COASTAL CONSERVATION PROGRAM (PHASE I)

(BA-0014)

EXECUTIVE SUMMARY

BORROWER : Government of Barbados

EXECUTING AGENCY: The Coastal Conservation Project Unit (CCPU) under the Ministry of Tourism, International Transport and the Environment.

AMOUNT AND SOURCE:

IDB:	US$3,600,000 (OC)
Cofinancing:	US$ 350,000
Local counterpart funding:	US$ 550,000
Total:	US$4,500,000

FINANCIAL TERMS AND CONDITIONS:

Amortization period:	20 years
Disbursement period:	38 months
Interest rate:	variable
Inspection and supervision:	1%
Credit fee:	.75%

COFINANCING: A grant up to CAN$500,000 (US$350,000 approximately) from the Canadian Technical Cooperation Program to complement the local counterpart funding.

OBJECTIVES: The main objective of the program is to develop a nation-wide integrated Coastal Zone Management Program for Barbados by complementing the activities undertaken for the west and south coasts and to effect the institutional reforms necessary for successful implementation of the program. The specific objectives are to: (a) carry out diagnostic studies and develop a Coastal Zone Management Plan for the north, east and southeast coasts; (b) strengthen the local institutions responsible for coastal zone management; and (c) complete the feasibility assessment and design of an investment program (Phase II) for integrated coastal zone management.

DESCRIPTION: The technical cooperation would consist of the following three components:

a. Development of a National Coastal Zone Management Plan, which would entail diagnostic surveys of the north, east and south-east coasts; and community participation and demonstration projects in coastal zone management to be

selected by a Project Evaluation Committee in accordance with eligibility criteria agreed upon with the Bank.

b. Institutional strengthening activities consisting of the preparation of an income-generating strategy for coastal management; legal and regulatory reforms; the expansion of a Geographic Information System (GIS) for coastal management purposes; professional training in coastal zone management and related fields; public awareness and education activities; and the upgrading of environmental laboratory analysis services in support of coastal zone management.

c. Design of the nation-wide Investment Program (Phase II) (BA-0019) and an assessment of its socio-economic, institutional, financial, legal and environmental feasibility, including cost recovery mechanisms for the investments.

ENVIRONMENTAL CLASSIFICATION: The Environmental Management Committee, at its meeting of July 26, 1994, classified this as a Category I operation.

IMPACT ON POVERTY: The Program is aimed at maintaining the environmental quality of the coast through the use of improved data and monitoring for land use planning as well as institutional strenghtening. As such the operation does not meet the criteria pursuant to the Report on the Bank's Eight General Increased on Resources which would enable it to be classified as an operation aimed at reducing poverty.

BENEFITS: The program is designed to build the foundation for an integrated, nation-wide coastal management program for Barbados thereby contributing to the sustainability of the tourism sector. Each component is expected to yield positive and, in some instances, measurable environmental and socio-economic benefits such as delineation of coastal setbacks, coastal land use regulation, enhancement of local understanding of coastal processes, support for coastal management measures among targets groups, integration of coastal development decisions, improved compliance with environmental policies in the coastal zone, and greater access to reliable environmental data. The investment program resulting from the technical cooperation would yield long-term benefits in environmental quality, optimal resource allocation and financial sustainability.

RISKS: This technical cooperation does not present any significant risks by virtue of the activities proposed and the technical capacity of the CCPU. However, the full benefits of the institutional strengthening activities depend on the establishment of the CZMU and the enactment of the **Coastal Zone Management Act** and the **Marine Pollution Control Act** which are not in effect. Benchmarks and contractual conditions have been incorporated to the execution of the technical cooperation to assure that a sound legal foundation for the CZMP is established by the conclusion of the operation.

EXCEPTIONS TO BANK POLICY: A waiver to the procurement procedures of the Bank is recommended, as requested by the Government of Barbados, for the direct contracting of Bellairs Research Institute as the quality assurance firm. The exception can be justified on the basis that Bellairs Research Institute is the only entity with the technical capacity to provide the services required and to meet the criteria of the Canadian Technical Cooperation Program. Bellairs Research Institute is also the institution providing quality assurance for the Coastal Conservation Pre-Investment Program (loan 571/OC-BA; ATC/CD-3317-BA; ATN/JF-3318-BA).

THE BANK'S COUNTRY STRATEGY: An important goal of the Bank's lending strategy in Barbados is to support the Government in achieving sustained growth and continued social development, including restoring the competiveness of exports in key sectors such as tourism. Consistent with this strategy, the proposed operation is designed to enhance the tourism sector through improved management of the coastal zone --a key tourism asset.

SPECIAL CONTRACTUAL CONDITIONS: Conditions to be met prior to first disbursement: The Borrower shall demonstrate to the satisfaction of the Bank that: (a) the Project Officer has been recruited; (b) the Bellairs Research Institute of McGill University of Canada to provide quality assurance services has been contracted in accordance with the terms of reference agreed upon with the Bank; and (c) the Project Steering Committee has been established (paragraphs 3.9, 3.14, and 3.20).

Condition to be met within 60 days of signature of the agreement: The Borrower will submit a Project Initiation Report in accordance with the guidelines provided by the Bank (paragraph 3.18).

Condition to be met prior to contracting of the principal consulting firm: The Borrower shall

demonstrate to the satisfaction of the Bank that the Coastal Zone Management Unit has been established (paragraphs 1.8 and 3.23).

Condition to be met within 24 months of signature of the agreement: The Borrower shall present to the Bank revised drafts of the Coastal Zone Management Act, the Marine Pollution Control Act and their implementing regulations which shall take into account, to the Bank's satisfaction, the policies of the Coastal Zone Management Plan. (paragraphs 1.9 and 3.23).

Condition to be met prior to initiation of the demonstration project activities: The Borrower shall demonstrate to the satisfaction of the Bank that the following eligibility criteria have been met. The projects shall: (a) serve as a test of shoreline stabilization and coastal habitat restoration techniques under varying field conditions; (b) provide mechanisms for community-based management of coastal resources; (c) assess the environmental impacts of a shoreline enhancement or stabilization technique; (d) enhance the use of coastal resources for income-generating purposes; and (e) have been approved by the Programming and Evaluation Committee (paragraph 3.4).

NOTE: The draft loan contract is available to members of the Board of Executive Directors.

I. BACKGROUND

1.1 The Government of Barbados (GOB) has requested Inter-American Development Bank (Bank or IDB) financing for Phase I of a nation-wide integrated Coastal Zone Management Program (CZMP) for Barbados. The GOB sees effective coastal zone management as an essential tool for maintaining the quality of the coastal environment, which in turn provides the basis for a viable tourism sector in Barbados.

1.2 Phase I activities are intended to build progressively on the studies and pilot activities being undertaken along the west and south coasts with financing from the Coastal Conservation Pre-Investment Program (loan 571/OC-BA). As such, Phase I would consist of an expansion of coastal zone management activities to the north, east and southeast coasts of Barbados. This would take place concurrent with continued implementation of institutional measures, further monitoring of the pilot structures constructed during the Pre-Investment Program, and other activities required for timely implementation of a coast-wide investment program (Phase II) planned for Bank approval in late 1996.

A. Economic context for coastal management

1.3 The economy of Barbados is closely linked to the character and quality of its 92 km coastline. The west and south coasts support a tourism infrastructure that depends on good coastal water quality, sand beaches and other coastal resources. Fringing coral reefs predominate along the west or leeward coast, with rubble banks and patch reefs found along the south coast. This reef tract serves as a natural barrier against wave erosion as well as a tourism asset. The north and southeast coasts are characterized by limestone cliffs with pocket beaches, while the east coast features sand beaches backed by sedimentary slopes and offers broad scenic vistas which contribute to the tourism product.

