

BAHAMAS

**SUPPLEMENTARY FINANCING FOR NEW PROVIDENCE
TRANSPORT PROGRAM-BAHAMAS**

(BH-L1024)

**ENVIRONMENTAL AND
SOCIAL IMPACT REPORT**

Supplementary Financing for New Providence Transport Program - Bahamas ENVIRONMENTAL AND SOCIAL IMPACT REPORT

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Acronyms

AA	Associated Asphalt Limited
BEC	Bahamas Electric Corporation
BEST	Bahamas Environment, Science and Technology Commission
BNT	Bahamas National Trust
DEHS	Department of Environmental Health Services
DoPW	Department of Public Works
EIA	Environmental Impact Assessment
EMPs	Environmental Management Plans
ESIA	Environmental and Social Impact Assessment
ESIR	Environmental and Social Impact Report
GoB	Government of the Commonwealth of the Bahamas
IDB	Inter-American Development Bank
MM	Mott MacDonald Consultants
MOMA	Ministry of Maritime Affairs and Labour
MOTA	Ministry of Tourism and Aviation
MOWT	Ministry of Works and Transport
NPTP	New Providence Transport Program
RTD	Road Traffic Department
SFNPTP	Supplementary Financing for New Providence Transport Program
TDP	Transport Development Plan for New Providence Island
TEPP	Total Energy Power Plant
TPPU	Transport Planning and Policy Unit
WRMU	Water Resources Management Unit
WSC	Water and Sewage Corporation

I. INTRODUCTION

- 1.1. This report is based on information contained in the Environmental and Social Impact Assessment (ESIA, 2000)¹ contracted by the Ministry of Works and Transport (MOWT), on the Environmental and Social Impact Report (ESIR, 2000), on the Environmental Management Plans (EMPs) prepared for design and civil works, on the environmental audits of first phase implementation (November 2001 and April 2002), on the work specifications of the international bid put out in 2007, and other related documents.
- 1.2. During the period of February 4 to 11, 2008, the environmental consultant met with the permanent secretary of MOWT, Mr. Colin Higgs, and Project Unit engineer, Mr. Henry Moxey; with the new director of BEST Commission, Mr. Philip Weech and Ms. Lorraine Cox, staff member; Resident Engineer for Mott MacDonald Consultants, Mr. Damian Francis; and former BEST Commission staff member, Ms. Rochelle Newbold. An overall site visit was organized by Ms. Charlene, from MOWT. IDB local representative, Mr. Colin Forsythe accompanied all the meetings and provided all information available on the project first phase.
- 1.3. This report was prepared in order to update the former ESIR for this Supplementary Financing for New Providence Transport Program.

II. PROGRAM BACKGROUND

- 2.1. The Bahamas comprise 700 islands and cays with a total land area of 5,383 square miles spread over 100,000 square miles. The total population of the country is 320,000 persons of which 69% reside in New Providence (83 square miles), 16% reside in Grand Bahamas (530 sq. miles), the second major centre, and the remainder is scattered among the other 28 inhabited islands. New Providence Island, which houses the capital, is only 7 miles wide and 25 miles long and accounts for only 1.5% of the country's land mass.
- 2.2. Being an archipelago, the Bahamas depends upon inter-island marine and air transport. The country has 1,700 miles of roads, of which 715 miles are paved. The country has two international ports and a large number of small harbours, docks and marinas. Its merchant marine numbers over 1,000 ships of more than 1,000 gross tons each, of which over two-thirds are registered there as a flag of convenience. The Bahamas also has 65 airports of which 17 accommodate international traffic.
- 2.3. New Providence Island, where Nassau is located, is the most populated island of the Bahamas. Most residents use private cars or buses for transport, while the tourists arriving on cruise ships docking in Nassau harbour, or by air at the international airport, use taxis and boats or simply walk around the downtown area.
- 2.4. Private automobiles are the main mode of transport for a large part of the population and public transportation is underused. Automobile ownership rates have risen dramatically

¹ ESIA was approved by the Bahamas Environment, Science and Technology Commission in 2000.

over the past decade, with 85% of the workforce already commuting by car to work. Congestion is increased by the daily arrival of cruise ships at Nassau Harbour that discharge thousands of tourists into a fleet of taxis and small buses.

- 2.5. Eastern New Providence is highly urbanized. High traffic volumes produce severe congestion that causes high costs to road users and the urban environment. During the 7:30 to 9:30 a.m. peak, traffic moves at average speeds estimated at less than one quarter of normal speed. In the central part of the island, the road network consists mainly of narrow two-lane urban roads. The capacity of this network is far from adequate for existing traffic, let alone for the additional traffic volumes that can be expected in the next few years.
- 2.6. Due to these high levels of congestion, there is a need to improve traffic flows on the island's road networks. The most effective method of achieving these improvements in the medium term is through a combination of traffic, transport and planning measures and well-targeted improvements in physical infrastructure to increase road capacity.

The Transport Sector in the Bahamas

- 2.7. *Public Transport.* Public transport consists of taxis and small buses called "jitneys". The approximately 400 public buses in service are privately owned and operate under individual licenses on 23 routes. Ineffective regulation results in excessive competition on popular routes and leaves much of the rest of the Island with poor and infrequent service. The taxi fleet, while diverse and large, mainly serves tourists and tends to concentrate around the hotel areas and downtown Nassau. The taxis and jitneys that carry the itinerant tourists from the cruises compete for road space with private cars and trucks and further increase congestion.
- 2.8. *New Providence Roads.* The surface transportation system of New Providence Island consists of 1,000 miles of roadways, the majority of which are paved. Of this total, 200 miles of roadway provide the basic arterial roadway function carrying the majority of the peak traffic. Pavements of the main road network are generally in adequate condition, with sufficient funds for maintenance being annually allocated in the annual budget. A limited road hierarchy exists. Some roads are of a better standard, but these are not connected, nor properly signalized. Most major roadways, especially in the intensely developed eastern and central parts of New Providence Island are narrow, and without proper designed intersections, and have uncontrolled access, poor right of way definition, few pedestrian facilities, and inadequate traffic control. The capacity of this network is far from adequate for existing traffic, let alone for the additional traffic volumes that can be expected in the medium term.
- 2.9. *Institutional arrangements.* Institutional responsibility for the transport sector in The Bahamas is currently divided among three ministries: the Ministry of Works and Transport (*surface transport*), the Ministry of Tourism and Aviation (*air transport*) and the Ministry of Maritime Affairs and Labour (*sea transport*). The Ministry of Works and Transport (MOWT) is responsible for establishing and implementing transport policy, regulating land transport services and for the construction, maintenance and operation of all public buildings and transport infrastructure, including roads. A Transport Planning and Policy Unit (TPPU) has been established under the New Providence Transport Program (NPTP) with basic responsibilities for making recommendations on updating transport policy and

carrying out transport planning activities. Regulation of public transportation, road safety, vehicle registration and driver licensing is currently under the responsibility of the Road Traffic Department (RTD) of the MOWT in accordance with the Road Traffic Act.

- 2.10. The MOWT is also responsible for the construction, maintenance and operation of all public buildings and transport infrastructure, including roads. The main executing entity within the ministry is the Department of Public Works (DoPW). The DoPW is organized into three divisions: Civil/Structures, Buildings and Administration. The DPW has limited direct executing capabilities, carrying out most of its activities through international and local contractors and consultants. Due to shortages of qualified local staff, many professional positions within the DPW are occupied by expatriate staff on medium term (2 to 3 year) contracts.

Country's Sector Strategy

- 2.11. *Infrastructure, Regulation, and Population Growth.* There are numerous challenges. The Bahamas faces in terms of provision of infrastructure amidst population growth. The country's archipelagic geography means that it is difficult to benefit from economies of scale in terms of infrastructure capacity on many islands. Furthermore, the majority of infrastructure in The Bahamas is installed on the islands of New Providence and Grand Bahamas, where much of the investments and large tourism development projects were located for the better part of the twentieth century. As such, significant new investments must be developed into the Family Island communities that are now growing and expanding, as well as rehabilitation and expansion works should be implemented in New Providence and Grand Bahamas. The Government of The Bahamas is currently reviewing land use and physical planning policy to determine areas that accommodate expansion for urban development.
- 2.12. *Urban Development.* Lack of planning, restricted human and technical resources, and a limited political will are all contributory factors to the current state of urban development that exists in The Bahamas. Furthermore, large scale development remains driven by concessions as planning is done along the lines of development projects, land concessions, and policies rather than based on a comprehensive, community-based national development plan focused on sustainable growth and urban development. In this regard, the development of a strategic master plan that takes into account all future urban developments in terms of timelines, levels and rates of development, public sector reforms, human and technical support and training, and private sector partnerships, is crucial for the future of The Bahamas. As noted in subsequent sections, significant efforts are being made by GOBH in addressing the issue of transport policy and planning.
- 2.13. *Urban Transportation.* The Bahamas strategy for the urban transport sector is based on the "Transport Development Plan for New Providence Island" (TDP) prepared in 1995 and updated in 1999. The Road Traffic Department has made the management of New Providence traffic one of its chief priorities and has sought to undertake several studies, contracting local and international consultants. These studies include Unification of Public Bussing, Traffic Congestion and Reduction Study, and Road Safety, which consists of driver training and crash collection data. Studies that are still pending include the Downtown Nassau Traffic Management Study, the Routine Maintenance Management

System for New Providence, the development of a proper traffic management, and a maintenance management plan for the roads of New Providence.

III. PROGRAM DESCRIPTION

- 3.1. The main objective of the New Providence Transport Program, and this supplementary financing, is to reduce transport costs for road users by providing a more rational and efficient transport system for New Providence Island. This objective will be met by improving the existing road network, modernizing and strengthening the institutional framework responsible for the provision of transportation services, improving road safety, improving public transportation, and alleviating the negative environmental impacts associated with the existing traffic congestion levels.

New Providence Transport Program (LO 1320/OC-BH)

- 3.2. The original New Providence Transport Program consisted of three major components: (i) roadway development and traffic management, including physical works and traffic management measures needed to provide the island with a well defined road hierarchy; (ii) engineering studies, including preliminary engineering designs, economic feasibility and environmental studies, environmental supervision and auditing; and (iii) institutional development and strengthening, providing assistance in transportation planning, traffic management, road maintenance, public transportation, and road safety.
- 3.3. The original physical works included 23 km of road improvements, consisting mainly of the widening of 10 existing roads (corridors), and 15 km of 9 new road construction (corridors), and improvements to 5 major junctions (sections).
- 3.4. In April 2001, a design-build contract for the NPTP was awarded to Associated Asphalt Limited (AA). In July 2002, AA had substantially completed construction on 3 corridors and commenced work on approximately 7 other corridors when it went into receivership and its contract was terminated in November 2002. Following the termination of AA's contract, AA's designer (Halcrow Consultants) was contracted to complete the remaining designs. Additionally Mott MacDonald Consultants (MM), the project supervisory consultant up to that point in time, was retained as the GoB's Engineer of Record.

