

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

**BOLIVIA**

**LA PAZ STORM DRAINAGE PROGRAM**

**(BO-0223)**

**LOAN PROPOSAL**

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Electronic Links and References	
Basic socioeconomic data	<a href="http://www.iadb.org/countries/home.cfm?language=Spanish&amp;ID_COUNTRY=BO">http://www.iadb.org/countries/home.cfm?language=Spanish&amp;ID_COUNTRY=BO</a>
Active loans	<a href="http://portal.iadb.org/approvals/pdfs/BOsp.pdf">http://portal.iadb.org/approvals/pdfs/BOsp.pdf</a>
Environmental and social management report	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=1165753">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=1165753</a>
Annex II Procurement plan	<a href="http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=1209639">http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=1209639</a>
Annex III Financial indicators	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=1165044">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=1165044</a>

## ABBREVIATIONS

CDFI	Convenio de Desempeño Financiero Institucional [institutional financial performance agreement]
DGIR	Dirección de Gestión Integral de Riesgo de la OMT [Comprehensive Risk Management Division of the OMT]
EIRR	Economic internal rate of return
EPSAS	Empresa Pública Social de Agua y Saneamiento [public water and sanitation company]
GDP	Gross domestic product
GMLP	Gobierno Municipal de La Paz [Municipal Government of La Paz]
IDH	Impuesto Directo a los Hidrocarburos [direct tax on hydrocarbons]
IGAS	Informe de Gestión Ambiental y Social [Environmental and Social Management Report]
OMT	Oficialía Mayor Técnica del GMLP [Technical Administrative Office of the GMLP]
PASA	Plan de Aplicación y Seguimiento Ambiental [Environmental Application and Monitoring Plan]
PEAPAC	Programa Educación Ambiental y Participación Ciudadana [Environmental Education and Citizen Participation Program]
PEU	Program executing unit
PMDP	Plan Maestro de Drenaje Pluvial de la Ciudad de La Paz [City of La Paz Storm Drainage Master Plan]
PPM	Programa de Prevención y Mitigación [Prevention and Mitigation Program]
POMP	Plan de Operación y Mantenimiento Preventivo [Operation and Preventive Maintenance Plan]
PPRD	Plan Piloto Prevención de Riesgos de Desastres en la Cuenca del Río La Paz [Pilot Plan for Disaster Risk Prevention in the La Paz River Basin]
PPRR	Project for the Prevention, Rehabilitation, and Reconstruction of Urban Infrastructure Damaged by Natural Hazards
PRF	Plan de Recaudación Financiera [Financial Reform Plan]
SIGMA	Sistema Integrado de Gestión y Modernización Administrativa [Integrated Administrative Modernization and Management System]
SIREMU	Sistema de Regulación Municipal [Municipal Regulation System]
UNDB	<i>United Nations Development Business</i>

## PROJECT SUMMARY

### BOLIVIA LA PAZ STORM DRAINAGE PROGRAM (BO-0223)

Financial Terms and Conditions <sup>1</sup>				
Borrower: Republic of Bolivia Guarantor: Municipal Government of La Paz (GMLP)			OC	FSO
			Amortization period: 30 years	Amortization period: 40 years
			Grace period: 5.5 years	Grace period: 39 years
Source	Amount (US\$)	%	Disbursement period: 4 years	Disbursement period: 4 years
IDB (OC)	14 million	64	Interest rate: variable	Interest rate: 0.25%
IDB (FSO)	6 million	27	Inspection and supervision fee:* 0%	Inspection and supervision fee:* N/A
Local:	2 million	9	Credit fee:* 0.25%	Credit fee:* N/A
Total	22 million	100	Currency: US dollars	Currency: US dollars
Project at a glance				
<p><b>Project objective:</b> The <b>goal</b> of the program is to help improve the quality of life of the inhabitants of the city of La Paz. The <b>purpose</b> of the program is to reduce the incidence of human loss and property damage caused by extreme hydrometeorological events.</p> <p><b>Special contractual conditions:</b> <i>Conditions precedent to the first disbursement:</i> (a) the executing unit has been set up within the executing agency and is responsible for executing the program, with the staff necessary to do so (paragraph 3.2); (b) the Operating Regulations and Program Procedures have been approved (paragraph 3.4); (c) the procurement support firm, the technical and environmental works supervision firm, and the environmental and technical experts have been hired by the executing agency (paragraph 3.3); (d) the municipal ordinance for the drainage system budget allocation has been approved; (e) drainage expenditure in the municipal system has been identified exclusively and exhaustively; and (f) a subsidiary agreement has been signed by the borrower—the Republic of Bolivia—and the executing agency—the Municipal Government of La Paz (paragraph 3.1). <b>Condition during the life of the contract:</b> (a) the GMLP is to maintain financial stability, which will be monitored by means of liquidity and solvency ratios (paragraph 4.20).</p> <p><b>Execution conditions:</b> (a) evidence, prior to the call for tenders for the works, that the bidding documents include detailed designs for the works and specific requirements established in the environmental license approved by the competent environmental authority; (b) if families need to be relocated, evidence that the Family and Business Expropriation and Relocation Plan has been implemented prior to the start of the works and that the IDB's policies on the matter have been followed (OP-710); (c) evidence, prior to the start of the tendering process for the works, that the borrower legally owns the land where the works are to be built; and (d) evidence, prior to the start of the tendering process for the works, that the borrower has the environmental licenses for the works in question.</p> <p><b>Exceptions to Bank policies:</b> None</p>				
<p><b>Project consistent with country strategy:</b> Yes [ X ]      No [ ]</p> <p><b>Project qualifies as:</b>      SEQ [ X ]      PTI [ ]      Sector [ ]      Geographic [ ]      Headcount [ ]</p> <p><b>Procurement:</b> See paragraphs 3.5 and 3.6</p> <p><b>Verified by CESI on:</b> 8 June 2007</p>				

<sup>1</sup> The interest rate, credit fee, and inspection and supervision fee mentioned in this document are established pursuant to document FN-568-3 Rev. and may be changed by the Board of Executive Directors, taking into account the available background information, as well as the respective Finance Department recommendations. In no case will the credit fee exceed 0.75%, or the inspection and supervision fee exceed 1% of the loan amount.\*

\* With regard to the inspection and supervision fee, in no case will the charge exceed, in a given six-month period, the amount that would result from applying 1% to the loan amount divided by the number of six-month periods included in the original disbursement period.

## I. FRAME OF REFERENCE

### A. Background

- 1.1 The objective of this operation is to support the Municipal Government of La Paz (GMLP) in the implementation of works and complementary actions to improve the city of La Paz's storm drainage system and its management. The operation is the first group of interventions in the Storm Drainage Master Plan of the city of La Paz (PMDP).

