

PROJECT STUDY PLAN

PSP

JAMAICA BAY ECOSYSTEM RESTORATION JAMAICA BAY, NEW YORK

Prepared By:

U.S. Army Corps of Engineers
New York District

December 1995

PROJECT STUDY PLAN

JAMAICA BAY, NEW YORK

Table of Contents

December 1995

<u>Par. No.</u>	<u>Title</u>	<u>Page</u>
I.	Introduction	1
II.	General Description	1
	A. Location of Study Area	1
	B. Background History	2
	C. Results of Reconnaissance Phase for Jamaica Bay	3
III.	Plan Formulation and Development	5
	A. Proposed Plan Development, Study Purpose and Methodology	5
	B. Non-Federal Sponsor	11
	C. Obligations of the Corps of Engineers and the Local Sponsor	12
IV.	Major Activities and Product Deliverables	14
V.	Feasibility Study Tasks, Schedule and Budget	16

LIST OF ATTACHMENTS

Attachment 1	Feasibility Task Descriptions and Costs
Attachment 2	Resource Allocation Plan
Attachment 3	Critical Path Method Network
Attachment 4	Milestone Schedule
Attachment 5	Project Schedule

PLATES

Figure 1	Vicinity Map
Figure 2	Detailed Site Map
Figure 3	Authorized Project Site Map
Figure 4	NYCDEP Habitat Restoration Sites

TABLES

Table 1	Potential Restoration Measures and Target Habitats
Table 2	Task Costs
Table 3	"In-Kind" Service dollar estimates

PROJECT STUDY PLAN

JAMAICA BAY, NEW YORK

I. Introduction

This document outlines the Project Study Plan (PSP) prepared in accordance with Engineering Regulation (ER) 5-2-1 dated July 1989, ER 1105-2-100 dated 28 December 1990 and EC 1105-2-208 dated 23 December 1994 for conducting an environmental study to further develop and evaluate ecological restoration works within the confines of Jamaica Bay, New York. This PSP has been developed by the New York District of the U.S. Army Corps of Engineers (USACE), and is being coordinated with prospective local sponsor(s).

The plan details the scope, schedule, and budget for accomplishing feasibility tasks. This document also includes a critical path method (CPM) network which shows the logic and interrelationship of tasks; a cost summary table and detailed work task descriptions; a work breakdown structure; and division of responsibilities to be accomplished during the study by the New York District, the New York City Department of Environmental Protection (NYCDEP, the local sponsor), and their respective consultants and contractors.

This Project Study Plan has been prepared by the New York District. Upon approval by Washington Level Higher Authority, the plan will be implemented by the New York District and the prospective local sponsor.

II. General Description.

A. Location of Study Area.

Jamaica Bay is a semi-enclosed body of water sheltered from the Atlantic Ocean by the Rockaway peninsula. The Bay is located in the Boroughs of Queens and Brooklyn, New York. The study area includes Plumb Beach and the communities of Gerritsen, Bergen Beach and Canarsie in Brooklyn and Howard Beach and Rockaway in Queens. John

F. Kennedy International Airport is located on the northeast side of Jamaica Bay. The communities located on Rockaway peninsula in Queens, which forms the southern limit of the bay include Rockaway Point, Roxbury, Neponsit, Belle Harbor, Rockaway Park, Seaside Hammel, Arverne, Edgemere and Far Rockaway. The communities of Lawrence, Inwood and Cedarhurst are located in Nassau County, adjacent to the Bay. Portions of the Bay are operated and maintained by the National Park Service as part of the Gateway National Recreation Area.

B. Background History.

Jamaica Bay remains a vital link in the regions coastal ecology, though its current extent only represents a portion of its historical size and productivity. Within the heavily developed metropolitan area, it represents a rare expanse of nearly contiguous habitat. Over 300 species of birds utilize the bay, which represents a primary stopover along the Atlantic Flyway, a major migratory route for east coast waterfowl. Along this flyway, Jamaica Bay now exceeds even Cape May for the diversity and density of birds that utilize its resources during spring and fall migrations.

The Federally endangered piping plover nests within the borders of Jamaica Bay, as does state threatened least terns. With Massachusetts, New York supports the majority of the coastal population of plovers, and the Jamaica Bay sub-population represents an especially productive component of the overall state-wide population. Juveniles of several species of threatened and endangered sea turtles (Kemps Ridley, Green, Loggerhead) rely heavily on shallow water basins like Jamaica bay, for foraging habitat. Members of the Hudson river population of the federally endangered short-nose sturgeon has also been known to migrate into the bay during their early juvenile years. Various parts of the bay itself has been declared critical or important habitat for all three of these Federally protected species.

In addition, the bay serves as spawning and nursery habitat for many species of anadromous and estuarine fish, including the commercially/recreationally important striped bass, bluefish, weakfish, summer and winter flounders, porgy, and blackfish. The bay was distinguished for the abundance, variety, and quality of its shellfish and finfish for almost three hundred years. During much of its early history, Jamaica Bay gained fame for its oysters, soft-shell clams (steamers) and hard clams. The shellfishing industry later collapsed with the discovery that Canarsie shellfish consumption was responsible for cases of typhoid and gastroenteritis.

Jamaica Bay has served as a source of food and a place for recreation, while its waters and associated wetlands have been used as solid waste and sewage disposal areas. Sewage related pollution, exasperated by major alterations to the hydrology and flushing patterns, contaminated approximately 27 miles of the bay, which led to the closing of shellfishing beds by the New York City Board of Health in 1921. However, the greatest direct impact to the bay's overall productivity has come at the hand of extensive alterations to its shoreline and bathymetry.

During the early part of the century, New York City Department of Docks and Ferries records show that the beginning of the major changes in topography to Jamaica Bay began about 1911. Projects such as the deepening and widening of navigation channels, basin, and inlets were begun as cost-shared efforts or with New York City acting as an agent for the Department of Defense. The bulkheading and filling of significant portions of the marsh-shoreline were included in these projects, with the materials removed from the dredging activities serving as fill for adjacent wetlands. All of the present day basins including Hawtree Mill, Gerritsen, Bergen, Paerdegat and Thurston were excavated from the larger formerly meandering creeks and their adjacent marshlands and tidelands were filled in. The conglomeration of groups of islands within the bay had occurred after the shoreline had already been transformed into upland. Around 1930, one of the largest of the Jamaica Bay Filling Projects was begun. This was the expansion of Barren Island which became Flyod Bennett Field, and is now part of the Gateway National Recreation Area.

Dredging and filling projects in Jamaica Bay continued and included the construction of Idlewild (now known as John F. Kennedy Airport), also one of the larger individual projects.

Conservative estimates of alterations to Jamaica Bay include the excavation of approximately 114 million cubic yards of bottom sediments (of which at least 20 million is attributable to relatively recent Corps activities). Most of this dredged material was used for fill, some was disposed of at sea. Of the original 25,000 acres of surface water and marsh about 12,000 was converted to upland. Of the remaining 13,000 acres only about 4,000 has been left undisturbed, mostly in the central portion of the bay.

The above mentioned actions, together with large scale sand mining (to expand John F. Kennedy airport) and increased water volume from deepening of channels, etc. increased residence time of water in the bay from 11 days to 35 days, thereby reducing the flushing of the entire system, significantly degrading the quality of the bay's aquatic marsh habitat. The average depth of the bay was originally just over one meter, today the average depth is about five meters. In addition to direct impacts to the bay's water quality and habitats, the reduced flushing has also exacerbated adverse impacts from sewage/industrial discharges and later inputs from combined sewer outflows, non-point runoff, sanitary landfill leachates and dumping, thereby worsening overall water quality problems in the bay at present.

