

Ex-Ante Evaluation (for Japanese ODA Loan)

Southeast Asia Division 1, Southeast Asia and Pacific Department, JICA

1. Name of the Program

Country: The Republic of Indonesia (Indonesia)

Program Site/Target Area: Special Capital Region of Jakarta

Program: Construction of Jakarta Mass Rapid Transit Project (Phase 2) (II)

Loan Agreement: March 31, 2023

2. Background and Necessity of the Program

(1) Current State and Issues of the Urban Transportation Sector in Indonesia

The population of the Jakarta metropolitan area, also known as “JABODETABEK,” which stands for the five areas of Jakarta, Bogor, Depok, Tangerang, and Bekasi, increased to approx. 35 million people in 2019. This is an increase of 1.6 times in 20 years from approx. 21 million people in 2000. In particular, the populations of the districts neighboring the Special Capital Region of Jakarta have seen significant increase in recent years, along with the number of people who commute from these areas to the center of Jakarta (approx. 3.2 million people in 2019, an increase of 1.4 times from approx. 2.4 million people in 2014). In addition, 91% of passengers and freights in the metropolitan area depend on road transportation. Indonesia enjoyed an annual economic growth rate of 5.0% until 2019 after the 1998 Asian currency crisis, and as a result, the number of registered vehicles in the Special Capital Region of Jakarta increased to approx. 18,000,000 in 2019, an increase of 1.5 times from approx. 11,990,000 in 2010 (Source: DKI Jakarta Provincial Government (hereinafter referred to as “DKI”), PT Mass Rapid Transit Jakarta (MRTJ), etc.). This has resulted in severe traffic congestion, which has led to the deterioration of investment environments, as well as air pollution due to exhaust fumes in the country, so boosting the capacity of public transportation and mitigating the traffic congestion are major issues to be addressed. Therefore, the Indonesian government and DKI (hereinafter referred to collectively as the “Indonesian government, etc.”) have been taking various measures, such as limiting the volume of passenger cars coming into the center of Jakarta and introducing bus lanes. In addition, in order to promote a modal shift to public transportation, they constructed a mass rapid transit system (MRT) between Lebak Bulus located in the south of Jakarta and Bundaran HI located in its center under Phase 1 of the Construction of Jakarta Mass Rapid Transit Project (hereinafter referred to as “this Project”) as the first subway in Indonesia, which was put into service in March 2019. Construction is now underway in the Phase 2A section that extends north from the Phase 1 section to Kota.

Currently, this Project has seen a temporary decrease in passenger demand due to the spread of COVID-19, but the Indonesian government, etc., intends to proceed with Phase 2 in light of the necessity of public transportation that has been made clear by this Project, and has requested further loans that meet the financial requirement.

In the National Mid-term Development Plan (2020–2024), the Indonesian government identifies the development of infrastructures that help to promote the economic growth of the country as a priority national development issue to be addressed to solve these problems, and this Project is positioned as a top-priority project in this plan. In addition, this Project is one of the national strategic projects selected in the President Regulation (No. 109/2020), and is positioned as a priority project of the country. Thus, this Project is consistent with the Indonesian government's development policies in the urban transportation sector.

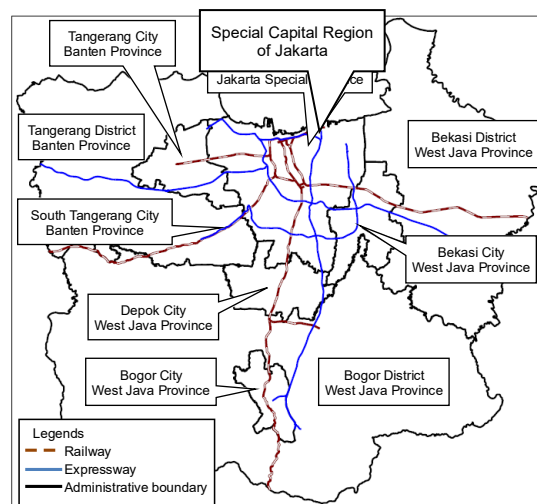


Figure 1: Administrative Divisions of the Jakarta Metropolitan Area (JABODETABEK)