Works completed

- 3.5. *Clearance of the Right of Way.* Identification of the land required for the NPTP was substantially completed in 2000 and the compulsory land acquisition process commenced in 2004 with the publication of the Government's Declaration of Intended Acquisition. All 446 acquisitions for the NPTP corridors had been completed. However, the progress with respect to the valuation of these properties, the re-establishment of legal boundaries and compensation payments has not yet been satisfactorily achieved. Substantial land compensations are still outstanding. This condition though does not compromise works execution.
- 3.6. *Advance Utility Diversion Works and Wall, Tree and Fence Relocation Works.* Based on the experience learned from project's first implementation phase, all overhead utility

diversions and relocations of walls, fences and salvageable trees must be completed prior to commencement of further works in order to avoid construction delays. Thus, four contracts were awarded in 2007 and are substantially completed on the shifting and relocation of walls and fences. Approximately 200 overhead poles still remain to be relocated by Bahamas Electricity Company (BEC).

- 3.7. *Relocations.* As indicated in the ESIA, only five occupied houses and three empty houses were taken out of the ROW and families had already been transferred to new homes. In addition, one house was relocated within its own area. There were no other direct impacts on low income population requiring resettlement.
- 3.8. *Civil works.* Only 3 corridors/sections were substantially completed under the NPTP: (i) Section 1B – Buttonwood Avenue to Beatrice Avenue Junction (1.2 mile, 2-lane roadway); (ii) Corridor 3 – Sir Milo Butler *Improvements* (4-lane, 1.2 mile corridor); (iii) Corridor 6 – Gladstone Road Realignment – Phase I (2-lane, 0.5 mile corridor). Other corridors were completed or partially recovered by MOWT under local contractors: (i) Corridor 10 – Baillou Hill Road between Robinson Road and Carmichael Road – part of the corridor north of the Baillou Hill Rd/Independence was completed in Feb 2007; (ii) Corridor 11 – Baillou Hill/Market One Way Couplet between Robinson Road and Duke Street – temporary maintenance works were undertaken in 2003 that included milling and pavement overlays; (iii) Corridor 16 – Wulff Road between Marathon Road and Village Road – temporary maintenance works were undertaken in 2003 that included milling, pavement overlays and minor widening at roundabout. Corridor 14 – Harrold Road between Bethel Avenue and Baillou Hill Road (now named Tonique Williams-Darling Highway) was completed out of NPTP, in Aug 2005. A full table with the description and actual status of corridors and sections are presented in Annexes 1 and 2.
- 3.9. *Environmental Management Plan.* The Project EMP established the structure for environmental management and presented a checklist of environmental impacts and detailed environmental management programs, which provided information on how the proposed schemes should be managed during the construction phase. The EMP provides useful information that the new Contractor may wish to utilize. Generic Method Statements were produced to cover areas and activities likely to be encountered throughout the construction process. This EMP provides a wealth of useful information and as such should be provided to the Contractor and detailed in the list of documents provided for information only. An updated version of the EMP was included in the bidding documents.
- 3.10. *Site Environmental Management Plans.* A brief walkover survey was undertaken on all sites where construction work had commenced or clearance had occurred. The aim of the walkover was to establish whether environmental design and construction completed so far had achieved the original requirements.
- 3.11. *Environmental audits.* Accordingly to the Employer's Requirements of the project, two environmental audits were performed by Mott MacDonald (November 2001 and April 2002) during construction. The first environmental audit focused on the road designs and site EMPs, on the environmental awareness of the senior management in charge of implementing all aspects of the EMP and ongoing civil works at corridors 1B, 2, 3, 4, 6 & 7 and compound. The second audit focused on issues relating to environmental management of the ongoing civil works at corridors 1A, 1B, 2, 3, 4, 6, 7 & 17. Issues

requiring corrective and preventive actions were concerned predominantly with the transfer of oils and fuel and maintenance of vehicles in an inappropriate location; with the monitoring of noise adjacent to sensitive receptors² such as schools and residential areas; with the need to develop a method/procedure for a post-construction auditing regime, with emphasis to landscaping; and no fencing was observed where vegetation clearance had taken place.

Institutional strengthening

- 3.12. The Institutional Development and Strengthening Component provided for the establishment and staffing of a Transport Policy and Planning Unit (TPPU), within the Road Traffic Department of the Ministry of Works and Transport.³ The TPPU would be responsible for transportation planning, review of the Road Traffic Act, development of traffic management standards, development of a road maintenance management program, and review of public transportation and traffic safety issues.
- 3.13. TPPU was established in early 2002 but did not function until August 2004 when a Transportation Specialist⁴ was hired. The TPPU has established a dedicated website for their public awareness campaign, and is currently analyzing the various transportation studies undertaken and the implementation of the recommendations. TPPU was involved in a wide range of activities related to the development and implementation of land transport policy and planning⁵. A final report of the Transportation Specialist was presented in June 18, 2006.
- 3.14. TPPU created a Transport Development Plan (TDP) further to the plan developed in 1995 and updated in 1999. A later updated version was included in the first Project Quarterly Report, as "A 10 Year Vision" of transport initiatives needing implementation. In addition, the TPPU with the assistance of Transport Research Laboratories (TRRL) collected road safety data, and analyzed and developed road safety and driver education manuals.
- 3.15. In 2004, the TPPU prepared a policy recommendation paper for the unification and establishment of a public bus transportation system for New Providence and a public bus specialist was hired in 2006 for the preparation of a proposed work program, for the unification of the public bus system for New Providence, drafting a business plan and a legislative/regulatory framework implementation of the proposed plan.
- 3.16. In 2006, the TPPU commissioned an urban transportation congestion reduction study and the development of a strategic action plan. The firm presented their findings, recommendations and a strategic plan for implementation reduction of traffic congestion for New Providence. The Road Traffic Department is currently working on the proposed plan and implementation strategy.

² However, it was noted that there have been very few complaints.

³ The project did not include Roadway Development and Road Maintenance Management System (RMMS) which are under the responsibility of the Ministry of Public Works (MOPW).

⁴ Mr. Arnold Van Buuren, from WSP International Management Consulting, served as Transportation Specialist attached to the Transport Policy and Planning Unit within the Road Traffic Department (RTD) of the Ministry of Transport and Aviation (MOTA), from August, 2004 to June, 2006.

⁵ Projects/studies undertaken by TPPU: Urban Transportation Congestion Reduction Study and Strategic Plan for The Bahamas; Downtown Nassau Traffic Study; New Providence Traffic Study; Public Transportation Development Plan; Road Safety and Driver Education Manuals; and others.

Environmental management

- 3.17. In 2001, ICF Consultants was appointed for the provision of consulting services to the BEST Commission on the Strengthening of Environmental Management component of the IDB loan. During the period of the AA Design/Build contract, ICF provided environmental oversight of the road works and reviewed the site EMPs. The services of the consulting firm were put on hold after termination of AA's contract in November 2002.
- 3.18. To meet the environmental requirements for the various corridors under the NPTP it was agreed that the green space areas required for each corridor would be aggregated into one large park in the Big Pond area. ICF assisted BEST with the preparation of a master plan for the development of the Big Pond Park, worked with stakeholders to move the project forward, and assisted with the development of a project implementation plan.
- 3.19. In 2001, a Master Plan had been formulated for the Big Pond Park. The principal goals of this Master Plan were: maintain natural character of Big Pond; clean up the area and prevent future dumping; improve local drainage and enhance existing ponds and wetlands; safe and pedestrian friendly access for neighbouring residents; provide infrastructure on perimeter such as restrooms and parking; allow for passive recreation (walking, running, biking). The key features of the Master Plan are: clean-up and trash removal component; access controls to stop dumping and assure public safety; looping trail network for walking and jogging; elevated boardwalk and interpretative nature trail; picnic, parking, and restroom amenities on perimeter; bird watching platforms.
- 3.20. The conceptual plan was presented to primary stakeholders in April 2001, with an overwhelmingly favourable response. Given the complexity of the project, a project implementation plan was developed, but implementation was never initiated.

Supplementary Financing of the New Providence Transport Program

- 3.21. The main objective of the Program is to reduce transport costs for road users by providing a more rational and efficient transport system for New Providence Island. The objectives of the supplementary financing are to improve the existing road network, modernize and strengthen the institutional framework responsible for the provision of transportation services, improve road safety, improve public transportation, and alleviate the negative environmental impacts associated with the existing traffic congestion levels. This supplementary financing will cover the following main components.
- 3.22. *Component 1: Civil works.* This component will finance the following activities: (i) completion of the international slices (corridors 4, 5, 10, 11a, 11b, 12, 18, section 24, 1a, 13a, 13b, 15, 16, 17, and section 23); (ii) additional works to be carried out at corridor 13b part two (Prince Charles Drive, between Beatrice and Fox Hill Road), which were not included in the bidding documents; (iii) completion of the local slices (corridors 1a junctions, corridor 17 junctions, corridor 4 full corridor, and remedial works at corridor 1b); and (iv) restoration and protection of the Big Pond area as an urban open space, for the mitigation of any potential negative environmental impacts that may arise from the construction of new roads.
- 3.23. *Component 2: Institutional strengthening.* This component will finance the strengthening and modernization of MOWT institutional capacity to develop and implement the

comprehensive surface transport policy. In addition, this component will clearly focus on specific actions, such as assuring efficient maintenance of the roadways in the program and improving the regulation of the existing public transport services. Furthermore, this component will provide assistance to the MOWT in the form of consulting services for specific tasks and/or the use of project funds for staff training; and technical studies to facilitate preparatory designs.

- 3.24. *Component 3: Supervision and administration.* This component will finance the following activities: (i) a consulting firm that will provide technical support to the MOWT in the preparation, supervision and execution of the Program, and (ii) increase the Project Execution Unit capacity to timely execute the NPTP.

Bidding Process

- 3.25. In August 2006, the Bank appointed a procurement specialist to review the bidding documents and to recommend a strategy for the re-tendering of the works. Based on those recommendations detailed bidding documents and the short list were prepared. The bid documents were issued to the firms in May 2007, and tenders have been submitted in August 2007. Bid was originally set for corridors 5, 10, 11, 12, 13, 15, 16 18, and sections 23 and 24. After that, the MOWT decided to include in this contract corridors 1, 4, 17 and two new corridors (34 and 41). Negotiations for this amendment are currently ongoing with the lowest evaluated bidder.
- 3.26. The local bidding for other corridors has been progressing with corridors 10, 21 and 22 (slice 7) recently completed; corridor 3B was awarded to a local contractor in March 2007; and 3A still in the procurement phase. Corridors 8, 9 and 19 are programmed to continue in parallel with the international package.
- 3.27. Several modifications on the original scope of the program were made during these years. The construction of Harrold Road (Corridor 14) was taken out of the project in 2004 and a contract was awarded to a joint venture contractor with GoB funds. The road works were completed in 2005 and the corridor was renamed the Tonique Williams-Darling Highway. In 2005, a contract for the roundabout/junction at Baillou Hill Road and Tonique Williams-Darling Highway was awarded to the same joint venture contractor, but has not yet been completed. Corridor 7 has been taken off the project as it will be part of an agreement with a developer related to the Baha Mar project.

