



THE REPUBLIC OF GHANA
MINISTRY OF ROADS AND HIGHWAYS
TRANSPORT SECTOR IMPROVEMENT PROJECT (TSIP)



GHA/DFR/AS/EU/CA/03/P151026/18:
ASSESSMENT STUDY TO IMPLEMENT OPBRC
FOR FEEDER ROADS IN UPPER WEST REGION
(PACKAGE 1)

ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT

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EXECUTIVE SUMMARY

INTRODUCTION

This Executive Summary section of the report presents an overview of the Project, key impacts (negative and positive) identified during the impact assessment process and the proposed mitigation and management measures. It has been prepared in line with relevant national regulations, as well as international requirements such as the World Bank Operational Policies (OPs) and the World Bank Group Environmental, Health and Safety Guidelines (EHSGs).

The Upper West Package 1 Project consists of a network of feeder roads, access roads, connectivity roads, as well as irrigation and market access roads within the Wa Municipal, Wa West and Nadowli-Kaleo districts in the Upper West Region. The road network is mostly gravel roads or earth roads in generally poor condition. Much of the road sections have drainage issues, thus making them prone to flooding and inaccessible during rain events. The proposed interventions for the road network will comprise improvement or rehabilitation works, including the treatment across the full width of the road pavement, including shoulders; and potential realignments at sensitive locations.

The conduct of the Environmental and Social Impact Assessment (ESIA) for the Project is a regulatory requirement per national regulations such as the Environmental Assessment Regulations, 1999 (L.I. 1652) and the Environmental Protection Agency Act, 1994 (Act 490). Undertakings requiring environmental permits or the conduct of ESIA as listed under Schedule 1, 2 and 5 of L.I. 1652 includes road construction. The L.I. 1652 is organised into schedules of projects which may either be subjected to a complete ESIA or a Preliminary Environmental Assessment (PEA), based on the level of environmental and social risks associated with the project. Per the requirements of L.I. 1652 therefore, the Upper West Package 1 Road Project falls within the category of projects for which the conduct of ESIA is mandatory (Schedule 2). The conduct of the ESIA is also mandatory given that the Project is classified as a Category B Project per the World Bank's criteria for categorizing projects based on environmental and social significance, type, location, sensitivity, and scale.

Though the Project is being implemented under the Transport Sector Improvement Project (TSIP) which is a group of projects for which the Republic of Ghana obtained funding from the International Development Association (IDA) of the World Bank, this Package is funded with European Union (EU) Aid through the 11th European Development Fund (EDF).

NEED FOR THE PROJECT

A wide range of environmental and social benefits will arise as a result of the Project. These will include economic benefits, employment generation, social services, travel and transport, enhanced gender opportunities, fuel economy and reduced pollution, among others. A reliable and affordable road transport system forms part of the social safety net, enabling trade and employment opportunities in both urban and rural communities, as well as facilitates the movement of goods and services in various sectors of the economy including tourism, education, health and agriculture.

The Project will also provide necessary employment opportunities for the citizenry. The employment creation potential of the Project is substantial and will facilitate economic development and growth. The Project will also contribute significantly to reduction in the high post-harvest losses experienced by farmers in the Upper West Region by facilitating the transportation of agriculture produce to marketing centres in the region and across the country, thus increasing trade effectiveness.

PROJECT ALTERNATIVES

The ESIA includes a consideration of alternatives by providing analysis of the no project alternative with other project alternatives. The analyses did not consider unselected alternatives as unviable, but only presents them as least favourable with respect to the other options evaluated. The project alternatives evaluated included the following:

- **No-Go Alternative (“Do Nothing” Option)**

The No-Go alternative (“Do nothing” option) considers non-development of the Project, which implies little or no improvement would be realised in the environmental and socio-economic setting or life of the area as it currently exists. The implication of this alternative is enormous as all the environmental and social benefits that would be derived from the road construction alternative would be lost.

The advantages (environmental and socio-economic) that the No-Go alternative presents are that the potential adverse environmental and social impacts such as dust emissions, noise and exhaust emissions, land expropriation, potential loss of flora and fauna, landscape alteration, etc. that may be associated with the road construction would be avoided. Also, the huge financial costs associated with the Project implementation will be avoided and money saved.

Nevertheless, the No-Go alternative also has a lot of environmental and socio-economic downsides. For instance, the local economy of the Project area is comprised mainly of agriculture and commerce / services; therefore, non-development of the Project would lead to the slowing down of the economic growth in the area as agricultural productivity and/or marketing of produce will no longer be boosted, given the poor nature of the road (which is a huge socio-economic drawback). Similarly, the potential for improving the scenic view, road condition and/or traffic situation with its associated cost (financial and travel time) to the public would all be lost. Other benefits which would be foregone as a result of non-construction of the roads include opportunities for improvements in drainage (and solving perennial flooding), employment opportunities for local residents along the road, boost in tourism and trading activities, poverty reduction, enhanced development and improvement in housing and other amenities, as well as gender empowerment opportunities. Non-construction of the roads will also imply no improvements in all elements of the road’s environmental and social safety features.

- **Re-construction / Rehabilitation of the Existing Road**

The project implementation alternative will yield all the environmental and socio-economic benefits that would have been lost under the “Do nothing” option. The proposed road re-construction or rehabilitation will follow the existing alignment of the roads, however, improvements will be made to the existing surface and geometric alignments of the existing roads, where necessary. This will also involve constructing or rehabilitating culverts to acceptable safety and environmental standards, and to improve drainage. The proposed road upgrades from their existing standards will also require the provision of appropriate road signage so that motorists are warned of hazards such as culvert locations and speed reductions or increases, location of intersections and appropriate signs notifying motorists of traffic calming measures.

This Project implementation alternative is a more realistic option and would bring significant benefits to communities along the roads and the general population. While some negative environmental and social impacts (disadvantages) will characterize this alternative, such as potential destruction of vegetation or landscape alteration, dust and noise emissions, and some potential displacement of people and properties or assets, these negative impacts (drawbacks) will be managed and reduced to as low as reasonably practicable levels by employing effective mitigation measures. The Project would limit the potential destruction of vegetation, avoiding at best, vegetation of special ecological and economic significance. Similarly, positive impacts from the Project would be enhanced.

- **Alternative Design and Technology**

Under the Project development alternative, further design and technology options were evaluated based on specific design data to determine whether some potential Project impacts could be avoided or reduced. Although the existing alignment of the roads was largely maintained in the concept designs, different design and technology approaches were evaluated and recommended, where necessary, to limit impacts to settlements along the road corridor, limit the ecological footprint or destruction, limit cost of labour and materials and construction cost. Potential design changes would be unavoidable under the Project development alternative and would be viable or sustainable considerations especially when it would lead to significant reductions in project environmental and social impacts.

For instance, areas with structures such as schools, churches and mosques, as well as areas of high ecological conservation status which fall within the ROW would require modifications to designs or alignment. For example, the design speed of the road would be adjusted at such locations as necessary, especially through areas with a high concentration of people or buildings; and appropriate signages and traffic calming measures implemented. In other instances, through small villages or moderately built-up areas, the design speed could not be maintained in the Concept Design due to proximity of structures and limited space between dwellings. Due to geometric and safety considerations, the design speed was reduced in these locations.

Geometric improvements have also been proposed in the Concept Design where the existing road geometry was perceived as unsafe. The road width was reduced in instances where the minimum design cross-section or the minimum geometric standards cannot be achieved without impacting on existing buildings or structures. Where necessary, through villages where the existing road geometry is substandard and considered unsafe, alternative alignments were proposed to allow for continued safe mobility and to reduce the social impact of the road upgrades on settlements along the roads. Figure A and Figure B presents some bypass or realignment options considered in the concept design.



Figure A Proposed Bypass Road P1_40 at Km 5,8



Figure B Proposed Bypass of Road P1_42 to Avoid Structures

APPLICABLE LEGISLATION AND STANDARDS

Various Ghanaian legislations are relevant to this project, including the underlisted:

- Environmental Assessment Regulations, 1999 (LI 1652), as amended (2002)
- Environmental Protection Agency Act, 1994 (Act 490)
- Wetland Management (RAMSAR sites) Regulation, 1999
- Water Use Regulations, 2001 (LI 1692)
- The State Lands Act, 1962 (Act 125)
- Lands (Statutory Wayleaves) Act, 1963 (Act 186)
- Forestry Commission Act, 1999 (Act 571)
- National Road Safety Commission Act, 1999 (Act 567)
- Labour Act, 2003 (Act 651)
- Children's Act, 1998 (Act 560)

STAKEHOLDER ENGAGEMENT

Some of the key stakeholders consulted as part of the ESIA are outlined below:

A. Government Ministries, Departments and Agencies

- Wa Municipal Assembly, Nadowli-Kaleo District Assembly and Wa West District Assembly
- Upper West Regional Coordinating Council (RCC)
- Environmental Protection Agency (EPA)
- Ministry of Food and Agriculture (MOFA)
- Northern Development Authority (NDA), formerly Savannah Accelerated Development Authority (SADA)
- Women in Agricultural Development (WIAD)
- Water Resources Commission – Black Volta Basin Secretariat

B. Community Stakeholders / Residents

- Community leaders / opinion leaders, vulnerable groups (e.g. women and the elderly), the youth, farmers, etc.
- Charia Electoral Area (Wa New Market) Assemblyman; Weichau Assemblyman; Nyoli Assemblywoman, etc.

Issues and concerns raised by stakeholders on the project relates to the road design, recruitment of local labour, potential dust generation and pollution of water sources, increase in accidents, loss of assets through construction demolitions, scarcity of water and need to provide complementary water sources, among others.

ESIA PROCESS, APPROACH AND METHODOLOGY

Information gathering for the ESIA was achieved by means of desk studies (document screening) and drive-through or walkover field surveys. Available Project documents were extensively reviewed based on the Terms of Reference (TOR); and this included but not limited to the World Bank's Environmental and Social Framework (2017), as well as other reference documents, namely:

- Environmental and Social Assessment for Transport Sector Improvement Project, (MRH, 2017)
- Environmental and Social Management Framework for Road Sector Operations (MRH, 2017)
- Resettlement Policy Framework for Road Sector Operations (MRH, 2017)
- Roads Reservation Management: Manual for Coordination (MRH, 2001)
- Environmental Assessment Guidelines for the Transport Sector (EPA, 2010)
- Traffic Calming Design Guideline (Ministry of Transportation, 2007)

- Standard Specification for Road and Bridge Works (Ministry of Transportation, 2006)
- Geometric Design Guide (Ghana Highway Authority, 1991)
- Draft Manual of Road Signs and Markings (Ghana Highway Authority, 2007)

Consultations were also carried out with various stakeholder groups, including selected residents along the road corridors to identify key concerns and issues, obtain some baseline information and to understand their expectations of the Project. Generally, the ESIA was conducted in accordance with LI 1652. Following identification of potential impacts, the impact assessment followed the steps below:

- Prediction of Project activity consequences on environmental and social receptors;
- Importance and significance of impact evaluation;
- Mitigation measures development to manage significant impacts where practicable; and
- Significance of the residual impact evaluation.

The Knight Piésold impact significance rating system is based on the following equation:

$$\text{Significance of Environmental / Social Impact} = \text{Consequence} \times \text{Probability}$$

The *consequence* of an impact is derived from the sum of the following factors:

- **Severity / Magnitude** - the degree of change brought about in the environment;
- **Reversibility** - the ability of the receptor to recover after the impact has occurred;
- **Duration** - how long the impact may be prevalent; and
- **Spatial Extent** - the physical area which could be affected by an impact.

The severity, reversibility, duration, and spatial extent are scored and then the **overall consequence** determined by adding up the individual scores and multiplying it by the **overall probability** (the likelihood of the impact occurring). Once a score has been determined, it is checked against the **significance** descriptions indicated in Table A below. Once the significance of the impact has been determined, the degree of confidence in the assessment is determined as low, medium or high.

Table A Significance Definitions

Score According to Impact Assessment Matrix	Colour Scale Ratings	
	Negative Ratings	Positive Ratings
Negligible Significance	Negligible	Negligible
Low Significance	Low	Low
Moderate Significance	Moderate	Moderate
High Significance	High	High

A range of mitigation measures, management actions and monitoring requirements to eliminate or reduce adverse environmental and social impacts, enhance positive impacts and monitor the effectiveness of mitigation measures implemented were clearly identified in the ESIA process. Delivery of these will be through the Project Environmental and Social Management Plan (ESMP).

PROJECT ACTIVITIES AND IMPACTS: PRE-CONSTRUCTION PHASE

Various activities will be carried out at the pre-construction phase and will include the following:

- Design and desk work - Majority of the work here involved desk studies, alternatives assessment, analysis of various field data, preparation of various pre-construction reports, as well as going through various design stages from conceptual designs through to detail or final designs phase. Environmental and social considerations were generally factored into all aspect of the concept design. For instance, the macro-climatic region of the project area was an important consideration in the pavement design. Surfacing of roads in urban areas, in particular, with interlocking concrete

block paving, was recommended in the designs due to the higher volumes of traffic within the urban areas and the importance of all-weather access for businesses and residents. Similarly, the physical environment within which the road is situated, as well as social factors such as the population density, were considered in the calibration of the traffic model, given that the optimal design for a given traffic flow depends on terrain and other characteristics. Attention was also given to environmental factors such as the topography, vegetation, geology, rainfall and climate of the project area in conducting hydrological investigations as part of drainage designs or drainage improvement recommendations. Design recommendations for constructing or rehabilitating culverts also considered acceptable public safety and environmental standards. Also, recommended improvements to the existing surface and geometric alignments of the existing roads at certain sections considered ultimately the safety of the road users.

- Construction materials investigations - Construction materials investigations involved field visits and sampling of construction materials for laboratory testing. Sub-grade soils, base material and subbase materials under the existing alignment were tested, including identification and sampling of materials from test pits along the road alignment and from existing or potential borrow pits.
- Road inventory and data on road usage - Road inventory involved horizontal and vertical alignment assessments and the recording of the condition of observed features along the road, including the road condition, junctions, road structures, and drainage structures (bridges and culverts).
- Site surveying - Surveying involved topographical surveys along the Project route and cadastral surveys to identify land and properties that may be affected during the construction phase.
- Labour recruitments - Various pre-construction surveys (engineering, hydrological, biodiversity, socio-economic, geotechnical, land valuation, etc.) involved recruitment of various specialists from other parts of the country and local labour from the local communities as support staff.
- Temporary land take (expropriation) - Construction works on the roads will demand acquisition of land and some displacement of people and properties within the ROW. Land will also be required for access roads, location of construction camps, storage site for stockpiled materials, etc.

Some key potential impacts that may result from the Project at this phase are presented in Table B.

Table B Summary of Pre-construction Phase Impacts

Impacts	Pre-mitigation rating	Summary of mitigation and management measures	Post-mitigation rating
Landscape modification through material sourcing and test pitting	Low negative	<ul style="list-style-type: none"> • Restrict geotechnical activities and material extraction to only defined project road widths. • Implement a dust control program to reduce the amount of dust generated. • Avoid storing of soil or materials near water ways and on slopes. 	Negligible
Waste pollution and congestion	Low negative	<ul style="list-style-type: none"> • Enforce site clean-up at the end of each day and avoid negligent behaviour with regard to the generation and disposal of waste. • Wastes generated should be collected and disposed of at approved sites of disposal or handled by a certified waste handler. 	Negligible
Creation of job opportunities	Low positive	<ul style="list-style-type: none"> • Sourcing and procurement of goods and services locally should be encouraged. • Equal employment opportunities should be provided for vulnerable groups and individuals (as defined in the RPF) in the Project area. 	Moderate positive

Impacts	Pre-mitigation rating	Summary of mitigation and management measures	Post-mitigation rating
		<ul style="list-style-type: none"> Gender issues should be given a priority during recruitment on the Project and women given equal opportunities on the Project. 	
Risk of conflict due to land expropriation and related physical / economic displacement	Low negative	<ul style="list-style-type: none"> It is important to educate individuals on the Project and its requirements for some temporary land acquisitions and provisions for livelihood restoration programs. Carry out an assessment of PAPs and undertake valuation of affected properties and loss of land/crops. The valuation, negotiations and agreements on land taken for the purpose of the project should be well documented. The outcome of the valuation should be used to determine compensation thereafter and compensations should be paid in good time and the amounts must be enough (based on the full replacement cost without depreciation principle) for PAPs to be able to restore their livelihoods to at least pre-project levels or even better. 	Negligible
Accidents / occupational health and safety risks during preliminary investigations	Low negative	<ul style="list-style-type: none"> Every worker recruited on the Project should be inducted on safety issues before the Project or surveys are embarked on. The investigation teams should wear PPEs including high visibility vests whenever they are working in the field and First Aid kits should be available during the surveys. 	Negligible
Traffic disruptions / interruptions and diversions	Low negative	<ul style="list-style-type: none"> Workers on the Project including local labour should be inducted on safety issues before the Project or surveys are embarked on. The investigation teams or field staff should only be driven by trained and professional drivers. 	Negligible
Land acquisition and the potential physical and economic displacement and related impacts	Moderate negative	<ul style="list-style-type: none"> Continue engagement with community members and educate individuals on the Project and its impacts to farming activities and properties. Early notice should be given to the community members before any service interruption. Compensate people who may lose their crops or properties as a result of the Project development adequately and promptly. 	Low Negative

PROJECT ACTIVITIES AND IMPACTS: CONSTRUCTION PHASE

The construction phase of the project will also see various activities being undertaken, including:

- Site preparation activities - There will be need for transporting construction equipment as well as installation of temporary facilities (i.e., fencing, parking, construction offices, staging areas, construction camp, laydown areas, equipment maintenance and fuel storage). There will be earth

moving and/or cut and fill activities which will be accomplished using front-end loaders, backhoe, rippers, shovels, dozers, motor graders, rollers, water trucks and dump trucks for hauling spoils.

- Vegetation clearance and general earth works - There may be realignment of the roads which may require vegetation clearance. There will also be earth-stripping of topsoil and excavation of spoil material that is unsuitable to form the road bed and replacing it with suitable materials from cuts or borrow areas, as well as excavating drains and foundations of drainage structures.
- Operation of borrow pits and quarries - Operation of quarries will involve the use of explosives to blast rocks, crushing of rocks, sorting and piling of crushed aggregate for construction works. Alternatively, this can be sourced from existing commercial sources within the Project area or region. Borrow pit operations will also involve clearance of vegetation and stripping of topsoil, excavation of gravel, and stock-piling of the overburden materials, among other activities.
- Drainage works - Culverts will be provided at relevant intervals to transfer accumulated flow from the sides of the road and longitudinal drains may be provided with top covers for easy cleaning, which will also act as pedestrian walkways and provide access to properties.
- Road surfacing and ancillary works - Surfacing involves surface dressing of the roads and the shoulders, including road markings, placing of road signs, guardrails, and street lights.
- Construction waste management - Various wastes, ranging from solid to liquid and gaseous will be generated at the construction phase and will need to be appropriately disposed of.

Some key potential impacts that may result from the Project at this phase are presented in Table C.

Table C Summary of Construction Phase Impacts

Impacts	Pre-mitigation rating	Summary of mitigation and management measures	Post-mitigation rating
Dust and air quality degradation	High negative	<ul style="list-style-type: none"> • An ESMP should be implemented so that the works are conducted to achieve an ongoing reduction of air emissions. • The Contracting Entity should advise or notify local households on dust and other dangers as construction progresses. • Usage of water bowsers to suppress dust regularly at active work sections. 	Moderate Negative
Disturbance by ground vibrations and noise pollution	Moderate negative	<ul style="list-style-type: none"> • An ESMP should be implemented so that the works are conducted to minimize noise emissions and vibration and their effects on the citizens. • The Project should apply best practice innovative noise mitigation measures. • Construction workers should be supplied with noise mufflers, where applicable. • Use equipment or machinery that are in good working order and that meets noise emission limits. 	Low Negative
Water quality degradation	Moderate negative	<ul style="list-style-type: none"> • Waste lubricants and oils should be collected and recycled or disposed of offsite to approved disposal sites. • Floors of workshops, bitumen storage plants and refueling points for haulage vehicles and construction machinery should be bunded (lined with concrete) to avoid percolation of spilled oils and fuels into ground water or runoff of spilled oils and fuels into surrounding surface water. 	Low Negative

Impacts	Pre-mitigation rating	Summary of mitigation and management measures	Post-mitigation rating
		<ul style="list-style-type: none"> Road construction crews should be under strict instruction to dispose of both solid and liquid wastes appropriately. 	
Increase in disease spread	High negative	<ul style="list-style-type: none"> Construction workers should be provided with and encouraged to sleep under treated mosquito nets. Promote HIV/AIDS or sexual awareness and encourage use of condoms and where practicable, make them available to workers. Educate or sensitize young children or teenage girls to stay in school and on the dangers of unprotected and/or premarital sex. Provide first aid services and arrangements made with a larger hospital or health facility where major cases will be referred to. Encourage continuous cleaning of camp facilities and waste management practices. 	Low Negative
Loss of vegetation and terrestrial and aquatic habitats	Moderate negative	<ul style="list-style-type: none"> Limit the area that needs to be cleared as far as practicable and Rehabilitate cleared areas as soon as possible with indigenous species. Limit as much as possible the destruction of large / important / economic trees or flora. Choose methods that will avoid or decrease the potential for disturbing the aquatic environment, limit the diversion and blocking of the flow of water. 	Low Negative
Income generation opportunities from direct / indirect employment	Moderate positive	<ul style="list-style-type: none"> Include clauses in work contracts to recruit labour from the Project area or local communities and transparent hiring protocols should be applied. Skills training should be provided to residents of the local communities to increase local employment capacity. Gender issues should be seriously considered during recruitment on the Project. Women should be given equal opportunities on the Project and not discriminated against. 	High Positive
Potential labour influx and associated impacts	High	<ul style="list-style-type: none"> Include clauses in work contracts to as far as practicable utilize local labour and give equal opportunities to women and not discriminate against vulnerable groups who have the capacity to work. Work contracts should also include clauses against sexual harassment. Develop Project site-wide cultural awareness and management program to educate workers on existing traditional systems within the Project areas and observance of traditional rights as part of the Project. Engage with the Traditional Council to identify sensitive traditional and cultural assets in the Project area. 	Moderate

Impacts	Pre-mitigation rating	Summary of mitigation and management measures	Post-mitigation rating
		<ul style="list-style-type: none"> • Support traditional leadership to diffuse or resolve tensions within and between local and Project migrant communities. • Implement and provide information regarding Worker Code of Conduct in local language(s). • Provide cultural sensitization training for workers regarding engagement with local community. • Mandatory and regular training for workers on required lawful conduct in host community and legal consequences for failure to comply. • Implement a Grievance Redress Mechanism (GRM) as a part of a wider Stakeholder Engagement Plan. 	
Economic displacement and disruption of livelihood activities	Moderate negative	<ul style="list-style-type: none"> • Continue engagement with community members and educate individuals on the Project and its impacts to farming activities and properties. • Early notice should be given to the community members before any service interruption. • Compensate people who may lose their crops or properties as a result of the Project development adequately and promptly. 	Low Negative
Potential destruction of physical cultural resources	Moderate negative	<ul style="list-style-type: none"> • Regularly engage with the Traditional Council to identify sensitive traditional and cultural assets in the Project area. • Develop a site-wide cultural awareness and management program to educate workers on existing traditional systems and observance of traditional rights as part of the Project. • Work should immediately stop when physical cultural resources are encountered and chance find procedures should be adhered to. 	Low Negative

PROJECT ACTIVITIES AND IMPACTS: POST-CONSTRUCTION PHASE

This phase will involve routine and periodic maintenance works such as pothole patching, cleaning of drainage systems, repairs of broken road features, among others. This phase will also involve the demobilization of construction workers and construction equipment as needed. Demobilization will also involve restoration of environmental components impacted by the Project infrastructures demobilized.

Some potential impacts that may result from the Project at this phase are presented in Table D.

Table D Summary of Post-construction Phase Impacts

Impacts	Pre-mitigation rating	Summary of mitigation and management measures	Post-mitigation rating
Improvement in drainage and	Low positive	Conducting scheduled inspections along the ROW, including:	Moderate Positive

Impacts	Pre-mitigation rating	Summary of mitigation and management measures	Post-mitigation rating
reduction of flooding and road deterioration		<ul style="list-style-type: none"> • Checking for problematic erosion areas and implementing remedial works as appropriate. • Monitoring and confirming drains and crossings are kept clear to avoid flooding. • Inspecting ditches and culverts and removing accumulated debris. • Monitoring unplanned developments and encroachment to the road reserves or ROW. 	
Employment and revenue generation opportunities	High positive	<ul style="list-style-type: none"> • Skills training should continue to be provided to residents of the local communities to increase local employment capacity. • Identify and strengthen institutions with the potential of supporting trade and commerce in the wider Project area. • Promote tourism, including educational and research expeditions, and private tours. • Provide economic incentives to investors in the area, and promote development of sectors such as commerce, tourism, etc. 	High Positive
Improvements in road condition and travel / accessibility	High positive	<ul style="list-style-type: none"> • Traffic policing should be implemented to reduce the “new road effect” associated with speeding with its elevated risk of accidents. • Appropriate signage should be installed on the roads to guide traffic effectively. • Regular maintenance should be carried out on the roads to safeguard their deterioration. • Timely repair or replacement of damaged road signage and other safety installations. 	High Positive
Visual / scenic quality impacts	Moderate positive	<ul style="list-style-type: none"> • Plant trees to compensate for vegetation clearance as a fundamental step in enhancing the scenic beauty of the road corridor and degraded areas rehabilitated. • Regular maintenance should be carried out on the roads to safeguard their deterioration. 	Moderate Positive
Accidents / occupational health and safety risks during road operation	Moderate negative	<ul style="list-style-type: none"> • Install appropriate traffic safety signage at vantage points on the roads to guide traffic effectively and enhance safety. • Install traffic calming measures (speed bumps and rumble strips) to slow traffic down within communities or populated areas and near schools, churches, mosques, hospitals, etc. • Improve and enhance community sensitization on road traffic accidents. 	Low Negative
Increased agricultural productivity and improvement in livelihoods	High positive	<ul style="list-style-type: none"> • Provide roadside amenities or social services such as markets as part of the Project to reduce post-harvest losses from traveling long distances to sell at bigger markets. • Provision of improved farm machineries and inputs as support to individual farmers or groups to help increase their yields. • Consider provision or improvement in irrigation systems to encourage year-long production. For instance, existing irrigation 	High Positive

Impacts	Pre-mitigation rating	Summary of mitigation and management measures	Post-mitigation rating
		dams could be dredged to increase their capacities to support year-long cultivation.	

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

To avoid or reduce negative impacts, and to enhance the realization of positive impacts, an ESMP has been prepared as part of the ESIA. The ESMP will be used to deliver the Project's environment, health and safety, as well as social regulatory compliance objectives and other commitments. The ESMP will be used as a checklist for compliance with statutory requirements, safety and environmental policies and to check compliance and effectiveness of proposed mitigation measures.

The management or action plans and procedures incorporated into the ESMP include, but are not limited to Construction Management, Traffic Management, Waste Management, Rehabilitation, Spill Response / Management, Emergency Response, Public Consultation, Gender-based Violence Management, Health and Safety Management, etc. The Plan includes the various actions, identified environmental and social impacts, proposed mitigation measures, estimated budget (US\$ 233,000) to carry out environmental monitoring and implementation of the ESMP. In addition, in accordance with World Bank's OP 4.12 requirement, a Resettlement Action Plan (RAP) is being prepared to mitigate and manage impacts associated with land acquisition. A summary of the provisional ESMP budget is presented in Table E.

Table E Summary Environmental and Social Management Budget

Activity	Management Program	Comments	Cost/Year (USD)
Project Training Program	Training and capacity building for personnel (From Table 10-3)	Training provided for approximately 32No. officers at both pre-construction and construction phase.	20,000
Auditing and Monitoring	Environmental and social monitoring and key performance indicators	Conducted throughout the Project lifespan.	110,000*
	Annual environmental and social audit	Reflects the overall performance of the Project.	20,000
Reporting and Documentation	Environmental Management Plan Preparation / Updates	A requirement of LI 1652 and should be submitted to the EPA 18 months after project completion and every 3 years thereafter.	30,000
	Annual Environmental Report	Annual submission in line with LI 1652 requirements.	25,000
Procurement of environmental monitoring equipment**	Noise emissions	2 no. digital sound level meter	1,200
	Soil compaction and vibrations	2 no. portable vibration meter kits	3,000
	Potential air pollution	2 no. outdoor air quality test kit (complete suite)	9,000

Project are not significantly damaging enough to render it not acceptable from an environmental and socio-economic perspective. The severity of the negative impacts evaluated could be significantly reduced through the mitigation measures proposed. The major positive impacts relate to road condition and traffic improvement as well as economic aspects such as increased income generation opportunities from direct and indirect job creation, economic development and improved services and community life. The positive influence of the Project on employment and economic impacts are considered to remain at high significance levels with enhancement measures.

Based on strict adherence to the mitigation and management measures described in the ESIA and continuous monitoring for potential environmental and social effects, there exists reasonable justification for the authorization of the Project to commence. The Project is deemed highly beneficial and will largely promote economic growth and development on both local and national levels.

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APPENDICES

ANNEXURE A: ENVIRONMENTAL

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ACRONYMS

AIT	Agency Implementation Team
CBR	California Bearing Ratio
CEA	Citizen Engagement Assessment
CESMP	Contractor's Environmental and Social Management Plan
CHPS	Community-based Health Planning and Services
CHRAJ	Commission for Human Rights and Administrative Justice
CITES	Convention in International Trade of Endangered Species
CPESDP	Coordinated Programme of Economic and Social Development Policies
CWSA	Community Water and Sanitation Agency
DBOMT	Design-Build-Operate-Maintain-Transfer
DCP	Dynamic Cone Penetration
DFR	Department of Feeder Roads
DMP	Disaster Management Plan
DOVVSU	Domestic Violence and Victims Support Unit
DUR	Department of Urban Roads
DVLA	Driver and Vehicle Licensing Authority
ECOP	Environmental Code of Practice
EDF	European Development Fund
EHS	Environment, Health and Safety
EHSGs	Environmental, Health and Safety Guidelines
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMU	Environmental Monitoring Unit
EPA	Environmental Protection Agency
EPCM	Engineering, Procurement and Construction Management
EPRP	Emergency Preparedness and Response Plan
ESA	Environmental and Social Assessment
ESF	Environmental and Social Framework
ESMF	Environmental and Social Management Framework
EU	European Union
FASDEP	Food and Agriculture Sector Development Policy
FC	Forestry Commission

FGD	Focus Group Discussions
FIDIC	International Federation of Consulting Engineers
FSD	Forest Services Division
FWD	Falling Weight Deflectometer
GASIP	Ghana Agricultural Sector Investment Programme
GCEA	Ghana Consulting Engineers Association
GCLS	Grievance and Complaints Logging System
GCMs	General Circulation Models
GDP	Gross Domestic Product
GHA	Ghana Highway Authority
GIDA	Ghana Irrigation Development Authority
GIIP	Good International Industry Practice
GLSS	Ghana Living Standards Survey
GoG	Government of Ghana
GPRTU	Ghana Private Road Transport Union
GPRS	Growth and Poverty Reduction Strategy
GPS	Global Positioning System
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GRO	Grievance Redress Officer
GSA	Ghana Standards Authority
GSGDA	Ghana Shared Growth and Development Agenda
GWC	Gravel Wearing Course
GWCL	Ghana Water Company Limited
HSE	Health, Safety & Environment
IDA	International Development Association
IFC	International Finance Corporation
IFI	International Financial Institution
IFRTD	International Forum for Road Transport Development
ILO	International Labour Organization
ITP	Integrated Transport Plan
IUCN	International Union for Conservation of Nature
JHS	Junior High School
KII	Key Informant Interviews
KPI	Key Person Interviews

KTC	Koforidua Training Centre
KVIP	Kumasi Ventilated Improved Pit
LAP	Land Administration Project
LC	Lands Commission
LI	Legislative Instrument
LRD	Land Registration Division
LUSPA	Land Use and Spatial Planning Authority
LVD	Land Valuation Division
LWD	Light Weight Deflectometer
MDAs	Ministries, Departments and Agencies
MDD	Maximum Dry Density
MICS	Multiple Indicator Cluster Survey
MLGRD	Ministry of Local Government and Rural Development
MMDAs	Metropolitan, Municipal and District Assemblies
MOF	Ministry of Finance
MOFA	Ministry of Food and Agriculture
MOGCSP	Ministry of Gender, Children and Social Protection
MOT	Ministry of Transport
MOTI	Ministry of Trade and Industry
MRH	Ministry of Roads and Highways
MSLC	Middle School Leaving Certificate
MSWR	Ministry of Sanitation and Water Resources
MTDP	Medium-Term Development Plan
MTTD	Motor Transport and Traffic Department
MWH	Ministry of Works and Housing
NCCP	National Climate Change Policy
NEDCo	Northern Electricity Distribution Company
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NGO	Non-Governmental Organization
NHARCON	National HIV and AIDS Research Conference
NLCD	National Land Cover Database
NMTDP	National Medium-Term Development Plan
NRSA	National Road Safety Authority
NTP	National Transport Policy

NTU	Nephelometric Turbidity Units
OPs	Operational Policies
OPBRC	Output and Performance-Based Contracting
PAPs	Project Affected Persons
PEA	Preliminary Environmental Assessment
PHC	Population and Housing Census
PPDs	Physical Planning Departments
RCC	Regional Coordinating Council
RFS	Road Fund Secretariat
ROW	Right of Way
RSA	Road Safety Audit
SADA	Savannah Accelerated Development Authority
SAI	Social Area of Influence
SHS	Senior High School
SMD	Survey and Mapping Division
SPSS	Statistical Package for Social Scientists
SSA	Social Study Area
SSSI	Sites for Special Scientific Interest
TDS	Total Dissolved Solids
TOR	Terms of Reference
TSDP	Transport Sector Development Program
TSIP	Transport Sector Improvement Project
WD	Wildlife Division
WHO	World Health Organization
WIAD	Women in Agricultural Development
WRC	Water Resources Commission

GLOSSARY

ALARP (As Low as Reasonably Practicable)	Used in defining the desired level of risk and hazard control measures.
Alternative	Alternatives can refer to any of the following, but are not limited to: alternative sites for development, alternative projects for a particular site, alternative site layouts, alternative designs, alternative processes and alternative materials.
Anthropogenic	Caused by humans.
Aquifer	Fresh water (usually) held in underground layers of water-bearing permeable rock or unconsolidated sediments (gravels/sand/silt).
Arable	Land that can be cultivated for growing crops.
Area of Influence (AOI)	The AOI comprises the areas where the Project infrastructure will directly influence.
Baseline	The current physical, biological, cultural and human conditions that will prevail in the absence of the Project, including interactions among them.
Benthos	Species living in or on river, lake, sea and/or ocean bottoms.
Best Management Practices (BMPs)	These are methods that have been determined to be the most effective and practical means of preventing or reducing non-point source pollution to help achieve water quality goals. BMPs include both measures to prevent pollution and measures to mitigate pollution.
Biodiversity	The variability among living organisms – animals, plants, their habitats – from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part. This includes diversity within species, between species, and of ecosystems.
Biodiversity Specialist	A qualified member of the environmental consultants who will conduct baseline studies, implementation and management of activities associated with plant and animal species, and their habitats.
Biomass	The total mass of living matter within a given unit of environmental area.
Biota	The animal and plant life of a given region.
Catchment	An area from which surface run-off is carried away by a single drainage system.
Community Relations Officer (CRO)	The representative tasked with assisting in community communication and notification procedures. The CRO is to be based on site to deal with and respond to public concerns.
Competent Person	A person assessed as competent for the tasks they shall perform and who has acquired, through training, qualification, experience or a combination of those things, the knowledge and skills required to perform the required task competently and safely.
Consequence	Outcome or impact of an event or activity
Consulting Engineers	Engineers responsible for engineering design and/or assessment of the project.
Contracting Entity	An individual, company or other legal entity that carries out work or performs services pursuant to a contract for service. This includes sub-contractors / third parties.

Culvert	A man-made structure used to channel water.
Cumulative Impacts	Impacts that result from the incremental impact of the proposed activity on areas or common 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 when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time, and can include both direct and indirect impacts.
Developer (or Proponent)	The client (an individual or group), who is responsible for the planning, funding and development of the project. In this report, the Ministry of Roads and Highways (Department of Feeder Roads)
Direct Impacts	Impacts that result from a direct interaction between a planned Project activity and the receiving environment/receptors (e.g. between occupation of a site and the pre-existing habitats, or between an effluent discharge and receiving water quality). These impacts are usually associated with the construction, operation or maintenance of an activity, and are generally obvious and quantifiable.
Ecosystem	A community of plants, animals and smaller organisms that live, feed, reproduce and interact in the same area or environment.
Ecosystem Services	The benefits people obtain from ecosystems.
Emergency	An abnormal occurrence that can pose a serious threat to the safety or health of workers, and local communities or which can cause significant damage to assets or the environment.
Emergency Response Plan (ERP)	Plan to address contingencies associated with process upset and accidental circumstances.
Endemic	Restricted to a particular area. Used to describe a species or organism that is confined to a particular geographical region.
Engineering Team	The Project's Engineering Team (includes Front-End Engineering Design (FEED) Contractors involved in the design of the Project).
Environment	The surroundings within which humans exist, and that are made up of: (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the inter-relationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing. This includes the economic, social, cultural, historical and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.
Environmental and Social Impact Assessment (ESIA)	The process of predicting and evaluating the social and environmental impacts and risks of a proposed Project and identifying mitigation measures that will enable the Project to meet the requirements of stakeholders, applicable laws and regulations, and any additional requirements for social or environmental performance identified by the Project, so that impacts are kept as low as technically and financially feasible.
Environmental and Social Management Plan (ESMP)	A set of actions and measures to be carried out by the project developer, in order to manage the negative impacts and enhance

	the positive impacts resulting from the implementation of the proposed activity, prepared under the scope of the Environmental and Social Impact Assessment (ESIA).
Environmental Management	Process that confirms that environmental concerns are included in the various stages of development, so that the development is sustainable and does not exceed the carrying capacity of the environment.
Event	An occurrence of a set of circumstances.
Fauna	All the animal life in a region or period.
Flora	All the plant life in a region or period.
Front-End Engineering Design (FEED)	The design phase of the Project.
Greenhouse Gases (GHG)	Unless indicated otherwise, GHG emissions are made up of CO ₂ , CH ₄ , N ₂ O, HFCs, and PFCs.
Habitat	An ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism. It is the natural environment in which an organism lives, or the physical environment that surrounds (influences and is used by) a species population.
Harm	Significant and/or long-lasting adverse impact on people, the environment or the community.
Hazard	A source of potential harm, injury or detriment.
Hazardous Waste	Substances classified as hazardous wastes possess either one or all of four characteristics of ignitability, corrosivity, reactivity and toxicity – or appear on special lists.
Health, Safety and Environment (HSE) Manager	The HSE Manager is an individual appointed by the Contracting Entity to represent the contracting team and is to be responsible for the day-to-day implementation of the ESMP on the site by the team in question. The HSE Manager is to be informed of the contents of the ESMP relevant to the activities of the construction team, and is to understand the basic environmental issues associated with the development.
Herpetofauna	Amphibians and reptiles.
Hydrocarbons	Compounds that contain only hydrogen and carbon molecules such as petroleum-based products.
Ichthyofauna	Fish
Impact	Any alteration of existing conditions, adverse or beneficial, caused directly or indirectly by the Project.
Incident	Any occurrence that has resulted in, or has the potential to result in a near miss, adverse consequences to people, the environment, property, reputation or a combination of these. Significant deviations from standard operating procedures are also classed as an “incident”. Ongoing conditions that have the potential to result in adverse consequences are also incidents.
Indirect Impacts	Impacts that result from other activities that are encouraged to happen because of the Project (e.g. in-migration for employment placing a demand on resources). Indirect impacts can also be referred to as induced or secondary impacts. These types of impacts include potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
Infauna	Animals that live in sediment.

Infectious Disease	Illnesses attributable to specific infectious agents or their toxic products that arise through the transmission of these agents or their products from an infected person, animal or inanimate reservoir to a susceptible host. Examples include water-borne, water-related, food-borne, respiratory and sexually transmitted diseases.
Interested and Affected Parties (I&APs)	Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/or who are concerned with a proposal or activity and its consequences.
Invasive or Alien Species	Species introduced outside its normal distribution. Its establishment and spread modifies ecosystems, habitats or species. Aliens are called invasive when they spread rapidly and outcompete indigenous species.
Invertebrates	Species lacking a spinal column (e.g. crabs).
IUCN Red List	Also known as the IUCN Red Data List, this is the world's most comprehensive inventory of the global conservation status of biological species. Taxa are classified according to formal ranking systems assessing relative risks of extinction.
Land Capability	A combination of terrain form, soil types, thickness and slope gradients in association with broad agricultural potential define the land capability of an area.
Land Cover	The physical coverage of land, usually expressed in terms of vegetation cover or lack of it.
Landscape	A geographical mosaic composed of interacting ecosystems resulting from the influence of geological, topographical, soil, climatic, biotic and human interactions in a given area.
Microalgae	Microscopic single-celled algae in fresh, brackish (estuarine) and marine waters.
Mitigate	The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.
Mitigation Measure	A feature, procedure or other action that the Project commits to implement to avoid or reduce the magnitude of an adverse impact, or to enhance the magnitude of a positive impact.
Near Miss	A near miss is an occurrence or a situation which potentially could have caused adverse consequences to people, the environment, property, reputation or a combination of these but which did not.
No-Go Alternative	The no-go alternative is the option of not undertaking the proposed activity or any of its alternatives. This alternative also provides the baseline against which the impacts of other alternatives should be compared.
Operational Phase	The period of the Project's life after construction when the road is open to traffic.
Particulate Matter (PM)	Fine particles of solid matter.
PM _{2.5}	Particulate matter with aerodynamic diameter equal or less than 2.5µm.
PM ₁₀	Particulate matter with aerodynamic diameter equal or less than 10µm.
Procedure	A specified, documented way to carry out an activity or a process.
Project Activities	Activities that are planned as part of the Project. This excludes unplanned events.

Project Manager	The person responsible for coordinating and integrating activities across multiple, functional lines.
Protected Areas	An area of land and/or sea especially dedicated to the protection of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.
Personal Protective Equipment (PPE)	Worn by personnel to protect them from hazards which cannot be eliminated by other reasonable and practicable controls.
Public Consultation	Term used when referring to the activity of consulting with stakeholders or I&APs.
Public Participation Process	Term used when referring to the regulatory-driven stakeholder or I&AP engagement process.
Receptor	Humans and other animals that can be impacted by Project activities.
Resettlement Action Plan (RAP)	Establishes the principles, approach and procedures that will be followed in planning resettlement and awarding compensation to people who are physically or economically displaced by a project.
Resettlement Policy Framework (RPF)	Establishes the principles and procedures that will be followed in planning resettlement and awarding compensation to people who are physically or economically displaced by a project, including the process by which people can raise a grievance if they consider that they have been adversely affected or unfairly treated.
Residual Impact	Impacts that remain after mitigation measures, including those incorporated into the Project's design, have been applied.
Resource	An element of the physical, biological, cultural or human environment that is not a human or other animal (these are referred to as receptors), which can be impacted by the Project activities.
Risk	The danger that injury, damage or loss will occur. It has two dimensions: the likelihood of something happening and the consequences if it were to happen.
Risk Assessment	A formal systematic examination of a process, design, plant or other situation/condition to identify and assess the potential hazards of operation and the proposed methods of their control.
Significance	An impact is significant if, in isolation or in combination with other impacts, it should be considered in the decision-making process. The degree of significance depends on the combination of impact magnitude and probability of impact occurrence.
Sound Exposure Level	The total noise energy delivered over a measured duration averaged over one second.
Specialist Studies	The technical studies undertaken by specialists for the ESIA (e.g., ecology, air quality, noise, socio-economic studies, etc.)
Stakeholder Engagement	The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.
Stakeholders	See interested and affected parties (I&APs) above.
Study Area	The entire area under baseline investigation, where impacts may occur as a result of the Project.
Survey Area	The area over which physical surveys take place as part of the collection of primary baseline data. As in the case of Study Area, this is defined for each relevant resource/receptor and will differ for each specialist study.

Unplanned Event	A reasonably foreseeable event that is not planned to occur as part of the Project, but which may conceivably occur because of Project activities (e.g. accidents), even with a low probability.
Worker	Any person, including staff, hired labour, Contracting Entity, or others, who undertake work on the Project.

1.0 INTRODUCTION

1.1 BACKGROUND TO THE PROJECT

The Government of Ghana (GoG), through the Ministry of Roads and Highways (MRH) and in partnership with the Ghana Highways Authority (GHA) and the Department of Feeder Roads (DFR), is combining the well-known traditional methods of road construction and rehabilitation with the new concept of Output and Performance-Based Road Contracting (OPBRC) for the management and maintenance of road networks in three specific packages in the Upper West Region. The Project is funded with European Union (EU) Aid through the 11th European Development Fund (EDF) under Focal Sector No. 2. This focal sector specifically aims at infrastructure development and this project concentrates on productive investments into water resource management (irrigation facilities) in the Upper West Region.

The Contract GHA/DFR/AS/EU/CA/03/P151026/18 to provide Consultancy Services for the Assessment Study to Implement Output and Performance Based Road Contracts for selected Feeder Roads in the Upper West Region was signed between the GoG (represented by GHA) and UWP Consulting (Pty) Ltd in association with Knight Piésold Ghana Ltd on 14 August 2018. Under this contract, three (3) OPBRC packages were defined for this project as follows:

- Package 1: The area of Package 1 covers the Wa Municipal, Wa West and Nadowli-Kaleo administrative districts; and has Wa, Wechiau and Nadowli as main centres in the area.
- Package 2: The area of Package 2 covers the Jirapa Municipal, Lawra Municipal and Daffiama Bussie Issa administrative districts and has Jirapa, Lawra and Daffiama as main centres in the area.
- Package 3: The area of Package 3 covers the Nandom and Lambussie administrative districts and has Nandom and Lambussie as main centres in the area.

This ESIA report focuses and addresses environmental and social risks or issues pertaining only to the various feeder roads that have been prioritized for construction and/or rehabilitation under the Upper West Package 1.

The OPBRC concept is based on Design-Build-Operate-Maintain-Transfer (DBOMT) contracting principles and will include the initial rehabilitation works and maintenance services in lump sum contracts where payments are based on achieving performance targets. This means that road design and construction risks are transferred to the Contracting Entity to provide and maintain the road at specific levels of service. The concept addresses the issue of inadequate incentives and is expected to curtail the deterioration of road assets in general so that road users benefit from a sustained level of service, adequate for their needs. At the same time, it reduces the cost for providing and maintaining these road networks at the required service levels.

The OPBRC Project is being implemented under the bigger umbrella of the World Bank-funded Transport Sector Improvement Project (TSIP). The TSIP is targeted at reducing travel time on selected road networks in Northern Ghana, promoting road safety and strengthening the institutional management of the transport sector. The DFR is the main implementing agency for the Project, under the direction of the MRH who has the overall responsibility for Project implementation.

The Project is in support of productive investments into irrigation and associated infrastructure development components and tailored towards improving the agriculture sector of the Upper West Region where agriculture remains a major employer. It aligns with the Ghana Agricultural Sector Investment Programme (GASIP) which targets sustainable poverty reduction in rural Ghana through value chain development, enabling rural infrastructure (access roads and farm tracks), and knowledge

management, policy support and coordination. The overall goal of the OPBRC Project is therefore on improving regional connectivity, supporting agricultural development, and improving access in selected areas.

Roads are the dominant means of transportation in Ghana. It has been recognized that the road network in Ghana constitutes the single largest asset owned by the Government. Inadequate management and maintenance of this asset therefore results in huge losses for the national economy, hence the need for this OPBRC Project.

The road networks under the Project will entail different degrees of upgrading interventions. The road network is mostly gravel roads or earth roads with some sections in generally poor condition and without drainage structures, thus making them prone to being flooded and inaccessible during rain events. It is expected that most of the improvements to the roads would be accommodated within the existing road reserve, however some isolated sections may require additional land to accommodate the design intent and/or realignments, if needed.

The ESIA report has been prepared to include an Environmental and Social Management Plan (ESMP) and in accordance with the provisions of the Ghana Environmental Protection Agency Act, 1994 (Act 490) and the World Bank's Operational Policies.). The MRH's Environmental and Social Assessment (ESA) for Transport Sector Improvement Project (TSIP) and the Resettlement Policy Framework (RPF) guidance documents, including other relevant documents were also consulted in the preparation of the ESIA.

The term ESIA is used instead of Environmental Impact Statement (EIS) or Environmental Impact Assessment (EIA) hereinafter, to emphasize that the process not only assessed environmental impacts but also potential socio-economic impacts per international best practice. Baseline conditions such as bio-physical, social and climatic conditions, as well as land form, land use and related characteristics that have relevance or implications for the feeder roads development have been assessed in the ESIA report.

The report also addressed potential direct and indirect impacts of the Project on the environment at the pre-construction, construction, and post-construction phases.

1.2 PURPOSE OF THE ESIA

The conduct of an ESIA for the Project is a regulatory requirement per national laws and regulations such as the Environmental Assessment Regulations, 1999 (LI 1652), the Environmental Protection Agency Act, 1994 (Act 490) and the 1992 Constitution of Ghana. The Constitution mandates that appropriate measures be taken to protect and safeguard the national environment. Similarly, LI 1652 mandates that no undertaking which is likely to adversely impact on the environment or public health commences without the conduct of an EIA and prior approval of the Ghana Environmental Protection Agency (EPA). Undertakings requiring the conduct of EIA as listed under Schedule 1, 2 and 5 of LI 1652 includes road construction of the nature and magnitude as this OPBRC Project.

Again, per the Environmental Assessment Guidelines for the Transport Sector (EPA, 2010), ESIA is mandatory for road sector projects involving major rehabilitation and upgrading, potential reconstruction of the existing road and establishment of borrow pits.

The ESIA is also needed because the Project is expected to satisfy requirements of the World Bank's Operational Policies (OPs). The Project has been classified as a Category B Project per the World Bank criteria for categorizing projects based on environmental and social significance, type, location, sensitivity, and scale. Category B Projects refer to projects that involve site specific and immediate project environment interactions and have adverse impacts that are not sensitive, diverse, unprecedented and are mostly reversible. Though they generally do not significantly alter natural

systems and resources or consume much natural resources (e.g. ground water), the conduct of an ESIA is a requirement.

The World Bank is committed to several operational and safeguards policies which are targeted at preventing and mitigating undue harm to people and their environment in development initiatives or projects supported by the Bank through Investment Project Financing. Details on the World Bank's OPs that the Project is required to meet are provided in Section 3.5.

This ESIA therefore evaluated several issues which relates to the physical and biological environment of the Project area, as well as socio-economic, cultural, health and safety issues. The ESIA identified potential impacts (positive and negative) that may result from the Project and recommended applicable mitigation measures for negative impacts and enhancement measures for positive impacts.

Specifically, the purpose or objective of the ESIA report is therefore to present the following:

- A comprehensive description of the Project and relevant Project activities;
- The ESIA process and a review of legislation, standards and guidelines pertinent to the Project and associated ESIA;
- Description of stakeholder engagement activities;
- A comprehensive baseline study and review of the physical, biological and socio-economic characteristics of the Project area;
- Assessment of potential impacts to the physical, biological and socio-economic environments within the Project's area of influence; and
- Mitigation measures and associated management plans targeted at avoiding, reducing or managing the severity of identified impacts;

The ESIA report will be a significant source of information which the World Bank, the public and Government decision-makers would use in assessing the Project. This ESIA is based on the concept design and will be updated by the Contracting Entity based on the final detailed design, approved by the Project developer (MRH / DFR).

1.3 SCOPE OF THE ESIA STUDY

Information gathering for the ESIA was achieved by means of drive-through and walkover field surveys and document screening (existing documentation relevant to environmental and social impacts of the Project). Available Project documents were extensively reviewed based on the Terms of Reference (TOR). This included preliminary information on the engineering design concept, the World Bank's Environmental and Social Framework, national legal and administrative framework documents, other readily accessible baseline information, as well as MRH guidance documents.

Both field surveys and desk studies were undertaken which allowed for familiarizing with the Project area and the Project layout and helped in outlining an appropriate approach to the study. Stakeholder consultations were also undertaken which helped to identify key concerns or issues and understand stakeholder expectations of the Project.

Generally, issues identified or assessed in this ESIA study covered the following thematic areas;

Physical and biological environment

- Location characteristics – recording of accurate location coordinates using a Global Positioning System (GPS) and photographs of relevant features.
- Climate and meteorology.
- Geography and topography – how the topography of the Project area affects the site's visual impression and surface water flow.

- Geology and soils – soil types and geotechnical laboratory analysis, fault systems, areas of instability, etc.
- Hydrology/Water resources – presence of surface water (rivers and streams), dams/dug-outs, wells, etc. and their distribution characteristics within the corridor of influence.
- Flora and fauna (terrestrial and aquatic).
- Land tenure and land use – general land use types abutting the road corridor, e.g. agriculture, roadside plantations, settlements, industrial/commercial uses.
- Protected areas – forest reserves, national parks and sanctuaries, RAMSAR sites, environmentally sensitive habitats, if any.

Socio-economic environment

Information was gathered from physical observations, public consultations, interviews, focus group discussions and review of existing documentation. Issues identified or assessed include:

- Population dynamics along road corridor – settlements (permanent and temporal structures), household characteristics (size, income, expenditures), population size and density, etc.
- Resettlement – identification of project affected people, affected settlements, businesses and other infrastructure, affected farm lands and economic trees/crops, etc. within the corridor of influence.
- Public health and safety – prevalent diseases, health facilities, water and sanitation facilities, energy sources, etc.
- Education – type of educational institutions, general intake and drop-out rates, literacy levels, etc.
- Gender and Poverty levels – gender and poverty dynamics.
- Physical infrastructure, trade and tourism – physical evaluations noting the type of trade (economic activities) and condition/dynamics of infrastructure and taking of photographs.
- Archaeology and physical cultural heritage – artefacts and monuments (shrines, mosques, churches), burial sites, sacred grooves, history and culture, etc.

Figure 1-1 provides a schematic illustration of the various information sources and/or studies that generally feed into the ESIA and how individual tasks (including engineering components) relate to each other and contribute to the general appraisal of the Project. It also shows that the steps or process is not necessarily sequential. Even though feedback loops are not shown in the illustration, iteration between steps is common and attention to environmental and safety issues is a critical path that should be recurrent throughout the Project life cycle.

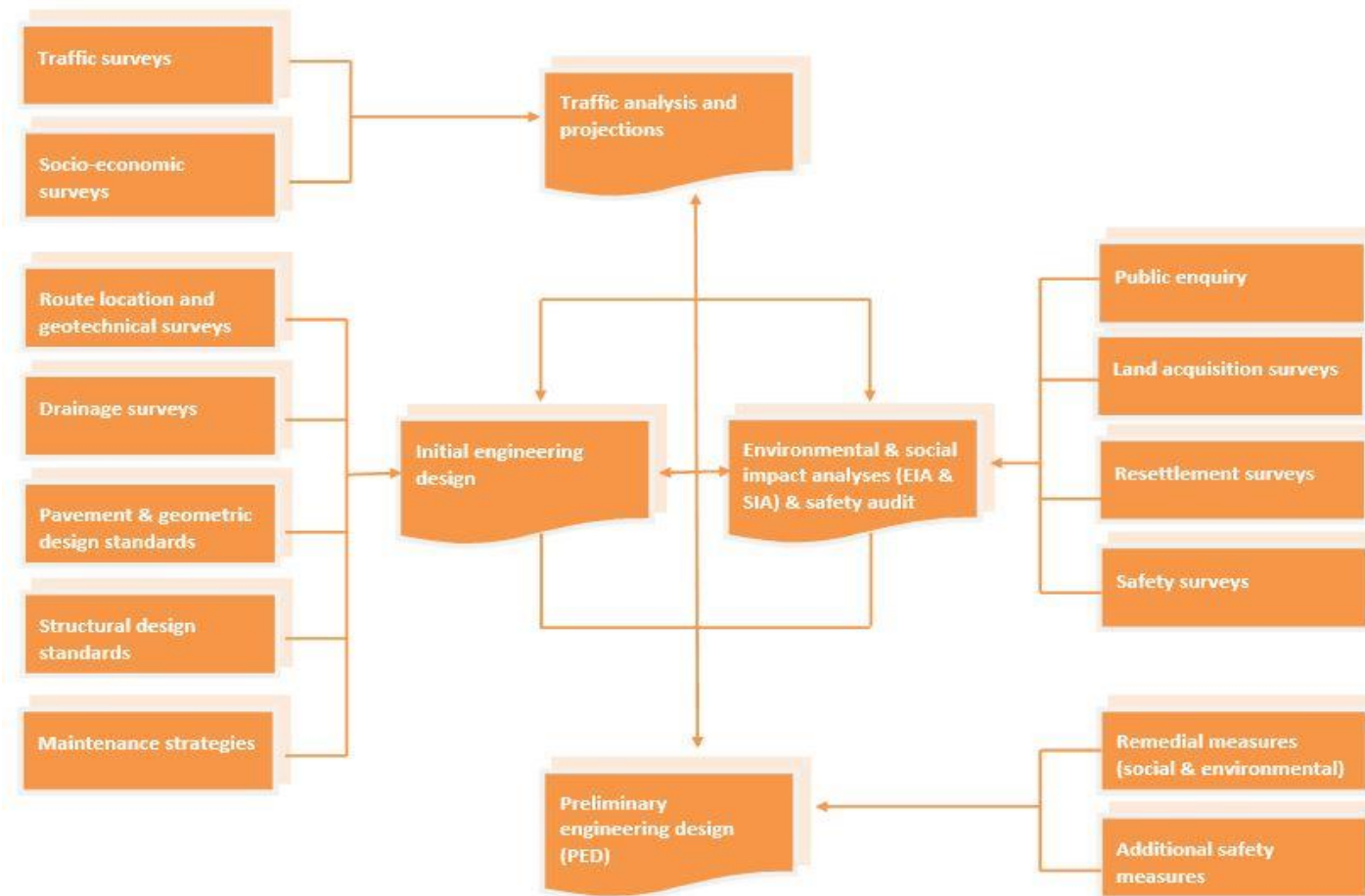


Figure 1-1 Relationship between the ESIA and other Project Components

Source: Department for International Development (DFID), 2015

1.4 STRUCTURE OF THE ESIA REPORT

The structure and content of the ESIA report is presented in Table 1-1 below.

Table 1-1 ESIA Report Structure

Chapter	Contents
Acronyms and Glossary	Provides details of terms and a list of acronyms utilised in the report.
Executive Summary	Provides a summary of the ESIA report in non-technical language.
Chapter 1 - Introduction	Presents a brief background to the Project and the purpose and structure of the report.
Chapter 2 - Project Description	Provides a brief overview of the OPBRC concept and the Project road features. It also describes the need or rationale for the Project, including the Project alternatives assessment conducted as part of the ESIA process.
Chapter 3 - Applicable Legislation and Standards	Describes national legislative, policy and administrative requirements, as well as international best practise and guidelines applicable to the Project.
Chapter 4 - ESIA Process, Approach and Methodology	Describes the ESIA process followed, including the associated potential impacts assessment methodology employed.
Chapter 5 - Environmental and Socio-economic Baseline	Provides a comprehensive baseline assessment of the bio-physical and socio-economic environment or components of the Project.
Chapter 6 - Stakeholder Engagement	Provides descriptions of the engagement activities undertaken as part of the ESIA.
Chapter 7 - Project Activities Description	Describes the various activities that will be undertaken throughout the project lifecycle or the phases the Project will go through.
Chapter 8 - Assessment of Environmental Impacts and Measures Proposed	Presents the predicted impacts to the bio-physical environment because of the Project and the associated mitigation measures to avoid or reduce negative impacts and management measures to enhance positive impacts.
Chapter 9 - Assessment of Socio-economic Impacts and Measures Proposed	Presents the predicted impacts to the socio-economic environment because of the Project and the associated mitigation measures to avoid or reduce negative impacts and management measures to enhance positive impacts.
Chapter 10 - Environmental and Social Management Plan Overview	Presents an overview of the plan developed for the integrated management of the environmental and socio-economic impacts identified. The plan will incorporate mitigation and enhancement actions, roles and responsibilities, provisional timeframes for implementation and monitoring requirements. It also presents a framework outlining procedure for effectively containing emergency situations that may result from the Project.
Chapter 11 - Conclusion	Summarises the key findings or outcome of the ESIA.
Chapter 12 - References	Provides a list of references used as cited in the text.

2.0 PROJECT DESCRIPTION

This section of the report presents a comprehensive description of aspects of the Project, such as the OPBRC concept, road features and proposed design and/or construction interventions. It also describes the need or rationale for the Project, including the Project alternatives assessment conducted as part of the ESIA process.

2.1 PROJECT OVERVIEW

2.1.1 THE ROAD SECTOR

With reference to the ESA for TSIP Guideline Document (MRH, 2017), Ghana's transport system consists of one international airport, four domestic airports, an estimated national road network of 72,381 km in 2015, a limited rail network in the southern half of the country which has deteriorated considerably, and an underdeveloped inland water transport system.

The road transport sector accounts for the bulk of transport services, constituting over 95% of total land transport services supply in Ghana. It has linkages with the economic sector with respect to macro-economic development, and in addressing conditions of rural equity for access and conveyance as economic development grows.

Roads are the dominant means of transportation in Ghana and they are categorized into three (3) types; trunk roads, urban roads and feeder roads. The road network has a functional classification system for each road type as shown in Table 2-1 below.

Table 2-1 Ghana Road Classification

Trunk Road	Feeder Road	Urban Road
National	Inter District	Major Arterial
Inter-Regional	Connector	Minor Arterial
Regional	Access	Distributor / Collector
-	-	Access / Local

Source: Ministry of Roads and Highways, as referenced in the ESA for TSIP Guideline Document (MRH, 2017)

As of 2017, there was approximately 72,381 km of roads which was made up of 42,045 km of feeder roads, 15,463 km of urban roads and 14,873 km of trunk roads. About 39% of the road network is in good condition, 32% is in fair condition and 29% is in poor condition. The paved section of the network is only about 30%. The network is comprehensive, connecting to neighbouring countries, linking all regions, districts, farming and tourist centres within the country.

The sector as a policy has prioritised maintenance of the existing network over expansion hence the network size has remained fairly constant over the past years. By the end of the year 2017, the sector projected to have increased the network of roads in good condition from the provisional figure of 39% to 50% and similarly, increase the network of roads in fair condition from the provisional 32% to 35%. By this, the network of roads in poor condition will reduce from the provisional figure of 29% to 15%. Table 2-2 below shows the trend of the network size and condition for the period 2012 – 2015, provisional figures for 2016 – 2017 and projected targets for end of 2017.

Table 2-2 Ghana Road Network Size and Condition (2012 - 2017)

	2012		2013		2014		2015		2016*		2017*		
Network Condition	Percent	Length (km)	Percent	Length (km)	Percent	Length (km)	Percent	Length (km)	Percent	Length (km)	Percent	Length (km)	Percentage Target
Good	42%	28,588	45%	31,978	35%	24,872	39%	28,210	39%	28,210	39%	28,210	50%
Fair	28%	19,059	25%	17,766	33%	23,451	32%	23,127	32%	23,127	32%	23,127	35%
Poor	30%	20,420	30%	21,319	32%	22,740	29%	21,044	29%	21,044	29%	21,044	15%
Network Size													
Trunk Roads	13,477		14,873		14,873		14,874		14,873		14,873		
Urban Roads	12,400		14,000		14,500		15,462		15,463		15,463		
Feeder Roads	42,190		42,190		42,045		42,045		42,045		42,045		
Total Network	68,067		71,063		71,418		72,381		72,381		72,381		

* Network condition for 2016 and 2017 is provisional based on information as at June, 2017

Source: Adapted from Ministry of Roads and Highways, as referenced in the ESA for TSIP Guideline Document (MRH, 2017) and Medium-Term Expenditure Framework (MTEF) for 2018 – 2021: Programme Based Budget Estimates for 2018 (MRH, 2018)

2.1.1.1 TRUNK ROADS

Trunk roads are roads that run through the country connecting the regions and linking Ghana to its neighbours. They are classified using socio-economic considerations as follows:

- National (N) – Roads linking the national capital to regional capital, important border towns in neighbouring countries, ports and major tourist sites;
- Inter-Regional (IR) – Second hierarchy roads serving as important lines of communication between the various regions to ensure regional coherence; and
- Regional (R) – The third category link district capitals to their respective regional capitals or to the nearest district capitals and major industrial, trade or tourist centres.

2.1.1.2 FEEDER ROADS

The feeder roads are roads that connect from the towns and villages into the main trunk roads. They are classified as follows:

- Inter District – Roads that cross more than one district;
- Connector – Feeder roads that link a trunk or higher-class feeder road; and
- Access – Feeder roads that start from either a trunk or higher-class feeder road and ends in a community.

2.1.1.3 URBAN ROADS

Urban roads are roads within the cities and major towns. The urban road system is classified into four main classes as follows:

- Major Arterials – Roadways that serve most of the inter-city trips. Principal arteries are further divided into freeways and main arterials;
- Minor Arterials – They augment the major arterials in the formation of a network of roads that connect urbanised areas. Travel speeds on the minor arterials can be as high as those on the major arterials;
- Distributor / Collector – roads, which primarily carry traffic within individual urbanized areas and trip distances, are usually shorter than those on the arterial roads;
- Access / local – These are streets that provide access to residence and to adjacent lands and properties and residential driveways.

2.1.2 THE OPBRC MODEL

The OPBRC concept is designed to increase the efficiency and effectiveness of road asset management and maintenance. Part of its benefits include adequate design, adequate construction quality, road completion at awarded price and adequate maintenance of the roads after construction. Payment reductions are expected if road conditions are not maintained to defined service levels per the schedule given in the contract. Payments may even be suspended, and the contract cancelled, if the Contracting Entity fails during an extended period to achieve certain thresholds values of service levels. The role of the Employer or Government then is to enforce the contract by verifying compliance with the agreed road conditions (service levels) and with applicable legislation and regulations.

Road conditions and service levels are defined through output and performance measures, and these are used under the OPBRC to define and measure the desired performance of the Contracting Entity. The Contracting Entity under OPBRC is paid on an output basis (maintaining the road at a specified service standard) rather than an input basis as occurs under the traditional road contracts.

In the OPBRC, the defined performance measures are thus the accepted thresholds for the quality levels of the roads for which the Contracting Entity is responsible and covers all aspects of the contract. This type of contract makes it necessary for the Contracting Entity to have a good financial and management capacity.

Table 2-3 below highlights basic differences between the OPBRC and traditional road contract.

Table 2-3 OPBRC and Traditional Road Contracts Compared

OPBRC	Traditional Road Contracts
The Contracting Entity is responsible for the design of works required to reach and maintain specified service levels over the length of the contract. The Employer (or Government) may however provide design for improvement works.	The Employer (or Government) is responsible for design and the provision of specifications to the Contractor.
The OPBRC focuses on the integral management of the road asset.	Maintenance, if any, is provided through Government or a separate contract.
Payments under OPBRC is linked to measured outputs delivered at specific service levels.	Payments based on quantities of work measured by unit prices for work inputs.

The Basis of Design Report (UWP, 2019) defines some service level criteria or quality indicators that will be applicable to this Upper West Package 2 Road Project and these include, but not limited to the following:

- Road usability: Accessibility
- Average travel speed: Average speed for a standard vehicle
- Road user service and comfort: Cracking, cleanliness, rutting, raveling, etc.
- Durability: Crossfall, roughness, width, vegetation, drainage, signage, etc.

These indicators will together define the service level required for a particular road, which in essence are the minimum quality thresholds the Contracting Entity is required to meet in order to receive payment for maintenance services. Some specifications for these service level criteria are presented in subsequent sections below and further details can be referred from the Basis of Design Report (UWP, 2019).

2.1.2.1 ROAD USABILITY

Regarding this service level criteria, the Contracting Entity is always expected to have or keep the road open to traffic and free of interruptions. Some exceptions may however be permitted, which includes but not limited to the underlisted:

- Following defined emergency events resulting in closure of part of the road;
- During parades and demonstrations when a road section may be closed for a short period;
- When the road is closed by the police or security services; and
- When works being carried out by other contractors or local authorities, in consultation with the Contracting Entity, result in closure of the road.

2.1.2.2 AVERAGE TRAVEL SPEED

It is important that the Contracting Entity maintains the road surface conditions in a manner that does not constrain vehicle speed and allows vehicles to be able to circulate in a safe manner at average speeds defined in Table 2-4.

Table 2-4 Average Travel Speed for the Road Packages Service Levels

Service Level	Average Travel Speed (km/h)
Unpaved Sections	
Fair (support roads)	25
Fair (feeder roads)	40
Good	60
Very good	70
Paved Sections (Urban / built-up areas)	
Average driving speed achieved on each road link respectively (keeping road free of interruptions at all times)	50

Source: Basis of Design Report (UWP, 2019)

2.1.2.3 ROAD USER SERVICE AND COMFORT

The proposed criteria for the road user service and comfort measures for the unpaved and paved sections of the project roads are as defined in Table 2-5 and Table 2-6 below.

Table 2-5 Road User and Comfort Measures - Unpaved Roads

Item	Service Level		Measurement / Detection
	Feeder roads	Irrigation support / access roads	
Road corrugation amplitude	Permitted maximum value at any single point of road: Fair: 45mm Good: 35mm Very Good: 25 mm	Permitted maximum value at any single point of road: Fair: 45 mm	Visual inspection. Ruler
Rut depth	Permitted maximum value at any single point of road: Fair: 50 mm Good: 40 mm Very Good: 35 mm	Permitted maximum value at any single point of road: Fair: 50 mm	Visual inspection. Ruler
Other surface degradations (potholes, erosions and similar types of degradations, other than corrugation and rutting)	Permitted maximum value at any single point of road: Fair: 50 mm Good: 40 mm Very Good: 35 mm Permitted maximum number of accumulated degradations with any dimension greater than nominated diameter in any 1 km section: Fair: 20 /300 mm Ø Good: 10 /250 mm Ø Very Good: 2 /250 mm Ø	Permitted maximum dimension of any single degradation: Fair: 450 mm Permitted maximum number of accumulated degradations with any dimension greater than nominated diameter in any 1 km section: Fair: 20 /300 mm Ø	Visual inspection. Ruler

Item	Service Level		Measurement / Detection
	Feeder roads	Irrigation support / access roads	
Cleanliness of the pavement surface and shoulders.	The road surface must always be clean and free of soil, debris, trash and other objects.	The road surface must always be clean and free of soil, debris, trash and other objects.	Visual inspection.

Source: Basis of Design Report (UWP, 2019)

Table 2-6 Road User and Comfort Measures for Paved (Concrete Block Paving) Roads

Item	Service Level	Measurement / Detection
Rut depth, Undulations, Shoving (CPB)	Permitted maximum value in a 1 km section is 30 mm over 10m length.	Visual inspection. Ruler
Surface Degradations (depressions, erosions and similar types of degradations)	Permitted maximum depth of any single depression is (30 mm). Permitted maximum number of accumulated depressions with an average depth of 2cm in any continuous 1km section is: 5 no.	Visual inspection. Ruler
Edge Restraint or anchor beam damage (depressions, erosions and similar types of degradations)	Severe cracking visible, lateral displacement of restraint present or Edge restraint not functional. Must be less than 1m/km.	Visual inspection.
Loss of Jointing Sand (CPB)	A limited amount of jointing sand present in the joints. Joint widths are variable, and the blocks can be rocked by standing on them. All Joints must be properly filled.	Visual inspection.
Broken, spalled bricks	If in 50m of paved road more than ten blocks are broken or shattered this will be a non-compliance. Must be less than 1no. in a 10m road length.	Visual inspection.
Cleanliness of the pavement surface and shoulders.	The road surface must always be clean and free of soil, debris, trash and other objects.	Visual inspection.

Source: Basis of Design Report (UWP, 2019)

2.1.2.4 DURABILITY

It is important that the activities of management and maintenance of the roads by the Contracting Entity during the entire period of the contract does not endanger the long-term sustainability of the roads, which depends on several criteria as defined in Table 2-7.

Table 2-7 Durability Measures for Project Roads Service Levels

Item	Service Level	Measurement / Detection
Required longitudinal profile	Accepted maximum negative vertical tolerance: <ul style="list-style-type: none"> 30mm below the height of the required longitudinal profile No limit above the height of the required longitudinal profile 	Manual measurement using topographical survey instruments
Useable road surface width	Pavement width must be at least as wide as specified in the typical cross sections. Accepted maximum negative tolerance: <ul style="list-style-type: none"> 0 cm less than the width of the useable road 	Manual measurement using a metric measuring tape

Source: Basis of Design Report (UWP, 2019)

2.1.2.5 SIGNALLING AND ROAD SAFETY

It is important that all horizontal and vertical signaling, as well as guardrails and other road safety features fully comply with the relevant sections in the Ghana “Standard Details, Road Sign and Markings for Urban and Trunk Roads” (MRH, 1991). The proposed service level requirements for signaling and road safety features are as defined in Table 2-8.

Table 2-8 Signaling and Road Safety for the Project Roads Service Levels

Item	Service Level	Measurement / Detection
Road signs	All road signs as per the design must be present, complete, clean, legible, and structurally sound.	Visual inspection
Horizontal demarcation and/or pavement paint marking	Must be present, legible and firmly attached to pavement. Micro spheres must be firm and visible.	Visual inspection
Mileposts and guidance posts	Must be present, complete, clean, legible and structurally sound; surface painted or otherwise covered.	Visual inspection
Guardrails (crash barriers)	Must be present, clean, without any significant damage, without corrosion.	Visual inspection

Source: Basis of Design Report (UWP, 2019)

2.1.2.6 DRAINAGE

It is required that the Contracting Entity puts in adequate measures so that all drainage elements and structures associated with the roads are without any obstructions which may reduce their normal cross-section and impede the free flow of water. The proposed service level requirements for drainage structures or devices are as defined in Table 2-9.

Table 2-9 Drainage Criteria for Project Roads Service Levels

Item	Service Level	Measurement / Detection
Ditches and vertical drains	Must be clean and free of obstacles. In case of lined drains, lining must be without any significant damage. Permitted tolerance: obstructions equivalent to less than 10% of capacity of item.	Visual inspection
Collectors	Must be clean and free of obstacles, and without structural damage. Must be firmly contained by surrounding soil or material.	Visual inspection
Culverts and similar	Must be clean and free of obstacles, and without structural damage. Must be firmly contained by surrounding soil or material. Permitted tolerance: obstructions equivalent to less than 10% of capacity of item.	Visual inspection

Source: Basis of Design Report (UWP, 2019)

2.1.2.7 STRUCTURES

The Contracting Entity will be responsible for the routine maintenance of all bridges and similar structures along the roads and road sections included in the contract. In particular, the Contracting Entity will be responsible for the correct functioning of the structures (paint of metallic structures, road surface on structures, condition and presence of guardrails) and the safety and comfort of road users while using the structures at normal speeds.

The proposed service level requirements for bridges and retaining walls and similar structures are as defined in Table 2-10. Visual inspections will be conducted using the standard or approved GHA Structures inspection form.

Table 2-10 Structures Criteria for Project Roads Service Levels

Item	Service Level	Measurement / Detection
Approaches, furniture, equipment, superstructure, substructure, erosion protection and retaining walls	No defects as described on GHA inspection form. Item must have a Rating notation = 1 and condition = A.	Visual inspection
Steel or other metal structures	Guardrails must be present and not deformed. All metal parts of overall structure shall be painted or otherwise protected and free of corrosion. Drainage system must be in good condition and fully functional.	Visual inspection
Riverbeds	There must be free flow of water under bridge and up to 100 meters upstream. Contracting Entity must maintain design clearance under bridge and take all reasonable measures to control erosion around bridge abutments and piers.	Visual inspection

Source: Basis of Design Report (UWP, 2019)

2.1.2.8 VEGETATION WITHIN THE RIGHT OF WAY

Vegetation growing within the right of way of the project roads is to be controlled to the heights, at the locations and with the restrictions as defined in Table 2-11. The proposed service level requirements for vegetation control are presented in Table 2-12.

Table 2-11 Vegetation Control Types and Applicable Road Features

Type	Height (mm)	Road features applicable to
1	50 – 300	Non-urban roads and large vegetated areas, including surface water channels.
2	Vegetation Free or Near Vegetation Free [Note vegetation up to 200 mm high may be acceptable in these zones]	Vegetation control around: <ul style="list-style-type: none"> • Edge marker posts • Signposts • Bridge end and culvert markers • Guardrails • Sight rails • Lighting Columns • Bridge abutments
3	Vegetation Free or Near Vegetation Free	Applies to vegetation control around: <ul style="list-style-type: none"> • Culvert ends • Culvert headwalls • Side drains • Culvert waterways • Surface water channels with gradient < 3% (except where nominated for mowing in the specific contract requirements) • Kerb and channel • Lined channels • All sealed surfaces • Road shoulders • Bridge decks
4	Growth removed when it encroaches into the Vegetation Free Zone from the side or top.	Applies to control of vegetation in the envelope, including trees, scrub or branches hanging into the Vegetation Free Zone (within 0.5m of the line of the edge marker posts or to within 6.0m above the pavement)

Source: Basis of Design Report (UWP, 2019)

Table 2-12 Service Level Requirements for Vegetation Control

Item	Service Level	Measurement / Detection
Vegetation height	The average height of the vegetation of Type 1 areas shall be less than 300 mm in any 1 km section. The distance from the edge of the pavement shall be a minimum of 3.0m and a minimum of 5.0m on the inside of curves.	Manual measurement using a metallic ruler / measuring tape
Clearance	The average height of free clearance in any 1 km section shall be at least 6.0m.	Visual Inspection with extendable measuring staff

2.1.3 THE UPPER WEST PACKAGE 1 ROADS OVERVIEW

The Upper West Package 1 OPBRC road network comprise of several feeder roads and access roads which altogether spans about 235.4 km. The prioritized road networks fall within the Wa Municipal, Wa West and Nadowli-Kaleo Districts in the Upper West Region. Some of the roads connect to various pump station locations on the Black Volta which will be developed to support irrigation and boost agricultural productivity in the area. Others connect to existing dams along the stretch or proposed locations for the siting of new dams to serve as irrigation facilities for use of farmers.

The feeder road network within this package traverses a predominantly level terrain with an average elevation of 300m above MSL. The elevations generally vary between 150m and 330m above MSL. The terrain generally slopes towards the Volta Lake and its tributaries. The road network is mostly gravel roads or earth roads. Much of the road sections do not have drainage structures, thus making them prone to flooding and inaccessible during rain events. This has left almost all the roads ridden with gaping potholes or depressions on the road. Sections of the roads also have visible erosion gullies due to poor drainage. The Concept Design Report (UWP, 2020) classifies majority (about 38%) of the roads as being in poor condition, about 31% impassable and about 22% in fair condition. Only about 2% of the roads can be classified as in good condition. A sectional view of a typical road within this network is shown in Figure 2-1.

The Black Volta is one of the major waterbodies that drain the Project area, besides other smaller streams and dugouts (earth dams). Agriculture forms the predominant land use in this area and there is a high potential for tourism, except for the bad nature of roads. Tourist attraction within the area include the Wechiau Hippo Sanctuary.



Figure 2-1 A Typical Road within the Upper West Package 1 Roads Network

Further description of the road links within this network is provided in Section 2.2. Figure 2-2 below shows the distribution of the network of selected feeder roads (in green).

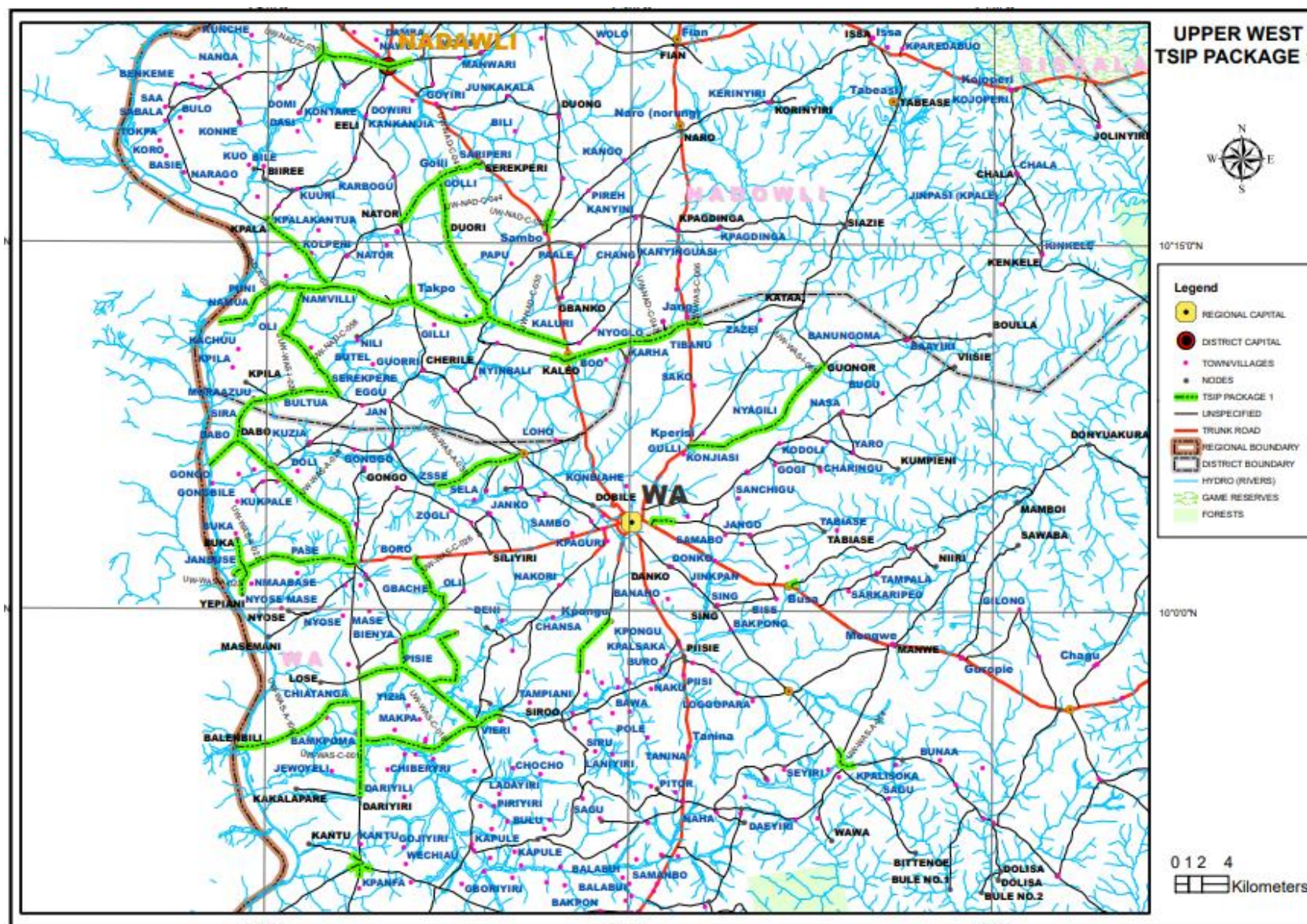


Figure 2-2 The Upper West Package 1 Roads Network Map

2.1.4 NEED FOR THE PROJECT

Ghana's economic performance has seen improvements in recent years with the growth attributed in part to the exploitation of Ghana's rich resource base, including gold, bauxite, manganese, timber, cocoa, diamonds, agricultural products and more recently oil and gas, in addition to major industries.

The economic exploitation of resources is mutually dependent on a good and well-functioning road network. Road infrastructure and the transport sector play a strategic role in the socio-economic development of Ghana. Roads play a major role in achieving a robust economic growth for every country. The transport sector accounts for approximately 9% of Ghana's GDP and generates a significant share of the total budgetary revenue of the country.

A wide range of environmental and social benefits will arise as a result of this OPBRC Project. These will include economic benefits, boosts to agricultural productivity, employment generation, social services, travel and transport, enhanced gender opportunities, fuel economy and reduced pollution. A reliable and affordable road transport system forms part of the social safety net, enabling trade and employment opportunities in both urban and rural communities. It also facilitates the movement of goods and services in all sector of the economy including tourism, education, health and agriculture, among others.

Roads improvement (especially feeder roads) is known to accelerate connections to main food growing and potential agricultural growth areas of the country. A major objective of this Project is to provide connectivity between farms, markets and commercial centres to promote agricultural development of commodities in the Upper West Region which is seen as one of the regions in the country with poor feeder road networks. The Upper West Region has also been reported as the poorest region in the country according to the poverty profile in Ghana (2005 - 2013) publication by the Ghana Statistical Service in August 2014, based on the Ghana Living Standards Survey Round 6. The report also indicated that extreme poverty is concentrated in the rural savannah areas where about a quarter of the population are affected.

Some of the direct beneficiaries of the project would be farmers needing improved access for bringing farm inputs and extension services to their farms and transporting their produce to markets within the value chain. The road improvement would reduce the high post-harvest losses experienced by farmers in the region by facilitating the transportation of agriculture produce to the marketing centres in the region and across the country, thus increasing trade effectiveness. This will also lead to increased income or maximization of returns for the farmers and ultimately significantly reduce poverty levels in the region. Other beneficiaries would be the local communities needing improved access to social services such as schools, clinics, and markets. Smaller towns, villages, and rural settlements within the targeted rural areas will also benefit directly from socioeconomic improvements. Road infrastructure is one of the sectors of the economy that has contributed tremendously to poverty reduction in Ghana.

Besides these, the road project will generate considerable travel benefits. When the roads are in good shape, travelling time will reduce, vehicle wear and tear will also reduce (leading to direct savings on the cost of operating vehicles). Also, villages and settlements, including estate developers will spring up in and around the newly constructed or rehabilitated roads. These settlers will engage in economic activities such as petty trading, food and drinks vending, mechanics, fitting workshops and hairdressing salon operations. These activities will result in a significant rise in enterprise and income activities within the Project area.

In essence, this would lead to improvement in the livelihood of the beneficiary communities. It will also be a boost to the tourism potential of the area/region. Similarly, the security situation of the area would

improve. Potentially, it is also expected that there may be some reductions as well in vehicular emissions due to the overall improved efficiency of the roads.

2.2 LIST OF PRIORITISED ROADS IN PACKAGE 1

The list of roads under the Upper West Package 1 Project with their start and end points, actual length and facilities on or along the roads are presented in Table 2-13 below. Further description of the road links within the package is presented in the subsequent sections.

Table 2-13 List of Prioritised Roads in Upper West Package 1 Road Network

Revised Road No.	Facility	Length (km)	District	Start Town	End Town	Road Name
P1_1_1	Pump Station 10	6.7	Nadowli Kaleo	Nanville	Kpaala	Nanville-Kpaala
P1_1_2	Pump Station 10	7.7	Nadowli Kaleo	Boo-Yiri	Nakoruyiri	Boo-Yiri-Nakoruyiri
P1_2	Pump Station 9	17.4	Nadowli Kaleo	Saan	Nadowli	Saan-Cherikpong-Tangalsia-Nadowli
P1_4	Pump Station 15	7.9	Wa West	Bakparma	Yiziri	Bakparma-Yiziri
P1_5	Pump Station 14	4.4	Wa West	Nwaabasi	Buka	Nwaabasi-Jambosi-Buka
P1_6	Pump Station 11_Pump Station 12_Pump Station 13	13.7	Wa West	Dorimon	Dabo	Dorimon - Dabo
P1_7	Pump Station 10	1.5	Nadowli Kaleo	Kpaala	Pump station 10	Kpaala - Pump site 10
P1_8	Pump Station 11	2.7	Nadowli Kaleo	Siiraa	Pump station 11	Siiraa - Pump site 11
P1_9	Pump Station 12	3.0	Wa West	Dabo	Pump station 12	Dabo -Pump Site 12
P1_10	Pump Station 13	3.3	Wa West	Dabo	Pump station 13	Dabo - Pump Site 13
P1_11	Pump Station 14	2.3	Wa West	Buka	Pump station 14	Buka - Pump Site 14
P1_12	Pump Station 15	2.4	Wa West	Bankpama	Pump station 15	Bankpama - Pump Site 15
P1_13	Pump Station 16	7.4	Wa West	chietanga	Bienye	Chietanga - Guse - Bienye
P1_15	Pump Station 9	3.4	Nadowli-Kaleo	Saan	Pump station 9	Saan - Pump Site 9
P1_15a	Nyoli Market	0.9	Wa West	Nyoli	Nyoli	Nyoli
P1_15b1	Wechiau Market	0.2	Wa West	Wechiau	Wechiau	Wechiau
P1_15b2	Wechiau Market	0.3	Wa West	Wechiau	Wechiau	Wechiau
P1_15c	Takpo Market	0.1	Nadowli Kaleo	Takpo	Takpo	Takpo
P1_15d	Kaleo Market	0.4	Nadowli Kaleo	Kaleo	Kaleo	Kaleo
P1_15e	Sankana Market	0.2	Nadowli Kaleo	Sankana	Sankana	Sankana

Revised Road No.	Facility	Length (km)	District	Start Town	End Town	Road Name
P1_15f	Piisi Market	0.2	Nadowli Kaleo	Piisi	Piisi	Piisi
P1_15g	Sombo Market	0.2	Nadowli Kaleo	Sombo	Sombo	Sombo
P1_15h	Nadowli Market	0.2	Nadowli Kaleo	Nadowli	Nadowli	Nadowli
P1_15i	Wa Market	0.2	Wa	Wa	Wa	Wa
P1_15j	Jang Market	0.2	Nadowli Kaleo	Nadowli Kaleo	Nadowli Kaleo	Jang
P1_15k	Tangasia Market	0.2	Nadowli Kaleo	Nadowli Kaleo	Nadowli Kaleo	Tangasia
P1_24	New Dam 5	3.5	Nadowli Kaleo	Kaleo	New Dam 5	Kaleo - New Dam 5
P1_25	Existing Dam 4	2.9	Wa Municipal	Busa	Existing Dam 4	Busa - Existing Dam 4
P1_26	New Dam 1	2.8	Wa West	Piisie	Losse	Piisie - Losse
P1_27	Existing Dam 5	7.0	Wa West	Vieri	Siiru	Vieri - Siiru
P1_28		9.2	Wa West	Piisie	Boro	Piisie-Domawa-Boro
P1_31		3.8	Wa West	Piisee	Boro	Piisee-Losse-Gbondberi-Salimana-Boro
P1_42		9.7	Nadowli-Kaleo	Nator	Sankana	Nator-Natoduri-Changu-Sankana
P1_43		8.2	Nadowli-Kaleo	Nanville	Nator	Nanville-Nator
P1_47		8.0	Nadowli-Kaleo	Serekpere	Nator Duori	Nator Duori-Goli-Serekpere
P1_50		19.5	Nadowli-Kaleo	Nadowli	Nanville	Nadowli-Tangasia-Cherikpong-Nanville
P1_62		9.5	Wa West	Tanvare	Vieri	Tanvare - Vieri
P1_82		1.1	Wa West	Jambusi	Mwabasi	Jambusi - Mwabasi
P1_87		8.8	Wa West	Mwabasi	Dorimon	Mwabasi - Dorimon
P1_90		2.2	Wa West	Konbuoli	Dorimon	Konbuoli - Dorimon
P1_94		10.3	Wa West	Dabo	Sukpere	Dabo - Sukpere

Revised Road No.	Facility	Length (km)	District	Start Town	End Town	Road Name
P1_96		12.6	Wa West	Sukpere	Nanvilli	Sukpere - Nanvilli
P1_102		8.8	Wa Municipal	Siiru	Kpongo	Dadafuri - Kpongo
P1_114		12.9	Wa Municipal	Kperisi	Guonuo	Kperisi - Guonuo
P1_116		6.8	Wa West	Asse	Charia	Asse - Charia

Visual condition survey was conducted on the road networks. The roads were assessed subjectively by providing a rating of poor, fair or good every 500 m interval. The ratings were defined based on the travel speed criteria, associated with roughness (riding comfort), following World Bank Guidelines (Unpaved Road's Roughness estimation by subjective evaluation - Transport No. RT - 2) and Road Economic Decision Model (RED). Based on the above, the following condition categories in Table 2-14 were used to assess the unpaved roads.

Table 2-14 Road Condition Rating Scale

Condition Rating	Travel Speed Criteria	Typical Condition of Road
Good	> 50 km/hr	Shallow depressions and no presence of corrugations
Fair	30 km/hr - 50 km/hr	Few depressions, occasional potholes, and some corrugations
Poor	< 30 km/hr	Lot of depressions, not possible to avoid all depressions, presence of potholes

Source: Concept Design Report (UWP, 2020)

2.2.1 NANVILLE – KPAALA ROAD (ROAD NO. P1_1_1)

The current route can be classified as a semi-engineered connector road (Figure 2-3). The route traverses a flat terrain. This road serves a low population density area and connects the surrounding few villages to a health facility located in the vicinity of Takpo. Also, along this road are a few education facilities and a market town. The road generates moderately low motorised traffic volumes.

2.2.2 BOO-YIRI – NAKORUYILI (ROAD NO. P1_1_2)

The current route can be classified as a semi-engineered connector road. The route traverses a flat terrain as shown in Figure 2-3. This road is also serving a low population density area which has a few villages around it. This road is linked to a trunk road. Along this road there are health facilities, schools and a market town. This road also provides access to an existing dam, from where communities in this area collect water for farming and for washing and other domestic uses. The road has a moderately high non-motorised traffic volume, mainly due to the clinics along the road.

2.2.3 SAAN – NADOWLI (ROAD NO. P1_2)

The current route can be classified as a semi-engineered connector road. The route traverses a flat terrain (Figure 2-4). This road is in a low population density area connecting the surrounding villages with the social facilities, i.e. health facilities, schools and market towns, and is approximately 20km long. Communities along this route include Tangasia and Charikpong. This road also connects the western communities, in the vicinity of Sabala to Naribu with the highway which then acts as a link for commuters wanting to travel long distances by car, possibly to town for commercial reasons.

The road has a moderately high motorised and non-motorised traffic volume. The vegetation along the road at the time of the survey looked very dry and burnt, with date palms a common feature along the road. Social services identified along the route include a mosque and a health centre at Charikpong.

2.2.4 BAKPARMA – YIRIZI (ROAD NO. P1_4)

The current route can be classified as a semi-engineered connector road (Figure 2-4). The route traverses a flat terrain. Although this road links surrounding communities with health facilities, there is little motorised traffic due to a low population density and short length (5km) of this road. It has a low-moderate volume of non-motorised traffic comprising mainly of people walking to their farm lands and/or to fish from the Black Volta located to the west of this road, or visiting a nearby clinic.

2.2.5 NWAABASI – BUKA (ROAD NO. P1_5)

The current route can be classified as a semi-engineered connector road. The route traverses a flat terrain (Figure 2-5). Road P1_5 is a very short road section serving two villages, has a clinic and a school nearby. There are no other crucial social facilities that potentially attract motorised transport, except for one health facility which is located near the intersection of this road with P1_87 (in Jambusi village).

2.2.6 DORIMON – DABO (ROAD NO. P1_6)

The current route can be classified as a semi-engineered connector road and traverses a rolling terrain as shown in Figure 2-5. This road is located on a low population density area, serves some social facilities, i.e. health facilities, schools and market, surrounded by a few villages / settlements and connects these villages to a trunk road via Dorimon village on the southern end of P1_6. This road acts as a link for people wanting to travel along a western corridor, to travel north from the Dorimon settlement, towards Nanvilli village.



Figure 2-3 A Section of Nanville - Kpaala Road (Left) and Boo-Yiri - Nakoruyili Road (Right)



Figure 2-4 A Section of Saan - Nadowli Road (Left) and Bakparma - Yirizi Road (Right)



Figure 2-5 A Section of Nwaabasi - Buka Road (Left) and Dorimon - Dabo Road (Right)

2.2.7 KPAALA – PUMP STATION 10 (ROAD NO. P1_7)

The current route is classified as an irrigation support access road. The route traverses a flat terrain. This road is mainly a proposed link / access to a future pump-site located on the Black Volta and currently has very little traffic activity, due to the road being in a very poor condition.

2.2.8 SIIRAA – PUMP STATION 11 (ROAD NO. P1_8)

The current route traverses a flat terrain and is classified as an irrigation support access road. This short road (approx. 2.5km) provides access to a future proposed pump-site along the Black Volta and currently connects Siiraa village with the Black Volta. There is low non-motorised traffic involving mainly locals wanting to fish at the river and/or farm their lands in this area. There is also a low motorised traffic since there are no traffic attracting facilities or villages at all along the road other than locals using motorbikes to travel to the river.

2.2.9 DABO – PUMP STATION 12 (ROAD NO. P1_9)

The current route is classified as an irrigation support access road and traverses a flat terrain. This road has similar properties as P1_8 and thus similar traffic volumes (Figure 2-6). The pump station is on the Black Volta that runs along the Ghana and Cote D'Ivoire border. A number of people, including children were seen wading through the river to cross from the Cote D'Ivoire banks into the Ghana side (Figure 2-7). They spoke mainly French. The road is in very poor state and ridden with potholes.

2.2.10 DABO – PUMP STATION 13 (ROAD NO. P1_10)

The current route is classified as an irrigation support access road. The route traverses a flat terrain and is in very poor condition with many potholes. No other crucial facilities are present along this road, and it is currently serving a very low population density area. As such, the road has very low motorised and non-motorised traffic comprised mostly of locals residing in Oongo village near the Black Volta River, who are travelling to their farm lands, or nearest health facility and/or school located in Dabo (Figure 2-6).



Figure 2-6 A Section of the Road Leading to Pump Station 12 (Left) and 13 (Right)



Figure 2-7 People Crossing the Black Volta at Site for Pump Station 12

2.2.11 BUKA – PUMP STATION 14 (ROAD NO. P1_11)

The current route is classified as an irrigation support access road. The route traverses a flat terrain and is in poor condition, with the sections leading to the riverside (pump station) quite obstructed by vegetation and small tree stumps (Figure 2-8). Road P1_11, currently only links a low population density Buka village to the main road via P1_87 (a secondary gravel road) which then connects to the nearest town in Wa Municipal. This road will further act as an access road to the future proposed pump-site just north-west of Buka village.

There are no social facilities along or around this road which may potentially attract motorised transport, except for one health facility which is located near the intersection of this road with P1_87 (in Jambusi village). Based on these factors, there is currently very low motorised and non-motorised traffic.

2.2.12 BANKPAMA – PUMP STATION 15 (ROAD NO. P1_12)

The current route is classified as an irrigation support access road. The route traverses a flat terrain. The road leading to the pump station looks more like a foot path and thus was not accessible during the survey via drive-through. Social services were identified along the route in the form of CHPS Compound, school and community borehole (Figure 2-10).

This road is also merely providing access to the Black Volta or proposed future pump station. The road serves a low population density area with only one village nearby (Jewoyeli village). This road links this village to a nearby clinic, located in Bankpama.

2.2.13 CHIETANGA – BIENYE (ROAD NO. P1_13)

The current route is classified as an irrigation support access road. The route traverses a flat terrain. P1_13 is on a low population density area with approximately 4 villages around its 5km radius and serves a few educational facilities. No other crucial facilities significantly attract traffic along this road, therefore, not much traffic activity exists.

2.2.14 SAAN – PUMP STATION 9 (ROAD NO. P1_15)

The current route is classified as an irrigation support access road. The road leading to the river (pump station) looked more like a foot path and thus was not accessible during the survey via drive-through. The riverside (pump site) was thus accessed by foot and the vegetation along the path looked very dry (Figure 2-8). Activities of fishermen were observed near the river bank in the form of fishing nets, canoes, cooking pots and a fire place (Figure 2-9). It is believed sacrifices are also made to the river gods occasionally as feathers of fowls were seen at the river bank.

This road provides access to the Black Volta (proposed pump-site) and does not have any traffic attracting facilities, except for locals staying in and around Saan village that may want to travel to the Black Volta to fish and/or to their farming areas. Other than the aforementioned, there are no real traffic attracting facilities. The expected motorised traffic along this road would mainly be motorbikes or motor tricycles due to the narrow width of this road / pathway.



Figure 2-8 A Section of the Road Leading to Pump Station 15 (Left) and 9 (Right)



Figure 2-9 Pump Station 9 River Bank and Signs of Fishermen Activities



Figure 2-10 CHPS Compound and School Facilities on the Bankpama Road

2.2.15 MARKET ACCESS ROADS

These are typically short sections of roads (ranging from 0.1 km to 0.9 km) leading to various markets or market areas (See Figure 2-11 and Figure 2-12). The prioritised roads under the market access roads category are as listed below.

- Nyoli Market Road (Road No. P1_15a)
- Wechiau Market Road (Road No. P1_15b)
- Takpo Market Road (Road No. 15c)
- Kaleo Market Road (Road No. 15d)
- Sankana Market Road (Road No. 15e)
- Piisi Market Road (Road No. 15f)
- Sombo Market Road (Road No. 15g)
- Nadowli Market Road (Road No. 15h)
- Wa Market Road (Road No. 15i)
- Nadowli Kaleo – Jang Road (Road No. 15j)
- Nadowli Kaleo – Tangasia Road (Road No. 15 k)



Figure 2-11 A Market at Nyoli (Left) and Wechiau (Right)



Figure 2-12 A Market in Takpo (Left) and Kaleo (Right)

2.2.16 KALEO – NEW DAM 5 ROAD (ROAD NO. P1_24)

The current route can be classified as a semi-engineered access road. The route traverses a flat terrain. This road is merely providing access to the new proposed dam and has no crucial facilities along it to attract any major traffic. However, it is most likely that the traffic is concentrated at the start of this road, in the vicinity of Puli village, where there are a few health facilities and where this road intersects the highway - but traffic travelling along this road would mainly be people making local trips to school and/or their farm lands.

2.2.17 BUSA – EXISTING DAM 4 ROAD (ROAD NO. P1_25)

The current route can be classified as a semi-engineered access road and traverses a flat terrain (Figure 2-13). This road is a short loop road intersecting the main road or highway and is mainly providing access to the existing dam in Tangaju village. This road is in a very high population density area (201-250 persons per km²) and serves Busa and Tangaju large villages. There is moderate non-motorised traffic, which is made up of locals making local trips to the dam and farming areas and/or to the nearest clinics and schools.

2.2.18 PIISIE – LOSSE ROAD (ROAD NO. P1_26)

The current route can be classified as a semi-engineered access road. The route traverses a flat terrain. Social services along the route include a CHPS Compound (Figure 2-14). This road is also an access

road to a new proposed dam in Losse. Very few, small with low population villages, are located in the vicinity of this road and no other crucial facilities are located in this area, except for a school which is at the start of this road (intersection of P1_26 and P1_31). However, there are no other real traffic attractions. The existing traffic comprise mainly locals staying in the surrounding villages who make up the non-motorised traffic.

2.2.19 VIERI – SIIRU ROAD (ROAD NO. P1_27)

The current route is classified as an inter-district road and has a flat terrain (Figure 2-13). This road travels along a boundary of a low to moderate population density area, serves various villages and has a few schools and a health facility along it. This road is also linked to roads that are serving other various villages, schools and clinics, making it experience moderate motorised traffic volumes.



Figure 2-13 A Section of the Busa - Dam 4 Road (Left) and Vieri - Siiru Road (Right)



Figure 2-14 A Section of the Piisie - Losse Road Leading to CHPS Compound

2.2.20 PIISIE – DOMAVA – BORO ROAD (ROAD NO. P1_28)

The current route is classified as a semi-engineered connector road. The route traverses a flat terrain. This road links communities to the main road or highway (Figure 2-15). It is in a low population density zone but has a health facility and some schools located along it. This road connects other southern feeder roads with the highway, making it experience moderate motorised traffic volumes for commuters wanting to make long distance trips, particularly to the nearest town and/or for work purposes via the highway. Social services were identified along the route in the form of Mosque and CHPS Compound (Figure 2-16).

2.2.21 PIISIE – LOSSE – SALIMANA – BORO ROAD (ROAD NO. P1_31)

The current route is a 3.8 km connector road and traverses a flat terrain (Figure 2-15). This road is a continuation of or linked to P1_28 discussed above and similar conditions apply.



Figure 2-15 A Section of the Piisie - Domava Road (Left) and Salimana - Boro Road (Right)



Figure 2-16 A CHPS Compound and Mosque on the Domava Road

2.2.22 NATOR – SANKANA ROAD (ROAD NO. P1_42)

The current route is classified as a semi-engineered connector road. The route traverses a flat terrain. Social services were identified along the route in the form of CHPS Compound, church, mosque, etc. There is also a large dam at Sankana which is depended on by residents for their domestic water needs and also used by livestock. Fishermen were also seen on the dam (Figure 2-18).

This road is serving a low population density area, with a few villages located along this road. At the end of this road section are clinics, schools and a market town in the vicinity of Yimago. The road experiences a moderately high motorised traffic demand, comprising mainly of motorbikes and/or motor tricycles. This mode preference may be due to the current poor road conditions, narrow road widths and unaffordability of private cars - hence locals wanting to visit the nearest clinics, farming areas, schools and/or market town utilize these mode types or walk.

2.2.23 NANVILLE – NATOR ROAD (ROAD NO. P1_43)

The current route can be classified as a semi-engineered connector road. The route traverses a flat terrain. This road is on a low population density area and serves a number of small villages (Figure 2-17). Along this road are health facilities and a few schools. This road links villages located south with the trunk road via P1_47 and therefore experiences a moderate to high motorised traffic, mainly for people wanting to travel long distances via the highway.

2.2.24 SEREKPERE – NATOR DUORI ROAD (ROAD NO. P1_47)

The current route can be classified as a semi-engineered connector road. The route traverses a flat terrain. This road directly links traffic to the main road or highway and links the southern corridor of secondary roads to this highway as well. It has very similar environmental conditions with P1_43 discussed above, and therefore similar traffic conditions.

2.2.25 NADOWLI – NANVILLE ROAD (ROAD NO. P1_50)

The current route can be classified as a connector road with a flat terrain. It is a long route of about 19.3 km with sections in very poor state (Figure 2-17). This road is long, making it more of a mobility road; serves a low population density area with a number of villages along and around it, with some health facilities and a number of schools served by this road.



Figure 2-17 A Section of Naville - Nator Road (Left) and Nadowli - Nanville Road (Right)



Figure 2-18 A Roadside Church (Left) and Activities at Sankana Dam (Right)

2.2.26 TANVARE – VIERI ROAD (ROAD NO. P1_62)

The current route can be classified as a semi-engineered connector road. The route traverses a flat terrain (Figure 2-19). This road runs along a low population density area and serves a number of villages, highly concentrated to the west portion of this road. There are schools surrounded by these settlements, and a health facility located at the eastern end of this road. It experiences a moderate non-motorised traffic, comprising mainly of pedestrians and locals making short trips either to school or the nearest clinic and/or farming areas.

2.2.27 JAMBUSI – MWABASI ROAD (ROAD NO. P1_82)

The current route can be classified as a semi-engineered access road. The route traverses a flat terrain (Figure 2-19). This is a very short road, approximately 2km long; serves a low population density area with very few settlements around or along it. About 2 schools and a clinic are also served by this road. No other major traffic attractions are present on P1_82. This is merely an access road to a health facility and a school, and these are the main traffic attractions for this road.

2.2.28 MWABASI – DORIMON ROAD (ROAD NO. P1_87)

The current route can be classified as a semi-engineered connector road and traverses a flat terrain. Social services were identified along the route in the form of a Chief's Palace, Mosque, Traditional Council and Fuel Station (Figure 2-20). This road has similar environmental conditions as P1_82 discussed above - running along a low population density area, serving approximately 7 small settlements and provides a link to a clinic and a school. It has no crucial traffic attractions other than these available social facilities. This road feeds 3 other short gravel secondary roads and links to a trunk road. It experiences a moderately high non-motorised traffic and a moderately low motorised traffic.

2.2.29 KONBUOLI – DORIMON ROAD (ROAD NO. P1_90)

The current route can be classified as a semi-engineered connector road. The route traverses a flat terrain (Figure 2-21). This is a very short road, about 2km long making it more of a non-motorised traffic concentrated road. It is located on a low population density area and serves only 4 villages. This road directly connects the southern located villages (Nyose, Maase and Konbuoli) to a trunk road travelling east and to the P1_6 road travelling north. People residing in these villages use this road to travel to the nearest clinic, located in Dorimon, just north of this road and to travel to schools located along this

road and these are mainly made up of low non-motorised traffic volume (pedestrians and cyclists) more than the motorised traffic.

2.2.30 DABO – SUKPERE ROAD (ROAD NO. P1_94)

This route has a flat terrain and is classified as a semi-engineered connector road (Figure 2-21). This road is on a low population density area and serves a moderate number of villages, linking these settlements to the health facilities and schools located along this road. This road also connects with other secondary roads providing continuation of traffic flow from one area to the other along its corridor. The road experiences a moderate motorised and non-motorised traffic, with non-motorised traffic comprising mostly of local trips and motorised traffic made up of medium to long distance trips.

2.2.31 SUKPERE – NANVILLI ROAD (ROAD NO. P1_96)

This route is an inter-district road and traverses a flat terrain. The road covers a total length of about 12.6 km and has sections in very poor stage due to the lack of good drainage infrastructure (Figure 2-22). This road has similar environmental conditions as P1_94 discussed above, and are linked or connected, providing continuation of traffic flow.

2.2.32 SIIRU – KPONGO ROAD (ROAD NO. P1_102)

The current route can be classified as an inter-district road, spanning about 8.3 km. The route traverses a flat terrain and have sections ridden with potholes (Figure 2-22). P1_102 is located on a very high population density area and serves a fair number of settlements. This road also provides access to health facilities and a few schools. This road is travelled by a moderate to high motorised traffic and non-motorised traffic since it serves a high population area and connects these areas and other secondary roads to the main road or highway.

2.2.33 KPERISI – GUONUO ROAD (ROAD NO. P1_114)

The current route can be classified as a connector road. The route traverses a flat terrain. This road is in a very high population area and serves a moderate number of villages; has health facilities and schools along and around it, and directly connects with the main road or highway to the west in Kperisi. It experiences a moderate motorised traffic, comprising mainly of people wanting to travel to Wa Municipal town and some travelling to the nearby hospital.

2.2.34 ASSE – CHARIA ROAD (ROAD NO. P1_116)

The current route can be classified as a connector road with a flat terrain. The route spans about 6.5km. This road is on a low population density area and serves very few small settlements. It has 2 hospitals located at both ends. There are no major traffic attractions along and around this road. It experiences very low motorised traffic and moderate non-motorised traffic.



Figure 2-19 A Section of Tanvare - Vieri Road (Left) and Jambusi - Mwabasi Road (Right)



Figure 2-20 A Traditional Council Building and Mosque at Dorimon



Figure 2-21 A Section of Konbuoli - Dorimon Road (Left) and Dabo - Sukpere Road (Right)



Figure 2-22 A Section of Sukpere - Nanvilli Road (Left) and Siiru - Kpongo Road (Right)

2.3 SENSITIVE AREAS ALONG THE PROPOSED ROADS

Road construction is usually associated with noise and dust generation as well as safety disturbances and these could have adverse effects on sensitive locations. There is the need to identify all facilities along the project roads and incorporate into the planning of the construction activities. Tables 2-15, 2-16 and 2-17 are the list of facilities identified along the project roads.

Table 2-15 List of Schools Along Package 1 Roads

District	Community	Level	Location	
			Latitude	Longitude
Nadowli Kaleo District	Duong	Primary	10.34440333	-2.550468333
Nadowli Kaleo District	Nadowli	SHS	10.37698833	-2.68502
Nadowli Kaleo District	Tangasie	Primary	10.38088667	-2.714615
Nadowli Kaleo District	Nanga	Primary	10.36838333	-2.765051667
Nadowli Kaleo District	Charikpong	JHS	10.35177333	-2.791278333
Nadowli Kaleo District	Charikpong	Primary	10.35182167	-2.791276667
Nadowli Kaleo District	Saan	Primary	10.33935167	-2.8194
Nadowli Kaleo District	Saan	JHS	10.33931	-2.819398333
Nadowli Kaleo District	Sampena	Primary	10.32727833	-2.814498333
Nadowli Kaleo District	Naribu	Primary	10.28679833	-2.78461
Nadowli Kaleo District	Kpaala	Primary	10.266175	-2.749768333
Nadowli Kaleo District	Kulpieni	Primary	10.24831833	-2.728833333
Nadowli Kaleo District	Baayuru	Primary	10.246235	-2.692048333
Nadowli Kaleo District	Nator	Primary	10.26155667	-2.668978333
Nadowli Kaleo District	Nator	Primary	10.26678667	-2.66091
Nadowli Kaleo District	Nator	JHS	10.266715	-2.660971667
Nadowli Kaleo District	Serekpere	Primary	10.30600667	-2.603715
Nadowli Kaleo District	Serekpere	JHS	10.30591	-2.603646667
Nadowli Kaleo District	Goli	Primary	10.30176667	-2.625498333
Nadowli Kaleo District	Goli	JHS	10.30167833	-2.625443333
Nadowli Kaleo District	Duori	Primary	10.25676	-2.623958333
Nadowli Kaleo District	Changu	Primary	10.234515	-2.61619
Nadowli Kaleo District	Changu	JHS	10.23561667	-2.615168333
Nadowli Kaleo District	Sankana	Primary	10.21394333	-2.602065
Nadowli Kaleo District	Papu	Primary	10.23793	-2.576031667

Nadowli Kaleo District	Papu	Pre school	10.238025	-2.575886667
Nadowli Kaleo District	Papu	JHS	10.238715	-2.573523333
Nadowli Kaleo District	Kaleo	SHS	10.17462333	-2.549583333
Nadowli Kaleo District	Kaleo	Voc/Comm/Tech	10.171665	-2.550276667
Nadowli Kaleo District	Kaleo	Primary	10.17180833	-2.542206667
Nadowli Kaleo District	Takpo	JHS	10.21421833	-2.647213333
Nadowli Kaleo District	Takpo	Primary	10.21425667	-2.646671667
Nadowli Kaleo District	Takpo	SHS	10.214475	-2.646756667
Nadowli Kaleo District	Nanville	Primary	10.22181333	-2.705198333
Nadowli Kaleo District	Nanville	JHS	10.22091333	-2.705351667
Nadowli Kaleo District	Kaabogu	Primary	10.30148333	-2.663248333
Nadowli Kaleo District	Kanyini	Primary	10.27309167	-2.490978333
Nadowli Kaleo District	Kanyini	JHS	10.27476167	-2.490836667
Wa Municipal	Kperisi	Primary	10.116375	-2.455025
Wa Municipal	Kperisi	JHS	10.115005	-2.453146667
Wa Municipal	Konjeh	Basic school	10.11705667	-2.432643333
Wa Municipal	Busa	Basic school	10.01886833	-2.38818
Wa Municipal	Dignafuro	SHS	9.964873333	-2.5329
Wa Municipal	Dignafuri	Primary	9.9593	-2.534295
Wa Municipal	Dandafuri	JHS	9.958616667	-2.533168333
Wa Municipal	Charia	Primary	10.10834667	-2.571401667
Wa Municipal	Charia	JHS	10.10833167	-2.571258333
Wa Municipal	Asse	Primary	10.08740333	-2.625785
Wa Municipal	Asse	JHS	10.08437	-2.626423333
Wa Municipal	Wa	SHS	10.073455	-2.541675
Wa Municipal	Yelimana	Primary	10.07936833	-2.557843333
Wa Municipal	Zingu	Primary	10.08610333	-2.571271667
Wa Municipal	Charia	Basic school	10.11149667	-2.587621667
Wa Municipal	Egu	Basic school	10.14434333	-2.662465
Wa Municipal	Charible	Basic school	10.15251833	-2.622395
Wa West District	Balawa	Basic school	9.938633333	-2.5431
Wa West District	Vieri	Primary	9.923693333	-2.61126
Wa West District	Berenyasi	JHS	9.91136	-2.642656667
Wa West District	Berenyasi	Primary	9.910461667	-2.648585
Wa West District	Tanvari	Primary	9.912731667	-2.680288333
Wa West District	Wechiaw	JHS	9.827373333	-2.685133333
Wa West District	Wechiaw	Primary	9.828473333	-2.687936667
Wa West District	Wechiaw	SHS	9.851455	-2.685361667
Wa West District	Siira	Basic school	10.13469333	-2.765801667
Wa West District	Dabo	Basic school	10.115715	-2.769306667
Wa West District	Kukpale	Basic school	10.09118667	-2.73936
Wa West District	Dorimon	Primary	10.03825667	-2.687953333
Wa West District	Dorimon	JHS	10.03679833	-2.687853333
Wa West District	Dorimon	SHS	10.03546	-2.687213333
Wa West District	Jambusi	Primary	10.02902	-2.761638333
Wa West District	Jambusi	JHS	10.02893833	-2.761643333
Wa West District	Chietangah	Primary	9.938001667	-2.730855
Wa West District	Bienya	Primary	9.979033333	-2.688745
Wa West District	Yizirii	Primary	9.938528333	-2.684826667
Wa West District	Bakpoama	Primary	9.906805	-2.726725

Wa West District	Bakpoama	JHS	9.906936667	-2.72721
Wa West District	Piisie	Primary	9.964796667	-2.682398333
Wa West District	Piisie	JHS	9.964826667	-2.682103333
Wa West District	Bacha	JHS	10.01944	-2.635316667
Wa West District	Bacha	Primary	10.01929167	-2.634743333
Wa West District	Boro	Primary	10.03714	-2.644295
Wa West District	Boro	JHS	10.03727167	-2.644381667
Wa West District	Yeliridi	JHS	9.894726667	-2.597055
Wa West District	Yeliridi	Primary	9.895681667	-2.597905
Wa West District	Buli	JHS	9.845943333	-2.566981667
Wa West District	Masse	Primary	10.00514833	-2.709345
Wa West District	Masse	JHS	10.00504167	-2.709396667
Wa West District	Nyagli	Primary	10.08321333	-2.662168333
Wa West District	Nyagli	JHS	10.08353167	-2.662325

Table 2-16 List of Markets Along Package 1 Roads

District	Community	Level	Location	
			Latitude	Longitude
Nadowli Kaleo District	Jang	Market	10.206555	-2.461741667
Nadowli Kaleo District	Nadowli	Market	10.37156167	-2.667961667
Nadowli Kaleo District	Nadowli	Market	10.36708833	-2.662713333
Nadowli Kaleo District	Tangasie	Market	10.38098833	-2.710228333
Nadowli Kaleo District	Gabile	Market	10.35885667	-2.78281
Nadowli Kaleo District	Saang	Market	10.34300833	-2.815705
Nadowli Kaleo District	Nator	Market	10.26360667	-2.658218333
Nadowli Kaleo District	Sombo	Market	10.31092333	-2.689391667
Nadowli Kaleo District	Goli	Market	10.29730667	-2.6313
Nadowli Kaleo District	Sankana	Market	10.20343833	-2.597976667
Nadowli Kaleo District	Kaleo	Market	10.17683333	-2.544161667
Nadowli Kaleo District	Kaleo	Market	10.17271333	-2.542741667
Nadowli Kaleo District	Takpo	Market	10.21102667	-2.6486
Nadowli Kaleo District	Nanville	Market	10.221635	-2.710156667
Wa Municipal	Busa	Market	10.02004167	-2.389303333
Wa Municipal	Wa	Market	10.062575	-2.506008333
Wa Municipal	Charia	Market	10.10926	-2.572491667
Wa West District	Vieri	Market	9.923788333	-2.604425
Wa West District	Tanvari	Market	9.913316667	-2.68339
Wa West District	Wechiau	Market	9.83264	-2.684338333
Wa West District	Siira	Market	10.13081833	-2.768798333
Wa West District	Dabo	Market	10.11622167	-2.770826667
Wa West District	Dorimon	Market	10.036535	-2.68522
Wa West District	Buli	Market	9.852045	-2.567846667
Wa West District	Nyoli	Market	9.754675	-2.495905

Table 2-17 List of Schools Along Package 1 Roads

District	Community	Level	Location	
			Latitude	Longitude
Nadowli Kaleo District	Duong	CHPS Compound	10.34862833	-2.54961167
Nadowli Kaleo District	Nadowli	Hospital	10.36231167	-2.65848167
Nadowli Kaleo District	Jang	Health Center	10.19720333	-2.459755
Nadowli Kaleo District	Tangasie	CHPS Compound	10.38717333	-2.71181
Nadowli Kaleo District	Gabile	CHPS Compound	10.35751333	-2.78445167
Nadowli Kaleo District	Sampina	CHPS Compound	10.32204667	-2.81301333
Nadowli Kaleo District	Kulpieni	CHPS Compound	10.24737333	-2.72712
Nadowli Kaleo District	Namville	Health Center	10.22886	-2.71173833
Nadowli Kaleo District	Nator	CHPS Compound	10.26352167	-2.66669167
Nadowli Kaleo District	Cheri Sombo	CHPS Compound	10.31647167	-2.68830833
Nadowli Kaleo District	Goli	CHPS Compound	10.30058667	-2.624075
Nadowli Kaleo District	Sankana	Health Center	10.19908833	-2.59108667
Nadowli Kaleo District	Kaleo	Health Center	10.17122667	-2.5464
Nadowli Kaleo District	Takpo	Health Center	10.21352667	-2.65003333
Nadowli Kaleo District	Olli	CHPS Compound	10.191555	-2.73856833
Nadowli Kaleo District	Kanyini	CHPS Compound	10.267085	-2.492535
Wa Municipal	Konjeh	CHPS Compound	10.11587167	-2.43384833
Wa Municipal	Nyagli	CHPS Compound	10.13163	-2.39935667
Wa Municipal	Dandafuri	CHPS Compound	9.95651	-2.53398667
Wa Municipal	Charia	Health Center	10.11002333	-2.57060833
Wa Municipal	Asse	CHPS Compound	10.08603667	-2.62858667
Wa Municipal	Wa	Hospital	10.08667833	-2.51944
Wa Municipal	Penitobo	CHPS Compound	10.170295	-2.64382667
Wa West District	Vieri	Health Center	9.923795	-2.605685
Wa West District	Wechiau	Hospital	9.826713333	-2.68402167
Wa West District	Bultuo	CHPS Compound	10.146945	-2.74018667
Wa West District	Dabo	CHPS Compound	10.11712167	-2.76607667
Wa West District	Dorimon	Health Center	10.03496833	-2.68520833
Wa West District	Jambusie	CHPS Compound	10.02589	-2.77181667
Wa West District	Bakpoama	CHPS Compound	9.908666667	-2.72499667
Wa West District	Sigri	CHPS Compound	9.962058333	-2.68334167
Wa West District	Varimpere	CHPS Compound	9.977255	-2.59343667
Wa West District	Buli	CHPS Compound	9.851843333	-2.568895
Wa West District	Masse	CHPS Compound	10.00582167	-2.7106
Wa West District	Gbegru	CHPS Compound	10.08059167	-2.56216667

2.4 DESCRIPTION OF PROPOSED ROAD FEATURES

2.4.1 DESIGN STANDARDS AND GEOMETRIC DESIGN ASPECTS

Geometric design is generally the process whereby the layout of the road in the terrain is designed to meet the needs of the road user. The principal elements of this process are the selection of suitable horizontal and vertical alignments and road widths. The geometric design standards provide the link between the cost of building the road and the costs to the road users. The optimal design for a given traffic flow will depend on terrain and other characteristics. The geometric designs will be aimed at achieving adequate levels of safety whilst taking into consideration cost efficiency. Detailed information on the Design Standards and Geometric Designs are presented in the Concept Design Report (UWP, 2020), under a separate cover.

2.4.1.1 FUNCTIONAL AND TERRAIN CHARACTERISTICS

The functional classifications utilised in the concept design will be based on four functional classifications, three of which are from the DFR Design Standards (March, 2009) classifications:

1. Access/Spur feeder road;
2. Connector feeder road; and
3. Inter-district feeder road

In addition, the fourth classification is “support road” for the irrigation access/support roads included in the OPRC networks, for which separate design standards will apply.

For terrain classification, the characteristics of the natural terrain and topography are preferred as basis for determining the type of terrain, as opposed to the grade of the vertical alignment of the road included in the current DFR Design Standard. The following natural ground slopes perpendicular to ground contours are recommended for terrain classification:

- Flat: terrain without horizontal and vertical restrictions on route selection, with 0 - 5 % grade equivalent
- Rolling: terrain with low hills introducing moderate levels of rise and fall with some restrictions on vertical alignment, 6 - 12 % grade equivalent
- Mountainous: terrain that is rugged and very hilly with substantial restrictions in both horizontal and vertical alignment

The functional and terrain classifications for the feeder roads in Package 1 are shown in Table 2-18.

Table 2-18 Functional and Terrain Classifications and Design Speed for Package 1 Roads

Revised Road No.	Road Name	Length (km)	Functional Classification	Terrain Classification	Design Speed (km/h)*
P1_1_1	Nanville-Kpaala	6.7	Connector	Flat	60
P1_1_2	Nanville-Kpaala	7.7	Connector	Flat	60
P1_2	Nadowli-Tangalsia-Cherikpong-Saan	17.7	Connector	Flat	60
P1_4	Yiziri-Bakparma	7.9	Connector	Flat	60
P1_5	Jambosi-Buka-Nwaabasi	4.4	Connector	Flat	60
P1_6	Dorimon – Dabo	13.7	Connector	Rolling	50

Revised Road No.	Road Name	Length (km)	Functional Classification	Terrain Classification	Design Speed (km/h)*
P1_7	Kpaala - Pump site 10	1.5	Irrigation Support	Flat	30
P1_8	Siiraa - Pump site 11	2.6	Irrigation Support	Flat	30
P1_9	Dabo -Pump Site 12	3.0	Irrigation Support	Flat	30
P1_10	Dabo - Pump Site 13	3.3	Irrigation Support	Flat	30
P1_11	Buka - Pump Site 14	2.3	Irrigation Support	Flat	30
P1_12	Bankpama - Pump Site 15	2.4	Irrigation Support	Flat	30
P1_13	Chietanga - Guse – Bienye	7.3	Irrigation Support	Flat	30
P1_15	Saan - Pump Site 9	3.4	Irrigation Support	Flat	30
P1_15a	Nyoli Market	0.923	Access	Flat	30
P1_15b1	Wechiau Market 1	0.223	Access	Flat	30
P1_15b2	Wechiau Market 2	0.908	Access	Flat	30
P1_15c	Takpo Market	0.106	Access	Flat	30
P1_15d	Kaleo Market	0.397	Access	Flat	30
P1_15e	Sankana Market	0.460	Access	Flat	30
P1_15f	Loggu Market	0.113	Access	Flat	30
P1_15g	Sombo market	0.19	Access	Flat	30
P1_15h	Nadowli Market	0.19	Access	Flat	30
P1_15i	Wa market	0.19	Access	Flat	30
P1_15j	Jang market	0.19	Access	Flat	30
P1_15k	Tangasia market	0.19	Access	Flat	30
P1_24	Kaleo - New Dam 5	3.5	Access	Flat	50
P1_25	Busa - Existing Dam 4	2.9	Access	Flat	50
P1_26	Sigir – Losse	2.8	Access	Flat	50
P1_27	Vieri – Siiru	7.0	Inter-district	Flat	60
P1_28	Boro-Domawa-Piisie	9.2	Connector	Flat	60
P1_31	Piisee-Losse-Gbondberi-Salimana-Boro	3.8	Connector	Flat	60
P1_42	Nator-Natoduri-Changu-Sankana	9.5	Connector	Flat	60
P1_43	Nanville-Nator	8.0	Connector	Flat	60

Revised Road No.	Road Name	Length (km)	Functional Classification	Terrain Classification	Design Speed (km/h)*
P1_47	Serekpere-Goli-Nator Duori	8.0	Connector	Flat	60
P1_50	Nadowli-Tangasia-Cherikpong-Nanville	19.5	Connector	Flat	60
P1_62	Tanvare – Vieri	9.5	Connector	Flat	60
P1_82	Jambusi - Mwabasi	1.1	Access	Flat	50
P1_87	Mwabasi - Dorimon	8.8	Connector	Flat	60
P1_90	Konbuoli - Dorimon	2.2	Connector	Flat	60
P1_94	Dabo – Sukpere	10.3	Connector	Flat	60
P1_96	Sukpere - Nanvilli	12.6	Inter-district	Flat	60
P1_102	Dadafuri - Kpongo	8.4	Inter-district	Flat	60
P1_114	Kperisi – Guonuo	12.9	Connector	Flat	60
P1_116	Asse – Charia	6.8	Connector	Flat	60

* Design speed is based on gravel type surface

2.4.1.2 DESIGN SPEED

The design speed of a feeder road is based on the road classification, terrain classification and type of surfacing, as defined in Table 2-19 below, which is extracted from the DFR Design Standards. It should be noted that all feeder roads under this project will predominantly be designed to have a gravel surface, however, sections of the roads passing through settlements would be upgraded to surfaced roads.

Table 2-19 Design Speed for the Project Roads

Terrain	Irrigation Access/Support (km/h)	Access/Feeder (km/h)		Connector (km/h)		Inter-District (km/h)	
	Unsurfaced (gravel)	Unsurfaced (gravel)	Surfaced	Unsurfaced (Gravel)	Surfaced	Unsurfaced (gravel)	Surfaced
Flat (F)	30	50	60	60	80	60	80
Rolling (R)	30	40	50	50	60	50	60

Source: Concept Design Report (UWP, 2020), as extracted from DFR Design Standards

2.4.1.3 ROAD CROSS SECTIONS AND RESERVATION WIDTH

Details of the typical cross-sections of the roads and populated areas of the project roads that may require paving are presented in the Concept Design Report (UWP, 2020). In accordance with the Road Reservation Management Manual for Coordination (First Edition), the road reservation for the inter-district and connector feeder roads is 30 m and for the access feeder roads 15 m. A road reservation width of 12 m is proposed for the irrigation access / support roads. Where necessary, the Contracting Entity in the interest of minimizing resettlement impact may recommend in agreement with the GHA/DFR practical minimum reservation widths.

2.4.1.4 PROPOSED ALIGNMENT / REALIGNMENT

The horizontal alignments for the roads would be designed to follow the existing road alignments as much as possible within the given corridors, and in accordance with the DFR Design Standards (March, 2009). Geometric improvements have been proposed in the concept design where the existing road geometry was perceived as unsafe. Summary of horizontal alignment design criteria for flat and rolling terrain types are presented in Table 2-20 and Table 2-21 respectively.

The vertical alignment of the roads would be designed to follow the existing ground levels with minimum earthworks as much as possible, and in accordance with the DFR Design Standards. Where modification is deemed necessary, the existing alignment can be improved on certain sections. However, the maximum vertical grade shall conform to the maximum grades prescribed in the standards for all classes of the feeder roads.

Table 2-20 Horizontal Alignment Design Criteria for Flat Terrain and Gravel Surface

Design Criteria		Road Classification		
		Irrigation access / support roads	Access roads	Connector & Inter-District roads
Design speed (km/h)		30	50	60
Min. curve radius R (m)	Absolute	32	85	130
	Desirable	42	150	220
Coefficient of friction (f)	Absolute	0.13	0.14	0.13
	Desirable	0.08	0.08	0.08
Super elevation (e %)	Absolute	9	9	9
	Desirable	5	5	5
Min. stopping sight distance (m)		30	60	80
Min. passing sight distance (m)		170	350	500

Source: Concept Design Report (UWP, 2020)

Table 2-21 Horizontal Alignment Design Criteria for Rolling Terrain and Gravel Surface

Design Criteria		Road Classification		
		Irrigation access / support roads	Access roads	Connector & Inter-District roads
Design speed (km/h)		30	40	50
Min. curve radius R (m)	Absolute	32	50	85
	Desirable	42	100	150
Coefficient of friction (f)	Absolute	0.13	0.15	0.14
	Desirable	0.08	0.08	0.08
Super elevation (e %)	Absolute	9	9	9
	Desirable	5	5	5
Min. stopping sight distance (m)		30	60	80
Min. passing sight distance (m)		170	350	500

Source: Concept Design Report (UWP, 2020)

2.4.1.5 DRAINAGE IMPROVEMENTS (DRAINAGE DESIGN)

Drainage is vital to the successful performance of a road because understanding the interaction of hydrology with the proposed structures such as cuttings, embankments, and designing them accordingly is critical. Allied with drainage is the problem of erosion and depending on soil type, climate and site conditions, anti-erosion measures will be proposed for embankment faces, cuttings, culverts, side drains and stream crossings. A properly engineered drainage system is the means whereby water is controlled.

Most of the existing culverts need capacity improvements. The following actions are proposed on various existing drainage infrastructure:

- Surface run-off collected inside drains must be discharged regularly either by cross drainage culverts or by mitre (offshoot) drains at regular intervals;
- Culverts in good condition are to be cleaned and extended to suit the proposed cross-section;
- Culverts in fair/poor condition are to be replaced to suit the width of the proposed cross-section;
- Culverts smaller than 900 mm diameter pipes are to be replaced with minimum 900 mm diameter pipe culverts; and
- A minimum cover of 600 mm should be maintained over all new culverts.

Mitre drains facilitate discharge from the side drain into the natural terrain and the spacing of mitres is dependent among others on the grade of the road, soil type and erodibility and rainfall. Typically, mitres are provided every 200 m for road gradients less than 0.5%. The mitre drains intervals reduce with increasing road gradient.

The road drainage design would be optimized based on the condition of the existing drainage structures, site conditions, flood estimates and waterway openings, among others (Figure 2-23). The topography, vegetation, geology, rainfall and climate of project area were considered in conducting hydrological investigations and key reference guidelines depended on include:

- Republic of Ghana Department of Feeder Roads: Guidance Notes for the Design of Drainage Structures on Rural Feeder Roads, Version D, February 2005; and
- Highway and Urban Hydrology in the Tropics, D Fiddes and LH Watkins. Pentech Press, 1984.

Summary of the proposed design values for the hydrological and hydraulic analysis for the feeder roads is provided in Table 2-22 below.

Table 2-22 Design Values for Hydrological and Hydraulic Analysis of the Feeder Roads

Hydrological or hydraulic component	Design value
Hydrology model: <ul style="list-style-type: none"> ○ Where no streamflow data available ○ Where streamflow data available 	Generalized Tropical Flood Model Statistical Analysis
Design Flood Return Period <ul style="list-style-type: none"> ○ Box culverts and small bridges ○ Pipe culverts 	1:25 years 1:10 years
Freeboard <ul style="list-style-type: none"> ○ Culverts 	Higher of 0.0 m to soffit and 1.0 m below road level.
Minimum culvert sizes <ul style="list-style-type: none"> ○ Stream crossings ○ Access and side drain relief 	2 No. 900 mm pipe culverts, or equivalent area 900 mm pipe culvert or equivalent U-culvert when necessary
Minimum culvert gradients	1.0 %
Maximum outlet velocity	1.2 m/s

Source: Concept Design Report (UWP, 2020)



Figure 2-23 Existing Drainage Structures on the Roads

2.4.2 PAVEMENT DESIGN

Pavement design for the gravel feeder roads will be in accordance with the DFR Design Standards. The existing pavement structure has been evaluated through visual condition assessment, materials investigation and soils testing. These tests and surveys provide information about the condition and quality of the existing pavement and will form the basis of the upgrading and/or rehabilitation design.

Where the in-situ subgrade material has a soaked California Bearing Ratio (CBR) < 3%, i.e., subgrade strength class SC1, realigning the road to avoid such material would be considered, otherwise the material shall be excavated and backfilled with competent selected subgrade material of minimum soaked CBR 15%. The depth of backfill depends on the required material depth.

The design of the Gravel Wearing Course (GWC) thickness would consider the fact that gravel will be lost from the road continuously. Gravel loss (normally expressed in mm/year/100vpd) is a function of several factors including climate, traffic, material quality, road geometrics, maintenance frequency and type, etc. As such, the appropriate wearing course thickness would be determined based on expected annual gravel loss, traffic and the number of years between regravelling operations. The design wearing course thickness would be kept within a range of 150 to 250 mm for construction practicality and maintenance purposes. The regravelling frequency has been assumed as 5 years with an expected gravel loss of 30mm/year.

Surfacing of roads in urban areas, in particular, is recommended due the higher volumes of traffic within the urban area and the importance of all-weather access for businesses and residents. Interlocking concrete block paving is considered in urban areas and other areas that require surfacing. The interlocking pavers, bedding sand and jointing sand would comply with the requirements as set out in DFR Surfacing and Pavement Options for Low-Volume Roads.

Further details are provided in the Concept Design Report (UWP, 2020).

2.4.3 STRUCTURES DESIGN

The existing structures on the feeder roads are managed by the DFR. The Upper West Assignment scope of works does not include any bridge structures on the road network. Road condition survey and visual assessment was conducted on existing major culverts using the DFR's Standardised Bridge Inventory forms and inspection criteria specified by the Consultant in their assessment report. During the road condition survey, the Consultant identified eighteen (18) major structures (culverts) in Package 1 and details are presented in the Concept Design Report (UWP, 2020). Further assessment will determine which structures require rehabilitation, widening/lengthening or replacement. Hydraulic assessments will determine which structures require capacity improvements and upgrades.

The structures design criteria will be split into two distinct categories:

- Structural assessment of existing major culverts; and
- Design of new bridges and major culverts

Culverts on the feeder roads will be designed in accordance with the DFR's Guidance Notes for the Design of Drainage Structures on Rural Feeder Roads (Version D, February 2005).

Design of new structures would be required for the following reasons:

- Existing structure which requires replacement;
- Existing structure which requires widening; and
- New structures over a feature or obstacle.

2.4.4 CONSTRUCTION TECHNOLOGY AND PROCEDURES

A qualified Contracting Entity will be contracted to undertake construction of the roads and associated works. The construction will also involve a number of temporary facilities such as equipment and workshop yard, labour camp and site offices. The construction contract will be based on the International Federation of Consulting Engineers (FIDIC) conditions, which stipulate that the Contracting Entity must provide a performance bond, as well as the following insurances:

- Insurance of works and Contracting Entity's equipment
- Third party insurance

Prior to actual construction work, the Contracting Entity may need to undertake additional ground investigations over and above the one done by the Consultant. There may also be concrete works at certain sections of the feeder roads where there may be need for new culverts and other drainage structures.

Earthworks will also be carried out and may include:

- Site survey and setting out
- Excavation by cutting into topsoil, normal soil, rock or artificial material
- Trimming some excavated surfaces and disposing of excavated material(s)
- Filling to embankment and general filling with imported natural material other than topsoil. Natural materials include rock; sand and other approved naturally occurring materials
- Scarifying, watering and compaction of fill layers or in situ road formation level.

2.4.5 PROPOSED INTERVENTIONS FOR THE ROADS

Based on document review and engagement with GHA and DFR, road construction interventions that could be applied to the project will follow the MRH's Design Standards for Department of Feeder Roads, Edition 1, 2009 and the Basis of Design Report for the Upper West Feeder Roads prepared by UWP Consulting (Pty) Ltd (UWP, 2019).

Generally, the interventions for the roads would include the following:

- Rehabilitation;
- Standard level maintenance interventions;
- Basic level maintenance interventions; and
- Minimum level maintenance intervention.

A brief description and definition of the above interventions are provided in the following sub-sections, however, specific interventions (pavement designs) for the Package 1 roads is presented in Table 2-23 below.

Table 2-23 Proposed Intervention / Conceptual Pavement Design for Package 1 Roads

Road No.	Pavement Design / Intervention
P1_1_1	Periodic maintenance - Reshape
P1_1_2	Periodic maintenance - Reshape
P1_2	Periodic maintenance - Reshape
P1_4	Periodic maintenance - Reshape
P1_5	Rip and recompact existing road to a depth of 150mm at 93% Maximum Dry Density (MDD) and construct a 150mm GWC, compacted to 97% MDD
P1_6	Periodic maintenance - Reshape
P1_7	Remove top 250mm, rip and recompact in-situ material (150mm thick) to 93% MDD, construct a 100mm thick G15 subbase compacted to 95% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_8	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_9	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD

Road No.	Pavement Design / Intervention
P1_10	Remove top 250mm, rip and recompact in-situ material (150mm thick) to 93% MDD, construct a 100mm thick G15 subbase compacted to 95% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_11	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_12	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_13	For km 0.0 - 6.2: Maintenance - grading For km 6.2 - 8.4: Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_15	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_15a	<p>Surfaced road - CPB Type A Pavement –</p> <p>Rip and recompact existing road to a depth of 150mm at 95% MDD; Construct 125mm cement stabilised base, compacted to 97% MDD; Lay 30mm bedding sand; and Pave 200 x 100x 65mm interlocking concrete block paving, Class 40/2.6, laid in herringbone pattern</p>
P1_15b	
P1_15b2	
P1_15c	
P1_15d	
P1_15e	
P1_15f	
P1_15g	
P1_15h	
P1_15i	
P1_15j	
P1_15k	
P1_24	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_25	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_26	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_27	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_28	Remove top 250mm, rip and recompact in-situ material (150mm thick) to 93% MDD, construct a 100mm thick G15 subbase compacted to 95% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_31	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_42	For km 0.0 - 5.2: Periodic Maintenance - reshape For km 5.2 - 9.6: Remove top 250mm, rip and recompact in-situ material (150mm thick) to 93% MDD, construct a 100mm thick G15 subbase compacted to 95% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_43	Periodic maintenance - Reshape

Road No.	Pavement Design / Intervention
P1_47	Periodic maintenance - Reshape
P1_50	Periodic maintenance - Reshape
P1_62	Maintenance - Grading
P1_82	Maintenance - Grading
P1_87	Maintenance - Grading
P1_90	Maintenance - Grading
P1_94	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_96	Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_102	For km 0.0 - 2.2: Surfaced road - CPB Type A Pavement – Rip and recompact existing road to a depth of 150mm at 95% MDD; Construct 125mm cement stabilised base, compacted to 97% MDD; Lay 30mm bedding sand; and Pave 200 x 100x 65mm interlocking concrete block paving, Class 40/2.6, laid in herringbone pattern For km 2.2 - 8.8: Rip and recompact existing road to a depth of 150mm at 93% MDD and construct a 150mm GWC, compacted to 97% MDD
P1_114	Maintenance - Routine
P1_116	Periodic maintenance - Reshape

Source: Concept Design Report (UWP, 2020)

2.4.5.1 REHABILITATION INTERVENTION

- Full Rehabilitation

This will apply to the upgrading of an earth track or un-engineered road to a fully engineered, gravel road.

- Partial Rehabilitation

This will be applicable to widening of an existing gravel road to required standard of a minimum width of 6 m or widening an existing earth / un-engineered road to required minimum width of 6 m.

It is noted that according to DFR geometric guidelines, Inter-District and Connector Feeder roads are required to be 7 m wide, whereas Access Feeder roads are required to have a minimum width of 6 m. Since some of the feeder roads were found to be narrower than these minimum requirements and because the widening of a road by only a narrow strip of say 1 m is a costly and inefficient process, the following approach and criteria for widening will be applied:

- The difference in actual width versus design standards for each road was calculated;
- Where the existing road is wider than specifications, the road will remain that width;
- Where a road is more than 1 m below standard width, the road will be widened to the standard;
- The absolute minimum width that will be allowed on all existing roads is 6 m. Therefore, where a road is an Inter District or Feeder Road and is in the width range of 6 - 7 m, i.e., where the width shortfall is less than 1 m, it will not be widened, since it meets the absolute minimum criteria for EXISTING roads of 6 m.

- Spot Improvements

This refers to improvement to an impassable road made passable. This includes the cost to construct a bridge, major culverts or other hydraulic structures and also involves:

- Clearing vegetation;
- Shaping and compaction;
- Filling, i.e. raising low lying sections of the road to required levels;
- Compaction to required densities; and
- Minor culvert repairs and / or new minor culvert installations.

2.4.5.2 STANDARD MAINTENANCE LEVEL INTERVENTIONS

- Regravel

This intervention involves:

- Grading the road to the required camber;
- Constructing a wearing course or placing subbase material of varying thickness depending on traffic volumes on the road and
- Compaction to relatively 95% MDD

- Minor Improvements

This intervention involves:

- Culvert repairs;
- Shaping the road; and
- Replacing lost gravel (base or subbase) on the road surface.

2.4.5.3 BASIC MAINTENANCE LEVEL INTERVENTIONS

- Reshaping

This Intervention involves:

- Restoring the camber to the right slope;
- Re-excavating/cleaning the side ditches; and
- Grass cutting.

- Grading

This Intervention involves

- Grading the road to the required camber;
- Compaction to 93% MDD; and
- This is done normally for formation levels.

2.4.5.4 MINIMUM MAINTENANCE LEVEL INTERVENTIONS

The minimum intervention on a project road consists of routine maintenance. Usually, this is required where drainage is the main cause of road deterioration. Routine maintenance consists among others of vegetation clearing and cleaning side drains and culverts.

It is however noted that where a project road was identified to require a minimum maintenance level intervention, i.e., routine maintenance, there would be no improvement since this is an operation undertaken routinely by the DFR's Maintenance Department.

2.4.6 PROPOSED INTERVENTIONS FOR FARM TRACKS

The appropriate standard for farm tracks is an all season, low-level motorable, semi-engineered 3 m wide (carriageway width) farm road. Such road allows three-wheeler motorised vehicles (Figure 2-24) to carry farm inputs (seeds, fertilizer, etc.), harvest and sometimes farmhands between the nearest feeder road and the farming area.

Based on various site visits undertaken, the farm tracks generally will need full new construction, upgrading the existing paths and tracks to the minimum standard as described above. This is because the existing tracks to the farms are mainly narrow and in poor conditions such that some of them are inaccessible even with motorbikes. The activities that need to take place for the farm road construction include:

- General site clearance of light bush, including topsoil, undergrowth of trees of all sizes and other obstructions, grub up all roots and clear away;
- Widen existing path and/or track where applicable;
- Formation of road surface to crossfalls and compaction of roadbed;
- Excavation of V-shaped side drains;
- Filling in with selected material from borrow pits where necessary; and
- Construction of minor drainage structures.



Figure 2-24 Typical Tricycle for Transporting Agricultural Produce

2.5 CONSIDERATION OF PROJECT ALTERNATIVES

This section describes and analyses the important features of the components of alternatives that were evaluated with regards to the Project, considering environmental, social and economic variables. The Project alternatives were assessed with focus on defined criteria, and mostly considering project location, designs and technology, construction and operation procedures.

This analysis does not consider the unselected alternative as unviable, but only presents it as the least favourable with respect to the other options (See Table 2-25 for alternative analysis matrix of the advantages and disadvantages of each option).

Selection of criteria to qualify an alternative is important and specific for each case; thus, a set of criteria generated for a specific Project cannot be applied to another without properly studying the

characteristics of each case. The criteria established often depends on the project type and duration, as well as the environmental, social and cultural conditions of the area where it will be developed.

2.5.1 ASSUMPTIONS

It is very important to identify the starting assumptions in each analysis of alternatives. This allows putting in perspective the analysis limitations according to its relevance. The analysis cannot be considered valid if after it has been completed, the Project objectives change or if there are significant changes in the Project development. The assumptions included in the analysis of alternatives for this Project are as follows:

- The socio-economic parameters will not change to the extent that a radical change in the Project design and requirements would be needed.
- Should there be any design changes at this stage, they would not significantly impact the Project requirements.
- There are no conflicts between the Government and the roadside communities.
- The environmental and social conditions for this study are representative of the Project area, and therefore they have been considered as the basis for the analysis of alternatives.

2.5.2 NO-GO ALTERNATIVE (DO NOTHING OPTION)

The No-Go alternative (“Do nothing” option) considers non-development of the Project, which implies little or no improvement would be realised in the environmental and socio-economic setting or life of the area as it currently exists. The implication of this alternative is enormous as all the environmental and social benefits that would be derived from the road construction alternative would be lost.

The advantages (environmental and socio-economic) that the No-Go alternative presents are that the potential adverse environmental and social impacts such as dust emissions, noise and exhaust emissions, land expropriation, potential loss of flora and fauna, landscape alteration, etc. that may be associated with the road construction would be avoided. Also, the huge financial costs associated with the Project implementation will be avoided and money saved.

