

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

ECUADOR

**QUITO METROPOLITAN TRANSPORTATION SYSTEM
FIRST LINE OF THE QUITO METRO**

(EC-L1111)

LOAN PROPOSAL

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ELECTRONIC LINKS	
REQUIRED	
1.	Annual work plan (AWP) http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37245975
2.	Monitoring and evaluation plan http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37131205
3.	Environmental and social management report (ESMR) http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37155778
4.	Procurement plan (PP) http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37166405
OPTIONAL	
1.	Diagnostic assessment of mobility conditions in Quito http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36680862
2.	Socioeconomic feasibility study http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37151412
3.	Demand studies: Model http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36680852
4.	Institutional structure of the Integrated Passenger Transportation System http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36680867
5.	Financial feasibility study http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37128404
6.	Outcome of consulting engagement: Model financial sensitivity scenarios http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37158488
7.	Review of project economic evaluation http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37167379
8.	Outcome of consulting engagement: Risk analysis http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37079092
9.	Project map http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36787165
10.	Proposed integrated pricing policy for the Integrated Passenger Transportation System http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36680890
11.	Integrated Passenger Transportation System http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37206351
12.	Securitization and BIESS contributions http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37208895
13.	How common and how large are cost overruns in transport infrastructure projects? http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37166459
14.	Analysis of metro project costs and their applicability to the Quito Metro project http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37225398

ABBREVIATIONS

AMTP	Autoridad Metropolitana de Transporte Público [Metropolitan Public Transportation Authority]
AMTS	Autoridad Metropolitana de Tránsito y Seguridad Vial [Metropolitan Transit and Road Safety Authority]
AWP	Annual work plan
ATC	Automatic train control
BdE	Banco del Estado
BIESS	Banco del Instituto Ecuatoriano de Seguridad Social [Bank of the Ecuadorian Social Security Institute]
CAF	Development Bank of Latin America (formerly the Andean Development Corporation)
DMPPM	Departamento Metropolitano de Política y Planeamiento para la Movilidad [Metropolitan Department of Mobility Policy and Planning]
DMQ	Distrito Metropolitano de Quito [Quito Metropolitan District]
DPDTM	Departamento Metropolitano de Desarrollo Tecnológico para la Movilidad [Metropolitan Department of Technological Development for Mobility]
EIA	Environmental impact assessment
EIB	European Investment Bank
EPMOP	Empresa Pública Metropolitana de Movilidad y Obras Públicas [Metropolitan Public Enterprise for Mobility and Public Works]
EPMMQ	Empresa Pública Metropolitana Metro de Quito [Quito Metro Metropolitan Public Enterprise]
ESMR	Environmental and social management report
GCI-9	Ninth General Capital Increase, or Ninth General Increase in the Resources of the Inter-American Development Bank
ICB	International competitive bidding
MDMQ	Municipio del Distrito Metropolitano de Quito [Municipio of the Quito Metropolitan District]
NAMA	Nationally appropriate mitigation action
NCB	National competitive bidding
OR	Operating Regulations
PLMQ	Primera Línea del Metro de Quito [First Line of the Quito Metro]
REST	Regional Environmentally Sustainable Transport
SITP	Sistema Integrado de Transporte Masivo [Integrated Passenger Transportation System]
UNMQ	Unidad de Negocios Metro de Quito [Quito Metro Business Unit]
WAL	Weighted average life

PROGRAM SUMMARY

ECUADOR

QUITO METROPOLITAN TRANSPORTATION SYSTEM

FIRST LINE OF THE QUITO METRO

(EC-L1111)

Financing Terms and Conditions				
Borrower: Republic of Ecuador Executing agency: Municipio of the Quito Metropolitan District (MDMQ), acting through the Quito Metro Metropolitan Public Enterprise (EPMMQ)			Flexible Financing Facility **	
			Amortization period	25 years
			Original WAL:	15.25 years
			Disbursement period:	5 years
Source		Amount (US\$)	Grace period:	13.5 years
IDB (OC)		Up to 200,000,000*		
Parallel financing	EIB	250,000,000	Interest rate:	LIBOR-based
	CAF	250,000,000		
BdE financing		200,000,000	Credit fee:	***
BIESS investment		154,000,000		
Supplier financing		188,000,000	Inspection and supervision fee:	***
Local counterpart		253,000,000		
Program total		1,500,000,000	Currency:	United States dollars
Program Overview				
<p>Program objective: Improve urban mobility in the city of Quito, addressing the growing demand for public transportation. The First Line of the Quito Metro (PLMQ) will shorten travel times, lower the operating costs of transportation service, improve the connectivity, safety, and comfort of the current system, and reduce pollutant and greenhouse gas emissions. The program is structured around the following components: (i) civil works, facilities, and expropriations; (ii) rolling stock; and (iii) technical assistance for project execution (see paragraphs 1.21 to 1.25).</p>				
<p>Special conditions precedent to the first disbursement (see paragraph 3.3). Prior to the first disbursement, the Municipio of the Quito Metropolitan District (MDMQ) will provide: (i) evidence of the signature and entry into effect of a subsidiary agreement for the transfer of resources, rights, and obligations between the borrower and the MDMQ; (ii) evidence of the signature and entry into effect of: (a) the supplementary financing loan contracts between the borrower and the European Investment Bank (EIB), the Development Bank of Latin America (CAF), and Banco del Estado (BdE) for the program; and (b) the contract with the program management firm; (iii) evidence that the trust has been established for the investment of the Bank of the Ecuadorian Social Security Institute (BIESS) in the program; (iv) evidence of the entry into effect of the program Operating Regulations, on the terms agreed upon with the Bank; (v) the submitted draft Implementation Plan for the Integrated Passenger Transportation System (SITP), on the terms agreed upon with the Bank; (vi) evidence that the environmental and social management plan document has been completed, on the terms agreed upon with the Bank; and (vii) the strategy and critical path submitted for development and implementation at the Quito Metro Metropolitan Public Enterprise (EPMMQ) during works execution, as well as an environmental and social management system and evidence that the necessary human and economic resources have been allocated to address all environmental, social, occupational health, and labor issues.</p>				
<p>Special contractual execution conditions (see paragraph 3.4). (i) Prior to contract signature for the civil works and facilities, the MDMQ will provide, to the Bank's satisfaction: (a) documentary evidence of the financial market's interest in buying the securities resulting from securitization of the MDMQ's rights in the operation of the new Quito airport; and (b) evidence of contract signature for inspection of the civil works and</p>				

facilities; and (ii) no later than the end of the second quarter of 2016, the DMQ will provide, to the Bank's satisfaction: (a) evidence that a unified collection system for the Metrobús-Q system has been implemented using technology compatible and interoperable with the Quito Metro Project collection system; (b) evidence of the operational design of the SITP network; (c) evidence that a unified collection system is functioning in 70% of the public transportation buses in the DMQ urban area, using technology compatible and interoperable with the Quito Metro Project collection system; (d) the final version of the environmental, social, occupational health, and contingency plans required for the operation stage of the PLMQ; and (e) evidence that an independent environmental and social audit firm has been engaged.

Exceptions to Bank policies. For the reasons described in paragraph 3.7, the project team is requesting an eligibility exception to the Bank's procurement policies (document GN-2349-9), in order to allow the contracting of companies from IDB nonmember countries of the European Union in international competitive bidding (ICB), since the EIB is a provider of parallel financing for the program.

Program consistent with country strategy: Yes [☒] No [☐]

Program qualifies as:	SEQ <input type="checkbox"/>	PTI <input type="checkbox"/>	Sector <input type="checkbox"/>	Geographic <input type="checkbox"/>	% of beneficiaries <input type="checkbox"/>
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* This amount is comprised of two loans of up to US\$100 million each, as established in the proposed resolutions attached to this loan proposal.

** Under the Flexible Financing Facility (document FN-655-1), the borrower has the option of requesting changes to the amortization schedule, as well as currency and interest rate conversions, subject in all cases to the date of the final amortization payment and the original weighted average life. The Bank will take market conditions as well as operational and risk management considerations into account when reviewing such requests.

