Appendix 4. Minutes of Discussions (M/D)

4 - 1 . First field survey

MINUTES OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE PROJECT FOR URGENT IMPROVEMENT OF
WATER SUPPLY SYSTEM FOR MANDALAY CITY
IN THE REPUBLIC OF THE UNION OF MYANMAR

Considering the urgent needs of expanding water supply system and securing safe drinking water in Mandalay City, the Government of Japan decided to conduct a Preparatory Survey on the Project for Urgent Expansion of Water Supply System in Mandalay City (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Myanmar the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Shigeyuki Matsumoto, Director, Water Resources Management Division I, Water Resources and Disaster Management Group, Global Environment Department, JICA, and the survey is scheduled to stay in the country from April 20 to July 16, 2014.

The Team held discussions with the officials of MCDC and conducted a field survey at the survey area.

In the course of discussions and field survey, both parties confirmed the main items described in the attached sheets.

Mandalay, 2 May, 2014

Shigeyuki Matsumoto
Leader
Preparatory Survey Team
Japan International Cooperation
Agency (JICA)

U Tun Kyi
Committee Member
Mandalay City Development Committee
Mandalay Region Government
The Republic of the Union of Myanmar

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ATTACHMENT

1. Objective of the Project

1) To increase water supply coverage in Pyi Gyi Tagon Township by construction of water supply system

2) To secure safe drinking water in Mandalay City by installing disinfection facilities

2. Project site

The Project site is Mandalay city as shown in **Annex-1**.

3. Implementing Agency

The Implementing Agency is Mandalay City Development Committee (hereinafter referred to as "MCDC"). The organization charts of MCDC and the Water and Sanitation Department of MCDC are shown in **Annex-2**

4. Items requested by MCDC

After discussions between MCDC and the Team (hereinafter referred to as "the both sides"), the items described below were requested by MCDC.

The both sides confirmed that the appropriateness of the request would be examined in accordance with the further studies and analysis in Japan, and the final components of the Project would be decided by the Japanese side.

(i) Civil / Mechanical works

a) Construction of water supply system in Pyi Gyi Tagon Township

Tube wells, transmission pipe line, a ground concrete reservoir and an elevated tank if necessary, disinfection equipment, booster pump sets and distribution pipe network

b) Installation of disinfection equipment for the existing water supply systems

Installation of disinfection facilities at 9 locations, excluding No.4 and No.8 Treatment Plant, with disinfection houses if necessary

(ii) Consulting Services

Detailed design, Assistance for tendering, Construction supervision, Technical assistance (soft component)

5. Japan's Grant Aid Scheme

5-1) MCDC understood the Japan's Grant Aid Scheme explained by the Team, as described in **Annex-3**.

5-2) The Myanmar side will take the necessary measures, as described in **Attachment 2 of Annex-3**, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Schedule of the Survey

6-1) The consultant team will conduct studies in Myanmar until early July, 2014.

6-2) JICA will prepare the draft preparatory survey report in English and dispatch a mission in order to explain its contents to the Myanmar side around the end of October, 2014.

6-3) In case that the contents of the report are accepted in principle by the Myanmar side, JICA will finalize the report and send it to the Myanmar side around January 2015. MCDC understood that the execution of the Preparatory Survey (hereinafter referred to as "the Survey") would not necessarily imply the Japanese Government's commitment of the project implementation.

7. Other relevant issues

7-1) Submission of Official Request

Both sides confirmed that MCDC should submit the official application form for grant aid from Japan through the diplomatic channel by July, 2014.

7-2) The master plan in 2003 and the Project

Both sides confirmed that JICA had supported the implementation of "The Study on Water Supply Systems in Mandalay City and in the Central Dry Zone" from March 2001 to July 2003, and the Project was based on the basic concept proposed in the master plan and its follow-up in 2012, which had recommended the urgent project of groundwater development for the Phase I and the following surface water system development for the Phase II. However, the planning basis, such as per capita water consumption, will be revised considering the present situation, latest data, and so forth.

7-3) Target year

The target year of the Project is basically set up as the year 2020, which is shortly after the construction, because Japan's grant aid aims to implement the project components to meet the urgent and immediate needs in the Project area. The target year for design of the distribution pipe network in Pyi Gyi Tagon Township is set at 2025 in consideration of difficulty of the stepwise expansion of pipe capacity.

7-4) Scope of the Project

MCDC explained that MCDC prioritized the expansion of water supply service in Pyi Gyi Tagon Township among the two (2) components, and requested the Team to include the target area as large as possible. Both sides agreed that the scope of the Project will be decided in consideration of the priority of following two (2) components and the appropriate size of the total Project cost as Grant Aid Scheme and that the scope of the Project would be finally adjusted by adding/ reducing area of replacement of distribution network in Pyi Gyi Tagon Township and/or the number of disinfection facilities, if all of following two (2) components should be included in the Project based on the

result of the Survey.

- Construction of water supply system in Pyi Gyi Tagon Township including tube wells, transmission pipeline, a reservoir or an elevated tank, disinfection equipment, booster pump sets and distribution pipe network
- Installation of disinfection facilities for the existing water supply systems in Mandalay City including disinfection equipment, and houses, if necessary.

7-5) Service pipe and water meter

MCDC explained that the owner of service pipes and water meters are MCDC and requested the Team that provision and installment of service pipes and water meters should be included in the Project scope. The team took note of it and agreed to discuss further during the Survey.

7-6) Service coverage and water source of the water supply system in Pyi Gyi Tagon Township

The current water supply ratio is estimated as 5.7% in Pyi Gyi Tagon Township. The project will be conducted aiming at increasing the water ratio up to around 30%, which will be reviewed and determined in the course of the preparatory survey. The team also explained that groundwater along the Ayewarddy River is observed as appropriate for the water source of the Project from the view point of groundwater potential, cost efficiency, and easiness of O&M. The team also explained that water source and its location and design shall be determined based on the natural condition survey such as geophysical survey, test drilling, pumping test, groundwater level monitoring, water quality test, etc. MCDC agreed with it.

7-7) Installation of disinfection facilities for the existing water supply systems in Mandalay City

Disinfection facilities will be considered in the Survey at 9 locations of the existing reservoirs and/or pump stations. Chemicals and facilities of disinfection facilities of the Project are designed to be same as the one used by the project "Improvement of Mandalay's Capacity on Water Treatment Plant Operation," which is under implementation by Kitakyusyu City under the Japanese grassroots technical cooperation scheme.

7-8) Public Relations

The team explained that the residents who are currently using water for free for domestic use from the public taps, private wells, ponds etc. may tend to be reluctant to shift to charged water. The team pointed out that it is important to take necessary measures to promote house connections by appropriate setting of water tariff considering the low income residents, and public awareness building on the safe drinking water for health.

7-9) Measures to be taken by the Myanmar side

MCDC agreed to facilitate the Survey by following activities.

- Provision of necessary data related to the Survey
- Assignment of the related government officers according to the Survey schedule
- Coordination of relevant agencies
- Accompany and coordination for the Team member for site visit
- Other necessary facilitation for the Team including office space

MCDC also agreed with "Table 7.1 Major Undertakings to be taken by Each Government" and to secure the necessary budget including the cost for B/A, A/P for the fiscal year 2015. More information about the necessary amount of budget will be informed by September 2014, after the Survey progresses.

7-10) On-the-Job Training

Following OJT programs during the commissioning are to be considered for the Project scope. Detail components will be determined through the preparatory survey, avoiding a duplication of the activities of the on-going grassroots technical cooperation project.

- Operation and maintenance methods for the disinfection facilities
- Operation and maintenance of water supply facilities to be covered in the Pyi Gyi Tagon area

7-11) Technical assistance ("Soft Component" of the Project)

Following Soft Component programs are to be considered for the Project scope. Detail components will be determined through the preparatory survey, avoiding a duplication of the activities of the on-going grant assistance for grass-roots human security project.

- Management and application of DMA and remote monitoring system
- Installation works of service pipes and customer meters
- Information, education and communication (IEC) activities for customers

7-12) Tax

The Team explained that the standard stipulation of the Exchange of Notes (E/N) for Japanese grant aid required the taxes exemption including Value Added Tax (VAT), custom duty, and any other fiscal levies in Myanmar, which are to be arisen from the Project activities, should be exempted. MCDC agreed that custom duties for imported equipment and material could be exempted, and MCDC would assist to get the tax exemption from the department concerned. MCDC explained about the existing laws and regulations adopted by the Union Government for the tax exemption. However, both sides agreed to further investigate the arrangement for VAT based on the relevant laws, regulations, and practices. .

7-13) Coordination with other projects

The both sides confirmed that the Project should be coordinated with any other project supported by JICA, other development partners, NGOs, and Myanmar official organizations and departments, rather than making duplication.

7-14) Project Implementation Committee

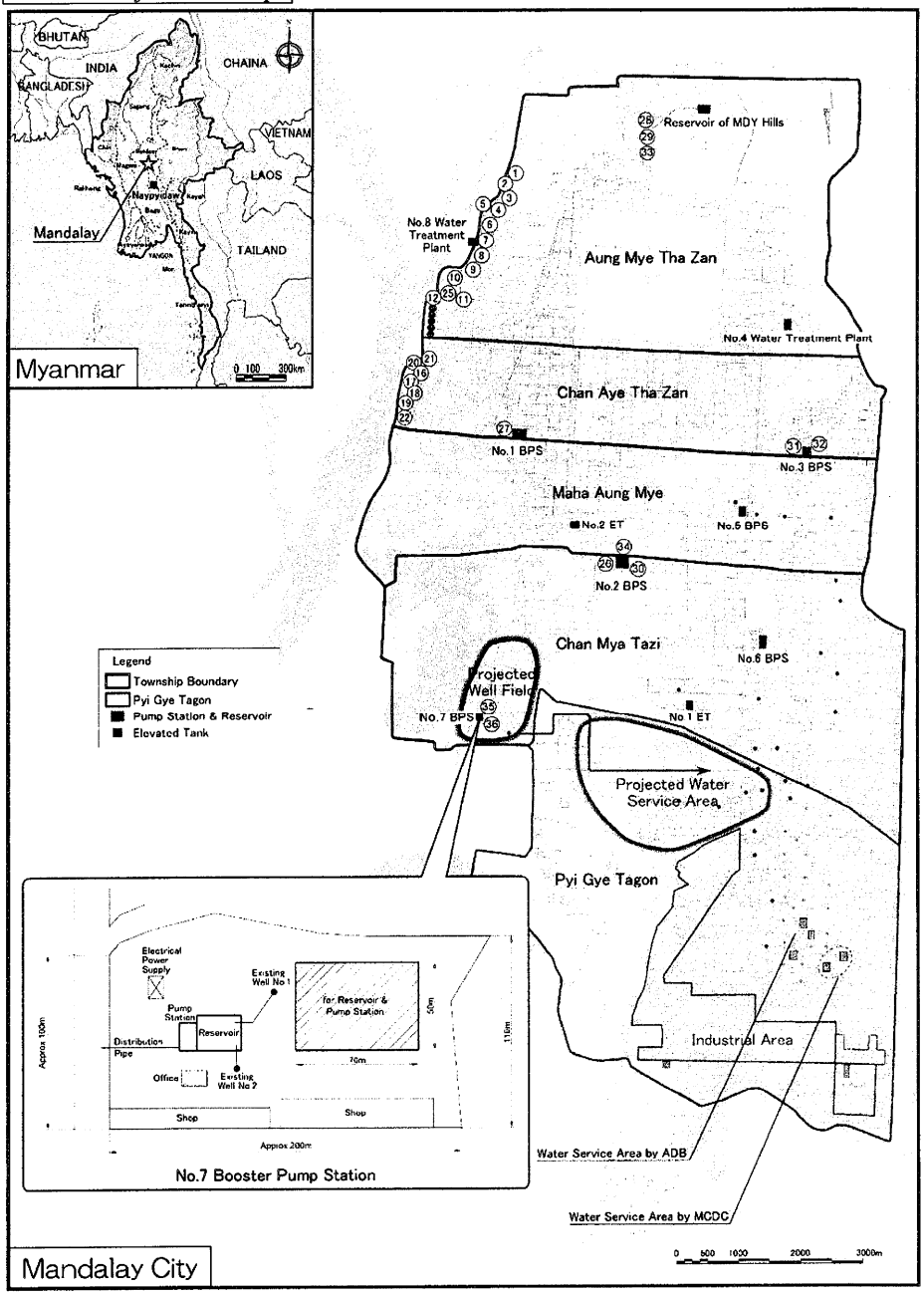
MCDC proposed to establish the Project Implementation Committee to enhance smooth implementation of the Project during the implementation stage of the Project.

