

NATIONAL GEOGRAPHIC INFORMATION SYSTEM

(TC-96-01-08-1)

EXECUTIVE SUMMARY

REQUESTER: Ministry of Finance and Planning.

EXECUTING AGENCY: Office of The Prime Minister.

BENEFICIARIES: Office of the Prime Minister, Ministry of Finance and Planning, Ministry of Public Works, Ministry of Agriculture and Fisheries, Ministry of National Security and the Ministry of Economic Development.

FINANCING:

IDB:	US\$ 992,000 (JCF)
Local counterpart funding:	US\$ 300,000
Total:	US\$1,292,000

TERMS:

Execution period:	24 months
Disbursement period:	30 months

ENVIRONMENTAL AND SOCIAL IMPACT: The CESI reviewed this operation at its meeting of September 5, 1997 and found it satisfactorily addressing the environmental and social issues.

OBJECTIVES: The general objective of this project is to promote and advance the efficient and practical use of integrated geographically referenced land information to support decisions regarding land resource management and physical development. In addition the project will assist the government in their on-going effort to modernize public administration in the areas of: (a) property valuation and taxation; (b) management of economic and social statistics; and (c) public safety. The specific objective of this technical assistance project is to put in place the geographic information policy, training, geographic database and institutional agreements for collaboration between agencies required to establish a multi-agency network of GIS systems as a tool to assist primarily in the management of land information.

DESCRIPTION: To achieve the objectives, the technical cooperation project will include the following four components: (a) geographic information policy; (b) information systems technology; (c) technical assistance for GIS training and database development; and (d) pilot projects. In addition, the project will include a pre-feasibility study intended to advance the preparation of a broader project focussed on the issues of land

use policy, land administration and land resource management.

Working with the Office of the Prime Minister, the five key land-related ministries and the three utility corporations, the project will: (a) establish an inter-agency geographic information project steering committee that will be responsible for formulating geographic information policy recommendations as well as supervising project execution; (b) develop institutional procedures and data protocols enabling agencies to exchange computerized geographic data; (c) establish geographic databases at each of the key agencies; (d) create a network of GIS systems (hardware and software) in the key agencies for the collection, management, analysis and dissemination of geographic information; (e) strengthen the existing GIS Unit into a national coordinating center and clearinghouse for geographic information; (f) train managerial and technical staff in the use of geographic information and the application of GIS at each of the key agencies; (g) complete two pilot projects to develop and test GIS applications and deliver short and medium term useable products; and (h) perform a study to determine the objectives, justification and costs of a broader project focusing on the issues of land use policy and land administration.

BENEFITS:

The project will provide the following major benefits: (a) improved effectiveness, efficiency and equity of government strategic planning, management decisions, and operations in the areas of land development and planning; (b) reduced cost in data management resulting from the elimination of redundant data collection and maintenance efforts; (c) improved collaboration between agencies and increased flow information from internal users to the private sector; (d) ability to integrate diverse and disparate data to form previously unavailable information; (e) increased technical capacity in the application of GIS; and (f) available and readily accessible geographic referenced digital data bases.

The beneficiaries of this program will be the participating agencies of the government ministries the utility corporations, private sector land owners and investors.

RISKS:

(a) Recurrent Costs: To be sustainable the project will require periodic update and maintenance of the geographic databases developed, staff will require

continued training to stay abreast of the latest technological advances and equipment will have to be maintained and replaced. To counteract the risk of failing agency support, the project includes two pilot projects which have been designed to illustrate the use of GIS in topic areas important for The Bahamas and to focus on the delivery of short and medium-term products. Also the program will consist of three seminars to raise managerial awareness to GIS and to solidify continued budgetary and human resources support to ensure the sustainability of the project; (b) Lack of interagency coordination: Without cooperation between the agencies involved in the project, there is a risk that agencies will remain isolated in the use of GIS technology thereby not gaining the full benefits which result from inter-agency cooperation and data sharing. To avoid this risk the project design includes a component which focusses directly on developing the geographic information policy and procedures required for inter-agency exchange of information. The project will also establish a GIS Steering Committee responsible for formulating geographic information policy recommendations and an inter-agency Memorandum of Understanding for agency cooperation; (c) Lack of computer-compatible procedures: Procedures required for physical planning approvals, sub-division controls and property valuation assessments require reform in order to reduce bureaucracy. The project will begin to address this issue, by computerizing essential data and completing a study to determine the feasibility and costs of a broader land use policy and land administration reform project.

