Environmental Mitigation and Monitoring Plan

WASH-UP Ghana Project

CHF International Ghana

USAID FROM THE AMERICAN PEOPLE

CHF International Ghana

SUBMITTED TO:
Emmanuel Odotei
AOR, USAID/Ghana
P.O. Box 1630
Accra, Ghana
eodotei@usaid.gov

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Contents

List of Figures

List of Tables

LIST OF ABBREVIATIONS

AMA	Accra Metropolitan Assembly
BCC	Behavior Change Communication
BCS	Behavior Change Support
CBO	Community-Based Organization
CLTS	Community-Led Total Sanitation
CWSA	Community Water and Sanitation Agency
EHSD	Environmental Health and Sanitation Directorate
GWCL	Ghana Water Company Limited
JHU	Johns Hopkins University
INFORMART	Information Market
MLGRD	Ministry of Local Government and Rural Development
MMDA	Metropolitan, Municipal and District Assemblies
MWRWH	Ministry of Water Resources, Works and Housing
NGO	Non-Governmental Organization
PHAST	Participatory Hygiene and Sanitation Transformation
RCC	Regional Coordinating Council
SCALE-UP	Slum Communities Achieving Livable Environments with Urban Partners
STMA	Sekondi-Takoradi Metropolitan Assembly
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene
WASH-UP	Water Access, Sanitation and Hygiene for the Urban Poor
WATSAN	Water and Sanitation
WSB	Water and Sanitation Board

1. INTRODUCTION

1.1 Background

The three-year WASH-UP program, which is aimed at improving access to water, sanitation and hygiene in urban Ghana, ended in September 2012. While significant achievements have been made, there is an opportunity to build on momentum, particularly around the release of the National BCC and Community Participation in Provision of WASH Strategies to consolidate gains in the current program areas and expand activities to new ones. The WASH-UP extension will adjust focus to take a more holistic approach, building community and MMDA capacities to respond to the growing demand for improved access to WATSAN infrastructure and improve hygiene practices and linking that experience to national policy.

The overall goal of the extended WASH-UP Ghana Project is to increase equitable access to improved water supply and basic sanitation for poor urban communities in Ghana by improving water supply and sanitation infrastructure, behavior change communication, and governance. This goal is consistent with the intended results of the Health Status Improved objective under the USAID/Ghana and West Africa strategic framework. The program will achieve this goal through the following five objectives:

1. Increase household access to affordable, improved, and sustainable drinking water supply
2. Increase household access to improved and sustainable sanitation facilities
3. Promote innovative economic enterprises in the areas of water and sanitation
4. Improve hygiene and sanitation behaviors among the urban poor
5. Strengthen local governance for water supply, sanitation service, and hygiene promotion

The program will directly install water points and sanitation facilities where gaps are the most critical in three slum communities of Accra and two slum communities of the urban area of Sekondi-Takoradi. CHF will also promote hygiene behavior change and strengthen participation in urban water and sanitation governance. Additionally, the program will support private enterprises working in water and sanitation-related activities. CHF will take a community-based approach to implementing WASH-UP, working through a network of local NGO partners and collaborating closely with community groups and local municipal authorities.

1.2 Purpose and Scope

USAID regulations require that the Agency assess the environmental effects of its actions before any program is funded and implemented, and that appropriate environmental safeguards are adopted to assure that significant environmental harm is avoided. In view of that USAID has developed an Initial Environmental Examination (IEE) which provided the first review of the reasonably foreseeable effects on the environment, as well as recommended Threshold Determinations for the WASH-UP Ghana Project. The IEE identified potential environmental impacts and mitigation measures that are required to adequately reduce the potential damage to human health and the

environment. The IEE requested the implementing agency, Cooperative Housing Foundation (CHF); to summit for approval an Environmental Mitigation and Monitoring Plan (EMMP) describing in specific terms, how environmental impacts can be addressed.

The specific scopes of the EMMP is to present environmental mitigation measures that would be integrated into WASH-UP Ghana Project activities to ensure that the project does not have any adverse effect on the environment. This is specific to conditions outlined in the IEE.

1.3 Approach and Methodology

Information for the EMMP was gathered through literature review, site visits, consultations with government and non-governmental agencies, interviews with consultants, visits to agency archives, data analysis and online research.

2. PROGRAMME DESCRIPTION

The WASH-UP Ghana Project will build on the original WASH-UP Project through the achievement of the following program objectives:

Objective 1: Increase household access to affordable, improved, and sustainable drinking water supply

Mains extension and improved access to water points with the following specific activities;

- ✓ Collaborate with GWCL, Sub-Metro structures and communities through the WSBs to extend the pipe-network to increase community and household access to improved drinking water supply.
- ✓ Collaborate with relevant state agencies to construct wells and boreholes for communities
- ✓ Support individual house connections and water kiosks to provide at least 40 liters of safe water per person per day within 200 meters walking distance to the user's home.
- ✓ Installation of an additional 20 water kiosks serving the communities at-large and 400 household connections.
- ✓ Update the GIS data-base developed under SCALE-UP for AMA and WASH-UP for STMA to include water points, identified as household or public-access kiosk. The maps produced by the data-base will be updated and used by the MMDAs and WSBs to identify gaps in coverage and allow for appropriate planning for extension of services.

Installation of Rainwater Harvesting Systems in Schools with the following activity:

- ✓ Develop rainwater harvesting and storage facilities in three additional schools linked exclusively to the operation of their sanitation facilities to lessen the reliance on and cost of GWCL-provided water.

This water will not be available for human consumption. Installation will include solar pumps to pump water from ground level to elevated tanks to provide water flow. This activity will be closely coordinated with the MWRWH, which is developing a new national strategy on rainwater harvesting. MWRWH will provide technical support. The project will work with the MWRWH to improve on the technical design of the systems to increase amounts harvested and stored.

GWCL Zonal Metering Pilot with the following activity:

- ✓ Collaborate with GWCL, AMA and STMA to identify three communities in which to pilot a zonal approach to water metering.

Objective 2: Increased household access to improved and sustainable sanitation facilities

Installation of Household Latrines with the following specific activities:

- ✓ Work with BIOFIL latrine manufacturing companies to identify financial institution(s) to develop a credit facility to offer to customers for the purchase of the latrine facility
- ✓ Develop systems and processes for improved enforcement of environmental sanitation controls, particularly around sanitation facilities and solid waste management
- ✓ Through the Ghana Microfinance Network (GHAMFIN), work with micro-finance institutions to develop loan products supporting acquisition of household latrines.

Construction of Wastewater infrastructure (Community drainage systems) with the following activity:

- ✓ Construct Install an additional 2000 meters of secondary and tertiary drains in areas prone to flooding and thus subject to cholera outbreak in Avenor and Ayidiki.

This will continue to be done in collaboration with the Metro Assemblies, which are responsible for constructing them. Though included in their development agendas, Assemblies are currently unable to raise the capital for construction. However, they do have the capacity to manage and maintain them once they are in place. Communities receiving these drains will, as part of the intervention, be required to design and commit to a plan to keep the drains free of debris. This plan will be included in the community solid waste management plan.

Community-level Solid Waste Management with the following specific activities;

- ✓ Develop a plan for transferring collected waste from the household level to strategic community locations for onward disposal by municipal Authorities;
- ✓ Develop fee-for-service for household collection enterprises that promote recycling and sale of recyclable materials.

