SFG1542

ENVIRONMENTAL MANAGEMENT FRAMEWORK (EMF) FOR JAMAICA DISASTER VULNERABILITY REDUCTION PROJECT (JDVRP)

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EXECUTIVE SUMMARY

Jamaica is one of the most vulnerable countries in the world to two or more natural hazards by virtue of its geographic location, small size, topography and geology among other things. The country has been devastated by numerous hydro-meteorological events in its recent history, amounting to millions of dollars in damages, loss of lives, and reduction in economic growth. In fact, during the last decade the country has experienced ten major events with far-reaching impacts, affecting approximately two million people and causing approximately $US 1.21 billion (PIOJ, 2010). Consequently, the Government of Jamaica (GoJ) approached the World Bank (WB) to secure a loan to implement a disaster vulnerability reduction project aimed at reducing the country's vulnerability to natural disasters and climate change and to mitigate the negative impact of natural disasters on the Country's debt burden and fiscal profile by enabling the Government to plan for and respond to disasters without significant diversion from its economic development programme.

The civil works component of the Project will include retrofitting of existing bridges or construction of new ones; rehabilitation of urban drainage systems; seismic retrofitting and/or construction of critical public infrastructures such as fire stations, police stations, and schools; and feasibility studies, design and implementation of coastal defence systems. Project activities may also include road rehabilitation, river training and landslide mitigation to support the primary activities. The completion of these projects will have positive environmental impacts, however during implementation there is potential for adverse environmental and human health impacts. Consequently, this environmental management framework (EMF) is developed as a general guide to foster the implementation of projects in an environmentally sustainable and socially acceptable manner.

The development of an EMF is a World Bank (WB) Operational Policy requirement for civil projects. It facilitates the integration of environmental concerns in the design and implementation of project activities. The EMF outlines the processes and procedures required to implement the project in a manner that is compliant with applicable Jamaican Laws and Regulations, and the WB's Operational Policy safeguards. It describes among other things, procedures relating to environmental screening, environmental assessments, development of a generic Environmental Management Plan (EMP), guidelines for conducting more detailed environmental assessments and EMPs if and when necessary, subsequent monitoring and evaluation, and reporting during implementation of the proposed sub-projects under the JDVRP.

1. INTRODUCTION

1.1. About the Jamaica Social Investment Fund (JSIF)

The Jamaica Social Investment Fund (JSIF) finances and implements a variety of small-scale community level projects in rural, peri-urban and urban areas. These projects are expected to have generally positive environmental impacts, albeit some could result in minor adverse environmental impacts that would be mostly local and reversible. Occasionally, there may be a need for involuntary land acquisition under eminent domain to meet the requirements of land for a project. JSIF has developed this Environmental Management Framework (EMF) to manage these potential adverse impacts and also to ensure compliance with the requirements of Jamaican environmental laws and regulations and the relevant policies of its major funding agencies like Caribbean Development Bank, European Union, Inter-American Development Bank, World Bank and other development partners.

One of the guiding operational principles (principle # 9) of JSIF is that projects funded by JSIF must conform to the Government of Jamaica's environmental regulations and have minimum impacts on the natural and cultural environment. Thus the EMF became an integral part of JSIF's Operational Manual (OM) and has evolved into an Environmental Management System (EMS) which was certified to ISO 14001:2004 standards in January 2009. The EMS is applicable to all investments financed by JSIF, regardless of its funding source or implementing agency. The JSIF EMS has successfully passed all ISO 14001 external audits and was re-certified in 2011.

1.2. Jamaica Disaster Vulnerability in Context

It is well established that Jamaica is one of the most vulnerable countries in the world to natural disasters by virtue of its geographic location, geology, topography, and small size. As indicated in a 2008 World Bank report on Natural Disaster Hotspot, Jamaica has the second highest economic risk exposure to two or more hazards, including hydro-meteorological hazards such as hurricanes, floods, tropical storms, and storm surges; and seismic hazards such as earthquakes. It is reported that 96.3% of the national population, 94.9% of the national territory and 96.3% of GDP is exposed to two or more hazards, which when coupled with other vulnerability factors such as its high debt burden, high poverty, climate change, environmental degradation, unplanned development, weak enforcement of building code and zoning regulations, lack of

awareness, and rapid population growth in coastal urban centres, clearly demonstrate Jamaica's high risk of significant impacts from natural hazards.

For more than 50 years, Jamaica's development is considered very unsustainable with anaemic economic growth partly due to the impact of natural hazards. The economic impacts of natural disasters have even become more prevalent in recent times. Recorded disasters in Jamaica between 2001 and 2010 were triple compared to any other decade. During this period there were ten major events with far-reaching impacts affecting approximately two million people and causing approximately $1.21 billion (PIOJ, 2010). The repeated impacts have culminated in economic stagnation or decline since funds targeted for economic growth and development activities had to be diverted to disaster recovery and reconstruction. For example, in the immediate aftermath of Hurricane Ivan in September 2004, J$94.9 million was diverted from government institutions to finance relief activities. The total economic impact of this hurricane is estimated at J$35,931million or the equivalent of 8.0 percent of the country's GDP for 2003 (Planning Institute of Jamaica, 2004).

Approximately 70% of Jamaica's population live in the coastal zone and the number is projected to increase in the major coastal urban centres. According to a PIOJ report on development trends in the coastal areas, population increase in the ten fastest growing coastal towns ranged from 14.37% to 56.6 %. The report also indicated that economic development is also showing an increasing trend in these areas and is anticipated to continue far in the future. Uncontrolled population growth and developments in these coastal towns is potentially consequential as a result of climate change impacts such as sea level rise; and anticipated environmental degradation associated with human settlement, such as destruction of mangroves and wetlands, deforestation, and improper solid waste management, *inter alia*.

Existing data have shown that climate change is impacting Jamaica and the wider Caribbean as indicated by increased frequency and intensity of hurricanes, storm surges and sea level rise, floods, change in rainfall patterns, and extended droughts. Currently, there are extreme problems with coastal erosion and flooding in many communities; massive landslides which often marooned communities; storm surges which contributed to soil salinization; extreme drought conditions which impacted agricultural production; and diversion of rivers resulting in property damages. The situation is projected to become even

more extreme in the foreseeable future. According to a World Bank study, "Sea Level Rise and Storm Surges", the impact of sea level rise and intensified storm surge in Latin America and the Caribbean will be highest in Jamaica – noting an increase of 56.8 percent - with 28.49 percent of the coastal population exposed and potential losses of coastal GDP projected to exceed 26.62 percent. Furthermore, the inundation risk in Jamaica from storm surges could affect 36.55 percent of the coastal wetlands. With climate change threatening to heighten the impacts of hydro-meteorological hazards, the result in the decades to come may be an increase in the burden of weather-related disasters that can threaten the sustainability of Jamaica's development processes.

In the absence of timely and appropriate disaster risk reduction and climate change adaptation measures, the increased frequency of natural hazards will further erode Jamaica's economic foundation, especially with regards to water resources, ecosystems, human settlements, agricultural operations, coastal resources, tourism infrastructure and human health (National Risk-Reduction Policy for Jamaica, 2005) and devastate especially our vulnerable population. The JDVRP is aimed at addressing some of the risk associated with natural disasters through a series of DRR and CCA interventions. The civil works component of the Project will include retrofitting and/or construction bridges including the possibility of road realignment and river training; seismic retrofitting of critical public infrastructure; rehabilitation of urban drainage; installation of accelerometers; and possible construction of coastal protection structures.

1.3. The Jamaica Disaster Vulnerability Reduction Project (JDVRP) in Context

Jamaica has for several decades struggled with anaemic economic growth partially due to frequent devastation by natural disasters which among other things contribute to high debt. Jamaica's vulnerability to natural disasters is influenced by its geographical location, small size, geological characteristics, topographic features, and exorbitant lingering debt. In an effort to help curtail the debt burden on Small Island States, the World Bank (WB) has developed the Comprehensive Debt Framework (CDF) which is structured around four pillars for reducing long-term debt, reflecting the fundamental causes and symptoms of high debt in these States. Mitigating fiscal impact of natural disasters on debt and fiscal profile is one of the pillars of the CDF. This pillar encompasses two

strategies: (i) expanding the use of financial instruments for risk transfer (insurance, Cat-Bonds/Swaps) and risk retention (sovereign funds) and (ii) promoting public investment in areas that reduce risk to natural disasters. The common objective of these strategies is building resilience and addressing vulnerability which will ultimately contribute to fiscal sustainability. With this understanding, the Government of Jamaica (GoJ) approached the WB for a loan to fund a disaster vulnerability reduction project.

The objective of the Jamaica Disaster Vulnerability Reduction Project (JDVRP) is to enhance the climate and disaster resilience of key infrastructure assets and the country's disaster response capacity. This would be achieved through a mix of physical investments, technical assistance and risk financing aimed at improving the structural integrity of key infrastructure, expanding and improving hazard data collection and monitoring mechanisms, fostering capacity building and institutional strengthening, and enhancing disaster recovery systems. The implementation of the project is anticipated to reduce the level of devastation caused by natural hazards on especially the productive sectors of the economy, decrease the recovery period, and eliminate or reduce the need for the GoJ to divert budgetary allocations to directly finance disaster recovery.

The outcome of the JDVRP would be measured using the following key indicators: (i) Reduced vulnerability of Jamaica's public infrastructure including bridges, schools, and police and fire stations natural hazards and/or increased adaptation to climate change impacts; (ii) Decreased risk of death and injury due to hazardous events; (iii) Lowered impact of natural disasters on the economy of Jamaica; (iv) Improved recovery period after a natural disaster; and (v)increased capacity of the GoJ to identify and monitor climate risk and impacts.

Considering the conditions outlined in the Bank's Environmental Assessment (EA) Policy (Operational Policy OP 4.01), the JDVRP is classified as a Category B project, meaning that environmental impacts for the type of work anticipated under the project are expected to be moderate in nature and can be managed through the application of appropriate engineering and management measures. Since the specific locations of the sub-project under the JDVRP are not fully defined at this point, this EMF will serve as a general guide to implementation of the activities identified in the project description. It provides the approach to

identifying and managing environmental concerns which may be encountered during the project implementation. Ultimately, it will inform the environmental management of future subprojects or activities once they are defined in sufficient detail for execution. The EMF will serve as a screening tool for work activities and subprojects designed in order to identify potential environmental impacts, provide standardized mitigation measures in the form of an environmental management plan (EMP), and identify works requiring additional assessment during project execution.

The main objectives of this EMF are to:

- establish procedures for screening all proposed projects for their potential adverse environmental impacts and land requirements/acquisition;
- specify measures for managing, mitigating and monitoring environmental impacts during project implementation and operation; and
- outline the training and capacity-building arrangements needed to successfully implement the provisions of the EMF.

1.4. Description of Subprojects Types

1.4.1. Seismic retrofitting of critical public infrastructure: Based on the application of the Federal Emergency Management Agency's (FEMA) methodology for a Rapid Screening Assessment of critical infrastructure in the Kingston Metropolitan Area undertaken by ODPEM, it was established that a significant need exists to rehabilitate/retrofit critical infrastructure including schools, fire and police stations, *inter alia.* This in an effort to improve the country's resilience or reduce vulnerability to seismic activities. Under this activity, buildings that were determined to need intervention were prioritized and selected for implementation. In spite of the need for intervention in all areas of critical facilities, this project will be focused on schools and fire stations. Under this programme, three fire stations will be constructed and a minimum of six schools will be constructed or expanded. A fire station will be constructed at Barnett Street in Montego Bay, St. James; one at Port Maria in St. Mary; and one at Yallahs in St. Thomas. A new school is proposed to be constructed at Robins Bay in St. Mary; while the Grange Hill Primary School (Westmoreland), Ginger

Hill Primary (St. Elizabeth), St. Benedict's Primary (St. Andrew), Priory Primary (St. Ann) and Mt. Moriah Primary (Manchester) schools are targeted for expansion by six or more classrooms. Generally, these interventions will include demolition and reconstruction of sections of buildings, installation of reinforcement and casting of concrete, land clearing and tree removal, excavation and trenching, backfilling of trench with excavated material, transportation of aggregates and cement to the site, mechanical preparation of concrete onsite, erection of concrete block-work, casting of reinforced concrete roof, erection of perimeter fencing, construction of drainage and sanitation systems, installation of electrical and plumbing works, and carting away of construction and demolition (C&D) waste. Special attention will be made to identify the presence of asbestos components in the roof and other structures during rehabilitation and demolition. Asbestos abatement protocol will be applied if detected. These protocols are well established and will not be outlined here. Termite treatment for buildings will also follow established protocols such as using only registered, licensed companies for application of pesticides.

1.4.2. Retrofitting and/or construction of major and parochial bridges:

The National Works Agency (NWA) and to a lesser extent the Local Authorities (Parish Councils) have assessed for intervention, the bridges under their portfolio. The bridges determined to be most critical with respect to disaster resilience were prioritized for implementation under the JDVRP. The bridges will be reconstructed. Three bridges (Myton, Church Pen 1, and Church Pen 2 bridges all in St. Catherine) were prioritized by the NWA. The Ministry of Local Government and Community Development has prioritized the Canaan Mountain Bridge in Westmoreland; Georgia (Dundee) Bridge in Hanover; Duke Street Bridge in Clarendon; and Latium Bridge in St. James for intervention. Work activities may include: upgrading of access roads leading to the bridges; demolition of reinforced concrete bridges and other structures; carting away of construction and demolition (C&D) waste; mechanical mixing of concrete; transportation of aggregates and cement to the site; excavation, placing culverts and cast reinforced concrete abutments; construction of bridge deck; placement and compaction of gravel base course; slope stabilization; river training; clearing of vegetation and debris; and piling.

The appropriate environmental management procedures will be implemented to mitigate potential impacts. Special attention will be paid to screening riparian (riverside) vegetation to avoid affecting sensitive natural habitat; erosion control measures to ensure that waterways are not excessively affected by silt or sediment; and public safety measures to help prevent accidents on roadways and public access areas.

1.4.3. Urban drainage: A number of urban centres in Jamaica including the Kingston Metropolitan Area (KMA), Montego Bay and Old Harbour have been identified as being vulnerable to urban flooding. Factors such as, under designed and out-dated infrastructure, lack of appropriate maintenance and cleaning, and an increased frequency of severe rain events contributed to recurrent flooding, often resulting in loss of lives and property. The project will include rehabilitation or reconstruction of drains in these urban areas with special focus on section(s) the Sandy Gully (KMA), Anchovy/Long Hill Drainage System (Montego Bay, St. James), and the Big Pond Myton Gully (Old Harbour). Works activity may include demolition of existing drain structures including base and walls; clearing of debris, mechanical mixing and deposition of concrete, erection of concrete walls, transport of aggregates and cements to the site; construction of gully inverts; and cart away of C&D waste. Measures will be taken to reduce health threats to workers from water-borne and mosquito-borne disease. Possibilities to optimize benefits will also be evaluated, such as green space development and debris removal traps.