**THE BANK'S
COUNTRY STRATEGY:**

The Bank's strategy is to support the government's continuing efforts to expand the role of the private sector by improving competitiveness, diversifying the economy, improving intersectoral linkages, and strengthening of environmental regulation. An essential element in the strategy is to have a qualitative impact through policy dialogue and technical cooperation projects, especially in assisting the authorities in assessing the remaining structural impediments to restoring sustained growth as well as issues related to social services and public sector efficiency. This operation impacts a variety of different elements of government's developmental objectives and Bank strategy in the following ways: (a) the GIS project will help strengthening the role of the public sector in environment regulation by bringing an important tool for monitoring natural resources, tourism development and the status of infrastructure; (b) the GIS will be used to provide an assessment of

the social services in the country and help develop and maintain quality social statistics; (c) the project fits with the "modernization of the state" priority of the government; and (d) the project will strengthen public institutions and enhance human resource quality through the extensive training provided.

This GIS project, combined with the Enabling Expanded Private Sector Investment Program (TC-93-01-18-6) designed to establish an environmental regulatory framework, will allow the government to focus on land use policy and administration issues. Completion of these two technical cooperation projects expects to precede a request for a loan project which would address the broader issues of land administration, land use policy and physical development planning and land resource management.

**SPECIAL
CONTRACTUAL
CONDITIONS:**

Prior to the first disbursement, the Executing Agency shall present to the Bank evidence that: (a) a Memorandum of Understanding (MOU) has been signed by each of the six key ministries and three utility corporations involved in the execution of the project stating the name or title of the official designated as responsible for the project and a commitment that the computer equipment provided by the project will continue to be used for the National GIS project after the life of the project. (This MOU will serve to commit and enforce the full collaboration of the agencies particularly in the areas of data sharing, database development and training); and (b) proof that the National GIS Center of the Office of The Prime Minister has been provided with sufficient and appropriate facilities and has been staffed with a National Project Coordinator and three technical specialists at the appropriate level.

I. BACKGROUND

A. Macroeconomic context

- 1.1 The Commonwealth of The Bahamas mostly withstood the global recessions of the 1970s and 1980s, but economic growth decelerated since the mid-1980s. Real GDP grew by an annual average of about 5% in the early 1980s, followed by 3% in the late 1980s and a negative 0.7% in the early 1990s. This growth reflects inadequate economic policies which did not deal with worsening structural problems in an economy based on tourism, and external changes in the tourist source countries.
- 1.2 The emergence of the rapidly growing low cost Caribbean destinations eroded The Bahamas' traditional dominance of the regional market at a time when the regional share of a growing number of World stopover tourists increased. Domestic output declined in The Bahamas in the recession of 1991 and 1992, by a cumulative 6% in real terms. During this period, private and public savings fell sharply, and the external deficit widened, resulting in a macroeconomic disequilibrium. The equilibrium was broadly restored by adequate policy measures introduced since late 1991. By 1993, the economy had rebounded on a somewhat renewed strengthening in the tourism sector, and the government began to implement economic policies directed at dealing with the structural problems. The investment climate improved as the government simplified regulation for foreign direct investment.
- 1.3 Real GDP growth in The Bahamas is estimated to have accelerated to about 3.5% in 1996. This higher growth rate has been achieved mainly due to increased tourist arrivals and expenditures. Renewed economic buoyancy follows privatization of major hotels since 1994 and completion of major renovations by the new owners, as well as increased marketing and an improved foreign investment regime.
- 1.4 The economy is projected to grow by 4% in 1997, as substantial increases in tourist arrivals are not expected in the course of the year due to capacity limitations at hotels. Nevertheless, increased investment of over US\$600 million in construction-related activities -- including expansion of bed capacity at recently renovated hotels and new hotel and resort constructions -- will provide some impetus in 1997 and early 1998. However, 1997 also was an election year in which monetary and fiscal policies were relatively more expansionary. Beyond 1997, as investments in the expansion of hotel capacities and other tourism-related activities are consolidated, the economy should expand by more than 4% a year in the absence of any adverse external factors provided the authorities adopt the appropriate monetary and fiscal policies.

B. Current situation

- 1.5 Land tenure, resource management and land development agencies. As is common in many former British-held Caribbean states, land in The Bahamas is held both by the government as Crown Lands which are leased to individuals through a rent to buy agreement, and through free-hold by private individuals. It is estimated that 70% of the total land area of the country, and the majority of tillable agricultural land is held by the government as Crown land. Administration of these lands is inefficient due to inadequate human resources, the lack of a complete inventory and map of government land holdings, bureaucratic leasing procedures, laws established to meet the needs of large landholders and few property transactions, and the lack of a clearly defined policy for public land divestment.
- 1.6 Further complicating the land tenure situation is the failure of the existing land title registration system to require registration of property transfers. Over time this defect diminishes the reliability of the property records, reducing individuals ability to access land based credit and government's ability to use parcel-based information to effectively manage land resources.
- 1.7 In the environmental context The Bahamas occupies an important geographic niche in the ecology of several species of endangered animals. Efforts to protect these species have been made through the establishment of The Bahamas Environment, Science and Technology Commission (BEST) which is currently developing a national bio-diversity data base, the development of restrictions on the capture of animals and the protection of natural habitat. In addition the Bahamas National Trust administers over 240,000 acres of National Parks and other protected areas. Despite these positive steps, there is a need for greater effort in developing land resource management policies and physical development plans that support economically viable land uses while protecting the unique Bahamian environment which the eco-tourism industry relies upon.
- 1.8 Numerous agencies share the responsibility for planning and managing land development in The Bahamas. In general these agencies lack a consistent and environmentally sound policy on which to base their technical decisions. This lack of overall land use policy combined with land tenure imperfections and inadequacies in the land titling and registration process restrict useful development while providing opportunities for potentially negative development.
- 1.9 For example, the Department of Physical Planning receives approximately 2000 building permits per year that are processed by hand using out-of-date maps. Additionally, the physical planning unit is unable to coordinate with the roads section and the building section of the same ministry nonetheless with other agencies or the utility corporations in charge of water and sewerage, electricity and telephone. This results in isolated decision making, and redundant collection and maintenance of data which is costly and difficult to sustain.

