**CARIBBEAN DEVELOPMENT BANK**

# NOTIFICATION OF APPROVAL BY THE PRESIDENT OF A GRANT ROAD INFRASTRUCTURE REHABILITATION – ANTIGUA AND BARBUDA



Notified at the Two Hundred and Seventy-Fourth Meeting of the Board of Directors on December 8, 2016

**BD 140/16**

| | |
|---|---|
| *Director*<br>*Projects Department* | *Mr. Daniel M. Best* |
| *Division Chief (Ag.)*<br>*Economic Infrastructure Division* | *Ms. Merlyn P. Combie* |

**DECEMBER 2016**

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**CARIBBEAN DEVELOPMENT BANK**

**TWO HUNDRED AND SEVENTY-FOURTH MEETING OF THE BOARD OF DIRECTORS**

**TO BE HELD IN BARBADOS**

**DECEMBER 8, 2016**

**PAPER BD 140/16**

## NOTIFICATION OF APPROVAL BY THE PRESIDENT OF A GRANT – ROAD INFRASTRUCTURE REHABILITATION – ANTIGUA AND BARBUDA

In accordance with the authority delegated by the Board of Directors at its Two Hundred and Seventieth Meeting (Minute 270-32), the President approved a grant of thirteen million, nine hundred thousand Pounds Sterling (£13,900,000 mn) from the Special Funds Resources of the Caribbean Development Bank (CDB), allocated from funds provided by the United Kingdom through the Department for International Development to CDB under the United Kingdom Caribbean Infrastructure Partnership Fund, to assist in financing the rehabilitation of 8.7 kilometres of existing road corridors and associated works and the procurement of equipment to upgrade the Materials Laboratory, on the terms and conditions referred to in the attached Paper.

2. It is a condition that each project approved by the President and the terms and conditions thereof be reported to the Board at its first convenient scheduled Meeting after approval of the project.

3. The Board is therefore asked to note the approval by the President of the abovementioned project and the terms and conditions thereof.

**CARIBBEAN DEVELOPMENT BANK**

# APPRAISAL REPORT

# ON

# ROAD INFRASTRUCTURE REHABILITATION
# ANTIGUA AND BARBUDA

.

**(BD140/16)**

**DECEMBER 2016**

## CURRENCY EQUIVALENT

Currency throughout refers to Pounds Sterling (£) unless otherwise stated.

£1.00 = XCD3.038
XCD1.00 = £0.303

## ABBREVIATIONS

| | | |
|---|---|---|
| ABBS | - | Antigua and Barbuda Bureau of Standards |
| ADT | - | Average Daily Traffic |
| ASTM | - | American Society for Testing Materials |
| BMCs | - | Borrowing Member Countries |
| BOD | - | Board of Directors |
| CDB | - | Caribbean Development Bank |
| CGA | - | Country Gender Assessment |
| CLO | - | Community Liaison Officer |
| CPGs | - | Community Participate Group |
| CVA | - | Climate Vulnerability Assessment |
| DCD | - | Design and Control Department |
| DFID | - | Department for International Development |
| DMRB | - | Design Manual for Roads |
| EC | - | Engineering Consultant |
| ECCU | - | Eastern Caribbean Currency Union |
| ERR | - | Economic Rate of Return |
| ESAL | - | Equivalent Single Axle Load |
| ESMP | - | Environmental and Social Management Plan |
| FDOT | - | Florida Department of Transportation |
| FHR | - | Friars Hill Road |
| FY | - | Financial Year |
| GDP | - | Gross Domestic Product |
| GM | - | Gender Mainstreamed |
| GOAB | - | Government of Antigua and Barbuda |
| GWH | - | Sir George Walter Highway |
| HDI | - | Human Development Index |
| HDM | - | Highway Development Model |
| IRI | - | International Roughness Index |
| km | - | Kilometres |
| LOS | - | Level of Service |
| mn | - | million |
| MOU | - | Memorandum of Understanding |
| MTDS | - | Medium-Term Development Strategy |
| MWH | - | Ministry of Works and Housing |
| NPV | - | Net Present Value |
| p.a. | - | per annum |
| PBL | - | Policy-Based Loan |
| PC | - | Project Coordinator |
| PCR | - | Project Completion Report |
| PPE | - | Project Performance Evaluation |
| PRO | - | Public Relations Officer |
| PWDs | - | Persons with Disabilities |
| QMS | - | Quality Management System |

| | | |
|---|---|---|
| RA | - | Roads Act |
| RD | - | Road Department |
| RIR | - | Road Infrastructure Rehabilitation |
| RRC | - | Revenue Recovery Cost |
| SCF | - | Standard Conversion Factor |
| SDF | - | Special Development Fund |
| SFR | - | Special Funds Resources |
| SpCF | - | Specific Conversion Factor |
| SSS | - | Single Source Selection |
| TA | - | Technical Assistance |
| TOR | - | Terms of Reference |
| UK | - | United Kingdom |
| UKCIF | - | United Kingdom Caribbean Infrastructure Partnership Fund |
| USD | - | United States Dollar |
| VOC | - | Vehicle Operating Costs |
| VOT | - | Value of Time |
| WHO | - | World Health Organisation |
| XCD | - | Eastern Caribbean Dollar |

## MEASURES AND EQUIVALENTS

| | | |
|---|---|---|
| 1 hectre (ha) | = | 2.47 acres |
| 1 kilometer (km) | = | 0.621 mile (mi) |
| 1 square kilometer ($km^2$) | = | 0.386 square mile ($mi^2$) |
| 1 metre | = | 3.281 (ft) |
| 2 millimetres (mm) | = | 0.039 inch (in) |
| 1 square meter ($m^2$) | = | 10.756 square feet ($ft^2$) |

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## APPENDICES



## FIGURE

# COUNTRY DATA: ANTIGUA AND BARBUDA

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| PER CAPITA GDP (current market prices: US$) | 13,017.3 | 12,817.8 | 13,525.6 | 13,342.1 | 13,500.0 | 14,359.4 |
| **GROSS DOMESTIC PRODUCT (GDP)** | | | | | | |
| GDP at Current Market Prices ($mn) | 3,066.0 | 3,050.8 | 3,252.7 | 3,241.6 | 3,296.6 | 3,502.7 |
| Demand Components: | | | | | | |
| Consumptions Expenditure | 2,612.7 | 2,693.5 | 2,954.2 | 2,957.7 | 2,925.4 | 2,839.5 |
| Gross Domestic Investment | 872.1 | 637.1 | 716.6 | 757.0 | 780.4 | 847.4 |
| Exports of Goods and Non-Factor Services | 1,414.4 | 1,451.9 | 1,477.4 | 1,473.0 | 1,595.4 | 1625.92 |
| Imports of Goods and Non-Factor Services | 1,833.1 | 1,731.7 | 1,895.4 | 1,946.1 | 2,004.6 | 1810.12 |
| Gross Domestic Savings Ratio (%) | 14.8 | 11.7 | 9.2 | 8.8 | 11.3 | 18.9 |
| **Sectoral distribution of current GDP (%)** | | | | | | |
| Agriculture | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 | 1.1 |
| Mining and Quarrying | 1.0 | 0.8 | 0.8 | 1.1 | 1.1 | 0.9 |
| Manufacturing | 2.5 | 2.6 | 2.4 | 3.0 | 3.0 | 3.1 |
| Electricity and Water | 4.3 | 5.0 | 4.1 | 4.3 | 4.3 | 4.5 |
| Construction | 11.3 | 8.6 | 9.4 | 9.7 | 9.6 | 9.9 |
| Transport, Storage and Communications | 12.8 | 12.3 | 12.0 | 10.7 | 10.8 | 10.9 |
| Hotels and Restaurants | 12.7 | 13.4 | 13.1 | 12.5 | 12.4 | 12.2 |
| Wholesale and Retail Trade | 14.9 | 14.2 | 15.0 | 14.7 | 14.5 | 15.5 |
| Financial Intermediation | 10.0 | 10.6 | 9.9 | 9.1 | 9.1 | 8.8 |
| Government Services | 9.1 | 9.1 | 9.0 | 9.4 | 9.3 | 9.0 |
| Other Services | 17.1 | 18.6 | 20.3 | 21.9 | 21.1 | 20.6 |
| Less: Imputed Service Charges | 3.4 | 3.5 | 3.1 | 2.7 | 2.8 | 2.7 |
| GDP at Current Factor Cost ($mn) | 2,628.1 | 2,613.1 | 2,775.1 | 2,817.9 | 2,848.9 | 3,016.8 |
| GDP at Constant 2006 Prices ($mn) | 2,351.4 | 2,307.5 | 2,390.8 | 2,427.5 | 2,529.6 | 2,613.5 |
| Annual rate of growth in GDP (%) | **(8.5)** | **(1.9)** | **3.6** | **1.5** | **4.2** | **3.3** |
| **MONEY AND PRICES ($mn)** | | | | | | |
| Consumer prices (end of period % change) | 2.9 | 4.0 | 1.8 | 1.1 | 1.33 | 0.9 |
| Money supply (M1; annual % change) | -1.8 | -2.6 | -0.08 | 7.8 | 5.9 | 9.8 |
| Total domestic credit (net) | 2,947.9 | 2,861.8 | 2,711.7 | 2,684.3 | 2,610.9 | 2,250.5 |
| Private sector credit (net) | 2,544.3 | 2,442.3 | 2,376.2 | 2,269.5 | 2,151.6 | 1,908.8 |
| Public sector (net) | 403.6 | 419.5 | 335.5 | 414.8 | 459.3 | 341.6 |

# COUNTRY DATA: ANTIGUA AND BARBUDA

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| **CENTRAL GOVERNMENT FINANCES ($mn)** | | | | | | |
| Current Revenues | 654.4 | 599.3 | 648.9 | 599.1 | 665.8 | 848.8 |
| Current Grants | 31.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Current Expenditures | 639.6 | 596.3 | 646.6 | 597.8 | 664.4 | 783.0 |
| Current Account Surplus/(Deficit) | -43.0 | -118.4 | -24.8 | -102.8 | -54.0 | 29.7 |
| Capital Revenue and Grants | 27.8 | 25.8 | 2.2 | 1.3 | 15.2 | 87.0 |
| Capital Expenditure and Net Lending | 53.6 | 67.5 | 20.9 | 43.1 | 55.1 | 51.4 |
| Overall Surplus/(Deficit) | -36.9 | -160.1 | -43.5 | -144.6 | -93.9 | 65.3 |
| **BALANCE OF PAYMENTS (USD mn)** | | | | | | |
| Merchandise Exports (f.o.b) | 123.4 | 151.6 | 169.9 | 182.9 | 149.0 | 147.58 |
| Merchandise Imports (c.i.f) | 1,225.5 | 1,162.2 | 1,329.3 | 1,358.3 | 1,349.7 | 1,350.86 |
| Trade balance | (1,102.05) | (1,010.59) | (1,159.35) | (1,175.37) | (1,200.68) | (1,203.28) |
| Net Balance on service account | 683.3 | 730.8 | 741.4 | 713.8 | 736.1 | 729.90 |
| Income (net) | (85.0) | (106.6) | (137.9) | (83.5) | (100.4) | (114.71) |
| Transfers (net) | 52.6 | 69.3 | 81.9 | 70.7 | 77.1 | 77.45 |
| Current Account Balance | (451.2) | (317.0) | (473.9) | (474.4) | (487.9) | (510.64) |
| **TOTAL PUBLIC DEBT ($mn)** | | | | | | |
| Total Public Debt | 2,709.4 | 2,842.1 | 2,840.6 | 3,223.9 | 3,380.2 | 3,071.8 |
| Domestic debt outstanding | 1,544.4 | 1,582.5 | 1,639.0 | 1,666.9 | 1,869.1 | 1,519.6 |
| Long term | … | … | … | … | … | |
| Short term | … | … | … | … | … | |
| External debt outstanding | 1,165.0 | 1,259.6 | 1,201.6 | 1,557.0 | 1,511.1 | 1,552.2 |
| Debt service | 228.9 | 176.6 | 226.0 | 232.2 | 228.8 | 415.9 |
| Amortisation | … | … | … | … | … | |
| Interest Payments | … | … | … | … | … | |
| External debt service as % exports of goods and services | 6.8 | 4.5 | 4.2 | 5.0 | 8.6 | 8.0 |
| Total debt service as % of current revenue | 35.0 | 29.5 | 34.8 | 38.8 | 34.4 | 49.0 |
| AVERAGE EXCHANGE RATE | | | | | | |
| Dollar(s) per US dollar | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |

Sources: ECCB and Ministry of Finance.
Notes:

# COUNTRY DATA: ANTIGUA AND BARBUDA

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| **POPULATION** | | | | | | |
| Mid-year Population (000's)[1] | 84.35 | 85.57 | 86.79 | 88.07 | 89.39 | 90.44 |
| Population Growth Rate (%) | … | 1.40 | 1.44 | 1.48 | 1.50 | 1.20 |
| Crude Birth Rate | … | 14.78 | 14.67 | 14.57 | 14.48 | … |
| Crude Death Rate | … | 5.63 | 5.61 | 5.63 | 5.72 | … |
| Infant Mortality Rate | … | 20.72 | 17.15 | 14.28 | 11.98 | … |
| **INDICATORS OF HUMAN DEVELOPMENT** | | | | | | |
| Life Expectancy at Birth (years) | | | | | | |
| Male | | 73.49 | 73.98 | 74.30 | 74.47 | … |
| Female | | 80.24 | 80.92 | 81.30 | 81.43 | … |
| Dependency Ratio | | | | | | |
| Male | | 47.94 | 47.19 | 46.46 | 45.78 | … |
| Female | | 44.52 | 44.01 | 43.52 | 43.07 | … |
| Human Development Index (value) | 0.778 | 0.772 | 0.773 | 0.774 | 0.783 | … |
| **Tourism** | | | | | | |
| Total Stay-Over Visitors ('000) | 229.94 | 241.33 | 246.93 | 243.23 | 249.32 | 250.45 |
| Cruise Ship Visitors | 557.64 | 606.50 | 572.15 | 533.99 | 522.34 | 644.31 |

Source: Statistics Division, Government of Antigua and Barbuda.
1. Census data indicates the population stood at 88,411 in 2011.

## GRANT AND PROJECT SUMMARY

| Financial Terms and Conditions | | | |
|---|---|---|---|
| **Beneficiary:** | Government of Antigua and Barbuda (GOAB) | **Amortisation Period:** | N/A |
| **Executing Agency:** | Ministry of Works and Housing (MWH) | **Grace Period:** | N/A |
| | | **Disbursement Period:** | December 31, 2016 – December 31, 2018 |
| **Source** | **Amount (£ mn)** | | |
| **Grant** | 13.9 | | |
| **Counterpart** (XCD30.125 mn) | 9.071 | **Commitment Fee:** | N/A |
| **Total** | 22.971 | | |

**Project Summary**

**Project Objective/Description:**

The expected objective of the Project is to contribute to increased resilience in the road sector and the socio-economic development of Antigua and Barbuda. The two corridors to be rehabilitated serve as primary arteries linking the capital of St. John's, the airport and the majority of the island's core residential settlements, tourism sites and attractions.

In order to accomplish the stated objective, the Project consists of the following:

(a) Preparation of final designs, rehabilitation and upgrade of 3.9 kilometres (km) of the Sir George Walter Highway (GWH) and 4.8 km of Friars Hill Road (FHR) and associated drainage infrastructure.

(b) Land: Acquisition of privately owned lands adjacent to GWH and FHR, to facilitate the widening of the corridors to improve capacity and enhance road safety. No resettlement or relocation is anticipated.

(c) Project Management: Project Coordinator (PC), Community Liaison Officer (CLO), Public Relations Officer (PRO) and Administrative Support.

(d) Engineering Services: Consultancy services for supervision, certification of the road rehabilitation works and enhancement of staff of the MWH Materials Laboratory and the Antigua and Barbuda Bureau of Standards (ABBS) in pavement design, construction and maintenance through the conduct of training.

(e) Materials Laboratory Upgrade: Construction of a new Materials Laboratory facility, procurement of Materials Laboratory equipment and associated training.

(f) Capacity Building: Consultancy services for gender capacity building and training for MWH, contractors, and construction workers.

**CDB Contributions to Country Outcomes – Key Outcomes**

| No. | | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| 1. | Transport: Primary, secondary and other roads built or upgraded (km) | - | 5.0 | 3.7 |
| 2. | Transport: Beneficiaries of road projects (number) | - | - | 65,180 |
| | - of whom female | | - | 32,629 |

**Item 2: Capacity Building:**

(a) MWH – Road Division, Materials Laboratory equipped to international accredited standards by May 2017 - personnel trained 6.

(b) Gender Sensitisation Training: MWH, Ministries and Contractors – 150 personnel.

| **Sector Code:** | 21020 | **Sector:** | Road Transport |
|---|---|---|---|

**Exceptions to CDB Policies:**

N/A.

| **Gender Marker** | | | | | | |
|---|---|---|---|---|---|---|
| **Gender Marker** | **Analysis** | **Design** | **Implementation** | **Monitoring and Evaluation** | **Score** | **Code** |
| | 0.75 | 0.5 | 1.0 | 1.0 | 3.25 | **GM**[1] |

[1] Gender mainstreamed (GM)**:** the project has the potential to contribute significantly to gender equality.

# 1. STRATEGIC CONTEXT AND RATIONALE

## GRANT REQUEST

1.1 By letter dated March 7, 2016, GOAB applied to the Caribbean Development Bank (CDB) for a grant to assist in financing a project for the rehabilitation and upgrade of two road corridors under the United Kingdom Caribbean Infrastructure Partnership Fund (UKCIF) (see Figure 1.1). The capital project proposed was initiated by the recommendations of a Technical Assistance (TA) feasibility study, "Road Infrastructure Rehabilitation – Antigua and Barbuda" funded by CDB in July 2016.

## THE ROAD SECTOR

### The Road Network

1.2 The road network in Antigua and Barbuda is well established and consists of approximately 1,253 km of road, of which 436 km are unpaved and 817 km are paved. MWH is responsible for the planning, construction and maintenance of public roads. The current vehicle fleet numbers 30,213. The standard of construction and serviceability of the road network varies widely across Antigua, with serviceability being largely a function of weather conditions and frequency of maintenance. Of the 817 km of paved road approximately 60 km make up the core sections of the network. Within the past 10 to 20 years no substantial road rehabilitation has been undertaken by MWH. Given the limited road upgrades and rehabilitation works there is an infrastructure deficit, whereby the road sector cannot meet the demands of national development nor the potential impacts of climate variability.

1.3 The road fatality rate in Antigua and Barbuda averages approximately 6.7 fatalities per 100,000 population[2]. These incidents translate into lost productivity, medical expenses, grief, and a considerable drain on the economy. The World Health Organisation (WHO) reports that road traffic injuries are estimated to cost countries between 1–2% of their gross national product[3]. In the Antigua and Barbuda context, this translates to an economic impact of approximately USD0.07 mn per year in direct and indirect costs. The financial impact on individual families has been shown to result in increased financial borrowing and debt, and increased vulnerability to poverty.

### Organisation and Structure

1.4 All major road, drainage and infrastructure construction works are the responsibility of the Road Department (RD) and the Design and Control Department (DCD) of MWH. RD is subdivided into five divisions, with core responsibilities for Special Development Projects, Materials Testing, Maintenance, the Quarry Site and Administration. DCD has responsibility for the design of roads. These two departments have responsibility for the entire road project life cycle, inclusive of project designs, estimates and construction supervision of the road sector. An Organisational Chart of MWH is provided in Appendix 1.1.

### Road Maintenance

1.5 As a result of *ad hoc* development in the capital of St. John's and its environs over the past two decades, there is an urgent need to upgrade and rationalise the existing drainage systems of the road corridors. The deplorable state of drainage infrastructure contributes to the present poor road conditions and frequent flooding events. There is evidence of surface cracking, multiple potholes, partial erosion of

[2] WHO's Global Status Report on Road Safety 2015

[3] Global Status Report on Road Safety 2013.

the surface dressing and intermittent patching. Shoulder and road edge failure and ponding due to inadequate maintenance and drainage infrastructure are also prevalent. The adjacent poorly defined earthen drains, outlets and culverts are filled with dirt, heavy silt and vegetation. Many of the major road corridors have been classified as having a pavement roughness as high as 6 mm/m which is synonymous with frequent moderate and uneven depressions or patches that adversely affect the ride quality of a vehicle. Appendix 1.2 summarises the various levels of road roughness values.

1.6 Over the period 2011 to 2015 the annual maintenance budget increased from $1.8 mn to $4 mn. However, this still represents an average annual shortfall in actual expenditure by $6 mn. Despite high annual expenditure associated with road maintenance within Antigua and Barbuda, there is currently no structured maintenance programme or methodology being implemented by MWH. Notwithstanding, MWH through its Strategic Plan 2015 - 2017 has placed a priority on addressing these issues. As it relates to road maintenance, this project supports the realignment of the planning and implementation objectives of Goals 2.1 to 2.4[4] of the primary strategic goals as set out in MWH Strategic Plan.

1.7 GOAB has identified road infrastructure rehabilitation as a high priority. This level of commitment to the sustainability of road infrastructure has been demonstrated through their efforts to strengthen the road maintenance capacity of MWH, with the procurement of critical equipment such as an asphalt plant, crusher and concrete plant between 2009 and present. Further, an assessment of the Materials Laboratory and its personnel was undertaken with the assistance of CDB in February 2016 with recommendations for the procurement of equipment to upgrade the Laboratory in line with internationally accepted standards. The key findings and issues of the Material Laboratory assessment are as follows: the absence of a Quality Management System; inadequate facility and safety standards; no guiding principles of capabilities and mix design standards; uncertified personnel; and inadequate, uncalibrated and outdated laboratory equipment. Appendix 1.3 summaries these findings.

**Issues and Constraints**

1.8 There are several key issues and constraints affecting the road sector in Antigua and Barbuda, many of which are prevalent within the core corridors. These include:

(a) Institutional capacity constraints relating to the management and maintenance of the road network: There are inadequate supporting standards, guidelines and systems to manage and implement road maintenance, rehabilitation and construction activities effectively.

(b) Inadequate Drainage: Visual inspections of the road network reveal varying levels of road failure, which can primarily be attributed to inadequate drainage. There is also the prevalence of blocked drains either as a result of the lack of maintenance or due to residential and commercial development activities.

(c) Increasing Maintenance burden on MWH: Due to the aging road and inadequate drainage infrastructure MWH's maintenance budget has increased.

4 Goal 2.1 'To achieve and maintain the highest possible standard of construction and maintenance of public infrastructure consistent with available resources', Goal 2.2 'To work with relevant agencies to improve the planning coordination and implementation of multi-agencies infrastructural development', Goal 2.3 'To work with appropriate agencies to minimise negative environmental impacts of infrastructure projects' and Goal 2.4 'To develop a comprehensive plan for the road infrastructure.

(d) Inadequate Mobility and Accessibility: As a result of increased development and vehicular traffic there has been a reduction in the Level of Service (LOS) being delivered by the road network[5].

(e) Negative Impacts of Climate Change on the Road Network: Antigua and Barbuda is already experiencing some of the effects of climate variability and change as demonstrated through infrastructure damage from severe weather systems, as well as more gradual changes in temperature and rainfall patterns.

