EXECUTIVE SUMMARY

Introduction

The Kingston to Bushy Park segment of Highway 2000 (H2K) is the subject of this Environmental Impact Assessment (EIA). The alignment covers a distance of 22km from the Mandela interchange to the interchange at Bushy Park where the alignment will connect with the dualised Old Harbour Bypass.

The Highway 2000 Project (H2K) is one of the Government of Jamaica's landmark Millennium Projects. It will link Kingston to Montego Bay, through the parishes of Kingston & St. Andrew, St. Catherine, Clarendon, Manchester, St. Elizabeth, Westmoreland and St. James. The Highway will also connect Bushy Park and Ocho Rios, traversing the parishes of St. Catherine and St. Ann. The total length of the highway is approximately 230 km, with an anticipated right-of-way of 100m.

The EIA follows a Strategic Environmental Assessment (SEA), which was requested by the National Development Bank of Jamaica Ltd., the executing agency for the project. The SEA was conducted by Dessau-Soprin International Ltd. of Canada in association with the local firm, Environmental Solutions Ltd. The SEA provided guidelines for design and alignment within the context of a 1 km corridor, which had been selected by the "least constraining methodology". The study recommended issues and areas for further study in detailed project-level EIAs which would be necessary to support the application for an environmental permit.

Within the Kingston to Williamsfield corridor (of which Kingston to Bushy Park is a part) ten areas were recommended for study within the EIA(s). These were Portmore, Portmore Causeway, Rio Cobre crossing and floodway, Bushy Park, Freetown, Rio Minho, Milk River, Sandy Bay, Porus and Williamsfield. These areas were selected because of issues related to relocation, loss of economic activity, interchanges, water resources, hazard vulnerability, hydrology, coastal dynamics and air quality.

Project Description

Phase IA of the Highway 2000 Project includes construction of the highway from Kingston to Sandy Bay, incorporating the Old Harbour Bypass road . Construction of the Portmore Causeway and Bridge and upgrade of the Dyke Road, which form part of Phase 1A will be the subject of a later study.

The section from Kingston to Bushy Park requires the construction of a four lane, toll highway beginning with an interchange on the Mandela Highway in the vicinity of Caymanas Estates just north of the railway line, and crossing the railway at Grange Lane. The Highway then passes through Bernard Lodge, south of Spanish Town to the area of Hartlands. The route then follows the railway alignment, on the southern side, through the areas of Bridge Pen and Cherry Garden, to connect with the recently constructed Old Harbour Bypass at Bushy Park.

Permitting

NRCA/NEPA has been interacting with the Highway 2000 project since inception of the functional planning process. The NRCA through an Endorsement Statement (March 2000) conveyed its support for the approach taken by the study and design team to ensure that the H2K satisfied all the requisite environmental requirements. Whereas there was no provision for SEA's in the statute, the agency recognized that the SEA process would serve to optimize engineering design and minimize environmental impact. The SEA is a comprehensive process of evaluating the environmental impacts of a policy, plan or programme, at the strategic level.

The NRCA received and reviewed the SEA and participated in various meetings. The NRCA/NEPA agreed to the issues proposed for further study in the project level EIA.

The Permit and Licence System was established in 1997 to ensure compliance with Sections 9 & 12 of the NRCA Act, which gives the NRCA the right to issue permits for new developments and request EIA studies where necessary. Highway construction is listed in the prescribed categories of projects requiring a permit. In keeping with the current application process a Project Information Form (PIF) and a Permit Application (PA) were submitted to NRCA/NEPA with the requisite application fee of J$ 1000. Terms of Reference submitted for approval, were approved with revisions .

Approach and Methodology

The SEA assembled and analysed detailed information on the 1km corridor within which the preferred alignment was determined. The project level EIA drew on the data derived for the SEA, and expanded on information relevant to this study.

A multi-disciplinary team was assembled to collect and analyze data on the existing environment, review relevant legislation and determine potential impacts. Baseline data for the study area was collected using the following methods: Windshield Survey, Site Reconnaissance, Analysis of Maps and Plans, Literature Review, Desk Top Research, Public Consultations, Field Studies, and Laboratory Analyses.