1.4 Over the past two decades, tourism has become the leading economic sector in Barbados, accounting for 15% of GDP and 55% of export earnings and employing up to 20% of the work force. After record numbers of stayover tourist arrivals in 1988 and 1989, Barbados experienced a decline in arrivals of 6.1% in 1990, 9.0% in 1991 and 2.6% in 1992. Two problems identified in the Barbados Government Development Plan for 1993-2000 as contributing to this decline are the quality of the tourism experience and the changing tastes of the average tourist. A decline in quality of the Barbados environment is identified as one major cause of the decline in quality of the tourism experience. Problems which impact negatively on tourism, and which have become more evident over time, include the bacteriological contamination of coastal waters and increasing user conflicts. Changes in tourist tastes identified include heightened sensitivity to the environment and a shift in demand towards nature-based tourism.

1.5 In light of these changing conditions, the 1993-2000 Development Plan states that the tourism policy for Barbados over the Plan

period is to foster quality tourism through enhancement of the tourism product. It emphasizes that this will require national efforts to protect and conserve the environment.

B. Past coastal zone management activities in Barbados

1.6 The GOB has long recognized the need to conserve and manage its coastal zone. Following diagnostic and pre-feasibility studies funded by the IDB in 1983-1984, the Government initiated two operations also financed by the Bank. These were:

a. the Coastal Conservation Pre-Investment Project (loan 571/OC-BA; ATC/CD-3317-BA; ATN/JF-3318-BA) aimed at designing and testing beach stabilization and enhancement measures, carrying out environmental monitoring activities and preparing a coastal zone management plan for the west and south coasts. Designs and a feasibility assessment for investments along the west and south coasts should be available by April 1995.

b. an Institutional Strengthening Study (ATN/SF-3316-BA) which recommended the establishment of a Coastal Zone Management Unit (CZMU), implementation of legislation for marine pollution control and coastal zone management, and suggested preliminary alternatives for cost recovery.

1.7 Through these project activities, the Coastal Conservation Project Unit (CCPU) has enhanced its capacity in coastal engineering, planning and marine pollution control. Data on coastal processes and resources have been acquired for about 40 km of shoreline along the south and west coasts.

1.8 Recognizing the importance of effective long-term coastal zone management to the achievement of sustainable development, the GOB has initiated steps to transform the CCPU into a single permanent unit to be called the Coastal Zone Management Unit (CZMU). This unit would assume the responsibilities of the CCPU, ensure that the policies of agencies responsible for coastal development are coordinated, as well as oversee implementation of a comprehensive CZMP for Barbados, and related investments. An Establishment Order has been prepared and the Government intends to pursue the steps needed for its approval. The CZMU would be established as a condition to be met prior to contracting the principal consulting firm for this technical cooperation.

1.9 The draft **Marine Pollution Control Act** and the **Coastal Zone Management Act** have not yet been enacted. The reasons for this are: (a) the need to clarify the relationship between this legislation and other legislation for natural resources management; and (b) revisions are necessary to ensure the application to the entire coast rather than only the south and west coasts. These revisions would be prepared during this technical cooperation to ensure a sound legal foundation for coastal zone management.

1.10 The cost recovery mechanisms identified in the Institutional Strengthening Study were indicative in nature since final designs

for investments were not yet available and since the mechanisms proposed were suited primarily to the west and south coasts. A formal feasibility analysis would be undertaken during the technical cooperation as a first step towards ensuring the CZMP's financial sustainability.

C. Institutional context and priorities

1.11 The Coastal Conservation Project Unit (CCPU) was established by the GOB in 1983. It was initially conceived as a specialized execution-oriented government unit specifically concerned with issues relating to coastal erosion, its prevention and control.

1.12 The CCPU is currently staffed with six professionals including a project manager, a coastal engineer, a coastal planner, a marine biologist, an information specialist and a full-time accountant. Information on the CCPU's organizational structure and staff is available in the project files.

1.13 In addition to overseeing the execution of the Coastal Conservation Pre-Investment Program, the CCPU now carries out routine coastal zone management activities such as shoreline and water quality monitoring and the provision of development control advice to the Town and Country Planning Department. In Barbados, public or crown lands extend from the mean high water mark seaward, while backshore areas are primarily under private ownership. Specific areas where advice is sought from the CCPU are: setback requirements, public access to the shore, and the potential impacts of coastal infrastructure. By providing technical advisory support and data for land use decisions in the coastal zone, the CCPU is expected to play an important role in Barbados' strategy for sustainable development.

1.14 Other immediate priorities for institutional strengthening pertain to: (a) coordinated patrolling and enforcement of existing natural resource regulations in the coastal zone; (b) the revision of the draft **Marine Pollution Control Act** and the **Coastal Zone Management Act** and the preparation of implementing regulations; (c) the need to provide reliable environmental laboratory analysis for coastal zone management; and (d) the introduction of income-generating mechanisms.

1.15 Government Analytical Services (GAS) is an existing laboratory facility within the Ministry of Agriculture and Rural Development which carries out environmental laboratory analysis for the CCPU and other government units. The laboratory requires additional analytical equipment, supplies and trained technicians dedicated to the environmental analysis of Phase I activities as well as the routine monitoring requirements of the CCPU. Experience gained during the Pre-Investment Program revealed that the laboratory was not equipped to facilitate rapid and reliable analysis of marine and terrestrial water quality. The lack of reliable analyses in the future could impede the use of the data for enforcement and development control purposes.

1.16 The objectives of this technical cooperation are consistent with the Government's strategy in that it would enable Government to expand the information base and strengthen the institutional mechanisms and functions required for a permanent CZMP in advance of the investments foreseen for Phase II.

D. The north, east and southeast coasts

1.17 This region consists of the exposed, windward coast of the island. It differs substantially from the south and west coasts both in terms of its physiography and demographics. Some areas, such as the Scotland District, exhibit unstable soils and are susceptible to landslides. The region is less densely populated than the west coast, and thus offers a distinct, more nature-oriented experience. There is also a proposal to establish a National Park in the area.

1.18 While until recently the effects of land use change had been more apparent along the west and south coasts, pressures are now extending to the north, east and southeast coasts. Applications to develop the southeast coast for residential properties as well as requests for sand extraction along the east coast are being submitted with increasing frequency. In the absence of reliable data on carrying capacity and adequate land use guidelines, the area could experience increasing environmental deterioration, erosion and land use conflicts. The Government places a high priority on ensuring that future development decisions are compatible with the unique character of this region.

E. Bank strategy in the sector

1.19 The Bank's current lending strategy in Barbados focuses on assisting the country to achieve sustained growth and continued social development. The key to achieving sustained growth is restoring the competitiveness of exports, and mainly that of tourism, which is by far the most important export. This in turn requires avoiding degradation of the environment in which the tourism sector operates. Consistent with this strategy, the proposed operation is designed to enhance the sector through improved management of the coastal zone environment --a key tourism asset.

1.20 More than half of the Bank's lending portfolio with Barbados is committed to environmental protection. This technical cooperation is designed to complement on-going operations in environmental sanitation as well as a pending tourism sector loan and a technical cooperation for environmental management and land use planning.

II. OBJECTIVES

2.1 The purpose of the technical cooperation is to develop a nation-wide integrated CZMP for Barbados by complementing the activities undertaken for the west and south coasts and to effect the institutional reforms necessary for successful implementation of the program.

2.2 The specific objectives of the technical cooperation are to:

a. Carry out diagnostic studies and develop a Coastal Zone Management Plan for the north, east and southeast coasts of Barbados (from Maycock's Bay to South Point);

b. Strengthen the local institutions with responsibility for executing an investment program in integrated coastal zone management; and

c. Complete the feasibility assessment and design of an Investment Program (Phase II) for integrated coastal zone management in Barbados.

III. PROJECT DESCRIPTION

A. Specific activities

3.1 The technical cooperation would consist of the following three components:

1. Development of the Coastal Zone Management Plan

3.2 A coordinated set of diagnostic surveys would be undertaken along approximately 45 km of shoreline from Maycock's Bay to South Point as the basis for developing the Coastal Zone Management Plan. The surveys would entail: (a) the delineation and classification of the north, east and southeast coasts into geomorphological units; (b) historical analysis of beach and shoreline changes; (c) the acquisition of baseline data on oceanographic conditions, sediment transport, hydrogeology, marine and terrestrial water quality, coastal habitats and resources; and (d) the design of permanent field monitoring programs.