Description of Civil Works

- 3.28. All corridors have been reviewed, as the designs were finalized, and due to some improvements implemented by the MOWT during these years, modifications of the extension of the works as well as some characteristics related to new information on traffic demands resulted. Annex 1 show a complete table of civil works originally proposed and Annex 2 show works included in this supplementary financing.
- 3.29. For this project the MOWT jointly with its engineering services consultants had prepared fairly detailed preliminary engineering studies for all the proposed works. These designs have been developed taking into account all recommendations proposed in the ESIA and the EMP and lessons learned during the first phase.

- 3.30. The new contractor that will be awarded the civil works for this phase will have to prepare the new site EMPs for each corridor and submit to BEST Commission for approval before the commencement of any civil works. Former EMPs will be made available to the Contractor to be updated or modified as required.

Program Execution

- 3.31. MOWT is the *Executing Agency* for this project. The Department of Public Works, through the Project Executing Unit (PEU), is responsible for the execution of the Civil Works component, and for the routine maintenance management and completion audit. The Office of the Roads Commissioner will be responsible for implementing all program components, demanding the cooperation of other national entities, such as BEST, BNT, BEC, CoB, MOS.
- 3.32. The supplementary financing will be an investment loan, as was the original program. The borrower will be the Commonwealth of The Bahamas (GoB). The executing agency will be the Ministry of Works and Transport (MOWT), through the Project Executing Unit (PEU) implemented to execute the NPTP (LO 1320/OC-BH). The PEU will continue to be responsible for loan administration, including the same main functions as under loan 1320/OC-BH in relation to financial management and accounting, reports, bank accounts, control and supervision, and coordination with other international lenders. The special execution conditions of loan contract 1320/OC-BH will apply. Procurement of new contracts to be financed with this supplementary loan will be conducted in accordance with Bank policies (documents GN-2349-7 and GN-2350-7).
- 3.33. Due to the size and scope of the Program, MOWT has contracted Mott MacDonald (MM) to supervise, administer and manage the contract. This firm has assisted the MOWT in the preparation of preliminary studies and designs, prepared the ESIA, EMP and HAZMAT, and supervised the environmental and social aspects of the Program for MOWT. The firm also reviewed the final designs and Site EMPs prepared by the contractor for each corridor, determined if environmental and social impact mitigation measures had been included in the final designs, supervised construction works for proper implementation of the recommended environmental and social mitigation measures, and performed environmental audits. Possibly MOWT will retain this firm again in this second phase. MOWT does not have in-house capacity to perform all these activities.

Environmental Management

- 3.34. The supplementary financing will fund the same class of civil works as the original project. As such, the environmental and social strategy and the environmental and social management report originally approved for the NPTP program is still valid and applies. Environmental oversight of all major projects will be provided by BEST Commission, which has the responsibility to protect, conserve and responsibly manage the environmental resources of The Bahamas.
- 3.35. In the first loan, BEST should have provided independent auditing of the site ESMPs through an international consulting firm and oversight of the implementation of environmental and social mitigation measures during construction. Though, as BEST's

capacity was very restricted, only mostly in office activities were performed such as review and approval of EMPs, as well as advisory actions related to contaminated areas.

- 3.36. The bidding documents prepared for the contract include corridors designs, an ESMP for the project and guidelines for preparation of specific Site EMPs for each corridor. Nevertheless, landscape recommendations presented on the ESIA (see Annex 2) have been forgotten along time.
- 3.37. In November 2007, BEST hired several new technicians to augment its staff complement to 15. Although the number of technical resources have been largely expanded (there were only 3 technicians in 2000) there is still a need to upgrade their capacity to review and approve studies, follow-up on projects and EMPs, monitor and audit.

IV. LEGAL AND INSTITUTIONAL FRAMEWORK

Transportation

- 4.1. The Ministry of Works and Transport (MOWT) is responsible for establishing and implementing transport policy, regulating land transport services and for the construction, maintenance and operation of all public buildings and transport infrastructure, including roads. The Department of Public Works (DPW) is the main executing entity and organized into three divisions: Civil/Structures, Buildings and Administration. Regulation of public transportation, road safety, vehicle registration and driver licensing is currently under the responsibility of the Road Traffic Department (RTD) of the MOWT in accordance with the Road Traffic Act.
- 4.2. The Road Traffic Act has been modified since 1958, and the last review was in 2002. The Road Traffic Act declares, amends and codifies the law relating to motor vehicles, and provides for the regulation of traffic on roads and of motor vehicles; provides for the establishment of a Road Traffic Authority; provides for the protection of third parties against risks arising out of the use of motor vehicles; amends the law with respect to the licensing of motor vehicles plying for hire or reward; and provides for the regulation of public transport services.
- 4.3. In addition, the MOWT, along with the Town Planning Committee, has approved powers under the Private Roads and Subdivision Act for layout of new roads or subdivisions. MOWT is responsible for roads and may alter and close roads. The Road Act ensures that land needed for public roads can be acquired under the Acquisition of Land Act. Transportation planning on New Providence is under the purview of the Transport Development Plan (TDP) for New Providence (1995, updated in 1999). After TPPU has been established, some amendments have been prepared to the TDP, but still have not been implemented.

Environmental management

- 4.4. Responsibilities for environmental management, including natural resource management, in The Bahamas is shared among a wide range of government ministries, departments, agencies and organizations: Office of the Prime Minister– Bahamas Environment, Science

and Technology Commission (BEST); Department of Lands and Surveys; Ministry of Health – Department of Environmental Health Services (DEHS); Ministry of Labour and Immigration – Department of Labour Ministry of Public Works and Utilities (MOPW&U) – Department of Physical Planning; Ministry of Agriculture Fisheries, and Local Government (MAF); Water and Sewerage Corporation (WSC); Bahamas Agricultural and Industrial Corporation (BAIC); The Bahamas National Trust.

- 4.5. The Bahamas Environment Science and Technology (BEST) Commission is currently mandated to be the central policy and coordinating body for environmental affairs in The Bahamas and focal point for all environmental activities. BEST is supported by the Department of Environmental Health Services which is responsible for public health and industrial regulation and enforcement.
- 4.6. The primary role of BEST is to coordinate the work of the various governmental and non-governmental agencies with responsibilities or concerns for the environment to avoid conflicts of interest and to ensure the most effective use of resources. BEST is also acting as a focal point for all international environmental conventions and protocols, and with ensuring compliance with the obligations arising from these conventions and protocols. BEST is not intended to be an operational agency, but to be an advisory entity for all environmental issues pertinent to The Bahamas.
- 4.7. BEST received a technical cooperation⁶ from the Bank to develop policy and procedures in environmental management. As part of this institutional strengthening project, ICF Consulting recommended the creation of a Ministry of Environmental Planning and Protection ensuring the sustainable development of natural resources. The proposed Ministry would amalgamate the responsibility of BEST, DEHS, the Department of Physical Planning and the Department of Land and Survey. The Ministry would be composed by departments of environmental planning and environmental protection, and an environmental advisory council.
- 4.8. In 2000, BEST drafted a new Environmental Planning and Protection Act and various guidelines to enhance the conservation and protection of the environment of the Bahamas consistent with the goal of sustainable development. The Environmental Impact Assessment Regulations (Draft, 2000 – not promulgated as an act) outlines the purpose for the environmental impact assessment process, and categorize projects subject to the EIA process and defines steps of the EIA process; defines the roles, responsibilities and rights of project proponents, the proposed Ministry of Environmental Planning and Protection, and the public and interested parties.
- 4.9. Impact assessments are required by BEST for major development projects and international assessment procedures are followed. An Environmental and Social Impact Assessment (ESIA) was conducted for this project by consultants to the MOWT and approved by BEST in 2000. Projects that are not so significant may require only an Environmental Management Plan (EMP).
- 4.10. In 2005 a National Environmental Management Action Plan was published. A National Environmental Policy, Environmental Impact Assessment Regulations, and Pollution

⁶ IDB non reimbursable Technical Cooperation Multilateral Investment Fund Enabling Private Investment: Strengthening Environmental Management

Control and Waste Management Regulations have been completed in 2005, but still have not been enforced. At this point, it is critical to the goals of the BEST Commission for the establishment of its legal mandate and of the structure and legal basis of the National Environmental Policy and regulations.

- 4.11. Environmental protection in The Bahamas is supported by several laws and regulations that control activities in the physical and biological environment: The Town Planning Act, 1961; Water and Sewerage Corporation Act, 1976; Environmental Health Act, 1987; Agriculture and Fisheries Act, 1964; Fishery Resources (jurisdiction and conservation) Act, 1977; Bahamas National Trust Act, 1959 and by laws, 1986; Conservation and Protection of the Physical Landscape of the Bahamas Act, 1997 and regulations; Wild Animals Protection Act, 1968; Wild Birds Protection Act, 1987; Plants Protection Act, 1987; Antiquities, Monuments and Museum Act, 1998 and regulations, 1999; and National Wetlands Policy, 2007.
- 4.12. The Environmental Health Act provides a general framework for developing environmental regulations in The Bahamas. The Act authorizes the DEHS to develop regulations that prevent and control air pollution, soil contamination, and preserve water quality.
- 4.13. The Conservation and Protection of the Physical Landscape of The Bahamas Act (1997) controls the physical landscape for the purpose of preventing environmental degradation, flooding and removal of hill excavation in the form of land removal, quarrying, mining, harvesting sand or rock; filling lands, wetlands, drainage basins or ponds; digging or removal of sand from beaches and sand dunes; any work that will affect the coastlines; and harvesting or removal of eleven protected tree species. Permits must be obtained for any of these activities. Severe penalties, fines and imprisonment, can be imposed for violations of the provisions of the Act.
- 4.14. The Wild Animals Protection Act and Wild Birds Protection Act (1987) protect animals, birds and bird eggs during closed seasons, but not habitat. The Plants Protection Act (1987) relates to plant disease and control importation of plants. Written authorization is required for any taking or capturing of any wild animal or bird. A permit is also required by the Agriculture and Fisheries Department for any potential disturbance of marine resources.
- 4.15. Established as a non-profit, non-governmental organization in 1959 by the Bahamas National Trust Act, Bahamas National Trust (BNT) has a parliamentary mandate to build and manage the country's national park system and to promote permanent preservation of lands, buildings, underwater areas of beauty, natural or historic interest, identify sites and administer those areas declared protected. There are currently 25 national parks totalling approximately 283,300 hectares (700,000 acres) under the management of the Trust. The BNT has been the leading organization in the country's conservation efforts. The Big Pond Park, when implemented, will be administered by BNT.
- 4.16. Areas or structures of cultural, anthropological, archaeological, paleontological or historical significance are regulated under the Antiquities, Monuments and Museum Act (1998) and Regulations (1999). Discovery of a cultural or historical feature must be reported to the Minister and measures then taken to protect it.
- 4.17. A National Oil Spill Contingency Plan has been developed to address the accidental spillage of oil in marine areas. The Plan sets a detection, reporting and coordination

mechanism to ensure a timely and effective response to pollution which may threaten the natural resources of The Bahamas. The lead agency involved in executing the plan is the Ministry with the responsibility for the Port Department. To assist in the execution of the plan, an Oil Spill Contingency Advisory Committee, made up of representatives from government, industry and environmental representatives was formed. No Spill Contingency Plan has been enforced for land environment.

