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DEVELOPMENT STRATEGIES FOR FRAGILE LANDS

**DESFIL**

**SOUTH-EAST PENINSULA AREA  
DEVELOPMENT PROJECT**

**Length of Project Implementation Plan  
September 1987 - September 1989**

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## INTRODUCTION

### Background

DESFIL has placed two long-term advisors on St. Kitts to provide technical assistance on the development of the approximate 4000 acres of land and salt ponds that comprise the South-East Peninsula (SEP). The project is designed to: (1) monitor the environmental impacts of a planned ten kilometer road which will penetrate the peninsula, (2) provide support to the South-East Peninsula Development Board in carrying out its functions for land use management, (3) implement the essential mitigation measures identified in the SEP Environmental Assessment Report (EAR), (4) train personnel in land use management and environmental protection, (5) provide analysis of government policies regarding investments and (6) develop a streamlined guidance system for the preparation, processing and approval of plans for peninsula related investments.

### The South-East Peninsula Access Road

The proposed construction of a ten kilometer access road will open major development opportunities for tourist oriented development. The major negative effect of the road construction program will be the high intensity, short-term deposition of fine sediments on coral reefs and sea grass beds. Coral reefs are genetically rich and diverse communities occurring in shallow oceanic waters. Suspended sediments will reduce the penetration of sunlight and interfere with their productivity in the marine environment. Habitat destruction associated with rapid sedimentation also severely impairs the ability of other coastal environments to support commercially important finfish and shellfish populations.

The computer-derived road design does not adequately reflect the reality of the topography, geology and climatic regime of the area. The road should have followed more closely the natural contours of the hillsides. The cuts and fills (some of which are as deep as 100 feet) should have been minimal. The present design proposes long tangents and vertical curves which scar the terrain and encourage high speeds. The slopes are too steep on the cuts and fills in an area subject to intense short duration rainfall associated with hurricanes and tropical depressions. For example, the deep (+/- 100 foot) cut at a 1:4 slope near station 0+900 is in a rubble zone which has the potential to slide. Such a slide could be triggered by intense rains which lubricate the clays in the rubble zone, by blasting during construction, or by earth tremors which occasionally occur in St. Kitts. In addition to the potential for a slide, there is a very real concern for falling boulders and cobbles, which in this steep terrain could cause a serious accident to a vehicle.

Evidence that slides and falling rocks have occurred in the very recent past under natural conditions is evident along the entire shoreline of the SEP. For example a recent slide occurred in a rubble zone on the face of Nags Head between White House Bay and Majors Bay. Massive erosion can be expected to occur from these unstable cut and fill situations along the entire length of the mountainous portion of the road. These negative impacts can affect fisheries, aesthetics and the functioning of the road, and thus the attractiveness of the SEP for tourism.

Technical assistance will focus on diminishing sedimentation through the introduction of erosion control techniques.

### Tourism Oriented Development

The SEP has magnificent hillside views and a variety of attractive beaches that make it extremely desirable for tourism oriented development. Much of the SEP is steeply sloping. Only at Friars Bay and at the southern end of the peninsula are there areas of relatively gently sloping land. These areas are potentially suitable for a total of approximately 2000 hotel rooms and/or condominium units. The major amenity for these tourist oriented units would be the several beaches on the windward and leeward shorelines. In addition, the hillsides of the peninsula provide magnificent scenic views of the sister island of Nevis, the sea, and the surrounding seacoast of St. Kitts.

Uncontrolled housing, condominium and hotel development on the SEP could have a potentially disastrous effect on the natural resources of the area. The type of destructive activities that normally occur during development activities can be described as follows:

1. Earthmoving on dry lands
2. Dredging and filling on wetlands
3. Uncontrolled deposition of liquid and solid wastes

The above activities can, in an uncontrolled coastal environment, cause soil erosion, land slides, rock falls, beach erosion, coral reef destruction, sea grass and sand dune destruction, pollution of shallow aquifers, destruction of wildlife habitat, and a general adverse reaction to the ecological balance of the SEP. All of the natural resources that exist today in this area provide a special ambience attractive to tourists.

Environmental protection measures will have to be implemented to preserve the SEP's fragile terrestrial and marine habitat against degradation from earthmoving, dredging, filling and deposition and subsequent pollution by liquid and solid wastes.

## Environmental Assessment and Land Use Management Studies

In February 1986 an Environmental Assessment Report on the SEP was prepared by The Island Resources Foundation. Funding support was provided by the US Agency for International Development. The Environmental Assessment Report (EAR) was prepared to determine whether the ten kilometer penetration road and its stimulated and expected economic development would cause unreasonable environmental degradation. A number of concerns were to be investigated. These included: (1) changes in biological diversity; (2) loss of endangered species; and (3) loss of aesthetic, recreational, archaeological, scientific, or economic values.

An impact analysis was also performed on the anticipated results of traffic, sail and power boats, utilities and residential facilities. The report concluded that the road construction should not provide unreasonable degradation providing certain conditions were met. The conditions included: (1) an erosion control/sedimentation plan; (2) a separate professional engineering contract for the supervision of the road and the adherence to environmental mitigation; and (3) the initiation of an Environmental Management Unit to design and implement a coastal zone management program.

In July 1986 a Land Use Management Plan (LUMP) for the SEP was prepared by The Island Resources Foundation (IRF). Funding support was again provided by The US Agency For International Development. The LUMP provided a comprehensive plan that addressed environmental protection and yet allowed for sustainable touristic development scenario for the SEP. A land suitability analysis was performed that confirmed the availability of over three quarters of the Peninsula for development activity. Three development zones of varying land use intensity were designated. In addition two types of conservation zones were allocated. The LUMP made specific mention that "top of the market" high value tourism could only be sustained if government was willing to expand upon the special natural ambience of the Peninsula and provide an effective environmental management program.

### The Land Use and Environmental Management Program

The overall objective of the Land Use and Environmental Management Program is to provide a technical assistance team that will guide and encourage development activities on the SEP in such a way that the economy of the Government of St. Kitts and Nevis (GSKN) will be strengthened by touristic development while at the same time ensuring that the natural resources of the peninsula will not be degraded.

The major challenge to the technical assistance team will be to establish and gain effective support for regulations and standards to guide a rational and sustainable process of economic

development in the SEP.

Specific Objectives of the Project

1. To carry out planning studies related to various elements in the SEP. These studies will supplement various studies conducted by The Island Resources Foundation in the original Environmental Assessment Report (EAR). These will include studies on vegetative associations, marine biology and ecology, soil erosion, flora and fauna preservation, and land use planning.
2. To implement the essential conservation programs and mitigation measures identified in the initial EAR. In addition, to also implement any conservation programs and mitigating measures that become apparent as the technical assistance group performs additional planning studies.
3. To expand upon the previously prepared Land Use Management Plan and modify this plan into a total environmental protection plan. Where land use designations would be more precisely defined and zones would address a multitude of factors in addition to slope. (Included in this plan will be a program that allocates and zones land for different purposes.)
4. To develop a series of resource specific plans that will focus on the control of pollution and the maintenance of environmental quality and coastal conservation throughout the SEP.
5. To provide support to the South-East Peninsula Land Development and Conservation Board in carrying out its functions for land use management while concurrently educating the Board to the positive effects of a master environmental protection program for the SEP.
6. To streamline systems for approvals of Peninsula related investments, including the development of environmental assessment procedures and a Developer's Handbook.
7. To train personnel in land use management, environmental and natural resource protection.
8. To evaluate residential, commercial, industrial, agricultural, and other development schemes on the SEP and advise on their suitability and economic viability.
9. To design and implement an environmental education program that will create within the school system and the general public an awareness of natural resource values of the island and SEP in particular.

## Strategy For Achieving Objectives

The scope of work to achieve the aforementioned objectives will consist of four basic tasks.