1.4.4. Coastal management: Considering that a great majority of Jamaica's population live on the coast and that majority of the country's GDP is generated in the coastal region, coastal protection is noted as a priority. Beach erosion is of significant concern, specifically as it relates to the important contribution of the tourism industry to Jamaica's economy. The implementation of hard coastal protection is recommended for two sites; the Port Royal Street to Harbour View project (KMA) and Black River in St. Elizabeth. There are also considerations for the implementation of soft mitigation works based on recommendations from the previous studies in some other vulnerable sites around the Country. These soft and hard measures may include replanting of mangroves, construction of sea walls and coastal revetment. These activities have the potential to impact the

coastal environment and must be mitigated adequately, based on detailed studies of coastal processes, and design of site-specific mitigation plans through environmental assessments.

1.4.5. Installation and Upgrade of Seismometers: In an effort to maximize the quantity and quality of seismic data collected, this activity will include the installation of forty upgraded seismometers in remote areas across the island. Existing stations will be used, so the works will involve only a minimal amount of land clearing and potential tree removal. Towers are already in use, so the works will likely not require trenching. In some cases, the construction of concrete structures (vaults) to house the devices will be necessary.

2. LEGAL AND REGULATORY FRAMEWORK

2.1. National Regulatory Framework

The National Environment and Planning Agency (NEPA), the body primarily responsible for environmental regulations, administers a Permit and License System (P&L) to which construction and operation of all Jamaican Facilities and development projects are subscribed. NEPA operates under the auspices of the National Resources Conservation Act (NRCA). Some of the infrastructure types proposed to be implemented under the JDVRP will require an environmental permit from NEPA; which includes the necessary terms and conditions for implementation. Depending on the environmental sensitivity or vulnerability of contiguous ecosystems, as well as the scale of the project, NEPA may require the preparation of a full Environmental Impact Assessment (EIA) prior to granting the environmental permit. NEPA also grants license to facilities that discharge effluents into the atmosphere, ground, and/or surface water. At this point, none of the proposed projects will involve effluent discharge, however as sub-projects become defined any required permit will be obtained to ensure compliance with the Law.

There are also other Government agencies that have environmental management and regulatory responsibilities as indicated in the **Table 1** below.

Table 1: Agencies with Environmental Regulatory and Management Responsibilities

AGENCY	REPONSIBILITY	ACT/LEGISLATION
Office of Disaster and Emergency Management (ODPEM)	The Act gives ODPEM the authority to coordinate national disaster response activities and gives limited power to the Prime Minister in making disaster declarations. The limited power can be exercised by the Prime Minister during disaster events or an impending threat based on the advice of ODPEM. The revised Disaster Management Act will provide guidelines for the declaration of disaster areas, and evacuation orders. It will also give power to ODPEM to create regulations in disaster management and gives legal standing to authorities and documents pertaining to disaster management.	Disaster Preparedness and Emergency Management (DPEM) Act (1993)
Ministry of Local Government and Community Development (MLGCD)	The MLGCD through the Parish Councils enforces the requirements or guidelines for land use based on legal instruments known as Development Orders which covers most of the urban and coastal areas of Jamaica. "Development Orders are to control both rural and urban development, ensure proper sanitary conveniences, coordinate building of roads and other public services, and protect public amenities (conservation areas, wetlands, mangroves)". The Act outlines specific standards for land use, density and zoning in reducing disaster related risks.	The Town and Country Planning Act (1958)
National Solid Waste Management Authority (NSWMA)	The Act governs the actions, procedures and operations of the National Solid Waste Management Authority (NSWMA) as it relates to the collection and disposal of waste in safeguarding public health. The Act also highlights operational guidelines for hazardous waste as a transboundary hazard. Sanctions areincorporated into the Act and enforcement is the responsibility of various organizations/agencies. The NSWMA us the chief regulatory	The National Solid Waste Management Act (2002)

	agency for the provisions of the Act.	
NEPA	The Act was established to protect and manage Jamaica's natural resources and control pollution. The guidelines provided by this Act cover monitoring and enforcement of environmental laws and regulations with regards to watershed protection and beach control among other issues. "The Environmental Management Unit of the Ministry of Health and local planning authorities monitor construction work to ensure that all development restrictions and requirements are properly adhered to"13. Sanctions and penalties can be assigned to particular offences based on breaches of the Act.	The National Resources Conservation Authority (NRCA) Act (1991)
MLGCD	The building code has been updated and awaits passing into law. Although the code has not been passed into law, local authorities (Parish Councils) are able to enforce building regulations under the Building Act.	Building Act
MLGCD	The Parish Building Regulation and Development Orders outline and guide the development process in Jamaica. The Parish Building Regulations provide guidelines to developers based on the existing building codes. The Parish Development Orders are used to ensure that premises in areas of the parish are not used contrary to the purpose provided by developers and residents. Other regulatory and related instruments pertaining to DRR include but are not limited to the Severe Weather Orders, Draft National Building Codes, and international legislative considerations and guidelines.	The ParishBuilding Regulation and Development Orders
Water Resources Authority (WRA)	The Act gives the WRA authority regulatory power over the country's water resources. The WRA is responsible for planning, development and equitable allocation of water resources. The Act gives power to the Minister of Water Land Environment and Climate Change to guarantee loans to the WRA where needed. Provisions for the abstraction and use of water, control of water quality, control and protection of underground water are all outlined (WRA	The Water Resources Act (1995)

	1995). The Act allows for punishment of polluters of water resources.	
MLGCD through the Jamaica Fire Brigade	The Acts provide frameworks geared toward reducing risk related to fire hazards. The Fire Brigade Act (1988) governs the establishment and operation of the Jamaica Fire Brigade which aims to minimize loss of lives, injury to persons and damage to property from fires, natural disasters, accidents and other emergencies as necessary. The Country Fire Act (1942) empowers the Minister to prohibit open fires to crop or trash especially at night. The Act outlines punishment of offences and highlights the negligent use of fire.	The Fire Brigade Act (1988) and Country Fire Act(1942)
Jamaica Defence Force	The Defense Act (1962) governs the actions, procedures and operations of the Jamaica Defense Force (JDF). The Act outlines the development of the regular and reserve forces along with their names. It also outlines the duties of the Defense Board as defined by the Act and charges the JDF with the defense and maintenance order of Jamaica. The JDF is deployed during the public state of emergency once declared by the Governor General to ensure that public order is maintained.	The Defence Act (1962)
Ministry of Health (MOH)	The Public Health Act (1974) outlines the provisions and guidelines for the establishment of the Central Health Committee and Local Boards to contain and treat various diseases. The MOH regulates the immunization of children, assembly of persons, and closure of public places for health reasons. In 1985, the Act was amended to include monitoring of imported food, food preparation and distribution. Hazard Analysis Critical Control Point (HACCP) system is a procedure utilized by the Ministry of Health to ensure safe food production. Penalties can be applied where provisions and guidelines are not adhered to.	The Public Health Act (1974)
Forestry Department	The Act provide for the protection and management of designated forest reserves. It empowers designated persons to enter premises in forest	The Forest Act (1996)

	reserves, Forest management/protected Area or lands which need to be declared; and to ensure compliance with Act and Regulations.	
Pesticide Control Authority	The Act is designed to manage and regulate the use of pesticides which are potentially harmful to the environment. It empowers designated personnel to enter any premises or vehicle where extermination is being carried out, pesticides are manufactures, stored, kept to inspect, investigate and take samples and where required seize and detain any records or articles as evidence of the commission of an office.	The Pesticides Act (1987)
Ministry of Health	The Act is designed to control air pollution by regulating the amount of any noxious or offensive gas, which is permitted to escape or discharged from any affected premises into the air. The Law empowers designated persons to enter, inspect or examine premises where work is in progress and take samples, test of smoke, fumes, gas, or dust or make enquiries.	The Clean Air Act (1964)
NEPA	The Act provides for the protection of watersheds and areas adjoining watersheds and promote the conservation of water resources.	The Watersheds Protection Act (1963)

2.2. Applicability of Regulatory Framework

In light of the types of sub-projects that are being considered for implementation under the JDVRP and the potential environmental impacts envisioned to be associated with the civil works activities, the primary regulatory or authoritative bodies that will be engaged are indicated in the table below:

AGENCY/AUTHORITY	FUNCTION
National Environment and Planning Agency (NEPA)	Environmental regulatory agency which falls under the umbrella of the Ministry of Water, Land Environment and Climate Change (MWLECC)
Parish Council	The technical and enforcement arm of the Ministry of Local Government and Community Development
National Works Agency (NWA),	The technical arm of the Ministry of Transport, Works and Housing
National Solid Waste Management Authority (NSWMA)	Regulates the collection, transportation, and disposal of solid waste and falls under the auspices of the MLGCD.

ACTS	PROVISIONS
Natural Resources Conservation Authority Act (1991)	Provides for the management, conservation and protection of the natural resources of Jamaica. The Act also addresses sewage and trade effluent discharges as well as air pollution. The NRCA Act serve as the umbrella for a number of subsidiary Acts, so to speak, for example, the Water Shed Protection Act (1963); Beach Control Act (1956); The Clean Air Act (1964); Watershed Protection Act (1963); Wildlife Protection Act (1945); the Endangered Species Protection Act (2000); and the Natural Resources Conservation (Permits and Licensing) Regulations (1996). The NRCA Act is administered by the Natural Resources Conservation Authority/NEPA.

	All environmental permits and licenses for development activities under the JDVRP that fall within the confines of the NRCA Act must be submitted to NEPA for approval. The NEPA will assess the proposed development and make recommendations for an environmental impact assessment (EIA) if required. The agency has final approval in this regard.
Flood Water Control Act (1958)	The Act provides for the management of watercourses to protect against floodwater damages. NWA administered the Flood Water Control Act. Any project activities that involve drainage and bridge works or which potentially will impact watercourses will go through the NWA.
The National Solid Waste Management Act	is administered by the NSWMA and provides for the management of solid waste in an environmentally friendly manner. This body will regulate the collection, storage, transportation and disposal of any waste generated at the sub-project sites.
The Town and Country Planning Act (1958)	The Act provides the framework for all development in the Country. It falls under the responsibility of the MLGCD and is administered by the Town and Country Planning Authority and the Local Planning Authorities (Parish Councils…PCs). The designs for all sub-projects under the JDVRP must be submitted to the respective PCs for approval and is subject to monitoring by the Council to ensure compliance with Development Orders.
Public Health Act (1985)	The PCs also administered the Public Health Act (1985), which governs the protection of the public and environmental health, waste management and pollution control. Within these legislations lies the authority of the Planning Division of the Councils. Once an application

	is submitted to the PC a comprehensive assessment will be made of the design, potential impacts of the development and the conformity to zoning requirements for granting of permission. The PC will circulate copies of the design to other regulatory agencies such as the Environmental Health Unit of the Ministry of Health and NEPA to solicit inputs on the adequacy of the designs and any need for impact assessment or incorporation of mitigation measures.

2.3. World Bank Safeguard Policies

The World Bank funded projects and activities are governed by Operational Policies (OP), which are designed to ensure that the projects' implementation approach is economically, financially, socially and environmentally sustainable. The Bank has specific safeguard policies, which include Environmental and Social Assessments and policies designed to prevent inadvertent adverse impacts on people and the environment. These specific safeguard policies address pest management, involuntary resettlement, natural habitats, cultural property, safety dams, indigenous peoples, projects on international waterways and projects in disputed areas.

The World Bank's environmental assessment policy and recommended processing are used to identify, avoid, and mitigate the potential negative environmental impacts associated with Bank lending operations and are described in the Bank's **Operational Policy (OP)/Bank Procedure(BP) 4.01: Environmental Assessment**. This policy is considered to be the umbrella policy for the Bank's environmental 'safeguard policies' which among others things include: Natural Habitats (OP 4.04), Forests (OP 4.36), Pest Management (OP 4.09), Physical Cultural Resources (OP 4.11), and Safety of Dams (OP 4.37).

Under OP4.01 the Bank will undertake **environmental screening** of each proposed project to determine the appropriate extent and type of environmental assessment required. Proposed projects are classified into one of four categories,

depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. The categories of potential environmental impacts are classified as A, B, C and FI, as described below.

2.3.1. World Bank Project Category Description

2.3.1.1. Category A project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. The EA for Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" scenario), and recommends any measures needed to prevent, minimise, mitigate, or compensate for adverse impacts and improve environmental performance. For Category A project, a borrower is responsible for preparing an Environmental Impact Assessment (or a suitably comprehensive regional or sectorial EA).

2.3.1.2. Category B project has potential adverse environmental impacts on human populations or environmentally important areas, including wetlands, forests, grasslands, and other natural habitats - which are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects.

2.3.1.3. Category C project is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required.

2.3.1.4. Category F or FI project involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

During the project preparation process, a preliminary review was conducted of the proposed sub-project types to be implemented under the JDVRP. It was determined that the project is considered to be Category B based on the projected minor to moderate environmental impacts from civil works activities. These impacts will be managed or mitigated through the design and implementation of appropriate measures. The World Bank Safeguard Policy OP 4.01 for Environmental Assessment (EA) is triggered, and requires that an Environmental Management Framework (EMF) be prepared along with an Environmental Management Plan (EMP) to guide the implementation of specific activities in an effort to prevent or minimize environmental impacts.

Since specific sub-projects are not identified at the moment, it is difficult to precisely assess the potential impacts, and to determine if special attention should be paid to mitigate any effects on natural habitats or physical cultural resources. Consequently, these policies have been triggered as a precaution, and the relevant mitigation measures are included in this EMF to ensure that they are taken into account in the planning process. The policies are described briefly below just in case they become relevant as sub-projects are defined.

- Operational Policy 4.04 on Natural Habitats seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats (land and water areas where most of the native plant and animal species are still present).

- The objective of OP/BP 4.11 on Physical Cultural Resources is to avoid, or mitigate, adverse impacts on cultural resources from development projects that the World Bank finances. Cultural resources are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often avoidable. Physical cultural resources are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural interest may be at the local, national level, or within the international community.

The above two policies have been triggered as precautions, so that the appropriate measures to protect natural habitats and physical cultural resources are certain to be included in this EMF.

The possibility of triggering World Bank policies on pest management and forests was also evaluated during the project preparation process, and it was determined that the policies have not been triggered; rather, exclusions are built into the EMF to ensure that those policies are not triggered. A description of each of the policies appears below, for reference in future screening and assessment during implementation of the JDVRP.

- Operational Policy 4.09 on Pest Management seeks to ensure that rural development and health sector projects avoid using harmful pesticides. A preferred solution is to use Integrated Pest Management (IPM) techniques and encourage their use in the whole of the sectors concerned. The Bank requires that any pesticide it finances be manufactured, packaged, labelled, handled, stored, disposed of, and applied according to standards acceptable to the Bank. The Bank does not finance formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.

