



Republic of Liberia
Ministry of Public Works



P.O Box 9011, South Lynch Street
Monrovia, Liberia

REQUEST FOR EXPRESSIONS OF INTEREST (CONSULTING SERVICES – FIRMS SELECTION)

April 19, 2022

Assignment Title: Consulting Services for the Preparation of Studies, Designs, Bidding Documents, Contract Packages & Procurement support for the Liberia Urban Resilience Project (LURP)

Reference No. : LR-MPW-270591-CS-QCBS

The Government of Liberia has received a preparation advance from the World Bank toward implementing the Liberia Urban Resilience Project (LURP), and intends to apply part of the proceeds for consulting services. The overarching objective of this assignment is to develop climate resilient, cost-effective and sustainable designs to rehabilitate existing and implement new urban drainage infrastructure and additional secondary / tertiary infrastructure supported by the stakeholders in four selected communities in Greater Monrovia: northern Bushrod Island, Omega Market area, Central Business District and Southeastern Paynesville.

The envisioned interventions in these neighborhoods are rehabilitation of existing and construction of new grey, green and blue infrastructure including cleaning, dredging and repair of existing drainage channels. Where necessary and possible, this will be complemented with new measures, including blue solutions (open water areas for temporary stormwater storage), green solutions (wetland or green vegetated areas to maintain soil infiltration and temporarily store surface stormwater), and grey solutions (traditional constructed drainage of adequate size and design to drain roads and residential areas). Alongside, these shall be combined and integrated with other neighborhood upgrading activities such as park & community infrastructure and provision of other public services and facilities.

Specific objectives of this assignment are to support the Ministry of Public Works to:

(a) define a package of grey-green-blue urban drainage interventions in the selected areas within the available budget for works based on a community-oriented planning and design exercise,

(b) prepare detailed designs of these interventions,

(c) support the Ministry of Public Works in the engagement/communication with the stakeholders,

(d) prepare Bidding Documents in accordance with the World Bank's Standard Bidding Documents for the selected contract package of works and support Ministry of Public Works with subsequent bid evaluation and contract finalization.

(e) provide support to Ministry of Public Works for the procurement of the works.

The Ministry of Public Works now invites eligible consulting firms ("Consultants") to indicate their interest in providing the Services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services. The shortlisting criteria are:

1. At least 15 years of general experience implementing feasibility studies and preparing detailed design and providing procurement support for urban projects worldwide and specifically in developing countries; experience in the Africa Region in general and in Liberia in particular is an advantage;
2. At least 10 years of specific experience in the feasibility studies and detailed design of flood risk management interventions in developing countries with specific emphasis on urban drainage interventions;
3. Have a proven record of successful completion of at least 3 assignments in the past 10 years related to the design of new and the rehabilitation of existing urban drainage infrastructure design;
4. Have knowledge of hydrological and hydraulic modeling for urban environments, and experience with design and implementation of grey-green-blue infrastructure in urban environments;
5. Have knowledge of World Bank procedures and requirements, including procurement and safeguards.
6. Have expertise with social and stakeholder engagement of urban infrastructure interventions in developing countries/cities;
7. Have working experience in Africa and preferably Sub-Saharan Africa.

Key experts will not be evaluated at the shortlisting stage.

The attention of interested Consultants is drawn to Section III, paragraphs 3.14, 3.16 and 3.17 of the World Bank's "Procurement Regulations for IPF Borrowers" July 2016 and updated in November 2017 and August 2018 and November 2020 ("Procurement Regulations"), setting forth the World Bank's policy on conflict of interest.

Consulting firm may associate with other firms to enhance their qualifications, but should indicate clearly whether the association is in the form of a joint venture and/or a sub-consultancy. In the case of a joint venture, all the partners in the joint venture shall be jointly and severally liable for the entire contract, if selected.

A firm will be selected in accordance with the Quality- and Cost Based Selection (QCBS) method set out in the Procurement Regulations.

Further information can be obtained at the address below during office hours 08:00 till 2pm Liberia time (GMT). Copy of the Terms of Reference (TOR) can be downloaded at www.emasion.gov.lr, www.mpw.gov.lr and ju-mpw.org.

Expressions of interest must be delivered in a written form to the address below in person, or by mail\courier by May 17, 2022 till 2pm Liberia time.

Ministry of Public Works
Attn: Mr. James Reynolds
Assistant Minister Planning & Programming
Tel: 0777-004004 / 0880523691
E-mail: jjreynolds@mpw.gov.lr / jimmyx@yahoo.com



Republic of Liberia Ministry of Public Works

Liberia Urban Resilience Project (LURP)

RFP No. XXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Consulting Services for the Preparation of
Studies, Designs, Bidding Documents, Contract Packages & Supervision Services
for the
Liberia Urban Resilience Project (LURP)

March 2022

Consulting Services:

Consulting Services for Surveys, Preliminary Design, Detailed design, Contract Packaging, Preparation of Bidding Documents and Procurement Support

Contract Type: Firm – Using Quality and Cost Based Selection Procedures (QCBS)

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I. Introduction

Urban development and disaster risk management are key elements of Liberia’s medium-term national development strategy, the Pro-poor Agenda for Prosperity and Development (PAPD). The PAPD (2018-2023) emphasizes the role of urban areas and especially of Greater Monrovia in supporting the economic transformation necessary for the country to generate shared prosperity. Floods are highlighted in the PAPD as a cause of climate induced disasters. The National Disaster Risk Reduction and Resilience Strategy of Liberia (2020) aims to reduce and control the risks associated with flood, coastal erosion and windstorms in the Monrovia area (Action 3.1.). The PAPD is also cognizant of the extent of informality and lack of service access that has paralyzed the economy of Greater Monrovia. Coastal erosion risks are currently being addressed by the United Nations Development Program (UNDP) through the “Monrovia Metropolitan Climate Resilience Project”.

Monrovia’s vulnerability to floods is due to its low-lying, flat topography and lack of adequate drainage. Flood events in Monrovia and the surrounding areas resulted in over 30,000 affected people, during 2018, including thousands of children. Monrovia’s surface water system was constructed between 1955-1957 with later additions to accommodate urban growth. The system is plagued by several challenges, including lack of maintenance (only 15 employees of the Ministry of Public Works (MPW) are working on surface water drainage in Monrovia), inadequate and fragmented drainage construction and connection to sewers, illegal connections of sewage pipes to drains, intersection of drainage with major sewer line leading sewage spillage in the city, broken force-main sewer system, and lack of funding. Flood impacts on residential areas and infrastructure are set to increase, including disruptions in access to markets and schools, and significant health risks for the population. A disaster and climate risk assessment for Monrovia reveals that about 140,000 people (14 percent) in Greater Monrovia are directly affected by predominantly pluvial flooding on average every year. Average annual direct economic damage is about US\$20 million (0,6 percent of GDP). Climate change will further increase these numbers.

Pluvial flooding (from the rain) poses the highest flood related risk in Liberia. Although fluvial (river) floods are of the greatest depth, pluvial flooding creates the highest risk in terms of damage due to the area covered and frequency. Greater Monrovia experiences regular flooding from both coastal flooding and flooding from the St Paul River to the north of the city. Severe fluvial flooding can affect larger areas of the city given the low-lying nature of the land around the Mesurado and Stockton Creek. The existing built-up area requires a combination of grey – green – blue interventions to mitigate the growing impacts of urban flooding including substantial repairs.

Inadequate infrastructure and flood risks combined with management deficiencies negatively affect the resilience, economic activity, and revenue potentials of markets in Greater Monrovia. Duala market is one of Monrovia’s biggest markets and is illustrative of the challenges faced by Monrovia’s markets. Duala market has expanded 11.8 times in size without any planning since its creation. Therefore, Duala market suffers from a fragmented and ineffective drainage system. Further, it is estimated that 93 percent of toilets are within 100m of wetlands with exposure to flooding, posing epidemiological risks. A lack of clarity of organizational structure and lack of investments contributes to food losses (5.6 percent of daily products) and lack of revenues to invest in the market infrastructure. Currently, 72-89 percent of

vendors operate informally and their inclusion in an improved formal market management system could increase revenues by 2.6-7.9 times. Consolidating and regulating market fees throughout the entire expanded area would decrease informal payments and increase payment of daily market ticket fees.

Within this context, the Government of Liberia (through the Ministry of Public Works) requested financing from the World Bank for the Liberia Urban Resilience Project (LURP), which will be part of a package of World Bank support for urban development and economic transformation. This project is currently under preparation with envisioned approval date Q1 FY2022 (July 2022). The Project Development Objective (PDO) is to enhance climate resilience and urban living conditions in Liberia, and to strengthen institutional capacity for sustainable urban management. Specific outcomes which will be fine-tuned during the project preparation are to:

- Outcome 1: Area of Greater Monrovia protected from 1 in 5-year flood events
- Outcome 2: People provided with improved urban living conditions (sex-disaggregated)
- Outcome 3: Improved capacity of resilient urban planning and management in Greater Monrovia

Currently, the Bank supports several other projects, where synergies and collaboration are being forged, including the Cheesemanburg Landfill and Urban Sanitation Project (P159961), the Liberia Urban Water Supply Project (P155947), and the Liberia Land Administration Project (P162893).

To meet its development objectives, the proposed LURP will have four components:

Component 1	Climate Resilient Infrastructure and Urban Upgrading	US\$30 million
	1.1.Climate Risk Management Infrastructure	US\$25 million
	1.2.Climate Resilient Community and Market Upgrading	US\$5 million
Component 2	Strengthening Integrated Resilient Urban Development Capacity	US\$6 million
	1.1.Resilient Urban Planning and Development Control	US\$3 million
	1.2.Solid Waste Management Operations and Financing	US\$3 million
Component 3	Project Management	US\$4 million
Component 4	Contingency Emergency Response Component	US\$0 million
Total		US\$40.0 million

In addition to US\$40 million IDA financing, the French Development Agency (AFD) will provide parallel financing in the amount of EUR10.0 million (US\$11.3 million) for neighborhood upgrading activities. AFD will finance neighborhood upgrading activities under component 1 in three neighborhoods (Shoe Factory, Wood Camp, Lakpazee). AfD funding activities are not covered or included in the

activities of this consultancy service. However, both projects are expected to be implemented in parallel with similar implementation periods and working through the same implementation arrangements, including using the same Project Management Unit (PMU), housed in the Ministry of Public Works (MPW).

A Project Steering Committee (PSC) will be established to provide strategic oversight, review annual work plans and budgets, regularly review implementation status, support in resolving policy coordination challenges throughout project implementation and ensure ownership and institutional sustainability beyond the project term. The PSC will be chaired by MFDP and MCC, Ministry of Internal Affairs (MIA) and PCC will be co-chairs. Members will be EPA, LLA, MPW, and NDMA. A Project Technical Committee (PTC) will be established to guide technical discussions and coordinate technical input to TORs, specifications, evaluation committees, and technical reviews of consultancy outputs. The PTC would ensure that technical inputs are provided in time and would regularly monitor implementation progress at the technical level. The PTC will be chaired by MPW and members will include EPA, MCC, MFDP, MIA, and PCC. The PMU will serve as the secretariat for the PTC. AFD and the World Bank are observers to this group.

MPW, with support from the World Bank, intends to secure the services of a Consulting Firm to prepare feasibility studies, preliminary and detailed designs, bidding documents, and provide procurement support for the Liberia Urban Resilience Project (LURP). This project has been conceptualized and structured for the improvement of urban livelihood and climate resilient infrastructure in designated neighborhoods. This assignment will focus on drainage and flood risk management interventions and upgrading in the communities identified below which are financed under Component 1 through the Bank's IDA financing only (see Figure 1): northern Bushrod Island (1), Omega Market area (2), Central Business District (3) and Southeastern Paynesville (4).