Physical Planning and Zoning

- 4.18. Physical planning is effected through a development control process under the Town Planning Act (1961), which provides the statutory and legal basis for land use planning on New Providence. The Planning Regulations (1988) under Section 17 of the Act provide procedures and guidelines for land development, land use planning, zoning, design and signage.
- 4.19. The Department of Physical Planning (within MOWT) is responsible for ensuring the conservation and maintenance of the environment of the country. The Ministry is given broad land-use control and zoning powers. The powers are interpreted and administered by the seven member Town Planning Committee which advises the Ministry. The Town Planning Committee has the final decision on all land-use issues.
- 4.20. MOWT, along with the Town Planning Committee, has approved powers under the Private Roads and Subdivision Act for layout of new roads or subdivisions. MOWT is responsible for roads and may alter and close roads. The Road Act ensures that land needed for public roads can be acquired under the Acquisition of Land Act. Transportation planning on New Providence is under the purview of the Transport Development Plan for New Providence (1995), updated in 1999.

Land Acquisition

- 4.21. Land to be acquired for a specific building or construction must meet the requirements of the Acquisition of Land Act (1913) and its regulations (1987). Whenever land in any locality is likely to be needed for any public purpose a notification to that effect shall be published in the Gazette, the official Government publication. A public notice is displayed at a convenient place in the respective district to show what land is needed and where. After notification, a 30-day public response period is observed. The selected land may be acquired by private purchase agreement or through compulsory purchase by the Government. In the event that a structure is moved, compensation is paid to the owner to cover the expense of moving the house to another site plus payment for any damages incurred.

V. ENVIRONMENTAL AND SOCIAL CONDITIONS

- 5.1. Total territorial area of lands and waters of The Bahamas (latitude 20°50'N and 27°30'N and longitude 72°35'W and 80°30'W) is estimated at 259,000 km² (100,000 sq. miles). The Bahamas is not an isolated area and therefore does not suffer much from the isolation common to some other island states. Its close proximity to North America and the Northern Caribbean, contributes considerably to its socio-economic development.

- 5.2. The Bahamas constitutes one of the most extensive archipelagos in the world comprising a chain of 700 islands and cays. This archipelagic feature presents additional challenges in the public administration of the country, which would not be experienced by single, island states or landlocked small states. The total land area of all of The Bahamas is 15,000 km² (5,792 sq. miles). Andros Island, at 5,956 km² (2,300 sq. miles), is the largest landmass in the archipelago while New Providence, the most densely populated island, is 207 km² (80 sq. miles).
- 5.3. The islands are low-lying; the highest point in the entire archipelago, at 62.8 m (206 ft), is found in Cat Island. Consequently landslides are rare, limited in magnitude and areal extent, and economically insignificant. In addition, the geographical makeup and location of The Bahama Islands makes them vulnerable to seasonal storms and hurricanes. Extensive damage to landscape, particularly shoreline erosion in addition to flooding and structural damage, is usually experienced, resulting in great economic and property losses.
- 5.4. In addition to its tropical climate, the most valuable and well known natural resources of The Bahamas are aspects of its environment, including its numerous white and pink sandy beaches, coral reefs, and clear, shallow and sheltered waters. These environmental treasures, along with a stable political economy, contribute to the popularity of The Bahamas as a favourite destination for world travellers including tourists, business travellers, researchers and other explorers.
- 5.5. The geology of the islands is primarily shallow carbonate sediments overlain on a deep igneous base on the slowly subsiding Bahamas Banks. The Bahamas is not well endowed with mineral resources. Its soils, in general, are sandy, stony and alkaline. There are no appreciable amounts of metallic ores or fossil fuels; however salt and aragonite have been exploited on a large scale. Bahamian soils are poor in nutrients and require heavy fertilization. Nonetheless, there are areas in the Family Islands, such as Abaco, Cat Island, Eleuthera and Long Island, where some farming is done. Mechanized agriculture is restricted by the shallowness of the soil and the frequent outcrops of bare rock.
- 5.6. New Providence is the most heavily populated of the Bahamian islands and the majority of its land surface is at least partly developed or disturbed. Shoreline habitats include dunes and mangrove wetlands that are important as nurseries for many fishes and crustaceans, as well as habitat for birds. Inland fresh and brackish water wetlands are common throughout the island. Fresh and brackish water ponds and lakes are fairly common, and support substantial resident and migratory bird populations. Terrestrial habitats are dominated by pine forests and coppice, a broadleaf tree ecosystem. Mixtures of these woodland types occur throughout.
- 5.7. There are no rivers or streams on New Providence. It is predominantly flat and low-lying, except for a few ridges of 50-100 ft high, a major constraint to drainage. Many roads in Nassau suffer flooding during and after storm rainfall events. However, it is apparent that in some places, problems have been exacerbated by shortcomings in construction of the roads.
- 5.8. Percolation and infiltration rates are generally high because of the porous limestone substrate. The water table is very close to the surface and in many areas only about 1.5 ft above sea level. Fresh water lenses are perched just below the surface throughout the

island and extensive well fields tap these lenses for potable water. These drinking water resources may be easily contaminated from runoff water. Drainage is helped through drilled wells to inject water into sub-surface areas below the water lenses.

- 5.9. Mangroves, ponds and wetlands in The Bahamas are subjected to considerable pressure from development. Landowners frequently fill them to gain more land. Formal and illicit dumping takes place on a regular basis in and around these aquatic features. Over 1,000 species of trees and flowering plants occur in the Bahamas. Twenty one species of plants are considered rare or threatened, with two of these species found on New Providence. There is no virgin forest left on the islands although mature stands of coppice are scattered over the island. Most present day pineland and coppice is secondary or tertiary.
- 5.10. The islands are inhabited by few species of mammals. Rats and mice are common. Many species of bats and an abundance of bird species, particularly winter migrants from North America, are found throughout the islands. Eighteen bird species are considered endangered or rare.
- 5.11. The total population of The Bahamas enumerated in the most recent Census year 2000 is 303,611 inhabitants. More than two-thirds of the population (210,832 inh.) of The Bahamas live in Nassau, the capital city, which is located on the island of New Providence; population density is calculated 1,018 inh/km² (2,635 per sq. mile).
- 5.12. Potable water is provided to most of New Providence; potable water supply consists of water from Government and private wells and local reverse osmosis plants. There are 37 centralized sewerage systems on New Providence that service various pockets of the island, including the downtown area, the airport area and several subdivisions. In total, only 20% of households in New Providence are served by sewage collection systems; the remaining households use septic tank systems.
- 5.13. The Bahamas does not have petroleum reserves; therefore, fuel oil and gasoline is imported from various suppliers to meet the energy and fuel demands. The two major agencies responsible for meeting the energy needs of The Bahamas are Grand Bahama Power Company (GBPC) and The Bahamas Electricity Corporation (BEC). GBPC provides electricity to all of Grand Bahama, while BEC services New Providence and the other major Family Islands.
- 5.14. The Bahamas has the third highest per-capita gross domestic product (GDP) in the Western Hemisphere. Many Bahamians have expressed concern that the perception of a wealthy Bahamas may be very misleading due to the uneven distribution of income and the high costs incurred in the administration of an archipelagic nation. Moreover The Bahamas is not eligible for certain types of international funding that is sorely needed for development in rural communities and depressed urban areas because of its high GDP ranking.
- 5.15. The largest sectors of the Bahamian economy are tourism, and banking and financial services. Tourism employs approximately 50,000 people; while over 4,500 persons are engaged in the banking sector. It is estimated that tourism produces 50 to 60% of the total GDP. Expenditure for all visitors to The Bahamas increased from US\$1.58 thousand million in 1993 to US\$1.76 thousand million in 2003. The banking sector contribution to the Bahamian economy is estimated at 12 to 15% of the GDP.

- 5.16. Social indicators in The Bahamas are among the most favourable in the Latin America and Caribbean region. The Government has utilized the recent economic growth to advance development in the social sectors. In the 2003/04 budget, health-related services accounted for approximately 13% of Government expenditures.
- 5.17. Recently, the Government of The Bahamas has undertaken a comprehensive plan of action to address the shortcomings of the solid waste system in the country, involving a major expansion of the capacity of the sanitary landfill in New Providence through the establishment of a new solid waste disposal facility on 40.5ha (100 acres) of land adjacent to the former landfill at Harrold Road, including a hazardous waste storage facility.

Corridors specific conditions

- 5.18. *Corridor 1A*. The re-surfaced corridor had minimal potential environmental impacts; it was noted that the drainage ditches on either side of the road were becoming worn and that grass had not taken.
- 5.19. *Corridor 1B (mostly completed)*. The corridor passes through scrub and woodland; for all cleared land it was stated that a 2 for 1 re-planting program would be initiated once construction had finished. There is no evidence of this. There had also been an area unnecessarily cleared at the junction of 1B and Beatrice Ave.
- 5.20. *Corridor 2*. No construction has taken place, although the road corridor has been cleared of vegetation and rubbish removed. There are conditions to hydro-seed the embankment and plant palms and shrubs along the corridor approaching the junction at Fire Trail Ave.
- 5.21. *Corridor 3 (substantially completed)*. The road passes through a cutting and slopes down both to the north (Bethel Ave) and south (Fire Trail Road). There has been considerable damage to the drainage system due to water flow and as such water is draining into the surrounding wetlands without passing through the interceptors. The EMP stated that the central reservation and junction areas should be planted with palms and shrubs.
- 5.22. *Corridor 4*. No construction has taken place; the corridor has been cleared of all vegetation. The transformers found on site, which had led to PCB contamination of the surrounding soil, have been removed. However, further guidance is required from BEST as to future work.
- 5.23. *Corridor 5*. A small section of the corridor has been cleared. The initial walkover survey did not detect any likely causes of contamination and as such no testing is required. No runoff water can be discharged directly into these ecosystems. These areas will have specific drainage systems to ensure that contamination risk is minimized. Surface water runoff along corridor where it crosses the Perpal's Water Works, which supplies drinking water to a section of New Providence, will be diverted from these wetlands. A lined drainage system, over one quarter of the length of the corridor, will be provided to discharge the runoff via drainage wells.
- 5.24. *Corridor 6 (substantially completed)*. The existing drainage system consists of drainage channels, which run from the ridge in a southerly direction towards Gladstone Road and northerly towards JFK Drive and Lake Cunningham. The drainage channels running

towards Lake Cunningham show signs of erosion. Of the two settling ponds the one to the east has been in-filled and redirected to the eastern end of the cemetery, and the one to the west does not seem of a suitable size to contain run-off. All contaminated land has been identified tested and removed if found to be over trigger levels established by the Contractor and in consultation with BEST.