(f) Mainstreaming Gender Equality and Persons with Disabilities (PWDs): The limited participation of women, and PWDs bolsters poverty by undermining human capital development and income-generation. The availability of technical capacity for socially inclusive planning, gender-responsive design and universal design standards to meet the needs of PWDs, are crucial to ensure successful implementation of public infrastructure projects.

## COUNTRY SECTOR STRATEGY

1.9 One of the Government's main infrastructural developmental objectives over the medium term, is to improve access to services through the expansion of road infrastructure which will complement developments in air and sea ports and utilities. Improving connectivity is key to enhancing competitiveness in Antigua and Barbuda. Priority areas identified in the Medium Term Strategy and the Country Strategy[6] are all geared towards improving the road infrastructure and logistics, particularly around the capital St. John's. The Strategy also identified the importance of road infrastructure to inclusive growth, a cohesive society which fosters national and civilian security, as well as improving the health and natural environment of the people as key cross-cutting issues to sustainable development for Antigua and Barbuda. Other priority areas identified by GOAB are centred on improving road safety and building resilience to natural disasters and the impacts of climate change. Other issues are centred on youth, gender and human resource capacity development to maintain a high level of human development; and reduce poverty and vulnerability. While Antigua and Barbuda does not have a National Gender Policy, GOAB recognises the significance of investments in infrastructure with a view to reducing poverty and promoting gender equality and justice through the findings and recommendations of the Country Gender Assessment in 2014 and the National Youth Policy. A summary of the Social Context of the Project is presented at Appendix 1.4 and the detailed macroeconomic context is presented at Appendix 1.5.

## CDB'S STRATEGIC OBJECTIVES AND POVERTY GOALS

1.10 UKCIF will be managed using standard CDB systems, procedures and guidelines[7]. The proposed Project is consistent with:

(a) The purpose and objectives of UKCIF.

(b) CDB's Strategic Objective of promoting inclusive social development and broad-based economic growth within its Borrowing Member Countries (BMCs);

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5 LOS is a quality measure describing conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience

6 Preparation and implementation of a National Transport Plan; conduct of a road rationalisation study; strengthen the quality of road maintenance activity; improve the aesthetics along road ways; undertake an urban renewal study; reduce traffic congestion in St. John's; reduce spatial pressures on road corridors leading to St. John's.

7 Memorandum of Understanding (MOU) between the Department of International Development (DFID) and CDB. Annex 1 - Governance Arrangements and How Funds will be disbursed. Governance Arrangements - Clause 2.

(c) CDB's Corporate Priority to strengthen and modernise public infrastructure;

(d) CDB's Gender Equality Policy and Operational Strategy; and

(e) Country Strategy Paper for Antigua and Barbuda (2015 – 2018) outcome of Improved Physical Infrastructure.

**PROJECT RATIONALE**

1.11 GWH and FHR currently service 75% of the population of Antigua on a daily basis, and serve as critical connecting corridors between the capital of St. John's, the prime tourism areas, heavily populated areas and the newly reconstructed V.C. Bird International Airport. Both corridors are currently functioning at low LOS (Appendix 1.6). Projected levels of failure to the mobility of GWH are expected within the next ten years, thus necessitating increased capacity. Both corridors also exhibit drainage deficiencies which are reflected in marked levels of flooding during high levels of precipitation. It is for these reasons, following the recommendations of the Technical Assistance (TA) feasibility study, "Road Infrastructure Rehabilitation – Antigua and Barbuda" (RIR) that GOAB requested, that UKCIF be allocated to the rehabilitation of these two critical corridors.

1.12 The road project and the benefits which are expected to accrue to overall economic activity and sustainable development, including building resilience, forms part of the overall strategy of CDB for GOAB. GOAB's road maintenance and capital works expenditure has increased over the past decade. However, limited fiscal space and rising debt have impacted the level of maintenance and expansion of road networks that GOAB can undertake. To this end, the rehabilitation of two road corridors under UKCIF is an initiative which can potentially have a positive effect on the most disadvantaged in society, through improved mobility and accessibility.

1.13 The overall condition and serviceability of GWH and FHR, if not addressed, will worsen and impede residential, tourism, commercial and industrial development and other economic activity in Antigua and Barbuda. Project investment in rehabilitating and upgrading these two corridors is an essential component of the overall infrastructural requirements needed for the economic and social development of the road network of Antigua and Barbuda.

1.14 The Materials Laboratory plays a pivotal role in the pavement life cycle. An assessment of the existing facility by independent consultants concluded that in its present condition it cannot fulfil its required mandate. The assessment recommended that a new facility be constructed, equipment be replaced/upgraded, staff skills be enhanced and new operational standards and guidelines in keeping with international best practices be introduced. GOAB has further demonstrated their commitment to the implementation of the project with the construction of a new Materials Laboratory, which is scheduled to be completed in the first quarter of 2017. Early commencement of this component will permit the new facility to play a key role in the upgrade of the road network project.

1.15 Although investment in road maintenance has been steadily rising, a notable deficit remains. Planning and prioritisation of investments also remains a constraint. MWH is currently implementing the Strategic Plan of MWH 2015 - 2017 which has recommended some temporary and interim measures to address improvements to road infrastructure. However, to more adequately address the challenge of sustainable maintenance practices, it will be necessary for MWH to incorporate complementary institutional strengthening within future road rehabilitation interventions.

1.16 Presently there are limited opportunities for women within the construction industry in Antigua and Barbuda. The Project can contribute significantly to the achievement of outcomes envisaged in CDB's Gender Equality and Operational Policy Action Plan[8]. MWH has indicated that it wishes to encourage contractors to diversify their labour force, and to increase focus on social inclusion, where possible. The participation of a considerable number of young, unemployed women and men in the construction activities, represents an opportunity to support them in obtaining adaptive life skills and directing them towards more sustainable livelihood opportunities.

## 2. PROJECT DESCRIPTION

### PROJECT OBJECTIVES

2.1 The Project outcomes expected are:

(a) increased efficiency, resilience and improved road safety of road transportation along GWH and FHR;

(b) enhanced institutional capacity of MWH in pavement design, construction and maintenance; and

(c) enhanced MWH and Antigua and Barbuda road contractors' capacity to address gender equality and social inclusion of PWDs in current and future construction projects.

2.2 A Design and Monitoring Framework summarising the characteristics of the Project is presented in Table 2.1.

### PROJECT DESCRIPTION

2.3 The proposed project comprises the following components (further details of which are presented in Appendix 2.1):

(a) Preparation of final designs, road rehabilitation and upgrade of 3.9 km of GWH and 4.8 km of FHR and associated drainage infrastructure.

(b) Land: Acquisition of 5 acres of privately owned lands adjacent to GWH and FHR, to facilitate widening of the corridors to improve capacity and enhance road safety. No resettlement or relocation is anticipated.

(c) Project Management: a PC, a CLO, a PRO, and Administrative Support.

(d) Engineering Services: Consultancy services for supervision and certification of the road rehabilitation works and training of staff of MWH Materials Laboratory and the Antigua and Barbuda Bureau of Standards (ABBS) in pavement design, construction and maintenance.

(e) Materials Laboratory Upgrade: Construction of a new materials laboratory facility, procurement of materials laboratory equipment and associated training.

(f) Capacity Building: Consultancy services for gender capacity building and training for MWH, contractors, and construction workers.

[8] Outcome 3.1 "BMC capacity to institutionalise gender equality enhanced".

## TABLE 2.1: DESIGN AND MONITORING FRAMEWORK

| Narrative Summary | Performance Indicators | Means of Verification | Assumptions |
|---|---|---|---|
| **IMPACT**<br><br>Contribute to increased resilience in the road sector and the socio-economic development of Antigua. | (a) Reported economic losses resulting from natural disasters and climate variability (% of GDP): **Baseline**: $85 mn (2011-2015). **Source**: International Disaster Database.<br><br>(b) Annual GDP per capita growth rate (constant USD prices): **Baseline**: 4% (2014). **Source**: World Bank Database. Target 5% (2020) | 1. The International Disaster Database.<br><br>2. Annual Economic and Sector Reviews. | **Assumptions for achievement of Impacts:**<br><br>1. GOAB pursues sound social and economic policies and maintains macro-economic stability.<br><br>2. Natural hazards and external shocks do not reverse development gains.<br><br>3. No weather events occur that exceed the design threshold for project drainage structures. |
| **OUTCOME**<br><br>1. Increased efficiency and resilience to natural hazards of road transportation along GWH and FHR. | 1a Savings in annual average vehicle operating costs (VOC): **Baseline**: $0.0 mn (2016). **Target**: 8.5 mn (2019).<br><br>1b. Road scour and flooding eliminated (for a 1:20-year event): **Baseline:** No (December 2016). **Target:** Yes (December 31, 2018). | 1. Re-runs of Highway Design Management 4 (HDM-4).<br><br>2. MWH traffic surveys.<br><br>3. MWH road maintenance reports.<br><br>4. Annual MWH traffic counts.<br><br>5. MWH Condition Assessment Surveys | **Assumptions for achievement of Outcomes:**<br><br>1. Project infrastructure adequately maintained and efficiently operated.<br><br>2. Traffic surveys are carried out at periodic intervals and systematic records of survey results are maintained. |
| 2. Enhanced institutional capacity of MWH for pavement design, construction and maintenance. | 2a. MWH has implemented the Material Laboratory institutional Strengthening Plan: **Baseline**: n/a, no plan exists (December 2016). **Target**: Yes. (December 31, 2018). | 2a. Operational guidelines and design standards submitted by MWH for the Project Completion Report (PCR). | 3. GOAB/MWH implements agreed recommendations of operational guidelines for the Materials Laboratory.<br><br>4. GOAB/MWH implements the recommended Gender Equality Guidelines for Implementing Infrastructure Projects |
| 3. Enhanced capacity of MWH to address gender equality and universal design standards of persons with disabilities in future construction projects. | 3a. Development of Gender Equality Guidelines for Implementing Infrastructure Projects: **Baseline**: 0 (October 2016). **Target**: 1 (December 31, 2018).<br><br>3b. Percentage of MWH's projects that incorporate gender equality and universal design standards for persons with disabilities components. **Baseline**: 0 (October 2016) **Target**: 20% (December 31, 2019) | 3a. Gender Equality Guidelines for Implementing Infrastructure Projects.<br><br>3b. Annual Reports and Strategic Plans for MWH. | |

## TABLE 2.1: DESIGN AND MONITORING FRAMEWORK (Cont'd)

| Narrative Summary | Performance Indicators | Means of Verification | Assumptions |
|---|---|---|---|
| **OUTPUTS:** | | | **Assumptions for achievement of outputs:** |
| 1. Road infrastructure of GWH and FHW rehabilitated and upgraded consistent with universal design standards for persons with disabilities | 1a. Kilometres of road rehabilitated/upgraded along GWH: **Baseline:** n/a. **Target**: 3.9 km (December 2018)<br>1b. Kilometres of road rehabilitated/upgraded along FHR: **Baseline:** n/a. **Target**: 4.9 km (December 2018) | 1. Engineering Consultant's Supervision Reports.<br>2. Engineering Consultant's PCR. | 1. No major adverse weather conditions.<br>2. GOAB counterpart contribution available. |
| 2. MWH/ABBS has enhanced facilities, equipment, and staff skills to effectively implement road projects | 2a. Materials laboratory equipment commissioned: **Baseline**: No (October 2016). **Target**: Yes (May 2017<br>2b. Number of MWH and two ABBS staff trained to international accredited standards for use of materials laboratory: **Baseline**: 0 (October 2016). **Target**: 6 (4MWH staff;2 ABBS staff) (December 2017) | 3. Engineering Consultant's Training completion Report. | |
| 3. Gender capacity-building training delivered to MWH, contractors and construction workers. | 3a. Number of Gender Sensitisation Training Participants: **Baseline:** No (October 2016). **Target**: MWH - 30 males, 15 females; contractors - 44 males10 females; and construction workers - 75 males 25 females (December 31, 2017 | 4. Final Report from Gender Sensitisation Training. | |

| **ACTIVITIES/INPUTS** | **CDB (£'000)** | | |
|---|---|---|---|
| | **GRANT/ UKCIF** | **GOAB** | **Total** |
| 1. Project Preparation<br>2. Land Acquisition<br>3. Road Rehabilitation and Upgrade Works<br>4. Upgrade of Material Laboratory<br>5. Capacity Building – Gender Sensitisation Workshop | 10,935 | 7,114 | 18,049 |
| 6. Engineering Services<br>7. Project Management | 2,965 | 1,957 | 4,922 |
| 8. Contingencies | | | |
| **Total Project Cost** | **13,900** | **9,071** | **22,971** |

## TABLE 2.2: RESULTS MONITORING FRAMEWORK

| Project Outcome Indicators | Baseline 2016 | Year 1 | Year 2 | Year 3 | Report and Frequency | Responsibility for Data Collection |
|---|---|---|---|---|---|---|
| 1. VOC (£ mm/km) | - | - | £4.12 mn | £8.5 mn | Annually from 2019 | MWH |
| 2. Pavement roughness (IRI) | 6 | - | 2 | | | |
| 3. Reduction of flooding (%) | - | 0 | - | 80 | | |
| **Project Output Indicators:** | | | | | | |
| **Component 1: Infrastructure Works:** | | | | | | |
| 1. Final designs, road rehabilitation and upgrade of 3.9 km of GWH (%) | 0 | - | 100 | | Progress Reports | PC |
| 2. Final designs, road rehabilitation and upgrade of 4.9 km of FHR (%) | 0 | - | 100 | | Progress Reports | PC |
| **Component 2: Materials Laboratory Upgrade:** | | | | | | |
| 1. Procurement of Materials Laboratory Equipment (%) | 0 | 100 | | | Progress Reports | PC |
| **Project Intermediate Outcomes:** | | | | | | |
| **Targets achieved for:** | | | | | | |
| 1. Development of *Gender Equality Guidelines for Implementing Infrastructure Projects* | 0 | 1 | | | Final Report | MWH |
| 2. 25 MWH and other government partners complete gender sensitisation training by December 31, 2017 | 0 | 25 | | | Final Report | MWH |
| 3. 10 contractors complete gender sensitisation training by December 31, 2017 | 0 | 10 | | | Final Report | MWH |
| 4. 40 construction workers (at least 10% women) complete gender sensitisation training by December 31, 2017 | 0 | 20 (minimum 10% women) | 20 (minimum 10% women) | | Final Report | MWH |

**LESSONS LEARNED**

2.4 The project design has been informed by lessons drawn from the experience of CDB and other development partners in the implementation of road infrastructure rehabilitation projects. These are summarised in Table 2.3.

**TABLE 2.3: LESSONS INCORPORATED INTO PROJECT DESIGN**

| Lesson No. | Description | Project Response |
|---|---|---|
| 1. | *Form of Contract:* The form of contract engagement can affect the effective delivery of the project, and should be chosen according to the nature of the project and the constraints. | *Design-Build:* The "design-build" approach is useful in reducing engineering supervision costs and contractor claims and would be appropriate for this project. This form of contract should facilitate the effective execution of the project within the restricted time frame. |
| 2. | *Integration of Social Inclusion and Gender Equality:* Approaches that boost the social inclusion and gender equality impact of road infrastructure investments improve effectiveness. | *Mainstreaming Gender Equality and Persons with Disabilities*: Has been integrated into the project design and specifications. |

## 3. FINANCING STRUCTURE AND COSTS

3.1 The project cost is estimated at £22,971,000 which will be financed with resources from CDB and GOAB. The proposed project will be executed under a design/build contract arrangement. Preliminary engineering designs and cost estimates for the road works were prepared by independent consultants. CDB staff are satisfied that adequate contingencies have been provided. A summary of the project cost is presented in Table 3.1. Further details are given in the Project Cost, Phasing and Financing Plan, which is presented at Appendix 3.1.

3.2 CDB signed a 'Memorandum of Understanding' (MOU) with the Government of the United Kingdom, acting through the Department of International Development (DFID) in March 2016, for the purpose of financing the UKCIF Programme (up to £300 mn by way of grant). The Programmes main activity is the establishment of a fund that will provide grants to build economic infrastructure in DFID's focus Overseas Development Administration-eligible countries in the Caribbean, and which Antigua and Barbuda is eligible.

3.3 The proposed Project will be financed by:

(a) a grant to GOAB of an amount not exceeding the equivalent of thirteen million, nine hundred thousand pounds sterling (£13,900,000) representing 61% of project cost; and

(b) counterpart funding of XCD30,125,000, representing 39% of project costs, to finance land acquisition, utility relocation, and to partly finance Engineering services and project management and associated contingencies. GOAB has provided assurances that adequate budgetary allocations has been made for funding of its counterpart contribution.

**TABLE 3.1: SUMMARY OF PROJECT COST AND FINANCING**
**(£ '000)**

| | Item | CDB-SFR UKCIF | GOAB | Total |
|---|---|---|---|---|
| 1 | Project Preparation | | | |
| 2 | Land Acquisition | | | |
| 3 | Road Rehabilitation and Upgrade Works | | | |
| 4 | Materials Lab Upgrade | 11,445 | 7,583 | 19,028 |
| 5 | Capacity Building | | | |
| 6 | Engineering Services | | | |
| 7 | Project Management | | | |
| 8 | Contingencies | 2,454 | 1,488 | 3,943 |
| | **Total Project Cost** | **13,900** | **9,071** | **22,971** |
| | **USD Equivalent** | **17,097** | **11,157** | **28,254** |
| | **XCD Equivalent** | **46,161** | **30,125** | **76,285** |
| | **Percentage Allocation** | **61%** | **39%** | **100%** |

3.4 The cost estimates are based on exchange rates prevailing on October 19, 2016. The price contingencies which are typically based on the projected inflation rate have been augmented to account for potential volatility in the exchange rate. It shall be a condition of the grant that any escalation in cost above the price contingency provision will be for the account of the beneficiary.

## 4. PROJECT VIABILITY

### TECHNICAL ANALYSIS

4.1 The TA feasibility study, "Road Infrastructure Rehabilitation – Antigua and Barbuda" funded by CDB in July 2016 informed the completion of the preliminary engineering designs, cost estimates, specifications and the Design-Build Bid Documents. The preliminary designs and recommended improvements have been based on: present and projected capacity and demand requirements, with a design life of 20 years; utilisation of the existing horizontal and vertical alignment except in special circumstances; keeping, as far as possible, any improvement works within the road right-of-way; minimising land acquisition; improving vehicle and pedestrian safety; and incorporating structurally sound existing drainage elements (that meet design capacity) into new alignment works.

4.2 Capacity analyses were performed for GWH. The results of the analyses indicate that expanding the corridor to four lanes at base year (2017) would yield the most efficient LOS over the life cycle of the corridor. The present LOS of the corridor (E), utilises 86% of its capacity. However, with the recommended upgrade, the average LOS in year 20 should be a C, utilising 50% to 60%of its capacity, which is deemed as an acceptable LOS (see Appendix 4.1).

4.3 The pavement design was informed by Penetration Testing to determine existing layer depths and evaluate the in-situ load bearing capacity of the road structure. Subsoil sampling was carried out using the test-pit methodology to classify the soil samples to predict the performance under loading. Investigation results confirmed that there are significant levels of failure of the asphalt layer. The results of the Traffic Survey and the Roadway Investigations and Testing Programme were utilised to arrive at the required pavement design for the two corridors. The design guidelines adopted by the Engineering Consultant (EC) of the feasibility study for the proposed road upgrade works have been informed by international standards acceptable to CDB.

4.4 An HDM-4 analysis was conducted on two possible upgrade alternatives to determine the Least Cost methodology to achieve a useful design life of 20 years, as compared to a Base Alternative of solely undertaking periodic maintenance over the same period. The Improvement Options comprised: (1) "Do minimum" which assumed that current maintenance practices and expenditure would continue; (2) widening the existing carriageway, overlaying with a layer of asphalt and cleaning of existing drains; and (3) widening the existing carriageway adding an aggregate base-course, then overlaying with asphalt and reconstitution of drainage to take into account a 1-in-20 year return storm. The Least Cost alternative was determined to be Improvement Option 3 for both corridors. The recommended infrastructure works will entail full rehabilitation of the base and sub-base layers with 50 mm asphalt surface layer. Infrastructure works will also entail the incorporation of a water main upgrade programme and adding capacity to the drainage system on each corridor. The EC concluded that the benefits of selecting Option 3 as opposed to Options 1 or 2 include: (a) a significantly slower rate of deterioration; (b) greater pavement serviceability to sustain vehicular loads; (c) fewer maintenance interventions; and (d) significantly lower road user costs over the road's design life.

4.5 Decisions on retaining, rehabilitating, improving or replacing existing drainage elements were made after consideration of both structural adequacy and hydraulic capacity. Structural evaluations were based on a combination of field observations and measurements, construction assumptions, and engineering experience. Technical analysis processes were completed including flood risk assessment and determination of storm flows (for 1-in-10 and 1-in-20 return periods). Proposed drainage improvement works for the corridor consist of roadside drains (rehabilitated and new-build) and culvert crossings of varying sizes, which will improve the climate resilience of the project.

4.6 No road safety audits were completed under the feasibility study. However Stages 1, 2 and 3 - Road Safety Audits will be completed by the Design-Build Contractor. Preliminary designs and specifications have addressed road safety risks to all road users, vehicular as well as pedestrian. There will be: new sidewalks; edge of road drop-off improvements through upstands and guardrails; edge of drain vertical drops demarcated by kerb upstands; wider carriageways; improved horizontal visibility for road users; improved pedestrian crossing markings in all areas, including school zones; road lining and warning signage; implementation of universal design criteria/standards to guarantee access for persons with disabilities; and junction improvements.

4.7 The recommendations from the assessment of the Materials Laboratory propose an approach that incorporates not only the procurement of equipment, but also infrastructural and institutional investments, through the construction of a new facility and the training of the Material Laboratory staff and those of ABBS, who will have responsibility for the calibration of the equipment following the warranty period. GOAB has issued Bid documents for the procurement of the equipment inclusive of training.

## ECONOMIC ANALYSIS

### Economic Impact

4.8 The economic analysis of the Project focuses on the main quantifiable benefits associated with the road improvements, consisting of savings in maintenance and VOC and reduced travel time costs incurred by road users due to the provision of a better road facility. The benefits from improvement in the climate resilience of the project roads have largely been considered as a co-benefit of the design option selected. Potential road safety improvements benefits have been excluded from the analyses due to a paucity of data related to traffic crashes by road type, location and road condition. This omission is unlikely to have a material impact on the findings of the economic analyses given the generally low level of traffic accident fatalities on the island.

4.9 The analysis was carried out using the Highway Development Model 4 (HDM-4). The outputs of the feasibility study provided the required input data, and the road project has been evaluated based on the current traffic and cost assessment. Overall, the project will contribute to improved road transport connectivity in Antigua through reconstructing and rehabilitating approximately 8 km of major urban roads to all weather standards. All-weather roads will provide all-year access to social and commercial services and significantly reduce VOCs. Other benefits will include reduce congestion, better riding quality, and safer roads, improved access for persons with disabilities—resulting in reduced travel time. Without the project, the road capacity will be reached in the next five years and speeds will drastically reduce. Road deterioration will also be faster with higher traffic.

