TERMS OF REFERENCE FOR PROJECT COMPONENT A
Institutional Strengthening and Preparation of a Zoning and Physical Development Master Plan for Kingston Harbor

Name of TC project: Institutional Strengthening to Support Environmental Management of Kingston Harbor

IADB project number: TC-02-01-04-8-JA

Executing agency: National Environment and Planning Agency, an agency of the Ministry of Land and Environment

Duration of this TOR: **January 2004 – February 2005**

A. Background:

1.1 Kingston Harbor is located on the southeastern coast of Jamaica and encompasses about 26 sq. km of navigable water with depths of up to 18 m. The Harbor has developed into a leading regional transshipment center for both the Caribbean and Central America.

1.2 The impact of pollution on Kingston Harbor has increased rapidly since the late sixties. Studies show increasing levels of bacterial contamination, decreasing levels of dissolved oxygen, declining species diversity, high nitrate concentrations, an increase in the frequency of algal blooms, decreases in shrimp and fish populations, elevated metal concentrations in fish, and increasing pesticide levels in fish. Indications are that unless urgent mitigating action is taken, the continuing rapid decline of the quality of the Kingston Harbor and the overall cost of rehabilitation will reach levels that are financially infeasible or will take many decades to reverse.

1.3 Comprehensive studies of Kingston Harbor have revealed that the quality of its water has been deteriorating as the result of four principal sources of contamination: (1) untreated sewage, (2) industrial discharges (directly to the waterway as well as leaching and runoff from local solid waste landfills receiving industrial waste), (3) dumping of untreated ship wastes, and (4) agricultural runoff. The issue of sewage, the largest source of pollution to the harbor, is being addressed through the Bank's Water and Sanitation Project (JA-0114) that will result in construction of new wastewater treatment facilities. The Rio Cobre is the second largest source of Harbor pollution, contributing an estimated 32% of the total Biological Oxygen Demand (BOD) loading. This TC Project will address two of the three remaining sources, industrial discharges (primarily to Kingston rivers and waterways) and release of ship waste into the Harbor. Problems stemming from agricultural runoff lie beyond the scope of this project, although some of the activities intended to strengthen NEPA capacity may also encompass monitoring of pesticide levels.

1.4 The contamination of the Kingston Harbor is a longstanding problem requiring urgent attention. For many decades, Jamaican Authorities have made various sporadic efforts to deal with the environmental problems of the Kingston Harbor. These efforts have had very limited success in abating environmental pollution of the Harbor, in part due to a lack of clarity regarding responsibility, as well as accountability for regulatory actions, and duplication of efforts due to poor or non-existent coordination among agencies.

1.5 The GOJ has indicated the need to structure and build up the institutional capacity for the environmental management of the Kingston Harbor, with the purpose of coordinating the diverse number of actors and activities that impact upon the current state of the Harbor and defining an overall investment plan for its clean up. An adequate institutional setting for the Kingston Harbor is highly complementary to the Kingston Water and Sanitation Project, under study by the Bank.

1.6 This TOR pertains to one of four components comprising the Kingston Harbor Environmental Management Technical Cooperation Grant (TC-02-01-04-8-JA), and consists of a total of thirteen tasks. The total budget of the TC Grant is US$620,000, of which US$500,000 consists of an IADB grant and $120,000 from local GOJ contributions.

1.7 The National Environment and Planning Agency (NEPA) has been selected as the Executing Agency because of its overarching and cross-sectoral influence in matters pertaining to the environmental quality of Kingston Harbor. With its recent reorganization, and several progressive new initiatives, NEPA is poised to play a more direct and proactive role in the legislation and administration of the environmental management of Kingston Harbor.

1.8 The environmental pollution control and monitoring legislation that has direct impact on the Harbor includes 15 Acts, dates back as far as 1949 (the Irrigation Act), and involves at least 10 institutions and administrative agencies. Among the most important pieces of legislation are the following: Natural Resource Conservation Act, Public Health Act, Underground Water Control Act, Water Act, Harbor Act, and Petroleum Act. Among the Administering Agencies are the National Environment and Planning Agency (NEPA), the Environmental Control Division (ECD), the Underground Water Authority (UWA), the Port Authority and the Ministry of Public Utilities and Transport, and the Petroleum Corporation of Jamaica.