*** The credit fee and inspection and supervision fee will be established periodically by the Board of Executive Directors as part of its review of the Bank's lending charges, in accordance with the applicable policies. In no case will the credit fee exceed 0.75% or the inspection and supervision fee 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. DESCRIPTION AND RESULTS MONITORING

A. Frame of reference, problem to be addressed, and rationale

- 1.1 **Structure of the Quito Metropolitan District.** The Quito Metropolitan District (DMQ), which was the first urban settlement in the Republic of Ecuador, covers an area of 423,000 hectares, of which 18,860 (4.4%) are in the city of Quito, the administrative seat of the DMQ. The current population of the DMQ is 2.4 million, distributed in 8 macro-areas divided into 32 urban and 33 suburban parishes. The city of Quito, as the country's capital and leading political, administrative, and educational center, has a population of nearly 1.7 million.
- 1.2 **Urban development.** Quito is laid out north to south, with its historic downtown area being the main center for the city's economic and financial activities, drawing around 47% of all motorized travel in the DMQ. Outside the historic center, the pattern of land use is one of lower residential density, with a population distribution unaligned with urban facilities, which remain concentrated in the downtown area, and an accelerating process of conurbation in the city's periphery, which makes mobility more problematic and creates a greater need for travel, with cars being the main mode of transportation.
- 1.3 **Private transportation.** Quito has seen a significant increase in motorized vehicles. The number of cars has grown by a factor of 2.3 over the last eight years from 175,000 vehicles in 2002 to 405,300 in 2009¹ (an average annual increase of 10% to 16%). There are now nearly 200 cars per 1,000 inhabitants. This is the result of the city's patterns of development, recent economic growth combined with the effects of dollarization, and the lower cost of private vehicles.
- 1.4 **Quito's public transportation system.** Quito's public transportation involves two different systems: (i) the Metrobús-Q² system (a mass transit system of buses and articulated trolleys⁰, which accounts for 26% of travel using public transportation; and (ii) the Conventional Public Transportation System³ (a traditional system of buses, minibuses, and minibuses), which accounts for the remaining 74%. This type of service is hampered by slow operating speeds and long travel times. In the case of the Metrobús-Q system, the travel corridors are already at full capacity. A notable example of this is the Central Trolley Corridor, which is totally saturated, serving daily demand of around 248,000 trips per day at average speeds of 13.5 km/hour and a level of service/comfort⁴ exceeding 7 passengers per square meter at rush hour. The Conventional Transportation System has operational

¹ Quito Metro. Analysis report on current conditions (see [link](#)).

² The Metrobús-Q System consists of trunk line, feeder line, crosstown, and neighborhood services across four partially segregated corridors, under a semi-integrated fare structure that operates 770 vehicles (conventional and feeder trolleys, articulated buses distributed over 44 routes).

³ The Conventional Transportation System is operated by buses with wide coverage, serving 186 routes with a fleet of 2,800 vehicles and a total of 60 operators.

⁴ By agreement, the maximum level of occupancy in the bus rapid transit (BRT) systems is 6 passengers per square meter, which serves as a baseline for design purposes.

limitations such as oversupply, low reliability, lack of defined bus stops, substandard vehicles, poor maintenance, high accident rates and pollution levels, and lack of incentives for operators to provide good service.

- 1.5 In terms of options for expanding the transportation offerings, the Municipality of Quito faces two physical limitations that require any new transportation infrastructure connecting north and south to be underground: (i) the road corridors used by the Metrobús-Q system are narrow and already highly developed, and expanding their capacity is not part of the DMQ plans, as it would involve a major impact on the urban area; (ii) the placement of the city's historic center constitutes an obstacle to travel between the north and south of Quito, since there is only one tunnel linking the two areas. This tunnel cannot be expanded to allow for the passage of high-capacity buses and has become a bottleneck in any scheme to increase the supply of public transportation.
- 1.6 **Distribution of transportation demand in the city of Quito.** At present there are 4.06 million trips made per day using motorized vehicles, of which 0.96 million (24%) are by private car (including taxis), while 3.1 million (76%) are on public transportation. Of the total trips using public transportation, 2.3 million are on the conventional system, and 0.8 million on the Metrobús-Q mass transit system. Though these figures suggest that there is a modal matrix conducive to public transportation, the high saturation levels in the system have a detrimental effect on the quality of service for those using it, making it impossible to attract and transport additional passengers and creating greater demand for taxis and private vehicles⁵ (see [link](#)).
- 1.7 **Integrated Passenger Transportation System (SITP).** Given the mobility conditions in the city, the DMQ Secretariat of Mobility has proposed implementation of an integrated plan to alter the current model of territorial expansion and organize urban activities through interventions in the transportation system. To this end, the Secretariat has proposed design and implementation of the SITP as a means of addressing the problems of insufficient capacity and long travel times.⁶ The SITP plan includes: (i) expanding the supply of public transportation by constructing a metro (subway) line; (ii) integrating the fares and operations of all bus services (Metrobús-Q and Conventional) with the metro; and (iii) identifying an appropriate institutional arrangement for the new mobility model. The main benefits expected from the proposed model are shorter travel times, lower operating costs, and reduced pollutant emissions. In the long run, the SITP is expected to help stem the growth of automobile traffic and urban sprawl.

⁵ According to the transportation model, in the scenario without the project, daily trips in individual vehicles would increase at an annual rate of 2.2%, while trips using public transportation would grow at an annual rate of 1.5%. By contrast, in the scenario with the project, the rate of increase for private travel would be 1.8%, with travel by public transportation increasing by 2.2% per year as a result of improved service.

⁶ 93% of users in the urban Quito region will be less than 400 meters from an SITP stop.

- 1.8 **First Line of the Quito Metro (PLMQ).** In order to develop the PLMQ project, the Quito Metropolitan District established the Quito Metro Metropolitan Public Enterprise (EPMMQ), as part of the restructuring of the sector and transfer of various functions to the municipios. The EPMMQ team⁷ has been working since 2010, with advisory support from Consorcio de Madrid, to develop the necessary detailed designs, technical specifications, economic and financial feasibility studies, social and environmental impact analysis, and financing arrangement. This work was supplemented with geological, seismic, hydrological, archeological, social, and user demand studies commissioned by EPMMQ, culminating in the final detailed design for the PLMQ.
- 1.9 **Profile of the PLMQ.** The PLMQ will be a fast, efficient public transportation system covering a length of approximately 23 km.⁸ It will have 15 stations and run entirely underground. The planned routing for the system will connect the city's



- main hubs for travel, such as the “Y” where the trolley line (the line’s starting point) intersects with the central BRT corridor; the Central Bank, where Quito’s three major transportation systems meet (trolley, Ecovía, and central-north corridor); the historic city center, which is the largest hub for trips related to work or study; and the neighborhoods of Rodrigo Chávez, El Recreo, and Morán Valverde, notable for their high residential population density. A 33-minute ride on the Metro will connect the two ends of the city, giving rise to new mobility patterns. The distance between stations will range from 500 meters to 1,500 meters, and the trains will operate at around 40 km/hour.
- 1.10 The rolling stock will consist of 18 sets of 6 cars (4 motorized cars for each train) with capacity to accommodate 1,270 passengers (at a service level of 6 passengers per square meter), a maximum speed of 100 km/hour and a track width of 1.435 meters. The PLMQ will be equipped with an automatic train control (ATC)

⁷ The predecessor of the EPMMQ, which was created in May 2012, was the Quito Metro Business Unit, established in May 2010.

⁸ 22.07 km of tunnel and 930 meters at ground level to the depots.

signaling system for the rail network, making it possible to monitor itineraries and locate trains in real time.

- 1.11 Future plans call for the PLMQ to be complemented by a reorganization of the current BRT system, in order to eliminate unnecessary competition (e.g., the trolley between La Alameda and the North Terminal), while providing for expanded coverage of the high-capacity system. The reduced demand on Metrobús-Q service will lead to enhanced service levels for that system. Under an integrated system, the various modes of transportation will complement, rather than compete with, each other. The Integrated Transportation System will consist of three levels: the Metro, as the main backbone (north-south), the Metrobús-Q system (northeast, northwest-southeast, and southwest), which will complement and link up with Metro line, and the feeder lines, chiefly the crosstown lines (east-west) (see [link](#)).
- 1.12 In terms of demand, and in a scenario of medium population growth, the line is expected to move some 360,000 passengers per day by 2016, of which 310,000 (87%) will be using the public transportation system, 36,000 (10%) will be using private transportation, and approximately 10,000 trips per day (3%) will be added by virtue of having a more reliable and efficient system. The projected future growth in demand is 1.5% per year. These projections assume the physical, operational, and fare integration of the SITP system. The most highly traveled stretch of the PLMQ will accommodate 18,500 passengers/hour, a figure projected to reach 23,000 passengers/hour by 2020 (see [Demand study](#)).
- 1.13 For execution of the civil works, the project has been divided into two stages. The first, now up for bid, consists of the construction of two transfer stations: La Magdalena and El Labrador, to accommodate interconnections with the Metrobús-Q system; the cost of this stage will be covered by the MDMQ's own resources. The second stage encompasses the rest of the PLMQ project. Given the type of terrain in the city of Quito, the construction methods for the tunnel will include: (i) tunneling machines, which are the most efficient for the purpose; (ii) traditional construction methods for the more sensitive downtown areas; and (iii) cut-and-cover for shallower areas at the southern part of the city. Interference with already built spaces will be limited to the construction of open-air stations and a short stretch of tunnel at the southern end of the city.
- 1.14 **Management of the SITP and PLMQ.** At present, the DMQ agency tasked with oversight, planning, management, and evaluation of transit and transportation issues is the Secretariat of Mobility. Ecuador's new Constitution transferred management of transportation to the municipalities, and, as such, the Secretariat of Mobility has sole responsibility for the sector in the restructuring process (see [link](#)). Under the new structure, the Metropolitan Public Transportation Authority (AMTP) will control the concessioning of transportation company contracts,⁹ and will manage all

⁹ The conventional buses are owned by companies in which the vehicle owners join together to operate certain routes (the routes are owned by the Municipality). The Metrobús-Q system relies on a public operator that runs all corridors except the Central North Corridor, which is operated privately by a consortium of operators, whose contract expires in 2017.

revenue intake once an integrated system is in place. The management of public transportation is concentrated in three metropolitan public enterprises, one of which is the recently created EPMMQ, tasked with development of the Metro project and its future operation.

