MINISTRY OF PUBLIC WORKS

Liberia Urban Resilience Project

Environmental and Social Management Plan

for Solar Street Lighting and Patching of Potholes

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Submitted To:
Environmental Protection Agency of Liberia
4th Street Sinkor, Monrovia

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EXECUTIVE SUMMARY

The **Liberia Urban Resilience Project (LURP)**, supported by the Government of Liberia (GoL) and financed by the World Bank with an envelope of USD 40 million, seeks to address critical urban challenges in Greater Monrovia. This initiative focuses on enhancing urban resilience to climate change, improving infrastructure, and strengthening urban management capacities. Under **Component 1: Climate Resilient Infrastructure and Urban Upgrading**, the **Ministry of Public Works (MPW)** has identified two pivotal subprojects: **Solar Street Lighting** and **Patching of Potholes** (**asphalt repair, sectional pavement rehabilitation, rigid pavement repair and asphalt overlaying across different road sections)**. These initiatives aim to bolster nighttime mobility, economic activities, and overall community safety while ensuring sustainable urban growth.

Project Rationale and Justification

Monrovia's deteriorating road conditions, particularly in Paynesville, impede economic activities by causing traffic delays, increasing accident risks, and elevating vehicle maintenance costs. Concurrently, the urban landscape suffers from inadequate street lighting, exacerbating safety concerns and limiting economic opportunities during the dark. The **Potholes Patching Project** seeks to repair critical road sections, enhancing safety and reducing travel delays, while the **Solar Street-lighting Project** aims to improve public safety, support economic activities, and promote a vibrant community environment through sustainable energy solutions.

Objectives of the Environmental and Social Management Plan (ESMP)

The ESMP for these subprojects is designed to:

- **Ensure Regulatory Compliance:** Adhere to Liberian environmental laws and international standards, and the World Bank's Environmental and Social Framework (ESF).
- **Identify and Mitigate Potential Environmental and Social Risks and Impacts:** Systematically assess the potential environmental and social risks and impacts, implement effective mitigation strategies and the associated cost for each mitigation measure to ensure the E&S provisions in contracts are effective.
- **Facilitate Permitting:** Provide comprehensive documentation for acquiring necessary Environmental Permits from the Environmental Protection Agency (EPA) of Liberia.
- **Promote Stakeholder Engagement:** Foster transparent and inclusive communication with all stakeholders to address concerns and incorporate feedback.
- **E&S Monitoring Measures:** Identify the environmental and social monitoring measures and the associated cost of the measures.

Project Description

The proposed project will involve:

- **Potholes Patching:** The urban road rehabilitation and improvement targets over fifty potholes in key areas of Paynesville, the project involves asphalt repair, sectional pavement rehabilitation, and rigid pavement repair including cleaning of existing culverts and side drains to enhance road safety and longevity.

- **Solar Streetlighting:** All works on the project are intended for the provision of an electric power supply source through solar panels. The pedestals shall be designed and constructed 20/25 meters apart. The Ministry of Public Works (MPW) will assist the selected contractor in identifying the Right of Way (ROW) for installing the pedestals. The contractor is expected to design, procure, supply, and install sustainable all-in-one integrated solar streetlights in selected neighborhoods.

Description Of Project Area

The main locations considered for the Solar Streetlight project implementation include Paynesville and Bushrod Island, while the location for Potholes Patching is Paynesville. Both Projects initiatives will be carried out in Paynesville and Bushrod which are integral part of the Greater Monrovia Area. These projects will focus their efforts on fixing potholes and installing Solar Streetlights specifically in the Greater Monrovia regions. These routes are vital for both drivers and commuters travelling through these road corridors. Tackling the potholes and streetlights problems in Greater Monrovia region align not only with community infrastructure enhancement but is also crucial for enhancing transport efficiency, ensuring public safety, and stimulating economic development.

Regulatory, Policy, and Institutional Framework

The project aligns with national policies of Liberia such as the National Environmental Policy (2003), National Energy Policy (2009), and adheres to key legal frameworks including the Environmental Protection and Management Law (EPML) (2003), World Bank ESF and relevant ESS Standards (2016). Institutional coordination involves the Ministry of Public Works, EPA, Local Government Authorities, and oversight by the World Bank, ensuring comprehensive compliance and effective implementation. During implementation, the PMU will conduct regular monitoring visits, and the contractors will be responsible for implementing the mitigation measures in the ESMP.

Stakeholder Engagement and Community Participation

In line with the project Stakeholder Engagement Plan (SEP), a preliminary stakeholder engagement exercise in the form of consultations with the population in the target project areas was conducted between January 13 and 15, 2025.

During these meetings, participants expressed several concerns and proffered a number of valuable recommendations, which were relatively similar across the different project locations. The key concerns include: the involvement and participation of community leaders and members in project related work, women participation, and the security and maintenance of the solar lights. The communities also voiced their distrust in the quality of the road works in the country and expressed their preference for contracting road works to local rather than foreign contractors. The exercise also provided the platform for the project team to provide education and awareness on the proper use of the road. Details of the consultation meetings are found in **Section 7.3** below.

Anticipated Impacts

Potential Adverse Environmental and Social Risks / Impacts Identification

From the overall E&S assessment carried out on the target solar streetlights and potholes repair corridors, the adverse potential environmental and social risks and impacts associated during implementation of these subproject are similar despite their different types and locations. The main potential environmental and social risks associated with the execution of both sub-projects are:

- Air Pollution – the risk of air pollution may result from transportation of project materials, excavation of soil for streetlights pedestals construction and the generation of dust particles and vehicular/machinery emissions, removal of damaged asphalt materials during potholes repair.
- Noise Pollution – the risk of noise associated with movement and usage of equipment during construction.
- Traffic Disruption – traffic disruption may arise from barricading segments of the road under rehabilitation as well as those targeted for streetlights installation;
- Access Restriction – the risk of access restriction may derive from barricading the work zones which would limit pedestrian walkways (i.e., sidewalks, cross walks, community access roads, business access, etc.)
- Occupational Health and Safety Hazards – this risk would derive from project workers working in exposed and unsafe working zones on both projects. Specific risks to workers, pedestrians and other road users and vulnerable groups to vehicular accidents. include: working along roads and at heights, lifting of heavy items, exposure to noise from equipment.
- Disruption of Livelihood – the risk of livelihood disruption is limited to potential access restriction to businesses along the road corridors.
- Social Tension – this risk is associated with unmet/undue community expectations and grievances including, desire for employment, delayed remunerations, limited community participation, GBV issues, etc.

Due to the nature of work activities, the proposed project location, sensitivity, and scale of the project, the overall rating for these impacts is "**Moderate**" in accordance with World Bank's environmental and social standards (ESS1), and falls under "**Category C Projects"** in line with the Liberia's EPA regulation.

The project is expected to deliver numerous benefits, including:

- **Enhanced Traffic Management, Road Safety and Longevity:** Reduced accidents and extended road lifespan through effective pothole repairs.
- **Improved Public Safety and Economic Activity:** Better-lit streets deter crime, enhance visibility, and support nighttime economic activities.
- **Environmental Sustainability:** Utilization of renewable energy for streetlighting reduces carbon footprint and promotes sustainable practices.
- **Socio-Economic Upliftment:** Job creation, increased property values, and improved quality of life for Greater Monrovia residents.

ESMP Implementation Budget

The grand total estimated cost for the ESMP implementation and monitoring is **US$ 62,914.50**

Table 01: Estimated Budget for the Implementation of the ESMP for Solar Streetlights Installation

Item	Responsibility	Cost Estimate in US Dollars (US$)
Mitigation	Contractor	7700.00
Monitoring	LURP PMU (No additional cost)	0.00
Training, and Capacity Building	LURP PMU	8,750.00
Stakeholder Engagement	LURP PMU before & after contract) Contractor (during Contract implementation)	12,000.00
Sub-Total		**28,450.00**
Contingency (%)	Contractor (5% of Sub-total cost)	1,442.00
Total Cost		**29,892.00**

Table 02: Estimated Budget for the Implementation of the ESMP for Potholes Patching

Item	Responsibility	Cost Estimate in US Dollars (US$)
Mitigation	Contractor	12,700.00
Monitoring	LURP PMU (No additional cost)	0.00
Training, and Capacity Building	LURP PMU	8,750.00
Stakeholder Engagement	LURP PMU before & after contract) Contractor (during Contract implementation)	10,000.00
Sub-Total		**31,450.00**
Contingency (%)	Contractor (5% of Sub-total cost)	1,572.50
Total Cost		**33,022.50**

Conclusion and Recommendations

The Solar Street Lighting and Potholes Patching subprojects represent a significant advancement in urban infrastructure and resilience for Greater Monrovia. The ESMP provides a robust framework to manage the potential environmental and social risks and impacts, ensuring compliance with national and international standards and the World Bank ESF. It is recommended that the **Environmental Protection Agency (EPA)** grants the necessary Environmental Permits contingent upon the full implementation of the ESMP. Additionally, continuous monitoring, capacity building, and adaptive management are essential to sustain the project's benefits and mitigate any emerging risks.

Disclosure Requirement

This ESMP shall be disclosed to the public at designated centers within the project area, and published on the website of the Infrastructure Implementation Unit (IIU) at the Ministry of Public Works (MPW), accessible to the project in line with the guidelines of the Liberia's **Environmental Protection Agency (EPA)**. Subsequently, the report will be disclosed in the external website of the World Bank.

Key Recommendations:

- **Obtain Environmental Permits:** Ensure all mitigation measures are implemented to secure EPA approval and permits.
- Selected Contractors to submit Contractors ESMP (CESMP) to the PMU prior to project works, and the CESMP will be revised/updated during the implementation phase of the project in line with any changes to the project, environmental and social sensitivities.
- **Regular Environmental and Social Monitoring:** Conduct weekly, monthly and quarterly assessments to track compliance and impact mitigation measures.
- **Promote Renewable Energy:** Incorporate additional renewable energy sources to enhance sustainability.
- **Strengthen Waste Management:** Implement comprehensive waste segregation, recycling, and disposal strategies.
- **Enhance Training Programs:** Provide ongoing training to project staff and contractors on environmental and social best practices.
- **Foster Continuous Improvement:** Regularly update the ESMP based on monitoring results and stakeholder feedback to enhance environmental performance.

ACRONYMS

Acronym	Definition
BOD	Biochemical Oxygen Demand
BS	British Standards
CEPP	Community Emergency Preparedness Plan
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ERT	Emergency Response Team
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMP	Environmental and Social Management Plan
GCI	General Consultancy Incorporated
GIS	Geographic Information Systems
GRM	Grievance Redress Mechanism
IFC	International Finance Corporation
ISO	International Organization for Standardization
LPRC	Liberia Petroleum Refining Company
LURP	Liberia Urban Resilience Project
LWQS	Liberia Water Quality Standards
MIDP	Monrovia Integrated Development Project
MIDP	Monrovia Integrated Development Project
MPWs	Ministry of Public Works
PPE	Personal Protective Equipment
SOP	Standard Operating Procedures
TMP	Traffic Management Plan
VOCs	Volatile Organic Compounds

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1. INTRODUCTION

1.1 GENERAL PROJECT CONTEXT

The Government of Liberia (GoL), with financial support from the World Bank (WB), has embarked on the Liberia Urban Resilience Project (LURP). The project aims to address multifaceted urban challenges within Greater Monrovia, focusing on enhancing urban resilience to climate change, improving urban infrastructure, and fortifying urban management capacities in Liberia with a financing envelope of USD 40 million. Urban development, by its nature, requires navigating a complex landscape of interests, rights, and aspirations. The LURP supports four components:

Component 1: Climate Resilient Infrastructure and Urban Upgrading

1.1 Climate Risk Management Infrastructure

1.2 Resilient Urban Planning and Development

Component 2: Strengthening Integrated Resilient Urban Development Capacity

2.1 Climate Resilient Spatial Development Planning for Greater Monrovia

2.2 Solid Waste Management Operations and Financing

2.3 Revenue mobilization and financial sustainability

2.4 Operations and maintenance of infrastructure

Component 3: Project Management

Component 4: Contingency Emergency Response Component

As part of the Project Components, the Ministry of Public Works (MPW) has envisaged the implementation of two subproject components within Component 1: The Solar Streetlights and the Rehabilitation/ Patching of Potholes in Greater Monrovia. The Solar Streetlighting Project among others aims to facilitate night-time mobility and economic activities in selected neighbourhoods within Greater Monrovia. In the same vein, the Pothole patching aligns with community upgrading infrastructures. Both subprojects will be financed under component one. The selected contractor responsible for the Engineering, Procurement, and Construction (EPC) aspects of the project will be decided upon the completion of the full bidding process. As for the design, it has been done by the Ministry of Public. The EPC role will include the construction, testing, and commissioning of the necessary infrastructure in the case of the solar streetlights. The General Consultancy Incorporated (GCI), a Certified Environmental Impact Assessment (EIA) firm licensed by the Environmental Protection Agency (EPA) of Liberia, has been commissioned by the Ministry of Public Works (MPW) to prepare this Environmental and Social Management Plan (ESMP) for the two subprojects under component one (1) of the overall LURP project.

Rationale and Justification

The rationale and justification of the proposed project is to enhance urban living conditions and climate resilience in Greater Monrovia and to strengthen municipal and institutional capacities for integrated urban management. This ESMP is essential for ensuring that the project complies with national environmental and social regulations and international best practices and for facilitating the acquisition of the necessary Environmental Permit from Liberia's Environmental Protection Agency

(EPA) and meeting the requirement of the funding partner, the World Bank Environmental and Social Framework (ESF).

1.1.1 Patching of Potholes

The deterioration of roads in Monrovia, particularly in Paynesville, significantly hampers economic activities by causing delays, increasing accident risks, and elevating vehicle maintenance costs due to potholes and poor conditions. This not only affects the daily commutes but also worsens traffic congestion during peak hours, leading to public frustration and frequent complaints directed at the Government and the Ministry of Public Works. The Potholes Patching Project aims to address these issues by repairing critical road sections, thereby enhancing road safety, reducing travel delays, and providing a smoother driving experience. This intervention is crucial, especially as the rainy season approaches, to prevent further damage and costly repairs. With support from the World Bank through LURP augmenting the Government's limited budget, this timely intervention is set to prevent small defects from becoming larger issues, prolong the life of existing infrastructure, and maintain road functionality affordably, all of which are essential for the city's continued mobility and safety.

1.1.2 Solar Streetlights in Greater Monrovia

The Solar Streetlighting Project in Greater Monrovia aims to improve the severe lack of streetlighting in various neighbourhoods, boosting safety, economic opportunities, and community vitality. Particularly targeting poorly lit urban areas outside central Monrovia, this initiative addresses immediate needs for better public lighting to support community-level security, mobility, and economic activities. By enabling extended educational and commercial activities, and reducing crime, the project significantly enhances residents' quality of life and promotes a more inclusive, vibrant community environment. This strategic step aligns with broader socio-economic goals, facilitating sustainable development throughout Greater Monrovia.

1.2 OBJECTIVES OF THE ESMP

The objective of the ESMP is to ensure that the identified potential adverse E&S risks and impacts likely to arise from the construction and operations of the proposed project are identified, addressed and appropriate mitigation measures integrated into the project to ensure protection of the environment and the people throughout the project lifecycle.

1.3 PURPOSE AND SCOPE OF THE ASSIGNMENT

This ESMP is developed to manage the environmental and social risks and impacts associated with two sub-projects (Solar Streetlights Installation and Potholes Patching), under Component 1 of LURP. The main scope of this assignment is to identify potential environmental and social risks and prepare an environmental and social management plan that will be used to monitor and mitigate those potential risk and impacts during construction and operation of the solar streetlights installation and potholes patching, to prevent or minimize adverse impacts as a result of the implementation of both projects.

Methodology

The following procedures were followed in the preparation of this ESMP:

- Literature review of the relevant documents as contained in the TOR
- Site visits and field assessments to all the proposed roads and solar street lighting sites requiring interventions conducted from November 13-28, 2024.
- Assessment of the baseline environmental and social data
- Identification of potential environmental and social risks and impacts.
- Identification of impact mitigation measures
- Assessment of capacity to implement the ESMP and training requirements
- Engagement with key stakeholders to gather insights, concerns, and suggestions:
  - **Local Communities**: Consultations with community representatives, traditional authorities, local chiefs and residents to identify potential social impacts and opportunities for community benefits.
  - **Project Personnel**: Discussions with MPW, LURP Project Team, EPA and other experts to clarify project details and operational procedures.
- Preparation of an Environmental and Social Management Plan.
- **Review and Approval**

The draft ESMP underwent:

- **Internal Review**: By MPW LURP Project Team to ensure alignment with project objectives and incorporation of inputs received from MPW.
- **External Review & Approval**: By World Bank to ensure the ESMP is in compliance with WB Environmental and Social Standards.
- **Regulatory Approval:** Submission to the EPA for review and approval as part of the permitting process.

2. PROJECT DESCRIPTION

Many road corridors in Monrovia have potholes and are without lights to support visibility and safety for road users. These corridors are virtually dark at night and pose constraints for drivers and pedestrians alike. The dark condition along these corridors also limits the ability of community people to extend their business operations beyond the daylight. The proposed initiative will focus on installing solar streetlights and repairing potholes in Greater Monrovia's deteriorated roads. This Solar Streetlighting Project is designed to enhance nighttime mobility and boost economic activities in certain Monrovia neighborhoods. The project's roll out is expected to provide short-term employment for some community people over the period of approximately four months. It will improve residents' quality of life by enhancing safety, visibility, perception of the local environment, and access to public spaces, thereby supporting economic activities and potential opportunities for earning. Similarly, addressing the rapidly worsening street conditions and preventing future, costly issues, pothole repair is part of an effort to upgrade community infrastructure and is funded under the first component of the project. These initiatives are integrated into the larger Liberia Urban Resilience Project (LURP), funded by the World Bank, which focuses on climate-resilient infrastructure and urban improvements in Greater Monrovia. The project's first component also supports flood risk management and community infrastructure improvements.

2.1 LOCATION AND CONTEXT

2.1.1 Patching of Potholes

Pothole repair initiatives (asphalt repair, sectional pavement rehabilitation, rigid pavement repair and asphalt overlaying. across different road sections). will be carried out in Paynesville, an integral part of the greater Monrovia Area. More than fifty (50) potholes have been identified across different routes in Paynesville, including locations such as SKD Boulevard, Neezoe, Pipeline, Wood-camp, Police Academy, Dillon Avenue, GSA Road, SD Cooper Road, among others. These routes are vital for both drivers and commuters travelling through Paynesville. Tackling the pothole problems in Paynesville aligns not only with community infrastructure enhancement but is also crucial for enhancing transport efficiency, ensuring public safety, and stimulating economic development. The table below presents details about each road corridor, including the location, length, pothole area, causes of the potholes, and the interventions proposed.

Table 1: Description of Project Corridor, coordinates and proposed scope of intervention

ROAD NAME / DESCRIPTION:					Paynesville City: Neezoe					
ROAD (CORRIDOR) LENGTH (km):										
		GPS Coordinate								
No	**Location of Intervention**	**X Coordinate**	**Y Coordinate**	**Start Chainage (km)**	**End Chainage (km)**	**Length of Pothole (m)**	**Width of Pothole (m)**	**Area of Pothole (m^2)**	**Cause of Pothole**	**Proposed Scope of Intervention**
1	Before Club Beer	-10.698631	6.308087	0 + 0.00	0 + 800	22.1	10	221	Poorly Design speed bump; traffic	Patch and overlay
2	Club Beer	-10.698467	6.308367	0 + 800	1 + 090	48.2	10	482	Poorly Designed speed bump; traffic	Rehabilitation; Asphalt Repair; overlay; Redesign Speed Bump
3	Near first speed breaker from Japanese Freeway	-10.698467	6.308367	1 + 090	1+ 100	20	10	200	Poorly Designed speed bump; traffic	Rehabilitation; Asphalt Repair; overlay; Redesign Speed Bump
4	Before the bridge from Japanese Freeway	-10.690526	6.305619	1+ 100	1 + 060	25	10	250	Poorly designed speed bump; traffic	Rehabilitation; Asphalt Repair; overlay; Redesign Speed Bump
5	Tender Heart Daycare Primary School	-10.684515	6.298963	1 + 060	2 + 180	96.3	10	963	Poorly designed speed bump; traffic	Rehabilitation; Asphalt Repair; overlay Redesign Speed Bump
ROAD NAME / DESCRIPTION:					**PAYNESVILLE - SD COOPER ROAD**					
ROAD (CORRIDOR) LENGTH (km):										

		GPS Coordinate								
No	**Location of Intervention**		**GPS Coordinate**	**Start Chainage (km)**	**End Chainage (km)**	**Length of Pothole (m)**	**Width of Pothole (m)**	**Area of Pothole (m^2)**	**Cause of Pothole**	**Proposed Scope of Intervention**
1	SD Cooper Road Junction	-10.708442	6.264487	0 + 00	0 + 260	36	15.1	543.6	Traffic Turning Moment at the intersection; Lack of Maintenance	Repair with Rigid Pavement; Overlay
		-10.707243	6.264544			44.7	15.3	683.91	Traffic Turning Moment at the intersection; Lack of Maintenance	Repair with Rigid Pavement; Overlay
2	Fortune Jr. Car Wash			0 + 260	0 + 450	22.2	7	155.4	traffic	Asphalt Repair and overlay
		-10.708548	6.262466			24.3	7	170.1	Traffic	Asphalt Repair and overlay
3	Gond Academy			0 + 450	0 + 500	11.7	3.5	40.95	traffic	Asphalt Repair and overlay
		-10.708954	6.260175			2.3	2.04	4.692	traffic	Asphalt Repair and overlay
4	BNEL Pharmacy	-10.707081	6.258334	0 + 500	0 + 860	3.5	2	7	traffic	Asphalt Repair and overlay
5	Liberia Micro Finance Business Incubation	-10.706072	6.257321	0 + 860	1+ 160	41.5	7	290.5	traffic	Rehabilitation and overlay
6	Angelle's Closet	-10.704936	6.256176	1 + 160	1 + 400	29.5	7	206.5	traffic	Rehabilitation and overlay
7	Master Trade Center	-10.704722	6.255979	1 + 400	1 + 790	25.5	7	178.5	traffic	Asphalt Repair and Overlay

ROAD NAME / DESCRIPTION:					**PAYNESVILLE - ZAZAY COMMUNITY**					
ROAD (CORRIDOR) LENGTH (km):										
		GPS Coordinate								
No	**Location of Intervention**	**X Coordinate**	**Y Coordinate**	**Start Chainage (km)**	**End Chainage (km)**	**Length of Pothole (m)**	**Width of Pothole (m)**	**Area of Pothole (m^2)**	**Cause of Pothole**	**Proposed Scope of Intervention**
1	Zazay Community Junction	10.684515	6.298963	0 + 000	0+420	13.2	7	92.4	Traffic & Speed	Asphalt Repairs and overlay
2	Harmon Field Junction	-10690325	6.279137	0+420	0+520	18.7	3.5	65.45	Runoff water and sewer	Cut, repair sewage, and patch
3	Benson Hospital	-10.690193	6.283676	0+520	1+000	4.1	3.5	14.35	Traffic	Asphalt Repairs
4	Medicine store			1+000	1+500	3	3	9	Shoveling	Asphalt Repairs
		-10.690411	6.278624			12.8	7	89.6	Shoveling	Asphalt Repairs
5	Ma Tenneh Adu Business Center	-10.690445	6.277309	1+500	2+640	7.1	4	28.4	Traffic	Asphalt Repairs
	Hariom Pharmacy	-10.681061	6.291893	2+640	3+090	15	7	105	Poor construction of speed boom, and traffic	Asphalt Repairs
ROAD NAME / DESCRIPTION:					**PAYNESVILLE (ZUBA TOWN - DALLION AVENUE)**					
ROAD (CORRIDOR) LENGTH (km):										
		GPS Coordinate								

