

Ex-Ante Evaluation**1. Name of the Project**

Country: The Republic of Panama

Project: Panama Metropolitan Area Urban Transportation Line-3 Development Project (I)

Loan Agreement: April 20, 2016

Loan Amount: 29,575 million yen

Borrower: The Republic of Panama

2. Background and Necessity of the Project**(1) Current Development State and Issues of the Urban Transportation Sector in Panama**

The Panama City Metropolitan Area has a population of approximately 1.7 million people (as of 2010), which constitutes about half of the total population of the Republic of Panama. The metropolitan area has lagged behind in the development of urban transportation systems. Neither city nor intercity buses satisfy the demands for urban transportation. Moreover, with a high economic growth rate in Latin America, Panama is facing a rise in the private vehicle ownership rate as well as a constant increase in the use of private automobiles for commuting. Meanwhile, residential areas are being expanded in the outskirts of the metropolitan area due to the escalation of land prices in the metropolitan center. This situation, as well as the increase of the number of private vehicles, has caused serious traffic congestion on roads between the metropolitan center and residential suburbs, especially during the morning and evening rush hours, paralyzing the functions of the city.

The Panama City Metropolitan Area borders the Gulf of Panama in the south, stretching to the east, west, and north. The development of residential zones in the western part of the metropolitan area was started later because it is accessible only by crossing the Panama Canal, but now approximately 23% of the total metropolitan population live in this area, and the population is still rapidly growing, driven by the recent housing construction. Nevertheless, there is only one road accessing this western side of the canal from the metropolitan center in the east, and this two-lane dual road, especially around the Bridge of Americas, becomes a major traffic bottleneck during the morning and evening peak hours. Thus, it is essential to introduce an efficient public mass transportation system that can be used instead of buses and private automobiles.

(2) Development Policies for the Urban Transportation Sector in Panama and the Priority of the Project

Identifying social development (to improve the quality of life) as one of the priority areas in the Government Strategic Plan 2015-2019 (Panama's national development plan), the Government of Panama is implementing the Urban Transportation Development Program by facilitating the efforts of the Metro de Panamá to develop a mass transportation system. The Urban Transportation Line-1 (MRT system) running to

the north went into operation in April 2014. To the east, the Urban Transportation Line-2 (MRT system) is now being constructed. In this context, the Panama Metropolitan Area Urban Transportation Line-3 Development will be implemented to construct the line between the metropolitan center and La Chorrera, one of the major cities to the west of Panama City. As the first phase of the development of the Urban Transportation Line-3, the project to develop approximately 26 km between the Albrook terminal station in the metropolitan center and the Ciudad del Futuro station (herein after referred to as “the Project”), where a train depot is to be constructed, will be implemented. . Following from the previous administration, the President Varela administration has also put the Project on the priority list. Moreover, the Project is expected to facilitate the sustainable economic growth of Panama by supporting the development of economic infrastructure that takes environmental considerations into account.

(3) Japan and JICA’s Policy and Operations in the Urban Transportation Sector

Japan’s Country Assistance Policy for the Republic of Panama (April 2014) identifies “sustainable economic growth” as a priority area. The Project is in line with this policy as it aims to reduce traffic congestion and air pollution through the development of the Urban Transportation Line-3 and hence to contribute to the improvement of the urban environment and the mitigation of climate change. Moreover, although Japan’s loan assistance to Panama, which is transitioning to a “graduating” country, is limited to the projects deemed to be strategically significant, the Project is considered to have a strategic significance from the viewpoint of Japan’s Growth Strategy and Infrastructure System Export Strategy because the intention of Government of Panama to developing high-quality infrastructure in terms of safety and reliability has been confirmed.

(4) Other Donors’ Activity

The “Corporación Andina de Fomento (CAF)” provided loans for the development of the Urban Transportation Line-1, while the “Inter-American Development Bank(IDB)” supported a feasibility study for the Urban Transportation Line-2 and the capacity development of the “Metro de Panamá”.

(5) Necessity of the Project

The Project is in line with the development policies of the Government of Panama and the assistance policies of the Government of Japan and JICA as it is to assist the Government of Panama with its efforts to improve the functions of urban transportation networks and impelment climate change measures by developing a urban transportation system in the western part of the Panama City Metropolitan Area. Therefore, it is highly necessary for JICA to implement the Project.

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| 3. Project Description |
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(1) Project Objective

The Project is to contribute to the improvement of urban mobility and the reduction of emission of greenhouse gases, through the construction of the

Metro Line-3 which connects the downtown and the western side of the Panama Metropolitan Area, introducing high-quality monorail vehicles and its system, which have sufficient robustness and reliable track record of commercial operations as an urban transportation system, thereby contributing to the sustainable economic development of Panama..

(2) Project Site/Target Area

The western side of the metropolitan area in Panama (Panama City, Arraiján City and La Chorrera City)

(3) Project Components

- 1) Procurement of the monorail system for the Urban Transportation Line-3
- 2) Construction of elevated structures and stations, etc. for the Urban Transportation Line-3 (14 stations between Albrook and Ciudad del Futuro stations; approximately 26 km)
- 3) Consulting services (basic design, support for preparation of tender documents, support for procurement procedures, project supervision, supervision of the interface with the Fourth Bridge)

(4) Estimated Project Cost (Loan Amount)

299,215 million yen (Loan Amount of phase (I): 29,575 million yen)

(5) Schedule

April 2016 to December 2025 (117 months in total). Project completion is defined as when the commercial operation in the Albrook – Ciudad del Futuro section is commenced (scheduled in December 2021).

(6) Project Implementation Structure

- 1) Borrower: The Republic of Panama
- 2) Guarantor: None
- 3) Executing Agency: Metro de Panamá, S.A.
- 4) Operation and Maintenance System: Metro de Panamá, S.A.

