Ex-Ante Evaluation (for Japanese ODA Loan)

Southeast Asia Division 4, Southeast Asia and Pacific Department,

Japan International Cooperation Agency (JICA)

1. Basic Information

Country: The Republic of the Union of Myanmar

Project: Yangon Sewerage System Development Project

Loan Agreement: January 21, 2020

2. Background and Necessity of the Project

(1) Current State and Issues of the Sewerage System Development in Myanmar and the Positioning of the Project

Yangon City, the largest commercial city of the Republic of the Union of Myanmar ("Myanmar"), has about 5.21 million people, which is about 10% of the 51.41 million population of Myanmar (2014). In Yangon City, the amount of sewage (human waste, domestic wastewater, industrial wastewater) is about 500,000 m^3/day (2011). For human waste treatment, the Central Business District ("CBD") of Yangon City with a population of about 0.25 million (2014) where sewage amounting to about 43,000 m^3/day is generated (2014) uses human waste collection pipelines developed during the British colonial period at the end of the 19th century, and the government built a wastewater treatment plant (treatment capacity: about 15,000 m^3/day) on its own budget connected to the existing pipelines in 2005. However, the human waste collection area has not been expanded, and the wastewater inflow to the wastewater treatment plant is estimated to be as low as about 630 m^3/day due to failures of squeeze pumps for human waste collection pipelines, water leakage from pipes, and other reasons. The water level, water quality, and water temperature have not been measured in the wastewater treatment plant. During the short 4-hour operation time per day, a large amount of sewage flows into the treatment facility, and therefore, the water quality fluctuates significantly. In other areas than the CBD, most of the human waste is treated at individual wastewater treatment facilities using septic tanks, etc., where tank sludge removal and cleaning is not properly managed. Other human waste is discharged into rainwater drainage channels without being treated.

Domestic wastewater and industrial wastewater, including those from the CBD, are discharged as untreated into rainwater drainage channels and flow into rivers and lakes in Yangon, causing deterioration in water quality. The annual average biochemical oxygen demand (BOD) of the Yangon River is 23 mg/l, which is higher than the Saigon River in Vietnam (10 mg/l) and the Chao Phraya River in Thailand (5 mg/l). In addition,

in the rainy season, water mixed with sewage from rainwater drainage channels overflows into Yangon, causing inundation damage and deterioration of hygienic environment.

Under such circumstances, with the progress of water supply in the CBD under the "Greater Yangon Water Supply Improvement Project (Phase 2) " (Japanese ODA loan signed in 2017), the sewage volume in the district is expected to reach about 112,000 m^3/day in the future. Therefore, the rehabilitation and expansion of the wastewater treatment plant is a pressing issue.

The new administration established in March 2016 positions the "Upgrading of Public Services and Projects" as one of the important polices in the "New Economic Policy" announced in July 2016. JICA helped Myanmar to formulate the Sewerage and Drainage System Master Plan in the Preparatory Survey on "The Project for the Improvement of Water Supply, Sewerage and Drainage System in Yangon City in the Republic of the Union of Myanmar" (2014) (hereinafter referred to as the "Master Plan"), and the Yangon City Development Committee (hereinafter referred to as the "YCDC") has been working on the development of water supply facilities based on the "Master Plan". The development of the sewerage system in the CBD, where a rapid and significant increase in sewage generation is expected, is positioned as a top priority project. In this respect, the "Yangon Sewerage System Development Project" (hereinafter referred to as the "Project") is consistent with the policies of the Myanmar government and the YCDC.

(2) Japan and JICA's Cooperation Policy, etc. in the Sewerage Sector and the Positioning of the Project

In the “Japan’s Projected Economic Cooperation to the Republic of the Union of Myanmar” established in April 2012, "assistance for developing infrastructure and related systems necessary for sustainable economic growth" is specified as a priority field, which includes assistance for the sewerage sector of Yangon City. Also, "(vi) urban development/urban transport" is one of the pillars of the Japan-Myanmar Cooperation Program agreed upon between the Japanese and Myanmar Governments in November 2016. Furthermore, the Project is consistent with the cooperation policy agreed upon between Myanmar State Counsellor Aung San Suu Kyi and Japan's Prime Minister Abe in the meeting held in November 2017, focusing on accelerating specific cooperation on "Yangon Urban Development."