Nevertheless, the No-Go alternative also has a lot of environmental and socio-economic downsides. For instance, the local economy of the Project area is comprised mainly of agriculture and commerce / services; therefore, non-development of the Project would lead to the slowing down of the economic growth in the area as agricultural productivity and/or marketing of produce will no longer be boosted, given the poor nature of the road (which is a huge socio-economic drawback). Similarly, the potential for improving the scenic view, road condition and/or traffic situation with its associated cost (financial and travel time) to the public would all be lost. Other benefits which would be foregone as a result of non-construction of the roads include opportunities for improvements in drainage (and solving perennial flooding), employment opportunities for local residents along the road, boost in tourism and trading activities, poverty reduction, enhanced development and improvement in housing and other amenities, as well as gender empowerment opportunities.

Non-development of the project will also imply no improvements in all elements of the road's environmental and social safety features. For instance, the roads as they currently are do not have adequate sight distance provisions for drivers to have enough time to identify and appropriately react to all elements of the road environment, including other road users and hazards. Meanwhile it is important that the road reserve is clear of any obstructions that might restrict sight of drivers, which includes keeping the road reserve clear of vegetation, especially at horizontal curves and installing road safety features or traffic calming measures. Opportunities for dust management through improved road surfacing and drainage management would also be lost.

2.5.3 RE-CONSTRUCTION / REHABILITATION OF EXISTING ROAD ALTERNATIVE

The project implementation alternative will yield all the environmental and socio-economic benefits that would have been lost under the “Do nothing” option. The proposed road re-construction or rehabilitation will follow the existing alignment of the roads, however, improvements will be made to the existing surface and geometric alignments of the existing roads, where necessary. This will also involve constructing or rehabilitating culverts to acceptable safety and environmental standards, and to improve drainage. The proposed road upgrades from their existing standards will also require the provision of appropriate road signage so that motorists are warned of hazards such as culvert locations and speed reductions or increases, location of intersections and appropriate signs notifying motorists of traffic calming measures. To further improve the road user's safety, guardrails will also be provided in fills higher than 3.00 m and at all bridges; as well as fixing of speed ramps and other road safety features. Sidewalks are also considered in built-up areas to separate pedestrian and cyclists from motorised modes of transport, as well as the provision of bus laybys or stopping areas.

The Project implementation alternative is a more realistic option and would bring significant benefits to communities along the roads and the general population. While some negative environmental and social impacts (disadvantages) will characterize this alternative, such as potential destruction of vegetation or landscape alteration, dust and noise emissions, and some potential displacement of people and properties or assets, these negative impacts (drawbacks) will be managed and reduced to as low as reasonably practicable levels by employing effective mitigation measures. The Project would limit the potential destruction of vegetation, avoiding at best, vegetation of special ecological and economic significance. Similarly, positive impacts from the Project would be enhanced.

2.5.4 ALTERNATIVE DESIGN AND TECHNOLOGY

Under the Project development alternative, further design and technology options were evaluated based on specific design data to determine whether some potential Project impacts could be avoided or reduced. Although the existing alignment of the roads was largely maintained in the concept designs, different design and technology approaches were evaluated and recommended, where necessary, to limit impacts to settlements along the road corridor, limit the ecological footprint or destruction, limit cost of labour and materials and the overall cost of project construction.

It is worth noting that in built-up areas, people's assets or community infrastructure that fall within the road reserve or right of way (ROW) will present expensive displacement / compensation costs to the Project. As such, some design modifications to the road alignment or design intent would be needed at those sections to avoid or reduce these impacts, where practicable. Similarly, areas with structures such as schools, churches and mosques, as well as areas of high ecological conservation status which fall within the ROW would require modifications to designs or alignment. For instance, the design speed of the road would be adjusted at such locations as necessary, especially through areas with a high concentration of people or buildings; and appropriate signages and traffic calming measures implemented.

In some instances, through small villages or moderately built-up areas, the design speed could not be maintained in the Concept Design due to proximity of structures and limited space between dwellings. Due to geometric and safety considerations, the design speed was reduced in these locations. The posted speed limits will be reduced to 40 km/hr and other traffic calming measures implemented at the entrance to the villages and departure from these villages. Where the design speed on feeder roads is more than 50km/h, the posted speed would be reduced gradually by 20km/h over a distance of 100m per 20km/h differential. Where roads pass adjacent to existing villages and no dwellings are located within the ROW, the proposed design speed will be maintained.

Geometric improvements have also been proposed in the Concept Design where the existing road geometry was perceived as unsafe. The road width was reduced in instances where the minimum design cross-section or the minimum geometric standards cannot be achieved without impacting on existing buildings or structures. Where necessary, through villages where the existing road geometry is substandard and considered unsafe, alternative alignments were proposed to allow for continued safe mobility and to reduce the social impact of the road upgrades on settlements along the roads. Table 2-24 below, for instance, describes some areas or road sections where design alternatives were recommended and the possible interventions. Figure 2-25 through to Figure 2-27 presents an illustration of bypass or realignment options considered in the concept design of the roads.

Further reference should be made to the Concept Design Report (UWP, 2020) for details on or appraisal of the road design and technology approaches. However, it is noted that potential design changes would be unavoidable under the Project development alternative and would be viable or sustainable considerations especially when it would lead to reductions in the Project costs likely to be incurred through compensation of project affected persons (PAPs) and extra payments on labour and materials, as well as bring about significant reductions on the ecological footprint of the Project through reduced negative environmental impacts.

Table 2-24 Horizontal Alignment Alternatives / Interventions for Package 1 Roads

Road No	Road Name	Section (km)	Length (km)	Posted Speed	Comment / Intervention
P1_7	Kpaala - Pump site 10	Km 0.2 - km 0.74	0.54	30km/h	Bypass proposed
P1_8	Siiraa - Pump site 11			60km/h	Improve horizontal alignment
P1_28	Boro-Domawa-Piisie	Km 3.9 - km 4.1	0.20	60km/h	Bypass to avoid building structures
P1_42	Nator-Natoduri-Changu-Sankana	Km 5.8 - km 6.4	0.60	60km/h	Alternate option available
		Km 8.9 - km 9.0	0.10	60km/h	Bypass to avoid building structures
P1_43	Nanville-Nator	Km 2.0- km 2.21	0.20	60km/h	Bypass proposed

Source: Concept Design Report (UWP, 2020)



Figure 2-25 Proposed Re-alignment of Road P1_28 at Dam

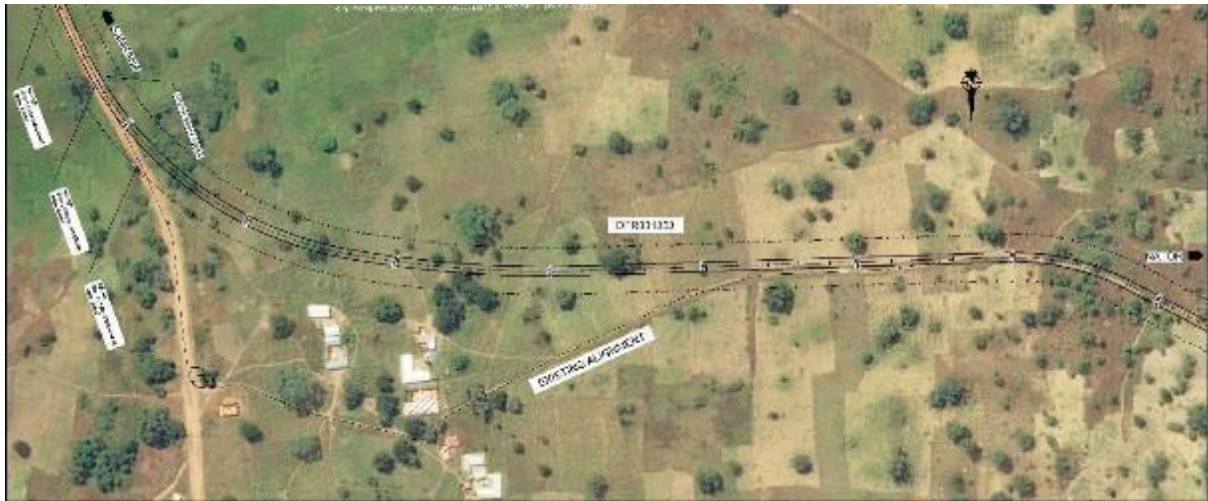


Figure 2-26 Proposed Bypass Road P1_40 at Km 5,8

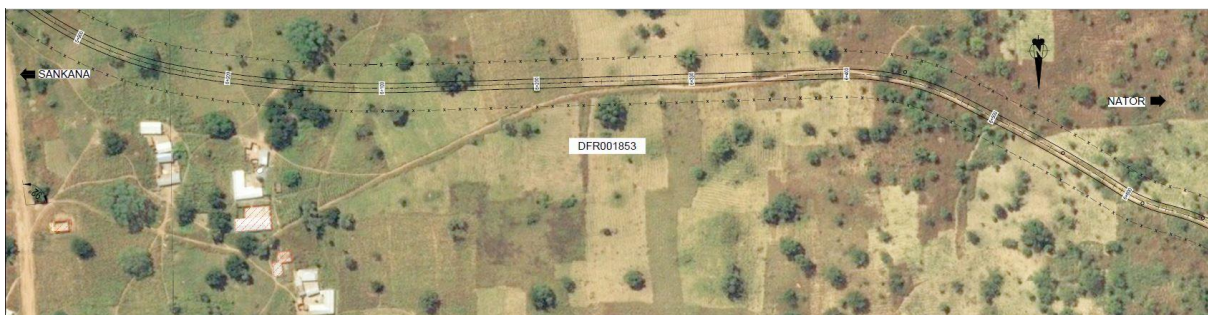


Figure 2-27 Proposed Bypass of Road P1_42 to Avoid Structures

2.5.5 CONCLUSION

The No-Go alternative was found to be unsustainable mainly because of the myriad of benefits that the Project implementation presents which far outweighs the advantages of non-development of the project (See Table 2-25). The No-Go alternative was therefore ignored and instead, the project implementation alternative was upheld as the most sustainable or best alternative (See also, the justification of the project earlier delineated in Section 2.1.4). Where practicable, necessary design and technology options or recommendations will be implemented to complement the construction / rehabilitation of the roads and achieve desired service levels.

Table 2-25 Alternatives Analysis Matrix

Alternatives	Advantages	Disadvantages
No-Go Alternative (“Do Nothing” Option)	<ul style="list-style-type: none"> • Avoid adverse environmental and social impacts associated with the road construction, e.g., dust and air emissions, noise and vibrations, land expropriation, potential loss of flora and fauna, landscape alteration, physical and economic displacement, etc. • Avoid the huge financial costs associated with the Project and the money saved. 	<ul style="list-style-type: none"> • No construction or rehabilitation of roads. • No improvement in the environmental and socio-economic conditions of the area to promote safety of residents and enhance scenic view. • Slowdown of economic growth / agricultural productivity / marketing of produce. • Poor road condition with its associated cost (high cost of travel and longer travel time) and connectivity issues. • Frequent vehicle breakdowns and high cost of vehicle maintenance. • Loss of opportunities for improvements in drainage (and solving perennial flooding). • Loss of employment opportunities for local residents along the road and potential for poverty reduction. • Loss of opportunities to improve social amenities, boost tourism and trading activities. • No installation / improvements in all elements of the road’s safety features, e.g., road signs, street lights, speed ramps, bus stops, etc. • Opportunities for dust management through improved road surfacing would also be lost.
Re-construction / Rehabilitation of the Existing Road	<ul style="list-style-type: none"> • The existing surface and geometric alignments of the roads would be improved. • Improved road conditions with installation of road safety features to reduce accidents and promote public safety, e.g., road signs, street lights, speed ramps, bus stops, etc. • Construction or rehabilitation of culverts to acceptable safety and environmental standards to improve drainage. 	<ul style="list-style-type: none"> • The road construction will promote negative environmental and social impacts, e.g., destruction of vegetation or landscape alteration, dust and noise emissions, and some potential displacement of people and properties or assets. • High cost of constructing the roads and associated expensive displacement / compensation costs to the Project. • Increased demand on natural resources for construction activities and reduced access,

Alternatives		Advantages	Disadvantages
		<ul style="list-style-type: none"> • Enhanced economic growth through boost in agricultural productivity, marketing of produce / trading activities and improved tourism potential. • Creation of job opportunities and income generation opportunities for local residents and improvement in livelihoods. • Opportunities for providing skilled training to local workforce and gaining exposure to sufficient health and safety standards. • Improved connectivity and road travel (movement of goods and services) with associated benefits of reduced cost of travel and travel time. • Prospects for improvements relating to community development initiatives to boost social amenities, tourism, trading activities and general social standards of communities. • Opportunities for dust management and improved scenic qualities through improved road surfacing and positive landscape amendments. • Implementation of effective mitigation measures to manage and reduce negative impacts to as low as reasonably practicable levels. • A RAP would be prepared and approved by the World Bank in line with OP 4.12 to cater for potential loss of land and other assets or livelihoods and work out compensation payable to PAPs, based on the “full replacement value” of impacted assets. 	pressure and overburdening of physical and social infrastructure.
Alternative Design and Technology	Pavement Design / Surfacing Options (For Urban or Built-Up Areas)		
	Hot mix asphalt	<ul style="list-style-type: none"> • Provides a competent, durable, all-weather surface. • Can be produced off site and then hauled to site. 	<ul style="list-style-type: none"> • Expensive for low volume roads. • Haul distance may be significant if the closest plant is far away. • Doesn't lend to labor-intensive. • Difficult to construct in confined areas.

Alternatives		Advantages	Disadvantages
			<ul style="list-style-type: none"> • Vibratory compaction could damage adjacent poor-quality properties. • Not feasible in small quantities in remote locations.
	Concrete block paving	<ul style="list-style-type: none"> • Provides a competent, durable, all-weather surface. • Relatively easy to install. • Can be hauled to site and stacked. • Lends itself to labor-intensive construction. • Can be constructed in confined areas. 	<ul style="list-style-type: none"> • May be expensive for low volume roads. • May deform under heavy vehicle turning action without appropriate edge constraint and subbase strength.
	Surface dressing (seal)	<ul style="list-style-type: none"> • Provides a competent, durable, all-weather surface. • Can be labor-intensive. • Provides most cost-effective alternative of the options presented. 	<ul style="list-style-type: none"> • Dressing may deteriorate prematurely under heavy vehicle turning action. • Specific material (stone especially) needs to be sourced and hauled in. • Difficult to construct in confined areas. • Maintenance requirements more frequent than other two options.
	Alternative Alignment Options (At Critical Sections)		
	Existing Alignment	<ul style="list-style-type: none"> • Avoid the financial costs associated with re-alignments and bypasses. • Avoid negative environmental and social impacts associated with the re-alignments and bypasses. 	<ul style="list-style-type: none"> • Potential for expensive displacement / compensation costs to the Project due to impacts on settlements and structures. • Public safety may be compromised (may not be in the best interest of public safety). • Higher dust, noise and vibration impacts on roadside social receptors. • There will be little room for construction equipment to maneuver at certain locations.
	Bypass / Re-alignment	<ul style="list-style-type: none"> • Avoid or limit impacts to structures and settlements or expensive displacement / compensation costs to the Project • Improved horizontal road alignment • Improved road conditions and road safety features to reduce accidents and promote public safety 	<ul style="list-style-type: none"> • Additional construction cost in some instances. • Some negative environmental and social impacts, e.g., new vegetation clearance, increased dust generation, acquisition of new ROW or lands, and general discomfort to some residents.

Alternatives		Advantages	Disadvantages
		<ul style="list-style-type: none"> • Reduced construction cost in some instances • Mitigation measures will manage and reduce negative impacts to as low as reasonably practicable levels. • A RAP would be prepared and approved to cater for potential loss of assets and livelihoods and compensations paid to PAPs, based on the “full replacement value” of impacted assets. 	

3.0 APPLICABLE LEGISLATION AND STANDARDS

This Chapter details the legislative and administrative framework for the ESIA and the Project as a whole. In addition to applicable national regulations, the Project is committed to align as far as practicable to the requirements of the World Bank OPs and the World Bank Group Environmental, Health and Safety Guidelines (EHSGs).

3.1 INSTITUTIONAL AND ADMINISTRATIVE FRAMEWORK

Some key institutional stakeholders of the Project are presented below. Other stakeholder institutions with roles linked to national legislations are presented in Table 3-1.

3.1.1 ENVIRONMENTAL PROTECTION AGENCY

The principal institution established for environmental protection in Ghana is the EPA, created under the Environmental Protection Agency Act, 1994 (Act 490). The EPA's policy direction is articulated by the Environmental Assessment Regulations, 1999 (LI 1652). These two pieces of legislation mandate the EPA to manage, control and monitor compliance of environmental regulations by specific industries. The EPA has an important role in the Project implementation as the lead environmental regulator, which oversees compliance with environmental assessment requirements, facilitate public participation and disclosure, and issue environmental permits for the project. The Environmental Assessment Regulations, 1999 has listed the developments that require clearance with the EPA. Development of road network is one of the undertakings that require the issuance of environmental permit before construction can be done.

The EPA has the mandate to decide on project screening, guide the conduct of the environmental assessment studies and to grant environmental approval for the project to commence. Its mandate also covers monitoring of implementation phase of the project to confirm compliance with approval conditions, mitigation measures, and other environmental commitments and quality standards.

3.1.2 MINISTRY OF TRANSPORT (MOT)

The MOT was established in January 2009. The vision of the MOT is to create an integrated, modally complimentary, cost effective, safe, secure, sustainable and seamless transportation system responsive to the needs of society, supporting growth and poverty reduction and capable of establishing Ghana as a transportation hub of West Africa. The Ministry oversees policy development, management and oversight of the maritime and inland waterways, and road transport services sub-sectors. It is underpinned by several modal agencies which provide services, regulations and infrastructure development. This is aimed at achieving the integration and co-ordination of all the transport modes for better planning and effective utilization of resources. The MOT has oversight of the following Road Transport Services:

- National Road Safety Authority (NRSA)
- Metro Mass Transit Limited
- Intercity State Transport Corporation
- Driver and Vehicle Licensing Authority (DVLA)
- Government Technical Training Center

The MOT Deputy Director in-charge of Road Safety and Environment under the Directorate of Policy Planning and the various units he/she manages are significant to the implementation of this project.

3.1.3 MINISTRY OF ROADS AND HIGHWAYS

Established to play a lead role in providing an integrated, efficient, cost-effective and sustainable road transportation system responsive to the needs of society, supporting growth and poverty reduction and capable of establishing and maintaining Ghana as a transportation hub of West Africa. The Ministry has oversight responsibility over the OPBRC project. The main functions of the Ministry are policy formulation, markets regulation, asset management, monitoring, evaluation and coordination with regard to the road infrastructure sector that consist of the following;

- Road Infrastructure Development and Maintenance;
- Road Safety and Environment;
- Road Maintenance Financing; and
- Training

The following Departments, Agencies and Units operate under the direct ambit of the MRH;

- Ghana Highway Authority
- Department of Feeder Roads
- Department of Urban Roads (DUR)
- Koforidua Training Centre (KTC)¹
- Road Fund Secretariat (RFS)²

The major capacity issues of the Environmental and Social Unit of the three agencies (MRH, GHA, DUR, and DFR) has to do with the staffing numbers, skill sets and the availability of and exposure to the use of basic environmental monitoring equipment (especially for noise and dust monitoring) and appropriate modern technologies (including GPS). Though under the TSIP full time Monitoring Consultants will be engaged who will monitor the performance of the Contracting Entity, this would also mean additional work for the agency safeguards staff with respect to oversight of Monitoring Consultants and review of monitoring reports.

To mitigate the safeguards capacity constraints, the following specific institutional strengthening measures are being implemented: i) the appointment of a full-time social safeguards specialist with gender experience; ii) the use of a Non-Governmental Agency (NGO) to assist communities and oversee the grievance redress system; iii) focused training programs for safeguards staff; and iv) dedicated funding for safeguards operational costs. These measures will enable regular site visits, required for consistent implementation oversight.

3.1.3.1 GHANA HIGHWAY AUTHORITY

GHA is established as a corporate body with responsibility for the administration, control, development and maintenance of the country's trunk road network.

3.1.3.2 DEPARTMENT OF FEEDER ROADS

DFR was established with the responsibility of administering, developing and maintaining the network of rural roads in Ghana. The DFR is the main or lead implementing agency for the project. The DFR

¹ The KTC is the dedicated centre for training of professionals (engineers, contractors, consultants, administration staff, etc.) in the road transport sector.

² The RFS was also established by the Road Fund Act, 1997 (Act 536) to finance routine and periodic maintenance of road and related facilities, upgrading and rehabilitation of roads, selected road safety projects and other relevant activities as may be determined by the Road Fund Board.

has classified feeder roads in Ghana into 3 groups namely; Engineered, Partially Engineered and Un-engineered feeder roads. The OPBRC feeder road project falls directly under their administration.

3.1.4 MINISTRY OF FINANCE (MOF)

The MOF is the agency that administers the central government's budget. The MOF is responsible for disbursing money to be paid to persons affected by projects undertaken by the state. Once the compensation data for the project has been approved, the Ministry, subject to the readiness of funds, will release the total amount of compensation to the acquiring agency for subsequent payment to the affected persons.

3.1.5 MINISTRY OF LOCAL GOVERNMENT AND RURAL DEVELOPMENT (MLGRD)

The Ministry of Local Government and Rural Development is the central government agency tasked with promoting government policies and projects at local level in Ghana. It also facilitates governance and balanced rural based development. The local government structures (District Assemblies and Regional Coordinating Councils) in the various districts and regions within which the road projects will be implemented, will play a part in the planning, implementation and monitoring of the project, including resettlement/rehabilitation operations.

The Physical Planning Departments (PPDs) of the various MMDAs are set up among others, to ensure that developments are done in an orderly manner and that land use is optimized. The PPDs are responsible for the preparation of layouts for towns and cities. They also assess and approve layout by prospective developers (especially the Private Estate Developers) and specify all reservations based on projected land use plans. It ensures that the ROW is implemented according to the approved planning schemes on each road.

3.1.6 MINISTRY OF FOOD AND AGRICULTURE (MOFA)

MOFA is the Ministry charged with the development and growth of agriculture, including fisheries, in Ghana. Its primary roles are the formulation of appropriate agricultural policies, planning and co-ordination, monitoring and evaluation within the overall national economic development. MOFA is also responsible for the overall implementation of GASIP and the Ghana Commercial Agriculture Project (GCAP) which are aimed at improving agricultural productivity and production of both smallholder and nucleus farms in selected project intervention areas with increased access to reliable water, land, finance, and agricultural input and output markets. MOFA will provide inputs into the project planning and execution as a major stakeholder.

3.1.7 GHANA IRRIGATION DEVELOPMENT AUTHORITY (GIDA)

GIDA is a semi-autonomous agency of MOFA and was established by the Supreme Military Council Decree (SMCD) 85 of 1977 to explore all water resources for livelihood options in agriculture at appropriate scales for all communities. GIDA's functions include formulating, developing and implementing irrigation and drainage plans for all year-round agriculture production, livestock and fish culture in Ghana. Currently, its services and activities comprise:

- Developing design standards for irrigation infrastructure;
- Designing irrigation infrastructure and related facilities, e.g., dams, ponds, and tube-wells, conveyance structures;
- Carrying out land-use planning in areas earmarked for irrigation development;

- Providing public irrigation facilities;
- Providing technical services for the development of irrigation facilities;
- Providing technical and managerial services for effective use of irrigation facilities; and
- Developing and disseminating adaptive irrigation technology.

GIDA is one of the major stakeholders of the Project and will thus provide various technical inputs into the project planning and execution, given that the Project involves the development of irrigation facilities (pumping stations).

3.1.8 WATER RESOURCES COMMISSION (WRC)

The Water Resources Commission Act, Act 552 of 1996, created the WRC that was made responsible for integrated water resources management including permits for water abstraction. In accordance with the Water Use Regulations L.I. 1692, the sources of water for which permits are related are freshwaters such as stream, rivers, and lakes, and springs, and underground water. Water uses/for purposes such as construction, damming, dewatering, diversion, dredging, and freshwater spillage, among others require permitting. Any alterations to, abstraction from and disturbance of freshwater resources occasioned by the project will require approval and permitting from WRC. The WRC's role in safeguards management is usually coordinated with the EPA.

3.1.9 FORESTRY COMMISSION (FC)

The Forestry Commission of Ghana is responsible for the regulation of utilization of forest and wildlife resources, the conservation and management of those resources and the coordination of policies related to them. The Wildlife Division (WD) and the Forest Services Division (FSD) of the Forestry Commission (FC) are the wildlife and forest resource management institutions respectively. These institutions become relevant whenever such resources under their management are likely to be impacted on or implicated in a proposed road project.

The WD and FSD will be consulted in the planning and decision processing to prevent, avoid, reduce or mitigate the likely impact of the OPBRC project. They will also have to give their consent with respect to the extent to which such resources may be affected or lost as a result of the road construction. WD and FSD role in safeguards management is usually coordinated with the EPA.

3.1.10 LANDS COMMISSION (LC)

The passage of the Lands Commission Act, 2008 (Act 767), incorporating four of the public sector land agencies (Survey and Mapping Division, Land Registration Division (LRD), Land Valuation Division and the Public and Vested Lands Management Division (PVLMD)) into a single entity – the LC - restructured land administration in Ghana with the aim to ensure efficiency and effectiveness in land administration.

The PVLMD is charged primarily with the management and administration of state and vested lands. The LC's role in the area of compulsory acquisition on the project (if any) is that it serves as a Member/Secretary to the permanent Site Advisory Committee, a technical committee that considers requests for compulsory acquisition by state agencies and recommends its acceptance or otherwise. The proprietary plan covering the site to be acquired is plotted by the Commission in the government records. Also, endorsement of the acquisition is processed by the Commission for the approval of the Minister responsible for lands, before an Executive Instrument (E.I.) would be issued and gazetted.

3.1.11 LAND USE AND SPATIAL PLANNING AUTHORITY (LUSPA)

LUSPA which was formerly the Town and Country Planning Department (TCPD), with the passage of the Land Use and Spatial Planning Act, 2016 (Act 925) is the national entity solely responsible for land use and spatial planning in Ghana, and thus will be providing inputs into the OPBRC project planning and execution. In line with the new three-layer planning model formulated under the Land Administration Project (LAP) 2, the LUSPA is tasked with the preparation of long term national spatial development strategy/framework for achieving defined social, economic and environmental policies.

LUSPA has finalized the preparation of the National Spatial Development Framework (2016 - 2035). It is intended that from the national spatial development strategy/framework, regional and MMDA spatial development frameworks will be developed. Act 925 is expected to be the institutional structure for preparation and enhancement of comprehensive spatial development plans for all MMDAs, sub-regions and regions, and requires the preparation of structural and local plans for all urban areas to guide future development and redevelopment and upgrading of existing communities (including slum areas). These innovative arrangements would significantly inform corridor selection and planning and implementation of resettlement projects in road sector operations. This calls for closer working relationships amongst road sector agencies and the various ranks of planning authorities (from national, regional and MMDA levels).

3.1.12 GHANA MUSEUMS AND MONUMENTS BOARD (GMMB)

The GMMB is the legal custodian of Ghana's material cultural heritage (movable and immovable heritage). The Board was established in March 1957 – on the eve of Ghana's independence - as a result of the merger of the then interim Council of the National Museum of the Gold Coast and the Monuments and Relics Commission. The GMMB is governed by the National Liberation Council Decree (NLCD) 387 of 1969, now known as Act 387 of 1969, which was further strengthened by the E.I. 29 of 1973. The mission of the GMMB is to acquire, protect, conserve and document Ghana's movable and immovable material cultural heritage for posterity, for the purposes of research and education of the public. Ghana ratified the World Heritage Convention in 1975. Therefore, GMMB is guided by the operational guidelines for the implementation of the World Heritage Convention. GMMB is also guided by international guidelines, recommendations and charters.

The material cultural heritage of Ghana comprises monuments which include buildings of traditional Ghanaian architecture and décor, and other colonial-era buildings. The movable cultural heritage includes artefacts such as pots, stools, musical instruments, textiles, clothing, leather works, weapons, tools, carvings, masks, jewellery, and ritual dolls. The material cultural heritage of Ghana also includes several archaeological finds.

The GMMB has procedures for addressing archaeological finds. The Project will involve earthworks and excavations, as such, if any historical or cultural assets are found during the road construction, the GMMB will be contacted and Chance Find Procedures (see Section 4.6) will be activated as stipulated by the GMMB Code of Protection of Cultural and Heritage Resources.

3.1.13 ATTORNEY GENERAL'S DEPARTMENT

The Attorney General's Department has redress mechanisms in place for aggrieved persons. Affected persons on the OPBRC project who are not satisfied with compensation due them and project grievance mitigation results are empowered by the constitution to seek redress in the court of law. When this happens, the Attorney General's Department represents the government in the court proceedings. The Attorney General's Department has the duty to draft the Executive Instrument for acquiring the needed land for the project.

3.1.14 UTILITY SERVICE PROVIDERS

Utility providers like Northern Electricity Distribution Company (NEDCo), Ghana Water Company Limited (GWCL), Ghana Water Company Limited (CWSA), Bulk Oil Storage and Transportation Company Limited (BOST) and telecommunication services like Vodafone and MTN are public/private institutions that provide and/or manage utility services including, electricity, water, telecommunications and petroleum transmission and storage infrastructure. These are all linear transmission facilities either through underground pipes or overhead lines along the road network.

The proposed project may affect such transmission lines which may require relocation, realignment, etc. to make room for the road operation, which calls for the involvement of the respective utility companies or institutions by the Contracting Entity and implanting agencies in the decision-making processes and implementation of required safeguards actions as appropriate. These institutions may also have monitoring responsibility or supervisory oversight during construction in an area of concern or interest to them.

3.1.15 METROPOLITAN, MUNICIPAL AND DISTRICT ASSEMBLIES

The Metropolitan, Municipal and District Assemblies (MMDAs) are the second-level administrative subdivisions of Ghana, below the level of the regions. The Metropolitan Assemblies have populations of more than 250,000; the Municipal Assemblies population of over 95,000 whilst District Assemblies have population 75,000 and over. The MMDA is:

- Created as the pivot of administrative and developmental decision-making in the district and the basic unit of government administration.
- Assigned with deliberative, legislative as well as executive functions.
- Established as a monolithic structure to which is assigned the responsibility of the totality of government to bring about integration of political, administrative and development support needed to achieve a more equitable allocation of power, wealth, and geographically dispersed development in Ghana.
- Constituted as the Planning Authority for the District.

MMDAs are sub-divided into Urban/Town/Zonal/Area Councils and Unit Committees. In the performance of their function the District Assemblies work through the Executive Committee. This includes the Social Services Sub-Committee, Works Sub-Committee, Finance Administration and Development Planning Sub-Committee, among others. The Executive Committee is presided over by the District Chief Executive and consists of not more than one-third of the total members of the Assembly excluding the Presiding member.

With regard to environmental management at the district level, the District Environmental Management Committees (DEMC) has been set up to among other things promote and provide guidelines for the establishment of community level environmental committees to put into effect the environmental programmes of the Assembly; and plan or recommend to the Assembly, strategies and activities for the improvement and protection of the environment with emphasis on fragile and sensitive areas, river courses, etc.

The MMDAs involved in the Project will play a significant role in the implementation of resettlement schemes and also serve as media for public education and community consultations. Some of the administrative structures of the Assemblies, that is, offices of the Assembly member and the Unit Committees are normally used to inform and educate people in the project area about the intended projects, their impact and proposed mitigation measures. The Assembly members also act as witnesses during payment of Supplemental Assistance to PAPs.

3.1.16 TRADITIONAL AUTHORITIES

Traditional authorities hold deep institutional relevance, particularly in rural areas where they continue to command significant respect. Traditional authorities play significant roles in the administration of local areas. At the local level, family and land disputes and development issues are mostly traditionally dealt with by the traditional authorities (chiefs and elders). Besides providing important leadership roles, chiefs act as custodians of stool/skin land, can mobilise their people for developmental efforts and arbitrate in the resolution of local disputes. Although chiefs generally have no direct political authority, some are appointed by the Government on District Assemblies.

The traditional authorities will therefore play a particularly important role in the ongoing project, for instance in areas of land allocation and management, and in grievance resolution as relates to the project.

3.1.17 PRIVATE SECTOR

The private sector also plays a very important role in the operations of the road infrastructure sector. Apart from local contractors and other foreign contractors who may participate in the project, typically, supervision of road works is generally given to private consultants (local or foreign) depending on specific contract conditions.

3.2 POLICY FRAMEWORK

3.2.1 NATIONAL ENVIRONMENTAL ACTION PLAN, 1988

The National Environmental Action Plan (NEAP) provides the basic policy framework for environmental and land management in Ghana and covers some of the key issues for the country's economy and environmental sustainability, including land management, forestry, wildlife, water management, marine and coastal systems, mining, manufacturing, hazardous chemicals and human settlements. The NEAP was initiated to define a set of policy actions, related investments and institutional strengthening activities that would make Ghana's development strategy more environmentally sustainable.

The Plan formulated a national environmental policy as the framework for implementing the Action Plan. The Policy aims at ensuring a sound management of resources and the environment, and to avoid any exploitation of these resources in a manner that might cause irreparable damage to the environment. Specifically, it provides for maintenance of ecosystems and ecological processes essential for the functioning of the biosphere, sound management of natural resources and the environment, and protection of humans, animals and plants and their habitats.

The development of the NEAP led to the establishment of the Water Resources Commission and the EPA, which is mandated with the regulation, establishment and enforcement of environmental standards. The design and implementation of the proposed project will take into consideration measures to promote the sustainable use of natural resources and confirm environmental management.

3.2.2 NATIONAL ENVIRONMENTAL POLICY, 2012

The 2012 National Environmental Policy (NEP)³ sets out a new vision for environmental management in Ghana and is based on an integrated and holistic management system for the environment. It is aimed at sustainable development now and in the future. The policy seeks to unite Ghanaians in working toward a society where all residents of the country have access to sufficient and wholesome food, clean air and water, decent housing and other necessities of life that will further enable them to live in a fulfilling spiritual, cultural and physical harmony with their natural surroundings.

The NEP is defined under key operational principles of accountability, equity, environmental justice, inclusivity and open information, precautionary and polluter pays principles. Within the NEP are sector specific environmental protection policies. The NEP is intended to serve as the roadmap for Ghana towards protection, management and promoting sustainability of environmental objects.

3.2.3 NATIONAL LAND POLICY, 1999

The National Land Policy acknowledges that in order to enhance the conservation of environmental quality, preserve options for the present and future generations and secure human sustenance, there is the urgent need for the wise use of land, based on sound principles of resource management through striking a meaningful balance among the competing demands of the very economic activities, which support human livelihood and survival. Central to the policy, therefore, is the application of these principles to the sound management and utilisation of the country's land and water resources.

Under the Policy, the use of any land in Ghana for sustainable development, the protection of water bodies and the environment, and any other socioeconomic activity will be determined through national land use planning guidelines based on sustainable principles in the long-term national interest. Land categories outside Ghana's permanent forest and wildlife estates are available for such uses as agriculture, timber, mining and other extractive industries, and human settlement within the context of a national land use plan. However, all land and water resources development activities must conform to the environmental laws in the country and where Environmental Impact Assessment report is required, this must be provided. Environmental protection within the 'polluter pays' principle will be enforced under the Policy.

The implementation of the proposed project will conform to the relevant environmental laws and policies of the country which includes, registration with the EPA, Environmental and Social Impact Assessment and obtaining an environmental permit prior to commencement.

3.2.4 NATIONAL TRANSPORT POLICY, 2008

The Ministry of Roads and Highways and the Ministry of Transport have adopted a sector approach with the preparation of the National Transport Policy (NTP) (currently under review) as a framework for the development and improvement of transportation in general. The vision of the transport sector, as stated in the NTP, is to provide an integrated, efficient, cost-effective and sustainable transportation system. The NTP defined the following strategic goals for improving the performance of the sector as follows:

- Establish Ghana as a Transportation Hub for the West African Sub-Region;

³Ghana National Environmental Policy (Revised) 2010 comes in to replace the 1992 National Environmental Policy broad vision founded on and directed by respect for all relevant principles and themes of environment and sustainable development. The policy describes major environmental challenges in Ghana and recommends operational policies, sector strategic goals and sector environmental policies to combat them.

- Create a sustainable, accessible, affordable, reliable, effective, efficient, safe and secure transport system that meets user needs and is world classed;
- Integrate land use, transport planning, development planning and service provision;
- Create a vibrant investment and performance-based management environment that maximizes benefits for public and private sector investors;
- Develop and implement a comprehensive and integrated Policy, Governance and Institutional Framework;
- Ensure sustainable development in the transport sector; and
- Develop adequate human resources and apply new technology.

With time, this has led to a more intricate decision-making situation and a steady re-direction from a project-led approach to a strategy-led approach to planning investments in the Sector. This intention has been buttressed by Sector Medium Term Plans adapted from the Transport Sector Development Programme (2008-2012), the Ghana Shared Growth and Development Agenda (GSGDA) II and the Integrated Transport Plan (ITP), which aims at facilitating the transition of transport development to a strategy-led approach.

3.2.5 NATIONAL WATER POLICY, 2007

The National Water Policy provides a framework for the sustainable development of the country's water resources. The policy also recognises the various cross-sectoral issues related to water-use and the links to other relevant sectoral policies such as those on sanitation, agriculture, transport, energy, etc.

As its objective, Section 2.2.1 Focus Area 1 which focuses on Integrated Water Resources Management seeks to achieve sustainable management of water resources and ensure equitably sustainable exploitation, utilisation and management of water resources, while maintaining biodiversity and the quality of the environment for future generations. Similarly, the objective of Section 2.2.3 Focus Area 3 – Water for Food Security, is to ensure availability of water in sufficient quantity and quality for cultivation of food crops, watering of livestock and sustainable freshwater fisheries to achieve sustainable food security for the country. The relevant policy measures and/or actions to be undertaken are to:

- i. Support the establishment of micro-irrigation and valley bottom irrigation schemes among rural communities with the assistance of district assemblies;
- ii. Strengthen district assemblies to assume a central role in supporting community operation and maintenance of small-scale irrigation and other food production facilities;
- iii. Promote partnership between the public and the private sector in the provision of large commercial irrigation infrastructure taking into consideration effects on economy, culture, environment and health;
- iv. Encourage the efficient use of fertilizers to reduce pollution of water bodies and ensure conservation of water;
- v. Promote and encourage water use efficiency techniques in agriculture and reduce transmission losses of water in irrigation systems; and
- vi. Manage land use and control land degradation, including bush fires, to reduce soil loss and siltation of water bodies.

The proposed construction and/or rehabilitation of the roads fits directly into this policy framework given that many of the prioritised roads lead or connect to various irrigation schemes (e.g. pumping stations on the Black Volta River) targeted at improving agricultural productivity.

3.2.6 NATIONAL IRRIGATION POLICY, STRATEGIES AND REGULATORY MEASURES, 2010

The National Irrigation Policy is the outcome of a consultative process, which began with a national forum on irrigation development and management in 2004. The Policy is a sectoral national policy adopted by MOFA and GIDA to address the problems, constraints and opportunities, which cut across the whole irrigation sub-sector; and specifically, for informal, formal and commercial irrigation. It is designed to open the investment space for intensified and diversified irrigated crop production in Ghana.

The objective of irrigation policy is to expand and improve the efficiency of irrigation to support agricultural development and growth. It will be pursued with principles of sustainability in operation and maintenance, and use of natural resources, equitable access by women to benefits of irrigation, and the rights to participate in irrigation management. The targets of the policy are to attain national food security, increase livelihood options, intensify and diversify production of agricultural commodities.

The implementation of the Policy will help establish proper irrigation systems that will contribute to food production and food security of the country. The Policy will seek to raise the environmental performance of all types of irrigation and related agricultural practice through a broad adoption of good agricultural practice on irrigated lands; and to extend cost-effective, demand driven irrigation services to public and private irrigators through a series of clear economic incentives for farmer participation.

The relevance of this policy to the proposed project cannot be underestimated given that many of the prioritised roads lead or connect to various irrigation schemes in the Upper West Region.

3.2.7 NATIONAL CLIMATE CHANGE POLICY, 2013

The National Climate Change Policy (NCCP), designed within the context of national sustainable development priorities, serves as the country's integrated response to climate change. The NCCP provides a clearly defined pathway for dealing with the challenges of climate change within the current socio-economic context of Ghana, and looks ahead to the opportunities and benefits of a green economy. The Policy is built on seven (7) systematic pillars and the objective of the Policy is to mitigate and ensure effective adaptation and social development in key sectors of the economy, such as agriculture and food security, natural resources management, energy, industry and infrastructure, among others.

Key actions under the policy include promoting appropriate technologies for small-scale irrigation, water re-use and water harvesting; developing climate-resilient infrastructure that provide key services so that communities are less exposed and vulnerable during extreme events; and providing communities with reliable access to markets, key services and lifeline facilities. Other measures include constructing proper storm drainage systems, riverbank protection, buffer zones, and undertaking afforestation along embankments and other measures to reduce flooding; constructing channels, water collecting reservoirs and dams to contain floods and store water for the dry season; and improving public adaptation strategies, through provision of wells, boreholes and road infrastructure, land tenure administration reform, education, etc.

3.2.8 NATIONAL EMPLOYMENT POLICY, 2014

The National Employment Policy indicates that the employment situation in Ghana has not improved much despite better economic growth performance, macro-economic stability and improved infrastructure in the last two decades; and that there is a strong correlation between the employment situation and poverty. The policy states that the key source of demand for labour emanates from the productive sectors of the economy, namely, agriculture, industry and service (trade). One of the key

strategies of the employment policy is to promote farm and nonfarm rural employment through modernization of agriculture, improving the productivity of farmers and contract farming arrangements, promoting effective linkages between farm and non-farm activities among others.

Other strategic actions of the policy include promoting investment in strategic sectors of the economy that have the greatest potential for job creation, including modernised agriculture; and supporting initiatives for the creation of green jobs in energy and industrial efficiency, energy supply, transportation, biodiversity, conservation and ecosystem restoration, soil and land management, and waste management.

The policy also recognised the need for gender equity in employment to enhance women's access to productive employment opportunities and implementation of initiatives directed at eliminating all forms of child labour, and collaborate effectively with partners to eliminate the worst forms of child labour. The proposed road project is expected to bring both direct and indirect employment opportunities to the local communities. This policy and other labour laws will guide recruitment on the project.

3.2.9 NATIONAL GENDER POLICY, 2015

The then Ministry of Women and Children Affairs (MOWAC) which is now the Ministry of Gender, Children and Social Protection (MOGCSP) put in place the National Gender and Children Policy in year 2015. The overall goal of the policy is to mainstream gender concerns in the national development process in order to improve the social, legal, civic, political, economic and socio-cultural conditions of the people of Ghana, particularly women, girls, children, the vulnerable and people with special needs, persons with disability and the marginalized. Ghana's goals towards achieving gender equality and women empowerment are guided by the 1992 Constitution.

The specific objectives of the policy are to:

- Reduce imbalances which arise from existing gender inequalities through policy review, legal reforms and enforcement of existing legislation.
- Provide a national framework from which policies are derived.
- Implement activities designed to strengthen women's role in the economic development.
- Implement activities designed to promote children's development and protection.
- Promote women's equal access to, and control over economically significant resources and benefits.
- Enhance the survival, development and protection of children.

The Project will be guided by this policy in addressing bottlenecks, barriers and critical issues pertaining to gender roles and inclusiveness. The Project will in line with this policy make sure that women and men, the marginalized and the vulnerable have a voice, participate and benefit equally from the project.

3.2.10 FOOD AND AGRICULTURE SECTOR DEVELOPMENT POLICY, 2007

The first Food and Agriculture Sector Development Policy (FASDEP) was developed in 2002 as a framework for the implementation of strategies to modernisation of the agricultural sector. The strategies in that policy were based on the Accelerated Agricultural Growth and Development Strategy (prepared in 1996), and were designed to forge linkages in the value chain. The revised policy (FASDEP II) in 2007 emphasized the sustainable utilization of all resources and commercialization of activities in the sector with market-driven growth in mind and with emphasis on environmental sustainability. The policy was consistent with national development objectives as specified in the Growth and Poverty Reduction Strategy II (GPRS II), which aims at achieving accelerated and sustainable shared growth, poverty reduction, gender equity, protection and empowerment of the vulnerable and excluded within a decentralised and democratic environment.

Part of the strategies of the policy for attaining food security includes developing appropriate irrigation schemes for different categories of farmers for production throughout the year and liaising with the Ministry of Transportation for road transport and the Ministry of Harbours and Railways to improve accessibility from farm to market centres and facilitate the distribution of crops. Irrigation is seen as a necessary instrument for the modernisation of agriculture, and in particular, for reducing vulnerability of smallholders to rainfall variability. Improving access and connectivity to irrigation schemes in the Upper West Region through the construction and/or rehabilitation of roads under this Project will improve agricultural incomes and national food security, and thus will be a significant contribution to realizing the objectives of FASDEP.

3.2.11 RIPARIAN BUFFER ZONE POLICY FOR MANAGING FRESHWATER BODIES IN GHANA

The Buffer Zone Policy has been designed as a harmonized document of all the dormant and fragmented regulations in the country concerning buffers bordering waterbodies or river systems. The Buffer Zone Policy is intended to protect, regenerate and maintain the native or established vegetation in riparian buffer zones to improve water quality by instituting proper procedures for managing and controlling activities along river banks and generally in catchments of surface water bodies. It was developed between 2004 and 2012; approved by Cabinet in 2013 and launched in 2014 by the erstwhile Ministry of Water Resources Works and Housing (MWRWH) in collaboration with the Water Resources Commission and other stakeholders for sustainable management of freshwater bodies in the country.

The policy aims at regulating human activities along freshwater bodies through sustainable practices. To achieve this, it outlines these five (5) major areas of focus for which it sets out specific objectives and measures within the context of national development goals (MWRWH, 2013):

- Maintaining the ecological and life-supporting functions of buffer zones;
- Sustaining the multi-functionality of buffer zones;
- Riparian buffer zones specific to urban and peri-urban areas;
- Building capacity through research and education, training and empowerment of communities on conservation of buffer zones; and
- Coordinating and harmonizing existing policies and traditional bye-laws.

The Policy provides comprehensive measures and actions that would guide the coordinated creation of vegetative buffers for the preservation and functioning of the nation's waterbodies and vital ecosystems. It recommends buffer widths of 60 to 90 metres for municipal reservoir shoreline protective areas such as Weija Dam and Lake Bosomtwe; 10 to 60 metres for major perennial rivers or streams such as the Volta, Offin and Tano; and 10 to 50 metres for streams within forest reserves.

3.2.12 ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF) FOR THE TRANSPORT SECTOR

The ESMF was prepared by the MRH to be used as a guideline for the Transport Sector Development Program (TSDP) with focus on road sector projects. This policy document has been revised by the MRH under the TSIP, however, it serves the same purpose. The purpose is to provide corporate environmental, and social safeguard policy frameworks, institutional arrangements and capacity available to identify and mitigate potential safeguard issues and impacts of each sub-project.

The document is relevant to the study because it represents statements of policy, guiding principles and procedures, as well as environmental and social safeguard instruments of reference for the road sector projects agreeable to all key stakeholders such as the EPA, the World Bank, MRH and the implementing agencies.

3.2.13 RESETTLEMENT POLICY FRAMEWORK FOR THE TRANSPORT SECTOR

The RPF was prepared by the MRH to be used as a guideline for the TSDP with focus on road sector projects. The RPF has subsequently been revised by the MRH under the TSIP. Specifically, the RPF documents the following resettlement and compensation procedures as outlined by the following steps:

- Prepare social impact assessment
- Apply framework for compensation and resettlement, and
- Design compensation resettlement plan if applicable

The RPF is designed to ensure the following:

- All types of losses are identified, clearly defined and properly categorized to reflect the nature of the loss;
- A standard or uniform measure for defining eligibility and entitlement in order to have a fair basis for assessing compensation for the loss or impact suffered;
- Displaced persons will be compensated for their losses at full replacement cost, provided relocation assistance and disturbance allowance prior to the beginning of civil works;
- A comprehensive database, based on which values will be assessed, validated in the event of disputes and more importantly serve as the database for monitoring and evaluation of the resettlement instrument; and
- The project affected persons would be consulted and given the chance of participating in the design, implementation and monitoring of the resettlement.

3.2.14 THE MEDIUM-TERM NATIONAL DEVELOPMENT POLICY FRAMEWORK (2018 – 2021)

The Medium-Term National Development Policy Framework (2018-2021), is the sixth in the sequence of medium-term national development policy frameworks prepared over the past twenty years. It is the operational framework of the President's Coordinated Programme of Economic and Social Development Policies (CPESDP), – An Agenda for Jobs: Creating Prosperity and Equal Opportunity for all, which was submitted to Parliament in December 2017 in fulfilment of Article 36, Section 5 of the Constitution.

The strategic direction underlying the “Agenda for Jobs” is to create an optimistic, self-confident and prosperous nation, through the creative exploitation of our human and natural resources, and operating within a democratic, open and fair society in which mutual trust and economic opportunities exist for all. The main goals are (i) Create opportunities for all Ghanaians; (ii) Safeguard the natural environment and ensure a resilient built environment; (iii) Maintain a stable, united and safe society; and (iv) Build a prosperous society.

3.2.15 THE ROAD SECTOR MEDIUM-TERM DEVELOPMENT PLAN (2018 - 2021)

According to the Road Sector Medium-Term Development Plan (SMTDP), the mission of the road sector is to “*provide an integrated and well-maintained road infrastructure and services that meet national requirements and international standards on a sustainable basis, through effective formulation and implementation of policies, promoting private sector participation, developing, implementing, monitoring and regulating standards, as well as carrying out strategic investments*”. The SMTDP hinges on the National Medium-Term Development Policy Framework (2018-2021) which is themed “An Agenda for Jobs”.

Over the medium-term 2018-2021, the goal of the National Medium-Term Development Framework (Agenda for Jobs) regarding the environment, infrastructure and human settlement development is to ensure a resilient built environment while safeguarding the natural environment. The two national policy objectives for the road sector are;

- Improve efficiency and effectiveness of road transport Infrastructure and service
- Ensure safety and security for all categories of road users

The road sector goals have been aligned with these two national objectives to achieve the development agenda of the government in the next four years.

The sector goals include the following:

- Sector Goal 1: Establish Ghana as a Transportation Hub for the West African Sub-Region
- Sector Goal 2: Create and sustain an efficient and effective transport system that meets user needs
- Sector Goal 3: Integrate land use, transport planning, development planning and service provision
- Sector goal 4: Create appropriate environment for private sector participation in the delivery of transport infrastructure
- Sector Goal 5: Ensure sustainable development and management of the transport sector
- Sector Goal 6: Develop adequate skilled human resource base
- Sector Goal 7: Develop and implement comprehensive and integrated policy, governance and institutional frameworks

3.3 LEGISLATIVE FRAMEWORK

3.3.1 THE CONSTITUTION OF GHANA

The 1992 Constitution⁴ of Ghana sets out the first source of environmental protection requirements in Ghana. Article 36 (9) of the Constitution states that “*the State shall take appropriate measures needed to protect and safeguard the national environment for posterity; and shall seek co-operation with other states and bodies for purposes of protecting the wider international environment for mankind*”. In addition, Article 41 (k) requires that all citizens protect and safeguard the natural environment of the Republic of Ghana.

The Constitution of Ghana (1992) upholds the rights of citizens to own property and receive adequate reparation from the state when lands are compulsorily acquired by the state. The Constitution provides for individual property rights, the protection of those rights, and appropriate compensation from the government if it compulsorily acquires a private person’s property. Again, by Article 20(3) the 1992 Constitution requires that where compulsory acquisition or possession of land is effected by the State 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. These requirements of the Constitution shall be applicable to the Project.

3.3.2 ENVIRONMENTAL PROTECTION AGENCY ACT, 1994 (ACT 490)

The Environmental Protection Agency Act, 1994 (Act 490) came into being to establish the EPA as a body for the protection, conservation and management of environmental resources for the Republic of Ghana. The Act mandates the EPA with the formulation of environmental policy, prescribing of standards and guidelines, issuing of environmental permits and pollution abatement notices.

⁴The 1992 Constitution of the Republic of Ghana sets out the Rights, Freedom, Duties and Obligation of every citizen of Ghana. These are the constitutional rights of Ghanaians. The constitution also defines specific requirements for the protection of the Environment such as provided under: Article 37(3); Article 39(6); Article 41(k); Article 268 and Article 269.

Section 2 (i) of Act 490 further mandates the EPA to enforce compliance with established EIA procedures among companies and businesses in the planning and execution of development projects, including existing projects. Section 10 (2) of the Act also promulgates the establishment of a Hazardous Chemicals Committee with functions to monitor the use of hazardous chemicals by collecting information on the importation, exportation, manufacture, distribution, sale, use and disposal of such chemicals. As the lead environmental regulator, the EPA's regulations will guide the conduct of the ESIA studies and environmental approval for the road project to commence will be granted by EPA.

3.3.3 ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999 (L.I. 1652), AS AMENDED (L.I. 1703, 2002) AND (L.I. 2228, 2015)

The Environmental Assessment Regulations is established to provide a framework for environmental assessment of development projects in Ghana. This ESIA for the road project is guided by these environmental assessment regulations. The L.I. 1652 is organised into five schedules of categorised projects which may either be subjected to a complete EIA or a Preliminary Environmental Assessment (PEA). The Schedules include:

- **Schedule 1**, Regulation 1 (1) outlines activities for which an Environmental Permit is needed.
- **Schedule 2**, Regulation (3) outlines activities for which EIA is mandatory.
- **Schedule 3**, Regulation 15 (2) provides requirements for disclosure of scoping notice and “notice of intent” to undertake the proposed project.
- **Schedule 4**, Regulation 16 (3) provides requirements for disclosure and public consultation in the EIA process.
- **Schedule 5**, Regulation 30 (2) outlines environmental sensitive areas known as Sites for Special Scientific Interest (SSSI).

Regulation 1 (2) of L.I. 1652 mandates that no person shall commence an undertaking which in the opinion of the Agency has or is likely to have adverse effects on the environment or public health unless, prior to the commencement, the undertaking has been registered by the EPA and an environmental permit has been issued by the Agency in respect of the undertaking. Regulation 11 and 12 sets out requirements for submission of scoping report which sets the scope or extent of the EIA to be carried out by the applicant and includes a Draft TOR, which indicates the essential issues to be addressed in the environmental impact statement.

The L.I. 1652 prescribes requirements for the following documents:

- Environmental Impact Statement (EIS)
- Preliminary Environmental Assessment
- Environmental Management Plan
- Annual Environmental Report
- Environmental Permits and Certificates

The Environmental Assessment (Amendment) Regulations, 2002 (L.I. 1703) ammended LI 1652 by the insertion after Schedule 2 of Schedules 2A, 2B and 2C and provided environmental processing charges, permit fees and certificate fees for undertakings under those schedules.

3.3.4 FEES AND CHARGES (AMENDMENT) INSTRUMENT, 2019 (L.I. 2386)

The Fees and Charges (Amendment) Instrument, 2019 (L.I. 2386) replaced the Fees and Charges (Amendment) Instrument, 2015 (L.I. 2228), which earlier also replaced Fees and Charges (Amendment) Instrument, 2014 (LI 2216), and gives regulation to the Fees and Charges (Miscellaneous Provision) Act 2009, Act 793. The L.I. 2386 provides the latest comprehensive rates, fees and charges collectable by Ministries, Department and Agencies (MDAs) for goods and services delivered to the public. The L.I.

2386 is relevant to the Project as it will inform on the fees and charges collectable by state institutions such as the EPA with respect to granting of permits, certificates, licenses and other approvals for the Project.

3.3.5 WATER RESOURCES COMMISSION ACT, 1996 (ACT 522)

The Water Resources Commission Act, 1996 (Act 522) establishes and mandates the WRC as the sole Agency responsible for the regulation and management of the utilization of water resources and for the co-ordination of any policy in relation to water resources.

According to Section 13 of the WRC Act, a person shall not divert, dam, store, abstract, construct or maintain any works for the use of water resources without the authority of the WRC. Section 15 of Act 522 stipulates that where it appears the use of water for a purpose at a place poses a serious threat to the environment or to public health, WRC may issue an enforcing notice requiring the user to take steps to prevent or stop the activity. This is supported by Section 24 of the same Act, which authorizes WRC to convict any person who pollutes or fouls water resource beyond threshold levels prescribed by the EPA. The Act states under Section 24, that – *“any person who pollutes or fouls a water resource beyond the level that the EPA prescribes, commits an offence and is liable on conviction to a fine or a term of imprisonment or both”*. The Contractor for the project will be guided by all the regulations of the WRC regarding water requirements for the road construction.

3.3.6 WATER USE REGULATIONS, 2001 (LI 1692)

The Water Use Regulations, 2001 (LI 1692) lists activities for which a water use permit is required, and these include domestic, commercial, municipal, and industrial water use, among others. Regulation 1 of the LI 1692 indicates that a person may obtain a permit from the WRC for water use. In accordance with LI 1692, the sources of water for which permits are related are freshwaters such as stream, rivers, and lakes, springs and underground water. Water uses/for purposes such as construction, damming, dewatering, diversion, dredging, and freshwater spillage, among others require permitting. Where necessary, the Contracting Entity will obtain a water use permit from the Directorate of the WRC before any abstraction from, potential alterations to, or disturbance of freshwater resources in the project area.

3.3.7 DRILLING LICENCE AND GROUNDWATER DEVELOPMENT REGULATIONS, 2016

According to the Drilling License and Groundwater Development Regulations, a person (drilling contractor) shall not construct a well for the abstraction, or monitoring of groundwater or for research if that person does not have a drilling licence granted by WRC. Failure to obtain a licence from the WRC is an offence that is liable on summary conviction to a fine of not more than two hundred penalty units or imprisonment for a term of not more than twelve months or to both. The Regulations also gives the WRC the absolute right to refuse the grant of a licence based on issues of public safety or other reasonable justification, as well as also withdraw a drilling licence where the WRC determines that the holder has conducted drilling operations in an unprofessional manner, intentionally makes a misstatement of facts in a report required from the holder or fails to comply with the provisions of these Regulations or conditions specified in the licence. At any reasonable time, an authorised officer of the WRC could make inspection visits to a well site. The Contracting Entity will be guided by this regulation in obtaining the necessary permits for all drilling works.

Section 13 of the Regulations also places a responsibility on the drilling contractor to not construct a well in a manner that leads to contamination or pollution of groundwater or aquifer.

3.3.8 HAZARDOUS AND ELECTRONIC WASTE CONTROL AND MANAGEMENT ACT, 2016 (ACT 917)

The Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917) ensures that harmful elements associated with hazardous and other waste products are captured and processed safely to preserve critical ecological components such as the soil, groundwater, flora and fauna. This Act is applicable to the Project since the construction of the road and use of equipment / machinery may involve the transportation, storage, handling and management of some hazardous chemicals or wastes.

3.3.9 HAZARDOUS, ELECTRONIC AND OTHER WASTES (CLASSIFICATION) CONTROL AND MANAGEMENT REGULATIONS, 2016 (LI 2250)

This legislative instrument spells out clearly the appropriate and relevant regulations guiding the classification and implementation of the Hazardous and Electronic Wastes Control and Management Act, 2016 (Act 917).

3.3.10 PUBLIC HEALTH ACT, 2012 (ACT 851)

The Public Health Act, 2012 (Act 851) revises and consolidates the law relating to public health to prevent disease, promote, safeguard, maintain and protect the health of humans and animals and to provide for related matters. Provisions on management of diseases of a communicable nature are also made under the Act (Part 1) and includes among other things, the communication of the existence of communicable disease, disinfection, destruction infected of animals, removal and detention of infected persons or disposal of corpse, as well as isolation of contacts. Part 2 of the Act also makes it a requirement on an employer of an immigrant in Ghana to give notice of the arrival and the place of entry of the immigrant to the appropriate authorities before the entry of the immigrant and to furnish the authorities the necessary public health documentation of the immigrant.

Act 851 also lays down rules relative to environmental sanitation (Part 5). The Act provides rules relative to food vending and food-borne diseases, prohibits noxious or offensive practices that may cause damage to the lands, crops, cattle, or goods of the public, and prohibits practices that pollutes or fouls the water of a well, tank, spring, reservoir, or place used or intended to be used for the supply of water for human or animal consumption.

The Project will be guided by this Act in implementing appropriate measures in promoting environmental sanitation and to prevent or manage the spread of communicable diseases, should there be any such incidences on site or in the Project area. The Project shall also be guided by this Act to implement measures to educate the public on non-communicable diseases and provide facilities for screening, early detection and management of non-communicable diseases and for the promotion of public health.

3.3.11 PERSONS WITH DISABILITY ACT, 2006 (ACT 715)

The Persons with Disability Act, 2006 (Act 715) defines a disabled person in Article 59 as “an individual with a physical, mental or sensory impairment including a visual, hearing or speech functional disability which gives rise to physical, cultural or social barriers that substantially limits one or more of the major life activities of that individual”. Among other things, the Act provides for rights of Persons with Disability (PWDs) such as unrestricted access to public places and buildings, free health care, employment, education and transportation. Under Act 715, a person shall not discriminate against, exploit or subject a person with disability to abusive or degrading treatment and an employer shall not discriminate against

a prospective employee or an employee on grounds of disability. Act 715 also makes it mandatory for all buildings to which the public has access to be fitted with disability-friendly facilities to make them accessible to PWDs; this is the sole responsibility of the owner or occupier of such buildings.

The Project will be guided by this Act to make adequate provisions for PWDs on the Project and implement measures to eliminate all forms of discrimination and social exclusion of PWDs. PWDs would be given equal and fair representation on the Project, to the extent practicable.

3.3.12 GHANA NATIONAL FIRE SERVICE ACT, 1997 (ACT 537)

The Ghana National Fire Service Act, 1997 (Act 537) makes provision for the management of undesired fires and as per the functions of the Service, provides technical advice for building plans in respect of machinery and structural layouts to facilitate escape from fire, rescue operations and fire management. Other functions of the Ghana National Fire Service (GNFS) include organizing public fire education programmes, inspect and offer technical advice on fire extinguishers, and offer rescue and evacuation services to those trapped by fire or in other emergencies. The GNFS is a key stakeholder on the Project and would be collaborated with on various aspects of the Project, especially in the development of fire prevention and management protocols on site and community education or sensitization programs on bush fires.

3.3.13 FIRE PRECAUTION (PREMISES) REGULATIONS, 2003 (LI 1724)

The Fire Precaution (Premises) Regulations, 2003 (L.I. 1724) reinforces the requirement for a fire certificate to be obtained for premises used as a public place or place of work as stated under the Ghana National Fire Service Act, 1997 (Act 537). This requirement would be adhered to on the Project and the Project Developer and Contracting Entity will ensure that adequate measures are introduced to minimise or prevent fire outbreaks and a fire permit is obtained for the development prior to the commencement of works.

3.3.14 FACTORIES, OFFICES AND SHOPS ACT, 1970 (ACT 328)

The Factories, Offices and Shops Act, 1970 (Act 328) mandates the Department of Factories Inspectorate under the Ministry of Employment and Labour Relations to register factories and ensure that internationally accepted standards of providing occupational safety, health and welfare of persons employed in premises or all workplaces are adhered to. It defines a factory to include any premises (whether in or not in a building) in which one or more persons are engaged in manual labour, among others.

The road Project will involve significant labour recruitment (both skilled and unskilled labour) and there will be need for setting up temporary construction camps on the site to house as many staff or personnel as needed. Similarly, fuel and material storage warehouses, workshops, fabrication shops and field offices would be required. As such, the requirements of this Act (Act 328) will be adhered to on the Project and the necessary collaborations with the Department of Factories Inspectorate and the Ministry as a whole will be undertaken to safeguard the health and wellbeing of all persons employed or engaged on the Project.

3.3.15 THE ADMINISTRATION OF LANDS ACT, 1962 (ACT 123)

Act 123 of 1962 was enacted to facilitate the management and administration of stool lands (and other lands). The Act empowers the Minister responsible for lands to manage stool lands in accordance with the provision of the law. By Section 7 of the Act 123, the President of the Republic may by Executive Instrument declare any stool land to be vested in trust and accordingly the state could administer such

land as a trustee for the stool involved. In such a situation the legal rights to sell, lease, collect rent, litigate and manage generally is taken away from the customary land owners and vested in the State. However, the equitable right in the land, which is right to enjoy the benefits, is retained by the land owner.

Similarly, the Act provides in Section 10 that *“the President may authorize the occupation and use of any land for any purpose which, in his opinion, is conducive to public welfare or the interest of the state”*. It is a requirement that a public notice shall be published in the Gazette giving particulars of the lands to be taken and the uses to which they will be put. Persons whose interests are affected by “reasons of disturbance as a result of the authorization so made are entitled to be paid”.

The Act shall guide land acquisition on the project. The entitlements are however to be assessed by giving due consideration to the values of the land (and other losses suffered) and the benefits to be derived by the people in the area (by way of the use to which the state is going to put the land). The difficulty of this law is that the nature of interest taken is not expressed in definite terms. Again, stakeholder consultation and community involvement are not highlighted. It must be observed that the state does not normally use this section of the Act and thus occupation of lands is rarely exercised.

3.3.16 THE STATE LANDS ACT 1962 (ACT 125 AS AMENDED)

The State Lands Act together with the State Lands Regulations, 1962 (LI 230) and State Lands (Amendment) (No. 2) Regulations, 1963 (LI 285) constitute the principal law under which private lands could be compulsorily acquired on the project. The law empowers the President to acquire any land for the public benefit. The Act and its Regulation, that is, the State Lands Regulation, 1962 (LI 230), detail out the mechanism and procedure for compulsorily acquiring lands. It is a mandatory requirement that a copy of the instrument of acquisition be served on any person having an interest in or possession of such lands or be affixed at a convenient place on the land and be published thrice in a newspaper circulating in the municipality where the land is situated.

The Act emphasizes the payment of compensation to the victims of acquisition made under the Act. The basis of the said compensation should be either the market value or replacement value. Costs of disturbance and incidental expenses or other damage suffered are to be considered in the award of compensation. One critical limitation of the Act is that not much premium has been given to the issue of public involvement in the acquisition process. Community consultations and involvement is therefore not mandatory.

3.3.17 THE LANDS STATUTORY WAY LEAVES ACT 1963, ACT 186

This Land Statutory Way Leaves Instrument is the most relevant Act with regard to land acquisition for the road construction. The Act empowers the President whenever, in his opinion, it is in the public interest to provide for entry on any land for construction, installation and maintenance of works of public utility and for the creation of ROW and other rights in respect of such works.

Therefore, the Act regulates the acquisition of land for road projects. It provides for an instrument for acquisition which contains a description (including measurement) and a plan showing the road alignment. It provides compensation for certain types of loss or damage incurred as a result of those activities. And once the property owner is served a copy of the Way Leaves, he/she has three months from that date within which to make a compensation claim. Section 6 (1-4) specifies conditions under which a person can be compensated as a result of carrying out survey, including installation, construction, inspection, replacement and removal on lands. This Act will guide the assessment of compensation requirements for PAPs on the Upper West Road Project.

3.3.18 THE LAND TITLE REGISTRATION ACT 1986, PNDCL 152

The challenges arising from registration of instruments under the Land Registry Act 1962, Act 122 led to the promulgation of the Land Title Registration Act 1986, PNDCL 152 which would be an improvement on the registration of deeds. The law provides for accurate parcel or cadastral maps which would reduce fraud, multiple registrations and reduce litigation. It also provides for publication and adjudication of conflicts. The certificate of title to the land is indefeasible and can only be cancelled by a court of law. The Land Title Registration Law provides for the registration of all interests under the project held under customary law and also the common law. Under this law, the registrable interests include

- Allodial title;
- Usufruct / customary law freehold;
- Freehold;
- Leasehold;
- Customary tenancies; and
- Mineral licenses.

3.3.19 PUBLIC LANDS (PROTECTION) ACT, 1974 (NRCD 240)

This Act provides for the protection of public land from unlawful deeds, occupation, trespass or other illegal encroachment or interference. It also prescribes penalties for unlawful sale or occupation of public land and provides for the ejection of trespassers. The Act will guide encroachment on the Project.

3.3.20 FARMLANDS (PROTECTION) ACT, 1962 (ACT 107)

The Farmlands Act upholds the principles that where a person, in this Act referred to as a farmer, acquires land after the commencement of this Act for the purposes of farming and does not farm a part or the whole of that land for a period of eight years from the date of the acquisition, his title to the whole of the land or that portion that has not been farmed shall be deemed for all purposes to have been extinguished.

Where a farmer has, in good faith, at any time after the thirty-first day of December, 1940, and before the commencement of this Act, acquired any land by customary law or otherwise in a prescribed area for purposes of farming and has begun farming on that land within eight years from the date of such acquisition, this section shall, notwithstanding any defect in the title to the contrary, operate to confer valid title on such farmer provided that the land in question had not been farmed by any other person for a period of eight years previous to the acquisition by the farmer.

Where there are any proceedings for vacant possession on the ground that a person other than the farmer who acquired the land is entitled to the land or proceedings have been instituted or are instituted by such farmer on the ground that his title to the land is being in any manner challenged, the Court, where it considers that if this Act had not been passed a possession order would fall to be made by reason that the acquisition taken by the farmer did not operate to confer on him the title to the land, but that to make an order would cause hardship and injustice to the person against whom it would fall to be made, may, instead of making the possession order, make an order providing that the acquisition by the farmer shall be deemed for all purposes to have operated to confer on him the title to the land.

Where an order is made and the Court considers that the order would by itself cause hardship and injustice to any person, the Court may make a further order requiring the person in whose favour the order is made to pay the other person a sum of money by way of compensation provided that the aggregate of any such sum ordered to be paid shall not exceed an amount equal to twice the value of

the consideration paid at the date of the purported acquisition. Any person who procures or attempts to procure any other person to give up possession of land by any means other than by due process of a Court of competent jurisdiction shall be guilty of a misdemeanour. The Act shall guide land acquisition on the project.

3.3.21 OFFICE OF THE ADMINISTRATOR OF STOOL LANDS ACT, 1994 (ACT 481)

The Act establishes the Office of the Administrator of Stool Lands as enshrined in Article 267 (2) of the 1992 Constitution and it is responsible for the establishment of a stool land account for each stool, collection of rents and the disbursement of such revenues. The Administrator is charged with the management of stool lands and in accordance with the provisions in the 1992 Constitution, 10% of the gross revenue goes to the Administrator of Stool Lands for administrative expenses whilst the remainder is disbursed as follows:

- 25% to the stool through the traditional authority for the maintenance of the stool;
- 20% to the traditional authority; and
- 55% to the District Assembly, within the area of authority of which the stool lands are situated.

The Act 481 includes, the Administration of Lands Act, 1962 (Act 123), the Concessions Act, 1962 (Act 124) and the State Lands Act, 1962 (Act 125) and their amendments.

3.3.22 THE LANDS COMMISSION ACT 2008, (ACT 767)

The Lands Commission Act 2008 establishes the Lands Commission to integrate the operations of public service land institutions in order to secure effective and efficient land administration to provide for related matters. The objectives of the Commission include among others to:

- Promote the judicious use of land by the society and ensure that land use is in accordance with sustainable management principles and the maintenance of a sound eco-system; and
- Ensure that land development is effected in conformity with the nation's development goals.

Section 5 (j) mandates the Commission to encourage that socio-economic activities are consistent with sound land use through sustainable land use planning in the long term. Section 22 of the Act also prescribe functions of the Land Valuation Division (LVD) of the Commission to among other things, assess the compensation payable to PAPs upon acquisition of land by the Government. The relevance of the Act to the Project will therefore lie in the assessment of compensation for PAPs and the assessment of the viability for the provision of socio-economic activities on the OPBRC Road Project.

3.3.23 SURVEY ACT 1962, ACT 127

The Survey Act 1962, Act 127 relates to geological, soil and land survey. Part II of the Act deals with demarcation and survey of lands, and this applies to the project. Under the law, the Sector Minister may appoint official surveyors and the Chief Survey Officer (Director of Surveys) may license private surveyors. It is the official surveyor or licensed surveyor that shall certify plans for attachments to instruments of conveyance, leases, assignment, and charge or transfer. Under the law, it is an offence to damage, destroy or alter any boundary mark.

The Act 127 gave legal backing to the Director of Surveys to carry out cadastral and other surveys through official surveyors who work directly under him at the Survey Division of the Lands Commission. It also gave authority to the Director of Surveys to recommend from time to time experienced surveyors to the Minister responsible for Lands to be licensed to undertake surveys.

3.3.24 ENVIRONMENTAL GUIDELINES

The EPA has issued several formal guidelines or standards on regulatory requirement for the protection of the environment and general public health. The following guidelines are relevant to the EIA process and the proposed Project:

- Ghana Standard for Health Protection – Requirements for Ambient Noise Control (GS 1222, 2018)
- Ghana Standard for Environmental Protection – Requirements for Effluent Discharge (GS 1212, 2019)
- Ghana Standard for Environment and Health Protection – Requirements for Ambient Air Quality and Point Source / Stack Emissions (GS 1236, 2019)
- Ghana Standard for Environment and Health Protection – Requirements for Motor Vehicle Emissions (GS 1219, 2018)
- Ghana Standard for Acoustics – Guide for Measurement of Outdoor A-Weighted Sound Levels (GS 1253, 2018)

The above mentioned has been taken cognisance of in specialist studies.

3.3.25 OTHER LEGISLATIONS AND DOCUMENT

Other relevant legislations applicable to the Project have been summarised in Table 3-1 below. The following MRH/MOT road sector documents are also applicable to the ESIA and Project development;

- Environmental and Social Assessment (ESA) for the Transport Sector Improvement Project, 2017
- Environmental and Social Policy Framework for Road Sector Operations, 2017
- Resettlement Policy Framework for Road Sector Operations, 2017
- Roads Reservation Management: Manual for Coordination, 2001
- Standard Specifications for Road and Bridge Works, 2006
- Annex 2 to Special Specifications for Precast Concrete Works and Road Furniture
- MRH Labour Standards

Table 3-1 Other Relevant National Legislation Applicable to the Project

Legislation	Objective	Implementing Agency	Comment	Relevance to Project
National Road Safety Commission Act, 1999 (Act 567)	Development and promotion of road safety in the country	National Road Safety Authority	Section 2 of the Act specifies functions of the Commission. Sub-section 2 (o) requires the Commission to set standards for road safety equipment in consultation with the Building and Roads Research Institute, The Ghana Standards Authority and other bodies with relevant knowledge and expertise on road safety and enforce compliance with the standards.	Key stakeholder in the management of traffic, health and safety concerns on the OPBRC road Project during construction and rehabilitation stages
			Sub-section 3 mandates the Commission to take into consideration the interest of the public and the interest of the owners of properties on adjoining roads.	
National Museum Decree, 1969 (NLCD 387) now known as National Museums Act, 1969 (Act 387)	Custodian and preservation of Ghana's material cultural heritage (movable and immovable)	Ghana Museums and Monuments Board	Section 8 (1) specified that "no person shall by means of excavation or similar operation search for any antiquity unless authorised by a permit".	Identification, assessment and removal of archaeological artefacts identified during road construction works where excavation occurs
			Section 9 of the Decree provides requirements for the removal of antiquity.	
			Section 10 (1) behoves responsibility for any person who discovers an antiquity and the owner or occupier or any land upon which an antiquity is discovered on becoming aware of the discovery to without delay notify the Board.	
Wetland Management	Protection and management of wetland SSSI	Game and Wildlife Division of the Forestry Commission	Protection of vital ecosystems and valuable environmental components.	Protection of mangroves and wetlands within the Project area

Legislation	Objective	Implementing Agency	Comment	Relevance to Project
(RAMSAR sites) Regulation, 1999				
Wild Animals Preservation Act, 1961	Protection of wild animals, birds and fish	Game and Wildlife Division of the Forestry Commission	Protection of critical species and habitats	Protection and management of terrestrial and aquatic wildlife
Forestry Commission Act, 1999 (Act 571)	Regulation of the utilization of forest and timber resources and managing of forest reserves and protected areas	Forestry Commission	The Act promotes management practices that encourage sustainability and provides for technical assistance in matters of resource protection	Protection and management of forest resources and protected areas encountered during the road construction
Rivers Act, 1903	Protection and sustainable use of rivers and related matters	Water Resources Commission	Section 3 of the Act prohibits a person from dredging a river or extracting the water for construction purposes unless a license is obtained	Protection of water resources during the road construction
Local Governance Act, 2016 (Act 936)	Promote local economic development and support productive activities and social development by removing obstacles to initiative and development	Ministry of Local Government and Rural Development Metropolitan, Municipal, District Assemblies.	Section 5 of the Act mandates District Assemblies to co-ordinate, integrate and harmonize the execution of programs and projects under approved development plans for the district and other development programs promoted or carried out by Ministries, Departments, public corporation and other statutory bodies and non-governmental organization in the district.	Support the Project implementation and the OPBRC process through provision of data, information and district level resources where needed.
Ghana Meteorological Agency Act, 2004 (Act 687)	Provide meteorological information, advice, and warnings to mitigate the effects of natural disasters	Ghana Meteorological Agency	This Act establishes the Ghana Meteorological Agency, which replaces the Meteorological Services Department. The Agency is to provide meteorological information, advice, and warnings for the benefit of agriculture, civil and military aviation among others	The Project will work closely with the Ghana Meteorological Agency especially in seeking meteorological information and advice for successful project execution.

Legislation	Objective	Implementing Agency	Comment	Relevance to Project
			to mitigate the effects of natural disasters such as floods, storms and droughts on socio-economic development and projects. The Agency is to provide accurate data on climatic data which are relevant for establishing climate change trends.	
Labour Act, 2003 (Act 651)	Promote employer and employee relationships	Ministry of Employment and Labour Relations / Labour Office	Section 9 (c) mandates an employer to take practicable steps to promote worker safety from risk of personal injury or damage to his or her health while lawfully on the employer's premises. Section 68 also stipulates that every worker shall receive equal pay for equal work. Various sections including 14, 63 and 87 makes provisions that bars an employer against discrimination based on gender, colour, race, etc.	Provision of labour requirements for the Project and defends workers' rights against discrimination.
Children's Act 1998, Act 560	Spells out the rights of the child, maintenance and adoption, regulate child labour and apprenticeship, for ancillary matters concerning children generally and to provide for related matters.	Ministry of Gender, Child and Social Protection	Part V of the Act provides prohibition for employment of children (persons below the age of 18 years). Section 93 indicates requirement for engagement of children and young person in industrial undertakings. The Act requires that no person shall engage a child in exploitative labour and labour is exploitative of a child if it deprives the child of its health, education or development.	Project labour recruitment and management of child labour and abuse concerns.
Domestic Violence Act 2007, Act 732	Establishes the Domestic Violence and Victim Support Unit (DOVVSU) of the Ghana Police Service, with the	DOVVSU, Ghana Police Service	Act 732 criminalizes all forms of violence and abuse; and empowers DOVVSU to speedily respond to situations of violence against women and children.	The project will be guided by this Act in reporting and dealing with issues concerning violence against women and children, if any arises.

Legislation	Objective	Implementing Agency	Comment	Relevance to Project
	capacity to oversee matters of domestic abuse against women and children. DOVVSU has a mission to prevent, apprehend and prosecute culprits of domestic violence and child abuse.			

3.4 INTERNATIONAL TREATIES, CONVENTIONS AND PROTOCOLS

Table 3-2 below summarises the international and regional treaties, conventions and protocols to which the Government of Ghana is a signatory and identifies those aspects of the Project where they are relevant.

Table 3-2 International Treaties, Conventions and Protocols Applicable to Project

Treaty/Convention/Protocol	Objective	Relevance to the Project
Convention on Biological Diversity (1992)	Preserving and sustaining biological diversity.	Biodiversity studies and management/preservation.
Convention on Migratory Species of Wild Animals (1983)	An international regime for the protection of migratory animals and their habitats, and the prevention, reduction and control of factors that endanger them.	Biodiversity studies and management of migratory species of wild animals.
The Basal Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (1989)	The Convention directs for the control and transport of hazardous waste and their disposal. It sets in light the proximity principle for managing waste.	Plant and material selection for construction and demolition. Management of hazardous waste and health protection.
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) (1993)	To conserve and protect the wise use of wetlands through local, regional and national actions and international cooperation.	Construction works and operations.
Vienna Convention for the Protection of the Ozone Layer	Protection of the Ozone Layer.	Compliance with standards and protocols.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973)	To enforce that international trade in specimens of wild animals and plants does not threaten their survival.	Biodiversity studies and management.
Stockholm Convention on Persistent Organic Pollutants (POPs) (2004)	A legally binding, international ban on the use and production of a range of persistent organic pollutants (POPs) includes eight organo-chlorine pesticides, two industrial chemicals and two groups of industrial by-products: dioxins and furans.	Waste management.
United Nations Framework Convention on Climate Change (1992)	The reduction of negative changes to the earth's climate, with focus on greenhouse gases. Places focus on industrialised countries to reduce emissions. Developing countries like Ghana are currently exempt from the reduction requirement; however, this may change.	Manage Greenhouse Gas (GHG) emissions associated with the Project.
Convention Concerning the Protection of the World Cultural and Natural Heritage	International Convention to identify and conserve the world's cultural and natural heritage.	Protection of natural heritage and zones of cultural influence within the Project area.

Treaty/Convention/Protocol	Objective	Relevance to the Project
(World Heritage Convention), Paris (1975)		
Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment due to Air Pollution, Noise, and Vibration (ILO No. 148)	The Convention encourages that employers in consultation with their workers understand project hazards related to air pollution, noise pollution, and vibrations.	Project occupational health and safety.
Bamako Convention on the Ban and Import to Africa and the Control of Transboundary Movement and Management of Hazardous Waste (1991)	The Convention, affirming a commitment to address the problem of hazardous wastes in Africa, bans the import into Africa and the control of transboundary movement and management of hazardous wastes within Africa.	Plant and material selection for construction and demolition. Hazardous waste management and health protection.
African Convention on the Conservation of Nature and Natural Resources	The objectives of this Convention are: to enhance environmental protection; to foster the conservation and sustainable use of natural resources; and to harmonize and coordinate policies in these fields with a view to achieving ecologically rational, economically sound and socially acceptable development policies and program.	Biodiversity studies and management of wetlands.
Universal Declaration on Human Rights	The law provides for the promotion of respect for rights and freedoms and for progressive national and international measures to secure the effective recognition and observance among people of signatories themselves and among the territories under their jurisdiction. Key provisions include: Article 19: Everyone has the right to freedom of opinion and expression. Article 20: (1) Everyone has the right to freedom of peaceful assembly and association. (2) No one may be compelled to belong to an association. Article 24: Everyone has the right to rest and leisure, including reasonable limitation of working hours and holidays with pay.	Employment or labour issues and protection of worker welfare.
Arhaus Convention on Public Access to Information and Participation in Decision Making and Access to Justice in Environmental Matters (1998)	Protection of the right of present and future generations to live in an environment adequate to their health and well-being. Each party would promote the rights of access to information, public participation in decision-making and access to justice in environmental matters in accordance with the provision of this Convention.	Enhance Project information disclosure, public consultation and stakeholder engagement for the Project.

3.5 THE WORLD BANK SAFEGUARD POLICIES AND SOCIAL ANALYSIS IN TRANSPORT PROJECTS

3.5.1 THE WORLD BANK SAFEGUARD POLICIES

For this Project, the World Bank is represented as the International Financial Institution (IFI). The Project is therefore committed to meeting the World Bank's OPs which sets out requirements that applies to Borrowers. The World Bank OPs are as listed below:

- OP 4.01 Environmental Assessment;
- OP 4.04 Natural Habitats;
- OP 4.36 Forestry;
- OP 4.09 Pest Management;
- OP 4.11 Physical Cultural Resources;
- OP 4.10 Indigenous Peoples (replaces operational Directive 4.20 on Indigenous People);
- OP 4.12 Involuntary Resettlement;
- OP 4.37 Safety of Dams;
- OP 7.50 Projects in International Waterways; and
- OP 7.60 Projects in Disputed Areas.

The specific OPs applicable to (or triggered by) the Upper West Road Project include OP 4.01, OP 4.04, OP 4.36, OP 4.11 and OP 4.12. Summary of these safeguard policies are presented in Table 3-3.

Table 3-3 Project Triggered or Applicable World Bank Safeguard Policies

Policy	Summary of Core Requirements	Triggered / Applicable
OP 4.01 Environmental Assessment	Screen early for potential impacts and select appropriate instrument to assess, minimize and mitigate potentially adverse impacts. The assessment takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and transboundary and global environmental aspects.	Yes
OP 4.04 Natural Habitats	Do not finance projects that degrade or convert critical habitats. Support projects that affect non-critical habitats only if no alternatives are available and if acceptable mitigation measures are in place.	Yes
OP 4.36 Forestry	Support sustainable and conservation-oriented forestry. Do not finance projects that involve significant conversion or degradation of critical forest areas or critical vegetation.	Yes
OP 4.11 Physical Cultural Resources	Investigate and inventory cultural resources potentially affected. Include mitigation measures when there are adverse impacts on physical cultural resources or avoid if possible.	Yes
OP 4.12 Involuntary Resettlement	Avoid involuntary resettlement or displacement to the extent feasible, or to minimise and mitigate its adverse social and economic impacts. Assist displaced persons in their effort to improve or at least restore their standards of living. Displaced persons should be provided with opportunities for participation in the project and sharing in project profits. Pay compensation for affected assets at replacement cost through an approved RAP.	Yes

3.5.2 THE WORLD BANK GROUP ENVIRONMENTAL, HEALTH AND SAFETY GUIDELINES

The World Bank Group Environmental, Health and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). Industry sector EHS guidelines are designed to be used together with the general EHS guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. The EHS guidelines for toll roads include information relevant to the construction, operation and maintenance, as well as decommissioning of large sealed road projects, including associated bridges and overpasses; while the general guidelines are applicable to facilities or projects that generates emissions to air at any stage of the project lifecycle. The general guidelines provide GIIP advice relating to the following elements, to protect human health and the environment:

- **Environmental**
 - Air Emissions and Ambient Air Quality;
 - Wastewater and Ambient Water Quality;
 - Water Conservation;
 - Hazardous Materials Management;
 - Waste Management;
 - Noise; and
 - Contaminated Land.
- **Occupational Health and Safety**
 - General Facility Design and Operation;
 - Communication and Training;
 - Hazards - Physical, Chemical, Biological and Radiological;
 - PPE Usage; and
 - Monitoring.
- **Community Health and Safety**
 - Water Quality and Availability;
 - Structural Safety of Project Infrastructure
 - Life and Fire Safety;
 - Traffic Safety; and
 - Emergency Preparedness and Response.

The IFC EHS General Guidelines are relevant to the proposed project as they provide applicable GIIP for handling relevant EHS issues. Also relevant is the World Bank's General Environmental Management Conditions for Construction Contracts (See Appendix 1 in Annexure A).

3.5.3 SOCIAL ANALYSIS IN TRANSPORT PROJECTS: GUIDELINES FOR INCORPORATING SOCIAL DIMENSIONS INTO BANK-SUPPORTED PROJECTS, 2006

According to the World Bank's Social Analysis in Transport Projects: Guidelines for Incorporating Social Dimensions into Bank-Supported Projects, social analysis in the World Bank has grown over the years from focusing largely on adverse impacts and compliance with safeguard policies to a more comprehensive framework – a broader focus on opportunities, constraints and risks to development that arise from the social context. Transport is an integral part of any country's economy and assists the poor in gaining access to services and employment opportunities. At the same time, the provision of transport infrastructure often disproportionately affects the poor through unmitigated adverse impacts.

Social analysis in Bank-supported Projects is a tool that enhances the following:

- Assessment of project feasibility
- Understanding the project environment
- Project responsiveness to community needs
- Maximization of project benefits
- Sensitivity to potential project related risks
- Efficiency of project implementation
- Evaluation of project outcomes and impacts

Transport sector covers a wide array of social issues that span products, processes and outcomes. Transport has important linkages with poverty, gender, inclusiveness of the elderly and people with disabilities, HIV/AIDS, access to social services (health, education` market, employment etc.). Transport is integral to the World Bank's mission of poverty reduction. Without good transport, many other sectorial interventions may be ineffective as poor people cannot reach them. Transport concerns differ for rural and the urban poor and also for men, women and children.

In the development and improvement of road infrastructure, it is important to consider the gender characteristics and variations evident in the given locality or project area. The designing and planning of any road infrastructure should allow for inclusions and exclusions of the design that will highlight the unique features of each gender. Thus, the International Forum for Road Transport Development (IFRTD), stipulates that designs created by Engineers should not only take a look at the economic productivity of road infrastructure but must ensure that created works should have a gender dimension to it to increase the socio-economic opportunities of the various groups; particularly women and children.

3.6 GAP ANALYSIS BETWEEN NATIONAL LEGISLATIONS AND WORLD BANK POLICIES / STANDARDS

Generally, there is very little or no gap between the national regulations and World Bank requirements regarding the environmental assessment of road projects of the type as this OPBRC Project as the conduct of an ESIA is a mandatory requirement under both, with the aim of achieving an environmentally and socially sound and sustainable project. However, on the social front and especially in relation to Involuntary Resettlement and Vulnerable Groups, some significant gaps exist between the national regulations and the World Bank Policies.

A summary of the observed gaps is presented in Table 3-4 below and includes a column on measures that will be used to bridge the identified gaps so that the project achieves the highest level possible of environmental and social sustainability, and that PAPs are protected by the highest possible standard.

Where there are differences between the provisions or requirements of the World Bank and the Laws of Ghana, the policy or regulation that guarantees the highest standard of environmental and social protection, as well as addresses the interests of PAPs will be applied under this project.

Table 3-4 Gaps between Ghana Legislation and World Bank Policies / Standards

Topic	Ghana Legislation Requirement	World Bank Requirement	Gap Filling Procedures
Conduct of ESIA	Mandatory	Mandatory	Both national and World Bank requirements will be applied.

Topic	Ghana Legislation Requirement	World Bank Requirement	Gap Filling Procedures
Timing of compensation payment	Prompt	Prior to displacement	Compensation payments are done prior to displacement (or commencement of civil works on the impacted land)
Calculation of compensation	Fair and adequate	Full replacement cost	The Replacement Cost Approach (RCA) will be adopted for the calculation of compensation
Tenants or squatters, including settlers / migrants	No provision. Are deemed not to be eligible	Are to be provided resettlement assistance (but no compensation for land)	Are to be provided resettlement assistance (but no compensation for land).
Resettlement	In the event where inhabitants have to be physically displaced, the State is to resettle them on "suitable land with due regard for their economic well-being and social and cultural values"	Affected people who are physically displaced are to be provided with residential housing, or housing sites, or, as required, agricultural sites at least equivalent to the old site. Preference to be given to land-based resettlement for displaced persons whose livelihoods are land-based	Physically displaced PAPs are to be provided with housing sites at least equivalent to the old site. Preference to be given to land-based resettlement for displaced persons whose livelihoods are land-based (i.e. farmers, etc.). Periodic monitoring is required during project life to ensure that the PAPs have adjusted to their new environment
Resettlement assistance	No specific provision with respect to additional assistance and monitoring	Affected people are to be offered support after displacement, for a transition period	Affected people will be offered resettlement support to cover a transition period.
Vulnerable groups	No specific provision	Particular attention to be paid to vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children	Particular attention to be paid to vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children
Livelihood restoration and assistance	There are no specific laws or regulations specifying support for livelihood restoration and transition and moving allowances.	Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better.	Ghanaian law to align with World Bank policy. Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better.
Information and consultation	The owner/occupier of the land must be formally notified at least a week in advance of the	Displaced persons and their communities are provided timely and relevant information, consulted on resettlement	Displaced persons and their communities will receive timely and relevant information, consulted on resettlement

Topic	Ghana Legislation Requirement	World Bank Requirement	Gap Filling Procedures
	intent to enter, and be given at least 24 hours' notice before actual entry	options, and offered opportunities to participate in planning, implementing, and monitoring resettlement	options, and offered opportunities to participate in planning, implementing, and monitoring resettlement
Grievance	Access to Court of Law	Appropriate and accessible grievance mechanisms to be established	Appropriate and accessible grievance mechanisms established The Grievance Redress Mechanism (GRM) must be accessible, reliable and transparent

4.0 ESIA PROCESS, APPROACH AND METHODOLOGY

This Chapter presents an overview of the process undertaken to complete the ESIA for the Upper West Roads Project. It describes key stages and methodologies adopted to collect baseline environmental and social information and to identify and assess potential significant impacts from the road reconstruction or rehabilitation.

The ESIA process followed the requirements of LI 1652 and the World Bank's Environmental and Social Framework.

Generally, the methodology employed in carrying out the ESIA study included the following:

- Project definition and streamlining of the TOR for the study;
- Literature search for theoretical support and direction. This involved undertaking desktop research to establish an environmental information database for the ESIA. Consulted materials included textbooks, articles, reports, maps, satellite images, photographs, etc. Some relevant documents or literature consulted include:
 - Environmental Assessment Procedures and Guidelines (EPA, 1996)
 - Environmental Assessment Guidelines for the Transport Sector (EPA, 2010)
 - The Rapid Impact Assessment Matrix (RIAM) for EIA (Pastakia and Jensen, 1998)
 - Roads and their Major Ecological Effects (Forman et al., 1998)
 - The Ecological Effects of New Roads - A Literature Review (Spellerberg and Morrison, 1998)
 - Introduction to Environmental Impact Assessment (Glasson et al., 2012)
 - Procedure for Environmental and Social Review of Projects (IFC, 1998)
 - Evaluation of Ecological Impacts from Highway Development (USEPA, 1994)
 - National Biodiversity Strategy for Ghana (MEST, 2002)
- Preliminary screening and gap analysis. A reconnaissance survey was first undertaken to familiarize the ESIA Team with the Project area and to facilitate concept design of field work execution. The field work covered relevant aspects of the bio-physical and socio-economic environment (including preliminary consultations and interaction with stakeholders within selected communities along the road corridor);
- Baseline survey involving field sampling and specialist field studies. This was relevant to verifying and complementing information obtained from literature search or review. This also involved administration of questionnaires, Focus Group Discussions and relevant community and stakeholder interviews;
- Predicting the potential impacts of the Project activities and recommending measures for mitigation of negative impacts and enhancement of positive impacts. This included the incorporation of expert opinions in identify potential environmental impacts and in predicting their significance (empirical worst-case scenario). Specialist consultants who were part of the project team were consulted for their judgement on issues relating to the potential impacts of the Project;
- Development and incorporation of a comprehensive ESMP; and
- Report preparation to World Bank standards with considerations to the environmental and social performance requirements of the ESA for TSIP (MRH, 2017) guideline document.

The process can be broken down into the following key stages:

- Screening and Gap Analysis
- Stakeholder and public engagement;
- Baseline data collection;
- Project description and interaction with design and decision-making;
- Assessment of impacts and identification of mitigation and/or enhancement measures;
- Reporting and disclosure.

The subsequent sections provide further details on how each stage of the ESIA process was applied to the Project.

4.1 SCREENING AND GAP ANALYSIS

Preliminary screening was undertaken to identify important issues to be examined in detail during the impact assessment phase. The screening assessment consisted of initial field observations, initial data collection, familiarization with the physical and biological environment of the Project area and initial assessment of existing human activities and impacts (without project).

The purpose of the screening was to identify key sensitivities and activities with the potential to contribute to or cause potentially significant impacts to environmental and socio-economic receptors and resources, and to evaluate potential alternatives for the Project. The screening was also aimed at obtaining initial high-level stakeholder views through consultation, making sure that the process and output are focused on the key issues.

Subsequent phases of the ESIA process focused on these key issues through the engagement of stakeholders, the collection of information on existing environmental and socio-economic conditions, understanding the impacts, and developing measures to enhance positive impacts or avoid, reduce or remedy negative impacts.

4.2 STAKEHOLDER ENGAGEMENT

The key principle of consultation is for views of stakeholders to be considered and reported in the ESIA. The objective is to make the process or assessment inclusive, robust and transparent, and that it considers the full range of issues or perceptions to an appropriate level of detail.

Stakeholders include those individuals, groups or organizations who themselves could be directly affected by the Project (PAPs). It also includes those individuals or organizations who although not directly affected by the Project, represent those affected or have a regulatory duty, an interest, influence or secondary involvement in the Project (secondary stakeholders).

Stakeholder engagement continued throughout the ESIA process. To allow for legislative requirements and Project standards to be met, stakeholder concerns were incorporated and addressed in the impact assessment process and sources of existing information and expertise were identified and drawn upon. Details on stakeholder consultations, including list of stakeholders consulted, along with a summary of their views and comments on the Project is presented under Chapter 6.0 of this report.

4.3 BASELINE DATA COLLECTION

Environmental and social baseline studies were undertaken for the feeder roads. The baseline studies were undertaken to provide an understanding of prevailing social and environmental conditions, and also to provide a basis for future monitoring of the environmental and social consequences of the Project. The description of the baseline environmental and social conditions provides information on receptors and/or resources that have been identified during screening assessment as having the

potential to be significantly impacted by the Project. It also describes baseline conditions that have been used as basis for the impact assessment phase.

The description of the baseline conditions is aimed at providing sufficient detail to meet the following objectives:

- To identify the key conditions and sensitivities in areas potentially to be impacted by the Project;
- To provide data to aid the prediction and evaluation of potential impacts as a result of the Project;
- To understand stakeholder concerns, perceptions and expectations regarding the Project;
- To allow development of appropriate mitigation and enhancement measures later in the ESIA; and
- To provide a benchmark to assess future changes and to assess the effectiveness of proposed measures.

The feeder roads are already existing roads, as such, for the environmental baseline studies, the focus of specialist investigations was placed on the present terrestrial and aquatic biodiversity (flora and fauna) of the Project area. It is deemed the major potential impact of the road reconstruction or maintenance works will be to the biodiversity composition of the Project area. Ambient noise and air quality baseline data collected from some communities in the region assisted in describing patterns and trends in the environment. The literature reviewed included the District/Municipal Medium-Term Development Plans, among others.

Similarly, studies like geotechnical (soils and materials) investigations and hydrological surveys were covered under separate studies that form part of the scope of the design component of works and details are reported separately in the Design/Geotechnical Investigation Factual Report.

4.3.1 METHODOLOGICAL APPROACH TO ENVIRONMENTAL BASELINE DATA COLLECTION

4.3.1.1 LANDSCAPE AND VISUAL

An initial reconnaissance and roads handover field visit was first undertaken where the Client officially handed over the various roads under the OPBRC Project to the Consultants. Other site visits were then subsequently undertaken by the Consultant as part of various studies conducted. The condition of the feeder roads was assessed and photographs were taken from key visual receptor locations and GPS coordinates taken.

This procedure was undertaken to provide an understanding of the road terrain or landform. Details assessed included topography (defining categories in flat, undulating or hilly areas), road surface type (e.g., gravel or earth), road width and road surface condition (dusty, loss of gravel, erosion, potholes, and rutting or sunken tracks), and drainage issues.

4.3.1.2 TERRESTRIAL AND AQUATIC BIODIVERSITY

Surveys were carried out for floral coverage, fauna and hydrobiology between 8th and 12th April 2019. The terrestrial and aquatic biodiversity baseline study was set out to achieve the following objectives:

- Conduct a natural resource evaluation of the Project corridor of influence using appropriate survey methods;
- Identify flora and fauna (including rare and endangered species, if any) that are native to the Project area and recommend Project compliance with national regulations governing the protection of such biodiversity; and

- Determine the impacts that the Project may have on the existence of these species and develop mitigation and/or enhancement measures or suggest alternatives to the implementation of the Project.

The terrestrial and aquatic biodiversity baseline data collection process included flora and fauna ecological components of land and freshwater resources in the Project area. This involved desktop studies and field sampling. The desktop study involved a review of existing secondary data, including reports of ecological studies conducted in the broader Project area. This helped to obtain a broad understanding of the existing bio-data in the Project area and to identify valuable ecological components (VECs) known or likely to occur. Reference was also made to the following documents:

- Hawthorne, W. (1995). Forest of Ghana Geographic Information Exhibitor Manual. IUCN/ODA/Forest Dept. Republic of Ghana.
- Hutchinson, J. & J.M. Dalziel, (1972). Flora of West Tropical Africa. 2nd edition. Revised by Keay, R.W.J. and F.N. Hepper, Crown Agents, London.
- Arbonnier, M. (2004). Trees, Shrubs and Lianes of West African Dry Zones. CIRAD.
- White, F. (1983). The vegetation of Africa. A Descriptive Memoir to Accompany the UNESCO/AETFAT/UNSO Vegetation Map of Africa. UNESCO. Paris.
- Innes, R. (1977). A Manual of Ghana Grasses. Tolworth Tower, Surbiton, Surrey, Land Resources Division, Ministry of Overseas Development.

The sampling method adopted for the terrestrial biodiversity study was the Rapid Botanic Survey (RBS) plotless sampling techniques, which involved making frequent stops during the drive-through (especially at areas of noticeable unique landscape physiognomies) to take random samples (descriptions) of flora and fauna species encountered, instead of painstakingly walking the entire road link. This methodology was informed by the observed homogeneousness (little diversity) of plant species compositions when the roads were traversed during the initial reconnaissance survey. Sample locations along the road were also selected based on (i) whether the road intersects a river / stream and/or (ii) if the road occurs close to a major town or market town. The vegetation patterns were examined (including at specific locations such as along riverbanks, dams/dugouts, reed swamps, etc.) and remotely sensed imagery support using drone technology (with DJI Mavic 2 Pro Drone) was employed (Figure 4-1).

Specimens of species that could not readily be identified in the field were identified in the Ghana Herbarium. Nomenclature used largely follows Hutchinson and Dalziel (1954-72) with updates from recent taxonomic revisions. A checklist of floral species encountered along the routes traversed was made. A semi-quantitative rating to provide estimate of relative abundance of each type of plant found were assessed using the DAFOR scale where: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare (Morris, 1995). The conservation status of all the species were verified in the International Union for Conservation of Nature (IUCN) Red List.



Figure 4-1 Biodiversity Specialists Operating the DJI Mavic 2 Pro Drone during Baseline Data Collection

Four main methods were used in the faunal survey:

- Direct/opportunistic observation,
- Identification of animal spoors,
- Interviews, and
- Desk surveys of available literature and scientific reports on fauna of the Upper West Region and particularly those relating to the study area. These included:
 - Wechiau Community Hippo Sanctuary (2012); Sheppard et al. (2010); Borrow and Domey (2010); IUCN Red List of Threatened Species (2018 Version 2); Hughes and Barry (1969); Serle et al. (1992); Delany Happold (1979); Kingdom (1987); Hughes (1988); Haltenorth and Diller (1988); and Larsen (1994).

Direct/opportunistic observation involved recording any animal sightings or animal trails while driving or walking within the project area. Birds were surveyed using a pair of binoculars (Bushnell H20 8 x 42 mm Roof Prism, Bushnell Performance Optics Company, China). Bird names followed Borrow and Demey (2010). Transect walks to spot animal spoors (any sign left by a living animal, such as feeding sites, regular pathways, tracks, footprints, faecal pellets, nests, etc.) were also undertaken.

Some individuals in villages within the project area were also interviewed to gather information about the fauna of the area (Figure 4-2). The interviews focused mainly on the various animals that commonly occurred in the area and their relative abundance. All interviews were conducted in English with the support of translator who speaks the Dagaare and Sisaala languages. Thus, the local names of the animals were translated into English by the assistant when the interviewees do not know the English name of the species. Animal parts such as jaws, horns, etc., kept by hunters as trophies were also looked out for in the communities.



Figure 4-2 Interview of Locals to Gather Information on Terrestrial and Aquatic Fauna

Similarly, the aquatic biodiversity study employed purposive sampling methodology whereby focus was restricted to perennial waterbodies encountered. On a drive along the stretch, a stop was made at waterbodies within 100 m of the road and water quality samples and in-situ readings were taken at some locations using a test kit (Figure 4-3). The in-situ water quality analysis was conducted with a Horiba U-50 multiparameter water quality checker. Water samples obtained were collected with a pre-cleaned water sample bottle, kept in a cooler with ice packs at approximately 4°C and transferred to the Department of Marine and Fisheries Sciences Laboratory of the University of Ghana for further analysis. The parameters analysed in-situ were water temperature, pH, dissolved oxygen, turbidity, total dissolved solids and conductivity. Laboratory analyses were conducted for nitrates, ammonia, phosphates, silicates, sulphates, magnesium and calcium.

At each waterbody or water source, a GPS location was taken and a visual assessment (types and abundance of species) made of typical aquatic biota (plant and animal life), in addition to noting the conditions of the habitat. Some key informants found in the vicinity of the waterbodies were interviewed to provide local information on species diversity and abundance within the waterbodies.

A desktop study was also conducted into water quality and aquatic biota for the study area. Literature sources used for the study included Abban et al. (1995), Abban et al. (2002), Abobi et al. (2015), Amevenku and Quarcoopome (2006), Dankwa et al. (1999), Kpieta and Laari (2014), Alhassan (2014), Alhassan and Ofori-Danson (2016), Alhassan et al. (2016), among others.



Figure 4-3 Aquatic Baseline Studies and Water Quality Sampling

4.3.2 METHODOLOGICAL APPROACH TO SOCIAL BASELINE DATA COLLECTION

The social baseline draws on a range of primary data collected for the ESIA, and publicly available secondary data. To provide further background to the baseline, some of the information gathered was presented within the national, regional and district framework or context.

The social baseline study was undertaken to achieve the following objectives:

- Determine if the Project area as a whole is of a higher special interest to the community, including but not limited to cultural, religious, and aesthetic use or value and for which reason there may be potential of conflicts arising due to the Project;
- Identify and report areas of conflict where resources use between the Project and the public may overlap and recommend effective measures to mitigate such conflicts;
- Identify feasible employment opportunities on the Project for residents, as well as identify PAPs;
- Conduct a Social Impact Assessment, including gender analysis and Citizen Engagement Assessment (CEA) and highlighting major risks or impacts to public health and safety attributable to the road Project;
- Present data gathered on the Project risks or impacts both qualitatively and quantitatively, along with relevant mitigation and enhancement measures or alternatives; and
- Propose contingency plans, including RAP to govern the construction and operation of the Project and to address issues or incidents that may occur, e.g., physical injury to workers, displacement of people and compensation issues.

A combination of methodologies was utilized to collect both quantitative and qualitative socio-economic data and included:

- Review of relevant secondary data;
- Household questionnaire survey;
- Key Informant Interviews (KII) with various stakeholders such as the District Assemblies, government regulatory agencies and professional bodies, as well as community opinion leaders;
- Focus Group Discussions (FGD) with residents or communities along the roads;
- Participatory Appraisal (PA) techniques used during FGD, including community mapping;
- Drive-through and walkover field surveys or observations; and
- Examination of satellite imagery to identify areas of sensitivity.

Some highlights on the study methodology are presented below and further details on the baseline information or data gathered are presented in Chapter 5.0 of this report.

4.3.2.1 PRE-TESTING OF QUESTIONNAIRE

A questionnaire pre-testing schedule (or pilot) was undertaken on 16th May, 2019 to assess respondents' understanding and answering of questions and increase the validity and reliability of the survey. The pilot comprised a team of two (2) Enumerators and two (2) locally engaged Field Assistants who assisted with interpretation into the local language. A total of eight (8) farmers were interviewed. The pilot provided the team with an initial bird's eye view of the terrain and confirmed the accuracy of the questions asked. It also helped the Field Assistants appreciate the precision needed in the interpretation, as well as managing time per respondent. Figure 4-4 shows the pre-testing training with the field team.



Figure 4-4 Training / Induction of Field Assistants (Left) and Core Team Briefing (Right)

4.3.2.2 DATA COLLECTION

The key instrument for primary data collection was direct questionnaire administration to residents living along the selected road networks (Figure 4-5). In all, a total of two hundred and eighty-one (281) households living in thirty-two (32) communities situated along the road networks (within 1km) in the three (3) municipalities / districts were interviewed. A total sample size of three hundred and twenty (320), representing ten (10) households each from thirty-two (32) out of fifty-four (54) communities identified along the road network were initially targeted as the zone of influence for the study. However, as a result of scheduling difficulties, the 281 households were the ones interviewed and reported on. Out of this number, 73.7% of the respondents made up of two hundred and seven (207) were males and seventy-seven (74) representing 26.3% of the respondents were females. About 64.1% of the respondents are household heads whereas the remaining are relations of the household head, and only 26.1% of the household heads are females with majority (73.9%) being males. The basis for sampling was proximity of community to a project road and availability of household head or representative for the questionnaire administration. The selection of the households was done randomly.

Through the instrumentation of unstructured interviewing, i.e., Key Person Interviews (KPI) and FGD, consultations were also held with individuals and team of officials in both public and non-public sector institutions. This included a meeting with the Coordinating Director of the Regional Coordinating Council (RCC) to introduce the purpose of the study and also obtain his opinion or concerns about the project. Some opinion leaders in the communities were also consulted.



Figure 4-5 Household Questionnaire Administration (Left) and Key Informant Interview with Assemblywoman of Nyoli (Right)

4.3.2.3 DATA COLLATION AND ANALYSIS

Data collation of qualitative data was manually put together, while quantitative data was collected and processed with computer-based software programs such as Statistical Package for Social Scientists (SPSS), Stata and Microsoft Excel. All data gathered were disaggregated by sex. The collation and analysis concentrated on the following, as a minimum:

- Bio-data of household representatives;
- Occupations, incomes and expenditure;
- Mode of transport and frequency of use of the project roads; and
- Expected impacts and mitigation measures.

4.4 IMPACT ASSESSMENT AND PROPOSITION OF MITIGATION OR ENHANCEMENT MEASURES

The impact assessment stage comprised several steps that collectively assessed the way the Project will interact with elements of the bio-physical and socio-economic environment, and potentially impact them. The potential impacts of the road development were identified by superimposing Project elements onto the existing social and environmental baseline conditions. A checklist method was used to identify the impacts and recommend mitigation and/or enhancement measures.

The steps involved in the impact assessment stage are described in greater detail in the subsequent sections.

4.4.1 OVERVIEW

The purpose of the impact assessment is to identify and evaluate the likely significance of potential impacts on identified receptors and resources according to defined assessment criteria, to propose mitigation or enhancement measures, and to report the significance of the residual impacts that may remain following mitigation.

The adequate assessment of potential impacts (positive or negative) from the Project necessitates the development of a scientific method that will reduce the subjectivity involved in making such evaluations.

From experience, Knight Piésold uses a simple, clearly defined method to accurately determine the significance of the predicted impacts on the surrounding natural and/or social environment.

Nonetheless, an impact assessment will usually contain a degree of subjectivity, as it is based on the value judgement of Specialists and Environmental Assessment Practitioners. The evaluation of significance is thus contingent upon values, professional judgement, and dependent upon the specific environment or community context. Ultimately, impact significance involves a process of determining the acceptability of a predicted impact to society.

4.4.2 DEFINING THE NATURE OF THE IMPACT

An impact is essentially any change to a resource or receptor brought about by the presence of the Project component or by the execution of a Project related activity. The terminology used in this report to define the nature of an impact is presented in Table 4-1 below.

Table 4-1 Impact Description

Terminology	Definition
Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Negative	An impact that is considered to represent an adverse change from the baseline or introduces a new undesirable factor.
Direct impact	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (e.g., between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality).
Indirect impact	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g., in-migration for employment placing a demand on resources).
Cumulative impact	Impacts that act together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and/or receptors as the Project.

4.4.3 ASSESSING SIGNIFICANCE

The Knight Piésold impact significance rating system is based on the following equation:

$$\text{Significance of Environmental/Social Impact} = \text{Consequence} \times \text{Probability}$$

The consequence of the impact is derived from the following factors:

- **Severity / magnitude**- the degree of change brought about in the environment;
- **Reversibility** - the ability of the receptor to recover after an impact has occurred;
- **Duration** - how long the impact may be prevalent; and
- **Spatial extent** - the physical area which could be affected by an impact.

The severity, reversibility, duration, and spatial extent are ranked using the criteria indicated in Table 4-2 and then the **overall consequence** is determined by adding up the individual scores and multiplying it by the **overall probability** (the likelihood of such an impact occurring). Once a score has been determined, this is checked against the **significance** descriptions indicated in Table 4-3.

Once the significance of the impact has been determined, it is important to qualify the **degree of confidence** in the assessment. Confidence in the prediction is associated with uncertainties, for

example, where information is insufficient to assess the impact. Degree of confidence can be expressed as low, medium or high.

It should be noted that significance can be determined also based on regulations, standards, guidelines, norms, etc., which may need to be taken care of in assessment methods. The significance rating adopted for assessing impacts in this report does not explicitly incorporate a legal or regulatory constant in its rating process. However, it is expected that environmentally sensitive areas backed by legislations, guidelines and norms (e.g., areas marked by law as environmentally sensitive areas per schedules 5 of LI 1652) will by their nature have very high significance rating based on the combined effect of the criteria incorporated in the equation. In such instances, they will receive higher scores, hence a resultant high overall significance.

Table 4-2 Ranking Criteria

Severity / Magnitude (M)	Reversibility (R)	Duration (D)	Spatial extent (S)	Probability (P)
5 – Very high – The impact causes the characteristics of the receiving environment/ social receptor to be altered by a factor of 80 – 100 %	5 – Irreversible <u>Environmental</u> - where natural functions or ecological processes are altered to the extent that it will permanently cease. <u>Social</u> - Those affected will not be able to adapt to changes and continue to maintain pre-impact livelihoods.	5 – Permanent - Impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of ecological habitat) that endures substantially beyond the Project lifetime.	5 – International - Impacts that affect internationally important resources such as areas protected by international conventions, international waters etc.	5 – Certain/Definite - The impact will occur with 80 – 100 % certainty.
4 – High – The impact alters the characteristics of the receiving environment/ social receptor by a factor of 60 – 79 %		4 – Long term - impacts that will continue for the life of the Project but ceases when the Project stops operating (16 – 30 years).	4 – National - Impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences.	4 – High probability – There is a 60 – 79 % likelihood that the impact will occur.
3 – Moderate – The impact alters the characteristics of the receiving environment/ social receptor by a factor of 40 – 59 %	3 – Recoverable <u>Environmental</u> - where the affected environment is altered but natural functions and ecological processes may continue or recover with human input. <u>Social</u> - Able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support or intervention.	3 – Medium term - Impacts are predicted to be of medium duration (5 – 15 years).	3 – Regional - Impacts that affect regionally important environmental resources or are experienced at a district to regional scale as determined by administrative boundaries, habitat type/ecosystem.	3 – Medium probability – There is a 40 – 59 % likelihood that the impact will occur.
2 – Low – The impact alters the characteristics of the receiving environment/ social receptor by a factor of 20 – 39 %		2 – Short term - Impacts are predicted to be of short duration (less than 5 years).	2 – Local - Impacts that affect an area in a radius within 5 km around the site.	2 – Low probability – There is a 20 – 39 % likelihood that the impact will occur.

Severity / Magnitude (M)	Reversibility (R)	Duration (D)	Spatial extent (S)	Probability (P)
1 – Minor – The impact causes very little change to the characteristics of the receiving environment/ social receptor and the alteration is less than 20 %	1 – Reversible <u>Environmental</u> - The impact affects the environment in such a way that natural functions and ecological processes are able to regenerate naturally. <u>Social</u> - People/ communities are able to adapt with relative ease and maintain pre-impact livelihoods.	1 – Temporary - Impacts are predicted to be intermittent/ occasional.	1 – Site only - Impacts that are limited to the site boundaries within a kilometre radius of the site.	1 – Improbable – There is less than 20 % likelihood that the impact will occur

Table 4-3 Significance Definitions

Score According to Impact Assessment Matrix	Significance Definitions	Colour Scale Ratings	
		Negative Ratings	Positive Ratings
Less than 25 significance points indicate Negligible Significance	An impact of negligible significance is where a resource or receptor 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 levels.	Negligible	Negligible
Between 26 and 49 significance points indicate Low Significance	An impact of low significance is one where an effect will be experienced, but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value.	Low	Low
Between 50 and 75 significance points indicate Moderate Significance	An impact of moderate significance is one within accepted limits and standards. The impact on the receptor will be noticeable and the normal functioning is altered, but the baseline condition prevails, albeit in a modified state. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is As Low as Reasonably Practicable (ALARP). This does not necessarily mean that “moderate” impacts have to be reduced to “low” impacts, but that moderate impacts are being managed effectively and efficiently to not exceed accepted standards.	Moderate	Moderate
	An impact of high significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An impact with high significance will completely modify the baseline conditions. A goal of the EIA	High	High

Score According to Impact Assessment Matrix	Significance Definitions	Colour Scale Ratings	
		Negative Ratings	Positive Ratings
76 to 100 significance points indicate High Significance	process is to get to a position where the Project does not have any high negative residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be high residual impacts after all practicable mitigation options have been exhausted (i.e., ALARP has been applied). An example might be the visual impact of a development. It is then the function of regulators and stakeholders to weigh such negative factors against the positive factors, such as employment, in coming to a decision on the Project.		

4.4.4 PROPOSITION OF MEASURES AND ASSESSING RESIDUAL IMPACTS

For identified significant impacts, the Project team has identified suitable and practical mitigation and/or enhancement measures that are implementable. These measures will be incorporated into the Project design in order to avoid or reduce the negative impacts or enhance the positive impacts. A description of the proposed mitigation and enhancement measures has also been included in the ESMP that has been developed for the project, and included as an integral part of this ESIA report (See ESMP overview in Chapter 1.0 and the detailed plan in Annexure C).

Residual impacts are those impacts which remain after the mitigation measures have been designed and applied. Once the mitigation is applied, each impact is re-evaluated (assuming the mitigation measure is effectively applied) and any remaining impact is rated again using the process outlined in Section 4.4.3. The result is a significance rating for the residual impact.

4.5 INTERACTION WITH DESIGN AND DECISION MAKING

The interaction between the ESIA team and the design and decision-making process is one of the key areas in which an ESIA can influence how a project develops. It includes involvement in defining the Project and identifying those activities with the potential to cause environmental and socio-economic impacts. Project planning, decision-making and refinement of the Project description continue throughout the assessment process and in response to identified impacts.

During the ESIA process, there was liaison between relevant parties, including UWP, MRH, GHA, DFR, and other institutions regarding identifying alternatives, impacts and potential mitigation or enhancement measures. This included meetings to identify risks as early as possible in the planning process and a review of proposed conceptual engineering designs aspects, as and when information becomes available. The completed ESIA and proposed measures will also feed into the final designs as the Project progresses towards construction.

4.6 CHANCE FIND PROCEDURE

A chance find procedure is a project-specific procedure that outlines the actions to be taken if previously unknown cultural heritage is encountered. The possibility of chance finds cannot be underestimated because the Project will involve earthworks and excavations. There is the possibility of encountering family or clan graveyards, shrines, sacred groves and artefacts of cultural or religious significance. Also, the chance find procedure applies to cultural heritage regardless of whether or not it has been legally protected or previously disturbed.

The following steps are proposed to be followed in the event of a chance find during construction, in line with the requirements of the World Bank's OP 4.11 (see Section 3.5.1) and the GMBB's Code of Protection of Cultural and Heritage Resources (see Section 3.1.12):

- Construction works should immediately cease along that section and the area appropriately delineated.
- GPS coordinates of the chance find should be taken and the area or spot identified with a flagging tape.
- The discovery or chance find should then be reported immediately to the Supervising Engineer or whoever is in charge of the site.

- The nearest authority on the road link (potentially the nearest District Assembly) should be immediately informed about the find and the actions taken for them to contact the appropriate higher authorities such as the GMMB or take appropriate decision on the way forward. For the Upper West Region, there is a regional office of the Monuments Division of GMMB in Wa, that should be contacted.
- In the event that the chance find is human remains, the nearest Police Station should also be informed to prepare the human remains for forensics examination.
- In the case of removable antiquities or sensitive remains, a night guard should be arranged until the responsible local authorities and/or personnel of the GMMB take over.
- Cooperate with the responsible agencies to remove the find from the Project area.
- Seek the advice of the responsible agencies (i.e., the Police, District Assembly and/or GMMB) on the recovery, packaging and labelling of the find for transfer to the National Museum or other alternative location at the choosing of the responsible authorities.
- If the chance find is found to be an irremovable remain of cultural or archaeological importance needing conservation, preservation, restoration and/or salvage, or the site found to be of high value needing any of the above actions per the professional judgement of the relevant authorities, necessary design changes would need to be made to accommodate the request and preserve the site.
- Construction work may resume only after permission is given from the responsible authorities concerning safeguard of the heritage.

5.0 ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE

This Chapter provides baseline descriptions of the physical and biological environment of the Upper West Package 1 roads corridor, as well as socio-economic baseline conditions.

The environmental baseline for the road package has been established through specialist surveys and reference to available secondary literature, as well as some information obtained through interviews with key informants. Information from literature review was captured for the wider Project area to make up for unavailable information specific to the road servitude under study. The baseline environmental conditions of the Project area were determined not only to provide an understanding of prevailing environmental conditions but also to provide a basis for future monitoring of the environmental implications of the Project.

The socio-economic baseline assessment examines the broader economic and social context at the district level but also looks in detail at the way in which communities, households and individuals may be affected by the project where they currently live. To provide a context to the potentially impacted area, the social baseline includes data presented at the district level. This socio-economic baseline study sought to:

- Understand the existing socio-economic context of the project and provide a benchmark of pre-project conditions to help predict project-induced changes and inform impact predictions (positive and negative);
- Provide a basis for monitoring to evaluate actual residual impacts and the success of proposed mitigation and enhancement measures following implementation;
- Provide comparative data, so that the project affected areas can be compared to national and regional/district indicators;
- Understand the existing socio-economic development context in the project area and the extent to which the project supports and is aligned with local development objectives, if applicable;
- Identify individual stakeholders and stakeholder organizations that may have roles and responsibilities regarding implementation of the project (e.g., local administrators, politicians and development NGOs) or that are generally affected by the project; and
- Provide a context for understanding feedback and perceptions from stakeholders, specifically verifying what is reported by stakeholders and to understand the differences between stakeholders' perceptions of impacts and actual impacts.

5.1 SOURCE OF DATA AND INFORMATION

Primary and secondary data collection were appropriate means to gather baseline information on the Project road networks. Primary environmental baseline data collection involved undertaking ecological field studies for terrestrial and aquatic flora and fauna characterisation. Primary socio-economic baseline data collection involved undertaking community and household surveys, through administration of questionnaires, official consultations and focus group discussion with identified key informants. Recruitment and training of local enumerators for the household data collection was undertaken to eliminate language barriers and also to engage the locals at the various levels to become part of the project and to start benefitting financially.

Some baseline information on the physical and socio-economic environment or conditions of the Project area were obtained through review of secondary literature. Secondary data was obtained from various

project background documents, including MMDAs analytical reports and from the Internet. The Ghana Statistical Service (GSS) website and the Government dedicated website (www.ghanadistricts.com) were also referred to in providing up to date information. The information gathered from these sources were relevant in defining the general environmental and social settings of the Project area. Other documents (resources) reviewed included;

- District Analytical Report of the 2010 Population and Housing Census
- Wa Municipal Medium-Term Development Plan (MTDP) 2018 – 2021
- Wa West District Assembly Medium-Term Development Plan 2018 – 2021
- Nadowli-Kaleo District Assembly Medium-Term Development Plan 2018 – 2021
- Ghana Living Standards Survey (GLSS), Round 6 (GLSS 6)
- The World Bank Policy on Environmental Assessment (OP/BP 4.01), including Public Consultation and Disclosure
- The World Bank Policy on Involuntary Resettlement (OP/BP 4.12)
- The World Bank Policy on Physical Cultural Resources (OP/BP 4.11)
- Social Analysis in Transport Projects: Guidelines for Incorporating Social Dimensions into Bank Supported Projects
- Environmental and Social Assessment for Transport Sector Improvement Project, 2017
- Environmental and Social Management Framework for the Transport Sector, 2017
- Resettlement Policy Framework for the Road / Transport Sector, 2017
- The International Finance Corporation's Guidance Notes: Performance Standards on Environmental and Social Sustainability
- Rainfall Intensity Duration Frequency Curves (IDF), Ghana Metrological Agency (Updated under the Transport Sector Improvement Project)

Data from the social survey conducted are presented below in Section 5.4. Additional details, including questionnaires / survey instruments and list of stakeholders consulted are presented in Annexure B. Consent was obtained from the respondents in relation to all the data or information they provided.

5.2 PHYSICAL ENVIRONMENT

5.2.1 LOCATION, TOPOGRAPHY AND DRAINAGE

The project is located in the far north-west corner of Ghana, entirely in the Upper West Region. Both to the north as well as to the west, the project area is bordered by Burkina Faso. The entire project area has a plain landscape with rolling and undulating land surface. The average height of the plain ranges between 200m and 350m above sea level from the ridge that stretches from Wa in the south to the Burkina Faso border in the north and that forms the watershed between the Black Volta in the west and the Kulpawn river and White Volta in the East. The Volta River, with a catchment area (within Ghana) of nearly 70% of the country, is by far the largest river draining the entire project area. The major sub-basins of the Volta include the Black and White Volta Rivers, the Oti River and the Lower Volta, including Lake Volta. The Volta River basin is shared with Cote d'Ivoire, Burkina Faso, Togo, Benin and Mali.

Specifically, the Wa Municipality and Wa West District lays in the Savannah high plains, which generally, is gently undulating with an average height between 160 m and 300m above sea level. Low lying areas are found in the following localities; Charia, Zingu, Kperisi to the north and Piisi, Dapouha, Boli, Sing, Biihe and Busa to the south. Valleys in the low-lying areas collect and retain water over long period during the rainy season. The main drainage systems are the Sing-Bakpong and its tributaries to the south and Billi and its tributaries to the north. The streams are seasonal and thus dry up during the long dry season thereby reducing availability of water for agriculture and other uses such as domestic, industrial and construction. The Nadowli-Kaleo district is also low lying but gently undulating at altitudes

ranging between 150m-300m above sea level, though some parts average 600m. There is one major stream, the Bakpong and several ephemeral streams, which flow into the Black Volta.

Generally, the poor road and track conditions in the project area are a result of inadequate drainage or no provision for drainage at all. Drainage condition along the roads affect their passability. In terms of passability, the project roads were categorized as either A (impassable all year road), B (impassable part of the year) or C (passable). A road was categorized as impassable all year (Category A) when the route includes a river crossing, but without a facility (bridge or major culvert) for vehicles to cross the river.

5.2.2 GEOLOGY AND SOILS

Underlying the Wa Municipal and Wa West District are predominantly Pre-Cambrian, granite and metamorphic rocks that have seen lesser weathering than similar rock types elsewhere in the country due to low rainfall, high evapo-transpiration and less vegetation. Nevertheless, sourcing water from boreholes has been successful because the rocks have well-developed fracture systems. This situation has created the opportunity for the development of a quarry on the Wa - Busa road. There are two main types of soil, the laterite and the savannah ochrosols. The others are clay found in the Charia community which is famous for pottery and sand found in Nakore. The laterite soil occurs abundantly and is excavated for roads and housing construction. The savannah ochrosols on the other hand are shallow but support the growth of a variety of crops including millet, sorghum, soya beans, groundnuts, rice and yams. underlain

Three main types of rocks underlie the Nadowli-Kaleo District; these are Birimian and Granite to the west and some parts of the east, and basement complex to the east. These rocks also hold a considerable quantity of water, which can readily be developed for use by drilling of boreholes and sinking of wells. The soil types are laterite, sandy and sandy loam (savanna ochrosols). They are generally poor in organic matter and nutrients as a result of the absence of a dense vegetative cover, a situation largely caused by bush burning, overgrazing, protracted erosion and poor farming practices.

The geological map for Package 1 is shown in Figure 5-1 and the and the classification of materials along the route is provided in Table 5-1.

Table 5-1 Classification of the Materials along the Route for Package 1

Age	Supergroup	Subgroup	Description
Mesozoic	-	-	msd : Mafic dyke, dolerite (may include pre-Mesozoic dykes, may be concealed by Voltaian cover).
Paleoproterozoic	Eburnean Plutonic Suite	-	gsht : Hornblende-biotite tonalite, minor granodiorite, minor quartz diorite.
Paleoproterozoic	Eburnean Plutonic Suite	-	gsh : Hornblende-biotite granitoid, undifferentiated.
Paleoproterozoic	'Tamnean' Plutonic Suite	-	tmbz : Biotite-hornblende (monzo)granite, quartz monzodiorite and monzodiorite.
Paleoproterozoic	Birimian Supergroup	Birimian Protoliths	bmbt : Biotite schist

Age	Supergroup	Subgroup	Description
Paleoproterozoic	Birimian Supergroup	Volcano-Plutonic Group	bvm : Basaltic flow, subvolcanic rock and minor interbedded volcaniclastics.
Paleoproterozoic	Birimian Supergroup	Volcano-Plutonic Group	bvc : Undifferentiated volcaniclastics, spatially associated and interbedded with flow rock.
Paleoproterozoic	Birimian Supergroup	Volcano-Sedimentary Group	bs : Sediment/ volcaniclastic sediment, undifferentiated, locally mica schist.

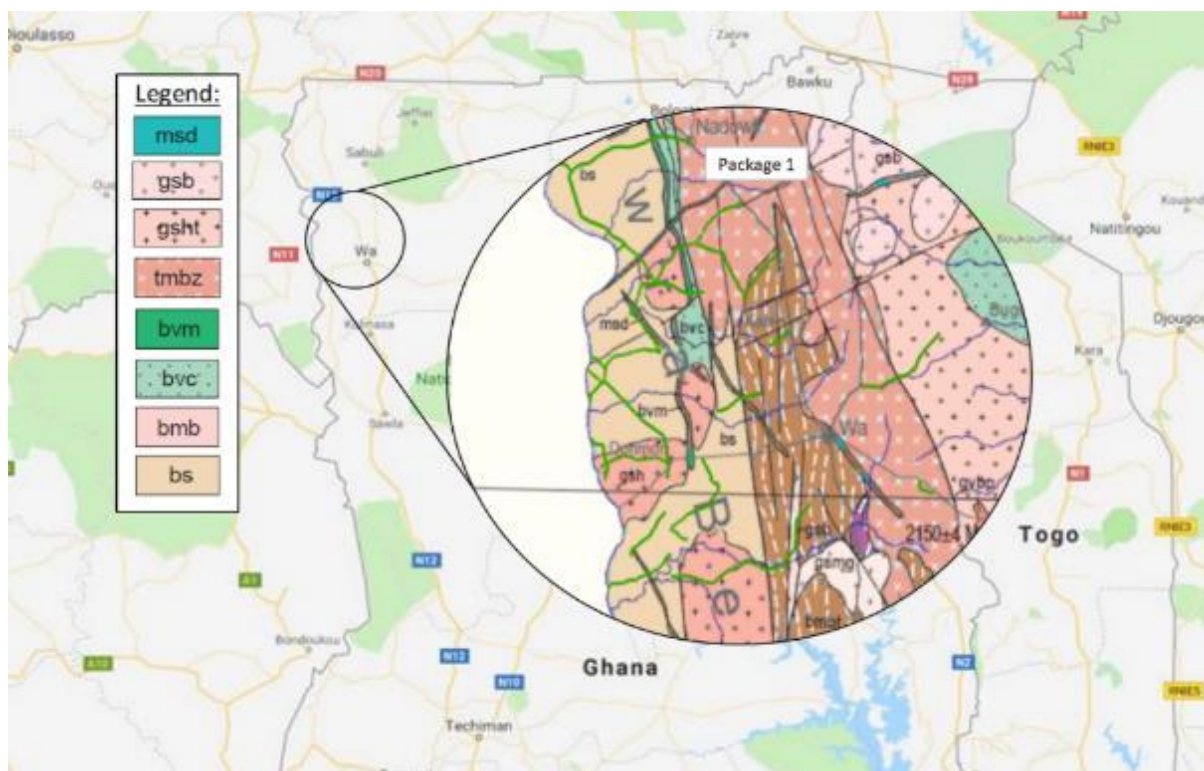


Figure 5-1 Geological Map Extract (1: 1000,000 Ghana) for Package 1

5.2.3 CLIMATE

The project area has two marked seasons, namely, the wet and dry seasons. The South-Western Monsoon winds from the Atlantic Ocean bring rains between April and October, while the North-Eastern Trade winds from the Sahara Desert bring the long dry season between November and March. The mean annual rainfall varies between 840mm and 1400mm. Most of the rainfall occurs between June and September with its peak in August and it is not unusual to have very high rainfall figures concentrated in a few rainy days. One feature of the rainfall pattern is that it tends to occur in heavy downpours thus, that encourages run-off rather than soil moisture retention. The rainfall pattern is irregular and unreliable. Sometimes, it results as long period of no rain during the farming season which affects harvest.

The project area has a mean annual temperature of 32°C and a mean monthly temperature ranging between 36°C in March to 27°C in August. Relative humidity is between 70 and 90 percent during the rainy season but is as low as 20 percent during the long dry season. Project specific areas experience maximum average annual temperature within the range of 32 to 35 °C and minimum average annual temperatures typically within the range of 22 to 25 °C. Areas around Nandom, Lawra and Lambusie Karni Districts experience average annual minimum temperature of about 25 °C and average annual maximum temperature of about 35 °C, while areas within Wa Municipal, Nadowli-Kaleo and Wa West Districts experience annual minimum of about 22 °C and annual maximum temperature of about 33 °C. Jirapa and Daffiama Bussie areas have an average annual minimum temperature of about 23 °C and average annual maximum temperature of about 34 °C.

Rainfall and temperature data were also obtained from the Ghana Meteorological Agency. The rainfall data obtained has a virtually complete record for a minimum period of 13 years at the Kaleo weather station, 15 years at the Lawra weather station, and 17 years at the Wa weather station. All these three stations have records for rainfall data as daily precipitation for their respective record periods. The available recorded temperature data for the project area obtained from the Ghana Meteorological Agency was for only Wa and is presented as monthly average minimums and maximums from 1998 to 2016. Analysis of rainfall records from the Ghana Meteorological Agency shows that the maximum average monthly rainfall ranges between 227mm (Kaleo and Wa) and 264mm (Lawra), and occurs in the month of August across all the recording stations. The average annual rainfall over the period for which data was collected is as follows for the three stations: 942mm (Kaleo), 818mm (Lawra) and 1040mm (Wa).

Further reference can be made to the detailed climate assessment study conducted as part of the Project and incorporated into the overall OPBRC Assessment Study Report (UWP, 2020) submitted under a separate cover.

5.2.3.1 HISTORIC AND CURRENT CLIMATE TRENDS

Overall temperature patterns of the Upper West Region reveal that there was an increase of average annual temperature from 1990 to 2009, of 0.4°C (Subaar et al., 2018). The extreme heat events are high throughout the region, as indicative of increasing temperatures. Climate trends also show that there has been an increase in the number of hot days and hot nights between 1961 and 2003, and this trend will likely continue in the coming years (Marke, 2013). A small increase in mean temperature observed for the Upper West region indicates that between 1900-1909 temperatures were 27.67°C, between 2005 and 2014 temperatures were 28.4°C, indicating that there was an increase of 0.37°C (Assam et al., 2018). These findings by Assam et al. (2018) are similar to the research by Subaar et al. (2018) which portrayed that the year 2001 was recorded as one with the highest annual mean temperature of 29.2°C. Extreme heat conditions are likely to result in heat stress and other impacts on road infrastructure at least once in the next five years. Figure 5-2 portrays that the entire Upper West Region is subject to high risk of heat events. The extreme heat hazard for the Upper West Region is classified as high. Prolonged exposure to heat, resulting in heat stress, is expected to occur once every five years.

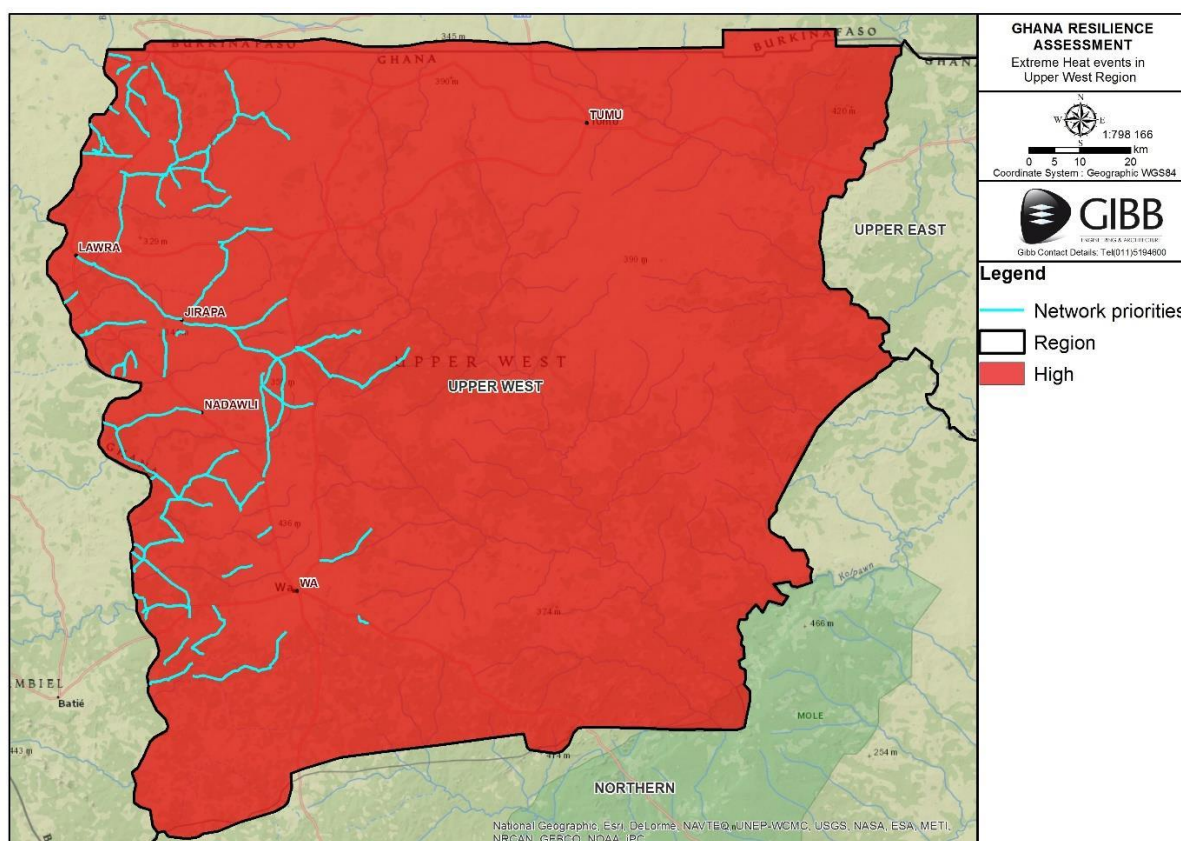


Figure 5-2 Extreme Heat Risk Events in the Upper West Region for the Next Five Years (2020-2025) [Adapted from Think Hazard, 2019]

The climate of the Upper West Region is characterised as a semi-arid area with mean annual rainfall between 700-1200mm. Rainfall occurs during a seven-month season from April to October (Blench, 2006). The Upper West region experiences the hottest temperatures, and low rainfall (Marke, 2013). The Upper West region is experiencing increasing changes in climate, particularly for rainfall patterns which affect the quantity and quality of water for domestic and agricultural purposes (Zulfawu, 2017).

Recent research undertaken by Assam et al. (2018) indicated historical patterns of rainfall measured for the years 1900-1909, which indicated the mean rainfall to have declined from 1122mm to 1068mm. The Upper West Region has experienced significant increases in rainfall variability and decreases in total rainfall in all the districts (Assam et al., 2018). Research undertaken by Subaar et al. (2018) revealed that the annual average rainfall distribution of the Upper West Region, specifically the capital of Wa Metropolitan showed that in the two decades (1990-2009), the lowest minimum annual rainfall measured, was in 1998, which was 63.94mm; the highest annual average was measured in 2001, which was 116.15mm. This indicates that there has been an increase in total annual rainfall within the first decade (Subaar et al., 2018).

River floods are classified as high-low in the Upper West Region (Figure 5-3). Areas in the Upper West Region, particularly the Lawra District as shown on the map remains particularly vulnerable to flood risks. This region has experienced periodic and devastating flash floods from high-intensity short rainfall duration (Twumasi et al., 2014). The risk of river flooding varies from low to high across different parts of the region. Flooding within the area is likely to occur at least once in the next ten years resulting in damage to infrastructure such as roads, especially roads situated adjacent to rivers.

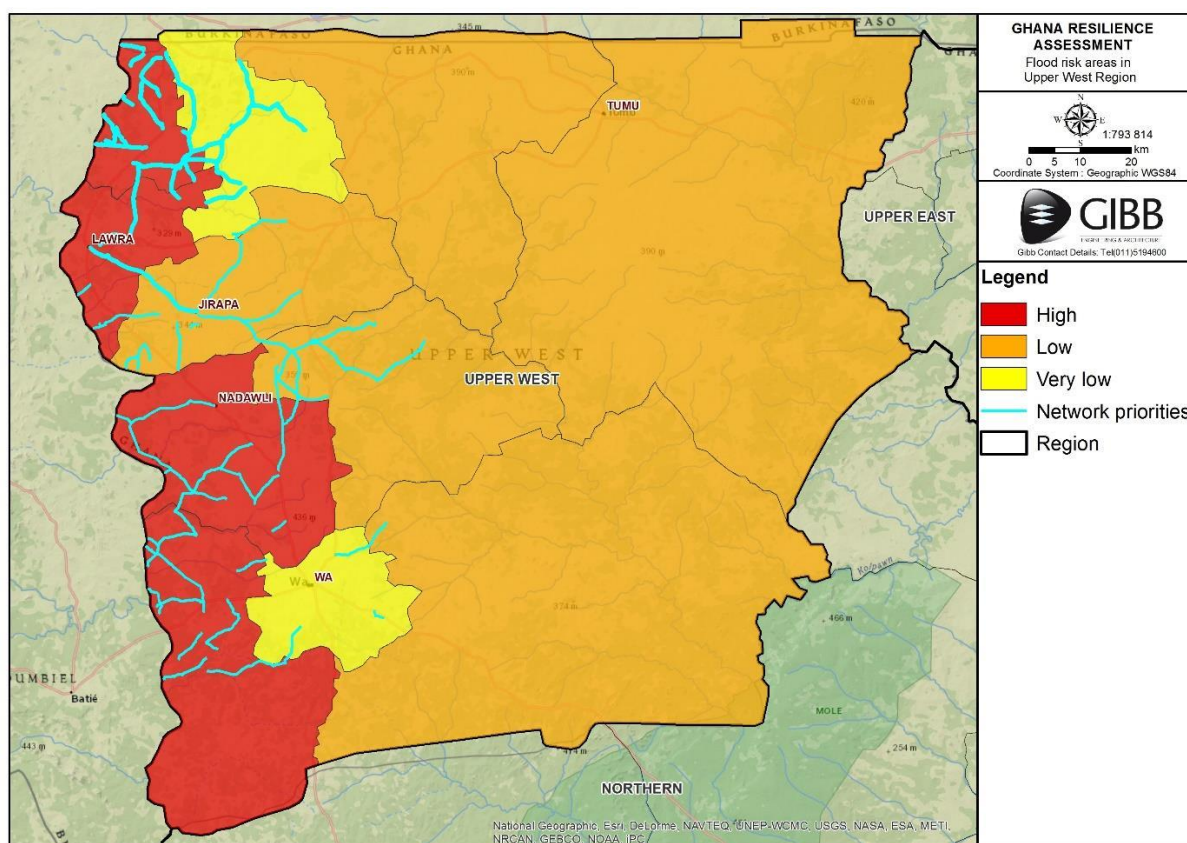


Figure 5-3 Extreme Flood Risk in the Upper West Region for the Next Five Years (2020-2025) [Adapted from: Think Hazard, 2019]

5.2.3.2 PROJECTED CLIMATE TRENDS

Rainfall predictions for the Upper West Region indicate that, for the period 2010 to 2029, the year 2024 will record the highest annual rainfall of 131.55 mm. The predicted annual rainfall indicates a rise of 18.00 mm indicating a rise of 9.19 mm per decade (Subaar et al., 2018). Precipitation patterns are expected to increase over the next decade, i.e., 2010-2029 (Subaar et al., 2018) [refer to Appendix 3 in Annexure A].

General Circulation Models (GCMs) have also predicted that mean temperature for the Upper West Region will increase, and under one of the modelled scenarios, temperatures are predicted to rise by 2.1-2.4°C by the year 2050 (Marke, 2013). Predicted temperature patterns show that the highest temperature of 36.4°C over the next two decades (2010-2029) will be recorded in the year 2024 (Subaar et al., 2018). Overall temperature patterns reveal that there was an increase of average annual temperature from 1990-2009, of 0.4°C, which would increase to an approximate change of 1°C over the next two decades (2010-2029) for the Upper West region (Subaar et al., 2018).

5.2.3.3 SUMMARY OF HISTORIC AND PROJECTED CLIMATE TRENDS

Table 5-2 provides a summary of the climate data for Ghana and the Upper West Region. Further historic and projected climate data is presented in Annexure A (Appendix 3). Temperature in the region has increased and is projected to increase in the medium and long term while rainfall has decreased and are projected to decrease in the short-term future. With increased temperature, extreme heat events are projected to intensify. Although rainfall is projected to decrease, the intensity of rainfall events is projected to increase, which could result in more flood events occurring.

Table 5-2 Summary of Historic and Projected Climate for the Study Region (Temperature, Rainfall and Extreme Events)

Region	Historic		Projected		Weather Event Risk	
	Temperature	Rainfall	Temperature	Rainfall	Heat	Flood
Upper West	Increase in temperature between 1961 and 2003, including an increase in the number of hot days and hot nights during the same period.	Decrease between 1900 - 1909 (Assam et al., 2018). Between 1990 and 2009, there was an increase in total annual rainfall in the first decade.	Temperatures are predicted to rise by 2.1 degrees to 2.4 degrees by the year 2050 (Marke, 2013). Increase in temperatures of 0.4 degrees predicted for 2010-2029 (Subaar et al., 2018).	Increase in precipitation trends between 2010 and 2010 and 2029 (Subaar et al., 2018).	High	Low to high
Ghana	Increase by 1 degree between 1961-2000 (Republic of Ghana, 2015).	Decrease rainfall between 1970-2011 (Issahaku et al., 2016).	Increase by 1.02 degrees by 2040 Increase by 1.5 degrees by 2060 Increase by 1.8 degrees by 2080 (Republic of Ghana, 2015).	Decrease by 2.9% by 2040 Increase by 1.1% by 2060 Decrease by 1.7% by 2080 (Republic of Ghana, 2015).	High (Northern) and Medium (Southern)	High

5.2.4 CLIMATE CHANGE

Some identified potential anthropogenic causes of climate change in the project area include bushfires and deforestation. Hunters in the area sometimes set fires to drive out game during hunting. People in the project area also engage in indiscriminate felling of trees for charcoal production which leads to the depletion of the tree cover in the area. Some herders also start fires at the beginning of the dry season to facilitate the growth of new grass for livestock. The need for fresh green grass leads to the tendency of herders to indiscriminately burn dry and undesirable vegetation to promote the growth of pasture. These activities further worsen the already erratic rainfall pattern and destroys arable lands in the area.

Erratic changes in rainfall pattern have been observed in the area over the past ten years by some residents. For instance, they report that the rains are now increasingly erratic and it rains for shorter durations now than in the past during the rainy season which results in reduced amounts of rainwater and negative impacts on farming and crop productivity. They have also noted that temperatures are rising, citing high intensity of heat as a change. Climate change is also perceived to be affecting livestock, as it is becoming more difficult to find water for animals, including the availability of fodder. These reported developments corroborate studies by Alhassan and Hadwen (2017) that postulates that changes in climate will result in decreased reliability and predictability of seasonal rainfall events, placing strain on water resources especially in developing countries such as Ghana. Also, Zulfawu, (2017) reported that the Upper West region is experiencing increasing changes in climate, particularly

for rainfall patterns which affects the quantity and quality of water for domestic and agricultural purposes. Various other studies (Marke, 2013; Subaar et al., 2018; Assam et al., 2018) also report increasing temperature patterns and heat events in the Upper West Region.