No	Location of Intervention	X Coordinate	Y Coordinate	Start Chainage (km)	End Chainage (km)	Length of Pothole (m)	Width of Pothole (m)	Area of Pothole (m^2)	Cause of Pothole	Proposed Scope of Intervention
1	Dallion Avenue	-10.682064	6.271807	0 + 0.00	0+440	16.6	3.5	58.1	Traffic and material failure	Rehabilitation
						31.3	6.5	203.45	Traffic and material failure	Rehabilitation
						120	6.5	780	Traffic and material failure	Rehabilitation
						5.6	3.5	19.6	Traffic and material failure	Rehabilitation
2	St. Kathleen M. Catholic School Junction	-10.680315	6.266762	0+440	0+650	6.3	3.5	22.05	Traffic	Asphalt Repairs
3	Determine art Center			0+650	1+040	2	2	4	Traffic	Asphalt Repairs
4	Dave Pharmacy			1+040	2+060	16	6.5	104	Traffic	Asphalt Repairs and overlay
		-10.679487	6.265285			2.4	2.2	5.28	Traffic	Asphalt Repairs and overlay
						26	6.5	169	Traffic	Asphalt Repairs and overlay
5	Rehab Car Wash	-10.673398	6.260907	2+060	2+450	6	3.5	21	Traffic	Asphalt Repairs and overlay
6		-10.671146	6.258101	2+450	2+650	4	3.5	14	Traffic	Asphalt Repairs and overlay
7	Azina Bar & Restaurant			2+650	2+990	2.2	2	4.4	Traffic	Asphalt Repairs and overlay
		-10.671472	6.256909			2.2	2.2	4.84	Traffic	Asphalt Repairs and overlay

8	Hans Lounge	-10.676719	6.252489	2+990	3+430	6.5	6	39	Traffic	Asphalt Repairs and overlay
						4	3.5	14	Traffic	Asphalt Repairs and overlay
9	Chacha Business Center	-10.679215	6.247591	3+430	3+490	15.1	6.5	98.15	Traffic	Asphalt Repairs and 0verlay
10	Ma Sader Memorial Clinic Junction	-10.680062	6.24533	3+490	3+860	4	3.5	14	Traffic	Asphalt Repairs and overlay
	Cabana 9782	-10.67813	6.243105			3.5	2	7	Traffic	Asphalt Repairs and overlay
11	901 Entertianment Center	-10.67977	6.243306	3+860	3+960	26.5	7.5	198.75	Traffic	Asphalt Repairs and overlay
12	Duport Road Market Junction	-10.67031	6.243007	3+960	4+260	6.8	3.5	23.8	Traffic	Asphalt Repairs and overlay
ROAD NAME / DESCRIPTION:					**PAYNESVILLE- PARKER PAINT - PIPELINE ROAD**					
ROAD (CORRIDOR) LENGTH (km):										
		GPS Coordinate								
No	Location of Intervention	**X Coordinate**	**Y Coordinate**	**Start Chainage (km)**	**End Chainage (km)**	**Length of Pothole (m)**	**Width of Pothole (m)**	**Area of Pothole (m^2)**	**Cause of Pothole**	**Proposed Scope of Intervention**
1	Parker Paint Junction	-10.684526	6.298987	0 + 000	0	0	0	0	NA	
2	JT Business Center	-10.684588	6.299134	0 + 000	0+310	27.5	7	192.5	Speed bomb and traffic	Patching. Overlay, and reconstruction of the speed bump

3	VIP Network Auto Garage	-10.687777	6.302131	0+310	0+890	20.2	7	141.4	Poor construction of Speed boom and traffic	Patching, overlay, and reconstruction of speed bump
4	Pipeline Intersection	10.6908386	6.300925	0+890	1+390	28.9	26.9	777.41	speed limit and traffic	Patching, overlay, and reconstruction of speed bump
5	Ma Juah Provision Shop	-10.690927	6.300923	1+390	1+520	20.7	10	207	Speed limit and traffic	Patching, overlay, and reconstruction of the speed bump
6	Pipeline Turning Point	-10.690510	6.305511	1+520	1+890	20.6	10	206	Traffic	Asphalt Repairs and overlay
7	Beensema Store	-10.690526	6.305619	1+890	1+970	47.4	10	474	Traffic	Asphalt Repairs and overlay
ROAD NAME / DESCRIPTION:					**PAYNESVILLE- SKD Boulevard**					
ROAD (CORRIDOR) LENGTH (km):										
		GPS Coordinate								
No	**Location of Intervention**	**X Coordinate**	**Y Coordinate**	**Start Chainage (km)**	**End Chainage (km)**	**Length of Pothole (m)**	**Width of Pothole (m)**	**Area of Pothole (m^2)**	**Cause of Pothole**	**Proposed Scope of Intervention**
1	72nd Junction	-10.701934	6.298472	0+000		55	7.5	412.5	High Traffic Movement	Rigid Pavement and overlay
2	72nd Junction	-10.702115	6.298248			105	35	3675	Poor Wearing Surface	Asphalt Overlay
3	Festac-39 Guest House	-10.707569	6.29313			105	22	2310	Poor Speed Bump	Asphalt Overlay

									Construction; Traffic Loading	
4	Festac-39 Guest House	-10.707928	6.292995			93	22	2046	Poor Speed Bump Construction; Traffic Loading	Rigid Pavement and overlay
5	Before Roland Duo Estate	-10.714575	6.291612			44	22	968	Poor Speed Bump Construction; Traffic	Asphalt Repair and overlay
6	Before Roland Duo Estate	-10.714973	6.291507			105	22	2310	Traffic Loading; Poor Maintenance	Asphalt Overlay
7	Roland Duo Estate	**-10.71541**	**6.291457**			**41**	**22**	**902**	Poor Speed Bump Construction; Traffic	**Asphalt Repair**
8	Roland Due's House (curve)	-10.717092	6.290799			20	22	440	Traffic Loading; Poor Maintenance	Asphalt Repair and overlay
9	Roland Duo Estate	-10.717077	6.289995			30	15.5	465	Traffic Loading; Poor Maintenance	Asphalt Repair
10	Swakermore Junction	-10.717027	6.289745			44	22	968	Poor Speed Bump Construction; Traffic	Asphalt Repair and overlay
11	SKD Blvd. - Tubman Blvd. Junction	6.289995	6.269084			55	7.5	412.5	Traffic Loading; Poor Maintenance	Rigid Pavement Section and overlay
12	SKD Blvd. - Tubman Blvd. Junction	-10.712914	6.269084			105	35	3675	Traffic Loading; Poor Maintenance	Asphalt Overlay

ROAD NAME / DESCRIPTION:				**PAYNESVILLE - POLICE ACADEMY**						
ROAD (CORRIDOR) LENGTH (km):										
No	Location of Intervention	**X Coordinate**	**Y Coordinate**	**Start Chainage (km)**	**End Chainage (km)**	**Length of Pothole (m)**	**Width of Pothole (m)**	**Area of Pothole (m^2)**	**Cause of Pothole**	**Proposed Scope of Intervention**
1	SKD Boulevard Road - Police Academy	-10.714405	6.280266	0 + 000	0+020	29.1	11	320.1	Subgrade failure (settlement); traffic; lack of maintenance	Cut and asphalt repair
2	Edward Block Factory	-10.710340	6.280978	0+020	0+530	24.3	10	243	Subgrade failure (settlement); traffic; lack of maintenance	Cut and asphalt repair
3	Thandie Excell Academy	-10.707122	6.281690	0+530	0+900	29	10	290	Poorly design Speed Bump; Traffic; lack of maintenance	Redesigned Speed Bump; Patch/Asphalt Repair
4	Aries Security Services	-10.706945	6.281773	0+900	1+270	10	3	30	Traffic; Lack of Maintenance	Asphalt Repair/Patch

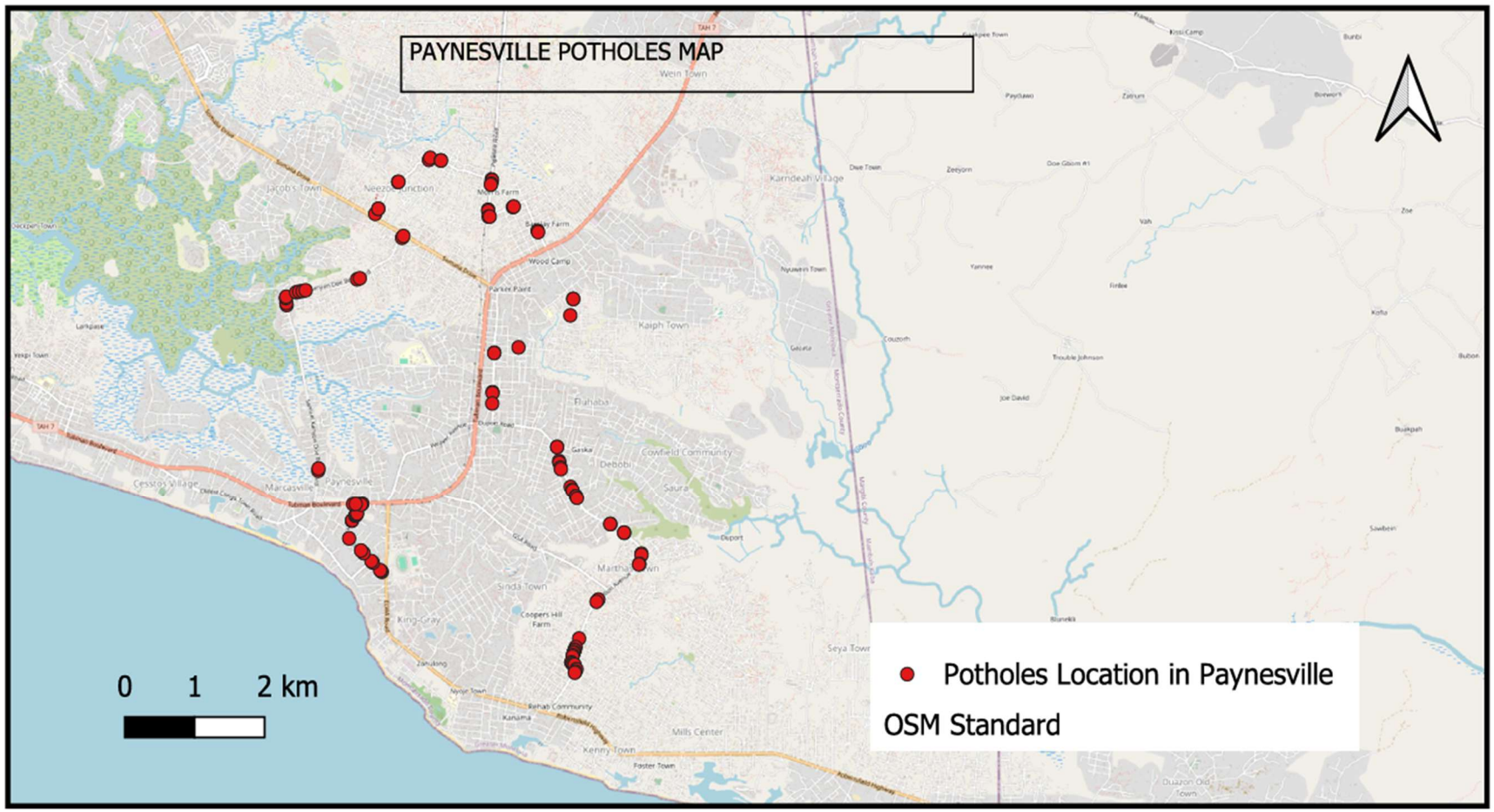

Figure 1: Potholes Patching Location Map

2.1.2 Solar Streetlights

The planned project is set to span eleven (11) economic corridors in the Paynesville and Bushrod Island areas within Greater Monrovia, as defined in Table 2 and Table 3. The focus will be primarily on the major commercial zones of these designated areas, which are the central economic hubs in their respective communities. Additionally, the project may extend to enhancing public lighting within the community if considered essential.

Table 2: Location for Streetlighting - Paynesville

No	Road Corridor	Starting Coordinates	End Coordinate	Total Length (Km)
1	Neezoe Rd- Pipeline Rd	-10.705747,6.300887	-10.690947, 6.30103	2.23
2	Wood Camp-Parker Paint	-10.69083,6.301008	-10.683573, 6.29707	1.8
3	Zayzay Community-Duport Rd	-10.683569,6.297071	-10.690333, 6.27484	3.8
4	Vogar Mission	-10.695178,6.274244	-10.705953, 6.276249	1.24
5	Weaver Street			0.83
	Total			9.9

Table 3: Location for Streetlighting – Bushrod Island

No	Road Corridor	Starting Coordinates	End Coordinate	Total Length (Km)
1	Clara Town	-10.799952, 6.328796	-10.794125, 6.32731	1.6
2	Doe Community	-10.793473, 6.328768	-10.787289, 6.3388	1.88
3	Jamaica Road	-10.782584, 6.339839	-10.7898, 6.344198	1.27
4	Logan Town- Mombo Town	-10.786488, 6.352909	-10.785093, 6.376235	3.6
5	OAU Hotel Africa Road	-10.785399, 6.404081	-10.803932,6.390586	2.74
6	Banjor Community	-10.791486, 6.401831	-10.785348,6.415342	2.5
	Total			13.59

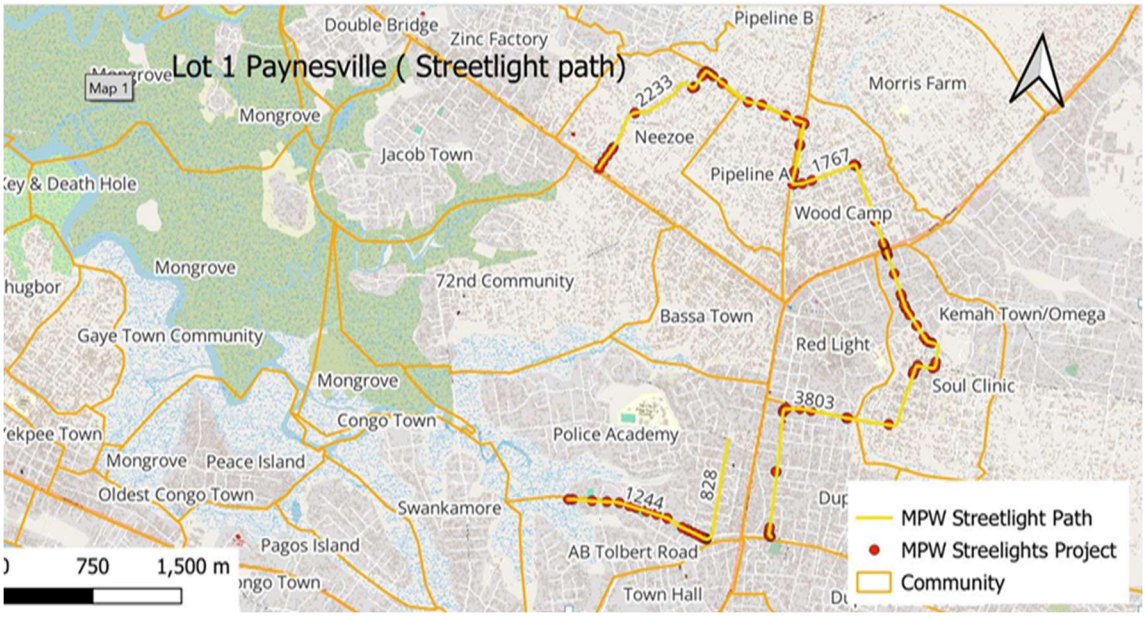

Figure 2: Solar Streetlights Location Map for Paynesville Corridor

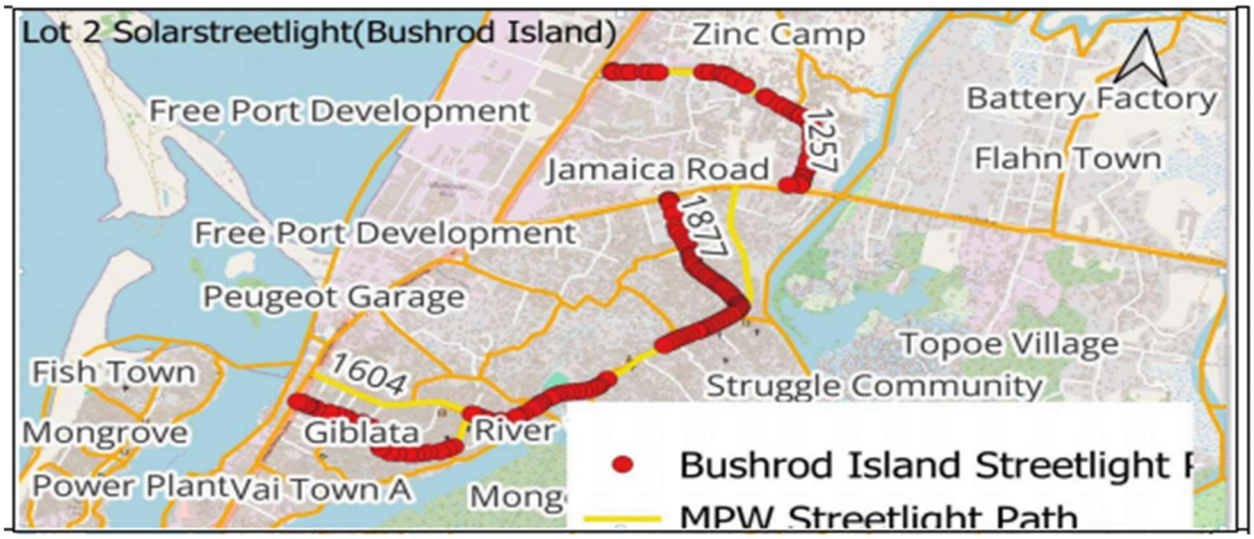

Figure 4: Solar Streetlights Location Map for Clara Town to Jamaica

Figure 5: Solar Streetlights Location Map for Logan Town to Mombo Town

Figure 6: Solar Streetlights Location Map for Virginia to Iron gate & OUA Hotel Africa Road to Banjor Community

2.3 DESCRIPTION OF PROJECT ACTIVITIES (PATCHING OF POTHOLES)

2.3.1 Scope of Work- Patching of Potholes

The proposed patching of potholes on the dilapidated corridors aims to enhance safety and improve the overall riding comfort for road users. Civil works will involve asphalt repair, rigid pavement repair (patching) of potholes including removing of waste from culverts and side drains. It will be carried out using hot mix asphalt (HMA) depending on the extent, severity, and location– intersections with heavy axial turning. Table 6 provides a summary of the activities.

Table 4: Summary of the Potholes Repair Activities

Activities	Description of Activities
Removal of waste from Culverts and Side Drains	Before starting the repair works, wastes will be removed from the side drains and along the culvert sections. This will be done using labor based method, and the waste will be properly covered and transported to Whein Town landfill.
Cleaning Out Debris:	The first step involves removing any loose material, dirt, and debris from the potholes to ensure a clean surface for the asphalt to adhere properly. This can be done using brooms, shovels, and air compressors.
Applying a Tack Coat	A tack coat is a light application of asphalt emulsion that is sprayed over the clean, dry surface of the pothole. This creates a sticky layer that helps the new asphalt to bond effectively with the existing pavement.
Applying a Hot mix asphalt (HMA)	Hot mix asphalt (HMA) is then carefully poured into the potholes, filling them up to slightly above the surrounding pavement level to allow for compaction. The type and grade of asphalt used depends on the traffic conditions and the severity of the pothole.
Compacting	Once the potholes are filled, a roller is used to compact the asphalt. This ensures that the filled potholes are level with the surrounding pavement and provides a smooth, durable finish. Proper compaction also helps to prevent premature deterioration of the repair. The target is to achieve a 50mm compacted layer to match the existing road surface
Sectional pavement rehabilitation	Sectional pavement rehabilitation will be undertaken in areas of severe road deterioration, consisting of partial to full-depth rehabilitation. This will involve removing the damaged layers (surface, base, sub-base, and sub-grade layers in some cases) and replacing them with new layers to restore the road's structural integrity.
Rigid pavement repair	Rigid pavement repair will target sections known for consistent failures and heavy axial turning such as major junctions and intersections. This repair will involve cutting and removing damaged sections, placing and compacting the base layer, and casting in situ reinforced concrete at about 150mm thickness
Asphalt overlaying	Asphalt overlaying will be conducted on rigid pavement sections, asphalt repair sections, or asphalt sections with visible cracks. The overlaying work will include priming of the road surface and proper laying of 50mm thick asphaltic concrete.

2.3.2 Project Activities

The focus of this study is on enhancing safety and improving the overall comfort of road users. The project will involve various repair and rehabilitation activities including: Asphalt repair, Sectional pavement rehabilitation, Rigid pavement repair and asphalt overlaying.

2.3.3 Project Phasing and Timeline

Table 7: Summary of the Project Phasing and Timeline

Phasing and Timeline	Description	Timeline
Phase 1: Survey and Assessment	• A detailed survey was conducted on the road sections in Paynesville to identify areas with defects (e.g., potholes, cracks, drainage issues). • Sections prioritized based on traffic volume, defect severity, and safety concerns. • Assessment report, BOQ, specification, and other documents are attached	• 3 weeks 3 months Sept. 2024 - February 2025
Phase 2: Mobilization of Resources and Tendering Process	• Secure funding approval from the World Bank through the LURP • Select the most responsive contractors through a competitive bidding process to execute the projects.	• 6 months
Phase 3: Civil Works	• Implement pothole patching, and rehabilitation works as per the plan. • Use both day and night shifts for high-traffic areas to minimize disruption to traffic flow. • Begin work in high-traffic areas and move to less critical sections as progress is made.	• Proposed for three (3) months –May-July 2025
Phase 4: Quality Assurance and Final Inspection	• Assigned project engineers will be assigned to ensure the contractors maintain quality standards during execution. A final inspection will be done to ensure the quality and durability of repairs. • Address any issues identified during inspections and ensure all sections meet specified standards.	• –May - July 2025

2.4 MATERIAL RESOURCES AND QUANTITIES

Table 12: Detailed of materials needed for the proposed works

Project Name	Patching of Potholes and Sectional Overlaying of Critical Areas within the Paynesville Area
Date:	**18-Dec-24**
DETAILS BILL OF QUANTITIES FOR LOT # 1, PAYNESVILLE AREA	

Item	Description	Unit	Estimated Quantity
A	**GENERAL ITEMS**		
1000	Mobilization of equipment, materials and personnel	L.S	1.00
1100	Demobilization of equipment, facilities, and personnel from the site, including restoration of the area to a satisfactory condition as approved by the Engineer.	L.S	1.00
1200	Establish, maintain, and operate the site camp, site office, and site store for the entire contract duration	L.S	1.00
1300	Provide operational safety, health equipment, and personnel safety equipment for day and night work as required along the project corridor	L.S	1.00
1400	Provision, erection, and maintenance of temporary traffic control directional signs to provide guidance for road users for the entire contract duration	L.S	1.00
PAVEMENT PATCHING AND SECTIONAL OVERLAYING (ASPHALT CONCRETE)			
2000	Cut & excavate damaged asphalt sections at the required depth not exceeding 150mm. Including disposal of unsuitable material offsite as directed by the MPW Project Engineer.	m^2	14953.67
2100	Supply lay, and compact approved crush aggregate (0-30mm) for leveling at a minimum depth of 100mm	m^3	1495.367
2200	Provide and place approved asphaltic concrete (12.5.0mm - 0.075mm) for asphalt repair (Patching) and rehabilitation at 50mm thick. Asphalt Concrete Mixture for Patching must comply with ASTM or AASHTO testing methods and the Engineer must approve test results before applications with 60/70 bitumen grade.	m^2	12082.67
2300	Provide and seal all potholes using C30 concrete as per the design and specification	m^3	430.65
2400	Provide heat and spray Cut Back Bitumen (MC30) prime coat for the asphalt repair section and overlay the patched sections 1.0 liters/sqm.	m^2	25280.18
2500	Provide and place asphaltic concrete Overlay 50mm (25.0mm - 0.075mm). and Asphalt Concrete Mixture for the overlay of the entire section must comply with ASTM or AASHTO testing methods and the Engineer must approve test results before applications with 60/70 bitumen grade.	m^2	13197.15

2.4.1 Project Expected Outcomes

- Reduced road-related accidents and vehicle damages due to improved road conditions.
- Improved traffic efficiency through smoother traffic flow and reduced travel times.
- Longer-lasting Road infrastructure with minimized need for extensive future repairs.
- Lower vehicle maintenance costs and enhance business operations due to better road conditions.