1. Task #1: Administrative Responsibilities and Institution Building
2. Task #2: Design and Implementation of Environmental Programs
3. Task #3: Training
4. Task #3: Investment Analysis

A variety of activities will occur concurrently in order to achieve the objectives of the project. Most activities will occur over the life of the project. For ease of identification the project is divided into two phases. The first phase is mobilization. This phase which took four months is now complete. The second and final phase of the project is planning implementation which will take twenty months to complete. The two phases of the project and the activities that occur during each phase are shown in Annex 1, the attached critical path chart (CPC). A listing of all activities by alphabetical order is attached on a separate sheet.

The major effort of the project consists of integrating the long-term and the short-term technical assistance over the length of the project to provide the direction necessary to produce a planning institution complete with documents that will efficiently guide and manage harmonious development activities over the next 15 to 20 years on the SEP.

The Land Development Board and staff will be provided with opportunities for continuous education throughout the life of the project. This education shall include a number of one-on-one discussions as well as off-island seminars. In addition, a model tour of outstanding resorts is planned to occur in the second phase of the project. Short-term technical specialists will provide supporting educational programs as they share their findings with the staff and the Board members.

The major effort in designing and implementing the environmental programs will occur in the second phase. The CPC shows that activities in environmental education, environmental planning, environmental impact assessment procedures, environmental legislation and the Developer's Handbook will all occur during this phase. Roads construction observation, to ensure that environmental compliance is met, will continue through the life

of the project. Investment Analysis will be conducted by an outside consultant.

The remainder of this report will deal specifically with the two individual phases of the project. A more detailed description of the activities that have occurred or will occur in each of the phases will be discussed.

## PHASE I MOBILIZATION

### Task #1 Administrative Responsibilities and Institution Building

#### a. Technical Assistance Team

**Objective:** To provide the expertise and manpower necessary to quickly organize an efficient office and develop a plan for implementation of strategies and plans necessary to achieve the goals and objectives of the project.

**Strategy and Results:** During the four months of mobilization a variety of institution building activities occurred. The South-East Peninsula Land Development and Conservation Board (SEPLD&CB) office was established. This was a time consuming effort which involved evaluating a number of different locations including proximity to local government offices and other groups that would have some peripheral involvement with the SEP. This activity was followed by planning office space layout, awarding renovation contract work and ensuring that renovations were properly and efficiently made. Furniture and necessary supplies were ordered, transported and placed in service.

The development of a long-term technical assistance team was a vitally important effort. After consideration, an Environmental Planning Officer was retained. The successful candidate was Randolph Walters, who was born in Nevis and has had a wealth of experience in project design and management of environmental projects in the Caribbean. In addition, John Buchter, a US Peace Corps volunteer (PCV) was successfully recruited. He has been seconded to the Land Development Board to work as an environmental specialist. He is a senior forester with a degree in environmental law.

Several Peace Corps Volunteers, assigned to other activities on St. Kitts, have volunteered to provide a limited amount of part-time planning assistance in the areas of marine biology, wildlife management and historical preservation.

All of the aforementioned members of the long-term technical assistance team have had an opportunity to visit the SEP and assist in the basic delineation of the field work necessary to timely implement environmental programs outlined in this report.

The presently determined technical assistance needs are as follows;

Personnel	Environmental Planning Data Gathering		Environmental Planning Map Production		Environmental Legislation		Developer's Handbook	
	Days	\$	Days	\$	Days	\$	Days	\$
Soil Scientist	20	5,000						
Biologist	42	10,000						
Hydrologist	6	1,500						
Geologist	6	1,000						
Wildlife Specialist	16	4,000						
Recreation Planner			8	2,000				
Env. Planner			8	2,000				
Forester	6	1,500	6					
Drainage Engineer			12	3,000				
Utilities Engineer			14	3,500				
Beach Specialist			12	8,000				
Tourism Specialist			8	2,000				
Land Use Planner			60	15,000			8	2,000
Landscape Architect			18	4,500			6	1,500
Solid Waste Eng.			6	1,500				
Env. Lawyer					8	2,000		
Marina Engineer			6	1,500				
Land Use Lawyer					6	1,500		
Park Manager			6	1,500				
Land Acquisition Specialist			6	1,500				
Fishery Specialist	6	1,500	30	7,500				
<b>Total</b>	<b>108</b>	<b>28,700</b>	<b>170</b>	<b>38,000</b>	<b>14</b>	<b>3,500</b>	<b>14</b>	<b>3,500</b>

During the first phase of the project (mobilization) plans were formulated for short-term technical assistance that would be needed to acquire the essential natural resource data and provide the planning services necessary to develop the resource specific plans.

The above represents 300 days of short-term technical assistance. At a rate of \$ 250/ day this equates to US \$ 73,000. The project will require these funds during the first seven months of the planning implementation phase. The CPC illustrates the sequence of events over time. Short-term technical assistance was not required during the mobilization phase.

The mobilization phase also was an active time in the establishment of relationships with the Physical Planning Unit of the Government of St. Kitts-Nevis (GSKN). Discussions were held with the Director of Physical Planning relative to the Planning Unit's preparation of a Coastal Zone Management program for the entire coastal zone of St. Kitts and Nevis. Coastal Zone enabling legislation and information from California was shared with the Planning Unit. The information included rules, regulations and applications for development approval.

**b. South-East Peninsula Board and Land Use Management Plan (LUMP)**

**Objective:** To provide support to the South-East Peninsula Land Board in developing an effective land use planning capability.

**Strategy and Results:** Outside external economic pressures drive development in directions that could destroy the very ambience that the SEP now has tourism activities. The SEP Board is now a formal group holding regular meetings in an organized manner. Adequate public notice and preparation of agendas and minutes should stimulate increasing public interest.

Open channels of communication have been developed with the Planning Unit. It has been agreed that all matters dealing with The SEP will be processed first through the Board and its staff and then in an appropriate manner through the Planning Unit.

**Task #2 Design and Implementation of Environmental Programs**

**a. Environmental Education Programs**

**Objective:** To make the residents of St. Kitts Nevis more aware of the importance of protecting natural environment in the face of increased pressures on the resource base from potentially uncontrolled housing, condominium and hotel development.

**Strategy and Results:** Tourism development could, without control, destroy the amenities and wildlife values that currently make the

SEP attractive for tourism.

A core group of interested citizens was formed during the mobilization phase to discuss and provide guidance on how best to promote environmental education in The Federation of St. Kitts and Nevis.

Contact has been made with The Atlantic Center for The Environment to provide an exchange program for a talented young local educator to visit the United States and Canada for a period of three months in order to observe how other communities manage their environments. A counterpart from North America will visit the Federation of St. Kitts and Nevis for an equal period of time in order to provide training to local educators in practical techniques of environmental education.

A complete video camera and VCR with TV monitor were acquired through the Project and are now available on St. Kitts for use within the education system. The camera has been used to take a video of the SEP in its natural undeveloped state. This video will be edited and made available to schools and groups interested in activities in the SEP.

A second video, in preparation, illustrates high quality resort development on nearby islands in the Caribbean in contrast to poor quality development on the same islands. The intent of the video is to demonstrate to the people of the Federation (and outside developers planning investments on the SEP) how natural resource protection and development planning can enhance tourism development.

In addition to the video, a series of printed teaching aids are in production for distribution to all schools and groups seeing the video. This literature is similar in scope to the material produced by The St. Lucia Environmental Education Program. Topics include: (1) the natural resources of the SEP (wildlife, flora, earth forms, views, beaches, coastal waters, salt ponds, marine life), and (2) natural resource protection measures (soil and water conservation, litter control, preservation of endangered species habitat).

A long-term educational program was initiated in coordination with The Social Studies Curriculum Change Committee. Environmental education will be introduced into the permanent curriculum. Changes in curriculum course content are being suggested. In addition a writers workshop has been organized with a series of Social Science teachers to write a textbook entitled "Our Country". This text will have extensive portion devoted to environmental matters. Such topics as geology, geomorphology, soil and water conservation, wildlife protection and forest preservation will be included in the text.