Local weather prediction systems that used indicators such as clouds, bird calls and emergence of certain insects were traditionally used to plan planting of crops and other livelihood activities. However, community members report that these systems are no longer accurate and could not be relied upon for planning their farming activities. The common sources of climate information in the project area include NGOs such as CARE, agricultural extension officers, relatives, friends or neighbours, radio and TV.

Based on historical data (Twerefou et al., 2015; EPA et al., 2015), projections of temperature and rainfall for Ghana indicates that there will be likely warming and an increase in rainfall variability by 2080. The climate in Ghana is projected to be hotter, with gradual increases in minimum and maximum temperatures in all ecological zones of the country. Research undertaken by Issahaku *et al.*, (2016) reveals that shorter rainy season and increased temperatures are projected for most parts of Ghana and the number of hot days is predicted to increase while the number of cold nights is projected to decrease. The spread of climatic change is expected to be more intense towards the Northern Ghana regions than the South for both temperature and rainfall. Rainfall variability in these regions will negatively affect supply of water resources and affect livelihoods in vulnerable communities. Increased climate change will also have negative impacts on road infrastructure resulting in decreased access to school and work due to flooded and damaged roads.

The Project was also evaluated in terms of the risks posed to it by climate change and these details are presented in a comprehensive climate assessment study conducted as part of the Project and incorporated into the overall OPBRC Assessment Study Report (UWP, 2020) submitted under a separate cover.

5.2.5 AIR QUALITY

Air quality along the Project network routes is noted to be generally good, based on visual assessment. Monitoring of the air quality in some of the communities along the project roads produced good results. The TSP, PM₁₀ and PM_{2.5} concentrations at all the monitoring locations were below their respective Ghana Standard values of 150 µg/m³, 70 µg/m³ and 35 µg/m³. The highest values obtained in the region for TSP, PM₁₀ and PM_{2.5} were obtained in Nandom and the lowest in Ko. The highest figures obtained were 80.04 µg/m³ for TSP, 53.35 µg/m³ for PM₁₀ and 24.41 µg/m³ for PM_{2.5}. The lowest figures obtained were 26.03 µg/m³ for TSP, 18.54 µg/m³ for PM₁₀ and 11.56 µg/m³ for PM_{2.5}.

The SO₂ levels of 0.38 µg/m³ recorded at Nandom Market was within the Ghana Standard value of 520 µg/m³ for 1-hour averaging time though the highest among all the SO₂ values recorded. The highest NO₂ value of 9.79 µg/m³ was also recorded. The value was however within the Ghana Standard value of 250 µg/m³ for a 1-hour averaging time.

However, the Project roads are mainly gravel surfaced which increases the potential for dust emissions and its impact on communities along the road. Observed sources of dust emission were from wind-blown erosion from road surface, shallow earth excavations for civil works and crop planting. Other particulate sources included ash and soot from bush burning activities for farming purposes. The USEPA (1995) postulates that the theoretical drift distance for fugitive dust emissions is a function of particle diameter and mean wind speed, as such, for a typical mean wind speed of 16 km/hr (10 mph), particles larger than about 100 µm are likely to settle out within 6 to 9 meters (20 to 30 feet) from the edge of the road or other point of emission. Particles that are 30 to 100 µm in diameter are likely to undergo impeded settling and depending upon the extent of atmospheric turbulence, are likely to settle within a few hundred feet from the road. Smaller particles, particularly PM₁₀, and PM_{2.5}, have much

slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence.

5.2.6 NOISE

The ambient noise [Equivalent Continuous Noise (Leq)] measured within some communities in the region were all within the Ghana Standards for both daytime and night time. Daytime values ranged from 54.8 dB(A) to 67.05 dB(A). The ambient nighttime values were from 52.2 dB(A) to 59.0 dB (A). These values were all below the recommended commercial standard values prescribed in the Ghana Standard (GS 1222: 2018) of 75 dB(A) and 65 dB(A) for daytime and nighttime respectively.

Identified sources of noise included movement of vehicles and birds chirping; and expected to be within permissible daytime noise levels. During construction however, it is anticipated that daytime noise will rise above the permissible noise level for residential areas by the EPA. As far as possible, the construction activities are recommended to be limited to daytime only.

5.2.7 TRAFFIC

The traffic study for the Package 1 feeder roads indicates that the traffic volumes are relatively low. Moving Observer Counts (MOC) were adopted to collect traffic information on the listed roads. In addition to MOCs, a pilot study was undertaken on the feeder roads, whereby both MOCs and stationary counts were conducted to determine traffic volumes, trends and patterns on market and non-market days and to correlate the MOC with stationary count results. Table 5-3 presents a summary of the traffic volume data and estimated Average Daily Traffic volumes for the listed roads. Further details are presented in the Concept Design Report (UWP, 2020). The detailed design phase will also explore traffic information on the roads much further prior to construction.

The traffic study undertaken during the Concept Design did not collect specific information on accident in the project area. However, an independent Road Safety Audit (RSA) was carried out on the Concept Design. The Independent Road Safety Specialist reviewed the concept designs to identify and address safety hazards for all road users. This review is likely to reduce accidents or at least reduce the severity of accidents on the project roads. The Concept Design responses to the findings of the independent RSA are included in Table 5-4.

Table 5-3 Summary of Classified MOC Traffic Data for the Feeder Roads

Road No.	Average Daily Traffic per Road User Type							
	Pedestrian	Cyclist	Motorbike	Motor tricycles	Light Vehicles	Bus	Truck	Other Vehicles ⁵
P1_1_1	210	53	53	53	0	53	0	0
P1_1_2	215	215	108	0	0	0	0	0
P1_2	831	240	332	129	18	55	0	0
P1_4	121	0	0	0	0	0	0	0
P1_5	250	63	63	63	0	0	0	0
P1_6	236	105	157	0	0	26	0	0
P1_7	0	0	0	0	0	0	0	0
P1_8	71	0	0	0	0	0	0	0

⁵ Other vehicles are typically agricultural tractors.

Road No.	Average Daily Traffic per Road User Type							
	Pedestrian	Cyclist	Motorbike	Motor tricycles	Light Vehicles	Bus	Truck	Other Vehicles ⁵
P1_9	0	0	0	24	0	0	0	0
P1_10	63	0	126	0	0	0	0	0
P1_11	0	0	0	0	0	0	0	0
P1_12	0	0	39	0	0	0	0	0
P1_13	239	30	60	0	0	0	0	0
P1_15	85	0	0	42	0	0	0	0
P1_24	420	0	53	0	0	0	0	0
P1_25	496	83	83	0	0	0	0	0
P1_26	0	0	0	82	0	0	0	0
P1_27	152	152	51	0	0	0	0	0
P1_28	352	32	160	64	0	0	0	0
P1_31	477	0	68	0	0	0	0	0
P1_42	258	103	155	0	0	0	0	0
P1_43	365	81	122	41	41	0	41	0
P1_47	369	41	82	0	0	0	0	0
P1_50	307	243	65	16	0	16	0	0
P1_62	226	38	75	0	0	38	0	0
P1_82	1094	0	273	0	0	0	0	0
P1_87	1431	179	224	45	0	0	45	0
P1_90	1649	495	165	660	0	0	0	0
P1_94	100	100	25	0	0	0	0	0
P1_96	191	72	48	0	24	24	0	0
P1_102	239	34	102	68	34	0	0	0
P1_116	156	156	0	52	0	0	0	0
P1_114	450	30	30	30	60	0	30	0

(Source: Concept Design Report, 2020)

Table 5-4 Concept Design Responses to Findings of Road Safety Audit

	Risk	RSA Risk Rating	Consultant response
General Risks identified from design standards and reports – Feeder Roads			
1	Drainage channel in populated areas.	Medium	Contractor to complete detail survey during detail design to determine access locations. Install 450mm (minimum) pipes across accesses. Provision has been made for sidewalks along surface roads only.

	Risk	RSA Risk Rating	Consultant response
2	Protective barriers.	High	Right of way to be cleared of any hazards. If hazard cannot be removed, designer agrees with recommendation to install guardrails where warranted.
3	Appropriate road signs	High	Contractor to allow for warning signs where warranted.
4	Retro-reflectivity of Road Signage	High	Agree with recommendation for retro reflective signage. Retro reflective markings only feasible on surface roads.
5	Vegetation within the road reserve	High	Agree with recommendation to clear right of way of any hazards, including vegetation.
Specific Risks – PACKAGE 1: Selected Feeder Routes in Upper West Region			
1	Sharp bend in populated areas		
	<u>Package 1:</u> • Road 2 (DFR01839): Saan to Nadowli (±km 4,96)	High	Section located within populated area with a design speed of 40km/h. Appropriate guardrails with chevrons should give adequate warning to drivers.
	• Road 5 (DFR01955 and DFR01954): Nwaabasi to Jambosi to Buka (±km 4,40)		Section located within populated area with a design speed of 40km/h. Appropriate warning signs to be erected.
	• Road 12 (Pump station 15): Bankpama to Pump site 15 (±km 2,18)		Road 12 has no through traffic and traffic volumes are low. Drivers will be familiar with road conditions.
	• Market Access Road 15A: Nyoi Market (±km 0,16) Nyoi Market (±km 0,20)		Section located within populated area with a design speed of 40km/h. Appropriate warning signs to be erected.
2	Series of back-to-back or reverse curves on flat and straight road sections		
	<u>Package 1:</u> • Road 9 (Pump station 12): Dabo to Pump site 12 (±km 1,00 to ±km 1,20) • Road 12 (Pump station 15): Bankpama to Pump site 15 (±km 1,00 to ±km 1,40) • Road 13 (Pump station 16): Chietanga to Guse to Bienye (±km 5,30 to ±km 5,90) • Road 24 (New Dam): Kaleo to New Dam 5 (±km 1,68) • Road 26 (New Dam 1): Piisie to Losse (±km 1,70) • Road 26 (New Dam 1): Piisie to Losse (±km 2,60)	High	The design team agree with the recommendation however, cost need to be considered. All access roads to pump station have low traffic volumes with little to no through traffic. These roads are likely to be used by drivers who are familiar with the route. It is therefore not economically feasible for significant geometric upgrades and re-alignment of these roads. Due to low traffic and driver familiarity, the design team does not agree on the likelihood of occasional. The likelihood is more improbable. This therefore reduces the risk from High to Medium.
3	Skew intersections		
	<u>Package 1:</u>	Intolerable	Intersection is at an angle of 62 degrees and falls within the minimum acceptable criteria.

	Risk	RSA Risk Rating	Consultant response
	<ul style="list-style-type: none"> • Road 116 (DFR001962): Asse to Charia (±km 6,75) 		
	<ul style="list-style-type: none"> • Road 2 (DFR01839): Saan to Nadowli ±km 0,00; 		Current intersection is at a 6-legged intersection and is unsafe. A possible traffic circle could be considered or closing off and diverting 2 legs of the intersection. The above falls outside the scope of the design.
	<ul style="list-style-type: none"> • Saan to Nadowli ±km 13,81; 		It is proposed that the current intersection be re-aligned.
	<ul style="list-style-type: none"> • Saan to Nadowli ±km 13,32 		Local access and traffic volumes low.
	<ul style="list-style-type: none"> • Road 6 (DFR01959): Dorimon to Dabo (±km 13,66) 		It is proposed that the current 4-legged intersection be re-aligned.
	<ul style="list-style-type: none"> • Road 7 (Pump Station 10): Kpaala to Pump site 10 (±km 0,25) 		Local access and traffic volumes low. Access is at an angle of 62 degrees and falls within the minimum acceptable criteria.
	<ul style="list-style-type: none"> • Road 8 (Pump Station 11): Siira to Pump site 11 (± 0,00) 		It is proposed that the current intersection be re-aligned.
	<ul style="list-style-type: none"> • Road 9 (Pump station 12): Dabo to Pump site 12 (±km 0,00) 		It is proposed that the current 4-legged intersection be re-aligned.
	<ul style="list-style-type: none"> • Road 27 (DFR01948): Vieri to Siiru (±km 0,00) 		Intersection is at an angle of 65 degrees and falls within the minimum acceptable criteria.
	<ul style="list-style-type: none"> • Road 47 (DFR01850): Serekpere to Nator Duori (±km 3,78) 		Intersection is at an angle of 60 degrees and falls within the minimum acceptable criteria.
	<ul style="list-style-type: none"> • Road 50 (DFR01839): Nadowli to Nanville (±km 6,60. • Road 50 (DFR01839): Nadowli to Nanville (±km 6,78) 		Intersection is at an angle of 63 and 68 degrees respectively and falls within the minimum acceptable criteria.
	<ul style="list-style-type: none"> • Road 90 (DFR01932): Konbuoli to Dorimon (±km 1,14) 		Intersection is at an angle of 64 degrees and falls within the minimum acceptable criteria.
	<ul style="list-style-type: none"> • Road 94 (DFR01960): Dabo to Sukpere (±km 2,29) 		Intersection is at an angle of 80 degrees and falls within the minimum acceptable criteria.
	<ul style="list-style-type: none"> • Road 102 (DFR01950): Siiru to Kpongo (±km 0,00) 		Intersection is at an angle of 65 degrees and falls within the minimum acceptable criteria.
	<ul style="list-style-type: none"> • Road 102 (DFR01950): Siiru to Kpongo (±km 3,90) 		It is proposed that the current intersection be re-aligned.
4	Unsafe access location		
	<u>Package 1:</u> <ul style="list-style-type: none"> • Road 13 (Pump station 16): Chietanga to Guse to Bienye (±km 2,74) 	High	Accept: Low volume road, no through traffic
	<ul style="list-style-type: none"> • Road 28 (DFR01957): Piisie to Boro (±km 2,90) 		Accept: Low volume road through settlement.
	<ul style="list-style-type: none"> • Road 42 (DFR01853): Nator to Sankana (±km 0,38) 		Relocate access

	Risk	RSA Risk Rating	Consultant response
	• Road 42 (DFR01853): Nator to Sankana (±km 5,80)		Designer has re-aligned road and access.
	• Road 96 (DFR01865): Sukpere to Nanvilli (±km 10,46) • Road 102 (DFR01950): Siiru to Kpongo (±km 0,62)		Access should be treated as a 3-legged intersection. Accept: Access its located on a low volume road.
	• Road 114 (DFR02016): Kperisi to Guonuo (±km 2,60)		Accept: Access located on outside of a horizontal bend on a low volume road. The visibility has been checked
	• Road 116 (DFR01962): Asse to Charia (±km 6,56)		Close access as alternate is available.
	The design team agree and support the re-aligning or relocating access. However, this may not practically be feasible due to driver behavior. Any attempt to rational access, improve spacing of accesses or re-align accesses may be futile as there is no restraint along unsurfaced roads and driver will create their own paths over time.		
5	Vegetation within the road reserve		
	<u>Package 1:</u> • Road 5 (DFR01955 and DFR01954): Nwaabasi to Jambosi to Buka (±km 0,23 to ±km 0,50) • Road 5 (DFR01955 and DFR01954): Nwaabasi to Jambosi to Buka (±km 0,60) • Road 28 (DFR01957): Piisie to Boro (±km 6,60 to ±km 6,70) • Road 28 (DFR01957): Piisie to Boro (±km 7,00) • Road 96 (DFR01865): Sukpere to Navilli (±km 0,98) • Road 96 (DFR01865): Sukpere to Navilli (±km 7,60)	High	Agree with recommendation to clear right of way of any hazards, including vegetation. Final assessment of sight lines and vegetation clearance to be undertaken during detail design and construction. Any areas where vegetation clearance is required to be maintained for the safe operation of the road user will need to be part of the Maintenance Strategy at the detailed design stage.

5.3 BIOLOGICAL ENVIRONMENT

This section of the report presents a general description of the terrestrial and aquatic ecology of the road servitude. The studies or assessment was carried out by a team of biodiversity experts made up of a flora expert, a fauna expert and a hydrobiology expert.

Ecological studies in relation to the Project roads was aimed at providing information on the local dynamics of terrestrial and aquatic flora and fauna in the road corridor. Although a one-off rapid assessment, it provides an opportunity to determine the current status and ecological health to help inform further monitoring and mitigations actions towards sound ecological management during the road development and other proposed operations. The ecological studies were undertaken with a view towards managing environmental concerns associated with development activities to promote national ecosystem conservation and preservation objectives are well addressed.

Table 5-5 below shows the coordinates and description of the sample locations, including activities carried out at each location.

Table 5-5 Sample Location, Coordinates, Description and Activities Carried Out

Location Name	Latitude N	Longitude W	Description	Activity
P1L1	9°55.9370	2°32.0210	Dam near Topiayiri. Mango farm destroyed by fire	Water quality, Water sample, Flora, Fauna
P1L2	9°55.5360	2°33.5920		Flora, Fauna
P1L3	9°55.8620	2°36.1970	Near Vieri. Dry Stream bed. Pond with water	Water quality, Water sample, Flora, Fauna
P1L4	9°55.7900	2°41.4540		Drone, Flora, Fauna
P1L5	9°2.0580	2°38.7560	Outskirts of Boro	Flora, Fauna
P1L6	10°0.7880	2°37.9490	Bacha	Water quality, Water sample, Flora, Fauna
P1L7	10°2.0920	2°41.7140	Outskirts of Dorimon	Drone, Flora, Fauna
P1L8	10°2.2620	2°44.0270		Drone, Flora, Fauna
P1L9	10°2.3310	2°41.4440	Dasayiri	Water quality, Water sample, Flora, Fauna
P1L10	10°6.0160	2°47.3380	Black Volta	Water quality, Water sample, Drone, Flora, Fauna
P1L11	10°11.8410	2°40.3400	Olli. Dry river bed	Flora, Fauna
P1L12	10°11.1870	2°36.2570	Sankana Dam	Water quality, Water sample, Flora, Fauna
P1L13			Saan. Black Volta	Water quality, Water sample, Drone, Flora, Fauna

5.3.1 FLORA BIODIVERSITY

A rapid flora inventory was conducted along the feeder roads corridor (defined right of way) and vascular plant species encountered at sampled locations were identified and recorded. Details are presented below.

5.3.1.1 GENERAL VEGETATION OF THE PROJECT AREA

The project area (all packages) lies within the Guinea Savanna vegetation zone (Taylor, 1960), with its various physiognomic types. The main vegetation type within this zone is the open savanna woodland. This vegetation type is characterized by dispersed trees with crowns reaching a maximum height of between 12 m and 15 m (Figure 5-4). The trees seldom form a close canopy and are usually found with a ground cover consisting of herbaceous tussock grasses with culms reaching up to 2 m during the rainy season (Innes, 1977). The observed vegetation has been subjected to centuries of disturbance by shifting cultivation, fire and grazing, an observation also noted by Ramsay & Innes (1963). Very few natural stands however remain at some areas. Commonly occurring trees are shea, dawadawa, kapok and baobab. Cashew and mango are exotic species that grow well in the area.



Figure 5-4 Dispersed Tree Vegetation along Road Corridor (Left) and Sparse Vegetation along the Bank of the Black Volta (Right)

Six (6) broad vegetation formations were identified, based on floristic patterns and their degree of physiognomic distinctiveness. These are described below.

1. Open Savanna Woodland

These are made up of open stand of trees, about 8 m tall, with 40% or more canopy cover. Ground cover is dominated by shrubs and grasses (Figure 5-5).

2. Scrub Woodland

Stunted or degraded woodland less than 5m tall often on shallow soils on iron stone, and other rocky outcrops, heavily grazed landscapes (Figure 5-5).

3. Wooded Grassland

Grass and other herbaceous species dominated landscape with moderately dispersed woody plants (Figure 5-6).

4. Riparian Thicket

A closed stand of impenetrable bushes and climbers; few trees along perennial streams and rivers, e.g., along the Black Volta (Figure 5-7).

5. Wooded Farmland

Cultivated fields with self-sown, specially preserved tree species of economic importance, such as *Azelia africana*, *Faidherbia albida*, *Khaya senegalensis* and *Vitellaria paradoxa* (Figure 5-6).

6. Fresh Water Swamp

Swamp vegetation mostly in and around permanently flooded areas such as dams and dugouts (Figure 5-7). Characteristic species are either rooting in the soil (e.g., *Typha domigensis*) or freely floating (e.g. *Nymphaea micrantha*). Cattle grazing and other animal activities (goats, sheep, etc.) is also apparent at these locations (Figure 5-8).



Figure 5-5 Open Savanna Woodland Vegetation (Left) and Scrub Woodland (Right)



Figure 5-6 Wooded Grassland (Left) and Wooded Farmland (Right) Vegetation Types



Figure 5-7 Riparian Thicket (Left) and Fresh Water Swamp Vegetation (Right)



Figure 5-8 Animal Grazing and other Activities at Swampy Areas and Dams / Dugouts

The vegetation in the three (3) packages are generally similar and show little variation in species composition and distribution. The dominant vegetation types identified were degraded open savanna woodland with stunted trees and new flush coppice shoots from recent fires. A total of 117 vascular plant species were recorded belonging to 44 families. The leguminous family, Fabaceae was recorded most with 24 species.

Several species recorded have a widespread distribution in the survey area with *Diospyros mespiliformis*, *Mitragyna inermis*, *Vitellaria paradoxa*, *Parkia biglobosa* and *Sarcocephallus latifolius* being most abundant. *Anogeissus leiocarpus*, *Balanites aegyptiaca*, *Daniellia oliverii*, *Detarium microcarpum*, *Azadirachta indica*, *Combretum fragrans*, *Ficus sycomorus*, *Dichrostachys cinerea*, *Acacia sieberiana*, *Pterocarpus erinaceus* and *Lannea acida* were frequently encountered during the survey. Some species showed restricted distribution to vegetation formations such as riparian/gallery woodland and thickets, freshwater swamps, riverbanks, etc., and seasonally inundated landscapes. These include: *Cola laurifolia*, *Pterocarpus santalinoides*, *Mimosa pigra*, *Paulinia pinnata*, *Cardiospermum*, *Aphania senegalensis*, *Vitex chrysocarpa*, *Typha domingensis*, *Ipomoea aquatica*, *Garcinia livingstonei*, *Nymphaea micrantha*, *Antidesma venosum*, *Cardiospermum halicacabum* and *Eugenia nigerina*.

Predominantly, trees constituted 61.5% of the lifeform distribution of the flora of the study area. Table 5-6 shows the distribution of life forms in the flora recorded. The poor representation of herbaceous flora and grasses could be attributed largely to intensive cultivation and annual ritual of bush fires. *Englerina lecardii* and *Tapinanthus dodoneifolius* are epiphytic parasites found attacking mostly *Vitellaria paradoxa* (Shea butter tree) in the study area.

Table 5-6 Distribution of Lifeforms in the Flora

Life form	Frequency	%
Tree	72	61.5
Shrub	13	11.1
Climber	12	10.2
Herbs	10	8.5
Grasses	7	5.9
Epiphytic Parasites	2	1.7
Palms	1	0.8

Source: Field Survey, August 2019

5.3.1.2 VEGETATION OF THE RIGHT OF WAY

The vegetation type along the Package 1 feeder roads ROW is largely degraded with open savanna woodland dominated by stunted trees and shrubs with grassy undergrowth swept by fire, including farms and farm re-growths. In some cases, new flush coppice shoots are seen after recent fires. It was observed that land clearing and land preparation for farming was ongoing in several locations visited. The main crops cultivated on the farmlands are Maize, Beans, Yam and Cassava. The built-up areas along the ROW have isolated trees.

There were thirteen (13) sampling stops within Package 1. A summary of the vegetation of the project site (road corridor) as represented by habitat types and common species sampled is shown in Table 5-7.

Table 5-7 Profile of Representative Sample Locations and Summary of Vegetation Cover Types or Habitats

Sample Location	Description of vegetation cover	Common species
P1L1	Degraded open savanna woodland with stunted trees and new flush coppice shoots from recent fires. Common species include:	<i>Lannea acida</i> , <i>Parkia biglobosa</i> , <i>Balanites aegyptiaca</i> , <i>Vitex doniana</i> , <i>Maytenus senegalensis</i> , <i>Detarium microcarpum</i> , <i>Crossopterix febrifuga</i> , <i>Sterculia setigera</i> .
P1L2	Open savanna woodland; typical shrubby and grassy undergrowth swept by fire.	<i>Piliostigma thonningii</i> , <i>Parkia biglobosa</i> , <i>Vitellaria paradoxa</i> , <i>Dannielii oliveri</i> , <i>Pseudocedrela kotschy</i> , <i>Annona glauca</i> , <i>A. senegalensis</i> , <i>Acacia dudgeonii</i> , <i>Azalia africana</i> .
P1L3	Seasonally inundated lowland, virtually devoid of vegetation, dedicated for dry season farming.	<i>Stachytarpheta</i> sp, <i>Crinum jagus</i> noted.
P1L4	Seasonal stream. Scrappy vegetation along the banks.	<i>Crinum jagus</i> , <i>Paullinia pinnata</i> , <i>Sarcocephallus latifolius</i> , <i>Imperata cylindrica</i> , <i>Vitex chrysocarpa</i> , <i>Piliostigma thonningii</i> , <i>Diospyros mespiliformis</i> .
P1L5	Fallow farmland on the outskirts of Boro village, awaiting tilling/beginning of the farming season.	<i>Vitellaria paradoxa</i> , <i>Parkia biglobosa</i> , <i>Detarium microcarpum</i> , <i>Lannea acida</i> , <i>Isobertia doka</i> , <i>Haematostaphys barteri</i> , <i>Diospyros mespiliformis</i> , <i>Icacina senegalensis</i> , <i>Adansonia digitata</i> .
P1L6	Earth dam/Dugout. Vegetation on the embankments.	<i>Calotropis procera</i> , <i>Ficus sycomorus</i> , <i>Balanites aegyptiaca</i> , <i>Pterocarpus santalinoides</i> , <i>Vitex chrysocarpa</i> , <i>Zanthoxylum xanthoxyloides</i> , <i>Sarcocephallus latifolius</i> , <i>Mitragyna inermis</i> , <i>Acacia sieberiana</i> , <i>Azadirachta indica</i> , <i>Typha domingensis</i>
P1L7	Wooded farmland at the outskirts of Dorimo village.	<i>Vitellaria paradoxa</i> , <i>Parkia biglobosa</i> , <i>Hyphaene thebaica</i> , <i>Azadirachta indica</i> , <i>Balanites aegyptiaca</i> , <i>Pseudocedrela kotschy</i> , <i>Entada abyssinica</i> , <i>Combretum fragrans</i> , <i>Diospyros mespiliformis</i> , <i>Piliostigma thonningii</i> , <i>Annona senegalensis</i> .
P1L8	Open savanna range/wood land. Cattle grazing apparent.	<i>Sterculia setigera</i> , <i>Ozoroa insignis</i> , <i>Vitellaria paradoxa</i> , <i>Parkia biglobosa</i> , <i>Lannea acida</i> ,

Sample Location	Description of vegetation cover	Common species
		<i>Cochlospermum planchonii</i> , <i>Acacia dudgeoni</i> , <i>A. gourmaensis</i> , <i>Pseudocedrella kotschyi</i> , <i>Entanda abyssinica</i> , <i>Flueggea virosa</i> , <i>Ficus sp.</i>
P1L9	Scrappy vegetation around the embankment of earth dam.	<i>Acacia sieberiana</i> , <i>Ficus sp.</i> , <i>Vitellaria paradoxa</i> , <i>Combretum fragrans</i> , <i>Sterculia setigera</i> , <i>Balanites aegyptiaca</i> , <i>Azadirachta indica</i> , <i>Detarium microcarpum</i> , <i>Diospyros mespiliformis</i> .
P1L10	Relic patches of riparian vegetation along Black Volta river.	<i>Mitragyna inermis</i> , <i>Aphania senegalensis</i> , <i>Antidesma venosum</i> , <i>Acacia sieberiana</i> , <i>Mimosa pigra</i> , <i>Paullinia pinnata</i> , <i>Quisqualis xx</i> , <i>Pterocarpus santalinoides</i> , <i>Ziziphus mauritianum</i> , <i>Combretum molle</i> , <i>Danielia oliveri</i> .
P1L11	Relic patches of riparian vegetation along a dry riverbed.	<i>Mimosa pigra</i> , <i>Mitragyna inermis</i> , <i>Landolphia heudelotii</i> , <i>Aphania senegalensis</i> , <i>Terminalia macroptera</i> , <i>Acacia sieberiana</i> , <i>Pterocarpus santalinoides</i> , <i>Sesbania sesban</i> , <i>Desmodium sp.</i> , <i>Khaya senegalensis</i> .
P1L12	Scrappy vegetation along the embankment of Sankana Dam.	<i>Anogeissus leiocarpus</i> , <i>Omorcarpum sp.</i> , <i>Mimosa pigra</i> , <i>Nymphaea micrantha</i> , <i>Mitragyna inermis</i> , <i>Vitex chrysocarpa</i> , <i>Cochlospermum planchonii</i> , <i>Parkia biglobosa</i> , <i>Sarcocephallus latifolius</i> , <i>Annona senegalensis</i> , <i>Maytenus senegalensis</i> , <i>Flacourtia flavescentis</i> ,
P1L13	Riparian vegetation along Black Volta (near. Saan)	<i>Mimosa pigra</i> and <i>Dicrostachys cinerea</i> forming impenetrable thickets at sections. Other species: <i>Pterocarpus santalinoides</i> , <i>Quisqualis indica</i> , <i>Ziziphus mauritianum</i> , <i>Antidesma venosum</i> , <i>Cardiospermum halicacabum</i> , <i>Acacia sieberiana</i> , <i>Garcinia livingstonei</i> .

5.3.1.3 SPECIES OF CONSERVATION CONCERN

Four species recorded in the study area have been listed on the global IUCN Red List of Threatened Species. *Pterocarpus erinaceus* (African Rosewood) is listed as an “Endangered” species and *Afzelia africana*, *Khaya senegalensis* and *Vitellaria paradoxa* are listed as “Vulnerable” (IUCN, 2018). The IUCN Red List of Threatened Species is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of quantitative criteria to evaluate the extinction risk of thousands of species.

Logging and lumbering of these threatened species continue to gain notoriety in the Northern, Upper East and Upper West regions of Ghana despite the ban placed by the Ghana Forestry Commission.

5.3.1.4 CONCLUSION AND CONSERVATION MEASURES

The results of the survey indicate that the global flora biodiversity significance of the project area is not of high priority. However, it is advisable to protect relic patches of riparian/gallery woodland vegetation along the Black Volta. Restoration efforts aimed at promoting natural regeneration along the banks is recommended.

Logging and lumbering, in any form, should not be permitted anywhere in this sensitive Guinea Savanna ecological zone. The study upholds and reiterates IUCN's recommendations for the development of conservation and sustainable management, law enforcement and monitoring protocols for the

endangered species, *Pterocarpus erinaceus* (African Rosewood), to control the illegal trade. Beyond the IUCN recommendations, further specific actions proposed towards minimizing the illegal logging activities in the Project area include, but not limited to the following:

- Logging of some tree species (such as Rose wood) is illegal. The FC should be encouraged or motivated to enforce the ban on the illegal activity. This could include a needs-based assessment of the weaknesses in the FC's monitoring and implementation activities and augmenting these needs, as the case may be.
- International trade partners, particularly Asian partners should be made aware that logging of the wood species in Ghana is illegal. Hence, they should be encouraged to refuse entry of such species from Ghana into their countries. This can be achieved through diplomatic channels.
- Community-based natural resource management groups (which largely exist within the project area) should be strengthened and equipped to handle issues of illegal logging, including reporting of such activities to authorities.
- Independent monitoring and evaluation of forest resource needs to be carried out to augment the activities of the FC and community groups. This should include an assessment of current standing crop of endangered species and their periodic monitoring (half-yearly basis) to determine impacts on them within the footprint of the Project.
- Re-forestation projects or programmes are highly recommended, particularly of ecologically restricted species, such as species occurring near riverbanks within the Project area. These plants will help protect the rivers in addition to offsetting plants that will be removed as a consequence of the Project. For the re-forestation, it is recommended that the planting of about 20,000 indigenous tree species be prioritized.

5.3.2 FAUNA BIODIVERSITY

5.3.2.1 GENERAL SPECIES RICHNESS AND CONSERVATION SIGNIFICANCE

In general (for all three packages), 49 species of birds were observed during the opportunistic observation (Table 5-8). Additionally, seven (7) species of mammals, five (5) species of reptiles and two (2) species of amphibians, were either seen during the survey, identified by their spoors or recorded through the interviews (Table 5-9). These brought the total number of vertebrate species recorded in the study area to sixty-three (63).

The most recurring species was the Laughing dove (*Spilopelia senegalensis*) which was observed in about 65% of the locations visited. This was followed by the Cattle egret (*Bubulcus ibis*) which was observed in about 38% of the specific locations visited (Figure 5-9).

Out of the 63 species associated with the study habitats, 62 were species of Least Concern on the IUCN Red List of Threatened Species (Version 2018-2). The Hippopotamus (*Hippopotamus amphibious*) which was reported to be associated with the Black Volta was a Vulnerable species on the IUCN Red List of Threatened Species and therefore needs conservation attention (Table 5-9).



Figure 5-9 A Roost of Cattle Egrets (Left) and Black Kite (Right) in the Study Area



Figure 5-10 Cast Skin of Colubrid Snake (Left) and Nest of White-billed Buffalo Weaver (Right) in the Study Area

Table 5-8 List of Birds Observed during the Survey and their Conservation Status

Class	Common Name	Species Name	Conservation Status⁶
Accipitriformes	Black kite	<i>Milvus migrans</i>	LC
	Yellow-billed kite	<i>Milvus migrans parasitus</i>	LC
Anseriformes	White-faced whistling duck	<i>Dendrocygna viduata</i>	LC
Bucerotiformes	African grey hornbill	<i>Tockus nasutus</i>	LC
Charadriiformes	African jacana	<i>Actophilornis africanus</i>	LC
	African wattled plover	<i>Vanellus senegallus</i>	LC
	Common sandpiper	<i>Actitis hypoleucos</i>	LC
	Spur-winged lapwing	<i>Vanellus spinosus</i>	LC
	White headed lapwing	<i>Vanellus albiceps</i>	LC
Columbiformes	Laughing dove	<i>Spilopelia senegalensis</i>	LC
	Red-eyed dove	<i>Streptopelia semitorquata</i>	LC
Coraciiformes	Abyssinian roller	<i>Coracias abyssinicus</i>	LC
	Broad-billed roller	<i>Eurystomus glaucurus</i>	LC
	Malachite kingfisher	<i>Alcedo cristata</i>	LC
	Pied Kingfisher	<i>Ceryle rudis</i>	LC
Cuculiformes	Levaillant's cuckoo	<i>Oxylophus levaillantii</i>	LC
	Senegal Coucal	<i>Centropus senegalensis</i>	LC
Falconiformes	Grey kestrel	<i>Falco ardosiaceus</i>	LC
Galliformes	Double spurred Francolin	<i>Francolinus bicalcaratus</i>	LC
Passeriformes	Beautiful sunbird	<i>Cinnyris pulchellus</i>	LC
	Black-faced firefinch	<i>Lagonosticta larvata</i>	LC
	Bronze mannikin	<i>Spermestes cucullatus</i>	LC
Passeriformes	Brown-throated martin	<i>Riparia paludicola</i>	LC
	Common bulbul	<i>Pycnonotus barbatus</i>	LC
	European bee-eater	<i>Merops apiaster</i>	LC
	Fanti saw-wing	<i>Psolidoprocne obscura</i>	LC

⁶ The IUCN periodically publishes a Red List of Threatened Species which categorises globally-threatened animals as follows:

X	Extinct: No reasonable doubt that the last individual has died
EW	Extinct in the wild: Known only to survive in captivity or as naturalized populations well outside its previous range
CR	Critically Endangered: The species is at imminent risk of extinction in the wild
EN	Endangered: The species is facing an extremely high risk of extinction in the wild
VU	Vulnerable: The species is facing a high risk of extinction in the wild.
NT	Near Threatened: The species does not meet any of the criteria that would categorize it as risking extinction, but it is likely to do so in the future
LC	Least Concern: There are no current identifiable risks to the species
DD	Data Deficient: There is inadequate information to assess the risks to this species

Class	Common Name	Species Name	Conservation Status ⁶
	Fork-tailed drongo	<i>Dicrorus adsimilis</i>	LC
	Garden warbler	<i>Sylvia borin</i>	LC
	Green- backed Camaroptera	<i>Camaroptera brachyura</i>	LC
	Little weavers	<i>Ploceus luteolus</i>	LC
	Melodious warbler	<i>Hippolais polyglottal</i>	LC
	Northern Black flycatcher	<i>Melaenornis edolioides</i>	LC
	Northern grey- headed sparrow	<i>Passer griseus</i>	LC
	Orange-cheeked waxbill	<i>Estrilda troglodytes</i>	LC
	Pied crow	<i>Corvus albus</i>	LC
	Pied-winged swallow	<i>Hirundo leucosoma</i>	LC
	Red bellied quelea	<i>Quelea quelea</i>	LC
	Red-winged warbler	<i>Helilais erythropterus</i>	LC
	Village weaver	<i>Ploceus cucullatus</i>	LC
	White-billed buffalo weaver	<i>Bubalornis albirostris</i>	LC
	White-fronted black chat	<i>Myrmecocichla albifrons</i>	LC
	White-shouldered black tit	<i>Parus guineensis</i>	LC
	White-throated bee-eater	<i>Merops albicollis</i>	LC
	Yellow-billed shrike	<i>Corvinella corvina</i>	LC
Pelecaniformes	Cattle egret	<i>Bubulcus ibis</i>	LC
	Grey Heron	<i>Ardea cinereal</i>	LC

Table 5-9 List of Additional Species of Animals Recorded in the Project Area Indicating the Method of Recording and Conservation Status

Class	Order	Common Name	Species name	Conservation status	Method of recording			
					Seen	Interviews	Spors	Desktop survey
Mammals	Lagomorpha	African savanna hare	<i>Lepus victoriae</i>	LC		✓		
	Rodentia (rodents)	Grasscutter	<i>Thryonomys swinderianus</i>	LC		✓		
		Giant pouched rat	<i>Cricetomys gambianus</i>	LC		✓	✓	
		Mice and rats	Muridae	LC		✓		
	Primates	Patas monkey	<i>Erythrocebus patas</i>	LC		✓		
	Artiodactyla (even-toed ungulates)	Hippopotamus	<i>Hippopotamus amphibius</i>	VU		✓		
	Chiroptera (Bats)	Gambian epauletted fruit bat	<i>Epomophorus gambianus</i>	LC	✓	✓		
Birds	Galliformes	Helmeted guinea fowl	<i>Numina melagris</i>			✓		
Reptiles	Squamata (snakes and lizards)	Bosc monitor lizard	<i>Varanus exanthematicus</i>	LC		✓		
		Agama lizard	<i>Agama agama</i>	LC	✓			
		Colubrid snake	Colubridae	LC			✓	
		Spiting cobra	<i>Naja nigricolis</i>	LC		✓		
	Crocodylia	West African crocodile	<i>Crocodylus niloticus suchus</i>	LC		✓		
Amphibians	Anura	Frogs	<i>Rana spp</i>	LC				✓
		Toads	<i>Bufo spp</i>	LC				✓

5.3.2.2 FAUNA OF THE PACKAGE 1 RIGHT OF WAY

The commonest bird species observed in the Package 1 Project area is the laughing dove, which was found in nine (9) of the thirteen (13) sample locations. The cattle egret was also commonly found within the package. The least common species include the yellow-billed kite, the African grey hornbill, the Malachite kingfisher, the pied kingfisher, the double spurred francolin, the beautiful sunbird, the bronze manikin, the green-backed Camaroptera, the northern black flycatcher, orange-cheeked waxbill, green bellied quelea, village weaver, white-fronted black chat and the white-shouldered black tit. The species count ranged from one (1) in Location 8 to ten (10) in Location 1. Table 5-10 below summarizes the birds observed on the Package 1 ROW.

Other species of concern in Package 1 include the hippopotamus, *Hippopotamus amphibious* which is reported to be associated with the Black Volta and the Wechiau Community Hippo Sanctuary, south of Package 1.

5.3.2.3 CONSERVATION ISSUES AND MEASURES

Out of the sixty-three species recorded, only the Hippopotamus (*Hippopotamus amphibious*) which is associated with the Black Volta is Vulnerable. Located south of the study area is a 34 km riverine forest of the Black Volta that is protected for its hippopotami population. Known as the Wechiau Community Hippo Sanctuary, the area has been under protection since 1998 and houses one of the two remaining populations of the hippopotamus in Ghana. Sheppard et al (2010) reported the sightings of hippopotami 70 km upstream of the Wechiau Community Hippo Sanctuary and indicated connections between the Hippopotami community of the Sanctuary and populations at Bontioli Forest Reserve in Burkina Faso. This therefore confirms the sighting of hippopotamus in the study area along the Black Volta as reported by the interviewees.

Since the hippopotami was reported to be more associated with the sanctuary than the study area, it appears that development of road network in the study area would not adversely affect the Hippopotami community. However, pumping of water from the Black Volta for irrigation purposes may have implications for the Hippopotami community downstream. This is because some studies (e.g. Sheppard et al., 2010) suggest contact between the hippo population in the Wechiau reserve and those in Burkina Faso, in which case the natural migration route between these two populations will be the Black Volta. Similarly, farming of irrigated lands may create room for human – hippopotami conflicts. Therefore, it is recommended that additional studies on the Hippopotami community in the Black Volta should be carried out in relation to the Project, if possible, by the Contracting Entity at the final designs stage prior to construction. The aim of such studies will be to establish if the two hippo populations are linked in any way and if the Black Volta serves as migration route for the hippos in the Wechiau reserve. The result of such a study will lead to adequate mitigation for the migrating hippos.

Again, sustainable management and restoration efforts are encouraged to promote natural regeneration along all river banks and relic patches of riparian/gallery woodland vegetation along the Black Volta should be protected. Law enforcement and monitoring protocols need to also be tightened in respect of potentially vulnerable species, especially the Hippopotamus.

5.3.2.4 CONCLUSION

Animals provide insight to environmental health as a result of which their presence. Changes in their diversity and abundance are used to assess changes in the environment. This survey recorded sixty-three (63) species of animals in the project area, consisting of forty-nine (49) species of birds, seven (7) species of mammals, five (5) species of reptiles, and two (2) species of amphibians. The data

indicates a relatively high bird species richness while the species richness of mammals, reptiles and amphibians were generally low.

The high species richness of birds in the Upper West region have previously been confirmed by Sheppard et al (2010). This could partly be explained by the heterogeneity of the landscape which include both wetlands and upland habitats. Indeed, the specific habitat types which recorded the highest species richness in each of the Packages were all wetlands.

Table 5-10 Bird Species Observed at Sample Locations on Package 1 ROW

Class	Common Name	Species Name	Package 1 Sample Locations												
			1	2	3	4	5	6	7	8	9	10	11	12	13
Accipitriformes	Black kite	<i>Milvus migrans</i>						✓			✓	✓			✓
	Yellow-billed kite	<i>Milvus migrans parasitus</i>	✓												
Bucerotiformes	African grey hornbill	<i>Tockus nasutus</i>													✓
Charadriiformes	African jacana	<i>Actophilornis africanus</i>	✓					✓							
Columbiformes	Laughing dove	<i>Spilopelia senegalensis</i>	✓	✓	✓			✓	✓	✓	✓	✓		✓	
	Malachite kingfisher	<i>Alcedo cristata</i>												✓	
	Pied Kingfisher	<i>Ceryle rudis</i>									✓				
Cuculiformes	Levaillant's cuckoo	<i>Oxylophus levaillantii</i>	✓					✓							✓
	Senegal Coucal	<i>Centropus senegalensis</i>				✓			✓						
Falconiformes	Grey kestrel	<i>Falco ardosiaceus</i>		✓			✓				✓				✓
Galliformes	Double spurred Francolin	<i>Francolinus bicalcaratus</i>										✓			
Passeriformes	Beautiful sunbird	<i>Cinnyris pulchellus</i>						✓							
	Black-faced firefinch	<i>Lagonosticta larvata</i>											✓		✓
	Bronze mannikin	<i>Spermestes cucullatus</i>				✓									

Class	Common Name	Species Name	Package 1 Sample Locations												
			1	2	3	4	5	6	7	8	9	10	11	12	13
Passeriformes	Brown-throated martin	<i>Riparia paludicola</i>	✓					✓	✓					✓	✓
	Common bulbul	<i>Pycnonotus barbatus</i>	✓										✓	✓	
	Fanti saw-wing	<i>Psalidoprocne obscura</i>	✓		✓	✓								✓	
	Green- backed Camaroptera	<i>Camaroptera brachyura</i>					✓								
	Northern Black flycatcher	<i>Melaenornis edolioides</i>		✓											
	Northern grey-headed sparrow	<i>Passer griseus</i>						✓							✓
	Orange-cheeked waxbill	<i>Estrilda troglodytes</i>						✓							
	Pied crow	<i>Corvus albus</i>	✓					✓			✓				
	Red bellied quelea	<i>Quelea quelea</i>													✓
	Red-winged warbler	<i>Helolais erythropterus</i>											✓		✓
	Village weaver	<i>Ploceus cucullatus</i>	✓												
	White-billed buffalo weaver	<i>Bubalornis albirostris</i>				✓			✓						
	White-fronted black chat	<i>Myrmecocichla albigula</i>					✓								
	White-shouldered black tit	<i>Parus guineensis</i>		✓											

Class	Common Name	Species Name	Package 1 Sample Locations												
			1	2	3	4	5	6	7	8	9	10	11	12	13
Pelecaniformes	Cattle egret	<i>Bubulcus ibis</i>	✓		✓			✓			✓			✓	
Count			10	4	3	4	3	10	4	1	6	3	3	6	9

5.3.3 AQUATIC ECOLOGY

5.3.3.1 GENERAL SPECIES DIVERSITY AND CONSERVATION SIGNIFICANCE

Several of the waterbodies identified had dried up at the time of the survey, which was conducted in the dry season. Therefore, it was not possible to adequately assess the water quality or the aquatic lifeforms in those waterbodies. Figure 5-11 shows a drone image of a typical dry floodplain or riverbed observed during the survey. It is known that a number of the waterbodies are seasonal because their presence and state is determined by the volume of rainfall and other climatic factors. In all, seven (7) water samples were obtained from Package 1. Table 5-11 below summarizes the observations made on the condition of the waterbodies and the aquatic biota observed during the survey.

Table 5-11 Conditions of Waterbodies and Aquatic Biota Observed during the Survey

Sample Location	Nearest Settlement	Condition of Waterbody	Aquatic Biota
P1L1	Near Topiayiri	Earth dam; water quite turbid. Stream feeding dam dried up.	Insects, including dragonfly and water boatman. Submerged vegetation including Typha.
P1L3	Pond near Vieri	Main stream dry at time of visit. Pond located near bridge in depression.	Few insect species, mainly housefly and dragonfly observed. Little vegetation near pond.
P1L6	Earth Dam at Bacha	Main stream feeding dam dried up at time of visit. Water turbid, probably disturbed from cattle drinking same water.	Vegetation found include Typha and Cyperus. Housefly and dragonfly seen hovering over waterbody. Also found were mosquito larvae among plants.
P1L9	Stream at Dasayiri	Stream was small and turbid. No fishing activity observed though locals indicate that fishing does occur in the stream.	Locals indicate that fish species including tilapias are caught in the stream. None was however observed. Some aquatic plant species including Typha and Sporobolus were observed.
P1L10	Black Volta	River level was reduced in relation to river channel and previous water level mark. Main activity in the river at the time was swimming.	Some bird and plant species were identified on the banks of the river and are described in the floral and faunal sections of this report. No fishing activity was observed. Literature sources indicate the Black Volta has insect species including Chironomid larvae and dragonfly larvae, finfish species including tilapias and catfish and other vertebrates including crocodile, hippo and snakes.
P1L12	Earth Dam near Sankana	Dry riverbed leading to dam. Dam turbid and serves as cattle watering hole.	Plant species observed include Typha, Cyperus and Echinocloa. Aquatic fauna observed include the water boatman and the dragonfly.
P1L13	The Black Volta near Saan.	The Black Volta looked turbid and the water level	Interviews with locals indicate the river is a rich source of finfish

Sample Location	Nearest Settlement	Condition of Waterbody	Aquatic Biota
		was decreased in the channel.	including tilapias and catfish species. Literature sources indicate the Black Volta has insect species including Chironomid larvae and dragonfly larvae, finfish species including tilapias and catfish and other vertebrates including crocodile, hippo and snakes.

Literature on the fauna of the Upper West Region waterbodies and the Black Volta include Amakye (2001), Abban et. al. (1995), Abban et al. (2002), Abobi et al. (2015), Amevenku and Quarcoopome (2006), Dankwa et al. (1999), Alhassan (2014), Alhassan and Ofori-Danson (2016), Alhassan et al. (2016), among others. The authors listed a number of planktons, benthic and finfish species as occurring in waterbodies of the Northern, Upper East and Upper West Regions of Ghana. A careful study of these publications shows that the species listed were of least concern on the IUCN Red List of species of conservation importance. The Black Volta is however noted for its hippopotamus population and the species has been noted as vulnerable by the IUCN.



Figure 5-11 Drone Image of a Dry Floodplain

5.3.3.2 WATER QUALITY

The water quality of the locations sampled is presented in this section. The locations (waterbodies) from which water samples were analysed in Package 1 are:

- P1L1 - a dam near Topiayiri;
- P1L3 - an accumulation of water along a dry streambed near Vieri;
- P1L6 - a dam near Bacha;
- P1L9 - a dam near Dasayiri;
- P1L10 - the Black Volta after Kukpali;
- P1L12 - a dam near Sankana; and
- P1L13 - the Black Volta at Saan.

While water quality analysis was conducted to establish a baseline, it is worth noting that the most undesirable constituents of drinking water, according to the World Health Organization (WHO), are those capable of having a direct adverse impact on public health. The acceptability of drinking water to consumers is subjective and can be influenced by many different constituents. The concentration at which constituents are objectionable to consumers is variable and dependent on individual and local

factors, including the quality of the water to which the community is accustomed and a variety of social, environmental and cultural considerations (WHO, 2017).

Figure 5-12 shows the water temperature and dissolved oxygen concentration within the waterbodies sampled in Package 1. While the waterbodies were warm with temperature between 29°C and 35°C, the samples were well oxygenated, probably as a result of their shallow nature, which encouraged mixing. Oxygen solubility in water is negatively correlated with water temperature. Temperature and dissolved oxygen are important indicators of overall water quality; however, they do not present any direct health implications.

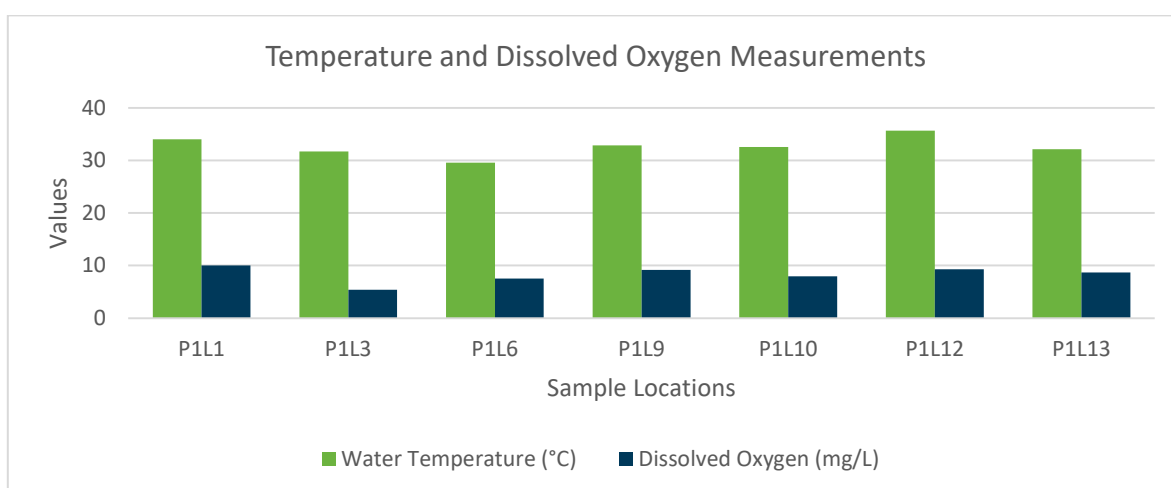


Figure 5-12 Temperature and Dissolved Oxygen Concentration of Sampled Waterbodies

The conductivity and total dissolved solids (TDS) concentrations within the waterbodies are presented in Figure 5-13. Electrical conductivity of water is a function of the ions dissolved in it (reflects the mineral salt content of water) and correlates well with total dissolved solids. The values obtained indicate low concentrations of dissolved ions in the water samples. Conductivity values ranged from 0.07 mS/cm (P1L6) to 0.21 mS/cm (P1L6) while the TDS concentration also ranged between 0.045 g/L (P1L6) to 0.138 g/L (P1L1). The samples from the Black Volta exhibited similar values for conductivity and TDS. The values were well below the Ghana Standards Authority (GSA) and GWCL guideline limit of 1000 μ S/cm for TDS in drinking water.

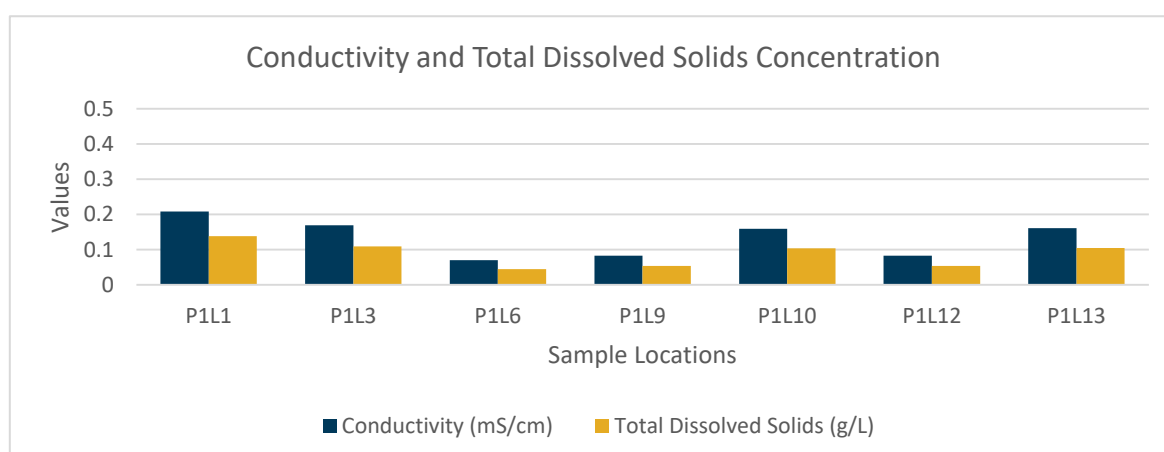


Figure 5-13 Conductivity and Total Dissolved Solids Concentration in the Water Samples

Figure 5-14 shows the pH in the water samples. The GSA and GWCL recommends pH of drinking water to be within the range of 6.5 - 8.5, however, the pH of most of the water samples were outside this

range. The values ranged from 8.04 to 9.92, indicating alkaline environment. However, the values were within a range similar to that of Kpieta and Laari (2014) who studied the water quality of small-scale dams and the possible health risks to users of the water in the Upper West Region.

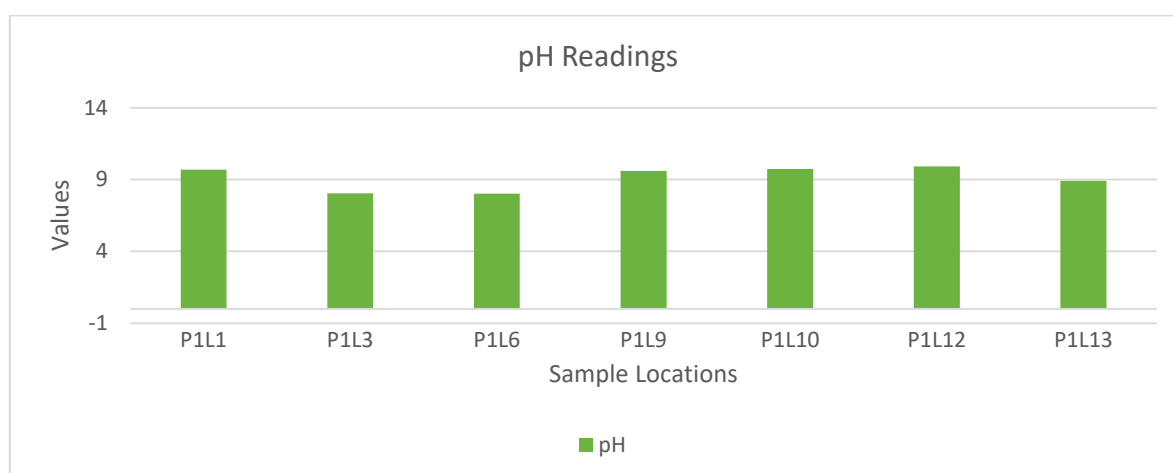


Figure 5-14 pH Readings in Sampled Waterbodies

Turbidity which measures the amount of suspended materials in the water samples was rather high at all the locations sampled. Turbidity in water arises from the presence of very finely divided solids which in most cases are not filtrable by routine methods. The WHO, GSA and GWCL guideline limit for turbidity of drinking water is 5 Nephelometric Turbidity Units (NTU), however, the turbidity values of the measured samples ranged between 121 NTU and 884 NTU (Figure 5-15). The high turbidity observed could be due to the shallow nature of the waterbodies and disturbance by animals such as cattle. The turbidity of the water could markedly affect its acceptability for drinking purposes without treatment or its utility for other domestic activities.

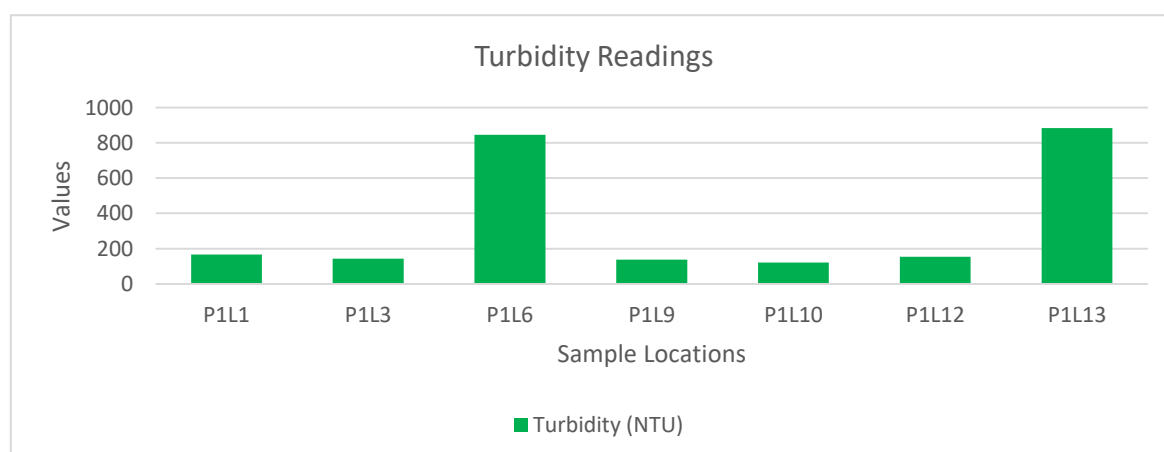


Figure 5-15 Turbidity Readings in Sampled Waterbodies

Figure 5-16 show the distribution of ammonia, nitrates and phosphates in Package 1. It was noted that the values were highest at Location P1L6 and lowest at P1L1. The contribution of ammonia and the nutrients into the waterbodies may be from animal activities or surface runoff since the streams that feed these waterbodies with the exception of the Black Volta had dried up during the survey. This could also be attributable to the project area being typically an agrarian society, as such, agricultural activities and intensive rearing of farm animals could give rise to detectable levels in surface water.

Natural levels of ammonia in surface water are usually below 0.2 mg/L; similarly, nitrate concentration in surface water is normally low but can reach high levels as a result of leaching or runoff from

agricultural land or contamination from human or animal wastes as a consequence of the oxidation of ammonia and similar sources (WHO, 2017). Phosphorus is also a major constituent of detergents, particularly those for domestic use, as such, the use of detergents in or near the waterbodies by residents could also be a potential contributor of phosphorus (or phosphates) in the waterbodies. Concentrations reported in the samples were however below the WHO, GSA and GWCL guideline limits for nitrate and nitrite which is 50 mg/L and 3 mg/L respectively. While the WHO has not set a guideline value for ammonia and phosphate, the GSA and GWC operates with maximum guideline values of 3 mg/L (ammonia) and 400 mg/L (phosphate), and the samples tested below these limits.

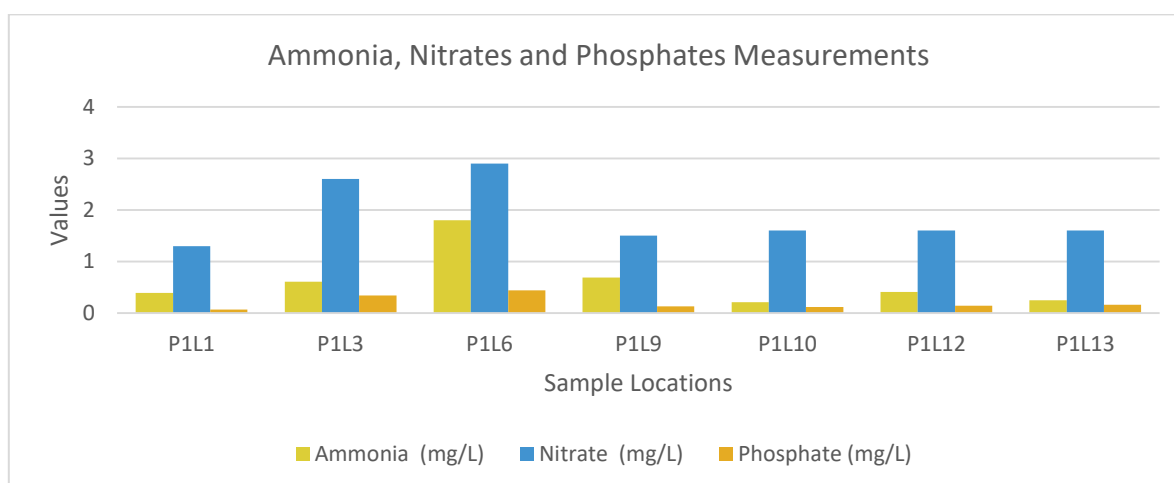


Figure 5-16 Concentration of Ammonia, Nitrates and Phosphates in Sampled Waterbodies

Sulphates and silica exist in natural waters, the concentrations varying according to the nature of the terrain through which they flow. Sulphates were highest at location P1L1 while silicates were highest at location P1L6 (Figure 5-17). Again, it is seen that the sources of this ions into the waterbodies may be surface run-off. The values in the samples from the Black Volta were similar, but P1L13 had slightly more elevated values than P1L10. The values were however well below the guideline limit of 500 mg/L by the WHO, and the GSA and GWCL guideline limit of 400 mg/L. While silica has no definite health implication in water, the major health implication of sulphates in drinking water is that excess sulphate has a laxative effect, especially in combination with magnesium and/or sodium. Also, the utility of waterbodies for domestic purposes will be severely limited by high sulphate concentrations.

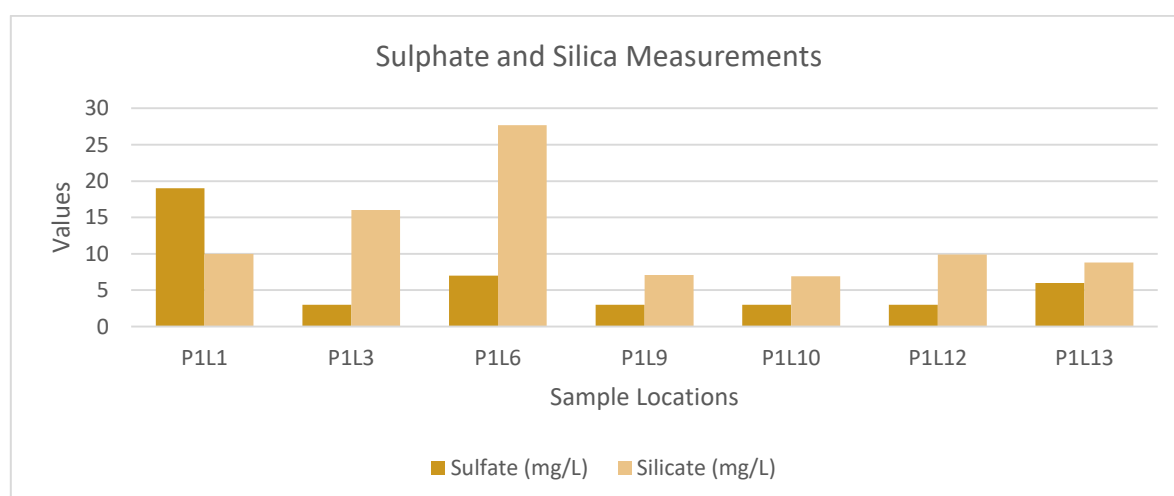


Figure 5-17 Concentration of Sulphate and Silica in Sampled Waterbodies

Calcium (measured as CaCO₃) and magnesium ions contribute to the hardness of water, with magnesium generally comprising about 15-20 percent of the total hardness expressed as CaCO₃. The recommended value for calcium by the WHO is 100-300 mg/L. The GSA/GWCL guideline values for magnesium and calcium are 150 mg/L and 200 mg/L respectively. The survey found that the values of calcium and magnesium ions in the water samples was low, usually less than 4 mg/L (Figure 5-18). The values were highest at P1L6 with calcium ion concentration being 2.1 mg/L and magnesium being 3.78 mg/L. The health implication of calcium in a waterbody is rather beneficial as waters which are rich in calcium (and hence are very hard) are very palatable. However, the chief disadvantages of hard waters are that they neutralise the lathering power of soap and they can cause blockage of pipes and severely reduce boiler efficiency because of scale formation.

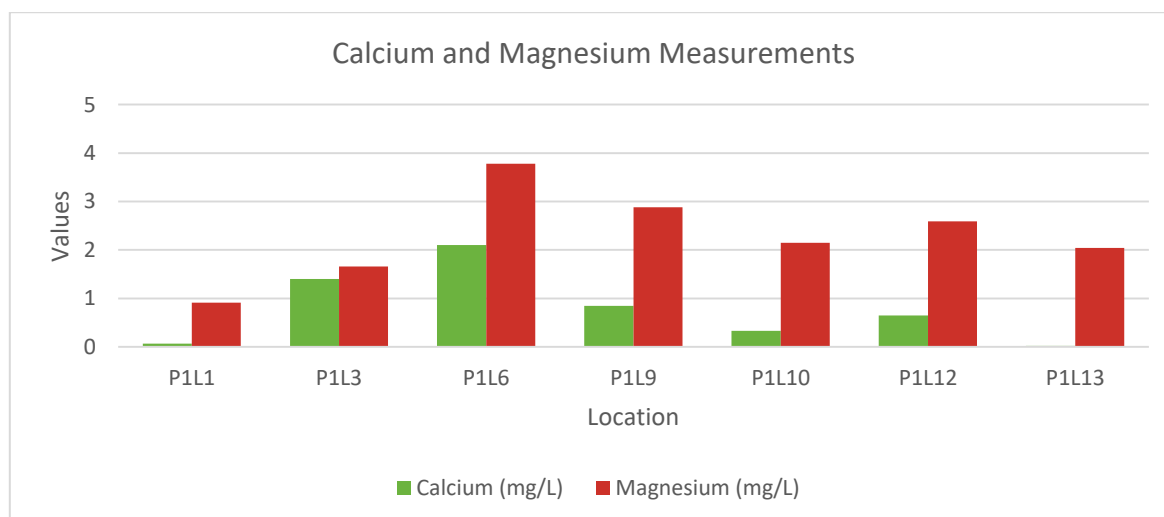


Figure 5-18 Calcium and Magnesium Concentrations in Sampled Waterbodies

5.3.3.3 CONCLUSION

Published literature shows a high diversity of aquatic fauna species associated with waterbodies in the three northern regions of Ghana, particularly within the plankton and benthic species. The study did not sample plankton or benthos but observed some benthic forms including gastropods and potentially polychaetes (particularly their burrows) during the survey. Interviews with local residents and fishers indicate that some diversity exists in the finfish species caught within the impoundments and along the Black Volta. However, during the survey, very little fishing activity was observed and the species that were observed were mainly the tilapia and catfish species. The tilapia species known to be associated with the Black Volta and waterbodies within the area are *Tilapia semifasciatus*, *T. zillii* and *Oreochromis niloticus* and the catfish species *Heterobranchus* sp., *Chrysichthys* sp. and *Clarias* sp. Though the locals in the area indicate the presence of crocodiles and monitor lizards, none of these was encountered during the survey.

The hippopotamus was described as associated with the Black Volta and its presence was reported by locals within the area. The conservation value of the hippopotamus is described under Section 5.3.2.3 of this report. Apart from the hippopotamus, no aquatic biota of conservation value was identified or encountered during the survey. It can therefore be concluded that the area has low significance for aquatic flora and fauna.

Water quality within the area was found to be within ranges of previously published literature on water quality within the three northern regions. The waterbodies encountered, with the exception of the Black Volta, were isolated from the streams that feed them. This is probably due to the period the survey was carried out, which was the dry season, during which several streams in the Upper West Region dry up.

However, the importance of this water resources to the communities cannot be overemphasized since the waterbodies serve as sources of drinking water in some of the communities, and are important for cattle or livestock. It is therefore recommended that during the construction of the road network, measures should be implemented to minimize the impacts of the construction activities on the water quality.

5.4 SOCIO-ECONOMIC ENVIRONMENT

This section looks into the existing socio-economic context of the project and provides comparative data on project affected areas that besides helping to draw comparisons with national and regional/district indicators, will also serve as a benchmark of pre-project conditions to help predict project induced changes and inform impact predictions. The data also provides a context for understanding feedback and perceptions from stakeholders, specifically verifying what is reported by stakeholders and understand the differences between stakeholders' perceptions of impacts and actual impacts.

The term 'social' as used in this chapter will include the following, as a minimum:

- Formal and informal settlements (including temporary and permanent human residents with both formal and informal tenure of land/structures);
- Population dynamics including population size, structure, settlement patterns and migration;
- Social infrastructure such as schools, community centers, electricity and potable water services;
- Livelihoods and businesses; and
- Community health and safety.

5.4.1 REGIONAL / DISTRICT BACKGROUND

This section provides basic descriptions on Wa Municipality, Nadowli-Kaleo and Wa West Districts. It does so collectively due to the numerous similarities shared. It provides brief descriptions of the demographics, economic activities, religion and culture, as well as social amenities or infrastructure and services. The information presented are culled from various sources, including the 2010 PHC, data from the social survey, as well as field observations.

5.4.1.1 DEMOGRAPHICS

The Wa West District was carved out of the Wa Municipality and made an autonomous district by L.I 1746. The District is located in the western part of the Upper West Region, approximately between latitudes 9° 40' N and 10° 10' N and also between longitudes 2° 20' W and 2° 50' W. The administrative capital is Wechiau. The District shares boundaries with Sawla-Tuna-Karlba District to the south, Wa Municipal to the east, Nadowli-Kaleo District to the north and to the west with Ivory Coast. The GSS (<https://statsghana.gov.gh>), projected population of the Wa West District for 2019 is 98,193. This is made up of 48,283 males and 49,910 females. The projected population for 2020 is 100,439, and this comprises of 49,419 males and 51,020 females.

The Nadowli-Kaleo District is located in the central part of the Upper West Region. It lies between latitudes 11° 30' N and 10° 20' N and longitudes 3° 10' W and 2° 10' W. It covers a total land area of 2,742.50 km² and the administrative capital of the Nadowli Kaleo District is Nadowli. The District shares boundaries with Jirapa Municipal to the north, to the south with Wa West District, to the east with Daffiama-Bussie-Issa District and to the west with Ivory Coast. The District is basically made of rural localities. The population is youthful, as much as 40.5% of persons being below 15 years, depicting a broad base population pyramid which tapers off with a smaller percentage of elderly persons (60 years and older) representing 9.6%. The GSS, projected population of the Nadowli-Kaleo District for 2019 is

74,498 made up of 36,639 males and 37,859 females, and that of 2020 is 76,195, made up of 37,491 males and 38,704 females.

The Wa Municipal is located in the southeastern part of the Upper West Region. The capital is Wa. It has a landmass of about 1,078 km², which lies between latitudes 9° 55' N and 10° 25' N and longitudes 1° 10' W and 2° 5' W. The Municipal shares borders with Wa West District to the west, Nadowli District to the north, Wa East District to the east, and Sawla-Tuna-Karlba Districts to the south. Those aged 15 years and below represent 35% of the total population depicting a broad base population pyramid which tapers off with a small number of elderly persons representing 6.2%. The GSS projected population of the Wa Municipality for 2019 is 129,546 made up of 63,713 males and 65,833 females, and that of 2020 is 132,487, made up of 65,191 males and 67,296 females.

Table 5-12 shows the Municipality / Districts under the OPBRC Package 1 Project and their projected population and density.

Table 5-12 Demographic Profile of the MMDAs

MMDA	Capital	Projected Population (2019)	Population Density
Wa West	Wechiau	98,193	65.8/km ²
Nadowli-Kaleo	Nadowli	74,498	27.1/ km ²
Wa Municipal	Wa	129,546	120.1/ km ²

Source: www.ghanadistricts.com / www.citypopulation.de

5.4.1.2 POVERTY DYNAMICS

Geographic conditions (drought-prone plains) of the Upper West Region puts the region at a disadvantage, as this contributes to the high rate of poverty in the region. According to the Ghana Growth and Poverty Reduction Strategy 2006 - 2009 report, low productivity and poorly functioning markets for agricultural outputs are among the main causes of rural poverty, particularly in the Upper West Region. This situation has been corroborated by statistics from the Ghana Statistical Service (GSS, 2015) which shows the region has the highest poverty incidence among all the regions in Ghana (70.7%). Within the region, Wa West District recorded the highest poverty headcount (92.4%), followed by Wa East (83.8%) and Sissala West (81.2%) districts, see Figure 5-19. The poverty headcount for Nadowli-Kaleo District is 68.5% and Wa Municipal's 35.5% is the lowest in the region. Thus, the Wa West District has the highest poverty incidence and depth. In terms of depth of poverty per the Poverty Map of Ghana (2015), the Wa West District, Nadowli-Kaleo District and Wa Municipal were ranked 1st, 18th and 56th respectively, out of the 216 districts assessed at the time.

In terms of the number of poor persons, Wa West District (74,297) has the highest, followed by Jirapa Municipal (62,364) and Wa East District (59,577). The Daffiama-Bussie-Issa District, which has the lowest population in the region, has the lowest number of poor persons. Wa Municipal, on the other hand, has the largest population of 102,264 in the region but had a relatively low number of poor persons (36,253).

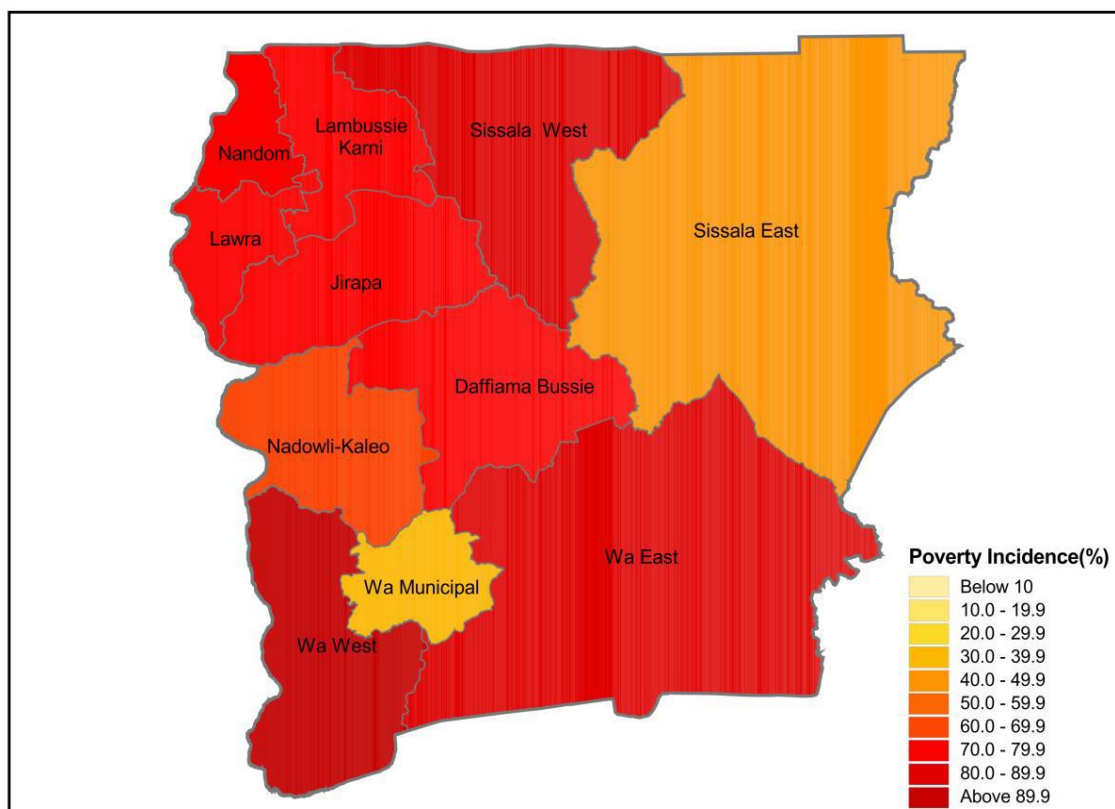


Figure 5-19 Poverty Incidence Map – Upper West Region

Source: Ghana Poverty Mapping Report, Ghana Statistical Service, May 2015

Data obtained from FGD, official consultations and CEA meetings all indicated that about 75% of the population can be described as poor. This stems partly from the type of farming system practised in the districts / municipality (which is mostly subsistence farming), whereby the majority of agricultural households cultivate crops mostly to feed the family and only a small percentage of crops harvested are sold. Also, the lack of collateral, sureties or guarantees to secure loans from financial institutions for business start-ups makes it impossible for people to set-up small businesses.

Even though the Business Advisory Centre of the National Board for Small Scale Industries exist in the three (3) MMDAs, they only provide education and training on ways to start-up small businesses but do not offer any form of financial assistance to bring these businesses into the real world. In addition, lack of market for crops, bad roads linking villages to market centres, among others, do not allow farmers to sell crops at market prices; rather they sell well below those prices so as to prevent crops from going bad. This leads to low-income generation after months of tedious work on the farm, as well as returns on investments in agro-inputs.

5.4.1.3 ECONOMIC ACTIVITIES

5.4.1.3.1 Major Economic Activities

The main economic activity of the Upper West Region is agriculture. The predominantly agrarian economy has people engaged in the cultivation of food crops such as millet, sorghum, maize, rice, yams, groundnuts and beans, and rearing of animals. Most farmers undertake a combination of crops and animal production. Tree cropping is also done, particularly mangoes and cashew. However, the districts under this program have varying percentages of the levels of agriculture's contribution to their economies. These vary from as high as about 85% in Nadowli-Kaleo and as low as 30.2% in Wa

Municipal. This gives an average of about 60%. The Wa West District Assembly for instance places a high priority on irrigation facilities to enhance dry season gardening and it is estimated that there are about sixteen dams and dugouts in various communities in the district.

Not only is agricultural production in the region characterized by small farms, productivity of crops is also low due to a combination of factors such as inadequate rainfall, low soil fertility, poor cultural practices and low technology application. Due to the small size of most farms, market-oriented activities are limited and the majority of farmers are involved in subsistence farming. Interestingly, female-led farms, especially those that are of medium or large size, are more likely to be market-oriented than those held by men of similar size.

In all three (3) districts, the informal sector of the economy overwhelmingly dominates the formal sector by a ratio of 70%.

5.4.1.3.2 Inequality Patterns

According to the 2010 PHC, income distribution is expectedly generally higher for men than women in the Upper West Region. While 55.7% of men earn up to GHS 1,000 per month, just above half of this figure (31.6%) of women earn a monthly income within the same range of up to GHS 1,000 as primary income. Conversely, 3.8% of men earn between GHS 2,500 per month and GHS 4,000 per month, whereas the figure for women is less than 1%. A major determinant for economic well-being is gender.

5.4.1.3.3 Economic Differences between Men and Women

There are major economic differences between men and women. The most pronounced one is in the division of labour. Domestic production is traditionally allocated to women and they include activities such as providing subsistence as well as care to their families. This has tended to leave women with tasks and responsibilities that are not paid for such as organizing the homes, doing domestic chores and fending for the family unlike the men who can migrate and take up paid employment.

Additionally, women and girls are engaged in economic activities that are generally not regarded as economic work such as fetching water, taking care of younger children and the elderly, household work, and sometimes work on small homestead farms. Most women farm on the homesteads while their male counterparts farm both on the homesteads and outside of the homestead or in the bush (other farm areas). The dual responsibilities of women tend to limit their income earning opportunities and have generally resulted in women earning less than men. Also, the educational level of women is far below that of men, which gives men much more employment opportunities to earn income than for women. Another major difference is that women have no ownership of assets (factors of labour) such as land and sometimes capital in terms of money. These differences are the main contributors to the skewedness of economics of gender.

5.4.1.3.4 Working Conditions and Employment

The economically active population, which is made up of those 15 years and above, is mainly engaged in agriculture and related work, trading and artisanal work, with the highest number (80.4%) engaged in agriculture; also, 18.5% engage in trading and artisanal works from the survey. The employment status of the active population is mostly self-employed. In all the districts, the employment range is between 65.2% and 83.6%, and employment for men is slightly higher than that of women. In the same vein however, unemployment is higher for males than females. It is thought that domestic activities together with small-scale economic activities such as shea processing tend to fill in the employment gaps for women, even though they themselves do not always regard it as income earning activity.

5.4.1.4 CULTURAL ENVIRONMENT

5.4.1.4.1 Ethnicity, Language and Religion

The ethnic group found within the three (3) districts in the survey were mostly Dagaaba, Wala, Dagomba and Akans. From the survey, about 58.6% of the people are of the Dagaaba ethnic group, 32.9% from the Wala ethnic group, 2.9% from the Dagomba ethnic group and Akans added up with 0.7%. However, Akan (Twi) is fairly commonly spoken, given that the team encountered Twi speaking residents in about 40% of the communities surveyed. Christianity, Islam and Traditional religion are the main religions. Available statistics from the 2010 Population and Housing Census Report identify the predominant religious groups as Christianity (29.0% for Wa Municipal, 38.6% for Wa West District and 68.8% for Nadowli-Kaleo District), Islam (65.9% for Wa Municipal, 23.5% for Wa West District and 17.0% for Nadowli-Kaleo District) and Traditional (4.1% for Wa Municipal, 29.5% for Wa West District and 9.9% for Nadowli-Kaleo District).

5.4.1.4.2 Traditional Governance and Practice

The traditional set-up and governance are centered on traditional councils. The Nadowli-Kaleo District for instance has five (5) Traditional Councils, namely, Kaleo, Sankana, Takpo, Nadowli, and Charikpong Traditional Areas; all headed by paramount chiefs. These traditional areas, however, are not necessarily confined within district boundaries, since districts are the creation of the political state of Ghana. Festivals are key celebrations of the people of these districts, as it is with the larger Ghanaian cultural set up. While the people of Takpo still celebrate the major ones like the Willaa Festival, others have become dormant.

The Paramount Chief of Wa also referred to as the Waana is the overlord of the Waala Traditional area with four (4) distinct gates namely Busa, Guli, Kperisi and Sing (Bin Salih, July 2018). The people celebrate the Dumba festival to mark the birth of Prophet Mohammed, whereby the overlord has to jump over a live cow to renew his mandate as the paramount chief. The Waalas are thus predominantly Muslims.

The key traditional head of the Wa West District is the overlord of the Wechiau Traditional Area. The people of Wechiau (Wecheeguu) revere the hippopotamus and have thus created the “Kaka” or “hippo” festival based on the belief that it was the hippos that saved them from slave raiders in the era of the slave trade. Thus, there is a hippo sanctuary at Wechiau for the conservation of the hippos and other animals and it is a major tourist site in the Upper West Region of Ghana.

5.4.1.5 SOCIAL INFRASTRUCTURE AND SERVICES

All the three (3) districts within the project area had all the basic infrastructural services such as schools (primary, secondary, and tertiary for Wa Municipal), health facilities, police stations, churches and mosques, electricity, water, etc. Some of these facilities were easily seen in the communities visited or on the way to the communities. The survey also revealed that the main source of lighting (73.2%) is electricity. Other sources include flashlights / torches, kerosene lamps, candles, firewood and crop residue. The sources of cooking fuel for households are mainly charcoal, wood and Gas (LPG).

The three (3) major telecommunications networks (MTN, Vodafone and AirtelTigo) are present in almost all the districts and mobile phones are largely used for communication. From the totality of the survey and general interactions, the dominance of MTN and Vodafone is evident as most phone numbers provided by the survey respondents and other contacts were of these networks. AirtelTigo follows these two networks. All three (3) telecom service providers have visible presence and carry the full portfolio of the services they provide. Nevertheless, communities in enclaves close to the border of Burkina Faso and the Black Volta, such as Mwabasi in the Wa West District, have no telecom services signal from

Ghanaian networks. On the contrary, Orange network from Burkina Faso is easily accessed in these areas.

Major markets in these districts are the Wa New Market, Wa (Old) Market, Wechiau Market, Dorimon Market and Nyoli Market.

5.4.1.6 SANITATION AND WATER SERVICES

The disposal of both liquid and solid waste is mainly by throwing waste outside the house or compounds. The main method of solid waste disposal in the districts is mostly in an open public area or open space (38.1%). This is followed by 30.7% who dump waste in a public waste container. Meanwhile, 20.9% dump waste indiscriminately. With regards to liquid waste, most (75.1%) households throw their liquid waste onto the compound. Another 14.7% throw their liquid waste onto the street or outside while 9.4% throw liquid waste into gutters.

Regarding toilet facilities, members of households with no toilet facility resort to open defecation in the bush or field. However, the majority (67.8%) have access to a toilet facility. Out of those who have access, 73% use the public toilet, 3.9% use the pit latrine, and 2.7% use water closets (WC). In terms of bathing facilities in the municipality, those who have access to their own bathroom for exclusive use make up 19.3%, whereas 24.5% use shared bathrooms. Meanwhile, 27.8% use shared open cubicles.

The Wa West District Medium-Term Expenditure Framework Report 2017, indicated that, for Wa West, a total of 19,067 people gained access to improved household toilet facilities in the district under the Community-Led Total Sanitation (CLTS) Project. Additionally, about thirty-eight (38) communities in the district have attained open defecation free status. This had won the assembly the accolade of being the best performing district in combating open defecation in the region. However, open defecation persists in the district.

Boreholes serve as the main source of drinking water for 78.8% of the households; and an overwhelming number (77.1%) of them are public ones.

5.4.1.7 TOURISM

The tourism potential of the project area is found in its rich natural, cultural, historical and man-made attractions. The most significant of them is the Wechiau Community Hippo Sanctuary which is about 18 km from Wechiau. The Wechiau Hippo Sanctuary is a community-based conservation initiative aimed at providing the Wechiau catchment area inhabitants with a source of revenue and improved quality of life, while simultaneously offering protection to the flora and fauna found within the designated lands. The coordinates of the river portion of the sanctuary are 09° 51' North and 02° 44' West and 09° 38' North and 02° 44' West for the northern and southern boundaries respectively. About 237 birds, 226 plants, 50 mammals, 32 reptiles and 9 amphibians are hosted by the Wechiau Community Hippo Sanctuary (Sheppard, 2010).

Other potential tourism sites that could provide income to the district are the Ga crocodile pond, the Lobi Architecture, a three hundred-year-old mosque, located in Wa Municipality around the Chief's Palace and indigenous grinding mills.

Various festivals are also celebrated in the project area which attracts tourism. Notable ones are the Wilaa festival.

5.4.2 SOCIAL / HOUSEHOLD CHARACTERISTICS

5.4.2.1 DISTRICTS / COMMUNITIES STUDIED

The various communities under Package 1 OPBRC network where the social survey was carried out is as shown in Table 5-13 and further illustrated in Figure 5-20. Table 5-14 presents the distribution of interviews conducted in each district across gender. As indicated, a total of 281 household respondents were interviewed. The respondents were drawn from different communities through which the project roads traverse. All project community members could not be covered under this survey, hence the sampling. A total of 73.67% of the respondents were males (representing 207) while the remaining 26.33% were females (74 respondents). More than half (55.52%) of the total respondents were sampled in the Wa Municipality. This was followed by Nadowli-Kaleo (27.76%) and Wa West (16.73%). Other information sources used in obtaining information or concerns from the community members included FGD and community fora.

Table 5-13 MMDAs and Communities Studied

MMDA	COMMUNITIES	TOTAL COMMUNITIES
Wa Municipal	Busa, Tangaju (Dam 4), Dadafuri, Kpongo, Kperisi, Guonuo, Wa township	7
Wa West	Yiziri, Bakparma, Jambosi, Buka, Nwaabas, Dorimon, Dabo, Egggu, Chietanga, Guse, Bienye, Nyoli, Wechiau, Sigir, Losse, Vieri, Siiru, Boro, Domawa, Piisie, Gbondberi, Salimana, Tanvare, Konbuoli, Sukpere, Asse, Charia	27
Nadowli-Kaleo	Nanville, Kpaala, Nadowli, Tangasia, Cherikpong, Saan, Siiraa, Takpo, Kaleo, Sankana, Piisi, Sombo, Jang, Nator, Natoduri, Changu, Serekpere, Goli, Duori, Cherikpong	20

Table 5-14 Gender Distribution of Respondents across the MMDAs

MMDA	Male		Female		Total	
	No.	%	No.	%	No.	%
Wa Municipal	111	39.50	45	16.01	156	55.52
Wa West	33	11.74	14	5.34	47	16.73
Nadowli-Kaleo	63	22.42	15	4.98	78	27.76
Total	207	73.67	74	26.33	281	100.00

Source: Field Survey, August 2019

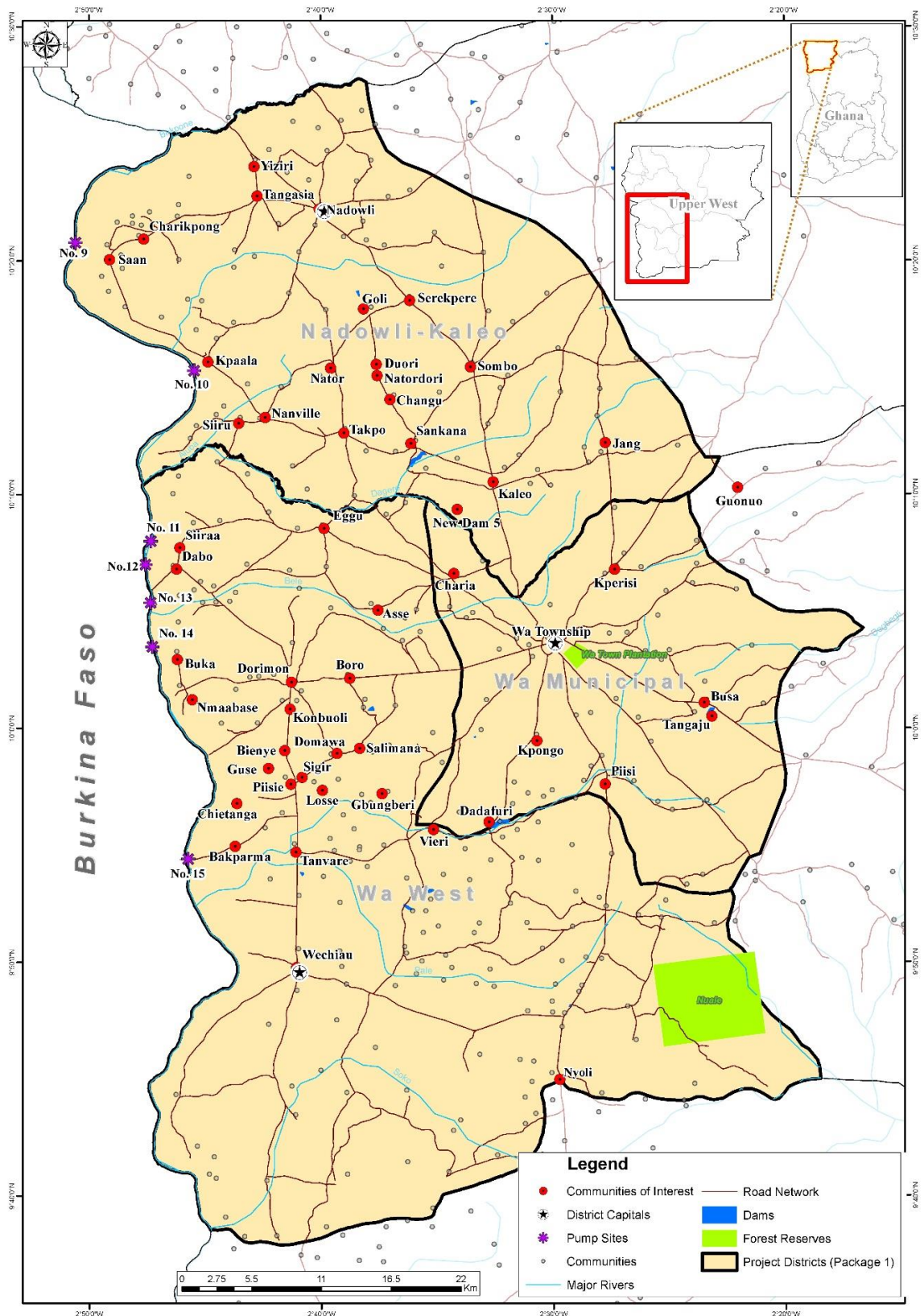


Figure 5-20 Communities along the Feeder Roads where Survey was Conducted

5.4.2.2 HOUSEHOLD STATUS OF RESPONDENTS

Table 5-15 provides the household status of respondents. More than half of the respondents surveyed (64.06%) were heads of households. Majority (58.72%) of the household heads are males as compared to females (5.34%). This is also evident in the Upper West Region as a whole where, according to the 2010 PHC, males constitute a very high (85.5%) proportion of household heads compared to females (15.0%). The spouses and children of the heads of households who were interviewed constituted 14.59% and 6.41% respectively of the total sample of 281 respondents.

Table 5-15 Household Status of Respondents

Status	Male		Female		Total	
	No.	%	No.	%	No.	%
Household Head (HH)	165	58.72	15	5.34	180	64.06
Rep	6	2.14	5	1.78	11	3.91
Spouse	4	1.42	37	13.17	41	14.59
Son	12	4.27	0	0.00	12	4.27
Brother	7	2.49	0	0.00	7	2.49
Daughter	0	0.00	6	2.14	6	2.14
Grandson	2	0.71	0	0.00	2	0.71
Mother	1	0.36	8	2.85	9	3.20
Father	10	3.56	0	0.00	10	3.56
Grandchildren	0	0.00	3	1.07	3	1.07
Total	207	73.67	74	26.33	281	100

Source: Field Survey, August 2019

5.4.2.3 AGE AND GENDER DISTRIBUTION

There were more males (207, representing 73.67%) than females (74, representing 26.33%) engaged in the survey. Out of this, the age distribution across gender and the total distribution is as presented in Table 5-16. In general, the 31 - 40 years age cohort dominated with 30.60% representation. This was followed by the 41 - 50 years and 21 - 30 years age groups (27.05% and 12.46% respectively). There were more males than females in each age category.

Table 5-16 Age and Gender Distribution of Respondents

Age Category	Male		Female		Total	
	No.	%	No.	%	No.	%
18 - 20	14	4.98	7	2.49	21	7.47
21 - 30	23	8.19	12	4.27	35	12.46
31 - 40	62	22.06	24	8.54	86	30.60
41 - 50	50	17.79	26	9.25	76	27.05
51 - 60	30	10.68	1	0.36	31	11.03
61 - 70	22	7.83	3	1.07	25	8.90
71 - 80	3	1.07	0	0.00	3	1.07

Age Category	Male		Female		Total	
	No.	%	No.	%	No.	%
Above 80	3	1.07	1	0.36	4	1.42
Total	207	73.67	74	26.33	281	100.00

Source: Field Survey, August 2019

5.4.2.4 EDUCATIONAL ATTAINMENT OF RESPONDENTS

Table 5-17, which shows the educational attainment of survey respondents, confirms the low level of education of the people in the Region as indicated in the 2010 PHC report. More than half (59.79%) of the respondents had no formal education. For those with formal education, majority (12.81%) of them went up to Junior High School (JHS) or had Middle School Leaving Certificate (JHS/MSLC). This is followed by those who ended at primary or basic school level (11.03%). Those who went up to Senior High School (SHS) accounted for 7.47%. Generally, there were more males than females at all levels of education.

Table 5-17 Highest Level of Education Attained by Respondents

Education Level	Male	%	Female	%	Total	%
None	122	43.42	46	16.37	168	59.79
Primary	18	6.41	13	4.63	31	11.03
JHS/MSLC	29	10.32	7	2.49	36	12.81
Senior High School (SHS)	17	6.05	4	1.42	21	7.47
Voc/Tech/Com	2	0.71	0	0.00	2	0.71
Training College	10	3.56	1	0.36	11	3.91
Polytechnic	2	0.71	1	0.36	3	1.07
University	7	2.49	2	0.71	9	3.20
Total	207	73.67	74	26.33	281	100.00

Source: Field Survey, August 2019

5.4.2.5 NATIONALITY OF RESPONDENTS

All surveyed respondents are Ghanaians. The implication is that, the responses from the respondents and their demographics entirely portrays a Ghanaian view and context.

5.4.2.6 RELIGIOUS AFFILIATION

All the respondents belonged to a religious group. Table 5-18 shows that there are more Christians (53.38%) than Muslims (40.93%), Traditionalists (5.34%) and other religions (0.36%). There were more male Muslims and traditionalists than females, while the female Christians dominated over their male comparators. Majority of the Christians are Catholics.

Table 5-18 Religious Affiliation of Respondents

Religion	Male		Female		Total	
	No.	%	No.	%	No.	%
Christian	113	40.21	37	13.17	150	53.38

Religion	Male		Female		Total	
	No.	%	No.	%	No.	%
Muslim	80	28.47	35	12.46	115	40.93
Traditional	13	4.63	2	0.71	15	5.34
Others	1	0.36	0	0.00	1	0.36
Total	207	73.67	74	26.33	281	100.00

Source: Field Survey, August 2019

5.4.2.7 MARITAL STATUS

Out the 281 respondents, there were 145 married men (51.6%) and 44 married women (15.66%), followed by single men (13.17%) and single women (3.2%) as shown in Table 5-19.

Table 5-19 Marital Status of Respondents

Marital Status	Male	%	Female	%	Total	%
Married	145	51.60	44	15.66	189	67.26
Single	37	13.17	9	3.20	46	16.37
Divorced	8	2.85	2	0.71	10	3.56
Widow/er	11	3.91	12	4.27	23	8.19
Separated	3	1.07	3	1.07	6	2.14
Consensual union	3	1.07	4	1.42	7	2.49
Total	207	73.67	74	26.33	281	100.00

Source: Field Survey, August 2019

5.4.2.8 DISABILITY STATUS

Only 8 (2.85%) of the respondents from the three districts affirmed having a disability while 273 (97.15%) were all able bodied and had no form of disability as shown in Table 5-20 and further illustrated in Figure 5-21. Out of the 8 disable people, 3 (2 males and 1 female) were physically challenged, 3 (2 males and 1 female) were visually impaired and 2 (all males) were hearing impaired.

The assessment of the vulnerability status of people is key to establishing conditions specific to the project area and interventions that can be put out to deal with concerns regarding vulnerability. Compared with the regional statistics, the Wa Municipality is reported to have 2.6% of the population being disabled, of which 50.5% are females. For the Wa West and Nadowli-Kaleo Districts, 3.0% and 4.8% of the respective populations are disabled of which 48.1% and 52.4% are females respectively.

Table 5-20 Disability Status of Respondents

Disability Status	Yes	No	Total
Male	6	201	207
Female	2	72	74
Total	8	273	281

Source: Field Survey, August 2019

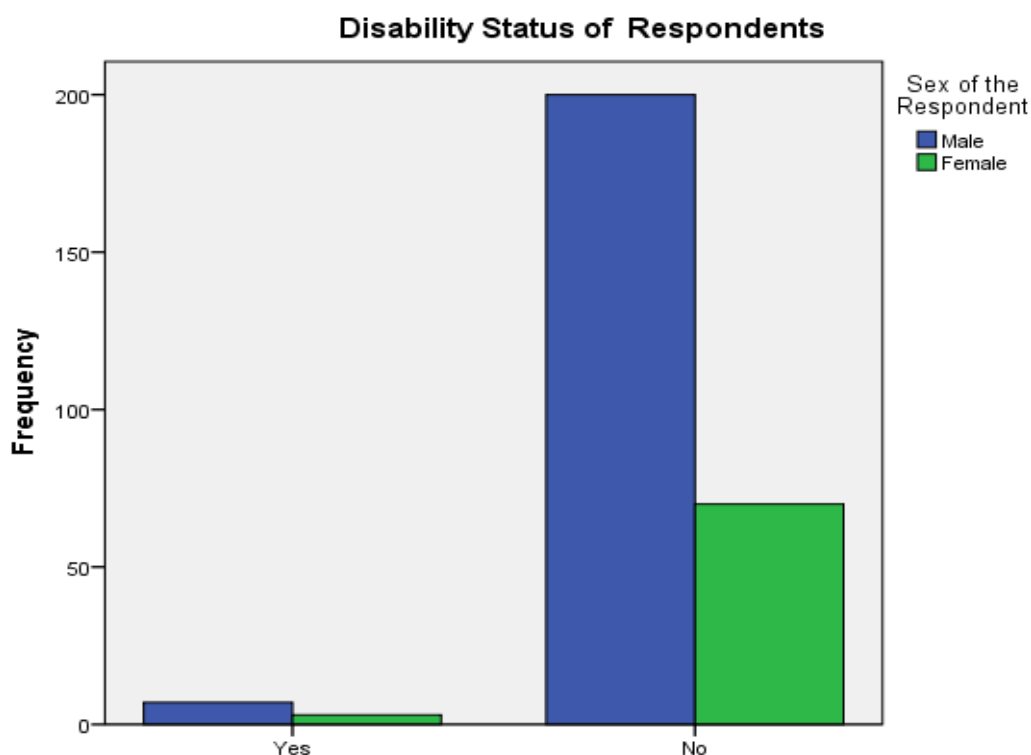


Figure 5-21 Responses on Disability Status of Respondents

5.4.2.9 HOUSEHOLD SIZE

Table 5-21 shows the household characteristics in terms of size. The average household size in the area of study is 3 persons per household, which is lower than the national average of 4.4 persons (PHC, 2010). There were 22.78% single member households and the largest category was the 2 - 5 member households with 65.48%. This was followed by the 6 - 9 member households and 10 - 15 member households with 11.03% and 0.36% of respondents respectively. At least each household had a member aged 18 years and above. This is due to the criteria employed in engaging survey respondent, who were expected to be of age.

Table 5-21 Household Size of Respondents

Household Size	Male		Female		Total	
	No.	%	No.	%	No.	%
1 member	41	14.59	23	8.19	64	22.78
2 - 5	143	50.89	41	14.59	184	65.48
6 - 9	21	7.47	10	3.56	31	11.03
10 - 15	1	0.36	0	0.00	1	0.36
16 and above	1	0.36	0	0.00	1	0.36
Total	207	73.67	74	26.33	281	100.00

Source: Field Survey, August 2019

5.4.3 ECONOMIC CHARACTERISTICS

5.4.3.1 MAJOR AND MINOR (SECONDARY) OCCUPATION

A total of 184 (65.48%) out of the 281 respondents affirmed that they are economically engaged or employed. The main economic activity engaged in by the people of Upper West Region is agriculture. This is confirmed by the survey result across the three (3) districts as presented in Table 5-22 and further illustrated (in terms or percentage proportion) in Figure 5-22.

The majority of the respondents (75.54%) are engaged in agriculture - crop farming, livestock and fishing. Another 14.67% are into trade, while 3.8% are artisans and 1.67% are into charcoal production. The trade engaged in by the women is mainly the brewing of “pito”, an indigenous drink brewed by the people of the Upper West Region. The married and co-habiting women serve as support-family workers to their partners while others engage in trade, mainly brewing and sale of “pito”. The artisanal work included weaving, carpentry and masonry, among others.

There was a male domination at all level of employment status, and many of the respondents were generally engaged full time than part-time.

Table 5-22 Major Occupation of Respondents

Major Occupation	Male		Female		Total	
	No.	%	No.	%	No.	%
Crop farmer	96	52.17	30	16.30	126	68.48
Livestock farmer	9	4.89	3	1.63	12	6.52
Fisherman	1	0.54	0	0.00	1	0.54
Charcoal produce	2	1.09	1	0.54	3	1.63
Petty trader	19	10.33	8	4.35	27	14.67
Artisan	5	2.72	2	1.09	7	3.80
Student	6	3.26	0	0.00	6	3.26
Others	2	1.09	0	0.00	2	1.09
Total	140	76.09	44	23.91	184	100.00

Source: Field Survey, August 2019

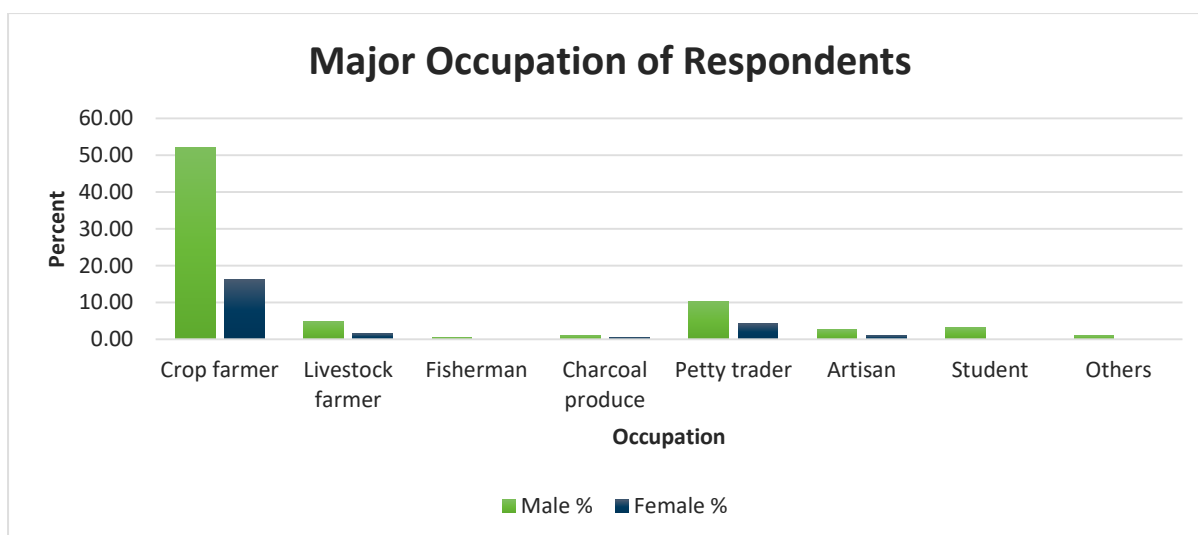


Figure 5-22 Pictorial View of Respondents' Major Occupation

Out of the 184 employed respondents, 46 (25%) respondents confirmed that they have a secondary job, with 80.43% being males and 19.57% being females as shown in Table 5-23.

Table 5-23 Responses on whether Respondents have a Secondary Occupation

Gender	Yes	No	Total
Male	37	103	140
Female	9	35	44
Total	46	138	184

Source: Field Survey, August 2019

5.4.3.2 INCOME

5.4.3.2.1 Source of Income

The main sources of income reported by respondents and their households are earnings from primary and secondary occupations, and non-labour income. Of the 184 respondents having primary occupations, their income altogether comes to about GHS 73,089.72/month with an average of approximately GHS 397.23/month. The total income of the 46 respondents with additional (secondary) occupations also totals GHS 23,975.46/month and averages GHS 521.21/month. The data also show some 97 respondents who have some sources of non-labour income with a monthly total of about GHS 3,152.50/month and an average of GHS 32.50/month as shown in Table 5-24.

Table 5-24 Respondents' Source of Income

Income sources	Households that earn income	Total monthly income of all households (GHS)	Average monthly income (GHS)
Primary Occupation	184	73,089.72	397.23
Secondary Occupation	46	23,975.46	521.21
Remittances	97	3,152.50	32.50

Source: Field Survey, August 2019

5.4.3.2.2 Monthly Income from Primary Sources

Table 5-25 shows the income earned from primary occupation in various monthly income brackets. The primary income of majority (68.5%) of respondents is shown to be at most GHS 200.00 per month. This is followed by 19.6% of respondents whose incomes fall within the GHS 201.00 to GHS 500.00 monthly bracket. Again, the Table shows that males dominate in all income categories relative to their female comparators.

Table 5-25 Respondents' Monthly Income from Primary Occupation

Monthly Income Bracket	Male		Female		Total	
	No.	%	No.	%	No.	%
Up to 200	96	52.17	30	16.30	126	68.48
201 - 500	25	13.59	11	5.98	36	19.57
501 - 1000	16	8.70	3	1.63	19	10.33
1501 - 2000	1	0.54	0	0.00	1	0.54
2001 - 2500	1	0.54	0	0.00	1	0.54
2501- 4000	1	0.54	0	0.00	1	0.54
Total	140	76.09	44	23.91	184	100.00

Source: Field Survey, August 2019

5.4.3.2.3 Monthly Income from Secondary Sources

In line with the general earnings of men being higher than that of women, this data shows similar trend where the highest earnings from secondary sources are earned by the male gender (Table 5-26). The Table also shows that 84.8% of respondents earn below GHS 201.00 from their secondary occupations.

Table 5-26 Respondents' Monthly Income from Secondary Occupation

Income Bracket	Male		Female		Total	
	No.	%	No.	%	No.	%
Up to 200	30	65.22	9	19.57	39	84.78
201 - 500	7	15.22	0	0.00	7	15.22
Total	37	80.43	9	19.57	46	100.00

Source: Field Survey, August 2019

5.4.3.2.4 Monthly Remittance Income

There were more females than males who earn non-labour income in terms of total proportion. The monthly non-labour income of respondents in the three (3) districts is as shown in Table 5-27.

Table 5-27 Monthly Non-Labour Income of Respondents

Income Bracket	Male		Female		Total	
	No.	%	No.	%	No.	%
Up to 200	17	17.53	48	49.48	65	67.01
More than 200	9	9.28	23	23.71	32	32.99
Total	26	26.80	71	73.20	97	100.00

5.4.3.3 HOUSEHOLD EXPENDITURE

Each household spends on average GHS 8.75 daily on food and most households eat twice daily. Most respondents indicated no expenses on clothing at all and that they only buy clothes once in a while.

The expenditure on education was calculated on annual basis by taking into consideration the expenditure on books, tuition and transport to and from schools, feeding, as well as other school-related expenses. The total annual educational expenditure is captured as a single figure by summing up the various education-related expenses. Accordingly, while some households spend as low as nothing, others spend as high as GHS 4,712.00 annually. There was a minimum and maximum of 0 and 13 respectively recorded for number of children in households who are still schooling.

While 180 (64.1%) of respondents affirmed that they have valid NHIS cards, the remaining responded in negation. The data showed annual health expenditure of GHS 414.00 as the highest spent by households. The health-related expenditure per household showed an annual amount of GHS 135.00.

The highest monthly expenditure on electricity and water by the surveyed respondents was GHS 90.00 and GHS 42.00 respectively.

5.4.3.4 HOUSEHOLD ASSETS

Table 5-28 shows the various assets owned by households. Of all the assets, plastic chairs were the most owned by households representing 19.38%. motorbikes (17.33%), radio (16.15%), mobile phones (13.95%) and bicycles (9.25%) were some of the most owned assets by the households. Most households did not own generators, tractors, vehicles and freezers. For all asset categories, the males had greater ownership. Thus, for all households surveyed, the males were found to own more asset than their female comparators. This affirms the gender differences in asset ownership nationally in Ghana.

Table 5-28 Household Asset Ownership

Type of Asset	No. of Households	% of Household	Total Asset Owned	Quantity Owned by Male	Quantity Owned by Female	Average Per Household
Vehicle	2	0.29	2	2	0	1.00
Motorbikes	118	17.33	119	80	39	1.01
Bicycle	63	9.25	65	43	22	1.03
Television	38	5.58	39	29	10	1.03
Motor-Tricycle	25	3.67	37	30	7	1.48
Horse/Donkey	1	0.15	2	2	0	2.00
Plastic Chair	132	19.38	136	100	36	1.03
Freezer	10	1.47	10	5	5	1.00
Fridge	26	3.82	26	18	8	1.00
Radio	110	16.15	114	81	33	1.04
Livingroom Furniture	58	8.52	58	47	11	1.00
Canoe	1	0.15	1	1	0	1.00
Tractors	0	0.00	0	0	0	0.00

Type of Asset	No. of Households	% of Household	Total Asset Owned	Quantity Owned by Male	Quantity Owned by Female	Average Per Household
Mobile Phones	95	13.95	101	74	27	1.06
Generator	2	0.29	3	3	0	1.50

Source: Field Survey, August 2019

5.4.4 HOUSING CHARACTERISTICS AND ACCESS TO SERVICES

5.4.4.1 HOUSE OWNERSHIP AND TYPE OF DWELLING

The majority (63.7%) of the respondents live in a self-owned house, while 29.89% live in a family-owned house and the rest, i.e., 6.41% live in a rented house as shown in Table 5-29.

Table 5-29 Ownership of Dwelling

Types of Ownership	Frequency	Percent
Self-owned	179	63.70
Family-owned	84	29.89
Rented	18	6.41
Total	281	100.00

Source: Field Survey, August 2019

5.4.4.2 MAKE OF HOUSE RESPONDENTS LIVE IN

Concerning the type of material used for construction of the houses the respondents live in, the survey results showed that the outer walls of the houses occupied are mainly made of sandcrete material (60.84%), mud/ mud bricks (23.95%), landcrete blocks (15.2%). The floors of the buildings are mainly made of cement (80.1%) and earth/mud (19.1%) and other materials (0.8%). All the houses are roofed, either with thatched (5.3%), aluminum (94.3%) or asbestos (0.4%).

5.4.4.3 MAJOR FACILITIES IN DWELLING

- **Lighting**

The main source of lighting for the dwellings is electricity (79.9%) and candles / torches (20.1%).

- **Fuel for Cooking**

The main source of fuel for cooking is firewood (50.9%) and charcoal (45.7%). The remaining 3.4% use LPG.

- **Water**

Borehole is the main source of water for majority of the respondents (75.91%) with 18.25% accessing pipe borne, 0.73% get water from rivers/streams, 0.36% harvest the rains, 0.36% from dams while the remaining 4.38% use sachet water.

- **Toilets**

Majority of the households (66.9%) have access to toilet facilities in house while the remaining 33.1% do not. Regarding the type of ownership of the toilet facilities, 23.6% of the households had their

privately owned facilities while 75.0% of the households accessed the public facilities with 1.4% of the households sharing the toilet facilities with other households. The most common toilet facility is KVIP (used by 72.97% of the households). Other types used include WC (2.70%), Pit Latrine 3.86% and the free range (20.46%).

5.4.4.4 WASTE DISPOSAL

The method of waste disposal, whether liquid waste or solid waste, is by mainly indiscriminate dumping/throwing them outside. For solid waste disposal, 49.1% of the respondents dump their waste in open area (indiscriminate dumping) and 25.3% resort to public waste dumpsites, while 21.9% resort to open burning or burying and 3.7% uses skips/refuse container. For the disposal of liquid waste, 73.7% of the households throw liquid wastes outside compound, 15.7% of them throw it on the street, 10.6% of households throw liquid wastes into septic tanks/soak away.

5.4.5 HEALTH STATUS OF HOUSEHOLDS

Malaria fever, Acute Respiratory Infection (cold, cough) and Diarrhoea are the three (3) most common health complaints that affected all members of the household. Other common health related diseases that have affected all categories of household members in the past twelve months include cholera and skin rashes/itching. According to the World Health Organization (WHO), climate-change induced flooding and droughts can impact household water and sanitation infrastructure. For instance, flooding can disperse faecal contaminants, increasing risks of outbreak of waterborne diseases. Again, water shortages due to drought can increase risks of diarrhoea disease. This explains the prevalence of oral-faecal and water-borne diseases such as diarrhoea, cholera and bilharzia on the corridor.

Data from the Ghana Health Service Facts and Figures 2017 indicate that the HIV/AIDS prevalence rates among pregnant women attending Antenatal Clinics (ANC) in the Upper West Region has generally been low over the years compared to other regions in the country and the national average. Data over the period 2008 - 2016 is shown in Figure 5-23 below and as evident from the data, the Upper West Region's prevalence rate has only been higher than the national averages in 2009 and 2016, but consistently lower for the rest of the years.

Region	2016	2015	2014	2013	2012	2011	2010	2009	2008
Ashanti	2.6	2.7	2.8	3.2	2.6	3.1	3	3.9	3
Brong Ahafo	2.7	1.7	2.6	2.1	2	2	2	2.9	2.6
Central	1.8	1.8	1.4	1.1	1.9	4.7	1.9	3	2
Eastern	2.6	2.7	3.7	3.7	3.6	3.6	3.2	4.2	4.2
Greater Accra	2.4	3.2	3.1	2.7	3.5	3.2	2.6	3.2	3
Northern	0.7	1.2	0.6	0.8	0.9	0.3	0.7	2	1.1
Upper East	1.7	1.5	1.4	1.7	2.1	1.5	2.4	2.2	2
Upper West	2.5	1.3	1.3	0.8	1.2	1	1.7	3.1	1.6
Volta	2.7	1.7	2.2	1.2	2.5	2.2	1.8	2.6	1.7
Western	2.5	2	2.4	2.4	2.4	1.9	2.5	3.1	2.9
National	2.4	1.8	1.6	1.9	2.1	2.1	2	2.9	2.2

Source: NACP, GHS

Figure 5-23 HIV/AIDS Prevalence among Pregnant Women Attending ANC

Similarly, as shown in Figure 5-24, the National HIV and AIDS Research Conference (NHARCON) reported the HIV/AIDS prevalence rate in the Upper West Region for the year 2017 as 1.3 percent, which was the second lowest in the country. This was also lower than the national average of 2.4 percent reported by the Ghana AIDS Commission: National and Sub-National HIV and AIDS Estimates and Projections, 2017 Report. Nonetheless, there is the need for vigorous prevention and awareness / sensitization programs as part of project activities.

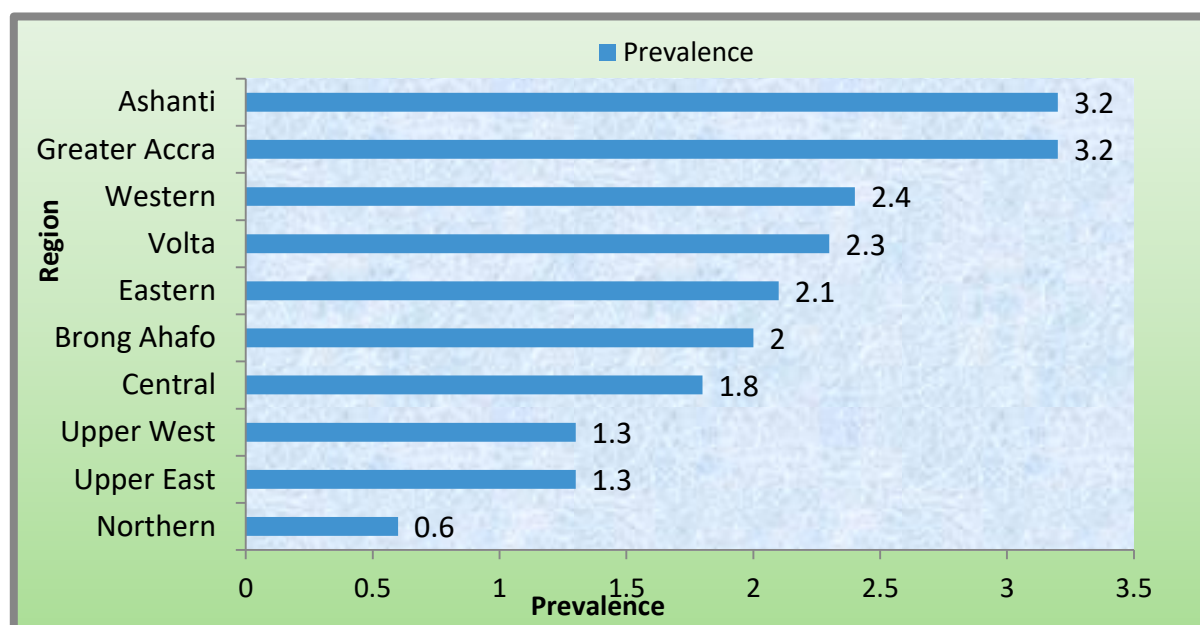


Figure 5-24 Regional HIV/AIDS Prevalence Rates

Source: National HIV and AIDS Research Conference (NHARCON 2018) 8th – 11th May 2018.

Also, data on Guinea Worm prevalence from the National Guinea Worm Eradication Programme (Figure 5-25) indicates that like other regions, guinea worm has been eradicated in the Upper West Region since 2009. The current development could be attributed to the success of collective governmental and non-governmental efforts over the years towards improving access to safe water sources in the Region.

Region	2016	2015	2014	2013	2012	2011	2010	2009	2008
Ashanti	0	0	0	0	0	0	0	2	5
Brong Ahafo	0	0	0	0	0	0	0	2	11
Central	0	0	0	0	0	0	0	0	1
Eastern	0	0	0	0	0	0	0	1	2
Greater Accra	0	0	0	0	0	0	0	0	0
Northern	0	0	0	0	0	0	8	237	479
Upper East	0	0	0	0	0	0	0	0	1
Upper West	0	0	0	0	0	0	0	0	1
Volta	0	0	0	0	0	0	0	0	1
Western	0	0	0	0	0	0	0	0	0
National	0	0	0	0	0	0	8	242	501

Source: Guinea Worm Eradication Programme

Figure 5-25 Regional Guinea Worm Prevalence Rates

With regards to the COVID-19 pandemic which is still spreading around the world, the current statistics from the Ghana Health Service website on the regional case count for the Upper West Region, as at 29th June, 2020 stands at 40 cases as against the national confirmed case count of 18,134 (with 13,550

recoveries/discharges and 117 deaths). The regional distribution of cases map is presented in Figure 5-26. It is important to note however, that the COVID-19 case count keeps changing quickly as the disease evolves.

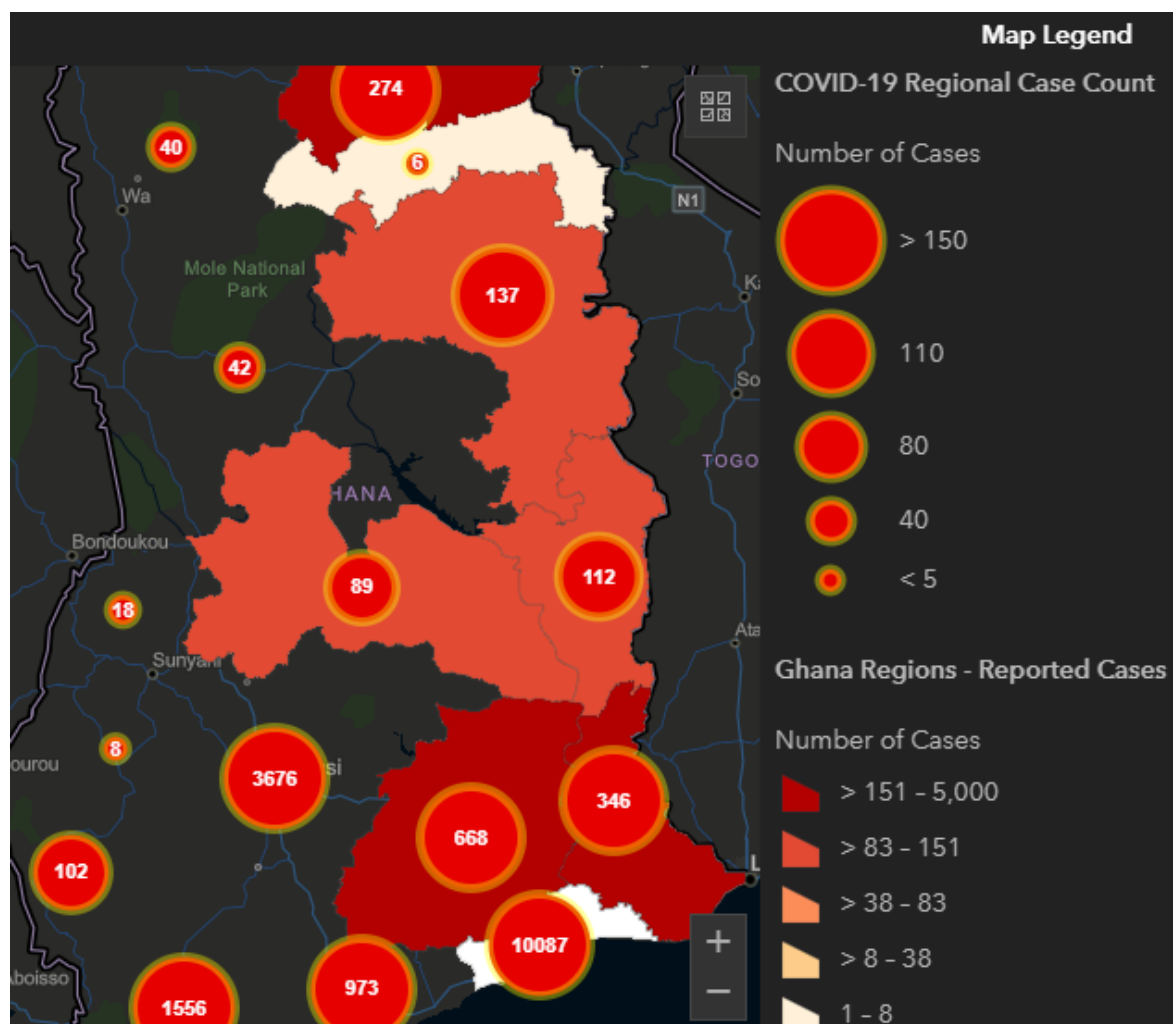


Figure 5-26 Regional Distribution of COVID-19 Cases in Ghana

Source: Ghana Health Service, Available Data as at 29 June, 2020 (<https://www.ghanahealthservice.org/covid19/>)

With regards to preference of health service providers, the two (2) most common medical service providers consulted by household members are the Community Health Centre / Community Health Post / Community Health Planning Services (CHPS) Compound and the Public Hospitals. Other health facilities preferred by household members were Pharmacies or Licensed Chemical Shops, Traditional Medicine Practitioners and Private Hospitals.

The three (3) main reasons for the choice of the medical provider consulted include:

- Closeness to the community;
- Effectiveness of service; and
- Low cost of service.

Generally, the number of health facilities in the various districts are 57 in Wa Municipal, 24 in Wa West District and 49 in Nadowli-Kaleo District. Most of these are CHPS compounds – Wa Municipal (26), Wa West District (16) and Nadowli-Kaleo District (30), and they are evenly spread in the Municipals / Districts.

5.4.6 TRANSPORTATION

5.4.6.1 AWARENESS AND USE OF PROJECT ROAD

All 281 respondents surveyed responded to questions on awareness and use of the network of project roads. Response from whether they are aware and whether they make use of the project roads is presented in Figure 5-27. About 52.7% of the respondents affirmed that they are aware of the project roads while the remaining 47.3% responded in the opposite. On the use of the project road, all 281 (100%) responded that they make use of the project road.

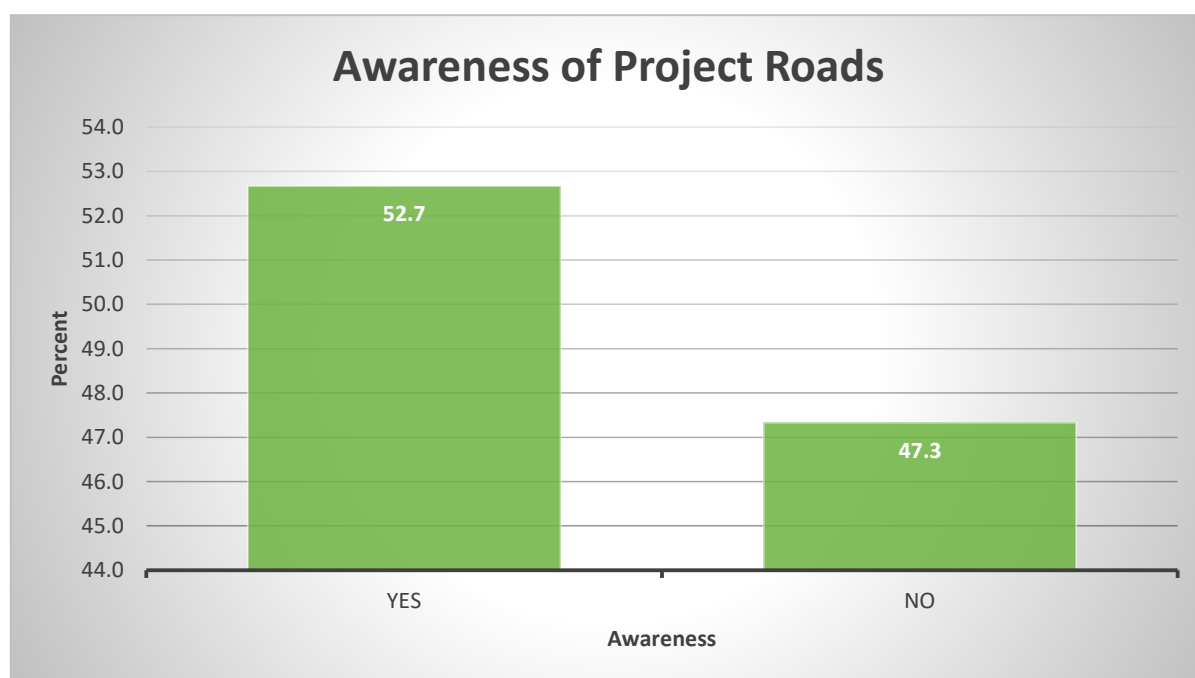


Figure 5-27 Respondents' Awareness of Project Roads

5.4.6.2 PURPOSE OR USE OF PROJECT ROAD

The 281 respondents who affirmed that they make use of the project roads do so for various purposes as indicated in Table 5-30. They mostly use the proposed project roads to the farm (24.10%), to the funeral (20.05%), to community gatherings/ meetings (15.09), to hospital/ health centers (9.68%), to school (8.78%), and to market and Shop/ Work (7.88% each), and visit (2.25%) among major uses. Based on the data, the most use respondents derive from the roads is to connect to their farms, thus improvements in the road will boost agricultural productivity, among other important benefits.

Table 5-30 Respondents' Use of Project Roads

Purpose of Use of Road	Male		Female		Total	
	No.	%	No.	%	No.	%
Market	23	5.18	12	2.70	35	7.88
Farm	80	18.02	27	6.08	107	24.10
Shop/work	23	5.18	12	2.70	35	7.88
Funeral	64	14.41	25	5.63	89	20.05
Community gathering/meetings	54	12.16	13	2.93	67	15.09
Visit	7	1.58	3	0.68	10	2.25

School	29	6.53	10	2.25	39	8.78
Hospital/ Health Centre	31	6.98	12	2.70	43	9.68
Other	12	2.70	7	1.58	19	4.28
Total	323	72.75	121	27.25	444	100.00

Multiple responses

Source: Field Survey, August 2019

5.4.6.3 MEANS AND FREQUENCY OF TRAVEL ON PROJECT ROADS

The study also assessed the gender specifics of travel in the UWR Package 1 area. The most popular means of travel by respondents were motorcycles (Okada), bicycles or by walking. The least popular means of transport were medium bus / large bus and trucks. Excerpts of the findings are as presented below:

- About 93.8% of the people use at least part of the project road when travelling;
- From the results obtained, it can be concluded that about 60% of the people travel to the farm less than a kilometer every day for 30 - 60 minutes. The major mode of transport for people going to the farm is bicycle and it is frequently used more than 5 times in a week;
- Also, 20% of the respondents travel to school for a distance of about 1-3 kilometers every day for 30 - 60 minutes. Majority of this people walk 2 - 4 days per week;
- Again, 19% of the respondents travel to the market, less than a kilometer once a week and 11% of the people travel to visit family and friends about 4 - 6 kilometers occasionally for 61 - 90 minutes; and
- Taxis are very rare and people hardly board them. Motorcycles (okada) and bicycles, on the other hand, are popular.

5.4.6.4 CURRENT CONDITION OF PROJECT ROADS

The current state of the project roads is generally of very low quality. Out of 281 respondents, 83.27% of them indicated that the existing project roads are of very low quality with the remaining responses showing low quality (2.85%), and ordinary (13.88%). The details are as shown in Table 5-31.

Table 5-31 Current State / Quality of Project Roads

Quality of Road	Male		Female		Total	
	No.	%	No.		No.	%
Ordinary	35	12.46	4	1.42	39	13.88
Low Quality	4	1.42	4	1.42	8	2.85
Very Low Quality	168	59.79	66	23.49	234	83.27
Total	207	73.67	74	26.33	281	100.00

Source: Field Survey, August 2019

5.4.6.4.1 Impacts of Present Condition of the Roads on the Activities of Women

The impact on women that was cited most (60%) is the difficulty in transporting their farm produce to the market; which is attributable to the bad nature of the roads and lack of transportation as drivers most often do not want to use those routes. As a result of this, post-harvest losses have become the norm in the area. Those who manage to find means of transport are mostly faced with high

transportation costs; however, those who do not have to take long walks to their destination (Figure 5-28). Since perishable goods go bad and do not arrive at market centres early, this results in low-income generation. Also, 9.2% of women confirmed that some pregnant women easily experience miscarriages due to the nature of the roads. In addition, delays during travelling cause referrals to arrive late at hospitals which sometimes leads to death. About 20% of the respondents also complained about the high cost of transportation, due to the bad nature of the roads since few vehicles take the risk to travel on the roads. Demands get higher and fares also increases. Another 10.8% also affirmed the frequent incidence of accidents on the roads because of their bad state.



Figure 5-28 Group of Women Walking to Charia due to the Lack of Vehicle Plying the Route

5.4.6.4.2 Impacts of Present Condition of the Roads on the Activities of Men

Most respondents (82.1%) indicated that, difficulty in transporting farm produce to the market and other communities is a major impact of the present condition of the road on men. The nature of the roads presently prolongs travel time of some men who visit other communities to trade especially in the rainy season. When this happens, men are left with no other option than to sell their produce below market prices leading to low-income generation. Some 19.8% of the respondents talked about other impacts, which include frequent accidents and breakdown of motorbikes, bicycles and vehicles.

5.4.6.4.3 Impacts of Present Condition of the Roads on the Activities of Children

With the current nature of the road, 41.6% of the respondents affirmed that children are unable to arrive at school on time which tend to influence their academic work. Some 33% also said children stay at home during the rainy season, when the roads become deplorable and 20% of respondents also complained about the dusty nature of the road which tends to influence the health of children. Another 5.4% gave statement to the effect that drivers in their attempt at swerving potholes end up knocking

down some of these children injuring them or even killing them. Also, children often find it difficult moving from one community to another on errands and those who board vehicles pay high lorry fares.

5.4.6.4.4 Impacts of Present Condition of the Roads on the Activities of the Elderly

The main effect of the current road condition on the activities of the elderly, as mentioned by some 70% of respondents is the discomfort when travelling on the road. About 19.8% of the respondents also talked about the delays in travel and difficulty in accessing quality health care. Similarly, about 10.2% of respondents spoke about some other impacts on the elderly which include high cost of transportation, accidents due to the bad nature of the road and delay in referrals to health centers.

5.4.6.4.5 Impacts of Present Condition of the Roads on the Activities of the Poor

Unlike the main effect of current road on men and women's activities, the main effect on the activities of the poor is the cost of transportation. Some 60% of the respondents stated these impacts as the major problem. About 20% of the respondents also talked about the low income received, while some 11% of the respondents face the problem of accessing a good quality health care. In addition, 9% have challenges of transporting farm produce to the market early for sale.

5.4.6.4.6 Impacts of Present Condition of the Roads on the Activities of People with Disabilities

Persons with disabilities in the project communities currently find it extremely difficult to travel to other communities as compared to people without disabilities. Some are not able to ride on motorcycles and motor tricycles which are the common mode of transportation in the area. Due to the difficulty in accessing good transport services, the disabled are not able to reach health centres on time in cases of emergencies. During the rainy season for instance, those who engaged in some economic activity are not able to travel to their business locations, thus, they become dependent on other household members during this period.

5.4.6.4.7 Impacts of Present Condition of the Roads on the Activities of Drivers and Passengers

At a meeting with Station Masters in Wa (GPRTU – Wa Station), it was stressed that the Wa Station serves the whole region and beyond, with daily travel from the station to Hamile, Lawra, Jirapa, Tumu, etc. They stated that there are only five organized stations (areas designated as stations). The rest of the places designated as stations are public spaces used by drivers to pick and stop for passengers to alight, and they include Chiefs' palaces and public spaces as far as they are allowed by the communities. In some instances, they use the shoulders of the roads as bus stop.

According to the drivers, the only good road is in Wa and then the highways, with the rest ranging from just motorable to worse. All the drivers are males (>500) and the idea of a female driver is alien to them. The drivers do not have a policy of denying or segregating their clients by gender. Access to their vehicles is based on first come first served basis and ability to pay. Traders (mostly women) are their main clients who regularly require their services. As a result of the bad roads that they ply on, most drivers only make two trips in a day (that is to move from Wa and return to the station). The unpassable nature of the roads results in broken down vehicles that require them to visit the mechanic shop almost every day and having to change shock absorbers regularly (See Figure 5-29).

The bad nature of the roads and the lack of vehicles plying the routes make it difficult to access vehicular transport to short distance locations and one has to walk in such situations.



Figure 5-29 State of a Vehicle that Returned to the Wa Station from a Trip

5.4.6.5 PERCEPTION OF IMPACTS OF CONSTRUCTION OF PROJECT ROADS

5.4.6.5.1 Perceived Benefits from Project Roads

Ten (10) out of the 281 respondents did not offer any input on the benefits of the project roads. Of the remaining 271 respondents who affirmed that the project road has some positive implications (benefits), the majority (42.8%) of them remarkeded that it will “boost economic / trading” such that buying and selling of goods in or from the market will be easy and fast. Also, 22.14% of the respondents talked about “job creation”. This was followed by another 19.56% who mentioned that the roads will “ease transportation of farm produce” as one of the major benefits. The easing of transportation of farm produce benefit was expressed in terms of how fast as possible the harvested farm produce will be at the market. The details are as shown in Table 5-32.

Table 5-32 Benefits from Project Road

Benefit from Road	Male		Female		Total	
	No.	%	No.	%	No.	%
Boost economic / trading	81	29.89	35	12.92	116	42.80
Job creation	48	17.71	12	4.43	60	22.14
Reduction in transportation cost	15	5.54	2	0.74	17	6.27
Ease transportation of farm produce	38	14.02	15	5.54	53	19.56
High income generation	10	3.69	3	1.11	13	4.80
Travelling will be more convenient	5	1.85	2	0.74	7	2.58

Benefit from Road	Male		Female		Total	
	No.	%	No.	%	No.	%
Reduce time travel	2	0.74	1	0.37	3	1.11
Improve standard of living	1	0.37	0	0.00	1	0.37
Other	1	0.37	0	0.00	1	0.37
Total	201	74.17	70	25.83	271	100.00

Source: Field Survey, August 2019

5.4.6.5.2 Perceived Negative Effects of Project Roads

Five (5) out of the 281 respondents did not offer any input on the negative effects of the project roads. As presented in Table 5-33, of the remaining 276 respondents who mentioned that a road had or does have negative effects on them, majority (42.03%) of them mentioned “properties close to roads may be demolished”, 17.75% mentioned “road accidents may be rampant”, and 11.6% mentioned “animals will be knocked down by speeding vehicles / motors”, among other effects.

Table 5-33 Negative Effects of Project Road

Negative Effects	Male		Female		Total	
	No.	%	No.	%	No.	%
No negative impact	25	9.06	3	1.09	28	10.14
Road accidents will be rampant	33	11.96	16	5.80	49	17.75
Animals will be knocked down by speeding vehicles / motors	20	7.25	12	4.35	32	11.59
Properties close to project roads may be demolished	84	30.43	32	11.59	116	42.03
Increase in criminal activities and vices	11	3.99	4	1.45	15	5.43
Noise and water pollution	21	7.61	1	0.36	22	7.97
Rise in levels of dust	10	3.62	4	1.45	14	5.07
Total	204	73.91	72	26.09	276	100.00

Source: Field Survey, August 2019

5.4.7 NEEDED AMENITIES AND FACILITIES IN THE COMMUNITIES

As part of the survey, social amenities needed in the communities were discussed during household enumeration and focus group discussions, and multiple responses were obtained. In terms of total percentage, the major facilities in descending order of need are toilet facilities (22.37%), Educational Infrastructure (15.27), hospitals/ clinics/ CHPS compound (13.55%), good roads (12.90%), street lights (9.89%), markets (8.39%), electricity (7.96%), drinking water/ borehole (5.81%), and irrigation facilities/ dams (3.87%). The data is presented below in Table 5-34.

Table 5-34 Social Amenities Needed by Communities

Facilities	Male		Female		Total	
	No.		No.	%	No.	%
Good roads	37	7.96	23	4.95	60	12.90
Market	29	6.24	10	2.15	39	8.39
Irrigation facilities / Dam	13	2.80	5	1.08	18	3.87
Drinking water / Borehole	19	4.09	8	1.72	27	5.81
Hospitals / Clinics / CHPS	26	5.59	37	7.96	63	13.55
Educational infrastructure	50	10.75	21	4.52	71	15.27
Toilet facilities	90	19.35	14	3.01	104	22.37
Electricity	29	6.24	8	1.72	37	7.96
Street lights	29	6.24	17	3.66	46	9.89
Total	322	69.25	143	30.75	465	100.00

Source: Field Survey, August 2019

It is important to manage the expectations of community members in this regard since the needs are many. The suggestion is that project personnel must take advantage of every interaction with officials, as well as community beneficiaries to stress the project objectives and activities and to explain that the project implementers cannot exceed their mandate or budget.

However, some of the needs can be addressed by means of the project design making livelihood restoration an integral part of the resettlement of PAPs. These will include re-training in alternative skills for the establishment of new livelihoods; training and capacity building to enhance current economic activities; and environmental management aimed at the sustainable use of resources (water, land, fisheries, agriculture, etc.). The project can do this in collaboration with already existing institutions and NGOs in specific fields, including the MMDAs, MOGCSP, EPA, MOFA, WIAD, Ministry of Trade and Industry (MOTI), the National Board for Small Scale Industries (NBSSI), Business Advisory Centres (BACs), the Youth Employment Agency (YEA), etc. It is also recommended that the Contracting Entity aims at having at least 10% of workers being females and employ people from the communities. A wide range of activities including traffic control, store keeping, security, painting, stone pitching, beautification/ landscaping and sweeping can be reserved for or allocated to women.

Additional information was obtained during the Citizen Engagement (CE) meetings on community and gender specific needs and details have been presented in the CEA Report, submitted under a separate cover. During the CE consultations, the various communities' most urgent needs in terms of smaller socio-economic works or infrastructure was solicited for and assessed to provide the basis for project selection of facilities for improvement and supply. These facilities are needed along the project routes and within the project communities. Among the facilities mentioned, community members further prioritised the three most urgent needs within their respective communities, with 1 representing the topmost priority and 3 the least (See Table 5-35). These included educational infrastructure (e.g., basic schools), potable water, health facilities, markets, electricity, street lights, etc. In some communities, though facilities were prioritized, it required expansion of the existing facility.

5.4.7.1 SCHOOLS

If school infrastructure is added to the project as requested by various communities, e.g., Asse, Bankparma, Dorimon, Nanville, Takpo, Tanvare, etc., it will boost education in the project catchment

area in a major way. Depending on the kind of facilities in the school structure, when classroom blocks are furnished and space is provided for computer laboratories, libraries, teachers' common rooms, offices for headmasters and separate toilet blocks fitted with boreholes and overhead tanks to supply water, these developments will boost school enrolment, enhance quality of teaching and learning, ICT training and school sanitation.

Better roads will also improve the rates at which teacher postings to the communities are accepted and will improve quality of education. Children who want to attend better schools in other communities will also be able to do so with ease.

5.4.7.2 HEALTH FACILITIES

The addition of more facilities to some of the existing health facilities will enhance health care delivery as higher-level facilities are far off. Communities that need or have requested for health facilities include Kaleo, Konboul, Kpaala, Sankana, Serekpere, Sigir, etc. When more health facilities are provided or existing ones improved, nurses and doctors will also accept postings to the communities readily, ensuring an improvement in the healthcare services available.

5.4.7.3 PROVISION OF MARKETS AND TRANSPORT INFRASTRUCTURE

The construction of market infrastructure under the OPBRC will boost businesses in the area, especially women's businesses. Communities that need or have requested for new markets or expansion of existing ones include Charia, Nyoli, Siiru, Wa, Wechiau, etc. Construction of bus terminals will also facilitate transport services from the rural communities to major towns in the municipality.

5.4.7.4 PROVISION OF BOREHOLES / POTABLE WATER

Majority the community members complained that the communities have water problems and that the construction of the project may worsen the already existing situation, unless other alternatives are provided. Many of the communities, e.g., Bienye, Boro, Dabo, Dadafuri, Dorimon, Egg, Kpongo, etc. have requested that new boreholes or other sources of potable water should be provided for the project communities to ensure an adequate supply of water. Provision of adequate supply of water is also very essential for the operation of the health facilities in the project area.

5.4.7.5 PROVISION OF TOILET FACILITIES

Many of the communities, e.g., Boro, Dabo, Guonuo, Kperisi, Kpongo, Losse, Nator, Piisi, Tanvare, Wechiau, etc., bemoaned the inadequacy of waste management and toilet facilities in their communities. It is thus very important and in the interest of public health protection, that these facilities are provided for the rural communities along the road corridor.

5.4.7.6 PROVISION OF IRRIGATION FACILITIES AND AGRO-BUSINESSES

The respondents suggested that the Government should through MOFA and other institutions or NGOs introduce commercial agriculture into the area and encourage investors to establish agro-businesses in the project area. Community members commended the Government for its flagship "1 District 1 Factory" and "1 District 1 Dam" policies and are expectant that these irrigation facilities and factories would accompany the road construction to create employment opportunities for locals.

5.4.7.7 OTHER SUGGESTIONS

Besides the suggestions or requests obtained from stakeholder engagements as presented above, the study (Consultants) further recommend that fencing (wall) should be provided for schools (including furniture), churches, mosques and important buildings along the main settlements on the road corridor. Access road should be provided from the project road to the schools and religious buildings along the corridor. A well-resourced and motivated police patrol on the roads will also help minimize the presence of armed robbers and guarantee public safety. As such, more police stations / posts should be provided for communities along the routes to among other things, compel the pedestrians and motorists to adhere to road signs and traffic regulations.