#### 1. Floods in the city of La Paz

- 1.2 The city of La Paz, located in the Andean highlands of Bolivia, had a population estimated at 840,000 in 2006, with a current urban area of 21.6 square kilometers, irregular topography, and location at between 2,800 and 4,000 meters above sea level. Because of its very complex geological, geotechnical, hydrological, and topographical conditions, maintenance of the city's urban infrastructure in general presents many difficulties. Moreover, La Paz faces frequent natural risks such as floods, landslides, washouts, *mazamorras*,<sup>1</sup> and flash floods. Physical space limitations have led to accelerated unregulated squatting on hillsides, exacerbating the problems because the areas are geologically unstable and steeply sloped. In addition, hillside deforestation and removal of material for civil construction has led to the transport of sediment into the drainage system, which, together with garbage dumped on the banks of rivers, constantly block channels and pipes, causing floods.
- 1.3 During the rainy season (November to February), and because of the above-mentioned lack of maintenance, drainage problems result in emergencies associated with overflows, floods, structural collapses of the main sewers, landslides, and slope destabilization, causing human and material losses. On 19 February 2002 a historically unprecedented hail storm in the city of La Paz and surrounding areas caused 70 deaths and over US\$70 million in damage. More recent events that reflect storm drainage system deficiencies occurred in the 2005-2006 rainy season. The storm drainage system collapsed as a result of the intense precipitation, contributing to the city's rivers overflowing. This severely affected the channeling works and hydraulic control of the main rivers and tributaries, destabilizing hillsides, bridges, and hydraulic works and causing considerable damage to urban infrastructure (US\$4 million for the city of La Paz).

#### 2. Status of the current urban storm drainage system

- 1.4 The various analyses conducted as part of the PMDP, and in coordination with the GMLP, show that the main problems plaguing the stormwater drainage system are: (i) lack of comprehensive planning; (ii) intermittent hydraulic inadequacy and deterioration and/or collapse of some of the drainage works; (iii) uncontrolled urban growth; (iv) lack of control over sediment production and conveyance; (v) inappropriate dumping of solid waste and inadequate street cleaning service in

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<sup>1</sup> Local name given to an avalanche of mud and rocks.

urban areas that generate significant amounts of waste; (vi) insufficient hydraulic works maintenance and cleanup; and (vii) lack of an updated cadastre of the system. The microdrainage system drains associated with the urban road network do not work properly either because of obstructions, lack of cleaning and/or maintenance, or inadequate location and/or size.

- 1.5 The sanitary sewage system, which has 40% coverage, and the storm drainage system are separate in the networks that collect wastewater and stormwater in the urbanized area (secondary network). However, when these systems converge in the main sewers (open or vaulted), a single system dumps the water and sewage directly into the rivers, untreated. As a result, the water is highly polluted, especially in times of low water, causing bad odor problems in the city's central zone.

### **3. Watershed system**

- 1.6 The city of La Paz has two different areas in terms of the hydrographic system and urban development: in the north, the watersheds of the Choqueyapu and Orkojahuira Rivers, and in the south, those of the Irpavi, Achumani, and Huayñajahuira Rivers. These rivers travel below the city in various structures, primarily vaults, and collect the city's rainwater and wastewater.
- 1.7 The main drainage system of the Choqueyapu and Orkojahuira watersheds is comprised of very old open and vaulted sewers. This is because when La Paz was founded in 1548, it initially grew on the banks of the Choqueyapu River, especially the western and northwestern slopes. Because of the high speed of runoff and the resulting erosion, many conduits in these watersheds are in poor condition and collapse, preventing their proper operation and causing floods when precipitation is intense. In addition because many of these conduits are located at great depth, they are difficult to maintain. One example of this type of problem is the Avenida del Poeta sector of the Choqueyapu River; the intervention to correct the problem is part of the program sample (see paragraph 2.6).
- 1.8 The southern watersheds, involving the Irpavi, Achumani, and Huayñajahuira Rivers, began to be developed beginning in about 1960, and their drainage system is largely comprised of open sewers because erosion is still not effectively controlled in the watersheds and subwatersheds. As a result, during the rainy season large quantities of solid granular material is transported from higher areas to lower ones, through natural channels and sewers, blocking the drainage structures and causing floods in urban areas. The upper subwatershed of the Jiluyasa River, a tributary of the Achumani River, is an example of this type of problem; the intervention to correct it is part of the program sample (see paragraph 2.6).

### **B. The institutional framework**

- 1.9 The Dirección de Gestión Integral de Riesgo [Comprehensive Risk Management Division] (DGIR) is in the Oficialía Mayor Técnica [Technical Administrative Office] (OMT) of the Municipal Government of La Paz (GMLP). It is in charge of

project planning, control, and design and the operation and maintenance of the macrodrainage system and part of the microdrainage system. Maintenance of the microdrainage system is the primary responsibility of the OMT's Maintenance Division and EPSAS, the public water and sanitation company, based on the current concession contract. As reflected in the current diagnostic assessment of the storm drainage system, the maintenance work is inadequate and insufficient. The open and covered channelized water courses and many of the gullies are not cleaned systematically, which is a risk factor for the city: obstructions produced by the material deposits from the erosion in upper watersheds and garbage dumping cause rivers to overflow, significant flooding, and avalanches of mud and rocks (*mazamorras*).

- 1.10 The Municipal Development Plan prepared by the GMLP in 2000 and approved in March 2001, the Land Use Intensity Regulations approved by the La Paz Municipal Council in October 2007, and the Urban Management Plan currently in the process of being drafted and approved by the aforementioned council are the basic references for any stormwater drainage planning actions. Through its programs, the Municipal Development Plan seeks to create the conditions necessary for the social and material wellbeing of the inhabitants by improving the regulation, administration, and execution of works and services and to preserve and conserve the environment, the heritage, and land settlement. The proposed operation was prepared to be consistent with the latter. The Land Use Intensity Regulations establish the parameters and values for regulating the intensity of land occupation and use and the Urban Management Plan serves as a regulatory instrument that guides territorial and overall development.

### **C. The GMLP's strategy**

- 1.11 In response to the emergency caused by the hail storm in La Paz in February 2002 (paragraph 3.3), the GMLP requested support from the Bank in the amount of US\$15.4 million for the execution of emergency works through the document entitled "Project for the Prevention, Rehabilitation, and Reconstruction of Urban Infrastructure Damaged by Natural Hazards" (PPRR). In July 2002, an IDB mission, together with OMT technical staff, reviewed the PPRR and other technical documents available on the drainage system. They also visited the areas affected by the February rains and noted the progress in the reconstruction, repair, and control of ravines carried out with resources from the reformulation of the nonreimbursable technical-cooperation operation for the institutional strengthening of the Ministry of Sustainable Development and Environmental Protection (ATN/929/SF-BO). During the mission, a medium- and long-term stormwater drainage and risk management strategy was agreed upon. The strategy is based on three initiatives: (i) execution of the PPRR's emergency works; (ii) preparation of a master plan for drainage in the city of La Paz; and (iii) implementation of a disaster prevention and risk management plan in the La Paz basin.
- 1.12 As part of that strategy, in December 2003 the Bank approved a technical-cooperation operation with the Japanese Trust Fund (ATN/JC-8537-BO) in the



amount of US\$750,000 to review and update the Storm Drainage Master Plan (PMDP) of the city of La Paz. The PMDP's vision over the course of its 20-year horizon is to protect and strengthen the La Paz urban area with a safe, efficient, effective storm drainage system that is financially, environmentally and socially sustainable. To this end, the PMDP—after conducting a diagnostic assessment of the current condition of the storm drainage system in the city of La Paz and considering the various options for addressing the problems identified—proposes a series of structural and nonstructural interventions in all the city's watershed over the short (2011), medium (2015), and long (2025) terms, costing approximately US\$60 million. The short-term interventions (2011), currently estimated at some US\$19 million in direct costs constitute the first stage of implementation of the PMDP through the operation described herein. They consist of a coherent package of immediate actions and works needed in all the city's watersheds to address current critical situations stemming primarily from lack of control of sediment production and transport and the deterioration of the existing drainage system. The medium- and long-term interventions will complement the short-term ones and, while less urgent, will ensure the proper operation of the drainage system in all the city's watersheds, especially in view of future urban expansion. The program will include resources to prepare detailed designs and economic and environmental assessment studies of works identified by the PMDP for the medium and long terms, in order to ensure that the implementation of the PMDP continues in the future.

