

MAHAICA-ROSIGNOL ROAD REHABILITATION PROJECT

(GY-0056)

EXECUTIVE SUMMARY

Borrower and Guarantor:	The Government of the Cooperative Republic of Guyana (GOG)		
Executing Agency:	Ministry of Public Works and Communications (MPW&C)		
Amount and Source:	IDB: (FSO) in foreign currency	US\$	33,000,000
	Local counterpart funding:	US\$	7,000,000
	Total:	US\$	40,000,000
Financial Terms and Conditions:	Amortization period:	40 years	
	Grace period:	10 years	
	Execution period:	48 months	
	Disbursement period:	60 months	
	Interest Rate:	1% during grace period	
		2% thereafter	
	Inspection and Supervision:	1%	
	Credit fee:	0.5%	
Objectives:	The general objective of the project is to increase competitiveness by reducing vehicle-operating costs and improving traffic safety. The specific objectives of the proposed project are:		
	a) To increase the efficiency and effectiveness of the Ministry of Public Works and Communications (MPW&C) to plan for infrastructure investments and maintenance and to increase its		

capacity to contract with the private sector for the execution of civil works

- b) To implement a Weight Control Program to reduce the damage caused by overweight vehicles to the road network
- c) To rehabilitate the 42 miles of road between Mahaica and Rosignol
- d) To determine the feasibility of activities to improve the southern access to the city of Georgetown and to rehabilitate the New Amsterdam to Crabwood Creek Road and associated rural roads.

Description:

The Project consists of four components: (1) institutional strengthening of the Ministry of Public Works and Communications (MPW&C); (2) implementation of weight control program; (3) rehabilitation of the Mahaica-Rosignol road segment; and (4) feasibility and design studies of southern approaches to Georgetown.

(1) Institutional Strengthening of the Ministry of Public Works and Communications (MPW&C) (US\$7.6 million)

The MPW&C has created the Work Services Group (WSG) to design and implement all contracts for investment and maintenance of roads and, bridges. The WSG will also be responsible for investment, maintenance and planning of public works. The staff of the WSG will receive competitive salaries. The Bank loan will finance technical assistance, training and computer equipment for the WSG. The GOG will finance all investment and recurrent costs needed for establishing the WSG plus increased funding for maintenance of the road network

(2) Weight Control Program (US\$0.4 million)

The implementation of a weight control program (WCP) was halted in 1997 after the portable scales being used became inoperable. The MPW&C requested the Bank's assistance to re-establish the WCP to safeguard the road investments being made. The Project will finance the design of a WCP and the establishment of six permanent weight stations.

(3) Rehabilitation of the Mahaica-Rosignol Road Segment (US\$24.0 million)

The main objective of this component is to reduce road user costs by improving riding quality and highway safety through rehabilitation works. The proposed road rehabilitation works include pavement and shoulder strengthening and widening, improvement of drainage works, construction of curbs, sidewalks, parking lanes in priority areas, and installation of traffic signs and pavement markings and road lighting and other safety elements. The estimated direct costs of the road improvements are US\$21.5 million, of which about US\$6.0 millions will be used to improve highway safety. The Project will also fund the services of an engineering consulting firm that will supervise the civil works.

(4) Feasibility and Design Studies (US\$ 3.2 million)

The Project will finance feasibility studies for investments to improve the southern access to the city of Georgetown and for rehabilitation of the New Amsterdam to Crabwood Creek Road-Moleson Road and associated rural roads. The Project will also finance the detailed designs and the preparation of bidding documents for feasible and affordable solutions.

**Environmental/
Social Impact:**

The Project will have a positive socio-economic impact upon the rural poor of Guyana, who rank among the poorest in the hemisphere, as the road traverses an eminently agricultural region and is the main source of market access for agricultural producers. Negative impacts will be mainly related to rehabilitation activities and are expected to be temporary, of small magnitude and localized to civil work areas. These negative impacts can be avoided or mitigated through efficient application of environmental management, specifications for which will be included in the construction contracts. An Environmental Impact Assessment (EIA) was prepared with extensive consultation with governmental agencies and the general public. The draft EIA was released to the public in October 2000, and discussed in a public meeting on April 22, 2001. The issues of most importance raising during the public hearing were those regarding safety, control of speeders and drainage. As a result of the consultation process, US\$6 million will

be used to enhance safety along the road. A full Environmental Management Plan (EMP) has been prepared and presented by the Ministry to the Environmental Protection Agency, in compliance with environmental laws. The EMP will be considered a contractual requirement for contractors. The CESI, at its meeting of November 10, 2000 and July 6, 2001, reviewed the Project and its recommendations are included in this Report.

Benefits:

The strengthening of the MPW&C through the establishment of the WSG is expected to rationalize public resource use for roads and bridges and will establish a model that could be used for the modernization of other public sector entities. Infrastructure maintenance, road safety and environmental management are expected to improve. The implementation of the weight control program is expected to contribute to lower road maintenance costs.

The economic benefits of the rehabilitation of the Mahaica-Rosignol Road were evaluated using the HDM-4 model. The IRR was estimated at 33% and the NPV at US\$29 million. These results exclude the benefits that are expected to result from increased highway safety expenditures. These results are quite robust. For example, with cost increases of 100%, the IRR would be reduced to 16% and the NPV would be US\$9 million.

The benefits that would result from the feasibility studies can not be estimated *a priori*. However, analysis of traffic flows indicates that an improvement of the Southern approach to Georgetown and the rehabilitation of the New Amsterdam to Crabwood Creek road would have adequate IRRs.

Risks:

The **main risks** are:

- a) lack of a strong project management capability in the MPW&C
- b) inadequate road maintenance
- c) inability of the MPW&C to monitor contractors adequately
- d) cost overruns
- e) delays in the initiation of the project

Risk mitigation measures proposed include:

- a) establishing and strengthening of the WSG

- b) improving the system to rationalize maintenance (financed under the Bridges Rehabilitation Program) and a commitment to double maintenance expenditures over a period of four years.
- c) a 3-year maintenance contract within the rehabilitation works, and implementation of an RMMS on 200 miles of main roads.
- d) hiring an engineering supervision firm using ICB procedures
- e) using lump sum contracts for the civil works.
- f) using C&D funds and funds from on-going projects to support actions related to Project implementation before the Loan Contract is signed.

**The Bank's and
the Country
Strategy:**

The Bank strategy in the road sector, as reflected in the 1998 Country Paper, is to rehabilitate, maintain and complete critical components of the road network in order to reduce transportation costs, and thus promote national integration and economic growth. The Programming Mission of November 2000 included the Mahaica-Rosignol Road in the 2001-A project pipeline, thus reiterating the priority of rehabilitating this critical road stretch. During the Programming Mission, the Bank agreed to consider the financing of feasibility studies of the Southern Approach to Georgetown and of the New Amsterdam to Crabwood Creek-Moleson Road and associated rural roads. In terms of modernization of the public sector, the Bank supports actions designed to increase the efficiency and effectiveness of public sector institutions, particularly by outsourcing the execution of works.

**Special
Contractual
Conditions:**

To ensure proper Project execution the special conditions below are proposed:

1. Prior to first disbursement of the resources of the loan, the Executing Agency shall present for the Bank's approval evidence that Work Services Group (WSG): a) is fully staffed; b) has established a financial management system to carry out the Project activities; and c) has a budget which includes the counterpart funds for the Project for the first year. Paragraph 3.5
2. Prior to the pre-qualification of the civil works contractor the Executing Agency shall hire the Engineering Supervisory firm for the Civil Works Component." Paragraph 3.10

3. Prior to the first disbursement of loan resources for the civil works component, the Executing Agency shall provide evidence to the Bank that it has hired a consulting firm to establish the Routine Maintenance Management System (RMMS). Paragraph 1.20

Procurement: The threshold above which procurement will be subject to ICB is US\$350,000 for goods and US\$1,000,000 for civil works. All Bank-financed civil works (rehabilitation of the Mahaica-Rosignol road) will be let in one package to pre-qualified firms.

SEQ/PTI: This operation qualifies as a social equity-enhancing project, as described in the indicative targets mandated by the Bank's Eighth Replenishment (Document AB-1704). Furthermore, this operation qualifies as Poverty Targeted Investment (PTI) (See paragraphs 2.5 and 2.6). The borrowing country will be using two percentage points in additional financing.

