

Ex-Ante Evaluation (for Japanese ODA Loan)

**Central America and the Caribbean Division,
Latin America and the Caribbean Department,
Japan International Cooperation Agency**

1. Name of the Project

- (1) Country: The Republic of Panama
- (2) Project Site / Target Area: Western side of the Panama metropolitan area
- (3) Project: Panama Metropolitan Area Urban Transportation Line-3 Development Project (III)

Loan Agreement: February 6, 2025

2. Background and Necessity of the Project

- (1) Current State and Issues of the Urban Transportation Sector and the Priority of the Project in Panama

In the capital of the Republic of Panama (Panama), the metropolitan area's population was estimated to be around 1.9 million people in 2017 (according to the Metro de Panama, S.A.'s "Metro Panama New Master Plan") (the actual measurement in 2010 was 1.7 million people (Panama population census)), so over 40% of Panama's total population is concentrated there. The urban transportation system in the metropolitan area is underdeveloped, and the current main means of public transportation, city buses or inter-city buses, do not adequately meet the urban transportation needs. Furthermore, residential areas are expanding to the outskirts of the metropolitan area due to the soaring price of land in the center and, along with an increase in car ownership propelled by high economic growth, this is causing serious traffic congestion during the peak morning and evening hours in the areas between the center of the metropolitan area and the residential zones on the edges, and leading to a paralysis of urban functions.

The Gulf of Panama is situated on the south side of the metropolitan area, and the northern, western, and eastern parts are expanding with economic development. To the east of the Panama Canal, the Urban Transportation Line-1 connecting south to north opened in 2014, and the Urban Transportation Line-2 connecting east to west opened in 2019, in response to the growing transport demands that accompanied increased economic development. On the other hand, as you had to cross over the Panama Canal to go to the center of the city from the western part, this area lagged behind in development, but about 27% of the total population of the metropolitan area lived in this western part as of 2017,

and this population is increasing rapidly due to further recent housing developments. Especially as there is only one road with two lanes going each way from the western side of the Panama Canal eastwards to the center of the city, not only does this cause serious traffic congestion during the morning and evening peak times, centered around the Bridge of the Americas that crosses the canal, but the carbon dioxide emissions from the private cars and buses also causes air pollution, so there is a need for the introduction of an alternative and efficient mass transit public transportation system.

Under these circumstances, in January 2016, the Government of Panama and the Government of Japan regarding the implementation of the Panama Metropolitan Area Urban Transportation Line-3 Development Project (hereinafter referred to as “the Project”), which connects the downtown and the western side of the metropolitan area, agreed on the importance of introducing a monorail system that utilizes high quality Japanese technology, and has a commercial track record of being a thoroughly safe and reliable urban transportation system.

The Project aims to alleviate traffic congestion and improve transport functions, as well as mitigate air pollution by reducing carbon dioxide emissions, through the development of the Urban Transportation Line-3 (approximately 25 km) that will connect the western side of Panama’s metropolitan area to the central part, and in the “2019-2024 Strategic Government Plan for Panama” (a national strategic plan for economic and social development formulated by the government every five years, with five designated pillars of development), the implementation of the Project is mentioned prominently, so it is positioned as a high priority project. In addition, among the nine lines throughout the Panama metropolitan area, including the six Metro de Panama, S.A. has planned to construct, the Urban Transportation Line-3 is a key line connecting the downtown and the western side of the metropolitan area.

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

Japan’s Country Assistance Policy for the Republic of Panama (September 2018) designates “support for sustainable socio-economic development” as a priority area, and the Project is consistent with the policy as it will contribute to the development of eco-friendly economic infrastructure, with the aim of alleviating traffic congestion and air pollution through the development of the Urban Transportation Line-3. It is also consistent with JICA’s Global Agenda policies on “2 Transportation” and “16 Climate change.”