- 1.13 To complement formulation of the PMDP, the GMLP is receiving support from the Bank in the form of two technical-cooperation operations. The first, entitled "Municipal Actions for Management of the Storm Drainage System of the City of La Paz" (ATN/SF-1054-BO), in the amount of US\$149,000, has performed a diagnostic assessment of storm drainage system management and is developing, together with the GMLP, an option to finance storm drainage system operation and maintenance costs as well as storm drainage system management arrangements. The second operation, entitled "Studies for the Preparation of the Municipio de La Paz Drainage Program" (ATN/OC-10337-BO), in the amount of US\$500,000 with resources from the Infrastructure Fund, is financing preparation of the detailed designs of the PMDP's short-term investments and the respective environmental and social impact and economic assessment studies.

#### **D. Bank actions and lessons learned**

- 1.14 Bank financing in the sector for the metropolitan area of La Paz over the last five years has included the La Paz Revitalization and Urban Development Program (1557/SF-BO), through its rehabilitation of the urban environment component, which includes storm drainage interventions. The experience gained in the design and implementation of that operation has been taken into account in defining this one's scope and design. Preparation of the proposed operation also took into account the Bank's experience in other storm drainage programs either completed

or under way in Latin America. The lessons learned from those programs and reflected in this operation are as follows:

- a. the importance of delineating preventive actions (sediment retention, streamflow regulation, sustainable reforestation, etc.) in the high regions of the watersheds to decrease loads in the urban drainage system. The management of the slopes problem and its relationship to the city's storm drains require a comprehensive conceptual overview that takes into account the interface between technical, social, economic, and environmental considerations. **The operation envisages execution of sustainable works for sediment control and reforestation of the upper watersheds. As with all the interventions under the operation, these works stem from a comprehensive conceptual overview in the context of the PMDP** (paragraphs 1.12, 1.15, and 2.5);
- b. the need to follow the technical guidelines of the master plan to make appropriate decisions to improve, rehabilitate, and expand the storm drainage systems. **The program was conceptualized and designed its action strategy based on the PDMP** (paragraphs 1.12, 1.15, and 1.16);
- c. raising the community's awareness of the need to protect the drainage systems to prevent garbage dumping and obstruction of the gullies. **In this regard, the program includes an environmental education program to provide guidance to the communities** (paragraph 2.5).

#### **E. Conceptual overview of the program**

- 1.15 The program seeks to implement a comprehensive solution to the problems facing the city of La Paz's storm drainage system and described in the PMDP. The program's lines of action stem from that comprehensive strategy with a long-term vision through the implementation of an initial set of actions identified by the PMDP as emergencies or priorities in the short term, as well as preparatory studies and institutional guidelines to undertake additional PPMD interventions in the medium and long terms. The program's first line of action is support for works and complementary actions to improve the city of La Paz's drainage system. The second is to support the Municipio of La Paz to improve stormwater drainage management, including contingency planning and prevention. Under the first line of action, the program will finance: structural interventions to improve and rehabilitate the drainage system for the northern watersheds; structural and nonstructural interventions for reforestation, sediment control, improvement and rehabilitation of the drainage system for the city's southern watersheds; and environmental education and disaster prevention in the entire La Paz River basin. In addition, this first line of action will include resources for the production of detailed designs, economic assessment studies, and environmental impact studies related to the works identified by the PMDP for the medium and long terms.
- 1.16 The second line of action seeks to improve the capacity for technical management of the La Paz storm drainage system—including its capacity to address problems

associated with uncontrolled urban growth, to the extent that they can compromise the drainage system's operation and solid waste management in areas that generate significant amounts of waste—and establish and implement the mechanisms and instruments to finance the operation and maintenance of the storm drainage system to ensure its sustainability. Accordingly, under the second line of action the program will provide support to the municipality in issuing regulations, developing land-use management tools, implementing a financial sustainability strategy for the drainage system, and improving street cleaning services in areas that generate large quantities of solid waste.

## **II. THE PROGRAM**

### **A. Objective**

- 2.1 The goal of the program is to help improve the quality of life of the inhabitants of the city of La Paz. Its purpose is to reduce the human loss and property damage caused by extreme hydrometeorological events.

### **B. Program description**

- 2.2 The Storm Drainage Master Plan of the City of La Paz (PMPD), and therefore the program, calls for interventions in the city's five main watersheds. Given the different problems in each watershed (paragraphs 1.7 and 1.8) and the repetitive nature of the interventions required to address the problems in those watersheds, the program was designed as a multiple-works investment program. The program will finance the following components in order to reach its objective:

#### **a. Flood and erosion control (US\$17,905,000)**

- 2.3 Macrodrainage works identified in the PMDP: (i) improvement and rehabilitation of vaults and sewers in the city's main macrodrainage system; (ii) new drainage spillways.
- 2.4 Microdrainage works recommended in the PMDP to control surface runoff by rehabilitating existing drains and building new ones.
- 2.5 Works and complementary actions to protect the drainage system: (i) structural interventions for water erosion reduction and reforestation of the upper watershed; (ii) sediment retention works in the upper and middle sections of the watershed identified in the PMDP; (iii) formulation and implementation of the pilot plan for disaster risk prevention in the La Paz River basin (PPRD); (iv) formulation and implementation of an environmental education and citizen participation program (PEAPAC), to provide guidance for the communities on garbage disposal and on the importance of implementing land-use regulations to protect the city's stormwater drainage system; and (v) studies to prepare detailed designs and economic and environmental assessment studies for the successive implementation of the works identified in the PMDP.

- 2.6 The works under this component will be executed under the multiple-works structure based on Operating Regulations. For purposes of developing the latter, a sample of works was identified that, in line with the PMDP, served to establish the criteria for setting priorities and eligibility parameters for the other works that will be part of the program. The sample is representative of the number and total amount of the program interventions and of the subwatershed-based comprehensive resolution of the main problems encountered in the context of the city's storm drainage system (lack of control over sediment production and transport in the southern area watersheds and deterioration of the storm drainage system in the northern area watersheds). Under this hypothesis, it was agreed that **the year one sample** would include the following works, identified as emergencies in the PMDP:
- a. *Choqueyapu basin*: hydraulic improvement on the Avenida del Poeta sector of the Choqueyapu River, in order to control the problems stemming from extraordinary precipitation that causes the flow to exceed the hydraulic capacity of the existing vault. This generates constant boils that endanger the stability of the main drainage network of the city. The solution calls for rehabilitation of the existing vault and the construction of a new collector sewer with an alignment parallel to the right side of Avenida del Poeta. This solution ensures operation in case one of the two conduits is blocked and provides hydraulic capacity and continuity with the upstream and downstream parts of the section in question, making the Choqueyapu River drainage network—the backbone of the city's drainage network—secure (US\$5.4 million).
  - b. *The Achumani watershed*: sedimentation generation and control works on the upper Jillusaya subwatershed, which include structural and nonstructural interventions in the Jake Jake watershed and a sedimentation pond located alongside the main drainage network downstream of the Charapaya subwatershed. The structural interventions consist of cross barriers to regulate the slope of the bed, short breakwaters to control local erosion, and sedimentation ponds as areas for deposit of granular material that reduce the volumes of solid materials and the peak flow rates. The complementary nonstructural interventions involve the planting of commercial and noncommercial protection forests (US\$800,000).
- 2.7 In addition, execution during the first 18 months of execution of the following interventions—also identified as emergencies by the PMDP and based on the Operating Regulations—was considered important:
- a. *Huayñajahuira watershed*: macrodrainage works and recovery of natural channels to control and transport sediments.
  - b. *Achumani watershed*: works to generate and control sedimentation on the upper Jillusaya subwatershed, including structural and nonstructural interventions and the implementation of conveyance flumes from the Jake Jake and Charapaya subwatersheds, which join the Jillusaya River.