- 1.15 **Fare structure.** The fare system in Ecuador is legally predetermined by the National Government. In the case of the MDMQ, fares have been

Table 1. SITP Fare structure

The fare must ensure system sustainability. The proposed fares for 2016 are as follows:			
Multioperator 0.70	Center single operator 0.45	Periphery single operator 0.30	Average fare for Metro Line 1 0.40

frozen at their current levels for ten years, so the system's operating costs are partially met by a monthly subsidy from the National Government for each bus. The current fare for public transportation service is US\$0.25 per trip.

- 1.16 Currently, the various public transportation systems have a low level of fare integration.¹⁰ The PLMQ, in the context of the SITP, will introduce a fare increase in the following manner: (i) the fare for single operator services will be US\$0.45 per passenger carried; and (ii) the multioperator fare (trips with one or more transfers within the SITP) will be US\$0.70. This fare structure will require a single method of payment, along with a system of collection and distribution of fare revenues among the different operators.¹¹
- 1.17 **Investment plan.** The Government of Ecuador has requested Bank support to finance the program. The program's estimated cost is US\$1.5 billion, of which the Bank will contribute up to US\$200 million. There will be parallel financing of US\$250 million from the Development Bank of Latin America (CAF), and of €200 million (approximately US\$250 million) from the European Investment Bank (EIB). The rest of the investment will be covered as follows: (i) the rolling stock will be financed with supplier credit; (ii) Banco del Estado (BdE) will finance US\$200 million; (iii) the Bank of the Ecuadorian Social Security Institute (BIESS) will contribute US\$154 million as a program investor; and (iv) the local counterpart will consist of US\$53 million from the National Government and US\$200 million from the municipio, of which US\$80 million will be secured from the financial market through securitization of revenues from Quito's new airport.
- 1.18 **The Bank's country strategy with Ecuador.** The program is included in the Bank's new country strategy with Ecuador 2012-2017 (document GN-2680), whose objective is to overcome the long-term constraints on economic growth and the emergence from poverty, focusing on the transportation sector and providing crosscutting support for environmental sustainability and climate change mitigation

¹⁰ At present, the Metrobús-Q system uses a centralized collection and clearinghouse system for each corridor, with fares prepaid at the stations, as well as centralized management, record-keeping, and operational control systems.

¹¹ Surveys were conducted as part of the demand and social impact studies for the operation, to determine how future users perceive the Metro and its cost. The impact of the proposed fare on the structure of household expenditures in the DMQ was also analyzed. Perceptions of the metro are positive, and there is awareness that a faster, higher quality service will benefit the community.

measures. This program will contribute to the following targets of the Bank's Ninth General Capital Increase (GCI-9): lending to small and vulnerable countries, and protecting the environment through a reduction in CO₂ emissions.¹²

- 1.19 **Coordination with other institutions and other donors.** The Bank, the EIB, and CAF have joined forces in analysis of the program, providing for a thorough review of the related documentation by various technical teams. Throughout the program's preparation phase, these entities have agreed to continue working within the framework of the IDB's procurement policies, which, along with the conditions associated with disbursements, will be reflected in the Operating Regulations (OR) now in preparation. The OR will harmonize the reporting and monitoring requirements of the three multilateral institutions.
- 1.20 **Additionality of the Bank's involvement.** The Bank will play an important role in the operation, both as principal financier and as a valuable partner in mitigating risks and defining strategies for development of the PLMQ. Its engagement takes several forms, including: (i) reinforcement of the program design benefits in the area of sustainable transportation, consistent with the Bank's Regional Environmentally Sustainable Transport (REST) action plan, with an emphasis on linking nonmotorized transport with the SITP; (ii) reinforcement of the commitment to climate change mitigation and sustainability, consistent with the Bank's GCI-9; (iii) preparation of a nationally appropriate mitigation actions (NAMA) proposal for the city;¹³ (iv) use of IDB procurement policies, making it possible for the CAF and EIB to join the financing effort, and use of IDB policies by EPMMQ in contracting for works inspection; (v) contribution of consulting services to review construction and operation issues, including demand, feasibility, socioeconomic and financial, cost, and institutional structure studies; (vi) reinforcement of the importance of public consultation and review of environmental, social, and occupational health impact studies, as well as the need to prepare effective management plans; (vii) support in determining the most appropriate type of contracting; and (viii) harmonization of processes with other financiers to lower transaction costs for the municipio.

B. Objectives, components, and costs¹⁴

- 1.21 The program's objective is to improve urban mobility in the city of Quito, addressing the growing demand for public transportation. The PLMQ will shorten travel times, lower the operating costs of transportation service, improve the connectivity, safety, and comfort of the current system, and reduce pollutant and greenhouse gas emissions.

¹² The program is also consistent with the Bank's Regional Environmentally Sustainable Transport (REST) action plan.

¹³ With support from the ECC, work is proceeding on a nationally appropriate mitigation actions (NAMA) proposal that will lay the groundwork for generating future credits for the reduction of greenhouse gases.

¹⁴ Advanced engineering study of Quito's Integrated Passenger Transportation System and of the PLMQ: Advanced engineering summary document, September 2012 (see [link](#)).

- 1.22 **Component I. Civil works, facilities and expropriations (US\$1.2652 billion).** The estimated cost per kilometer constructed for the PLMQ is US\$65 million (including rolling stock), for a total of US\$1.5 billion for the entire work. Of that amount, US\$195 million will come from Bank financing.
- 1.23 The PLMQ civil works will include construction of approximately 23 km of line, 15 stations, a depot yard with maintenance area, architectural design, and improvements to the system. The system facilities include 11 electrical substations, development of the power distribution system, a rigid catenary system for delivering electricity, rail signals, fire protection systems, ventilation, communications, a ticket sales system, systems for station monitoring, and a centralized control room. This component includes the acquisition of the land parcels necessary to build the main integration stations, the majority of which have already been closed. Given the level of design detail, the construction contract will employ the unit cost modality. The EPMMQ has engaged an international law firm to assist in preparing the terms of the contract.
- 1.24 **Component II. Rolling stock (US\$188 million).** This component will provide resources for purchasing approximately 18 trains, each with 6 cars. This component will be financed separately with supplier credit.
- 1.25 **Component III. Technical assistance (US\$45.8 million).** This component will cover the contracting of: (i) a program management firm; (ii) specific technical for assistance for the EPMMQ during program execution; and (iii) a company for inspection of PLMQ project construction. The Bank will contribute US\$5 million in financing for inspection.
- 1.26 **Costs.** The program's estimated budget is US\$1.5 billion, broken down as shown in Table 2.

Table 2. Breakdown of project costs (in US\$)

Project costs		Resources		Total cost per component	
		IDB	Other source		
1	Expropriations		\$8,864,000		\$8,864,000
2	Civil work				
	First stage		\$85,902,000		\$85,902,000
	La Magdalena station			\$40,540,000	
	El Labrador station			\$45,362,000	
	Second stage	\$195,000,000	\$875,430,000		\$1,070,430,000
	Depots/workshops			\$58,904,000	
	Tunnel and rest of stations			\$842,000,000	
	Facilities			\$161,626,000	
	Disposal areas			\$7,900,000	
3	Rolling stock		\$188,000,000		\$188,000,000
4	Overall contingencies		\$64,318,000		\$64,318,000
5	Price adjustment (inflation)		\$35,650,000		\$35,650,000
Construction cost					\$1,453,164,000
6	Technical assistance				\$45,836,000
	Project management		\$15,316,000	\$15,316,000	
	Inspection of first stage		2,148,000	2,148,000	
	Inspection of second stage	\$5,000,000	\$23,372,000	\$28,372,000	
7	Audits and evaluation		\$1,000,000	0	\$1,000,000
Subtotal		\$200,000,000	\$1,300,000,000	0	
Total cost of the First Line of the Quito Metro					\$1,500,000,000

- 1.27 **Financial feasibility.** The financial assessment conducted by the MDMQ indicates that the PLMQ project will be financially feasible (see [link](#)).
- 1.28 In terms of municipal finances, the MDMQ has additional borrowing capacity of between US\$350 million and US\$508 million, depending on the projected year (between 2012 and 2022), and so is capable of assuming financial commitments. Local legislation establishes that the maximum amount of indebtedness shall be less than 200% of the ratio of annual total debt/total revenues (not including financing), and that the ratio of annual debt service/total revenues (not including financing) shall not exceed 25%. The analysis conducted by the Bank shows that both indicators will be below the ceiling during the years when the PLMQ will be built and operating (see financing capacity study [link](#)).¹⁵
- 1.29 In terms of Metro operation, the studies conducted by the MDMQ indicate that the revenues would be sufficient to cover operating costs, with a return sufficient to allow EPMMQ to assume minor investment costs. Under the planned fare system and the demand projections presented, annual Metro operating revenues would be

¹⁵ The ratio of total debt/total revenues ranges from a minimum of 38.7% (2011) to a maximum of 117.8% (2016); the ratio of debt service/revenues ranges from a minimum of 7.6% (2011) to a maximum of 12.4% (2016).