The Terms of Reference requested that attention be paid to:

- Flora and Fauna
- Plant and animal communities immediately outside the project corridor
- Noise and Air Quality
- Waste Disposal (construction spoil)
- Sourcing and Storage of Earth Materials
- Hazards and Risks (flooding, health and safety, accidents)
- Relocation/Resettlement
- Potential Loss of Economic Activity/Local businesses
- Loss of agricultural lands
- Community disruption
- Crossings and access
- Traffic Flow
- Interchanges and Toll Plazas
- Public Sentiment
- Existing Enterprises

- Proposed Developments
- Archaeological and cultural heritage
- Aesthetics and amenity

Information is presented in the following format:

- Physical Environment (Climate, Geology, Soils, Hydrology, Drainage, Air Quality, Noise, Water Quality, Hazard Vulnerability and Landscape Attributes and Scenic Vistas)
- Biological Environment (Vegetation, Fauna, Parks and Protected Areas)
- Social Environment (Land Use and Zoning, Land Acquisition, Population Statistics, Traffic, Transportation, Access Roads, Infrastructure, Business Enterprises, Solid Waste Management, Proposed Developments, Archaeological and Cultural Heritage, Sourcing and Storage of Earth Materials and Establishment of the Construction Camp Site)

Legislative and Regulatory Considerations

Relevant legislative and regulatory considerations at both the national and international levels were reviewed. Key instruments included the Natural Resources Conservation Act (1991), the Environmental Review and Permitting Process (1997), Land Acquisition Act (1947) and the new Toll Roads Act (2002).

Description of the Existing Environment

The existing environment was described in terms of the physical, biological and social attributes paying particular attention to the areas identified in the Terms of Reference.

Physical Aspects

The Kingston to Bushy Park segment of the Highway 2000 alignment is located in the dry, St. Catherine plains between Caymanas Estate in the east and Bushy Park in the west. The average annual rainfall for the area is 987 mm and the seasonal rainfall pattern is bimodal with rainfall peaks in May and October.

Soils

The soils along the route are derived from alluvium and consist of silty-clay and clayey-loam. In general the soils have moderate to low water retention capacity and consequently are fairly well drained. In areas dominated by clay, such as Bushy Park, the drainage is poor.

Underlying the soil horizon, especially in the Bernard Lodge area are significant deposits of high-grade sand. The sand is often mined illegally for use in the construction industry.

Hydrology and Drainage

The alignment is located in the southern sub-basin of the Rio Cobre Hydrologic Basin. The Rio Cobre is the only major stream along the proposed alignment and there are no tributaries south of the Bog Walk Gorge. The first 1.3 km of the highway is within the flood plain of the Rio Cobre. This area was inundated by floodwaters during the flood in June, 1969. Beyond 1.3 km the proposed highway is protected from flooding by the Rio Cobre Dyke which extends from Lakes Pen to Hunts Bay along the west bank of the river.

A number of minor gullies cross the proposed highway. These are from east to west, Town Gully (10+000 km), Salt Island Creek 1 (11+350 km), Salt Island Creek 2 (13+180 km), Cut Throat Gully (18+160 km) and Black River East (18+480 km).

The alignment of the highway between Kingston and Bushy Park is underlain by the Rio Cobre alluvium aquifer. The alluvium aquifer is an important source of irrigation water to the St. Catherine Plains and domestic water to Portmore and Spanish Town and environs. The aquifer is composed of sand and gravel and the average depth to groundwater in the vicinity of the highway is 6.0 m.

The alluvium aquifer is highly vulnerable to contamination from improper waste disposal at the surface, given the relatively shallow groundwater table and the high permeability of the aquifer material. The alluvium aquifer is also vulnerable to saline intrusion.

Air Quality

Air quality levels measured at the three sites are presently within the national guidelines and USEPA PM10 standard for ambient air of 0.15 mg/m^3. Levels of noise detected at three stations along the Kingston to Bushy Park alignment are also within the required limits.