This Consultancy Services assignment focuses on Component 1 of the LURP which finances rehabilitation of existing and implementation of flood risk management and community upgrading infrastructure in selected areas. The rehabilitation of drainage systems will finance the cleaning of surface and underground channels by removal of sludge, silt, organic material, and debris. The component will also finance the repair of surface and underground channels, including the replacement of broken or missing manhole covers. This will be complemented with new blue-green-grey drainage measures, including blue solutions (open water areas for temporary stormwater storage), green solutions (wetland or green vegetated areas to maintain soil infiltration and temporarily store surface stormwater), and grey solutions (traditional constructed drainage of adequate size and design to drain roads and residential areas). The project is envisaged to finance several measures with traditional concrete drain channels conveying water towards rehabilitated/protected urban wetlands and permeable paving to enhance infiltration or green swales (vegetated strips that capture and store stormwater from roads and residential areas). Such measures will be combined with improved land use planning, zoning and construction permitting (see below). The drainage design should also consider protection against solid waste (generated from market places or nearby households) as well human waste associated with such environment.

Apart from access and drainage investments the activities will include other public infrastructure for markets and communities such as water supply, sanitation (wastewater and solid waste

collection facilities) and community facilities such as community halls, open spaces, playgrounds etc. Many of these facilities should consider the functional rehabilitation of underutilized spaces where feasible. Project investments would complement existing/ongoing World Bank financed projects in related sectors either through working in neighborhoods where no network services are in place or by focusing on upgrading reticulation/neighborhood systems where there is access to network services. The specific investments will depend on the completion of feasibility reports with recommendation from the consultant, which will also ensure that gender gaps will be identified and addressed through the investments, for example ensuring that sanitation facilities are safe for women.

This Terms of Reference is organized as follows. A further description of the project scope is provided in Section II. Section III will provide the details of the objectives and the required tasks in this Consultancy Services and the necessary expertise from the Consultant in this assignment.

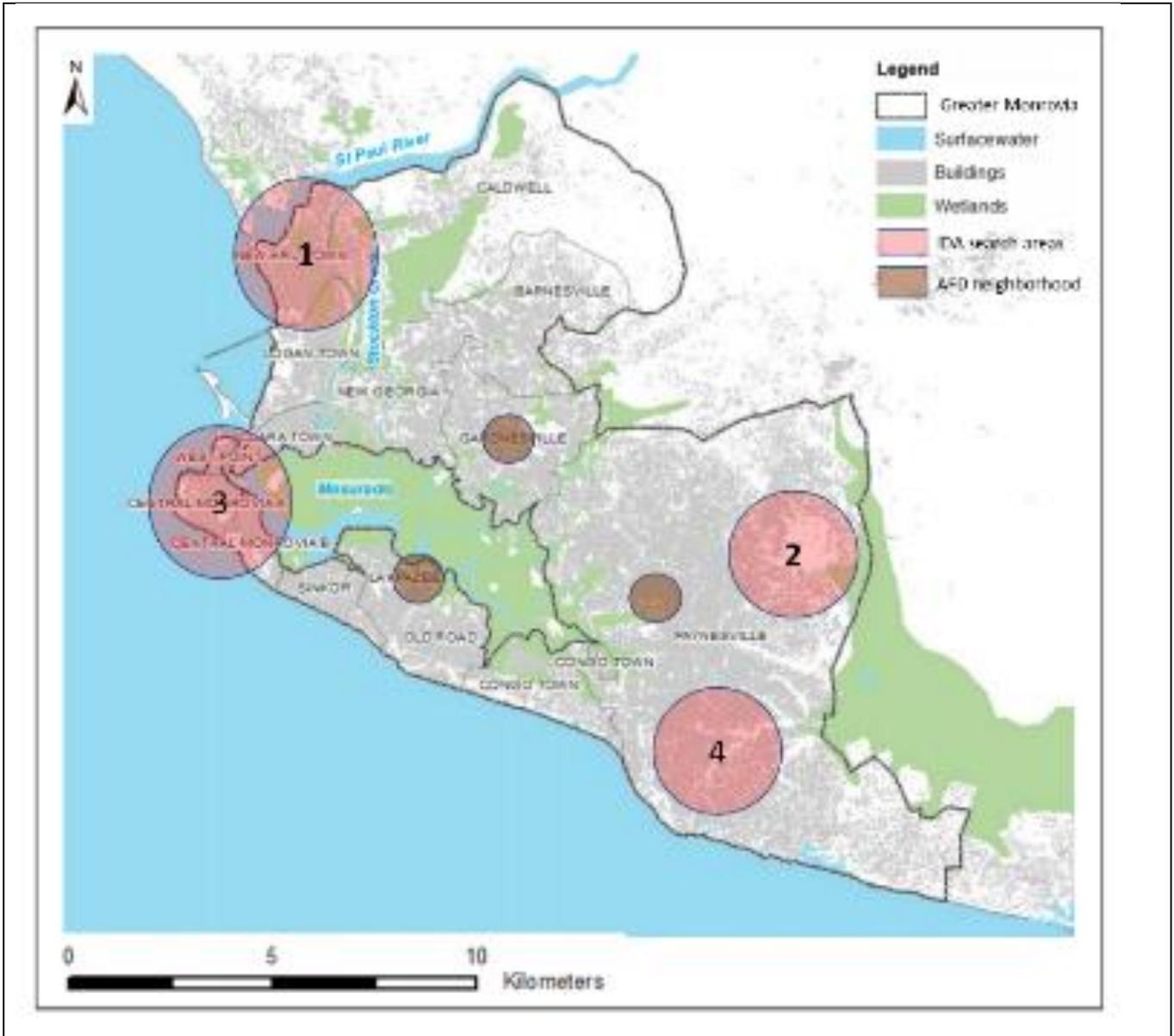


Figure 1: Four search areas in Monrovia for Component 1 in this TOR: The northern part of Bushrod Island (1), the area around Omega Market (2), the Central Business District (3) and southeastern Paynesville around Duport Rd (4). The selected AFD neighborhoods (Lakpazee, Shoe Factory and Wood Camp) are also indicated in this map.

II. Project Description

The current available budget allocated for all works interventions under this project is 26 million US\$. This assignment shall further define the scope of interventions in the four locations depicted in Figure 1 which will fit into this budget. It is expected that the majority of the available budget will be

spent on improving the urban flood risk management infrastructure (+/- 80%), and the remainder will be dedicated to other small public infrastructure in the neighborhoods. Depending on the outcome of the Feasibility Study, the final selection of the interventions for implementation may or may not cover all areas depending on budget and other constraints. The budget allocation and also the tentative overall timeline of the project implementation are provided in the tables below. This schedule is subject to change as project preparation and procurement continues.

Table: Component 1 Budgetary Allocation

Component 1 Allocation (US \$ M)	30
Flood Risk Management Infrastructure (of which 15-20 percent Urban Upgrading)	26
Feasibility, Design, Environmental and Social Studies and Instruments and Supervision	2.5
Resettlement Compensation	1.5

Table: Tentative timeline for implementation

Key Activity	Proposed Start Date
Consultant’s commencement of services Component 1	June 2022
Feasibility and Detailed Design study Component 1 Completed	February 2023
Works Bidding Commencement	March 2023
Works Contract Award	September 2023
Works Substantially Completed	September 2027

The main locations being considered for this intervention, which requires further feasibility assessment to determine the economic, technical, environmental and social viability of these locations are as indicated below (see also Figure 1):

Location 1: Northern Bushrod Island

The northern part of Bushrod Island around the Duala Market (under jurisdiction of Monrovia City Council, MCC) extending from the south of Logan Town, Jamaica Road – UN Drive Intersection,

Momboe Town, Duala Market (both east toward the St. Paul River tributary and west ward toward New Kru Town and Beer Factory Community.

Location 2: Omega Market Area

The Omega Market includes the entire section of the Omega Ball (approximately 452 acres) and the north of Soul Clinic Community (under the jurisdiction of Paynesville City Council, PCC).

Location 3: Central Monrovia, Soniwein CBD

The central business district of Monrovia with particular reference to the Water Street business area extending to the UN Drive Road. Further priority is given to the City's only functional storm water drainage facility, Soniwein, serving the south of the City's CBD.

Location 4: South Eastern Paynesville

The south-east of Paynesville which includes the south of Zayzay Community, GSA Road & Duport Road Communities and extends toward the coast in the South (RIA Highway).

During the inception phase, the Consultant shall specify the communities to be included in the search areas in more detail. The final definition of the search areas of interest for this assignment shall be defined after consultation with MPW, target communities and other stakeholders in the inception phase.

As outlined in the Introduction, the envisioned interventions in these areas are to finance rehabilitation of existing and implementation of new drainage infrastructure in the selected areas. Neighborhood upgrading activities will provide access to basic services and reduce flood risks, also providing economic and social benefits. Project activities may also support improved other infrastructure including pedestrian walkways, market stalls, roofing, water and sanitation facilities, run off and tertiary drainage, electricity including solar panels, childcare centers, and cold and dry storage facilities. The infrastructure investments should be designed to climate and disaster resilient standards, taking into account 2050 climate scenarios, and prioritizing low impact and low carbon investments where possible. These are priorities identified in an earlier assessment but require further updating based on the latest situation. Neighborhood upgrading activities will be informed through a participatory bottom-up community engagement process. These infrastructure measures will be complemented improved land use planning, zoning and development control (under Component 2).

Location 1: Northern Bushrod Island

This area is under the jurisdiction of the Monrovia City Council and has the UN Drive as important transport link towards the north with the Duala Market as an important economic hub, which is currently being upgraded under another donor-funded project. This area is densely urbanized for the most part. The topography of this area varies significantly with the urbanized areas around UN Drive/Duala Market at relatively high ground (> 4m+MSL) whereas the northeastern urbanized part and also the open and green spaces towards the east are close to 1 – 2m+MSL and just above maximum tide levels at present. The entire area is underserved regarding drainage infrastructure and frequent flooding occurs around the Duala

market and in other urbanized parts mainly as a result of pluvial events. Also, the neighborhoods have limited basic services like water and sanitation facilities, pedestrian walkways, street lighting, etc.

Envisioned urgent structural interventions for drainage of rainfall in this area at this moment include:

- i) Road drainage along the northern and southern part of UN Drive (currently non-existent), with particular attention to densely populated or commercial areas like the market and the Jamaica Road junction in the south.
- ii) Enhance connectivity of runoff from the urbanized areas to the low-lying and open spaces on the east part of island;
- iii) Preserve and connect the open greens areas as retention areas for (future) rainfall events;
- iv) Improve drainage connections towards the north (St Paul River mouth) and/or east (Stockton Creek).
- v) Drain channels for effective runoff management within communities

The northern and eastern part of Bushrod Island is also vulnerable to fluvial and coastal flooding. To mitigate these risks, a wide variety of measures could be considered including raising embankments. Investigation should be made into if these risks can be mitigated with structural solutions in an effective way and if these should be prioritized over pluvial drainage infrastructure interventions.

Neighborhood upgrading interventions envisioned in this area should rely on bottom-up community engagement to set priorities. Potential neighborhood upgrading activities to be considered are water and sanitation services, pedestrian walkways and other improvements such as cold and dry storage facilities around/at Duala Market. Also, the two large green spaces in the East of Bushrod Island are divided by a raised (about 5m) abandoned Bong railway line which is used as a walkway that connects the island to the north of the Port area in the East. This could be considered as one potential urban upgrading project.