- c. *San Pedro River watershed*: rehabilitation of the vault for the San Pedro River, a tributary of the Choqueyapu River.
- d. *Microdrainage works*: rehabilitation and construction of drains in a pilot watershed located in the upper portion of the Choqueyapu River watershed and then replication of the pilot experience in other city of La Paz watersheds.

**b. Institutional development and environmental management (US\$830,000)**

- 2.8 To improve urban management and planning related to the La Paz stormwater drainage system and urban growth and to ensure sustainability of the investments, in particular their operation and maintenance, the actions recommended by the technical-cooperation operation entitled “Municipal Actions for Management of the Storm Drainage System of the City of La Paz” will be financed. These actions include: (i) support for the new Dirección de Gestión Integral del Riesgo [Comprehensive Risk Management Division] (DGIR), through a detailed design study and implementation of the drainage system’s operation and preventive maintenance plan (POMP); (ii) study to supplement the macrodrainage system cadastre; (iii) procurement of equipment for maintaining the macrodrainage system; (iv) support for the Oficialía Mayor de Gestión Territorial [Chief Administrative Office for Land Management] (OMGT) by generating and implementing land management tools in the La Paz River basin, in particular the Ecological-Territorial Management Plan for Land Use in the La Paz Urban Area Watersheds; and (v) support for the Municipal Regulation System (SIREMU) and the Environmental Quality Division (DCA) of the GMLP through a study on optimizing the street cleaning system in core areas of La Paz that generate large quantities of solid waste, by providing financing for the respective equipment.

**C. Program cost and financing**

- 2.9 The total cost of the proposed works and actions is estimated at US\$22 million, of which US\$14 million will be financed from the Ordinary Capital and US\$6 million from the Fund for Special Operations. The remaining US\$2 million will be the local counterpart funding and will be provided by the GMLP. A summary of the main categories and sources of financing is shown in Table 1 below:

**Table 1: Estimated budget (US\$000)**

<b>Categories</b>	<b>IDB/ OC-FSO</b>	<b>Local</b>	<b>Total</b>	<b>%</b>
<b>I. Engineering and administration</b>	<b>1,240</b>	<b>0</b>	<b>1,240</b>	<b>5.6</b>
1.1 Works supervision	644	0	644	
1.2 Executing unit	216	0	216	
1.3 Procurement support firm	380	0	380	
<b>II. Direct costs</b>	<b>16,796</b>	<b>1,939</b>	<b>18,735</b>	<b>85.2</b>
<b>2.1 Flood and erosion control</b>	<b>15,966</b>	<b>1,939</b>	<b>17,905</b>	<b>81.4</b>
2.1.1 Works	14,366	1,939	16,305	
2.1.2 PPRD	600	0	600	
2.1.3 Designs and studies	500	0	500	
2.1.4 PEAPAC	500	0	500	
<b>2.2 Institutional development and environmental management</b>	<b>830</b>	<b>0</b>	<b>830</b>	<b>3.8</b>
2.2.1 POMP and equipment	420	0	420	
2.2.2 Cadastre supplementation	200	0	200	
2.2.3 Urban management support	150	0	150	
2.2.4 Street cleaning optimization	57	0	57	
<b>III. Associated costs</b>	<b>150</b>	<b>0</b>	<b>150</b>	<b>0.7</b>
3.1 Audit, evaluation, and monitoring	150	0	150	
<b>IV. Financial costs</b>	<b>1,814</b>	<b>61</b>	<b>1,875</b>	<b>8.5</b>
4.1 Interest	1,814	0	1,814	
4.2 Credit fee	0	61	61	
<b>Total</b>	<b>20,000</b>	<b>2,000</b>	<b>22,000</b>	<b>100.0</b>

### **III. PROGRAM EXECUTION**

#### **A. Borrower, guarantor, and executing agency**

- 3.1 The borrower will be the Republic of Bolivia. The Municipal Government of La Paz (GMLP) will serve as executing agency, through the Oficialía Mayor Técnica [Technical Administrative Office] and a program executing unit (PEU) set up within the GMLP's current Dirección de Gestión Integral de Riesgo [Comprehensive Risk Management Division] (DGIR). As a condition precedent to the first disbursement, the borrower—the Republic of Bolivia—and the executing agency—the Municipal Government of La Paz—will sign a subsidiary agreement whereby the borrower will transfer the proceeds of the Bank's financing to the executing agency under the same financial terms and conditions, establish the obligations of the GMLP as program executing agency, and stipulate that, in cases of discrepancies between the subsidiary agreement and the loan contract, the latter

will prevail. The GMLP will be responsible for the respective financial obligations under the loan, including the local counterpart and debt service.

**B. Program execution and administration**

- 3.2 The PEU will be the program's interlocutor vis-à-vis the Bank and will have the following responsibilities: (i) investment planning and programming; (ii) preparation and monitoring of the tendering processes for procurement of works, goods, and consulting services; (iii) works supervision oversight and monitoring; (iv) verification that environmental mitigation measures have been implemented; (v) accounting, record-keeping, filing of requests for disbursement, and reporting; (vi) preparation of program reports; (vii) presentation of evidence that contractual clauses have been fulfilled; and (viii) outcome monitoring and evaluation. The PEU will be formalized as the GMLP's Administrative Center, with administrative and procurement autonomy. ***The legal formalization of the PEU as the GMLP's Administrative Center, with administrative and procurement autonomy, will be a condition precedent to the first disbursement.*** The PEU will have a general coordinator, support staff, a procurement specialist, a financial specialist, a planning, monitoring, and oversight specialist, and a technical environmental specialist. The latter three will be hired with program resources. ***The engagement of these specialists by the PEU will be a condition precedent to the first disbursement.***
- 3.3 The PEU will use program resources to hire: (i) a consulting firm for procurement support, (ii) a technical and environmental works supervision firm, and (iii) a technical expert and an environmental expert. The firm specializing in procurement will manage program contracting overall. The procurement specialist will liaise with and monitor the work of the procurement support firm, supervise procurement, and be responsible for carrying out the procurement plan. The works supervision firm will provide services involving the technical-financial and environmental oversight and monitoring of construction firms and will provide technical direction. The technical and environmental experts will coordinate with the GMLP's Inspection Division and the Environmental Quality Division to inspect program works. ***The PEU's hiring of the procurement support firm, the works technical and environmental supervision firm, and the technical and environmental experts will be a condition precedent to the first disbursement.***
- 3.4 Works that are not part of the representative sample will be executed in accordance with the program's Operating Regulations, which set out the works eligibility criteria and the expenses eligible for financing with program resources. ***The entry into force of the Bank-approved Operating Regulations will be a condition precedent to the first disbursement. In addition, evidence, prior to the start of the tendering process for all the works, that the borrower has the environmental licenses for the works in question will be a contractual condition for execution.***