Water Quality

Water quality was also measured at three sites. The data generated shows that the water quality in Coleburn Gully at present is very stressed. High coliforms, chloride, and phosphate levels as well as low levels of dissolved oxygen were measured at this site. The Rio Cobre station also showed effects of contamination from human or animal excreta evidenced in the elevated fecal coliform levels. Nitrate and sulphate levels were elevated at all three sites sampled.

Hazard Vulnerability

The proposed highway alignment crosses a number of seasonal gullies, each of which poses some risk of flood. The area has a history of flood damage and therefore particular attention must be paid to design for flood-waters. Earthquakes are the other natural element, which the highway design must take into account. Safety constitutes the third area of concern, as it is with all construction projects.

Biological Environment

Vegetation

The vegetation is characterized primarily by modified and secondary communities, and there are no areas of primary vegetation or natural forest which will be impacted by Highway 2000. The modified communities are largely sugar cane plantations (large herbaceous cultures) as well as areas of Mixed Culture and Mixed Subsistence and

pasture. Other areas not currently cultivated can be classified as secondary communities, which have formed as a result of invasive species and wasteland, which has become vegetated over time.

Fauna

Several species of birds were observed, but none are considered endangered or threatened. Endemic bird species were observed and have been reported from the area. Several species of reptiles and amphibians have been reported from within the general area of alignment. None of these are considered threatened or endangered at this time.

Protected Areas

The proposed alignment for Highway 2000 will be just within the northern boundary of the Portland Bight Protected Area, which is marked by the railway line. The Highway will enter the PBPA in the area south of McCooks Pen/Bridge Pen and will follow the existing railway line until it connects to the recently completed Old Harbour Bypass. These areas are disturbed and degraded and are not considered to be of high ecological significance. The highway is not expected to impact directly on the dry limestone habitat of the endemic and endangered Jamaican Iguana in the Hellshire Hills, the Braziletto Mountains nor the caves at the southern end of Portland Ridge, which provide a habitat for endemic fauna.

Social Aspects

Land Use

The alignment passes largely through lands which have been zoned for agricultural use. Sugar cane cultivation - current and abandoned - with the attendant sugar estate infrastructure is the dominant use.

The highway begins on the Caymanas Estate which currently provides sugar cane for processing at Bernard Lodge and currently uses the existing road network that will be crossed by the Highway alignment.

Considerable illegal dumping is evident along the road to Grange Lane. A closed major waste disposal facility was located at Lakes Pen in close proximity, and trucks seem to continue to bring refuse to the general area. Sand mining, believed to be illegal was also evident, and close monitoring of the source of materials for H2K construction is essential as sand mining from this area increases the flood risk on the Rio Cobre floodplain.

In summary, the greater part of the alignment will utilize lands that are currently under sugar cane cultivation. These are in the areas at 7+500 to 11+000, 12+000 to 18+000. – Caymanas, Bernard Lodge, Windsor Park, Hartlands, Innswood, McCook's Pen and Bushy Park. Other areas, between 11+000 and 12+000 are sugar cane lands currently out of production and now thorny scrubland dominated by *Acacia sp*. Between 18+000 and 20+000 thorny scrubland also dominates.

Traffic, Transportation, and Access

At the initial stage of the route (chainage 0+000 km – 2+000 km) where the highway intersects the Mandela Highway and the Dyke Road out of Portmore, there are major transportation and traffic functions associated with the existing Mandela Highway and Portmore Drive. Mandela Highway is the major artery west out of the Kingston Metropolitan Area and Portmore Drive connects Greater Portmore, a major residential area, with the Mandela Highway.