Contact has been made with The Media Center of the Ministry of Education. The Center's objective is to produce educational broadcasts for the school system. Arrangements have been with the center to prepare a number of broadcasts ( to be prepared by teachers) that will be presented to the school children while they are at school. The Teachers Training College is participating in the environmental education program by introducing environmental topics into the continuing teachers education program that is a vital part of its extension outreach mission.

The education program thus far has produced the basic foundation for challenging and interesting exercises that will enable the people of the state to start to have a greater awareness of the multiple benefits of environmental protection.

#### **b. Environmental Planning**

**Objective:** To prevent the loss of (1) endangered and threatened species of flora and fauna and their native habitat, and (2) aesthetic, recreational, archeological, or vegetative natural resources. It is vital to preserve and enhance ecological harmony and biological diversity.

**Strategy and Results:** The preparation of a series of natural resource protection plans were initiated during the mobilization phase. These plans included the following:

- Erosion Control and Sediment Reduction Plan
- Wildlife/Endangered Species Management Plan
- Beaches and Dunes Management Plan
- Land Acquisition Plan for Parks and Recreation
- Marine Resources Management Plan
- Recreational Development Plan
- Management of Park and Protected Areas Plan
- Reforestation Plan
- Land Use Management Plan
- Feeder Roads, Utilities, and Infrastructure Master Plan

An outline of the short-term technical assistance required to achieve the fruition of the plans was developed and is described under Task #1. In order to develop this outline, a series of reconnaissance trips were taken during the first four months of the project. Initially these trips were by foot and boat. In the last month however, the trail has been opened up by the contractor for the road so as to make the entire distance of the SEP open to four wheel drive traffic. The members of the staff, together with occasional outside guests, have evaluated the resource data needed to prepare the aforementioned plans. Work has commenced on the marine resources inventory in the Friars Bay area using members of the long-term technical assistance staff together with the Peace Corps Volunteer who is a specialist in marine biology.

### c. Environmental Impact Assessment Procedures

**Objective:** To assure The GSKN that each developer has made a complete and careful study of his development plans with regard to minimizing impact on the natural resources of the specific site and the region that surrounds this site.

**Strategy and Results:** During the mobilization phase various environmental assessment procedures used in other jurisdictions were evaluated. Several of these were prepared by members of the long-term technical assistance staff. The most appropriate assessment procedures studied were those for hotel and condominium development that were prepared for developers planning large scale projects in the State of Florida. We have developed as our model for the SEP the basic assessment format used in the State of Florida's Application for Development Approval (ADA) for Developments of Regional Impact (DRI). This program is administered by The Department of Community Affairs of The State of Florida.

The environmental impact assessment questions that shall be asked of developers on the SEP shall relate to anticipated specific impacts on the environment that can be expected to occur due to their development activities. If impacts are somewhat negative but economically sound then the developer shall be requested to consider mitigating measures that would offset potentially negative impacts.

Needed is an understanding of biophysical characteristics of the resources that may be altered by the proposed development. More important than the specific site being developed are the impacts that may be anticipated on the entire SEP. Thus the Application for Development Approval (ADA) shall require addressing the entire SEP as a regional system. The ADA shall demonstrate how the proposed development shall become a part of the greater regional system for the management of potable water, waste water, storm water, solid wastes, and recreational amenities.

### d. Environmental Legislation

**Objective:** To ensure that proper and adequate environmental legislation has been approved by the GSKN so that developers are aware that the full force and power of the GSKN stands behind the protection of the country's vital natural resources.

**Strategy and Results:** During the mobilization phase an extensive review was made of legislative documents from outside the GSKN. Contact was made with the legal draftsman in the Attorney Generals Office and extensive study was made of the enabling legislation for the South-East Peninsula Land Development and Planning Board (SEPLD&CB). The National Conservation Act was also reviewed in detail.

#### **e. Developer's Handbook**

**Objective:** To place in one location all the standards, specifications, rules and regulations that will be necessary to guide development in an orderly manner while providing for the preservation and enhancement of the natural resources of the SEP. An outline for the Handbook was prepared during the mobilization phase and is attached as Annex 2.

**Strategy and Results:** During the mobilization phase several Developer's Handbooks were studied for applicability to the SEP, including examples from the US Virgin Islands, the Florida Keys, and Central Florida.

The SEP Developer's Handbook will provide for protective measures against soil erosion, rock slides, dredging and filling of wetlands, indiscriminate destruction of vegetation and wildlife and marine life habitat, the sanitary storage and distribution of potable water, and the sanitary collection, treatment and disposal of solid and liquid wastes. The Developer's Handbook will be closely related to The Land Use Management Plan (LUMP).

#### **f. Road Construction**

**Objective:** To ensure that the least possible environmental degradation occurs during and after construction of the penetration road.

**Strategy and Results:** During the mobilization phase the entire length of the alignment of the proposed road was walked. Locations of culverts were pinpointed, and areas of potential landslides designated. This information was passed to the TAMS/ELMS Supervising Engineering group representing the Government of St. Kitts and Nevis (GSKN).

It was demonstrated that many of the designed locations of culverts are not in the existing drainage galleys that run down to the sea. Thus, severe erosion can be expected downstream of the proposed culverts. Brochures describing soil erosion control techniques were passed on to the Supervising Engineers. The major concern, as outlined in the introduction to this report, is the potential for landslides on the steep cuts and fills and the lack of any design mechanisms to protect these slopes from severe erosion and subsequent extensive degradation of the marine environments in the near shore areas.

#### **Task #3 Training**

**Objective:** To ensure that a sustaining force of environmentally aware citizens and professionals is built up within the Federation of St. Kitts and Nevis.

**Strategy and Results:** During the mobilization phase discussions were directed toward the long-term technical staff, the government employees within The Planning Unit, government officials in the various ministries, and the appointed members of SEPLD&CB. Included were discussions about the importance of land use planning in the context of high quality tourism development throughout the Caribbean and the Southeastern United States. Particular emphasis was placed on high density negative coastal development activities that occurred with great frequency in former years along Florida's coast. Case situations were cited and coastal zone manuals from the States of Florida and California illustrating ecologically sound development techniques were displayed. In addition typical Subdivision Regulation Manuals, Applications for Development Approval and Environmental Impact Statements from specific projects were used as training resources.

Extensive planning took place during the mobilization phase relevant to the model resort tour that is planned for the Spring of 1988. Contacts have been made with resort owners on Saba, Tortola, Virgin Gorda, St. Lucia, St. Croix and St. Thomas. A number of resorts along the Florida coast were considered as potential visitation sites. Included in these were Key West, Amelia Island, Key Largo, Sanibel Island and Longboat Key. The designed program ensures maximum exposure to quality tourism development. Some time will be expended observing developments that were planned with little concern for environmental protection. Visits to Planning Boards in the United States and in the Virgin Islands have been arranged so that the Board members from the SEPLD&CB will have maximum exposure to the problems encountered in dealing with developers in fragile land situations where immediate economic benefits often receive a higher priority than long range planning for sustained development.

The training effort produced a greater sensitivity for land use planning among the various participants involved in the anticipated planning activities on the SEP.

#### Task #4 Investment Analysis

**Objective:** To provide an analysis of government policies regarding Peninsula investment decisions and government revenue requirements.

**Strategy and results:** No action was taken in this area.

## **PHASE II PLANNING IMPLEMENTATION**

### **Task #1 Administrative responsibilities and Institution Building**

#### **a. Technical Assistance Team**

**Objective:** To provide manpower and resources necessary to ensure that the various environmental protection plans are formulated, approved and placed into action.

**Strategy:** The organization of 21 short-term technical specialists will be required to prepare the natural resource environmental protection plans that will form the foundation of the environmental management effort. Some of the specific tasks may be managed jointly by one person. For example one engineer may adequately handle solid wastes, utilities, and drainage. Coordination of these experts is the responsibility of the long-term technical assistance team during the planning development phase. Terms of reference for short-term technical assistance will occupy considerable time in the beginning of the phase. These terms of reference will be submitted through the proper channels to USAID for approval and timely implementation. The various specialists will be required primarily in the first three months of 1988.