In the interest of public health and building of lessons learned from CHF's Gates Foundation funded YES program, the project will engage all nine communities engaged in the project in the development of solid waste management plans (collection and transfer).

Objective 3: Promote innovative economic enterprises in the areas of water and sanitation

Limited income and economic opportunities are additional constraints to sustainable access to water supply and sanitation service in the poor communities in Ghana. To address this need, WASH-UP linked entrepreneurs and households to loans and business development services.

Creating Economic Opportunities in Water Supply and Sanitation with the following specific activities:

- ✓ Promote innovative micro-enterprises engaged in water and sanitation activities such as public bath houses, hair dressing and water kiosks.
- ✓ Promote links between these enterprises and microfinance institutions to foster relationships that promote long-term growth as well as showcasing to MFIs that there are indeed business opportunities for them in these communities.
- ✓ Increase awareness of business opportunities using the mobile Information Markets, InfoMarts in the current 5 and additional 4 target communities.

- ✓ Training and technical assistance to support microenterprises that might be created in areas of basic business planning, accounting and marketing skills
- ✓ Using the InforMarts to provide behavioral change messages and information about latrine technology options.

Establishing New WSBs

In line with the national policy and the strategy on community participation in WASH delivery, the project will Work with the AMA and STMA Sub-metro water and sanitation teams to identify gaps in the WSBs in the target communities and specific activities include:

- ✓ Identify, train and support additional WSBs to fill those gaps and work with them to develop new community water points or latrines with appropriate revenue plans.
- ✓ Develop business plans to support the WSBs operations, facility maintenance and expansion plans
- ✓ Engage micro-finance institutions from the start of each intervention under this activity in order to promote access to finance for expansion of services beyond the life of the project.
- ✓ Organize workshops for MFIs on the business opportunities in the WASH sector in these communities, sharing lessons learned from WASH UP implementation.

Objective 4: Improved hygiene and sanitation behaviors among the urban poor

Support Implementation of National BCC Strategy

Specific activities:

- ✓ Develop a two-day technical training in each of the 3 zones on the strategy for the 170 MMDAs, 10 Regional Coordinating Councils and relevant government, private sector and civil society stakeholders.
- ✓ Collaborate with the EHSD to sustain implementation of the national BCC strategy by working through the AMA and STMA.
- ✓ Collaborate with EHSD, the Health Promotion Unit of the Ghana Health Service and the Ghana Education Service to further disseminate the strategy so it can be implemented according to the specifications for sustainable social change.

Build Capacity for Public-Private Partnerships with the following specific activity:

- ✓ Incorporate public – private partnerships activities as part of the BCCs efforts.

Expand Use of Mass Media with the following specific activities:

- ✓ Promote dissemination of BCC messages through mass media to promote key behavioral changes.
- ✓ Technical support and assistance to AMA and STMA in the development and implementation of their WASH BCC plans in areas of branding and marketing

The project will connect to the Ghana Water and Sanitation Journalist Network (GWJN). The use of mass media will involve audio discussions and dramas on sanitation and hygiene by school children on local FM Stations as well as TV presentations. In order to strengthen the program and reach a broader audience, the campaigns will be coordinated with other efforts including: the Behavior Change Support (BCS/JHU) Project slots on TV shows; and community Water and Sanitation's (CWSA) videos and audios on hand-washing.

Consolidate WASH Behavior Change in Basic Schools with the following specific activities

- ✓ Disseminate lessons learned from previous experiences and institutionalize the approach, seeking incentives to keep School Health Committees active and engaged and linking their efforts to the AMA and STMA WASH BCC Plans.
- ✓ Support city officials to develop public-private partnerships which can provide funding to underwrite annual Global Hand-washing Day celebrations and continue to strengthen and empower members of the SHCs and WASH Clubs to lead and sustain BCC activities in the schools.

Expand "Healthy Foods" Campaign with the following specific activities:

- ✓ Assisting in creating business networks between food vendors and WASH-UP assisted water business operators to improve and sustain access to clean water;
- ✓ Assisting food vendors to develop menus based on nutrition standards, local practices and affordable food staples;
- ✓ Supporting food vendors' access to soap, water dispensers and garbage bins at vending points;
- ✓ Collaborating with local authorities to perform formal inspection and licensing of the food vendors;
- ✓ Supporting food vendors to brand their food carts to make them easily recognizable and attractive particularly to children; and
- ✓ Promoting opportunities for entrepreneurship and job creation for women through micro-franchising of common/popular food items in collaboration with private sector partners.

Objective 5: Strengthened local governance for water supply, sanitation services and hygiene promotion

Connect Metropolitan Experience to National Strategy

Specific activities:

- ✓ Collaborate with MWRWH and the MLGRD to develop the National Strategy for Community Participation in WASH Service Delivery to help streamline urban delivery especially at the sub-metro level.
- ✓ Build participatory community involvement and strengthen governance at the national, metropolitan and community levels with strong linkages to the private sector as described below.

Connect Metropolitan Experience to National Strategy with the following specific activities:

- ✓ Use the Ghana Urban Platform and the Water Forum to share lessons learned.
- ✓ Support the MWRWH and the MLGRD with the launch of the National Strategy for Community Participation in WASH Service Delivery.
- ✓ Support the roll-out of the strategy through printing and distribution of the document to all 170 MMDAs, 10 Regional Coordinating Councils (RCC) and relevant stakeholders such as GWCL, the Water Sector Working Group, Ghana Water and Sanitation Monitoring Platform and to local NGOs through groups like CONIWAS.
- ✓ Organize workshops for these groups on the details and goals of the strategy

Reinforce Capacity and Share Results of Municipal Government Experience with the following specific activities:

- ✓ Reinforce and consolidate the gains made with the AMA and STMA in improving the technical and project management capacity of their staff, particularly the Unit Committees.
- ✓ Continue to support the Environmental Health Units to scale-up use of participatory tools (PHAST/modified CLTS) for urban sanitation promotion.
- ✓ Improve ability to form and manage public-private partnerships to support their WASH BCC Plan.
- ✓ Reinforce capacity of the Sub-metros to monitor service delivery and regulate activities of WSBs.
- ✓ Establish and build the capacity of Sub-metro WASH teams to provide back- up technical support to communities.

- ✓ Support collaboration of AMA and STMA technical staff with the National Association of Local Authorities of Ghana, the Institute of Local Government Studies, as well as national government ministries to share their experience with other MMDAs, which may include presentations as well as peer exchanges and "study tours" from other cities.

Strengthen Capacity of WSBs and Community Groups and Local NGOs with the following specific activities:

- ✓ Training of CBOs including WSB and Assembly members to strengthen their capacity to negotiate and articulate their needs, concerns and demand water supply and sanitation improvements in their various communities.
- ✓ Support further organizational development of Local NGOs through trainings

3. ENVIRONMENTAL POLICY, LEGAL, AND INSTITUTIONAL FRAMEWORK

United States Agency for International Development (USAID)
The United States Congress passed the Foreign Assistance Act on September 4, 1961, which recognized the U.S foreign assistance programs. The Act mandated the creation of an agency to administer economic assistance programs, which led to the establishment of USAID on November 3, 1961. USAID was established to:

- Unify assistance efforts;
- Provide a new focus on the needs of a changing world; and
- Assist other countries in maintaining their independence and become self-supporting.