- 1.10 Consistent with each of these issues is the government's inability to effectively manage land resource information. And while resolution of the broader land use policy and tenure issues presented fall beyond the scope of this project, three obstacles to the management of land resource information can be addressed at this time. These are: (a) the lack of modern information technology tools and databases needed to assist government decision-makers and planners; (b) staff trained to use these modern tools; and (c) the policy and operational procedures for interagency coordination and data sharing.
- 1.11 The government realizes these inadequacies and the need to address them. In turn they have developed a strategy to begin with a project to establish a multi-agency Geographic Information System (GIS) that includes the necessary investments in technology and emphasis on agency collaboration. This GIS project, combined with the Enabling Expanded Private Sector Investment Program (TC-93-01-18-6) designed to establish an environmental regulatory framework, will allow the government to focus on land use policy and administration issues. Completion of these two technical cooperation projects expects to precede a request for a loan project which would address the broader issues of land administration, land use policy and physical development planning and land resource management.
- 1.12 Application of geographic information systems. GIS is a computerized information technology which allows the user to collect, combine and analyze diverse and disparate geographic information by linking digital maps with relational databases. GIS is being used throughout the world by governments at all levels of jurisdiction to produce decision making information for numerous applications including: land use planning, analysis of demographic data, transportation and infrastructure planning, natural resource assessments and monitoring, law and order, social services optimization and managing of property records and land administration.

C. Government request for technical assistance

- 1.13 On June 6, 1996 the Minister of Finance and Planning requested the IDB's assistance in the preparation of an operation intended to finance a National Geographic Information System. In discussions leading to this request, the government stressed the need for modernization and computerization of public administration in general with particular focus on the areas of land use planning and development, environmental protection and public safety. Efforts in these areas were needed in order to continue to attract foreign investment and tourism while providing efficient and modern services to the Bahamian public.
- 1.14 Between June and December 1996, the Project Team used financing from the United Kingdom Trust Fund and the Japanese Trust Fund for Consultancy Services (JCF) to conceptualize the project and prepare the detailed costs and activities. In December 1996, the government requested a formal presentation on GIS applications and a descrip-

tion of the proposed project. This presentation to government officials and cabinet members, took place on July 7 to 9, 1997.

D. Governmental development objectives and Bank strategy

- 1.15 The five key development challenges in The Bahamas are: (a) restore sustained growth by repositioning the economy to effectively withstand the emerging challenges from a more competitive environment; (b) develop human resources; (c) protect social services; (d) protect the environment; and (e) modernize the State and functioning of civil society.
- 1.16 The government's main development objectives are to diversify the economy geographically and by economic activities to lessen: (a) the pressures toward geographic concentration of social and economic activity in two small areas of the country; and (b) the country's heavy dependence on the somewhat volatile tourism sector while providing alternative employment opportunities for the segment of the population that cannot be absorbed directly into the tourism sector. In seeking to achieve these objectives, the government is responding to the development challenges. Restoring sustained growth, human resources development, and protecting social services and the environment are high priority areas for the government. Modernization of the State and functioning of civil society are being given increased importance.
- 1.17 The Bank's strategy ^{1/} is to support the government's continuing efforts to expand the role of the private sector by improving competitiveness, diversifying the economy, improving intersectoral linkages, and strengthening environmental regulation. An essential element in the strategy is to have a qualitative impact through policy dialogue and technical cooperation projects, especially in assisting the authorities in assessing the remaining structural impediments to restoring sustained growth as well as issues related to social services and public sector efficiency.
- 1.18 Given the multi-sectoral nature of GIS, this operation impacts a variety of different elements of government's developmental objectives and Bank strategy in the following ways: (a) the GIS project will help strengthen the role of the public sector in environment regulation by bringing an important tool for monitoring natural resources, tourism development and the status of infrastructure; (b) the GIS will be used to provide an assessment of the social services in the country and help develop and maintain quality social statistics; (c) the project fits with the "modernization of the state" priority of the government; and (d) the project will strengthen public institutions and enhance human resource quality through the extensive training provided.