Table 5-35 Prioritized Community Needs for Package 1

Community	Facilities Needed								
	Drinking Water / Borehole	Educational Infrastructure	Electricity	Irrigation Facilities / Dams	Good Roads	Hospitals / Clinics / CHPS	Markets	Toilet Facilities / Refuse Containers	Street Lights
Asse	2	1	-	-	3	-	-	-	-
Bankparma	-	1	-	-	2	-	-	-	-
Bienye	1	3	-	-	-	-	-	2	-
Boro	2	-	-	3	-	-	-	1	-
Changu	-	2	-	3	1	-	-	-	-
Charia	-	-	-	-	1	3	2	-	-
Dabo	2	3	-	-	-	-	-	1	-
Dadafuri	2	-	3	-	1	-	-	-	-
Dorimon	2	1	-	3	-	-	-	-	-
Eggu	2	-	-	-	1	-	-	3	-
Goguyiri	-	1	-	2	-	-	-	3	-
Guonuo	-	-	-	-	3	2	-	1	-
Kaleo	3	-	-	-	-	1	-	2	-
Konbouli	-	-	3	-	2	1	-	-	-
Kpaala	-	2	-	-	-	1	-	2	-
Kperisi	-	2	1	-	-	-	-	1	-
Kpongo	2	3	-	-	-	-	-	1	-
Losse	-	3	-	-	2	-	-	1	-
Nanville	3	1	-	-	-	2	-	-	-

Community	Facilities Needed								
	Drinking Water / Borehole	Educational Infrastructure	Electricity	Irrigation Facilities / Dams	Good Roads	Hospitals / Clinics / CHPS	Markets	Toilet Facilities / Refuse Containers	Street Lights
Nator	3	-	-	-	-	2	-	1	-
Nmaabase	3	-	-	-	-	-	-	2	1
Nyoli	expand	-	-	-	-	3	1 (expand)	2	-
Piisi	-	-	3	2	-	-	-	1	-
Saan	-	-	3	-	-	-	-	2	1
Sankana	-	-	2	-	-	1	-	-	3
Serekpere	-	-	-	-	2	1	-	-	3
Siiru	-	3	-	-	-	2	1	-	-
Sigir	-	-	2	3	-	1	-	-	-
Takpo	-	1	2	-	-	-	-	3	-
Tanvare	-	2	3	-	-	-	-	1	-
Wa	-	-	2	-	-	-	3 (expand)	2	-
Wechiau	2	-	3	-	-	-	- (expand)	1	-

Note: community members prioritised the three most urgent needs within their respective communities, with 1 representing the topmost priority, 2 represents the second urgent need and 3 the least (third urgent need).

6.0 STAKEHOLDER ENGAGEMENT

This chapter presents on the engagement activities undertaken as part of the ESIA process. It discusses the engagement approaches adopted, the stakeholders included in the engagement activities, and the methods through which they were engaged.

6.1 STAKEHOLDER ENGAGEMENT PROCESS

The engagement process was designed to meet Ghanaian regulatory requirements for public participation and aligns as far as practically possible with international industry best practice. Reference is made to the Project's Community Engagement Assessment (CEA) study and report conducted as part of the wider Environmental and Social Assessment for this Project.

Key objectives of stakeholder engagement for the ESIA process included:

- **Building understanding:** An open, inclusive and transparent process of culturally appropriate engagement and communication was undertaken so that stakeholders are kept well informed about the project. Information throughout the ESIA process was disclosed early, and as comprehensively as possible for stakeholder groups.
- **Involving stakeholders in the assessment:** Stakeholders were included in the investigation of issues, the assessment of impacts, the generation of mitigation and management measures and the finalization of the ESIA report. They also played important roles in providing local knowledge and information which served as baseline information for the impact assessment phase.
- **Building relationships:** Through supporting open dialogue, the engagements helped establish and maintain a productive relationship between the ESIA team and stakeholders.
- **Engaging vulnerable people:** An open and inclusive approach to consultation increases the opportunity of stakeholders to provide comment on the Project and to voice their concerns. Some stakeholders, however, need special attention in such a process due to their vulnerability. Where vulnerable groups were identified, differentiated measures were used to enable effective participation of vulnerable stakeholders.
- **Managing expectations:** It was important to manage expectations so that the Project does not create or allow unrealistic expectations to develop amongst stakeholders about Project benefits. The engagement process was designed to serve as one of the mechanisms for understanding and then managing stakeholder and community expectations, where the latter will be achieved by disseminating accurate information in an accessible way.
- **Enable compliance:** The process was designed to enable compliance with Ghanaian regulatory requirements, the World Bank requirements and align with international industry best practice.

Stakeholder consultations were considered an essential part of the project development. It provided a platform and enhanced a two-way process by which potential project affected persons (PAPs), interested parties and stakeholders within the Social Study Area (SSA) and Social Area of Influence (SAI) could present their views and concerns about the project and seek answers. The SSA refers generally to the specific areas where social baseline data was collected while the SAI refers to the broader geographical extent the social impacts related to the Project would cover.

6.1.1 STAKEHOLDER MAPPING AND CLASSIFICATION

Stakeholders were identified across the SAI and SSA. The SSA was developed to gather a representative indication of social conditions across the SAI. Due to the considerable extent of the SAI, primary data was not collected across the entire SAI; however, an approach was developed that

included data collection in a representative manner of the SAI. Identified stakeholders were located at the district level which represented the SAI and at the community level which represented the SSA. Representatives at the community level were mainly opinion leaders, women's groups, youth groups, market women and transport unions.

The area covered by this ESIA cuts across three administrative districts, namely, Wa Municipal, Wa West District and Nadowli-Kaleo District. The SAI in the case of this project is taken as the broader geographical area (and all communities) under the above administrative districts. The SSA was limited to the communities traversed by the roads which were sampled for the household survey conducted as part of the socioeconomic baseline. The Project is anticipated to impact particularly upon communities and people living and undertaking livelihood activities closer to the roads' corridor of influence.

The stakeholders identified have been grouped into three (3) general categories. These are presented below;

- **Stakeholders likely to be directly and/or indirectly affected by the Project**

Stakeholders who are likely to experience the direct impacts of the project include persons whose assets and or means of livelihood in the ROW could be affected. They will include home owners, business owners and farmers, as well as traditional leaders who are owners or custodians of land. In addition, members of the community along the road and the general traveling public are also likely to be affected by the environmental and social impacts of the project. These shall include vulnerable groups as defined by the Project's RPF.

Stakeholders likely to be affected indirectly include NGOs, Civil Society Organizations (CSOs) and religious bodies whose members or clients would be directly affected by the Project.

- **Stakeholders with interest in the Project and interventions under the Project**

Stakeholders in this category comprise community members with diverse interest and benefits of rehabilitated roads traversing towns and villages while providing access to community potable water, proper school buildings and markets, as well as health facilities.

Officials of MMDAs, as well as decentralized agencies of health, education, agriculture, police and revenue authorities all have an interest in having the requisite infrastructure in their areas of operation. The central Government of Ghana also has an interest in bringing development into all areas of the country and thus secure its social and political mandate.

- **Stakeholders with potential to influence the outcomes of the Project**

Key stakeholders with the most potential to influence the outcome of the Project is the Government of Ghana and by extension, the MMDAs and the road's implementing agencies, i.e., MRH and DFR / GHA. Other stakeholders with such influence include; the traditional and opinion leaders of the communities where the roads traverses.

The youth in the communities can also influence project outcomes by virtue of being energetic and having the ability to mobilize themselves for or against the project. NGOs, CSOs and religious bodies whose members or clients would be directly affected by the project can also influence the Project outcome because NGOs and CSOs have advocacy powers whilst religious bodies have a lot of influence on how their members behave but can act as mediators in the relationship between the project and people in neighbouring communities.

6.1.2 APPROACH TO ENGAGEMENT

Several methods and approaches were evaluated at the planning stage to determine the best means of engaging with stakeholders. The preferred method of engagement was through direct 'face-face' consultation. This approach involved organizing meetings with key informants and holding Focus Group Discussion (FGD). A 'face-face' and FGD consultation process provides stakeholders the opportunity to be represented at all levels and build stakeholder capacity to contribute to the project.

A 'face-face' and FGD approach again offered the Project implementation team opportunity to make informal contact first, followed by formal acknowledgement and opportunity to socialize with potential project impact communities. The Project's wider CEA further adopted public and open forum meetings and comments have been incorporated in the ESIA.

6.1.3 STAKEHOLDER ENGAGEMENT ACTIVITIES

The engagement process was designed to align to the stages of the ESIA process. A summary of the objectives and engagement activities is listed in Table 6-1. The stakeholder consultation is an iterative process which will continue throughout the Project development stages, as such, a provisional stakeholder engagement plan is presented in Table 6-2. The plan does not serve as a detailed implementation plan but rather a guide to engagement at various stages of the Project. It should therefore be updated whenever there is any significant change to the scope of the project to reflect changes to the stakeholder groups affected and the potential impacts of the project.

Table 6-1 Phases of Engagement

Phase	Objective	Key Activities / Stakeholder Groups	Key Outputs / Document Disclosure
Scoping Engagement	<ul style="list-style-type: none"> ▪ To gain a preliminary understanding of the scope of the Project, it's likely impacts and relevant stakeholders; ▪ To meet key stakeholders and introduce them to the Project and the ESIA; ▪ To generate feedback on the process, including the scope, approach and key issues to be investigated further for the ESIA; and ▪ To consult key stakeholders on the next steps in the ESIA process. 	<ul style="list-style-type: none"> ▪ Notification and communication on the Project and associated ESIA through: <ul style="list-style-type: none"> – Baseline Information Documents (BIDs) – Meetings with key stakeholders including: <ul style="list-style-type: none"> ▪ Government Ministries, Departments and Agencies, including EPA ▪ Local Public Organisations ▪ Communities – Discussion of highlights of the process. 	<ul style="list-style-type: none"> ▪ Updated records detailing engagement and stakeholder issues or concerns ▪ Records of Scoping, including list of preliminary identified impacts.
Baseline Data Gathering Engagement	<ul style="list-style-type: none"> ▪ To collect baseline data through detailed surveys using participatory appraisal methods. 	<ul style="list-style-type: none"> ▪ Community surveys; ▪ FGD with select stakeholders; and ▪ Key Informant Interview (KII) with key stakeholders. 	<ul style="list-style-type: none"> ▪ Updated records detailing engagement and stakeholder issues or concerns ▪ Engagement tools and socio-economic baseline data.
ESIA Engagement	<ul style="list-style-type: none"> ▪ To generate feedback on the draft ESIA and preliminary impact assessment. 	<ul style="list-style-type: none"> ▪ Dissemination of highlights of the draft ESIA to key stakeholders; ▪ Meetings and workshops at the national, regional / district and local level. 	<ul style="list-style-type: none"> ▪ Highlights of the draft ESIA findings and summary of identified impacts and mitigation measures; and ▪ Records of meetings and feedbacks.

Table 6-2 Stakeholder Engagement Plan / Strategy

Stakeholder Category	Sub-categories	Level of Priority (Impact; interest; influence)	Project Phase	Key Consultation Points	Frequency of Engagement	Method(s) of Engagement
Institutional entities	MMDAs	1	From Pre-construction to Operations and Maintenance phase	<u>Pre-construction Phase:</u> <ul style="list-style-type: none"> Community opinions and procedures for implementing environmental and social protection / accountability The support of the community members for the Contracting Entity Safety of lives of construction workers and general public Safe work techniques for operations and activities Safekeeping of equipment conveyed to the site by the Contracting Entity Informing communities about alternative routes Availability of local workforce within the community Construction timelines Etc. 	Before and during every phase	Phone calls Emails Text / Instant messaging Formal meetings Workshops
	Road Sector Agencies / Public Officials					
	Decentralised Agencies	3				
	Transport Unions (GPRTU, PROTOA)	1				
	Utility companies (NEDCo, Telcos, GWCL)	1				
Neighbouring communities	Traditional / opinion leaders	1	From Pre-construction to Operations and Maintenance phase	<u>Pre-construction Phase:</u> <ul style="list-style-type: none"> Community opinions and procedures for implementing environmental and social protection / accountability The support of the community members for the Contracting Entity Safety of lives of construction workers and general public Safe work techniques for operations and activities Safekeeping of equipment conveyed to the site by the Contracting Entity Informing communities about alternative routes Availability of local workforce within the community Construction timelines Etc. 	Before and during every phase	Phone calls Messengers Information Centre and Information Boards Focus Group meetings in a language of their understanding (E.g., English, Dagaare, Dagbani, Sisaala, Wali, Twi, etc.) Public meetings in a language of their understanding Assisted transport to meetings
	Youth					
	PAPs subject to involuntary resettlement					
	Vulnerable groups (e.g., women, elderly, PWD, the unemployed / poor, etc.)					
	Community-based organizations					
	Tradesmen and artisans' associations					
Independent stakeholders	NGOs	2	From Pre-construction to	<u>Construction Phase:</u> <ul style="list-style-type: none"> Assessment of willingness of 	As and when needed	Phone calls

Stakeholder Category	Sub-categories	Level of Priority (Impact; interest; influence)	Project Phase	Key Consultation Points	Frequency of Engagement	Method(s) of Engagement
	CSOs		Operations and Maintenance phase	cooperation with the Contracting Entity <ul style="list-style-type: none"> • Evaluation of security situation in the construction environment • Dialogue on evolving issues not foreseen as a result of the construction • Review of accessibility to the communities 	As and when needed	Emails Text / Instant messaging Formal meetings
	Religious bodies				As and when needed	Focus Group meetings in a language of their understanding (E.g., English, Dagaare, Dagbani, Sisaala, Wali, Twi, etc.)
	Mass media	3	From Construction to Operations and Maintenance phase	<ul style="list-style-type: none"> • Discussions on how the vulnerable and marginalized groups are coping or being engaged • Awareness raising and education on disease prevention, Gender-based Violence (GBV) management and child protection. • Etc. 	As and when needed	Formal meetings
The general Ghanaian travelling public		2	From Construction to Operations and Maintenance phase	<p><u>Operations and Maintenance Phase:</u></p> <ul style="list-style-type: none"> • Expression of gratitude to community members for their backing and cooperation during the road construction • Education on how to maintain road features, including the bridges / culverts constructed • Road Safety education and awareness raising 	As and when needed	Print media and Radio announcements in a language of their understanding (E.g., English, Dagaare, Dagbani, Sisaala, Wali, Twi, etc.)

Stakeholder Category	Sub-categories	Level of Priority (Impact; interest; influence)	Project Phase	Key Consultation Points	Frequency of Engagement	Method(s) of Engagement
				<ul style="list-style-type: none"> • Awareness raising and education on Disease prevention, GBV management and child protection. • Etc. 		

6.2 OUTCOME OF THE STAKEHOLDER ENGAGEMENT ACTIVITIES

The study identified stakeholders at the national, regional / MMDA and community levels who were consulted. The team undertook broad consultative meetings with a number of relevant bodies, including governmental and regulatory bodies, local government authorities and some private sector institutions or professional bodies. The selection was also based on a list from the facilitators of the project, the GHA, DFR and MOFA. The consultation process was to establish an active connection with authorities and members of the project communities; and solicit for their professional or technical views, opinions and suggestions concerning the project. As part of the process, concerns were raised by stakeholders at all levels. Sample questionnaires / survey instruments developed for the stakeholder engagement and the consulted stakeholders' names and other background details are provided in Annexure B. A summary of the outcomes of the engagement process is outlined below.

6.2.1 NATIONAL LEVEL CONSULTATIONS

Besides various engagements with the main project implementers, i.e., the MRH (DFR and GHA), at the national level, some principal stakeholders with offices or operations in the national capital, Accra, were also identified and consulted to solicit their opinion and input into the project. This included meetings with officials of the World Bank, the Ghana Consulting Engineering Association (GCEA), Ghana Agriculture Sector Investment Project (GASIP), Ghana Commercial Agriculture Project (GCAP), Ghana Irrigation Development Authority (GIDA) and Ghana Statistical Service (GSS) (See Figure 6-1 and Figure 6-2). Generally, there was a high appreciation of the project by the stakeholders and some suggestions were made, which includes, but not limited to the following:

- There is the need for the project to start early and not stall, as such, critical stakeholders and departments must be well involved to provide necessary support for successful implementation of the project;
- It is important that the project aligns with the World Bank's principles and policies and is constructed in a sustainable and environmentally friendly manner; and the implementation design should be gender-focused;
- Drainage characteristics and management should be given a critical look and standard engineering measures should be critically considered to ensure safety of road users;
- It is important that the Contracting Entities demonstrate effective monitoring and maintenance culture so that the aim of the TSIP and/or OPBRC is not defeated; and
- Sustainability of the roads is very important to accrue all the benefits envisaged by the project on both agriculture and the road sector.

Further details are presented in Section 6.2.4.

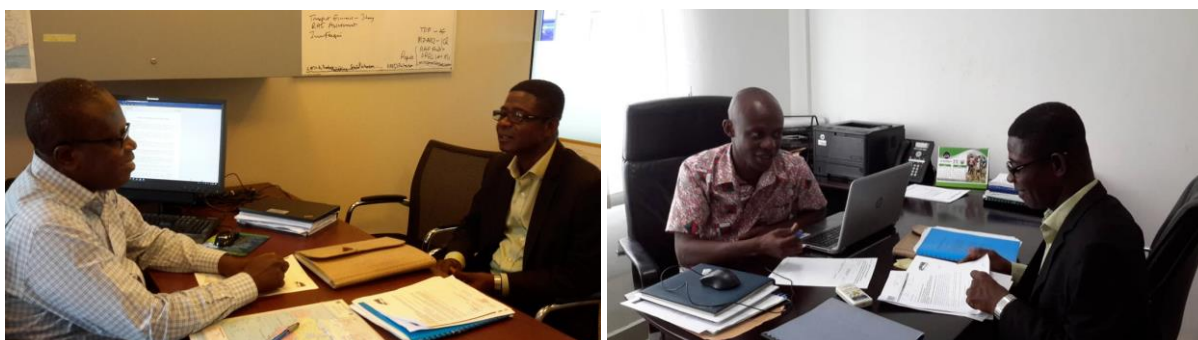


Figure 6-1 Stakeholder Meeting with Officials of the World Bank (Left) and GASIP (Right)



Figure 6-2 Stakeholder Meeting with the Ghana Consulting Engineering Association

6.2.2 REGIONAL / DISTRICT LEVEL CONSULTATIONS

Discussions were held with various officials at the regional and MMDA level. The team had meaningful consultations with all the three (3) MMDAs under the Upper West Package 1 Road Project, namely, the Wa Municipal Assembly, the Wa West District Assembly and the Nadowli-Kaleo District Assembly. Other consultations were also held with regional officials or representatives from the following institutions or bodies:

- The Regional Coordinating Council
- MOFA / EU Desk
- MOFA Regional Director
- MOFA Regional Monitoring and Evaluation Unit
- Land Use and Spatial Planning Authority
- National Road Safety Commission
- Northern Development Authority (NDA), formerly Savannah Accelerated Development Authority (SADA)
- Women in Agricultural Development (WIAD)
- Environmental Protection Agency
- Ghana Highway Authority

- Department of Feeder Roads
- Water Resources Commission – Black Volta Basin Secretariat

Majority of the stakeholders at the regional and district level had some prior knowledge about the proposed project and confirmed receipt of emails from the Consultant pertaining to the proposed road projects. Some of the stakeholders specified the kind of involvement or key roles they expect to play during the implementation of the project. Some of these include community mobilization, education and sensitization programs, as well as the provision of skilled labour force. However, they also raised some concerns and made some suggestions about the project. These details are presented in Section 6.2.4.

Generally, the MMDAs expect to play the following key roles during the implementation of the proposed project:

- Sensitization of traditional leaders and community members about the proposed project;
- Supervision and monitoring of the proposed project during the construction and operations phase;
- The Assembly hopes to be keenly involved in the recruitment of skilled and unskilled labor in the communities;
- Ensuring the welfare of Contracting Entity and construction workers, including assets;
- Provision of construction materials and equipment for the proposed project;
- Contribution to the development of the road design;
- Involving trained Community-Based Organizations (CBOs) and NGO personnel in the monitoring of the project;
- Providing security services to construction workers and securing construction materials so that none is pilfered;
- Providing necessary support to the Contracting Entity at any point in time; and
- Resolving issues between property owners and the Contracting Entity in case there is a demolition which needs compensation.

Some photos of the engagement process are presented below in Figure 6-3 and Figure 6-4.



Figure 6-3 Meeting with the Coordinating Director of the Regional Coordinating Council



Figure 6-4 Meeting with the District Chief Executive of Wa West District (Left) and other District Assembly Officials (Right)

6.2.3 COMMUNITY LEVEL CONSULTATIONS AND FOCUS GROUP DISCUSSIONS

Focus group discussions were held with some key stakeholder groups in the project communities such as community leaders / opinion leaders, vulnerable groups (e.g., women, girls, children and the elderly), the youth, farmers, etc., to seek for their input and concerns about the proposed project. Community representative views were also obtained through key person interviews with the following people (Figure 6-5):

- Charia Electoral Area (Wa New Market) Assemblyman - Steven Naah
- Weichau Assemblyman – R. Y. Issahaku
- Nyoli Assemblywoman - Ayishetu Amadu Tipeani
- Busa Assemblyman – Issaka Hamidu
- Weichau Resident - Saaka Mauzu
- Wa New Market Occupant – Suleimana



Figure 6-5 Key Person Interview with the Assemblyman of Weichau

Findings from the community engagements revealed that the main economic activities engaged in by majority of the people are crop farming, artisanship and trading. After school hours, most boys and girls in these communities assist their parents on the farm. Main crops cultivated in these communities are yam, maize, beans, cowpea, millet and cassava. The dominant ethnic groups in these communities are the Dagaaba, Wala, Dagomba, and Akans. Poverty is endemic in almost all the communities and some of the traditional perceptions that categorize a person as poor in these communities include: those who

are not able to provide basic needs such as food, clothing and shelter for their household; the elderly; the sick/disabled and unemployed youth. Although both men and women are poor, women are worse off. Poverty among the aged is mainly because of their inability to engage in rigorous activities that can generate income, while the limited job opportunities and economic activities accounts for poverty with respect to persons with disability. Poverty among women stems from the lack of access to business opportunities and generation of returns after farming seasons.

The stakeholders engaged expressed some concerns and/or suggestions about the proposed road project. Majority bemoaned the bad nature of the roads and the growing agitation among the youth as a result. Some opinion leaders suggested that both skilled and unskilled labour should be recruited from the project communities to help reduce the unemployment rates among the youth especially. Employment opportunities should be made available for locals and should also prioritize women, as past projects prioritized only men. This will also help reduce rural-urban migration, especially of the young female population who become head potters in the national capital. Again, community members are highly optimistic that the rehabilitated roads will greatly increase trading activities and lighten the burden of women especially, given that women often carry very heavy loads of farm produce to the markets because of difficulty with transportation due to the poor state of the roads. They also believe construction of the roads will enhance security in the area and also reduce medical emergencies (mostly maternity related) that often have to be referred to the District Hospitals (e.g., Wechiau).

In addition, community members suggested that other roads in the project area which needs to be improved should be considered. Some of the roads mentioned include the road connecting Wechiau to Wa which is not tarred, and the major road linking Wechiau and Burkina Faso which is only accessible by motorbikes and thus has reduced trading to those who use motorbikes only. They also suggested the road should get to the Black Volta and a bridge constructed across it to enable crossing with a car. They also suggest that the road designs take into consideration areas with markets and schools in order to construct the road to suit communities with such facilities.

Generally, there is a high positive perception of and anticipation for the project due to expected positive impacts, which are summarized below:

- Economic benefits (job creation, boost in economic / trading activities and marketing of agriculture produce);
- Travel benefits (reduction in road accidents, ease in transportation of farm produce, reduction in transportation costs, reduced travel time and increased life span of vehicles);
- Benefits to education (improved access to educational facilities during bad weather, improved punctuality to school and increased enrolment of school children);
- Improved health status and access to health facilities in other communities;
- Enhancement of skills of local artisans (local labour will benefit from training by the Contracting Entity);
- Increased revenue for land and property owners (influx of construction workers will lead to increased demand for accommodation and land for commercial purposes); and
- Improvement in the aesthetics of communities (when income levels rise, people tend to invest in buildings, so it is expected that those who are even unable to put up new structures may renovate their old ones).

Nonetheless, some negative impacts were associated with the project development by the community members, which include:

- Increase in dust levels;
- Some level of noise pollution;
- Pollution of waterbodies;
- Risk of traffic-related accidents;

- Possible increase in social vices;
- Increase in communicable diseases and sexually transmitted infections (STIs); and
- Possible loss of assets through construction demolishing.

Some pictures of consultation with the various community stakeholder groups are shown in Figure 6-6 to Figure 6-9.



Figure 6-6 FGD with Elderly Women in Dorimon (Left) and Key Person Interview with an Elderly Man in Tangasia (Right)



Figure 6-7 Meeting with Farmers in Siiraa (Left) and Members of Nyoli Community (Right)



Figure 6-8 FDG with Women at Asse (Left) and Dorimon (Right) in Wa West District



Figure 6-9 Discussions with the Youth showing a Male Respondent at Tangasia (Left) and Female Respondents in Saan (Right)

6.2.4 CONCERNS AND SUGGESTIONS FROM OFFICIAL CONSULTATIONS AND COMMUNITY DISCUSSIONS

As discussed in the preceding sections, some important concerns about the project were highlighted during the various levels of consultation and some suggestions were also made by the stakeholders to promote the success of the project.

Details of the outcome of the various consultations have been collated and presented in Annexure B.

6.3 GENDER-BASED VIOLENCE DISCUSSIONS

Gender-based violence is predominantly violence directed against a person of a particular gender. Women, girls, men and boys can all be victims of GBV. However, women and girls of all ages and backgrounds are the most affected. The incidence of GBV was acknowledged as an issue during the FGD and exists in some communities within the project catchment area. The type of GBV identified includes Domestic Violence (physical assault).

Discussions with the women and girls on the corridor affirmed that there are issues that affect women and children in the community that are of social concern. These include gender-based violence, sexual exploitation and abuse (SEA), sexual harassment (SH), school drop-out and teenage pregnancy. Rape is not common in the communities but few cases of physical assault of wives exist. Husbands sometimes beat wives when they are found guilty of adultery or when they disobey instructions given to them by their husbands. However, women do not have the right to discipline their husbands when they misbehave. Such misbehavior could include men cheating in marriage, irresponsible men who do not take care of their family, etc.

Other gender-based issues of concern in the Districts are early marriages, forced marriages and teenage pregnancies, and these are explained briefly below.

6.3.1 EARLY MARRIAGES

The 1992 Constitution and the Children's Act (Act 560) of Ghana both define a child as a person below the age of 18 years. Therefore, early marriage also known as child marriage can be defined as a marriage that occurs before a person reaches the age of consent which is 18 years. Child marriage in Ghana is rooted deeply in discriminatory gender norms and tradition. The Ghana Multiple Indicator Cluster Survey (MICS), conducted by the Ghana Statistical Service for 2017 / 2018 shows that, on the

national level, about 27 percent of females between the ages of 20-24 years get married before they turn 18 years old, in rural areas. Similarly, about 7 percent were married before age 15 (GSS, 2019). A greater number of girls between 15 and 18 years are entering marriage, often against their will. This is mostly due to parents' decision to marry off their daughters in order to protect the honour of their families resulting from the fear that their daughters may become pregnant out of wedlock.

At the district and community level, the high value of dowry received for brides in some communities is reportedly a form of survival strategy adopted by some families. Early marriage forces young girls to assume responsibilities and situations for which they are often physically and psychologically unprepared to handle. The various District Assemblies when consulted acknowledged the ascendancy in the incidence of child marriages and marriage by abduction and this has been related to girls dropping out of school. In Ghana, 1 in 5 girls aged 20-24 years are married before the age of 18. In other words, the percentage of girls between 20-24 years who were married or in a union by the age of 18 is 21%, nationally (UNICEF, 2014). According to the 2014 DHS, in the upper west region, this percentage is 37.3%. Nadowli-Kaleo had 10 reported cases of early marriages in 2020 but the other districts in this package had no official records as these marriages are often not reported. The result is teenage pregnancies and failure at examinations after the basic level. This has resulted in the municipalities / districts organising sensitization programmes on teenage pregnancy and child marriage. However, there is still the need for vigorous education and sensitization among JHS girls and parents.

By eradicating the problem of child marriage, girls in the area can benefit from the following:

1. Preservation of childhood
2. Promoting the right to education
3. Decreasing the exposure to violence and abuse
4. Protection from the risks of HIV infection, death during childbirth, and debilitating medical conditions like obstetric fistula.

Poverty and the lack of access to education exacerbate the problem of child marriage. Women should therefore be empowered and trained to undertake viable economic ventures to help address poverty so as to enable them cater for the needs of their daughters particularly in their education.

6.3.2 FORCED MARRIAGES

Forced marriage is any marriage that occurs without the expressed consent of either one or both of the parties. Usually, the party whose consent is not sought is the girl and she is forced or coerced into marriage. Some boys, however, can be affected by this practice. This canker is largely influenced by cultural beliefs, poverty and societal pressure. According to the Ghana Multiple Indicator Cluster Survey conducted by the Ghana Statistical Service for 2017 / 2018, about 27 percent of young women (aged 20 – 24 years) in rural areas were married before age 18, mostly forced into the marriage either by their parents or guardians (GSS, 2019).

Consultations at the district and community levels, many people cited protection of girls' virginity and family honour, gender-biased cultural norms, lack of sex education and fear of the stigma of teenage pregnancy as some of the major reasons for forced and child marriages in the country. In some communities, traditions and customs permit girls to be given as gifts to "big men" (titled men) or as a means of "compensation" and "settlement" of family debts, inherited liabilities and/or settlement of religious obligations.

The various District Assemblies when consulted acknowledged the incidence of forced marriages in the district, however there are no official records as these marriages are not reported. The Children's Act of Ghana (Act 560) sections 14 and 15, buttresses section 109 of the Criminal Code and classifies it as an offence to force a child to be betrothed, subjected to dowry transactions or to be married. As such,

the districts have been organising sensitization programmes on teenage pregnancy, and child and forced marriages.

6.3.3 TEENAGE PREGNANCY

Teenage pregnancy can be referred to as an unintended pregnancy during adolescence. According to the Ghana Multiple Indicator Cluster Survey regional data on sexual behaviour, about 12 percent of women between 15 – 24 years in the Upper West Region have had sex before age 15 (GSS, 2019). The same report indicated that 10.5% of females had their first pregnancy between ages 15 – 19 years in the Upper West Region with 0.5% having live birth before the age 15 years. Wa Municipality recorded a total of 334 teenage pregnancies in the first half of the year 2021. Nadowli-Kaleo District recorded 37 teenage marriages in the year 2020. Wa West recorded a total of 518 cases of teenage pregnancies in the year 2019. The incidence of young girls in their adolescent age getting themselves pregnant exists in some of the project communities. In some situations, male colleagues in school and male teachers impregnate these girls. During consultations, community members explained that some parents of these girls manage to cater for their children and encourage them to go back to school. Some of the girls are also forced to marry the person responsible for the pregnancy at a tender age. Most of these girls forced into marriages are not reported as the culture accepts these marriages. Meanwhile, some men or boys responsible for the pregnancy either cater for both mother and child or only cater for the child and neglect the mother after birth.

Consultations at the district and community levels revealed that various factors contribute to early pregnancy among adolescents and these include high levels of poverty, improper parenting, low educational expectations, peer pressure, sexual coercion, low self-esteem and lack of knowledge about sex. Various suggestions were made during these consultations on some measures that can be used to reduce the incidence of teenage pregnancies in the project area or communities. Some of these suggestions include:

- Organizing sex education programmes for girls in the community and this should be done frequently;
- Parents should educate their children on the dangers of pre-marital sex;
- The Contracting Entity must conduct mandatory and regular training for workers on required lawful conduct in host community and legal consequences for failure to comply with laws;
- There must be commitment on the part of the Contracting Entity to cooperate with law enforcement agencies investigating perpetrators of GBV, SEA and SH;
- The Contracting Entity must partner with local NGOs to report workers' misconduct and complaints / reports on GBV, SEA and SH through the GRM;
- The Contracting Entity must provide opportunities for workers to regularly return to their families;
- Local law enforcement agencies must be instructed and equipped to act on community complaints; and
- Information and awareness-raising campaigns must be organised for community members, especially women and girls.

6.3.4 SCHOOL DROP-OUT

The Ghana Multiple Indicator Cluster Survey shows that there are inequalities in school attendance rates across the country, with net attendance and completion rates lower for those living in rural areas as compared to those in urban areas. The out of school rates recorded for the rural areas were 8.2% and 7.5% for males and females respectively whereas the urban areas recorded 6.1% males and 5.2% for males and females respectively. Similarly, net school attendance and completion rates vary significantly according to wealth, with children most likely to attend through to high levels of education

being those who belong to richer households. While attendance rates vary across the regions, Volta, Brong Ahafo, Northern, Upper East and Upper West regions are consistently represented in the bottom five – across all levels of education; with Upper West recording the lowest rates for JHS and SHS level, and third lowest for primary level. Additionally, the MICS reports that about eight in every ten school children in the Ashanti region have completed primary school while this is lowest in the Upper West at about half. According to the Ghana Education Fact Sheet, 4,800 children dropped out of school in the year 2020 in the Upper West Region and according to the 2010 population census, a total of 3,967 students dropped out of school in the Wa Municipality and according.

Consultations at the district and community levels revealed that children dropping out of school is common in most of the project communities. Nadowli –Kaleo District reported a total of 52 school dropouts in the year 2020. According to the Wa West Municipality, 164 boys dropped out of school in the year 2020 and 205 girls dropped out in that same year.

Some children are forced to provide income for the family or help on the farm. Also, children sometimes complain to their parents that they do not understand what they are taught in school and therefore gradually drop out of school even when they are persuaded by their parents to attend school. It is also noted that the high rate of illiteracy in many of the communities does not also motivate the children to attend school.

Another factor contributing to school dropout is teenage pregnancy among girls. The various District Assemblies when consulted acknowledged the ascendancy in the incidence of child marriages and this has been related to girls dropping out of school. Young boys who drop out tend to learn a trade while young girls engage themselves as head potters in the southern part of the country. The female head potters commonly referred to as 'kayaye' are however able to earn income after working for a while to buy few items which will help them in their marital homes.

During the consultations, some community members suggested that the practice of young females who engage themselves as head potters after dropping out of school due to teenage pregnancy can be controlled if they are supported to go back to school or given employment during the proposed road project in order to support themselves. They also called for education against stigmatization of teenage girls who want to go to school after giving birth. The Municipal and District Assemblies also acknowledged that they have been organising some level of sensitization programmes on teenage pregnancy and child marriage, however, there is still the need for vigorous education and sensitization among JHS girls and parents.

6.3.5 SUGGESTED MEASURES

The advent of the project could have both positive and negative effects. Some of the positive effects will be to make women economically less dependent leading to a certain degree of empowerment. It can also make victims support and justice more accessible, provided it is the suitable kind. However, the very increase in women's incomes can also become a source of friction in the marital relationship because the man might attempt to control the woman's earnings and if she resists it can lead to physical abuse. Some men might also use the additional income to marry more wives or chase other women leading to more marital discord.

If roads are accessible, sensitization and education can take place to enable victims seek justice. To minimize or eradicate these occurrences in the project communities, there is the need for improvement in sensitization / awareness campaigns. Also, from time to time, the various institutions such as National Commission for Civic Education (NCCE), District Information Service Department, religious organizations and NGOs/CBOs could visit the communities to educate members of the community and ensure security.

Additional measures that can be instituted by project implementers include incorporating Violence against Women and Girls (VAWG) prevention and response programs into project activities. This entails, partnerships with governments and civil society organizations on one hand, and on the other, mutual engagement with public transport users, transport operators and with the community in general. This should form the basis for creating a clear legal, social, cultural and technical assessment to develop innovative and cost-effective solutions.

Towards the management of GBV, SEA and SH, the Client has developed a GBV Framework (see Appendix B of Annexure C) which specifies the minimum requirements for the Contracting Entity in addressing GBV, SEA and SH risks. The Contracting Entity should always therefore be guided by this document and further develop a workable GBV Action Plan. Construction staff should also be included in any training sessions and awareness campaigns on GBV management and child protection. Construction staff are to be the object of training and awareness raising so they will recognize women's concerns, including matters of sexual harassment in the construction site and the fundamental gender inequality and social customs that maintain the appropriateness of violence. Codes of conduct for employees and project staff on construction sites must be established. In addition to the code of conduct clearly outlining unacceptable behavior and consequences for harassment and any other type of gender violence, a mechanism should be created for the community to report cases of abuse by staff.

The communities should be included in the implementation and monitoring and evaluation of transport initiatives to address VAWG. Transport users and communities must have access to feedback and grievance mechanisms and the complementary community structures such as the Community Consultation Mechanism, Community Monitoring System and Grievance Redress Mechanism. They must have representation on the Grievance Committee to be created for the project. This will also ensure that the government is working along the project cycle with traditional authorities, women, men, NGOs, and networks with strong institutional capacity to monitor the impact of the implemented transport and road maintenance projects and that women are participating in the decision-making process.

6.4 MONITORING AND REPORTING

It is important to monitor and report on stakeholder engagement efforts to assess that the desired outcomes are being achieved, and to maintain a comprehensive record of engagement activities and issues raised. Stakeholder engagement must be a continuous program throughout the project implementation stages (refer to Table 6-2).

6.5 CONCLUSION

Feedback from and evaluation of the consultation activities helped both to guide the direction of the consultation and inform the project team of the significance and importance of specific issues to stakeholders and communities.

7.0 PROJECT ACTIVITIES DESCRIPTION

7.1 PRE-CONSTRUCTION PHASE ACTIVITIES

This phase is generally used in effectively planning the construction project before actual construction works begin and lays out the entire scope and schedule of the project for the construction team. This phase entails mobilization and coordination of labour (including subcontractors) and equipment, and construction of temporary offices/camps, as well as acquisition of various permits that are needed under the laws of Ghana for road construction works. Designs or design reviews and other engineering analyses would also be completed during this phase and further studies may be conducted to build on preliminary studies. Activities or studies during this phase include topographical surveys, geotechnical investigations, soils and construction materials investigation, potential land acquisition and identification of sources of materials, including source of water. There would be some amount of waste generated at this stage which needs to be disposed of appropriately.

Details on the specific processes and activities that encompass the pre-construction phase of the Project are described in the subsequent sections. The pre-construction phase is expected to last a period of 6 to 9 months.

7.1.1 DESIGN AND DESK WORK

A lot of desk work and conceptual designs have been undertaken at the time of writing this report by the assessment consultant. Majority of the work involved analysis of the various field data collected, preparation of various preliminary reports, as well as going through various conceptual design stages, all of which are needed before the Project construction kicks off.

Environmental and social considerations were generally factored into all aspect of the concept design. For instance, the macro-climatic region of the project area was an important consideration in the pavement design. The average annual rainfall (1100-1400mm) of the project area was a major design input parameter in the pavement design of the project roads. The population density of the built-up areas was also considered in selecting the sections of the roads to be upgraded to surfaced standard. Surfacing of roads in urban areas / built-up areas, in particular, with interlocking concrete block paving, was recommended in the designs due to the higher volumes of traffic within the urban areas and the importance of all-weather access for businesses and residents. The selected pavement option will also reduce the extent of air pollution (dust) in the built-up areas, as well as provide employment opportunities to local residents due to its labor-intensive nature. The status quo of the region also informed the risk assessment, impacts and recommendations for the climate impact assessment (See Section 5.2.3). The report includes recommendations that are resilient to climatic changes such as increased temperature and increased intensity of flood events. The recommendations as part of the designs included permeable pavement technology which allows for infiltration of stormwater or rainwater during a high intensity rainfall event, thus reducing runoff and the amount of water reaching the road surface.

Similarly, the physical environment within which the road is situated, as well as social factors such as the population density, number and type of facilities served, proximity of settlement, etc., were considered in the calibration of the traffic model, given that the optimal design for a given traffic flow depends on terrain and other characteristics. Attention was also given to environmental factors such as the topography, vegetation, geology, rainfall and climate of the project area in conducting hydrological investigations as part of drainage designs or drainage improvement recommendations. Design recommendations for constructing or rehabilitating culverts also considered acceptable public safety and environmental standards. The terrain and functional classifications of the project roads were a major design standard and criteria in the geometric design of the roads. This influenced the design speed and cross section of the project roads. Also, recommended improvements to the existing surface and geometric alignments of the existing roads at certain sections considered ultimately the safety of the road users. Again, in the

interest of public safety, the design also considers adjusting or modifying the alignment or design speeds as necessary, at locations such as schools, churches and mosques, as well as areas of high ecological conservation status or with high concentration of people or buildings; and appropriate signages and traffic calming measures implemented.

Further details on design considerations (including environmental and social considerations) are presented in the Basis of Design Report (UWP, 2019) and Concept Design Report (UWP, 2020), prepared by UWP Consulting (Pty) Ltd and submitted under a separate cover. The awarded Contracting Entity will however need to conduct further desk studies and reviews until finalizing of designs.

7.1.2 CONSTRUCTION MATERIALS INVESTIGATIONS

Construction materials investigations have been conducted by the assessment consultant and may need to be reviewed or furthered by the Contracting Entity prior to actual construction. The investigations involved field visits and sampling of materials for laboratory testing. As part of the investigations, sub-grade soils, base material and subbase materials under the existing alignment were tested. The investigations also involved identification and sampling of materials from existing and potential borrow pits, and excavation of test pits along the road alignment with associated materials testing.

Geotechnical investigation is a critical component of the Project and is important for the following reasons:

- Helps to determine the best route between the origin and destination (horizontal alignment), avoiding (where practicable) difficult or unstable ground;
- Determines the bearing capacity of the soils on the route and thereby have a strong influence on the thickness of the pavement;
- Helps to identify the type, strength and quantity of suitable materials for building the road;
- Helps to determine the best construction methods; and
- Has an important role to play in assessing the effects of the Project on the environment, both close to the road and remote from it, and in designing measures to reduce potential adverse impacts.

In line with the TOR for the OPBRC Projects, Dynamic Cone Penetration (DCP) and test pits excavation were undertaken. Thereafter, material testing and soils investigation was performed to identify and test appropriate materials for the rehabilitation and maintenance of the roads in accordance with the Standard Specification for Road and Bridge Works of Ghana. Test results and details are reported in the Concept Design Report (UWP, 2020), submitted under a separate cover.

Test pit positions were defined for 1 km interval and a depth of 800 mm was selected since the road sections are classified as low volume gravel roads (Figure 7-1). Test pits were hand dug and samples retrieved were prioritized to test the material up to a minimum depth of 400 mm. At each test pit, pavement layer and subgrade samples were collected to undertake soil classification, grading analysis, and Atterberg Limits. At a number of predefined test pits, subgrade samples were collected to undertake optimum moisture content and maximum dry density determination, and CBR. DCP test or alternatively, Light Weight Deflectometer (LWD) test was also undertaken.



Figure 7-1 Some Test Pit Excavations during Materials Investigation

The technical objective of the materials investigation is to evaluate geological conditions, prove the quality of materials available, and estimate the quantities of compliant material available. Selection of a suitable material source would be determined based on a number of factors, including the following:

- Material quality and quantity;
- Accessibility and haul distance;
- Environmental sensitivity and impact; and
- Land-use sensitivity and expropriation value.

7.1.2.1 BORROW AREAS

As part of the geotechnical investigations, potential sources of natural granular materials for subbase course and improved subgrade along the roads were investigated from potential borrow pits. A potential borrow pit was identified along road P1-50 (Nadowli-Tangasia-Cherikpong-Nanville road) and has an estimated area of 5,600 m². Location coordinates are currently not available. Further investigations on borrow pits will need to be conducted by the Contracting Entity at the detailed design stage to determine their adequacy and suitability as construction materials.

It is important that sources of road-building materials are identified within an economic haulage distance and they should be available in sufficient quantities and quality for the purposes intended (Smith and Collis, 1993). However, to obtain more materials for the construction/rehabilitation of the road if identified sources prove inadequate during construction, new borrow pits may have to be located at further distance away from the road. The Contracting Entity therefore needs to perform detailed borrow pit investigations during the detailed design phase to identify additional sources for construction utilisation. It is important however that in the case of opening new borrow pits, the Contracting Entity should make necessary arrangements for land acquisition in accordance with the country's laws and the area bye-laws. The Contracting Entity must follow due process and necessary consultations prior to acquiring land for borrow pits and other activities in order to prevent land related conflicts that have the potential of stalling the project.

During the construction phase, the Contracting Entity will also need to follow appropriate mitigation measures to operate and reclaim the borrow sites upon completion of operation, including considering compensatory replanting to mitigate for lost vegetation.

7.1.2.2 QUARRY SITES

Potential sources of hard rock quarries were also investigated as part of the geotechnical investigation study to establish their suitability to produce graded crushed stones for subbase or base and aggregates for concrete works. The investigation was however limited to sources within reasonably short haulage distance from the roads and in this regard no quarry was sighted. It is believed that the type of geology of

the project area presents an opportunity for the development of a quarry on the Wa - Busa road, however this has not been verified.

Further investigation is recommended to be done at the final designs stage by the Contracting Entity in locating operating commercial quarries within the wider project area that can be depended on for sourcing of construction materials; otherwise, materials should be exported from outside the project area. In this regard, a quarry is reported to be situated in Pwalugu in the Upper East Region where aggregates can be outsourced. The quarry produces 10 mm to 14 mm sized granitic aggregates. Quarry materials could also be obtained from existing EPA approved quarry site in Sawla. The Sawla site of the proposed quarry is located about 20km north of Sawla, or 75km South of Wa. It is an abandoned quarry previously operated by Messrs Modern Ghana Builders, a civil engineering construction firm.

7.1.3 ROAD INVENTORY

Road inventory was conducted as part of the study by the assessment consultant and involved horizontal and vertical alignment assessments and the recording of the condition of observed items and features along the road, including the road condition, junctions and drainage structures, among others. Some of the details have been reported in Sections 2.2 and 2.3, and further details are provided in the Concept Design Report (UWP, 2020).

Also included is existing culverts assessment which involved inspection of drainage structures along the stretch of road. Summary of the proposed design values for potential new culverts were provided in Table 2-22 under Section 2.4.1.5 and further details can be found in the Concept Design Report. However, based on the TOR and the Project Inception Report, the rehabilitation or upgrading recommendations to existing bridges, if any, will not necessarily be based on actual structural integrity calculations and/or testing. Whether or not structural integrity calculations can be carried out will depend on the availability of as-built information. Intrusive investigation into concrete strength, the position and amount of reinforcing steel is outside the scope of the concept design. If needed, this may be done by the successful Contracting Entity.

7.1.4 DATA COLLECTION ON ROAD USAGE

This basically involved the collection of traffic data, patterns and movements on the existing road, as well as site physiography evaluation and economic assessment to identify road upgrade requirements. It also included traffic counts (traffic demand), junction counts and origin - destination studies (O&D). Summary of traffic information along the roads was provided in Section 5.2.7 and further details can be found in the Concept Design Report (UWP, 2020). Further studies will be required by the successful Contracting Entity prior to actual construction to confirm baseline traffic information.

7.1.5 SITE SURVEYING

Site surveying involved detailed topographical surveys along the routes and cadastral surveys to identify land and properties that may be affected during the road construction phase. It also involved establishment of the centerline of the road and marking the limit of the current road reserve and new land take-over limits for the proposed right of way.

7.1.6 LABOUR RECRUITMENT

Labour was recruited by the assessment consultant for the various surveys (engineering, hydrological, biodiversity survey, socio-economic survey, geotechnical investigations, land valuation, etc.) that was undertaken to inform the Project conceptual design and planning. These surveys recruited specialists from other parts of the country and local labour from the Project areas as support staff on most of them.

Labour from the Project area included drivers, field assistants, field guides, social studies enumerators, interpreters, casual labourers, among others who were recruited from majority of the communities along

the stretch. The total number of local recruitments on the various studies undertaken on the project is estimated to be in the range of 50 to 60. Because of the nature of the assessment studies and the logistics involved, it was not possible for labour to be recruited from all the communities that would be affected by or will benefit from the project. It is envisaged that the construction phase of the project will see the Contracting Entity consciously spread recruitment to many more communities along the road.

7.1.7 LAND ACQUISITION AND RESETTLEMENT / ECONOMIC DISPLACEMENT

The requirement for land on the Project is associated with the planned re-construction of the existing feeder roads, access roads, storage sites for materials and equipment, location of workers or construction camps and material sources such as borrow pits. Construction works on the roads may demand acquisition of land and the displacement of people and properties within the ROW. Land will also be required for location of construction camps, storage site for stockpiled materials, etc., and the Contracting Entity will need to determine the suitability of the sites for these facilities. The Contracting Entity must also work out necessary institutional permit requirements and purchase or compensation agreements with the land owners before start of the works.

It is important that the identified locations for these facilities are not within or close to any environmentally and socially sensitive areas (Refer to Section 7.2.4 and Section 7.2.5).

A Resettlement Action Plan (RAP) would be prepared and approved by the World Bank in line with OP 4.12 (see details in Section 3.5.1) to cater for potential land take and people affected, and compensation payable to the PAPs. The Land Valuation Division (LVD) of Lands Commission will be responsible for granting approval for the valuation, which must be based on the “full replacement value” of impacted assets as required by the World Bank's OP 4.12. PAPs can be described as persons affected by land acquisition, relocation, or loss of incomes associated with the acquisition of land and/or other assets as well as the restriction of access to legally designated sites and protected areas. Compensation payments are expected for landed assets, temporary structures, crops and farm lands, economic trees (community assets), businesses in landed buildings, etc.

Apart from parcels of farmlands and crops that will be adversely impacted by the project, in some communities, physical structures close to the roads will also be affected. In certain places, creating space for construction machinery to work could lead to some demolition of structures but this should be avoided unless absolutely necessary. Potential impacts within rural farming communities will be limited to farm lands and crops while on rural developed lands, it will be on buildings and civil improvements on land, temporary business structures affixed to the ground with civil works and moveable trading chattels of street vendors. Impacts on street vendors and roadside traders (possibly a spillover of trading activities of community markets and lorry terminals) are envisaged to be temporary relocation of trading chattels, thus the project will only cause a temporary disturbance or disruption of trading activities during the construction period.

Alternative lands that are suitable and comparable exist in the project area for relocations but further consultation with the community on this issue is required and should be done by the Contracting Entity in collaboration with the Client and relevant government agencies. Considerations should also be made in the engineering design at specific places to avoid sacred trees, shrines and other important assets of religious or cultural significance.

The RAP study which has not been concluded at the time of writing this report would identify the number of people that could potentially be displaced physically and economically and provide indicative cost of resettlement, land acquisition and livelihood restoration measures. Detailed list / category of potentially affected persons would be presented in the RAP report. However, the following listed category of persons are expected to be potentially affected:

- Owners of landed assets;
- Owners of farm crops, i.e., farmers;

- Community ownership of economic trees;
- Owners of temporary and permanent structures; and
- Owners of moveable trading chattels, i.e., “Permanent Street Vendors”.

Expected losses or potential impacts that would occur from the acquisition of lands or assets along the project corridor would include the following:

- Loss of landed assets;
- Permanent or temporary loss of income and livelihood;
- Loss of ground positions / locations of trading chattels; and
- Loss of peaceful enjoyment of one's property.

Based on the proposed Project plan and ROW, involuntary displacement of some people, properties and utilities (especially electricity / power lines) will be inevitable. The Government of Ghana (or the Client) would need to set aside a dedicated fund for compensation of affected persons during the Project life. Utility companies like NEDCo, GWCL, CWSA and the telecommunication companies would also generally play significant roles in the resettlement schemes. These agencies at the appropriate times will disconnect and reconnect PAPs to their services before and after relocation as the case may be. Special priority has to be given to PAPs so that they are not treated as usual applicants for services to their new places.

The LVD is the government agency authorized to process compensation claims on compulsory acquisitions for government projects. The LVD collects and authenticates documentation on affected persons and properties. This is to ensure that payments are made to all eligible PAPs at Full Replacement Cost, as required by the national laws and the World Bank policy. The authorized compensation valuation list from the LVD is then forwarded to the acquiring agency for processing for payment. Subsequent to clearance being given by LVD, the acquiring agency applies to the MOF for the release of funds for compensation payment. The Survey and Mapping Division (SMD) of the Lands Commission is the government agency responsible for supervision, regulation and control of the survey and demarcation of land for the purposes of land use and land registration in Ghana. It is also the guardian and protector of records and operations relating to the survey of any parcel of land. SMD plays a critical role in the mapping and preservation of road ROWs.

Persons who are likely to suffer any loss / destruction of asset or property need to be engaged using the acceptable and preferred protocols of the respective communities, as cultural systems for redress of loss of every kind exist in the local communities. It is noted that, the custodians of land, e.g., the Tindanas and Chiefs are those that resolve issues relating to land and disputes in most communities. Although not documented in most cases, in most communities, these higher traditional authorities know who owns the land and are able to resolve land issues to the satisfaction of all parties. For family-owned lands, family heads are responsible for resolution as a first line of call whilst the Chief is brought in at a later stage when issues have not been properly resolved due to entrenched positions. These existing cultural systems should be explored, and where relevant and necessary, some of these measures must be adopted and adapted to address losses. Communication and information would be key as every effort must be made towards transparency and fairness in compensation. All these should engender the prompt and adequate payment of the assessed compensation, complete with all necessary documentation.

A GRM should also be implemented to adequately address the concerns of the PAPs (Refer to Section 10.1.5 for details on the GRM). The implementing agencies and the Contracting Entity will establish information and grievance management systems as part of the environmental and social management planning of the Project construction and operation.

Effective management of grievances is especially important in the context of resettlement, compensatory payments, gender and child issues and where issues concerning entitlements may arise. Compensation payment for the Project will be subject to the approval of the RAP report which would be ready prior to issuing of the bid documents for selection of Contracting Entities. It is recommended that civil works do not commence until the PAPs have been compensated.

7.1.7.1 PROCEDURE FOR COMPULSORY ACQUISITION OF RIGHT OF WAY

Acquisition of the ROW for the road project will follow laid down procedures and be in conformance with Ghana laws (e.g., Act 186, see Section 3.3.17). In Ghana, the acquisition of ROW for road projects follows a three-stage process as described below.

- **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 PAPs) on the acquisition. The above package is submitted in the form of an application to the Lands Commission office in the region where the ROW to be acquired is located.

- **Approval Processing**

This stage encompasses the submission of the application package by the Regional Lands Commission (RLC) for the consideration of the Site Advisory Committee⁷ (a technical committee that considers requests for compulsory acquisition by state agencies and recommends its acceptance or otherwise), approval of the decision of the Site Advisory Committee by the Regional Minister, submission of the approved plan to the RLC office for processing and preparation of draft E.I., the approval of plan and draft E.I. by the Ministry responsible for Lands, submission of plan and draft E.I. to the Attorney-General's office for legal clearance, submission of E.I. to Assembly Press for gazetting, and publication of E.I. by the LC in a national newspaper.

- **After Approval - Field Implementation**

This stage entails the setting out of the acquired ROW by the SMD of LC or a licensed Surveyor, measurements of affected properties by LVD for the assessment of compensation, and other processes leading to payment of due compensation and the eventual demolition of properties within the acquisition corridor.

7.2 CONSTRUCTION PHASE ACTIVITIES

The Project would be designed and constructed in accordance with safety standards that are intended to provide adequate protection for the public or roadside communities. As part of the safety measures, it is important that pedestrian crossings, speed humps and rumble strips be provided in built up areas, near schools and trading centres (markets). Based on the Concept Design Report (UWP, 2020), the construction is estimated to be completed over a period of two (2) years and the public can then have full access to the roads. The Contracting Entity during the final design stage would however provide a better indicator or details on exact construction timelines or schedules. The Contracting Entity, among other requirements, will not be allowed to commence any construction works prior to the submission of the first partial design of works and acceptance and approval of the design is given by the DFR.

Specific processes and activities to be carried out during the construction phase are described in the subsequent sections.

7.2.1 SITE PREPARATION ACTIVITIES

The overall approach to the construction or rehabilitation of the roads is to reduce impacts to the environment and disruption to local communities. Construction equipment that will be transported to the site at the commencement of the construction phase and will need to be within the posted weight limits to reduce impacts to the existing roadways and disruption of local traffic patterns. Other activities will include

⁷ The site Advisory Committee are composed of representatives of the Public and Vested Lands Management Division, LVD, LUSPA, SMD and the Client.

the installation of temporary facilities (i.e., fencing, parking, construction offices, staging areas, construction camp, laydown areas, equipment maintenance and fuel storage areas, etc.).

7.2.1.1 TEMPORARY CONSTRUCTION CAMP

The Contracting Entity will set up temporary camps and facilities on the site to house Contracting Entity's personnel, subcontractor's personnel and other personnel as needed. Temporary construction camps will be set up for the Project migrant workers while locally sourced labour will have the benefit of commuting to work from their respective homes. Additional temporary facilities would be established to support the construction, such as fuel and material storage warehouses, workshops, fabrication shops and field offices. It is important that the Contracting Entity consults the appropriate authorities and professionals for the proper planning, design and siting of these facilities. The Contracting Entity will also need to implement safety and emergency response measures at these facilities and also make adequate provisions for fire extinguishers and/or fire hydrant systems to fight possible fire incidents.

Temporary facilities would need to be self-sufficient and provide for their own power from diesel generators, including making provisions for waste management. The staff camp like any other domestic place will generate various streams of waste such as garbage, packaging, sacks, papers, cardboard boxes, plastic, wood crates, bottles, glass, metal cans and the like. Such wastes will need to be segregated for appropriate disposal by an authorised or contracted waste handler.

Construction of temporary access roads may be needed to access the construction camps depending on their location. Similarly, it is important that the Contracting Entity makes provisions for sufficient water supply (e.g., drilling of boreholes), adequate sanitation facilities, as well as recreational facilities where the construction camps are located. Appropriate consultations should be made with the community leaders and relevant authorities to develop and agree on a plan of relinquishment of these facilities for use of the local communities when construction works come to an end.

7.2.1.2 CONSTRUCTION WORKFORCE

The construction workforce is expected to comprise both skilled and unskilled labour. The size of the workforce would depend on the Contracting Entity that would execute the Project; however, it is anticipated this may peak at around 100 people. Majority of the manpower and skills needed on the Project is expected to be supplied locally (within Ghana and from the local communities). A list of craft categories that may be needed for construction activities include the following:

- Labourers, semi-skilled
- Carpenters
- Iron workers (Structural & Rebar)
- Cement masons
- Electricians
- Mechanics
- Pipe fitters
- Welders
- Equipment operators
- Drivers
- Others - surveyors, materials men, guards, catering, etc.

Other personnel categories will include management, engineering, supervision, technical personnel, quality control and administrative support. These categories could represent an additional 10% in number of workers. Labour that may be difficult to hire in the local area would be relocated to the site from other areas of Ghana.

7.2.1.3 EQUIPMENT AND MATERIALS REQUIREMENTS

Various equipment and materials are expected to be used during the implementation of the Project and a summary list is presented in Table 7-1 below. Details (especially of estimated quantities of materials) will be included in the Design Report to be submitted under a separate cover. However, it is worthy of note that actual quantities of materials needed on the Project will vary depending on the Contracting Entity that would be contracted to execute the works. It is however recommended that the materials to be used for the civil works are of approved regulatory standards, strength and grades.

Table 7-1 Proposed Equipment List and Materials Requirements

Equipment / Material	Source
Lateritic material	Identified borrow pits
Quartzites and granolithic crushed stones	Identified quarries
Cement	Imported or locally sourced
Reinforcement bars	Imported or locally sourced
Lime	Imported or locally sourced
Chemical additives	Imported or locally sourced
Water	Local water sources / Contracting Entity
Dozers	Contracting Entity
Graders	Contracting Entity
Heavy compaction equipment (various)	Contracting Entity
Loading buckets (wheel and track loaders, etc.)	Contracting Entity
Dump trucks	Contracting Entity
Cargo crane trucks	Contracting Entity
Excavators (back hoes, back actors, etc.)	Contracting Entity
Water truck	Contracting Entity
Fuel tankers	Contracting Entity
Concrete batch plant	Contracting Entity
Air compressor	Contracting Entity
Generator	Contracting Entity

Equipment such as crushers, haulage trucks, trailers, etc., will need to be located at a specific site. Similarly, construction materials such as cement, lime, oils, lubricants, petrol, diesel, sand, aggregates, gravel, concrete products (e.g., culverts, kerbs), etc. would need special storage locations as well. Where there are fuel stations situated along the road stretch or close to the project, large storage of petrol, gas or diesel should be discouraged where necessary so that these commercial fuel suppliers or sales points would be depended on for fueling construction vehicles or machinery. This will also serve as a means of generating income for the local businesses into oil and gas delivery.

7.2.1.4 WATER REQUIREMENTS

Water will be required in sufficient volumes to facilitate the construction activities. The anticipated source for this water is the various major streams or rivers along the road network or in the wider Project area. However, water abstraction for the Project would be a sensitive issue especially when the source is scarce or depended on by residents. As such, there will be need for consultations or dialogue with the traditional leaders in the Project area, as well as the Contracting Entity obtaining a water use permit from the Directorate of the Water Resources Commission before any abstraction from, potential alterations to, or disturbance of freshwater resources in the project area.

Pursuant to the Water Resources Commission Act, 1996 (Act 522), no person shall divert, dam, store, abstract or otherwise use water resources or construct or maintain any works for the use of water resources prior to obtaining a water use permit. Similarly, a permit is needed in the case of abstracting groundwater for construction works. Per the Drilling License and Groundwater Development Regulations, 2006 (LI 1827), a person shall not construct a well for the abstraction or monitoring of groundwater or for research if that person does not have a drilling license granted by the Water Resources Commission.

The OPBRC Contracting Entity, subject to the necessary permits, and because of water scarcity in the area, should obtain its construction water from the major rivers along the road corridor instead of from the smaller streams or dugouts already depended on heavily by communities. The Black Volta River is one of such major rivers in the project area which usually does not dry up in the dry season, and as such can provide season-long water source.

Alternatively, as part of the complementary intervention's component of the contract, the Contracting Entity would be required to construct boreholes within some road communities, especially areas not served by a major waterbody or in communities lacking good water sources and thus may compete with the project for water. It is recommended that the Contracting Entity liaise and/or negotiate with the local communities (chiefs and elders) that the boreholes be used for construction purposes only, after which they will be mechanized for community utilization. The construction of these boreholes will therefore be included in the community infrastructure intervention budget of the contract, as well as serve as a source for construction and community utilization (Concept Design Report, 2020).

For generating data on the quality of water for construction and domestic uses, some water quality monitoring was conducted during the ESIA study (and could be furthered at the detail design stage) for the purpose of assessing the quality of water resources along the road corridor to determine if they meet construction or drinking water standards. The results of the water quality assessment are presented in Section 5.3.3.2.

7.2.2 VEGETATION CLEARANCE AND TOPSOIL REMOVAL

This covers the land within the proposed ROW and involves clearing of vegetation and structures within the road prism, as well as excavation and grading activities. There may be realignment of the roads at certain sections which may require vegetation clearance. Several large trees are located immediately adjacent to the roadway and within the roadway. These trees obstruct site lines and creates a roadside hazard to motorists and pedestrians. Debris and branches often get blown or knocked onto the road, impacting a driver's ability to operate their vehicle safely. Where required, The Contracting Entity will need to remove all trees in the clear zone to ensure required sight distance, however, the removal of trees should be undertaken in consultation with relevant authorities such as the Forestry Commission, the EPA and the District Assemblies, and in accordance with the environmental regulations of Ghana.

Vegetation growing within the ROW of the project roads should be controlled to the heights, at the locations and with the restrictions as defined in Table 7-2. The proposed service level requirements for vegetation control are presented in Table 7-3. Details on the vegetation along the road ROW are presented in Section 5.3.1, however, it is noted that a few species recorded in the study area are listed on the global IUCN Red List of Threatened Species and should be protected. This includes *Pterocarpus erinaceus* (African Rosewood), *Azizelia africana*, *Khaya senegalensis* and *Vitellaria paradoxa*. Vegetation clearance along the ROW should thus be limited to only areas where it is absolutely needed. Further measures for mitigating the loss of vegetation on the Project are presented in Section 8.2.16 and should be adequately followed by the Contracting Entity.

Bushfires are also prevalent in the project area as a result of bad farming, hunting and illegal lumbering practices and the project must seek to not promote the practice. As such, burning of vegetation or other waste material should be discouraged by the Contracting Entity on the Project and communities (especially farmers, herders and hunters) sensitized as part of the project and at any given opportunity on bushfires and unsafe farming practices that destroys the vegetation. The Ghana National Fire Service

(GNFS) has rural fire departments responsible for the control and management of bushfires and should be collaborated with in the development of community education or sensitization programs on bush fires.

The Contracting Entity should be guided by the Control and Prevention of Bushfires Act, 1990 (PNDCL 229) which prohibits and criminalizes the intentional, reckless, or negligent causing of such fires (uncontrolled burning of a farm, forest or grassland) and holding the offender liable for all consequences of the fire. The Act only makes provision for the Chief Conservator of Forests or the Chief Game and Wildlife Officer to authorize starting of fires by authorized officers in conservation areas. Outside of conservation areas, the Act only permits persons authorised by the Director of Agricultural Extension Services or the Director of Animal Health and Production Department to set fire to a specified area other than a conservation area for the purpose of range management or any other agricultural purpose. The Contracting Entity should also note that the Act requires that an organisation responsible for the clearing and weeding of a roadside takes every necessary measure to keep the roadside free of all bushfire hazards.

Topsoil removal will involve excavation and cutting away of top soils and other materials not appropriate for road construction. It will also involve the removal of the existing wearing course of asphalt concrete to spoil, which, if not contaminated by the subgrade materials, will be reused in selected subgrade or as cut to fill in other pavement layers. All cut-to-spoil material cleared will have to be disposed of in permitted or authorized dumping areas, or where practicable, they would be re-used for grassing the slopes or restoration of abandoned borrow pits from past projects or for reinstating borrow pits opened by the Contracting Entity.

Though vegetation clearance will be limited to narrow strips along the roads, it would still potentially modify the local environmental conditions and flora or biodiversity composition.

Table 7-2 Vegetation Control Types and Applicable Road Features

Type	Height (mm)	Road features applicable to
1	50 – 300	Non-urban road sections and large vegetated areas, including surface water channels.
2	Vegetation Free or Near Vegetation Free [Note vegetation up to 200 mm high may be acceptable in these zones]	Vegetation control around: <ul style="list-style-type: none"> • Edge marker posts • Signposts • Bridge end and culvert markers • Guardrails • Sight rails • Lighting Columns • Bridge abutments
3	Vegetation Free or Near Vegetation Free	Applies to vegetation control around: <ul style="list-style-type: none"> • Culvert ends • Culvert headwalls • Side drains • Culvert waterways • Surface water channels with gradient < 3% (except where nominated for mowing in the specific contract requirements) • Kerb and channel • Lined channels • All sealed surfaces • Road shoulders • Bridge decks
4	Growth removed when it encroaches into the	Applies to control of vegetation in the envelope, including trees, scrub or branches hanging into the Vegetation Free Zone

Type	Height (mm)	Road features applicable to
	Vegetation Free Zone from the side or top.	(within 0.5m of the line of the edge marker posts or to within 6.0m above the pavement)

Table 7-3 Service Level Requirements for Vegetation Control

Item	Service Level	Measurement / Detection
Vegetation height	The average height of the vegetation of Type 1 areas shall be less than 300 mm in any 1 km section. The distance from the edge of the pavement shall be a minimum of 3.0m and a minimum of 5.0m on the inside of curves.	Manual measurement using a metallic ruler / measuring tape
Clearance	The average height of free clearance in any 1 km section shall be at least 6.0m.	Visual Inspection with extendable measuring staff

7.2.3 GENERAL EARTHWORKS

Earthworks form a significant part of road construction and the economic appraisal. During the construction phase, the general earth works for the roads will involve activities including earth-stripping of topsoil, borrow pits excavation; excavating spoil material that is unsuitable to form the road bed and replacing it with suitable materials from cuts or borrow areas. This will also involve excavating side drains, catchwater drains, offshoots, outfall drains and foundations of other drainage structures.

The earthworks associated with the road construction will also involve filling of low-lying areas and scarifying and compacting existing material, if appropriate, to form the sub-grade in cuts or laying and compacting selected sub-grade materials. The site cut and fill activities will be accomplished using front-end loaders, backhoe, rippers, shovels, dozers, motor graders, rollers, water trucks and dump trucks for hauling spoils. Excavated cut material will be used for fill where appropriate. Dust will be managed using water bowsers.

The “cut-and-fill” approach will involve using material excavated from road cuttings to provide embankments or other road features. It is important that the Contracting Entity makes sure construction activities avoid utility lines (water, power / electricity, etc.) as much as practicable and should consult or work closely with utility service providers before relocating any affected utility line.

7.2.4 CONSTRUCTION ACTIVITIES AT ENVIRONMENTALLY SENSITIVE AREAS

Schedule 5 of the Environmental Assessment Regulations, 1999 (LI 1652) recognises forest reserves, sacred groves, wildlife reserves, sanctuaries and waterbodies (supporting domestic, fishery and other activities – see Figure 7-2) as critical or environmentally sensitive areas and should be protected from negative impact of the road construction. This implies that as much as possible, these areas should be avoided at best by the Contracting Entity or an environmental impact assessment conducted and appropriate mitigation measures implemented to limit impacts to as low as reasonably practicable levels if construction activities are within or at less than 0.5 km from these areas.

Other areas classified as environmentally sensitive areas include the following:

- Areas which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna).
- Areas of unique historic, archaeological or scientific interests.
- Areas which are traditionally occupied by cultural communities.

- Areas prone to bushfires.
- Hilly areas with critical slopes.
- Areas classified as prime agricultural lands.
- Recharge areas of aquifers.
- Water bodies characterized by one or any combination of the following conditions -
 - Water tapped for domestic purposes;
 - Water within the controlled and/or protected areas; and
 - Water which supports wildlife and fishery activities.



Figure 7-2: Water Abstraction at Bacha Dugout near Domawa (Left) and Fisherman on Black Volta at Pump Site 9 (Right)

7.2.5 CONSTRUCTION ACTIVITIES AT SOCIALLY SENSITIVE AREAS

It is important the road construction also considers socially sensitive areas or receptors (see Figure 7-3) and as much as possible avoid such areas or limit impacts to as low as reasonably practicable levels with appropriate mitigation measures, especially when construction activities are within, border or at less than 0.20 km from such areas. A list of some socially sensitive areas that the Contracting Entity is required to take critical note of is presented below:

- A human settlement or community or township
- A cultural resource or site - cemetery, sacred grove, shrine, church, mosque, etc.
- A medical or health facility - hospital, clinic, Community-based Health Planning and Services (CHPS) compound, etc.
- An educational or research facility



Figure 7-3: CHPS Compound at Nator (Left) and Chief's Palace at Dorimon (Right)

7.2.6 OPERATION OF BORROW PITS AND QUARRIES

Operation of quarries will involve the use of explosives to blast rocks, crushing of rocks, sorting and piling of crushed aggregate for the road construction works. Where necessary, the Contracting Entity should target existing licensed quarries being operated by private companies for the procurement of materials to limit the needless proliferation of quarries and their associated environmental impacts in the project area.

Generally, borrow materials will be used where the overburden material obtained from cuts cannot cover sections of fills, and low-lying areas such as swamps. Identification of borrow pits will take place at the planning and pre-construction stage (refer to Section 7.1.2.1) or closer to the commencement of construction activities, and actual sourcing of borrow materials will take place during the construction phase. Active involvement of local actors is highly recommended to avoid land-related conflicts. The Contracting Entity should at the final designs phase further investigate potential commercial sources of fine aggregates for concrete and other works in the project area. In this regard, it is important that the Contracting Entity conducts due diligence to verify that the commercial sites or activities are not illegal and that the operators have the necessary licenses or permits.

Activities associated with the borrow pit operations will include clearance of vegetation and stripping of topsoil, excavation of gravel from borrow pits, and stock-piling of the overburden materials, among other activities. As a minimum, the Contracting Entity that will be operating a potential borrow site should:

- Hold necessary consultations with the Chiefs and traditional leaders of the area, including the District Assembly and district or regional offices of the Lands Commission or the offices of the Administrator of Stool Lands to identify the ownership title of the land;
- Legally acquire the land with necessary compensations paid to the rightful land owners;
- Obtain the necessary licenses and permits (e.g., from the Minerals Commission, EPA and Forestry Commission) before beginning operations on the land.

The Mining and Minerals Act 2006 (Act 703) regulates the activities of stone quarries and sand/gravel winning in Ghana. It classifies sand/gravel and stone as major minerals and therefore subjects them to the same process of obtaining permits as it is done in the case of those who mine gold, diamond, bauxite and other precious minerals. Consequently, despite the right or title which a person may have to land in, upon or under which minerals are situated, a person shall not conduct activities on or over land in Ghana for the search, reconnaissance, prospecting, exploration or mining for a mineral unless the person has been granted a mineral right in accordance with Act 703. The Contracting Entity that will be operating a quarry or borrow site on the project is therefore required by Act 703 to apply for a mineral right to the Minerals Commission in the prescribed form and accompanied with a statement providing the following:

- Particulars of the financial and technical resources available to the applicant for the proposed mineral operations;
- An estimate of the amount of money proposed to be spent on the operations;
- Particulars of the programme for the proposed mineral operations; and
- Particulars of the applicant's proposals with respect to the employment and training of Ghanaian locals.

The Minerals Commission shall then submit its recommendation on an application for a mineral right to the Minister of Lands and Natural Resources within ninety (90) days of receipt of the application. The Minister shall within sixty (60) days on receipt of recommendation from the Commission make a decision and notify the applicant in writing of the decision on the application and where the application is approved, the notice shall include details of the area, the period and the mineral subject to the mineral right.

The Environmental Assessment Regulations, 1999 (LI 1652) also categorizes stone quarries and sand/gravel pits, where the total area is greater than 10 hectares, or where any portion is to be located within an environmentally sensitive area, under Schedule 1 undertakings requiring registration and environmental permit before operation. As such, the Contracting Entity that will be operating such an area is required by LI 1652 to also register the undertaking(s) with the EPA and an environmental permit issued in respect of the undertaking(s) prior to commencement of excavation of the site.

In accordance with Regulation 5 of LI 1652, the EPA shall on receipt of an application and any other relevant information required, as an initial assessment, screen the application taking into consideration the following:

- The location, size and likely output of the undertaking;
- The technology intended to be used;
- The concerns of the general public, if any, and in particular concerns of immediate residents if any;
- Land use; and
- Any other factors of relevance to the particular undertaking to which the application relates.

Where the EPA approves the application at the initial assessment, it shall register the undertaking, the subject of the application, and issue in respect of the undertaking an environmental permit within 25 days from the date of the receipt of the application for an environmental permit.

The Contracting Entity would need to also make necessary consultations with the District Forest Services Division of the Forestry Commission, especially if there are any forest / economic trees on the land and obtain their permit before removal of any such trees. It is expected that routine monitoring and sampling of the excavated materials will also be conducted by designated government archaeologists to determine the presence or otherwise of archaeological artefacts.

Per the recommendations of Regulation 91 of the Minerals and Mining (Health, Safety and Technical) Regulations, 2012, where earth, sand, gravel or any other unconsolidated materials are being removed by means of powered equipment, the Contracting Entity should safeguard that the working face is sloped at the angle of repose or the vertical height of the working face is not more than one and a half metres above the maximum reach of the equipment.

If the potential quarries or borrow areas are located within, bordering or at less than 0.5 km distance from any environmentally sensitive area or less than 0.2 km from a socially sensitive area (refer to Section 7.2.4 and Section 7.2.5), such areas should be avoided at best by the Contracting Entity or a detailed environmental impact assessment conducted and appropriate mitigation measures implemented to limit impacts to as low as reasonably practicable levels. Where appropriate, borrow areas should be decommissioned progressively throughout the construction phase of the Project as they no longer become needed in their respective areas.

The following management/mitigation measures should be observed by the Contracting Entity, as a minimum, with regard to the operation of borrow pits and quarries:

- Where the Contracting Entity opens up new material sources other than procuring materials from commercial operators, restoration of the sites immediately after the construction phase should be undertaken in accordance with an approved restoration or management plan (Further reference should be made to the ESMP in Annexure C).
- The Contracting Entity should obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas, and their location should be approved by appropriate Government authorities (e.g., EPA, Lands Commission, District Assembly), including traditional authorities if the land on which the quarry or borrow areas fall is traditional land.
- New material sourcing areas should not be located in the vicinity of settlements, cultural and historical / archaeological sites, wetlands, forest reserves, or any other valued ecosystem, on high or steep ground or in areas of high scenic value.
- Where materials are sourced from commercial operators, the Contracting Entity should establish the operators' compliance with statutory requirements and environmental standards with evidence of certificates of compliance.
- The Contracting Entity should undertake the necessary due diligence in verifying the availability and legitimacy of all required licences and permits of the commercial operator and visually inspecting the sites of the commercial operators to be used for the project construction.
- The Contracting Entity should rehabilitate and replant land excavated for borrow pits.

7.2.7 ACCESS ROADS AND BYPASS CONSTRUCTION

If quarries, borrow areas and construction camps are not served by the existing roads, then construction of temporary access roads would be needed to access these areas or facilities. The Contracting Entity in that case would be required to carry out separate environmental studies for these facilities on signing of contract with the DFR.

The Contracting Entity must also ensure that at all open works sites the public traffic can move free of restrictions, if necessary, by providing adequate by-passes, which must be regularly maintained. Work sites of major structures must anyway be provided with a bypass, which must be maintained during the period of its usage. It is important that the Contracting Entity institutes traffic safety measures to avoid accidents, injuries and even death to both workers and road users. As part of those measures, the Contracting Entity must ensure carefully planned detours and timely dissemination of information to the local communities and road users. Also, it is important that adequate standard warning and guiding signs are used to redirect traffic or moving vehicles, and reflector vests and PPEs should be worn while working on the roads. Further measures are provided in Section 9.2.13 and Section 9.2.14.

7.2.8 DRAINAGE WORKS AND REHABILITATION OF BRIDGES

The road construction works will involve construction and improvement of the road drainage system. This will comprise installation of culverts, catchwater drains, side drains, etc., at various locations where they will be needed depending on the ground or hydrological situation.

Existing culverts or bridges are installed at certain sections or locations where the road crosses a waterbody (stream or river). Rehabilitation or reconstruction of some of these drainage structures, e.g., culverts and/or bridges is required as part of the road project (Figure 7-4 and Figure 7-5).



Figure 7-4 Some Structures Needing Reconstruction or Rehabilitation



Figure 7-5 A Broken or Collapsed Bridge on the Loose Road

New culverts or structures will be provided at relevant intervals to transfer accumulated flow from the sides of the road. New structures will be required as a result of either upgrading pipe culverts to box culverts, upgrading box culverts to bridges or additional structures required for hydraulic compliance. Longitudinal drains may be provided with top covers for easy cleaning, which will also act as pedestrian walkways and provide access to properties. It is important as a safety measure that culverts and/or bridges end marker signs are installed by the Contracting Entity to guide motorists on the presence of such structures on the road (see Figure 7-6 and Figure 7-7). Details on hydrological structures inventory and assessment are presented in the Concept Design Report (UWP, 2020).

Activities associated with the installation or rehabilitation of culverts and/or bridges will include excavation of trenches, backfilling, compaction and construction of inlets and outlets structures including head and wingwalls. These activities hold the potential of degrading the waterbodies crossed by these structures and it is important that the Contracting Entity implements appropriate management and/or mitigation measures to limit the impacts to as low as reasonably practicable levels.

The following measures are recommended, as a minimum (refer to Section 8.2.11 and Section 8.2.14 for further assessment on impacts to water quality and aquatic habitats):

- Implement erosion and sediment control measures at watercourse crossings, and downstream of side cast material as needed, and where safe and practical;
- Materials like wet concrete and mortar should be prevented from entering waterbodies because they are highly alkaline and if they enter the river or stream, they can negatively impact fish and invertebrates;
- Avoid stockpiling of soil near waterways / wetlands or on slopes;
- Choose methods that will avoid or decrease the potential for disturbing the aquatic environment, and limit the diversion and blocking of waterways or sources;
- Limit the area and period that work takes place within aquatic environments;
- Employ methods that will limit the extent to which silt is generated and the distance it travels (e.g. silt curtains, rock gabions);
- Rehabilitate and stabilize the banks of affected water crossings as soon as practicable and replace vegetation where it has been destroyed;
- During channelization, the Contracting Entity should endeavour to maintain the original direction of water flow, unless alternatives present better drainage improvement opportunities;
- Oil spill prevention and response measures should be in place and should be followed with oil spills cleaned up immediately they occur;
- Culverts should be constructed considering the peak water levels; and
- Culverts must also be levelled appropriately so that they are self-cleaning.



Figure 7-6 Sample Culvert End Marker Signs

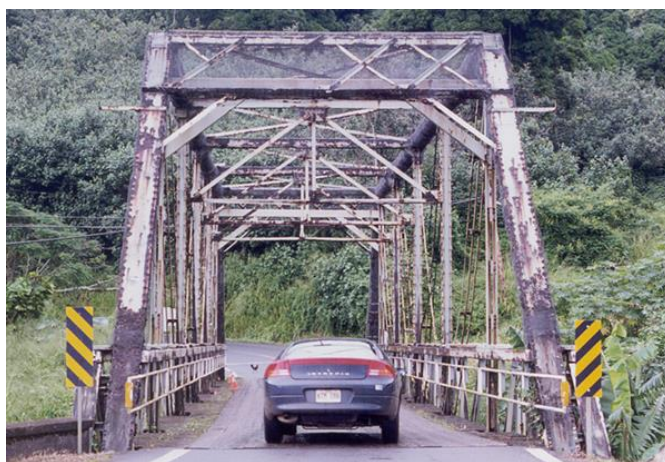


Figure 7-7 Sample Bridge End Marker Sign

7.2.9 ANCILLARY WORKS

This will generally involve the installation of all ancillary road features such as road signs, posted speed limits, kilometre posts, railings, street lights, sidewalks, and various other traffic calming measures, which are necessary to safeguard the safety of all road users. Identifying and addressing safety hazards, for all road users, is likely to reduce accidents or at least reduce the severity of accidents. An average of ten (10) road signs, five on each side of the road, has been allowed in the designs per km of road under signage. A sidewalk would also be required on both sides of surfaced roads in urban areas, however, there are no requirements for sidewalks for the irrigation access roads. The side walks will provide appropriate shared space to accommodate both pedestrian and cyclist which will assist in reducing the existing vehicle / pedestrian conflicts experienced in the urban and semi-urban areas. Street lights are also important, especially in built-up areas, in improving safety for vehicles, pedestrians and cyclists.

7.2.10 CONSTRUCTION WASTE MANAGEMENT

Various waste streams will be generated at the construction phase. Waste refers to any substance or object which the holder discards or intends or is required to discard. Wastes should be segregated in well labelled containers before disposal at designated or approved dump sites in the Project area (Figure 7-8).



Figure 7-8 Waste Segregation in Labelled Waste Containers

Waste from construction activities will include mainly rubble and spoil materials removed from excavation which may comprise topsoil, subsoil, peat or rocks. Other waste types will include scoured materials, scrap metals, lubricating oil, hydraulic oil, scrap parts and other fluids generated from equipment maintenance, etc.

The construction workshop and workers camps will generate wastes in the form of garbage, packaging, sacks, papers, cardboard boxes, plastic, wood crates, bottles, glass, metal cans, etc. Sewage or wastewater will also be generated, mainly emanating from worker's camps, and runoffs crossing hydrocarbon contaminated areas. Wastewater contaminated with oils, fuels, chemicals or other hazardous compounds would be collected and disposed of by an authorised or contracted waste handler.

Hazardous waste may be generated by activities such as the demolition of existing buildings, where for example asbestos roofing materials may be found. On-site maintenance activities on the road project may generate hazardous waste in the form of waste oil, oil-contaminated filters, brake fluid and other associated materials. Residues left in drums of chemicals or fuels used on the site may cause those containers and their contents to be classed as hazardous waste.

It is also important that the Contracting Entity takes particular care in the removal of underground storage tanks, as these may contain fuel or other chemical residues. Designated hazardous waste containers must be well covered and appropriately labelled with the hazardous waste sign (Figure 7-9) and located in bunded concrete structures.



Figure 7-9 Hazardous Waste Sign

Table 7-4 below shows the expected types of waste, amount, treatment or disposal measures during the construction phase. The estimates are based on an assumed workforce of 100 people.

Table 7-4 Waste Streams Expected at the Construction Phase

Waste Class	Types	Estimated Amount	Treatment / Disposal
Solid Waste (Degradable)	Garbage (Food remains, cardboards and papers)	50 kg/day (based on a generation rate of 0.5 kg/day/person and 100 workers)	Collected in a dedicated waste container at the campsite / site office and disposed by authorised or contracted waste handler. Alternatively, they can be composted and used as manure for gardens at the site or elsewhere.
Solid Waste (Non-Degradable)	Scrap metals	10 kg/day	Sold to recyclers or disposed by authorised or contracted waste handler.
	Tins, glasses and plastics	20 kg/day	Sold to recyclers or disposed by authorised or contracted waste handler.
Liquid Waste	Sewage	1.4 m ³ /day (based on 100 people, 20l/capita/day* consumption and 70% becomes wastewater)	Septic tank or soak away system at the campsite / site office. Disposed by authorised or contracted waste handler.
	Oils and greases	1 - 2 litres/day	Vehicles and other equipment maintenance will not be done on site but at approved or contracted garages, hence little waste oil is expected on site. If any, collect left over oils and grease in labelled containers for disposal by authorised waste handler.

*Based on the minimum requirement of Community Water and Sanitation Agency Sector Guidelines (Small Towns Design Guidelines), 2010 and the WHO minimum recommended consumption (for all uses).

The main professional waste handling company in the Project area is Zoomlion Ghana Limited. It is recommended that the Contracting Entity consults with the Waste Management Department of the District Assemblies served by the project and possibly partner or contract Zoomlion to handle the disposal of all the wastes generated on the project. Zoomlion will be able to provide the Contracting Entity with dedicated and clearly labelled containers for all the various streams of waste and schedule times for periodic collection and disposal. Beyond contracting Zoomlion for waste collection and disposal, the Contracting Entity and his team must also observe further waste management / mitigation measures on and off site and these have been highlighted in Section 8.2.9.

The Contracting Entity must confirm that the contracted third-party waste handlers themselves and the waste disposal and recovery activities and/or waste facilities they operate are fully licensed and that appropriate forms of authorization or permits are in place and will remain in force over the duration of the road construction. Engineering new dump sites for waste disposal as part of the project will present huge cost implications, rigorous permitting requirements / approvals, separate specialist studies and long process involved, besides the potential of creating conflict of interest that could stall the road project from being delivered on time.

7.3 POST-CONSTRUCTION PHASE ACTIVITIES

This phase involves the road operation and maintenance activities to be carried out by the Contracting Entity (in the case of the OPBRC model) to enable optimization of road operations. It includes both routine and periodic maintenance works on the road, such as pothole repair, surface failure repair, crack repair, vegetation control, cleaning of drainage, etc., on surfaced roads; and reshaping and blading, spot-regravel, cleaning of drainage, vegetation control, etc., on gravel roads. During the road operation phase, several activities would be carried out which will have little interference with the use of the road. Other activities will involve temporary interruption of traffic.

Road maintenance will be carried out throughout the road operation phase which would last at least three (3) years. Based on the Concept Design Report (UWP, 2020), the design life of the road is at least ten (10) years. These details may however be revised at the final design stage.

7.3.1 DEMOBILIZATION

The post-construction phase will also involve the demobilization of construction workers and construction equipment as needed. During demobilization, structures like construction camps, guard posts, workshops, and material storage areas should be dismantled or demolished, packed and transported to appropriate disposal sites or used at other construction sites. Alternatively, they should be sold out to potential buyers (e.g., other building or road contractors) in the project area.

7.3.2 ENVIRONMENTAL REMEDIATION

Demobilization will also involve restoration of environmental components impacted by the Project infrastructures demobilized. It is important that the demobilization or restoration exercise be supervised by a qualified environmental practitioner (supervision consultants) contracted by the Project developer (MRH / DFR) who should enforce adequate management or mitigation measures. The supervision consultant (with environmental and social expertise) is required to maintain high standard of site supervision and operation to reduce risk of damage to environmental components.

The Contracting Entity must take note that remediation is always required to take place in relation to land proximate to existing or planned residential development, wetland areas, high amenity areas, and land designated for conservation purposes such as national heritage areas or sites of special scientific interest. The Contracting Entity must also note that it would be profitable for the Contracting Entity to undertake the environmental remediation simultaneously with the evolution of the construction works.

As part of environmental remediation, the following activities are recommended, as a minimum:

- Unsettled issues of compensation and relocation should be solved before the start of demolishing works in regard of the demobilization;
- Waste generated by the construction and demobilization works should be collected and properly disposed of at a permitted or certified waste dump site;
- Unpaved areas cleared of vegetation such as temporary access roads should be revegetated with grass and trees indigenous to the Project area;
- Boulders and stones exposed during road construction should be appropriately covered; and
- Except where commercial borrow pits are used, borrow pits should be restored by backfilling with spoil material from road cuts and stockpiled overburden initially removed from the borrow pit sites and grading to a stable slope and to re-establish natural drainage patterns. A layer of top soil should be placed on top of the overburden and planted with grass and/or trees indigenous to the sites. Where practicable, adequate watering should be carried out until the vegetation is well established. Cliffs left behind at borrow pits after back filling should be supported by stone filled wire meshes and gaping holes left behind fenced off.

7.3.3 REHABILITATION ACTIVITIES

The specific goals for rehabilitating the site after construction are as follows;

- Achievement of acceptable land use suitability – Rehabilitation will aim to create a stable landform with land use capability similar to that prior to disturbance, unless other beneficial land uses are pre-determined and agreed;
- Creation of stable landform – The site will be rehabilitated to a safe condition that is self-sustaining; and
- Preservation of water quality – Surface and ground water quality will be maintained at levels that are acceptable for domestic use and/or for consumption.

The following measures are recommended in accordance with environmental standards of good practice:

Hazardous Waste Clean Up and Transport:

- Hazardous wastes should be transported to approved hazardous waste storage or disposal sites.

Site Rehabilitation:

- Disturbed areas (adversely affected by construction activities) should be rehabilitated and revegetated;
- Native flora should be used to re-vegetate the rehabilitated sites;
- Pit and quarry slopes should be graded to a slope conforming to that existing prior to the activity;
- The bed, banks and floodplains of watercourses (rivers and streams) affected by construction activities should be adequately protected from erosion using applicable erosion control methods; and
- Natural drainage patterns should be reinstated where practical.

Employment and Business Opportunities:

- Trained personnel from the Project area should be used for rehabilitation activities where practicable.

Monitoring:

Monitoring of the rehabilitated areas is needed to determine whether the objective of the rehabilitation is being achieved and whether a sustainable, stable landform condition has been attained. Monitoring will include inspections for the following key aspects:

- Soil erosion
- Revegetation success;
- Weed infestation; and
- Integrity of the modified natural drainage systems and erosion control structures.

Monitoring should be conducted by a qualified supervision consultant at locations which will be representative of the range of conditions at rehabilitated areas. Annual reviews should be conducted on the monitoring data to assess trends and the effectiveness of the monitoring program. The outcome of these reviews will be included in reports to relevant government authorities. Further details on monitoring are provided in Section 10.2.2 and the ESMP.

Maintenance works will be undertaken to address deficiencies or areas of concern identified from the monitoring. This may include the re-application of topsoil, re-seeding and/or re-vegetation, weed control, drainage improvement works, re-grading of eroded areas, etc.

7.4 PROJECT ACTIVITIES: ENVIRONMENT, SOCIAL, HEALTH AND SAFETY MANAGEMENT

Project activity-specific environmental, social, health and safety management measures (mitigation and/or enhancement measures for potential impacts from the project activities) have been developed (refer to Chapter 8.0 and 9.0) and their performance should be monitored against targets. Once project

construction commences, the Environmental and Safeguards Team of MRH / DFR and the Supervision Consultants (as appropriate) should commence monitoring of the project activities in close collaboration with the Contracting Entity.

An overview on the framework for implementation of the Project ESMP is presented in Chapter 10.0.

8.0 ASSESSMENT OF ENVIRONMENTAL IMPACTS AND PROPOSED MEASURES

This Chapter evaluates the potential biophysical impacts that may result from the Upper West Package 1 Roads Project. The impacts have been identified based on primary research (specialist fieldwork and data gathering), secondary data (information from previous studies within the Project area) and professional judgement based on experience from similar projects.

Potential impacts on the environment arising from the Project activities across the pre-construction, construction, and post-construction (operation and maintenance) phases include direct and indirect (both permanent and temporary) impacts on various receptors within the Project area. The impact identification and assessment involved an understanding of the baseline environment and potential deviations or changes associated with the Project.

A number of relevant documents were utilized to provide some legal, regulatory and theoretical framework for the assessment, and this included the LI 1652, the World Bank's Environmental and Social Framework (2017), as well as other reference documents, namely:

- Environmental and Social Assessment for Transport Sector Improvement Project (MRH, 2017)
- Resettlement Policy Framework for Road Sector Operations (MRH, 2017)
- Roads Reservation Management: Manual for Coordination (MRH, 2001)
- Environmental Assessment Guidelines for the Transport Sector (EPA, 2010)
- Traffic Calming Design Guideline (Ministry of Transportation, 2007)
- Standard Specification for Road and Bridge Works (Ministry of Transportation, 2006)
- Geometric Design Guide (Ghana Highway Authority, 1991)
- Draft Manual of Road Signs and Markings (Ghana Highway Authority, 2007)

The following sections provides detail explanations and assessment of the impacts identified and their assessed significance. For each impact, mitigation and/or enhancement measures are identified to avoid or reduce the effects of the impact or enhance the potential benefits.

8.1 PRE-CONSTRUCTION PHASE IMPACTS AND PROPOSED MEASURES

This refers to impacts relating to Project planning, reconnaissance surveys and preliminary site investigations and field data collection to inform conceptual designs and the ESIA. Preliminary site investigations comprise road alignment and condition surveys, topographical surveys, geotechnical investigations involving test pitting and materials sampling, construction materials investigations, as well as specialist environmental surveys such as biodiversity (terrestrial and aquatic flora and fauna) studies and specialist social studies. The pre-construction activities also included economic analyses such as traffic surveys and land use or livelihood analyses.

8.1.1 LANDSCAPE MODIFICATION THROUGH MATERIAL SOURCING AND TEST PITTING

Description of Impact/Project Activities			
From both an engineering and an economic point of view, geotechnical investigations are of fundamental importance because they have a large impact on many elements of the design and construction of the road. Geotechnical investigations involve identification of material sources and sampling of materials for laboratory testing by means of excavating shallow pits along the road links and at potential borrow sites off the road. Test pits produce considerable quantities of material and sometimes leave small damages to the road pavement.			
Aside from negative visual impacts from excavations on the existing road, test pitting can also generate reasonable amount of dust during the excavation, sampling and transporting of collected samples which can impact the air quality.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The likelihood of the impact occurring is high; however, the severity of the impact will be moderate. The impact will be limited to the road corridor of influence and will be short-term.			
Impact Criteria	Severity	3	Moderate
	Reversibility	1	Reversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		32	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
<ul style="list-style-type: none">• Restrict geotechnical activities and material extraction to only defined project road widths.• Implement a dust control program to reduce the amount of dust generated.• Avoid storing of soil or materials near water ways and on slopes.• Exposed soil and material stockpiles should be protected against wind erosion and the location of stockpiles should take into consideration the prevailing wind directions and locations of sensitive receptors.• Material loads should be suitably covered and secured during transportation to prevent the scattering of soil, sand, materials, or dust.• Backfill shallow pits with excavated material once investigation is over.• The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.• The Contracting Entity should adequately follow the Environmental Codes of Practice (ECOP) for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.			
Significance Rating After Mitigation			
Following the application of the proposed mitigation measures, the severity of the impact should reduce to low and the likelihood of the impact occurring will reduce to low; with the resultant impact significance rating reducing to Negligible.			
Negligible	Low	Moderate	High

8.1.2 WASTE POLLUTION AND CONGESTION

Description of Impact/Project Activities			
Some amount of waste would be generated during preliminary investigations. The waste may come from various sources, including excavation spoils, garbage generated by the people involved in the studies, oil spills from equipment operation or transport vehicles, etc.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The level of impact severity and likelihood of impact occurrence resulted in the determination of the significance of the impact as being low. The impact severity has been assessed as moderate but the likelihood of the impact occurring is high. The impact will be short-term and limited to the road corridor of influence.			
Impact Criteria	Severity	3	Moderate
	Reversibility	1	Reversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		32	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Enforce site clean-up at the end of each working day and avoid negligent behaviour with regard to the generation and disposal of waste.Wastes generated should be collected and disposed of offsite at approved sites of disposal or handled by a certified waste handler.Arrangements should be made with the Waste Management Unit of the District Assemblies under the Project or other waste handlers for weekly collection of inorganic wastes generated, particularly near communities.Collected wastes should be kept in areas away from surface waterbodies to avoid water contamination and sedimentation.Regular servicing and maintenance of equipment and vehicles to keep them in good working condition.While transporting waste, care should be taken to prevent waste spreading to areas outside the site boundary.Chemical waste of any kind should be disposed of at an approved appropriate landfill site and in accordance with local legislative requirements.The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.			
Significance Rating After Mitigation			
The severity of the impact should reduce to low and the likelihood of the impact occurring will also reduce to low following the application of the proposed mitigation measures. As a result, the impact significance rating will reduce to Negligible.			
Negligible	Low	Moderate	High

8.1.3 SOIL CONTAMINATION

Description of Impact/Project Activities			
There is the possibility of soil contamination during preliminary site investigation surveys and at material offtake (sampling) at borrow areas. Excavation tools or equipment if not well treated prior to use can spread contamination on site and this can wash off during rain events to contaminate water resources.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The impact severity and probability of occurrence has been assessed as moderate. The impact will be short-term and limited to the road corridor of influence. The resultant significance of the impact will therefore be low.			
Impact Criteria	Severity	3	Moderate
	Reversibility	1	Reversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	3	Medium
Total Score		24	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
<ul style="list-style-type: none">Enforce site clean-up at the end of each working day and avoid negligent behaviour with regard to equipment clean-up.Wastes generated should be collected and disposed of offsite at approved sites of disposal to avoid picking up contamination with equipment.Collected wastes should be kept in areas away from surface water bodies to avoid water contamination and sedimentation.While transporting waste, care should be taken to prevent waste spreading to areas outside the site boundary.Chemical waste of any kind should be disposed of at an approved appropriate landfill site and in accordance with local legislative requirements.Adopt appropriate procedures for:<ul style="list-style-type: none">Equipment handling, transport and storage procedures.Materials handling, storage and disposal.Handling of contaminated waste.Soil remediation where contamination has occurred.			
Significance Rating After Mitigation			
The severity of the impact should reduce to low and the likelihood of the impact occurring will also reduce to low following the application of the proposed mitigation measures. The impact significance rating will thus reduce to Negligible.			
Negligible	Low	Moderate	High

8.2 CONSTRUCTION PHASE IMPACTS AND PROPOSED MEASURES

This comprises impacts relating to site preparation activities and the actual construction/civil works. Site preparation will consist essentially of vegetation (bush) clearing, levelling, grading and compacting activities. It will also involve mobilization of human resources for the construction, as well as mobilization of construction equipment and plant, construction materials and the erection of construction camps.

It will be necessary that the construction camps are located away from the local communities (at least about 500 m away) to limit the harmful effects of noise on residents of the communities. It would also need to be located away (at least about 10 km) from conservation areas or sensitive vegetation in the Project area. It is also important that the operation of construction camps is done in a manner that does not generate conflict with the local residents or communities over the use of local resources for domestic purposes.

The Project construction activities will involve vehicular movement, civil engineering construction works, vegetation (bush) clearing, topsoil removal, earth (soil) material loading and hauling, stockpiling, compaction and topographic grading or levelling. Earthworks or excavations, drainage works, alignment and re-alignment of road segments, creation of road pavement, and bridge / culvert works will also be executed at the construction phase. It may also involve the construction of temporary diversions for vehicular traffic on the roads and for construction access. Site clean-up and restoration activities will also be considered as part of construction phase activities.

It will be important that construction activities adhere to industry standards and the Project specific ECOP which is set out to enable meeting of environmental standards on the Project. It is also important that appropriate procedures are undertaken to reduce the environmental impact of various activities related to the road construction works and services.

8.2.1 DUST AND AIR QUALITY DEGRADATION

Description of Impact/Project Activities			
<p>The main pollutant of concern from site development activities is dust occurring as particulate matter. It is expected that the level of particulates will be much higher in roadside locations compared to residential and commercial locations. Negative impacts on air quality from the Project would result from dust emissions which may hamper visibility, cause damage to vegetation by impairing their growth and quality, stain roadside sold goods, stain houses and household properties along the road. The dust may also degrade surface water quality, cause respiratory problems (such as silicosis and asthmatic attacks) and eye infections (particularly for workers).</p> <p>Further, the generation of dust from vehicle movements is anticipated to be a large source of dust. Construction vehicles may also generate toxic fumes which will degrade the ambient air quality and affect health of workers and the general population. Wind-blown dust from denuded areas and soil or construction material stockpiles can result in considerable dust emissions under strong wind conditions. Clearing of vegetation and earthworks could increase dust levels as well, especially in the dry season.</p> <p>It is anticipated that the extent of dust emissions and air quality impacts will vary substantially on daily basis depending on the level of activity, the specific operations and prevailing meteorological conditions. Nonetheless, it is important that effective dust control measures are taken into consideration during the road construction or upgrade.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			

Potential likelihood of air and dust emissions occurring is definite. Although emissions are expected to be localized to the construction areas, there is possibility for emissions to travel beyond, aided by air/wind. Such emissions contribute to climate change which is a global phenomenon, as such, the impact is assessed as having national consequences.

Impact Criteria	Severity	5	Very High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	4	National
	Probability	5	Definite
Total Score		80	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			

- Dust generating activities should be limited in windy conditions if practicable; soil or construction materials should be well stored and managed appropriately.
- An ESMP should be implemented so that the works are conducted to achieve an ongoing reduction of dust and air emissions.
- The Contracting Entity should advise or notify local households on dust, noise, vibration and other dangers as construction progresses.
- The Contracting Entity should use water bowsers to suppress dust regularly at active work sections along the road and at quarries and/or borrow sites for the protection of workers and the general population from dust impacts.
- Truck queuing, needless idling of trucks and trips should be reduced through logistical planning of materials delivery and work practices.
- Vehicles travelling within the worksites should be restricted to a speed limit appropriate for the conditions of safety and so as to limit dust generation from vehicle movements. Entry and exit points to construction areas should have a speed limit of 20km/hr.
- Reduce generation of dust by implementing dust suppression measures including watering and temporary sheeting.
- Trucks carrying dusty, erodible materials should be covered.
- Reduce cleared areas as far as practicable by utilizing existing easements.
- Silt and other material should be removed from erosion control structures as soon as is practicable following a rain event.
- The Contracting Entity should implement a reforestation or land remediation measures involving the planting of indigenous tree species to rehabilitate degraded areas and act as carbon sink.
- Limit clearing of the right of way to when it is absolutely needed, having regard to soil type, terrain and construction requirements.
- The Contracting Entity must limit the area and period that work (especially earthworks or excavations) takes place within or near water sources like streams, rivers and dugouts.
- Blasting if needed should be done on schedule and neighbouring residents given prior notice to reduce impacts of dust and fly rocks.
- New material sourcing areas should not be located in the vicinity water sources like streams, rivers and dugouts.
- Dispose of overburden in a manner that it will not be windblown or washed into a waterbody and adequate soil erosion protection should be employed.
- Overburden stockpiles / spoil sites must be covered with topsoil and quickly rehabilitated using indigenous vegetation.
- The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.
- The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.

Significance Rating After Mitigation

The significance of the impact will revert to moderate as a result of the impact severity reducing from very high to moderate following the application of the proposed mitigation measures. The mitigation measures will assist in the suppression of dust from construction activities, thereby reducing the emission, its effect on the ambient environment and the frequency of occurrence. Similarly, the mitigation measures relating to operation of construction equipment and vehicle emissions are also aimed at reducing the emission at source, hence reducing the impact.

Negligible	Low	Moderate	High
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8.2.2 GREENHOUSE GAS EMISSIONS AND CONTRIBUTIONS TO LOCAL CLIMATE CHANGE AND AILMENTS DURING ROAD CONSTRUCTION

Description of Impact/Project Activities			
<p>Construction vehicles and trucks used to transport construction materials from their sources to the Project site will contribute to increases in emissions of greenhouse gases like CO₂, NO₂, and SO₂; and particulates (PM₁₀) due to fuel (diesel) combustion. These vehicles produce high emission rates due to their low speeds and high workloads. When movement is limited, a buildup of gaseous and particulate pollutants within the Project area or construction site can occur.</p> <p>Such emissions can lead to contribute to several environmental impacts including climate change (global warming) and health impacts in the short to long term. Vehicular emissions also constitute an important trigger factor for respiratory illnesses. Besides their contribution to global climate change, the inhalation of sulfur dioxide (SO₂) and nitrogen dioxide (NO₂) are associated with upper respiratory health impacts. Inhalation of volatile organic compounds (VOC) can result in carcinogenic impacts depending on the VOC and the exposure time.</p> <p>It is anticipated that the extent of vehicular emissions will vary substantially on daily basis depending on the level of activity, the specific operations and prevailing meteorological conditions. Nonetheless, it is important that climate resilient measures are taken into consideration during the road construction or upgrade. As such, a comprehensive climate risk assessment was conducted as part of the Project as detailed in the Assessment Study Report (UWP, 2020) submitted under a separate cover. Some identified potential anthropogenic causes of climate change in the project area include bushfires and deforestation. Vegetation clearance as a result of the project would be a contributing factor to changing climate variables in the area and therefore should be limited to where it is much needed or unavoidable.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>Potential likelihood of vegetation clearance and air emissions occurring is definite. Although emissions are expected to be localized to the construction areas, there is possibility for emissions to travel beyond, aided by air/wind. Such emissions contribute to climate change which is a global phenomenon, as such, the impact is assessed as having national consequences.</p>			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	4	National
	Probability	5	Definite
Total Score		75	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			

- Burning of vegetation or other waste material should be discouraged and communities (especially farmers, herders and hunters) sensitized on bush fires and unsafe farming practices.
- Establish buffer strips or conservation strips (strips of vegetation that act as buffer) to act as carbon sink.
- An ESMP should be implemented so that the works are conducted to achieve an ongoing reduction of air emissions.
- Truck queuing, needless idling of trucks and trips should be reduced through logistical planning of materials delivery and work practices to limit vehicular emissions.
- Reduce cleared areas as far as practicable by utilizing existing easements.
- Limit clearing of the right of way to when it is absolutely needed, having regard to soil type, terrain and construction requirements.
- Vegetation clearing should be supervised or undertaken by a vegetation specialist on the Contracting Entity's team and species of conservation concern should be identified and avoided or preserved.
- The local authorities and state institutions should be empowered to arrest and punish culprits of illegal tree felling.
- The Forestry Commission must be encouraged and resourced to intensify their monitoring, and to embark on education and sensitization programs on the dangers of deforestation.
- The Contracting Entity should collaborate with the Forestry Commission to implement a reforestation or land remediation program involving the planting of indigenous tree species to rehabilitate degraded areas and should give more opportunities to women to be part of and benefit from the program.
- Skills training and education or sensitization programs should continue to be provided to the communities (including schools, religious groups, opinion leaders, farmers, etc.) and issues such as climate change and sustainable agricultural practices should be addressed.
- The Ghana Meteorological Service should pass on information about climate change in the Upper West Region to Extension officers representing MOFA at the community level who will educate farmers on changing rainfall patterns, the right period to engage in farming activities and on sustainable farming practices. This then implies the need to increase the number of extension officers in the various communities.

Significance Rating After Mitigation

The significance of the impact will revert to low as a result of the impact severity reducing from high to low and the probability of occurrence also reducing following the application of the proposed mitigation measures. The mitigation measures relating to operation of construction equipment and vehicle emissions are also aimed at reducing the emission at source, hence reducing the impact.

Negligible

Low

Moderate

High

8.2.3 DISTURBANCE BY GROUND VIBRATIONS AND NOISE POLLUTION

Description of Impact/Project Activities

Road construction works are often associated with noise pollution. Increased noise levels are expected from clearing equipment and construction machinery. The primary noise source associated with site preparation and construction works will be noise from operation of construction machinery such as dozers, excavators, compactors, haulage trucks, graders, etc., as well as noise from construction activities and workers. Increased noise levels have the potential of causing auditory fatigue, temporary and permanent loss of hearing ability, sleep disorders, and can even contribute to learning problems in children (especially for roadside schools and residential facilities).

Most of the feeder roads traverse areas with residential, public health and education facilities or services along the roads which will be impacted by noise emissions from construction activities. Vibrations from construction activities may also cause physical damage to these sensitive roadside properties.

Per EPA guidelines, the permissible ambient noise levels in residential areas are 55 decibels (dBA) during the day and 48 dBA at night. Those at and around educational and health facilities are 55 dBA during the day and 50 dBA at night, while the noise level for areas with light commercial or light industrial activities are 60 dBA and 55 dBA during the day and night respectively. The guidelines also permit 70 dBA noise levels during the day and 60 dBA during the night for light industrial areas and places of entertainment and public assembly such as churches and mosques are set at 65 dBA for day and 60 dBA for night.

Not only human settlements would be affected by this impact. The increased noise levels can also lead to habitat change or reduced population of wildlife.

Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The severity of the noise emissions is considered high even though noise sources are not expected to be incessant during the construction phase. The spatial extent of the noise emission is expected to be limited to or only affect facilities or settlements near to or along the roads.			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		55	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Where reasonable and feasible, the Project will apply best practice innovative noise mitigation measures including:<ul style="list-style-type: none">Increasing the offset distance between noisy machinery and residential receptorsAvoiding operation of noisy machinery close to sensitive receptors or install noise barriersProper choice of plant and machinery (i.e. fitted with noise silencers or reducers)Reducing consecutive works in the same localityUndertaking loading and unloading away from noise sensitive areasLocating quarry areas away from human habitations (at least 500 m away).Site inductions should cover the importance of noise control and appropriate noise reduction measures.Construction workers should be supplied with noise mufflers and usage should be enforced at noisy work environments.Use equipment or machinery that are in good working condition and that meets noise emission limits.Regularly service, maintain and appropriately repair haulage vehicles and construction machinery with a potential to generate noise.The Contracting Entity should develop noise monitoring program as part of environmental monitoring requirements prior to construction and regular noise monitoring during construction in compliance with EPA ambient noise guidelines.Community liaison should form a critical element in the management of noise impacts, especially regarding potential excavations, blasting and site clearance activities, where adequate notice should be served to affected sensitive receptors prior to undertaking the activities. A designated Project team member should handle the concerns of locals.A grievance mechanism should be established to enable identification and resolution of noise related concerns from the communities at an early stage.			

- Limit vehicle reversing to reduce noise caused by reversing alarms, as well as limit activities such as needless acceleration and breaking squeal.
- Restrict working hours to daytime only and off-school days for sections with school. Where night-time work is to be undertaken, a designated Community Relations Officer (CRO) should engage with local residents or notice given.

Significance Rating After Mitigation

Noise emissions will not be incessant and will be limited to daytime. The severity of noise emissions affecting sensitive receptors when mitigation measures are followed will reduce from very high to moderate. The probability would also reduce. Thus, the significance rating of noise impacts will markedly reduce to low after mitigation measures have been applied.

Negligible	Low	Moderate	High
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8.2.4 POTENTIAL INCREASE IN EROSION DUE TO VEGETATION CLEARANCE AND TOPSOIL REMOVAL

Description of Impact/Project Activities

Construction activities such as excavation and removal of vegetation cover and top soil at construction sites may loosen the soil and expose it to erosion effects. Topsoil is the uppermost layer (first several inches) of the soil profile and generally provides the most fertile growing medium since there are more microorganisms, organic matter, and nutrients than in the subsoil. Removal of more than several inches of soil during clearing and grading activities can lead to reduction in the overall fertility of the soil.

Soil degradation is indicated by a lowering of the fertility status, either by a reduction of the nutrient level or by physical loss of topsoil. Clearing and grading can potentially lead to such degradation by mixing topsoil with excavated soil and increasing soil erosion (Sorrell, *et al.*, 1982). Movement of heavy construction machinery (e.g. bulldozer, backhoe, excavator, etc.) can affect the soils ability to support plant growth, as such increasing erosion potential. Vegetation clearing and grading activities, coupled with poor drainage will contribute to an increase in surface runoff and erosion of the soil. Soils that are denuded of vegetative cover are prone to erosion by running water and high winds. The climate of the Project area is such that erosion due to rainfall could be exacerbated in the area from topsoil (and vegetation) removal.

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact

Summary of Reasoning

The severity of the impact is high and the probability definite. The impact will be localized and short-term as revegetation following construction will help reduce the consequences.

Impact Criteria	Severity	4	High
	Reversibility	1	Reversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		45	

Significance Rating Before Mitigation

Negligible	Low	Moderate	High
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Degree of Confidence

Low	Medium	High
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Proposed Mitigation Measures

- Terrain evaluation and mapping should be undertaken and vegetation clearing or area of ground clearance should be limited as much as practicable.

- Best practice construction measures should be adopted to reduce erosion, restore the natural contour of the ground, and restore surface drainage patterns as close to pre-construction conditions as practicable.
- Where vegetation is removed, and/or where the area is not to be paved after land contouring, re-vegetate the areas immediately after construction activity finishes.
- Progressive replanting of disturbed areas should be considered and done during the construction phase and not after.
- Implement erosion and sediment control measures at watercourse crossings, and downstream of side cast material as needed, and where safe and practical.
- Isolate construction area from clean runoff and monitor for and rectify areas of problematic erosion.
- The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.
- The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.

Significance Rating After Mitigation

The severity and likelihood of the impact will reduce following application of mitigation measures. With proper management during construction and following of construction protocols or the mitigation measures, the significance measure of topsoil removal and erosional impacts should reduce markedly to negligible rating. Vegetation will ultimately be restored and should not take long to establish and provide adequate ground cover.

Negligible

Low

Moderate

High

8.2.5 SOIL COMPACTION DUE TO HEAVY CONSTRUCTION EQUIPMENT USE

Description of Impact/Project Activities

Equipment such as compressors, heavy trucks, wheel loaders, excavators, etc. will be used during construction. The use of these heavy construction equipment will result in soil compaction, thus making the topography more impermeable with potential for increased surface runoff and erosion. Soil compaction impact is likely to occur in different areas from various sources including the actual road construction, construction of ancillary facilities, and at material stockpile areas. Haulage trucks moving along undesignated routes are also likely to compact the soil. Compaction of soil would reduce the water infiltration capacity, increase surface water flow, and consequently soil erosion and possibly flooding in localized areas.

Negative impact from excavation activities and vegetation clearance will also result in relative change in the arrangement and structure of soils in areas affected. Material sourcing could result in the exposure of subsurface soil layers and depressions that may not easily promote faster vegetation regrowth or even be breeding grounds for vectors if left unrestored. Construction activities such as excavations and grading activities can cause the mixing of the subsoil with topsoil; and this can affect the soils ability to support vegetation.

Nature of Impact

Positive

Negative

Direct

Indirect

Rating of Impact

Summary of Reasoning

Soil compaction is a negative impact on the biophysical environment, likely to occur in different areas from various sources. The severity of the impact will be high. Restoration is possible either mechanically or by natural means which could potentially return the soil conditions to baseline conditions. The temporal effects are likely to last slightly beyond restoration of vegetation. Impact will be limited to the ROWs.

Impact Criteria

Severity

4

High

Reversibility

1

Reversible

	Duration	3	Medium term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		50	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
<ul style="list-style-type: none">Best practice construction measures should be adopted to reduce erosion, restore the natural contour of the ground, and restore surface drainage patterns as close to pre-construction conditions as practicable.Area of ground disturbance should be limited as far as practicable.Schedule construction to limit areas of soil disturbance during wet seasons.Implement erosion and sediment control measures at watercourse crossings, and downstream of side cast material as necessary, and where safe and practical.Separate stockpiles should be kept for each type of material excavated. This should be done to achieve systematic backfilling of created pits and to maintain a geologic arrangement or soil structure close to the original.Monitor for and rectify areas where hardpan has developed as a result of compaction with heavy equipment by using sub soils to break up the hardpan.The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.			
Significance Rating After Mitigation			
With proper management during construction and following of construction protocols or the mitigation measures proposed, the significance of the impact should reduce markedly following reductions in the impact severity and likelihood. Vegetation will ultimately be restored and this will help improve or restore the soil in the long-term. The impact is rated low after mitigation.			
Negligible	Low	Moderate	High

8.2.6 SOIL CONTAMINATION DURING ROAD CONSTRUCTION

Description of Impact/Project Activities			
Soil contamination may primarily result from solvents, grease, oil and waste oil spillages unto land. Material and rags soaked in oil when not kept properly can be a potential source of soil contamination after rainfall wash off. Accidental oil / fuel spillages during refuelling of Project vehicles and generators, maintenance and servicing of vehicles may also pollute the soil. Contamination of soil as a result of various activities including solid and hazardous waste disposal can potentially lead to soil degradation and the loss of its fertility and ability to support vegetation growth.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
Spills or leakage of hazardous wastes could seep into the surrounding soil and remain for years if not well managed. Depending upon their toxicity, persistence, and mobility, the effects would be reversible with effective treatment. The spatial extent of the impact would be site-specific (within 1 km radius of the site) considering that only soils at the affected sites or close to the affected sites would be affected, unless the contamination is carried elsewhere. In most cases, spills would occur within the ROW or near the construction site. The severity would however be moderate.			

Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	1	Site only
	Probability	4	High
Total Score		36	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Best Management Practices (BMPs) should be implemented during storage, usage and transport of hazardous materials and wastes.Readily make available spill containment kits at the construction and office areas.A soil contamination management plan or procedures should be developed as part of the ESMP that will include appropriate procedures for:<ul style="list-style-type: none">Fuel handling, transport and storage procedures.Construction raw materials handling, storage and disposal.Storage and handling of radioactive material.Handling of contaminated waste.Soil remediation where contamination has occurred.Oil spill prevention and response measures should be in place in accordance with the provisions of the ESMP.			
Significance Rating After Mitigation			
The impact significance rating will reduce following the application of the proposed mitigation measures. The impact is reversible with effective treatment, although the persistent impact of some metals (lead, zinc, etc.) in soil may remain. The impact will be negligible post-mitigation following reductions in the severity and likelihood of occurrence.			
Negligible	Low	Moderate	High

8.2.7 LANDSCAPE MODIFICATION THROUGH MATERIALS DISPLACEMENT AND DESTABILIZATION OF SLOPES

Description of Impact/Project Activities			
<p>This impact will result from creation of road cuts or embankments and earthworks. Earth will be displaced during the road construction and especially from acquisition of materials from quarries and/or borrow pits for the construction of the roads. The sourcing of materials plays a critical role in road construction and maintenance projects. Earth will also be displaced during cut processes and though this earth will most likely be replaced during fill processes, it may still lead to modifications and/or unstable ground conditions at some areas.</p> <p>Slope stability is the potential of soil covered slopes to withstand and undergo movement. Cut and fill processes have the tendency of destabilizing slopes by destroying the cohesion between soil grains and reducing friction. The steepness of cut slopes coupled with deficiencies in drainage and modification of water flows can potentially magnify this impact.</p> <p>When the road construction is not planned or executed well, it can create a lack of harmony between the road and landscape features such as natural relief and morphology, hydrology, and the natural vegetation. However, since the Project involves an already existing road, construction activities may not result in significant alteration of landscapes and the potential creation of new land forms.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			

Summary of Reasoning			
The likelihood of the impact occurring is definite considering that some section of the roads to be re-constructed may have to undergo cut and fill processes. The duration will be short term and limited to the construction phase.			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		40	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
<ul style="list-style-type: none">• Avoid the creation of cut slopes and embankments of an angle greater than the natural angle of repose for the local soil type which could lead to rock falls, slips and landslides.• Balance filling and cutting requirements through appropriate route choice, so as to avoid/reduce the production of excess spoil material and reduce the need for borrow pits.• Implement engineering solutions such as intercepting ditches at the top and bottom of slopes. Gutters and/or culverts should be used to control the flow of water down a slope or terraced or stepped slopes to reduce the steepness of a slope.• Riprap, or rock material embedded in a slope face, sometimes combined with planting, retaining structures, such as gabions (rectangular wire baskets of rocks), etc. should be explored.• Best practice construction measures should be adopted to restore the natural contour of the land as close to pre-construction conditions as practicable.• Where vegetation is removed, and/or where the area is not to be paved after land contouring, re-vegetate the areas immediately after construction activity finishes.• Progressive replanting of disturbed areas should be considered and done during the construction phase and not after.• The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.• The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.			
Significance Rating After Mitigation			
The impact significance rating will reduce from low to negligible following the application of proposed mitigation measures. The probability of the impact should reduce to low if mitigation measures are followed. The impacts will be localized to the road corridor of influence and remedial works would be conducted where needed which will reduce the impact severity as well.			
Negligible	Low	Moderate	High

8.2.8 MATERIAL SOURCING AND MATERIAL STORAGE IMPACTS DURING CONSTRUCTION

Description of Impact/Project Activities			
<p>There will be vast material requirements on the Project and the need for storage of materials (fuel, lubricants and construction machinery). Among others, there will be need for aggregates, cement, water, etc. Negative effects from construction material sourcing will include scarring of the original landscape of the Project area if materials would be sourced locally, including potential impacts from the material hauling tracks, their exhaust emissions, dust and dangers posed by borrow pits, etc. Other environmental concerns associated with material sourcing or borrow pits development will be the temporary loss of productive land (crop/grazing), erosion, pollution of ground water, creation of conducive environment for disease vectors and accidents or safety concerns.</p> <p>During the construction phase of the project, pits dug for the extraction of sand and gravel from a deposit near the surface of the earth may be left uncovered or not reinstated. The sand and gravel extracted is usually used in the mixing of concrete for road surfacing and in the production of other construction-related materials. During the raining season, these pits may collect and store stagnant water and become breeding grounds for mosquitoes, reptiles and other water-borne insects. This can in turn affect the health of the people living in and around the area. Domestic animals and even children could fall into these pits, get trapped or drown. Mounds of construction materials like sand and gravel could also be dumped along the shoulders of the roads by the Contracting Entity; and usually, these mounds pose a danger to drivers and riders, especially those who do not ply the roads often and may not be aware of the presence of these materials or moulds. This may result in needless accidents and loss of lives.</p> <p>Similarly, the storage of petroleum products could also result in fires and explosions, as well as cause air pollution through evaporation loss of gasoline during fuel transfer from the tank or trunk to a storage site. Material storage may also generate a variety of hazardous waste streams that needs to be managed properly to avoid environmental pollution concerns.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>The likelihood of the impact occurring is definite considering the material requirements for the Project. The duration will be short term and limited to the construction phase. The impacts will be localized to the material sources and storage areas.</p>			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		50	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			

- Where the Contracting Entity opens up new material sources other than procuring materials from commercial operators, restoration of the sites immediately after the construction phase should be undertaken in accordance with an approved restoration plan.
- The Contracting Entity should obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas, and their location should be approved by appropriate Government authorities, including traditional authorities if the land on which the quarry or borrow areas fall is traditional land.
- New material sourcing areas should not be located in the vicinity of settlements, cultural and historical / archaeological sites, wetlands, forested areas, or any other valued ecosystem, on high or steep ground or in areas of high scenic value.
- Where materials are sourced from commercial operators, the Contracting Entity should establish the operators' compliance with statutory requirements with evidence of certificates of compliance.
- Rehabilitate and replant land excavated for borrow pits. However, in the case of public request, the borrow pits may be left open or converted into well engineered dugouts for water harvesting and to recharge the groundwater. But it should be borne in mind that LI 1652 (under Schedule 2) recommends mandatory ESIA's for the construction of engineered water holding facilities (e.g., dugouts / dams and man-made lakes) and irrigation schemes and the necessary procedures should be followed to obtain the relevant licenses and/or permits.
- Areas for disposing hazardous materials such as contaminated liquid and solid materials should be approved by the appropriate local and/or national authorities before the commencement of work.
- Plastic sheeting should be placed under hazardous material and their storage areas to collect and retain leaks and spills.
- Contaminated storm water at oil storage areas should be drained or led into ditches and ponds with oil traps (interceptors).
- The floors of refueling points should be bunded/lined with impervious material.
- Avoid spilling of hazardous materials on surfaces outside the project site.
- Institute stringent fuel storage and refueling procedures such as not refueling or transferring fuel after dark or under deficient light conditions.
- Implement concrete casing of fuel storage tanks with a bund around it. Also, install oil interceptors at fuel storage areas and stock adequate supplies of oil/fuel spill control kits.
- The Contracting Entity should implement safety and emergency response measures at construction camps, material (including fuel) storage areas and other facilities and also make adequate provisions for fire extinguishers and/or fire hydrant systems to fight possible fire incidents.
- A proper waste management plan should be developed as part of the Contracting Entity's ESMP and followed; and also, train staff in spill prevention and control.

Significance Rating After Mitigation

The impact significance rating will reduce following the application of proposed mitigation measures. The impact severity will reduce from moderate to low and the impact significance rating as well.

Negligible	Low	Moderate	High
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8.2.9 POLLUTION OF THE ENVIRONMENT DUE TO IMPROPER DISPOSAL OF WASTE

Description of Impact/Project Activities			
During the construction phase, different forms of waste streams will be generated, including domestic waste, construction waste and hazardous waste. These may include plastics, paper, glass, containers and oily rags, used oil, grease, culinary waste and cut-to-spoil materials. If inadequately handled, they could create environmental pollution, aesthetic problems, contamination of waterbodies, sedimentation and/or blockage of water channels, and soil degradation.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The impact severity is assessed as very high and the likelihood of impact occurrence is definite because waste generation cannot be dissociated from road construction. The impact will be short-term and limited to the construction phase and the road corridor of influence.			
Impact Criteria	Severity	5	Very High
	Reversibility	1	Reversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		50	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
<ul style="list-style-type: none">Plastic sheeting should be placed under hazardous material and their storage areas to collect and retain leaks and spills.Areas for disposing hazardous materials such as contaminated liquid and solid materials should be approved by the appropriate local and/or national authorities before the commencement of work.Hazardous wastes should be stored in an area or facility bunded/lined with impervious material.Implement concrete casing of fuel storage tanks with a bund around it. Also, install oil interceptors at fuel storage areas and stock adequate supplies of oil/fuel spill control kits.Avoid spilling of waste materials on surfaces outside the Project site. During transportation, waste materials should be well packed to avoid spillages.A proper waste management plan should be developed as part of the Contracting Entity's ESMP and followed.Contract a licensed waste handler to collect and dispose of wastes. Some waste such as waste oils could be returned to suppliers for either reprocessing or reuse.Arrangements should be made with the Waste Management Unit of the District Assemblies under the Project or other waste handlers for weekly collection of inorganic wastes generated, particularly near communities.Waste reduction through reuse should be emphasized and implemented throughout the Project.Wastes must be appropriately segregated into categories such as; inert, domestic, non-hazardous or hazardous, metal, plastics, biodegradable, non-biodegradable, etc. in clearly labelled containers.Waste storage areas should be hygienic to prevent nuisance odours, vermin and dust, loss of waste materials and scavenging.Sanitary facilities will be provided at the camp for workers in a proportion of five (5) toilets to a workforce of hundred (100), as well as waste bins.			

Significance Rating After Mitigation			
The severity of the impact should reduce to moderate and the likelihood of the impact occurring will also reduce following the application of the proposed mitigation measures. As a result, the impact significance rating will reduce to low.			
Negligible	Low	Moderate	High

8.2.10 SILTATION OF WATERBODIES AND MODIFICATION OF WATER FLOWS DUE TO POOR CONSTRUCTION ACTIVITIES

Description of Impact/Project Activities			
<p>Road construction activities like excavation, compaction, clearance of vegetation, installation of culverts, and cut and fill, will loosen soils that may get eroded into surface water courses. Culvert construction may stir riverbed deposits into suspension which will increase the turbidity of surface water sources. The siltation of streams downstream could impact waterbodies through adverse increment in sediment load and turbidity. Also, if left unaddressed, siltation can clog drainage channels and result in flash floods downstream.</p> <p>Construction activities also have the potential of obstructing, blocking and diverting water flows at stream or river crossings or channels. Rechannelling of waterways is often undertaken as part of road construction to avoid flooding and make crossing structures simpler. In the process, natural streambeds are dug up and useful obstructions, including large boulders, are removed. Construction activities may also result in the concentration of flows at certain points and in some cases, increase the speed of flow thus increasing the risk of erosion, flooding, changes in biological activities, and destruction of spawning beds for fish, among others.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The impact will be short-term and limited to the construction phase. The level of impact severity should it occur is assessed as high due to the scarcity of water in the Project area and few waterbodies traversed by the roads. The likelihood of impact occurrence is nonetheless high.			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		44	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			

- During channelization, the Contracting Entity should endeavour to maintain the original direction of water flow - unless alternatives present better drainage improvement opportunities.
- Avoid stockpiling of soil near waterways / wetlands or on slopes.
- Stockpiled materials should not be left uncovered; and perimeter drains should be built around stockpile areas.
- Surround erodible stockpiles with a ring of stones to prevent materials being washed away by surface runoff.
- Protect areas susceptible to erosion using either temporary or permanent drainage works.
- Limit earthworks such as excavation, cut and fill, vegetation clearance, and compaction, to only areas where it is absolutely needed.
- Soil erosion checks should be in place along drains. These checks should include scour checks, silt traps, paving of drains, and stone pitching. In addition, drains should be regularly desilted.
- Construct interception ditches, and settling ponds to prevent muddy water reaching water sources.
- Use existing roads as access roads to quarry sites and borrow areas and re-vegetate constructed access roads after the construction phase of the Project.
- Where the Contracting Entity opens up a quarry, stone crushing plants should be located away from water courses.
- The Contracting Entity should be guided by the requirements of Riparian Buffer Zone Policy for Managing Freshwater Bodies in Ghana in the implementation of construction activities near waterbodies along the road corridor.
- The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.
- The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.

Significance Rating After Mitigation

The impact significance rating will reduce from low to negligible following the application of proposed mitigation measures resulting in impact severity and probability reducing to low.

Negligible	Low	Moderate	High
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8.2.11 WATER QUALITY DEGRADATION

Description of Impact/Project Activities

This negative impact may result from various sources, including siltation, erosional discharge and construction camp domestic effluent, among others. Road construction activities involve use of oils and fuels for running haulage trucks and other construction machinery. If there are any leakages, these oils, fuels and lubricants would end up in surface waterbodies crossed by or next to the road construction work and also in ground water. The fuels, oils and lubricants would pollute these waters and hence degrade its quality. Wastes from storage sites, workshops, and at construction sites has the potential to contaminate water.

Riverbanks are also sometimes unstable and susceptible to erosion. The potential rehabilitation or reconstruction of culverts and bridges may also induce further erosion or scouring of the river or stream banks and the subsequent siltation can affect the water quality. Aside the potential effect on aquatic life, this can also lead to disease spread and endanger the life of community members who depend on these waterbodies for domestic uses and recreational purposes like swimming.

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact

Summary of Reasoning

The likelihood of impact occurrence is high. The level of impact severity is assessed as very high due to the scarcity of water in the Project area. The impact will be short-term and limited to the construction phase. The spatial extent of the impact is assessed as regional because waterbodies serve a wide area of people even beyond the corridor of influence.

Impact Criteria	Severity	5	Very High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	3	Regional
	Probability	4	High
Total Score		52	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
<ul style="list-style-type: none">Waste lubricants and oils should be collected and recycled or disposed of offsite to approved disposal sites.Floors of workshops, bitumen storage plants and refueling points for haulage vehicles and construction machinery should be bunded (lined with concrete) to avoid percolation of spilled oils and fuels into ground water or runoff of spilled oils and fuels into surrounding surface water.Plastic sheeting should be placed under hazardous material and their storage areas to collect and retain leaks and spills.Contaminated and worn plastic sheeting should be packed into drums and disposed of offsite.Undertake regular servicing of vehicles and generators and other machinery to prevent fuel leakages.Oil spill prevention and response measures should be in place and should be followed.Facilities for collection and safe disposal of litter (wastes) should be provided at work sites.Road construction crews should be under strict instruction to dispose of both solid and liquid wastes into only the designated facilities or waste bins.Routine inspections aimed at assessing the effectiveness of waste management systems should be undertaken by the Contracting Entity's site engineer and the resident engineer.The Contracting Entity should encourage the locals and construction crews to immediately report any change in colour, appearance and taste in waterbodies to the resident engineer so that the cause can be investigated and appropriate local health authorities consulted.The Contracting Entity should be guided by the requirements of Riparian Buffer Zone Policy for Managing Freshwater Bodies in Ghana in the implementation of construction activities near waterbodies along the road corridor.The Contracting Entity must develop and implement a waste management plan in accordance with the provisions of the ESMP.Use appropriate safety wear (gloves, boots, nose masks / respirators, etc.) when handling or undertaking construction work.			
Significance Rating After Mitigation			
The impact significance rating will reduce following the application of proposed mitigation measures. The impact significance is rated low post-mitigation.			
Negligible	Low	Moderate	High

8.2.12 ROAD DETERIORATION DUE TO INADEQUATE DRAINAGE AND FLOODING EVENTS

Description of Impact/Project Activities			
<p>Potential for water to cause damage during road construction is high. The presence of water weakens road building materials and unbounds materials including the subgrade, causing roads to deteriorate quickly. The feeder roads have no drainage provisions, as such, during heavy rainfall there are recorded incidences of flooding and the roads become impassable and also develop potholes and gullies. The roads are also narrow, thus presenting limited construction space which could result in construction or excavated material being placed or left un-attended within drainage path or systems. Siltation as a result of construction activities could also affect drainage of storm water from the road and cause flooding on the roads.</p> <p>Flooding is also sometimes a consequence of climate change impacts and inadequate provision of drains along roads during construction. Increased intensity of rainfall events (flooding) may result in the development of potholes and the deterioration of existing potholes on the roads. This may result in increased risk to vehicles. Flooding and increased potholes on the road, coupled with the construction works may also lead to increased traffic as vehicles travel slower, resulting in increased vehicle emissions.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>The extent of this impact would be local. The duration of the impact would be short-term. The magnitude of this impact would be moderate.</p>			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	3	Medium
Total Score		30	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			

- Culverts should be constructed considering the peak water levels.
- Culverts must also be levelled appropriately so that they are self-cleaning.
- Side drains running parallel and adjacent to the road should be constructed, to drain water from the road and adjacent lands and dispose it away from the road.
- The construction of artificial wetlands can be used for management of stormwater, with the wetlands acting as a buffer to absorb water before it reaches a road surface.
- Consider re-design or expansion of stormwater drainage systems to handle increased volume of runoff during periods of intense rainfall.
- De-silting and cleaning of drains should be carried out regularly (during or after construction).
- Offshoots or mitre drains draining water away from side drains should not discharge into people's homesteads, and the construction of infiltration ditches must be considered as an alternative. However, if offshoots must discharge onto private land, then provision must be made for the safe discharge of water (for example by constructing artificial waterways).
- The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.
- The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.

Significance Rating After Mitigation

The impact significance rating will reduce following the application of proposed mitigation measures. The impact significance rating post-mitigation will be negligible.

Negligible	Low	Moderate	High
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8.2.13 LOSS OF TERRESTRIAL HABITATS

Description of Impact/Project Activities

Linear projects like road construction have the potential to create detrimental edge effects and cause habitat fragmentation. The possible clearing of vegetation, topsoil and the digging of trenches will disturb the habitat of fauna and flora living within or near the feeder road corridors.

Clearing of vegetation is expected to occur during the construction phase of the Project which will lead to loss or reduction of terrestrial habitats. There would be vegetation clearance at sections where it is needed, which would ultimately modify the local environmental conditions or terrestrial habitats. The potential of loss or the Project impacting protected conservation areas, areas of thick natural vegetation and community tree plantations should be avoided at best or compensatory replanting carried out.

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact

Summary of Reasoning

The probability of the impact occurring is high. The severity of the impact is rated very high as loss of habitats has long-term consequences. Rehabilitation is able to recover lost habitats in the long-term.

Impact Criteria	Severity	5	Very High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		56	

Significance Rating Before Mitigation

Negligible	Low	Moderate	High
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Degree of Confidence

Low	Medium	High
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Proposed Mitigation Measures

<p>The following mitigation measures should be put in place to limit the loss of terrestrial habitats:</p> <ul style="list-style-type: none"> • Limit the area that needs to be cleared as far as practicable. • Stockpile topsoil separately and see to it that it is replaced so that revegetation is viable. • Rehabilitate the cleared areas as soon as possible with existing plant species. • Put in measures to prevent weeds and alien vegetation from colonizing the corridor. • Waste should be disposed of according to its nature and its hazard potential. • Limit as much as possible the destruction of large / important / economic trees or flora. • In order to replace vegetation that will be removed, a total of 20,000 trees will be planted. This will also contribute to improve aesthetics along the corridor. The trees will mostly be planted in communities along the corridor and selected sections of the road. • The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works. • The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document. 			
Significance Rating After Mitigation			
Without effective intervention or mitigation measures, the breakdown of terrestrial ecosystems could become permanent. The impact significance rating will reduce following the application of proposed mitigation measures to low. Rehabilitation would be conducted.			
Negligible	Low	Moderate	High

8.2.14 LOSS OF AQUATIC LIFE AND HABITATS

Description of Impact/Project Activities			
<p>Surface waterbodies such as streams and/or rivers are found within the Project area and along the road corridor of influence. The road reconstruction/maintenance activities may disturb or destroy aquatic habitats near or along the road corridors. Dust generated from construction activities and wastes generated may find their way into aquatic resources and potentially affect the life forms in these water bodies such as fishes and aquatic insects.</p> <p>River bed materials also provide habitat for benthos and these may be disturbed during culvert installations or bridge rehabilitation activities. Various aquatic lifeforms may be affected from this activity. The aquatic environments or habitats along the road corridor support fish and other aquatic plants and animals that are utilized by communities in the Project area. Some of these habitats also serve as source of water abstraction by local communities and their pollution from dust or erosion impacts or destruction by construction activities would negatively affect the livelihood of the people. Additionally, these habitats may support flora and fauna species that may require conservation.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>The severity of the impact is rated high as lost of habitats has long-term consequences. The impacts on the aquatic environment may be reversed with human intervention and natural processes. Rehabilitation is able to recover lost habitats in the long-term. The probability of the impact occurring is high. The impacts will be localized to the road corridor of influence.</p>			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		52	
Significance Rating Before Mitigation			

Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
The following mitigation measures should be put in place to limit the loss of aquatic habitats:			
<ul style="list-style-type: none">Choose methods that will avoid or decrease the potential for disturbing the aquatic environment, and limit the diversion and blocking of waterways or sources.Limit the area and period that work takes place within aquatic environments.Employ methods that will limit the extent to which silt is generated and the distance it travels (e.g., silt curtains, rock gabions).Rehabilitate and stabilize the banks of affected water crossings as soon as practicable and replace vegetation where it has been destroyed.Chemicals must be handled according to their Materials Safety Data Sheets (MSDS).The following activities and facilities should not be allowed within 50m of the edge of a watercourse:<ul style="list-style-type: none">Mixing of concreteLaydown areas, stockpile areas or spoil areasSanitary facilitiesConstruction campsHydrocarbon storage facilities (fuel trucks, oil drums, etc.)Vehicle maintenance activities or facilitiesSpills must be cleaned up immediately. This includes oil spills from vehicles, concrete (hardened and unhardened) and other chemicals utilized.Dispose of overburden in a manner that it will not be washed into a watercourse.Adequate soil erosion protection must be employed.Overburden stockpiles / spoil sites must be covered with topsoil and rehabilitated using indigenous vegetation.The Contracting Entity should be guided by the requirements of Riparian Buffer Zone Policy for Managing Freshwater Bodies in Ghana in the implementation of construction activities near waterbodies along the road corridor.			
Significance Rating After Mitigation			
Without effective intervention or mitigation measures, the breakdown of aquatic ecosystems could become permanent. The impacts are reversible with adherence to best management practices. By following the proposed mitigation measures and other management practices, the loss of aquatic habitat would be less likely to occur. The impact significance rating will therefore reduce significantly from moderate to low.			
Negligible	Low	Moderate	High

8.2.15 LOSS OF FAUNA DURING CONSTRUCTION

Description of Impact/Project Activities
<p>Terrestrial fauna utilises the road corridors, especially areas with undisturbed natural vegetation. A number of insects, amphibians, reptiles, birds and mammals inhabit the Project area or corridor of influence, therefore direct impacts are expected from construction activities. Animals such as small mammals, birds, reptiles and arthropods may be lost during the construction phase of the Project. Riparian vegetation often provides an ecosystem for migratory birds and terrestrial birds, and variety of mammals, some of which may be lost as well. Night working can also cause needless attraction or disturbance of wildlife. Domestic animals, including livestock such as cattle, goats and sheep may also be run over by project vehicles.</p> <p>Activities during construction that may lead to the loss of fauna include:</p> <ul style="list-style-type: none"> Clearing of vegetation and topsoil destroying ground dwelling or nesting animals.

<ul style="list-style-type: none">• Possible destruction, unearthing or burying of fossorial reptiles, mammals and arthropods during earthworks.• Trapping of animals due to construction activities.• Other general actions of the Contracting Entity.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The impact severity will be moderate. Death of fauna is not reversible and can have short to long-term consequences on the biodiversity richness of the Project area. Impacts will be localized to the Project area of influence, except for migratory fauna. There is a high probability of the Project negatively impacting local fauna.			
Impact Criteria	Severity	3	Moderate
	Reversibility	5	irreversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		48	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
<ul style="list-style-type: none">• Surveys involving vegetation clearing should be undertaken by a trained specialist to identify and remove fauna that may be impacted by the Project. Such fauna should be relocated to an area of known habitat conducive to their sustainable survival.• The intentional harming or killing of animals is forbidden.• The hunting or trapping of animals for food is forbidden.• The Contracting Entity should identify species that are of conservation concern and avoid disturbing them.• Always check for trapped animals in construction area before commencing work. These animals must be relocated to habitat conducive to their survival when encountered.• Trenches should be covered as soon as practicable. If trenches are to remain open for long periods, they should be fenced where feasible.• Limit noise during construction, especially near wetland areas and bird nesting sites.• Construction vehicles and machinery should be driven at moderate speed to avoid disturbing wildlife in their habitats, particularly in access roads to quarries and camp sites.• The Project should limit the number of access roads in order to avoid affecting a significant proportion of wildlife habitats, food sources and forage for livestock through destruction of vegetation and soil compaction.			
Significance Rating After Mitigation			
Impacts will be localized to the corridor of influence, except for migratory fauna. The impact significance rating will become negligible following the application of proposed mitigation measures as the likelihood of the impact reduces from high to low.			
Negligible	Low	Moderate	High

8.2.16 LOSS OF VEGETATION (FLORA) DURING CONSTRUCTION

Description of Impact/Project Activities			
The clearing of vegetation during construction activities is a high possibility, especially for sections where road widening works will be needed. Clearing of vegetation is expected to occur during the construction phase of the Project which will lead to loss or reduction of floral and faunal diversity. Though vegetation clearance will be limited to narrow strips along the Project roads, clearance of vegetation would still modify the local environmental conditions and flora or biodiversity composition.			
There may be realignment of the feeder roads which may require extra vegetation clearance. The risk of vegetation clearance would be particularly higher in protected areas like sacred groves and areas with vegetation species of conservation concern, however, these should be avoided through design changes. There may also be potential loss of shade and community trees, as well as some commercial tree crops (private tree plantations) located along the road corridor.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The magnitude of the impact will be very high. However, lost or destroyed vegetation can be replaced during rehabilitation with same or other indigenous species. The duration of the impact would be short-term as vegetation usually regenerates after some time subject to best management practices.			
Impact Criteria	Severity	5	Very High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		60	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
<ul style="list-style-type: none">Vegetation clearing should be supervised or undertaken by a vegetation specialist and species of conservation concern should be identified and:<ul style="list-style-type: none">Should be avoided.Dug up and maintained in a nursery by a trained horticulturist and replanted either on-site or a similar area, if practicable.Propagated off-site and the area later rehabilitated with same or other indigenous species.Rehabilitate the area as soon as practicable with indigenous tree species through a compensatory replanting or reforestation program and remove alien plant species by hand after rehabilitation. Locally based women groups or contractors, if available, should be prioritized in assigning these kinds of contracts.Encourage planting of trees as a climate change mitigation measure and also discourage needless clearing and burning of vegetation.Practice topsoil conservation so that propagules within the topsoil can re-establish during rehabilitation.The clearing of vegetation should be limited, especially in areas close to a wetland or other aquatic ecosystem.Necessary consultation should be made with the Forest Services Division of the Forestry Commission by the Contracting Entity and possibly a memorandum of understanding established with respect to forest reserves, if practicable.The Contracting Entity must obtain the necessary permits from the FC before removal of any economic timber trees and a reforestation program executed to restore the vegetation.			

- Areas that may be destabilized due to the lack of vegetation should be stabilized with the use of rock gabions or biodegradable geofabrics.
- Avoid the disturbance of culturally sensitive sites found within the road corridor of influence.
- The Contracting Entity should make sure the bulldozer driver should be sensitized on how to do clearing in a manner as to limit plants destruction.
- The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.
- The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.

Significance Rating After Mitigation

The individual plants that are destroyed cannot be replaced; however, conscientious rehabilitation can replace the vegetation. Following mitigation measures, the probability of especially rare and endangered species being lost will be low and the overall impact significance would reduce considerably to a low rating.

Negligible	Low	Moderate	High
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8.2.17 LOSS OF SUPPLY OF ECOSYSTEM GOODS AND SERVICES

Description of Impact/Project Activities

Terrestrial and aquatic ecosystems supply important ecosystem services and therefore their destruction needs to be avoided as far as possible. People, animals, plants and the physical environment interact in the ecosystem and depend on each other for services such as the maintaining ecological food chains, provision of pollination, nesting sites, physical stability, food and nutrients.

The rural settlements along the feeder roads depend heavily on ecosystem goods and services which also is a source of their livelihoods. Activities that will create impacts on ecosystem's stability and health and the supply of ecological goods and services include:

- Loss of key plants and animals
- Loss of aquatic ecosystems
- Open corridors which provide people access to previously inaccessible areas that may then be exploited
- Obstructing, blocking and diverting water flows at stream or river crossings

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact

Summary of Reasoning

Negatively impacted ecosystems are recoverable over time but without effective intervention or mitigation measures, the breakdown of ecosystems could become permanent. The consequences on rural communities that depend heavily on ecosystem goods and services and are the major source of agricultural products can be grave.

Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		44	

Significance Rating Before Mitigation

Negligible	Low	Moderate	High
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Degree of Confidence

Low	Medium	High
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Proposed Mitigation Measures

The following mitigation measures should be applied together with those outlined earlier for terrestrial and aquatic habitat destruction impacts:

- Destruction of terrestrial and aquatic ecosystems should be avoided as far as practicable.
- Indigenous, fruit bearing trees should not be disturbed, or otherwise replaced if destroyed.

Significance Rating After Mitigation

Effective application of the proposed mitigation measures will see a reduction in the impact likelihood and severity and an overall reduction in the significance rating of the negative impact from low to negligible.

Negligible	Low	Moderate	High
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8.2.18 INTRODUCTION OF INVASIVE SPECIES TO THE PROJECT AREA

Description of Impact/Project Activities

It is possible that material stockpiles could introduce invasive alien species in the Project area especially when the materials are outsourced. Invasive alien species could also be eroded into areas far beyond the direct zone of influence of the Project and result in habitat alteration. Invasive species may be introduced to the Project areas in various ways, including being carried on vehicle tyres or in construction materials such as gravel or aggregates.

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact

Summary of Reasoning

The impact likelihood and severity will be moderate. Impacts will be localized to the Project area of influence, except for when material is sourced from outside the Project area.

Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	3	Moderate
Total Score		30	

Significance Rating Before Mitigation

Negligible	Low	Moderate	High
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Degree of Confidence

Low	Medium	High
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Proposed Mitigation Measures

- The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.
- The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.
- Rehabilitate the area as soon as possible and remove alien plant species by hand after rehabilitation.
- The site should be revegetated using local flora. The choice of plant species for rehabilitation should be done in consultation with the local people, local research institutions, and the Forestry Department.

Significance Rating After Mitigation

Effective application of the proposed mitigation measures will see a reduction in the significance rating of the negative impact following reductions in impact likelihood and severity. The impact will be negligible post-mitigation.

Negligible	Low	Moderate	High
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8.3 POST-CONSTRUCTION PHASE IMPACTS AND PROPOSED MEASURES

Post-construction impacts relate to activities associated with the road operation and maintenance. During the road operation phase, a few activities may be carried out which will require little interference with the use of the road, however, other activities may result in temporary interruption or diversion of traffic. Road maintenance will be carried out throughout the road operation phase which may last several years as the Contracting Entity will be responsible for the roads until handing over to Government.

These activities may include but not limited to periodic inspection of roads to maintain good drainage, keep bridges and culverts in functional conditions, and other maintenance works. It will also involve road rehabilitation by mending potholes, rutting, reworking or strengthening of base and sub-bases of deteriorated pavements to improve their structural integrity and surfacing as needed, repainting of road markings, clearing of road shoulders, among others.

This phase will also involve the demobilization of construction workers and construction equipment as needed. Some may be demobilized immediately after road construction; others may be left in place for use during periodic road maintenance and only demobilized after closing out the Project. During demobilization, structures like construction camps, workshops, and material storage areas will be dismantled, packed and either transported to appropriate disposal sites, used at other sites or just sold out to potential buyers. The various waste streams that will be generated during this exercise will be managed in same manner as applied in former phases (pre-construction and construction phases).

8.3.1 AIR QUALITY DEGRADATION

Description of Impact/Project Activities			
Road improvement will lead to reduction in the amount of dust generated at the construction phase. However, increased movement of vehicles within the Project areas during the operation phase is expected due to improved road conditions. Impaired air quality is expected from vehicular fumes, including dust emission from completed untarred (gravel surfacing) sections of the road, unless the final designs recommends tarring the entire road network. Also, periodic road maintenance activities will contribute some emissions to air. Nonetheless, the impact significance is expected to be moderate since the completed road will culminate in significant improvement in dust emissions.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The probability of the impact occurring remains high, however, the impact will not be very severe. Due to improvement in the road condition and the natural effects of vegetation acting as wind break, the impact severity is expected to be moderate even though the impacts will span a long period; throughout the life of the roads.			
Impact Criteria	Severity	3	Moderate
	Reversibility	1	Reversible
	Duration	4	Long term
	Spatial Extent	3	Regional
	Probability	4	High
Total Score		44	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			

- Encourage planting of roadside trees and also discourage needless clearing and burning of vegetation. Government should take the lead role to encourage tree planting among the various communities.
- Skills training and education or sensitization programs should continue to be provided to the communities (including schools, religious groups, opinion leaders, farmers, etc.) and issues such as climate change and sustainable agricultural practices should be addressed.
- Community members should be sensitized about the negative effects of deforestation.
- Continue using water bowsers to suppress dust regularly on the gravel (untarred) roads.
- Vehicles travelling on the road should be encouraged to respect the design speed limit for the feeder roads so as to limit dust generation from vehicle movements.
- Install traffic calming measures (speed bumps and rumble strips) to slow traffic down within communities or populated areas.
- Speed bumps and caution signs should be erected in sections of the road near sensitive infrastructure such as schools, churches, mosques, hospitals and other social amenities.

Significance Rating After Mitigation

The likelihood of the impact would reduce to moderate and the impact severity also reduce from moderate to low following the application of the proposed mitigation measures. The significance of the impact will however remain low.

Negligible	Low	Moderate	High
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8.3.2 GREENHOUSE GAS EMISSIONS AND CONTRIBUTIONS TO LOCAL CLIMATE CHANGE AND AILMENTS DURING ROAD OPERATION

Description of Impact/Project Activities

Road infrastructure can become vulnerable to the impacts of climatic changes which can be seen through increased temperatures, extreme heat events (e.g., droughts), decreased rainfall and extreme flood events. Increased temperatures and floods have the potential of damaging roads through the development of cracks and potholes. The development of cracks and potholes on the road increases the risk to vehicles and maintenance costs of the road and decreases the lifespan of the road. Similarly, it may also lead to increased congestion as vehicles travel slower, resulting in increased vehicle emissions over time. It also increases the risks to human livelihoods as many vehicles travel on these routes, carrying produce to markets and urban centres (USEPA, 2015; Twerefou *et al.*, 2015).

The construction of the road will lead to increased movement of vehicles on the road during the operation phase which will translate into impaired air quality from vehicle emissions. The likely emissions will include CO₂, NO₂, SO₂, CO, PM and VOCs which could contribute to changes in climate variables of the Project area over time. New roads bring about increased developments in terms of sprawling of new communities, business centres, etc. and this implies clearing of existing greenfield land (undeveloped land) to support the new developments with associated increase in emission levels. Nonetheless, the impact significance is expected to be low since the Project areas are mainly characterized by enough greenery (vegetation) and more agricultural land use than commercial and industrial activities and new developments are not expected to be too rapid or exponential.

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact

Summary of Reasoning

The projects contribution to climate change after construction will not be very severe. Due to natural effects of vegetation acting as carbon sinks, wind dynamics and the non-continuous nature of expected vehicular emissions, the impact is expected to be low. Impacts will span a long period; throughout the life of the roads and emissions could have transboundary effect since roads are linear projects cutting across different administrative districts.

Impact Criteria	Severity	3	Moderate
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	Reversibility	1	Reversible
	Duration	4	Long term
	Spatial Extent	3	Regional
	Probability	3	Moderate
Total Score		33	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Road use regulations should be enforced by appropriate institutions and vehicle road worthiness regularly checked.The transport sector agencies should develop policies or measures to promote the use of cleaner fuels and the culture of regular vehicle maintenance.Encourage planting of trees as a climate change mitigation measure and also discourage needless clearing and burning of vegetation. Government should take the lead role to encourage tree planting among the various communities.Skills training and education or sensitization programs should continue to be provided to the communities (including schools, religious groups, opinion leaders, farmers, etc.) and issues such as climate change and sustainable agricultural practices should be addressed.Community members should be sensitized about the negative effects of deforestation.The Ghana Meteorological Service should pass on information about climate change in the Upper West Region to Extension Officers representing MOFA at the community level who will educate farmers on changing rainfall patterns, the right period to engage in farming activities and on sustainable farming practices. This then implies the need to increase the number of extension officers in the various communities.			
Significance Rating After Mitigation			
The mitigation measures would be adequate in addressing climate change impacts post-construction, and result in the impact probability and severity reducing from moderate to low. As such, the significance of the impact will become negligible.			
Negligible	Low	Moderate	High

8.3.3 NOISE DISTURBANCE OF ROADSIDE DWELLERS

Description of Impact/Project Activities			
<p>The ambient noise quality post-construction is expected to be good since the Project areas are mainly characterized by agricultural land use. Increased movement of vehicles within the Project areas are envisaged during the operational phase. There will be potential noise impacts from increased traffic and over speeding, as well as increased commercial and residential activities as a result of the road improvements. Also, periodic road maintenance activities will generate some level of noise over the duration of the exercise. Impaired hearing can also result from the increased vehicular noise and increased commercial activities or developments in the Project area. Nonetheless, the impact significance is expected to be lower than experienced at the construction phase.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>Noise impacts are expected to be moderate. Due to natural effects of atmospheric attenuation (temperature, relative humidity and winds) and vegetation cover, noise impacts would be reversible. Impacts are expected to occur throughout the operational life of the roads. Noise impacts will travel the entire length of the road network.</p>			
Impact Criteria	Severity	3	Moderate

	Reversibility	1	Reversible
	Duration	4	Long term
	Spatial Extent	2	Local
	Probability	3	Medium
Total Score		30	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Needless speeding and honking by vehicles and motorcycles should be discouraged.Adequate education should be done by appropriate institutions to reduce the “new road effect” associated with over speeding with attached elevated risk of accidents.Appropriate signage should be installed on the roads to guide traffic effectively, especially near settlements.Traffic policing should be implemented to reduce the “new road effect” associated with over speeding with attached elevated risk of accidents.			
Significance Rating After Mitigation			
The likelihood of the impact and the impact severity ratings would reduce following the implementation of the mitigation measures proposed. Thus, the significance rating of noise impacts will markedly reduce to negligible post-mitigation.			
Negligible	Low	Moderate	High

8.3.4 IMPROVEMENT IN DRAINAGE AND REDUCTION OF FLOODING AND ROAD DETERIORATION

Description of Impact/Project Activities			
The Project implementation will directly improve the condition of the feeder roads, with expansions expected on narrow sections. Improvements are also expected with the drainage systems of the existing feeder roads with significant reduction anticipated in flooding likely to be observed during the operational phase. Coupled with regular or periodic maintenance as part of the OPBRC model, significant reduction should be realized in the rate at which the roads get deteriorated and become impassable.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The likelihood of this positive impact is high and of moderate severity. The impact is expected to have a long-term duration and persist throughout the operational life of the roads.			
Impact Criteria	Severity	3	Moderate
	Reversibility	1	Reversible
	Duration	4	Long term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		40	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Enhancement Measures			
Operational phase impact enhancement measures will focus on conducting scheduled inspections along the ROW, including:			
<ul style="list-style-type: none">Checking for problematic erosion areas and implementing remedial works as appropriate.			

- Monitoring and confirming drainage systems are functioning well to avoid flooding.
- Monitoring unplanned developments and encroachment, including vegetation growth in areas that will affect good drainage along the roads.
- Drains, if constructed, should not be directed into residential buildings abutting the road.
- Inspecting ditches and culverts and removing accumulated debris.

Significance Rating After Mitigation

The effective implementation of the proposed enhancement measures would boost the impact severity from moderate to very high. This will correlate in an increase in the impact significance rating from low to moderate.

Negligible	Low	Moderate	High
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8.3.5 SOIL CONTAMINATION DURING ROAD OPERATION AND MAINTENANCE

Description of Impact/Project Activities			
During the operation phase of the Project, vehicular accidents or break downs are possible and could result in soil contamination through lead emissions, or accidental oil/fuel spillages. If workshops for vehicle repair, washing, battery repair and other services spring up along the road corridors, this could also impair the quality of the soil around where they operate via spill of oils, fuels and other wastes from serviced vehicles and machinery.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The severity of the impact would be moderate. Spills or leakage of hazardous wastes could seep into the roadside soil and remain for years if not well managed. The impact can be reversible with effective treatment. The spatial extent of the impact would be site-specific.			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	1	Site only
	Probability	3	Moderate
Total Score		27	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium		High
Proposed Mitigation Measures			
Operational phase mitigation measures will focus on conducting scheduled inspections along the ROW, including: <ul style="list-style-type: none">Potential soil contamination by larger accidental spillage of fuels, oils and chemicals through traffic accidents or leakages should be managed in accordance with the ESMP.Encourage regular vehicle maintenance and the use of cleaner fuels among vehicle owners.Educate and encourage vehicle owners (including vehicle service operators) on appropriate fuel, chemical and oil handling and disposal procedures.			
Significance Rating After Mitigation			
The impact significance rating will reduce following the application of the proposed mitigation measures. The impact is reversible with effective treatment, even though some elevated concentrations of metals (lead, zinc, etc.) have the potential of persisting in the soil. The impact will be negligible post-mitigation following reductions in the severity and likelihood of occurrence.			
Negligible	Low	Moderate	High

8.3.6 WATER QUALITY DEGRADATION

Description of Impact/Project Activities			
This can result from a number of sources including spillage of hazardous products in transit, accidental oil or fuel spillage in the event of an accident or vehicle break down, poor waste management practices or even from vehicle exhaust emissions, and vehicle tyre wear. Pollution from these sources may find their way into surface runoff and cause downstream water quality degradation. Spills or leakage of hazardous wastes could seep into nearby waterbodies.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The severity of this negative impact should it occur would be high. The impact can be reversible with effective treatment. The spatial extent of the impact would be site-specific.			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	1	Site only
	Probability	3	Moderate
Total Score		30	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Secure an arrangement with local waste management facilities and/or road transport agencies for regular pick up of waste and broken-down vehicles during road operation.Arrangements should be made with the Waste Management Unit of the District Assemblies under the Project or other waste handlers for weekly collection of inorganic wastes generated, particularly near communities.Professional handling of pollution point sources along the route is important and decommissioning of potential point sources of pollution along the route should be pursued.Educate road users to take responsibility of their own waste or pollutants through collaboration with relevant authorities.If practicable, waste bins should be available at vantage points along the road as well as the provision of sanitary facilities for roadside communities so open defecation and disposal in water bodies is discouraged.Implement good drainage system and introduce appropriate vegetation to control soil erosion from road corridor through stormwater flows.			
Significance Rating After Mitigation			
The impact significance rating will reduce following the application of the proposed mitigation measures. The impact will be negligible post-mitigation following reductions in the severity and likelihood of occurrence.			
Negligible	Low	Moderate	High

8.3.7 LOSS OF FAUNA

Description of Impact/Project Activities			
The feeder roads as they currently exist are not open to a lot of vehicular traffic, as such, it is common to find domestic animals occupying the middle of the roads and loitering about. With improvement in the roads and potential for easy and fast movement of vehicles, there is the possibility of fauna colliding with traffic (moving vehicles). Also, the noise from vehicles plying the routes as well as noise during road maintenance could cause wild fauna to migrate from their original habitats leading to a loss in richness of biodiversity in the Project areas.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The impact likelihood and severity are assessed as moderate. The impact will be localized to the Project area of influence and will be a short-term impact.			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	3	Moderate
Total Score		30	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Used chemicals, hazardous wastes and their containers should not be disposed of along the roads by road users to avoid exposing wildlife and livestock to potential poisoning.Transport agencies should be involved to educate vehicle owners to respect road speed limits and drive at moderate speed especially within communities to avoid collision with fauna, as well as avoid human accidents.Speed regulations should be enforced to avoid disturbing wildlife in their habitats or decrease wildlife road kills and injuries. Roads warm up quickly and hence are attractive to reptiles and amphibians (including domestic animals) who tend to bask on the roads, a situation which can increase the incidence of road kills.Speed bumps and road signs should be erected in sections of the road where there are human settlements where it is common to find livestock.			
Significance Rating After Mitigation			
The impact significance rating will become negligible following the application of proposed mitigation measures as the severity and likelihood of the impact reduces to low.			
Negligible	Low	Moderate	High

8.4 CUMULATIVE ENVIRONMENTAL IMPACTS

Cumulative impacts discussed include new impacts, or boost of existing impacts, that may arise because of the interaction of the road Project with other nearby projects within the Project area. Though sometimes insignificant, they have the potential to accumulate over time, from one or more sources, and can cause substantial environmental degradation. Environmental impacts identified as potentially cumulative in nature because of the impact from other existing and previous development projects within the Project area include the following: vegetation clearance (loss of flora and fauna), soil erosion, material sourcing, increased noise and air quality degradation.

While the Project is expected to result in vegetation clearance and associated loss of flora and fauna, the impact is cumulative in nature because of the previous impacts from the original construction of most of the feeder roads. The flora and fauna along these feeder roads were disturbed long ago during the earlier construction of the roads. The flora has already been replaced by tertiary growths and most of the fauna may have either relocated or adapted to the prevailing local traffic and human activities.

Similarly, existing developments (residential, commercial, educational, religious, etc.) in the area have contributed in some extent to some loss of vegetation, and have modified the original environment in terms of contribution to erosion, material sourcing, noise and air quality degradation impacts. Also, induced development projects and land use changes as a result of the road improvement (though expected to be minimal) will generate some impacts, such as noise and air quality impacts which are cumulative in nature.

The mitigation measures previously proposed under the respective pre-construction, construction and post-construction impact identification subsections are applicable to the cumulative impacts identified and are adequate in effectively mitigating or managing them.

9.0 ASSESSMENT OF SOCIO-ECONOMIC IMPACTS AND PROPOSED MEASURES

This Chapter assesses potential socio-economic impacts that may result from the Upper West Package 1 Roads Project. This includes impacts across the pre-construction, construction, and post-construction phases. Appropriate discussion of the key activities or actions that will result in impacts to social receptors because of the Project is provided.

The impact assessment covered several themes, including:

- Socio-Economics and Livelihoods;
- Social and Cultural Cohesion;
- Community Health, Safety and Security;
- Physical and Social Infrastructure Resources and Services; and
- Labour and Working Conditions.

9.1 PRE-CONSTRUCTION PHASE IMPACTS AND PROPOSED MEASURES

9.1.1 CREATION OF JOB OPPORTUNITIES

Description of Impact/Project Activities			
The Project will present job opportunities as a result of various surveys (engineering, land and valuation, hydrological, biodiversity survey, socio-economic survey, geotechnical investigations, etc.) needed to inform the Project design and planning. This is a positive impact of the Project from local to national scale. These preliminary surveys though mostly of short-term duration (few months), will recruit specialists from the country and will also recruit people (local labour) from the Project areas as support staff on most of these surveys. For instance, the Project will recruit drivers, field assistants, field guides, social studies enumerators, interpreters, casual labourers, etc. from the Project area. Also, personnel on these surveys will patronize lodging and dining services within the Project area and this will create new income streams for these service providers.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
Recruitments for conducting the surveys will be nationwide with a high probability of job opportunities being provided to the local people in the Project area. The impact is short-term but will lead to improved incomes.			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	4	National
	Probability	4	High
Total Score		48	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			

- Include clauses in work contracts to recruit labour from the Project area or local communities. Transparent hiring protocols should be applied so that workers are not hired in an ad hoc manner.
- Workers on the Project including people recruited from the Project area should be inducted on safety issues before the Project or surveys are embarked on.
- The Contracting Entity should present quarterly reports to the GHA, stating how categories of people, such as women and indigenes, are being engaged on the Project.
- The investigation teams or field staff should only be driven by trained and professional drivers. Where practicable, drivers should be sourced from reputable car rental companies within the Project area or region.
- Preliminary training programs should be designed to 'up-skill' local candidates to allow them gain experience that will be relevant and useful at the construction phase.
- Sourcing and procurement of goods and services locally should be encouraged and facilitated.
- Equal employment opportunities should be provided to all traditional areas / communities and vulnerable groups / individuals (as defined in the RPF) in the Project area. Also, implement focused and inclusive discussions that incorporate their specific needs.
- Gender issues should be given a priority during recruitment on the Project and women should be given equal opportunities on the Project and must not be discriminated against (at least 15% female employment on the project).
- Provide a community relation contact to act as liaison between the community and the Project and monitor community concerns throughout the Project and implement an effective grievance redress mechanism.
- A Stakeholder Engagement Programme built on openness, mutual trust and inclusiveness that will seek to actively inform stakeholders of Project activities should be developed. Engagement should include raising awareness on training, recruitment and capacity development programs.

Significance Rating After Mitigation

The impact is considered to be significant and a positive one, and the application of the proposed enhancement measures would see an improvement in the magnitude of the impact. The impact significance rating will likewise improve from low to moderate.

Negligible

Low

Moderate

High

9.1.2 ACCIDENTS / OCCUPATIONAL HEALTH AND SAFETY RISKS DURING PRELIMINARY INVESTIGATIONS

Description of Impact/Project Activities

Inadequate standard warning and guiding signs during the preliminary surveys, especially during geotechnical test pitting could result in the collision of vehicles, injuries and even death to both workers and road users. Inappropriate use of Personal Protective Equipment (PPE) such as reflector vests, hard hats, gloves, safety shoes, goggles, etc., by the workers at the Project sites will also present safety concerns. For instance, health hazards may result from inhalation of dust associated with geotechnical excavations when PPEs are not appropriately used. When reinstatement of the excavations from the test pits are not well done, moving vehicles may be tempted to dodge them which can lead to accidents.

Nature of Impact

Positive

Negative

Direct

Indirect

Rating of Impact

Summary of Reasoning

Preliminary investigations will be restricted to the feeder road corridor. Preliminary surveys will however be on short-term durations and the expected magnitude of health and safety impacts associated with the surveys is moderate because safe working standards will be followed.

Impact Criteria	Severity	2	Low
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	3	Regional

	Probability	3	Medium
Total Score		30	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Workers on the Project including people recruited from the Project area should be inducted on safety issues before the Project or surveys are embarked on.The investigation teams or field staff should only be driven by trained and professional drivers. Where practicable, drivers should be sourced from reputable car rental companies within the Project area or region.The investigation teams should wear PPEs including high visibility vests whenever working in the field and First Aid kits should be available during the surveys.The investigation team should be observant and alert of dangers in the work area during the investigations and surveys should not be conducted in the night, unless mandatory.Where practicable, pedestrian walkways/shoulders, cycle ways, efficient pedestrian crossing signals at intersections, guard rails on the sides of the roads, safe stopping/parking spaces/lay-bys, etc. should be incorporated into the road designs.The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.			
Significance Rating After Mitigation			
Following the application of the proposed mitigation measures, the likelihood of the impact occurring will reduce to low probability and the impact significance rating will likewise reduce to Negligible.			
Negligible	Low	Moderate	High

9.1.3 TRAFFIC DISRUPTIONS / INTERRUPTIONS AND DIVERSIONS

Description of Impact/Project Activities			
This negative impact will occur as a result of surveys and geotechnical investigations that may necessitate diversions or the need for vehicles to slow down at sections where geotechnical investigations (or other surveys) are underway. Without carefully planned detours and dissemination of information to the local communities, the situation can lead to accidents, injuries and even death to both workers and road users. Also, it is important that adequate standard warning and guiding signs are used to redirect traffic or moving vehicles, and reflector vests and PPEs should be worn while working on the roads.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The geotechnical investigations and other surveys will only last a few months. Traffic disruptions will be localized to test areas and the expected magnitude of the impact will be moderate. The probability of occurrence will however be high.			
Impact Criteria	Severity	3	Moderate
	Reversibility	1	Reversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		32	

Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Workers on the Project including local labour should be inducted on safety issues before the Project or surveys are embarked on.The investigation teams or field staff should only be driven by trained and professional drivers. Where practicable, drivers should be sourced from reputable car rental companies within the Project area or region.The investigation teams should wear PPEs including high visibility vests whenever working in the field and First Aid kits should be available during the surveys.The investigation or survey teams should be observant and alert of dangers in the work area during the investigations and surveys should not be conducted in the night, unless mandatory.A Stakeholder Engagement Programme built on openness, mutual trust and inclusiveness that will seek to actively inform stakeholders of Project activities should be developed. Engagement should include raising awareness on training, recruitment and capacity development programs.The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document.			
Significance Rating After Mitigation			
The likelihood of the impact occurring will reduce to medium probability following the application of the proposed mitigation measures. The severity should also reduce from moderate to low, and the impact significance rating will likewise reduce to Negligible.			
Negligible	Low	Moderate	High

9.1.4 VISUAL / SCENIC QUALITY IMPACTS

Description of Impact/Project Activities			
Geotechnical investigations involve excavation of test pits to extract materials for laboratory testing. These would be done on the feeder roads at about 1 km intervals and will create negative visual impacts for road users by exposing freshly dug earth materials. Besides the narrow nature of the feeder roads, vehicles may be tempted to keep dodging scars left by the trial pits which they may imagine to be pot holes, especially when they have not been properly remediated. There is also the possibility however of them developing into potholes if the exposed and loose earth materials are washed away during rain events.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The visual impacts may cover the entire length of the feeder roads; however, the expected magnitude of the impact will be moderate. The probability of occurrence will however be high. The impact will be reversible following the road reconstruction or maintenance.			
Impact Criteria	Severity	3	Moderate
	Reversibility	1	Reversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		32	
Significance Rating Before Mitigation			

Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Workers on the Project including local labour should be inducted on safety issues before the Project or surveys are embarked on.Working standards and remediation procedures should be followed to restore degraded or impacted landscapes.Restriction of geotechnical investigation activities to designated areas and within the defined ROW or servitude to reduce the impact on visual intrusion.Development of a code of practice so that sensitive areas will not be impacted.Engagement should be continued with community members. It is necessary to educate individuals on the various needs and requirements of the Project.Implement grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.Conducting consultation processes that achieve free, prior and informed participation of affected people and communities in the decision making.			
Significance Rating After Mitigation			
The likelihood of the impact occurring will reduce to medium probability following the application of the proposed mitigation measures. The severity should also reduce from moderate to low, and the impact significance rating will likewise reduce to Negligible.			
Negligible	Low	Moderate	High

9.1.5 RISK OF CONFLICT DUE TO LAND EXPROPRIATION

Description of Impact/Project Activities			
This impact will result from the need for temporary land take for borrow pits, diversions, equipment storage areas and/or construction camps and associated facilities prior to actual construction works beginning. Some displacement would be permanent and may result from road widening or realignment. It is required by law that appropriate compensation be made to PAPs for damages caused to crops or properties, and for land taken for the Project prior to its implementation. Failure to provide prompt and proper compensation can result in conflicts and social unrests with local communities due to losses suffered and this can cause undue delay in construction schedule.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The severity of the impact has been assessed based on professional judgment and experience as moderate and the impact is evaluated as a long-term impact because land take for the various requirements of the Project may only be released when the construction ends. The probability of the impact occurring is high because even though the Project does not envisage development of new quarries and construction materials may preferably be sourced from commercial sources, establishing equipment storage areas and/or construction camps and associated facilities may be inevitable.			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		48	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			

Low	Medium	High
Proposed Mitigation Measures		
<ul style="list-style-type: none"> • Continuous engagement with community members to include raising awareness on training, recruitment and capacity development / livelihood restoration programs. • It is important to educate individuals on the Project and its requirements for some temporary land acquisitions. • Carry out an assessment of PAPs and undertake valuation of affected properties and loss of land/crops. The valuation, negotiations and agreements on land taken for the purpose of the project should be well documented. • Conducting consultation processes that achieve free, prior and informed participation of affected people and communities in the decision making. • Engage with relevant Government departments and authorities to understand their mandated roles and responsibilities for land ownership, land occupation and land use within the Project area. • The right compensation should be paid for land acquired for the Project and to farmers who may lose their crops. Engage with officers of the Land Valuation Division of the Lands Commission in the affected Districts in order to determine value of crops or properties on portions of affected lands and reach an agreement with affected persons. • The outcome of the valuation should be used to determine compensation thereafter and compensations should be paid in good time and the amounts must be enough (based on the full replacement cost without depreciation principle) for PAPs to be able to restore their livelihoods to at least pre-project levels or even better. 		
Significance Rating After Mitigation		
Effective application of the proposed mitigation measures will reduce the impact magnitude and its likelihood and the resultant impact significance rating will become Negligible.		
Negligible	Low	Moderate
		High

9.2 CONSTRUCTION PHASE IMPACTS AND PROPOSED MEASURES

9.2.1 INCOME GENERATION OPPORTUNITIES FROM DIRECT / INDIRECT EMPLOYMENT ON THE PROJECT

Description of Impact/Project Activities			
<p>The Project is expected to bring important benefits to Government, the road users and the local populations and businesses along the roads. The Project will result in various benefits including direct employment on the Project, taxes and royalties, and community development initiatives. These provide or serve as income generation opportunities. Good roads open up opportunities for economic growth directly and indirectly at the local level which translate into national economic growth.</p> <p>Road improvement provides socio-economic benefits as accessibility and commercial activities are enhanced to facilitate economic integration at various levels. The Project will cause an influx of workers (and job seekers) to the Project area which is likely to attract small scale business opportunities. Businesses typically run by local women are expected to also benefit significantly. For instance, influx of workers will directly result in the growth of eateries and female hawkers that may seek to market food and products to the Project workers. The demand for accommodation (lodging) services will also rise. Community members who own property would also enjoy higher revenues from renting of residential units and there will be demand for land for commercial purposes given the expected improvement in the road network.</p> <p>The Project will also offer potential economic benefits through the local procurement of services or human resource. In the construction phase, opportunities for both skilled and unskilled labour will be available to the local people (including women) to earn income. Low-level skill jobs such as carrying of water, sand and concrete, cooking for construction workers, cleaning of project site offices or collection of waste at construction site, direction of traffic (flag women), etc., can be reserved for women. This will be a significant impact since unemployment is currently high in the area and the country at large, and will also boost women participation in projects. The Project will require the supply of large quantities of materials some of which will be sourced locally in the Project areas. This provides ready market for material suppliers such as quarrying companies, hardware shops, car spare part dealers and local individuals with such materials. It is expected that many of such businesses will be opened as road projects often attract investors interested in providing related services to make money.</p> <p>The host District Assemblies of the project are also expected to benefit financially. It is expected that trucks carting materials to the site will be required to pay toll which will bring some revenue to the assemblies. Revenue can also be generated by the assemblies from traders who sell or trade around the project site through ticketing. Construction of access roads to selected markets will improve or increase trading activities in these markets, leading to a boost in revenue collection.</p> <p>The combined effect of direct employment and contracting, and the procurement of goods and services may have a 'multiplier effect'⁸ on economic growth, where beneficiaries spend the additional income they have generated in their local communities, driving increased economic growth.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			

⁸ The multiplier effect refers to the 'trickle down' of economic growth as those who receive additional income spend that income in shops and businesses, driving further economic growth.

The direct and indirect contracting of employees, procurement of goods and services and combined multiplier effect of this economic growth will result in increased income for the local people; promoting some degree of increases in standards of living. Though it is recognized that some construction related employment will require highly skilled labour and experience which may be unavailable in the local area and would have to be outsourced, the impact on employment and income is considered to be significant. The impact is a positive one and the likelihood is also certain.

Impact Criteria	Severity		4	High
	Reversibility		3	Recoverable
	Duration		3	Medium term
	Spatial Extent		4	National
	Probability		5	Definite
Total Score			70	
Significance Rating Before Mitigation				
Negligible	Low	Moderate	High	
Degree of Confidence				
Low	Medium		High	
Proposed Enhancement Measures				

- Include clauses in work contracts to as far as practicable utilize local labour and give equal opportunities to women and should not discriminate against vulnerable groups who have the capacity to work. Work contracts should also include clauses against gender-based violence, sexual exploitation and abuse, and sexual harassment.
- Transparent hiring protocols should be applied so workers are not hired in an ad hoc manner.
- Skills training should be provided to residents of the local communities to increase local employment capacity. This training can be designed into short and medium-term programs targeted at eligible local candidates at the construction / maintenance phase.
- Training programs should be designed to 'up-skill' local candidates to allow them attain positions within construction teams, potentially gain experience in the construction sector and also prepare them for future construction projects. For instance, locals (especially women) with some form of education from SHS to University level can be offered opportunities to be engaged for positions such as clerks, secretarial duties, health and safety officers and first aid caregivers.
- The poor and the elderly should be encouraged to continue to seek support through existing programs such as LEAP and MASLOC.
- The Contracting Entity should present quarterly reports to the GHA, stating how categories of people, such as women and indigenes, as well other vulnerable groups like Persons with Disability (PWD) are being engaged on the Project, e.g., prioritizing women groups or contractors in revegetation / re-afforestation programs.
- Sourcing and procurement of goods and services locally should be encouraged and facilitated.
- Affirmative action should be taken to provide equal employment opportunities to vulnerable groups and individuals in the Project area. Also, implement focused and inclusive discussions that incorporate their specific needs.
- Gender issues should be seriously considered during recruitment and women should be given equal opportunities on the Project (at least 15% female employment on the project) and must not be discriminated against in terms of pay and sexual abuse upon recruitment.
- National labour laws and regulations, especially the Labour Act, 2003 should be adhered to, including aspects relating to child labour. Persons considered as children by law should not be employed on the Project.
- The following are proposed to address child labour/abuse concerns related to the Project;
 - Enforce the provision of valid photographic national ID's during labour recruitment
 - Avoid recruiting of person below employable age limits with ID cards of identifiable/affiliated political parties
 - Comply with Part V of Children's Act 1998 (Act 560) and minimum age of employing children
 - Educate communities and Project stakeholders on the dangers of child labour and include issues of child labour in Project/site risk registers
 - Identify child protection NGOs and child headed household in the Project area and source information on rate of child abuse, type of jobs and employment children are engaged etc.
 - Implement a monitoring system for person with minimum age being employed
- A database can be developed of locally available human resources, detailing skills, proficiency and education levels of potential interested applicants. This database will be a 'live document' controlled by Human Resources and should be developed in coordination with the formal and traditional governance structures (where practicable).
- A Stakeholder Engagement Programme built on openness, mutual trust and inclusiveness that will seek to actively inform stakeholders of Project activities should be developed. Engagement should include raising awareness on training, recruitment and capacity development programs.

Significance Rating After Mitigation

Following the effective application of the proposed enhancement measures, it is expected that the magnitude of the impact would increase which will provide long-term economic benefits that will continue throughout the life of the Project. The impact is considered to be significant and a positive one with benefits that can culminate in a national level growth in GDP. The impact significance rating will likewise improve from moderate to high.

Negligible	Low	Moderate	High
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9.2.2 LOSS / DISRUPTION OF UTILITIES, ROADSIDE COMMUNITIES AND SOCIAL ACTIVITY

Description of Impact/Project Activities			
Though the Project will result in employment opportunities, generation of new businesses and improvements in livelihood, construction activities will also result in the loss or disruption in some existing roadside utilities, community structures and social activities. Earthworks are likely to result in the loss of underground utility cable networks, if present. Damage to buried water pipes could also occur which could result in temporary water shortages but also supply cut-offs for some areas near or far from the Project sites. Accessibility to healthcare centers, schools, mosques and churches along the road will also be impacted negatively during the construction phase, as such it is important for alternative accesses to be created, where practicable. Social activities may also include the congregation of people under shelters by the roadside to talk or play outdoor games (cards and board games like Draughts). The road construction may also create disruption in the patterns of villagers accessing their farmlands.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The severity of the impact has been assessed on the basis of professional judgment and experience as moderate and the impact is evaluated as a short-term impact because disrupted communities, services and social activities will return once construction ceases. The probability of the impact occurring is high although the feeder roads do not have a lot of roadside communities or settlements along them.			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		40	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- Construction activities should be restricted to the road corridor of influence or the defined ROW.
- Early notice should be given to the community members and potentially affected people before the construction starts or before any service interruption.
- The Contracting Entity should make sure construction activities avoid utility lines (water, power / electricity, etc.) as much as practicable and should consult or work closely with utility service providers before relocating any affected utility line.
- Utility service providers must be proactive in disconnecting and reconnecting PAPs to their services before and after relocation as the case may be.
- Alternative access routes should be created by the Contracting Entity where existing access points to healthcare facilities, schools, churches and mosques are affected by construction works.
- Compensation should be paid to affected persons in good time.
- Funds should be available for the potential relocation of infrastructure or utility lines (e.g. water lines) if any.
- Continuous engagement with community members to include raising awareness on training, recruitment and capacity development / livelihood restoration programs.
- Conduct consultation processes that achieve free, prior and informed participation of affected people and communities in the decision making.
- Implement grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.
- A Stakeholder Engagement Programme built on openness, mutual trust and inclusiveness that will seek to actively inform stakeholders of Project activities should be developed.

Significance Rating After Mitigation

Implementation of the proposed mitigation measures should help bring the impact severity to low. The impact probability should also reduce significantly from high to low. This should see the impact significance rating improve and move from low to negligible.

Negligible	Low	Moderate	High
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9.2.3 ECONOMIC DISPLACEMENT AND DISRUPTION OF LIVELIHOOD ACTIVITIES

Description of Impact/Project Activities			
<p>Construction works on the roads would demand acquisition of land and the displacement of people and properties within the ROW. Land will also be required for location of construction camps, storage areas for stockpiled materials, etc. Even though the feeder roads are quite narrow, earthworks are likely to result in the loss of some economic assets and properties including economic trees, ornamental plants and crops. The potential for loss of income and disruption of livelihood activities is definite as construction activities will affect some buildings and civil improvements on land, temporary business structures affixed to the ground with civil works and moveable trading chattels of street vendors, as well as some roadside businesses or commercial activities which may include the selling of goods, eateries, and vehicle repair or spare parts shops, etc.</p> <p>The main impact will be to crops or farms within or abutting the road corridors. Farmers use portions of lands close to the road ROW / servitude for farming. During construction works, some farms or crops may be displaced or destroyed due to the use of construction machinery which need adequate space to operate. The loss of crops or farms may also be due to the requirement of the Project to widen some roads under the Project.</p> <p>This can create a lot of socio-economic stress and psychological disruption for the affected individuals and their families if not handled well through appropriate program of compensations and resettlement. Compensation for lost properties is an important issue that should not be underestimated. It is important that compensation be made prior to implementation of the Project, failure of which can result in conflicts and social unrests with local communities that can cause delay in construction schedule.</p> <p>Construction works will however be restricted to the ROW as much as practicable in order not to extensively and negatively impact adjacent land uses along the feeder roads. A RAP would be prepared and approved by the World Bank in line with OP 4.12 to cater for potential loss of land, other assets or livelihoods and work out compensation payable to PAPs, based on the “full replacement value” of impacted assets. Section 7.1.7 addresses land acquisition for the project and includes the procedure for compulsory acquisition of the ROW (the existing ROW are officially feeder roads, however, the E.I. is yet to be prepared).</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>Many farmlands and some small number of structures used for commercial and livelihood activities abut the feeder roads. The Project will however not result in significant loss of land and space for subsistence farming given that most of the works would be undertaken within existing ROW of the accesses. Again, land along the roads needed temporarily for works will not be taken from farmers and farmers would be able to cultivate crops soon after construction works are completed. The impact will be short-term and is recoverable.</p>			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		55	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- Continuous engagement with community members to include raising awareness on training, recruitment and capacity development / livelihood restoration programs (e.g. provision of credit facilities or start-up capital to women to engage in active economic activities such as trading).
- It is important to educate individuals on the Project and its impacts to farming activities and other properties or assets, and the processes and modalities for assessment and payment of compensation, in line with national regulations and requirements of the World Bank OP 4.12.
- The project will also provide agro-processing equipment to selected women's agro-processing groups. This would reduce drudgery in the processing of cassava, shea nuts and groundnuts into gari, shea-butter and groundnut oil respectively.
- Where practicable, the Contracting Entity should schedule construction activities during the dry season to minimize impact on crops and disruption of farming activities.
- Implement grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.
- Continuously engage and map out unidentified stakeholders and provide enough information on the Project activities.
- Conducting consultation processes that achieve free, prior and informed participation of affected people and communities in the decision making.
- Early notice should be given to the community members before any displacement / disruption of livelihood activities.
- Where markets or traders (including street vendors) are affected, the Contracting Entity should engage with the District Assemblies and traditional authorities to identify equally viable alternative or temporal sites for their relocation and effectively coordinate or manage this.
- Engage with relevant Government departments and authorities to understand their mandated roles and responsibilities for land ownership, land occupation and land use as part of the Project.
- Involve District Assemblies in assessment and payment of compensations if possible, to avoid issues that may arise during the grievance redress. For example, the Assembly's agricultural officers can be involved in the valuation and RAP.
- Compensate people who may lose their crops, assets or livelihoods as a result of the Project development adequately and promptly. Engage with officers of the Land Valuation Division of the Lands Commission in the affected Districts in order to determine value of crops and properties on portions of affected lands. The outcome of the valuation should be used to determine compensation packages thereafter and in agreement with the affected persons.
- Compensation should be paid in good time and the amounts must be enough (based on the full replacement cost without depreciation principle) for PAPs to be able to restore their livelihoods to at least pre-project or pre-displacement levels or even better.
- Cultural systems for redress of loss of every kind exist in the communities and these should be explored, and where necessary, some of these measures must be adopted and adapted to address losses.
- Financial literacy or management training should be provided to PAPs receiving cash compensation before disbursement to ensure efficient use of the cash and prevent post-displacement vulnerabilities.
- Alternative livelihood restoration measures such as training in soap making, rice processing, hairdressing, etc., should be provided for affected persons and given a start-up capital to start a business after the training.

Significance Rating After Mitigation

Effective application of the proposed mitigation measures will reduce the impact magnitude and its likelihood and the resultant impact significance rating will become low.

Negligible	Low	Moderate	High
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9.2.4 POTENTIAL PHYSICAL DISPLACEMENT ALONG ROAD CORRIDOR AND RESETTLEMENT

Description of Impact/Project Activities			
<p>International Financial Institutions (IFIs) recognise that development projects which displace people or livelihoods involuntarily usually give rise to severe economic, social and environmental problems and may create liabilities to the Project. The Project will involve upgrading and repair of the feeder roads to make them easily motorable and enhance connectivity and agricultural productivity within the Project areas.</p> <p>Though the road reconstruction works will be limited to the defined ROW / servitudes and exclusion zones, some possible displacements of physical structures like houses and other residential assets or statuses (e.g. tenancy) within the ROW or corridor of influence is inevitable. As much as practicable, construction activities would be limited to the ROW to avoid displacement of physical structures and people outside of the corridor of influence, in line with OP 4.12. Some displacements may however be permanent if the project requires widening or realigning of some sections of the roads.</p> <p>It is noted that displacements can create a lot of socio-economic stress and psychological disruption for the affected individuals and their families if not handled well through appropriate program of compensations and resettlement. A RAP would be prepared and approved by the World Bank in line with OP 4.12 to cater for potential physical displacements and work out compensation payable to the PAPs, based on the “full replacement value” of impacted assets. The RAP will also identify and determine the number of people who could be potentially displaced physically and economically and provide an indicative cost of potential land acquisition and involuntary resettlement. Section 7.1.7 addresses land acquisition for the project and includes the procedure for compulsory acquisition of the ROW (the existing ROW are officially feeder roads; however, the E.I. is yet to be prepared).</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>Road construction activities along the ROW could potentially impact on physical residential, commercial, etc. structures or lands which will leave irreversible impacts. Although construction activities will be restricted to the ROW corridors, the severity of the impact will be high on those affected. The probability of the impact occurring is however rated as medium because there are only few settlements (and low populations) along the feeder roads. The impact will be localized to the affected assets or areas. Construction methods will however be designed as best as practicable to avoid or limit this impact from occurring.</p>			
Impact Criteria	Severity	4	High
	Reversibility	5	Irreversible
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	3	Medium
Total Score		39	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- Construction activities should be limited to the designated corridors of the road.
- Continue engagement with community members. It is necessary to educate individuals on the Project and its impacts to potential physical displacement, and the processes and modalities for assessment and payment of compensation, in line with national regulations and requirements of the World Bank OP 4.12.
- Implement grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.
- Continuously engage and map out unidentified stakeholders and provide enough information on the Project activities.
- Early notice should be given to the community members and property owners before any displacement / disruption of their activities.
- Conducting consultation processes that achieve free, prior and informed participation of affected people and communities in the decision making.
- Compensate people who may be physically displaced as a result of the Project development adequately and promptly. Engage with valuation authorities in order to determine the value of the compensation and reach agreement with the affected persons.
- Compensation should be paid in good time and the amounts must be enough (based on the full replacement cost without depreciation principle) for PAPs to be able to restore their livelihoods and standard of living to at least pre-project or pre-displacement levels or even better.
- Displaced persons should be provided with assistance (such as moving allowances) during relocation and provided with residential housing, or housing sites, or as required, agricultural sites for which a combination of productive potential, location advantages, and other factors is at least equivalent to the advantages of the old site.
- Cultural systems for redress of loss of every kind exist in the communities and these should be explored, and where necessary, some of these measures must be adopted and adapted to address losses.
- Involve District Assemblies in assessment and payment of compensations if possible, to avoid issues that may arise during the grievance redress.

Significance Rating After Mitigation

Effective application of the proposed mitigation measures will reduce the impact magnitude and its likelihood and the resultant impact significance rating will become negligible.

Negligible

Low

Moderate

High

9.2.5 IMPROVED ROAD TRANSPORT AND TRAVEL

Description of Impact/Project Activities

Sections of the road are in poor conditions. The implementation of the OPBRC Project will right from the construction phase progressively reflect in improved travel on the feeder roads with its associated benefits. Farming areas which previously were not accessible will become more accessible.

The enhanced accessibility due to the Project will lead to general improvements in the welfare and well-being of the rural communities through increased access to health care, education and other social services, which will be rendered closer because of reduced travel time and ease of travel. This will begin right from the construction phase. Improved accessibility will also provide benefits in respect of general road safety. People with disabilities who previously have difficulties accessing the roads with their wheel chair due to the many potholes and puddles during rain events will also benefit greatly from the road construction. The road improvements will also reduce vehicle break down on the routes with a resultant improvement in vehicle operational cost.

Nature of Impact

Positive

Negative

Direct

Indirect

Rating of Impact

Summary of Reasoning

The road construction will provide positive benefits through improvement in travel and road transport. The benefits will be experienced on the local, regional and national level. The impact of improvement in road transport and travel will be permanent and irreversible because it will leave a permanent change in the affected Project areas that lasts substantially beyond the Project construction phase.

Impact Criteria	Severity	3	Moderate
	Reversibility	5	Irreversible
	Duration	4	Long term
	Spatial Extent	4	National
	Probability	5	Definite
Total Score		80	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			
<ul style="list-style-type: none">Construction activities should adhere to the highest level of both industry and international standards.Conspicuous and readable road safety signs should be posted where need be, in order to help drivers and other road users.The Contracting Entity should employ traffic wardens to enable children and persons with disabilities cross the feeder roads safely during construction and the road designs make provisions for them.Develop and implement grievance mechanism as a part of a wider stakeholder engagement plan enabling community concerns to be documented and resolved in a timely fashion.The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH’s ESA for TSIP (2017) guideline document.			
Significance Rating After Mitigation			
Application of the proposed enhancement measures should result in a further improvement in the magnitude of the impact. The impact significance rating will improve but remain high.			
Negligible	Low	Moderate	High

9.2.6 POTENTIAL LABOUR INFLUX AND ASSOCIATED IMPACTS

Description of Impact/Project Activities			
<p>The Project will cause an entry of employment-seekers (labour influx) from other parts or regions into the Project area. For instance, the Project will need development of facilities such as construction camps and associated facilities and this may see the influx of people migrating to the local community and wider social area of influence and thus increase pressure on local amenities. The influx of job seekers from other parts, and the possible presence of foreign or expatriate workers on the Project also has the potential to affect the way of life (change behaviours) and traditional structures in the Project area, influence disease dynamics and create socio-cultural imbalances.</p> <p>The influx of labour at even its modest rate may lead to negative impacts on host communities and exacerbate pre-existing social issues and its associated myriad of problems. Labour influx may increase tension, disputes and conflicts between locals and migrants over social services and other resources. In addition, tension may heighten if local content participation in the road construction project is not considered.</p> <p>Also, the influx of labour and the generally congested work environment that characterize construction projects may increase the spread of communicable diseases, including the current COVID-19 pandemic. It is therefore important that the project develop a COVID-19 avoidance and management protocol to prevent the spread of the virus, isolate and treat any unfortunate potential contractions and generally deal decisively with the pandemic. Section 9.2.11 provides further assessment on the negative impact of disease spread.</p> <p>The influx of immigrants / expatriates may also have an impact on cultural resources like traditional shrines and other cultural heritages, as immigrants may not have significance for their use or value these resources as much as the locals. There is the possibility of foreign behaviours to potentially influence local behaviours and culture.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>The influx of foreigners and migrant workers in search of job and the procurement of permanent Project workers will potentially have an impact on the traditional set up within communities in the Project area. The likelihood of the impact is recognised as definite. Though the impact is expected to be experienced more in the affected local communities, it would have trans-boundary effect or implications. The significance rating will thus be high. Hopefully, the impact will be offset by a potential boost in economic activities due to the presence of immigrants.</p>			
Impact Criteria	Severity	5	Very High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	4	National
	Probability	5	Definite
Total Score		80	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- Include clauses in work contracts to as far as practicable utilize local labour and give equal opportunities to women and should not discriminate against vulnerable groups who have the capacity to work. Work contracts should also include clauses against GBV, SEA and SH.
- Local content participation in the road construction project should be mandatory so as to increase income levels of community members and to prevent tension between inhabitants and workers employed from outside the communities.
- Alternative livelihood training should be provided to women and other locals who could not get employment opportunities on the project to help improve their income levels and empower them for self-sufficiency and dependency.
- Sensitization and awareness programmes should be carried out in health centres, schools, mosques, churches and other gatherings targeted at addressing some negative impacts associated with labour influx. This will help address issues of sexual exploitation, exchange of sex for money, food and other items, teenage pregnancy, HIV/AIDS and other sexually transmitted diseases, as well as protocols on the prevention and management of the current COVID-19 pandemic.
- Given that the news and advice about COVID-19 pandemic keeps evolving or changing quickly as more information becomes available about the virus's spread, all construction staff should be encouraged to stay updated on COVID-19 prevention / management protocols laid out by the WHO and Ghana Health Service / Ministry of Health. The Contracting Entity must also adhere to the World Bank's Interim Guidance on COVID-19 for Construction / Civil Works Projects.
- A project-specific COVID-19 avoidance and management protocol should be developed to prevent the spread of the virus, isolate and treat any unfortunate potential contractions. Basic disease prevention measures must be outlined in the protocol and must include, but not limited to the following:
 - Wash hands often with soap and water for at least 20 seconds.
 - Cover cough or sneeze with a tissue, dispose the tissue in a closed bin, and then wash your hands.
 - Always wear a mask over the nose and mouth, particularly when leaving home or place of abode.
 - Avoid touching eyes, nose, and mouth.
 - Clean and disinfect frequently touched objects or surfaces.
 - Avoid close contact with people who are sick and stay home when sick.
 - To the extent possible, screen all visitors on all construction sites in advance of their arrival on the job site for signs and symptoms of COVID-19.
 - Check and record at least twice daily, temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site, and at close of work.
 - Adopt staggered work schedules, e.g., provide alternating workdays or extra shifts, to reduce the total number of employees on a job site at any given time and to ensure physical distancing.
 - Keep in-person meetings (including toolbox talks and safety meetings) as short as possible, limit the number of workers in attendance, and use social distancing practices.
 - Ensure clean toilet and handwashing facilities. Clean and disinfect portable job site toilets regularly. Fill hand sanitizer dispensers regularly. Disinfect frequently touched items (i.e., shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets) regularly.
 - Report any safety and health concerns immediately to the Site Supervisor and call designated health line(s) in the district for necessary assistance or support if you develop fever, cough, or difficulty breathing.
- Develop a Project site-wide cultural awareness and management program. The schedule of the program will have to educate workers on existing traditional systems within the Project areas and observance of traditional rights as part of the Project.
- Constantly engage with the Traditional Council to identify sensitive traditional and cultural assets in the Project area.
- Provide support and community capacity building among traditional leadership to diffuse or resolve tensions within and between local and Project migrant communities.

- Appoint a CRO to act as a designated point of contact for the community. It is important to make the communities understand that this person is a point of contact for the Project and that they can have free access to him/her. They will act as means of communication with the Project management and are a potential channel of conflict resolution with the Project as well.
- Develop a grievance mechanism as a part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.

Significance Rating After Mitigation

The proposed mitigation measures will be adequate in reducing the impact magnitude from very high to moderate and its likelihood as well. The resultant impact significance rating should also reduce from high to moderate.

Negligible	Low	Moderate	High
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9.2.7 POTENTIAL DESTRUCTION OF PHYSICAL CULTURAL RESOURCES WITHIN THE CORRIDOR OF INFLUENCE

Description of Impact/Project Activities

Cultural resources are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of the people's cultural identity and practices. Physical cultural resources may be above or below ground and carry a lot of social and amenity values by the people. The loss of such resources may be irreversible, but fortunately, it is often avoidable if road design and construction takes account of such cultural heritage and resources through undertaking of heritage studies early (prior to construction) to identify these. Destruction of cultural resources is possible as a result of the road construction activities and related works such as development of borrow sites.

Residents in the Project area have a strong cultural attachment to the area. Damage or destruction of cultural resources such as traditional shrines or deities, Chief's palaces, sacred groves, burial grounds and other cultural heritages would negatively affect the historic, scientific, social, and amenity values of the Project area. Some local deities were identified in some markets during the social survey that needs to be avoided. Cultural resources also include trees with cultural or historical attachment, such as shea nut trees. It is anticipated that construction activities will avoid alignments that cuts through known cultural sites or assets and also avoid obstruction of access to cultural heritage sites (including Churches and Mosques).

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact

Summary of Reasoning

The destruction or loss of physical cultural resources in majority of cases will be permanent and irreversible because it will leave a lasting change in the affected Project areas that continues substantially beyond the Project lifetime. The impact will be localized to the affected sites or boundaries where cultural resources are found. The likelihood of the impact is recognised as high. The severity of this impact would be high due to the high cultural attachment of the local people in the Project area to their cultural sites or objects.

Impact Criteria	Severity	4	High
	Reversibility	5	Irreversible
	Duration	5	Permanent
	Spatial Extent	1	Site only
	Probability	4	High
Total Score		60	

Significance Rating Before Mitigation

Negligible	Low	Moderate	High
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Degree of Confidence

Low	Medium	High
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Proposed Mitigation Measures			
<ul style="list-style-type: none"> The Contracting Entity should engage with the Traditional Council and opinion leaders to identify sensitive traditional and cultural assets in the Project area and encourage the workers to respect the local culture and sensitivities at all cost. Provide support and community capacity building among traditional leadership to diffuse or resolve tensions within and between local and Project migrant communities. Develop a Project site-wide cultural awareness and management program. The schedule of the program will have to educate workers on existing traditional systems within the Project area and observance of traditional rights, if any, as part of the Project. Work should immediately stop when physical cultural resources are encountered and chance find procedures should be adhered to. Care must be taken during excavations to avoid family or clan graveyards. It is important that the road Contracting Entity establishes the proximity of potential graveyards before construction and where practicable, negotiations should be made with the owners. Develop relationships with and maintain ongoing engagement with directly impacted persons or communities, aligned with stakeholder engagement strategy in a forum consistent with their cultural traditional norms and practices. Appoint a CRO to act as a designated point of contact for the community. It is important to make the community understand that this person is a point of contact for the Project and that they can have free access to him/her. They will act as means of communication with the Project management and are a potential channel of conflict resolution with the Project as well. Develop a grievance mechanism as a part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion. 			
Significance Rating After Mitigation			
The proposed mitigation measures should be adequate in reducing the impact severity from high to low and its likelihood from high to medium. The resultant impact significance rating should then reduce from moderate to low.			
Negligible	Low	Moderate	High

9.2.8 VISUAL / SCENIC QUALITY IMPACTS

Description of Impact/Project Activities			
<p>The Project area is characterised by tranquil agricultural landscape. Construction activities will impact on the tranquillity and visual aesthetics within the Project area. The road improvement will create visual modifications and it is possible some areas would be negatively affected. There will be some loss of local sense of place especially for areas that will experience significant modifications or transformations.</p> <p>During the construction period, there will be an increase in construction equipment, machines and other support vehicles. This will cause a change in the landscape the local people are used to. Scenic quality degradation will also occur due to stockpiling of construction materials and discoloration of vegetation and houses along the roads due to windblown dust. Excavation work, as well as the presence of construction vehicles, plants and equipment will also add to scenic quality degradation. Where construction activities occur in the night, the use of flood lights may attract people to the Project construction site, but also act as a distraction to some people. The road improvement will also either improve public security or present security concerns.</p> <p>Scenic quality degradation may also occur off-site, at the sources of construction materials, the quarries and sand mines. Scenic quality deterioration can also destroy the economic and aesthetic value of public and/or private property, including land.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			

The Project may have a direct impact on local residents as they may temporarily experience a loss of local sense of place. The probability of the impact occurring is high. The impact significance is rated moderate and it is predicted that over time, local residents will adapt and adjust to the changes within the Project area, and the impact will significantly reduce.

Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	3	Medium term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		44	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">Continue engagement with local residents and educate them about the Project and related construction activities. This will be a good platform for collecting grievances to be addressed by the Project.Construction activities should be restricted to designated areas and within the defined ROW or servitude in order to reduce the impact on visual intrusion.Dispose of waste arising from the road Project, both along the road and in camp sites, in an environmentally sound manner.Dismantle and remove equipment and machinery after construction from the site or Project area.Rehabilitate trenches and disturbed areas as soon as practicable.Develop construction code of practice so that sensitive areas will not be impacted.			
Significance Rating After Mitigation			
Effective application of the proposed mitigation measures will reduce the impact magnitude and its likelihood to low rating and the resultant impact significance rating will become negligible.			
Negligible	Low	Moderate	High

9.2.9 POTENTIAL INCREASE IN ANTI-SOCIAL BEHAVIOURS, CRIME AND CONFLICTS

Description of Impact/Project Activities			
<p>The Project development will see an influx of people and prospective job seekers to the Project's social area of influence. This group of job seekers will comprise mainly the youth. As populations change and increase over a period of time, there is the likelihood for potential increase in crime rates and other social vices through change behaviours and influence by immigrant Project workers.</p> <p>There may be the potential of the project to contribute to child or forced labour, child trafficking and other abuses. The laws of Ghana, including the Children's Act, 1998 promise adequate protection to children from forced labor and trafficking. The 1992 Constitution for instance requires that Parliament enacts laws that protect children against exposure to physical and moral hazards and work that adversely affects their development. Ghana's Human Trafficking Act, 2005 (Act 694) prohibits human trafficking; secures the government's commitment to provide for the care and rehabilitation of trafficked persons; and prohibits the use of trafficked persons in labour situations - the penalty for which is imprisonment for a term of no less than five years. Under the statute, a person who provides another person for purposes of trafficking commits an offense even when the provider is a parent.</p> <p>The migration of Project workers to the area may potentially increase crime, violence and tensions within the host communities and result in breakdown of law and order. It is also noted that the peace and security situation in the Project area could be exacerbated by the unregulated influx of labour and/or the lack of Project opportunities for qualified locals. Project workers may be susceptible to assault/attack/intimidation by the local people, especially where communities face insecurity of land tenure or are unable to get job opportunities on the Project. The impact is also likely to occur if the Project activities are carried out during the night or in case of erroneous trespass through contested land.</p> <p>Towards the management of these issues, the Client has developed a GBV Framework and a Grievance and Complaints Management Framework which specifies the minimum requirements for the Contracting Entity. The Contracting Entity would always therefore be guided by these documents.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>With the influx of people to the Project area, there is the potential of direct introduction or growth of anti-social behaviours and conflicts. The direct impacts will be on the Project workers and the community members and it may have indirect impacts on the entire Project area. Based on professional judgement, both the likelihood and magnitude of this negative impact occurring is recognised as high.</p>			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		52	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- The Project should as far as practicable, utilize local labour (where available). Include clauses in work contracts to recruit local labour, abhor all forms of crime, including child trafficking.
- Institute proactive measures to educate local communities about the need to bring in skilled labour when needed.
- Engage the services of a security agency, if practicable, to protect construction workers during Project development. Adequate risk assessment must be conducted by the Contracting Entity and the security agencies on all security engagements or deployments on the project prior to undertaking any such activities and no loss of life or harm to persons must be registered.
- The police should be engaged to follow up on reported cases of child trafficking, rape, defilement and other sexual and/or gender-based violence / issues that may arise during the proposed project.
- The security agencies should be encouraged and well-resourced to prioritize the arrest, prosecution and conviction of perpetrators of child trafficking, rape, defilement and other sexual and/or gender-based violence / issues.
- Where there is no police presence, the Chiefs should be responsible for law and order and conflict management and their palace could function as a court when necessary.
- There is the need for strong trauma-informed recovery services for victims of child trafficking, rape, defilement, etc. and thus the provision of related psycho-social support for victims should be intensified by state agencies like DOVVSU and Anti-Human Trafficking Unit of the Ghana Police Service, and the Department of Social Welfare under the Ministry of Gender, Children and Social Protection in partnership with NGOs and other stakeholders in the project area.
- The Contracting Entity should be guided by the requirements of the Client's GBV Framework.
- The number of police officers and police posts and patrol teams should be increased in the districts or communities and especially at hotspots of identified crimes, including child trafficking, rape, defilement and other sexual and/or gender-based violence as adequate police presence is often a deterrent to crime and unacceptable behaviour.
- Given that poverty is sometimes the primary push factor for child trafficking and some sexual and/or gender-based violence, the economic empowerment potential of the project especially to local women should be deployed in tandem with other solutions to ensure adequate protection of these vulnerable groups.
- Foster good relationships with Project affected communities through regular provision of Project information and disclosure of information which will negatively affect the community members during Project construction. The community engagement process should be made to continue throughout the Project life.
- Educate and encourage health workers and teachers to occasionally screen girls for potential signs of sexual abuse and sexual exploitation as the girls may find it easier to confide in them.
- Encourage Contracting Entity-community relations and citizens participation (involvement of local actors) in the Project.
- Development of community training programs and sensitization awareness campaigns as part of stakeholder engagement strategies.
- Develop and implement grievance mechanism as a part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.
- Support community capacity building among traditional leadership to diffuse or resolve tensions within and between local and migrant workers into communities using community police services, traditional courts and dispute resolution mechanisms.
- Work with community leadership, identified NGOs, voluntary groups and civil society organizations to develop capacity and support for vulnerable groups.

Significance Rating After Mitigation

Effective application of the proposed mitigation measures will reduce the impact magnitude and its likelihood from high to low and the resultant impact significance rating will become Negligible.

Negligible	Low	Moderate	High
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9.2.10 GENDER-BASED VIOLENCE (GBV), SEXUAL EXPLOITATION AND ABUSE (SEA), SEXUAL HARASSMENT (SH) AND IMPACT ON VULNERABLE GROUPS

Description of Impact/Project Activities			
<p>Particularly in rural areas, gender distribution of wealth is biased in favour of men with significant gender disparities existing in employment opportunities and even in land holdings, men hold or own more of the farms than women. For people living with disabilities, the 2010 PHC reveals that while the proportion of economically active persons among abled-bodied population is 72 percent, the corresponding proportion for those who are disabled is 57 percent.</p> <p>The influx of labour at even its modest rate may lead to negative impacts on host communities and exacerbate pre-existing social issues in the host communities such as GBV, SEA, SH and discrimination against vulnerable groups. Women, girls, men and boys can all be victims of GBV, SEA and SH. However, women and girls of all ages and backgrounds are the most affected. It is possible women and other vulnerable groups may be discriminated against on the project, not given a voice in decision making or even abused.</p> <p>Domestic violence (assault) especially of women or wives is a type of GBV identified in the project area. Wives are sometimes beaten by their husbands when they disobey instructions given to them, however, women do not have the right to ‘discipline’ their husbands when they do misbehave. Domestic violence is attributed to a deep cultural belief that, it is socially acceptable for men to discipline their wives physically when they misbehave. One of the main reasons for the incidence of domestic violence is that, most communities in Ghana are highly patriarchal where the man/father is the head of the household and takes all major household decisions. Thus, women are reluctant to report the issue to the police. Towards the management of GBV, SEA and SH, the Client has developed a GBV Framework and a Grievance and Complaints Management Framework which specifies the minimum requirements for the Contracting Entity. The Contracting Entity would therefore be guided at all times by these documents.</p> <p>The potential of the influx of migrant workers contributing to a rise in sexual violence including rape and sexual assault; and harmful practices such as child and forced marriages can also not be underrated. The feeder roads at their current state are also not disability friendly and without their reconstruction, persons with disability may have difficulty travelling to access health care.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>With the influx of people to the Project area, there is the potential of rise in gender-based violence, sexual exploitation and abuse, sexual harassment and discriminations against vulnerable groups. The direct impacts will be on the community members and it may have indirect impacts on the entire Project area. Both the likelihood and magnitude of this negative impact occurring is recognised as high.</p>			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	3	Regional
	Probability	4	High
Total Score		56	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- Include clauses in work contracts to as far as practicable utilize local labour and give equal opportunities to women and should not discriminate against vulnerable groups who have the capacity to work. Work contracts should also include clauses against sexual harassment.
- Institute proactive measures to educate and sensitize local communities on GBV, SEA and HS, and encourage women to report abuses to the police, other state agencies and advocacy groups in the area.
- Encourage and support the growth of advocacy groups and NGOs in the project area.
- Educate and empower chiefs and community leaders in taking lead role in addressing the issue and meting out punishments where necessary.
- Engage services of a security agency, if practicable, to protect construction workers (especially women and vulnerable groups) during Project development. Adequate risk assessment must be conducted by the Contracting Entity and the security agencies on all security engagements or deployments on the project prior to undertaking any such activities and no loss of life or harm to persons must be registered.
- The police should be encouraged to follow up on reported cases of child trafficking, abuse, rape, defilement and other sexual and/or gender-based violence/issues during project development.
- The security agencies should be encouraged and well-resourced to prioritize the arrest, prosecution and conviction of perpetrators of child trafficking, rape, defilement and other sexual and/or gender-based violence/issues.
- There is the need for strong trauma-informed recovery services for victims of child trafficking, rape, defilement, etc. and thus the provision of related psycho-social support for victims should be intensified by state agencies like DOVVSU and Anti-Human Trafficking Unit of the Ghana Police Service, and the Department of Social Welfare under the Ministry of Gender, Children and Social Protection in partnership with NGOs and other stakeholders in the project area.
- There should be capacity building exercise for state agencies that provide GBV services and other stakeholders to operate effectively. They should be supported with offices, trained staff and resources like motorbikes, bicycles, computers, mobile phones, etc.
- The number of police officers and police posts and patrol teams should be increased in the districts or communities and especially at hotspots of identified crimes, including child trafficking, rape, defilement and other sexual and/or gender-based violence as adequate police presence is often a deterrent to crime and unacceptable behaviour.
- Given that poverty is sometimes the primary push factor for some sexual and/or gender-based violence, the economic empowerment potential of the project especially to local women should be deployed in tandem with other solutions to offer adequate protection to vulnerable groups.
- Women and other vulnerable groups should be given Business Development Training to improve their businesses and credit facilities made available and accessible to them.
- Educate and encourage health workers and teachers to occasionally screen girls for potential signs of sexual abuse and sexual exploitation as the girls may find it easier to confide in them.
- Develop and implement grievance mechanism (consistent with the client's GBV framework) as a part of a wider Stakeholder Engagement Plan enabling GBV concerns on the project to be documented and resolved in a timely fashion.
- Work with community leadership, identified NGOs, voluntary groups and civil society organizations to develop capacity and support for vulnerable groups.
- The Contracting Entity should employ traffic wardens to enable children, persons with disabilities and other vulnerable groups cross the feeder roads safely during construction and the road designs should make adequate provisions for their safety. Vehicles and ambulances should also be readily available to transport cases of emergencies to a health facility.
- The Contracting Entity should be guided by the requirements of the Client's GBV Framework.

Significance Rating After Mitigation

Effective application of the proposed mitigation measures will reduce the impact magnitude and its likelihood from high to low and the resultant impact significance rating will become Negligible.

Negligible	Low	Moderate	High
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9.2.11 INCREASE IN DISEASE SPREAD

Description of Impact/Project Activities			
<p>The prevalence of common illnesses like malaria, cholera, diarrhoea and headache in the Project area can be attributed to poor sanitary conditions. Sanitation conditions are poor and proper waste management systems are inadequate in most areas. With the significant potential influx of workers to the Project area, it is expected that communicable diseases will increase among workers through interaction with local communities and vice versa. Key receptors for malaria, cholera and diarrhoea or those likely to be more affected are children and the elderly as they have weaker immune systems.</p> <p>Project construction activities will also generate solid and liquid waste which if not properly managed will create unsanitary conditions and degrade the environment. Workers on the Project must be provided with appropriate housing, sanitation and living conditions.</p> <p>Diffusion or increase in the spread of diseases like HIV/AIDS and STIs and others is also expected as a result of labour influx. The Project may also experience the influx of sex workers to the area which may result in the increase in sexually transmitted infections and HIV cases. Influx of construction workers, some of whom are likely to come from other parts of the country, is a potential avenue for transmission of HIV/AIDS and other social infections. Again, in the mix of the prevalence of the COVID-19 pandemic, the influx of labour and the generally congested work environment that characterize construction projects may increase the spread of the disease. The project must develop a COVID-19 avoidance and management protocol to prevent the spread of the virus, isolate and treat any unfortunate potential contractions and generally deal decisively with the pandemic.</p> <p>The influence of money on residents will play a major role in the spread of STIs and HIV/AIDS from unprotected sex. Construction workers who are normally away from regular sexual partners are often better resourced to negotiate for sex. Project workers may use money to entice young girls in the Project area into having sexual relations with them and this can potentially lead to increase in teenage pregnancies, child marriages and children dropping out of school. Road construction increases opportunities to have sexual relationship with multiple partners because the mobile nature of the work makes workers spend much time away from their homes and tend to satisfy their sexual needs on the road (project communities).</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>The Project will have direct negative impacts on populations within the Project area and workers/visitors in terms of increase in vector borne and communicable diseases (including COVID-19). Sexually transmitted diseases are also likely to be transferred through sexual interactions or from sex workers. Diseases like HIV/AIDS and COVID-19 may not be reversible and can lead to loss of life. The probability of occurrence of this impact is definite and there is the possibility of the impact to spread beyond the local borders of the Project communities or area. Disease spread has a national consequence.</p>			
Impact Criteria	Severity	4	High
	Reversibility	5	Irreversible
	Duration	4	Long term
	Spatial Extent	4	National
	Probability	5	Definite
Total Score		85	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- Develop a COVID-19 prevention and management protocol to avoid the spread of the virus, isolate and treat any unfortunate potential contractions and deal decisively with the pandemic. Basic disease prevention measures must be outlined in the protocol and must include, but not limited to the following:
 - Wash hands often with soap and water for at least 20 seconds.
 - Cover cough or sneeze with a tissue, dispose the tissue in a closed bin, and then wash your hands.
 - Always wear a mask over the nose and mouth, particularly when leaving home or place of abode.
 - Avoid touching eyes, nose, and mouth.
 - Clean and disinfect frequently touched objects or surfaces.
 - Avoid close contact with people who are sick and stay home when sick.
 - To the extent possible, screen all visitors on all construction sites in advance of their arrival on the job site for signs and symptoms of COVID-19.
 - Check and record at least twice daily, temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site, and at close of work.
 - Adopt staggered work schedules, e.g., provide alternating workdays or extra shifts, to reduce the total number of employees on a job site at any given time and to ensure physical distancing.
 - Keep in-person meetings (including toolbox talks and safety meetings) as short as possible, limit the number of workers in attendance, and use social distancing practices.
 - Ensure clean toilet and handwashing facilities. Clean and disinfect portable job site toilets regularly. Fill hand sanitizer dispensers regularly. Disinfect frequently touched items (i.e., shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets) regularly.
 - Report any safety and health concerns immediately to the Site Supervisor and call designated health line(s) in the district for necessary assistance or support if you develop fever, cough, or difficulty breathing.
- Engage the services of a medical professional or health facility to conduct medical screening of staff engaged in the Project. This should be routine and undertaken throughout the Project life.
- The Contracting Entity should put in measures to avoid creating mosquito breeding grounds near human settlement and construction camps.
- Construction workers should be provided with and encouraged to sleep under treated mosquito nets.
- The Contracting Entity should promote HIV/AIDS awareness and encourage the use of condoms and where practicable, make them available to workers on the Project who should be discouraged from sleeping with young girls or married women.
- Where practicable, the Contracting Entity should provide workers with sufficient accommodation to enable married employees to stay with their spouses or host their spouses during visits.
- The Contracting Entity should develop a vaccination programme for employees and visitors against relevant vaccine-preventable diseases based on adequate risk assessment.
- The Contracting Entity should provide first aid services to construction workers and further arrangements made with a larger hospital or health facility where major cases will be referred.
- Encourage community liaison and education on potential health issues the Project development will attract to the area. Conduct community sensitization and screening on potential diseases and health problems within the Project area, including Hepatitis B. This may be implemented as part of a wider social responsibility contribution for the Project.
- The Contracting Entity should develop a disease prevention strategy and liaise with municipal and district assemblies as necessary so that it is aligned to the national strategy goals on health delivery.
- Adequate housing should be provided to the Project workforce so that overcrowding does not occur which may increase the possibility of disease outbreaks.
- The Contracting Entity should provide separate sanitary rooms and public toilets for workers, especially considering that the Project area is a predominantly Muslim environment. The sanitary rooms should also be adapted to suit the needs of women and disabled persons.

- Encourage good maintenance of water distribution systems, continuous cleaning of camp facilities and waste management practices. Implement a pest management plan as part of this.
- Water obtained from surface sources for drinking and bathing purposes should be boiled before using as they may contain guinea worm parasites. Needless wading or bathing in surface waters should also be discouraged.

Significance Rating After Mitigation

It is expected that the magnitude of the impact can become moderate following the application of the proposed mitigation measures and its likelihood reduce from high to medium. The impact should also become recoverable with hygienic practices, health screening, use of the appropriate PPEs, safe sex and condom use. The resultant impact significance rating should then reduce from high to low.

Negligible

Low

Moderate

High

9.2.12 RISE IN TEENAGE PREGNANCIES AND SCHOOL DROP-OUTS

Description of Impact/Project Activities

The incidence of young girls in their adolescent age getting themselves pregnant is common in the project area. In some situations, these girls are impregnated by their male colleagues in school and end up dropping out of school. Sometimes, parents of these girls manage to cater for their children and encourage them to go back to school. Some of the girls are also forced to marry the man/boy responsible for the pregnancy at a tender age. Meanwhile, some men or boys responsible for the pregnancy either cater for both mother and child or only cater for the child and neglect the mother after birth.

Factors contributing to early pregnancy among adolescents in the project area include high levels of poverty, improper parenting, low educational expectations, peer pressure, sexual coercion, low self-esteem and lack of knowledge about sex. It is expected that the project may contribute to the rise in teenage pregnancy in the area. Project workers may use money to entice young girls in the Project area into having sexual relations with them and this can potentially lead to increase in teenage pregnancies, child marriages and children dropping out of school. There is also likely to be an increase in the incidence of HIV/AIDS and other sexually transmitted infections, due to the possible influx of construction workers who are normally away from regular sexual partners and are better resourced to negotiate for sex with young girls from impoverished homes and also less informed about sex.

Children dropping out of school is also common in the project area. Children sometimes complain to their parents that they do not understand what they are taught in school and therefore gradually drop out of school even when they are persuaded by their parents to attend school but major factors include poverty, need for farm hands, large family sizes and teenage pregnancy. Young boys who drop out tend to learn a trade while young girls migrate to the southern part of the country and engage themselves as head potters (commonly referred to as 'kayaye').

The current condition of the feeder roads which is mostly difficult to use during the rainy season also affects school attendance as school children often find themselves arriving late at school or not going at all and this affects their academic work. This situation may be exacerbated during the construction phase especially if the road construction delays unnecessarily.

Nature of Impact

Positive

Negative

Direct

Indirect

Rating of Impact

Summary of Reasoning

The Project may exacerbate teenage pregnancies and school drop-outs. Sexually transmitted diseases are also likely to be transferred through sexual interactions with young girls. Diseases like HIV/AIDS may not be reversible and can lead to loss of life. The probability of occurrence of this impact is high and there is the possibility of the impact to spread beyond the local borders of the Project communities or area. The impact has a national consequence.

Impact Criteria

Severity

4

High

		Reversibility	5	Irreversible
		Duration	4	Long term
		Spatial Extent	4	National
		Probability	4	High
Total Score			68	
Significance Rating Before Mitigation				
Negligible	Low	Moderate	High	
Degree of Confidence				
Low	Medium		High	
Proposed Mitigation Measures				
<ul style="list-style-type: none">Promote HIV/AIDS awareness and encourage the use of condoms and where practicable, make them available to workers on the Project who should be discouraged from sleeping with young girls or married women.Educate or sensitize young children and teenage girls to stay in school and on the dangers of unprotected and/or premarital sex.Radio stations should be encouraged and utilized to provide age-appropriate sex education to young girls and boys and parents should be sensitized as well to take renewed interest in their children's sexuality.The security agencies should be encouraged and well-resourced to prioritize the arrest, prosecution and conviction of construction workers who impregnate teenage girls.Encourage young girls who have been violated by construction workers to report them to their parents and appropriate authorities like traditional authorities, police, DOVVSU, the Department of Social Welfare, etc.The Contracting Entity should engage the services of a medical professional or health facility to conduct medical screening of its staff. This should be routine and undertaken throughout the Project life.Where practicable, the Contracting Entity should provide workers with sufficient accommodation to enable married employees to stay with their spouses or host their spouses during visits.Educate and encourage health workers and teachers to occasionally screen girls for potential signs of sexual abuse and sexual exploitation as the girls may find it easier to confide in them.Work with community leadership, identified NGOs, voluntary groups and civil society organizations to develop capacity and support for teenage girls and school drop-outs.The Contracting Entity should develop an HIV/AIDS and teenage pregnancy prevention strategy and liaise with the municipal and district assemblies as necessary so that it is aligned to the national strategy goals on health delivery.The practice of young females engaging themselves as head potters can be controlled if they are given employment on the proposed road project.The women leaders in the communities should collaborate with the queen mothers and women associations in the project communities and organize sex education programs for girls in the community. There is a need for community support to organize these programs frequently.The Contracting Entity should work on schedule so that unnecessary delays do not affect the use of the road by school children and the general public.Support for children's education should be encouraged and provided. This can be done through the supply of educational materials, facilitation of travel through provision of bicycles, wheel chairs for children with disability and scholarships schemes for tertiary education.				
Significance Rating After Mitigation				
It is expected that the magnitude of the impact can become low following the application of the proposed mitigation measures and its likelihood also reduce from high to low. The impact should also become recoverable with more public education, encouraging health screening, safe sex and condom use. The resultant impact significance rating should then reduce from moderate to low.				
Negligible	Low	Moderate	High	

9.2.13 TRAFFIC DISRUPTIONS / INTERRUPTIONS AND DIVERSIONS DURING CONSTRUCTION

Description of Impact/Project Activities			
<p>From the baseline traffic surveys, it was found that the feeder roads have less traffic situations because of their generally poor condition with some being mainly farm roads. Nonetheless, construction activities which involve the use of many machinery and equipment, and movement of earth materials will lead to traffic congestions on the road network which will potentially affect road users. The development if not well managed can also lead to accident situations on the road.</p> <p>Project construction workers are also vulnerable to accidents. Inadequate or improper standard warning and guiding signs during construction could result in the collision of vehicles or motorbikes, injuries and even death to both workers and road users. Alcohol and substance abuse may occur in the area and can also be a trigger of traffic accidents should both construction drivers and commercial drivers operate under the influence of either and thus not pay attention to warning signs and guides during traffic disruptions / interruptions.</p> <p>Also, during road construction, temporary routes or diversions may be prepared so that vehicles continue to operate along the roads. These access roads or diversions may probably have to traverse grassland or cultivated land, with adverse effects on landholders if they are not properly reinstated.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>During Project development, commercial vehicles will still utilise the road links moving in and out of the Project construction areas. The likelihood of the impact occurring is definite as construction activities will disrupt flow of traffic at sections of the road link. Accidents may occur from improper or inadequate use of standard warning and guiding signs in such situations which can cause injury and potential death to workers, community members or other road users. The severity of the impact will be high but should cease after construction.</p>			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		55	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- The Contracting Entity should develop and implement a “No Drinking” “No Alcohol” policy on site during construction.
- The Contracting Entity should install traffic safety signage at vantage points along construction routes and ensure that traffic management plans and signs are presented in English and the local languages.
- The road and traffic guiding/warning signs should also use gender sensitive language such as “Go Slow, Works in Progress” instead of “Go Slow, Men at Work”.
- The Contracting Entity should install speed control limits for the project and enforce that vehicles comply with the site driving regulations.
- Improve and enhance community sensitization on road traffic accidents within the Project area.
- The Contracting Entity should employ traffic wardens to enable children, persons with disabilities and other vulnerable groups cross the feeder roads safely during construction and the road designs make provisions for their safety.
- The Contracting Entity should develop a health and safety management plan for construction vehicles and machines.
- The Contracting Entity must conduct periodic and routine alcohol checks for site drivers and site workers.
- The Contracting Entity should comply with the provisions of the ESMP to facilitate the adequate management of various aspects of the works and this should be reviewed and approved by the Client before start of the works.
- The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH’s ESA for TSIP (2017) guideline document.

Significance Rating After Mitigation

Application of the above mitigation measures will reduce the impact severity to moderate and the probability from definite to high. This should reduce the impact significance rating to low.

Negligible

Low

Moderate

High

9.2.14 ACCIDENTS / OCCUPATIONAL HEALTH AND SAFETY RISKS DURING CONSTRUCTION

Description of Impact/Project Activities

Accidents constitute one of the most important risks in road construction and maintenance resulting in injuries. Construction activities will present health and safety issues to both workers and road users. The inadequacy of warning sign and safeguards can result in unplanned accidents.

The Project will require intensive engineering and construction cutting, masonry work, among others, which will expose construction workers to risks of accidents and injuries. Such workplace accidents and injuries can result from slip and falls, cuts from hand tools, construction equipment failure, collapse of machines, inadequate following of safe codes of conduct or disregard for health and safety measures, etc.

The Project will also expose the public (especially workers) to atmospheric emissions from construction equipment, intense heat from the sun, and excessive or continuous noise and vibrations from construction activities. Some workers will also be exposed to lubricants, some of which contain solvents with the potential to cause skin irritation and allergies, respiratory disorders and acute poisoning. Air pollution due to the Project will also adversely affect the health of people engaged directly or indirectly in the construction activities. The effects are due largely to particulates from vehicular emissions and constructional equipment powered by gasoline or diesel, as well as silica in dust from the earth agitated by constructional equipment and vehicles plying uncompleted and untarred roads.

Nature of Impact

Positive

Negative

Direct

Indirect

Rating of Impact

Summary of Reasoning

The probability of the impact occurring is definite; however, the severity is expected to be moderate as the traffic situation on the feeder road network is not extremely high or unmanageable to prevent accidents. Similarly, the Project being World Bank funded is expected to follow high health and safety standards to prevent work-related hazards.

Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		50	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">• The Contracting Entity should develop and implement a “No Drinking” or “No Alcohol” policy on site during construction and conduct periodic or routine checks for site drivers and site workers.• The Contracting Entity should provide appropriate and adequate protective wear, such as reflectors, safety shoes, ear muffs, gloves, goggles, and others for the safety of the workers.• Install traffic safety signage at vantage points along Project site or construction routes, including visible road signs warning road users about on-going road construction works.• Put in place proper and visible guiding signs or recruit traffic wardens / guides to direct vehicles, and the traffic signs should be presented in English and the local languages.• Road and traffic guiding/warning signs should use gender sensitive language such as “Go Slow, Works in Progress” instead of “Go Slow, Men at Work”.• Install traffic calming measures (speed bumps and rumble strips) to slow traffic down and also Install speed control limits and make vehicles comply with the site driving regulations.• Designated animal crossing areas should be marked appropriately with warning signs and traffic calming measures.• Properly cover construction materials carried by haulage trucks with a tarpaulin.• Suppress dust emissions by regularly sprinkling water during dusty conditions to improve visibility and reduce the health impact of dust pollution to both workers and the general public.• The Contracting Entity should have further consultations with the local Police Service at the detailed or final designs phase and obtain existing data on accidents and crime rate in the project area to help identify hotspots and implementation of appropriate design interventions.• Install screening concrete barricades and warning conspicuous tapes in and around disturbed and excavated areas to control access and reduce pit-falls / accidents.• Improve and enhance community sensitization on road traffic accidents within the project areas, through a targeted public road safety awareness program.• Document community grievances, accidents and actions taken. Also have regular safety talks with workers and institute strict punitive measures for non-compliance with safety rules.• Carry out HIV/AIDS awareness raising campaign with workers and local communities, strategically integrating workers residing both in and outside the camp.• A well-stocked First Aid kit (administered by a medical personnel) should be maintained at each camp, quarry sites and each active work section along the road.• Medical personnel should be available on the project and also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce. Major cases can be sent to operating health facilities.• Regulate / institute a strict code of conduct at the workers’ camps, and see to it that facilities such as lavatories, bathrooms, and accommodation are separated according to gender.• The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH’s ESA for TSIP (2017) guideline document.			
Significance Rating After Mitigation			

Application of the above mitigation measures will reduce the impact severity from moderate to low and the impact significance rating should reduce to low.

Negligible	Low	Moderate	High
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9.2.15 REDUCED ACCESS, PRESSURE AND OVERBURDENING OF PHYSICAL AND SOCIAL INFRASTRUCTURE

Description of Impact/Project Activities			
<p>The social survey revealed that infrastructure for water delivery, proper sanitation and waste management are inadequate in the Project area. Labour procurement during Project development and construction will see potential influx of job seekers into the Project area. As populations increase, the dependency on social infrastructure will increase. The short-term increase in population across the Project areas will potentially influence renting and accommodation cost, as house owners will be tempted to make huge profits within a short period of time.</p> <p>Limited access to health care facilities will pose significant threats to local residents following the influx of construction workers and job seekers and in the likely event of any major disease spread. As the numbers increase, the dependency levels on social resources in the road communities will also change. The Project development through the construction of camping sites and offices will also impact on the existing infrastructure in the Project area and increase demand for utilities like electricity and water and can create shortages.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>Although the influx of immigrants to the various communities is expected, the numbers will reduce as procurement of Project workers ends. It shall be the Project's objective to procure labour for low skilled jobs from the local communities in the Project area. As workers become permanently resident in the communities; it is assumed that they will increase the dependency on physical resources such as water and electricity. The severity of the impact would be high.</p>			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		44	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			

- The Contracting entity should encourage much of the construction workforce to stay in the construction camps and also encourage the local communities through collaboration with the local / traditional authorities to accommodate migrant workers and promote harmony between workers and community members.
- Increase efforts towards adequate provision of utilities (water, electricity) and accommodation for construction workforce, as well as expansion or resourcing of existing health facilities to accommodate or serve more patients at a given time.
- Rainwater harvesting should be encouraged at construction camps and the communities should be educated and supported with storage tanks to practice rainwater harvesting.
- The project should help improve access to water supply within the road corridor through the provision of more boreholes or small-town water systems.
- The Contracting Entity should maintain high standards of site supervision and operation to reduce the risks of damage to water, power and telecommunication lines.
- Potable or constructed toilets must be provided on site / camp for construction workers and implement safe disposal practices.
- The provision of certain complementary interventions such as mechanized boreholes, health facilities, schools, etc., is also considered a mitigation measure to the increased pressure on social amenities.
- A solid waste control procedure (storage, provision of bins, site clean-up schedule, bin clean-out schedule, etc.) must be prepared by the Contracting Entity and it must be carefully followed.
- The Contracting Entity must institute measures to discourage negligent or unacceptable behaviour on the part of the workers and in regard to the norms of the local communities.
- Disseminate Project information to local authorities, enterprises and households through community meetings before commencement of construction works; and provide a community relation contact to act as liaison between the community and the Project.
- Inform local residents about construction work schedules, interruption of services, relocations / resettlement, demolitions, etc., as appropriate.
- Maintain open communications with the local government and local communities; the Contracting Entity should coordinate with local authorities for agreed schedules of construction activities at areas near to sensitive places or at sensitive times (e.g., religious festival days).
- The Contracting Entity should monitor community concerns throughout the Project and implement an effective grievance redress mechanism.

Significance Rating After Mitigation

The mitigation measures should reduce both the severity and probability of the impact to low. The impact significance rating would improve, i.e., become Negligible.

Negligible	Low	Moderate	High
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9.2.16 INCREASED NATURAL RESOURCE REQUIREMENTS FOR CONSTRUCTION ACTIVITIES

Description of Impact/Project Activities

Natural resources like water are scarce in the Project area and construction water requirements will put pressure on existing inadequate water resources. Rivers, ponds, dams and groundwater are used as water supply sources in the Project area for drinking, washing and consumption by cattle and other domestic animals. Construction camps (workers) will also require adequate supply of water.

The increased demand for water due to the Project may affect availability for human abstraction and use which can generate conflicts between communities themselves, conflict between workers on the Project and the communities, as well as livestock-wildlife-human conflicts. The increased demand can also lead to overexploitation of water sources and subsequently pollution of available sources. This can also result in the spread of waterborne diseases.

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact			
Summary of Reasoning			
There is a definite probability of high natural resource requirements for construction. The impact severity during the construction period is recognised as high due to the scarcity of some resources like water in the Project area. As workers become permanently resident in the communities; it is assumed that they will increase the dependency on resources such as water. Not only that, the road construction work itself will place demands on potable water and other construction materials.			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		55	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">• The exploitation of natural resources such as hunting, fishing, collection of forest products, sand (or gravel) winning or any other activity that might have a negative impact on the social and economic welfare of the local communities should be discouraged.• The Contracting Entity should see to it that the provision of resources (e.g., water) is adequate.• Rainwater harvesting should be encouraged at construction camps and the communities should be educated and supported with storage tanks to practice rainwater harvesting.• The project should help improve access to water supply within the road corridor through the provision of more boreholes or small-town water systems.• The Contracting Entity should as much as practicable avoid conflicting with water demands of the local communities and explore alternative sustainable water sources.• The Contracting Entity should avoid needless damage to areas of particular environmental interest and erosion of sensitive areas, as well as areas where the presence of wildlife or species of conservation importance has been noted.• Abstraction of both surface and underground water should only be done in consultation with the local community and after obtaining a permit from the Water Resources Commission.• Abstraction of water from wetlands should be avoided as much as possible. Where needed, permission has to be obtained from relevant authorities.• No construction water containing spoils or site effluent, especially cement and oil, should be allowed to flow into natural water drainage courses.• Waste water from washing out of equipment should not be discharged into water courses without pre-treatment.• Site spoils and temporary stockpiles should be located away from the drainage system, and surface runoff should be directed away from stockpiles to prevent erosion.			
Significance Rating After Mitigation			
The proposed mitigation measures should cause a reduction in the impact severity and probability levels and this would improve the significance rating.			
Negligible	Low	Moderate	High

9.2.17 IMPROVEMENTS RELATED TO COMMUNITY DEVELOPMENT INITIATIVES

Description of Impact/Project Activities			
<p>Community development initiatives are significant avenues to demonstrate commitment towards development and improvement in the lives of people in communities where a Project operates. Community development strategies are often directed at the provision of road improvements, schools, medical and health centres, markets, waste and sanitation facilities, water supply facilities and provision of electricity. It was also established from the household survey that communities within the Project area have similar preferences for development initiatives. It is expected that the Project will contribute to upgrading the social standards of communities. For instance, school children will benefit from improved access to educational facilities. Similarly, there will be improved provision and access to quality health care.</p> <p>This is recognized as a positive impact to the Project. It is projected that the Project sponsors will through the Project also implement community development programmes which will improve the current social livelihood of populations within the Project affected communities.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>This positive impact will be realised by community members in the wider social area of influence. Although this impact is positive and of moderate significance, it is important that community development initiatives or programs are supported by members of the communities.</p>			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		52	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			

- The Contracting Entity in collaboration with the DFR and local development authorities should implement a policy on Community Development Initiatives for the Project, if applicable.
- The Contracting Entity should disseminate Project information to local authorities, enterprises and households through community meetings before commencement of construction; and provide a community relation contact to act as liaison between the community and the Project.
- The Contracting Entity should present quarterly reports to the GHA, stating how categories of people, such as women and indigenes are being engaged on the Project.
- The Contracting Entity should provide potable water sources (e.g., boreholes) and water storage facilities (small-town water systems) for communities lacking good water sources, or communities that might compete with the project for water.
- Provide roadside amenities or social services such as markets, as a component of the Project to reduce post-harvest losses from traveling long distances to sell produce at bigger markets.
- Include the provision of electricity (possibly solar power systems) and storage facilities for agricultural produce as a component of the Project, if practicable, to enhance agricultural productivity in the Project area.
- The Contracting Entity should include in the Project design, the construction of bus stops along road sections, particularly at identified market centres.
- Maintain a grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.
- Develop community development programs in consultation with NGOs and other civil societies in the Project area. Where NGOs can be identified, it is recommended that they are engaged to provide ideas and suggestions on the needs of the people. It is recommended that such community programs focus on the areas of improving education, healthcare, sanitation, etc.
- The Contracting Entity should continually engage with local opinion leaders and key persons within the project communities to determine lacking needs and provide support, if possible.

Significance Rating After Mitigation

The positive benefits experienced from this impact would be boosted following the application of the proposed enhancement measures, and the severity and probability rating should both improve. Improved roads bring with it a lot of community development initiatives and with the application of good management measures, the derived benefits will improve and leave lasting benefits beyond the life of the Project. The impact significance rating would therefore improve and become high.

Negligible	Low	Moderate	High
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9.2.18 EXPOSURE OF WORKFORCE TO SUFFICIENT HEALTH AND SAFETY STANDARDS

Description of Impact/Project Activities			
<p>Health and safety requirements are key aspects for any developmental project which is financed by the World Bank and other international bodies. According to IFC performance standard 2, “<i>economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers</i>”. The provision of a safe and healthy work environment that considers inherent risks and hazards in the working area is a requirement of the standard. The requirements and conditions of this standard are applied to the development of this Project.</p> <p>In Ghana, health and safety practices are promoted in a number of Government documents and national regulations and guidelines, including legislations such as the Factories, Shops and Offices Act of 1970 (Act 328), the Ghana National Fire Service Act, 1997 (537) and the Workmen Compensation Act, 1987 (PNDL 187). These standards, laws and guidelines, will be adopted to protect workers under the OPBRC Project. During the Project construction phase, there will be labour influx from other parts of the region or Ghana as a whole. Wherever labour is procured from, it is important to provide training to workers. As such, workers will be exposed enough to health and safety regulations and standards which will seek to make the Project construction a ‘Zero Harm’ site. During road construction, the Contracting Entity and Sub-contractors would be under contract to have a health and safety management plan in place.</p> <p>Periodic site meetings and other monitoring activities will be embarked upon by District Assembly personnel and other stakeholders, and this will provide them the opportunity to gain technical knowledge thus enhancing their capacity. Local artisans such as carpenters, masons, welders, etc, who are employed by the project will have the opportunity to be trained by the Contracting Entity. This training will enhance their skills on the job and push them to a higher level in their field or career.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>This will provide direct positive impacts to Project workers and the Project in general. There is sufficient health and safety legislation which will protect Project workers in Ghana. The Project will also align with international best practice. The applicability of the transferable skills or knowledge of health and safety protocols acquired by workers on the Project cannot be limited as it will stay with the workers for life and they can apply the knowledge on other Projects. This is recognised as an irreversible positive impact and of moderate significance.</p>			
Impact Criteria	Severity	3	Moderate
	Reversibility	5	Irreversible
	Duration	5	Permanent
	Spatial Extent	3	Regional
	Probability	4	High
Total Score		64	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			

- The Contracting Entity must develop and implement a health and safety policy for the Project.
- The Contracting Entity and sub-contractors should have a documented health and safety management plan in place and also have designated Health, Safety and Environment (HSE) officers always on site.
- Engage the services of a local health and safety consultant where appropriate. The consultant will engage and work with HSE managers or EM to resolve health and safety issues on site.
- Health and safety requirements should be in place on construction sites and in work camps and regular training and safety tips should be provided to workers, including daily toolbox talks.
- The Contracting Entity must install lights and cautionary signs in hazardous areas.
- Safety and inspection procedures should be enhanced and the use of PPE enforced by the Contracting Entity.
- Maintain and implement grievance mechanism throughout the development of the Project and continue engagement and education of community members on construction details and health and safety measures.

Significance Rating After Mitigation

The application of the proposed mitigation measures is expected to boost the probability factor which will effectively result in an increase in the impact significance rating from moderate to high.

Negligible	Low	Moderate	High
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9.2.19 COMPETITION FOR LABOUR / INCREASED COST OF LABOUR FOR OTHER PRODUCTIVE SECTORS

Description of Impact/Project Activities

Though the Project will result in employment opportunities, generation of new businesses and improvements in livelihood, the project will also invariably create competition for labour with other economic sectors, particularly agriculture, depending on the season local labour is required for the road project. If people (especially the youth) start working on the project site and earn regular, reliable and relatively higher incomes, other productive sectors such as farming will become less attractive to them, which would lead to labour shortage in the agricultural sector.

This can create some significant amount of socio-economic stress as the competition for labour could possibly drive the cost of labour up for the other productive sectors. This development could slightly destabilise the local economy and this development would need to be handled well through appropriate and corresponding program of lucrative interventions and supports for the other sectors during the same period the road construction takes place.

Nature of Impact

Positive	Negative	Direct	Indirect
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Rating of Impact

Summary of Reasoning

The impact will be short-term and recoverable as many people will begin to move back to other sectors soon after construction works are completed. The severity of the impact will be moderate. The impact will not only be localized to the local communities but will have transboundary effect given that people will leave jobs and occupations in other communities to move to the project area to secure employment. It is also recognized that some construction related employment will require highly skilled labour and experience which may be unavailable in the local area and would have to be outsourced from other areas.

Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	2	Short term
	Spatial Extent	3	Regional
	Probability	4	High
Total Score		44	

Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">• The Government through MOFA should devise a program to introduce commercial agriculture into the area and encourage investors to establish equally lucrative agro-businesses in the project area.• Continuous engagement with community members to include raising awareness and managing expectations on training, recruitment and capacity development programs.• The Contracting Entity in collaboration with the local authorities should educate individuals on the Project and its impacts to farming activities and other sectors of the local economy.• Residents should be given Business Development Training to improve their businesses and credit facilities made available and accessible to them so they are not forced to look for more lucrative opportunities brought about by the project.• Implement grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.• Conducting consultation processes that achieve free, prior and informed participation of affected people and communities in the decision making.• The Contracting Entity should engage with relevant Government departments and authorities in the project area to understand their mandated roles and responsibilities for developing interventions to support other sectors of the local economy.• People who may lose their crops or properties as a result of the Project development should be compensated adequately and promptly so they do not lose their existing livelihood and forced to compete with the project for new jobs.			
Significance Rating After Mitigation			
Effective application of the proposed mitigation measures will reduce the impact magnitude and its likelihood and the resultant impact significance rating will become negligible.			
Negligible	Low	Moderate	High

9.3 POST-CONSTRUCTION PHASE IMPACTS AND PROPOSED MEASURES

9.3.1 EMPLOYMENT AND REVENUE GENERATION OPPORTUNITIES

Description of Impact/Project Activities			
<p>This is a positive impact. The improved road networks will contribute to improved rural economies, especially for roadside communities. Some of the businesses created during the construction phase will continue operation post-construction. Similarly, some of the workers (job seekers) may find new jobs after the construction or may just decide to continue living in the Project area, and as such will continue to patronize local businesses or services. The improved road networks will also promote irrigation services which will enable farmers to plant all year round and enjoy good revenue from their investments. As such, the farming population is expected to also grow over time.</p> <p>The road project will bring new economic openings for rural women as well from improvement in agriculture and trading sectors. As more settlements spring up following the new road intervention, rural women will expand their opportunities for catering and trading, since there will be increased demand for food, goods and services, both in the construction and operation phases.</p> <p>Similarly, the reduced travel times and ease of transport expected as a result of the road improvement will also open up the local areas to tourists which will rake in income to the local people. The value of land and properties will also appreciate after the roads are improved which will bring revenue to land and property owners.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
<p>The improved road network is expected to stimulate a lot of economic growth from jobs created as a result of the Project which will result in increased income for the local people and promoting increases in standards of living. The benefits will not be reversible and will translate into national economic gains. The impact is a positive one and considered significant. The likelihood is also definite.</p>			
Impact Criteria	Severity	4	High
	Reversibility	5	Irreversible
	Duration	4	Long term
	Spatial Extent	4	National
	Probability	5	Definite
Total Score		85	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			

- Regular maintenance should be carried out on the roads to safeguard their deterioration.
- Skills training should continue to be provided to residents of the local communities to increase local employment capacity.
- Identify and strengthen institutions with the potential of supporting trade and commerce in the wider Project area.
- Promote tourism in the area, including educational and research expeditions, and private tour operators.
- Consider providing economic incentives to investors in the area, and promoting development of sectors such as commerce, tourism, etc.
- The Project should identify local groups and women associations and as far as possible offer them jobs involving afforestation and revegetation, particularly in areas where borrow pits or degraded vegetation will be reinstated.
- Have long-term plans on provision of water and electricity as part of the overall infrastructure package.
- Initiate a continuous economic evaluation of the road and strengthen social linkages.
- Continue strengthening of advocacy through awareness training of the remaining construction staff and communities in HIV/AIDS and other STDs; including encouraging the use of preventive measures like condoms as illness and disease affects economic productivity.
- A grievance mechanism should be implemented as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented so that improvements can be made where necessary.

Significance Rating After Mitigation

Application of the above mitigation measures should improve the impact severity. The impact significance will remain high.

Negligible

Low

Moderate

High

9.3.2 IMPROVEMENTS IN ROAD CONDITION AND TRAVEL / ACCESSIBILITY

Description of Impact/Project Activities

There will be enormous positive improvements in travel on the feeder roads and therefore savings in terms of time (and therefore productivity). There would also be reduced fuel wastages and reduced air contamination and thus reduced potential health risks. Change in fuel consumption and level of vehicular emissions are expected. The improved road surfaces will also significantly improve the economic life of vehicles. In addition, farming areas which previously were not accessible will become more accessible. Road travel would likely be possible all year round without fear of flood waters.

The enhanced accessibility due to the Project will lead to general improvements in the welfare and well-being of the rural communities through increased access to health care, education and other social services, which will be rendered closer because of reduced travel time and ease of travel. Accessibility and use of wheel chairs on the road will also be much safer and convenient than before for people with disabilities.

Similarly, criminal activities by armed persons that are suffered by residents in communities that use feeder and access roads could see a reduction in numbers, as most robberies take place because vehicles are not able to move at a safe speed on many of the bad roads.

Nature of Impact

Positive

Negative

Direct

Indirect

Rating of Impact

Summary of Reasoning

The benefits of improved mobility and accessibility are expected to be lasting and go beyond the Project life, especially when the roads are regularly maintained. The likelihood of the impact is definite with high positive severity rating.

Impact Criteria

Severity

4

High

Reversibility

5

Irreversible

	Duration	5	Permanent
	Spatial Extent	2	Local
	Probability	5	Definite
Total Score		80	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			
<ul style="list-style-type: none">Traffic policing should be implemented to reduce the “new road effect” associated with speeding and its elevated risk of accidents, as well as help reduce criminal activities on the roads.Appropriate signages should be installed on the roads to guide traffic effectively.Regular maintenance should be carried out on the roads to safeguard their deterioration.Clear information should be given to the public and motorists on road blockages or closures during repair or maintenance works.Damaged road signages and other safety installations should be repaired or replaced on time.Vehicles exceeding the weight capacity of the roads should not be allowed to use these roads and heavy penalties should be imposed to those who exceed weight and speed limits.A grievance mechanism should be implemented as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented so that improvements can be made.			
Significance Rating After Mitigation			
Application of the above mitigation measures should improve the impact severity. The impact significance will remain high.			
Negligible	Low	Moderate	High

9.3.3 VISUAL / SCENIC QUALITY IMPACTS

Description of Impact/Project Activities			
It is not expected that many activities will be undertaken during Project operation, except for scheduled road maintenance activities. Unlike in the construction phase, during operation or road maintenance, there will be a significant reduction in construction vehicles and operation of machinery.			
The road improvements will generally enhance the scenic beauty of the Project area at the operation phase. Though there may be some loss of local sense of place, especially for areas that will experience significant modifications or transformations, this will be insignificant compared with the overall derived benefit. The road improvements will also improve public security or safety in the Project area and also benefit agricultural productivity since the Project area is generally an agricultural landscape. It is assumed that residents will easily adapt to the beneficial changes in the landscape in a short period of time.			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The visual impacts will apply to the entire length of the feeder roads and the expected magnitude of the impact will be high. The probability of occurrence will however be high.			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	3	Regional
	Probability	4	High
Total Score		52	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High

Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			
<ul style="list-style-type: none"> It is expected that residents within the Project area would get accustomed to the presence of the Project in a short time. However, community engagement should continue post-construction and any grievances which may arise appropriately recorded and addressed. There should be selective clearing of roadside vegetation during construction and post-construction, making sure that only vegetation that must necessarily be cut down is removed, thus conserving as much of the natural vegetation as practicable to enhance scenic beauty. Trees should be planted to compensate for vegetation clearance as a fundamental step in enhancing the scenic beauty of the Project area. Degraded areas should be rehabilitated with indigenous tree species to also act as carbon sinks. Sensitization campaigns should also be continued for communities, schools, religious groupings, opinion leaders, etc. to educate them on the need for afforestation (or tree plantations), avoiding bush fires, sustainable agricultural practices, among others. Regular maintenance should be carried out on the roads to safeguard their deterioration. 			
Significance Rating After Mitigation			
No significant change is expected over time as residents adapt to the positive changes as a result of the road improvement.			
Negligible	Low	Moderate	High

9.3.4 ACCIDENTS / OCCUPATIONAL HEALTH AND SAFETY RISKS DURING ROAD OPERATION

Description of Impact/Project Activities			
<p>Health and safety risks could be elevated due to the “new road effect”. Accidents from the transport of goods and personnel on the improved road network are expected. The improved state of the roads could tempt drivers into needless speeding, leading to increased risk of accidents. Accidents can also lead to fires, explosions and loss of human life. Increased health risks could also result from vehicle emissions inhalation and various traffic hazards. Typical of the Upper West Region, livestock are often observed crossing the roads at various locations, and these wandering livestock can pose a significant hazard on the gravel roads and result in fatal accidents.</p> <p>Consequently, several traffic safety elements will be included in the road designs, such as road signs, road kerbs, rumble strips, road speed humps, etc. These will help reduce the impact during the operational phase of the Project.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The probability of the impact occurring is high, however, the severity is recognised as moderate as the general traffic situation on the feeder road network is not high. In extreme situations, accidents can sometimes leave long-term, irreparable damage on those affected.			
Impact Criteria	Severity	3	Moderate
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	2	Local
	Probability	4	High
Total Score		48	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			

Low	Medium	High	
Proposed Mitigation Measures			
<ul style="list-style-type: none">• The Contracting Entity should install appropriate traffic safety signage at vantage points on the roads to guide traffic effectively and enhance safety.• Install traffic calming measures (speed bumps and rumble strips) to slow traffic down within communities or populated areas, as well as where heavy vehicles cross or enter busy roads.• Designated animal crossing areas should be marked appropriately with warning signs and traffic calming measures.• Build capacity of the Police service and traffic policing should be implemented to reduce the “new road effect” associated with needless speeding by drivers with its elevated risk of accidents.• Conduct periodic and routine alcohol checks for drivers plying the road and institute punitive actions.• Improve and enhance community sensitization on road traffic accidents within the Project areas.• Speed bumps and road signs should be erected in sections of the road near schools, churches, mosques, hospitals and other social amenities.• Given the experience of the communities with the existing road, the local community should be encouraged or consulted to suggest sections of the road where speed bumps and road signs may be necessary.• Regular maintenance should be carried out on the roads to safeguard their deterioration.• The Ghana Health Service and other relevant agencies should be encouraged to prioritize the tooling and equipping of local hospitals and ambulance services so they are able to respond to and handle accidents and emergencies during road operation.• Continue strengthening of advocacy through awareness training of the remaining construction staff and communities adjacent to the project in HIV/AIDS and other STDs; including encouraging the use of preventive measures like condoms.• A grievance mechanism should be implemented as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented so that improvements can be made where necessary.• The Contracting Entity should include in the Project design, the construction of bus stops along road sections, particularly at identified market centres.			
Significance Rating After Mitigation			
Application of the mitigation measures above is expected to reduce impact significance from Low to Negligible as a result of reductions in the impact severity and likelihood to low.			
Negligible	Low	Moderate	High

9.3.5 INCREASED AGRICULTURAL PRODUCTIVITY AND IMPROVEMENT IN LIVELIHOODS

Description of Impact/Project Activities			
<p>The road improvement will benefit agricultural production in the farming and fishing communities, and this will not be dependent on educational levels or skills. The improved road networks will also promote irrigation services which will enable farmers to plant all year round and avoid investment losses during the dry season or periods of low rainfall. The road project will have a direct positive impact on agricultural productivity in the area. Agricultural productivity will increase due to less travel times and ease of transporting agricultural produce. Increased production ultimately results in employment generation. It also increases farm employment and reduces out-migration in search of jobs in the urban centres. At the local level, trading in farm produce will intensify as production levels are increased and diversified and access is gained to wider markets. This will substantially contribute to improvements in livelihood, as well as national GDP growth.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			

Summary of Reasoning			
The growth in agricultural production will result in increased income for the local communities; promoting some degree of improvements in livelihood. The likelihood for this impact is definite. The impact is considered to be significant and a positive one with benefits that can culminate in a national level growth in GDP.			
Impact Criteria	Severity	5	Very High
	Reversibility	3	Recoverable
	Duration	4	Long term
	Spatial Extent	4	National
	Probability	5	Definite
Total Score		80	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			
<ul style="list-style-type: none">Regular maintenance should be carried out on the roads to safeguard their deterioration.Provide roadside amenities or social services such as markets, as a component of the Project to reduce post-harvest losses from traveling long distances to sell produce at bigger markets.The RCC and MOFA should be engaged to take up the responsibility to establish economic linkages between the food producing areas and the markets. The RCC would also need to generate markets for food and other items produced in the area through innovative ways such as the promotion of tourism activities.Include the provision of electricity (possibly solar power systems) and storage facilities for agricultural produce as a component of the Project, if practicable, to enhance agricultural productivity.Provision of improved farm machineries and inputs as support to individual farmers or groups to help increase their yields.Consider provision or improvement in irrigation systems to encourage year-long production. For instance, existing irrigation dams could be dredged to increase their capacities to support year-long cultivation.Skills training and education or sensitization programs should continue to be provided to the communities (including schools, religious groups, opinion leaders, farmers, etc.) and issues such as climate change and sustainable agricultural practices should be addressed.Consider providing economic incentives to investors in the area and promoting development of sectors such as agriculture (e.g., livestock rearing, fish farming, etc.) and ecotourism.			
Significance Rating After Mitigation			
The impact significance rating will remain high following the application of enhancement measures. The impact is considered to be significant and a positive one with benefits to be experienced even at the national level.			
Negligible	Low	Moderate	High

9.3.6 INDUCED DEVELOPMENTS AND IMPROVED COMMUNITY LIFE AND SOCIAL SERVICES

Description of Impact/Project Activities			
<p>The road improvement could trigger rapid development and growth of socio-economic activities along the road. The emergence of developments along the road cannot be underestimated. The current rural areas could grow and the quality of the settlements improve towards urban conditions as a result of increased transit traffic and economic growth.</p> <p>The road improvements will also enable easy delivery of drugs/medicines to health care facilities and facilitate patients in the Project area to receive faster medical attention (especially in emergency cases, e.g., maternity), thus lives of some patients will be saved. Health workers and teachers will also enjoy easier access to work than before and school children would also be able to go to school all year round. Attendance would improve and postings will more likely be accepted by teachers and nurses posted to these communities perceived as unfriendly due to difficult access. The road improvement will also indirectly benefit local women by easing the drudgery of long-distance walking with children to school and health care centres, etc. The transportation of people and products between the villages will become faster and safer.</p> <p>Non-governmental organizations that give support to the vulnerable in society find it difficult to access the communities due to the current road condition. However, when the roads are improved, these organizations would be able to easily and readily locate these communities and provide support to the vulnerable in society like the Aged and PWDs in order to reduce their dependency on their families.</p>			
Nature of Impact			
Positive	Negative	Direct	Indirect
Rating of Impact			
Summary of Reasoning			
The impact has medium probability but a high positive severity rating which will culminate in positive socio-economic gains to the Project area.			
Impact Criteria	Severity	4	High
	Reversibility	3	Recoverable
	Duration	3	Medium term
	Spatial Extent	2	Local
	Probability	3	Medium
Total Score		36	
Significance Rating Before Mitigation			
Negligible	Low	Moderate	High
Degree of Confidence			
Low	Medium	High	
Proposed Enhancement Measures			
<ul style="list-style-type: none">Regular maintenance should be carried out on the roads to safeguard their deterioration.The appropriate institutions should check and control inappropriate or unplanned developments so that potential developments along the roads are well planned.Sensitize residents to not encroach on the road reserve.Monitor and install appropriate traffic safety signage at vantage points on the roads to guide traffic effectively, especially at areas sprawling with new developments.Install traffic calming measures (speed bumps and rumble strips) to slow traffic down within newly developing communities or populated areas.Provide roadside amenities, such as road stations, preferably as a component of the Project to avoid unplanned parking of trucks.Traffic policing should be implemented to reduce the “new road effect” associated with speeding and its elevated risk of accidents.			
Significance Rating After Mitigation			

The likelihood of the impact is expected to increase following the application of the proposed enhancement measures. In the long-term, the local benefits associated with this impact should translate into benefits to be experienced on the regional scale. The significance score would improve from low to moderate.

Negligible	Low	Moderate	High
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9.4 CUMULATIVE SOCIO-ECONOMIC IMPACTS

Cumulative environmental impacts have been discussed in Section 8.4. Socio-economic impacts identified as potentially cumulative in nature because of the impact from other existing and previous development projects within the Project area include the following: increased road accidents, visual / scenic quality impacts, teenage pregnancies, disease spread such as HIV/AIDS, and population influx.

The mitigation measures previously proposed under the respective pre-construction, construction and post-construction impact identification subsections are applicable to the cumulative impacts identified and are adequate in effectively managing them.

10.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN OVERVIEW

This Chapter presents an overview of the components and framework for implementation of the Project ESMP. This includes environmental and social monitoring, documenting compliance (e.g., record-keeping) as needed to measure the effectiveness of mitigation / enhancement measures, reporting on environmental and social performance, and the process for defining and implementing procedures for corrective action.

The ESIA assessed impacts (both positive and negative) to the physical, natural and socio-economic environments, as presented in Chapter 8.0 and Chapter 9.0). In order to avoid or reduce negative impacts, and in order that opportunities for the enhancement of positive impacts are realized, a provisional ESMP has been prepared (Refer to Annexure C) and some highlights presented in subsequent sections.

The ESMP outlines the scope of environmental, social and health management pertaining to compliance with applicable regulatory requirements. It transfers the findings and recommendations of the ESIA into clear measures for the management and monitoring of impacts during the Project phases. Implementation of the ESMP provides tools for auditing the Project's mitigation and monitoring activities and communicating monitoring outcomes to stakeholders⁹.

10.1 FRAMEWORK FOR IMPLEMENTATION OF THE ESMP

10.1.1 PURPOSE OF THE ESMP

To enable the detection and resolution of identified and unforeseen or unidentified impacts, a set of management plans or measures have been developed. These will be supplemented with additional requirements as detailed design proceeds and as a Contracting Entity is selected. The Contracting Entity will develop their working methods and procedures in accordance with the management plan or update the ESMP where necessary. The detailed ESMP is presented in Annexure C.

10.1.2 CONTENTS OF THE ESMP

The management plan provides:

- A description of the impacts;
- A description of actions, direct responsibility and financial requirements for managing the impact;
- Monitoring requirements, including targets and performance indicators; and
- Reporting requirements.

The formulation of each plan covers the planning process of the ESMP while the implementation of each plan will cover the implementation and operations processes.

10.1.3 DEFINING ROLES AND RESPONSIBILITIES

To implement the management plans, roles and responsibilities for implementation need to be defined. Some of these roles and responsibilities are discussed below. Others, especially the roles of the institutional or national authorities involved in the project have been earlier highlighted in Section 3.1. Further details on roles and responsibilities can also be found in the ESMP in Annexure C.

⁹ A Stakeholder Engagement Strategy has been developed to describe engagement strategies with identified project stakeholders.

10.1.3.1 RESPONSIBILITIES OF THE PROJECT DEVELOPER

The successful implementation of the ESMP needs commitment from DFR and the Contracting Entity, as well as the other TSIP Implementation teams such as the MOT, including support agencies such as the GHA, DUR, Driver Vehicle Licensing Authority (DVLA), Motor Transport and Traffic Department (MTTD) and NRSA, whose specific roles under the TSIP management and implementation has also been defined in the ESA for TSIP framework document and should be referred to.

Generally, as the Project Developer or main government implementation agency for the project, the MRH / DFR will be responsible for enforcing that the environmental and social management measures recommended as part of the Project or in the ESMP are implemented for each phase of the project. The obligation of the Project Developer will include, but not limited to the following:

- See that all contracting companies tendering for work in the project affected area receive a copy of the ESIA, ESMP, RPF, RAP and any other relevant project documents and are assisted in understanding their responsibility to operate within the framework of the measures defined in the ESMP. When adjudicating tenders, the MRH / DFR should confirm that Contracting Entities have made appropriate allowance for management of environmental and social matters and develop their own ESMP (where necessary) which shall be approved;
- See that on appointment, contracting companies shall sign the ESMP component of this ESIA so the ESMP will then become part of the contract and be legally binding on the Contracting Entity. Contracting companies will also receive the required training or be guided to understand their responsibility to operate within the framework of the measures defined in the ESMP;
- Enforce that the responsibility for implementing and complying with the conditions of the ESMP forms part of the conditions of appointment of all Contracting Entities throughout the life of the project;
- See that independent environmental experts (supervision consultants) are appointed to audit the implementation of, and compliance with, the ESMP and monitoring plan on an annual basis; and the independent environmental audits, together with other relevant monitoring information, are made available to the public, throughout the life of the project;
- See that a formal senior management review of environmental management performance is undertaken on a quarterly basis for the first one-year, then on monthly basis throughout lifespan of the project. Senior management responsibility will include the review and approval of any proposed measures to improve environmental performance;
- See that training and awareness creation is provided to all Contracting Entities in environmental and social management and the mitigation of impacts, to ensure they are aware of their responsibilities and are competent to carry out their work in an environmentally and socially responsible manner. The MRH / DFR should not tolerate transgressions of the provisions of the ESMP; and
- Make sure there is availability of human and financial resources needed to conduct all environmental management, mitigation and monitoring activities throughout the project phases.

Within the MRH / DFR corporate structures (e.g. the Engineers and Environmental and Social Officers that make up the Environmental and Social Safeguards Team), specific roles and responsibilities for the implementation of the management plans should be defined as presented in Table 10-1.

Table 10-1 Project Health, Safety and Environment (HSE) Organisation

Role	Responsibility
Project Coordinator	Oversee and coordinate the various activities pertaining to the Project; ultimately responsible for HSE; arrange meetings and independent technical / procurement audits of the works under the Project; and reporting.
HSE Manager / Environmental and Social Safeguards Team	See to it that the Project, including the Contracting Entity operates in accordance with applicable regulatory environmental requirements and the ESMP; liaise with regulators; and oversee programs associated with environmental and social initiatives.
Site Manager	Monitor, report, and enforce the efficient working conditions of site activities; assist the HSE Manager / Environmental and Social Safeguards Team with matters related to HSE compliance and enforcement including implementation of the ESMP.

10.1.3.2 RESPONSIBILITIES OF THE CONTRACTING ENTITY

During construction, the Contracting Entity will be the key implementer of proposed mitigation and enhancement measures; and together with DFR, they will be responsible for enforcing compliance with the Project policies and commitments.

Under their contracts, the Contracting Entity will be responsible for managing the potential environmental, socio-economic, safety and health impacts of their contract activities, including those of their sub-contractors.

The Contracting Entity should as part of their obligations:

- Prepare detailed design (approved by DFR) and revise the preliminary ESIA based on the detailed design;
- Prepare a Contractor's Environmental and Social Management Plan (CESMP), RAP and Monitoring Plan that will be approved by DFR and the World Bank before commencement of any related work (as specified in the ESA for TSIP Framework Document of the MRH, 2017). The CESMP will provide detailed explanation of how the Contracting Entity will comply with the project's safeguard documents such as the ESIA / ESMP, and must include specific mitigation measures required to manage the environmental, social, health and safety issues identified in the ESIA such as local hiring, traffic management, occupational health and safety, environmental management, social management, labour influx, etc. In other words, the CESMP will comprise a series of individual Management Strategy and Implementation Plans;
- Demonstrate commitment to the ESIA and its management plans in their contract or management structure;
- Identify individuals responsible for overall environment, social, safety and health management;
- Institute measures to promote or implement COVID-19 and HIV/AIDS awareness programs at the site camp and also discourage gender discrimination and related vices;
- Institute strict codes of conduct which should include specific provisions against SEA, SH and GBV for the Contracting Entity and the Contractor's managers and direct and subcontract employees and adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document;
- Undertake regular environmental, social, health and safety inspections and provide reports to allow for the monitoring and evaluation of performance; and
- Bring to the attention of DFR, environmental incidents or breach of the conditions of the ESMP, immediately for severe incidents or within 24 hours of minor incidents.

Similarly, within the Contracting Entity's structures or team, specific roles and responsibilities need to be defined as shown in Table 10-2.

Table 10-2 Engineering, Procurement and Construction Management (EPCM) Contractor HSE Organisation

Role	Responsibility
EPCM Project Director	Oversee and coordinate Project activities; ultimately responsible for HSE compliance of the Contracting Entity.
EPCM Site Manager	See to it that the work by the Contracting Entity and other sub-contractors is done in compliance with applicable regulatory environmental requirements and the HSE plans. Responsible for coordination with the designated CRO for community relations issues, including upcoming works.
EPCM Contractor HSE Manager	See to it that the Contracting Entity operates in accordance with applicable regulatory environmental requirements and the HSE plans.
Community Relations Officer	Liaise with the Project communities, oversee programs associated with social and community development initiatives; and coordinate with the NGO engaged by the Client in implementing the Project's grievance procedure.

Although the Contracting Entity will have the primary role in delivering on the measures set out in the ESIA and management plans, DFR and the contracted Supervision Consultant will have the ultimate responsibility for making sure the measures are delivered.

10.1.3.3 RESPONSIBILITIES OF THE CONSULTING ENGINEER (SUPERVISION CONSULTANT)

The Consulting Engineer's team shall include at least one qualified and experienced E&S professional who has been involved in updating the ESIA and the development of the CESMP to oversee the implementation of the ESMP. The responsibilities of the Consulting Engineer will include, but not limited to:

- Enforcing the environmental and social specifications of the project;
- Monitoring compliance with the requirements of the specification and enforce implementation of management or mitigation measures;
- Enforcing that the Contracting Entity institutes a strict code of conduct at the workers' camps and adequately follows the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document;
- Documenting, in conjunction with the Contracting Entity, the state of the site prior to construction activities commencing. This documentation may be in the form of photographs, video recording or other appropriate formats; and
- Maintaining high standard of site supervision and operation to reduce risk of damage to environmental and social components.

10.1.3.4 RESPONSIBILITIES OF THE HSE MANAGER

The Contracting Entity will procure an HSE Manager as part of his team for the duration of the Project, and the HSE Manager would be responsible for the overall implementation of the ESMP in accordance with the requirements of the Contract. There should always be an approved HSE Manager on the site, and it is proposed that the HSE Manager is made part of the construction project management team. The HSE Manager will communicate site specific environmental and social issues to the Contracting Entity and personnel involved in the Project before construction commences. The ESMP will be kept on-site and made accessible to all personnel.

The HSE Manager is to understand the environmental and social responsibilities as stated in the ESMP and is to enforce that the project is undertaken in an environmentally and socially considerate manner, as prescribed by the ESMP. The HSE Manager will be fully versed in the contents of the ESMP and is to enforce that the activities of the contracting team remain in compliance with the code of conduct and site-specific protection measures identified by the ESMP. The HSE Manager will be responsible for all

monitoring and reporting activities such as noise, water and dust/air quality monitoring. He is to enforce that all monitoring records are available for review by the competent authority when needed. The HSE Manager will coordinate all specialists that are required on site, if and when required.

Specific roles/activities to be performed by the HSE Manager are outlined below:

- Enforce site protection measures on-site;
- Enforce that all the environmental authorizations and permits required in terms of the applicable legislation have been obtained;
- Monitor and verify compliance with the ESMP and contract and keep records of compliance/non-compliance, and make them available to the external auditor;
- Monitoring and verifying that environmental and social impacts are kept to a minimum;
- Reviewing and approving construction method statements with input from the Contracting Entity, where needed, in order that the environmental and social specifications contained within the ESMP are adhered to;
- Keeping accurate and detailed records of all activities on-site;
- Monitoring the undertaking by the Contracting Entity of environmental and social awareness training for all new personnel on-site;
- Assess the Contracting Entity's environmental and social performance from which a brief monthly statement of environmental and social performance is drawn up for record purposes;
- Enforce that third parties who carry out all or part of the Contracting Entity's obligations under the Contract are conversant with the requirements of the ESMP and the site protection measures;
- Enforce that the Contracting Entity complies with every applicable legislation;
- Maintain a register of complaints and queries by members of the public at the site office and the actions taken in response to these complaints;
- Recommend that the Contracting Entity suspend any or all works on-site if the third parties who carry out all or part of the Contracting Entity's obligations under the Contract fail to comply with the said specifications;
- Conduct environmental and social audits for compliance with the ESMP and Contract, and report on the findings to the Supervision Consultant; and
- Undertaking a continual internal review of the ESMP and submitting any changes to the Contracting Entity and Supervision Consultant, as well as the Client for review and approval.

10.1.3.5 RESPONSIBILITIES OF THE HSE OFFICER(S)

The HSE Officer(s) will have the following responsibilities;

- Monitor incidents of injury, illness, and other situations within a construction area;
- Write reports detailing daily, weekly and monthly health and safety activities and incidences;
- Work with the HSE Manager to design strategies to reduce incidents of illness, environmental accidents, and other issues that may affect Project workers and general public safety;
- Investigate environmental incidences and other public safety concerns within the particular area where construction will be ongoing;
- Assist the HSE Manager to design training programs to provide safety awareness education;
- Offer presentations about current safety hazards based on the Project to educate Project workers on avoiding health, safety, and environmental hazards; and
- Assess risks associated with tools and equipment, jobsites, and work environments.

10.1.3.6 RESPONSIBILITIES OF THE EXTERNAL AUDITOR

Auditing or monitoring activities involve the structured observation, measurement, and evaluation of environmental data over a period. As such, an external environmental and social auditor will be appointed on the Project. The External Auditor will implement an environmental and social audit program that will include the following, as a minimum:

- Comprehensive environmental and social audits to be undertaken every three (3) months during the construction phase, to verify compliance with the ESMP and Contract, and applicable environmental legislation. An audit report should contain recommendations on environmental and social management activities that need to be implemented. The external auditor should report concurrently to the Contracting Entity, DFR and/or the Supervision Consultant.
- A comprehensive environmental and social audit to be undertaken at the completion of the construction phase, to verify compliance with the ESMP and applicable environmental legislation. The audit report will contain recommendations on environmental and social management activities that need to be implemented within the operation and maintenance phases. The External Auditor will report concurrently to the Contracting Entity, DFR and/or the Supervision Consultant.

10.1.3.7 RESPONSIBILITIES OF THE COMMUNITY RELATIONS OFFICER

The CRO will be part of the Contracting Entity's team and would be responsible for liaising with the Project communities because it is important that the Contracting Entity maintains communication with local communities and other local stakeholders during construction. The CRO will also coordinate with the NGO engaged by the Client to oversee the Project's GRM (see Section 10.1.5) in documenting complaints, enquiries, recommendations or concerns that are received by any member of the public. The CRO will have procedures in place to notify I&APs of any potential impacts of construction activities on the surrounding area, e.g., notifying I&APs of activities which may generate excessive noise. The CRO will also coordinate and liaise with the Environmental and Social Safeguards Team or any social specialist sub-consultants that are required on site, and assist with implementing the social aspects of the ESIA and ESMP during the construction, rehabilitation and operational phases of the project.

10.1.3.8 RESPONSIBILITIES OF THE COMPENSATION DISBURSEMENT TEAM (CDT)

A Compensation Disbursement Team is proposed and representatives should be drawn from the DFR, Contracting Entity and Supervision Consultant with compensation monitoring done by MRH, MOF and LVD. This team will be responsible for organizing and confirming that compensations payable to PAPs are delivered in line with the provisions and procedures set out in the RAP and the Resettlement Policy Framework.

10.1.3.9 RAP MONITORING AND EVALUATION TEAM

The RAP Monitoring and Evaluation Team comprising representatives from EPA, LVD and DFR will be responsible for field monitoring and evaluation of the RAP implementation program to confirm that stated targets are met and PAPs are duly compensated in line with the RAP requirements. Inputs, outputs and outcomes of compensation, resettlement and other impact mitigation or management measures will be monitored. The team is to be led by the Social Safeguards Specialist of DFR.

The World Bank Social Safeguards team will have general oversight over the resettlement of PAPs. They will receive and review reports from the Environmental and Social Safeguards Team and conduct occasional missions to the Project to among other things determine compliance of the RAP implementation with applicable national laws and regulations and compliance with World Bank policies.

10.1.3.10 RESPONSIBILITIES OF EPA

The EPA will be the lead environmental regulator and decide on project screening, guide the conduct of the ESIA studies and grant environmental approval for the road projects to commence. The EPA will also monitor the implementation phase of the road projects to ensure compliance with approval conditions, mitigation measures and other environmental commitments and quality standards. The EPA will also provide technical review of project environmental monitoring reports.

10.1.3.11 RESPONSIBILITIES OF NRSA, DVLA AND MTTD

The NRSA, DVLA and MTTD will serve as the lead road safety stakeholders on the Project. Their role will involve collaborating in the provision of pedestrian safety, as well as bus and heavy goods vehicle safety interventions. Similarly, they will also provide training and dissemination of road safety information to road users, especially drivers, as well as providing technical inputs into road design or construction, especially as relates to installation of safety features. They will also collaborate with emergency services providers, such as the National Ambulance Service and the Ghana National Fire Service in responding to road accidents and providing emergency medical services to accident victims.

The MTTD especially will play significant roles in traffic control / management and enforcement of road traffic laws and regulations. They will also cause the arrest of road users who disobey road traffic rules or regulations. The DVLA will also perform its main mandate of vehicle inspections and certification in making sure only roads in good working condition use the roads, and together with the MTTD and NRSA, will keep records on motor accidents on the roads.

10.1.3.12 RESPONSIBILITIES OF MOT

The MOT as a government Ministry play a significant role in training or capacity building of monitoring teams in the performance of routine and periodic monitoring of the roads and related facilities, and reporting of findings. This will be necessary in ensuring that the Project activities are consistent with the applicable regulatory and legal frameworks, including the World Bank Safeguard Policies. Specifically, the MOT will be supporting the NRSA and the DVLA in the discharge of their duties through institutional strengthening and capacity building. Similarly, the MOT will also collaborate with other agencies (MRH, GHA and DFR) in employing Supervision Consultant(s) for the duration of the road project contract to monitor the performance of the Contracting Entity.

10.1.3.13 RESPONSIBILITIES OF DUR

The DUR will be providing support services such as provision of technical inputs into the overall project implementation, as well as administration, planning, control, development and maintenance of sections of the roads that can be considered as urban sections. The DUR's roles will also involve assisting the DFR in monitoring of the project as an important feedback mechanism, and reporting of findings.

10.1.4 STAKEHOLDER ENGAGEMENT

Stakeholder engagement should continue throughout the life of the Project. During construction, communication with local communities and other local stakeholders should be undertaken by the designated CRO who will be part of the Contracting Entity's team, and in close collaboration with the Environmental and Social Safeguards Team. Community consultation is an important aspect of any development project to ensure that the objectives of the project respond to the particular needs of the community. It is therefore imperative that all stakeholders, but especially the beneficiary communities, have a way of communicating their ideas and issues regarding the projects in their communities. Also, the Assemblymen and Assemblywomen could be engaged in handling some communications that would emanate from the project implementers through the municipal / district assembly.

The objectives of the Stakeholder Engagement Strategy are as follows:

- To promote understanding by facilitating an open, culturally appropriate and inclusive approach to engagement that provides timely and accurate information in an accessible and transparent way to stakeholders, regardless of their status.
- To manage expectations and concerns by providing a mechanism which not only provides stakeholders an opportunity to freely provide comment and feedback but also allows responding to this feedback and addressing concerns.

- To manage risks through building sustainable relationships. Engagement will allow for understanding stakeholder interests and issues and working with stakeholders to find mutually acceptable ways to achieve or address these.
- To create value where engagement allows for partnerships to be developed for the mutual benefit. This includes but is not restricted to corporate social investment activities. This relates also to seeking mutual benefit through design and operations by considering opinions of stakeholders and seeking their benefit in the various Project activities.

10.1.5 GRIEVANCE REDRESS MECHANISM

It is intended that the stakeholder engagement objectives / approach outlined above, and the mitigation and management measures outlined in the management plan, will work proactively towards identifying and addressing issues on the project before they become grievances. However, when grievances are reported, they need to be addressed in a consistent and verifiable manner. This will be done through the implementation of a grievance procedure or a GRM that will be operated by the DFR together with the Contracting Entity and will allow project beneficiaries to submit questions, complaints or suggestions via email, phone, text message, personal delivery/walk-in, regular mail or through a dedicated GRM hotline or website. Grievances will also be managed through a computer-based system that will enable documenting salient details of complaints (e.g., dates and time received and actions taken), sorting, verifying, acting on and tracking them.

The GRM focuses on the recording and processing of complaints and grievances and not of incidents, which should be dealt with through the ESMP. The definitions of both a grievance and an incident are presented below. Although their definitions may differ, there are clear links that need to be established between this grievance procedure and the incident reporting system. The definitions are as follows:

- **A grievance** is when a complaint linked to the project is raised with the expectation that the complaint will be addressed.
- **An incident** is any occurrence that has caused, or has the potential to cause, a negative impact on people, the environment or property (or a combination thereof). It also includes any significant departure from standard operating procedures.

In some cases, grievances may be linked to actual incidents, in which case the incident also needs to be reported.

There may also be internal grievances from the staff or employees of the Contracting Entity and it is expected that the process to be followed for addressing such grievances will be developed and approved by the Contracting Entity. Internal grievances may include but not limited to the following:

- Complaints pertaining to amount of wage, salary, other remuneration or benefits as per the contracting entity's human resource policy;
- Timely disbursement of remuneration;
- Gender discrimination;
- Issues related to workers organization;
- Labour accommodation;
- Health and safety issues; and
- Extended working hours.

The project shall appoint an NGO¹⁰ to oversee the Grievance Redress Service of the Project. The NGO will work with all project communities to achieve accountability and transparency in project delivery using an online GRM platform, as well as offline grievance redress mechanisms. It is important that a site-based Grievance Redress Officer (GRO) is designated to work closely with a local Grievance Redress Committee (GRC) which will be drawn from the leadership and representatives of project affected communities and

¹⁰ Project NGO refers to the NGO that would be engaged by the Client for the purpose of citizens' engagement and to oversee the GRM operations.

PAPs, drawing on the existing local systems (community leaders, local government officials, traditional justice system, etc.) to pre-empt and resolve grievances.

Each grievance received, shall be recorded in a grievance register using a web-platform. For this purpose, a simple computer-based system has been developed by MRH / DFR for more effective management of complaints. The web-platform will be managed by the NGO, and will guide the implementing agency (DFR), particularly the Environmental and Social Safeguards Team on the steps and arrangements for receiving, sorting, verifying, acting and tracking complaints.

A four-level grievance redress structure and composition (members/representatives) is proposed for the Project. The grievances that are brought directly to the project team should be addressed at the local level unless unresolved before it travels through the levels. At the first level (local level grievance resolution), each project community shall appoint a community focal person for receiving and recording of related grievances using a grievance form (see Appendix A of Annexure C). The grievance form should be signed and dated by the aggrieved person or embossed with his/her thumbprint. This process shall be facilitated by the project NGO, who shall establish site offices at each project district for receiving, recording and assigning project-related complaints. The focal person must be a respectable member of the community, and with the ability to document and communicate community concerns accurately. The focal person will be the first point of contact for day-to-day grievance issues.

For each District affected by the road project/sub-project, there shall be constituted a District-level GRC responsible for receiving, evaluating and addressing significant complaints (district level grievance resolution). Following the recommendations of the CEA, the GRC shall comprise stakeholder representatives of project affected communities, the highest traditional authority in the district, the district administration, religious or faith-based organizations, NGOs, the project implementing agency and Contracting Entity. The GRC shall mediate all grievances that remain unresolved after site-based or local community level interventions.

All project related grievances that remain unresolved at the District level shall be referred to a third-level and the membership of this third-level grievance redress shall comprise the MRH Agency Implementation Team (AIT) and the Project Steering Committee, including nominated representatives of the Environmental and Social Monitoring Unit (ESMU) of GHA and the Social Safeguards Specialist of DFR who will together receive, record, review, and address project-related concerns in coordination with the AIT or Steering Committee. The Project Steering Committee, established under the TSIP, is responsible for reviewing and approving the project's annual work plans and budgets, providing policy and program guidance, and ensuring communication and cooperation among stakeholders. The Project Steering Committee will be co-chaired by the Directors of Planning of the MRH and MOT and will include officials from the MRH, MOT, MOF, MOFA, GHA, DUR, DFR, DVLA and NRSA.

Finally, if no agreement is reached at this third level, then the grievance is taken to the national legal level, which involves the Commission for Human Rights and Administrative Justice (CHRAJ) or the courts, whose verdict will be binding on the parties.

All project beneficiaries, PAPs and local stakeholders can submit project related grievances, complaints or suggestions formally and at any time. Grievances and complaints related to the project can be formally submitted by either dropping a letter in a grievance box at a vantage location or contacting the community focal persons and/or site GRO directly through face-to-face interaction or through a free hotline, SMS, email (contact information of officers to be provided to project communities; and inscribed on project signboards). However, in the absence of the community focal person or GRO, grievances or concerns can be raised with the assemblyman of the project area or any member of the District Grievance Committee. Complaints and suggestions may also be directly reported to the NGO site office and online using the project grievance web-platform (website to be publicised by NGO). PAPs and local stakeholders will be made aware of this platform and its usage through periodic campaigns and stakeholder engagement sessions to be undertaken by the NGO.

Once the grievance is received, a case number shall be allocated and communicated to the grievant by the desk GRO, technically on the same day as the grievance is received. This communication shall also

serve as an acknowledgement of the grievance. As part of this acknowledgement a tentative timeline for the redressal of the grievances shall be identified.

Both formal and informal grievance resolution mechanisms would be employed on the Project. Further details on the project GRM is provided in the RAP submitted under a separate cover. Reference should also be made to the ESA for TSIP Guideline Document (MRH, 2017) and the TSIP Grievance and Complaints Management Framework developed by the GHA for additional guidance on grievance redress and grievance handling procedures.

10.2 KEY COMPONENTS FOR THE IMPLEMENTATION OF THE ESMP

Mitigation, monitoring and management measures are contained throughout this ESIA. In addition to these commitments, other key components of the ESMP include training, audits and inspections and reporting.

10.2.1 TRAINING / OCCUPATIONAL HEALTH AND SAFETY (OHS) AWARENESS

The key components of training requirements are to enable that site personnel, including the Contracting Entity understand the following:

- Environmental, social, health and safety (ESHS) requirements of the Project and how these will be implemented and monitored on site;
- Contents and relevant requirements of Project actions contained within the applicable management plans;
- Environmental, social, health and safety (ESHS) sensitivities of the Project area;
- Procedures to be followed in the event of non-compliance with the environmental, social, health and safety requirements; and
- Procedures for responding to the media, unauthorised visitors to the site, and enquiries from the public.

They should also:

- Know how to deal with unforeseen environmental, social, health and safety (ESHS) incidents; and
- Be aware of their roles with respect to ESHS issues.

The Environmental and Social Safeguards Team shall therefore confirm that everyone who is part of the team expected to carry out the implementation of the ESMP is equipped with the requisite education, training or experience. Likewise, the Contracting Entity must carry out general HSE awareness raising for his workers and specialized training for those whose behaviour may have significant consequences for the project communities. This will make the workforce conversant with the important aspects of the ESMP and capable of fulfilling their roles and functions.

10.2.1.1 PROJECT TRAINING PROGRAM

One of the most important mechanisms for the enhancement of the Project's environmental and social performance will be the continued implementation of a training program for Project personnel.

Training will include:

- Induction training for MRH's field staff, including modules on: health and safety, environmental awareness, accommodation rules, worker code of conduct, stakeholder engagement, grievance mechanisms and cultural heritage awareness;
- Toolbox training for specific tasks;
- Training for individuals involved in tasks with specific responsibilities; and

- Refresher training programs to facilitate continual improvement in environmental awareness for Project personnel.

Training should be provided at pre-construction phase, as well as construction and possibly operation phases, as needed. Training records should be maintained and an assessment of the effectiveness of the training programs included as part of the internal audit procedures. Some specific training requirements include;

- General Health and Safety (Safe handling of tools and equipment, etc.)
- General Waste Management
- Noise Awareness
- COVID-19, HIV/AIDS and other Sexually Transmitted Infections (STI) prevention and management
- Gender in the Construction Place
- GBV, SEA and SH prevention and management
- Basic Site Security Management
- Basic Site Monitoring and Emergency Response / Management

To help build the institutional capacities of the different agencies or bodies that will be involved in the implementation of the ESMP, two broad areas of capacity enhancement have been recommended as part of the training program to be offered to at least twelve safeguards officers from the Employer, MC and CE. Another twenty officers from the MMDAs, NGO and community Focal persons will also receive some training to aid in the monitoring of safeguards activities. The proposed training program, course content and targeted audience are presented in Table 10-3 below.

Table 10-3 Proposed Training Program for the Implementation of the ESMP

Capacity Building Activity	Proposed Topics	Objectives	Target Audience	Duration	Proposed Budget (USD)
Module 1: Training on ESMP implementation	<ul style="list-style-type: none"> • Outline of Environmental and Social Impact Assessment • Summary of potential impacts of the project • ESMP • Environmental and Social Performance Monitoring – Monitoring Mitigation Measures • Environmental and Social Reporting 	To increase competence in Environmental and Social Safeguards sustainability and best practice.	32No. Made up of Environmental and Social Safeguards Team of MRH (GHA & DFR), MMDAs, Contracting Entity's Team, Consulting Engineer, Community Focal Persons, NGOs and CSOs	1 day	10,000.00
Module 2: Training on Construction HSE	<ul style="list-style-type: none"> • Introduction to Construction HSE • Summary of Health and 	To guarantee conclusion of project with zero loss of life, zero Lost Time Injuries (LTI) or occupational illness by	30No. Made up of Environmental and Social Safeguards Team of MRH (GHA & DFR),	1 day	10,000.00

Capacity Building Activity	Proposed Topics	Objectives	Target Audience	Duration	Proposed Budget (USD)
	Safety Hazards in Construction <ul style="list-style-type: none"> Incidents Causation, Investigation and Reporting Excavation Safety Site Specific OHS Construction Site Inspection Personal Protective Equipment 	means of promoting safe and healthy working conditions as well as the health of workers, community members and those that will be engaged in monitoring.	MMDAs, Contracting Entity's Team, Consulting Engineer, Community Focal Persons, NGOs and CSOs		
Total					20,000.00

10.2.1.2 CONTRACTING ENTITY TRAINING PROGRAM

The Contracting Entity will also be responsible for making sure their personnel are aware of their ESHS responsibilities. They will develop and implement training programs that satisfies the requirements of the ESA for TSIP framework document and the ESMP.

Training should include:

- Induction training for staff prior to carrying out work on site. This will include modules on: health and safety, environmental awareness, accommodation rules, worker code of conduct, stakeholder engagement, grievance mechanisms and cultural awareness;
- Toolbox training for specific tasks;
- Training for individuals involved in tasks with specific responsibilities; and
- Training programs organised by the Project Sponsor or Client as needed.

A provisional training program is presented in Table 10-4.

Table 10-4 Training Program for Contracting Entity

Training Program	Courses
General Awareness, Health, Safety and Environment	HSE Induction/Orientation Course (site safety rules, PPE requirements, Emergency Preparedness and Response); Daily tool box talk for workers at the start of each day's job; Refresher HSE Courses as at when required
Project Specific OHS	Manual Handling Techniques; First Aid Training (for Site First Aiders); Safe Driving Techniques (for drivers)
Code of Conduct	Sensitization and awareness raising on HIV/AIDs, STIs harassment, sexual behaviour, Gender Based Violence, etc.

The Contracting Entity will be required to submit in-house HSE training and procedures to the Environmental and Social Safeguards Team for approval before commencement of civil works. The Contracting Entity should keep auditable records of training given. Assessment of the effectiveness of the training program will be included as part of the ESMP audit procedures.

10.2.1.3 INCIDENTS IDENTIFICATION AND REPORTING

The Contracting Entity is expected to report and document incidents that occur on site or on the Project. The reporting and investigation of potential and actual incidents that could have a detrimental impact on human health, the natural environment or property is needed so that remedial and preventive steps can be taken.

Environmental incidents can be classified into three categories, with each category having specific reporting and follow-up requirements, as defined in Table 10-5 below.

Table 10-5 Environmental Incident Categories

Classification	Category 1	Category 2	Category 3
Identification	An incident resulting in a breach of specifications, environmental regulations and/or standards; an incident that is reportable to the government by law or other statute or has caused significant environmental harm or injury to people, animals, or property. This category of incident also includes incidents whose impacts have extended onto publicly accessible land and which have the potential to adversely impact on surrounding communities, livestock or wildlife.	An incident with potential to breach specifications or environmental regulations or standards, but which is not reportable to the government (though voluntary disclosure may be undertaken at the discretion of site management). Has the potential to cause significant environmental harm or injury to people or animals and/or has impacted on publicly accessible land in some measure. This includes incidents that have interfered with the public domain outside the Project area of influence, but which are not reportable by law to government.	An incident with little potential to breach specifications or environmental regulations or standards and which is not reportable to the government and/or the management committee.
Reporting	Immediately reportable to the Project Director and/or Project Sponsors.	Reportable to management in charge of site operations.	Reportable to the environmental site officer.
Follow up	Formal investigation required.	Formal investigation required.	Informal investigation actions required.

The actions resulting from formal or informal investigations will be used to update the applicable management plans. The Audit program should be revised to review areas or aspects where incidents occur more regularly so that the potential for such incidents recurring can be reduced.

10.2.1.4 RISK MITIGATION AND EMERGENCY PREPAREDNESS AND RESPONSE

There is need for the application of rigorous standards in the road design and operation and undertaking of a comprehensive risk assessment to applicable industry and international standards. Environmental events that will constitute risks to the Project will be mainly floods as a result of changes in climatic events over the implementation period.

If floods occur, their adverse consequences should be mitigated through institutionalizing a standard Emergency Preparedness and Response Plan (EPRP) and/or a Disaster Management Plan (DMP). The

Contracting Entity should compile and maintain environmental emergency procedures so that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts. The EPRP should be presented to DFR for approval.

HSE Managers and designated Emergency Response Team Members would be involved in the implementation of the EPRP. Contracting Entities performing work for DFR should be appropriately trained and have ready access to equipment and supplies that would allow them to contain and control an accidental release until the arrival of an Emergency Response Team.

10.2.1.5 IDENTIFIED SOCIAL RISKS ASSOCIATED WITH THE PROJECT

The study reveals that there are some likely social risks which may affect the Upper West Package 1 Roads Project. Some of the possible project social risks identified include security problems; project delays or abandonment; reputational damage; lack of user acceptance; and major modifications due to stakeholder pressure. These threats and suggested mitigation measures are delineated in the Table 10-6 below.

Especially with security risks, security is currently an issue in the Wa West district. This is attributed often to the presence of Fulani herdsmen and their families, who are largely perceived to be armed and are suspected of some crimes in the area. Police presence and visibility is not strong on a sustainable basis in the areas traversed by the feeder roads. The consultant's team encountered very few police road check points in the Wa West District, half of which were unmanned at the time of sighting. Road robberies have been reported as rampant in the area, as such, the Field Assistants on the consultant's team (recruited from the project area) always insisted that the team leaves the remote areas well within daylight hours for security reasons. This was corroborated by residents both in Nadowli-Kaleo and Wa West Districts who often cautioned the team to set out for Wa during daylight hours.

It is important that institutions responsible for security in the project districts, especially the Police, need to be made aware of the road projects in good time and be engaged in all security details. This would enable the project activities to be included in their operational purview, and proactive measure taken. The police must be engaged in all security arrangements for the project. The local communities should also be engaged and made active stakeholders in security related issues. The recruiting of some residents both on voluntary or paid basis could be considered. Contract workers also need to be well informed and be security conscious.