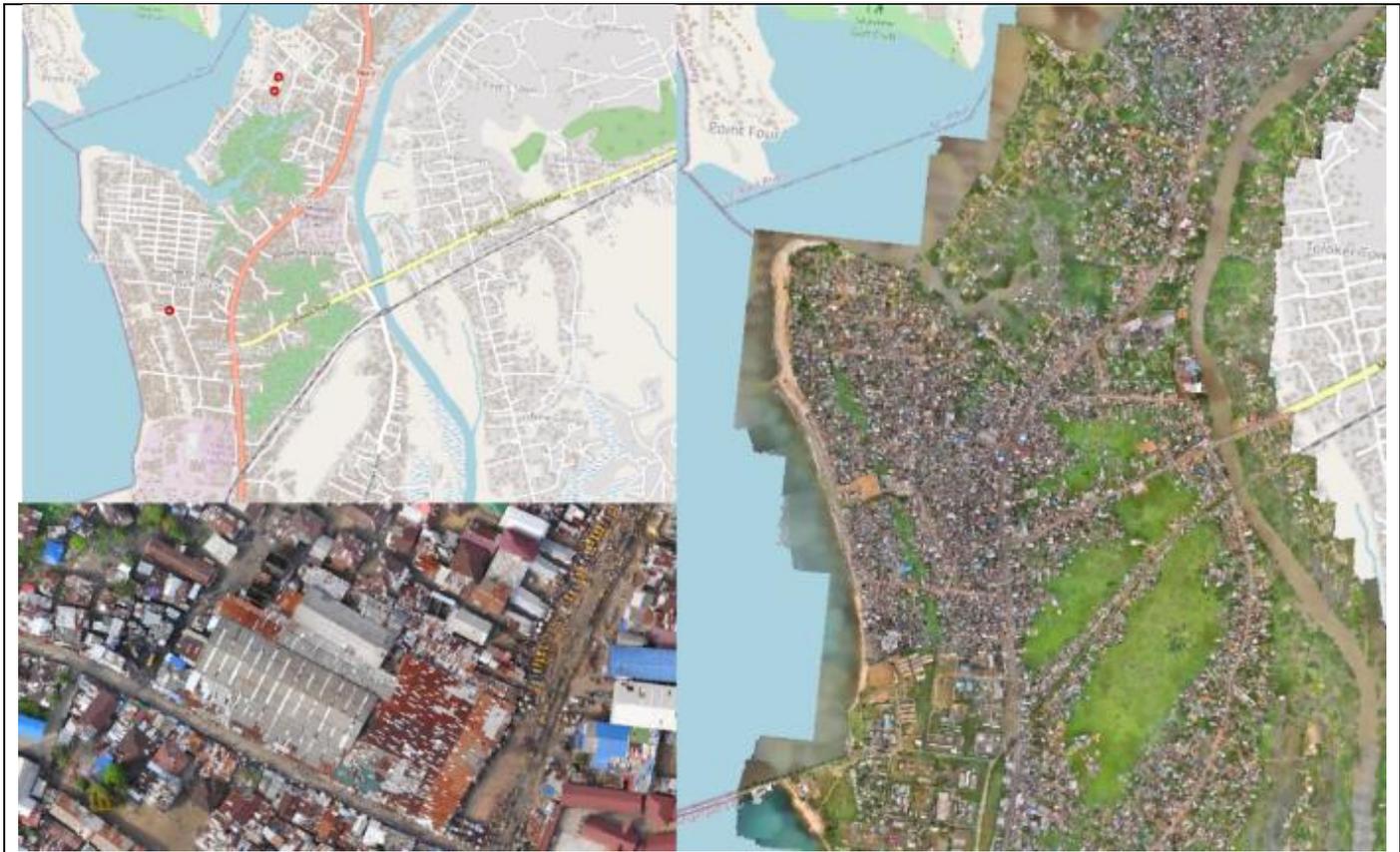


Figure 2: Impression of the northern part of Bushrod Island based on available orthophoto imagery with Duala Market at the bottom left panel.



Photo 1: Green Corridor in New Kru Town area



Photo 2: Roads intersecting the green corridor



Photo 1: Character of green open spaces in Logan Town/King Peter



Photo 2: Garbage blocking drainage through culvert underneath UN Drive (left), Photo 3: Outlet Duala Market towards St Paul River (right)

Figure 3: Impression of Northern Bushrod island.

Location 2: Omega Market Area

This area is located under the jurisdiction of the Paynesville City Council (PCC) and the Omega Market is located at the former Paynesville Transmission Tower. This tower was demolished in 2011 and some urban development has taken place in this area but the area still remains quite un-developed, probably because it is so low lying and flood prone. The Omega Market was opened in 2016 and further expansion of the market is ongoing. The Omega Market area, however, faces significant flood issues during pluvial rainfall events. Based on an initial analysis of the topography and modeling, the former Transition Tower area (4 – 6 m+MSL) surrounded by relatively higher ground (10-20 m+MSL) which likely result collection of rainwater in this relatively flat area before draining further towards the southeast into the Mesurado River. Potential bottlenecks for sufficient drainage are: i) insufficient secondary/tertiary infrastructure surrounding the built-up area including Omega Market, ii) insufficient storage/retention area, iii) insufficient conveyance capacity of the stream towards Mesurado River due to a limited and vegetated cross-section, road crossings, or a combination of the above. Prioritizing these bottlenecks and identifying and designing structural solutions to resolve these will be part of this assignment.

It will be essential that the drainage interventions must be integrated into the current urban development and plans as much as possible and accompanied with potential urban upgrading and/or amenities. Consideration must be given to proposed layouts and designs planned by MPW for the area including road network and also to further development of land use plans and identifying upgrading activities with engagement of communities (also linking to Component 2). For example, the open spaces in both areas that could function as retention areas (ponds/basins) must be considered. These could be further upgraded as city parc / recreational areas during dry weather conditions.



Figure 4: Omega Ball area with indication of ongoing activities and drainage patterns.



Figure 5: Site Images for Omega Site Location

Location 3: Central Monrovia, Soniwein CBD

Central Monrovia serves as the primary business area of the City with existing drainage structures constructed between 1972-78. Inadequate urbanization and facility expansion as well as poor maintenance culture have heavily influenced the poor functional state of the current drainage facilities.

The existing Soniwein drainage commences from the top of Benson Street, Mamba Point, running through and beneath some of the principal streets of the city and discharges at the back of the BTC barracks, Buzzy Quarter Community. The primary drain is clogged with much garbage, sediment and sludge resulting in reduced conveyance and also health issues (Photo 1). According to local knowledge, the Soniwein drain does not overtop during very severe rainfall events except for some small parts. The secondary natural drain running into the Soniwein Canal at Johnson Street is known to be flood prone affecting the community nearby (Photo 2). At the downstream end, the Soniwein Canal drains into the Atlantic Ocean (Photo 3). The outlet opens during the rainy season but also closes during the dry season because of the coastal sediment transport. Large amounts of garbage are present near the opening and also due to the ponding of water in this area.

Potential interventions in this area may include but not limited to maintenance / dredging of the existing primary drain, repairs to broken infrastructure elements (e.g. culverts, manholes, etc.) and connecting and improving the drainage of specific neighborhoods (e.g. community near Johnson Street). Considerations should be given to cosmopolitan attractive urban solutions that incorporates sustainability requirements for this effort.

Neighborhood upgrading should be carefully considered alongside with the drainage infrastructure improvements. Potential ideas in this area are upgrading/improving the downstream part close to the beach and making this a more attractive urban green corridor connecting to the beach front at the Atlantic Ocean. These interventions should also integrate future land use plans and zoning requirements in order to ensure sustainability of such intervention. Example of such zoning requirements could include designation of protected areas (protected reserves) to mitigate future flooding risk to the city. Special considerations should be made for developing safe green corridors with protections to mitigate / control human impact or activities.

Waste management is an integral part of the city facilities management and potential neighborhood upgrading should consider the impact of waste on these development corridors and provide efficient designs that incorporate efficient waste management activities for maintenance purposes.



Figure 6: Soniwein Drainage in Central Monrovia



Photo 1: View on Water Street / Mesurado Estuary from Front Street

Photo 1: Garbage and siltation in Soniwein Drain (left), Photo 2: Natural drain entering Soniwein Drain near Johnson Street (right)



Photo 2: Open Space between Water Street and Front Street (left), Photo 3: Clogged drain at Water Street towards Mesurado Estuary (right)



Photo 3: Outlet Soniwein Drain at Atlantic Ocean

Figure 7: Impression of the CBD area regarding drainage.

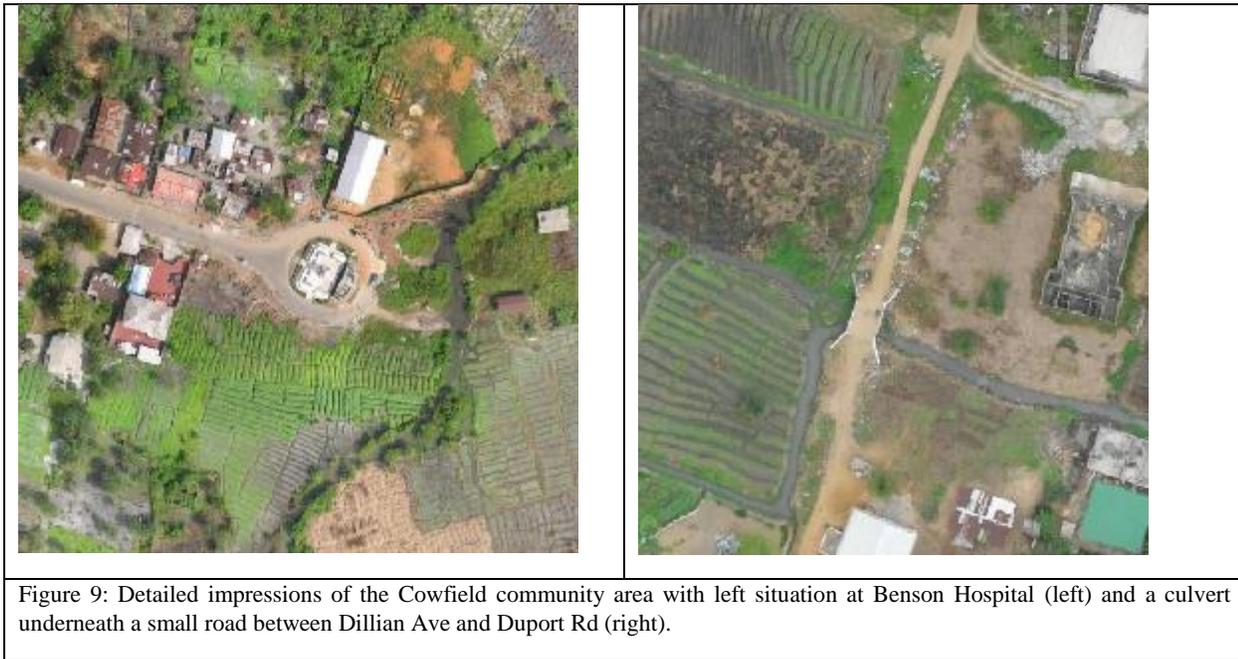
Location 4: South eastern Paynesville

Paynesville City is a fast developing metropolitan city with inadequate, and in some areas nonexistent drainage facility. Although fast developing, the city is not layout, non-existent drainage plan / strategy and poor resilience to flooding which has become a regular occurrence during the raining season. The South of Paynesville City has seen regular flooding for some time due to pluvial activities and serves as a serious risk for communities' low lying towards the Mesurado river. Potential interventions in this area are to improve and enlarge the existing natural corridors which drain the rainfall water towards the lower areas. Also, removing potential bottlenecks (e.g. blocked culverts) underneath roads are likely to be addressed to improve the drainage capacity. Urban upgrading options in these areas could be to make these natural drains more attractive for the neighboring communities and, develop green parc type solutions for the residents which are also protected from further encroachment. As previously mentioned, integrate future land use plans and zoning requirements in order to ensure sustainability of all upgrading activities. Requirements such as designation of protected areas (protected reserves) to mitigate future flooding risk to the city, and creating green corridors that serve to increase the cities aesthetics and functionally should be included.

