construction noise



sources and assessing them against relevant standards. An assessment of noise from construction will focus on works to construct the main highway, where the majority of potentially affected NSRs are located. Impacts from the construction of features such as structures, feeder roads and junctions will be estimated. During construction, vibration may be noticeable at times when construction equipment passes close to individual receptors. Vibratory rollers, which may be required during construction, can generate significant vibration levels which may be noticeable at residential receptors within approximately 50 m. Most other equipment is likely to generate lower levels of vibration. Vibration effects from construction are expected to be short-lived at individual receptors as works progress along the route of the proposed road and are therefore scoped out of assessment.

Operation of the Project has the potential to result in significant noise impacts at nearby NSRs from increases in traffic flow, speed and changes in the composition of traffic. Also, the proposed road would be wider than the existing road which will reduce the distance to NSRs. Noise assessment will be carried out by predicting noise levels from potential operational noise sources and assessing them against relevant standards. A high level noise model will be developed using noise modelling software to allow the populations likely to experience potentially significant adverse noise effects to be estimated and reported.

Modelling simplifications will be necessary due to the size of the Project and the preliminary stage of the design. Mitigation of noise from the operation of the Project will be considered, if necessary, in the form of a case study (i.e. not geographically specific), to estimate the potential for noise reduction.

The assessment of operational noise will consider absolute levels and also the change in baseline noise. Ghanaian national regulations on noise and the IFC General noise guidelines provide relevant noise standards which will be considered. These noise standards are not intended to be used for the purpose of assessing noise from roads, however, they are preferred noise levels, above which, in general terms noise is likely to cause some disturbance. The IFC EHS Guidance for Toll Roads<sup>17</sup> will be considered. This guidance makes reference to one specific noise impact example of  $L_{10}$  70 dB(A) for residential land use from the USA.  $L_{10}$  levels are usually a few decibels higher than  $L_{eq}$  levels for road traffic noise. In other countries, similar levels are used to indicate that mitigation is required. Thus, noise levels above this slightly precautionary level of 65 dB  $L_{Aeq}$  day can be considered high and will, in general, warrant consideration of further mitigation where practicable, noting there are no Ghanaian requirements to mitigate at that level.

A new road surface would be laid as part of the Project, which would be smooth and free of significant irregularities. Therefore, it is assumed operational vibration effects from traffic during operations would not be significant (and in some locations possibly a positive impact compared to the baseline situation).

- **Climate Change:** The Project has the potential to have impacts on the climate due to greenhouse gas (GHG) emissions during construction and operation. The ESIA will include an assessment of the Project GHG emissions for the so-called scopes 1, 2 and 3.

On the other hand, the future climate change characteristics may also have potential impacts on the Project design and integrity of the road structures (such as culverts, bridges, asphalt) and other Project aspects due to changes in heat, precipitation, floods, etc. Thus, a climate change risk assessment (CCRA) will be conducted.

For example, flooding was one the concerns during the stakeholder meetings which is also supported by INZAG's Advance Design Report (May 2020). It is stated in the relevant report that "*the Greater Accra Metropolitan Area faces serious flooding problems during the rainy season which causes damage to life and property*". "...especially prone to flooding are Tema and

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<sup>17</sup> World Bank Group Noise Guidance for Toll Roads, April 2007.

*Ashaiman, near the beginning of road project. People in these areas are often the victim of heavy flooding. On 20 June 2010, for example, 11 people lost their lives due to heavy floods in Ashaiman and Tema”.*

- **Displacement of Existing Land Uses, Property and People:** The following types of impacts were identified as potential consequences of the Project during scoping:
  - impacts on people, households, business (formal and informal) and communities resulting from economic displacement as a result of loss of assets or access to them, loss of employment or other aspects of livelihood, welfare and/or amenity, due to direct changes in land use on which the road and its ancillary facilities will be constructed;
  - impacts on people, households, business and communities resulting from physical displacement to facilitate the construction and operation of the road;
  - disturbance to local livelihoods and community severance issues;
  - impacts of the road on the overall access to resources and on the spatial fabric of social and economic relations;
  - impacts on planned developments; and
  - indirect land use changes as a result of the operation of the road (such as changing the zoning or development plans in the vicinity of the road).

The extent of these impacts and the corresponding mitigation/compensation measures will be subject to extensive further assessment during the ESIA and the Resettlement Framework. Despite the application of the Smart Designs and other design optimisation to optimise the routing alignment, it is inevitable that there will be some residual impacts to the existing land users.

- **Cultural Heritage:** Construction activities have the potential to impact tangible cultural heritage resources such as archaeological sites, built heritage (i.e. historic or culturally significant buildings or structures) resources, and living heritage resources (i.e. shrines, cemeteries, religious/ritual sites, etc.). Potential impacts to cultural heritage resource include, but are not limited to the following:
  - Ground disturbing activities associated with the Project are the most likely source of direct physical impacts to undiscovered archaeological sites, if present (although by design the extent of ground disturbance – especially digging to depth will be minimised; most of the ground disturbance will be close to ground level),
  - Built heritage and living heritage resources are also susceptible to direct physical impacts if buildings, shrines, or other resources will be removed or damaged during road construction. Impacts could occur if resources are removed during construction or due to ancillary impacts from increased vibration and pollutants caused by increased vehicle traffic.
  - Built and living heritage resources are also susceptible to indirect impacts through the introduction of intrusive visual or auditory elements to their physical environment or “setting”. These impacts could include increased noise and/or exhaust and dust during construction and use of the expanded road.
  - The creation of construction restriction zones associated with the Project could also restrict user access to existing cultural heritage sites. An example of this type of impact would be restricting access to the Klowem Hill, an area used by local stakeholders for festivals and traditional activities.
  - The stakeholder discussions as part of the scoping studies have identified that intangible heritage should also be included. For example, certain traditional festivities are held at specific times and locations, and therefore construction activity at these times/locations should be avoided.

- **Socio Economic Impacts:** The following types of impacts were identified as potential consequences, both positive and negative, of the Project during the scoping:
  - temporary and permanent changes in the study area's population and demographic characteristics due to the Project, including influx;
  - temporary and long-term direct and indirect employment opportunities as a result of construction and operation;
  - Temporary induced economic impacts and socio-economic development of the municipalities along the road alignment. Benefits will arise from both indirect and induced employments, from the supplementing supplier and service industries and the expenditure of direct and indirect employees' earnings in the economy, for example.
  - Disruption and damage to infrastructure and utilities during construction;
  - The road will cause severance and fragmentation of agricultural lands and possibly other holdings making them less viable due to the limited access.
  - Traffic.

Appropriate site-specific studies may be warranted for the above situations to determine the most appropriate measures to avoid or mitigate the potential impact.

- **Community Health and Safety:** Impacts on the health and safety of the community may arise during construction as a result of noise, vibration, dust and other emissions from earthmoving, blasting, piling, and operation of equipment and vehicles.

Other risks involving the public associated with construction could include physical accidents on sites, impacts from construction traffic and accidents involving handling of hazardous materials during construction. Children and youths are amongst those vulnerable to the physical hazards associated with the construction activities, including fall from unguarded areas at height, construction traffic, for example, especially in event of unauthorised entry.

Local communities can also potentially be exposed to health and safety issues posed by fuel stations along the road, including spills, fires and explosions.

The presence of an external workforce working and living in the Project area camps where interaction with nearby communities is possible could lead to the increased transmission of communicable and sexually transmitted diseases within these communities. Any community concerns or perceptions with regard to reduced health and physical safety by the community also need to be addressed.

- **Workforce social Issues :** Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working or living conditions. These issues should be considered not only for those who are directly employed by INZAG but also its contractors (including sub-contractors) and within the supply chain. Labour and working conditions as compared to relevant Ghana laws and the Lenders Requirements will be assessed in the ESIA
- **Cumulative Impacts:** The Project area was reviewed during the scoping studies and a new railway project which has recently been constructed was identified that may be of direct relevance to the assessment of the cumulative impacts of the Project. The ESIA will assess the cumulative impacts as a separate section define the potential impacts and mitigation measures accordingly.
- Transboundary issues are not a factor for the ESIA because the Project is not located near any international borders. As such, this topic is fully "scoped out" for this Project.

After submitting the scoping report to the EPA and prior to the baseline surveys, ERM developed a sensitivity assessment. Through remote sensing analysis a high resolution landcover/landuse

classification of terrestrial areas has been developed. This analysis was conducted in two software platforms: ArcGIS 10.7 and ENVI (a specialized remote sensing platform).

The landcover/landuse classification model used both automated and semi-automated analyses to identify both natural and manmade features within the terrestrial component of the study area. The types of classification included, but are not limited to: bare ground, closed forest, open forest, secondary growth, thicket mosaics, floodplains, wetlands, water, marshes, urban or settled areas, cultivated areas, roads, and mining activities. Once the different classes were obtained and further dataset was overlapped, a final sensitivity map was developed

The European Space Agency Sentinel-2 satellite was used to generate the landcover. This satellite has very recent imagery (within one month of current date), publically available and is designed for landcover studies at a resolution of 10m.

In addition to the landcover modelling that was derived from Sentinel-2 data, ERM verified modelling results using publically available high resolution imagery from ESRI's living atlas platform, which provides high-resolution visual data at approximately 50cm resolution. This visual data was used to identify smaller landscape features, such as buildings or small roads that would otherwise be missed by the Sentinel-2 imagery. By combining these two types of imagery together, it was possible to generate a highly accurate Landcover model that also incorporates smaller landscape features.

Further sources of information were integrated into the final sensitivity assessment based on international and national databases, such as for example protected areas, important bird areas, cultural heritage sites, surface water network.

The analysis was run taking into account 500m buffer per side of the centerline (1km wide corridor).

While landcover/landuse models were initially developed at the desktop, the outcomes were further ground truthed to assess the level of accuracy. Data collected from the ground truthing effort was then fed back into the model for adjustment/refinement.

The final product was a cartographic output in PDF format presenting results of sensitivity assessment, included imbedded statistics on intersections of the proposed right of way with Landcover categories and biodiversity and social sensitivities (Appendix F).

## 5.4 Overview of the ESIA Approach

ERM's approach in conducting this ESIA study is to work closely with the teams of the EPC Contractor and the Project Owner so that the environmental and social assessment is an iterative process. In this way, all E&S considerations and mitigation and enhancement measures are embedded into the design, where possible, to maximise efficiencies.

ERM's standard Impact Assessment Methodology is presented in Figure 5-1.

This methodology follows international good practice as recognized and accepted by KfW, IFC and other international lenders. The potential impacts of the Project (i.e. the interaction of elements of the physical, biological, cultural or human environment) are assessed against the baseline conditions of the Project's Area of Influence (to be further addressed in the ESIA Report).

The significance of an impact is assessed as a result of the impact magnitude (which depends on extent, duration and other impact factors) and the sensitivity characteristics of resources and receptors. The resulting impact significance is then defined in terms of Minor, Moderate or Major – or positive. For potential impacts that are found to be Major (and in some cases Moderate), one or more mitigation measures are recommended in line with the so-called "Mitigation Hierarchy" to either: avoid, minimise, mitigate or compensate for the impact so that the resulting residual impact significance is acceptable.



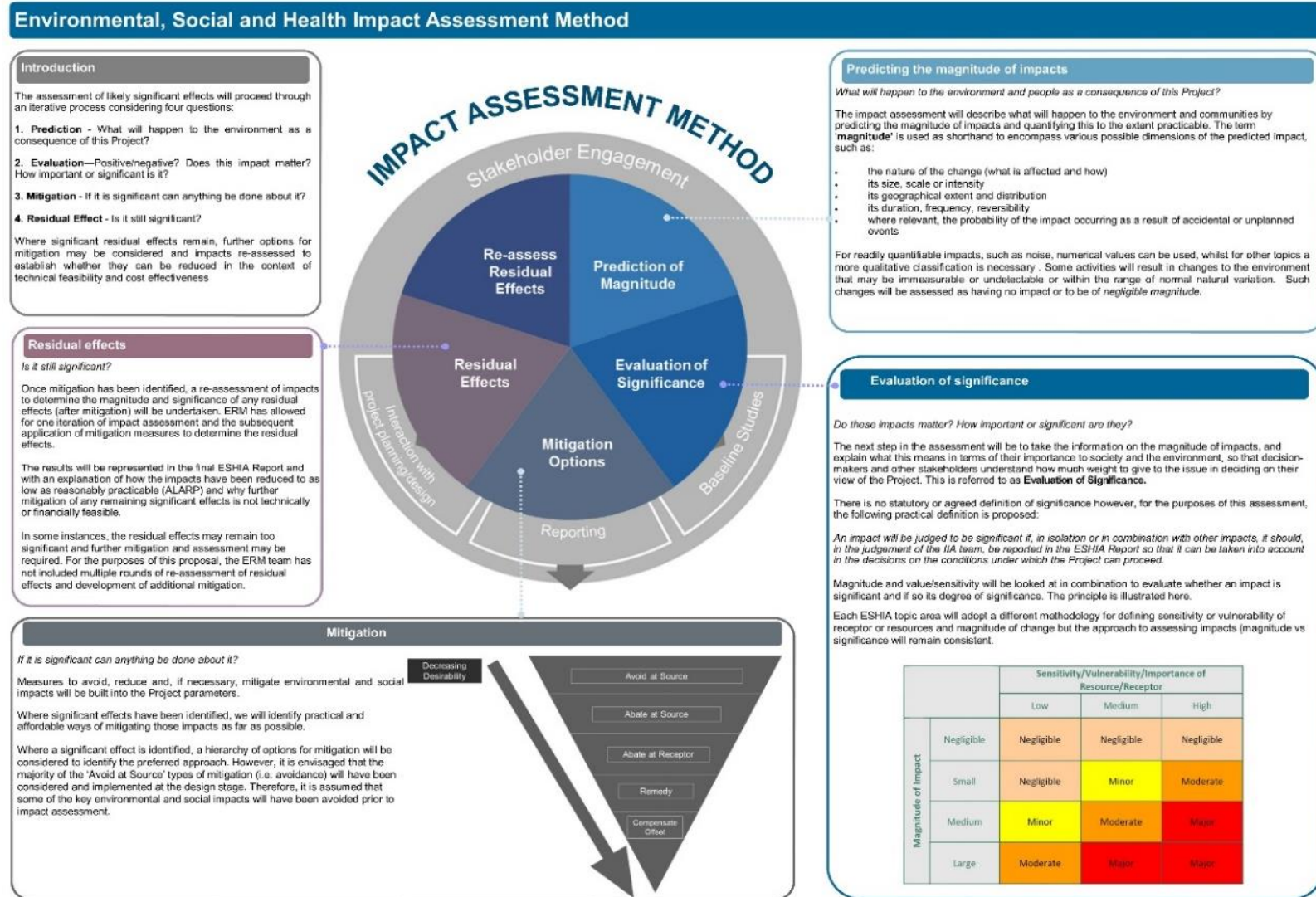


Figure 5-1 ERM Impact Assessment Methodology



ERM has worked closely with INZAG during the early stages of the Project so that the design already includes many technical measures to avoid/minimise impacts (e.g. DART and Smart Design Solutions Tools). Such “embedded measures” are considered as part of the existing Project design and not specified again as mitigation measures - they are anyhow already planned/obligatory. The mitigation measures will be implemented by INZAG after receiving approval from GHA (To be further addressed in the ESIA Report).

## 5.5 ESIA Team

The ERM experts have comprehensive experience and covers all of the necessary qualifications requested for this specific Assignment. An overview of the key members of ERM's Project team is provided below, including the local Ghana partner, PSS Urbania. Note that for each of the technical areas, only the topic leads' names are listed here. However, they will be supported by other team members.

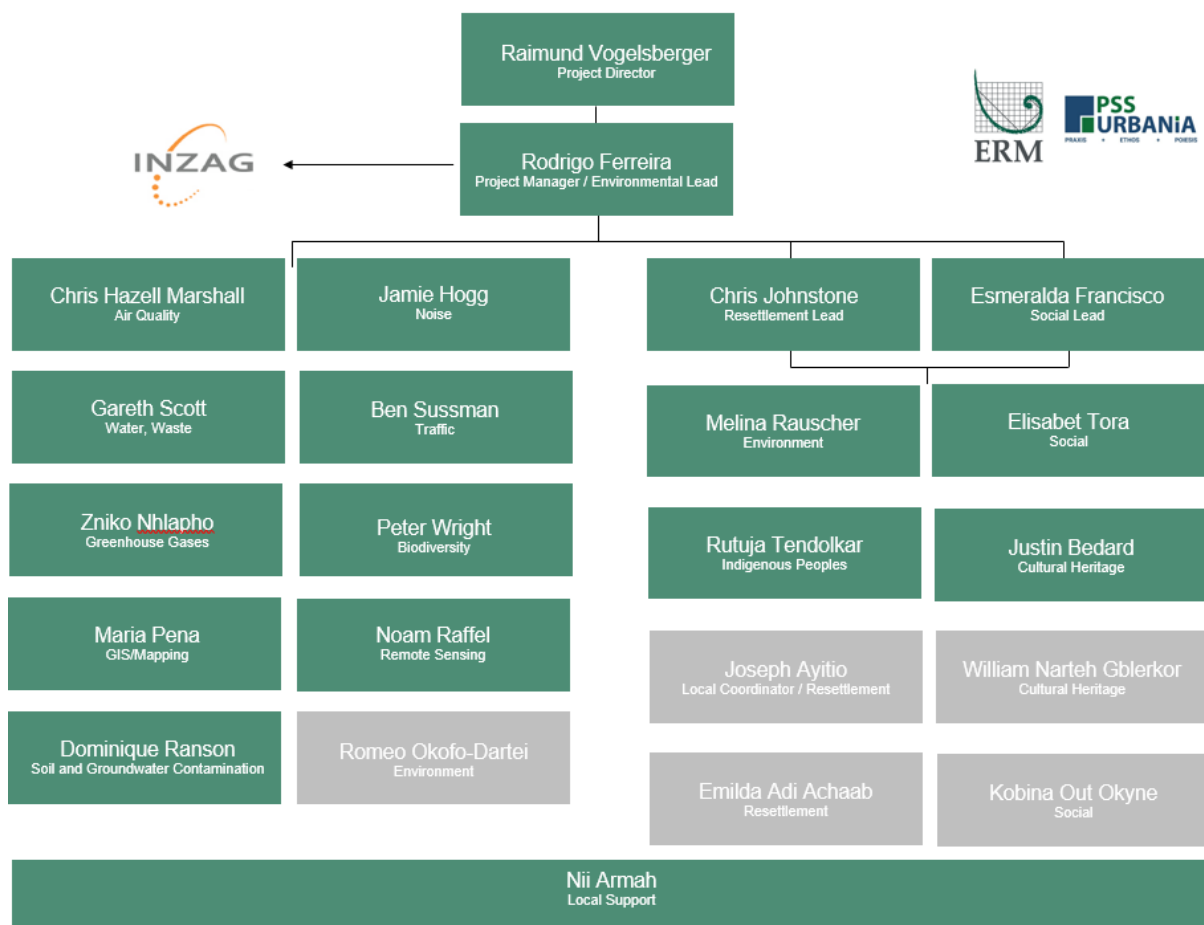


Figure 5-2 ESIA Team

## 6. PRELIMINARY BASELINE FINDINGS AND IMPACTS DURING CONSTRUCTION AND OPERATION

### 6.1 Embedded Controls

Embedded controls include procedures or technical/design aspects that will be employed to avoid or minimise potential environmental or social impacts of the Project; these controls are considered an integral part of the Project design. The impact assessments on individual topics in this ESIA assume that these controls are already implemented and that any supplemental mitigation measures would therefore be 'above and beyond' any existing / planned embedded controls to address specific risks that are not sufficiently mitigated by these controls.

Embedded controls that have already been applied or will be integrated into the next phase of the Project's design are as follows:

- Ghanaian Environmental and Social Laws/Regulations;
- IFC EHS Guidelines for Toll Roads;
- IFC EHS Guidelines for Construction Materials Extraction;
- IFC General EHS Guidelines;
- INZAG Smart Design Solutions; and
- Design Action Readiness Tool - DART (ERM tool based on the international best practices and IFC EHS Guidelines).

*Example: the improper storage of fuels and hazardous liquids or wastes in the field poses a risk of spillage and consequential contamination of local soils, vegetation and potential surface or groundwater. However, the proper storage, handling and labelling of such materials (including containment/bunding, spill-response, etc) is addressed in Ghana regulations, IFC Guidelines and is standard practice of INZAG. Therefore, these embedded controls are deemed sufficient to address the normal risks of such material storage, including the practice of routine inspection/monitoring of these storage locations under a construction management system that will be applied. As such, no supplemental mitigation measure is warranted to adequately manage these risks. An exception to this might be in case there are some particularly vulnerable/sensitive receptors in the Project area, and it may then be justified to implement some further restrictions/protective measures as a further, enhanced mitigation measure.*

In summary, many of the "normal" E&S risks of Project construction and operations will be sufficiently addressed by the numerous embedded measures, and only the more significant or unique risks will warrant supplemental mitigation measures. The Impact Assessment for each individual topic (Sections 6.5 to 6.17) therefore focusses mainly on the case-specific measures, as it assumed that INZAG has already adopted and/or has committed to applying the embedded measures in the Project's design and implementation.

A comprehensive set of embedded controls is contained within the INZAG's Smart Design solution tool and the so-called DART tool, as described below.

## 6.2 INZAG's Smart Design Solution

The Smart Design Solution tool is developed by INZAG in order to identify the most challenging areas along the road alignment and find optimum solutions. Through this tool, INZAG takes a proactive approach in assessing and mitigating key Environmental & Social risks by conducting micro alignments of the road, within its 90 m RoW.

To date the tool has been applied for more than 10 cases in different locations along the road alignment. The following case studies have been selected to best represent how the Smart Design Solution was applied practically to the Project.

The different colours in the photos have the following meanings:

- Green: RoW by Ghana Law **90 m**;
- Yellow: Road Reservation - Area bought by GHA (The Client) **78m**;
- Pink: Construction Width - Area that effectively will be cleared during Construction Stage up to **60m**;
- Red/Blue: Limits of Road Corridor Earthworks (Cut/Fill); and
- White: Road Corridor Alignment.

### 6.2.1 Case Study 1: Ashaiman Timber Market

**Location:** KM 1+200

The Ashaiman timber market is located directly adjacent to the existing road, and

**Background:** most of their customers simply pull their cars/trucks off the road in front of the market and park there. In future, this parking area will be taken up by the new road.

**Objective:** Engage with the timber market vendors and discuss options for alternative parking areas nearby.



**Figure 6-1 Ashaiman Timber Market**

## 6.2.2 Case Study 2: Re-alignment

**Location:** KM 3+600 to KM 4+500

**Background:** This section of the road is characterized by densely populated settlements on the eastern side of the road corridor.

**Objective:** Adjust the road's alignment to the extent possible to the western side in order to minimize social impacts on existing settlements and businesses.



Figure 6-2 Sample Alignment

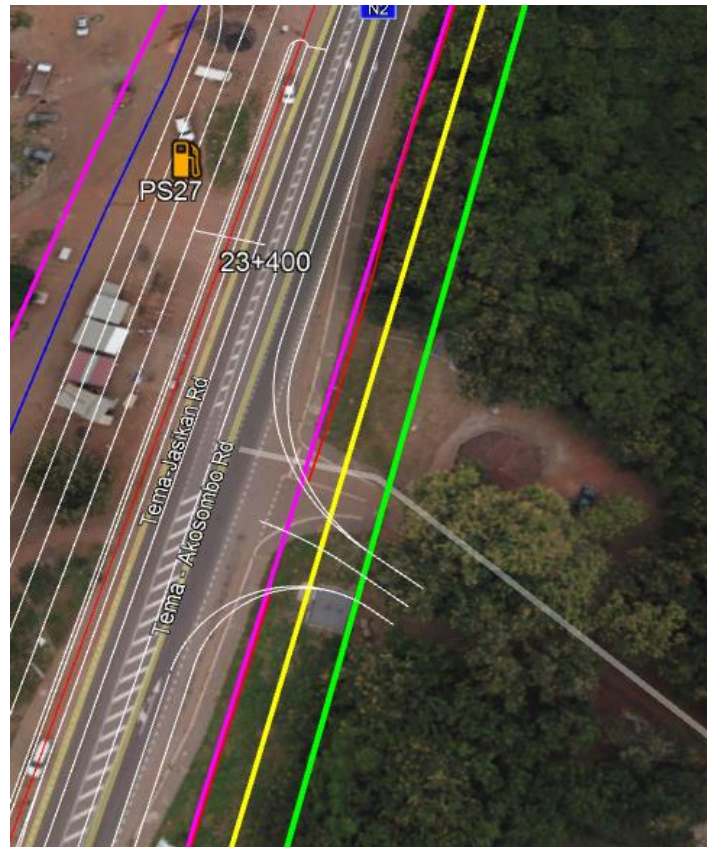


### 6.2.3 Case Study 3: Shai Hills Resource Reserve

**Location:** KM 23+400 to KM 29+600

**Background:** The current alignment would affect the entrance to the Shai Hills Natural Reserve.

**Objective:** Adjust the road's alignment as far as possible to the west, in order to not affect the reserve. Also, prepare on/off lanes to facilitate entrance and exit to the park during construction activities.



**Figure 6-3 Shai Hills Resource Reserve**

## 6.2.4 Case Study 4: Fuel Stations

- Location:** Along the whole road
- Background:** Within the Row, INZAG has identified 43 existing fuel stations which could be affected by the road's construction.
- Objective:** Conduct eventual realignment of the road (either east or west) to minimize the impact on petrol stations. Additionally, INZAG plans to provide access between these stations and the new road to avoid disruption of business activities.



**Figure 6-4 Sample of Petrol Station**

## 6.3 DART Mitigation Measures

DART is a tool prepared by ERM to identify the general mitigation measures applicable for the design, construction and operation phases of highway projects. It includes international best practices and requirements of IFC EHS Guidelines for each topic. The DART tool has been tailored to the Project's scope and is presented in Table 6-1 (design), Table 6-2 (construction) and Table 6-2 (operations)



**Table 6-1 Best Practice (BP) Guidelines for Design of Roads**

<b>DESIGN PHASE</b>	
<b>SUBJECT</b>	<b>INTERNATIONAL BEST PRACTICES</b>
Geology, Soils and Contaminated Land	The road design shall be optimized to limit the gradient of the access roads to reduce runoff-induced erosion, and provide adequate road drainage based on road width, surface material, compaction and maintenance.
Surface and Groundwater	<p>Project elements will be located to minimize risks to important sources of groundwater and to ensure surface waters and water supplies are not impacted;</p> <p>Culverts will be designed to maintain the natural riverbed width and the natural riverbed level;</p> <p>The design of structures will minimize obstruction of the natural water flows to maintain free passage for fish and other aquatic species, as well as terrestrial animals using the stream banks for passage beneath the roadway;</p> <p>Appropriate measures will be adopted for stream and river crossings, such as viaducts and bridges, for which the placement of piles and other foundation structures in the waterbed will be avoided if possible.</p>
Biodiversity and Conservation	<p>Wherever possible working in or near watercourses will be avoided (by avoiding locating structures within water bodies) to the extent possible. If it is unavoidable Best Practice Guidance will be used including Pollution Prevention Guidance (PPG 5).</p> <p>Lighting will be avoided near watercourses or areas likely to be used by bats unless as part of a strategy to minimise collisions with vehicles. Lighting elsewhere will be designed to minimise light spill away from the road by effective use of cowls;</p>
Air Quality	The application of automatic toll systems along the road, as compared to manual booths, will also contribute to an optimisation of traffic flows and thus lower emissions
Noise	Installing noise barriers along the border of the right-of way (e.g. earthen mounds, vegetation, etc.) where passing through sensitive receptors cannot be avoided.

**DESIGN PHASE**

SUBJECT	INTERNATIONAL BEST PRACTICES
Socio-Economic	<p>Consult with provincial and local administrations about the implications of changes in regional accessibility and the implications for local development plans and zoning policies;</p> <p>Early consultation with local people and businesses which may be affected by the Project has been taking place and will be continued to be done according to the SEP;</p> <p>The minimisation of severance impacts is one of the main issues which will be addressed by appropriate design of the Project.</p>
Displacement of Existing Land Use, Property and People	<p>Minimise the area of land take, expropriation and demolition required for the Project during the next stage of design works;</p> <p>If additional locations are identified - through public consultation, comments or the planned census - where the issue of severance affects people significantly, it will be assessed where additional passages can be incorporated in the design.</p>
Archeology and Built Heritage	<ul style="list-style-type: none"> <li>■ A programme of comprehensive walk-over reconnaissance (Field Survey) by archaeological specialists of all proposed areas of ground works to support avoidance and minimisation of impacts through detailed design development and to identify any suspect areas;</li> <li>■ Operation of a Chance Find Procedure to address construction phase heritage impacts in accordance with international standards;</li> <li>■ Public involvement, access and sharing of information (with due consideration of the need for keeping certain site-specific information confidential, as per international common practice).</li> </ul>

**Table 6-2 Best Practice (BP) Guidelines for Construction of Roads**

CONSTRUCTION PHASE	
SUBJECT	INTERNATIONAL BEST PRACTICES
Resources and Waste	<p><b>Hazardous Materials Management Procedure:</b></p> <ul style="list-style-type: none"> <li>■ Procedures for handling and storage of hazardous materials in accordance with manufacturer’s instructions</li> <li>■ Register of hazardous materials and identification of dangers posed by hazardous materials within the Project site;</li> </ul> <p>Storage of fuels, oils and hazardous materials on a suitably sized impervious and bunded base and use of drip trays for fuelling;</p> <ul style="list-style-type: none"> <li>■ Training of on-site personnel on the presence, handling, transport and disposal of hazardous materials and on emergency response management;</li> <li>■ Provision of personal protective equipment (PPE) to staff who are required to handle certain chemicals;</li> </ul> <p>Protect public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odours, or other emissions.</p> <p><b>Waste Management Procedure:</b></p> <ul style="list-style-type: none"> <li>■ Application of waste hierarchy to avoid, segregate, re-use, recycle wastes as much as possible and as last option safely dispose wastes;</li> <li>■ Training of construction staff to ensure safe management of all types of waste preventing harm to themselves, the environment and the public;</li> <li>■ Collection and segregation of waste according to its type, whether it is re-usable, recyclable, non-hazardous or hazardous waste;</li> <li>■ Storage of wastes according to international best practice (IFC EHS General Guideline).</li> <li>■ Use and labelling of designated waste collection containers and storage areas for different kinds of wastes (hazardous and non-hazardous);</li> </ul> <p>Re-use of excavated soils in the Project area as far as possible and seeking alternative uses for surplus spoil where practicable (e.g. landscaping and earth works for other projects) to minimise the requirements for off-site disposal;</p> <p>Transport and dispose wastes at licenced waste management sites; prior to selection a due diligence review will be undertaken to understand if the sites are materially compliant with EU requirements;</p> <p><b>Soil Management Procedure:</b></p> <ul style="list-style-type: none"> <li>■ The area of soil exposure and disturbance shall be limited to the construction site only;</li> <li>■ Measures to prevent erosion from excavated areas and soil storage heaps;</li> </ul> <p>Prevent sediments flowing into surface waters and drainage channels by localised control measures (eg sediment fences, check dams, mulch barriers, rock groynes, or geofabric barriers, sediment basins), appropriate contouring to optimise slope angle and steepness;</p> <ul style="list-style-type: none"> <li>■ Prevent wind erosion via fencing, covering, etc;</li> </ul>

**CONSTRUCTION PHASE**

SUBJECT	INTERNATIONAL BEST PRACTICES
	<p>Measures to divert external ‘clean’ runoff around the construction area to prevent mixing of ‘clean’ and ‘dirty’ runoff and reduce the size of the required sediment basins;</p> <ul style="list-style-type: none"> <li>■ Covering of disturbed fertile top soil and protection with vegetation, mulch or erosion-resistant material;</li> </ul> <p>Approach to storage of topsoil for re-use, to preserve it to the maximum extent possible to facilitate re-vegetation of excavated areas, cut and embankment areas;</p> <ul style="list-style-type: none"> <li>■ Early construction of all drainage structures (i.e. culverts, sediment basins and catch drains) along the Road.</li> </ul>
Surface and Groundwater	<p>Project elements will be located to minimize risks to important sources of groundwater and to ensure surface waters and water supplies are not impacted. Where impacts cannot be avoided, appropriate technically and financially feasible mitigation measures will be developed, such as new ground water wells and diversions of irrigation channels to maintain the functionality of the systems during construction period.</p> <p>Sustainable road drainage and storm water management practices will be implemented and maintained in accordance with international guidelines (such as the AASHTO Highway Drainage Guidelines) to minimize impacts of road drainage on surrounding water resources;</p> <p>Sand layers will be used as filters in seepage pits (detritus basins in the form of a shallow pit connected to drain trenches), to prevent harmful substances to percolate into deeper soil layers or into the groundwater;</p> <p>All wastewater from the camps will be either discharged into the local/municipal sewage network (if available nearby) or otherwise treated decentrally prior to discharge to the suitable receiving environment. All wastewater discharges must comply with relevant national legal requirements and other Lender Standards (eg the IFC General EHS Guidance) prior to disposal;</p>
Biodiversity and Conservation	<p>Where no animal crossings exist, all roadside ditches will be fitted with escape ramps of roughened concrete and angled so that wildlife can escape.</p>
Air Quality	<p>Regular inspection and maintenance of machinery and vehicles.;</p> <p>Unpaved roads and other dust generating areas will be controlled by water spraying under dry weather conditions;</p> <p>Routing through villages will be avoided where possible by use of dedicated site access road</p>

**CONSTRUCTION PHASE**

SUBJECT	INTERNATIONAL BEST PRACTICES
Noise	<p>Regular inspection and maintenance of all machinery and vehicles;</p> <p>Taking advantage of the natural topography for noise shielding;</p> <p>Implementation of speed limits (50 km/h) for trucks while travelling to and from construction sites (within settlements and on village roads of poor condition: 30 km/h);</p> <p>Reducing Project traffic routing through community areas wherever possible;</p> <p>Limiting hours of operation for specific equipment or operations (e.g. trucks or machines operating in or passing through community areas);</p> <p>Restricting the noise to be perceived at nearby settlements from construction to 70 dB Leq during the evening and 65 dB Leq at night as far as practicable for short term activities lasting not more than 10 days;</p> <p>Noise levels from longer term construction activities (longer than 10 days) will be restricted to 55 dB LAeq during the evening, and 50 dB LAeq at night as far as is practicable, or to other standards that have been agreed with the local authority;</p> <p>Storage of excavated material between the construction site and the sensitive use building to form a noise barrier (with cover to avoid dust erosion) or installation of other (temporary) noise barriers;</p> <p>Shutting down of machines in intermittent use in the intervening periods between work (or throttle them down to a minimum);</p> <p>Positioning of all ancillary plant (e.g. generators, compressors) so as to cause minimum noise disturbance;</p> <p>Use of the road alignment for transportation whenever possible;</p> <p>Use of dedicated site access roads that avoid routing through villages;</p> <p>Slow driving rules in villages (e.g. 30km/h), particularly near sensitive use areas which will be identified (at least one month) prior to start of construction related activities;</p> <p>Keeping internal haul routes well maintained and avoiding steep gradients;</p>



**CONSTRUCTION PHASE**

SUBJECT	INTERNATIONAL BEST PRACTICES
	At quarry sites, and if blasting is required during earthworks, close monitoring/supervision will be undertaken to ensure that legislative requirements and blasting permit conditions are complied with; if the standards are exceeded additional measures will be taken to reduce vibration impacts.
Vibration	<p>Identification of buildings located within 50 m of significant sources of vibration ahead of construction works. Evaluation of the sensitivity of the identified buildings and building occupants to vibration;</p> <p>A documentation will be prepared for each of the identified buildings which will include photographs of building structures sensitive to vibration and results of the sensitivity evaluation;</p> <p>Monitoring of vibration on commencement of relevant activities to ensure that the Ghanaian requirements are met. If the standards are exceeded additional measures will be taken to reduce vibration and if necessary altering the methods of working to use equipment that creates lower levels of vibration.</p>
Socio-Economic	All roads that will be crossed by the road will be maintained through underpasses or other appropriate design solutions to ensure the continued free passage.
Community Health and Safety	Community Project Education Programme which will cover both communicable disease and physical hazards topics. One plan will be developed for the construction phase and subsequently for operations.
Displacement of Existing Land Use, Property and People	For every crossed road and frequently used access road, an underpass or bridge is planned to ensure and maintain the passage through the road acting as barrier.
Archeology and Built Heritage	<ul style="list-style-type: none"> <li>■ Operation of a Chance Find Procedure to address construction phase heritage impacts in accordance with international standards;</li> </ul> <p>Public involvement, access and sharing of information (with due consideration of the need for keeping certain site-specific information confidential, as per international common practice).</p>

**Table 6-3 Best Practice (BP) Guidelines for Operation of Roads**

OPERATIONAL PHASE	
SUBJECT	INTERNATIONAL BEST PRACTICES
Resources and Waste	<p>Development of a plan available to all staff at operational areas, toll booths etc. showing where different types of wastes can be deposited;</p> <p>Regular inspections of sites to ensure waste facilities are correctly used and are kept clean and tidy;</p> <p>Maintaining full records of the type, quantity, composition, origin, disposal destination and method of transport for all wastes. Collecting solid wastes on a regular basis and disposing appropriately at a designated disposal site;</p> <p>Labelling solid waste containers according to the waste to be disposed in it. Proper labelling will also prevent any hazardous waste to be disposed together with non-hazardous solid wastes;</p> <p>Application of reuse/recycling methods to minimise solid waste generation;</p> <p>Using certified/licensed facilities for final disposal of solid wastes, which cannot be reused/recycled;</p> <p>Prevention of disposal of solid waste outside the designated sites and into any surface or groundwater source, or any other location that would potentially affect the environment and human settlements;</p> <p>Use of signs and other postings to advise motorists not to litter;</p> <p>Hazardous wastes to be disposed of by appropriate licensed contractor.</p>
Surface and Groundwater	<p>Preparing Emergency Prevention and Response Plan, which also include handling of spills and leakages of hazardous materials during operation and maintenance. These procedures will be updated routinely as the level of detail of the Project Design increases;</p>
Air Quality	<p>Optimisation of traffic flows – smoothly flowing traffic will be associated with lower overall emissions when compared to traffic that is in a start-stop cycle on a motorway. The use of variable speed limits in order to maintain smooth traffic flow will reduce the overall emissions of airborne pollutants..</p> <p>Maintaining appropriate distances to receptors - where there are receptor locations in close proximity (&lt;20 m) from the roadside, designing the road alignment to be even a small distance (5-10 m) further away from receptor locations will result in decreases in exposure to airborne pollution.</p>

**OPERATIONAL PHASE**

<b>SUBJECT</b>	<b>INTERNATIONAL BEST PRACTICES</b>
Socio-Economic	Deliver long term local community benefits through promoting local employment (including job training) and purchasing local goods and services during the operation of the road to the extent possible. Measures will include the facilitation of access to alternative employment for people affected by the loss of jobs through the Project;
Community Health and Safety	Develop and Implement: <ul style="list-style-type: none"> <li>■ Community Health, Safety and Security Plan (Including Gender Based Violence management procedure)</li> <li>■ Emergency Prevention and Response Plan (EPR Plan)</li> <li>■ Traffic Safety Management Procedures (on-site and off-site)</li> <li>■ Hazardous Materials Management Procedure</li> </ul>

## 6.4 Impact Assessment

During the impact assessment phase, the ways in which the Project will interact with the physical, biological, cultural and social environments to produce impacts to resources/receptors were assessed. This involved a number of stages as set out below.

Note that the starting assumption for the impact assessment is that the embedded controls (as described above) are being implemented. The potential risks/impacts described below are thus those risks that still exist after consideration of these controls.

### 6.4.1.1 Prediction of Magnitude

The magnitude of each impact was predicted as falling into one of the following designations: negligible, small, medium or large. The 'magnitude' encompasses various possible dimensions of the predicted impact, such as:

- extent (ie local, regional or international);
- duration (ie temporary, short-term, long-term or permanent);
- scale or size (no fixed designations);
- frequency (no fixed designations); and
- likelihood, for unplanned events only (ie unlikely, possible, likely).

Each ESIA topic area (eg noise, biodiversity, social, etc) adopted a different methodology for defining the magnitude of change as appropriate to the discipline however, the designations used were consistent. For example, for readily quantifiable impacts, such as noise, numerical values were used to define its size, whilst for other topics, eg social impacts, a more qualitative classification was necessary.

In the case of positive impacts, no magnitude was assigned.

### 6.4.1.2 Sensitivity of Resources and Receptors

The sensitivity (or vulnerability / importance) of the impacted resource or receptor was also defined using one of the followings designations: low, medium or high. As per the magnitude rating, the definition for each designation varied on a resource/receptor basis. Where the resource is physical (for example, a water body) its quality, sensitivity to change and importance (on a local, national and international scale) are considered.

Where the resource/receptor is biological or cultural (for example, the Shai Hills Resource Reserve), its importance (for example, its local, regional, national or international importance) and its sensitivity to the specific type of impact are considered.

Where the receptor is human, the vulnerability of the individual, community or wider societal group is considered. The sensitivity definition for each resource / receptor is defined in more detail in the individual topic assessment sections.

### 6.4.1.3 Evaluation of Significance

Once the magnitude of the impact and sensitivity of the resource/receptor has been characterised, the impact significance is assigned using the significance matrix presented in Figure 6-5.

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

**Figure 6-5 Impact Significance Matrix**

Table 6-4 provides context for what the various impact significance ratings signify.

**Table 6-4 Context of Impact Significance**

Significance Designation	Significance Context
<b>Negligible</b>	A resource/receptor (including people) will 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.
<b>Minor</b>	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.
<b>Moderate</b>	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.
<b>Major</b>	An accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors.
<b>Positive</b>	There will be a beneficial impact to a resource/receptor. ( <i>note: no magnitude is assigned for positive impacts</i> ).

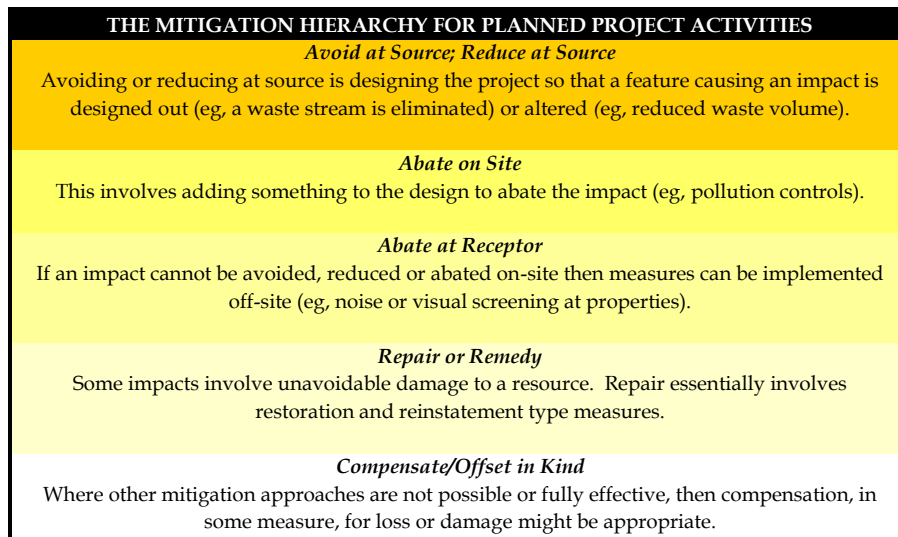
#### 6.4.1.4 Identification of Mitigation Measures

Where significant impacts were identified (ie those with a minor, moderate or major rating), mitigation measures have been developed to find practical ways of addressing negative impacts and enhancing positive impacts. The key objective was to mitigate impacts to a level that is 'as low as reasonably possible' (ALARP).

A hierarchy of mitigation options is considered, with avoidance at the source of the impact as a priority and compensatory measures or offsets to reduce the impact significance as a last resort. The mitigation hierarchy that is utilised in this MDR is presented in Figure 6-6. The preference is to avoid the impact at source, and least desirable option is to provide compensation or an offset for residual impacts that cannot be further reasonably avoided.

Embedded controls (i.e., physical or procedural controls that are planned as part of the Project design and are not added in response to an impact significance assignment), were considered as part of the Project (ie prior to the impact assessment stage of the ESIA Process). Accordingly, they are not described as mitigation measures in the individual topic assessment sections.

All the mitigation measures outlined within the MDR will be included in the ESIA Report and ESMP.



Source: ERM 2020

**Figure 6-6 Hierarchy of Options for Mitigation**

### 6.4.1.5 Assessment of Residual Impact

Following the identification of mitigation measures, impacts are re-assessed to determine their residual impact. This is essentially a repeat of the impact assessment steps discussed above, albeit with a consideration of the assumed implementation of the mitigation measures.

## 6.5 Resources and Waste

Section 2.5 provides a description of the resources and materials needed for the construction and operation of the Project as well as the wastes' generation expected during construction and operation phases. Below is provided a summary of findings of this assessment.

### 6.5.1 Summary of Baseline Findings

#### 6.5.1.1 Quarries and Borrow Pits

Currently, it is estimated that approximately 1.170.000 tons of aggregates and 850.000 m3 of borrow material will be used during the Construction Stage. INZAG plans to procure the aggregates from the existing quarries in the region which are mainly located outside of the Shai Hills Resource Reserve and open the borrow pits within the RoW alignment when needed.

The existing capacity within the Project vicinity is assumed to be adequate to cater to the aggregate requirements of the Project. However, in case INZAG decides not to use an existing quarry but to open up a new one, the application and approval procedures for acquiring a quarry license will be in line with Ghana regulations. In addition to local compliance, Environmental, Health and Safety (EHS) considerations that will need to be taken into account in the due diligence and the selection of appropriate quarry sites and access routes in line with IFC General EHS Guidelines (IFC, 2007) as well as guidelines for IFC EHS Guidelines for Construction Materials Extraction (IFC, 2007).



These mitigation measures together with the existing permitting framework in Ghana and Design Change Management Procedure will be used to minimize the worst-case scenario impacts.

### 6.5.1.2 Excavation Material

Estimated amount of excavation will range between 600.000 m<sup>3</sup> to 1.200.000 m<sup>3</sup> and most of this material may be useful for construction of other parts of the Project. The aim will be to achieve a balance of cut and fill material as far as possible. INZAG considers "0" net surplus material target during the design phase to avoid the waste generation.

In case the Project activities result with net surplus material, priority will be given to reusing the surplus material to reinstate the borrow pits along the RoW alignment. In case this option is not applicable, INZAG will use dumpsites to store the surplus material and implement the Design Change Management Procedure during the selection and approval process to comply with Project E&S requirements.

### 6.5.1.3 Other Wastes

Other typical construction wastes will be stored temporarily onsite in appropriate containers and then transferred to and disposed of (or treated) via licensed waste facilities located in vicinity of the Project. The waste facilities used during construction will be selected by INZAG. The wastes that will be generated during the construction process include:

- Recyclable wastes: waste metals, plastics, cables, glass, paper (packaging material, clean air filters, clean containers, drums bins, crushed stone).
- Wastewater from construction camps and construction operations
- Non-hazardous waste from construction camps and construction operations (scrap metal, slightly contaminated discarded material)
- Hazardous waste (chemicals, additives, paints) generated from use of hazardous materials for road construction
- Machinery operation and maintenance related wastes (machinery parts replacement, used filters, etc)
- Waste generated from concrete batch plant and asphalt plant and painting operations (wastewater, sludge, waste bitumen, spent paint)
- Lubricants and oil from lorries or mechanical part of plant and storage tanks
- Medical waste
- Waste batteries and accumulators.

The quantities of materials used and wastes generated during the Project operation phase will primarily relate to the operation of the toll plazas, as well as to the maintenance of the road corridor.

Solid waste generation during operation and maintenance activities may include road resurfacing waste (e.g. removal of the old road surface material); road litter, illegally dumped waste, or general solid waste from rest areas; animal carcasses; vegetation waste from right-of-way maintenance; and sediment and sludge from stormwater drainage system maintenance. Paint waste may also be generated from road and bridge maintenance.