2.5 DESCRIPTION OF PROJECT ACTIVITIES (SOLAR STREETLIGHTS)

2.5.1 Scope of Work (Solar Street Lighting)

Solar streetlights will complement the efforts of the Ministry of Public Works to cater for neighborhoods that are still without streetlights. The streetlight pedestals shall be designed and constructed 20/25 meters apart and must ensure vertical and horizontal alignment of the poles for proper installation and be designed with Class II lightning protection and fitted with anti-theft hardware. It should be able to withstand wind loading of 180 km/hr. The offered Solar PV Modules shall be in accordance with Rural & Renewable Energy Agency (RREA) requirements.

The general scope of civil works includes but is not limited to:

- Survey and investigation of sites;
- Design, supply, installation (including necessary civil works) and commissioning of all-in-one integrated solar PV streetlight systems with appropriate mounting structures; and
- the provision of warranties, spare parts, training of staff, and after-sales service for the systems as per the Conditions of Contract.

2.5.2 Installation of the solar streetlights

The installation works will cover the following as indicated below:

- LED Street Luminaire with accessories (including Dimmable and non-Dimmable Drivers), solar PV module, battery, and MPPT controller integrated as one unit
- Anti-theft hardware (alarming option only)
- Earthing system for the mounting pole
- Lighting protection for the streetlight system
- Mounting structure (anchorage arms, galvanized steel pole with bearing plate attached), and relevant hardware accessories (bolts, etc.) for installation of the streetlight systems
- Any other electrical equipment/component that is not specifically listed above but necessary to make the system complete and functional in all respects as per specification and statute.

2.5.3 Civil Works for the solar streetlight systems

All civil works associated with installations of the systems will include:

- Setting out (poles spotting)
- Vegetation and general obstacle clearance
- Cleaning up, washing and surface preparation
- Excavation in soil and/or concrete
- Dewatering in foundation (if applicable)

- Provision of lean concrete for foundation
- Construction of reinforced concrete foundation/ pedestals
- Backfilling of soil in the foundation
- Restoration of existing facilities affected by the works
- Grouting
- Quality control testing of materials as per the Specification
- Vertical and horizontal alignment of the poles for proper installation
- Disposal of surplus excavated materials and materials not required for the work at approved dumping sites.
- Safety measures, protection barriers and signals
- Supply and installation of signboards (2nos. per site) for visibility of the project
- Working in wet conditions
- Any other civil work necessary for the mounting of the streetlighting system.

2.5.4 Code of Practice for Installation

Streetlight system installations must comply with NEC 2017 Article 690, covering solar PV system installation, protection, and grounding, and adhere to Chapter 3 wiring standards and materials. Steel pole installation and civil works must meet specified International Standards. These standards require supplying all necessary materials, equipment, and services to fulfil the specification intentions. Installations should align with current international codes, standards, and safety guidelines effective on the award date. Any damage incurred during installation must be repaired to its original condition. Costs arising from installation defects, such as misaligned poles or damaged PV modules, may be covered by the contractor's Insurance or Performance Securities. Installation requirements may be updated following evaluations made during sample system installations.

2.5.5 Training Requirements

With support from LURP E&S Team, the Contractor will provide E&S training to the Employer's designated staff. Other training such as electrical engineers and technicians, focusing on the key aspects of installation, operation, maintenance, and repair will be provided by the Contractor. A one-day training session will take place in Monrovia post-final acceptance of the Sample System. Additionally, on-site and follow-up training sessions are included, during which the Contractor's technicians will simultaneously perform maintenance and train local staff. The contractor will also provide maintenance training using maintenance kits during the warranty period. Each project site's Local Authority will select staff for this training to support long-term technical assistance and supervision. Training efforts must be documented in maintenance and repair reports, specifying training durations, which shall be signed by the Contractor and trainees and submitted to the Employer via an approved communication method. Lastly, the Contractor will submit a detailed training plan post-contract effectiveness for the Employer's approval.

At a minimum, the training shall include the following specific components:

- Basic use of the streetlight systems – operating principles, basic operating modes and practices, safety issues
- Uses and limitations of the streetlight systems installed
- Basic fault diagnosis and key indicators of system or component failure

- User-maintenance responsibilities, administration of maintenance visits and completion of user sections of maintenance log sheets
- Safety procedures and precautions
- Contact information for queries and break-down maintenance service

2.5.6 O&M Technical Manual for the Solar Streetlighting System

The Contractor shall provide an Operations and Maintenance Manual to be used by their technicians and the Employer's technicians. The copy shall always remain on site after Acceptance of the system. The O&M Booklet is a pre-requisite for Acceptance Tests and inspections. A further copy shall be provided at the Employer's office. The O&M Booklet shall be written in English and must be graphically illustrated for unambiguous interpretation and understanding by operators and maintenance staff. Special attention must be drawn to fault finding and remedial action. All drawings shall be annotated in English. All drawing symbols must be standardised according to IEC or international symbols and must be consistently used. Each section shall be partitioned with labelled plastic dividers.

The main sections are outlined below:

i. ***Operator section (including)***
   - Introduction
   - Instructions on safety techniques
   - Operating instructions start-up and shut-down procedures, functional description and interpretation of status and error indicators.
   - Fault finding instructions, normal and fault indicators. Rules for action in error situations
   - Repair of minor faults
   - Servicing instructions with details of service schedules,
   - Regular maintenance procedures, plant care and cleaning, maintenance schedule

ii. Contacts for backup, in order of reporting
   - Local Authority's technicians (first line reporting)
   - The Employer (or LURP)
   - Installer
   - Manufacturer of major components

iii. Logbook and maintenance section
   - Records of date
   - Forms to enable the keeping of a logbook and collection of data and maintenance records.

iv. Spare parts list
   - Parts list in agreement with the graphical documents quoting all the data necessary for ordering as required in the section. (taken from the Schedules submitted)

v. As-built drawings
   - A set of "As-built" drawings of the installation shall be furnished.
   - Single line diagram

Layout/profile drawings, cross sections, elevation drawings, etc. of the streetlight systems

2.5.7 Procedures for Completion, Commissioning Inspections and Acceptance of the Systems

As stipulated in the Bidding Document regarding the Conditions of Contract. The Procedure for assessing Practical completion is illustrated in the flow chart below. Guarantee tests shall be as specified as per the Inspection and Testing procedure

Pre-Commissioning Procedure – Flow Chart

1. GENERAL INFORMATION
Record general information on the record sheet. "As Built" Schematic Diagram
2. PV MODULES- VISUAL CHECK
Check details. Check for damage. Check module security marking. Array tilt angle. Orientation.
3. MOUNTING STRUCTURE – VISUAL CHECK
Location. The Mounting structure hot dipped galvanized. Bolts installed, as required. Security upgrades in place. Structure earthing (if required).
4. BATTERY
Check details. Check status.
5. CHARGE CONTROLLER
Check details. Check status.
6. LUMINAIRES
Check inventory of lights and light placement. Complete the record sheet and note any comments.
7. EARTHING AND EARTH FAULTS
Are all cables stranded copper wire? Complete the record sheet and note any comments. Earth spikes and earthing as per Certificate of Compliance.
8. FINISH OF WORK
Screw bolts, and nuts tightened. Concrete pedestal. Anti-theft hardware
9. USER TRAINING
The Inspection Officer should also make certain that the In-charge and at least two other staff understand the operation and their responsibilities concerning the maintenance and management of the systems. The installer's responsibility is to explain the basic operation, handling, care and first-line maintenance needs of the streetlight system to the In-charge and staff. Interview form to be filled in. Complete record sheet

10. HANDOVER / SIGNATURE / OTHER DOCUMENTS
Finalize the Completion Certificate to ensure that the system is on-site and installed completely.

2.5.8 Summary of the Project and Activities

Table 13: Project and Activities in Summary

S. no.	Description	Streetlighting coverage	
		Unit	Qty
1	Supply & Testing of All-in-One integrated solar streetlights with galvanized steel pole, complete as per the Specifications	km	**23.43**
2	Provision of Mandatory Spares for the streetlight systems pursuant to the Specifications	km	**23.43**
3	Site Specific Survey & Investigations pursuant to the Specifications	km	**23.43**
4	Road lighting and Electrical & Mechanical related design and engineering as per stipulations of the Specifications	km	**23.43**
5	Detailed engineering including planning, design, and preparation of construction drawings for streetlights installation as per the Specifications	km	**23.43**
6	Provisions of As-Built drawings as per Specifications	km	**23.43**
7	Installation & Commissioning of All-in-One integrated Solar Streetlight with galvanized steel pole and founding concrete pedestal, complete as per the Specifications	km	**23.43**
8	After installation services: Maintenance Services, Spares management, Training, etc. for 60 months as per Specifications	km	**23.43**
9	Training of Employer's staff	L/S	**1**
Notes: Works are cumulated for the 11 project sites, with an average of 2.13 km per site.			

3. REGULATORY, POLICY AND INSTITUTIONAL FRAMEWORK

The preparation of this ESMP was carried out within the context and requirements of the relevant Liberia regulatory and institutional framework, and the relevant environmental and social standards of the World Bank Environmental and Social Framework (ESF). This chapter outlines the policy, legal, and institutional frameworks relevant to the streetlighting and patching of potholes project. The project's compliance with these frameworks is essential to ensure that the environmental and social considerations are adequately addressed in line with national and international regulations and standards.

2.6 NATIONAL POLICY FRAMEWORK

The project triggered the application of several laws and regulations governing environmental protection, land use, and energy development in Liberia. Key legal instruments applicable to this ESMP includes the following.

Table 14: National Policies and Legal Framework Relevant to the Project

Policy	Description	Relevance to the Project
National Energy Policy (2009)	The National Energy Policy of Liberia provides a comprehensive framework for the development of the energy sector. It emphasizes energy security, the promotion of renewable energy sources, rural electrification, and energy affordability.	• Supports the development of renewable energy projects like the Solar Streetlight • Encourages decentralized electrification, aligning with LURP objectives. • Promotes capacity building and institutional strengthening in the energy sector.
National Environmental Policy (2003)	This policy aims to ensure the sustainable management of Liberia's environment and natural resources. It emphasizes the integration of environmental considerations into development planning.	• Requires environmental assessments for projects that may have significant impacts (ie) mandates the conduct of ESIA). • Advocates for public participation in environmental decision-making. • Supports the conservation of biodiversity and ecosystems, relevant to site selection and project planning.
National Renewable Energy Action Plan (NREAP) (2015-2030)	The NREAP outlines Liberia's strategy to increase the share of renewable energy in the national energy mix, in line with the ECOWAS Renewable Energy Policy.	• Set targets for renewable energy generation, which the project contributes to. • Encourages investment in solar energy technologies. • Aim to enhance energy access in rural areas.
Poverty Reduction Strategy (PRS) and Pro-Poor Agenda for Prosperity and Development (PAPD) (2018-2023)	The PAPD is Liberia's national development plan focused on reducing poverty and achieving sustainable economic growth.	• Aligns with goals of improving infrastructure and access to basic services. • Supports initiatives that create job opportunities and improve livelihoods. • Emphasizes the importance of energy access for development.
Liberia Gender Policy (2018)	This policy promotes gender equality and the empowerment of women in all sectors of society.	• Encourages the inclusion of women in project planning and implementation. • Aim to ensure that women benefit equally from development projects.

Policy	Description	Relevance to the Project
		• Addresses gender issues relevant to community engagement and social impacts.
Public Health Law (2010)	**Protects public health by regulating activities posing health risks.**	• **Addresses issues related to waste management and sanitation during construction and operation.** • **Requires measures to prevent pollution and health hazards.**
Decent Work Act (2015)	Provides regulations on labour practices, including employment conditions, occupational health and safety, and workers' rights.	• Mandates fair labour practices and safe working conditions. • Protects the rights of workers involved in the project. • Requires compliance with occupational health and safety standards.
National Environmental and Occupational Health Policy, 2010	Assess the working conditions in major work places, establishes data base, plan and implements workers' wellness programs, for the purpose of protecting and promoting health in the workplace for all workers in Liberia, to provide guidelines and standards for the effective implementation and rendering of occupational health services.	• Requires compliance with occupational health and safety standards
Liberia Electricity Law (2015)	Establishes legal and regulatory framework for the electricity sector; promotes private sector participation and renewable energy development.	• Supports the development of renewable energy projects. • Outlines licensing requirements for electricity generation and distribution. • Encourages access to electricity in rural areas.

2.7 INSTITUTIONAL FRAMEWORK

The successful implementation of the project requires coordination among various governmental and non-governmental institutions. Key institutions include:

Table 5: Institutional Framework

Agency	Mandate	Role in the Project
Ministry of Public Works	Responsible for administering the engineering components, such as surveying, drafting/designing, construction, and supervision of all public infrastructure in Liberia.	Proponent for the Project Approval of all civil works drawings and issue construction licenses to contractors.
Environmental Protection Agency (EPA)	The principal authority for environmental management, protection, and conservation in Liberia.	• Reviews and approves the Environmental and Social Impact Assessment. • Issues Environmental Permits and monitors compliance. • Provides guidelines and standards for environmental protection.

Ministry of Gender Children and Social Protection	The ministry has the mandate to practicalize the Universal Declaration of Human Rights and its related instruments including UN Convention on the Elimination of all forms of Discrimination Against Women (CEDAW); the Convention on the Rights of Children (CRC); the AU Protocols on Women and Children, UNSCR 1325 on Women Peace and Security; and the Beijing Platform for Action	• Benchmark the project achievements on GBV/SH • Provide guidelines of the protection on the rights of children •
Ministry of Finance	Formulate, institutionalize and administer economic development fiscal and tax policies for the promotion of sound and efficient management of financial resources of the government in line with international financial management best practices	• Leading project negotiations with the World Bank. • Overseeing financial management services through its Project Financial Management Unit (PFMU) • Coordinating and monitoring project implementation progress against the work plan/budget.
Local Government Authorities (Monrovia City Corporation (MCC) and Paynesville City Corporation (PCC)	Local governance structures include county, district, and community leadership.	• Provide guidance and contacts as needed for implementing the activity. • Supervision to ensure that the activities in each jurisdiction comply with any relevant procedures related to their waste management mandates. • Facilitates community engagement and stakeholder consultations. • Addresses local socio-economic concerns • Supports conflict resolution and community development initiatives.
World Bank	Provide financial and technical assistance to developing countries around the world to reduce poverty and support economic development. This includes funding infrastructure projects, education, healthcare, and tackling environmental issues to promote long-term sustainable growth.	• The World Bank is providing the funding for this project and as such, it is expected that there will be some oversight of the project by the Bank, especially to ensure that its environmental and social standards are being complied with.

2.8 INTERNATIONAL CONVENTIONS AND AGREEMENTS

Liberia is a signatory to several international conventions and agreements that are relevant to the project. Compliance with these instruments demonstrates the country's commitment to global environmental and social standards.

Table 16: International Conventions

Treaty	Description	Relevance to the Project
United Nations Framework Convention on Climate Change (UNFCCC)	An international environmental treaty to combat climate change by reducing greenhouse gas emissions.	• The project contributes to emission reductions by promoting renewable energy. • Aligns with Liberia's Nationally Determined Contributions (NDCs).
Ramsar Convention on Wetlands	An international treaty for the conservation and sustainable use of wetlands.	• Relevant if wetlands are present near the project site • Requires measures to prevent degradation of wetland ecosystems.
International Labour Organization (ILO) Conventions on Decent Work (C189)	Sets international labor standards, including those related to occupational health and safety, and workers' rights.	• Mandates fair labor practices during construction and operation. • Protects the rights of workers involved in the project.
World Heritage Convention	Aims to identify and protect cultural and natural heritage around the world considered to be of outstanding value to humanity.	• Requires protection of any cultural heritage sites near the project area. • No known World Heritage Sites are in the immediate vicinity, but due diligence is necessary.
ILO Convention 138 and 182 on Child Labor	Convention 138 sets the minimum age for employment; Convention 182 aims to eliminate the worst forms of child labor.	• Ensures prohibition of child labor in project activities • Requires adherence to labor standards.
UN Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)	An international treaty aiming to eliminate discrimination against women and promote gender equality.	• Ensures inclusion of women in project benefits. • Addresses gender issues in employment and community engagement.

2.9 WORLD BANK ENVIRONMENTAL AND SOCIAL STANDARDS (ESS)

As the World Bank funds the project, it must comply with the Bank's Environmental and Social Framework approved in 2016. (ESF 2016) . The ESF sets out the World Bank's commitment to sustainable development through a set of Environmental and Social Standards (ESS) designed to support Borrowers in addressing environmental and social risks and impacts of projects. These policies are designed to prevent and mitigate adverse impacts associated with Bank-funded projects.

2.9.1 Applicable World Bank Environmental and Social Standards

Table 17: Applicable World Bank Environmental and Social Standards

E&S Standards	Brief Description	Objective	Relevance	Description
ESS1	Assessment and Management of Environmental and Social Risks and Impacts	To identify, evaluate, and manage the environmental and social risks and impacts of the project in a manner consistent with the ESSs.	**Relevant.** The project involves construction activities that may have environmental and social risks and impacts requiring assessment and management.	This Environmental and Social Management Plan (ESMP) is prepared to comply with this ESS. The risk assessment and mitigation sections of the report will ensure the project is environmentally and socially sound and sustainable through proper assessment and management of risks and impacts.
ESS2	Labor and Working Conditions	To promote fair treatment, non-discrimination, and equal opportunity of project workers; to protect workers' rights and safety.	**Relevant.** The project will involve hiring workers for construction and operation, necessitating adherence to fair labor practices and safe working conditions.	A Labor Management Plan has been prepared that addresses labor and working conditions for all project workers, including contractors and subcontractors. The content of the LMP adheres to national labor laws, which cover the prohibition of child labor and forced labor and ensure safe and healthy working conditions during construction and operation.
ESS3	ESS3: Resource Efficiency and Pollution Prevention and Management	To promote the sustainable use of resources, including energy, water, and raw materials, and to minimize pollution from project activities.	**Relevant.** The project may involve resource use (materials, energy) and potential pollution risks that need to be managed efficiently.	Ensures efficient use of resources and implementation of measures to prevent and reduce pollution during construction and operation. Addresses management of air emissions, noise, wastewater, waste, and hazardous materials, and promotes energy efficiency in the project design and execution.
ESS4	ESS4: Community Health and Safety	To anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle.	**Relevant.** Construction and operation activities may pose risks to community health and safety that need to be mitigated.	It requires the assessment and management of risks and impacts on community health and safety. It addresses issues such as increased traffic, exposure to hazardous materials, construction-related hazards, emergency response, and infrastructure safety during the construction and operation phases.
ESS10	ESS10: Stakeholder Engagement and Information Disclosure	To establish a systematic approach to stakeholder engagement that helps Borrowers identify stakeholders and maintain a constructive relationship with them.	**Relevant.** The project requires engagement with stakeholders, including local communities, for successful implementation.	Requires the development and implementation of a Stakeholder Engagement Plan (SEP). Mandates ongoing engagement with affected communities, transparent information disclosure, and establishing a grievance mechanism to address stakeholders' concerns throughout the project life cycle.

2.9.2 World Bank Environmental, Health, and Safety Guidelines

The Environmental, Health, and Safety (EHS) Guidelines serve as technical reference materials containing general and industry-specific instances of Good International Industry Practice (GIIP). Whenever a World Bank Group member is part of a project, these EHS Guidelines are implemented per the applicable policies and standards of the member involved. The General EHS Guidelines are intended to be utilized in conjunction with the corresponding Industry Sector EHS Guidelines, which offer advice on EHS matters pertinent to industry sectors.

2.10 GOOD PRACTICE NOTE (GPN)

The Good Practice Note (GPN) or the Good Practice Note - Addressing Gender-Based Violence in Investment Project Financing Involving Major Civil Works outlines clear methodologies for identifying risks of gender-based violence (GBV), particularly Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH), that may arise in Investment Project Financing (IPF) with significant civil works contracts. It provides guidance for Borrowers on effective risk management strategies. Drawing upon the World Bank's experiences and international industry norms, including those from various development partners, the GPN is rich in contextual knowledge. While primarily targeting World Bank Task Teams, the GPN also seeks to enhance the broader understanding of the topic. Issued alongside the World Bank's new 'Environmental and Social Framework' (ESF), the GPN supports Task Teams engaged with new projects under the ESF, as well as ongoing projects that adhere to the older safeguard frameworks prior to the ESF. The Environment & Social Framework for IPF Operations Good Practice Note on Road Safety on addressing road safety on World Bank financed operations.

2.10.1 Environmental Health & Safety Guidelines for Construction Materials Extraction[1]

The World Bank Environmental Health & Safety Guidelines for Construction Materials Extraction comprises information pertinent to the extraction activities of construction materials, including but not limited to aggregates, limestone, slates, sand, gravel, clay, gypsum, feldspar, silica sands, and quartzite, as well as dimension stone extraction. It covers both independent projects and extraction activities that support construction, civil works, and cement projects. Although the guidelines for construction materials extraction highlight large-scale and complex operations, they apply to smaller-scale operations as well. The document also discusses environmental concerns that arise during the operational, construction, and decommissioning phases of construction materials extraction, focusing on issues like air emissions, noise and vibrations, water, waste management, and land conversion.

[1] 113619-WP-ENGLISH-Construction-Materials-Extraction-PUBLIC.pdf

2.10.2 Gap Analysis between National Regulations & World Bank ESF

Table 18: Analysis of Gaps between National Regulations and World Bank ESF

Issue/Topic	Liberia Legal Requirement	WB Policy Requirement	Gap & Proposed Mitigation to Bridge Gap
Grievance mechanism and dispute resolution	various legislative measures exist in Liberia for persons to lodge complaints for redress	Appropriate and accessible grievance mechanisms to be established	**Gap:** No intermediate avenues for redress other than ADR and a court of law under Liberia laws. **Mitigation:** The existing project GRM for the LURP will be used. The GRM will be accessible, reliable and transparent.
Information and consultation	A compulsory acquisition of land shall not be undertaken by the State without consultations with the PAPs, traditional authority and community leaders and their concerns taken into consideration before implementation in Liberia (Provide the applicable laws)	Displaced persons and their communities are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement.	**Gap:** Under Liberian laws, no clear parameters on consultation with affected persons and affected persons are also not kept abreast with the project timelines leaving them unprepared to fit into implementation schedules. **Mitigation:** Displaced persons and their communities will receive timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Detailed public consultation plan and communication strategy will ensure informed participation throughout the project life.