(3) Other Donors' Activities

The World Bank has been implementing the Southeast Asia Disaster Risk Management Project including the improvement of rainwater drainage channels in the

CBD of Yangon City since October 2017. In addition, the UK's Department for International Development (DFID) conducted surveys for the purpose of enhancement of operation, maintenance and management capabilities of existing sewerage facilities in Yangon City from January to April 2018.

3. Project Description

(1) Project Objective

The objective of the Project is to improve wastewater treatment service in Yangon city by improving and expanding wastewater treatment plant (WWTP) and renewing and installing sewer pipe network in Yangon city, thereby contributing to improvements of the living environment of residents in Yangon city.

(2) Project Site/Target Area

C1 treatment district including the CBD of Yangon City, and part of W1 treatment district

(3) Project Components

a) Construction of Main Sewer

Renewal and new installation of sewerage pipes (extension: 52.6 km)

b) Construction of Wastewater Treatment Plant

Rehabilitation and expansion of the wastewater treatment plant (treatment capacity: 112,000 m^3/day)

c) BDS Sewer Connection

Branching of off-street drainage (176 places) and renewal of off-street drainage pipes (6 places)

d) Consulting services

(support for detailed design, bidding assistance, construction supervision, technology transfer, and environmental and social considerations)

(4) Estimated Project Cost

53,399 million yen (including ODA loan of 45,900 million yen)

(5) Project Implementation Schedule/Cooperation Period

From January 2020 to May 2029 (113 months in total) provided that the project is considered to be completed when the facilities are placed in service in April 2028.

(6) Project Implementation Structure

1) Borrower: Government of Republic of the Union of Myanmar

2) Guarantor: None

3) Executing Agency/Implementation Structure: Yangon City Development

Committee (YCDC)

4) Operation/Maintenance Management Agency: The Engineering Department (Water & Sanitation) of the YCDC will be responsible for administering, maintaining, and securing the budget for sewerage pipes and wastewater treatment plant.

(7) Collaboration and Division of Roles with Other Projects and Donors

1) Japan's Assistance Activities

In the water supply project, JICA is supporting water supply to the CBD and other places in Yangon City under the "Greater Yangon Water Supply Improvement Project (Phase 2)" (loan aid) (2017 to 2026). In addition, through the project for "Improvement of Water Supply Management of Yangon City Development Committee" (technical cooperation; from 2015 to 2020), JICA also provides support to enhance operation, maintenance and management capabilities of the Water Supply Division in charge of operation, maintenance, and management of facilities developed by the project.

In the project for "Capacity Development in Basic Water Environment Management and EIA System in Myanmar" (technical cooperation; from 2013 to 2018), JICA supported the development of capacity for formulating basic measures against water pollution based on appropriate understanding and interpretation of data of the current state of water pollution for the Environmental Conservation Department of the Ministry of Natural Resources and Environmental Conservation (MONREC), YCDC, and other organizations.

2) Other Donors' Assistance Activities

The World Bank has been implementing the "Southeast Asia Disaster Risk Management Project" including the improvement of rainwater drainage channels in the CBD of Yangon City since October 2017. In addition, the UK's Department for International Development (DFID) conducted surveys for the purpose of enhancing operation, maintenance and management capabilities of existing sewerage facilities in Yangon City from January to April 2018.

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

1) Environmental and social considerations

i. Category: B

ii. Reason for Categorization: The project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA guidelines for environmental and social considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant.

iii. Environmental Permit: The Environmental Impact Assessment (EIA) Report is submitted to the Environmental Conservation Department (ECD) of the Ministry of Natural Resources and Environmental Conservation (MONREC) in April 2020 and the approval will be received by August 2020.

iv. Anti-Pollution Measures: During construction work, negative impacts due to the occurrence of water pollution, noise, vibration, etc. are expected, however, such impacts are expected to be minimized by implementing mitigation measures, such as the use of low-noise construction equipment and proper treatment of wastewater and leachate. After the start of service, sludge generated at the treatment plant is machine-dried and appropriately transported to existing waste disposal sites operated by Yangon City. Given the volume and the number of times of transportation, the environmental impact by transportation is limited and there are no particular negative impact is expected. The wastewater from wastewater treatment facilities will be treated to meet Myanmar's domestic wastewater standards and released into rivers, therefore, the impact on the environment is expected to be minimal.

v. Natural Environment: The project site including its surroundings does not include any natural preserved areas and the Project is expected to have no negative impact on the natural environment.

vi. Social Environment: The Project will cause resettlement of staff and their families residing in existing wastewater treatment facilities, however, since housing is secured so that they can maintain their current life and livelihood, the impact is expected to be minimal.

vii. Other/Monitoring: In the Project, the executing agency and contractors will monitor air quality, noise and waste during construction as well as the impact of sludge treatment after the start of service.