Exceptions to Bank Policies: None

I. FRAME OF REFERENCE

A. Economic Framework

- 1.1 For the two decades after its 1966 independence, Guyana followed statist economic policies, and several important enterprises in the sugar, rice and bauxite sector were brought under government control. Economic stagnation, high inflation, fiscal and current account deficits, ballooning external debt, and unprecedented levels of migration characterized the period. Beginning in 1988, a number of measures were implemented to stabilize and liberalize the economy, and to give a greater role to the private sector. The improved policy framework began to have highly positive effects beginning in the early 1990s. In the period 1991 to 1997, real GDP grew at an average rate of over 7%, compared to an average negative growth of 3% in the 1980s, while inflation was reduced from over 100% in the late 1980s to 4.5% in 1997.
- 1.2 In the 1998-2001 period, economic progress was impeded by political uncertainty, which resulted from the civil unrest following the December 1997 elections; the Hermanston Accord which called for a protracted process of Constitutional Reform and effectively reduced the term in office from 5 to 3 years and the health-related resignation of a President and the delay of Presidential elections introduced some uncertainty for investors. Elections took place in March 2001, and international observers declared them free and fair. It is expected that the resulting political certainty will enhance investor confidence.
- 1.3 During the same period (1998-2001), Guyana experienced a number of external and internal shocks that significantly weakened the economy. The shocks included the El Niño drought, La Niña flooding, continued deterioration of export prices for bauxite, gold, timber and rice, Euro depreciation that reduced the value of preferential sugar exports, a public service strike, and rising oil prices. Real GDP contracted by 1.7% in 1998, expanded by 3.0% in 1999, and contracted again by 1.0% in 2000. The public sector deficit increased to 6.3% due to the second installment of the Arbitration Tribunal salary award for public workers of 66% (31.06% in 1999 and 26.66% in 2000), which helped close the notional private-public sector compensation gap, but diverted debt relief earmarked for poverty reduction initiatives under the Original Heavily Indebted Poor Countries Initiative (O-HIPC). Although recently contained, end of period inflation increased from 4.2% in 1997 to 5.9% in 2000, while the nominal exchange rate depreciated by about 30%.
- 1.4 Despite the trying political and economic environment, the Government implemented a significant number of structural reforms under the IMF's First Annual Arrangement of the Poverty Reduction and Growth Facility (PRGF) between 1998-1999, including specific financial, private and public sector reforms. The Bank has supported the reform program with sectoral loans,

including the Agricultural Sector Loan and the Financial Sector Program. The implementation of macroeconomic, structural and social sector reforms was satisfactory – except for civil service reform – and helped Guyana reach the “completion point” under the Original HIPC Initiative on May 14, 1999. The fiscal impact of the Arbitration Tribunal award delayed negotiations by more than a year, but Guyana achieved good standing with the IMF following agreement on a macroeconomic, structural and social reform program for the 2000-2001 period.

- 1.5 The Boards of the IMF and World Bank approved Guyana’s “Completion Point” under the Original Heavily Indebted Poor Countries (O-HIPC) Initiative in May 1999, which provided debt relief of US\$256 million in net present value terms. While the ratio of external debt to central government revenues was significantly reduced to 348% in 2000, the ratio did not fall below the “fiscal criteria” target of 280%, primarily due to a significant depreciation of the nominal exchange rate. Under the Enhanced HIPC (E-HIPC) Initiative, the IMF and World Bank revised the “fiscal criteria” target to 250% and Guyana reached the “Decision Point” in November 2000, which qualifies the country for additional debt relief of \$329 million in net present value terms. While the IMF and World Bank are already providing interim debt service relief, other donors will await the “Completion Point”, which is expected toward the end of 2001. The IDB is the largest donor under both Initiatives. Debt relief under both HIPC Initiatives is expected to average about 7% of GDP ratio between 2000-2007 before tapering off sharply in later years.
- 1.6 A major recent development is the sustained dialogue and progress toward building of national consensus on important economic and political issues between the two major political parties. Political resolution is a window of opportunity for the Government to accelerate structural reforms and strengthen institutional, organizational, and human resource capacities. Restoring economic growth, improving productivity and basic infrastructure, and diversification efforts to ameliorate the adverse impact of exogenous shocks are key priorities.

B. The Road Network

- 1.7 The road network of Guyana totals 2,485 miles classified as follows:

TYPE	LENGTH (MILES)	%
Main roads (paved)	585	24
Feeder roads	510	20
All weather trails	700	28
Earthen trails	690	28
Total	2,485	100

- 1.8 The national paved road network originates in Georgetown and consists of four main roads. One road extends southeast from Georgetown to the villages of Mahaica and Rosignol and to the west bank of the Berbice River (across from New Amsterdam) and then continues on the east bank of the Berbice to the border with Suriname. A second road goes southward and westward from Vreed en Hoop, on the west bank of the Demerara River, to Potosi and Parika, and from there to Huber on the East Bank of the Essequibo River. A third road goes south, passing by the international airport at Timehri and continuing to Linden and Wismar in the interior of the country. The fourth road extends from the West Bank of the Essequibo River to Charity on the Pomeroon River. All national paved roads have only two lanes and they serve a national fleet of about 52,000 vehicles. See map at the beginning of this report.

C. Institutional Framework

- 1.9 The Ministry of Public Works and Communications (MPW&C) has numerous objectives that include:

- a) Coordinating and monitoring policies and activities with respect to public infrastructure in roads, bridges, sea ports, airports, and sea and river defenses
- b) Supervising the construction and maintenance of all public buildings
- c) Promoting and monitoring technical standards in electrical installation

- 1.10 The MPW&C has six line divisions. These divisions and their functions are:

- a) **Roads Division.** Responsible for the construction and maintenance of roads and bridges, and for traffic safety. Demerara Harbor Bridge. The main aim of this unit of the Ministry is to manage and maintain the Demerara Harbor Bridge. This unit has been corporatized.
- b) **Transport and Harbors Department.** Responsible for the construction, maintenance, and management of all sea and river ports. This unit has been corporatized.
- c) **Civil Aviation Department.** Responsible for the efficient and safe operation of all airports and aerodromes, as well as for civil aviation regulation. This unit has been corporatized.

- d) **Sea and River Defenses Division.** The main objective of the Sea and River Defenses Division is to rehabilitate, improve and maintain the sea and river defenses.
 - e) **Buildings Division.** The main objective of the Buildings Division is to construct and maintain all Government buildings.
 - f) **Electrical Division.** The Electrical Division is primarily responsible for the safe utilization of electricity through the country, including carrying out inspections to determine compliance with prevailing standards.
- 1.11 The main staff division is the **Central Transport Planning Unit**. This unit is responsible for strategy and inter-model planning of facilities and sea defenses and coordinating public sector investments programs, establishing project priorities and consolidating budget proposals within the Ministry. Other staff divisions or units handle human resources management, financial management and other normal staff functions.
- 1.12 The capability of the MPW&C to carry out its mission has been hindered by a number of constraints, such as low salaries for civil servants, minimal spending on training, and cumbersome procurement procedures. In the past two years, however, capable and strong leadership has improved operations of the MPW&C. For example, the corporatization of key units of the MPW&C is contributing to improved efficiency and effectiveness. The creation of the Work Services Group, discussed in detail in Chapters III and IV of this document will increase the capability of the MPW&C to contract with the private sector for the construction, rehabilitation and maintenance of civil works.
- 1.13 The MPW&C executed a **weight control program (WCP)** that was financed by the World Bank and that was terminated in 1997. The WCP supported the enforcement of weight limits on the public roads of Guyana and employed portable scale units for random checks on heavy vehicles at various selected locations. The system of portable scales encountered mechanical problems, and the current weight limit (16,000 lbs. for a single-axle) is lower than accepted international standards and therefore should be modified as part of a program to increase enforcement.

D. The Bank Strategy

- 1.14 The Bank's country strategy seeks to promote sustainable growth and poverty reduction through public sector modernization reforms that stand to benefit economic growth, alleviate poverty, and strengthen social-service delivery. The Bank's strategy for the transport sector, as outlined in the Country Paper (September 30, 1998), is to "rehabilitate and expand infrastructure, particularly in priority areas as required to support the private sector and for

the improvement of living conditions.” The Programming Mission of November 2000 included the Mahaica-Rosignol Road in the 2001-A project pipeline, thus reiterating the priority of rehabilitating this critical road stretch. During the Programming Mission, the Bank agreed to consider the financing of feasibility studies of the Southern Approach to Georgetown and of the New Amsterdam to Crabwood Creek-Moleson Road and associated rural roads. The Mahaica-Rosignol Road and the New Amsterdam to Crabwood Creek-Moleson Road provide access to the important agricultural areas. The Southern area of Georgetown contains industry, commerce and housing, including low-income housing.

E. The Bank Experience in the Transport Sector

1. The On-going Road Rehabilitation Project (Loan 890/SF-GY)

1.15 On September 16, 1992, the Bank approved Loan 890/SF-GY for US\$23.4 million to repave and construct shoulders in main segments of the national road network. This project faced significant implementation problems, some due to exogenous factors but some due to policy decisions by the Government of Guyana. Main problems have been:

- a) The addition to the project, with Bank approval, of some road segments within Georgetown as well as a bypass road for the Georgetown-Mahaica segment. These additions reduced the resources available for rehabilitation of the main road network.
- b) Poor engineering administration (design, construction and supervision) and lack of adequate cooperation among the contractors, supervisors and MPW&C.
- c) The government policy of fragmenting the contracting of the civil works (see paragraph 1.25).

1.16 The civil works under this project have been completed satisfactorily, but much later than forecasted. The institutional strengthening support component, which has about US\$200,000 of unspent funds, will be completed by the end of March 2002. Some of these remaining funds will be used to strengthen the WSG.

2. Bridges Rehabilitation Program (Loan 999/SF-GY)

1.17 A closely related operation is the Bridges Rehabilitation Program that was approved on November 25, 1997 for an amount of US\$41 million. This loan will replace, rebuild or rehabilitate existing bridges and culverts along the main road system, including the Mahaica-Rosignol segment. In addition, the loan will fund a study of the feasibility of improving the crossing at the Berbice River, between the townships of Rosignol and New Amsterdam, and will also fund those improvements including access road, if they are

demonstrated to be economically and financially viable. Improvements to the Berbice River crossing are expected to increase traffic in the Mahaica-Rosignol road segment.