**C. Procurement**

- 3.5 Works, goods, and related services will be procured in accordance with the Bank's policies for the procurement of works and goods (document GN-2349-7). Consulting services will be selected and contracted in accordance with the policies for selection and contracting of consultants (document GN-2350-7). National competitive bidding will be carried out for works costing between US\$250,000 and US\$3 million, and shopping may be used for works costing less than US\$250,000. National competitive bidding will be used for goods costing between US\$50,000 and US\$200,000, and price comparison may be used for goods costing less than US\$50,000. For consulting services costing over US\$200,000 notices will be published internationally in the UNDB. For consulting services costing less than US\$200,000, the short list may consist entirely of national consultants. A procurement plan has been prepared showing works, related services, and consulting services to be procured for the first 18 months of program execution.
- 3.6 The Bank will conduct ex ante supervision of all procurement. After successful completion of the first three to five tendering processes, and to the extent that the executing agency so requires, the Bank may change the supervision modality and conduct periodic evaluations, review external audit reports, and conduct inspection visits. As a result of this analysis, the possibility of applying ex post supervision for works and goods involving amounts below the thresholds for international competitive bidding will be considered. The hiring of consulting firms and individual consultants involving costs below US\$200,000 and US\$50,000, respectively, will be reviewed ex post. In each case, partial or general ex post review of procurement may be revoked by the Bank at any time, if the findings of the reviews and evaluations so indicate. In addition, under certain circumstances, financing for noneligible procurement undertaken with resources from the financing or the local counterpart may be rejected.

**D. Revolving fund**

- 3.7 A revolving fund will be created for the program to provide resources in advance of the activities financed with loan proceeds. The amount of the revolving fund will be limited to 5% of the amount of the loan from the IDB. The GMLP's PEU will be responsible for presenting semiannual reports on the status of the revolving fund within 60 days of the close of each six-month period.

**E. Recognition of expenditures**

- 3.8 The executing agency has not requested recognition of expenditures against the local counterpart funding or the loan.

**F. Implementation period and disbursement timetable**

- 3.9 The program will be executed over a four-year span in accordance with an approved disbursement timetable. The estimated cost of the operation is US\$22 million, of which US\$20 million represent the Bank's financing. The following table shows the proposed disbursement timetable:



**Disbursement timetable (US\$ million)**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>Total</b>
6.2	6.31	4.18	3.30	20.0
1.0	0.99	0.01	0.00	2.0
<b>7.2</b>	<b>7.30</b>	<b>4.19</b>	<b>3.30</b>	<b>22.0</b>
33%	33%	19%	15%	100%

## **G. Monitoring and evaluation**

- 3.10 Program execution will be monitored by means of semiannual progress reports, which the PEU will produce and submit to the Bank within 60 days after the close of each six-month period. These reports will gauge progress with respect to compliance with the commitments set out in the logical framework. The reports covering the second calendar half-year will include the annual work plan (AWP) and budget for the following year, information on activities and targets to be achieved over that period, and projections through the program's completion.
- 3.11 Outcome indicators agreed between the Bank and the executing agency and contained in the logical framework for this operation will be used for periodic monitoring of the program. The executing agency and the Bank will meet within 60 days after the Bank receives each semiannual report, to jointly evaluate progress.
- 3.12 Each year, the executing agency will submit the procurement plan to the Bank for review and approval. The plan will include the estimated cost of contracts and projects, grouping of tenders, financing sources, selection criteria and methods, and the Bank's review procedure. This plan will be updated to cover the following 18 months of implementation, and submitted each time to the Bank for review and approval. It will also need to be updated whenever significant changes occur.
- 3.13 The program's evaluation tools will be: an independent midterm evaluation, which will be conducted two years into the program, counted from the date of entry into force of the loan contract, or when the funding is 50% disbursed, whichever is earlier; an independent final evaluation, six months after the last disbursement; and the program completion report that the Bank will prepare. The midterm and final evaluations may be commissioned with program resources.

## **H. Audits**

- 3.14 The GMLP's PEU will: (i) maintain separate and specific bank accounts to manage the resources of the Bank and those of the local counterpart; (ii) present disbursement requests and supporting documentation for eligible expenses in a timely manner; (iii) implement and maintain effective financial information and internal control systems to manage the IDB's and local counterpart's resources in accordance with the Bank's requirements; (iv) prepare and submit the financial and revolving fund reports semiannually and other financial reports that the bank may

require, including audited financial statements; and (v) maintain an effective filing system for supporting documentation on eligible expenses for verification by the Bank and the external auditors.

- 3.15 During the implementation period, the GMLP's PEU will submit the program's audited financial statements annually. The external audit will be performed by a firm of independent auditors acceptable to the Bank, in conformity with Bank policies in this regard (documents AF-100 and AF-300) and terms of reference (AF-400), previously approved by the Bank. The procedures established in the document on procurement of audit services (document AF-200) will be used to select and hire the firm. The program's annual financial statements will be submitted within 120 days of the end of the fiscal year and the closeout audit within 120 days of the last disbursement. Audit costs will be considered part of the cost of the program and will be financed out of the loan proceeds.

#### **IV. VIABILITY AND RISKS**

##### **A. Institutional viability**

- 4.1 The GMLP's institutional capacity to manage the program was evaluated using the Institutional Capacity Assessment System (ICAS) methodology. The analysis covered the following systems: (i) components and activities planning; (ii) organizational management; (iii) personnel management; (iv) goods and services management; (v) financial management; (vi) internal control; and (vii) external control.
- 4.2 The assessment rates the GMLP's institutional capacity as "satisfactory," with a risk level rated "low." The execution and control capacities are rated "satisfactory (risk level "low"). The programming and organization capacity is rated "average" (risk level "average"), primarily because preparation of the program Operating Regulations and the AWP is under way. Approval of these two documents is a condition precedent to the first disbursement. The GMLP has experience with the Bank's methods and procedures, in particular the experience acquired over the last few years through implementation of the executing unit for and administration of the La Paz Revitalization and Urban Development Program (1557/SF-BO). The GMLP will have the following resources to implement and start up the PEU: (i) the specialists to be hired by the PEU in the areas of financial management, programming, and monitoring and evaluation (paragraph 3.2); (ii) the procurement management firm (paragraph 3.3); (iii) a specific consulting assignment to be contracted with program resources for the design and implementation of a programming, monitoring, and evaluation system; and (iv) direct support for the following GMLP units: the Dirección de Desarrollo Organizacional [Organizational Development Division] (DDO), the Dirección de Planificación y Control [Planning and Control Division] (DPC), and the Dirección Especial de Finanzas [Special Finance Division] (DEF), which are involved in the formalization of functions and procedures and the implementation of information systems. The above includes in

particular the implementation of a GMLP budget, accounting, and financial records system in the PEU (SIGMA, SISIN) and of the Bank's project management system.