1.9 In the area of sewage and solid waste disposal, six additional pieces of legislation have bearing. These include the National Water Commission Act, Kingston Improvement Act, the Water Supply Act, the Port Authority Act and the Solid Waste Management Act. The NWC administers the National Water Commission Act. The NWC is responsible for water supply and most of the sewerage works in the Kingston/St. Andrew area. The control of pollution of streams and rives used for potable water also falls under the responsibilities of the NWC. The National Solid Waste Management Authority is responsible for administering the Solid Waste Management Act.

1.10 Reviews of the legislative and institutional setting reinforce the view that duplications of powers of intervention and legislation hinder environmental pollution monitoring and enforcement. Even though the NRCA Act provides the framework for addressing the pollution problems of Jamaica, no effective regulations have been implemented and the enforcement of any regulation appears to be very limited. In the NRCA Act alone, twelve sections provide for licenses, enforcement notices, permits or ministerial orders.

1.11 This Project will focus on the environmental management of Kingston Harbor. Three organizations have primary responsibility over all commercial activities in the Port of Kingston, the Port Authority of Jamaica (PAJ), the Maritime Authority of Jamaica, and the Shipping Association of Jamaica (SAJ). In addition, a National Steering Committee over Kingston Harbor has been in existence in various forms since 1993.

1.12 A National Steering Committee for Kingston Harbor has been in existence since 1993 instituted by the then Minister for the Environment. Its work was primarily related to the SENTAR[1] Study of the Harbor. It ceased meeting after the close of the project. When it was again reconstituted in 1996, a smaller Technical Committee (TC) was formed out of the members of the Steering Committee. The TC met monthly or at regular times to review and advise the Steering Committee on technical reports and plans regarding the UNOPS Project from which came the *Integrated Investment Plan for Rehabilitation of Kingston Harbor* document which was tabled in parliament in 1999. In this plan it was recommended that a Kingston Harbor Executive Committee be established and this Committee be charged with the responsibility of overseeing the implementation of the Rehabilitation program. Because of scarcity of the necessary financial resources, over two years went by without the KHEC being formed and so towards the end of 2001, NEPA, as an interim measure, employed a suitable individual to promote and coordinate all on-going efforts towards implementation of the Kingston Harbor Rehabilitation Program. The terms of reference of the Kingston Harbor Steering Committee are:

- To participate in the development and review of appropriate programs and action plans related to the rehabilitation of Kingston Harbor,

- To advise government on the effectiveness of programs and projects related to the state of Kingston Harbor,

- To monitor the various rehabilitate initiatives (including the Global Environment Facility rehabilitation project) and advise on sources of funding, support and investment opportunities for related projects,

- To review and make recommendations on program results and formulate future policy directions related to the sustainable management of the Harbor and its ecosystems, and

[1] A series of reports were completed in the early 1990's by SENTAR Consultants Ltd (now Stantec Consulting Intl. Ltd.) as part of the Kingston Harbor Environmental Project, funded jointly by the World Bank and CIDA.

- To make recommendations on long term programs which will contribute to sustainable management of the Kingston Metropolitan Region (Kingston and St. Catherine) and its coastal resources.

1.13 The Environmental Action Program (ENACT) is a ten-year, C$12,000,000 project funded by CIDA, running until the end of March of 2004. The goal of ENACT is to promote sustainable development through supporting the sound management and use of Jamaica's natural resources. It has been working to develop the capacity of key strategic players at the government policy, private sector, community and general public levels to identify and solve their environmental problems in a sustainable way. ENACT has supported a variety of programs to strengthen the institutional capacity of NEPA and to improve environmental management in the private sector. The thrust of NEPA support has involved capacity development through formalizing a regulatory framework, establishing compliance and enforcement framework, and technical assistance to the Pollution Prevention and Policies division within NEPA. Several components of this project focusing on the institutional strengthening of NEPA will directly complement the existing ENACT activities. Most prominent will be the introduction of a water quality model, development of compliance and enforcement mechanisms for Kingston Harbor polluters, and direct technical assistance to industry in the areas of pollution prevention and environmental management systems. ENACT has also been active in the area of environmental education, where it has developed educational tool kits used in communities and schools with the Ministry of Education, Youth and Culture. IADB Project activities will also directly complement these ENACT initiatives and consultants will work closely to ensure integration of Project activities with the ENACT work.