Invasive aquatic plant control species have invaded a large portion of the remaining tidelands and marsh habitats. The result of the combination of degraded flushing and hydrology, poor water quality and loss of pristine habitat due to invasive species and physical alterations, has resulted in a decline in the diversity of wildlife within the region. The Corps ecological restoration project seeks to improve habitat within the bay through a series of tasks designed to restore native habitat diversity and flushing patterns. In setting this goal, the Corps is following the recommendations of the Harbor Estuary Program (HEP). Authorized under EPA's national estuary program, HEP was developed by a coalition of public and private interests

charged with developing a management plan for the environmental clean-up of New York harbor. Their recently released Comprehensive Conservation and Management Plan (CCMP) for the harbor identified habitat restoration and protection as a major objective, targeting Jamaica Bay in particular.

C. Results of Reconnaissance Phase for Jamaica Bay.

The reconnaissance phase is the first phase of the Corps of Engineers' two-phase planning process. The purpose of the reconnaissance phase is to identify and evaluate environmental improvements; to determine whether there would be sufficient Federal interest in the environmental improvements to warrant continuation of the study; to determine if there is local support for a potential project; and to develop a scope of study and cost estimate for a cost-shared feasibility study. The reconnaissance study for Jamaica Bay, Marine Park, and Plumb Beach, New York resulted in recommending the further development and evaluation of a plan of improvement for Jamaica Bay.

Items which are to be addressed in the feasibility study phase identified in the reconnaissance phase include the following:

- A. Develop detailed descriptions of baseline water circulation and current patterns in Jamaica Bay.
- B. Develop detailed habitat descriptions and values of existing degraded areas identified by the Corps of

Engineers, New York State Department of Environmental Conservation, and the City of New York Department of Environmental Protection as having a high potential for restoration.

- C. Assess existing resource usage within the Bay to determine needs and opportunities on an ecosystem basis, and set priorities accordingly.
- D. Identification of activities and efforts to restore fisheries and other aquatic habitats through the improvement of hydrology and tidal flushing of currents within the Bay. Utilization of the 3D models to assess alternatives.
- E. Development of measures to restore degraded wetland and waterfowl habitats at selected sites.

Tasks listed under Section IV of this report ("Major Activities and Product Deliverables") describe actions which would address the items listed in the Reconnaissance Report.

III. Plan Formulation and Development

A. Proposed Plan Development, Study Purpose and Methodology.

1. The Feasibility Phase: The Feasibility Study is the second phase of the Corps of Engineers' planning process, and follows a favorable Reconnaissance Report and execution of a Feasibility Cost Sharing Agreement between the USACE and the non-Federal sponsor. The purpose of the Feasibility Study is to fully evaluate all reasonable solutions to the problems identified during the reconnaissance phase. The

Feasibility report documents the study, and the phase includes all further planning, engineering, design and real estate activities required to provide a basis for a decision on Federal participation in the construction of a project. The Feasibility Report is a complete decision document which presents the results of the reconnaissance and feasibility phases and provides the basis for recommending the construction of a project and preparation of a Design Memorandum (if necessary) and Plans and Specifications during the Preconstruction Engineering and Design (PED) phase.

A feasibility study is organized in a logical progression of these tasks required to fulfill the scope and purpose of the study. The major tasks begin with the study initiation period, data collection, and an assessment of the "without project" conditions. These tasks are then followed by the plan formulation process, which is based on the results of modeling, benefit and cost estimating, detailed design analyses and environmental impact assessment. The last portion of the study consists of report preparation, review and approval by higher authority, and culminates in the potential initiation of the Plans and Specifications (P&S) Phase during the Preconstruction Engineering and Design (PED) phase.

2. Study Scope: The study area will be the same as that identified in the Reconnaissance report, beginning at Rockaway Inlet and extending inward to the Head of Bay (Figure 2) . The Reconnaissance report summarized a process whereby NYCDEP, as part of its Jamaica Bay Comprehensive Watershed Management Plan (JBCWMP), identified 18 sites for habitat restoration (Figure 4). These sites were primarily located along the periphery of the bay, where the more severe and direct alterations generally occurred. The Feasibility study would examine these sites in more detail, as well as possible sites in the central part of the bay that could also provide high quality restoration outputs. This final pool of sites would be screened based on current resource use/value, anticipated restoration outputs, costs, local support/opposition, and overall ecosystem needs. Selected sites would then be evaluated in terms of suitable alternatives, and detailed restoration designs developed. At this time, it is assumed that twenty sites from this final pool will be selected for detailed

design, though many will be variations of similar measures.

In addition to site-specific habitat restoration, the Feasibility phase will also investigate alternatives to improve adverse flushing and hydrological conditions brought about by past excavations and disposal/fill operations (channels, bulkheads, shoreline protection/extension, etc). Identified in the reconnaissance report as recontouring the bay, the goal of this effort would be to restore as appropriate past water flow patterns and flushing rates that currently exacerbate water quality conditions and habitat degradation within the bay and its tributaries. These efforts are independent of the more traditional water quality improvements that the City and State are implementing to control point and non-point sources of pollution (sewage and industrial effluents), combined sewage overflow (CSO), and landfill runoff. Recontouring the bay is an effort to restore historical flow and flushing rates to the system, many of which were impacted by Corps projects. In essence, it would restore the bay bottom, or more accurately selected portions of bottom, to former conditions, thereby restoring both benthic /fishery habitats, and the hydrology/tidal flushing that supported them. These actions may augment traditional water quality measures, but are being considered primarily as a means of supporting the site-specific restoration measures, as well as improving the overall habitat value of the Bay as a whole, thereby increasing its use as a spawning/nesting ,nursery, and migratory stop-over area. At this time it is assumed, based on preliminary data, that recontouring would concentrate on Grassy Bay and adjacent portions of the eastern part of Jamaica Bay, as well as the major tributaries (Mill, Spring, Fresh, Paedergat, and Shellbank creeks) that feed the northern section of the bay.

3. Restoration Measures: Alternatives currently considered suitable for implementation at the site-specific restoration sites include regrading, ditching, vegetative plantings, culverting and full or partial removal of dike, bulkhead, rip rap, rubble, derelict vessels, or abandoned/deteriorated pilings and related shore facilities. In addition, most sites, especially those along the shore line, would require varying degrees of clean-up (removal of debris, rubble, and other garbage dumped or washed up on the degraded shorelines and adjacent upland)

and protection (fencing, guard rails, upland buffers, etc) to maximize habitat value and minimize disturbances, especially during the early phases of each restoration project. These activities would not be the primary actions at any site, but would be necessary to ensure success of the selected alternative. Based on existing information, it is assumed that most sites will require some degree of regrading and planting to achieve desired inundation levels and species composition; clean up and protection would also be a part of many site plans. About half of the anticipated 20 site designs will also include structural alterations (mostly removal), or major excavations (ponds, interior waterways, culverts). The shoreline sites identified in the JBCWMP range in size from 1/2 to 5 acres, though they often include extensive stretches of shorelines, since many sites are relatively narrow. It is anticipated that sites identified in the central part of the bay, where there are less spatial restrictions, would average 10 - 15 acres. Various size alternatives would be included in assessing each site, with the final decision being based on a combination of priority resource needs, minimal effective size, and incremental cost analysis. Table 1 lists initial ideas for restoration measures and habitats at the 18 JBCWMP sites, as well as the central Bay sites and recontouring areas. The preliminary concepts include an assumption that excavated material will be suitable for use on or near the site, to enhance habitat values or site stability/protection; thereby avoiding costs for transport and disposal. The presence of material that is found to be unsuitable for beneficial reuse will likely result in site rejection.