Waste management considerations mentioned above should also be incorporated into the design.



Figure 8: Impression of the project area in Paynesville with particular area of interests identified.



The Government of Liberia is currently implementing some projects with similar activities and in some instances near the targeted sites for intervention. Below is a list of some of these projects that are planned or ongoing :

- Liberia Beach Sporting & Recreational Facility – Donor funded (Abu Dhabi Fund for Development)
- Omega International Market Expansion & Upgrade Projects – GOL funded (Ministry of Public Works & LACE)
- Monrovia Raw Water Pipeline Project – Donor Funded (World Bank)
- ELWA Junction – Red Light Road Project : Donor Funded (World Bank)

Some of these projects are currently ongoing including the roads project, pipeline construction project, drainage and market construction project while the beach recreational facility construction is expected to start quite shortly. Interfaces with these projects shall be carefully considered during this assignment.

III. Description Scope of services

This Section describes the scope of services, objectives, goals, specific tasks required to implement the assignment, and relevant background information; provides details on the required qualifications of the key experts; and lists the expected deliverables. This information is for planning, surveys, engineering designs and bidding documents preparation for the Liberia Urban Resilience Project to be implemented in the above-mentioned locations.

A. Objectives of Consultancy Assignment

The overarching objective of this assignment is to develop a cost-effective, community-owned and sustainable plan and design for flood risk management infrastructure and targeted upgrading interventions in specific areas of Greater Monrovia. Specific objectives of this assignment are to:

(a) define a local area resilience plan and package of interventions in the selected areas within the available budget for blue-green-grey flood risk management and community infrastructure, based on a community-oriented planning and design exercise,

(b) prepare detailed designs for these interventions, along with Bidding Documents in accordance with the World Bank's Standard Bidding Documents for the selected contract package of works and support with subsequent bid evaluation and contract finalization.

Throughout the assignment the consultant shall ensure that environmental and social safeguard impacts of the project are properly assessed, and mitigation plans prepared in accordance with the project's Environmental and Social Management Framework (ESMF); Resettlement Policy Framework (RPF), and in coordination with the consultancy that will be developing site specific Environment and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP). Findings of the ESIA and RAP will need to be taken into consideration in the final infrastructure design.

B. Principles and Guidelines

The following overarching considerations need to be addressed during the preparation of all aspects of the project:

a) Stakeholder involvement

The guiding principle is the active participation by communities in all stages of preparation and implementation. Demands from stakeholders shall be taken carefully into considerations in the further detailing and design of the interventions. The consultant shall identify, analyze and map stakeholders to facilitate consultations with such stakeholders and entities, to factor their views, needs and priorities into the planning, designing and construction phases of the intervention. All stakeholder's engagement should be inclusive targeting gender, youth and diverse ethnic groups and persons with disabilities. The

Consultant will undertake public consultations, in as much as it is possible, with the relevant stakeholders including the different categories of project participants and other affected people like the elderly, the youth, women, people with disabilities and other marginalized groups. Some important stakeholders and institutions of Government already identify under this project include:

NATIONAL LEVEL

Ministry of Finance & Development Planning (MFDP)
Ministry of Public Works (MPW)
Ministry of Internal Affairs (MIA)

MUNICIPAL LEVEL

Monrovia City Corporation
Paynesville City Corporation
Townships

AGENCIES

Liberia Institute of Statistics and Geo-Information Services (LISGIS)
Environmental Protection Agency (EPA) (including relevant nature protection/ wetland groups)
National Disaster Risk Management Agency (NDRMA)
National Water Sanitation & Hygiene Commission (NASHC)
Liberia Water and Sewer Corporation (LWSC)
Liberia Land Authority (LLA)
Liberian Hydrological Service (LHS)(MME)
Liberian Meteorological Service (LMS)(MOT)
WASH Commission
Liberia Marketing Association (LMA)

PARTNERS

Japan International Cooperation Agency (JICA)
European Union (EU)
Cities Alliance
Liberian WASH Consortium
United States Agency for International Development (USAID)
Agence Francaise de Development (French Development Agency)
World Bank (WB)
United Nations Development Programme (UNDP)

b) Environmental and Social issues

Upgrading should aim to improve infrastructure and services with minimum relocation or resettlement in order to maintain the social fabric of communities and minimize expropriation costs. Also, infrastructure will be designed to maximize environmental benefits and minimize and negative environmental impacts,

using costed alternative design options and scenarios. Special consideration of environmentally sensitive areas around Monrovia, including the RAMSAR designated Mesurado Wetlands. Also, special attention shall be paid to any contaminated dredged material/excavated soil and garbage (e.g. cleaning of primary drains) that must be treated and/or stored. Since clogging of the drains by garbage is a widespread issue, this project shall take this aspect as a key priority into account during feasibility and design studies.

c) Green-blue-grey urban drainage infrastructure

Investments that must be considered are green-blue-grey infrastructure. All locations of interest including Bushrod Island, Monrovia CDB- Soniwein, South Eastern Paynesville and Omega Market have good opportunities to maximize the use of green-blue infrastructure in combination with grey infrastructure to lower the flood risk. This will include blue solutions (open water areas for temporary stormwater storage), green solutions (wetland or green vegetated areas to maintain soil infiltration and temporarily store surface stormwater), and grey solutions (traditional constructed drainage of adequate size and design to drain roads, residential areas and markets). These opportunities shall be carefully considered in the initial stages of the exploration of interventions. The recent World Bank Catalogue of Nature-Based Solutions for Urban Resilience should be consulted and integrated wherever possible. <https://openknowledge.worldbank.org/handle/10986/36507>

d) Integration in the urban fabric and community upgrading

Although focus will be on drainage infrastructure, opportunities for park & community infrastructure/furniture that would create a community spaces that could be used during the dry season. Neighborhood upgrading should be considered where it can be easily integrated. The consultant should explore options of urban integrated interventions that look into sustainable urban mobility, social, economic, environmental and technical aspects; in this sense review use of public spaces including retention basins that could bring durable positive improvement to the community utilizing solutions articulated to the existing urban fabrics, with emphasis on optimum use of spaces, building on existing features in each of the selected areas for the provision of public services and facilities. Since waste management is a major problem in the targeted project areas and also leads to clogging of the drainage system, this aspect shall have special attention. Improvements and interventions to improve waste collection and disposal shall be identified and designed if possible through close consultation with the local stakeholders as part of the feasibility studies (e.g. small-scale waste depots).

e) Affordable, sustainable and responsive to Community demands

Investments must be built at a level which is affordable, specifically in view of Operation and Maintenance during the lifetime of these investments. This could also imply strong focus on use of local materials and equipment to maximize the impact of the existing budget but also to ensure that the infrastructure can be easily maintained. Consultant should explore local trends that are applicable as well as cosmopolitan realizing that the nature and architecture of the environment has significant bearing on the quality of livelihood of the environment. Labour intensive methods should be considered throughout, to maximize opportunities for employment and livelihood opportunities for local community.

Adopting a multisectoral approach will encourage communities to include most basic service improvements in their upgrading packages, these synergies tend to increase social and economic benefits. Previous investigation of residents in similar communities indicates a strong preference of the specific needs:

Top priority needs common to all communities are:

- drainage
- improved roads (with safe designated pedestrian spaces)
- drinking water
- community halls
- public toilets

Specific needs expressed by women and young people are:

- playgrounds
- drainage
- access to drinking water
- libraries
- recreation/sports areas

Women expressed that it is very important for them to have a safe place where they can take their children and grandchildren and where youngsters can have an occupation (sports, recreation, education, etc.).

Consultant is expected to validate these demands for possible inclusion to an extent where budget and facilities are available.

f) Climate resilient and adaptable

Investments must be built with a thorough investigation at future changes in climate (e.g. rainfall) and also be adaptable when the city further grows and/or climate is changing requiring higher service levels of the infrastructure. The infrastructure will be designed with climate resilience in mind, so that 10 year floods under the most likely 2050 climate scenario will be anticipated and designed for. This objective will be validated in this study to ensure that this is economically viable and cost effective. It may be that a 1-in-5 return period in 2050 is more cost effective. Appropriate modelling and cost effectiveness analysis needs to be conducted in order to validate the most cost-effective design.

g) Project management aspects

Timely delivery of the consultancy services according to the schedule presented in this Terms of Reference to initiate the works is one of the critical success factors for the client. The Ministry as well as the PMU will work closely with the Consultant to provide all services necessary to achieve the previously stated objectives in full and to the satisfaction of the Client in accordance with the Principles & Guidelines and the provisions defined in these Terms of Reference.

C. Description of Activities

This assignment will focus on selecting and detailing the interventions and preparing design and bidding documents and procurement support for the works contracts. These designs shall be accompanied with developing Local Area Resilience Plans. It will require active stakeholder engagement throughout the entire process of preparing design and the local resilience plans. Stakeholder meetings shall be organized together with the Ministry of Public Works and the PMU for consultations with stakeholders in all the project locations to understand project concerns from the stakeholders, to obtain feedback during the design process and sensitize them to proposals being considered, and to discuss possible ideas with the stakeholders for integrating the interventions into the urban context of Greater Monrovia.

Official stakeholder meetings are required at three moments: (i) to consult on priorities at the start of the Local Area Resilience Plan and Preliminary Design Stage, (ii) to validate the plan and designs at the end of the preliminary design phase and (iii) to consult on the detailed design. These meetings will be organized in each project areas. Thus, in total 12 official stakeholder meetings are to be organized in all of the proposed project communities which would include both local and governmental stakeholders with discussions in English. The Consultant is responsible for the logistics and costs of the venue, light snacks/drinks. The Ministry & PMU will be responsible for inviting the stakeholders. The Consultant will prepare presentation materials in coordination with the PMU be present at the meetings and may present the proposed works and do the reporting of these meetings.

The following five stages are envisioned during this assignment:

1. Inception
2. Pre-design studies (surveys, modeling, feasibility)
3. Local Area Resilience Plan & Preliminary designs
4. Detailed design and bidding documents
5. Procurement support

These are discussed in detail below.

Stage 1: Inception

The Consultant shall use the inception phase to get familiarized with the project scope and data availability, the stakeholders involved, and make a detailed work plan for the design phase of the project and initiate the required surveys. The PMU will visit the project areas with the Consultant, have initial meetings with stakeholders, and discuss the details of the project. Also, the Consultant will be introduced to the relevant agencies and Ministries of Government. The Consultant will also discuss with MPW practical details regarding use of formats and software in which the digital versions of the documentation of this assignment shall be presented to the PMU for approval and record.