**B. Drainage system sustainability**

- 4.3 A diagnostic assessment of drainage system management was conducted in the context of preparing the program, through the technical-cooperation operation entitled "Municipal Actions for Management of the Storm Drainage System of the City of La Paz." As a result, three action focuses were identified to develop sustainable drainage management over the medium term.
- 4.4 The first focus of action to achieve sustainable drainage management is the streamlining of sector organization. Several entities are currently involved in managing the drainage system. The microdrainage system is for the most part under the contractual responsibility of the public water and sanitation company (EPSAS), by virtue of the current concession contract. The GMLP's Oficialía Mayor Técnica [Technical Administrative Office] (OMT) is in charge of the macrodrainage system—managed by the Dirección de Gestión Integral de Riesgos [Comprehensive Risk Management Division] (DGIR)—and of part of the microdrainage system. The latter is managed by the Emergencies Unit and the Neighborhood Maintenance Unit of the OMT's Maintenance Division, together with several other activities. For the surface drainage to be managed efficiently, there is sector consensus on the need for: (i) better coordination between the GMLP and EPSAS, and (ii) a more streamlined OMT. On this second point, the OMT's current activities in this area are centralized in a Microdrainage Maintenance Unit, under the Maintenance Division. A second stage will involve centering the surface system maintenance activities in a single entity, either the OMT or EPSAS, and the institutional reform of EPSAS. This process is expected to take place in 2008.
- 4.5 The second focus of action is the implementation, during program execution, of drainage system preventive maintenance, particularly macrodrainage. Currently, most of the OMT's efforts involve emergency interventions, which stem from the advanced deterioration of the infrastructures. Program execution, with emergency interventions specifically aimed at improving the condition of the infrastructures, will allow the OMT to redirect its activity toward preventive maintenance. To this end, the above-mentioned technical-cooperation operation has developed a preventive and operation maintenance plan (POMP) for the La Paz drainage system, as a legal basis for sustainable management of the system, to be implemented under the program. The plan sets out the activities (nature and frequency) to be carried out to ensure the technical sustainability of the system in general and the investments under the program in particular. Upon program completion, preventive maintenance will cover the entire macrodrainage system. The estimated annual normative cost for the drainage system overall comes to US\$4.1 million, of which US\$3.6 million is earmarked for the OMT-managed macrodrainage system, and US\$500,000 for the microdrainage system for which EPSAS is contractually responsible. As part of the implementation of the POMP and based on the diagnostic assessment performed in the context of the technical-

cooperation operation, program resources will be used to finance: (i) completion of the macrodrainage system cadastre; (ii) a consulting assignment to support the OMT in the detailed design of the POMP; and (iii) the equipment the OMT needs to execute the activities envisaged in the POMP (paragraph 2.8).

- 4.6 The purpose of the third focus of action is to ensure the financial sustainability of the drainage system. Currently drainage system expenditures are not precisely identified in the SIGMA municipal budget system, since the existing budget line items do not offer an adequate level of discrimination. Nevertheless, the analysis undertaken as part of the technical-cooperation operation indicates that implementation of the POMP with the program will not generate an increase in operation and maintenance expenditures. Expenditures currently incurred in emergency interventions resulting from lack of maintenance will be replaced with less costly preventive maintenance and repair activities. Even so, this operation will implement a financial mechanism to ensure drainage system sustainability. First, the SIGMA municipal budget system will be adjusted to include budget line items identifying drainage system expenditures exclusively and exhaustively. By municipal ordinance, the budget of the Municipio of La Paz will contain an allocation of own resources specifically earmarked to finance the activities envisaged in the POMP. The amount of the allocation will be based on a formula set out in the ordinance based on representative physical and financial parameters of the POMP's financing needs. This mechanism will enter into force with fiscal year 2009.
- 4.7 *The following conditions precedent to the first disbursement will apply: (i) the exclusive and exhaustive identification of drainage system expenditures in the SIGMA municipal system; and (ii) approval of the municipal ordinance regarding the budget allocation for the drainage system.*
- 4.8 The effectiveness of the mechanism to ensure the financial sustainability of the drainage system will be analyzed in the course of the program's midterm evaluation. If necessary, system changes to be made by the GMLP will be identified.

#### **C. Socioeconomic viability**

- 4.9 An economic evaluation of each of the works in the program sample has been conducted. The evaluation was done in two stages. First, a determination was made that the least-cost solution had been adopted. Then a cost-benefit analysis was performed to verify that the proposed work has an internal rate of return above 12%. The evaluation was based on a comparison of economic costs and benefits in situations with and without the program. The benefits were calculated on the basis of estimates of property values, a valuation of the decrease in damage to property and infrastructure, and operation and maintenance cost savings. The costs considered for the evaluation were the incremental costs of investment and operation and maintenance, valued at efficiency prices established by the Office of the Deputy Minister for Public Investment and External Financing (VIPFE).

### **1. The works in the sample**

- 4.10 The set of works in the sample account for almost 34.9% of the value of the program's physical works component and adequately represent the types of works that the program will finance. The cost of the intervention at market prices was converted to economic prices based on the conversion factors.<sup>2</sup> Applying the factors to the construction and maintenance costs gave average conversion factors equal to 0.80 and 0.85 respectively.

<b>Works in the sample</b>	<b>Cost US\$000</b>
Av. del Poeta	5,544
Jillusaya River upper watershed	800
Total	6,344
Works component	18,440

### **2. Least-cost analysis**

- 4.11 The drainage interventions in the sample were subjected to an analysis of options that helped identify the least-cost alternative as the solution.

### **3. Cost-benefit analysis**

- 4.12 Each of the projects was subjected to cost-benefit analysis. The benefits of drainage considered were: increase in the value of property (B\$23.72 per square meter, which represents 20% of current assessed value), material damage avoided by families and public infrastructure, and average savings of 12% on current maintenance costs.
- 4.13 The results of the analysis show that the program is economically viable with respect to each project, with economic internal rates of return (EIRR) that are significantly higher than 12%, with the exception of the Avenida del Poeta project, which has an EIRR of 12.6%. The following table summarizes the results.

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<sup>2</sup> The factors are as follows: national material 0.84; imported material 1.0887; skilled labor 1.00; unskilled labor 0.60; machinery and equipment 1.0887; earnings 0.70; preinvestment, overhead or administrative costs 0.00; and taxes and finance charges 0.00.

**Economic cost-benefit analysis**

Work	Economic net present value (US\$000)				EIRR	C/B
	Benefit	Investment	O&M	Net benefit		
Av. Del Poeta	5,153	4,059	428	160	12.6	1.15
Charapaya River	1,019	713	75	131	14.6	1.30
Jake Jake River	1,290	428	45	683	33.3	2.73
Jilusaya River (777m)	1,772	663	69	858	29.4	3.42

- 4.14 A sensitivity analysis of the program was carried out, which simulated variations in expected benefits and costs incurred. In the simulations, the values of the estimated parameters were modified. The parameters were property assessments, cost savings, and avoidable damages. According to the analysis, the viability results were found to be robust, except for the investments in the Avenida del Poeta and Charapaya River works, which will not tolerate cost incrementals of 5% and 15% respectively.

**D. Financial viability**

- 4.15 In 2000 the GMLP joined the Ministry of Finance's Financial Reform Plan (PRF) for five years (2001-2005). During that period the GMLP met the PRF's principal targets in terms of collection, expenditure rationalization, debt control, and administrative efficiency and in 2006 showed ongoing improvement in its financial situation. The measures taken to improve efficiency in collection together with current expenditure rationalization resulted in a rapid increase in current performance. In the 2003-2006 period, current performance increased by 133% in current dollars, reaching a value of US\$33 million. Over the same period, investments only grew by 35% (US\$34 million for 2006), which made possible a 30% reduction in debt. The GMLP's total debt at 31 December 2006 came to US\$55 million equivalent, i.e., 68% of the year's current revenue (compared with 149% in 2003).
- 4.16 The GMLP was the first municipal government in the country to comply with Supreme Decree 28666 of 2006, which makes access to concessional loans by departmental and municipal administrations subject to the signature of an institutional financial performance agreement (CDFI) with the Ministry of Finance. The five-year agreement signed with the Ministry in November 2006 extends adherence to the PRF guidelines and, through a commitment matrix containing borrowing and administrative management indicators, establishes guidelines for the financially balanced development of the GMLP. Fiscal year 2006 saw a significant increase in transfer revenues<sup>3</sup> for the GMLP, which represented 44% of the

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<sup>3</sup> Legal revenue-sharing in the taxes collected by the national government and in the distribution of the direct tax on hydrocarbons (IDH), which represents 32% of settlement price of all hydrocarbons extracted. The municipio of La Paz received 1.73% of total IDH in 2006 and should receive 1.91% beginning in 2008 pursuant to the legislation.