(Source: JICA's Project on the Study on JABODETABEK Public Transportation Policy Implementation Strategy – Final Report (2012))

(2) Japan and JICA's Policy and Operations in Relation to the Urban Transportation Sector

Japan's Country Assistance Policy for the Republic of Indonesia (September 2017) identifies assistance for the improvement of international competitiveness as a priority area, and states that Japan intends to provide assistance for the development of quality infrastructures, including transportation infrastructures, in the country. JICA Country Analysis Paper for the Republic of Indonesia (June 2018) also states that JICA intends to cooperate with the country, as part of the Distribution, Transport, and Traffic Infrastructure Development Program, in

developing a mass public transportation system in the metropolitan area in order to meet the growing transport demand. Thus, this Project is consistent with these policies and analyses.

This Project is also consistent with the objectives of Transportation, which is one of JICA's global agendas, and Urban Public Transport, which is a cluster.

(3) Other Donors' Activity

Currently, there are no other donors that support the construction of an MRT, and no overlapping projects. In the urban transportation sector, the World Bank developed general guidelines for Bandung (2017–2020), supported the development of an urban transportation master plan (2019), proposed improvements to the existing railway system (2019), and proposed MRT/LRT, etc. (2019). The French Development Agency (AFD) has been supporting the development of an urban transportation master plan for Medan (since 2021), and KfW (Kreditanstalt für Wiederaufbau), a German development bank, proposed improvements to the existing railway system in Surabaya (2015), and has been supporting the development of an urban transportation master plan (since 2021) (Source: Collection of information and investigations on the urban public transportation systems in major provincial cities).

3. Program Description

(1) Program Description

1) Program Objective(s)

The objective of this Project is to construct a mass rapid transit system in the Jakarta metropolitan area, which has severe traffic congestion, thereby addressing the increasing transport demand and promoting a modal shift from automobile traffic to public transportation. It will ultimately contribute to the mitigation of the traffic congestion, the improvement of investment environments, and the reduction of environmental burdens in the Jakarta metropolitan area.

2) Program Component(s)

This Project is intended to construct an MRT in the Jakarta metropolitan area, which has severe traffic congestion. The original overall project plan was to construct an MRT in the section between Lebak Bulus and Kampung Bandan (total length: 23.5 km) in two phases, and assumed that Phase 1 section would be between Lebak Bulus and Bundaran HI (total section length: 15.7 km) and Phase 2 section would be between Bundaran HI and Kampung Bandan (total section length: 7.8 km). However, there were difficulties in acquiring the land in Kampung Bandan where a train depot was to be constructed in Phase 2, so the plan for Phase 2 was changed. Following this

change, it was decided to construct a train depot in Ancol Barat, which is to the north of Kota Station, and a new route to the depot is being planned (the new total length for Phase 2 is approx. 12.0 km). Phase 2 is now divided into Phase 2A between Bundaran HI and Kota (original route: total section length of approx. 6.0 km) and Phase 2B between Kota and Ancol Barat (extended route: total section length of approx. 5.0 km) (see Attachment). At this point, construction for Phase 2B is not included in this Project.