3.3 As a complement to the diagnostic surveys, the program would also finance: (a) a coastal land use survey for the north, east and southeast coasts; (b) an inventory of existing coastal engineering structures; and (c) a socio-economic profile of local communities and their reliance on coastal resources. This profile would serve as a basis for the Coastal Zone Management Plan and to design demonstration projects in coastal zone management.

3.4 Approximately five demonstration projects would be executed to assess the feasibility and cost-effectiveness of selected techniques in coastal zone management. To be eligible, the projects would have to meet the following criteria prior to their initiation: (a) serve as a test of shoreline stabilization and coastal habitat restoration techniques under varying field conditions; (b) provide mechanisms for community-based management of coastal resources; (c) assess the environmental impacts of a shoreline enhancement or stabilization technique; (d) enhance the use of coastal resources for income-generating purposes; and (e) approval from the Programming and Evaluation Committee (PEC). The projects would encourage the private sector, including target groups, such as fishing communities and shorefront property owners,

to contribute to the development of the Coastal Zone Management Plan.

3.5 A National Coastal Zone Management Plan would be prepared on the basis of the above. This would entail the formulation of specific policies such as coastal setbacks, restricted land use zoning and other regulatory measures designed to protect private property from coastal hazards and control erosion while also recognizing private property rights and the identification of investment priorities for the north, east and southeast coasts. These results would be combined with the West and South Coast Coastal Zone Management Plan prepared during the Pre-Investment Program.

2. Institutional strengthening

3.6 Activities of this component include the following sub-components:

a. **Development of an income generation strategy:** The recommendations provided by the Institutional Strengthening Study would be revisited in light of the design of the nationwide CZMP and the investments contemplated for Phase II. Recommendations would be made based on a detailed feasibility analysis of specific mechanisms in terms of cash flow projections and their impact on Government and private sector revenues. As a result of this Technical Cooperation, it is expected that an income generating scheme would be approved by Government with the purpose of beginning the process of financial sustainability of coastal zone management activities. In addition, specific cost recovery mechanisms would be developed in order to recover part or all of the Phase II investments for all coasts depending on the nature of the benefits and targeted beneficiaries. By the conclusion of the technical cooperation, targets for cost recovery and mechanisms for their implementation would be defined.

b. **Legal and regulatory reforms for the CZMP:** The establishment of the CZMU as a permanent entity would be a condition prior to signature of the contract with the principal consulting firm. This would ensure that the unit would become the GOB focal point for coastal zone management thus ensuring better coordination in development review, information dissemination and enforcement. In addition, revised drafts and implementing regulations of the **Coastal Zone Management Act** and the **Marine Pollution Control Act** would be prepared to take into account the policies of the Coastal Zone Management Plan for the north, east and southeast coasts. The revised draft legislation and implementing regulations would be presented as a condition to be met within 24 months of signature of the agreement. This is needed as legal basis for the CZMP and will provide the time required for the legal revisions.

c. **Professional training in coastal management:** An estimated 30 professional staff and technicians in the CCPU and collaborating government units (e.g. Town Planning Unit, Environmental Engineering Division, Environmental Unit, South and West Coast

Sewage Project) would receive short-term and on-the-job training in coastal zone managementand other related and relevant fields. Specific fields include Geographic Information System (GIS) data management and applications for development control, oceanographic equipment maintenance and repair, maritime enforcement and quality assurance control in laboratory analyses.

d. **Public awareness and education:** The program would finance the design and delivery of public information programs on coastal zone management, through local public media, community seminars, workshops and lectures to professional societies, non-governmental organizations (NGO) and community groups.

e. **Information systems:** The CCPU's existing GIS capabilitites would be expanded to cover the north, east and southeast coasts. GIS applications for permit review would be designed and refined.

3.7 Environmental analytical services for coastal zone management will be improved by upgrading laboratory equipment and specialized training in its use and maintenance at GAS. In addition to a basic upgrade, Phase I would finance: (a) an assessment of mid- to long-term environmental analytical needs for coastal zone management and environmental protection in an effort to arrive at a rational plan for providing the full range of environmental analytical services for the country; and (b) the development of a quality control/quality assurance program.

3. Design and feasibility study of Phase II

3.8 This would entail: (a) updating the field-specific designs for shoreline management measures proposed for the west and south coasts under the Pre-Investment Program to take into consideration the results of the additional year of monitoring, new data and methodologies in coastal zone management; (b) preparation of additional final designs for shoreline management measures (structural and non-structural) for the north, east and southeast coasts; (c) preparation of a consolidated investment program for coastal zone management eligible for IDB financing (Phase II), including the design of the cost recovery mechanisms referred to above; and (d) an assessment of the technical, socio-economic, financial, institutional, legal and environmental feasibility of the investment program in accordance with Bank requirements.

B. Execution of the program

1. Execution mechanisms

3.9 The CCPU under the Ministry of Tourism, International Transport and the Environment will have overall responsibility for program execution on behalf of the GOB. A Project Officer will be recruited by the Government prior to first disbursement to coordinate the day-to-day administrative tasks required. The CCPU will provide the required administrative support, as well as the

counterpart requirements through the assignment of existing technical staff.

3.10 The CCPU will contract the following three entities: (a) an international consulting firm or a consortium with demonstrated experience in coastal zone management to execute most of the activities of the technical cooperation ("the principal consulting firm"); (b) a firm or firms to carry out the demonstration projects; and (c) the Bellairs Research Institute.

3.11 The principal consulting firm will be responsible for recruiting, and overseeing the work of the specialists needed conduct the diagnostic studies for the north, east and southeast coasts, the institutional strengthening activities, including the specialized training, as well as the design and feasibility assessment of Phase II. The corresponding terms of reference appear in Annex III-1.

3.12 The principal consulting firm will provide an estimated total of 115 expert/months in coastal engineering and geomorphology, oceanography, hydrogeology, analytical chemistry, marine and terrestrial ecology, natural resource economics, coastal zone management and land use planning, sociology, public media and GIS data management. The work is to be performed in Barbados.

3.13 A firm or firms with local experience in community participation for environmental management will be contracted to provide about 20 person/months of services in local planning and community-based promotion needed to carry out the demonstration projects. The corresponding terms of reference are available in the project files.

3.14 The CCPU will also contract with the Bellairs Research Institute of McGill University of Canada to provide quality assurance services and related training to the CCPU for duration of the program. The exception to Bank policy can be justified on the basis that Bellairs Research Institute is the only marine and coastal research institution established in Barbados and as such is the only entity with the technical capacity to provide the services required. Bellairs Research Institute is also the institution providing quality assurance for the Coastal Conservation Pre-Investment Program. Bellairs Research Institute will provide a total of 35 expert/months over the life of the program in the disciplines necessary to review the work of the consulting firms. Terms of reference for quality assurance services are available in the project files.

3.15 Specialized equipment for oceanographic monitoring, laboratory analysis and GIS will be acquired for the execution of the technical cooperation. The value of each piece of equipment is less than the equivalent of US$200,000 and the purchase will be from different manufacturers. Due to its specialized nature, the equipment will be purchased by the principal consulting firm following limited international bidding procedures which are acceptable to the Bank and consistent with national legislation. The equipment will remain with the GOB at the conclusion of the

project for the permanent monitoring activities. A detailed list of the specialized equipment appears in Annex III-1. There is no contracting of works contemplated within this operation.

3.16 The Government Analytical Services will designate a senior officer as a Liaison Officer to coordinate with the CCPU the timely execution of the laboratory upgrade and training activities.

3.17 The technical cooperation will have a 32 month execution period and a disbursement period of 38 months. Project schedule appears in Annex III-2.

2. Reports

3.18 The executing agency would be responsible for submitting a project initiation report within 60 days of signing the agreement. This report shall include: (a) the names of the counterpart staff assigned to the project; (b) a short-list of individuals being considered for Project Officer; (c) the names of the members of the Project Steering Committee (PSC); (d) a letter from the Ministry of Agriculture and Rural Development naming the counterpart staff and setting forth the procedures for use of the Government Analytical Services in the project. The CCPU would also submit quarterly reports along with the interim, draft and final reports of the consulting firms.