Table 10-6 Potential Project Social Risks and Suggested Measures

#	Social Risk	Measure to Control / Manage Risk
1	Currently, security is sometimes an issue on the feeder roads and access roads. The feeder roads are difficult to patrol by the Police in their current poor state and robbers do take advantage because vehicles are not able to move at a safe speed on the bad roads. Women traders on their way to the market have been sometimes robbed and project personnel may also be exposed to this risk.	This situation calls for close collaboration between the Ghana Police, project contractor and the traditional leaders as well as members of the beneficiary communities to minimize such incidents. There should be consistent police check points on the roads with enough police men. They should be provided with ammunitions to be able to combat crime in the area.
2	Complaints from community members that contractors on previous projects refuse to pay for work done by indigenes because the indigenes are the ultimate beneficiaries.	Employment agreement with local people must be mediated by the chiefs in the area. Employment contracts must be in writing, with the terms clearly stated and signed by the chiefs who will ensure that the employees are paid regularly.

#	Social Risk	Measure to Control / Manage Risk
3	The high rate of unemployment in the project area may contribute to teenage pregnancy and immoral sexual acts among younger female adults as they may easily succumb to construction workers when enticed with money. Again, wives of unemployed husbands may also be easily lured by workers with money.	The contract should include adequate provision to address code of conduct. There should be sensitization and awareness on HIV/AIDs, harassment, sexual immorality, Gender based violence, etc.
4	The advent of the project may worsen the problem of early marriage as some parents may force their young daughters into early marriage to put them out of the reach of contractors and their workforce, out of desperation.	The contract should include adequate provision to address code of conduct, especially the prohibition of sexual liaisons with underage girls.
5	Project Delays or Abandonment: The project runs the risk of being delayed by a number of reasons, including poor handling of project-community relations, construction season (e.g. rainy season), and a change in government. The citizens or indigenes have become more demanding and aware of the power of mass action, especially the youth with social media acting as a ready facilitator.	Effective stakeholder consultations and adherence to project implementation timetable
6	Reputational Damage for Institutions Involved in the Project: The Donor, the central government of Ghana and the other proponents of the project run the risk of suffering reputational damage if any of the possible negative impacts of the projects remain unmitigated. For example, if records on affected assets are not captured to the point where the PAP feels he/she has been treated fairly, compensations are not paid promptly, water pollution is not kept to the barest minimum possible or dialogue between the project and the communities are not conducted in a transparent manner, it will all be a reflection on the reputation of all the institutions involved.	Effective stakeholder interactions and strict compliance with the WB social safeguards
7	Weak User Acceptance: It is possible for users to refuse to accept some of the project components, especially if they feel that their input was not considered in the project. For instance, some residents in the project area feel the length of market access roads being considered is not acceptable. An example is the 0.2 km each of market access roads for Wechiau, Wa Market and others. When compared with the long lengths of untarred roads leading to these markets, the residents feel such a decision would not have been made if they had been consulted earlier.	Wide ranging stakeholder consultations
8	Major Modifications Due to Stakeholder Pressure: the beneficiary communities are mostly expecting tarred roads although feeder roads in Ghana are usually gravel roads and they might insist on tarred roads. The potential for this risk to occur is minimal but it is still worth mentioning.	Although this has been explained at the consultations, it needs to be repeated during subsequent interactions to manage the expectations of the beneficiaries to avoid insistence on tarred roads when that is not what is in the project budget.
9	Risk of contracting or spreading COVID-19: the influx of labour and the generally congested work environment that characterize construction projects may increase the spread of communicable diseases, including the current	All construction staff should be encouraged to observe and stay updated on COVID-19 prevention / management protocols laid out by the WHO and Ghana Health Service / Ministry of Health.

#	Social Risk	Measure to Control / Manage Risk
	COVID-19, among construction workers and community members.	<p>The Contracting Entity must also adhere to the World Bank's Interim Guidance on COVID-19 for Construction / Civil Works Projects.</p> <p>A project-specific COVID-19 avoidance and management protocol should also be developed to prevent the spread of the virus, isolate and treat any unfortunate potential contractions.</p> <p>See Section 9.2.6 and 9.2.11 for further mitigation / management measures.</p>

10.2.2 ENVIRONMENTAL AND SOCIAL MONITORING

Once an environmental permit is secured for the project, contract is awarded and the project implementation commences, the Project Environmental and Social Safeguards Team and the Supervision Consultants (as appropriate) will commence monitoring as an important feedback mechanism. A sample performance monitoring checklist is included (See Appendix 2 under Annexure A). Monitoring should be done in close collaboration with the Contracting Entity. It is necessary to continue to monitor environmental and social parameters during the Project implementation in order to;

- Confirm baseline conditions established during the ESIA;
- Assess the effectiveness of specific mitigation measures implemented and where adequate, identify additional remedial actions (including corrective measures or re-design mitigation measures);
- Confirm the Contracting Entity's adherence to the environmental and social clauses and principles governing the project implementation; and
- Build a database of background environmental data, for subsequent road construction activities within the Project area or Region.

Monitoring is a long-term process that should begin at the start of construction and continue even after the road construction. During monitoring, trends or changes in environmental or social degradation or improvements will be established, and previously unforeseen impacts identified or pre-empted.

Environmental and social monitoring is an important component of the Project implementation because it allows for measures to be implemented in time in order to prevent or avert negative impacts. It also assumes even more significance given the adoption of OPBRC arrangements which depend on outcomes as against input tracking monitoring.

The monitoring results should be analysed and the monitored information and recommended actions compiled for the attention and action of the appropriate road sector agencies (e.g., DFR / GHA). The monitoring report should then be formalized with the agency's agreed action and timeframes and submitted as the agency's Annual Environmental Report to the EPA, MRH, and the World Bank. The Annual Environmental Report will form the basis of the EPA carrying out its own compliance monitoring to satisfy itself that the permit conditions and relevant standards and mitigation measures are being fulfilled by the project developer (MRH / DFR). Where necessary, other stakeholder institutions such as the WRC and FC may perform their own monitoring activities and deal with the Contracting Entity through the project developer.

The general institutional arrangement for the ESMP implementation is presented in Figure 10-1.

Some key components of the project that would need to be monitored are briefly described in the subsections below. Further details on monitoring (including the parameters to be monitored, key performance indicators, schedule or timelines, costing, etc.) are presented in the Provisional ESMP attached as Annexure C.



Emissions to air will occur because of the construction, rehabilitation and use of the roads. The main emission from site development activities will be dust occurring as particulate matter (PM). Dust generated from vehicle movement, wind-blown dust from denuded areas and soil or construction material stockpiles are anticipated to be a large source of dust (PM) emission. Construction equipment and vehicles used to construct the road will produce emissions to the atmosphere from the combustion of fuels such as diesel and gasoline. These gases include CO₂, NO₂ and SO₂.

The ESMP should be implemented to confirm that construction works are conducted to achieve reduction of dust emissions, among others.

The road construction works will be associated with noise pollution. Increased noise levels are expected from clearing equipment and construction machinery. The primary noise source associated with site preparation and construction works will be noise from operation of construction machinery such as dozers, excavators, compactors, haulage trucks, graders, etc., as well as noise from construction activities and workers.

Increased movement of vehicles within the Project area is also envisaged during the operational phase. There will be potential noise impacts from increased traffic and vehicle speeding, as well as increased commercial and residential activities as a result of the road improvements.

The ESMP should be implemented to manage noise emissions. It is expected that the Project (Contracting Entity) will apply best practice innovative noise mitigation measures including increasing the offset distance between noisy machinery and residential receptors, and avoiding the operation of noisy machinery close to sensitive receptors. Also, the use of equipment or machinery that are in good working order and that meets noise emission limits should be encouraged.

10.2.2.3 WASTEWATER DISCHARGES

The road construction / rehabilitation phase will generate wastewater streams that will need treatment or appropriate disposal. Potential effluent sources include the following:

- Stormwater runoff
- Accidental chemicals and oil spills
- Domestic wastes from construction camps

During road operation, little or no effluent streams are anticipated. There will therefore be a limited need for sewage treatment and/or disposal during the operation phase. The ESMP should be implemented to manage wastewater discharges.

10.2.2.4 SOLID AND HAZARDOUS WASTE

Solid waste generated from construction will consist primarily of construction debris and domestic waste. These wastes should be collected onsite at central collection points and disposed offsite at approved disposal sites.

Hazardous wastes which will include spent oil, solvents, filters, containers, oily rags, used paint cans, or any other materials contaminated with oil, solvents, paint, etc. should be stored in dedicated containers. These containers should be in a bunded concrete structure with sufficient capacity to hold the volume of waste generated. The hazardous wastes should periodically be collected and transported by authorized transporters to a licensed Government or private facility (e.g., landfill site) for appropriate disposal.

10.2.2.5 RAP IMPLEMENTATION

Details on proposed RAP implementation activities and responsible agencies are presented in the RAP report. Internal monitoring of the resettlement activities will be undertaken by the RAP Monitoring and Evaluation Team, led by the Social Safeguards Specialist of the implementing agency (MRH/DFR). The monitoring will look at inputs, outputs and outcomes of compensation, resettlement and other impact mitigation or management measures. Input monitoring will establish if staff, organization, finance, equipment, supplies and other inputs are on schedule, and in the requisite quantity and quality. Output monitoring will establish if agreed outputs are realized on time for:

- Communication with the affected communities;
- Agreed resettlement and compensation policy, procedures, and rates;
- Compensation for land, crops, structures and businesses;
- Livelihood program delivery and uptake;
- Grievance resolution; and
- Attention to vulnerable people.

Outcome (or effectiveness) monitoring will determine the degree to which the program objectives and performance targets have been achieved. Recommended internal monitoring milestones are presented in Table 10-7 below.

Table 10-7 RAP Internal Performance Monitoring Milestones

Indicator Type	Milestone
Input	Payment of Compensation
	Site visits to encourage PAPs to move
Output	Cooperation from PAPs (willingness to relocate)
	Relocation of temporary structures
Outcome	PAPs relocated
	Grievance redress procedures established and working
	Monitoring results produced

External monitoring will involve dedicated representatives from the EPA and selected NGOs in the area, as well as the supervision consultant contracted by DFR. Where necessary, representatives from the traditional authorities can be included. The World Bank Social Safeguards Team are expected to also perform occasional or scheduled visits to the Project to conduct oversight responsibilities, including verifying the results or outcome of the internal monitoring.

An evaluation (audit) should be undertaken after RAP inputs to verify that physical inputs committed in the RAP have been delivered and required services provided, as well as confirm that the mitigation measures prescribed have achieved the desired effect. The completion audit should bring to closure DFR's implementation of resettlement.

To provide guidance for lessons learned, an implementation completion report should be submitted upon the full resettlement of PAPs to capture the objectives, processes and implementation challenges of the resettlement / compensation procedure, outstanding issues (if any), as well as the key lessons learned from the process.

10.2.3 AUDIT AND INSPECTION

In addition to the environmental and social monitoring program, an audit program detailing the aspects to be audited, the area, and the frequency of audits need to be established. An external environmental and social auditor should be appointed by the Contracting Entity, at their cost, to confirm compliance with the ESMP subject to approval by the Client. The audits will be based on appropriate protocols prepared by the environmental and social functions.

Regular environmental and social audits and random spot checks should be undertaken by selected audit team members every three (3) months throughout the Project. The audit and inspection frequencies may be increased or reduced according to the findings and degree of confidence in the audit program. Audits will also assess compliance with agreed objectives and targets as well as the effectiveness of the management plans or measures and their implementation.

Audit findings should be reviewed and corrective actions implemented where necessary.

10.2.4 REPORTING

Besides the environmental and social monitoring reporting as presented in Section 10.2.2, the Project also needs to develop a system of internal reporting that allows for appropriate reporting on the effectiveness of the ESMP. During the construction phase, the Contracting Entity needs to identify and document incidents of environmental, social, health and safety non-conformance. These records should be produced weekly, identifying the category of non-conformance, potential severity of incidences and near misses and frequency. The resultant records should be addressed in appropriate Project management meetings to initiate corrective actions and shared with relevant stakeholders, especially the Client (MRH / DFR).

Incident Notification and Reporting:

The Contracting Entity should notify the Project Coordinator or Sponsor (MRH / DFR) immediately following an environmental or social incident. The environmental and social incidents should be appropriately documented, the relevant parties notified, and reporting requirements around the incident met. These records are intended to facilitate the purposeful reduction of incidents of non-conformance, leading to a consequential reduction of the root causes of such incidents.

10.2.5 ENVIRONMENTAL AND SOCIAL MANAGEMENT BUDGET

It is important for effective Project cost planning purposes that a detailed cost analysis be conducted for the implementation of monitoring or environmental and social management programs. The environmental and social management budget provided in Table 10-8 below is provisional and does not include costs that will be associated with resettlement of PAPs or compensation for landed assets, temporary structures, crops and farm lands, economic trees (community assets), etc., as well as costs associated with the RAP implementation activities. The Project will be requiring an amount of Two Hundred and Thirty-Three Thousand US Dollars (USD 233,000.00) for environmental and social management. The above costs will be funded from the project funds.

Table 10-8 Provisional Environmental and Social Management Budget

Activity	Management Program	Comments	Cost/Year (USD)
Project Training Program	Training and capacity building for personnel (From Table 10-3)	Training provided at both pre-construction and construction phase.	20,000
Auditing and Monitoring	Environmental and social monitoring and key performance indicators	Conducted throughout the Project lifespan.	110,000*
	Annual environmental and social audit	Reflects the overall performance of the Project.	20,000
Reporting and Documentation	Environmental Management Plan Preparation / Updates	A requirement of LI 1652 and should be submitted to the EPA 18 months after project completion and every 3 years thereafter.	30,000
	Annual Environmental Report	Annual submission in line with LI 1652 requirements.	25,000
Procurement of environmental monitoring equipment**	Noise emissions	2 no. digital sound level meter	1,200
	Soil compaction and vibrations	2 no. potable vibration meter kits	3,000
	Potential air pollution	2 no. outdoor air quality test kit (complete suite)	9,000
	Water quality	2 no. multiparameter water quality test kit	10,000
	General purpose equipment	2 no. handheld GPS	800
		2 no. digital camera	3,000
		PPEs	1,000
TOTAL			233,000

* Cost details or breakdown is presented in the Provisional ESMP attached as Annexure C.

** This cost would not recur yearly, unless monitoring equipment become faulty, damaged or needs to be re-purchased.

10.2.6 MANAGING CHANGES

Changes in the Project may occur due to unanticipated developments. The Project need to implement a formal procedure to manage changes that will apply to Project activities. The process for dealing with Project changes and uncertainty recognises three levels of change or uncertainty:

- **Level One: Minor Significance**, where the change or uncertainty is largely deemed to be immaterial to the ESIA findings and does not affect the Project's ability to meet environmental and social performance requirements outlined in the ESMP. This change may need additional but limited environmental or social study or survey activities.
- **Level Two: Moderate Significance**, where the change or uncertainty is deemed to be material to the ESIA findings but is within the boundaries of the defined Project base-case covered by the ESIA. This may need minor changes to the ESMP and additional surveys or environmental and social assessments.
- **Level Three: Higher Significance**, where a future significant change or uncertainty leads to a departure from the base-case, or a key aspect of it. An addendum to the ESIA, or a new ESIA and formal submission and approval process, is then needed.

The above-mentioned process will make the Project able to adapt to changes whilst meeting the relevant environmental and social performance requirements.

10.2.7 COMMUNICATION TO STAKEHOLDERS

As noted during the various phases of stakeholder consultation programs, the Project is committed to engaging with and reporting to stakeholders. Audit reports may need to be shared with stakeholders in a transparent manner, as they become available.

10.2.8 MANAGEMENT REVIEW

The DFR would be responsible for confirming that the companies contracted on the Project receive copies of the ESMP, ESIA, RAP and other relevant documents, and are assisted in understanding their responsibility to operate within the framework of measures defined in the ESMP. When adjudicating tenders, DFR will need to confirm that the Contracting Entity has made appropriate allowance for management of environmental and social issues and have the adequate training on implementing the action plans in the ESMP before being approved to commence work.

Where appropriate, independent environmental experts could be appointed to audit the implementation of, and compliance with the ESMP. This environmental management performance review should, as much as practicable, be undertaken quarterly throughout the Project execution stages. This helps to continually ascertain the efficiency of the system and to improve environmental performance going forward.

11.0 CONCLUSION

11.1 GENERAL

The ESIA for the Upper West Package 1 Roads Project was undertaken in accordance with LI 1652 and other relevant national and international legislation, including the World Bank OPs. Additionally, the ESIA was conducted in line with a wide range of industry best practice requirements. This was to enable the Project gain approval by Ghana's EPA, as well as being undertaken in a highly sustainable and environmentally friendly manner.

The ESIA process adopted a systematic approach and comprised of a number of key steps, including stakeholder consultation; environmental and socio-economic baseline data collection; impact assessment and identification of mitigation measures; as well as development of an ESMP and associated documents.

Key issues raised by stakeholders will provide further inputs into the overall Project design process and help to further align the needs of the Project with the environmental and social sensitivities of the Project area.

Baseline information on receptors and resources was collected from available data sources and specialist field surveys. Existing environmental and socio-economic conditions were described as basis against which the potential impacts of the Project were assessed. Environmental, socio-economic and health and safety impacts of the Project were adequately assessed and mitigation measures identified to avoid or reduce adverse impacts and enhancement measures proposed for positive impacts.

Mitigation and management measures proposed were also appraised to be effective in confirming that negative impacts are brought to negligible or ALARP residual impact levels as shown in Table 11-1 and Table 11-2 below.

The positive impacts associated with the project include creation of job opportunities or income generation opportunities, improvement in road condition, travel and accessibility, increased agricultural productivity and improvement in livelihoods, improved drainage and scenic beauty. Others are exposure of workforce to sufficient health and safety standards and induced developments and improved community life and services.

Impacts such as dust and air quality degradation; ground vibrations and noise emissions; waste generation and disposal; material sourcing and storage; soil compaction and change in soil structure; topsoil removal and erosion; soil contamination; displacement of materials and destabilization of slopes; water quality degradation; siltation of waterbodies and modification of water flows were identified as negative Project impacts. Other negative impacts were loss of vegetation and terrestrial and aquatic habitats; loss of fauna; traffic disruptions and diversions; accidents / health and safety impacts; loss of land, crops, properties, roadside communities, and social activities; and potential physical displacements along road corridor and associated resettlement.

All the negative pre-construction impacts identified were found to be of low significance rating prior to mitigation. For the construction phase, majority of the negative impacts identified were of moderate significance prior to mitigation. Only dust / air quality, potential labour influx and the potential spread of diseases were the impacts assessed to be of high negative significance during construction. Majority of the impacts will cease with the construction phase and will not be present post-construction, as such, post-construction impacts were either positive impacts or of low negative significance.

The negative impacts need careful implementation of effective mitigation measures and a program of monitoring. It is expected that the measures and monitoring requirements outlined for each impact in the ESIA are adequate in reducing negative impacts of high significance to low or negligible significance and enhancing the positive impacts as well.

The impact mitigation and enhancement measures identified will be further integrated into the Project design and serve the basis for the development of project management plans and procedures. Notable among these plans is the ESMP. The ESMP is an adaptive management plan designed so that mitigation measures proposed in the ESIA are effectively implemented during the Project life and continually refined as needed based on actual field conditions and unanticipated circumstances.

11.2 ENVIRONMENTAL IMPACTS

Table 11-1 Mitigation and Enhancement Effectiveness for Environmental Impacts

Impacts	Phase	Pre-mitigation rating	Post-mitigation rating
Landscape modification through material sourcing / test pitting and materials displacement	Pre-construction	Low negative	Negligible
	Construction	Low negative	Negligible
Waste pollution / improper disposal of waste and congestion	Pre-construction	Low negative	Negligible
	Construction	Moderate negative	Low negative
Dust and air quality degradation	Construction	High negative	Moderate negative
	Post-construction	Low negative	Low negative
Greenhouse gas emissions and contributions to local climate change and ailments	Construction	Moderate negative	Low negative
	Post-construction	Low negative	Negligible
Disturbance by ground vibrations and noise pollution	Construction	Moderate negative	Low negative
	Post-construction	Low negative	Negligible
Increased erosion due to vegetation clearance and topsoil removal	Construction	Low negative	Negligible
Soil compaction due to heavy construction equipment use	Construction	Moderate negative	Low negative
Soil contamination	Pre-construction	Low negative	Negligible
	Construction	Low negative	Negligible
	Post-construction	Low negative	Negligible
Material sourcing / borrow pits development and material storage	Construction	Moderate negative	Low negative
Siltation of waterbodies and modification of water flows due to poor construction activities	Construction	Low negative	Negligible
Water quality degradation	Construction	Moderate negative	Low negative
	Post-construction	Low negative	Negligible
Drainage and flooding events / road deterioration	Construction	Low negative	Negligible
	Post-construction	Low positive	Moderate Positive
Loss of terrestrial habitats	Construction	Moderate	Low

Impacts	Phase	Pre-mitigation rating	Post-mitigation rating
		negative	negative
Loss of aquatic life and habitats	Construction	Moderate negative	Low negative
Loss of fauna	Construction	Low negative	Negligible
	Post-construction	Low negative	Negligible
Loss of vegetation (flora)	Construction	Moderate negative	Low negative
Loss of supply of ecosystem goods and services	Construction	Low negative	Negligible
Introduction of invasive species to the Project area	Construction	Low negative	Negligible

11.3 SOCIO-ECONOMIC IMPACTS

Table 11-2 Mitigation and Enhancement Effectiveness for Socio-economic Impacts

Impacts	Phase	Pre-mitigation rating	Post-mitigation rating
Creation of job opportunities / Income generation opportunities from direct / indirect employment on the Project	Pre-construction	Low positive	Moderate positive
	Construction	Moderate positive	High positive
	Post-construction	High positive	High positive
Accidents / occupational health and safety risks	Pre-construction	Low negative	Negligible
	Construction	Moderate negative	Low negative
	Post-construction	Low negative	Negligible
Traffic disruptions / interruptions and diversions	Pre-construction	Low negative	Negligible
	Construction	Moderate negative	Low negative
Visual / scenic quality impacts	Pre-construction	Low negative	Negligible
	Construction	Low negative	Negligible
	Post-construction	Moderate positive	Moderate positive
Risk of conflict due to land expropriation for project	Pre-construction	Low negative	Negligible
Economic displacement and disruption of livelihood activities	Construction	Moderate negative	Low negative
Loss / disruption of utilities, roadside communities and social activity	Construction	Low negative	Negligible
Potential physical displacement along road corridor and resettlement	Construction	Low	Negligible

Impacts	Phase	Pre-mitigation rating	Post-mitigation rating
		negative	
Potential labour influx and associated impacts	Construction	High negative	Moderate negative
Potential destruction of physical cultural resources within the corridor of influence	Construction	Moderate negative	Low negative
Potential increase in anti-social behaviours, crime and conflicts	Construction	Moderate negative	Negligible
Gender-based violence and impact on vulnerable groups	Construction	Moderate negative	Negligible
Increase in disease spread	Construction	High negative	Low negative
Rise in teenage pregnancies and school drop-outs	Construction	Moderate negative	Low negative
Reduced access, pressure and overburdening of physical and social infrastructure	Construction	Low negative	Negligible
Increased natural resource requirements for construction activities	Construction	Moderate negative	Low negative
Improvements related to community development initiatives	Construction	Moderate positive	High positive
Exposure of workforce to sufficient health and safety standards	Construction	Moderate positive	High positive
Competition for labour / increased cost of labour for other productive sectors	Construction	Low negative	Negligible
Improvements in road condition and traffic flow / mobility	Construction	High positive	High positive
	Post-construction	High positive	High positive
Increased agricultural productivity and improvement in livelihood	Post-construction	Moderate positive	High positive
Induced developments and improved community life and social services	Post-construction	Low positive	Moderate positive

11.4 SUMMARY

The assessment revealed that the identified potential impacts of the Upper West Package 1 Roads Project are not significantly damaging enough to render it not acceptable from an environmental and socio-economic perspective. The Project was not characterized by significant fatal flaws that should prevent it from going ahead, weighed against the potential benefits obtainable from the Project.

However, it is important that impacts are adequately managed and especially biodiversity is not heavily impacted or where construction cannot avoid this, the number of individual species affected would be as

low as reasonably practicable. Similarly, social impacts are often very sensitive issues, as such, mitigation measures should be adequately followed to limit the significance of these impacts.

Activities that will impact on the rich biodiversity of the Project area need to be executed with due consideration for environmental concerns (e.g. avoiding unnecessary destruction of vegetation, need for protection of the more delicate species and habitats, conservation education programs for both the workers and local population, etc.). The impact on these species (biodiversity) should be easily offset by allowing for natural re-growth.

On the basis of confirming strict adherence to the mitigation and management measures prescribed in the ESIA and continuous monitoring of environmental and social effects, there exists reasonable justification for the authorization of the Project to commence. The Project is deemed highly beneficial and will largely boost agricultural productivity and promote economic growth and development on both local and national levels. A timely delivery of the project is a pressing need and it is important that continuous and regular consultation (or open communication) is maintained by the project proponent and Contracting Entity with all stakeholders and beneficiary communities throughout the period of the project implementation.

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ANNEXURE A: ENVIRONMENTAL

**Appendix 1: World Bank's General Environmental
Management Conditions for Construction Contracts**

**Appendix 2: Environmental and Social Safeguard Monitoring
Checklist**

**Appendix 3: Historic and Projected Climate Data for Upper
West Region**

APPENDIX 1: GENERAL ENVIRONMENTAL MANAGEMENT CONDITIONS FOR CONSTRUCTION CONTRACTS

General

1. In addition to these general conditions, the Contractor shall comply with any specific Environmental Management Plan (EMP) or Environmental and Social Management Plan (ESMP) for the works he is responsible for. The Contractor shall inform himself about such an EMP, and prepare his work strategy and plan to fully take into account relevant provisions of that EMP. If the Contractor fails to implement the approved EMP after written instruction by the Supervising Engineer (SE) to fulfil his obligation within the requested time, the Owner reserves the right to arrange through the SE for execution of the missing action by a third party on account of the Contractor.

2. Notwithstanding the Contractor's obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an EMP. In general these measures shall include but not be limited to:

- (a) Minimize the effect of dust on the surrounding environment resulting from earth mixing sites, asphalt mixing sites, dispersing coal ashes, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living in the vicinity dust producing activities.
- (b) Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.
- (c) Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and/or re-established where they are disrupted due to works being carried out.
- (d) Prevent bitumen, oils, lubricants and waste water used or produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs, and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes.
- (e) Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards.
- (f) Upon discovery of ancient heritage, relics or anything that might or believed to be of archaeological or historical importance during the execution of works, immediately report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfilment of the measures aimed at protecting such historical or archaeological resources.
- (g) Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities.
- (h) Implement soil erosion control measures in order to avoid surface run off and prevents siltation, etc.(i) Ensure that garbage, sanitation and drinking water facilities are provided in construction workers camps.
- (j) Ensure that, in as much as possible, local materials are used to avoid importation of foreign material and long distance transportation.
- (k) Ensure public safety, and meet traffic safety requirements for the operation of work to avoid accidents.

3. The Contractor shall indicate the period within which he/she shall maintain status on site after completion of civil works to ensure that significant adverse impacts arising from such works have been appropriately addressed.

4. The Contractor shall adhere to the proposed activity implementation schedule and the monitoring plan / strategy to ensure effective feedback of monitoring information to project management so that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.

5. Besides the regular inspection of the sites by the SE for adherence to the contract conditions and specifications, the Owner may appoint an Inspector to oversee the compliance with these environmental conditions and any proposed mitigation measures. State environmental authorities may carry out similar inspection duties. In all cases, as directed by the SE, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of any works.

Worksite/Campsite Waste Management

6. All vessels (drums, containers, bags, etc.) containing oil/fuel/surfacing materials and other hazardous chemicals shall be banded in order to contain spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed off at designated disposal sites in line with applicable government waste management regulations.

7. All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.

8. Used oil from maintenance shall be collected and disposed off appropriately at designated sites or be re-used or sold for re-use locally.

9. Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.

10. Construction waste shall not be left in stockpiles along the road, but removed and reused or disposed of on a daily basis.

11. If disposal sites for clean spoil are necessary, they shall be located in areas, approved by the SE, of low land use value and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials should be placed in low-lying areas and should be compacted and planted with species indigenous to the locality.

Material Excavation and Deposit

12. The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.

13. The location of quarries and borrow areas shall be subject to approval by relevant local and national authorities, including traditional authorities if the land on which the quarry or borrow areas fall in traditional land.

14. New extraction sites:

- a) Shall not be located in the vicinity of settlement areas, cultural sites, wetlands or any other valued ecosystem componentt, or on high or steep ground or in areas of high scenic value, and shall not be located less than 1km from such areas.
- b) Shall not be located adjacent to stream channels wherever possible to avoid siltation of river channels. Where they are located near water sources, borrow pits and perimeter drains shall surround quarry sites.
- c) Shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the

presence of government authorities having a mandate for their protection.

d) Shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental impact study shall be conducted.

e) Shall be easily rehabilitated. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.

f) Shall have clearly demarcated and marked boundaries to minimize vegetation clearing.

15. Vegetation clearing shall be restricted to the area required for safe operation of construction work. Vegetation clearing shall not be done more than two months in advance of operations.

16. Stockpile areas shall be located in areas where trees can act as buffers to prevent dust pollution. Perimeter drains shall be built around stockpile areas. Sediment and other pollutant traps shall be located at drainage exits from workings.

17. The Contractor shall deposit any excess material in accordance with the principles of the general conditions, and any applicable EMP, in areas approved by local authorities and/or the SE.

18. Areas for depositing hazardous materials such as contaminated liquid & solid materials shall be approved by the SE & appropriate local &/or national authorities before the commencement of work. Use of existing, approved sites shall be preferred over the establishment of new sites.

Rehabilitation and Soil Erosion Prevention

19. To the extent practicable, Contractor shall rehabilitate the site progressively so the rate of rehabilitation is similar to the rate of construction.

20. Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.

21. Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.

22. Re-vegetate stockpiles to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.

23. Locate stockpiles where they will not be disturbed by future construction activities.

24. To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.

25. Remove toxic materials and dispose of them in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.

26. Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.

27. Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use, and allow natural regeneration of vegetation.

28. Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.

29. Minimize erosion by wind and water both during and after the process of reinstatement.

30. Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.

31. Revegetate with plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people.

Water Resources Management

32. The Contractor shall at all costs avoid conflicting with water demands of local communities.

33. Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.

34. Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.

35. Temporary damming of streams and rivers shall be done in such a way avoids disrupting water supplies to communities down stream, and maintains the ecological balance of the river system.

36. No construction water containing spoils or site effluent, esp. cement and oil, shall be allowed to flow into natural water drainage courses.

37. Wash water from washing out of equipment shall not be discharged into water courses or road drains.

38. Site spoils and temporary stockpiles shall be located away from the drainage system, and surface run off shall be directed away from stockpiles to prevent erosion.

Traffic Management

39. Location of access roads/detours shall be done in consultation with the local community especially in important or sensitive environments. Access roads shall not traverse wetland areas.

40. Upon the completion of civil works, all access roads shall be ripped and rehabilitated.

41. Access roads shall be sprinkled with water at least 5 times a day in settled areas, & 3 times in unsettled areas, to suppress dust emissions.

Blasting

42. Blasting activities shall not take place less than 2km from settlement areas, cultural sites, or wetlands without the permission of the SE.

43. Blasting activities shall be done during working hours, and local communities shall be consulted on the proposed blasting times.

44. Noise levels reaching the communities from blasting activities shall not exceed 90 decibels.

Disposal of Unusable Elements

45. Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the SE. The Contractor has to agree with the SE which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.

46. As far as possible, abandoned pipelines shall remain in place. Where for any reason no alternative alignment for the new pipeline is possible, the old pipes shall be safely removed and stored at a safe place to be agreed upon with the SE and the local authorities concerned.

47. AC-pipes as well as broken parts thereof have to be treated as hazardous material and disposed of as specified above.

48. Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.

Health and Safety

49. In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of AIDS.

50. Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.

51. Construction vehicles shall not exceed maximum speed limit of 40km per hour.

Repair of Private Property

52. Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.

53. In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation.

Contractor's Environment, Health and Safety Management Plan (EHS-MP)

54. Within 6 weeks of signing the Contract, the Contractor shall prepare an EHS-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an EMP for the works. The Contractor's EHS-MP will serve two main purposes:

- For the Contractor, for internal purposes, to ensure that all measures are in place for adequate EHS management, and as an operational manual for his staff.
- For the Client, supported where necessary by a SE, to ensure that the Contractor is fully prepared for the adequate management of the EHS aspects of the project, and as a basis for monitoring of the Contractor's EHS performance.

55. The Contractor's EHS-MP shall provide at least:

- a description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an EMP;
- a description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- a description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and
- the internal organizational, management and reporting mechanisms put in place for such.

56. The Contractor's EHS-MP will be reviewed and approved by the Client before start of the works. This review should demonstrate if the Contractor's EHS-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

EHS Reporting

57. The Contractor shall prepare bi-weekly progress reports to the SE on compliance with these general conditions, the project EMP if any, and his own EHS-MP. An example format for a Contractor EHS report is portrayed below. It is expected that the Contractor's reports will include information on:

- EHS management actions/measures taken, including approvals sought from local or national authorities;
- Problems encountered in relation to EHS aspects (incidents, including delays, cost consequences, etc. as a result thereof);
- Lack of compliance with contract requirements on the part of the Contractor;
- Changes of assumptions, conditions, measures, designs and actual works in relation to EHS aspects; and
- Observations, concerns raised and/or decisions taken with regard to EHS management during site meetings.

58. It is advisable that reporting of significant EHS incidents be done "as soon as practicable". Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keep his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendixes to the bi-weekly reports. A sample format for an incident notification is shown below. Details of EHS performance will be reported to the Client through the SE's reports to the Client.

Training of Contractor's Personnel

59. The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project EMP, and his own EHS-MP, and are able to fulfil their expected roles and functions. Specific training should be provided to those employees that have particular responsibilities associated with the implementation of the EHS-MP. General topics should be:

- EHS in general (working procedures); emergency procedures; and social and cultural aspects (awareness raising on social issues).

Cost of Compliance

60. It is expected that compliance with these conditions is already part of standard good workmanship and state of art as generally required under this Contract. The item "Compliance with Environmental Management Conditions" in the Bill of Quantities covers this cost. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable EHS impact.

3. Example Format: EHS Report

Contract:

Period of reporting: EHS

management actions/measures:

Summarize EHS management actions/measures taken during period of reporting, including planning and management activities (e.g. risk and impact assessments), HSE training, specific design and work measures taken, etc.

EHS incidents: Report on any problems encountered in relation to EHS aspects, including its consequences (delays, costs) and corrective measures taken. Include relevant incident reports.

EHS compliance: Report on compliance with Contract HSE conditions, including any cases of non-compliance.

Changes: Report on any changes of assumptions, conditions, measures, designs and actual works in relation to EHS aspects.

Concerns and observations: Report on any observations, concerns raised and/or decisions taken with regard to EHS management during site meetings and visits.

Signature (Name, Title Date) of Contractor Representative

4. Example Format: EHS Incident Notification

EHS Incident Notification

Provide within 24 hrs to the Supervising Engineer

Originators Reference

No:..... Date of

Incident:.....

Time:..... Location of

incident:.....

Name of Person(s)

involved:.....

Employing

Company:.....

Type of

Incident:.....

..... Description of Incident:

Where, when, what, how, who, operation in progress at the time (only factual)

Immediate Action:

Immediate remedial action and actions taken to prevent reoccurrence or escalation

Signature (Name, Title, Date):.....

Contractor Representative

APPENDIX 2: ENVIRONMENTAL AND SOCIAL SAFEGUARD PERFORMANCE MONITORING CHECKLIST

This form is designed for site inspection use and may not be exhaustive. Modifications and additions may be necessary to suit current/emerging situations on-site to address specific environmental issues and associated mitigation measures.

Project:

Site Location:

Construction Stage: Pre-Construction ☐ Construction ☐ Operation ☐

Activities:

Inspection Date: Inspection Time:

Inspected by:

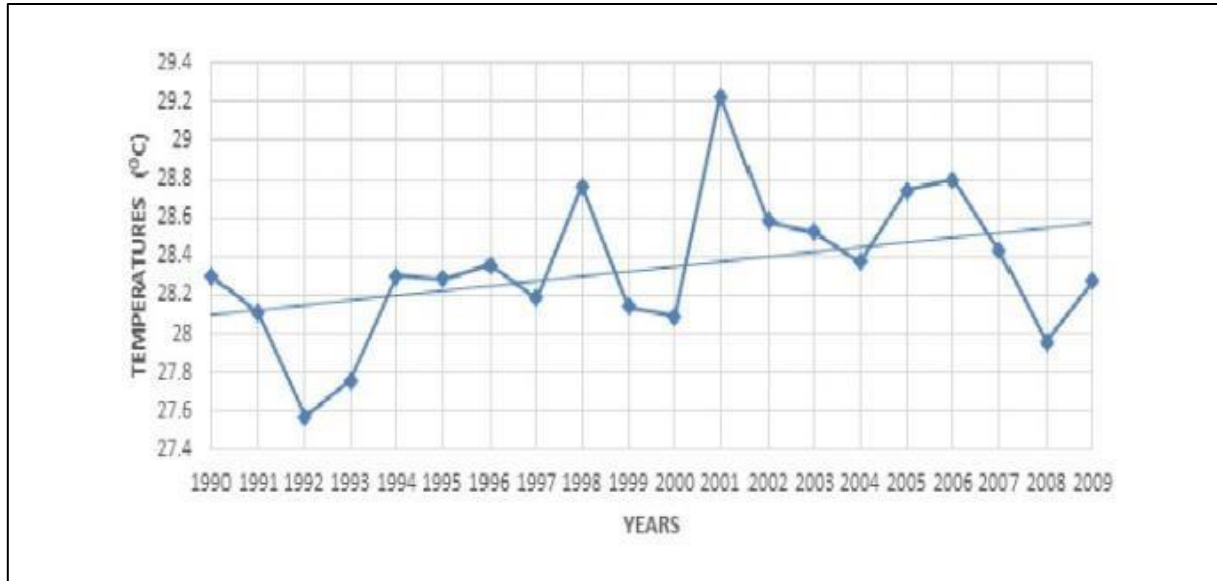
Inspection Parameter	Implemented?			Rating (if yes)				Remarks: (specify location, good practices, problem observed, possible cause of non-conformity and/or proposed corrective /preventative actions)
	Yes	No	N/A	1	2	3	4	
1. Air Pollution Control								
1.1. Are the construction sites watered to minimize dust generated?								
1.2. Are all vehicles carrying dusty loads to and from site covered?								
1.3. Are vehicles, plant and equipment well maintained? (any black smoke observed, please indicate the plant/equipment and location)								
1.4. Are drivers/ workers trained on proper operation of vehicles and equipment especially on fuel efficiency and anti-idling techniques?								
1.5. Are speed control measures applied to reduce dust generation on unpaved surfaces? (e.g. speed limit sign)								
1.6. Others (please specify)								
2. Water and Soil Pollution Control								
2.1. Is any water quality parameter (Mn, Fe, Cu, Zn, Cd, Pb, PO_4^{3-} , NO_3^- , SO_4^{2-} , TDS, TSS, BOD, DO) above baseline level?								
2.2. Is any soil quality parameter (pH, Ca, Mg, K, Na, Mn, Fe, Cu, Zn, P) above baseline level?								
2.3. Is off-site storm and flood water controlled before it reaches areas being excavated to prevent run-off of sediment?								
2.4. Are measures provided to prevent run-off of sediments to surface water? (e.g. silt fences)								
2.5. Are sedimentation traps free of silt and sediment?								
2.6. Are there measures to ensure fuel storage tanks are leak proof and installed with a bund?								
2.7. Others (please specify)								
3. Noise Control								
3.1. Does construction noise exceed 70dB(A)								
3.2. Does any haulage and noise generating activity take place outside working hours?								
3.3. Are idle vehicles/equipment turned off or throttled down?								
3.4. Are hearing protection devices used (ear plugs/muffs)?								
3.5. Any noise mitigation measures adopted (e.g. mufflers on engine exhausts, use of noise barrier etc)?								

Inspection Parameter	Implemented?			Rating (if yes)				Remarks: (specify location, good practices, problem observed, possible cause of non-conformity and/or proposed corrective/preventative actions)
	Yes	No	N/A	1	2	3	4	
3.6. Are silenced equipments utilized?								
3.7. Others (please specify)								
4. Waste Management								
4.1. Is there a site specific waste management plan being implemented?								
4.2. Are excavated materials reused as fill materials?								
4.3. Is the site kept clean and tidy? (e.g. litter free, good housekeeping)								
4.4. Are stockpile & disposal area stable and protected against erosion?								
4.5. Are separated labelled containers / areas provided for facilitating recycling and waste segregation?								
4.6. Are construction wastes / recyclable wastes and general refuse removed off site regularly?								
4.7. Are construction wastes collected and disposed of properly by licensed collectors?								
4.8. Are chemical wastes, if any, collected and disposed of properly by licensed collectors?								
4.9. Are oil drums and plants/equipments provided with drip trays/ bunds?								
4.10. Are drip trays/ bunds free of oil and water?								
4.11. Is there any oil spillage? Clean-up the contaminated soil immediately?								
4.12. Others (please specify)								
5. Storage of Oils, Chemicals and Hazardous Materials								
5.1. Are oils/chemicals/ hazardous materials securely stored and labelled properly?								
5.2. Is there any spillage or contamination observed on site?								
5.3. Are there proper measures to control oil/ chemical spillage? (e.g. provide bunds)								
5.4. Are spill kits / sand / saw dust used for absorbing chemical spillage readily accessible?								
5.5. Others (please specify)								
6. Protection of Flora, Fauna and Historical Heritage								
6.1. Are disturbance to terrestrial flora minimized/ limited to area of need?								
6.2. Are disturbance to terrestrial fauna minimized/ limited to area of need?								
6.3. Any historical heritage exists on site? If yes, is appropriate measures taken to preserve it?								
6.4. Others (please specify)								
7. Protection of Public Utility/ Community Infrastructure								
7.1. Is there any damage to underground public utility cables/pipes?								
7.2. Is there any disruption to public utility services?								
7.3. In case of disruption, was service swiftly restored?								
7.4. Are all basic amenities provided in workers' camp to prevent dependencies on community infrastructure?								

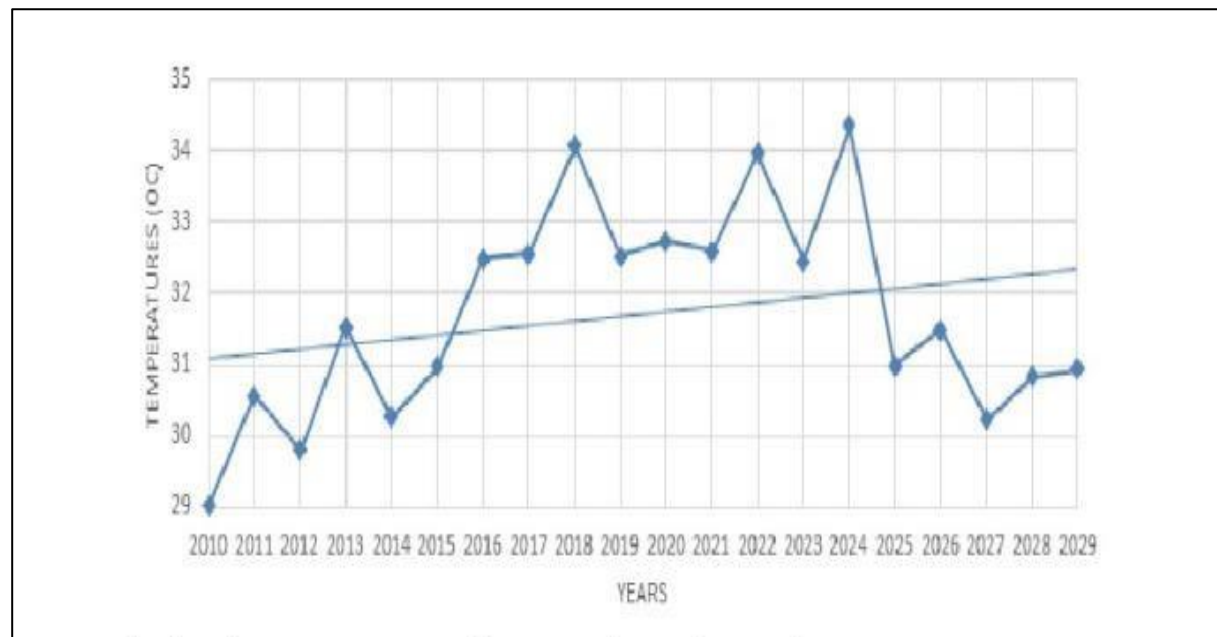
Inspection Parameter	Implemented?			Rating (if yes)				Remarks: (specify location, good practices, problem observed, possible cause of non-conformity and/or proposed corrective /preventative actions)
	Yes	No	N/A	1	2	3	4	
7.5. Are grievances/ complaints received and documented?								
7.6. Are aggrieved parties adequately carried along in the Grievance Redress process?								
7.7. Others (please specify)								
8. Protection of Community Culture, Safety and Security								
8.1. Does workers' Code of Conduct meet the requirements of ESMP and best practice?								
8.2. Does the Code of Conduct prohibit violence against women, exploitation, prostitution, use of illegal drugs etc?								
8.3. Does the Code of Conduct highlights penalties and punishments for offences								
8.4. Rate the level of awareness of workers to local cultures, traditions and lifestyles								
8.5. Is there any underage worker on site?								
8.6. Are there local workers on site? What is the percentage of local workforce to the total workforce?								
8.7. Are there competent security personnel on site?								
8.8. Others (please specify)								
9. Protection of Community Health								
9.1. Is there any HIV prevention program implemented (peer education, condom distribution etc)?								
9.2. Is there any health awareness and education initiatives on STDs amongst workers and in nearby communities?								
9.3. Are the drivers trained on defensive driving techniques, haulage & pedestrian safety?								
9.4. Are there speed control devices on vehicles?								
9.5. Are there traffic signs on the roads?								
10. Protection of Workers' Health								
10.1. Is there a site specific Occupational Health and Safety (OHS) plan being implemented?								
10.2. Does the OHS Plan meet the requirements of ESMP and best practice?								
10.3. Is there a trained First Aider and First Aid box on site?								
10.4. Are the right Personal Protective Equipment (PPE) being used by workers?								
10.5. Are workers observing basic safe working practices?								
10.6. Are there illicit drugs or alcohol on site?								
10.7. Others (please specify)								
11. Emergency Preparedness and Response								
11.1. Are there emergency contingency plan in place for accident, fire, spillage?								
11.2. Are accidents and incidents reported and reviewed, and corrective & preventive actions identified and recorded?								
11.3. Others (please specify)								

Key	Rating	Definition
N/A	-	Not Applicable
1	Unsatisfactory	Performance consistently fails to meet the minimum requirements or expectation.
2	Moderately Satisfactory	Performance meets some but not all of the requirements or expectation.
3	Satisfactory	Performance is consistent with requirements or expectation.
4	Highly Satisfactory	Performance is consistent and frequently exceeds requirements or expectation.

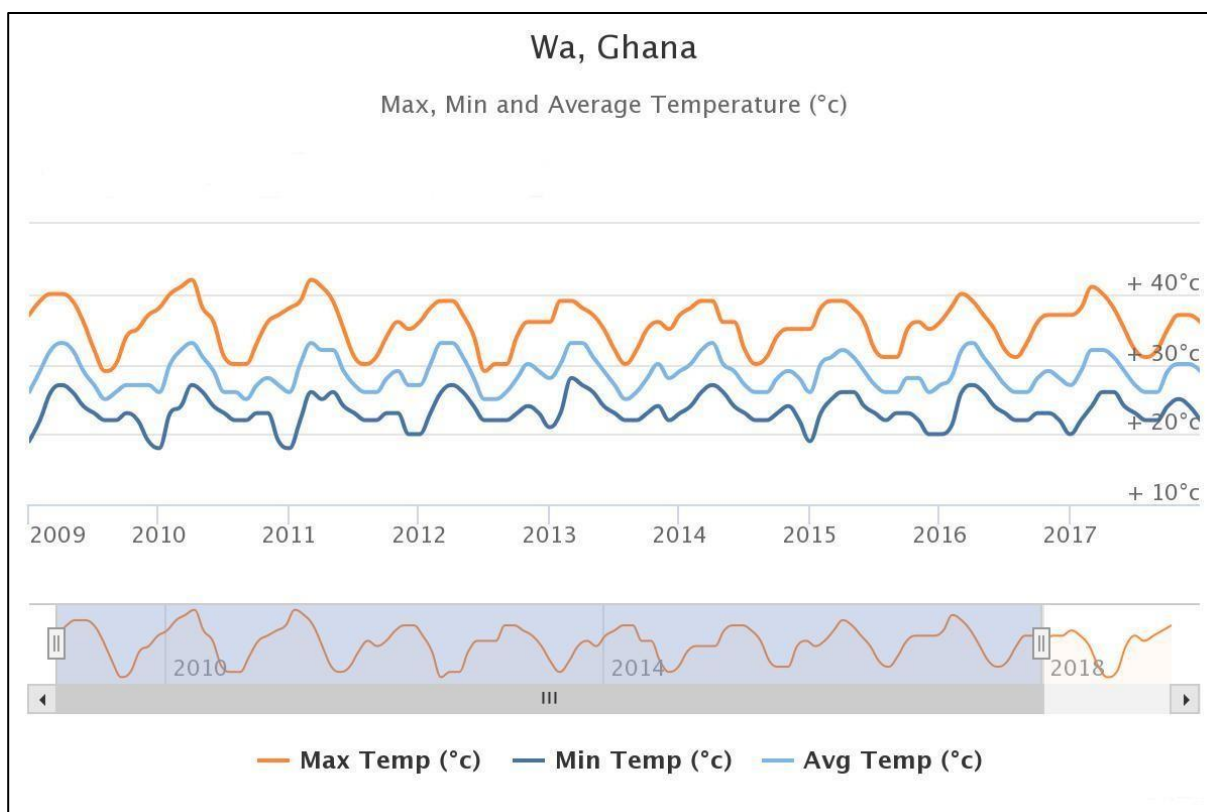
APPENDIX 3: HISTORIC AND PROJECTED CLIMATE DATA FOR UPPER WEST REGION



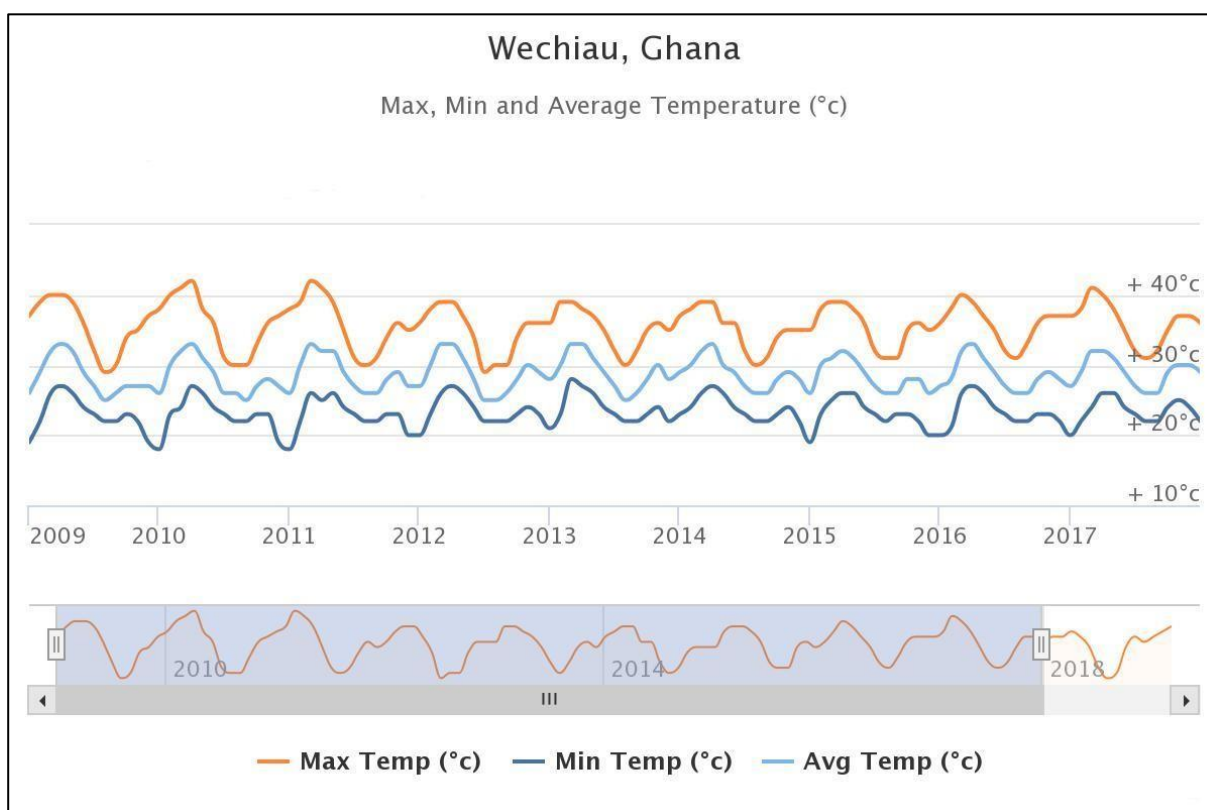
Distribution of total annual average mean temperature between 1990 and 2009 for Wa district in the Upper West Region (Subaar *et al.*, 2018:5).



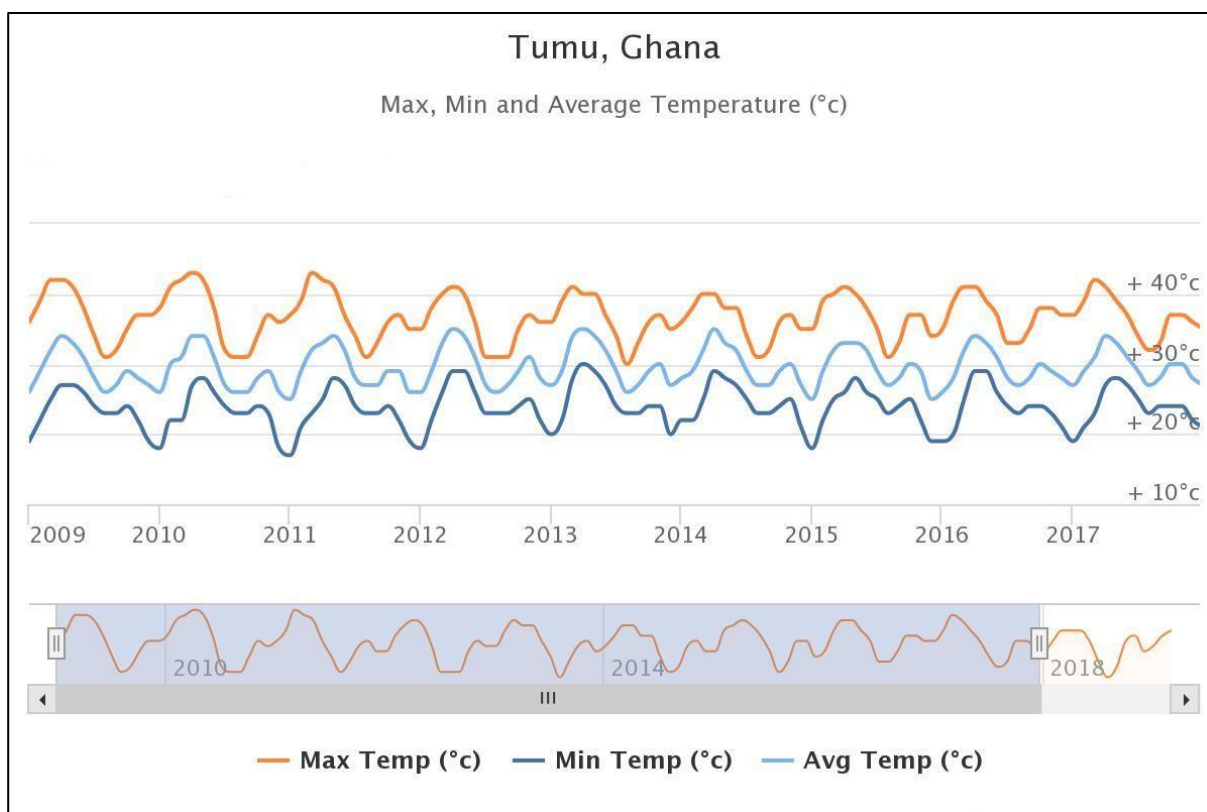
Predicted annual average mean temperature between 2010 and 2029 for Wa district in the Upper West Region (Subaar *et al.*, 2018:5).



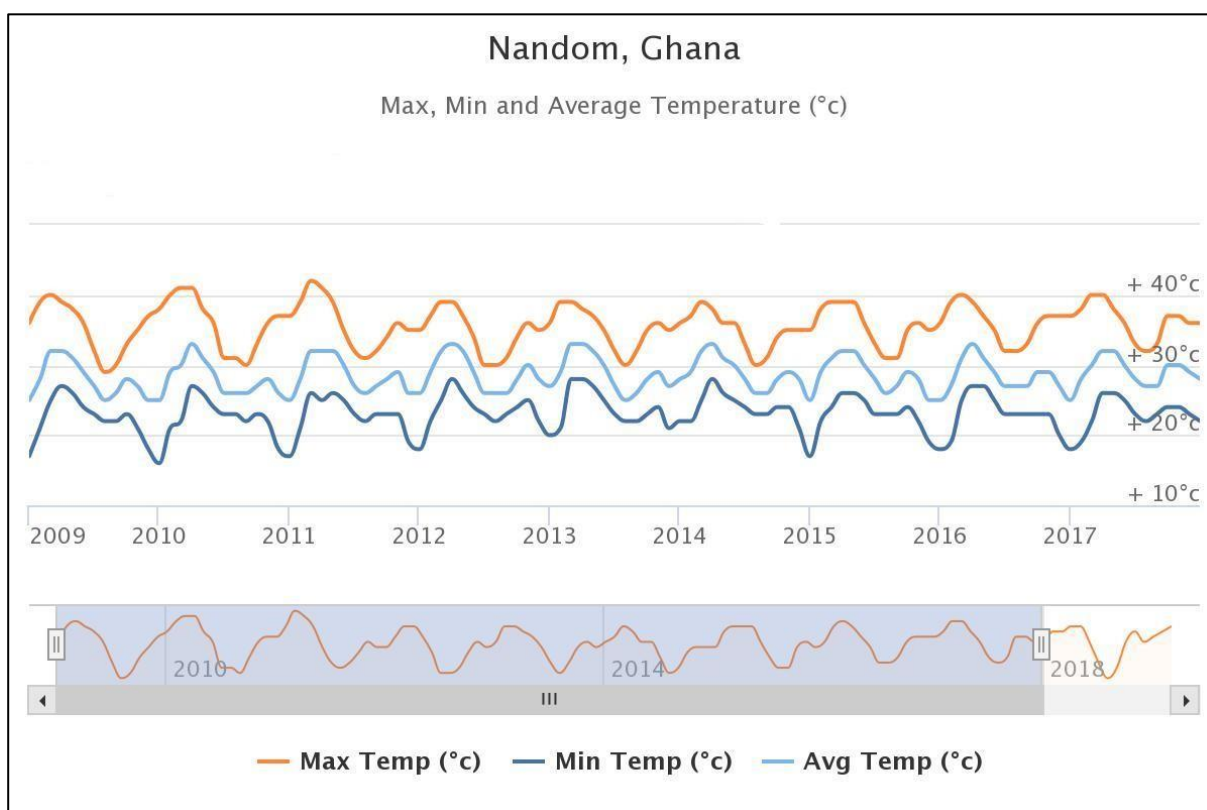
Maximum and Minimum Temperature for period 2009 to 2017 for Wa District in the Upper West Region (www.worldweatheronline.com).



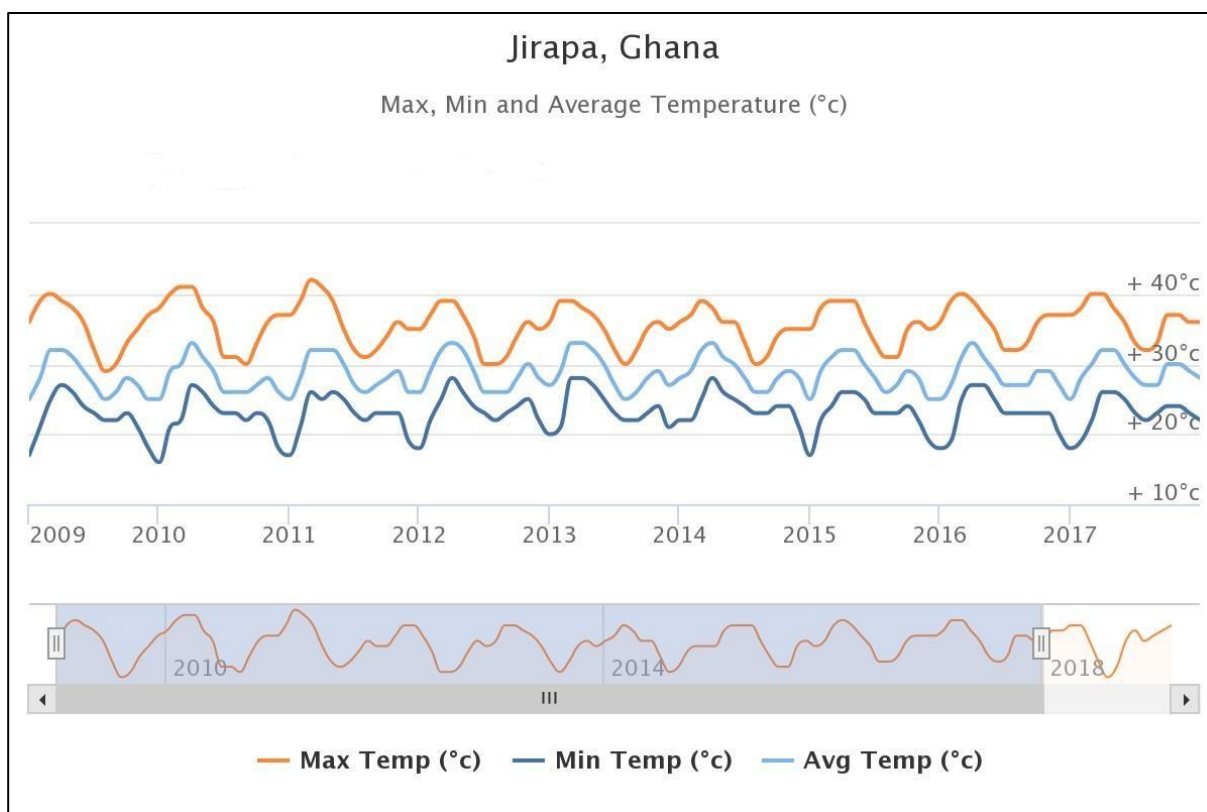
Maximum and Minimum Temperature for period 2009 to 2017 for Wechiau District in the Upper West Region (www.worldweatheronline.com).



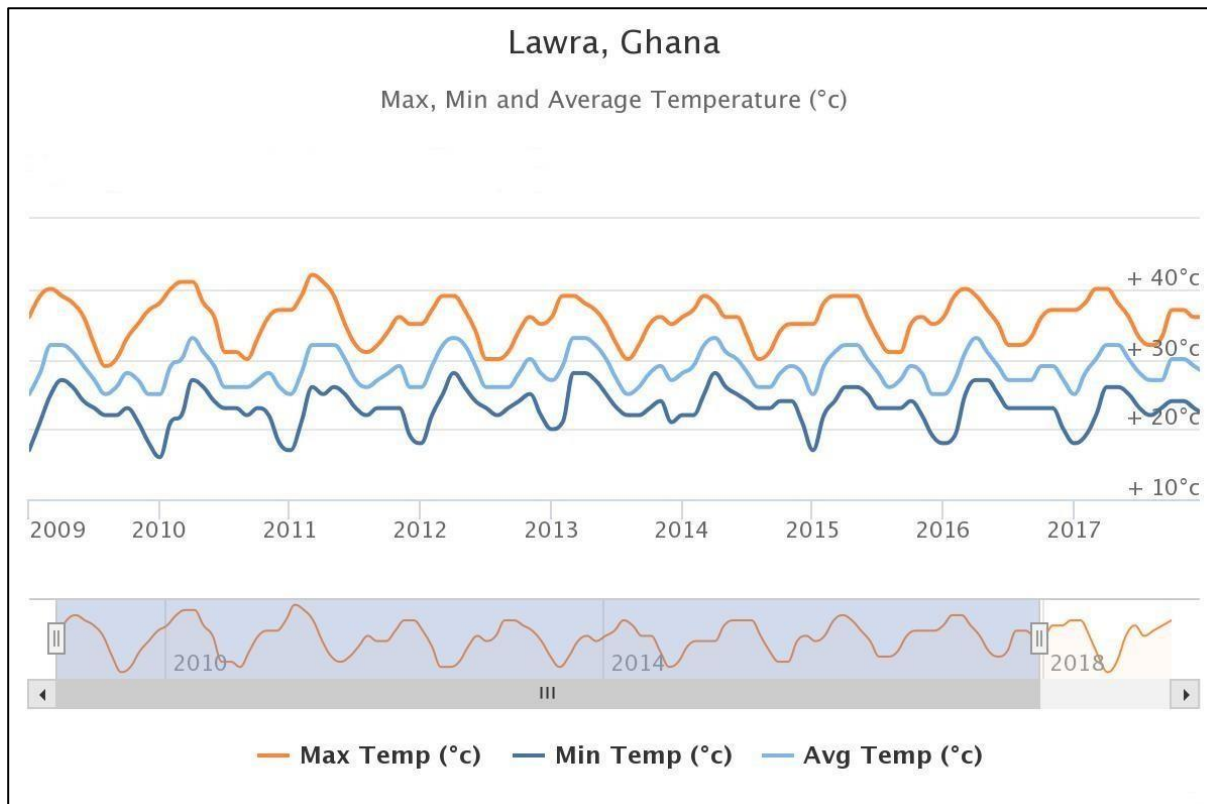
Maximum and Minimum Temperature for period 2009 to 2017 for Tumu District in the Upper West Region (www.worldweatheronline.com).



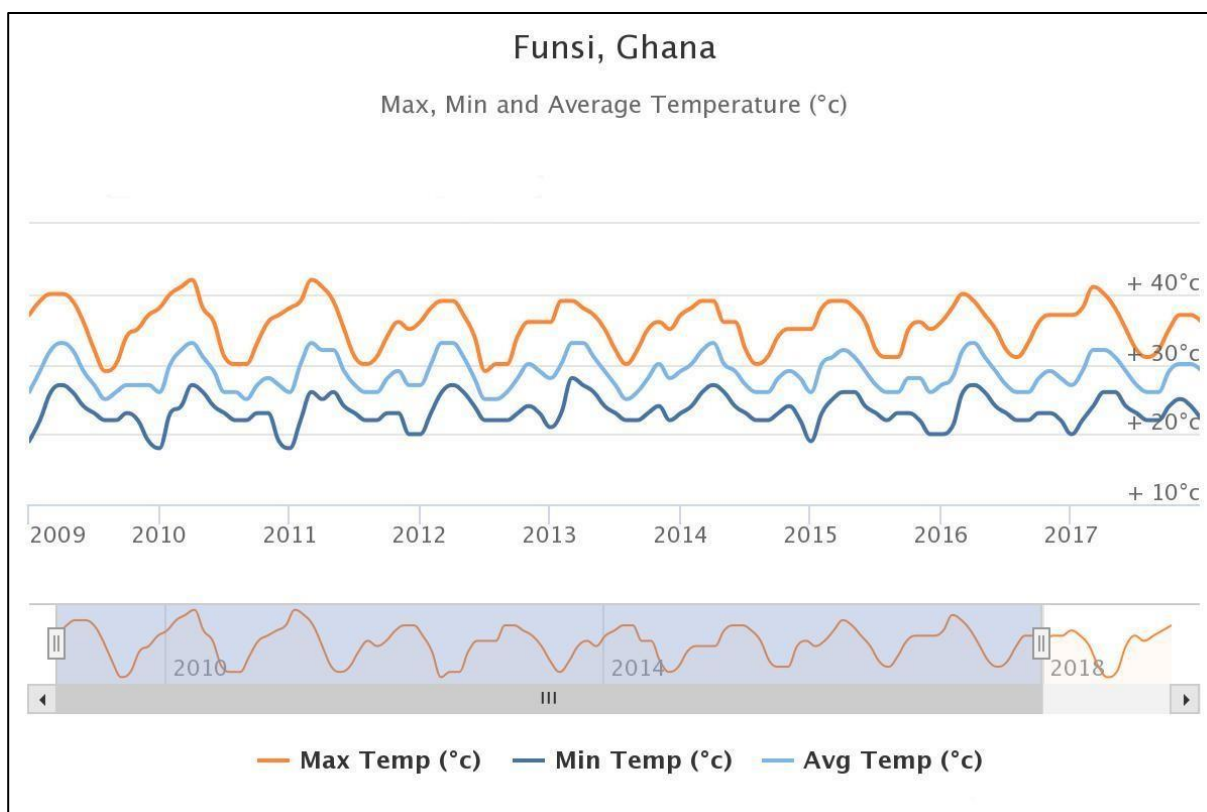
Maximum and Minimum Temperature for period 2009 to 2017 for Nandom District in the Upper West Region (www.worldweatheronline.com).



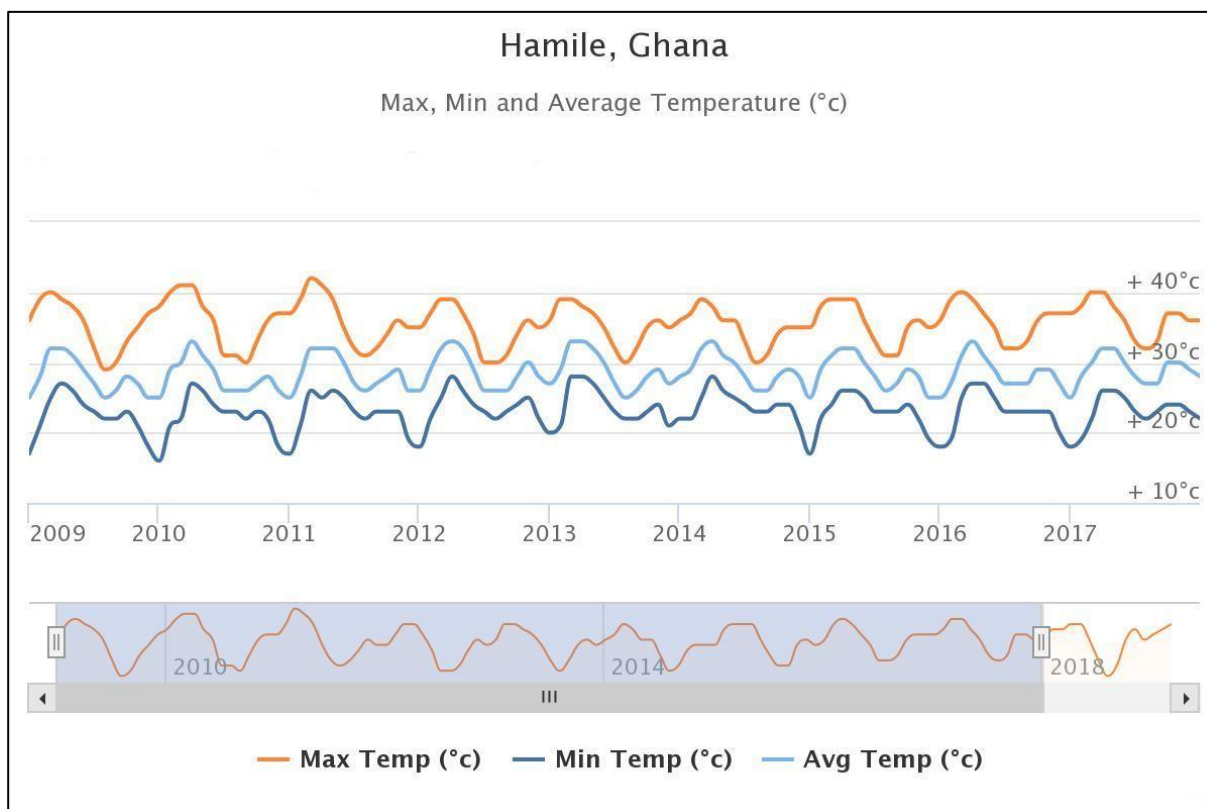
Maximum and Minimum Temperature for period 2009 to 2017 for Jirapa District in the Upper West Region (www.worldweatheronline.com).



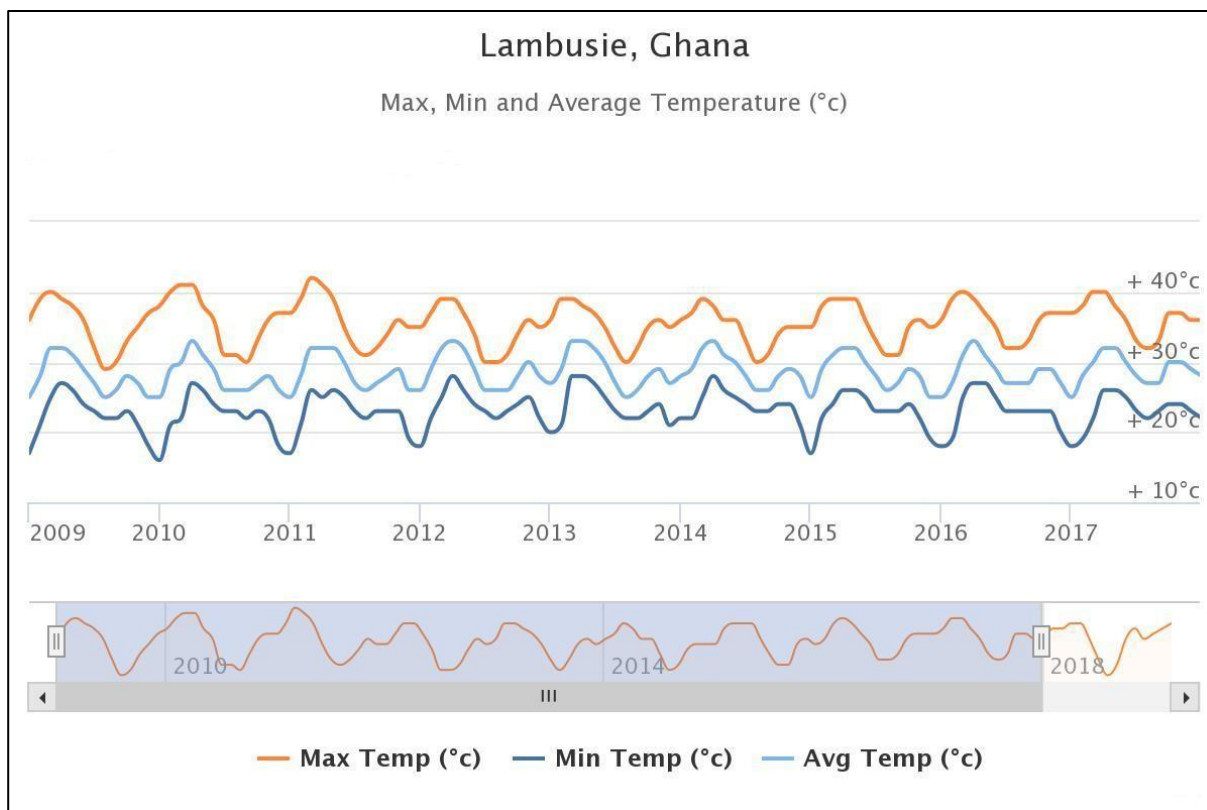
Maximum and Minimum Temperature for period 2009 to 2017 for Lawra District in the Upper West Region (www.worldweatheronline.com).



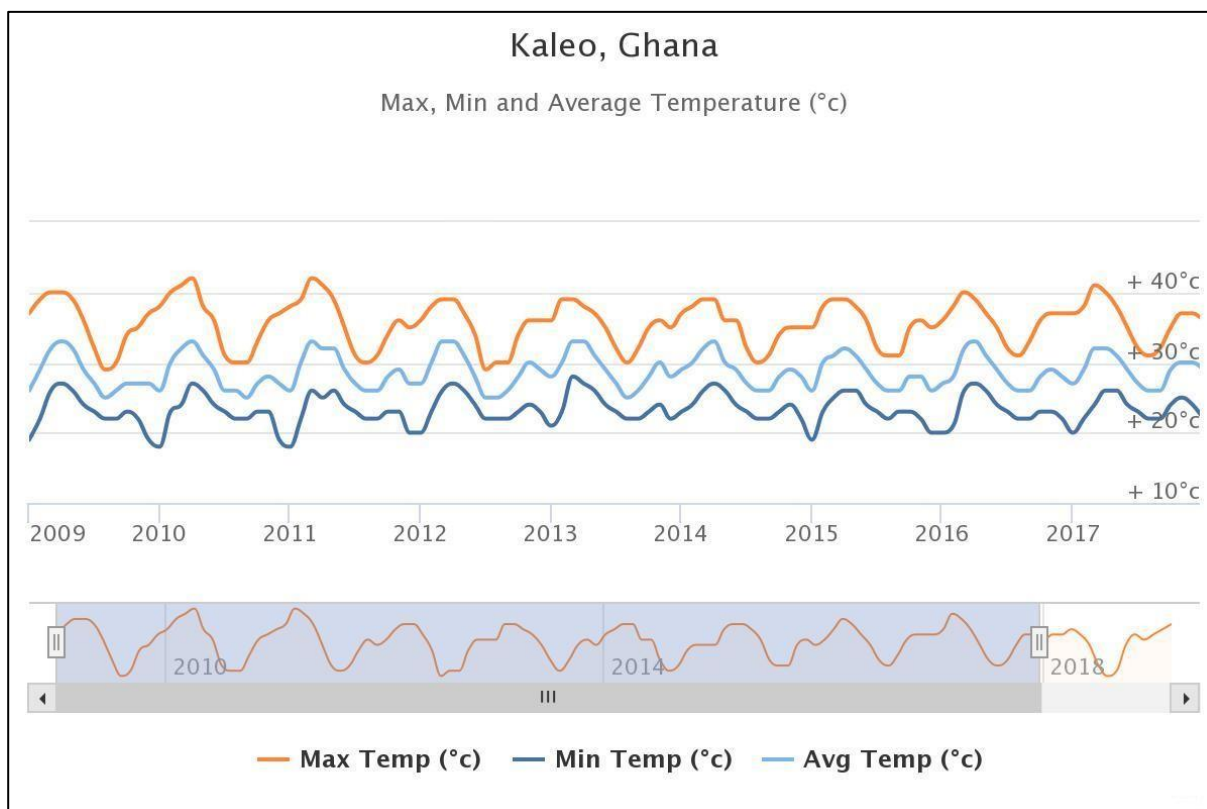
Maximum and Minimum Temperature for period 2009 to 2017 for Fungsi District in the Upper West Region (www.worldweatheronline.com).



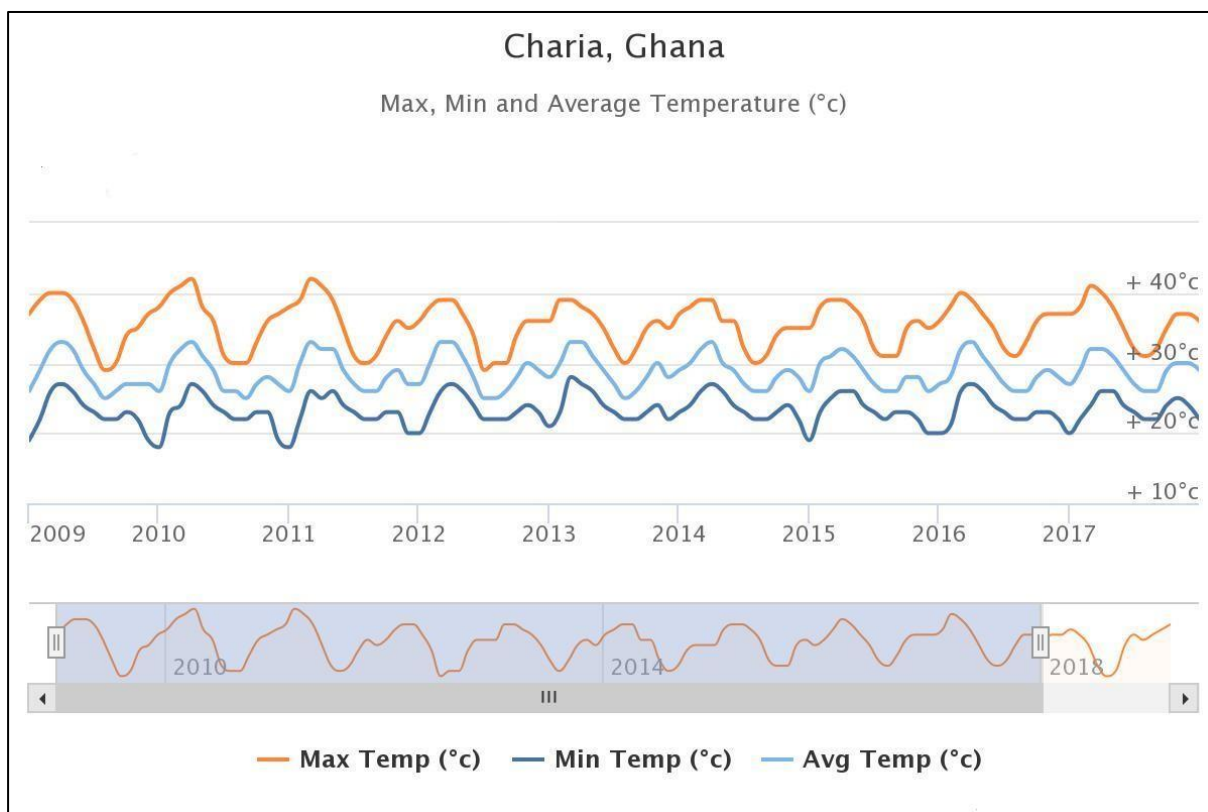
Maximum and Minimum Temperature for period 2009 to 2017 for Hamile District in the Upper West Region (www.worldweatheronline.com).



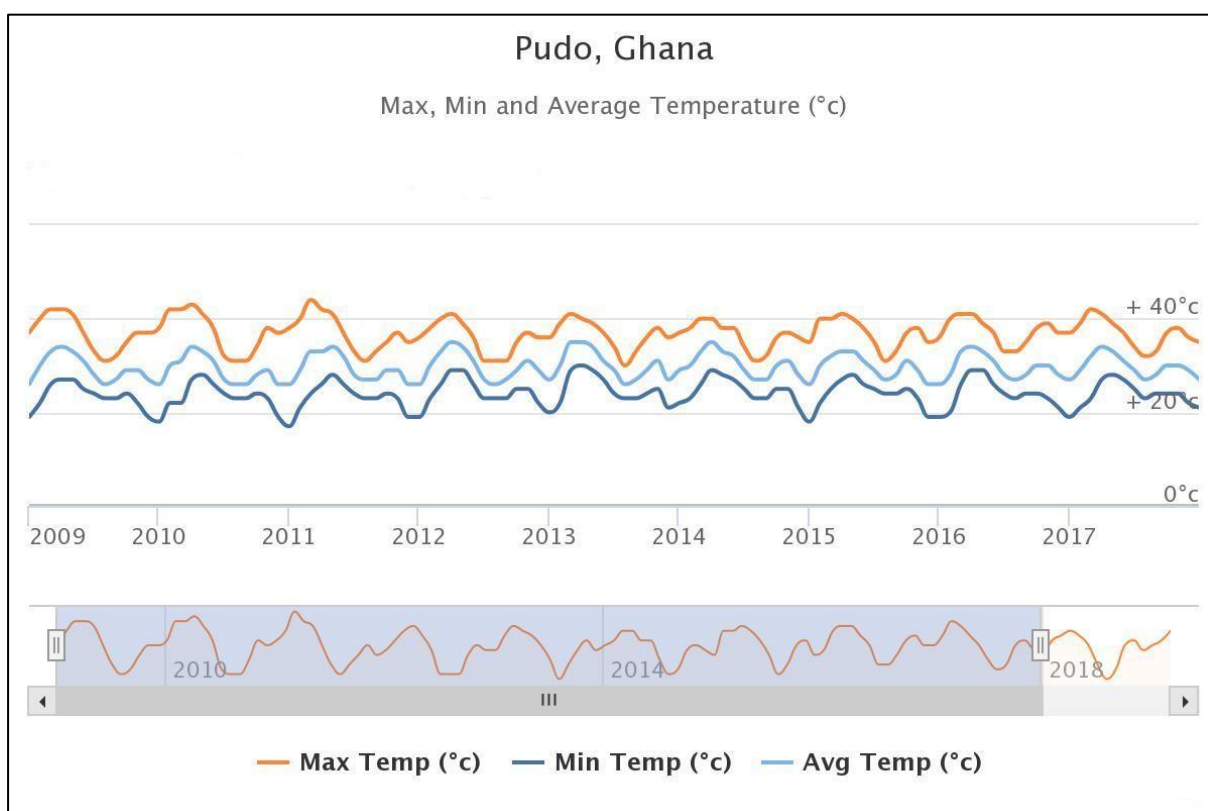
Maximum and Minimum Temperature for period 2009 to 2017 for Lambusie District in the Upper West Region (www.worldweatheronline.com).



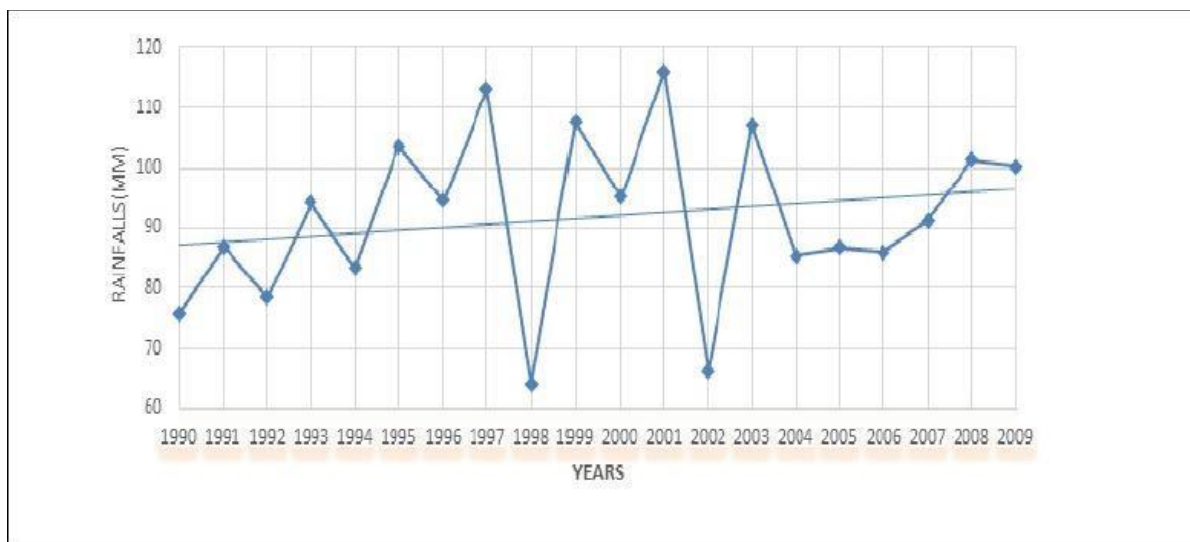
Maximum and Minimum Temperature for period 2009 to 2017 for Kaleo District in the Upper West Region
(www.worldweatheronline.com).



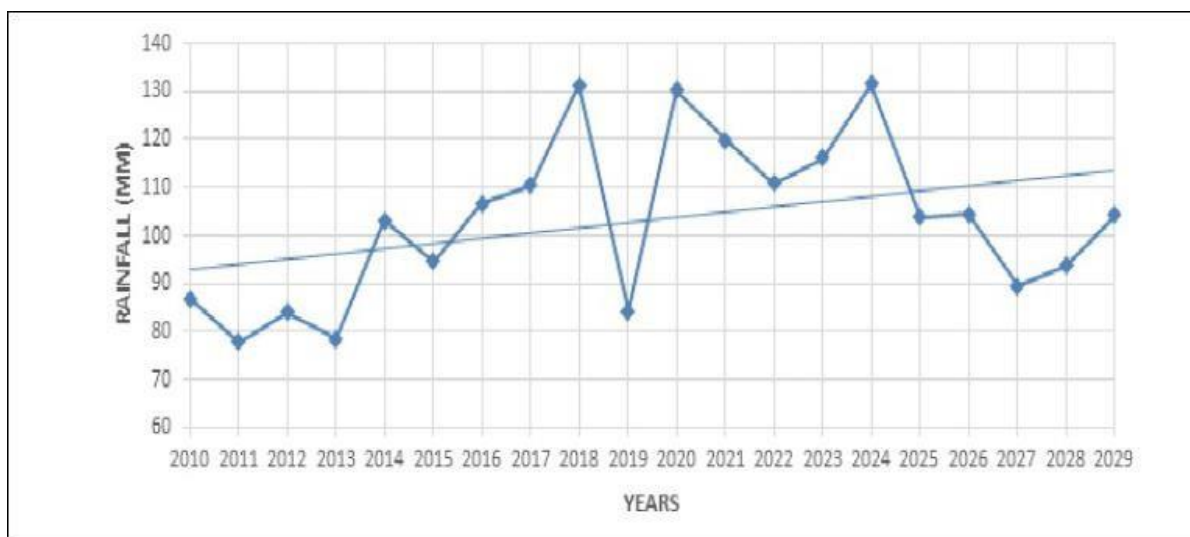
Maximum and Minimum Temperature for period 2009 to 2017 for Charia District in the Upper West Region (www.worldweatheronline.com).



Maximum and Minimum Temperature for period 2009 to 2017 for Pudo District in the Upper West Region (www.worldweatheronline.com).



Total annual rainfall distribution between 1990 and 2009 of Wa Metropolitan in the Upper West Region (Subaar *et al.*, 2018:4).



Predicted annual rainfall distribution between 2010 and 2029 of Wa Metropolitan in the Upper West Region (Subaar *et al.*, 2018:4).

ANNEXURE B: SOCIAL

**Survey Instruments / Questionnaires, Consultation/FGD
Guides / Persons Consulted and Consultation Outcome**



Region:	MMDA:	Community: Traditional Area
Interviewer's Name:	Date of Interview:	Road Name:

1. **Name of Respondent - Household head (HH) / Representative):**
.....
2. **Status of Respondent:** a. Household Head (HH) b. Rep (Specify relation to HH) (a. Spouse b. Son c. Brother d. Daughter e. Grandson f. Mother g. Father h. Sister)
3. **Sex:** a. Male b. Female
4. **Age of Respondent** (in completed years)
5. **Contact (House No. / Tel. No).**
6. **Hometown:**
7. **Highest Educational Level:** a. None b. Primary c. JHS/MSLC d. SHS/Sec. e. Tech/Voc./Commercial f. Training College (Nursing, Teacher Training etc.) g. Polytechnic.
- h. University k. Arabic School i. Other (specify).....
8. **Nationality:** a. Ghanaian b. Non-Ghanaian (name of country)
9. **If Ghanaian, what ethnic group:** a. Dagaare b. Waala c. Birifor d. Dagomba e. Basare f. Nanumba g. Guan h. Kokomba i. Ga-Adangme j. Akan k. Frafra l. Kotokoli m. Other (specify)

10. **Religion:** a. Christian b. Muslim c. Traditional d. Other
(specify).....

11. **Marital Status:** a. Married b. Single c. Divorced d. Widow/er e.
Separated f. Consensual Union

12. **Do you have any disability?** a. Yes b. No (If no, skip to Q 14)

13. **If yes, what type of disability is it?** a. Physically Challenged b. Visually
Impaired c. Hearing Impaired d. Other (specify)
.....

14. **What is the size of your household?**
.....

15. **How many households are in your dwelling?**
.....

16. HOUSEHOLD COMPOSITION

#	a. Name of Household member	b. Relationship to the Household Head	c. Sex	d. Age	e. Currently Schooling (yes or no)	f. Highest Educational Level and skills	g. Occupation	h. Total monthly Income (GHC)	i. Type of Disability
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

#	a. Name of Household member	b. Relationship to the Household Head	c. Sex	d. Age	e. Currently Schooling (yes or no)	f. Highest Educational Level and skills	g. Occupation	h. Total monthly Income (GHC)	i. Type of Disability
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									
19.									
20									
21									

B. MIGRATION

- What is the residential status of your household in the community? a. Indigene b. Migrant
c. Other (Specify)
- If migrant, where did the household migrate from?
- How long ago has this migration been?
- What drove you to settle in this community/town?
- Do you intend going back to your hometown in future? a. Yes b. No
- If yes, when do you intend to leave the community for good?

C. ECONOMIC CHARACTERISTICS**1. MAJOR AND MINOR OCCUPATION OF RESPONDENT**

- Major Occupation:** a. Crop farmer b. Livestock farmer c. Fisherman d. Hunter
e. Charcoal Producer f. Petty Trader (hawker, table-top etc.) g. Artisan (specify)
..... h. Office work (specify institution and position or title
.....) i. Student j. Other
(specify).....
- Do you engage in any minor occupation?** a. Yes b. No (If no, move to section C2.)
- If yes, what other minor occupation are you engaged in:** a. Crop farmer b. Livestock
farmer c. Fisherman d. Hunter e. Charcoal Producer f. Petty Trader (hawker, table-top etc.)
g. Artisan (specify)
..... h. Office work
(specify institution and position or title) i.
Student j. Other (specify).....

2. INCOME

- What are the sources of income for your household? a. Major occupation b. Minor occupation
c. Remittance d. Rental (specify.....) e. GOG/NGO benefit
f. Other (specify)
- Estimate your **Monthly income (GHC)** and that of all the people who earn income in the household:

#	STATUS OF INCOME EARNER (TO HH)	SEX	SOURCES OF INCOME					
			MAJOR OCCUPATION (GHC)	MINOR OCCUPATION (GHC)	REMITTANCES (GHC)	RENTALS (GHC)	GOG/NGO BENEFIT (GHC)	OTHER (GHC)
1.	Household Head							
2.	Spouse							

#	STATUS OF INCOME EARNER (TO HH)	SEX	SOURCES OF INCOME					
			MAJOR OCCUPATION (GHC)	MINOR OCCUPATION (GHC)	REMITTANCES (GHC)	RENTALS (GHC)	GOG/NGO BENEFIT (GHC)	OTHER (GHC)
3.								
4.								
5.								
6.								
7.								
8.								
9.								

3. EXPENDITURE

- 1. What is the cycle of your household expenditure?** **a. Daily** **b. Weekly** **c. Monthly**
- d. Yearly** **e. Other (Specify)**

- 2. How much (in GH¢) does your household spend on the following items?**

ITEM	AMOUNT (GH¢)					
	DAILY	WEEKLY	MONTHLY	SEASONAL	YEARLY	
Food						
Transport						
Education						
Electricity						
Batteries						
Kerosene						
Water						
Medicals						
Funeral						
Savings						
Other, specify.....						

D. HOUSEHOLD ASSETS

- 1. Which of these assets are owned by your household?**

#	Type of property	Total no.	Number owned by women	#	Type of property	Total no.	Number owned by women
1	Vehicle			10	Fishing net		
2	Power tiller			11	Outboard motor		

#	Type of property	Total no.	Number owned by women	#	Type of property	Total no.	Number owned by women
3	Motorbike			12	Mobile Phone		
4	Motor-tricycle			13	Horse/donkey		
5	Bicycle			14	Television (TV)		
6	Tractor (ploughing and carting crops)			15.	Fridge		
7	Set of living room furniture			16	Freezer		
8	Plastic chairs			17	Radio		
9	Canoe			18	Others		

E. HOUSING CHARACTERISTICS AND ACCESS TO SERVICES

Housing			
1.	Year of construction of the house	
2.	Number of rooms	1. 1-2 5. 9-10 2. 3-4 6. 11-12 3. 5-6 7. 13-14 4. 7-8 8. 15 and above	
3.	Types of Roofing	1. Thatched 2. Aluminum 3. Asbestos 4. Leaves Other (specify)	
4.	Types of floors	1. Cement 2. Earth 3. Other (Specify)	
5.	Types of construction materials used for walls	1. Sandcrete 2. Landcrete 3. Concrete 4. Mud	

		5. Wattle and daub 6. Bamboo 7. Wood 8. Other (Specify) 	
6.	Type of ownership	1. Self-Owned 2. Family Owned 3. Rented 4. Squatter 5. Other (Specify.....) 	
7.	If rented, state the rental cost per month	
8. If rented, state length of tenancy remaining			
Toilet			
1.	Do you have access to a toilet facility?	1.Yes 2.No	
2.	Type of toilet facility	1. WC 2. KVIP 3. Pit Latrine	
3.	What is the type of ownership?	1. Household (private) 2. Public 3. Shared with other households	
4.	Where is the Toilet facility located?	1. Within the House 2. Outside the House	
Electricity			
1.	Do you have access to electricity?	1. Yes 2. No	
2.	If no, what is the household's source of lighting?	1. Kerosene Lantern 2. Candle 3. Solar Lamp 4. Generator 5. Torch 6. Other (Specify) 	
Energy Used for Cooking			
1.	What type of fuel does the household use for cooking?	1. Fuel wood	

		2. Charcoal 3. Kerosene 4. Electricity 5. LPG 6. Other (specify)	
Refuse Disposal			
1.	How do you dispose of solid waste?	1. Door to door service 2. Community dump 3. Skips/Refuse Containers 4. Burning/Burying 5. Free range/Indiscriminate dumping	
2.	How do you dispose of waste water?	1. Throw on the street 2. Throw into the yard 3. Pour into gutters/drains 4. Septic tank/Soak away	
Access to Water			
1.	What is your main source of water for drinking?	1. Pipe borne 2. Sachet Water 3. River/Stream 4. Dam 5. Rain 6. Well 7. Pond 8. Lake 9. Borehole 10. Other specify	
2.	What is your main source of water for household use?	1. Pipe borne 2. Sachet Water 3. River/Stream 4. Dam 5. Rain 6. Well 7. Pond 8. Lake 9. Borehole 10. Other specify	

F. HEALTH STATUS OF HOUSEHOLD

Which of the following health conditions/diseases has a member of your household suffered from within the last one year?

#	Gender	Diseases suffered in the past 12 months	Medical Providers consulted	Reason for selecting medical provider
		a. None b. malaria/fever c. Diarrhoea d. Acute Respiratory Infection (cold, cough) e. Bilharzia f. Guinea Worm g. Cholera h. Tuberculosis i. HIV/AIDS j. Malnutrition k. Skin Rashes/Itching l. Heart Diseases m. Arthritis n. Other, specify	a. Community Health Centre/Community Health Post/CHPS Compound b. Public Hospital c. Private Hospital d. Traditional Medicine Practitioner e. Pharmacist/Chemist f. other, (specify)	a. Low cost b. Distance – Close/Nearby c. Religious/Traditional Beliefs d. Effectiveness e. Other, (specify)
1	Women			
2	Men			
3	Boys			
4	Girls			

G. TRANSPORTATION

- Do you use at least part of the project road when travelling? a. Yes b. No
- If yes, provide details below: (Please tick that which applies)

Travel Details				
Travel Purpose	Travel Destination	Travel Distance	Frequency	Travel Time
1. To Work		a. Less than 1 km b. 1-3km c. 4-6km d. 7-9km e. 10-20km f. 21-30km g. 31-40km h. 41-50km i. Above 50 km	1. Every week day 2. Once a week 3. Twice a week 4. 3 times a week 5. 4 times a week 6. Every day 7. More than once a day 8. Other (Specify).....	1. 1-30 minutes 2. 31-60minutes 3. 61-90minutes 4. 91-120minutes 5. Above 120 minutes
2. Market		a. Less than 1 km b. 1-3km c. 4-6km d. 7-9km e. 10-20km f. 21-30km g. 31-40km h. 41-50km i. Above 50 km	1. Every week day 2. Once a week 3. Twice a week 4. 3 times a week 5. 4 times a week 6. Every day 7. More than once a day 8. Other (Specify).....	1. 1-30 minutes 2. 31-60minutes 3. 61-90minutes 4. 91-120minutes 5. Above 120 minutes
3. Visit		a. Less than 1 km b. 1-3km	1. Every week day	1. 1-30 minutes

		c. 4-6km d. 7-9km e. 10-20km f. 21-30km g. 31-40km h. 41-50km i. Above 50 km	2. Once a week 3. Twice a week 4. 3 times a week 5. 4 times a week 6. Every day 7. More than once a day 8. Other (Specify).....	2. 31-60minutes 3. 61-90minutes 4. 91-120minutes 5. Above 120 minutes
4. For social programs (funeral/naming/marriage etc.)		a. Less than 1 km b. 1-3km c. 4-6km d. 7-9km e. 10-20km f. 21-30km g. 31-40km h. 41-50km i. Above 50 km	1. Every week day 2. Once a week 3. Twice a week 4. 3 times a week 5. 4 times a week 6. Every day 7. More than once a day 8. Other (Specify).....	1. 1-30 minutes 2. 31-60minutes 3. 61-90minutes 4. 91-120minutes 5. Above 120 minutes
5. Transact business		a. Less than 1 km b. 1-3km c. 4-6km d. 7-9km e. 10-20km f. 21-30km g. 31-40km	1. Every week day 2. Once a week 3. Twice a week	1. 1-30 minutes 2. 31-60minutes 3. 61-90minutes

		h. 41-50km i. Above 50 km	4. 3 times a week 5. 4 times a week 6. Every day 7. More than once a day 8. Other (Specify).....	4. 91-120minutes 5. Above 120 minutes
6. To a Health facility		a. Less than 1 km b. 1-3km c. 4-6km d. 7-9km e. 10-20km f. 21-30km g. 31-40km h. 41-50km i. Above 50 km	1. Every week day 2. Once a week 3. Twice a week 4. 3 times a week 5. 4 times a week 6. Every day 7. More than once a day 8. Other (Specify).....	1. 1-30 minutes 2. 31-60minutes 3. 61-90minutes 4. 91-120minutes 5. Above 120 minutes
7. Other (specify).....		a. Less than 1 km b. 1-3km c. 4-6km d. 7-9km e. 10-20km f. 21-30km g. 31-40km h. 41-50km i. Above 50 km	1. Every week day 2. Once a week 3. Twice a week 4. 3 times a week 5. 4 times a week 6. Every day 7. More than once a day	1. 1-30 minutes 2. 31-60minutes 3. 61-90minutes 4. 91-120minutes 5. Above 120 minutes

			8. Other (Specify).....	
--	--	--	----------------------------	--

MODE OF TRANSPORT AND FREQUENCY OF USE

1. How frequently do you use each of the following types of transport?

(Please tick one box on each line only)

	5+ days per week	2 – 4 days per week	about one day per week	less than once a week but more than once a month	Up to once a month	never
Private Car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motorcycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taxi, car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taxi, Motorcycle (Okada)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motor tricycle cargo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taxi, Motor tricycle (Yellow Yellow)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trotro/mini bus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private van	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Large bus (e.g. MMT)/Coach/HGV)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bicycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Push/Pull cart/donkey- cart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify.....)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

COST OF TRAVEL

1. Cost of travel per journey per mode of transport?

Mode	Cost of passenger / journey (GHC)	Cost of luggage (large sack bag) (GHC)
Taxi – car		
Trotro/minibus		
Large bus		
Private car		
Motorbike		
Motor-tricycle (Yellow Yellow)		
Motor-tricycle (cargo)		
Push/Pull cart/donkey-cart		

G. POVERTY

- Which people are usually considered to be the poor in the community? (Provide indicators for the poor)?** a. Those who are aged and cannot engage in active work b. Those who cannot afford at least a meal in a day c. Those who cannot provide the basic needs of the family (Shelter, education, clothing) d. Those who are vulnerable (Disability, lack access to healthcare) e. Those who are unemployed f. Those who are aged and cannot engage in active work g. Those who are peasant farmers h. Those whose have low income level i. Other (Specify).....
- Are the poor in the community mostly:** a. women b. men c. Both men and women d. Elderly e. People with disability
- What percentage of your community would you consider to be poor?** a. 1-20 b. 21-40 c. 41-60 d. 61 – 80 e. 81+
- Is your household benefiting from the Livelihood Empowerment Against Poverty (LEAP) programme of the government?** a. Yes b. No
- If yes, how much do you receive? GHC**
- Is your household benefiting from any other support programme?** a. Yes b. No
- If yes, what is the source of the support?** A. GOG. b. NGO/CSO c. FBO
- Describe the kind of support given** a. Cash b. Inputs c. Clothing d. Scholarship e. food f. Mosquito nets g. Educational materials (books, uniforms, etc.) h. Other (specify)

9. If support is in cash, how much do you receive? GHC

10. How long is the money given for?

H. KNOWLEDGE ABOUT THE PROJECT

1. Have you heard about the proposed road project in your area? a. Yes b. No (If no, skip to Q. 5)

2. If yes, what have you heard? a. I heard that the road is going to be rehabilitated
b. I heard that the road will be expanded c. I only see officials and workers on the road working
d. Other (Specify)

3. From where did you get the information a. Family and friends/neighbors b. Television (station.....)
c. Radio (station.....) d. Internet
e. Assemblyman f. Rumour g. Chiefs/Opinion Leaders h. Contractor/Construction Workers (Specify)
i. Other (Specify)

4. Is this your usual source of information? a. Yes (If yes, skip to section G) b. No

5. (If No), what is your usual source of information? a. Radio (station)
b. Friends/neighbors c. Assembly man d. Newspapers e. TV (station)
f. Internet Other (specify)

I. IMPACT OF THE PROPOSED PROJECT - CURRENT CONDITIONS OF TRAVEL

1. How would you rate the road surface condition of the road? a. Good b. Fair
c. Poor d. Don't know

2. If poor, give suggestions on what can be done to improve it? a. Government intervention
b. The road should be asphalted and culverts should be built c. The road should be rehabilitated
d. provision of adequate drainage system to minimize erosion e. Proper maintenance culture
f. The road needs to be expanded g. Organizing communal labour to fill the potholes h. Other (Specify)
.....

3. How does the current condition of the road affect your activities? a. Difficulty in transporting farm produce to the market
b. High Cost of transportation c. Increase travel time
d. Frequent rate of accidents e. Road is inaccessible during rainy season
f. Low income generation due to the bad nature of the road g. Damages vehicles and motorcycles
h. Lateness to school i. Other (Specify).....

4. How does the current condition of the road affect the activities of the following:

4a Men - a. Difficulty in transporting farm produce to the market/other communities b. Frequent incidence of accidents
c. Low income generation d. Delays travel e. Low market prices for farm produce
f. High transportation cost g. Road is inaccessible during the rainy season
h. Frequent Breakdown of motorbikes and vehicles i. Other (Specify)

4b Women - a. Difficulty in transporting farm produce to the market b. Pregnant women experience miscarriages
c. Delays Travel d. Frequent accident due to the bad nature of the road
e. Low income generation f. High transportation of cost
g. Nurses hardly visit the community to weigh babies due to the nature of the road
h. Other (Specify).....

care i. Easy access to transportation services j. Other (Specify)

7. How can the **positive impacts** be enhanced? a. Provision of good drainage system
b. Regular Maintenance, monitoring and evaluation c. Educating community members on road regulations
d. Locals with requisite skills should be employed e. Provision of incentives for construction workers
f. Adequate security measures g. Cooperation among construction workers and locals
h. Include relevant road signs to reduce accident i. Other (Specify).....

7b. What are the likely **negative impacts** of the project? a. No negative impact b. Road accidents will be rampant
c. Animals may be knocked down by over speeding vehicles/motorcycles
d. Properties close to the project road may be demolished during construction e. Increase in criminal activities and social vices
f. Noise and water pollution g. Rise in the level of dust
h. Influx of people i. Other (Specify).....

8. What **negative impacts** is the proposed project likely to have on the activities of the following:

8a. Men - a. No negative impact b. Road accidents will be rampant c. Animals may be knocked down by over speeding vehicles/motorcycles
d. Properties close to the project road may be demolished during construction e. Increase in criminal activities and social vices
f. Noise and water pollution g. Rise in the level of dust
h. Influx of people i. Other (Specify).....

8b. Women - a. No negative impact b. Road accidents will be rampant c. Animals may be knocked down by over speeding vehicles/motorcycles
d. Properties close to the project road may be demolished during construction e. Increase in criminal activities and social vices
f. Noise and water pollution g. Rise in the level of dust
h. Influx of people i. Other (Specify).....

8c. Boys: - a. No negative impact b. Accidents will be rampant due to over speeding
c. Increased rate of School drop-out d. May indulge in social vices and criminal activities
e. Increase in child labor f. Other (Specify).....

8d. Girls: - a. No negative impact b. Accidents will be rampant due to over speeding c. Increased rate of School drop-out
d. May indulge in social vices and criminal activities
e. Increase in child labor f. Other (Specify).....

8e. Elderly: - a. No negative impact b. Exposed to frequent rate of accidents which may lead to loss of lives
c. Noise and dust pollution during construction may affect their health d. The elderly may not be able to cross the road when drivers over speed
e. May be unable to get support from relatives
f. No alternative route to access health care during construction phase
g. Reduce labour in farming activities h. High cost of living i. High cost of transportation
j. The elderly may sit by the roadside to beg for money k. Other (Specify).....

8f. The poor: - a. No negative impact b. Over speeding may lead to increased rate of road accidents
c. Farms and other properties may be affected which may increase their poverty level
d. Emission of dust during construction may affect their health e. High cost of living f. High transportation cost
g. May sit by the roadside and beg for money h. Prices of food may increase
i. Cannot pay hospital bills when accidents occur j. Other (Specify).....

9. How can the **negative impacts** be mitigated? a. Drivers and locals should be educated on the safe and efficient use of the road
b. Speed ramps, traffic lights, road signs and pedestrian walk way should be provided
c. Affected persons should be compensated and relocated d. There should be police checkpoints and stations at vantage points
e. The road should be expanded and culverts constructed
f. Social amenities such as markets, pipe borne water, etc. should be provided for the community
g. Adequate security measures should be put in place h. There should be effective supervision, monitoring and evaluation
i. Government should support the poor and the elderly
j. Project implementation body should not allow school children to work on the site
k. Other (Specify)

J. NEEDED SOCIAL AMENITIES IN THE COMMUNITY

1. Apart from the social amenities the community already has, what other social amenities does the community still need?

.....

What support networks or services are available in the community for the vulnerable?

Vulnerable	Support networks/Groups	Main Support
	a. LEAP b. SEND Ghana c. Advance Ghana d. Camfed Ghana e. Plan Ghana f. World Vision g. USAID h. UNICEF i. Songtaba j. World Food Programme k. Secondary Education Improvement Programme (SEIP) l. Action Aid m. Christian Children Fund of Canada (CCFC) n. Associations (Specify name.....) o. Other (Specify).....	a. Financial Support b. Provision of relief items c. Provision of farm inputs and seeds d. Provision of food items e. Provision of educational materials f. Provision of credit facilities g. Provision of clothing h. Provision of scholarships i. Education on improved farming methods k. Other (Specify).....
Men		
Women		
Girls		
Boys		
Elderly		

**GHA/DFR ASSESSMENT STUDY TO IMPLEMENT OPBRC ROAD CONTRACTS –
SIA/GENDER AND POVERTY STUDY
INTERVIEW GUIDE FOR TRADITIONAL AUTHORITIES AND OPINION LEADERS
BACKGROUND**

1. What is the name of this community?
2. What Traditional Area or Paramountcy does the community belong to?
3. What is the current population of the community? a. Men b. Women c. Children
4. Which ethnic groups are represented in the community? (Which ethnic group is in the majority?)
5. What languages are spoken in the community?
6. What are some of the cultural traditions in the area?
7. How many communities are located within 2 Km away from the project road?
8. Describe the land tenure system in your community?
9. How do men and women get access to land for farming?

POVERTY

1. What percentage of your community's population would you consider to be poor (with less than GHC9.00 to spend/per day?). Or are unable to provide their basic needs of food, clothing and shelter
2. Are those you consider to be poor mostly men or women?
3. What other criteria would you use to describe the poor in your community?

NGOs/CSO

1. What groups/associations/cooperatives such as NGOs/CBOs/FBOs/CSOs exist or work in the community?
2. What do they do?
3. How does their work affect men, women, boys, girls, the poor, the elderly?

IMPACT OF CURRENT CONDITION OF ROAD

1. What is the impact of the current condition of the road surface on
 - Men's activities
 - Women's activities
 - Boys and girls going to school
 - Transport services

Probe for positive and negative impacts

2. What is the impact of the current condition of the road surface on activities of men and women, boys and girls with disability?

- The blind
- Lameness on clutches/wheel chair

Probe for positive and negative impacts

IMPACT OF PROPOSED ROAD PROJECT

1. What are the expected positive impacts of the proposed road rehabilitation on?

- Men's activities
- Women's activities
- Persons with disability?
- Poverty reduction

Probe for positive and negative impacts

Probe for impact during construction phase and operations phase

2. What is the impact of the proposed road rehabilitation on access to and delivery of social services for men and women:

- Transport services
- Education
- Health
- Marketing of agricultural produce

Probe for positive and negative impacts

Probe for impact during construction phase and operations phase:

3. What are your expectations from the proposed project?
4. What should be done for people whose farms/properties/livelihoods could be affected by the project?
5. What are your concerns about the proposed project?

ACCESS TO FACILITIES/SERVICES

1. Community access to Facilities and Services

#	Facilities/Services	Location: (in or out of community)	Access/ mode or means of transport	Time needed
1.	Electricity			
2.	Water – for Drinking			
3.	Mobile networks			
4.	Water – Domestic chores			
5.	Hospital			
6.	Health centres			
7.	CHPS compounds			
8.	Schools			
9.	Police stations			
10.	Markets			
11.	Churches			
12.	Mosques			
13.	Selling points on road			
14.	Artisans along the road			
15.	Entertainment facilities			

**GHA/DFR ASSESSMENT STUDY TO IMPLEMENT OPRC ROAD CONTRACTS
SOCIAL IMPACT / GENDER AND POVERTY ASSESSMENT
FOCUS GROUP DISCUSSION GUIDE (ADAPTABLE FOR WOMEN AND YOUTH)**

A. GENERAL

1. What major economic activities do women in the community engage in?
2. What about **girls/young women**?
3. What major economic activities do men in the community engage in?
4. What about **boys/young men**?
5. What percentage of women/ young women in the community would you say are unemployed?
6. What percentage of men/ young men in the community would you say are unemployed?
7. What percentage of girls and boys in the community would you say are employed?
8. What are their main products? **Probe for production level/volumes?**
9. How much of the produce is kept for consumption at home and how much is sold?
10. How much of the produce is processed and by what method?
11. How will you rate the economic standing/income level of women as against their male counterparts in the community?
12. Who do you consider to be a poor person in the community / what indicators do you use to define a poor person?
13. Are the poor persons mostly: Men? Women? Elderly?
 Youth?
14. Are there youth/women's organizations/cooperatives such as NGOs/FBOs/CBOs that exist in the community?
15. What roles do they play?
16. What kind of support or assistance do they give to women and girls? Men and boys? The poor? The elderly?

DIFFERENTIAL TRAVEL PATTERNS

1. How often do men, women, youth, boys and girls, elderly and the poor travel on the project road? **Probe for:**
 - a. **Purpose of travel**
 - b. **Usual destination**
 - c. **Frequency of travel**

d. Mode of transport

2. What are the travel needs of:
 - Women
 - Men
 - Boys
 - Girls
 - Poor
 - Elderly
 - Persons with Disability

B. PROPOSED PROJECT

1. Have you heard about the proposed project prior to this meeting?
2. If yes, **probe for the sources and the exact information heard.**
3. How would you rate the current condition of the road?
4. What have been some of the challenges experienced by women/youth as a result of the current road condition?
5. What can be the possible positive impacts of the project during construction on:
 - Women
 - Men
 - Girls
 - Boys

Probe for impacts on

- ✓ **a. On their economic activities**
- ✓ **b. Their standard of living**

6. How can the positive impacts be enhanced for the benefit of women, men, youth, girls and boys in the community?
7. What can be the possible positive impacts of the project during the operations phase on:
 - Women
 - Men

- Girls
- Boys

Probe for impacts on

- ✓ **a. On their economic activities**
- ✓ **b. Their standard of living**

8. How can the positive impacts be enhanced for the benefit of women, men, youth, girls and boys in the community?

9. What can be the possible **negative impacts** of the project during **construction phase** on:

- Women
- Men
- Girls
- Boys

Probe for impacts on

- ✓ **a. On their economic activities**
- ✓ **b. Their standard of living**

10. What can be the possible **negative impacts** of the project during **operations phase** on:

- Women
- Men
- Girls
- Boys

Probe for impacts on

- ✓ **a. On their economic activities**
- ✓ **b. Their Standard Of Living**

11. How can the negative impacts be mitigated for women, men, girls and boys in the community?

GHA/DFR ASSESSMENT STUDY TO IMPLEMENT OPRC ROAD CONTRACTS INTERVIEW GUIDE FOR MARKET ASSOCIATION EXECUTIVES

A. BACKGROUND

1. What is the name of the market?
2. When did the market start operating?
3. How many unions does the market have?
4. What are the names of these unions?
5. When was the executive committee formed?
6. What is / are the functions of the executive committee?
7. How many traders are in the market?
8. What services does the market association provide to its members?
9. Where do the market women/traders get their wares/goods/commodities from?
10. Which day(s) do you consider as the main market days?
11. Which day(s) are your peak market day(s)?
12. Which day(s) are your lean market day(s)?
13. On the average, what estimated number of buyers / customers patronize the market? (Probe for patronage on peak and lean days)
14. What are the conditions one needs to fulfill before obtaining a place in the market to sell?
15. What are the means of transport used in conveying your goods/commodities/wares to the market?

B. PROPOSED PROJECT

1. Have you heard about the proposed project prior to this meeting?
2. If yes, **probe for the sources and the exact information heard.**
3. How would you rate the current condition of the road?
4. What have been some of the challenges experienced by women/youth as a result of the current road condition?
5. What can be the possible positive impacts of the project during construction on:
 - Women
 - Men
 - Girls
 - Boys

(Probe for impacts on their economic activities; their standard of living!!!!)

6. How can the positive impacts be enhanced for the benefit of women, men, youth, girls and boys in the community?
7. What can be the possible positive impacts of the project during the operations phase on:
 - Women
 - Men
 - Girls
 - Boys

(Probe for impacts on their economic activities; their standard of living!!!!)

8. How can the positive impacts be enhanced for the benefit of women, men, youth, girls and boys in the community?
9. What can be the possible **negative impacts** of the project during **construction phase** on:
 - Women
 - Men
 - Girls
 - Boys

(Probe for impacts on their economic activities; their standard of living!!!!)

10. What can be the possible **negative impacts** of the project during **operations phase** on:
 - Women
 - Men
 - Girls
 - Boys

(Probe for impacts on their economic activities; their standard of living!!!!)

11. How can the negative impacts be mitigated for women, men, girls and boys in the community?

Is there a space in or around the market where traders or the market women can move temporarily to allow construction of the market?

1. If yes, where is the actual location?
2. Who owns the place?

D. PROJECT IMPACTS

1. What could be the positive impacts of the project (construction and operations) on?
 - a. Market women
 - b. Buyers / Customers

2. How can the positive impacts be enhanced?
3. What could be the negative impacts of the project (construction and operations)?
4. What measures should be adopted to avoid, reduce and mitigate the negative impacts?

F. CONCERNS

1. What particular concerns do you have about the project?

GHA/DFR ASSESSMENT STUDY TO IMPLEMENT OPRC ROAD CONTRACTS DISCUSSION GUIDE FOR TRANSPORT TERMINALS

A. BACKGROUND

1. Name of Transport Terminal
2. Location of terminal
3. How long has the Terminal been at the current location?
4. What facilities (light at night, washrooms etc.) are being enjoyed at the current location?
5. How many are your members?
6. Where are your destinations?
7. Which types of Vehicles are used by Transport Terminal operators?

B. PROPOSED PROJECT

12. Have you heard about the proposed project prior to this meeting?
13. If yes, **probe for the sources and the exact information heard.**
14. How would you rate the current condition of the road?
15. What have been some of the challenges experienced by women/youth as a result of the current road condition?
16. What can be the possible positive impacts of the project during construction on:
 - Women
 - Men
 - Girls
 - Boys

(Probe for impacts on their economic activities; their standard of living!!!!)

17. How can the positive impacts be enhanced for the benefit of women, men, youth, girls and boys in the community?
18. What can be the possible positive impacts of the project during the operations phase on:
 - Women
 - Men
 - Girls
 - Boys

(Probe for impacts on their economic activities; their standard of living!!!!)

19. How can the positive impacts be enhanced for the benefit of women, men, youth, girls and boys in the community?

20. What can be the possible **negative impacts** of the project during **construction phase** on:

- Women
- Men
- Girls
- Boys

(Probe for impacts on their economic activities; their standard of living!!!!)

21. What can be the possible **negative impacts** of the project during **operations phase** on:

- Women
- Men
- Girls
- Boys

(Probe for impacts on their economic activities; their standard of living!!!!)

22. How can the negative impacts be mitigated for women, men, girls and boys in the community?

23. What are your expectations about the proposed project?

24. What issues/complaints do you have as far as the road project is concerned?

25. What steps have you taken to resolve the issues/complaints?

26. What other concerns do you have about the road project?

27. What do should be done to address the concerns?

GHA/DFR ASSESSMENT STUDY TO IMPLEMENT OPRC ROAD CONTRACTS
INTERVIEW GUIDE FOR NGOs

A. BACKGROUND

1. Name of organization -----

2. Year established -----
3. Years of operation in project area -----
4. Objectives -----

5. Coverage/target groups -----

6. Specific programs for women, men, boys, girls -----

7. Staff numbers -----

B. POVERTY

1. What percentage of the population in your area of operation would you consider to be poor (with less than GHC9.00 to spend/per day?). Or are unable to provide their basic needs of food, clothing and shelter? -----

2. Are those you consider to be poor mostly men or women? -----
3. What other criteria would you use to describe the poor in your area of operation? -----

4. How do your programs help address poverty? -----

C. IMPACT OF CURRENT CONDITION OF ROAD

1. What is the impact of the current condition of the road surface on your service delivery?

-----What is the impact of the current condition of the road surface on

Men's activities -----

Women's activities -----

Boys and girls going to school -----

Transport services -----

Probe for positive and negative impacts!!!!!!

2. What is the impact of the current condition of the road surface on activities of men and women, boys and girls with disability such as the blind, lame, on clutches/wheel chair).

Probe for positive and negative impacts!!!!!!

D. IMPACT OF PROPOSED ROAD PROJECT

6. What are the expected positive impacts of the proposed road rehabilitation on your service delivery?

7. How can the positive impacts be enhanced? -----

8. What are the expected negative impacts of the proposed road rehabilitation on your service delivery? -----

9. How can the negative impacts be mitigated? -----

10. What are the expected positive impacts of the proposed road rehabilitation on:

Men's activities -----

Persons with disability -----

Poverty reduction -----

Probe for positive and negative impacts!!!!!!!!!!

Probe for impact during construction phase and operations phase!!!!!!!!!!

11. What are the impacts of the proposed road rehabilitation on access to and delivery of social services for men and women:

Transport services -----

Education -----

Health -----

Marketing of agricultural produce -----

Probe for positive and negative impacts

Probe for impact during construction phase and operations phase:

E. What are your expectations from the proposed project? -----

F. RESETTLEMENT

1. What should be done for people whose farms/properties/livelihoods could be affected by the project? -----

What are your concerns about the project? -----

TRANSPORT SECTOR IMPROVEMENT PROJECT

INTERVIEW GUIDE FOR MMDAS/OFFICIALS

A. BACKGROUND

1. What is the population of your district? Men---Women---Children--- (Identifying specific roads and communities)
2. What are the main economic activities engaged in by men, women, and the youth (15 – 35yrs)? (Emphasis on affected roads and communities)
3. What social amenities do you have in the district? (Probe on all available infrastructural facilities and services)
4. Are there any ongoing major activities along the project road?
5. If yes, how are these activities likely to be affected by the project?

B. INVOLVEMENT

1. How do the MMDA authorities expect to be involved in the project?
2. How can the MMDA authorities help to ensure the success of the project?
3. How can the MMDA authorities help to minimize or eliminate any friction that may arise as a result of the project?

C. THE PROPOSED PROJECT

1. What have you heard about the proposed road project?
2. What positive impacts is the project likely to have on members of your district/municipality?
3. What positive impacts is the project likely to have on education in your district/municipality?
4. What positive impacts is the project likely to have on health in your district/municipality?
5. What positive impacts is the project likely to have on policing in your district/municipality?
6. How can the positive impacts be enhanced?
7. What percentage of the population is most likely to become employed because of the road project?
8. What skills are available within the community for use by any potential employer such as a contractor or the proposed project itself?
9. What negative impacts is the project likely to have on your district/municipality?
10. How can the negative impacts be mitigated?

LIST OF PERSONS CONSULTED

Stakeholder/ Institution/ Location	Persons Consulted	Role/Position	Contact Info.	Date
Regional Coordinating Council	Gilbert Nuuri-Teg	Regional Coordinating Director	0244 830 012	21/05/2019
Ministry of Food and Agriculture	Sasu Yeboah	Regional Director	020 354 69 33	21/05/2019
Ministry of Food and Agriculture	Gaeten Baligi	Monitoring & Evaluation Unit	0243 84 5050	21/05/2019
Land Use and Spatial Planning Authority (LUSPA)	Rockson Niminga-Beka	Assistant Regional Director	0207633177	23/05/2019
National Road Safety Authority	Samad Mohammed	The Regional Director	0501260548	23/05/2019
Women in Agricultural Development (WIAD)	Elizabeth Kutina	The Regional Officer	0248547721	23/05/2019
Department of Feeder Roads	Justice Koranteng	The Regional Director	0246916188	23/05/2019
Environmental Protection Agency	Zeinabu Wasai-King	Regional Director	0501301387	21/05/2019
Northern Development Authority (formerly Savannah Accelerated Development Authority - SADA)	Vivian Adams Nabie	Regional Director	024 408 7489	23/05/2019
Ghana Highway Authority	Thomas K. Oppong-Baah	Ag. Regional Highway Director	020 813 64 82	23/05/2019
	Andrew Okere	Regional Maintenance Manager	024 428 5048	
Water Resources Commission – Black Volta Basin Secretariat	Joachim Ayiwe	Chief Basin Officer, WRC	020 785 5495 0392 024 459	23/05/2019
World Bank, Ghana Office - Accra	John Richardson	Snr. Transport Specialist	0243 400 200	11/06/2019
Ghana Agricultural Sector Investment Programme (GASIP) - Accra	Chelteau Barajei	Programme Coordinator	0244 714 650	11/06/ 2019
Ghana Consulting Engineering Association	Ing. Albert Ayeh Ogyiri	Water Engineer	0248 547 721	11/06/2019
Ghana Consulting Engineering Association	Ing. Kwaku Boampong	Road Engineer	0244 337 762	11/06/2019
Ghana Statistical Service	Rosalind Quartey	Head of Geographic Information Systems	0244 418 999	12/6/ 2019
MoFA / EU Desk - Accra				1 st Week July

Ghana Commercial Agriculture Project	Galina Okartei-Akko	Agribusiness Analyst	0501 315 464	1/8/2019
Ghana Irrigation Development Agency (GIDA)	Samuel Manu Ansah	Acting Director	0244 142 562	12/06/2019
Ghana Irrigation Development Agency (GIDA)	Ben Agbakpe	Project Coordinator	0547 162 787	12/06/2019
Nadowli-Kaleo District Assembly	Katherine T. Lankono	District Chief Executive	0207 44 44 84	17/05/2019
Nadowli-Kaleo District Assembly	Safia Abdulai	District Planning Officer	024 447 163	17/05/2019
Nadowli-Kaleo District Assembly	Gilbert Amenano	Head of Works Department	0244 29 08 55	17/05/2019
Wa Municipal Assembly	Tahiru Issahaku Moomin	Municipal Chief Executive	024 829 0569	23/05/2019
Wa Municipal Assembly	Adam Abdul-Latif	Head of Works	020 771 4911	23/05/2019
Wa Municipal Assembly	Mr. Fatal	Municipal Coordinating Director	024 484 0142	22/05/2019
Wa West District Assembly	Edward Laabiiv Sabo	District Chief Executive	020 906 1020	22/05/2019
Wa West District Assembly	Hilda Boroh	Assistant Director, Coordinating	0240 4756 78 0207 881 830	22/05/2019
Wa West District Assembly	Awal Ishawu	Development Program Officer	0244 182 325	22/05/2019
Wa West District Assembly	Kpegluu Gordon	Senior Technician Engineer	0540 544 211	22/05/2019
Wa West District Assembly	Osman Al-Hilal	Assistant Director	0242 829 889	22/05/2019
Charia Electoral Area (Wa New Market)	Steven Naah	Assemblyman	054 11 01 357	23/05/2019
Weichau Market and Township	R.Y. Issahaku	Wichau Assemblyman	0242 805 908	22/05/2019
Weichau Township	Saaka Mauzu	Weichau Resident	0544 360 869	01/06/2019
Nyoli Township	Amadu Ayishetu Tipeani	Nyoli Assemblywoman	054 331 5948	05/07/2019

DETAILS OF STAKEHOLDER CONSULTATIONS AND CONCERNS RAISED

Stakeholder / Institution / Location	Contact Person	Role	Contact Information	Date	Concerns Raised / Information Received
<i>Relevant Government and Regulatory Institutions</i>					
Regional Coordinating Council	Gilbert Nuuri-Teg	Regional Coordinating Director	0244830012	21/05/2019	<p>The Coordinating Director iterated that:</p> <ul style="list-style-type: none"> • The Team was welcome to the region • The RCC eagerly looks forward to the start date of the project roll-out • Everything necessary for the successful implementation of the project would be fully supported by the RCC
Ministry of Food and Agriculture	Sasu Yeboah	Regional Director	0203546933	21/05/2019	<p>The MOFA Regional Director expressed the following concerns:</p> <ul style="list-style-type: none"> • It is essential that the Engineering Unit of the Ministry be included or involved in the project implementation. • Well-constructed water holding areas for animals or watering of crops exist in Burkina Faso. The incorporation of this if possible, could be helpful. • Although this project is very helpful, there is a great need to open up the Upper West Region with the construction of a few major roads to link the region to Bawku and Bolgatanga, which are more economically active. • Beyond a few districts such as Nadowli-Kaleo and Dafiamma-Bussie-Issah, travelling in the region can be difficult. The Wa East District roads also need to be developed quickly. • These suggestions could make the project under discussion even more meaningful.
	Gaeten Baligi	Monitoring & Evaluation Unit	0243845050	21/05/2019	<ul style="list-style-type: none"> • Although the earmarked roads are important, priority must be given to the major farming areas. • Currently, warehouses are being built by the Government through its 1 District 1 Factory (1D1F) policy. It would be good that links with districts that are not well connected.

					<ul style="list-style-type: none"> MOFA should be part of the project implementation. This would allow or create a basis for monitoring and evaluation.
Land Use and Spatial Planning Authority	Rockson Niminga-Beka	Assistant Regional Director	0207633177	23/05/2019	<p>The LUSPA Assistant Director expressed the following concerns:</p> <ul style="list-style-type: none"> Community members living along the road networks earmarked for upgrading should be made to understand what the TSIP project is all about since that would be a very good tool to elicit their opinions via the questionnaire administration. As a principle to guide implementers of the project, a 100 feet width of each road should be maintained so as to help other utility service providers in the future. The implementers of the project should ensure a good water facility for the people, their farms and livestock to really enhance agro-productivity in the area. The project should not affect the people negatively. Database on all road upgrades in the region should be shared with the LUSPA. The Director commended the team for broader consultations with agencies and departments in the Region before implementation of the TSIP project.
National Road Safety Authority	Samad Mohammed	The Regional Director	0501260548	23/05/2019	<p>Among the issues raised were the following:</p> <ul style="list-style-type: none"> There is poor <i>work zone safety</i> in most locations undergoing construction by the GHA and the DFR and this should be guarded against. The GHA and DFR should carry out due diligence so that Contractors do their work effectively. The visiting team should talk to the various Assemblies they are working with so that GHA and the DFR do their work very well by monitoring such agencies and not conniving with them during the time of construction. All road safety standards should be ensured during the construction period. It is hoped that the TSIP project will engender a number of progress outcomes in the Region.

Women in Agricultural Development (WIAD)	Elizabeth Kutina	The Regional Officer	0248547721	23/05/2019	<p>The Regional Officer acknowledged the project and expressed the following sentiments:</p> <ul style="list-style-type: none"> • Almost all the designated road networks earmarked for upgrading by the TSIP project are in the most deplorable state and the situation gets worse during the rainy season. • The implementers of the project should speed up the upgrading. • The widths of the roads to be upgraded should be widened and graveled for a longer lifespan. • There should be a robust supervision of the TSIP implementation for a better outcome. • The Regional Officer asked the visiting team to involve women as respondents to administered questionnaires to elicit a balanced study outcome.
Department of Feeder Roads	Justice Koranteng	The Regional Director	0246916188	23/05/2019	<p>The concerns shared by the Director and his Assistants include the following:</p> <ul style="list-style-type: none"> • The visiting team should consider that the period of their study coincided with the farming, and therefore the rainy season. • The team should do well to contact all Unit Committee members in designated locations. • The project implementers should ensure good water facility for the people, their farms and livestock. • The project should not negatively affect water supply but rather enhance it. • Surface upgrading of roads should be with bitumen. • The project concept design should welcome all people on board and by June/July 2019, tendering should have been completed.
Environmental Protection Agency	Zeinabu Wasai-King	Regional Director	0501301387	21/05/2019	<ul style="list-style-type: none"> • There are environmental issues with gravel pits and dug-outs. Contractors need to agree on the fact that there would be those constructions BEFORE implementation. • There are things that need to be done before final payment, e.g. call in the EPA to inspect.

					<ul style="list-style-type: none"> • Project sites need to be studied by the EPA before, during and after projects. • The EPA should be an implementing partner. • The main issue is to safeguard the environment.
Northern Development Authority - formerly Savannah Accelerated Development Authority	Vivian Adams Nabie	Regional Director	0244087489	23/05/2019	<p>The Regional Director shared the following sentiments:</p> <ul style="list-style-type: none"> • The NDA / SADA was part of the inception of this project. It had three (3) components – research, feeder roads, and irrigation dam construction. • There must be an intensive and purposeful community engagement as part of the project. • The people must understand the linkages of community-irrigation-road network-farm gate. • Other agencies such as Ministry of Health, Ghana Health Service, Ministry of Education and Ghana Education Service would benefit immensely from the project because many of such workers commute great distances because they are unable to live in places that are generally difficult to access.
Ghana Highway Authority	Thomas K. Oppong-Baah Andrew Okere	Ag. Regional Highway Director Regional Maintenance Manager	0208136482 0244285048	23/05/2019	<ul style="list-style-type: none"> • There are needs, expectations and aspirations of communities that should be met. Agencies such as the GHA provide the infrastructural assets.
Water Resources Commission – Black Volta Basin Secretariat	Joachim Ayiwe	Chief Basin Officer, WRC	0207855495 0392024459	23/05/2019	<p>The following sentiments were shared by the Chief Basin Officer:</p> <ul style="list-style-type: none"> • Construction companies need to note that there is a process to go through to dam waterbodies. • They should also note where conveyance drains are to be sited. • The WRC needs to be consulted in the consideration of raising a road because of a dam.
The World Bank	John Richardson	Senior Transport Specialist	0243400200	11/06/2019	<p>The Regional / Country Manager shared that some principles or policies of the World Bank regarding the implementation of the TSIP should be considered critically. These are:</p>

					<ul style="list-style-type: none"> • People shouldn't be worse off environmentally. For example, construction works on the proposed road networks should not affect the flora and fauna of such nodes (sustainability of the TSIP). • The implementation design of the TSIP should be gender-focused. That is, every single indicator of women, for example, their livelihoods and status should not be impacted negatively. Rather, such indices should be guarded safely. • A network approach should also be considered. That is, there should be a departure from the traditional mode of road construction where only a limited or a single stretch of road distances are considered instead of a number of closely-linked network of roads noted for production of a particular agricultural product. • Socially, the diversion of roads may affect people and should therefore be considered during the implementation design. • A road maintenance approach should be considered critical in the design implementation stage. • As much information as possible should be shared at all levels to minimise negative impact of the project. • Any shortfall in the World Bank's principles or policies as a guide to implementing TSIP should attract the attention of the Consultants for recommendation and eventual redress by implementers.
Ghana Consulting Engineering Association	Ing. Albert Ayeh Ogyiri Ing. Kwaku Boampong	Water Engineer Road Engineer	0248547721 0244337762	11/06/2019	<p>The following concerns were expressed:</p> <ul style="list-style-type: none"> • Infrastructure development is the basis of any development and so the TSIP project should be looked at from this perspective. • Drainage characteristics and management should be given a critical look in implementation of the project. • Direct implementers of the project should undertake thorough soil investigation, for example, soil type and strength to determine the capacity levels of the roads.

					<ul style="list-style-type: none"> Given the general flat terrain of the Region, there should be creation of a minimum level of longitudinal slopes to drain water, especially during the rainy season. Overall volume of road traffic and types of vehicles plying current road networks should be looked at to determine extent of road damage. This will help in road sustainability plans. The road construction design should consider building simple toll booths to mobilise funds for local development. Proper engineering (e.g. surveying and alignment) of roads should be critically considered so as to ensure safety of road users.
Ghana Irrigation Development Authority	Samuel Manu Ansah Ben Agbakpe	Acting Director Project Coordinator	0244142562 0547162787	12/06/2019	<p>The team was welcomed by the Acting Director and Project Coordinator, who indicated and explained the following:</p> <ul style="list-style-type: none"> GIDA was part of the team that designed the TSIP project, which embraces upgrading of roads and development of irrigation facilities to enhance agricultural productivity. All designated Pump Stations are supposed to be where irrigation facilities would be set up; and this would comprise locations close to the Black Volta, existing dams and new dams. The whole idea of TSIP was conceived against the background of a comprehensive network of closely-knitted roads connecting a number of districts and not necessarily stand-alone district projects. This is to ensure that contractors could do effective monitoring and maintenance. The Consultants should contact one Mr. Banini (0242906926) for comprehensive annotated maps showing the array of interconnecting locations cutting across districts. Valleys on the road networks with possible water sources should be protected with culverts to provide water for livestock. GIDA concluded that the entire TSIP project or contract is a performance and maintenance-based one to ensure proper execution by contractors through annual assessments.

Ghana Statistical Service	Rosalind Quartey	Head of Geographic Information Systems	0244418999	12/06/2019	<ul style="list-style-type: none"> GSS officials indicated that the GSS was part of the team that designed the TSIP, which embraces the upgrading of roads and development of irrigation facilities to enhance agricultural productivity and shared similar concerns as the GIDA.
Ghana Agricultural Sector Investment Programme	Chelteau Barajei	Programme Coordinator	0244714650	11/06/2019	<p>The Coordinator mentioned that GASIP was part of the initial Team that designed the TSIP project; and also emphasized the following:</p> <ul style="list-style-type: none"> Farmers should be deeply sensitised to know that the upgrade of the roads is really for them. Though there is a clear roadmap for road infrastructural development, there is no clear roadmap on what precisely MOFA will be doing. In other words, there is no clear agronomic roadmap in the TSIP by MOFA. The exact roles of MOFA on the entire TSIP project should be clearly spelt out from the top, that is at the ministerial level so as to trickle down to the bottom to elicit optimum support. Broad consultation should be considered to elicit views. It will not be enough to just provide roads but there should be a corresponding need for developing agriculture in itself but unfortunately, the funds are not available.
Ghana Commercial Agriculture Project	Galina Okartei-Akko	Agribusiness Analyst	0501315464	01/8/2019	<ul style="list-style-type: none"> The role roads play in the agriculture value chain, especially small holder farmers who produce the bulk of the produce in the focal area of the project is immense. Bad roads negatively impact on incomes. Roads must be innovatively designed to enable water harvesting to provide water for farmers during the dry season for farming and livestock purposes. Poorly constructed roads should not be accepted. Sustainability of the roads is very important to accrue all the benefits envisaged by the project on both agriculture and the road sector.
Local Government Authorities					

Nadowli-Kaleo District Assembly	Katherine T. Lankono	District Chief Executive (DCE)	0207444484	17/05/2019	<p>The DCE stressed on the mission and vision of the Assembly and mentioned that the roads would be economically important especially in aiding the following:</p> <ul style="list-style-type: none"> • The roads would aid agribusiness, and open up the district for general development in line with the vision and mission of the Assembly. • It would particularly enhance the education sector in eliminating many of the dangers posed to children such as crossing streams to get to schools.
Nadowli-Kaleo District Assembly	Safia Abdulai	District Planning Officer	024447163	17/05/2019	<p>The Officer expressed the following views:</p> <ul style="list-style-type: none"> • The project must address the issue of affected properties, such as farms, houses, etc. • There should be full consultations with the Assemblies involved, as well as opinion leaders in the respective communities before the project begins. • There would be great benefits from the project, such as reducing post-harvest losses, reducing the incidence of maternal mortality and other medical emergencies. • Road accidents involving both persons and animals would likely increase. • How soon would the project be implemented and would all the listed roads be worked on?
Nadowli-Kaleo District Assembly	Gilbert Amenano	Head of Works Department	0244290855	17/05/2019	<p>The Officer expressed the following views:</p> <ul style="list-style-type: none"> • Understand the rain pattern of the work areas, as well as the rain and heat intensities. • Laterite filling needs to be thicker than the standard 225. • Community engagement, especially community entry needs to be done correctly. • The project should not be void of the cultural, social, and socio-psychological considerations and aspirations of the communities. These soft aspects of civil works determine the buy-in and ultimate success of the project.

Wa Municipal Assembly	Tahiru Issahaku Moomin	Municipal Chief Executive (MCE)	0248290569	23/05/2019	<p>The MCE shared the following views on the project:</p> <ul style="list-style-type: none"> • The economic importance of the Market Road is numerous – it is quite central to many activities in the municipality. • It is the only link from many areas into Wa; it is however so narrow and poses a danger to lives. The whole of the Wa West area connects to Wa by this road. • Involvement of the technical staff of the Assembly is key for effective monitoring and supervision as work progresses. Again, since the post-contract activities management lies with the Municipal Assembly, it is essential that the technical staff have full knowledge of work being done. • It is important that all the roads being built are fit for purpose. There must be bus and loading bays where appropriate. When these are not provided, the communities that use the roads would be forced to improvise, and such structures, e.g. improvised loading bays and speed ramps compromise the quality and lifespan of the roads. • Since most of the roads listed are feeder roads, the flow of foodstuff into the larger markets would be easier, and in turn enhance every kind of trading activity. • Contractors assigned to work in the Municipality must consider some degree of local content in their labour force.
Wa Municipal Assembly	Adam Abdul-Latif	Head of Works	0207714911	23/05/2019	<p>The following views were shared by the Officer:</p> <ul style="list-style-type: none"> • The road narrows as it gets closer to the market. It is too narrow especially where it should have widened. The factors that informed this are not clear. This is an issue which has been raised at earlier stakeholder consultations. • There is a need for a parking and offloading bay at the shoulder of the road. Some amount of loading and off-loading outside the market must be allowed. Not everyone using the road would be entering the market.

					<ul style="list-style-type: none"> The Engineering Department of the Assembly <u>must</u> be part of the whole process, otherwise there would be no basis for the Department to monitor whatever the Contractor is doing.
Wa Municipal Assembly	Fatal	Municipal Coordinating Director	0244840142	22/05/2019	<p>The Municipal Coordinating Director expressed his views as follows:</p> <ul style="list-style-type: none"> The whole market street stretch significantly shortens the distance coming into Wa from the Wa West District Area. The Assembly should be brought along the whole process – from the beginning to the end. This is because it is the Assembly that would be addressing or managing the communication with the people on issues such as dust pollution, noise, etc. The Assembly is the political leadership that is known and more easily recognized by the people; therefore, they must be in the know to enable them explain to the people to get a complete buy-in. The post-contract management of infrastructure such as roads sit with the Assembly, therefore they must be well informed. The Engineer needs to be literally embedded in the whole process to enable him brief the Management of the Assembly, as needed.
Wa West District Assembly	Edward Laabiiv Sabo	District Chief Executive	0209061020	25/05/2019	<p>The DCE shared the following concerns on the project:</p> <ul style="list-style-type: none"> The Wa West District is quite vast, but road connectivity is very poor. Many important food baskets have great difficulty accessing markets and other economically important locations. For example, Jambosse-Nwabassi is where the water plant is located, yet no good road leads there. Dorimon-Babo-Eggu areas are not easily accessible to Wechiau, the district capital. The Gurmu-Dornye is an important food basket, where the Region's 2nd Best Farmer farms. Very often, there are hundreds of bags of maize that are transported with great difficulty. The involvement of the local governance system could enrich road projects such as this present one with local information, as well as monitoring and supervision.

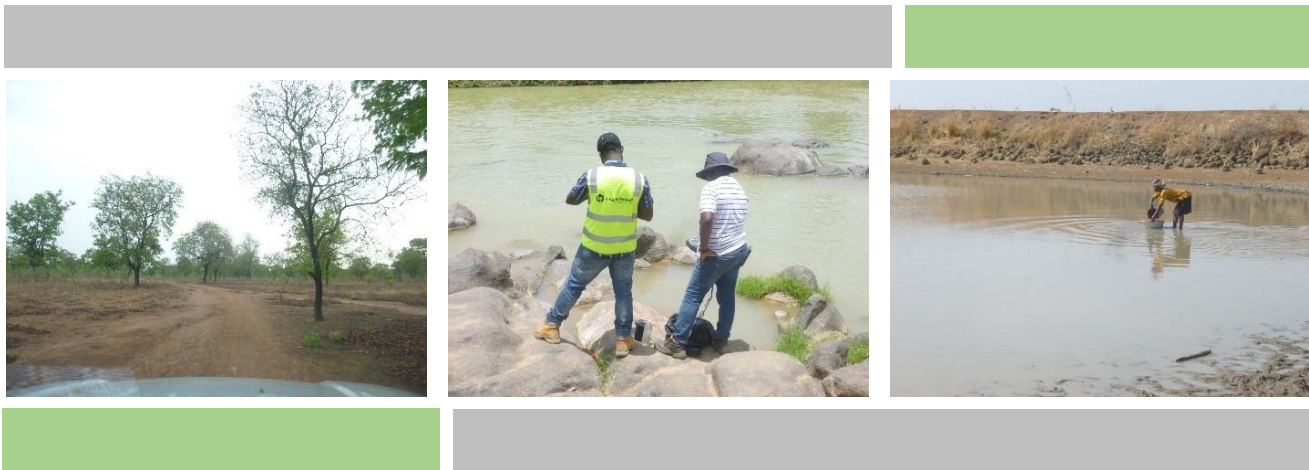
					<ul style="list-style-type: none"> On security, although real dangers such as those posed by Fulani herdsmen exist, the construction of many of these roads would significantly reduce armed robbery incidents. The need is dire and overdue; therefore, it would be helpful if some timeframes were communicated to the Assembly to help in managing expectations. The overall economic standing and potential of the Wa West District would be significantly enhanced if all these roads become a reality as soon as possible.
Wa West District Assembly	<p>Awal Ishawu</p> <p>Hilda Boroh</p> <p>Kpegluu Gordon</p> <p>Osman Al-Hilal</p>	<p>Development Program Officer</p> <p>Assistant Director, Coordinating</p> <p>Senior Technician Engineer</p> <p>Assistant Director</p>	<p>0244182325</p> <p>0240475678 0207881830</p> <p>0540544211</p> <p>0242829889</p>		<p>The Officers shared the following concerns:</p> <ul style="list-style-type: none"> Contractors are usually not accountable to the Assembly, perhaps due to the manner in which the contracts are structured. If the contracts were such that some technical staff of the Assembly is included, it would be difficult for a contractor to disregard the Assembly. The monitoring team of the Assembly should be incorporated into the monitoring aspect to enable the unit see to the interest of the Assembly and its people. Is it possible for dams to be created during the road construction where there are valleys where water could be dammed? Being one of the poorest districts in the country, some local content component in the labour force would go a long way to get the community to own the proposed road project. The road project would help boost the Wechiau Tourist Center's activities for the benefit of the district. The Engineering Unit would need resources to monitor the project.
Community Views					
Wechiau Market and Township	R.Y. Issahaku	Wechiau Assemblyman	0242805908	22/05/2019	<p>The following concerns were shared:</p> <ul style="list-style-type: none"> The market link road, as well as other untarred roads leading into and out of Wechiau are of great importance to the town and really cannot be discussed in isolation.

