

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The People's Republic of Bangladesh

Project: Dhaka Mass Rapid Transit Development Project (III)

Loan Agreement: June 14, 2018

2. Background and Necessity of the Project

(1) Current State and Issues of the Urban Development Sector and Priority of the Project in Bangladesh

The population of Dhaka increased from 6.62 million to 16.98 million between 1990 and 2014 (United Nations Population Division, 2014). This population increase has caused a rapid increase in transportation demand, which in turn has led to chronic traffic congestion and air pollution.

As a result, the average vehicle travel speed in Dhaka is 6.4 km/hour, less than half that in central Tokyo (14.7 km/hour; Ministry of Land, Infrastructure, Transport and Tourism, 2015). In terms of air pollution, the annual average PM₁₀ concentration is reported to be 158 µg/m³ (World Health Organization [WHO], 2016). This exceeds the WHO environmental standard of 20 to 70 µg/m³. The economic loss due to traffic congestion is 3.868 billion US dollars per year (Bangladesh Water Development Board, etc., 2013), which is degrading the investment environment greatly and hindering the economic and social development of Bangladesh.

To solve this problem, the Government of Bangladesh established the Strategic Transportation Plan (STP) in 2005 as a long-term comprehensive transportation plan that will continue for 20 years. In the STP, three Mass Rapid Transit (MRT) routes and three Bus Rapid Transit (BRT) routes were selected as high-priority projects. Additionally, following the establishment of the STP, the Dhaka Urban Transport Project Formation Survey was conducted in 2008 with the support of JICA. This survey confirmed the potential of introducing an MRT system, and MRT Line 6 was selected as the top priority line because it had the highest demand at that time, was relatively inexpensive, and had the highest cost-effectiveness.

Furthermore, the Government of Bangladesh also identified the promotion of economic growth and poverty reduction as a major goal in the 7th Five-Year Plan (FY2016/17–FY2020/21) and highlighted in its Traffic and Communication Development Strategy the importance of reducing road traffic congestion in the metropolitan area with appropriate investment. Based on this plan, the government revised the STP with aid from JICA in August 2016. In the revised STP, five MRT routes and two BRT routes were reclassified as high-priority lines. MRT Line 6 was also identified as one of the high-priority lines in the revised STP.

The Dhaka Mass Rapid Transit Development Project (III) (hereinafter referred to as the “Project”) is intended to develop MRT Line 6, which will connect the northern part of the Dhaka Metropolitan Area and the central area of Dhaka city for 19.8 km, in order to ease traffic congestion and air pollution in the Dhaka Metropolitan Area.

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

The JICA Country Analysis Paper for Bangladesh (May 2014) identifies urban development as a priority area. Additionally, Japan’s Country Assistance Program for Bangladesh (February 2018) sets the Acceleration of Economic Growth that Benefits All People as a priority area and aims to develop high-quality transportation and traffic infrastructure and promote the efficient transportation of passengers and goods. The Project is, therefore, consistent with these policies and the analysis.

To support the development of a legal system for urban railways, JICA also dispatched experts, such those provided under the following projects: “Consultants to Help Strengthen the Implementation System of the Dhaka City High-Speed Rail in Bangladesh (Specialist Loan Assistance)” (Technical Assistance Related to ODA Loan) (FY2010–2011) and “Legal Technical Assistance for Dhaka Urban Transport” (Technical Assistance Related to ODA Loan; FY2013–2015). JICA has also provided support for the revision of the STP through the Project for the Revision and Updating of the Strategic Transportation Plan for Dhaka (Technical Assistance Related to ODA Loan; FY2014–2016).

The Project promotes a modal shift from automobile transportation to railway transportation and provides access to safe, affordable, accessible and sustainable transport systems. As this project also aims to reduce greenhouse gas (GHG) emissions by improving traffic congestion, it contributes to targets 11.2¹ and 11.6² of the Sustainable Development Goals (SDGs).

(3) Other Donors’ Activity

The World Bank assisted in the formulation of the STP and implemented the Clean Air and Sustainable Environment Project, followed by a support for the detailed design of BRT Line 3 (between the airport and Jhilmil) from 2009 to 2016.

The Asian Development Bank has been implementing the Greater Dhaka Sustainable Urban Transport Corridor Project to develop BRT Line 3 (between Gazipur and the airport) since 2010 with the aim of opening the route by the end of

¹ SDG 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

² SDG 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

2019.