^{1/} Reference is made to The Bahamas Country Paper approved by the Board on July 10, 1996 (Document GN-1993).

II. OBJECTIVES

A. General objective

- 2.1 The general objective of this project is to promote and advance the efficient and practical use of integrated geographically referenced land information to support decisions regarding land resource management and physical development. In addition the project will assist government in their on-going effort to modernize public administration in the areas of: (a) property valuation and taxation; (b) management of economic and social statistics; and (c) public safety.

B. Specific objectives and expected results

- 2.2 The specific objective of this technical assistance project is to put in place the geographic information policy, training, geographic database and institutional agreements for collaboration between agencies required to establish a multi-agency network of GIS systems as a tool to assist primarily in the management of land information.
- 2.3 The specific results of the project will be: (a) an inter-agency geographic information project steering committee that will be responsible for formulating geographic information policy recommendations as well as supervising project execution; (b) institutional procedures and data protocols enabling agencies to exchange computerized geographic data; (c) geographic databases at each of the key agencies; (d) a network of GIS systems (hardware and software) in the key agencies for the collection, management, analysis and dissemination of geographic information; (e) a strengthened GIS coordinating center and clearinghouse for geographic information; (f) management and technical staff trained in the use of geographic information and the application of GIS at each of the key agencies; (g) pilot projects completed in two geographic locations to develop and test GIS applications and deliver short and medium term useable products; and (h) a study detailing the objectives, justification and costs of a broader land use policy and land administration project.

III. PROJECT DESCRIPTION

A. Project components

- 3.1 To achieve the objectives and the expected results, the technical cooperation project will include the following four components: (a) geographic information policy; (b) information systems technology; (c) technical assistance for GIS training and database development; and (d) pilot projects. In addition, the project will include a pre-feasibility study intended to advance the preparation of a broader project focussed on the issues of land use policy, land administration and land resource management. The project will

focus on the topics of land development and physical planning and environment and the spectrum of issues related to these topics. In turn, six ministries 2/ representing eleven key land related agencies 3/ will participate in the project as well as the three quasi-government public utility corporations.

- 3.2 Geographic information policy. This component (US\$52,000) will establish an overall geographic information policy which will serve as the foundation for long-term exchange of information between government agencies and support the provision of information to the public and private information user community. Under the authority and direction of the GIS Steering Committee a geographic information policy specialist will be hired with resources of the project to assist the committee in developing a "Five Year GIS Policy Agenda".
- 3.3 A short-term information policy specialist will be contracted to develop a comprehensive digital geographic data management strategy. The resulting strategy will be supported by the information policies currently being formulated under the Government's National Information Technology Program and within the bio-diversity data base project being completed by the Bahamas Environment, Science and Technology Commission.
- 3.4 Within the overall strategy, short-term consultants will be contracted to fashion industry-based best practices into the Bahamian context and prepare reports on the priority issues of: (a) standards for data exchange and data quality; (b) custodianship and updating of agency data; and (c) data provision, including the topics of data accessibility and confidentiality, data charging, cost recovery and copyright.
- 3.5 Information systems technology. The component (US\$373,000) will result in the installation of a network of 11 GIS systems distributed among each of the key agencies. Based on the agency interviews and system pre-design developed during project preparation, resources will be provided to complete a detailed users needs assessment and develop a final system design and technical specifications for the distributed network of GIS systems. These systems will be PC-based and will include specialized GIS hardware and software as well as peripheral data processing equipment.

2/ Office of the Prime Minister, Ministry of Finance and Planning, Ministry of Public Works, Ministry of Agriculture and Fisheries, Ministry of National Security and the Ministry of Economic Development.

3/ The Lands and Surveys Department, the Physical Planning Department and The Bahamas Environmental Science and Technology Commission, of the Office of the Prime Minister; the Real Property Taxation Section of the Ministry of Finance and Planning; the Royal Bahamas Police Force of the Ministry of National Security; the Registrar General and the Statistics Department of the Ministry of Economic Development; the GIS Unit, Roads Section, Building Control and Sub-division Sections of the Ministry of Public Works; the Ministry of Agriculture and Fisheries, and The Bahamas Electricity Corporation, The Bahamas Telecommunications Corporation and the Water and Sewerage Corporation.