Overall, the quantities of wastes during operations will be minor compared to the waste materials during construction activities.

## 6.5.2 Summary of Significant Construction Impacts

**Table 6-5 Significant Construction Resources and Waste Impacts and Mitigation**

No.	Impact Description	Impact Assessment	Mitigation /Enhancement Measures	Residual Impact
1	<p>Risk of destruction of habitats and vegetation during earthworks and resource extraction</p> <p>Noise and dust nuisance on Shai Hill Resource Reserve and the community</p> <p>Limited/Rstricted access for Shai Hill Resource Reserve visitors</p> <p>Increased traffic due to construction activities bringing up community safety risks</p> <p>Damage to the existing roads used by Project</p>	Moderate Impacts	<p>An E&amp;S due diligence will be conducted by INZAG for existing quarries to ensure permits are valid and operations are in compliance and international guidelines. Relevant suggestions will be made to improve current standards of the quarry and quarries will be monitored frequently.</p> <p>In case INZAG decides to open a new quarry, INZAG will establish a separate Quarry and Associated Facilities Management Plan as part of the ESMP to ensure compliance with applicable Ghana environmental standards and IFC Guidelines for Construction Materials Extraction (IFC, 2007). The procedure will include criteria for selecting quarry and spoil disposal sites that integrates the relevant international requirements and include environmental and community HS factors like site sensitivity, travel routes, mining methods etc. in the decision-making process.</p>	Minor
2	Disposal of excavated waste soil	Impacts of <b>major</b> significance are predicted before mitigation on the environment where the soil is disposed	<p>INZAG will prepare a Soil Erosion, Reinstatement and Landscape Management Plan in accordance with Ghanaian laws and IFC guidelines</p> <p>Re-use of excavated soils in the Project area as far as possible and seek alternative uses of surplus spoil where practicable (eg landscaping and earth works for other projects) to minimise the requirements for off-site disposal.</p> <p>Compliance with Ghanaian environmental regulations and implementation of embedded mitigation measures will be adequate to minimize the waste related risks.</p>	Minor

### 6.5.3 Summary of Significant Operational Impacts

No Project specific operational impacts for Resources and Waste have been identified. All items have been already considered in the Embedded Controls (Section 6.1) and will be mitigated according to International Best Practice guidelines.

## 6.6 Geology, Soils and Contaminated Land

The geological and geotechnical characterization presented in this section is based on the surface geological surveys conducted by LCW Consult for the preparation of the engineering design report of the Project<sup>18</sup>. The assessment is based on:

- Geological Map of Ghana, scale 1:1.000.000 (Ghana Geological Survey, 2009);
- Google Orthophotomaps of the region concerned by the Project; and
- Topographic maps.

### 6.6.1 Summary of Baseline Findings

The area through which the upgraded road passes is generally of lowland character, with some parts (especially north Kpong), going through hilly zones with high elevations.

#### *Geology and Soils*

According to the Geological Map of Ghana, 1:1 000 000, the bedrock underlying the ECR Lot 1 Project area between Ashaiman Roundabout and Akosombo Junctions is covered by Quaternary deposits such as topsoil, fill deposits and alluvial-colluvial deposits. Especially, in the first segment of the Project there are pockets of marshy areas that are liable to flooding and sustained wet conditions. This causes serious flooding challenges during the rainy season, causing damage to life and property in the low-lying areas characterized by informal settlements.

Furthermore, a site exploration survey to some parts of the Accra plains, reveal that civil engineering structures such as roads and buildings show varied degrees of distresses in the form of cracks and deformations suggesting that the soils may be potentially expansive. These soils become muddy in the wet season and exhibit polygonal cracks in the dry season. The cracks are sometimes very wide and deep with some running as much as one meter deep from ground surface and about twenty-five centimeters wide.

#### *Flooding*

Flooding was one the concerns during the ESIA stakeholder meetings which is also supported by INZAG's Advance Design Report dated March 2020, prepared by LCW. This report states that "the Greater Accra Metropolitan Area faces serious flooding problems during the rainy season which causes damage to life and property". As stated above in the Geology and Soils section, the southernmost first segment of the Project area is especially prone to flooding. The LCW report describes a severe event in June 2010, for example, in which 11 people lost their lives due to heavy floods in Ashaiman and Tema.

#### *Contaminated Land*

Up to date, existing contamination has not been identified within the RoW based on desktop studies. Where new contamination is discovered with the RoW, GHA will be responsible for ensuring corrective actions are taken and the procedures are followed in line with Ghanaian regulations.

Project design does not include any fuel stations, service stations and maintenance areas. Therefore neither construction nor operation of any fuel stations by INZAG and GHA is envisaged. However,

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<sup>18</sup> Advance Design Report dated 18.05.2020 prepared by LCW on behalf of INZAG

there are over 40 private operating fuel stations identified in the RoW alignment which are owned and operated by third parties and which contain underground storage tanks (USTs).

INZAG plans to keep the existing fuel stations within the RoW alignment as much as possible using SMART design in order to avoid the need for relocation/removal of the fuel stations. However, a few of these stations may need to be relocated to make room for Project construction. Depending on the age of the station and the condition of the USTs and related piping, as well as other site-specific factors, there is a reasonable chance of encountering some moderate soil contamination during removal of any stations.

In case the fuel stations will need to be relocated or removed, then:

- This activity will be defined as an Associated Facility of the Project;
- A site specific Method Statement will be prepared;
- The Design Change Management Procedure will be followed including the E&S and OHS risk assessment prior to the activity.

INZAG will liaise with GHA in terms of planning, compensation and approval of specific Method Statement to be developed to minimize the potential environmental and social impacts in line with Ghana regulations and IFC EHS Guidelines.

### *Seismicity*

Ghana lies on the south-eastern margin of the West African Craton (stable old crust) which is in contact with the Pan African mobile belt. Even though Ghana is far from major plate boundaries, significant earthquakes have struck and continue to strike Ghana. Especially, the capital city Accra has been subject to a significant number of earthquakes. The latest significant events have occurred in 1997, 2003 and 2006 with magnitudes ranging between 4 to 6.5 on the Richter scale. The Project's design is based on the latest Ghanaian code for the Seismic Design of Concrete Structures, issued in 2010 by the Ghanaian Building and Road Research Institute (BRRI 2010).

## 6.6.2 Summary of Significant Construction Impacts

No.	Impact Description	Impact Assessment	Mitigation /Enhancement Measures	Residual Impact
1	<b>Soil Instability Risk</b>	<b>Moderate Impacts on occupational safety and community safety.</b>	<p>Since Project design will already consider soil conditions the potential risks are considered to be negligible.</p> <p>During the construction phase, appropriate techniques will be implemented that will incorporate risk assessment before excavation and slope stability requirements to make sure that occupational and community safety risks are avoided.</p>	<b>Negligible</b>
2	<b>Contaminated Land</b>	<b>Negligible to major depending on the source and receptor setting</b>	<p>Implement Smart Design Solutions and consider to realign the design to include the existing fuel stations in RoW alignment to minimize relocation and relevant spillage risks during relocation process.</p> <p>Implement the land contamination notification procedure in case unexpected encounter of contaminated soils during construction. The procedure shall include the following:</p> <p>Immediately contact the GHA representative and relevant authority representative of Environmental Protection Agency (EPA).</p> <p>Photograph the construction site and take down the names and statements of the people who were present during the discovery of the contamination.</p> <p>Preserve the site as best as possible. Do not do anything to cover-up or change the physical terrain immediately surrounding the site where contamination was discovered.</p>	<b>Negligible</b>
3	<b>Seismicity</b>	<b>From minor to major, depending on the sensitivity of the receptors and magnitude of the event</b>	<p>Since Project design will already consider seismicity, the potential risks are considered to be negligible.</p>	<b>Negligible to minor</b>

No.	Impact Description	Impact Assessment	Mitigation /Enhancement Measures	Residual Impact
4	<b>Contamination due to Spillage and Runoff</b>	From <b>minor</b> to <b>major</b> , depending on the sensitivity of the receptors and magnitude of the spills/runoffs	Compliance with Ghanaian environmental regulations and implementation of embedded mitigation measures will be adequate to minimize the pollution risks.	<b>Negligible to minor</b>

### 6.6.3 Summary of Significant Operational Impacts

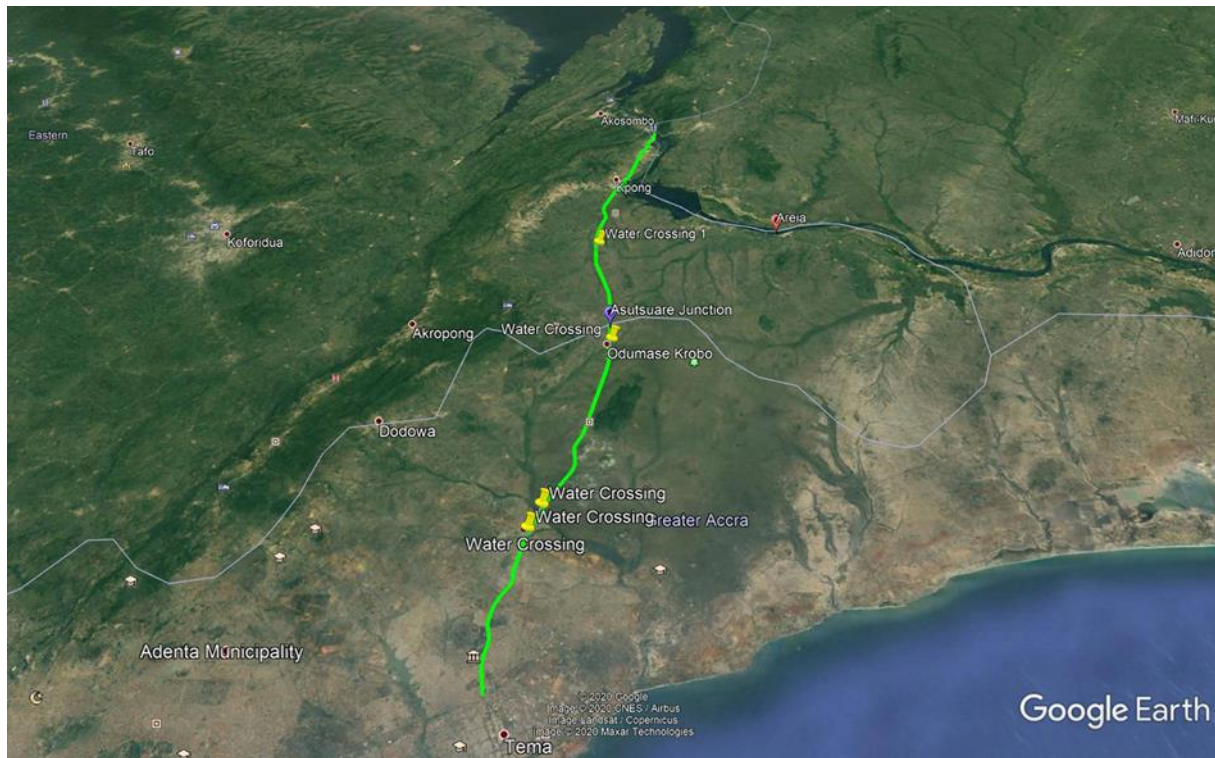
No.	Impact Description	Impact Assessment	Mitigation /Enhancement Measures	Residual Impact
1	<b>Seismicity</b>	From <b>minor</b> to <b>major</b> , depending on the sensitivity of the receptors and magnitude of the spills/runoffs	Since Project design will already consider soil conditions the potential risks are considered to be negligible.	<b>Negligible to minor</b>



## 6.7 Surface and Groundwater

### 6.7.1 Summary of Baseline Findings

The following section presents an overview of the water quality studies which have been conducted, also including related ecological features as it provide relevant information regarding watercourses current condition. Figure 6-7 presents the survey points for the water crossings. It is noted that the area has no perennial rivers with the exception of the Volta River.



**Figure 6-7 Location of Water Crossings**

#### 6.7.1.1 Watercourses

##### Rivers

The Volta River is the largest water body in the vicinity of the project, and the road is located downstream of the Akosombo Dam. The habitat traverses a built environment with high sensitivity that can be classified as natural and modified. The aquatic plants identified are *Ceratophyllum demersum*, *Eichhornia crassipes*, *Lemna paucicosta*, *Ludwingia erecta*, *Ludwingia hysopifolia*, *Ludwingia stolonifera*, *Typha angustifolia*, *Typha domingensis*, *Cyperus articulatus* and *Nymphaea lotus*. *Eichhornia crassipes*, which is known to be invasive, *Ceratophyllum demersum* and *Typha domingensis* were the dominant species. Aquatic fauna likely to be present include tilapia, cat fish, silver fish, mudfish, and prawns.

##### Small Streams/rivers

##### *Watercourse 1 – Dechidaw River (Km12)*

This watercourse is the Dechidaw River. The surrounding lands are generally swampy or marshy with medium to high sensitivity. Some marshy areas around the habitat are filled up for construction purposes. The watercourse provides water for irrigation and habitat for aquatic plants and insects. Fauna likely to be present are frogs, birds and fishes.

The watercourse is overgrown with *Typha domingensis* and surrounded by maize (*Zea mays*) farms. Notable trees around the water body are *Azadirachta indica*, *Leucaena leucocephala*, *Ceiba pentandra*, *Parkinsonia aculeata*, *Terminalia catappa* and *Lonchocarpus sericeus*. Shrubs recorded were *Sida acuta*, *Cassia occidentalis*, *Ricinus communis*, *Phaseolus* sp., and *Crotalaria retusa*. Herbs and grasses were *Euphorbia hirta*, *Cissus quadrangularis*, *Commelina diffusa*, *Helitropium indicum*, *Mimosa pudica*, *Luffa cylindrical*, *Panicum maximum*, *Paspalum scrobiculatum*, and *Sporobolus pyramidalis* respectively. The aquatic plants observed in the water body were *Nymphaea lotus*, *Typha domingensis*, *Cyperus articulatus*. Trees that dominated with 40% and 20% were *Leucaena leucocephala* and *Lonchocarpus sericeus*. *Panicum maximum* was the dominant grass and *Typha domingensis* the dominant plant in the water.

Note: This river is apparently related to the Dechidaw Stream protected area (see Biodiversity Section 6.8); further information on protection status to be ascertained during the ESIA.

### Watercourse 2 – Unnamed (Km14)

The habitat can be described as riverine forest with a medium to high sensitivity. Figure 6-8 shows images of the habitat. It can be described as natural due to the riverine forest that grows several kilometres away from the road and modified because of the human settlement. The habitat is highly disturbed by cattle grazing on the grasslands. Mudfish and tilapia are the likely fishes and prominent abundance of bats at the habitat.

The plants identified in this habitat are *Ceiba pentandra*, *Azadirachta indica*, *Leucaena leucocephala*, *Millettia thonningii*, *Securinega virosa*, *Sida acuta*, *Talinum triangulare*, *Helitropium indicum*, *Mimosa pudica*, *Commelina diffusa*, *Portulaca grandiflora*, *Gloriosa superba*, *Grewia megalocarpa*, *Vernonia cinerea*, *Panicum maximum*, *Digitaria insularis*, *Nephrolepis biserrata*, and *Tapinanthus globeiferus*. The aquatic plant identified in the water and marshes was *Cyperus articulatus*. Cultivations around the water include mango and coconut.



**Figure 6-8 Photographs of Watercourse 2 (Source – ERM Fieldwork)**

### Watercourse 3 – Unnamed (Km31)

This watercourse was located some kilometres away from the Shai Hill Resource Reserve. The habitat is made up of a grassland and coastal thicket vegetation. Plants identified around this water body were *Azadirachta indica*, *Leucaena leucocephala*, *Calotropis procera*, *Diospyros mespiliformis*, *Ceiba pentandra*, *Mitragyna inermis*, *Zanthoxylum zanthoxyloides*, *Crotalaria retusa*, *Securinega virosa*, *Centrosema pubescens*, *Paullinia pinnata*, *Mimosa pudica*, *Secamone afzelii*, *Ficus* sp., *Chromolaena odorata*, *Euphorbia hirta*, *Helitropium indicum*, *Panicum maximum*. *Cyperus articulatus* was the only plant found growing in the water crossing. The dominant tree was *Leucaena leucocephala* and the dominant grass *Panicum maximum* at this location.



### Watercourse 4 - Unnamed (Km44)

The habitat can be described as farmland with riverine forest along the watercourse with a sensitivity of moderate to high. It is disturbed by farming and cattle grazing. Figure 6-9 below shows the habitat. The waterbody provides livelihood through farming, water for irrigation and domestic purposes for some communities up and down stream. The watercourse 4 had plants like *Ceiba pentandra*, *Azadirachta indica*, *Antiaris toxicaria* Lonchocarpus sericeus, *Cassia siamea*, *Zanthoxylum zanthoxyloides*, palm (*Elaeis guineensis*), *Securinega virosa*, *Sida acuta*, *Talinum triangulare*, *Euphorbia hirta*, *Ipomoea purpurea*, *Sporobolus pyramidalis* and *Panicum maximum* around it as arranged respectively in order of tree, shrubs, herbs and grasses. There were a lot of human settlements close to this watercourse. Plantain, okro, mango, cassava, and maize farms were observed around this water course. *Lemna paucicosta* was the only aquatic plant identified in the water.



**Figure 6-9 Watercourse 4 with riverine forest around it (Source – ERM Fieldwork)**

### Watercourse 5 – Unnamed (Km 54)

The habitat was built environment with moderate to high sensitivity. The vegetation observed was marshland dominated by grasses and short trees (Figure 6-10). The habitat provides water for irrigation and drinking. The plants around this watercourse arranged according trees, shrubs, herbs and grasses are: *Caesalpinia pulcherrima*, *Azadirachta indica*, *Leucaena leucocephala*, Lonchocarpus sericeus, *Zanthoxylum zanthoxyloides*, *Securinega virosa*, *Ocimum sanctum*, *Secamone afzelii*, *Ipomoea purpurea*, *Sida acuta*, *Cissus quadrangularis*, *Chromolaena odorata*, *Boerhavia diffusa*, *Paullina pinnata* and *Panicum maximum* respectively. Cultivations of maize and mango were observed close to this watercourse. The dominant plant along the road close to the watercourse was *Leucaena leucocephala*. The aquatic plants identified in the watercourse are *Nymphaea lotus*, *Typha domingensis*, *Cyperus articulatus* with *Typha domingensis* being the most dominant among the three.





**Figure 6-10 Watercourse 5 (Source – ERM Fieldwork)**

### *Watercourse 6 – Unnamed (Km 55)*

The habitat was built with high sensitivity and water body relatively undisturbed. The habitat provides water for irrigation and wood for fuel. The plants identified around watercourse 6 are: *Leucaena leucocephala*, *Zanthoxylum zanthoxyloides*, *Azadirachta indica*, *Mitragyna inermis*, *Ficus sp.*, *Chromolaena odorata*, *Securinega virosa*, *Tiliacora funifera*, *Triclisia angolensis*, *Triclisia angustifolia*, *Grewia megalocarpa*, *Bignonia capreolata* and *Panicum maximum* arranged according to trees, shrubs, herbs and grasses respectively. *Leucaena leucocephala* was the dominant plant around this watercourse too.

### **Water Quality**

Five water crossings within the Project corridor were sampled (Figure 6-7) and physicochemical analyses were carried out at the CSIR WRI Laboratories in Accra according to international standards.



**Figure 6-11 Water Sampling activity**

The following water quality variables were analyzed:

- Physical-chemical: pH, conductivity, turbidity, total alkalinity, total dissolved solids, Dissolved Oxygen and total hardness;
- Major ions: calcium, magnesium, sodium, potassium, chloride, sulphate, bicarbonate;
- Nutrients: nitrate-nitrogen, nitrite- nitrogen, ammonium-nitrogen, and phosphate-phosphorus; and
- Trace Metals: iron and manganese.

This analysis concluded that in general there are moderate levels of pollution within the water, with low levels of nutrients, although elevated levels of phosphate were identified in all streams. All samples indicated a moderate level of dissolved oxygen concentrations, and low levels of trace metals. The samples indicated low levels of dissolved mineral contents. In General, the physio-chemical make-up of the streams are considered satisfactory.

### 6.7.1.2 Groundwater

The hydrogeological setting of the Project area is dominated by the Crystalline Basement Complex and minor alluvial plains.

The sensitivity of the groundwater resources can be considered to be medium to high as they are being used for drinking and/or domestic purposes.

The generally impervious nature of the weathered zone and the massive crystalline structure of the rocks limit the available groundwater that can be developed by wells or boreholes. The rocks are inherently impermeable and groundwater occurrence in the geologic formation is controlled mainly by the development of secondary porosity e.g. fractures, faults, joints and the associated weathered zone groundwater potential is relatively high at the foothills of the Akwapim Mountains. Recharge to the aquifer is by direct percolation of rainfall along the Akwapim Mountains (Akiti 1986). Minor or indirect recharge also occurs mainly in the rainy season when fractures or mega joints intercept the ephemeral stream courses (Kortatsi, 2006).

These channels act as conduits that allow water to recharge the aquifer. Recharge of the groundwater system is estimated as 15% of the annual precipitation. Boreholes drilled in the Plains at average depth of 55 m have a mean yield value of 2.7m<sup>3</sup>/h. The groundwater is recharged by meteoric water. The recharge takes place in fractures in the geological formation with the occurrence of minor evaporation. The groundwater is also affected by the mixing of various rainfall events and or surface runoff.

Since the main rocks are inherently impermeable, groundwater occurrence in the area is controlled mainly by the development of secondary porosities e.g. fractures, faults, joints etc., and the associated weathered zone. Where these openings are extensive, good supplies of ground water can be developed from boreholes. Springs frequently occur along the flanks of hills where quartzites are in contact with argillaceous rocks of the valleys, such as in the Akwapim-Togo Ranges.

The acid gneisses weather to slightly permeable calcareous clay while the basic type to impermeable clay. The quartzites and phyllites weather to sandy clay. The depth of the weathering is highly variable and it is greatest along the foothills of the Akwapim Togo ranges where it has reached 47 m and least in the heart of the Accra Plain where it rarely exceeds 6 m.

Table 6-6 presents an overview of groundwater within the Project Area.



**Table 6-6 Main Hydrogeological Characteristics (Source Advance Design Report dated 08.05.2020 prepared by LCW on behalf of INZAG)**

Lithology	Hydrogeological properties	Groundwater potential	Groundwater vulnerability
DAHOMAYAN PARAGNEISS	Primary porosity as well as fracturing of the massive paragneiss is very low. The lower weathered zone builds a low yielding aquifer. Overburden: Clayey sands or loam of low permeability. Recharge: Low Depth to groundwater table: 5 - 15 m	Drilling success rate: Low (40 %) Drilling depth: 20 - 30 m Yield: Low, 1 - 30 l/min Groundwater potential: Poor due to low yields and high salinity in project area.	Unconfined aquifer with good attenuation capacity due to clayey nature of the overburden. Low infiltration rates. Occurrence of groundwater at moderate depths. Vulnerability: Low Recommendations: Groundwater protection is of less concern in the Dahomeyan formation. Unavoidable pollution hazards should preferably be located in this formation.
TOGO QUARTZITE, ORTHOQUARTZITE AND PHYLLITE	The highly folded, jointed and fractured layers of quartzite build a fracture flow aquifer. Springs and artesian groundwater are encountered in the Togo series. In the stratigraphically lower portions, several meters thick of phyllites are intercalated. Overburden: Less permeable where clay (argillaceous) materials form overburden. Highly permeable where sand and rock fragments (arenaceous) materials form the overburden. Recharge: High Depth to groundwater table: High spatial variability, 0 - 20 m	Drilling success rate: Moderate to good >70 % Drilling depth: Variable (25 - 80 m) Yield: Variable, but frequently high yielding (up to 400 l/min) Groundwater potential: Moderate to good. Suitable for small scale water supply schemes (small towns or irrigation) by mechanized boreholes.	Arenaceous overburden. Very low attenuation capacity and high infiltration rates. Argillaceous overburden; good attenuation capacity and low infiltration rate. Occurrence of ground water sometimes at shallow depths. Vulnerability: Very high Recommendations: Pollution hazards (landfills, sewage treatment works, large cemeteries) should not be allowed unless strict protective measures are implemented. Construction of septic tanks / pit latrines need to conform to building regulations.

### 6.7.2 Potential impacts

Impacts on surface water quality and quantity are considered to be temporary during construction operations and include the following:

- Silty/soiled water from excavations (e.g. cut and fill), exposed ground, stockpiles of soil, quarries, topsoil placing and excess material, plant and wheel washings, construction roads, washing of finished road surfaces to remove accumulated soil and disturbance of drains and streambeds (i.e. in-stream construction of culverts and channel diversions/improvement works), and landscaping e.g. of road embankments.
- If a construction site or a refuelling and storage depot is located near a surface water body, the surface water is at risk from the spill of hazardous substances. Liquid cement (and associated wastewater run-off), due to its high alkalinity and corrosive nature, is highly polluting and can give rise to major fish kills in aquatic environments. The accidental spillage of cement and of fuel, oils and lubricants can have significant water quality consequences on watercourses, aquatic ecology and downstream users.
- Other sources of contamination during the construction phase arise from the use of bitumen compounds in the wearing course of the road and materials used for waterproofing of concrete surfaces.
- Waste from construction activities and wastewater generation from construction accommodations may impact the surface water quality. All wastewater from these compounds poses a risk to the water environment if not treated prior to discharge (either by on-site treatment or removal for disposal via the local sewage network, if available).
- Use of surface water supply sources to obtain water supply needs for the construction process.
- Roadway repair activities (including removal of worn down asphalt and replacement, painting, infrastructure maintenance) has the potential to impact the ground quality since these will involve construction activities including the usage of chemicals. The risk of water pollution is also high within all road sections close to ground water resources.

Large construction sites, if not properly managed and operated, can lead to significant impacts on groundwater quality. The following identifies the main potential issues that have been considered



in the assessment on groundwater quality and quantity which can arise in the absence of appropriate mitigation and controls.

- There is the possibility of contamination of aquifers in the event of intentional or accidental discharges of hazardous materials to the ground during construction, particularly in shallow overburden areas.
- The bedrock aquifers may be impacted by various activities involving site clearance / earthworks, and spillages / leakages from construction plant and at refuelling and storage depots located on site.
- Construction accommodation compounds along the route will be developed to house construction workers. All wastewater from these compounds poses a risk to the water environment if not treated prior to discharge (either by on-site treatment or removal for disposal via the local sewage network, if available).
- The use of groundwater extraction wells for water supply related to operating facilities may impact the groundwater availability in the vicinity of the extraction well.
- Groundwater from any temporary dewatering measures during construction will be drained to a nearby surface water course. The turbidity has to be monitored and if needed a settling tank (or similar structure) utilised to reduce turbidity prior to discharge. In addition, there is the possibility of risks of excavation groundwater being contaminated by chemicals (e.g. from grouting) or cementitious materials.
- No transboundary issues are expected on water quality, as none of the relevant water courses are international waters in the Project Area, and the Project will not be altering the volume or flow of the water bodies.

### 6.7.3 *Embedded Measures*

A number of embedded measures are already in place for the Project, which will help to minimize the impacts of the Project construction activities on surface water and groundwater to as low as possible; these measures are summarized as follows:

- Safe Fuelling and Gasoline Handling Guidelines will be developed in the construction areas. No fuelling of vehicles or equipment will take place within excavated areas. If heavy equipment cannot be moved to appropriate fuelling points, an impervious surface (such as a drip-tray) will be used for refuelling this equipment to prevent accidental releases to groundwater aquifers.
- An Emergency Response Plan (ERP) will be developed in line with Environmental, Health, and Safety (EHS) Guidelines: General EHS guidelines (IFC, 2007) for handling spills of hazardous materials including fuels that will be handled during construction works.
- Environmental Management Plan, Soil erosion, Reinstatement and Landscape Management Plan, Watercourse Crossing Plan, Control of Substances Hazardous to Health Procedure etc will cover the preventative and mitigation measures to minimize and manage the effects on soil and water quality during construction. The procedure will include erosion, sediment and pollution control, management of upper soil, as well as storm water run-off.
- The specific items in the Soil Management Plan will address the measures below related to surface water and groundwater quality protection:
  - Spoil and soil storage areas and open stores of construction materials will be designed and managed to control loss of sediments into run-off by minimizing the length and angle of slopes.
  - Schemes to prevent new eruption of ground surface from rainfall erosion or to avoid construction activities during periods of heavy rainfall.
  - Contouring and minimise the length and the steepness of the slopes.

- Local control measures such as sediment fences, control dams, mulch barracks and sludge traps, as well as line inspections such as sediment basins from construction sites.
- Diversion of external 'clean' runoff around the construction area to prevent mixing of 'clean' and 'dirty' runoff and reduce the size of the required sediment basins.
- Conveyance of all 'dirty' runoff to the proposed sediment basins.
- Establishment of barrier fences and / or markings to determine the extent of the structure / work area that may be damaged.
- Installation of controls to trap sediments, including but not limited to, sediment fences, rock groynes, geofabric barriers and hay bales.
- Limitation of the exposure to the soil and the minimum amount of deterioration required for the construction.
- Covering and protection of the degraded fertile ground by soil, vegetation, mulch or erosion-resistant material.
- Construction of all drainage structures (e.g. culverts, sediment basins and catch drains) should be established as early as possible.
- Existing drainage and irrigation channels, sediment barriers, green areas, protection strips, such as drains and drainage and erosion control pits should be protected by taking appropriate measures.

### 6.7.4 Summary of Significant Construction Impacts

**Table 6-7 Surface and Groundwater Construction Impacts**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
1	Runoff from construction site into surface water courses	<b>Major</b>	<p><b>Surface and Groundwater Quality</b>                      Drainage from excavations will be collected and settled to remove suspended materials prior to discharge in accordance with required permits. Where practicable, local perimeter drains will be constructed around working areas to collect suspended run-off and direct it to a system of settlement basins before discharge in accordance with required permits.</p> <hr/> <p>All facilities and structures will be regularly inspected and maintained to ensure proper and efficient operation at all times, and especially after heavy rainfall. Sediment deposits will be regularly removed and disposed of at either by spreading on site (if uncontaminated) or at a suitably licensed facility.</p> <hr/> <p>Spoil and soil storage areas and open stores of construction materials will be designed and managed to control loss of sediments into run-off by minimizing the length and angle of slopes.</p> <hr/> <p>The size and duration of exposure of areas of open ground will be kept to the minimum.</p> <hr/> <p><b>Surface Water Bodies and Water Infrastructure (Channels)</b>                      Foundation works for the bridges, viaducts, retaining walls and other structures at or close to particularly sensitive surface water bodies will not take place during the high-water season</p> <hr/> <p>Work on stream crossings will be carried out, where technically feasible, from the banks above the channel and avoiding direct intervention in the watercourse, unless the existing bank reinforcement needs to be replaced.</p> <hr/> <p>Sensitive areas of rivers and drains will be protected from impacts of vehicles and other construction activities via fencing or other appropriate means.</p>	<b>Negligible</b>

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>Driving within rivers, streams or on their banks will be forbidden except if unavoidable to construct a particular structure. Then appropriate measures will be implemented to protect sensitive areas, for example by placing with metal plates to drive on.</p> <hr/> <p>Where practicable small drains within the construction area will be covered with metal plates which can be passed over by construction machines, to protect them against disturbance, or conveyed to have free flow through the pipes placed for this purpose.</p> <hr/> <p>Protection measures to prevent soil erosion after the finalisation of the earth work will be implemented where required such as:                      use of grass turf to cover the soil surface;                      use of erosion-control blankets or mats;                      renaturation as soon as feasible.</p> <hr/> <p>Wastewater generated during concrete batch plant operations and washing of cement trucks will be monitored for the pH and temperature of the wastewater effluent. Water usage is significant in concrete plants, not only in concrete production but also for washing waste in concrete mixer trucks, washing patios, and sprinkling on aggregates to reduce dust. Concrete wastewater may show high pH values, between 11 and 12, and high alkalinity due to the presence of hydroxides and carbonates in addition to the elevated concentration of solids. These characteristics make it necessary to treat wastewater prior to final disposal, whether in water or soil. Effluent guidelines for the. Ghanaian legal requirements and other Lender Standards prior to disposal.</p>	

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
2	Damage to freshwater ecosystems through change in water quality	Major	<p>Wastes and any other product containing hazardous chemical substances (i.e. fuel) will not be stored in the proximity of freshwater features. Their management will be done according to a Environmental Management Plan that will consider among their objectives the avoidance of any spill affecting to the freshwater ecosystems.</p> <hr/> <p>Excavated materials will not be dumped into freshwater features, nor will they be stored in their proximity, to avoid any increase of the turbidity levels.</p> <hr/> <p>Vegetation clearance works will avoid affecting the riparian vegetation, whenever possible, since it provides areas for spawning and sheltering of many aquatic organisms.</p>	Minor
3	Impacts on groundwater through temporary dewatering	Moderate	<p>Groundwater from any temporary dewatering measures during construction will be drained to a nearby surface water course.</p>	Minor
4	Impacts on surface and groundwater due to flooding	Major	<p>An E&amp;S review will include a review of culvert discharge locations and assessment of risks to flooding. Alternative mitigation may need to be developed for improving the design/mitigating significant impacts as far as possible.</p> <hr/> <p>Assessment of surface water runoff and of flooding conditions after heavy rainfall events for efficiency of water conveyance systems will be implemented.</p>	Minor



## 6.7.5 Summary of Significant Operational Impacts

No significant impacts to surface or groundwater are expected during the operational phase of the road.

## 6.8 Biodiversity and Conservation

### 6.8.1 Summary of Baseline Findings

The following section presents an overview of the biodiversity and conservation studies which have been conducted during both the wet and dry seasons. Figure 6-12 presents the survey points for the biodiversity baseline study.



**Figure 6-12 Biodiversity Survey Points**

#### 6.8.1.1 Habitats and Flora

The road corridor is characterised by built and natural environments. The common trees along the road corridor are *Albizia lebeck*, *Baphia nitida*, *Calotropis procera*, *Ceiba pentandra*, *Khaya senegalensis*, *Mangifera indica*, *Terminalia catappa*, *Zanthoxylum zanthoxyloides*, *Azadirachta indica*, *Leucaena leucocephala*, *Antiaris toxicaria*, *Lonchocarpus sericeus* and *Terminalia ivorensis*.

Common shrubs identified are *Securinega virosa*, *Cassia occidentalis* and *Chromolaena odorata*. The usual herbs and climbers observed were *Bignonia capreolata*, *Boerhavia diffusa*, *Centrosema pubescens*, *Commelina diffusa*, *Euphorbia hirta*, *Mimosa pudica*, *Musa paradisiaca*, *Passiflora edulis*, *Schwenckia americana*, *Secamone afzelii*, *Ipomoea purpurea*, *Cissus quadrangularis*, *Heliotropium indicum*, *Luffa cylindrical*, *Acalypha indica*, *Talinum triangulare* and *Vernonia cinerea*. The common grasses were *Paspalum scrobiculatum*, *Sporobolus pyramidalis*, *Dactyloctenium aegyptium*, *Digitaria insularis*, *Typha domingensis*, *Nymphaea lotus*, *Cyperus articulatus*, *Lemna paucicosta* were the common aquatic plants and *Nephrolepis biserrata* the common fern.

The most abundant trees are *Azadirachta indica*, *Leucaena leucocephala*, *Lonchocarpus sericeus* and *Cassia siamea*. The dominant grass is *Panicum maximum* and *Commelina diffusa*, *Euphorbia hirta* and *Boerhavia diffusa* the dominant herbs. The most abundant shrub is *Chromolaena odorata*. The most dominant aquatic plant is *Typha domingensis*.

The habitats have been modified by mainly anthropogenic factors such as settlement, cultivation, cattle grazing, etc. The major habitat types encountered along the road corridor are listed below:

- Agricultural lands: Farms and ornamentals
- Coastal grassland
- Thicket and Woodland
- Riverine forest

### Agricultural Lands: Farms and Ornamentals

The Project corridor hosts maize, plantain, cassava, onion farms as well as mango and palm plantations. The most common along the road stretch were the maize and mango farms. There were cultivations of ornamentals like *Rheo discolor*, *Vinca minor*, *Bougainvillea spectabilis*, *Colues scutellarioides*, *Portulaca grandiflora* especially approaching the precincts of the Akosombo Roundabout. The grasslands and watercourses showed a history of disturbance caused by cattle grazing and bushfires.



**Figure 6-13 Maize Farm along the road corridor**

### Coastal Grassland

The most common vegetation type observed along the road corridor was Coastal Grassland dominated mainly by *Panicum maximum*, *Digitaria insularis*, and *Sporobolus pyramidalis* with interspersed populations of trees like *Azadirachta indica*, *Leucaena leucocephala*, *Lonchocarpus sericeus*, *Zanthoxylum zanthoxyloides* and *Cassia siamea* and shrubs like *Chromolaena odorata* and *Securinega virosa*.





**Figure 6-14 Grassland vegetation**



**Figure 6-15 Grassland disturbed by farming and grazing**

### Thicket and Woodland

Thicket and woodland vegetation were dominated by populations of trees like *Leucaena leucocephala*, *Lonchocarpus sericeus*, *Zanthoxylum zanthoxyloides* and *Cassia siamea*; shrubs like *Chromolaena odorata* and *Securinega virosa*; herbs/climbers like *Bignonia capreolata*, *Boerhavia diffusa*, *Centrosema pubescens*, *Commelina diffusa*, *Euphorbia hirta*, and *Secamone afzeli*.

## Riverine forest

Patches of forest or deciduous tree vegetation occur along the banks of the watercourses. The forests are dominated by populations of trees like *Azadirachta indica*, *Leucaena leucocephala*, *Lonchocarpus sericeus*, *Mitragyna inermis*, and *Parkinsonia aculeate*. *Luffa cylindrical* was observed to be creeping at the upper sides of the banks.



**Figure 6-16 Riverine Forest along Dechidan Stream**

### 6.8.1.2 Protected Areas

The Protected Areas<sup>19</sup> within 5 km of the Project area were ascertained using various information sources, as well as the IBAT database<sup>20</sup>. The relevant areas in the wider region are illustrated in Figure 6-17<sup>21</sup>, and the Protected Areas specifically within 5 km of the Project corridor are included in Table 6-8.

**Table 6-8 Protected Areas Within 5 km of Project Corridor**

No.	Area	Distance
1	Chipa Tributaries Forest Reserve	1.0 km
2	Dechidaw Forest Reserve	1.0 km
3	Shai Hills	1.0 km
4	Volta River	5.0 km
5	Yogaga	5.0 km

Source: IBAT Proximity Report (2020)

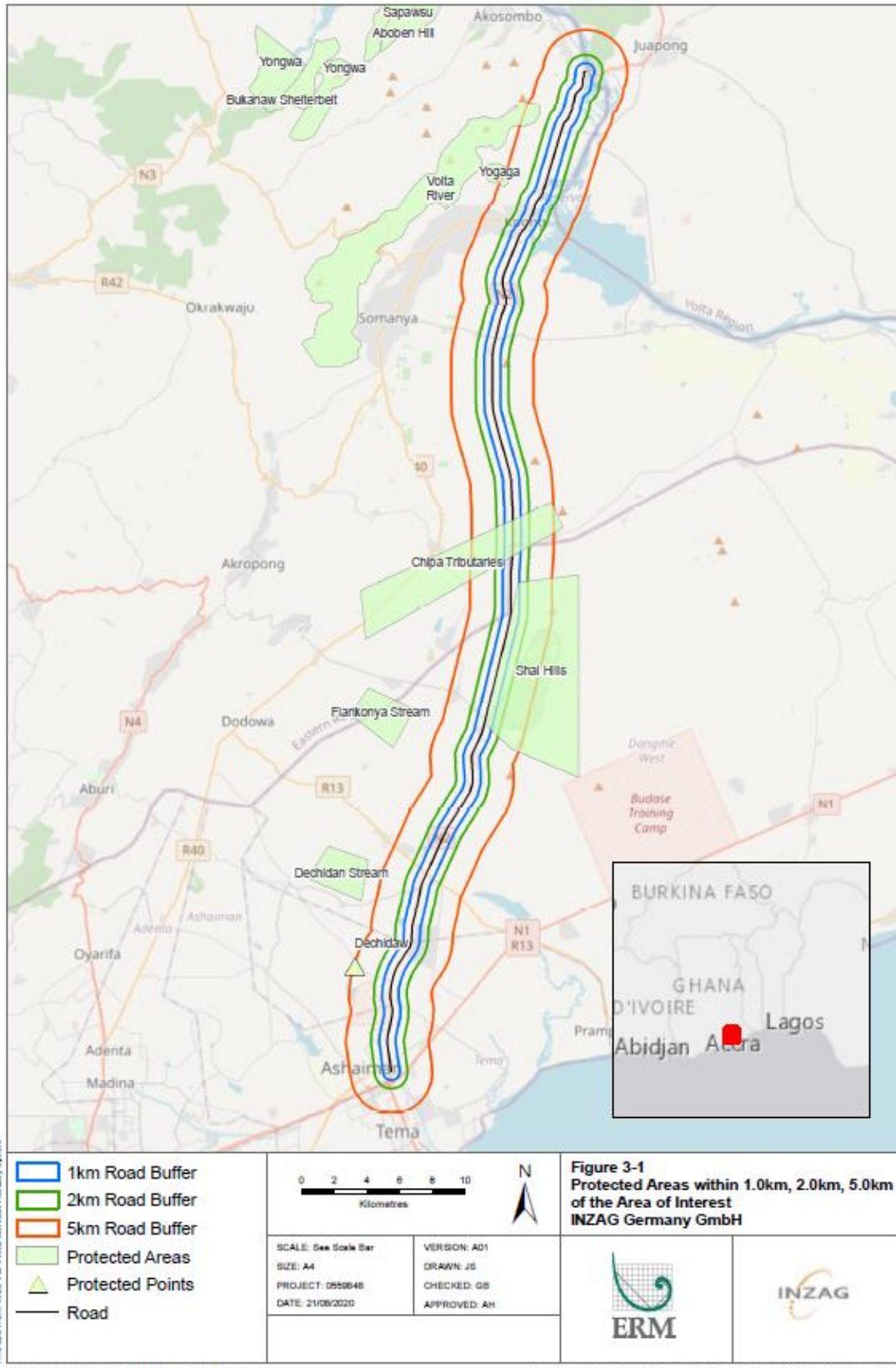
Several other protected areas shown in the IBAT figure are outside of the 5 km corridor (eg Dechidan Stream and Fiankonya Stream); these areas are not further evaluated as the probability of impact-interaction with the Project is considered to be remote.

<sup>19</sup> Protected areas that conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area". Available at: <https://www.iucn.org/theme/protected-areas/about/protected-areas-categories/category-vi-protected-area-sustainable-use-natural-resources>

<sup>20</sup> Integrated Biodiversity Assessment Tool

<sup>21</sup> The closest Ramsar site wetland of international important is the Sakumo lagoon, approximately 2.5 km southwest of the Project site and whilst unlikely to be directly affected is something we should remain aware of due to the intense anthropogenic pressures in the area.





**Figure 6-17 Protected Areas in wider region of Project Corridor**  
 (Source IBAT Proximity Report (2020))

### 1. Chipa Tributaries

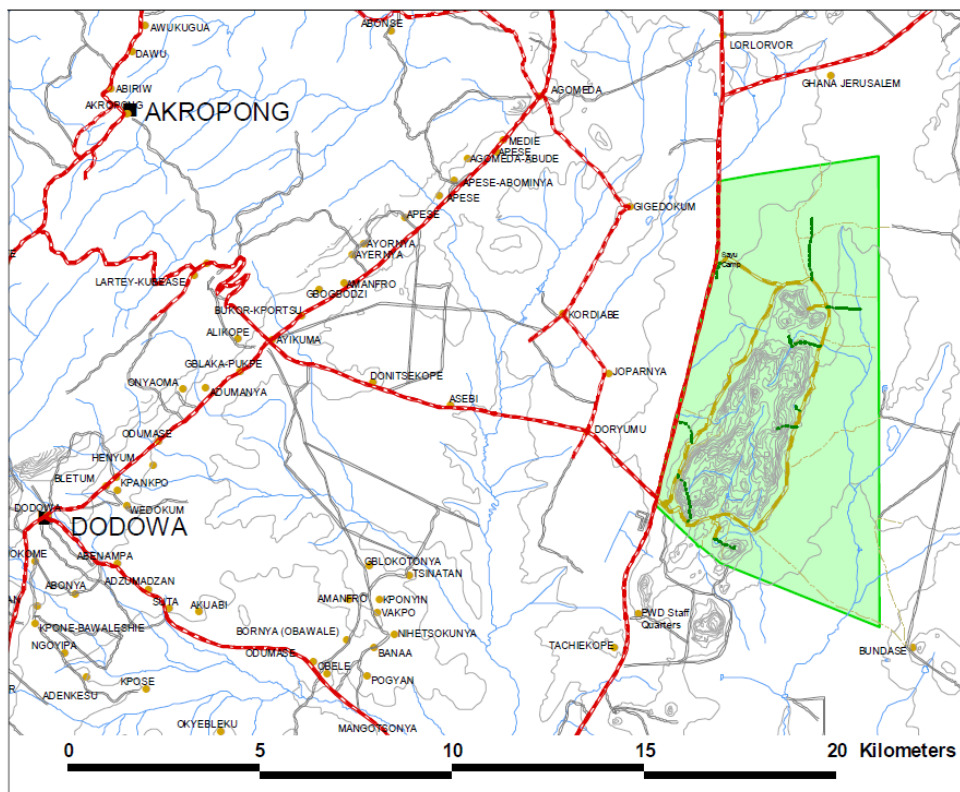
The IBAT report mentions that the Chipa Tributaries Forest Reserve is within the Project footprint. During the engagement with the Forestry Commission, however, the Commission provided confirmation that the Reserve area will not overlap with the Project footprint. Additionally, the status and conservation value of the Reserve is poorly documented<sup>22</sup>.

### 2. Dechidaw Forest Reserve

The Dechidaw Reserve is a small forest reserve with an area of approximately 4km<sup>2</sup>; it has not yet been possible to confirm its location during stakeholder engagement with the Forestry Commission. Both the location of the area, protection status and biological values will be clarified during the ESIA.

### 3. Shai Hills Resource Reserve

Shai Hills Resource Reserve (also considered as an Important Bird and Biodiversity Area - IBA) is located on the Accra Plains, in the Shai traditional area of the Dangme West District, approximately 50 km NE of Accra. The reserve is made up largely of savanna covered plains, at about 60m elevation, which surround a series of *inselbergs*, the Shai Hills, where the most prominent peak rises to 290m (Figure 6-18). The hills are covered by a mosaic of forest, thickets and grassland with the unique low stature dry forest being mainly found in the intervening canyons (Figure 6-19). It is classified as a category IV IUCN protected area. A Management Plan was originally compiled in 1992 and updated as a draft version in 2010.



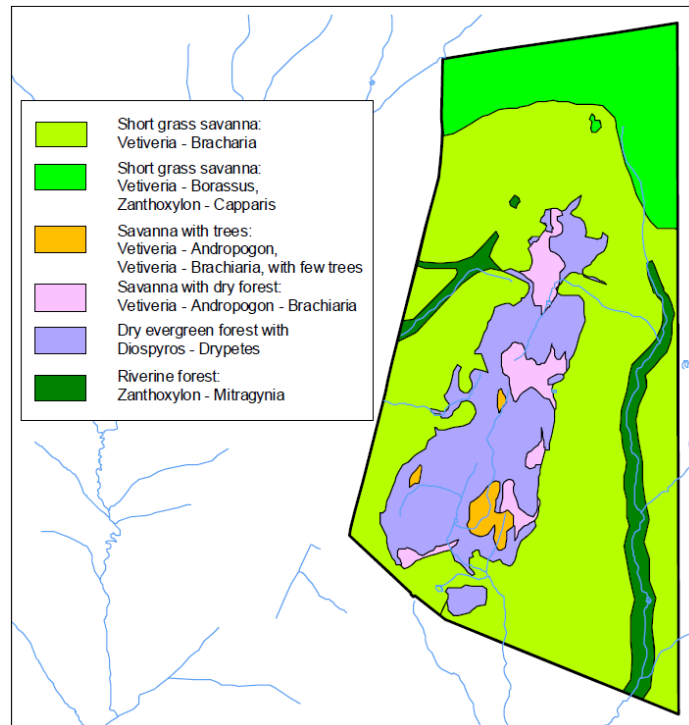
Source: Shai Hills Management Plan (2010)

**Figure 6-18 Shai Hills Resource Reserve Boundaries – shown in green**

<sup>22</sup> Hawthorne, W.D. and Abu-Juam, M. (1995) Forest Protection in Ghana. The IUCN Forest Conservation Programme. Forest Inventory and Management Project, Planning Branch, Forestry Department, Kumasi, Ghana.