4.10 Both roads are critical to the long-term economic viability of the island. GWH provides the main link between the Capital, St. John's and the VC Bird International Airport, and will be rehabilitated and upgraded to a dual carriage way from the airport to the intersection with Old Parham road. Friars Hill road provides access to the north of the island and much of Antigua's tourism infrastructure as well as two of the island's largest supermarkets chains, several banks, two malls, and several commercial facilities and schools (Appendix 4.2). This road will undergo full rehabilitation including repair of the road sub-base, replacement of pavement with higher quality works and provision of adequate drainage. The resultant capacity augmentation of the selected roads will cater for anticipated increase in traffic volumes for the next 20 years.

4.11 The analysis assumed three broad options for road treatment as discussed at para. 4.04. For both roads in the Project, Option 3 (the full rehabilitation option) yielded superior results even if it entails significantly higher upfront cost.

4.12 The combined cash flow streams for the two project roads are shown in Appendix 4.3 and are based on the assumptions at Appendix 4.4. The results are summarised in Table 4.1 below.

**TABLE 4.1: ECONOMIC ANALYSIS RESULTS**

| Road Name | ERR[9] (%) | NPV[10] ($'millions) |
|---|---|---|
| Sir George Walter Highway | 28.9 | 49.97 |
| Friars Hill Road | 42.6 | 64.2 |
| Combined | 32.0 | 96.143 |

[9] ERR- Economic Rate of Return

[10] NPV – Net Present Value

4.13 The results indicate that the proposed improvements of the selected project roads are all economically viable, yielding an economic rate of return (ERR) of 32%, significantly higher than CDB cut-off rate of 12%. The high ERR is consistent with the volume of traffic projected for the proposed roads. Current traffic volumes of the two roads together account for 46% (47,745) of the Average Annual Daily Traffic (AADT) on the primary road network on the island. Further, GOAB is expected to save between 60% and 70% of its current expenditure on annual road maintenance on the Project roads. Thus, it is reasonable to expect that funds will be available to meet incremental recurrent costs associated with the project, thereby ensuring its long term financial sustainability.

4.14 The results of sensitivity tests, focusing on key variables most likely to impact the achievement of project benefits, are summarised in Table 4.2 below. In all scenarios, ERR is well above the 12% cut-off rate. Even in the scenario where the project benefits are tested against a combination of increased project cost and a reduction in VOC and travel time costs savings, ERR is a robust 25.2%. Further, the switching values suggest that the investment would have to more than double or VOC and time savings decline by at least 70% for the proposed project to become unviable. In the extreme case assuming that no time benefits are realised, the Project yielded an ERR of 22.0%. Given the critical role played by these roads, such a scenario is most unlikely. The results indicate that even in the most conservative scenarios, the Project remains economically viable.

**TABLE 4.2: SENSITIVITY ANALYSIS**

| Sensitivity Variables | NPV ($ mn) | ERR (%) | Switching Value |
|---|---|---|---|
| **Base Case** | **96.143** | **32.0** | **-** |
| 1. Investment Cost increase by 20% | 84.85 | 27.0 | >100% |
| 2. VOC & Travel Time Savings reduced by 20% | 65.37 | 25.2 | 70% |
| 3. A combination of (1) and (2) | 58.0 | 23.0 | - |
| 4. No Time Savings Benefits | 39.6 | 22.0 | - |

## ENVIRONMENTAL AND SOCIAL ANALYSIS

4.15 The Project is classified as a Category 'B' Project based on CDB's Environmental and Social Review Procedures. The environmental impacts are considered small, reversible and temporary in nature.

### Environmental Impacts Assessment

4.16 The main negative impacts identified are expected in the construction phase. These potential impacts have been summarised in Appendix 4.5. Prior to commencement of works, the Contractor will be required to prepare an occupational health and safety plan. A traffic management plan will also be prepared by the Contractor to include proper signage, use of alternative routes, and increased deployment of traffic police. Details of the activities, probable impacts and mitigation measures are highlighted in Appendix 4.5.

4.17 Positive environmental impacts of the project include: reduced flooding of roads through proper drainage and increased capacity of culverts thus reducing negative impact on lives, property and livelihood; improved visual quality through landscaping; and reduced impact on surface water as a result of reduced flooding.

**Potential Natural Hazard and Climate Risks**

4.18 Project sites are located in areas vulnerable to the impact of intense precipitation, high temperatures, floods, and sea-level rise. There is also the potential for land slippage and soil erosion in some areas during construction.

4.19 A Climate Vulnerability Assessment (CVA) was undertaken to determine the likely effects of prevailing natural hazards and projected climate change impacts on the Project. The findings of the CVA informed the preliminary designs and specifications (utilising a 1 in 20 year return storm) the bid documents. Adaptation features will likely include slope stabilisation; and flood reduction such as: increasing drainage capacity and elevating sections of the roads; increasing the clearance of bridges, and adequate base height.

**Environmental Monitoring**

4.20 A draft Environmental and Social Management Plan (ESMP) has been prepared by the EC for inclusion by the Contractor in the bid documents. The draft ESMP summarised at Appendix 4.5 identifies potential impacts and risks, proposed mitigation measures, a complaints mechanism, environmental monitoring and reporting requirements, and cost estimates. The Contractor will be required to refine and price the draft ESMP. This will included specifications for implementation of the mitigation measures, including routine monitoring and reporting to the PC. Monitoring of the Contractor's operations to ensure conformance with mitigation measures will be undertaken jointly by the EC, PC, MWH and CDB.

## SOCIAL AND GENDER IMPACTS

4.21 The residents of project areas, business community (traders and service providers)[11] and road users are among the direct beneficiaries. The Project will have positive social and gender impacts. The infrastructural enhancements will reduce the negative impacts on lives, property, livelihoods, and other losses attributed to poor road conditions. It will also improve access to social services as well as facilitate economic activities including short-term employment opportunities. Possible reduction in travel time and related time use, especially important for women as primary caregivers, are expected.

4.22 The project design will mitigate adverse impacts identified during the participatory Environmental and Social Impact Assessment in the following key areas.

**(a)** **Gender Equality**: An increased number of male workers in small communities may pose challenges associated with transactional sex, alcohol and drug use, sexually transmitted diseases like HIV/AIDS, and managing gender-based conflicts on work sites in a male dominated sector. The Project thus affords an entry point to address gender equality through gender sensitisation training of the MWH and other partner ministry(ies), contractors and construction workers to strengthen social relations among both sexes, and participation of women in key growth sectors of the economy [see Appendix 4.6 for the Terms of Reference (TOR)]. *Gender Equality Guidelines for Implementing Infrastructure Projects* will also be developed for the MWH. The Project is thus gender mainstreamed

11 They include small businesses, private quarry operators, truckers, roadside vendors, small shop operators, supermarkets and the tourism sector (See Appendix 4.2 for the Social Profile of Project Areas – for each road).

with a score of 3.25 on the Bank's Gender Marker, having potential to contribute significantly to gender equality (Appendix 4.7).

**(b)** **Mainstreaming Disability**: Environmental inaccessibility including roads and public transportation limit the participation of PWDs in all aspects of national development. The presence of two schools for students with disabilities on FHR as well as multiple education facilities along GWH underscores the relevance of implementing universal design criteria as part of the project design to accommodate physical access for PWDs.

**(c)** **Gender-responsive Road Safety Awareness:** Improved road surfaces encourage increased road use, and speeding with risks for accidents resulting in death, disability and injury. A Road Safety Awareness Plan will be implemented by GOAB's Community Liaison and Relations Department. The Plan will use community-driven and gender-responsive strategies to target road users and at risk sub-groups, such as young males and females, children and PWDs.

**(d)** **Other Impacts**: The Draft ESMP in Appendix 4.5 also addresses other significant impacts during project implementation such as livelihood displacement of road side vendors, and the acquisition of private lands, although resettlement is not anticipated based on the preliminary designs for rehabilitation works. Stakeholder participation and ownership will be supported through the establishment of community participation groups (CPGs). The CPGs will: (i) keep communities informed on matters related to implementation including unexpected inconveniencies; and (ii) serve as grievance mechanisms by facilitating the reporting of concerns from communities to the MWH. An appointed CLO will coordinate the CPG, as well as develop and monitor a Stakeholder Participation Plan in consultation with MWH (see Appendix 5.4 for TOR). CPGs will consist of representatives of residents and businesses along the rehabilitated roads, as well as MWH representatives.[12]

## 5. IMPLEMENTATION AND PROJECT MANAGEMENT

5.1 The Beneficiary of the Grant is GOAB. GOAB shall implement the Project through the RD of MWH.

**PROJECT MANAGEMENT AND IMPLEMENTATION**

5.2 The administration and management of the Project will be undertaken by RD within MWH. It will be a condition precedent to first disbursement of the Grant that a PC, whose qualifications and experience are acceptable to CDB, is engaged by MWH. CDB is satisfied with the performance of the present PC, who is executing the requisite functions under the TA component of the project for which they were selected under a competitive process. The method of procurement for the Project Coordinator will be Single Source Selection (SSS), as allowed for under CDB procurement guidelines referenced in 5.09 below, which allows for a natural continuation of the previous work carried out under the TA. CDB is satisfied that MWH has the capacity to implement the project successfully. PC shall primarily be responsible for supervising the implementation of the various project components, project reporting and record keeping, in consultation with EC. A description of the duties of PC is set out at Appendix 5.1. The cost of these services will be financed by the Grant. It will also be a condition of the Grant that MWH

12 The Project Management Team will ensure that CPGs are inclusive, adequately representing the various groups of persons residing in project communities reflective of distribution by sex (males/females), youth, and disability PWDs. Prior to commencement of construction, the engineering consultants will brief MWH and CPG on the works to be undertaken.

maintains in its service, in RD, a minimum staff complement of PRO, one civil engineer, one civil engineering technician, one CLO and an administrative assistant. This core staff complement with the PC will constitute the Project Management Team. It will also be a condition of the Grant that MWH maintains in its service, in the Materials Laboratory, a minimum staff complement of two technicians. The proposed management structure is presented in Appendix 5.2.

5.3 It will be a condition precedent to first disbursement with respect to the Road Rehabilitation and Upgrade Works components that GOAB engage engineering consultants, whose qualifications and experience are acceptable to CDB, to provide the engineering services specified in Appendix 5.3. CDB is satisfied with the performance of the existing EC, who will be selected under SSS method to provide the necessary engineering services under the project, as detailed in Appendix 5.3, in accordance with the CDB procurement guidelines referenced in 5.07 below. They were previously selected under a competitive process which specifically detailed the possibility of such downstream work and evaluated consultants' capacity to perform an expanded role. This allows for a natural continuation of the previous work carried out under the TA, particularly in regards to providing the specialised support services MWH requires to complete the on-going procurement and then supervise the contractor on a "design-build" contracting basis, a modality in which MWH has limited experience, within the available project timeframe. The cost of these services will be financed by the Grant. It will also be a condition precedent to first disbursement with respect to the Road Rehabilitation and Upgrade Works component that GOAB select and engage, for the duration of the implementation of the Project, a CLO with qualifications and experience acceptable to CDB, who shall report to PC and shall be responsible for community consultations, including the duties and responsibilities set out in Appendix 5.4. The cost of these services will be financed by the Grant. The Project Implementation Support Plan is set out at Appendix 5.5.

5.4 It will be a condition of the Grant that GOAB collect and store, in an accessible location all existing, maps, reports, drawings, studies and any other relevant documentation required for the consultancies, including data created as a result of the Project.

5.5 As a condition precedent to disbursement of the construction components of the design-build contract, GOAB shall have submitted to CDB evidence, satisfactory to CDB, that the lands required have been vested in GOAB, free of encumbrances, covenants, conditions and stipulations or, alternatively arrangement acceptable to CDB have been made for the entry by GOAB into possession of such lands for the purposes of the Project.

**Implementation Schedule**

5.6 The Project is projected to be implemented over a period of 26 months commencing from CDB approval. Implementation of construction works is estimated to take 24 months, commencing by the first quarter of 2017. The proposed Project Implementation Schedule is presented in Appendix 5.6.

## PARTICIPATION OF STAKEHOLDERS AND BENEFICIARIES

5.7 All of the major stakeholders and beneficiaries were involved during the feasibility study, and the appraisal process that informed the design of the Project. Among the key issues identified during this consultation process, was the importance of effective coordination of the various utilities and timely dissemination of information to impacted community members. Consequently, Utilities Coordination Meetings have commenced prior to the construction phase and will continue during project implementation, separate to regular site meetings, to bring greater focus to utility-related issues under the Project. Land acquisition was another key issue identified and required GOAB commitment to this aspect

prior to completing the Appraisal Report. Also, MWH will conduct several stakeholder meetings with impacted communities, establish formal Community Participation Groups (CPGs)[13] and appoint a CLO as part of the Project Management Team to ensure efficient information transfer and that the communities' project related concerns are addressed. The Environment Division will also be represented at site meetings to ensure that the project implementation process and activities occurs in accordance with national legislation and regulations.

**DISBURSEMENT**

5.8 Disbursement of the CDB Grant will be made in accordance with CDB's Guidelines for the Withdrawal of Grant Proceeds. It is expected that the first disbursement of the Grant will be made by December 31, 2016. The Grant is expected to be fully disbursed by December 31, 2018. An Estimated Quarterly Grant Disbursement Schedule is presented at Appendix 5.7.

**PROCUREMENT**

5.9 Procurement of consultancy services shall be in accordance with CDB's Guidelines for the Selection and Engagement of Consultants by Recipients of CDB Financing (October 2011). Contracts for capital works and equipment to be financed by CDB Grant will be procured in accordance with CDB's Guidelines for Procurement (January 2006 edition). The Procurement Plan is provided at Appendix 5.8.

**MONITORING AND REPORTING**

5.10 It will be a condition of the Grant that GOAB shall furnish, or cause to be furnished to CDB, the reports listed in Appendices 5.9 and 5.10 to this Report, in such form or forms as CDB may require, not later than the times specified therein for so doing.

**PERFORMANCE EVALUATION RATING**

5.11 The composite performance rating based on CDB's Project Performance Evaluation (PPE) has been estimated at 6.75. This is a 'highly satisfactory' rating, which suggests that there is a good probability that the Project will achieve its objectives. The details of PPE are presented in Table 5.1.

**MAINTENANCE**

5.12 It will be a condition of the Grant that GOAB adequately maintain the road, infrastructure and equipment financed under the Project. Commencing in 2019, for a period of seven years, no later than December 31 in each year, GOAB will provide CDB with MWH Road Division's Road Maintenance Programme Condition Assessment Report, setting out the cost of maintenance for the project infrastructure.

**SUSTAINABILITY AND RISKS**

5.13 Sustainability of the Project will depend on the following:

(a) GOAB's provision of adequate resources to undertake planned maintenance of the project infrastructure; and

13 Section 4.18 (Social and Gender Impact) describes the CPGs' functions and the CLO's role (See Appendix 5.4 for the CLO's TOR).

(b) the commitment of GOAB to implement recommended measures of the Materials Laboratory Evaluation Report to ensure sustainability, efficiency and credibility. It will be a condition of the Grant that GOAB implement the recommended measures of the Materials Laboratory Report.

**TABLE 5.1: PROJECT PERFORMANCE EVALUATION**

| **Criteria** | **Score** | **Justification** |
|---|---|---|
| Strategic Relevance | 8.0 | The Project contributes significantly to the achievement of GOAB's development objectives by supporting its high priority policy objectives of improving mobility, accessibility, road safety and building natural hazard resilience in the economy. |
| Poverty Relevance | 5.5 | The Project is expected to make a satisfactory contribution to poverty reduction through improved mobility and accessibility, road safety and CC resilience improvements. The civil works contracts will deliver HIV/AIDS, GBV and adaptive life skills training. |
| Efficacy | 6.5 | The Project is highly likely to achieve its objectives to reduce traffic congestion; maintain evacuation route security; and improve road safety and CC resilience. There is high-level support within MWH to incorporate gender responsiveness into their projects and processes. |
| Cost Efficiency | 9.0 | The estimated NPV for the Project is $96.1 mn and ERR is 32%. Such high returns are associated with the high traffic volumes. |
| Institutional Development Impact | 5.5 | The Project is expected to make a moderate contribution towards improving MWTHs capability to implement gender-responsive projects. |
| Sustainability | 6.0 | The proposed works incorporate CC and gender considerations into their design. There is strong stakeholder support for the Project. The proposed capacity building of the Materials Laboratory of MWH is expected to chart the way forward for more sustainable maintenance management and funding arrangements. |
| Composite Score | 6.75 | Highly Satisfactory |

**Risks**

5.14 The main risks to the Project and proposed mitigation measures are presented in Table 5.2 below.

**TABLE 5.2: RISK AND MITIGATION**

| Risks Type | Description | Mitigation Measure |
|---|---|---|
| **Implementation** | Inadequate Financing Due to Depreciation of Exchange Rate | Sufficient contingency has been added to compensate for foreign exchange risk. |
| | Utility Implementation Delays and Cost Increases | A dedicated and experienced PC, and Engineering Consultants supported by the Utilities Coordination Meetings, will be engaged to oversee this process throughout project implementation. |
| | Management of Traffic Implementation Delays | An efficient traffic management plan to be implemented by the Contractor, supported by an aggressive public relations campaign through the MWH, PRO. |
| | Land Acquisition | No resettlement or relocation is anticipated for the project. Laws of Antigua and Barbuda make provisions for the acquisition of privately owned lands for a public purpose.[14] GOAB has further demonstrated its commitment through a Cabinet decision to proceed with the Land Acquisition process. |
| | Counterpart Funding | GOAB has budgeted the necessary amounts to finance counterpart contributions |
| **Operation** | Maintenance of the Project Infrastructure: | GOAB will be required to provide CDB, on an annual basis, the Road Maintenance Programme Condition Assessment Report, inclusive of the operations and maintenance of the Materials Laboratory. |

[14] Laws of Antigua and Barbuda. Land Acquisition CAP. 233. November 29, 1958

## 6. RECOMMENDATIONS

6.1 It is recommended that the President approve a grant to GOAB of an amount not exceeding thirteen million, nine hundred thousand Pounds Sterling (£13,900,000), allocated from resources provided to CDB by DFID under the UKCIF, to assist GOAB in financing the rehabilitation of 8.7 km of existing road corridors and associated drainage works and structures, and equipment upgrade of the materials laboratory (the Project), on CDB's standard terms and conditions, and on the following terms and conditions:

(1) **Disbursement:**

(a) Except as CDB may otherwise agree:

(i) the Grant shall be used to finance the components of the Project allocated for financing by CDB as shown in the Project Cost, Phasing and Financing Plan for the Project at Appendix 3.1 (the Financing Plan) up to the respective limits specified therein; and

(ii) total disbursements shall not exceed in the aggregate sixty-one per cent (61%) of the cost of the Project.

(b) The first payment of the Grant shall be made by December 31, 2016, and the Grant shall be fully disbursed by December 31, 2018, or such later dates as CDB may specify in writing.

(c) The Grant shall not be used to meet any part of the cost of the Project which consist of identifiable Taxes and Duties.

(2) **Procurement**

(a) Procurement shall be in accordance with the procedures set out and/or referred to in the Grant Agreement, or such other procedures as CDB may from time to time specify in writing.

(b) The Procurement Plan approved by CDB is set out at Appendix 5.8.

(c) Any revisions to the Procurement Plan shall require CDB's prior approval in writing.

(3) **Condition Precedent to First Disbursement of the Grant:**

The PC referred to in sub-paragraph 6(b)(iii)(aa) shall have been engaged.

(4) **Conditions Precedent to Disbursement in respect of the Road Rehabilitation and Upgrade Works:**

CDB shall not be obliged to disburse any amount of the Grant in respect of the road rehabilitation upgrade works until:

(a) the engineering consultants referred to in sub-paragraph 6(b)(iii)(bb) shall have been engaged; and

(b) the CLO referred to in sub-paragraph 6(b)(iii)(cc) shall have been engaged.

(5) **Condition Precedent to Disbursement in respect of the Construction Component of Each Design Build Contract:**

CDB shall not be obliged to disburse any amount of the Grant in respect of the construction component of each design build contract until GOAB shall have submitted to CDB evidence, satisfactory to CDB, that the lands required have been vested in GOAB, free of encumbrances, covenants, conditions and stipulations or, alternatively, arrangements acceptable to CDB have been made for the entry by GOAB into possession of such lands for the purposes of the Project.

(6) **Other Conditions:**

(a) Except as CDB may otherwise agree, GOAB shall implement the Project through the RD of MWH.

(b) GOAB shall:

(i) contribute to the Project an amount of thirty million one hundred and twenty-five thousand Eastern Caribbean dollars (XCD30,125,00), which shall be expended in a timely manner on the components of the Project designated for financing by GOAB as shown in the Financing Plan of the Project, unless CDB shall otherwise specify in writing;

(ii) carry out the Project at all times:

(aa) with due diligence and efficiency, with management personnel whose qualifications and experience are acceptable to CDB, and in accordance with sound technical, environmental, financial and managerial standards and practices; and

(bb) institute and maintain organisational, administrative, accounting and auditing arrangements for the Project acceptable to CDB;

(iii) in accordance with the procurement procedures applicable to the Grant, select and engage:

(aa) a person with qualifications and experience acceptable to CDB as PC, who shall be responsible for coordinating and monitoring all aspects of the Project, with the duties and responsibilities set out in Appendix 5.1. The qualifications and experience of any person subsequently engaged as PC shall be acceptable to CDB;

(bb) competent and experienced engineering consultants to provide the services set out in Appendix 5.3;

(cc) a person with qualifications and experience acceptable to CDB to provide the community liaison services in accordance with the TOR set out in Appendix 5.4. The CLO shall report directly to the PC;

(dd) a person with qualifications and experience acceptable to CDB to provide the gender capacity building training services in accordance with the TOR set out in Appendix 4.6; and

(ee) contractors to carry out the works under the Project.

(c) GOAB shall procure that MWH shall:

(i) for the duration of the Project maintain in the service of MHW, a minimum staff complement of one (1) civil engineer, one (1) civil engineering technician, the public relations officer, one CLO; and an administrative assistant, and for the duration of the Project maintain the Project Management Structure set out in Appendix 5.2.

(ii) for the duration of the Project maintain in the service of the Materials Laboratory, a minimum staff complement of two (2) technical staff; and

(iii) collect and store, in an accessible location all existing, maps, reports, drawings, studies and any other relevant documentation required for the consultancies, including data created as a result of the Project.

(d) GOAB shall:

(i) keep the roads, works and other infrastructure financed under the Project, or cause the same to be kept, in good repair and condition and shall provide the financial and other resources required to adequately maintain the infrastructure financed from the Grant;

(ii) within a timeframe acceptable to CDB, implement the recommended measures of the Materials Laboratory Report;

(iii) commencing in 2019, for a period of seven years, submit to CDB by December 31 of each year the MWH Road Division's Road Maintenance Programme Condition Assessment Report setting out the budgetary allocation for maintenance of the infrastructure financed under the Grant;

(iv) except as CDB may otherwise agree, furnish or cause to be furnished to CDB, the reports listed in Appendices 5.9 and 5.10 in the forms specified or in such form or forms as CDB may require, not later than the times/periods specified therein for so doing;

(v) ensure that the contracts provide for the acknowledgement of, and that each deliverable produced under the Project, contains a visibility

statement acknowledging that the Grant has been provided by UKaid and the UKaid logo must be utilised;

(vi) facilitate and permit, during implementation of the Project, and up to the year 2025, any authorised representative of CDB or DFID to conduct investigations of credible suspicion of or actual fraud, corruption or any other financial irregularity, impropriety or wrong doing;

(vii) permit CDB, or any person appointed thereby, to audit the expenditures financed by the Grant, and to provide CDB, or the appointed person with all reasonably required assistance, documents and information; and

(e) except as CDB may otherwise agree, GOAB shall :

(i) meet or cause to be met:

(aa) any amount by which the cost of the Project exceeds the amount set out in the Financing Plan with respect thereto; and

(bb) the cost of any other items needed for the purpose of, or in connection with, the Project; and

(ii) provide or cause to be provided, all other inputs required for the punctual and efficient carrying out of the Project not being financed by CDB.