- 3.6 Technical assistance. The technical assistance component (US\$787,000) is designed to assist specifically in training and GIS database and applications development.
- 3.7 **Training program.** As the use of GIS will be new to the majority of the agencies involved in the project, the design and execution of a comprehensive training program is critically important to its long-term success. The training program will be developed to serve two levels of GIS users, managerial and technical and will consist of a series of seminars and classes as well as on-the-job training.
- 3.8 Training at the managerial level is designed to expose top and middle level decision-makers to the benefits to be derived from using geographic information in their agencies work and will cover issues of information policy and management. The program will consist of a series of three seminars to raise managerial awareness as to what the project and GIS makes available to them and to solidify continued management, budgetary and human resources support to ensure the sustainability of the project.
- 3.9 Training at the technical level will focus on providing the staff of the agencies with the expertise to use GIS not only to become more effective in meeting their mandates, but also to develop new services and capabilities. The technical portion of the training program will focus on the following: (a) GIS software and hardware operations; (b) applications of GIS to the particular issues important to the individual agencies; and (c) computer system maintenance to ensure the long-term functioning of the investment in computer equipment.
- 3.10 So as to maximize the coverage of the technical training and include as many agency staff as possible, a series of training workshops will be held on-site in each of the key agencies. These workshops will combine formal presentations as well as on-the-job training. A specialist in designing and executing GIS training programs will be contracted with resources from the project to design and execute the training program.
- 3.11 A unique feature of the training program will be the production of geographic databases as direct useful products of the training workshops. This feature is intended to both assist the agency personnel in building the required geographic databases within their training activities as well as reduce the need for expensive service contracts to computerize data.

- 3.12 **Geographic database and applications development.** Essential to the successful implementation and use of GIS is the availability of computerized digital geographic data. Currently, much of the geographic data that would be appropriate and beneficial for inclusion in a national GIS system is not in digital form. While the project is not intended to provide resources for digital conversion of all existing data, the project will allow individual agencies the opportunity to computerize their primary data sets as a by-product of the training process.
- 3.13 In order to rapidly advance in this area, during project preparation, each agency has identified those data sets which are of key importance to their daily functioning. In addition, during the project the GIS Steering Committee will assign priorities to the computerization of those data that will contribute significantly to the national GIS. Project resources will be used to contract specialized services for digital conversion and geographic referencing of these data. In addition, digital conversion of existing data will form part of the responsibility of two local GIS technicians assigned to the GIS Center.
- 3.14 Among the data sets identified by agencies for computerization and inclusion into the national GIS are: (a) statistical enumeration districts and demographic data; (b) police patrol maps and crime statistics; (c) Crown lands lease maps and records; (d) physical development subdivision plans; and (e) water and sewerage facility infrastructure.
- 3.15 Pilot projects. Two pilot projects focussing on the issue of land development will be carried out within the technical cooperation project in order to demonstrate short and medium term results. These projects will allow the various aspects of the national GIS to be tested and evaluated on a smaller scale while at the same time enable the agencies and individuals to gain necessary experience and build data bases of essential geographic information.
- 3.16 The pilot projects are proposed to be completed also intended to illustrate specific areas of interest where government may wish to direct future investments, to enable the participation of local governments and serve as a model for the expansion of the GIS to the Family Islands.
- 3.17 The pilot projects are proposed to be completed in two locations: Pinewood Gardens subdivision in Nassau and the island of San Salvador. The pilot in Pinewood Gardens will demonstrate the use of GIS in an urban setting while San Salvador Island will serve to demonstrate the use of GIS in the Family Islands context. The Government will have the possibility of changing these locations with locations having the same characteristics.
- 3.18 Urban-based GIS applications and geographic databases developed for the Pinewood Gardens location include: (a) multiple sector plan-

ning and management of land development; (b) creation of a building address system; (c) linking of data between government agencies and the utility corporations; (d) public safety, emergency 911 response and crime prevention; (e) enumeration district boundary definition and statistical analysis; and (f) property ownership, valuations and taxation.

- 3.19 The environmental management and protection applications of GIS will be demonstrated in the San Salvador location. Various data bases will be developed by collecting field data as well as through the use of remote sensing technologies and merged with existing field data. These data will be combined and analyzed using GIS to facilitate land use and physical development planning in order to protect sensitive environmental areas and promote ecologically aware development.
- 3.20 Pre-feasibility study on land use policy and administration. As part of the technical assistance project, a study will be performed to determine the issues, costs and scope of the Land Use Policy and Administration Project which is currently in the country pipeline. This study (US\$80,000) will concentrate on determining the suitability of the legal framework controlling property ownership and the effectiveness and equity of government procedures for the administration of land.
- 3.21 Specifically this study will: (a) investigate the possibility of developing an integrated fiscal and legal property cadastre; (b) determine the effectiveness of the existing land titling and registration of property rights system for securing land tenure and supporting a dynamic land market; (c) examine the current property valuation and taxation system; and (d) prepare recommendations to reform the system for management, leasing and divestment of publicly-held Crown Land.

B. Goods and services

- 3.22 Consulting services. An international consulting firm specialized in designing and implementing GIS systems will be contracted to provide 52 person/months of consulting services.
- 3.23 Acquisition of equipment. The acquisition of computer equipment is essential to upgrade existing GIS capabilities and establishing new capabilities. In particular, the installation of a network of 11 GIS systems consisting of 18 personal computer workstations, specialized equipment and software will enable the sharing of databases between agencies and the use of geographic information at the technical and managerial levels.
- 3.24 Training. The project will provide extensive training. The bulk of training will be on-the-job training and will be provided by each of the experts in the project. In addition the terms of reference for the international consultant firm include an eight-month consultant directly responsible for developing and executing

a training program exclusively for training the government officials in the use of GIS and geographic information.