Table 18: Summary of Gap Analysis

Table 69: Gap Analysis between National Regulations & World Bank ESF

ESF	Applicable local legislation	Addressing gaps
Assessment & Management of Environmental & Social Risks and Impacts **ESS1 requires that borrowers identify and manage environmental and social risks associated with a project, including through conducting an environmental and social assessment during the project preparation stage. Establishes a mitigation hierarchy which instructs borrowers first to anticipate and avoid risks and impacts; then to minimize or reduce risks and impacts to acceptable levels; then once risks and impacts have been minimized or reduced, mitigate; and finally, where significant residual impacts remain, compensate for or offset them. Instructs borrowers to ensure that project negative impacts do not fall disproportionately on those who might be disadvantaged or vulnerable, and to ensure that all groups have access to project benefits.**	**Environment Protection Agency Liberia Law 2002** An Act to establish a monitoring, coordinating and supervisory authority for the sustainable management of the environment in partnership with regulated Ministries and organizations and in a close and responsive relationship with the people of Liberia; and to provide high-quality information and advice on the state of the environment and for matters connected therewith. It **provides** for a wide-ranging responsibility for environmental management by the EPA. One of the most	The EPA Act does broadly adequately cater for identifying and managing Environmental and Social risks. Where there are gaps relating to standards and guidelines, those relating to ESS 1 will be adopted. EPA's EIA Process allows for adopting higher standards **Part 5, Section 37 of the EPA Act:** **Section 37** **Environmental Impact Assessment** 1) The Agency shall require that an environment impact assessment be undertaken on all projects, policies, programs and activities specified by the Agency in consultation with relevant ministries and agencies and published by notice; 2) A developer, or project proponent, shall not commence, carry out, execute, implement or conduct a project or activity for which an environmental impact assessment is required unless an environmental impact assessment has been concluded and an environmental

ESF	Applicable local legislation	Addressing gaps
	prominent issues are the need for the development of administrative procedures for the preparation of EIA to ensure effective environmental governance. The required administrative procedures and how they are arranged to reflect the intent of the law is the subject of the following guidelines. **Environmental Impact Assessment Procedural Guidelines, 2006** It provides guidance on the EIA process and has been evident since the establishment of the EPA. It sets out the processes and procedures from applying for EIA to the EPA to the issuance of environmental permit.	regulation made there under; 3) A licensing or permitting agency or authority under any law in force in Liberia shall not issue a license for any project for which an environmental impact assessment is required under the Act, unless the applicant produces to the licensing agency or authority an environmental impact assessment license or permit issued under this Act and the regulations made there under; and 4) The Agency shall establish all rules, regulations and procedures relating to the implementation of the environmental impact assessment requirement under this Act, which shall be reviewed five years after the implementation date to assure their effectiveness.
Labor & Working Conditions **ESS2 requires that borrowers ensure safe labor and working conditions in Bank-financed projects. Prohibits the use of forced or child labor in Bank-financed projects. Borrowers must provide a grievance mechanism for project workers, including sub-contracted workers.**	**Labor Laws of Liberia** **Decent Work Act of Liberia, 2015** Provide a synopsis of applicable labor laws, occupational health and	Although some labor laws are old and outdated, labor laws have been drawn up for the project that is in line with the requirements for ESS2. These will be acceptable to the Government of Liberia as the country also subscribes in principle to many of the labor laws of the ILO and the UN and many of the international Human Rights Laws. Contractors will also be required to adopt many of the practical

ESF	Applicable local legislation	Addressing gaps
The requirements are guided in part by several international conventions negotiated through the International Labor Organization (ILO) and the United Nations (UN). The specific objectives are: To promote fair treatment, non-discrimination, and equal opportunity for workers. To establish, maintain, and improve the worker- management relationship. To promote compliance with national employment and labor laws. To protect workers, including vulnerable categories of workers such as children, migrant workers, and workers engaged by third parties, and to promote safe and healthy working conditions, and the health of workers. To avoid the use of forced labor.	safety, conditions of service, contracts etc.	aspects of ESS2 implementation through stipulated requirements specified in the ESMPs and Contractor Labor Management Plans.
Resource Efficiency and Pollution Prevention and Management **ESS3 recognizes that economic activity and urbanization often generate pollution of air, water, and land, and consume finite resources that may threaten people, ecosystem services, and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention, and GHG emission**	**Environmental Protection and Management Law of Liberia, 2002** **EIA Procedural Guidelines, 2006** Sets out the processes and procedures involved in the conduct of Environment and Social Impact Assessment	Although there are gaps with ESS3 and national regulations such as the EPML, management measures are also being sourced from ESS3. These measures will be acceptable to the Government of Liberia. Contractors will be required to adopt industry-specific guidelines to promote and support sustainable use of natural resources and complement them with appropriately developed modern technologies.
Community Health and Safety **ESS4 addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of**	**New Public Health Law of Liberia, Title 33**	It is therefore the obligation of the Liberian government to create and promote safety policies aimed at protecting workers from workplace injuries, death, and other associated illnesses. Environmental health and safety management is an important component of a safe work environment

ESF	Applicable local legislation	Addressing gaps
their circumstances, may be vulnerable. It recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impact and must be eliminated, prevented, mitigated or reduced		because it protects human health and safety in the workplace. In cases where the New Public Health Law does not address an issue, the relevant provisions of ESS4 will be adopted which is allowable under the Liberian Governance system
Stakeholders' Engagement and Information Disclosure **ESS10 recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. Stakeholder engagement is an inclusive process conducted throughout the project life cycle. When properly designed and implemented, it supports the development of strong, constructive, and responsive relationships that are important for successful management of a project's environmental and** **social risks. Stakeholder engagement is most effective when initiated at an early stage of the project development process, and is an integral part of early project decisions and the assessment, management,** **and monitoring of the project's environmental and social risks and impacts.**	Environmental Protection and Management Law, 2002. The EPML provides the legal basis on which stakeholders shall be consulted during and throughout the project life cycle. EIA Procedural Guidelines,2006, sets out the procedures involved in conducting stakeholder consultation during the conduct of an Environmental and Social Impact Assessment	The EPML do not required the preparation of a Stakeholders' Engagement Plan (SEP). The project has adopted and prepared a SEP as part of the compliance process to ESS10.

4. BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

This section provides a detailed overview of the current environmental and social conditions at the proposed project location. It begins with an overview of the general context from the national perspective and narrows down to the project host environment.

4.1 OVERVIEW

4.1.1 Project Location

The proposed project operations will be conducted in the Greater Monrovia region of Liberia, where a quarter of the country's 4.5 million populace resides. This area is especially prone to flooding due to its low-lying and flat terrain, high rainfall, and socio-economic challenges like fragility and poverty, exacerbated by climate change. The Mesurado wetlands, a certified Ramsar site, are within this region. Key infrastructure including 30 kilometers of main roads, 35% of schools, and 14% of hospitals are at risk in flood zones. From 1975 to 2014, Greater Monrovia's built-up area expanded by 0.37 per cent annually, with 104sq.km now in flood risk zones. A projected one-meter sea level rise by the century's end could endanger 230,000 people and result in US$250 million in losses, striking 2,150 square kilometers of coastal land. Post-civil wars from 1989 to 2003, which disrupted infrastructure and commercial activities, there is a hopeful yet slow recovery and rebuilding process, with some progress in diversifying the economy and improving social indices.

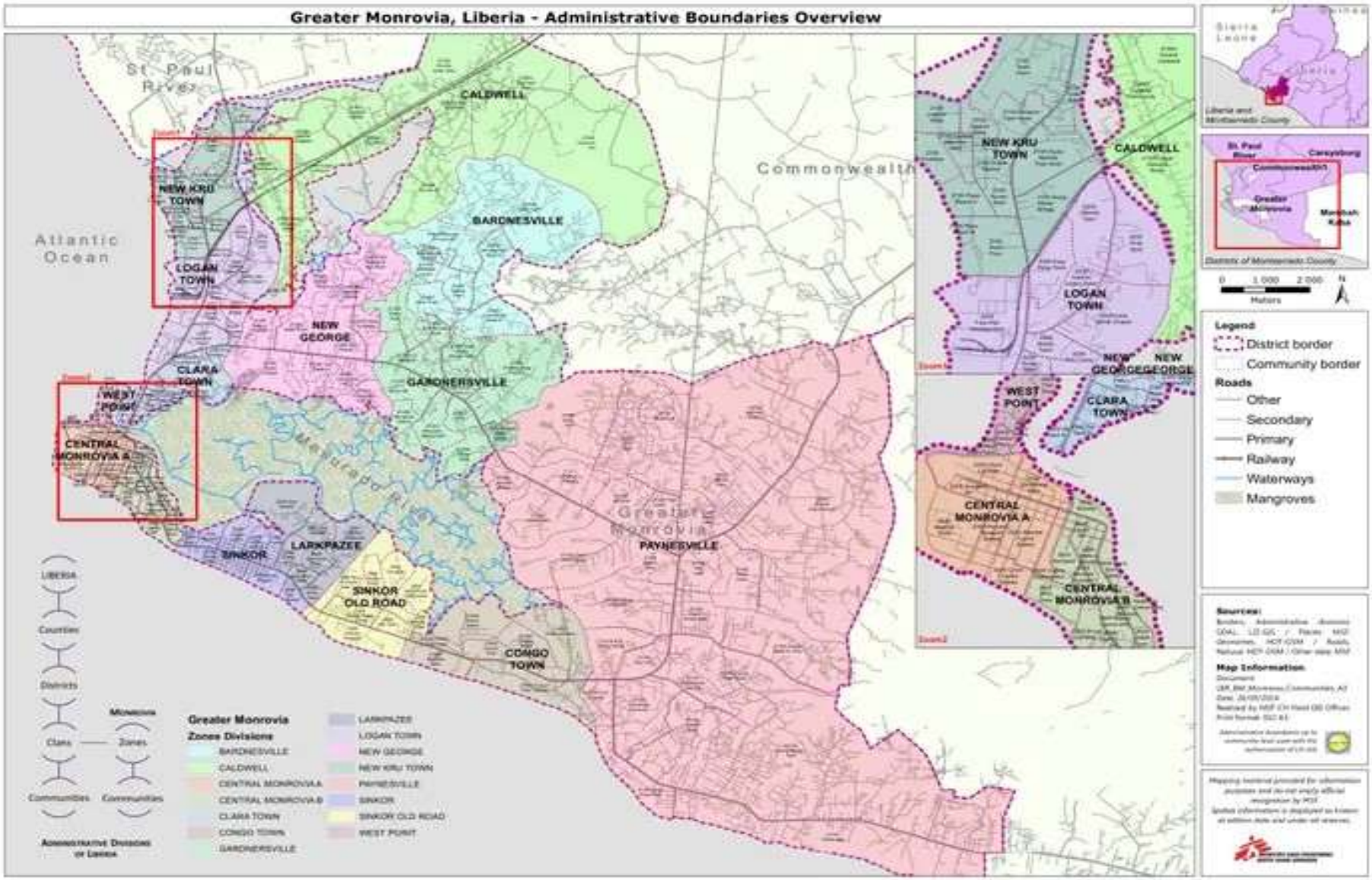

Figure 3: Map Showing Administrative Boundary of Greater Monrovia

Source 1: Sources: Borders, Administrative divisions: GDAL, LIZ-GIS / Places: MSF, Geonames, HOT-OSM / Roads, Natural: HOT-OSM / Other data: MSF

4.2 SETTING FOR SOCIO-ECONOMIC BASELINE CHARACTERISTICS

The proposed subprojects will be implemented in Greater Monrovia. Greater Monrovia is the capital region of Liberia and the nucleus of the country's economy. Over 40% of Liberians live in Greater Monrovia, which comprises the cities of Monrovia and Paynesville as well as 12 smaller townships[2]. In addition to a literature review of available statistics, field visits were undertaken in the potential project-affected areas, and a total of 100 individual households were sampled during the screening phase of the project. Besides, the team consulted community leaders and business owners, informing them about the project and acquiring their contact information to aid in planning the upcoming community engagement meetings.

4.3 ETHNICITY AND RELIGION

Liberia's population is 97% indigenous, with 3% being Americo-Liberians. Indigenous tribes, maintaining traditional beliefs and dialects, speak Niger-Congo languages found across Sub-Saharan Africa. Women traditionally hold significant roles, with practices including female circumcision. Both monogamy and polygyny are practiced, with marriage often seen as a practical arrangement between families, involving bride price payments. Liberia is ethnically diverse, home to 16 ethnic groups and practices Christianity (85%), Islam (12%), and indigenous religions (3%). Greater Monrovia is the hub of political, economic, and social activities, boasting better education, health, security, and infrastructure standards, and represents all major tribes. Religion-wise, Christianity and Islam are prevalent, with some adherence to traditional beliefs.

4.4 GENDER ISSUES

Liberia faces significant gender disparities, particularly in women's access to productive assets and decision-making roles as noted in the National Gender Policy (2009). Despite progress post-civil war, deeply ingrained traditional and religious views still promote male superiority, sidelining women from economic opportunities and leadership positions. This is underscored by societal norms assigning strict roles based on gender across various sectors including education and employment.

4.5 LAND TENURE, OWNERSHIP

In Liberia, land is owned under a dual system comprising traditional and statutory tenures as outlined by the 2018 Land Rights Act, categorizing land into public land, government land, customary land, and private property. Securing vacant land in Greater Monrovia is increasingly difficult. However, the project locations are government owned and poses very limited interference with private land ownership.

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4.6 ACCESS TO WATER SUPPLY WATER AND SANITATION

Potential PACs have access to borehole wells, hand pumps, and vendor-sold sachet water, managed by the Liberia Water and Sewer Corporation in Greater Monrovia. These sources are primarily used for drinking and domestic purposes. Improved sources like piped water, boreholes, and hand pumps are considered safer, while non-improved sources such as unprotected wells and surface water are riskier and may negatively impact health.

[2] Greater Monrovia Urban Development Strategy | Cities Alliance

Poor sanitation and unsafe water sources increase the risk of water-borne diseases such as dysentery, diarrhea, and typhoid fever. The lack of proper toilets and improper disposal of fecal matter exposes communities to health risks. Improved sanitation facilities significantly reduce disease contraction. Frequent exposure to feces, especially through practices like open defecation on beaches and dumpsites, poses significant health risks to all age groups, particularly children, the disabled, and the elderly. Few households have pit latrines, and public latrines, though provided, come at a considerable cost to community members.

4.7 WASTE MANAGEMENT

Apart from investments in Potholes patching and solar streetlights, the project also covers sanitation (removal of waste from side drains and culvert sections). In general, waste generation and the need for disposal in Liberia's urban population is growing, resulting in poor waste collection and insufficient disposal facilities. Solid wastes affect the quality of surface and groundwater in metropolitan settings. Residing in the vicinity are also exposed to health dangers because of inefficient garbage management.

4.8 SCHOOLS

At the secondary school level, Liberia's education system is divided into three categories: primary (elementary), middle (junior high), and secondary school (senior secondary education). Liberia's elementary (years 6-12) and junior high (ages 12-15) schools are both free and compulsory, though enforcement is difficult.

4.9 LIVELIHOOD STRATEGIES

4.9.1 Employment

Employment can be categorized as regular (formal) or non-regular (informal). Employment statistics generally cover persons aged 15 to 65, the recognized working age range globally. Regular employment involves a formal, often long-term contract in areas like companies, retail, or domestic work. Non-regular employment includes more short-term, informal jobs such as trading, running small shops, carpentry, and some paid farming activities. Liberia's official unemployment rate was 2.34% in 2016 (Statista, 2018).

4.9.2 Income and Expenditure

The predominant sources of income are businesses, fishing, and farming (gardening). In terms of expenditure, most households referred to education, health, and transportation as being some of their highest expenditures. However, Bike/Kekeh riding is another huge source of income in Greater Monrovia. This economic activity is occupied by young men who are dominantly high school graduates. They commute with passengers, including marketers, from one point to another destination between PCAs and/or outwardly.

4.9.3 PACs Access Roads and Markets

Greater Monrovia features numerous market districts and commercial centers. In the affected project communities, Omega and Duala are prominent markets, with smaller markets like GSA Road also present. The region hosts various shops selling construction materials, pharmaceuticals, provisions, and food, along with entertainment venues and vehicle and petrol stations positioned along key streets. Commercial motorcycle riding is a significant income source, predominantly among young men who facilitate the movement of merchants and goods. When motorbike access is restricted, walking becomes an alternative.

4.10 BIOLOGICAL /ECOLOGY

The location of the projects is predominantly urban built environment, and this is a clear indication that sensitive vegetation and wildlife are absent from the area. Rapid urbanization and developmental activities in the past decades have completely modified the previous natural environment thereby establishing human ecosystems. There are no sensitive habitats or endangered or threatened species of flora and fauna in this urban environment

4.11 WATER BODIES

The proposed project work activities will have no significant impacts on water bodies. However, two of the proposed existing roads for rehabilitation such as SKD Boulevard and police academic route are constructed along water bodies.

5. ENVIRONMENTAL AND SOCIAL RISKS, IMPACTS AND MITIGATION MEASURES

This section provides a summary of the expected environmental and social risks and impacts associated with the proposed patching of potholes and installation of solar streetlights as part of the LURP Project. All environmental and social risk and impact screening has been done following the World Bank Environmental and Social Framework as well as relevant Liberian national guidelines. The information presented here is derived from data gathered and assessments conducted during fieldwork specifically undertaken for the preparation of this Environmental and Social Management Plan (ESMP) report.

5.1 RISK SCREENING

To study the risks and impacts involved with the project, risk screening criteria based on WB ESF were employed as shown in Table 20 and the risk assessment for this project is presented in Table 21. The overall risk level is **Moderate** based on the following assessment, which is a result of an E&S screening conducted on September 10, 11, 12 and 13, 2024.

Table 20: Risk Classification criteria during screening

Risk Category	Screening Criteria
High	The resource/receptor would likely experience a large magnitude impact that would endure for a long time, extend over a large area, exceed national/international standards endanger public health and safety, threaten a species or habitat of national or international significance, and/or exceeds a community's resilience and ability to adapt to change. The Project may have difficulty complying with the applicable ESF requirement and significant mitigation would likely be required.
Substantial	The resource/receptor would experience a clear change from baseline conditions and would approach but not exceed applicable standards. The project would comply with the applicable ESF requirement, but mitigation would be required.
Moderate	The resource/receptor would experience a noticeable effect, but the magnitude of the impact is sufficiently small (with or without mitigation) that the overall effect would remain well within applicable standards. The project would comply with the applicable ESF requirement, but mitigation may be required.
Low	The resource/receptor will either not be affected, or the likely effect would be imperceptible or indistinguishable from natural background variation. The Project would comply with the applicable ESF requirement and mitigation would typically not be required.

5.2 ANTICIPATED POSITIVE IMPACTS OF THE PROJECT

Table 25: Positive Impacts of the Project-Streetlights

Potential Positive Impacts	Description
Enhanced Visibility and Security	• **Improved Nighttime Illumination:** Solar streetlights provide consistent lighting at night, which enhances visibility for pedestrians, cyclists, and drivers. Better-lit areas can reduce the risk of accidents and deter criminal activity. • **Increased Perception of Safety:** Well-lit streets can help residents feel safer in their neighborhoods, encouraging them to spend more time outdoors, which can foster community engagement.
Reduction in Crime Rates/Deterrent Effect	Studies have shown that proper lighting can deter criminal behaviors. Better-lit areas can reduce incidents of theft, vandalism, and violence, therefore directly improving community safety.
Promotion of Physical Activity	**Encouragement of Outdoor Activities:** With better lighting in public spaces, residents are more likely to walk, jog, or engage in outdoor activities after dark, contributing to physical health and well-being.
Environmental Benefits	• **Reduced Pollution and Carbon Footprint**: Solar streetlights rely on renewable energy, reducing reliance on fossil fuels. This contributes to better air quality and fewer health issues related to pollution, indirectly benefiting community health. • **Sustainable Practices:** Implementing solar lighting solutions promotes environmental responsibility and awareness within the community.
Cost Savings for Communities/Lower Energy Costs	Solar streetlights reduce electricity costs for municipalities, allowing funds to be redirected toward other health and safety initiatives in the community, such as improved emergency services or community programs.
Resilience During Natural Disasters/Power Independence	Solar streetlights can continue to function during power outages, such as those caused by storms or disasters, contributing to community safety and navigation in critical situations.
Support for Mental Health	• Well-Lit Public Spaces: Improved lighting can lead to more attractive public areas, encouraging social interaction and outdoor activities, which are linked to better mental health outcomes. • Reduction of Fear and Anxiety: Knowing that public spaces are adequately lit can reduce feelings of anxiety and fear associated with crime or accidents.
Accessibility for Emergency Services/Easier Navigation	Better lighting improves visibility for emergency responders, allowing for quicker response times during crises, which is crucial for community health and safety.

In summary, the proposed solar streetlights will significantly enhance the health and safety of a community by improving visibility, reducing crime, fostering physical activity, promoting environmental sustainability, and increasing resilience during emergencies. These benefits not only contribute to immediate safety but also enhance the overall quality of life for community members.

Table 26: Positive Impacts of the Project (Potholes Patching)

Positive Impacts	Description
Enhanced Safety	The proposed project aims to minimize incidents such as tire damage, suspension failures, and accidents caused by swerving to avoid potholes. This could lead to a reduction in road-related injuries and fatalities.

Positive Impacts	Description
Increased Road Longevity	By addressing and repairing potholes, the overall stress on the road surface will be significantly lessened. This can prevent further damage and decay, thus extending the lifespan of the road.
	Increased Road Longevity: By addressing and repairing potholes, the overall stress on the road surface will be significantly lessened. This can prevent further damage and decay, thus extending the lifespan of the road.
Improved Traffic Flow	Optimally paved roads will reduce the necessity for drivers to slow down or detour around damaged sections. This can result in smoother and faster commutes, with more predictable travel times.
Economic Benefits	Fewer vehicle repairs will be needed due to reduced damage from the road, a factor that can translate into cost savings for individuals and businesses. Moreover, smoother roads can enhance fuel efficiency due to reduced idling and acceleration events.
Increased Property Values	Neighborhoods benefitting from better road conditions can experience a rise in property values due to the improved accessibility and aesthetic of the area.
Positive Environmental Impact	By reducing the number of cars idling, slowing, and accelerating to avoid potholes, there can be a slight reduction in vehicle emissions. Additionally, well-maintained roads cause less wear and tear on tyres, decreasing the amount of particulate matter released into the environment.
Better Emergency Services Response	Improved Road conditions ensure that emergency vehicles can travel more swiftly and safely, potentially improving outcomes in critical situations.