- 5.25. *Corridor 7*. Has been cleared, vegetation removed from site and drainage wells established. This Corridor is extremely sensitive due to its proximity to Lake Cunningham and ponds and wetlands near the golf course. Currently it would seem that runoff is occurring from the corridor to the Lake and wetlands. An area of contaminated land was found to be present, adjacent to the Total Energy Power Plant (TEPP). Extensive testing has been undertaken and mitigation measures proposed.
- 5.26. *Corridor 8*. Has been predominately cleared. There will need to be testing carried out along this corridor due dumping of cars and household rubbish and the presence of a disused power station nearby. A contaminated land strategy should be established before work starts on site due to the complexities of the construction program, sensitive nature of Big Pond and the past history of contamination on the corridor. Contractor should provide a detailed methodology covering potential environmental impacts to the Lake and proposed mitigation measures.
- 5.27. *Corridor 9*. Has only had a small amount of clearance. Although the original walkover survey recommended that some contaminated land testing would be required, it was later decided that the report produced by the contaminated land specialist was inaccurate. It is likely that this corridor is expanded towards east.
- 5.28. *Corridors 10, 11a, 11b, 12, 13a, 13b, 14, 15 & 16*. No significant works have started on these corridors.
- 5.29. *Corridor 17 (partially completed)*. No contaminated land testing was required; no retention ponds were noted on site. There is little evidence of grassing.
- 5.30. *Corridor 18 & 19*. No works have started on these corridors.
- 5.31. *Corridor 34*. This new corridor along East Bay Street has been included recently. No preliminary works have been initiated. Corridor passes through a high income residential area. Land acquisition is expected to be costly and politically difficult.
- 5.32. *Corridor 41*. Also another new corridor, corresponding to Corridor 2 extension, from Carmichael Rd to Cow Pen Rd. Preliminary site survey has identified some 7 occupied houses within the ROW.

Land contamination

- 5.33. Five areas have been identified in the ESIA as being at risk of contamination from surface water runoff and road accident spillage (Harrold Pond – corridor 3 substantially completed; Perpall's Water Works – corridor 5; Lake Cunningham and wetlands west of the Golf Course – corridor 7, which will be implemented by private sector; and Big Pond – corridor 8 that shall be reviewed due to new land use around Big Pond). Waste found in corridor 3 was properly removed and disposed of at the Harrold Road Landfill site.

- 5.34. The potential contamination found adjacent to TEPP was addressed as follows: soil samples and tests were carried out to establish the presence of Petroleum Range Hydrocarbons (PRH), Polychlorinated Biphenols (PCB), Halogenated Hydrocarbons (HH) and metals. Results indicated elevated levels of PRH (6840mg/kg of Petroleum Residual Organics – PRO) in one location; and 81.5mg/kg of BDL in another. No PCBs or Chlorinated Hydrocarbons were found. TEPP was clearly identified as the cause of the pollution, although results have shown that pollution is relatively localized.
- 5.35. MOWT on the advice of BEST Commission have adopted the Florida EPA Cleanup Target Levels. For the purpose of Soil Cleanup Target Levels the Total Recoverable Petroleum Hydrocarbons (TRPH) levels are 340mg/kg and 2500mg/kg for residential and commercial properties respectively. For this location it is understood that the location is zoned as commercial and contamination testing results will be assessed on this basis. A remediation strategy will need to be developed for the hydrocarbon spill located adjacent to the TEPP. As Corridor 7 will no longer be implemented under the NPTP, BEST Commission must assure that Baha Mar developers perform adequate clean up.
- 5.36. The international bidding documents prepared for this supplementary financing set up specific requirements to carry out a detailed topographical survey to review and finalize the designs and construction details of the works on corridor 5. The documents also indicate other locations that might require additional testing: corridor 12 (East Street); corridor 15 (Marathon Rd); and section 22 (Baillou Hill Rd roundabout).

Big Pond area and surroundings

- 5.37. The Big Pond is located between middle to low income residential housing to the north and a vast open area historically associated with Oakes Fields Airport but now owned by the Ministry of Youth, Sports and Culture and being developed as a large, diverse sports complex. To the east of the lake stands the National Insurance Board building and to the west are the College of Bahamas (CoB) and the Hotel Training Center. The lake used to be a greater area but has been subject to extensive landfill in the south and north. The housing particularly to the north along Lake View Road and Tucker Road has been constructed on reclaimed land. The dirt track running along the northern bank of Big Pond has been subject to extensive dumping of cars in particular. Items including fridges and beds can be seen in and around the water.
- 5.38. Big Pond has been subject to extensive contamination in the past as a result of receiving drainage contaminated with hydrocarbons from BEC. This practice has ceased and the shallow waters now support numerous fish including Tilapia, the broad killey fish and mosquito fish. Big Pond no longer receives drainage from the BEC Compound situated to the northeast. There are extensive drainage channels running from north to the south of the Big Pond, over to open woodland to the south down to the Baillou Hill sporting complex.
- 5.39. The edges are fringed by white, red and black mangroves with particularly high banks of mangroves occurring in the northwest end following round to the south. These mangroves provide very important habitats for a range of birds which nest within the mangroves or use the waters for feeding. Approximately 70 species of birds are known to visit Big Pond.

- 5.40. As part of the NPTP loan agreement, it has been stipulated that the Big Pond area should be restored and protected as an urban open space, for the mitigation for any potential negative environmental impacts that may arise from construction of new roads. The Big Pond Park is bounded to the north and south by residential neighbourhoods (Bain Town and Yellow Elder), and to the west by abandoned Oakes Field airstrip. To the east is a mix of commercial, public and private properties, as well as Baillou Hill Road, a major north-south arterial. The site is about 170 acres in total size, with approximately 41 acres being the surface area of Big Pond. The remainder is a low-lying natural area, heavily vegetated and pocketed with wetlands. The site has never been developed, though the middle portions were at one time an active landfill for the island.

VI. ENVIRONMENTAL AND SOCIAL IMPACTS

- 6.1. The Environmental and Social Impact Assessment (ESIA) conducted for the program provided general and indicative, positive and negative environmental and social impacts. All 19 corridors were studied in order to characterize existing environmental and social conditions on and along the corridors and to identify the potential impacts of the proposed improvements and construction. An Environmental Management Plan (EMP) was prepared and provided requirements and guidance for road works design and preparation of specific ESMPs for each corridor. A summary of specific potential negative impacts and associated mitigation and enhancement measures for each corridor are shown Annex 3.
- 6.2. As all the final designs for each corridor are now completed and additional assessments were undertaken, new Site EMPs will be prepared for each corridor by the new contractor, based on the EMP and additional information provided in the bidding documents. The following sections provide the highlights of the potential environmental and social impacts identified and mitigation measures.

Positive Impacts

- 6.3. Improvements to the road system are designed to relieve congestion. The increased efficient burning of fuel will reduce pollution from vehicular emissions; in areas where traffic has been re-routed the locations where pollution levels are highest will change, while addition of new lanes to improve the flow rate of traffic should reduce localized air pollution hotspots. Nevertheless, it is appreciated that if the road scheme should encourage further traffic onto the roads or increase the appeal of road travel in the long term, air pollution from car exhausts will increase. The project will also improve the public transportation system, hopefully counteracting excessive car use.
- 6.4. Positive benefits will result from closure of side roads, the provision of pedestrian crossings and improved safety to the road user through safety measures including improved signage and road markings. The carefully designed road hierarchy will free housing developments from short-cutting by motorists. In the case of the new road corridors, there is a real opportunity to address safety considerations. Incorporation of sidewalks in public places, including schools, will help alleviate accidents to pedestrians and children. Provision of bus stops and lay-bys will help to alleviate congestion and improve safety and improve the attractiveness of public transportation.

Potential Negative Impacts

- 6.5. Work in some corridors will result in the removal of the existing surface soil and upper levels of the underlying subsoil to provide suitable material for road foundations and drainage channels. A permit will be obtained prior to excavations under the Conservation and Protection of the Physical Landscape of The Bahamas Act. If not controlled, sediment may be washed from the exposed cut and into nearby wetlands and water bodies resulting in loss of aquatic flora and fauna. This adverse effect should be mitigated through erosion control protection associated with construction, hydro-seeding of the exposed face to help stabilize the cut surface and reduce sediment creation from erosion, and rapid revegetation of the exposed flat areas.
- 6.6. Organic soil cover and depth is very limited across the island and will be conserved. Uncontaminated soil must first be stripped and stored correctly prior to excavation of the underlying subsoil/rock and then this soil reused as topsoil for landscape plantings.
- 6.7. Road corridors 5 and 8 have large resident and migratory bird populations associated with adjacent habitats and bats are present in caves along corridor 19. Prior to the construction, the workers will be trained in environmental protection procedures and restrictions, including those related to sensitive areas, bird migration, fish and bat caves. Best management practices for construction will be implemented, e.g. noise minimization measures, special methods of construction at ponds, and closely monitored during July — September.
- 6.8. Corridor 8 will benefit the landscape around College of Bahamas (CoB) and the Hotel Training Center by directing traffic away from these campuses. On the other hand, there will be an adverse visual impact to those low-income housings backing on to the northern edge of Big Pond. The new road will lead to infilling of approximately 1.5 acres along the northern edge of the pond which supports a wide range of fish and aquatic life. A small clump of mangrove (approx. 44 sq. ft.) will be lost and possibly two other clumps (approx. 66 and 100 sq. ft.) making a total of 210 sq. ft. Consultation with local conservationists revealed that the important habitat for wildlife is situated further to the south of the pond and that the loss of mangroves is of no real significance. Street lights along the north of Big Pond will comprise flat grass lightning to minimize disturbance to wildlife.
- 6.9. In general the ecological impacts associated with the road improvements are not substantial, but cumulatively are considered to be of significance. These include: removal of some protected tree; loss and fragmentation of broadleaf coppice along corridors; loss of seasonal wetland/mangrove habitat; and pond infilling at the northern edge of Big Pond. Final designs shall reduce the construction corridor width and realignment of the road corridors to avoid as many trees as possible; promote roadside planting with native trees and shrubs; and transplant protected trees. A compensation program for the cumulative loss of wetlands, woodlands, and pond filling was prepared for Big Pond Park clean up, development, and restoration. This program must be implemented during this supplementary financing.
- 6.10. Visual intrusion to properties has been identified as a concern on most of the road corridors. In many cases this will be mitigated with roadside planting. However, where corridors are within existing urban areas there is limited space remaining for screen

planting; some properties will also be so close to widened roads that visual impacts will remain. Wherever possible, existing street trees will be retained and plantings will be enhanced. The ESIA had proposed specific landscaping guidelines, which need to be incorporated in the Contractor's responsibilities.

- 6.11. Archaeological sites have been identified near corridors 5 (dry stone plantation wall) and 19 (Lucayan indian petroglyphs and dry stone plantation walls). The petroglyphs are the only known petroglyphs in New Providence Island. In these areas it is recommended that the finds which are just off route are protected during construction. Prior to the construction, the workers will be trained in procedures and restrictions related to protect these areas. Although corridor 11 passes through some of the oldest parts of the island, no adverse impacts are envisaged because no major excavations are proposed along this corridor.
- 6.12. The ROWs have already been cleared and the impacts on home owners (5 occupied and 3 empty houses and 1 house relocated) have already been compensated. Exceptions to this are corridor 34 and 41 which have been recently proposed for inclusion in the program. On corridor 34, high income housing might be a problem for land acquisition; on corridor 41, some 7 occupied houses have been preliminary identified to be within the ROW.
- 6.13. Disruption in traffic flow and access by residents to their properties will occur during construction. The Contractor will present a traffic management plan during construction to minimize these temporary impacts.
- 6.14. Other impacts during construction are expected to be: water contamination (surface and groundwater); hydrological disturbance, siltation of water courses, and alteration of groundwater table; land contamination; release of organic vapours, air pollution/nuisance, odour and noise; disturbance of natural habitats; ecological and archaeological disruption. The Contractor will prepare site EMPs to minimize these temporary impacts.