- 1.18 After several initial delays a result of poor management and attempts to change the original design of the program, the program is moving ahead rapidly under the new Project Manager. Final designs for the first package of structures were completed in June 2001, and requests for proposals for the supervision of construction were invited from short-listed firms at the end of July 2001. Construction is expected to begin in the first quarter of 2002.
- 1.19 Given that two bridges and numerous culverts that will be built under this project are in the Mahaica-Rosignol Road segment, the activities under the Bridge Rehabilitation Program are being coordinated closely with the proposed Mahaica-Rosignol Road Rehabilitation Program.
- 1.20 The Bridges Rehabilitation Program is also financing a number of activities that improve road management in general and are therefore supportive of the proposed Project. These activities include:
 - a) Funding for an international road maintenance engineer. This engineer has been advising the MPW&C since May 2001 and it is expected that he will continue to provide intermittent support until March 2002.
 - b) Funding for a road maintenance pilot project. This pilot project will cover about 60 miles, and will test the use of multi-year performance-based contract modes with private firms. This routine maintenance contracting modality will be expanded, using the RMMS; to cover the entire main road networked in 3-4 years.
 - c) Funding for a firm that will establish in the Work Services Group (WSG) a Routine Maintenance Management System (RMMS). The RMMS will permit the rationalization of maintenance expenditures. This firm will be hired prior to the first disbursement of loan resources for the civil works component of the Proposed Project (Mahaica-Rosignol Road Rehabilitation).
 - d) Funding for a highway safety consultant and the establishment of a highway safety unit within the WSG. This unit will develop a data base, a strategy and action plans for improving highway safety on the entire main road network.

3. Air Transport Reform Program (Loan 1042/SF-GY)

- 1.21 The loan for the Air Transport Reform Program LO1042/SF-GY was approved in February 2000. This loan provides funding for institutional and infrastructure development to bring Guyana into compliance with

international standards as required by the International Civil Aviation Organization (ICAO). A key component is the transfer of responsibilities for civil aviation from central government to two statutory corporations. First, the Air Transport Reform Program supports the establishment of the Guyana Civil Aviation Authority (GCAA). Second, it supports the creation of an airport corporation to manage the Cheddi Jagan International Airport (CJIA) at Timheri (close to Georgetown) as well as the aerodromes and airstrips in the hinterland. To accomplish this, legislative changes and regulatory changes were required. In addition, the regional aerodrome at Ogle, which is within the greater Georgetown area and serves commuter flights to the hinterland areas as well as some small private traffic between Guyana and Surinam, Brazil and Venezuela, is to be leased to private operators.

- 1.22 The new Civil Aviation Act of 2000 gave legislative approval for the new institutional arrangements for civil aviation. Following a consultancy on the restructuring of the Civil Aviation Department, work has now begun on the transition to the new GCAA. The corporatization of the CJIA is underway, with policy decisions being set by an interim Board of Directors. Recruitment of senior aviation professionals to staff the GCAA and the CJIA has been the focus of intensive activity in a very competitive international market.

F. Other Donor Experience in the Transport Sector

- 1.23 The World Bank and the European Community (EC) have been active in the road transportation sector. The World Bank has disbursed US\$20 million of an Infrastructure Rehabilitation Projects of US\$26 million. This project focused mainly on the rehabilitation of the Essequibo coast road and preventive maintenance of sea defenses. The EC, through the National Indicative Program (Lomé Consortium), financed an Economic Infrastructure Rehabilitation Project of US\$25.9 million. The program included rehabilitation of sea defenses and the Demerara Harbor Bridge. The EC also financed the establishment of a ferry service between Suriname and Guyana and an upgrading of the road link from the ferry crossing to Corriverton. The operation of the ferry will result in a small increase in traffic in the road network, including traffic in the Mahaica-Rosignol road.

G. Lessons Learned from Transport Sector Projects in Guyana

- 1.24 Projects from all donors have faced major implementation delays and cost overruns. Implementation delays have resulted from the inability of the executing agency to meet conditions prior to loan disbursement, an inability to conclude contract actions in a reasonable amount of time, and lack of implementation capability in place before project implementation begins. Some projects may have been approved before they were fully designed. An important lesson learned in Guyana and elsewhere is that to implement projects in a timely fashion it is necessary to conclude main actions necessary for project implementation before loan approval. C&D funds are being use to

finance an advisor to the WSG and advertisements for expressions of interest for the main contracts have been published in the U.N. Development Business for the implementation of this Project.

- 1.25 Inadequate design and lack of cooperation among stakeholders (MPW&C, civil works contractors, engineering supervision firm, Bank and civil society in the area of influence of the project) has been a source of cost overruns and other inefficiencies. Another major source of cost overruns has been the fragmentation of contracts, as small contracts have not attracted well-qualified bidders. Therefore, the proposed Project will require the “bundling” of construction activities into a single contract that is expected to attract interest from international construction firms.
- 1.26 Cost-plus contracts in Guyana have transferred most or all of the risk to the public sector. The use of lump-sum contracts- can be a good mechanism to restrict cost overruns. These lump-sum contracts have to be based on adequate engineering and environmental designs, quality control and quality assurance procedures, value engineering, maintenance warranties and most importantly, effective and transparent cooperation among all stakeholders, including the MPW&C, civil works contractor, engineering supervision firm and the Bank.

II. THE PROJECT

A. Objectives

- 2.1 The general objective of the project is to increase competitiveness by reducing vehicle-operating costs and improving traffic safety. The specific objectives of the proposed project are:
- a) To increase the efficiency and effectiveness of the Ministry of Public Works and Communications (MPW&C) in the management of engineering, construction, and maintenance activities in the roads sector, and promote the inclusion of road safety and environmental concerns in all aspects of road management.
 - b) To reduce the damage to the road network caused by overweight vehicles.
 - c) To rehabilitate the 41 miles of road between Mahaica and Rosignol.
 - d) To carry out feasibility studies, detailed design and bidding documents of actions to improve the southern access to the city of Georgetown and to rehabilitate the New Amsterdam to Crabwood Creek-Moleson Road and associated rural roads.

B. The Project Areas

- 2.2 The Mahaica Rosignol Road area, where the rehabilitation works will be carried out, is described below, and shown in the map presented at the beginning of this report. Additionally, the Southern approaches to Georgetown and the New Amsterdam to Crabwood-Moleson Road area is also described. Feasibility and detailed design for activities to improve access to southern area of the city of Georgetown and for rehabilitating the New Amsterdam to Crabwood Creek-Moleson Road will be financed by the proposed project.

1. Mahaica-Rosignol Road Project Area

- 2.3 The Mahaica-Rosignol (MR) road is a 41 mile section of the East Coast road that extends from the east abutment of the Mahaica river bridge to the Rosignol steeling, on the banks of the Berbice River, across from the City of New Amsterdam, the second largest city in the country. The road provides the only access to New Amsterdam and to the Berbice Region, the most important agricultural area in Guyana. The entire Mahaica-Rosignol road is situated in the coastal belt and traverses an almost continuous ribbon of houses and businesses on both sides, with short intermittent breaks. The main townships along the road are Mahaica, Mahaicony, Abary, Bush-Lot and Rosignol.
- 2.4 The area is among the most populated regions of Guyana. The main economic activities are rice cultivation (100,000 hectares) and coconut groves

(10,000 hectares). About 48,000 people live along the road and about 299,000 people live immediately west of the road. About 143,000 people live east of the road (across from the Berbice River) and use it as their main connection to commute to Georgetown. In total the Mahaica Rosignol road serves, directly or indirectly, about 490,000 people or more than fifty percent of the population of Guyana.

- 2.5 GDP per capita in Guyana is US\$785, one of the lowest in the region, and much of its social infrastructure remains in a state of deterioration. Consistent with Guyana's successful economic performance in the 1990s, absolute poverty at the national level declined from 43% in 1993 to 35% in 1999. While this decline is significant, the overall rate is still high by regional standards. Moreover, the benefits of growth have been uneven. The largest decline in poverty occurred in Georgetown, from 29% to 16%, with smaller decreases in other urban areas (from 23% to 15%) and the rural coastal region (from 45% to 37%). Since the Mahaica-Rosignol Road is located in the rural coastal region East of Georgetown, the program qualifies as PTI on the basis of the geographical criteria, given that this region has poverty rates higher than the national average.
- 2.6 Moreover, a 1999 poverty survey of Guyana done by the Bank classifies the poverty level this region as very and most severe. This classification indicates that the Mahaica- Rosignol Road serves mainly communities which are under the poverty line that was defined as G\$91,668 or about US\$550 per annum per person.
- 2.7 In addition, the Mahaica-Rosignol road currently serves an average daily traffic volume between two thousand to thirty-eight hundred vehicles. Out of this total volume of traffic about 40% percent are mini buses or small buses that serve about 10,000 people who are generally low-income groups. Also, the rehabilitation of the Mahaica-Rosignol Road will provide future services to outpatient citizens that currently use the main hospital in Georgetown and in the future will use the new health facilities that will be constructed along the coastal area East of Georgetown.
- 2.8 The road was constructed in 1963-64 and has completed its useful life. The surface conditions are variable, ranging from very poor to fair, with an International Roughness Index (IRI) ranging from less than four meters/km up to a maximum of nine meters/km¹ which suggests that there is an urgent need to rehabilitate the road. The present traffic volume varies between 2,000 and 3,800 vehicles per day and justifies the rehabilitation of the road on the basis of reduced transportation costs and improved road safety.