3.19 The two consulting firms would be required to present an inception report, quarterly progress reports, draft and final reports as stipulated in their respective terms of reference. In addition to quarterly progress reports, Bellairs Research Institute would submit reports commenting on each of the reports submitted by the consulting firms.

3. Monitoring and supervision

3.20 A Project Steering Committee (PSC) will be established prior to first disbursement to provide policy and programming guidelines, and ensure coordination with other ongoing activities in-country that impinge on the successful completion of this project. The PSC will assist the CCPU with the selection of the consulting firms. The Committee will be chaired by the Director of the CCPU and will have one representative from: the Environmental Unit, Environmental Engineering Division, Town & Country Planning Office, Water Authority, National Conservation Commission, and GAS.

3.21 A Programming and Evaluation Committee (PEC), to be chaired by the Director of the CCPU will be established to approve workplans, progress and other reports as well as approve the demonstration projects proposed for execution in accordance with the basic eligibility criteria. It will have representatives of the principal consulting firm, Bellairs Research Institute, the IDB Country Office and headquarters.

3.22 The basic supervision of this technical cooperation will be the responsibility of the Bank's Country Office in Barbados. The

project team will also participate as members of the Project Evaluation Committee and conduct periodic field reviews.

3.23 A mid-term review will be conducted by the Bank within 12 months of signature of the contract with the principal consulting firm to assess with the GOB the progress achieved towards the objectives listed in Section II. The indicators of performance for this review as well as the Bank's periodic monitoring will include as a minimum: (a) the quality of physical, environmental and socio-economic data acquired through the diagnostic surveys and their application for coastal zone management as indicated by the development permit review process; (b) the effectiveness of the demonstration projects in resolving coastal problems; (c) the extent of local resident participation in public awareness and demonstration activities; and (d) the skills acquired by the recipients of training. In addition, the legal foundation of the CZMP as indicated by the establishment of the CZMU and the revision of the **Coastal Zone Management Act** and the **Marine Pollution Control Act** would be monitored during the operation.

C. Project budget and financing

3.24 The total cost of the technical cooperation is estimated at US$4.5 million. The Bank's contribution would amount to US$3.6 million. The local counterpart would be the equivalent of US$0.9 million, of which CAN$500,000 or approximately US$350,000 equivalent, would be financed through the Canadian Technical Cooperation Program (CANTAP). The following table shows the costs, subdivided into categories and financing sources.

CONSOLIDATED BUDGET (equivalent in US$)					
BUDGET CATEGORIES	BANK	OTHER 1/	LOCAL	TOTAL	%
1. PROFESSIONAL SERVICES FIRM	2,898,000	350,000	140,000	3,388,000	75.3
1.1 Fees (includes OVH)	2,125,000	350,000	0	2,475,000	55.0
1.2 Equipment	734,000	0	140,000	874,000	19.4
1.9 Other direct costs	39,000	0	0	39,000	0.9
2. INDIVIDUAL CONSULTANTS	0	0	122,000	122,000	2.7
2.1 Remuneration	0	0	102,000	102,000	2.3
2.3 Local travel & per diem	0	0	20,000	20,000	0.4
3. SCHOLARSHIPS & TRAINING	50,000	0	0	50,000	1.1
3.1 Registration & Tuition (5)	15,000	0	0	15,000	0.3
3.2 Subsistence (5)	15,000	0	0	15,000	0.3
3.3 Travel (5)	10,000	0	0	10,000	0.2
3.5 Training materials (Pub.part)	10,000	0	0	10,000	0.2
6. GENERAL SUPPORT	0	0	186,400	186,400	4.1
6.1 Office rentals	0	0	40,000	40,000	0.9
6.4 Office supplies	0	0	20,000	20,000	0.4
6.6 Support personnel (32 p/mos)	0	0	26,400	26,400	0.6
6.8 Communications	0	0	20,000	20,000	0.4
6.9 Other costs	0	0	80,000	80,000	1.8
7. PUBLICATIONS	0	0	50,000	50,000	1.1
7.1 Report production	0	0	50,000	50,000	1.1
SUBTOTAL	2,948,000	350,000	498,400	3,796,400	84.4
98. UNALLOCATED COSTS	249,000	0	10,600	259,600	5.8
87. FINANCIAL COSTS	403,000	0	41,000	444,000	9.9
TOTAL	3,600,000	350,000	550,000	4,500,000	100.0
1/ Canadian Technical Cooperation Program					

3.25 The Bank's contribution (80%) would finance costs related to the principal consulting firm, part of the demonstration activities, most of the purchase of equipment, financial and contingency costs.

3.26 The local counterpart contribution (20%) would be used for costs related to general support, local personnel, a small portion of the equipment purchases, the quality assurance services and part of the demonstration activities.

IV. BENEFITS AND RISKS

4.1 This technical cooperation is designed to build the foundation for an integrated, nation-wide coastal management program for Barbados

thereby contributing to the sustainability of the tourism sector. As such, it recognizes the close biophysical and socio-economic linkages that exist between the densely developed west and south coasts and the open north, east and southeast coasts.

4.2 Each component of the technical cooperation is expected to yield positive and, in some instances, measurable environmental and socio-economic benefits. The baseline studies for the north, east and southeast coasts will serve to delineate coastal setbacks and other measures aimed at controlling cliff and beach erosion and the negative effects of unregulated land use change. The demonstration projects will enhance local understanding of appropriate land use practices among targets groups such as shorefront property owners and fishing villages.

4.3 The institutional strengthening component will promote the integration of environmental considerations in coastal development decisions. The coast-wide GIS will improve access to reliable environmental data during the CCPU's review of proposed coastal developments for the Town and Country Planning Department.

4.4 The implementation of the Coastal Zone Management Plan, specially through the institutional and land use planning components, will contribute in the most cost effective way to the preservation of coastal resources, the environment and sustainable land use. It will also contribute to optimize nation-wide investment decisions, particularly in the tourism sector, making them more effective in terms of capturing broad-based economic benefits.

4.5 The program is aimed at maintaining the environmental quality of the coast through the use of improved data and monitoring for land use planning as well as institutional strenghtening. As such the operation does not meet the criteria pursuant to the Report on the bank's Eight General Increased on Resources which would enable it to be classified as an operation aimed at reducing poverty.

4.6 This technical cooperation does not present any significant risks by virtue of the activities proposed and the institutional capacity of the CCPU. Nonetheless there are areas of concern which will require attention during execution. The full benefits of the institutional strengthening activities depend on the establishment of the CZMU and the enactment of the **Coastal Zone Management Act** and the **Marine Pollution Control Act** which are not in effect. Benchmarks and contractual conditions have been incorporated to the execution of the technical cooperation to assure that a sound legal foundation for the CZMP is established by the conclusion of the operation.

TERMS OF REFERENCE

COASTAL CONSERVATION PROGRAM (PHASE I)

I. BACKGROUND

1.1 Following the diagnostic, pre-feasibility and feasibility studies for coastal conservation on the south and west coasts of Barbados, the Government of Barbados (GOB) has asked the Inter-American Development Bank (IDB or Bank) for assistance in financing the first phase of a nation-wide Coastal Zone Management Program (CZMP) for Barbados.

1.2 Emphasis in the first phase will be on diagnostic studies for the north, east and south east coasts to complement those already conducted on the west and south coasts. The Phase I Program will therefore consist of three components: (a) development of a Coastal Zone Management Plan for the north, east and south-east coasts, including the information necessary for plan preparation and synthesis with the Coastal Zone Management Plan available for the south and west coasts; (b) institutional strengthening including the implementation of legal reforms and cost recovery mechanisms necessary for coastal zone management in Barbados; and (c) completion of the feasibility assessment and design for the Investment Program for Phase II of the Barbados CZMP.

1.3 The executing agency for the program will be the Coastal Conservation Project Unit (CCPU) under the Ministry of Tourism, International Transport and the Environment. The CCPU will be responsible for the overall direction and coordination of the program on behalf of the GOB and, as such, will provide counterpart support.

1.4 The CCPU is seeking an international consulting firm or a consortium with demonstrated experience in coastal zone management to carry out the activities for all three components of the program as described below. The duration of the project execution is expected to be 32 months. A task description for the three major project components is provided below.