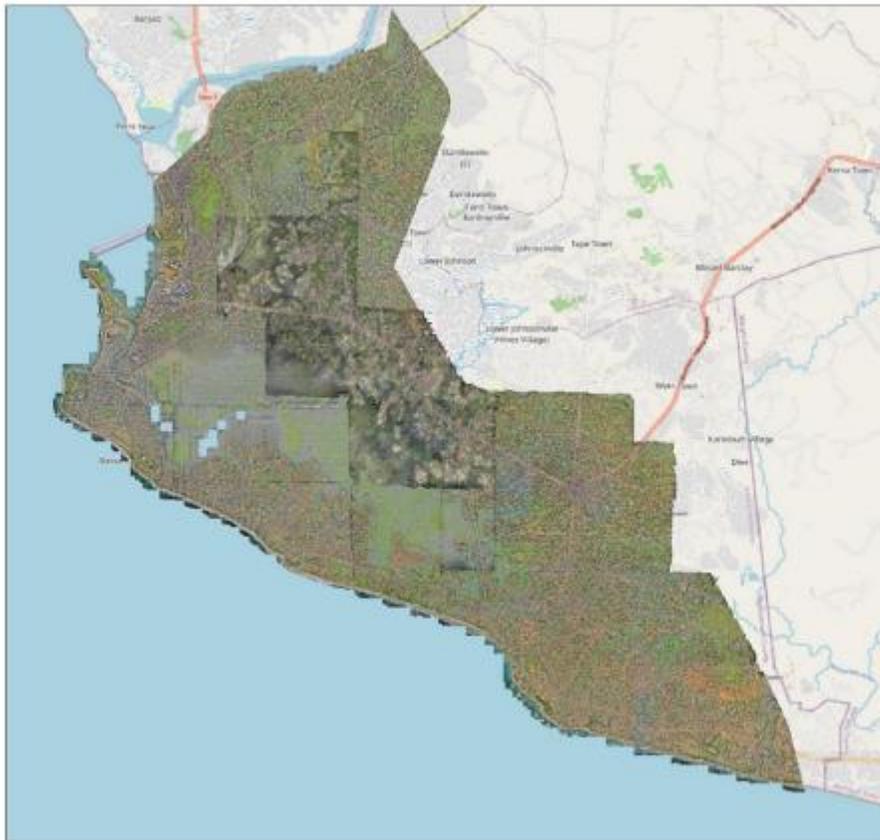
The PMU will handover at the start of the Inception phase the following data:

- Past reports on drainage system and other infrastructure assessments (a.o. JICA study)
- Orthophotos collected in 2019-2020 (source: World Bank)*
- Digital Elevation Model (source: World Bank)**
- Modeling data Flood Hazard and Risk Assessment (source: World Bank)***

- Maps of relevant project areas/ previously analyzed settlements
- Know Your City Neighborhoods (Greater Monrovia)
- Recent survey reports of Omega Market including road designs, etc.
- EPA studies and data on flooding in Monrovia
- All other related project reports and data conducted around the proposed project location containing information relevant for the design of the project.

* The orthophoto imagery covers most of search areas except for the Omega Market area. These orthophotos provide a very detailed imagery of the areas of interest.

Figure 10: Overview of orthophoto coverage



** The Digital Elevation Model available is a satellite derived product with a 0.5 meter horizontal resolution. This elevation model was not calibrated against local benchmarks and thus has an unknown vertical accuracy in the area of interest. The (uncalibrated) vertical accuracy of this DEM is in the order of 1 meter which is not sufficient for a feasibility/design study. Ground truthing and detailed calibration of this DEM shall be done for the areas of interest as part of this assignment.

*** In 2019/2020, a detailed flood hazard and risk assessment was carried out for the Greater Monrovia area. The baseline of pluvial, fluvial and coastal flood hazard and risk was determined for existing and future conditions taking into account climate change and socio-economic scenarios. A two-dimensional model has been developed for the area of interest with relevant forcings such as rainfall, water levels and river discharge. Pluvial, fluvial and coastal events with a range of different return periods have been evaluated for hazard and risk mapping. At conceptual level, solutions were proposed to reduce the risk of flooding in the Greater Monrovia area. The reports and results of this analysis will be shared with the Consultant.

Initiation and development of a community consultation process will be a key activity in the inception stage. The Consultant is expected to build upon previous work in the communities in the areas of interest and have initial consultations with these communities. In close consultation with MPW and other stakeholders, a community engagement plan/strategy shall be developed, and the Consultant shall determine the stages of the project where community participation would be most critical and what level of participation would be required (e.g. involvement in decision-making, contribution to costs, direct participation in construction; responsibility for subsequent operation and maintenance).

The Inception report should include a detailed methodology and work plan of all activities as to how the consultants will carry out assignment, including detailed timelines, detailed approach of the community consultation process with tentative list of consultations, including names and titles of stakeholders to be invited. Specific attention shall also be paid to the choice of software and methodology of the modeling and analysis necessary for sizing the drainage infrastructure and performing the necessary hydraulic, geotechnical and structural calculations. In addition, the Consultant shall outline in the inception report the methodology what process will be followed to reach recommendations for the design and how to include the views from the stakeholders in this process. Also, a fully costed proposal for all survey activities shall be proposed. An indicative program shall form part of consultants' technical proposals for this sum including a rationale for the selection of specific surveys based on the information provided in this Terms of Reference. The inception report should also include a preliminary overview and analysis of proposed locations including initial review of topography and site conditions (ground conditions) of the proposed locations and a strategy for prioritizing investment and selection of these locations in the context of the overall objectives of the intervention.

The Consultant is expected to produce a draft inception report within 3 weeks after signing the contract. The PMU will review this document and provide comments within 2 weeks after submission. The final Inception report will be submitted to the World Bank for review no later than 7 weeks after signing the contract.

Stage 2: Pre-design studies

Once the Consultant is familiarized with the project scope through inception, Stage 2 will focus on pre-design work including surveys and hydrological/hydraulic modeling and further consultation and mapping of the communities and their needs in the areas of interest. The information gathered will feed into in two deliverables of this stage: a Local Area Resilience Plan for each of the areas and a Design Basis. The following tasks shall be carried out in this stage:

Task 1: Topographic and bathymetric surveys

Based on the assessments of surveys carried out in the preparation phase, the Consultant shall undertake all necessary details to enable preliminary and detailed engineering designs to be carried out in the areas of interest. The Consultant has the freedom to select appropriate subcontractors to perform these surveys in time and with the required quality. It is encouraged to use local sub consultants for carrying out these activities where possible. The consultant shall utilize provisional sums allocated under the project for this activity.

Topographic survey:

The surveyors must survey and map the following:

- a. The meets and bounds of the locations mentioned above for intervention reflecting particular flood risk zones and communities as targeted under this project;
- b. All permanent public & private structures (social, commercial and residential) located within the project area;
- c. The immediate land and floodplain areas around the area of interest, as directed by the PMU, including the access road, existing drainage infrastructure including nature earth drainages, and all relevant flood related areas for the purpose of planning.
- d. Built-up approaches
- e. Limits of green areas including coconut groves, isolated trees of significance etc.
- f. Limits of agricultural land within the area if any
- g. Limits of open space, including parks, sports grounds, reclaimed areas, cemeteries etc
- h. The boundaries of all the plots, with specific use should be identified:
 - any residential plots (block level demarcation is sufficient)
 - any public buildings (e.g. schools, island office, mosques etc)
 - any utilities and municipal land uses (e.g. powerhouses, cemeteries, water plants etc)
 - any commercial and industrial buildings, public facilities, etc.
- i. All other permanent structures
- j. Nature water flow sections
- k. Identify possible retention ponds/basins

The topographic survey must have sufficient vertical and horizontal accuracy and shall result in a detailed 3-D plan/3D-reality model of the area of interest. As said, there is an existing elevation model with a 0.5 meter horizontal resolution. The Consultant is expected to perform ground truthing with sufficient ground control points in the areas of interest to generate a DTM with a vertical resolution within +/- 0.10 m. Specific emphasis shall be on areas which are critical for the drainage infrastructure (eg. possible retention areas, existing drainage channels, man-made structures, etc.) which shall be surveyed with high accuracy (+/- 0.03 m). Also, existing drainage structures in the areas of interest shall be surveyed with high accuracy for making detailed designs (e.g. identifying m³ of material to be dredged). It is noted that the orthophoto imagery can be also be used for defining some relevant dimensions (e.g. culvert lengths, etc.).

For the areas of interest, collection of high-resolution aerial imagery is required with minimum 2 cm GSD using survey grade UAS/Drone having on board dual GNSS system and calibrated camera of 20 MP. The UAV Aerial Photo Acquisition shall be done to cover the areas mentioned above making up the specific scope of the survey. Images shall be clear / sharp imagery with good light condition with XYZ co- ordinates and rotational information, sensor size, focal length,etc.

The Surveyor shall supply surveyed maps in AutoCAD DWG format (version 2021 or less), also all the Maps should be combined to one .pdf file. The digital raw files from the survey also should be submitted for the review. Final processed data in .csv file format (Point ID, Easting, Northing, and Description) and required shape files.

The results of any analyses, tests and audits carried out shall be supplied as part of the survey report.

All the Maps shall include:

- Grid Information (grid intervals at 50m)
- Survey date and time and shorelines surveyed date
- Name of the chief surveyor, surveyor registration number.
- All the Maps should be in A3 or larger paper size.
- Control Network Map shall include bearing and distance to each control station.
- An Index Map (This map should fit in one A3 paper)
- Survey Maps in 1:1000 scale with Grid lines and if tiled with joint lines.
- CAD Layer naming as per CAD standards provided by MLSA.

The Surveyor shall supply 2 sets of printed survey reports and maps and all information (raw data, maps etc.) shall also handed over in digital format on USB and cloud folder, details of which can be confirmed in the inception stage.

Bathymetric survey:

The Consultant is also expected to do bathymetric surveys where necessary. A particular area of interest is the Stockton Creek area, St Paul River and Mesurado Estuary near the CBD. These water bodies are relevant to analyze the tidal levels and also the conveyance capacity during high river floods (in particular St Paul River/Stockton Creek). The Consultant is expected to carry out a hydrographic survey of these water bodies that surround the selected areas of interest (particularly Northern Bushrod Island and CBD). The Consultant is expected to propose a sufficiently high but efficient horizontal survey resolution keeping mind the purpose of the use of the data for analysis and engineering.

Task 2: Geotechnical and soil investigations

For the purpose of adequate engineering analysis of the site, geotechnical investigation shall be carried out as part of the preliminary & detail design activities. However, preliminary site investigation and ground conditions shall be done during the pre-design studies to provide general data of the site topography, weather conditions, human and natural actions affecting the land and general climate risk

analysis in order to inform the type and nature of detail investigations. Further geotechnical and soil investigations will be conducted for project specific locations following identification and acceptance of community specific interventions during the detail design phase.

The scope of the geotechnical & soil investigation shall cover all activities associated with the infrastructure proposed to be constructed under this project as well as exploration of the soil and ground conditions to inform flood water absorption rates, drainage channel excavation requirements, sediment quality of dredged/excavated materials, borehole sinking, infrastructure foundation works required for this project. The Consultant shall conform to all specifications and procedures for soil investigations in line with the Standards use in the Liberia for such geotechnical investigation works, as provided by the Ministry of Public Works / PMU.

The Consultant shall also ensure that all studies, data and works applied as a result of the geotechnical investigation are carried out as required / instructed by the Client. Specifications for geotechnical investigation for drainage interventions shall be updated following preliminary investigation and depending on the scope of the intended works to be carried out at site.

The purpose of the proposed sub-soil investigation is to provide adequate information on sub-surface and surface conditions for the foundations and other sub-structures for the proposed project, leading to their economical and safe designs.

The Consultant shall provide a detail methodology for approval by the PMU during the detail design stage of the work that sets out the scope and nature of site specific geotechnical and soil investigation to be carried out. This will include the planning of the work, choice of the method of boring, selection of the type of samples and procedure for sampling shall be detailed and outline in his methodology for review and approval by the PMU before detail investigation can be conducted.

For the purpose of tender preparation, the Consultant shall furnish his tentative programme regarding the above along with his offer which, necessarily, should consider the site conditions and time schedule for completing the work, comprising subsurface features, borings, in-situ tests, sampling, visual observations and laboratory tests of samples, reporting of the test results, including discussions, correlating the field and the laboratory test values and commendations.