Highway 2000 will be operated as a closed system toll highway., and access to the Highway between Kingston and Bushy Park will be limited to the following points:

- From Mandela Highway Interchange at 0+000
- From Portmore Causeway Interchange and Bridge at 0+ 1+500 (in 2004)
- From Spanish Town Interchange at 7+450 or further west at 11+000
- From Bushy Park Interchange at 22+000

The cessation of the railway service from Spanish Town to Kingston in 1993 dealt a blow to the public transport system, and caused hardship for transport of agricultural goods to markets. Proposals to restore rail service have been reviewed and discussed. Highway

2000 will not sterilise the railway and highway design has taken account of the potential need for crossings.

During the construction phase it is expected that traffic flow will be disrupted at areas where the Highway crosses, merges or connects with existing roadways. The highway will cross the major east west corridor from the KMA to the western parishes of the island, and an interchange will be provided to facilitate access.

This area of the highway is densely travelled by commuter and commercial traffic. The alignment will cross a number of local routes, and crossings, as described above, have been provided so as to minimize dislocation. Existing roads crossing the Highway, railway crossings, pedestrian and farm crossings, including field connectors have been designed as grade separated crossings.

The Highway corridor was selected using the least constraining methodology. This approach sought to minimize the number of parcels of land being crossed and to maximize on crossings of large parcels particularly those that are state owned.

Land Acquisition

Land Acquisition is currently the responsibility of the National Roads Operating and Constructing Company Ltd. (NROCC), a government agency. Within the segment Kingston to Bushy Park, 117 parcels of land will be crossed. Approximately 90% of these are state owned properties with the major owners being the Urban Development Corporation and the Commissioner of Lands. Acquisition of land is currently in progress, and is being conducted in accordance with the laws of Jamaica.

Water demand

In St Catherine, large farms, mainly in sugar cane, use approximately 80% of all irrigation water. Future demands are projected at 330Mm3/yr, and with a surplus of less than 18Mm3/yr, there will be shortages in the future. Seven projects have been identified

in St. Catherine and these developments should see increases in sugar cane, fish and vegetable production. The Highway crosses several irrigation canals at several points.

Planned Development Projects

The Kingston to Bushy Park section of Highway 2000 will connect to the recently constructed Old Harbour Bypass to create a toll Highway linking Kingston to Sandy Bay. Another Phase of Highway 2000 will see the construction of the alignment from Sandy Bay to Williamsfield and then from Williamsfield to Montego Bay.

Several projects and developments are envisaged, access to which will be facilitated by Highway 2000 - beginning with the Kingston to Bushy Park section. These include Millennium Projects such as New Town in Clarendon, Outlet mall near to New Town, Multi-Purpose Stadium, Vernam Field Airport, Industrial Parks and Milk River Spa and Resort.

Archaeological Sites

The Jamaica National Heritage Trust has provided a list of 'Listed Sites' that are along the Highway alignment. The Grid References are incomplete, as the precise location of some of the sites is not yet known. However, this data will become available if a detailed archaeological survey is commissioned by the JNHT.

Materials

The earthworks quantities required for the highway construction is approximately 65 m^3 per km. The material will be obtained from registered and/or certified sources. The backfill materials will mainly be obtained from limestone quarries in close proximity to the site. Storage will be on sites on which the top-soil (first 20 cm) has been removed. This top soil will be replaced after removal of the stored material.

Construction Camp Site

The exact location of the construction camp-site has not yet been determined. A site will be selected, that will be in close proximity to the proposed alignment. The camp site will

be organised with specific zones for container offices, maintenance, power and water supply, solid waste collection, traffic (vehicular and pedestrian), car park, and stockpiling of earth materials. Solid waste will be sorted and removed by licensed contractors. Waste-water will be piped into a septic tank which will be emptied on a regular schedule. Fugitive dust will be minimised by regular sprinkling of stockpiled earth materials. Machinery and equipment will be certified and regularly maintained to ensure minimal release of toxic emissions and particulate material.

Potential Negative Impacts and Recommended Mitigation Measures

It is important to note that during the process of the Strategic Environmental Assessment various alternatives to the proposed route were considered in order to optimize the alignment along the entire length of the highway, and to minimise negative environmental impacts. In the Kingston to Bushy Park section, three alternatives were considered between chainage 0-20 km, before the optimal alignment was selected.