(f) CDB shall be entitled to suspend, cancel or require a refund of the Grant, or any part thereof, if the UKCIF resources or any part thereof is suspended, cancelled or required to be refunded, except that GOAB shall not be required to refund any amount of the Grant already expended in connection with the Project and not recoverable by GOAB, unless that amount already expended was misappropriated due to a proven fraudulent, unethical or other activity of wrong doing.

## 7. LOANS COMMITTEE RECOMMENDATION

The Loans Committee considered this proposal on November 4, 2016 and agreed to recommend it for the approval of the President.

## 8. APPROVAL

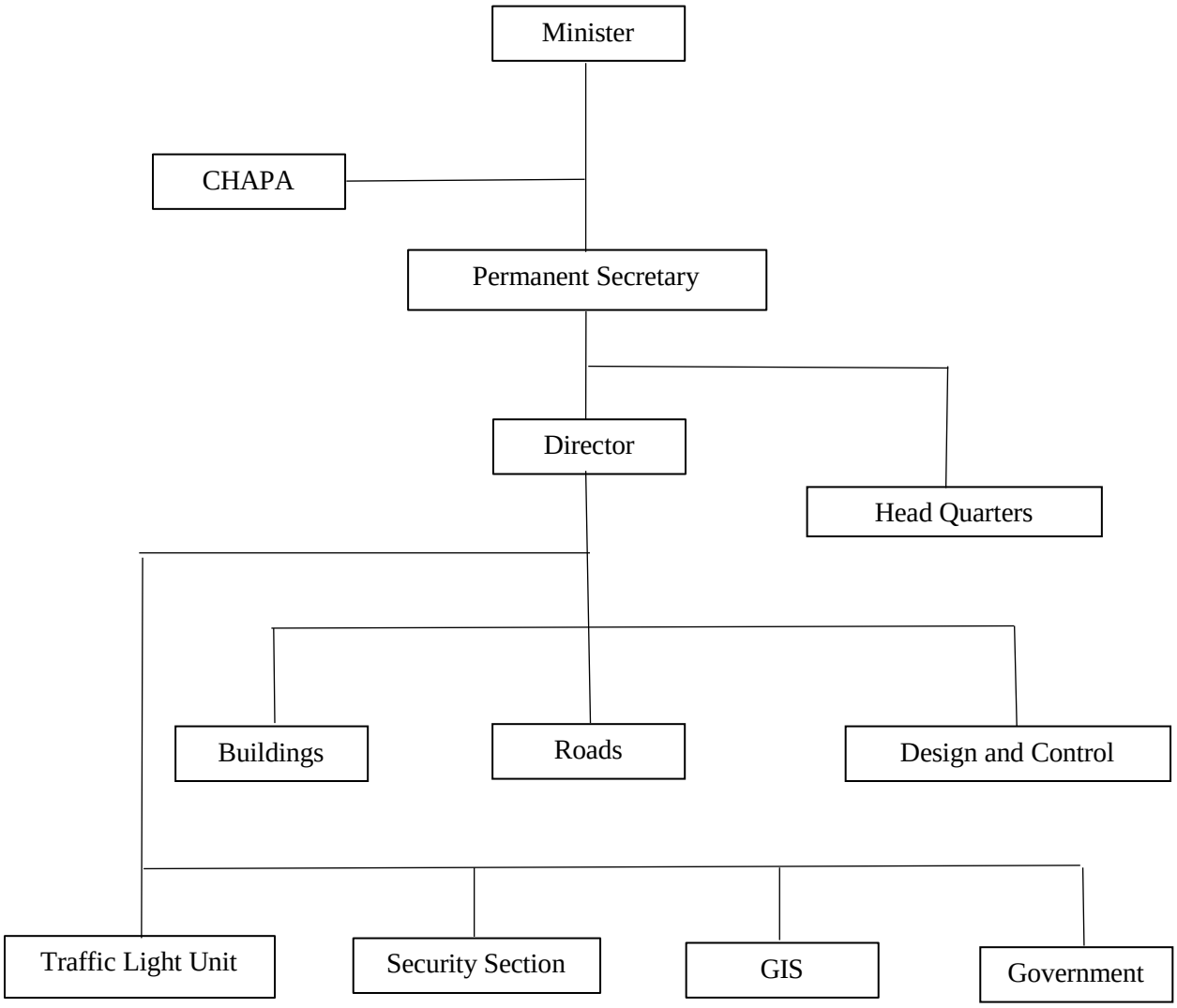
The abovementioned Grant is approved.

Signed: Wm Warren Smith — November 9, 2016

President — Date

**APPENDIX 1.1**

**ORGANISATIONAL CHART**
**MINISTRY OF WORKS**



**APPENDIX 1.2**

## ROAD ROUGHNESS VALUES FOR PAVED ROADS FOR VARIOUS SERVICEABILITY LEVELS

| Description of Serviceability | m/km IRI | mm/km BI[1] |
|---|---|---|
| Ride comfortable over 120 km/h. Undulation barely perceptible at 80 km/h in range 1.3 to 1.8. No depressions, potholes or corrugation are noticeable: depressions less than 2 mm/3 m. Typical high quality asphalt 1.4 to 2.3. High quality surface treatment 2.0 to 3.0. | 1.5-2.5 | 1,000-2,000 |
| Ride comfortable up to 100-200 km/h. At 80 km/h moderately perceptible movements or large undulations may be felt. Defective surface: occasional depressions, patches or potholes (e.g. 5-15 mm/3 m or 10-20 mm/5m with frequency 1-2 per 50 m) or many shallow potholes (e.g. on surface treatment showing extension ravelling). Surface without defects: moderate corrugation or large adulations. | 4.0-5.5 | 3,000-4,000 |
| Ride comfortable up to 79-90 km/h, strongly perceptible movements and swaying. Usually associated with defects: frequent, moderate and uneven depressions or patches (e.g. 15-10 mm/3 m or 20-40 mm/5 mm with frequency 5-3 per 50 m) or occasionally potholes (e.g. 1-3 per 50 m). Surface without defects: strong undulations or corrugations. | 7.0-8.0 | 5,500-6,500 |
| Ride comfortable up to 50-60 km/h, frequent, sharp movements or swaying. Associated with sever defects: frequent, deep and uneven depressions and patches (e.g. 20-40 mm/3 m or 40-80 mm/5 m with frequency 5-3 per 50 m) or frequent potholes (e.g. 4-6 per 50 m). | 9.0-10.0 | 7,000-8,000 |
| Necessary to reduce velocity below 50 km/h. Many deep depressions, potholes and severe disintegration (e.g. 40-80 mm deep with frequency 8-16 per 50 m). | 11.0-12.0 | 9,000-10,000 |

[1] Bump Integrator Index.

**APPENDIX 1.3**

## KEY FINDINGS AND ISSUES OF THE MATERIALS LABORATORY ASSESSMENT

1. **Quality Management System:** A key element for quality is documentation and adherence to formalised and documented quality management system (QMS). There is no evidence that such a documented system exists or is in place and practiced. A documented quality system clearly identifies the organisational approach to quality management, including the management structure (an organisational chart) with clearly identified duties and responsibilities of each member in the structure, from top management all the way down to the person who samples the material from the roadway grade or aggregate stockpile. In addition, the documented QMS should clearly illustrate the capabilities of the Laboratory (that is what tests the lab can perform) along with satisfactory demonstration of equipment condition and calibration, technician qualifications, and proper data forms and reporting software to efficiently and correctly produce reliable and correct testing results.

2. **Facility and Safety Standards:** From international operational and health and safety standards the facility has been assessed as unsafe and inadequate. The present Laboratory is located in the city of St. John's in a fairly old wooden framed two-storey building. Contained in two narrow corridors on the ground floor, there is insufficient room for personnel to manoeuver. The space is partially air-conditioned, with poor ventilation which can have implications particularly when handling chemicals or hydrocarbons as part of a test procedure. GOAB, is committed to constructing a new facility to accommodate the upgrade of the Materials Laboratory on the compound of the Asphalt Plant. These civil works will form part of GOAB's counterpart funding. These civil works have commenced and are expected to be completed during the first quarter of 2017 at an estimated cost of XCD950,000.

3. **Capabilities and Mix Designs:** The Laboratory is presently focused on performing soil and aggregate tests, as well as aggregate composition materials such as asphalt concrete and Portland cement concrete. One of the key requirements of a Materials Laboratory is that of completing mix designs. The Laboratory is not equipped to perform such mix designs. As a Materials Laboratory and with the expectation of carrying out the necessary test to inform the road design process, these limited tests are inadequate and can therefore be considered a contributing factor to the poor quality of roads being constructed by MWH.

4. **Personnel:** The Laboratory is supervised by an individual with 35 years' experience preforming such duties as field and laboratory sampling and testing. The individual is however not certified and has not received any formal training, but has acquired most of his knowledge base from working with past consultants appointed by MWH on various road projects. MWH, acknowledging the need for succession planning, certification and training, has advised of their intentions to engage two additional technicians under the upgrading process.

5. **Equipment and Calibration:** The Laboratory has accumulated an array of testing equipment over its operational life of the lab. Based on the assessment it has been recommended that most of the equipment be replaced, as it is highly unlikely that the equipment can capably achieve acceptable calibrations for standardisation. Calibration will be required for equipment to be retained and a calibration programme be put in place as part of QMS for the sustainability of the Laboratory.

# SOCIAL CONTEXT

## Population and Demography

1. The country of Antigua and Barbuda consists of the islands of Antigua, Barbuda, and the uninhabited Redonda. It has a total area of approximately 440 km² with Antigua measuring 280 km², Barbuda 160 km², and Redonda 1.6 km². The country's population (2011 Census) is 88,411, of which 42,565 are males and 45,846 females[1]. A total of 86,560 reside on Antigua and 1,851 on Barbuda, with population density of about 300 persons per $km^2$ on Antigua and about 12 persons per $km^2$ on Barbuda. The 2011 Population and Housing Census indicated significant population increase in the last 2 intercensal periods. On average, the population grew at about 4% per annum between the 1991 and 2011. The increased population is due to reduced death rates and high immigration. The population, while still relatively young is also aging. Improvements in health and sanitation services and overall quality of life have contributed to increased life expectancy at birth and as a consequence, an increased proportion of older persons in the population.

## Poverty and Human Development

2. Antigua and Barbuda registered a Human Development Index (HDI)[2] value of 0.783 in 2014, and was ranked in the high human development category. This positioned the country at 58 out of 188 countries and is above the HDI average for countries in the high human development group, and countries in Latin America and the Caribbean (0.744 and 0.748 respectively). The HDI for 2014 also indicated a steady increase from 0.774 in 2013, and 0.760 in 2012. Despite improvements in quality of life over the years, issues of poverty, social vulnerability and the ability of the poor to sustainably improve their life chances and wellbeing remain.

3. The latest available data (2006) shows that 18.0% of the population is poor, 3.7% indigent and 10% vulnerable to poverty in the event of a major economic shock or natural hazard[3]. This situation has become more acute since the onset of the global economic recession of 2008. The crisis exacerbated this vulnerability was evidenced by an increase in the number of applications from poor households (predominantly female-headed) for government social assistance, which is a reliable proxy of deprivation. The level of inequality in the country, as measured by the Gini Coefficient[4] of 0.48 is also of concern. Indeed, the richest 20% of the population accounts for 56% of total consumption of goods and services, compared with less than 5% for the poorest 20%. The hardships experienced disproportionately affects vulnerable groups such as women and PWDs.

4. PWDs are estimated to represent 5.1% of the population which is slightly higher among females based on the 2001 Census (4.4% and 5.7% respectively). Several types of disabilities were reported during the Census: Sight, Hearing, Speech, Gripping, Mobility/Moving, Body Movements, Learning, Behavioural and Other. PWDs experience multiple barriers due to inaccessible public infrastructure including roads and public transportation. Lack of accessible roads with ramps and adequate sidewalk width for wheelchair and white cane users for example, limit the participation of PWDs in all aspects of national development. This includes their ability to access schools, places of employment and other essential services. GOAB signaled its commitment to mainstreaming disability through the ratification of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) in 2016. Adopting

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1 The country has a projected growth rate of 115,000 by 2050.

2 The HDI is an average measure of basic human development of a country. It takes into account the indicators of life expectancy at birth; expected years of schooling; mean years of schooling; and Gross National Income per capita.

3 This is based on a consumption level of 25% above the poverty line as calculated in the Country Poverty Assessment.

4 The Gini Coefficient measures income distribution on a scale of 0 to 1, with 1 indicating absolute inequality. Gini coefficients in other BMCs range from 0.23 in The British Virgin Islands to 0.57 in The Bahamas.

universal design of public infrastructure is consistent with the UNCRPD, which will also redound to the benefit of an aging population.

5. The national unemployment rate is 10%, with 11% for males and 9.4% for females based on the 2011 Census. Notwithstanding the slight difference in unemployment, labour market segregation continues to affect women who are more likely to be found in lower paying and/or less secure jobs. The "technical and physical labour intensive jobs" viewed as men's work which facilitates hegemonic traditional gender division of labour in the home (Country Gender Assessment 2014, p.20). Accordingly, higher proportions of men are represented in the sectors that contribute to the highest percentage to GDP (Construction, Transportation and Communication)[5].The GOAB's prioritisation[6] of gender mainstreaming in mainstay economic sectors through the *National Medium-Term Development Strategy 2016 – 2020* (MTDS) provides a critical platform for action[7].

6. The *Country Strategy Paper 2015-2018* (CSP) identified improving physical infrastructure, including roads as 1 of 7 outcomes for the period. The rehabilitation of the Sir George Walter Highway and Friars Hill Road will improve the transportation network, access to social services as well as economic activities including employment spinoffs (see Appendix 4.2 for the Social Profile of Project Areas). The project will incorporate attention to universal design criteria to accommodate PWDs. The project also affords an entry point to address gender equality through gender sensitisation of ministries and contractors to strengthen social relations among both sexes, and contribute to the participation of women and youth in key growth sectors of the economy. Such inclusive approaches will contribute to the MTDS as well as sustainable poverty reduction, and the realisation of the UNCRPD and the Sustainable Development Goals.

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5 The construction sector contributed 21.9% to GDP. However, total employment (000s) was 3.419 for males and 0.138 for females (CGA 2014, p.18).

6 The GOAB does not have a National Gender Policy. The priorities are recorded in the CGA.

7 *MTDS 2016 – 2020* provides strategies and actions to be undertaken to move the country towards its long-term development goals.

**APPENDIX 1.5**

## MACRO-ECONOMIC CONTEXT

1. Growth in Antigua and Barbuda slowed to an estimated 3.8% in 2015 compared to 4.7% growth recorded in 2014. This is due in part to lower levels of activity in the key economic sectors of tourism and construction. Value added in the hotel and restaurant sector grew by 2.6% in 2015, down from 3.0% recorded in 2014 on account of lower arrivals in the first half of the year. Construction led activity grew by 4.0% in 2015 compared to 7.0% in 2014. The slowdown is attributed to the delayed start of a number of tourism development projects. Other major sectors which recorded lower growth levels include public administration and real estate. A primary surplus of 3.0% of GDP was recorded in 2015, compared to a deficit of 0.2% in 2014. This led to an overall surplus of 0.9% of GDP in 2015, compared to an overall deficit of 2.9% in 2014. The improved performance reflected in part, better revenue performance with a 25.0% increase in receipts mainly from the citizen by investment programme. Receipts for most revenue categories also increased.

2. Real output growth is expected to remain flat at 3.7% in 2016. This performance is predicated on continued growth in tourism and notwithstanding a delayed start in some key construction projects. Stayover arrivals grew by 9.0% from January to September while cruise arrivals fell by 5.8% over the same period. Visitor expenditure is estimated to have grown by 7.7 percent for the period January to June of 2016. Inflation is expected to be lower than the levels recorded in 2015. An underlying primary surplus of 2.3% of GDP (less CIP receipts) is projected for the year 2016. This is influenced mainly by an increase in tax and capital revenue as well as an increase in total expenditure.

3. Disbursement of the second tranche of the Antigua and Barbuda Financial and Fiscal Policy Based Loan (PBL) approved by CDB in December 2015, was pre-conditioned on GOAB attaining an underlying fiscal primary surplus (excluding CIP receipts) of 2.65% of GDP in 2016. This outturn was based on a number of accompanying measures which were geared towards achieving fiscal sustainability over the medium term. However, the preliminary outturn for 2016 is expected to be below the primary balance target due to the delayed implementation of a number of measures outlined in the PBL agreement. The projected underlying primary balance for 2016 is 2.3% despite the lack of implementation of the fiscal measures. This is due mainly to a one-off revenue receipt from forfeiture funds in the amount of USD67 m. Therefore, under the assumption that the fiscal adjustment was made and the one-off revenue receipt was realised, the primary balance would have been more favourable.

4. CDB is of the view that it is within the capability of GOAB to make the required fiscal adjustment during the short to medium term which will enable GOAB to obtain additional resources for the implementation of the UKCIF road project. However, it should be noted that in the absence of a fiscal adjustment, and low market access, a large financing gap is envisioned. It is therefore important that GOAB implement a programme of robust fiscal reforms that will bring sustainability to the fiscal accounts and begin to reverse the accumulation of debt towards the desired ECCU target of 60% of GDP by 2030. Furthermore, CDB is of the view that if GOAB implements the necessary fiscal and structural reforms, the signals to the market would be positive and would facilitate fiscal financing from the markets or other sources.

## MACRO-ECONOMIC IMPACT

5. The road rehabilitation project is expected to provide an important boost to economic activity in Antigua and Barbuda that will complement developments on the port and the rehabilitation and construction of new tourism plant. Its timing will serve to accelerate the economic recovery while the country engages in the necessary reforms and activities to boost other sectors and the vital tourism sector. It will is also expected to contribute to an improvement in transportation and logistics within Antigua, specifically adding value to the doing business environment, and the tourism sector, while reducing the probability of flooding and traffic congestion. This will be a key project to enhancing the island's efforts at improving the image of Antigua and Barbuda as a tourism destination and to enhanced productivity and competitiveness by improving the access roads from the airport and into the city of St. John's. The project will also contribute to an increase in employment both directly and indirectly in the short to medium term.

6. The part financing of the project largely through the UKCIF, will allow the government to make much progress earlier than it would have otherwise been able to on its medium term development strategy. However, the counterpart funding from GOAB will depend heavily on the ability of the government to improve the fiscal balances and to access financing on the market. Meeting the conditions set by the authorities under the PBL will greatly enhance the ability of GOAB to meet this objective in financing the road project. In addition, maintenance of the road network must be a priority of GOAB in order to ensure sustainability of the project.

# LEVELS OF SERVICE CRITERIA

## TABLE 1.1: LEVEL OF SERVICE CRITERIA (HCM) TWO LANE HIGHWAYS

## (AUTOMOBILES)[1]

| Level of Service (HCM*) | Class III Highway PFFS[2] (%) |
|---|---|
| A | >91.7 |
| B | >83.3 – 91.7 |
| C | >75.0 – 83.3 |
| D | >66.7 – 75.0 |
| E | ≤66.7 |

*HCM – High Capacity Manual

## TABLE 1.2: LEVEL OF SERVICE CRITERIA (HCM) MULTI-LANE HIGHWAYS

## (AUTOMOBILES)[3]

| Levels of Service (HCM) | FFS(mi/h) | Density (pc/mi/h) |
|---|---|---|
| A | ALL | >0 – 11 |
| B | ALL | >11 – 18 |
| C | ALL | >18 – 26 |
| D | ALL | >26 – 35 |
| E | 60 | >35 – 40 |
| | 55 | >35 – 42 |
| | 50 | >35 – 43 |
| | 45 | >35 - 35 |
| | | Demand Exceeds Capacity |
| F | 60 | >40 |
| | 55 | >41 |
| | 50 | >43 |
| | 45 | >45 |

1 HCM 2010 Exhibit 15-3 Page 15-7
2 Percent of Free Flow Speed (PFFS)
3 HCM 2010 Exhibit 14-4 Page 14-4

**APPENDIX 2.1**

# DETAILS OF THE PROJECT

## INFRASTRUCTURE WORKS

1. This component includes the completion of final designs and the rehabilitation and upgrade of 3.9 km of GWH and 4.8 km of FHR. The description of the proposed works to be funded by CDB are summarised in the Table below.

**TABLE 1: PROPOSED WORKS**
**(£ '000)**

| Location | Description of Proposed Works | Estimated Cost |
|---|---|---|
| Sir George Walter Highway and Friars Hill Road | Preparation of final designs and rehabilitation and upgrade of 8.7 km of road inclusive of associated drainage works. | [redacted] |

## ENGINEERING CONSULTANCY

2. This component consists of three elements: (a) finalising of bid documents; (b) review of design-build contractor final designs; (c) Construction Supervision Services, including the evaluation of tenders and preparation of tender report, contract administration, construction supervision, preparation of progress reports, certification of payments and inspection services during the defects liability period; (d) enhancement of staff of the MWH Materials Laboratory and the ABSS in pavement design, construction and maintenance through the conduct of training; and (e) preparation of a PCR. [redacted]

## PROJECT MANAGEMENT

3. This component encompasses the functions of PC and a technical team including a CLO and a PRO and is included in GOAB's counterpart contribution. [redacted]

## MATERIALS LABORATORY UPGRADE

4. This component consists of: the construction of a new Materials Laboratory facility, and the procurement of equipment for the Materials Laboratory, associated training. [redacted]

## CAPACITY BUILDING

5. This component consists of cconsultancy services for gender capacity building and training for MWH, contractors, and construction workers. [redacted]

## LAND ACQUISITION

6. This component consists of the acquisition of five acres of privately-owned land adjacent to road right-way to facilitate widening of the corridor and improving pedestrian safety with the construction of sidewalks and is included in GOAB's counterpart contribution. [redacted]

**PROJECT COST, PHASING AND FINANCING PLAN**
**(£ '000)**

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.

**APPENDIX 3.1**

**APPENDIX 4.1**

## EXISTING AND PROJECTED LEVELS OF SERVICE FOR SIR GEORGE WALTER HIGHWAY AND FRIARS HILL ROAD

1. Highway Capacity Software (HCS) 2010 was utilised for the analyses with an annual vehicular growth rate of 3% based on the Transport Economic Report and a growth factor of 1.34 for a 10-year horizon and 1.8 for a 20-year horizon respectively. The HCM 2010 LOS criteria designations are A – F.