For each of the proposed communities, the Consultant shall be required to provide a location plan for the ground investigation indicating key/major facilities with proposed facilities being marked as “proposed study area” attached. The location plan will set out to detail the type scope and nature of soil / geotechnical investigation to be conducted at each location for review and approval by the PMU. The plan should also capture specific locations for boreholes and field tests along with their interval for repetition. At each location, plate load tests and other field tests, the Consultant shall establish the ground level prior to commencing of the operations. The ground level shall be related to an established benchmark or to a GTS benchmark or as directed by the PMU.

Task 3: Hydrological and hydraulic modeling for the selected areas

The Consultant is expected to assess existing hydrological/hydraulic data (modelled and observed if available) in combination with additional detailed modeling in the project areas. Appropriate boundaries and an appropriate modeling methodology must be defined in the Inception Report. The geographical outlines of the areas of interest based on initial mapping of the hydrological catchment can be used as a starting point. The Consultant is expected to review the existing information and define the final areas to be analyzed in the hydrological/hydraulic analysis.

For the four selected areas, the Consultant shall use an appropriate software modelling system for the construction of the hydrological and hydrodynamic model to be developed and used in this LURP study. Preferably, this code should be non-proprietary and must be compatible with national choices and standards. As inputs for the modeling, the Consultant may use the existing data (e.g. rainfall statistics/curves, etc.) and models developed during the hazard and risk assessment in 2019/2020. It is expected that the Consultant will check and refine this approach (e.g. by including existing structures and/or creeks/channels and including more detailed topographic survey information) and calibrate the 2D modeling with data and/or local knowledge of the flooding to make the analysis as accurate and realistic as possible. Special attention shall be given to how to deal with uncertainties in the entire modelling chain in this methodology.

The Consultant shall use the modeling to analyze different design storm events (e.g. rainfall events including the combined effect of other driving forces like tidal water levels which can limited gravity drainage). The Consultant is expected to produce detailed flood maps for the baseline situation and also future scenarios for the project areas. Initial computations must be carried out to understand the local system behavior, also some preliminary interventions may be evaluated to understand the sizing etc. and get an understanding of a realistic return period for preliminary design of the drainage infrastructure.

The Consultant is also expected to quantify the benefits of the interventions (i.e. “avoided damages”, “reduction of affected population”). For this purpose, the Consultant shall evaluate the risk of flooding for the baseline situation and for the situation with interventions as inputs for cost-benefit analyses (see also next stage). Similar to the hydrological/hydraulic modeling, the existing data and models developed during the hazard and risk assessment in 2019/2020 can be applied. Quantification for these selected areas of the number of affected people and the direct economic damage is required taking into account the exposure distribution (assets, population) and vulnerability. The indirect economic damage can be added as a fixed allowance on top of the direct economic damage, but the allowance must be justified based on situations with similar characteristics.

Task 4: Community mapping, needs and prioritization

The Consultant is expected to do in-depth mapping of the communities in the areas of interest based on available data and fill in gaps with additional surveys and desk research. These maps shall cover building footprints as well as location of relevant infrastructure (with emphasis on drainage infrastructure) and other basic services (water supply, etc.) in the four areas of interest. Also, the Consultant is expected to

analyze and summarize relevant physical (land elevation, climate and rainfall characteristics, etc.), socio-historical information (historical patterns of establishment, local governance structures, etc.), demographic information (population density, growth rate, population structure, etc.), economic profiles (predominant occupation, significant commercial businesses, etc.), housing conditions (building footprint with permanent and temporary structures, water supply, electricity, etc.), transportation (main transport modalities, infrastructure, critical facilities), land tenure (delineation of state lands, private land, etc.),

Also, the Consultant is expected in this stage to engage in a series of consultations with communities through various fora (as appropriate) including large “town hall” meetings, small focus group meetings, and meetings with specialized groups to further explain the project scope and identify specific needs and priorities but also implementation aspects like land ownership and land use rights, etc. which are relevant for defining investment options. Steps to be undertaken could be first to explain the basic objectives, principles, processes, parameters, and time frames and to obtain initial feedback on these and consult the community on general land use rights and other pertinent issues. The Consultant is expected to organize a round of consultations so that teams representing selected communities are (i) sensitized about the overall budget envelope (hard budget constraint) in terms of per capita, per household and/or per hectare cost, and about the need to make trade-offs regarding priorities within that envelope; (ii) informed about the possible need to factor in cost recovery requirements; (iii) asked to rank their community’s infrastructure needs in order of priority (drainage will be of paramount importance but other community infrastructure shall also be considered). The consultants should facilitate these sessions and provide feedback to the teams if different actors produce different results.

Task 5: Local Area Resilience Plans

The Consultant shall develop a Local Area Resilience Plan for each of the targeted areas. This plan shall be based on the information gathered from the community consultations (this task), surveys and hydrological/hydraulic modeling (task 1 - 3), It shall be a high-level plan for each of the targeted areas and provide a detailed baseline description of the area and the functioning of its communities, the potential hazards/disasters (not limited to floods), and also presenting key priorities in flood resilience and other community infrastructure. Aspects to be included but not limited to area: layout of the main drainage pathways, areas to be protected for water retention during rainy seasons and public spaces during dry seasons, key community facilities and other critical infrastructure including transport routes, waste management facilities and collection routes. This plan shall also present maps with potential hazards in the neighborhoods. Apart from presenting flood maps (see task 3), this also may include maps of recent other hazard/disasters such as fires, etc. The plan shall outline the key priorities regarding flood resilience and other community infrastructure priorities based on the consultations with the communities and own analysis.

Task 6: Develop a Design Basis with boundary conditions and requirements

The Consultant shall also develop for all identified structural interventions a so-called Design Basis based on the information gathered in Task 1-4. In this document, the Consultant will lay down in consultation with the Ministry and Technical stakeholders as well as the PMU appropriate guidelines to prepare detailed designs of all works, including engineering plans for different types of structures and reports for

the Project. The design basis shall summarize the outputs from the community consultations and shall define the specific needs and priority in terms of drainage and neighborhood upgrading for each of the areas.

The recommended design criteria, specifications, technical standards, and codes of practice will give due consideration to relevant international design criteria/codes of practice/specifications and GoL, taking due account of advice provided by the PMU. Where GoL codes of practice/specifications and standards are not available, international codes of practice, specifications and standards may be adopted with the approval of the PMU. The approved criteria and specifications will become part of the design and this Design Basis will be a separate deliverable throughout the project.

The design basis will provide an initial view on potential interventions of drainage infrastructure and neighborhood upgrading in the areas of interest following the surveys, desk research and community consultations. Also, the relevant aspects to be covered in this Design Basis for all these interventions under consideration are (but not limited to):

- General: design time horizon, durability considerations, reference levels
- Geotechnical: soil characteristics such as soil strength, consolidation, subsidence, sediment quality etc.
- Structural: concrete, steel norms/specifications
- Mechanical and Electrical: electrical circuit and power requirements, lifting mechanisms
- Drainage: conveyance capacity / cross-sectional profile / design return periods
- Sustainability, Operations & maintenance: painting, cleaning, vegetation minimization/removal/ minimum recurring O&M requirements
- Environmental: sediment disposal of polluted sediments, minimization of vegetation
- Landscaping/public realm: recreational / public facilities, ground surfaces/paving, fences
- Safety and inclusion: Crime Prevention Through Environmental Design (CPTED) principles, public safety, lighting, universal design, fire protection

Deliverables Stage 2

The following deliverables are expected from the Consultant at the end of Stage 2:

- Topographic/bathymetric survey data and reports (activity 1)
- Preliminary Geotechnical Report (activity 2)
- Hydrological/hydraulic and risk modeling (activity 3)
- Local Area Resilience Plans (activity 4)
- Design Basis (activity 6)

The survey data and all reports shall be delivered 10 weeks after contract signing. After a review period of 2 weeks by the PMU, the Consultant has another 2 weeks to deliver final versions of these deliverables to the PMU.

Stage 3: Prioritization and Preliminary Design

Once the Consultant is familiarized with the project scope and the baseline situation through inception and pre-studies, Stage 3 will focus on further detailing and prioritization of interventions and preparing a preliminary design for submission to PMU for consideration and pending PMU's approval of the packages of work to be covered. The Consultant is thus expected to comprehensive, cost-efficient and supported drainage solutions integrated into the urban fabric for each of the four areas at preliminary design level and provide suggestions for prioritization. Based on the findings, the PMU will decide which of the interventions and/or selected areas will feed into the work packages for detailed design and implementation under Component 1 of this MDIP within the available budget of US\$ 26 million. Preliminary designs will be carried out for the project areas. In parallel, the ESIA and RAP will be further prepared by another consultancy, that requires strong coordination and information sharing.

This stage comprises detailing drainage infrastructure design, including green solutions and small-scale societal functionalities and detailing of socioeconomic impacts of the works, e.g. unavoidable resettlements, development of a site analysis plan, detailing of the environmental friendly retention areas, preparation of preliminary drawings and the preparation of initial bills of quantities and cost estimates. Also, the neighborhood upgrading interventions shall be further detailed into preliminary designs and cost estimates shall be prepared for these interventions. In parallel, the ESIA and RAP will be further prepared by another consultancy, that requires strong coordination and information sharing.

This stage will need intensive stakeholder consultation following the initial consultations as described in the previous stages. The Consultant shall use these consultations to further get feedback/input potential concerns and input for design ideas for integrating the interventions into the urban fabric. Consultants are also expected to explain why certain scenarios are not feasible due to cost or technical reasons. Participants are asked to express explicit preferences in order to narrow down the options as much as possible. Consultants can initiate discussions with communities on their likely role in project implementation and where relevant provide details on the implied roles and responsibilities of the community in management/operation and maintenance of facilities chosen through the consultation process.

This stage will require an iterative approach to arrive at a set of support investments by the PMU and other stakeholders involved based on costs, environmental/social benefits and impacts, etc. The overarching principles and guidelines as outlined in this TOR shall be given specific attention during this stage.

Task 1: Develop structural interventions for drainage and urban upgrading

This task involves the development of a preliminary design for the drainage interventions and other urban upgrading interventions for the four areas under consideration. This shall include further development of ideas generated at the stakeholder meetings as appropriate. It is important that the Consultant follows a clear process to be outlined in the inception stage to reach design recommendations for the four selected areas.

The drainage infrastructure can include but is not limited to specific road drainage (e.g. along UN Drive, roads in other areas of interest), connecting/constructing new primary drainage channels, improving the connectivity between retention areas (e.g. Northern Bushrod Island), sizing new retention areas (e.g. in the Omega Circle area), dredging/cleaning of existing primary drains (e.g. Soniwein drain), and including new outlet structures and/or widening existing outlet structures (e.g. the outlet structure at Stockton Creek). Dredging/excavation of primary drains will result in sediments which might be reused if the quality of these sediments is sufficient. When the sediment quality is not sufficient, suitable areas for storage of these sediment shall be identified and auxiliary infrastructure (e.g. sediment depot) must be developed where these sediments can be stored and/or treated.

The preliminary design of the drainage infrastructure shall be based on a thoroughly chosen set of design calculations. These shall include but are not limited to the hydraulic (water levels etc.) and any other relevant load calculations and the strength calculations such as hydraulic/geotechnical/structural stability of structures where applicable. The Consultant shall use state-of-the-art software for these analyses. The Consultant shall perform a detailed analysis of the availability, price and options for key construction materials. The Consultant shall perform the design assessments with the models set up in the previous stages (and add other modeling / calculations if necessary) to ensure the solution meets the flood protection level during its design lifetime.

Special emphasis shall be also paid during the development of the urban drainage and other neighborhood interventions such as water supply/sanitation, community facilities such as playgrounds, footpaths, waste collection points, drinking water points etc. to integrate these into and work with the existing natural system and the urban fabric. The Consultant is expected to include urban planning and design experts throughout the entire design process of these structural interventions to ensure that these solutions fit within and can enhance the existing surroundings and urban space. This shall be supported by sketches and drawings to visualize this integration and enhancement of the urban space.