(3) Other Donors' Activities

The Development Bank of Central America and the Caribbean (CAF) provided financing for the development of the Urban Transportation Line-1, and the Inter-American Development Bank provided technical support for the feasibility study of the Urban Transportation Line-2 and the capacity development of the Metro de Panama, S.A.

3. Project Description

(1) Project Description

① Project Objective

The objective of the Project is to contribute to the improvement of urban mobility and the reduction of emission of greenhouse gases, through the construction of the Urban Transportation 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 sustainable economic development of Panama.

② Project Components

- a) Procurement of a monorail system for the Urban Transportation Line-3 (based on prior agreement between Metro de Panama, S.A. and high quality suppliers with a proven track record of commercial operations as a sufficiently safe and reliable urban transportation system, designate civil engineering work contractors to procure the monorail system (e.g., trains, signals, switches, feeders and transformers, track beams, vehicle maintenance equipment, platform gates)).
- b) Engineering and construction work for the Underground Section (approximately 5 km for the part between Albrook and Panama Pacifico), elevated structures (approximately 20 km between Panama Pacifico and Ciudad del Futuro) and station buildings, etc. and procurement of equipment not including the monorail system (international competitive bidding and change of contract based on Panama's procurement system) for the Urban Transportation Line-3.

(At the time of the Exchange of Notes and Loan Agreement (I), the plan was for the line to cross the Panama Canal via a No. 4 bridge (for both the train and vehicular traffic) to be constructed by Panama through a

PPP project, but construction of the bridge was postponed for reasons such as land acquisition. For this reason, the method for crossing the canal was changed to a tunnel system, and the dedicated tunnel will be constructed in this project.)

(Of the 14 stations initially expected, three are not covered by the loan as the construction period has been postponed.)

c) Consulting services (the Tunnel Section)

Basic design review, detailed design review, implementation supervision, etc.

③ Project Beneficiaries (Target Group)

Direct beneficiaries (customers using Line-3): Approximately 180,000 people (estimated number of passengers getting on and off the train per day in 2030)

Ultimate beneficiaries (local residents and overseas visitors that benefit from the alleviation of traffic congestion owing to the development of Line-3): Over 650,000 people (predicted population of the western part in 2030, and overseas visitors)

(2) Estimated Project Cost

846,829 million yen (of which, 159,496 million yen is covered by ODA loan in this period)

(3) Schedule (Cooperation Period)

Scheduled from April 2016 to December 2031 (187 months in total). The Project completion is defined as when commercial operation in Albrook - Ciudad del Futuro, including the Underground Section, is commenced (scheduled for December 2028).

(4) Project Implementation Structure

1) Borrower: The Republic of Panama

2) Guarantor: None

3) Executing Agency: Metro de Panama, S.A. (MPSA)

4) Operation and Maintenance System: Metro de Panama, S.A. Metro de Panama, S.A. operates and maintains Urban Transportation Line-1 and Urban Transportation Line-2 and has experience operating a railway system. It smoothly operates both Line-1 and Line-2 using the automatic train stop (ATS) device planned to be used in Line-3. Metro de Panama, S.A. has been maintaining the trains and lines without any issues and JICA plans to use consulting services to support the agency's capacity building for equipment

portion related to the monorail that differs from the regular trains used on Line-1 and Line-2 and for maintenance of the underground tunnel portion. As for its finances, it covers operation and maintenance costs with fare revenue and subsidies from the Government of Panama and is also considering methods for securing non-rail revenue, such as advertising revenue and revenue from renting out stations.