Alignment

The alignment for Highway 2000 was determined using several criteria and utilising the least constraining methodology. Optimisation of the alignment was carried out through the consideration of alternatives during the Functional Planning stage. Potential negative impacts have been identified in association with the alignment where it crosses springs, traverses sugar cane plantations and vegetative stands, crosses infrastructure and railway, runs in close proximity to archaeological and cultural resources, and joins, crosses or intersects with the existing road network.

Hydrology and Drainage

Hydrology and drainage are the most significant considerations for the Kingston to Bushy Park segment of the highway. Storm run-off and irrigation systems require careful engineering. The natural drainage is north to south and the highway alignment is east to

west. Inadequately designed hydraulic structures could result in impact to the highway, existing infrastructure and properties adjacent to the highway.

Surface drainage design considers both the major and minor systems. The major system is the route followed when the minor system is exceeded. The engineering design has used the 100-yr. event as design criterion for major drainage, including bridge openings, to accommodate flash floods and catastrophic events, which typify the area. Storm water runoff (more frequent events) will be handled by curbs, channels, catch basin inlets, storm sewer\s, minor swales and roadside ditches. These have been designed to prevent ponding and flooding of the highway and adjacent properties.

Hazard Vulnerability

Flooding is the major natural hazard to be encountered by construction of the highway, and the major impact is derived from the effect of extreme runoff on the site. The area through which the alignment passes is prone to extreme events, which generate high water levels in gullies and rivers.

Design of bridges, culverts and drainage channels have taken account of the 100-year event and the channels are therefore expected to handle the flood flows. Site preparation and construction schedules should take account of the traditional rainy season in May and September-October, making note, however, of the hurricane season June to November, which sometimes brings heavy rains. Extraordinary tropical systems have also caused problems of supersaturation, so that schedules should factor the eventuality.

Soil Erosion

Changes in stream morphology could result in higher velocities thus increasing the potential for soil erosion in the stream channels of the Rio Cobre, Black River and gullies. Such erosion may undermine the foundation of structures such as bridges and river training works. There is also the potential for soil erosion on embankments and in roadside ditches (scour).

Soil erosion can be minimised by protection measures to prevent scour, planting of vegetation on embankments, and paving of roadside ditches.

Air Quality

Road construction activities will result in the removal of extensive acres of vegetation in sugar cane plantations, in secondary communities and scrubland areas, as well as stripping of existing road surfaces. This will create areas of exposed top-soil which can become airborne by daily winds. This would result in an increase in levels of fugitive dust.

Periodic wetting of loose dirt, un-vegetated areas and stripped road surfaces should be carried out to reduce the levels of fugitive dust generated during site preparation and construction activities. Stock piling of earth materials for construction should be carried out within temporarily constructed enclosures to limit fugitive dust. Vehicles transporting earth materials should be covered *en route.*

Noise

Levels of noise are expected to increase during construction activities with the use of heavy machinery and earth moving equipment. Proper scheduling of activities during the construction phase will be required to minimise the nuisance of noise.

To mitigate against increased levels of noise along the alignment, it is recommended that vegetative buffers be planted on berms along the length of the right-of-way. The alignment passes mainly through rural landscape and therefore concrete barriers would reduce aesthetic appeal and block potential scenic vistas. Noise levels are expected to be higher at the Toll Plaza than along the other areas of the alignment. However, the Toll Plaza will be sited approximately 500 m south of the nearest settlements, and vegetative buffers planted on berms should provide adequate protection against noise in this peri-urban area.

Water Quality

There is the potential for both direct and indirect surface and groundwater pollution from construction of the highway. Contamination of surface water sources is likely, especially during the construction phase. Groundwater contamination can occur from improper waste disposal associated with new development along the highway or increased groundwater production to meet increased water demand.

Measures to control or limit sedimentation of streams and gullies during the construction phase will include storage of earth materials within containing berms, and the deployment of silt screens as required at gullies and streams during the construction of bridges and culverts. The engineering design has incorporated measures for slope stabilization and reinforcement at the approach to bridges.