- municipio's current revenue (compared with 34% in 2005). The Ministry of Finance anticipates sustained growth in these transfers over the next five years, because of the hydrocarbon contracts, which are expected to raise the IDH, the growth in gross domestic product (GDP), and the anti-tax fraud efforts, which should increase tax collection and, therefore, revenue sharing.
- 4.17 To evaluate the program's financial viability, a historical analysis was conducted of municipal accounts, the CDFI and its financial projections, and the prospects mentioned in the previous point. A financial simulation model of the GMLP was prepared. The macroeconomic parameters (GDP, inflation, exchange rate, and others) are those of the Bolivian government. The municipio's own tax revenues and those from revenue sharing for the most part are projected on the basis of GDP. The IDH is a percentage of the total value, at settlement prices, of the hydrocarbons extracted in the year. The unit prices and volumes of gas reflect the provisions of each of the contracts. The GMLP's investment projection is considered separately: (i) investments to be made with internal resources, projected on the basis of those of previous years and reflecting GDP trends; and (ii) investments to be made with the proceeds of contracted loans or prospective loans already authorized by the national government, which give rise to the projection of disbursements to be received from use of the credit. For these operations and for those contracted previously, the projections of amortizations and financial charges stem from the contractual clauses. The operation under analysis was projected separately, following the investment timetable indicated in paragraph 3.9, with the terms and conditions set for the loan. Given that investments are expected to begin around mid-2008, the projections, based on fiscal years, consider that 50% of the first year will be executed in 2008 and the remaining 50% in 2009, and in the same way for subsequent years, so that half the investments of the last year will be made in 2012. Incremental maintenance and operation expenses have not been included since they will remain constant, as shown in paragraph 4.6.
- 4.18 Two scenarios were evaluated on that basis. In the first scenario, the IDH was calculated based on contractual values, with the exception of the domestic market and the oil, which were projected at constant prices and production as per the Yacimientos Petrolíferos Fiscales Bolivianos (YPFB) projection. A second scenario, the projection of which is presented below, assumes a two-year delay in making the investments that secure growth in the production and sale of gas contracts, which provide for increases in deliveries. This is equivalent to deferring IDH revenues by two years.
- 4.19 The results of this second scenario indicate that the GMLP would have the financial capacity to assume its obligations: financial costs and counterpart during execution and debt service. These obligations during the 2008 (start of execution) to 2017 period show significant headroom with respect to available resources. The sum of the obligations projected for 2009 (financial expenses and counterpart) represents only 1.39% of current savings and 1.04% of projected current revenue. More importantly, those obligations represent 1.59% of projected investments with own

resources, i.e., those that can be reduced or increased depending on resource availability. The situation is similar in 2013, the year when the value of obligations is highest in the subsequent period, representing 1.38%, 1.05%, and 1.55% of current savings, current revenue, and own investments, respectively.

- 4.20 To ensure that the GMLP's financial stability is maintained, two indicators will be used to monitor its liquidity and solvency ratios. These indicators are set out in the institutional financial performance agreement (CDFI), are calculated at the end of each year, and make it possible to measure: (i) liquidity: the proportion of current revenue earmarked for debt service; and (ii) solvency: net debt (long-term plus floating minus availability of financial resources) divided by current revenue. The formulas are provided in Annex III. **Maintaining the liquidity indicator below 0.20, and the solvency indicator below 2.00 will be a contractual condition.** Based on the projections, these conditions will be fulfilled, as shown in the following table:

Situation projected at the end of each year (US\$000)											
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Assets	10.48	15.46	18.39	20.10	21.75	25.36	27.51	32.23	34.19	37.79	41.11
Liabilities	9.07	9.01	9.46	9.94	10.48	11.32	12.26	13.24	14.30	15.45	16.69
Funded debt	83.86	112.9	132.5	129.7	125.5	118.0	180.0	98.83	88.41	81.32	75.21
- External	40.98	73.27	96.19	97.17	96.76	92.68	89.29	86.48	82.71	78.94	75.21
- Internal	42.88	39.66	36.31	32.59	28.81	25.33	18.72	12.34	5.70	2.38	0.00
Net financial assets	1.16	1.72	1.94	2.02	2.08	2.24	2.24	2.43	2.39	2.45	2.46
Net debt	82.45	106.4	123.5	119.6	114.3	103.9	92.75	79.84	68.53	58.98	50.79
Debt service/Current rev. year		0.10	0.10	0.12	0.11	0.10	0.11	0.90	0.90	0.07	0.06
Net debt/Current rev. previous year		1.13	1.19	1.09	0.97	0.83	0.69	0.55	0.44	0.36	0.30

- 4.21 In fact, the situation would be better than is shown, because the formulas consider debt service for the year to begin and net debt took at the start of the year (or end of the previous year), but take current revenue from the previous year, which trends upward annually.

## E. Environmental and social considerations

- 4.22 The program seeks to resolve the environmental and social problems of La Paz's population. Accordingly, positive environmental and social benefits are anticipated. The positive impacts will be associated with improving the hydraulic flow conditions of the drainage system, thus preventing floods and emergency situations. The main social benefits are reflected in a drop in critical events that obstruct the movement of the inhabitants of La Paz, a reduction in material damages, and less concern about catastrophes on the part of residents in high risk areas.

- 4.23 The works will have negative environmental impact, most of them discrete and short-term, especially in connection with the construction period (noise, dust and debris, interference with traffic, risk of accidents, etc.). As a result, in accordance with the Bank's Environmental and Social Safeguards Policy, the team proposed



- rating the program a category “B”, which would mean overriding the category C proposed by the toolkit. Currently, the involuntary resettlement of families or businesses is not anticipated. If any type of involuntary resettlement or expropriation becomes necessary, the IDB’s policies (OP-710) and national legislation on the subject will be followed. In such a case, evidence that the Family and Business Expropriation and Relocation Plan has been implemented—prior to the start of works and pursuant to policy OP-710 on these matters—will be a contractual condition of execution.
- 4.24 The social and environmental aspects of storm drainage system planning in the city, including program works, were analyzed in the context of preparation of the La Paz storm drainage master plan (PMDP), through a Strategic Environmental Evaluation. The community participated in the evaluation process through public consultations that began in November 2006. The evaluation was made available at the Public Information Center and in Bolivia in July 2007. An environmental brief was prepared for each work in the sample together with the respective Prevention and Mitigation Program (PPM) and the Environmental Application and Monitoring Plan (PASA), pursuant to Bolivian law and the Bank’s requirements. The competent environmental authority—the Departmental Government of La Paz—issued the categorization of those works in October 2007, an indication that the projects are eligible to receive startup licenses. The PPM and PASA identified the specific impacts and proposed the respective environmental management and mitigation measures, which will be included in the bidding documents for the works. Evidence, prior to the start of the tendering process for the works, that the bidding documents include detailed designs of the works and the specific requirements set out in the environmental license approved by the competent environmental authority will be a contractual condition for execution. All the mitigation and management measures identified in the Strategic Environmental Evaluation, the PPM, and PASA make up the program’s Environmental and Social Management Report (IGAS). As a contractual clause for execution, prior to tendering each work the borrower will submit the environmental licenses for the works to the Bank.
- 4.25 The environmental management structure provided for in the IGAS requires that program resources be used to hire a technical-environmental specialist for the PEU, with terms of reference agreed upon with the Bank. He or she will ensure compliance with the mitigation measures specified in the IGAS and the bidding documents and will process the environmental licenses with the competent environmental authority, in this case the Departmental Government of La Paz. A consulting firm will be responsible for technical-environmental supervision, with support from a technical expert and an environmental expert who will coordinate with the Environmental Quality and Inspection Divisions of the La Paz Municipal Government. Both will be hired on the basis of terms of reference agreed upon by the Bank.