¹ IRIs of nine are extremely rare in the Mahaica-Rosignol road segment.

- 2.9 The existing road structure, its foundation, its thickness and its engineering characteristics are not uniform and requires using new techniques of non-destructive testing for its evaluation to achieve cost effective rehabilitation.

2. The Southern Approach to Georgetown

- 2.10 The expansion of Georgetown and a rapid increase in traffic has resulted in major congestion in the southern approach to the city, a mixed-use area that includes housing, industrial and commercial establishments. Average daily traffic is 18,000, of which about 8,000 are trucks, and there is heavy congestion and numerous accidents. Analysis of traffic counts in the entire road network indicates that improvements in the southern approach to the city could have a high Internal Rate of Return (IRR).

3. New Amsterdam to Crabwood Creek-Moleson Road

- 2.11 Another high priority road project would be the rehabilitation of the road going from New Amsterdam to Crabwood-Moleson Creek, on the banks of the Corentyne River at the border with Suriname. Rehabilitating this road and its associated rural roads would improve access in an important agricultural region and could also contribute to greater economic integration between Suriname and Guyana. A ferry crossing the Corentyne River and a road from Molson Creek, at the ferry landing, to Crabwood Creek, was financed by the European Union.

C. Project Description

- 2.12 The project consists of four components that are:

- a) Institutional strengthening of the Ministry of Public Works and Communications (MPW&C)
- b) Implementation of a Weight Control Program (WCP)
- c) Rehabilitation of the Mahaica-Rosignol road segment
- d) Feasibility and design studies of southern approaches to Georgetown, and the rehabilitation of the road going from New Amsterdam to Crabwood Creek-Moleson Road and associated rural roads.

1. Institutional Strengthening of the Ministry of Public Works and Communications (MPW&C) (US\$7,650,000)

- 2.13 The GOG, with support from the Bank, has initiated a number of studies that will define a strategy and action plan for the modernization of the public sector. Key principles guiding the modernization effort will be:

- a) Evaluation of civil service salary levels and increases to approach greater parity with the private sector.
- b) Concentration of public sector activity on planning and regulation, and increased reliance on the private sector for the execution of programs (outsourcing).

2.14 This public sector modernization program will take several years to implement. The Project Team worked very closely with the staff from the MPW&C to develop an execution mechanism for the proposed Project that would ensure efficient implementation while at the same time supporting the longer-term efforts for public sector modernization. To achieve these two objectives, the MPW&C proposed the creation of the Work Services Group (WSG). The WSG will be in charge of highway planning (HDM-IV), design, procurement, implementation, quality control, quality assurance and monitoring of all contracts for investment and maintenance of roads and bridges.² It will also have the capability to plan for investment and maintenance of public works. The staff of the WSG will receive competitive salaries. Therefore, the establishment of the WSG can be considered as a first, tangible step for the modernization of the MPW&C in accordance with the principles that were established for the modernization of the public sector. The details of the WSG are given in Section III. The Multi-Sector Pre-investment Program presently under preparation will support activities to strengthen the planning capability of the MPW&C.

2.15 The Bank loan will finance³:

- a) Advisory services (individual or firms) for the WSG.
- b) Training for the staff of the WSG on management, contract management, highway design and management (HDM), pavement evaluation and design, contracting and procurement procedures, and computer use.
- c) Training on environmental analysis.
- d) Training for local engineering and construction firms on contract management, quality control, quality assurance procedures and environmental analysis.
- e) Short-term consultants in planning (HDM), public sector management, finance, legal issues, and materials testing.

² At a future date, the WSG may also assume responsibility for sea defense.

³ The Bridge Rehabilitation Program (Loan 999/SF-GY) will finance the services of a firm that will install a Routine Maintenance Management System (RMSS) in the WSG and will train the WSG staff in its use. This Program is also financing the services of a long-term highway safety advisor.

- f) Consultants to assist in the monitoring of the environmental aspects of the Mahaica-Rosignol Road Project.
- g) Computer equipment and software.
- h) Material testing equipment and instituting a laboratory testing program.
- i) *Ex post* evaluation of the use of lump sum contracts. The terms of reference have been prepared and have been agreed with the GOG.

2.16 Counterpart resources will finance:

- a) All local staff salaries in the WSG.
- b) Other operating costs such as electricity, telephone, office materials, etc.
- c) Set up costs, including modifications of an existing building for the WSG and the necessary renovations.
- d) Incremental road maintenance costs that will be prioritized using the RMMS and will be used for the national paved road network.

2. Weight Control Program (WCP) (US\$400,000)

- 2.17 The MPW&C requested the Bank's assistance to re-establish the WCP to safeguard the road investments being made. Information from the previous World Bank WCP indicates that there are vehicles exceeding the allowable weight limit. However, it seems that this has not affected significantly the surface conditions of the main highways. As an example Mahaica-Rosignol road was constructed 35 years ago and there is no evidence of serious surface deterioration such as heavy rutting or other type of plastic deformation. The MPW&C requested the Bank to support the review of the existing weight limits with the objective of setting these limits on par with international standards. Review of local legislation will also consider penalties for overloading vehicles and mandatory compliance by vehicle operators with weight control procedures. In addition, the MPW&C plans to install six permanent scales at approximately 100km intervals or at key locations of the national paved road system. A quantity of portable units will be procured and used for random checks and axle loads. The estimated total cost for this activity is US\$400,000.00 of which US\$300,000 is for equipment and civil works, US\$50,000 for consultancy services and US\$50,000 for operating expenses. The operating expenses will be financed using GOG resources.

**3. Rehabilitation of the Mahaica-Rosignol Road Segment
(US\$24,000,000)**

- 2.18 The main objective of this component is to reduce road user costs by improving riding quality and highway safety through rehabilitation works. The proposed road rehabilitation works include:
- a) Pavement and shoulder strengthening and widening.
 - b) Improvement of drainage works.
 - c) Construction of curbs, sidewalks and parking lanes in priority areas.
 - d) Installation of traffic signs, pavement markings, road lighting and surface rumble strips to encourage speed reduction.
 - e) Pavement and shoulder widening to improve safety of motorized and non-motorized traffic.
 - f) Maintenance of the road for three years (total cost US\$300,000).
- 2.19 The estimated direct costs of the road improvements are US\$24.0 million of which about US\$6.0 millions will be used to improve highway safety. The Project will also fund the services of an engineering consulting firm that will supervise the civil works. Cost of engaging the engineering consulting firm has been estimated at US\$2.0 million. Contracting will be under ICB.

4. Feasibility and Design Studies (US\$3,250,000)

- 2.20 As discussed in paragraph 2.7, the southern approach to the city of Georgetown is highly congested with about 18,000 ADT, and numerous traffic accidents occur, and therefore it is likely that a project to reduce congestion and increase safety would be economically viable. The Government of Guyana (GOG), through the Ministry of Public Works and Communications (MPWC), requested Bank support for investments to improve access to the city. The Project will finance feasibility studies for investments to improve the southern access to the city of Georgetown and for rehabilitation of the New Amsterdam to Crabwood Creek-Moleson Road and associated rural roads. The Project will also finance the detailed designs and the preparation of bidding documents for feasible and affordable solutions. The terms of reference for the studies have been prepared by the Project Team and the MPW&C and are in the Project Files.

D. Project Costs and Financing

- 2.21 Project costs are summarized in the table below (in US\$000) .

ITEM	Bank	GOG	Total	Percent
1. Institutional Strengthening	1,100	6,550	7,650	19%
2. Weight Control Program	350	50	400	1%
3. Mahaica-Rosignol Road Rehabilitation		-		
- Civil works	21,800		21,800	55%
- Supervision	2,000	200	2,200	5%
Sub-total rehabilitation	23,800	200	24,000	60%
4. Feasibility Studies	3,050	200	3,250	8%
5. Contingencies	4,000	-	4,000	10%
6. Financial Costs (Inspection and supervision fees and interest)	700	-	700	2%
TOTAL:	33,000	7,000	40,000	100%

- 2.22 The Ministry of Finance agreed to provide US\$7.0 million of counterpart funds during the execution of the project. These funds will finance costs associated with the establishment and operations of the WSG. Additionally, the Ministry of Finance agreed to increase highway maintenance funding during the years 2002 to 2005 at an annual rate of 20%:

III. PROJECT EXECUTION

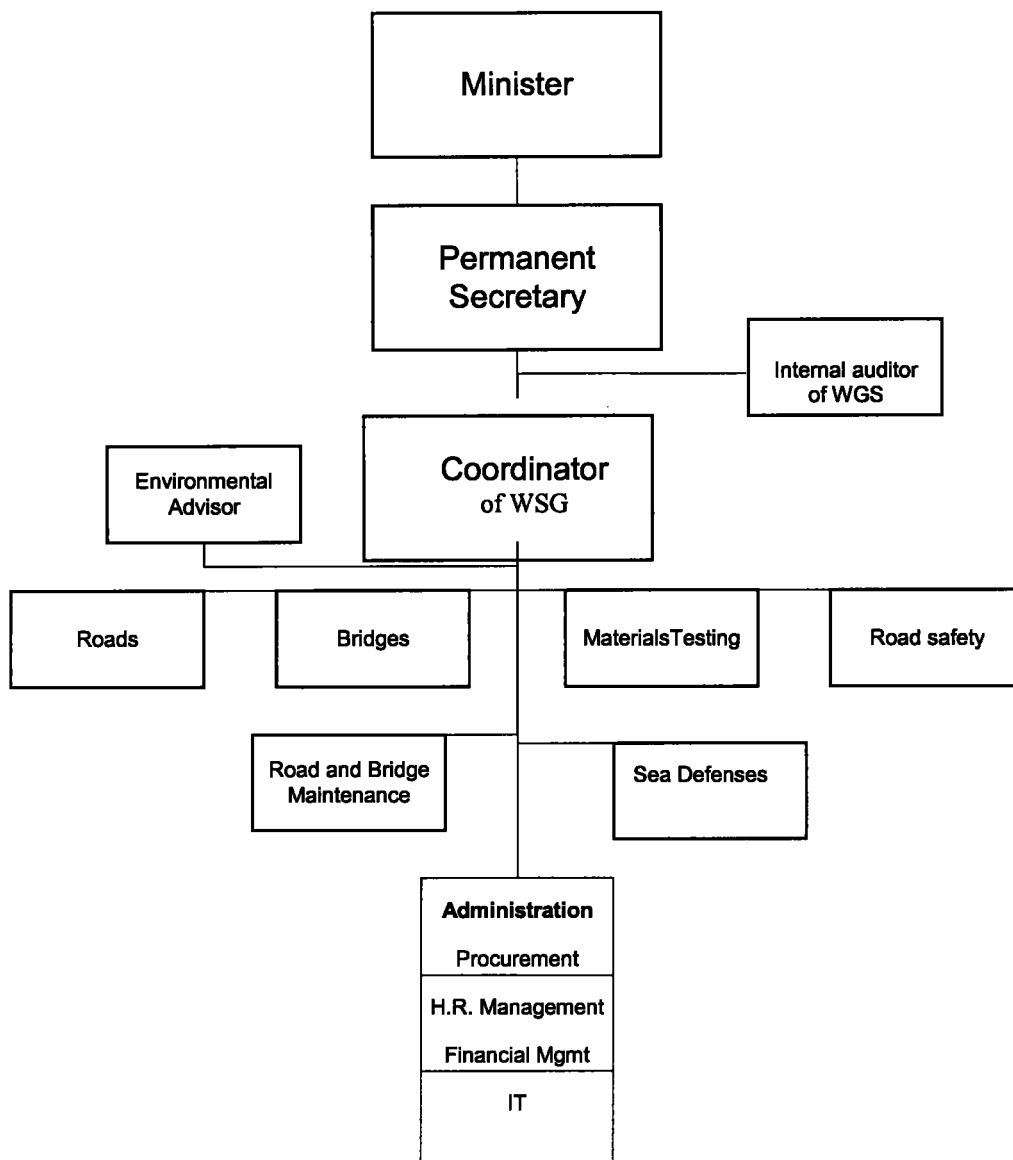
A. Execution Mechanism

- 3.1 The MPW&C is beginning to implement a program to rationalize its operations. Significant progress has been made in the corporatization of revenue-making units of the MPW&C, including the Demarara Harbor Bridge, the Transport and Harbors Department and the Civil Aviation Department. Additionally, the MPW&C is taking steps to improve the efficiency and effectiveness of contract administration for the planning, design, construction, rehabilitation and maintenance of bridges, roads and sea defenses.
- 3.2 To improve contract administration, the MPW&C is implementing a program to consolidate its contract design and supervision functions in one unit, the Work Services Group (WSG), which will eventually become the core unit of a Works Authority. The WSG will result from the rationalization of existing activities of the WSG, which will result in annual savings of up to US\$270,000 per year. The Works Authority is established, the MPW&C will concentrate its functions on policy formulation and regulation of the infrastructure sector, and the Works Authority will be in charge of improving and maintaining roads and sea walls, almost totally through contracting with the private sector.
- 3.3 The proposed WSG will implement all investment and maintenance projects for roads, bridges and airports, including all donor-funded project as well as projects funded by domestic resources. It is expected that at a later stage, the WSG will also be the implementation unit for sea defense programs. It will be led by a coordinator and will have six line divisions: roads, bridges, road maintenance, road safety and sea defenses. It will also have staff offices dealing with human resources management, finance, procurement and information technology. An environmental advisor will report directly to the coordinator and will be responsible for ensuring that environmental issues are addressed adequately in all operations of the WSG. Staffing will include 12 senior professionals, about 35 more junior professionals, and support staff. Total staff costs and other recurrent costs such as communications, utilities, travel, road and laboratory testing, etc. have been estimated at US\$1.3 million per year. The proposed organigram of the WSG is shown below.
- 3.4 On June 18, 2001, the MPW&C submitted to the Bank a draft Action Plan for the establishment of the WSG, and this is a high quality document. The GOG has agreed to fully fund the local costs of operating the WSG, while the Bank loan would finance technical assistance to develop the procedures of the WSG, training costs, short-term technical assistance, Information and Communications Technology (ICT) equipment, and the improvement of the financial and management information systems. A memorandum of Understanding between the GOG and the main donor to the transport sector

(Caribbean Development Bank the Bank) was signed. In this memorandum the CDB and the Bank confirm their support for the WSG concept. The WSG was established on October 1, 2001, and an interim coordinator was appointed.

- 3.5 Prior to first disbursement of the resources of the loan, the Executing Agency shall present for the Bank's approval evidence that the Work Services Group (WSG): (a) is fully staffed; (b) has established a financial management system to carry out the Project activities; and (c) has a budget that includes the counterpart funds for the Project for the first year.
- 3.6 The entire staff of the WSG has been located in one building. The initial costs of setting up the WSG include the rehabilitation of the building, computer equipment and software, other equipment, and vehicles for field visits. These costs have been estimated at US\$550,000.

**WORK SERVICES GROUP ORGANIGRAM AND ITS POSITION WITHIN
THE MINISTRY OF PUBLIC WORKS AND COMMUNICATIONS ⁴**



⁴ The Sea Defense Unit will be incorporated in the WSG at a later date.

- 3.7 The WSG will be responsible for the implementation of the proposed Project. The WSG will monitor the activities of the engineering supervision firm, and will maintain adequate accounting and financial controls, and appropriate support documentation filing systems. WSG will also prepare and submit to the Bank the disbursement requests and the corresponding justification of expenses, financial reports, and the annual audited financial statements. WSG will also act on behalf of the borrower in such matters as contractor claims and major design changes.

B. Engineering Supervision

- 3.8 The contractor who will carry out the civil works for the rehabilitation of the Mahaica- Rosignol road will be overseen by an engineering supervision firm hired by the WSG with project funds, in accordance with terms of reference agreed with the Bank (on file) and using ICB procedures. This firm will carry out the supervision of the environmental aspects of the civil work. The firm will have the direct responsibility to:
- a) familiarize itself with designs
 - b) make minor adjustments in the contract before award is made
 - c) establish appropriate inspection, quality assurance/quality control procedures to ensure adequate administration of the lump sum construction contract, and ensure that environment and social concerns are addressed fully by the contractor
 - d) approve civil works contract invoices, and submit them to the GOG.
- 3.9 The firm will also review all technical documentation at the beginning of its contract and at regular intervals throughout the project to ensure, *inter alia* the adequacy of the programming of work such as geotechnical and subsurface investigation, drainage, environmental specifications and mitigation measures, and worker safety recommendations. The firm will also confirm that Contractor qualifications and equipment capacity satisfy design requirements.
- 3.10 The firm will submit bi-annual reports to the Executing Agency and the Bank outlining progress compared with the Project Monitoring Checklist in Appendix 2. The supervisory firm will also prepare as-built drawings (they will also be submitted in digital format) for all work performed upon the completion of each major work component. It is recommended that this firm be hired prior to completing contractor pre-qualification to ensure adequate supervision over the process and to avoid unnecessary claims.

C. Contracting for the Civil Works

- 3.11 Civil works contracts in Guyana have been plagued by cost overruns that have often exceeded 100% of estimated costs, partially the result of the use of cost plus contracts. Therefore, the GOG has requested that contracts for civil works be structured as a lump sum (fixed price) contract. The on-going

Bridges Rehabilitation Program is already using this construction contract modality.

- 3.12 The Project Team believes that using lump-sum contracts at Mahaica-Rosignol is feasible and advisable for the following reasons:

This lump-sum contract provides the incentives and encourage collaboration of all stakeholders and especially the contractor and the supervisor to implement effectively the technical designs and their quality control procedures and in terms of eliminating unwarranted construction claim and implementation delays and thus reducing the total cost over-run risks.

This lump-sum contract will shift the reduced cost overrun risk to the agent (construction firm) that has a greater ability to manage and control that risk.

This lump-sum contract includes specific bonus, penalty clauses and performance warranties until the conclusion of the 3-year maintenance responsibility.

The road foundation has been in place for more that 35 years so its characteristics are well known, and therefore the risk are very low that there will be a need to carry out unforeseen civil works.

The engineering consulting firm that carried out the feasibility study and design for the civil works at Mahaica-Rosignol used non-destructive techniques (Benkelman Beam) to assess the condition of the pavement and foundation throughout the entire length of the road. As a result, it is very unlikely that there will be unforeseen costs because of foundation factors.

This engineering consulting firm is highly experienced in the design of lump sum contracts and has defined very precisely the work that needs to be carried out.

The bidding documents for the civil works contract have been designed using best practices from developed and developing countries.