II. SCOPE OF SERVICES AND TASK DESCRIPTION

A. Component 1. Development of the Coastal Zone Management Plan and its information base

1. Diagnostic surveys

a. Delineation of the project area (Maycock's Bay to South Point) and classification by geomorphological units

2.1 This is a preliminary activity in which the study team will delineate the project area (from Maycock's Bay to South Point), provide rationale for the delineation, identify potential linkages between the project area and adjacent coastal zones, and subdivide and map the project area's coastal zone (including the landward and maritime boundaries) by geomorphological unit. The latter will be undertaken using existing topographical coverage (1:10,000 scale) as base maps. This will: (a) facilitate design of all subsequent data acquisition activities; and (b) facilitate the definition of the coastal planning area referred to in the Coastal Zone Management Act and over which the Coastal Zone Management Act will preside. Clear definitions of the coastal planning area will be required during the production of the Coastal Zone Management Plan.

b. Beach and Shoreline Changes

2.2 The study team will use aerial photographic analyses to determine shoreline changes in the project area (land loss or gain relative to land-based controls) and to prepare digital maps of historical shoreline positions. Aerial surveys of the project area will be conducted to upgrade the photographic data base to present date as required and feasible. The team will use the photographic data base, along with a 12-year time-series of beach profile data available at the CCPU, to determine long-term trends in beach changes and to characterize the current beach status in the project area. They will use the beach profile data set to conduct analyses of seasonal and inter-annual variation in beach characteristics (e.g. width, volume, slope, sediment characteristics).

2.3 The study team will review the beach profile monitoring program currently used by the CCPU in the project area with respect to parameters and locations monitored, location-specific monitoring frequencies, and data analysis and handling techniques. The study team will recommend modifications to the current monitoring program as required and giving consideration to the CCPU's mandate, priorities and capacity.

2.4 The beach change data will be used, in collaboration with oceanographic data collected during the project, to develop models of physical coastal processes in the project area under various temporal and climatological scenarios (e.g. seasonal, inter-annual, long-term, storm-induced, sea level change). The data and models

will be used to guide the development of policies and management strategies for the coastal planning area, which will be required during the production of the Coastal Zone Management Plan.

2.5 The consulting firm will provide on-the-job training to CCPU counterpart staff during the acquisition of all baseline data, the use of field equipment and subsequent analysis for coastal zone management purposes.

c. Oceanography

2.6 The consulting team shall acquire primary baseline data on waves, currents, tides and other oceanographic parameters in the project area, and shall design and implement a monitoring program for these parameters. The data should be supplemented by the compilation of any global and regional oceanographic data available and relevant to the project area. Strong emphasis must be placed *a priori* on the most appropriate approach to data collection and retrieval in the field, both in terms of cost effectiveness and physical feasibility, given the harsh oceanographic conditions prevailing in the project area. This may include the establishment of an offshore buoy for acquiring and transmitting the necessary oceanographic data (see Section VI. Equipment and Supplies).

2.7 The consulting team shall compile, review and analyze the wind data available for the project area from East Point Lighthouse, Grantley Adams Airport and Lamberts.

2.8 The wind, wave, current and tidal data will be used to evaluate present understanding of current patterns in the project area and develop a model for oceanographic processes in the area (see Beach and Shoreline Changes). The data and models will guide design criteria for selected coastal structures under varying sea-level and storm scenarios (see Engineering).

2.9 The oceanographic model developed for the project area should be adequately interfaced with the coastal oceanographic models developed for the south and west coasts. The data and models produced in the Oceanography Program should assist in development of construction guidelines for marine and coastal structures in the coastal planning area, and thereby guide the development of policies and management strategies for the coastal planning area, which will be required during the production of the Coastal Zone Management Plan.

d. Sedimentology and Sediment Transport

2.10 The consulting team will collect and analyze data on beach and offshore sediment characteristics (e.g. grain size, texture, structure, geological composition and distribution) to establish the relationship between the sediment characteristics, their distribution, potential sediment sources (land or marine) and potential sediment transport mechanisms. These data will be used

to develop a numerical sediment model and budget for the coastal system relevant to the project area.

2.11 The consulting team will design and implement a sediment monitoring program which can verify or modify the sediment model and budget proposed. The consulting team should consider how deterioration of coral reef habitats may influence their value as a sediment source and should quantitatively explore and incorporate this into the sediment budget as feasible. Linkages between sediment processes in the project area and sediment processes on the south and west coasts should be explored, documented and quantified as feasible.

2.12 In implementing the program, the consulting firm should be aware that program outputs must be of immediate value to coastal zone management in the project area, through more informed evaluation of development proposals as they may be impacted by, or cause changes in, sediment transport and beach dynamics; as well as through more informed assessment of the need for, and likely success of, structural or non-structural mitigative measures for beach protection. The outputs of these activities must therefore strongly guide the policies and management strategies of the Coastal Zone Management Plan.

e. Hydrogeology and Terrestrial and Marine Water Quality

2.13 The consulting firm shall conduct marine water quality studies (nutrients, sediments, bacteria, pesticides *inter alia*) to characterize the current status of marine water quality in the project area relative to recommended standards. An inventory of all point sources (including individual wastewater collection systems and outfalls) will be conducted. Baseline data must also be collected and assessed on the volume and quality of point source flows, and on the volume and quality of terrestrial surface and groundwater flows (non-point source flows) to the coastal zone to determine their contributions to the prevailing coastal marine water quality. In undertaking this diagnostic survey, the consulting firm shall review the results of an on-going Water Resources Management and Water Loss Study also financed by the Bank. The firm will also investigate sanitary engineering practices (e.g., use of filter beds, "soak aways" and septic tanks) in the project area, particularly the backshore and identify the effects of these practices on soil stability, erosion and contamination.

2.14 The baseline water quality data will be used to: (a) determine the relative levels of contamination of nearshore waters and groundwater resources within the project area; (b) identify priority areas for sediment and effluent control; (c) recommend remedial solutions to control contamination levels in coastal areas; and (d) propose a permanent water quality monitoring program for the project area giving consideration to the CCPU's mandate and capacity. The remedial solutions will provide a basis for defining investment opportunities for Phase II.

2.15 The consulting firm shall conduct a preliminary investigation of the relationship between current human population densities, geological strata and ground water and marine contamination levels in the project area. Based on this, the consulting firm shall attempt a preliminary estimate of threshold population densities that may be feasible in the project area without recourse to area-wide sewage treatment facilities. The results of this program should guide the development of policies and management strategies for the coastal planning area as required for the preparation of the Coastal Zone Management Plan.

f. Bathymetry and Coastal and Marine Resource Mapping

2.16 The consulting firm shall conduct biological and geological surveys to identify, characterize and quantify the various coastal and marine resources in the project area. Emphasis will be on bathymetric, sub-bottom and side-scan surveys, aerial and underwater photography and surveys, and coastal vegetation mapping, including cliff and sand dune vegetation communities. Remote sensing approaches to surveying must be supported by ground-truthing where feasible. The data should be presented in digital format and incorporated into the GIS at the CCPU.

2.17 The consulting firm shall use these baseline surveys to guide them in designing a coastal resource monitoring program for the project area. In implementing this Program, the consulting firm shall be sensitive to the possible importance of coastal marine populations in the project area as breeding stocks for exploited populations on the south and west coasts, and should be sensitive to the issue of endangered species in the project area.

g. Land Use

2.18 Using aerial photography and field surveys, the consulting firm shall conduct an inventory of current land use patterns in the project area, and characterize recent trends in land use patterns as feasible. Emphasis will be on use as agricultural areas, residential areas, hotel development areas, and recreational and aesthetic space; and will include categorization by public versus private ownership, and large-scale versus small-scale ownership. The analysis must include documentation of current land values. The consulting firm shall identify and inventory historical, cultural, and archaeological sites of interest in the project area, and shall assess and document their socioeconomic potential (see Socio-Economic Analysis).

2.19 The consulting firm shall conduct an analysis of broad changes in population density and distribution in the project area over the past 35-40 years, based on available census data.