**F. Benefits and beneficiaries**

- 4.26 The beneficiaries are the inhabitants of La Paz, who currently experience human and material losses as a result of a deficient storm drainage system. They will benefit from the technical and financial sustainability of the system. The GMLP will also benefit, since it will have more information and resources for the operation and maintenance of the storm drainage system.
- 4.27 The number of emergencies dealt with by civil defense forces during periods of intense precipitation is expected to drop. In addition, material damages and the cost of maintaining hydraulic structures should decrease, thanks to the works and actions to prevent the discharge of sediment into the drainage systems. With the actions in support of the GMLP, the institutional and financial capacity to manage drainage services is expected to improve, thereby ensuring the service's sustainability.

**G. Risks**

- 4.28 The lack of systematic sanitation and maintenance of the open and covered channelized watercourses and of a number of gullies and forested areas is a risk factor for the city and for the sustainability of program investments. The proposed execution structure will ensure that actions to strengthen the Comprehensive Risk Management Division (DGIR) and the financing mechanisms to cover the cost of operation and maintenance of the city of La Paz drainage system will be implemented as part of this program.
- 4.29 A perceived risk analysis was conducted on the basis of a 17-person panel. The analysis corroborated the importance of approval by the Municipal Council of the Land-use Regulations, which took place in October 2007.

## LA PAZ STORM DRAINAGE PROGRAM (BO-0223)

### LOGICAL FRAMEWORK

Narrative summary	Indicators	Means of verification	Assumptions
<b>Goal</b> The quality of life of the inhabitants of the Municipio of La Paz, Bolivia, is improved.	By the end of the program, a 10% increase is expected in the neighborhood satisfaction index with respect to drainage services.	Survey of a sample of residents conducted by the GMLP and provided for in the program	The works executed are maintained and monitored and hydrological distribution is normal.
<b>Purpose</b> The incidence of human loss and property damage caused by extreme hydrometeorological events is reduced thanks to implementation of an effective stormwater drainage system.	By the end of program execution <ul style="list-style-type: none"> <li>▪ The number of people affected annually by hydrometeorological events drops from 9,882 to 8,000 (extrapolation based on statistical data from the Centro de Operaciones de Emergencias [Emergency Operations Center] (COE) ).</li> <li>▪ Number of hours/equipment used to maintain the channels drops from 29,044 to 25,400.</li> </ul>	GMLP statistics.  SIREMU and OMT	The Municipal Government of La Paz (GMLP) maintains control over land settlement and use in the La Paz River watersheds. The GMLP's institutional and financial capacity is sufficient to manage the storm drainage system. The contracts with the cleaning companies contain the same technical and operation conditions for the machinery.
<b>Components</b> <b>1. Flood and erosion control</b>  <b>2. Institutional development and environmental management</b>	The number of emergencies resulting from hydrometeorological events is expected to drop from 1,647 to 1,300 (COE). Maintenance costs related to removing sediment and trash drop by 10%.	GMLP statistics.  SIREMU and OMT statistics	The Departmental Government maintains its policy of support for the storm drainage program. The GMLP maintains the contractual conditions for operation of the machinery.

Narrative summary	Indicators	Means of verification	Assumptions
<b>Activities</b>			
<b>1A) Macrodrainage works recommended by the PMDP (improvement, rehabilitation, change in alignment)</b>	The PMDP defined the following total lengths for the short term, i.e., four years: Repair = 9 km Expansion = 13 km Improvement = 16 km	Numbers to be prepared by the PEU (Technical-environmental specialist)	The timetable for the work is not changed as a result of adverse weather conditions.
<b>1B) Microdrainage works recommended by the PMDP.</b>	60 drains built and in good operating condition	Numbers to be prepared by the PEU (Technical-environmental specialist)	The timetable for the work is not changed as a result of adverse weather conditions.
<b>1C) Works and complementary actions identified by the PMDP</b>	▪ 5% reduction in the volume of sediment removed from the drainage system.	Calculated based on hours/machines/rainy season, used to remove sediment.	Maintenance of nonstructural works (GMLP) and replacement of dead trees.
	▪ 10% reduction in the weight of solid waste dumped in the channels	SIREMU-GMLP	Maintenance of the quality of solid waste collection services.
<b>1C(i) Structural interventions for water erosion reduction and reforestation of the upper watersheds</b>	108 Ha reforested with trees planted and kept alive for a period of two years.	OMT-PEU	The timetable for the work is not changed as a result of adverse weather conditions.
<b>1C(ii) Sediment retention works in the upper sections</b>	4 works completed	OMT-PEU	The timetable for the work is not changed as a result of adverse weather conditions.
<b>1C(iii) Design and implementation of the PPDR</b>	10% reduction in cases involving drainage system-related disasters.	GMLP	Target population agrees to participate in the program.
<b>1C(iv) Formulation and implementation of PEAPAC</b>	30% of the target population acquires knowledge about proper disposal of solid waste, land use and settlement regulations, and the benefits of reforestation.	Survey already included as PEAPAC activity	Target population agrees to participate in the program.
<b>1C(v) Preparation of design for successive works indicated in the PMDP</b>	10 final designs, economic and environmental studies of the works (in two years)	Studies performed-physical indicator of the activity	GMLP counterpart guaranteed.
<b>2A) Optimization of the street cleaning system</b>	Study on optimizing the street cleaning system performed and implemented	SIREMU	Concessionaire agrees to changes in the contract.
<b>2B) Support for implementation of land-use planning tools</b>	Land-use plan in watersheds prepared and implemented.	OMGT-GMLP	The departmental and national governments maintain their policy of support for the storm drainage program.

Narrative summary		Indicators	Means of verification	Assumptions
<b>2C)</b>	<b>Supplementation of macrodrainage system cadastre</b>	Cadastre of macrodrainage system completed	OMT-PEU	
<b>2D)</b>	<b>Operation and preventive maintenance plan of the La Paz drainage system</b>	Operation and preventive maintenance plan of the La Paz drainage system completed	OMT-PEU	

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-\_\_\_/07

Bolivia. Loan \_\_\_/BL-BO to the Republic of Bolivia  
La Paz Storm Drainage Program

The Board of Executive Directors

RESOLVES:

1. 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 Republic of Bolivia, as Borrower, for the purpose of granting it a financing to cooperate in the execution of a program for La Paz storm drainage.
2. Such financing will be for the amount of up to US\$20,000,000, as follows:
  - (i) up to the amount of US\$14,000,000, from the resources of the Single Currency Facility of the Bank's Ordinary Capital, and
  - (ii) up to the amount of US\$6,000,000, from the resources of the Bank's Fund for Special Operations.
3. Such financing will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Executive Summary of the Loan Proposal.

(Adopted on \_\_\_ 2007)

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