- The Bank's Forests Policy (Operational Policy/Bank Procedure 4.36) aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development. The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank also assists borrowers with the establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable forest plantations to help meet growing demands for forest goods and services. This policy applies to the projects that have or may have impacts on the health and

quality of forests, projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests, and projects that aim to bring about changes in the management, protection, or utilization of natural forests.

As mentioned above, exclusions are built into this EMF so that future JDVRP subprojects do not trigger the forests or pest management policies.

Careful examination (screening) of subprojects in the future is warranted to ensure that adequate steps are taken for protection of natural habitat and conservation of physical cultural resources, and to ensure the exclusion of projects involving forest resources or purchase of pesticides. Screening of proposed projects will reveal whether the appropriate inquiries must be included in the analysis of environmental impacts and the design of mitigation measures. This EMF report provides details on those types of possible impacts in the context of this program, as well as guidelines for screening and subsequent actions.

2.4. Confluence of the World Bank Safeguard Policies and the Country Systems

In 2006, the World Bank had conducted a Safeguards Diagnostic Review For Piloting the Use of Jamaican Systems to Address Environmental and Social Safeguard Issues in the Proposed Inner-City Basic services Project (ICBSP) and determined that the main difference between Jamaican national environmental requirements for the types of infrastructure projects financed by JSIF and those of the World Bank and other international development partners is the preparation and use of an Environmental Management Plan (EMP). Consequently the Country System with the inclusion of a generic EMP was adopted for management of potential environmental impacts during the implementation of Inner-city Basic Services Project (ICBSP). This approach has evolved to account for the more complex sub-projects that will be undertaken under the JDVRP, with a generic EMP for relatively simple subprojects, and a customized EMP derived from a more detailed assessment for relatively complex subprojects. Also, the JSIF's environmental management system (EMS) is certified to ISO 14001 standards and therefore the potential environmental issues arising from

sub-projects approved for implementation under the JDVRP will be managed in accordance with international standard requirements.

An EMP sets out project specific mitigation measures and corresponding monitoring requirements. The use of generic EMPs for small-scale infrastructure projects with minor adverse environmental impacts (as in this case) has become internationally accepted good practice, and generic or standardized EMPs are often adapted as Standard Operating Procedures (SOP) for relatively simple projects. More complex projects, or those occurring in sensitive areas or with potentially significant impacts, will use an EMP that has resulted from the detailed analysis of the specifics of a particular subproject, commonly as the result of an EIA and/or environmental permit required by the country system.

Table 2 below provides a generic list of infrastructure categories and project types to be financed under the JDVRP. It also shows requirements for an environmental permit from NEPA and / or an EIA depending on project type. The need for preparation and use of a project specific EMP based on project categories and types is also indicated in **Table 2**.

2.5. JSIF's Innovative Environmental Policy Requirements

The long-term sustainability of sub-projects is a key objective in the implementation of JSIF sub-projects. Therefore, the JSIF continuously researches and adopts new and sustainable approaches and/or technologies to improve the operational efficiency of its sub-projects and to reduce their impacts on the environment. In 2011, the JSIF drafted a Green Elements Policy which focuses mainly on four components: Green Space; Water Conservation; Energy Conservation; and Waste management. The relevant requirements of the Policy will be applied to the JDVRP.

As a policy requirement, a green space will be included in the construction plan for all building sub-projects, for example, schools and fire stations. All buildings must be equipped with energy and water efficient fixtures including low flush toilets, low flow faucets, compact fluorescent lamps (at least T-8 with electronic ballast) or LED light bulbs, solar external lights, and motion light sensors, *inter alia,* where necessary. Rainwater harvesting systems will be implemented at all building sub-projects, and where practicable wastewater reuse systems will be

explored. Considering the high cost of electricity supplied by the National Grid, the feasibility of the use of alternative energy such as wind and solar power as energy source to run building facilities will be considered on all occasions and implemented if necessary.

Under the JSIF Policy, the minimum requirement for onsite sewage treatment at sub-project sites is a secondary treatment system. The system must have at minimum a septic tank, gravel bed, chlorination chamber, and soak-away pit. However, the replacement of gravel bed with reed bed to provide tertiary level treatment is the preferred option moving forward. In an effort to promote proper waste and litter management, a composting and recycling component will be implemented at the critical public facilities, especially the schools.

The environmental Officer will conduct training for staff annually and on a as need basis with a view to increase exposure to and awareness of new environmental technologies to be incorporated in the sub-projects.

Table 2: Infrastructure Project Categories and Regulatory and Other Environmental Requirements

PROJECT CATEGORIES	PROJECT TYPES	NEPA Permit[1] Yes/No (Y/N)	EMP[2] Yes/No (Y/N)	NOTES
SCHOOLS	• BasicSchools (2-4 classrooms) and associated amenities, such as sanitation. • Primary/All-Age Schools – Rehab or Expansion (1-4 classrooms) and associated amenities (sanitation)	**N** (see Notes) **N** (see Notes)	**Y** **Y**	1. NEPA permit is required if a bio-digester system is installed. 2. If septic tank/tile field is installed, a project brief should be sent to NEPA and comments from WRA and Environmental Health Unit of the Ministry of Health must be obtained. 3. If connection to public sewer system NWC permission must be obtained.
FIRE STATIONS	• Construction, rehabilitation, or expansion of fire stations including associated amenities, such as sanitation.	**N**	**Y**	
POLICE STATIONS	• Construction, rehabilitation, or	**N**	**Y**	

1 This means an environmental permit and most likely the preparation of an EIA (Environmental Impact Assessment)
[2]Environmental Management Plans (EMPs)

	expansion of fire stations including associated amenities, such as sanitation.			
BRIDGES	• Construction or rehabilitation of major bridges including Myton, Church Pen 1 and Church Pen 2 bridges.	**Y**	**Y**	NWA should be consulted; NEPA may require EIA
	• Construction or rehabilitation of parochial bridges (Canaan Mountain, Latium, Duke Street, Georgia (Dundee)). Activities include rehabilitation or reconstruction of small, single-lane bridges and approaches, foot bridges, and retaining walls.	**Y**	**Y**	Parish Council should be consulted; NEPA may require EIA if sensitive natural habitat is affected
SEISMIC STATIONS	• Upgrading of equipment for accelerographs and towers • Fitting of tower transmission • Construction of vaults and other small structures	N	**Y**	Existing sites, towers, and access roads will be used
SMALL ROADS	• Small roads in agricultural areas, including small, single-lane bridges and approaches, foot bridges, retaining walls,	N **N**	**Y**	Small rural roads mean Jamaican Category C (minor roads) less than 5km in length and an average width of 5m.

	fording and associated drainage structures • Upgrading, rehabilitation and repair of urban local access roads		**Y**	
URBAN DRAINAGE	• Construction and/or rehabilitation of urban drainage systems including gullies and other types of storm drains in major urban centres.	**Y**	**Y**	NWA and local Parish Council also should be consulted.
COASTAL DEFENCES	• Construction of coastal infrastructures such as breakwaters and sea defence.	**Y**	**Y**	**NEPA permit is required for the installation of all development in and offshore, as well as EIAs with extensive public consultation.**

Note: NEPA requirements are based on Letters of Query submitted by JSIF to NEPA on November 7 & 10, 2005 and NEPA's response in letters dated December 6, 2005.

3. POTENTIAL PROJECT IMPACTS

The implementation of the proposed projects will have positive impact on the environment; however civil works activities at the respective sites may have some negative effects if not adequately mitigated. It is anticipated that the adverse impacts will be small and reversible, however the true nature of the effects will not be known until the necessary environmental screening and assessments are conducted at sub-project sites. The following is a general outline of the potential impacts from implementation of the proposed sub-projects types.

3.1. Impacts: Construction and or Rehabilitation of Bridges

- Pollution of river from discharge of cement wash-water
- Siltation or sedimentation of rivers and other water bodies
- Air pollution from project generated spoils (dust)
- Diversion of normal water course
- Death of aquatic species due to sedimentation and habitat disturbance
- Destruction of natural habitat due to clearing of riparian zones
- Poor solid waste management
- Traffic congestion and potential for motor vehicle accidents
- Reduction of flooding and property damage
- Unsafe working conditions

3.2. Impacts: Upgrading and/or Improvements to Seismic Stations

- Air pollution from improper dust management at the site
- Noise pollution
- Poor solid waste management
- Destruction of or damage to trees and wildlife habitat
- Increased access if roads are improved to sites
- Unsafe working conditions (work at heights on towers)

3.3. Impacts: Construction and/or Rehabilitation of Schools, Fire and Police Stations

- Air pollution from improper dust management at the site

- Noise pollution
- Poor solid waste management
- Destruction of or damage to trees and wildlife habitat
- Soil and water pollution caused by runoff of concrete dust or petroleum compounds from leaking equipment or stored materials
- Unsafe working conditions

3.4. Impacts: Construction and/or Rehabilitation of Urban Drainage

- Pollution of river from discharge of cement wash-water
- Siltation or sedimentation of rivers and other water bodies as a result of erosion
- Air pollution from project generated spoils (dust)
- Diversion of normal water course resulting in flooding and property destruction
- Death of aquatic species due to sedimentation and habitat disturbance
- Destruction of natural habitat due to clearing of riparian zones
- Environmental pollution caused by poor solid waste management
- Traffic congestion and potential for motor vehicle accidents
- Unsafe working conditions associated with traffic flow and use of heavy equipment onsite
- Noise pollution
- Reduction in water quality
- Potential release of oil grease and other chemicals into surface water
- Increased soil erosion

3.5. Impacts: Coastal Defenses

- Pollution of marine environment due to oil leaks from machinery
- Harm to corals and other species by sediment clouding waters from dredging
- Introduction of exotic species or pathogens into the marine ecosystem
- Disturbance of marine habitat and harming of sensitive species
- Destruction of mangrove or shoreline habitat by clearing
- Disturbance of current and wave patterns, with erosion or flooding in areas affected by the new conditions caused by the works
- Air pollution from operation of machinery

- Reduction of beach erosion and coastal flooding
- Reduced vulnerability of coastal infrastructure
- Unsafe working conditions (occupational health and safety issues)
- Motor vehicle accident

3.6. Impacts: Landslide, Slope and River Bank Stabilization

- Increased sedimentation or siltation of rivers and other water bodies
- Disturbance and removal of vegetation including trees
- Air pollution associated with poor dust management
- Improper solid waste management
- Reduced loss of topsoil and productive lands
- Reduced destruction of property and infrastructure
- Unsafe working conditions
- Traffic Congestion and accidents
- Water pollution caused by oil or fuel leaks from equipment

The mitigation methods to reduce or prevent these impacts are described in Section 4 of this EMF.

4. ENVIRONMENTALMANAGEMENT ARRANGEMENTS

The overarching responsibility for implementation of sub-projects under the JDVRP, including management of environmental aspects, falls within the remit of the JSIF, the Executing Agency. The sub-projects will be implemented by entities such as the National Works Agency (NWA), National Environment and Planning Agency (NEPA), Office of Disaster Preparedness and Emergency Management (ODPEM), University of the West Indies (UWI), and the Ministry of Local Government and Community Development (MLGCD) through the Local Authorities (Parish Councils). The provisions of this EMF will apply regardless of the Implementing Agency, and JSIF will retain ultimate responsibility for the enforcement of good environmental management of all sub-projects. However, it is the obligation of the Implementing Agencies to ensure that works are executed in compliance with the necessary Laws and Regulations, as those Agencies would also be liable for non-conformances.

As outlined in Section 3, it is anticipated that the implementation of the civil works component of the project will potentially have some negative impacts on the environment. Consequently, a general set of procedures have been developed to manage and mitigate these impacts with a view to preserve the long term sustainability of the environment and minimize the adverse effects of the project on workers and beneficiaries of the interventions. These procedures are outlined below and shall be implemented by JSIF and made available to each of the Implementing Agencies.

4.1. Environmental Screening

Some site-specific issues may present serious project related environmental risks and/or impacts. The proposed sub-project types may have significant impact on the environment or the existing site condition may impact the sub-project negatively. For example, the implementation of a sub-project in close proximity to a river, wetland or protected forest could have potential impacts on unique natural habitat which affects endemic species of fauna or flora. Also, a site with high water table could cause flooding of sub-project if implemented or would have potential effect on the design and operation of sanitation systems such as soak-away pits or tile fields. In such cases alternatives should be considered or the project application should be rejected due to the unsuitable site conditions. The JSIF develop a site screening mechanism to identify sites that are potentially unsuitable due to site-specific environmental conditions.

In addition, the land on which a project is to be located must be zoned for that specific type project as stipulated in the NEPA requirements and relevant local planning legislation. In this context, the local authorities (Parish Council) has an important role to play, not only to review applications and issuing local planning permit, as required, but also in the review of the details of any proposed development facilities. This is important since the Parish Council is also expected to assist with the operation and maintenance of many of the proposed sub-projects under the JDVRP.

As well, some projects may exhibit complex environmental conditions or affect sensitive ecological habitat, such as mangroves, forests, river vegetation, shorelines, or coral reefs. Such projects merit further detailed investigation and

evaluation in order to compare alternatives and select the best option, and to design the most appropriate mitigation measures in the form of a site specific EMP. If a project is highly sensitive from the cultural or social perspective, it too can merit a similar analysis. In such cases an EIA would be necessary to assess the potential impacts, at a level of detail consistent with the scale of those potential impacts. The screening process described below would indicate whether such complex or sensitive conditions exist, and so guide the decision whether or not an EIA is needed. On the contrary, if conditions are fairly simple, the checklist and screening process below would indicate that this is the case, and a generic EMP could be relied upon to mitigate any fairly minor potential impacts. The generic EMP is described later in this EMF.

4.1.1. Screening Process

Each project will be screened by a JSIF Technical Officer (TO) and Social Officer (SO), early in the project cycle, to identify potential environmental impacts and social concerns, for example resettlement and land tenure issues, or the occurrence of sensitive ecological areas or zones of natural habitat. The TO and SO shall visit and conduct a site surveillance with support from residents and other stakeholders of the beneficiary community. The environmental screening checklist outlined below must be completed in Fund Manager (JSIF's MIS software) by the TO and submitted for approval by the Environmental Officer (EO). The TO use the information in **Table 1** above as a reference to make a preliminary decision whether or not an EIA should be prepared due to complex or sensitive conditions, whether a NEPA permit to construct and/or license to operate is warranted, or if any other legal or loan requirements need to be satisfied, and whether the project is eligible under the loan criteria. For example, if a project would trigger the Forests or Pest Management Policy (questions 36 or 37 respectively in Table 1), then it should be excluded from the JDVRP portfolio to avoid the need for restructuring the loan. If the checklist shows that a project exhibits complex conditions or affects sensitive habitat, JSIF will proceed with the preparation of an EIA.This decision must be confirmed by the JSIF EO after reviewing additional site specific information as detailed in the Form "Checklist for Screening Site Specific Issues".