(7) Environmental and Social Consideration/Poverty Reduction/Social Development

1) Environmental and Social Consideration

- i) Category: B
- ii) Reason for Categorization: The Project is classified as Category B because it does not fall under those large-scaled projects in the road, railway and bridge sector specified in the JICA Guidelines for Environmental and Social Considerations (published in April 2010) nor is likely to have any significant adverse impact on the environment and because it does not have characteristics that are liable to cause adverse impacts or not located in or near sensitive areas as specified in the JICA Guidelines.
- iii) Environmental Permit: The Environmental Impact Assessment report prepared by Metro de Panamá, S.A. was approved by the Ministry of Environment in January 2016.
- iv) Anti-Pollution Measures: During the construction period, the amount of exhaust gas

and dust emissions is likely to increase, affecting the quality of air. This impact, however, can be alleviated by covering loaded trucks and sprinkling water on access roads. Noise and vibration from construction works are also to be mitigated by measures such as limiting nighttime construction activities and installing sound barrier walls. After the commencement of services, these environmental impacts are likely to be reduced to meet the local standards by taking measures such as installing sound insulation walls and ensuring the regular maintenance of trains.

- v) **Natural Environment:** The Project is designed to construct an elevated railway line along an existing road. Although this railway line will not go through nature reserves and the like, the acquisition of ROW is likely to result in the loss of approximately 43 ha of vegetation. Moreover, species categorized as Vulnerable (VU) by the International Union for Conservation of Nature (IUCN) are known to inhabit around the project site, but neither their important habitats nor primeval forests will be included in the project site. During the construction period, measures will be taken to protect wildlife and mitigate the impact of the loss of vegetation, e.g., transplanting plants and planting trees to offset deforestation.
 - vi) **Social Environment:** The Project will involve the acquisition of approximately 13 ha of land and the relocation of 17 residents of 5 households and 35 businesses. Moreover, the construction works of the Project are likely to block access to some of the stores in the vicinity. The relocation and compensation will be carried out based on the simplified Resettlement Action Plan (mini-RAP) to be developed in accordance with the JICA Guidelines and the World Bank OP 4.12. No objection has been raised against this Project.
 - vii) **Other / Monitoring:** In the Project, the implementation agency will monitor the quality of air and the level of noise and vibration during the construction period; the level of noise and vibration after the commencement of services; and the progress of land acquisition and resident relocation.
- 2) **Promotion of Poverty Reduction:** Because it is assumed that the fares will be kept low by the government, the Project is categorized as a poverty-integrated project.
 - 3) **Promotion of Social Development:** The Government of Panama has established guidelines, design standards, and minimum specification requirements by law (August 27, 1999) to ensure accessibility for the disabled. These guidelines and regulations serve as recommended standards for public facilities such as parks, roads, and sanitation facilities. The Project is also designed to construct stations that are accessible for all passengers.
- (8) **Collaboration with Other Donors:** None in particular.

4. Targeted Outcomes

(1) Quantitative Effect

1) Outcomes (Operation and Effect Indicator)

| Indicators | Baseline (Actual Value in 2015) | Target (2023) [2 years after project completion] |
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| Volume of passenger transportation (thousand people/day) | — | 172 |
| Running distance (km/day) | — | 9,719 |
| Average frequency of trains during peak hours (six-car trains/peak hour) | — | 19 |
| Train operating rate (%) | — | 90 |
| Travel time (minutes)* | 104 | 40 |
| CO ₂ emission reduction (tons/year) | — | 34,003 |

* Representing the estimated travel time on the railway line to be developed by this Project (approx. 26 km) calculated from the average travel time between La Chorrera and Albrook (approx. 30 km) by car at all hours of the day and night.

(2) Qualitative Effect

Enhancement of urban mobility and resulting improvements in the living environment and functions of the city

(3) Internal Rate of Return (IRR)

Based on the conditions below, the Economic Internal Rate of Return (EIRR) of the project is 5.7% and the Financial Internal Rate of Return (FIRR) is negative.

[EIRR]

Cost: project cost (tax excluded), operation and maintenance costs

Benefit: reductions in travel time, costs, and CO₂ emissions

Project Life: 30 years

[FIRR]

Cost: project cost, operation and maintenance costs

Benefit: revenue from the fares

Project Life: 30 years

5. External Factors and Risk Control

The completion of the Forth Bridge, which is being constructed, is a prerequisite for the Urban Transportation Line-3 to cross the Panama Canal. The outcomes expected of the Project cannot be achieved unless the bridge is completed without delay and in a way that allows a monorail system to be installed for the Urban Transportation Line-3.

6. Lessons Learned from Findings of Similar Projects Undertaken in the Past

(1) Evaluations of similar projects undertaken in the past:

The results of the ex-post evaluation of the Chongqing Urban Railway Construction Project in China suggested that a project plan should be developed based on the potential passenger traffic estimated from a detailed analysis and examination of the possible development of the transportation network and its surrounding residential areas during the period between the start and end of the project.

(2) Lessons for this project:

Based on the above-mentioned lesson learned, the preparatory survey of the Project formulated a development plan for the Line-3 based on the demand forecast derived from an analysis of the existing urban transportation networks, the new urban transportation development plan, and development plans for areas along the railway network. Moreover, the Project will have project supervision consultants examine coordination with the development of residential and other areas along the transportation network and connections with feeder buses when confirming individual plans.

7. Plan for Future Evaluation

- (1) Indicators for Future Evaluation: as described above (refer to 1) Outcomes (Operation and Effect Indicator) in (1) Quantitative Effect of 4. Targeted Outcomes)
- (2) Timing: Two years after project completion