7-15) Initial Environmental Examination (IEE)

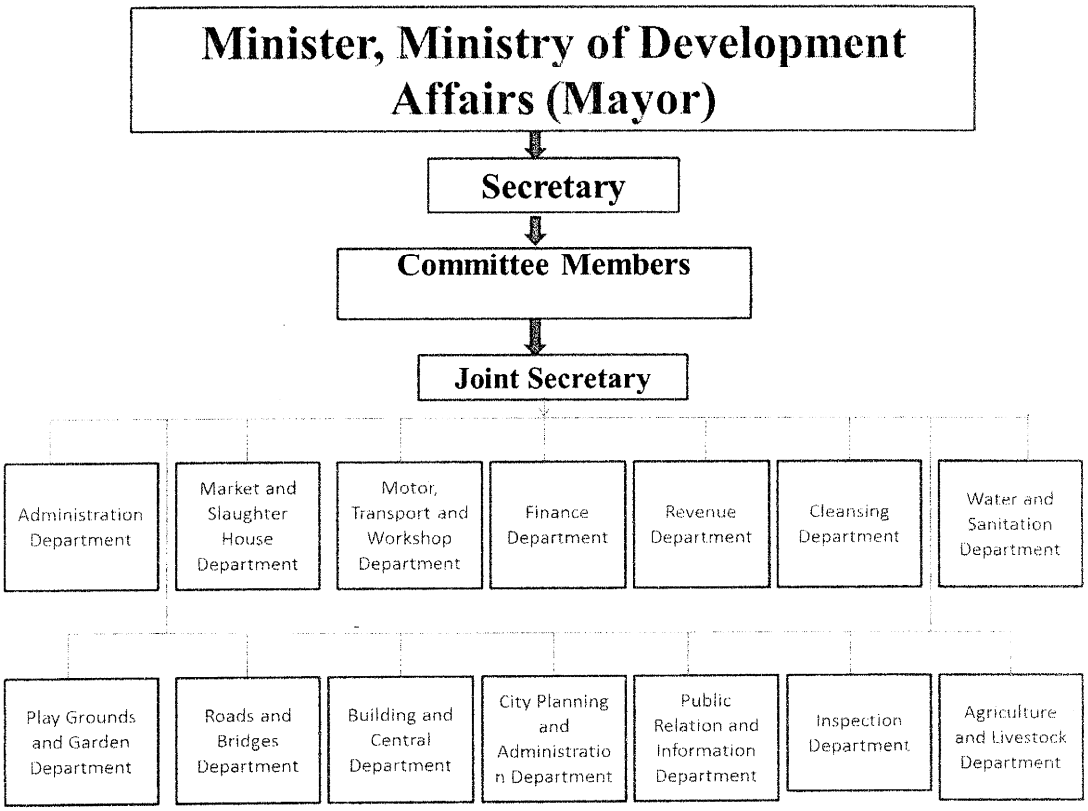
The Initial Environmental Examination (IEE) level will be conducted for the formulated water supply plans by the Team. The environmental and social considerations process will follow the "JICA Guidelines for Environmental and Social Considerations" (April 2010). The both sides confirmed that MCDC is responsible for taking any measures to complete the clearance process, in case that the laws and regulations in Myanmar require any environmental and social considerations for implementing the Project.

Annex-1	Project Sites Map
Annex-2	Organization Charts
Annex-3	Japan's Grant Aid Scheme

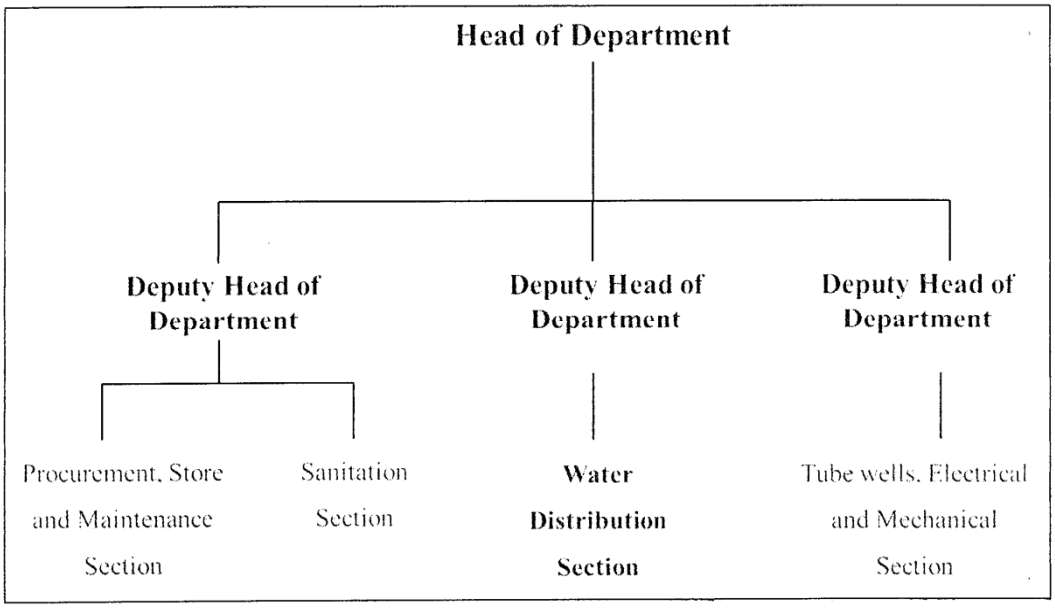
Annex-1: Project Sites Map



Annex-2-1: Organization Chart of MCDC



Annex-2-2: Organization Chart of Water and Sanitation Department, MCDC



Annex-3: Japan's Grant Aid Scheme

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as part of this realignment, JICA was reborn on October 1, 2008. After the reborn of JICA, following the decision of the GOJ, Grant Aid for General Project is extended by JICA.

Grant Aid is non-reimbursable fund to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures (Attachment 1)

Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as "the Survey")
  - The Survey conducted by JICA
- Appraisal & Approval
  - -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation
  - -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and a recipient country
- Implementation
  - -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.

- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the E/N will be singed between the GOJ and the Government of the recipient country to make a plead for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

The consultant firm(s) used for the Survey Will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical consistency.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese

corporations controlled by persons of Japanese nationality.)

(4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Attachment 2

(6) Proper Use

The Government of recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) Export and Re-export

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

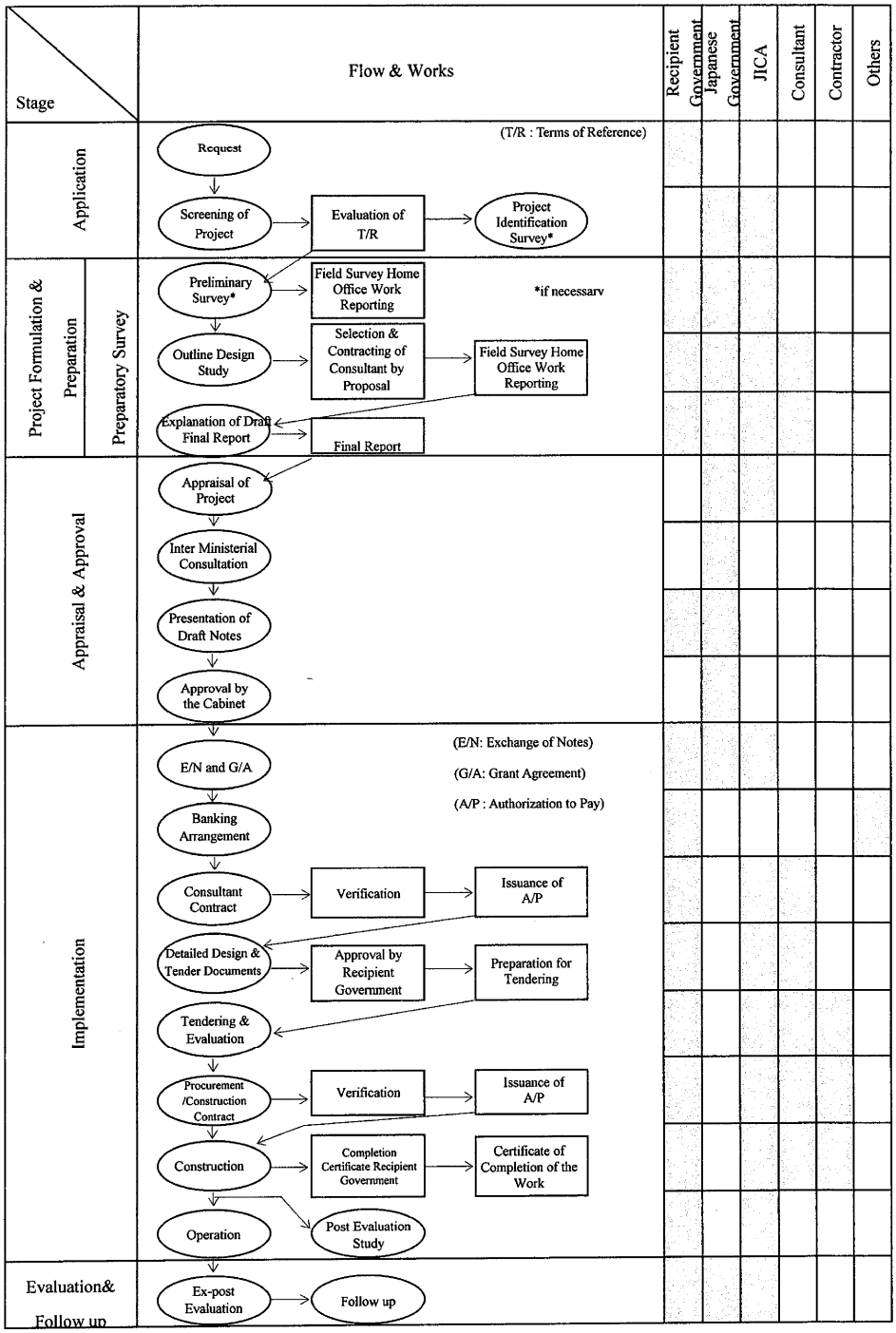
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA socio-environmental guideline.

Attachment 1 of Annex-3

Flow Chart of Japan's Grant Aid Procedures



Attachment 2 of Annex-3

Major Undertakings to be taken by Each Government

No.	Items	To be covered by the Grant	To be covered by Recipient
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply,		
	1)Electricity		
	a.The distributing line to the site		●
	b.The drop wiring and internal wiring within the site	●	
	c.The main circuit breaker and transformer	●	
	2)Water Supply		
	a.The city water distribution main to the site		●
	b.The supply system within the site (receiving and/or elevated	●	
	3)Drainage		
	a.The city drainage main (for storm, sewer and others) to the site		●
	b.The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4)Gas Supply		
	a.The city gas main to the site		●
	b.The gas supply system within the site	●	
	5)Telephone System		
	a.The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b.The MDF and the extension after the frame / panel	●	
	6)Furniture and Equipment		
	a.General furniture		●
	b.Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●

	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●
14	To appoint counterpart personnel to implement the Project		●

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

4 - 2 . Explanation of draft final report

MINUTES OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE PROJECT FOR IMPROVEMENT OF
WATER SUPPLY SYSTEM IN MANDALAY CITY
IN THE REPUBLIC OF THE UNION OF MYANMAR

Considering the urgent needs of expanding water supply system and securing safe drinking water in Mandalay City, the Government of Japan decided to conduct a Preparatory Survey on the Project for Improvement of Water Supply System in Mandalay City (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). Through discussions, field surveys, and technical examination of the study results in Japan, JICA has prepared a draft final report of the survey.

In order to explain and to consult with the Government of Myanmar (hereinafter referred to as "Myanmar") on the components of the draft final report, JICA dispatched the Draft Final Report Explanation Team (hereinafter to as "the Team") headed by Ms. Eriko Tamura, Director, Water Resources Management Team I, Water Resources and Disaster Management Group, Global Environment Department, JICA, from January 7th to January 14th, 2015.

As a result of discussions, both sides confirmed the main items described in the attached sheet.

Mandalay, 8th January, 2015

Eriko Tamura	U Tun Kyi
Leader	Committee Member
Preparatory Survey Team	Mandalay City Development Committee
Japan International Cooperation Agency (JICA)	The Republic of the Union of Myanmar

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ATTACHMENT

1. Components of the Draft Final Report

The Myanmar side agreed and accepted in principle the components of the draft final report explained by the Team. The Project sites map and outline of the Project are respectively shown in **Annex-1** and **Annex-2**.

2. Responsible and Implementing Agency

The responsible and implementing agency is Mandalay City Development Committee (hereinafter referred to as "MCDC").

3. Japan's Grant Aid Scheme

3-1. The Myanmar side understood the Japan's Grant Aid Scheme explained by the Team, as described in **Annex-3**.