4.1.2. Checklist for Screening for Site Specific Issues

This Form is to be prepared for all JSIF projects by the TO in consultation with community liaison officers and community representatives. The checklist is intended to identify fairly simple cases where a standard, generic EMP can be used for minor impacts, as compared to complex sensitive cases where additional work is needed to accurately and appropriately assess and mitigate potential impacts through an EIA.

Note: A "Yes" or "Do Not Know" response to any of the questions below warrants an investigation by the Environmental Officer (EO). One copy of this Form must be sent to the EO, prior to project application review and another copy must be attached to the project application.

Project Title: _____ Project Number: _____

Technical Officer: _____ Project Type: _____

Appraisal Officer: _____ Date: _____

#	ISSUES	Yes	No	Do Not Know
1	Is the project area zoned for the intended land use?			
2	Will the project use any vacant public land?			
3	Is the project located in an area with cultural properties such as archaeological, historical sites/monuments, religious structures, sacred groves and or cemeteries?			
4	Is the project located in an area of tourist importance?			
5	Is the project located in an area with cultural properties such as archaeological or historical? Is it located inside or within 1 km of a national park, a protected area, wilderness area, wetlands and or critical habitats or an area with endemic fauna or flora?			
6	Will the project involve hoarding?			
7	Will the project result in the removal of any trees (shade and fruit etc.) or land clearing during implementation?			

8	Will the project due to its nature and location change the existing environment in such a way that would result in the loss of farmland?			
9	Is the project area prone to flooding?			
10	Will the project involves extraction of groundwater or surface water supplies?			
11	Will the project involve sewage and/or waste water treatment solution?			
12	Does the project involve the sourcing of aggregate material?			
13	Does the project have the potential to impact the drainage pattern of the area?			
14	Is the project located in a polluted or contaminated area and/or close to a waste dump?			
15	Will the project involve the use of hazardous materials e.g. chemicals, solvents, poisonous or explosive gases?			
16	Will the project involve any build –up or accumulation of waste from project activities?			
17	Will the project produce any unsafe physical conditions for workers such as poor sanitation, excavation, working from height and working with heavy equipment, etc.?			
18	Is the project located in an area of steep slope and or susceptible to landslides or erosion of topsoil?			
19	Will the project result in the release of dust to the environment?			
20	Will the project result in the production of noxious gases or odor?			
21	Will the project generate noise? If so are there sensitive noise receptors nearby (homes, schools, hospitals)?			
22	Will the project impact the travel patterns of persons within the community?			
23	Will the project create a cleaner and safer environment for members of the community?			
24	Upon completion will the project provide an option for recreation?			
25	Will the project positively impact the aesthetics of the area?			

26	Will the project result in the displacement of persons or affect the livelihood of persons negatively?			
27	Will the project involves the construction or rehabilitation of a processing facility?			
28	Will the project involve construction on major road and bridge network?			
29	Will the project cause obstruction of regular traffic flow?			
30	Will the project involve any effects to the coastal or marine environments?			
31	Will the project pose a risk of contamination of aquatic or coastal ecosystems from discharge of pollutants e.g. as petroleum products, or physical damage to reefs or other sensitive ecosystems e.g. by clouding of waters by dredge spoil?			
32	Will the project present a high risk of human exposure to pathogens, such as mosquito-borne or water-borne diseases?			
33	Will the project involve the transportation of large boulders on the public main road network?			
34	Will the project involve dredging of water bodies or excavation of wet materials in river or coastal areas?			
35	Will the project involve onsite storage of pollutants such as petroleum products?			
36	Will the project change the use or management of forest resources?			
37	Will the project require the purchase or use of pest control agents or bioactive compounds, such as pesticides, herbicides, fungicides, pharmaceuticals, or hormones?			
38	Will the project create hazardous driving conditions e.g. detours, missing bridges, lack of shoulders on roadways, heavy equipment crossings, piles of stones on roads, etc.?			
39	Will the project affect a building or structure of aesthetic importance to the surrounding community?			
40	Will the project affect the angle or strength of waves reaching shore, the movement of sand near beaches, the movement of tidal waters, or other			

	coastal/marine aspects?			
41	Will the project involve the generation and/or storage of hazard material including waste?			
42	Will the project substantially degrade water quality?			
43	Will the project create significant hazard to the public or environment through the use or disposal of hazardous material?			
44	Will the project have a substantial adverse effect, either directly or through habitat modifications, on any species Identified as a sensitive or endemic species?			
45	Will the project have a substantial adverse effect on any habitat or other sensitive natural community identified in local, regional or national and policies?			
46	Will the project interfere substantially with the movement of any native, resident or migratory fish or wildlife species?			
47	Will the project create or contribute runoff water that would exceed the capacity of existing or planned storm-water drainage systems or provide substantial additional sources of polluted runoff?			
48	Will the project impact any adjacent homes or building adjacent?			
49	Will the project cause temporary or permanent displacement of resident?			
50	**General Comments:**			

Signed by Project Officer: ……
Name: _____
Date: _____

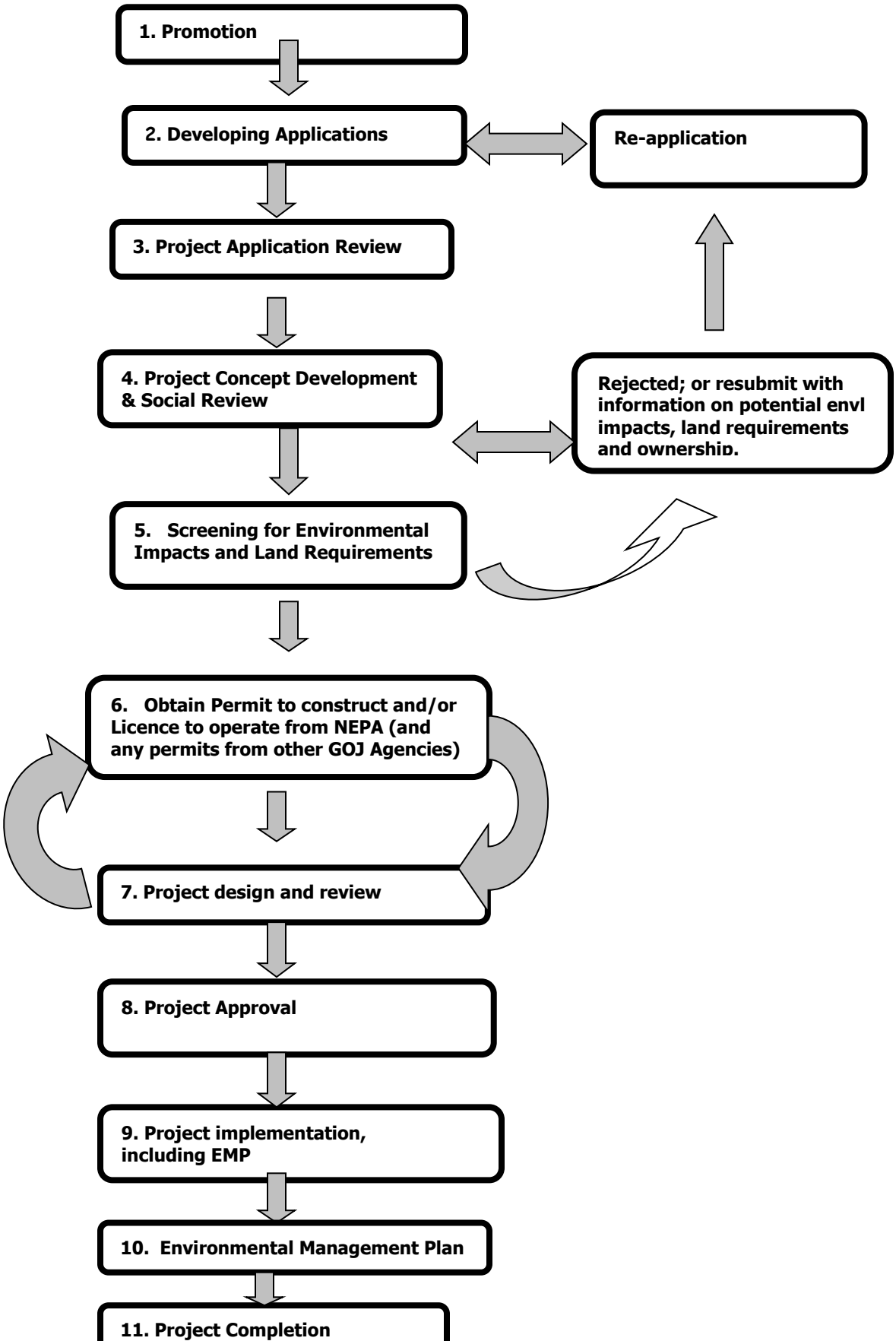
Signed by Community Representative: ……....
Name: _____
Date: _____

Approved by EO: …… Generic EMP sufficient (Y/N): _____
Name: _____ EIA Required (Y/N): _____
Date: _____ NEPA Env. Permit Required (Y/N): _____

* Note that projects which would trigger Forest or Pest Management policies are not eligible for financing under the JVDRP.

Figure 1 below further shows how the screening and implementation of mitigation measures are integrated with the JSIF project cycle.

Figure 1: Integration of Screening with JSIF Project Cycle



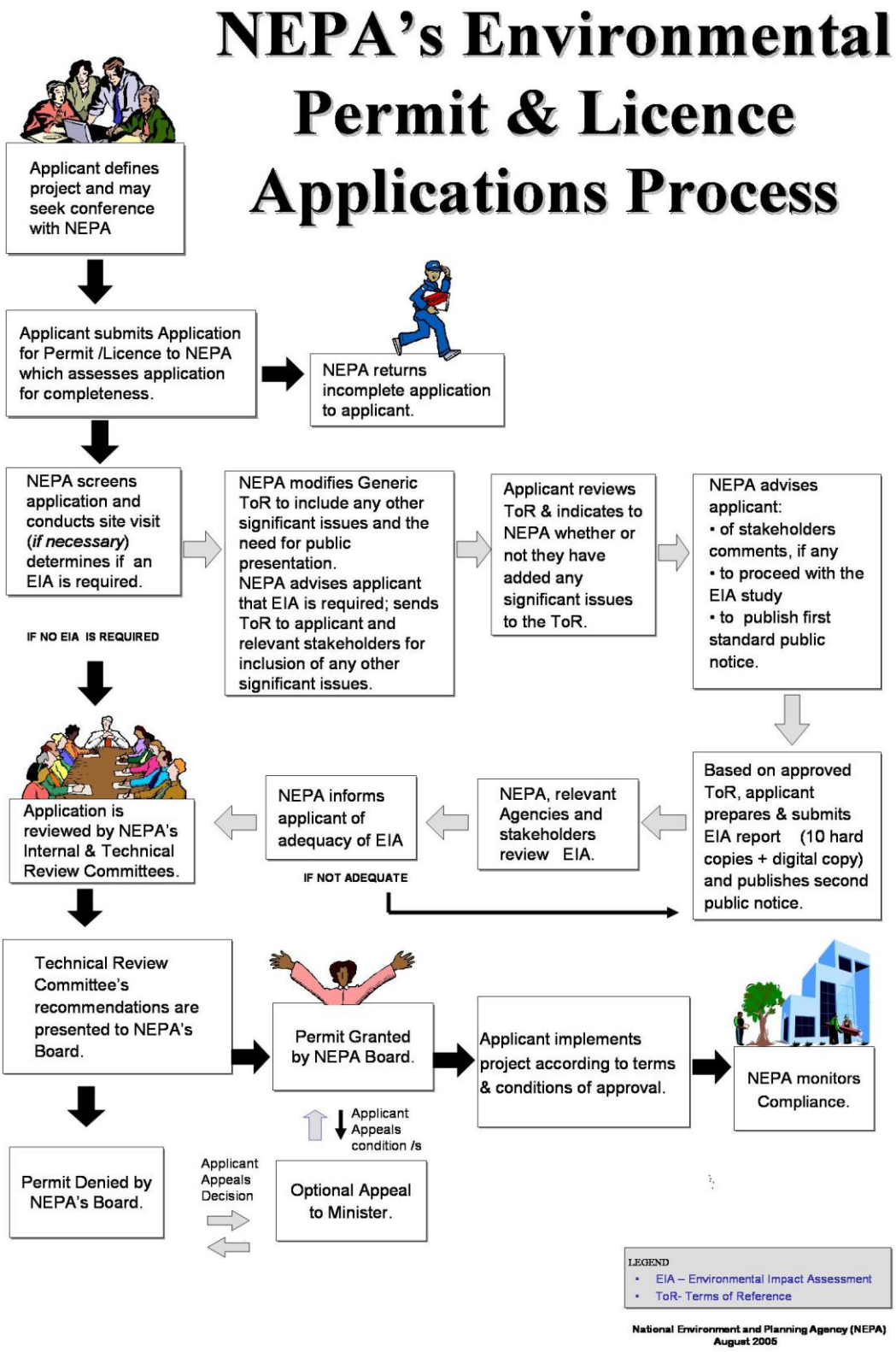
4.1.3. Implementing NEPA Requirements

Based on the results of the screening, JSIF staff (Project Officer in consultation with Environment Officer) will determine if a generic EMP is sufficient, or whether an EIA is also required. If it is necessary to prepare the necessary application to NEPA for a permit (and licence to discharge, where applicable), then the application requires the submission of a detailed Project Information Form (PIF). NEPA reviews the application and determines whether (i) a full Environmental Impact Assessment must be prepared before a permit is issued, or (ii) a permit is issued by NEPA with or without Terms & Conditions. See **Figure 2** for the detailed flow diagram of NEPA's environmental permit application process. If needed, JSIF proceeds with the preparation of a full EIA, using the TOR from NEPA and with the no-objection of the World Bank.

Once NEPA has issued a permit to construct, JSIF makes sure that all terms and conditions, and any requirements resulting from a full EIA, where applicable, are fully integrated into the design and the contract documents of the specific project. Depending on the nature of NEPA requirements, this may be done through an alternative design, special design features or modifications, an EMP, special contract clauses.

NEPA may also require special monitoring and reporting actions, and normally will carry out periodic monitoring of the implementation of the project to make sure the requirements are being met. World Bank will also make periodic supervision visits to support the implementation of project environmental requirements.

Figure 2: Flow Diagram of Environmental Permit Application Process (Source: NEPA)



4.1.4. Project Design and Technical Review

All sub-project design must be formulated by a qualified and competent individual or company. The project design must address environmental issues identified during screening and take into consideration measures recommended by NEPA as a condition of the permit. The formulator shall present the project design to the JSIF's Technical Review Committee (TRC) for a comprehensive assessment of the technical and environmental soundness. Upon approval by the TRC, the project design will be uploaded into Fund Manager and the Document Management System. Following TRC approval, the project will also be assessed by the Project Management Review Committee and the JSIF Board of Directors prior to final approval for implementation.