[Phase 1]

- I. Civil work (elevated part and train depot)
 - (i) Construction of elevated part (9.8 km)
 - (ii) Construction and development of tracks (9.8 km)
 - (iii) Construction of station buildings (7 stations)
 - (iv) Construction of a train depot (1 depot)
- II. Civil work (underground part)
 - (i) Excavation (5.9 km)
 - (ii) Construction and development of tracks (5.9 km)
 - (iii) Construction of station buildings (6 stations)
- III. Civil work
Development of the area in front of Dukuh Atas Station (to be covered by Indonesia's own funds)
- IV. Development of electric and mechanical systems
 - (i) Electric power facilities (including SCADA)
 - (ii) Signal and communication systems (including an Operation Control Center (OCC))
 - (iii) Station facilities (including an automatic fare collection system)
 - (iv) Facilities inside the train depot, factory, etc.
- V. Procurement of train cars (16 trains and 96 cars)

[Phase 2A]

- I. Civil work (underground part)
 - (i) Excavation (approx. 6.0 km)
 - (ii) Construction and development of tracks (approx. 6.0 km)
 - (iii) Construction of station buildings (7 stations)
- II. Development of electric and mechanical systems
 - (i) Electric power facilities (including SCADA)
 - (ii) Signal and communication systems (including an OCC)
 - (iii) Station facilities (including an automatic fare collection system)
- III. Procurement of train cars (14 trains and 84 cars)

[Phase 2B (just for reference)]

* As mentioned in (2), construction for Phase 2B may be included in this Project if requirements are met.

- I. Civil work (elevated part and train depot)
 - (i) Construction of elevated part (1.0 km)
 - (ii) Construction and development of tracks (1.0 km)
 - (iii) Construction of a station building (Ancol Barat) (1 station)
 - (iv) Construction of a train depot (1 depot)
- II. Civil work (underground part)
 - (i) Excavation (approx. 5.0 km)
 - (ii) Construction and development of tracks (approx. 5.0 km)
 - (iii) Construction of station buildings (2 stations)
- III. Electric and mechanical systems
 - (i) Electric power facilities (including SCADA)
 - (ii) Signal and communication systems (including an OCC)
 - (iii) Station facilities (including an automatic fare collection system)
 - (iv) Tracks (approx. 5.0 km)
- IV. Construction of a train depot, etc. (near Ancol Barat Station) (1 depot)

3) Beneficiaries of this Project (Target Group)

Users of Jakarta Mass Rapid Transit and local residents will benefit from the mitigation of traffic congestion brought about by this Project. (For reference, the population of the Special Capital Region of Jakarta is 10,560,000 people (as of 2020).)

(2) Estimated Program Cost

Estimated program cost: 455,434 million yen (Phase 1: 164,903 million yen, Phase 2: 290,530 million yen)

Total loan amount: 380,634 million yen (Phase 1: 139,316 million yen, Phase 2: 241,318 million yen)

Loan amount on this occasion: 87,918 million yen

The above costs and loan amounts do not include those for Phase 2B.

(3) Schedule (Cooperation Period)

Scheduled period of cooperation: 273 months in total from November 2006 to July 2029. An MRT from Phase 1 was put into service in March 2019. The Project will be completed when all facilities have been put into service (July 2029).

(4) Program Implementation Structure

- 1) Borrower: The Government of the Republic of Indonesia
- 2) Guarantor: None

- 3) Executing Agencies: Directorate General of Railways, Ministry of Transportation, and DKI Jakarta Provincial Government
- 4) Operation and Maintenance Agency: PT Mass Rapid Transit Jakarta
- (5) Cooperation and Sharing of Roles with Other Donors

- 1) Japan's Assistance Activities

In the railway sector in Indonesia, JICA has provided a total of 47 Japanese ODA loans with a total loan amount of 427.34 billion yen since the Railway Rehabilitation Project (Approved in FY1970). JICA's recent assistance projects in the railway sector are listed below:

- Railway Electrification and Double-Double Tracking of Java Main Line Project (I) (Approved in FY2001)
- Construction of Jakarta Mass Rapid Transit Project (E/S) (Approved in FY2006)
- Railway Double Tracking on Java South Line Project (III) (Approved in FY2007)
- Construction of Jakarta Mass Rapid Transit Project (I) (Approved in FY2008)
- Jabodetabek Railway Capacity Enhancement (I) (Approved in FY2013)
- Railway Double Tracking on Java South Line Project (IV) (Approved in FY2013)
- Jakarta Mass Rapid Transit System (North-South Line) Project (E/S) (Phase 1) (Approved in FY2015)
- Construction of Jakarta Mass Rapid Transit Project (II) (Approved in FY2015)
- Construction of Jakarta Mass Rapid Transit Project (Phase 2) (I) (Approved in FY2018)

JICA has been engaged in the development of railway networks in the Jakarta metropolitan area since the Jakarta Metropolitan Transportation System was Approved in FY1979. Specifically, JICA has been supporting the enhancement of the transport capacity in the metropolitan area by promoting electrification, developing signal systems, and providing cars in various projects such as the Improvement and Construction of JABOTABEK Area Railway (1) to (8) and the Railway Electrification and Double-Double Tracking of Java Main Line Project (I).

In addition to these Japanese ODA loan projects, JICA also carried out (1) the Study on Integrated Transportation Master Plan for JABOTABEK (Phase I) (2000 to 2001) and Phase II (2001 to 2004), which are related to this Project, and supported the development of a transportation master plan

in the Jakarta metropolitan area, as well as supported the revision of the master plan by carrying out (2) the Project for JABODETABEK Urban Transportation Policy Integration (JUTPI) (2009 to 2012). In addition, in the Project for the Study on JABODETABEK Public Transportation Policy Implementation Strategy (2011 to 2012), JICA supported the development of strategies for implementing public transportation plans until 2014 in the Jakarta metropolitan area within the framework of the master plan. JUTPI2 was then carried out from 2014 to 2020, with the aim of strengthening the administrative functions of the central government and local governments for improving the urban transportation system. JICA is considering supporting the development of a plan to develop areas along railways in JABODETABEK Urban Transportation Policy Integration Project Phase 3 to be carried out in the future.

In the period between 2008 and the end of FY2021, JICA has sent Jakarta MRT Project Advisors to DKI, an organization that supervises MRTJ, with the aim of planning and carrying out this Project smoothly.

2) Other Donors' Assistance Activities

Currently, there are no other donors that support the construction of an MRT, and no overlapping projects. In the urban transportation sector, the World Bank developed general guidelines for Bandung (2017–2020), supported the development of an urban transportation master plan (2019), proposed improvements to the existing railway system (2019), and proposed MRT/LRT, etc. (2019). The French Development Agency (AFD) has been supporting the development of an urban transportation master plan for Medan (since 2021), and KfW (Kreditanstalt für Wiederaufbau), a German development bank, proposed improvements to the existing railway system in Surabaya (2015), and has been supporting the development of an urban transportation master plan (since 2021) (Source: Collection of information and investigations on the urban public transportation systems in major provincial cities).

(6) Environmental and Social Consideration

1) Environmental and Social Consideration

(i) Category: A

(ii) Reason for Categorization: This Project falls under the railway sector under the Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations, established in April 2002 (hereinafter referred to as the "JBIC Guidelines"), and is considered to have characteristics that are likely to have adverse impacts according to the guidelines.

(iii) Environmental Permit:

The Local Environmental Monitoring Agency of DKI already approved the revised Environmental Impact Assessment (EIA) Report for Phase 1 of this Project in November 2010. The Agency also approved the EIA Report for Phase 2 in January 2011. However, the route and the land to be used for a train depot were changed, so new EIA reports for Phase 2A and 2B were prepared. The report for Phase 2A was approved in February 2021.

(iv) Anti-Pollution Measures:

To mitigate the impacts on air quality during construction work, measures will be taken, such as sprinkling water periodically, covering materials when they are transported, and installing dust control fences during construction. To mitigate the impacts of noise, measures will be taken, such as installing sound barrier walls in civil work sites near resident areas and doing periodic maintenance on heavy machines. Waste produced during construction work will be disposed of according to the local legal system. Surplus soil will be reused or disposed of after consultation among the executing agencies, the contractors, and DKI. As measures against noise and vibrations during operation, noise barriers, long rails, vibration isolation mats, etc., will be installed to meet Indonesian environmental standards.