As per the checklist provided by Dowsett-Lemaire & Dowsett (2013), 4 of the bird species listed are already extinct from the reserve, 9 have been listed by the IUCN Red List of Threatened species, 43 are wholly protected by the Wild Species Preservation Act of Ghana and 30 are Palearctic migrants. The reserve is important for over 220 different bird species including, 30 Palearctic migrants, 10 Sudan-Guinea Savanna Biome restricted species, 2 Critically Endangered Species, an Endangered Species, 5 Vulnerable Species and a Near Threatened species.



Source: Shai Hills Management Plan (2010)

**Figure 6-19 Shai Hills Resource Vegetation Cover**

The reserve is entirely fenced (although the fence is broken in places) and provides a range of habitats supporting antelope including kob (*Kobus kob*) and bushbuck (*Tragelaphus scriptus*) and at least 173 species of birds. The site has been designated as an Important Bird and Biodiversity Area (IBA) by Birdlife International because it supports important populations of a number of biome restricted species including violet turaco (*Musophaga violacea*) (IUCN LC) and blue-bellied roller (*Coracias cyanogaster*) (IUCN LC).

One threat noted for the Shai Hills Resource Reserve is spread of the invasive neem.

#### 4. Volta River

Information on the protection status to be obtained in the ESIA. It is not anticipated that the Project will have any impacts on the Volta River.

#### 5. Yogaga

Information on the protection status to be obtained in the ESIA. It is not anticipated that the Project will have any impacts on this area.

### 6.8.1.3 Fauna

#### Birds

Sixty-eight species belonging to 29 different bird families were recorded within the study area. This represents about 30% of bird species recorded in the Shai Hills Resource Reserve. Apart from the Hooded Vulture which is Critically Endangered (BirdLife International, 2017), all the species recorded are widely distributed and thus considered least concern by the IUCN Redlist of threatened species. However, 6 species of birds recorded are wholly protected in Ghana by the Wild Animals Preservation Act 1961, Act 43. Furthermore, three species Purple Glossy Starling (*Lamprotornis purpureus*), Yellow-billed Shrike (*Corvinella corvina*) and Senegal Parrot (*Poicephalus senegalus*) are Sudan–Guinea Savanna biome restricted species.

#### Mammals

According to work done by Wilson (1993), with additions and corrections by Dowsett in 2005, the following primates and carnivores (as captured in the table below) have been spotted in and around the Shai Hills Resource Reserve. The order and nomenclature follow Kingdon (2004). Old names are given in brackets and are underlined if they are more commonly used in Ghana.

**Table 6-9 Occurrence of Fauna in the Shai Hills Resource Reserve**

<b>Cercopithecinae (Baboons and monkeys)</b>		
Anubis baboon	<i>Papio anubis</i>	common, widespread
Tantalus ( <u>green</u> ) monkey	<i>Cercopithecus aethiops</i> <i>tantalus</i>	common, widespread on hills
Spot-nosed monkey	<i>Cercopithecus petaurista</i>	Uncommon, on hills
Family Galagidae (Galagos)		
Demidoff's galago	<i>Galagoides demidoff</i>	Probably common in forested areas
<b>CARNIVORA Family Canidae (Jackals and wild dog)</b>		
Side-striped Jackal	<i>Canis adustus</i>	occasional reports; seen by Dowsetts, 2005
Hyaenidae (Hyaenas)		
Spotted Hyaena	<i>Crocuta crocuta</i>	Rare
Viverridae (Civets, genets)		
African civet	<i>Viverra civetta</i>	Uncommon
Felidae (Cats)		
Serval cat	<i>Felis serval</i>	Rare
Leopard	<i>Panthera pardus</i>	Rare
<b>HYRACOIDEA Family Procaviidae – Hyraxes</b>		
Rock Hyrax	<i>Procavia capensis</i>	Possible (Dowsett 2005)
Tragelaphini		
Bushbuck	<i>Tragelaphus scriptus</i>	Common, widespread
Cephalophini		
Bush (Grimm's or Grey) duiker	<i>Sylvicapra grimmia</i>	uncommon, on hills
Neotragini		

### Cercopithecinae (Baboons and monkeys)

Oribi	<i>Ourebia ourebi</i>	Uncommon, on hills
Reduncini		
Kob (Buffon's kob)	<i>Kobus kob</i>	Common on plains

## Amphibians

During the fieldwork, no species of protected amphibians were discovered. In particular *Arthroleptis zimmerai*, a species of terrestrial leaf-litter frog, and *Phrynobatrachus albolabris* a species of puddle frog were not identified.

### 6.8.1.4 Vegetation and Soils

The vertisols of the plains are liable to seasonal waterlogging and drought and have short grass savanna with shrubs and evergreen trees: a formation known to be unique in Africa. Two distinguishable communities have been recognized:

- i. The *Vetiveria fulvibarbis* - *Brachiaria falcifera* community is a generally low open grassland of perennial grasses with an average plant cover of 80% and fewer than 20 species present:
- ii. The *Vetiveria fulvibarbis* - *Borassus aethiopum* community dominates the northern part of the reserve and is distinguished by scattered fan palms and a denser shrub and bush cover.

Tall tussock grassland is confined to the wetter areas and two communities have been distinguished.

- i. The *Pennisetum cf. polystachyon* – *Schizachyrium sanguineum* is a dense high grassland (up to 2.5 m) mainly confined to alluvial clays in depressions and seasonal water courses. It is characterised by *Crinum ornatum*.
- ii. The *Vetiveria fulvibarbis* - *Andropogon gayanus* community, which is generally shorter, with an average cover of more than 90%, is mainly confined to steep slopes over leptosols. This community seems to be associated with the *Bridelia ferruginea* - *Vetiveria fulvibarbis* association which is endemic to the Accra Plains and therefore of major conservation interest.

**Dry evergreen forest** is the dominant forest community of the hills and is a mixture of grassland, woodland thicket and low forest. This *Diospyros abyssinica* - *Drypetes parvifolia* community is a dense, low, dry evergreen forest. It grows on the richer soils of the inselberg slopes. The unique floristic and ecological properties of this community are of great conservation interest. The *Zanthoxylum zanthoxyloides* - *Capparis brassii* community is confined to the deeper soils of termite mounds and hummocks on the plains. Thorny species and lianas are abundant in these dense thickets. the *Zanthoxylum zanthoxyloides* - *Mitragyna inermis* community is a dense riverine forest which is confined to vertisols along seasonal streams. Marshy and aquatic vegetation is restricted to small dams and depressions but constitutes an important conservation feature of the reserve.

## 6.8.2 Potential Impacts

### Construction Phase

During the construction phase, the following potential impacts can arise:

#### **Damage, fragmentation and loss of habitats**

There are a number of activities during the construction activities that can result in the damage, fragmentation and loss of habitats: Vegetation clearance, Soil and rock excavations and Borrow pits and quarries and pesticide use.

#### **Loss of flora**

Flora species will be directly affected from the road construction through vegetation removal.

## Introduction of Alien invasive species

The clearing of new areas may provide opportunities for AIS introduction.

## Accidental loss of fauna

The vegetation clearance activities can result in accidental loss of fauna.

## Disturbance to fauna

Construction activities can directly and indirectly cause disturbance to species of fauna, due in most of the cases to the presence and activity of the machinery.

## Operational Phase

In the operational phase, potential impacts are:

### Accidental loss of fauna

The presence of the road can result in the loss of some fauna, as a result of accidents when crossing the road, getting run over by the vehicles. This can affect to all the different groups of fauna. However, some groups of fauna will be more affected than others.

### Barrier effect in fauna

The linear infrastructures, such as road projects, contribute significantly towards the habitat fragmentation by creating barriers to fauna animal movement and the isolation of their populations.

The barrier effect created by such linear infrastructures can affect the dispersion and movement capacity of the fauna. This affects indirectly to their capacity for searching food, shelter or other individuals of their same species during the breeding season. These factors are linked with the species populations dynamic and can influence in the survival of threaten species.

## 6.8.3 *Embedded Measures*

The Project does not involve constructing a new, greenfield road, but rather expanding an existing one. As such, most of the anticipated threats associated with bird strike with vehicles, noise associated with moving vehicles and artificial light from vehicles among others are already existing. Hence the species present may have learned or are learning to live with such disturbances.

The major threat is expected to be associated with the construction: Noise levels are expected to be higher and persistent; artificial lights and pollution will be higher and prolonged; vegetation will be cleared; human presence will be higher; among other prominent disturbances. These are expected to cause extra stress to birds and other biodiversity resources within the corridor.

A number of embedded measures are already in place, which will help to minimize the impacts to as low as possible, and these are summarized as follows:

- Employment of an “Ecological Clerk of Works” (ECoW), who will prepare the environmental documentation on delivery of ecological requirements on site before construction activities commence. The ECoW will monitor construction activities to ensure that construction activities are delivered in accordance to relevant laws and Project commitments
- Speed of vehicles will be limited to minimise emission of dust in non-paved access roads and to lower the risk of accidents with fauna.
- Noise emission will be limited as much as possible: speed limit for vehicles, maintenance programs of machinery, avoidance of emission of noise during the night, etc.
- Use of signs and/or fences in access roads and construction sites, to avoid any affection to areas out of the Project footprint. Protective measures will be implemented especially on the locations

of active construction works. Use of fences in the construction sites will also avoid the entrance of fauna in them, avoiding accidents.

- No planting of alien species will occur in the camps or any areas within the AoI, including landscaping of re-vegetated areas.
- Develop habitat restoration/revegetation measures on temporary construction areas through the Soil Erosion, Reinstatement & Landscape Management Plan.

Wastes created during the construction activities will be managed under a Environmental Management Plan, to limit the disturbance to fauna as a result of presence of wastes and spills.

#### **6.8.4 Summary of Significant Construction Impacts**

Significant impacts and proposed mitigation measures are summarised for the construction in Table 6-10 and for operation in Table 6-11.



**Table 6-10 Biodiversity Construction Impacts**

No.	Impact Description	Impact Assessment	Mitigation /Enhancement Measures	Residual Impact
1	<b>Damage, fragmentation and loss of habitats</b>	<b>Major</b>	<p>Delimitation of areas to be cleared before the beginning of the construction activities in order to limit as much as possible the surface of vegetation to be cleared.</p> <hr/> <p>Access roads will be defined before the beginning of the construction activities. Some of the public roads may need to be used for access. Driving out of the access roads by the construction vehicles taking part of the construction activities will not be allowed.</p> <hr/> <p>Use of signs and/or fences in access roads and construction sites, to avoid any affection to areas out of the Project footprint. Protective measures will be implemented especially on the locations of active construction works. Use of fences in the construction sites will also avoid the entrance of fauna in them, avoiding accidents.</p> <hr/> <p>Vegetation clearance will avoid, whenever feasible, the breeding period.</p> <hr/> <p>If possible, gradual vegetation clearance will be conducted, to enable fauna to move to other areas.</p> <hr/> <p>Revegetation (i.e. the sowing of native herbaceous species on top soils and/or the planting of native shrubs/trees) will be undertaken as soon as possible after clearance and construction.</p> <hr/> <p>Wastes created during the construction activities will be managed under a Environmental Management Plan, to limit the disturbance to fauna as a result of presence of wastes and spills.</p> <hr/> <p>An additional level of mitigation will be adopted during the construction activities in those areas of the Project overlapping National Protected Areas and International Designated Areas, in particular the SHRR .</p>	<b>Minor</b>
2	<b>Loss of flora</b>	<b>Major</b>	<p>Develop habitat restoration/revegetation measures on temporary construction areas through the Soil Erosion, Reinstatement &amp; Landscape Management Plan.</p> <hr/> <p>Seeds of limited range distribution flora should be collected from the roadside to be used in the post-construction landscaping phase</p>	<b>Minor</b>

No.	Impact Description	Impact Assessment	Mitigation /Enhancement Measures	Residual Impact
3	Introduction of Alien invasive species	Moderate	<p>No planting of alien species will occur in the camps or any areas within the Aol, including landscaping of re-vegetated areas.</p> <hr/> <p>A monitoring plan will be carried out to record alien species populations in the project area of influence and aimed at removing new populations and preventing them from spreading throughout the Aol. In addition, prompt revegetation (i.e. sowing of native herbaceous species and/or planting native shrubs/trees) on bare soil with natural or semi-natural vegetation will reduce the spread of alien species.</p>	Minor

### 6.8.5 Summary of Significant Operational Impacts

No.	Impact Description	Impact Assessment	Mitigation /Enhancement Measures	Residual Impact
1	Barrier effect in fauna	Moderate	<p>The following mitigation measure is to be implemented in relation with the barrier effect of the road:</p> <p>Fauna crossing points (i.e. culverts) should be installed along the road. This will increase the permeability of the road and will reduce the barrier effect.</p> <p>Reduced speed limit within the area of SHRR to reduce the risk of interactions with fauna</p> <p>Limit center lighting of the road in certain places to minimise light disturbance to fauna, and bats.</p>	Minor

## 6.9 Air Quality

### 6.9.1 Summary of Baseline Finding

DustTrak monitors and Diffusion Tubes were mounted at selected sensitive receptors along the existing road corridor to monitor particulate and gaseous air emissions, predominantly vehicular emission levels. No major pollution sources have so far been observed. Monitoring is ongoing and details of the results and existing emission sources will be included in the final ESIA.

Overall, the baseline conditions of the route within Greater Accra (the initial approximately 15 Km of the roadway) are expected to be typical for such urban/semi-urban areas; most other parts of the route are rural/agricultural and baseline conditions may vary seasonally (e.g. higher dust/particulates during the dry season).

### 6.9.2 Potential Impacts

Air pollutant emissions both during construction and operation can cause health problems for local residents as well as nuisance (such as dust) if they are not properly managed.

The main impacts associated to air quality are considered as:

- Dust from Construction Activities
- Other Emissions from construction activities
- Vehicle emissions from operational traffic

### 6.9.3 Embedded Measures

A number of embedded measures are already in place, which will help to minimize the impacts to as low as possible, and these are summarized as follows:

- where unpaved roads are utilised by vehicles, water will be sprayed on the surface to avoid dust generation;
- a speed limit of 30kph on unpaved surfaces should be used;
- vehicles should be kept clean to avoid tracking dirt around and off the site;
- vehicles transporting friable materials should be covered;
- where feasible, surface binding agents should be used on exposed open earthworks;
- use of localised dampening and activity specific dampening should be used to reduce localised emissions of dust;
- all stockpiling will be carried out using standard stockpiling best practices, such as being located away from sensitive receptors, optimised to retain a low profile with no sharp changes in shape enclosed or sheet as much as possible, and enclosed or sheeted as far as possible;
- wind breaks should be erected around the key construction activities and, if possible, in the vicinity of potentially dusty works, to minimise impacts at nearby residential receptors; and
- it is good practice to use vehicles that are compliant with recent emission standards (for example, EURO 3 or USEPA Tier 2) and maintained in reasonable working order. When not in use, vehicles should be switched off, unless impractical for health and safety reasons (for example maintenance of air conditioning).

### 6.9.4 Summary of Significant Construction Impacts

Significant impacts and proposed mitigation measures are summarised for construction in Table 6-11 and for operation in Table 6-12.

**Table 6-11 Air Quality Construction Impacts**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
1	<b>Construction dust through demolition, earthworks and vehicle traffic</b>	<b>Significant</b>	<p>exposed ground and earthworks areas should be covered as much as possible, for example with sheeting or boarding, or the use of chemical binders should be investigated;</p> <p>where ground and earthworks are covered or surface binders are used, the smallest possible area for working should be exposed</p>	<b>Minor</b>

**6.9.5 Summary of Significant Operational Impacts**

**Table 6-12 Air Quality Operational Impacts**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
1	<b>Off-site impacts</b> An increase in vehicle numbers is predicted along the Proposed route and major linking roads as traffic uses the major arterial routes and this will impact air quality within the wider traffic network.	<b>Minor</b>	Within a fixed route alignment, there is very limited opportunity to actively mitigate increased pollution load. Most of the opportunities lay within wider regulatory measures to improve vehicle efficiency and maintenance. It is proposed that long term monitoring is implemented to respond to any exceedances that occur in the longer term	<b>Minor</b>

## 6.10 Climate Change Risk Assessment

### 6.10.1 Overview

This section presents the Climate change risk assessment (CCRA) to assess the potential physical and transition risks of climate change on the Project. The CCRA is in line with the Equator Principles 4<sup>23</sup>, and according to the Guidance of the Task Force on Climate-related Financial Disclosures (TCFD) <sup>24</sup> as relevant for a Category A project.

According to the EP 4, the CCRA for such a Category A project must include (i) consideration of physical risks and (ii) – if combined Scope 1 and Scope 2 Emissions are expected to be more than 100,000 tonnes of CO<sub>2</sub> equivalent annually – then also transition risks must be assessed as well as an evaluation of GHG-saving alternatives.

The CCRA should address the following questions at a high level:

- What are the current and anticipated climate risks (transition and/or physical) of the Project?
- Does the client have plans, processes, policies and systems in place to manage these risks?
- What is the Project's compatibility with the host country's national climate commitments, as appropriate? [this topic not a material issue, but will be addressed in the ESIA]

ESIA baseline GHG emissions calculation will include Scope 1, 2 and 3 as applicable to relevant Standards. The Scope 1 and Scope 2 GHG emissions caused by the Project activities (construction and operation stages) will be calculated and reported in the ESIA report according to the international requirements. The Scope 1 and 2 emissions during roadway operations are expected to be relatively minor (e.g. some emissions from maintenance vehicles, electricity for roadway lighting, operation of the toll-booths) and highly unlikely to exceed the annual 100,000 tonnes of CO<sub>2</sub> eq. threshold. However, the combined emissions during the construction stage may have the potential to exceed 100,000 tonnes of CO<sub>2</sub> eq.; for the purpose of this MDR, it is therefore assumed that the threshold is exceeded and the corresponding assessment of transition risk for the Project is needed

As such, in this section the following assessments are provided:

- Physical risk of climate change on the Project in the construction stage (8.6.3)
- Physical risk of climate change of Project in the operations stage (8.6.4)
- Transition risk on the Project (8.6.5)
- Evaluation of potential alternatives in construction stage that are less GHG-intensive. (8.6.6)

### 6.10.2 Summary of Baseline Findings

Ghana has a tropical climate with annual rainfall ranging from 1100 mm in the north to about 2100 mm in the southwest. The northern part of the country has one rainy season that extends from May to September; the south has two rainy seasons – the first lasts from April to July and the second from September to November. The dry season (December to March) brings the arid and dusty harmattan winds that blow from the Sahara Desert, and is marked by low humidity, hot days and cool nights. Average annual temperatures are around 26°C, with higher temperatures in the north and during the dry season.

Ghana has experienced severe droughts and floods in the last two decades<sup>25</sup>, some of which have had severe economic and social implications. Climate change adds to these existing threats through

<sup>23</sup> Source: <https://equator-principles.com/wp-content/uploads/2020/01/The-Equator-Principles-July-2020.pdf>

<sup>24</sup> Source: <https://www.fsb-tcf.org/wp-content/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf>

<sup>25</sup> Source: <https://reliefweb.int/report/ghana/ghana-must-move-coping-floods-adapting-them>



rising temperatures, changing rainfall patterns and ultimately extreme weather events. The following Table 6-13 shows historic and future weather and climate projections.

**Table 6-13 Climate Change in Ghana<sup>26</sup>**

Historic Weather and Climate	Projected Weather and Climate
Average annual temperatures have risen 1.0°C since 1960, an average rate of 0.21°C per decade.	Average annual temperatures are predicted to increase by 1.0-3.0°C from the 1970-99 average by the 2060s.
Precipitation in Ghana decreased by 2.4 percent per decade between 1960-2006.	Projected changes in annual precipitation for the 2030s range from a decrease of 9 percent to an increase of 8 percent from the 1970-99 average.
Experienced periodic extreme events such as rainstorms, floods, and droughts.	Rainfall is expected to exhibit greater variability, and a larger percentage of precipitation is anticipated to fall during heavy rainfall events. Droughts are anticipated to become more frequent and intense.

The anticipated impacts of climate change may have potential implications for the Project design and the integrity of road structures (such as culverts, bridges, asphalt) due to changes in heat, rainfall, flooding, etc.

Sea level rise will not be relevant to the Project, as the starting point of the roadway route (Ashaiman Roundabout) is about 6 km inland from Tema Port, the nearest point to the sea.

### 6.10.3 Summary of Physical Risks on Project during Construction

For identifying physical risks, the broad descriptions of projections of changes in long-term, seasonal averages and extreme weather events are used to qualitatively assess the effects of climate change on the infrastructure and assets which comprise the Project, which are interpreted using professional expertise and judgement.

The assessment considers that the Project will be designed to be:

- resilient to impacts arising from current weather events and climatic conditions and designed in accordance with current planning, design and engineering practice and codes considered.

The assessment also identifies any relevant resilience measures for each risk either already in place or in development for the Project's infrastructure, as outlined in the project's description and supporting documentation.

Using the baseline assessment, an analysis is made of the key project-specific climate change risks in terms of interruptions to operations and damage to assets, such as heat, precipitation, floods, etc.

#### 6.10.3.1 Increased Temperatures

Increased temperatures during the construction phase may result in overheating of vehicles and equipment. There is a possibility that in the dry seasons there may be decrease in the availability of surface water used for construction. High temperatures will lead to heat stress if employees will work for long periods of the heat. Which in turn will result in extended duration of construction and delay in transporting material to and from site.

<sup>26</sup> Source: [https://www.climatelinks.org/sites/default/files/asset/document/ghana\\_adaptation\\_fact\\_sheet\\_jan2012.pdf](https://www.climatelinks.org/sites/default/files/asset/document/ghana_adaptation_fact_sheet_jan2012.pdf)

### *6.10.3.2 Storms, Extreme Precipitation, Flash Flooding, & Riverine Flooding*

Higher levels of future seasonal precipitation are likely to lead to access roads more easily developing potholes, or for existing potholes to deepen quickly. Increased lightning storms could pose a threat to worker safety and risk damaging equipment and buildings during construction phases.

During construction flooding will be very disruptive, potentially washing away materials, damaging equipment, vehicles, worker camps, buildings, fencing and flooding borrow pits, sand sources and quarries.

### *6.10.3.3 Mitigation Measures during Construction*

Significant impacts and proposed mitigation measures are summarised for the construction in Table 6-14. In order to reduce the impact of climate change on the project, the following mitigation measures are to be implemented. The measures may be adapted in relation to specific construction activities.

**Table 6-14 Climate Change Construction Impacts**

CONSTRUCTION PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
1	<p><b>Increased Temperatures</b></p> <p>Occupational heat stress for employees will have an impact on workers' health and safety, and higher costs, extended duration of construction due to restricted working hours</p> <p>Overheating of vehicles and equipment.</p> <p>Decrease in the availability of surface water used for construction.</p> <p>Stresses to other road infrastructure, such as steel in bridges through thermal expansion and movement of bridge joints, overpasses, culverts and viaducts.</p>	<b>Moderate</b>	<p>International best practice is used to raise awareness and reduce the risk of heat stress of workers at construction site; further information on OHSE risks and mitigation is given in detail in Section 6.15.</p> <p>As the design is already using reinforced steel, regular checks will be done to identify potential damage and stress as a result of thermal expansion before major damage to infrastructure occurs such as bridge failure.</p>	<b>Minor</b>
2	<p><b>Storms, Extreme Precipitation, Flash Flooding, &amp; Riverine Flooding</b></p> <p>Access roads develop potholes, or for existing potholes to deepen quickly.</p> <p>Lightning could pose a threat to worker safety and risk damaging equipment and buildings during construction phases.</p> <p>Flooding will be very disruptive, potentially washing away materials, damaging equipment, vehicles, worker camps, buildings, fencing and flooding borrow pits, sand sources and quarries.</p>	<b>Major</b>	<p>Assess potential flood risk and determine if additional flood defence measures are required, for example, raised platforms for equipment, sandbags to stop flood waters entering buildings, extra drainage or barriers to divert flood waters.</p> <p>Install plenty of temporary drainage during construction to reduce chance of water build up. Assessing flood risk especially at worker camps for the best way to introduce flood measures which will be effective.</p> <p>Bridge footings will be inspected regularly for scour, and debris will be removed which builds up which could increase the rate of scour.</p>	<b>Minor</b>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	Risk of injuries due to both surface and flowing water.  Increased risk of damage to bridges, underpass and overpasses, culverts and viaducts infrastructure during peak flow.			

## 6.10.4 Summary of Physical Risks on the Project during Operation

### 6.10.4.1 Increased Temperatures

Extreme high temperatures can cause road surface material to soften and expand, which can result in rutting and potholes. High temperatures increase the probability of road surfaces developing cracks more easily. In addition, long periods of higher temperatures and increased solar radiation are likely to reduce the lifetime of asphalt road surfaces.

Extreme heat can also cause stresses to other road infrastructure, such as steel in bridges through thermal expansion and movement of bridge joints. Additionally, it may affect overpasses, culverts and viaducts.

### 6.10.4.2 Storms, Extreme Precipitation, Flash Flooding, & Riverine Flooding

If the severity and extent of the flooding is sufficiently intensive, it could result in road closures during operations due to driving being unsafe. Waterlogging of the road can result in cracking of the road surface, and as outlined by the Ghana Adaptation Fact Sheet<sup>27</sup>, “Road assets are particularly vulnerable to climate stressors such as higher temperatures, increased precipitation, or flooding.”

An increased risk of damage to bridges, underpass and overpasses, culverts and viaducts infrastructure during peak flow is likely, and also there can be a risk of destruction to the road from debris and flood waters. If flood waters rise significantly this can result in injuries to people from flowing water, and waterborne diseases could be spread as a result of standing water.

In storm conditions, debris carried by flood waters could obstruct the road, whilst In addition, high winds from storms could cause road closures during operation, especially in locations with bridges and raised road surface.

### 6.10.4.3 Mitigation Measures during Operation

Significant impacts and proposed mitigation measures are summarised for the operational phase in Table 6-15. In order to reduce the impact of climate change on the project, the following mitigation measures are to be implemented. The measures may be adapted in relation to specific construction activities.

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<sup>27</sup> [https://www.climatelinks.org/sites/default/files/asset/document/ghana\\_adaptation\\_fact\\_sheet\\_jan2012.pdf](https://www.climatelinks.org/sites/default/files/asset/document/ghana_adaptation_fact_sheet_jan2012.pdf)



**Table 6-15 Climate Change Operation Impacts**

OPERATIONAL PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
1	<p><b>Increased Temperatures</b></p> <p>Road surface material can soften and expand, which can result in rutting and potholes.</p> <p>Road surfaces developing cracks more easily.</p> <p>Reduce the lifetime of asphalt road surfaces.</p> <p>Stresses to other road infrastructure, such as steel in bridges through thermal expansion and movement of bridge joints, overpasses, culverts and viaducts.</p>	<b>Moderate</b>	<p>Asphalt will be used which is as heat resistant as feasible.</p> <p>Routine maintenance will be done to avoid cracks developing into potholes.</p> <p>As the design is already using reinforced steel, regular checks will be done to identify potential damage and stress as a result of thermal expansion before major damage to infrastructure occurs such as bridge failure.</p>	<b>Minor</b>
2	<p><b>Storms, Extreme Precipitation, Flash Flooding, &amp; Riverine Flooding</b></p> <p>Waterlogging of the road can result in cracking of the road surface.</p> <p>Debris carried by flood waters could obstruct the road.</p> <p>High winds from storms could cause road closures during operation, especially in locations with bridges and raised road surface.</p> <p>If the severity and extent of the flooding is sufficiently intensive, it could result in road closures during operations due to driving being unsafe.</p>	<b>Major</b>	<p>The drainage/runoff systems, culverts, bridges, potential flooding areas such as Tema and Ashaiman etc will be designed to handle the peak flows and floods.</p> <p>Enhancement of road segment resistance, e.g. on embankments, creating deeper road foundations on slopes, enhancing drainage structures.</p> <p>Consider planting vegetation and flowers in close proximity to the road which will absorb any excess surface water. This may require engineering to divert the water towards the vegetation.</p> <p>Bridge footings will be inspected regularly for scour, and debris will be removed which builds up which could increase the rate of scour.</p> <p>Monitoring of extreme weather events and how the road system responds.</p>	<b>Minor</b>

OPERATIONAL PHASE

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	<p>If flood waters rise significantly this can result in injuries to people from flowing water, and waterborne diseases could be spread as a result of standing water.</p> <p>Increased risk of damage to bridges, underpass and overpasses, culverts and viaducts infrastructure during peak flow.</p>			

### 6.10.5 Transition Risks

The steps of the Transition Risk Assessment according to TCFD are reviewed briefly. The following Table 6-16 shows the relevant issues and its respective review for the four risk categories: policy and legal, technology, market and reputation.

**Table 6-16 Overview Transition Risk Assessment**

Category	Issue	Review
<b>Policy and Legal</b>	National policy framework screening regarding E&S topics including climate change policies and regulations as part of ESIA	Risks for existing N2 road extension are not expected.
<b>Technology</b>	Substitution of existing road with lower emissions options	Transition to E-Mobility of trucks/cars is possible but has no effect on N2 Road usage Domestic aviation poses very limited foreseeable alternative to freight and passenger use of the N2 Road and is not considered a low carbon technology. Railway can in future pose an energy efficient partial-alternative – currently Ghana is expanding both its roadway and railway systems across the country. At present a railway is planned to go in parallel to part of the N2 Road, from Tema to Kumasi. From a logistical point of view, rail freight transport to the northern countries will only be viable when the other bordering countries also build connecting railways.
<b>Market</b>	Increased cost of raw materials Increased production costs due to changing input prices (e.g., energy, water) and output requirements (e.g., waste treatment)	Currently no red flags on supply-demand issues expected
<b>Reputation</b>	Shifts in consumer preferences Increased stakeholder concern or negative feedback	The Project objectives are to improve the road infrastructure, logistical connection, road safety and decrease traffic disruption. Construction phase will be a major driver for local economy. Negative reputational risks regarding climate-related issues are not expected.

Currently, no red flags can be assumed therefore the scope for this task in the ESIA will be limited and the focus lies in the assessment of physical risks such as the vulnerability of the Project to extreme weather events.

### 6.10.6 Evaluation of less GHG-intensive Alternatives in Construction

According to Equator Principles 4 an alternative analysis to determine less GHG-intensive options is required for projects emitting more than 100,000 t of CO<sub>2</sub> equivalent annually within combined Scopes 1 and 2. The combined emissions during the 30-month construction phase will most likely exceed the 100,000 t of CO<sub>2</sub> eq., but perhaps not within a single year (to be calculated during the ESIA).

For the purposes of this MDR, however, it is assumed that the threshold will be exceeded and therefore an appropriate assessment of potential Project alternatives in construction stage that are less GHG-intensive will be conducted.

However, there is no fundamental lower-emission alternative to the planned expansion of the N2 road. Most of the emissions are caused by the construction works. The main emitter is fuel combustion of vehicles and other construction equipment. INZAG will try to optimise fuel consumption and keep the GHG emissions to the lowest possible level. For this purpose, international best practice mitigation measures will be applied (such as the WB GHG Handbook for Road Construction<sup>28</sup>).

Mitigation of GHG emissions during the Project construction phase can be achieved through a series of measures that should be included within the Construction and Environment Management Plan. These mitigation measures are split between the various impacts, as identified in Table 6-17, and offer a qualitative rather than quantitative approach to mitigation due to a lack of data.

**Table 6-17 GHG Mitigation Measures: Construction Phase**

Impact	Mitigation Measure
Emissions associated with transport of raw materials	Optimize transport logistics (locations/routes) to ensure efficient carriage of raw materials. Reducing vehicle idling times through focus on scheduling of construction operations. Prioritise the use of fuel efficient transportation vehicles and ensure regular maintenance of vehicles. Provide efficient driving guidelines to transportation vehicle drivers to promote fuel efficiency.
Emissions associated with construction activity	Ensure that on-site power generation is designed, sized and operated for emissions performance as well as reliability. Optimization of the timing for works implementation (Traffic management) to minimize traffic delays due to rehabilitation, widening or maintenance work zones on existing road sections.
Emissions associated with land use change	Minimise the area of land clearance required. Productive utilisation of biomass material (wood) subsequent to land clearance.
Emissions associated with design	The use of high modulus asphalt concrete enables to save about 20% in GHG emission, compared to traditional road base asphalt. Use of cold recycling of road materials. Decreased in quantities of materials also result in a decrease of the transport requirements. carefully selecting the surface and structural type of pavement to be provided and, for low traffic roads, to prefer whenever technically suitable, gravel roads or surface treatments. Ensure low roughness since fuel consumption of vehicles driving on a road depends, among others, on the roughness of road surface. Use soil stabilisation

<sup>28</sup> World Bank (2010) Greenhouse Gas Emissions Mitigation in Road Construction and Rehabilitation: A Toolkit for Developing Countries

Impact	Mitigation Measure
	<p>Take maintenance into account during design. Maintenance works have a significant importance in the overall emissions of road construction</p> <p>Ensure recycling of steel. Recycling steel at the end of life of the structure in which it is embedded can significantly reduce the emissions associated to the construction of the structure.</p> <p>Optimizing the alignment, for a given use, in order to reduce the number and dimensions of structures (walls, tunnels, bridges). Optimizations may include: shorter spans, better foundation ground, limited skew, shorter tunnels, lower and shorter walls. This may result in additional earthworks</p>

## 6.11 Noise and Vibration

### 6.11.1 Summary of Baseline Findings

Six (6) unattended ambient noise measurements were conducted to monitor existing ambient noise levels along the road corridor. A 24-hour continuous measurement was undertaken at each sampling location over a 24-hour period. This is to account for daily variations in environmental sound levels of the area.



**Figure 6-20 Noise Monitoring activities**



Continuous sound level recordings were made using Class 1 Cirrus CR:171B Optimus Plus Sound Level Meter with built-in 1/3 octave band. As an important requirement for ensuring integrity of the results, all equipment were calibrated before and after use. The sound level meter was mounted on a tripod stand with the microphone elevated at a height of 1.5 meters above ground level and inclined at an angle of 45°. The microphone of the meter was covered with environmental wind screen to reduce wind noise and prevent damage in the event of the rains (which was a precaution). The equipment was manned during the period to ensure security and to record both instantaneous and other observable noise sources.

The meter was set to fast response time and at A-weightings for all measurements. The logging rate for the sound level meter was set to one minute during the sampling period (24-hour) and sound recordings were saved every 5 minutes. The average (Leq), maximum (Lmax) and minimum (Lmin) as well as statistical values for LA10, LA50, LA90, and LA95 noise levels will be computed and recorded over the same period (day and night) at each sampling location.

### 6.11.2 Key Potential Impacts

The key areas of impact that have been considered are:

- Noise impacts from construction of linear features (e.g. from the main carriage ways)
- Noise impacts from fixed sites and particularly bridge construction
- Noise impacts from Construction Compounds
- Operational traffic noise impacts

### 6.11.3 Embedded Measures

A number of embedded measures are already in place, which will help to minimize the impacts to as low as possible, and these are summarized as follows:

- Buildings located within 50 m of significant sources of vibration (e.g. piling, operation of vibratory equipment (e.g. compaction) and blasting) will be identified ahead of construction works. Sensitivity of the identified buildings and building occupants to vibration will be evaluated, and if vibration predictions or measurements show the potential for building damage, alternative construction methods should be developed to avoid damage occurring. Where disturbance due to vibration is likely, the method will be reviewed as far as practicable. The vibration standards will be as defined in the ESIA as implemented through the noise management plan. Documentation of the current structural status/conditions for each of the identified buildings will be prepared. This will include photographs of building structures sensitive to vibration and results of the sensitivity evaluation;
- Monitoring of vibration on commencement of relevant activities to ensure that the Ghanaian requirements are met. If the standards are exceeded additional measures will be taken to reduce vibration and if necessary altering the methods of working to use equipment that creates lower levels of vibration.
- Mechanical ripping will be preferably used to avoid or minimize the use of explosives.
- Instead of using secondary blast, hydraulic hammers or other mechanical methods will be preferred to improve rock fragmentation and minimize fly-rock risks. Hammers will be shielded by noise screens in order to avoid significant increase in noise impacts on villages situated in the vicinity;
- Delayed, micro-delayed, or electronic detonators will be used to reduce individual charge mass to safe limits where possible. At quarry sites, and if blasting is required during earthworks, close monitoring/supervision will be undertaken to ensure that legislative requirements and blasting permit conditions are complied with; if the standards are exceeded additional measures will be taken to reduce vibration impacts.

- Where the Project procures material from quarries and suppliers not in the direct ownership of the Project or a Project-contractor; the Project will undertake to review the operations of this facility (or supplier) to confirm compliance with its permitted activities and related operational conditions (e.g. required control measures).

#### **6.11.4 Summary of Significant Construction Impacts**

Significant impacts and proposed mitigation measures are summarised for the construction in Table 6-18 and for operation in Table 6-19.

**Table 6-18 Noise and Vibration Construction Impacts**

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
1	<b>Noise generated at Roadway Construction Sites (including main or satellite construction sites and structures)</b>	<b>Major at the residential properties</b>	<p>The Project will develop a comprehensive noise baseline survey plan to be issued to approval when the detailed design are available.</p> <p>The baseline will be quantified during the detailed design stage. A noise model will be constructed to predict the noise from the existing road, which is the main source at most receptor locations. The model will be validated using measurements where necessary and this will be used to establish baseline noise levels at key locations where the impacts are predicted. This will be used to inform the detailed design of mitigation.</p>	<b>Minor</b>
2	<b>Potential building damage from vibration generated during construction</b>	<b>Moderate</b>	<p>Monitoring of vibration on commencement of relevant activities to ensure that the Ghanaian requirements are met. If the standards are exceeded additional measures will be taken to reduce vibration and if necessary altering the methods of working to use equipment that creates lower levels of vibration.</p> <p>Measures to control vibrations at quarry sites:</p> <p>Mechanical ripping will be preferably used to avoid or minimize the use of explosives. Blasting will be limited to dedicated blasting times which will be negotiated with the affected communities in order to protect the people and minimize nuisance. Specific blasting plans and charging procedures will be developed;</p> <p>Instead of using secondary blast, hydraulic hammers or other mechanical methods will be preferred to improve rock fragmentation and minimize fly-rock risks. Hammers will be shielded by noise screens in order to avoid significant increase in noise impacts on villages situated in the vicinity;</p> <p>Delayed, micro-delayed, or electronic detonators will be used to reduce individual charge mass to safe limits where possible. At quarry sites, and if blasting is required during earthworks, close monitoring/supervision will be undertaken to ensure that legislative requirements and blasting permit conditions are complied with; if the standards are exceeded additional measures will be taken to reduce vibration impacts.</p> <p>A Quarry and Associated Facilities CMP will be developed which will include plans to retain rock structures as noise barrier between the quarrying area and any potentially affected village.</p>	<b>Minor</b>

### 6.11.5 Summary of Significant Operational Impacts

**Table 6-19 Noise and Vibration Operation Impacts**

No.	Impact Description	Impact Assessment	Embedded controls/Mitigation Measures	Residual Impact
1	Road Noise from Traffic	<p><b>Major</b> at the residential properties</p> <p><b>Moderate</b> at Commercial/ Administrative buildings.</p>	<p>maintenance of the road surface in good condition;</p> <p>speed reductions;</p>	<b>Minor</b>

## 6.12 Socio-Economic Assessment

### 6.12.1 Summary of Baseline Findings

#### 6.12.1.1 Overview of Area of Influence

The Project falls within the Greater Accra and Eastern Regions, crossing the 7 Districts of Ashaiman Municipality, Kpone Katamanso Municipality, Ningo Prampram Municipality, Shai Osudoku District, Yilo Krobo Municipality, Lower Manya Krobo Municipality, and Asuogyaman District.

A Social Field Survey was conducted over a three week period between 20 July and 7 August 2020 by a team of 4 social specialists from PSS Urbania. A representative from INZAG participated to some of the activities namely meetings with national authorities and Community Representative Forums.

Primary baseline data was collected through field observations, ground truthing, settlement profiling activities, and Key Informant Interviews (KIIs) with National and District Authorities, community representatives and Traditional Authorities.

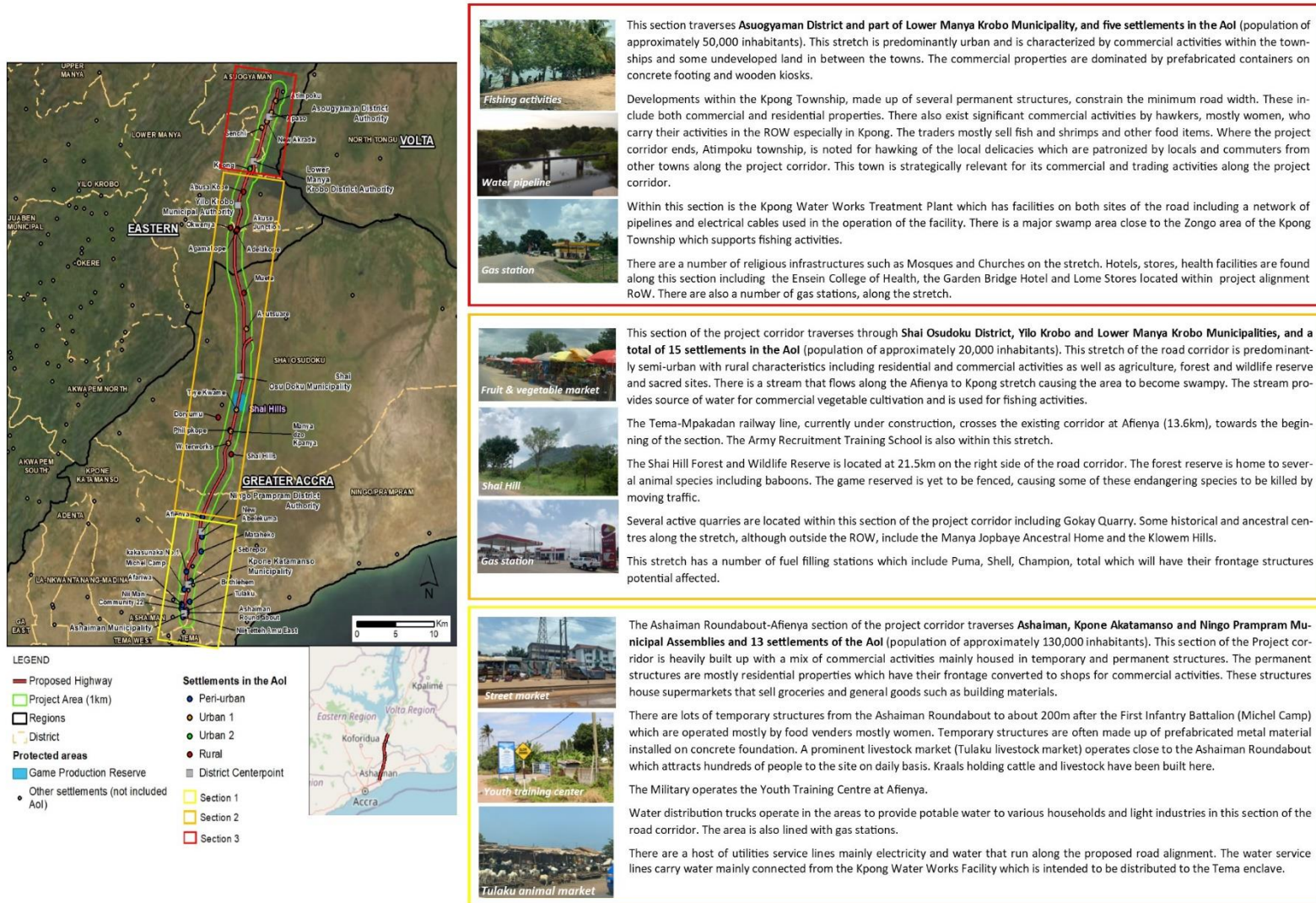
The Social Field Survey was carried out bearing in mind the division of the road into three sections according to the main features and characteristics in relation to the type of land use and urban or rural landscape. The three sections are:

- Section 1 (Km 0 – Km 14 - Ashaiman Roundabout to Afienya): This section of the Aol is located south of the road closer to Accra and is characterised by a highly urbanised landscape with good access to infrastructure and services due to the connection to Accra.
- Section 2 (Km 14 – Km 54 - Afienya to Kpong): This section of the Aol covers the middle portion of the road and has mostly semi-urban and rural characteristics, including agricultural activities.
- Section 3 (Km 54- Km 64 - Kpong to Atimpoku Junction): This section of the Aol runs through the northern part of the road and is characterised mostly by a semi-urban landscape with commercial flows.

Figure 6-21 below provides an overview of the main socioeconomic features along each section of the road.



Figure 6-21 Overview of the Aol



### 6.12.1.2 *Ethnicity and religion*

In Ghana, ethnicity is characterised by one's native, first language. The dominant ethnic group in Ghana is Akan, which is made-up of a number of smaller ethnic groups, each of which has its own language.

Ashaiman Municipality is the most diverse district in terms of ethnicities and religions with 6 ethnic groups, the majority of which are Ga-Dangme (25%), Ewe (23%), Akan (23%), and Dagbani (18%). Nzema (2%) and Wala (2%) are less predominant. In Kpone Katamanso Municipality, the main ethnic groups are Ga-Dangme, Akan and Ewe. Ningo Prampram Municipality and Shai Osudoku District are predominantly Ga-Dangme, while the majority group in Asuogyaman District is Ewe (approx. 40%). Yilo Krobo and Lower Manya Krobo Municipalities are predominantly Krobo (approx. 60%)

The dominant ethnic group in most of the Districts is the Ga-Dangmes, which represent 5% of the country's total population and are largely found in the Greater Accra Region. They speak the Gas-Adangme language. Asuogyaman District is the only exception, predominated by Ewe people who speak the Ewe language. This ethnic group represents 10% of the total Ghanaian population.

In terms of religion, Christians, Muslims, traditionalists and atheists are found in all of the districts. However all districts are predominantly Christian; except for, Ashaiman Municipality which counts more atheists than religious people, and shows a higher variety of religion. This could be explained by its Metropolitan status and the variety of ethnic groups residing there.

At the Aol level, settlements in Ashaiman district also include Ghanaians from the northern region as well as foreigners. Other ethnic minorities also present in the settlements of Ashaiman Municipality include the Dagomba, Frafra, Gonja, and Kussasiano. Generally, the most influential groups in a settlement are either the majority (usually Ga-Dangme or Ewe) or the indigenous groups and custodians of the land such as the Akans in New Akrade (Asuogyaman district) or the Krobos in Akuse (Lower Manya Krobo Municipality).

### 6.12.1.3 *Education attainment and literacy*

In 2018 the literacy rate of Ghanaians 15 – 24 years was 92.49% with an insignificant gender gap. For the 15 – 64 age bracket it was 79.04% with an approximately 10% gender gap and for the people over 65 the rate was 50.93%, with an approximately 25% gender gap.

Literacy rates for both sexes 11 years and older is 63% (71.8% for males and 55.5% for females), with high urban rural variations (74.5% in urban and 50.1% in rural areas).

According to the Education Sector Analysis 2018 Report, only 54% of men and 43% of women who graduated basic education had acquired literacy skills that will persist through adulthood, thus only individuals who have completed Secondary High School education are considered by default to be fully literate.

Among the districts crossed by the Project, Asuogyaman District has the highest literacy rate of 83% and Shai Osudoku District has the lowest (48.1%). All districts have a higher literacy rate in both English and Ghanaian than in any other language.