US\$46.7 million in 2016. Operating costs for the same year would be US\$34.8 million, giving the project an annual operating surplus of US\$11.8 million.

- 1.30 **Socioeconomic feasibility** (see [link](#)).¹⁶ The economic assessment conducted by the MDMQ indicates that the PLMQ will generate a positive social return. This study used the results from passenger demand projections and the transportation model to estimate the characteristics of the trips and to calculate the benefits with respect to time saved and lower operating costs. The results were considered robust, even under sensitivity scenarios reflecting negative variations.¹⁷

Table 3. Socioeconomic feasibility

Indicators of socioeconomic return	Values in 2010 U.S. dollars
Costs (economic/shadow)	US\$1.089 billion
Benefits	US\$1.899 billion
Net present value (2010)	US\$810 million
Internal rate of return	18.35%
Benefit-cost ratio	1.74
Discount rate used	12%
Evaluation period	2010-2045

C. Outcome indicators

- 1.31 The main expected outcomes of program implementation are summarized below. For greater detail, see the Results Matrix (Annex II).

Table 4. Expected outcomes

Expected outcomes	Unit	Value (2018)
Shorter travel time for public transportation users	minutes/passenger	23.1 minutes
Lower operating costs of Quito's vehicle fleet	US\$/year	1.181 billion
Reduced greenhouse gas emissions	tons/year	1.40 million

- 1.32 **Disbursement schedule.** The loan proceeds will be disbursed over a period of five years, running from the date of entry into effect of the loan contract. The schedule of EPMMQ disbursements is as follows:

¹⁶ Review of the socioeconomic model conducted by the Bank. To view the original study, see this [link](#).

¹⁷ The sensitivity analysis found that there would need to be a simultaneous cost increase of > 40% and demand decrease of > 40% for the level of return to no longer be satisfactory.

Table 5. Disbursement schedule (US\$ millions)

Source	Year 1	Year 2	Year 3	Year 4	Year 5	Total (US\$ millions)
IDB	0.0	65.6	64.8	51.5	18.1	200.0
CAF	0.0	82.3	75.6	68.1	24.0	250.0
EIB	0.0	82.0	75.6	68.2	24.2	250.0
Banco del Estado	0.0	64.1	58.3	57.5	20.1	200.0
BIESS	0.0	49.1	45.6	44.0	15.3	154.0
Suppliers	0.0	57.4	38.6	57.9	39.1	193.0
Counterpart	16.0	90.2	76.9	62.3	23.6	253.0
Total	16.0	490.7	435.4	409.5	160.2	1,500.0

II. FINANCING STRUCTURE AND RISKS

A. Financing instrument

- 2.1 **The Metro system investment program** will be conducted under the investment loan modality. The term of the loan will be 25 years with a disbursement period of 5 years. This program will receive parallel financing from two other multilaterals: the European Investment Bank (EIB) and the Development Bank of Latin America (CAF) (see paragraph 1.17), which, together with the IDB, will contribute US\$700 million, to be assumed by the National Government.¹⁸ The National Government will also contribute US\$53 million of its own resources to make up half of the total estimated cost of the PLMQ, to which it has made a commitment (see paragraph 2.6). The program will also have US\$200 million in financing from Ecuador's Banco del Estado (BdE).
- 2.2 **The municipio's contributions.** The municipio will directly assume 40% of the total estimated cost of the PLMQ project through a combination of supplier credit for the rolling stock, securitization of future revenues of the new airport, a credit from BdE, and own resources. Own resources will come from a dedicated fund of approximately US\$30 million per year¹⁹ for construction of the PLMQ (US\$120 million), derived from savings on current operations. This figure should increase from the fifth year onward, to cover contributions of principal and debt service in the relevant proportion under the terms of the subsidiary agreement with the National Government (see paragraph 3.3.i). The MDMQ will contribute an additional US\$80 million for construction, derived from the securitization of future

¹⁸ The National Government will also assume the revenues from the VAT (12%) that will be applied to the facilities and rolling stock.

¹⁹ At present, the municipio is making investments of US\$340 million per year, of which US\$150 million are for mobility projects.

revenues from operation of Quito's new international airport,²⁰ scheduled to open in February 2013 (see paragraph 3.4.i.a).

- 2.3 The Bank of the Ecuadorian Social Security Institute (BIESS) has agreed to participate in the project as a long-term investor, contributing 10% of the value of the PLMQ. As security, the MDMQ will guarantee BIESS a 5% fixed annual return. The remainder of BIESS's earnings will come from surplus proceeds from securitization of the airport revenues and from the operation of the Metro. These revenues will be guaranteed by the National Government (see [link](#)). A trust will be established for the BIESS contribution, as a condition of the loan (see paragraph 3.3.iii).

B. Main risks and mitigation measures

- 2.4 **Execution risk.** The main execution risk is that the costs of the program will exceed the budget, given that rail projects tend to incur higher costs, particularly in urban areas, due to the extent of the work done in a setting that is already built up and occupied.
- 2.5 As part of the PLMQ analysis, the project team conducted a careful review of the studies and budgets prepared by Consorcio de Madrid and was able to determine that they were of such high quality that it was possible to make a final detailed quantitative assessment of the work. The EPMMQ supplemented the Consorcio de Madrid studies with additional microseismic studies, thorough archeological surveys, and studies on the reinforcement of buildings in the historic city center, in order to mitigate problems during construction. The analysis, conducted by an expert on metro systems (see [link](#)), identified as possible causes of cost increases during construction: design errors or changes, the possibility of variances in the geotechnical conditions, changes in the international price of inputs, and possible delays and unforeseeable circumstances.
- 2.6 In terms of the PLMQ, the following factors significantly reduce the risk of increased costs: (i) a more precise design than used in other metro projects (detailed to a scale of 1:100), prepared by Consorcio de Madrid, an entity with experience in developing more than 200 km of underground metro lines and extensive knowledge of their operation in Madrid; (ii) the additional studies conducted by the EPMMQ; (iii) the level of specification of the rolling stock and additional facilities (electromechanical, communications, etc.); (iv) the economic slowdown in international markets, which increases the likelihood of obtaining competitive bid prices and attracting multiple bidders; (v) Quito's high-quality soil, which facilitates the construction of tunnels and reduces drilling costs; and (vi) the Bank's experience in competitive bidding processes for civil works in Ecuador (loan EC-L1065), with projects awarded for amounts below the budget.

²⁰ The contributions are 11% of the revenues collected from airport fees. The projections are consistent with the SCF Quiport project (see [link](#)). At > 200% of the value of the securitization, the issue qualifies as AAA.

- 2.7 In the event that more investment is required, both the MDMQ and the National Government will cover such an eventuality. The assessment of the city's ability to pay (see [link](#)) indicates that the MDMQ would be able to assume additional credits of up to US\$500 million (see paragraph 1.28). In covering at least 50% of the total value of the program,²¹ the National Government would contribute a similar amount.²²
- 2.8 **Financing risk.** There is a risk that the total program financing may not materialize on schedule, particularly for startup of the construction stage, leading to construction delays. This risk is based on: (i) the multilateral financing, which is dependent on the CAF approving two loans for a total of US\$250 million;²³ and (ii) the MDMQ financing, which is dependent on the securitization of revenues from the new airport²⁴ and on support from BIESS. Given these potential risks, several contractual conditions have been established (see paragraph 3.3.ii), that enable EPMMQ to show that the financial close of the program is guaranteed. It should be noted that the multilateral loans, the supplier credits, and the BIESS investment are backed by the sovereign guarantee of the Republic of Ecuador.
- 2.9 **Fiduciary and institutional risk.** The fiduciary risks and associated mitigation measures are identified in the Fiduciary Agreements and Requirements (Annex III), and relate primarily to EPMMQ's lack of experience. Since it is a public entity created only recently, the overall program risk associated with fiduciary management is medium. To mitigate this, the IDB is assisting in the preparation of bidding documents and requests for proposals for the activities to be financed with IDB resources. For the works execution and inspection phase, the EPMMQ will have highly specialized advisory support in works management, financed with local contribution resources. Furthermore, the EPMMQ's lack of experience in operating metro systems will be mitigated by the planned future contracting of the Madrid Metro to operate the PLMQ for at least three years, allowing for a gradual handover of responsibilities to the EPMMQ. The Bank is also preparing a nonreimbursable technical cooperation operation (EC-T1260), to support the EPMMQ on fiduciary, technical, environmental, and social issues.
- 2.10 **Risk of demand and operating revenues.** The projections provided by the MDMQ indicate that the PLMQ will obtain an annual surplus of around 25% of operating revenues (2016). This projection seems optimistic, given that very few

²¹ Presidential Decree 750 of 2012 establishes that the National Government will cover at least 50% of the costs of the project and will secure any national or international loan required.