4.1.5. Implementing EMP Requirements

The civil works sub-projects proposed to be financed by JSIF under the JDVRP are categorized into four broad groups as follows:

- Construction of new and/or retrofitting of existing buildings (schools, fire stations, public buildings and police stations, including the provision of on-site water supply and sanitation services)
- Construction of new and/or retrofitting of major and parochial bridges, including supporting activities such as slope stabilization and landslide risk control, river training, and road rehabilitation.
- Construction of new and/or rehabilitation of existing urban drainage systems.
- Planning, design and construction of new coastal defence systems.
- Installation and retrofitting of seismometers.

A standard generic EMP has been prepared to include mitigation measures for each of the categories listed above, based on the expected likely environmental impacts during the construction phase (see **Appendix 3** for the generic EMP by infrastructure category). Further to the results of the project screening, the applicable EMP must be incorporated into the bidding and contract documents for the contractors procured to implement the project. Some projects may have

additional requirements for mitigating and monitoring in response to issues identified during site screening, which shall also be specified in the contract documents. (If a permit to construct was received from NEPA, then the generic mitigation measures and monitoring requirements should be amended to include the general and specific terms and conditions issued by NEPA; or, if an EIA is required, the resulting recommended mitigation measures from the EIA will be incorporated into the EMP for the works, and included in the contract documents.)

4.1.6. Environmental Requirements in the Construction Contracts

Volume II (Technical Specifications) of the construction contract documents contain, in Part H, technical clauses on "Environmental Mitigation and Health & Safety"; including a section on how the contractor shall deal with chance finds of cultural property and archaeological remains. Based on the screening results and depending on the type of infrastructure works to be executed, the JSIF Project Officer, in consultation with EO, must prepare a list of measures to mitigate potential adverse impacts. These would include terms and conditions mentioned in NEPA's permit to construct or license to operate, including any specific measures from an EIA if one has been prepared for the subproject, and the relevant generic EMP (from Table 3) supplemented by any additional site specific measures, if required. These measures must be attached to Part H of the contract specifications.

A clause in the Particular Conditions of Contract will refer to these environmental management requirements in the EMP and will state that it is a supplement to Part H of the Specifications. The Particular Conditions of Contract will also stipulate that any non-compliance with the mitigation measures set out in the contract will attract the same remedies under the contract as any non-compliance with the contract provisions; such remedies would be instructions, notices, suspension of work, etc. The Instructions to Bidders will highlight the inclusion of the EMP in the contract specifications and the contractor's obligation of compliance.

4.1.7. Managing Other Potential Impacts

In addition to the above, projects that require conversion of any natural habitats should be evaluated to ensure compliance with the World Bank Operational Policy on Natural Habitats. In the JDVRP project it is expected that such cases would be restricted to sensitive or ecologically important areas near bridge works, in coastal zones, or in

marine areas; and, that an EIA will have been conducted for these zones to provide the specific measures to address each case.

The JDVRP project will exclude any activity that involves the purchase of biological control agents. A screening checklist and Pesticide Management Plan including non-chemical measures for pest management and guidelines for proper selection, application, storage, handling, transport and disposal of pesticides has been developed for projects that may require procurement of pesticides or that result in the increased use of pesticides. Considering the nature activities to be implemented under this project, large scale use of pesticides is not anticipated. Incidental pesticide issue will be managed with the standard pesticide management plan, for example using only registered licensed pest control operators for termite treatments in buildings.

Another potential impact may be chance finds of physical cultural property. Site screening may indicate that the project site is in, or close to, an area with and important cultural property. The Jamaica National Heritage Trust (JNHT), under the provisions of the JNHT Act, may enter a property or site to investigate impacts on cultural properties. If there is a chance find of archaeological or cultural value the JNHT has a right to protect that find and may issue an emergency Preservation Order covering sites and buildings considered to be potentially archeologically important or significant.

The central area of Spanish Town in the Parish of St. Catherine is a declared Historic District and the JNHT has the right to stop any works in that area that may prove destructive to archaeological monuments or cultural property. Certain parts of downtown Kingston may soon be similarly protected. If any chance find artefacts are found during project works the JNHT may need to perform Rescue Archaeology in order to secure and preserve these artefacts. This may require the temporary cessation of certain project activities to facilitate JNHT procedures. The contract specifications in Part H, Section 1.6 contain a clause that sets out the required actions for the contractor to comply with the requirements of the JNHT Act to protect any chance finds of cultural property[3].

Local input will be solicited as to the appearance or disposition of buildings or structures with cultural, aesthetic, or historic value to the community. This type of community engagement is important to the image and success of any project. Additional information appears in the section below.

4.1.8. Consultation and Disclosure Management

[3]This provision will also satisfy the requirements of the policies on cultural property by the various development partners, such as the World Bank's, as set out in the draft OP 4.11 on Physical Cultural Property.

It is JSIF's mission to empower communities to effectively implement community-based programs aimed at social development. JSIF's Operational Manual (OM) prescribes a project preparation and implementation process that involves participation of the project community at all keys steps. This participatory process facilitates the consideration of environmental aspects as it integrates into the project cycle disclosure of project information to, and consultation with, the community.

For JDVRP projects such as bridge works and urban drainage works, there is a minimum level required for community consultation; however, engagement with the local residents is paramount for project success, particularly as regards the preparation of a traffic management strategy, the selecting of detours and routing when road closures are necessary, and the advisement of when heavy machinery may be entering and exiting neighbourhoods and thoroughfares. Attention to public concerns such as dust or noise will be required, with a meaningful and effective mechanism to receive and resolve complaints.

This EMF was also subject to public disclosure and consultation, in accordance with World Bank policy OP/BP 4.01. In the development of the EMF, comments were solicited from stakeholders by invitation to a JDVRP institutional workshop on January 22, 2015 at the Terra Nova Hotel in Kingston. The attendees included relevant agencies, NGOs, and interested parties, as shown in Appendix 4. The comments received were incorporated in the drafting of the EMF. The draft EMF was published March 25, 2015 on the JSIF website and on World Bank's Infoshop. Further comments were solicited specifically from the NEPA, ODPEM, NWA and PIOJ via e-mail. The final version of the EMF included revisions to include these comments.

The consultation and disclosure requirements specific to individual subproject within the JDVRP envelope are described below.

Retrofit and rehabilitation of seismic stations will most likely occur in remote areas that are not publicly accessible; therefore, little effect on public perception is likely to occur, and the need for public input is minimal. However, if there is a need to improve access to any of the facilities, road work may be required and the measures outlined above (for bridges and urban drainages) would be appropriate.

Rehabilitation or construction of fire stations and schools are project that are more community-intensive. These buildings may serve as emergency response centres or shelters, and may directly affect the communities long after the physical works are completed. Structures are often of aesthetic, historical or cultural importance, and may form the focal point of a community. These types of projects require strong management of social aspects and intensive community consultation. The following

matrix shows the key environment-related consultation and disclosure actions during project preparation and implementation of these types of projects, and the outputs or results of these actions.

Step in Project Cycle as per Operations Manual	**Actions for Screening and Social Management**	**Output / Results**
Promotion[4]	• JSIF / community leaders to publicize intention to apply for project funding[4]	• There is adequate awareness in the community about the project
Developing project application[4]	• JSIF to hold community-wide consultation on local priorities and needs[4] • Community to participate and contribute	• Local and specific environmental concerns and constraints are considered
Project Concept Development	• Wide cross-section of community to participate in site screening process	• Alternatives have been considered and environmental feasibility is ascertained
Project Design and Review	• JSIF to publicly display designs for min. 2 weeks • Community reviews designs and "signs off"	• Ensures that designs are environmentally appropriate, among other criteria
Project Implementation (after contract award and signing)	• JSIF to arrange for sign board providing project details • JSIF to organize Project Information Meeting held in and with community	• Information on contract and contractor is disclosed • Community is made aware of its role in implementation • Community has channel

[4]This step and the corresponding actions are not needed when a community has been selected for a project, as will be the case with the Jamaica Disaster Vulnerability Reduction Project. However community sensitization will be conducted by JSIF and the implementing agencies.

	• Community to attend and participate actively • JSIF to establish Project Steering Committee (PSC) • Implementing Agencies with the support of the Community to monitor work and progress of contractor • JSIF and community to participate actively in PSC meetings • JSIF will have full oversight of all sub-projects and will perform regular monitoring and reporting.	for providing feed-back • Community makes sure that EMPs are complied with
Project Completion	• Community to set up maintenance committee • JSIF and partner agencies to assist community with O&M	• Continuing maintenance, including environmental aspects, is ensured

Coastal defence works will require a different approach to consultation and community engagement. During the planning and design phase, extensive community involvement is required to identify stakeholders, understand their concerns, and incorporate these ideas into the alternatives for action. Typically this is done as part of an environmental impact assessment (EIA) as may be required by NEPA along with requirements for public disclosure and consultation. This level of community interaction is also required by the World Bank for EIA studies. In the JDVRP project the coastal studies will also be of great economic importance to artisanal fishermen, the tourism industry, and other local interests, thus heightening the importance of social engagement in their feasibility studies, design, planning, and implementation. It is expected that the TORs for EIAs will include project specific plans for public disclosure and consultation, similar to the matrix above but customized for each particular case.

Finally it should be noted that any EIA will also require public consultation under Jamaican law (see section 4.1.3) as well as World Bank Policy. These sorts of consultations would occur once the details of a project are fully known, and will give the public a chance to comment upon and improve the designs.

4.1.9. Monitoring and Reporting

An implementation monitoring system has been established by the JSIF to ensure that projects are adequately supervised with a view to minimize environmental impacts. The monitoring system has several layers including the TOs, consultants, EO, internal auditors, and external auditors. The TOs will be required to visit each project site once every two weeks while the respective Implementing Agency or consultant must visit the site at least twice every week. The Technical Officer will complete an environmental monitoring report in Fund Manager for every site visit for which a Contractor Environmental Management Conformance report will be generated automatically. This report can be used to guide management decisions with respect to the contractors' suitability to continue the existing contract and to secure future contracts.

Internal and external auditing is a standard requirement for the maintenance of the JSIF ISO 14001 certification. The internal and external auditors will visit sites randomly usually once per year. A report detailing the performance of the EMS in respect of the ISO 14001 Standards is prepared for each audit. The EO will visit project sites at least twice during implementation and if and when environmental issues arise. A site monitoring report will be completed for each site visit.

Annex 1 contains additional guidance for detailed steps in good environmental management, specifically for the design and operational (O&M) phase.

JSIF Board and Management will have the main responsibility for monitoring the application and use of this EMF. For this purpose the EO will prepare quarterly and annual reports on the key steps, outputs and results of the environmental management actions taken for all projects throughout the project cycle. Problems and issues arising during the use of the EMF will be flagged and brought to the attention of the JSIF Management for action. Copies of the annual EM reports

will also be sent to the World Bank. The Bank will also review these reports during the periodic supervision missions.

JSIF's management information system (MIS) will be used to track the key steps in the environmental management system and to generate the necessary reports for the JSIF Board and Management. The following steps will be monitored for all projects:

Stage in Project Cycle	Action	Result / Outcome
Project Concept Development	Site Screening	Acceptance
		Rejection
Project Appraisal	Project Screening	NEPA Environmental Permit Required
		EMP Required
		None
Project Implementation	NEPA Env'l Permit	With full EIA
		With terms and conditions
	EMP	Included with contract
	EMP implemented	With problems or issues
		With complaints
		With residual impacts
Operation	Maintenance Plan	Environmental Requirements

5.0 TRAINING AND CAPACITY-BUILDING

JSIF has designated a full-time EO and an alternate for back-up and support. The designated alternate EO is JSIF's Legal Officer; this provides a very good complement to the environmental qualifications and experience of the staff who is the main EO.

Although the designated JSIF environmental staff have good knowledge and experience with Jamaican national regulatory requirements, they need some specific training in the policy areas of environmental assessment (and also in land acquisition and involuntary resettlement) as applied by international and bilateral development partners, such as the World Bank, the IADB, USAID, EU, CIDA, DfID, etc. who are all active in Jamaica[5]. The

[5]Both this EMF, and a Land Acquisition and Resettlement Policy Framework that has been prepared in parallel, are in part based on the international approaches and standards.

World Bank will assist to identify appropriate external training opportunities for the EO[6]. Suitable national training should also be part of the capacity building of the EO and alternate EO.

The designated senior EO is also responsible for the organization and provision of training sessions in environmental screening and environmental management for JSIF project officers, field supervision staff, the community liaison officers and selected community representatives. EO staff shall prepare a training plan and training modules for project officers, field supervision staff, and community liaison officers (CLOs) to familiarize them with the principles and procedures as set out in this framework. Project officers and CLOs, supported by the EO, will be responsible for training community representatives.

Any funding for overseas training and capacity-building shall be provided under the project management component of the JDVRP. The funding for routine training of staff by the EO shall be built into JSIF's annual budget. Only marginal cost implications are expected in this context since environmental training of field staff and community workers shall be integrated with the other training aspects.

[6]It may be possible to combine any external EA training with training in Involuntary Resettlement that is offered periodically by the World Bank Institute.

Appendix 1 – Jamaica Social Investment Fund Environmental Guidelines

1.0 The Environmental Impact of JDVRP Sub-projects

Positive

There are a number of potential positive impacts of the sub-projects to the physical environmental in the communities in which they are situated as well as nationally. In keeping with principles of sustainable development and holistic planning where the environment is defined as the physical, biological, social and economic factors of life, the projects will have the effect of:

i. Eliminating environmental safety hazards from deteriorating structures
ii. Improving environmental health through water, sanitation and health infrastructure
iii. The creation of temporary and permanent employment opportunities and long-term income generation
iv. The provision of social services that were previously not available
v. Improved learning environments and access to education and non-formal training
vi. Improved living conditions in poor communities
vii. Improving access to population center and social amenities by the upgrading and provision of access bridges and roads.
viii. Improving resilience of communities to disaster risk and enhancing capacity to adapt to climate change.
ix. Increasing the Country's capacity to respond to hazards.
x. Preservation of natural resources and ecosystems
xi. Improving protection of the Country's productive assets, value chains, and connective network; which ultimately will facilitate sustained economic growth and development.

Negative

Most of the negative impacts associated with Sub-projects are likely to occur during construction and rehabilitative works on roads, buildings, drainage, water and sanitation projects and where designs are inadequate. These tend to be minor and are easily identified and mitigated and determination of these potential impact forms and integral part of the analysis of the technical feasibility of the projects. In keeping with

the principles of technical and environmental soundness however, adequate technical review, through peer review and using technical advisors, must take place to ensure adequacy of designs.

Negative impacts will also occur during operation particularly with relation to disposal of solid and sewage waste, where there is improper operational and maintenance procedures in place. These issues must also be factored into the technical analysis of the projects at the design phase.