2. The corridor was analysed in two segments, based on geometric properties and travel time. Segment 1 commences at the intersection of GWH and Sir Sydney Walling Highway and terminates at its intersection with Old Parham Road and Segment 2 commences at its intersection with Old Parham Road and terminates at Jabberwock Beach Road. As a single lane highway Segment 1 in the Base Year operates at LOS D, whereas Segment 2 operates at LOS E utilising 86% of its capacity. Under a "do minimum" scenario, in 10 and 20 Year Segment 1 will operate at LOS E and F respectively. Whereas Segment 2 will operate at LOS F from year 10 (utilising between 95 – 100% of its capacity). Table 1 refers.

**TABLE 1: EXISTING SINGLE LANE ANALYSIS SIR GEORGE WALTER HIGHWAY HCM LOS**

| Segment | Period | LOS | V/C Ratios |
|---|---|---|---|
| Sir S. Walling Highway – Old Parham (Seg. 1) | Base Year | D | 0.57 |
| Old Parham – Jabberwock (Seg. 2) | Base Year | E | 0.86 |
| Sir S. Walling Highway – Old Parham (Seg 1) | 10th Year | E | 0.76 |
| Old Parham – Jabberwock (Seg. 2) | 10th Year | F | 1.15 |
| Sir S. Walling Highway – Old Parham (Seg 1) | 20th Year | F | 1.02 |
| Old Parham – Jabberwock (Seg. 2) | 20th Year | F | 1.54 |

3. Therefore based on projected growth rates and reduced LOS, GWH was analysed with an increased capacity of four lanes. With the increase capacity, in the base year, this would result in a LOS A, for Segment 1 and LOS B for Segment 2. In Year 10 Segment 1 will operate at a LOS B whereas Segment 2 will operate at LOS C. Year 20 will yield LOS B and C for Segments 1 and 2 respectively. Table 2 refers.

**TABLE 2: RECOMMENDED FOUR-LANE ANALYSIS SIR GEORGE WALTER HIGHWAY HCM LOS**

| Segment | Period | LOS | Density (pc/mi/1n.) |
|---|---|---|---|
| Sir S. Walling Highway – Old Parham (Seg. 1) | Base Year | A | 9.8 |
| Old Parham – Jabberwock (Seg. 2) | Base Year | B | 14.25 |
| Sir S. Walling Highway – Old Parham (Seg 1) | 10th Year | B | 13.1 |
| Old Parham – Jabberwock (Seg. 2) | 10th Year | C | 19.15 |
| Sir S. Walling Highway – Old Parham (Seg 1) | 20th Year | B | 17.6 |
| Old Parham – Jabberwock (Seg. 2) | 20th Year | C | 25.65 |

**APPENDIX 4.2**

## SOCIAL PROFILE OF PROJECT AREAS

### PARISH PROFILE

1. The FHR and the GWH identified for rehabilitation works, are located in parish of St. John's. The parish has the largest number of households in Antigua and Barbuda, that is, 18,447 of 30,213 households nationally. St. John's has a population of 51,129, with 24,306 males and 26,823 females (Table 1)[1]. The population represents 58% of the country's total population. Unemployment rates (%) range from 10.8% in rural St. John to 14.7% in the City, both exceeding the national rate (10%)[2]. Approximately 84.3% of the labour force works away from home traversing the road network via 30,213 cars, in addition to public transportation[3]. The rehabilitated works will directly serve the highest proportion of the population (58%), with estimated average daily traffic of 24,727 for FHR and 23,018 for GWH.

**TABLE 1: CHARACTERISTICS OF THE PARISH OF ST JOHN'S**

| Location | Population | | | Number of Households | Unemployment Rate (%) |
|---|---|---|---|---|---|
| | Male | Female | Total | | |
| St John's City | 10233 | 11410 | 21643 | 7879 | 14.7% |
| St John's Rural | 14073 | 15413 | 29486 | 10568 | 10.8% |
| **Total** | **24306** | **26823** | **51129** | **18447** | **-** |

**Source**: Population and Housing Census 2011 (ESIA Section, Draft Final Feasibility Report)

2. The rehabilitative works will reduce flooding of roads through provision of proper drainage and increased capacity of culverts. The infrastructural enhancements will reduce the negative impacts on lives, property, livelihoods, and other the losses attributed to poor road conditions. The improved transportation network will also strengthen access to social services as well as facilitate economic activities including short-term employment opportunities as well as employment in the medium to long- term[4].

### FRIARS HILL ROAD

3. FHR is high volume an urban roadway of 4.8 km. It provides direct access to and from the capital of St. John's with many social, economic and residential amenities in adjacent communities. Friars Hill Road features heavy vehicular and pedestrian traffic, with the absence of sidewalks on both sides of the carriageway, as well as some vegetation, posing safety risks.

4. There are six communities along the road accounting for a population 8,058 in Cedar Grove, Hodges Bay, Blue Waters and Crossbies, Cedar Valley, Paradise View/Trade Winds and Marble Hill, Woods Centre and Gamble's (Table 2). The project area is flood prone resulting from changes in land use (agriculture to commercial), the proliferation of hard surfaces, and increased run-off which the current drainage system cannot absorb. Residents' homes and livelihoods in the project area, particularly the Yorks community, are adversely affected.

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1 There are 7,879 households in St. John's City and 10,568 in St. John's Rural.

2 The national unemployment rate is 10%, with 11% for males and 9.4% for females based on the 2011 Census

3 The roads are used to fulfil other private socio-economic as well as public functions such as waste removal. National Solid Waste Authority for example use the road network, serving some 81,279 persons and private trucks serving 2,362 persons that live off the main road system in Antigua.

4 The roads importantly connect workers in the services sector that account for 75.6 % of the workforce, Tourism as a service sector directly employs 22.6% of the workforce and indirectly employs 84.5% of the workforce (2010).

**TABLE 2: POPULATION OF COMMUNITIES BY SEX**

| Sir George Walter Highway | | | | Friars Hill Road | | | |
|---|---|---|---|---|---|---|---|
| **Community** | **Male** | **Female** | **Total** | **Community** | **Male** | **Female** | **Total** |
| Paynters | 86 | 98 | 184 | Cedar Grove | 933 | 426 | 1359 |
| Carlisle | 279 | 275 | 554 | Hodges Bay | 900 | 471 | 1371 |
| Cassada Gardens | 143 | 176 | 319 | Blue Waters & Crossbies | 1023 | 506 | 1529 |
| Pigotts and Fitches Creek | 1128 | 1,365 | 2493 | Cedar Valley | 1096 | 501 | 1597 |
| Airport (Coolidge, High Point, Camp Blizzard) | 18 | 16 | 34 | Paradise View, Trade Winds and Marble Hill | 591 | 288 | 879 |
| **Total** | **1654** | **1930** | **3584** | Woods Centre and Gamble's | 889 | 434 | 1323 |
| | | | | **Total** | **5432** | **2626** | **8058** |

**Source**: Population and Housing Census 2011 (ESIA Section, Draft Final Feasibility Report)

5. There are three day care centers (75 children) along FHR (Table 3). Six educational facilities including: three primary schools (505 children); one secondary school (234 children); and two schools for students with disability (91 students) are present. The schools for disabled students underscore the relevance of universal design criteria as part of the project design. The area also has a health clinic, a cemetery and well as several enterprises along FHR including:

(a) Financial institutions – Caribbean Union Bank, Global Bank of Commerce, the Bank of Nova Scotia, the Antigua Commercial Bank, and the East Caribbean Amalgamated Bank.

(b) Large supermarkets - Epicurean and Billy's.

(c) Shopping malls - Woods Mall and Royal Palm Place with book stores, hair salon, restaurants, hardware stores and pharmacies.

(d) Telecommunications - Flow and Digicel.

(e) Others such as Caribbean Cinemas, Courts, gas station, tyre repair facilities, rum distillery and two large facilities selling second-hand products and hardware stores.

(f) Small-scale vending along the roadway.

**TABLE 3: POPULATION OF EDUCATIONAL AND DAY CARE INSTITUTIONS BY SEX**

| **Sir George Walter Highway** | | | | **Friars Hill Road** | | | |
|---|---|---|---|---|---|---|---|
| **Name of School** | **Male** | **Female** | **Total** | **Name of School & Day Care** | **Male** | **Female** | **Total** |
| AB Institute for Continuing Education | NA | NA | 450 | Cedar Grove - public primary | 76 | 61 | 137 |
| Parham - public primary | 61 | 31 | 92 | Adele - public special needs | 44 | 33 | 77 |
| Pares - public primary | 47 | 50 | 97 | School for the Deaf - public special needs | 8 | 6 | 14 |
| Potters - public primary | 111 | 103 | 214 | St Andrews- private primary | 100 | 105 | 205 |
| Pares - public secondary | 222 | 199 | 421 | St Nicholas - primary | 83 | 80 | 163 |
| Willikies-public primary | 43 | 29 | 72 | St Anthony's - private secondary | 105 | 129 | 234 |
| Glanvilles - public secondary | 82 | 67 | 149 | Little Angels Day Care | NA | NA | 20 |
| Sunnyside Tutorial - private primary | 228 | 247 | 475 | Tiny Treasures Day Care | NA | NA | 25 |
| Faith and Hope | 4 | 10 | 14 | Learning Ladder Day Care | NA | NA | 30 |

**Source**: ESIA Section, Draft Final Feasibility Report.

6. Some eight buses ply the route of the project area, providing transportation for residents. A large proportion of residents work in high income homes and hotels in the north[5]. The primary users of public transportation therefore include domestic workers, tradesmen and hotel workers, some of whom are immigrants.

**SIR GEORGE WALTER HIGHWAY**

7. GWH is a major urban roadway of 3.9 km. It provides access from the V.C. Bird International Airport to the major ports in the capital of St. John's, and other critical commercial and business services. There are major intersections with Sir Sidney Wallings Highway, Old Parham Road, Pavilion Drive and Osborne. Five communities along the highway account for a population 3,584 (Table 2). The communities include Cassada Gardens, Carlisle, Parynthers, Pigotts and Fitches Creek, and Airport (Coolidge, High Point, Camp Blizzard). Flooding impacts areas such as Pares and Gilbert communities due to overflowing of ghuts; as well as the junction with GWH due to the density of buildings and inadequate drainage.

8. Mangrove swamps are found in the Glanville/Pares areas. The project areas has very important agricultural land, with Pares being a farming area. The highway provides access to the Seatons community located on the coastline. Seatons affords scenic views of off shore islands located in the North

[5] Some include Sun Sail and Colona Beach and the Hodges Bay Club nearing completion in Blue Waters, Marble Hill, Crosbies and Hodges Bay areas.

East Marine Managed Area generating tourism revenue from water sports and boat excursions. Several small operations exist in this area to include sea moss operation, Stingray City, and Paddles.

9. The villages of Pares, Seatons, Glanvilles and Willikies are served by thirteen buses. There are two bypass roads from the Pares main road taking traffic to Collins and long lane, Diamond, Bethesda, Newfield, St. Philips, Freetown and High end hotels at Mill Reef, Harmony Hall. Most of the residents work in the tourism sector operating taxis and receive direct employment at the three large hotels, and private homes in the east of the island. The historical sites of the Antigua Sugar Factor, Betty's Hope and Devil's Bridge are located at different points of the highway. The sites are visited by many tourists and locals alike.

10. The project area has nine educational facilities: five primary schools (950 children); two secondary schools (570 children); and two other institutions (464 students) (Table 3). A police station, health clinic, three churches[6] and businesses such as supermarkets, heavy equipment operation services, the Sir Vivian Stadium and a locally owned hotel are also present. Small-scale vending is also done along the highway.

6 The denominations are Seventh-Day Adventist, Wesleyan Holiness and Moravian.

**APPENDIX 4.3**

# ECONOMIC RATE OF RETURN CALCULATION
## ($ '000)

| Year | Capital Cost | Savings | | | Net Benefits |
|---|---|---|---|---|---|
| | | Maintenance | Time | VOC | |
| 2016 | (1,808) | | | | (1,808) |
| 2017 | (27,722) | | | | (27,722) |
| 2018 | (32,226) | 889 | 2,054 | 4,119 | (25,164) |
| 2019 | | 1,778 | 4,352 | 8,521 | 14,651 |
| 2020 | - | 1,778 | 6,047 | 11,018 | 18,842 |
| 2021 | - | 1,778 | 6,386 | 11,380 | 19,544 |
| 2022 | - | 1,778 | 6,743 | 11,753 | 20,274 |
| 2023 | - | 1,778 | 7,121 | 12,139 | 21,038 |
| 2024 | - | 1,778 | 8,571 | 13,313 | 23,663 |
| 2025 | - | 1,778 | 9,052 | 13,751 | 24,581 |
| 2026 | - | 1,778 | 9,596 | 14,230 | 25,604 |
| 2027 | (9,880) | 1,778 | 10,174 | 14,726 | 16,798 |
| 2028 | - | 1,778 | 13,661 | 18,416 | 33,855 |
| 2029 | - | 1,778 | 14,484 | 19,058 | 35,320 |
| 2030 | - | 1,778 | 15,356 | 19,721 | 36,855 |
| 2031 | - | 1,778 | 15,970 | 20,213 | 37,961 |
| 2032 | - | 1,778 | 20,966 | 24,701 | 47,444 |
| 2033 | - | 1,778 | 21,805 | 25,316 | 48,899 |
| 2034 | - | 1,778 | 22,677 | 25,946 | 50,402 |
| 2035 | - | 1,778 | 23,585 | 26,593 | 51,956 |
| 2036 | - | 1,778 | 21,985 | 24,128 | 47,891 |
| 2037 | 13,864 | 1,778 | 22,866 | 24,728 | 63,237 |
| **ERR CALCULATION** | | | | | **32%** |
| **NPV** | | | | | **96,143** |

# NOTES AND ASSUMPTIONS TO THE ECONOMIC ANALYSIS

## HIGHWAY DEVELOPMENT MODEL 4

1. The proposed project included the rehabilitation and or reconstruction and resurfacing of two arteries which are critical to the long-term viability of Antigua and Barbuda. HDM-4 was used to calculate the benefits of the Project. The analytical framework for the model is based on the concept of pavement life cycle analysis and is used to predict the effects of road deterioration, road-works, socioeconomic, and environmental effects on road-user costs over the life of a road pavement.

2. Once constructed, road pavements deteriorate as a result of several factors, such as traffic loading, environmental weathering, and the effect of inadequate drainage systems. The impacts of road conditions, as well as the road design standards, are measured in terms of road-user costs, and other social and environmental effects.

3. The two roadways to be rehabilitated differ in terms of pavement condition, road width and traffic and are as follows:

**TABLE 1: ROAD ANALYSIS**

| Section | Name | Length (km) |
|---|---|---|
| A | Friars Hill Road | 4.010 |
| B | Sir George Walter (Airport) Road | 3.934 |
| | **Total Length** | **7.944** |

## BASE YEAR TRAFFIC

### Traffic Surveys

4. Base Year traffic was developed from a traffic survey[1] undertaken by a regional firm in July 2016 which was supplemented by a traffic desktop study and additional traffic counts at six locations for seven consecutive 24-hour periods, undertaken by the Feasibility Study consultants in August and September 2016. In cases where only 12-hour counts were available, these were converted to 24-hour Annual Daily Traffic by applying a factor of 1.25, based on experience on similar type projects. The resulting Average Annual Daily Traffic (AADT) for the road sections is provided in Table 2.

**TABLE 2: AADT IN 2016**

| Sections | AADT 2016 |
|---|---|
| A | 24,727 |
| B | 23,018 |

[1] Traffic Data Collection and Conditions Survey Report, July 2016, Caribbean Transportation Consultancy Services (CARITRANS) Ltd.

### Traffic Forecasts

5. Traffic forecasts were determined utilising a model developed by the UK's Traffic Research Laboratory for forecasting traffic growth in developing countries. The method relates vehicle ownership and growth to the growth of incomes and population. On the basis of forecasts of average GDP growth rate of 2.5% between 2017 and 2037, vehicle ownership rate of 0.39 vehicles per person, and population growth of 1.24%, the model yielded an average annual traffic growth of 3.06 % for cars, light goods vehicles, and trucks and 2.60 % for buses over analysis period.

6. The vehicle characteristics utilised in the model are summarised in Table 3.

**TABLE 3: SUMMARY OF VEHICLE FLEET CHARACTERISTICS**

| Vehicle | Small Car | Medium Car | Large Car | Small Truck | Medium Truck | Large Truck | Small Bus | Large Bus | Articulated Truck |
|---|---|---|---|---|---|---|---|---|---|
| Gross Vehicle Weight (t) | 1.2 | 1.6 | 2.2 | 6.9 | 10.0 | 18.6 | 10 | 12.1 | 27.7 |
| Vehicle Axles | 2 | 2 | 2 | 2 | 4 | 5 | 2 | 3 | 6 |
| Equivalent Standard Axles/Vehicle | - | - | 0.01 | 0.06 | 2.18 | 3.15 | 0.08 | 3.15 | 4.63 |
| Passenger Car Equivalency | - | - | 1.1 | 1.2 | 1.3 | 1.8 | 1.2 | 1.8 | 2 |
| No. of Tyres | 2 | 2 | 2 | 6 | 8 | 10 | 2 | 6 | 12 |
| **Utilisation:** | | | | | | | | | |
| Annual Utilisation (km) | 23,000 | 23,000 | 32,000 | 45,000 | 55,000 | 85,000 | 55,000 | 75,000 | 85,000 |
| Hours Driven/Year | 550 | 550 | 900 | 1300 | 1700 | 2000 | 1500 | 1900 | 2000 |
| Average Service Life (Yrs) | 10 | 10 | 10 | 10 | 11 | 11 | 10 | 10 | 12 |

7. The economic prices of the representative vehicles and tyres were calculated based on CIF values adjusted for dealers mark-up. These are shown in Table 4. As required by HDM, these costs are for an equivalent new vehicle.

**TABLE 4: VEHICLE AND TYRE COSTS**
**($ '000)**

| Vehicle | Small Car | Medium Car | Large Car | Small Truck | Medium Truck | Large Truck | Small Bus | Medium Bus | Articulated Truck |
|---|---|---|---|---|---|---|---|---|---|
| Vehicle Cost | 20,045 | 43,445 | 75,656 | 136,396 | 175,595 | 329,289 | 74,158 | 288,390 | 453,184 |
| Tyre Cost | 83.70 | 167.40 | 302.40 | 534.60 | 1,112.40 | 1,441.80 | 248.40 | 982.80 | 1,441.80 |

### Petrol and Lubricants

8. The economic cost was estimated at $2.76 and $2.70 per litre for gasoline and diesel, respectively. The cost for lubricants was determined at $7.02 per litre.

### Maintenance Labour

9. Maintenance cost per hour is estimated at $44.66 for cars and light goods vehicles and $89.29 for heavy goods vehicles and large buses.

**Time Savings**

10. The model includes congestion effects for which the value of time (VOT) is a critical input. The valuation of travel time savings is based on the World Bank paper: 'The Value of Time in Economic Evaluation of Transport Projects' (Professor K. G William). The approach used is waged-based. For work related trips the analysis estimates the value of time per hour by dividing annual GDP per capita by the estimated number of working hours per annum. For non-work related trips the VOT is assumed to have a value equal to half that of work related trips. The parameters used in the calculation of travel time values is provided in Table 5:

**TABLE 5: ESTIMATION OF TRAVEL TIME VALUES**

| | |
|---|---|
| GDP per capita (2016 prices) | 36,631 |
| Average wage ($/hour) | $44.48 |
| Annual working hours | 2,000 |
| Employment overhead (%) | 15% |
| Shadow wage rate factor (SWR) | 0.859 |
| Working VOT ($/hour) | 18.32 |
| Non-working VOT ($/hour) | 9.58 |
| Proportion of work related trips | 30% |

## PROJECT LIFE

11. For the purpose of analysis, the economic life of the roads was assumed to be 20 years from completion of construction.

## CONSTANT PRICES

12. ERR calculations are based on 2016 constant prices.

13. Traded items were converted to their border price, while non-traded items were expressed in their border price equivalents after adjusting for the distortion between international and domestic prices caused by import duties, tariffs, subsidies and other market distortions, by applying a Standard Conversion Factor (SCF) of 0.91.

14. The residual value of the Project at the end of the 20-year project period is based on the estimated useful lives of the drainage and road works of 40 years.