2.20 The consulting firm shall review existing policies and legislation which affect land use activities in the project area, and make recommendations on mechanisms to ensure a more integrated approach

to land use planning, and better integration of land use planning with overall coastal zone management planning. All activities in the Land Use Program must be interpreted and discussed in the contexts of plans for the area as identified in the 1993-2000 Physical Development Plan for Barbados, and in the proposed East Coast National Park plan, and must be sensitive to constraints and guidelines on land use as identified by the Soil Conservation Project.

2.21 In implementing this program, the consulting firm shall be sensitive to the importance of sound land use planning and management in the project area. Such planning will determine the appropriate balance between development of the project area through the more classic avenues of hotel and residential developments, and development of the project area through maintenance and enhancement of the broad and impressive scenic vistas which currently characterize the project area, which contribute significantly to the tourism experience, and which provide the only remaining large-scale scenic recreational opportunities for locals in the country. The results of the land use analysis must be fully integrated with the socio-economic analysis for the project area. The results will also assist in the development of land use zoning and setback policies for the Coastal Zone Management Plan.

h. Engineering

2.22 The consulting firm shall inventory and describe existing terrestrial and marine coastal structures in the project area (e.g. soil-conservation structures, revetments, groynes, jetties, fish landing sites, outfalls), and shall evaluate their performance and impacts as feasible. The location of boat channels must be identified, charted and marked, their suitability assessed, and recommendations for improved navigational access provided, as appropriate. Other physical activities which may have occurred in the project area (e.g. rubble clearing, channel clearing, sand mining, unapproved developments) must be identified and inventoried, and their performance and impacts evaluated, as feasible.

2.23 The consulting firm shall investigate, and make recommendations on, additional boat access needs in the project area, particularly in the context of temporary mooring locations for enforcement vessels.

2.24 Based on the inventory of engineering structures and the data and models emerging from the diagnostic surveys, the consulting firm shall: (a) develop design criteria for selected coastal structures; and (b) compile a list of priority engineering structures needing rehabilitationor improvements. These may include revetments, groynes, fishing and recreational craft jetties, and the marine and land-based components of fish landing sites. The firm will also identify and make recommendations for vulnerable areas (e.g., rapidly eroding or undercut cliffs, eroding beaches and backshore areas) requiring engineering solutions. This information will

provide a basis for defining investment possibilities for Phase II.

2.25 In implementing this program, the consulting firm shall be sensitive to the importance of its outputs in assessing the physical feasibility and cost-effectiveness of engineering structures in coastal zone development and management in the project area. The outputs of the program will assist in the development of construction guidelines for the coastal planning area as required in the Coastal Zone Management Plan.

2. Community knowledge and mechanisms of participation

2.26 The consulting firm shall prepare a detailed profile of communities, coastal resource users and local organizations of the north, east and southeast coasts. In preparing this profile, the firm shall conduct surveys and other structured interactions with local resource user groups to acquire and document, as quantitatively as possible, local knowledge relevant to coastal resources, their status and use. This will serve to design a participatory process for executing the demonstration activities (see below). It will also assist in the identification of mechanisms for community participation required during the production of the Coastal Zone Management Plan.

2.27 The consulting firm will recommend permanent, formalized arrangements for local participation in coastal zone management issues and initiatives.

3. Demonstration projects

2.28 The principal consulting firm will coordinate its activities with the execution of a series of demonstration projects in coastal zone management to be undertaken by a local consulting firm to be hired under separate contract. The principal consulting firm will: (a) review and provide technical advice in the design and selection of the demonstration projects; and (b) assist the CCPU in the field supervision of activities to ensure coordination with other project activities.

4. Socio-economic analysis 1/

2.29 The consulting firm shall conduct a full socioeconomic analysis of developmental alternatives for the project area (see section on Land Use). Issues to be considered include agricultural development, fisheries, hotel and associated physical developments, residential development, historical, cultural and archaeological site development, recreational development (e.g. picnics, hikes) and development through maintenance and enhancement of the scenic vistas of the project area; and emphasis should be placed on the

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1/ See Appendix 1 for detailed guidelines for the socio-economic analysis.

compatibility of combinations of the above alternatives. The potential costs of area-wide supporting infrastructure (e.g. marine structures, sewage treatment facilities) that may be required by some alternatives must be considered in the analysis. It is critical that methodologies for evaluating the less tangible scenic attributes of the area, as well as for evaluating the costs of marine environmental deterioration, be developed by the consulting firm.

2.30 In implementing this program, the consulting firm should appreciate that its results may strongly influence the developmental path chosen for the project area. The outputs of the socio-economic analysis will strongly guide the development of policies and management strategies for the coastal planning area as required during production of the Coastal Zone Management Plan.

5. Preparation of the Coastal Zone Management Plan

2.31 The consulting firm shall develop, prepare and produce a comprehensive Coastal Zone Management Plan for the project area. The plan must provide management guidelines and implementation procedures which public agencies and private individuals can draw upon to achieve sustainable coastal zone use and development in the project area. The potential scope of the Plan and its relationship with other project activities will be discussed during the early stages of the project to ensure that the results of the diagnostic surveys are designed at the outset to support plan preparation.

2.32 The consulting firm shall use the data acquired through the diagnostic surveys, as well as in the community participation and demonstration projects in preparing a Coastal Zone Management Plan. The plan will therefore be built upon the improved comprehension and models emerging from the beach and shoreline change studies, the oceanography studies, the sedimentology and sediment transport studies, the hydrogeology and marine and terrestrial water quality studies, the bathymetry and coastal resource mapping studies, the land use studies and the engineering program; and will be strongly guided by the analyses and outputs of the socio-economic analysis. The Coastal Zone Management Plan must be sensitive to the 1993-2000 Physical Development Plan for Barbados, as well as to policies and plans proposed for the East Coast National Park. The Coastal Zone Management Plan must also establish the legal, institutional, and community group arrangements and practices needed for successfully implementing coastal zone management. It must provide a clear formulation of coastal zone management policies for the project area, including land use zoning and setback provisions given the mixture of private and crown land prevailing in the project area.

2.33 The consulting firm shall ensure that the process of preparing the Coastal Zone Management Plan is fully consultative with respect to relevant government agencies, relevant non-governmental organizations, community groups and the general public. The draft Coastal Zone Management Plan should be presented to the public using a

multimedia approach and organized consultative techniques for a period of at least one month before finalization and submission of the plan.

2.34 The consulting firm shall ultimately integrate the Coastal Zone Management Plan for the project area with the CZMP for the south and west coasts to produce an overall Coastal Zone Management Plan for the country.

C. Component 2. Institutional strengthening

2.35 The consulting firm shall review recommendations on cost recovery provided by the Institutional Strengthening Study in light of the design of the nationwide coastal zone management program and the Phase II Program which will include investments for all coasts. The economic team will reexamine the cost recovery alternatives which included a Land Tax Surcharge, a Hotel Bed-Night Tax and a Philanthropic Trust and explore new ones for the east and southeast coasts. Recommendations will be made based on a detailed feasibility analysis of specific mechanisms in terms of cash flow projections and their impact on Government and private sector revenues. The consulting firm will propose an overall strategy of sustainable income generating sources on the basis of this analysis. It is expected that the income generating scheme will be approved by Government with the purpose of beginning the process of financial sustainability of the coastal zone management activities. The firm should clearly state the eligibility criteria for selecting the set of alternatives and specify the detailed administrative mechanisms of execution of these alternatives. These proposals should be closely tied to the socio-economic studies to be conducted by the firm.

2.36 The consulting firm shall review the draft **Marine Pollution Control Act** and the **Coastal Zone Act** in light of their application to entire coast and propose revisions where appropriate to ensure consistent nation-wide application of policies. In addition, implementing regulations for both Acts will be prepared. Concurrent with the preparation of the implementing regulations, the consulting firm will assess the existing procedures and mechanisms in place for enforcement of coastal zone legislation (both shore-based and maritime surveillance and enforcement activities). The consulting firm will conduct a needs assessment in this context, and propose further institutional strenghtening measures as appropriate and feasible. The latter may provide a basis for investment opportunities during Phase II.