VII. ENVIRONMENTAL AND SOCIAL MANAGEMENT PROGRAMS

Traffic Management Master Plan

- 7.1. The Contractor shall develop a Traffic Management Master Plan in order to minimize any reduction of road network capacity during construction, and assure safe access to the site. The traffic management master plan shall include at minimum the following: (i) works sequencing and impact minimization on the road network capacity; (ii) lane closures and detours on each section of works; (iii) roads corridors traffic management schedule, on a month-by-month basis; (iv) constraints satisfaction approach (e.g. traffic management constraints, possession of site, utility diversions, approvals etc); (v) specific and general approvals from the relevant statutory bodies; (vi) night work to will be undertaken at key locations to minimize traffic congestion; (vii) liaising with affected residents, local businesses, public utilities, emergency services and the media on affected roads; (viii) program communication; (ix) complaints management relating to traffic; (x) opening of new work sections communication and coordination; (xi) traffic management enforcement; (xii) traffic management maintenance.

- 7.2. Attention shall be paid by the Contractor in maintaining the riding comfort of the roads/detours/diversions. The Contractor shall provide for and maintain pedestrian, public and vehicular traffic during the construction period where required in the project sections by any of the following methods: (i) construction and maintenance of diversion at the existing pavement level when road construction is on the half width of road; (ii) maintenance of existing road not yet taken up for construction; (iii) maintenance of completed half width of road opened to traffic; (iv) maintenance of traffic on exposed granular layers subject to traffic in carriageway under construction; (iv) diversion of traffic onto secondary roads.
- 7.3. The pavement surface of the diversions shall be as the diverted road; the foundation shall be adequate for the traffic and period required. The Contractor shall implement adequate safety measures to reduce accident risks and shall install signboards and other safety devices. The Contractor's responsibility shall include the rectification of any damage caused to the road, and to all accesses including any temporary or alternative access due to passage of traffic, rains or flood. The specific requirements of the diversions shall also depend upon the Contractor's method of working and the Contractor shall be deemed to have covered the same in quoting his price.
- 7.4. The Contractor shall so conduct his operations as to offer the least possible obstruction and inconvenience to the public and he shall have under construction no greater length or amount of work than he can properly manage at a time with due regard to the rights of the public in maintaining a free flow of traffic.
- 7.5. The traffic management master plan shall be developed in accordance with the following constraints at specific locations:
- (i) All road works causing a reduction in road capacity on East Street shall not be undertaken simultaneously with road works causing a reduction in road capacity on Baillou Hill Road, south of Tonique Williams-Darling Highway (Harrold Road).
 - (ii) All road works requiring lane closures, diversions or reduction in road capacity on East Street shall not be undertaken at the same time as any works requiring traffic management on Soldier Road or Marathon Road.
 - (iii) There shall be no road works requiring traffic management on existing roads between 15 December and 27 December except otherwise agreed by the Traffic Management Committee.
 - (iv) Full access to Saunders Beach (corridor 18) shall be maintained during public holidays and at weekends

Site Environmental Management Plan for construction

- 7.6. The bidding documents included an ESMP for the contractor to prepare the specific Site EMPs and the requirements for environmental compliance. The Contractor will be expected to draw up specific Site EMPs using these guidelines. The EMPs should be seen as dynamic documents, with revisions being appropriate at various stages of the project and thus shall be subject to periodic audits to refocus the plans in light of experience gained and issues that have emerged.

- 7.7. The broad purpose of the Site EMPs is to ensure that the various environmental impacts, identified in the ESIA and through experience gained during the previous contract, are understood and acknowledged and appropriate mitigation measures adopted during construction.
- 7.8. The Site EMP shall contain a copy of the Contractor's environmental policy or a statement to commit to comply with all applicable national and international environmental legislation, regulations and codes of practice; to minimize emissions and waste; to prevent pollution; and to improve the environmental performance of the project over the project lifetime.
- 7.9. The Contractor shall be responsible for ensuring that relevant legislation and regulations have been taken into account. The Contractor shall comply with all Special Requirements of all Utility Authorities imparted via communications. Where approvals or consents are required by any such authority, in connection with the works or any method of working, the Contractor shall be responsible for obtaining such approval or consent.
- 7.10. The Contractor shall review the ESIA, construction drawings, and contract specifications, and elaborate on probable working practice, in close liaison with the PEU in order to record potential environmental aspects and associated impacts. The Contractor shall use this process to establish a register of significant aspects and impacts, which will include as a minimum the following: archaeology; materials; air quality and dust; waste management; landscape and visual; water resources; ecology; noise and vibration; traffic and transport (site management); contaminated land; and community/social. The Contractor shall act proactively to manage potential environmental impacts and develop appropriate mitigation measures from an early stage in the project.
- 7.11. The Contractor shall provide appropriately qualified personnel for the implementation of the Site EMP. The Environmental Specialist shall be responsible for overseeing all works, especially those that have been identified as having a potential environmental impact, as well as assigning environmental management responsibilities to all those whose activities have, or potentially have, significant impacts on the environment. The Site EMP shall state how different environmental management responsibilities are to be assigned to different people involved with the project. The Site EMP shall include an organizational chart clearly showing the Contractor's Environmental Specialist's position within the structure of personnel on the Project, including lines of communication and responsibility.
- 7.12. All personnel on the project whose work may, directly or indirectly, cause a significant impact on the environment must be made aware of this and be given sufficient know-how to manage their activities accordingly. The Contractor shall ensure the Site EMP identifies how environmental awareness is to be achieved, how environmental competence training needs are identified and how training will be undertaken.
- 7.13. The Contractor shall perform regular internal audits, every six months, to establish the effectiveness of environmental management. The audits shall include: assessing the degree of compliance with the Site EMP achieved; reviewing the continuing relevance of the plan in the light of experience gained and the instigation of changes where appropriate; reviewing the organizational and administrative frameworks described in the Site EMP; reviewing environmental monitoring data and its reporting; the identification of environmental aspects and impacts and the mitigation measures proposed to mitigate

these; and identification of any deficiencies in environmental performance and information on measures.

- 7.14. Requirements for environmental compliance shall include: site management (sanitary conveniences, tidiness of the site, equipment maintenance, fuelling and storage, site compound and stock piles, borrow pits and haul roads, fire control measures); water resources (prevention of pollution of groundwater, soil erosion and silt runoff, pollution of drinking water and other water bodies); materials (source materials, topsoil, waste management and disposal); utilities (utility corporations and companies); dust and air pollution; noise; contaminated land (tested locations, testing requirements, sampling, temporary storage of materials, contaminated material disposal); and ecology (vegetation, outside and within ROW, cleared vegetation, protection of fauna, protection of flora).

Hazardous Materials Spill Contingency Plan

- 7.15. A final draft of the Hazardous Materials Spill Contingency Plan (HAZMAT Plan) was prepared under the NPTP by Mott MacDonald and presented in 2001. The purpose of the HAZMAT Plan⁷ was to establish the organizational structure and procedures to enable a coordinated, controlled and effective response to incidents where there is a release of hazardous substances from road vehicles. This plan has not yet been implemented by the GoB.
- 7.16. There is currently limited information available relating to the types and quantities of hazardous materials stored and transported over the island. A record is currently being compiled by the fire service which should be made centrally available and maintained. Vehicles involved in the transport of potentially hazardous materials are not subject to rigorous testing; instead inspections are focused on fire safety. There are currently no requirements to display information on the load transported.
- 7.17. No legislation exists to determine the liability relating to the response and cleanup of hazardous material spills. Measures are required to ensure that the responsible party pays for all costs associated with the emergency response and decontamination in addition to any monitoring and further management.
- 7.18. The HAZMAT Plan is separated into four sections: (i) current situation on the island including legislation required for implementation; (ii) the Hazardous Material Spill Contingency Plan; (iii) a detailed training plan for organizations and persons who may be involved in a hazardous material spill incident; (iv) appendices holding information on the current emergency response situation, materials transported on the island, existing company specific contingency plans and the National Marine Oil Spill Contingency Plan. It also provides documents to assist with decision making in incidents requiring evacuation, and a map of environmentally sensitive areas.
- 7.19. The response to an incident involving the spillage of potentially hazardous materials will depend on the nature of the materials spilled and the location. The first point of contact in the event of an incident will be the emergency services. The most senior officer on the

⁷ Should spillage affect the coast or ports, then the existing National Marine Oil Spill Contingency Plan is to be implemented, and will take precedence over this document.

scene will become the Incident Commander who will take control during the emergency response phase. Under the Response Management System the Incident Commander must zone the site for safety purposes and depending on the material spilled, evacuate local residents. The principal primary objective is to attempt to stem the release of materials from a damaged vehicle, and prevent entry into sensitive areas.

- 7.20. Once the situation has stabilized, management will be taken over by the Spill Response Team (SRT) compiled of personnel who have specific knowledge and an understanding of environmental management and health and safety issues. This team will combine personnel from: Department of Environmental Health Services; BEST; MOWT; BNT; Bahamas Water and Sewerage Corporation; Ministry of Agriculture and Fisheries; and Bahamas Information Services. The SRT will be managed by the Spill Response Coordinator (SRC) from the Department of Environmental Health Services.
- 7.21. The MOWT have responsibility for cleanup of a spill incident including provision of personnel and resources. Their services may also be required to assist with operations during the emergency response phase. Material specific contingency equipment is to be held on vehicles transporting hazardous materials, and further supplies must be available at emergency service stations, MOWT Depots and by oil companies on the island.
- 7.22. The HAZMAT plan provides details of material specific pollution prevention procedures and containment methods. Site specific decontamination procedures and options for material disposal are documented, with emphasis given to the potential reuse or recycling of materials where possible. Detailed procedures are provided within the HAZMAT Plan for the termination of an event, reporting requirements, the need for monitoring, post incident evaluation and periodic review of the plan.
- 7.23. Finally the section on training provides details of the training requirements of the various parties involved in spill response. There is to be an annual HAZMAT training event held in conjunction with the existing Annual National Oil Spill Contingency Plan training event. This will allow the transfer of information relating to spill response management and any advances in pollution control. Annual drills are to be organized to ensure familiarity with spillage control devices, pollution control equipment and materials.

Environmental Compensation Plan

- 7.24. The ESIA of the NPTP established that compensation measures for all the environmental impacts due to project implementation, operation, and maintenance should take place in one single location, at Big Pond area, and surrounding environments. Although environmental losses and damage are not substantial, cumulative effects require the compensation of these losses.
- 7.25. The mangroves surrounding Big Pond and the mixed coppice woodland south of the pond are valuable areas and should be protected for bird and fish refuge and as a green space for recreation. The land is government owned and various governmental and private organizations are interested in the area's protection and sensible use.
- 7.26. The Big Pond Master Plan has already been prepared and presented to the public in April 2001. A preliminary implementation plan has also been prepared in the same year, but no further actions have been implemented. The Supplementary Financing shall review and

update what has already been prepared, as well as former stakeholder commitments, and re-initiate project implementation. It is important to notice that BEST is not an executing agency, and has not the necessary powers to enforce this project. The BNT must be involved in this project, as it will be responsible for future park management.