3-2. The Myanmar side will take the necessary measures, as described in the **Attachment 2 of Annex-3**, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

4. Project Implementation Schedule

The Team explained to the Myanmar side that the expected implementation schedule is as attached in **Annex-4**.

5. Important issue on the Project Component

5-1. Expected outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Myanmar side has responsibility to monitor the progress of the indicators and achieve the target in year 2020.

[Quantitative Effect]

Indicator	Original (Year 2013)	Target (3 years after the completion, planned as Year 2020)
Average amount of water supply within Pyi Gyi Tagon (m^3/day)	1,137	9,386
Population served within Pyi Gyi Tagon (Person)	7,158	59,077
Rate of continuous dosing at disinfection facility (%)	0	100

[Qualitative Effect]
-Ability of the MCDC for distribution management will be enhanced by soft component
-The incidence rate of water-borne disease of residents in the water supply area will decrease due to supply of treated water.

5-2. Intake capacity from the production wells

The Project will supply water with 3 production wells around No.7 pumping station along the Irawaddy River. The preparatory survey analyzed that approximately 9,000m^3/day could be available based on the pumping test, geophysical analysis, etc. However, it was recommended to control the actual pumping volume based on the group well pumping test after construction of the production wells and ground water monitoring, as capacity of ground water could be affected by climate (rainfall etc.) and intake volume of surrounding production wells of the same aquifer. The Project is planned to install a monitoring well and provide technical assistance to MCDC staff on the ground water monitoring through the soft component. The Myanmar side confirmed that it will conduct ground water monitoring and control the intake volume accordingly.

In addition, the Team explained that the Myanmar side has responsibility to obtain public understanding of the Project. For example, residents around the intake wells and the construction of transmission tend to have concern of any negative impact to their private wells. The Myanmar side confirmed that it will conduct public awareness with its own responsibility.

5-3. Service pipes and meters

The Project is planned to procure and install service pipes and meters for the households which confirm the willingness to connect at the stage of detailed design. The Project is also planned to procure service pipes and meters for the expected future connections by 2020, which shall be installed by the Myanmar side to promote early achievement of the project purpose and to secure the quality of the equipment. Following is the tentative demarcation of procurement and installation of service pipes and meters, which shall be determined at the stage of detailed design.

a. Number of service pipes and meters to be procured by the Project	8,952
b. Number of service pipes and meters to be installed by the Project	8,309
c. Number of service pipes and meters to be installed by the Myanmar side (Materials will be provided by the Project) (c.=a.-b.)	643

*Above number shall be reviewed at the detail design stage.
*The connection is only for the individual households who are legally registered at Department of Water and Sanitation in MCDC.

The Myanmar side confirmed that it will conduct IEC activities (awareness raising through Information, Education and Communication) and smooth installation of the service pipes and meters provided by the Project. The Myanmar sides also confirmed that progress of the installation will be monitored annually by filling the form attached in **Annex-7** (this annex form will be duly confirmed by both sides at the stage of signing of Grant Agreement).

With respect to the connection fee from users for house connection, the Team advised the Myanmar side to follow the rule applied in Mandalay City. The Myanmar side explained that current connection fee is composed of registration charge and actual expense as shown in the table below. The Team advised that it is important to collect registration fee for cost recovery of water supply service in Mandalay City, but actual cost is not necessary to be collected as such cost is born by the Project. The both side agreed that MCDC will collect only the registration fee (item e. of the table below) from users for 8,309 connections. For the 643 connections which will be constructed by MCDC with the material provided by the Project, both side agreed that MCDC will collect the connection fee except material cost (item a. c. d. and e. of the table below). The Myanmar side also confirmed that if it makes any revision of the current regulation on the collection fee, it shall promptly inform to JICA.

[Current connection fee from users for house connection]

<table>
<tr><th>Component of the connection fee</th><th>Type</th></tr>
<tr><td>a. Direct labor cost (excavation, plumbing, water meter installation) for construction + 15%</td><td>Actual cost +15%</td></tr>
<tr><td>b. Material cost +15%
<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Ferrule with saddle</td><td>Size: 150, 100, 50mm x ID 13 mm</td></tr>
<tr><td>Water supply pipe</td><td>Size: ID 13mm, PE pipe</td></tr>
<tr><td>Water stop valve</td><td>Size: ID 13mm, Bronze valve</td></tr>
<tr><td>Water meter</td><td>Size: ID 13mm, Direct reading type</td></tr>
<tr><td>Water meter box</td><td>For ID 13mm water meter</td></tr>
</table></td><td>Actual cost + 15%</td></tr>
<tr><td>c. Advance survey cost of MCDC</td><td>Actual cost</td></tr>
<tr><td>d. Charge for the connection to network pipeline</td><td>Fix amount</td></tr>
<tr><td>e. Application fee</td><td>Registration fee :fix amount</td></tr>
</table>

5-4. Technical assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the provided facility, following technical assistance is planned to be provided under the Project. The Myanmar side confirmed that it will assign necessary number of competent and appropriate C/Ps as described in the draft

final report. The Team explained and the Myanmar side understood that the IEC activities will start its activities at the detailed design stage and assignment of C/Ps shall be completed prior to the commencement of detailed design.

- IEC activities to users for house connection in Pyi Gyi Tagon
- Water distribution control of DMAs in Pyi Gyi Tagon
- Monitoring of groundwater and control of the intake capacity of water supply in Pyi Gyi Tagon

6. Necessary budget to be covered by the Myanmar side

The Team explained necessary project cost to be covered by the Myanmar side and necessary annual operation and maintenance cost as attached in **Annex-5**. The Myanmar side agreed to secure necessary budget.

The Team also noted that O&M cost will be increased further along with the development of surface water supply, rehabilitation of old pipes, etc. The Team reminded and MCDC fully understood that MCDC needs to make strategic financial management including the increase of revenue, improvement of the efficiency and establish of independent account for water supply.

7. Undertakings of the Myanmar side

The Team explained to the Myanmar side its undertakings as listed in **Attachment 2 of Annex-3**, and **Annex-6**, and the Myanmar side understood and agreed to execute them.

8. Environmental and social considerations

1) Laws and Regulations for EIA in Myanmar

The laws and regulations related to Environmental Impact Assessment (hereinafter referred as 'EIA') are under development in Ministry of Environmental Conservation and Forest. Therefore, the environmental and social considerations were implemented according to the JICA Guidelines for Environmental and Social Considerations. Once the laws and regulations become effective, MCDC needs to follow such laws and regulation as it will require for existing project.

2) Environmental Checklist

The Myanmar side and the Team confirmed that information on environmental and social considerations including major impacts and relevant mitigation measures are summarized in the Environmental Checklist as **Annex-8.** The Myanmar side confirmed that it will inform JICA of any major changes which may affect environmental and social considerations made for the Project by revising the Checklist in a timely manner

3) Environmental Monitoring

The Myanmar side and the Team confirmed that environmental monitoring will be conducted by the Myanmar side in accordance with the Environmental Monitoring Plan described in the Draft Final Report.

The Myanmar side confirmed that the results of environmental monitoring will be provided to JICA as a part of Progress Report by filing in the monitoring results reporting form for construction attached as **Annex-9** on a quarterly basis until the completion of the Project, provided that there is no outstanding issue regarding the environmental and social considerations during operation of the Project.

In case JICA finds that there is a need for improvement in a situation with respect to environmental considerations after the agreed monitoring period, JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed in accordance with the agreement between the Myanmar side and JICA.

The Myanmar side confirmed that it will take stipulated procedures for information disclosure in accordance with relevant law and regulation in Myanmar. In addition, the Team requested the Myanmar side to disclose the monitoring results to local project stakeholders, and the Myanmar side agreed to disclose monitoring results on its website/in its field offices. The Myanmar side agreed JICA's disclosure of provided monitoring results in the monitoring form on its website.

9. Ex-Post Evaluation

JICA will conduct ex-post evaluation three (3) years after the project completion with respect to five evaluation criteria (Appropriateness, Impact, Effectiveness, Efficiency, Sustainability) of the project. Result of the evaluation will be publicized. The Myanmar side is required to provide necessary support for them.

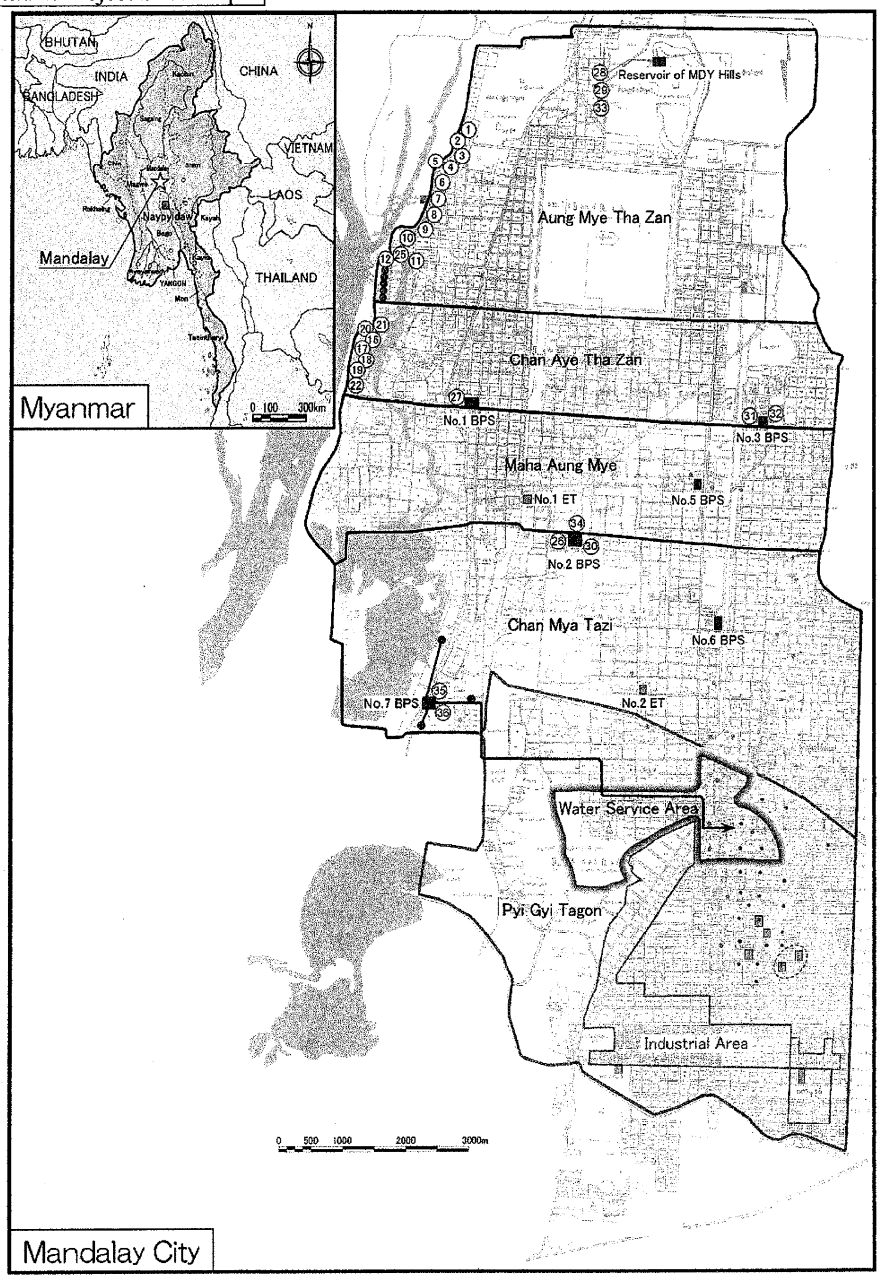
10. Coordination with other projects

The both sides confirmed that the Project shall be coordinated and demarcated with any other project supported by JICA, other development partners, NGOs, and Myanmar official organizations and departments.

11. Schedule of the Preparatory Survey

JICA will complete the final report in accordance with the confirmed items and send it to the Myanmar side in April 2015.

Annex-1: Project Sites Map



Annex-2: Outline of the Project

1. Title of the Project (tentative)

The Project for Improvement of Water Supply System in Mandalay City

2. Purpose of the Project

The Purpose of the project is to construct a water supply system in Pyi Gyi Tagon Township and disinfection facilities for the existing water supply facilities in Mandalay City to increase population served and secure safety of drinking water, thereby contributing to improvement of health and hygiene for residents and the living environment in Mandalay City.