The engineering firm that will be selected to supervise the construction firm will have to demonstrate that it has experience in the supervision of lump sum contracts.

D. Bank Experience with Lump Sum Contracts for Road Rehabilitation

- 3.13 Lump-sum highway rehabilitation and maintenance bidding procedures are very common in developed countries. Lump-sum contracts have been used recently in two recent Bank financed projects in Ecuador, 1138/OC-EC and 1057/OC-EC. Results have been very successful in eliminating unwarranted construction and supervision claims and project's implementation delays that support a cost reduction of over 50% in relation to historical costs. Also, the first package of the Bridges Rehabilitation Program (Loan 999/SF-GY) was designed as lump-sum construction contract. Construction is expected to start in the first quarter of 2002.

E. Project Oversight

- 3.14 The Bank will have oversight responsibilities principally through the Country Office in Guyana with the support of the Project Team. An engineering supervision firm will be hired using project fund to supervise the construction firm. During the first year of implementation, review meetings will be held at least monthly among representatives of the Bank, the WSG, and the supervisory firm to oversee the advance of the Project. Depending on the level of progress during the first year, the periodicity of meetings may be reduced.

F. Financial Statements and Auditing

- 3.15 During the project execution, the Executing Agency will prepare and submit annual financial statements regarding the use of the Program's funds. These financial statements will be submitted within one hundred and twenty (120) days after the closing date of each fiscal year. The Auditor General of Guyana, as mandated in Article 223 of the Constitution, will audit the accounts of the WSG. Presently, the Auditor General is up to date with audits of all Bank-financed projects.

G. Procurement of Goods and Services

- 3.16 In procuring goods and services financed by the Bank, the Executing Agency will follow the basic Bank procurement policies and procedures. The Executing Agency will use international competitive bidding for all goods and services valued at more than US\$350,000, for civil works valued at more than US\$1.0 million, and for consulting services in excess of US\$200,000. Government regulations in Guyana require public tender for contracts for goods and services that exceed G\$750,000 (US\$4,100).
- 3.17 To avoid delays in project implementation the MPW&C has initiated the procurement of Program works and services prior to Loan approval by advertising for expressions of interest in the UN Development Business. In all cases these processes have carefully followed all Bank procurement procedures.

H. Financial Management

- 3.18 The Executing Agency will open separate accounts in a commercial Bank to deposit the proceeds from the Bank's financing and from the local counterpart funds. The Executing Agency will prepare and submit to the Bank, within a period of sixty (60) days after the closing of each calendar semester, a report showing the use of the yearly loan's funds.

I. Ex-post Evaluation

- 3.19 The Project Team agreed with the GOG that an ex-post evaluation of the use of lump contracts will be carried out. The terms of reference are in the Project Files, and funding has been provided in the budget. The Project Team will carry out and evaluation of the institutional component of the Project.

IV. BORROWER AND EXECUTING AGENCY

A. Entities Involved

- 4.1 The borrower is the Government of the Cooperative Republic of Guyana (GOG). The executing agency is the Ministry of Public Works and Communications (MPW&C). Project implementation will be the direct responsibility of the WSG, and will be supported by an engineering supervision firm recruited under International Competitive Bidding Procedures.

B. Institutional Aspects of the Transport Sector

- 4.2 The Ministry of Public Works and Communications (MPW&C) has overall responsibility for the planning, construction, improvement, operation and regulation of the transport sector. The Ministry of Agriculture participates in the development of the farm and feeder road system. The Ministry of Finance is responsible for reviewing and allocating budgetary funds for the sector agency and formulates the public sector investment program.
- 4.3 The MPW&C is mandated to control the development of the transport sector by integrating the investment proposals of the different sector agencies. The MPW&C is also mandated to establish priorities among projects and propose and review transport tariffs and other charges.
- 4.4 The network is generally in fair to poor condition with International Roughness Index (IRI) of less than 7¹ m per km, but some segments are in bad condition, with roughness of 8. Better maintenance management and at least 20% to 50 % of additional expenditures will be needed to provide better and safer road conditions. The Ministry of Finance agreed to increase road maintenance budget allocation steadily during the next five years.
- 4.5 The MPW&C oversees a number of revenue-making entities in the transport sector, including the Civil Aviation Department, the Transport and Harbors Department, and the Demerara Harbor Bridge unit. Much progress has been made to date in the corporatization of these revenue-making units of the MPW&C, including increased administrative and financial autonomy.
- 4.6 As part of the design of the Mahaica-Rosignol loan program, an Institutional and Organizational Capacity Assessment was undertaken with the objective of formulating an Improvement Plan. This Improvement Plan consists of two elements; (i) strengthening national transport planning and policy formulation; and (ii) institutional reform to improve the capacity of the MPW&C to design and supervise construction, rehabilitation and maintenance of roads and

¹ Based on the International Roughness Index (IRI). This index starts at 1.0 to 2.0 for a road in perfect condition and while it does not have a theoretical maximum, roads with IRIs higher than 8.0-9.0 need urgent rehabilitation.

bridges. The creation of the Work Services Group (WSG) is discussed in Chapter III.

C. Financial Aspects of the Sector

- 4.7 Almost 100% of investment in roads, bridges and sea defenses is funded by foreign donors and International Financial Institutions (IFIs), principally the European Union, the Caribbean Development Bank, and the Bank. In the past three years, investments in these sectors have averaged US\$25 million, or about a third of total public sector investment. Planned investments for the period 2002-2004 are expected to average about US\$36 million.
- 4.8 The budget of MOF includes several lines of items to fund for routine maintenance and rehabilitation. During fiscal years 2000 and 2001, the MPW&C received G\$50million (US\$270,000) per year for a Routine Maintenance Fund (RMF) that was established with World Bank support. This fund permits timely payments in accordance with the actual scheduling of routine maintenance works, especially in the dry season (January - April and July - November). The establishment of the Routine Maintenance Management System will permit the prioritization of maintenance expenditures. Each year the Maintenance Unit of the WSG will provide a justification for the highway network routine maintenance works using the RMMS. It is essential that the Maintenance Unit and the Ministry of Finance agree at least six months ahead of the fiscal year on the affordable level of routine maintenance works in order to be able to contract out the services before the fiscal year starts.
- 4.9 The RMMS will produce the optimum and minimum level of needed funding and within these parameters the Minister of Finance will approve the actual funding level. The Maintenance Unit will also use the RMMS to provide the justification of the actual expenditures implemented in routine maintenance works and the quality of service of the routine maintenance works actually done. The Bank and the Minister estimate that the funding level will be increased from US\$270,000 by 20% per year for the following four years. Given the improving fiscal situation arising from debt service relief (original and enhanced HIPC's) this increase in spending for routine maintenance is sustainable, and very small in relation to total public expenditures for 2001 (US\$360 million). The project team has concluded that the WSG will be able to implement this program adequately and provide a reasonable level of funds for highway maintenance expenditures.

V. VIABILITY AND RISKS

A. Feasibility Summary

- 5.1 The Project Team has reviewed all available information regarding the Project and concludes that there are no known technical, environment, financial or socio-economic obstacles to proper implementation. The creation of the WSG is expected to reduce significantly the institutional weaknesses detected in the Executing Agency. To the fullest extent possible, the Team has attempted to anticipate issues and ensure that they have been considered in designing the Project so as to maximize benefits accruing and reduce to a reasonable minimum unexpected costs.

B. Technical Feasibility

- 5.2 The technical feasibility of the proposed Project has been established on the basis of the Project Team's review of the studies, basic and final designs and specification to verify that they meet relevant engineering standards. Considerations related to proper environment management and provisions for foreseeable forces of nature have been incorporated into final designs and construction specifications. It is recommended that bidding documents and contracts include the environmental guidelines and mitigation measures set forth in the Environmental Study.
- 5.3 The budget includes funds for contracting an internationally reputable supervisory firm to supplement local expertise in managing projects of this scope in order to ensure the technical capacity and experience necessary for timely Project execution.
- 5.4 Finally, the execution schedule (48 months) takes into account the nature of the works to be financed and the amount of time required to carry out the bidding process. It is the opinion of the Project Team that the schedule is realistic so long as sufficient resources are assigned from the GOG budget. The schedule for Project implementation is summarized in the implementation. It is important to note that the MPW&C has already begun the process of obtaining expressions of interest from international firms for some of the key procurement actions.
- 5.5 The project design included the use of sophisticated techniques of non-destructive testing needed to determine the engineering characteristics of the existing non-uniform road structure. These procedures were utilized to maximize the use of the existing pavement in order to minimize waste disposal and to minimize construction quantities of new materials and therefore reducing Project costs. In addition, to achieve a cost-effective, safer and affordable project, the rehabilitation of the Mahaica-Rosignol road was designed to a standard of 7.4 meters pavement width with an economic life

expectancy of seven years, 1.5 meters of paved shoulders, 0.6 meters of unpaved shoulders, a minimum cross slope of 1.0% in order to ensure proper surface drainage. In addition inter-urban design speed is 40 to 70 km/h and the urban design speed is 40 to 50 km/h

- 5.6 The Project Team evaluated the design procedures and the cost estimates and determined that these designs are feasible, affordable and reliable. Also, the final rehabilitation cost estimate of US\$21.5 million including the 3-year routine maintenance costs of US\$300,000 are reliable. Reference costs will be included in the bidding documents.