C. Costs and financing

- 3.25 The total cost of the project will be the equivalent of US\$1.292 million, of which the Bank will provide non-reimbursable financing up to US\$0.992 million equivalent from the Japanese Trust Fund for Consultancy Services, in accordance with the following estimated budget summary.

BUDGET SUMMARY (in US\$ equivalent)			
CATEGORY	BANK (JCF)	LOCAL (GOB)	TOTAL
A. PROFESSIONAL SERVICES FIRMS			
1. GIS Project Execution Team	337,500		337,500
Project Manager/GIS Analyst	157,500		157,500
GIS Applications Programmer	27,000		27,000
GIS Specialist in Database development	27,000		27,000
GIS Training Specialist	72,000		72,000
GIS Technician	54,000		54,000
2. Geographic Information Policy Research Team	26,400		26,400
Geographic Information Policy Specialist	13,200		13,200
Data Management Specialist	13,200		13,200
3. Land and Use Policy and Adm. Study Team	38,600		38,600
Proj. Team Leader/Inst. & Land Tenure Specialist	12,100		12,100
Land Use Planning Specialist	7,500		7,500
Property Attorney	6,500		6,500
Registration and Cadastral Specialist	7,500		7,500
Land Valuation and Taxation Specialist	5,000		5,000
4. Overhead Professional Services	201,250		201,250
5. Travel and Per Diem	143,525		143,525
6. Data Capture	21,000		21,000
Maps and satellite imagery	6,000		6,000
Digitizing of maps and data entry	10,000		10,000
Field Surveys	5,000		5,000
7. Seminars	3,000		3,000
B. GENERAL SUPPORT			
1. Equipment	98,274	300,000	398,274
2. Supplies	18,000	0	18,000
3. Communications	18,000	0	18,000
C. CONTINGENCIES	86,451	0	86,451
TOTAL US\$	992,000	300,000	1,292,000

- 3.26 The Bank's contribution, which amounts to 77% of the total project cost, will be used to finance a total of 52 person/months of consulting services, and general support including equipment supplies, computer services and communications.

D. Organization and execution

- 3.27 The executing agency for the project is the Office of The Prime Minister. The project will have an execution period of 24 months. Project supervision will be the responsibility of a 10 person Project Steering Committee to be established by the government for this purpose. The Steering Committee will be chaired by a representative of the Office of The Prime Minister, and composed of the Minister of Finance and Planning or his representative, the National GIS Coordinator, and representatives from each ministry and the three utility corporations involved in the project. The Steering Committee will also be responsible to provide geographic information policy guidance to the government.
- 3.28 In order to enforce the full collaboration of the agencies involved in project execution, particularly in the areas of data sharing, database development and training, a Memorandum of Understanding (MOU) will be signed by each of the six ministries and the utility corporations. This MOU will include a written commitment that the computer equipment provided by the project will continue to be used for the National GIS project after the life of the project.
- 3.29 Project execution will be the responsibility of a Project Execution Unit consisting of an international Project Manager and a team of four international specialists qualified in the development of national level GIS. The international specialists will be teamed with the members of the GIS Center including the National Project Coordinator and three local specialists. An international consulting firm will be selected by open competitive bidding procedures among Japanese companies and their partner firms to provide the international specialists and assist the Office of the Prime Minister in completing the project. The National Project Coordinator, the head of the GIS Center of the Office of The Prime Minister, will be responsible for the daily administrative operations of the project.
- 3.30 The Project Manager and the National Project Coordinator will be advisors to the Steering Committee. During the life of the technical cooperation project, the Committee will meet every month or as requested by one of the members to advise on the following matters: (a) providing guidance to the National Project Coordinator and to the Project Manager in the day-to-day administration and execution of the project; (b) assisting in the coordination of the project activities; (c) providing advice in solving potential implementation issues; (d) coordinating project activities with the needs of other public institutions and projects of other international organizations; (e) evaluating the development and implementation of the project; (f) revising the semiannual progress reports and (g) reviewing the final evaluation report.
- 3.31 The Project Executing Unit will consist of four international specialists: (a) a project manager (15 months), (b) a GIS applications programmer (3 months), (c) a GIS systems specialist in

database development (3 months); (d) a training program specialist (8 months); and (e) a GIS technician (18 months). These specialists will be provided by the selected consulting firm.