²² As part of project preparation, a risk analysis was done to confirm that these amounts of potential additional financing would be sufficient (see [link](#)).

²³ The EIB approved a loan of US\$250 million equivalent in August 2012. The CAF approved US\$120 million in 2012, and should process an additional loan operation for US\$130 million in 2013.

²⁴ The airport is expected to begin operations in February 2013, and the municipio's actual income from its operation need to be ascertained before the revenues can be securitized.

metro systems in the world manage to cover their operating costs through fares.²⁵ Meeting these targets for operating revenue is based on the demand projections and pricing policies.²⁶ The various assumptions used in these projections may fail to materialize, impacting the projected revenues: (i) implementation of the SITP, which includes the restructuring of routes, including operational and fare integration, since the bus system will supply nearly 30% of Metro demand; (ii) revision of the value of the fare, which is now US\$0.25 and will need to be updated on the basis of the pricing policy proposed by SITP; and (iii) a very high-quality service, to attract people now using private cars, who are expected to account for 10% of the demand for Metro service. In any case, the MDMQ has the fiscal headroom to make up any shortfall (see paragraph 1.29).

- 2.11 Implementation of the SITP will be monitored by the Bank based on a series of milestones agreed upon with the government and included as contractual conditions for the first disbursement (see paragraph 3.3.v), and certain special conditions (see paragraphs 3.4.ii and iii). Fares will have to be adjusted before the PLMQ goes into operation. The Bank will monitor the fare revision through dialogue. In the event that the expected revenues fail to materialize, the project will require major subsidies, which will affect public finances. However, if there was a large difference in revenue intake, the National Government could make up the shortfall, given that, historically, it has reimbursed the municipio (or operators) for the cost of subsidies.
- 2.12 **Environmental and social risks.** The Metro program is classified as category “A” under the Bank’s environment and safeguards compliance policy, due to the risks it poses. The PLMQ underwent to public consultation, and the environmental impact assessment (EIA) has been available to the public since March 2012. The project will be executed primarily underground, and most of the stations are expected to be on public land, thus minimizing the need for land acquisitions and/or relocations. The archeological and cultural risks have also been lessened through extensive prospecting studies and the addition of structural reinforcements to reduce the risk of harm to the historic city center.
- 2.13 The specific design elements necessary to accommodate prevention, mitigation, compensation, and/or replacement measures are in the final stage of completion, and cover all aspects of dealing with environmental, social, health and industrial-security issues. These detailed plans are described in the environmental and social management report (ESMR) (see [required link 4](#)). In order to ensure strict compliance with the environmental and social requirements, resources will be devoted to strengthening the EPMMQ team, and the personnel of the contractors and the firms responsible for works inspection and management will be required to

²⁵ Although this is the case for most of the world’s metro systems, some metro lines in developing countries manage to cover their operating costs, as is the case for Medellín, Guadalajara, Rio de Janeiro and Santiago, Chile (Alamys, 2011).

²⁶ The operating costs presented were analyzed and validated, comparing them with other metro systems in Latin America. The costs in the case of Quito are within the expected range. To view a comparative analysis of the costs of fares and operating costs of other metro systems in Latin America, see [link](#).

possess sufficient capabilities. In order to ensure that sufficient instruments are in place to effectively manage the operational stage, it was agreed to establish a special condition (see paragraph 3.4.iv) for the operational stage of the PLMQ.

- 2.14 Other risks identified by the project team include: (i) geological and geotechnical risks; (ii) fluctuations in demand; (iii) delays in obtaining permits and licenses; (iv) possible discovery of cultural and archeological materials; (v) differences between designers and builders; (vi) lack of availability of equipment; (vii) problems importing machinery and equipment; and (viii) scarcity of inputs for works execution, etc. These risks are mitigated by the high level of detail in the program design, as well as by the interest of the authorities in assigning the program high priority.

III. EXECUTION AND MANAGEMENT PLAN

A. Execution mechanism

- 3.1 **Borrower, executing agency, and guarantor.** The borrower will be the Government of Ecuador, and the executing agency will be the Municipio of the Metropolitan District of Quito (MDMQ), acting directly and/or through the Quito Metro Metropolitan Public Enterprise (EPMMQ).
- 3.2 **Execution arrangements.** The executing agency will be directly responsible for (i) the contracting of technical studies; (ii) the solicitation, contracting, execution management, and supervision of the works; (iii) institutional strengthening and social and environmental viability activities; and (iv) management, supervision, and monitoring of the program, for which it will engage the support of a program management firm, as a condition precedent to the first disbursement.
- 3.3 **Special conditions precedent to the first disbursement of the loan proceeds.** Prior to the first disbursement, the MDMQ will provide: (i) evidence of the signature and entry into effect of a subsidiary agreement for the transfer of resources, rights, and obligations between the borrower and the MDMQ (see paragraph 2.2); (ii) evidence of the signature and entry into effect of: (a) the supplementary financing loan contracts between the borrower and the European Investment Bank (EIB), the Development Bank of Latin America (CAF), and Banco del Estado (BdE) for the program; and (b) the contract with the program management firm (see paragraph 3.2); (iii) evidence that the trust has been established for the investment of the Bank of the Ecuadorian Social Security Institute (BIESS) in the program; (see paragraph 2.4); (iv) evidence of the entry into effect of the program Operating Regulations, including the procedures for reporting, audits, and disbursements²⁷ (see paragraph 1.19); (v) the submitted draft Implementation Plan for the Integrated Passenger

²⁷ The Operating Regulations must also include the terms and requirements for environmental, social, and health and safety reports, as well as for audits in those areas.

- Transportation System (SITP), on the terms agreed upon with the Bank;²⁸ (vi) evidence that the environmental and social management plan document has been completed, on the terms agreed upon with the Bank;²⁹ and (vii) the strategy and critical path submitted for development and implementation at the Quito Metro Metropolitan Public Enterprise (EPMMQ) during works execution, as well as an environmental and social management system and evidence that the necessary human and economic resources have been allocated to address all environmental, social, occupational health, and labor issues.**
- 3.4 Other special contractual conditions: (a) Prior to contract signature for the civil works and facilities, the borrower, acting through the MDMQ, will provide, to the Bank's satisfaction: (i) documentary evidence of the financial market's interest in buying the securities resulting from securitization of the MDMQ's rights in the operation of the new Quito airport (see paragraph 2.2); and (ii) evidence of contract signature for inspection of the civil works and facilities; and (b) no later than the end of the second quarter of 2016, the DMQ will provide, to the Bank's satisfaction: (i) evidence that a unified collection system for the Metrobús-Q system has been implemented using technology compatible and interoperable with the Quito Metro Project collection system; (ii) evidence of the operational design of the SITP network; (iii) evidence that a unified collection system is functioning in 70% of the public transportation buses in the DMQ urban area, using technology compatible and interoperable with the Quito Metro Project collection system; (iv) the final version of the environmental, social, occupational health, and contingency plans required for the operation stage of the PLMQ; and (e) evidence that an independent environmental and social audit firm has been engaged.
- 3.5 The executing agency will be responsible for monitoring and supervision of program execution, and thereafter of startup and operation. Specific functions relating to program execution include: (i) planning of loan execution and annual work plans (AWPs); (ii) preparation and updating of procurement plans; (iii) review of the bidding documents for the procurement of consulting services, works, and goods, ensuring their compliance with the Bank's procurement and contracting policies; (iv) support and monitoring of progress in consulting and works contracts and goods procurement; (v) preparation of financial statements and disbursement requests; and (vi) monitoring and evaluation of program execution.
- 3.6 **Procurement.** The procurement of works and goods, and the selection of consulting services, will be conducted in accordance with the "Policies for the procurement of goods and works financed by the IDB" (document GN-2349-9) and

²⁸ The SITP implementation plan must include the pricing policy, physical and operational integration model, and proposals and corresponding timetables for the investments and operational reforms that are to occur.