Vegetation

The vegetation identified along the Highway alignment comprises agricultural stands of sugar cane, secondary scrubland, overgrown pasture, and thorny scrubland dominated by *Acacia sp*. No significant rare, threatened, endangered or endemic species are expected to occur in these areas. These areas provide green space, which assists in the purification of the air shed by removal of carbon dioxide and release of oxygen. Additionally, the areas provide host plants for species of insects, reptiles, amphibians, butterflies and birds. Site preparation and construction activities will remove several acres of these vegetative stands removing the airshed purification function and some habitat.

To continue to provide airshed functions of purification it is recommended that verges and medians be replanted with trees and shrubs. Additionally, tree planting can be carried out to form shelter belts, windbreaks, noise buffers, slope stabilization bands, erosion control and for aesthetic appeal. Selection of plants for landscaping should consider the following: habitat suitability, trees of national interest, flowering trees and shrubs.

Fauna

Birds located in the modified vegetative communities will relocate when their habitat is removed. Species along the proposed alignment such as reptiles are also highly mobile and should also relocate to adjacent similar habitats. Insects, snails and other groups with low mobility may suffer from loss of specimens, as a result of heavy machinery and the use of earth moving equipment. The highway has the potential to open up some new areas and create increased access to remote areas.

Landscaping and vegetation buffers will result in the replacement of some habitat for selected species. It is not expected that poachers will be a threat. However, encroachment by squatters could result in degradation of areas. As a Toll Road, the highway will be limited access and will be enclosed by fencing thereby reducing the possibility of encroachment from the roadway.

Social Environment

Land Use

The alignment will disrupt the current modus operandi of the cane lands and sugar estate by crossing internal roads and by taking out lines of cane cultivation to facilitate passage of the road and space for construction support activities.

Current land use and ownership necessitates acquisition and purchase of land. Discussions must be held with the Sugar Company of Jamaica to ensure preservation of economic units for estate and factory operations. Field connectors must be provided and full consultation on the requirements for operations must be held, to ensure appropriate provisions for the needs of the operations. Sterilisation of economic units must be avoided. Valuation of crops should also be undertaken to facilitate discussion with the respective farmers, and to avoid unnecessary/disruptive conflict.

Traffic, Transportation and Access Roads

Site preparation and construction activities will impinge on traffic flow in the areas where the Highway connects or crosses existing roads including agricultural feeder roads. Through-way will have to be maintained and obstruction to traffic minimised.

Scheduling of construction work should seek to minimise disruption by using non-peak traffic times for movement of material and heavy equipment. Arrangements for parking and storage of material should be made as far off-site as is feasible for efficient operations. Discussions should be held early with relevant stakeholders to determine their needs and requirements and to advise them of the construction schedule. Public notices by the print and electronic media should also be posted in order to make the general public aware of the construction schedule and to provide construction updates. Properly trained flag men and road side signs should also alleviate discomfort to commuters.

Business Enterprises

Some businesses will be affected by the construction works. Discussions should be held with businesses that are likely to be impacted by the Highway construction.

Employment

Employment opportunities will be created during the site preparation and construction phases. This will mostly be unskilled labour for the duration of the construction activities. Additionally, economic opportunities will involve the sourcing of construction material and linkages created with local and regional suppliers and industries.

Solid Waste Management

Solid waste generated from the site preparation and construction activities will include construction debris, vegetation, solid waste from beaches and solid waste generated from the construction camp.

Construction sites generate considerable waste and provision must be made for suitable collection by certified contractors and disposal at legal sites. Worker briefing should include instructions on how to dispose of food and drink containers emphasizing the need to protect the harbour and the gateway to Kingston. Construction camps should be adequately equipped with portable chemical toilets.

Proposed Developments

There are no proposed developments that are likely to be impacted negatively by the construction of the Highway.