#### **b. SEP Board and Land Use Management Plan (LUMP)**

**Objective:** To continue to work closely with the South-East Peninsula Land Development and Conservation Board during the natural resource inventory process and the LUMP preparation activities so that the Board is fully aware at all times of the activities that are underway.

To amend the land use management plan so that it allows realistic development while conserving natural resources.

**Strategy:** The Board will continue to meet often. Board meetings will be held in the newly completed Board offices. Agendas will be prepared and minutes produced with action items delineated.

An open channel of communication will be maintained with the Planning Unit so that planning techniques that are developed for the SEP may be used where applicable in other areas of the Islands.

As the eight basic natural resource environmental protection plans are prepared and completed during activity "D" on the critical path chart (April and May of 1988) they will be submitted to the Board for their review, discussion and approval. These plans shall then be consolidated into a composite plan that will clearly delineate those areas that have opportunities for development and those areas that possess constraints against

development. From this composite plan will come the final Land Use Management Plan and the Master Development Plan showing feeder roads, infrastructure, and utilities.

**Results Anticipated:** A team of highly experienced short-term professional land use specialists, working with the SEPLD&CB can produce the plans, policies, specifications, regulations, and handbooks necessary for a locally appreciated and useful comprehensive land use planning system.

## Task #2 Design and Implementation of Environmental Programs

### a. Environmental Education Programs

**Objective:** To make the people of St. Kitts and Nevis more aware of their environment.

**Strategy:** The environmental education core group will continue to meet on a periodic basis throughout project. The environmental programs begun during the mobilization phase will continue to move forward during the planning implementation phase. This is shown as activity "H" on the critical path chart.

The environmental education programs started during phase I which will continue during phase II are briefly described as follows: These programs were explained in greater detail in the mobilization section of this report.

- 1) The Atlantic Center for Environment Exchange Program. This program, which is estimated to cost \$15,000, will occur during phase II. This will be a three month program (May-July 1988).
- 2) The preparation and showing of a video on the SEP. The raw video footage was shot during the mobilization phase. Editing and audio dubbing of the sound track will take place during this phase. An additional video about tourist development on nearby islands will be prepared and shown. These programs will be implemented during phase II. These estimated cost is \$5,000. This will be a six month program (January-June, 1988).
- 3) The long-term evaluation program that involves the writing, printing and distribution of the text book "Our Country" will be implemented during phase II. This will be a three month program (January-March, 1988) with an expected cost of \$5,000.
- 4) The broadcasts program will continue to be conducted through the media center at the Ministry of Education. This program is estimated to have no additional cost over office overhead. These broadcasts will be continued throughout the length of the project.

In addition to the above the following two environmental educa-

tion programs which were recommended in the environmental assessment report will be held during phase II.

Poster competitions will be held within the school system with the winners receiving a boat trip to some of the nearby islands and around the coastal waters of the SEP. An effort will be made to have first class poster winners receive their awards at an annual Earth Day ceremony. Hopefully, the Prime Minister would present the award. Efforts would be pursued to allow the winning poster to be placed on a postage stamp. The Earth Day activities would be planned to become an annual event with major exhibitions put up in the schools to demonstrate how sound management of natural resources can produce better health, superior habitation and greater economic benefits for all concerned.

An executive summary of the Developer's Handbook in easy to read format will be published and distributed throughout the schools and local community organizations so that citizens of the Federation will have a greater awareness of the techniques that will be used to manage development on the SEP.

**Expected Results:** The environmental education program should alter the attitudes and perceptions of adults and children alike about the environment in which they live. The ongoing newsletter that will be published commencing in September 1988 and every quarter thereafter should keep alive the programs and efforts that will be placed in action during the first seven months of 1988.

It is anticipated that as development activity accelerates on the SEP, more citizens of the Federation will visit the peninsula. The people who visit will have a greater appreciation for the considerable natural beauty that exists on the SEP and will be disposed to participate in preservation activities.

**Duration and cost of technical assistance:** The environmental education program is shown as activity on the attached CPC. It shall continue for the life of the project. The total funds to be expended on environmental education during the implementation phase are US \$ 30,000 (as outlined in program 1, 2, and 3 above).

#### **b. Environmental Planning**

The design and implementation of the environmental planning effort will be supported by a series of carefully defined short-term consultancies in St. Kitts during the spring and summer of 1988. These professionals will be inventorying and studying the natural resource base of the SEP with more precision than was possible during the period when the Environmental Assessment Report (EAR) was prepared. This effort will be divided into two activities. The first activity is to gather the data (see CPC). The second activity will be to synthesize the data and prepare

the natural resource environmental protection plans and a composite opportunities and constraints plan.

### Data Gathering

**Objective:** To inventory the natural resources and physical condition of the. Base maps will be prepared of the SEP and documentation of the surveys that adequately reflect the natural conditions that exist in the SEP will be produced.

**Strategy:** The rainfall, runoff, vegetation, wildlife, bird life, marine life, beaches, shorelines, rock formations, soils, slopes, beaches, dunes, wetlands, salt ponds, wetlands, and the near shore coastal waters will all be studied with care to assure that all important natural resource areas and critical habitat is mapped. Places where natural hazards exist will be delineated. This work effort is shown as activity "C" on the attached CPC. The eight specialists required include a soil scientist, a biologist, a hydrologist, a geologist, a wildlife manager, a forester, a beach geomorphologist, and a fisheries expert.

A soil scientist will study slope stability and potential for shear failure so that those areas that were unsuitable for development could be delineated. The soil scientist would describe in more detail the characteristics of the various soils associations for development. This would include soil drainage, depth to bedrock, adaptability for accepting structures and susceptibility for erosion.

A biologist will study the salt ponds, the mangrove wetland areas, and the near shore marine environments to determine which areas are ecologically productive and deserving of conservation.

A hydrologist will study the rainfall patterns and flow characteristics of the runoff so that detention or retention strategies can be suggested to impede and attenuate runoff. His major emphasis would be to delineate methods that would allow for post development runoff to be less than or equal to pre-development runoff.

A geologist will study potentially unstable rock formations that could be susceptible to rock slides initiated by either heavy rains or earth tremors.

A wildlife specialist will study in greater detail existing wildlife habitat. He will study (1) the effect of fragmentation on the species originally present in the intact habitat on the SEP, and (2) how fragmentation could lead to the loss of species. His goal would be to preserve the various species found on the SEP whose continued existence would be jeopardized by the anticipated habitat transformation and destruction caused by development on the SEP.

A forester will study the various vegetative associations that exist on the SEP and their ability to withstand stress due to development. He would further delineate outstanding tree formations that warranted conservation. He would assist in the development of arbor ordinances that would require developers to conserve certain species of trees. Further studies would recommend species that would survive easier during periods of intense drought.

A beach morphologist will study the transport of beach sediment, variations in wave energy, tidal currents, wave generating currents, and wave types so that sediment budgets could be developed. He would study the morphology of the various beaches and dunes on the SEP so as to develop strategies that would help to protect the beaches from erosion due to manmade or natural causes.

A fisheries specialist will study the development potential and status of near-shore habitats which would include identification and quantification of commercially important species in these habitats. His work schedule will include periodic visitations to ensure that a water quality analysis program is implemented by the long-term technical assistance staff.

**Expected Results and their Relation to Other Activities:** Upon the completion of the data gathering activity (shown as activity "C" on the CPC) the natural resource protection plans shown as activity "D" on the CPC would be prepared. Meanwhile, the reforestation plan would be underway as a separate effort. Concurrently legislation both in and out of the country would be under study. The result of this activity would be a series of valuable data bases for use in the anticipated natural resource protection plan preparation. These plans will be forerunners of the final Land Use Management Plan Map.