Alternatives considered for recontouring the bay include filling in large pits in Grassy Bay, as well as removal of bars across tributary mouths and sediment that has accumulated within those waterbodies. To the extent possible, the two operations would be considered in conjunction with each other, with the excavated material used to fill pits and other artificial cuts in the bay bottom. Material removed to regrade or excavate ponds/waterways at individual habitat restoration sites would also be considered for use in recontouring the bay.

4. Selection and Evaluation of Restoration Alternatives: Existing conditions at the habitat restoration sites would be determined by field

investigations that would document vegetative cover, fish and waterfowl use, benthic communities, waterbird and song bird use and other resources on a seasonal basis. A habitat evaluation procedure (HEP) would then be applied to determine current value. Physical and chemical characteristics of each site would be determined by collection and analysis of surface sediments (grain size and bulk sediment analysis for commonly occurring contaminants), local water quality (dissolved oxygen, organics, chlorophyll) and site-specific physical conditions (salinity, temperature, water level, tide ranges, inundation periods, hydrology, depth, bathymetry). This data would be used to determine and prioritize the limiting factors responsible for degraded conditions of each site. A HEP analysis would be conducted on those alternatives that best address these limiting conditions, and selections made on the basis of which alternatives (methodology, size, location) produces the better overall increase in habitat value for the targeted species.

A survey for other potential restoration sites within the central portions of the bay would also be conducted. This would consist of an analysis of aerial photos and a one-time field survey of the benthic community (most directly effected by impacts to hydrology and sediment). These data would be used to identify degraded areas that would be subjected to follow-up field trips to visually screen sites to an additional 6 - 12 candidates for more intensive site-specific investigations and evaluations described above.

A series of plans will be evaluated to determine the optimal actions which could be implemented in order to improve the environmental quality of Jamaica Bay. A 3 cycle process of plan formulation will be employed. An initial screening of alternatives (cycle 1) will be followed by a more detailed screening (cycle 2) according to the following criteria: technical feasibility, environmental considerations, socio-economic considerations and institutional considerations. Input from the study sponsor will also be used as an aid in identifying desirable alternatives. Subsequently, detailed analysis (cycle 3) of different scales of the selected alternatives will be performed. These detailed plans will be finalized and presented in the

Jamaica Bay feasibility report. The final plans will be described at a sufficient level of detail to provide an appropriate basis for the initiation of the PED phase.

Alternatives to recontour the bay will be evaluated through use of the 3D hydrology/water quality model. Various recontouring scenarios will be run on the model to determine the location and depth of fill providing the most cost-effective improvements, and to determine which tributaries are most directly impacted or adversely effect the overall sediment transport, water movement and quality within the Bay. An extensive year-long sampling program of over 40 priority water quality parameters is needed to provide the data to develop and calibrate the model . The model will also be used to characterize flow patterns and tidal ranges at the restoration sites, and predict levels of improvement from the various restoration measures considered at each site.

5. Restoration Goals and Outputs: The bulk of the habitat impacted by past disturbances are wetlands, tributaries, and shallow water bay bottom (fish and shellfish habitat). The site-specific restoration projects primarily target the wetlands and adjacent shallows, while recontour the bay addresses the larger issues of tributaries and bay bottom. Assuming an average size of three acres for the NYCDEP sites and ten acres for the central bay sites, restoration would produce 96 acres of wetlands at an estimated cost of \$6,298,000. In a region where average wetland mitigation run around \$90,000 - 100,000/acre, this cost alone represents a economic approach. This approach is made even more appealing by focusing in on sites already owned by governments (city, state, and Federal) or managed by environmental groups (Audubon), thereby minimizing the amount of land/easement that would have to be purchased. In addition to the wetlands and littoral habitat restored, the sites would also restore adjacent upland and, in some cases, beaches that would provide their own habitat value, as well as increasing both the functional values and protection of the wetland. These wetland values would be even further compounded when one considers the contiguous nature of many of these wetlands, both among each other and in conjunction with remaining wetlands in the basin. By linking projects

together the habitat value of the larger combined area will generally exceed that of both individual habitats. Finally, up to half the sites identified or anticipated are adjacent to or in close proximity of other, similarly degraded areas, especially habitats currently choked with invasive species. During the feasibility phase such sites would also be examined to expand or be added to the total restoration acreage recommended for construction. If the incremental cost analysis shows such expansion to be cost effective. Even if additional areas are not recommended for inclusion in construction, these other areas would still benefit from the data and plans developed for recommended alternatives.

With respect to recontouring, cost estimates will vary greatly, depending on the geographical extent and depth of recontouring. It has been estimated that implementation of this option in the more stressed eastern portion of the bay, returning it to a maximum depth of twenty feet, including tributaries, would cost in excess of \$120 million, requiring 24 million cubic yards of fill. This estimate assumes all the fill would have to be purchased. The benefits of restoring historical depths in the degraded eastern bay would be considerable. Preliminary model projections suggest the flushing time could be reduced from over a month to a matter of days. This level of impact would be felt bay-wide, significantly improving both the aquatic and wetland habitats currently in place, and laying an excellent ground work for ensuring the success of all future restoration efforts.

B. Study Components

All study components are described in detail in the Tasks Descriptions section of this report.

1. Environmental Studies - Environmental studies will be conducted in order to develop conceptual plans of improvement for Jamaica Bay. Environmental studies will include coordination with local agencies to incorporate existing data into the conceptual plan designs.

Environmental studies will also include the examination of existing vegetative coverage, sampling of aquatic vertebrate and invertebrate species, use of 3D Models to describe current flows and hydrologic functions within the bay, water quality analysis, and survey of existing wildlife throughout the bay and surrounding shore areas. Draft and Final conceptual restoration plans will be developed in association with environmental studies tasks. Many of the hydrologic studies are expected to be provided as "in-kind" service by the local sponsor. Computer modelling developed by the local sponsor will meet guidelines under EC 1110-1-83, "Policies, Guidance, and Requirements for Geospacial Data and Systems". Many of the environmental studies extend over long periods of time as much of the environmental analysis cannot be initiated during winter months and times of extreme weather.

2. Cultural Resources - Cultural resource activities include coordination with the State Historic Preservation Office (SHPO), field reconnaissance of proposed restoration sites, and activities undertaken to satisfy requirements under section 106 of the National Historic Preservation Act (1966 as amended).

3. Benefit/Economic Analysis - A cost analysis will be generated in association with activities planned and identified under the environmental studies tasks. While a benefit/cost ration is not necessarily developed; an analysis of estimated costs in association with expected benefits of the project will be presented in the Feasibility Report; along with discussion on the value of anticipated outputs.

4. Real Estate - Real Estate tasks will include the approximate costs for acquiring property (if any) in association with the recommended restoration plan. Rights of entry (if required) for environmental studies will be carried out through the Real Estate Branch.

5. Study Management - Study Management efforts will ensure that the study progress according to schedule and within budget. Tasks will include interagency coordination, institutional studies, resource management, plan formulation, and report preparation.

6. Design Branch - Design Branch will make recommendations for the methodology and cost for removal of structures or bulkheads (if any) associated with restoration activities along the shoreline of the Bay. Required subsurface explorations and surveys will be coordinated with the design branch.

C. Non-Federal Sponsor

The New York City Department of Environmental Protection (NYCDEP) has indicated its support for the Jamaica Bay Restoration Project based on a letter sent to the New York District office signed on June 7, 1995 by Commissioner Marlyn Gelber. Local interests, including the New York State Department of Environmental Conservation (NYSDEC), strongly support a feasibility study for the restoration of Jamaica Bay.

D. Obligations of the USACE and the Local Sponsor

The USACE shall:

1. Expeditiously conduct the study under the leadership of an Individual Project Manager (IMP) and Planning Division Study Manager. the study will be overseen by the Executive Committee, as discussed in the FCSA, which will meet periodically to review progress and findings.