²⁹ The environmental and social management plan must include the plans, programs, and procedures to be applied for construction; the design of the environmental and social management strategy for the Quito Metro (which measures are in the design stage, which are being transferred to contractors, which are being assumed either directly or indirectly through outsourcing), the inspection strategy; and, once identified, the management strategy and strengthening needs.

“Policies for the selection and contracting of consultants financed by the IDB” (document GN-2350-9), both approved in March 2011.

- 3.7 **Exception to Bank policy.** Given that the European Investment Bank (EIB) will provide parallel financing, and the Bank’s procurement policies will be used, an eligibility exception to the Bank’s procurement policies (document GN-2349-9) is requested from the Board of Executive Directors, in order to allow the contracting of companies from IDB nonmember countries of the European Union in the international competitive bidding (ICB) process, considering that the procedures cannot be separated and/or divided.
- 3.8 The Fiduciary Agreements and Requirements describe the financial management and procurement guidelines for the program, as well as the type of fiduciary supervision and the fiduciary risks identified. The Fiduciary Agreements and Requirements are based on an analysis of the fiduciary context of the country and of the EPMMQ and the outcome of the risk workshop and meetings of the project team, Finance Ministry staff, the MDMQ, the EPMMQ and other key stakeholders involved in the operation. The risk analysis also includes an analysis of the initial institutional capacity of the EPMMQ, which determined a level of “medium risk.”
- 3.9 **Disbursements.** The loan will be disbursed under the advance of funds modality, with the frequency of disbursements based on the program financial programming with a maximum of 180 days. For the purposes of Component I, it has been agreed that disbursements will be made on a pari passu basis among the three multilateral institutions (EIB, CAF, and IDB) and the local counterpart, according to the disbursement schedule and AWP previously approved by the parties. This condition precedent to execution will be specified in the program OR (see paragraph 3.3.iii).
- 3.10 **External audit.** During the execution period, the EPMMQ will deliver the consolidated annual financial statements for the program to the Bank within 120 days after the close of each fiscal year. The external audit firm to be engaged must be acceptable to the Bank and meet its requirements. Bank procedures will be used in selecting and contracting the firm. The audit costs will form part of the cost of the program.

B. Summary of monitoring and evaluation measures

- 3.11 The monitoring arrangements include: (i) administrative missions; (ii) six-monthly status reports; and (iii) the AWP and external annual audits. Details of these activities can be found at the required electronic link, “Monitoring and evaluation plan” (see [link](#)).

Development Effectiveness Matrix				
Summary				
I. Strategic Alignment				
1. IDB Strategic Development Objectives		Aligned		
Lending Program		Lending to small and vulnerable countries.		
Regional Development Goals		Stabilization of CO2 equivalent emissions (metric tons per inhabitant).		
Bank Output Contribution (as defined in Results Framework of IDB-9)		Number of people given access to improved public low-carbon transportation systems.		
2. Country Strategy Development Objectives		Aligned		
Country Strategy Results Matrix	GN-2490	Maintain and expand the system of ground transportation, ports, and airports to support local production, domestic commerce and foreign trade, national integration, and productivity and competitiveness.		
Country Program Results Matrix	GN-2661-4	The project is not included in the 2012 Country Program Document.		
Relevance of this project to country development challenges (If not aligned to country strategy or country program)				
II. Development Outcomes - Evaluability		Highly Evaluable	Weight	Maximum Score
		9.3		10
3. Evidence-based Assessment & Solution		8.8	25%	10
4. Ex ante Economic Analysis		10.0	25%	10
5. Monitoring and Evaluation		8.3	25%	10
6. Risks & Mitigation Monitoring Matrix		10.0	25%	10
Overall risks rate = magnitude of risks*likelihood		Medium		
Environmental & social risk classification		A		
III. IDB's Role - Additionality				
The project relies on the use of country systems (VPC/PDP criteria)		Yes	Financial Management: Budget and Treasury. Procurement: Information System.	
The project uses another country system different from the ones above for implementing the program				
The IDB's involvement promotes improvements of the intended beneficiaries and/or public sector entity in the following dimensions:				
Gender Equality				
Labor	Yes	The Bank will help design and implement the plan to develop the capacities of the public company in charge of Quito's Metro to operate the metro systems.		
Environment	Yes	The Bank has helped the EPMQ in the design of the measures required for the prevention, mitigation, compensation, and/or replenishment of all the aspects related to the environmental, social, health and industrial safety management. Likewise, the Bank will support the strengthening of the EPMQ team in charge of enforcing the compliance with the social and environmental requirements.		
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project		Yes	Organizational Strengthening of Metro Quito Public Enterprise (EC-T1260).	
The ex-post impact evaluation of the project will produce evidence to close knowledge gaps in the sector that were identified in the project document and/or in the evaluation plan.				

The POD presents the problems to be addressed by the project. The magnitudes of the problems are presented as are the factors which have contributed to them. The proposed interventions are linked to the problems identified in the diagnosis. The results matrix has vertical logic. The impacts, outcomes and outputs are clearly presented and each has its indicator. All indicators are SMART, have baselines, targets and sources of information. With regards to the data required for the PMR, the annual outputs are presented and the project costs are broken down by product and year.

The project was analyzed using a cost-benefit analysis. The economic benefits are clearly spelled out and the costs reflect real resource costs to the economy. The assumptions are spelled out and justified and a sensitivity analysis of the assumptions was undertaken. The project has a monitoring and evaluation plan. The evaluation plan follows the DEM guidelines. The operation will be evaluated using a reflexive methodology and an ex-post cost-benefit analysis.

Finally, the risk matrix presents the projects risks which are rated for magnitude and probability. Mitigation measures are presented for each risk as well as indicators to monitor its implementation.

RESULTS MATRIX / MATRIX OF INDICATORS

Program impact	Contribute to maintain the modal share of public transportation in motorized travel.		
Impact indicator	Baseline 2012	Target 2018	Means of verification
Percentage modal share of public transportation in motorized travel	76%	76%	Mobility survey 2018 Secretariat of Mobility

Program objectives	Improve urban mobility in the city of Quito, addressing the growing demand for public transportation. The First Line of the Quito Metro (PLMQ) will shorten travel times, lower the operating costs of transportation service, improve the connectivity, safety, and comfort of the current system, and reduce pollutant and greenhouse gas emissions.			
Final outcome indicator	Baseline 2012	Target 2018	Remarks	Means of verification
Travel time for public transportation users (average minutes per passenger) ¹	38.5 min	23.1 min	In the 2018 scenario without the project, this travel time would be 42.5 minutes.	Mobility Survey: EDM11 Survey of Quito Metro users 2018 EPMMQ
Operating costs of Quito's vehicle fleet (US\$ millions / year) ²	US\$999 million	US\$1,181 million	In the 2018 scenario without the project, the operating costs would be US\$1,249 million.	Socioeconomic model 2018, based on the costs of inputs. Includes input cost update survey. EPMMQ
Greenhouse gas emissions (million tons per year) ³	1,201 million tons	1,407 million tons	In the 2018 scenario without the project, emissions would be 1,472 million tons.	Socioeconomic model 2018, based on update of the number of vehicles and trips (individual and mass transit) EPMMQ Records of the City of Quito's Secretariat of Mobility

¹ Travel time door-to-door (including walking, waiting, and vehicle travel) of users of the bus system who will take the Metro system.

² Total operating cost of the public transportation and private vehicle fleets.

³ Total emissions of the public transportation and private vehicle fleets.

Intermediate outcome indicators	Baseline 2012	Target 2018	Means of verification
Passengers per day in the Metro System ⁴	0	369,714 passengers	Electronic Collection System EPMMQ
Level of Metro passenger occupancy (passengers/m ²)	0	6 passengers/m ²	Electronic Collection System EPMMQ
Percentage of Metro feeder routes in operation ⁵	0	100%	Electronic Collection System EPMMQ
Percentage of DMQ bus fleet under a unified collection system ⁶	30%	90%	Electronic Collection System EPMMQ
Percentage of users satisfied with the Metro	0	65%	Quito Metro User Satisfaction Survey EPMMQ

Component 1. Civil work, facilities, and expropriations							
Indicators	Baseline 2012	Year 2014	Year 2015	Year 2016	Year 2017	Target 2017	Means of verification
Construction of underground work (km of tunnel constructed, with structure) ⁷	0	0.36	6.21	5.77	9.73	22.07	Certificate of delivery/acceptance Inspection report EPMMQ
Construction of boarding stations (number of stations built)	0	0	4	8	3	15	Certificate of delivery/acceptance Inspection report EPMMQ
Construction of depots (number of depots built) ⁸	0	0	1	0	0	1	Certificate of delivery/acceptance Inspection report EPMMQ

⁴ It is estimated that regular users of public transportation will account for 87% of Metro users, with 10% attributable to users of private cars, and 3% to “new” trips.