2.37 The consulting firm shall develop public information material on coastal zone management policies, legal reforms and activities. The consulting firm shall implement public information programs on coastal zone management, through media use, seminars, workshops and lectures to professional societies, NGOs, community groups and the general public (see also Project Component: Community Knowledge and

Mechanisms of Participation). The consulting firm shall ensure that the information material, and approaches to, and capability in, information dissemination is transferred to the CCPU through the Unit's involvement in the activities during the project.

2.38 The consulting firm shall organize and implement professional training and educational opportunities in coastal zone management. These may be directed at CCPU personnel as well as personnel in other Government agencies with responsibilities relevant to coastal zone management (e.g. Town Planning Unit, Environmental Engineering Division, Environmental Unit, South and West Coast Sewage Project). Particular attention should be paid to a recent training and institutional needs assessment conducted on behalf of the Environmental Engineering Division. Training may take the form of seminars, workshops, or short courses (up to 2-4 months duration). The consulting firm should be aware that data management for GIS, oceanographic equipment maintenance and repair, and quality assurance/quality control in laboratory analyses are areas currently identified as priorities for training. The training and technology transfer program must be designed to complement and facilitate the institutional reforms recommended by the Institutional Strengthening Study, and agreed to by the GOB and the Bank.

2.39 The consulting firm shall document the current uses and stage of development of the CCPU's GIS and conduct a GIS needs assessment, particularly in the context of CCPU's expanded role for coastal zone management in the north, east and southeast coasts. The needs assessment should include consideration of the feasibility of networking all technical staff to the GIS. The consulting firm shall design and implement an expansion of the CCPU's GIS to accommodate the baseline data acquired during the diagnostic surveys for the north, east and southeast coasts. The improvements to the GIS will include a refinement and expansion of software applications for zoning, development permit review, environmental impact assessment, and other activities of the CCPU.

2.40 The consulting firm will carry out institutional strengthening activities aimed at improving environmental analytical services for coastal zone management. This will include the purchase and installation of specialized equipment for the Government Analytical Services, the Government laboratory within the Ministry of Agriculture and Rural Development which provides environmental analysis for the CCPU. The laboratory requires additional analytical equipment, chemicals and reagents and trained technicians dedicated to the environmental analysis of the Phase I activities and the routine monitoring requirements of the CCPU. A preliminary list of basic equipment and supplies to be financed during Phase I appear in Section VI.

2.41 In addition to the immediate upgrade of services, the consulting firm will undertake the following activities: (a) an assessment of mid- to long-term environmental analytical needs (equipment and staff resources) for coastal zone management purposes; (b) the

development of a quality control/quality assurance program; and (c) an assessment of the functions, capabilities, staffing, equipment, etc. of the various analytical laboratories involved in environmental analysis in an effort to detect strengths, overlap and gaps in functions, kinds and condition of equipment, capability of technicians, etc. and, ultimately, to arrive at a rational plan for providing the full range of environmental analytical services for the country. In implementing the needs assessment, the consulting firm must consult with relevant Government agencies and private sector groups, review existing equipment and human resource capabilities, and review current laboratory procedures, with emphasis on approaches to quality assurance and control. In assessing the alternatives, consideration must be given to both the likely efficiency of the laboratory and costs. Particular attention should be paid to ensuring appropriate CCPU access to the up-graded laboratory or unit, and to whether provisions in law will be required to give the laboratory the status necessary to provide environmental evidence in the country's law courts.

D. Component 3. Completion of design and feasibility assessment of an investment program for Integrated Coastal Zone Management (Phase II)

2.42 The consulting firm shall reassess the choice of, and update the field-specific designs for, the coastal zone management measures proposed for the west and south coasts under the current Coastal Conservation Project, to take into consideration the results of the additional year of pilot project monitoring, new data, and new methodologies in coastal zone management. Where required, updated engineering designs based on actual site conditions and cost estimates will be prepared for those works selected for financing during Phase II. Criteria for selecting works based on cost-effectiveness and environmental considerations will also be prepared. The consulting team will propose options for executing and maintaining works for further consideration during the feasibility analysis. Attention will be given to those approaches that facilitate private sector and community participation in erosion control.

2.43 The consulting firm shall prepare final designs for coastal zone management measures for the north, east and southeast coasts. Using the results of the diagnostic surveys, detailed designs and cost estimates will be prepared for a specific package of works and activities such as: (a) shoreline stabilization structures; (b) the rehabilitation of coastal structures for beach and cliff stabilization; (c) improvement of coastal access; (d) upland erosion control measures; (e) coastal habitat restoration; (f) establishment of marine protected areas; (g) coastal pollution control measures; and (h) community-based coastal resources management activities. The consulting frim will propose criteria for selecting coastal zone management works and activities and recommend a mechanism for executing these activities.

2.44 The consulting firm shall prepare a consolidated investment program for nation-wide integrated coastal zone management in Barbados, that is eligible for IDB financing (Phase II of the Barbados Coastal Zone Management Program). The duration of the program to be financed by IDB would be five years.

2.45 The study team will assess the technical, socio-economic, financial, institutional, legal and environmental feasibility of each component of the program and will consolidate the information necessary for the Bank's analysis of the operation.

2.46 In assessing technical feasibility, the study team will address whether the eligibility criteria proposed for including works in the program are sound; alternatives considered; demonstrated experience in implementing technical solutions for each component; justification for the program's dimension; and how the program relates to the expressed needs of the affected coastal communities and to the relevant policies of existing plans. The study team will demonstrate that sufficient opportunities have been included in the program for the participation of traditional user groups, communities and women.

2.47 The study team will prepare an environmental analysis of the proposed program as required by the Bank. This assessment will contain: a description (quantitative where possible), of the program's expected environmental benefits (i.e., water quality); an evaluation of the possible negative impact of the program, particularly the physical, ecological and social impacts of the works and shoreline stabilization measures; recommended prevention and mitigation measures along with executing agencies and cost estimates. Special attention will be directed at the potential indirect or induced impacts of improving services on land use and tourism.

2.48 The study team will also prepare a socio-economic evaluation of the proposed program consistent with the Bank's requirements for natural resources management projects. It will encompass: (a) a description of targeted beneficiaries and projections of the expected benefits; (b) a justification of principal activities and works, based on economic priority and/or degree of resource degradation and risk; (c) recommendations for market-oriented incentives for coastal pollution control, solid waste management, and marine fisheries conservation; and (d) recommendations for additional socio-economic data collection and analysis. As part of the socio-economic analysis, the study team will identify the direct and indirect beneficiaries for each component of the program and globally and determine the distributional impact of the program benefits.

2.49 Specific cost recovery mechanisms will be developed in order to recover part or all of the Phase II investments for all coasts depending on the nature of the benefits and targeted beneficiaries. Targets for cost recovery and the mechanisms for their

implementation will be defined by the consulting firm and discussed with the Government.

2.50 In assessing institutional and financial feasibility, the study team will address the technical, managerial, administrative and financial capacities of the institutional structure recommended for program execution. It will also be necessary to evaluate risks due to delayed program implementation in light of current institutional capacity. To this end, reliable performance indicators will be established for monitoring program execution and early detection of potential delays caused by institutional, managerial and financial capabilities and other uncertainties. The net financial impact of the Phase II loan on the budgetary allocations of the respective Ministries will be assessed using historical data and developing projections for an 8-year period. This will take into account the cost recovery and income generating schemes described above. All monthly recurrent costs associated with the execution and continuation of these projects will have to be estimated.

2.51 The legal analysis will address the legal feasibility and implications of all proposed measures, institutional adjustments, regulatory mechanisms, land use control measures, cost-recovery schemes, etc. This analysis should be closely coordinated with the institutional and financial activities being developed.

2.52 The results of the feasibility analysis will be presented at public meetings and inter-institutional working sessions to be hosted by the CCPU. Agreements would also be reached on the preferred institutional arrangements for program execution.