2. Develop and monitor a detailed schedule and network for execution of the study as a basis for determining the work effort to be accomplished by the USACE, the non-federal sponsor, and their respective contractors. This network will form the basis for determining study budget requirements and milestones. It will be modified and updated as necessary to reflect study findings, budget considerations, scope modifications and other changes as the study progresses.

3. Identify and manage study task contingencies in order to effectively manage the study budget and finances.

4. Develop a range of alternatives with Federal regulation criteria

to address the environmental problems in the study area. This range of alternatives will form the basis of a federally preferred plan. Locally preferred plans, if any, will be identified. In order for the locally preferred plan to be recommended for implementation, it must be in compliance with Federal rules and statutes applicable to the Corps' project development principles and guidelines cited in the FCSA and granted approval by the Assistant Secretary of the Army (Civil Works).

5. Develop project cost estimates using the M-CACES and Code of Accounts, identifying contingencies as separable items, and coordinate with the Non-Federal sponsor as a basis for planning project financing.

6. Manage and report on the study compliance with regulation in ER 5-2-1 dated 31 July 1989, on the Life Cycle Project Management System. This includes the required upward reporting through the New York District Project Review Board (PRB) and the USACE hierarchy, as well as coordination with the Non-Federal sponsor on project cost and schedule changes, the study progress, key project issues and other sponsorship matters such as financing and local cooperation requirements.

The Local Sponsor shall:

1. Appoint representatives to coordinate on scheduling, study management of in-kind services and other matters related to the study conduct. Representatives will also participate on the Executive Committee to oversee the study progress and review findings.

2. Accomplish in an expeditious manner all activities to be provided as in-kind services including participation in management activities; review of key products and accomplishment of tasks identified as in-kind services.

3. Notify the USACE at least 90 days in advance of task

initiation if any change of in-kind services is planned, so that appropriate steps can be taken to accomplish the work without affecting the overall study schedule.

4. "In-Kind" Services: The sponsor, through its own contract, is expected to undertake tasks 18, 19 and 20 (Develop Hydrodynamic Model, Water Quality Sampling Program, and Develop Water Quality Modelling) as listed on table 2. The percentage of task completion and projected value of "in-kind" service dollars is presented in attachment 2. The water quality model will aid in determining whether fisheries habitat can be restored to Jamaica Bay. The Corps' Waterways Experiment Station (WES) will evaluate the development of the hydrodynamic models developed by the local sponsor.

IV. Major Activities and Product Deliverables

The activities and anticipated delivery of products reflects the New York Districts capability to initiate the study in January of Fiscal Year 1996. This PSP will cover the development of products for the Jamaica Bay Restoration project, prior to the initiation of the Plans and Specifications Phase. A product based approach will be emphasized with regard to the study execution, and also for purposes of helping track progress and performance. The feasibility study results and the products are summarized below:

a. Draft & Final Feasibility Report. All study activities will lead to the approval of a Final Feasibility Report by the Office of the Chief of Engineers. The document will entail all problem identification and formulation activities, required to identify and recommend a plan of improvement. The documentation for the report is coordinated with all interested parties, and is reviewed by higher authority (Washington level) review. Then, ultimately upon certification, the report is transmitted to Congress. The feasibility phase culminates in the Notice of the Division Engineer, and is scheduled for completion by the end of the third quarter

of Fiscal Year 2000.

b. Draft & Final Environmental Documents. This product includes all activities leading to the assessment of environmental impacts related to proposed plans. This includes scoping and preparation of the appropriate environmental document, public coordination and review, and notification of findings. Preparation of an EA and possibly and EIS will be needed to meet NEPA requirements. Completion of the appropriate environmental document along with a filing of the Record of Decision (ROD) if necessary is scheduled for the third quarter of Fiscal Year 1999.

c. Preliminary Project Cooperation Agreement (PCA) and Financing Plan. As the details of the recommended plan are finalized, coordination will be undertaken with the local sponsor to review the model language for a PCA for construction of a storm damage reduction project. A letter of intent will be provided by the local sponsor which acknowledges the requirements of local cooperation and expresses a good faith intent to provide the items of cooperation for the recommended project. Additionally, a preliminary financing plan will be developed by the sponsor to detail plans for financing costs. As assessment of this plan will then be completed by the New York District. Coordination of the PCA model and preliminary financing plan are scheduled for completion by the end of FY 2000.

d. Draft Project Management Plan (PMP). As part of the feasibility effort, a draft Project Management Plan will be prepared based on the recommended project and baseline cost estimates. The draft PMP will address the schedule of the Plans and Specifications activities for the initial construction products and more detailed plans, construction bid documents, real estate and permit acquisitions for the successful management and completion of the project. The draft PMP will serve as the basis for the finalizing the Project Management Plan which be used for project construction assuming initiation of the PED phase. The draft PMP is submitted with the Draft Feasibility Report, scheduled for the last quarter of Fiscal Year 1999.

e. Other Supporting Documents and Plans. Other supporting documents and plans will be developed as needed during the progress of the study including an interim progress report on the formulation methods and to address specific items as needed such as local cooperation, right-of-entry permits, real estate acquisition, quality control, value engineering, environmental and cultural resources matters, safety and security, and operation and maintenance.

Plans and Specifications could be initiated during the fourth quarter of FY 2000.

V. Feasibility Study Tasks, Schedule and Budget.

In accordance with current budgetary policy, this PSP reflects the New York District's capability to initiate the study in July of Fiscal Year 1995, subject to availability of funds as well as an executed FCSA. However, if funds should become available prior to this anticipated start date, then the schedule can be adjusted accordingly. The following attachments are provided for further details on the study tasks, costs and schedule:

Attachment 1	Feasibility Task Descriptions and Costs
Attachment 2	Fiscal Year Costs
Attachment 3	Project Schedule
Attachment 4	Cost-sharing tasks
Attachment 5	Milestone Schedule

Feasibility Task Descriptions and Costs Attachment 1

The following paragraphs provide estimates of the proposed level of effort for the tasks to be performed as part of this Restoration Study. For ease of review, the tasks have been grouped under general task descriptions according to the relevant code of accounts. The majority of the work to be performed during this study is composed of environmental analysis.

Feasibility Task Descriptions and Costs

The Feasibility Phase is organized to represent the progression of tasks required to fulfill the scope and purpose of study. The progression is depicted in the Project Schedule in this report. Following is a listing of the general task descriptions and costs that will be required to conduct the feasibility report for the restoration project. The majority of the work to be performed during this study is composed of Hydrologic and Hydraulic Investigations, Design Engineering, and Environmental Studies. The sub-accounts for all assignments to be completed within the District is described below including a detailed description of tasks associated with each sub-account as itemized in Table 2. These tasks are also listed on Attachment 5 - Project Schedule presented with this report. Some items in Attachment 5 are listed as milestones, therefore all numbered tasks are listed below. Tasks which are divided into 2 or more sub accounts have the financial portions of their costs listed in parenthesis under each associated sub-account.

22A - PUBLIC INVOLVEMENT

Public Involvement includes the interagency coordination between the District, New York City Department of Environmental Protection (NYCDEP), the New York State Department of Environmental Conservation (NYSDEC), and other interested parties. Project scoping

and status meetings will be held with the local sponsor (NYCDEP) and NYSDEC. Additional public meetings will be held to discuss data collection and restoration opportunities with various organizations as applicable. Newsletters, fact sheets and/or individually written letters may be generated to keep interested parties updated on the status of the project. The District will provide the local sponsor with minutes of meetings and forward appropriate information regarding the project schedule. Presentations and updates will be presented to the Harbor Estuary Program.