(v) Natural Environment

The Project site is not located in or around any sensitive areas such as national parks, and it is likely to have minimal adverse impact on the natural environment.

(vi) Social Environment

This Project requires the acquisition of a total of approx. 48.57 ha of land (Phase 1: 13.31 ha, Phase 2A: 5.7 ha, Phase 2B (just for reference): 29.56 ha), and the involuntary resettlement of 128 households (Phase 1: 128 households, Phase 2A: 0 households, Phase 2B (just for reference): 0 households). Land acquisition and involuntary resettlement have been implemented in accordance with the domestic laws and regulations of Indonesia and the Land Acquisition and Resettlement Action Plan (LARAP) developed as per the JBIC Guidelines. Consultations with residents have already been held for all sections, and the consent of local residents for implementing this Project has been obtained during the consultation sessions and individual follow-ups. Mechanisms for holding

consultations with local residents and handling complaints during the Project have been put in place.

(vii) Other/Monitoring

In this Project, MRTJ will monitor the air quality, noise, vibrations, waste, groundwater quality, and so on during the construction and operation phases. DKI will monitor the progress of land acquisition and involuntary resettlement involved in this Project.

(7) Cross-cutting Issues

1) Project Related to Measures Against Climate Change

This Project aims to reduce air pollution and mitigate climate change through the promotion of public transportation, and contributes to reducing greenhouse gas emissions. Implementing this Project (Phase 2A) is expected to reduce GHG emissions by up to 30,253 t-CO₂/year. (The amount of reduction will reach the maximum in 2037.)

2) Measures Against and Consideration for Poverty

To set the fares, MRTJ considered and reflected the fares of the existing public transportation systems, such as buses, as well as the use of MRT by the poor.

3) Countermeasures Against AIDS/HIV and Other Infectious Diseases

It was confirmed that the executing agencies would take countermeasures against HIV-AIDS to protect workers engaged in the construction work in cooperation with the contractors. The contractors will also take countermeasures against COVID-19 continuously according to the executing agencies' instructions, the contracts, etc.

4) Participatory Development

None in particular.

5) Consideration for People with Disabilities, etc.

Station facilities with a barrier-free design that considers those with disabilities and the elderly were constructed in Phase 1, and will also be constructed in Phase 2.

(8) Gender Category: ■ GI (S) (Gender Integrated Project)

<Reason for Categorization> Women-only cars were introduced in this Project (the last car of each six-car train is exclusively set for women for two hours each during morning and evening rush hours). In addition, a nursing room will be installed in each station. This Project is expected to install convenient facilities and equipment regardless of gender and promote the involvement of women in its implementation. Moreover, MRTJ specifies gender policies in its internal

regulations, which provide that men and women should be given equal opportunities to obtain jobs, higher positions, rewards, etc.

(9) Other Important Issues

None in particular.

4. Targeted Outcomes

(1) Quantitative Effects (Phase 1 and Phase 2A)

1) Outcomes (Operation and Effect Indicators)

Indicator	Baseline (*1)	Target (2031 [2 years after project completion])
Volume of passengers (persons per km per day)	N/A	4,407,637
Number of running trains (trains per day)	N/A	259
Running distance (km per day)	N/A	31,646
Operating rate (%)	N/A	86.9

*1: N/A means that no actual value is available because not all lines are in service at this point of time.

2) Impacts

Indicator	Baseline	Target (2030) (*1)
Greenhouse gas (CO ₂) emission reduction (t-CO ₂ /year)	N/A	104,000

*1: Target of Jakarta Province set based on the DKI Jakarta Governor Regulation (Regulation No. 131/2012, about local action plan—GHG Emission Reduction). The target for 2030 was set because it is the target year in the governor regulation.