					<ul style="list-style-type: none"> • The Wechiau market is a central location for at least 5 surrounding villages whose major marketplace is the Wechiau market. • These roads would greatly increase trading activities and lighten the burden of women especially. Women often carry very heavy loads of maize, beans and other farm produce to the market because of difficulty with transportation, as a result of the poor state of the roads. • The tarring of these roads would reduce medical emergencies that have been referred to the District Hospital in Wechiau. Many of these are maternity related. • It would also greatly enhance the security of the general area. This is especially important because of the Hippo Sanctuary which is a recognised and an award-winning Ghana Tourist Authority site.
Charia Electoral Area (includes the Wa New Market Area)	Steven Naah	Assemblyman	0541101357	23/05/2019	<p>The concerns shared include the following:</p> <ul style="list-style-type: none"> • The main Wa New Market Road is a link road for about 80% of the people coming from surrounding towns to the market area. • The untarred nature of the road poses environmental, as well as traffic difficulties. • The youth in the area are highly agitated about the road and sometimes threaten to demonstrate and to deliver a press statement.
Wechiau Township	Saaka Mauzu	Wechiau Resident	0544360869	01/06/2019	<p>The following concerns were shared by the resident:</p> <ul style="list-style-type: none"> • The market link road should not be considered over and above the other roads because it is only a small part of the untarred roads in Wechiau, in any case, it would enhance a lot of things. • The project will generate employment - at least, at the construction stage, employing general labour. • Cooked food is sold in the market; already the manner in which food is sold, is unhygienic. This is further compounded by dust generated by the untarred road.

					<ul style="list-style-type: none"> • As it is a market link, it is an access road to a food basket/market. A good road network would reduce food spoilage. • There is a major road linking Wechiau and Burkina Faso, which is everyone's dream that it would be re-constructed. Presently, a car cannot go there. This has reduced trading to those who use motorbikes only. The road should get to the black Volta and then a bridge constructed to enable crossing with a car. However, this is a huge project and probably out of scope for now. • The road leading to Wa is not tarred, if it could be tarred, it would be very helpful. • How long will it take for this project to begin?
Nyoli Township	Amadu Ayishetu Tipeani	Nyoli Assembly-woman	0543315948	05/7/2019	<p>The following opinions were expressed by the Assembly woman:</p> <ul style="list-style-type: none"> • The Nyoli Market area needs to be handled in a holistic manner. Although the market road would be greatly appreciated, the needs of the whole market area are multi-faceted. • In the construction of the market road, the women should be considered when the need for general labourers comes up. In past instances, only men were engaged. • The project should consider creating an inlet for vehicles (entrance) and an outlet (exit). These gates could even be tolled to raise money for maintaining the market. • There is no good source of potable water in the market area. The women resort to the use of alum in uncertain quantities to treat water before usage.

ANNEXURE C: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

MINISTRY OF ROADS AND HIGHWAYS
OPBRC ASSESSMENT STUDY



**ENVIRONMENTAL AND SOCIAL
MANAGEMENT PLAN**

Upper West Package 1 Roads (Wa Municipal, Wa West & Nadowli-Kaleo Districts)

Rev 3
July 2020

PREPARED FOR:
Ghana Highway Authority
Hall of Technology, Ormsby Road
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ABBREVIATIONS AND ACRONYMS

AIT	Agency Implementation Team
CA	Competent Authority
CDT	Compensation Disbursement Team
CESMP	Contractor's Environmental and Social Management Plan
CHRAJ	Commission for Human Rights and Administrative Justice
CM	Construction Manager
COD	Chemical Oxygen Demand
CRO	Community Relations Officer
CS	Construction Supervision
CSO	Civil Society Organization
DADU	District Agricultural Development Unit
DO	Dissolved Oxygen
DOVVSU	Domestic Violence and Victims Support Unit
DVLA	Driver and Vehicle Licensing Authority
EPRP	Emergency Preparedness and Response Plan
EAP	Environmental Assessment Practitioner
EAR	Environmental Assessment Regulations
EIRF	Environmental Incident Report File
EMU	Environmental Monitoring Unit
EPA	Environmental Protection Agency
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plans
GBV	Gender-Based Violence
GCLS	Grievance and Complaints Logging System
GHA	Ghana Highway Authority
GoG	Government of Ghana
GRM	Grievance Redress Mechanism
GRC	Grievance Redress Committee
GRO	Grievance Redress Officer
GSA	Ghana Standards Authority
GWCL	Ghana Water Company Limited
HSE	Health, Safety and Environment
I&AP	Interested and Affected Parties
IDA	International Development Association
ISO	International Organization for Standardization
LI	Legislative Instrument
LOA	Land Owner Agreement
LVD	Land Valuation Division
MMDAs	Metropolitan, Municipal and District Assemblies
MOF	Ministry of Finance
MOFA	Ministry of Food and Agriculture
MOT	Ministry of Transport
MRH	Ministry of Roads and Highways
MTTD	Motor Transport and Traffic Department
NADMO	National Disaster Management Organisation
NCR	Non-Conformance Report
NGO	Non-Governmental Organization
NRSA	National Road Safety Authority
OHS	Occupational Health and Safety
OMC	Oil Marketing Company
OPBRC	Output and Performance-based Road Contracting

PAPs	Project Affected Persons
PPE	Personal Protective Equipment
PPP	Public Participation Process
PTO	Permission to Occupy
PWD	Persons with Disability
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SDS	Safety Data Sheet
SHE	Safety Health and Environment
SOP	Standard Operating Procedures
TSIP	Transport Sector Improvement Project
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
WHO	World Health Organization

1 INTRODUCTION

1.1 PROJECT CONTEXT

The Government of Ghana (GoG), through the Ministry of Roads and Highways (MRH) and in partnership with the Ghana Highways Authority (GHA) and the Department of Feeder Roads (DFR), is combining the well-known traditional methods of road construction and rehabilitation with the new concept of Output and Performance-based Road Contracting (OPBRC) for selected network of roads in the Upper West Region of Ghana. This Upper West Package 1 Project consists of a network of feeder roads, access roads, connectivity roads, as well as irrigation and market access roads within the Wa Municipal, Wa West and Nadowli-Kaleo districts in the Upper West Region.

Though the Project is being implemented under the Transport Sector Improvement Project (TSIP) which is a group of projects for which the Republic of Ghana obtained funding from the International Development Association (IDA) of the World Bank, this Package is funded with European Union (EU) Aid through the 11th European Development Fund (EDF).

The road networks under the Project entail different degrees of upgrading interventions. The road network is mostly gravel roads or earth roads in generally fair to poor condition. Some of the road sections have drainage issues, thus making them prone to flooding and inaccessible during rain events. This has left the roads ridden with gaping potholes or depressions. There are many visible erosion gullies on the roads due to poor drainage. It is expected that most of the improvements to the roads would be accommodated within the existing road reserve, however some isolated sections may require additional land to accommodate the design intent and/or realignments, if needed.

Knight Piésold Ghana Limited (Knight Piésold) was appointed by UWP as the independent Environmental Assessment Practitioner (EAP) to undertake the compilation and submission of an Environmental and Social Impact Assessment (ESIA) for the Project in accordance with the Environmental Assessment Regulations, 1999 (LI 1652) and the Environmental Protection Agency Act, 1994 (Act 490). The proposed Project has also committed to comply with the requirements of the World Bank Environmental and Social Safeguard Standards.

The ESIA identified impacts (both positive and negative) of the Project to the physical, natural and socio-economic environment of the Project area and prescribed appropriate mitigation and enhancement measures to avoid, minimise and reduce negative impacts, and to promote opportunities for the enhancement of positive impacts. To achieve continuous improvement in the environmental and social performance of the Project, this provisional Environmental and Social Management Plan (ESMP) has been prepared. The ESMP will serve as an action plan or framework for project environmental management and is aimed at providing a holistic approach to the management of environmental impacts during the design, construction and operation of the proposed roads under the Project. The development of the ESMP is in line with Regulation 24 of LI 1652.

1.2 OBJECTIVES OF THE ESMP

The objectives of this ESMP are as follows:

- To outline standards and guidelines for compliance to environmental/social management;
- To communicate the aims and goals of the ESMP and incorporate environmental and social management into the project planning, construction and operational phases;
- To guide Contracting Entities, sub-contractors and other workers involved in the Project in meeting the legislative and best practice commitments set out in the ESIA;
- To set out cost effective mitigation measures in order to minimize the extent of negative environmental and social impacts and to enhance positive impacts;

- To provide guidance regarding method statements which are required to be implemented to achieve the environmental specifications; and
- To define corrective actions to be taken in the event of non-compliance with the specifications of this ESMP in order to prevent long-term environmental degradation.

1.3 APPLICABILITY TO OTHER DOCUMENTATION

This ESMP applies to work to be undertaken with regards to the Upper West Package 1 Feeder Roads Project. The ESMP should be read in conjunction with relevant documents that comprise the suite of documents for this contract (e.g. the ESIA and Project design reports). Third parties appointed by the Contracting Entity in terms of the contract should validate compliance with the conditions of this ESMP.

The ESMP is a dynamic document subject to similar influences and changes as are wrought by variations to the provisions of the project specification. Information contained in this current version will be reviewed and updated annually. The findings and recommendations of periodic assessments (annually or more frequently) by internal / external auditors will be used to update the current version at that time, if required.

2 DEFINITIONS AND INTERPRETATION

2.1 PARTIES INVOLVED

All staff: The entire workforce and project team appointed by the Developer (see definition below) to implement the Project. Sub-contractors, service or product providers / suppliers, artisans and workers employed by the Contracting Entity, Consulting Engineers or Supervision Consultants, and persons visiting or making deliveries to the site.

Biodiversity Specialist: For the purposes of this document, the term 'Biodiversity Specialist' refers to a qualified member of the environmental consultant's team who will oversee the implementation and management of rescue and rehabilitation activities associated with plant and animal species.

Community Relations Officer (CRO): For the purpose of this document, the term 'CRO' refers to the representative on the Contracting Entity's team tasked with assisting in community communication and notification procedures. The CRO will be based on site to deal with and respond to any public concerns.

Consulting Engineer (Supervision Consultant): Consultants contracted by the Project Developer (see definition below) and responsible for monitoring and reporting on the Project.

Contracting Entity: Engineers contracted by the Project Developer and responsible for the road construction and maintenance works or implementing designs on the ground.

Developer (or Proponent): The Client (an individual or group) that is responsible for the planning, funding and development of the project. In this case, the MRH and DFR, on behalf of the Government of Ghana.

Environmental Consultant (or Environmental Assessment Practitioner (EAP)): The individual or company responsible for the development of the ESMP. For the purposes of this document, the term 'Environmental Consultant' refers to Knight Piésold Consulting.

External Auditor: A suitably qualified and experienced independent expert appointed by the Contractor to audit the Project in accordance with contract specifications and applicable legislations and/or regulations.

Health, Safety and Environment (HSE) Manager: For the purposes of this document, the HSE Manager is an individual appointed by the Contracting Entity, with the approval of the MRH / DFR, to represent the contracting team, and is responsible for the day-to-day implementation of the ESMP on the site. The HSE Manager will oversee the construction of the Project, and to make sure that environmental specifications and ESMP obligations are met. The HSE Manager is to be well informed of the contents of the ESMP

relevant to the activities of the construction team and is to understand the basic environmental issues associated with the development. The HSE Manager will be responsible for monitoring, reviewing and verifying compliance with the ESMP by the Contracting Entity.

HSE Officer: A designated person appointed by the Contracting Entity to work and report to the HSE Manager on the day-to-day implementation of the ESMP at construction sites.

Interested & Affected Parties (I&APs): Any individual or group of individuals concerned with, interested in, or affected by the Project and its consequences, including (but not restricted to) the local community and general public, Government and local authorities, stakeholders, landowners, tribal authorities and public interest groups.

Method Statement: A written submission by the Contracting Entity in response to the specification of the Project, spelling out the plan, materials, labour and the methods the Contracting Entity proposes to carry out specific activities and address project impacts. It is written in such detail that the Project Developer and/or Consulting Supervisor is enabled to assess whether the Contracting Entity's proposal is in accordance with the ESMP and associated specifications.

Project Manager / Director: The person or representative on the Contracting Entity's team responsible for coordinating and integrating activities across multiple, functional lines.

Rehabilitation Specialist: For the purposes of this document, the term 'Rehabilitation Specialist' refers to the main specialist appointed as a Sub-Consultant (nominated sub-contractor) to the Contracting Entity to undertake rehabilitation activities following the road construction. The Rehabilitation Specialist is required to adhere to the ESMP.

Specification: Instructions and guidance for specific construction activities designed to help prevent, reduce and/or control the potential environmental implications of these activities.

2.2 ABOUT THE CONSTRUCTION ACTIVITIES

Active sites: The active sites are areas of the working corridor of pre-determined lengths where clearing activities, excavations, trench activities, reinstatement activities and rehabilitation activities are taking place. More than one active site may be operative along the route.

Builders rubble: Any material (for example: wooden planks, waste concrete, cardboard, used bricks, unused subsoil, and metal scraps) utilised in the construction activities, or resulting from the demolition of existing structures on site, that will not serve a purpose in the final structural support, and will require removal from site prior to project hand-over.

Barricades: Any structure meant to protect a construction area from access to the general public. Barricades will be constructed in accordance with the Project's specifications.

Clearing / cleared surface: The natural surface of the ground after clearing of surface vegetation.

Cleared and grubbed: Portions of the site on which excavations are to be carried out. The Contracting Entity should enforce that the general shape, profile, and levels of the area are not altered during the clearing and grubbing operations. In order to avoid re-clearing or to control dust and erosion, the Contracting Entity may have to clear and grub at the latest practicable stage of construction. Topsoil removed during clearing should be set aside and stockpiled in a designated topsoil stockpile area. This topsoil should be re-used during rehabilitation.

Construction camp / site office: The areas / containers utilised for on-site staff offices (for engineers and Contracting Entities, etc.) as well as to store materials, plant, equipment and ablution facilities. In this document construction site office / camp / containers will be used interchangeably.

Construction site: The working corridor (see definition below) and associated construction camp, stockpile areas, workshops, yards, storage facilities, site access roads, etc. The construction site is to be

demarcated and signposted by the Contracting Entity. All construction activities are to remain within the confines of the working corridor, construction camp and yards.

Environment: The surroundings in which humans exist and which comprise:

1. The land, water and atmosphere of the earth.
2. Micro-organisms, plant and animal life.
3. Any part or combination of i) and ii) and the interrelationships them among and between them
4. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that can influence human health and well-being.

Environmental Impact: The change to the environment resulting from an environmental aspect (an activity) on the environment, whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.

Environmental and Social Impact Assessment (ESIA): The process of examining the environmental and social effects of a development. The assessment requires detailed/specialist studies of significant issues that have been identified during the initial assessment phase.

Environmental and Social Management Plan: A detailed plan of action prepared so that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental / social impacts are implemented during the life-cycle of the Project.

Land Owner Agreement (LOA): refers to an agreement between the MRH / DFR and a registered landowner for permission to occupy land, or part thereof, for a specified period during construction activities. The MRH / DFR and landowner are to come to an agreement prior to the Contracting Entity occupying this area.

Minor repair: For the purposes of this document, the term 'minor repair' refers to vehicle / machinery / plant repair that is not potentially polluting to the environment. For example, a tyre change is considered to be 'minor repair', however an oil spillage is considered to be potentially polluting to the environment.

Open trench: Refers to the area within the Working Front (see definition below) where trench excavation activities are occurring. An open trench ceases to be open once backfilling and reinstatement have taken place.

Permission to Occupy: This document serves as an access permit which will be issued by the MRH / DFR to the Contracting Entity for construction purposes. This signifies that a LOA is in place and states the specifics of the area or extent of land that will be occupied or utilised and for how long.

Registered servitude: For the purposes of this document, the (registered) servitude will refer to the area of the working corridor that will be registered as a permanent servitude for the operational phase of the project for the purposes of maintenance works. The servitude will be reinstated and rehabilitated, but both plant species choices and land uses will be limited along this corridor.

Temporary working space: For the purposes of this document, the temporary working space will refer to the area of the working corridor (see definition below) that will be used for construction purposes but will not be registered as part of the permanent servitude during the operational phase of the project. For example, the working corridor may be 30m wide in some instances, and will comprise 12m of the permanent servitude, and 18m of the temporary working space. The working space is temporary, and permission to occupy this land is to be obtained from the relevant landowners prior to construction on their land. This servitude is to be reinstated and rehabilitated after construction.

Working corridor: This is the temporary working space (refer above) as agreed to by the affected landowners together with the registered (or operational) servitude. The working corridor is the corridor within which work will take place for the entire length of the project.

Working front / area: The working front is the area of the working corridor where work is actively taking place such as clearing activities, excavations, trench activities, reinstatement activities and rehabilitation activities. More than one working front may be operative along the route. The working fronts are to be

temporarily fenced, and all construction and rehabilitation related activities are to remain within the confines of the temporary boundary and are to make use of access routes as determined for each active site.

3 ENVIRONMENTAL MANAGEMENT APPROACH

The environmental management approach for this Project is based on the ISO 14001:2015 Environmental Management System standard. The use of this standard enables:

- that the environmental management requirement on the Project is properly planned for;
- a robust mechanism for implementation; and
- conditional improvement of the environmental management function

As such, this ESMP has been structured according to the five key elements of the standard. These are:

- Environmental Policy
- Planning
- Implementation of Operation
- Checking and Corrective Action
- Management Review

4 ENVIRONMENTAL POLICY

4.1 ENVIRONMENTAL POLICY STATEMENT

The Contracting Entity should undertake (and procure that sub-contractors undertake) the development and operation of the Project in an environmentally responsible way by complying with the MRH's corporate environmental policy specified in the works contract.

As a means of achieving this, the Contracting Entity is expected to include this ESMP with project contract documents that it issues to any third party who carries out all or part of the Contracting Entity's obligations in terms of the contract. The Contracting Entity should procure the construction in an environmentally responsible way by imposing adherence to the provisions of the ESMP as a contractual obligation in respect of every project contract document for the construction activities.

5 PLANNING

5.1 ENVIRONMENTAL OBJECTIVES, TARGETS AND METHOD STATEMENTS

In order to meet the commitments of the environmental policy, as well as those included within the environmental specifications of this ESMP, environmental objectives and targets have been developed. The objectives and targets are captured throughout the document and should be supplied to the external auditor for review and use during audits.

Method statements provide details on the management and mitigation plans. The method statements are presented with each of the mitigation measures throughout the document.

5.2 LEGISLATIVE FRAMEWORK

The Contracting Entity should agree to comply with the ESMP and enforce compliance with the ESMP by third parties appointed by the Contracting Entity to fulfil its obligations within the terms and conditions set out in the contract.

5.2.1 NATIONAL REGULATORY REQUIREMENTS

Requirements for an ESMP are contained in the Environmental Assessment Regulations of 1999 under Part II, Section 15. Under Section 24, the regulation further states:

24. (1) The person responsible for an undertaking in respect of which a preliminary environmental report or an environmental impact statement has been approved shall submit to the Agency an environmental management plan in respect of his operations within 18 months of commencement of operations and thereafter every 3 years.

The EPA has issued a number of formal guidelines on regulatory requirement for the protection of the environment. The following documents are relevant to the Project:

- Environmental Quality Standards for Ambient Air and Noise.
- Sector Specific Effluent Quality Standards for Discharges into Natural Water Bodies.
- General Environmental Quality Standards for Industrial or Facility Effluents, Air Quality and Noise Levels.

Chapter 3 of the ESIA contains a regulatory review and key environmental legislations applicable to the design, construction and implementation phases of the Project that should be referred to and complied with.

The Contracting Entity should be familiar with the requirements of the applicable legislation and standards and any amendments thereof. The Contracting Entity should also establish and maintain procedures to keep track of and confirm compliance with environmental legislative changes.

5.2.2 ENVIRONMENTAL STANDARD

Every applicable environmental standard contained within the environmental legislations should be adhered to. The following environmental guidelines and standards are highlighted. The list is intended to serve as a guideline only for the Contracting Entity and is not exhaustive.

5.2.2.1 AIR QUALITY STANDARDS

In terms of air quality, the Contracting Entity will implement dust control measures in compliance to EPA Environmental Quality Standards for Ambient Air during the construction and maintenance phase.

5.2.2.2 NOISE QUALITY STANDARDS

The Contracting Entity will implement noise control measures in compliance with EPA Environmental Quality Standards for Ambient Noise. Where practical, noise control measures should be developed in consultation with the local authorities.

5.2.2.3 CONTROL OF WEEDS AND INVASIVE SPECIES

The Contracting Entity will implement measures to control invasive species from colonizing the site. Recommended methods of control may include the following:

- Uprooting and disposal for other uses as mulch for local communities
- The application of a suitable chemical weed-killer (herbicide), or

- Any other method of permanent eradication.

The Contracting Entity should not uproot or remove such plants and dump or discard them elsewhere to re-grow or to allow their seeds to be spread or blown to other areas.

5.2.3 ENVIRONMENTAL PERMITTING REQUIREMENTS

Environmental permits or approvals should be obtained from relevant state agencies for aspects of the road construction, upgrading and rehabilitation for which they are required. This will apply to activities involving or affecting the following, as a minimum:

5.2.3.1 RIVER AND STREAM CROSSINGS

The Contracting Entity is expected to know that alterations of a stream or river requires a permit or approval from the Water Resources Commission of Ghana in accordance with Section 24 of the Water Resource Commission Act 1996 (Act 522). The Rivers Act, 1903 prohibits a person from dredging a river unless a license is obtained. Similarly, permission or approval is needed for the removal of riparian vegetation and disturbance of the river bank itself for all river crossings. Pollution of waterbodies (silt-laden run-off, oil from machines, etc.) is not permitted and management or rehabilitation measures should be effectively implemented.

Wetlands are also protected under the Wetland Management (Ramsar Sites) Regulation, 1999 (LI 1659) and the Project is expected to protect mangroves and wetlands within the project areas. The Contracting Entity will not be allowed to drain or undertake any activity in such areas without permission or approval from the Game and Wildlife Division of the Forestry Commission who are the implementing agency in charge of wetlands.

5.2.3.2 ABSTRACTION OF WATER

If water is to be abstracted, the Contracting Entity will need to obtain a license from the Water Resources Commission of Ghana under the Water Use Regulations 2001 (LI 1692).

5.2.3.3 HERITAGE SITES

Per the National Museum Decree, 1969 (NLCD 387), a permit or approval is needed for the disturbance, removal or destruction of any national or local heritage sites, archaeological and paleontological sites, burial grounds and graves and public monuments and memorials. Section 8(1) of the National Museum Decree specifically states that “*no person shall by means of excavation or similar operation search for any antiquity unless authorised by a permit*”.

Section 10 (1) behoves responsibility for any person who discovers an antiquity, and the owner or occupier or any land upon which an antiquity is discovered on becoming aware of the discovery to without delay notify the Ghana Museums and Monuments Board.

5.2.3.4 PROTECTED AREAS AND VEGETATION

The Contracting Entity should comply with the relevant national legislations and local bye-laws that require the protection of certain areas as well as critical plant and animal species of conservation status. Removal or destruction of protected tree species or plants is prohibited by the Forestry Commission Act, 1999 (Act 571), unless a permit is obtained from the Forestry Commission.

Similarly, the Wild Animals Preservation Act, 1961 offer protection for wild animals, birds and fish (including those in reserves) and prohibits hunting, killing or capturing animals or in a manner that would drive, stampede or disturb the animals including that of filming or photographing.

5.2.3.5 WASTE DISPOSAL AND SANITATION

Solid, liquid and hazardous wastes generated during the construction of the road should be disposed of at appropriately licensed or approved sites. This includes disposal of sewage effluent and human waste. Cognisance should also be taken of the relevant local bye-laws in this regard. The design of sanitation and disposal facilities at construction camps, should be submitted and approved by the District Engineer of the relevant / particular District Assembly.

5.2.4 OTHER PERMIT REQUIREMENTS

In all cases, the Contracting Entity will be responsible for confirming that any permits required are identified and obtained from the appropriate authorities or implementing agencies, including local authorities.

6 IMPLEMENTATION AND OPERATION

This section provides details on the overall accountability and responsibilities for the ESMP. Generally, the Contracting Entity is expected to appoint an HSE Manager to oversee the day to day environmental and social management of the site. However, the overall responsibility of implementing the ESMP and ESIA on site is with the Project Developer (MRH / DFR). To enforce that the Project is compliant to local and international environmental laws and legislation, a team of Environmental and Social Safeguard Specialists should be assembled by the MRH / DFR to confirm that the Contracting Entity is compliant to the ESIA and ESMP.

Further details on roles and responsibilities are expanded upon below.

6.1 ROLES AND RESPONSIBILITIES

6.1.1 RESPONSIBILITIES OF THE PROJECT DEVELOPER (MRH / DFR)

The Project Developer will perform the following roles:

- Oversee that all contracting companies tendering for work in the Project affected area receive a copy of the ESIA, ESMP, Resettlement Policy Framework (RPF), Resettlement Action Plan (RAP) and any other relevant project documents and are assisted in understanding their responsibility to operate within the framework of the measures defined in the ESMP. When adjudicating tenders, MRH / DFR should confirm that Contracting Entities have made appropriate allowance for management of environmental and social matters and develop their own ESMPs (where necessary) which shall be approved;
- Oversee that on appointment, contracting companies shall sign the ESMP component of this ESIA so the ESMP will then become part of the contract and be legally binding on the Contracting Entity. Contracting companies will also receive the required training or be guided to understand their responsibility to operate within the framework of the measures defined in the ESMP;
- Enforce that the responsibility for implementing and complying with the conditions of the ESMP forms part of the conditions of appointment of all Contracting Entities throughout the life of the project;
- Oversee that on appointment, Contracting Entity formulates and ensures strict adherence of protocols to prevent the spread and manage COVID-19 and related issues. Ensure that the Contracting Entity and all sub-contractors follow any government and/or project developer issued guidance or directives on prevention and management of COVID-19 and related issues;
- Oversee that independent environmental and social experts (supervision consultants) are appointed to audit the implementation of, and compliance with, the ESMP and monitoring plan on an annual basis; and the independent environmental audits, together with other relevant monitoring information, are made available to the public, throughout the life of the project;

- Oversee that a formal senior management review of environmental and social management performance is undertaken on a quarterly basis for the first one-year, then on monthly basis throughout lifespan of the project. Senior management responsibility will include the review and approval of any proposed measures to improve environmental and social performance;
- Oversee that training and awareness creation is provided to all Contracting Entities in environmental and social management and the mitigation of impacts, to ensure they are aware of their responsibilities and are competent to carry out their work in an environmentally and socially responsible manner. The MRH / DFR should not tolerate transgressions of the provisions of the ESMP; and
- Make available human and financial resources needed to conduct all environmental and social management, mitigation and monitoring activities throughout the project phases.

6.1.2 RESPONSIBILITIES OF THE CONTRACTING ENTITY

The Contracting Entity is required to:

- Be responsible for the overall implementation of the ESMP;
- Be conversant with the requirements of this ESMP and enforce sub-contractors or third parties who carry out all or part of the Contracting Entity's obligation under the contract comply with the requirements of this ESMP;
- Prepare a Contractor's Environmental and Social Management Plan (CESMP), RAP and Monitoring Plan that will be approved by DFR and the World Bank before commencement of any related work (as specified in the ESA for TSIP Framework Document of the MRH, 2017). The CESMP will provide detailed explanation of how the Contracting Entity will comply with the project's safeguard documents such as the ESIA / ESMP, and must include specific mitigation measures required to manage the environmental, social, health and safety issues identified in the ESIA such as local hiring, traffic management, occupational health and safety, management of labour influx, etc. In other words, the CESMP will comprise a series of individual Management Strategy and Implementation Plans;
- Prepare and implement the CESMP in accordance with this ESMP. The CESMP shall be implemented subject to approval by the Consulting Engineer;
- Carry out the works in accordance with the CESMP and conduct daily and weekly safeguard inspections of the works to confirm compliance and reporting the results of these inspections to the Consulting Engineer;
- Proactively update the CESMP as construction methodology or other features change;
- Advise the Consulting Engineer of any changes to works or methods that are outside the scope of the ESMP for updating;
- Be responsible for the procurement of relevant environmental permits that are required for the construction and operation of the Project;
- Supply method statements for activities requiring special attention as specified and/or requested by the Project Developer for the duration of the Contract;
- Bear the costs of damages / compensation resulting from non-compliance with the ESMP;
- Be responsible for informing DFR or the Supervision Consultant of foreseeable activities that will require their input in a timely manner;
- Appoint a suitably experienced and qualified person to fulfil the role of the HSE Manager as detailed in this ESMP;
- Appoint suitably experienced and qualified persons to fulfil the roles of Environmental Officer and Social Safeguards Officer to support the HSE and oversee the day-to-day implementation of the environmental and social dimensions of this ESMP respectively;
- Formulate and ensure strict adherence to protocols to prevent the spread and manage COVID-19 and related issues. Follow any government and/or project developer issued guidance or directives on prevention and management of COVID-19 and related issues;
- Institute strict codes of conduct which should include specific provisions against SEA, SH and GBV for the Contracting Entity and the Contractor's managers and direct and subcontract employees and

adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document; and

- Conduct activities in a manner that minimizes or avoids impacts to the environment, affected residents and the public in general.

6.1.3 RESPONSIBILITIES OF THE CONSULTING ENGINEER (SUPERVISION CONSULTANT)

The Consulting Engineer's team shall include at least one qualified and experienced E&S professional who has been involved in updating the ESIA and the development of the CESMP to oversee the implementation of the ESMP. The Consulting Engineer or Supervision Consultant is responsible for:

- Enforcing the environmental, social, health and safety specifications of the project;
- Monitoring compliance with the requirements of the specification;
- Documenting, in conjunction with the Contracting Entity, the state of the site prior to construction activities commencing. This documentation may be in the form of photographs, video recording or other appropriate formats;
- Maintaining high standard of site supervision and operation to reduce risk of damage to environmental, social, health and safety components;
- Daily monitoring of the Contracting Entity's work for compliance with the CESMP and ESMP as per the measures detailed in Table 10-7, and providing safeguard monitoring results in their monthly reporting to the MRH. As part of their CESMP monitoring responsibilities, the Supervision Engineer will ensure that a suitably qualified and experienced safeguard specialist is resourced to provide at least monthly site inspections to MRH and available for support at other times to respond to incidents, non-compliances, review of CESMP, update of the ESMP and other tasks;
- Managing the review process of the CESMP for approval. The Supervision Engineer would confirm that all current safeguard instruments have been reviewed internally as well as by MRH, World Bank and final approval from World Bank has been secured before disclosure;
- Updating the ESMP as necessary to reflect changes in the work designs;
- Working with MRH to provide meaningful input and direction into community consultations on the updated versions of the ESMP;
- Enforcing that the Contracting Entity institutes a strict code of conduct at the workers' camps and adequately follows the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document;
- Managing instances of non-compliance by the Contracting Entity and reporting all instances to MRH; and
- Escalating recurring instances of non-compliance by the Contracting Entity to MRH / DFR for action.

6.1.4 RESPONSIBILITIES OF THE HSE MANAGER

The Contracting Entity will procure the appointment of an HSE Manager for the duration of the Project, and the HSE Manager would be responsible for the overall implementation of the ESMP in accordance with the requirements of the contract. There should always be an approved HSE Manager on the site, and it is proposed that the HSE Manager is made part of the construction project management team. The HSE Manager will communicate site specific environmental issues to the Contracting Entity and personnel involved in the Project before construction commences. The ESMP will be kept on-site and made accessible to all personnel.

The HSE Manager is to understand the environmental, social, health and safety responsibilities as stated in the ESMP and is to enforce that the project is undertaken in an environmentally and socially considerate manner, as prescribed by the ESMP. The HSE Manager will be fully versed in the contents of the ESMP and is to enforce that the activities of the contracting team remain in compliance with the code of conduct and site-specific protection measures identified by the ESMP. The HSE Manager will be responsible for all monitoring and reporting activities such as noise, water and dust/air quality monitoring. He is to enforce

that all monitoring records are available for review by the competent authority when needed. The HSE Manager will coordinate all specialists that are required on site, if and when required.

Specific roles/activities to be performed by the HSE Manager are outlined below:

- Enforce site protection measures on-site;
- Enforce that all the environmental authorizations and permits required in terms of the applicable legislation have been obtained;
- Monitor and verify compliance with the ESMP and contract and keep records of compliance/non-compliance, and make them available to the external auditor;
- Monitoring and verifying that environmental and social impacts are kept to a minimum;
- Reviewing and approving construction method statements with input from the Contracting Entity, where needed, in order that the environmental specifications contained within the ESMP are adhered to;
- Keeping accurate and detailed records of all activities on-site;
- Monitoring the undertaking by the Contracting Entity of environmental, social, health and safety awareness training for all new personnel on-site;
- Assess the Contracting Entity's environmental, social, health and safety performance from which a brief monthly statement of environmental, social, health and safety performance is drawn up for record purposes;
- Enforce that third parties who carry out all or part of the Contracting Entity's obligations under the Contract are conversant with the requirements of the ESMP and the site protection measures;
- Enforce that the Contracting Entity complies with every applicable legislation;
- Maintain a register of complaints and queries by members of the public at the site office and the actions taken in response to these complaints;
- Recommend that the Contracting Entity suspend any or all works on-site if the third parties who carry out all or part of the Contracting Entity's obligations under the Contract fail to comply with the said specifications;
- Conduct environmental and social audits for compliance with the ESMP and Contract, and report on the findings to the Supervision Consultant; and
- Undertaking a continual internal review of the ESMP and submitting any changes to the Contracting Entity and Supervision Consultant, as well as the DFR for review and approval.

The HSE Manager is expected to have the following qualifications, as a minimum:

- A good working knowledge of relevant environmental, social, health and safety policies, legislation, guidelines and standards;
- The ability to conduct inspections and audits and to produce thorough, readable and informative reports;
- The ability to manage public communication and complaints;
- The ability to think holistically about the structure, functioning and performance of environmental, social, health and safety systems; and
- Proven competence in the application of the following integrated environmental management tools:
 - Environmental and Social Impact Assessment
 - Environmental and social management plans/programs
 - Environmental and social auditing
 - Mitigation and optimisation of impacts
 - Monitoring and evaluation of impacts
 - Environmental and Social Management Systems

The DFR and/or Supervision Consultant will have the authority to instruct the Contracting Entity to replace the HSE Manager if, in their opinion, the appointed person is not fulfilling his/her duties in line with the requirements of the ESMP. The decision to replace an HSE Manager will be made jointly by the DFR and/or Supervision Consultant and the Contracting Entity. Such instruction should be in writing and should clearly set out the reasons why a replacement is required and within what timeframe.

6.1.5 RESPONSIBILITIES OF THE HSE OFFICER(S)

The HSE Officer(s) must possess effective communication, organization, analytical, public and leadership skills, and will have the following responsibilities;

- Monitor incidents of injury, illness, and other situations within a construction area;
- Write reports detailing daily, weekly and monthly health and safety activities and incidences;
- Work with the HSE Manager to design strategies to reduce incidents of illness, environmental accidents, and other issues that may affect Project workers and general public safety;
- Investigate environmental incidences and other public safety concerns within the particular area where construction will be ongoing;
- Assist the HSE Manager to design training programs to provide safety awareness education;
- Offer presentations about current safety hazards based on the Project to educate Project workers on avoiding health, safety, and environmental hazards; and
- Assess risks associated with tools and equipment, jobsites, and work environments.

6.1.6 RESPONSIBILITIES OF THE EXTERNAL AUDITOR

The development of an ESMP for a project is an important and necessary task that is aimed at assigning responsibilities and mitigation options to a variety of activities. However, it can be an ineffective tool in the absence of auditing or monitoring activities. Auditing or monitoring activities involve the structured observation, measurement, and evaluation of environmental data over a period of time. As such, an external environmental and social auditor will be appointed by the Contracting Entity.

The External Auditor will implement an environmental and social audit program that will include the following, as a minimum:

- Comprehensive environmental and social audits to be undertaken every three (3) months during the construction phase, to verify compliance with the ESMP and Contract, and applicable environmental legislation. An audit report should contain recommendations on environmental and social management activities that need to be implemented. The external auditor should report concurrently to the Contracting Entity, DFR and/or the Supervision Consultant.
- A comprehensive environmental and social audit to be undertaken at the completion of the construction phase, to verify compliance with the ESMP and applicable environmental legislation. The audit report will contain recommendations on environmental and social management activities that need to be implemented within the operation and maintenance phases. The External Auditor will report concurrently to the Contracting Entity, DFR and/or the Supervision Consultant.

6.1.7 RESPONSIBILITIES OF THE COMMUNITY RELATIONS OFFICER

The CRO will be part of the Contracting Entity's team and would be responsible for liaising with the Project communities because it is important that the Contracting Entity maintains communication with local communities and other local stakeholders during construction. The CRO will also coordinate with the NGO engaged by the MRH / DFR to oversee the Project's GRM (see Section 7.3.1) in documenting complaints, enquiries, recommendations or concerns that are received by any member of the public. The CRO will have procedures in place to notify I&APs of any potential impacts of construction activities on the surrounding area, e.g., notifying I&APs of activities which may generate excessive noise. The CRO will also coordinate and liaise with the Environmental and Social Safeguards Team or any social specialist sub-consultants that are required on site, and assist with implementing the social aspects of the ESIA and ESMP during the construction, rehabilitation and operational phases of the project.

6.1.8 RESPONSIBILITIES OF THE COMPENSATION DISBURSEMENT TEAM (CDT)

A Compensation Disbursement Team comprising representatives of the Ministry of Finance (MOF), MRH, DFR and Land Valuation Division (LVD) of the Lands Commission will be responsible for organizing and

confirming that compensations payable to Project Affected Persons (PAPs) are delivered in line with the provisions and procedures set out in the RAP and the Project Resettlement Policy Framework.

6.1.9 RAP MONITORING AND EVALUATION TEAM

The RAP Monitoring and Evaluation Team comprising representatives from EPA, LVD and DFR will be responsible for field monitoring and evaluation of the RAP implementation program to confirm that stated targets are met and PAPs are duly compensated in line with the RAP requirements. Inputs, outputs and outcomes of compensation, resettlement and other impact mitigation or management measures will be monitored. The team will be led by the Social Safeguards Specialist of DFR.

The World Bank Social Safeguards team will have general oversight over the resettlement of PAPs. They will receive and review reports from the DFR Environmental and Social Safeguards Team and conduct occasional missions to the Project to among other things determine compliance of the RAP implementation with applicable national laws and regulations and compliance with World Bank policies.

6.1.10 RESPONSIBILITIES OF EPA

The EPA will be the lead environmental regulator and decide on project screening, guide the conduct of the ESIA studies and grant environmental approval for the road projects to commence. EPA will also provide clearance to the ESIA. The EPA will further monitor the implementation phase of the road projects to ensure compliance with approval conditions, mitigation measures and other environmental commitments and quality standards. The EPA will also provide technical review of project environmental monitoring reports.

6.1.11 RESPONSIBILITIES OF NRSA, DVLA AND MTTD

The National Road Safety Authority (NRSA), Driver and Vehicle Licensing Authority (DVLA) and Motor Transport and Traffic Department (MTTD) will serve as the lead road safety stakeholders on the Project. Their role will involve collaborating in the provision of pedestrian safety, as well as bus and heavy goods vehicle safety interventions. Similarly, they will also provide training and dissemination of road safety information to road users, especially drivers, as well as providing technical inputs into road design or construction, especially as relates to installation of safety features. They will also collaborate with emergency services providers, such as the National Ambulance Service and the Ghana National Fire Service in responding to road accidents and providing emergency medical services to accident victims.

The MTTD especially will play significant roles in traffic control / management and enforcement of road traffic laws and regulations. They will also cause the arrest of road users who disobey road traffic rules or regulations. The DVLA will also perform its main mandate of vehicle inspections and certification in making sure only roads in good working condition use the roads, and together with the MTTD and NRSA, will keep records on motor accidents on the roads.

6.1.12 RESPONSIBILITIES OF MOT

The MOT as a government Ministry play a significant role in training or capacity building of monitoring teams in the performance of routine and periodic monitoring of the roads and related facilities, and reporting of findings. This will be necessary in ensuring that the Project activities are consistent with the applicable regulatory and legal frameworks, including the World Bank Safeguard Policies. Specifically, the MOT will be supporting the NRSA and the DVLA in the discharge of their duties through institutional strengthening and capacity building. Similarly, the MOT will also collaborate with other agencies (MRH, GHA and DFR) in employing Supervision Consultant(s) for the duration of the road project contract to monitor the performance of the Contracting Entity.

6.1.13 RESPONSIBILITIES OF DUR

The DUR will be providing support services such as provision of technical inputs into the overall project implementation, as well as administration, planning, control, development and maintenance of sections of

the roads that can be considered as urban sections. The DUR's roles will also involve assisting the DFR in monitoring of the project as an important feedback mechanism, and reporting of findings.

6.2 PROJECT TRAINING PROGRAM

One of the most important mechanisms for the enhancement of the Project's environmental and social performance will be the continued implementation of a training program for Project personnel.

Training will include:

- Induction training for MRH's field staff, including modules on: health and safety, environmental awareness, accommodation rules, worker code of conduct, stakeholder engagement, grievance mechanisms and cultural heritage awareness;
- Toolbox training for specific tasks;
- Training for individuals involved in tasks with specific responsibilities; and
- Refresher training programs to facilitate continual improvement in environmental awareness for Project personnel.

Training should be provided at pre-construction phase, as well as construction and possibly operation phases, as needed. Training records should be maintained and an assessment of the effectiveness of the training programs included as part of the internal audit procedures. Some specific training requirements include;

- General Health and Safety (Safe handling of tools and equipment, etc.)
- General Waste Management
- Noise Awareness
- Prevention and management of COVID-19
- HIV/AIDS and other Sexually Transmitted Infections (STI)
- Gender in the Construction Place
- Basic Site Security Management
- Basic Site Monitoring and Emergency Response / Management

To help build the institutional capacities of the different agencies or bodies that will be involved in the implementation of the ESMP, two broad areas of capacity enhancement have been recommended as part of the training program. The proposed training program, course content and targeted audience are presented in Table 6-1 below.

Table 6-1: Proposed Training Program for the Implementation of the ESMP

Capacity Building Activity	Proposed Topics	Objectives	Target Audience	Duration	Proposed Budget (USD)
Module 1: Training on ESMP implementation	<ul style="list-style-type: none"> • Outline of Environmental and Social Impact Assessment • Summary of potential impacts of the project • ESMP • Environmental and Social Performance 	To increase competence in Environmental and Social Safeguards sustainability and best practice.	Environmental and Social Safeguards Team of MRH (GHA & DFR), MMDAs, Contracting Entity's Team, Consulting Engineer, Community Focal Persons, NGOs & CSOs	1 day	10,000.00

	Monitoring – Monitoring Mitigation Measures <ul style="list-style-type: none"> Environmental and Social Reporting 		(Approx. 32No.)		
Module 2: Training on Construction HSE	<ul style="list-style-type: none"> Introduction to Construction HSE Summary of Health and Safety Hazards in Construction Incidents Causation, Investigation and Reporting Excavation Safety Site Specific OHS Construction Site Inspection Personal Protective Equipment 	To guarantee conclusion of project with zero loss of life, zero Lost Time Injuries (LTI) or occupational illness by means of promoting safe and healthy working conditions as well as the health of workers, community members and those that will be engaged in monitoring.	Environmental and Social Safeguards Team of MRH (GHA & DFR), MMDAs, Contracting Entity's Team, Consulting Engineer, Community Focal Persons, NGOs and CSOs (Approx. 32No.)	1 day	10,000.00
Total					20,000.00

6.3 REPORTING

A framework of internal and external reporting that allows for appropriate reporting on the effectiveness of the ESMP is presented in Figure 6-1 below. The Contracting Entity will have the responsibility of identifying, documenting and reporting to the MRH / DFR (in weekly or monthly reports) on issues relating to the environmental, social and health performance of the Project. In order to provide evidence of ongoing mitigation activities, the Contracting Entity is obliged to keep records. Such records may consist of site monitoring plan, HSE Policy, Site Specific HSE Plan, Waste Management Plan, Traffic Control Plan, Emergency Response and Preparedness procedures, site instructions, training records, complaints records, incident reports, inspection, maintenance and equipment calibration records, etc.

Further details on reporting are expanded upon in subsequent sections below.

- Method statements from the Contracting Entity for various phases of the project.
- Weekly report from HSE Manager (regardless of whether there has been an incident).

These documents should be presented to the Environmental and Social Safeguards Team of DFR upon request. In addition, all significant communications with EPA and other relevant authorities should be documented and preserved. These documents are necessary for tracking performance to attain and establish compliance with the monitoring plan and appropriate regulatory requirements. The HSE Manager will issue a monthly compliance audit report and copies thereof should similarly be filed at any sub-contractor's representative's office and should be furnished to the Consulting Engineer (Supervision Consultant) simultaneously with such filing. The External Auditor's reports will be addressed to the Consulting Engineer with copies to DFR, the Contracting Entity and where applicable, the Contracting Entity's sub-contractors on site.

6.3.3 HEALTH, SAFETY AND ENVIRONMENT DOCUMENT CONTROL

The Contracting Entity will have responsibility for establishing procedures for HSE document control. The HSE document control procedure will comply with the following requirements:

- Documents should be identifiable by organisation, division, function, activity and contact person;
- Documents should identify the personnel and their positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution; and
- Documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a specified period.

The Contracting Entity will oversee that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations essential to the functioning of the ESMP are performed. Documents should be made available to the external auditor, DFR and/or Supervision Consultant upon request.

6.3.4 HEALTH, SAFETY AND ENVIRONMENT TRAINING AND AWARENESS

The Contracting Entity will provide resources and HSE training needs to all employees and any third party who carries out all or part of the Contracting Entity's obligations under the Contract. Every employee will have an induction presentation on environmental awareness as part of the recruitment process. The presentation needs to be conducted in a language understood by employees and other site personnel.

The training by the Contracting Entity should, as a minimum, include the following:

- General environmental, health and safety awareness training describing the importance of policies, standards, key environmental and social sensitivities or requirements of the Project;
- Conformance to Standard Operating Procedures (SOP) as means to avoid or reduce environmental and social impacts;
- Requirements of the ESMP and how it will be implemented and monitored on site;
- Prevention and handling of fire and other incidences, including procedures to be followed in the event of non-compliance with the environmental, social and health requirements;
- Protocols for Prevention and Management of COVID-19 and related issues;
- Training on HIV/AIDS, Gender-Based Violence (GBV) and violence against children;
- The significant environmental and social impacts, actual or potential, as a result of their work activities;
- The environmental and social benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- Provide appropriate PPEs and orientation and support on the use of PPEs to all employees and visitors so that they can act in an appropriate and safe manner;
- The mitigation measures that need to be implemented when carrying out their work activities;

- Water and waste management;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible;
- Details regarding archaeological and/or historical sites that may be unearthed during construction, and the procedures to be followed should these be encountered; and
- The procedures which should be followed should a graveyard/cemetery be encountered or unearthed during the construction phase.

Training should be provided at the pre-construction and construction phase and where necessary, the operation phase, as needed. The training can be in different forms, namely:

- Induction training for staff, including modules on: health and safety, environmental and social awareness, accommodation rules, worker code of conduct, stakeholder engagement, grievance mechanisms and cultural heritage awareness;
- Toolbox training for specific tasks;
- Training for individuals involved in tasks with specific responsibilities; and
- Refresher training programs to facilitate continual improvement in environmental and social awareness for Project personnel.

Works which may pose a hazard to humans and animals are to be adequately protected and appropriate warning signs erected. The Contracting Entity should always also provide adequate and operational fire safety equipment, and personnel on-site should be trained on how to operate fire extinguishers, etc. The use of construction vehicles will be restricted to authorised personnel only, and speed limits adhered to. Speed stickers should be placed in all vehicles on site as a caution to drivers. The construction vehicles should also be restricted in terms of overloading.

The Contracting Entity will also implement an HIV/AIDS, COVID-19 and GBV awareness program at the site camp and HIV/AIDS and GBV awareness included in pre-start information session and weekly or monthly toolbox meetings.

A training needs assessment will also be conducted by the HSE Manager to identify appropriate HSE training programs, and the appropriate target groups amongst the employees of the Contracting Entity. The HSE awareness training programs should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. The training programs should contain the following information:

- The names, positions and responsibilities of personnel to be trained.
- The framework for appropriate training plans.
- The summarized content of each training course.
- A schedule for the presentation of the training courses.

The Contracting Entity should enforce that records of training interventions are kept in accordance with the record keeping and documentation control requirements as set out in the ESMP. The training records should verify each of the targeted personnel's training experience. Assessment of the effectiveness of the training programs should be included as part of the internal audit procedures.

6.3.5 EMERGENCY PREPAREDNESS AND RESPONSE

The Contracting Entity will compile and maintain procedures for environmental and social emergency, as approved by the MRH / DFR, so that there will be appropriate response to unexpected or accidental events, throughout the construction and maintenance stages of the project. Such emergency events may include:

- Accidental discharges to water and land;
- Accidental spillages and exposure of employees to hazardous substances;
- Accidental fires; and
- Traffic accidents.

These plans or procedures should include, as a minimum:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel.
- Details of emergency services applicable to the various areas along the route (e.g. hospitals and ambulance services, fire service, department, spill clean-up services, National Disaster Management Organisation (NADMO) offices, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.
- Training plans, testing exercises and schedules for effectiveness.

Contracting Entities performing work for DFR should demonstrate appropriate training in emergency preparedness and response and have ready access to equipment and supplies that would allow them to contain and control some emergencies to an extent until the arrival of an Emergency Response Team.

6.3.6 INCIDENT REPORTING AND REMEDY

In the event of an emergency incident or situation on site, the local emergency services should be notified immediately of the incident. The following information should be provided:

- The location.
- The nature of the load.
- The status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire).

Written records should be kept on the corrective and remedial measures implemented and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports should be used for training purposes in an effort to prevent similar future occurrences.

Incident identification, reporting and follow-up requirements are presented in Table 6-2 below.

Table 6-2: Incident Identification and Reporting

Classification	Category 1	Category 2	Category 3
Identification	An incident resulting in a breach of specifications, environmental regulations and/or standards; an incident that is reportable to the government by law or other statute or has caused significant environmental harm or injury to people, animals, or property. This category of incident also includes incidents whose impacts have extended onto publicly accessible land and which have the potential to adversely impact on surrounding communities, livestock or wildlife.	An incident with potential to breach specifications or environmental regulations or standards, but which is not reportable to the government (though voluntary disclosure may be undertaken at the discretion of site management). Has the potential to cause significant environmental harm or injury to people or animals and/or has impacted on publicly accessible land in some measure. This includes incidents that have interfered with the public domain outside the Project area of influence, but which are not reportable by law to government.	An incident with little potential to breach specifications or environmental regulations or standards and which is not reportable to the government and/or the management committee.

Classification	Category 1	Category 2	Category 3
Reporting	Immediately reportable to the Project Director and/or Project Sponsors.	Reportable to management in charge of site operations.	Reportable to the environmental site officer.
Follow up	Formal investigation required.	Formal investigation required.	Informal investigation actions required.

7 CHECKING AND CORRECTIVE ACTION

7.1 NON-COMPLIANCE AND REMEDIAL ACTION

The HSE Manager and External Auditor will monitor the ongoing conformance or lack thereof by the Contracting Entity and sub-contractors. The External Auditor should consult with and report non-conformances with the ESMP to the HSE Manager, with a copy of such report being given to the Contracting Entity, DFR and/or Supervision Consultant. In any non-conformance report ("NCR"), the External Auditor should also stipulate the recommended corrective action that needs to be taken to remedy such non-conformance. The Contracting Entity is deemed not to have complied with the ESMP in the event of any of the following occurring:

- There is evidence of contravention of the ESMP specifications within the boundaries of the construction site. site extensions and haul / access roads.
- There is contravention of the ESMP specifications that relate to activities outside the boundaries of the construction site.
- Environmental damage ensues due to negligence.
- Construction activities take place outside the defined boundaries of the site without the approval of the Supervision Consultant or HSE Manager.
- The Contracting Entity fails to comply with corrective or other instructions issued by the Supervision Consultant within a specific time period.
- The HSE Manager has failed to recognize, act on or bring the non-compliance issue to the attention of the Supervision Consultant.
- Littering by the Contracting Entity on site.
- Lighting of illegal fires by the Contracting Entity on site. Persistent or unrepaired oil leaks from the Contracting Entity's vehicles.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances by the Contracting Entity on site.
- Any Contracting Entity vehicles being driven in excess of designated speed limits.
- Removal and/or damage by the Contracting Entity to fauna, flora or cultural or heritage objects on site.
- Urination and open defecation by Contracting Entity staff anywhere except in designated areas.

7.2 REMEDIAL ACTION

Remedial action would be managed by the HSE Manager in two categories as described below.

7.2.1 SPECIFIED CORRECTIVE ACTION

This constitutes remedial or mitigatory measures specified by the External Auditor in any NCR, coupled with a specified time limit within which the specified corrective action needs to be completed, at the expense of the party identified in the NCR as being responsible for carrying out the said work.

The External Auditor may on requests grant an extension of time for the implementation of such corrective action. If the said corrective action has not been carried out within the period stipulated by the External

Auditor in the NCR, or agreed on between the Auditor and the Contracting Entity, the non-conformance in question would be dealt with as per Section 7.2.2 hereunder.

7.2.2 FORMAL REMEDIAL WORK

Where a non-conformance has resulted in environmental damage to the site which cannot be remediated as per the External Auditor's specified corrective action or where the Contracting Entity has failed to carry out any of the External Auditor's specified corrective actions within the prescribed time limit (or permitted extension thereof), the External Auditor will convene a meeting between representatives of the Contracting Entity and DFR and/or Supervision Consultant. The meeting will seek to come to a resolution on the best remedial action. Should there not be a consensus within ten (10) days, the Project dispute resolution mechanism should apply.

Where necessary, the Supervision Consultant will issue an instruction to the Contracting Entity to procure execution of the remedial work as agreed between the parties, and the Contracting Entity should be obliged to procure such remedial work within the prescribed period to the satisfaction of the Supervision Consultant. Failure by the Contracting Entity to comply with an instruction from the Supervision Consultant to procure the carrying out of the required remedial work may constitute a material breach of Contract, entitling the MRH / DFR to the applicable remedy provided for in the Contract.

7.3 GRIEVANCE REDRESS

When grievances are reported in relation to the Project, they need to be addressed in a consistent and verifiable manner. To this end, the proponent has instituted a TSIP-wide electronic-based Grievance Management System (GRM) to be managed by an independent NGO. This will allow project beneficiaries to submit questions, complaints or suggestions via email, phone, text message, personal delivery/walk-in, regular mail or through a dedicated GRM hotline or website. This web-based system will enable documentation of salient details of complaints (e.g. dates and time received and actions taken), sorting, verifying, acting on and tracking them. A sample grievance form is included as Appendix A (as part of the Preliminary Grievance and Complaints Management Framework).

With regards to internal grievances from the staff or employees of the Contracting Entity, the process to be followed for addressing such grievances will be developed and approved by the Contracting Entity. Internal grievances may include but not limited to the following:

- Complaints pertaining to amount of wage, salary, other remuneration or benefits as per the contracting entity's human resource policy;
- Timely disbursement of remuneration;
- Gender discrimination
- Issues related to workers organization.
- Labour accommodation
- Health and safety issues
- Extended working hours

Both formal and informal grievance resolution mechanisms would be employed on the Project. Further reference should be made to the ESA for TSIP Guideline Document (MRH, 2017) and the TSIP Grievance and Complaints Management Framework developed by the MRH for additional guidance on grievance redress and grievance handling procedures.

7.3.1 PROJECT NGO¹¹

The Project shall appoint an NGO to oversee the Grievance Redress Service. The NGO will work with all Project communities to achieve accountability and transparency in grievance resolution and delivery using

¹¹ Project NGO refers to the NGO that will be engaged for the purpose of citizen's engagement and oversee the GRM operations.

an online GRM platform as well as offline grievance redress mechanisms. The key responsibilities of the NGO with respect to grievance redress shall include, but not limited to:

- Establish site offices for receiving and recording complaints. The NGO shall establish site offices at each of the Project districts for the duration of the project. The district offices would be responsible for receiving, recording and assigning Project-related complaints received directly from PAPs, community focal persons or by the Grievance Redress Officer (GRO). At the minimum, each site office shall include a site GRO, Desk Grievance Officer or Complaints Administrator, and District Coordinator.
- Facilitate the establishment of the GRM at the various levels: The NGO will work with the Project safeguards team to facilitate the appointment of the grievance focal persons, grievance redress officers at the community and sub-project levels, as well as the constitution of grievance committees at the district level. The NGO will train and periodically build the capacity of these officials and committees on their functions and operations.
- Publicizing and disclosure of the GRM. The NGO shall be responsible for disclosing the GRM to the stakeholders through media and face-to-face community/public campaigns. With support from the MRH safeguard staff, the NGO will simplify the contents of the GRM in locally accepted languages agreed with the affected parties. This way, the approaches, ways and contact information at both project locations and NGO site offices for seeking redress will be clearly spelt out. The NGO will also put in place suggestion / complaint boxes at the local GRM desk. The NGO shall engage community groups and local stakeholders in regular community awareness and project updates, and consolidate their concerns for redress
- Verify, record and log complaints on the Grievance and Complaints Logging System (GCLS). The NGO, through appointed site-based grievance officers will verify and document or record precise details of complaints including photographs or videos, and geolocations where necessary. This information will be recorded immediately onto the online GCLS by the Complaints Administrator and a dedicated officer assigned to resolve it within a stipulated time.
- Act as a social mobiliser and mediator between complainants and respondents. The NGO shall follow up on all assigned complaints so that grievances are addressed satisfactorily and in a timely manner by the appropriate project officials at the various levels. The NGO will also provide immediate feedback to complainants on the status of their complaints and immediately action has been taken.

7.3.2 ONLINE GRIEVANCE AND COMPLAINTS LOGGING SYSTEM

Each grievance received, shall be recorded in a grievance register using a web-platform. For this purpose, a simple computer-based system would be developed by MRH for more effective management of complaints. The web-platform will be managed by the NGO, and will guide the implementing agency (DFR), particularly the Environmental and Social Safeguards Team on the steps and arrangements for receiving, sorting, verifying, acting and tracking complaints. The appointed NGO will oversee the operations of the online platform and be responsible for a quick turnaround on addressing complaints.

The Environmental and Social Safeguards Team will oversee the operations of the NGO. This will include direct monitoring and supervision of the day-to-day operations of the NGO, as well as assign additional tasks to the NGO were necessary. They will also review and approve monthly and quarterly progress reports submitted by the NGO prior to payments to confirm that project targets have been achieved. PAPs and local stakeholders can monitor issues associated with the road construction in their community and convey their complaints through the web-platform or the appropriate GRM structures (walk-in to GRM committees, phone calls, SMS, email, etc.). Issues reported must be recorded on the GCLS by a dedicated GRO regardless of the mode of receipt to enable real time redress of all grievances.

7.3.3 GRIEVANCE STRUCTURE

A four-level grievance redress structure and composition (members / representatives) is proposed for the Project as discussed below. Grievances that are brought directly to the project team should be addressed at the local-level unless unresolved before it travels through the levels.

7.3.3.1 LOCAL LEVEL

Community Focal Person

Each project community shall appoint a community focal person for receiving and recording of related grievances using the grievance form. This process shall be facilitated by the project NGO. The focal person must be a respectable member of the community, and with the ability to document and communicate community concerns accurately to the project grievance officer and other project stakeholders. The focal person will be the first point of contact for day to day grievance issues. The community focal person will provide an immediate acknowledgement of the complaint and will report all grievances immediately to the site GRO for a formal response and documentation.

The community focal person does not have the authority to resolve grievances but only to receive and report every complaint to the GRO for a formal redress. Nonetheless, such focal officers would be most useful to persons living with disability, old people with limited mobility and poor persons who cannot afford the expense of traveling long distances to lodge a complaint. Focal persons shall be resourced, so they commute to different parts of project communities when it is required and make phone calls. The NGO shall provide a simple mobile phone with a monthly talk-time bundle to each community focal person to facilitate his/her operations.

NGO Site-Office

The NGO shall establish site offices at each project district for receiving recording and assigning project-related complaints. There shall be at least two dedicated GROs for each project district, appointed by the project NGO to evaluate and address grievances at the site level – a Desk Grievance Officer and Site GRO. Both GROs shall be based at the NGO site office, and where necessary, supported by additional technical and administrative staff.

1. The Desk Grievance Officer

The key role of the Desk Grievance Officer is to maintain the district grievance register. This will involve electronically recording all complaints received at the site office, updating the register and assigning complaints to responsible officers for resolution. Complaints made to the NGO site office, through the project hotline, walk-ins and through the website shall also be processed by the desk GRO. For grievances lodged directly at the site office, a complaint form shall be filled, dated and signed. If the complaint relates to the Contracting Entity, a copy of the same shall be deposited in the Supervising Engineer's office. An acknowledgement of complaint form shall also be filled, signed and given to the complainant. Once the grievance is received and recorded, based on the subject and issue, the Desk Grievance Officer shall identify the department, contractor or personnel responsible for resolving the grievance and, using the web-platform, assign the task of resolving the complaint to the responsible officer.

2. The Site Grievance Redress Officer

The Site GRO shall be responsible for supervising the activities of community focal persons within his/her project district. The site GRO shall be resourced to commute to project communities daily where necessary to receive, verify official complaints from community focal persons, and provide preliminary response to such complaints. The NGO shall be responsible for providing the required logistics for his/her transportation and communication. Where it is determined jointly by MRH's Safeguards Team and the NGO that more than one GRO is necessary to optimise operations at the district level, the NGO shall arrange for adequate number of GROs to be assigned, whether temporarily or as permanent staff.

For every complaint received and logged onto the web-platform, the Site Grievance Officer and concerned officer / respondent shall work closely with the community focal persons, leadership and representatives of project affected communities and individuals to undertake an enquiry into the facts relating to the grievance. This shall be aimed at establishing and analysing the cause of the grievance and subsequently identifying suitable mitigation measures for the same. As part of this investigation, the site GRO may also undertake confidential discussions with the concerned parties to develop a more detailed understanding of the issue

at hand. The site investigation shall be completed in no more than 10 working days of receiving the grievance.

Based on the understanding thus developed, the site GRO, in consultation with the concerned officials, shall identify a suitable resolution to the issue and communicate the proffered solution to the Contracting Entity through a site instruction for action. Where the complaint can be resolved directly by the site GRO, he/she may address grievances directly with the complainant, under the following conditions:

- The grievance must be recorded formally by the GRO using the grievance form.
- The GRO must resolve the grievance within 10 working days or otherwise discuss with the District Grievance Committee. If for any reason the resolution would require longer than 10 working days, the aggrieved person must be notified by the GRO that his/her complaint is being considered but would take longer and an estimated completion date shared.
- A written record of the proposed resolution shall be made. The solution proffered shall be recorded and dated. The site GRO will follow up to find out whether the complainant is satisfied, and the results of the follow-up will be recorded.
- If the site GRO cannot resolve the grievance, the Desk Grievance Officer will immediately refer the complaint to the District Grievance Committee for immediate redress.

7.3.3.2 DISTRICT LEVEL

For each district affected by the road project/sub-project, there shall be constituted a District Grievance Committee responsible for receiving, evaluating and addressing significant complaints at the district level. The NGO shall facilitate the constitution of each of the District Grievance Committees. Membership of the Grievance Committee will be publicized throughout the sub-activity areas along with other details of the GRM.

The composition of the District Grievance Committee shall include;

- Presiding Member of District Assembly (Chair)
- District Development Planning Officer
- Representatives of affected stakeholder groups within the project area of influence
- Site Grievance Redress Officer(s)
- Contracting Entity's Grievance Redress Officer
- Community focal person(s) from which complaint has been received
- Representative of traditional authorities, if necessary
- MRH Environmental Monitoring Unit (EMU) representative, if necessary

The Grievance Committee shall mediate all grievances that remain unresolved after site-based or local community level interventions. The District Grievance Committee will convene monthly to address all grievances that have been brought to their attention. The GRO will also update members of all grievances and resolutions that have been recorded in project communities during this time. Emergency meetings may also be convened where necessary to address a matter brought to their attention. In the case of an emergency meeting, the site GRO shall work directly with the District Presiding Member to facilitate this process. The District Presiding Member shall chair all meetings, and in his absence, the District Development Planning Officer or GRO. The processes for resolving the majority of grievances will be as follows:

- Grievance Committee meetings will be scheduled within the last week of every month.
- Each Grievance Committee meeting will have a minute written. The meeting will start with the review of outstanding grievances and agreed actions. New grievances will be discussed and recorded using the grievance form.
- For each grievance to be resolved by the Grievance Committee, an action plan shall be agreed. The person responsible for implementing the action plan will normally be the site GRO unless cultural or resource demands necessitate another individual. The timeline for implementing the action plan shall also be agreed during the meeting, but preferably within 15 working days upon receipt.

- After the Grievance Committee proposes an action plan to a complaint, the GRO shall contact the complainant to confirm that the redress action is satisfactory. If the complainant is unsatisfied with the outcome of the redress action, further mediation shall be taken to resolve the issue or reach an amicable agreement, or the matter be referred to the project grievance committee. Verification will be completed within 2 weeks of resolution of a grievance at a Grievance Committee.
- The date of the next grievance meeting will then be agreed.

For emergency grievances in the event of a fatality, significant damage to personnel, property or physical conflict associated with the Project or a claim involving more than 4 individuals:

- The GRO will escalate the matter to Project Safeguards officials immediately who will provide a response within 24 hours;
- In the meantime, the GRO will call an Emergency Grievance Committee meeting with the Grievance Committee members and arrange a meeting within 1 week.
- The process for assessing and resolving a grievance will follow the regular grievance mechanism in so far as a resolution and action plan should be completed within 2 days of the committee meeting.

7.3.3.3 PROJECT LEVEL

All project related grievances that remain unresolved at the District level shall be referred to a third-level and the membership of this third-level grievance redress shall comprise the MRH Agency Implementation Team (AIT) and the Project Steering Committee, including nominated representatives of the Environmental and Social Monitoring Unit (ESMU) of GHA and the Social Safeguards Specialist of DFR who will together receive, record, review, and address project-related concerns in coordination with the AIT or Steering Committee. The Project Steering Committee, established under the TSIP, is responsible for reviewing and approving the project's annual work plans and budgets, providing policy and program guidance, and ensuring communication and cooperation among stakeholders. The Project Steering Committee will be co-chaired by the Directors of Planning of the MRH and MOT and will include officials from the MRH, MOT, MOF, MOFA, GHA, DUR, DFR, DVLA and NRSA. Complaints received at this level shall be addressed within 10 working days upon receipt.

7.3.3.4 NATIONAL LEVEL

If no agreement is reached at this stage, then the grievance is taken to the Commission for Human Rights and Administrative Justice (CHRAJ) or the court, whose verdict will be binding on the parties.

7.3.4 GRIEVANCE REDRESS PROCESS

The grievance procedure or process discussed herein should be followed for all grievances relating to the Project.

7.3.4.1 RECEIVING AND RECORDING OF GRIEVANCES

All project beneficiaries, PAPs and local stakeholders can submit project related grievances, complaints or suggestions formally and at any time. Grievances and complaints related to the project can be formally submitted by:

- Dropping a letter in the grievance box next to the project's notice board at vantage locations (see NGO responsibilities).
- Contacting the respective community focal persons and/or GRO directly through face-to-face interaction or through a free hotline, SMS, email (contact information of officers to be provided to project communities; and inscribed on project signboards).
- In the absence of the community focal person or GRO, grievances or concerns can be raised with the assemblyman of the project area or any member of the project communication committee or District Grievance Committee. Irrespective of the mode or channel of receipt all grievances should then be communicated formally to the community focal person or the site GRO for formal recording using the

grievance form. The completed form must be submitted manually to the district office of the NGO by close of day to be recorded formally on the online system.

- Complaints and suggestions may also be directly reported to the NGO site office and online using the project grievance web-platform (website to be publicised by NGO). PAPs and local stakeholders will be made aware of this platform and its usage through periodic campaigns and stakeholder engagement sessions to be undertaken by the NGO.
- Once the grievance is received, a case number shall be allocated and communicated to the grievant by the desk GRO. This communication shall also serve as an acknowledgement of the grievance. In case the grievance is assessed to be out of the scope of the GRM, a communication towards the same shall be made to the grievant, and an alternative mode of redressal shall be suggested. As part of this acknowledgement a tentative timeline for the redressal of the grievances shall be identified, in keeping with the process below. This acknowledgement shall be provided on the same day as the grievance is received.

7.3.4.2 PROCEDURE FOR GRIEVANCE RESOLUTION

The procedure for handling of grievances shall be as follows:

- All grievances irrespective of the mode or channel of receipt shall be referred to the site-based GRO for resolution. The grievance form shall be completed for all grievances received and logged into the web-based platform by the Desk GRO for tracking. If the affected person appears in person, the affected person should file his/her grievance in writing. The grievance form should be signed and dated by the aggrieved person. Where the affected person is unable to write, he/she should be assisted to complete the grievance form and emboss the form with his/her thumbprint. The process should also allow for anonymity at the discretion of the complainant, especially where it is necessary to protect the confidentiality of the complainant. The sample grievance redressal form makes provision for anonymous reporting where necessary.
- The Site GRO shall respond within 10 working days during which time any meetings and discussions to be held with the aggrieved person(s) should be conducted. The Site GRO may draw on existing mechanisms in the community (community leaders, local government officials, traditional justice system, etc.) to address the grievance. If the grievance may necessitate a longer period of time, the aggrieved person must be notified by the Site GRO that his/her complaint is being considered.
- The GRO is expected to lodge the complaint to the District Level Grievance Committee if the grievance cannot be resolved locally or where the complainant is unsatisfied with the proposed solution.
- The District Grievance Committee shall meet monthly to resolve all matters brought to their attention within 15 days upon receipt, following laid down procedures identified above. Where a matter requires emergency redress, a meeting may be convened through the facilitation of the GRO and District Presiding Member.
- If an agreement cannot be reached at the District GRC level, the GRO shall refer the matter to the Project GRC for redress.

8 MANAGEMENT REVIEW

When adjudicating tenders, the DFR will need to confirm that the Contracting Entity has made appropriate allowance for management of environmental and social issues and have the adequate training on implementing the action plans in the ESMP before being approved to commence work. Where appropriate, independent environmental experts could be appointed to audit the implementation of, and compliance with the ESMP. This environmental management performance review should, as much as practicable, be undertaken quarterly throughout the Project execution stages. This helps to continually ascertain the efficiency of the system and to improve environmental performance going forward.

9 SPECIFIC MITIGATION MEASURES / MANAGEMENT PLANS

To enable the effective implementation of the mitigation measures proposed for the likely adverse impacts of the proposed road construction project, method statements (management plans) have been developed for the following key impacts or aspects of the project and should be adhered to. The Environmental and Social Safeguards Team of DFR or MRH in collaboration with the Supervision Consultant would be mainly responsible for monitoring the implementation and functioning of the method statements / management plans.

9.1 STAKEHOLDER ENGAGEMENT / PUBLIC CONSULTATION MANAGEMENT

9.1.1 OBJECTIVE

To engage stakeholders throughout the project implementation period.

9.1.2 TARGET

The purpose of the stakeholder engagement / public consultation plan is to get interested and affected parties and the travelling public timeously informed of the project activities.

9.1.3 METHOD STATEMENT

There will be disruption of traffic during the Project and potential for many residents, road users and others to be impacted on during the construction phase. Local residents and road users may experience a short-term impact, especially with regard to travelling delays as a result of construction works.

The design phase would provide recommendations to address disturbance to road users during the construction phase and would make provisions for maintaining access, adequate notice of road closures, and alternative routing if required.

The Contracting Entity should allow up to one (1) month notification to the travelling public of intended construction activities commencement dates. These notifications should be made per work area as defined in Project specifications. The notification should include the following, as practical:

- Advertise in local newspapers
- Liaise with important local radio stations
- Information Management System (IMS) of MRH or the Contracting Entity
- Flyers
- Variable traffic signages

Stakeholder engagement is an iterative process and should be continued throughout the project implementation period and stakeholder concerns (including those of vulnerable groups) considered in the project execution. Stakeholder consultation is an essential part of the project development and the various stakeholder categories identified in the ESIA should be engaged by the Contracting Entity in collaboration with the Environmental and Social Safeguards Team at every phase of the project execution. This is necessary as it will help to manage expectations and concerns by providing a mechanism which not only provides stakeholders an opportunity to freely provide comment and feedback but also allows the MRH / DFR and AIT to respond to this feedback, thereby addressing concerns. It will further help to manage risks through building sustainable relationships and a sense of inclusiveness with project stakeholders. It is a common trend in large infrastructure development projects that communities expect more open and transparent dialogue and longer-term social commitments from project implementers.

A stakeholder engagement plan / strategy has thus been designed for use during all three phases of the project life - Pre-construction, Construction, and Operations and Maintenance Phases. Stakeholders to be engaged comprise public agencies / public officials, opinion leaders, community-based organizations, women groups, youth groups, religious organizations, among others. Some of the key topics for discussions at the various phases of the project or engagement have been identified and include the following: community social protection and social accountability; safety of construction workers and general public; availability of local workforce within the community; cooperation with the Contracting Entity; construction timelines; dialogue on evolving issues not foreseen as a result of the construction, awareness raising and education on disease prevention, GBV management and child protection.

The public consultation or stakeholder engagement plan is presented in Table 9-1 below. It does not serve as a detailed implementation plan but rather a guide to engagement at various stages of the Project. It should therefore be updated whenever there is any significant change to the scope of the project to reflect changes to the stakeholder groups affected and the potential impacts of the project.

9.1.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the CRO and/or Supervision Consultant.

Table 9-1: Stakeholder Engagement Plan / Strategy

Stakeholder Category	Sub-categories	Level of Priority (Impact; interest; influence)	Project Phase	Key Consultation Points	Frequency of Engagement	Method(s) of Engagement
Government officials	MMDAs	1	From Pre-construction to Operations and Maintenance phase	<p><u>Pre-construction Phase:</u></p> <ul style="list-style-type: none"> • Community opinions and procedures for implementing environmental and social protection / accountability • The support of the community members for the Contracting Entity • Safety of lives of construction workers and general public • Safe work techniques for operations and activities • Safekeeping of equipment conveyed to the site by the Contracting Entity • Informing communities about alternative routes • Availability of local workforce within the community • Construction timelines • Etc. <p><u>Construction Phase:</u></p> <ul style="list-style-type: none"> • Assessment of willingness of cooperation with the Contracting Entity • Evaluation of security situation in the construction environment 	Before and during every phase	Phone calls Emails Text / Instant messaging Formal meetings Workshops
	Road Sector Agencies / Public Officials					
	Decentralised Agencies	3				
	Transport Unions (GPRTU, PROTOA)	1				
	Utility companies (NEDCo, Telcos, GWCL)	1				
Neighbouring communities	Traditional / opinion leaders	1	From Pre-construction to Operations and Maintenance phase		Before and during every phase	Phone calls Messengers Information Centre and Information Boards Focus Group meetings in a language of their understanding (E.g. English, Dagaare, Sisaala, Mòoré, Mande, Dioula / Dyula, Twi, etc.) Public meetings in a language of their understanding Assisted transport to meetings
	Youth					
	PAPs subject to involuntary resettlement					
	Vulnerable groups (e.g. women, elderly, PWD, the unemployed / poor, etc.)					
	Community-based organizations					
	Tradesmen and artisans' associations					
Independent stakeholders	NGOs	2	From Pre-construction to Operations and		As and when needed	Phone calls Emails
	CSOs				As and when needed	Text / Instant messaging

Stakeholder Category	Sub-categories	Level of Priority (Impact; interest; influence)	Project Phase	Key Consultation Points	Frequency of Engagement	Method(s) of Engagement
			Maintenance phase	<ul style="list-style-type: none"> • Dialogue on evolving issues not foreseen as a result of the construction • Review of accessibility to the communities • Discussions on how the vulnerable and marginalized groups are coping or being engaged • Awareness raising and education on disease prevention, GBV management and child protection. • Etc. 		Formal meetings
	Religious bodies				As and when needed	Focus Group meetings in a language of their understanding (E.g. English, Dagaare, Sisaala, Mòoré, Mande, Dioula / Dyula, Twi, etc.)
	Mass media	3	From Construction to Operations and Maintenance phase		As and when needed	Formal meetings
The general Ghanaian travelling public		2	From Construction to Operations and Maintenance phase	<p><u>Operations and Maintenance Phase:</u></p> <ul style="list-style-type: none"> • Expression of gratitude to community members for their backing and cooperation during the road construction • Education on how to maintain road features, including the bridges / culverts constructed • Road Safety education and awareness raising • Awareness raising and education on Disease prevention, GBV management and child protection. • Etc. 	As and when needed	Print media and Radio announcements in a language of their understanding (E.g. English, Dagaare, Sisaala, Mòoré, Mande, Dioula / Dyula, Twi, etc.)

9.2 EMPLOYMENT AND REVENUE GENERATION

9.2.1 OBJECTIVE

To enhance the economic potential of the project by providing opportunities for employment and earning income.

9.2.2 TARGET

To increase direct and indirect employment and equal skilled and unskilled labour opportunities for locals and achieve at least 15% female employment on the project.

9.2.3 METHOD STATEMENT

The Project will result in various benefits including direct employment on the Project, taxes and royalties, and community development initiatives. These provide or serve as income generation opportunities. Good roads open up opportunities for economic growth directly and indirectly at the local level which translate into national economic growth. The Project will cause an influx of workers (and job seekers) to the Project area which is likely to attract small scale business opportunities. Businesses typically run by local women are expected to also benefit significantly.

It is important that clauses are included in work contracts for the Contracting Entity to recruit labour from the Project area or local communities and the Contracting Entity should apply transparent hiring protocols so that workers are not hired in an ad hoc manner. Also, a policy on Community Development Initiatives could be developed and where necessary, training programs designed to 'up-skill' local candidates to allow them attain positions within construction teams, and potentially gain experience. The Contracting Entity should also be encouraged to source and procure goods and services locally. Gender issues should be seriously considered during recruitment by the Contracting Entity and women should be given equal opportunities on the Project (at least 15% female employment) and must not be discriminated against in terms of pay and sexual abuse upon recruitment. Where necessary, women and other vulnerable groups, including the youth should be given Business Development Training to improve their businesses and credit facilities made available and accessible to them.

It is important that national labour laws and regulations, especially the Labour Act, 2003 should be adhered to, including aspects relating to child labour. Persons considered as children by law should not be employed on the Project. The Contracting Entity together with the implementing agencies should disseminate Project information to the local authorities, enterprises and households through community meetings before construction commencement; and a community relations officer designated to act as liaison between the community and the Project. Constant engagement should also be made with local opinion leaders and key persons within the communities to determine lacking needs and provide support.

The Contracting Entity should present quarterly reports to the DFR, stating how categories of people, such as women and indigenes, as well other vulnerable groups like Persons with Disability (PWD) are being engaged on the Project. E.g. prioritising women groups or contractors in revegetation / re-afforestation programs. The poor and the elderly should be encouraged to continue to seek support through existing programs such as the Livelihood Empowerment Against Poverty (LEAP) and Microfinance and the Small Loans Centre (MASLOC). Also, relevant institutions like MOFA, the municipal/ district assembly and DFR through community consultation and/or awareness creation programmes should also sensitize farmers on income earning opportunities associated with the project, for instance, in producing food for the increased population (migrant workers) as against seeking direct employment in the road construction project.

9.2.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the CRO and/or Supervision Consultant.

9.3 SLOPE STABILIZATION AND EROSION CONTROL

9.3.1 OBJECTIVE

To adequately manage slopes created during road construction.

9.3.2 TARGET

Identify areas where slopes will be created during design in order to prevent erosion, sedimentation and unsafe slopes.

9.3.3 METHOD STATEMENT

Slopes should be cut to gradients that will achieve stability as indicated by a full slope stability analysis. Areas in which such an analysis will be required should be defined and specified in the detailed design stage. New cut and fill slopes should be rounded on the edges to allow them to blend with the surrounding landforms and should as far as possible, reflect the natural form of the landscape to reduce visual intrusiveness. Cut slopes with a constant gradient from top to bottom and across the face should be avoided, the so called "butter-knife" cut.

Cut slopes should be self-sustaining. Where it is necessary to use retaining structures or gabions, it should be designed to minimise visual intrusiveness. In areas where the road intersects ridges or spurs, the exposed rock face and soil should be stepped back in a manner that mimics natural rock faces as far as possible.

Where practicable, weed-free topsoil with an appropriate indigenous seed mix could be placed on the slopes by allowing the soil to cascade naturally down the slope, to be retained in small pockets as it falls down the irregular surface of the slope. This will allow for the creation of microhabitats where plants can become established.

Steep cut and fill slopes in soft or erodible material will require erosion control measures and appropriate re-vegetation methods. The design should allow for the planting of vegetation along the verges and on medians, if appropriate. The vegetation mix should promote biodiversity and should be non-invasive. Such areas are to be identified during the construction phase by the Contracting Entity, and appropriate remedial design implemented in consultation with the Supervision Consultant.

Where slopes are steeper, surface erosion protection measures should be implemented. These should include some or all of the following:

- Use of groundcover or indigenous grass.
- Construction of cut off berms (earth or rock).
- Placing of brushwood on bare surface.
- Hard landscaping, e.g. gabions, only under the instruction of the Consulting Engineer.

Monitoring for signs of erosion elsewhere across the site should be undertaken on a regular basis (weekly) and remedial action taken if required such as rock in fill or the construction of storm water diversion channels.

9.3.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly or Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager and/or Supervision Consultant.

9.4 LOCATION / RELOCATION OF SERVICES / PHYSICAL AND ECONOMIC DISPLACEMENTS

9.4.1 OBJECTIVE

To achieve minimum public disruptions with location / relocation of services and potential physical and economic displacements.

9.4.2 TARGET

Utility services infrastructure and physical structures or properties (including businesses) would be identified during the design phase that will be affected by the construction to minimise impacts to the public.

9.4.3 METHOD STATEMENT

Even though realignment is expected to be minor on the project and only little land acquisition is envisaged, construction activities are likely to result in the loss of properties including temporary and permanent structures, ornamental plants, crops and underground utility cable networks. This creates socio-economic stress and psychological disruption for the affected individuals and their families if not handled well through appropriate program of compensations and resettlement. The Contracting Entity will consider and treat issues of compensation with high urgency. It is important that the Contracting Entity confirms compensation is fully paid to PAPs prior to implementation of the Project, failure of which can result in conflicts and social unrests with local communities that can cause delay in construction schedule.

The location of utility services infrastructure, e.g. fibre optics, water, etc. should be incorporated into the design with full liaison with the relevant utility authorities. The minimum disruption to services and physical structures or properties (including businesses) should be maintained at all times. If services are to be relocated, wayleave procedures are to be followed by the Contracting Entity.

Construction activities should be limited to the designated corridors of the road as much as practicable by the Contracting Entity and broader community engagement should continue and should include education of PAPs on the Project's potential impact on local services, land uses, physical structures and roadside businesses. Based on the RAP, affected persons should be compensated adequately and promptly. Compensation should be paid in good time and the PAPs supported to be able to restore their livelihoods to at least pre-project levels or even better. Where necessary, MMDAs must participate in the assessment of loss and payment of compensation, and records of same be lodged with the MMDAs to aid in resolution of potential grievances.

The public would be informed well in advance should services at any time be disrupted and prior to land takes and destructions to properties (Refer to Section 9.1). The Contracting Entity together with the implementing agencies should implement grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion. Alternative livelihood programs should also be implemented to alleviate impact on PAPs. For instance, roadside sellers and kiosk operators should be given some financial assistance to cater for cost incurred in relocating and initial loss of man-hours and reduction in business activity or a binding policy on Community Development Initiatives for the Project developed, if practicable.

9.4.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly or Monthly) should be conducted by the Social Safeguards Team of DFR or MRH, LVD, Grievance Redress Officer (GRO), CRO, CDT and/or Supervision Consultant.

9.5 AREA DESIGNATION / LAND EXPROPRIATION

9.5.1 OBJECTIVE

To achieve proper location of construction camps, offices, workshops, staff accommodation and testing facilities (if applicable).

9.5.2 TARGET

Construction camps, offices, workshops, staff accommodation and testing facilities on the site (if applicable) should be identified before construction commences to achieve minimal impacts to the environment prior to the commencement of construction. No accommodation should be allowed within the existing road reserves or within buffer/flood zones.

9.5.3 METHOD STATEMENT

The Contracting Entity would be responsible for obtaining applicable written permissions from landowners for use of suitable sites for erection of construction camps, offices, workshops, staff accommodation and testing facilities, should these be set up. The Contracting Entity should establish these facilities in accordance with the design criteria, and in a manner, that does not adversely affect the environment. These facilities should also be maintained in an orderly and tidy condition.

Before construction commences, the Contracting Entity should submit a site layout plan to the DFR for approval including:

- Site access (including entry and exit points).
- Access and haulage routes.
- Material and equipment storage areas (including storage areas for hazardous substances such as fuel and chemicals).
- Construction offices and other structures (e.g. accommodation for staff).
- Areas where construction vehicles will be serviced.
- Security requirements (including temporary and permanent fencing, and lighting) and accommodation areas for security staff.
- Areas where vegetation will be cleared.
- Solid waste collection facilities for litter, kitchen refuse, and for non-hazardous solid waste including office and workshop waste.
- Waste treatment facilities for sewage, grey water and workshop-derived effluents, where no formal facilities exist.
- Storm water control measures.
- Provision of potable water and temporary ablution facilities.
- Potential pollution hazards and mechanisms to manage these.

Only designated areas may be used for the storage of materials, machinery, equipment, site offices and accommodation facilities. The site offices and accommodation units should not be sited in close proximity to steep areas, as this will increase the potential for soil erosion. Preferred locations would be areas of little relief. If the route traverse watercourses, streams and rivers, it is recommended that the offices (and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles) are located as far away as possible from any watercourse, and downstream water bodies. Regardless of the chosen site, the Contracting Entity's intended mitigation measures should be indicated on the plan and approved by the Supervision Consultant.

The construction campsite should be completely fenced and should have controlled security access. Structures should be of a temporary nature or should make use of existing buildings already on the site. Security lighting should not pose a disturbance to neighbouring residents or be a risk to passing traffic.

Throughout the period of construction, the Contracting Entity should restrict activities to within the designated areas on the construction site layout plan. Any relaxation or modification of the construction site layout plan is to be approved by the Supervision Consultant.

Power supplies may be via generators or an application made to the appropriate state agency for an official connection on-site.

Detailed, colour photographs should be taken of the proposed site before clearing commence. These records are to be kept by the HSE Manager for consultation during rehabilitation of the site.

The following restrictions or constraints should be placed on the site camp and construction staff in general, and should be monitored by the HSE Manager:

- The use of rivers and streams for washing of clothes.
- The use of welding equipment, oxy-acetylene torches and other bare flames where veld fires constitute a hazard.
- Indiscriminate disposal of rubbish or construction wastes or rubble.
- Littering of the site.
- Spillage of potential pollutants, such as petroleum products.
- Collection of firewood.
- Poaching of any description.
- Defecating outside of the designated facilities.
- Burning of wastes and/or cleared vegetation.

The Contracting Entity should make available adequate energy sources for construction and supervision personnel for heating and cooking purposes.

9.5.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, LVD, GRO, CRO, and/or Supervision Consultant.

9.6 GENERAL WASTE MANAGEMENT

The Contracting Entity's intended methods for waste management and waste minimisation should be implemented at the onset of the contract and approved by DFR and/or the Supervision Consultant. Personnel should be instructed to dispose of every waste in a proper manner.

9.6.1 SOLID WASTE

9.6.1.1 OBJECTIVE

To properly manage domestic and construction waste material on site and prevent littering by the Contracting Entity staff on site.

9.6.1.2 TARGET

To initiate processes to minimise and prevent environmental impacts due to solid waste pollution.

9.6.1.3 METHOD STATEMENT

During the construction period, the facilities should be maintained in a neat and tidy condition, and the site is to be kept free of litter. Refuse on site should be collected in drums/bins and emptied at regular intervals. The Contracting Entity will provide skips (containers) at all times during period of construction works. It is recommended that separate and well-labelled containers should be used for waste that can be recycled, e.g. paper, cans and glass. All other non-hazardous waste should be disposed of at registered or approved waste disposal sites.

No waste should be burned at the site offices, or anywhere else on the site. The Contracting Entity should enforce that no waste is disposed of in quarries or borrow pits.

Measures should be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of refuse. At all places of work, the Contracting Entity should provide litter collection facilities for later safe disposal at approved waste disposal sites.

9.6.1.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly or Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the Waste Management Department of the Metropolitan, Municipal and District Assemblies (MMDAs), the HSE Manager, CRO and/or Supervision Consultant.

9.6.2 HAZARDOUS WASTE

9.6.2.1 OBJECTIVE

To achieve proper management of hazardous waste on site.

9.6.2.2 TARGET

To initiate processes to minimise and prevent environmental impacts due to hazardous waste pollution.

9.6.2.3 METHOD STATEMENT

Hazardous waste such as bitumen and oils should be disposed of in approved hazardous waste landfill sites. Receipt of proof of disposal of hazardous waste should be submitted to the Supervision Consultant.

Under no circumstance should the spoiling of bituminous products on the site, over embankments, in borrow pits or burying be allowed. Unused or rejected bituminous products, including rejected asphalt premix, should be removed from site and taken to the supplier's production plant. No spillage of bituminous products should be allowed on site. In the event of the above occurring, the affected areas should be promptly reinstated to the satisfaction of the HSE Manager.

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and returned to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner should be retained in a safe holding tank and removed from site for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit should be stored in the service unit's sludge tank and discharged into the safe holding tank for collection and safe disposal. The Contracting Entity should oversee that a spill contingency plan is in place for implementation in the case of a spill or discharge of substances that can be harmful to an individual or the receiving environment.

Used filter materials should be stored in a secure bin for disposal off site. Hazardous waste should not be stored or stockpiled in any area other than that designated on the construction site layout.

Contaminated soil should be removed and replaced. Soils contaminated by oils and lubricants should be collected and disposed of at approved hazardous waste landfill sites. Receipt of proof of disposal of hazardous waste should be submitted to the Supervision Consultant.

9.6.2.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly or Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the Waste Management Department of the MMDAs, the HSE Manager, CRO and/or Supervision Consultant.

9.7 WASTEWATER AND SEWAGE MANAGEMENT

9.7.1 OBJECTIVE

Wastewater from the construction camp/office sites should be disposed of in a properly designed and constructed system, situated away from water sources (streams, rivers, dams, etc.) so they are not adversely impacted.

9.7.2 TARGET

To achieve proper management of waste water and sewage to prevent land and surface water pollution and its resultant health implications.

9.7.3 METHOD STATEMENT

Wastewater should be channelled so as to reduce runoff and erosion. Maintenance and servicing bays should have a concrete floor and be fitted with sumps and collection tanks for wastewater that is contaminated with diesel, petrol and oil. Collected wastewater should be disposed of at approved disposal sites.

Particular reference in the site establishment plan should be given to the management of sewage generated at the site offices, site laboratory and staff accommodation, and on-site (road) facilities for labour. Sanitary arrangements should be to the satisfaction of the HSE Manager, the local authorities and applicable legal requirements. These may be in the form of portable serviced toilets. The use of soak pits is not recommended. Portable toilets should be situated at appreciable distances away from construction camps. At any particular period during construction works, the Contracting Entity and HSE Manager should check and make available a portable toilet for use on site during the daytime (working hours). Use of open spaces for this purpose is not allowed under any circumstances.

Outside toilets should be provided with locks and doors and should be secured to prevent them from blowing over. The toilets should also be placed outside areas susceptible to flooding. The Contracting Entity should arrange for regular emptying of toilets and should be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the HSE Manager.

The appropriate permits for installing sanitation facilities and disposal should be obtained from the appropriate local authority during the design stage.

9.7.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly or Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the Waste Management Department of the MMDAs, the HSE Manager, CRO and/or Supervision Consultant.

9.8 MATERIALS HANDLING, USE AND STORAGE

The Contracting Entity's management and maintenance of his plant and machinery should be strictly monitored according to the criteria provided below, regardless of whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop) or not.

9.8.1 HAZARDOUS MATERIAL STORAGE

9.8.1.1 OBJECTIVE

To achieve proper storage of hazardous materials like petrochemicals, gas, fuel and oils in order to prevent human exposure to danger.

9.8.1.2 TARGET

To initiate processes to minimise and prevent environmental impacts due to hazardous material pollution.

9.8.1.3 METHOD STATEMENT

Petrochemicals, oils and identified hazardous substances should only be stored under controlled conditions. Hazardous materials should be stored in a secured, appointed area that is fenced and has restricted entry. Storage of bituminous products should only take place using suitable containers approved by the HSE Manager. Persons accessing such areas of storage should obtain security clearances from the HSE Manager. Hazardous materials and chemicals should be accompanied by a safety data sheet (SDS) at all times.

The Contracting Entity should provide proof to the Supervising Consultant that relevant authorisation to store such substances has been obtained from relevant authorities. In addition, hazard signages indicating the nature of the stored materials should be clearly displayed on the storage facility or containment structure. Before containment or storage facilities can be erected, the Contracting Entity should furnish the Supervision Consultant with details of the preventive measures that are proposed to be installed in order to mitigate against pollution of the surrounding environment from leaks or spillages. The preferred method should be a concrete floor that is bunded. The proposals should also indicate the emergency procedures to be implemented in the event of misuse or spillage of substances that will negatively impact on an individual or the environment.

The necessary handling and safety equipment required for the safe use of petrochemicals and oils should be provided by the Contracting Entity and used or worn by the staff whose duty it is to manage and maintain the supplier's plant, machinery and equipment.

Fuel should be stored in a secure bunded area in steel tanks supplied and maintained by the fuel suppliers or a licenced oil marketing company (OMC). Measures to prevent fuel leakage during offload and re-fuelling should be implemented. An adequate bund wall should be provided for fuel and diesel areas to accommodate spillage or overflow of these substances. The area inside the bund wall should be lined with an impervious liner to prevent infiltration of the fuel into the soil. Gas cylinders should be stored in a secure, well-ventilated area that is clearly marked with hazard signs. Spill containment kits should be made available at all times. Some safe handling procedures are shown in Table 9-2.

9.8.1.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly and Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the Waste Management Department of the MMDAs, the HSE Manager, CRO and/or Supervision Consultant.

Table 9-2: Hazardous Materials Safe Handling Procedure

Product	Safe Handling Procedure
Diesel	Do not get in eyes, on skin or on clothing. Avoid breathing vapour, mist, fumes. Do not swallow. Wear protective equipment and/or garments if exposure conditions warrant. Wash thoroughly after handling. Wash contaminated clothing before reuse. Use in areas with adequate ventilation. Keep away from heat, sparks, and flames. Store in a closed container in a well-ventilated area.
Motor Oil / Hydraulic Oil / Transmission Fluid	Wear protective clothing and impervious gloves when working with oils and transmission fluids.

Product	Safe Handling Procedure
	Keep container closed until ready for use.
Gasoline	Avoid skin contact. Avoid breathing vapour, mist, or fumes. Wash contaminated clothing before reuse. Store in a designated flammable liquids area, away from heat, ignition sources, and open flames.
Automotive Grease	Avoid prolonged or repeated contact with skin. Remove contaminated clothing; wash or dry-clean before re-use. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period.

9.9 LOSS OF FLORA AND FAUNA / TERRESTRIAL HABITATS

9.9.1 OBJECTIVE

To prevent disturbance to the natural flora and fauna (and terrestrial habitats) along the road corridor.

9.9.2 TARGET

Undue interference by Contracting Entity staff in the project area with the natural flora and fauna (including terrestrial habitats) is to be prohibited.

9.9.3 METHOD STATEMENT

The sections of the road corridor are bordered by natural vegetation and established plantations. The probability of vegetation clearing to occur as some sections of the road corridor is high mostly at sections which may require some road widening to allow for placement and movement of construction vehicles and equipment. Similarly, terrestrial fauna utilises the road corridors, especially areas with undisturbed natural vegetation. A number of insects, amphibians, reptiles, birds and mammals inhabit the Project area or corridor of influence, therefore direct impacts are expected from construction activities. However, utmost care should be taken by the Contracting Entity to protect indigenous vegetation within the project area of influence. Fauna and flora may only be disturbed to the extent of the projects' right of way and only when absolutely necessary.

In areas where the natural indigenous vegetation borders the road, no more clearing than what is required for the construction of the road should be done. Cleared vegetation should be removed to an approved disposal site immediately and not stockpiled adjacent to the road for collection at a later date. Burning of vegetation is prohibited. Similarly, intentional harming or killing of any fauna and hunting or trapping of fauna is prohibited. Prior to any disturbance/stockpiling and clearing of natural vegetation and soil (either within the road reserve or at designated or instructed areas outside the road reserve), the Contracting Entity should submit a plan of action to the Supervision Consultant and/or DFR for approval. This plan should form part of the HSE Manager's records and the HSE Manager should facilitate measures to revegetate the areas.

Where possible and without compromising road safety, large established indigenous trees should be left in place and roads infrastructure erected around them. If possible, vegetation should be transplanted to adjacent suitable areas. The Contracting Entity must also check always for trapped animals in construction areas before commencing construction activities and if any if found, they must be relocated to habitat conducive to their survival. The Contracting Entity must also limit noise during construction, especially near wetland areas and bird nesting sites.

The Contracting Entity will have responsibility for re-establishing vegetation within the road reserve boundaries for areas disturbed during road construction as well as areas outside the road reserve that was disturbed by the Contracting Entity. This includes, for example, service roads, stockpile and spoil areas, stop/go facilities, and wherever material generated for, or from, road construction has to be stored temporarily or otherwise within the road reserve, or at designated or instructed areas outside the road reserve.

Areas within the road reserve that have become contaminated with weeds and invader plants should be cleared of this vegetation. On completion of the section of road from which the weeds and invader plants were removed, the area should be replanted in a similar situation, as near to the original state as possible with local plant species. Although it may be possible to move most plants, some may be too large to survive the upheaval. These identified trees and shrubs may only be removed and discarded after authority has been obtained from the Supervision Consultant.

9.9.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly or Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, Rehabilitation Specialist and/or Supervision Consultant.

9.10 HYDROLOGY (WATER QUALITY) DEGRADATION AND LOSS OF AQUATIC LIFE AND HABITATS

9.10.1 OBJECTIVE

To prevent degradation of waterbodies and aquatic life and habitats along the road corridor.

9.10.2 TARGET

Undue interference by Contracting Entity staff with the natural hydrological pattern of the project area, quality of waterbodies (including aquatic life and habitats) is to be prohibited.

9.10.3 METHOD STATEMENT

Road construction activities such as excavation, compaction, clearance of vegetation, installation of culverts, and cut and fill, have the tendency of leaving negative impacts on the hydrological patterns, water quality, aquatic life and habitats of the project area. These activities may loosen soils that then get eroded into surface water courses, stir riverbed deposits into suspension which will increase the turbidity of surface water sources and destroy their quality and life forms. Aside the potential effect on aquatic life, water quality degradation can also lead to disease spread and endanger the life of community members who depend on these waterbodies for domestic uses and recreational purposes. The Contracting Entity must limit construction activities in areas where, or during periods that work takes place within aquatic environments and employ methods that will limit the extent to which silt is generated and the distance it travels (e.g. silt curtains, rock gabions). The Contracting Entity must avoid at all times stockpiling materials near waterways / wetland or on slopes. Construction camps and other facilities should also be located away from water courses.

During channelization, the Contracting Entity should endeavour to maintain the original direction of water flow, unless alternatives present better drainage improvement opportunities. Soil erosion checks should be in place along drains and these checks should include scour checks, silt traps, paving of drains, and stone pitching. Earthworks such as excavation, cut and fill, vegetation clearance, and compaction must also be limited to only areas where it is absolutely needed.

Road construction activities also involve use of lubricants/oils including bitumen, for road surfacing, and oils and fuels for running haulage tracks and some construction machinery. If there are any leakages, these oils, fuels and lubricants could end up in surface waterbodies crossed by or next to the road construction work and also in ground water. The Contracting Entity should therefore institute oil spill prevention and

response measures which should be adhered to. Regular servicing of vehicles and generators and other machinery need to be undertaken to prevent fuel leakages. Routine inspections aimed at assessing the effectiveness of waste management systems should be undertaken by the Contracting Entity's site engineer and road construction crews should be under strict instruction to dispose of both solid and liquid wastes into only the designated facilities or waste bins.

The Contracting Entity will have responsibility for rehabilitating and stabilizing the banks of affected water crossings as soon as practicable and replace vegetation where it has been destroyed.

9.10.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring of water quality should be conducted by the Supervision Consultant on ad hoc basis during construction and monthly by Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, Rehabilitation Specialist and/or Supervision Consultant.

9.11 TOPSOIL AND STORMWATER FLOW

9.11.1 OBJECTIVE

To take appropriate action for topsoil stripping and stockpiling and implement proper measures in terms of stormwater control to reduce the risk of erosion and flooding under extreme storm events.

9.11.2 TARGET

To strip topsoil at an appropriate depth for stockpiling before construction commences and to also achieve reduced erosion and flood risks.

9.11.3 METHOD STATEMENT

The road design should include appropriate erosion control measures in order to reduce flow velocities and minimise the loss of topsoil. In addition, drainage systems should be kept as natural as possible, and erosion should not occur at the stormwater inlet/outlet point of rivers/streams. Runoff should not be canalised or concentrated in areas where sheet flow may occur, or where highly erodible soils occur. The construction of artificial wetlands can be used for management of stormwater, with the wetlands acting as natural sponges that will absorb or trap the water and slow the speed before it reaches a road surface. Culverts should be constructed considering the peak water levels and they must also be levelled appropriately so that they are self-cleaning.

The Contracting Entity should remove topsoil from the designated sites and stockpile it in surge piles no greater than 1.5 m in height. Topsoil stripping in windy conditions should be avoided. The stockpiles should not be compacted in any way. The stockpiles are to be maintained in a weed free condition. These stockpiles should then be used in the rehabilitation phase.

The Contracting Entity should enforce that minimal amounts of topsoil are lost due to erosion, either by wind or water. This can be facilitated through the grassing of topsoil stockpiles. Areas to be grassed should be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contracting Entity's program should clearly show the proposed rate of progress of the application of topsoil and re-vegetation.

Best practice construction measures should be adopted to reduce erosion, restore the natural contour of the ground, and restore surface drainage patterns as close to pre-construction conditions as practicable. Where vegetation is removed, and/or where the area is not to be paved after land contouring, the Contracting Entity should re-vegetate the areas immediately after construction activity finishes. The Contracting Entity's responsibility should also extend to the clearing of drainage or water systems that may have been affected by such negligence within and beyond the boundaries of the road reserve.

9.11.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, Rehabilitation Specialist and/or Supervision Consultant.

9.12 NOISE

9.12.1 OBJECTIVE

To minimise noise impact from construction activities.

9.12.2 TARGET

To comply with appropriate noise control legislation.

9.12.3 METHOD STATEMENT

Road construction works are often associated with noise pollution. Increased noise levels are expected from clearing equipment and construction machinery. The OPBRC Project traverse areas with residential, public health and education facilities or services along the roads which will be impacted by noise emissions from construction activities. As such, noise levels should be kept to a minimum where work takes place adjacent to residential areas and other sensitive roadside properties. Where there is the need for extended working hours, I&APs should be informed of the extended working hours in the manner stipulated in Section 9.1. As far as possible, night time construction activities should be avoided.

Vehicles should be driven at a moderate speed. Activities that could cause major disturbance should only be carried out during normal working hours. Should noise generating activities have to occur at night, the local communities should be informed well in advance and the activities should be kept to a minimum. Site inductions should cover the importance of noise control and appropriate noise reduction measures.

Construction site yards, construction camps and other noisy facilities should be located away from residential areas. Where unavoidably noisy construction activities occur in the vicinity of these areas, the Contracting Entity should liaise with the local residents advising them of the times when there will be noisy activities.

It is also important that the Contracting Entity develops a noise monitoring program as part of environmental monitoring requirements prior to construction and regular noise monitoring during construction in compliance with EPA ambient noise standards. Also, established project grievance mechanism will enable identification and resolution of noise related concerns from the communities at an early stage.

9.12.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring should be conducted by the HSE Manager / Site Manager and Supervision Consultant on ad hoc basis during construction and monthly by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

9.13 AIR QUALITY / GREENHOUSE GAS EMISSIONS AND CONTRIBUTIONS TO CLIMATE CHANGE AND AILMENTS

9.13.1 OBJECTIVE

To keep air emissions at a minimum so that it does not cause a nuisance to residents and the travelling public.

9.13.2 TARGET

That little or no air emissions (e.g. dust) complaints are received from the public.

9.13.3 METHOD STATEMENT

The main pollutant of concern from site development activities is dust occurring as particulate matter. The Project would generate dust in quantities which may hamper visibility, cause damage to vegetation by impairing their growth and quality, stain roadside sold goods, stain houses and household properties along the road. The dust may also degrade water quality of nearby community water sources like streams, rivers and dugouts. It also has the potential to cause respiratory problems (such as silicosis and asthmatic attacks) and eye infections (particularly for workers). As such, appropriate emissions control management practices and procedures should be defined during the design phase for the effective suppression of dust and other emissions during all future activities.

Appropriate dust-suppression techniques (e.g. the use of water bowsers) should be employed by the Contracting Entity on all exposed surfaces during periods of high wind. Potential methods include:

- Remove only limited vegetation to accommodate construction activities.
- Spray unpaved roads and construction areas, including stockpiles and spoil with water routinely throughout construction to contain dust.
- Implement traffic control measures to limit vehicle entrained dust from unpaved roads (e.g. by limiting construction vehicle speeds and by restricting traffic volumes).
- Re-vegetate verges and cuttings once construction is completed, and when the lay down area/construction camp is vacated.

Contracting Entity vehicles emitting fumes should be repaired and maintained. Such emissions can lead to contribute to several environmental impacts including climate change (global warming) and health impacts in the short to long term. Vehicular emissions also constitute an important trigger factor for respiratory illnesses. Burning of vegetation or other waste material should be discouraged and communities (especially farmers, herders and hunters) sensitized on bush fires and unsafe farming practices. Truck queuing, idling of trucks and trips should be reduced through logistical planning of materials delivery and work practices and vehicles travelling within the worksites should be restricted to a speed limit appropriate for the conditions of safety and so as to limit dust generation from vehicle movements.

The Contracting Entity should also consider planting of indigenous tree species to rehabilitate degraded areas to act as carbon sinks. No burning of waste material should be allowed at the site offices or anywhere else on the site. Skills training and education or sensitization programs should continue to be provided to the communities (including schools, religious groups, opinion leaders, farmers, etc.) and issues such as climate change and sustainable agricultural practices should be addressed.

9.13.4 MONITORING RESPONSIBILITY AND SCHEDULE

Air quality monitoring should be conducted by the HSE Manager / Site Manager and Supervision Consultant on ad hoc basis during construction and monthly by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

9.14 SPOILING OF MATERIAL / LANDSCAPE MODIFICATION

9.14.1 OBJECTIVE

To achieve proper location and management of spoil sites considering the socio-economic and environmental requirements of the project.

9.14.2 TARGET

Spoil sites will be located such that no secondary pollution or negative physical impacts will emanate.

9.14.3 METHOD STATEMENT

The Contracting Entity should be responsible for the identification and approval of spoil sites, prior to the commencement of construction. Spoil areas should not negatively affect surface drainage, and they should also not alter the topography to the extent that they become visually intrusive. The Contracting Entity should balance filling and cutting requirements through appropriate route choice, so as to avoid or reduce the production of excess spoil material and reduce the need for borrow pits.

The Contracting Entity should be responsible for the safe siting, operation, maintenance and closure of spoil sites used during the contract period. Dumping of material over embankments should not be permitted. Before spoil sites may be used, proposals for their locality, intended method of operation, maintenance and rehabilitation should be given to the Supervision Consultant for approval. Should the spoil site fall outside the road reserve, the affected landowner should be consulted and should provide written consent for the location of these spoil sites on the property. No spoil site should be located within 500 m of any watercourse, nor in areas of high ecological sensitivity. A photographic record should be kept of spoil sites for monitoring purposes and should include photographs of the site before use, as well as after re-vegetation.

The use of spoil sites for the disposal of hazardous or toxic wastes is prohibited.

Best practice construction measures should be adopted to restore the natural contour of the land as close to pre-construction conditions as practicable. Spoil sites should be shaped to fit the natural topography. These sites should receive adequate topsoil and be grassed with the recommended seed mixture. Appropriate re-vegetation measures to minimise soil erosion should be undertaken by the Contracting Entity.

9.14.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager and/or Supervision Consultant.

9.15 STOCKPILES

9.15.1 OBJECTIVE

To enforce that stockpiles are properly planned and located considering the socio-economic and environmental requirements of the project.

9.15.2 TARGET

Stockpiles will be located such that no secondary pollution or negative physical impacts will emanate.

9.15.3 METHOD STATEMENT

The Contracting Entity should be responsible for the identification and approval of stockpile areas (if any) prior to the commencement of construction. If the stockpile area is located closer than 500 m from a river, erosion protection measures should be designed and implemented. As far as possible, existing roads should be used to access these stockpile areas.

As far as possible, the Contracting Entity should have activities planned so that materials excavated from borrow pits and cuttings can be transported directly to the site and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material should be indicated and demarcated on the site plan and submitted in writing to the Supervision Consultant for approval, together with the Contracting Entity's proposed measures for prevention, containment and rehabilitation against environmental damage. The Contracting Entity should confirm that the size of the demarcated areas is sufficient for this purpose. No increase in size should be accommodated without proper motivation to the Supervision Consultant.

The areas chosen for temporary stockpiling should have no indigenous trees and shrubs present that may be damaged during operations. In determining the location of these temporary stockpile, cognisance should be taken of sensitive areas, and should be located within the road reserve boundary, where feasible. Care should be taken to preserve vegetation in the immediate area of these temporary stockpiles.

During the life of these temporary stockpiles, the Contracting Entity should at all times enforce that they are:

- Positioned and sloped to create the least visual impact.
- Constructed and maintained so as to avoid erosion of the material and contamination of the surrounding environment.
- Kept free from weeds and invader plants/undesirable vegetation.

The stockpiling of aggregate material for surface seals should be lined and covered in order to avoid leaching of material into soil and groundwater, any leakage and contamination of soil or water should be acted on immediately with the affected materials removed to a toxic waste disposal site.

After the stockpiled material has been removed, the site should be re-instated to its original condition. No foreign material generated/deposited during construction should remain on site, Areas affected by stockpiling should be landscaped, top soil applied, grassed and maintained at the Contracting Entity's cost until clearance from the DFR and/or Supervision Consultant is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the HSE Manager within the road reserve, should be subject to the same condition as other stockpiled materials. Excess materials from any debris of material from road construction activities should be properly contained for disposal. The HSE Manager should approve the areas for stockpiling and disposal of construction rubble before operations commence.

9.15.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager and/or Supervision Consultant.

9.16 SPILLAGES / CONTAMINATION

9.16.1 OBJECTIVE

To protect land, streams, rivers and dams from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils. aggregate, tailings, wash water, organic materials and bituminous products.

9.16.2 TARGET

To initiate programs to prevent contamination of land, rivers and streams.

9.16.3 METHOD STATEMENT

In the event of a spillage, the Contracting Entity will have responsibility to arrange for competent entities to clear the affected area. The individual responsible for, or who discovers a hazardous waste spill should report the incident to the HSE Manager. The HSE Manager and HSE Officer will assess the situation in consultation with the Supervision Consultant and initiate early spill containment. The exact treatment of polluted soil or water should be determined in consultation with the Supervision Consultant. Areas cleared of hazardous waste should be re-vegetated according to the HSE Manager's instructions.

Should water downstream of the spill location be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice should be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input should be agreed with the HSE

Manager. The costs of containment and rehabilitation should be in the Contracting Entity's account, including the costs of specialist input.

The Contracting Entity should report emergency incidents in accordance with its incident reporting procedure.

9.16.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly or Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, the Waste Management Department of the MMDAs and/or Supervision Consultant.

9.17 CULTURAL / HERITAGE RESOURCES

9.17.1 OBJECTIVE

To implement appropriate procedure when uncovering any archaeological remains or graves during the construction phase.

9.17.2 TARGET

To collect and manage in an appropriate manner archaeological artefact and cultural heritage that is uncovered during the construction phase.

9.17.3 METHOD STATEMENT

Cultural resources are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of the people's cultural identity and practices. The loss of such resources may be irreversible, however, avoidable should road design and construction take account of such cultural heritage and resources through undertaking of heritage studies early (prior to construction) to identify these.

Necessary consultations or engagements especially relating to the performance of certain rites and pacifications prior to destruction of certain physical resources should be done by the Contracting Entity. This is important in preventing conflicts that could stall the project.

If an artefact on site is uncovered, work in the immediate vicinity should be stopped immediately. If a grave is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the gravesite should be stopped. The Contracting Entity should take reasonable precautions to prevent any person from removing or damaging any such artefact and should immediately inform the HSE Manager of such discovery and the project approved chance find procedures initiated.

9.17.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Quarterly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

9.18 VISUAL IMPACTS

9.18.1 OBJECTIVE

To minimise or reduce the effect of visual intrusion / visual aesthetic degradation by the Project.

9.18.2 TARGET

The construction of the road should enhance the visual amenity of the surrounding area.

9.18.3 METHOD STATEMENT

The Project area is characterised by tranquil agricultural landscape or environment with little industrial operations. The local people have a strong aesthetic attachment to the area. During the construction period, there will be an increase in construction equipment, machines and other support vehicles. The presence of these equipment will cause a change in the landscape of the local community. Scenic quality degradation could also occur due to stock piling of construction materials and discoloration of plant leaves and houses in the vicinity of the roads due to windblown dust, etc.

The Contracting Entity will restrict construction activities to designated areas and within the defined ROW or servitude in order to reduce the impact on visual intrusion. Screen planting should be provided at strategic points to intercept views from key viewpoints where the road construction will change the horizon line. The Contracting Entity should implement recommended good housekeeping measures such as keeping the working area and construction camp neat, clean and organised. Waste arising from the road Project, both along the road and in camp sites, should be disposed of in an environmentally sound manner at designated sites as recommended by the local District Assembly. The construction camp should be placed sensitively where it will be least visible for passing traffic. The Contracting Entity should keep the footprint of the construction camp as small as possible.

Disturbed or degraded areas due to the construction activity should be rehabilitated. Rehabilitation should be implemented directly after completion of the project in order to enhance quick recovery.

9.18.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

9.19 TRAFFIC DISRUPTIONS / ACCIDENTS AND HEALTH AND SAFETY

9.19.1 OBJECTIVE

To make sure that the construction activities do not disrupt traffic unnecessarily and accidents and other health and safety impacts are curtailed.

9.19.2 TARGET

The road construction should improve traffic situation along the road corridor and achieve accident free construction as far as possible whiles keeping health issues on the minimum.

9.19.3 METHOD STATEMENT

Construction activities which involve the use of machinery and equipment, and movement of earth materials will lead to traffic congestions on the road network, potentially affecting road users. The development if not well managed can also cause vehicular and human accidents. Accidents constitute one of the most important risks in road construction and maintenance. The inadequacy of warning and precautionary signages can result in accidents. Construction activities will present health and safety issues to both workers and road users. The Project will require intensive engineering and construction cutting and masonry work which will expose construction workers to risks of accidents and injuries.

The Contracting Entity is expected to take note of these and implement measures to address the possibility of these incidences materializing. The Contracting Entity will develop a health and safety management plan for construction vehicles and machines and install speed control limits for the Project and see to it that vehicles comply with the site driving regulations. The Contracting Entity will also install visible traffic safety / guiding signages which should be presented in English and the local languages and also recruit traffic wardens or guides to direct vehicles and also help persons with disabilities cross the road safely during

construction. The Contracting Entity must also document community grievances, accidents and actions taken, and also hold scheduled safety tool box, pre-start safety information share and institute strict punitive measures for non-compliance with safety rules. The Contracting Entity will also institute a strict code of conduct at the workers' camps, and see to it that facilities such as lavatories, bathrooms, and accommodation are separated according to gender.

The Contracting Entity will make sure medical personnel are available to the project with responsibility for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce. Major cases such as those of severe injury nature will be referred off site to the nearest clinic or hospital. It is also important that the Contracting Entity collaborates with appropriate agencies in the project area to enhance community sensitization on road traffic accidents within the project areas, through a targeted public road safety awareness program.

9.19.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Weekly or Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

9.20 DRAINAGE SYSTEMS AND POTENTIAL FLOODING

9.20.1 OBJECTIVE

To achieve adequate drainage pertaining to the project specifications and to limit the potential of flooding.

9.20.2 TARGET

Drainage systems should be adequately designed and undertaken in accordance with design guidelines.

9.20.3 METHOD STATEMENT

Most of the existing road sections have either inadequate drainage or no drainage provisions. Where drainages are available, they are hindered by the small size or poor construction preventing the free flow of runoff. Such areas have become flood prone and during heavy rainfall there are recorded incidences of flooding.

It is important therefore that the Contracting Entity installs culverts, pipes and channels in accordance with design guidelines. In designing culverts along the proposed route, drainage systems should be kept as natural as possible. Natural drainage should be retained, and normal flow achieved at all times. Culverts should be constructed considering the peak water levels and they should be levelled appropriately so that they are self-cleaning. However, de-silting and cleaning of drains should be carried out regularly (during or after construction). Where necessary, the construction of artificial wetlands can be used for management of stormwater, with the wetlands acting as natural sponges to absorb water before it reaches a road surface.

The design of bridges and embankments should consider the effect of the structures on the river and flood plain system and aim to minimise the impacts. Design calculations should prove that the optimum solution is being implemented. The effects of backwash should be considered and appropriate measures employed.

9.20.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO and/or Supervision Consultant.

9.21 ANTI-SOCIAL BEHAVIOURS, CRIME AND CONFLICTS

9.21.1 OBJECTIVE

To eliminate or minimise anti-social behaviours, crime and conflicts on the project.

9.21.2 TARGET

To initiate processes to minimise anti-social behaviours, crime and conflicts and achieve little or no related reported incidences on the project.

9.21.3 METHOD STATEMENT

The influx of labour may lead to negative impacts on host communities and exacerbate pre-existing social issues in host communities. This includes potential increases in crime rates and other social vices through change behaviours and influence by immigrant Project workers. Project workers may be susceptible to assault/attack/intimidation by the local people especially where communities face insecurity of land tenure or are unable to get job opportunities on the Project. The project, it is feared by the project communities, may also lead to increased rates of child trafficking to neighbouring countries such as Togo and Nigeria.

The Contracting Entity will implement measures to address these issues. It is important that the Project as far as practicable utilize local labour and include clauses in work contracts to recruit local labour. Proactive measures should also be instituted to educate local communities about the need to bring in skilled labour when needed. Children and other person under statutory working ages of eighteen (18) years should not be engaged in any form of physical labour in relation to the Project. The provision of valid photographic national ID's during labour recruitment should be enforced.

If criminal activities are to be kept at the barest minimum, then there should be police visibility or checkpoints and stations at vantage points along the project roads to adequately address all security concerns. All institutions responsible for security in the project districts, especially the Police, should be made aware of the road projects in good time and be engaged in all security details. This would enable the project activities to be included in their operational purview and proactive measures taken. The Contracting Entity should also engage the police to follow up on reported cases of child trafficking, rape, defilement and other sexual and/or gender-based violence/issues that may arise during the proposed project. The Contracting Entity should also work with community leadership, identified NGOs, voluntary groups and civil society organizations to develop capacity and support for vulnerable groups, as well as made active stakeholders in security related issues. The Contracting Entity should further develop specific strategies or measures against the risk of child labour and child trafficking on the project.

In areas / towns of perceived potential conflicts, the Contracting Entity should engage the services of a security agency, if practicable, to protect construction workers during Project development.

9.21.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

9.22 GENDER-BASED VIOLENCE (GBV), CHILD PROTECTION AND OTHER GENDER ISSUES

9.22.1 OBJECTIVE

To eliminate or minimise GBV, SEA and SH incidences and other gender / child protection issues on the project.

9.22.2 TARGET

To initiate processes to minimise GBV, SEA and SH and achieve little or no gender-based complaints from the public or workers on the project.

9.22.3 METHOD STATEMENT

The influx of labour may lead to negative impacts on host communities and exacerbate pre-existing social and gender issues in host communities such as GBV, SEA and SH and discrimination against vulnerable groups. Women, girls, men and boys can all be victims of GBV, SEA and SH. However, women and girls of all ages and backgrounds are the most affected. It is possible women and other vulnerable groups may be discriminated against on the project, not given a voice in decision making or even abused. The potential influx of migrant workers will contribute to a rise in sexual violence including rape and sexual assault; and harmful practices such as child and forced marriages in the project area cannot be underrated. Project workers may use money to lure young female groups and women into sexual relationship which will in-turn may result in teenage pregnancies and spread of sexually transmitted diseases and rise in female school dropout.

The Contracting Entity must institute measures that will culminate in minimising or mitigating GBV, SEA and SH and related issues on the project. The Contracting Entity should as far as practicable, respect clauses in work contracts to utilize local labour and offer equal opportunities to women and should not discriminate against vulnerable groups who have the capacity to work. Women performing the same role as men should not be discriminated against in terms of their pay or wages. Gender issues (e.g. sexual abuse to women) should not be condoned on the Project.

The Contracting Entity should also collaborate with relevant institutions to as part of stakeholder engagement educate and sensitize local communities on GBV, SEA and SH and encourage women, girls and even children to report abuses to the police, state agencies like the Domestic Violence and Victims Support Unit (DOVVSU) and Anti-Human Trafficking Unit of the Ghana Police Service, the Department of Social Welfare under the Ministry of Gender, Children and Social Protection and to advocacy groups or NGOs in the area. Security agencies should be encouraged and well-resourced to prioritize the arrest, prosecution and conviction of construction workers who impregnate teenage girls or abuse children in any form. As part of stakeholder engagement, the chiefs and community leaders should be educated and encouraged in taking lead roles in addressing these gender issues and meting out punishments where necessary.

The Contracting Entity should coordinate with the police to follow up on reported cases of abuse, rape, defilement and other sexual and gender-based violence / issues involving any worker on the project and should not prevent the arrest, prosecution and conviction of perpetrators of such crimes. The Contracting Entity should also be at the forefront of the provision of trauma-informed recovery services or psycho-social support for workers who are victims of such acts by collaborating with state agencies or private bodies / NGOs who provide such services at no cost to the worker.

The Contracting Entity should work with community leadership, identified NGOs, voluntary groups and civil society organizations to develop capacity and support for vulnerable groups on the project. The Contracting Entity should also employ traffic wardens to enable persons with disabilities cross the road safely during construction. Vehicles and ambulances should also be readily available to transport cases of emergencies to a health facility. The Contracting Entity should also work on schedule so that unnecessary delays do not affect the use of the road by school children and the general public.

Towards the management of GBV, SEA and SH, the MRH has developed a GBV Framework (see Appendix B) which specifies the minimum requirements for the Contracting Entity. The Contracting Entity should therefore be guided at all times by this document. The Contracting Entity should implement the Project grievance mechanism so that GBV, SEA and SH concerns on the project are documented and resolved in a timely fashion. Construction staff should also be included in any training sessions and awareness campaigns on GBV, SEA and SH management and child protection. Construction staff are to be the object of training and awareness raising so they will recognize women's concerns, including matters of sexual harassment in the construction site and the fundamental gender inequality and social customs that maintain the appropriateness of violence.

9.22.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

9.23 BORROW PITS OPERATION AND MANAGEMENT

9.23.1 OBJECTIVE

To achieve an environmentally friendly and sustainable operation and management of borrow sites.

9.23.2 TARGET

To initiate processes to minimise negative impacts from borrow pits and achieve little or no complaints from the public.

9.23.3 METHOD STATEMENT

The Contracting Entity shall remain responsible for managing borrow pit operations throughout the Project development. As far as possible, reinstatement of borrow sites must be completed by the Contracting Entity during the construction phase. The recommended measures herein are aligned as far as practicable with requirements in Section 6 of the Standard Specification for Road and Bridge Works (MRH, 2007).

9.23.3.1 BORROW SITE ASSESSMENT AND SELECTION

- A preliminary site assessment prior to undertaking excavation works should be undertaken by the Contracting Entity.
- A written approval for use of the proposed site shall be obtained from the local authorities. It is recommended to commence discussion with relevant authorities as soon as possible to understand requirements and potential limitations of the process. Negotiation may require preparation of the narrative that describes borrow pit operations, outline of potential risks to the nearby communities, mitigation measures to control and minimise such risks and preparation of restoration plans.
- Excavation of test pits shall be carried out to confirm the extent and quality of the materials within the borrow site. Test pits and boreholes shall be decommissioned unless used as a borrow site.
- Hydrogeological information shall be obtained to determine the presence and depth of any groundwater table.
- Borrow pits should be preferably located in areas with minimal volume of vegetation or existing/decommissioned pits can be used.
- The borrow site shall have clearly defined property lines which will be surveyed and clearly marked to limit excavation within the approved area of the site.
- The borrow pit operational site must have an undisturbed buffer area of natural vegetation of a minimum of 25 meters in width around the perimeter of the site - excluding entry roadway with a maximum width of 5 meters.
- The property line of the site shall not be within or near to any site of special scientific interest.
- Location of the borrow sites shall be well documented. Documentation will include: a map showing the location and a plan-view of the site, in a scale of 1:25012, a photographic record of the site in its undisturbed state (photographs should be taken from the geographic centre of the proposed site in 4 directions: north, south, east, east and west).

9.23.3.2 BORROW SITE OPERATION

The borrow site operational area shall include: area of extraction, a buffer zone, perimeter berm, stockpiles (i.e. topsoil and overburden) and area for general operations. An estimated lifespan of the site (operation)

¹² Ministry of Transportation, Standard Specification for Roads and Bridges, 2007

should be given based on the geotechnical assessment, anticipated rate of extraction and planned site reclamation by the Contracting Entity.

Stockpiles

- Topsoil depth ranges between 150 mm and 500 mm. The exact depth shall be determined from the geotechnical site assessment. Topsoil shall be stripped and stockpiled away from other materials. Topsoil shall be only used for reclamation purposes when pit operation is complete.
- Overburden soil (i.e. the layer of soil below the topsoil and above the material of interest) shall be used as a perimeter berm to direct drainage on the site or stockpiled separately from topsoil and later used to landscape and backfill exhausted areas of the borrow pit.
- During operation, the lower 100 mm of stockpiled material will not be utilized for construction.

Excavation Slopes

- Pit excavations shall be a maximum of 6 meters in depth with a maximum allowable horizontal to vertical slope (H:V) of 2:1 or 50% grade.
- One side of the excavation shall have a maximum horizontal to vertical slope (H:V) of 2.5:1 or 40% grade for efficient operation of heavy equipment and to allow for ease of access.
- Pit excavations greater than 6 meters must be fenced all round.

9.23.3.3 ENVIRONMENTAL AND SAFETY MANAGEMENT

The Contracting Entity must undertake the following environmental, health and public safety measures:

Site Clearance and Access / Safety

- The Contracting Entity shall remove topsoil and/or overburden from borrow pits, spoil and stockpile areas and access roads. Topsoil and overburden shall be stripped and stockpiled separately solely for later rehabilitation of the excavations. Topsoil and overburden shall not be used in the works.
- The extraction site should have a barrier such as yellow warning tape and/or perimeter berms to control or discourage public access. Alternatively, the Contracting Entity can post a local full-time guard until the site is reinstated.
- Any deep excavation site that has standing water greater than 0.75 meters deep must be protected from public access by installing a fence and/or posting a full-time guard before the water level goes down.
- Entrances to the site should be gated so as to restrict ease of access to the public and shall be designed to provide vehicles with adequate sight distance to avoid a safety hazard.
- Durable warning signs shall be posted around the perimeter of the borrow site not more than 50 meters apart which will provide symbols of danger and no trespassing.
- Liaison with the local community should be undertaken, which includes information on dangers within borrow pit operational sites and that trespassing is not permitted.

Visual

- Existing vegetation within a minimum of 25-meter buffer area should not be disturbed, as it should provide some visual screening of pit operations from the road and nearby residents.

Noise

- Existing vegetation within a minimum 25-meter buffer area should not be disturbed, as it should screen noise of pit operations from nearby residents.

Water

- If water is needed for borrow pit operations, the Contracting Entity shall make available a water truck for such purpose.
- Borrow pits shall not be located within and at least 100 metres away from a wetland area.
- Excavation below the water table is not permitted.

- Standing water in the borrow pit is not permitted and shall be removed either through drainage structures and/or pumping. Alternatively, any pits with deep (greater than 0.75 meter) pools of water must be secured by a fence and/or full-time guards to prevent public access.
- Under no circumstances shall community members be allowed to use water at an active borrow pit site for any purpose (e.g. crop irrigation, washing clothes, etc.).
- Overburden soil can be used as a perimeter berm to direct drainage away from the site.
- Efforts shall be made to reduce the amount of runoff into the borrow pit.

Erosion

- Erosion control measures must be undertaken in all aspects of pit operations including stockpiles and access roads. These measures include reduced slopes, seeding, and stockpile covers to protect stockpiles and the adjacent land.
- Topsoil stockpiles shall be protected from wind and water erosion by reducing slopes (i.e. less than 50% grade), using a covering, and/or spraying with water.

Dust

- In all operation of the borrow pits, measures shall be undertaken to minimise dust emission and spread (water sprinklers, covering stockpiles, introducing speed limits, etc.).
- If a rock crusher is used, the dust control measures shall be undertaken by using a water truck or fixed sprinklers on crushing equipment.

9.23.3.4 SITE RECLAMATION

Site reclamation (reinstatement) should be completed prior to handover of completed road section.

Stockpile Reuse

- Overburden stockpiles and perimeter berms shall be placed on the excavated site and graded to the desired slopes and drainage paths.
- Reserved topsoil shall be spread on top of the overburden with more topsoil focused on sloping land (minimum depth on slopes: 150 mm).

Final slope and drainage

- Suitable surface slopes together with drainage ditches and conduits, as needed, shall be constructed to prevent water from collecting at the site.
- Final slopes within the site shall be a maximum horizontal to vertical slope (H:V) of 3:1 or 33% grade.

Final cover

- The borrow pit operational site including access roads shall be thoroughly scarified as needed to help establish adequate vegetative cover.
- A minimum of 75% of vegetative cover should be established and maintained following the first rains after reclamation.
- Particular focus shall be given to vegetation cover on the side slopes of the excavated area to minimize erosion. Any required seeding used shall be of local plant varieties.

Interim reclamation

- When excavation activities are going to cease for longer than 60 days, interim reclamation measures should be undertaken to protect the environment and public safety.
- Borrow pits, quarry, stockpiles and spoil areas which will no longer be used shall be reinstated within 14 days after the last day of use.
- Interim reclamation measures include a minimum of seeding of topsoil stockpiles and grading the site to reduce erosion potential.

- If the local community requests that the borrow pit, quarry, spoil or stockpiled areas not be reinstated, the Contracting Entity shall, upon approval from the Supervision Consultant and consensus from the EPA and the District Assemblies, obtain a signed agreement with the community leaders to that effect.
- Borrow pits and quarries shall not be used as landfill sites unless permission to do so has been granted by the relevant authorities and an EIA has been undertaken.

9.23.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO, Rehabilitation Specialists and/or Supervision Consultant.

9.24 DISEASE SPREAD (COMMUNICABLE AND SEXUALLY TRANSMITTED)

9.24.1 OBJECTIVE

To make sure that the increased labour influx as a result of the road construction and the typical congested work environment associated with road projects does not increase the spread of diseases (including the COVID-19 pandemic) in the project area beyond levels that could not be sustainably managed or the impacts curtailed.

9.24.2 TARGET

The construction of the road should improve the health situation of the project area as far as possible whiles keeping unhygienic conditions and the spread of diseases on the minimum.

9.24.3 METHOD STATEMENT

The prevalence of common diseases like malaria, cholera and diarrhoea in the Project area can be attributed to poor sanitary conditions. The potential influx of workers to the Project area and the typical congested work environment associated with road projects is expected to cause an increase in communicable diseases (including the COVID-19 pandemic) among workers through interaction with local communities and vice versa. Project construction activities will also generate solid and liquid waste which if not properly managed will create unsanitary conditions. The Contracting Entity must therefore see to it that workers on the Project are provided with appropriate housing, sanitation and living conditions. The Contracting Entity must also institute strict management protocols to prevent and address potential COVID-19 cases and a strict code of conduct at the workers' camps, and see to it that facilities such as lavatories, bathrooms, and accommodation are separated according to gender.

The Contracting Entity must also make sure medical personnel are available on the project and also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce. The Contracting Entity must provide first aid services to construction workers and further arrangements made with a larger hospital or health facility where major cases will be referred to. The Contracting Entity must also collaborate with the appropriate institutions and health facilities to adhere to any government or project developer directives on prevention and management of COVID-19 and develop and implement vaccination programme for employees and their visitors or families (where necessary) against relevant vaccine-preventable diseases based on adequate risk assessment. Construction workers should also be provided with appropriate PPEs to protect against COVID-19 and encouraged to sleep under treated mosquito nets.

It is important that there is adequate community liaison and education on the potential health issues the Project development will attract to the area and where necessary, community sensitization and screening on potential diseases and health problems within the Project area, including Hepatitis B should be implemented as part of a wider social responsibility contribution for the Project.

Diffusion or increase in the spread of diseases like HIV/AIDS and STIs and others is also expected as a result of labour influx. The Project may also experience the influx of sex workers to the area which may result in the increase in sexually transmitted infections and HIV cases. It is important that the Contracting Entity collaborates with appropriate agencies in the project area to enhance community sensitization on hygienic practices, communicable diseases, HIV/AIDS and other sexually transmitted diseases within the project areas, through a targeted public awareness program. The Contracting Entity should encourage the use of condoms and where practicable, make them available to workers on the Project who should be discouraged from sleeping with young girls or married women. The security agencies should be encouraged and well-resourced to prioritize the arrest, prosecution and conviction of construction workers who impregnate teenage girls and it is important that the Contracting Entity does not shield them or try to cover up such crimes or misconducts.

9.24.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Monthly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

9.25 LABOUR INFLUX AND ASSOCIATED IMPACTS

9.25.1 OBJECTIVE

To effectively manage increased labour influx as a result of the road construction and its associated negative impacts.

9.25.2 TARGET

To initiate processes to minimise negative impacts from increased labour influx and achieve little or no complaints from the public or not exacerbate pre-existing social issues.

9.25.3 METHOD STATEMENT

The Project will cause entry of employment-seekers (labour influx) from other parts or regions into the Project area which may lead to negative impacts on host communities and exacerbate pre-existing social issues and its associated problems. Labour influx can be direct or indirect to the Project. It will be the responsibility of the Contracting Entity to manage labour influx at the Project level, working with the District assemblies.

Labour influx management should be done in line with management of its related impacts as described in the ESIA, including but not limited to:

- Increased price inflation and economic vulnerability at the local level due to the arrival of migrants into the Project area or communities, which may result in additional demand for goods and services causing an increase in the cost of basic goods.
- Increased demand for potable water due to increased population sizes.
- Potential breakdown of traditional institutions, traditional leadership structures and cultural norms leading to a loss of community identity and resilience.
- Increased competition for natural resources, land occupation and use, and actual and perceived Project benefits and entitlements.
- Increased disposable income may result in increased incidences of prostitution and casual sexual relations. These sexual relations could lead to an increase in STIs and an increased incidence of HIV/AIDS.

The following recommendations are proposed to manage project in-migration at construction and operation / maintenance phases of the Project.

9.25.3.1 LABOUR INFLUX MANAGEMENT AT THE CONSTRUCTION PHASE

- Establish in the Project recruitment policies, the objective of offering jobs to persons from Project impacted communities 'First' and thereafter nearby communities within 2km radius of the Project footprint.
- The Contracting Entity will enlist all unskilled and semi-skilled labour which will be procured in these local communities at common places including community centres, District assemblies, information centres and any other place of convenience accessible to community members.
- The Contracting Entity will issue clearly defined dates for recruitment and application cut-off dates.
- The Contracting Entity should give equal opportunities to women and should not discriminate against vulnerable groups who have the capacity to work. Work contracts should also include clauses against sexual harassment.
- The CRO will be the designated point of contact between the community and the Contracting Entity. The CRO will act as means of communication with the Project management and are a potential channel of conflict resolution with the Project as well.
- The Contracting Entity's will establish a regular monitoring and stakeholder engagement process. Monitoring will be undertaken regularly to build up an understanding of worker in-migration patterns. Monitoring activities will take place on a quarterly basis during the construction period.
- Develop a grievance mechanism as a part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion.

9.25.3.2 LABOUR INFLUX MANAGEMENT AT THE OPERATION / MAINTENANCE PHASE

It is anticipated that the impacts which occur during the operation / maintenance phase will be less significant compared to the construction phase. It should however be noted that even if the measures outlined to manage labour influx in the construction stage is implemented fully, some in-migration is still expected to continue during the maintenance phase of the Project life cycle. Management of labour influx during this phase should thus focus on the following, as a minimum:

- The effective delivery of Project benefits to local communities;
- Strengthening of the Project and local governance capacity; and
- Directly addressing negative impacts of in-migration.

The Contracting Entity should also adopt the following measures;

- Maintain existing monitoring and stakeholder engagement process. Monitoring should be conducted on a quarterly basis during the maintenance phase.
- Maintain labour recruitment process and as far as possible, reserve some roles for women. For instance, the Contracting Entity should identify local groups and women associations and as far as possible offer them jobs involving afforestation and revegetation particularly in areas where borrow pits or degraded vegetation will be reinstated.
- Maintain working relations with traditional governance system and communicate related labour recruitment process to community leaders.
- Maintain grievance redress mechanism and continue to document and resolve community concerns in a timely fashion.

9.25.4 MONITORING RESPONSIBILITY AND SCHEDULE

Monitoring (Quarterly) should be conducted by the Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.

10 ENVIRONMENTAL AND SOCIAL MONITORING

Environmental and social monitoring will allow for measures to be implemented in time to prevent or avoid negative impacts. The monitoring of environmental and social parameters specific to the Project is necessary as it enables the confirmation or otherwise of impacts identified during the ESIA study and enables the continuous availability of environmental data for assessing potential problems likely to occur in the future following project implementation. The monitoring is expected to adhere to standard principles of being holistic and comprehensive, scientifically rigorous, adaptive and robust, inclusive and collaborative as well as being transparent and accessible.

Following the award of contract and commencement of the Project, the Environmental and Social Safeguards Team of DFR or the MRH in collaboration with the Contracting Entity should commence monitoring. The designated authority in charge of monitoring should also be given the authority to stop work (the project) in the event of identified and verifiable risks to the environment and human health. The successful implementation of the monitoring program will depend on the commitment and capacity of the Environmental and Social Safeguards Team and other third parties (institutions) to implement the program effectively.

The main environmental media that will be impacted by the Project and that may present health (socio-economic) concerns are air, land and water. The monitoring should thus include but not limited to the following components:

- Air quality
- Noise levels
- Effluent and water discharge quality
- Land and surface water pollution / degradation
- Compensation and grievance redress (Loss of land / property and resettlement)

These components should be monitored throughout the life of the Project or contract period (beginning at the start of construction). The results of the monitoring program and the effective communication of issues identified will provide the opportunity for adopting appropriate control measures that will enhance the Project's benefits. Monitoring will also involve periodic review of construction and maintenance activities to determine the effectiveness of the recommended mitigation measures.

10.1 MONITORING PARAMETERS / PERFORMANCE INDICATORS

10.1.1 AIR QUALITY MONITORING

Air quality monitoring should be undertaken on ad hoc basis during the construction ensure that pollutions are curbed early to minimize dissipation and monthly monitoring throughout the Project's lifespan, beginning right before construction commences. Monitoring should be conducted for the following parameters:

- NO₂
- SO₂
- CO₂
- PM₁₀

Assessments based on the results of the monitoring should be done in line with standard recommended guideline values from the Ghana EPA as shown in Table 10-1. This is to confirm that emissions to air do

not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards.

Table 10-1: Air Quality Guidelines

Type	Averaging period	EPA Guideline Value (µg/m ³)
Particulate matter (PM ₁₀)	24 hours	70
Nitrogen dioxide (NO ₂)	24 hours	150
Sulfur dioxide (SO ₂)	24 hours	150
Total Suspended Particulates (TSP)	24 hours	230

10.1.2 NOISE LEVEL MONITORING

Noise level monitoring should be conducted on ad hoc basis during the construction and monthly throughout of the Project's lifespan. Monitoring should be done in selected communities in close proximity to the road corridor or construction area to determine non-exceedance to established national noise guidelines as shown in Table 10-2.

Table 10-2: Ghana Ambient Noise Level Guidelines

Zone	Description of noise reception	Permissible Noise Level in dBA	
		Daytime (06:00-22:00)	Night-time (22:00-06:00)
A	Residential areas with low or infrequent transportation	55	48
B1	Educational (school) and health (hospital, clinic) facilities	55	50
B2	Areas with some commercial or light industry	60	55
C1	Areas with some light industry, places of entertainment or public assembly and places of worship located in this zone	65	60
C2	Predominantly commercial areas	75	65
D	Light industrial areas	70	60
E	Predominantly heavy industrial areas	70	70

Source: Ghana EPA (2008)

10.1.3 EFFLUENT AND WATER DISCHARGE QUALITY MONITORING

Effluent and water discharges will be monitored in strict adherence to relevant legislations and guidelines including recommendations set out in the EPA's Sector Specific Effluent Quality Guidelines for Discharges into Natural Water Bodies which provides maximum permissible effluent discharge concentrations for a number of parameters as shown in Table 10-3.

Table 10-3: General Effluent Guidelines

Parameter	EPA Effluent Guideline Value
pH	6 - 9
BOD (mg/L)	50
COD (mg/L)	250
Colour (TCU)	200
Conductivity (uS/cm)	1500
Oil & Grease (mg/L)	10
TDS (mg/L)	1000
TSS (mg/L)	50
Turbidity	75

Other physicochemical and bacteriological parameters could be monitored, including the presence or otherwise of any heavy metals. Included here will also be periodic monitoring for any system leakages and chemical discharges that could potentially impair any receiving environmental media. A periodic (e.g. weekly) leak detection and repair monitoring program will be implemented. Effluent and water discharge quality monitoring will be on a continuous basis as some parameters may need to be monitored on a daily basis, others on weekly or monthly timescales.

10.1.4 LAND AND SURFACE WATER POLLUTION / DEGRADATION

Construction activities may impact nearby surface waters. As such a monitoring program will be implemented in this regard and will involve periodic (weekly) visual observations and recording/documentation of any land-based impacts such as soil erosion and land degradation/contamination, volumes and rate of various waste streams generated, etc. Also, ad hoc testing using a portable testing device will be conducted on the water bodies and periodic (monthly) soil and surface water sampling and quality testing will be conducted for some selected locations in line with recommended industry guidelines and recommendations.

Parameters to be monitored will include pH, temperature, Dissolved Oxygen (DO), conductivity, odour, colour, turbidity, Total Suspended Solids (TSS), Total Dissolved Solids, oil/grease, Nitrate, Ammonia, Phosphate, Magnesium, Chloride, Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Total Coliforms, Faecal Coliforms, *E. Coli*, etc. Heavy metals and/or toxic parameters such as Lead, Arsenic, Chromium, Copper, Iron, Zinc, Cadmium, Mercury, Cyanide, Nickel, Silver, etc will also be monitored on a monthly timescale. Appropriate industry standard sampling, testing (laboratory) and reporting processes and procedures will be adhered to and information made available to the EPA as and when needed.

Water quality results should be assessed against Ghana Standard Requirements for Effluent Discharge (GS 12 12: 2019) as shown in Table 10-4 below.

Table 10-4: Water Quality Guidelines for General Industries

Parameters	GSA
Colour (TCU)	200
Conductivity (uS/cm)	1500
pH	6 - 9
Temperature (°C)	≤3 Above ambient
Turbidity (NTU)	75
TDS (mg/L)	1000
TSS (mg/L)	50
BOD ₅ (mg/l)	50

Parameters	GSA
COD	250
Ammonia as Nitrogen (mg/L)	-
Nitrate as Total Nitrogen (mg/L)	50
Oil and Grease (mg/L)	5
Alkalinity (mg/L)	-
Chloride (mg/L)	-
phenols (mg/L)	-
Phosphorous Total (mg/L)	2
Sulphide (mg/L)	-
Cadmium (mg/L)	-
Chromium ⁶⁺ mg/L	-
Chromium Total (mg/L)	-
Total coliforms (MPN/100ml)	400

10.1.5 COMPENSATION AND GRIEVANCE REDRESS

Construction works will be restricted to the corridors of the ROW as much as practicable to avoid or limit negative impacts to adjacent land uses, crops and properties (physical structures); some of the impacts may not be avoided and need to be monitored regularly. This can create a lot of socio-economic stress and psychological disruption for the affected individuals and their families if not handled well through appropriate program of compensations, resettlement and grievance redress.

As part of the monitoring, continuous engagement of community members will be undertaken to educate PAPs on the Project and its impacts to farming activities, properties and utilities. Officers of the LVD in the affected Districts will determine value of crops and properties on portions of affected lands as part of a RAP and the outcome of the valuation will be used to determine compensation thereafter and in agreement with the PAPs.

Grievances when reported any time during the proposed road construction, will be addressed as described in Section 7.3.

10.1.6 RAP IMPLEMENTATION

The proposed RAP implementation activities (expected to last a period of six months) and responsible agencies is presented in Table 10-5 below and further details will be presented in the RAP report when RAP studies are concluded.

Table 10-5: RAP Implementation Activities

Task	Responsible Agencies
Determination and validation of compensation levels for affected persons	Private valuer, LVD and DFR Environmental and Social Safeguards Team
Approval and disclosure of the RAP	The World Bank
Disclosure of RAP in the project area through all forms of media	DFR Environmental and Social Safeguards Team, Various MMDAs
Formation of Grievance Redress Committees	DFR Environmental and Social Safeguards Team, Various MMDAs, PAPs

Task	Responsible Agencies
Distribution of offer letters	LVD, DFR Environmental and Social Safeguards Team
Signing and submission of acceptance letters	PAPs
Payment of compensations	MOF and Ministry of Local Government and Rural Development (MLGRD) for Government of Ghana, DFR Environmental and Social Safeguards Team
Relocation of temporary structures	DFR Environmental and Social Safeguards Team, Sub-metro officials
Demolition (Partially or fully) of immovable structures	DFR Environmental and Social Safeguards Team, Sub-metro officials
Submission of RAP Implementation Report to the World Bank	DFR Environmental and Social Safeguards Team
Monitoring and evaluation of the living standards of the relocated persons	DFR Environmental and Social Safeguards Team, NGO / Consultant
RAP completion audit report	DFR Environmental and Social Safeguards Team, Various MMDAs

Internal monitoring of the resettlement activities should be undertaken by the RAP Monitoring and Evaluation Team, led by the Social Safeguards Specialist of DFR. The monitoring will look at inputs, outputs and outcomes of compensation, resettlement and other impact mitigation or management measures. Input monitoring will establish if staff, organization, finance, equipment, supplies and other inputs are on schedule, in the requisite quantity and quality. Output monitoring will establish if agreed outputs are realized on time for:

- Communication with the affected communities
- Agreed resettlement and compensation policy, procedures, and rates
- Compensation for crops, structures and business
- Livelihood program delivery and uptake
- Grievance resolution
- Attention to vulnerable people

Outcome (or effectiveness) monitoring will determine the degree to which the program objectives and performance targets have been achieved. Recommended internal monitoring milestones are presented in Table 10-6 below.