Tasks to be completed under sub account 22A include:

Task 6	Inter-Agency Coordination	\$43,000
--------	---------------------------	----------

The Coordination and Public Involvement Task involves the coordination of meetings with the public as required under the NEPA documentation process; meetings with the local sponsor to evaluate and examine the out-puts and development of "in-kind" services; coordination with the USFWS and New York state officials to complete any permits which are required; and additional meetings with agencies and organizations with property or vested interests in Jamaica Bay.

An additional item to be performed with this task is the formation of a technical review committee which will be comprised of members of the District (CANAn N-PL-E), members of NYCDEP, and members of NYSDEC. This committee will meet quarterly (at a minimum) to review data collected by various technical studies and assess their use in the Plan Formulation Process. It is likely that some of these members will also be on the Habitat Evaluation Procedures (HEP) team or similar team performing the actual studies on prospective restoration areas.

Total cost for sub account 22A is expected to be \$43,000.

22B - INSTITUTIONAL STUDIES

An investigation will be conducted to identify the jurisdictions, concerns, authorities and financial capabilities of the Sponsor and interest of agencies and organizations that may be involved with the study.

Tasks to be completed under sub account 22B include:

Task 5	Gathering of Existing Written Data	\$10,000
--------	------------------------------------	----------

The District will evaluate the Sponsor's financial capability for project construction and for handling post-construction project costs such as maintenance, vegetative or structural repairs or replantings, and long term replacements to project features. The District will prepare a financing plan for the project construction, including Government outlays, Sponsor cash and credit contributions, use of lands and disposal areas by Fiscal Year. The District will also collect and/or review pertinent written data and photographs required to assist in the completion of a variety of socio-economic and environmental studies. It is expected that the District's Planning Division will complete Task 5.

The total cost for sub account 22B is \$10,000.

22C - SOCIAL STUDIES

The existing sociological, economic and demographic conditions for Jamaica Bay will be documented for the final report. Much of this information has been gathered during the Reconnaissance phase and in other reports generated by the local sponsor. The "with" and "without" project conditions will be defined and documented. The "without" condition should reflect habitat restoration projects which are most likely to be constructed and other actions that may be taken in absence of a Federal Project.

Tasks to be completed under sub-account 22C include:

Task 47 Prepare Draft/Initiate incremental (\$5,000)
 Cost Analysis

Although most of the data incremental cost analysis for the restoration project will be based on environmental data, some socio-economic data will need to be included into the incremental cost analysis. Both positive and negative socio-economic impacts will be considered in producing the incremental cost analysis. The District's Planning Division will perform the incremental cost analysis.

Task 49 Development of Alternatives Analysis (\$5,000)

Similar to items to be considered in incremental cost analysis, alternative analysis will involve socio-economic input. Aesthetic impacts or benefits created by proposed restoration activities will be examined. The District's Planning Division will perform the Alternatives Analysis.

The total cost for sub account 22C is \$10,000.

22D - CULTURAL STUDIES

Cultural investigation will include evaluation of various sites throughout Jamaica Bay for historic and prehistoric archaeological data. History of vessel activity within the Bay will also be examined to determine the probability and possibly location(s) of abandoned or wrecked vessels.

Investigative studies will be completed to evaluate the potential impact of recommended restoration activities on sites eligible for the National Register of Historic Places. Field reconnaissance and coordination with the State Historic Preservation Office (SHPO) will be required to complete the aforementioned tasks.

Tasks completed under sub account 22D include:

Task 33	Cultural Investigations	\$90,000
---------	-------------------------	----------

Cultural Investigations consist of 2 separate types of studies.

1) A preliminary assessment of known historic or cultural sites or structures within the study area will be performed. This data will be presented to the Technical Review Committee and used in the plan formulation process to determine what areas should be used for restoration.

2) Once specific restoration sites have been selected, additional cultural examinations may be required by the State Historic Preservation Office (SHPO) on these sites to verify the presence or absence of historic or archaeological material.

All studies will be performed to meet NEPA and section 106 of the National Historic Preservation Act (1966) requirements. Studies will be performed by the District's Planning Division.

The total cost for sub account 22D is \$90,000.

22E - ENVIRONMENTAL STUDIES

All environmental study activities can be categorized into 3 separate types of investigations. Each type of this is detailed below:

1) The City of New York has identified 18 shoreline sites for potential restoration. These sites are located at various points along the shores of Jamaica Bay. These sites will be evaluated by the District.

2) The District will perform its own site reconnaissance which will include shoreline sites located within the bay, and on locations along the perimeter of the bay. From 6 to 10 sites will be selected for detailed

analysis as a result of this site screening.

3) Consultation with the local sponsor and preliminary data suggests that past impacts to the bottom of Jamaica Bay has adversely affected fisheries habitat. At this point the District hypothesizes that areas which have been deepened through dredge activities create sumps which have altered natural hydrologic conditions and establish stagnant areas of exceptionally poor water quality. Secondarily, these deepened sumps collect contaminated sediments. It has been documented through a variety of marine studies that many aquatic species forage or attempt to breed in deepened "holes" regardless of whether the holes have been artificially or naturally created. Extended contact with contaminated sediments and contaminated water by marine species combined with the lack of hydrologic circulation in deepened sumps likely results in the degradation of viable fisheries habitat. In addition, the adverse affects reduce Bay-wide flushing and circulation thus impacting all habitats within the system, including potential restoration sites. The District proposes to re-contour artificially created holes so that hydrologic circulation can occur and marine habitat can be restored. The District will test this hypothesis through a variety of marine studies including a review of past studies in the area; water sampling at various depths throughout the Bay; and the development of a hydrodynamic model to assess water circulation within the Bay, and identify depths and locations to target recontouring for greatest overall effect.

Environmental Studies include describing and assessing existing and future ecological, biological, aesthetic, and recreational conditions; assessing adverse and beneficial impacts of proposed projects through the use of a habitat analysis study; identify restoration activities; provide an incremental cost analysis of project benefits and costs; describing the proposed restoration activities; and evaluation of proposed activities under the following regulations: Clean Water Act Section 404 (b) (1), Endangered Species Act Section 7, the state water quality certificate, permitting action initiation and produce an Environmental assessment and, if necessary, Environmental Impact Statement (EIS) as required under the National Environmental Policy Act. Environmental Studies also

include obtaining tidal flow information, creation of conceptual restoration plans, and review of the draft and final Feasibility Reports.

All computer modelling efforts will comply with EC 1110-1-83, "Policies, Guidelines, and Requirements for Geospacial Data and Systems".

Tasks completed under sub account 22E include:

Tasks 9 and 10	Investigations of	(\$40,000)
	Identified Restoration Sites	

Tasks 9 and 10 are investigations of shoreline sites identified by the City of New York and reviewed during the Reconnaissance phase as likely areas for ecological restoration. The District will collect existing and limited field data (sufficient to characterize sites broadly, but not for detailed analysis) on these sites which will include the following information:

- 1) Locations of wetlands
- 2) Locations of hydrologic sources
- 3) Mapping and inventory of existing vegetation
- 4) Existing usage by the public and wildlife species
- 5) Listing of unique features or potential constraints to restoration activity
- 6) Identification of physical conditions defining each site.

This data will be evaluated in task 13 of this study. The District's Planning Division will complete tasks 9 and 10. The remaining funds for this study are presented under sub account 22F as some of the stages of the study are from a wildlife perspective as opposed to an environmental perspective.