3. Component of the Project

Items	Categories	Japanese Side	Myanmar Side
water supply system in Pyi Gyi Tagon	Intake Facility	2 Intake wells (φ300mm, Depth 140m approximately). Totally 3 wells are set as intake wells including 1 well constructed during the preparatory survey. *The depth of the intake well shall be determined at the construction stage.	
		1 Monitoring well (φ100mm, Depth 133m) at No.7 BPS	
		3 Intake pump building with 3 sets of Submersible pump and motor, Valve, Pipe, Electrical equipment for intake pump at No.7 BPS	Power Supply (up to breaker of secondary side of transformer (including transformer)
	Transmission pipe (Intake well to distribution reservoir)	Ductile iron pipe (φ350 ～ 250mm 、 L=Approx. 2.8 k m)	
	Distribution reservoir	1 Distribution reservoir (RC structure, Q=3,024 m^3) at No.7 BPS	
	Distribution pump station at No.7 BPS	1 Building for distribution pump station and disinfection facility	
		3 sets of Distribution pump and motor (1 stand-by, 4.8 m^3/min, 55mH)	

		3 sets of Valve, Pipe and fitting, Electrical equipment for distribution pump	Power Supply (Same as above)
	Disinfection facility at No.7 BPS	1 set of Sodium hypochlorite generation equipment	Power Supply (Same as above)
		1 set of Chlorinator	
	Distribution pipe (Distribution reservoir to service area)	Ductile iron pipe (φ450 ～ 200mm, L=Approx. 14.9 km)	
		PVC (φ150～100mm, L=Approx. 29.0 km)	
		PE (φ50mm, L=Approx. 54.6km)	
	House connection	-Procurement of Valve, service pipe and water meter(φ13mm) for 8,952 connections -Construction for 8,309 connections *The above number shall be reviewed at the detail design stage	-Construction for 643 connections *The above number shall be reviewed at the detail design stage
	Monitoring system	1 set of central monitoring equipment in Main Control Center	
		5 sets of Pressure gauge and flow meter for DMA	
Disinfection facility in the existing water supply system in Mandalay city	Disinfection facility	7 buildings (No.2,3,5,6, BPS, No.1,2 ET and Well 28) to be constructed for disinfection facility 1 building (No.1 BPS) to be rehabilitated for disinfection facility	
		1 set of sodium hypochlorite generation equipment at No.1 BPS	Power supply
		9 sets of chlorinator at No.1,2,3,5,6,7 BPS, No.1,2 ET and Well 28 (*2 dosing sites at No.7 BPS)	
Soft component	Distribution management skills	Preparation of manuals, implementation of training related to use of data in management and analysis of distribution data, distribution management	

	Skills in informing, educating and communication with residents	Training in IEC (Information, Education, Communication) activities, assistance in implementation and preparation of guidelines	
	Groundwater management skills	Groundwater level observation techniques, implementation of training methods for managing pumped water using groundwater level data, preparation of manuals, etc.	
(On-the-Job Training)	OJT by the Contractor	OJT for installation of house connection, O&M of water supply facilities including disinfection facility	

Annex-3: Japan's Grant Aid Scheme

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as part of this realignment, JICA was reborn on October 1, 2008. After the reborn of JICA, following the decision of the Government of Japan (hereinafter referred to as "the GOJ"), Grant Aid for General Project is extended by JICA.

Grant Aid is non-reimbursable fund to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures (Attachment 1)

Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as "the Survey")
  - The Survey conducted by JICA
- Appraisal & Approval
  - -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation
  - -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and a recipient country
- Implementation
  - -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.

- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the E/N will be singed between the GOJ and the Government of the recipient country to make a plead for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

The consultant firm(s) used for the Survey Will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical consistency.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Attachment 2

(6) Proper Use

The Government of recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) Export and Re-export

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

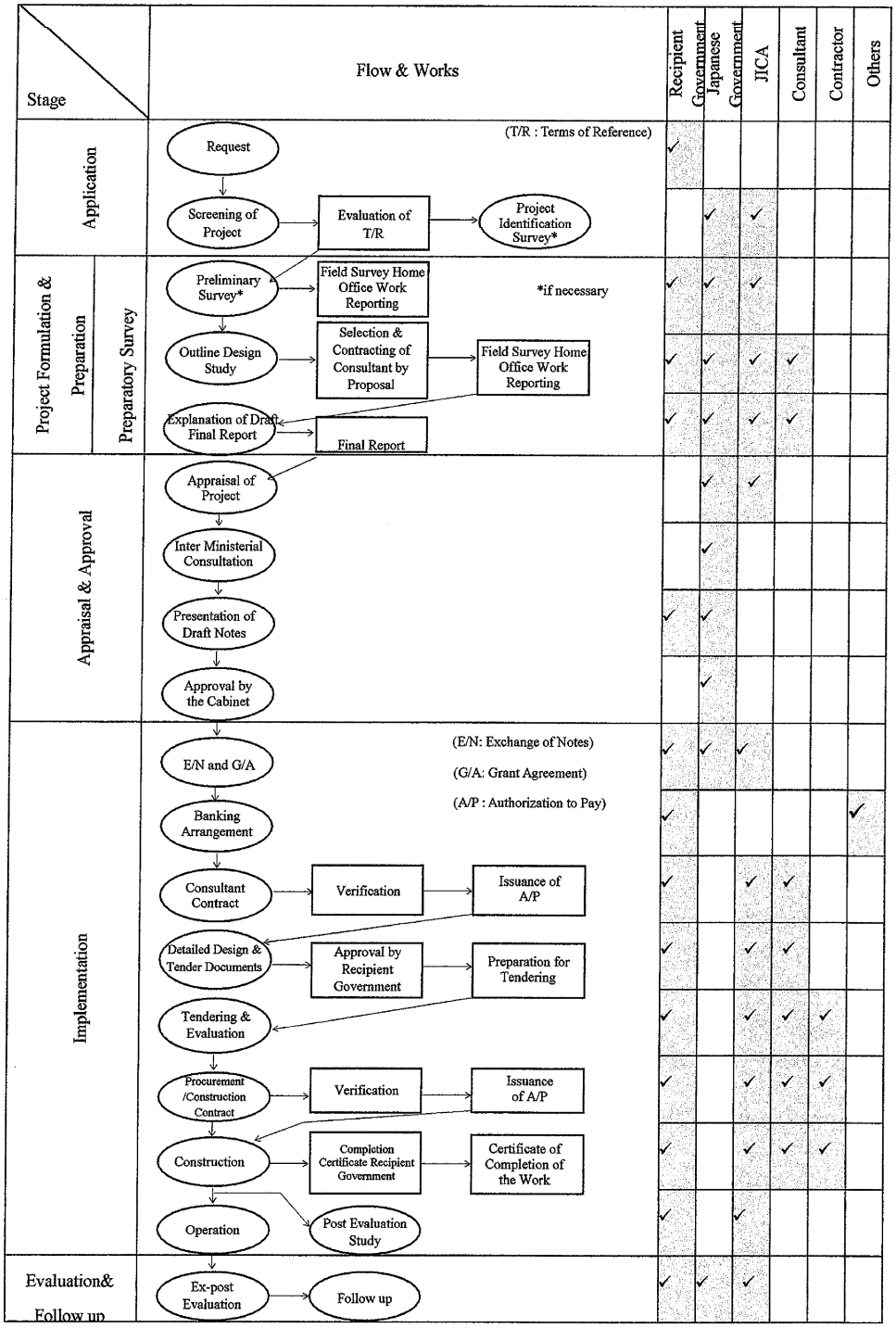
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA socio-environmental guideline.

Attachment 1

Flow Chart of Japan's Grant Aid Procedures



Attachment 2

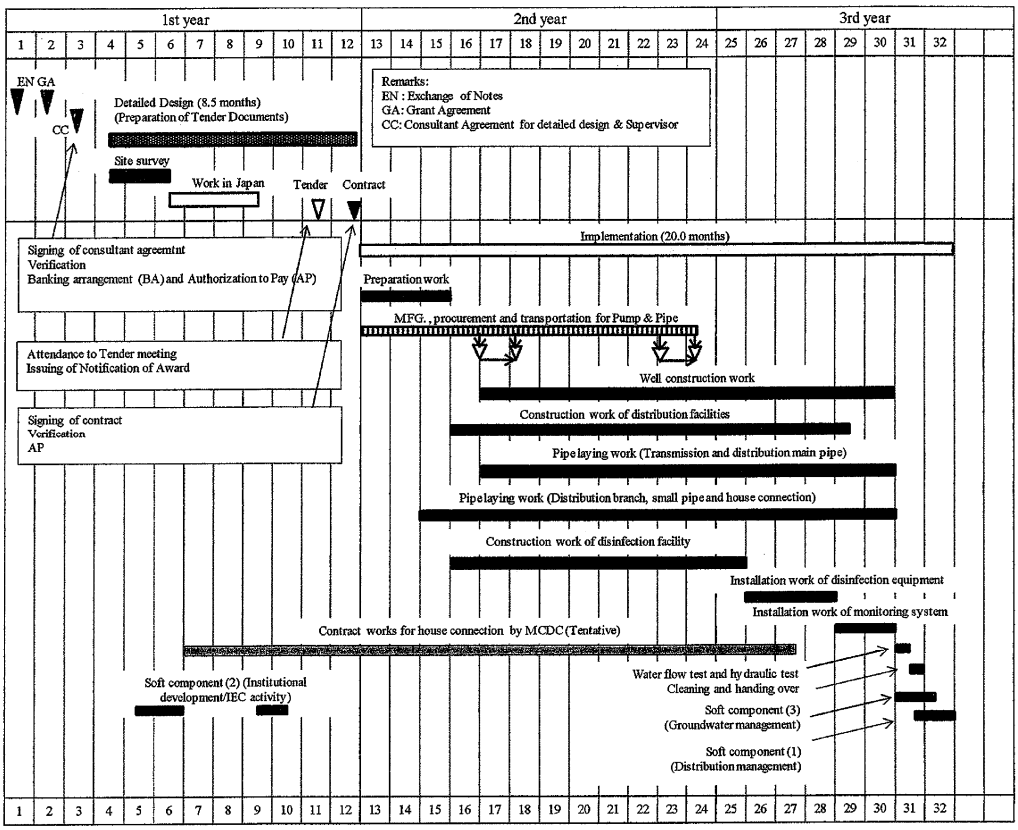
Major Undertakings to be taken by Each Government

No.	Items	To be covered by the Grant	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1)Electricity		
	a.The distributing line to the site		●
	b.The drop wiring and internal wiring within the site	●	
	c.The main circuit breaker and transformer	●	
	2)Water Supply		
	a.The city water distribution main to the site		●
	b.The supply system within the site (receiving and/or elevated tanks)	●	
	3)Drainage		
	a.The city drainage main (for storm, sewer and others) to the site		●
	b.The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4)Gas Supply		
	a.The city gas main to the site		●
	b.The gas supply system within the site	●	
	5)Telephone System		
	a.The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b.The MDF and the extension after the frame / panel	●	
	6)Furniture and Equipment		
	a.General furniture		●
	b.Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)

10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●
14	To appoint counterpart personnel to implement the Project		●

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

Annex-4: Expected Project Implementation Schedule



Annex-5 Cost for Undertakings by the Myanmar side and Annual Operation and Maintenance

(1) Cost for Undertakings by the Myanmar side

No.	Work Items	Description	Quantity	Implementation deadline (tentative)	Estimated Cost (Kyat)
1	Banking Arrangement Commission (B/A)	-	1	After GA, Before signing of consultant contract (In June 2015)	21,900,000
2	Authorization to Pay (A/P)	-	9	At the timing of payment (First payment will be advance payment of consultant contract in June 2015)	402,000
3	Construction of electrical lines and power receiving	-		Before signing of construction contract (By March 2016)	128,200,000
				Total	150,502,000

Cost of B/A and A/P is estimated on the exchange rate at October 2014 (1Kyat=JPY 0.112)

(2) Cost for Annual Operation and Maintenance

No.	Item	Q'ty (Operation)	capacity (per 1set)		Operation time (hrs.)	Unit cost (Kyat)		Max. per day cost (Kyat)	Ave. per day cost (Kyat)	per annual cost (Kyat)
1. Pyi Gyi Tagon Township water supply system										
	Electricity									
(1)	intake submersible pump	3	37	kW/1set	20	100	Kyat/kWh	222,000	201,707	73,623,073
(2)	Distribution pump	2	75	kW/1set	24	100	Kyat/kWh	360,000	218,062	79,592,511
(3)	Disinfection equipment	1	13.2	kW/total	12	100	Kyat/kWh	15,840	15,840	5,781,600
	Salt									
(1)	disinfection equipment	1	108.5	kg/d	-	153	Kyat/kg	16,601	16,601	6,059,183
	sub total								452,209	165,056,366
2. Disinfection equipment for existing water supply system										
	Electricity									
(1)	Hypo chlorine generator	1	42.4	kW/total	12	100	Kyat/kWh	50,880	50,880	18,571,200
(2)	Hypo chlorine dosing equipment's	1	3.85	kW/total	12	100	Kyat/kWh	4,620	4,620	1,686,300
	Salt									
(3)	Existing system	1	371	kg/d	-	153	Kyat/kg	56,763	56,763	20,718,495
	sub total								112,263	40,975,995
	Grand Total								564,472	206,032,361