In 2010, the percentage of people three years and older who attended primary school was the lowest in Ashaiman and Kpone Katamanso. In all Districts, less than half of the population has attended primary school.

Enrolment in tertiary education is generally low in the Districts of the Aol (between 0.3% in Shai Osudoku and Asuogyaman to 0.6% in Ashaiman and Kpone Katamanso Municipalities), and largely inferior to the national average of 2.1%. Ashaiman Municipality, Kpone Katamanso Municipality and Ningo Prampram Municipality have the highest number of tertiary education graduates (3.7% and 4.5% and 4.5%) compared to 1.5% in Lower Manya Krobo Municipality.

#### 6.12.1.4 Livelihoods and Economy

The Gross Domestic Product (GDP) in Ghana was 66 billion US dollars in 2019, according to official data from the World Bank and projections from Trading Economics. The GDP value of Ghana represents 0.05% of the world economy. The agricultural sector remains a major driving force in the development of the Ghanaian economy, despite being overtaken by the services sector in recent times. The sector continues to provide employment for almost 50% of employed persons in Ghana.

However, the industrial sector, with average annual growth exceeding 10%, was a major driver of growth in the three years up to 2019.

The economy is expected to remain on a steady course of expansion in 2020. FocusEconomics panellists project the economy will expand 6.1% in 2020 and 5.6% in 2021. (*Note: these estimates were made prior to the Covid-19 Pandemic*)

Main economic activities in Ghana and also largest contributors to the GDP, include:

- Agriculture, which includes farming, fishing, and forestry;
- Industry, including mining, manufacturing, energy production and construction; and
- Services, covering government activities, communications, transportation, finance, and all other private economic activities that do not produce material goods

Greater Accra Region has the lowest poverty rate in the country, and poverty in the Region is concentrated in two Districts – Ningo Prampram (31.2%) and Shai Osudoku (55.1%). The distribution of inequality in the Region indicates that Shai Osudoku has the highest levels of inequality (40.1%), and is the only District with inequality above the Regional average of 37.6%.

The Eastern Region also presents high variations in poverty rates among Districts. The districts of Lower Many Krobo and Asuogyaman crossed by the Project show lower levels of poverty incidence.<sup>29</sup>

The main economic activities and livelihoods in the districts crossed by the road can also be characterized as follows within the three sections:


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<sup>29</sup> Ghana Statistical Service, 2015. Ghana Poverty Mapping Report. Available from:

<https://www2.statsghana.gov.gh/docfiles/publications/POVERTY%20MAP%20FOR%20GHANA-05102015.pdf>



**Table 6-20 Economic Activities by Section**

Section	District	Main Economic Activities	Pictures
<b>Section 1</b>	Ashaiman Kpone Katamanso Ningo Prampram	<ul style="list-style-type: none"> <li>■ Main economic activities include industry, agriculture (farming and animal husbandry) and commerce/services including petty trading, artisanal work and transport. Fishing is also practiced in the districts crossed by the road, but not in the Aol settlements along the road corridor.</li> <li>■ In the peri-urban settlements of Ashaiman district, the main economic activities providing jobs are commerce, the public sector (teacher, doctor/nurse, and government employee) and the private sector (engineers, bankers and consultants). In contrast small scale farmers in the district are losing their land to urbanization.</li> <li>■ In Kpone Katamanso district, mining of sand and gravel is also a main economic activity with some quarries located along the road corridor.</li> <li>■ In Ningo Prampram district, the housing industry and tourism are also primary activities.</li> </ul>	



Section	District	Main Economic Activities	Pictures
<p><b>Section 2</b></p>	<p>Shai Osudoku                       Yilo Krobo                       Lower Manya Krobo</p>	<ul style="list-style-type: none"> <li>■ The local economy is largely reliant on agriculture (farming and forestry), fishing and fisheries related activities and animal production. Some commercial activities are undertaken along the road (drivers, street vendors).</li> <li>■ In the settlements of Lower Manya Krobo district, the renting and leasing of properties is also a primary activity.</li> <li>■ In the settlements in the Municipality of Shai Osudoku, which ranks amongst the most impoverished districts in Ghana, 20% of the population lives underneath the poverty line.</li> </ul>	
<p><b>Section 3</b></p>	<p>Lower Manya Krobo                      Asuogyaman</p>	<ul style="list-style-type: none"> <li>■ The economic activities are mixed. Agriculture is a major economic activity in terms of employment and rural income generation for both districts, and is completed by commerce and services (drivers, hotels).</li> <li>■ In Asuogyaman, agriculture engages nearly 60% of the total working population in livestock farming, food cropping and cash cropping. The industry sector is also a main economic activity providing jobs.</li> <li>■ In Kpong, the settlement of Lower Manya Krobo, other main economic activities are fishing in the swamp and the renting and leasing of properties.</li> </ul>	

Source: ERM, 2020

### 6.12.1.5 *Public Safety and Security*

According to the Ghana Statistical Service (2019), communities reported to have often experienced force or violence from other groups of people or one group against the other in the past 3 years preceding the Ghana Livings Standards Survey. About 6 out of 10 communities (61.2%) of Ghanaians indicated that their communities had never experienced any force or violence by other groups of people or one group against the other, while 18.7% indicated that their communities have occasionally experienced force or violence (Ghana Statistical Service 2019). Most urban dwellers (62.2%) indicated that they never experienced any force or violence in their communities from other group of people or one group against the other, while 20.7% indicated that their communities occasionally experienced this. Similarly, about six out of every ten (59.7%) rural dwellers indicated that they never experienced any force or violence in their communities. However, 17.1% have experienced some force or violence in their communities once while 15.7 % have occasionally experienced it. Nevertheless, 7.5% have frequently experienced the use of force and violence in their communities or neighbourhood in the past three years preceding the survey.

The Greater Accra (89.8%), followed by the Upper West Region (82.7%) indicated they never experienced any force or violence in their communities with the Ashanti region having the lowest proportion of 37.3 percent. In the Western Region, 64.3% of the people indicated they had never experienced the use of force or violence in communities or neighbourhood in the past three years.

No breakdown of the safety level from crime and violence at home was available from the settlements in the Aol.

### 6.12.1.6 *Infrastructure and Utilities*

#### *Electricity supply*

The Power Distribution Services (PSD) is responsible for the distribution of power across southern Regions of Ghana. There have been frequent power shortages in Ghana, linked to increased demand and limited power infrastructure. Alternative sources of energy for power and lighting include diesel generators, and kerosene lamps. In fact, Ghana's businesses typically rely on diesel generators to prevent impacts from loss of grid energy supply. Charcoal, kerosene, gas and firewood are also used for cooking.

The communities along Section 1 of the road (Ashaiman, Kpone Katamanso, Ningo Prampram districts) and Section 3 (Asuogyaman) typically have a good connection rate (90% of the communities are connected to the grid) while the communities along Section 2 (Shai Osudoku and Lower Manya Krobo districts) have a lower connection rate closer to 30%. Communities connected to the grid may also experience frequent power outages.

There are a host of utilities service lines mainly electricity that run along the communities of Ashaiman district along Section 1 of the proposed road alignment. Along Section 2, some low high-tension wires managed by Ghana Grid Company (GRIDCO) are also observed along the road. Electricity pylons are also observed along the road alignment carrying power from the Akosombo Dam.

#### *Telecommunication*

There are fibre optic cables belonging to the telecommunication companies buried along the road. The six major service network companies in the country are Vodafone, MTN and Tigo, Airtel, Expresso and Glo. Network access is typically better in the communities along Sections 1 and 3 of the road while communities along Section 2 have poorer access.



## Road network and safety

The existing road is currently a single-lane route.

Ghana's roads are generally quite unsafe (2018: more than 1,600 road deaths with approx. 1.2 million registered vehicles). This is mainly due to overloaded or de facto unroadworthy vehicles and often leads to serious accidents, often involving personal injury (*Ghana Motor Traffic and Transport Department, 2019*).

In the communities located along the proposed road alignment, the majority of the road network is made of gravel roads, with a small percentage of tarred, bitumen, or asphalted road. The road network in Section 1 is generally of better quality with around 30% composed of tarred, bitumen, or asphalted roads, versus 70% of gravel roads. The gravel roads are generally in poor condition causing traffic congestion, high vehicle maintenance costs and accidents.

## Railway infrastructure

The Tema-Mpakadan railway line, currently under construction, crosses the existing corridor at Afienya (Section 2 of the road alignment). The firm executing the railway construction works, AFCON, has its office located also along the road alignment at KM 18.7.

## Irrigation and Water Supply

The Ghana Water Company Limited (GWCL) supplies potable water for domestic, industrial, institutional and commercial purposes within the Greater Accra Region. Additionally, the Community Water and Sanitation Agency (CWSA) provides boreholes to communities with lower populations.

Lack of access to safe sources of water or the irregularity of the water supply significantly raises the risk of outbreaks of disease, including cholera and typhoid and other water-borne diseases caused by pollution or salt-water intrusion.

There are two major lines of the Ghana Water Company Limited (GWCL) from the Kpong waterworks that run through the communities on the right side (west side) from Kpong to Tema, along the most part of the road alignment.

Most of the communities along the alignment depend to some extent on the Kpong water supply. In particular, the communities of Asuogyaman district (Section 3 of the road) reportedly depend largely on the Kpong water supply while the communities of Kpone Katamanso (Section 1) rely on both the Kpong dam and the Oyibi water system. Water supply lines from the Kpong Water Works Facility also run along Ashaiman communities (Section 1) for distribution to the Tema enclave south of the road. In addition, the communities of Shai Osudoku district (Section 2) rely on a mix of water sources, including dams, for irrigation.

The main concerns raised by the GHCL are as follows:

- Road construction has a high potential to damage the pipeline infrastructure, and any interruptions may be very significant to the consumers, especially the industrial users. A one-hour service interruption can take 24 hours to reconnect because the entire system has to be shut down and restarted;
- GWCL cannot afford to take the line off for more than a day. Where there will be a relocation of a pipeline, the contractor will have to undertake all the preparatory works so that the necessary connections can be made without much delay; and
- The areas closest to the water supply points have the highest pressures which could go up to 30 bars. This pressure could kill/injury workers (or public) close to the broken pipeline;

The Social Field Survey was conducted over a three week period between 20 July and 7 August 2020 by a team of 4 social specialists from PSS Urbana. A representative from INZAG participated to some of the activities namely meetings with national authorities and Community Representative Forums.

### **6.12.2 Summary of Significant Construction Impacts**

This section assesses the potential socioeconomic impacts associated with the Project in Ghana namely:

- Economy and Employment
  - Temporary direct and indirect employment opportunities (primarily unskilled)
  - Temporary economic impacts from taxes and fees, procurement and worker spending
  - Long-term benefits of capacity enhancement (on-the-job and formal training opportunities)
- Community Cohesion
  - Disturbance from the presence of workforce
  - Community Severance
  - Unmet expectations of benefits
- Infrastructures:
  - Disruption to infrastructures and utilities during construction
  - Temporary loss of water flow due to planned disruption to water pipeline during construction

Significant impacts and proposed mitigation measures in relation to socioeconomic impacts are summarised for the construction and operations in tables below.

**Table 6-21 Significant Construction Impacts for Local Economy and Employment**

CONSTRUCTION PHASE				
No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<p><b>Temporary direct and indirect employment opportunities (primarily unskilled)</b></p> <ul style="list-style-type: none"> <li>■ It is estimated that 967 personnel of INZAG (and its subcontractors) will be involved in the site construction works in peak times during the 30-months construction period. Of this figure, at least 95% will consist of local people and the remaining expatriate workers.</li> <li>■ Some of these workers and expats participated in the renovation of Lots 5 and 6 of the ECR, and therefore acquired valuable experience regarding project specificities.</li> <li>■ Typical construction activities will include site clearance works, excavation and movement of soil, embankment construction, construction of the various elements of the road (main road, access roads, viaducts, bridges, tunnels, culverts etc.) and their associated sub-elements (e.g. sub-base, road surface, pavements, concrete and steel works, retaining walls, drainage infrastructure and features etc.), soft and hard landscaping features, and finish works (lighting, signs, road markings, etc.).</li> <li>■ It is assumed that workers will be housed in accommodation camps which will be constructed by INZAG in the following locations: KM 17+290 (Shai Hills) and at KM 47+175 (Kpong). Thus, worker spending is not foreseen to be significant on the basis that services such as accommodation camps, including dining facilities (e.g., a mess hall and kitchen), medical facilities, a laundry, recreation facilities, etc. are provided.</li> </ul>	<p><b>Positive</b>                  impact on the creation of employment opportunities for local people</p>	<ul style="list-style-type: none"> <li>■ A Recruitment and Employment Plan will be developed by INZAG which will define the process to be followed for the recruitment, training and development of local personnel, concretely:                         <ul style="list-style-type: none"> <li>- INZAG will work with local authorities and employment organisations to ensure that all positions are advertised in a manner that is accessible to the communities in the Aol; and</li> <li>- INZAG will ensure that the recruitment process is fair and transparent, public and open to all regardless of ethnicity, religion or gender;</li> <li>- INZAG will develop specific measures to facilitate access to employment of women and youth.</li> </ul> </li> <li>■ A Stakeholder Engagement Plan will be implemented to outline how INZAG will ensure regular, open and transparent communication with all stakeholders, concretely:                         <ul style="list-style-type: none"> <li>- To provide clear information on the number and limited timescales of employment opportunities.</li> <li>- To ensure information on the employment and the procurement strategies is disclosed at all settlements within the Aol.</li> <li>- To plan an engagement with stakeholders through early, inclusive dialogue to build a shared understanding of the potential positive and negative impacts of workers influx, and the associated risks and opportunities.</li> </ul> </li> </ul>	<p>This impact will remain <b>positive</b></p>

CONSTRUCTION PHASE

No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<ul style="list-style-type: none"> <li>■ In addition to direct employment, the Project will result in the indirect employment of workers through procurement of select local goods and services.</li> </ul>		<ul style="list-style-type: none"> <li>- Continuing to engage local people in the employment opportunities and work with suppliers to enable capacity building, procurement, employment and contracting opportunities at a settlement-level, as part of maximizing the positive benefits.</li> <li>■ Community Grievance Management Procedure will be implemented to ensure that individuals who have concerns or complaints about the Project or wish to report their potential expectations or concerns related to local economy and employment can communicate directly with the Project.</li> </ul>	
	<p><b>Temporary economic impacts from taxes and fees, procurement and worker spending</b></p> <ul style="list-style-type: none"> <li>■ In general, construction and operation activities associated with the Project will likely generate economic benefits from the purchase of goods and services during construction and even in the operational phase, which will generate benefits at national, regional and where possible, local level.</li> <li>■ Significant quantities of various types of construction materials will be needed such as concrete, prefabricated segments, aggregates, asphalt, together with construction plant, vehicles and machinery. In accordance with international good practice, environmental and social implications need to be considered in the selection, sourcing and transport of materials from quarries and borrow pits will be assessed</li> </ul>	<p><b>Positive</b>                  impact on in-country and local profit generation from taxes/fees, procurement and worker spending</p>	<ul style="list-style-type: none"> <li>■ Local Content and Procurement Plan will be developed to inform the Project's in-country value planning, specifically, with respect to the employment potential for multiple positions and the local provisioning potential through local suppliers from the area, concretely:                         <ul style="list-style-type: none"> <li>- As part of the tendering process, INZAG's contractors will be required to develop a purchasing strategy that stipulates how national and local purchase of goods will be optimised. The purchasing strategy will be required to adhere to all INZAG HSE policies and procedures. Agreed measures will be monitored and reported on;</li> <li>- INZAG will implement a phased capacity building programme (sector by sector) that will enable local companies to achieve qualifications and potentially certification with the relevant standards and requirements well in advance of the tendering process;</li> <li>- INZAG will engage with local government, and other organisations to determine opportunities for targeted training;</li> </ul> </li> </ul>	<p>This impact will remain <b>positive</b></p>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<p>in the ESIA. The main principle is to source the materials locally where possible and feasible.</p> <ul style="list-style-type: none"> <li>For those companies that meet the eligibility criteria and enter the supply chain, there will be short-term benefits to the businesses and their employees through increased experience, capacity and training opportunities. During operations, it is expected that the new south-north transport axis of the ECR will significantly increase trade between the countries (especially food and perishable goods), which will have a significant employment effect in the region in the short to medium term.</li> </ul>		<ul style="list-style-type: none"> <li>Any selected potential suppliers will have to meet health, safety and quality standards;</li> <li>Following selection of primary contractors, INZAG will carry out training of contractors on the Project HSE and socioeconomic and health policies prior to the start of construction;</li> </ul>	
	<p><b>Long-term benefits of capacity enhancement (on-the-job and formal training opportunities)</b></p> <ul style="list-style-type: none"> <li>Those who are able to secure employment on the Project during construction will likely have the opportunity to improve their skills, gain experience and thereby improve their opportunities for future employment within the construction and other sectors.</li> <li>In addition to on-the-job experience at the level of individual workers, the Project will also represent an opportunity for Ghanaian companies to tender for work on different project-related components and basic services (e.g. food supply, maintenance...), which will</li> </ul>	<p><b>Positive impact on capacity enhancement of local, regional or national individuals and businesses</b></p>	<ul style="list-style-type: none"> <li>A Social Investment Plan will be developed by the Project in consultation with local communities, with active engagement required to determine the location and nature of investments. All stakeholders will be kept informed on the progress of investment activities and opportunities.</li> <li>A Local Content Strategy will be developed, including the following:                             <ul style="list-style-type: none"> <li>INZAG will enhance national supplier capacity through a comprehensive demand and supply analysis; phased capacity building program; targeted training agreed with local government and other organisations.</li> <li>INZAG will carry out training of contractors on Project Health and Safety Requirements (aligned with internal INZAG HSE Management Plan) and socioeconomic policies prior to the start of construction activities and during operations when needed</li> </ul> </li> </ul>	<p>This impact will remain <b>positive</b></p>



**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	result in a capacity enhancement and reputational benefits from working on a major international project to the highest safety and performance standards.			

**Table 6-22 Significant Construction Impacts for Community Cohesion**

CONSTRUCTION PHASE				
No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<p><b>Disturbance from the presence of workforce</b></p> <ul style="list-style-type: none"> <li>■ Non-local workers, both Ghanaian and third party nationals (only about 5% of total) will be brought into the vicinity of Project activities through a managed process of recruitment and transportation. The Project has devised management measures to ensure that the percentage of local workers from the districts through which the project passes is maximised,</li> <li>■ Non-local workers will be housed in two self-contained camps and will be subject to a code of conduct with regard to their behaviour and conduct towards local people (refer to Section.</li> <li>■ In addition to the directly hired Project labour, it is also possible that people could move towards the proposed Project sites in the hope of finding work directly with the Project, or to gain benefit from the indirect economic opportunities that the Project may bring, such as selling goods or services to the Project or its workforce. A high degree of influx could result in other effects such as inflation, socioeconomic tensions, and changes to behavioural norms</li> <li>■ Infrastructure Projects often raise tensions within communities (intra-community tension) or between communities (inter-community tension).</li> </ul>	<p><b>Moderate</b> on the potential disturbances regarding inter-community and intra-community tensions</p>	<ul style="list-style-type: none"> <li>■ Stakeholder Engagement Plan (SEP) stating:                             <ul style="list-style-type: none"> <li>- Communication will be based on the principle of transparency and clarity, clearly explaining the selection process and criteria.</li> <li>- Ongoing dialogue between the Project, through its Community Representatives (CR) and local communities to assist in information sharing with regard to employment practices and the use of non-local staff. Local communities to be provided information on the number of non-locals to be brought to the area, their housing arrangements and the measures that the Project is putting in place to ensure that all workers abide by local customary practices. Information will also be shared on the number of local unskilled and semi-skilled positions available to local residents, along with the recruitment methods used to identify potential candidates.</li> <li>- Relevant Project information in particular those related to environmental and socioeconomic impacts, employment and project benefits will be disclosed at the local level in a manner that is accessible, understandable and culturally appropriate for those affected. This will be facilitated by the Community Representatives(CR) employed for the duration of construction activities. The CLO</li> </ul> </li> </ul>	<p><b>Minor</b></p>

CONSTRUCTION PHASE

No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
			<p>will proactively and regularly engage with local stakeholders prior to commencement of construction activities, providing updates and answering their queries. The CLO will be present on the ground during the whole construction process and available to the affected communities. The aim of this is to ensure that all working practices are transparent and any issues between local residents and non-local workers are communicated and dealt with early on.</p> <ul style="list-style-type: none"> <li>■ Grievance Mechanism: A Project grievance mechanism will be developed and implemented, and information about this mechanism will be shared amongst local communities. The Contractor will also be responsible for managing a grievance mechanism that allows communities and employees to raise complaints. This will be a key monitoring and reporting requirement of the Project. The grievance mechanism will be implemented prior to commencement of the construction phase, with all relevant staff fully cognizant of their roles in the grievance resolution process so that quick and effective response is provided to the concerns raised by local stakeholders. Additional resources may be required to resolve concerns within a set timeframe.</li> <li>■ A Social Investment Plan will be developed by the Project in consultation with local communities, with active engagement required to determine the location and nature of investments. All stakeholders will be kept informed on the progress of investment activities and opportunities.</li> </ul>	

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<p><b>Community Severance</b></p> <ul style="list-style-type: none"> <li>■ Severance issues, such as households no longer having direct access to some of their land, schools, shops, other neighbourhoods etc, due to physical barrier posed by the rehabilitation project is one of the main detrimental effects to social fabrics of the communities in the Aol.</li> <li>■ The harmful effects of community severance are not limited to a restriction of movement, but also to psychological consequences on individuals which, experienced collectively, permeate the entire social fabric of each community.</li> </ul>	<p><b>Moderate to Major (on sections where highway will be 2x3 and 2x2 lines) on the physical, pshycological and social impacts regarding community severance</b></p>	<ul style="list-style-type: none"> <li>■ Severance Management Plan with a detailed assessment and measures to mitigate community severance in each of the settlement locations</li> <li>■ A Social Investment Plan will be developed by the Project in consultation with local communities, with active engagement required to determine the location and nature of investments. All stakeholders will be kept informed on the progress of investment activities and opportunities.</li> </ul>	<p><b>Minor</b></p>
	<p><b>Unmet expectations of benefits</b></p> <ul style="list-style-type: none"> <li>■ There is a high degree of expectation that the proposed Project will bring local and municipal/district level benefits. The main expectation for benefits is access to employment opportunities, compensation packages and economic and livelihood benefits thanks to the improvements to the road infrastructure. Due to the extent of these expectations, there is potential for unmet expectations especially if workers from other parts of Ghana are on site.</li> <li>■ There is a risk for some communities to have perceptions of unfair or inequitable</li> </ul>	<p><b>Moderate on potential</b></p>	<ul style="list-style-type: none"> <li>■ Communities will be engaged in the preparation of the Social Investment Plan activities to be taken forward in the vicinity of their communities. They will then be kept informed on the progress of such activities and opportunities for their involvement will be maximised.</li> <li>■ INZAG will release quarterly project update leaflets from six months prior to construction to the end of the construction phase. These information releases will emphasise the limited nature of employment and the recruitment processes and the progress of the Social Investment Plan.</li> </ul>	<p><b>Minor</b></p>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<p>compensation arrangements for land and the belief that those people who are being resettled are receiving additional benefits resulting in the perception that there are 'winners and losers' or that some people are missing out. This fear is exacerbated as many people do not have title deeds to the land/businesses they utilise and are concerned that they will not be eligible for compensation.</p>			



**Table 6-23 Significant Construction Impacts for Infrastructure and Utilities**

CONSTRUCTION PHASE				
No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<ul style="list-style-type: none"> <li>▪ <b>Disruption to infrastructure and utilities during construction</b></li> <li>■ Potential impacts on utilities and infrastructure during road construction will stem from construction activities including site clearance works, excavation and movement of soil, embankment construction, and construction of the various elements of the road.</li> <li>■ The main potential impacts on local infrastructure and utilities as a result of these project activities are disruption to traffic and transportation due to road crossings, pressure on existing local utility supplies and short-term planned and unplanned disruption to electricity, telecommunication, and water supply for irrigation, domestic, drinking and industrial purposes. Disruption to water supply are assessed separately in the next section.</li> <li>■ Disruption to infrastructure and utilities could result in impacts to livelihood or quality of life and if unmanaged could result in health impacts (e.g. water restrictions, inability to pass roads in an emergency etc.). Also, with respect to road and traffic disruption specifically, INZAG plans to use the existing N2 road and other adjacent access roads, which might result in increased traffic disruption, temporary increases in traffic flows, potential for delays and congestion, conflicts between Project employees and public road users, access restrictions, short-term closures/diversions of existing transport routes (eg roads,</li> </ul>	<p><b>Moderate</b> impact on local communities' from disruption to road networks and access to other infrastructure and utilities</p>	<ul style="list-style-type: none"> <li>■ INZAG will develop a Public Utilities Enhancement Plan in which infrastructure relocated by the Project (electric and telecommunication lines, water supply and irrigation pipes, etc.) will be developed in a way that allows neighbouring communities to benefit from them after construction is over. Special attention will be paid to the settlements located in semi-urban and rural areas with poor access to infrastructure and services such as those along Section 2 of the road in Shai Osudoku and Yilo Krobo, and Lower Manya Krobo districts in particular. The Public Utilities Enhancement Plan will be developed in close coordination with local utilities companies, authorities at the regional and local level and communities to ensure the appropriateness of the relocation and improvements.</li> <li>■ To preserve the articulation with the existing road network and minimize disturbances in this national road, imbedded mitigation measures as part of the design include the establishment of two roundabouts, one interchange, and six at-grade intersections located at the major junctions providing left-turn lane, to prevent accidents and minimize interfering with the existing N2 road capacity.</li> <li>■ Where roads are closed, local solutions (including diversions if necessary) to be put in place.</li> <li>■ INZAG shall develop a Traffic Management Plan which will include a wide range of measures such as stakeholder engagement before temporary closure and diversion off the roads, appropriate signage, requirements in case a new access road needs to be built, etc.</li> <li>■ Engagement with local authorities and utilities companies to ensure continuity of supply to communities. Only short term 'planned' disruption to drinking water or electricity services will be allowed.</li> <li>■ The Project will work with local utilities companies to ensure coordinated and rapid response to unplanned events such as damage to electric lines and water pipes.</li> </ul>	<p><b>Minor</b></p>

CONSTRUCTION PHASE

No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<p>paths, railways) where routes crossed, traffic accidents and dust and noise nuisance.</p> <p>It is therefore envisaged that, if unmanaged, disruption to services might result in community distrust and resentment towards the Project, especially in those areas where access to infrastructure and utilities is already deficient such as in the communities along Section 2 of the road primarily.</p> <ul style="list-style-type: none"> <li>It is also expected that local communities will benefit from infrastructure improvements made during construction as part of the Public Utilities Enhancement Plan, resulting in improved access to electricity, telecommunication and water (see next section).</li> </ul>		<ul style="list-style-type: none"> <li>CLOs will be present at work fronts to ensure that impacts from planned disruptions are minimised and that unplanned disruptions are properly managed.</li> <li>Grievance mechanism with rapid response time and access to a compensation process should unplanned disruption result in loss of livelihoods that could not otherwise be avoided</li> <li></li> </ul>	
	<p><b>Temporary loss of water flow due to planned disruption to water pipeline during construction</b></p> <ul style="list-style-type: none"> <li>Displacement and relocation of existing irrigation and water supply infrastructures and services is expected during the construction phase. Specifically, there are two major lines of the Ghana Water Company Limited (GWCL) from the Kpong waterworks that run through the communities on the right side (west side) from Kpong to Tema, for the most part of the road alignment.</li> <li>Potential impacts on irrigation and water supply systems will be caused mainly by the crossing of such infrastructures due to construction activities including site clearance works, excavation and movement of soil, embankment construction, and construction of the various elements of the road. These construction activities could potentially cause temporary loss of flow in both irrigation and water supply systems as a result of planned disruption or accidental damage to the irrigation and water supply pipelines. Communities reliant on irrigation for their livelihood such as those along Section 2 of the road in Shai Osudoku and Lower Manya Krobo districts might experience</li> </ul>	<p><b>Moderate</b>                      impact on local communities' access to domestic and drinking water and on communities livelihoods in rural areas due to increased interruptions to water supply for domestic,</p>	<ul style="list-style-type: none"> <li>Displacement of water and irrigation infrastructure will be minimised during detailed design. This will involve identification of water and irrigation infrastructure and adjustments to the proposed road alignment to avoid loss where possible.</li> <li>A detailed pre-construction survey will be signed off by landowners and conducted to identify infrastructure at risk.</li> <li>INZAG will develop a Public Utilities Enhancement Plan in which infrastructure relocated by the Project, including water supply and irrigation pipes, will be developed in a way that allows neighbouring communities to benefit from them after construction is over.</li> <li>Crossing of irrigation pipes and channels will be planned in cooperation with local communities and if feasible these will be planned during a time that irrigation is not required.</li> <li>Where irrigation in existing irrigation pipes or channels is required by land users, irrigation water flow will be maintained through appropriate non-invasive construction techniques such as trenchless methods whenever possible.</li> </ul>	<p><b>Minor</b></p>

CONSTRUCTION PHASE

No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<p>temporary disruption to water supply for agricultural purposes and thus impacts on their livelihood. Impacts to livelihoods from project activities are discussed in detail in Section 6.12.</p> <ul style="list-style-type: none"> <li>■ In the case of water supply pipes throughout the road alignment, disruption or loss of flow might result in reduced access to water for domestic and drinking purposes adding to the existing water supply irregularity and shortages and further increasing the risk of outbreak of water-borne diseases. Community health impacts are described in more detail in Section 6.15. This is especially the case in the communities along Section 2 of the road where access to infrastructure is generally poorer. What is more, according to the GHCL, an hour service interruption can take up to 24 hours for the service to reconnect due to technical challenges. Service interruptions will also affect industrial and institutional users.</li> </ul>	<p>drinking, and irrigation</p>	<ul style="list-style-type: none"> <li>■ Irrigation and water supply infrastructure will be reinstated to at least pre-construction status.</li> <li>■ The post construction status survey will be signed off by land owners and will ensure that all affected infrastructure has been properly reinstated.</li> <li>■ The Project will implement a grievance procedure, which will specify required response times.</li> <li>■ Access to compensation for businesses and households in the event of temporary loss of water flow as a result of project activities.</li> </ul>	

### 6.12.3 Summary of Significant Operation Impacts

**Table 6-24 Significant Operation Impacts for Local Economy and Employment**

OPERATION PHASE				
No	Impact Description	Impact Assessment	Enhancement Measures	Residual Impacts
	<p>Temporary direct and indirect employment opportunities (primarily unskilled)</p> <ul style="list-style-type: none"> <li>■ During operations phase the workforce will be under the responsibility of Ghana Highway Authority (GHA).</li> <li>■ Employees will be required for the operation of the toll collection and maintenance of the road, and as environmental health and safety staff such as the Emergency Response Team (ERT).</li> </ul>	<p><b>Positive</b> impact on the creation of employment opportunities for local people</p>	<ul style="list-style-type: none"> <li>■ INZAG will enhance national supplier capacity through a comprehensive demand and supply side analysis; phased capacity building program; targeted training agreed with local government, industry and other organisations.</li> <li>■ A Recruitment and Employment Plan will be developed ensuring that the recruitment process is fair and transparent, public and open to all regardless of ethnicity, religion or gender;</li> <li>■ A Stakeholder Engagement Plan will be implemented to outline how INZAG will ensure regular, open and transparent communication with all stakeholders, concretely:                         <ul style="list-style-type: none"> <li>- To provide clear information on the number and limited timescales of employment opportunities.</li> <li>- To advertise all openings in ways that are accessible to local communities</li> </ul> </li> <li>■ Community Grievance Management Procedure will be implemented to ensure that individuals who have concerns or complaints about the Project or wish to report their potential expectations or concerns related to local economy and employment can communicate directly with the Project.</li> </ul>	<p>This impact will remain <b>positive</b></p>

**Table 6-25 Significant Operation Impacts for Infrastructure and Utilities**

**OPERATION PHASE**

<b>No</b>	<b>Impact Description</b>	<b>Impact Assessment</b>	<b>Enhancement Measures</b>	<b>Residual Impacts</b>
	Benefits from improvements to infrastructure and services including road improvements	<b>Positive</b> impact on local communities from infrastructure improvements (road network, electricity and water supply, etc.)	<ul style="list-style-type: none"> <li>■ GHA will develop and deliver an Infrastructure Improvement Plan that ensures that infrastructure improvements (access roads, electric and water supplies, telecommunication, etc.) contribute to the physical and economic development of local communities in the study area.</li> </ul>	<b>Positive</b>

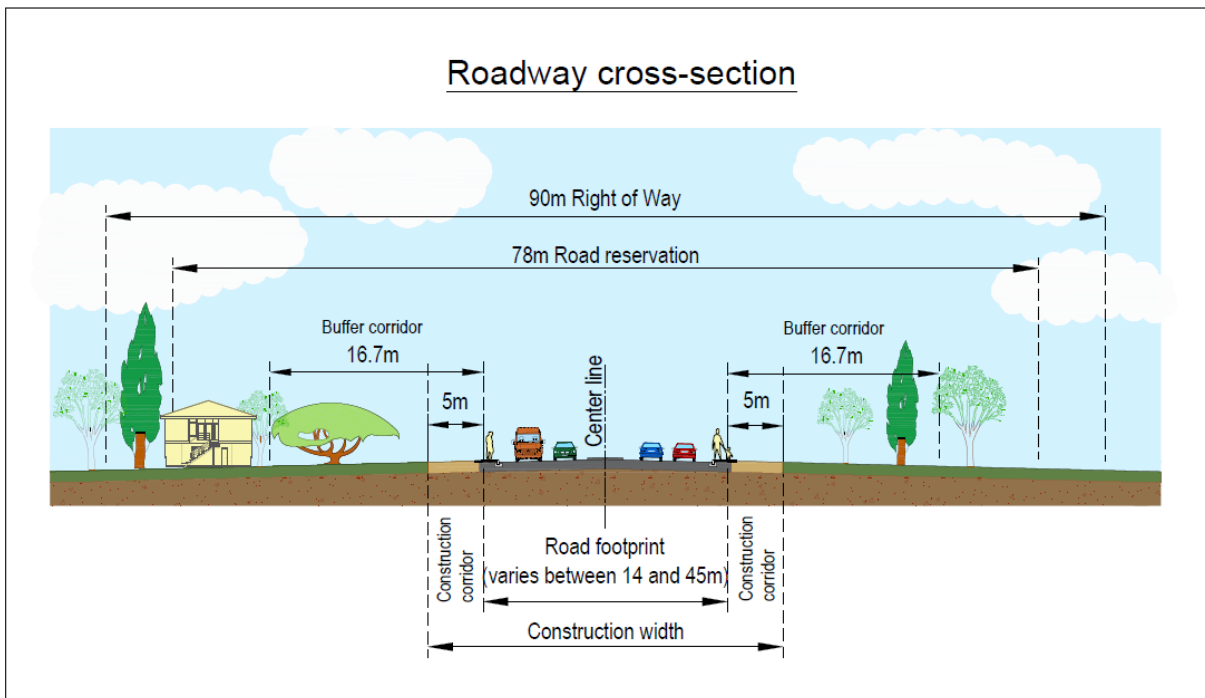


### 6.13 Displacement of Existing Land, Use, Property and People

This section addresses the likely physical and economic displacement impacts caused by acquisition of land inside the 90 m Right of Way (RoW), including classifying the types and extent of displacement and livelihood impacts based on the limited data collection that has been undertaken to date in a corridor of 100 m along the road alignment (see *Section 2.4*).

As described in Section 2.4, the Project will be developed within the 90 m RoW corridor of the existing N2 route of which GHA owns title to all land. A number of corridors are established within these 90 m that will have different restrictions with regard to land-use and access during construction and operation of the Project. To avoid, minimize and reduce environmental and social impacts, INZAG may reach specific agreements with Ghana Highway Authority (GHA) to modify the below listed restrictions. (These negotiations are as yet to be arranged and will commence after signing of the contract between INZAG and GHA – assumed in September 2020).

- The footprint of the road (i.e. the pavement layers of the road itself, sidewalk, embankments and drainages) will require permanent land restrictions during construction as well as operation.
- A corridor of 5 m along the road footprint will be used for construction purposes and with the footprint of the road constitutes the construction width. The 5 m used for construction will be rehabilitated. No permanent activities and structures are allowed in the entire construction corridor post construction however permits may be acquired for temporary activities.
- It is anticipated that all activities will take place within the 78 m Road Reservation.
- Restrictions in the remaining area between the construction corridor and the 90 m RoW are yet to be defined between INZAG and GHA. It is currently assumed, that structures will remain and activities will be continued throughout construction and operation of the Project.



**Figure 6-22 Various Corridors within the 90 m RoW**

To assess the Project's displacement impacts, it is necessary to clearly define the type of restrictions within each corridor displayed above in Figure 6-22. Table 6-26 below presents a summary of the restrictions to physical structures, access and activities along the RoW during construction and operation of the Project. More details are outlined in Section 2.4.

**Table 6-26 Summary of Restrictions to Physical Structures along the RoW during Construction and Operation**

Component	Construction Restrictions	Operation Restrictions
<b>90 m Right of Way – subdivided in two main Corridors</b>		
<b>A. Construction Width (between 24 m and 55 m)</b>		
<b>Road footprint</b> - Between 14 – 45 m width- depends on number of lanes	<ul style="list-style-type: none"> <li>■ Permanent removal of all houses and structures. No new houses and structures.</li> <li>■ Land clearance and removal of all trees, crops and vegetation. No new trees or crops.</li> <li>■ No entry for pedestrians in areas under construction.</li> <li>■ Low speed limits for vehicles crossing sections</li> </ul>	<ul style="list-style-type: none"> <li>■ Paved area: no new houses/structures, crops and trees allowed.</li> </ul>
<b>Construction Corridor</b> - 5 m Construction Corridor on either side of the road footprint	<ul style="list-style-type: none"> <li>■ Removal of all houses and structures.</li> <li>■ Land clearance and removal of all trees, crops and vegetation.</li> <li>■ No entry for pedestrians in areas under construction.</li> <li>■ No business activities.</li> <li>■ Low speed limits for vehicles crossing sections</li> </ul>	<ul style="list-style-type: none"> <li>■ No construction of new houses or permanent structures allowed.</li> <li>■ No permanent crops/plantation allowed.</li> <li>■ No permanent activities.</li> <li>■ Permits for temporary activities may be obtained (e.g. commercial activities, street vendors).</li> <li>■ Vegetation will be planted to possibly use the corridor as recreational space.</li> </ul>
<b>B. Remaining area up to the 90 m RoW</b>		
(Between 17,5m 33 m either side of the construction corridor (depending on number of lanes)	<ul style="list-style-type: none"> <li>■ Houses and structures allowed as long as these are outside the Construction Width.</li> </ul>	<ul style="list-style-type: none"> <li>■ None</li> </ul>

The Ghana Highway Authority (GHA), the Project owner, has confirmed that it already owns title to all the land within the 90 m RoW within which the ECR will be developed. The land was acquired in the 1990s and since then significant encroachment has occurred<sup>30</sup>. Therefore, even though the Project-related widening, construction and rehabilitation of the road will fall entirely within the titled corridor, significant economic and physical displacement impacts are expected.

In line with the requirements of the Resettlement Policy Framework for Road Sector Operations<sup>31</sup> prepared by the Ghana Highway Authority (GHA) as well as applicable international standards, a Resettlement Framework<sup>32</sup> is being prepared for the Project. This Framework will ultimately be

<sup>30</sup> Regardless of formality of land title, the Project recognizes all affected people in line with the applicable Ghanaian Resettlement Policy Framework for Road Sector Operations as well as the requirements of IFC PS 5.

<sup>31</sup> Ministry of Roads and Highways, 2017.

<sup>32</sup> The Resettlement Framework Report: Easter Corridor Road – Lot 1: Ashaiman Roundabout to Akosombo Junction Project (hereinafter referred as the Resettlement Framework).

supplemented by a formal Resettlement Action Plan (RAP) or multiple smaller RAPs. The Resettlement Framework will outline the Project's commitment to mitigate adverse socioeconomic impacts from land acquisition or restrictions on affected persons' use of or access to land. The Resettlement Framework will provide the foundation for the resettlement process including an entitlement matrix that will ensure adequate compensation, resettlement and livelihood restoration options are provided to project affected people.

The assessment impacts described in this section will be further refined as part of the Resettlement Framework finalisation process and will be further quantified through the asset survey inventory and household survey, which will be undertaken as part of preparation of the Resettlement Action Plan (RAP). At the time of this MDR report as well as the ESIA and Resettlement Framework, the final design plans for the ECR were not finalized yet and no detailed land requirements were yet defined. At this stage it is therefore not possible to determine the exact number of land plots (agricultural, residential, or other), structures and households that will be affected. However, based on desktop assessments and ground-truthing to date an estimated 3,770 structures and a total of 595 ha of land (agricultural, residential, commercial, etc.) have been identified within the RoW of which 1,196 will have to be removed to establish the construction width (over 300 could be residential structures). Households whose non-land assets will be affected by the Project will be entitled to compensation for the loss of these assets but not for the land itself since GHA already owns title to all land within the 90 m RoW.

This section describes the following:

- Key baseline findings with regard to displacement impacts (i.e. information on population and settlements, information on land-use including economic activities and structures, summary of findings from stakeholder meetings);
- Summary of significant construction impacts with regard to displacement (including impacts to physical resources such as loss of assets, housing and non-residential structures; impacts to natural resources, loss of access to livelihood resources such as agricultural plots, grazing and foraging land, crops and trees, and forested areas; and impacts to social resources including loss of access to social infrastructure and socio-cultural impacts); and
- Summary of significant operational impacts with regard to displacement.

## 6.13.1 Summary of Baseline Findings

### 6.13.1.1 Population and General Characteristics of Settlements in the Aol

A total of 33 settlements have been identified in the Ara of Influence (Aol), of which 24 are considered main settlements (within 100 m of the road centreline, the primary Aol) and 9 are sub-areas or neighbourhoods of these main settlements. Settlements are typically located around the existing road. Given the Project activities, widening of the road and restricted crossing options, settlements will become more divided by the road (for details, see Section 6.13.2 and Figure 6-26 to Figure 6-30). While population data is incomplete, the population in these settlements range from around 1,000 inhabitants to 48,000 inhabitants. Within the immediate vicinity of the planned road alignment (i.e. within the 90 m RoW), population density varies from high density in urban areas and large communities to low density in rural areas that have smaller settlements.

As presented in Figure 6-23, Lot 1 can be separated in three sections:

- Section 1 concludes the first 14 km between Ashaiman Roundabout to Afiénya. This section is characterised as a heavily built up **urbanised area** with **densely populated, large communities**. Given its proximity to the greater Accra region, the section includes prominent commercial buildings and activities in permanent as well as temporary structures.
- Section 2, between Afiénya and Kpong (between 14 km – 54 km), is predominantly **semi-urban and rural** and is therefore **less densely populated** compared to Section 1. This area is

characterized by residential and commercial activities as well as agriculture, forest and wildlife reserves.

- Section 3 between Kpong and Atimpoku Junction (between 54 km – 64 km), is again, similar to Section 1, **densely populated** and can be characterized as **urban commercial area**.

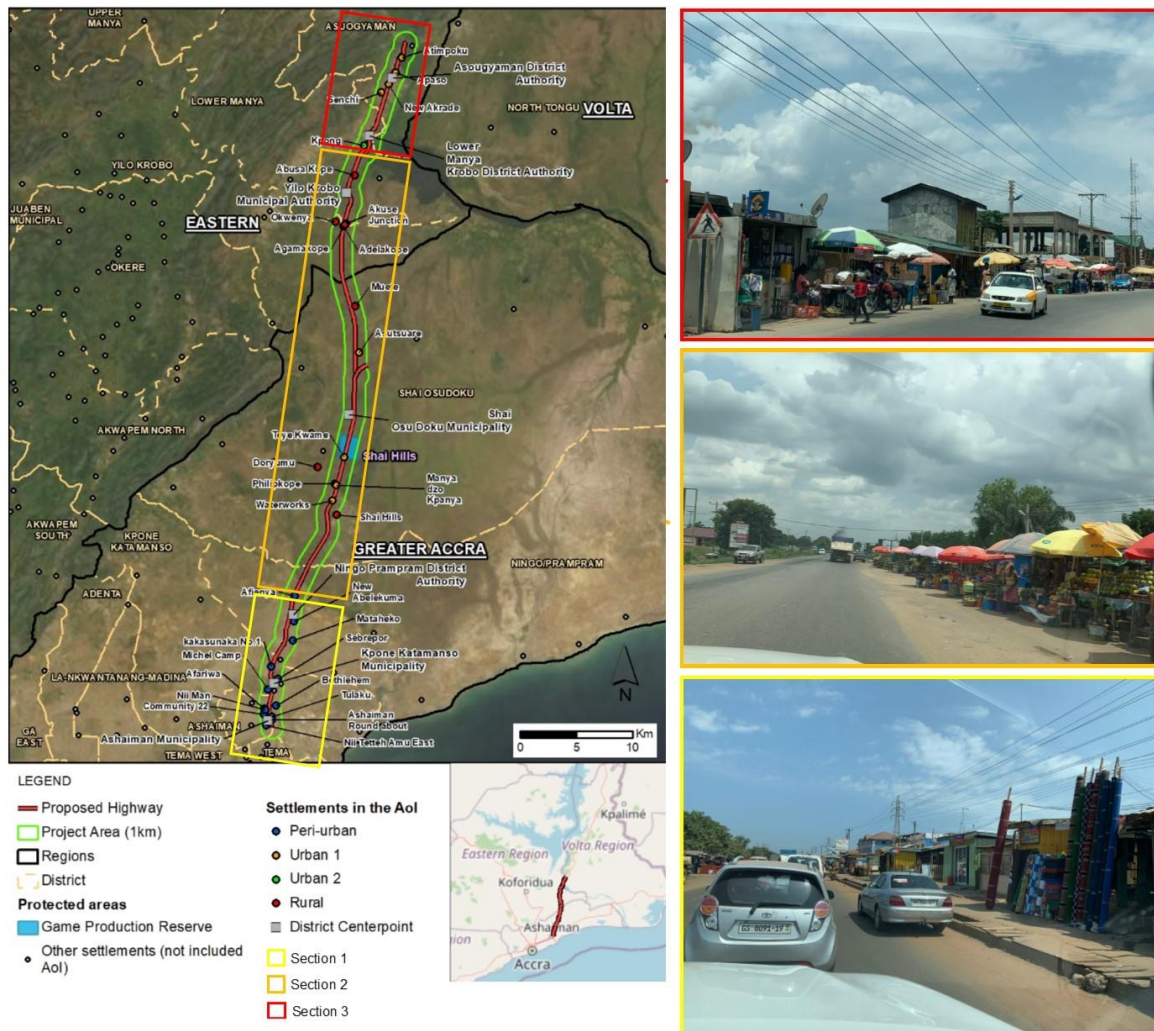


Figure 6-23 Division of Lot 1 in three Sections and Examples of Settlements

### 6.13.1.2 Land Use

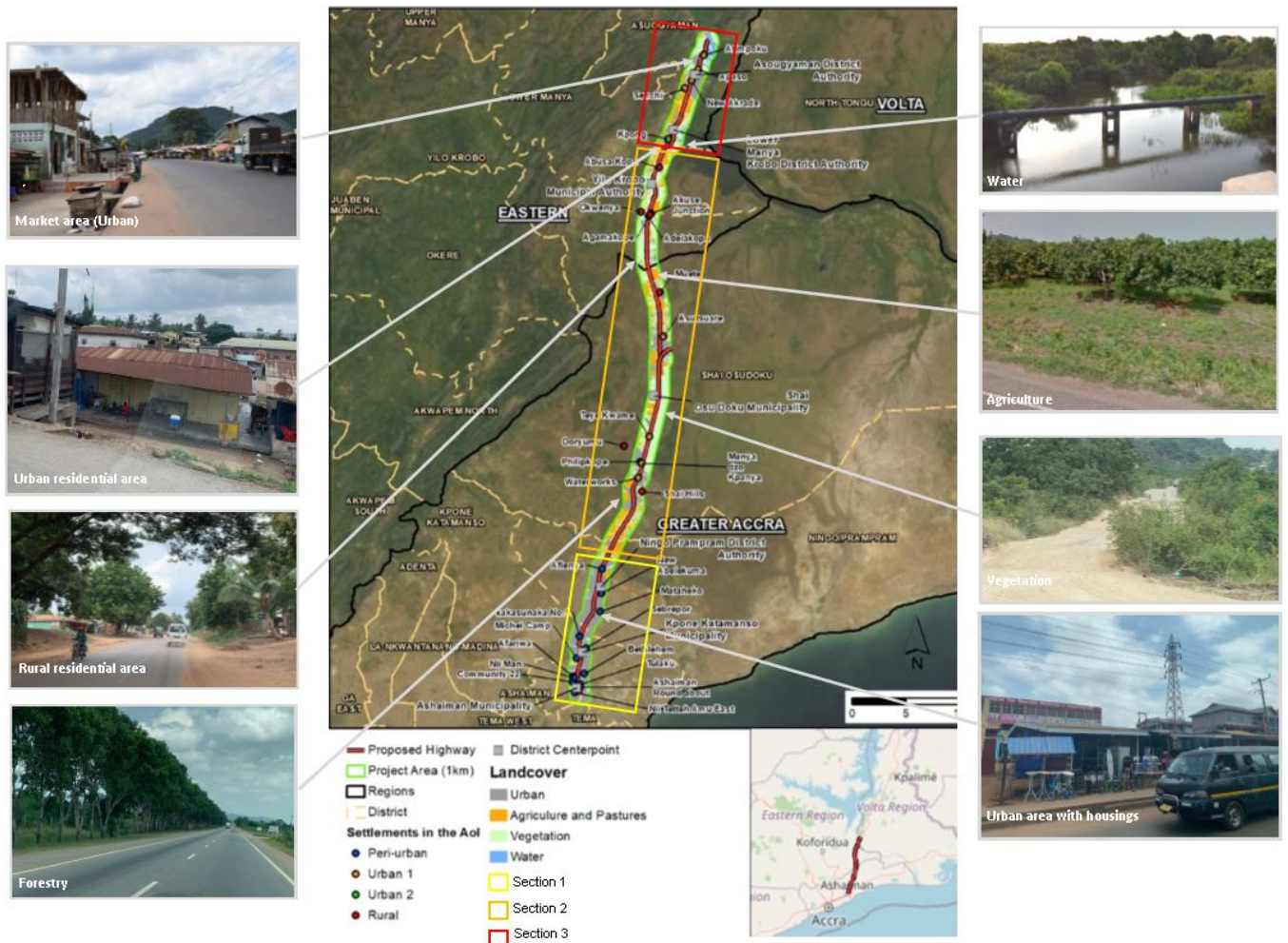
The pattern of land-use within the Aol (1 km corridor along the road alignment) is influenced by the road and vehicle traffic. The major land cover as a result of human activities along the proposed road corridor are displayed in Figure 6-24 below and include urban, agriculture and pastures, vegetation and water bodies.