Table 10-6: RAP Internal Performance Monitoring Milestones

Indicator Type	Milestone
Input	Payment of Compensation
	Site visits to encourage PAPs to move
Output	Cooperation from PAPs (willingness to relocate)
	Relocation of temporary structures
Outcome	PAPs relocated
	Grievance redress procedures established and working
	Monitoring results produced

External monitoring will involve dedicated representatives from the EPA and selected NGOs in the area, as well as the Supervision Consultant contracted by DFR. Where necessary, representatives from the

traditional authorities should be included. The World Bank Social Safeguards Team are expected to also perform occasional or scheduled visits to the Project to conduct oversight responsibilities, including verifying the results or outcome of the internal monitoring.

An evaluation (audit) should be undertaken after RAP inputs to verify that physical inputs committed in the RAP have been delivered and required services provided, as well as confirm that the mitigation measures prescribed have achieved the desired effect. To provide guidance for lessons learned, an implementation completion report should be submitted upon the full compensation and/or resettlement of PAPs to capture the objectives, processes and implementation challenges, outstanding issues (if any), as well as the key lessons learned from the process.

10.2 ENVIRONMENTAL AND SOCIAL MONITORING SCHEDULE

A schedule for the proposed environmental monitoring program is provided in Table 10-7 below. An estimated **One Hundred and Ten Thousand US Dollars (USD 110,000)** will be needed for monitoring the various environmental and social components or aspects. This does not include costs associated with the RAP implementation activities as the RAP studies is yet to be concluded. The estimate does not also include cost of the Implementing Agency safeguards capacity development activities; hiring of safeguard specialists, purchase of vehicles for safeguards team, and operating costs, etc. which are expected to be accommodated by the “Provisional ESA Implementation Budget” presented in the ESA for TSIP Guideline Document (MRH, 2017).

The cost has only been estimated based on related projects and professional judgement. Further consultations with specialists or experts should be relied on by the Contracting Entity to establish actual monitoring cost requirements. The cost should also be updated subject to the conclusion of the RAP studies.

Table 10-7: Provisional Environmental and Social Monitoring Schedule

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Pre-Construction Phase						
Landscape modification through material sourcing / test pitting	<ul style="list-style-type: none"> • Restrict geotechnical activities and material extraction to only defined project road widths. • Implement a dust control program to reduce the amount of dust generated. • Avoid storing of soil or materials near water ways and on slopes. • The investigation or survey teams should be observant and alert of dangers in the work area during the investigations and surveys should not be conducted in the night, unless mandatory. • Adequately follow the Environmental Codes of Practice (ECOP) for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document. 	Project site / road corridor	<ul style="list-style-type: none"> • No. of test pit sites, trenches, and/or exposed surfaces; • No. of sites reclaimed or restored to original status; • PPEs worn correctly and at all times; • Warning signages posted; • Community engagements / consultations; • Compliance with the ECOP and other working standards; etc. 	Weekly	Environmental and Social Safeguards Team of DFR or MRH, the HSE Manager / Site Manager and/or Supervision Consultant.	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Waste pollution and congestion	<ul style="list-style-type: none"> • Enforce site clean-up at the end of each day and avoid negligent behaviour with regard to the generation and disposal of waste. • Wastes generated should be collected and disposed of at approved sites of disposal or handled by a certified waste handler. • Collected wastes should be kept in areas away from surface waterbodies to avoid water contamination and sedimentation. • Regular servicing and maintenance of equipment and vehicles to keep them in good working condition. 	Road corridor, Camps (Lodging), etc., as well as streams along road corridor	<ul style="list-style-type: none"> • Vehicles and machinery in good working condition; • No fuel leakages from vehicles and machinery; • A waste management plan in place and implemented; • Compliance with the ECOP; • A functional grievance redress or complaints handling system; etc. 	Weekly	Environmental Safeguards Team / HSE Manager / Site Manager / Grievance Redress Officer (GRO)	1,200
Soil contamination	<ul style="list-style-type: none"> • Enforce site clean-up at the end of each working day and avoid negligent behaviour with regard to equipment clean-up. 	Road corridor	<ul style="list-style-type: none"> • Vehicles and machinery in good working condition; • No fuel leakages from vehicles and machinery; 	Weekly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, the Waste Management	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Wastes generated should be collected and disposed of offsite at approved sites of disposal to avoid picking up contamination with equipment. • While transporting waste, care should be taken to prevent waste spreading to areas outside the site boundary. • Adopt appropriate procedures for: <ul style="list-style-type: none"> ○ Equipment handling, transport and storage procedures. ○ Materials handling, storage and disposal. ○ Handling of contaminated waste. ○ Soil remediation where contamination has occurred. 		<ul style="list-style-type: none"> • A waste management and spill prevention plan in place and implemented; • Compliance with the ECOP; • A functional grievance redress or complaints handling system; etc. 		Department of the MMDAs and/or Supervision Consultant.	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Creation of job opportunities	<ul style="list-style-type: none"> • Sourcing and procurement of goods and services locally should be encouraged and facilitated. • Equal employment opportunities should be provided for vulnerable groups and individuals (as defined in the RPF) in the Project area. • Gender issues should be given a priority during recruitment on the Project and women given equal opportunities on the Project. • Provide a community relation contact to act as liaison between the community and the Project and monitor community concerns throughout the Project and implement an effective grievance redress mechanism. 	Project area / local communities	<ul style="list-style-type: none"> • Records of local recruitments and procurement of goods and services; • Community engagements / consultations; • A functional grievance redress or complaints handling system; etc. 	Monthly	Environmental and Social Safeguards Team, the CRO and/or Supervision Consultant.	1,000
Accidents / occupational	<ul style="list-style-type: none"> • Include safety induction in workers recruitment and 	Project site / road corridor	<ul style="list-style-type: none"> • Safety inductions / meetings; 	Weekly / Monthly	Environmental and Social Safeguards	1,500

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
health and safety risks during preliminary investigations	<p>induction programs, and conduct pre-start safety briefs and session prior to commencement of any field work/event.</p> <ul style="list-style-type: none"> • The investigation teams should wear PPEs including high visibility vests whenever they are working in the field and First Aid kits should be available during the surveys. • Investigation teams or field staff should only be driven by trained and professional drivers sourced from reputable car rental companies within the Project area or region. • Adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document. 		<ul style="list-style-type: none"> • No. of workers trained / inducted; • No. of accidents and injuries; • Increase / decrease in Lost Time Injuries (LTI); • PPEs worn correctly and at all times; • Availability of First Aid kits; • Compliance with Occupational Health and Safety (OHS) Plan; • Compliance with the ECOP; etc. 		Team, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Traffic disruptions / interruptions and diversions	<ul style="list-style-type: none"> Workers on the Project including local labour should be inducted on safety issues before the Project or surveys are embarked on. The investigation teams or field staff should only be driven by trained and professional drivers. The investigation teams should wear PPEs including high visibility vests whenever working in the field and First Aid kits should be available during the surveys. Adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document. 	Project site / road corridor	<ul style="list-style-type: none"> Safety inductions / meetings; Traffic congestion occurrences and queue lengths; Travel times; PPEs worn correctly and at all times; Warning signages posted; Availability of First Aid kits; Compliance with Occupational Health and Safety (OHS) Plan; Compliance with the ECOP; A functional grievance redress or complaints handling system; etc. 	Weekly / Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant	1,000
Visual / scenic quality impacts	<ul style="list-style-type: none"> Restriction of geotechnical investigation activities to designated areas and within the defined ROW or 	Project site / road corridor	<ul style="list-style-type: none"> No. of test pit sites, trenches, and/or exposed surfaces; 	Weekly / Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site	1,300

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>servitude to reduce the impact on visual intrusion.</p> <ul style="list-style-type: none"> Working standards and remediation procedures should be followed to restore degraded or impacted landscapes. Engagement should be continued with community members and educate individuals on the various needs and requirements of the Project. Implement grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion. 		<ul style="list-style-type: none"> No. of sites reclaimed or restored to original status; Community engagements / consultations; Compliance with the ECOP and other working standards; A functional grievance redress or complaints handling system; etc. 		Manager, CRO, GRO and/or Supervision Consultant.	
Risk of conflict due to land expropriation for project	<ul style="list-style-type: none"> Continuous engagement with community members to include raising awareness on training, recruitment and capacity development / 	Project site / road corridor	<ul style="list-style-type: none"> Community engagements / consultations; Compliance with the ECOP; 	Once (RAP Compensations); Monthly (Impacts, Grievances, etc.); and as and when additional land	Environmental and Social Safeguards Team, Officers from LVD, GRO, CRO, CDT, RAP	N/A (RAP not yet concluded)

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>livelihood restoration programs.</p> <ul style="list-style-type: none"> • Educate individuals on the Project and its requirements for some temporary land acquisitions. • Carry out an assessment of PAPs and undertake valuation of affected property and loss of land/crops. This should be well documented. • Payment of the right compensation for land acquired for the Project and to farmers for loss of their crops. • Compensations should be paid in good time and the amounts must be enough for PAPs to be able to restore their livelihoods to at least pre-project levels or even better. • Conducting consultation processes that achieve 		<ul style="list-style-type: none"> • A functional grievance redress or complaints handling system; • Approved Resettlement Action Plan (RAP) and Compensation Policy; • Number of abbreviated RAPs prepared; • Records of temporary land acquisitions and compensation payments; • Record of complaints managed and number of any pending PAPs to be compensated; etc. 	requirement emerges	Monitoring and Evaluation Team	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	free, prior and informed participation of affected people and communities in the decision making.					
Construction Phase						
Dust and air quality degradation	<ul style="list-style-type: none"> • An ESMP should be implemented so that the works are conducted to achieve an ongoing reduction of dust emissions. • The Contracting Entity should advise or notify local households on dust, noise, vibration and other dangers as construction progresses. • Usage of water bowsters to suppress dust regularly at active work sections. • Truck queuing, needless idling of trucks and trips should be reduced through logistical planning of materials delivery and work practices and trucks carrying dusty, erodible 	Construction area and selected roadside communities	<ul style="list-style-type: none"> • Air quality measurements for NO₂, SO₂, CO₂, PM₁₀ (Refer to Table 10-1); • Records of dust control measures implemented and their effectiveness; • Vehicles and machinery are regularly serviced and records kept; • Speed controls instituted to reduce dust emissions; • Idling of vehicles and machinery avoided; • Records of progressive rehabilitation of degraded areas; • Compliance with OHS Plan and the ECOP; • A functional grievance redress or complaints handling system; etc. 	Weekly / Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, GRO	10,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>materials should be covered.</p> <ul style="list-style-type: none"> • Vehicles travelling within the worksites should be restricted to a speed limit appropriate for the conditions of safety and so as to limit dust generation from vehicle movements. • Limit clearing of the right of way to when it is absolutely needed, having regard to soil type, terrain and construction requirements. • The Contracting Entity must limit the area and period that work (especially earthworks or excavations) takes place within or near water sources like streams, rivers and dugouts. • The Contracting Entity should implement a reforestation or land remediation measures 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	involving the planting of indigenous tree species to rehabilitate degraded areas and act as carbon sink.					
Greenhouse gas emissions and contributions to local climate change and ailments during construction	<ul style="list-style-type: none"> • Burning of vegetation or other waste material should be discouraged and communities (especially farmers, herders and hunters) sensitized on bush fires and unsafe farming practices. • An ESMP should be implemented so that the works are conducted to achieve an ongoing reduction of air emissions. • Truck queuing, needless idling of trucks and trips should be reduced through logistical planning of materials delivery and work practices to limit vehicular emissions. 	Project site / project area	<ul style="list-style-type: none"> • Air quality measurements; • Community engagements / consultations; • Skills training and education / sensitization programs; • Vehicles and machinery conditions and servicing records; • Idling of vehicles and machinery avoided; • Records of progressive rehabilitation of degraded areas or reforestation programs; • Compliance with the ECOP; etc. 	Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, GRO	5,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Reduce cleared areas as far as practicable by utilizing existing easements. • The Forestry Commission must be encouraged and resourced to intensify their monitoring, and to embark on education and sensitization programs on the dangers of deforestation. • The Contracting Entity should collaborate with the Forestry Commission to implement a reforestation or land remediation program involving the planting of at least 20,000 indigenous tree species to rehabilitate degraded areas and should give more opportunities to women to be part of and benefit from the program. • Skills training and education or sensitization programs should continue 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	to be provided to the communities (including schools, religious groups, opinion leaders, farmers, etc.) and issues such as climate change and sustainable agricultural practices should be addressed.					
Disturbance by ground vibrations and noise pollution	<ul style="list-style-type: none"> The Project should apply best practice innovative noise mitigation measures, including: <ul style="list-style-type: none"> Increasing the offset distance between noisy machinery and residential receptors Avoiding operation of noisy machinery close to sensitive receptors Proper choice of plant and machinery (i.e. fitted with noise silencers or reducers) Reducing consecutive works in the same locality 	Construction area and selected roadside communities / sensitive receptors	<ul style="list-style-type: none"> Background noise level monitoring (Refer to Table 10-2); Noisy operations and records of complaints; Machinery fitted with silencers; Vehicles and machinery conditions and servicing records; The staff is provided with, and uses the PPE including eye and hearing protection; Measures implemented near sensitive receptors (e.g. speed humps and noise barriers); 	Weekly / Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, CRO, GRO	10,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> ○ Undertaking loading and unloading away from noise sensitive areas ○ Locating quarry areas away from human habitations (at least 500 m away). • Construction workers should be supplied with noise mufflers and usage should be enforced at noisy work environments. • Use equipment or machinery that are in good working order and that meets noise emission limits. • Regularly service, maintain and appropriately repair haulage vehicles and construction machinery with a potential to generate noise. • The Contracting Entity should develop noise monitoring program as part of environmental monitoring 		<ul style="list-style-type: none"> • Community engagements / consultations and sensitization, including notices served prior to undertaking noisy activity; • Compliance with the ECOP and other work standards; • Record of compensation paid for damage of properties from vibrations; • A functional grievance redress or complaints handling system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>requirements prior to construction and regular noise monitoring during construction in compliance with EPA ambient noise guidelines.</p> <ul style="list-style-type: none"> • Community liaison should form a critical element in the management of noise impacts, especially regarding potential excavations, blasting and site clearance activities, where adequate notice should be served to affected sensitive receptors prior to undertaking the activities. 					
Potential increase in erosion due to vegetation clearance and topsoil removal / drainage and	<ul style="list-style-type: none"> • Terrain evaluation and mapping should be undertaken and vegetation clearing or area of ground clearance should be limited as much as practicable. • Best practice construction measures should be 	Construction area / road corridor	<ul style="list-style-type: none"> • Erosion and flood control measures implemented; • Compliance with the ECOP and other work standards; • Records of progressive rehabilitation of degraded areas or reforestation programs; 	Weekly / Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, Rehabilitation Specialist and/or	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
potential flooding	<p>adopted to reduce erosion, restore the natural contour of the ground, and restore surface drainage patterns as close to pre-construction conditions as practicable.</p> <ul style="list-style-type: none"> • Where vegetation is removed, and/or where the area is not to be paved after land contouring, re-vegetate the areas immediately after construction activity finishes. • Progressive replanting of disturbed areas should be considered and done during the construction phase and not after. • Implement erosion and sediment control measures at watercourse crossings, and downstream of side cast material as needed, and where safe and practical. 		<ul style="list-style-type: none"> • Drainage areas and evidences of erosion; • Silt in drains is regularly dredged; • Original direction of water flow maintained; • Culverts / stormwater drainage systems constructed to be self-cleaning and accommodate peak water levels; etc. 		Supervision Consultant.	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Isolate construction area from clean runoff and monitor for and rectify areas of problematic erosion. • The construction of artificial wetlands can be used for management of stormwater, with the wetlands acting as a buffer to absorb water before it reaches a road surface. • Consider re-design or expansion of stormwater drainage systems to handle increased volume of runoff during periods of intense rainfall. • De-silting and cleaning of drains should be carried out regularly (during or after construction). • Adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document. 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Soil compaction due to heavy construction equipment use	<ul style="list-style-type: none"> • Best practice construction measures should be adopted to reduce erosion, restore the natural contour of the ground, and restore surface drainage patterns as close to pre-construction conditions as practicable. • Area of ground disturbance should be limited as far as practicable. • Schedule construction to limit areas of soil disturbance during wet seasons. • Implement erosion and sediment control measures at watercourse crossings, and downstream of side cast material as necessary, and where safe and practical. • Separate stockpiles should be kept for each type of material excavated. This should be done to 	Construction area / road corridor	<ul style="list-style-type: none"> • Compliance with the ECOP and other work standards; • Vehicle movements and ground disturbances limited to designated areas and off-road driving prohibited; • Existing roads used as access routes; • Restoration plan for areas where hardpan has developed as a result of compaction with heavy equipment; • Records of progressive rehabilitation of degraded areas; etc. 	Weekly / Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, Rehabilitation Specialist and/or Supervision Consultant.	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>achieve systematic backfilling of created pits and to maintain a geologic arrangement or soil structure close to the original.</p> <ul style="list-style-type: none"> • Monitor for and rectify areas where hardpan has developed as a result of compaction with heavy equipment by using sub soils to break up the hardpan. 					
Soil contamination during construction	<ul style="list-style-type: none"> • Best Management Practices (BMPs) should be implemented during storage, usage and transport of hazardous materials and wastes. • Readily make available spill containment kits at the construction and office areas. • A soil contamination management plan or procedures should be 	Construction area / road corridor	<ul style="list-style-type: none"> • Soil tests as and when required; • Compliance with the ECOP and other work standards; • Safe use, handling, storage and disposal methods implemented for wastes (e.g. floors for refuelling points, hazardous materials and their storage areas lined or under plastic sheeting, no hazardous waste spilled on road during 	Weekly / Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, the Waste Management Department of the MMDA and/or Supervision Consultant.	3,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>developed as part of the ESMP that will include appropriate procedures for:</p> <ul style="list-style-type: none"> o Fuel handling, transport and storage procedures. o Construction raw materials handling, storage and disposal. o Storage and handling of radioactive material. o Handling of contaminated waste. o Soil remediation where contamination has occurred. <p>• Oil spill prevention and response measures should be in place in accordance with the provisions of the ESMP.</p>		<p>transport, waste lubricants, used oils and other wastes properly disposed by certified waste handler, etc.);</p> <ul style="list-style-type: none"> • Functional oil spill containment kits; • Soil contamination management plan or oil spill prevention measures in place; • Compliance with Material Safety Data Sheets; • Vehicles and machinery conditions and servicing records and records of fuel leakages from vehicles and machinery; etc. 			
Landscape modification through materials displacement and	<ul style="list-style-type: none"> • Avoid the creation of cut slopes and embankments of an angle greater than the natural angle of repose for the local soil type which 	Project site / road corridor	<ul style="list-style-type: none"> • Compliance with the ECOP and other best practice construction / engineering measures; • No spoil site located within 500 m of any watercourse, 	Weekly / Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager and/or	2,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
destabilization of slopes	<p>could lead to rock falls, slips and landslides.</p> <ul style="list-style-type: none"> • Balance filling and cutting requirements through appropriate route choice, so as to avoid / reduce the production of excess spoil material and reduce the need for borrow pits. • Implement engineering solutions such as intercepting ditches at the top and bottom of slopes. Gutters and/or culverts should be used to control the flow of water down a slope or terraced or stepped slopes to reduce the steepness of a slope. • Riprap, or rock material embedded in a slope face, sometimes combined with planting, retaining structures, such as gabions (rectangular wire baskets of 		<p>nor in areas of high ecological sensitivity;</p> <ul style="list-style-type: none"> • Photographic records of spoil sites; • No spoil used for disposal of hazardous or toxic wastes; • Excavations / cut slopes consider gentle angle of cut and not distort the natural topography; • Appropriate re-vegetation measures to minimise soil erosion; • Records of progressive rehabilitation of degraded areas; etc. 		Supervision Consultant.	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>rocks), etc. should be explored.</p> <ul style="list-style-type: none"> • Best practice construction measures should be adopted to restore the natural contour of the land as close to pre-construction conditions as practicable. • Where vegetation is removed, and/or where the area is not to be paved after land contouring, re-vegetate the areas immediately after construction activity finishes. • Progressive replanting of disturbed areas should be considered and done during the construction phase and not after. 					
Material sourcing and material storage impacts during construction	<ul style="list-style-type: none"> • Where the Contracting Entity opens up new material sources other than procuring materials from commercial operators, restoration of the sites 	Borrow areas and storage locations	<ul style="list-style-type: none"> • Compliance with the ECOP and other best practice construction / engineering measures; • PPEs worn correctly and at all times; 	Weekly / Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, CRO, GRO, Rehabilitation	10,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>immediately after the construction phase should be undertaken in accordance with an approved restoration plan.</p> <ul style="list-style-type: none"> • The Contracting Entity should obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas, and their location should be approved by appropriate Government authorities, including traditional authorities if the land on which the quarry or borrow areas fall is traditional land. • New material sourcing areas should not be located in the vicinity of settlements, cultural and historical / archaeological sites, wetlands, forested areas, or any other valued ecosystem, on high or 		<ul style="list-style-type: none"> • Photographic records of borrow sites and storage locations; • No. of borrow sites established and number reclaimed or restored; • Warning signages posted; • No borrow pits used for disposal of hazardous or toxic wastes or located in areas of high ecological sensitivity; • Restoration plan for borrow pits in place and restoration undertaken; • Records of progressive rehabilitation of degraded areas; • All licenses / permits to operate quarries or borrow areas obtained; • Commercial operators compliance with statutory requirements, and evidence of EIA approval certificates 		Specialists and/or Supervision Consultant.	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>steep ground or in areas of high scenic value.</p> <ul style="list-style-type: none"> Where materials are sourced from commercial operators, the Contracting Entity should establish the operators' compliance with statutory requirements with evidence of certificates of compliance. Rehabilitate and replant land excavated for borrow pits. Areas for disposing hazardous materials such as contaminated liquid and solid materials should be approved by the appropriate local and/or national authorities before the commencement of work. 		<p>and certificates of compliance obtained;</p> <ul style="list-style-type: none"> Safe storage and disposal methods implemented for materials or wastes; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Pollution of the environment due to improper disposal of waste	<ul style="list-style-type: none"> • Areas for disposing hazardous materials such as contaminated liquid and solid materials should be approved by the appropriate local and/or national authorities before the commencement of work. • Implement concrete casing of fuel storage tanks with a bund around it. Also, install oil interceptors at fuel storage areas and stock adequate supplies of oil/fuel spill control kits. • During transportation, waste materials should be well packed to avoid spillages. • A proper waste management plan should be developed as part of the Contracting Entity's ESMP and followed. 	Road corridor, construction camps, offices, workshops, etc., as well as streams along road corridor	<ul style="list-style-type: none"> • Volume of waste streams generated; • No fuel leakages from vehicles and machinery; • A waste management plan in place and implemented; • Oil / fuel spill control measures and kits in place; • Safe use, handling, storage and disposal methods implemented for wastes (e.g. floors for refuelling points, hazardous materials and their storage areas lined or under plastic sheeting, no hazardous waste spilled on road or surfaces outside project site, waste lubricants, used oils and other wastes properly disposed by certified waste handler, etc.); • Waste segregation in clearly labelled containers implemented; 	Weekly / Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, GRO, Waste Management Department of the MMDA and/or Supervision Consultant.	4,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Contract a licensed waste handler to collect and dispose of wastes. Some waste such as waste oils could be returned to suppliers for either reprocessing or reuse. • Arrangements should be made with the Waste Management Unit of the District Assemblies under the Project or other waste handlers for weekly collection of inorganic wastes generated, particularly near communities. • Waste reduction through reuse should be emphasized and implemented throughout the Project. • Wastes must be appropriately segregated into categories such as; inert, domestic, non- 		<ul style="list-style-type: none"> • Compliance with the ECOP; • A functional grievance redress or complaints handling system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	hazardous or hazardous, metal, plastics, biodegradable, non-biodegradable, etc. in clearly labelled containers. <ul style="list-style-type: none"> Waste storage areas should be hygienic to prevent nuisance odours, vermin and dust, loss of waste materials and scavenging. 					
Water quality degradation, siltation of waterbodies and modification of water flows	<ul style="list-style-type: none"> Floors of workshops, fuel storage areas and refuelling points for haulage vehicles and construction machinery should be bunded (lined with concrete) to avoid percolation of spilled oils and fuels into ground water or runoff into surrounding surface water. Road construction crews should be under strict instruction to dispose of both solid and liquid wastes appropriately. 	Road corridor, construction camps, offices, workshops, etc., as well as streams along road corridor	<ul style="list-style-type: none"> Drinking water quality tests (Refer to Table 10-4); A waste management plan in place and implemented; Facilities for waste disposal in place on and off site; Oil / fuel spill control measures and kits in place; Effluent generation volume and rate; Spills / leakages inventory and spill control measures; Compliance with the ECOP and the Riparian Buffer Zone Policy for Managing 	Weekly / Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, GRO and/or Supervision Consultant	12,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Facilities for collection and safe disposal wastes should be provided at work sites. • Routine inspections aimed at assessing effectiveness of waste management systems should be undertaken by the Contracting Entity's site engineer and the resident engineer. • The Contracting Entity should be guided by the requirements of Riparian Buffer Zone Policy for Managing Freshwater Bodies in Ghana in the implementation of construction activities near waterbodies. • Avoid stockpiling of soil near waterways / wetlands or on slopes. • Stockpiled materials should not be left uncovered; and perimeter 		<p>Freshwater Bodies in Ghana;</p> <ul style="list-style-type: none"> • Soil erosion measures in place and earthworks minimized to areas where they are absolutely needed; • Best practice construction measures implemented (e.g. cutoff ditches or perimeter drains around stockpiles, erodible stockpiles covered, original direction of water flow maintained, etc.); • A functional grievance redress or complaints handling system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	drains should be built around stockpile areas. <ul style="list-style-type: none"> • Surround erodible stockpiles with a ring of stones to prevent materials being washed away by surface runoff. • Protect areas susceptible to erosion using either temporary or permanent drainage works. • Limit earthworks such as excavation, cut and fill, vegetation clearance, and compaction, to only areas where it is absolutely needed. 					
Loss of vegetation and terrestrial and aquatic life and habitats	<ul style="list-style-type: none"> • Limit the area that needs to be cleared as far as practicable and rehabilitate cleared areas as soon as possible with indigenous species through compensatory replanting or reforestation program and 	Project site / road corridor, construction camps, storage areas, etc., as well as streams along road corridor	<ul style="list-style-type: none"> • Compliance with the ECOP and the Riparian Buffer Zone Policy for Managing Freshwater Bodies in Ghana; • Chemicals handled according to their Materials Safety and Data Sheets; 	Weekly / Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, Rehabilitation Specialist and/or Supervision Consultant.	5,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>remove alien plant species by hand after rehabilitation.</p> <ul style="list-style-type: none"> • Encourage the planting of at least 20,000 indigenous trees as a climate change mitigation measure and also discourage needless clearing and burning of vegetation. • Practice topsoil conservation so that propagules within the topsoil can re-establish during rehabilitation. • Limit as much as possible the destruction of large / important / economic trees or flora. • Choose methods that will avoid or decrease the potential for disturbing the aquatic environment, limit the diversion and blocking of the flow of water. • Reduce soil erosion throughout the site, 		<ul style="list-style-type: none"> • No hunting, trapping, harming and killing of animals; • Speed limits for construction vehicles observed; • Vegetation clearance limited to areas absolutely necessary; • Indigenous grass and tree species planted in degraded areas; • Reforestation campaigns / community sensitization programs; • A functional grievance redress or complaints handling system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>especially near watercourses and employ methods that will limit the extent to which silt is generated and the distance it travels (e.g. silt curtains, rock gabions).</p> <ul style="list-style-type: none"> • Vegetation clearing should be supervised or undertaken by a trained specialist to identify and possibly avoid flora of conservation concern and remove fauna that may be impacted by the Project. Such fauna should be relocated to an area of known habitat conducive to their sustainable survival. • Limit noise during construction, especially near wetland areas and bird nesting sites. 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Introduction of invasive species	<ul style="list-style-type: none"> • Put in measures to prevent weeds and alien vegetation from colonizing the corridor. • The Contracting Entity should adequately follow the ECOP for the Project as highlighted in MRH's ESA for TSIP (2017) guideline document. • Rehabilitate the area as soon as possible and remove alien plant species by hand after rehabilitation. • The site should be revegetated using local flora. The choice of plant species for rehabilitation should be done in consultation with the local people, local research institutions, and the Forestry Department. 	Degraded areas along the road corridor; sites for borrow pits, quarries, construction camps, equipment storage areas, etc.	<ul style="list-style-type: none"> • Sensitization of project workers on introduction of invasive species and preventive measures; • Compliance with the ECOP; • Vegetation clearance limited to areas absolutely necessary; • Indigenous grass and tree species planted in degraded areas; • Records of progressive rehabilitation of degraded areas; • Reforestation campaigns / community consultation; etc. 	Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, Rehabilitation Specialist and/or Supervision Consultant.	2,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Income generation opportunities from direct / indirect employment on the project	<ul style="list-style-type: none"> • Include clauses in work contracts to as far as practicable utilize local labour and give equal opportunities to women and should not discriminate against vulnerable groups who have the capacity to work. Work contracts should also include clauses against sexual harassment. • Skills training should be provided to residents of the local communities to increase local employment capacity. • The Contracting Entity should present quarterly reports to the DFR, stating how categories of people, such as women and indigenes, as well other vulnerable groups like Persons with Disability (PWD) are being engaged on the Project. E.g. 	Communities along the project road.	<ul style="list-style-type: none"> • Records of locals, including the vulnerable and/or disadvantaged such as women, youths and the disabled employed during project implementation; • Contracting Entity's work contract and quarterly reports; • Adherence to national labour laws; • Records of training, recruitment and capacity development programs; • A functional grievance redress or complaints handling system; etc. 	Monthly	Environmental and Social Safeguards Team, GRO, CRO and/or Supervision Consultant.	2,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>prioritizing women groups or contractors in revegetation / reforestation programs.</p> <ul style="list-style-type: none"> • Gender issues should be considered during recruitment on the Project and women should be given equal opportunities on the Project (at least 15% female employment on the project) and must not be discriminated against in terms of pay and sexual abuse upon recruitment. • National labour laws and regulations, especially the Labour Act, 2003 should be adhered to, including aspects relating to child labour. Persons considered by law as underaged for employment should not be employed on the Project. • A Stakeholder Engagement Program built 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	on openness, mutual trust and inclusiveness that will seek to actively inform stakeholders of Project activities should be developed. Engagement should include raising awareness on training, recruitment and capacity development programs.					
Physical and economic displacement and disruption of livelihood activities	<ul style="list-style-type: none"> • Construction activities should be limited to the designated corridors of the road. • Continuous engagement with community members to include raising awareness on training, recruitment and capacity development / livelihood restoration programs. • Educate individuals on the Project and its impacts to farming activities and properties. 	Project affected persons along road corridor	<ul style="list-style-type: none"> • Record of early notices given to communities and affected people; • No. of PAPs assessed for compensations for lost assets; • Record of disputes, conflicts or complaints; • Record of grievances addressed; • Approved RAP and Compensation Policy in place; • Number of abbreviated RAPs prepared; 	Once (RAP Compensations) & Monthly (Impacts, Grievances, etc.)	Environmental and Social Safeguards Team, Officers of LVD, GRO / Grievance Committee, CRO, CDT, RAP Monitoring and Evaluation Team and/or Supervision Consultant.	N/A (RAP not yet concluded)

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Where practicable, the Contracting Entity should schedule construction activities during the dry season to minimize impact on crops and disruption of farming activities. • Implement grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion. • Early notice should be given to community members before any service interruption. • Compensate people who may lose their crops and properties as a result of the Project development promptly. • Compensation should be paid in good time and the amounts must be enough 		<ul style="list-style-type: none"> • Record of compensation payments; • Number of any pending PAPs to be compensated; • Record of stakeholder engagement meetings held; • A functional grievance redress or complaints handling system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	for PAPs to be able to restore their livelihoods to at least pre-project levels or even better.					
Loss / disruption of utilities, roadside communities and social activity	<ul style="list-style-type: none"> Restricting construction activities to the road corridor of influence or the existing or defined ROW. Giving early notice to the community members and affected people before construction starts or before any service interruption. The Contracting Entity should make sure construction activities avoid utility lines (water, power / electricity, etc.) as much as practicable and should consult or work closely with utility service providers before relocating any affected utility line. Utility service providers must be proactive in disconnecting and 	Communities and project affected persons along road corridor	<ul style="list-style-type: none"> Record of early notices given to communities and affected people; Number of utilities and communities / social centres displaced; Record of disputes, conflicts or complaints; Record of grievances addressed; Approved RAP and Compensation Policy in place; A functional grievance redress or complaints handling system; Record of compensation payments; Record of stakeholder engagement meetings held; etc. 	Once (RAP Compensations) & Monthly (Impacts, Grievances, etc.)	Environmental and Social Safeguards Team, Utility Providers, GRO / Grievance Committee, CRO, CDT, RAP Monitoring and Evaluation Team and/or Supervision Consultant.	Same comments as above

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>reconnecting PAPs to their services before and after relocation as the case may be.</p> <ul style="list-style-type: none"> • Compensation should be paid to affected persons in good time. • Funds should be available for the potential relocation of infrastructure or utility lines (e.g. water lines) if any. • Implementing a grievance mechanism as part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion. • Development of a Stakeholder Engagement Programme built on openness, mutual trust and inclusiveness that will seek to actively inform 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	stakeholders of Project activities.					
Potential destruction of physical cultural resources	<ul style="list-style-type: none"> • Regularly engage with the Traditional Council to identify sensitive traditional and cultural assets in the Project area. • Develop a site-wide cultural awareness and management program to educate workers on existing traditional systems and observance of traditional rights as part of the Project. • Work should immediately stop when physical cultural resources are encountered and chance find procedures should be adhered to. • Care must be taken during excavations to avoid family or clan graveyards. It is important that the road Contracting Entity establishes the proximity of potential graveyards before 	Communities along the project road.	<ul style="list-style-type: none"> • Inventory of sensitive traditional and cultural assets on the road corridor; • No. of cultural heritage sites disturbed by construction works; • Compliance with the ECOP and chance find procedures; • Record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages; • Record of Stakeholder engagements and sensitization / awareness programs; • A functional grievance redress or complaints handling system; etc. 	Quarterly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>construction and where practicable, negotiations should be made with the owners.</p> <ul style="list-style-type: none"> • Provide support and community capacity building among traditional leadership to diffuse or resolve tensions within and between local and Project migrant communities. • Develop a grievance mechanism as a part of a wider Stakeholder Engagement Plan enabling community concerns to be documented and resolved in a timely fashion. 					
Potential increase in anti-social behaviours, crime and conflicts	<ul style="list-style-type: none"> • The Project should utilize local labour (where available and practicable) while instituting proactive measures to educate local communities about the need to bring in skilled labour when needed. 	Project area / communities along the project roads	<ul style="list-style-type: none"> • Level of visible engagement in prostitution observed; • No. of reported cases of sexual abuse, rape, engagement of minors in sexual activities; 	Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Engaging the services of a security agency, if practicable, to protect construction workers. • Fostering good relationships with Project affected communities through disclosure of any information which will negatively affect the community members during Project construction. The community engagement process should last throughout the Project life. • Development of community training programs and sensitization awareness campaigns as part of stakeholder engagement strategies. • The police should be engaged to follow up on reported cases of child trafficking, rape, defilement and other sexual and/or 		<ul style="list-style-type: none"> • No. of incidents of conflicts and criminality; • Record of Stakeholder engagements and sensitization / awareness programs; • Level of engagement or collaboration with security agencies and all relevant stakeholders; • A functional grievance redress or complaints handling system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>gender-based violence / issues that may arise during the project.</p> <ul style="list-style-type: none"> • The security agencies should be encouraged and well-resourced to prioritize the arrest, prosecution and conviction of perpetrators of child trafficking, rape, defilement and other sexual and/or gender-based violence / issues. • There is the need for strong trauma-informed recovery services for victims of child trafficking, rape, defilement, etc. and thus the provision of related psycho-social support for victims should be intensified by state agencies like the Domestic Violence and Victims Support Unit (DOVVSU) and Anti-Human Trafficking Unit of the Ghana Police Service, and 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>the Department of Social Welfare under the Ministry of Gender, Children and Social Protection in partnership with NGOs and other stakeholders in the project area.</p> <ul style="list-style-type: none"> • Encourage Contracting Entity-community relations and citizens participation (involvement of local actors) in the Project. • Work with community leadership, identified NGOs, voluntary groups and civil society organizations to develop capacity and support for vulnerable groups. 					
Gender-based violence and impact on vulnerable groups	<ul style="list-style-type: none"> • Include clauses in work contracts to as far as practicable utilize local labour and give equal opportunities to women and should not discriminate against vulnerable groups 	Project area / communities along the project roads	<ul style="list-style-type: none"> • No. of reported cases of sexual abuse, rape, engagement of minors in sexual activities, child abuse / trafficking, etc.; • Compliance with the ECOP and the GBV Framework; 	Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.	2,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>who have the capacity to work. Work contracts should also include clauses against sexual harassment.</p> <ul style="list-style-type: none"> • The Contracting Entity should be guided by the requirements of the MRH's GBV Framework. • Institute proactive measures to educate and sensitize local communities on GBV and encourage women to report abuses to the police, other state agencies and advocacy groups in the area. • The police should be engaged, encouraged and well-resourced to follow up on reported cases of child trafficking, abuse, rape, defilement and other sexual and/or gender-based violence/issues and prioritize the arrest, 		<ul style="list-style-type: none"> • Record of Stakeholder engagements and sensitization / awareness programs; • Economic empowerment and business development training programs implemented; • Level of engagement or collaboration with security agencies and all relevant stakeholders; • A functional grievance redress or complaints handling and support system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>prosecution and conviction of perpetrators.</p> <ul style="list-style-type: none"> • The provision of psycho-social support for victims should be intensified by state agencies DOVVSU and Anti-Human Trafficking Unit of the Ghana Police Service, and the Department of Social Welfare under the Ministry of Gender, Children and Social Protection in partnership with NGOs and other stakeholders in the project area. • The number of police officers and police posts and patrol teams should be increased in the districts or communities and especially at hotspots of identified crimes, including child trafficking, rape, defilement and other sexual and/or gender-based violence as 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	adequate police presence is often a deterrent to crime and unacceptable behaviour.					
Increase in disease spread	<ul style="list-style-type: none"> • The Contracting Entity should put in measures to avoid creating mosquito breeding grounds near human settlement and construction camps. • Construction workers should be provided with and encouraged to sleep under treated mosquito nets. • Promote HIV/AIDS or sexual awareness and encourage use of condoms and where practicable, make them available to workers who should however be discouraged from sleeping with young girls or married women. • Educate or sensitize young children or teenage girls to stay in school and 	Project area / communities along the project road	<ul style="list-style-type: none"> • Prevalence rates of diseases such as Malaria, Typhoid, Cholera, HIV/AIDS, STIs, etc. in comparison with baseline levels; • State of workers' accommodation / camp; • Waste management practices and toilet facilities; • First Aid kits, supply of mosquito nets, condoms, etc.; • Record of vaccination programs, community sensitization / sexual awareness programs; • Level of engagement or collaboration with MMDA and health facilities; • A functional grievance redress or complaints 	Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.	2,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>on the dangers of unprotected and/or premarital sex.</p> <ul style="list-style-type: none"> • Provide first aid services and arrangements made with a larger hospital or health facility where major cases will be referred to. • Encourage continuous cleaning of camp facilities and waste management practices. • Adequate housing should be provided to the Project workforce so that overcrowding does not occur which may increase the possibility of disease outbreaks. • Community liaison and education on potential health issues the Project development will attract to the area. Conduct community sensitization and screening on potential 		handling and support system; etc.			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>diseases and health problems within the Project area, including Hepatitis B. This may be implemented as part of a wider social responsibility contribution for the Project.</p> <ul style="list-style-type: none"> • Develop vaccination programme for employees and visitors against relevant vaccine-preventable diseases based on adequate risk assessment and/or develop a disease prevention strategy and liaise with municipal and district assemblies as necessary so that it is aligned to national strategy goals on health delivery. 					
Traffic disruptions / interruptions and diversions	<ul style="list-style-type: none"> • Installation of traffic calming measures (speed bumps and rumble strips) to slow traffic down where heavy vehicles cross or enter busy roads. 	Project site / road corridor	<ul style="list-style-type: none"> • Safety inductions / meetings; • Traffic congestion occurrences and queue lengths; • Travel times; 	Weekly / Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, CRO, GRO	2,500

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Installation of speed control limits for the Project ensuring that vehicles comply with site driving regulations. • Improve and enhance community sensitization on road traffic accidents within the Project areas. • Presentation of the traffic management plans and signs in English and local languages. • Develop health and safety management plan for construction vehicles and machines. • The Contracting Entity should employ traffic wardens to enable children and persons with disabilities cross the feeder roads safely during construction and the road designs make provisions for them. 		<ul style="list-style-type: none"> • No. of diversions created; • PPEs worn correctly and at all times; • Warning signages posted and traffic calming measures implemented; • Availability of First Aid kits; Compliance with Occupational Health and Safety (OHS) Plan; • Compliance with the ECOP; • Policy on alcohol in place and routine alcohol checks conducted; • Record of community engagement / sensitization programs; • A functional grievance redress or complaints handling system; etc. 		and/or Supervision Consultant.	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Develop and implement a “No Drinking” “No Alcohol” policy on site during construction and conduct periodic and routine alcohol checks for site drivers and site workers. • Adequately follow the ECOP for the Project as highlighted in MRH’s ESA for TSIP (2017) guideline document. 					
Accidents / occupational health and safety risks during construction	<ul style="list-style-type: none"> • Develop and implement a “No Drinking” or “No Alcohol” policy on site during construction and conduct periodic and routine checks for site drivers and site workers. • Provide appropriate and adequate protective wear such as reflectors, safety shoes, ear muffs, gloves, goggles, and others for the safety of the workers. 	Project workers and communities along road	<ul style="list-style-type: none"> • Regular safety inductions / meetings and inspections; • Records on Training / Health programs and Workshops; • Records of accidents, injuries, illnesses, etc.; • Increase / decrease in Lost Time Injuries (LTI); • PPEs worn correctly and at all times; • Availability of First Aid kits and medical personnel; 	Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.	4,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Install traffic safety signage at vantage points along Project site or construction routes, including visible road signs warning road users of on-going construction works. • Install traffic calming measures (speed bumps and rumble strips) to slow traffic down and also Install speed control limits and make vehicles comply with the site driving regulations. • Suppress dust emissions by regularly sprinkling water during dusty conditions to improve visibility and reduce the health impact of dust pollution to both workers and general public. • Install screening concrete barricades and warning conspicuous tapes in and around disturbed and excavated areas to control 		<ul style="list-style-type: none"> • Compliance with Occupational Health and Safety (OHS) Plan; • Compliance with the ECOP; • Warning signages posted and traffic / work safety measures implemented; • Policy on alcohol in place and routine alcohol checks conducted; • Record of public health and road safety awareness programs; • A functional grievance redress or complaints handling system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>access and reduce pit-falls / accidents.</p> <ul style="list-style-type: none"> • Improve and enhance community sensitization on road accidents through a targeted public road safety awareness program. • Document community grievances, accidents and actions taken. Also have regular safety talks with workers and institute strict punitive measures for non-compliance with safety rules. 					
Reduced access, overburdening of physical and social infrastructure and increased natural resource requirements	<ul style="list-style-type: none"> • Increase efforts towards adequate provision of utilities (water, electricity) and accommodation for construction workforce. • The Contracting Entity should at as much as practicable avoid conflicting with water demands of local communities. 	Project site, workers' camps and communities along the road	<ul style="list-style-type: none"> • Availability / adequacy of essential amenities in workers' camps / project site; • Compliance with the ECOP; • Strict code of conduct for workers in place and followed; 	Monthly	Environmental and Social Safeguards Team, HSE Manager / Site Manager, GRO and/or Supervision Consultant.	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Rainwater harvesting should be encouraged at construction camps and the communities should be educated and supported with storage tanks to practice rainwater harvesting. • The project should help improve access to water supply within the road corridor through the provision of more boreholes or small-town water systems. • Maintain high standards of site supervision and operation to reduce risks of damage to community amenities. • Potable or constructed toilets must be provided on site / camp for construction workers and implement safe disposal practices. 		<ul style="list-style-type: none"> • Efforts towards rainwater harvesting and provision of boreholes; • Record of community engagement / sensitization programs; • A functional grievance redress or complaints handling system; etc. 			

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Measures should be taken to discourage negligent or unacceptable behaviour on the part of the workers and in regard to the norms of the local communities. • The exploitation of natural resources such as hunting, fishing, collection of forest products, sand (or gravel) winning or any other activity that might have a negative impact on the social and economic welfare of the local communities should be discouraged. • Monitor community concerns throughout the Project and implement an effective grievance redress mechanism. 					
Rise in teenage pregnancies and school drop-outs	<ul style="list-style-type: none"> • Promote HIV/AIDS awareness and encourage the use of condoms and where practicable, make them available to workers 	Project area / communities along the roads	<ul style="list-style-type: none"> • No. of reported cases of teenage pregnancies, sexual abuse, rape, engagement of minors in sexual activities, child abuse / trafficking, etc.; 	Monthly	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, CRO, GRO	2,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>on the Project who should be discouraged from sleeping with young girls.</p> <ul style="list-style-type: none"> • Educate or sensitize young children and girls to stay in school and on the dangers of unprotected and/or premarital sex. • Radio stations should be encouraged and utilized to provide age-appropriate sex education to young girls and boys and parents sensitized to take renewed interest in their children's sexuality. • The security agencies should be encouraged and well-resourced to prioritize the arrest, prosecution and conviction of workers who impregnate teenage girls. • Encourage young girls who have been violated by construction workers to report them to their parents 		<ul style="list-style-type: none"> • School drop-out statistics in comparison with baseline (pre-project) records; • Compliance with the ECOP and the GBV Framework; • Strict code of conduct for workers in place and followed; • Record of Stakeholder engagements and sex education / adolescent health awareness programs; • Level of engagement or collaboration with security agencies, local media, NGO, traditional authorities and all other relevant stakeholders; • Scheduled project updates / progress reports; • A functional grievance redress or complaints handling and support system; etc. 		and/or Supervision Consultant.	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>and appropriate authorities like traditional authorities, police, DOVVSU, the Department of Social Welfare, etc.</p> <ul style="list-style-type: none"> • Work with community leadership, NGOs, voluntary groups and civil society organizations to develop capacity and support for teenage girls and school drop-outs. • Develop an HIV/AIDS and teenage pregnancy prevention strategy and liaise with municipal and district assemblies as necessary so that it is aligned to national strategy goals on health delivery. • The Contracting Entity should work on schedule so that unnecessary delays do not affect the use of the road by school children and the general public. 					

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
Post-construction (Operation and Maintenance) Phase						
Air quality degradation	<ul style="list-style-type: none"> • Community members should be sensitized about the negative effects of deforestation. • Continue using water bowsters to suppress dust regularly on the gravel (untarred) roads. • Vehicles travelling on the road should be encouraged to comply with the design speed limit for the feeder roads so as to limit dust generation from vehicle movements. • Install traffic calming measures (speed bumps and rumble strips) to slow traffic down within communities or populated areas. • Speed bumps and caution signs should be erected in sections of the road near sensitive infrastructure such 	Project site / selected communities along the roads	<ul style="list-style-type: none"> • Air quality measurements for NO₂, SO₂, CO₂, PM₁₀ (Refer to Table 10-1); • Records of dust control measures implemented and their effectiveness; • Speed controls implemented to reduce dust emissions; • Records of progressive rehabilitation of degraded areas; • Compliance with OHS Plan and the ECOP; • A functional grievance redress or complaints handling system; etc. 	Quarterly / Biannually	Environmental and Social Safeguards Team, HSE Manager / Site Manager, GRO	3,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	as schools, churches, mosques, hospitals and other social amenities.					
Greenhouse gas emissions and contributions to local climate change and ailments during road operation	<ul style="list-style-type: none"> • Encourage the planting of at least 20,000 indigenous trees as a climate change mitigation measure and also discourage needless clearing and burning of vegetation. Government should take the lead role to encourage tree planting among the various communities. • Skills training and education or sensitization programs should continue to be provided to the communities (including schools, religious groups, opinion leaders, farmers, etc.) and issues such as climate change and sustainable agricultural practices should be addressed. 	Project site / project area	<ul style="list-style-type: none"> • Skills training and education / sensitization programs; • Level of enforcement of road use regulations by relevant authorities; • Records of progressive rehabilitation of degraded areas or reforestation programs; • Compliance with the ECOP; etc. 	Quarterly / Biannually	Environmental and Social Safeguards Team, HSE Manager / Site Manager, GRO	2,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Community members should be sensitized about the negative effects of deforestation. • Road use regulations should be enforced by appropriate institutions and vehicle road worthiness regularly checked. • The transport sector agencies should develop policies or measures to promote the use of cleaner fuels and the culture of regular vehicle maintenance. 					
Noise disturbance of roadside dwellers	<ul style="list-style-type: none"> • Needless speeding and honking by vehicles and motorcycles should be discouraged. • Adequate education should be done by appropriate institutions to reduce the “new road effect” associated with over 	Project site / selected communities and sensitive receptors along the roads	<ul style="list-style-type: none"> • Noisy road maintenance operations and machinery fitted with silencers; • Notices served prior to undertaking noisy maintenance activity; • Background noise level monitoring (Refer to Table 10-2); 	Quarterly / Biannually	Environmental and Social Safeguards Team, HSE Manager / Site Manager, CRO, GRO	4,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>speeding with attached elevated risk of accidents.</p> <ul style="list-style-type: none"> • Appropriate signage should be installed on the roads to guide traffic effectively, especially near settlements. • Traffic policing should be implemented to reduce the “new road effect” associated with over speeding with attached elevated risk of accidents. 		<ul style="list-style-type: none"> • PPE use during road maintenance works; • Measures implemented near sensitive receptors (e.g. speed humps and noise barriers); • Level of sensitization and enforcement of road use regulations by relevant authorities; • A functional grievance redress or complaints handling system; etc. 			
Improvement in drainage and reduction of flooding and road deterioration	<ul style="list-style-type: none"> • Checking for problematic erosion areas and implementing remedial works as appropriate. • Monitoring and confirming drainage system is functioning well to avoid flooding. • Monitoring unplanned developments and encroachment, including vegetation growth in areas 	Project site / road corridor	<ul style="list-style-type: none"> • Effectiveness of erosion, flood control and drainage improvement measures implemented; • Records of progressive rehabilitation of degraded areas; • Silt in drains is regularly dredged; • Rate of encroachments and measures implemented; etc. 	Quarterly / Biannually	Environmental and Social Safeguards Team, the HSE Manager / Site Manager, Rehabilitation Specialist and/or Supervision Consultant.	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>that will affect good drainage along the roads.</p> <ul style="list-style-type: none"> • Drains, if constructed, should not be directed into residential buildings abutting the road. • Inspecting ditches and culverts and removing accumulated debris. 					
Water quality degradation	<ul style="list-style-type: none"> • Arrangements should be made with the Waste Management Unit of the District Assemblies and/or road transport agencies for regular pick up of waste and broken-down vehicles during road operation. • Professional handling of pollution point sources along the route is important and decommissioning of potential point sources of pollution along the route should be pursued. • Educate road users to take responsibility of their 	Road corridor / water sources along road corridor	<ul style="list-style-type: none"> • Drinking water quality tests (Refer to Table 10-4); • Facilities for waste disposal provided for communities along road by relevant agencies; • Records of broken-down vehicles on the roads and actions taken; • Effectiveness of soil erosion, and drainage improvement measures implemented; • A functional grievance redress or complaints handling system; etc. 	Quarterly / Biannually	Environmental and Social Safeguards Team, HSE Manager / Site Manager, GRO and/or Supervision Consultant	3,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>own waste or pollutants through collaboration with relevant authorities.</p> <ul style="list-style-type: none"> • If practicable, waste bins should be available at vantage points along the road as well as the provision of sanitary facilities for roadside communities so open defecation and disposal in waterbodies is discouraged. • Implement good drainage system to control soil erosion from road corridor through storm water flows. 					
Employment and revenue generation opportunities	<ul style="list-style-type: none"> • Skills training should continue to be provided to residents of the local communities to increase local employment capacity. • Identify and strengthen institutions with the potential of supporting trade and commerce in the wider Project area. 	Project area / communities along the roads	<ul style="list-style-type: none"> • Records of skills enhancement and employability capacity building programs; • Performance of economic improvement indexes; • A functional grievance redress or complaints handling system; etc. 	Biannually	Environmental and Social Safeguards Team, GRO, CRO and/or Supervision Consultant.	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<ul style="list-style-type: none"> • Promote tourism, including educational and research expeditions, and private tours. • Provide economic incentives to investors in the area, and promote development of sectors such as commerce, tourism, etc. • The Project should identify local groups and women associations and as far as possible offer them jobs involving afforestation and revegetation particularly in areas where borrow pits or degraded vegetation will be reinstated. • Initiate a continuous economic evaluation of the road and strengthen social linkages and family kinship. 					
Improvements in road condition	<ul style="list-style-type: none"> • Traffic policing should be implemented to reduce the “new road effect” 	Project site / road corridor	<ul style="list-style-type: none"> • Level of enforcement of road use regulations by relevant authorities; 	Quarterly / Biannually	Environmental and Social Safeguards	1,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
and travel / accessibility	<p>associated with speeding with its elevated risk of accidents.</p> <ul style="list-style-type: none"> • Appropriate signages should be installed on the roads to guide traffic effectively. • Regular maintenance should be carried out on the roads to safeguard their deterioration. • Timely repair or replacement of damaged road signage and other safety installations. • Clear information should be given to motorists of road blockages during repair works. • Vehicles exceeding the weight capacity of the roads should not be allowed to use these roads and heavy penalties should be imposed to those who 		<ul style="list-style-type: none"> • Road maintenance schedules in place and followed; • Appropriate signages installed; • Timely repair of damaged road features by relevant authorities; • A functional grievance redress or complaints handling system; etc. 		Team, HSE Manager / Site Manager, GRO	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	exceed weight and speed limits.					
Accidents / occupational health and safety risks during road operation	<ul style="list-style-type: none"> • Install appropriate traffic safety signage at vantage points on the roads to guide traffic effectively and enhance safety. • Install traffic calming measures (speed bumps and rumble strips) to slow traffic down within communities or populated areas. • Improve and enhance community sensitization on road traffic accidents within the Project areas. • Designated animal crossing areas should be marked appropriately with warning signs and traffic calming measures. • Build capacity of the Police service and traffic policing should be implemented to reduce the 	Project area / communities along road	<ul style="list-style-type: none"> • Regular safety inductions / meetings and inspections during road maintenance; • Records of accidents, injuries, etc.; • Road maintenance schedules in place and followed; • PPEs worn correctly and at all times during road maintenance works; • Availability of First Aid kits and medical personnel during road maintenance; • Compliance with Occupational Health and Safety (OHS) Plan; • Compliance with the ECOP; • Warning signages posted and traffic / work safety measures implemented; 	Quarterly / Biannually	Environmental and Social Safeguards Team, HSE Manager / Site Manager, CRO, GRO and/or Supervision Consultant.	2,000

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>“new road effect” associated with needless speeding by drivers with its associated elevated risk of accidents.</p> <ul style="list-style-type: none"> • Conduct periodic and routine alcohol checks for drivers plying the road. • Given the experience of the communities with the existing road, the local community should be encouraged or consulted to suggest sections of the road where speed bumps and road signs may be necessary. • Regular maintenance should be carried out on the roads to safeguard their deterioration. 		<ul style="list-style-type: none"> • Policy on alcohol in place and routine alcohol checks conducted; • Record of public health and road safety awareness programs; • A functional grievance redress or complaints handling system; etc. 			
Increased agricultural productivity and improvement in livelihoods	<ul style="list-style-type: none"> • Provide roadside amenities or social services such as markets as part of the Project to reduce post-harvest losses from 	Project area / communities along the roads	<ul style="list-style-type: none"> • Road maintenance schedules in place and followed; 	Quarterly / Biannually	Environmental and Social Safeguards Team, HSE Manager / Site Manager, CRO, GRO, Officials of	2,500

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>traveling long distances to sell at bigger markets.</p> <ul style="list-style-type: none"> • Regular maintenance should be carried out on the roads to safeguard their deterioration. • Provision of improved farm machineries and inputs as support to individual farmers or groups to help increase their yields. • Consider provision or improvement in irrigation systems to encourage year-long production. For instance, existing irrigation dams could be dredged to increase their capacities to support year-long cultivation. • Skills training and education or sensitization programs should continue to be provided to the communities (including schools, religious groups, 		<ul style="list-style-type: none"> • Effectiveness of livelihood programs delivery and uptake; • Performance of agricultural and economic improvement indexes; • Level of engagement or collaboration with individual farmers or groups, state agencies, NGOs and all other relevant stakeholders providing support to the agricultural sector; • A functional grievance redress or complaints handling system; etc. 		MOFA and/or Supervision Consultant.	

Potential Impact	Mitigation / Enhancement Measures	Monitoring Site / Location	Monitoring Parameters / Performance Indicators	Monitoring Frequency	Responsibility	Monitoring Cost/Year (USD)*
	<p>opinion leaders, farmers, etc.) and issues such as climate change and sustainable agricultural practices should be addressed.</p> <ul style="list-style-type: none"> • Consider providing economic incentives to investors in the area and promoting development of sectors such as agriculture and livestock rearing. 					
TOTAL						110,000

*Costs were only estimated based on professional judgement from similar projects. Costs do not include the purchase of monitoring equipment. Typical costs for air quality, noise, surface water and effluent water quality will vary depending on the number of samples for testing or the number of sampling locations established, which essentially depends on a number of other factors including the length of road, the number of sensitive receptors or settlements along the route, the number of streams or waterbodies traversed by the road and the construction workforce required. Costs will also vary depending on the Laboratory/Consultant contracted for testing/monitoring.

10.3 ENVIRONMENTAL AND SOCIAL MANAGEMENT BUDGET

It is important for effective Project cost planning purposes that a detailed cost analysis be conducted for the implementation of environmental management and monitoring programs. The environmental management budget provided in Table 10-8 below is only preliminary and thus not exhaustive. The Project will be requiring an amount of **Two Hundred and Thirty-Three Thousand US Dollars (USD 233,000)** for environmental and social management. This does not include costs that will be associated with resettlement of PAPs or compensation for landed assets, temporary structures, crops and farm lands, economic trees (community assets), etc. and costs associated with the RAP implementation activities.

Table 10-8: Provisional Environmental and Social Management Budget

Activity	Management Program	Comments	Cost/Year (USD)
Project Training Program	Training and capacity building for personnel (From Table 6-1)	Training provided at both pre-construction and construction phase.	20,000
Auditing and Monitoring	Environmental and social monitoring (From Table 10-7)	Conducted throughout the Project lifespan.	110,000
	Annual environmental and social audit	Reflects the overall performance of the Project	20,000
Reporting and Documentation	Environmental Management Plan Preparation / Updates	A requirement of LI 1652 and should be submitted to the EPA 18 months after project completion and every 3 years thereafter.	30,000
	Annual Environmental Report	Annual submission in line with LI 1652 requirements.	25,000
Procurement of environmental monitoring equipment*	Noise emissions	2 no. digital sound level meter	1,200
	Soil compaction and vibrations	2 no. potable vibration meter kits	3,000
	Potential air pollution	2 no. outdoor air quality test kit (complete suite)	9,000
	Water quality	2 no. multiparameter water quality test kit	10,000
	General purpose equipment	2 no. handheld GPS	800
		2 no. digital camera	3,000
		PPEs	1,000
TOTAL			233,000

* This cost would not recur yearly, unless monitoring equipment become faulty, damaged or needs to be re-purchased.

11 DECOMMISSIONING

The concept of progressive rehabilitation is to be implemented throughout the life of the Project. As soon as work on one area is completed, the rehabilitation of that is to commence. This will involve returning the condition of disturbed areas to a state that they were in before the Project began, or better.

11.1.1 CONSTRUCTION CAMP

The construction campsite and worker's accommodation area, if applicable, will require rehabilitation immediately after completion of the construction contract. All construction material, buildings, concrete slabs, fencing and other temporary structure should be removed, and these areas rehabilitated. The area may require ripping and the re-spreading of topsoil to generate vegetation.

For rehabilitation to be effective, the topsoil should be stripped and stockpiled prior to the establishment of the camp, and then re-used during rehabilitation. Re-vegetation and rehabilitation of the construction campsite will be required to be undertaken after the completion of construction. Offices, structures, machinery and equipment should be removed from site. Fences and gates should be removed. Power and water supplies should be disconnected, unless otherwise instructed by the Supervision Consultant. Concrete foundations and buried pipes should be removed.

The site should be scarified and topsoil from the stockpiles placed. Indigenous and native plants should be grown where possible. Advice on a suitable seed mix can be obtained from the appropriate state agency. The area should be maintained, watered and fertilized until an adequate grass cover is established to the Supervision Consultant's satisfaction.

11.1.2 STOCKPILES

Stockpiles should be removed and surplus material sold off or removed to an approved site. The area should be ripped, scarified, topsoil applied and seeded with an approved indigenous grass or seed mix. The site should be watered and weeded until a suitable grass cover has become established. Rehabilitation should commence as soon as a stockpile becomes redundant.

11.1.3 VEGETATION

Any post-development re-vegetation must only use species indigenous to the project area. As far as possible, plants naturally growing along the route that would otherwise be destroyed during construction, should be used for re-vegetation/landscaping purposes.

11.1.4 ACCESS ROADS

Unless otherwise directed by the Supervision Consultant, access and haul roads should be ripped, scarified, top soil applied and seeded as described previously. Temporary construction related signs erected along these roads should be removed.

11.1.5 STORM WATER CONTROL

The site should be monitored for signs of erosion and remedial steps taken to repair eroded areas and prevent further erosion, such as the construction of berms and rock filled channels, should a problem arise.

11.1.6 PHOTOGRAPHS

Photographs of the construction campsite, access roads and stockpile area are to be taken before and during construction operations and after rehabilitation of the site. The HSE Manager should be responsible for keeping updated records (including photographs).

12 CONCLUSION

This ESMP should be considered to be a dynamic document and should be updated as required on a continuous basis. However, cognisance should be taken of the fact that substantial changes to the document in future should be submitted to the MRH / DFR for approval.

TSIP: GRIEVANCE AND COMPLAINTS MANAGEMENT FRAMEWORK

1. INTRODUCTION

An integral part of stakeholder engagement is establishing an efficient information and grievance management system for affected people to communicate their complaints. An effective Grievance Redress Mechanisms (GRM) will enable the MRH to track project-related complaints including a feedback system for regular and timely feedback on actions taken to respond to complaints. In recognition of this, the Ministry of Roads and Highways will establish an information and grievance management system as part of the environmental and social management planning of the TSIP operations. The key functions of the GRM are to (a) record, screen, and investigate grievances; (b) resolve the grievances in consultation with the affected persons/parties and other stakeholders; (c) inform the affected persons/parties about the resolution of the grievances; and (d) forward any unresolved cases to higher authorities.

The principal issues to be covered by the GRM would be related mainly to involuntary resettlement and construction related issues. To this end, the following issues will be considered in the GRM:

- Requests for information;
- Inventory and measurement of assets that were missed during census;
- Valuation of assets;
- Compensation awards and their disbursement;
- Matters related to physical relocation;
- Site clearance;
- Community health and safety;
- Traffic congestion; and
- To the extent possible issues related to ownership and inheritance.

2. FEATURES OF THE GRIEVANCE REDRESS MECHANISM

Both formal and informal grievance resolution mechanisms shall be employed. The TSIP Grievance Redress Mechanism (GRM) shall be set up with the following features:

2.1 Project NGO

The project shall appoint an NGO¹³ to oversee the Grievance Redress Service of the TSIP. The NGO will work with all project communities to ensure accountability and transparency in project delivery using an online GRM platform as well as offline grievance redress mechanisms. The key responsibilities of the NGO with respect to grievance redress shall include, but not limited to:

- **Establish Site Offices for receiving and recording complaints.** The NGO shall establish site offices at each of the project districts for the duration of the project. The district offices would be responsible for receiving, recording and assigning all project-related complaints received directly from PAPs, community focal persons or by the Grievance redress officers. At the minimum, each site office shall include a site grievance redress officer, desk grievance officer/complaints administrator, and district coordinator.

¹³ Project NGO is used in this document to represent the NGO that would be engaged for the purpose of citizens' engagement and to oversee the GRM operations.

- **Facilitate the establishment of the GRM at the various levels:** The NGO will work with the project safeguards team to facilitate the appointment of the grievance focal persons, grievance redress officers at the community and sub-project levels, as well as the constitution of grievance committees at the district level. The NGO will train and periodically build the capacity of these officials and committees on their functions and operations.
- **Publicizing and Disclosure of the GRM.** The NGO shall be responsible for disclosing the GRM to the stakeholders through media and face-to-face community/public campaigns. With support from the MRH's safeguard staff, the NGO will simplify the contents of the GRM in locally accepted languages agreed with the affected parties. This will ensure that approaches, ways and contact information both at project locations and at NGO site office for seeking redress is clearly spelt out. The NGO will also put in place suggestion/ complaint boxes with details of the project hotline at strategic locations along the project corridor. The NGO shall engage community groups and local stakeholders in regular community awareness and project updates, and consolidate their concerns for redress
- **Verify, record and log complaints on the GCLS.** The NGO, through appointed site-based grievance officers will verify and document/record precise details of complaints including photographs/video, geolocations where necessary. This information will be recorded immediately onto the online web-platform (see Annex A) by the complaints administrator and a dedicated officer assigned to resolve it within a stipulated time.
- **Act as a social mobiliser and mediator between complainants and respondents.** The NGO shall follow up on all assigned complaints to ensure that grievances are addressed satisfactorily and in a timely manner by the appropriate project officials at the various levels. The NGO will also provide immediate feedback to complainants on the status of their complaints and immediately action has been taken.

More specific responsibilities in relation to stakeholder engagement and grievance redress to be performed by the NGO are highlighted in the TOR.

2.2 Online Grievance and Complaints Logging System

Each grievance thus received, shall be recorded in a grievance register using a web-platform. For this purpose, a simple computer-based system shall be developed by the MRH for more effective management of complaints. The web-platform will be managed by the NGO, and will guide the implementing agency particularly the environmental and social safeguards unit on the steps and arrangements for receiving, sorting, verifying, acting and tracking complaints. These are detailed out in **Annex A**. The appointed NGO shall oversee the operations of the online platform and ensure a quick turnaround on addressing complaints.

The EMU shall oversee the operations of the NGO. This will include direct monitoring and supervision of the day-to-day operations of the NGO, as well as assign additional tasks to NGO were necessary. The EMU shall review and approve monthly and quarterly progress reports submitted by the NGO prior to payments to ensure that project targets have been achieved.

PAPs and local stakeholders can monitor issues associated with roadways construction in their community and convey their complaints through the web-platform or the appropriate GRM structures (walk-in to GRM committees, phone calls, SMS, email etc). Any issue must be recorded on the GCLS by a dedicated grievance redress officer regardless of the mode of receipt to enable real time redress of all grievances.

3. GRIEVANCE REDRESS STRUCTURE

The GRM will consist of a four-tier system which include the following:

- Local (project site) level;
- District Level Grievance resolution
- Project-level grievance resolution; and
- National legal level

❖ **Local Level**

• **Community Focal Person**

Each project community shall appoint a **community focal person** for receiving and recording of related grievances using the grievance **Form A**. This process shall be facilitated by the project NGO. The focal person must be a respectable member of the community, and with the ability to document and communicate community concerns accurately to the project grievance officer and other project stakeholders. The focal person will be the first point of contact for day to day grievance issues. The community focal person will provide an immediate acknowledgement of the complaint and will report all grievances immediately to the site Grievance Redress Officer for a formal response and documentation. The community focal person does not have the authority to resolve grievances but only to receive and report every complaint to the GRO for a formal redress. Nonetheless, such focal officers would be most useful to persons living with disability, old people with limited mobility and poor persons who cannot afford the expense of traveling long distances to lodge a complaint. Focal persons shall be resourced, so they commute to different parts of project communities when it is required and make phone calls. The NGO shall provide a simple mobile phone with a monthly talk-time bundle to each community focal person to facilitate his/her operations.

• **NGO Site-Office**

The NGO shall establish Site Offices at each project district for receiving recording and assigning all project-related complaints. There shall be at least two dedicated Grievance Redress Officers for each project district, appointed by the project NGO to evaluate and address grievances at the site level – a **Desk Grievance Officer** and **Site Grievance Redress Officer**. Both Grievance Redress Officers (GROs) shall be based at the NGO site office, and where necessary, supported by additional technical and administrative staff.

i. **The Desk Grievance officer**

The key role of the Desk Grievance Officer is to maintain the district grievance register. This will involve electronically recording all complaints received at the site office, updating the register and assigning complaints to responsible officers for resolution. Complaints made to the NGO site office, through the project hotline, walk-ins and through the website shall also be processed by the desk GRO.

For grievances lodged directly at the site office, a complaint form shall be filled, dated and signed. If the complaint relates to the contracting entity, a copy of the same shall be deposited in the Supervising Engineer's office. An acknowledgement of complaint form shall also be filled, signed and given to the complainant.

Once the grievance is received and recorded, based on the subject and issue, the **Desk Grievance Officer** shall identify the department, contractor or personnel responsible for resolving the grievance and, using the web-platform, assign the task of resolving the complaint to the responsible officer.

ii. **The Site Grievance Redress Officer**

The site GRO shall be responsible for supervising the activities of community focal persons within his/her project district. The site GRO shall be resourced to commute to project communities daily where necessary to receive, verify official complaints from community focal persons, and provide preliminary response to such complaints. The NGO shall be responsible for providing the required logistics for his/her transportation and communication. Where it is determined jointly by MRH's safeguards team

and the NGO that more than one GRO is necessary to optimise operations at the district level, the NGO shall ensure that an adequate number of GROs are assigned, whether temporarily or as permanent staff.

For every complaint received and logged onto the web-platform, the **Site Grievance Officer** and concerned officer/respondent shall work closely with the community focal persons, leadership and representatives of project affected communities and individuals to undertake an enquiry into the facts relating to the grievance. This shall be aimed at establishing and analysing the cause of the grievance and subsequently identifying suitable mitigation measures for the same. As part of this investigation, the site GRO may also undertake confidential discussions with the concerned parties to develop a more detailed understanding of the issue at hand. The site investigation shall be completed in no more than 10 working days of receiving the grievance.

Based on the understanding thus developed, the site GRO, in consultation with the concerned officials, shall identify a suitable resolution to the issue and ensure that the proffered solution is communicated to the contractor through a site instruction for action. Where the complaint can be resolved directly by the site GRO, he/she may address grievances directly with the complainant, under the following conditions.

- The grievance must be recorded formally by the GRO using the grievance form in **Annex B**
- The GRO must resolve the grievance within **10 working days** or otherwise discuss with the District grievance committee. If for any reason the resolution would require longer than 10 working days, the aggrieved person must be notified by the GRO that his/her complaint is being considered but would take longer and an estimated completion date shared.
- A written record of the proposed resolution shall be made. The solution proffered shall be recorded and dated. The site GRO will follow up to find out whether the complainant is satisfied, and the results of the follow-up will be recorded.
- If the site GRO cannot resolve the grievance, the desk grievance officer will immediately refer the complaint to the district grievance committee for immediate redress.

❖ **District Grievance Mediation Team:**

For each district affected by the road project/sub-project, there shall be constituted a **District Grievance Committee** responsible for receiving, evaluating and addressing significant complaints at the district level. Following the recommendations of the citizens' engagement assessment, the District Grievance committee shall comprise stakeholder representatives as proposed by their constituents. The NGO shall facilitate the constitution of each of the district grievance committees and confirm the representatives proposed by the CEA. Membership of the grievance Committee will be publicized throughout the sub-activity areas along with other details of the GRM.

The composition of district grievance committee shall include;

- District Presiding member (Chair)
- District development planning officer
- Representatives of affected stakeholder group within the project area of influence
- Site Grievance Redress officer(s)
- Contractor's grievance redress officer
- Community focal person(s) from which complaint has been received
- Representative of Traditional authorities, if necessary
- MRH EMU representative, if necessary

The grievance committee shall mediate all grievances that remain unresolved after site-based or local community level interventions. The District grievance committee will convene monthly to address all

grievances that have been brought to their attention. The GRO will also update members of all grievances and resolutions that been recorded in project communities during this time. Emergency meetings may also be convened where necessary to address a matter brought to their attention. In the case of an emergency meeting, the site GRO shall work directly with the presiding member to facilitate this process. The district presiding member shall chair all meetings, and in his absence, the district development planning officer or GRO. The processes for resolving the majority of grievances will be resolved as follows:

- Grievance Committee meetings will be scheduled every month
- Each Grievance Committee meeting will be minuted. The meeting will start with the review of outstanding grievances and agreed actions. New grievances will be discussed and recorded using the grievance form in Annex B.
- For each grievance to be resolved by the Grievance Committee, an action plan shall be agreed. The person responsible for implementing the action plan will normally be the site GRO unless cultural or resource demands necessitate another individual. The timeline for implementing the action plan shall also be agreed during the meeting, but preferably within **15 working days** upon receipt.
- After the Grievance Committee proposes an action plan to a complainant, the GRO shall contact the complainant to confirm that the redress action is satisfactory. If the complainant is unsatisfied with the outcome of the redress action, further mediation shall be taken to resolve the issue or reach an amicable agreement, or the matter be referred to the project grievance committee. Verification will be completed within 2 weeks of resolution of a grievance at a Grievance Committee.
- The date of the next grievance meeting will then be agreed.

For emergency grievances in the event of a fatality, significant damage to personnel, property or physical conflict associated with the TSIP project or a claim involving more than 4 individuals:

- The GRO will escalate the matter to project MRH's safeguards officials immediately who will provide a response within 24 hours;
- In the meantime, the GRO will call an Emergency Grievance Committee meeting with the Grievance Committee members and arrange a meeting within 1 week.
- The process for assessing and resolving a grievance will follow the regular grievance mechanism in so far as a resolution and action plan should be completed within 2 days of the committee meeting.

❖ **Project Level Grievance Resolution**

All project related grievances that remain unresolved at the district level shall be referred to **project grievance redress committee** for resolution as a third level grievance redress mechanism. The membership of the GRC shall draw primarily from nominated representatives of the EMU and Project Implementation Team (PIT) and the social safeguards specialist. The PGRC will be the focal contact to receive, record, review, and address project-related concerns in coordination with the Project Implementation Team or Steering Committee. Complaints received at this level shall be addressed within 10 working days upon receipt.

❖ **National Level**

If no agreement is reached at this stage, then the grievance is taken to the Commission for Human Rights and Administrative Justice (CHRAJ) or the court, whose verdict will be binding on the parties.

4. GRIEVANCE REDRESS PROCESS

❖ Receiving and Recording of Grievances

All project beneficiaries, PAPs and local stakeholders can submit project related grievances, complaints or suggestions formally and at any time. Examples of project-related grievances are provided in annex C. Grievances and complaints related to the project can be formally submitted either by:

- Dropping a letter in the grievance box next to the project's notice board at vantage locations (see NGO responsibilities).
- Contacting the respective Community Focal Persons and/or GRO directly by face-to-face interaction or through a free hotline, SMS, email (contact information of officers to be provided to project communities; and inscribed on project signboards).
- In the absence of the community focal person or GRO, grievances or concerns can be raised with the assemblyman of the project area or any member of the project communication committee or district grievance committee. Irrespective of the mode or channel of receipt all grievances should then be communicated formally to the community focal person or the site GRO for formal recording using the grievance **Form A**. The completed form must be submitted manually to the district office of the NGO by close of day to be recorded formally on the online system.
- Complaints and suggestions may also be directly reported to the NGO site office and online using the project grievance web-platform (website to be publicised by NGO). PAPs and local stakeholders will be made aware of this platform and its usage through periodic campaigns and stakeholder engagement sessions to be undertaken by the NGO.
- Once the grievance is received, a case number shall be allocated and communicated to the grievant by the desk GRO. This communication shall also serve as an acknowledgement of the grievance. In case the grievance is assessed to be out of the scope of the GRM, a communication towards the same shall be made to the grievant, and an alternative mode of redressal shall be suggested. As part of this acknowledgement a tentative timeline for the redressal of the grievances shall be identified, in keeping with the process below. This acknowledgement shall be provided on the same day as the grievance is received.

❖ Procedure for Grievance Resolution

The procedure for handling grievances shall be as follows:

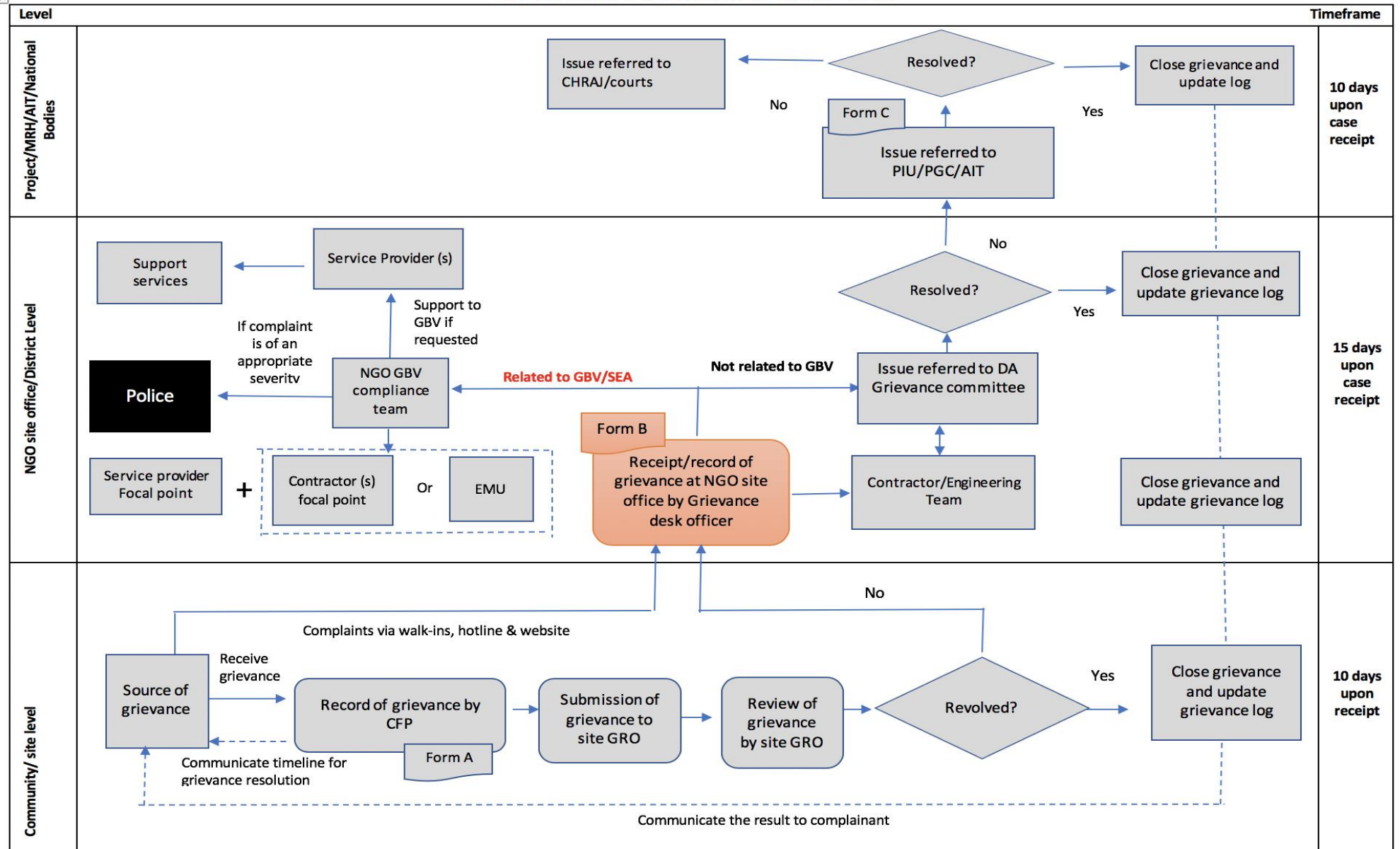
- All grievances irrespective of the mode or channel of receipt shall be referred to the site-based GRO for resolution. A grievance form shall be completed for all grievances received and logged into the web-based platform by the desk GRO for tracking. If the affected person appears in person, the affected person should file his/her grievance in writing. The grievance form should be signed and dated by the aggrieved person. Where the affected person is unable to write, s/he should be assisted to complete the grievance form and emboss the form with his/her thumbprint. The process should also allow for anonymity at the discretion of the complainant, especially where it is necessary to protect the confidentiality of the complainant. The sample grievance redressal form is provided in **Annex B**, makes provision for anonymous reporting where necessary.
- The site GRO shall respond within 10 working days during which time any meetings and discussions to be held with the aggrieved person(s) should be conducted. The site GRO may draw on existing mechanisms in the community (community leaders, local government officials, traditional justice system, etc.) to address the grievance. If the grievance may necessitate a longer period of time the aggrieved person must be notified by the site GRO that his/her complaint is being considered.

- The GRO is expected to lodge the complaint to the district level grievance committee if the grievance cannot be resolved locally or where the complainant is unsatisfied with the proposed solution.
- The district grievance committee shall meet monthly to resolve all matters brought to their attention within 15 days upon receipt, following laid down procedures identified above. Where a matter requires emergency redress, a meeting may be convened through the facilitation of the GRO and district presiding member.
- If an agreement cannot be reached at District GRC level, the GRO shall refer the matter to the Project grievance redress Committee for redress.

The schematic representation of the grievance redressal process is shown in the diagram below;



TSIP GRIEVANCE MANAGEMENT FRAMEWORK



Annex A. WEB-BASED GRIEVANCE AND COMPLAINTS LOGGING SYSTEM (GCLS):

The overall purpose of the online grievance system is to help the MRH comply with the GRM requirements of the project by recording, assessing, and resolving grievances¹⁴ and complaints¹⁵ during the implementation of the TSIP in an efficient, effective, and transparent manner as possible.

The centralised data management system will be designed to allow the safeguards team (and with the help of the project NGO) to record and process complaints and grievances that arise from a project. The online system will automatically receive complaints/grievances made online through the project website and also allow for the entering of complaints/grievances manually when received via other means (e.g. sms, in person, by email etc).

The manager of the GCLS (project NGO) will prioritise the complaints, categorise them according to their cause (e.g. environmental, contractor related etc) and assign them to designated specialists for resolution (depending on the category of the complaint/grievance). Once the issue has been satisfactorily resolved with the 'complainant', then the complaint will be closed. The complainant will be notified in accordance with the procedures as documented in the GRM, and this will be recorded in the platform.

GCLS Functions

It is expected that the online grievance system will allow for:

- Full auditing of the process by which a complaint was addressed;
- Supervisors to review and comment on all grievances; and,
- The monitoring of service standards for resolving complaints. The GCLS will maintain statistics on number of and types of complaints, time taken to resolve, etc. These statistics can be easily published to a public website or included in reports.

The online system will be accessible via any device with an internet browser. Complaints may be lodged through a website, by SMS, in person, by telephone, e-mail, or letter. Website complaints are automatically logged in the system, while other forms are manually entered by the '*Complaints Administrator*' to be performed by the project NGO staff.

Managing Complaints: Roles and Responsibilities

It is proposed that there will exist three main types of users are: (i) Level 1; (ii) Level 2; and, (iii) Supervisor. In addition, there is the: (iv) System Administrator; and, (v) Guest user.

i. **Level 1 User.** The Level 1 User is the one who deals day-to-day with the complaints, and has the greatest functionality. They have access to all aspects of the system, from managing the setup data to entering and processing complaints. Apart from the supervisor, the level 1 users would also be assigned the authority to close a complaint. The Level 1 User may also be assigned 'System Administrator' privileges, depending on how the project progresses.

In this regard, it is anticipated that the project NGO, specifically the Desk GRO, shall perform this function as part of its duties, to assign dedicated complaints administrators for each sub-project. In other words, each OPRC package shall have a dedicated desk GRO/complaints administrator to receive, record and assign complaints to task officers within their jurisdictions.

¹⁴ A **grievance** could trigger the World Bank's resettlement policy. Grievances may arise, for example, if the land owner of the acquired lot for the relocated household is not happy with the compensation paid, or if a contractor employed directly by a project damages a person's private property (for example, through debris clean up or transporting and offloading materials).

¹⁵ A **complaint** does not trigger the World Bank's resettlement policy. Complaints may relate, for example, to the beneficiary classification, excessive noise, damage to property, pollution concerns, quality of the works, or other concerns. However, in this document, the term '**complaint**' is used for both 'grievances' and 'complaints'.

ii. **Level 2 User.** The Level 2 User's role is limited to working with complaints and reporting. Level 2 users are typically technical experts who are invited to comment if the grievance is related to their field of expertise. i.e designated specialists for responsible for resolving a complaint. An example is indicated in table 2 below

Level 2 User	Complaint Category
contractor	<ul style="list-style-type: none"> • Occupational Safety • Traffic • Employment
Accountant	<ul style="list-style-type: none"> • Compensation Payment
Safeguards officers	<ul style="list-style-type: none"> • Environment & Safety • Gender • HIV/AIDS • Land Acquisition and Resettlement

iii. **Supervisor.** The overall responsibilities of the Supervisor (head of safeguards team/social safeguards officer) include monitoring the responses of the Level 1 and Level 2 Users to individual Complaints, and to ensure that all Complaints are being dealt with in a satisfactory and timely manner; the Supervisor may also add Comments to any Complaint. For example, where it is observed that Complaints are not being Processed or Resolved on a timely basis, the Supervisor should contact the assigned Level 1 User to determine the reasons why and take appropriate action. Two key actions/functions are envisaged here, which are available only to a Supervisor:

a. Review Unprocessed and Unresolved Complaints: The Supervisor should regularly review the list of Unprocessed and Unresolved Complaints. The Supervisor should contact the assigned Level 1 User to determine the reasons why and take appropriate action.

b. Review and Comment upon Individual Complaints: The Supervisor should regularly review the list of Unresolved Complaints and view the Comments that have been posted by the Level 1 and Level 2 Users. The Supervisor may add a Comment to any individual complaint; for example, to give direction on how the complaint is to be investigated or dealt with. As such, it is proposed that this supervisory role should be performed by the social safeguards specialist.

iv. System Administrator. The System Administrator's role is limited to managing the configuration of the GCLS system. This role would be performed dedicatedly by an officer appointed as the IT officer for the TSIP.

v. Guests. Guest users can only review reports. Other project implementing staff such as members of the AIT, steering committee members can be categorised and granted guests access.

The table below shows the different functions available to each type of user.

Function	Level 1 (Complaints Administrator/ NGO staff)	Level 2	Supervisor	System (MRH IT)	Administrator	Guest
Manage Configuration					√	
Manage Users					√	
Manage Categories	√					
Manage Priorities	√					
Add Complaint (e.g. via phone, person)	√		√			
Modify Complaint						
Contact info (name, e-mail etc.)	√	√				
Process complaint	√	√				
Location	√	√				
Category	√	√	√			
Priority	√	√	√			
Add Comment	√	√	√			
Upload Picture	√	√				
Close Complaint	√		√			
View Complaint and Responses	√	√	√		√	√
Receive Notifications	√	√	√		√	
View Activity Log	√	√	√		√	
Reports / Statistics						
Run Reports / Statistics	√	√	√		√	√
Download Complaints	√	√	√		√	

ANNEX B FORM A: SAMPLE GRIEVANCE RECORDING FORM

PART 1: CONTACT AND DETAILS		Grievance ID Number:
DATE:		RECORDED BY:
Place/method grievance was received:		
Gender: M / F	Age:	
Anonymous (Y/N)	Complainant Name:	
Telephone number / email/ address:		
Method of contact:		
PART 2: DESCRIPTION OF GRIEVANCE(S), attach supplementary information/ photos as required		
Describe the grievance: <ul style="list-style-type: none"> - When it occurred - Where it occurred - How it occurred and who was involved - Complainant(s)'s story and expectation 		
Type/Category of complaint	Compensation / Land Access / Inadequate Notification/ Disruption to Business or Property / Property Damage / Irrigation / Boundary Dispute / Environmental Damage / Construction Activities / Safety Risk /Traffic / Other	
PART 3: GRIEVANCE SCREENING		
The grievance will be ADDRESSED LOCALLY / REFERED TO ANOTHER COMMITTEE/ NOT LINKED TO PROJECT Preliminary response to be issued to claimant (within 7 days maximum)		
PART 4: PROPOSED ACTION(S)		
Describe the proposed response, including: <ul style="list-style-type: none"> - Accepted/ Not accepted - Timeframe for implementing action: immediate, 14 days / 1 month / 3 months - Responsible PERSON for implementing action: [Name] - Date of final response to claimant 		
The claimant has ACCEPTED/SATISFIED the proposed action		YES / NO
Further action is required		YES / NO
Signatures or thumb print		
Recorder:		Date:
Claimant:		

ANNEX C: GRIEVANCE DEFINITION AND CATEGORIES

A grievance is a concern or complaint raised by an individual or a group within communities affected by company operations. Both concerns and complaints can result from either real or perceived impacts of a company's operations and may be filed in the same manner and handled with the same procedure. Grievances may take the form of specific complaints for actual damages or injury, general concerns about project activities, incidents and impacts or perceived impacts. Based on the understanding of the project area and the stakeholders, an indicative list of the types of grievances have been identified for the project. These include all grievances related to involuntary resettlement as pointed out at the introduction. Other

Grievances that are not related to involuntary resettlement will often be related to construction and community health and safety issues. Persons living and using a construction corridor may be disrupted by:

- Damage of trees and property;
- Open trenches that block their accesses;
- Poor storage arrangements and stockpiling of materials that lead to obstruction of accesses and reduces visibility;
- Issues related to transportation and traffic;
- Increase in environment pollution;
- Poor disposal of construction waste;
- Impact on community health such as noise and dust;
- Disturbances to locals due to influx of migrant workers in the area;
- Issues arising out of sharing of employment and business opportunity;
- Concerns over the impact on local cultures and customs; and
- Misconduct by staff of works contractors, among others.

The list of grievances will be regularly updated as and when the new one arises.

Internal Grievances: The process to be followed for the redressal of the internal grievances from employees (including both direct and indirect employees, including local workers and migrant workers through contractors) will be developed and approved by the contracting entity. Such grievances include but not limited to;

- Complaints pertaining to amount of wage, salary, other remuneration or benefits as per the contracting entity's human resource policy;
- Timely disbursement of remuneration;
- Gender discrimination;
- Issues related to workers organization;
- Labour accommodation;
- Health and safety issues;
- Extended working hours.



Republic of Ghana

**Ministry of Roads and Highways
Ghana Highway Authority**

TRANSPORT SECTOR IMPROVEMENT PROJECT (TSIP)

**FRAMEWORK TO PREVENT AND RESPOND TO GENDER BASED VIOLENCE AS
WELL AS CHILD ABUSE/EXPLOITATION**

PREPARED BY: TSIP SAFEGUARDS TEAM

DATE: MARCH 2019

1. Introduction

i. This Gender Based Violence (GBV) and Violence Against Children (VAC) framework includes specific arrangements for the Transport Sector Improvement Project (TSIP) by which GBV risks will be addressed. The GBV and VAC framework will define the general direction by which GBV risks are to be addressed in the project. In this framework, GBV is used to describe any harmful act that is perpetrated against a person's will and that is based on socially ascribed gender differences. This includes acts that inflict physical, mental, sexual harm or suffering; threats of such acts; and coercion and other deprivations of liberty, whether occurring in public or in private life.

ii. The framework shall guide the contracting entity in the preparation of a GBV action plan as part of the contractor's ESMP. The contractor's GBV action plan will outline the necessary protocols and mechanisms to minimize the risk of exacerbating GBV in the project with a main focus on Sexual Exploitation and Abuse (SEA) and Violence Against Children (VAC). The GBV Action Plan shall include considerations such as;

- GBV allegation procedures, indicating how employees and the community can report cases of GBV
- Managers and Employee Code of Conduct to manage worker behaviours
- GBV services providers to which GBV survivors will be referred, and the services which will be available
- Awareness raising strategy, which describes how workers and local communities will be sensitized to GBV risks and the worker's responsibilities under the Codes of Conduct (CoC)
- Monitoring and Reporting of GBV/SEA issues

2. The GBV and VAC Committee

The project shall establish a GBV and VAC committee¹⁶. The committee will include at least five representatives as listed below. However, based on the mapping of service providers and location of the works, the membership may be amended to include those that are more pertinent to manage GBV in the project area:

- a. MRH's social safeguard specialist
- b. The occupational health and safety manager from the contracting entity, or the officer tasked with the responsibility of addressing GBV and VAC
- c. The local NGO's GBV specialist¹⁷
- d. The GBV specialist of the monitoring consultant
- e. A representative from a local service provider with experience in GBV, preferably the district gender desk officer, or an officer from the district social welfare department

Responsibilities of the committee shall include;

- Approve any changes to the GBV action plan and the associated codes of conduct
- Monitor resolutions and sanctions with regard to complaints related to GBV and VAC associated with the project;
- Verify that the referral protocols and services are functional and delivered to survivors

¹⁶ In this document, 'GBV and VAC committee' will be used interchangeably with 'committee'

¹⁷ The NGO GBV specialist is responsible for receiving, managing and providing guidance for all project-related GBV and VAC complaints that come through the project GRM.

- Ensure that GBV and GRM statistics are up to date and included in the regular project monitoring reports

Members of the committee must undergo training by the local NGO prior to the commencement of their assignment to ensure they are sensitized on GBV and child protection case management. The committee shall hold quarterly meetings to discuss ways to strengthen resources and GBV/VAC support for employees and project-affected communities.

3. GBV Referral Pathway

The GBV referral system details where and how survivors can safely access multiple GBV actors and competent service providers, such as medical care, psychosocial services, police assistance and legal and justice support (see Figure 1). Any survivor reporting GBV through a reporting mechanism will receive care regardless of whether the perpetrator is known to be associated with the project or not. This is because the increased GBV sensitization activities may lead survivors in communities to seek services through the project, regardless of whether the perpetrator was linked to the project or not. Furthermore, the specifics of a perpetrator may not be known at the time that support services start, and once started a survivor should be able to continue to access care. Thus, survivors will receive support from GBV services providers until the survivor no longer requires support.

The project GBV referral system builds on the existing GBV service delivery providers and community-based structures, such as police (and CHRAJ), community and social workers (social welfare, gender desk and planning officers), health facilities, trusted members of the community¹⁸, educators (girl child officers, girls clubs) and community-based organisations (child protection committees, community-based surveillance volunteers) within the project area. A GBV service provider assessment within the project area confirms that a reasonable number of existing and potential providers and local actors exist for this purpose (see annex 1 for list of existing services in the project districts)¹⁹. In addition, the MRH will engage a local NGO to complement these existing service providers in the prevention and mitigation of project-related GBV risks.

The GBV referral system will form an integral part of the overall project Grievance Redress Mechanism, which will be operated by a local NGO to be engaged by the MRH. Integrating the GBV referral system with the project GRM provides a single channel for all issues concerning the project so it is easier to manage and to promote the reporting and feedback channel (GRM) to the local communities. In this regard, the GBV committee, the contracting entity and the local NGO shall establish a working relationship with the local service providers so that GBV and VAC cases can safely be transferred to them. The service providers will also provide support and guidance to the GBV and VAC committee as necessary. The service providers will each have a dedicated representative to serve on the GBV and VAC compliance team (whenever necessary) and be involved in resolving complaints related to GBV and VAC.

To strengthen the collaboration among providers, the MRH (through the NGO) shall conduct a joint training session for GBV service providers in each project district on a collaborative approach to case

¹⁸ These actors will be trained by the project NGO on how to manage GBV cases

¹⁹ For a detailed discussion on the capacities of existing service providers within the project area, see the social safeguards specialist's 2018 September progress report.

management, including confidential information sharing. This will ensure that survivors have access to multi-sector services.

Figure 1. Gender-Based Violence Referral Pathway



4. Response Protocol for GBV Incidents

This GBV framework emphasises GBV mitigation and response. In the event of an incident however, the following response protocols shall serve as guidance for all actors involved in resolving GBV complaints.

- **Survivor support measures: a survivor-centred approach**

In the event of an incident, it is essential for the NGO GBV specialist, the GBV and VAC committee and local service providers to respond appropriately to a survivor's complaint by respecting the survivor's choices. This means prioritising the survivor's rights, needs and wishes in every decision related to the incident, with every effort made to protect the safety and confidentiality of the survivor throughout the process. This also means that every action must be taken with the survivor's informed consent. These steps serve to minimize the potential for re-traumatizing and further violence against the survivor.

Upon receipt of any complaint through the project GRM, the GBV committee is required to inform the survivor about the appropriate service providers available to him/her. If the survivor wishes to use one or more of those services, the committee is required to help the survivor to obtain support services in the community (see section figure 1; and annex 1) by facilitating contact and coordination with these services.

Where feasible, the GBV committee may provide financial and other support services to survivors of GBV to cover the costs of GBV support services typically using loans/credit/salary advances/providing transportation etc. This will make it easier to ensure that any survivor receives the necessary support.

It must be emphasised that no monetary compensation should be given to the survivor – all support services and payments should be paid through the service provider.

Any officer receiving a survivor must treat them with non-discrimination, respect their confidentiality at all times and provide immediate affirmation and psychological support. This includes refraining from noting any information down in publicly available places and refraining from discussing any details of the case beyond what the survivor gives consent to. In addition, any person receiving the case must at all times respect the wishes of the survivor and must not try to coerce or convince the survivor of any action that the survivor does not wish to take.

In the case where the alleged perpetrator is an employee of the contracting entity, NGO or MRH, the employer (i.e contracting entity, NGO or MRH) shall consult with the survivor (and with support of the GBV service provider) and assess the risk of ongoing abuse to the survivor with appropriate resolution identified based on the accountability and response framework.

- **Perpetrator Policy and Response**

Encourage and accept GBV reports through the project GRM from employees and community members about perpetrators. For any complaint received, the GBV committee or service provider should oversee the investigation of these grievances, ensuring procedural fairness for the accused, and within the local laws. If an employee breaches a code of conduct, the employer will take action which could include;

- disciplinary action in accordance with sanctions in the individual code of conduct
- report the perpetrator to the police as per local legal paradigms, in consultation with the GBV/VAC committee
- If feasible, provide or facilitate counselling for the perpetrator.

- **Sanctions**

In accordance with the code of conduct, any employee identified as a potential GBV perpetrator shall be considered for disciplinary measures in line with sanctions and practices as agreed in the individual CoC. Potential sanctions may include;

- Informal warning
- Formal warning
- Additional training
- Loss of up to one week's salary
- Suspension of employment (without pay) for 1-6 months
- Termination of employment
- Referral to the police or other authorities as warranted

Disciplinary sanctions are intended to be part of a process that is entirely internal to the employer, is placed under the full control and responsibility of its managers, and is conducted in accordance with the applicable national legislations on labour and occupational health and safety.

Such process is expected to be fully independent from any official investigation that competent authorities (e.g police, CHRAJ) may decide to conduct in relation to the same case, and in accordance with the applicable national law. Similarly, internal disciplinary measures that the employer's managers may decide to enact are meant to be separate from any charges or sanctions that the official investigation may result into (e.g. monetary fines, detention etc.).

5. Making complaints: GBV and VAC allegation procedures

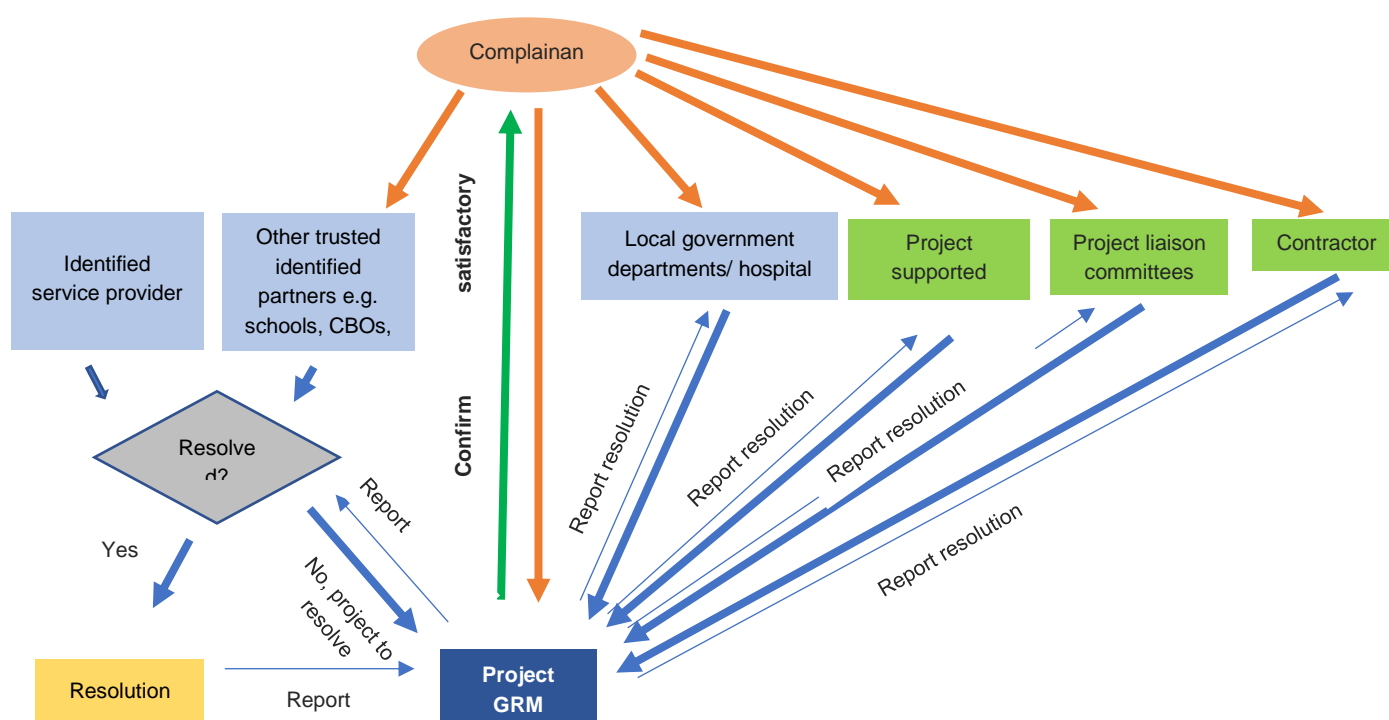
Members of the project-affected communities and staff of the contracting entity can report suspected or actual GBV and all other forms of child/sexual abuse to the GRM, but no identification of survivors will be provided. In this regard, a complaint form with provision for anonymous reporting shall be provided for this purpose. Managers are also obliged to report suspected or actual GBV cases as they have responsibilities to ensure staff compliance with the CoCs. The project (through the NGO) will provide information to employees and the project communities on how to report cases of GBV and VAC code of conduct breaches through community and stakeholder consultations. Investigation of GBV cases shall be undertaken by the appropriate service providers. However, the GBV and VAC committee will monitor resolutions, and ensure that the referral system is working, the necessary services are provided and penalties for any breaches per the COC are enforced.

The GBV and VAC committee shall ensure multiple channels/entry points exist for complainants to report GBV complaints, as shown in figure 2. The entry points will include trusted community-based groups and local GBV actors (see figure 1), who will be trained on minimum case management (including referrals and psychological first aid) by the project NGO. The use of trained community-based groups and actors is necessary particularly in the project areas where risks of stigmatization, rejection and reprisals against GBV survivors tends to create and reinforce a culture of silence, and complainants may be reticent to directly approach the project management team.

Because of the sensitive nature of GBV-related complaints, all NGO staff operating the computer-based GRM, including complaints administrators, grievance redress officers and community liaison officers will be trained on how to register GBV cases under a survivor centred approach (i.e. confidentially, emphatically, with no judgement, speedy resolution in accordance with the accountability and response process). It is essential that these officers understand the guiding principles and ethical requirements of dealing with survivors of GBV and VAC. This understanding shall be enforced through GBV case management training sessions to be conducted by the NGO with support from local GBV service providers. In particular, GRM operators should not ask for, or record information more than the following three aspects related to a GBV incident:

- The nature of the complaint
- The age of the survivor; and,
- If, the perpetrator was associated with the project.

Figure 2: Example of complaints reporting channel for sexual exploitation and abuse cases



6. GBV Complaint Resolution Process

The project will operate an IT-based GRM system. Reports of GBV or VAC, as well as other complaints may be submitted online, via telephone or in person through any of the NGO site offices²⁰. Any report of GBV allegation received by the NGO GBV specialist shall be kept confidential and the survivor immediately referred to the appropriate service provider for support²¹. In this regard, the online GRM will ensure that grievances are not identified publicly and will make use, for instance, of encryption mechanisms to ensure anonymous redress of GBV cases. It is up to the survivor/complainant whether to take up the referral. Where the survivor does not wish to place an official complaint with the project, the GRM will record the survivor's preference and the complaint is closed.

In the case where the complainant decides to take up the referral, the GRM complaints administrator will immediately refer the complaint to the NGO GBV specialist who should;

- Provide the needed psychosocial support as well as refer the case to the appropriate service provider with consent from the survivor. The survivor may also choose to go directly to the service provider to seek immediate help before making a complaint at will.
- the GBV specialist will provide basic update to the GBV/VAC committee as consented by the survivor (while protecting the identity of the survivor).
- Where the perpetrator is a contractor staff, then the GBV team can review the code of conduct and the corresponding sanctions and agree on the appropriate course of action, all within the shortest timeframe possible to avoid further trauma to the survivor. The

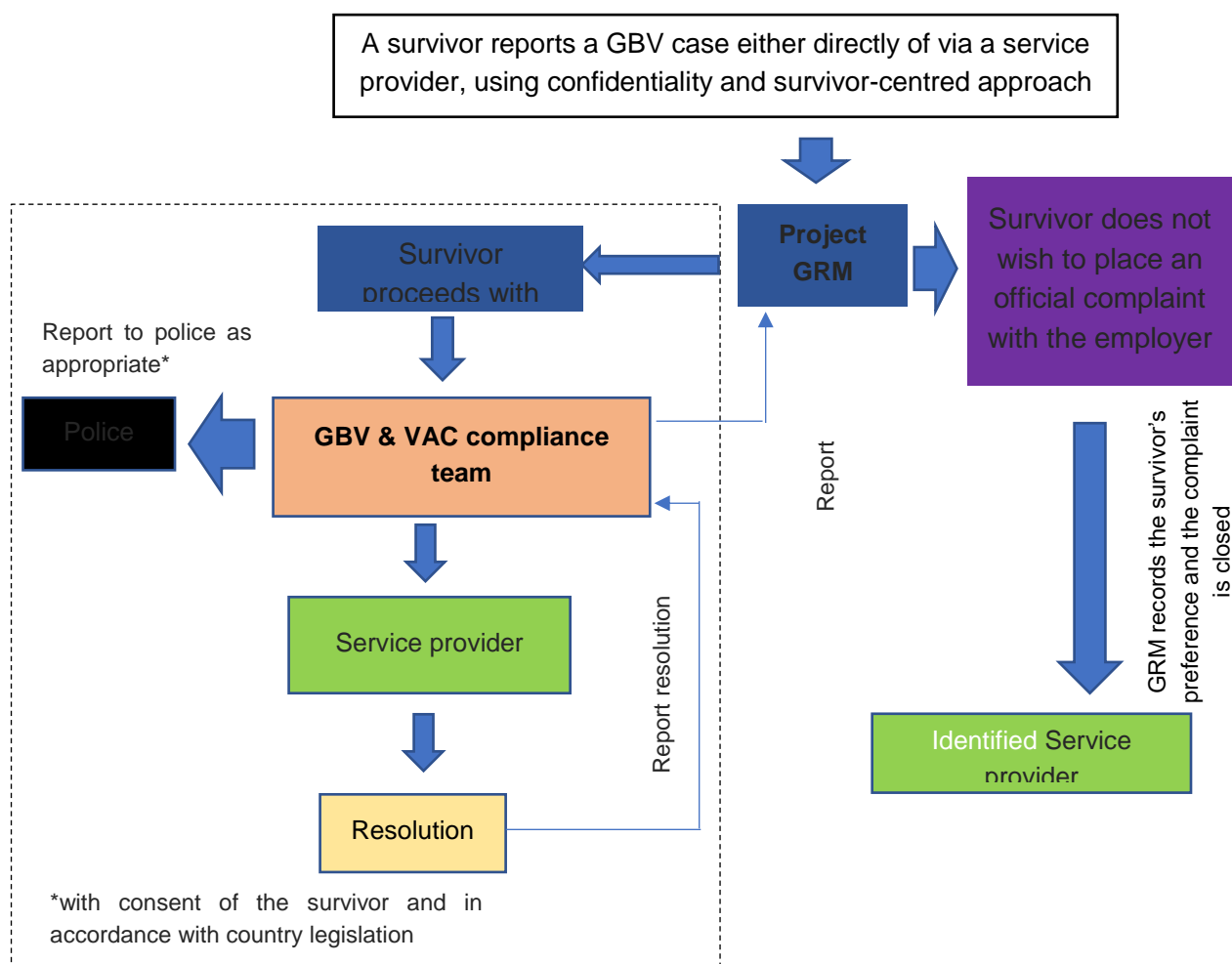
²⁰ See project GRM framework for details

²¹ It does not matter whether the GBV complaint is project related or not.

GBV/ VAC committee may also agree on other forms of additional support needed for survivors or families or access check the status of services provided to the survivor and ensure they are timely.

- upon resolution, the GBV specialist will advise the GRM complaints administrator that the case has been resolved²².
- The GRM complaints administrator will note the resolution and close the case. Where the complainant is different from the survivor, he/she will be notified of the outcome before the case is closed.

Figure 2 suggest the documentation of the GBV complaint resolution process. If a case is first received by the GBV Services Provider or through other identified reporting channels, the report will be sent to the GRM operator to ensure it is recorded in the system as illustrated by figure 1 in section 3.



²² The GRM complaints administrator is the NGO staff responsible for recording and assigning all complaints onto the online GRM database

7. Accountability Measures

All reports of sexual exploitation and abuse, and all other forms of GBV shall be handled in a confidential manner in order to protect the rights of all involved. The client, NGO and contractor must maintain the confidentiality of employees who notify any acts or threats of violence, and of any employees accused of engaging in any acts or threats of violence.

Multiple channels shall exist for complainants to report their complaints through; (i) phone, (ii) in-person through the NGO's site office, (iii) the local service provider, (iv) community-based organisations (see figure 2). All of these groups will have awareness of the project mitigation measures, referral pathway and will be trained on the main principles of a survivor centred approach. This is to ensure survivors feel confident and safe to disclose their experience of GBV and sexual abuse. In addition, only the service provider will be privy to information regarding the survivor and only the GBV and VAC committee will be privy to the perpetrator.

8. Monitoring and Reporting

The GBV and VAC committee must monitor and ensure that the GBV mitigation measures are functional and implemented at all times. Monitoring must collect the number of cases that have been reported and the share of them that are been managed by the police, NGO, service providers etc. These statistics shall be reported to the GRM and the resident/supervision engineer for inclusion in their regular reporting. GBV and VAC cases that have involved the police must be reported to the project steering committee immediately. As part of the monitoring process, the following GBV indicators will be included in the project results framework;

- Successful implementation of the agreed GBV action plan (Y/N)
- Number of training courses related to GBV delivered;
- Percentage of workers that have signed a CoC; and/or
- Percentage of workers that have attended the CoC training.

The emphasis of the MRH is the prevention of SEA/GBV incidents. In the event that SEA/GBV does occur, however, the following guidelines will be useful. Table 2 shows when, what and to whom to report. It is important to highlight that reporting will not have any identifiable information on individual cases. This is important to protect the confidentiality and safety of GBV survivors.

Table 2: Reporting of GBV during Implementation

Who	To whom	What	When
GRM operator (NGO)/ GBV specialist	Client	Reporting of GBV incidents with three key data: <ul style="list-style-type: none">○ Nature of the case○ Project related (Y/N); and○ Age and sex (if available)	As soon as becomes known
GBV service providers	Client & monitoring consultant ²³	Aggregate data on case load: <ul style="list-style-type: none">• Number of GBV cases referred by the GRM, disaggregated by adult/children and by sex• Number of cases open, and the average time they have been open	Monthly

²³ NGO to follow up on this information from dedicated officers from each service provider and make this information available to the client.

		<ul style="list-style-type: none"> Number of cases closed, and the average time they were open 	
Monitoring consultant	Client	<ul style="list-style-type: none"> Status on the implementation of project's GBV action plan The agreed project GBV indicators; e.g <ul style="list-style-type: none"> Number of training courses related to GBV delivered; % of workers that have signed CoC % of workers that have attended CoC training GRM functioning correctly for receiving and resolving complaints Mechanism to resolve GBV complaints established and functional The functioning of GBV service providers 	Monthly
Client	WB	<ul style="list-style-type: none"> Project GBV indicators; GRM indicators (as supplied by the monitoring consultant) 	In accordance with project reporting agreements

9. Supervision and Oversight

Effective supervisions and oversight of the project's GBV prevention and mitigation effects requires that all entities involved – local NGO, the MRH, and monitoring consultant – have clear roles and responsibilities throughout the implementation of the project. In addition, all those involved in GBV activities must have appropriate training and skills for the tasks assigned to them. Supervision will focus on ensuring that the mitigation measures are in place and working as expected. In addition to the compliance committee's supervisory roles, various roles have been envisaged for the following entities:

• Project NGO

The MRH will engage a local NGO to operate the project GRM and ensure the effective implementation of ESHS activities including GBV. The Terms of Reference for the NGO outlines clear expectations of the NGO's role in ensuring that GBV risks and mitigation measures are properly implemented. Hence, the MRH's safeguards team must ensure that the NGO's core staff include appropriately qualified GBV specialists. Part of the NGO's activities will include ensuring that the GBV prevention and mitigation measures are in place and working accordingly, by supervising the signing of the CoC, ensuring that a working GRM for GBV is in place so that referral of GBV cases can be made when needed. The NGO will also work with GBV service providers and local actors to raise awareness of the GRM. The NGO's roles also include the resolution of GBV complaints made to the GRM, not only for the project but also for ensuring any sanctions on their own staff are applied.

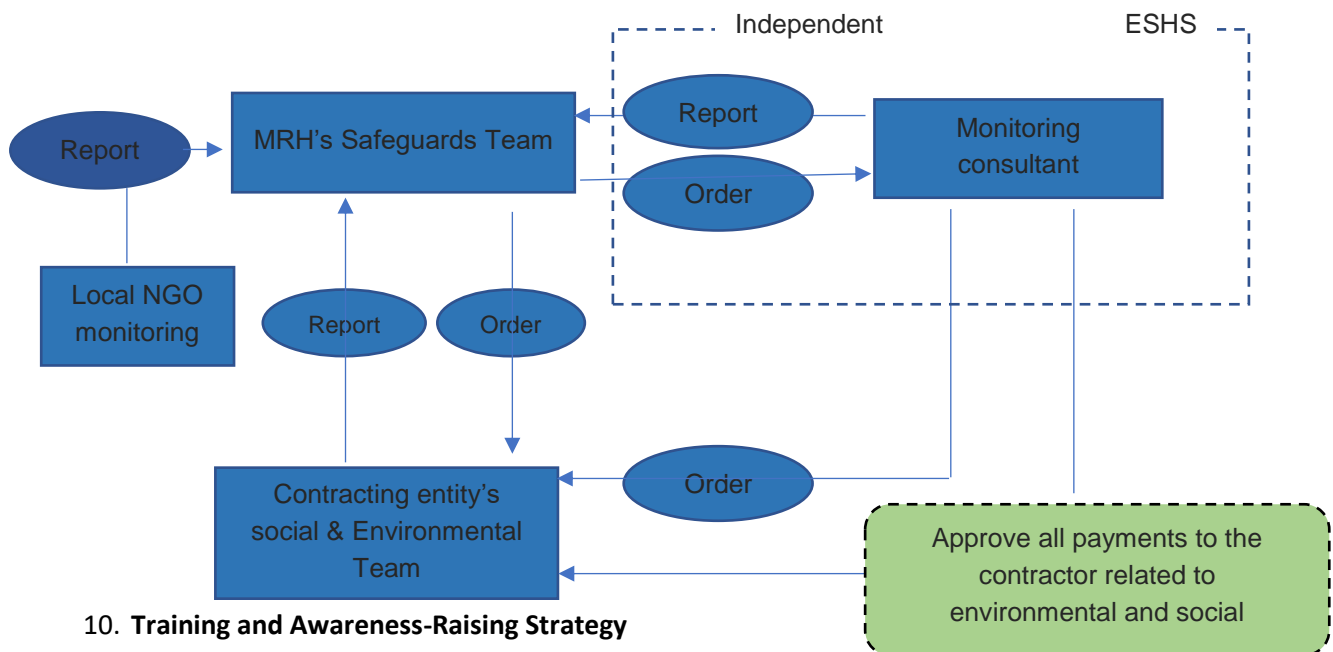
Quarterly inspections shall be undertaken to monitor the implementation of GBV mitigation measures. It is recommended that the inspection team include: (i) the NGO's GBV specialist; (iii) MRH's social safeguards specialist; and (iv) the contracting entity's safeguards officer. The presence of the social safeguards specialist will assist the NGO and Monitoring Consultant in meeting the necessary GBV standards, and all the specialists to verify that project safeguards reports adequately reflect the actual situation with regard to mitigating GBV risks.

- **Independent ESHS Monitoring (including GBV activities)**

The MRH has committed to engage a monitoring consultant as part of the TSIP. The monitoring consultant will independently monitor and report on the effectiveness of project implementation. ESHS activities, including GBV activities will form a key part of the monitoring consultant's supervisory activities during the civil works. It is not the duty of the monitoring consultant to track, manage or follow up on individual cases of GBV – that is the role of the GBV service provider and the NGO's GBV specialist, which also ensures confidentiality of the survivor. The monitoring consultant will perform a higher-level oversight function by confirming that project actors, including the GBV service providers and the compliance team, are implementing the GBV action plan. The monitoring consultant will also verify that the provisions to prevent and respond to GBV are in place and functioning, and also can provide early warning of problems that may surface.

The monitoring consultant will be required to have an experienced ESHS officer with experience in GBV so that part of the monitoring can be used to evaluate the quality of the actions undertaken. The monitoring consultant's quarterly reports must capture the effectiveness of GBV implementation.

Figure 4: Supervision and oversight of project's ESHS activities



10. Training and Awareness-Raising Strategy

Awareness and training form a key component of this framework and a training budget will be allowed for it in the civil works contract²⁴. Training and awareness activities will focus on how workers and project communities will be sensitized to GBV risks, and the worker's responsibilities under the CoC. This will also include awareness of the GRM.

The project NGO, working in collaboration with the contracting entity and the social welfare and gender officers at the local government level will deliver worker and manager trainings. All workers and managers are required to attend an induction training on GBV and VAC prior to commencing work to reinforce their understanding of the GBV and VAC CoC. It is important that the training course is

²⁴ Provision will be made for a budget for GBV implementation in preparing the project ESMP. The budget for implementing the GBV action plan will be shown as a Provisional Sum in the contract BOQ. This sum will be shared between the HIV/AIDS, STDs, Hepatitis B and GBV training requirements.

repeated on a regular basis as new staff start on the project. A sample training program is enclosed as annex II.

At the minimum, the training will include;

- Definition of GBV, particularly SEA and sexual harassment, and how the project can exacerbate GBV risks;
- National legislations on GBV
- Cultural sensitisation regarding engagement with local community
- Roles and responsibilities of actors involved in the project (the standards of conduct for project-related staff captured in CoCs);
- Case reporting mechanism, accountability structures, and referral procedures within agencies and for community members to report cases related to project staff;
- Services available for survivors of GBV; and
- Follow-up activities to reinforce training content.

Managers in particular are required to attend a manager training so that they are familiar with their roles and responsibilities in ensuring staffs' compliance with the CoCs. They are also responsible for implementing sanctions for transgressions. The training will help them better understand their position, power and role as leaders. Managers will be required to attend and assist project facilitated training courses for all employees. This will help ensure that staff see the importance of the training activities. Refresher trainings for workers and managers will be undertaken quarterly throughout the duration of the project as separate trainings, where it will be mandatory for all staff to attend a formal training session on GBV and associated issues.

Training on GBV, as well as a communication strategy to raise awareness, will also be made available to the project-affected communities so they can learn about the roles and responsibilities of actors involved in the project, processes of reporting incidents of project-related GBV, and the corresponding accountability structures and general education on GBV. These trainings will be undertaken as part of the overall citizen engagement process, in accordance with the project stakeholder engagement plan that will be developed by the safeguards team. In addition, the codes of conduct will be discussed at public consultations and these standards posted in public locations easily accessible to the community and project affected people. Training both project-affected communities and project implementers allows all stakeholders to understand the risk of GBV, as well as appropriate mitigation and response measures, putting everyone on the same page. The local NGO will work with community and social welfare officers and community organizations for awareness raising activities around the CoCs.

MRH's staff involved in the project and those who may have presence on the project affected communities such as the resident engineer, will also benefit from this training. This will help them to better understand the potential for GBV that can be exacerbated in the context of the project.

Annex I: Existing GBV Service Providers and Actors in the Project Districts

GBV Services Needed	Existing GBV Prevention and Response Actors					
	Package 1	Contact information	Package 2	Contact information	Package 3	Contact information
Health services (e.g. examination/treatment, provision of post-exposure services)	<ul style="list-style-type: none"> • District hospitals • Active public health, disease control & surveillance unit, adolescent reproductive health unit • Active community-based surveillance volunteers 	Director of health – Disease control officer – Health information officer –	<ul style="list-style-type: none"> • District hospitals • Active public health, disease control & surveillance unit, adolescent reproductive health unit • Active community-based surveillance volunteers 	Director of health – Disease control officer – Health information officer –	<ul style="list-style-type: none"> • District hospitals • Active public health, disease control & surveillance unit, adolescent reproductive health unit • Active community-based surveillance volunteers 	Director of health – Disease control officer – Health information officer –
Psychosocial support (e.g. counselling, social/community integration, awareness raising activities)	<ul style="list-style-type: none"> • Adolescent reproductive health unit • Department of social welfare & community development • District & community child protection committees • DOVVSU • District girl child officers • Guidance and 	Dept of social welfare – District girl child officer – District planning officer –	<ul style="list-style-type: none"> • Adolescent reproductive health unit • Department of social welfare & community development • District & community child protection committees • DOVVSU • District girl child officers • Guidance and 	Dept of social welfare – District girl child officer – District planning officer –	<ul style="list-style-type: none"> • Adolescent reproductive health unit • Department of social welfare & community development • District & community child protection committees • DOVVSU • District girl child officers • Guidance and 	Dept of social welfare – District girl child officer – District planning officer –

GBV Services Needed	Existing GBV Prevention and Response Actors					
	Package 1	Contact information	Package 2	Contact information	Package 3	Contact information
	counselling officers at basic schools • Girls clubs at basic schools • Queen mother of traditional area		counselling officers at basic schools • Girls clubs at basic schools • Queen mother of traditional area		counselling officers at basic schools • Girls clubs at basic schools • Queen mother of traditional area	
Police support and security (e.g. protection of survivors/witnesses, investigation of cases)	• District police service	District police commander – Chief Inspector –	• District police service	District police commander – Chief Inspector –	• District police service	District police commander – Chief Inspector –
Access to legal services (e.g. legal advice/support, support for prosecution)	• DOVVSU • CHRAJ	Divisional crime officer – District director of CHRAJ –	• DOVVSU • CHRAJ	Divisional crime officer – District director of CHRAJ –	• DOVVSU • CHRAJ	Divisional crime officer – District director of CHRAJ –
Socio-economic empowerment (e.g. training and awareness raising activities, livelihood support, implementing community-based interventions)	• Development planning office; • Gender desk officer • Department of social welfare & community development • NGOs	Planning officer – Gender desk officer – Social welfare officer –	• Development planning office • Gender desk officer • Department of social welfare & community development • NGOs	Planning officer – Gender desk officer – Social welfare officer –	• Development planning office • Gender desk officer • Department of social welfare & community development • NGOs	Planning officer – Gender desk officer – Social welfare officer –
Case management support	• District girl child unit • District	Planning officer – Social welfare	• District girl child unit • District	Planning officer – Social welfare	• District girl child unit • District	Planning officer – Social welfare

GBV Services Needed	Existing GBV Prevention and Response Actors					
	Package 1	Contact information	Package 2	Contact information	Package 3	Contact information
	arbitration committee • DOVVSU • Department of social welfare • Medical providers • Guidance and counselling officers at basic schools • Queen mother of traditional area	officer – Girl child education coordinator –	arbitration committee • DOVVSU • Department of social welfare • Medical providers • Guidance and counselling officers at basic schools • Queen mother of traditional area	officer – Girl child education coordinator –	arbitration committee • DOVVSU • Department of social welfare • Medical providers • Guidance and counselling officers at basic schools • Queen mother of traditional area	officer – Girl child education coordinator –

Annex II: Sample training GBV program for workers²⁵

Time	Topics	Group work/Tool to Train
8:00 – 8:30	Welcome	<ul style="list-style-type: none"> Welcome address Introduction by participations Participates fill out pre-training baseline survey
8:30 – 9:30	Understanding gender & violence against women in Ghana	<ul style="list-style-type: none"> Presentation on referral pathways Group exercise; <ul style="list-style-type: none"> Perception of women in project area Power dynamics (using tool 17 from Road to Good health²⁶)
9:30 – 10:45	Types of violence against women and children	<ul style="list-style-type: none"> Definitions of the types of violence – GBV, VAC, domestic violence, family and sexual violence <ul style="list-style-type: none"> Rape Sexual assault (including transactional sex) Emotional/psychological assault (withholding resources) Sexual harassment Cover the definitions using the codes of conduct Group work: norms and social acceptance of violence
10:45 – 11: 00	Tea Break	
11:00 – 11: 30	Understanding law: children's act and labour laws	<ul style="list-style-type: none"> What is consent? National and internal laws on consent and legal age to give consent. Code of conduct stance on consent Child labour and Labour Acts
11:30 – 12:00	The GRM and reporting cases	<ul style="list-style-type: none"> How to use the GRM for reporting cases: how and who can you report to? Accountability and confidentiality of all reporters and survivors Linkages to code of conduct
12:00 – 12:30	Services provided by the local NGO	<ul style="list-style-type: none"> NGO counselling and support services – how to seek help and/or refer people to the NGO Services provided by the NGO for survivors of violence What other services exist in project area
12: 30 – 1: 30	Lunch Break	
1: 30- 2: 15	GBV and VAC codes of conduct	<ul style="list-style-type: none"> Code of conduct: do we understand it? Questions on codes of conduct? Read through copies of CoC and ensure participants understand it Potential sanctions and penalties
2: 15 – 2: 45	Summarise, evaluation and close	<ul style="list-style-type: none"> Open forum to summarise and reflect on training Workshop evaluation Closing

²⁵ This training program is adapted from the Tuvalu Aviation Investment Project

²⁶ See <http://www.theroadtogoodhealth.org/>

Annex III: Individual Gender Based Violence and Child Protection Code of Conduct

The Code of Conduct clearly defines obligations of all project staff and establishes expectations for behaviour within a company and within the company which the company serves or works in. The following are recommended as minimum requirements to be included in the worker CoCs.

A satisfactory code of conduct will contain obligations on all Contractor's Personnel (including sub-contractors and day workers) that are suitable to address the following issues, as a minimum. Additional obligations may be added to respond to particular concerns of the region, the location and the project sector or to specific project requirements. The code of conduct shall contain a statement that the term "child" / "children" means any person(s) under the age of 18 years.

The issues to be addressed include:

Compliance with applicable laws, rules, and regulations

1. Compliance with applicable health and safety requirements to protect the local community (including vulnerable and disadvantaged groups), the Employer's Personnel, and the Contractor's Personnel (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment)
2. The use of illegal substances
3. Non-Discrimination in dealing with the local community (including vulnerable and disadvantaged groups), the Employer's Personnel, and the Contractor's Personnel (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, age, disability (physical and mental), sexual orientation, gender identity, political conviction or social, civic, or health status)
4. Interactions with the local community(ies), members of the local community (ies), and any affected person(s) (for example to convey an attitude of respect, including to their culture and traditions)
5. Sexual harassment (for example to prohibit use of language or behavior, in particular towards women and/or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)
6. Violence, including sexual and/or gender based violence (for example acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberty).
7. Exploitation including sexual exploitation and abuse (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading behavior, exploitative behavior or abuse of power)
8. Protection of children (including prohibitions against any sexual activity with a child under the age of 18, exploitation, abuse and any otherwise unacceptable behavior towards children, limiting interactions with children, and ensuring their safety in project areas)
9. Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)
10. Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection)
11. Respecting reasonable work instructions (including regarding environmental and social norms)
12. Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
13. Duty to report violations of this Code
14. Non- retaliation against workers who report violations of the Code, if that report is made in good faith.

The Code of Conduct should be written in plain language and signed by each worker to indicate that they have:

- received a copy of the code;
- had the code explained to them;
- acknowledged that adherence to this Code of Conduct is a condition of employment; and
- understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

ANNEXURE D: CLIENT'S COMMENTS ON REVISION 03 AND CONSULTANT'S RESPONSE

No.	Description of Comments	Consultant's Response (Rev 01)	Client's Response	Consultant's Response (Rev 02)	WB Comments	Consultant's Response (Rev 03)	Client's comments	Consultant's Response (Rev 04)
4	Section 5.2.5: Air quality measurements have not been provided here. It is strongly recommended that some calculations of current air quality be stated here to enable GHG tracking throughout the project	As part of current baseline studies, air quality measurement was not conducted, however the potential impact of the Project on the local ambient air conditions is predicted. Current air quality assessment relied on extensive literature review which revealed little or no baseline information on prevailing air quality. As such, it has been recommended as part of mitigation measures and included in the ESMP, that the Contracting Entity undertakes air quality	Unsatisfactory. It's unacceptable that this information is not collected / provided in the report despite several prompts from the MRH for the consultant (refer to comments and follow up discussions on the Northern packages). This cannot be deferred to detailed design stage when this is required at this stage.	Air quality measurements were not conducted as part of the studies based on Client's recommendation at the Contract negotiation stage. However, it has been recommended as part of mitigation measures and included in the ESMP, that the Contracting Entity undertakes air assessment as part of its environmental performance requirements in compliance to Ghana EPA Ambient Air Quality Standards.	Baseline ambient air quality measurements is required and should be collected and incorporated in the report before it can be deemed to be complete. The consultant's claim that the omission is based on Client's recommendation is not tenable. This document is being prepared to comply with requirements of both EPA and the World Bank, and the scope of the study is determined by these entities. Was a scoping report prepared and cleared by EPA and World Bank before the assessment? Baseline air quality measurements are a basic requirement of ESIAs, more so for a road construction project.	Baseline ambient air quality measurement discussions are ongoing with the Client and yet to be finalised.	Provide the baseline information	Based on further discussions with the Client, it has been agreed that the air quality baseline measurements be undertaken by the Contracting Entity.

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		assessment as part of its environmental performance requirements in compliance to Ghana EPA Ambient Air Quality Standards.						
5	Section 5.2.6: What are the current noise levels within the project corridor? This information should be included here	As part of current baseline studies, ambient noise measurements were not taken, however the potential impact of the Project on the local ambient noise conditions is predicted. Current noise assessment relied on extensive literature review which revealed little or no baseline information on prevailing air quality. As such, it has been	See comment above about air quality data. Same applies to noise. Baseline data on noise and air should be provided in the revised reports	Ambient noise measurements were not conducted as part of the studies based on Client's recommendation at the Contract negotiation stage. However, it has been recommended as part of mitigation measures and included in the ESMP, that the Contracting Entity undertakes ambient noise assessment as	Unacceptable. See preceding comment	Baseline ambient noise measurement discussions are ongoing with the Client and yet to be finalised.	Provide the baseline information	Based on further discussions with the Client, it has been agreed that the baseline ambient noise measurements be undertaken by the Contracting Entity.

No.	Description of Comments	Consultant's Response (Rev 01)	Client's Response	Consultant's Response (Rev 02)	WB Comments	Consultant's Response (Rev 03)	Client's comments	Consultant's Response (Rev 04)
		recommended as part of mitigation measures and included in the ESMP, that the Contracting Entity undertakes ambient noise assessment as part of its environmental performance requirements in compliance to Ghana EPA Ambient Noise Level Standards.		part of its environmental performance requirements in compliance to Ghana EPA Ambient Noise Level Standards.				
6	Section 8.2.1: What are the baseline PM10 and TSP values??? This is important to measure and track air quality degradation against EPA prescribed levels during implementation	As part of current baseline studies, air quality measurement was not conducted, however the potential impact of the Project on the local ambient air conditions is predicted. Current air quality assessment relied on	Unsatisfactory	Air quality measurements were not conducted as part of the studies based on Client's recommendation at the Contract negotiation stage. However, it has been recommended as part of mitigation measures and	Unacceptable. See preceding comments	Baseline ambient air quality measurement discussions are ongoing with the Client and yet to be finalised.	Provide the baseline information	Based on further discussions with the Client, it has been agreed that the air quality baseline measurements be undertaken by the Contracting Entity.

No.	Description of Comments	Consultant's Response (Rev 01)	Client's Response	Consultant's Response (Rev 02)	WB Comments	Consultant's Response (Rev 03)	Client's comments	Consultant's Response (Rev 04)
		extensive literature review which revealed little or no baseline information on prevailing air quality. As such, it has been recommended as part of mitigation measures and included in the ESMP, that the Contracting Entity undertakes air assessment as part of its environmental performance requirements in compliance to Ghana EPA Ambient Air Quality Standards.		included in the ESMP, that the Contracting Entity undertakes air assessment as part of its environmental performance requirements in compliance to Ghana EPA Ambient Air Quality Standards.				
8	Section 5.4.2.1: Were all project communities covered in this survey? If not how were	All project community members could not be covered under this survey, hence the sampling.	Unsatisfactory. See in text comments	There is no comment in the main text in this regard or as indicated by the Client's comment.	Please address the client's comment, "where all project communities covered in this survey?" This is different from whether all community	The survey was conducted in all project communities based on a sample of community members. This was supplemented with FGD and community	Okay	No action

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	concerns from the remaining communities captured? Via fGDs? Community forums? Kindly state. It will be useful to portray that you sought to capture all project communities	Other information sources used in obtaining information from the community members included Focus Group Discussions and Community Fora and the section has been revised to state this clearly.		However, the Consultant believes the study methodologies and/or sampling employed in data capture are adequate in obtaining concerns that are representative of all project communities.	members (of the surveyed communities) were covered. I presume the survey was conducted in all project communities based on a sample of community members. Then supplemented with FGD and community fora to obtain perspectives of the larger community. Please clarify.	fora to obtain perspectives of the larger community.		
New Comments by World Bank on ESIA Report Revision 2								
1	Executive Summary - Table B, Summary of Pre-Construction Phase Impacts				Please include land acquisition and the potential physical and economic displacement and related impacts	Addressed	Okay	No action
2	Section 3.1.2 Ministry of Transport				Please update with current status, scope and sectoral mandate of MOT since January 2017. This does not include Aviation and Railway, which are under separate ministries.	Addressed	Okay	No action

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3	Section 3.2.15 The Road Sector Medium-Term Development Plan (2014 – 2017)				This MTDP expired in 2017. Please update with current plan (2018 – 2021)	Addressed	Okay	No action
4	Table 3-1 Other Relevant National Legislations Applicable to the Project				Delete the reference to Act 462. It was replaced by Act 936.	Addressed.	Okay	No action
5	Section 4.3 Baseline Data Collection. There is a suggestion that the nature of the Project being a linear project covering long kilometers (with few or scattered settlements along the roads) did not favour the taking of comprehensive empirical or				Did EPA agree to this? Was a scoping report prepared and cleared with EPA and World Bank before commencement of the ESIA? This is critical baseline information and primary data should be collected and included in the report for it to be deemed complete.	Discussion on the baseline information in line with air quality and noise are currently ongoing with the Client	Provide the baseline information	Based on further discussions with the Client, it has been agreed that the ambient air quality and noise baseline measurements be undertaken by the Contracting Entity.

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	experimental measurements, especially on ambient noise and air quality.							
6	Section 4.4.4 Proposition of Measures and Addressing Residual Impacts – Statement on ESMP				Revise statement to indicate that the ESMP is included in this ESIA report, and reference the section	Addressed	Okay	No action
7	Section 5.4.1.1 Demographics – Use of 2010 PHC population data				The 2010 PHC data is quite dated. Use 2019 projected population data available on GSS website.	Addressed	Okay	No action
8	Section 5.4.1.4.2 Traditional Governance and Practice –				Only Nadowli-Kaleo District information included. What about Wa Municipal and Wa West District? Please update with information on these two districts.	Addressed	Okay	No action
9	Section 5.4.3.2.1 Source of Income – sentence on incomes not complete				What duration is the incomes stated? Per day/week/month/year?	Addressed	Okay	No action

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10	Table 6-3 Details of Stakeholder Consultations and Concerns Raised – Not too relevant in main text.				Not too relevant in main text. Consider moving to Appendix	Addressed. See Appendix B	Okay	No action
11	Section 6.3.1 Early Marriages				What is the specific data on early marriages in the three districts? This is needed to establish a baseline for tracking of this phenomena with the introduction of the project.	Additional field data required to address this comment. The consultant is working on obtaining this data	Provide information and update report	Supporting data has been difficult to obtain. However, the Ghana Multiple Indicator Cluster Survey (GSS, 2019) is referenced for some national and regional level indicators.
12	Section 6.3.2 Forced Marriages – The statement on 2011 MICS data from GSS				Is this specific to the project area? What is the specific data on forced marriages in the three districts? This is needed to establish a baseline for tracking of this phenomena with the introduction of the project.	Additional field data required to address this comment. The consultant is working on obtaining this data	Provide information and update report	Supporting data has been difficult to obtain. However, the Ghana Multiple Indicator Cluster Survey (GSS, 2019) is referenced for some national

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								and regional level indicators.
13	Section 6.3.3 Teenage Pregnancy – No data provided				What is the specific data on teenage pregnancies in the three project districts? This is needed to establish a baseline for tracking of this phenomena with the introduction of the project.	Additional field data required to address this comment. The consultant is working on obtaining this data	Provide information and update report	Supporting data has been difficult to obtain. However, the Ghana Multiple Indicator Cluster Survey (GSS, 2019) is referenced for some national and regional level indicators.
14	Section 6.3.4 School Drop-out – No data provided				What is the specific data on school drop-out within the three project districts? This is required to establish baseline for tracking of project impacts.	Additional field data required to address this comment. The consultant is working on obtaining this data	Provide information and update report	Supporting data has been difficult to obtain. However, the Ghana Multiple Indicator Cluster Survey (GSS, 2019) is referenced for some national and regional level indicators.
15	Section 9.2.3 Economic Displacement and Disruption of Livelihood				Please confirm whether the existing ROWs have been formally/officially/legally acquired. If yes,	Client to confirm whether existing ROWs have been formally/officially/legally acquired.	Existing RoWs are officially feeder roads, however, the EI	Noted. See revised Section 9.2.3. Also see Section 7.1.7 which addresses

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	Activities – It is stated that “Permanent land acquisition is not envisaged.”				please provide evidence of acquisition. If no, please revise sentence and address how the RoWs will be acquired permanently and address associated compensation matters (if any) in the ESIA.		is yet to be prepared.	land acquisition for the project and includes procedure for compulsory acquisition of ROW.
16	Section 9.2.6 Potential Labour Influx and Associated Impacts – Description of impacts				Please discuss potential health related impacts of labour influx, especially risk of introduction or exacerbation of the COVID-19 pandemic	Addressed	Okay	No action
17	Section 9.2.6 Potential Labour Influx and Associated Impacts – Proposed mitigation measures				Specific protocols and mitigation measures should be proposed to deal with prevention and management of COVID-19 and related matters	Addressed	Okay	No action
18	Table 10-6 Potential Project Social Risks and Suggested Measures				Include the risk of COVID-19 spread and state how the project should control/manage it.	Addressed	Okay	No action
19	Section 9.4.3 Method				This portend additional risk. Rather MMDAs	Addressed	Okay	No action

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	Statement – Sentence suggesting that compensation payment be channeled through District Assembly				must participate in the assessment of loss and payment of compensation, and records of same be lodged with the MMDAs to aid in resolution of potential grievances. Compensation should not be channeled through them.			
Other Comments in Report Text								
20	Executive Summary: Introduction				Indicate the E&S Risk Category for the project	Project risk categorization and details presented in main text (Section 1.2 and 3.3.16)	This can be mentioned in paragraph 3 of the Introduction in Executive Summary	Noted and addressed. See Paragraph 3 of Executive Summary.
21	Executive Summary: Project Alternatives (No-Go Alternative / Do Nothing Option)				This should be analysed from both positive and negative Environment and social perspective	Analysis considered all perspectives and only summary presented. Details in main text (See Section 2.4.2).	Provide a summary in the Executive Summary	See Executive Summary
22	Executive Summary: Design and desk work bullet (Project				Describe how E&S issues will be considered in the Design	The Concept Design Report (CDR) submitted under a separate cover details all design	Give a summary in this report as not all those who will read this ESIA will have	Noted. See Executive Summary. See also Section 7.1.1.

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	activities and impacts: Pre-construction Phase)					<p>considerations or basis of design. Also see statement in Section 7.1.1.</p> <p>E&S were generally considered in all aspect of the concept design. Few mentions include the following:</p> <p>The environment within which the road is situated, as well as social factors such as the population density, were considered in the calibration of the traffic model which is captured in the CDR in Section 3.4. The macro-climatic region of the project area was also considered in the pavement design (CDR Section 5.1). E&S were also extensively considered in the preparation of the bidding document.</p>	access to the Concept Design Report	
23	Executive Summary: Environmental and Social				Include a summary plan	Addressed.	Okay	No action

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	Management Plan							
24	Section 2.4.2: No-Go Alternative (Do Nothing Option) & Section 2.4.3: Re-construction / Rehabilitation of Existing Road Alternative				<p>This statement should be made following an alternative analysis. It will be useful to see an alternative analysis matrix of the advantages and disadvantages of each</p> <p>Since there are existing road, outline Alternative design and technology options</p>	<p>The advantages and disadvantages of the alternatives have been clearly put forth in the explanation of the alternatives. Description of some design alternatives have also been presented under the description of the project construction / rehabilitation alternative and references made to the CDR for details. The details of the design options considered were included in the CDR. Reasons / justifications of options or alternatives considered and the recommendations were all included. A typical example is Section 6.2.3 of CDR which details horizontal re-alignment options considered and the</p>	<p>Unsatisfactory Alternative analysis matrix not included.</p> <p>Not all readers of ESIA will have access to the Concept Design Report.</p>	<p>Noted. See Table 2-22 for alternative analysis matrix.</p> <p>See Section 2.4.4 for design and technology alternative analysis.</p>

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						recommendations (also captured in the ESIA).		
25	Section 3.1.2: Ministry of Transport (MOT)				Please update with current status, scope and sectoral mandate of MOT since January 2017. This does not include Aviation and Railway, which are under separate ministries.	See revised section.	Repeated Comment	Noted. No action
26	Section 4.6: Chance Find Procedure				What will be the role of the Ghana Museums and Monuments Board (GMMB)	Section revised to include their role. Also see Section 3.1.12.	Okay	No action
27	Section 5.2.2: Geology and Soils				If possible, provide a Geological and Soil map overlaid with road network	See revised Section.	Okay	No action
28	Section 5.2.3: Climate				An important aspect of baseline information is to show trend. What is the trend regarding rainfall and temperature?	Addressed. See Section 5.2.3.1 to 5.2.3.3 and Annexure A (Appendix 3)	Okay	No action
29	Section 5.2.7: Traffic				Any information on accidents?	The traffic study undertaken during the concept design didn't collect specific information on accident in the project area. However, an Independent Road	Why refer to concept design. Not everyone will have access to concept design. Summary of information in CDR should be	Noted. Information in the CDR included in report. See Section 5.2.7.

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						Safety Audit was carried out on the concept design. The Independent Road Safety Specialist has reviewed the concept designs and the stand-alone report and the designer's inputs based on review comments has been included in the Assessment Study Report which has been submitted to the Client.	added to this report. Also consider secondary data.	
30	Section 5.4.5: Health Status of Households				Will be useful to update this with current information on COVID-19	See revised Section.	Okay	No action
31	Section 9.2.3: Economic Displacement and Disruption of Livelihood Activities and Section 9.2.4: Potential Physical Displacement along Road Corridor and Resettlement				Please confirm whether the existing ROWs have been formally/officially/legally acquired. If yes, please provide evidence of acquisition. If no, please revise sentence and address permanent acquisition of RoW in ESIA.	See revised sections. Also see Section 7.1.7 which addresses land acquisition for the project and includes procedure for compulsory acquisition of ROW.	Okay	No action

No.	Description of Comments	Consultant's Response (Rev 01)	Client's Response	Consultant's Response (Rev 02)	WB Comments	Consultant's Response (Rev 03)	Client's comments	Consultant's Response (Rev 04)
32	Section 9.2.6: Potential Labour Influx and Associated Impacts				Please discuss potential health related impacts, especially risk of introduction or exacerbation of the COVID-19 pandemic. Specific protocols and mitigation measures should be proposed to deal with prevention and management of COVID-19 and related matters	Addressed. See revised section.	Okay	No action
33	Table 10-6: Potential Project Social Risks and Suggested Measures				Include the risk of COVID-19 spread and state how the project should control/manage it.	Addressed. See Table 10-6.	Okay	No action
34	Section 5.4.1.7: Tourism				Provide further details about the fauna of the Wechiau Sanctuary	Addressed. See revised section.	Okay	No action
					Indicate the specific location of the mosque. If possible, provide the geographic coordinates	The Mosque is located in the Wa Municipality around the Chief's Palace.	Okay	No action
35	Annexure C (ESMP) Section 9.23: Borrow Pits Operation and Management				Provide Geographic location of potential borrow pits identified	See ESIA Section 7.1.2.1	Okay	No action

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36	Annexure C (ESMP) Section 10.3: Table 10-8				What type of training programs? Include the cost of the implementation of the mitigation measures?	See ESMP Section 6.2 (Table 6-1 for training programs) See cost section of the Table or ESMP Section 10.2 (Table 10-7 for monitoring / implementation cost)	Addressed. Section 10.2 (it is Table 10-8 not Table 10-7)	No action
	Comments from in-text which were not captured in the matrix							
1	5.3.3.2 (last paragraph before 5.3.3.3)				Cross-check the information "The WHO has no reported guideline limit for magnesium"		(No Action taken so please delete if possible)	Deleted. See Section 5.3.3.2.
	5.4.2 Social / Household Characteristics				Provide baseline on healthcare and educational infrastructure		(No response given)	See Section 5.4.5 for health status of households and the last paragraph for health infrastructure count per district. Supporting data (or count) on existing educational infrastructure has been difficult to obtain, however

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								educational infrastructure needs of the communities has been presented in Section 5.4.7 (Table 5-35).