C. Environmental and Social Feasibility

- 5.7 The Mahaica-Rosignol Road Rehabilitation Project is considered environmentally and socially viable. The Environmental Impact Assessment (EIA), prepared during the project preparation, permitted the incorporation of elements that enhanced the overall design during the project preparation process, including aspects of pedestrian safety, improved drainage, sidewalks, warning signs, parking lanes and the safeguard of environmental processes related to erosion and sedimentation, proper waste management and the minimization of impacts related to construction activities.
- 5.8 The Project will have a positive impact upon the rural poor of Guyana who rank among the poorest in the hemisphere, as the road traverses an eminently agricultural region and is the main source of access for agricultural produces. It is often said in Guyana that the people “live on the roads” but with time these have become increasingly hazardous. As a result of the Project, the Mahaica-Rosignol Road will be widened in key areas to 7.4 meters of pavement width and with 1.5 meters of paved shoulders and 0.6 meters of unpaved shoulders so that pedestrian will not have to compete with vehicles for road space. Crosswalks and special safety measures around schools will protect young children, and educational programs will extend these benefits.⁵ From the total costs of civil works of US\$21.5 million, US\$6.0 million will be used to enhance safety along the Mahaica-Rosignol Road.
- 5.9 Execution of the EIA involved extensive consultation with governmental agencies and especially with the public. Several opportunities⁶ were provided for discussion of development of the design of the project. The Draft EIA was released for public and regulatory agencies reviewed in October 2000 and public meeting to present it was held on April 22, 2001. The issues of most

⁵ The Bridges Rehabilitation Program is funding a one-year consultancy in road safety and the consultant will train an officer of the MPW&C to enable him/her to perform road safety planning and monitoring after the expatriate consultant departs.

⁶ Meeting with representatives of the Region N. 5 Democratic Council on July 25, 2000; site visits to several NDCs of Region N.5; and meeting with residents of Mary Dam Community of January 20, 2001.

importance raised during the meeting were those regarding safety, control of speeders, and improving drainage.

- 5.10 Nearly half the motorized vehicles using the main roads are minibuses serving the general public. Improvements to the roadway – bridges and pavement – will benefit users of these vehicles as well as their owners, by reducing traveling times and making journeys more comfortable. Also, the proposed national bus safety program will result in higher safety standards in benefit of the travelling public at large. The introduction of minibuses over the last decade has increased the mobility of the population notably, permitting greater access to urban jobs from outlying areas, hence reducing rural-urban migration while opening employment opportunities to many previously denied access.
- 5.11 No properties will be expropriated nor persons, residents or businesses resettled or relocated. Only a few very minor structures, such as fences and patios may need to be moved back from the legal right-of-way to facilitate construction.
- 5.12 A full EMP – Environmental Management Plan has been prepared under separate cover and presented by MPWC to the Bank and EPA in compliance with requirements of the Guyana Environmental Protection Act, and its full content will be considered an integral component and specifications of the project design and contractual requirement. The EMP provides a systematic compilation of recommended actions, institutional framework and procedures developed over the course of the project design considered necessary to address environmental concerns and avoid or minimize negative impacts to the natural, social, cultural and economic environments that could result from construction and/or operation of the Mahaica-Rosignol Road Rehabilitation Project. The draft EIA was placed in the Bank's Public Information Center (PIC) on November 10, 2000.
- 5.13 Environmental and social mitigation and management actions proposed in the EMP fall into a number of categories:
 - a) procedures to be followed during construction (e.g., fuel management, waste disposal, water management, dust control, traffic management, etc.);
 - b) waste management procedures (for solid waste, hazardous waste and demolition debris);
 - c) construction stage monitoring, including inspection and reporting;
 - d) emergency response procedures (including spills management and contingency measures);
 - e) post-construction monitoring, inspection and reporting;
 - f) procedures to be followed during operation (e.g. maintenance, vegetation clearing, etc.);

- g) institutional/organizational arrangements to facilitate implementation of the environmental management plan (including the establishment of an environmental unit within the MPWC); and
- h) training (MPWC/WSG Environmental Specialist, Senior MPWC staff, construction contractor personnel, emergency response personnel, and invited EPA staff).

- 5.14 In addition to a description of the action to be taken, the EMP also provides: i) recommended timing for implementation of each action; ii) assignment of agency/person responsible for ensuring implementation of the action within the specified timeframe; iii) institutional arrangements, including reporting lines and relationships of persons/parties responsible for carrying out each action; and iv) estimates of costs to implement the EMP.
- 5.15 As this is the first project for which MPWC has submitted an Environmental Impact Assessment (EIA) and environmental management plan to the EPA - Environmental Protection Agency under provisions of the Guyana Environmental Protection Act, both MPWC and EPA have benefited from their participation in the process. Consequently, the Environmental Impact Assessment carried for the Project will serve as an initial model for both parties. EPA staff members will be involved in monitoring compliance of provisions in the EMP and will be invited to training events to be financed under the Project.
- 5.16 Activities proposed under Component 1 will improve MPWC's capability for environmental management, and the Ministry will be more efficient in monitoring the compliance and quality control in the application of environmental mitigation measures during execution of the Project. Training and technical assistance of MPWC staff, construction contractor personnel and Police and Fire Services in environmental management and HAZMAT emergency response will lead to improvements in operations of similar future projects throughout the country.

D. Economic Feasibility

- 5.17 The Rehabilitation of the Mahaica-Rosignol road will improve highway safety, reduce transportation costs to the Berbice River area, a major agricultural region of Guyana, and to New Amsterdam, the second largest city in the country located on the east bank of the Berbice River, thus increasing productivity and competitiveness of this important agricultural zone.
- 5.18 Positive benefits will result from the provision of pedestrian crossings, proper lighting, warning signs and speed zones, in more densely settled areas, on sidewalks in public spaces, to reduce accidents involving pedestrian.

- 5.19 The excavation and re-establishment of drainage canals and culverts will improve drainage both locally and regionally and should reduce local pounding and flooding of adjacent agricultural and residential properties. Conditions for agriculture and fisheries are expected to improve as previously clogged or closed drainage ways will be reopened.
- 5.20 Negative impacts related to the construction phase of the Mahaica-Rosignol Project will be temporary, of small magnitude and localized to construction areas, with potential impacts avoided or attenuated through efficient application of environmental management specifications include in construction contracts. Since this is an existing paved road, indirect negative impacts linked with human activities (i.e., changes in the use of land, deforestation, etc.) are not expected.
- 5.21 Mahaica-Rosignol gives access to the important agricultural region around the Berbice River and to the city of New Amsterdam, the second largest in the country. Because of the poor state of the road, unless this rehabilitation is carried out soon, it is certain that major expenses will have to be incurred to bring the road back to an adequate standard.
- 5.22 For the economic analysis, the Mahaica-Rosignol road was divided into eight segments that are homogeneous with respect to traffic, roughness and pavement distress. Using a combination of Net Present Value (NPV) and Agency Costs as criteria, the optimal rehabilitation strategy (treatment) was defined. The Internal Rates of Return (IRR) in all segments show that rehabilitating the road is economically feasible.
- 5.23 To achieve a cost effective, safer and affordable project, the rehabilitation of the Mahaica-Rosignol road has been designed to a standard of 7.4 meter pavement width (with an economic life expectancy of seven years), 1.5 meters of paved shoulders, 0.6 meters of unpaved shoulders, and a minimum cross slope of 1.0% in order to ensure proper surface drainage.
- 5.24 The design speed used for inter-urban areas is 40-70 km/h and for urban areas it is 40 to 50 km/h. The direct total construction cost for the project used in the economic analysis is \$21.5 million. This cost includes the costs for the construction of five major culverts that will be built using funds from the Bridge Rehabilitation Program.
- 5.25 This cost includes improvements of highway safety elements that could result in a possible reduction of about 15% of traffic accidents. Nearly 15 fatal accidents occur on the Mahaica-Rosignol each year. These accidents are mainly classified as either run off the road-one vehicle accident, or vehicle to vehicle collision, or vehicle to pedestrian/cyclist collision. Widening of the pavement together with widening and paving of the shoulders are among the

most cost-effective means of improving road safety⁷. In addition, to improve further on the highway safety along the Mahaica-Rosignol Road, the project will finance new road signage and surface rumble strips to encourage speed reductions within restricted speed zones.

- 5.26 The proposed geometric design also incorporates chevrons on sharp curves, pavement markings and raised reflectors, advanced curve warnings, identification of School Zones, additional parking lanes and road lighting in priority areas. The total cost of improving highway safety on the Mahaica-Rosignol road is estimated at \$6.0 million.
- 5.27 The economic justification, using the new HDM 4 program, shows that the IRR is 39% and the NPV is approximately US\$37 million⁸ (assuming 15% reduction in accidents). Without the reduction in accidents, the IRR is 33% with the corresponding NPV of \$29 million. This economic analysis considers an annual traffic growth rate of 3% which is rather conservative in comparison of actual traffic growth rate above 10% in recent years on rehabilitated roads in Guyana.
- 5.28 The estimated direct construction costs of adding a new one-lane bridge, 20 feet wide, located on the railway embankment of the 35 year Mahaicony bridge site, maintaining navigation clearance of 7 feet above mean high water and 125 feet horizontally, is \$826,000. The estimated economic benefits of the Mahaicony bridge improvement are \$1,012,242. The estimated direct construction costs of adding a new one-lane, 20 feet wide, bridge with modular short spans at elevation similar to the existing 35 year old Mahaica bridge, located immediately north of the existing bridge is \$598,000. The estimated benefits of the Mahaica bridge improvement are \$604,000. The economic analysis of the integrated road project (including its bridges) that is summarized below, adopts the conservative assumption that the actual bridge improvement costs are equal to the corresponding benefits.
- 5.29 The economic indicators of this analysis, in terms of the impact of a possible construction cost increase (sensitivity analysis) on the IRR and the NPV are shown in the table below.