Indicator	Baseline (automobiles) (*2)	Target (2031) (MRT) [2 years after project completion] (*3)
One-way travel time for Phase 1 and Phase 2A (min.)	90.7	43

*2: The baseline was calculated assuming a speed of 16.2 km/h and a road distance of 24.5 km based on provisional calculations by MRTJ.

*3: The target was calculated based on provisional calculations by MRTJ.

(2) Qualitative Effects

The following effects can be expected: creation of employment opportunities associated with railway operation, development of stations and surrounding areas, etc.; promotion of railway use by women and improved convenience; improvement in both living and investment environments in the Jakarta metropolitan area associated with greater convenience due to the alleviation of traffic conditions and punctual movement; economic development of the metropolitan area; and reduction of air pollution and greenhouse gas emissions, which results in the mitigation of climate change, through the promotion of public transportation.

(3) Internal Rate of Return

Based on the following assumptions, the economic internal rate of return (EIRR) and financial internal rate of return (FIRR) for Phase 1 and Phase 2A are 16.97% and 1.54%, respectively.

[EIRR]

Costs: Project costs (tax excluded), operation and maintenance costs (tax excluded)

Benefits: Reduction of travel time, reduction of travel cost, reduction of greenhouse gas (GHG) emissions, etc.

Project Life: 40 years

[FIRR]

Costs: Project costs, operation and maintenance costs, equipment renewal expenses

Benefits: Fare and non-fare revenue (including advertisement revenue)

Project Life: 40 years

5. External Factors and Risk Control

- (1) Prerequisites: None in particular.
- (2) External Factors: None in particular.

6. Lessons Learned from Past Programs

The following lessons were learned from the ex-post evaluation of the Metro Manila Strategic Mass Rail Transit Development Project, a Japanese ODA loan project for the Republic of Philippines. Firstly, an urban railway project generally requires a huge initial investment, which makes it difficult to run the project from fare revenue alone, and it is necessary to obtain capital investments and subsidies from the government. Secondly, to secure the financial soundness of

the project's executing agency, it is necessary to prepare a detailed financial plan and an action plan for government assistance at the planning stage of the project.

This Project also requires a huge initial investment, so securing the financial soundness of MRTJ is an issue. To keep the MRT in operation, DKI is providing subsidies to MRTJ every year, and will continue to do so in the future. It is important for DKI to set appropriate fares and for MRTJ to increase revenue from non-railway businesses, such as development of stations and surrounding areas. These plans have already been supported through consulting services under Japanese ODA loans.

According to the evaluation results (2014) of the Railway Double Tracking of CIKAMPEK-CIREBON Project (II) for the Republic of Indonesia, etc., Japan and Indonesia made it a rule to confirm the progress of the project and obstructions together if there is a delay caused by some external factor, and to prevent further delays in order to eliminate the risk of project delay as much as possible. Consequently, the lesson learned from this previous project is that it is necessary to be prepared for the risk of delay due to external factors in similar projects. In this Project, an agreement was reached with MRTJ on measures against the risk of delay due to external factors, such as COVID-19.

7. Evaluation Results

This Project is consistent with the development issues and policies of Indonesia, as well as Japan's and JICA's cooperation policies and analyses. Mitigating congestion through the development of a mass rapid transit system in the Jakarta metropolitan area, which has been facing huge economic losses due to traffic congestion, contributes to improving the investment environments in the country, and will likely contribute to three of the SDGs: Goals 9, 11, and 13. All these aspects suggest that it is highly relevant to continue to support the implementation of the Project.

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in section 4.