Task 2: Preparation of Preliminary Drawings

Drawings shall be prepared for all elements of the scope described above which shall be created with use of suitable commercially available design software (AUTOCAD DWG format, version 2021 or any other suitable software agreed with the PMU). For each of these elements the drawings should include but not be limited to:

- General design documentation (including three-dimensional perspectives, general arrangement/site plans, floor plans, elevations, sections)
- Longitudinal sections and cross sections of drainage and market/urban upgrading interventions;
- Initial structural drawings for features such as culverts, drainage canals, storage basins, water supply/sanitation, sediment depots, etc.

The Consultant shall also produce detailed maps for each area of interest, showing, besides principal new or rehabilitated drainage and green infrastructure works proposed, further essential works, such as vehicle

crossings, pedestrian and (motor) bike crossings, envisaged stockpile areas, etc. and non-essential, though additionally proposed works, such as secondary/tertiary infrastructure and small parks, pedestrian amenities, playgrounds, and other facilities fulfilling societal needs. The output of this preliminary plan will serve as input for the following subtasks and will be refined once decisions have been made on the intervention packages that will be implemented under the project.

The output of this activity will be site plans and profile sheets at 1:1000 horizontal scale and 1:200 vertical scale (or any other scale deemed appropriate if more detail is needed – to be agreed with PMU in the inception phase) showing all existing plan features, landownership boundaries, construction limits, existing ground levels, proposed finished profiles, typical cross sections, etc. These technical drawings shall be further complemented with good visuals (artist impressions with bird's eye views, landscape drawings) to communicate the proposed interventions to the wider audience.

Task 3: Inputs Environmental and Social Assessment

As previously noted environmental and social assessment is an integral part of the design process. A separate Consultancy will develop ESIA and RAP for this project. The Consultant shall closely coordinate with the ESIA/RAP Consultancy and ensure that the requirements of the ESMF and RPF are addressed in the preliminary design. Vice versa, the draft ESIA and RAP shall be finetuned during the preliminary design stage and submitted together with the preliminary design report/drawings. The ESIA and RAP follow a specific process for consultation and approval. It is expected that the Consultant shall work with MPW to respond to questions from stakeholders and World Bank and implement any changes in the preliminary designs as deemed necessary by the ESIA/RAP.

Task 4: Bills of Quantities and Cost Estimate

Prepare initial bills of quantities for the above works and use these to prepare and update the cost estimates. Separate cost estimates are required for the different main elements of the scope (i.e. works identified to be carryout from the Pre-design stage). Also, the consultant shall present the costs for different options in a clear way to enable decision-making. The accuracy of this cost estimate shall be with not more than 20% margin of accuracy. The Consultant shall describe the potential costs for the additional facilities for each of the areas of interest in order to allocate a provisional budget, to be agreed with the PMU, as a guideline for further detailing. This shall also have sufficient detail with a 20% margin.

Task 5: Multi-criteria analysis

The Consultant shall make a multi-criteria analysis to recommend prioritization of investments in the targeted areas. This shall include technical, environmental, social and economic aspects. As part of this, an economic analysis of the urban drainage and urban upgrading interventions shall be carried out to reflect social and economic justification of the interventions. This analysis shall also take into account operation and maintenance costs. The assumptions of the economic analysis shall be justified (e.g. interest rate) and the robustness of the conclusions will be tested with sensitivity analysis. The interventions can be based on a preliminary design level with a capital investment cost estimate +/- 20%. The economic analysis should also estimate the socio-economic costs and benefits of implementing the defined

interventions: inter alia damage reduced due to implementation of the prioritized measures but also resettlement costs. The socio-economic analysis should also reflect on costs and benefits of the project that are harder to monetize, including effects and/or co-benefits on urban development, poverty and environment and the overall improvement to livelihood of beneficiaries.

The economic analysis shall be reported as part of the preliminary design report. Results of economic analysis and full CBA (IRR's, NPV's and cost-benefit ratios) should be included. Insights in financial sustainability should be provided also in regard of coverage of O&M costs by national or local authorities. All models (financial analysis, CBA in excel or other software) will be handed over to the client as annexes to the preliminary design report.

Task 6: Procurement Strategy

The Consultant shall propose a procurement strategy for the recommended package(s) based on an analysis of the local and regional construction industry that takes account of potential contractors': relevant experience; technical and financial capacity; and anticipated interest. Consideration should also be given to current levels of industry demand at the national, regional and international level. The strategy should, amongst other aspects, recommend contract package sizes and the type of works contracts.

Deliverables Stage 3

The following deliverables are expected from the Consultant at the end of Stage 3:

- Preliminary Design Report and drawings (activities 1 - 6)

These deliverables shall be submitted in 17 weeks (4 months and 1 week) after contract signing with 3 weeks of review and 3 weeks for delivery of final versions.

Stage 4: Detailed Design and Bidding Documents

Detailed design shall be carried out for the package of works identified in the Preliminary Design that can be implemented within a budget of US\$ 26 million. It is envisaged that detailed design will proceed immediately after the final Preliminary Design Report has been submitted to MPW for consideration and pending MPW's approval of the final package of work to be funded under the project. Before commencement of detailed design and approval of the final package of works, the Consultant shall obtain formal agreement from MPW/PMU on the elements of the works package on which work should initially proceed. These will be non-contentious elements that will proceed irrespective of the final package of works that is eventually approved. The Consultant is responsible for ensuring that all design elements comply with relevant national and/or international engineering standards and building codes.

This stage will also kick-off with stakeholder meetings as described earlier in this document. The Consultant shall use these meetings to inform the stakeholders about the results of the preliminary design stage and provide feedback how suggestions from the previous stakeholder meetings have been incorporated. Also, the stakeholder meeting shall be used to present the scope and planning of this and following stages, get again feedback/input on the scope of the project, potential concerns and input for design modifications. These stakeholder meetings shall take place at three locations in the area of interest.

Task 1: Additional Surveys and Update Design Basis

The Consultant shall undertake any additional surveys considered necessary for detailed design beyond those already carried out. These surveys shall be defined based on the outcomes of the Preliminary Design Phase and shall be weighed against reducing the technical risk and the costs involved. The Consultant shall also update the Design Basis if needed based on new information from the surveys and/or other comments/input. The Final Design Basis shall be delivered as a separate deliverable.

Task 2: Feedback Environmental and Social Assessment into Design

The Consultant shall closely coordinate with the Consultancy preparing the ESIA and RAP. This coordination comprises adapting and refining the designs based on the findings of the ESIA and RAP to maximize environmental and social benefits, minimize risks and consider the cost benefit of how changes in design or alignment can reduce or increase the number of project affected persons, and associated costs of compensation. The Consultant shall also include the mitigation measures in the detailed design, cost estimates, bidding and contract documents.

Task 3: Detailed Design and Drawings

The Consultant shall develop detailed construction documentation based on the approved preliminary design. This shall include all engineered drawings needed for the bidding package such as but not limited to: general arrangement plans; structural, electrical, mechanical and civil engineering plans, sections and details; connection details and site utilities layouts; landscaping plans, plant schedules, and details; bed and bank protection plans; sections and cross-sectional details; elevations, as well as all needed schedules, technical details, and construction specifications. Design drawings shall be prepared at scales suitable for construction and agreed with MPW prior to commencement of this Stage.

Task 4: Bills of Quantities and Final Cost Estimate

The Consultant shall update the bills of quantities and cost estimates prepared for the final design making due provision for physical and price contingencies. Undertake an estimate on the proportions of the project's base costs in terms of (i) foreign exchange cost (including direct and indirect foreign exchange costs), (ii) local currency cost, and (iii) taxes. Present these calculations on a spreadsheet or similar software. This final cost estimate shall have an accuracy of +/- 10%.

Task 5: Bidding Documents

The Consultant shall prepare draft bidding documents in line with the approved procurement strategy prepared at the feasibility stage. Contract packages will be procured under arrangements acceptable to the World Bank. Detailed design will be used to prepare the bidding documents. The appropriate WB's Standard Bidding Documents shall be used based on the estimated maximum budget per package.

The Consultant shall submit completed draft bidding documents to MPW and the World Bank for review. Bidding documents reviewed and accepted by MPW shall be presented by them to the World Bank for their further review and No-Objection. After receipt of comments from MPW including observations

made by the World Bank, the consultant will prepare the final versions of the documents in the required number of copies and provide soft copies of all documents, suitably documented.

Deliverables Stage 4

The following deliverables are expected from the Consultant during Stage 4:

- Updated Survey report (activity 1)
- Updated Design Basis (activity 1)
- Final Design Report and drawings including reporting on including findings from ESIA/RAP into designs (activities 2 and 3),
- BoQs and Bidding documents (activity 4 and 5)

These deliverables will be delivered 6 months after contract signing. After a review period of 2 weeks by the PMU, the Consultant has another 2 weeks to deliver final versions of these deliverables.

Stage 5: Procurement Support

Procurement under the project is to be carried out in accordance with the ‘World Bank Procurement Regulations for IPF Borrowers for Goods, Works, Non-Consulting and Consulting Services’ dated July 2016 and revised in November 2017, August 2018 and November 2020 (‘Procurement Regulations’) and applicable to Investment Project Financing (IPF). The project is subject to the World Bank’s Anticorruption Guidelines, dated October 15, 2006, and revised in January 2011 and as of July 1, 2016. As required, a comprehensive Project Procurement Strategy for Development (PPSD) has been prepared by the Project. These procurement regulations are available on the World Bank website (www.worldbank.org).

The Consultant will assist the MPW/PMU in carrying out the following procurement actions for the works related to Component 1 of LURP:

- To prepare bidding documents for international procurement as per the World Bank’s Procurement Guidelines for the World Bank’s No Objection,
- To support the advertisement of the bid documents across multiple platforms and networks,
- To prepare the response to bidders’ queries,
- To assist in organizing a pre-bid meeting if this is adopted,
- To assign an expert to sit on the bid evaluation committee,
- To check conformity of bids to eligibility criteria in the bidding documents, technical specifications, BoQ, etc. to clarify any issues with the bidders, and to evaluate bidders in accordance with bid evaluation criteria,
- To prepare a bid evaluation report in a confidential manner containing a concise set of basis and justification for the ranking of bids and to prepare presentation materials to the PMU for deciding the tenders, and;

To proceed in contract award procedures, to prepare contract agreements for signing of contracts, which shall be submitted by the PMU to the Bank for approval upon signature by the successful bidder. The Consultant will coordinate the activities as described above with the Procurement Specialist from the PMU.

D Deliverables, Reporting and Payment Schedule

It is anticipated that the period of the Consulting Services (exclusive of support to PMU in evaluating bids for works, Stage 5) will be 30 Weeks (7.5 months).

All report deliverables of this assignment shall initially be presented as drafts and subsequently, on receipt of comments from PMU, shall be updated to final versions. All deliverables shall be submitted as 5 hard copies in English/1 soft copy in English. Language in reports shall be high quality with editing for language and technical accuracy by a translator familiar with technical terminology if necessary. Drawing formats shall all be agreed upon with the PMU and number and format of drawings (hard copy/soft copy) shall be agreed upon with the MPW.

Survey data shall be delivered to the Consultant in digital formats prior agreed with MPW in the inception phase. Two electronic copies of the entire survey data set shall be delivered to the MPW. The survey data shall include sufficient metadata for later use. Metadata shall be provided both in English. All other data (e.g. video and photo footage) generated during the project shall also be delivered to the MPW. All other data and model schematizations etc. generated during this assignment shall also be handed over to MPW at the end of assignment in a structured database with sufficient metadata for later use.