⁵ The operation of the feeder routes indicates that: (i) current bus travel has been restructured; (ii) the fare system for buses and Metro is integrated; and (iii) passengers have the physical facility of transfer to the Metro system, based on the Implementation Plan for the Integrated Public Transportation System (SITP).

⁶ This means that the system’s technology is compatible and interoperable with the Quito Metro project collection system.

⁷ Involves the entire concrete structure.

⁸ The depot/workshop will be located at the Quitumbe station.

Facilities in stations (number of stations with facilities completed) ⁹	0	0	1	7	7	15	Certificate of delivery/acceptance Inspection Report EPMMQ
Facilities in tunnels (km of tunnel with facilities) ¹⁰	0	0	8.18	4.59	9.3	22.07	Certificate of delivery/acceptance Inspection Report EPMMQ
Component 2. Rolling stock							
Indicators	Baseline 2012	Year 2014	Year 2015	Year 2016	Year 2017	Target 2017	Means of verification
Delivery of trains (number of trains delivered) ¹¹	0	0	0	12	6	18	Inspection report of verifying entity EPMMQ
Component 3. Technical Assistance							
Indicators	Baseline 2012	Year 2014	Year 2015	Year 2016	Year 2017	Target 2017	Means of verification
Six-monthly reports on project management results (number of project management reports approved by EPMMQ)	0	2	2	2	2	8	Certificate of delivery/acceptance EPMMQ
Quarterly reports on inspection results (number of inspection results reports approved by EPMMQ)	0	4	4	4	4	16	Certificate of delivery/acceptance EPMMQ

⁹ This indicates that all of the facilities needed for the proper functioning of the line are in place: (i) power distribution; (ii) electrification; (iii) ticket control and sale system; (iv) escalators and stairs; (v) fire protection system; (vi) ventilation; (vii) communications system and radio telephony; (viii) monitoring of stations; and (ix) central control room.

¹⁰ This indicates that the following are in place: (i) railway signals; (ii) electrical substations; (iii) power distribution; (iv) electrification; (v) fire protection system; (vi) ventilation; and (vii) communication system and radio telephony.

¹¹ Eighteen sets of 6 cars (4 motorized cars for each train) with capacity to accommodate 1,270 passengers.

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country: Ecuador
Project number: EC-L1111
Name: Quito Metropolitan Transportation System
First Line of the Quito Metro
Executing agency: Quito Metro Metropolitan Public Enterprise (EPMMQ)
Prepared by: Marco Alemán and Santiago Schneider, FMP/CEC

The institutional assessment for fiduciary management of the project was based on: (1) the fiduciary context of the country; (2) the results of the fiduciary risk assessment; (3) the institutional capacity analysis conducted by EPMMQ; (4) work meetings with the project team; and (5) meetings with personnel of various units of the Municipio of Quito and Ministry of Finance. This assessment was used to prepare fiduciary agreements for financial and procurement management in program execution.

I. FIDUCIARY CONTEXT OF THE COUNTRY

Procurement system. The National Public Contracting System (SNCP) was approved through the Law Establishing the SNCP in August 2008. Among the substantive changes introduced was the creation of the National Public Procurement Institute (INCOP) as the apex agency for public procurement. INCOP, with Bank support, conducted a diagnostic assessment of the SNCP using the OECD/DAC methodology, which rated SNCP's level of development as "medium." The final assessment report has been approved by the government. At present, the Bank, at the request of the government, is engaged in a joint process with INCOP to validate the subcomponents of SNCP, in order to determine their potential use in Bank-financed projects.

Financial management system. Since January 2008, central government entities have been using the e-SIGEF Integrated Financial Management System. Pursuant to the Public Enterprises Act, they are not required to manage their cash resources through the National General Treasury Account or to manage their financial information and resources through e-SIGEF. EPMMQ is in the process of acquiring its own financial management system.

According to the Law Establishing the Office of the Comptroller General, central government entities, as well as public enterprises, are subject to control and audit by Ecuador's supreme audit institution, the Office of the Comptroller General (CGE). The country control systems need be supplemented, for the time being, in executing Bank-financed projects, with an external audit conducted by a firm eligible for the IDB.

II. FIDUCIARY CONTEXT OF THE EXECUTING AGENCY

The project's executing agency is the Quito Metro Metropolitan Public Enterprise (EPMMQ). Initially, the executing agency was established as the Quito Metro Business Unit, part of the

Municipal Public Enterprise for Mobility and Public Works. Subsequently, in April 2012, EPMMQ was established on the basis of the Quito Metro Business Unit, as an entity with administrative and financial autonomy. Importantly, in 2009 the Municipio of the Quito Metropolitan District signed an agreement to receive technical assistance and advisory support from the Metro of Madrid, which provided detailed designs and technical specifications, economic and financial feasibility studies, and developed a financing structured for the project as a whole.

The Municipio of Quito established the executing agency (EPMMQ) in April 2012. Thus, in terms of institutional development, it is still in the initial organizational phase. The IDB team conducted an institutional analysis of EPMMQ, with a general finding of “incipient development,” associated with substantial risk. Given the complexity of the project, there should be activities focused on strengthening the executing agency, so that it can manage the project efficiently. To this end, a technical assistance component has been included in the project to finance these activities. A technical cooperation operation will also be processed to provide institutional support.

EPMMQ will procure the necessary goods, services, and works connected with its activities using the INCOP’s Public Procurement Portal, which has the Ecuadorian National Public Contracting System as its legal foundation. Contracting of the La Magdalena and El Labrador works (intermodal ground-level stations and civil works for the underground station) are currently in the competitive bidding process, both with a reference budget of US\$64.8 million. Five bids have been received, and according to the prescribed timetable the contracts for those works are expected to be awarded by mid-October 2012.

III. FIDUCIARY RISK EVALUATION AND MITIGATION MEASURES

Based on information available on the program, as well as the missions, workshops, and work meetings held with staff of EPMMQ, the Municipio, and other program stakeholders, the following fiduciary risks were identified and included in the risk matrix, with the following risks being the most significant:

A. Delays in contracting and/or execution of the principal work

Factors: (i) The executing agency’s lack of experience in applying the Bank’s procurement policies; and (ii) the executing agency’s lack of experience in contract administration.

Impact: Delays in procurement execution and/or delays during work execution.

Mitigation measures: (i) Technical assistance from an international consulting firm in structuring the prequalification document and solicitation for the principal work (US\$980 million) and the request for proposals for inspection of the principal work; and (ii) advisory support in project management during execution of the work from a leading firm with recognized experience in managing similar projects.

B. Unavailability of resources to cover potential cost overruns during work execution

Factors: (i) The complexity of the works (which mainly involve tunneling) could require additional work (a greater number of work line items) and/or the execution of supplemental works; and (ii) insufficient supply of labor, materials, and inputs on the international or domestic market. Other works of similar scale are being executed simultaneously in the

country (COCA-CODO for US\$1.7 billion; El Aromo Refinery for US\$1.5 billion; hydroelectric plants; road works; etc.), which could result in prices and/or problems of timely availability. **Impact:** Inability to proceed with the works, due to lack of materials or inputs or inability to pay for additional or supplemental works. **Mitigation measures:** (i) provide for contingencies and cost overruns, and ways of addressing them; (ii) as an alternative, the Government of Ecuador guarantees its readiness to make up a resource shortfall during the project; and (iii) make disbursements on a pari passu basis with respect to the different funds (ADC, EIB, IDB, local contribution) during the project.

IV. EXCEPTIONS TO PROCUREMENT POLICIES AND CONSIDERATIONS FOR THE SPECIAL PROVISIONS OF THE CONTRACT

A recommendation that emerged in project design was to request an exception to the Bank's procurement policies from the Board of Executive Directors. Accordingly, the following paragraph should be included in the proposal for operation development:

Exceptions to Bank policies: For the reasons described in the paragraph, the project team is requesting an eligibility exception to the Bank's procurement policies (document GN-2349-9), in order to allow the contracting of companies from IDB nonmember countries of the European Union in the international competitive bidding (ICB) process, given that the European Investment Bank (EIB) will provide parallel financing for the program. This request reflects the need to harmonize IDB and EIB procurement policies and to maintain pari passu financing of procurements.

Other considerations for the Special Provisions are as follows: (i) selection of the management firm to support the EPMMQ team; (ii) approval of the program Operating Regulations, with the Bank's prior no objection; (iii) delivery, to the Bank's satisfaction, of the project's environmental and social management system; (iv) approval of the pari passu disbursement arrangement; and (v) operation and validation of the integrated financial management, internal control, and internal audit system.

V. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

1. Procurement execution

The procurement plan will establish the procurements to be included in the program. The procurement plan may be updated annually or as the parties see fit. The project team leader (PTL) will be responsible for approving the procurement plan and updating it during the execution period. Procurements financed with program resources will be conducted in accordance within the framework of the Bank's procurement policies¹ (documents GN-2349-9 and GN-2350-9) and with the procurement plan approved by the Bank.