Population density patterns, land-use and characteristics vary from section to section:

- Land use in Section 1, being characterised as a heavily built up urbanised area with a high population density, is mainly classified as **urban landcover** (marked in grey) including predominantly residential, commercial and industrial use.
- Section 2 includes, besides the ongoing residential and commercial land-uses (See urban landcover in grey, less dense than Section 1), the following landcover categories: **agriculture and pasture** (in orange), and **vegetation** (in green).



- Section 3 in the north, including the areas through Kpong and Atimpoku, is characterized by a **peri-urban land-use** including residential, commercial, industrial (in grey), **water bodies** (*Volta River*) (in blue), and also **agricultural uses** (in orange).



**Figure 6-24 Simplified Overview of Land Cover within the Aol**

Table 6-27 below displays the total area in hectares within the RoW and construction width (see Figure 6-22) by various categories of land-use. This information has been analysed through a GIS sensitivity assessment.

**Table 6-27 Type of Land-Use in the 90 m RoW**

Land - Use Classification	Area in hectares (ha)				Total Area in ha	%
	Construction Width (Road Footprint + 5 m working area) (Ha/%)		Remaining Area within the 90 m RoW (Ha/%)			
Urbanised/residential	59	30,8%	132,6	69,2%	192	32%
Industrial (urban industrial)	1	12,5%	6,1	87,5%	7	1%
Road	138	89,0%	17,1	11,0%	155	26%
cleared/agriculture	16	25,2%	46,8	74,8%	63	11%
Pasture (Brush)	10	25,3%	29,3	74,7%	39	7%
Mixed Vegetation	40	28,9%	98,7	71,1%	139	23%
Stream/River	0	39,1%	0,4	60,9%	1	0%
Open Water	0	1,1%	0,2	98,9%	0	0%
<b>Total Area in ha</b>	<b>264</b>	<b>44,3%</b>	<b>331,2</b>	<b>55,7%</b>	<b>595</b>	<b>100%</b>
<b>%</b>	<b>44%</b>					

Source: ERM 2020

### Overview of Economic Activity in the RoW Corridor

As described in Section 3, with poverty and inequality being prevailing issues, the agricultural sector remains a major driving force in the development of the Ghanaian economy, with the service industry and the industrial sector becoming more and more dominant. Typically for the greater region of Accra, open spaces along the RoW are occupied through various economic activities such as small businesses (e.g. transportation), shops and other vending activities. Often, temporary or improvised structures are utilised to operate the business with street vendors using baskets and small carts.





In line with the land cover overview described above, the economic activities within the RoW can also be characterized within the three sections as described in Section 6.12.1.4. Main economic activities in Section 1 include industry, agriculture (farming and animal husbandry), fishing and commerce/services including petty trading, artisanal work and transport. In Section 2, the local economy is largely reliant on agriculture (farming and forestry), fishing and fisheries related activities and animal production. Some commercial activities are undertaken along the road (drivers, street vendors). Finally, in Section 3, the economic activities are mixed. Agriculture is a major economic activity in terms of employment and rural income generation for both districts, and is completed by commerce and services (drivers, hotels). Refer to Table 6-20 (in Section 6.12.1.4) for more details.







### Property and Structures

A total of 3,776 structures were identified within the 90 m RoW using Google Earth imagery.<sup>33</sup> It is assumed that these structures include a mix of commercial structures, residential structures and non-residential structures such as farms, animal shelters, factories and commercial buildings / markets. In the absence of detailed asset survey results (to be collected during RAP preparation), the various types of structures have been categorized (indicated within the white boundaries in the example pictures below) in Table 6-28 below.

**Table 6-28 Classification of Identified Structures**

Classification of Structures	Example Picture	Example of Typical Structure
<p><b>Commercial structures:</b>                      buildings within the first row of houses next to the existing road. Mainly commercial structures with up to 30% residential buildings.</p>		
<p><b>Commercial mixed structures:</b>                      buildings within the second row of houses next to the existing road. Both commercial and residential buildings with up to 30% commercial buildings.</p>		

<sup>33</sup> This method for counting of structures solely relies on Google Earth imagery from various points in time ranging between 2018 and 2020. For the images from 2018, it is expected that more recent structures are not captured. In addition, the above listed assumptions are to be verified through a complete asset survey.

Classification of Structures	Example Picture	Example of Typical Structure
<p><b>Residential structures:</b> all buildings beyond the second row of houses next to the existing road. Mainly residential structures.</p>		
<p><b>Other / Industrial</b></p>		

Source: ERM 2020

Table 6-29 below includes a summary of the number of different types of structures identified using Google Earth images in the different corridors ordered by Section and respective districts according to the assumptions listed above in Table 6-28.

Note that this evaluation of all structures within the 90 m RoW represents a type of “worst-case” assumption: as discussed previously, only a portion of the area within the RoW will actually be needed for the Project. The final number of affected structures will depend on the final design of the Project and selection of additional spaces utilized for construction purposes (e.g. access roads, lay-off areas, etc.).



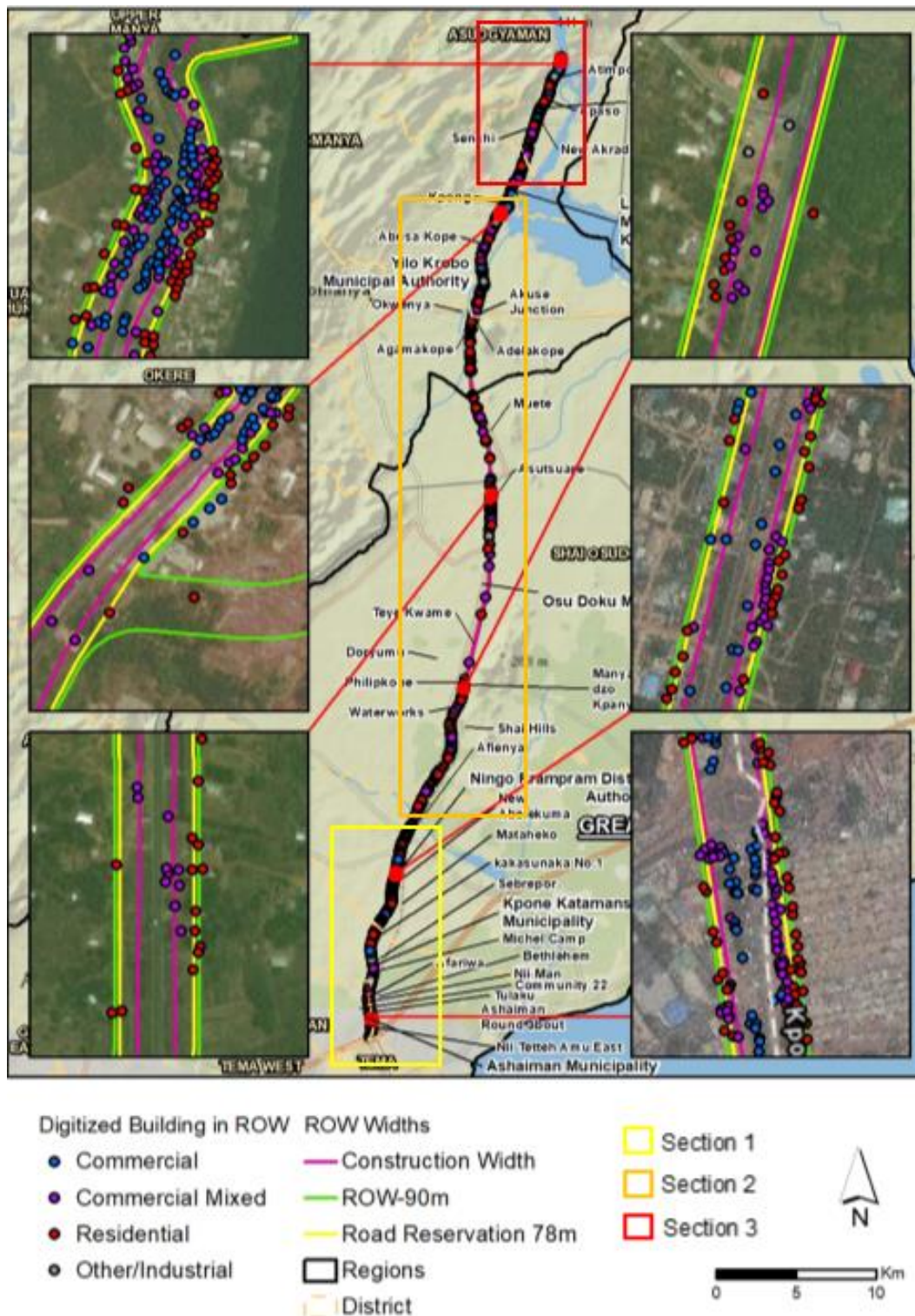
**Table 6-29 Count of Structures**

Type of Structure Classification	Section 1			Section 2		Section 3		Sum
	Ashaiman Municipality	Kpone Katamanso Municipality	Ningo Prampram District Authority	Shai Osu Doku Municipality	Yilo Krobo Municipal Authority	Lower Manya Krobo District Authority	Asougnyaman District Authority	
<b>Construction Width (Road Footprint + 5 m working area)</b>								
Commercial	170	100	219	0	0	183	163	835
Commercial/mixed	77	93	53	36	12	46	4	321
Residential	5	0	6	0	0	10	0	21
Other/Industrial	1	1	3	3	0	5	6	19
Sum	253	194	281	39	12	244	173	1196
<b>Remaining area to RoW Boundaries</b>								
Commercial	4	5	48	5	2	101	200	365
Commercial/mixed	53	165	293	110	27	300	314	1261
Residential	35	116	243	116	27	132	256	925
Other/Industrial	3	4	0	6	2	10	4	29
Sum	93	291	584	237	58	543	774	2580
<b>TOTAL</b>	<b>346</b>	<b>485</b>	<b>865</b>	<b>276</b>	<b>70</b>	<b>787</b>	<b>947</b>	<b>3776</b>

Source: ERM 2020

As indicated in the table above, a total of 3,776 structures have been identified within the 90 m RoW. Of these, 45% are located in Section 1 and 46% are located in Section 3. Around one third of all identified structures are commercial (see Table 6-28 for classification details) out of which nearly 70% are located within the Construction Width (Project footprint plus 5 m construction corridor on either side). Around 40% of all identified structures are classified as commercial/mixed with half located within the remaining corridor. The majority of all identified residential structures (87%) are located within the remaining area to the 90 m RoW boundary.

Figure 6-25 below provides a high level overview of the 3,776 structures that have been identified within the RoW and examples of representative areas in each of the three sections.



Source: ERM, 2020

**Figure 6-25 Overview Affected Structures within the RoW**

### Stakeholder Voices

Box 6.1 shows the main stakeholder feedback and concerns expressed by national and district authority stakeholders during social field survey. The main issues raised during those meetings concerned the overall compensation process, from the identification of rightful owners to the proper

payment of compensation. Livelihood restoration and the provision of alternative livelihoods for affected persons was also a key concern.

### **Box 6.1 Stakeholder Feedback and Concerns from National and District Authorities – Land Acquisition and Resettlement Impacts**

#### **General comments and recommendations:**

- Compensate and resettle all residential and commercial properties as well as social facilities and farms that will be impacted by the Project.
- Develop a Resettlement Action Plan prior to the commencement of works.
- Ensure adequate and sufficient community sensitization regarding the valuation and compensation processes.
- Avoid speculative development.
- Ensure proper documentation to avoid multiple compensation claims.
- Avoid severance, disconnection from community, resources or access to livelihood.
- Compensation should be borne by the contractor as part of the loan, to avoid delay of the Project.

#### **Physical displacement management recommendations:**

- Compensate for land and structures simultaneously to avoid delays and prevent impoverishment of affected parties.
- Engage an independent consultant to resolve all conflicting claims prior to payments.
- Notify all affected persons to relocate before construction begins.
- Identify rightful owners and directly involve affected persons during compensation payment.

#### **Economic displacement management recommendations:**

- Consider livelihood restoration an integral part of the resettlement package.
- Consider youth employment in livelihood restoration measures.
- Include provision of market structures for street and commercial vendors to continue their trading activities.
- Provide a well demarcated space for roadside vendors to continue their trading activities.
- Provide an alternate well demarcated space for transport users to easily access transportation.

The main stakeholder feedback and concerns expressed by the communities of the AoI during the Community Representatives Forums is presented in Box 6.2 below. The main issues and concerns raised during those meetings related to livelihood restoration (especially the provision of market structures which was an overall key concern during the engagements), the proper compensation of affected people and the relocation of pipelines and other utility to ensure continued service delivery during construction. It should be noted that during the engagements with the urban community of Kpong (Lower Many Krobo), concerns were raised about the identification of rightful owners and the lack of legal documentations for structures.



## Box 6.2 Stakeholder Feedback and Concerns from Communities – Land Acquisition and Resettlement Impacts

### Physical displacement management concerns and recommendations:

- Provide prior notice to relocate to all PAPs and business tenants to allow construction to start on date.
- Identify the PAPs to be compensated. Collaborate with the assemblyman or traditional authority to help identify property owners for compensation.
- Provide adequate type of compensations (crops, physical structures, lands)
- Negotiate on an individual basis with household in the ROW.
- Concerns about the process of compensation for PAPs, especially on the submission of legal documentation. What considerations would there be for old structures are old and without documentations or illegal structures?
- Relocate pipelines and other utility to ensure continued service delivery.

### Economic displacement management concerns and recommendations:

- Include provision of market structures for street and commercial vendors to continue their trading activities.
- Provide a well demarcated space for roadside vendors to continue their trading activities.
- Provide motor lanes for drivers to continue their motor transportation activities.
- Compensate all PAPs including tenants of businesses with appropriate resettlement packages.
- Restore livelihoods and promote social development such as improving community access roads, markets and lorry stations, provision of toilets and schools as part of project's social responsibility is anticipated by the project communities.

## 6.13.2 Summary of Significant Construction and Operation Impacts

### 6.13.2.1 Overview

#### *Land Requirements and Restrictions*

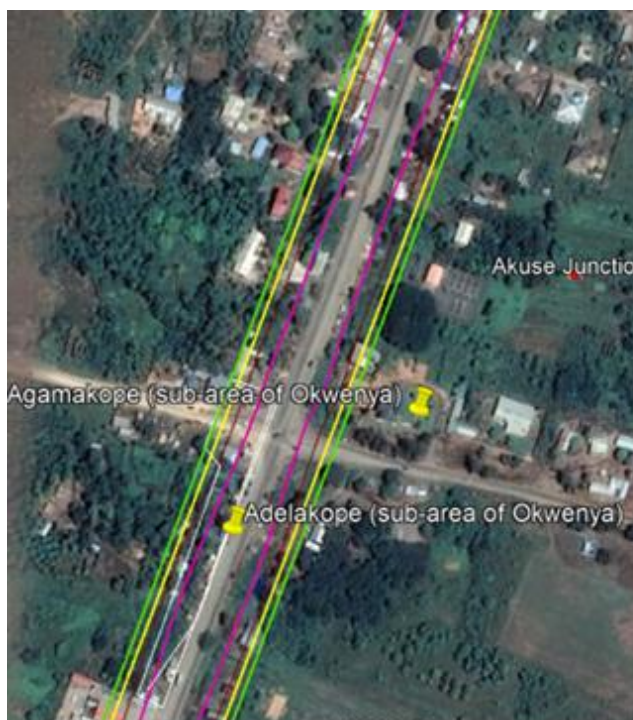
As described in Section 2.4 and at the beginning of this Section, the Project will be developed within the 90 m RoW corridor of the existing N2 route.

INZAG has been informed that GHA acquired the land rights for the entire 90 m RoW in the 1990s; however, the area has since been heavily encroached and will be affected by Project construction and operation activities. The component requiring permanent land restrictions during construction as well as operation includes the footprint of the road (i.e. the pavement layers of the road itself, sidewalk, embankments and drainages). A corridor of 5 m along the construction footprint will be used for construction purposes and with the footprint of the road constitutes the construction width. The 5 m used for construction will be rehabilitated and integrated. No permanent activities and structures are allowed in the entire construction corridor post construction. Permits may be acquired for temporary activities such as street vending. Generally, construction corridor post construction may contain planted vegetation for recreational purposes but no permanent, non-removable crops.

Further permanent or temporary restrictions beyond the construction width (i.e. the footprint of the road and 5 m on either side) are yet to be agreed between INZAG and GHA. While the Project commits itself to conduct all activities within the 78 m road reservation corridor, at most, the permanent land-take and restrictions could be extended to the entire 90 m RoW (see Figure 6-22 and Section 2.4).

## Influencing Factors

The widening of the road footprint with limited crossing options compared to pre-construction circumstances is likely to cause parts of communities, households and individuals to be affected due to severance of resources, infrastructures and communities. Figure 6-26 below serves as an example where the development and widening of the road could lead to communities being split with potential loss off access to agricultural areas. Figure 6-27 serves as an example in an urban, heavily built up area (Section 1) where the widening of the road to the maximum width of around 55 m could lead to neighbourhoods being split with potential loss of access to commercial areas.



**Figure 6-26 Potential Impacts on Division of Section 3 (Lower Manya Krobo<sup>34</sup>)**



**Figure 6-27 Potential Impacts on Division of Communities in Section 1 (Ashaiman and Kapone Katamanso<sup>35</sup>)**

The existing railway development may exacerbate this issue.

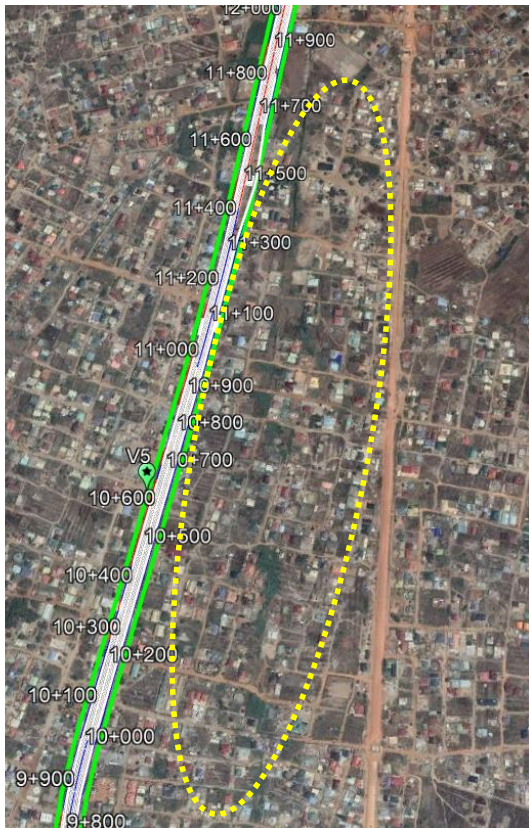
The Project may also lead to orphaned land. Orphaned land is land that is not directly located within the Project's footprint but becomes uneconomic as a result of land acquisition. Severance issues need to be taken seriously and sufficiently addressed through compensation and livelihood restoration measures.

Potential for this issue to become a significant impact is mainly in Section 3 of the route in Kpong (Lower Manya Krobo). An extreme example of severance due to infrastructure development is displayed below in Figure 6-28, Figure 6-29 and Figure 6-30.

<sup>34</sup> Akuse Junction and two sub-areas of Okwenya (Agamakope and Adelakope).

<sup>35</sup> Nii Tetteh Amu East, Community 22, Afariwa, Tulaku, Bethlehem.





**Figure 6-28 Potential for severance impacts between the ECR and the railway development (to the right) in Afienya**



**Figure 6-29 Potential for severance impacts between the ECR and the road diversion in Kpong**



**Figure 6-30 Drone capture of severance between the railway (left) and the road**  
Specific locations for potential severance impacts are yet to be defined by INZAG.

As discussed in the Project Description, INZAG has updated the road route and will be incorporating re-routings at key locations as well as some minor path changes where it can avoid or minimize displacement impacts.

### *Resettlement Framework*

As a first step in the process for managing displacement impacts INZAG has commissioned the development of a Resettlement Framework which will be supplemented by a Project Resettlement Action Plan (RAP) or multiple smaller RAPs. The Resettlement Framework will outline the Project's commitment to mitigate adverse socioeconomic impacts from land acquisition or restrictions on affected persons' use of or access to land. The Resettlement Framework will provide the foundation for the resettlement process including an entitlement matrix that will ensure adequate compensation, resettlement and livelihood restoration options are provided to project affected people. In line with the requirements of the Resettlement Policy Framework for Road Sector Operations<sup>36</sup> as well as the applicable international standards of the IFC, there are several key elements to this mitigation approach including:

- Providing compensation for loss of assets at replacement cost;
- Ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected;
- Improving or, at a minimum, restoring the livelihoods and standards of living of displaced persons to pre-project levels, so as to facilitate sustainable improvements to socio-economic status; and
- Paying particular attention to the needs of vulnerable groups.

The Resettlement Framework is a requirement for the environmental license and will be submitted together with the ESIA to the Environmental Protection Agency (EPA) in November 2020. The Resettlement Framework will be disclosed to affected communities at the time of the ESIA disclosure.

#### *6.13.2.2 Summary of Significant Construction Impacts*

The following impacts will need to be further understood and quantified after finalisation of Project design through the asset survey inventory and household survey, to be undertaken as part of the Resettlement and Action Plan (RAP) development and implementation.

- Impact to residential structures: physical displacement of individuals and households;
- Impact to economic structures: loss of business and economic displacement;
- Impact to crops and fields: loss of access, loss of livelihood and economic displacement;
- Impact to business infrastructure: loss of access, loss of business and economic displacement
- Loss of access to communal resources as well as infrastructure and social services;
- Severance and Loss of community cohesion.

At this stage therefore, it is not possible to determine the number of Project affected people (PAPs), households, and land plots (agricultural, residential, or other) that will be affected.

The listed potential significant impacts and proposed mitigation measures during construction are summarised in Table 6-30 below.

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<sup>36</sup> Ministry of Roads & Highways, 2017.

**Table 6-30 Summary of Impacts with regard to Displacement during Construction Phase**

CONSTRUCTION PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
1	<p><b>Loss of residential structures</b></p> <ul style="list-style-type: none"> <li>It is expected that a significant number of impacted structures are residential buildings. In the entire RoW and estimate of 2,528 structures have been identified and classified as either residential or residential mixed<sup>37</sup>, of which 342 are located within the Road Footprint and construction corridor (width varying from 24-55 m) (using the assumptions outlined in Table 6-28).</li> <li>As per Section 6.13.1.2 residential structures within the Road Footprint corridor as well as the construction corridor will be permanently removed. This results in roughly 1,256 residential structures (classified as either residential/commercial mixed or residential). Households residing in these structures will be experiencing permanent physical displacement. As these numbers rely on Google Earth imagery, the exact number of affected residential structures is to be confirmed during the asset inventory.</li> <li>The permanency of removal of any structures beyond the construction width is yet to be confirmed (remaining 1.272 residential structures).</li> <li>Permanent physical displacement, depending on the resettlement options provided by the Project,</li> </ul>	<p><b>Major impact</b> Physical displacement</p>	<ul style="list-style-type: none"> <li>A Resettlement Framework and subsequent Resettlement Action Plan will be developed in line with the National Resettlement Policy Framework for Road Sector Operations as well as applicable international standards: Physical displacement impacts will be clearly assessed and verified through the asset inventory to be conducted as part of the RAP studies once the project design has been finalized by INZAG. The studies will identify the persons who will be displaced by the Project and determine who will be eligible for compensation and assistance.</li> <li>The Resettlement Framework under preparation by INZAG will provide the foundation for the resettlement process including an entitlement matrix that will ensure adequate compensation, resettlement and livelihood restoration options are provided to project affected people.</li> <li>Resettlement options provided by the Project will ensure that households are able to continue to access the same livelihood resources or otherwise livelihood restoration measures will be provided to adequately manage economic displacement impacts.</li> </ul>	<p>Moderate</p>

<sup>37</sup> All structures within the second row of houses next to the existing road and beyond. (see Table 6-28 for more details).



**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	may cause inability or difficulty of households to continue to access the same livelihood resources leading to <b>related economic displacement impacts</b> .	<b>Major impact Economic displacement</b>	<ul style="list-style-type: none"> <li>■ Engagement will be maintained with Affected Communities through the process of stakeholder engagement;</li> <li>■ INZAG will seek to replace the lost residential land plots within the same settlements (in-fill resettlement)<sup>38</sup></li> <li>■ A grievance mechanism will be established as early as possible in the Project development phase.</li> </ul>	<b>Moderate</b>
2	<p><b>Loss of non-residential structures</b></p> <ul style="list-style-type: none"> <li>■ A significant number of structures subject to physical displacement are expected to also be of commercial use (given the proximity to the existing road). These may include small businesses, shops and permanent market structures. In the entire 90 m RoW and estimate of 1,196 non-residential commercial structures<sup>39</sup> have been identified through the GIS analysis. With the majority of these situated within the road footprint and the construction corridor.</li> <li>■ Owners and employees of these affected structures are expected to experience a temporary loss of income and employment due to the removal and relocation of the structures within</li> </ul>		<ul style="list-style-type: none"> <li>■ Same management measures as per Impact #1 Loss of residential structures</li> <li>■ The Resettlement Framework will include key compensation and livelihood restoration measures under the following principles in accordance with IFC PS 5:                             <ul style="list-style-type: none"> <li>- Means of income earning capacity, productivity levels and associated livelihoods and standards of living of affected communities must be improved or at least restored to pre-project levels.</li> <li>- Provide transitional support based on reasonable estimates of the time required to restore income earning capacity, productivity</li> </ul> </li> </ul>	

<sup>38</sup> Affected people with titles will be offered replacement land. The allocation of the land is to be assessed during RAP study. The expectation is that if available the priority will be to offer in-fill land close-by. For those that no longer have a title because they were expropriated in the 90s the GHA will seek to identify available community land to be offered at affordable lease

<sup>39</sup> All structures within the first row of houses next to the existing road. (see Table 6-28 for more details).

CONSTRUCTION PHASE

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	<p>the road footprint and the construction corridor. The permanency of removal of any structures beyond the construction width will be maintained.</p> <ul style="list-style-type: none"> <li>Should the businesses not be re-located close by, employees may experience <b>economic displacement</b>, needing to seek alternative employment in the local area.</li> <li>An additional of 46 structures have been identified in the RoW and classified as Other/Industrial. Of these, 19 structures are located in the corridor of the road footprint and the construction corridor. Hence they have to be re-located.</li> </ul>		<p>levels and associated livelihoods and standards of living.</p>	
3	<p><b>Loss of agricultural land, crops and trees</b></p> <ul style="list-style-type: none"> <li>Among the land to be acquired and cleared for construction (i.e. construction width), around 15 ha of agricultural land will be affected (e.g. land for crop cultivation, fruit tree plantations, etc.) Assuming an average land parcel size of 0.5 ha, potentially 30 plots may be affected<sup>40</sup>. This affected agricultural land, crops and trees will be cleared for the construction of the Project. Land owners and users will be affected facing the loss of livelihood source through permanent land take leading to <b>economic displacement</b>.</li> <li>Land take may also impact those households engaged in animal husbandry/ grazing of</li> </ul>	<p><b>Moderate impact</b>                      Economic displacement</p> <p>➤ The respective impacts on a given landowner can range from <i>minor to major</i>, depending on the size and the importance of the affected land (also in relation to remaining, unaffected land) as economic resource for the affected household.</p>	<ul style="list-style-type: none"> <li>Impact significance and magnitude will be assessed through the RAP related studies, including the socio-economic household survey and asset inventory.</li> <li>As described above, the Resettlement Framework will include key compensation and livelihood restoration measures. These include measures to restore land based livelihood sources specifically agricultural activities. The Project will ensure that alternative land is made available to affected households and that temporary income losses through the clearance of crops are compensated for.</li> </ul>	<p><b>Low</b></p>

<sup>40</sup> Please refer to Social Baseline Chapter in ESIA for further Details.

CONSTRUCTION PHASE

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	<p>livestock. Whereas agricultural/cultivated land may be either under customary land tenure or public lands, the grazing lands are either registered as community land or as official pasture land. Households who might lose access to local public-land grazing areas may suffer certain economic impact if alternative areas are not readily available nearby.</p> <ul style="list-style-type: none"> <li>Exact number of plots and sizes are yet to be confirmed during the asset inventory.</li> </ul>		<ul style="list-style-type: none"> <li>Impacts to agricultural and pasture lands will be minimised as far as possible by keeping the Project construction footprint as narrow as possible, and efficiently restoring any damaged areas.</li> <li>INZAG will seek to replace the lost agricultural land plots within the same area (in-fill resettlement)<sup>41</sup></li> </ul>	
4	<p><b>Loss of (access to) business infrastructure</b></p> <ul style="list-style-type: none"> <li>Similarly, the loss of local market areas will affect those that use it as a location of trading, and also as a space for social interaction (at least temporarily). This has been raised as a major concern during the stakeholder engagements.</li> <li>Various situations in which access to certain areas (businesses, shops, schools, etc.) may be affected temporarily during construction;</li> <li>Affected people relying on street vending activities or other trading/business conducted from non-permanent and informal structures will not be compensated under impact No. 2 while experiencing <b>economic displacement</b> nevertheless.</li> </ul>	<p><b>Major impact</b>                      Economic displacement                      &gt; The respective impacts on a given person can range from <i>minor to major</i>, depending on the type of business conducted and the importance in terms of economic resource for the affected household (any other livelihood strategies, or sole</p>	<ul style="list-style-type: none"> <li>The Resettlement Framework will include key compensation and livelihood restoration measures under the following principles in accordance with IFC PS 5:                             <ul style="list-style-type: none"> <li>Means of income earning capacity, productivity levels and associated livelihoods and standards of living of affected communities must be improved or at least restored to pre-project levels.</li> <li>Provide transitional support based on reasonable estimates of the time required to restore income earning capacity, productivity levels and associated livelihoods and standards of living.</li> </ul> </li> </ul>	Moderate

<sup>41</sup> Affected people with titles will be offered replacement land. The allocation of the land is to be assessed during RAP study. The expectation is that if available the priority will be to offer in-fill land close-by. For those that no longer have a title because they were expropriated in the 90s the GHA will identify available community land to be offered at affordable lease

CONSTRUCTION PHASE

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
		money-generating activity).	<ul style="list-style-type: none"> <li>The livelihood restoration measures as well as transitional support will specifically focus on provisions for affected people conducting business from non-permanent structures, hence are not included in compensation measures under impact 2. Alternative market areas will be identified, street vendors will be allowed to conduct business along the road stretches that are no under active construction.</li> </ul>	
5	<p><b>Loss of access to communal resources as well as infrastructure and social services</b></p> <ul style="list-style-type: none"> <li>Communities depend on a number of communal and natural resources for their livelihoods. Forest and bush land is used for collection of timber for construction, fuel wood, medicinal plants and reeds in the area inside and outside of the RoW. Pastures are used as open grazing areas for livestock and open water for irrigation and household consumption. In some cases, communities or individuals might lose access to those resources.</li> <li>The project will also cause loss of access to general community infrastructure and social services. Insufficient crossings can cause community members being cut off from health care centres, schools, places of worship, etc. In other cases, access will still be possible, but may take longer due to needed de-tours to use provided crossing points.</li> </ul>	Moderate impact Loss of access	<ul style="list-style-type: none"> <li>The final Project design will include safe road crossing options for pedestrians, bicycles, vehicles, animals, etc. to enhance access to communal resources, land and infrastructure where required. Bus stops are to be installed in relevant locations (e.g. schools, etc.).</li> </ul>	Minor

CONSTRUCTION PHASE

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
6	<p><b>Loss of community cohesion – severance issue</b></p> <ul style="list-style-type: none"> <li>■ The Project will cause severance and fragmentation of agricultural and possibly other holdings making them less viable through limited access.</li> <li>■ Limited crossing options will cause parts of communities, households and individuals being affected due to severance of resources, infrastructures and communities.</li> <li>■ In addition, the existing railway development may enhance this issue and cause orphaned land (and that is not directly located within the Project's footprint but becomes uneconomic as a result of land acquisition).</li> </ul>	<p><b>Major impact</b>                      Community cohesion.                      If not mitigated, impacts related to the change of access may range from <i>minor to major</i> in specific cases.</p>	<ul style="list-style-type: none"> <li>■ Sensitivity and severance impacts are yet to be assessed in detail by the Project.</li> <li>■ The minimisation of severance impacts is one of the main issues that will be addressed by appropriate design of the Project (e.g. numerous crossings). In any case, all existing roads that will be crossed by the ERC_1 road will be maintained through underpasses or other appropriate design solutions to ensure the free passage.</li> <li>■ This topic will be addressed in the ESIA. The installation of additional road crossing options (underpasses or overpasses) will be considered by the Project designers if requested by PAPs and subject to feasibility and GHA approval. Such design changes can be accommodated under the Project's Design Change Management Procedure.</li> <li>■ Orphaned land will be identified and compensation measures will be included in the eligibility matrix in the Resettlement Framework.</li> <li>■ Additionally, severance issues will be taken seriously and sufficiently addressed through compensation and livelihood restoration measures.</li> </ul>	<p>Moderate</p>



### 6.13.2.3 Summary of Significant Operational Impacts

Impacts during operation of the Project will need to be assessed and monitored on a continuous basis.

The listed potential significant impacts and proposed mitigation measures during operation are summarised in Table 6-31 below.

**Table 6-31 Summary of Impacts with regard to Displacement during Operation Phase**

OPERATION PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
1	<p><b>Business infrastructure</b></p> <ul style="list-style-type: none"> <li>While during operation of the Project most business infrastructure will have been re-established, difficulty to access specific business infrastructure could be a remaining impact resulting in <b>economic impacts</b>.</li> <li>At the same time however, the enlargement of the ECR can increase movement of population including potential target customers, etc. Therefore, the operation of the road could have a <b>positive effect on economic impacts</b> considering an improved business infrastructure.</li> </ul>	<p><b>Positive impact</b> Business infrastructure</p> <p><b>Potential residual minor to moderate impact</b> Economic displacement if not adequately managed.</p>	<ul style="list-style-type: none"> <li>Livelihood restoration measures will aim to enhance the positive effect the road will have considering its improved transportation infrastructure. Vending, trading, transportation and other businesses could have an increased customer range.</li> <li>To ensure access to business infrastructure is not lost and adequately re-established, the Project will continue to monitor this issue and make the grievance mechanism available.</li> </ul>	<b>Positive</b>
2	<p><b>Loss of (access to) communal resources as well as infrastructure and social services</b></p> <ul style="list-style-type: none"> <li>During operation, difficulties to access communal resources, infrastructure and social services may prevail. Insufficient crossings can cause community members being cut off from health care centres, schools, places of worship, forests etc. In other cases, access will still be possible, but may take longer due to needed de-tours to use provided crossing points.</li> </ul>	<p><b>Moderate impact</b> Loss of access</p>	<ul style="list-style-type: none"> <li>While the final Project design will include safe road crossing options for pedestrians, bicycles, vehicles, animals, etc. to enhance access to communal resources, land and infrastructure, these may not be sufficient. INZAG will monitor this issue and make the grievance mechanism available. Relevant grievances will be acted upon and installation of additional crossings will be considered.</li> </ul>	<b>Minor</b>

OPERATION PHASE

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
3	<p><b>Loss of community cohesion – severance issue</b></p> <ul style="list-style-type: none"> <li>■ The Project will cause severance and fragmentation of agricultural and possibly other holdings making them less viable through limited access.</li> <li>■ Limited crossing options will cause parts of communities, households and individuals being affected due to severance of resources, infrastructures and communities.</li> <li>■ In addition, the existing railway development may enhance this issue and cause orphaned land (and that is not directly located within the Project’s footprint but becomes uneconomic as a result of land acquisition).</li> </ul>	<p><b>Major impacts</b>                      Community cohesion.                      If not mitigated, impacts related to the change of access may range from <i>minor</i> to <i>major</i> in specific cases.</p>	<ul style="list-style-type: none"> <li>■ The minimisation of severance impacts is one of the main issues that will be addressed by appropriate design of the Project (e.g. numerous crossings).</li> <li>■ INZAG will monitor this issue and make the grievance mechanism available. Relevant grievances will be acted upon and installation of additional crossings will be considered as well as compensation claims for orphaned land.</li> <li>■ Effectiveness of compensation and livelihood restoration measures aiming to mitigate severance issues will be assessed, monitored and adjusted on a continuous basis.</li> </ul>	<p><b>Moderate</b></p>

## 6.14 Labour and Working Conditions

### 6.14.1 Summary of Baseline Findings

#### 6.14.1.1 Labour

In Ghana, the key responsible entity for labour topics is the Ministry of Employment and Labour Relations, notably the Labour Department. The Labour Act 2003 and related labour regulations govern the employment relationships of the country and establish the prohibition of discrimination on the basis of several categories, including gender, race, ethnic origin, religion, social or economic status, or disability, whether that person is already employed or seeking employment. However, discrimination in employment and occupation does occur with respect to women, persons with disabilities, HIV-positive persons, and LGBTI persons<sup>42</sup>.

In Ghana, the construction sector contributes significantly to gross domestic product (GDP) (13.7% in 2017) and employment within the economy. Given its labour-intensive nature, the construction sector is one of the major employers in the economy<sup>43</sup>. The composition of the workforce will include a vast number of local workers (the Project foresees the creation of 967 new jobs during construction peak, 95% of which will be locals). The hiring of labour for the project will be carried out within the framework of the Ghanaian Labour Act, and the laws and statutes in force. These include respect for freedom of association, no forced labour, the minimum age of employment and the rights of children and adolescents.

A national tripartite committee composed of representatives of the government, labour, and employers set a minimum wage. In July 2018, the committee raised the minimum daily wage by 10 % to 11.82 GHS (approximately \$2.05), effective January 1<sup>st</sup> 2020. It was reported that legislation governing minimum wages were not enforced in the informal sector and instances of violations were reported in the formal sector. Legislation governing working hours applies to both formal and informal sectors: it was largely followed in the formal sector but not in the informal sector. It was reported that the lack of labour inspectors and training meant that compliance could not be effectively enforced<sup>44</sup>.

#### 6.14.1.2 Child Labour

According to the Constitution of Ghana (1992) and the Children's Act (1998), the minimum age for employment is 15 years and the minimum age for engagement of a child in "light work"<sup>45</sup> is 13 years. The minimum age for apprenticeship is 15 years or after completion of basic education. The minimum age for hazardous work<sup>46</sup> and night work is 18 years. According to ILO, significant number of children below 18 years of age are engaged in hazardous conditions of work in the agricultural sector in Ghana, with an estimated 10 % of them working in cocoa-specific hazardous activities. The ILO Committee also reports information from a study carried out by ILO–IPEC that children are engaged in hazardous fishing activities and are confronted with poor working conditions<sup>47</sup>.

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<sup>42</sup> Ghana 2018 Human Rights Report, Country Reports on Human Rights Practices for 2018, United States Department of State, Bureau of Democracy, Human Rights and Labor available at <https://www.state.gov/wp-content/uploads/2019/03/Ghana-2018.pdf> and accessed on 2 April 2020

<sup>43</sup> Owoo and Quafeyio, The role of the construction sector in Ghana. September 2018. UNU-Wider. Available at: <https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2018-119.pdf>

<sup>44</sup> As above

<sup>45</sup> Light work is defined as work that is not likely to be harmful to the health or development of the child and does not affect the child's attendance at school or the capacity of the child to benefit from education

<sup>46</sup> Hazardous work includes the following activities: going to sea; mining and quarrying; carrying and transporting of heavy loads; manufacturing industries where chemicals are produced or used; work in places where machines are used; and work in places such as bars, hotels and places of entertainment where a person may be exposed to immoral behaviour.

<sup>47</sup> Comments on C182, Observation (CEACR) - adopted 2019, published 109th ILC session (2020), Worst Forms of Child Labour

Additionally, Human Rights Watch's research found that thousands of children work in Ghana's artisanal and small-scale gold mines in hazardous conditions. Most children are aged between 15 and 17, but younger children work in mining as well. Children have also been injured and killed in mine collapses. Many children who work in mining are enrolled in school, and some work specifically to cover school-related costs, but attend school irregularly.

According to the Ghana 2018 Human Rights Report<sup>48</sup> human rights issues in Ghana include exploitative child labour, including forced child labour. Although communities and official authorities shared no information regarding human right issues during the 2020 Field Survey, child labour is frequent in all of the AoI Districts. Child labour is mostly patent on market days where children as young as seven years old are seen carrying foodstuffs, pushing trucks and selling various items. Some of those children apparently forfeit school on market days to join either their guardians or peers to engage in economic activities. In farming and fishing communities, children are culturally expected to help their parents in their trade. Most of these children fall victim to child labour due to poverty and living on the streets.

There is the potential that nationally based subcontractors and suppliers (who may form part of the supply chain) could have child labour in their operations or are employing under 18's to undertake activities. This is a particular risk in companies where the use of informal and day workers is more prevalent. The use of child labour is likely to have negative impacts on the health and wellbeing (mental health) of affected children including access to education and social development as well as the child's right not to work in certain circumstances.

#### 6.14.1.3 Forced Labour

The Constitution (1992) prohibits all forms of forced labour. The Labour Act (2003) also prohibits all forms of forced or bonded labour. In addition, employers are prohibited from employing a trafficked person or a victim of trafficking as defined by the Human Trafficking Act, 2005.

The Government of Ghana has made significant efforts to eliminate trafficking by validating and implementing a national anti-trafficking action plan and expending funds allocated for the plan; prosecuting and convicting labour and sex traffickers under the Human Trafficking Act; increasing inter-agency cooperation in efforts to remove child victims from trafficking situations; adopting systematic procedures for identifying and referring trafficking victims for services; and conducting and providing support for anti-trafficking public awareness activities. The 2005 Human Trafficking Act, amended in 2009, criminalised sex and labour trafficking. However, the government reported initiating 113 total investigations into suspected human trafficking during the calendar year 2017, compared to 138 investigations in 2016. Of the 113, the Ghana Police Service (GPS) Anti-Human Trafficking Unit (AHTU) reported conducting 91 investigations of potential trafficking crimes, compared with 118 investigations in 2016. Of these 74 were labour trafficking investigations, most of which were trafficking within Ghana, and 17 were sex trafficking investigations, all of which involved cross border trafficking<sup>49</sup>.

#### 6.14.1.4 Occupational Health and Safety

Currently, Ghana does not have a national policy on occupational health and safety management, as the ILO convention number 155 (1981) requires. There are however, the Factories, Offices and Shops Act 1970, (Act 328), the Mining Regulations 1970 (LI 665), and the Labour Act 2003 (Act 561), which

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Convention, 1999 (No. 182) - Ghana (Ratification: 2000), available at

[https://www.ilo.org/dyn/normlex/en/f?p=1000:13100:0::NO:13100:P13100\\_COMMENT\\_ID:4001243](https://www.ilo.org/dyn/normlex/en/f?p=1000:13100:0::NO:13100:P13100_COMMENT_ID:4001243)

<sup>48</sup> Ghana 2018 Human Rights Report, Country Reports on Human Rights Practices for 2018, United States Department of State, Bureau of Democracy, Human Rights and Labor available at <https://www.state.gov/wp-content/uploads/2019/03/Ghana2018.pdf>

<sup>49</sup> United States Department of State, *2018 Trafficking in Persons Report - Ghana*, 28 June 2018, available at: <https://www.refworld.org/docid/5b3e0b364.html> [accessed 16 March 2020]

have some regulations about health and safety management at the work environment. The Ministry of Health and the Ghana Health Service, in collaboration with the World Health Organisation (WHO) country office as commissioned the development of policy and guideline on occupational health and safety for the health sector which was published in June 2010. But these are very limited in scope given the multifaceted distribution of industrial operations within the Ghanaian work setting. There is also the Workmen's Compensation Law 1987(PNDC 187) which relates to compensation for personal injuries caused by accidents atwork and hence, indirectly impacts on monitoring worker and workplace safety.

The government of Ghana has introduced Acts (e.g., Labour Act, 2003, Act 651 and Factories, Shops and Offices Act 1970, Act 328) and many other subsumed policies to protect the health, safety and welfare of all workers. The Labour Act, for example, makes it obligatory for the employer to "ensure that every worker employed in Ghana works under satisfactory, safe and healthy conditions (Labour Act, 2003 Act 651, Article 118:1). This provision is in consonance with the 1992 constitution of Ghana which states that "every person has the right to work under safe and healthy conditions" (section 24: 1). It is required that employees use the safety appliances, fire-fighting equipment and personal protective equipment provided by the employer in compliance with the employer's instructions (Labour Act, 2003 Act 651, Article 118:3).