**Duration and Cost of Technical Assistance:** The technical assistance required for this activity will occur during the first three months of 1988. The anticipated cost will be:

Soil Scientist	20 days
Biologist	48 days
Hydrologist	6 days
Geologist	6 days
Wildlife Manager	16 days
Forester	6 days
Beach Specialist	12 days
Fisheries Spec.	6 days
Total	120 days @ \$250/day = \$30,000

## **Plan Production**

**Objective:** To obtain a permanent graphic record of the natural resource environment that exists on the SEP in the pre-development stage. In addition a Land Use Management Plan and a Master Development Plan will be prepared so that growth can be effectively and efficiently managed.

**Plan Production Strategy:** Once data is correlated and gathering is complete then a series of natural resource protection plans will be produced (see activity "O" on the CPC). These eight (8) plans will clearly delineate fragile natural resources that should be conserved.

A composite constraints and opportunities map will be compiled from these natural resource protection plans. An amended Land Use Management Plan and A Master Development Plan (showing feeder roads, utilities and infrastructure) will be prepared so that the SEP Board will have information on which to base land use planning. The preliminary designs of the various property owners will be considered during this time. The final Land Use Management Plan will not only consider the natural resources of the SEP, it will also delineate conservation areas and zones of intense land use.

The eleven short-term technical specialists required to perform this activity include a recreational planner, an environmental planner, a drainage engineer, a tourism specialist, a land use planner, a landscape architect, a solid wastes engineer, a marina engineer, a park manager, and a land acquisition specialist.

The following provides various methodologies that the planners, engineers and other specialties would implement during the plan production program.

A recreational planner will study the establishment of scenic look-out pocket parks at important vista locations. He will select points that have outstanding views of surrounding islands and the nearby coastal waters. Archaeological and historic sites will be selected to be developed into tourist attractions. A hiking and horseback riding system of trails will also be established. Logical areas for public beaches, complete with shelters and benches will be a part of the program. Launching areas, marina locations, yacht club sites, and a golf course location will be selected and studied for economic feasibility. The work effort will also develop rules and regulations relative to aquatic sports activities. Spear-fishing, diving, waterskiing, boating and the multitude of other waterfront and land recreational activities will all come under the control of a quasi public authority that could be known as The South-East Peninsula Parks and Recreational Authority. This authority would be the logical entity to establish a South-East Peninsula Marine Park.

Based on these studies, in relation to the needs of tourists, the Recreation Planner will incorporate resource sensitive design into the conservation of natural resources. The critical concept is "stewardship of the land" and an understanding that developable land in the SEP is a scarce and limited resource. This entire effort will be based on maximization of open space. Involvement of private property owners will be a vital element in any space planning. Economic studies will be performed to indicate the cost benefit relationships.

A environmental planner will study ways and means to avoid polluting the natural environment. Initial studies will determine reasonable build out scenarios. From these studies total potable water flows and waste water flows will be calculated. The location of a waste water treatment plant site will be selected and disposal methods evaluated. A collection system will be conceptually designed based on expected location of development activity and quantities of flows anticipated. Working closely with the soil scientist the planner will evaluate the capacity of the sub-surface soils to absorb waste water effluent via spray irrigation. Assistance will be provided by the solid waste engineer in determining collection system methodology and disposal techniques of solid wastes. Studies will be performed in conjunction with the utilities engineer relevant to capital cost recovery agreements with the various property relevant to the operation of a central utility system. Guidance will be provided for developing environmental quality standards for the waste water effluent that will be discharged onto the land and the storm water discharge that will be sent out to the sea.

A drainage engineer will work closely with the hydrologist in designing a master drainage system for the SEP. A plan for storm water to be routed, detained, treated and then discharged into the sea will be developed. Methodology will be developed to incorporate into the Developer's Handbook details regarding on site collection, storage, and treatment of storm water prior to its discharge into the master system. The quality of storm leaving a developer's site will not be allowed to be reduced below pre-development levels. Rules will be developed so as to not allow post-development run-off rates and quantities of flow to exceed pre-development conditions. Grading criteria for steep slopes will be created to attenuate velocities and thus avoid erosion. Porous pavements, ditch checks, and retention areas will all be required and would become an integral part of the on-site storm water management requirements. Flooding possibilities and flood hazard areas will be studied. Measurements of subsurface permeability and transmissivity will be performed to ascertain base flow directions and the ability of the soils to store storm water and thus diminish surface run-off.

A utilities engineer will work closely with the Environmental Planner to develop a master utilities network for the entire SEP.

Based on anticipated build out he will perform preliminary design on a potable water distribution and storage system. This will include looping, and other redundancy methods to offset against the possibility of a break in the trunk main coming down from Basseterre. He will develop a preliminary waste water collection system and determine the most feasible location for a waste water treatment plant and disposal field. He will develop performance standards for on-site utility construction including the laying of pipes and the installation of valves, fittings, hydrants, manholes and pump stations.

In cooperation with the soil scientist he will determine the ability of the soil in the disposal area to absorb waste water effluent. He will evaluate mounding effects and transmissivity of subsurface flow rates. Other disposal systems on St. Kitts will be evaluated for operational ability and effectiveness in treating, and disposing of effluent. Based on this data he will determine effluent application rates, and area of disposal field required.

A **tourism** specialist will work closely with the recreation specialist to evaluate developing attractions from the natural resource base. An inventory of natural amenities will be developed and decisions made regarding public or private investments that might be needed to enhance the resources. Man made amenities such as a golf course, tennis courts, swimming area, walking trails, launching ramps, and jogging trails will be studied. Linkages with other attractions on St. Kitts and Nevis will be evaluated. Studies will be conducted relevant to cruise ship visitations and ferry boat operations between the SEP and Nevis. Guidance will be provided on steep slope development in order to capture vistas of the surrounding shoreline and nearby islands.

A **land use planner** will be the most important short-term technical specialist. His major effort will be to synthesize all data and develop the modifications to the Land Use Management Plan. This can be accomplished by integrating all of the Natural Resource Protection Plans to develop the Constraints and Opportunities Plan. Meetings with property owners will be held in order to understand their development plans and provide guidance and direction in their designs. Land use intensity criteria will be developed. In addition floor area, livability, open space, and other development ratios will be assessed. Performance standards will be prepared relative to buffers, setbacks, easements, (drainage, scenic and landscape). Circulation patterns will be developed for pedestrians and vehicles. Pavement widths and intersection designs will be developed after a study was made out of buildout trip volumes and destinations. A Town Center will be developed that would accommodate growth for shopping, recreation, office and livability space.

A landscape architect will work closely with the land use planner, the recreational specialist and the tourism specialist to develop specific designs for public places. He will lay out the town center with a central plaza and appropriate locations for services, amenities and commercial space. Close liaison will be maintained with the forester relevant to species of trees that were most tolerant to the particular climatic conditions of the SEP. Design layouts will be provided for the public look-out areas, and public beaches and other public rest areas. Guidelines will be provided in the Developer's Handbook for landscape and buffer standards relevant to standardizing planting techniques, including appropriate information on fertilization and irrigation. Typical designs would be provided for landscape screens to diminish public area lighting from reaching turtle beach nesting locations. Setbacks from beaches will be established together with methods of keeping beaches clean and attractive.

A solid wastes engineer will work closely with the utility engineer to develop a master collection and disposal system for solid wastes generated on the SEP. A study of the existing public dump site at Conaree near Basseterre and its possibility to absorb the additional refuse expected to be generated from the SEP, discussions with public health officials relevant to potential improvements of the existing dump site so that refuse could be disposed in a more sanitary manner, and the possibility of creating a managed land fill will be discussed and funding opportunities explored. Compaction, shredding, and resource recovery will be considered. Size and location of containers; times and frequency of pick up; and size and type of trucks will be evaluated.