The contracting of works to be financed with Bank resources will take the form of a contract with a reference value of US\$980 million, using the standard bidding document (SBD) for large

¹ In the missions conducted to date, both the Andean Development Corporation (CAF) and the European Investment Bank (EIB), as cofinanciers, have agreed that the works contracting is to be conducted within the framework of the IDB's procurement policies.

scale works, following a contractor prequalification process. To structure the SBD, an international consultant with extensive experience in this type of Bank-financed project has been contracted using IDB resources. This consultant will work with the executing agency, providing technical assistance from the initial phase through the contract award.

The request for proposals (RFP) approved by the Bank will be used for contracting of the inspection of the above work. The executing agency will also receive technical assistance from the international consultant to prepare the RFP.

These are the only procurements to be financed with IDB resources. Given the amount and complexity involved, both contracting processes will be subject to ex ante review by the Bank.

Given that the EIB is a cofinancier of the work to be contracted in the project, an exception to the Bank's procurement policy must be requested, in order to allow the participation of IDB nonmember countries of the European Union. This exception was identified and included in the procurement plan.

2. Records and files

The executing agency will keep records up-to-date and files well organized for review by the Bank, in accordance with the following guidelines:

- (a) The archive of procurement documentation must be kept in a single dedicated file or folder, easily distinguished from those processes financed with local contribution resources or with resources outside the program.
- (b) The documents must be kept and preserved in a well-organized manner, paginated and numbered in such a way that they can be clearly and immediately located and identified at any time for Bank review and audit.

3. Advance contracting and retroactive recognition of expenditures: Not applicable.

VI. FINANCIAL MANAGEMENT AGREEMENTS AND REQUIREMENTS

4. Programming and budget

The Code of Planning and Public Finance (COPYFP) establishes the general rules governing the programming, formulation, approval, execution, control, evaluation, and outturn of proposals.² These general rules apply to Bank-financed programs in the country. For public enterprises, it is principally the Code of Territorial Planning, Autonomy, and Decentralization (COOTAD)³ that governs such operations.

² COPYFP, Article 34: "The budgets of the decentralized autonomous governments and their public enterprises will be subject to their own plans, within the framework of the National Development Plan and without detriment to their individual jurisdictions and autonomy. The National Development Plan coordinates the jurisdictions of each level of government."

³ COOTAD, Article 57: "(g) Approve or dispute the budget of the municipal decentralized autonomous government, which must be aligned with the cantonal development plan and with the plan of the subnational authority; as well as ensure citizen participation within the framework of the Constitution and the law. Likewise, it shall approve or dispute the budget liquidation of the immediately preceding year, as amended."

Although the revenues and expenditures of EPMMQ are not part of the National General Budget, the preparation of pro forma budgets must also conform to the COPYFP and to the technical rules, directives, line items, and charts of account established by the Ministry of Finance. For such purpose, the EPMMQ will have an automated system that allows effective monitoring and control of the institutional budget.

The program's budget will be calculated on the basis of the annual work plan (AWP) agreed upon by the IDB, the other financiers, and the executing agency, and will serve as the basis for the budget's formal inclusion in the National General Budget. EPMMQ will consolidate its budget with that of the Municipio, manage disbursements and budgetary allocations for the project, and oversee budget execution for each four-month period using its internal systems.

5. Accounting and information systems

The Public Enterprises Act establishes that "public enterprises, their subsidiaries, and affiliates shall not be required to apply government accounting rules in their accounting, nor shall they be required to manage their financial resources through either the National General Treasury Account or e-SIGEF. Public enterprises will base their accounting on generally accepted accounting principles and international accounting standards, generating all financial information necessary to measure their administrative and financial management." EPMMQ is in the process of acquiring an integrated information system that channels and records all of the enterprise's financial information. The Bank will review the system's capacity as a condition precedent to the first disbursement. In the event that the system is unable to issue the project's financial statements and other reports, the Ketra tool will be implemented.

6. Disbursements and flow of funds

Since 2008, the Government of Ecuador has been using the National General Treasury Account mechanism, which unified the cash management of the entities that comprise the central government. The implementation of this mechanism did not eliminate the system of special or specific-purpose accounts managed by the Central Bank of Ecuador (BCE) for receiving funds from multilateral loans, including IDB loans. In order to receive disbursements of the IDB loan, the Ministry of Finance, in coordination with EPMMQ, will have to open and maintain a program specific account at the BCE. These funds will be transferred immediately to the National General Treasury Account, from which the resources disbursed by the IDB will be transferred in their entirety to the exclusive account to be created at the BCE for purposes of managing the program.

Program disbursements will be made according to the project's actual liquidity needs, using the advance of funds modality, based on an itemized financial plan reflecting the project's actual resource requirements for a six-month period. The financial plan must be prepared at the start of the project and updated as execution of the project proceeds. In order to ensure the timely availability of funds, a *pari passu* system will be used to ensure a proportional level of disbursements for the respective financing sources, based on the amounts contributed (EIB, IDB, CAF, Municipio). This matter will be addressed in detail in the program Operating Regulations.

The executing agency will submit the disbursement request to the Bank, along with the project financial plan and cash flow for the following 180 days. Disbursements will be justified once at least 80% of the advanced funds have been executed.

The review of supporting documentation for expenditures and payments made will be on an ex post basis, with a report issued by an external audit firm, which will conduct a review under the “underwriting services” modality, in order to verify the records and the supporting documentation for expenditures and payments made. Any expenditures determined by the report to be ineligible for the program must be reimbursed using local contribution resources.

7. Internal control and audits

With regard to internal control systems, the Constitution of the Republic of Ecuador establishes that the Office of the Comptroller General of the Republic (CGE) is responsible for directing the control system, consisting of internal audit, external audit, and internal control of public sector entities and of private entities with access to public resources. The CGE also issues regulations governing the execution of these functions. At present, EPMMQ does not have its own internal audit area. Although the enterprise’s organizational chart does include such an area, the CGE is currently in the process of appointing and assigning the necessary team of internal auditors, who are expected to be in place by the first quarter of 2013.

The program Operating Regulations will include the main internal control procedures necessary to ensure that the EPMMQ’s assets, and the interests of those associated with the project, are properly protected. During execution, the IDB’s fiduciary team in Ecuador will evaluate the quality of these procedures.

8. External control and reports

The CGE is responsible for the external control of public enterprises, which it performs through financial audits by certified firms specializing in each industry or sector. However, given that the CGE does not currently have sufficient capacity to exercise external control on a timely basis of projects financed with external borrowing resources, external audits of the project will be performed by first-tier independent auditors acceptable to the Bank (international audit firms), in accordance with IDB requirements.

During execution, EPMMQ will deliver audited financial statements for the project on an annual basis, pursuant to Bank guidelines and based on terms of reference previously approved by the Bank. The costs of the audits will be covered by local counterpart resources.

9. Fiduciary supervision plan

Supervision activity	Supervision plan			
	Nature and scope	Frequency	Responsible	
			IDB	Third party
Operational	Review of status report	Six-monthly	Fiduciary and sector team	
	Review of executing agency's portfolio	As per Ministry of Finance requirements	Fiduciary and sector team	
Financial	Inspection visits	Six-monthly	Fiduciary specialist	
	Financial audits	Annual	Fiduciary specialist	Executing agency
	Concurrent review of disbursements (report of external audit firm)	With each disbursement	Fiduciary specialist	Executing agency/ Auditors
	Review of disbursement requests	With each disbursement	Fiduciary team	
Procurement	Ex ante review of procurements	During program execution, for the two project procurements envisaged	PTL, with support of procurement specialist	Executing agency
	Update of procurement plan	Annual or as needed	PTL, with support of procurement specialist	Executing agency
Compliance	Fulfillment of conditions precedent	Once	Fiduciary team	
	Budgetary allocation	Annual	Fiduciary specialist	Executing agency
	Delivery of audited financial statements	Annual	Fiduciary specialist	

10. Execution mechanism

The project's executing agency is the Quito Metro Metropolitan Public Enterprise (EPMMQ), which will be the contracting entity for the planned project procurements. EPMMQ will receive technical support from a management firm.

The main activities of EPMMQ include: (i) administration of the loan proceeds and fiduciary matters (procurement and financing); (ii) planning of loan execution, including preparation of the AWP and monitoring and update of the procurement plan; (iii) coordination and supervision of activities relating to procurement processes for the contracting of works and consulting services; (iv) monitoring and supervision of program execution progress; (v) preparation of financial statements and disbursement requests; (vi) evaluation of program impact; and other activities described in the program Operating Regulations.

11. Procurement table

The procurement table can be found at: IDBDocs #37242234 ([Link](#))