⁷ Zegeer and Deacon. Effect of Lane Width, Shoulder Width, and Shoulder Type on Highway Safety. State of the Art report 6, TRB, Washington, D.C., 1987.

⁸ Using a discount rate of 12%

ECONOMIC SENSITIVITY ANALYSIS WITH RESP(discount rate-12%)			
Excluding highway safety benefits		Cost analysis	
IRR%	NPV US\$million	US\$000/km	% increase
33	29	330	Base estimate
22	19	494	50
16	9	659	100
11	-1	824	150

- 5.30 If highway safety benefits are excluded, doubling of costs would lower the IRR to 16%. This calculation was carried out without adjusting civil works expenditures associated with safety, and these are 27% of total civil works costs. Therefore, it can be concluded even using very pessimistic assumptions; the Project would be economically viable.

E. Institutional Feasibility

- 5.31 The Project Team also believes that the WSG can implement the Project as described in this document. The WSG will receive technical assistance and training, and an engineering consulting firm will be responsible for supervising the civil works component.

F. Financial Feasibility

- 5.32 The financial base of the sector and the availability of counterpart funding were treated in paragraph 4.7 and paragraph 2.16. Before first disbursement for the civil works, the Borrower will be requested to submit evidence that budgetary resources are available for funding the counterpart during the first year of Project executing. The Borrower will also be requested to submit to the Bank financial statements of the Project audited by the Auditor General in accordance with norms acceptable to the Bank.

G. Risks

- 5.33 The largest single risk is the lack of a strong project **management capability** in the MPW&C. To reduce this risk, the Project will provide funds to strengthen the WSG thorough improved management information and financial management systems, improved procedures, technical assistance, training, and continued support by the Project Team. Additionally, an engineering consulting firm, selected through an International Competitive Bidding Process (ICB), will have a major role in the supervision of the civil works. These measures will reduce the risk associated with the relatively weak institutional capability of the MPW&C.

- 5.34 Projects in Guyana in the transport and other sectors have had significant **cost overruns**, partially the result of using cost-plus contracts that transfer all the risks to the GOG. The use of lump sum contract for the engineering supervision firm and for the civil works contractor will reduce the risks of cost overruns.
- 5.35 Other sources of **cost overruns** have been delays in project implementation. To reduce this risk, the GOG is implementing a series of actions to ensure that Project activities can commence immediately after the Loan Contract is signed. Main activities include:
- a) WSG has been established, and senior staff and expatriate advisor have been hired.
 - b) Budget for WSG has been approved by Ministry of Finance, and includes funding necessary to implement the Project during the present budget cycle.
 - c) Advertisements asking for expressions of interest for the four main contract actions have been placed in UN Development Business.
 - d) An Environmental Specialist has been hired as a staff member of the Work Services Group. MPWC further agrees to approve funds in its annual budgets to permanently finance the position, as proposed in its reorganization plan, after funding under the Project is completed.

GUYANA
MAHAICA-ROSIGNOL ROAD REHABILITATION PROJECT
LOGICAL FRAMEWORK

OBJECTIVES	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Increased economic competitiveness			
Reduced vehicle operating costs and increase road safety	<p>IRI indexes on the Mahaica-Rosignol (M-R) road less than 3.5 after rehabilitation is completed</p> <ul style="list-style-type: none"> Ex-post internal rate of return using actual traffic and HDM4 greater than 16% 	<ul style="list-style-type: none"> MPW&C records of maintenance done Visual inspection of road using indicators such as BI to gauge the extent / severity of road defects 	<ul style="list-style-type: none"> Adequate macroeconomic framework Pro-investment business climate Export oriented development strategy Continuing investment in road maintenance and safety
<ol style="list-style-type: none"> Increased efficiency of the MPW&C to contract for the construction and rehabilitation of roads Improved system for maintaining roads and increased funding Mahaica-Rosignol road rehabilitated on time and on budget Feasibility and design study for the southern approach to the City of Georgetown completed Feasibility and design study for the New Amsterdam to Molson Creek road completed Enforcement of vehicle weight control program (WCP) improved. 	<ol style="list-style-type: none"> Two lump sum-contracts for construction issued (one for bridges and one for Mahaica-Rosignol) the end of 2003 Maintenance expenditure increases by 20% from 2003 to 2006 and the RMMS is used on 200 miles by the end of 2006. Cost overrun of less than 10% in relation to consultants estimates Construction completed within six months of estimates (estimate is 18 months, so maximum extension would be to 24 months) 15% reduction in severe accidents per km of travelling by 3 years after the completion of the construction. Reports of consultants Reports of consultants Implementation of 6 permanent scales is completed by the end of 2004. 	<ul style="list-style-type: none"> Inspection by IDB Country Office Auditor's reports WSG reports MPW&C's reports 	<ul style="list-style-type: none"> Works Services Group staffed adequately New management systems implemented Maintenance funds provided Counterpart funds for Mahaica-Rosignol road Continuing coordination with PSI
<ul style="list-style-type: none"> Competitive salaries for staff Technical assistance for strengthening the MPW&C Training for Work Services Group (WSG) and for private firms Computer equipment for WSG Materials testing equipment Rehabilitation of Mahaica-Rosignol road Supervising engineers Technical assistance for feasibility studies and design Technical assistance for road maintenance management (Bridges Rehabilitation Program) Increased funding for road maintenance 	SEE BUDGET TABLE	<ul style="list-style-type: none"> Inspection by IDB Country Office Auditor's reports 	<ul style="list-style-type: none"> Technical assistance to support WSG rapidly WSG staffed with competent personnel Technical assistance to carry out feasibility studies is contracted rapidly Counterpart fund provided

GUYANA
Mahaica-Rosignol Road Rehabilitation Project (GY-0056)

Procurement Plan

Activity	Year & Quarter of Advertisement	Contract Amount (US\$'000)	% IDB	Procedure
Engineering consulting firm to supervise rehabilitation of Mahaica-Rosignol	2001-III	2,200	91	International Competitive Bidding
Construction firm for rehabilitation of Mahaica-Rosignol Road (civil works)	2001-III	21,800	100	International Competitive Bidding
Consulting firm for feasibility study Southern Approach to Georgetown	2001-III	2,000	100	International Competitive Bidding
Consulting firm for feasibility study of New Amsterdam to Crabwood Creek Road and associated rural roads	2001-III	1,000	100	International Competitive Bidding
Computer equipment and software for WSG	2001-IV	235	100	National Competitive Bidding
Senior advisor WSG	2001-III	156	100	International Private Bidding
Technical assistance WSG: several individual consultant contracts ranging from US \$5,000 to US\$11,000	Throughout the project implementation period beginning 2002-I	160	100	International Private Bidding
Training WSG: several contracts ranging of about US\$15,000	Throughout the project implementation period beginning 2002-I	261	100	International Private Bidding
Local staff WSG: Eight senior staff and about 35-40 support staff	Beginning 2001-II	1,100 <i>per anum</i>	0	National Private Bidding
Vehicles: 5@25,000	2001-III	125	0	National Competitive Bidding
Furniture	2001-III	100		National Competitive Bidding
Threshold amounts (US\$'000)	goods	US\$350		
	civil works	US\$1,000		
	consultancies	US\$200		

PROJECT MONITORING CHECKLIST

Area	Indicator
Institutional Strengthening	<ol style="list-style-type: none"> 1. WSG fully operational, with all staff hired by end December, 2001 2. Firm to establish Routine Maintenance management System (RMMS) mobilized by end May, 2002
Weight Control Program (WCP)	<ol style="list-style-type: none"> 1. WCP Program designed by end June, 2002 2. Six WCP stations operational by end June, 2004
Mahaica-Rosignol Road Rehabilitation Program	<ol style="list-style-type: none"> 1. Engineering supervision firm mobilized by mid-May, 2002 2. Short list for construction firms determined by end May 2002 3. Construction firm mobilized by end December 2002 4. Construction completed by end June, 2005 5. <i>Ex post</i> evaluation of the use of lump-sum contracts completed by end December 2005
Feasibility/design studies	<ol style="list-style-type: none"> 1. Firms selected by end March 2002 2. Firms mobilized by end May 2002

Note: greater details are given in the GANTT Chart in the Project Files

PROPOSED RESOLUTION

**GUYANA. LOAN ____/SF-GY TO THE CO-OPERATIVE REPUBLIC OF GUYANA
(Mahaica-Rosignol Road Rehabilitation Project)**

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Co-Operative Republic of Guyana, as Borrower, for the purpose of granting it a financing to cooperate in the execution of the Mahaica-Rosignol Road Rehabilitation Project. Such financing will be for an amount of up to thirty three million dollars of the United States of America (US\$33,000,000), or its equivalent in other convertible currencies, from the Fund for Special Operations of the Bank, and will be subject to the "Special Contractual Conditions" and the "Financial Terms and Conditions" of the Executive Summary of the Loan Proposal.