1.14 The Kingston Harbor Environmental Project, funded jointly by CIDA and the World Bank in the early 1990s[2], resulted in a series of reports addressing the state of Kingston Harbor, threats to its environmental quality, and possible strategies for mitigation. The technical reports provide a high level of technical detail describing the sources and effects of contamination on Kingston Harbor and will be consulted in the execution of this project. In addition the project recommended that to avoid duplication of efforts it would be necessary to clarify accountability for regulatory actions in areas such as: a) standards setting; b) licenses and permits; c) regulations relating to the collection, treatment and disposal of waste; d) monitoring; and e) enforcement. In addition, the penalties for offences related to the improper disposal of waste are inadequate in most of the legislation to deter potential offenders.

1.15 The United Nations Office of Project Services (UNOPS) completed an Integrated Investment Plan in March of 1998 as part of its Project on Planning and Environmental Management of Heavily Contaminated Bays and Coastal Areas in the Wider Caribbean (Regional Project RLA/93/G41). This study included a brief but useful overview of the technical, institutional, legislative, and financial factors that have contributed to the contamination and deterioration of Kingston Harbor.

---

[2] The project was carried out by SENTAR Consultants (now Stantec Consulting International Ltd.).

1.16 The IADB has three concurrent projects with some relation to the environmental quality of Kingston Harbor; the Solid Waste Management Program (JA-0035), the Kingston Water and Sanitation Project (JA-0114), and the resulting Waste Water Treatment Plant that will likely be constructed at Soapberry, on the western rim of Hunts Bay..

1.17 A key component of this Project consists of the development of a Zoning Plan for Kingston Harbor that will consist of a set of zoning strategies and an action plan to encourage and make best use of improved environmental conditions of the Kingston Harbor. An overall KMA Sustainable Development Plan is being prepared (by 2004) by a Cities Alliance funding mechanism (USAID) with input from a wide base of city residents to guide the redevelopment and management of the city over the next twenty years. This KMA plan will be owned and implemented by people in communities, the business sector, the local authority and state agencies. It will be a strategic document that builds on a shared vision for KSA and contains strategies, goals and targets, management systems and performance indicators, that will lead in the direction of sustainability in priority development areas for the City and Parish. The Plan will aim to manage the orderly growth and development of the KMA in a way that meets the needs and aspirations of the residents. When completed the Plan will guide the preparation of a new Development Order (the regulatory land use instrument) and the preparation of a KSAC Corporate Plan (the institutional action plan for city management.). The total budget for the development of the Master Plan is $592,765. IADB Project consultants will closely integrate its activities with the KMA plan to ensure that all work is complementary and supportive of the KMA Plan.

B. Purpose:

The two primary objectives of this *overarching TC project* are:

a) To facilitate the institutional arrangements best suited to coordinate the diverse stakeholders and activities that impact upon the current state of the Harbor, and

b) To support pre-investment efforts to address major pollutant sources.

This component will provide the institutional basis for implementation of the Kingston Harbor Clean-up effort, presenting specific options to the GOJ, which should result in the selection of a specific plan of action dedicating resources, assigning responsibilities, and setting objectives. Four of the basic tasks within this component will consist of:

- Developing structural options for implementation strategies for the GOJ to consider,
- Developing the legal and regulatory framework supporting the option chosen by the GOJ, including a corresponding financially sustainable funding mechanism to support this option,
- Developing an implementation plan, and
- Supporting the first steps of implementation.

This component will also call for the development of two fundamental tools that are essential for successful execution of any national initiative to rehabilitate Kingston Harbour:

- A Basic Zoning Plan for the Harbor, and
- A Water Quality Model.

The Basic Zoning Plan will serve as a complement to and will be framed within the Global Master Plan of KMA. The Basic Zoning Plan will serve as a complement to, and will be framed within, the Master Plan of KMA described in the background section of this document. Given the limited budget available for this task, the Basic Zoning Plan will focus specifically on the problem of water quality of the Harbor, proposing general land and water uses on and around Kingston Harbor. The Water Quality Model will be used primarily by NEPA to provide an empirical basis for remediation activities, allowing NEPA to prioritize enforcement efforts internally as well as publicly. Several aspects of this component will have to be closely coordinated with the Institutional Strengthening component of the overarching TC, avoiding duplication of effort and capitalizing on synergies wherever possible. The resulting document will serve the GOJ in developing its general zoning policy.