USAID Environmental Compliance Procedures
Title 22, Code of Federal Regulations, Part 216.1 (b) of the USAID Environmental Compliance Procedures, it is USAID's policy in its assistance programs to:

- Ensure that the environmental consequences of development activities are identified and considered by USAID's and the host country prior to a final decision to proceed and that the appropriate environmental safeguards are adopted;

- Assist developing countries to strengthen their capabilities to appreciate and effectively evaluate the potential environmental effects of proposed development strategies and projects, and to select, implement and manage effective environmental programs;

- Identify impacts resulting from USAID's actions upon the environment, including those aspects of the biosphere which are the common and cultural heritage of all mankind; and

- Define environmental limiting factors that constrain development and identify and carry out activities that assist in restoring the renewable resource base on which sustained development depends.

The Constitution of the Republic of Ghana 1992
The Constitution of the Republic of Ghana 1992 makes provisions that protect the right to private property and sets principles under which citizens may be deprived of their property in the interest of the public.

The State Lands Act, 1962 Act 125
The Act 125 vests the authority to acquire land for the public interest in the President of the Republic. It also gives responsibility for registering a claim on the affected person or group of persons, and provides details of the procedure to do this. The State Lands Act, 1962 provides some details to be taken into consideration when calculating compensation such as definitions for (1) cost of disturbance, (2) market value, (3) replacement value, and so on.

Ghana National Environmental Policy (NEP), 1991

The National Environmental Policy was adopted to provide the broad framework for the implementation of the National Environmental Action Plan 1991. The aim is to improve the surroundings, living conditions and the quality of life of the entire citizenry, both present and future. It seeks to ensure reconciliation between economic development and natural resource conservation, to make a high quality environment a key element supporting the country's economic and social development.

Environmental Protection Agency Act 1994, Act 490

The Environmental Protection Agency (EPA) Act 1994 (Act 490) gives mandate and grants the Ghana Environmental Protection Agency enforcement and standards-setting powers and to ensure compliance with such standards and guidelines. The Agency is responsible to ensure compliance of all investments and undertakings with laid down Environmental Assessment (EA) procedures in the planning and execution of development projects, including compliance in respect of existing ones.

Maximum Allowable Noise Levels

This specifies the maximum allowable level of noise for the different types of areas, both during the daytime and at night.

Table 1: Ambient noise-level guidelines of the Ghana EPA

Zone	Description of area of noise reception	Permissible noise level dB (A)	
		Day (0600–2200 h)	Night (2200–0600 h)
A	Residential areas with negligible or infrequent transportation	55	48
B1	Educational (school) and health (hospital) facilities	55	50
B2	Area with some commercial or light industry	60	55
C1	Area with some light industry, place of entertainment, or public assembly and place of worship such as churches and mosques	65	60
C2	Predominantly commercial areas	75	65
D	Light industrial areas	70	60
E	Predominantly heavy industrial areas	70	70

Environmental Assessment Regulations 1999, LI 1652

The Environmental Assessment Regulations 1999 (LI 1652) enjoins any proponent or person to register an undertaking with the Agency and obtain an Environmental Permit prior to commencement of the project.

Environmental Assessment Regulations (Amendment) 2002, LI 1703

The Environmental Assessment Regulations (Amendment) 2002 (LI 1703) provide guidance and ensure adequate consideration of biodiversity and related sensitive resources for Environmental Impact Assessments in Ghana. It combines both an environmental assessment and environmental management systems.

Environmental Impact Assessment (EIA) in Ghana

The fundamental principle underlying Ghana's formal Environmental Impact Assessment (EIA) Procedures is the preventive approach to environmental management in which EIA is applied as a tool, especially at the project-specific level. Environmental Assessment (EA) is recognized and applied in Ghana to development projects as well as other undertakings as an environmental permitting pre-requisite and a major environmental management tool. The existing procedures have evolved over time since EA became a requirement in Ghana in 1989, to screen and evaluate all developments, undertakings, projects and programmes, which have the potential to give rise to significant environmental impacts.

The procedures establish an EA process of which one principal objective is the requirement to provide enough relevant information to enable the Environmental Protection Agency to set an appropriate level of assessment of any proposed undertaking, investment or programme for the assessment for the necessary review and to facilitate the decision-making process for EA approval. The information may be gathered through an environmental impact assessment study and published in an Environmental Impact Statement (EIS), Preliminary Environmental Report (PER), or by completing an Environmental Assessment Preliminary Registration, Form EA1 or EA2, depending on the complexity, nature, and location of the proposed undertaking. EPA is mandated by law to ensure compliance with laid down Environmental Impact Assessment (EIA) procedures in the planning and execution of development projects, including compliance in respect of existing projects. The basic objectives of the EIA system are

1. To integrate environmental management and economic decisions at the earliest stages of planning an undertaking or investment and
2. To provide avenues for the involvement of the public, proponents, private and government agencies in the assessment and review of proposed undertakings, among others It is imperative to mention that, the procedures provide for the registration of proposed developments with the EPA and subsequent screening to determine the level of environmental assessment required for the necessary projects environment authorization or otherwise.

The Local Government Act 1993, Act 462

Empowers the Metropolitan/Municipal/District Assemblies to be responsible for the development, improvement and maintenance of human settlements and environment at the district and local levels. It establishes planning departments to be responsible for the planning and development of their districts.

The New Labor Act 2003, Act 651

Section 118(1) of the New Labor Act 2003 (Act 651) stipulates that it is the duty of an employer to ensure that every worker employed works under satisfactory, safe and healthy conditions.

National Health Policy

The theme of the Health Policy is "Creating Wealth through Health". What is being brought to bear in this policy is a renewed emphasis on:

- The significant benefits that this country stands to derive from greater investments in health and nutrition.
- The critical role that healthy lifestyles, a health-enhancing environment, a vibrant health industry and other sectors beyond health care services play in improving health and socio-economic development.

The Policy adopts an approach that addresses the broader determinants of health. It focuses on the promotion of healthy lifestyles through good nutrition, regular physical exercise, recreation, rest and personal hygiene. The Policy further places healthy lifestyles within the context of the physical and social environments where people live, go to school and work; emphasizing potable water, sanitation, and safe food, housing and roads, as means of promoting good health and prevention of diseases and injury.

The Policy seeks to build a pluralistic health service that recognizes allopathic, traditional and alternative providers (both private and public). It also ensures access to quality health interventions for preventing disease and injuries, as well as for restoring the health of the sick and disabled. In that regard, the Policy aims to provide comprehensive health care services comprising preventive, curative and rehabilitative services.

Public Health Laws/Policies

These laws could be traced from the criminal code, ordinances, legislative and executive instruments, acts, bye-laws of the District Assemblies etc. Some of these laws include:

- Law on Statutory Nuisances (Towns Ordinance Cap 86 of 1954), which deals with animals, overgrowth of weeds, overcrowding, waste disposal, street and premise cleansing, trades, vermin, water etc.
- Criminal code - Act 29 of 1960 (chapters 8 and 9);
- Mosquitoes Ordinance - Cap 75;
- Vaccination Ordinance - Cap 76;
- The Quarantine Ordinance - Cap 77;
- Infectious Disease Ordinance - Cap 78 of 1908 amended in 1924;
- Food and Drugs Law of 1992 (PNDCL 305b);
- Bye-laws of the various Assemblies (e.g. Local Government Bulletin 1995, of the Accra Metropolitan Assembly);
- Model Bye-Laws (by the Ministry of Local Government and Rural development e.g. Control of Restaurants and Eating Houses);
- Registration of Birth and Death - Act 301 of 1965.