The employers' obligation under the Labour Act includes setting standards to safeguard the wellbeing of their employees, providing personal protection equipment, and providing necessary information, supervision and training consistent with the level of literacy of the employees. Furthermore, the Act requires employers to report the occurrence of occupational accidents to appropriate government agencies. Employees are obligated to exercise their actions with reasonable care as they go about their normal jobs at their workplaces to ensure their safety and the safety of others. The Act leaves the provision of standards opened to the discretion of every employer. This invariably has led to a disjointed and fragmented health and safety policy bodies as different industries (employers) have different oversight on health and safety issues in Ghana. The fragmentation is even clearer as Ghana has different agencies under different jurisdictions which monitor different industries for workplace and employee safety. For instance, there is a Road Safety Commission but with little standards, guidelines and impact on the transport industry and road users. The Minerals Commission has the Mining Regulations 1970, which contains some guidelines in Occupational Safety and Health but just for the Mining Industry.<sup>50</sup>

## 6.14.2 Summary of Significant Construction and Operation Impacts

### 6.14.2.1 Impact Description

#### Workers' Rights

Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working or living conditions. These issues should be considered not only for those who are directly employed by INZAG but also its contractors (including sub-contractors) and within the supply chain.

As stated in the baseline findings section (Section 6.14.1.1), in practice working conditions and labour rights in Ghana may not be fully respected. This is the case for the right to freedom of association. Despite robust legal and institutional safeguards, there have been some violations claims (including losing jobs trying to form or join trade unions) frustrating workers to exercise their right to form or join

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<sup>50</sup> This section has been elicited from the *Occupational Safety and Health Issues In Ghana: Strategies For Improving Employee Safety And Health At Workplace (2015)* accessed through: <http://www.eajournals.org/wp-content/uploads/Occupational-Safety-and-Health-Issues-in-Ghana.pdf>



unions of their choice<sup>51</sup>. There is a potential that nationally based subcontractors and suppliers could impede workers to exercise their right to freedom of association. Women are also at risk of being discriminated, as they are often not offered the same opportunities to get paid employment or are limited to taking on certain roles, which are traditionally associated with women such as cooking food or providing laundry services at the camps. During recruitment, women could be suffering discrimination and may not be provided with the same working conditions as men once recruited.

This, together with the reported risk of occurrence of child labour and forced labour cases (See Section 6.14.1.2 and 6.14.1.3) needs to be clearly assessed, while labour laws protect workers, enforcement of labour laws may not be effective in both the formal and informal spheres. INZAG will need to monitor its subcontractors to ensure that they fully comply with Ghana's legal requirements regarding working conditions.

### *Child Labour and Forced Labour in the Supply Chain*

INZAG is committed to meeting international best practices. For reasons explained earlier in this section, there is the potential that nationally based subcontractors and suppliers (who may form part of the supply chain) could have child labour in their operations or are employing under 18's to undertake hazardous activities. Again, this is a particular risk in companies where the use of informal and day workers is more prevalent. The use of child labour is likely to be hazardous and have negative impacts on the health and wellbeing (mental health) of affected children including access to education and social development as well as the child's right not to work in certain circumstances.

As indicated in the IFC standards, employment of minors will only be permitted in accordance with Ghanaian law, meaning that employment of persons 15 years of age would be permitted for apprenticeship or after completion of basic education and, in the case of light work, the age of employment could be 13 years. Hazardous work is explicitly prohibited for persons under the age of 18 years old.

The use of forced labour is illegal in Ghana and is not known to be a widespread problem in most regions of the country. It is therefore unlikely that the Project or its contractors and suppliers will be utilising forced labour. However, unskilled labourers, who would be more vulnerable to being used as forced labour, are more likely to be local. In the unlikely event that forced labour is used by subcontractors, this is likely to have an impact on the physical and mental health and well-being of the persons concerned, as well as on their right not to be forced to work.

### *Worker Health and Safety*

The workers involved in the construction and transportation as well as operation maintenance could be exposed to inherent construction and operation hazardous risks and fatalities as well as potential health and safety risks.

Large-scale employment of workforce will occur during construction phase of the Project (concretely 967 new jobs will be created for the construction phase). Activities of the site personnel will involve typical construction risks observed at construction sites such as risks due to moving equipment. The rate of accidents will be also dependent on the consciousness and cautiousness of the personnel regarding the specific hazards of the construction work they are involved in. These risks have to be managed with adequate trainings in accordance with the good management approaches and international construction site practices avoiding problems with the worker-employer relations and significant occupational health and safety risks.

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<sup>52</sup> A more detailed assessment of such risks will be presented in the ESIA. Currently details such as size of the camps, number of workers to be accommodated, open/close camp policy etc. are being defined by INZAG.

Workers will be accommodated in two campsites,<sup>52</sup> whose construction is foreseen by INZAG at KM 17+290 (Shai Hills) and at KM 47+175 (Kpong). All temporary site offices, warehouses, workshops, worker camps, dining halls and surrounding fences around respective facilities will be constructed in accordance with the specifications and regulations of INZAG's policies for occupational health and safety. Required facilities for accommodation, meals, sanitation and welfare will be provided in camps in accordance with local requirements and in line with Workers' Accommodation Processes and Standards IFC & EBRD Guidance Note. Further details will be provided in the ESIA.

Note that INZAG has already developed an integrated HSE management system which will be added to the proposed mitigation measures below.

#### *6.14.2.2 Summary of Significant Construction and Operation Impacts*

Significant impacts and proposed mitigation measures in relation to workers rights and labour conditions are summarised for the construction in Table 6-32 and for the operation in Table 6-33.

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<sup>52</sup> A more detailed assessment of such risks will be presented in the ESIA. Currently details such as size of the camps, number of workers to be accommodated, open/close camp policy etc. are being defined by INZAG.

**Table 6-32 Significant Construction Impacts for Labour and Working Conditions**

CONSTRUCTION PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	Labour and Working Conditions/Workers' Rights	<b>Moderate impact</b> on violations to labour rights as local population may not have an understanding of their labour rights as enshrined in the law or may be willing to waive these rights in order to earn incomes.	<p>INZAG should develop a Human Resources Policy to ensure:</p> <p>Access to clear and understandable information regarding worker's labour and working conditions;</p> <p>Provision of reasonable working conditions and terms of employment;</p> <p>Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects;</p> <p>Implementation of a grievance mechanism for the Project workers including subcontractor workforce;</p> <p>Adoption of open attitude towards freedom of association and in conformance with Ghana laws.</p> <p>A Workers Management Plan will be developed by INZAG (including workers accommodation) considering the following elements:</p> <p>No employee or job applicant will be discriminated against on the basis of his or her gender, marital status, nationality, age, religion or sexual orientation;</p> <p>All workers will, as part of their induction, receive training on worker rights in line with Ghanaian legislation to ensure that positive benefits around understanding labour rights are enhanced;</p>	<p><b>Minor</b></p> <p>As a result of the policies and procedures worker rights should be protected. However, issues with implementation and capacity may result in some breaches of workers rights especially within the supply chain and amongst casual labourers. If issues arise there is the opportunity for these to be identified and addressed through the worker grievance mechanism. However, individuals may be unwilling to report issues and as such breaches may go unnoticed</p> <p>Potential for positive legacy in terms of strengthening knowledge and practice of worker rights of contracted and supplier companies and their employees.</p>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>All workers (including those of contractors and subcontractors) will be able to join unions of their choice and have the right to collective bargaining;</p> <p>All workers (including those of contractors and subcontractors) will have contracts which clearly state the terms and conditions of their employment and their legal rights;</p> <p>Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights;</p> <p>Contractor contracts will establish the right for INZAG monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, INZAG's policies or clauses in the contract. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers;</p> <p>INZAG and Contractors' will implement a program of socioeconomic compliance monitoring to inform internal auditing and monitoring process. As such, KPIs will be developed around worker rights, discrimination and management, workforce grievance mechanism and monitoring of outcomes. As part of the contractor and supplier selection process, INZAG will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in Ghanaian law and ILO international standards;</p> <p>As part of the contractor and supplier selection process INZAG will take into consideration performance with regard to worker management and rights as outlined in Ghanaian law and international standards;</p>	

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>INZAG and its Contractors (and subcontractors) will oversee if suppliers comply with all applicable child labour laws and only employ workers who meet the applicable minimum legal age requirement in accordance with international standards;</p> <p>INZAG will put in place a worker grievance mechanism that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed including contractor workers.</p> <p>INZAG will review and monitor the outcomes of community engagement, media coverage and its workforce and community grievance mechanism for additional indications of labour-related issues that may be arising; and</p> <p>INZAG will develop a Human Resources Policy which will outline worker rights to be included in all contracts including restrictions on working hours in line with Ghanaian and international law, compensation including consideration of overtime, holidays etc. INZAG will require its contractors and subcontractors to put in place policies in line with national legislation and international regulations;</p>	
	Workers Health and Safety	<b>Moderate impact</b> on accidents resulting in injuries or fatalities	<p>INZAG will develop an Occupational Health and Safety (OHS) Plan as part of INZAG's Health and Safety Management System for the Project – Lot 1. This management system will be enforced throughout the Project including all Project personnel (including direct hire employees, advisors and consultants, contractors and sub-contractor personnel). It will include aspects such as regular training and monitoring, as well as monitoring, inspection and audit. The following measures will be included:</p>	<p><b>Minor</b></p> <p>Accidents resulting in injuries or fatalities remain a possibility albeit with reduced likelihood due to the implementation of the management system.</p> <p>Injuries and fatalities could have long term impacts on workers and their families.</p>



**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>Identification and provision of personal protective equipment (PPE) to all concerned workers during activities to avoid health implications (e.g. dust masks, protective clothing for handling waste materials etc.);</p> <p>Pre-employment screening protocols for all employees including contractors and subcontractors which will include medical checks of SARS CoV 2 history and symptoms TB and other diseases appropriate to WHO recommendations, the individual's country of origin and vaccinations.</p> <p>Workers will be provided with primary health care and basic first aid at worksites;</p> <p>All work of persons under the age of 18 will be subject to an appropriate risk assessment and regular monitoring of health, working conditions, and hours of work.</p> <p>Regular medical check-ups and centralized medical treatment for all workers of the Project (INZAG, contractors and subcontractors) will be provided;</p> <p>Workforce, including contractors and subcontractors, will be provided with health awareness training, including hazardous works, a significant briefing of hygiene practices (such as hand washing), implementation of educational outreach to increase awareness of major communicable disease and how to protect against infection and about transmission routes and the symptoms of the communicable diseases of concerns (including STDs and SARS CoV-2);</p> <p>Contractor contracts will specify monitoring to be undertaken by the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and the</p>	<p>Potential for positive legacy in terms of strengthening knowledge and practice of worker health and safety of contracted and supplier companies and their employees.</p>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>consequences for the contractor if they are found to be breaching national legal requirements, international standards, policies or clauses in the contract. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers;</p> <p>As part of the contractor and supplier selection process INZAG will take into consideration performance with regard to worker health and safety as outlined in Ghanaian law, international standards and INZAG policies; and</p> <p>Any appointed contractors should establish their own Emergency Response Plan and communicate key information to the Project workforce prior to work commencing on any site.</p>	
	<p>Child Labour and Forced Labour in the Supply Chain</p>	<p><b>Major impact</b> on potential use of child and forced labour in the supply chain</p>	<p>The Workers Management Plan will consider the following elements regarding child labour in the supply chain:</p> <p>INZAG will oversee if suppliers comply with all applicable child labour laws and only employ workers who meet the applicable minimum legal age requirement in accordance with international standards;</p> <p>Contractor contracts will specify monitoring to be undertaken by the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, policies or clauses in the contract regarding forced child labour. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers; and</p>	<p><b>Minor- Moderate for Child Labour</b></p> <p>Use of child labour or use of people aged 16-18 to be involved in hazardous work within the supply chain remains a possibility albeit with reduced likelihood due to the implementation of mitigation.</p> <p>If there are incidences of child labour the magnitude of the effect to the individual affected will remain unchanged.</p> <p>However, still potential for child labour or use of people aged 16-</p>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>In all contractor contracts the Project will make explicit reference to the need to abide by Ghanaian law and international standards in relation to child labour.</p>	<p>18 to be involved in hazardous work in the supply chain.</p> <p>Potential for positive legacy in terms of strengthening knowledge and practice of avoiding and managing out child labour within contracted and supplier companies.</p> <p>The likelihood of the use of forced labour will be significantly reduced as a result of the proposed mitigation such that it will become a non-routine event. However, should incidences occur the impacts on the individuals affected will remain unchanged</p>

**Table 6-33 Significant Operation Impacts for Labour and Working Conditions**

OPERATIONS PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	Labour and Working Conditions/Workers' Rights	<b>Moderate impact</b> on violations to labour rights as workforce number and use of contractors will decrease and as such there is a less likelihood of impacts occurring.	GHA will maintain all provisions of the existing Workers Management Plan in line with Ghanaian regulations.  GHA will maintain a Worker grievance mechanism that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed. Contractors and sub-contractors will be required to put in place a worker grievance mechanism. The GHA worker grievance mechanism shall be open to the contractor and subcontractor workforce in the event that their grievance is not adequately resolved by their direct employer. GHA will then have the authority to act to resolve this grievance.	<b>Minor</b>  As a result of the policies and procedures worker rights should be protected. However, issues with implementation and capacity may result in some breaches of workers rights especially within the supply chain and amongst casual labourers.  If issues arise there is the opportunity for these to be identified and addressed through the worker grievance mechanism.  Potential for positive legacy in terms of strengthening knowledge and practice of worker rights of contracted and supplier companies and their employees.
	Workers Health and Safety Construction traffic Emergencies	<b>Moderate impact</b> on accidents resulting in injuries or fatalities as operations activities will be less intense and will involve	GHA will maintain the Occupational Health and Safety (OHS) Plan as part of its Health and Safety Management System for the Project – Lot 1.	<b>Minor</b>  Accidents resulting in injuries or fatalities remain a possibility albeit with

OPERATIONS PHASE

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
		less workforce. However, accidents resulting in injuries or fatalities remain a possibility albeit with reduced likelihood	GHA will maintain the Worker grievance mechanism that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed.	<p>reduced likelihood due to the implementation of the management system and nature of work being undertaken.</p> <p>Injuries and fatalities could have long term impacts on workers and their families.</p> <p>Potential for positive legacy in terms of strengthening knowledge and practice of worker health and safety of contracted and supplier companies and their employees.</p>
	Child and Forced Labour in the supply chain	<b>Moderate impact</b> on potential use of child labour in the supply chain as workforce number and use of contractors will decrease and as such there is a less likelihood of impacts occurring.	<p>Maintenance of all provisions regarding child labour in the supply chain in the Workers Management Plan.</p> <p>GHA will maintain the Worker grievance mechanism that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed.</p>	<p><b>Minor</b></p> <p>Contractual requirements and penalties for use of child labour should minimise risk.</p> <p>Grievance mechanism and audit should pick up any instances of child labour.</p> <p>However, still potential for child labour or use of people aged 16-18 to be</p>



OPERATIONS PHASE

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
				<p>involved in hazardous work in the supply chain.</p> <p>Potential for positive legacy in terms of strengthening knowledge and practice of avoiding and managing out child labour within contracted and supplier companies</p> <p>The likelihood of the use of forced labour will be significantly reduced as a result of the proposed mitigation such that it will become a non-routine event. However, should incidences occur the impacts on the individuals affected will remain unchanged.</p>

## 6.15 Community Health and Safety

### 6.15.1 Summary of Baseline Findings

This section describes in detail the findings of the social baseline that serve as a basis for understanding its associated impacts.

#### 6.15.1.1 Road Safety

Road safety is a concern in Ghana because most roads are not well maintained and in poor condition. This situation is aggravated by unpredictable risky driver behaviour, vehicles that are not in good condition, overloaded vehicles and traffic congestion, which represent a threat to road safety. It is particularly dangerous to travel at night in the dark, due to poor street lighting and unpredictable behaviour of pedestrians, cyclists and livestock.

Among the most frequent causes of death in Ghana, road accidents show an increasing trend. Data compiled by the Motor Traffic and Transport Department (MTTD) of the Ghana Police Service has revealed that the number of commuters killed in road traffic accidents in Ghana in 2018 recorded a 12.76% increase from 2017, meaning more than 1,600 road deaths with approximately 1.2 million registered vehicles. This is mainly due to overloaded or de facto unroadworthy vehicles and often leads to serious accidents, often involving personal injury. These data are aligned with the records presented in the medium-term municipal development plans of the Aol districts.

Road safety in the Project Aol is very poor and puts non-motorised users in an unsafe situation. This is reflected in district reports, which show a high percentage of pedestrian deaths.

At present, pedestrians and cyclists are not segregated from traffic, which in some places moves quickly and in others is very congested, with vehicles often competing aggressively for position on the road. Vehicles move freely from the main transport route to the margins of the road, where pedestrians, traders and vehicles can come into conflict with each other, particularly in densely urban areas. The result of this bad management is that pedestrians cross the road arbitrarily from any point due to the inadequate layout of crossing points and footbridges. The absence of cycle lanes presents road risks for cyclists. The main crossings are not controlled by signs and pedestrians.

The Districts and communities of Aol that have reported most traffic accidents are the following:

- In Ashaiman Municipality; traffic accidents involving mainly pedestrians are reported to happen on a weekly basis in the communities of Naa Amerley and Nii Man;
- In Shai Osudoku District; traffic accidents have increased with the influx of Okada riders (motorcycle taxis); and
- In Lower Many Krobo District; traffic accidents involving pedestrians are frequent in Akuse and Kpong and occasional in Okwenya.

#### 6.15.1.2 Communicable Diseases

The top ten causes of death amongst people of all ages in Ghana in 2016 included malaria (7.2% proportional morbidity rate), pneumonia (7%), asphyxia (6.5%), HIV/AIDS (6.4%), anaemia (5.8%), hypertension, cerebrovascular accidents, diabetes, septicaemia and gastroenteritis. The most prevalent causes of death have not changed overall during a decade (2007-2017). The most notable change is the ranking of HIV/AIDS, which shows a reduction of almost 40% of cases in 2017 as compared to 2007.

The main issues mentioned at the Aol settlements are: diarrhoea, malaria, respiratory problems (respiratory tract infection) and gastrointestinal problems (abdominal pain, gastroenteritis, peptic ulcer). Other issues identified include: typhoid fever, urinary tract infection / waist pains, cholera, skin problems, malnutrition / anaemia, joint pains.

Main challenges and contributing factors to these health issues have to do with poor sanitation and waste management. Specifically, stagnant water in villages, resulting from blocked drains results in continued outbreaks of malaria, diarrhoea and cholera. Nii Man settlement (Ashaiman district) also reported free dumping in open and stagnant water in drains leading to an increase of breeding in mosquitos, which leads to malaria cases.

According to the epidemiological profile of Ghana<sup>53</sup>, despite a considerable decrease on malaria-attributable mortality, the whole country is at risk of malaria. Malaria was responsible for 19% of all recorded deaths in Ghana in 2015. Malaria is present in both Greater Accra Region and Eastern Region, with relatively high transmission rates.

Ghana is currently facing the SARS-CoV-2 communicable disease, which was first reported in Wuhan, China on 31 December 2019 and has spread globally into an epidemic. The 08<sup>th</sup> September 2020 Ghana had registered 45,012 cases of SARS CoV-2 (22,552 in the Greater Accra Region and 2,375 in the Eastern Region) and 283 deaths.

The prevalence of HIV/AIDS in Ghana is high, particularly in the eastern part of the country. In response to the disease spread, in 2016 the government established the Ghana AIDS Commission, which coordinates the efforts of NGOs, international organisations and other parties to support AIDS education and treatment throughout Ghana and to alleviate the problems of HIV/AIDS in the country.

However, HIV and AIDS remain a key risk. At the AoI level, there is a high incidence of HIV/AIDS and other sexually transmitted disease in Ashaiman due to inadequate education and sensitization, and a number of sex workers operating in the settlements; and in Lower Manya Krobo, which is associated to with very high HIV&AIDS prevalence, which is responsible for most deaths in the District in 2016, killing 123 people.

### *Gender-based Violence (GBV)*

The construction of the roadway will result in significant changes in local communities, including worker influx and changes in households dynamics which can exacerbate the risk of GBV in both public and private spaces. In 2008, a study conducted by the Demographic and Health Survey in Ghana revealed that 38.7 percent of married Ghanaian women between the ages of 15 and 49 had experienced physical, emotional or sexual violence by a husband or partner at some point in their lives. In the context of Ghana, the 2016 national survey reported how attitudes, beliefs and practices have led to violent actions against women being dismissed due to widespread beliefs that women give up their rights to their husbands at the point of marriage, particularly when bride prices are paid. <sup>54</sup> This situation has been exacerbated by the COVID-19 pandemic which has brought a disruption to economic activities, especially affecting the self-employed who have been forced to temporarily shut down in some cases. The interruption of sources of income has placed both financial and psychological burden on breadwinners, who are mostly men. This may also translate to heightened tension leading to violence.

### *Health Care Infrastructures*

The Ghana Ministry of Health is responsible for the healthcare system in Ghana and includes the Ghana Health Service (GHS) and five Teaching Hospitals (TH). Community and sub-District level government are responsible for providing primary healthcare, with District and Regional hospitals providing secondary health care.

The National Health Insurance Scheme (NHIS) is a social intervention program introduced by government to provide financial access to quality health care for all Ghanaians. NHIS subscribers fall

<sup>53</sup> Ghana. Severe malaria facts. Severe Malaria Observatory. Available at: <https://www.severemalaria.org/pays/ghana>

<sup>54</sup> The Socio-Economic And Health Impact Of Covid-19 On Sexual And Gender-Based Violence (SGBV) In Ghana (Briefing Note #2, April 2020), Unite Nations Ghana. ([https://ghana.un.org/sites/default/files/2020-04/COVID-19\\_UN%20Ghana%20Briefing%20Notes\\_No.2\\_2020\\_04\\_14.pdf](https://ghana.un.org/sites/default/files/2020-04/COVID-19_UN%20Ghana%20Briefing%20Notes_No.2_2020_04_14.pdf))

into two broad groups, the informal (who need to pay a premium that varies depending on the person's level of income) and exempt groups, who do not pay premium. The exempt group include:

- Formal sector employees and the self-employed who contribute to the Social Security and National Insurance Trust (SSNIT contributors);
- Children (persons under 18 years of age);
- Persons in need of antenatal, delivery and post-natal health care services (pregnant women);
- Persons classified by the Minister for Social Welfare as indigenous;
- Persons with mental disorders;
- Pensioners of the Social Security and National Insurance Trust (SSNIT pensioners); and
- Persons above seventy years of age (the elderly).

In 2017, there were 10.5 million people on the NHIS (35% of the population).

Ghana's health infrastructure is limited. Although the government of Ghana is making progress in improving health care, public hospitals remain overcrowded and underfunded. The quality of health care is one of the main detrimental factors. Emergency services are generally of reasonable quality, although ambulances fail to provide quick services.

Although district-level policies are increasingly focusing on health services deliveries, expansion of health infrastructure and sponsoring local employment in health sectors, health infrastructure and the health profile of the communities in the Aol was reported as poor.

The use of traditional healers is common in Ghana. In the Eastern Region it is very common for herbalists to be considered as the first medical resource in rural areas when there is a health problem. However, the herbs and concoctions that are administered by the healers can further worsen or risk the development of new diseases and organ failure. Healers often care for patients until they are transferred to a conventional health centre. Community health professionals also educate families and young patients about health issues<sup>55</sup>. The Department of Health offers basic training to traditional healers such as first aid, midwifery, identifying signs of anaemia and good hygiene for the mother and midwife. The Department also provides materials such as cotton wool, aprons, gloves and a booklet for recording patient details.

Approximately 90% of the population in the Greater Accra Region live within a 5 km radius of a medical facility and all districts have reported to have various health centres and clinics. However, the quality of the services does not seem to cover health needs of the communities. One of the main challenges facing the provision of medical services is a shortage of ambulances. This is a problem across the Aol Districts, including some private hospitals.

The Districts and communities of Aol that have reported to have hospitals are presented in the Box below. Further detailed information of the number and type of health facilities in each of the settlements in the Aol is being processed and will be presented in the ESIA.

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<sup>55</sup> Child Protection Baseline Research, Eastern Regional Profile. Available at:  
<https://www.unicef.org/ghana/media/2886/file/CP%20Profile%20-%20Eastern%20Region.pdf>

### Box 6.3 Hospitals per District and Settlement

- **Ashaiman Municipality:** 2 public hospitals
- **Kpone Katamanso District:** 6 public hospitals
- **Ningo Prampram District Authority:** 4 private hospitals
- **Shai Osu Doku Municipality:** 1 private hospital and 1 public hospital
- **Lower Manya Krobo:** 3 public hospitals and 1 mission hospital
- **Asuogyaman District:** 1 public hospital

Source: ERM, 2020

## 6.15.2 Summary of Significant Construction Impacts

### 6.15.2.1 Impact Description

The presence of the Project could affect the health and safety and security of the communities along the route alignment as a result of worker- community interactions, the risk of injury associated with construction activities, increased road accidents and competition for access to health care resources. Box 6.4 presents the key stakeholder feedback in relation to community health and safety. Any community concerns or perceptions with regard to reduced health and physical safety by the community also need to be addressed.

### Box 6.4 Stakeholder Feedback and Concerns – Community Health and Safety

#### Project design related (recommendations):

- Street lights
- Bilingual signs (English and French)
- Flag men to control traffic
- Well-marked road and separate lanes for motor cycles
- Speed tables and speed calming measures ( e.g. speed bumps)
- Wider bus stops
- Signs for cattle crossing (e.g. in the Shai Hills area)
- Coverage of drains to avoid flooding
- Rest stops at various locations
- Physical barriers to restrict movements of baboons
- Safe touristic access (access roads and pedestrian routes) to the Shai Hills park
- Service lanes
- Enforcement mechanisms to control road rules

#### Other Recommendations:

- Provision of ducts and crossing points (preferably not overpasses)
- Sound attenuation/abatement measures for humans and mammals
- Detailed assessment of crucial areas (e.g. railway intersections, interchanges and bridges)
- Community safety awareness trainings in collaboration with National Road Safety Authority (NRSA)
- Work zone safety protocols, especially at night
- Dust control
- Improve community access roads

### 6.15.2.2 Road Safety

Traffic accidents involving pedestrians during road construction and operations are likely to affect people of all ages but children and elderly could be most affected. Communities are used to crossing the existing one lane road for daily chores (going to school, visiting friends and family, going to market, going to work etc.).



The construction phase of the project is likely to have a negative impact on road safety as it involves a large number of vehicles travelling on the unpaved road networks used on the project site before the completion of the work. Also, there will be open work fronts and roadblocks, which will result in additional crossing difficulties and associated safety danger. The risks of pedestrian accidents will be further exacerbated when road is operational as pedestrian will no longer be able to cross the road and there is a high risk of accidents and injuries due to road crossings by individuals unwilling to take diversion roads.

Road safety was one of the main concerns raised by stakeholders, and local community representatives in particular, during engagements organised as part of baseline survey activities. The issue of road safety plays a major role for the Project; safety considerations have been incorporated into the design stage (crossing points, utility provisions, dust and noise mitigation etc.).

### *Site Trespass and Injury*

There is a potential risk of site trespass at work fronts for the duration of construction and maintenance and repair operations. It is assumed work fronts will not be fenced routinely although signage will be erected. Site trespass could result in accidents leading to injuries or even fatalities especially due to the presence of large pieces of machinery. Young people and children are most likely to trespass onto sites and are most at risk of getting injured.

### *Environmental Health*

Impacts on the health of the community as a result of environmental change may arise during construction as a result of noise, dust and other emissions from construction activities. As stated for the Air Quality impact (Section 6.9) the unpaved road network used across the Project Site prior to works completion can be particularly dusty when disturbed by vehicle movements. Also, construction of the roadway will progress along the route, resulting in temporary noise impacts as the construction approaches and moves past each settlement (See Section 6.13). These receptors have a direct impact on the well-being of communities.

During operations, a 100km/h design speed has been considered for the major part of the Road Corridor Lot-1, from PK 0+000 to PK 47+175 (from Ashaiman Round About to Akuse Junction approximately), whereas for the last part of the Road, between PK 53+700 and PK 64+440 (from Kpong to Atimpoku approximately) a 80 km/h design speed has been adopted. In urban areas, a lower design speed has been considered in order to ensure road safety adequate levels. Therefore, in the urban areas located between PK 0+000 and 53+700 (from Ashaiman Round about to Kpong approximately) a design speed of 60 km/h was adopted and in the remaining, located in the subsequent road section, a 50 km/h design speed was considered.

As presented in Section 2.4.1 different cross section lanes have been considered per road stretches. The road stretch from PK 3+500 to PK 13+450 (from Michel Camp to Afienya approximately) will have 2x3 lanes, whilst the stretches from PK 0+760 to PK 3+500 (from Ashaiman Round about to Michel camp) and from PK 13+430 to PK 53+700 (from Afienya to Kpong) will have 2x2 lanes and the stretch from PK 53+700 to PK 64+440 (from Kpong to Atimpoku approximately) will have 2x1 lanes.

The stretches with 2x3 lanes reaching 100km/h will be the ones sourcing most of the air emissions. Concentration of air emissions can also be potentially high in certain points of traffic congestion (e.g. toll stations). However, air quality will be impacted in the wider traffic network. Air quality modelling was carried out along the existing road corridor to monitor particulate and gaseous air emissions and no major pollution sources have so far been observed. Monitoring is ongoing and details of the results will be included in the final ESIA. In relation to noise nuisance, this will have a high impact during operations, as road widening inevitably leads to a higher concentration of traffic in the wide area.

### *Increased Transmission of Communicable Diseases*

The presence of workforce living in work camps could lead to the increased transmission of communicable diseases within the workforce and the nearby communities. In addition, if opportunistic workers (those hoping to find employment on the Project or from related activities) migrate to work fronts or Work camps this could also impact on the transmission of communicable diseases. Movements outside the camp are expected to be restricted due to security and safety issues. It must be noted that accommodation camps will be in accordance with local requirements and in line with Workers' Accommodation Processes and Standards IFC & EBRD Guidance Note.

Communicable diseases of concern are likely to include malaria, tuberculosis (TB), diarrheal diseases and respiratory diseases. The recent outbreak of SARS CoV-2 disease should be considered a high risk for the spread of pandemics. There is the potential for increased transmission between workers living and working in close quarters and then onwards into local workers' families and the communities through interactions. Children will be at particular risk of diarrhoeal diseases due to their poor sanitary behaviours, while the elderly will be at risk of more severe health outcomes as a result of their frailty. Health infrastructure in the Aol is reported to be poor, which could worsen the implications of the outburst spread of diseases.

During construction, modifications to the environment and in-migration into the area are likely to increase the risk of transmission of malaria. Modifications to the environment can create small water pools (e.g. wheel ruts and footprints) offering new mosquito breeding grounds and leading to increased vector densities and human-vector interaction. Any influx of people into the area may play an indirect role in increasing the malaria burden. This may result from an increase in pressure on medical facilities, inadequate waste management and establishment of make-shift housing (reducing natural protection from mosquitoes). The highly endemic nature of malaria means that the proposed Project is unlikely to significantly add to the already high disease burden of the community during the wet season. However, modifications to the environment may change the breeding patterns of mosquitoes extending the high risk malaria season for transmission from its peak.

Poor hygiene, sanitation and waste management can all result in increased risk of transmission of water borne communicable diseases such as hepatitis A and E and typhoid through increased risk of contamination of water and food with faecal matter. In addition, these factors can also result in increased number of pests, such as rats, which can contribute to disease transmission.

The profile of the diseases will be influenced by the existing diseases profile of communities along the route and the diseases profile of the countries workers are sourced from. Considering approximately 95% of the workforce will be sourced locally, the disease profile of the workforce is expected to be similar, with variations from regions. In Ghana most of the cases are concentrated in the Greater Accra Region. This could imply workforce sourced from this region to spread the disease in the Eastern region. Expatriate workforce from Germany will be also part of the workforce, adding up to the risk of disease spread.

### *Increased Transmission of Sexually Transmitted Diseases (STD)*

The Project could result in increased transmission of STDs including HIV/AIDS during construction due to:

- Shifts in power dynamics between community members and within households can result in increased Gender-Based Violence (GBV). Male jealousy, a key driver of GBV, can be triggered by labor influx on a project when workers are believed to be interacting with community women.
- Presence of a large workforce including males with higher incomes engaging in high risk sexual activities with Commercial Sex Workers (CSWs), in particular in larger urban centers and near to worker camps. Prostitution is illegal in Ghana, but it is a widespread activity that often involves child prostitution and trafficking;
- Women in settlements near worker camps resorting to prostitution for short-term economic gain;

- Workers establishing casual relationships with young girls in communities near the worker Camps;
- Engagement in casual high-risk sexual activity by transport drivers along their routes and at their end destination. Transport drivers typically have higher rates of STDs and HIV/AIDS than the general population;
- Increased numbers of Commercial Sex Workers, who may have higher infection rates of STDs and HIV, near construction sites, Worker camps and at truck stops;

CSWs may be better placed than other women to negotiate safe sex practices, such as the use of condoms, but may also be willing to waive their use for a fee. Any increase in the prevalence of STDs and/or HIV/AIDS along the proposed Road corridor is a risk to the health of the community including the men who engage in these activities, CSWs, the wives of married men and children through vertical transmission pathways.

While there is access to treatment for STIs including HIV/AIDS in the communities (Ghana AIDS Commission), it is limited in terms of quality. Furthermore, there are significant taboos around STDs, which may influence people's willingness to access treatment. Any lack of access to treatment could affect the long-term health of those who contract STDs other than HIV, including fertility, damage to internal organs and long-term disability or even death.

Increased transmission of STDs including HIV/AIDS has the potential to affect households along the proposed road but in particular near to the worker camps. However, impacts could spread regionally due to vehicle movements and the presence of CSWs in larger towns.

The increase in risk of STDs including HIV/AIDS will be long-term, as it can take time for prevalence/incident rates to return to baseline levels. Furthermore, those infected with HIV/AIDS will have health effects, which last beyond the duration of the construction activities.

The potential impact of communicable disease, particularly sexually transmitted disease and HIV/AIDS, on the population was a concern across settlements and Districts. One of the main recommendations from communities was the creation of awareness and sensitization campaigns around HIV, unwanted pregnancies and promiscuity for both workers and communities. Also, communities have expressed the need to include specific rules in the workers code of conduct regarding the prohibition to engage with community women and underage girls.

### *Increased Pressure on Health Care*

Influx of workers for construction of the road may place further strain on health facilities and detrimentally affect health care services and health status for communities. This risk will decrease during the operations phase, as the nature of operational activities involves fewer staff and that will result in less pressure on health care needs. Any decrease in access to health care facilities including longer waiting times is likely to be associated with worse health outcomes. This is a particular risk in the case of incidents involving multiple casualties or patients from both the workforce and community where hospital level care is required or in the case of a disease epidemic (SARS CoV-2). Use of Security Personnel

It is assumed security personnel will be hired by INZAG mainly during construction to prevent unauthorized access to the construction sites. The risk of security personnel is that if they are not appropriately trained, they may misuse their status and be abusive to local persons, or apply excessive force in their handling/apprehension of potential trespassers or other unauthorised persons.

One of the main feedbacks and concerns raised by stakeholders during the Social field study is that the project contractors should first consult with the chiefs and traditional leaders in regards to safety management in work camps in order to better harmonize the expectations of both stakeholders. Also, stakeholders in community forums have expressed the need to deploy security personnel to protect communities.

### *6.15.2.3 Summary of Significant Construction and Operation Impacts*

Significant impacts and proposed mitigation measures are summarised for the construction in Table 6-34 and Table 6-35

**Table 6-34 Significant Construction Impacts for Community Health and Safety**

CONSTRUCTION PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	Road safety	<b>Major</b> as construction traffic may add up to the already existent risks for pedestrians crossing unpaved roads	<p>Refer to Mitigation Measures regarding Traffic and Transport Impacts</p> <p>INZAG will develop a Traffic Management Plan will be developed, including the following:</p> <p>Drivers of Project vehicles will be trained/briefed about safe driving with respect to other drivers, pedestrians and livestock;</p> <p>Advance warning will be given of any proposed road diversions and closures;</p> <p>Project vehicles to be identifiable to the Project (e.g. an easy to read/see sign or symbol on vehicles which shows that they are connected to the Project);</p> <p>Address how the Contractor can reduce the exposure of vehicle drivers, their passengers and other road users from the hazards of road-related accidents;</p> <p>INZAG will develop a Grievance Mechanism. A Project grievance mechanism will be developed and implemented, and information about this mechanism will be shared amongst local communities. The Contractor will also be responsible for managing a grievance mechanism that allows communities and employees to raise complaints. This will be a key monitoring and reporting requirement of the Project. The grievance mechanism will be implemented prior to commencement of the construction phase, with all relevant staff fully cognizant of their roles in the grievance resolution process so that quick and effective response is provided to the concerns raised by local stakeholders.</p>	<b>Moderate</b>
	Site trespass and injury	<b>Major</b> as site trespass resulting in injuries or fatalities remain a possibility considering the	As part of the Stakeholder Engagement Plan developed by INZAG the following mitigation will be implemented:	<b>Moderate</b> Despite the mitigation the risk remains that there could



**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
		existence of construction works in multiple locations	<p>INZAG will undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, the dangers of playing on or near equipment or entering fenced areas. This will include presenting in every primary and secondary school in communities in the Aol.</p> <p>The programme will take into account especial vulnerabilities in regards to poor children. Poor children are particularly vulnerable to traffic danger, as they are less likely to receive road safety education since sometimes they do not assist school as they work as street vendors and are exposed to hazardous road risks. Specials poster and culturally appropriate signaling will be provided.</p> <p>A community meeting will also be given in every settlement along the route. Records of the meeting and attendees should be kept. As part of the schools meeting INZAG will present on other issues such as construction methods and skills required to work in construction to provide benefits. INZAG will provide access to health care for those injured by its activities. INZAG will ensure that signs are put up around work fronts and construction sites advising people of the risks associated with trespass.</p>	be an accident resulting in injuries or fatalities. This risk will be temporary for the duration of construction.
	Environmental Health	<b>Moderate</b> , as dust and noise will be present during construction on a temporary basis and will directly affect nearby settlements	<p>See Mitigation Measures for Section 6.9 and Section 6.11 regarding Air quality and Noise and vibration Impacts.</p> <p>As part of the Stakeholder Engagement Plan implemented by INZAG, awareness sessions to explain the type of noise, dust and emissions from Project activities, the mitigation measures implemented and a point person to contact in case of emergency etc. in order to alleviate potential concerns</p>	<b>Minor</b> Mitigation developed to minimise environmental impacts will minimise impacts to health and engagement will ensure that communities are kept informed. As such, impacts to wellbeing will be minimised.

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	Increased transmission of communicable diseases	<b>Major</b> , as risks related to SARS CoV-2 disease spread are present	<p>As part of the Workers Management Plan the following mitigation will be implemented by INZAG:</p> <p>The implementation of a Workforce Code of Conduct and measures for living and working conditions which will contribute to reduce the risks of diseases transmissions into the community and a worker grievance mechanism. The Code of Conduct shall expressly prohibit sexual interactions of any kind with underage persons.</p> <p>The Contractor will regularly monitor interactions between the community and workers both in public spaces in the communities and in private spaces.</p> <p>Workforce, including contractors and subcontractors, will be provided with health awareness training, including a significant briefing of hygiene practices (such as hand washing), implementation of educational outreach to increase awareness of major communicable disease and how to protect against infection and about transmission routes and the symptoms of the communicable diseases of concerns (including STDs and SARS CoV-2).</p> <p>Conduct pre-employment screening protocols for all employees including contractors and subcontractors which will include checks for SARS CoV-2, and testing for TB and other diseases appropriate to WHO recommendations, the individual's country of origin and vaccinations.</p> <p>Workers will be provided with primary health care and basic first aid at worksites.</p> <p>Regular medical check-ups and centralized medical treatment for all workers of the Project (INZAG, contractors and subcontractors) will be provided.</p> <p>As part of the Emergency Preparedness and Response Plan, INZAG will develop a SARS-CoV-2 Plan in line with IFC Guidance on the</p>	<p><b>Moderate</b></p> <p>Communicable diseases and SARS CoV-2 in particular remain a significant threat for both national and expatriate workforce.</p> <p>The exposure is long term and the access to health care for workers and the community is limited.</p>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>implementation of the EP during the SARS CoV-2 pandemic, especially the following items:</p> <p>Provide a comprehensive SARS CoV-2 intervention plan that includes direct and indirect impacts on the project, including the physical aspects of the project (programme, supply chain, labour, etc.) and associated metrics</p> <p>At relevant stages, undertake a review of the management of the response to SARS CoV-2 to identify lessons learned and areas for improvement.</p> <p>Support training measures to enable workers to acquire the skills needed to work in emergency or post-emergency situations COVID-19.</p> <p>At worker accommodation and sites the following will be implemented by INZAG at a minimum in order to minimise disease transmission:</p> <p>Providing workers with appropriate sanitary facilities, which are appropriately designed to prevent contamination;</p> <p>In line of with IFC Guidance on the implementation of the EP during the SARS CoV-2 pandemic: providing measures for social distancing, hand washing, food treatment; frequent sanitization, isolation rooms and FFP2 masks.</p> <p>Developing a robust waste handling system to avoid the creation of new vector breeding grounds or attracting rodents to the area;</p> <p>Implementing measures to reduce the presence of standing water onsite through environmental controls and source reduction to avoid the creation of new breeding grounds;</p> <p>Ensuring the worker camp is kept clean and free from any accumulation of wastes as well as supplied with clean potable water;</p>	

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>Ensuring appropriate food preparation and monitoring measures are in place;</p> <p>Providing insecticide-impregnated bed nets as a physical barrier to repel and kill mosquitos for workers that have been provided accommodation;</p> <p>Monitoring to ensure that all standards are being met by the relevant departments.</p>	
	Increased transmission of Sexually Transmitted Diseases (STD)	<b>Moderate</b> as the location of the work camps facilitates interaction with nearby communities and thus transmission of STDs	<p>As part of the Workers Management Plan to be developed by INZAG the following measures will be included:</p> <p>INZAG will offer all workers including contractors and subcontractors voluntary screening for STDs, which will be submitted to confidential treatment.</p> <p>INZAG will ensure all workers including contractors and subcontractors receive education around STDs including transmission routes and symptoms. The training will include specific content regarding STD prevalence rates in Ghana and/ or the relevant Regions, expectations of local communities if a woman is made pregnant (e.g. marriage, financial implications, etc.) and law penalties for sexual assault.</p> <p>INZAG will extend the Worker Code of Conduct to include guidelines on worker – community interactions.</p> <p>INZAG will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.</p> <p>INZAG will provide free condoms and femidoms to all workers at camps and accommodation and at entry/exit points of camps</p> <p>As part of the Worker Management Plan INZAG will develop an STD Management Plan designed to minimise the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a</p>	<p><b>Minor</b></p> <p>Baseline levels of STDs are high among local population.</p> <p>Transmission of STDs should be minimised by education and training on the risks and due to the worker code of conduct and associated consequences of any breaches of the code.</p> <p>The duration of any impact is likely to be temporary (for the duration of construction).</p>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
			<p>specialist in sexually transmitted diseases. A typical plan would include, among other things, the following measures:</p> <p>An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs to employees, through workshops, posters and informal information sessions;</p> <p>Encouragement of employees to determine their HIV status; and</p> <p>Supply of condoms/ femidoms at the construction site(s)/ Construction Camps;</p> <p>INZAG will partner with other NGOs and CBOs to support the provision of information, education and communication campaigns around safe sexual practices and transmission of STDs. These activities should be focussed in locations where construction camps are located or where drivers rest.</p> <p>INZAG will consult with local leaders such as village elders among others. The consultations should be aimed at finding ways of ensuring social vices such as prostitution are minimised either through punitive measures for clients, in particular Project workers, or rehabilitative measures for the CSWs.</p> <p>A Grievance Mechanism will be developed by INZAG, whereby affected people can raise issues and concerns associated with incidents related to Gender-based Violence (GBV), social vices, prostitution and the behaviour of workers and drivers.</p>	
	<p>Increased pressure on health care</p>	<p><b>Moderate</b> as even if work camps have health centers, in case of disease spread of SARS CoV-2, hospitalisation would be required and this would have direct effect on</p>	<p>A Community Health and Safety Management Plan (CHSMP) will be developed by INZAG, including the following health issues:</p> <p>INZAG will undertake a health facility assessment of medical infrastructure as part of the INZAG Health and Safety Management System to determine if facilities have sufficient resources and equipment to deal with emergencies. Agreements will be entered into with suitable hospitals to</p>	<p><b>Minor</b></p> <p>INZAG will provide basic health care for its workers and put in place agreement with hospitals following a needs assessment and</p>



**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
		<p>access to health care for communities</p>	<p>provide health care in emergency situations. These agreements will include provision of additional equipment or training for staff if required by INZAG. Project-dedicated international medical providers will complement the services of the local medical facilities that could be utilized by the Project and/or training of local medical personnel.</p> <p>INZAG will monitor the emergence of major pandemics through WHO alerts. When the WHO Pandemic Alert Scale reaches Level 4 INZAG will implement the relevant ERPs.</p> <p>An Emergency Preparedness and Response Plan (EPRP) will be developed by INZAG, covering the emergency situations (involving vehicles and pedestrians) that may occur during the Project construction, should be prepared and implemented by trained personnel in order to avoid significant risks. The EPRP to include:</p> <p>The emergency response in the event of fire, accidents, earthquake, flood etc.</p> <p>Procedure for staff and subcontractors to report any incidents and the investigation and preventive actions taken;</p> <p>Regular emergency response training including in the use of response equipment;</p> <p>Emergency Communication Procedure (under the SEP and the Emergency Response Plan) including with local communities and authorities.</p> <p>In the event of SARS-CoV-2 spread disease, the SARS-CoV-2 Plan will be followed by INZAG. The SARS CoV-2 Plan should determine an emergency procedure from prevention to detection and treatment of a potential infected worker, always in relation to the Stakeholder Engagement Plan.</p>	<p>upgrade support ensuring no or minimal decreased access for communities.</p>

**CONSTRUCTION PHASE**

No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	Use of Security Personnel	<b>Moderate</b>	<p>A Security Management Plan will be implemented by INZAG, including the following measures:</p> <p>A Security Management training will be provided to security personnel. Security Arrangements will be based on the Voluntary Principles for Security and Human Rights which are international best practice. This involves e.g. the selection based on a careful background screening of security forces, their training with regards to Human Rights and a careful monitoring of their services. INZAG will make security arrangement transparent to the local communities and consult regularly with them about the impact of arrangements on communities;</p> <p>Violation of the required standards will result in corrective actions, including termination of sub-contracts with security firms. Sufficient training including clear instructions on the objectives and the permissible actions will be provided to the security personnel. The instructions will be based on the relevant Ghanaian law and will be communicated as terms of employment and reinforced through periodic professional training. Given regular contact with the local populations, training on Grievance Mechanism, such as handling of community grievance will also be provided to the security staff as part of their periodic professional training.</p> <p>Complaints by the public (or other workers) with respect to behaviour of Security Personnel can be made via the Grievance Mechanism                      As part of the Stakeholder Engagement Plan developed by INZAG, the following measures will be adopted:</p> <p>INZAG and contractors will have an engagement meeting with chiefs and traditional leaders informing about the safety management plan and the procedures adopted. INZAG and contractors will consider and incorporate feedback and concerns of chiefs and traditional leaders into the safety management plan.</p>	<b>Minor</b>

**Table 6-35 Significant Operation Impacts for Community Health and Safety**

OPERATION PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
	Road Safety	<b>Major</b> as there is a high risk of accidents and injuries due to road trespassing by individuals unwilling to take diversion roads	GHA will maintain the Grievance Mechanism that will be accessible to all communities	<b>Moderate</b>

## 6.16 Archaeology and Built Heritage

Cultural Heritage sites were identified within the study area from south to north:

- Turaka Central Mosque (CH01), a place of worship which serves several hundred worshippers from Ghana and citizens of other West Africa countries. It is largely involved with historic regional trade of livestock;
- Youth Leadership Institute (CH02), currently utilised as the National Youth Authority. The facility was built in the mid 1900's and also facilitated the recruitment and training for soldiers;
- Cherekecherete Hill site (CH03), which is sacred to Shai residents. Annual pilgrimage occurs to this location. Local 13<sup>th</sup> Century pottery has been found in surficial scatters around the site.