5.3 Adverse Impact Assessment Matrix for the Streetlight & Potholes Rehabilitation Project

Table 21: Impact Assessment Matrix for the Streetlight & Potholes Rehabilitation Project

E&S Risks and Impacts	Risk Rating		Rationale	Project Components	
	Construction	Operation		Streetlights	Potholes
ESS1 Assessment and Management of E&S Risks and Impacts					
Vulnerable Group **Physical/economic displacement**	**Low** **Low**	**Low** **Low**	The proposed project will have no physical or economic displacement as the project will use the existing corridor and Right of Way, requiring no additional land. It will improve mobility and visibility for populations in the project areas and increase economic viability for groups are likely, with low impact during operation.	Not Applicable Both projects will have no impact on Vulnerable groups.	
ESS 2 Labor and Working Conditions					
Poor working conditions	**Moderate**	**Low**	Poor working conditions are common problems with most construction projects. However, the project is	Applicable	

			moderate in scale and will require workers who mostly are from within the PACs thus eliminating the potential working conditions that are associated with large-scale projects camps.	
Worker accommodations	**Moderate**	**Low**	Providing suitable housing for workers is a frequent issue in many Liberian construction projects. This project is moderate in size and will mainly employ workers from the Project Affected Communities (PACs), reducing concerns about accommodation. No migrant workers will be involved, as the workforce will primarily consist of local construction workers. Nevertheless, it's important to adhere to the World Bank Standard measures regarding workers' accommodation.	Applicable
Child Labor	**Moderate**	**Low**	Child labor is a prevalent issue in Liberia, and age verification is challenging. The project risks involving children, threatening their security and rights. However, the social survey conducted suggests a low likelihood of local children's involvement in child labor due to high youth and adult unemployment.	Applicable
Occupational Health and Safety	**Substantial**	**Low**	Occupational health and safety of the workforce road users and pedestrians is one of the risks and impacts to likely occur during the project. During construction, workers could be exposed to various health risks and hazards. Accidents and health hazards are likely during the clearing of	Applicable

			potholes, risk of falls from streetlight poles, and operation of construction vehicles such as excavators and dump trucks likely to have an impact on health and safety. The laborers could encounter injuries and accidents (sometimes casualties) in a lack of adequate safety measures.	
ESS 3 Resource Efficiency and Pollution Prevention Management				
Air Pollution (Dust)	**Moderate**	**Low**	Air pollution is likely near the project area due to machine operation, excavation, and construction activities. Dust and noise from crusher plants, batching, and bitumen-mixing plants near settlements can cause disturbances to residents, schools, religious sites, and health facilities. Transportation and excavation activities will increase dust pollution along the patching activities. Increased traffic during the operation period may raise PM10 and PM2.5 levels above safe standards, posing public health risks.	Applicable
Potential hazards **caused by concrete, cement and bitumen.**	**Moderate**	**Low**	The use of hazardous materials for roads such as concrete mortar, cement, bitumen etc. is inevitable during the time of construction. The storage of such material should be met by special precautionary measures. Containers of such chemicals such as bitumen drums often are damaged during transit, leading to a leakage in storage places that often are not or are not adequately cleaned up afterwards.	Applicable

Noise pollution	**High**	**Moderate**	Noise pollution is expected from operations such as excavators, concrete-mixing, and other machinery during pothole patching. During operation, noise levels will likely rise due to traffic, engine vibrations, tyres noise, and frequent use of pressure horns.	Not applicable	This will occur during the patching activities
Solid Waste generation	**Moderate**	**Low**	Solid waste will be generated during the pothole patching. As for the streetlights, solid waste from discarded packaging materials if not managed properly can accumulate as waste within the project intervention communities.	Both	
Pollution of Water Resources	**Low**	**Low**	In the project's intervention area, no surface water will be affected by the various activities. However, some communities in the project have self-dug wells that are frequently uncovered. As a result, dust generated from project activities, such as pothole repairs, could lead to minimal to low-level pollution of these exposed wells.	Both	
Land use and Acquisition involving disruption of livelihood	**Low**	**Low**	The proposed project will have no impact on the land as it will use the existing corridor and Right of Way, thus requiring no additional land.	Both	
ESS4 Community Health and Safety					
Traffic congestion/disruption	**High**	**Low**	The project, especially the patching of potholes, will affect the local traffic within the project area. Some road users, especially commercial motorcyclists are noted for violations of temporary road closures. There is a high likelihood of deliberate	Both	

			intrusions during the patching of potholes within these project areas. A traffic management plan has been prepared to address these issues.		
Traffic and Road Safety	**Substantial**	**Substantial**	With an improved road, vehicular traffic will increase and over-speeding in busy sections of the road might occur, thereby increasing the risks of accidents in overcrowded areas within some of the PACs.	Not applicable	Applicable
Ecosystem Services	**Low**	**Low**	The project will be implemented in urban areas. The natural vegetation or ecosystem within the se area has long since been affected and removed by anthropogenic activities, hence the current ecosystem is now built or human ecosystems.	Not applicable to both	Not applicable to both
Community Exposure to Health Issues and Labor Influx	**Low**	**Low**	As indicated in the previous section, the Project is moderate in terms of scale. There will be no influx of immigrant and migrant labor force, and no potential for the host communities to be exposed to the risk of various communicable diseases including STDs. Notwithstanding, the use of concrete mixers or bitumen has the potential to emit pollutants within some of the PACs.	Applicable	Applicable
Hazardous Materials	**Low**	**Low**	The Project will use a variety of hazardous materials and transport these materials through several local communities along the access road. The usage of hazardous materials	Not applicable	Applicable

			by the project is likely to create risk and impact in the project area.		
Emergency Preparedness and Response	**Moderate**	**Low**	The Project will pose minimal or low risks to local communities. Some of these minimal or low risks include falls of streetlight poles during installation, traffic accidents, fuel spills, etc. The project has developed an emergency preparedness and response plan to address these issues.	Applicable	Applicable
Gender-Based Violence (GBV)/Sexual Exploitation and Harassment (SEA) and Sexual Harassment (SH)	**Moderate**	**Low**	GBV is prevalent in Liberia due to unequal gender relations and discrimination towards women in both the public and private spheres. Notwithstanding, the moderate size of the Project makes the occurrence of GBV to be low as there will be no large labor influx and stress on local communities. However, measures will be put in place to mitigate any case of GBV/SEA & SH.	Applicable	Applicable
ESS 5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement					
Land Acquisition	**Low**	**Low**	The proposed project will have no impact on communal or private land as it will use the existing corridor and Right of Way, thus requiring no additional land.	Not Applicable	Not Applicable
Economic and livelihood Displacement	**Low**	**Low**	The proposed project will have no economic displacement as the project will use the existing corridor and Right of Way, requiring no additional land. It will improve mobility for vulnerable populations in the project areas Economic benefits for vulnerable groups are likely,	Not Applicable	Not Applicable

			with low impact during operation.		
Physical displacement	**Low**	**Low**	The proposed project will have no physical displacement as the project will use the existing corridor and Right of Way, requiring no additional land. It will improve mobility for vulnerable populations in the project areas Economic benefits for vulnerable groups are likely, with low impact during operation.	Not Applicable	Not Applicable
ESS 7: Indigenous Peoples					
Free Prior and Informed Consent (FPIC)	**Not Applicable**	**Not Applicable**	There are no indigenous communities present in Liberia, particularly within the PACs. The affected households and entities identified are primarily comprised of Christians and Muslims. Therefore, the adoption of the FPIC process is not necessary.	Not Applicable	Not Applicable
ESS 8: Cultural Heritage					
Tangible Heritage	**Low**	**Low**	Along the project road, there are several mosques, temples, churches, schools, colleges, madrasahs, etc. There is no historical archaeological site within the project-influenced area alignment.	Not Applicable	Not Applicable
Intangible Heritage	**Low**	**Low**	No impact is expected based on the socio-economic survey.	Not Applicable	Not Applicable
ESS 10: Stakeholder Engagement and Information Disclosure					
Continuous engagement of stakeholders during implementation	**Low**	**Low**	Extensive consultations are ongoing within the PACs. The aim was to provide awareness regarding the project implementation and potential E&S risks and impacts and how the communities participation is essential to address those risks and	Applicable	Applicable

			impacts identified. . Knowledge about the project is high among the PACs.		
Issues Related to the project	**Low**	**Low**	Construction/installation of streetlights and patching of Potholes.	Applicable	Applicable

5.4 ANTICIPATED ADVERSE IMPACTS AND RISK AND MITIGATION MEASURES

5.4.1 Impact during Construction Phase (Potholes Patching)

During the patching or rehabilitation of potholes, activities such as site formation, removal of unwanted material, installation work, and other activities are major activities that will be undertaken and are potential sources of impact.

Table 22: Summary of Project Impacts-Rehabilitation/ Patching of Potholes

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
Increase in amounts of fugitive dust, exhaust fumes and GHGs from movement of heavy-duty vehicles and equipment into work areas	• Dust generation during the cleaning of the debris • Dust generation due to the movement of vehicles • Emission of pollutants from vehicular exhaust • Unloading of raw materials • Removal of unwanted waste material • Accumulation of excavated earth material • Emissions from construction machinery, trucks, and hot mix asphalt (HMA) plants • Dust generation during excavation and material handling.	Fugitive dust generation-Particulate Matter (PM<2.5µm, PM<10µm), Sulphur dioxide (SO2), and Oxides of nitrogen (NOx)	• Site workers • Nearby residents • Local Environment	• Regular water sprinkling should be done to avoid dust materials • Minimization of vehicular movement • Ensure all vehicles and machines are serviced before being brought to site • Reuse excavated material within the boundary • Cover haul vehicles with tarpaulin/plastic sheet • Dust suppression measures will be applied where necessary through the watering of and road section. • Ensure construction equipment meets minimum emission standards by ensuring maintenance and minimizing idling time

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
Soil Quality/Land	• Earthwork, installation and construction activities, excavation and foundational work	• No adverse impact on land use as the proposed corridor is an existing road. • Impact on surrounding land use is negligible as all the required materials will be stored in the designated area within the project boundary.	• Local Environment	• The existing corridor ensures no adverse impacts on land use. • All required materials will be stored within the designated project boundary, minimizing impacts on surrounding land use.
Water Management	Construction activities such as mixing concrete, mortar, etc.	• Pressure on water resource • Runoff from the construction site carrying pollutants such as oils, greases, and chemicals which could contaminate local waterways. • Disturbance of soil leading to sediment-laden runoff. • Potential leakage of harmful substances from disposed materials	• Local Environment	• Minimize water and implement recycling of wastewater
Solid Waste and Generation of spoils and other excavated materials	• Construction activities • Debris, waste concrete, discarded material • Disposal of excavated materials and waste asphalt which could contribute to landfill overflow • Potential leakage of harmful substances from disposed materials.	Generation of solid waste	• Nearby residents • Project site • Local Environment	• Reuse of materials • Implementation of waste management • Timely collection and disposal of waste • Ensuring the proper collection and disposal of waste, including debris from pothole repairs and used asphalt, at approved disposal sites. • Reuse old asphalt from damaged sections as patching material on other unpaved roads where feasible to minimize waste

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
Resource Use	The materials used for filling and sealing potholes, such as asphalt and concrete, require significant energy for production and transport	• Pressures on natural resources • Resource depletion and environmental degradation	• Local Environment	• Prioritize the Use of Natural Resources sustainably
Increase in noise level above permissible noise level, (90dB)	• Operation of construction equipment, and movement of vehicles.	Noise pollution from use of equipment/machines	• Site workers • Nearby residents	• Adherence to speed limit by vehicles • Provision of PPE (earplugs/earmuffs.) to workers operating major noise-generating equipment • Limit noisy construction activities to daytime hours to minimize community disturbance • Select and use vehicles/ equipment with lower sound power levels. • Ensure vehicles/ equipment not in use are turned off.
Community Relations	• During project implementation • Traffic disruption during road closures and diversions. • Increase in commuting time and vehicle operating costs for road users. • Safety risks associated with construction activities.	• Protest and community agitation • Restricted access to residences, businesses, and public services causing inconvenience and potential economic losses.	• Site workers • Nearby residents • Local Environment	• Hold community consultations before starting the project to inform residents about the works, expected duration, and potential disruptions. • Establish a grievance redress mechanism (GRM) to allow community members to report concerns or issues during the project • Implement effective traffic management plans including clear signage and alternative routes. • Coordinate with local authorities for the least disruption during peak hours and special events. • Communicate clearly with the public about expected timelines and disruption

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
Risk to community health and safety	• Work-phase during project implementation • Undefined work stations • Absent of information regarding health and safety on site	• Injuries • Distortion of work •	• Site workers • Intruders • Nearby residents	• Provide adequate first aid, first aiders, PPE, signages, engineering barriers e.g. barricades • Ensure that the staging areas are always cordoned off • Safety measures to include where appropriate: flashing warning lights to be installed on sites, reflective warning signposts along the project area, concrete barriers, reflective tapes, access slabs for easy access and safety of the communities especially for physically challenged persons. • Consultations with community members on safety requirements is relevant to promote community health and safety. • Restrict unauthorized access to all areas of high-risk areas
Labor Management	• During project implementation • Non-involvement of locals	• Protest and agitation by workers	• Site workers • Nearby residents • Local En vironment	• Ensure contractors prioritize local employment for the patching works to support community livelihoods and their behavior with the community dwellers • Fair employment contracts/conditions • Upholding the rights of workers • Records of workers statistics
Traffic Management	• During project implementation • Traffic disruption during road closures and diversions. • Increase in commuting time and vehicle	• Protest and community agitation?? • Restricted access to residences, businesses, and public services causing inconvenience and potential economic losses. • Delay in travel time	• Site workers • Nearby residents • Local Environment	• Contractors submit traffic management/diversion plans in consultation with local authorities to minimize disruptions during patching works, using signage and barriers to guide road users. • Use public awareness campaigns (e.g., radio announcements, signage) to

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
	operating costs for road users. • Safety risks associated with construction activities. • Road Traffic Accident/ Delay in travel time	• Accidents		inform the public about work locations and alternate routes where necessary
Occupational accidents and injuries from the use of machinery and equipment	• Faulty equipment • Faulty tools • Improper PPEs • Non application of OHS • Non application of security measures	• Injuries • Accidents	• Workers • Intruders	• Ensure OHS system is in place and operational • Implement OHS plan • Workers should get a daily induction/toolbox • Provision of adequate first aid, first aiders, PPE, signages, engineering barriers • Restrict unauthorized access to all areas of high-risk activities including staging areas. • Ensure all Incident/accident are reported to the PMU • Ensure appropriate security measures
Unemployment of community members during Mobilization	Contractor having the sole authority to employ or contract work out. Low qualifications of many community dwellers. •	• Risk of community members not cooperating with the project due to low or no employment from the project communities.	• • Community Dwellers • Nearby residents • Local Environment	Ensure that locals within the area are employed or form part of the project workforce. Hence, the PMU shall include clause(s) in the contract which will require contractors to utilize as much as possible the available qualified labor within the affected communities.
Livelihood Disruption	• Restriction of access during civil works	• Loss of income	• Traders • Businesses nearby	Locate alternative access where applicable Avoid delays in the completion of works

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
Grievances	• Mobilization, Construction • Dissatisfaction • GBV /SEA / SH	• Protest • Disruption • Delays	• Workers • Nearby residents	Ensure proper engagement with PAPs and educate PAPs on the Project's Grievance Mechanism Subscribe to Code of Conduct
GBV/SEA/SH	• Employment, Labor Influx • Social & Financial empowerment of Project Workers	• Risk to community dwellers health and safety. • Disruption and delays of project's activities	• Project Workers • Nearby Residents • Local Environment	The Contractor shall hire a GBV/Gender Specialist who will monitor and ensure compliance to the Project's GBV Action Plan. The Specialist shall ensure that all workers sign the Code of conduct document.

5.4.2 Impact during Construction Phase (Solar Streetlight)

Table 73: Summary of Project Impacts-Installation of Streetlights

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
Air Quality	• Dust generation during the excavation of the earth • Dust generation due to the movement of vehicles • Emission of pollutants from vehicular exhaust • Unloading of raw materials	Fugitive dust generation-Particulate Matter (PM<2.5µm, PM<10µm), Sulphur dioxide (SO2), and Oxides of nitrogen (NOx)	• Site workers • Nearby residents	• Minimization of vehicular movement • Reused excavated material within the boundary • Covering haul vehicles with tarpaulin/plastic sheet

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
	• Removal of unwanted waste material • Accumulation of excavated earth materials			
Solid Waste	• Construction activities • Debris, waste concrete, discarded material, broken tiles, glass and wooden materials, bituminous mix waste	Generation of solid waste	Project site	• Reuse of materials • Implementation of waste management plan • Timely collection and disposal of waste
Noise/Sound Level	• Installation of equipment, foundation works, • fabrication of structures, operation and movement of vehicles.	Noise from site works and nearby residents	• Site workers • Nearby residents	• Maintenance of speed limit by vehicles • Provision of PPE (earplugs/earmuffs.) to workers operating major noise-generating equipment
Soil Quality/Land	Earthwork, installation and construction activities, excavation and foundational work	• No adverse impact on land use as the proposed corridor is an existing right of way.	• Local Environment	• The existing corridor ensures no adverse impacts on land use. • All required materials will be stored within the designated project boundary, minimizing impacts on surrounding land use.

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
		• Impact on surrounding land use is negligible as all the required materials will be stored in the designated area within the project boundary. See my earlier comments		
Unemployment of community members during Mobilization	Contractor having the sole authority to employ or contract work out. Low qualifications of many community dwellers. •	• Risk of community members not cooperating with the project due to low or no employment from the project communities. •	• • Community Dwellers • Nearby residents • Local Environment	Ensure that locals within the area are employed or form part of the project workforce. Hence, the PMU shall include clause(s) in the contract which will require contractors to utilize as much as possible the available qualified labor within the affected communities.
Livelihood disruption	• Restriction of access during civil works	• Loss of income	• Traders • Businesses nearby	Locate alternative access where applicable Avoid delays in the completion of works
Grievances	• Dissatisfaction • Misunderstanding of an action taken on the job.	• Protest • Disruption	• Workers • Nearby residents	Ensure proper engagement with PAPs Subscribe to Code of Conduct

Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
	• GBV /SEA / SH	• Delays		
GBV/SEA/SH	• Employment, Labor Influx • Social & Financial empowerment of Project Workers	• Risk to community dwellers health and safety. • Disruption and delays of project's activities	• Project Workers • Nearby Residents • Local Environment	The Contractor shall hire a GBV/Gender Specialist who will monitor and ensure compliance to the Project's GBV Action Plan. The Specialist shall ensure that all workers sign the Code of conduct document.
Public Safety	The construction sites can pose safety risks to the public, especially in densely populated urban areas	• The construction sites can pose safety risks to the public, especially in densely populated urban areas • Road side accidents	• Site workers • Nearby residents	Implement a robust community engagement plan to keep residents informed and address their concerns. Provide clear signage and traffic diversion plans to ensure public safety.
Traffic Management	• During project implementation • Traffic disruption during road closures and diversions. • Increase in commuting time	• Protest and community agitation?? • Restricted access to residences, businesses, and public	• Site workers • Nearby residents • Local Environment	• Contractors submit traffic management/diversion plans in consultation with local authorities to minimize disruptions during patching works, using signage and barriers to guide road users. • Use public awareness campaigns (e.g., radio announcements, signage) to inform the public about work locations and alternate routes where necessary

	and vehicle operating costs for road users. • Safety risks associated with construction activities. • Road Traffic Accident/ Delay in travel time	services causing inconvenience and potential economic losses. • Delay in travel time • Accidents			
Occupational Health and Safety	**Installation works** • **Work-phase during project implementation** • **Undefined work stations** **Absent of information regarding health and safety on site**	**Roadside accidents** **Falls from heights** **Electrical hazards** **Injuries**		• **Site workers** • **Intruders**	• **Provide and use appropreate PPEs** • **Provision of safety instructions and training**

5.4.3 Impact during Operation Phase (Potholes Patching)

During the operation phase of the road following rehabilitation, the activities previously undertaken such as site formation, removal of unwanted material, and installation work will have resulted in a restored road surface. This phase will focus on maintaining the integrity and functionality of the road, ensuring it is safe for public use, and monitoring for any issues that may arise from the previous rehabilitation activities. Regular inspection and maintenance will be key activities during this phase to preserve the quality and safety of the road.

Table 84: Summary of Project Impacts-Operations Phase (Potholes Patching)

Environmental & Social Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
Air Quality and Odors	Increased vehicle	Fugitive dust generation- Particulate Matter (PM<2.5µm, PM<10µm), Sulphur	Nearby residents	• Implementing strict emission standards for vehicles

Environmental & Social Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
		dioxide (SO2), and Oxides of nitrogen (NOx),		• Promoting the use of electric and hybrid vehicles by providing charging stations and incentives • Encouraging public transportation, carpooling, and non-motorized transport options like cycling and walking through dedicated infrastructure • Regular monitoring of air quality to ensure compliance with established health standards and take responsive actions when necessary.
Water Pollution	Runoff	Potential impacts on roads can carry pollutants such as oils, heavy metals, and sediments into nearby water bodies, impacting water quality and aquatic ecosystems.	Nearby residents	• Designing effective drainage systems that prevent runoff from directly entering water bodies • Utilizing permeable materials for road construction to enhance groundwater recharge and reduce surface runoff. • Frequent maintenance and cleaning of roads to prevent accumulation and wash-off of pollutants.
Noise Pollution	Traffic	Noise can disrupt local communities potentially affecting communication and behavior	Nearby residents	• Installation of sound barriers along sections of the road close to residential areas • Implementation of speed limits and smoother road surfaces to reduce traffic noise. • Enforcing regulations on vehicle noise standards. • Planning road routes to avoid noise-sensitive areas such as schools, hospitals, and conservation areas.
Increased Traffic and Congestion	Road operation	Increased traffic, contributing to congestion and potentially lengthening travel times.	Nearby residents	• Traffic management strategies such as timed traffic lights and dedicated lanes for buses and high-occupancy vehicles • Frequent monitoring and optimization of traffic flows using intelligent transportation systems (ITS) • Encouraging staggered work hours and remote-working options to spread out peak traffic loads. • Regular road maintenance to ensure efficient traffic flow.
Climate Change Impacts	Increased emissions	Increased emissions from vehicles contribute to global climate change, which	Local and beyond	• Promoting carbon-neutral or low-carbon transport options. • Participating in and supporting broader regional and international initiatives aimed at reducing vehicular emissions

Environmental & Social Components	Source of Impacts	Impacts	Receptors	Mitigation Measures
		can have widespread environmental and socio-economic impacts.		• Enhancing the resilience of road infrastructure to withstand extreme weather events caused by climate change. • Commitment to sustainability in road maintenance and construction materials, reducing the overall carbon footprint.

Risks	Likelihood	Impact Severity	Mitigation Measures
Physical Injuries: • **Risk from handling heavy machinery and equipment.** • **Potential for slip and fall accidents due to uneven surfaces and loose materials.** • **Risk of acute injuries from tools and equipment.**	**Moderate**	**Low**	• Provide and ensure the use of appropriate personal protective equipment (PPE) such as gloves, boots, and helmets. • Conduct regular safety briefings and training on correctly using tools and equipment. • Designate clear and stable walkways and mark uneven surfaces.
Exposure to Harmful Substances: • **Inhalation of harmful fumes from hot asphalt and emissions from machinery can affect respiratory health.** • **Skin contact with hot asphalt and tack coat can cause burns and irritation.**	**Moderate**	**Moderate**	• Use protective masks and proper ventilation methods to minimize inhalation of toxic fumes. • Implement regular breaks and rotation of workers to reduce prolonged exposure. • Provide first aid training and facilities for immediate treatment of burns or skin irritations.
Noise Pollution: • **Prolonged exposure to high levels of noise from machinery can lead to hearing damage**	**Moderate**	**Moderate**	• Provide noise-cancelling ear protection to all workers. • Schedule high-noise tasks during less sensitive hours to minimize exposure. • Regularly maintain machinery to ensure they operate within permissible noise levels.
Heat Stress: **Working in outdoor environments can expose workers to extreme temperatures leading to heat stress or heatstroke, especially during hotter months.**	**High**	**Moderate**	• Schedule more frequent breaks during extreme temperatures. • Provide cooling vests and access to shaded rest areas with hydration stations.

			• Encourage workers to wear light clothing and use sunscreen for protection against UV rays.
Vehicle and Equipment Movements: **Risk of accidents due to the movement of vehicles and construction equipment, particularly in high-traffic areas.**	**Moderate**	**Moderate**	• Utilize spotters and flaggers to guide and alert oncoming traffic through or around the work zone. • Mark all machinery and vehicles with high visibility colours. • Train all operators in safe vehicle maneuvering and provide them with communication tools for coordination.
Ergonomic Risks: **Repeated motions, heavy lifting, and working in awkward positions can lead to musculoskeletal disorders.**	**Moderate**	**Moderate**	• Advise on proper lifting techniques and provide equipment to handle heavy loads. • Use ergonomic tools and machinery that reduce the need for bending or reaching. • Encourage regular stretching and rotating tasks among workers to prevent repetitive strain injuries.

Table 9: OHS Risks and Mitigation Measures (Solar Streetlights)

Occupational	Likelihood	Impact Severity	Mitigation Measures
Risks Associated with Setting Out (Poles Spotting) **Risk of injuries or accidents due to incorrect pole placements leading to unstable installations.**	**Moderate**	**Moderate**	• Conduct thorough site surveys before setting out the pole. • Implement standardized guidelines for pole placement • Provide proper training for workers on equipment and safety. • Utilize advanced positioning technology to ensure accurate placements • Regularly inspect and maintain equipment used for installing poles. • Establish clear communication protocols to avoid miscommunication during installation.
Cleaning up, Washing, and Surface Preparation Risks: • **Slip and fall risks due to wet or dirty conditions.** • **Risk of inhaling dust and chemical vapors**	**Moderate**	**Moderate**	• Ensure proper signage is present to indicate wet or slippery floors. • Implement routine cleaning and drying to maintain clear walkways. • Provide necessary personal protective equipment, such as masks and gloves. • Ensure adequate ventilation in the work area to disperse harmful vapours.