A marine engineer will evaluate the possibilities for high quality marinas. Salt ponds will be studied for their ability to connect to the open sea, without having to resort to constant dredging of the connecting channel. Studies will be made on littoral drift and the direction and force of waves. The possibility to dredge without creating major environmental harm will be evaluated. Close contact will be maintained with the biologist that performed the initial base work. Benthic habitat will be considered both within the ponds and at the potential site of disposal of the dredged material. As alternatives, the development of islands within the ponds and land disposal will also be considered. The composition of the bottom soil strata in the ponds will be evaluated in consort with the soil scientist.

Berth and boat sizes will be studied as well as turning basin requirements and bottom holding power in the event of severe tropical storms. Details of marina design elements will be placed in the Developer's Handbook in order to establish criteria and standards of construction.

A park manager will prepare a long-term park management plan while working in close coordination with the recreational specialist. The possibility of extending the National Park system in use at Brimstone Hill to the SEP will be considered. Development of an environmental education center with volunteers or paid park rangers as interpreters will be explored as a possible action. Cost benefit studies will be accomplished relevant to user fees. The use of the aforementioned SEP park association as a management vehicle would be considered. Funding sources other than fees will be considered. Display centers for exhibition of local artifacts and historical items of special significance will be studied. A physical plan delineating a total park system linked by walking and riding trails will be explored.

A land acquisition specialist will define techniques for acquisition of land by outright purchase (fee) and by easement, and or transfer of development rights (non fee). These acquisitions will be primarily land that has been designated for conservation or land that was deemed essential for public facilities and or amenities. Close discussions will be held with property owners to establish a partnership arrangement where land for the public good would be deemed economically important for the ultimate success of the entire SEP. This effort will be closely coordinated with the Land Use Lawyer and the Attorney General's office of the GSKN.

**Types of Persons for Technical Activities:** The technical consultant outlined above will have had considerable experience in working on large scale land development projects that were on or near large waterfronts. Most will have had extensive island experience in the Eastern Caribbean or the Florida Keys. They will understand how to develop natural resources with minimum impact. They will appreciate the importance of natural resource preservation for attracting high quality tourism. They will work diligently to preserve and enhance the natural resources of the SEP and its nearby coastal waters. Throughout this effort the technical specialists will maintain close contact with counterparts in the Ministries of Development, Health, and Tourism.

**Expected Results and Relation to Other Activities:** When the modification to the Land Use Management Plan is complete the GSKN will have participated in creating an effective instrument for guiding and establishing high standards for quality development. The plan will have the ability to accommodate change in the years to come. The plan will have initial rigidity in requiring conformance to a pre-determined methodology of development that attempts to maximize investment opportunities while simultaneously preserving the natural resources of the SEP. It will protect and enhance property values, improve living conditions, and attract enlightened investors.

Other activities during this time will be the preparation of the Developer's Handbook, the development of the impact assessment procedures and the development of natural resource protection legislation.

**Duration and Cost of Technical Activities:** The natural resource plan preparation activity is shown as activity "D" on the CPC. This activity will occur during April and May of 1988. The modification of the Land Use Management Plan is shown as activity "O" on the CPC. It will occur during June and July of 1988. The anticipated cost of this short-term technical assistance effort is US\$ 38,000. It includes a total of 52 days of effort. A detailed breakdown of cost is shown in the schedule of technical assistance under Task # 1 of the mobilization phase of this report.

### c. Environmental Impact Assessment Procedures

**Objective:** To assure the GSKN that each developer has made a complete and careful study of their development plans with regard to minimizing the impact of their development activities on both their specific site as well as the entire SEP region.

**Strategy:** During the planning implementation phase the environmental impact assessment procedures will be written, distributed to property owners and processed. The assessment procedures studied during the mobilization phase will be used as guidelines. Meetings will be held with the property owners to discuss the procedures and the methodology behind their use. The Application For Development Approval (ADA) that was discussed in the mobilization section of this report will be reviewed in detail with the property owners. Each developer will be shown how the ADA addresses the preservation of natural resources by requesting the property owners to specify and identify impacts. In completing the ADA the owner will provide justification and/or mitigation measures for the intended impacts. Copies of similar ADA's used in the State of Florida will be distributed to the property owners for their review and guidance in the preparation of their applications. The data base developed during the natural resource inventory will be made available to developers. Assistance will be provide to developers wherever possible to assist them in the acquisition of additional data that will be site specific to their development.

The ADA will demonstrate how the proposed development will become a part of the greater regional system within the SEP. It will demonstrate how it will connect to the regional infrastructure system relevant to the management of roads, potable water, waste water and storm water. Each application would be required to outline those resources that would be consumed, depleted, permanently removed, destroyed or irreversibly altered by the proposed development activity.

After applications have been completed and reviewed for sufficiency by the long-term technical staff they will be forwarded to all appropriate departments of GSKN. A fee system will be established to defray the cost of government review.

Following review by other government departments a report on the anticipated impacts will be presented by the staff. Recommendations would be submitted to the SEPLD&CB for their consideration, approval and or rejection. Rejected applications will be returned to the developers for revisions and resubmission.

**Type of Persons required for Technical Assistance:** The long-term technical assistance staff will provide most of the work effort required to complete this activity. Additional help will be provided by technical specialists working on other planning activities. Backstopping support will be provided by line officers within the various ministries. The forestry officer and the fisheries officer have particular skills that will be effective during the implementation of this activity.

**Expected Results and their Relation to other Activities:** A well established and tight review process of any development usually places a burden on a developer to produce a high quality product. In this instance each developer will undergo an intense examination of his proposed development activities. This should produce a plan that adequately addresses the need for effective land use planning. Developers will be forced to look at the high cost normally associated with developing marginal sites such as wetlands, and steep slopes. Generally the assessment process guides the developer to accept the lower cost, environmentally sensitive course of action. Economic success can be achieved more effectively by designing with nature rather against nature.

**Duration and Cost of Technical Assistance:** The impact procedures will be developed in the period of April through July of 1988. During this activity (shown on the CPC as activity "y") a number of other related activities will be underway. These include the preparation of the natural resource protection plans, The land Use Management Plan and the adoption of the proposed legislative changes. The long-term technical staff will perform all of the functions necessary to complete this work effort.

#### d. Environmental Legislation

**Objective:** To ensure that proper and adequate environmental legislation is approved by government so that developers are aware that the full force and power of the GSKN is behind the protection of the country's natural resources.

**Strategy:** In this phase we will continue to contact international agencies concerned with natural resource preservation and conservation. Contacts will be made with World Wildlife Fund, the

Convention on International Trade in Endangered Species of Fauna and Flora and The International Union for The Conservation of Nature. Close coordination will be maintained with the Attorney Generals office to assure that the GSKN becomes a party to any International protocols and a signature to any international conservation agreements.

Visitations will be made to nearby Caribbean Islands during this phase to discuss with government officials active legislation that is guiding development in their countries. Close liaison will be maintained with the six Caribbean conservation organizations that are presently in the Caribbean Basin. Advice and guidance will be requested on way to develop legislation relative to natural resource protection including wildlife, marine life, wetlands, steep slopes, beaches, dunes, bird nesting grounds, coral reef and native vegetation.

Recommendations will be made to the GSKN relevant to any additional changes to the enabling legislation that will solidify and strengthen the ability to protect the natural resources of the SEP. It is planned to have the approved Land Use Management Plan and Developer's Handbook incorporated into a new legislative package. Through all of this, close liaison will be maintained with the legal draftsman from the Attorney General's office. Regulations that are not incorporated into a major legislative package will be submitted for the SEP Board for their approval and thence to the Minister of Development for his approval and subsequent printing in the Official Gazette in accord with the existing enabling legislation.

**Types of Persons for Technical Activities:** Two short-term specialists will be needed for this work effort; an environmental lawyer and a land use lawyer. Counterpart assistance will be provided by the Attorney General's office. The following provides various methodologies that the two attorneys will use to implement the legislative program.