NEPA does not currently possess or use a water quality model, although it is an essential tool for any regulatory agency and policy maker seeking to understand the impact of contamination sources on a water body. With the Model, NEPA will be able to develop a water quality monitoring and enforcement methodology for Kingston Harbor and the rivers that feed into it. Calibration of a Water Quality Model can assume various levels of detail. The more detail required, the more time, energy, and resources are required. Only a basic level of detail is required, considering just a few key indicator parameters in calibration, to allow NEPA to achieve its desired objectives of empirically supporting monitoring and enforcement activities. This list of parameters might include Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), Nitrogen, Phosphorous, Total Solids, and possibly one or two prominent heavy metals. Using model results, the Project will also support NEPA in developing a protocol for articulating and communicating key information on the quality of Kingston Harbor to other regulatory authorities and to the public at large. *To ensure that NEPA is able to operate the Water Quality model after the close of the project, NEPA will assign two fulltime NEPA staff engineers to be trained to calibrate and operate the Water Quality Model who will ultimately be responsible for maintaining the institutional memory for use of the Model within NEPA.*

The required water quality monitoring model for Kingston Harbour must specifically conform to the following requirements:

1. The model must be an improvement on the somewhat limited two-dimensional model used by SENTAR in their 1993 study, (if not a full 3D, some close approximation), which will resolve for:

    - depth of water
    - interaction over horizontal and vertical scales

- instantaneous and time lag/time compensated events

2. The model must be calibrated using the most recent data collected for bathymetry, circulation, tides, wind speed and direction, as well as fluvial inputs over long and short terms.

    - acquisition of existing data will be the responsibility of the successful bidder

    - collection of additional information, if necessary, to calibrate the model, will be the sole responsibility of the successful bidder

    - scenarios/options should be run/performed to the satisfaction of NEPA, eg. A typical 50 year flood event

3. The model must be able to simulate the processes and results of the following activities:

    - dredging (large change in bathymetry in small areas)

    - sedimentation (small changes in bathymetry over large areas)

    - boundary changes (land accretion or erosion)

    - changes to inflow and outflow characteristics of the Harbour (opening new and/or closing existing exchange points with adjacent ocean and land masses)

4. The model should be able to accurately predict the dissipation rate, accumulation point, and final destination of a pollutant (whether surface, water column or sediment borne) once the source is known. The retention time / flushing rates of the Harbour under varying meteorological conditions should be predictable.

5. The technology used in the model should be made available to the employer (or his designate) with training such that new and subsequent scenarios could be run in the near future.

6. There are two optional aspects that are highly desirable for inclusion in the development of the model:

    - The inclusion of watershed contribution to the Harbor’s condition

    - The impact of Harbour waste outflow to the south coast shelf of Jamaica

C. Target Objective/Success Indicator:

Preparation and adoption of an organizational structure for effective management and sustainable development of Kingston Harbor, a structure which will be financially sustainable, politically acceptable, and contextually feasible.

D. Contracting of Consultants:

This component will be carried out by consultants or a consulting firm (hereafter known as Consultant) working closely with and under the direction of NEPA staff, either as an independent endeavor, or in conjunction with other(s) of the four components comprising the overarching TC. As the executing agency, NEPA will lead the execution of this component, procuring consultants, as needed. NEPA will also develop a selection methodology that must then pass the IADB "no objection" review process. Selected consultants will be subject to approval by Bank staff.

E. Tasks/Scope of Work

Developing Options for Institutional Arrangements

Work Plan Task A1 *Review existing literature on Kingston Harbor*

Consultant will prepare a report identifying, cataloging, and reviewing all relevant completed studies addressing three topics, 1) the environmental state of Kingston Harbor, 2) sources and relative contribution of contamination to the Harbor, and 3) proposed plans for clean-up of the harbor and development of the surrounding waterfront.