			• Conduct regular training on handling chemicals and cleaning procedures. • Develop and enforce a comprehensive safety protocol for cleaning and surface preparation tasks.
Excavation in Soil and/or Concrete Risks: • **Risk of collapse of excavation sites.** • **Risk of striking underground utilities (e.g., gas, water, electricity).** • **Manual handling of injuries from using heavy equipment**	**Moderate**	**Low**	• Conduct a site assessment prior to excavation to identify potential underground utilities. • Implement shoring or trench boxes to prevent collapse in excavation sites. • Utilize ground-penetrating radar to detect and mark utilities before digging. • Train workers on proper manual handling techniques and equipment use. • Ensure all workers wear appropriate personal protective equipment (PPE). • Regularly inspect and maintain equipment to ensure safe and proper functionality • Develop and enforce a clear emergency response plan for injuries or accidents.
Dewatering in Foundation Risks (If Applicable): • **Risks associated with electrical equipment and water leading to potential electrocution.** • **Slipping hazards in wet areas.**	**Low**	**Low**	• Ensure that all electrical equipment is either waterproofed or far from water sources. • Mark wet areas to alert workers to the slipping hazard • Install adequate drainage systems to reduce standing water. • Provide non-slip mats and footwear for workers. • Regularly inspect the area for new risks as work progresses.
Provision of Lean Concrete for Foundation Construction of Reinforced Concrete Foundation/ Pedestals Risk: • **Risks of manual handling injuries from moving heavy bags of concrete.** • **Skin and eye irritation from cement contact.**	**High**	**Moderate**	• Use mechanical aids like wheelbarrows or portable mixers to transport and mix concrete. • Provide personal protective equipment (PPE) such as gloves, goggles, and long-sleeved shirts to prevent skin and eye contact with cement. • Conduct regular training sessions on proper manual handling techniques to minimize injury risks • Ensure first aid kits are readily available on-site for immediate response to any injuries or irritations. • Rotate tasks among workers to reduce fatigue and repetitive strain.

Backfilling of Soil in the Foundation Risks: **Risk of injuries related to manual handling and use of machinery.**	**Low**	**Low**	• Implement proper training on manual handling techniques and machinery operation. • Enforce the use of personal protective equipment (PPE). • Regularly inspect and maintain machinery • Use mechanical aids where possible to reduce manual handling. • Establish and enforce safety protocols around the excavation site. • Provide supervision and support for new or less-experienced workers.
Restoration of Existing Facilities Affected by the Works Risks: **Risks of damage to existing utility lines or infrastructure.**	**Moderate**	**Low**	• Conduct thorough pre-work site surveys to locate and map all existing utilities and infrastructure. • Implement a utility protection plan, including clear marking of utility lines. • Use non-invasive excavation techniques such as hydro or vacuum excavation in sensitive areas • Establish continuous monitoring and inspection procedures during construction to prevent damage. • Train construction teams on risk awareness and mitigation strategies related to existing facilities. • Create an emergency response plan for immediate action in case of any damage to utilities or infrastructure. • Engage with utility providers and local authorities for coordinated efforts and timely communications.
Grouting Risks: **Chemical exposure risks from grouting materials.**	**Low**	**Low**	• Use proper Personal Protective Equipment (PPE): gloves, goggles, and respirators • Ensure proper ventilation of the workspace. • Train staff on handling chemicals and immediate response to exposure. • Implement and follow Material Safety Data Sheets (MSDS) for all chemical products. • Store chemicals safely according to manufacturer's instructions. • Regularly monitor and enforce compliance with safety protocols.
Quality Control Testing of Materials as per Specification Risks: **Risk of incorrect installation due to failure in quality assessment.**	**Low**	**Moderate**	• Implement thorough training programs for quality control personnel. • Establish clear quality standards and specifications.

			• Develop routine quality checks during multiple installation stages. • Use precise and calibrated testing equipment. • Maintain detailed documentation for traceability and accountability. • Regularly review and update quality control processes and standards based on performance data and feedback.
Vertical and Horizontal Alignment of the Poles Risks: **Risk of poles falling due to incorrect alignment.**	**Low**	**Low**	• Conduct regular inspections to ensure that all poles are properly aligned. • Implement a maintenance schedule for adjusting pole alignments. • Train workers on proper installation techniques. • Use alignment tools and technology during installation. • Regularly monitor weather and environmental conditions that may affect pole stability. • Apply secure and appropriate foundational support for poles. • Address any deviations from standard alignment immediately.
Disposal of Surplus Excavated Materials Risks: • **Environmental contamination risks.** • **Traffic hazards when transporting materials.**	**Moderate**	**Low**	• Implement proper waste segregation and disposal protocols. • Conduct environmental impact assessments before disposal. • Use licensed and environmentally approved disposal facilities. • Ensure transport vehicles comply with safety regulations. • Schedule transport during low-traffic hours to mitigate congestion and hazards. • Train staff on safe handling and transportation procedures. • Monitor and audit disposal processes to ensure compliance with regulations.
Working in Wet Conditions Risks: • **Increased risk of slips, trips, and falls.** • **Risk of electrical shocks**	**Moderate**	**Moderate**	• Provide non-slip mats or slip-resistant footwear. • Use proper signage to indicate wet areas. • Maintain well-lit work areas. • Ensure all electrical equipment is properly insulated. • Regularly inspect and maintain equipment. • Train employees on safe work practices in wet conditions. • Implement procedures for quickly addressing spills.
Safety Measures, Protection Barriers, and Signals Risks: • **Inadequate signaling could lead to accidents.**	**Low**	**Low**	• Improve signage visibility and clarity. • Regularly update and maintain signals and signs.

			• Train employees on importance and meaning of signals and safety procedures. • Implement routine checks to ensure all signals are functioning correctly. • Install additional protection barriers where needed.
Supply and Installation of Signboards Risks: **Risk of accidents during installation from working at heights.**	**Low**	**Low**	• Provide appropriate safety training for workers. • Use safety harnesses and other personal protective equipment. • Conduct regular equipment inspections • Ensure proper and secure scaffolding. • Implement traffic control measures around the installation area. • Prepare and enforce an emergency response plan.

6. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This section outlines the strategies, methods, and action plans intended to address potential environmental and social risks and impacts as identified earlier. The project is envisaged to be highly beneficial to the various project intervention areas or communities within the Greater Monrovia, county and the country at large. Given the risk of impacts assessed on the two subprojects, the overall environmental and social risk rating is "Moderate" in accordance with the World Bank's environmental standards, and falls under "Category C Projects" in line with the Liberia's EPA regulation, and therefore severe adverse impacts are not expected. Consequently, the environmental and social impacts discussed previously are expected to be limited in scope and short in duration. Moving on, ESMP addresses several site-specific issues tailored to address specific environmental and social aspects of the project, these include

1. Environmental and Social Management and Monitoring Plan
2. Implementation Arrangements: Organizational structure for ESMP implementation;
3. Compliance Monitoring: Systems for monitoring compliance with the ESMP;
4. Public Participation and Stakeholder Engagement;
5. Waste Management Plan: Strategies for managing various waste streams (Annex 4).
6. Traffic Management Plan: Measures to manage and mitigate traffic-related impacts (Annex 5).
7. Emergency Response Plan: Procedures for responding to emergencies (Annex 6).
8. Occupational Health and Safety Plan (Annex 7).

6.1 OBJECTIVES OF THE ESMP

The Objectives of the ESMP are to provide mitigation and control measures for potential environmental and social impacts that have been identified, and to chronologically present the processes and procedures involved in implementing proposed measures to manage these impacts to acceptable levels. *Table 27 and 28 summarizes the potential impacts and mitigation measures, responsibilities, timeframes and budgets for the implementation of the ESMP for the Streetlights and Potholes patching respectively.*

6.2 MANAGEMENT OF PROJECT RISKS AND POTENTIAL IMPACTS (STREETLIGHTS & POTHOLES)

Table 27: Environmental and Social Management and Monitoring Plan (Streetlights Installation)

S/N	Activity	Potential Environmental & Social Impacts	Mitigation Measures	Monitoring Indicators	Responsibility & Frequency	Timeframe	Mitigation Budget (US$)
2.0		**ESS2: Labor and Working Conditions, ESS4: Community Health and Safety**					
2.1	Worker's Health and Safety	Occupational health and safety risk – workers would be subjected to unsafe and hazardous working conditions without the availability of the required PPE	Procure and provide to all workers on site PPE items that are appropriate for the work at hand (i.e., durable hand gloves for construction works; reflective vest; Nose covers with respirators; safety boots; and Safety eye goggles). The contractor shall recruit an occupational health and safety officer to manage, document and report all health and safety issues (incidents and accidents) on site. The OHS officer shall conduct weekly toolbox talk for workers on the health and safety requirements of the different tasks that will be included in the assignment, and to sensitize workers on the spread of communicable diseases Procure and make available on site First Aid Kits for use by workers as and when necessary.	**Indicator**: PPE & hand tools procurement receipts, distribution sign-off records, and evidence of use of PPE equipment available through field visit reports. Evidence of First Aid Kit and Incident report/forms Evidence of Project sign boards, and road safety signages at working sites (target: yes)	**Responsibility**: Contractor The PMU shall ensure compliance through monitoring by its E&S Team **Frequency**: Weekly	Throughout the contract period	Provision of E&S staff, Equipment, PPE items for each of the project corridor is not specified but embedded within the Lump sum installation cost of the Project. See BoQ for streetlights. The cost for the provision of First Aid Kits and a staff to administer it is estimated at **US$2500.00** The cost for Project sign boards and road safety signages at all critical work sites is **US$3,000.00**

			Barricade sensitive or dangerous areas and/or equipment within the work zone to prevent community exposure to danger and harm The contractor shall refer to the Project's Labor Management Procedures (LMP) for guidance in dealing with issues related to the recruitment, organization, deployment, management and remuneration of workers, including resolving work related complaints and grievances. The contractor shall also refer to the Project's Stakeholder Engagement Plan (SEP) to help him/her hold meaningful consultations with workers, community members and other people who may be affected by or have interest in the project activity				PMU E&S monitoring will not require additional costs
2.2	Protection of Workers and Community Dwellers against GVB/SEA&H	Risk of gender-based violence (GBV), sexual exploitation and abuse (SEA), and sexual harassment (SH) occurring at different levels	Contractor shall include in its workforce a GBV/Gender Officer who will monitor and ensure compliance to the Project's GBV Action Plan. The PMU Social Safeguard and Gender Specialist /	**Indicator**: GBV/Gender Officer hired by contractor and GBV incidents reported upon in E&S	**Responsibility** The Contractor (Through her GBV/Gender Specialist) Monitoring of the contractor's	Throughout the contract period	The cost of hiring a GBV/Gender Officer is estimated at **US$2,200.00**

		among workers, and between workers and community members	E&S Staff in the absence of the SSGS, will monitor to ensure that the contractor is operating in compliance with the GBV Action Plan and provide guidance for proper implementation. The Contractor shall include in its workforce a GBV/Gender Specialist who will monitor and ensure compliance to the Project's GBV Action Plan. The PMU Social Safeguard and Gender Specialist will monitor to ensure that the contractor is operating in compliance with the GBV Action Plan and provide guidance for proper implementation.	reports (target: yes)	work will be done by the PMU through its E&S Team **Frequency**: Weekly		The cost of **US$8,750.00** to cover GBV/SEA&H, code of conduct, grievance, training costs for workers; cost breakdown is as follows: $5,000.00 for participants meals; $2,250.00 for participants' transportation reimbursement (based on distance from training venue), and $1,500.00 for hall rental (three days/sections) PMU E&S monitoring will not require additional costs

2.3	Traffic Management in work zones	Risk to Traffic Implications and access restricted including impacts from traffic during mobilization of equipment to sites and carrying away of wastes, especially along sites that may not be accessible by good roads	The Contractor is required to prepare a detailed traffic management plan indicating how the work activities will be carried out along roads and within congested areas without restricting access for road users, and include it as an annex within the CESMP. Risk from restricting access should be identified and measures to mitigate impacts should be proposed. The Contractor should designate a **Traffic Management Supervisor** who will oversee traffic management along major roads and critical sections within the subproject target areas. Prepare and install warning and safety signs in work zones; Identify alternative access for pedestrians and road users	**Indicator**: Workers trained to manage traffic congestion in the work zone Warning and safety signs in work zones, workers trained to manage traffic congestion in the work place; Traffic management report	**Responsibility**: Contractor PMU through its E&S Team The PMU shall ensure compliance through monitoring by its E&S Team **Frequency**: Daily	Throughout the contract work phase	Cost to cover Project sign boards and road safety signage at all critical work sites is **US$3,000.00** The cost to hire a Traffic management Supervisor is included in the Lump sum BOQ and estimated costs.
2.4	Labor Management	Risk of violation of workers' rights, including various forms of discrimination	Workers shall make use of the Labor Management Procedures including the Code of Conduct and the Project's Grievance Mechanism to seek redress to their grievances	Contractor and workers	**Responsibility**: PMU through its E&S Team **Indicator**: Workers trained in LMP and CoC (target: yes) **Frequency**: Monthly	Throughout the contract period	Cost to cover training on LMP and Code of Conduct to be combined with GBV and Health/Safety training is covered under the above GBV training cost.
3.0		**ESS3: Resource Efficiency and Pollution Prevention and Management**					

3.1	Air Pollution	Emission of dusts and engine exhausts	Regular water sprinkling should be done to avoid dust materials; Minimization of vehicular movement; Reused excavated material within the boundary; Covering haul vehicles with tarpaulin/plastic sheet; Dust suppression measures will be applied where necessary; Procure and supply nose mask to workers while on site; Ensure construction equipment meets minimum emission standards by ensuring maintenance and minimizing idling time	Contractor	**Responsibility**: PMU through its E&S Team and the Project Engineer **Indicator**: Air quality from duct and exhaust exhaust (target: to be established with contractor) Compliance checks demonstrate monitor use of PPEs (target: yes **Frequency**: Weekly	Throughout the contract period	Costs for sprinkling and dust depression measures is included in the overall amount for installation within the project's budget. PMU E&S monitoring will not require additional costs
3.2	Noise Pollution/ Disturbances	Impacts of Noise from equipment movement	Selection of equipment with low sound power level;Well-maintained equipment should be operated on-site; Installing suitable muffles on engine exhausts and compressor components;	Contractor	**Responsibility**: PMU through its E&S Team and the Project Engineer **Indicator**: noise quality from equipment (target: to be established with contractor **Frequency**: Daily		The cost for noise management is embedded within the project's cost.
3.3	Waste Management	Risk of stockpiling of solid waste in communities	Ensure that stockpiles of solid waste materials are not abandoned for more	**Indicator:** Quantity of waste materials	**Responsibility** : Contractor: Through its Engineers and	Throughout the construction	The cost to properly collect and dispose waste

		alongside the project corridor	than 48 hours to prevent scattering or wind transport of solid waste particles into the environment. Solid waste materials should not be left in close proximity to the road but immediately disposed at the Whein Town Landfill after it is generated, to reduce odor intensity for surrounding inhabitants; Ensure regular and effective housekeeping within the site in line with best practice. Create awareness among the workers on the proper and safe disposal of waste. Get the support of MCC and PCC to effectively and efficiently manage the disposal of waste at Whein Town Landfill	collected and disposed at Whein Town Landfill; Asphalt materials excavated and reused to fill damage community road sections.	E&S Officer; Monitoring will be done by the PMU through its E&S Team Frequency: Weekly	phase of the project activities	is embedded within the Lump Sum Installation cost of the project. The Contractor should verify if the costs to transfer excavated asphalt materials to nearby community roads are included in the overall cost of the Project. And if not, the contractor should include the costs in his/her project costs. Relevant PMU Staff will ensure compliance. PMU E&S monitoring will not Require additional cost
4.0		**ESS 10: Stakeholder Engagement and Information Disclosure**					
		Risk of ignoring stakeholders and their engagement	In accordance with the SEP, ensure that consultations with	PMU	**The Contractor and PMU**	Prior to the start of work,	The cost to conduct stakeholder

		regarding project implementation causing the stakeholders harboring undue expectations and distrust due to lack of engagement and inadequate awareness raising about the project	stakeholders are planned and carried out before during and at the end of all work activities at regular intervals throughout the contract period		through their E&S Team **Indicator:** Number and nature of consultations held **Frequency:** Before, during and at end of contract. And as the need arise. **Note:** The PMU will finance the before and after contract engagements.	throughout the contract period and right after the works are completed on site.	engagement including planned meetings and trainings during the implementation of the ESMP is **US$12,000.00.** This cost will cover the provision of water, soft drinks, snacks and transportation for participants during engagement meetings
		Total *Additional* Cost to implement the ESMP for Solar Streetlights Installation					**US$28,450.00**

Table 28: Environmental and Social Management and Monitoring Plan (Potholes Patching)

S/N	Activity	Potential Environmental & Social Impacts	Mitigation Measures	Monitoring Indicators	Responsibility & Frequency	Timeframe	Budget (US$)
1.0		**ESS1: Assessment and Management of Environmental and Social Risks and Impacts**					
1.1	Environmental and Social Assessment/ Screening	E&S risks if no adequate E&S assessment is conducted	Conduct E&S Screening and prepare ESMP	E&S Screening Report and ESMP available (target: yes)	**Responsibility**: PMU, WB **Frequency**: Once, prior to contract signing	November -December 2024	The PMU E&S team conducted the assessment at no additional cost

1.2	Monitoring of ESMP	E&S risks if ESMP is not adequately monitored	Monitor ESMP implementation and ensure regular reporting	PPE usage, First Aid application, GRM, GBV/SEAH, LMP, TMP, WMP, engagement, Workers & community safety	**Responsibility**: PMU, WB **Frequency**: Monthly	Through out the project implement ation	The PMU will carry out monitoring at No added cost.
2.0		**ESS2: Labor and Working Conditions, ESS4: Community Health and Safety**					
2.1	Worker's Health and Safety	Occupational health and safety risk – workers would be subjected to unsafe and hazardous working conditions without the availability of the required PPE	Procure and provide to all workers on site PPE items that are appropriate for the work at hand (i.e. durable hand gloves for construction works; reflective vest; Nose covers with respirators; safety boots; and Safety eye goggles). The contractor shall recruit an occupational health and safety officer to manage, document and report all health and safety issues (incidents and accidents) on site. The OHS officer shall conduct weekly toolbox talk for workers on the health and safety requirements of the different tasks that will be included in the assignment, and to sensitize workers on the spread of communicable diseases	**Indicator**: PPE & hand tools procurement receipts, distribution sign-off records, and evidence of use of PPE equipment available through field visit reports. Evidence of First Aid Kit and Incident report/forms Evidence of Project sign boards, and road safety signages at working sites (target: yes)	**Responsibility**: Contractor The PMU shall ensure compliance through monitoring by its E&S Team **Frequency**: Weekly	Through out the contract period	Provision of staff, Equipment, PPE items for each of the project corridorsis not specified but embedded within the Lump sum installation cost of the Project. See BoQ for streetlights. The cost for the provision of First Aid Kits and a staff to administer it is estimated at **US$2500.00** The cost for Project sign boards and road safety signages

			Procure and make available on site First Aid Kits for use by workers as and when necessary. Barricade sensitive or dangerous areas and/or equipment within the work zone to prevent community exposure to danger and harm The contractor shall refer to the Project's Labor Management Procedures (LMP) for guidance in dealing with issues related to the recruitment, organization, deployment, management and remuneration of workers, including resolving work related complaints and grievances. The contractor shall also refer to the Project's Stakeholder Engagement Plan (SEP) to help him/her hold meaningful consultations with workers, community members and other people who may be affected by or have interest in the project activity				at all critical work sites is **US$3,000.00** PMU E&S monitoring will not require additional costs

2.2	Protection of Workers and Community Dwellers against GVB/SEA&H	Risk of gender-based violence (GBV), sexual exploitation and abuse (SEA), and sexual harassment (SH) occurring at different levels among workers, and between workers and community members	Contractor shall include in its workforce a GBV/Gender Officer who will monitor and ensure compliance to the Project's GBV Action Plan. The PMU Social Safeguard and Gender Specialist / E&S Staff in the absence of the SSGS, will monitor to ensure that the contractor is operating in compliance with the GBV Action Plan and provide guidance for proper implementation. The Contractor shall include in its workforce a GBV/Gender Specialist who will monitor and ensure compliance to the Project's GBV Action Plan. The PMU Social Safeguard and Gender Specialist will monitor to ensure that the contractor is operating in compliance with the GBV Action Plan and provide guidance for proper implementation.	**Indicator**: GBV/Gender Officer hired by contractor and GBV incidents reported upon in E&S reports (target: yes)	**Responsibility** The Contractor (Through her GBV/Gender Specialist) Monitoring of the contractor's work will be done by the PMU through its E&S Team **Frequency**: Weekly	Throughout the contract period	The cost of hiring a GBV/Gender Officer is estimated at **US$2,200.00** Contractor should estimate and include cost of hiring a GBV/ Gender Specialist in the contract budget. **US$8,750.00** to cover GBV/SEA&H training costs for workers; cost breakdown is as follows: $5,000.00 for participants meals;$2,250.00 for participants' transportation reimbursement (based on distance from training venue), and $1,500.00 for hall rental (three days/sections) PMU E&S monitoring will not require additional costs

2.3	Traffic Management in work zones	Risk to Traffic Implications and access restricted including impacts from traffic during mobilization of equipment to sites and carrying away of wastes, especially along sites that may not be accessible by good roads	The Contractor is required to prepare a detailed traffic management plan indicating how the work activities will be carried out along roads and within congested areas without restricting access for road users, and include it as an annex within the CESMP. Risk from restricting access should be identified and measures to mitigate impacts should be proposed. The Contractor should designate a Traffic Management Supervisor who will oversee traffic management along major roads and critical sections within the subproject target areas. Prepare and install warning and safety signs in work zones; Identify alternative access for pedestrians and road users	**Indicator**: Workers trained to manage traffic congestion in the work zone Warning and safety signs in work zones, workers trained to manage traffic congestion in the work place; Traffic management report	**Responsibility**: Contractor PMU through its E&S Team The PMU shall ensure compliance through monitoring by its E&S Team **Frequency**: Daily	Throughout the contract work phase	Cost to cover Project sign boards and road safety signage at all critical work sites is **US$3,000.00** The cost to hire a Traffic management Supervisor is included in the Lump sum BOQ and estimated costs.
2.4	Labor Management	Risk of violation of workers' rights, including various forms of discrimination	Workers shall make use of the Labor Management Procedures including the Code of Conduct and the Project's Grievance Mechanism to seek redress to their grievances	Contractor and workers	**Responsibility**: PMU through its E&S Team **Indicator**: Workers trained in LMP and CoC (target: yes) **Frequency**: Monthly	Throughout the contract period	Cost to cover training on LMP and Code of Conduct to be combined with GBV and Health/Safety training is covered under the above GBV training cost.
3.0		**ESS3: Resource Efficiency and Pollution Prevention and Management**					