Public Health and Safety

There are no sensitive land use issues such as homes, schools, health centres, hospitals or churches in the vicinity of the proposed Highway. However, staff of the business enterprises and persons living in adjacent areas utilize the bus stops, existing roads and agricultural feeder roads. Improper use of Highway ramps, exits and interchanges can result in traffic accidents.

To minimise risk to the public the construction activities which will directly affect the movement of traffic and pedestrians, should be carried out outside peak hours and standard construction techniques for sign–posting and flagging should be adhered to. Dust control by wetting is essential to prevent aggravation of the already poor air quality. Unnecessary idling of construction related vehicles should be discouraged. Construction of acceleration and deceleration lanes for business and recreational entrances is essential to reduce the accident risk, as well as proper sign posting of speed limits and entrances and exits.

An extensive Highway Public Education Programme should be designed and implemented to make commuters aware of proper procedures on the Highway. This should include aspects related to tolling, lane changing, use of ramps, and access and exits. Enforcement of Highway legislation and procedures will be required.

Archaeological and Cultural Heritage

The Jamaica National Heritage Trust should be involved in discussions about the occurrence of possible sensitive areas along the Highway alignment. The JNHT should be given an opportunity to conduct a Watching Brief during the construction phase and to perform Rescue Archaeology if any artifacts are discovered.

Positive Impacts

The highway is expected to improve drainage systems through engineering design of major structures to accommodate a one hundred year storm event, and integration of minor drainage ways into an overall stormwater management system. Erosion potential should also be minimised along embankments. The opening of scenic vistas along the alignment will provide new aesthetic elements. Vegetative buffers and landscaping will facilitate continued air-shed purification functions. Although scrubland, secondary growth and sugar cane cultivations will be lost in the process of vegetation clearance during site preparation and construction, landscaping along the highway will restore vegetative matter and provide habitats for some species, during the operation phase.

During site preparation and construction employment will be generated for several categories of workers including casual labourers, skilled and unskilled workers, as well as suppliers of goods and services.

During the operation of the road it is anticipated that there will be many positive impacts. These will relate to the movement of goods and services in a shorter time, reduction of wear and tear on vehicles, as well as reduction in levels of stress and frustration experienced during traffic congestion. Health and safety are always an issue when a new road is opened with more lanes and with a higher design speed than the existing road. Safety on the roads is expected to improve in the long term, with a more efficient road network and the associated driver education programme to be implemented.

Consultations with Stakeholders

Consultation and interviews have been held with relevant stakeholders including property owners, business enterprises and potential commuters. During the SEA process consultations were also held with various groups including environmental scientists with specific expertise, and other relevant professionals, as well as with Environmental Non-Governmental Organizations/Community Based Organizations and Government Agencies. In addition, a Sensitivity analysis was conducted with stakeholders and specialists in related disciplines. A Public Consultation will be held in July and a separate report will be prepared and submitted to NEPA on this event.

Monitoring Programme

If a permit is granted for the proposed project, and before site preparation and construction activities begin, TransJamaican Highway Ltd. should submit a Monitoring Programme to NEPA. The aim of the Monitoring Programme is to ensure compliance with relevant legislation, implementation of the mitigation measures and long-term minimization of negative environmental impacts. The Monitoring Programme should include a Construction Plan and Schedule with a description of any proposed phasing of activities, recommended Mitigation Measures and proposed methods of compliance.

Summary and Conclusions

The Highway 2000 Project is one of the Government of Jamaica's landmark Millennium Projects. The section from Kingston to Bushy Park requires construction of a four-lane toll highway with an interchange at Mandela Highway and at Spanish Town.

Although some potential negative impacts have been identified for the project, the majority are short-term direct impacts related to the site preparation and construction phases. Most of the negative impacts identified can be successfully mitigated.

There are several positive impacts associated with the project. These include improved efficiency in travel time and travel costs, greater movement of goods and services, improved access to remote areas, support of new developments and employment

opportunities. Implementation and enforcement of the mitigation measures recommended and on-going public communication are however, required to ensure successful project execution with minimum negative impacts on the environment.

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