15. Conversion factors used for the different cost components are provided in Tables 6 to 8.

**TABLE 6: CONVERSION FACTORS FOR COST ADJUSTMENT**

| Item | Shadow Rate | Standard Conversion Factor | Base Factor |
|---|---|---|---|
| Skilled Labour | 1.00 | 0.91 | 0.91 |
| Unskilled Labour | 0.85 | 0.91 | 0.77 |
| Local Materials | 0.80 | 0.91 | 0.73 |
| Imported Materials & Equipment | 1.00 | 0.91 | 0.91 |

**TABLE 7: DERIVATION OF SPECIFIC CONVERSION FACTORS (SpCF) FOR WORKS**

| Item | Skilled Labour | Unskilled Labour | Local Materials | Imported Materials & Equipment | SpCF |
|---|---|---|---|---|---|
| **Base Factor** | **0.91** | **0.77** | **0.73** | **0.91** | |
| Project Preparation | 0.80 | - | 0.05 | 0.15 | 0.90 |
| Land Acquisition | - | - | - | - | 0.91 |
| Road Rehabilitation and Upgrade Works | 0.25 | 0.15 | 0.15 | 0.45 | 0.86 |
| Materials Lab Upgrade | 0.25 | 0.05 | 0.20 | 0.50 | 0.87 |
| Capacity Building | 0.10 | - | - | 0.90 | 0.91 |
| Engineering Services | 0.90 | - | 0.05 | 0.05 | 0.90 |
| Project Management | 0.90 | - | 0.05 | 0.05 | 0.90 |

16. The overall conversion factor for the project was estimated as 0.87 as shown in Table 8.

**TABLE 8: OVERALL CONVERSION FACTOR FOR PROJECT**

| Base Cost + Physical Contingences | Financial Cost | SpCF | Economic Cost |
|---|---|---|---|
| Project Preparation | 969 | 0.90 | **873** |
| Land Acquisition | 8,800 | 0.91 | **8,008** |
| Road Rehabilitation and Upgrade Works | 54,584 | 0.86 | **47,064** |
| Materials Lab Upgrade | 1,342 | 0.87 | **1,163** |
| Capacity Building | 140 | 0.91 | **127** |
| Engineering Services | 1,775 | 0.90 | **1,599** |
| Project Management | 1,804 | 0.90 | **1,625** |
| **Total Base Cost & Physical Contingencies** | **69,413** | | **60,459** |
| **Overall Conversion Factor** | | | **0.87** |

**APPENDIX 4.5**

## DRAFT ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

| Project Activity | Potential Negative Impact | Proposed Mitigation Measures | Institutional Responsibility | Cost Estimates |
|---|---|---|---|---|
| **Pre-preparation** | | | | |
| Land Acquisition | Disagreement in relation to land assessed value, award and compensation | GOAB's utilisation of land acquisition procedures including in keeping with the Land Acquisition Act of 1958 | MWH (with Private Land Owners) | |
| Site Clearance | Disruption to utilities services | Pre-construction discussions with APUA to discuss proposed road rehabilitation; Identify location of utility infrastructure; Upgrade utility infrastructure prior or in concert with the road rehabilitation to reduce negative impact on communities. Communities informed of disruptions | MWH Contractor | Nil |
| Site Clearance | Ecosystem degradation | Re-vegetate areas where necessary; Mandate Forestry Division tosupervise works undertaken in protected areas; minimize impact on fauna and flora; identify and install signs in areas known to be frequent crossing for wildlife erected to warn drivers; prohibit hunting of birds or other wildlife by employees; Observe policies, rules and regulations of all recognized natural habitats, wetlands and protected areas in consultation with the Forestry Division prior to construction. | MSTCD FD Ministry of Tourism | Nil |
| Site Clearance | Reduced aesthetic quality | Replanting and re-vegetation to enhance the landscape. | MST Forestry Division MoT | |
| Levelling and grading site and access | Sediment run-off and potential for landslides | Minimization of excavated areas and or re-vegetation of ground cover; Where slopes are cut, keep angle of slopes within limits of soil type, balance cut and fill to limit steepness of slopes; Use retaining structures; Use silt fences, baffles, filters, or sedimentation basins to prevent sedimentation. | Contractor | Nil |
| **Construction Phase** | | | | |
| Civil works | Traffic disruption; accidents; injury, deaths | Undertake road rehabilitation on alternate sides of the road where possible; Implement traffic management plan to include proper signage, use of alternative routes, Increase deployment of traffic police; identifying alternative routes; erect proper signage; undertake effective public awareness | MWH | |
| Civil works | Blockage of access to homes, buildings, shops and roadways; Dust pollution | Apply water to suppress dust where needed; Meet with home owners and improving access in keeping with the objectives of the road rehabilitation. | MWH MST Local Authorities | |
| Civil works | Disruption of tourist activities and access to services by other road users | Provide timely and accurate information to service providers and visitors on traffic management plan; Erect adequate direction and safety signs; Prioritise roads that are most critical to the tourism industry. | MWH Antigua Hotel and Association. MoT | |

| **Project Activity** | **Potential Negative Impact** | **Proposed Mitigation Measures** | **Institutional Responsibility** | Cost estimates |
|---|---|---|---|---|
| Civil works | Disruption of economic activities of vendors | Provide specially demarcated areas for short-term use for stalls, facilitate engagement concerning suitable permanent locations for vendors' stalls along rehabilitated roads; and consider possible provision of a stipend for those who may lose their livelihood during that period | MWH<br>Vendors<br>Contractor<br>Local Authorities | |
| Civil works | Access to project information & potential impacts | Establish formal Community Participation Groups (CPGs) consisting of representatives of residents and businesses along the rehabilitated roads, as well as the MWH[1] to manage information flow between project implementers and communities; and b) appoint a community liaison officer to coordinate the CPG, and implement a Stakeholder Participation Plan. | MWH<br>Contractor | |
| Civil works | Gender-based Risks on Work Sites in male dominated sector[2] | Provide gender sensitisation training of the MWH and other partner ministry(ies), contractors and construction workers to manage the risks identified | MWH<br>Directorate of Gender Affairs<br>Contractor<br>Construction Workers | |
| Civil works | Inaccessible road infrastructure for persons with disabilities (PWDs) | Ensure the design and rehabilitation of roads incorporate universal design criteria to accommodate physical access for PWDs. | MWH<br>Development Control Authority Board<br>Contractor<br>Antigua and Barbuda Association of Persons with Disabilities | |
| Civil works | Lack of access to employment opportunities at the community level for women, youth, disabled persons and other poor | Develop a register of persons with the relevant skills to encourage the employment of poor and vulnerable groups and small businesses identified at the community level | MWH<br>Ministry of Social Transformation<br>Contractor<br>Antigua and Barbuda Association of Persons with Disabilities<br>NGO/CBOs | |

1 The Project Management Team will ensure that CPGs are inclusive, adequately representing the various groups of persons residing in project communities reflective of distribution by sex (males/females), youth, and disability PWDs. Prior to commencement of construction, the engineering consultants will brief MWH and CPG on the works.

2 Risks identified include but are not limited to commercial sex, alcohol and drug use, sexually transmitted diseases like HIV/AIDS, and managing gender relations/conflict resolution.

| **Project Activity** | **Potential Negative Impact** | **Proposed Mitigation Measures** | **Institutional Responsibility** | Cost estimates |
|---|---|---|---|---|
| Civil works | Unsafe working conditions and injury | Train employees in health and safety; Prepare occupational safety reference manual; provided workers with personal protective equipment for dust and noise and for protection of the eyes, the hands and the feet; Supervise use of chemicals using a senior employee with certification in the use of chemicals; Observe labour laws and working conditions for all employees | MHW<br>Contractor | Part of Contractor cost |
| Civil works | Unsafe working conditions; accident or injury to public | Employees wear protective gear; Regulate the speed of vehicles to. 30 -35 mph; Restriction of operating times to avoid early morning, late evenings and weekends; Regulating the hours of operation especially in areas in close proximity to schools, health centres or hospitals; Regular maintenance of vehicles, equipment and tools. | MWH<br>Contractor | Part of Contractor cost |
| Civil Works | Air pollution; Noise | Reduce the impact of quarry operation on the adjacent communities and the environment. | MWH | Part of Contractor cost |
| Civil Works | Air pollution | Use water to reduce dust; Ensure that vehicles carrying construction material are covered; Limit speed around construction area | Contractor<br>MHE<br>MWH | |
| Civil Works | Negative health impact | Ensure proper use and storage of oils and other chemicals; Remove and properly store all unused soil or particulate matter; construct grit traps as part of the drainage system to reduce clogging; Ensure construction of drains and culverts are undertaken to the highest specification to reduce flooding; ensure maintenance of existing drains and culverts. | MWH | Part of operations cost |
| Civil Works | Solid waste discharges | Provide adequate system for the collection, transportation and disposal of garbage and other solid waste generated at the sites; implement measures to prevent sediment and silt to contain and prevent silt from getting into drains or surface water by the use of barriers. | Contractor | Nil |
| Excavation | Spread of invasive Species | Restrict transportation of soil from affected area to other areas so as to curtail the spread of the Giant African Snail.<br><br>Wash the wheels of all vehicles involved in soil excavation to remove soils material to curb the transfer of this snail to other areas. | Contractor<br>MWH | Nil |

| **Operational Phase** | | | | |
|---|---|---|---|---|
| **Project Activity** | **Potential Negative Impact** | **Proposed Mitigation Measures** | **Institutional Responsibility** | Cost estimates |
| Road Users | Increased traffic movement; health and safety risks to public; noise pollution; reduced air quality | Air emissions monitoring; noise monitoring; spill preventing and response plan | MWH | Part of operations cost |
| Road Users | Increased speeding on rehabilitated roadways | Implement a Road Safety Awareness Plan using community-driven and gender-responsive strategies to target road users and at risk sub-groups such as young males and females, children, and disabled persons. | MWH<br>Antigua and Barbuda Road Safety Group | |
| Road Users | Citizen security risks | Coordinate the provision of street lighting and location of bus stops guided by community level crime and victimization data available | MWH<br>APUA | |

**APPENDIX 4.6**

# DRAFT TERMS OF REFERENCE
# CAPACITY BUILDING IN GENDER SENSITISATION FOR ROAD REHABILITATION WORKS

## 1. BACKGROUND

1.1 The population Antigua and Barbuda is 88,411, of which 42,565 are males and 45,846 females (2011 Census). The country registered a Human Development Index (HDI) value of 0.783 in 2014, and was ranked in the high human development category[1]. The HDI for 2014 shows steady increase from 0.774 in 2013, and 0.760 in 2012. Despite improvements in quality of life over the years, issues of social vulnerability and the ability of the poor to sustainably improve their life chances and wellbeing remain. The hardships experienced disproportionately affects women in particular, among other vulnerable groups.

1.2 According to the 2014 Country Gender Assessment (CGA), many policies and programmatic interventions are developed without reference to gender equality. Consequently, women "continue to be adversely affected by systemic, institutional and socio-cultural, political and economic inequalities" (CGA 2014, p. 1). Although the 2011 Census shows that unemployment is slightly higher for males by 1.6%[2] compared to previous years, labour market segregation continues to affect women. They are more likely to be found in lower paying and less secure jobs that generally reinforce stereotypical gender roles. The "technical and physical labour intensive jobs" viewed as men's work, facilitates hegemonic traditional gender division of labour (CGA 2014, p.20). Accordingly, higher proportions of men are represented in the sectors that contribute to the highest percentage to GDP (Construction, Transportation and Communication). The construction sector contributes some 21.9% to GDP. However, total employment was 3,419 males compared with 138 females (CGA 2014, p.18). Infrastructure projects thus increase the employment of men in the construction sector whereas women typically provide food as street vendors.

1.3 Infrastructure projects have positive effects of women and men. Road infrastructure and bridges reduce the time burden of women and men in accessing markets, hospitals, schools and other services. They also facilitate access to tourism sites and the related economic opportunities. Infrastructure projects can also do harm since they can increase occupational segregation, gender-based violence (GBV), sexual harassment on or near construction sites,[3] alcohol and drug use, transactional and commercial sex,[4] sexually transmitted diseases like HIV/AIDS, and social conflicts.[5] Women with disabilities who represent 5.7% of the population, are made vulnerable due to public infrastructure barriers[6]. Lack of accessible roads with ramps and adequate sidewalk width for wheelchair and white cane users for

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[1] The HDI is an average measure of basic human development of a country. It takes into account the indicators of life expectancy at birth; expected years of schooling; mean years of schooling; and Gross National Income per capita. The calculated HDI positioned the country at 58 out of 188 countries. The HDI is above the averages for countries in the high human development group, and countries in Latin America and the Caribbean (0.744 and 0.748 respectively).

[2] The national unemployment rate is 10%, with 11% for males and 9.4%.

[3] This may include but is not limited to sexual violence while using public utilities (latrines, bathing areas, etc.), and sexual violence on public transportation to and from work (https://www.usaid.gov/sites/default/files/documents/1865/FINAL_GBV_EI_Toolkit_Aug2015.pdf)

[4] Increased transactional and commercial sex may occur at construction sites among the workers who spend money, vulnerable women who offer services and their respective spouses and partners who might be affected later (http://www.adb.org/sites/default/files/publication/29660/gender-hiv-infrastructure-operations.pdf).

[5] *https://www.leximancer.com/wiki/images/9/96/MenandconflictARCOM.doc*

[6] PWDs are estimated to represent 5.1% of the population which is slightly higher among females based on the 2001 Census (4.4% and 5.7%). Several types of disabilities were reported during the Census: Sight, Hearing, Speech, Gripping, Mobility/Moving, Body Movements, Learning, Behavioural and Other. The GOAB signalled commitment to mainstreaming disability through the ratification of the United Nations Convention on the Rights of Persons with Disabilities in 2016.

example, limit the participation of PWDs in all aspects of national development, including access to construction work, other places of employment, schools, and other essential services.

1.4 The GOAB's prioritization[7] of gender mainstreaming in mainstay economic sectors through the *National Medium-Term Development Strategy 2016 – 2020* (MTDS) provides a critical platform for action[8]. The *National Strategic Action Plan to End Gender-based Violence (2013-2018)* also demonstrates the country's commitments.[9] The implementation of gender- responsive infrastructure projects is consistent with the GOAB's policy commitments. Gender- responsive infrastructure projects incorporate safeguards against GBV including the prevention and redress of sexual harassment, appropriate sanitation facilities and awareness trainings. Such projects also encourage employers to hire females in the labour force and empower women to increase access to economic opportunities. The GOAB's rehabilitation project thus affords an entry point to address gender equality through capacity building in gender sensitisation for the MWH and other relevant ministry partners, contractors and workers.

## 2 OBJECTIVES

2.1 The consultancy seeks to:

(a) support MWH to maximise its social and gender analysis capacity to deliver gender-responsive policies, programmes and projects that will minimise the negative gender effects of infrastructure construction projects;
(b) enhance the capacity of MWH and other relevant ministry partners, and contractors to implement equal employment and gender-responsive safeguard policies at the workplace; and
(c) provide gender sensitisation training for the road rehabilitation project workers.

## 3. SCOPE OF SERVICES

3.1 The consultant will work closely with the MWH, Directorate of Gender Affairs, contractors, construction workers and other critical stakeholders. Specifically, the consultant will:

3.2 Perform all investigative work, analyses and technical strategies to realise the objectives of the consultancy. The methodology must include:

(a) Review of secondary data including Country Gender Assessment, Poverty Assessments, *National Medium-Term Development Strategy 2016 – 2020, National Strategic Action Plan to End Gender-based Violence (2013-2018), Multiple Indicator Cluster Survey* other analytical reports/sector plans, studies, policy and legal documents, and data sources such as census reports, and surveys.
(b) Collection of primary data through participatory consultations with state and non-state stakeholders to inform robust programme design for capacity building in gender and gain buy-in for implementation. Elite interviews, focus groups, site visits, and other appropriate participatory methodologies must be employed. Focus groups may be convened separately for males, females, and specific vulnerable groups such as persons with disabilities.

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7 The GOAB does not have a National Gender Policy. The priorities are recorded in the CGA.

8 *MTDS 2016 – 2020* provides strategies and actions to be undertaken to move the country towards its long-term development goals.

9 There were 565 reported cases for females versus 50 for males concerning Rape and SV, Child Rape or SV, Physical Abuse, Psychological and Verbal, Financial Abuse, and Human Trafficking (CGA 2014, p.17).

3.3 Develop training packages with clearly articulated institutional support for strategic follow up on the delivery of concrete results for 3 groups of beneficiaries including the MWH, contractors, and construction workers for the road rehabilitation project. The training packages must be participatory and tailored to the profile of the respective trainees[10].

**Group 1 - MWH:** Design and deliver gender-sensitisation training for MWH and other key Government partner agencies/departments to strengthen institutional capacity for gender-responsive policy-making and programming. The consultant shall:

(i) conduct social and gender analysis and propose policy, programme and data collection strategies to be adopted by MWH, and included in the sectoral strategy, policies, annual work plan, and budget
(ii) develop *Gender Equality Guidelines for Implementing Infrastructure Projects*[11]
(iii) design training package to address: (a) GBV and conflict management, alcohol and drug abuse, commercial sex work, STDs especially HIV/AIDs and inclusion of person with disabilities among other at risk social groups;[12] and (b) grievance mechanisms on work sites, and national programmes and support services available from government, private sector and NGOs
(iv) identify potential resource persons and conduct a training of trainers

**Group 2 - Contractors**: Design and deliver gender-sensitisation training with contractors to address: (a) basic gender equality and social inclusion concerns in human resource and corporate social responsibility policies and practices; and (b) adoption of measures to reduce barriers for vulnerable persons such as the poor, young women and men, and persons with disabilities. The consultant shall:

(i) conduct gender assessment and needs analysis of the contractors' current practices and learning needs
(ii) design training package to address: (a) GBV and conflict management, alcohol and drug abuse, commercial sex work; STDs especially HIV/AIDs and inclusion of person with disabilities among other at risk social groups;[13] and (b) grievance mechanisms on work sites, and national programmes and support services available from government, private sector and NGOs
(iii) recommend ways of implementing the *Gender Equality Guidelines for implementing Infrastructure Projects* in the policies and practices of companies (e.g. code of conduct, equal opportunity programmes, prevention of sexual harassment, GBV, HIV/AIDS and STIs etc.)
(iv) Ensure that contractors meet the standard in keeping with the FIDIC clause 6.7 on health and safety including HIV/AIDS-awareness training and gender-based violence

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[10] Profile may consider factors such as education level and/or literacy, pre-training exposure to gender and native language (applicable in the case of immigrant workers). The consultant's investigative work (part 3.01 of the TOR) is expected to provide information necessary to inform training design.

[11] This would include, *inter alia*, development of gender and social inclusion standards to be inserted in the works specifications (e.g. appointment of a Health and Safety Officer on the works sites, who will be responsible for ensuring safety and health of workers, for overseeing the conditions and responsiveness of the facilities to the different needs of men and women workers, persons with disabilities, and enforcing the contractor's policies on sexual harassment).

[12] The training will provide contextual information on the legal framework to include *inter alia* The Social Security Act, Sexual Offences Act (1995), The Trafficking in Persons (Prevention) Act 2010, and the Labour Code.

[13] The training will provide contextual information on the legal framework to include *inter alia* The Social Security Act, Sexual Offences Act (1995), The Trafficking in Persons (Prevention) Act 2010, and the Labour Code.

**Group 3 - Workers**: Design and deliver gender-sensitisation training with construction workers for the rehabilitation project to address basic gender equality and social inclusion issues on work sites and surrounding communities. The consultant shall:

(i) conduct gender assessment and needs analysis of the workers and learning needs (inclusive of literacy levels);

(ii) design training package to address: (a) GBV and conflict management, alcohol and drug abuse, commercial sex work; STDs especially HIV/AIDs and inclusion of person with disabilities among other at risk social groups;[14] and (b) grievance mechanisms on work sites, and national programmes and support services available from government, private sector and NGOs.

3.4 Convene a Stakeholders' Consultation Workshop to review and solicit feedback regarding the training materials developed with key stakeholders identified by the MWH, Directorate of Gender Affairs, and the consultant. Prepare Stakeholders' Workshop Evaluation Report of participants' profile and feedback gleaned from the forum.

3.5 Conduct one-day Training Workshops with the MWH, contractors and workers, respectively. Prepare Training Workshop Evaluation Report of participants' profile and areas of satisfaction and dissatisfaction regarding the training provided.

## 4. REPORTING REQUIREMENTS

4.1 The Technical Proposal of the selected Consultant shall outline a work plan and approach to the assignment, the scope and methodology, the tasks and responsibilities and a time schedule for the completion of the assignment. The Technical Proposal will include any comments on, and suggestions for, improvements to the Terms of Reference. The following reports, one hard copy each, along with an electronic copy either by email, on CD ROM or flash drive, shall be submitted to the Caribbean Development Bank (CDB), Directorate of Gender Affairs and the MWH at the times indicated below. The reports must incorporate feedback provided by the MWH, Directorate of Gender Affairs and CDB.

(a) Inception Report within one month of commencement of the assignment including the findings from the investigative work.

(b) Interim Report, two months after commencement of the assignment including the Draft Training Packages for MWH, contractors and workers; and the *Gender Equality Guidelines for the Infrastructure Projects*.

(c) Draft Final Report, within three months of commencement of the assignment including the Revised Training Packages for MWH, contractors and workers; Revised *Gender Equality Guidelines for the Infrastructure Projects*, Draft Stakeholders' Consultation Report, and Draft Training Workshop Report (for all 3 worskshops)[15].

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[14] The training will provide contextual information on the legal framework to include *inter alia* The Social Security Act, Sexual Offences Act (1995), The Trafficking in Persons (Prevention) Act 2010, and the Labour Code.

[15] The report should have 3 sections for the MWH, contractors and workers respectively.

(d) Final Report, within four months of commencement of the assignment including the Final Training Packages for MWH, contractors and workers; Final *Gender Equality Guidelines for Implementing Infrastructure Projects*, Final Stakeholders' Consultation Report, and Final Training Workshop Report (for all 3 worskshops)[16].

All Reports shall contain sex-disaggregated data and critical gender analysis of the information presented.

## 5. IMPLEMENTATION ARRANGEMENTS

5.1 The GOAB represented by the MWH will appoint a Project Coordinator (PC). The PC will facilitate the work of the consultant and make available all relevant studies, reports and data relevant to completion of the exercise and will act as initial liaison between the consultant and stakeholders. The consultant will report to the PC. The consultant will work closely with the Directorate of Gender Affairs.

## 6. QUALIFICATIONS AND EXPERIENCE

6.1 The Consultant shall possess a minimum of a post-graduate qualifications in Gender and Development or relevant Social Development field with a minimum of ten years practical experience in gender training or instruction. Previous experience integrating gender issues in infrastructure and transport projects in collaboration with Ministries of Works and contractors is strongly preferred.

## 7. DURATION

7.1 It is expected that the assignment will require a maximum of 30 person-days over a period of 4 months.

**BUDGET**
**(£ '000)**

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.

[16] The report should have 3 sections for the MWH, contractors and workers respectively.

**APPENDIX 4.7**

## GENDER MARKER ANALYSIS

| Project Cycle Stage | Criteria | Score |
|---|---|---|
| **Analysis:** Introduction/ Background/ Preparation | Consultations with women/girls/men/boys and relevant gender-related or sector-related public or private organisations have taken place. | 0.5 |
| | Social analysis identifies gender issues and priorities. | 0.25 |
| | Macroeconomic analysis identifies gender issues and priorities. | 0 |
| **Design:** Project Proposal/ Definition/ Objective/ Description | To address the needs of women/girls and men/boys concrete interventions to reduce existing gender disparities have been designed. Effect on project outcome is direct. | 0 |
| | Project objective / outcome includes gender equality. | 0.5 |
| **Implementation:** Execution | Implementation arrangements (gender mainstreaming capacity building or gender expertise in implementing agency) to enhance the gender capacity of the implementing agency. Effect on project outcome is indirect. | 0.5 |
| | Terms of reference of project coordinating unit / project management unit include responsibilities of gender mainstreaming, especially at the levels of the project coordinator/director and the M&E officer. | 0.5 |
| **Monitoring and Evaluation:** Results-Monitoring-Framework (RMF) | Sex-disaggregated data included in the baselines, indicators and targets of the RMF.<br>*Or*<br>Collection of sex-disaggregated data required for M&E (stated and budgeted in Project) | 0.5 |
| | At least one gender-specific indicator at the outcome and/or output level in the RMF. | 0.5 |
| **Score:** | | **3.25** |

**Gender Mainstreamed (GM):** the project has the potential to contribute significantly to gender equality.

**APPENDIX 5.1**

# DRAFT TERMS OF REFERENCE
# PROJECT COORDINATOR

## 1. BACKGROUND

1.04 The Government of Antigua and Barbuda applied to Caribbean Development Bank (CDB) for a grant to assist in financing a project for the rehabilitation and upgrade of two road corridors under the United Kingdom Caribbean Infrastructure Partnership Fund (UKCIF). The capital project proposed was initiated by the recommendations of a Technical Assistance (TA) feasibility study, "Road Infrastructure Rehabilitation – Antigua and Barbuda" funded by CDB in July 2016. The expected outcome of the project is the rehabilitation of road infrastructure through climate resilient designs and construction methods and enhanced institutional capacity.

## 2. OBJECTIVE

2.1 The objective of the consultancy is the effective and timely achievement of the project outputs and outcome(s) through efficient coordination of project implementation.

## 3. SCOPE OF WORKS

3.1 The Project Coordinator will report to the Director, MWH, or an officer designated, and will be assigned exclusively to the project and will mainly be responsible for the implementation of the works. His/her duties will include, but will not be limited to:

(a) acting as MWH's representative with all major stakeholders including government and non-governmental agencies, sub-contractors and suppliers;

(b) providing contract administration services to MWH in relation to the project to include for, but not be limited to:

(i) project monitoring, specifically: (aa) finalising the Results Monitoring Framework, including collecting baseline data; (bb) developing a detailed results monitoring plan which clearly outlines the methods, sources, responsibilities and timelines for data collection; and (cc) collecting, analysing and reporting the results data as required by the Results Monitoring Framework; The data collected must be disaggregated by sex (males and females).