National Sanitation Policy

The National Environmental Sanitation Policy aims at developing and maintaining a clean, safe and pleasant physical environment in all human settlements, to promote the social, economic and physical well-being of all sections of the population.

The principal components of environmental sanitation identified in the policy include:

- Collection and sanitary disposal of wastes, including solid wastes, liquid wastes, excreta, industrial wastes, clinical and other hazardous wastes;
- Storm-water drainage;
- Cleansing of thoroughfares, markets and other public spaces;
- Control of pests and vectors of disease;
- Food hygiene;
- Environmental sanitation education;
- Inspection and enforcement of sanitary regulations;
- Disposal of the dead;
- Control of rearing and straying of animals;
- Monitoring the observance of environmental standards.

4. ENVIRONMENTAL AND SOCIOECONOMIC BASELINE

The WASH-UP Ghana project will be implemented in the Accra and Sekondi-Takoradi Metropolitan Areas.

4.1 Accra Metropolitan Area

The Accra Metropolitan Area has an estimated population of 1.8 million (Ghana Statistical Service, National Population Census, 2012). The Accra Metropolis has the highest population density in the country, exceeding

20,000 people/ km^2 in some communities and its growth rate is estimated at 4.4% a year. Over 60% of Accra's residents live in high-density, low-rental areas where there is a lack of basic amenities such as water, sanitation, drainage and proper roads.

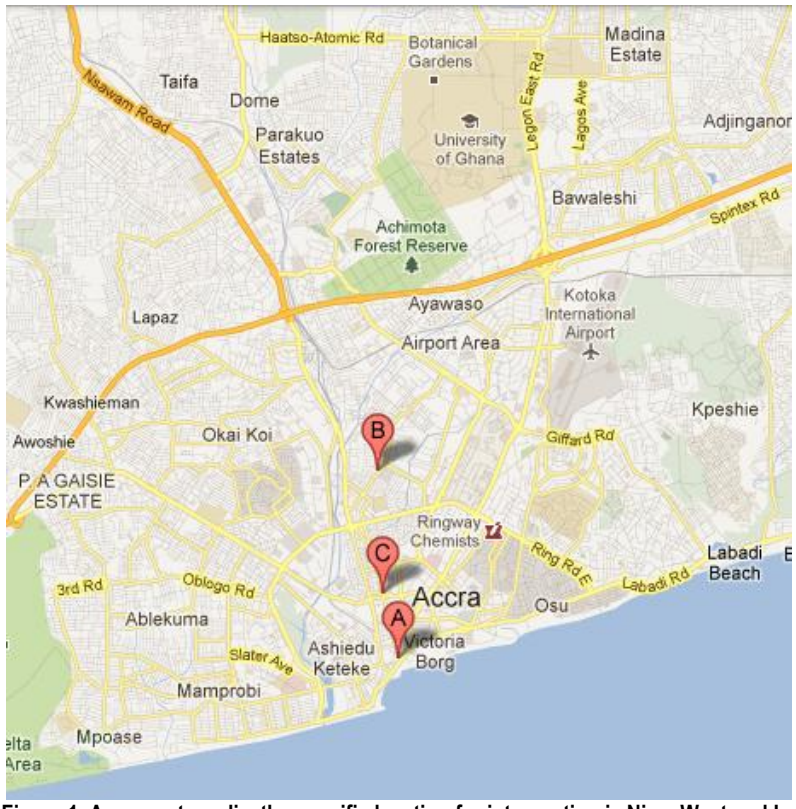

Figure 1. Accra metropolis, the specific location for intervention is Nima West and La

4.1.1 Climate

Rainfall in Accra is unimodal with an annual average of about 810 mm. The first rainy season begins in May and ends in mid-July. The second season begins in mid-August and ends in October. Rain usually falls in intensive short storms and gives rise to local flooding where drainage channels are obstructed. There is very little variation in temperature throughout the year. The mean monthly temperature ranges from 24.7°c in August (the coolest) to 28°c in March (the hottest) with annual average of 26.8°c. Daylight hours are practically uniform during the year. Relative humidity is generally high varying from 65% in the mid-afternoon to 95% at night. The predominant wind direction in Accra is from the WSW to NNE sectors. Wind speeds normally range between 8 to 16 km/hr. The maximum wind speed record in Accra is 107.4 km/hr (58 knots). Strong winds associated with thunderstorm activity often cause damage to property by removing roofing material. Several areas of Accra experience micro climatic effects. Low profile drainage basins with a north-south orientation are not as well ventilated as that orientated east west.

4.1.2 Vegetation

Vegetation in Accra consists of mainly grassland interspersed with dense thickets often less than 5m high with a few trees like *Antiaris africana*, *Ceiba pentandra*, *Albizia zygia* and *Azadirachta indica*. Shrubs commonly found in the area are *Baphia nitida*, *Grewia* spp, *Griffonia simplicifolia* and *Milletia* spp. Short and medium grasses are the dominant plant species. These include *Andropogon gayanus* and *Hyparrhenia dissolute*, *Vetiveria fulbibarbis* and *Brachiaria falcifera*. In addition to the natural vegetation zones, a number of introduced trees and shrubs area in the

metropolitan area. Neems, mangoes, cassias, avocados, and palms are prominent trees on the Accra landscape. Introduced shrubs like bouganvilia are also very prominent. These are being damaged from residential encroachment, sand collection and illegal tree felling. There is also evidence to suggest the vegetation of the metropolitan areas has been altered in the more recent past century by climatic, infrastructure development and other factors.

4.1.3 Terrestrial Fauna

Most animals have been pushed inland because for the rapid expansion of settlements in the Metropolitan area. Many species of snakes (some venomous) and lizards are found throughout the Metropolitan area. Metropolitan bird life is diverse and in spacious residential areas prolific.

4.1.4 Geology and Soil

The geology of the metropolitan area consists of Precambrian Dahomeyan schists, granodiorites, granites gneiss and amphibolites to late Precambrian Togo series comprising mainly quartzite, phillites, phylitones and quartz breccias. Other formations found are the palaeozoic accraian sediments - sandstone, shales and interbedded sandstone-shale with gypsum lenses. Soils in the area are *Acrisols*, *Luvisols*, *Cambisols*, *Gleysols*, *Solonetz* and intergrades.

4.1.5 Water and Sanitation

Sanitation provision in Accra (the capital of Ghana) is grossly deficient, as in most cities in sub-Saharan Africa: most people do not have access to a hygienic toilet; large amounts of faecal waste are discharged to the environment without adequate treatment; this is likely to have major impacts on infectious disease burden and quality of life.

Greater Accra is supplied by 3 main surface-water systems, the Kpong system on the Volta River, the Weija system on the Densu River and the Anun Boso system. The majority of the population uses water from the formal water supply system, whether piped directly or purchased from vendors. About 49% of the population of Greater Accra are reported to have within-plot piped water (10% indoor plumbing, 39% yard connection), while about 22% use water from neighbours, 16% buy from water vendors, and 13% use a community standpipe, generally privately owned; evidently, in-plot piped water supply is much less frequent in low-income communities. Only about 6% of the population is thought to use groundwater sources.