(5) Collaboration and Sharing of Roles with Other Donors

1) Japan's Activity

- Through Special Assistance for Project Implementations, Japan is supporting basic design, detailed design review, support for preparation of tender documents, support for procurement support, and implementation supervision of sections excluding the Tunnel Section that was added with the scope change of the Panama Canal Crossing method.
- The technical cooperation project "Project for Capacity Strengthening on Planning of Transit Oriented Development along the Metro Line 3" (cooperation period: April 2024 to March 2028) is being implemented as support to promote transportation oriented development (TOD) along the route of Line-3. These activities are expected to have synergistic effects such as supporting the strengthening of TOD planning capacity and clarification of the legal positioning of TOD plans for the station areas being developed (target: Vista Alegre Station and Nuevo Chorrillo Station) and the development of a mechanism for coordinating relevant organizations as well as expansion of the benefits from operating Line-3 and sustainable economic growth of the western side of the area.

2) Other Donors' Activity: None in particular

(6) Environmental and Social Consideration

1) Environmental and Social Consideration

- ① Category: B
- ② Reason for Categorization: The Project does not qualify as a large-scale one as listed in the road, railway, and bridge sector of the JICA Guidelines for Environmental and Social Considerations (published in April 2010), its undesirable impact on the environment is judged to be minimal, and it does not fall into any sensitive characteristics or sensitive areas categories according to the JICA Guidelines.
- ③ Environmental Permit: The Environmental Impact Assessment (EIA) report for the Project was prepared by Metro de Panama, S.A. in the

preparatory survey for cooperation, and was approved by the Ministry of the Environment in January 2016. The EIA report for the Tunnel Section was approved by the Ministry of the Environment in August 2022. The implementation stage began once the Ministry of the Environment approved the Environmental Management Plan (EMP) that was an ancillary condition of the EIA report for the Tunnel Section, and Metro de Panama, S.A. is submitting quarterly monitoring reports. In addition, 7 EIA reports have been produced as the project has progressed, and 6 of these have been approved by the Ministry of the Environment, while the remaining 1 (reports on a part of a stationary area of the Underground Section and small-scale changes to a section along the line) is expected to be approved by the Ministry of the Environment in March 2025.

- ④ Anti-Pollution Measures: Air quality is expected to be affected during construction by an increase in exhaust fumes and dust particles, but the impact will be limited by covering trucks transporting materials with dust-proof cloth, and spraying the access roads with water sprinklers. Countermeasures will also be taken for noise and vibrations, such as placing restrictions on working at night during the construction, informing residents in advance, and installing sound barriers. When it is in service, it is expected to conform with domestic standards due to the installation of sound barriers and regular maintenance of the railway vehicles.
- ⑤ Natural Environment: The Project will construct elevated structures alongside existing roads and will not pass through nature reserves, etc. About 43 ha of vegetation is expected to be lost as a consequence of the acquisition of the right of way (ROW), and species defined as vulnerable (VU) by the IUCN have been confirmed to be in the Project's target area, but it does not include any primary forests or essential habitats for these creatures. Mitigation measures such as afforestation to replace lost forest areas, transplantation of vegetation, and wildlife conservation measures will be carried out during the construction period.
- ⑥ Social Environment: The Project is expected to involve the acquisition of around 35.00 ha of land, the economic relocation of 183 people (as of September 2024) and 72 shops, and access to shops located near the route of Urban Transportation Line-3 is expected to be blocked by the construction work. Procedures for relocation and compensation will be carried out based on a simplified resettlement action plan (Mini

Resettlement Action Plan: MINI RAP) that is created in accordance with the JICA Guidelines. Furthermore, no particular objections were expressed regarding the Project.

- ⑦ Other/Monitoring: In the Project, the executing agency will play a central role in monitoring the air, noise and vibrations during the construction work, and noise and vibrations when it is in service, as well as monitoring the state of progress of the land acquisition and resident relocation. If items of cultural heritage are discovered at the construction site, construction will be suspended, an investigation will be carried out, a report will be made to the Agency for Cultural Affairs, and it will be dealt with appropriately.