Tasks 11 and 12	Preliminary Screening for	(\$89,000)
	Additional Sites	

In addition to evaluating the potential restoration sites identified by the City of New York, the District will conduct a brief screening of the entire Bay, examining islands within the Bay as well as other shoreline areas. During these tasks, the District will coordinate with various local agencies and examine existing aerial photos and field surveys to select potential sites to be examined for habitat restoration and recontouring along the bottom of the bay. Steps 1 through 6 listed in tasks 9 and 10 above will be undertaken for shoreline and island sites identified in tasks 11 and 12. The data obtained under these tasks will be evaluated in task 13. The remaining funds for this study are presented under sub account 22J as some of the stages of the study are from a hydrologic perspective as opposed to an environmental perspective.

The District's Planning Division will complete tasks 11 and 12.

Task 13	Evaluation and Selection of Final Sites	\$35,000
---------	--	----------

The District will evaluate the data obtained in tasks 9, 10, 11, and 12. From this data, the District will select approximately 20 terrestrial sites and 5 Bay bottom sites for detailed examination.

The terrestrial and Bay bottom sites will be evaluated utilizing the following criteria:

- 1) Existing and potential usage by wildlife species
- 2) Existing and potential usage by the public
- 3) Evaluation of surrounding habitat
- 4) Examination of any constraints to construction potentially required to for restoration activities.
- 5) Size and location of restoration site.
- 6) Potential presence or absence of HTRW contaminants.
- 7) Locations of known historic or archaeological sites.

Once the sites have been selected, tasks 14, 15, 23 and 24 can be initiated. The District's Planning Division in conjunction with the Technical Review Committee described under sub account 22A will perform task 13.

Task 14	Detailed Site Investigation of Selected Sites	\$80,000
---------	---	----------

Once the terrestrial sites have been identified under task 13, the sites will be examined through detailed investigation. Items to be completed during this investigation include:

- 1) Identification of areas of significant vegetative growth to be bio-benchmarked by a survey team. Biobenchmarking consists of selecting specific points of thriving vegetation and surveying the elevation of these points. The known elevations of existing thriving vegetation is critical to the restoration design of certain sites as tidal inundation regulates the growth of certain plant species.
- 2) The existing and potential tidal inundation of some sites will also be critical to restoration design. Selected sites will have tidal gauges installed, and tidal data collected.
- 3) Habitats will be classified under the Cowardine system for use in HEP studies or similar evaluation procedure.
- 4) Wetlands will be delineated at the selected sites.

The District's Planning Division will complete task 14.

Tasks 25, 26, 27	Benthic Analysis	\$35,000
------------------	------------------	----------

The District's Planning Division will perform an analysis of microinvertebrates located along the Bay bottom. Emphasis will be given to Bay bottom areas selected in task 13 for this inventory. Benthic grabs and similar devices will be utilized from Corps ships or shoreline for this analysis. Additional biological analysis will be

conducted under this study. Biological analysis involves mapping primary production areas, mapping plankton concentrations, and mapping of benthos production.

Task 29	Habitat and Wetland Functional Analysis	\$45,000
---------	---	----------

Utilizing information gathered from tasks 9, 10, 11, 12, 14, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, and 27; the District's Planning Division will conduct a Habitat Evaluation Procedure or similar analysis to assess the Value of existing conditions at the selected sites. Both terrestrial and Bay bottom sites will be evaluated. The District's Planning Division will complete task 29 augmented by the USFWS, NYCDEP and other members of the HEP team. This requirement is outlined in EC 1105-2-206.

Task 30	Develop Habitat Analysis Draft Report	\$10,000
---------	---------------------------------------	----------

A draft report for activities completed in task 29 will be developed. This report will be reviewed by the technical review committee described in sub account 22A.

Task 31	Develop Final Habitat Analysis Report	\$1,000
---------	---------------------------------------	---------

A final report incorporating comments from the technical review committee will be developed.

Task 37	Develop Existing Conditions Draft Report	\$5,000
---------	--	---------

An existing conditions report summarizing the environmental findings under tasks 9,10,11,12,13, 14, 25, 26, 27 and 29; engineering findings under tasks 16, 21, 22, 23 and 24; socio-

economic findings under task 5, cultural findings under task 33; and hydrologic findings under tasks 18 and 19 will be summarized in a report. This report will be generated by the District's Planning Division and subject to review by the technical review committee.

Task 38	Prepare Final Existing Conditions Report	\$1,000
---------	--	---------

A final report incorporating the committee's comments will be produced by the District's Planning Division. The results of this report will be utilized in the development of the conceptual mitigation plans, the incremental cost analysis, and the analysis alternatives analysis (tasks 42, 47 and 49 respectively).

Task 42	Develop Conceptual Restoration Plans as Selected Sites	\$45,000
---------	--	----------

Based on the results of the existing conditions report and the Habitat Analysis, the District's Planning Division will prepare Conceptual restoration plans which will be forwarded to the District's Engineering Division for specific site drawings, and cost estimates (tasks 44 and 45).

Task 43	Habitat Restoration Analysis	\$25,000
---------	------------------------------	----------

The Planning Division will predict increases in habitat value based on the plans developed under task 42. The results of this analysis will be used in the incremental cost analysis (task 47).

Task 49	Development of Alternatives Analysis	(\$10,000)
---------	--------------------------------------	------------

The District's Planning Division will complete an alternatives analysis. As the bulk of the analysis will be dependent on environmental inputs, the majority of the money for this task lies

under sub account 22E. Inputs from the existing conditions report (task 38) and other tasks will be used to develop the alternatives analysis. The results of this task will be used in the preparation of NEPA documentation (task 50).

Task 50	Preparation of Environmental Permits	\$30,000
---------	--------------------------------------	----------

Once the incremental cost analysis has been completed (task 48) and the final conceptual restoration plans are selected, the NEPA documentation process can be initiated. The District's Planning Division will prepare the NEPA documentation and initiate application and review process for all other necessary permits and actions required for construction. Likely actions include the preparation of Water Quality Certificate documentation, a Clean Water Act section 404 evaluation, and potential section 7 of the Endangered Species Act required coordination, as well as compliance with other Federal and State statutes.

Task 65	Vehicle / Vessel Use	\$30,000
---------	----------------------	----------

This money is to be used for the District's Planning Division's use of vehicles or vessels as necessary to complete environmental studies.

Task 69	Field Supplies and Equipment	\$30,000
---------	------------------------------	----------

This money will be used by the District to complete environmental studies, and support field studies and data storage/processing.

Task 70	Model Evaluation by Waterways Experiment Station	\$20,000
---------	--	----------

The Corps' Waterways Experiment Station will be used to evaluate "in-kind" service activities performed by the City of New York. The hydrodynamic studies and programs being developed by the local sponsor (namely tasks 18, 19 and 20) require the technical review of

an expert at the Federal level. Representatives from WES will serve in this capacity.

The total cost for sub account 22E is \$531,000.

22F - FISH AND WILDLIFE STUDIES

Fish and Wildlife studies consist of screening studies performed by the District, and a Fish and Wildlife Coordination Act Report generated by the USFWS as required under NEPA.

The following tasks will be completed under sub account 22F:

Tasks 9 and 10	Biological Investigations of Identified Terrestrial Sites	(\$40,000)
----------------	--	------------

As described under sub account 22E, portions of this task are set aside specifically for the examination and identification of wildlife species.

Task 34	Statement of Work for the USFWS	\$2,000
---------	---------------------------------	---------

The District's Planning Division will complete a scope of work for the United States Fish and Wildlife Service (USFWS) to complete a Fish and Wildlife Coordination Act Report (FWCAR).

Task 35	USFWS Contract Executed	\$25,000
---------	-------------------------	----------

This is the estimated cost for the USFWS to complete the FWCAR.

Task 36	NYD Review of USFWS FWCAR Report	\$2,000
---------	-------------------------------------	---------

The District's Planning Division will review the FWCAR.