Public toilets are widely used in low-income areas of the metropolis and these areas typically have very poor hygiene and long queues during peak periods.

4.2 Sekondi Takoradi Metropolitan Area

Sekondi-Takoradi Metropolitan Area has an estimated population of 559,548 (Ghana Statistical Service, National Population Census, 2012) and the administrative capital of the Western Region. With the first deep seaport in Ghana, major industries include timber, fishing, shipbuilding and an emerging oil and gas sector and attract a growing population of workers. More than 35% of the city's population lives in 20 slums where access to services and security of tenure is limited.

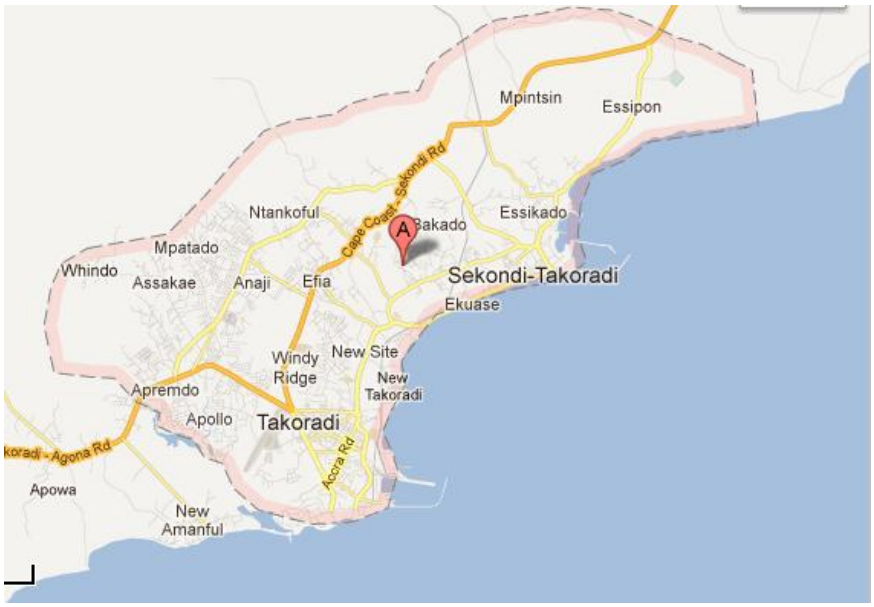

Figure 2.Sekondi-Takoradi Metropolis, the specific location for intervention is Efiakuma and Asakae

4.2.1 Climate

The metropolis has an equatorial type of climate with an average annual temperature of about 22^0C. Rainfall is bi-modal, with the major season occurring between March and July and the minor season occurring between August and November. The mean annual rainfall is about 1,380 mm, covering an average of 122 rainy days.The climate offers opportunities for varying agricultural production. Like the entire country. Sekondi -Takoradi has a democratic system of government.

4.2.2 Vegetation

Vegetation is highly woodland in the northern and central parts, while thicket is intermingled with tall grass species along the coast, especially in areas where there are no permanent crop. Along the coastal areas there are thickets interspersed with tall grass species.

4.2.3 Geology

The Sekondi-Takoradi Metropolis is characterized by faulted shales and sandstone resting on a hard basement of granite, gneiss and schist. The faulting system has marked influence on the land form especially along the coastline which clearly follows the main fault direction of North East.

The surface of the metropolis is fairly watered, with the drainage pattern being largely trellis in nature with minor dendrite forms. The two main rivers flowing through the metropolis are the Whin and the Kansawora rivers, while the lagoons are the Essei and the Butre.

4.2.4 Water and Sanitation

The estimated total solid waste generation from the metropolis is 206 tonnes per day (i.e. 75,293 tonnes per year). Classification and Composition of Municipal Solid Waste indicated a high proportion of organic waste and low proportions of recyclables (papers/cardboard, rubber, metals, etc). The high composition of organic waste implies a

high rate of putrefaction and hence a potential odour nuisance. The high vegetable/putrescible content and correspondingly high moisture content also makes the waste amenable to composting.

Supply of water is irregular at most places; however the quality of water has fairly improved and is largely free from dirt and its salty taste. Repair works have been undertaken at the headwater and these accounts for the improved situation. The production and supply of water in the Metropolis is fraught with constraints, these include encroachment on land reserves for utility services, frequent power interruption, illegal connections, unplanned and uncontrolled housing development, frequent damage to pipes by contractor as well as long service pipeline connections.

5. ENVIRONMENTAL IMPACTS

Below are the Potential Environmental Impacts and Recommended Determination as per the USAID IEE.

Objective 1: Increase household access to affordable, improved, and sustainable drinking water supply		
Activity	Potential Adverse Environmental Impacts	Recommended Determinations
Collaborate with GWCL, Sub-Metro structures and communities through the WSBs to extend the pipe-network to increase community and household access to improved drinking water supply. Support individual house connections and water kiosks to provide at least 40 liters of safe water per person per day within 200 meters walking distance to the user's home. Installation of an additional 20 water kiosks serving the communities at-large and 400 household connections.	Extending GWCL pipe – network to communities and households will involve some amount of construction and earthworks. Potential adverse impacts could include generation of construction waste and debris, risks of site accidents, erosion as a result of digging, pollution of near-by water sources if waste is not handled properly, creation of stagnant water from accidental spillage, which could serve as breeding grounds for disease vectors. During operational phase of the water supply, contamination of water may occur due to leakages and corrosion of underground steel pipes.	**Negative Determination** is recommended subject to the following conditions; Constructional phase of the pipe connections must follow general guidelines on environmental sound design and management as outlined in the Environmental Guidelines for Small Scale Activities in Africa, EGSSAA, the chapter(s) on construction and water and sanitation. During operation, appropriate protocols must be put in place to test for water quality at regular intervals. At minimum, initial testing must be carried out before the first supply of water to the communities. When feasible, the project must set in place capacities and responsibilities to assure that ongoing water quality monitoring occurs. The plan must include a response protocol in the event that the water does not meet water quality standards.
Update the GIS database developed under SCALE-UP for AMA and WASH-UP for STMA to include water points, identified as household or public access kiosk. The maps produced by the database will be updated and used by the MMDAs and WSBs to identify gaps in coverage and allow for appropriate planning for extension of services.	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(I) and (v)

Collaborate with GWCL, AMA and STMA to identify three communities in which to pilot a zonal approach to water metering.	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(I) for education, training or technical assistance
Develop rainwater harvesting and storage facilities in three additional schools linked exclusively to the operation of their sanitation facilities to lessen the reliance on and cost of GWCL-provided water.	Construction of rain water harvesting gutters, pipes & tanks may produce low volumes of construction waste; present the risk of site accidents; and may create noise or dust that temporarily disrupts the normal functioning of schools or communities	**Negative Determination** is recommended subject to the following conditions; Construction and installation of rainwater harvesting systems must follow general guidelines on environmental sound design and management as outlined in the Environmental Guidelines for Small Scale Activities in Africa, EGSSAA, the chapter(s) on construction and water and sanitation. During operation, appropriate protocols must be put in place to test for water quality at regular intervals. At minimum, initial testing must be carried out before the first supply of water to the communities. When feasible, the project must set in place capacities and responsibilities to assure that ongoing water quality monitoring occurs. The plan must include a response protocol in the event that the water does not meet water quality standards.
Collaborate with relevant state agencies to construct wells and boreholes for communities.	Potential impacts could range from pollution of surface and groundwater from run off, stagnation of water leading to the spread of disease vectors, erosion, generation of construction waste, site accidents	**Negative Determination** is recommended subject to the following conditions; 1. Good practice design standards generally consistent with USAID's Environmental Guidelines for Small Scale Activities (water supply and sanitation chapter) www.encpafrica.org/egsaa.htm must be implemented for both new construction and rehabilitation works. These standards must be specified in the EMMP and must include siting of new wells away from groundwater contamination sources, exclusion of livestock from water points (with respect to water intended for human consumption), and prevention of standing water at water supply points.