(7) Cross-Sectoral Issues

- ① Climate Change Countermeasures: The Project may contribute to the promotion of a modal shift, and as it is thought that this will play a part in reducing greenhouse gases (GHG), it will contribute to climate change countermeasures (mitigation measures). The climate change mitigation effects of the Project (rough estimate of the reduction in the emission of GHG) will be approximately equivalent to 32,482 tons of CO₂ per year (estimate for 2030).
- ② Disability Considerations: The Project will endeavor to make the facilities barrier free (with the installation of elevators, establishment of priority boarding for wheelchairs, installation of safety belts to secure wheelchairs, etc.) in accordance with the country's domestic laws.
- ③ Infectious Diseases Countermeasures: It has been confirmed that preventative awareness campaigns and countermeasures against infectious diseases like COVID-19 and HIV/AIDS will be carried out in accordance with the country's domestic laws and guidance.

(8) Gender Category: GI (Gender mainstreaming needs investigation and analysis item)

<Details of Activities/Reason for Categorization>

As the preparatory survey found that female drivers are operating on the already running Line-1 and Line-2, and no gender imbalance has been seen in the passengers of those lines, at this present stage no particular issues from a gender perspective have been identified, but as there may be potential needs regarding Line-3, a survey is being carried out as part of the Special Assistance for Project Implementations. Once the survey results have been submitted, JICA will discuss concrete gender-related initiatives

with the executing agency.

(9) Other Important Issues

A Japanese company's monorail system will be used in the Project, as it was judged to be the most suitable from the results of an investigation into what system to introduce in the preparatory survey.

4. Targeted Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

Indicator	Baseline (Actual value in 2015)	Target (2030) [2 years after project completion]
Volume of passenger transportation (thousand people/day)	-	179
Running distance (km/day)	-	9,996.8
Average frequency of trains during peak times (6-car train/peak time)	-	19
Train operating rate (%)	-	93
Travel time (mins) Between Albrook and Ciudad del Futuro	104 (By bus/private car)	35
CO ₂ emissions reduction (t/year)	-	32,482 (2030)

Note: As the completion period that was confirmed to be December 2026 at the 2nd Appraisal was postponed to October 2028, target values have also been pushed forward two years to 2030.

2) Impact

(2) Qualitative Effects

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

(3) Internal Rate of Return

Based on the assumptions listed below, the economic internal rate of return (EIRR) of the Project will be 5.1%, and the financial internal rate of return (FIRR)

will be negative.

[EIRR]

Cost: Project costs (excluding taxes), operation and maintenance costs

Benefit: Reduced travel costs, shorter travel times, reduction of CO₂ emissions

Project Life: 30 years

[FIRR]

Cost: Project costs, operation and maintenance costs

Benefit: Fare revenue

Project Life: 30 years

5. External Factors and Risk Control

- (1) Preconditions: None in particular
- (2) External Factors: None in particular

6. Lessons Learned from Past Projects

The result of the ex-post evaluation of the Chongqing Urban Railway Construction Project in China (evaluation in FY2009) suggested that a project plan should be developed based on potential passenger traffic estimate from a detailed analysis and examination of possible development of the transport network and its surrounding residential areas during the period between the start and end of the project.

Based on this lesson, 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 network, the new urban transportation development plan, and the development plans for areas along the railway network. In addition, the Consultant for Special Assistance for Project Implementations examined coordination with the development of residential and other areas along the transportation network and connections with feeder buses when confirming individual plans.

7. Evaluation Results

The Project is consistent with Panama's development issues and development policies as well as Japan's and JICA's cooperation policies and analyses. The development of Urban Transportation Line-3 will contribute to the country's sustainable economic growth by improving urban transportation functions and reducing carbon dioxide emissions, and as it is also considered to contribute to Goal 9 (Industry, innovation and infrastructure), Goal 11 (Sustainable cities and

communities), and Goal 13 (Climate action) of the SDGs. Therefore, it is highly necessary to support the implementation of the project.

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in Section 4.

(2) Future Evaluation Schedule

Ex-post evaluation: Two years after the project completion

END