The total cost for sub account 22F is \$69,000.

22G--ECONOMIC STUDIES

This work effort includes an economic assessment of the benefits of the "without-project" condition and "with-project" alternatives under consideration for the study. This involves some minimal additional data collection and assessments of economic impacts based on findings of the Reconnaissance study. A detailed examination of the problem area and appropriate economic analyses will be conducted.

The following tasks will be completed under sub account 22G:

Task 47	Prepare Draft/Initiate Incremental Cost Analysis	\$30,000
---------	--	----------

In addition to summarizing "with" and "without" project conditions, the District's Planning Division will prepare an incremental cost analysis based on values obtained through the habitat analysis in order to determine which restoration activities will be selected for the Construction phase.

Task 48	Prepare Final Incremental Cost Analysis Report	\$6,000
---------	--	---------

A final report and plan selection will be prepared for higher authority review.

The total cost for sub account 22G is \$36,000.

22H--REAL ESTATE STUDIES

Real Estate Studies will include the involvement and coordination with the Corps of Engineers, New York District, Real Estate Division (CENAB-RE). Integral to this work effort, as outlined in draft ER 405-1-12 dated January 1991, is the preparation of a Baseline Cost Estimate for Real Estate in M-CACES format and a Real Estate Supplement (RES). These items are

required for inclusion in the final report.

The following tasks will be completed under sub account 22H:

Task 32 Real Estate Evaluation of Selected Sites \$25,000

Real Estate will evaluate the selected sites for restoration in preparation of a Gross Appraisal (task 51). The District's Real Estate Division will also obtain rights-of-entry as is necessary for various studies.

Task 51 Real Estate Preparation of Gross Appraisal \$24,000

This will involve a detailed accounting of property ownership, property evaluation for possible easement rights or acquisition of impacted project lands, preparation of a Gross Appraisal, and assessment of LERD requirements. The final RESs will be provided to Project Management and incorporated into the PMPs. Real Estate representatives will also attend meetings and conferences with the sponsor when necessary. CENAD-RE will also be involved with preparing, modifying and revising the Project Cooperation Agreement (PCA) in cooperation with the local sponsor, study manager, project manager, and all other affiliated or concerned agencies.

The total cost for sub account 22H is \$49,000.

22J--HYDROLOGY & HYDRAULIC INVESTIGATIONS

Hydrology and Hydraulic Investigations comprise the largest task efforts in this study. Sub-aquatic as well as terrestrial studies will be required. Hydrogeologic studies include the analysis of tidal movements, wave actions, and location of groundwater as necessary to construct terrestrial and Bay bottom restoration plans. The majority of tasks initiated under this sub account will be completed by the local sponsor; with technical

review by WES (task 70).

Tasks under sub account 22J include:

Tasks 11, 12	Preliminary Screening for Additional Sites	(\$21,000)
--------------	--	------------

As described in sub account 22E, some items undertaken in this task include studies of a hydrologic nature. Components of these tasks include a background physical analysis. Physical analysis is based on existing data to the extent possible and includes mapping tidal and non-tidal currents, identify water mass distribution patterns, identification of fronts, identification of vertical mixing rates, characterizing air-Bay exchange process, and mapping of meteorological and climatological patterns.

Chemical analysis includes mapping of water quality characteristics of water column, mapping sediment contaminant distribution patterns, and Identification of biochemical processes and rates of exchange.

Task 18	Develop Hydrodynamic Model	\$175,000
---------	----------------------------	-----------

In order to assess water circulation at a site-specific scale throughout Jamaica Bay, a fine-grid model will be developed using curvilinear hydrodynamic 3D models. This will require extensive computer programming to create such a model and address required outputs for an environmental analysis.

Task 19	Water Quality Sampling Program	\$250,000
---------	--------------------------------	-----------

A water quality sampling program to assess the existing conditions of the Bay will be completed. The quality sampling program is necessary to both develop and calibrate the hydrodynamic modelling (task 18) and to describe existing conditions of fisheries habitat within the Bay.

Task 20	Develop Water Quality Modelling	\$280,000
---------	---------------------------------	-----------

Once the hydrodynamic model and water quality sampling program have been completed, a water quality model assessing the locations of water throughout the Bay can be developed. This model is required to predict not only the present circulation patterns, but also future water circulation patterns based on various proposed re-contouring efforts. The outputs from this model will be used in the Habitat Evaluation Process.

Hydrodynamic tasks (listed as 18, 19 and 20) will be performed by the local sponsor as "in-kind" services. These "in-kind" services total to 50% of the local sponsor's total cost of the project (\$675,000). The total cost for tasks 18, 19, and 20, however, exceeds the limit for "in-kind" services allowable under this authority. Additional costs will be born by the sponsor as a non-study cost.

The total cost for sub account 22J is \$726,000.

22K - GEOTECHNICAL INVESTIGATIONS

Geotechnical investigations will include evaluation of grain size distributions, sedimentation rates, material classification, and estimated volume of material at selected sites. Soil testing at selected restoration sites will be conducted as part of the geotechnical investigations. Design guidance will be provided for the various alternatives to be investigated for terrestrial restoration using available subsurface information and existing site conditions.

Tasks completed under sub account 22K include:

Task 16	Sediment Analysis at Selected Sites	\$85,000
---------	-------------------------------------	----------

Terrestrial sites identified under task 13 will be analyzed. Such analysis will be used to determine both the presence or absence of contaminants potentially limiting vegetative growth and the naturally

occurring conditions (nitrogen and phosphorus) elements needed for plant vitality. It is estimated that 30 samples will be tested.

Tasks 21,22	Sediment Analysis at Selected Aquatic Sites.	\$65,000
-------------	--	----------

Bay bottom sites identified under task 13 will be analyzed to determine existing fisheries habitat. Sediment analysis at these sites is critical to determining the existing conditions within the Bay. The information gathered in this task will be used in the habitat evaluation study. It is estimated that 10 samples will be collected and analysed.

The total cost for sub account 22K is \$150,000.

22N--SURVEYING AND MAPPING

Surveying of specific sites will be required for conceptual restoration design. Sediment data and beach data for grain size will be collected for use in design, if current information is unavailable or deemed insufficient.

Tasks completed under sub account 22N include:

Task 15	Detailed Topographic Design Survey	\$115,000
---------	------------------------------------	-----------

In order to develop conceptual restoration plans and costs, terrestrial sites identified in Task 13 will be required to be surveyed at sufficient detail to produce an accurate cost estimate (1 ft. contours). topographical contours. Tidal gauges and bio-bench marked flags placed during environmental studies will also be surveyed.

Tasks 23 and 24	Map Bathymetry of Aquatic Sites	\$25,000
-----------------	---------------------------------	----------

The Bay bottom sites selected in task 13 will be mapped. This will aid in re-contouring designs which will then be inputted into the hydrodynamic modelling (task 20) to determine water circulation and

habitat reconfiguration within the Bay.

Surveys of selected sites will be performed by the New York District and related field offices. The total cost of sub account 22N is \$140,000.