Even with adequate planning and design, there are risks of impacts during implementation where guidelines are not followed at a supervisory level. All contracts and Terms of Reference for formulators, supervisors and contractors must therefore clearly show deliverables with the relation to implementation of mandated environmental procedures. Potential impacts include:

i. Unnecessary removal of vegetation cover
ii. Creation of soil slippage and soil erosion conditions from excavation and inappropriate placing of excavated matter on slopes
iii. Blockage of drains from construction waste and excavated materials
iv. Water contamination during construction on all project types or during operation of inadequate sewage facilities
v. Excessive run-off where drainage on roads and off buildings is inadequate.
vi. Inappropriate disposal of solid waste
vii. Interruption of vehicular and pedestrian traffic flow or access to amenities.

2.0 General Guidance for Infrastructure Projects

I. Project Design

1. The project must be designed to minimize tree taking and damaging. When the project will result in clearing of land or cutting trees, at least the same number of trees must be replanted on or near the facility.

2. **Site Selection**

   The land on which a building is to be located must comply with the zoning requirements of the National Environmental Planning Agency and relevant planning legislation. It must also be well drained, aesthetically landscaped and

secure, especially if very small children are involved. All relevant permits and no objections from relevant agencies must be obtained.

(i) In rehabilitation projects, when an existing building does not comply with the guideline above. Rehabilitation must, whenever possible include drainage, security and landscape of the area as well as the building itself and testing for hazardous materials such as asbestos and lead;

(ii) In rehabilitation projects, when an existing building is located on unsuitable land, the JSIF shall not approve the project. The following are considered to be unsuitable lands:

(a) land resulted from fill up with any refuse matter that is contaminated by human or animal excreta or any other hazardous material;
(b) wetlands and flood plains;
(c) Protected Areas where approval has not been obtained
(d) Steep (more than 30% declivity) and unstable slopes susceptible to slippage.

3. Any road rehabilitation project must comply with the minimum technical standards of the relevant Parish authority to which the road will be handed over to and required no objections obtained.

4. In rehabilitation/expansion or construction projects the technical and financial feasibility of using traditional architecture and simple technologies and materials must be assessed, and simple, traditional style and materials adopted when suitable. A comparative assessment of environmentally friendly materials and techniques should also be adopted where suitable, based on comparisons of techniques and long-term cost-benefit analysis. This applies to any building, road, water and sanitation project.

5. All buildings should be well designed to provide security and at the same time to be attractive and well ventilated and make best use of natural lighting.

6. Adequate space and facilities for recreation inside and outside of a school must be designed accordingly and whenever possible, budget for its construction must be ensured in the project.

7. <u>Sanitary Systems</u>

Appropriate sanitation systems must be designed and installed; proper disposal systems must be functioning: it must also be determined if there is a need to provide training in environmental awareness to users[7].

(i) Sanitary facilities must be suitable to the local and ground conditions.

(ii) Sanitary facilities must be provided in sufficient number

(iii) In order to avoid surface water contamination, when public facilities for sewage treatment are not provided, effluent should not be discharged into surface waters without adequate treatment: to avoid ground water contamination, effluent must be treated in a septic tank (minimum efficiency of 70% reduction of BOD); the absorption tank is not efficient in preventing groundwater contamination.

(iv) The site where the sanitary facility is to be installed must have a low water table.

(v) If sanitary facilities use alternative technologies such as Ventilated Improved Pits (VIP) latrines and others, it must be located at least 15 meters from existing buildings and houses, in the opposite direction of the prevailing winds, to prevent odours and undesirable impacts.

(vi) When an external latrine vent pipe exists, it must be located at the sunny side of the latrine and painted black, to produce an updraft, due to the heating of the air inside the vent: an external cover at the top of the vent pipe will prevent flies and mosquitoes from coming out the vent and therefore will reduce the risk of contamination.

(vii) All required approval and permits must be obtained and the relevant agencies (NWC, NEPA etc.) informed and involved in the development of the project

8. Adequate water supply must be provided:

[7] Awareness by users of sanitary systems is required whenever new systems are installed which are different from the ones they are used to. This is particularly needed when flushing toilets are introduced to new users. In many cases it has been reported that flush toilets were used to grow plants because new users did not get accustomed to using them.

(i) Adequate structures for water storage must be provided.

(ii) Rainwater can be collected, stored and used for sanitary facilities.

(iii) The storage structure must be located (about 25 meters) from, the absorption tank, septic tank or other similar facility, and upstream the direction of the water table flow[8].

9. <u>Hazard Mitigation</u>

(i) **Fire Control:** Safety precautions against fire must be assessed, implemented, documented and functional at all times and water supply for fire hoses must be secured. Note that:

(a) Evacuation and fire extinguishing procedures must be approved by the fire department or a similar institution.

(b) Fire disaster preparedness should be addressed in organisational strengthening exercises and in maintenance training.

(ii) **Natural disaster mitigation:** The design of all infrastructure projects must accommodate the potential occurrence of a natural disaster and as such include the necessary mitigation measures to ensure minimum damage from disaster events. This includes but not exclusive to:

(a) Earthquake mitigation: Designs must uphold the minimum building standards recommended for Jamaica as indicated by the Building Code.

(b) Storm mitigation: This includes heavy rain, storm surges, tropical storms, hurricanes mitigation measures for strong winds and high levels of precipitation and runoff. Road and building designs must therefore have adequate drainage measures and buildings and other structures must maintain the minimum standards under the Building Code for wind resistance.

[8] If the storage facility is underground it can be contaminated by groundwater contaminated with effluent or by effluent directly, in case an absorption tank is located nearby.

(iii) **Safety:** Care must be taken to ensure that designs promote a safe work site and safe operation of the facility. The following must be considered:

(a) Materials: No toxic paints or construction materials (e.g., lead-based paints, amianthus, asbestos) may be used within the buildings or on water supply projects

(b) Site Safety: Designs must factor in terrain and other potential areas of danger that my lead to an unsafe work site. Where there is potential for danger on a site, cautions and recommendations for safe implementation must be outlined.

II. Construction

10. Dust and noise during construction works should be minimised:

(i) In residential areas, if works are conducted in the dry season, the contractor must water the exposed area and construction materials either stored or transported must be covered to avoid particulate matter to be blown by the wind.

(ii) Communities must be given adequate notice of intended construction and potential for dust and blockage of access to roads or community facilities during construction.

(iii) When sand is used to fill in land or to level a site it must be capped with clay turf, whenever possible. If this solution is not viable, spraying the area with water can minimize dust blown by the wind.

(iv) Construction work must be limited to daylight hours, from approximately 6:00 am to 8:00 pm, or according to local or specific regulations.

(v) Blasting to break up rocks will be conducted during daylight and residents will be advised when blasting will occur. The local regulatory authority should certify the person conducting this activity.

11. Adequate measures for preventing siltation of watercourses by run-off must be implemented, such as silt screens and straw devices, among others.

12. Safety measures must be taken to prevent accidents involving workers and members of the community.

13. Clearing of trees and other vegetation must be minimal.

14. All waste must be disposed of in environmentally sound ways and at dumpsites approved by the relevant Parks and Markets Authority.

15. All sewage disposal facilities are required to be adequate and fully functional and the end of construction.

16. Penalties are to be instituted for breach of guidelines mandated by JSIF.

III. Operation and Maintenance

17. Sanitary Facilities:

(i) Environmental awareness and maintenance training to users will beprovided on all sanitation projects.

(ii) Latrine pits, absorption tanks or septic tanks must be cleaned regularly, according to JSIF's Operation and Maintenance Manual for infrastructure project. Where technologies such as bio-digesters or composting toilets are being used, specific training must take place to ensure on-going functioning of these systems.

18. Solid Waste Management:

a. Solid waste will be collected and disposed of in an appropriate manner and on a regular basis, according to the JSIF's Operation and Maintenance Manual for infrastructure projects.

b. Wastes must be stored in a covered garbage storage unit, designed in accordance to current NEPA guidelines and protected from the access by animals.

c. When appropriate landfill is not provided by the local government or the sponsor community, the JSIF will develop a waste management manual provide the sponsor community with (which will become part of the Operation and Maintenance Manual). This manual will include self-sustained waste management plans that include alternative solutions for adequate disposal of organic wastes and garbage, and potential uses for recycled materials, waste collection campaigns and other environmental

awareness activities to be developed with the students and the community9.

19. <u>Buildings and other physical structures:</u>

a. Maintenance training must be done with users to ensure care of the structure and avoidance of physical danger due to deterioration or lack of maintenance, particularly in the case of schools, community centres, water supplies and small bridges.

2.0 Specific Guidelines by Project Sub-type

All Project Sub-types assume the General Guidelines in addition to the type-specific guidelines listed below and the procedure required during each stage of the Project Cycle as outlined in Section 4.0.

1. <u>Roads</u>

Design Phase

1. Roads must be designed and constructed so that they do not impede the free flow of intervening water ways:

   (i) At design phase, the grade of road must be established above the level of the existing drains.

   (ii) In case the existing road crosses a waterway, the design for rehabilitation must include culverts to allow the free flow of water. Size of culverts must be designed to accommodate a 30-year storm event.

2. Capped and uncapped roads must be designed and constructed so that water does not stand over long periods either on the road (in surface depressions) or at the sides or base.

   (i) In case the size of the existing drains are not sufficient to ensure free water flow of a 30 year storm event, their enlargement must be included in the rehabilitation design;

   (ii) If existing drains are blocked by vegetation or silt, clearing must be included in the rehabilitation project.

[9]Burning or, covering with earth are common practice for waste disposal in rural areas. The appropriate alternative will be provided in the JSIF Operation & Maintenance Manual.

3. Bridges design must include re-vegetation of shoulders using native vegetation to reduce erosion.

4. The shoulder declivity must be designed according to the soil characteristics.

Construction Phase

5. Construction works must comply with the JSIF's General Environmental Guidelines and implemented using JSIF's Environmental Handbook for Construction Supervision and monitoring and must ensure the following:

    (i) Defined grades must be correctly set in place

    (ii) No depressions must be left in the surface of the road.

    (iii) Drains must be unblocked and correctly sized, as in the project design.

6. Erosion control measures must be implemented accordingly to project design:

    (i) Exposed road shoulders must be vegetated early with native species, appropriate to the site to reduce the impact of raindrop erosion.

    (ii) Erosion (silt/sediment) barriers must be in place and functional throughout construction.

7. There must be a satisfactory system of regular collection and disposal of waste and garbage; during construction works the contractor must ensure that:

    (i) Materials are stored in such a way that will not be carried by rains and/or run-off waters into the drains

    (ii) Garbage and construction wastes are collected and disposed in appropriate sites in a way that ensure that they will not be carried into the drains or discharged into wetlands or in sensitive vegetation communities;

    (iii) Measures are implemented to avoid spills of lubricants, fuels and other chemicals, and in the event of an accidental spill, clean up is clone immediately

    (iv) After construction works are concluded the contractor must clear the area from all equipment, machines and wastes (liquids or solid)

(v) Whenever the sponsoring community does not provide an adequate site for waste disposal, the contractor shall follow the guidelines JSIF' will develop for waste disposal

Operation and Maintenance

8. Operations and Maintenance should follow JSIF's Operational and Maintenance Manual for Infrastructure Projects. Particular attention needs to be paid to:

   i. Erosion control

   ii. Drainage

   iii. Clearing and mitigating against land-slippage (within the capabilities of the community e.g. minor retaining walls, major works are the responsibility of the relevant authority.

2. <u>Infirmaries, Health Centres and Similar Facilities</u>

Project Design

1. Ministry of Health Standards for Design of Type 1 and 2 Health Centres must be applied to all JSIF Health Centre projects
2. Optimum sanitation must be maintained at all times. Cleanliness of utensils and equipment is paramount:

   (i) Water supply facilities must include running water. When public water supply is not available on site, the project must consider, whenever technical and economically feasible, drilling a well or other alternative to provide potable water to the centre, including storage of rain water and roof drain water.

   (ii) When public water supply is not available and no other alternative is technically and economically feasible, the JSIF must consider not financing the project.

   (iii) Medical wastes must be disposed though approved Ministry of Health facilities or techniques.

Construction Phase

3. Construction works must comply with the JSIF's General Environmental Guidelines and implemented using JSIF's Environmental Handbook for Construction Supervision and Monitoring.

Operation and Maintenance

4. Operations and Maintenance should follow JSIF's Operational and Maintenance Manual for Infrastructure Projects. Particular attention needs to be paid to:
   i. Maintenance of ventilation i.e. functioning secure windows.
   ii. Pest control – particularly in bathrooms and kitchen/dining areas.
   iii. Landscaping – ensuring safe, aesthetically pleasing surroundings.
   iv. Disaster preparedness – for hurricanes, flooding and fire.
   v. Waste disposal – safe disposal of medical and other wastes.

3. <u>Sanitary Facilities (latrines)</u>

Site Selection and Project Design

1. Pit 1atrines should be avoided due to (i) odour and insect (flies and mosquitoes) problems; (ii) risks of contamination by pathogens (virus, protozoa and helminths) transmitted by excreta; (iii) risk of small children falling into pits; (iv) where the water table is high
2. Pit latrines with adequately designed septic tanks and absorption pits are recommended when there is (i) inadequate water supply to support water closets (ii) where soil absorption rates ensure proper and safe diffusion of waste water (iii) where there is no potential for contamination of ground water supplies.
3. Other alternative sanitation technologies, such as ventilated improved latrines (VIP latrines), should be considered appropriate only when flushing toilets are not technically and economically feasible.
4. The sanitary facility must be installed in a site that (i) has a low water table (ii) is located downstr

Construction Phase

5. Construction works must comply with the JSIF's General Environmental Guidelines and JSIF's Environmental Handbook for Construction Supervision and monitoring.

Operation and Maintenance

6. Operation & maintenance must comply with the General guidelines presented as well as with JSIF's Manual for Operation and Maintenance of Infrastructure Projects.

4. Sanitary Facilities (community showers)

Site selection and project design

1. Before the sanitary facility is designed it must be ensured that the site where it is to be installed is located downstream any water body source.
2. Community showers must be located at least 15 meters from existing buildings and houses.
3. The community shower must be installed inside a well-ventilated and well-drained super structure.
4. The area surrounding the superstructure must be adequately landscaped, secure and well drained.
5. The size and number of showers must comply with JSIF's design guidelines

Construction Phase

6. Construction works must comply with the JSIF's General Environmental Guidelines and JSIF's Environmental Handbook for Construction supervision and Monitoring.

Operation and Maintenance

7. Operations and Maintenance should follow JSIF's Operational and Maintenance Manual for Infrastructure Projects. Particular attention needs to be paid to:
    a. Maintenance of plumbing and water supply
    b. Cleanliness of facility
    c. Maintenance of security measures

5. Drainage

Project Design

1. Project design must follow the general guidelines as well as the specified procedures outlines for appraisal of projects in Section 4.0.