(ii) managing the selection and engagement of technical assistance consultants and supervising these consultancies;

(iii) evaluation of bids and recommendation of the awards for the engineering consultants and construction contracts in consultation with the Technical Advisory Committee;

(iv) overseeing the engineering consultancies, to include for supervisory and certification of the works engineering consultant and construction contracts;

(v) overseeing capacity-building consultancy in gender, and monitoring of the training component and the extent to which the *Gender Equality Guidelines for*

*Implementing Infrastructure Projects* are used by the MWH;

(vi) managing the selection and engagement of design-build contractor and supervising these works; and

(vii) cost control.

(c) Supervising and monitoring all construction sites for compliance with safety standards as well as governance requirements and requirements of regulatory agencies; and

(d) Ensuring requirements of the CDB are met to include for but not limited to:

(i) expedition of the submission to CDB of claims for disbursement/reimbursement;

(ii) liaison with CDB on all technical and administrative aspects of the project;

(iii) preparation and submission to CDB of a Quarterly Report on the Investment Cost of the project in the form specified by CDB, within two weeks after the end of each calendar quarter, commencing with the quarter following the commencement of the assignment;

(iv) keeping separate accounts for project-related expenditures and disbursement activities;

(v) submission to CDB, within two weeks after the end of each month, of the monthly reports prepared by the Engineering Consultants;

(vi) submission to CDB of the annual report describing progress on targets outlined in the results monitoring framework and the level of road maintenance at the end of the preceding year;

(vii) submission to CDB of the Contract Completion Report within three months after the date of issue by the Engineering Consultants of a certificate of practical completion of each contract;

(viii) preparation and submission to CDB of a Project Completion Report, within three months after practical completion of the works. This report will focus on the project's performance on desired results as outlined in the results monitoring framework and lessons learned:

(ix) execute responsibilities for mainstreaming of gender equality and universal design environmental access requirements for persons with disabilities.

## 4. DURATION

4.1 The consultancy is expected to be conducted over a period of approximately 24 months.

## 5. QUALIFICATIONS

5.1 Prospective candidates must be civil engineers with a minimum of the following qualifications:

(a) a Masters Degree or equivalent in Civil Engineering, Construction Management or Project Management with a minimum of 10 years' experience in the management and implementation of civil engineering projects; or

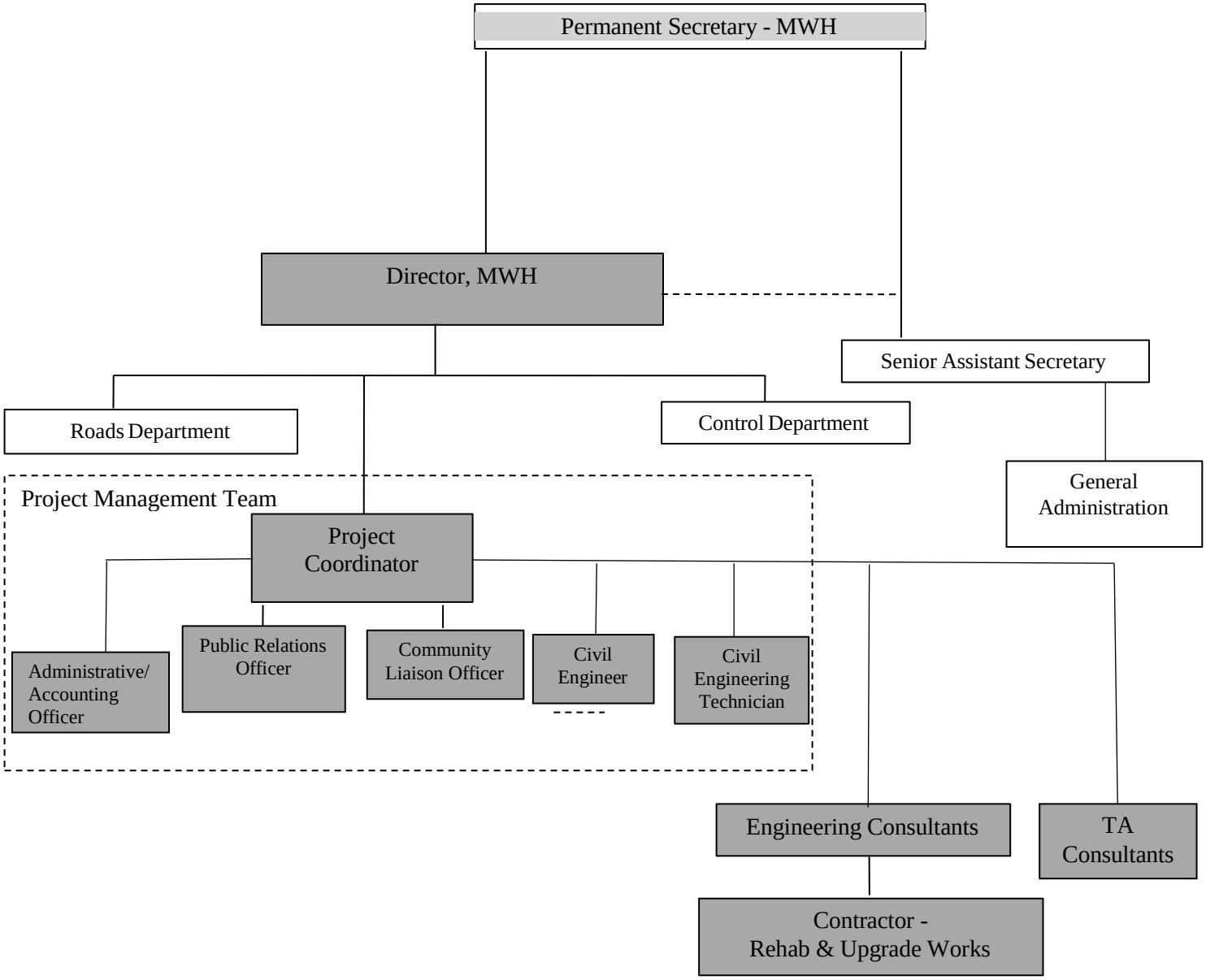
(b) a Bachelors Degree or equivalent in Civil Engineering, Construction Management or Project Management with a minimum of 15 years' experience in the management and implementation of civil engineering projects.

## BUDGET
**(£ '000)**

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.

**APPENDIX 5.2**

## PROJECT MANAGEMENT ORGANISATIONAL CHART



**APPENDIX 5.3**

# DRAFT TERMS OF REFERENCE
# ENGINEERING SERVICES AND CONSTRUCTION SUPERVISION

## 1. BACKGROUND

1.1 The captioned project's overall objective is to contribute to increased resilience in the road sector and the socio-economic development of Antigua. This expected outcomes of the Project are: (1) increased efficiency and resilience of road transportation along the Sir George Walter Highway (GWH) and Friars Hill Road (FHR); (2) enhanced institutional capacity of Ministry of Works and Housing (MWH) for pavement design, construction and maintenance; and (3) enhanced capacity of MWH to address gender equality and universal design environmental access requirements for persons with disabilities in the future construction projects. An assessment of the Material Laboratory and its personnel was completed with the assistance of the Caribbean Development Bank in February 2016 with recommendations for the procurement of equipment to upgrade the Laboratory in line with internationally accepted standards. The findings and recommendations of the laboratory have enabled the GOAB to proceed with the establishment of new Materials Laboratory Facility, inclusive of equipment, which is presently being procured.

## 2. OBJECTIVES

2.1 The objectives of the assignment are as follows:

(a) ensure that high-quality construction is achieved and that all work is carried out in full compliance with the contract documents and technical specifications; and

(b) provide support to MWH in the execution of its project management functions, including its monitoring and evaluation functions.

## 3. SCOPE OF WORKS

3.1 The Consultant(s) will undertake the following tasks:

(a) Bid Evaluation and Contract Negotiation: For the procurement of specialized design-build services of the Project, provide technical support in the evaluation of the Design-Build Bid Documents and negotiation of conditions of contract with the Contractor to adjust contract terms to suit the GOAB administrative and legal requirements. Issue the Order to Commence to Contractor.

(b) Contract Supervision: Technical support providing supervision of the Design-Build Contractor activities on behalf of MWH. In general, this includes carrying-out all the duties of the Engineer as specified in the Design-Build Contract, within the limitations specified therein, which corresponds to the following non-exhaustive activities:

Quality Control Supervision

(i) Review and approve the detailed designs, shop drawings and technical information prepared in respect of the Project and submitted by the Contractor to ensure adequacy of all aspects of the design conform with the requirements of the contract agreement including universal design environmental access requirements for persons with disabilities.

(ii) Approve Contractor's key personnel including any substitutions during implementation;
(iii) Approve materials and source of materials
(iv) Inspect the Works periodically during the construction period
(v) Supervise compliance with design standards including universal design environmental access requirements for persons with disabilities
(vi) Ensure the works are executed as per the contract specifications, detailed design drawings and the bill of quantities
(vii) Ensure that inspection, approval and testing when necessary of all materials and workmanship is conducted
(viii) Supervise Tests on Completion
(ix) Order special tests of materials or completed works and/or removal and substitution of improper materials and/or work, as required;
(x) Ensure follow up of all modifications and control of the changes
(xi) Coordinate required activities during the Defects Liability Period.
(xii) Quality Control Training: Establishment of Materials Laboratory and Training of MWH Laboratory Personnel:

(aa) As part of Quality Control and transfer of knowledge the consultant will be responsible for assisting MWH in the establishment of a new materials laboratory facility, suitable for undertaking quality control testing during the construction and maintenance periods. The Consultant will also be responsible for training to accredited international standards, four MWH technicians and two Antigua and Barbuda Bureau of Standards staff, who will be assigned to Laboratory. A training programme shall be submitted with the proposal.

Schedule Control

(i) Approve the contractor's work programme;
(ii) Work proactively with the contractor in order to plan activities on a short, medium and long term
(iii) Define key milestones
(iv) Control and appraise the progress of the Works and report any significant delays.
(v) Order suspension of the Works, if necessary, and authorise, with the employer's approval, extensions of the period for completion of the Works
(vi) Ensure contingency plan in case of delays

Budget Control

(i) Check documentation to support milestone payment requests
(ii) Check all quantity measurements and calculations required for payment purposes and ensure that all measurements and calculations are carried out in a manner and at the frequencies specified in the Contract Documents;
(iii) Issue recommendations for payment of Contractors according to progress of works, based on Contract conditions;
(iv) Follow up of payments (Information of payments actually processed shall be provided by GOAB)

Health, Safety and Environment Control

(i) Monitor adherence to the Health and Safety Plan
(ii) Supervise the Contractor in all matters concerning public safety and care of the works and, if required, request the Contractor to provide any necessary lights, guards, fencing, and watchmen;
(iii) Monitor adherence to the Environmental and Social Management Plan including the provision of sex disaggregated data (males and females) in reports

Risk Management

(i) Production and monitoring of a risk management plan
(ii) Constant assessment of the impacts of risks on the project
(iii) Definition of mitigation measures for each risk

Contract Administration

(i) Ensure contractual obligations are respected
(ii) Explain and/or adjust ambiguities and/or discrepancies in the Contract Documents
(iii) Issue variation orders, evaluate variations, fix rates for unpriced work, all after obtaining prior approval of the employer, and/or to make recommendations to the employer regarding alternatives;
(iv) Ensure amendments are in place and formalised when applicable
(v) Management of claims, non-conformances, request for information, etc.
(vi) Issue of Taking Over Certificates
(vii) Issue Certificates of Final Completion after the rectification by the Contractor of possible defects and end of Defects Liability Period, and recommendation for payment of retention money.

(c) Stakeholder Management: Ensure the best interest of all the relevant stakeholders is taken into account when decisions are made, ensure their active participation in the decision making process and ensure close coordination and the appropriate flow of information. Ensures coordination of the stakeholders within the Organisational Structure of the Project through the Community Participation Groups (CPGs)[1] and other fora.

(d) Community Awareness / Social Management Plan: Coordination of community awareness activities in collaboration with Community Liaison Officer (CLO) and the Project Coordinator, to inform the community about project activities and benefits, as well as to conduct other sensitisation activities to be defined with GOAB. This will include the following non-exhaustive activities:

(i) Participate in community meetings throughout project implementation to ascertain and inform, among other things, the communities' views on the Project,

[1] The CPGs will be coordinated by the CLO. The CPGs will consists representatives of residents and businesses along the rehabilitated roads, as well as the MWH[1] to manage information flow between project implementers and communities.

as well as the implementation progress and impacts through the CPGs and other fora.

(ii) Production and Monitoring of a Social Management Plan inclusive of critical aspects for mainstreaming of gender equality and universal design environmental access requirements/standards for persons with disabilities.

## 4. DURATION OF THE CONSULTANCY

4.1 The consultancy is expected to be conducted over a period of approximately 24 months. The Consultant will ensure additional support if necessary during the Defect Liability Period after the Taking Over Certificate has been issued. This support will be finalised by the issue of the Final Payment Certificate.

## 5. REPORTING REQUIREMENTS

5.1 The Consultant(s) will present the Reports in "pdf" format, as complete documents, as well as in Microsoft Word and Excel and/or other formats used in their creation. A copy of all data used in the preparation of the Reports shall also be submitted to CDB. These reports are as follows:

(a) Inception Report: The Inception Report will be presented within 28 days after the signing of the Contract, and it will include: Consultant's detailed work schedule and methodology, including proposed resources.

(b) Monthly Reports: The Consultant(s) will, no later than the specified date of each month, prepare a Progress Report summarising the work accomplished for the preceding month. The Reports will outline any problems encountered (administrative, technical, or financial) and give recommendations on how these problems may be overcome. The Reports will detail progress of ongoing works, include analysis and summaries of all test results, and shall record the status of payment of all contractor's monthly certificates, of all claims for cost or time extensions, and of actions required of MWH, other GOAB agencies, utility companies or other stakeholders to permit unconstrained works implementation. Information of payments actually processed should be provided by GOAB. The Reports shall all include for the monitoring of the requisite indicators of the Results Monitoring Frame Work.

(c) Contract Completion Report: The Consultant(s) will prepare a comprehensive Contract Completion Report. This Report, which will be issued within 3 months after the issue of taking over certificate of the Design-Build contractor works, will include As-Built drawings and shall summarise the method of construction, the construction supervision performed, actual implementation progress and costs compared to planned progress and costs, quality assurance and quality control results, Operational Guidelines, Standards and Procedures for the Materials Laboratory, technical issues addressed.

## 6. CONSULTING TEAM STRUCTURE

6.1 The proposed modality of work is based on the assignment by a project team of professionals which will undertake the tasks listed above in order to achieve a successful completion of this

infrastructure project while assuring the compliance with international procedures and regulations. The team will be constituted of the following key experts:

(a) **Key Expert No.1: Supervision Team Leader/ Engineer (5 person-months):**

(i) Education: MSc. in Highway/Road Engineering or other satisfactory professional qualifications.

(ii) Experience: At least fifteen (15) years' of professional experience with a proven record of at least 10 years of managerial experience in projects of a similar nature and magnitude (preferably with financing by international financing institutions). Experiencing working in the region will be an advantage.

(b) **Key Expert No.2: Resident Engineer (20 person-months):**

(i) Education: BSc. in Highway/Road Engineering

(ii) Experience: At least fifteen (15) years' regional/international professional experience including at least 10 years of relevant experience including contract management.

(c) **Key Expert No.3: Quality Assurance Engineer (15 person-months):**

(i) Education: BSc. in Highway/Road Engineering

(ii) Experience: At least ten (10) years' of international professional experience including at least 5 years of relevant experience. He/she should have experience with the construction and testing of flexible pavements and bituminous surface dressings and their constituent materials in tropical countries. He/she should have experience in the establishment of a materials laboratory, training of staff to a specified accredited international standard. Experience working in the region would be an advantage.

6.2 A Design Review team will be required and an Administrative Assistant. In addition to this key personnel, expertise in Environmental and Social Management will be reinforced to cover the specific needs of the grant administrator on these fields.

## 7. MANPOWER, SCHEDULING AND COSTS

7.1 In estimating man-month requirements and costs of the services, the Consultant(s) should ensure that the proposal takes full account of all of the above requirements and the following items:

(a) consultant(s) fees;

(b) consultant(s) out-of-pocket expenses;

(c) support staff services;

(d) equipment hire; and

(e) report production, documentation, and communication costs.

## 8. COMMENTS BY THE CONSULTANTS

8.1 The Consultant are required to make any comments on, and suggestions for, improvements to these TOR. The financial implications, if any, of these recommendations should be indicated in the Financial Proposal.

## 9. COORDINATION AND FACILITIES

9.1 MWH is the Executing Agency for the Consultancy. The Consultant(s) shall report to the Project Coordinator located within MWH. MWH will facilitate the issuance of any permits required for the Consultant(s) to carry out their duties and make available all relevant reports, documents, maps, and data. The Consultant(s) team members are expected to bring their own computers. MWH shall designate counterpart personnel whom the Consultant(s) shall mentor in all aspects of the assignment.

## BUDGET
**(£'000 )**

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.

**APPENDIX 5.4**

## DRAFT FUNCTIONS AND RESPONSIBILITIES OF THE COMMUNITY LAISION OFFICER

1. The Road Rehabilitation and Institutional Capacity Building Project will impact a wide range of stakeholders. To enhance project benefits, mitigate community dissatisfaction and avoid implementation delays it is recommended that stakeholder identification and involvement should be a dynamic ongoing process prior to, during and after project implementation. A CLO will be appointed to ensure that a best-practice approach is employed to provide stakeholders with a number of opportunities to participate in the decision making regarding issues that affect them as the project progresses. The CLO will be a member of the project coordinating team and will report to PC. The overall responsibility of CLO is to formulate and implement the project's Stakeholder Participation Plan inclusive of clearly defined Communication Strategies. The specific responsibilities of CLO will include:

(a) identifying project stakeholders;

(b) identifying project issues that will impact different groups of stakeholders;

(c) developing and maintaining constructive stakeholders relationships;

(d) determining appropriate engagement levels, techniques and duration to provide timely input into project development;

(e) providing communities affected and the general population with regular information regarding progress of project implementation and implication of works proposed;

(f) promoting awareness of gender and disability-responsive safety issues related to construction and road use by arranging road safety workshops/talks;

(g) identifying any new issues that may arise prior to and during implementation;

(h) monitoring implementation of social mitigation measures during construction guided by the Environmental and Social Management Plan;

(i) monitoring stakeholder attitudes to the development;

(j) encouraging the participation of women and persons with disabilities in non-traditional roles during project implementation;

(k) monitoring direct and indirect employment under the Project (disaggregated by males, females and nationality);

(l) monitoring gender, disability and cultural responsiveness of the communication plan;

(m) monitoring and evaluating community participation;

(n) collaborating with other members of the Project Coordinating Team to effectively execute the Stakeholder Participation Plan inclusive of Communication Strategies; and

(o) coordinate the establishment and effective functioning of formal Community Participation Groups (CPGs)[1] consisting of representatives of residents and businesses along the rehabilitated roads, as well as MWH representatives.

**DELIVERABLES AND REPORTING REQUIREMENTS**

2. The Consultant(s) will be expected to provide one hard copy and one electronic copy of the following for each phase of project implementation:

(a) a draft interim report detailing:

(i) identified potential stakeholders of target area by category;

(ii) an assessment of households to be affected by land acquisition; and

(iii) the composition of at least one Community Participation Group **(**CPG) for each road, with representatives of residents and businesses along the rehabilitated roads, as well as the MWH representatives. The profile of the members such as name, sex (males/females); age cohort (youth, elderly etc), disability status (disabled vis non-disabled), residential location, and business/community group represented. The frequency of meetings and procedures for conducting meetings, documenting discussions held and decisions taken must be outlined.

(b) the sub-project Stakeholder Participation Plan inclusive of clearly defined Communication Strategies two weeks prior to implementation at any given phase of the Project;

(c) monthly progress reports documenting:

(i) community forums held by type;

(ii) social mitigation measures implemented and level of stakeholder satisfaction;

(iii) direct and indirect employment created by the Project (disaggregated by males, females and nationality);

(iv) monitoring and evaluating the social and gender sensitivity and cultural appropriateness of the communication plan. To achieve this the CLO will measure and provide analysis by sex, age, nationality, occupation, interest group and other socio-cultural characteristics identified in the target area:

(aa) % target group engaged;

(bb) number of participants per forum;

[1] The objectives of the CPG is to: (a) keep community members informed on matters related to implementation including unexpected disruptions and inconveniencies that could emerge; and (b) facilitate reporting to MWH, on matters of concern to residents and the business community.

(cc) demographics of emerging leader/decision makers; and

(dd) level of public-private dialogue in the affected communities.

(v) monitoring and evaluating community participation.

**QUALIFICATIONS AND EXPERIENCE**

3. CLO should have:

(a) Bachelor's degree in the social sciences or mass communication;

(b) a minimum of ten years practical experience in stakeholder assessments and participatory assessment and communication techniques;

(c) a strong background in community research; and

(d) sensitivity to gender, disability and labour issues would be an asset.

**COMMUNITY/STAKEHOLDER PARTICIPATION PLAN BUDGET**
**(£ '000)**

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.

**APPENDIX 5.5**

## IMPLEMENTATION SUPPORT PLAN

1. CDB has been the principal partner for GOAB in the financing of road infrastructure projects, particularly on the main road network. This experience, strengthened by the satisfactory progress being made on implementing the ongoing Road Infrastructure Rehabilitation TA Project, provides a sound background for providing implementation support to GOAB. This support will also extend to the Capital Works component, as this will contribute to achieving anticipated outcomes on gender equality, also a strategic priority for CDB. The implementation support will be provided as part of CDB's project supervision functions and will include, among other things:

(a) reviewing implementation progress and achievement of project outcomes;

(b) addressing implementation issues;

(c) monitoring systems to ensure their continued adequacy through monitoring reports; audit reports and field visits; and

(d) monitoring changes in risks and compliance with legal agreements, as needed.

2. The Implementation Support Plan (ISP) will be reviewed at least once a year to ensure that it continues to meet the implementation support needs of the Project. In addition to reviewing implementation progress, the ISP aims at providing technical support to the BMC in the achievement of the results.

3. The strategy for implementation support has been developed based on the design of the Project, its risk profile, and an assessment of the Borrower and Executing Agency. The strategy remains a flexible tool that may be amended during project implementation in response to the changing needs of the Project and the Borrower/Implementing Agency.

### Strategy and Approach for Implementation Support

4. Supervision of the Project will be undertaken by a team comprising the lead supervisor (Civil Engineer), supported by legal counsel and specialists in the areas of environment/disaster risk management; procurement; financial analysis; and social analysis. Formal supervision and field visits will be undertaken semi-annually. The first formal supervision activity will be the Project Launch Workshop (PLW). The objective of PLW is to review the implementation arrangements, train the project management in the use of CDB's fiduciary management and procurement systems, and discuss project supervision issues. PLW is scheduled for the first quarter of 2017, and arrangements will be finalised in consultation with GOAB. The training provided during PLW on the Bank's financial management and procurement procedures and guidelines will be augmented during the semi-annual supervision visits, and support will be provided on a timely basis to respond to the client's needs.

5. The Supervision Coordinator will coordinate CDB's team to ensure that project implementation is consistent with the requirements as specified in the Procurement Plan, Terms and Conditions, and other legal documents. The Supervision Team will prepare annual Project Supervision Reports identifying the status of project implementation and any issue requiring the resolution of management. On the completion of the Project, or after 90% of the funds have been disbursed, Staff will conduct an Exit Workshop to assess project results, discuss implementation issues, and identify lessons. A draft PCR will be prepared and discussed with the client during the Exit Workshop. The final PCR will be validated by the Office of Independent Evaluation (OIE). Staff will prepare a management response to the OIE's

Validation Report. The Validation Report and Management's response will be presented to the Audit and Post-Evaluation Committee.