VIII. MONITORING AND SUPERVISION

- 8.1. Monitoring the environmental and social impacts of the NPTP will occur on three levels: (i) an Environmental Specialist will be hired by the contractor to prepare and implement the Site EMPs and monitor the construction activities and their impacts; (ii) the PEU will have an environmental specialist on staff to review the construction work and determine if the EMPs are being adhered to and no new impacts occur; and (iii) BEST will provide independent supervision over environment and social aspects of the road improvement program by reviewing and approving Site EMPs, periodically reviewing construction and approving the final environmental and social actions for each completed corridor.
- 8.2. The PEU's environmental specialist shall submit to the Bank, every 3 months, a monitoring report, indicating the development and compliance with the environmental standards and requirements of the civil works, as well as a specific chapter on the development of the Big Pond Project.
- 8.3. The Bank Country Office Bahamas and the Project Team will provide environmental and social impact review as part of normal Bank supervision of the road improvement program.
- 8.4. In coordination with the Contractor and the PEU, BEST will participate in field surveys to assist in preparation of the Site EMPs and provide suggestions and guidance on the contents of these plans; review final Site EMPs for each corridor; provide supervision and monitoring of construction to ensure that the mitigation plans are followed; and approve the environmental and social aspects of the works at the completion of construction.
- 8.5. It is not expected that BEST needs additional resources for supervisory and auditing activities under its responsibility, as their staff has been largely augmented. However, training this new staff should be necessary to speed up technical capacity.
- 8.6. In the original NPTP, BEST should provide the Bank with quarterly reports of their activities. No such reports have been found in Banks files. BEST informed that these reports were sent to the PEU in the MOWT.

IX. RECOMMENDATIONS

- 9.1. Although Site Environmental and Management Plans (EMPs) for each corridor have been prepared in the first phase, these must be updated as well as other Site EMPs must be prepared for the remaining corridors, in compliance with the new ESMP presented in the bidding documents and accordingly to the contractors Site Management Plans for each corridor/section. The Site EMPs must be submitted to BEST Commission for review and approval before construction commences on a corridor.

- 9.2. Site EMPs must include additional environmental requirements specific to each corridor, including but not limited to landscaping activities, pedestrian safety, dust control, problems associated with hydrocarbon spills and contaminated areas. The Contractor shall be responsible for its own Hazardous Materials Spill Contingency Plan at each site.
- 9.3. BEST will serve as an independent supervisor of the implementation of the Site EMP for each corridor. Environmental audits will be conducted by the Contractor's Engineer and overviewed by BEST Commission in order to verify compliance with the EMPs.
- 9.4. A comprehensive program for protection, rehabilitation and management of Big Pond and its environs, the future National Stadium, as well as for corridors 8 and 9 and its EMPs shall be developed, involving the MOWT (Physical Department), Bahamas National Trust, BEST Commission, as well as the potential stakeholders, such as BEC and CoB. Preliminary master plan and implementation plan were developed in 2001/2002 and must be reviewed and updated due to new sports equipment installed or planned for the surroundings, also considering new traffic demands associated to these new equipments.
- 9.5. The protection, rehabilitation and management of Big Pond and its environs was proposed to compensate for habitat loss and environmental damage from construction of all corridors in the NPTP, and as so must be implemented in parallel to all other civil works proposed. The reviewed management and implementation plan for the Big Pond area shall be submitted by MOWT to the Bank for review and non objection at the first 6 months after supplementary financing has initiated. The bidding documents for this implementation must be put out no more than 9 months after commencement.
- 9.6. Project Execution Unit must be staffed to provide adequate environmental supervision, as well as ensure that both roads improvements, corridors civil works, landscaping and environmental compensation are undertaken in parallel, especially assuring that compensation measures are implemented as well as all civil works. MOWT must provide proper staff and training for the PEU.
- 8.7. TPPU shall prepare environmental specifications for road design, road maintenance, landscaping and other activities necessary to protect and manage roads system in New Providence Island. TPPU will assist PEU to write down specific environmental monitoring and standards, monitor and supervise the activities of the contractor, and take action to prevent and minimize environmental damage.
- 9.7. BEST Commission shall properly train their new staff, to provide environmental supervision over the project. Some consultancy support might be necessary for BEST training in the first 6 months.

Ione Novoa Jezler Müller
Environmental consultant

Annex 1.

Description of Road Corridors Civil Works – Original NPTP

<i>Road Corridor</i>	<i>Description</i>	<i>Proposed Improvements</i>	<i>Length (km)</i>
1	Pinewood to Seabreeze between East Street and Sea Breeze	2-lane new, and rehabilitation	3.2
2	Sir Milo Butler Extension between Fire Trail Road and Carmichael Road	2-lane new	1.4
3	Sir Milo Butler improvements between Harrold Rd. and Fire Tr. Rd	4-lane existing Street lights, curbing and landscaping	1.9
4	Bethel Avenue - Phase A between Harrold Road and JFK Drive	4-lane new	1.6
5	Bethel Avenue- Phase B between JFK Drive and West Bay Street	2-lane new	2.1
6	Gladstone Road Realignment between bottom of south end of ridge and JFK Drive	2-lane new	0.8
7	Gladstone Road Extension between JFK Dr and West Bay St.	2-lane new	1.9
8	Moss – Cordeaux Link between Thompson Blvd and Baillou Rd.	2-lane new	1.0
9	Oakes Field Distributor North of new Govt. Subdivision between Bethel Avenue- Phase A and Yellow Elder Way	2-lane new	1.3
	Sub-total for new road corridors		15.2
10	Baillou Hill Road between Robinson Road and Carmichael Road	Widening of existing 2-lane to 4-lane Widening on east side of existing road	1.6
11	Baillou Hill / Market One Way Couplet between Robinson Road and Duke Street	Traffic Management, minor improvements Existing two way traffic to be one way	6.4
12	East Street Between Robinson Road and Soldier Road	Widening of existing 2-lane to 4-lane Widening of west side of existing road	1.1
13	Robinson Road - Prince Charles Drive between Baillou Hill Road and Fox Hill Road	Widening of existing 2-lane to 4-lane At selected locations widening on both sides of existing road within the road reservation	6.1
14	Harrold Road between Bethel Avenue and Baillou Hill Road	Widening of existing 2-lane to 4-lane Widening on north side of existing road	2.5
15	Marathon Road between Robinson Road and Wulff Road	Widening of existing 2-lane to 2-lane and central turning lane Widening on both sides of existing road to accommodate additional lane	1.1
16	Wulff Road between Marathon Road and Village Road	Widening of existing 2-lane Widening of both sides of existing road	0.8
17	Abundant Life Road – Windsor Place between Independence Highway and Soldier Road	Widening only at junctions of Abundant and Soldier Roads and Windsor Place and Soldier Roads	1.3
18	West Bay - Saunders Beach	Realignment of West Bay St to accommodate beach parking on south side and tie-in of Bethel B	0.3
19	West Bay - Blake Road Just east of Blake Road to Sea Beach Estates	Realignment of West Bay St on south side to accommodate beach parking	2.1
	Sub-total existing corridor improvements		23.3
	Grand total		38.2

Annex 2.

Description of Road Corridors Civil Works – Supplementary Financing

Road Corridor	Description	Proposed Improvements	Length (miles)	Landscape specifications (ESIA, 2000)	Status
1	Pinewood Drive between East St and Sea Breeze Ave	new 2-lane and rehabilitation 1A works include paving, sidewalks, landscaping, signal installations and road markings plus completion of street lighting, drainage and ducts for future use	0.8	Corridor to be grassed	corridor divided into 2 sections • 1A initiated in 2002 • 1B completed in 2002
	1A Bamboo Boulevard 1B between Buttonwood Dr and Savannah Dr	1B works include the rehabilitation of some 300' of carriageway west of Buttonwood Drive, drainage, landscaping and repairs to sidewalks etc	1.2		
2	Sir Milo Butler Highway extension between Fire Trail Rd and Carmichael Rd	new 2-lane works include earthworks, drainage, pavement, sidewalks, landscaping, signal installations, demolition, street lighting and road markings	0.9	Retention of existing vegetation along eastern side Hydro-seedling of rock-cut face and planting at base Palms and low shrub planting in median approaching junction at Fire Trail Rd Remainder of corridor to be grass	Initiated 2001; <i>under construction</i>
3	Sir Milo Butler Highway improvements between Harrold Rd and Fire Trail Rd	existing 4-lane Remedial works are required and include drainage, surfacing, kerbing, signage and landscaping	1.2	Palms and low shrub planting at junctions Palm planting along remainder of median Native planting between old road and junction with Fire Trail Rd.	Substantially completed 2002 <i>under construction</i>
4	Bethel Avenue - Phase A - between Harrold Rd and JFK Dr	new divided 4-lane works include earthworks, drainage, pavement, sidewalks, landscaping, signal installations, street lighting and road markings	1.0	Corridor to be grassed except for tree and low shrub planting in median at junction with Harrold Road and Oakes Field Distributer	Initiated 2001
5	Bethel Avenue - Phase B - between JFK Dr and West Bay St	new 2-lane works include fencing, earthworks, drainage, pavement, sidewalks, landscaping, signal installations, street lighting and road markings	1.3	Native woodland planting and fencing along edge of Perpal's water treatment Planting at base of rock-cut face Screening vegetation along western side for house near junction with West Bay St. Remainder of corridor to be grassed.	only partial site clearance and demolition

6	Gladstone Road realignment between bottom of south end of ridge and JFK Drive	new 2-lane Snagging works are still outstanding and include earthworks drainage, street lighting, signage and landscaping	0.5	Planting at base of rock-cut face Screen planting for cemetery Remainder of corridor to be grassed.	Substantially completed 2002
7	Gladstone Road extension between JFK Dr and West Bay St.	new 2-lane works include earthworks, fencing, drainage, pavement, sidewalks, landscaping, signal installations, lighting and road markings. (there is a current proposal before the Government to redevelop Cable Beach strip which in the event proceeds may impact the design for this corridor - Baja Mar development)	1.2	Planting at base of rock-cut face Native woodland planting along both sides of road across Prospect Ridge to Skyline Lakes Ridge Ornamental low/groundcover planting at junction with West Bay St. Planting of mangrove cuttings along toe of embankment over Lake Cunningham Screening vegetation and fencing along golf course and small pond.	Initiated 2001
8	Moss-Cordeaux Link between Thompson Blvd and Baillou Hill Rd.	new 2-lane works include earthworks, fencing, drainage, pavement, sidewalks, landscaping, signal installations, street lighting and road markings. (there is a proposal to redevelop the Big Pond area as part of an area wide environmental improvement project) may be transformed into 4-lane to accommodate new national stadium traffic	0.6	Screening vegetation to backs of houses and school off Tucker Road. Avenue planting in clumps along edge of Big Pond Mangrove planting along edge of Big Pond Ornamental low/groundcover planting at junction with Baillou Hill Rd.	
9	Oakes Field Distributor north of new Govt. Subdivision between Bethel Ave - Phase A and Yellow Elder Way	new 2-lane may be extended towards section 22 (Baillou Hill Rd)	0.8	Corridor to be grassed ornamental groundcover/low shrubs and grass at junction	
10	Baillou Hill Road between Robinson Rd and Carmichael Rd	Widening of existing 2-lane to 4-lane in some locations and 3-lane in others Widening on east side of existing road (part of the corridor north of the Baillou Hill Rd was completed by a local contractor)	0.8		Partially completed 2007 Boundary wall relocations and utility pole diversions completed.