**Figure 6-31 Local Pottery on the Surface at Cherekecherete Hill Site<sup>1</sup>**

- Shai Hills Resource Reserve (CH04), which has been occupied since 10,000 BC by hunter gatherers, and more recently by the Dangme Se or Shai communities. Archaeological remains are visible on the surface, including pottery, stone terraces and building foundations;
- Krobo Hill site (CH05), which serves as a pilgrimage site for descendants of the Krobo communities and is dated to the 13<sup>th</sup> Century. Archaeological remains are visible on the surface including local pottery, stone terraces, buildings, shrines and graves;



**Figure 6-32 King Sakitey (left)<sup>1</sup>**

<sup>1</sup> He is placing his two feet on stone blocks believed to have been removed from the Krobo Mountain, symbolizing the bond/roots of the people to their ancestral home. A priestess (right) carrying a stone block from the Krobo Mountain for use in Dipo rituals in present-day Krobo<sup>1</sup>



**Figure 6-33 Gold Coast Colony. Plan of Christiansborg (1883)<sup>1</sup>**

Source: DeCorse, 1992, p. 164

- Kpong Hotel (CH06). The building is dated to approximately the mid-1900s. The structure is currently used for residential purposes;
- Bronze statue of Nana Kofi Asomani (CH07). The statue at Atimpoku roundabout near the Adomi bridge is dedicated to Asomani for taking charge of Christianborg Castle in the mid-17<sup>th</sup> Century from the Danish;
- Adomi Bridge Spiritual Foundation Stone (CH08). The foundation stone of the original Adomi Bridge, including two oil palms and an earthenware pot.

It should be noted that historic places of pilgrimage are important in their tangible structure as well as intangible significance of the location. Archaeologically, these places have been occupied since about 10,000 BC and sites identified within the Cherekecherete, Krobo and Shai Hills regions today are known as ancestral settlement sites and landmarks within a landscape, demonstrating a deep connection between the people of Krobo Shai to their ancestral lands.

### 6.16.1 Summary of Significant Construction Impacts

Significant potential impacts and proposed mitigation measures are summarised below for the construction in Table 6-36 and for operation in Table 6-37. There will be no physical impacts on Cultural Heritage assets CH01, CH02, CH06 and CH08.

<sup>1</sup> The Iron Age and early state formation date to between 1400 and 1800. This is believed to be a period of expansion in agriculture, industry and trade across the Sahara and Akan regions. The Portuguese were recorded as the first Europeans to establish a foothold on the coast of Ghana with the construction of a trade fort at Elmina in 1482 (DeCorse, 1992, p. 164). Figure 6-33).



**Table 6-36 Cultural Heritage Construction Impacts**

CONSTRUCTION PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
CH03 CH04 CH05 CH07	<p>Cherekecherete Hill, Shai Hills, Krobo Hills and the bronze statue of Nana Kofi will be physically impacted by the development of the Proposed Scheme.</p> <p>Access to CH03, CH04 and CH05 may be hindered through construction related activities</p>	<b>Moderate</b>	<p>Liaise with the Ghana Museums &amp; Monuments Board (GMMB) to agree a strategy for archaeological mitigation;</p> <p>Pre-construction archaeological investigations (agreed with the GMMB), to identify, investigate and scientifically remove any archaeological deposits encountered by the development;</p> <p>A Chance Finds Procedure will be designed and implemented to manage any unexpected discovery of archaeological material in-line with national and international requirements and guidelines.</p> <p>Access arrangements will be made to the satisfaction of the local communities through a Memorandum of Understanding which will allow them to use the pilgrimages unrestricted. This memorandum should be in place before construction begins.</p>	<b>Minor</b>

**Table 6-37 Cultural Heritage Operation Impacts**

OPERATION PHASE				
No	Impact Description	Impact Assessment	Mitigation Measures	Residual Impacts
CH03 CH04 CH05	<p>Cherekecherete Hill, Shai Hills and Krobo Hills will be impacted through the restriction of public access to the pilgrimage locations during the operation phase.</p>	<b>Moderate</b>	<p>Access arrangements will be made to the satisfaction of the local communities through a Memorandum of Understanding which will allow them to use the pilgrimages unrestricted. This memorandum should be in place before construction begins.</p>	<b>Minor</b>

## 6.17 Ecosystem Services

### 6.17.1 Background

Ecosystem services are the benefits that ecosystems provide to people (including many resources that underpin basic human health and survival needs), support economic activities and provide cultural fulfilment. This section provides an overview of the steps taken to identify and prioritise ecosystem services, and summarises the impacts and mitigation measures related to ecosystem services.

### 6.17.2 Approach and Methodology

### 6.17.3 Data Sources

The information within this Section report draws on other MDR sections, such as:

- Biodiversity baseline and impact assessment;
- Socio-economic baseline and impact assessment;
- Cultural Heritage baseline and impact assessment;
- Physical environment baseline and impact assessment; and
- Land use and Livelihoods baseline and impact assessment.

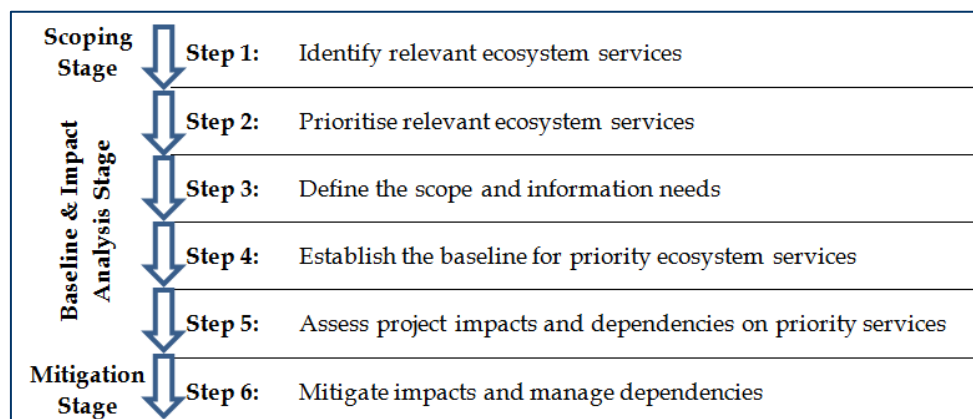
### 6.17.4 Approach to Assessment of Ecosystem Services

#### 6.17.4.1 Overview

The approach used for this assessment of ecosystem services follows the IFC Performance Standards which require specific assessment of potential impacts on ecosystem services. The relevant requirements of the IFC Performance Standard 6 (PS6) are as follows:

- Where a project is likely to adversely impact ecosystem services, as determined by the risks and impacts identification process, the client will conduct a systematic review to identify priority ecosystem services. Priority ecosystem services are two-fold:
  - (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts to Affected Communities; and/or
  - (ii) those services on which the project is directly dependent for its operations (e.g. water).
- When Affected Communities are likely to be impacted, they should participate in the determination of priority ecosystem services in accordance with the stakeholder engagement process as defined in Performance Standard 1.
- With respect to impacts on priority ecosystem services of relevance to Affected Communities and where the client has direct management control or significant influence over such ecosystem services, adverse impacts should be avoided. If these impacts are unavoidable, the client will minimise them and implement mitigation measures that aim to maintain the value and functionality of priority services.
- With respect to impacts on priority ecosystem services on which the project depends, clients should minimise impacts on ecosystem services and implement measures that increase resource efficiency of their operations, as described in Performance Standard 3.
- Additional provisions for ecosystem services are included in Performance Standards 4, 5, 7, and 8.

The methodology for identification and assessment of ecosystem services follows the World Resources Institute (WRI) approach<sup>(1)</sup>, which builds on the approach defined in the IFC Performance Standard 6. The WRI (2013) approach for assessment of ecosystem services incorporates six steps as presented in Figure 6-34. The WRI approach is developed to initially screen and guide the field assessment of ES.



Source: ERM 2020

**Figure 6-34 Six Steps of the Ecosystem Services Review for Impact Assessment**

The ecosystem services assessment included the following steps.

- **Screening and Scoping (Step 1, 2 and 3).** Using a standard checklist of ecosystem services, the screening exercise identified a list of potential ecosystem services present in the Project Aol. A scoping analysis was undertaken to identify those services potentially impacted or depended on by the Project and determine which of these are considered ‘priority’.
- **Baseline and Stakeholder Engagement (Step 4).** Ecosystem services have been identified during the ESIA and the Stakeholder Engagement activities that have been undertaken so far as part of the ESIA Scoping work and during the preparation of the MDR. Background Information on provisioning, regulating and supporting services are included in the MDR in different Appendices and have been collated as part of this Section. The approach used to prioritise these services was based on stakeholder input and data collected in the field and is described in Section 3.5.
- **Impact assessment and mitigation (Step 5 and 6).** The methodology of these steps is the same as for any of the other receiving elements, explained in each of the aspects, e.g. Biodiversity. In general impacts add mitigation has already been assessed in each aspect as related to the elements that provide the service (either or both biodiversity elements, physical environment elements, social elements, cultural heritage elements) Impacts on ecosystem services which have not been assessed previously, identified by assessing interlinkages and cross-cutting issues, are also included.

These steps are described in the following sections.

#### 6.17.4.2 Screening and Scoping: Identification of Ecosystem Services

The objective of ecosystem services screening and scoping was to arrive at a comprehensive list of the ecosystem services likely to be present in the Project Aol that might be affected by Project, and

(1) Landsberg, F.; Treweek, J.; Stickler, M.M.; Henninger, N. and Venn, O. 2013. Weaving Ecosystem Services into Impact Assessment. A Step-By-Step Method, Version 1.0. World Resources Institute. Washington. Available at: [https://www.wri.org/sites/default/files/weaving\\_ecosystem\\_services\\_into\\_impact\\_assessment.pdf](https://www.wri.org/sites/default/files/weaving_ecosystem_services_into_impact_assessment.pdf)

further to determine which of these are considered to be 'priority' and subject to further impact assessment.

To facilitate screening and scoping, Table 6-38 was created using a standard list of ecosystem services, based on the most recent list provided by the WRI, which is based upon the Millennium Ecosystem Assessment Reports (2005) <sup>(1)</sup>. The list was ordered under the four categories listed in the IFC Performance Standards:

- **Provisioning Services**, consisting of harvestable products, water, construction materials, biopharmaceuticals, and biomass for renewable energy;
- **Regulating Services**, consisting of climate regulation, waste decomposition, purification, pest/disease control and natural hazard mitigation;
- **Cultural Services**, which are associated with spiritual, recreation, scientific and educational values;
- **Supporting Services**, which are the natural processes that maintain the other services.

This list was used to identify all ecosystem services which are present and potentially impacted by the Project. For a service to be considered present, it had to meet two criteria:

1. The habitats present in the Project Aol are known to provide this service or are similar to habitats elsewhere that provide this service; and
2. People could potentially benefit from the service, either at the local, national or global level and /or the Project is expected to benefit from this service.

#### 6.17.4.3 *Prioritisation of Ecosystem Services*

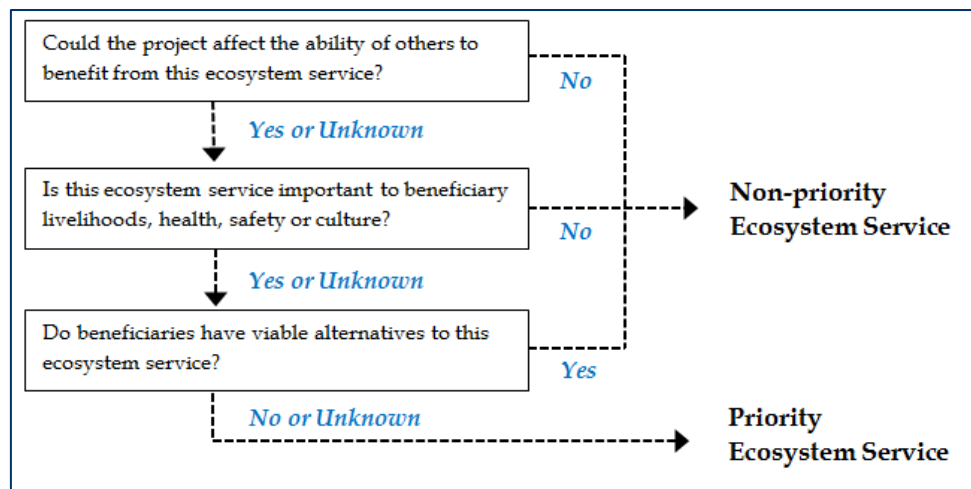
The IFC Performance Standards require that 'priority' ecosystem services are identified as part of the impact assessment process. The first stage of the prioritisation process was to identify which of the ecosystem services present the Project is likely to have a significant impact on (Type I) or that it depends on (Type II), provided that the Project has a direct management control or ability to influence the impact.

- **Type I** priority services are ecosystem services over which a project has direct management control or significant influence and where impacts on such services may adversely affect communities.
- **Type II** priority services are ecosystem services over which a project has direct management control or significant influence and on which the project directly depends for its operations.

The identified ecosystem services were then prioritised as either 'non-priority' or 'priority' on the basis of three questions, as per the approach advocated by the WRI (2013) as presented in Figure 6-35.

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(1) Millennium Ecosystem Assessment (2005) Ecosystems and Human Well-being Volumes 1-V.



Source: ERM 2020

**Figure 6-35 Logical approach followed for identifying Priority Ecosystem Services**

To enhance this process, and to provide additional information to feed into the assessment of potential impacts, scoped-in ecosystem services were also given a value rating.

The value attributed to an ecosystem service was based on an analysis of its importance to beneficiaries, the availability of sustainable alternatives and the resilience of species and habitats providing the service (refer to Section 3.5).

The importance of ecosystem services to beneficiaries was assessed according to the following criteria and assigned a rating from *minor* to *essential*.

- Intensity of use: e.g. daily, weekly or seasonal use of a provisioning service; number of downstream villages reliant on erosion or flood control services;
- Scope of use: e.g. household level versus village level; subsistence use, trade, or both;
- Geographic proximity;
- Degree of dependence: e.g. contribution of total protein in the diet or into the total income of the household.

The replaceability of ecosystem services was assessed according to the following criteria and assigned a rating from *low* to *high*.

- The existence of spatial alternatives (other sites where the same ecosystem service is also provided and that are close enough to be utilised by affected stakeholders);
- The sustainability of spatial alternatives given the potential for increased resource use, including a consideration of other users and the existing status and threats to the resource.

A rating of *low* replaceability indicates that there are no or few spatial alternatives, whereas a rating of *high* replaceability indicates that many alternatives are available in the area.

Based on an analysis of baseline data and comments made by stakeholders, the importance and replaceability of each service was assessed and a value rating attributed using the criteria matrix presented in Table 6-38. The results of this value assessment are presented in Table 6-39.



**Table 6-38 Criteria Used to Define the Value of Ecosystem Services**

		Replaceability of the service		
		High (many geographic locations possible)	Moderate (a few geographic locations possible)	Low (a few to no other possible geographic location)
Importance to beneficiaries of the ecosystem service	Minor	Low	Low	Medium
	Moderate	Low	Medium	Important
	High	Medium	Important	Priority
	Essential	Important	Priority	Priority

#### 6.17.4.4 Assessing Impacts to Ecosystem Services

In general terms, and as mentioned, the methodology of these steps is the same as for any of the other receiving elements, explained in each inherent section, like the Biodiversity Section. In general impacts add mitigation has already been assessed in each of those Sections as related to the elements that provide the service (either or both biodiversity elements, physical environment elements, social elements, cultural heritage elements). In this respect the impact characterisation and mitigation measures included in the impact assessment sections are also summarised and cross-referenced in this Section, focused and related to services resulting from the prioritisation process performed above.

Impacts on priority ecosystem services are in some cases assessed twice, one related to the basic elements providing the service, it being physical or biological environment (column Significance of Residual Impact to Receptor) and a second time to cross check that the ecosystem service component in the assessed element has been taken into account (column Significance of ES impact). Also elements which have not been assessed previously, identified by assessing interlinkages and cross-cutting issues, are also included, using the same methodology.

In accordance with IFC PS6, impacts to priority ecosystem services which the Project is most likely to negatively affect <sup>(1)</sup> are mitigated following a mitigation hierarchy strategy in order to maintain or restore the 'value and functionality' of these services. As with the impacts assessment, most mitigation measures are already identified and included for each receptor, but when relevant complementary measures or notes are included in the Additional Mitigation Measures to address Ecosystem Service Impact column..

#### 6.17.4.5 Stakeholder Engagement

Regular and ongoing stakeholder engagement, particularly with the traditional leadership and local communities, is central to the successful development of the Project.

As described in Section 3, these engagements provided information and highlighted stakeholder concerns about a range of issues which are critical to managing the risks associated with the Project. A summary of the engagement activities which have been used inform this report are presented below. A detailed account of engagement outcomes is presented in Appendix D.

#### 6.17.5 Results of Screening and Scoping

The outputs of the screening and scoping assessment for ecosystem services are summarised in Table 6-39.

<sup>(1)</sup> IFC PS6 Guidance Note 135 states that: Priority ecosystem services are defined in paragraph 24 of Performance Standard 6 as (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations (e.g., water).

**Table 6-39 Ecosystem Services Present in the Project Area and Potentially Affected by the Project**

Ecosystem Service	Description, Examples	Present and Potentially Affected by Project ✓ = Present; ○ = Not present
<b>Provisioning Services</b>		
Food: cultivated crops	Annual and permanent crops grown for subsistence use and commercial sale	✓
Food: wild-caught fish and shellfish & aquaculture	Sea and freshwater fish caught for subsistence or commercial sale; fish, shellfish, and/or plants that are bred and reared in ponds, enclosures, and other forms of fresh- or salt-water confinement for harvesting	○
Food: wild plants, nuts, mushrooms, fruit, honey	Fruit, nuts, wild plants, etc. collected in natural areas for consumption or sale. Bees.	✓
Food: wild meat	Animals hunted primarily for food (recreational hunting covered under cultural services).	○
Food: livestock grazing	Sedentary and nomadic livestock farming	✓
Biomass fuel	Wood, dung and plant matter collected for charcoal, fuel	✓
Extraction of Sand	Sand for concrete / bricks	✓
Timber and wood products	Wood collected for local use or for sale as timber, wood pulp, paper	✓
Non- wood fibres and resins	For example, cane, palm, straw, cotton, hemp, twine and rope, natural rubber, collected for local use or for sale	○
Freshwater	Freshwater for bathing, drinking, irrigation, laundry, household and/or industrial use	✓
Biochemicals, natural medicines, pharmaceuticals	Natural medicines, biocides, food additives, pharmaceuticals and other biological material for commercial or domestic use	○
Ornamental resources	For example, pelts, carved or decorative animal products, live animal trade	○
<b>Regulating Services</b>		
Regulation of air quality	The influence ecosystems have on air quality by extracting chemicals and dust from the atmosphere (ie serving as a 'sink') or emitting chemicals to the atmosphere (ie serving as a 'source')	✓
Climate regulation: global	Vegetated areas sequester CO <sub>2</sub> , with implications for global climate change	○
Climate regulation: local	Regulation of temperature, shade and rainfall by ecosystems (eg forests can impact regional rainfall levels)	✓

Ecosystem Service	Description, Examples	Present and Potentially Affected by Project ✓ = Present; O = Not present
Regulation of water timing and flows	Influence ecosystems have on the timing and magnitude of water runoff, flooding, and aquifer recharge	✓
Water purification and waste treatment	Role played by vegetation in the filtration and decomposition of organic wastes and pollutants and the assimilation and detoxification of compounds	✓
Shoreline protection (coastal processes)	Role of natural habitats (eg wetlands, beaches, reefs) in protecting crops, buildings, recreation areas from waves, wind and flooding from coastal storms	O
Fire regulation	Regulation of fire frequency and intensity (eg dense forest can provide firebreaks).	O
Erosion regulation	Role of vegetation in regulating erosion on slopes and riparian areas	✓
Pest regulation	Predators from forests, grassland areas, etc. may control pests attacking crops or livestock	✓
Disease regulation	Influence ecosystems have on the incidence and abundance of human pathogens	✓
Soil fertility	Soil fertility is maintained through hydrological processes, forest leaf litter and build-up of peat in the swamps	✓
Genetic resources	Genes and genetic information used for animal breeding, plant improvement, and biotechnology	✓
<b>Cultural Services</b>		
Sites and habitats of spiritual or religious value	Natural spaces or species with spiritual or religious importance	✓
Traditional practices	Cultural value placed on traditional practices such as hunting, fishing, crafts and use of natural resources	✓
Recreation and tourism	Use of natural spaces and resources for tourism and recreation (eg swimming, boating, hunting)	✓
Aesthetic value	Cultural value placed on the aesthetic value provided by landscapes, natural landmarks	✓
Educational and inspirational values	Information derived from ecosystems used for intellectual development, culture, art, design and innovation	✓

Ecosystem Service	Description, Examples	Present and Potentially Affected by Project ✓ = Present; O = Not present
<b>Supporting Services</b>		
Biodiversity Importance	Location within internationally important Biodiversity Areas,	✓
Pollination	Birds, insects and some small mammals pollinate certain flora species, including some agricultural crops	O
Nutrient cycling	Flow of nutrients (eg, nitrogen, sulphur, phosphorus, carbon) through ecosystems	O
Water cycling	Flow of water through ecosystems in its solid, liquid, or gaseous forms.	O
Soil formation	Natural soil-forming processes throughout vegetated areas	O
Maintenance of Terrestrial Biodiversity	Natural spaces that maintain species populations and protect the capacity of ecological communities to recover from disturbances	✓
Maintenance of Marine Biodiversity	The Project area extends into the marine environment, which supports important fishing biodiversity and resources	O

A total of 25 ecosystem services have been identified as being potentially affected by the Project in the Project AoI.

Provisioning ecosystem services that have been scoped out of the assessment are those which are not significant in the Project AoI.

Climate regulation has been scoped out as it is largely unaffected by the Project on a significant scale, and is proxied through other services (forestry, biodiversity, water cycling, etc) Additionally, the type and extent of vegetated areas within the Project footprint will not provide a significant climate regulating service at the global or local level.

It is noted that all five supporting services defined by the Millennium Ecosystem Assessment (pollination, nutrient cycling, water cycling, soil formation, habitat provision) are present in the Project AoI. However, since supporting services are not directly used but rather support other ecosystem services, these services have not been directly assessed, with the exception of the habitat provision service. Instead they are addressed elsewhere in the assessment of the provisioning, regulating and cultural services that they support. For example, changes to primary production are addressed in the effects on food resources and non-use services of biodiversity.

### **6.17.6 Results of Ecosystem Services Prioritisation**

This Section discusses the ecosystem services present within the Project AoI and considers their importance to local communities, their replaceability, and their sustainability, to determine which are considered to be priority services.

Ecosystem services are rated as of priority or non-priority by virtue of the application of the WRI logical assessment process. Additionally, those given a 'priority' value rating in are considered to be priority ecosystem services as defined by IFC PS6.

Through presentation and consideration of baseline data, the following ecosystem services have been identified as priority ecosystem services:

- Freshwater; and
- Sites and habitats of spiritual or religious value & Traditional practices.



## 7. CUMULATIVE IMPACTS

### 7.1 Introduction and Approach

This section presents a preliminary cumulative impact assessment (CIA) of the Project, comprising an initial description of the identified potential cumulative impacts with respect to other identified significant projects being developed within or near the sphere of influence of the Project (“Project Area”). It also sets out, where applicable, the mitigation measures to either prevent or minimise risks related to potential cumulative impacts in consideration also of those mitigation measures already planned within other topics of the MDR. This CIA will be presented in more detail in the ESIA report, by including relevant information gathered by then.

The international lender requirements of IFC PS1 specify that risks and impacts of a project are to be analysed in such a CIA, *inter alia*, with respect to cumulative impacts from (i) other existing projects or conditions gathered from baseline surveys, review of available published information and stakeholder engagement activities, and (ii) other future developments (including future stages of the project itself) that are realistically defined at the time the ESIA is undertaken and for with the sphere of influence of the various projects or developments may overlap.

Cumulative impacts are thus defined for this MDR as impacts which result from incremental changes caused by the Project together with other presently ongoing, or reasonably foreseeable future planned actions/projects within the Project Area <sup>(1)</sup>.

Depending on the type/characteristics of other identified projects and their specific impacts, the main issues of concern with respect to the CIA can thus include any type of impact that is considered in the MDR and further in the ESIA.

#### 7.1.1 Objectives

The objectives of the CIA are as follows:

- To determine if the combined impacts of the Project, other projects and activities, and natural environmental and social drivers will result in a Valued Environmental and Social Component (VEC) condition (or “receptors and resources”) that may put the sustainability of a VEC at risk (ie exceed a threshold for VEC condition which is an unacceptable outcome); and
- To determine what management measures could be implemented to prevent an unacceptable VEC condition; this may include additional mitigation of the Project being assessed, additional mitigation of other existing or predictable future projects, or other regional management strategies that could maintain VEC condition within acceptable limits

The overall aim of the CIA is to avoid/minimize any of the identified cumulative impacts.

#### 7.1.2 Assessment Methodology

The evaluation of potential cumulative impacts is highly dependent on the particular locations/activities under review, and therefore each situation will be assessed qualitatively on a case-by-case basis.

As above, the approach to the CIA has been undertaken in line with the *IFC Good Practice Handbook: Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Markets*. In line with the Handbook’s proposed approach, a Rapid Cumulative Impact Assessment (RCIA) approach is considered to be appropriate for the Project as it considers the challenges to conducting a CIA in an emerging market, which apply in this case, namely:

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(1) The definition is also based on that given in the EC Document “Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions”, May 1999; in addition, the IFC Good Practice Handbook “Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets, 2013, was used to inform the assessment process.

- Lack of baseline data related to the other project developments;
- Uncertainties associated with anticipated developments; and
- Limited and emergent, strategic regional, sectoral, or integrated resource planning schemes.
- In line with IFC PS 1 guidance notes (GN41) that the assessment should be “*commensurate with the incremental contribution, source, extent, and severity of cumulative impacts anticipated*”, this assessment attempts to focus only on the potentially significant cumulative impacts, and where the Project’s contribution to the cumulative impact is considered to be significant. In line guidance provided in Section 2 and 3 of the IFC handbook, potential mitigation measures are designed to focus on cooperation and information-sharing, in recognition of the limited control and direct influence/ decision-making ability of this private sector sponsor.
- In general, this cumulative impacts assessment follows the recommended approach to a RCIA as described by the IFC Handbook and is undertaken through the following five-step methodology:
- **Step 1:** *Definition of the relevant spatial and temporal boundaries;*
- **Step 2:** *Identification of key VECs and screening/Identification of potentially relevant other projects in the region;*
- **Step 3:** *Determine present conditions of the VECs; and*
- **Step 4 & 5 & 6:** *Assessment of potential cumulative impacts and identification of appropriate mitigation measures (1).*

The outcomes of these steps are carried out in the following sections.

### 7.1.3 Information Sources

The technical background information presented in this Section is drawn from the baseline information gathered through the ESIA process. This baseline information gathering included primary data collection, review of relevant existing scientific sources as well as review of regional planning documentation.

The key potential cumulative impacts are screened also considering the outcomes of the impacts assessment process.

The CIA also cross-references the stakeholder engagement process and outcomes from discussions and inputs from public and statutory stakeholders is considered. The scoping engagement discussions have provided inputs with regard to the identification of key issues, as applicable to the VEC confirmation. Although the specific exercise of identifying VECs for the RCIA was carried out with local stakeholders, through the engagement and contributions during the scoping engagement and baseline studies, the stakeholders have identified key issues important to the relevant stakeholder groups, which is reflected in the impact assessment, a key input to the CIA (Step 2).

Additional specific information is included as necessary for the description or assessment on a case-by-case basis. Information on potential other projects has frequently been obtained from publicly available sources.

## 7.2 Step 1 – Defining Spatial and Temporal Boundaries

### 7.2.1 Spatial Boundaries

The relevant spatial boundaries for this CIA are essentially the same as the specific Area of Influence (Aol) defined in Section 3 of this MDR Report for each relevant topic; this area typically extends

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(1) Note that Steps 4, 5 and 6 are included as one element here within the approach as the results of assessment and proposed mitigation are presented (in one table) for each of the projects where there are considered to be overlapping VECs.

(depending on the topic) from about 100m to 1000m (e.g. for visual and landscape features) as measured from the centre-alignment of the road.

For the purpose of the subsequent Screening in Step 2, a regional approach is used considering a zone of about 10-15 km (or more) from the Project; the intent here in the screening is to be inclusive of projects that might reasonably be relevant for the CIA, and if doubtful they are included. For the impact assessment in Step 4, 5 & 6, a more narrow focus is then made as appropriate for the relevant assessment topics.

### 7.2.2 Temporal Boundaries

The temporal boundary of the CIA formally encompasses the entire Project life-cycle, from construction through long-term operations. Nevertheless, the CIA process is inherently constrained by the ability to reasonably predict future events and trends, including (as will be discussed in the Screening in Step 3), the planning/implementation of other relevant projects in the region. Therefore, for the purpose of this CIA, consideration is given of the construction phase and, for operations – to the extent feasible for discussion and assessment of cumulative impacts with the other projects.

## 7.3 Step 2 – Identification of VECs and Screening of other Projects in Region

The ESIA process identified a number of VECs in the Project area that may be subject of potential impacts from the Project – and other relevant projects in a cumulative manner.

The outcomes of the impact assessments were reviewed to identify VECs that are impacted by the Project, and further narrowed by considering those where the Project would be a significant contributor to any cumulative impact realized. These significant impacts are considered to represent the development's contribution to cumulative impacts. Full details of all receptors and potential impacts are described in the respective MDR sections.

Relevant VECs to be considered within the RCIA are therefore considered to be:

- Water Resources (Construction);
- Biodiversity and Conservation (Construction and Operation);
- Land and livelihoods (Construction and Operation);
- Community Health and Safety (Construction and Operation);
- Archaeology and Built Heritage (Construction and Operation);
- Unplanned Events - Unplanned Spillages (Construction and Operation); and
- Unplanned Events - Community Health and Safety (Construction and Operation).

The approach and logic used to identify the VECs is shown in the table below.

Table 7-1 Key VECs

Aspect	Impact	Residual Impact after Mitigation	Receptor/Resource	VEC Identified?
<b>Construction</b>				
Soils	Loss of soil resources due to erosion	Negligible to Minor	Soil in the immediate RoW	No Per Section 6.6 the soils in the region are not particularly sensitive, and given the localised potential area of cumulative effects, this is not considered an important attribute in assessing risk.
Water Resources	Availability and Quality of Water Resources	Negligible to Minor	Surface water bodies crossed	<b>Yes</b> Fresh water resources are considered to be a provisioning ecosystem service
Waste Management	Disposal of excavated waste soil, and hazardous waste generation during construction activities	Moderate	Direct Area of Influence	<b>Yes</b> Soil, surface water and groundwater
Biodiversity And Conservation	Disturbance to vegetation and habitat loss and fragmentation as a result of the construction activities	Minor	Immediate RoW	<b>Yes</b> Shai Hills area only
Landscape and Visual	Change of landscape due to changes in land use during construction activities	Minor	Residents in the immediate vicinity of the RoW	<b>Yes</b> Particular VECs
	Visibility of new structures	Impacts can range from moderate negative to positive, depending on location and viewer perception	Residents in the immediate vicinity of the RoW	No. This does not meet the definition of any of the four categories of a VEC
Land and livelihoods	Temporary loss of livelihoods and household income as a result of temporary land take and loss of access to land	Moderate	Identified affected households	<b>Yes</b> Social conditions (economic)
	Physical displacement of Project-Affected People during construction	Moderate	Identified affected households	<b>Yes</b> Social conditions (economic)
Community Health and Safety	Community Safety (Road Accidents, Site Trespass)	Minor	Residents in the immediate vicinity of the RoW	<b>Yes</b> Social conditions (health)
	Environmental Health (Noise and Air)	Minor	Residents in the immediate vicinity of the RoW	<b>Yes</b> Social conditions (health)
	Interaction with Project Workforce	Minor	Residents in the immediate vicinity of the RoW	<b>Yes</b> Social conditions (health)
Worker's Health and Safety and Workers' Rights	Effects on worker health and safety and labour rights	Minor	Maintenance workers	No No potential for cumulative effects as workforce will only be used for Project
Archaeology and Built Heritage	Complete or partial removal of cultural heritage assets and significant change of the setting	Minor	Cultural material and immaterial heritage within the project Aol - Immediate RoW	No This does not meet the definition of any of the four categories of a VEC
Access to Infrastructure and Services	Disruption to traffic and transportation	Minor	Residents in the immediate vicinity of the RoW	No This does not meet the definition of any of the four categories of a VEC
Unplanned Events - Unplanned Spillages	Reduction in local soil quality	Minor	Soil in the immediate RoW	No Per Section 6.6, the soils in the region are not particularly sensitive, and given the localised potential area of cumulative effects, this is not consider an important attribute in assessing risk.
	Reduction in surface water	Minor	Surface water bodies crossed (See Figure 6-7)	<b>Yes</b> Fresh water resources are considered to be a provisioning ecosystem service
Unplanned Events - Community Health and Safety	Risk during construction activities	Minor	Residents in the immediate vicinity of the RoW	<b>Yes</b> Social conditions (health)

Aspect	Impact	Residual Impact after Mitigation	Receptor/Resource	VEC Identified?
	Effects from unplanned spillages	Minor	Residents in the immediate vicinity of the RoW	<b>Yes</b> Social conditions (health)
<b>Operations</b>				
Biodiversity and Conservation	Increase in fauna mortality due to strikes by vehicles	Minor	Birds in Aol	<b>Yes</b> Wildlife populations
Visual Amenity	Deterioration of visual amenity	Minor	Residents in the immediate vicinity of the RoW	No This does not meet the definition of any of the four categories of a VEC
Land and Livelihoods	Permanent loss of livelihoods and household income due to permanent land take and restrictions; severance.	Minor	Identified affected households	<b>Yes</b> Social conditions (economic)
Community Health and Safety	Traffic accidents	Minor	Residents in the immediate vicinity of the RoW	<b>Yes</b> Social conditions (health)
Unplanned Events - Unplanned Spillages	Reduction in local soil quality	Minor	Soil in the immediate RoW	No Per Section 6.6, the soils in the region are not particularly sensitive, and given the localised potential area of cumulative effects, this is not consider an important attribute in assessing risk.
	Reduction in surface water	Minor	Surface water bodies crossed	<b>Yes</b> Fresh water resources are considered to be a provisioning ecosystem service
Unplanned Events - Community Health and Safety	Effects from unplanned spillages	Minor	Residents in the immediate vicinity of the RoW	<b>Yes</b> Social conditions (health)

### 7.3.1 Approach to identifying other relevant projects in the region

The purpose of the Screening is to identify those other projects and activities in the region that could potentially have impacts that overlap spatially and temporally (per Step 1) with impacts of the Project on any the VECs identified.

As a first step, a “long-list” was prepared of known and reported larger infrastructure and other projects in some stage of planning or development in the wider region – areas crossed by ECR.

Each project in the Screening Table was then screened for relevance in the CIA via the evaluation of the project characteristics (namely type of project, proximity to the Project, and expected timing of construction and operations) compared to a set of Screening Considerations to determine the potential for likely cumulative impacts:

- **Spatial Overlap:** Are the two projects close enough to each other that the Areas of Influence are likely to affect each other?
- **Temporal Overlap:** Do the timelines of key activities (namely Construction and Operations) overlap with each other?
- **Common VECs:** Which VECs may be affected cumulatively by both projects (considering the previous special and temporal factors)?
- A qualitative conclusion was then given if the specific project is either “Screened In” or “Screened Out” of further consideration in this CIA.
- In addition, the current status of other projects was evaluated for this CIA as follows:
- For projects already in existence and operating: any existing emissions/ impacts of the project would already be reflected in the baselines studies conducted for this ESIA and hence integrated within the impact assessment and any mitigation measures foreseen; as such, they are screened out of the CIA;
- For projects currently under construction or approved and about to commence construction: reasonable assumptions are made about likely emissions/ impacts that may occur with the spatial and temporal boundaries of the CIA; such projects are usually screened in;
- For projects that are reportedly planned, but the start of construction is uncertain (and/or the project is under public dispute): unless such a project potentially has a direct and significant impact on shared VECs spatial and temporal boundaries, such projects are considered speculative and typically screened out.

This analysis is summarized in Table 7-2.

Based on this evaluation, potential adverse cumulative impacts are considered possible in relation to the following projects:

- Tema-Akosombo railway line;
- ECR Lot 2;
- Tema Motorway Interchange – Phase 2;
- ECR Lot1 tributary roads (access to local villages);
- Quarries and Borrow Pits; and
- Tema Port Expansion.



**Table 7-2 Other Projects and Developments - Screening Step 3**

Characteristics of Other Projects					Screening Considerations				Result
No	Name	Proximity to Project	Construction Period (start)	Operation Period (start)	Common VEC?	Spatial Overlap?	Temporal Overlap?	Comments	Screened in?
<b>Railway</b>									
01	Tema-Akosombo railway line	Projects intersect at KM 15 Km +420 and 61 Km + 750.	Is reportedly 70% complete (Ghana Railway Development Authority, August 2020).	March 2021	Local communities in relation to noise and community health & safety.	Yes	Operations	97.6 Km Tema-Akosombo railway line is a part of the Tema-Mpakadan railway line, under the Ghana-Burkina interconnectivity railways project.	Yes Under construction and crosses the Project in two locations
<b>Road Projects</b>									
02	ECR Lot 2	Adjoining Project	2021 (tentatively)	Long-term, same as Project	Local communities in relation to traffic risks and community health & safety as well as local infrastructure integrity	Yes	Operations	Lot 2: Akosombo + 75 Km, funding stage, EPC - GS International Developers Limited (China State Hualong Construction)	Yes Part of the ECR
03	Tema Motorway Interchange – Phase 1	Adjoining Project – southern limit	Concluded	Long-term, same as Project	Local communities in relation to traffic risks and community health & safety as well as local infrastructure integrity	Yes	Operations	Improvements to a 5 leg roundabout which connects key strategic routes including the Tema-Accra Motorway, Tema Port, ECL Lot1 and the Tema-Aflao Road.  The previous roundabout acted as a constraint on traffic entering the ECR Lot1 road and therefore traffic levels decreased once this junction is concluded.	No Construction complete
04	Tema Motorway Interchange – Phase 2	Adjoining Project – southern limit	2021	Not defined	Local communities in relation to traffic risks and community health & safety as well as local infrastructure integrity	Yes	Construction (probably)	Ghana has signed a pact with the Japanese government to commence phase two of the Tema Motorway Interchange project that aims the transformation of the parallel two-tier interchange into a three-tier to further hasten turnaround time at the interchange.	Yes Construction to start (tentatively) in 2021
05	Tema - Aflao Road Project	Adjoining Project – southern limit	2021	Not defined	BHM Construction International (UK) Ltd / UK Export Finance / ESIA	No	Construction (probably)	Project begins at the Tema Roundabout + 1Km in the Greater Accra Region running parallel to the country's coastlines, through an urban/industrial environment incorporating mixed-use towns such as Dawhenya and ends at Central University intersection (17 Km). The section of road forming part of the total project extends over approximately 167 km from Tema to Aflao on the Togo border. The highway is a major interstate transport infrastructure facility that not only forms the primary link, but also serves as the backbone for a significant and growing coastal residential, economic and recreational population.  Financial Arrangements for the Project - is provided under a Loan Agreement with United Kingdom Export Finance (UKEF) from JP Morgan Chase Bank, UK and Mauritius Commercial Bank Limited	No Construction to start (tentatively) in 2021 but not spatially connected to the Project, rather to Tema Motorway Interchange
06	Accra-Tema Motorway Expansion PPP Project	Adjoining Project – southern limit	2021	Not defined	Local communities in relation to traffic risks and community health & safety as well as local infrastructure integrity	Yes	Construction (probably)	The Accra-Tema motorway is a 19km dual carriageway. It forms an integral part of the National Route 1 (N1) starting from Aflao (in the Volta Region) and ending at Elubo (in the Western Region). It is also part of the Trans West African Highway (Abidjan-Lagos Corridor), linking the city of Accra, the Kotoka International Airport and Tema Port.	No Construction to start (tentatively) in 2021 but not spatially connected to the Project, rather to Tema Motorway Interchange
07	ECR Lot1 tributary roads (access to local villages)	Adjoining Project	Concluded	Long-term, same as Project	Local communities in relation to traffic risks and community health & safety as well as local infrastructure integrity	Yes	Construction and Operations	The Project does not include any intervention on these roads only in the section connecting it with ECR1. However accessibility to this roads can amplify some of the social impacts identified.	Yes The project will include upgraded connections to these roads
08	Eastern Corridor Road Development Program	Approx. 30 Km to the East of Lot 1	Not defined, currently EPC tendering	Uncertain	Local communities in relation to traffic risks and community health & safety as well as local infrastructure integrity	No	No	Eastern Corridor Road Development Program (African Development Bank, currently tendering for EPC)  The primary objective of the Programme is to contribute towards an efficient transportation system that promotes Ghana's ports and corridors to enhance inclusiveness, stimulate socio- economic development ,and facilitate domestic and regional trade and integration. This component covers the main civil works contracts incorporating: i) construction of two road sections -Section 3 Dufor	No

Characteristics of Other Projects					Screening Considerations				Result
No	Name	Proximity to Project	Construction Period (start)	Operation Period (start)	Common VEC?	Spatial Overlap?	Temporal Overlap?	Comments	Screened in?
								Adidome –Asikuma Junction (39.2km) and Section 4 Asutuare – Aveyime (23.9km) including 2 no. interchanges at Dufor Adidome and Asikuma Junction.	
<b>Quarries and Borrow Pits</b>									
09	Quarries: 8 have been identified in the Preliminary Design Borrow pits: 5 have been identified in the Preliminary Design	* Adjoining Projects	Concluded	Long-term	Local communities in relation to noise and community health & safety; waste management and biodiversity.	No	Construction and Operations	Several quarries and borrow pits have been identified as potential suppliers for raw materials.	Yes, Only the ones for which the location is known at the moment
<b>Public Infrastructures</b>									
10	Kpong Water Supply Expansion Project Phase II	Adjoining Projects	Undefined – currently under negotiations	Long-term, same as Project	Local communities in relation to traffic risks and community health & safety as well as local infrastructure integrity	Yes	Construction and Operations	The Kpong Water Supply Expansion project (Phase 1) is one of such interventions undertaken to improve water supply to the Greater Accra Metropolitan Area. EPC: China Gezouba Group, Lender: Exim Bank of China	No Very limited information <sup>1</sup>
11	Tema Port Expansion	Adjoining Project – southern limit	Ongoing	Not defined	Local communities in relation to traffic risks and community health & safety.	No	Construction and Operations	The Port of Tema is under an impressive expansion strategy since 2018. The goals are quite ambitious (as per the Ghana Ports and Harbours Authority's wider development plan, which includes a 35-year concession agreement signed in 2004 for the port's refurbishment.), as the port will be the largest and most efficient container terminal on the Western Coast of Africa with a deepest water draft. It has the potential to catapult Africa into a different level in the world shipping industry by creating new service routes and connections, and opening up the market for Africa. The hub port in Tema will connect Ghana to Africa's consumer markets through direct services, shorter transit times and competitive sea freight rates. It is expected to attract further investment in facilities and factories around Tema Port.	Yes Linked with Tema Motorway Interchange – Phase 1, Tema Motorway Interchange – Phase 2 and Accra-Tema Motorway Expansion PPP Project.

<sup>1</sup> <http://extwprlegs1.fao.org/docs/pdf/gha174499.pdf>

## 7.4 Step 3 – Determine Present Conditions of the VECs

The present conditions of the VECs identified are described in the respective baseline sections of this MDR - refer to the relevant sections for these descriptions.

The current understanding of baseline conditions has been used to identify and assess the potential cumulative impacts presented below.

## 7.5 Step 4 & 5 & 6 – Assessment of cumulative impacts and identification of mitigation measures

### 7.5.1 Approach

For each of the short-listed projects identified in the preceding Step 2, a qualitative assessment of potential cumulative impacts on the identified VECs is undertaken per the following sequence:

- Brief description of the relevant other project and location/activity, with reference made to respective ESIA Sections for further information regarding baseline conditions and other relevant data (if applicable);
- Assessment of key potential types of cumulative impacts on the VECs identified and estimation of significance and magnitude (as compared to the impacts of the Project on its own);
- Description of potential mitigation measures and residual cumulative impacts.
- Depending on the specific impact characteristics, it may or may not be feasible to assign a specific significance to the cumulative impacts. Where feasible, the significance criteria will be referred to for the corresponding types of impacts in the respective ESIA sections.

**[#01] Tema-Akosombo railway line**

**Brief Description:**

The Tema-Akosombo railway (97.6 Km) is part of the Tema - Mpakadan railway line under the Ghana-Burkina interconnectivity railways project, and is currently being constructed, including two bridges over ECR Lot 1. These are located in at 15 Km +420 and 61 Km + 750. Afcons Infrastructure Limited of India will be the EPC and EXIM Bank of India the Lender. In addition, Afcons campsite is located close to Shai Hills, along the N2.

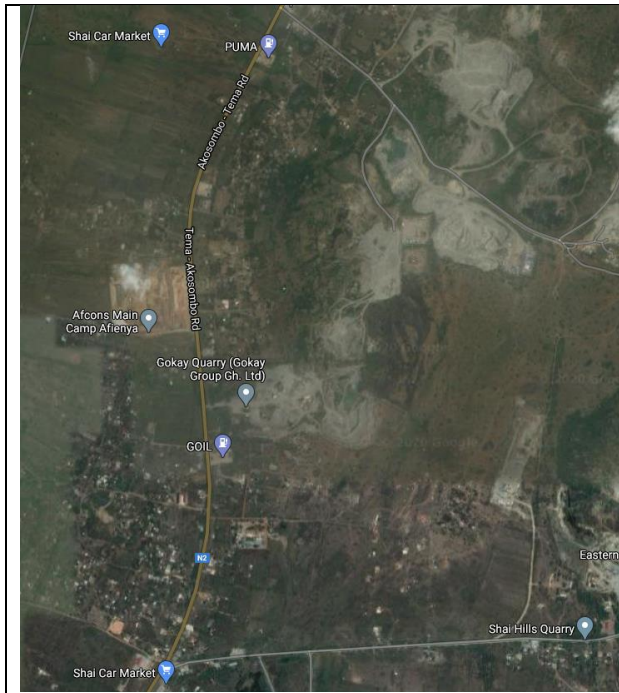


15 Km +420



61 Km + 750





Afcons campsite

**Potential cumulative impacts:**

This linear infrastructure was screened in for the CIA on the basis of its proximity to the Project area and the potential for common use of small roads through the same villages, thus cause impacts to local residents and community health and safety, as well as negative contribution to the surface water quality on the nearby streams. Any environmental emissions/impacts would be reflected from the ongoing construction activities in the baseline conditions. Additionally, as per the outcomes of the extensive stakeholder engagement held for the current Project, there are substantial references to non-favourable community expectations in terms of the payment of compensation during the resettlement process for this railway.

**Cumulative Assessment:**

**A. Construction:**

**Ecological VECs** *Community Health and Safety (Noise and Air Quality), Waste Management*

**Social-Landuse VECs** *Land and Livelihoods, Community Health and Safety (Road Accidents, Site Trespass)*

**Unplanned Events** *Unplanned Spillages*

**B. Operation:**

**Ecological VECs** *Community Health and Safety (Noise)*

**Social-Landuse VECs** *Land and Livelihoods, Community Health and Safety (Site Trespass) and Severance*

**A. Impacts on VECs during Construction**


Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: See Section 6	Resulting Impact Significance of Project: <b>Minor</b>
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**Discussion:** The railway project is subject to international financing, so it should include specific mitigation measures and an ESMP to reduce HSE impacts. A monitoring program is probably ongoing (to be confirmed in the ESIA). Most probably there will be no overlap between the construction activities between both projects. It is also plausible that the demand for raw materials both for the railway and ECR Lot 1 can trigger an overflow of the local quarries and borrow pits. Same applies to the existing waste management facilities.