3.1	Air Pollution	Emission of dusts and engine exhausts	Regular water sprinkling should be done to avoid dust materials; Minimization of vehicular movement; Reused excavated material within the boundary; Covering haul vehicles with tarpaulin/plastic sheet; Dust suppression measures will be applied where necessary; Procure and supply nose mask to workers while on site; Ensure construction equipment meets minimum emission standards by ensuring maintenance and minimizing idling time	Contractor	**Responsibility**: PMU through its E&S Team and the Project Engineer **Indicator**: Air quality from duct and exhaust exhaust (target: to be established with contractor) Compliance checks demonstrate monitor use of PPEs (target: yes **Frequency**: Weekly	Throughout the contract period	Costs for sprinkling and dust depression measures is included in the overall amount for installation within the project's budget. PMU E&S monitoring will not require additional costs
3.2	Noise Pollution/ Disturbances	Impacts of Noise from equipment movement	Selection of equipment with low sound power level;Well-maintained equipment should be operated on-site; Installing suitable muffles on engine exhausts and compressor components;	Contractor	**Responsibility**: PMU through its E&S Team and the Project Engineer **Indicator**: noise quality from equipment (target: to be established with contractor **Frequency**: Daily		The cost for noise management is embedded within the project's cost.
3.3	Waste Management	Risk of stockpiling of solid waste and excavated Asphalt	Ensure that stockpiles of excavated Asphalt and solid waste materials are	**Indicator:** Quantity of waste	**Responsibility** : Contractor: Through its	Throughout the constructio	**US$5,000.00** is estimated for dewatering pump

		materials in the communities living alongside the project corridor	not abandoned for more than 48 hours to prevent scattering or wind transport of solid waste particles into the environment. Solid waste materials should not be left in close proximity to the road but immediately disposed at the Whein Town Landfill after it is generated, to reduce odor intensity for surrounding inhabitants; Ensure regular and effective housekeeping within the site in line with best practice. Use excavated Asphalt materials/soil for upgrading/potholes filling of other damaged community roads. Excess excavated materials should not be used for filling in swamp lands but transfer to other community roads. This will help reduce the risk/impact from damage alleys/roads in the upcoming rainy season, Create awareness among the workers on the proper and safe disposal of waste and excavated asphalt materials	materials collected and disposed at Whein Town Landfill; Asphalt materials excavated and reused to fill damage community road sections.	Engineers and E&S Officer; Monitoring will be done by the PMU through its E&S Team Frequency: Weekly	n phase of the project activities	to support excavation. The cost to properly collect and dispose waste is embedded within the Lump Sum Installation cost of the project. The Contractor should verify if the costs to transfer excavated asphalt materials to nearby community roads are included in the overall cost of the Project. And if not, the contractor should include the costs in his/her project costs. Relevant PMU Staff will ensure compliance. PMU E&S monitoring will not

			Get the support of MCC and PCC to effectively and efficiently manage the disposal of waste at Whein Town Landfill				Require additional cost
4.0		**ESS 10: Stakeholder Engagement and Information Disclosure**					
		Risk of ignoring stakeholders and their engagement regarding project implementation causing the stakeholders harboring undue expectations and distrust due to lack of engagement and inadequate awareness raising about the project	In accordance with the SEP, ensure that consultations with stakeholders are planned and carried out before during and at the end of all work activities at regular intervals throughout the contract period	PMU	**The Contractor and PMU** through their E&S Team **Indicator:** Number and nature of consultations held **Frequency:** Before, during and at end of contract. And as the need arise. **Note:** The PMU will finance the before and after contract engagements.	Prior to the start of work, throughout the contract period and right after the works are completed on site.	The cost to conduct stakeholder engagement including planned meetings and trainings during the implementation of the ESMP is **US$10,000.00.** This cost will cover the provision of water, soft drinks, snacks and transportation for participants during engagement meetings
		Total *Additional* Cost to implement the ESMP for Potholes Patching					**US$31,450.00**

In summary, most mitigation measures shall be carried out by the contractors who will be required to include the respective costs in their financial proposals. The existing LURP operational budget covers for the staff and transportation costs for monitoring activities of the PMU Staff including E&S. Hence, as indicated in the above matrix, the estimated cost of conducting before and after project engagement meetings including training the contractors and their workers will be done by the PMU. The training will cover health and safety, GBV, labor management procedures and grievance redress. However, the contractors and their key E&S staff are required to conduct continuous stakeholder's engagement with the project communities, the PMU, and continuous training of their workers during project implementation. The cost of the contractor's portion to support engagements during implementation is estimated at **US$4000.00 out of US$12,000.00** for streetlights & **US$3,333.00 out of US$10,000.00** for Potholes) the rest of the funds under engagement is budgeted for the PMU to support stakeholders' engagement before and after contract. These engagements and training costs should be included in the overall cost of the Potholes and Streetlights Projects activities respectively, and should NOT be taken from LURP Project's operational budget.

6.3 MANAGEMENT OF ENVIRONMENTAL RISKS AND IMPACTS (STREETLIGHTS & POTHOLES PROJECTS)

6.3.1 Institutional Arrangements

The implementation arrangements for the project will follow the implementation model for the World Bank's Environmental and Social Standards for Development projects in Liberia. The PMU has been established to manage all projects under the LURP. The project will further strengthen the capacity of the Project Management Unit (PMU) through the competitive recruitment of staff, adoption of the monitoring and evaluation (M&E) system, provision of communication infrastructure, audit, and strengthening of the financial management and accounting systems

6.3.2 Implementation arrangements

The LURP will oversee the implementation of the Environmental and Social Management Plan (ESMP); the Ministry of Public Works through LURP's PMU is tasked with monitoring the quality of work done and ensuring compliance. Additionally, local authorities including the offices of the Superintendent and Commissioner, along with Community-Based Organizations, are integral to the project. Given their longstanding connections with communities involved in the project, local government bodies can facilitate and will be included during discussions amongst the Project team and relevant stakeholders. Below, the roles and responsibilities of key stakeholders in the ESMP implementation are detailed:

Table 109: Roles and Responsibilities in ESMP Implementation

Designation	Responsibilities
LURP Project Implementation Unit (PMU)	The PMU will have the overall responsibility for the implementation and monitoring of the ESMP. It will fulfill this responsibility through its E&S specialists, who will supervise the contractors' work to ensure compliance

	with the ESHS requirements of the project generally, and the ESMP particularly. Information gathered from site monitoring of the ESMP implementation shall be disclosed through periodic reports that will be produced and shared by the PMU with the project stakeholders. Both the Grievance Mechanism which is part of the Stakeholder Engagement Plan and the overall Project Grievance Redress Mechanism (which is still in a draft form) will be used to receive, address, document and report all grievances/complaints related to the subproject implementation activities.
Project Coordinator	The coordinator will oversee the Project's implementation. He/she will be responsible for initiating the ESMP process of subprojects that require clearance from EPA and World Bank.
Environmental and Social Specialist of the PMU	The E&S specialists will investigate and report all incidents/accidents reported to occur on site –either involving workers or community dwellers. The E&S specialists will supervise the contractor's ESHS specialist will ensure that contract documents contain environmental and social safeguard clauses that contractors must fully implement and are adhered to. He/She will provide progress reports on all environmental issues and activities, including implementation of the ESMPs Progress reports, which will be submitted to the World Bank Group.
Contractors	The contractors will be responsible for the implementation of all management and mitigation measures laid out in the ESMP to address work related environmental, social, health and safety risks and impacts. This responsibility will require the contractor to have in place dedicated environmental, social, health and safety specialist(s) to coordinate, monitor, document and report all ESHS issues and to ensure that the contractor implement the mitigation measures described in the ESMP and the contractor's site-specific management plans. The dedicated contractors' ESHS specialists will also conduct periodic (weekly) toolbox talk for workers on the inherent health and safety risks of waste-filled and highly polluted drainage channels.
Contractors HSE Officers	These are the personnel that will implement the ESMP. They will receive training on the Project's E&S requirements and how to implement the ESMP accordingly.
Environmental Protection Agency (EPA):	The EPA will be responsible to review the ESMP, ensure that it is prepared in accordance with the EPA National standards by confirming screening results, reviewing and clearing subproject-specific safeguards, and conducting compliance monitoring according to national laws and WBG policies. In addition, the EPA is responsible to issue environmental permit as a condition for operation.
Local authority and community	Local authorities and PACs will be involved in project preparation, ensuring their views are considered, monitoring contractor compliance with

	Environmental and Social Standards, and reporting grievances to the Site Manager if necessary.
Ministry of Public Works	Technical support for designs and implementation of the project with insight on E&S requirements
World Bank Group (WBG):	WBG will provide funding for the entire project activities, and do an overall monitoring of the project to ensure E&S compliance of the project with WB social safeguards standards.

6.3.3 Supervision Arrangement

Table 8: Proposed Supervision Arrangement

Supervision Arrangement	Descriptions
Project Engineers	• Project Engineers will be present on-site daily during all work shifts to ensure that all works are carried out according to technical specifications and safety procedures. • The assigned project engineers will oversee the daily activities, track progress, and ensure compliance with specifications. He/she along with the supervisors will coordinate closely with contractors.
Quality Control Team	The Ministry's Soil and Material Lab team will be dedicated to ensuring quality control measures are in place by regular material testing (e.g., asphalt mix, compaction levels, slump test) for compliance
Progress Meetings	Weekly progress meetings will be held with the contractors, resident engineers, and site supervisors to assess progress, resolve challenges, and ensure that timelines are being met.
Ministry Oversight	The Bureau of Design and Supervision Assistant Minister as representative from the Ministry on the project will provide oversight and ensure that the project aligns with the overall road maintenance strategy, handling approvals and any adjustments required during the implementation phase.
Monitoring and Reporting	**Regular Monitoring and Compliance Checks** • LURP E&S Officer will be assigned to conduct regular inspections and ensure compliance with the E&S management plan. • Submit compliance reports to the Ministry and relevant authorities monthly. **Corrective Action Plans:** • Develop and implement corrective actions for any identified environmental or social issues during monitoring.

6.4 CAPACITY BUILDING FOR ESMP IMPLEMENTATION

The PMU will organize and conduct capacity building training for the contractors, their site engineers, environmental, social and safety officers and workers during the initial stages of implementation of the assigned works. The training will, inter alia, sensitize them on: a) the Bank's ESF, b) the management of environmental, social, health and safety risks associated with the execution of the works, including the safe removal of damaged asphalt, handling and disposal of wastes, and c) the provisions of the ESMP and the M&E/reporting responsibilities of the contractor. The training program will help build and/or strengthen the requisite capacities within the contactors' organizations.

The PMU will use its E&S staff to provide the capacity building and training. Such training will be provided periodically as may be deemed necessary throughout the subproject implementation period.

6.4.1 Regular Training for Project Staff (Contractors)

- **ESMP Essentials:** Conduct training sessions focusing on the fundamentals of ESMP, including risk assessment, mitigation measures, and reporting processes.
- **Best Practices:** Updating personnel on national and international best practices in environmental and social management.
- **Specialized Training:** Offering specific training in areas such as biodiversity management, waste disposal, and community health and safety.

6.4.2 Adaptive Management

This ESMP is a dynamic document that will be reviewed and updated regularly to reflect:

- Changes in project scope or design.
- New legal or regulatory requirements.
- Findings from monitoring and evaluation activities.
- Feedback from stakeholders and the EPA.

Table 30: Potential Consequences of Non-Compliance

Level of Non-Compliance	Potential Consequences
Minor Violations	Warnings, Corrective Action Notices
Moderate Violations	Fines, Temporary Operations Suspension
Significant Violations	Stop order, Contract cancellation, Legal Prosecution

6.4.3 Compliance Monitoring

The ESMP's effectiveness will be evaluated through a comprehensive monitoring program. This section details the mechanisms for ensuring the project's compliance with the Environmental and Social Management Plan (ESMP) and the EPA Permit conditions and specifications that will be issued for the project implementation. It discusses both internal monitoring by the project implementer and external monitoring by independent parties.

6.4.3.1 Internal Monitoring

Internal monitoring is essential to ensure adherence to the ESMP's provisions, involving regular assessment, feedback, and documentation.

Components:

- **Self-monitoring Reports**: Daily/weekly reports by MISPL on compliance with ESMP protocols.
- **Compliance Audits**: Quarterly monitoring by MPWS's/LURP Project environmental and social officers reviewing adherence to mitigation measures and impact management.
- **Corrective Action Reports**: Documenting non-compliance incidents and steps taken to rectify them.
- **Engagement Logs**: Detailed records of community engagements, training sessions, and stakeholder consultations.

6.4.3.2 External Monitoring

External monitoring provides an unbiased third-party assessment of the project's adherence to environmental and social safeguards.

Components:

- **Independent Audits**: Regular Audit by certified EPA independent environmental expert/firm to assess overall project compliance with ESMP and the Environmental Permit that the EPA will issue.
- **Community Feedback Mechanisms**: Regular community meetings and public surveys to gather local perspectives on project impacts and mitigation efficacy.
- **EPA Inspections**: Periodic EPA inspections to verify compliance with environmental regulations and public health standards.

6.4.4 Implementation Schedule

Table 31: ESMP Implementation Schedule for Potholes and Streetlights Projects

Activity	Timeframe	Responsible
Prepare E&S Screening and ESMP	September – December 2024	PMU
Recruit contractors (signing of contract)	December 2024 – March 2025	PMU
Mobilization and Training of contractors/workers	May 2025	PMU
Implement subproject	May to July, 2025	Contractors
ESMP Implementation	May to July, 2025	Contractors
ESMP Monitoring of subproject	May to July, 2025	PMU/Consultants
Final reporting	August 30, 2025	PMU/Contractors/Consultants

ESMP Implementation Budget

The total cost estimated for the implementation and monitoring of the ESMP for Potholes Patching and Streetlights Installation is **US$ 62,914.50.** This cost covers hiring of the GBV Officer, Provision of first aid kits and Staff to conduct first aid, stakeholders' engagement, E&S training and capacity building on Labor Management, GBV/SEA&H, First Aid, GRM, Traffic Management, Code of Conduct and provision of the Project's signboard and road safety signages. However, the cost for providing PPE items for all workers on each project, hiring OSH Officer, cost for mitigating air pollution, noise pollution and cost for managing waste are not specified in the ESMP but embedded in the lumpsum Project implementation cost. The Contractor should verify if the costs transfer excavated asphalt materials to nearby community roads are included in the overall cost of the Project. And if not, the contractor should include the costs in his/her project costs. In summary, mitigation measures shall be carried out by the contractors who will be required to include the respective costs in their financial proposals.

Table 01: Estimated Budget for the Implementation of the ESMP for Solar Streetlights Installation

Item	Responsibility	Cost Estimate in US Dollars (US$)
Mitigation	Contractor	7700.00
Monitoring	LURP PMU (No additional cost)	0.00
Training, and Capacity Building	LURP PMU	8,750.00

Stakeholder Engagement	LURP PMU before & after contract) Contractor (during Contract implementation)	 12,000.00
Sub-Total		**28,450.00**
Contingency (%)	Contractor (5% of Sub-total cost)	1,442.00
Total Cost		**29,892.00**

Table 02: Estimated Budget for the Implementation of the ESMP for Potholes Patching

Item	**Responsibility**	**Cost Estimate in US Dollars (US$)**
Mitigation	Contractor	12,700.00
Monitoring	LURP PMU (No additional cost)	0.00
Training, and Capacity Building	LURP PMU	8,750.00
Stakeholder Engagement	LURP PMU before & after contract) Contractor (during Contract implementation)	 10,000.00
Sub-Total		**31,450.00**
Contingency (%)	Contractor (5% of Sub-total cost)	1,572.50
Total Cost		**33,022.50**

7. PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT

The Community consultations and stakeholder engagement will be a vital, integral part of the project implementation and will be conducted progressively throughout the project life cycle on the basis of needs and appropriateness. These stakeholder engagement exercises will be aligned with the goals of ESS 10 and the project's approved Stakeholder Engagement Plan (SEP), as well as in accordance with the Freedom of Information Act of 2010, referenced in the SEP. Details of the community consultation meetings will be included as an annex in the project report. The stakeholder engagement will aim to introduce local stakeholders to the project activities, and environmental protection measures, address concerns, and cultivate positive community relations. The process will be transparent, free from manipulation or intimidation, and provide information in a timely, relevant, and culturally appropriate manner.

7.1 OBJECTIVES OF THE COMMUNITY CONSULTATIONS

The main objective of public consultation, is to effectively communicate important project information, manage stakeholders' expectations, build trust, and improve collaboration and mutual participation. The following are the specific objectives of stakeholder consultation under both sub-projects:

- Describe the projects and their benefits to the communities and the country at large.
- Discuss the communities' concerns relating to the project as well as ways to address them.
- Identify key messages for communicating with stakeholders during different phases of the project where they are likely to be impacted or interested

7.2 CONSULTATION PROCESS (METHODOLOGY)

Public consultation for both projects will involve a variety of methodologies including:

- Consultation with local representatives.
- Door-to-door visits to local residences.
- Meetings with focal groups
- Key informant interviews.

These proposed consultation activities are aimed at ensuring comprehensive stakeholder engagement by gathering feedback, addressing concerns, and incorporating community suggestions into project planning and execution.

7.3 SUMMARY FINDINGS FROM INITIAL CONSULTATIONS

As part of efforts leading to the development of this ESMP, the project team planned and carried out a preliminary stakeholder engagement exercise in the form of consultations with the population in the target project areas. The exercise was conducted in collaboration with a team of technicians from the MPW, including two civil engineers and a representative from the Community Services Department. About 500 persons (including women, community leaders, elders, youth, people with disabilities, and other vulnerable groups) were targeted for a series of consultation meetings conducted in the project locations of Northern Bushrod Island and Southern Paynesville between January 13 and 15, 2025. Specifically, three separate sessions were conducted in three clustered locations in Paynesville and two in Bushrod Island as specified below:

Table 32: Summary findings from initial consultations for Potholes and Streetlights Projects

Project Areas/Clusters	Communities Clustered/Corridors
Paynesville	
Cluster 1	o Duport Road Connex Station – Parker Paint Junction o Parker Paint Junction – Pipeline Road o Pipeline Roundabout – 22nd Junction
Cluster 2	o SKD Boulevard Junction – 22nd Junction o Police Academy Road o AB Tolber Road
Cluster 3	o Duport Road Connex Station – GSA Road Intersection o GSA Road/Rehab Intersection – RIA Highway Intersection o SD Cooper Road
Bushrod Island	
Cluster 1	o Doe Community o Logan Town o Jamaica Road
Cluster 2	o Momo Town East – Logan Town Cinema o Virginia o Iron Gate – Hotel Africa o Banjor Community

The stakeholder engagement exercise was designed to:

- Introduce the projects to the stakeholders and clarify the scope of the project
- Inform stakeholders of the potential environmental and social impacts (both positive and negative) and mitigation measures associated with both projects
- Encourage stakeholders' ownership of the projects as well as solicit their active involvement in their implementation
- Clarify roles and responsibilities of all stakeholders in ensuring successful project implementation and sustainability
- Address stakeholders' concerns and feedback and further consider them during implementation of the projects.

During each of the meetings, lasting up to two hours and thirty minutes, the project team provided an overview of LURP, as well as those of the sub-projects (street lighting and potholes patching), discussed the potential positive and negative environmental and social impacts of the projects, and then solicited feedback from the community members. The team also provided education on the grievance management framework The participants expressed several concerns and proffered a

number of valuable recommendations, which were relatively similar across the different project locations. A few key feedback have been summarized below, including responses provided by the project team:

General/Cross-Cutting Feedback

- The involvement of community leaders and the hiring of community members in project related works was a key concern raised during all of the meetings held. In some areas, it was recommended that the contractors consider hiring skilled workers (i.e., electricians, engineers) within the target project communities. The project team clarified that the contractors reserve the right to supply skilled workers; that one of the criteria in the bidding and award process is for the contractors to demonstrate having the capacity to supply the required skilled workers. However, the PMU will liaise with the contractors to hire community members for casual labor.
- Some participants, especially businesspeople with makeshift structures along the roads, were concerned about compensation if there would be eviction. The project team clarified that no involuntary resettlements would take place under the current quick impact projects, and that no structure will be removed/destroyed.
- The issue of women hiring was highlighted. In most of the meetings, women expressed the desire to participate in the works. The project team confirmed that women participation is a critical consideration under LURP and that any potential recruitment process will be transparent and inclusive.

Street Lightening Specific Feedback

- The potential project beneficiaries expressed concerns over the security of the solar streetlights. They recounted experiences of theft of the solar streetlights in other communities. Some believe that the lights would be much secured when placed on the main LEC poles than when hooked to separate poles, while other recommended that the government provides security for the lights. The project team clarified that the government was exploring new technologies and designs that would guarantee security of the streetlights, but that in the meantime, the communities were in the best position to keep an eye on the lights.
- During several of the meetings, it was recommended that the solar streetlights be expanded to access roads within the communities, as security is more of an urgent issue at remote locations within those communities compared to along the main roads. The project team clarified that given the resources available, the focus for the current project is the main roads. Expansion would be considered once government obtains additional funds/resources.
- A concern was raised regarding maintenance of the streetlights. Most people observed that several of the solar streetlights installed in other communities are no longer functioning. The project team clarified that there is a maintenance plan in place, coordinated with LEC.

Potholes Project Specific Feedback

- Participants expressed concerns over the role of MPW when most civil works in the country, especially road construction and rehabilitation, are awarded to contractors, mostly foreign owned. They believe that road repairs have become frequent because those foreign contractors do normally compromise quality. The project team clarified that foreign contractors often win bids for civil works largely because they have the required capital

equipment, but that Liberian engineers do usually work with those international contractors and are involved more with supervision of the quality of the work. That the need for repairs does not necessarily suggest that the roads were not constructed according to standard, as there are many contributing factors for road depreciation/deterioration, including some actions by the road users and general population (i.e., washing cars along the roads, and dragging steel and other items on the road).

- Some participants noted that most of the roads under consideration have undergone maintenance works repeatedly and recommended that it would be efficient to reconstruct those roads rather carry-on continuous maintenance works. The project team clarified that a full-flesh reconstruction is capital intensive, and that the government is resource constrained. Repairs would provide temporary relief while the government garners resources for reconstruction/new road projects.

In responding to the feedback from the communities, the project team also provided additional education and awareness raising on behaviors and practices that increase the risk of road depreciation, including the followings:

- Speed bumps, especially those not meeting the standards set by the government, can cause fractures in the roads, ultimately resulting into potholes. Community members should desist from constructing speed bumps on their own along roads and community leaders have the obligation to ensure compliance with this.
- Water is another enemy of road and can trigger fractures overtime. Community leaders have the shared obligation to stop people who are engaged in washing cars along the roads

Dragging heavy or metal objects along the road, including tying them to vehicles that lack the capacity to carry them can also contribute to damaging the roads. Road users should avoid such behaviors or report them to the appropriate authorities.

8. GRIEVANCE REDRESS MECHANISM (GRM)

Grievance/complaint shall be handled and managed using the procedures outlined in LRUP's Grievance Redress Mechanism, and in the Project's Stakeholder Engagement Plan (SEP). These sub-projects will rely on the already existing LURP Grievance Redress system in place to provide support in addressing all complaints. In addition, the SEP itself will be used as part of the grievance redress tool for engaging workers and community stakeholders during the Potholes Patching and Solar Streetlights Projects activities. The contractor's Environmental Officer and the occupational health and safety officer assigned to various sites will be responsible to receive, register and report workers' grievances/complaints, and incidents and accidents. These Staff will coordinate with the community and project level grievance committees to provide redress to complaints

9. SUMMARY, CONCLUSION & RECOMMENDATIONS

9.1 CONCLUSION

According to the World Bank Environmental and Social Framework, activities under LURP Project Components 1 are categorized as moderate environmental and social risks, mostly confined to project sites and manageable with appropriate mitigation measures. The benefits, such as job creation, enhanced lighting and mobility of people, and improved roads outweigh the manageable negative impacts. The Environmental and Social Management Plan (ESMP) outlines strategies to reduce environmental impacts to acceptable levels, assigns management responsibilities, and details a monitoring strategy to ensure the plan's effective implementation. By adhering to these measures, the project effectively minimizes environmental harm and contributes positively to the community.

9.2 RECOMMENDATIONS

Strict monitoring and control measures are needed to manage development-related impacts. The Proponent (MPW-LURP) must obtain all necessary permits and approvals and follow the Environmental and Social Management Plan (ESMP) to minimize environmental harm. The LURP PMU must mandate the Contractors to comply with all mitigation measures and regularly review the plan for relevance and effectiveness. The Environmental and Social Management Plan (ESMP) should guide the project and required audit and monitoring should ensure compliance. Responsible parties must address any ESMP violations and conduct necessary mitigation.