22P--DESIGN QUANTITY AND COST ESTIMATES

Design efforts for Jamaica Bay consist of coordinating with involved parties relating to the surveying and mapping tasks, with the study team, and the various technical elements for determination and design of the proposed restoration features for the project. Proposed conceptual restoration plans developed through Environmental Studies will be evaluated and a cost for the implementation of these plans will be developed. Items evaluated during this process include: Topographic surveys, vegetation mapping, tidal range estimates, water quality analysis, estimate of fill removal, construction removal costs, sediment analysis, habitat and wetland analysis, analysis of soil suitability, estimate of demolition and removal of structures costs (as appropriate), estimate of fill volume and costs, erosion and stabilization control measure evaluations, and estimations on removal of bulkheads, concrete and fill material as appropriate. It is estimated that 40 conceptual plans will be submitted for initial cost estimates. After the incremental cost analysis is completed, it is estimated that 15 terrestrial and 3 Bay bottom sites will be selected for design sheets and M-CACES studies which are described below:

Task 44	Develop Engineering Plans for Selected Sites.	\$130,000
---------	---	-----------

Detailed design drawings of conceptual mitigation plans developed in task 42 will be created by the District's Engineering Division. These plans will meet Corps' specifications and be used in developing the cost estimate for restoration activities.

Task 45	Develop Projected Construction Costs	\$130,000
---------	--------------------------------------	-----------

For Restoration Plans

The District's Planning and Engineering Divisions will estimate the construction and implementation costs using M-CACES procedures based on the plans developed in task 44.

Task 52 Determination of Post-Construction Costs \$5,000

The District's Planning and Engineering Divisions will estimate and post-construction costs associated with the restoration plans. Post-construction costs are likely to include vegetative monitoring, re-planting costs, and maintenance of restoration property.

The total cost for sub account 22P is \$265,000.

22Q--STUDY MANAGEMENT

Study management involves coordinating all aspects related to the management of the Jamaica Bay study including scheduling, coordination, budget preparation, correspondence, etc., from the point of initiation through the review process and completion.

Tasks to be completed under sub account 22Q include:

Task 46 Engineering Management \$26,000

This is management of engineering tasks 44 and 45 for the District's Engineering Division management.

Task 66 Technical Program Management \$45,000

This includes coordination and implementation of study team and scoping meetings, executive committee meetings, communication with North Atlantic Division (NAD) and the study sponsor (cash contributions will be coordinated into the overall study budget).

Technical Program Management also includes management of environmental studies and other technical evaluations. A study manager is identified under the plan formulation management task (task 67).

The total cost for sub account 22Q is \$71,000.

22R--PLAN FORMULATION AND EVALUATION

Plan Formulation refers to the formulation and evaluation of alternative solutions to the problems initially identified during the Reconnaissance study and subsequently refined during the feasibility study. "Without" project future conditions will be assessed for each selected site for comparison with the "with-project" future conditions. Planning objectives and constraints and plan formulation rationale and criteria will be developed. The evaluation of alternatives will compare the costs and benefits associated with each plan for implementation.

The following tasks will be completed under task 22R

Task 39	Establish Without Project Conditions	\$3,000
---------	--------------------------------------	---------

"With-out" project conditions have already been described for the Bay in the Reconnaissance report. Additional "with-out" project conditions will be described for each selected restoration site based on environmental and socio-economic input. This task will be completed by the District's Planning Division.

Task 67	Plan Formulation Management	\$32,000
---------	-----------------------------	----------

Plan Formulation management will result in the managing of the incremental cost analysis report, and associated restoration site selection. Additionally, a study manager will be assigned from the District's Planning Division. A separate project biologist, who will lead data gathering and field operations, will also manage all

environmental studies listed under 22E.

The study manager will develop a detailed study plan and monitor funds and work progress to ensure tasks are completed on time and within budget.

Study Management will ensure that all data collection activities are proceeding as scheduled and that the information collected is properly disseminated.

Study Management includes frequent coordination with technical elements, response to congressional or other study related inquiries, annual preparation of the budget testimony and maintaining open dialogue with the Sponsor and NAD. This effort also entails preparation for, attendance when necessary and associated documentation for milestones as follows:

P3 Milestone--District Coordination Meeting

P4 Milestone - Formulation to NAD

P5 Milestone - Approval of Formulation Material

P6 Milestone - Submission of Draft Feasibility Report

P7 Milestone - Approval of Draft Report

P8 Milestone - Submission of Final Feasibility Report

P9 Milestone - Approval of Final Feasibility Report

Study Management also involves the preparation and review of a draft and final Project Management Plan for any recommended water resources project which would enter the Plans and Specifications phase.

Task 71 Prepare Formulation \$26,000

The plan formulation items taken into consideration are inputs from the incremental cost analysis (task 48), an analysis of "with" and "with-out" project conditions, and analysis of socio-economic data (tasks in sub accounts 22C and 22G). This formulation will be presented in the Feasibility Report. This task will be completed by the District's Planning Division.

The total cost of sub account 22R is \$61,000.

22S--REPORT PREPARATION

This feature includes assembling, writing, editing, typing, drafting, reviewing, reproducing and distributing draft and final study reports, environmental assessments and other related documentation required for transmittal by USACE to higher authorities and for use as a decision document.

Tasks included in sub account 22S include:

Task 54 Prepare Draft Feasibility Report and DEIS \$40,000

A draft feasibility report and draft Environmental Impact Statement (DEIS) will be prepared by the District's Planning Division. The contents of the Feasibility Report are summarized as follows:

- (1) Brief, concise main report summarizing the technical findings, conclusions and recommendations;
- (2) An Environmental Impact Statement (EIS) or Environmental Assessment (EA) with a Finding of No Significant Impact (FONSI);
- (3) Technical appendices presenting the detailed backup and results to individual work tasks;

- (4) Appendix containing the sponsor's financial capability statement and preliminary financing plan; and
- (5) Other supporting documentation including the Project Management Plan (PMP).

The steps necessary for producing a final report will include the following phases: Finalize draft Feasibility Report for internal/sponsor review; conduct review board meeting and revise and reproduce draft report for submission to NAD; revise draft report in response to NAD comments; reproduce draft for coordination with agencies and public; modify draft report in response to comments during agency and public comment; and coordinate with sponsor and internal elements and reproduce final District report for distribution.

Task 58 Prepare Final Feasibility Report and FEIS \$20,000

This report will incorporate comments from higher authority review.

Task 63 Prepare Record of Decision \$3,000

Once the NEPA documentation has been reviewed and approved, a Record of Decision will be prepared.

The total cost of sub account 22S is \$63,000

22T - PROGRAM AND PROJECT MANAGEMENT

This task involves macro-level tracking, monitoring and upward reporting of the study progress through NAD and Washington levels of the Corps of Engineers.

Tasks included under sub account 22T are:

Task 68 Program Administration \$30,000

This money is used by the District's Programs and Project Management Division (PPMD). PPMD will track monetary obligations and expenditures for each fiscal year.

The total cost for sub account 22T is \$30,000.

22V - DRAFT PROJECT COOPERATION AGREEMENT (PCA)

A Draft Project Cooperation Agreement for restoration activities of selected alternatives will be included in the feasibility report. The PCA is a legally binding agreement that sets forth the terms of the relationship between the Federal Government and the local sponsor for construction, operation and maintenance of projects approved through the feasibility process.

Tasks included in this sub account include:

Task 60	Preparation of Draft Project Cooperation Agreement	\$10,000
---------	--	----------

A draft PCA will be created by the District for higher authority review.

Task 61	Finalize Project Cooperation Agreement	\$7,000
---------	--	---------

A final PCA will be created by the District incorporating comments from higher authority and the local sponsor.

22Y--WASHINGTON LEVEL REVIEW

This item is included to ensure the sponsor is afforded the opportunity to participate in any significant effort as a result of the review by the Washington Level Review Center (WLRC). This is to cover expenses for the District and non-Federal sponsor associated with the review and

processing the feasibility report subsequent to the Division Commanders's Notice announcing the completion of the feasibility report. Additionally, representatives of the Sponsor, along with representatives from the District, shall attend a site visit by WLRC during the processing of the report. By regulation, this item is set a 5% of total study cost or \$50,000 whichever is less, and is to be cost-shared equally.