11	Baillou Hill/Market one-way couplet between Robinson Rd and Duke St (11A and 11B)	Traffic Management, minor improvements Existing two way traffic to be one way north and south respectively	4.0	Minimum amount of grass	Temporary maintenance undertaken in 2003
12	East Street between Robinson Rd and Soldier Rd	Widening of existing 2-lane to 4-lane Widening of west side of existing road	0.7	Corridor to be grassed ornamental groundcover/low shrub planting with clumps of trees and grass at roundabout	Overhead utility diversions have been completed.
13	Robinson Road/Prince Charles Drive between Baillou Hill Rd and Fox Hill Rd (13A and 13B)	Widening of existing 2-lane to 4-lane at selected locations, and to 3-lane at others. widening on both sides of existing road within the road reservation	3.8	Junctions to be grassed	Only works commenced were placing of some duct crossings at seven locations.
14	Tonique Williams-Darling Highway	Widening of existing 2-lane to 4-lane Widening on north side of existing road		Transplantation of existing palm and small broadleaf trees to north side of road Palm tree planting in median	Completed out of NPTP 2005
15	Marathon Road between Robinson Rd and Wulff Rd	Widening of existing 2-lane to 2-lane with a dedicated central turning lane Widening on both sides of existing road to accommodate additional road width	0.7	Corridor to be grassed	Works has commenced on utility diversions, site clearance and drainage work.
16	Wulff Road between Marathon Rd and Village Rd	Widening of existing 2-lane to 4-lane Junction improvements.	0.8	Corridor to be grassed	Temporary maintenance undertaken in 2003
17	Abundant Life Road/ Windsor Place between Independence Hwy and Sappodilla Blvd	Widening only at three junctions	0.8	Corridor to be grassed	Initiated 2001
18	West Bay Street - Saunders Beach	Local realignment of West Bay St to accommodate beach parking on north side Roundabout where Corridor 5 (Bethel Avenue - Phase B) ties in with this corridor.	0.2	Tree, palm shrub, perennial and runner planting Children's play area Benches	
19	West Bay - Blake Road	Realignment of West Bay St on south side to accommodate beach parking	2.0	Tree, palm shrub, perennial and runner planting Children's play area; benches	

20	Harrold Road / Sir Milo Butler Highway / Bethel Avenue	Roundabout to link corridors 4, 5 and 14		ornamental groundcover/low shrub planting with clumps of trees and grass	Completed out of NPTP 2005
21	Harrold Road / Baillou Hill Road / Independence Drive	Roundabout to link corridors 10 and 14		ornamental groundcover/low shrub planting with clumps of trees and grass	Completed 2007
22	Baillou Hill Road / Robinson Road	Junction to link corridors 11A and 13A		ornamental groundcover/low shrub planting with clumps of trees and grass	Completed 2007
23	Robinson Road / Marathon Road / Independence Drive	Widening of existing junction between corridors 13A, 13B and 15; and installation of traffic signals	0.3	ornamental groundcover/low shrubs and grass	
24	JFK Drive / Bethel Avenue	Widening of existing junction between corridors 4 and 5; and installation of traffic signals	0.3	ornamental groundcover/low shrubs and grass	
34	Eastern Road between Fox Hill and Village Rd	widening exiting 2-lane to 3-lane			designs not developed
41	Extension to corridor 2 between Carmichael and Cow Pen	new 4-lane some 7 houses to be relocated			designs not developed
	Grand total		38.2		

Annex 3.

Summary of Potential Negative Environmental and Social Impacts by Corridor

Corridor	Potential Negative Impacts	Mitigation/Enhancement Measures
1. Pinewood	<ul style="list-style-type: none"> • Ponding/flooding from runoff • Removal of some vegetation within degraded woodland. • Increase in number of accidents 	<ul style="list-style-type: none"> • Install drainage ditches and drainage wells • Plant native trees along the route • Remove dumped material within the woodland • Implement controlled pedestrian crossing in the vicinity of the school.
2. Sir Milo Butler extension	<ul style="list-style-type: none"> • Loss of approx. 4.5 acres of degraded pine/hardwood woodland 	<ul style="list-style-type: none"> • Acquire and protect critical ecosystems to compensate • Plant native trees along the route
3. Sir Milo Butler improvements	<ul style="list-style-type: none"> • Vegetation loss • Road runoff into Harrold Pond and wetlands increasing sedimentation and hydrocarbon pollution. • Street Lights will affect wildlife in Harrold Pond and associated wetlands. 	<ul style="list-style-type: none"> • Plant substantial belt of native vegetation to increase wildlife habitat • Install oil filters on outfalls to reduce hydrocarbon pollution to the pond • Plant tree barrier to diminish light intensity.
4. Bethel Ave.	<ul style="list-style-type: none"> • Vegetation loss (mixed broadleaf, pine, palm secondary growth and some protected species) • Contamination of wetlands from runoff water from road • Contaminated land from cement plant and BEC dumping • Flooding/ponding from road runoff 	<ul style="list-style-type: none"> • Retain as much vegetation as possible • Direct runoff away from wetlands; install hydrocarbon filters • Clean up wetland and prevent further use by cement plant • Test soil for contamination to determine extent of clean up • Install storm water retention pond and develop as wetlands
5. Bethel Ave.	<ul style="list-style-type: none"> • Loss of coppice woodland • Runoff and sediment contamination to Perpall's Water Works wetlands • Damage to wetlands south of West Bay St • Vegetation loss, erosion and sedimentation from removal of oolitic ridge • Contamination of Water Works wetlands from illegal dumping • Potential damage to old plantation walls at south end of Water Works from worker intrusion. 	<ul style="list-style-type: none"> • Identify protected tree species to minimize loss • Replant coppice habitat along ROW • Install drainage ditches and runoff retention ponds • Minimized through alignment • Control erosion and runoff • Install culverts under road to maintain water flow • Minimize cuts. Install erosion control measures during construction. • Revegetate with native species immediately. • Fence to prevent worker intrusion
6. Gladstone Rd.	<ul style="list-style-type: none"> • Loss of 0.6 acres of broad leaf coppice. • Cutting into oolitic ridge resulting in vegetation loss, runoff and erosion. 	<ul style="list-style-type: none"> • Replant native vegetation along road • Minimize cuts; install erosion control measures during construction • Revegetate road cut immediately.

7. Gladstone Rd extension	<ul style="list-style-type: none"> • Filling and loss of 1.2 acres of wetlands east of Lake Cunningham • Damage to Lake Cunningham wetlands from hydrocarbons and sediment from road runoff • Fish breeding disruption in Lake Cunningham and its wetlands from construction • Loss of approx. 1.2 acres of coppice woodland with potential loss of some protected tree species • Damage to oolitic ridge (Prospect Ridge) • Vegetation loss; Damage to woodlands west of golf course from fuel and sedimentation • Erosion and sedimentation • Loss of golf course's 13th tee 	<ul style="list-style-type: none"> • Compensation at Big Pond • Install protective drainage and sediment controls to avoid discharging into wetlands • Restore damaged areas • Adjust construction schedule to avoid fish breeding times • Minimize taking • Replant along road during and immediately after construction • Install erosion control measures during construction • Avoid direct damaged by realigning • Install drainage control to prevent runoff into wetlands
8. Moss-Cordeaux Link	<ul style="list-style-type: none"> • Filling of approx. 1.5 acres of Big Pond, with loss of some mangroves • Sediment runoff into Big Pond 	<ul style="list-style-type: none"> • Compensation by way of protected area at Big Pond with restoration of drainage areas • Install erosion and drainage control to prevent runoff into pond
9. Oakes Field Distributor	<ul style="list-style-type: none"> • small loss of secondary growth pine woodland • Noise and visual intrusion increased 	<ul style="list-style-type: none"> • Minimize taking; replant along edge of ROW with native species • Install roadside plantings
10. Baillou Hill Rd.	<ul style="list-style-type: none"> • Loss of small section of Caribbean pine • Ponding / flooding from road runoff • Visual intrusions to residential properties • Possible loss of residential gardens from widening at junctions 	<ul style="list-style-type: none"> • Prevent construction damage • Install flood water retention pond or drainage wells • Retain as much existing vegetation as possible and provide landscape planting • Minimize intrusion. Compensate for loss
11. Market St - Baillou Hill Rd	<ul style="list-style-type: none"> • Damage to trees along ROW during construction • Increase in speed and noise 	<ul style="list-style-type: none"> • Exercise care; prevent damage • Minimize through traffic signals and controls
12. East St	<ul style="list-style-type: none"> • Possible removal of some Caribbean pines • Moderate visual intrusion to residential properties 	<ul style="list-style-type: none"> • Minimize and replace with landscape planting of native species • Provide landscape planting with native species where possible
13. Robinson Rd. - Prince Charles Dr	<ul style="list-style-type: none"> • Ponding / flooding from runoff - slight 	<ul style="list-style-type: none"> • Construct drainage wells
14. Harrold Rd.	<ul style="list-style-type: none"> • Loss of roadside trees and shrubs • Ponding / flooding from runoff • Increase in traffic speed 	<ul style="list-style-type: none"> • Avoid large trees. Landscape with fruit trees and native hardwoods along corridor • Install flood water retention basins and maintain as wetland • Signals and surveillance
15. Marathon Rd	<ul style="list-style-type: none"> • Flooding from runoff • Small loss of front gardens 	<ul style="list-style-type: none"> • Install flood retention basins • Compensation. Replace plantings
16. Wulff Rd.	<ul style="list-style-type: none"> • Ponding/flooding from runoff • Loss of a few trees • Loss of parking area at junction 	<ul style="list-style-type: none"> • Install drainage wells • Minimize and replant if possible

17. Abundant Life Rd.	<ul style="list-style-type: none"> • Ponding/flooding from runoff • Loss of forecourts/gardens 	<ul style="list-style-type: none"> • Install drainage wells • Minimize and compensate for loss.
18. West Bay St. to Saunders Rd.	<ul style="list-style-type: none"> • Vegetation removal • Visual impact to homes in area 	<ul style="list-style-type: none"> • Replant in car park and along verges • Plant vegetation screen of native plants and shrubs
19. West Bay St. to Blake St.	<ul style="list-style-type: none"> • Damage to wetlands on private property • Loss of cosmetic plantings along roadside • Visual impacts • Increased visitors to caves with potential damage to recently discovered petroglyphs and historic walls 	<ul style="list-style-type: none"> • Alignment has been changed to avoid wetlands • Install protection measures to prevent runoff into wetlands • Install replacement plantings with native trees/shrubs • Plant screen of native trees/shrubs. • Provide security during construction and security and visitor control of cave areas.

Annex 4.
Project Corridors Map