The table below shows the proposed time schedule for this assignment. It also includes the time required for reviews by the MPW. The MPW will coordinate the reviews by other agencies within the GoL and produce a comment matrix for the Consultant. The Consultant shall implement the comments in the final deliverables and also shall deliver the comment matrix including a response how the comments were implemented into the deliverables.

Table of Outputs

<i>Ref #</i>	<i>Output/Report</i>	<i>Time from Start of Services (weeks)</i>
Design and Bidding Documents		
	Draft Monthly progress reports with minutes of technical meetings and progress meeting submitted at least 5 days prior to progress meeting (1 digital in pdf English)	<i>(N/A-Monthly)</i>
	Comments from MPW/PMU	<i>(N/A-Monthly)</i>
	Final monthly progress report with minutes of progress meeting (1 digital in pdf English)	<i>(N/A-Monthly)</i>
Stage 1: Inception		

	Draft Inception Report including design standards, assessment of existing data, reports	3 Weeks
	Comments from MPW/PMU	2 Weeks
	Final Inception Report	7 weeks
Stage 2: Pre-studies		
	Draft Survey Report with bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, Local Area Resilience Plans, Initial Design Basis	10 weeks
	Comments from MPW/PMU	12 Weeks
	Final Survey report with bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, Initial Design Basis	14 Weeks
Stage 3: Preliminary Design		
	Draft Preliminary Design Report including urban design sketches, preliminary cost estimate, procurement strategy, Updated Design Basis	16 Weeks
	Comments from PMU & MPW	18 Weeks
	Final Preliminary Design Report including urban design sketches, preliminary cost estimate and procurement strategy, Updated Design Basis	21 Weeks
Stage 4: Detailed Design and Bidding Documents		
	Draft Detailed Design report / Bidding documents / Final Design Basis	25 Weeks
	Comments from MPW & PMU	28 Weeks
	Final Detailed Design report / Bidding documents / Final Design Basis	30 Weeks
Stage 5: Assistance with Bid Evaluation and Contract Finalization		
	Ad hoc inputs to evaluation as required	
	Final contract document	

Payment Schedule

No.	Deliverable	
1	Acceptance of Stage 1	20%
2	Acceptance of Stage 2	20%

3	Acceptance of Stage 3	20%
4	Acceptance of Stage 4	20%
5	Acceptance of Stage 5	20%

E Required expertise of Consulting Firm

The Consultant is expected:

- To be a consulting firm or an association of consulting firms with the appropriate capabilities and experience to execute the services.
- Have at least 12 years of general experience implementing design and supervision contracts for civil engineering projects worldwide and specifically in developing countries; experience in the West African Region in general and in Liberia in particular is an advantage;
- Have at least 8 years of specific experience in the design and supervision of flood risk management and/or hydraulic engineering projects in developing countries;
- Have a proven record of successful completion of at least 3 assignments related to the design and construction supervision or rehabilitation of hydraulic structures, dredging works and or urban design and water management projects involving investments over \$10 million;
- Experience with the preparation and or technical support for the preparation of procurement packages and evaluation is required;
- To be able to mobilize the internationally experienced and locally experienced Key Experts and staff listed in the tables below.

The table below provides an indicative staffing for this assignment. The Consultant must evaluate for themselves the staff required to achieve the objectives of the assignment and may propose additional or alternative staff. Some related positions could be combined or may be filled with separate experts (e.g. environmental specialist and social / community specialist). Other specialist staff may also be necessary. Only resumes from Key Experts (KE) must be included in the consultant's proposal. One of the other key experts shall be designated as deputy team leader in the absence of the Team Leader and the requested qualifications of the deputy team leader listed below shall also be shown for this key expert in the proposal.

This assignment will be a lump sum contract and it is the consultant's responsibility to determine the duration of inputs required to achieve the objectives. The specific specialists are only intended to guide the Consultant to submit their proposals. The firm may adjust and optimize the structure according to the needs of the tasks provided that the requirements of this outline for the qualifications of consultants are met.

Indicative Staffing for Design and Bidding documents

Ref	Description
Lead Key Staff	
1	Team Leader (KE)
2	Hydraulic / Hydrological Engineer (Deputy Team Leader) (KE)
3	Procurement Specialist /Quantity Surveyor (KE)
4	Environmental and Social/Community Specialist (KE)
5	Geotechnical Engineer (KE)
6	Green Infrastructure/Urban Design Specialist (KE)
7	Waste Management Specialist (KE)
Support / Additional Staff	
1	Sanitary/Water supply Engineer
2	Structural Engineer
3	Urban Planner
4	Economist
5	Technicians – surveyors, draughtsman etc.

Legend:

KE – Key Expert

The Key Experts are required to fulfill, at a minimum the requirements listed below and in addition they must be fluent in written and spoken English. “Assignment Details” included are indicative only. A gender-balanced project team is encouraged. The Consultant is expected to present an organization diagram in its proposal.

Team Leader

- At least an MSc in Civil Engineering / Urban Planning or a strongly related discipline/field with verifiable experience in project management of infrastructural urban upgrading/development projects;
- At least 15 years relevant experience in managing integrated design studies for completion of detailed designs in hydraulic engineering or related projects (similar works) in urban environments, including at least 8 years

experience in working with development partners such as the World Bank, African Development Bank, ECOWAS Bank or other IFIs in developing countries.

- Experience in the Africa or West Africa in particular would be advantageous.
- Excellent communication and presentation skills and ability to prepare/manage the preparation of high-quality reports and project documentation.

Assignment Details: Responsible for all engineering aspects of the assignment. As Team Leader he/she shall have overall responsibility for the assignment and shall communicate directly with the PMU and ensure that the objectives of the scope of services are met. He/she shall be available for regular but also ad-hoc discussions with the MPW about project-related issues. He/she shall be based in Monrovia throughout the assignment. (> 50% of the time spent on the project).

- At least a MSc in Civil Engineering/ Urban Planning with emphasis or a closely related discipline;
- At least 10 years relevant experience in the feasibility, preliminary and detailed design of urban infrastructure, such as drainage, sanitary infrastructure. Including at least 5 years' experience in working with development partners or projects of similar nature and scope;
- Must have experience working in West Africa and preferably in Liberia.

Assignment Details: As Deputy Team Leader assist and work under the direction of the Team Leader to ensure that the objectives of this scope of services are met. Shall assist the Team Leader with all engineering aspects of the assignment. Shall be based in Monrovia.

Hydraulic / Hydrological Engineer & Deputy Team Leader:

- At least a MSc in Civil Engineering, with emphasis in hydraulics / hydrological engineering / drainage designs experience or a closely related discipline;
- At least 10 years relevant experience in the feasibility and detailed design studies with surveys, modeling and design of urban drainage infrastructure and related flood risk management infrastructure. Including at least 5 years' specific experience in working with development partners or projects of similar nature and scope;
- Experience in the West Africa in particular would be advantageous.

Assignment Details: The hydraulic/hydrological specialist is responsible for modeling and design of the urban drainage works.

Geotechnical Engineer

- At least a MSc degree in Geotechnical Engineering;
- At least 8 years relevant experience in the geotechnical investigations for design of urban drainage structures and channels or related subsurface structures. Experience with setup, data collection and interpretation of geotechnical investigations.
- Specific experience with embankment stability, retaining structures and or improvement of weak subsoils is required.

Assignment Details: Responsible for all geotechnical engineering aspects of the assignment.

Procurement Specialist/Quantity Surveyor (international) with

- At least a BSc degree in Civil Engineering, Quantity Surveying, Engineering Measurement or similar.
- At least 8 years relevant experience in projects of similar nature including experience in quantities estimating, preparation of bidding documents, bills of quantities and cost estimates for civil engineering construction projects in excess of US\$ 15 Million;

- At least 5 years' experience of working on World Bank or other IFIs projects in developing countries and familiarity with the procurement requirements of these organizations.
- Experience on flood risk management schemes will be advantageous.

Assignment Details: Prepare and, as the assignment progresses refine, cost estimates for the proposed works; prepare a procurement strategy for the flood risk management infrastructure improvements that includes gender-sensitive considerations; prepare general and specific procurement notices, bidding documents, and other documents as necessary in accordance with the World Bank procurement guidelines and Standard Bidding Documents; during the procurement of Works and Goods Contracts assist MPW to evaluate bids, including participating in technical discussions with bidders; secure clearance of evaluation reports from GoL and no objection from the World Bank; and prepare final contract documents.

Environment and Social Specialist :

- At least a MSc or MA degree in Environmental or Social Science discipline;
- At least 10 years' experience working on environmental and social impact assessments for development projects including those involving ethnic minorities or indigenous people and familiarity with national and World Bank/IFI environmental and social safeguards policies, including gender and citizen engagement requirements.
- At least 5 years specific experience on projects of similar nature in West Africa would be advantageous

Assignment Details: Shall work closely with the Consultancy for Environmental and Social aspects; coordinate with other team members at all stages of the assignment to ensure environmental and social aspects are addressed as an integral part of the design assignment; work with the Procurement Specialist to ensure that environmental and social protection requirements are included in the works bidding document; in conjunction with the team leader arrange and conduct all necessary public consultations including those relating to people who will be directly impacted by the project.

Green Infrastructure/ Urban Design Specialist:

- At least BSc degree in Urban Design, Urban Planning, Urban Landscape Architecture/Design, Urban Sustainable (environmental friendly) Drainage Systems, Architecture, or similar;
- At least 10 years' experience in urban design, urban planning, landscape architecture, urban green engineering or similar and in developing urban design plans/strategies and design standards, including at least 5 years in developing countries.
- Specific working experience in urban flood risk management, green infrastructure development for flood risk mitigation, and climate change.
- Experience in West Africa would be advantageous.

Assignment Details: Responsible for designing attractive, functional, inclusive, safe, and context-appropriate infrastructure solutions ensuring the effective integration of the project into the overall urban fabric of the Greater Monrovia area and enhancing its environmental and ecological appeal. Shall work closely with the Hydraulic Engineer and other technical staff to promote Sustainable Urban Drainage Solutions and to ensure that other ecofriendly and bioengineering solutions are adopted to the extent possible. Shall take specific responsibility for preparing the Urban Design Plan, Site Analysis Plan, and Urban Design Standards; as well as development of the interventions such as greenery, and urban design aspects such as walkability, accessibility of the recreational activities, etc.

Waste Management expert:

- At least MSc degree in Civil Engineering or a related field;
- At least 10 years relevant experience in design and management of waste facilities; .

- Experience with removal, handling and disposal of waste from urban drainage systems and urban environments in general;
- Experience in West Africa and particularly Liberia would be advantageous.

Assignment Details: Responsible for all waste management aspects of the assignment.

F. Required facilities from Consultant and support from MPW

The Consultant is responsible for providing its own facilities for the Engineer and the Engineer's staff. MPW will provide support in obtaining data, maps and supporting materials from other Ministries. Administrative support will be provided to facilitate obtaining work permits and visas for international staff if necessary.

The following items shall be fully arranged by the Consultant. The Consultant may choose to utilize their existing resources if available or quoted in their proposals any or all items if deemed necessary. All equipment and data procured under this contract will be property of the Employer after completion of the contract. However, the Employer encourages the Consultants to utilize their existing equipment as available in order to increase their financial competitiveness:

- Rented accommodation, office equipment (including computers and printers), site equipment, and all stationery for the Consultants' staff;
- Vehicles, drivers, fuel and vehicle maintenance;
- Airfares for Team Leader and international staff to attend meetings in Liberia;
- Unskilled labour needed as helpers for surveys and quality control.
- Training / Capacity Building of local authorities assigned to the project.

The consultant will be responsible for other services that may be needed, including:

- Professional editing and design of developed communications materials;
- Accommodation and catering for stakeholder consultations;
- Local transport;
- National, and international telecommunication;
- Field visits;
- Other means required for performing the services.