Construction Phase

2. Construction works must comply with the JSIF's General Environmental Guidelines and JSIF's Environmental Handbook for Construction Supervision and Monitoring.
3. Vegetation and silt materials recovered from dredging must be securely, disposed, in order to avoid being brought back to canals and drains, by runoff and rains.
4. During dredging, unauthorised persons must be prevented from approaching working areas by the installation of protecting devices, in order to avoid or minimise risks of accidents involving the community.

6. Water Projects

1. It must be verified that requirements for protecting the water source from contamination are adopted.
2. The delivery of safe potable water must be ensured: materials used in the pipeline must ensure that no leaks will threaten the delivery of safe potable water.

a. Site selection and protect design

3. Crater source must be located upstream any possible source of crater pollution and protected from contamination by a superstructure.
4. Project Application must require physical and bacteriological analysis of the water from the water source, which is intended to be used.
5. In case the water is not adequate for human consumption, the JSIF must consider not financing the project.

b. Construction phase

6. Excavation works must be made whenever possible during the dry season, to avoid erosion and siltation of drainage canals or other water bodies in the area.
7. During construction works, unauthorised persons must be prevented from approaching working areas by the installation of protecting devices, in order to avoid or minimize risks of accidents involving the community.

c. Operation and Maintenance

8. All infra and superstructure must be permanently maintained in adequate operating conditions.
9. Water source and water pipes must be continuously monitored to ensure that no contamination has occurred.

7. Agro-processing Facilities

1. Waste products must not be deposited in watercourses, wetlands or in sensitive vegetation communities.
2. Waste Crater and processing effluent must be treated to reduce contaminants and not be discharged directly to water bodies, wetlands, or in sensitive vegetation communities.

Appendix 2 – MANAGING SIGNIFICANT ENVIRONMENTAL ASPECTS

JSIF's activities fall in the category of administrative and operational. Operational refers to project activities and these are a function of the scope of the funding received from each source. The activities in both categories can interact with the environment resulting in an effect. The JSIF therefore developed a mechanism to identify and determine its significant environmental aspects (SEA) and establish controls to manage them adequately. Having generated the list of activities in which JSIF is involved and the associated aspects, the Environmental Officer coordinate with key members of staff and ensure that the list is vetted for completeness. The Environmental Officer then determines the impacts associated with the aspects identified and apply appropriate scores to the different ranking elements. Aspects and impacts are assessed for releases to the environment (air, water, soil, generation of waste) and impacts on human health. The potential for these impacts are considered under normal conditions as well as emergency conditions (e.g. hurricanes, fires, spills).

Based on the assessment of JSIF's activities and the application of the scoring system, six SEAs were identified for which standard management practices and procedures were developed with a view to minimize environmental impacts. These SEAs are as follows:

I. Removal and damages to natural habitat such as trees, coastal zones, or marine environments;

II. Provision of potable water;

III. Disruption of drainage pattern or improperly constructed drainage solutions;

IV. Ground and water pollution;

V. Release of particulates to the atmosphere (dust pollution)or to water bodies (sedimentation, turbidity, and runoff); and

VI. Erosion, sediment control and slope stability.

The following outlines a generic procedure for the management of these SEAs based on the JSIF EMS. These may be modified from time to time based on the particular characteristics of proposed project activities, for example dredging in coastal areas, were distinct potential impacts are present.

1. Site Assessment and Environmental Screening

Site assessment is carried out initially at the appraisal stage, when the Technical Officer or Formulator (in the case of emergency projects) makes an initial visit to the site. An initial site review will indicate whether there is a SEA or other issues which needs to be managed. The Technical Officer then screens the project on Fund Manager (complete environmental screening checklist), or uploads that which is sent by the Formulator. This environmental screening process will identify the potential environmental issues including the six SEAs.

JSIF Technical Officers assess sites for suitability in accordance with among other things, JSIF policies, environmental feasibility and structural feasibility.

When environmental screening is completed on Fund Manager, Environmental Screening Sheets, Management Plans (EMPs) and Monitoring Sheets are generated for integration in appraisal reports, technical reviews, bid/tender documents and contracts for contractors and formulators. These appraisal reports are generated for presentation for internal approval.

2. ***Formulation***

At this stage the formulator for the project design makes a more thorough visit and assessment of the site in order to produce complete designs, drawings and costs.

3. ***Technical Review***

The preliminary drawings, BQ, recommendations and conditions associated with the project are brought before a technical review committee, where they are examined for completeness. Recommendations from technical reviews must be incorporated in the final designs. The reviews must include an assessment of the EMPs generated from Fund Manager as well as the permits and licenses to ensure that the issues highlighted have been included both in the design and the final costs.

4. ***Implementation***

Once approvals, licences and permits as required have been applied for and obtained by the Environmental Officer (EO) the project moves to implementation. Implementation must be carried out by the contractor in accordance with construction and engineering standards. During implementation all project works are monitored by an assigned Supervisor. The

supervisor must visit project site as per Monitoring and Evaluation Procedure **EMS-I-PR-ME-24072008.** Supervisors will monitor projects during implementation and produce reports. Projects are monitored against *inter alia*, approved designs, environmental management, good construction and engineering practices.

5. *Responsibilities*

Technical Officer: The Technical Officer is responsible for site assessment and Environmental Screening at the Appraisal Stage; he/she is also responsible for assessing and recording Supervision Reports.

Contracting Department: Contracting ensures that the Environmental Sheet, Management Plans and Monitoring Sheets are included in bid / tender documents and contracts.

Formulator: The Formulator is responsible for environmental screening in the case of Emergency Projects as well as for developing complete designs and thereafter in his/ her capacity as Supervisor must ensure that the contractor performs in accordance with construction and engineering standards. See JSIF, Specifications and Requirements, PROC-I-MAN-SPECS-12052002.

Supervisor: This individual is contracted to monitor and ensure that all works are carried in accordance with construction and engineering standards. See JSIF, Specifications and Requirements, PROC-I-MAN-SPECS-12052002

Technical Review Committee: This group has the responsibility for ensuring that designs are reviewed for completeness and adjusted as recommended.

Environmental Officer: The EO ensures that the environmental screening process is completed. The EO also ensures that licenses and approvals are obtained, and project monitoring conducted and recorded.

Appendix 3: Generic/Standardized Environmental Management Plans (EMPs) to Mitigate Adverse Impacts during Construction

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
Construction of New and or Rehabilitation of Existing Buildings (Schools, Fire Stations, Police Stations, and Public Buildings including provision of on-site water supply and sanitation services)					
Earthworks (Excavation, Vegetation Clearance, Trenching and Blasting)	Increase in fugitive dust levels	1. In residential areas, if works are conducted in the dry season, wet the exposed areas and stockpiles of earth materials, particularly fines, to minimise windborne particles and increase in levels of fugitive dust. 2. Haulage vehicles transporting aggregate must be covered on all public roads. 3. Communities must be given at least two weeks prior notice of intended construction period. 4. For worker health and safety, all workers should be supplied with dust masks and other safety gears.	Contractor	Suspended particulate matter (if required respirable particulates < 10 micro grams) should be monitored as per NEPA guidelines. Frequency: Fortnightly for the first three months and monthly thereafter.	Technical supervision staff, and where appropriate, with the participation of community representatives and or respective community liaison officers. Spot checks by EO
	Soil erosion	5. Clear only small areas at a time. 6. Clear only areas designated for construction. 7. Replant cleared areas immediately after construction has completed. 8. Install sediment controls at property boundaries, particularly in drainages			
	Road closure and traffic congestion	9. Communities must be given prior notice of intended road closures and designated detours.			

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
	Improper waste disposal	10. Reuse was onsite where applicable. 11. Store waste in a designated location. 12. Cover spoils with plastic sheeting to minimize dust and erosion. 13. Dispose of waste at a NSWMA approved disposal site.			
	Sedimentation and water pollution	14. Silt Screens or Sediment Traps should be deployed where earthworks or trenching occurs in close proximity or adjacent to gullies, drainage lines or rivers to avoid deterioration of water quality.			
	Felling of trees	15. Compensate for trees removed by planting new trees. 16. Significant efforts should be made to preserve large trees and those of high economic value.			
	Loss of or damage to Historical and Cultural Artifacts	1. The contractor must ensure that provisions are put in place so that artifacts or other possible "chance finds" encountered in excavation or construction are noted and registered, the National Heritage Trust contacted, and work activities delayed or modified to account for such finds. 2. No item believed to be an artifact must be removed or disturbed by any of the workers. 3. Consultation with local community regarding final design of historical structures will be done as prudent.			

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
Movement of heavy machinery, blasting and drilling.	Soil and water pollution from petroleum products.	1. Ensure that machinery and motor vehicles are adequately serviced and not leaking oil. 2. Store petrol in a safe location surround by an embankment or berm. 3. Storage for hazardous materials including petroleum should be above ground and isolated. 4. Storage of fuels on site should be compliant with petroleum industry guidelines and fire precautions put in place. 5. Stage concrete mixers on impermeable liner.	Contractor	Noise level should be monitored as per NEPA guidelines.	Technical supervision staff, and where appropriate, with the participation of community representatives and or respective community liaison officers. Spot checks by EO
	Wildlife disturbance or displacement.	6. Control noise level when operating in wildlife habitats by turning off equipment when not in use. 7. Workers should be trained to ensure the protection of fauna, particularly rare, endangered or protected species. 8. Do not harm wildlife when moving machinery.			
	Injury to workers and visitors to project site.	9. All workers and visitors should wear safety gears when entering the site. 10. Only authorized persons should be allowed onsite. 11. Install hoarding around construction sites if possible. 12. Proper accident reporting and emergency procedures should be implemented onsite. 13.			
	Increase in noise levels.	1. Construction work must be carried out from 8:00 am to 6:00 pm or according to local regulations. The community must be notified			

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		and agreed on works outside of this period. 2. No works are to be done on Sundays and Public Holidays, and works done outside of this period will require permission. 3. Regular breaks should be taken when conducting noisy activities to reduce stress levels. 4. Blasting should be conducted during daylight and residents should be advised in advance when blasting will occur. 5. Blasting should only be conducted by a certified contractor and all safety requirements, including deployment of blasting mats; inspection of buildings within the designated blasting radius, before and after blasting; contracting local police or security to supervise and control the movement of the public; and provision of earmuffs to workers must be strictly followed.			
Generation of construction rubbles from refurbishing or upgrading of buildings	Drain blocks and unsafe conditions by indiscriminate disposal of rubbles. Dust pollution from improper storage of spoils.	1. All waste must be disposed in an approved landfill or disposal site, in consultation with the National Solid Waste Management Authority (NSWMA). 2. Waste should be removed from the site within one week of generation where practicable and feasible. 3. Stored waste should be covered with plastic sheeting or other suitable material to minimize dust dispersion. 4. Waste containers including bins for recyclables should be provided at project sites	Contractor	Confirmation on disposal of solid wastes at an approved site to be monitored fortnightly.	Technical supervision staff, and where appropriate, with the participation of community representatives and or respective community liaison officers.

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		for storage of garbage.			
Workers on site	Water pollution from unmanaged sewage waste. Unsanitary condition and disease outbreak due to lack of potable water.	1. Contractor to make suitable arrangements for the provision of sanitary facilities and potable water for workers. 2. Remote worksites must be equipped with portable chemical toilets, which must be supplied and serviced by an approved contractor. 3. Toiletries must be provided for use by workers.	Contractor	Check that the necessary arrangements have been made by contractors. Confirmation that portable toilets are supplied on site.	Technical supervision staff and where appropriate, community representatives and or respective community liaison officers.
Other construction activities such as: transportation of material, collection of waste, road improvement works, trenching, pipe-laying etc.	Traffic congestion and hindrance of pedestrian movement	1. The traffic management plan should be developed in consultation with the NWA and other applicable authorities. 2. Flagmen must be employed to direct traffic and reduce the occurrence of accidents. 3. Flagmen must be trained and wearing the appropriate safety gears during project implementation. 4. Road safety signs must be installed. 5. Material delivery must be confined to early mornings/late evenings (outside of peak periods) 6. Communities must be advised of intended road closures and designated detours. 7. Stockpiles and excavated material must be deposited in areas agreed on with the community so as not to interfere with local	Contractor	Traffic congestion and number of accidents. Fortnightly.	Community representatives/ respective community liaison officers

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		activities.			
Installation of temporary scaffolding supports for beams and slabs	Cutting of trees in the vicinity of site. Fall injury from poorly constructed scaffolding.	1. No live trees shall be cut and used for building scaffolding. 2. Steel or lumber supports for scaffolding must be obtained from an approved supplier. 3. Scaffold should be installed by professional and tested frequently throughout the project life. 4. Scaffolding should be checked immediately after a hazardous event, e.g. storm or earthquake.	Contractor	During and after installation. Weekly afterwards.	Technical supervision staff, assisted by community representatives
Installation of water and toilet fixtures	Water wastage and damage to equipment	1. Install water-efficient plumbing fixtures. Use institutional / commercial strength fixtures and equipment in all public facilities	Contractor (based on spec's by JSIF)	Before and after installation on site	Technical supervision staff Spot checks by EO
Construction of sanitation system including septic tank, gravel beds, reed bed or tile field and absorption or soak-away pits.	Trip and fall from height	1. Mark the perimeter of all excavated pits with caution tape. 2. Notify workers and visitors to the site of hazards. 3. Cover pits if possible when not in use.	Contractor	Continual assessment throughout implementation	Technical supervision staff Spot checks by EO
	Contamination of ground water	4. Use clean equipment to excavate pit especially there is a risk of coming in contact with groundwater. 5. Do not dump any contaminated materials or substance in the pits.			
	Improper Waste management	6. Re-use project generated spoils onsite if possible. 7. Dispose of waste at NSWMA approved site. 8. Store waste in a designated location with proper covering.			

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
	Removal of vegetation and trees	9. Re-vegetate cleared area immediately after construction. 10. Replace trees removed during construction. 11. Use silt traps to retain soil.			
	Cave-ins	12. Excavate pits with walls angled instead of square. 13. Install a ladder in pits that are four feet in depth or greater. 14. Reinforce pit walls if unstable.			
Asbestos Removal	Human exposure and adverse health effects	1. If asbestos is detected during rehabilitation of buildings, it shall be marked clearly as a hazardous material. 2. All works must be stopped immediately. 3. The asbestos must be properly secured by the contractor to prevent exposure. 4. An asbestos management plan must be prepared by the contractor and approved by the relevant local authorities including NEPA, Ministry of Health and NSWMA. 5. The asbestos will be treated with a wetting agent to minimize asbestos dust prior to removal. 6. The abatement team must be comprised of skilled professionals with the expertise and equipment requirement for handling and removal of asbestos. PPEs should at least include respirators and tyvec suites. 7. If asbestos material is to be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately.	Contractor	Ensure that area is fully secured and that the waste is not removed from the site without proper approvals.	Ministry of Health, NEPA and NSWMA.