Annex-6 Undertaking by the Myanmar Side

Following is the undertaking whish shall be conducted by the Myanmar side in addition to Attachment 2 of Annex-3

<table>
<tr><th>No.</th><th>Work Items</th><th>Description</th><th>Responsibility</th><th>Implementation timing (tentative)</th></tr>
<tr><td>1</td><td>Establishment of Project Implementing and Coordination Committee</td><td>The Myanmar side proposed to establish Project Implementing and Coordination Committee of the Project within MCDC. Structure and name list of the Project Implementing and Coordination Committee shall be informed to JICA</td><td>MCDC</td><td>Soon after signing of consultant contract
(By June 2015)</td></tr>
<tr><td>2</td><td>Assignment of C/Ps for the soft component</td><td>The Myanmar side needs to assign necessary number of competent C/Ps for the following soft component as described in DFR. List of C/Ps shall be informed to JICA
- IEC: 170 person-days
- Water distribution control: 184 person-days
- Groundwater monitoring: 80 person-days</td><td>MCDC</td><td>Before signing of consultant contract
(By June 2015)</td></tr>
<tr><td>3</td><td>Daily allowance and traveling expenses for staff participating in soft component</td><td>-</td><td>MCDC</td><td>At the time of necessity</td></tr>
<tr><td>4</td><td>Permission of land use for 2 production wells and 1 monitoring well</td><td>The Myanmar side confirmed that all the project sites are owned by MCDC. However, the land for construction of 2 production wells and 1 monitoring well under the Project shall be registered as Project Site by City Planning and Land Administration of MCDC.
[Production well]<table><tr><th>No.</th><th>Location</th><th>Owning and administrative department in MCDC</th></tr><tr><td>1</td><td>Playground next to transformer station</td><td>Dep. of playground and garden, MCDC</td></tr><tr><td>2</td><td>Behind New day gas station</td><td>Dep. of City Planning and Land Administration, MCDC</td></tr></table>[Monitoring well]<table><tr><th>No.</th><th>Location</th><th>Owning and administrative department in MCDC</th></tr><tr><td>1</td><td>Inside No.7 BPS</td><td>Dep. of playground and garden, MCDC</td></tr></table></td><td>MCDC</td><td>Necessary registration will be completed before signing of consultant contract
(By June 2015)</td></tr>
</table>

No.	Work Items	Description	Responsibility	Implementation timing (tentative)
5	Permission of land use for temporary warehouse or material stock yard	The Myanmar side needs to obtain official permission for the use of the land for temporary warehouse or material stock yard within the area of No.3 and any other appropriate area according to necessity.	MCDC	Before signing of consultant contract (By June 2015)
6	Permission to use public road for the construction of water pipes	The Myanmar side needs to obtain official permission for the construction along the public road and for the traffic control	MCDC Police	Before signing of construction contract (By March 2016)
7	Permission to use communication line	The Myanmar side needs to obtain official permission for the use of communication for monitoring system	MCDC	Before signing of construction contract (By March 2016)
8	Permission of the land use for the house connection	House connection is installed at the yard of the customer. The Myanmar side needs to obtain the consent of the customers for the use of their private land	MCDC	At the time of confirmation of willingness to connect (August 2015 – January 2016)
9	Banking Arrangement Commission (B/A)	Arrangement between Myanma Foreign Trade Bank (MFTB) & The Bank of Tokyo-Mitsubishi UFJ (BTMU) to open Grant Account with BTMU. MCDC needs to pay the commission fee for B/A.	MCDC	After GA, Before the signing of consultant contract (In June 2015)
10	Authorization to Pay (A/P)	A/P shall be issued by MFTB to BTMU to give authorization for BTMU to pay the consultant on behalf of MFTB. MCDC needs to initiate the following procedure. (1) Mandalay Regional Government Cabinet Approval (2) FE (Foreign Exchange) Permission by the Budget Department under the Ministry of Finance (3) Issuing of A/P by MFTB	MCDC	At the time of payment (First payment will be advance payment of consultant contract in June 2015)
11	Construction of electrical cable and power receiving	Power supply is necessary for the production well, pump station, and disinfection facilities as described in the Draft Final Report. MCDC needs to construct electrical cable and following power receiving facilities up to breaker of secondary side of transformer (including transformer) in consultation with MEPE (Myanmar Electric Power Enterprise). Number of receiving wells -Intake well: 100kVA 3 nos -BPS No.7: 400kVA 1 nos	MCDC MEPE	Before signing of construction contract (By March 2016)

No.	Work Items	Description	Responsibility	Implementation timing (tentative)
		-BPS No.1: 315kVA 1 nos *Demarcation of the responsibility for power supply construction Myanmar side: Up to breaker of secondary side of transformer (including transformer) Japanese side: From breaker to the electrical equipment planned in the Project (Installation of breaker is responsible for Myanmar side)		
12	IEC (Information, Education, Communication) activities	MCDC needs to continue IEC (water quality, water connection fee, water tariff, etc) activities and promote house connection.	MCDC	After the commencement of IEC activities with consultant (After August 2015)
13	Construction of house connection (service pipes and meters)	MCDC needs to install service pipes and meters provided by the Project for 643 customers.	MCDC	Year 2020
14	Monitoring of the ground water	MCDC needs to monitor the level of monitoring well and control the intake volume periodically.	MCDC	After the commencement of operation (After November 2017)
15	Additional staff for meter reader & collecting charge	MCDC needs to recruit additional staff (5 to 10) for meter reader & collection charge.	MCDC (Dep. of Revenue)	After the commencement of operation (After November 2017)

Annex-7 Monitoring Form (as an attachment of Record of Discussion) for Progress of the Construction Work

Record of Discussions (DRAFT)

With reference to the Grant Agreement between the Japan International Cooperation Agency (hereinafter referred to as "JICA") and the Mandalay City Development Committee (hereinafter referred to as "MCDC") dated <signing date of G/A> concerning the Japan's grant assistance for <title of the Project>, the representatives of JICA and of MCDC wish to record the following:

1. With regard to the Article 10 (1) (f) and (2) of the said Grant Agreement, the representative of JICA stated that:

(a) MCDC will submit to JICA annual progress reports on the construction work utilizing the materials and/or equipment procured under the said grant, for which MCDC is responsible, by filling in the form attached hereto until all the construction work is completed; and

(b) MCDC will submit to JICA a final report upon completion.

2. The representative of MCDC stated that MCDC has no objection to the statement by the representative of JICA referred to above.

Mandalay, Day Month 20xx

Masahiko Tanaka	**********
Chief Representative	**********
JICA Myanmar Office	MCDC
	(In principle, same signer as G/A)

[Progress / Completion] Report submitted on ○○○

1. Outline of the Project

(1) Name of Country: the Republic of the Union of Myanmar

(2) Name of the Project:

(3) Date of the Grant Agreement: ** ***** 2015

(4) Name of the Executing Organization: Mandalay City Development Committee (hereinafter referred to as "MCDC")

2. General Situation (how the equipment and/or materials procured under the Japan's Grant Assistance are used in general)

3. Detailed Explanation

equipment and/or materials;	How they are being used;	In case they haven't been used as planned	
		Reason for it; (Please specify the reason such as budgetary problems and problems in employing appropriate staffs etc.)	Measures to be taken to redress the situation;
Service pipe and meters for house connections			

4. Progress of the Construction Work done by MCDC

Project site	Current situation	In case the work is delayed		Planned completion date	Any other problems;
		Reason for delay;	Measures to be taken to redress the situation;		

5. Photos (please attach photos showing the progress of the construction work or the overall view of the facilities constructed by MCDC.)

Annex-8 Environmental Check List

Environmental check list

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process?	(a) **N**	(a) However, implementation of the IEE level survey is recommended taking into account that the Myanmar Government has followed the ADB's Guideline conventionally.
		(b) Have EIA reports been approved by authorities of the host country's Government?	(b) –	(b) –
		(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?	(c) –	(c) –
		(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(d) –	(d) –
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders?	(a) **Y**	(a) Stakeholder consultation with relevant parties such as residents' representatives held on 12th June 2014 in the MCDC hall. The project proponent shall continue to conduct adequate consultations at each stage of the Project implementation.
		(b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(b) **Y**	(b) The project proponent has already obtained comments from the stakeholders and is now considering for them.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) **Y**	(a) Several alternative plans regarding groundwater development and water supply area have already examined.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that chlorine from chlorine storage facilities and chlorine injection facilities will cause air pollution? Are any mitigating measures taken?	(a) **N**	(a) There is no concern that air pollution is occurred since every chemical including chloride compound will be managed properly.
		(b) Do chlorine concentrations within the working environments comply with the country's occupational health and safety standards?	(b) –	(b) The Government doesn't have such standards. However, occupational health and safety conditions will be secured by the project proponent.
	(2) Water Quality	(a) Do pollutants, such as SS, BOD, COD contained in effluents discharged by the facility operations comply with the country's effluent standards?	(a) **N**	(a) There are no effluent standards in the country. However, no water pollution is expected by the facility operations.
	(3) Wastes	(a) Are wastes, such as sludge generated by the facility operations properly treated and disposed in accordance with the country's regulations?	(a) **Y**	(a) The project proponent shall conduct necessary measures so that wastes will be handled in accordance with the regulations of the local authorities.
	(4) Noise and Vibration	(a) Do noise and vibrations generated from the facilities, such as pumping stations comply with the country's standards?	(a) **Y**	(a) Noise and vibrations will be occurred due to operation of construction machinery. The Project sites are located in urban area. Therefore, sound/sonic barriers will be built as the situation demands. For safety precaution as well, monitoring should be conducted properly.

Appendix—48

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) **N**	(a) There are no protected areas or international treaties and conventions in the Project sites.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?	(a) **N**	(a) Proposed project locations are not within primeval forests or tropical rain forests.
		(b) Does the project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?	(b) **N**	(b) The protected habitats of endangered species are not found.
		(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?	(c) **Y**	(c) If significant impacts will be identified during the study, mitigation measures will be implemented under the supervision and in accordance with recommendations of the relevant government agency.
		(d) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?"	(d) **N**	(d) There would be no negative impact on the aquatic environments by the Project.
	(3) Hydrology	(a) Is there a possibility that the amount of water used by the project will adversely affect surface water and groundwater flows?	(a) **Y**	Quantity of ground water may decrease in accordance with the drawdown amount from the well.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?	(a) **N**	(a) Resettlement of residents will not occur.
		(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?	(b) –	(b) –
		(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?	(c) –	(c) –
		(d) Are the compensations going to be paid prior to the resettlement?	(d) –	(d) –
		(e) Are the compensation policies prepared in document?	(e) –	(e) –
		(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly people below the poverty line, ethnic minorities, and indigenous peoples?	(f) –	(f) –
		(g) Are agreements with the affected people obtained prior to resettlement?	(g) –	(g) –
		(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?	(h) –	(h) –
		(i) Are any plans developed to monitor the impacts of resettlement?	(i) –	(i) –
		(j) Is the grievance redress mechanism established?	(j) –	(j) –

	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?	(a) N	(a) No adverse impact is expected on the living conditions of inhabitants, they rather have positive impacts on local economy.
		(b) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect the existing water uses and water area uses?	(b) N	(b) There would be no negative impact on the existing water uses and water area uses.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There are no local archeological, historical, cultural and religious heritages in the project sites.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) No adverse impact is expected on the local landscape by the Project.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?	(a) N	(a) There are no any ethnic minorities in the Project site.
		(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected?	(b) N	(b) Same as above. There would be no negative impact on ethnic minorities.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?	(a) –	(a) Laws and regulations related to working conditions are not yet established.
		(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?	(b) Y	(b) The safety considerations should be prepared by the contractor.
		(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?	(c) Y	(c) The safety training such as wearing working clothes and work shoes, use of temporally toilet, traffic safety and public health should be provided by the contractor.
		(d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(d) Y	(d) The education such as behavior and tongue to the citizen, the action to the complaint etc. should be provided to the security guard by the contractor.
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?	(a) Y	(a) Effective mitigation measures such as properly maintenance of construction vehicle, idling off and installation of mufflers should be taken. The excavated soil also should be disposed of at the existing landfill.
		(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?	(b) N	(b) No adverse impact is expected.
		(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(c) N	(c) No adverse impact is expected.
		(d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts?	(d) Y	(d) There is a possibility that traffic congestion may occur temporarily during construction. The mitigation measures such as prior notice of construction, provision of proper notice at site and alternative routes should be taken in cooperation with traffic police.