Both will be familiar with British case law as it relates to environmental and land use issues. They will be able to identify language that could be potentially declared invalid should the legislation be tested by developers in court. In the preparation of the legislative package they will provide preamble briefs supporting their position with established case law and judicial precedents. The Land Use Lawyer will advise on the proper description of the land use intensity zones, setbacks, easements, eminent domain actions, transfer of development rights, and various other non-fee acquisition practices.

**Expected Results and Their Relation To Other Activities:** It is expected that legislation will be developed that will clearly outline development requirements and the enforcement actions that could be taken if these requirements are not met. It will allow

for the streamlining of approvals of Peninsula related investments and protect the natural resources of the SEP through supportive actions of the official representatives of the people of the Federation.

The environmental legislative activities will be underway concurrently with the environmental planning activities. These activities are shown on the CPC as activities "J, V, W, and X".

**Duration and Cost of Technical Activities:** Short-term technical consultants will be required during April and May of 1988. The environmental lawyer will be required for 8 days and the land use lawyer will be required for a period of 6 days. The total cost will be US\$ 3,500.

#### e. Developer's Handbook

**Objective:** To place in one location all the standards, specifications, rules and regulations that developers will be expected to follow in the preparation of their plans for development activity.

**Strategy:** The Handbook will provide for the logical processing of plans. It will detail procedures for approval, and construction of tourist related investments. It will provide for the preservation of natural resources of the SEP and encourage the enhancement of the area by improved landscape activities .

The Handbook will be written concurrently with the drafting of legislation. It will follow closely behind the preparation of the Land Use Management Plan and the various natural resource protection plans. Developers will be invited to offer suggestions in the preparation of the Handbook.

The Handbook will contain standards for land use intensity, site design, transportation and access, and utility design and construction. It will also define land uses, develop performance standards, and site carrying capacities. In addition it will outline the site development review process.

**Type of Persons for Technical Assistance:** Two short-term technical consultants will be required for this activity. They are the land use planner and the landscape architect that were used during the plan development activities.

**Expected Results and Their Relation to Other Activities:** The Developer's Handbook will yield several results. It will illustrate, by schematics and easy-to-follow directions, design procedures that need to be used in order to preserve natural resources. This will result in a series of submitted plans that have been designed in accord with pre-developed engineering standards. It will allow feeder roads to be built to a pre-

developed standard. It will require parking areas to provide adequate space for ingress and egress and assure that fire fighting facilities can have access to all habitable buildings. It will provide for pedestrian walkways and circulation systems that follow land contours and avoid heavy cutting and filling operations. It will encourage development in clusters with adequate open space between clusters and development. It will foster heavily landscaped buffers between uses and units.

All of this will result in development that is attractive and coordinated while at the same time sensitive to the natural environment. The Developer's Handbook is shown as activity "G" on the CPC.

**Duration and of Technical Assistance:** The short-term specialists will required during August and September of 1988. The land use planner will be required for 8 days and the landscape architect will be required for 6 days. The total cost will be US \$3,500.

#### f. Road Construction

**Objective:** To ensure that the least possible environmental degradation occurs during and after construction of the penetration road.

**Strategy:** The construction activity on the penetration road will require daily observation beginning in early January 1988. Blasting operations and earth moving will require close monitoring to see that erosion is minimized.

**Expected Results and their Relation to other Activities:** A multitude of slope stability problems are anticipated since the slope angle on the cuts are almost vertical. High cuts coupled with clay seams in unstable rock rubble should produce extensive erosion. Large masses of broken rock could detach from the rock/soil faces triggering severe rockfall. This could become an endless erosion problem. It is conceivable that thousands of tons of rock and rubble could be deposited in the roadway during and after construction. This would eventually slide down the slopes and into the adjacent near shore marine environments where it could destroy coral reefs and sea grass beds.

**Cost and Duration of Technical Assistance:** The road monitoring work performed by the long-term technical assistance team will be continued for the duration of this contract. Occasional assistance will be solicited from the soil scientist and the geologist as they perform their planning data gathering activities.

### Task #3 Training

**Objective:** To ensure that a land planning board for the SEP (with staff) is installed and functioning. To provide opportunities for the Board to learn about coastal development and effective land use planning techniques.

**Strategy:** This activity will continue throughout the life of the project. Emphasis during the planing implementation stage will be to introduce both the Board and the staff to real life case situations of high quality and poor quality land use planning. To achieve this, close liaison will be maintained with the Physical Planning Unit within the Ministry of Development and with the individual Board members and the long-term staff.

Emphasis will placed on providing members with opportunities to interact with design professionals in considering the special situation and needs of the SEP. In-country workshops will be held with operational officers within the various ministries. One-on-one discussions will be held to stress the importance of performance criteria on the production of quality plans. The Board will have the opportunity to review and standardize concepts of carrying capacity and thresholds of safety will be reviewed and standardized in order to insure a high level of environmentally sound planning.

The two-week tour of model resort communities will be held during April, 1988. It will consist of visits to select Caribbean and Florida communities.

**Expected Results and their Relation to other activities:** At the end of the project the SEP should be on its way to becoming one of the finest resort communities in the Caribbean. It will have a local government planning agency that will have been exposed to as complete a planning analysis as any community in the United States has ever had. The Planning Board will be better trained than many planning boards in the United States. The level of education will be higher. It is anticipated that more and more citizens of the state will become appreciative of the advantages and benefits of land use planning. All will be able to see the enormous positive economic, social and environmental benefits resulting from good planning. This effort, without question, will allow St. Kitts and Nevis to become leaders in quality tourism within the Leeward Islands.

### Task #4 Investment Analysis

**Objective:** To provide an analysis of government policies regarding Peninsula investment decisions and on government revenue requirements.

**Strategy:** The probable impact of existing legislation and

regulations on the level on investment activity will be analyzed. An attempt will be made to identify which laws favor or discourage investments. Government will be assisted to identify legal, fiscal and regulatory changes that will permit attainment of environmental and fiscal objectives with minimal feasible distortion of incentives to the private sector. In addition, an effort will be made to quantify the impact of incentives on the government budget. Finally, information will be provided to government that will allow it to identify the tradeoffs between incentives to investors and the government's own budgetary needs.