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		8. Security measures must be implemented against unauthorized removal of asbestos from the site. 9. The waste should be buried in the appropriate containment at an approved site under the supervision of the NSWMA.			
Construction of New and or Rehabilitation of Bridges					
River training	Freshwater and marine pollution	1. Sediments and other project generated waste must be adequately contained and removed from the site as early as possible. 2. The contractor should avoid contact between waste and flowing water. 3. Waste should be disposed of at approved NSWMA disposal sites. 4. The contractor will install appropriate erosion and sediment control measures e.g. silt fences and traps to minimize offsite movement of sediments into streams and rivers, and other coastal aquatic ecosystems. 5. Portable toilets will be provided for workers to	Contractor	Weekly	Technical supervision staff

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		prevent improper disposal of human waste.			
	Disturbance of fish and aquatic wildlife.	6. Noise will be restricted in areas with sensitive wildlife. 7. The contractor will be required to preserve trees and other wildlife habitats, which have been identified as natural habitat or well preserved vegetation zones. 8. The control of sediment deposition into the aquatic system to prevent chemical and physical changes will be required of the contractor.		Weekly	
	Occupational safety issues	9. Workers will be required to wear safety gears at all times. 10. The contractor will be response for ensuring that unauthorized activities such as swimming are not carried out during work hours. 11. Road safety signs will be installed during work hours. 12. Contractor will ensure that trucks transporting materials are not overloaded.		Daily	
Excavation and earth works	Air pollution from increase fugitive dust in ambient air.	1. Wet dry areas on a regular basis. 2. Cover spoils with plastic or other materials to minimize dust emission. 3. Remove spoils from the site as early as possible. 4. Workers should wear dust mask when dust becomes a nuisance. 5. Dust monitoring should be conducted as per NEPA requirement.	Contractor	Periodic, i.e. weekly	Technical supervision staff Community representatives/ respective community liaison officers, with spot checks by EO

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
	Traffic congestion and hindrance of pedestrian movement	6. Inform the community at least two weeks in advance of the works and discuss alternative route(s). 7. Install road signs to indicate that works are in progress. 8. Store materials and waste to avoid hindrance to traffic and pedestrian movement. 9. Complete works in a timely manner.	Contractor	Daily	Contractor with support from the Technical supervision staff Community representatives/ respective community liaison officers, with spot checks by EO
	Inappropriate waste disposal	10. Re-use project generated spoils onsite if possible. 11. Store waste and designated location with proper covering. 12. Dispose of waste at NSWMA approved site. 13. Provide waste bins for storage of garbage.	Contractor	Continual assessment throughout implementation	Technical supervision staff Spot checks by EO
	Occupational safety issues	14. The contractor must develop and health and safety plan for the project site. 15. Contractor and site supervisor must conduct daily health and safety meeting prior to starting of work activities. 16. Emergency contact information should be posted onsite. 17. The contractor must provide workers with the appropriate safety equipment including hardhats, safety boots, security vest, dust mask, and gloves and ensure that they are worn properly. 18. The site supervisor and the contractor should ensure that Occupational Health and Safety regulations are enforced. 19. Sanitary facilities and portable water must be provided by the contractor for all workers on	Contractor	Continual assessment throughout implementation	Technical supervision staff Spot checks by EO

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		site. 20. At least one safety kit should be provided onsite in an accessible location. All workers should be apprised of the route to the nearest medical facility in case of an accident or illness. 21. Road safety signs must be installed when work is in progress. 22. Excavation safety should be addressed in a separate procedure or plan where more than 4 feet of material is removed or where overhanging slope are present.			
Traffic Control	Motor vehicle congestion and accidents	1. Inform the community at least two weeks in advance of the works and outline alternative route(s). 2. Install signs to indicate that works are in progress, visible at night or in poor weather. 3. Contractor must provide flagmen to direct traffic. 4. If necessary, works can be conducted at night time when the traffic on the road is at a minimum, provided adequate safety signage and visible warnings are in place. 5. If practicable and feasible, the contractor should setup alternative traffic bypass. 6. Complete works in a timely manner.	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO
Transportation of materials and waste	Air pollution from fugitive dust; and material spillage	1. Contractor should ensure that s material and waste are covered during transportation. 2. Trucks drivers should comply with traffic speeding limits.	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
Construction of New and or Rehabilitation of Existing Drainage Systems					
Drain excavation	Pollution or siltation of rivers and coastal waters from excavated material	1. Dispose of contaminated and unsuitable material in safe areas and cart away for off-site disposal at approved landfill site. 2. Use sediment traps and silt fences to contain excavated materials.	Contractor	Frequent, during critical flooding periods	Technical supervision staff assisted by the community representatives Spot checks by EO
	Flooding from inadequate or blocked drains	3. Use good design; do not block drains, clear blocked drains. Use sump pumps, especially during rains.	Contractor	Contractor, using good design	Technical supervision staff assisted by the community representatives Spot checks by EO
	Erosion of drains and siltation	4. Use concrete or masonry-lined drains, or cover drain sides with stones (riprap), or use vegetative cover. 5. Excavation safety should be addressed separately where more than 4 feet of material will be removed	Contractor	Contractor, using good design	Technical supervision staff assisted by the community representatives Spot checks by EO
	Human exposure to pathogens	1. All workers must wear the appropriate protective gears when performing drainage works. 2. Mosquito repellent shall be provided to workers as vector control. Bleach solution shall be sprayed on materials suspected of containing septic waste. 3. Workers must be provided with soap, hand sanitizers and potable water to wash hands	Contractor	Contractor	Technical supervision staff assisted by the community representatives Spot checks by EO

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		and body when necessary. 4. Workers shall be encouraged to wash hands before eating and smoking. 5. Any worker that comes in contact with the drain water will be required to clean up immediately. 6. Workers that show signs of illness shall be taken to a medical facility immediately.			
	Inappropriate waste disposal	7. Same as indicated previously. However, contaminated spoils should be removed from the site immediately.	Contractor	Contractor	Technical supervision staff assisted by the community representatives Spot checks by EO
Movement of heavy machinery and equipment onsite	Dust, noise and physical injury.	1. Same as indicated previously.	Contractor	Daily Contractor	Technical supervision staff assisted by the community representatives Spot checks by EO
Traffic Control	Traffic congestion and disturbance of residents' movement pattern.	1. Same as indicated previously.	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO
Transportation and delivery of materials and removal of waste from site	Air pollution from fugitive dust	1. Cover the waste and material during transportation. Truck drivers shall comply with speed limits.	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO
	Material spillage resulting in	2. Truck drivers shall comply with speed limits. 3. Truck drivers should comply with truck's	Contractor	Daily	Technical supervision staff assisted by the

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
	contamination, traffic accidents and injury	laden weight. 4. All spills shall be reported and cleaned up immediately.			community representatives Spot checks by EO
Construction of Coastal Defences					
Design of coastal works	Erosion or flooding of nearby areas	1. Depending on the scope and location of the project, the coastal works may require an EIA with feasibility assessment and comprehensive design evaluation of site and nearby areas with coastal process study for wave, sediment, and other effects.	Engineering Firm	Upon acceptance of design	Approval by JSIF technical review and NEPA permit
	Additional requirements	2. The EIA may include additional specific requirements that shall form part of the EMP	Contractor	Varies	Varies
Transportation of materials including large boulders		3. Truck drivers shall comply with speed limits. 4. Boulders should be transported in accordance with the National Transport Authority guidelines.	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO
Traffic Control	Traffic Congestion and disturbance of residents' movement	1. The contractor must develop a traffic management plan in consultation with the NWA, National Transport Authority and the police. 2. The residents must be informed at least two weeks in advance of any extended road closures or disturbance to traffic movement. 3. The contractor must notify the public of any alternative to their normal routes during the construction activities. 4. Flagmen should be trained and wearing	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		appropriate safety gears during project implementation. 5. The contractor install warning signs, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards, visible at night and in poor weather. 6. Provision must be made for the safe passages and crossings for all pedestrians where construction traffic interferes with their normal route. 7. There must be active traffic management by trained and visible staff at the site or along roadways as required to ensure safe and convenient passage for the vehicular and pedestrian public. 8. Adjustment of working hours to facilitate local traffic patterns, e.g. avoiding major work activities during rush hours and do temporary road closures at night.			
Excavation and earthworks	Marine pollution, disturbance of aquatic habitats and killing of marine species	1. A permit must be obtained from NEPA prior to execution of any works. 2. Destruction or clearing of mangroves or sensitive coastal habitat, or work directly affecting reefs or sensitive marine habitat, must be avoided or limited to specific areas as described explicitly in the EIA. 3. The contractor must implement proper erosion control measures prior to excavation and earthworks, for example, sediment traps and silt fences in coastal areas. 4. Onshore dredge spoils must be placed and	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		stored in such a way as to prevent runoff from entering water bodies. 5. Offshore dredging must have a plan in place to monitor currents and turbidity, and to minimize sediment dispersion in water (silt curtains, etc.). 6. The contractor must ensure that all machines and equipment are in good working order to avoid leakage of petroleum products into the soil and water. 7. Excavated materials and any other waste must be stored adequately with proper covering and perimeter fencing prior to removal from the site. 8. The contractor must remove waste from the site immediately or within one week where feasible. 9. The contractor must store construction materials, including any potential pollutants e.g. petroleum in a designated safe area. 10. Hazardous material storage must be isolated and above ground. 11. Storage of fuels on site should be compliant with petroleum industry guidelines and fire precautions put in place. 12. An oil spill contingency plan should be developed to manage potential discharge of petroleum. 13. Refuelling and servicing areas are to be located on impermeable areas served by an oil trap and run-off collection facilities.			

Activities	Potential Impacts	Mitigation Measures	Responsibility for Mitigation	Monitoring Requirements	Responsibility for Monitoring and Supervision
		14. Workshops and equipment storage areas should be drained such that all surface water run off passes through an oil separator prior to discharge into water courses 15. Water quality monitoring should be conducted in accordance with permitting requirements if necessary.			
Cleaning and servicing of vehicles	Marine pollution	1. The contractor shall wash vehicles and equipment only in a designated area where runoff to surface water can be controlled and treated if necessary.	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO

All activities	Worker safety, waste management, disturbance of fish and wildlife	Same as above	Contractor	Daily	Technical supervision staff assisted by the community representatives Spot checks by EO

Appendix 4 – STAKEHOLDER CONSULTATION

Inter-Institutional Workshop
Jamaica Disaster Vulnerability Reduction Project. January, 22, 2014

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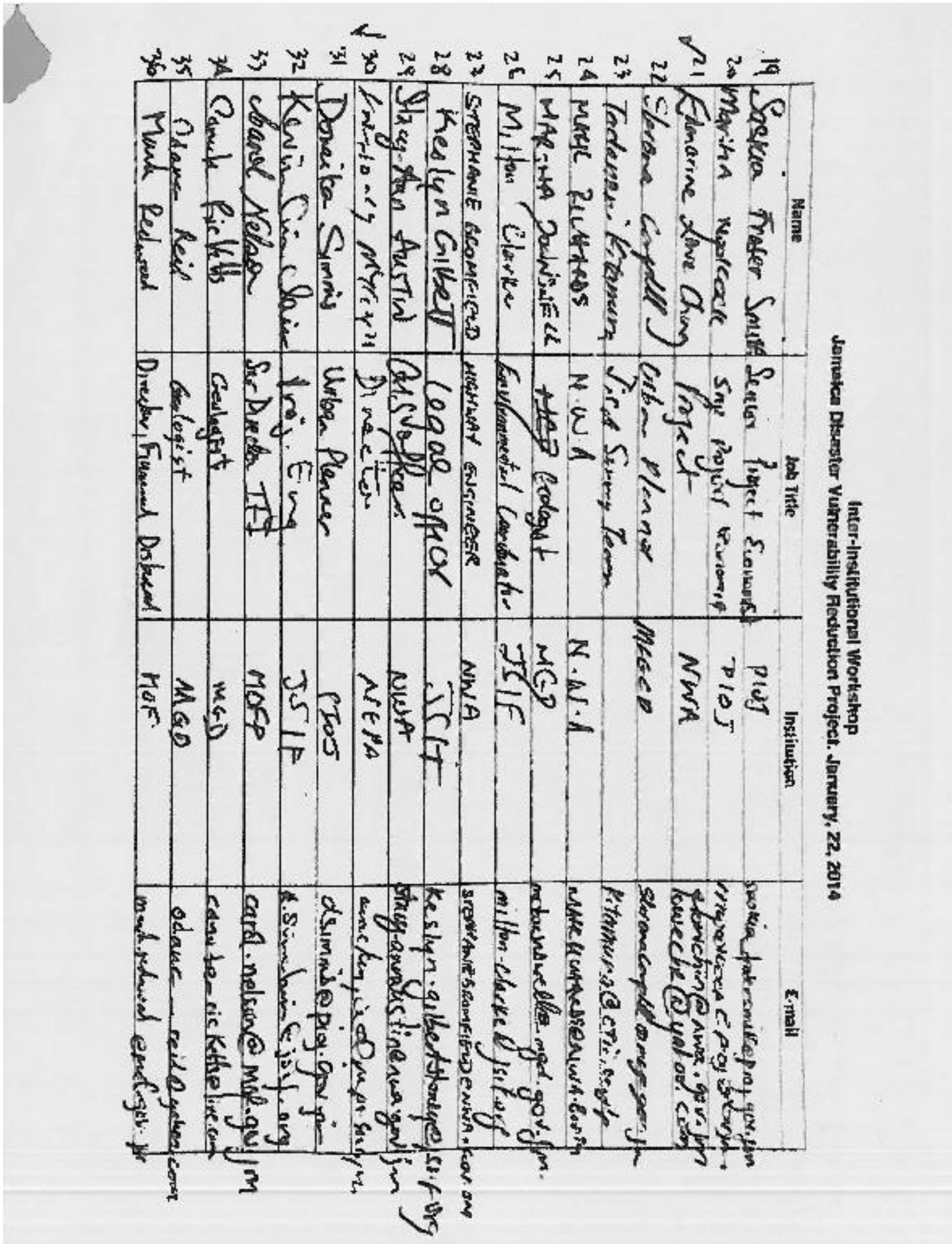
Inter-Institutional Workshop
Jamaica Disaster Vulnerability Reduction Project. January, 22, 2014

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In completing the final version of the EMF, a copy of the draft document was sent directly to the NWA, NEPA, ODPEM and PIOJ for review and comments. The NWA has responded with a number of important suggestions which were

incorporated to strengthen the document. The NWA's comments were mainly focused on improving the environmental screening of proposed sub-project sites; identification and streamlining of environmental impacts associated with anticipated project activities; and the strengthening of mitigation measures with a view to reduce or ameliorate environmental impacts.