III. EXPECTED RESULTS

Component I

- Large-scale maps of the project area boundaries and classification into geomorpholgical units
- Large-scale corrected aerial photography
- Proposed adjustments to shoreline monitoring program
- Primary baseline data on oceanography, sediment transport, terrestrial and marine water quality, coastal resources and habitats (suitable for GIS)
- Detailed design of permanent monitoring program of sediment transport, oceanography and water quality
- Physical oceanographic model of project area
- Detailed inventory and assessment of coastal structures
- Recommendations for rehabilitation of existing structures or areas needing engineering solutions
- Community profiles
- Detailed land use survey
- Socio-economic analysis
- Draft and final Coastal Zone Management Plan

Component II

- Income generating alternatives and strategy for coastal zone management
- Revisions to draft Coastal Zone Act and Marine Pollution Control Act and their implementing regulations
- Public education materials for coastal zone management'
- Short-term training courses in equipment maintenance, enforcement, GIS applications, laboratory analyses
- Expansion of CCOU GIS to project area
- Equipment upgrade and training at Government Analytical Services

- Needs assessment for environmental analytical services

Component III

- Updated engineering designs and cost estimates for investments on the west and south coasts
- Engineering designs and cost estimates for investments on the north, east and southeast coasts
- Coordinated inestment package (Phase II)
- Feasibility assessment (Phase II)

IV. QUALIFICATIONS

4.1 International consulting firm or consortium with demonstrated experience in coastal zone management. The principal consulting firm or consortium should demonstrate some experience in the following additional areas: coastal engineering, baseline oceanographic and marine resources surveys, tropical marine resources management, water quality monitoring, land use and environmental law, institutional analysis and design and natural resources economics. Demonstrated experience in undertaking international development projects in natural resources management projects in developing countries is required.

V. PERSONNEL REQUIRED

5.1 The specialized institution or consulting firm will assign a full-time project manager and the number of specialists with the appropriate professional profiles necessary to accomplish the tasks and deliver the products described below.

5.2 An estimated total of 115 person-months of specialized services in coastal zone management and related disciplines will be required to carry out the Program described in these terms of reference. The following are the areas of technical expertise for the Program:

- Project Manager (20 months)
- Coastal Engineer (8 months)
- Lawyer (4 months)

- Analytical chemist (6 months)
- Sociologist (4 months)
- Media Specialist (2 months)
- CZM Planner (8 months)
- Economist (8 months)
- Financial and institutional analyst (5 months)
- Geomorphologist (7 months)
- GIS/Data Base Manager (5 months)
- GIS Technician (8 months)
- Land Use Planner (8 months)
- Marine Ecologist (6 months)
- Oceanographer (7 months)
- Terrestrial Ecologist (4 months)
- Hydrogeologist (5 months)

5.3 In addition, an estimated 80 person-months of technical support (4 field technicians for 20 months) will be required to undertake the feasibility study. The professional profiles and terms of reference for the specific responsibilities of the specialists appear in the Bank's project files.

5.4 Given the nature of the services to be provided, it is expected that all the work will be conducted in Barbados.

VI. EQUIPMENT AND SUPPLIES

6.1 The consulting firm will purchase specialized equipment required for the execution of the program, particularly in the conduct of the oceanographic surveys, the expansion of the GIS and the institutional strengthening of the Government Analytical Services. All equipment purchased with program funds will remain the property of the GOB at the conclusion of the program. The specialized equipment to be purchased appears below:

Equipment required at the CCPU
Aerial Photography
Bathymetrics/Sub-Bottom Survey/Sidescan Sonar
Coastal monitoring buoy
Research vessel (40ft)
Diving equipment
CTD
Current Meters
Global Positioning System (DIF)
Radar/Drogues

Equipment required at the Government Analytical Services
Gas chromatograph
Ultraviolet photo diode array spectrometer
Bulk ultraviolet spectrometer
Analytical balance
Oven

Computer (486-DX 33MHZ) with printer
Millipore filtration unit
Autoclave
Incubators
Fridge
Freezer
Turbidity meter
pH meter
Fluorescent lamp
Dessicators (2)

VII. SCHEDULE AND DELIVERABLES

7.1 Inception report and initial work plan: within 60 days after the commencement of work, the firm will submit for the CCPU and Bank's approval, the Initial Work program, including: (a) including detailed Terms of Reference for each study; (b) schedule of the activities; and (c) schedule of disbursements.

7.2 Progress reports: The firm will submit to the CCPU and the Bank on a quarterly basis, progress reports that will cover: (a) the description of tasks undertaken; and (b) preliminary study results.

7.3 Special reports: The firm will submit special reports, such as but not limited to: (a) field sampling and data analysis program for the diagnostic surveys; (b) training plan (types and modalities); (b) public education and awareness program; (c) methodology for the socio-economic analysis; (d) draft Coastal Zone Management Plan; and (e) community participation program plan; all of them on the schedule approved in the Initial Work Plan.

7.4 Draft final report: two months before completion of the project, the consultant firms shall submit a draft final report including their findings of work completed in Phase I and recommendations for Phase II.

7.5 Final report: At the completion of the project, the consultant firms shall submit a final report incorporating all the comments received by the Project Evaluation Committee, the CCPU and the Bank.

SCHEDULE OF ACTIVITIES FOR THE TECHNICAL COOPERATION

Activities			Months								
	12 m	14	16	18	20	22	24	26	28	30	32
Contracting of study	12 m										
I - INFORMATION COLLECTION FOR CZM PLAN											
Mobilize project team		xxxxx									
Delineate project area		xxxxx									
Diagnostic surveys			xxxxxx	xxxxx	xxxxxx	xxxxx	xxxxxx	xxxxxx			
Community knowledge				xxxxx	xxxxxx	xxxxx					
Demonstration projects				xxxxx	xxxxxx	xxxxx	xxxxxx	xxxxxx	xxxxx	xxxxxx	
Socio-economic strategy						xxxxx	xxxxxx	xxxxxx			
Preparation of CZM Plan			xxxxxx			xxxxx	xxxxxx	xxxxxx	xxxxx	xxxxxx	
II - INSTITUTIONAL STRENGTHENING											
Income generation strategy						xxxxx	xxxxxx	xxxxxx	xxxxx		
CZM related training		xxxxx	xxxxxx	xxxxx	xxxxxx	xxxxx	xxxxxx	xxxxxx	xxxxx		
GIS expansion		xxxxx	xxxxxx				xxxxxx	xxxxxx	xxxxx	xxxxxx	xxxx
Public awareness activities		xxxxx				xxxxx	xxxxxx	xxxxxx	xxxxx	xxxxxx	xxxx
Government Laboratory Upgrade		xxxxx	xxxxxx								
Environmental analysis needs assessment				xxxxx	xxxxxx	xxxxx	xxxxxx				
III- DESIGN AND FEASIBILITY ASSESSMENT (PHASE II)											
Design revisions (WS coast)					xxxxxx	xxxxx	xxxxxx	xxxxxx			
Detailed designs (E coast)							xxxxxx	xxxxxx	xxxxx	xxxxxx	
Feasibility assessment								xxxxxx	xxxxx	xxxxxx	xxxx
Draft and final reports										xxxxxx	xxxx

PROPOSED RESOLUTION

BARBADOS. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE COASTAL CONSERVATION PROGRAM (PHASE I)

The Board of Executive Directors

RESOLVES:

1. That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, as Administrator of the grant funds made available by the Government of Canada under the Canadian Technical Cooperation Program, to enter into such agreements as may be necessary and to adopt such other measures as may be pertinent for the execution of the plan of operations referred to in Document _____ with respect to a technical cooperation with the Government of Barbados for the Coastal Conservation Program (Phase I).

2. That up to the sum of CAN$500,000 is authorized for the purposes of this resolution, chargeable to the resources of the Canadian Technical Cooperation Program.

3. That the above mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

BARBADOS. REIMBURSABLE TECHNICAL COOPERATION FOR
THE COASTAL CONSERVATION PROGRAM. PHASE I.

The Board of Executive Directors

RESOLVES:

1. That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document ____ with respect to technical cooperation with the Government of Barbados for the development of the Coastal Conservation Program. Phase I.

2. That up to the sum of US$3,600,000, or its equivalent in other currencies, except that of the Government of Barbados, is authorized for the purposes of this resolution, chargeable to the Ordinary Capital resources of the Bank.

3. That the above mentioned sum is to be provided on a reimbursable basis, in accordance with the conditions that shall be set forth in the agreement to be signed for this operation.