- 3.32 Staffing of the GIS Center will include of four government specialists: (a) a National Project Coordinator; (b) a GIS analyst; (c) a GIS technician; and (d) a technical assistant. Each of these specialists will be assigned by the government and designated to the GIS Center and the Project Executing Unit for the duration of the project.
- 3.33 An international consulting firm will be selected to assist the government in the execution of the project. This firm will be selected in accordance with the Bank's agreement with the Government of Japan establishing the JCF. There will be one contract for the full amount of the project including professional services, equipment and computer hardware and software needed to execute the project.
- 3.34 The GIS Center, under the Office of the Prime Minister, will serve as the "network hub", technical expertise provider as well as the central depository of geographic data. The agency-based nodes of users will be responsible to maintain and provide those data which fall under their institutional mandate and are essential to their daily activities. The agency-based installations will be stand-alone GIS systems with functionality and capability based on need and capacity of the agency. These systems will be linked through The Bahamas government-wide computing network which is currently being developed by the Data Processing Unit of the Ministry of Finance and Planning.

E. Selection of consulting firm

- 3.35 The technical assistance project will be financed by the Japanese Trust Fund for Consultancy Services (JCF). Because this fund is tied, the consulting firm will be selected from among Japanese consulting firms with an extensive experience in the area of GIS development and implementation. A joint venture between a Japanese firm and a non-Japanese firm would be allowable provided that the Japanese firm keeps the lead of the joint venture by subcontracting less than half of the project activities to a non-Japanese firm. An advertisement and project description will be provided to the Japanese authorities for distribution to interested and qualified firms.

F. Project monitoring

- 3.36 The following reports, to be prepared by the Project Executing Unit, will be submitted to the Bank by the Executing Agency to facilitate supervision of project performance:
- a. A semiannual progress report. Will be presented within 30 days after completion of each six-month period. The reports will

review the execution of each project component, their impact on project output and training and their interaction with other project components, if any. The first semiannual external report should include a detailed description and schedule of the training program to be executed as well as an implementation schedule for the remaining life of the project. Subsequent semiannual reports should describe the status of execution of the project components. The report will be submitted by the Project Executing Unit to the Bank and copied to the Executing Agency and the Steering Committee for review and comment.

- b. A final evaluation report. Will be presented within three months of the completion of the project. It will contain a summary of the activities carried out and the results obtained in terms of the established objectives and benchmark indicators (Annex I). The report will be submitted by the Project Executing Unit to the Steering Committee and to the Executing Agency for comment and review before being provided to the Bank.

G. Disbursements

- 3.37 This operation will be executed over a 24-month period. The final disbursement will be made at the latest 30 months from the date of signature of the agreement between the Bank and the GOB. To ensure prompt availability of funds, particularly for the computer equipment needed for the start of the operation, the executing agency may establish a revolving fund for up to 5% of the Bank's total contribution. The Government of The Bahamas will provide the counterpart resources budgeted for this operation.
- 3.38 Prior to the first disbursement, the Executing Agency shall present to the Bank: (a) A Memorandum of Understanding (MOU) signed by each of the six key ministries and three utility corporations involved in the execution of the project stating the name or title of the official designated as responsible for the project; (b) Proof that the National GIS Center of the Office of the Prime Minister has been provided with sufficient and appropriate facilities and has been staffed with a National Project Coordinator and three technical specialists at the appropriate level.

H. Benchmark indicators

- 3.39 The principal benchmark indicators are based on each of the project components. A table with the detailed benchmark indicators by which the project will be judged is presented in Annex I.

I. Environmental and social impact issues

- 3.40 The Committee for Environmental and Social Impact (CESI) reviewed this project at the meeting of its Technical Review Group on September 5, 1997, and found it satisfactorily addressing the environ-

mental and social issues. This project will focus on the land-related environmental issues facing sustainable development in The Bahamas, as well as the urban and social issues which confront the government in the city of Nassau and the Family Islands, through the application of GIS within the two pilot projects.

- 3.41 The pilot project for San Salvador Island is designed to directly assist the Ministry of Agriculture and Fisheries, the BEST and the Lands and Surveys Department in using GIS for environmental planning, management and impact assessment. Geographic databases developed as part of BEST's bio-diversity strategy will be used specifically in this pilot as well as form an important "layer" of information in the national GIS database.
- 3.42 Likewise, the pilot project for Pinewood Gardens has been designed to demonstrate the use of GIS to assist in the improvement of urban physical development by both reducing the potential negative environmental and health impacts resulting from inappropriate land use but also by improving the planning and provision of social services.
- 3.43 Activities in this urban pilot area include: (a) development of a reliable building address system and linking this system with police and fire dispatch to increase public safety especially in crime prevention planning and emergency 911 response; (b) linking of existing data from disparate government and utility corporation sources in order to more effectively plan public works maintenance efforts and to reduce flooding resulting from high-water table and inadequate sewerage capacity; and (c) automate demographic and social statistics within the Department of Statistics and link these data with the GIS system currently under development by the Ministry of Health in order to plan for and optimize the location of government social service providers including, health, child care and schools. Where applicable, geographic data relating to gender issues will be collected and used.