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	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?	(a) **Y**	(a) Groundwater level and noise/vibration will be monitored by the project proponent and constructor.
		(b) What are the items, methods and frequencies of the monitoring program?	(b) **N**	(b) Monitoring program has not yet stipulated and the followings are recommended. -The design/construction phases: Noise (4 times/year), vibration (2 times/year) and groundwater level (1time each in rain/dry season) will be investigated. -The operation phase: Noise (2 times/year), vibration (2 times/year) and groundwater level (2 times /year) will be also monitored.
		(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?	(c) **Y**	(c) Environmental & Social Consideration Team will be established in MCDC. The Team will conduct periodical monitoring, report the result to JICA and disclose it to local project stakeholders and to the public through its website/in its field offices.
		(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(d) **N**	(d) Reporting system of environmental monitoring has not yet established in the Government. MCDC will follow the system once it is established
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Dam and River Projects checklist should also be checked.	(a) –	Checklist of other sectors shall be considered to refer after details of the water supply plan finalized.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) –	Diesel motor pumps emit CO_2; however, there would be no large scale generators to be installed as to give negative impact on global warming.

Annex-9 Environmental Monitoring Form

Environmental monitoring form

1. Groundwater Level

Item	Unit	Stage	Measured Value (Mean)	Measured Value (Max.)	Remarks			
					Location	Frequency	Implementation	Supervision
Groundwater level	m	Design stage				2 times during dry and wet season	Constructor through approved monitoring agency	MCDC
		Construction stage				On complains		
		Operation stage				2 times with an interval of 6 months for 3 years (total 6 times)	MCDC through approved monitoring agency	

2. Noise

1) Design and Construction stage

Item	One hour LAeq	Unit	Measured Value (Mean)	Measured Value (Max.)	World Bank Guidelines*1	Remarks			
						Location	Frequency	Implementation	Supervision
Noise*1	Daytime (7:00 – 22:00) Design/	dB(A)			55		Design stage: 1 time as a base-line data	Constructer through approved monitoring agency	MCDC

	Night time (22:00 – 7:00) Design/				45		Construction stage: 4 times/year for 2 years		

2) Operation stage

Item	One hour LAeq	Unit	Measured Value (Mean)	Measured Value (Max.)	World Bank Guidelines*3	Remarks			
						Location	Frequency	Implementation	Supervision
Noise*1	Daytime (7:00 – 22:00)	dB(A)			55		2 times/year for 2 years	MCDC through approved monitoring agency	MCDC
	Night time (22:00 – 7:00)				45				

*1: Residential area, IFC EHS general guideline, for General Health, and Safety (EHS) Guidelines (2007)
Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off-site receptor

3. Vibration

1) Design stage

Item	Unit	Frequency band	Measured Value (Mean)	Measured Value (Max.)	Remarks			
					Location*1	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz				1 time with identification of noise barriers requirement locations*	Constructor through approved monitoring agency	MCDC
		10-50 Hz						
		Over 50 Hz						

2) Construction stage

Item	Unit	Frequency band	Measured Value (Mean)	Measured Value (Max.)	Remarks			
					Location*1	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz				Every 6 months during the stage, and on complain at the construction site	Constructor through approved monitoring agency	MCDC
		10-50 Hz						
		Over 50 Hz						

3) Operation stage

Item	Unit	Frequency band	Measured Value (Mean)	Measured Value (Max.)	Remarks			
					Location*1	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10 Hz				Every 6 months during the stage for 3 years	MCDC through approved monitoring agency	MCDC
		10-50 Hz						
		Over 50 Hz						

*1: The distance from the source (radius/width of corridor) shall be decided by the constructor and MCDC

Annex- 10 Attendance List

Project Title : THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY SYSTEM IN MANDALAY CITY

Meeting Place : MCDC Meeting Room
Date : 7 to 8 January 2015 (Wednesday to Thursday)

Sr. No	Name	Position	Organization
Myanmar side			
1	U Tun Kyi	Committee Member	MCDC
2	U Tun Win	Head of Department	MCDC, Water &
3	U Htay Win	Assistant Director	MCDC, Water &
4	U Than Oo	Assistant Director	MCDC, Water &
5	U Soe Maung Hla	Assistant Engineer	MCDC, Water &
6	Daw Thwe Hnin Aung	Assistant Engineer	MCDC, Water &
7	Daw Ei Ei Phyo	Assistant Engineer	MCDC, Water &
8	Daw Khin Thida Aung	Sub-Assistant Engineer	MCDC, Water &
9	Daw Yu Yu Htay	Sub-Assistant Engineer	MCDC, Water &
10	Daw Poe Thiri	Sub-Assistant Engineer	MCDC, Water &
11	Daw Than Than Hlaing	Sub-Assistant Engineer	MCDC, Water &
12	U Zin Min Thant	Sub-Assistant Engineer	MCDC, Water &
13	Daw Mya Thet Maw	Assistant Officer	MCDC, Water &
14	Daw Yi Yi Naing	Junior Engineer	MCDC, Water &
15	Daw Thu Zar Aung	Sub-Assistant Officer	MCDC, Water &
Japan Side			
1	Ms. Eriko TAMURA		JICA Headquarters
2	Ms. Tomoko KASHIHARA		JICA Headquarters
3	Daw Myat Thuzar (a) Tina		JICA Myanmar Office
4	Mr. Yoshifumi OKAGA		TECI
5	Mr. Masashi KAWAMURA		TECI
6	Mr. Mitsuyoshi SAITO KKC		TECI
7	Daw Hsu Mon Win		TECI

Preparatory Survey for the Project for Improvement of Water Supply Systems in Mandalay City in the Republic of the Union of Myanmar

Report on Soft Component Plan

October 2014

TEC International Co., Ltd.

Kokusai Kogyo Co., Ltd.

Preparatory Survey for the Project for Improvement of Water Supply Systems in Mandalay City in the Republic of the Union of Myanmar

Report on Soft Component Plan

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1. Background of soft component

1.1 Background

The current rate of population served in Mandalay city is 66.5% and the rate of population served in northern four (4) Townships (Aung MyeTha San, Chan Aye Thar San, Mahar Aung Myae and Chan Myar Tharzi) has reached to the range from 60% to 90%. On the other hand, the rate of population served in southern two (2) Townships (Pyi Gyi Tagon and Amarapura) had not been less than 6%. Although rapid increasing of water demand by construction of commercial facilities and population increase, the rate of population served in Pyi Gyi Tagon TS is 5.7% and poverty rate is 35.3%. The most of residents has been exposed to water borne disease by using unhygienic shallow well which water quality has been deteriorated by domestic wastewater. 95% of the amount of water supply by the existing water supply system in Mandalay city is groundwater and remaining the 5% is treated surface water by slow sand filter. The both of groundwater supply system and surface water supply system don't equip disinfection facility and don't conduct safety drinking water supply.

The aim of the Preparatory Survey on the Project for Improvement of Water Supply System in Mandalay City in the Republic of the Union of Myanmar" is to provide new water supply facilities for the Pyi Gyi Tagon TS in Mandalay City, Republic of the Union of Myanmar (hereafter "Myanmar"), install disinfection facilities at the existing facilities, and improve the status of water supply to the study areas. The scope of the project is the construction of intake equipment (production wells 3 no., electric and mechanical systems, transmission pipes to the distribution reservoir), distribution reservoir, booster pumping station and distribution pipe network, in Pyi Gyi Tagon TS and disinfection facilities in Mandalay City.

1.2 Necessity of soft component

For groundwater usage equipment such as wells, which will be constructed in the Project, MCDC has comparatively adequate knowledge on operation and maintenance. An assistance for operation and maintenance of disinfection facility is being given presently under the grassroots technical cooperation project, "Project for improving water treatment plant operation and management capacity in Mandalay City (Jan. 2014 to Dec. 2016)." On the other hand, technology transfer through soft components is considered necessary for ensuring realization of project effects and sustainability of the Project with respect to the points mentioned below.

Distribution management

Until now, MCDC has not accumulated basic data such as distribution amount and distribution pressure of the service areas, which have been estimated from the capacity of the distribution facilities. The reliability of this data is, however, low and the distribution amount and non-revenue water ratio in distribution area are unknown. Therefore, the water distribution status is not known, and operation and maintenance of distribution facilities is inappropriate; so distribution management cannot be performed properly.

The distribution pipeline network in the new water supply system of this project will be divided by DMA, a monitoring system will be installed in each DMA and basic data will be collected; in this way, basic data necessary for distribution management will be acquired for the first time. However, the knowledge of the staff and technical levels of the Water Supply and Sanitation Department of MCDC presently are inadequate, and an assistance is necessary for improving skills related to distribution management through soft component.

Ensuring customers for new connections

One of the project's components is the provision of new water supply facilities for unserved areas. There is concern that residents of unserved areas who have been using private wells free of charge may resist paying water tariff for new water connections. For this reason, it is important to deepen the understanding of the residents on the direct and indirect benefits and value of the water supply services through enlightenment and diffusion activities for the residents.

Strengthening the groundwater level monitoring system and using the observed results

The reasons why MCDC has not implemented groundwater monitoring (groundwater level observations) area as follows

(1) Production wells do not have a structure, by which groundwater level is easily observed.

(2) There is no observation well and selection of alternative wells is not adequate.

For the countermeasure, observation well and production well, which can observe water development around BPS No.7 in the Project.

Through continuous monitoring activities of groundwater by setting up the specifications of monitoring activities, groundwater level management is required.

The Project will provide three new production wells near the BPS No. 7. MCDC already has two production wells in the premises of BPS No. 7; so it will have a well field consisting of five wells in total.

The drawdown in the groundwater level will be estimated for planning the groundwater development mentioned above. The estimate may be made using theoretical equations based on the pumping test results of the test-bored well. For analysis with higher accuracy and for appropriate management and operation of each well in the well field, groundwater data must be collected..

Moreover, it is necessary to establish a system to make periodical observation, by selecting existing wells for monitoring water level near production wells, in the soft component.

In addition, it is necessary to propose an overall monitoring system in the entire city area to understand groundwater level in the city, in the soft component

2. Goal of soft component

The staff members of MCDC shall acquire knowledge and skills necessary for: 1) distribution management; 2) Public awareness and dissemination; and 3) strengthening the groundwater level monitoring system and appropriate use of observation results. Through these activities, capacity of MCDC staff on continuous operation and maintenance of water supply system will be enhanced.

3. Outcome of soft component

The outcomes of the implementation of soft component are given below.

Outcome 1: Distribution management skills are enhanced.
Outcome 2: Skills in public awareness and dissemination are enhanced.
Outcome 3: Groundwater management skills are enhanced.

4. Confirmation of achievement

The method of confirming achievement level is shown in the table below.

Table 1 Confirmation of achievement

Outcomes	Description	Items for confirming achievement level	Training method
1. Distribution management skills are enhanced.	The status of hydraulics of the distribution system can be understood.	- Is there awareness on the importance of monitoring status considering operation and maintenance? - Can the distribution data required in the pilot areas[*1] be properly collected, tabulated, analyzed and charted? - Can the tabulated results of the pilot areas be properly interpreted?	Record of training and practice implementation Paper test (data analysis)
	Distribution data is used for managing distributed water	- Can non-revenue water be estimated after comparing distributed water data and metered water quantity	Record of training and practice implementation Paper test (data analysis)

Outcomes	Description	Items for confirming achievement level	Training method
	(including non-revenue water management).	(quantity on water meter) in the pilot areas? - Has the distribution method meeting intake water flow been set up?	
	Manuals related to the activities mentioned above are available.	- Have manuals for distribution management been prepared?	Confirmation of existence of distribution management manuals
2. Skills in public awareness and dissemination are enhanced.	Systems are constructed to promote public awareness and dissemination activities.	- Has the implementing organization constructed a system to promote public awareness and dissemination activities? - Has the implementing organization held explanatory meetings in the project wards? - Have the understanding and awareness of hygiene of the residents related to water supply system and services improved?	Confirmation of the result of staff selection Confirmation of holding of explanation meeting in the Project target area (ward) Confirmation of the result of questionnaire after explanation meeting
	Guidelines related to the above activities have been provided.	- Have public awareness and dissemination activity guidelines been prepared?	Confirmation of existence of public awareness and dissemination activity guidelines
3. Groundwater management skills are enhanced.	Techniques for observing, processing and analyzing groundwater levels have been acquired.	- Has an observation field book or ledger been prepared for groundwater level observations? - Can the accuracy of observation records be confirmed? - Can a record of changes in groundwater levels be prepared? - Can the distribution of groundwater levels be understood?	Record of training and practice implementation Paper test (data analysis)
	Intake amount depending on groundwater variety has been set up	- Has the method of analyzing pumping test been understood? - Has water level prediction analysis using hydraulics formula been understood? - Has the relationship between pumped volume and groundwater level change been understood? - Has intake water flow been set accounting to change of groundwater level	Record of training and practice implementation Paper test (data analysis)
	Manuals on the above-mentioned	- Have manuals on groundwater level monitoring and pumped	Confirmation of existence of manuals for groundwater

Outcomes	Description	Items for confirming achievement level	Training method
	activities have been provided.	water management been prepared?	level monitoring and capacity management of pumping up

*1: A DMA, in which house connection work has been completed, will be selected as a pilot area, and training will be constructed. DMA has been set for each of the five administrative divisions, namely Wards 2, 4, 5, 6, and 10. Select one of these wards as pilot area.