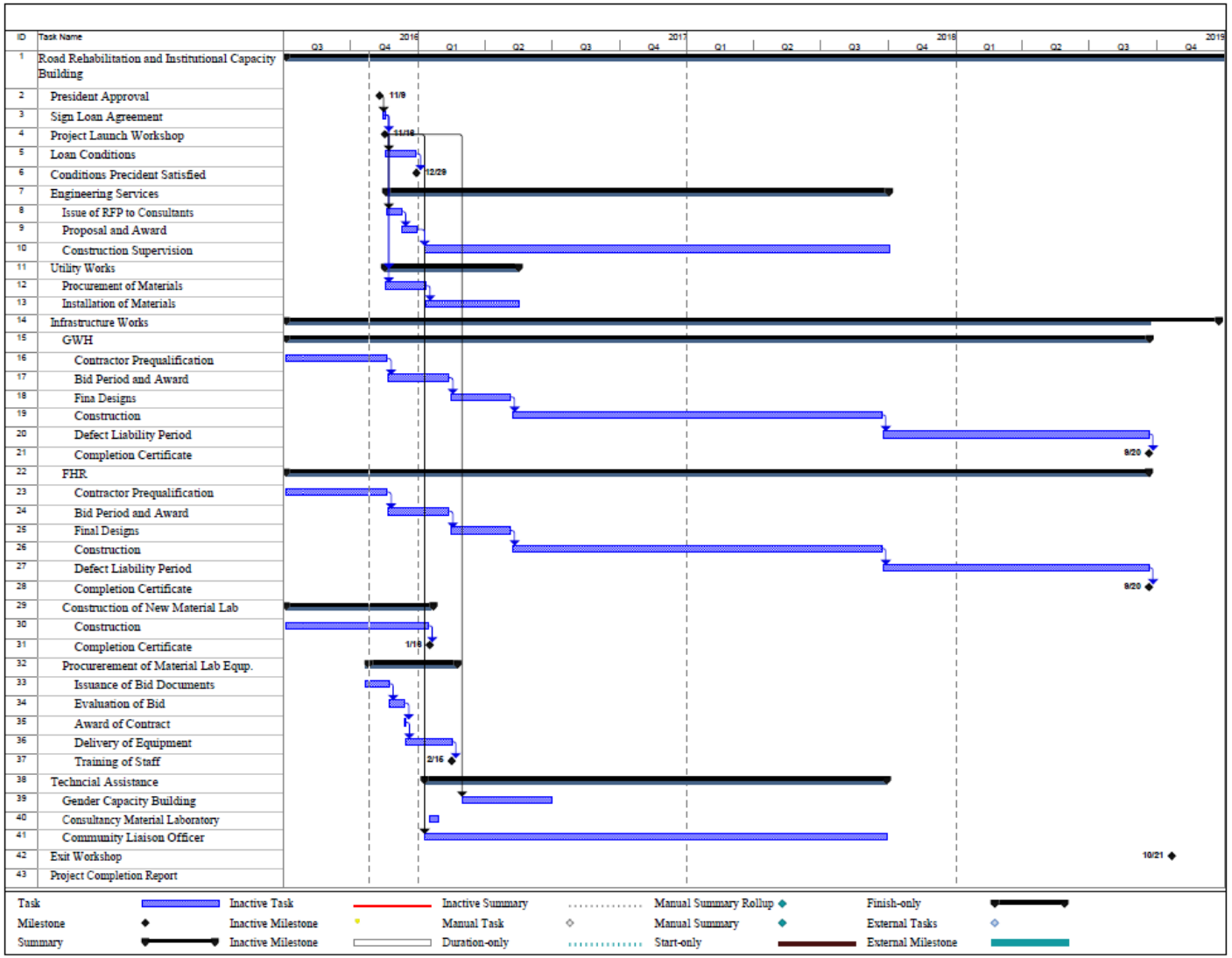
**TABLE 1: STAFF SKILLS REQUIRED**

| Period | Focus | Skills and Resources Estimate | |
|---|---|---|---|
| January – February 2017 | Specific<br>(1) Project Launch Workshop.<br>(2) Support in satisfying Conditions Precedent.<br>(3) Provide procurement support for review and evaluation of bidding documents, and also with respect to resolving procurement bottlenecks, and similar issues.<br><br>General<br>(1) Monitor project management arrangements<br>(2) Monitor Project Budgeting and Allocations.<br>(3) Monitor Project Results Framework.<br>(4) Provide technical support to PC and Implementing Agency.<br>(5) Monitor Design-Build activities, including review of reports<br>(6) Preparation of annual Project Supervision Report.<br>(7) Review and certification of requests for disbursement.<br>(8) Review of Monthly and Quarterly Reports from Implementing Agency | Lead Project Supervisor<br>Legal Counsel<br>Financial Analyst<br>Environmental Specialist<br>Social Specialist (incl. Gender)<br>Procurement Specialist<br>Administrative Assistant<br>Divisional Secretary | 5 weeks<br>2 weeks<br>0.5 weeks<br>1 week<br>2 weeks<br>1 week<br>1 week<br>0.5 weeks |

| Period | Focus | Skills and Resources Estimate | |
|---|---|---|---|
| March – December 2017 | Specific<br>(1) Provide support for procurement of Material Laboratory Equipment;<br>(2) Review of evaluation reports, and draft contracts for works and consultants.<br><br>General<br>(1) Monitor Project Budgeting and allocations.<br>(2) Monitor Project Physical Works progress and quality, including field trips.<br>(3) Monitor Project Results Framework<br>(4) Provide technical support to PC and Executing Agency.<br>(5) Preparation of annual Project Supervision Report.<br>(6) Review and certification of requests for disbursement.<br>(7) Review of Monthly and Quarterly Reports. | Lead Project Supervisor<br>Legal Counsel<br>Financial Analyst<br>Environmental Specialist<br>Social Specialist (incl. Gender)<br>Administrative Assistant<br>Divisional Secretary | 8 weeks<br>0.5 weeks<br>0.5 week<br>0.5 week<br>3 weeks<br>2 weeks<br>1 week |
| January – December 2018 | General<br>(1) Monitor Project Budgeting and allocations.<br>(2) Monitor Project Physical Works progress and quality, including field trips.<br>(3) Monitor Project Results Framework<br>(4) Provide technical support to PC and Executing Agency.<br>(5) Preparation of annual Project Supervision Report.<br>(6) Review and certification of requests for disbursement.<br>(7) Review of Monthly and Quarterly Reports. | Lead Project Supervisor<br>Legal Counsel<br>Financial Analyst<br>Environmental Specialist<br>Social Specialist (incl. Gender)<br>Administrative Assistant<br>Divisional Secretary | 10 weeks<br>0.5 weeks<br>0.5 weeks<br>2 weeks<br>3 weeks<br>1 week<br>0.5 weeks |

| | | | |
|---|---|---|---|
| January – -March 2019 | Specific<br>(1) Review PC and consultants final reports.<br>(2) Conduct Exit Workshop and complete PCR.<br><br>General<br>(1) Monitor reporting on infrastructure during Defects Liability Period.<br>(2) Review and certification of requests for disbursement.<br>(3) Review of TA reports. | Lead Project Supervisor<br>Legal Counsel<br>Financial Analyst<br>Environmental Specialist<br>Social Specialist (incl. Gender)<br>Administrative Assistant<br>Divisional Secretary | 3 weeks<br>1 week<br>2 weeks<br>1 week<br>1.5 weeks<br>1 week<br>0.5 weeks |

# PROJECT IMPLEMENTATION SCHEDULE




APPENDIX 5.6

**APPENDIX 5.7**

## ESTIMATED QUARTERLY GRANT DISBURSEMENT SCHEDULE
**(£ '000)**

| Year | Quarter No. | CDB/SFR UKCIF | Cumulative |
|---|---|---|---|
| | | | - |
| 2016 | 1 | | - |
| | 2 | | - |
| | 3 | 21 | 21 |
| | 4 | 185 | 205 |
| | **Sub-total** | **205** | **205** |
| 2017 | 1 | 989 | 1,194 |
| | 2 | 989 | 2,183 |
| | 3 | 1,919 | 4,102 |
| | 4 | 1,919 | 6,022 |
| | **Sub-total** | **5,817** | **6,022** |
| 2018 | 1 | 2,678 | 8,700 |
| | 2 | 2,757 | 11,458 |
| | 3 | 1,654 | 13,112 |
| | 4 | 788 | 13,900 |
| | **Sub-total** | **7,878** | |
| **Total** | | **13,900** | |

**APPENDIX 5.8**

# PROCUREMENT PLAN

## I. General

### 1. Project Information:

Country: Antigua and Barbuda

Borrower: GOAB

Project Name: Road Infrastructure Rehabilitation

Project Executing Agency: MWH

**2. Bank's Approval Date of the Procurement Plan:** November 2016

**3. Period Covered By This Procurement Plan:** December 2016 – December 2018

## II. Goods and Works and Non-Consulting Services

**1. Prior Review Threshold:** Procurement decision subject to prior review by the Bank as stated in Appendix 2 to the Guidelines for Procurement:

| | Procurement Method | Prior Review Threshold (USD) | Comments |
|---|---|---|---|
| 1. | ICB (works) | [redacted] | Tender Documents for works will be subject to prior review. |
| 2. | ICB (goods) | [redacted] | |
| 3. | Non-Bank Funded | No review | Procurement procedures of GOAB apply. |

**2. Prequalification.** Yes Design-Build Contract

**3. Reference to Project Operational/Procurement Manual:** CDB's Guidelines for Procurement (2006)

**4. Any Other Special Procurement Arrangements:** N/A

**Procurement Packages with Methods and Time Schedule:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Ref No. | Contract (Description) | Estimated Cost (£) | Procurement Method | Prequalification (Yes/No) | Bank Review (Prior/Post) | Expected Bid-Opening Date | Comments |
| 1. | Final Designs and Rehabilitation and Upgrade of GWH and FHR | [redacted] | ICB | Yes | Prior | December 2016 | Prequalification Process Commenced July 2016. [redacted] |
| 2. | Procurement of Material Laboratory Equipment and associated Training | [redacted] | ICB | No | Prior | November 2016 | Bid Documents Issued October 26, 2016 |

## III. Consulting Services

1. **Prior Review Threshold:** Procurement decision subject to prior review by the Bank as stated in Appendix 1 to the Guidelines for the Selection and Engagement of Consultants

| | Selection Method | Prior Revie | Threshold | Comments |
|---|---|---|---|---|
| 1. | Firms/Individuals Single Source Selection | ALL | | |
| 2. | Individual Consultant Selection | | | |

2. **Short list comprising entirely of national consultants**: N/A

3. **Reference to (if any) Project Operational/Procurement Manual**: CDB's Guidelines for Selection and Engagement of Consultants (October 2011)

4. **Any Other Special Procurement Arrangements**: Single Source Selection to be utilised for components of the project where tasks represent a natural continuation of previous works carried out under the Technical Assistance Feasibility Study.

5. Procurement Packages with Selection Methods and Time Schedule

**Procurement Packages with Methods and Time Schedule:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| **Ref No.** | **Assignment (Description)** | **Estimated Cost (£)** | **Selection Method** | **Review by Bank (Prior/Post)** | **Expected Proposal Submission Date** | **Comments** |
| 1. | Construction Supervision | | SSS | Prior | December 2016 | |
| 2. | Gender Sensitisation Training | | ICS | Post | January 2017 | |
| 3. | Communication Liaison Officer | | ICS | Prior | December 2016 | |
| 4. | Project Coordinator | | ICS-SSS | Prior | December 2016 | |

## IV. Implementing Agency Capacity Building Activities with Time Schedule

**1.** Project Launch Workshop: Schedule to be coordinated with GOAB

2. The provision of online procurement e-learning by the CDB.

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.

## V. Summary of Proposed Procurement Arrangement

| Project Component | CDB (£ '000) | | | | | | | | | NBF (USD'000) | | Total Cost (£ '000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary | Secondary | | | Other | | | | | | | |
| | ICB | LIB | RCB | NCB | Shopping | SSS | FA | QCBS | ICS | Country | Institution | |
| Project Preparation | - | - | - | - | - | - | - | | - | | - | |
| Land Acquisition | | | | | | | | | | | | |
| Final Designs and Road Works FHR and GWH | | | | | | | | | | | | |
| Engineering Services | | | | | | | | | | | | |
| Materials Laboratory Upgrade | | | | | | | | | | | | |
| Capacity Building: Gender Sensitisation Workshop | | | | | | | | | | | | |
| Communication Liaison Officer | | | | | | | | | | | | |
| Public Relations Officer | | | | | | | | | | | | |
| Project Coordinator | | | | | | | | | | | | |
| **Sub total** | | | | | | | | | | | | |
| Physical Contingency | | | | | | | | | | | | |
| Price Contingency | | | | | | | | | | | | |
| **Total Project Costs** | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| DC | Direct Contracting | NCB | National Competitive Bidding |
| FA | Force Account | QBS | Quality Based Selection |
| ICB | International Competitive Bidding | QCBS | Quality and Cost-Based Selection |
| LIB | Limited International Bidding | RCB | Regional Competitive Bidding |
| NBF | Non-Bank Financed | UOF | Use of Funds |

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.

**APPENDIX 5.9**

## REPORTING REQUIREMENTS

| Reports | Frequency | Deadline for Submission |
|---|---|---|
| **Implementation** | | |
| 1. Progress Report on project implementation prepared by PC. | Monthly | Within one month after the end of each calendar month until project implementation is completed, commencing one month after the Project Launch. |
| 2. Evaluation Reports on shortlists and proposals for the consultancies prepared by PC. | - | Within two weeks of the submission deadlines. |
| 3. Evaluation Reports on prequalification and tenders for works prepared by PC. | - | Within two weeks of the submission deadlines. |
| 4. Reports on the Investment Costs of the Project prepared by PM. (Sample guidelines presented in the Annex). | Quarterly | Two weeks after the end of each quarter until project implementation is completed, commencing with the quarter. |
| 5. Monthly progress reports on Civil Works contracts by the Construction Supervision Consultants. | Monthly | Within three weeks after the end of each calendar month until project implementation is completed. |
| 6. Consultants' Reports. | - | Within one month of acceptance of the reports. |
| 7. Completion Report for each Civil Works Contract prepared by the Construction Supervision Consultants (including as-built drawings). | - | Within three months of the date of issue of a certificates of practical completion for each Road Works Contract. |
| 8. Project Completion Report prepared by PC on the implementation and on the early operation stage of the Project, including its climate action aspects, in content and in form specified in Appendix 6.1. | - | Within three months of completion of the Project. |
| **Operation** | | |
| 9. Maintenance Plan for the road infrastructure, including reports of condition assessments of road infrastructure. | Annually | By January 1, commencing in 2019. |

## QUARTERLY REPORT ON INVESTMENT COST OF PROJECT
**(£ '000)**

| **Elements of Project** | **Expenditure for this Quarter** | **Cumulative Expenditure to date** | **Projected Expenditure for the Quarter** | | | **Estimated Expenditure to Complete Project** | **Latest Estimate of Expenditure** | **Project Estimate as per Appraisal Report** | **Variance Favourable/ (Adverse)** | **Comments/ Reasons for Adverse Variance and Financing Proposal to Meet Cost Overrun** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Ending** | **Ending** | **Ending** | | | | | |
| (1) | (2) | (3) | $(4)_1$ | $(4)_2$ | $(4)_3$ | (5) | (6) | (7) | (8) | (9) |
| 1. Land | | | | | | | | | | |
| 2.Road Rehabilitation and Upgrade | | | | | | | | | | |
| 3. Engineering Services-Supervision | | | | | | | | | | |
| 4. Project Management | | | | | | | | | | |
| 5. Capacity Building | | | | | | | | | | |
| 6. Materials Laboratory Upgrade | | | | | | | | | | |
| **Base Cost** | | | | | | | | | | |
| 7. Contingencies | | | | | | | | | | |
| **Total Project Cost** | | | | | | | | | | |
| CDB: - UKCIF | | | | | | | | | | |
| **GOAB** | | | | | | | | | | |

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.

## GUIDELINES FOR COMPLETION OF REPORT ON PROGRESS OF INVESTMENT COST

1. Elements of Project - The elements of the Project as outlined in the Appraisal Report must be recorded in this column. If it becomes necessary to further sub-divide the main elements of the project, then the sub-elements should be grouped to facilitate the determination of the expenditure related to the main elements identified in the Appraisal Report.

2. Expenditure for this Quarter - The expenditure incurred in the quarter to which the report relates in respect of each element of the project must be recorded in this column.

3. Cumulative Expenditure to Date - The expenditure incurred in respect of each element of the project from the commencement of the project to the end of the quarter to which the report relates must be recorded in this column.

4. Projected Expenditure for Quarter - An estimate of the expenditure to be incurred in each of the next three quarters must be recorded in the columns $4_1$, $4_2$, and $4_3$.

5. Estimate of Expenditure to complete Project - This column should be completed only in respect of those elements of the project, construction/installation of which stretches beyond three quarters from the end of the quarter to which the report relates. Where a project extends over more than one year - four quarters - an estimate of the expenditure to be incurred in the period subsequent to the year must be recorded in this column.

6. Latest Estimate of Expenditure - The amounts to be recorded in this column should be derived by adding columns 3, $4_{123}$, and 5. The amounts recorded in this column should be the best estimate of expenditure to be incurred in respect of each element of the project. These amounts may be less or greater than the appraised expenditure.

7. Project Estimates as per Appraisal Report - The estimate of expenditure to be incurred in respect of each element of the project, as outlined in the Appraisal Report, must be recorded in this column.

8. Variance - The difference between columns 6 and 7 must be recorded in this column. Where the amount in column 6 is less than that in column 7, a favourable variance results. An adverse variance results where the amount in column 6 is greater than that in column 7.

9. Comments - An explanation should be given for each variance which is more than 10% of the project estimates as per Appraisal Report.

**APPENDIX 5.10**

# FORM OF PROJECT COMPLETION REPORT

1. Dispatch of information: designation of the person responsible:

The information below has to be sent to CDB under the responsibility of:

| | |
|---|---|
| Company | |
| Contact person | |
| Title | |
| Function/Department | |
| Address | |
| Phone | |
| Fax | |
| Email | |

The above-mentioned contact person(s) is (are) the responsible contact(s) for the time being. GOAB shall inform CDB immediately in case of any change.

2. Information on the end of works and first 12 (twelve) months of operation:

GOAB shall deliver to CDB a completion report with the following information on project completion and initial operation after a year of the commissioning of the Project:

(a) a brief description of the technical characteristics of the Project as completed, explaining the reasons for any significant change;

(b) the date of completion of each of the main Project's components, explaining the reasons for any possible delay;

(c) the final cost of the Project, explaining the reasons for any possible cost increases vs. initial budgeted cost;

(d) the number of new jobs created by the Project: both jobs during implementation and permanent new jobs created;

(e) a description of any major issue with impact on the environment;

(f) description of the Climate Action and/or CC resilience (adaptation) aspects of the Project and their implementation and level of success in operation to date.

(g) update on the Project's demand or usage and comments;

(h) any significant issue that has occurred and any significant risk that may affect the Project's operation; and

(i) any legal action concerning the Project that may be ongoing.

# PROJECT AREA

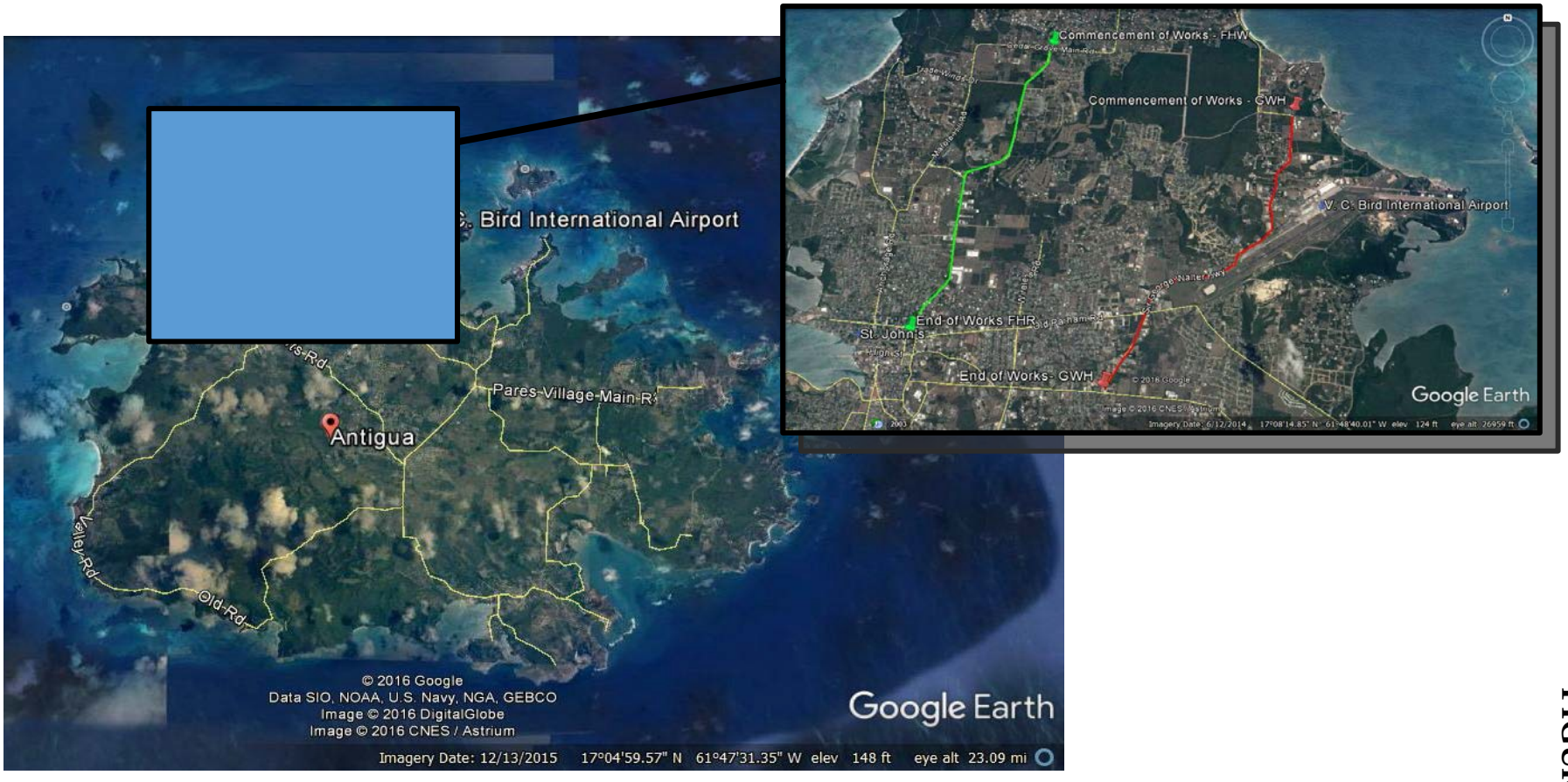



FIGURE 1