		2. Water quality assurance plan must be developed and implemented by IP. This plan must ensure that all new and rehabilitated USAID-funded water supplies provide safe drinking water, defined as meeting both local and WHO water quality standards. This plan must be approved by the MEO prior to initiation of these activities. The plan must include and assign responsibility to the IP for initial water quality testing. When feasible, the program must also set in place capacities and responsibilities to provide reasonable assurance that ongoing water quality monitoring occur. The standards for initial and ongoing testing including types of contaminants for which testing should be conducted, testing methods, testing frequency, and issues such as public access to results should follow any applicable USAID guidance, as well as local laws, regulations and policies. The plan must include a response protocol in the event that the water does not meet water quality standards. The plan must include testing for Arsenic per Guidance Cable State 98 108651. Specifically, the USAID managing team must assure that the standards and testing procedures described in "Guidelines for Determining the Arsenic Content of Ground Water in USAID Sponsored Well Programs in Sub-Saharan Africa" (www.encapafrica.org/docs.htm#specificwater). Note that this guidance requires initial testing, and quarterly testing for four quarters. If the program terminates in less than four quarters, remaining testing is the responsibility of the mission. Water Violating the 10ppb Arsenic standard may not be supplied *for* public consumption.

Objective 2: Increased household access to improved and sustainable sanitation facilities		
Activity	Potential Adverse Environmental Impacts	Recommended Determinations
Work with BIOFIL latrine manufacturing companies to identify financial institution(s) to develop a credit facility to offer to customers for the purchase of the latrine facility Through the Ghana Microfinance Network (GHAMFIN), work with micro-finance institutions to develop loan products supporting acquisition of household latrines.	There are no significant adverse environmental impacts associated with assisting beneficiary households or communities to assess funds for the purchase of the BIOFIL latrines. However, during the sitting and operation of the latrine facility, impacts such as contamination of surface and groundwater could occur from poor sitting and spillage, outbreak of vector borne diseases if facility is not well managed.	**Negative Determination** is recommended subject to the following conditions; Sitting of the facility must follow general guidelines on environmental sound design and management as outlined in the Environmental Guidelines for Small Scale Activities in Africa, EGSSAA, the chapter on water and sanitation taking into consideration local conditions with respect to the geological formations of the area and distance from nearby water sources. Appropriate protocols must be put in place to ensure that beneficiary communities or households are aware of the environmental consequences of not adhering to best practices in the operation of the facility. The protocol must at minimum address issues of hygiene, sanitation, education, social marketing campaigns and appropriate natural treatment systems.
Develop systems and processes for improved enforcement of environmental sanitation controls, particularly around sanitation facilities and solid waste management	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(I) for education, training or technical assistance
Develop fee-for-service for household collection enterprises that promote recycling and sale of recyclable materials	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(i) for education, training or technical assistance
Construct Install an additional 2000 meters of secondary and tertiary drains in areas prone to flooding and thus subject to cholera outbreak in Avenor and Ayidiki.	Construction and installation of community drainage systems could result in adverse impacts including construction waste, risk of site accidents, erosion, pollution of nearby surface waters, generation of stagnant waters serving as breeding	**Negative Determination** is recommended subject to the following conditions; General guidelines on environmental sound design and management as outlined in the Environmental Guidelines for Small Scale Activities in Africa, EGSSAA, and chapters on construction must be followed.

	grounds for disease vectors. During operation, choked drains could also lead to flooding during heavy rains, a situation commonly experienced in slum communities in Accra and other parts of the country.	Appropriate management plans must be put in place to ensure that operation of the drainage facility follows best practices. The plan must include at minimum; training of community leaders to synthesize the masses on best sanitation practices, behavioral change, education and communication campaigns, community bye-laws on open defecation and refuse dumping into drains and fines for violators.
Develop a plan for transferring collected waste from the household level to strategic community locations for onward disposal by municipal Authorities	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(i) for education, training or technical assistance

Objective 3: Promote innovative economic enterprises in the areas of water and sanitation		
Activity	Potential Adverse Environmental Impacts	Recommended Determinations
Promote innovative micro-enterprises engaged in water and sanitation activities such as public bathhouses, hairdressing and water kiosks.	Adverse impacts associated with such micro-enterprises as public bathhouses and hairdressing could include pollution of surface and ground water due to poor liquid waste handling and disposal, poor sanitation and hygiene practices resulting in diseases.	**Negative Determination** is recommended subject to the conditions that activities of these micro-enterprises follow best practices in sanitation, hygiene, and appropriate waste disposal practices
Promote links between these enterprises and microfinance institutions to foster relationships that promote long-term growth as well as showcasing to MFIs that there are indeed business opportunities for them in these communities. Increase awareness of business opportunities using the mobile Information Markets, InfoMarts in the current 5 and additional 4 target communities. Engage micro-finance institutions from the start of each intervention in order to promote access to finance for expansion of services beyond the life of the project.	Promoting linkages and increasing business awareness in WASH and linking them to the MFIs do not pose any significant adverse risk on the environment. However, the promotion and the expected links could result in increase in activities in this sector with attendant increase in environmental effects such as pollution, safety, health and hygiene.	**Negative Determination** is recommended subject to the conditions that activities of these micro-enterprises follow best practices in sanitation, hygiene, and appropriate waste disposal practices

Training and technical assistance to support microenterprises that might be created in areas of basic business planning, accounting and marketing skills	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(I) for education, training or technical assistance
Using the InforMarts to provide behavioral change messages and information about latrine technology options.	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(v) for document and information transfer.
Develop business plans to support the WSBs operations, facility maintenance and expansion plans	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(I) for education, training or technical assistance
Organize workshops for MFIs on the business opportunities in the WASH sector in these communities, sharing lessons learned from WASH UP implementation.	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(iii) for analysis, studies, academic or research meetings and workshops
Identify, train and support additional WSBs to fill those gaps and work with them to develop new community water points or latrines with appropriate revenue plans.	No significant adverse environmental impacts anticipated	**Categorical Exclusion** is recommended pursuant to 22 CFR 216.2(c)(2)(I) for education, training or technical assistance