The report should also contain a summary of agencies, committees, and other organizations with interest or authority over the improvement of environmental quality and the development of Kingston Harbor. Finally, the report should also contain useful data, salient themes, and recent developments in Jamaica important to the implementation of this TC. The resulting document is to be written in a handy, concise form that is beneficial to project team members and various GOJ officials who will be involved in the formulation of options called for elsewhere in this TOR. Topics and level of discussion should be limited only to those deemed to be useful to the group of decision makers who will be reviewing and selecting among models for the development of Kingston Harbor, as described in the following tasks.

Consultant qualifications: 10 years international experience in environmental management with heavy emphasis on water resources. Educational training in environmental management/engineering sciences or related fields. Familiarity with environmental problems faced by harbors.

Person Days: 8

Deliverable Product: Report containing the elements listed above pertaining to the environmental quality and the development of Kingston Harbor.

Work Plan task A2 *Review existing water quality standards for the different zones of the Harbor and revise as necessary*

Consultant will compare current water quality conditions with the proposed uses for the various zones designated by the GOJ, and will work with NEPA to develop target water quality parameters.

Consultant qualifications: 10 years international experience in environmental engineering sciences. Experience in applying water quality models, setting water quality parameters and familiarity with environmental problems common to coastal zone areas. Basic familiarity with the Jamaican environmental regulatory system.

Person Days: 10

Deliverable Product: Document proposing target water quality parameters based on zoning preferences.

Work Plan task A3 *Review and report on existing zoning and development data.*

Consultant will prepare a report identifying, cataloging, and reviewing data and studies addressing the zoning of Kinston Harbor and development of the surrounding waterfront. Consultant should coordinate the work of this task with other closely related tasks described in this TOR for Institutional Strengthening, avoiding duplication of effort and capitalizing on synergies wherever possible.

Consultant qualifications: Educational training in urban planning/environmental planning/engineering sciences or related fields.10 years experience in waterfront and harbor development projects. Familiarity with GOJ and NGO institutions with interest or authority over Kingston Harbor.

Person Days: 5

Deliverable Product: Report containing the elements listed above pertaining to the zoning and development of Kingston Harbor.

Work Plan task A4 *Review and assess international experiences on Harbor Clean-up*

In an effort to learn from past experience and identify possible models for adoption by the GOJ, Consultant will identify, review, and summarize a select group of international

case studies of cities and regions that have implemented bay or harbor clean-up programs. A start to this list might include, but should not be limited to, Boston Harbor; USA; Guayaquil, Ecuador; Bremen, Germany; Stockholm; Sweden; and Santa Gilla, Italy. The resulting report will summarize in written and tabular format the key features and outcome for each of the case studies reviewed. The Consultant should place a particular emphasis on case studies occurring in countries with limited pubic resources and where public-private partnerships have played a key role in success of these projects.

Consultant qualifications: Same as for Task A1

Person Days: 12

Deliverable Product: Summary of international experiences in harbor environmental quality restoration and development

Work Plan task A5 *Propose options*

Using lessons learned from the review of international case studies of harbor clean-up projects, Consultant will work with appropriate GOJ agencies, committees, and boards (as determined by NEPA, the Executing Agency), to develop a short list of options that seem most suitable to the Jamaican context. These options must be sustainable, feasible, and viable for Jamaica. An essential mandate for the consultants working on this component will be to build in mechanisms to assure financial sustainability of whatever model is ultimately developed so that the resulting initiative can thrive long after the IADB TC ends. This may mean tapping into consistent sources of revenue from a variety of users benefiting from the Harbor itself. Some examples would include earmarking revenues from ship docking fees, import surcharges, and penalties on polluting industries affecting the quality of the Harbor. The features of the three options in the short list should be described in enough detail to allow the three options to be circulated, reviewed, and commented on by the various stakeholders identified by NEPA.

Consultant qualifications: Same as for Task A3

Person Days: 15

Deliverable Product: Elaboration of three options for clean-up and development of Kingston Harbor

Work Plan task A6 *Select option*

NEPA will play the lead role in identifying and contacting appropriate stakeholders, scheduling times and locations for formal discussions. The Consultant will then synthesize the resulting consensus from the process of deliberation into a single option that seems most promising to win support from policy makers in the GOJ and meet the

objectives of leading to an acceptable improvement of environmental quality of Kingston Harbor.