3. Project Description

(1) Project Objective(s)

The objective of the Project is to alleviate the traffic congestion and mitigate the air pollution in Dhaka by constructing a mass rapid transit railway system (MRT Line 6) in Dhaka, thereby contributing to economic development throughout all of Bangladesh.

The Project is also intended to promote a modal shift from automobile transportation to public transportation and contribute to reduce air pollution in the Dhaka Metropolitan Area.

(2) Project Site / Target Area

Dhaka City

(3) Project Component(s)

- 1) Construction of railway structures (total length of 19.8 km; construction of elevated railways, stations, tracks, etc.)
- 2) Construction of a depot (land development, construction of depot buildings, railway sidings, etc.)
- 3) Procurement of rolling stock (144 cars: 6 cars × 24 sets)
- 4) Installation of electric and signal systems
- 5) General consulting services (F/S review, detailed design, tender assistance, construction supervision, training for operation and maintenance, etc.)
- 6) Consulting services for resident resettlement support
- 7) Consulting services for institutional development support

(4) Estimated Project Cost (Loan Amount)

Project Cost: 349,432 million Yen (Loan Amount: 242,796 million Yen)

Loan Amount in This Phase: 79,271 million Yen

(5) Schedule

December 2012 – June 2024 (138 months in total). The Project will be completed upon the opening of all sections (June 2022).

(6) Project Implementation Structure

- 1) Borrower: The Government of the People's Republic of Bangladesh
- 2) Guarantor: N/A
- 3) Executing Agency: Dhaka Mass Transit Company Limited (DMTC)
- 4) Operation and Maintenance System: DMTC

(7) Cooperation and Sharing of Roles with Other Donors

1) Japan's Activity

The Project for the Revision and Updating of the Strategic Transportation Plan for Dhaka (Technical Assistance Related to ODA Loan; 2014–2016) was implemented and development plans (including the Project) for five MRT lines and two BRT lines were formulated. Additionally, a technical cooperation project called the Project for

the Establishment of a Clearing House for Integrating Transport Ticketing Systems in the Dhaka City Area (2014–2018) supports the establishment of a system for IC card payments, and phase II of the project is being formulated with the goal of developing a permanent implementation structure to promote the use of IC cards, which is expected to start from FY2018. Furthermore, the Project for Training and Education on Mass Transit System Operation and Maintenance Management, which is mainly intended to develop trainers, is also being prepared with the aim of establishing an operation and maintenance system for MRT Line 6. Additionally, with regard to MRT Line 1, an E/S loan is being implemented as a Japanese ODA loan project for FY2017.

2) Other Donors' Activity

As described in 2 (3).

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

1) Environmental and Social Consideration

① Category: A

② Reason for Categorization: The Project falls into the railway sector (located in a sensitive area and likely to have a significantly adverse impact due to its characteristics) under the JICA Guidelines for Environmental and Social Considerations (published in April 2010).

③ Environmental Permit: An Environmental Impact Assessment (EIA) Report for the Project was prepared by the Dhaka Transport Coordination Authority (DTCA) and approved by the Department of Environment on July 11, 2011. The Environment Clearance Certificate (ECC) was updated July 2017.

④ Anti-Pollution Measures:

Water will be sprinkled periodically to suppress the dust that is expected to be generated during the construction work. Sound absorbers and sound-insulating walls will be installed to reduce noise and vibrations during the construction work. Wastewater that is discharged from the station and the train depot when the facilities are in service will be appropriately treated at wastewater treatment facilities.

⑤ Natural Environment: As the Project site is not located in or around national parks or other vulnerable areas, any undesirable impact on the natural environment is likely to be minimal. To compensate for the plants that will be removed for the construction of elevated railway tracks, trees will be planted under the tracks.

⑥ Social Environment: In the Project, most facilities will be constructed within the bounds of existing roads. It is estimated that 47.0 ha of land will be acquired, and the number of affected local residents is estimated to be 1,469 (of which, 60 live near the depot and 1,409 live alongside the railway tracks). According to the revised Resettlement Action Plan (RAP), which is based on the detailed design, all of the project sites will be acquired from public domain land, and all

of the affected local residents are people who are engaged in commercial activities, etc., within this land. Involuntary resettlements will not occur. The site acquisitions, etc., will proceed pursuant to domestic laws and the RAP, which was created according to JICA Environmental and Social Consideration Guidelines. In meetings with local residents, explanations about the Project were given, including the project description, planned routes, measures to mitigate the potential impact on the natural and social environment, an overview of the RAP plan, and compensation. No particular objections were raised.