Objective 4: Improved hygiene and sanitation behaviors among the urban poor		
Activity	Potential Adverse Environmental Impacts	Recommended Determinations
Develop a two-day technical training in each of the 3 zones on the strategy for the 170 MMDAs, 10 Regional Coordinating Councils and relevant government, private sector and civil society stakeholders. Collaborate with the EHSD to sustain implementation of the national BCC strategy by working through the AMA and STMA. Collaborate with EHSD, the Health Promotion Unit of the Ghana Health Service and the Ghana Education Service to further disseminate the strategy so it can be implemented according to the specifications for sustainable social change.	Activities in this intervention area are intended to promote and sustain BCC efforts through public-private partnerships and collaboration with relevant national and local government agencies. They are also meant to disseminate lessons and	**Categorical Exclusion** is recommended for all activity clusters in this intervention area pursuant to 22CFR216.2(c)(2)(i) for education, training and technical assistance, 22CFR216.2(c)(iii) for analysis, studies,

Incorporate public – private partnerships activities as part of the BCCs efforts. Promote dissemination of BCC messages through mass media to promote key behavioral changes. Technical support and assistance to AMA and STMA in the development and implementation of their WASH BCC plans in areas of branding and marketing Disseminate lessons learned from previous experiences and institutionalize the approach, seeking incentives to keep School Health Committees active and engaged and linking their efforts to the AMA and STMA WASH BCC Plans. Support city officials to develop public-private partnerships, which can provide funding to underwrite annual Global Hand-washing Day celebrations, and continue to strengthen and empower members of the SHCs and WASH Clubs to lead and sustain BCC activities in the schools. Assisting in creating business networks between food vendors and WASH-UP assisted water business operators to improve and sustain access to clean water; Assisting food vendors to develop menus based on nutrition standards, local practices and affordable food staples; Supporting food vendors' access to soap, water dispensers and garbage bins at vending points; Collaborating with local authorities to perform formal inspection and licensing of the food vendors; Supporting food vendors to brand their food carts to make them easily recognizable and attractive Promoting opportunities for entrepreneurship and job creation for women through micro franchising of common/popular food items in collaboration with private sector partners.	success stories from the WASH UP Project. These activities are not anticipated to have any significant adverse environmental impacts.	academic or research meetings and workshops and 22CFR216.2(c)(2)(v) for document and information transfer.

Objective 5: Strengthened local governance for water supply, sanitation services and hygiene promotion		
Activity	Potential Adverse Environmental Impacts	Recommended Determinations
Collaborate with MWRWH and the MLGRD to develop the National Strategy for Community Participation in WASH Service Delivery to help streamline urban delivery especially at the sub-metro level. Build participatory community involvement and strengthen governance at the national, metropolitan and community levels with strong linkages to the private Use the Ghana Urban Platform and the Water Forum to share lessons learned. Support the MWRWH and the MLGRD with the launch of the National Strategy for Community Participation in WASH Service Delivery. Support the roll-out of the strategy through printing and distribution of the document to all 170 MMDAs, 10 Regional Coordinating Councils (RCC) and relevant stakeholders such as GWCL, the Water Sector Working Group, Ghana Water and Sanitation Monitoring Platform and to local NGOs through groups like CONIWAS. Organize workshops for these groups on the details and goals of the strategy Reinforce and consolidate the gains made with the AMA and STMA in improving the technical and project management capacity of their staff, particularly the Unit Committees. Continue to support the Environmental Health Units to scale-up use of participatory tools (PHAST/modified CLTS) for urban sanitation promotion. Improve ability to form and manage public-private partnerships to support their WASH BCC Plan. Reinforce capacity of the Sub-metros to monitor service delivery and regulate activities of WSBs. Establish and build the capacity of Sub-metro WASH teams to provide back- up technical support to communities.	Activities in this intervention involves capacity building, training and technical assistance in WASH policy support and strengthening, meetings and workshops to share lessons in WASH implementation, and dissemination of information and documentations.	**Categorical Exclusion** is recommended for all activity clusters in this intervention area pursuant to 22CFR216.2(c)(2)(i) for education, training and technical assistance, 22CFR216.2(c)(iii) for analysis, studies, academic or research meetings and workshops and 22CFR216.2(c)(2)(v) for document and information transfer

Support collaboration of AMA and STMA technical staff with the National Association of Local Authorities of Ghana, the Institute of Local Government Studies, as well as national government ministries to share their experience with other MMDAs, which may include presentations as well as peer exchanges and “study tours” from other cities. Training of CBOs including WSB and Assembly members to strengthen their capacity to negotiate and articulate their needs, concerns and demand water supply and sanitation improvements in their various communities. Support further organizational development of Local NGOs through trainings		

6. ENVIRONMENTAL MANAGEMENT PLAN

Activities	Description of Mitigation Measure	Responsible Party	Monitoring Methods				Results				Recommended Adjustments
			Indicators	Methods	Frequency		Site inspected	Dates Monitored	Problems Encountered	Mitigation Effectiveness	
Site Selection											
Site contains habitat for important ecosystems, animals or plants	The project team will ensure project activities at various site will not destroy and impact habitat for important ecosystems, animals or plants. From the field assessment carried out at the selected sites, the affected vegetation is predominantly grass and neem trees which are common and not endangered/extinction in the region or country. Design so as to minimize clearing or disturbance	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist • Local Partners/Contractor	Report to the AOR on sites selected for construction	Visual Inspection	Once before construction						
Site has important scenic, archeological or cultural/historical features	The project team will ensure not to select sites with important scenic, archeological or cultural/historical features		Report to the AOR on sites selected for construction	Visual Inspection	Once before construction						
Site is wetland	The project team will ensure		Report to the	Visual	Once before						

or abuts body of water or prone to flooding	not to select sites that are wetlands or next to stream, river, lake or well or prone to floods. Design infrastructure to minimize risk, e.g., design with proper grading and drainage. Maintain design features such as drainage structures. The project will avoid constructing sanitation or other facilities that will use and store harmful materials at flood-prone sites.		AOR on sites selected for construction	Inspection	construction						
Construction of Water Facilities (Bore holes, Hand-dug Wells, Pipe System and Rain Harvesting Systems)											
Hydrogeological Survey/Siting	Water facilities will be located far away from any sanitation facilities to prevent contamination.	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist • Local Partners/Contractor	Distance between water facilities and sanitation facilities	Visual Inspection	Yearly/When required						
	The activity will follow engineering standards as set forth by National or District Water and Sanitation Agencies.		Report on hydrogeological survey	Visual Inspection	Once during construction						
	For clean well water, we will ensure that the aquifer that is tapped is not subject to contamination from surface water during any season.		Geology of aquifer	Visual Inspection of document on geology	Once during construction						

	Biodiversity of economic flora and fauna will not be destroyed during traverse cutting		The biodiversity of flora and fauna are kept	Visual Inspection	Yearly						
Drilling/Excavation of bore hole and hand-dug well	The noisiest types of work will be concentrated to short periods. Select quiet construction equipment, particularly air compressors, whenever possible. Fit motorized equipment with proper mufflers in good working order.	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist • Local Partners/Contractor	Assess time of drilling and the number of people who complained about the level of noise	Visual Inspection and interviews	Once following construction						
	We will ensure that contractors take measures to keep dust to a minimum during the construction of the facilities.		Level of dust during drilling/and usage of nose mask	visual Inspection	Once during construction						
	To avert depletion of fresh water resources (surface and groundwater) construction firms will design water supply based on adequate estimates.		Assess estimates on adequate water supply	Visual Inspection	Bi-Annually						
Well development/Pump Installation	Test would be conducted for biological (faecal coliforms), chemical (including arsenic) and physical parameters to ensure they are within the World Health Organization permissive limits.	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring &	Assess physio-chemical and biological quality of water Report to USAID AOR	Laboratory test and visual inspection	Complete testing prior to commissioning of well Bi-Annually (for p/a fecal coliforms)						