Consultant qualifications: Same as for Task A3

Person Days: 10

Deliverable Product: Summary of selection process and explanation justifying decisions made by the GOJ decision makers active in the process.

Work Plan task A7 *Develop legal and regulatory framework for selected option*

Taking their cue from discussions with key GOJ policy offices, Consultant will develop the legal and regulatory framework required for the selected option. This task, together with tasks A3 and A4 are anticipated to consume at least half of the total time allocated for the completion of Component A, since it is heavily dependent on receiving feedback and recommendations from key GOJ officials and other stakeholders.

Consultant qualifications: 10 years international experience in providing environmental legal and regulatory advice. Familiarity with environmental problems common to coastal zone areas. Experience with the Jamaican environmental regulatory system.

Person Days: 20

Deliverable Product: Report detailing the recommended legal and regulatory framework for the selected option

Work Plan task A8 *Develop an implementation plan*

Based on the selected option, Consultant will work closely with NEPA and other stakeholders to produce an implementation plan that proposes the steps and milestones required by key GOJ and other participants towards self-organization. The implementation plan should outline short-term and long-term activities, lead responsibility for specific activities, and progress indicators.

Consultant qualifications: Same as for Task A1.

Person Days: 10

Deliverable Product: Implementation plan

Work Plan task A9 *Kick-off Seminar*

A small portion of the budget has been reserved to allow the project to support the first activities outlined in the implementation plan. Using the implementation plan as a guideline, Consultant will work with the entity ultimately selected to lead the Harbor clean-up initiative to host a seminar to kick-off implementation activities.

Consultant qualifications: Same as for Task A1.

Person Days: 5

Deliverable Product: Progress report on the initial steps taken in implementation of the adopted Kgn. Harbor management model.

Work Plan task A10 *Acquire Coastal Water Quality Model*

A suitable water quality model is an essential tool for any regulatory agency and policy maker seeking to understand the impact of contamination sources on a water body. NEPA does not currently possess such a water quality model. Consultant will research the available range of candidate water quality models that might be suitable for use by NEPA and will work closely with NEPA staff in selecting and procuring the best choice. Some of the better-known possibilities include, but are not limited to, models developed by the USEPA, the Danish Hydraulic/Water Institute, and Delph of the Netherlands.

Consultant qualifications: Same as for Task A2

Person Days: 5

Deliverable Products:

1) Recommendation of a suitable water quality model with a report giving justifications for the recommended choice

2) Procurement of the recommended/approved water quality model.

Work Plan task A11 *Adopt monitoring methodology, train NEPA staff, establish harbour profile*

Once the water quality model has been acquired, Consultant will work with NEPA in developing a water quality monitoring methodology for the harbour and the rivers that feed into it. In addition, Consultant will train NEPA staff in the use of the Model and will support the activities associated with the collection and input of data, calibration, and operation of the model. Finally, Consultant will support NEPA in identifying the most significant polluters in the Kingston Harbour area and will use the water quality model to test the potential impact of specific discharge enforcement strategies.

Consultant qualifications: Same as for Task A2

Person Days: 60

Deliverable Products:

1). Water quality monitoring methodology for Kingston Harbour

2).Fully calibrated and operational water quality model for Kgn. Harbour.

Work Plan task A12 *Dissemination and communication to authorities and the general public*

Having applied the water quality model and developed specific enforcement strategies, Consultant will support NEPA in developing a protocol for articulating and communicating key information on the quality of Kingston Harbour waters to other regulatory authorities and to the public at large.

Consultant qualifications: Same as for Task A2

Person Days: 5

Deliverable Product: A protocol for articulating and communicating key information on the quality of the waters of Kingston Harbour.

Work Plan task A13: *Develop zoning strategies and action plan framed within Global Master Plan of KMA*

Consultant will work closely with NEPA and other relevant agencies in the GOJ to develop a set of zoning strategies and action plan that would encourage, as well as exploit, improved environmental conditions of the Kingston Harbor. Consultant should coordinate this task with the task described in the TOR for the Institutional Strengthening, avoiding duplication of effort and capitalizing on synergies wherever possible. First and foremost, the resulting document should be formulated and structured to serve the GOJ in developing its zoning policy.

Consultant qualifications: Same as for Task A2

Person Days: 30

Deliverable Product: Strategy and zoning document for development of Kingston Harbor