⑦ Other / Monitoring: During the construction phase, the contractor is in charge of monitoring air quality, noise, vibration, water quality, land acquisition, and the resettlement status under the supervision of the executive agency. After the start of operations, the executive agency will conduct the monitoring itself. Additionally, an external monitoring agency hired by the construction supervisory consultant will monitor social considerations.

2) Cross-Cutting Issues: The Project is intended to reduce air pollution and mitigate climate change through the promotion of public transportation, thereby contributing to reduced GHG emissions. The Project's mitigation effect on climate change (estimated GHG emissions) is expected to be approximately 0.18 million tons of CO₂/year (estimate for 2025).

3) Gender Category: [Gender Project] GI (S) (Gender Activities Integration Project) Activity Components/Reason for Categorization:

In Bangladesh's public transportation, the lack of sufficient safety measures for women, such as the prevention of sexual harassment, is proving an obstacle to women's use of public transport. Therefore, gender action plans, including the operation of women-only cars at peak times and the installation of surveillance cameras in stations, will be implemented to promote a deeper understanding of women's safety and gender issues.

Consequently, this is categorized as a Gender Activities Integration Project.

(9) Other Important Issues: In the development of the MRT system, Japanese advanced technologies (e.g., countermeasures for soft soil, construction technologies for narrow areas, and automatic fare collection systems) have been introduced.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicators)

Indicator	Baseline (Actual Value in 2009)	Target (2024) (Expected value 2 years after project completion)
Passengers carried (1,000 passengers-km/day)	—	8,629.5
Travel distance (km/day)	—	6,528
Travel time (min.) [*]	110.4	46.2
Operational rate (no. of train services/day)	—	80

Note: The travel times indicated above are for the section between Uttara North Station and Motijheel Station.

As a reference value, air pollutant density (density of NO₂ and total suspended particulates [PM_{2.5}/PM₁₀] along the railway line) will be monitored.

(2) Qualitative Effects

Response to transportation demand in the Dhaka Metropolitan Area, reduction in air pollution through the promotion of public transportation, and mitigation of climate change through the reduction of GHG emissions.

(3) Internal Rate of Return

According to the following preconditions, the Project's Economic Internal Rate of Return (EIRR) will be 23.61%. The Financial Internal Rate of Return (FIRR) will be 3.45%.

[EIRR]

Cost: Project costs (excluding tax) and operation/maintenance costs

Benefit: Reduction in vehicle operation costs, travel time, etc.

Project Life: 40 years

[FIRR]

Cost: Project costs and operation/maintenance costs

Benefit: Fare revenues

Project Life: 40 years

5. Preconditions / External Conditions

(1) Preconditions: N/A

(2) External Conditions: N/A

6. Lessons Learned from Past Projects

The results of the ex-post evaluation of the Philippines' Metro Manila Strategic Mass Rail Transit Development Project revealed that it is difficult to operate an urban transport business using fare revenues only, that funding and subsidies from the government are needed because a large initial investment is required, and that a detailed financial plan and an action plan for government support should be

developed in the project planning phase in order to ensure the financial health of the executing agency.

In addition, the results of the ex-post evaluation of India's past urban railway projects, including the Delhi High-Speed Transit System Construction Project (I)-(VI), indicated that it is necessary to ensure that the preconditions for profitability are satisfied and that, if they are not fulfilled, it is necessary to push for the satisfaction of these preconditions.

As the Project requires a large initial investment and, therefore, its financial soundness needs to be secured, appropriate fare setting will be conducted based on the lessons described above, and government funding (grants) and sub-loan from the government under concessional conditions will be used. Additionally, the DMTC's financial plans have already been developed as part of the consulting services for institutional development.

Furthermore, in order to secure non-rail revenues in addition to fare revenues, the development and implementation of business plans—including those for generating revenues from public transportation-oriented development, retail tenants in stations, advertising, etc.—will be supported through general consulting services.

7. Evaluation Results

The Project is consistent with Bangladesh's development issues and policies and with the assistance policies and the analysis of the Government of Japan and JICA. The Project is intended to respond to transportation demand in the Dhaka Metropolitan Area through the construction of a mass rapid transit system (MRT Line 6), thereby contributing to the achievement of SDG 11 ("Make cities and human settlements inclusive, safe, resilient and sustainable"). Thus, the necessity for JICA to support the Project is substantial.

8. Plan for Future Evaluation

(1) Indicators to be Used

As described in (1)-(3) of Section 4.

(2) Timing

Ex-post evaluation: Two years after the project completion