	Wells will be covered and have the approved hand pumps to prevent water contamination.	Evaluation Specialist • Local Partners/Contractor	Wells covered/fixed with approved hand pump and maintained	Visual Inspection	Yearly						
	Well apron and run-off outlets will be made so as not to create a problem of standing pools of water.		Well apron and run-off outlets constructed and maintained	Visual Inspection	Yearly						
Construction of pipe lines and stand post	Trenches would be covered immediately and grassed after laying pipes to check erosion.	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist • Local Partners/Contractor	Trenches covered and grassed	Visual inspection	Yearly/ When required						
	Stone drains/Soakaway pits will be constructed at stand post to drain waste water.		Percentage of stand posts with functional stone drains	Visual inspection	Yearly						
	Education of end users on proper usage of facilities, transport and storage of water at the household level		Percentage of water users who participated in water education programs	Visual inspection of education reports	Yearly						
	Maintenance of the system to ensure sustainability		Level of system maintenance	Visual Inspection of systems	Quarterly						
Water kiosks	Construct drainage systems to drain off spillage to avoid having stagnant water. This will avoid breeding grounds for disease vectors. Fencing to avoid sharing the same water points with	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist	Number of water kiosks with drainage systems		Quarterly						

	animals/livestock. Different water point will be created for livestock if needed.	• Local Partners/Contractor									
Rain Harvesting	Appropriate technologies (simple, low-cost, and easily maintained by users) will be used.	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist, Behavior Change Communication Specialist • Local Partners/Contractor	Assess the cost of facility	Visual inspection and estimates	Yearly						
	Households will be taught when to use the facilities to harvest rain water.		Percentage of households taught on when to use facilities to harvest rain and using them	Visual inspection of report and observation	Yearly						
	Beneficiaries will be taught how to clean and disinfect the water containers.		Percentage of beneficiaries taught how to clean and disinfect containers and using them	Visual inspection of report and observation	Yearly						
	Beneficiaries will be taught not to use harvested rain for drinking or cooking unless treated and suitable for drinking, and meets WHO drinking water standards. Test bacteriological quality of rainwater collected A flushing system would be used and this is very significant to divert the first foul rainwater entering into the storage reservoir. The main considerations are to use locally available materials and		Percentage of beneficiaries taught how to treated rainwater for drinking and cooking								

	ease of installation, easy operation, maintenance and durability.										
Construction of Sanitation Facilities (Latrines, Household Latrines and Hand Washing Facilities)											
Siting	Latrines will be located far away from any water supply and outside the main house and	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist • Local Partners/Contractor	Distance between latrines and nearest water supply	Visual inspection and measurements	Yearly						
	Latrines will be sited at down-slope of rainfall runoff and 2-3 meters minimum above the annual maximum water table elevation.		Position of latrine in relation to down-slope of rainfall runoff	Visual inpection	Yearly						
	Prior to latrine construction, project personnel will assess sites (for soil stability permeability, levels of water table, etc.).		Report on sites soil stability, permeability and level of water table	Visual inspection	Prior to latrine constructi on program in a village						
Excavation	All latrine pits will be covered during construction to prevent "fall-in accidents"	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist • Local Partners/Contrac tor	percentage latrine pits covered during construction	Visual inspection and interviews	Yearly						

Construction	Local artisans will be trained in latrine construction and as hygiene promoters. The Contractor/artisans will be required to use personal safety equipment (i.e. hard hats, goggles, steel-toed boots, gloves, dust masks) and Provide safety training in the proper use of all equipment. The Contractor/artisans will be required to ensure proper storage of materials. The Contractor/artisans will be required to provide medical services (access to a first aid kit). The Contractor/artisans will be required to fence around the construction site at all times The Contractor/artisans will be required to Identify the most environmentally sound source of materials within budget	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist, Behavior Change Communication Specialist • Local Partners/Contractor	Percentage of local artisans trained in latrine construction and as hygiene promotion	Visual inspection of training reports and observation	Yearly						
	Hygiene will be promoted through education and training to ensure effective and sustained use of the services.		percentage of beneficiaries who know about good hygiene	Observation and inspection of reports	Yearly						

Maintenance of Water and Sanitation Facilitities	WATSAN committee at the community level will be supported to develop policies to govern the management of the water.	• CHF - Country Director, Project Director, Water and Sanitation Engineer, Monitoring & Evaluation Specialist, Behavior Change Communication Specialist • Local Partners	Number of WATSAN committees supported to develop policies	Inspection of policy documents	Yearly						
	Beneficiaries will be educated to adhere to maintenance of good sanitation management practices.		Percentage of beneficiaries educated to adhere to maintenance of good sanitation	Visual Inspection and Observation	Yearly						
	Targeted resource users will be trained to wash their hands with soap after latrine use through public campaigns		Percentage targeted resource users trained to wash their hands after latrine use	Visual Inspection and Observation	Yearly						
	Chlorination will be done by qualified technicians two times in a year after which the Community WATSAN Committees will take over.		Reports on the chlorination process	Visual inspection and laboratory test	Yearly						
	Train beneficiaries to maintain water quality.		Percentage of beneficiaries trained to maintain facilities	Visual inspection of report and observation	Yearly						

	Water users will be trained to reduce waste and leakage of potable water to the barest minimum.		Percentage of water users trained to reduce waste and leakage	Visual Inspection and Observation	Yearly						

7. INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION OF EMMP

CHF would integrate the EMMP into project initial and annual work plans and report on its implementation as an element of regular project performance reporting. The Country Director will appoint a key member of staff preferably the **Senior Monitoring and Evaluation Officer** to take responsibility to implement the EMMP and ensure environmental compliance and the environmental soundness of WASH-UP Ghana project activities. The appointed staff will serve as a core member of each project team, helping CHF to identify potential adverse impacts resulting from their activities, to prepare necessary environmental analyses, and to monitor implementation of approved environmental mitigation measures as outlined in the EMMP. The ultimate responsibility of ensuring environmental compliance is with the Country Director. Other staff such as the Water and Sanitation Engineer, Behavior Change Communication Specialist, Governance Specialist, Monitoring & Evaluation Specialist, Capacity Building Specialist, Senior Knowledge Management Officer and Program Assistants will have key responsibilities of Monitoring to ensure compliance. CHF would make sure environmental compliance issues are included in Terms of References or Scope of Works for contractors and sub-grantees and ensure mitigation measures are adhere to in work schedules.

CHF would work with the following key national agencies and if require obtain permits to ensure compliance with host country requirements:

- Ministry of Water Resources, Works & Housing
- Ministry of Environment, Science & Technology
- Environmental Protection Agency
- Water Resources Commission
- Ministry of Local Government and Rural Development
- Ministry of Health
- Accra Metropolitan Assembly
- Sekondi Takoradi Metropolitan Assembly

USAID's Agreement Officer's Representative (AOR) or Activity Manager should also monitor activities on a regular basis to ensure compliance.