Resulting Cumulative Significance:  
**Moderate**

**Additional Mitigation Measures:**

Access periodic HSE monitoring reports (by liaising with EPA) to better understand potential deviances.  
 Engage with the railway EPC to align the implementation of specific management plans (emergency and preparedness, traffic, among

		<p>others) and to evaluate potential grievances received, analysing causes for those and plan for integrated interventions.                  The Project Community Representative (CR) should pay special attention to landowners/residents in this nodal area where the two projects overlap, and should reach out early to Afcons Infrastructure Limited representatives to ensure a mutual understanding of the commonly affected PAPs. The Road SEP should include Afcons Infrastructure Limited as an interested stakeholder.                  Consider as an option the use of Afcons campsites.</p>	
<b>B. Impacts on VECs during Operation</b>			
Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: See Sections 6.5 to 6.17	Resulting Impact Significance of Project: <b>Minor</b>
<p><b>Discussion:</b> The expected cumulative aspects during operation are mostly focused on Land and Livelihood (potential decrease on the value of property), Community H&amp;S (noise) and severance. Figure below illustrate the current context, upon the construction of the railway close to the existing N2.</p> 			Resulting Cumulative Significance: <b>Moderate</b>
<b>Additional Mitigation Measures:</b>	<p>On the areas identified as having high potential for significant severance impacts, detailed analysis should be developed to minimize mobility constraints for the affected populations.</p>		



[#02] ECR Lot 2			
<p><b>Brief Description:</b>                      The Eastern Corridor Road (ECR) – from Tema Motorway Roundabout in the Greater Accra Region until Kulungugu, on the North-Eastern Border with Burkina Faso, approx. 773 Km - was divided into seven (7) Lots.                      The closest lot to the Project (being Lot 1) is Lot 2 (Akosombo + 75 Km). Currently the developers are seeking for funding and the construction is expected to start in 2021.</p>			
<p><b>Potential cumulative impacts:</b>                      Each segment of the overall road will be expected to have similar impacts in their respective spatial footprints as have been described in this ESIA for the Lot 1 segment, during both construction and operations. Construction impacts on VECs such as local communities, soil, groundwater and freshwater will overlap spatially only at the connection points, but temporally. Assuming similar mitigation measures are applied as specified for this Project, the resulting residual impacts in the other segments are expected to also be comparable.                      The overall impact of the ECR project (including Lot 1, Lot 2 and the other more distant lots) for the wider region is expected to be positive in many respects, as the ECR is an important infrastructure especially for freight movement within Ghana and neighboring countries such as Burkina Faso, Niger, Mali and beyond, and also plays an important role in the North-South trade corridor by providing a shorter access from the Port of Tema and improving mobility between the Volta, Northern and Upper East Regions of Ghana and between Ghana and neighboring countries.</p>			
<p><b>Cumulative Assessment:</b>  <b>A. Construction:</b>                      Ecological VECs <i>Water resources. Waste Management</i>                      Social-Landuse VECs <i>NA</i>  <b>B. Operation:</b>                      Ecological VECs <i>Air Quality and Emissions</i>                      Social-Landuse VECs <i>NA</i></p>			
Impacts on VECs during Construction			
Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: See Sections 6.5 to 6.17	Resulting Impact Significance of Project: <b>Minor</b>
<p><b>Discussion:</b>                      At this stage it is not clear the strategy on water management, <i>i.e.</i> availability and quality of water resources can potentially be significant if groundwater will be used during construction. Also the phreatic vulnerability to pollution should be considered.</p>			Resulting Cumulative Significance: <b>Minor</b>
<b>Additional Mitigation Measures:</b>	No additional measures are proposed to manage cumulative effects.		
Impacts on VECs during Operation			
Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: See Sections 6.5 to 6.17	Resulting Impact Significance of Project: <b>Minor</b>
<p><b>Discussion:</b> NA                      During operations, it is clear that the road expansion will enable savings of time and fuel with corresponding lower emissions – and especially avoidance of traffic exposure (noise, dust emissions, nuisance etc.) to the many road users and communities along the alignment. A decrease on the traffic accidents risk is also expected due to better signalling and DART measures implementation.</p>			Resulting Cumulative Significance: <b>Positive, Moderate</b>
<b>Additional Mitigation Measures:</b>	No additional measures are proposed to manage cumulative effects.		

[#04] Tema Motorway Interchange – Phase 2			
<p><b>Brief Description:</b>                      Ghana has signed a pact with the Japanese government to commence phase two of the Tema Motorway Interchange project that aims the transformation of the parallel two-tier interchange into a three-tier to further hasten turnaround time at the interchange. Forming part of government's international corridor road improvement project to facilitate trade within the West African sub-region, the project is to be undertaken by Messrs Shimizu Dai-Nippon.                      The distance between Tema Motorway Interchange and Ashaiman roundabout (southern limit of the Project) is approx. 500 m. As such, there is not really any spatial overlap between the two projects.</p>			
<p><b>Potential cumulative impacts:</b>                      This infrastructure was screened in for the CIA on the basis of its proximity to the Project area, thus cause impacts to local residents and community health and safety. Assuming that the construction periods of both projects would happen at the same time, any environmental emissions/impacts would be reflected from the ongoing construction activities in the baseline conditions. During operation, the cumulative impacts are generally positive, as the current traffic congestion (that promotes diversion through local paths), would be significantly reduced. Associated to the decrease in emissions, the cumulative impact would also be felt in terms of the increase on the export of goods from Accra and Tema port towards the northern regions of the Country.</p>			
<p><b>Cumulative Assessment:</b>  <b>A. Construction:</b>  <b>Ecological VECs</b> <i>Water resources, Waste Management, Community Safety (Road Accidents, Site Trespass), Environmental Health (Noise and Air)</i>  <b>Social-Landuse VECs</b> <i>Land and livelihoods</i>   <b>B. Operation:</b>  <b>Ecological VECs</b> <i>Air Quality and Emissions</i>  <b>Social-Landuse VECs</b> <i>Community Health and Safety</i></p>			
Impacts on VECs during Construction			
Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: Sections 6.5 to 6.17	Resulting Impact Significance of Project: <b>Minor</b>
<p><b>Discussion:</b>                      Substantial waste produced during construction can induce an overflow on existing landfills. Additionally, the need for raw materials sourced in the different quarries localized within the region, can increase significantly the exploration area of these quarries (and borrow pits).                      The expansion of the Tema Interchange can trigger an increase in traffic flows on ECR Lot 1 by attracting additional usage of this strategic route.                      Air quality and noise levels can have a significant impact on community health and safety.                      It is not clear at this stage if the project would require physical resettlement of financial displacement. Considering Tema Interchange Phases 1&amp;2 and ECR Lot 1, the land ownership in this area has changed substantially in the last years. This can amplify the related impacts described in Section 7 of this MDR.</p>			Resulting Cumulative Significance: <b>Moderate</b>
<b>Additional Mitigation Measures:</b>	No additional measures are proposed to manage cumulative effects.		
Impacts on VECs during Operation			
Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: See Section 6	Resulting Impact Significance of Project: <b>Minor</b>
<p><b>Discussion:</b>                      During operations, it is clear that the Interchange will facilitate the local traffic, particularly, differentiating the traffic flow towards the Tema port, East (Tema - Aflao Road) and ECR Lot1, enabling savings of time and fuel with corresponding lower emissions – and especially avoidance of traffic exposure</p>			Resulting Cumulative Significance: <b>Positive</b>

(noise, dust emissions, nuisance etc.) to the many road users and communities in the surroundings.	
<b>Additional Mitigation Measures:</b>	No additional measures are proposed to manage cumulative effects.

**[#07] ECR Lot1 Tributary Roads**

**Brief Description:**

An overview of the regional tributary roads shows that the Project will rehabilitate the access lanes to those roads as follows:

ID	PK	Type*	Road Identification
1	1+400	Secondary	Ashaiman – Klagon Road (flyover)
2	2+600	Secondary	Afariwa Road
3	3+700	Secondary	Golf City Road
4	5+300	Secondary	Kpone Barrier Road
5	12+250	Secondary	Apolonia Road
6	13+300	Secondary	Afienya – Dodowa Road
7	16+400	Secondary	Kings Avenue
8	23+460	Secondary	Lartey Road (Doryum Junction)
9	32+300	Secondary	Gigedokum Road
10	34+080	Secondary	Asutsuare Road (flyover)
11	46+900	Secondary	Somanya – Okwenya Road / Akuse Road
12	54+400	Secondary	Oterkpalu – Kpong Road
13	64+550	Secondary	Asugyaman – Atimpoku Road

\* As per GHA Road and Design Guide 1991.

The Project does not include any intervention on these roads only in the section connecting it with ECR1.

**Potential cumulative impacts:**

The improved accessibility to this roads can:  
 Amplify some of the social impacts identified;  
 Increase traffic in these roads;  
 Potentiate changes in the land use (housing, farming, commerce and industry);  
 Reduce risks related with traffic accidents and related community health and safety.

**Cumulative Assessment:**

**A. Construction:**

**Ecological VECs** *Landscape, Community Safety (Road Accidents, Site Trespass), Environmental Health (Noise and Air)*

**Social-Landuse VECs** *Land and livelihoods and Severance*

**B. Operation:**

**Ecological VECs** *Air Quality and Emissions*

**Social-Landuse VECs** *Severance, Community Health and Safety*

**Impacts on VECs during Construction**

Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: See Sections 6.5 to 6.17	Resulting Impact Significance of Project: <b>Minor</b>
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**Discussion:**  
 In terms of potential cumulative impacts, it's important to emphasise the severance (the junctions layout will be changed and mobility (pedestrians and vehicles) is likely to be changed – note that in 2 of the 13 junctions flyovers will be constructed.

Resulting Cumulative Significance:  
**Moderate**

**Additional Mitigation Measures:** No additional measures are proposed to manage cumulative effects.

**Impacts on VECs during Operation**

Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: See Sections 6.5 to 6.17	Resulting Impact Significance of Project: <b>Minor</b>
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**Discussion:**  
 During operation, positive cumulative impacts will be particularly related with community health and safety, notably the reduction of traffic incidents, and potential social development on this marginal territories.  
 Also, the improved accessibility to this roads can lead to a significant urbanising effect on the landscape character. In particular the potential

Resulting Cumulative Significance:  
**Moderate**

interaction of lighting, noise and loss of green and open space could alter the existing character of the landscape.	
<b>Additional Mitigation Measures:</b>	No additional measures are proposed to manage cumulative effects.

**[#09] Quarries and Borrow Pits**

**Brief Description:**

Several quarries have been identified as potential suppliers for raw materials (various grain size such as gravel, crushed gravel, sand, slag, etc.). At this stage it is unknown which of these will provide materials, as well as type and quantity of those materials.



Borrow Pits

**Potential cumulative impacts:**

During construction, the demand for raw materials will imply a higher use of resources on the local quarries (and borrow pits). The cumulative analysis on this additional demand should also consider other projects in the region as the Tema-Akosombo railway line (under development); ECR Lot 2 (under financing planning); Tema Motorway Interchange - Phase 2 (expected to start in 2021); and Tema Port expansion (Phase 2 under development). Several environmental and social impacts are expected. This will require full compliance with IFC PS2.

**Cumulative Assessment:**

**A. Construction:**

**Ecological VECs** *Water Resources, Waste Management, Biodiversity and Conservation, Landscape and Visual, Community Safety (Road Accidents), Environmental Health (Noise and Air Quality)*

**Social-Landuse VECs** *Community Health and Safety*

Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: See Sections 6.5 to 6.17	Resulting Impact Significance of Project: <b>Moderate</b>
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<b>Discussion:</b> It is not clear the cumulative impacts on the environment and community health and safety potentially triggered by the demand on raw materials. Aspects as biodiversity (proximity to Shai Hills), air quality, noise, surface and ground water water quality	Resulting Cumulative Significance: <b>Moderate to High</b>
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<b>Additional Mitigation Measures:</b>	Quarries and borrow pits to be used should be chosen also considering the significance of environmental and social impacts that can be triggered. Quarries nearby Shai Hills should not be priority. Full adherence to IFC PS2, regarding suppliers management.
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**[#11] Tema Port Expansion**

**Brief Description:**

Recently, Phase 1 of the expansion was concluded – it included building a 1,000 m long wharf which consists of 3 berths and 98 Hectares (242 Acres) terminal facility on land reclaimed from the sea with all drainage, sewage, water, fire, electrical and IT services, 45 million paving blocks laid down, a 12 MW back-up power station, major facilities including administration buildings for MPS and the Authorities, a maintenance workshop, a 60 bay unstuffing shed for Customs, 6 scanners, several gate facilities, a fire plant, sewage treatment facilities and 1400 reefer container plugs. The new harbour basin was created on a 3 Km long beach directly on the Atlantic Ocean and right on the Meridian Timeline. Building into the sea, from the beach, the breakwater root goes 1,550m into the ocean with a 2 Km long arm extending eastwards from the root of the breakwater parallel to the quay wall. The 3,558 m long breakwater is harbouring a vast 450 ha of maritime waterfront. Phase 2 is now underway, and will include the construction of the 4th and the last berth of the new port. This new contract adds another 400 meters of berth to the 1000 meter already being built creating a total of 1.4 Km of full capacity berth capable of handling vessels up to 16-meter draft, reported MPS.

This expansion efforts, also include the upgrade of the Accra-Tema Motorway into a six-lane road to reduce traffic congestion in the Tema port area.

**Potential cumulative impacts:**

Due to the distance between the Tema Port and the ECR Lot1, no cumulative impacts are expected during the construction. However positive impacts are predicted for the operation phase, as the rehabilitated ECR 1 will maximize the exports towards the central and northern regions.

**Cumulative Assessment:**

**A. Operation:**

**Social-Landuse VECs *Economy***

Sensitivity of Receptor(s): <i>High</i>	Magnitude of Impact: <i>Medium</i>	Planned Mitigation for Project: <i>NA</i>	Resulting Impact Significance of Project: <b>Same as in this ESIA</b>
Discussion: NA			Resulting Cumulative Significance: <b>Same as in this ESIA</b>
<b>Additional Mitigation Measures:</b>	No additional measures are proposed to manage cumulative effects.		

## 7.6 Conclusion

A total of eleven infrastructure projects in the region were identified that might be relevant for this CIA. These projects were systematically screened, considering the potential for similar and potentially cumulative impacts with the Project and either spatial overlap with the Project Area of Influence and/or temporal overlap with Project activities.

The assessment found that for various reasons outlined in the previous sections, five of the eleven projects were not relevant and the following projects were considered for further assessment of potential cumulative impacts. The following projects were considered:

- Tema-Akosombo railway line (under development);
- ECR Lot 2 (under financing planning);
- Tema Motorway Interchange - Phase 2 (expected to start in 2021);
- ECR Lot1 Tributary Roads (ECR Lot 1 Project components);
- Quarries and Borrow Pits (to be defined which will be used by the Project); and
- Tema Port expansion (Phase 2 under development).

Table 7-3 summarizes the CIA assessment, highlighting **the impacts on Ecological and social** VECs induced by the above mentioned projects.

Based on the assumption that mitigation measures are implemented for the Project as laid out in the previous ESIA sections, and additional communication and liaison mitigation actions indicated within the CIA, the expected significance of the cumulative impacts is the same as for the Project alone (usually **Minor**, sometimes positive).

No specific recommendations are made for monitoring or measurements of potential impacts in the field. However, a number of mitigation measures are recommended in respect of contacting the responsible persons of the relevant projects to coordinate construction logistics, mitigation measures and other topics, and to include such parties in the Project SEP to enhance ongoing communication.

Three Moderate cumulative impacts are expected and one of them would warrant additional specific technical mitigation:

- Tema-Akosombo railway line - Severance (during construction and operation of the ECR Lot1);
- ECR Lot1 Tributary Roads - Landscape and Visual, Land and Livelihoods and Community Health and Safety (during construction of the ECR Lot1); and
- Quarries and Borrow Pits – Water, Waste Management, Biodiversity and Conservation, Landscape and Visual, Land and Livelihoods, Community Health and Safety (during construction of the ECR Lot1). The magnitude of these cumulative impacts is highly dependent on the amount of raw materials needed by the different projects within the region.

It is important to note that the cumulative assessment has utilised available information on other likely developments. However, this assessment has only been able to take account of currently available information, and potential for cumulative impacts to occur due to subsequent projects currently at earlier stages of planning and/or design development is therefore identified where applicable in this assessment but cannot be quantified.

**Table 7-3 Summary of the Cumulative Impact Assessment**

Relevant Projects	Aspects								Resulting Cumulative Significance
	Water Resources	Waste Management	Biodiversity and Conservation	Landscape and Visual	Land and Livelihoods	Community Health and Safety	Unplanned Events - Unplanned Spillages	Unplanned Events - Community Health and Safety	
<b>Construction Phase</b>									
E need[#01] Tema-Akosombo railway line		Environmental			Social	Environmental Social	Environmental		(-) Moderate
[#02] ECR Lot 2	Environmental	Environmental							(-) Minor
[#04] Tema Motorway Interchange – Phase 2	Environmental	Environmental			Social	Environmental Social			(-) Minor
[#07] ECR Lot1 Tributary Roads				Environmental	Social	Environmental Social	Environmental		(-) Moderate
[#09] Quarries and Borrow Pits	Environmental	Environmental	Environmental	Environmental	Social	Environmental Social			(-) Moderate to High
[#11] Tema Port Expansion									
<b>Operation Phase</b>									
[#01] Tema-Akosombo railway line					Social	Environmental Social			(-) Moderate
[#02] ECR Lot 2						Environmental Social			(+) Moderate
[#04] Tema Motorway Interchange – Phase 2						Environmental Social			(+) Moderate
[#07] ECR Lot1 Tributary Roads						Environmental Social			(+) Moderate
[#09] Quarries and Borrow Pits									
[#11] Tema Port Expansion						Environmental Social			(+) Moderate

Legend: red (negative) and green (positive) interactions between the different projects and the considered aspects.

## 8. PRELIMINARY ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

### 8.1 Introduction and Scope

This Preliminary Environmental and Social Management Plan (pESMP) compiles the potential adverse impacts of the Project activities identified in the ESIA studies up to date and outlines mitigation measures required to reduce the likely negative impacts on the biophysical and social environment.

The pESMP details roles and responsibilities that will be assumed by each Project parties as leader and/or supporter. INZAG has already acknowledged its commitments in this regards and ERM understands that discussions between INZAG and GHA have indicated that they also understand their responsibilities in this regard given their prior involvement with international funded projects, although further alignments will be held over the coming weeks to finalise this on the basis of the final ESMP.

This pESMP will be updated based on further ESIA findings and will be a part of the ESIA report' annexes. INZAG and GHA will have responsibility for the implementation of the mitigation measures outlined in the ESMP during design, construction and operation phases; but may delegate responsibility to its INZAGs and subINZAGs, where appropriate. In cases where other individuals or organisations have responsibility for mitigation measures, this will clearly indicated within the pESMP Table 8-2.

### 8.2 Environmental and Social Commitments

Through the Project development and ESIA process up to date, mitigation measures have been identified to address the major potential environmental and social impacts associated with Project activities and listed as commitments to be implemented to improve environmental and social performance and minimize the risks.

The commitments take can be summarized as below:

- **Avoidance:** During the planning phases, potential impacts to sensitive resources are identified. Where feasible, locations or processes can be changed during the planning or design phases to avoid impact to these areas.
- **Minimisation:** Minimisation involves measures to reduce proposed impacts to a resource.
- **Management:** Management commitments include development of plans and procedures for ensuring that measures to protect the environment actually take place and are of the desired standard of practice.
- **Monitoring:** Commitments to monitoring are primarily to ensure the above measures are working properly and delivering the desired (and anticipated) results.

### 8.3 Management Plans

Following the completion of ESIA studies, the ESMP will outline the management plans which will be developed for each topic. These plans will set out how the mitigation measures will be put into practice, monitored and upheld. Up to date, the pESMP has identified the following plans that should be prepared by INZAG prior to construction commencing:

#### **Environmental:**

- Waste Management Plan;
- Hazardous Materials Management Plan;
- Biodiversity Management Plan;
- Biorestitution and Aftercare Plan;

- Emergency Preparedness and Response Plan;
- Traffic & Transportation Management Plan;
- Occupational Health and Safety Plan; and
- Chance Find Procedure;

**Social:**

- Severance Management Plan;
- Stakeholder Engagement Plan (SEP) - update;
- Employment and Workforce Management Plan;
- Community Health and Safety and Security Plan;
- Resettlement and Livelihood Restoration Plans (LRPs); and
- Local Content and Procurement Plan.

Together with this ESMP, these specific plans will form the overall Environmental and Social Management System (ESMS) for the Project. This list is not conclusive and possible modifications and/or additions will be included in the final ESIA study.

The plans have been listed in Table 8-1, alongside with how they related to Project activities and impacts, as well as the identified responsible party for each specific plan.

**Table 8-1 Management Plans**

Plan Name	Includes	Plan Owner
<b>Specific Management Plans- Environmental</b>		
Waste Management Plan	Project-related waste handling procedures for hazardous and non-hazardous wastes.	HSE Manager
Hazardous Materials Management Plan	Plan for the management of the hazardous substances used during Project lifetime.	HSE Manager
Biodiversity Management Plan	The BMP will take the form of an operational document for use by site managers and INZAGs, that aims at providing means of managing biodiversity (as per ESMP requirements), supported by community involvement and relevant partnerships that will offer guidance on the protection and recovery of species within the Project area and the management of ecological processes and existing ecosystem services.	HSE Manager
Emergency Preparedness and Response Plan	Administration (policy, purpose, distribution, definitions, etc.), organisation of emergency areas (command centres, medical stations, etc.), roles and responsibilities, communication systems, emergency response procedures, emergency resources, training and updating, checklists (role and action list and equipment checklist) and business continuity and contingency. The Plan will also include specifications for emergency communications as well as on-going public and community communication and disclosure.	Project Manager
Traffic & Transportation Management Plan	Controls over prescribed routes, driver training, vehicle maintenance, speed restrictions, appropriate road safety signage, and vehicle loading and maintenance measures and vetting procedures. Will also include specification for community awareness and safety programmes.	Project Manager
Occupational Health and Safety Plan	Procedures on chemical hazards, fire and explosions, confined spaces and on site-traffic hazards. Communication and training	Project Manager



Plan Name	Includes	Plan Owner
	programmes. Safety analysis and industrial hygiene surveys procedures. Monitoring, record-keeping and audit procedures.	
Chance Find Procedure	Procedural guideline to be followed in the event that previously unknown heritage resources or and burial grounds and graves are exposed or found during the life of the project.	HSE Manager
<b>Specific Management Plans- Social</b>		
Severance Management Plan	Local tracks, routes and crossing points will be identified using engagement with communities. Where needed, tracks will also be upgraded near these crossing points to ensure continued safe access for people and livestock.	HSE Manager
Stakeholder Engagement Plan (SEP) - update	SEP will build on engagement undertaken to date and specify interactions with community and other stakeholders, as well as finalising the grievance procedure to be used throughout the Project. Community and Employee awareness training and code of conduct procedures.	HSE Manager
Employment and Workforce Management Plan	Plan for local training and procurement for operations. Also specifies requirements for INZAGs during construction. The Plan will include policies and procedures for hiring of local labour, unskilled, semi-skilled and skilled labour.	Human Resources (HR) Manager
Community Health and Safety and Security Plan	The purpose of the CHSSP is to provide a clear set of actions and responsibilities for the control of impacts affecting the health and safety of the communities within the Project's area of influence. The plan includes measures to respond to exposure to diseases due to worker interaction, environmental change and safety (traffic, unplanned events, etc.)	HSE Manager
Resettlement and Livelihood Restoration Plans (LRPs)	This plan defines the procedures and the actions that will be taken to mitigate adverse effects, compensate losses, and provide development benefits to persons and communities affected by the Project.	HSE Manager
Local Content and Procurement Plan	Plan that defines the procedures to be established by the Project to create jobs, promote enterprise development and accelerate the transfer of skills and technologies.	HSE Manager

## 8.4 pESMP Table

This pESMP table summarises all of the various mitigation measures that will be set out in the ESIA report. The table shows the responsible entities for implementation for each item, the required timing by which the measure must be implemented, the indicator to demonstrate completion.

The overall, ultimate responsibility for implementation of a given measure always rests with the Ghana Highway Authority (GHA) as the Project Owner and subsequent Operator, whilst certain activities related to the design and construction stages of the Project are in first instance the responsibility of INZAG as the Project EPC Contractor. All contractors and subcontractors must adopt and comply with the policies and plans required as part of this pESMP.

As stated previously, the Project will be designed, built and operated in accordance with the applicable Ghanaian Regulations and the international standards and guidelines of the lending institutions, including IFC Performance Standards and EHS Guidelines. Together, the applicable standards for the Project are referred to in the pESMP as the Lender Standards.

**Table 8-2 pESMP Table**

<b>Air Quality</b>			
<b>Aspect Activity</b>	<b>Management Measure</b>	<b>Timing</b>	<b>Responsibility</b>
Construction Dust Management	<ul style="list-style-type: none"> <li>■ All potentially Project Affected Peoples (PAPs) will be informed of the nature of works to be carried out, the duration, as well as contact details for a Project representative that be contacted in the event of a complaint.</li> <li>■ Impacts associated with construction road traffic during the construction phase will be mitigated by treating (dust suppression) unpaved road, to prevent or minimise dust emission from construction vehicles.</li> <li>■ Where practical and feasible, surface binding agents will be used on exposed open earthworks (e.g. laydown yards).</li> </ul>	Prior to Construction/ Throughout construction	INZAG
Management of Vehicle Emissions	<ul style="list-style-type: none"> <li>■ Vehicles will be regularly serviced (at least annually or in accordance with manufacturer's recommendations) and maintained in a reasonable working order to reduce emissions. In particular, exhaust emissions should not emit black exhaust fumes or smoke.</li> <li>■ When not in use, vehicles will be switched off, unless impractical for health and safety reasons (for example maintenance of air conditioning)</li> <li>■ Diesel generators will be subject to routine maintenance to keep the engines in optimum working order.</li> </ul>	Throughout construction	INZAG

<b>Noise Management</b>			
<b>Aspect Activity</b>	<b>Management Measure</b>	<b>Timing</b>	<b>Responsibility</b>
General Noise Mitigation Measures	<ul style="list-style-type: none"> <li>■ All PAPs will be informed of the nature of works to be carried out, the duration, as well as contact details for a Project representative that be contacted in the event of a complaint. All complaints will be managed as part of the Project's external feedback and grievance mechanism (mentioned above).</li> <li>■ As far as practical, the noise levels from longer term construction activities will be aligned to receptors and time of work, or to other standards that have been agreed with the local authority.</li> </ul>	Prior to Construction/ Throughout construction	INZAG
Vehicle and Machinery Management	<ul style="list-style-type: none"> <li>■ Where feasible and reasonable, mobile plant parking near residences and other sensitive land uses will be prohibited. Moreover, exclusion zones where the offloading of Project equipment / materials from trucks is not permitted will be established.</li> </ul>	Throughout construction	INZAG

### Noise Management

Aspect Activity	Management Measure	Timing	Responsibility
	<ul style="list-style-type: none"> <li>Vehicles and equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be periodically checked.</li> </ul>		
Mitigation of Noise Construction Camps	<ul style="list-style-type: none"> <li>If applicable, excavated material (with cover to avoid dust erosion), or use of buildings / structures or temporary noise barriers will be used to form a noise barrier between the Construction Camp and any noise sensitive receptors.</li> <li>The design of the Construction Camp and associated plant will be such that of all ancillary plant (e.g. crushers, mixers, loaders, generators, compressors, etc.) are sited so as to minimise noise disturbance</li> <li>The working time of construction plants at the Construction Camp will be during daytime hours only except such times that additional work shifts are required. Should additional work shift be required this will be timeously communicated with nearby residences..</li> </ul>	Throughout construction	INZAG
Mitigation of Noise at Quarries and Borrow Pits	<ul style="list-style-type: none"> <li>At quarry or borrow pit sites, a due diligence will be undertaken to ensure that the management of these site complies with Ghana legislative requirements and the requirements set forth in the ESMP</li> <li>INZAG will consider social issues in defining the transport routes for construction vehicles carrying materials and spoil to and from quarries and borrow pits. Transport routes will avoid residential areas where practicable.</li> <li>Night-time operation will be adjusted to minimize community impacts where practicable</li> </ul>	Prior to and throughout the construction	INZAG

### Water Management

Aspect Activity	Management Measure	Timing	Responsibility
Project Planning	<ul style="list-style-type: none"> <li>Construction Camps and associated Compounds will not be positioned adjacent to local water supplies, to minimise risk of affecting water quality of local water supply through the generation of silt (e.g.: by erosion) or waste (e.g.: from ablution facilities, refuelling of vehicles etc.).</li> </ul>	Prior to construction	INZAG
Harvesting Water from Aquatic Habitats	<ul style="list-style-type: none"> <li>Abstraction of surface water and shallow subterranean water will be avoided as much as possible from rivers and wetlands for construction purposes. Boreholes will be drilled and rainwater harvested to meet construction and operational water requirements.</li> </ul>	Prior to and throughout the construction	INZAG
Water permitting	<ul style="list-style-type: none"> <li>Appropriate Ghanaian government departments will be consulted to obtain water abstraction permits/licenses necessary for the successful construction of the proposed road.</li> </ul>	Prior to construction	INZAG

**Water Management**

Aspect Activity	Management Measure	Timing	Responsibility
Damage to Buildings by Flood Waters and Flooding of Borrow Pits and Quarries	<ul style="list-style-type: none"> <li>■ Potential flood risk will be assessed and determine if additional flood defence measures are required, for example, raised platforms for equipment, sandbags to stop floodwaters entering Project buildings, extra drainage or barriers to divert floodwaters.</li> </ul>	Prior to and throughout construction	INZAG
Instream Construction Activities	<ul style="list-style-type: none"> <li>■ Instream construction activities (eg for bridge works) that carry the highest risk of adversely impacting surface water quality will, as far as possible, be conducted during the dry season when water flows are minimal or absent.</li> </ul>	Prior to and throughout construction	INZAG
Surface Water Diversion	<ul style="list-style-type: none"> <li>■ Surface water diversions established for the construction of in-stream components of the proposed road will be designed to:                             <ul style="list-style-type: none"> <li>➢ Maintain original river flow as much as possible;</li> <li>➢ Avoid over-channeling the watercourse thereby increasing the flow rate and causing erosion; and</li> <li>➢ Keep excavation to a minimum to prevent erosion.</li> </ul> </li> </ul>	Throughout construction	INZAG
All Construction activities	<ul style="list-style-type: none"> <li>■ All reasonable measures will be taken to minimise the risk of causing adverse impacts to surface and groundwater quality in the broader area of the Project Footprint. These measures include:                             <ul style="list-style-type: none"> <li>➢ Proper storage, handling and disposal of waste;</li> <li>➢ Appropriate treatment of wastewater discharged from the project activities to meet legislated discharge standards in Ghana;</li> <li>➢ Conformance with spill prevention, control and containment management measures;</li> </ul> </li> <li>■ Soil stockpile management will be in accordance with the measures included in the rehabilitation and site clean-up management.</li> </ul>	Throughout construction	INZAG
Dewatering of Construction Sites	<ul style="list-style-type: none"> <li>■ Stormwater management of construction sites will be planned in advance and implemented to separate clean and dirty water systems to avoid the transport of contaminants and sedimentation into aquatic systems.</li> </ul>	Throughout construction	INZAG
Wastewater Management	<ul style="list-style-type: none"> <li>■ Sufficient temporary toilets will be located in strategic locations near active work sites and sited away from any water bodies or wetlands. Temporary toilets will be serviced regularly by a competent and</li> </ul>	Throughout construction	INZAG

**Water Management**

Aspect Activity	Management Measure	Timing	Responsibility
	suitably qualified service provider. Emptied waste will be transported and disposed of at the sewage treatment plant at the closest Construction Camp (or at local public WWTP).		

**Biodiversity Management**

Aspect Activity	Management Measure	Timing	Responsibility
Construction Camps	<ul style="list-style-type: none"> <li>■ Construction Camps will be placed outside of the boundaries of the Shai Hills Resource Reserve</li> </ul>	Prior to and throughout construction	INZAG
Pre-clearing Checks for Fauna	<ul style="list-style-type: none"> <li>■ Preclearing checks will be conducted ahead of any vegetation removal.</li> </ul>	Throughout construction	INZAG
Method Statement	<ul style="list-style-type: none"> <li>■ A Method Statement will be developed for Restoration of disturbed areas in protected areas</li> </ul>	Prior to and throughout construction	INZAG
Ongoing Engagement and Collaboration with Ghana Wildlife Division (GWD)	<ul style="list-style-type: none"> <li>■ A regular communication will be maintained with GWD for all activities, covering a broad range of issues, with specific emphasis (but not restricted to) the following aspects:                             <ul style="list-style-type: none"> <li>➢ Reporting schedules related to construction;</li> <li>➢ Planning and scheduling of fencing, construction activities, waste disposal procedures and processes, and rehabilitation and closure of disturbed areas;</li> <li>➢ Security issues, such as any likely encroachment by poachers or livestock herders;</li> <li>➢ Engagement and collaboration with surrounding conservancy stakeholders;</li> <li>➢ Ongoing invasive alien plant control procedures, their implementation, monitoring and assessment of results;</li> </ul> </li> <li>■ Planning and implementation of any additional conservation actions.</li> </ul>	Throughout construction	INZAG
Avoidance of Loss of Natural Habitats	<ul style="list-style-type: none"> <li>■ The layout and location of features such as borrow pits, quarries, Construction Camps, equipment laydown areas and access roads will as far as possible be aligned towards modified habitats to minimise the loss of natural habitat.</li> </ul>	Prior to and throughout construction	INZAG
Construction Footprints	<ul style="list-style-type: none"> <li>■ The footprints for road construction, equipment laydown areas, Construction Camps, parking areas and other footprints will be restricted to the minimum feasible extent with measures implemented to avoid footprint creep through the following approaches:                             <ul style="list-style-type: none"> <li>➢ Planning will be conducted in advance to determine the minimum feasible extent required.</li> </ul> </li> </ul>	Prior to and throughout construction	INZAG



**Biodiversity Management**

Aspect Activity	Management Measure	Timing	Responsibility
	<ul style="list-style-type: none"> <li>➤ Predetermined areas will be clearly demarcated on the ground, fenced where appropriate and enforcement measures taken to avoid footprint creep into surrounding areas.</li> </ul>		
General Issues Relating to the Siting and Management of Construction Camps	<ul style="list-style-type: none"> <li>■ Comprehensive induction programmes will be developed for all staff that are accommodated in Construction Camps, that explain procedures regarding waste, how to respond to different animal encounters, how to handle wildlife incidents, etc.</li> </ul>	Throughout construction	INZAG
Management of Wildlife Issues associated with Construction Camps	<ul style="list-style-type: none"> <li>■ Informed specifications should be considered for wildlife fencing around Construction Camps, with the primary concerns being deterrent of baboons.</li> </ul>	Throughout construction	INZAG

**Land Acquisition and Involuntary Resettlement Management<sup>64</sup>**

Aspect Activity	Management Measure	Timing	Responsibility
Physical and Economic Displacement	<ul style="list-style-type: none"> <li>■ Implementation of the Resettlement Policy Framework (RPF) that has been developed for the Project.</li> <li>■ A Resettlement Action Plan (RAP) and / or Livelihood Restoration Plan (LRP) in line with IFC Performance Standards and Ghanaian legislation will be developed for the proposed ECR to address issues associated with physical and economic displacement, loss of community infrastructure and other assets.</li> <li>■ Preference will be given to provision of replacement housing and/or land over cash compensation. Where possible replacement land will be provided in the same Location to avoid breaking social networks etc.</li> <li>■ A Grievance Mechanism will be developed, whereby affected people can raise issues and concerns associated with displacement and the RAP/ LRP processes. Establish KPIs for grievance resolution.</li> </ul>	(RAP / LRP development and implementation)	GHA

<sup>64</sup> A detailed account of roles and responsibilities between INZAG and GHA will be provided in the Resettlement Framework. However, INZAG will support the Ghanaian Government (through the Ghana Highway Authority and the Lands Commission) in this endeavours. The main undertakers will be the Ghanaian Government. The cost of the compensation will be paid by INZAG as part of the overall commitments for road development. The HSE manager from INZAG will undertake all the required activities of supporting the Ghanaian Government.

**Land Acquisition and Involuntary Resettlement Management<sup>64</sup>**

Aspect Activity	Management Measure	Timing	Responsibility
	<ul style="list-style-type: none"> <li>RAP and LRP implementation will be monitored until a point whereby it can be demonstrated that the standard of living and livelihoods of displaced households have been at least restored if not improved. As necessary corrective action will be put in place through implementation to achieve this outcome.</li> </ul>		
Temporary Economic Displacement	<ul style="list-style-type: none"> <li>Where economic displacement results from the siting of temporary facilities, a Livelihood Restoration Plan (LRP) will be developed and implementation commenced prior to displacement of affected people in line with the requirements of IFC PS5 and Ghanaian legislation. LRP measures will continue to be implemented until people have returned to their original lands and re-established their livelihoods in these locations.</li> </ul>	(RAP / LRP development and implementation)	GHA
	<ul style="list-style-type: none"> <li>The LRP implementation will be monitored (during and after the displacement) until a point whereby it can be demonstrated that the standard of living and livelihoods of displaced households have been at least restored if not improved. As necessary corrective action will be put in place through implementation to achieve this outcome.</li> </ul>	Prior to and throughout construction (RAP / LRP development and implementation)	GHA
	<ul style="list-style-type: none"> <li>Rehabilitation and site clean-up will be in accordance with the rehabilitation and site clean-up management measures to ensure that land can be returned to land users with the same productive potential in a timely manner.</li> </ul>	Throughout construction	INZAG
Indigenous Peoples (IPs)	<p>Note: Based on current information, ERM is of the understanding that IPs will NOT be impacted by the Project and FPIC will NOT be triggered. Additional information is being gathered to more strongly confirm the IP situation. The following text is thus a “placeholder” to show potential mitigation measures and commitments in case there are some impacts to IPs which may or may not require FPIC.</p> <ul style="list-style-type: none"> <li>Where IP still have communal land rights, which may be affected, the requirements of IFC PS7 will be implemented. This will include the development and implementation of Free, Prior and Informed Consent (FPIC) processes – if triggered - in consultation with each group of IPs based on their requirements and traditional decision making processes.</li> <li>An Indigenous Peoples Plan (IPP) will be developed and implemented in case the studies indicate that Indigenous People are present whose livelihoods or cultural heritage are adversely impacted..</li> </ul>	Prior to and throughout construction (FPIC Process to be developed prior to construction – if applicable)	GHA
			GHA

**Community Health and Management**

Aspect Activity	Management Measure	Timing	Responsibility
	<ul style="list-style-type: none"> <li>■ Workers will receive comprehensive training, as part of their induction and then at least every 6 months, on potential high risk communicable and vector borne diseases, symptoms, preventative measures and transmission routes as well as treatment options. This will be particularly important for diseases with which non-local workers are unfamiliar and in case of any emerging disease outbreaks. In addition, Toolbox Talks will occur on at least a monthly basis and will also address health standards including communicable and vector borne diseases.</li> <li>■ A Worker Code of Conduct will be developed providing a camp code of behaviour including worker-worker interactions, worker-community interactions and development of personal relationships with members of the local communities. This would apply to all Project workers and visitors to any Construction Camps.</li> </ul>	Throughout construction	INZAG
	Accommodation will be provided to workers in accordance with international good practice on workers' accommodation, including IFC / EBRD standards to prevent transmission of diseases associated with poor living conditions.	Prior to and throughout construction	INZAG
Vector Borne Diseases	<p>At worker accommodation and sites the following will be implemented at a minimum in order to minimise disease transmission:</p> <ul style="list-style-type: none"> <li>■ Providing workers with appropriate sanitary facilities, which are appropriately designed to prevent contamination.</li> <li>■ Developing a robust waste handling system to avoid the creation of new vector breeding grounds or attracting rodents to the area.</li> <li>■ Implementing measures to reduce the presence of standing water onsite through environmental controls and source reduction to avoid the creation of new breeding grounds.</li> <li>■ Ensuring the Construction Camp is kept clean and free from any accumulation of wastes as well as supplied with clean potable water.</li> <li>■ Ensuring appropriate food preparation and monitoring measures are in place. Conduct regular assessments of food handlers, kitchens fridges and freezers.</li> <li>■ Providing insecticide-impregnated bed nets as a physical barrier to repel and kill mosquitos for workers that have been provided accommodation.</li> </ul> <p>Monitoring to ensure that all standards are being met by the relevant departments.</p>	Throughout construction	INZAG

**Community Health and Management**

Aspect Activity	Management Measure	Timing	Responsibility
	<ul style="list-style-type: none"> <li>■ The workforce will be provided with access to treatment at health facilities on site/ at Construction Camps. The requirements for these health facilities will be based on a risk assessment taking into account access to existing health facilities and travel time to facilities that offer international standards of care. Access to health care will include direct employees, subcontractors and employees of the supply chain working or based on site.</li> <li>■ The Project will monitor the emergence of major pandemics through CDC and World Health Organisation (WHO) alerts and in the event of a pandemic review mobilisation and demobilisation of ex-patriate Project personnel and / or implement appropriate control measures and Emergency Response Plans.</li> </ul>	<p>Prior to and throughout construction</p>	<p>INZAG</p>
<p>Sexually Transmitted Infections</p>	<ul style="list-style-type: none"> <li>■ Conduct Information, Education and Consultation Communication (“IEC”) campaigns, at least every other month, addressed to all the Site staff and labour and to the immediate local communities, concerning the risks, dangers and impact of, and appropriate avoidance behaviour with respect to, STIs and STDs including HIV/AIDS.</li> <li>■ Develop an alleviation program for Site staff and labour and their families in respect of STIs and STDs including HIV/AIDS. The Project will develop an STD Management Plan designed to minimise the spread of HIV infection and other STDs. The plan will be prepared with the assistance of a specialist in sexually transmitted diseases. The plan should include, among other things, the following measures:                             <ul style="list-style-type: none"> <li>➢ An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs;</li> <li>➢ Encouragement of employees to determine their HIV status;</li> <li>➢ Supply of male and female condoms at appropriate locations; and</li> <li>➢ Development of a comprehensive Construction Camp Management Plan, including rules for on-site behaviour, entrance and exit policies and prohibition of sex workers on site.</li> </ul> </li> </ul>	<p>Prior to and throughout construction</p>	<p>INZAG</p>
<p>Prevention of construction traffic accidents</p>	<ul style="list-style-type: none"> <li>■ A Traffic Management Plan will be developed and implemented including consideration of:                             <ul style="list-style-type: none"> <li>➢ Safe worksite layouts;</li> <li>➢ Delivery routes to from project/ Construction Camp to considering community safety as well as traffic impacts.</li> <li>➢ Vehicle safety equipment standards (e.g. seat belts and first aid kits);</li> </ul> </li> </ul>	<p>Prior to and throughout construction</p>	<p>INZAG</p>

**Community Health and Management**

Aspect Activity	Management Measure	Timing	Responsibility
	<ul style="list-style-type: none"> <li>➤ Driving rules (e.g. speed limits, hours of driving, required breaks, carrying passengers and use of mobile phones/ radios);</li> <li>➤ Driver qualifications and selection (e.g. defensive driving courses, accident history and 'practical' interviews to test skills);</li> <li>➤ Driver education and training (awareness raising, information on required standards and review of incidents);</li> <li>➤ Vehicle inspection and maintenance (in line with manufacture requirements for vehicle roadworthiness and Project standards);</li> <li>➤ Accident/ incident reporting and investigation; and</li> <li>➤ Disciplinary procedures.</li> </ul>		
	<ul style="list-style-type: none"> <li>■ The Project will conduct an ongoing traffic safety awareness campaign during the construction period, particularly in those communities where construction vehicles will be most active. The awareness training will be repeated in villages as construction moves into their areas.</li> <li>■ Traffic incident reporting and investigation procedures will identify corrective measures to reduce the risk of the accident happening again.</li> </ul>	Prior to and throughout construction	INZAG
Protection of Community Safety and Security	<ul style="list-style-type: none"> <li>■ The Project will implement a Security Management Plan containing measures to protect the Project facilities and personnel against potential violent protest or social unrest and to train security personnel in safeguarding of community human rights.</li> <li>■ Sensitise local community members prior to the commencement of the construction phase so that they are aware of presence and role of security guards, the risk of site trespass and how to interact with the Project in the event of any concerns or issues.</li> </ul>	Prior to and throughout construction	INZAG

**Cultural Heritage Management**

Aspect Activity	Management Measure	Timing	Responsibility
Disturbance to Cultural Heritage	Stakeholder engagement with the relevant authorities will be undertaken to the present the construction activities and the authorities' sensitivity to noise and likely success of potential noise mitigation measures.	Prior to construction	INZAG
Provision of Cultural Heritage Training	<p>The Project will establish a Cultural Heritage Training Programme for all field staff. The objective of the Cultural Heritage Training Programme is to manage potential impacts to known and unknown cultural heritage sites by facilitating the identification and reporting of potential Chance Finds encountered during construction works. The programme will consist of training; <i>Chance Finds</i> tool box talks/training for field staff; and the development of reference materials such as fliers, signage, and educational posters to be posted in the Construction Camps and facilities. The plan should cover:</p> <ul style="list-style-type: none"> <li>■ Defining Chance Finds;</li> <li>■ Identifying Chance Finds in the field;</li> <li>■ Local sensitivity to damage to cultural heritage resources;</li> <li>■ Sensitivity of cultural heritage sites to looting and legal penalties for looting or the destruction of cultural heritage sites;</li> <li>■ Chance Finds reporting procedures; and</li> <li>■ The consultation process with local and national stakeholders and regulatory agencies.</li> </ul>	Prior to and throughout construction	INZAG



**Spill Prevention, Control and Containment Management**

Aspect Activity	Management Measure	Timing	Responsibility
Spill Prevention Training	Train personnel with responsibility for hazardous substances. No untrained staff shall be allowed to handle hazardous substances.	Throughout construction	INZAG
General Management	Provide collection systems (i.e. drip trays or impervious linings) under machinery or stationary equipment that may dispense or leak hydrocarbons / hazardous substances (i.e. generators and pumps).	Throughout construction	INZAG
	The bulk loading and unloading of hazardous materials and fuels will be confined to areas that are provided with secondary containment and in line with hazardous material handling procedures.	Throughout construction	INZAG
	Maintain an inventory of all dangerous and hazardous goods onsite, together with all relevant Safety Data Sheets (SDS) for all contaminants on-site. These will include human health effects of chemicals handled and will be included in the required chemical environmental and safety training for all employees handling or otherwise exposed to the contaminants. All appropriate personal protective equipment, handling and response procedures will also be identified in the SDS or otherwise recommended by the suppliers / manufacturers and followed by all Project staff.	Throughout construction	INZAG
	Prior to introduction to site, a hazardous material / substance will be reviewed and proper storage, handling and transportation procedures and spill risk analysis will be established.	Throughout construction	INZAG
Storage of Hazardous Materials	Segregation of corrosive substances that are kept in bulk from incompatible goods and goods with which they may react dangerously.	Throughout construction	INZAG
	Hazardous and dangerous material storage areas will be equipped with emergency spill response and fire prevention equipment.	Throughout construction	INZAG
Spills and Clean-up	Areas where spillage of soil contaminants occurs will be excavated (to the depth of contamination) and suitably rehabilitated. If any other minor spillage occurs, the spillage will be cleaned immediately and the contaminated area will be rehabilitated. All contaminated material will be suitably disposed of. Clean-up procedures will need to be fully recorded.	Throughout construction	INZAG
	Spill kits will be provided at any fuel or chemical storage location. Spill kits must be maintained.	Throughout construction	INZAG
	Designated and qualified staff designated for responsibility to respond to emergencies.	Throughout construction	INZAG

**Spill Prevention, Control and Containment Management**

<b>Aspect Activity</b>	<b>Management Measure</b>	<b>Timing</b>	<b>Responsibility</b>
	A maintained emergency contact list will be placed at all spill response kit locations.	Throughout construction	INZAG
	Development, implementation and regular training and testing of a Project wide Spill Response Plan will be implemented.	Throughout construction	INZAG

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