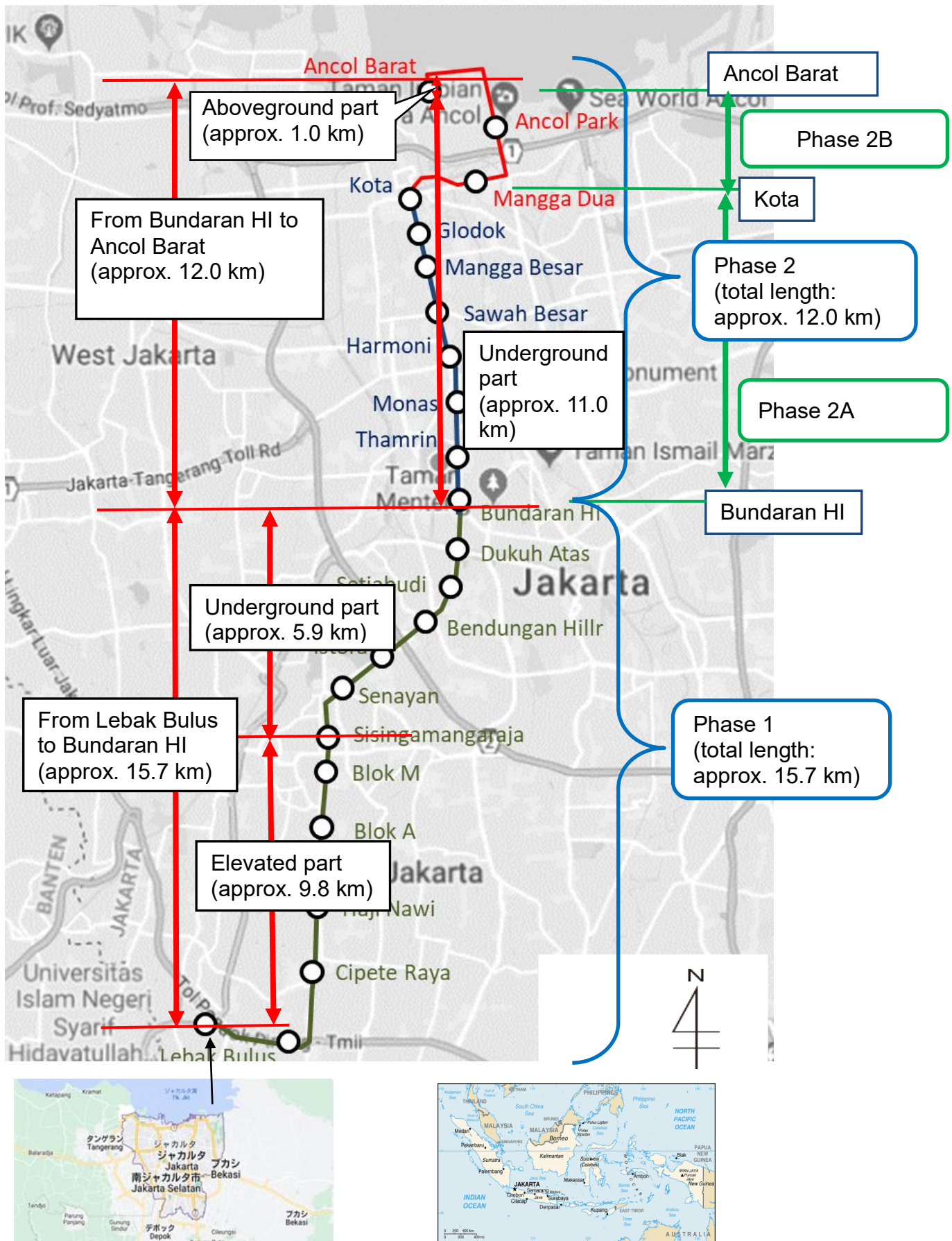
(2) Timing

Ex-post evaluation: 2 years after project completion

End

Attachment: Map - Construction of Jakarta Mass Rapid Transit Project

Map: Construction of Jakarta Mass Rapid Transit Project



(Source: MRTJ) * The section for Phase 2B in the map is just for reference.