5. Soft component activities (Input plan)

Outcomes		Activity
1	Distribution management skills are enhanced.	Preparation of manuals, implementation of training related to use of data in management and analysis of distribution data, distribution management (including non-revenue water management)
2	Skills in public awareness and dissemination are enhanced.	Training in public awareness and dissemination activities, assistance in implementation (holding explanatory meetings with residents, visits to individual households, etc.) and preparation of guidelines
3	Groundwater management skills are enhanced.	Groundwater level observation techniques (portable water level gauge, automatic water level gauge), implementation of training methods for managing pumped water using groundwater level data, preparation of manuals, etc.

Detailed description of soft component activities (Input plan) is given in the table below.

Table 2 Input plan of [Outcome 1]

No.	Activity	Input	
		Japanese Side	No. of participants on Myanmar Side
1)	Preparation for training		
①	Domestic preparation (Distribution management expert)		
D-1	Preparation of transfer of technology plan	1 person × 1 day=1 person-days	—
D-2	Preparation of test, questionnaire, training text (draft)	1 person×4 day=4person-days	—
	Travel	1 person×1 day=1 person-day	—
②	Preparation of training and introductory technical briefing (Distribution management engineer)		
②-1	Preparation of training room, C/P meeting, Preparation of implementation and briefing	1 person×4 days=4 person-days	2 persons×4 days=8 person-days Chief engineer and head of distribution section
②-2	Selection of trainees (pre-test, questionnaire, evaluation, selection)	1 person×3 days=3 person-days	2person×3 day=6 person-days
②-3	Implementation of briefing	1 person×1 day=1 person-days	20 persons×1 day=20 person-days MCDC Dept. of Water and Sanitation 13 persons, 1 person from each 5 DMAs and 2 persons from TS

No.	Activity	Input	
		Japanese Side	No. of participants on Myanmar Side
Sub-total		**14 person-days**	**34 person-days**
2)	Distribution data management (Distribution management engineer)		
①	Data analysis and data utilization		
①-1	Explanation on purpose and method of collection distribution data, outline of equipment, normal and abnormal value (flow meter, water pressure gauge (lecture))	1person×2 day=2 person-days	9persons×2 day=18 person-days MCDC Dept. of Water and Sanitation 4 person, 1 person from 5 DMAs
①-2	Collection of distribution data (Explanation on the collection method of flow data transmitting to monitoring equipment and the data capture method (lecture and workshop))	1 person×3 days=3 person-days	9 persons×3 days=27 person-days
①-3	Analysis of distribution data in the pilot areas (Analysis and evaluation of the collected data on time, date, seasonal variation of water quantity and quality (lecture and workshop))	1person×2 days=2 person-days	9 persons×2 days=18 person-days
Sub-total		**7 person-days**	**63 person-days**
3)	Distribution management (Distribution management engineer)		
①	Data utilization for water distribution management and non-revenue water management (Explanation on the management method of flow volume and water pressure in the pilot areas, Identification of non-revenue water amount and the causal analysis in comparison to revenue data collected	1 person×5 days=5 person-days	9 person×5 days=45 person-days
Sub-total		**5 person-days**	**45 person-days**
4)	Preparation for manuals relevant to the abovementioned activities		
①	Preparation for a manual of distribution management	1 person×2days=2 person-days	2 persons×2 days=4 person-days
Sub-total		**2 person-days**	**4 person-days**
5)	General report (Distribution management engineer)		
①	General seminar		
①-1	Preparation for general seminar	1 person×2 days=2 person-days	9 person×2 day=18 person-days
①-2	Holding seminar	1 person×1 day=1 person-day	20 person×1 day=20 person-days
②	Preparation for report		
②-1	Soft component evaluation	1 person×1 day=1 per son-day	—
②-2	Preparation and submission of general report	1 person×1 day=1 person-day	—
Sub-total		**5 person-days**	**38 person-days**
	Travel	**1 person-days**	—
Total		**34 person-days**	**184 person-days**

[Note] the desirable number of participants and the name of department/section from the Myanmar side is assumed by JICA Study Team

Table 3 Input plan of [Outcome 2]

No.	Activity	Input	
		Japanese Side	No. of participants on Myanmar Side
1)	Preparation		
①	Domestic preparation (Institutional development/ public awareness and dissemination activity expert)		
D-1	Preparation of transfer of technology plan	1 person×1 day＝1 person-day	—
D-2	Preparation of questionnaire, training text(draft), Handout for residential meetings	1 person×4 day＝4 person-days	—
	Travel (1st fieldwork)	1 person×1 day＝1 person-day	—
2)	Assistance for institutional development for the enhancement of public awareness and dissemination activity		
①	Assistance for institutional development		
①-1	C/P meeting, Selection of the responsible staffs, Consideration of the support system	1 person×5 days＝5 person-days	2 persons×5 days＝10 person-days, Chief engineer and Revenue section
①-2	Meeting with the responsible staffs, Development of public awareness and dissemination activity plan	1 person×5 days＝5 person-days	2 persons×5 days＝ 10person-days
	Sub-total	**16 person-days**	**20 person-days**
3)	Enhancement of public awareness and dissemination activity for residential people		
①-1	Preparation of explanatory meeting for residential people, Coordination (C/P, TS offices), Preparation of handout and materials	1 person×7 days＝7 person-days	5 persons×7 days＝35 person-days, Revenue section 5 persons
①-2	Holding explanatory meeting for residential people (all 5 TSs)	1 person×5 days＝5 person-days	5 persons×5 days＝25 person-days
4)	Enhancement of new service agreements for new customers		
①-1	Enhancement of new service agreements by visiting individual household	1 person×6 days＝6 person-days	5 persons×6 days＝30 person-days
	Travel	1 person×1 day＝1 person-day	—
	Sub-total	**19 person-days**	**90 person-days**
	Travel (2nd fieldwork)	1 person×1 day＝1 person-day	—
5)	Monitoring of public awareness and dissemination activity for residential people		
①-1	Monitoring the progress of new service agreement for new customers and follow-up	1 person×10 days＝10 person-days	5 persons×10 days＝50 person-days
	Sub-total	**11 person-days**	**50 person-days**
6)	Preparation of the Guideline related to the above activity		
	Preparation of the Guideline for public awareness and dissemination activity	1 person×2 day＝2 person-days	2 persons×2 days＝4 person-days, Revenue collection section 2 person
Sub-total		**2 person-days**	**4 person-days**

No.	Activity	Input	
		Japanese Side	No. of participants on Myanmar Side
7)	General report (public awareness and dissemination for residential people)		
①	General seminar		
①-1	Preparation for general seminar	1 person×2 days=2 person-days	2 persons×2 days＝4 person-days
①-2	General seminar	1 person×1 day=1 person-day	2 person×1 days＝2 person-days
②	Preparation for final report		
②-1	Soft component evaluation	1 person×1 day=1 person-day	—
②-2	Preparation and submission of general report	1 person×1 day=1 person-day	—
	Sub-total	**5 person-days**	**6 person-days**
	Travel	**1 person-days**	—
Total		**54 person-days**	**170 person-days**

[Note] the desirable number of participants and the name of department/section from the Myanmar side is assumed by JICA Study Team

Table 4 Input plan of [Outcome 3]

No.	Activity	Introduction	
		Japanese Side	No. of participants on Myanmar Side
1)	Preparation		
□	Domestic preparation (Groundwater management expert)		
D-1	Preparation of transfer of technology plan	1 person×1 day＝1 person-day	—
D-2	Preparation of questionnaire, training text(draft), Handout for residential meetings	1 person×4 days＝4 person-days	—
	Travel	1 person×1 day＝1 person-day	—
2)	Acquisition of observation technique for groundwater level		
①-1	To implement basic lecture for observation of groundwater and observation well	1 person×1 day＝1 person-day	10 persons×1 day＝10 person-days 2 persons from Dept. of water and sanitation, 8 persons of operators from section of well/electricity/mechanic facilities in MCDC
①-2	To obtain the method of water level measurement by using potable water level gauge and database preparation	1 person×1 day＝1 person-day	10 persons×1 day＝10 person-days
①-3	To obtain the method of data preparation of recording water level gauge	1 person×1 day＝1 person-day	10 persons×1 day＝10 person-days
①-4	To obtain the calculation method of the fluctuating groundwater level and analysis method	1 person×1 day＝1 person-day	10 persons×1 day＝10 person-days
①-5	To obtain the preparation method of groundwater level distribution and analysis method	1 person×1 day＝1 person-day	10 persons×1 day＝10 person-days
	Sub-total	**11 person-days**	**50 person-days**

No.	Activity	Introduction	
		Japanese Side	No. of participants on Myanmar Side
3)	To obtain the management method of pump discharge amount by using groundwater level data		
①-1	To obtain the calculation method of fluctuating groundwater level and the analysis method of pumping test	1 person×2 days＝2 person-days	10 persons×2 day＝20 person-days
①-2	To obtain the management method of pump discharge amount by using the forecast calculated water level and actual measured water level	1 person×2 days＝2 person-days	10 persons×2 day＝20 person-days
	Sub-total	**4 person-days**	**40 person-days**
4)	Preparation of manual related to the above activities		
①-1	Preparation of manuals for groundwater monitoring and pump discharge amount management	1 person×2 days＝2 person-days	2 persons×2 days＝4 person-days
	Sub-total	**2 person-days**	**4 person-days**
5)	General seminar		
①	General seminar		
①-1	Preparation of general seminar	1 person×2 days＝2 person-days	2 persons×2 days＝4 person-days
①-2	General seminar	1 person×1 day＝1 person-day	2 persons×1 day＝2 person-days
②	Preparation for report		
②-1	Soft component evaluation	1 person×1 day＝1 person-day	―
②-2	Preparation and submission of general report	1 person×1 day＝1 person-day	―
	Sub-total	**5 person-days**	**6 person-days**
	Travel	**1 person-days**	―
Total		**23 person-days**	**100 person-days**

[Note] the desirable number of participants and the name of department/section from the Myanmar side is assumed by JICA Study Team

To ensure technical effectiveness by soft component and sustainability, selection of trainees is implemented appropriately. Based on the following requirements, MCDC and Japanese consultant will select trainees carefully.

① Should have experience in water distribution management [Outcome 1]
② Should have experience in customer service and explanation to residents [Outcome2]
③ Should have experience in groundwater management
④ Should be familiar with basic operations of the computer
⑤ Should be familiar with basic operations of basic software (MS-Excel and MS-Word)
⑥ Should be able to devote adequate time for training (at least 3 hours per day)
⑦ Should have interest in the training program

Since there is no training room in MCDC, it is necessary to prepare training space in Pyi Gyi Tagon Township office or MCDC. MCDC bears travelling expense to the training place and daily

allowance, if necessary.

6. Procurement method of implementation resources of soft component

In the soft component, the following three Japanese consultants will be dispatched to the site. Judging from the need and conditions mentioned below, the use of Japanese consultants on site is deemed appropriate. Therefore, the soft component will be implemented as direct assistance.

(1) Distribution management expert

One Japanese consultant well versed in distribution management will be dispatched.

This expert is required to be knowledgeable in hydraulics, possess experience related to formulating the distribution management plan and language skills to communicate with engineers in Myanmar, in addition to the ability to understand issues on operation and maintenance of distribution systems in developing countries.

This soft component will be implemented after the work designed by Japanese consultants and a series of main tasks such as work supervision are completed; therefore, it is appropriate that the Japanese expert who understands the specific technology through the planning and construction work stages of this project implement this soft component.

(2) Institutional development and public awareness and dissemination activity expert

One Japanese consultant well versed in institutional development and public awareness and dissemination activities for residents will be dispatched.