2) Cross-Cutting Issues: The Project is expected to contribute to climate change mitigation (adaptation) measures by rehabilitating and improving wastewater treatment plant at rainfall which will mitigate the deterioration of the public health environment during heavy rains and floods anticipated as a result of climate changes.

3) Gender Classification: [Not applicable] GI (Gender Informed)

<Description of activities and reason for classification> It has been agreed in the appraisal that public relations/enlightenment activities should be carried out by

considering activity locations and timing from a gender perspective to encourage participation of female residents, however, specific activities will be examined in the future and details are yet to be determined.

(9) Other Important Issues: None in particular

4. Targeted Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

Indicator	Baseline (Actual value in 2017)	Target (2030) (2 years after project completion)
Target Area Population Treated (People) ※1	106,330	256,107
Amount of Wastewater Treated (m3/day)※2	630	86,823
Wastewater Treatment Capacity (m3/day)※3	15,000	112,000
BOD concentration(mg/l)※4	98	20
Percentage of Population Served in Target Area ※5 (%)	42	96

※1 Total of the population of households connecting to off-street drainage pipes leading to the wastewater treatment plant and the population of households connecting to newly installed sewerage pipes

※2 Annual maximum value of influent quantity per day in the wastewater treatment plant (when there is no influence of rainfall)

※3 Wastewater treatment capacity in the wastewater treatment plant (maximum per day)

※4 Measured value of biochemical oxygen demand of discharged water from the wastewater treatment plant (maximum value)

※5 The rate obtained by dividing the sewage treatment population in the project site by the population of households in the project site.

2) Impact

Reduction of environmental pollutants in channels in Yangon City

(2) Qualitative Effects

Improvement in the living environment for Yangon City residents, sustainable economic growth

(3) Internal Rate of Return

Based on the following assumptions, the Economic Internal Rate of Return (EIRR) of the Project is calculated to be 11.84%. The Financial Internal Rate of Return (FIRR) is not calculated because wastewater treatment service charges are not currently collected from users and future charge levels have not been determined yet.

[EIRR]

Cost: Project cost, and operation, maintenance and management costs (all excluding tax)

Benefits: Reduction of environmental pollutants, reduction of medical expenses for water-borne infectious diseases, reduction of maintenance costs for existing human waste collection pipelines, and increase in tourism revenue due to improved public health

Project life: 40 years

5. Prerequisite and External Factors

(1) Prerequisite: None in particular

(2) External factors: None in particular

6. Lessons Learned from Past Projects and Application of Lessons Learned to the Project

(1) Lessons Learned from Similar Projects

Based on the ex-post evaluation results of the technical cooperation for development planning "Study on Integrated Plan of Environmental Improvement in the Catchment Area of Lake Billings in Sao Bernardo do Campo" (2007) for the Federal Republic of Brazil, the lesson has been learned that it is important to establish an appropriate charge system for manifesting development effects and ensuring their sustainability after the project completion and that it is effective to promote understanding of cost burden through environmental and sanitation awareness activities for residents from an early stage of the project. It is also necessary to strengthen the operation, maintenance, and management systems from technical and personnel perspectives using consulting services and staff education and training through outsourcing to private companies.

(2) Application of Lessons to the Project

The YCDC is planning and considering the collection of wastewater treatment service charges in the future for the Project. While bearing in mind that legislation

and regulatory frameworks are required in addition to the lessons above, JICA will support awareness activities for residents to promote understanding of sewerage charges and sewerage connections through consulting services. Although the YCDC has experience in the operation, maintenance, and management of existing sewerage facilities, JICA will assist the development of a long-term operation, maintenance, and management plan and a sewerage development plan through consulting services, and contractors will provide operation guidance for the wastewater treatment plant.

7. Evaluation Results

The Project conforms to the development challenges and policies of Myanmar as well as the assistance policies and analysis of Japan and JICA, and contributes to the improvement of the living environment through the spread and improvement of sewerage facilities. Also, as it is deemed to contribute to Sustainable Development Goals 6—ensure availability and sustainable management of water and sanitation for all—JICA's assistance for the Project is highly necessary.

8. Plan for Future Evaluation

(1) Indicators to be Used

As provided in 4. (1) to (3).

(2) Next Evaluation Schedule

Ex-post evaluation: Two years after the project completion