9.2.1 Granting of Environmental Permit

The Environmental Protection Agency (EPA) of Liberia should grant an Environmental Permit for the project, contingent on the full implementation of the mitigation measures and monitoring plans as outlined in the report.

9.2.2 Environmental Monitoring

Conduct regular environmental monitoring*:* It is recommended to conduct quarterly environmental monitoring to assess any change that is contrary to the identified impact and to assess management compliance.

9.2.3 Other Best Practices:

- ***Use renewable energy sources:*** Consider incorporating renewable energy sources, such as solar panels or wind turbines, to power the facility. This will reduce reliance on non-renewable energy sources and contribute to a more sustainable operation.
- ***Promote waste management and recycling:*** Establish a waste management plan that includes the segregation, recycling, and proper disposal of waste generated during the operation of the facility.
- ***Conduct regular training:*** Provide regular training sessions to employees to create awareness about the environmental impact of their activities and to promote best practices in environmental management. This will ensure that all personnel understand their roles and responsibilities in maintaining environmental sustainability.
- ***Continuously improve environmental performance***: Implement a continuous improvement plan to enhance the environmental performance of the facility over time. Regularly review and update operational practices based on new technologies, regulatory requirements, and industry best practices.

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ANNEXURES

ANNEX 1: Photos generated from Solar Streetlights and Potholes Patching E&S Screening

Photos showing critical sections of potholes along Duport Road

Existing potholes in section of SKD Boulevard Road

A large section of the road damaged at the intersection of Neezoe and Japan freeway

Corridor for Solar Streetlights along Pipeline Road

Corridor for Solar Streetlight in Paynesville, Vokar Mission Road

Photos taken during Engagement Meetings for Solar Streetlights and Potholes Patching

Photos showing meeting held in Rehab Community/Paynesville

Photos showing meeting held at Zayzay Community in Paynesville

Community Leader making a statement at the meeting held in Soniwhein Community in Central Monrovia

Photo showing a huge presence of residents @ Shara community meeting

Engagement meeting held in New Kru Town/Bushord

PMU & MPW staff recording questions and concerns of community members at the engagement meeting held at SKD Boulevard Road in Paynesville

LWSC staff presenting on the water supply project at the engagement meeting held on GSA Road/Paynesville

Evidence of PMU providing transportation to all community dwellers who attended the meetings

ANNEX 3: ANALYTICAL RESULTS

UL CIVIL ENGINEERING LABORATORY
College of Engineering
University of Liberia, P.O. Box 9020
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Analytical Results

Order ID: SW00124
Proponent: Ministry of Public Works
Location: Greater Monrovia
Date of Assessment: December 14-, 2024
Type of Report: Environmental and Social Management Plan
Project/Activity: Construction/Installation of Streetlights and Patching of Potholes in Greater Monrovia
Sample Matrix: Sound and Air
Analysis Start Date: December 19, 2024
Laboratory: University of Liberia Civil Engineering Laboratory

Table 1: Air Quality Sampling Information

Code	Location	Coordinates (DMS)		Date	Time
		Longitude	Latitude		
AQ-001	Neezoe Rd- Pipeline Rd	-10.705747, 6.300887	-10.690947, 6.30103	12-14-24	9:09 a. m
AQ-002	Wood Camp-Parker Paint	-10.69083, 6.301008	-10.683573, 6.29707	10-14-24	10:13 a. m
AQ-003	Zayzay Community-Duport Rd	-10.683569, 6.297071	-10.690333, 6.27484	10-14-24	11:09 a. m
AQ-004	Vugar Mission	-10.695178, 6.274244	-10.705953, 6.276249	10-16-24	9:33 a. m
AQ-005	Clara Town	-10.799952, 6.328796	-10.794125, 6.32731	10-16-24	11:09 a. m
AQ-006	Doe Community	-10.793473, 6.328768	-10.787289, 6.3388	10-16-24	12:13 p. m
AQ-007	Jamaica Road	-10.782584, 6.339839	-10.7898, 6.344198	10-17-24	10:09 a. m
AQ-008	Logan Town-Mombo Town	-10.786488, 6.352909	-10.785093, 6.376235	10-17-24	11:13 a. m
AQ-009	OAU Hotel Africa Road	-10.785399, 6.404081	-10.803932, 6.390586	10-18-24	1:09 p. m
AQ-010	Banjor Community	-10.791486, 6.401831	-10.785348, 6.415342	10-18-24	1:33 p. m

AQ=Air Quality

Table 2: Sound Quality Monitoring Information

Code	Location	Coordinates (DMS)		Date	Time
		Longitude	Latitude		
SQ-001	Neezoe Rd- Pipeline Rd	-10.705747, 6.300887	-10.690947, 6.30103	12-14-24	9:09 a. m
SQ-002	Wood Camp-Parker Paint	-10.69083, 6.301008	-10.683573, 6.29707	10-14-24	10:13 a. m
SQ-003	Zayzay Community-Duport Rd	-10.683569, 6.297071	-10.690333, 6.27484	10-14-24	11:09 a. m
SQ-004	Vugar Mission	-10.695178, 6.274244	-10.705953, 6.276249	10-16-24	9:33 a. m
SQ-005	Clara Town	-10.799952, 6.328796	-10.794125, 6.32731	10-16-24	11:09 a. m

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SQ-006	Doe Community	-10.793473, 6.328768	-10.787289, 6.3388	10-16-24	12:13 p. m
SQ-007	Jamaica Road	-10.782584, 6.339839	-10.7898, 6.344198	10-17-24	10:09 a. m
SQ-008	Logan Town-Mombo Town	-10.786488, 6.352909	-10.785093, 6.376235	10-17-24	11:13 a. m
SQ-009	OAU Hotel Africa Road	-10.785399, 6.404081	-10.803932, 6.390586	10-18-24	1:09 p. m
SQ-010	Banjor Community	-10.791486, 6.401831	-10.785348, 6.415342	10-18-24	1:33 p. m

Table 3A: Air Quality Results

Parameter	**Unit**	**Analytical Method (Instrumentation)**	AQ1	AQ2	AQ3	AQ4	AQ5	**WHO Standard**
CO	Ppm	Air Quality Meter	6.0	6.40	6.10	5.57	5.56	50.00
CO_2	Ppm	Air Quality Meter	6.0	6.0	7.5	5.40	6.20	5000
VOC	Ppm	Air Quality Meter	<0.001	<0.001	<0.001	<0.001	<0.001	0.75
$PM_{2.5}$	Ppm	Air Quality Meter	5.20	5.30	6.34	6.20	6.32	35.00
PM10	Ppm	Air Quality Meter	5.05	6.07	6.20	6.20	7.0	50.0
SO_2	PPM	Air Quality Meter	0.30	0.31	0.21	0.40	0.32	2.0
NO_2	Ppm	Air Quality Meter	0.01	0.01	0.01	0.01	0.01	1.00

Table 3B: Air Quality Results

Parameter	Unit	Analytical Method (Instrumentation)	A6	AQ7	AQ8	AQ9	AQ10	WHO Standard
CO	Ppm	Air Quality Meter	7.22	6.35	6.08	6.81	5.91	50.00
CO_2	Ppm	Air Quality Meter	6.31	6.0	7.35	6.0	6.5	5000
VOC	Ppm	Air Quality Meter	<0.001	<0.001	<0.001	<0.001	<0.001	0.75
$PM_{2.5}$	Ppm	Air Quality Meter	5.19	5.16	5.14	6.17	6.18	35.00
PM10	Ppm	Air Quality Meter	6.20	6.34	6.41	6.13	7.32	50.0
SO_2	PPM	Air Quality Meter	0.32	0.35	0.28	0.47	0.55	2.0
NO_2	Ppm	Air Quality Meter	0.01	0.01	0.01	0.01	0.01	1.00

Table 4A: Sound Quality Results

Parameter	**Unit**	**Analytical Method (Instrumentation)**	**SQ1**	**SQ2**	**SQ3**	**SQ4**	**SQ5**	**WHO Standard**
Sound Leve	dBA	Sound Quality Meter	44.0	40.0	41.0	42.0	45.0	75.0

Table 4B: Sound Quality Results

Parameter	**Unit**	**Analytical Method (Instrumentation)**	**SQ6**	**SQ7**	**SQ8**	**SQ9**	**SQ10**	**WHO Standard**
Sound Level	dBA	Sound Quality Meter	47.0	45.7	48.0	49.0	45.8	75.0

Signed: *Alex B. Momo*
Chemical Analyst

ANNEX 4: WASTE MANAGEMENT PLAN (WMP)

S/N	Potential Source	Waste Type	WASTE STREAMS	Management	Responsibility	Cost
A	**MOBILIZATION**					
1	Movement of vehicles on unpaved surface and engine exhaust	Emission	CO_2, SO_2, NO_2, CO, Dust	Use water suppression to prevent dust emission Maintain vehicles and machineries to reduce emission Maintain low speed to reduce dust and gaseous emission	Contractor	Contractor may provide an estimate. However, dust emission will be of little or no issue during this rainy (wet) season in Liberia, particularly in Monrovia and surrounding coastal areas where rainfall is highest
B	**DRAINAGE CLEANING**					
1	Movement of vehicles on unpaved surface and engine exhaust	Emission	CO_2, SO_2, NO_2, CO, Dust, PM2.5, PM10	See A1	Contractor	Dust emission will be of little or no impact during this wet season in Liberia
2	Drainage cleaning works	Non-Hazardous /Industrial	• Sand, silts, debris • Plastic bottles, plastic bags • Domestic-type waste: wastepaper and food scraps, metal cans • Liquid waste/feces	Waste collected from drainages will be placed in smaller waste bins at congested areas and transported by workers to the bigger Bins and then to the Skip Bucket which will be stationed at a major collection point. The Waste collection vehicle will collect the skip bucket with waste from the collection point and transport it to Whein Town for disposal	Contractor	Cost is estimated in BoQ and also provided in ESMP Table 7
3	Drainage cleaning works	Hazardous Waste	**Solid Wastes:** used batteries, chemical	Store on site in closed containers with	Contractor	Included in the cost of

			containers, concrete etc. **Liquid Waste:** spent lubricating oils, hydraulic fluids, brake fluids, battery electrolyte, and dielectric fluids, chemical cleaning agents, paints, primers, thinners, and corrosion control coatings; sealants and adhesives etc.	secondary containment and transferred to a registered waste contractor with off-site permitted hazardous waste treatment, storage, or disposal facilities	Contractor	loading, haulage and disposal of collected wastes to the designated landfill. See ESMP Matrix – Table 7
4	Worker areas during breaks	Domestic and Sanitary	• Food remnant, kitchen wastes. Food packaging etc. • Domestic Sewage	See B2	Contractor	Usually, in such casual work or daily hire arrangements, the contractor does not provide food or resting area for workers. Workers leave site as soon as they complete their assigned individual task (specified distance) for the day.
C	**MAINTENANCE**					
	To be specified in overall project ESIA and Umbrella Waste Management Plan and Site-Specific Waste Management Plans					
	During the recent E&S site screening consultations, community members suggested the setting up of community-based taskforce teams to help them monitor and ensure that drainage channels are, during and after completion of the quick win cleaning activities, kept clean and functional. The suggested taskforce teams would through regular monitoring help prevent people dumping waste into the drainage channels. If the Project could consider providing support to the formation and operation of such community-based teams, this would be one practical way of supporting the maintenance of the drainage channels following the quick win cleaning activities.					
	Cost (Also captured in the relevant sections of the ESMP Table)					

The PMU will monitor compliance to these activities

ANNEX 5: TRAFFIC MANAGEMENT PLAN

This Traffic Management Plan (TMP) has been prepared to address the following key issues related to the subproject:

- **MOBILITY** - including interruptions to pedestrians, cyclists and vehicular traffic; and
- **COMMUNITY** - including interruptions to surrounding businesses and residents from drainage cleaning and waste transportation

The objective of this TMP is to provide safe passage for pedestrians, cyclists and vehicular traffic along the proposed intervention sites

General Traffic Management Measures

Based on the various activities described in the ESMP, drainage cleaning activities will involve the use of trucks to collect waste from drainages. To do this safely, it may necessitate cordoning off of the road, around the target areas and will generate minor traffic issues. In the following, an overview of traffic management requirements and plans are described.

Components of the Traffic Management Plan

The Contractor should designate a TMP Supervisor who will oversee traffic management along major roads within the subproject target areas.

The TMP Supervisor will address the following:

- **Safety Signage:** Safety signage will be put up along when waste trucks are parked on the road next to target sites when waste is removed and transferred from drainages/bins to the trucks. This signage will indicate that there are "Men at Work". Caution is most required by motorists and cyclists who transverse the project areas.
- **Liaisons with Government Traffic Agencies.** The TMP will ensure liaisons with the relevant traffic control agency. In situations where heavy traffic impacts are envisaged, the Contractor will liaise with the relevant traffic control agency to ensure traffic coordination and mitigate adverse traffic impacts.
- **Movements of project vehicles** will be timed to coincide with off peak periods of traffic.
- **Strict speed limits** shall be enforced on all truck drivers working on this project and non-compliance shall be addressed by the contractor, supervision engineer and PMU. Measures will be taken to educate the drivers during weekly pep talks.
- Vehicle breakdowns could occur and this could cause bottlenecks and snarls. Therefore, in the event of such an occurrence, there should be provision to immediately assist with evacuating such vehicles from the alternative routes while tow vehicles will be contacted from the nearest point.

- Adequate number of well-trained flagmen should be deployed to manage the traffic situation.
- The contractor should ensure that all rehabilitation activities are performed in accordance with the approved Traffic Management Plan.

- Adequate dewatering of waste material before transport to Whein Town disposal site;

- Maintain cleanliness of trucks for transporting dredged materials;
- All vehicles transporting dredged spoils to final dump sites must be covered completely with tarpaulin;
- Provide notification about the dredging activities at roads that will be and are currently affected by the activities;

- The contractor shall adopt best practices for transporting the dredged materials to prevent soil/mud spilling on the roads or environment;

Every Vehicle used for the transportation of waste shall:

- Be registered with the relevant Authority
- Have a hauling body constructed of metal, or any other approved material and all joints in the hauling body shall be effectively sealed and smoothened to avoid drippings or leakages of liquids
- Be provided with a tight metal hood having adequate openings fitted with smoothly operating loading and unloading doors.
- Have a means of covering the waste to be hauled and keep such waste secured within the hauling body to prevent dispersal
- Have covers made with appropriate material such as tarpaulin, canvas cover fitted with proper eyes, grommets and tie ropes and hooks whereby the cover can be held securely over the loaded wastes
- Not be loaded with garbage to a level above the side wall height if it does not have permanent covers
- Be thoroughly washed and steamed regularly and kept in good working condition
- Conduct collection and transportation of waste in such a manner that will not cause scattering, escaping, flowing out of the waste
- Be in such a state that shall not cause scattering, escaping, flowing out of the waste or emitting of noxious smells from the waste
- Collect waste from designated area of operations and shall deliver such waste to the designated station, disposal sure or plant.
- Equipment and vehicles that have all auxiliary (Water retaining facility, etc.) functional shall be engaged.
- Registered sand haulage Vehicles with the government should not be used for this exercise for the activities to be well regulated.
- The vehicles in use must be in good order.
- The haulage trucks will be adequately secured to prevent dust pollution and prevent dewatered dredged material from falling onto the access routes

- Contractor flagmen will work collaboratively with relevant traffic management authorities to prevent traffic congestion along the route to the approved disposal site.
- Health and safety of the communities living in the influence area of the anticipated dredged will be prioritized along material disposal transport routes and sites and road safety and traffic constraints

S/N	Aspects	Descriptions	Responsible Party	Cost (USD)
1	Traffic/Safety Signage	▪ Safety signage should be put at both ends of the road to warn road users of the ongoing cleaning activities.	Contractor	Included in ESMP Table 7
		▪ Mobilization of equipment and materials should be done at off-peak period (10am – 4pm). ▪ Enforce speed limit.	Contractor	$1,000.00 is allocated in each BoQ for all three Lots
2	Training	▪ Hire drivers with appropriate driver's license. ▪ Ensure drivers are familiar with TMP	Contractor	Training cost covered ESMP Table 7
3	Communication	▪ All Traffic and Safety signages should be boldly written in English languages ▪ Any incident/ accidents should be reported immediately to the PMU	Contractor PMU	
	Cost	All cost included have been embedded in the ESMP Matrix Table		

ANNEX 6: EMERGENCY PREPAREDNESS PLAN

Emergency procedures and response plan shall be developed by the contractor prior mobilizing to site. The procedures shall be communicated to all staff and all workers shall be trained to avoid and respond to emergencies appropriately. Also, each site shall always have at least a trained first aider on site.

Aspects	Requirements
Competency	All personnel required to operate or work with any equipment or machine must be competent, be tested for each equipment that he/she shall be operating. All personnel who as part of their profession require licensing or certification must obtain the necessary certification before he/she shall be allowed to work on the site. All personnel working on site shall be required to be certified medically fit to do so by an approved medical facility or Medical Doctor (pre-employment medical examination)
Induction/ Orientation	Every new or rehired employee must undergo mandatory OHS orientation / induction. The purpose of the Induction is to educate workers and make them aware of the major potential hazards he or she shall come into contact with while working on the site; also, it is one more opportunity to stress the importance of HSE being the first priority in the operations. The content of the HSE orientation / induction shall cover the following subjects: • Manual handling. • Emergency Prevention, Preparedness and Response • First Aid training (for site First Aiders) • Lifting and Rigging • Safe Driving techniques (for drivers)
Major Hazards	The major hazards identified for the proposed project include the general OHS risks of drainage cleaning works
Personal Protective Equipment (PPE)	The basic PPE required for the project shall be hand gloves (Impermeable and Chemically resistant); hooded reflective overalls (Impermeable and Chemically resistant); Nose covers with respirators; Rain/safety boots; Safety eye goggles). Any other PPE shall be used as applicable. The contractor is responsible for the provision of PPE and usage shall be enforced at all times. PPE shall be provided in circumstances where exposure to hazards cannot be avoided by other means. Information, instruction & training shall be given to all employees on safe use, maintenance and storage of PPE. Employees shall, in accordance with instructions given, make full use of all PPE provided and maintain it in a serviceable condition and report its loss or defect immediately to the maintenance department where it shall be replaced. PPE shall be replaced when it is no longer serviceable and returned on a new for old basis. Employees shall sign to state that they have received PPE when issued.
Signage	Adequate provision for warning and directional signs shall be made.
Reporting	All accidents must be reported to the PMU after which investigation shall commence and recorded so that appropriate corrective actions shall be implemented to prevent any re-occurrence and report findings shall be forwarded to the PMU. Reporting requirements shall include notification of incident, investigation report, and monthly report. Notification of Incident form shall be developed which shall be filled and submitted to the PMU for investigation.

ANNEX 7: OCCUPATION HEALTH AND SAFETY MANAGEMENT PLAN

PURPOSE	This table describes the Project Occupational Health and Safety (OHS) plan for the proposed project and the specific management controls, risk control systems and workplace and safeguards required to ensure compliance with Occupational Health and Safety Laws and Standards.
SCOPE	The Project Occupational Health and Safety (OHS) plan covers the scope of works defined in the contract. This includes the cleaning of drainages at the preparatory, implementation, and maintenance phase.
OBJECTIVES OF THE PLAN	• Adopt a positive Health & Safety Culture. • Adopt the principles of prevention to avoid risk. • Complete the project without incident (Zero fatalities, Zero Lost Time Injury or occupational illness).
OBLIGATIONS	• Participation of all personnel and the management in executing, maintaining and continually improving OHS processes is vital to the successful completion and achievement of quality objectives set by the management. • All project personnel shall therefore be required to be familiar with the content of the OHS plan and shall participate in implementing, maintaining and improving the management system • It is the responsibility of the project coordinator and all key personnel to ensure that the requirements for quality are fulfilled for works under their responsibility. • All new staff and staff who are given new responsibilities are to be inducted into the requirements set out in the plan in general and into their function and responsibilities in particular
POLICIES	• Workplace Health and Safety: all workers shall adhere to all workplace health and safety rules and the management will ensure the safety of the workers on site. • Rehabilitation Policy • Drug and Alcohol Policy: Prohibiting the consumption or possession of narcotics, drugs, alcohol and other banned substances
DUTIES AND RESPONSIBILITIES	**Safety Officer Responsibilities include:** • Main communication link between the contractor and the PMU Project Coordinator and PMU E&S Team. • Review daily work to be assigned to workers in line with ESMP • Inspect all work areas on a daily basis. • Respond immediately to all unsafe conditions. • Control of and distribution of all workers personal protective equipment. • Ensure deficiencies are corrected and reported to site manager. • Complete all incident/Non-conformance reports as required

	• Complete all orientation of all new or transferred employees. • Ensure that all required training is given or made available to all employees • Ensure Public health, Safety, and proper handling of waste during the transport of waste materials; **Workers' roles and responsibilities for Health and Safety** • Carry out their work in a manner that will not create a hazard to the health and safety of self or other employees. • Have the right to refuse unsafe work and report all job specific hazards to their manager. • Take care, an active role in the elimination and control of workplace hazards. • Assist site managers in reducing and controlling accident producing conditions and unsafe acts on the work sites. • Report any accidents/incidents, near misses and/or injuries immediately to the manager. • Report any anticipated loss of work time to the manager as soon as possible after being treated by a physician following injury. • Providing suggestions to improve the overall health and safety program. • Using all safety equipment provided. • Participating as required, in accident/incident investigations and assisting in the completing of the accident/incident forms. • Ensure co- workers are advised of unsafe conditions or acts that may cause injury or illness. • Demonstrate a professional attitude towards all projects OHS efforts.
COMMUNICATION RESOURCES	This may include project management meetings; inductions; training; and outcomes from inspections
RULES FOR WORKPLACE SAFETY	**BEHAVIOR:** Consuming or being in possession of or under the influence of alcohol or illegal drugs on project site and environs premises, is prohibited and disciplinary action will be taken. Fighting, horseplay, practical jokes or otherwise interfering with other workers is prohibited and disciplinary action will be taken. Theft, vandalism or any other abuse or misuse of equipment is prohibited and may be cause for immediate dismissal. "Strike Anywhere" matches are prohibited. Running is not permitted anywhere, except in the case of extreme emergency. Riding on any hook, hoist or other material handling equipment which is used strictly for handling material and not specifically designated to carry riders is prohibited. **First Aid and Injury Management** **Emergency Procedures** **i.** Render first aid immediately, first aid kits should be made available in all vehicles and all sites. All serious first aid injuries should be attended to by a trained first aid attendant only. **ii.** For all serious injuries, these general directions should be followed: • If you do not have first aid training send or locate a trained first aid attendant immediately

	• Apply artificial respiration if the patient is not breathing (by trained first aid attendants only) • Stop any severe bleeding, by applying pressure to the immediate wound area • Send someone for a doctor • Keep victim lying down: never move injured personnel unless the potential for further injury is immediately present **iii.** Stay calm. If the patient is breathing and no artery is spurting blood, giving first aid is usually unnecessary, and is often harmful **iv.** Do not attempt to remove foreign objects from eyes or any other part of the body or allow anyone else to do so, except a first aid attendant or a doctor **v.** Call for assistance; be ready to give the following information: • Accurate directions to the location of the injured person. • Nature of the injury. • Any assistance that may be required. • Give information slowly and clearly. • Report back to the scene of the accident; report to the superintendent or first aid attendant that help is on the way. If no one can be contacted at the office call/Inform operator which of the following is required: **a.** Ambulance. **b.** Police. **c.** Fire Department. **d.** Electrical Power Company. **e.** Gas utility company. **f.** Hospital. Restrict the immediate area of the accident, check if further danger exists
TRAINING OF CONTRACTOR'S PERSONNEL	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 and the ESMP, 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 ESMP. The topics to be covered are OHS in general (working procedures), emergency procedures, and social and cultural aspects (awareness raising on social issues).