IV. BENEFITS AND RISKS

A. Benefits and beneficiaries

- 4.1 The project will provide the following major benefits:
 - (a) Improved effectiveness, efficiency and equity of government strategic planning, management decisions, and operations in the areas of land development and planning;
 - (b) Reduced cost in data management resulting from the elimination of redundant data collection and maintenance efforts;
 - (c) Improved collaboration between agencies and increased flow information from internal users to the private sector;
 - (d) Ability to integrate diverse and disparate data to form previously unavailable information;
 - (e) Increased technical capacity in the application of GIS; and
 - (f) Available and readily accessible geographic referenced digital data bases.

- 4.2 The beneficiaries of this program will be the participating agencies of the government ministries the utility corporations, private sector land owners and investors.

B. Risks

- 4.3 Recurrent Costs: Benefits from GIS typically accrue in the medium to long-term as policies are developed, inter-agency procedures are established, agency coordination is strengthened, users become more sophisticated and data becomes more available. On the other hand costs for equipment, training and data are immediate. This project is intended to put in-place the necessary foundation for a nationwide, multi-agency GIS, however, the full development of such a system is an on-going process which requires continued government support, awareness to and demonstration of the benefits. To be sustainable this project will require periodic update and maintenance of the geographic databases developed, staff will require continued training to stay abreast of the latest technological advances and equipment will have to be maintained and replaced, all of which will result in future costs.
- 4.4 These recurrent costs are typical of all operations which involve the introduction of information systems technology and imply a commitment for continued funding from the various agencies involved. To counteract the risk of failing agency support and lack of funds the project includes two pilot projects which have been designed to illustrate the use of GIS in topic areas important for The Bahamas and to focus on the delivery of short and medium-term products. Also the program will consist of three seminars to raise managerial awareness to GIS makes and to solidify continued budgetary and human resources support to ensure the sustainability of the project.
- 4.5 Lack of interagency coordination: Exchange and integration of diverse geographic data is critical to the successful use of GIS. Without cooperation and collaboration between agencies there is a risk that groups will adopt GIS technology but remain isolated in their use, thereby not gaining the full benefits which result from inter-agency cooperation and sharing of data. During the preparation of the project a Technical Working Group was established by the Ministry of Finance and Planning and interagency coordination and communication improved considerably. However, if collaboration slackens during project execution it will take longer to achieve project objectives. To avoid this risk the project includes a component which focusses directly on developing the geographic information policy and procedures required for inter-agency exchange of information. The project will also establish a GIS Steering Committee responsible for formulating geographic information policy recommendations and an inter-agency Memorandum of Understanding will be prepared and signed which will serve as the instrument for agency cooperation.
- 4.6 Lack of computer-compatible procedures: Many of the established procedures currently used by government do not lend themselves to computerization. In the case of the land development process, pro-

cedures required for physical planning approvals, sub-division controls and property valuation assessments require reform in order to reduce bureaucracy. This project will not computerize inadequate and out moded procedures. Laws and regulations governing these procedures are also beyond the scope of this project. The project will, however, begin to address this issue by computerizing essential data and completing a study to determine the feasibility and costs of a broader land use policy and land administration reform project.

V. EVALUATION

- 5.1 In accordance with the established norms of the Bank, within six months from the date of last disbursement, the government shall prepare the Project Completion Report (PCR) of the proposed Technical Cooperation, which will contain a judgement on the attainment of the objectives of the operation.

BENCHMARK INDICATORS

COMPONENTS/ACTIVITIES	INDICATORS - MEANS OF VERIFICATION
1. Geographic information policy (paras. 3.2 to 3.4)	Produce the "Five year GIS Policy Agenda" by month 8. Produce digital geographic data management strategy by month 9.
2. Information system technology (paras. 3.5 and 3.6)	Installation of the network of the GIS including 13 computers to key ministries by month 6. Completion of the users needs assessment and the final system design and technical specifications by month 9.
3. Technical assistance a. Training (paras. 3.8 to 3.12) b. Geographic database development (paras. 3.13 to 3.15)	Training of at least 2 officials by participating agency by month 12 and at least a total of 40 officials by the end of the project. Primary data set in digital form by each participating agency by month 14.
4. Pilot project (paras. 3.16 to 3.20)	Building comprehensive data bases at both locations by month 16.
5. Pre-feasibility study on land use policy and administration (paras. 3.21 and 3.22)	Study completed by month 9.
6. Reporting (paras. 3.36)	Semi-annual progress reports at month 7 and 13. Final evaluation report three months after the completion of the project.

PROPOSED RESOLUTION

COMMONWEALTH OF THE BAHAMAS. NONREIMBURSABLE TECHNICAL
COOPERATION. NATIONAL GEOGRAPHIC INFORMATION SYSTEM.

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 Japanese Trust Fund for Consultancy Services, under the Agreement dated February 15, 1995, 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 AT-_____, with respect to a technical cooperation with the Commonwealth of the Bahamas, for the implementation of the National Geographic Information System.

2. That up to the sum of US\$992,000 is authorized for the purpose of this resolution, chargeable to the above mentioned Fund.

3. That the above mentioned sum is to be provided on a non-reimbursable basis.