Since there is no section in the Department of Water and Sanitation in charge of promoting and diffusing water supply activities, there is no foundation. The staff member responsible for promoting public awareness and dissemination activities to residents will be selected from the staff of the Department of Water and Sanitation. The consultant will support the maintenance of the system so that organizational approach can be adopted. The consultant will give assistance to the staff member in charge of public awareness and dissemination activities so that the said member can appropriately promote public awareness and dissemination activities to diffuse and promote the new water supply system to be constructed under the Project. This refers to the assistance to promote and ensure new house connections. The consultant will support the staff member in building up the awareness of the importance of customer-related management by preparing the public awareness and dissemination activity plan, by holding explanatory meetings, and by individual visits. The consultant will assist in the startup of activities to promote new house connections, monitor the results after a fixed period of time, and follow-up on the same for improvement. A direct assistance is necessary for promoting the development of business services focusing specially on customers in the future and for implementing public awareness activities, by which benefits of water supply

service is disseminated as much as possible.

This soft component is to be implemented from the time of detail design stage. Institutional development and public awareness and dissemination activity expert needs to share information on the outline of waterworks, specific technology of house connections, project implementation and supervising work with Japanese consultant who conduct field survey for the detail design; therefore, it is appropriate that the Japanese expert implements this soft component.

(3) Groundwater management expert

One Japanese consultant well versed in groundwater management will be dispatched.

This expert will be required to possess knowledge on hydrogeology, experience in drilling of wells and other items related to groundwater development, language skills to communicate with the engineers of Myanmar, and the ability to understand issues on operation and maintenance of the groundwater system in developing countries.

This soft component is to be implemented after the work designed by Japanese consultants and after a series of main tasks such as work supervision are completed; therefore, it is appropriate that the Japanese expert understand the specific technology through the planning and construction work stages of this project implement this soft component.

Details of personnel dispatch plan are shown in the table below.

Table 5 Staff assignment plan

Category	No. of persons	Country	Contents
Distribution management	1	Japan	To apply distribution management technique to the site condition and trainee's technical skills and implement the following items ▪ Preparation of training text and implementation of training ▪ Preparation and evaluation of test and report homework ▪ Preparation of manuals ▪ Preparation of several kinds of format ▪ Implementation of seminar ▪ Data collection, editing and modeling ▪ Evaluation
Institutional development/ public awareness and dissemination activity	1	Japan	To apply institutional development/ public awareness and dissemination activity method to the site condition and trainee's technical skills and implement the following items ▪ Preparation of public awareness and dissemination action plan ▪ Preparation of material for stakeholder meeting ▪ Implementation of explanatory meetings ▪ Facilitation of the contract by visiting to household ▪ Information and data collection ▪ Evaluation ▪ Meeting with C/P ▪ Preparation of guideline
Groundwater management	1	Japan	To apply groundwater management technique to the site condition and trainee's technical skills and implement the following items ▪ Preparation of training text and implementation of training ▪ Preparation and evaluation of test and report homework

			▪ Preparation of manuals ▪ Preparation of several kinds of format ▪ Implementation of seminar ▪ Data collection, editing and modeling ▪ Evaluation

7. Implementation schedule of soft component

(1) Distribution data management and distribution management

The soft component requires distribution amounts measured by newly installed monitoring equipment; therefore, such work will start after the construction of facilities is completed. The target location does not cover all the planned water supply areas, but only the DMA for which water supply pipelines have been laid. Such DMA will be set as pilot area and training will be implemented. DMA has been set for each of the five administrative divisions, namely Wards 2, 4, 5, 6, and 10. One of these wards will be selected as a pilot area.

The staff member of MCDC in charge of operating the monitoring system will be trained through OJT by a Japanese contractor in the handling of the equipment before the start of the soft component. The man-days required for soft component are given below.

Actual working days	34 days	Preparation in Japan: 5 days×1 person=5 days/person In the site: 29 days×1 person=29 days/person
Man-Months (MM) converted	In Japan: 0.25MM In the Site: 1.45MM	Preparation in Japan: 0.25MM×1 person＝0.25MM (5 days/20＝0.25MM) Period of dispatch to the site: 1.45MM×1 person＝1.45MM (29 days/20=1.45 MM)

(2) Activities for public awareness and dissemination activity

The soft component will be implemented in the period of field survey in the detail survey. Willingness to install house connection of residents will be confirmed before the commencement of the work of the Project and it is necessary to arrange schedule for smooth implementation of laying work of house connection.

Activities for public awareness and dissemination will be divided into two parts. When experts are dispatched the first time, preparations for and assistance in implementing the public awareness and dissemination activities will be carried out; subsequently, MCDC will continue the public awareness and dissemination activities. When the experts are dispatched for the second time, mainly the monitoring of public awareness and dissemination activities taken over by MCDC will be carried out. The timing for dispatch of experts the second time will be about one to two months after the dispatch the first time.

The water service connection laying work is estimated to start the 5^{th} or 6^{th} month after the

completion of the manufacture and procurement of water meters after start of the construction work. This work will be implemented after the dispatch of experts the second time and after take-over of public awareness and dissemination activities by MCDC; therefore, the work processes can be implemented sequentially after concluding agreements and contracts related to house connections of the residents.

Actual working days	54 days	Preparation in Japan: 5 days×1 person=5 days/person In the site: 49 days×1 person=49 days/person
Man-Months (MM) converted:	In Japan: 0.25MM In the Site: 2.45MM (1.50+0.95)	Preparation in Japan: 0.25MM×1 person＝0.25MM (5 days/20＝0.25MM) Period of dispatch to the site: (First round): 1.50MM×1 person ＝1.50MM (30 days/20=1.50MM) Period of dispatch to the site: (Second round): 0.90MM×1 person＝0.90MM (19 days/20=0.95MM)

(3) Strengthening groundwater monitoring systems and appropriately using the observation results

The soft component will be implemented after the completion of the construction work of wells in this project. The man-days required for soft component are given below.

Actual working days	23 days	Preparation in Japan: 5 days×1 person=5 days/person In the site: 18 days×1 person=18 days/person
Man-Months (MM) converted:	In Japan: 0.25MM In the Site: 0.90MM	Period of dispatch to the site: 0.25MM×1 person＝0.25MM (5 days/20＝0.25MM) Period of dispatch to the site: 0.90MM×1 person＝0.90MM (18 days/20=0.90MM)

Implementation plan for soft component is shown in the following tables.

Table 6 Implementation plan [Outcome 1]

Activity		1st Month after completion of the Work				2nd Month after completion of the Work			
		Week 1	Week2	Week3	Week4	Week 1	Week2	Week3	Week4
The soft component for distribution management will be started after completion of the Work (33th months after E/N).									
Distribution Management	【Output 1】								
	Domestic preparation								
	Preparation for implementation, Seminar for application technology								
	1-1. Doistribution data management								
	1-1-1. Distribution data analysis and utilization								
	1-2. Distribution water management								
	1-2-1. Datautilization for distribution managament and Non-Revenuw Water management								
	General report (general seminar, preparation and submission of report)								

Table 7 Implementation plan [Outcome 2]

Activity		1st Month after commencement of detail design				2nd Month after commencement of detail design				3rd Month after commencement of detail design				4th Month after commencement of detail design				5th Month after commencement of detail design			
		Week 1	Week2	Week3	Week4	Week 1	Week2	Week3	Week4	Week 1	Week2	Week3	Week4	Week 1	Week2	Week3	Week4	Week 1	Week2	Week3	Week4
The soft component for enhancement of public awareness and dissemination activity for residential people will be started after one month of commencement of detail design.	Field survey of detail design					Domestic work of detail design															
Enhancement of public awareness and dissemination activity for residential people	【Output 2】 Enhancement of IEC activity for residential people and of the service agreement for new customers																				
	Domestic preparation																				
	2-1. Assistance for institutional development for the enhancement of IEC activity																				
	2-1-1. Selection of the responsible staffs for public awareness and dissemination activity																				
	2-1-2. Assistance for development of public awareness and dissemination activity plan																				
	2-2. Explanatory meetings for residential people (2 townships)																				
	2-2-1. Preparation of explanatory meetings for residential people, and coordination																				
	2-2-2. Implementation of explanatory meetings (each township of the Project area)																				
	2-3. Enhancement of new service agreements for new customers																				
	2-3-1. Enhancement of new service agreements by visiting individual household			1st Fieldwork																	
	Continuous public awareness and dissemination activities by MCDC								Public awareness and dissemination activity will be continued by MCDC												
	2-4. Monitoring of public awareness and dissemination activity for residential people														2nd Fieldwork						
	2-4-1. Monitoring the progress of new service agreement and follow-up																				
	General report (general seminar, preparation and submission of report)																				

Table 8 Implementation plan [Outcome 3]

Activity		1st Month after completion of construction work for intake well			
		Week 1	Week2	Week3	Week4
The soft component for groundwater resource management will be started after completion of construction work for intake well.					
Groundwater resource management	【Output 3】				
	Domestic preparation				
	3-1. Lecture on basics for monitoring groundwater level and observation wells				
	3-2. Water level measurement by using potable water level gauge and database preparation				
	3-3. Method of data preparation of recording water level gauge				
	3-4. Calculation method of fluctuating groundwater level and analysis				
	3-5. Preparation method of fluctuating groundwater level distribution and analysis				
	3-6. Management method of pump discharge amount by using the forecast calculated water level and actual measured water level				
	3-7. Management method of pump discharge amount				
	3-8. Preparation of manuals for groundwater monitoring and pump discharge amount management				
	General report (general seminar, preparation and submission of report)				

8. Outcomes of soft component

The outcomes of soft component are given below.

Deliverables	Submission timing
Soft component plan report	Starting time
Progress report of soft component implementation	Commencement time of activity for outcome 1
Completion report of soft component	Completion time
[Outcome 1] : Distribution data management and distribution management Training material, input distribution data and distribution management manual	Completion time
[Outcome 2] : Activities for informing, educating and communicating with residents Training material, public awareness and dissemination activity plan, PR material, Attendees list of explanatory meeting, customer list of new house connection and public awareness and dissemination activity guideline	Completion time
[Outcome 3] : Strengthening groundwater monitoring systems and appropriately using the observation results Groundwater level monitoring and pumped volume management manual	Completion time

9. Obligations of the counterpart organizations

(1) Responsibility

The responsibility of MCDC for implementation of soft component is as follows..

1. Soft component will be led by MCDC initiative
2. MCDC assigns required staff members (operators and trainees) when required
3. MCDC pays daily allowance and transportation fee to trainees
4. MCDC implements monitoring activities (Water distribution and groundwater management)

(2) Feasibility for implementation

1) Water distribution data management and water distribution management

The Department of Water and Sanitation of MCDC is aware of the need in future for operation and maintenance after understanding the distribution water quantity and water pressure using monitoring equipment; therefore it has basically ensured the continuity of the work. This awareness is present at the Chief Engineer level and the Distribution Department Head level, that is, at the level of the decision makers. Therefore, the implementation of this component is feasible. This awareness will be adequately shared this time mainly by the trainees, that is, the operation and maintenance staff of the BPS No. 7 and the staff of the wards and staff of the Pyi Gyi Tagon TS.

2) Public awareness and dissemination activity for residents

The Department of Water and Sanitation of MCDC will decide the person in charge, and the top management of the department starting with the Chief Engineer, are adequately aware of the importance of the implementation of this component, so the implementation of this component is feasible.

3) Strengthening the groundwater monitoring system and appropriate use of observation results

The main water source used in the water supply project this time is groundwater. Since responsible personnel of the MCDC Water Supply and Sanitation Department related to groundwater development are already assigned, all top management members of the department starting with the Chief Engineer are adequately aware of the importance of this component; so the implementation of this component is feasible.

(2) Inhibiting factors and countermeasures

Reassignment or transfer of trainees and absence due to often routine work during monitoring and training activities are an inhibiting factor. Measures for holding back this reassignment or transfer of the trainees will be required. If it is difficult to use part of the additional working time by routine work being carried out until now, the senior supervisor should be instructed to assign the trainee as the sole person in charge of managing the monitoring system.

(3) Continual approach

1) Distribution data management and distribution management

MCDC must use the data acquired from the monitoring system, consider the content of the same and submit the distribution management report to the decision maker every month to achieve the goal of the soft component.

2) Public awareness and dissemination activity for residents

To achieve the goal of the soft component, the MCDC Department of Water and Sanitation must supervise activities such that the constructed activity system functions properly, cooperate with the Township office, and continuously perform the public awareness activities.

3) Strengthening the groundwater monitoring system and appropriately using the observation results

MCDC must use the data acquired from monitoring activities, consider the content of the same and submit the groundwater management report to the decision maker every month to achieve the goal of the soft component.