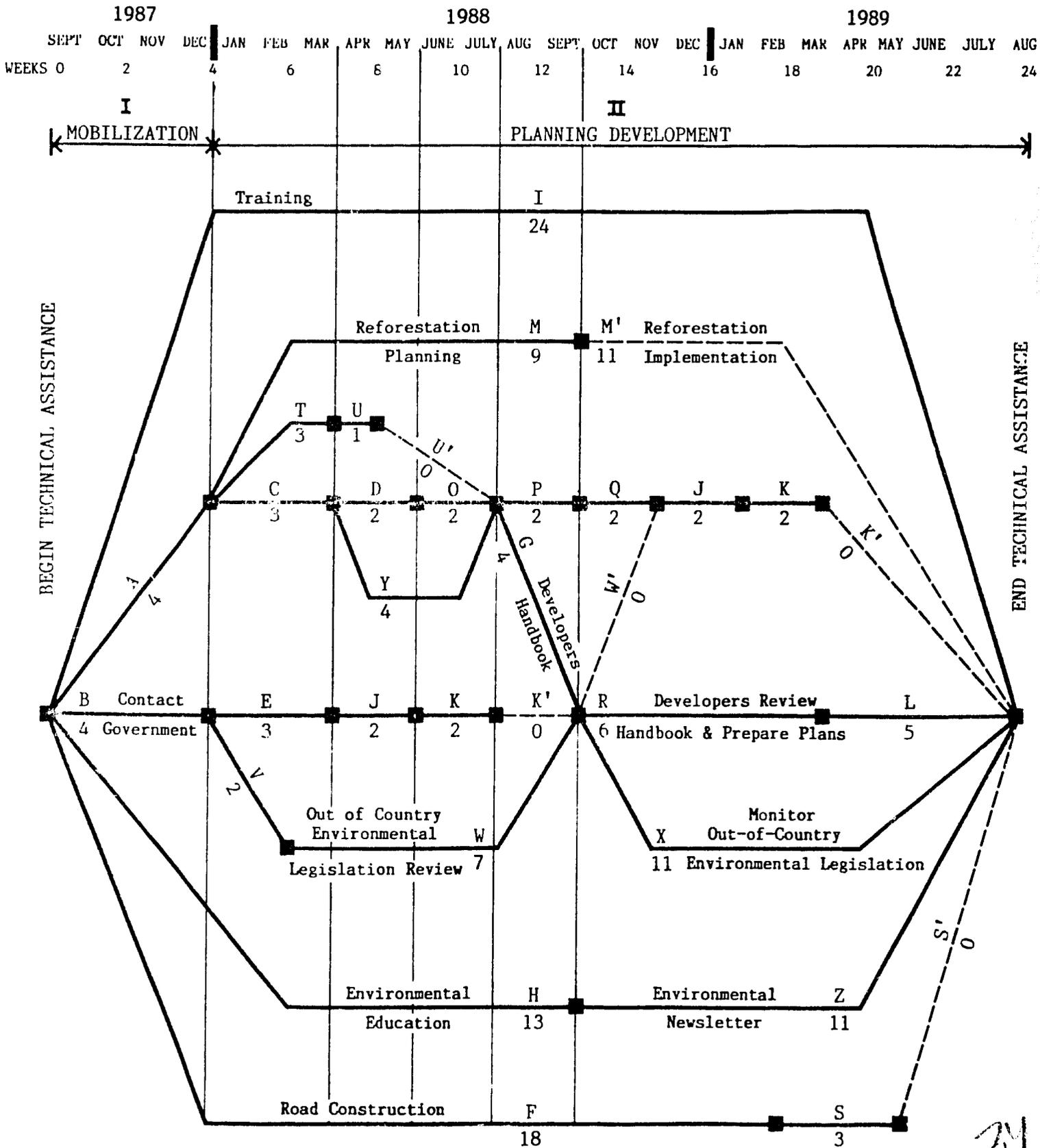
**Results Anticipated:** A schedule of investment activities that are beneficial to the local economy while simultaneously maintaining the quality of the existing natural resources of the SEP.

### CONCLUSION

The objectives of this project are many and varied. However, they all center on the achievement of quality sustainable tourism development on The South-East Peninsula which will provide a strong employment base so that the economy of St. Kitts and Nevis can be diversified and strengthened. The entire program of gathering data, synthesizing that data and preparing a Master Land Use Management Plan with attendant supportive documentation is laudatory. This type of planning effort has never been accomplished in the Caribbean. The program will establish a level of awareness of natural resources preservation that will stay with the people of this country for years to come. Future generations will praise this effort to sustain the country's most valuable natural resources.

The results of this project will preserve the pristine natural coastal waters and its magnificent sloping hills, and provide a place of permanent enjoyment for all the world to see.

# Critical Path Chart SEP Project Annex 1



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**KEY TO CRITICAL PATH CHART MATRIX (Annex 1)**

<b>Months Required</b>	<b>Preceding Activities</b>	<b>Activity</b>
4	NONE	A. Establish board office for SEPLD&CB
4	NONE	B. Contact key government agencies and officials
3	A	C. Inventory natural resources with coordinated technical assistance
2	C	D. Prepare environmental protection plans on natural resources
3	B	E. Review existing enabling environmental legislation
18	NONE	F. Review road design & monitor road construction for environmental compliance
4	O	G. Prepare Developer's Handbook
7	None	H. Prepare & present environmental education program
24	None	I. Recruit and train staff
2	Q	J. Assist in preparation of necessary environmental rules regulatory systems, & amendments to existing environmental protection legislation
2	J	K. Adopt necessary environmental rules regulatory systems, & amendments to existing environmental protection legislation
5	R	L. Review developers plans
9	A	M. Develop reforestation plan
2	D	O. Develop environmental protection strategies & modify Land Use Management Plan (LUMP)
2	O	P. Publish & have public hearings on LUMP
2	P	Q. Adopt land use management plan
6	G	R. Developers review handbook & prepare plans
3	F	S. Road construction demobilization
3	A	T. Study model resorts
1	T	U. Visit model resorts
2	B	V. Contact out of country environmental associations
7	V	W. Review out of country environmental information & legislation
11	W	X. Monitor out of country environmental information & legislation
4	C	Y. Develop impact assessment procedures
11	H	Z. Prepare & distribute quarterly environmental newsletters

ANNEX 2

SOUTH-EAST PENINSULA LAND DEVELOPMENT AND

CONSERVATION BOARD

OUTLINE OF DEVELOPER'S HANDBOOK

<u>Section</u>	<u>Title, Purpose &amp; Jurisdiction</u>
1000	Title
1001	Legislative Intent
1002	Commentary
1003	Purpose
1004	Interpretation
<u>Definitions</u>	
2000	Purpose
2100	Word Usage
2200	Abbreviations
2300	Definitions
<u>Regulations</u>	
3000	Introduction
3100	Use Regulations
	3101 - Types of Uses
	3102 - Table of Permitted Uses
	3103 - Use Categories Defined
	3104 - Commercial & Institutional Uses
	3105 - Residential Uses
	3106 - Recreational Uses
3200	Development Performance Standards
	3201 - Compliance
	3202 - Table of Performance Standards
3300	Site Capacity Calculation
	3301 - Base Site Areas
	3302 - Resource Protection Land
	3303 - Recreational Land
	3304 - Determination of Site Capacity
3400	Natural Resource Performance Standards
	3401 - Beaches
	3402 - Dunes

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- 3403 - Bluffs
- 3404 - Ravines
- 3405 - Flood-plains
- 3406 - Wetlands
- 3407 - Steep Slopes
- 3408 - Erosion Hazard Areas
- 3409 - Woodlands
- 3410 - Salt Ponds
- 3411 - Coastal Shorelines
- 3412 - Slat Pond Shorelines
- 3413 - Drainageways
- 3414 - Stormwater Run-off
- 3415 - Soil Erosion & Sedimentation Control
- 3416 - Water Quality Standards

3500 Open Space

3600 Land Use Intensity, Classification & Buffers

- 3601 - Land Use Intensity Standards
- 3602 - Buffers: Purpose
- 3603 - Buffers: Location
- 3604 - Buffer Requirements
- 3605 - Use of Buffers
- 3606 - Ownership of Buffer Areas

3700 Developmental Site Design Standards

- 3701 - General Landscape Requirements
- 3702 - Parking Area Landscape Requirements
- 3703 - Exterior Lighting Standards
- 3704 - Sign Regulations
- 3705 - Table of Sign Performance Standards

3800 Transportation & Access Standards

- 3801 - Road Classification
- 3802 - Definitions
- 3803 - Road Types
- 3804 - Road Standards
- 3805 - Roadway Access
- 3806 - Temporary Access
- 3807 - Access for Fire Vehicles & Apparatus
- 3808 - Clear View at Intersecting Streets

3900 Utility Standards

- 3901 - Potable Water Requirements
- 3902 - Waste Water Disposal Requirements
- 3903 - Underground Electric Power Requirements
- 3904 - Telecommunication Requirements
- 3905 - Solid Waste Disposal Requirement

**4000 Administration and Enforcement**

- 4001 - Purpose
- 4002 - Site Development Permits Required
- 4003 - Application for Development Approval
- 4004 - Environmental Impact Assessment Report

**Required**

- 4005 - Sign Permit Requirements
- 4006 - Application for Sign Permit
- 4007 - Application Procedures
- 4008 - Site Plan Review
- 4009 - Site Development Permit Issuance
- 4010 - Enforcement

**5000 Dunes of Land Development & Conservation Board**

- 5001 - Pre-design Conference
- 5002 - Conditional Use Permits
- 5003 - Variances
- 5004 - Appeals
- 5005 - Amendments
- 5006 - Public Hearings