Minutes of Discussions
on the Preparatory Survey for the Project for
Upgrading Road Maintenance Equipment in Addis Ababa City
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Addis Ababa City Roads Authority (hereinafter referred to as "AACRA") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") each on March 21, 2019 in response to the request from the Government of the Federal Democratic Republic of Ethiopia (hereinafter referred to as "Ethiopia"), JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Upgrading Road Maintenance Equipment in Addis Ababa City (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Addis Ababa, August 29, 2019

Mr. Takeshi Matsuyama
Leader, Preparatory Survey Team
Senior Representative
JICA Ethiopia Office

Mr. Moges Tibebu
Director General
Addis Ababa City Roads Authority
The Federal Democratic Republic
of Ethiopia

As witness:

Mr. Kokeb Misrak
Director
Bilateral Cooperation Directorate
Ministry of Finance
The Federal Democratic Republic
of Ethiopia

ATTACHMENT

1. Objective of the Project

   The objective of the Project is to achieve adequate road operation and maintenance and improve road conditions by providing equipment for road construction and maintenance, thereby contributing to improve economy and access to social services in Addis Ababa.

2. Title of the Preparatory Survey

   Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Upgrading Road Maintenance Equipment in Addis Ababa City".

3. Project Site

   Both sides confirmed that the sites of the Project are in Addis Ababa, which is shown in Annex 1.

4. Responsible Authority for the Project

   Both sides confirmed the authorities responsible for the Project are as follows:

   4-1. AACRA will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

   4-2. Addis Ababa City Administration shall be responsible for supervising the Executing Agency on behalf of the Government of Ethiopia.

5. Contents of the Draft Report

   After the explanation of the contents of the Draft Report by the Team, the Ethiopian side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Ethiopian side around December, 2019 . Equipment List is shown in Annex 3.

6. Cost Estimation

   Both sides confirmed that the cost estimate explained by the Team is provisional and will be examined further by the Government of Japan for its approval. The current cost estimation is shown in Annex 4.

7. Confidentiality of the Cost Estimation and Technical Specifications
Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant
The Ethiopian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 5, 6 and 7 shall be applied to the Project. In addition, the Ethiopian side agreed to take necessary measures according to the procedures.

9. Timeline for the Project Implementation
The Team explained to the Ethiopian side that the expected timeline for the project implementation is as attached in Annex 8.

10. Expected Outcomes and Indicators
Both sides agreed that key indicators for expected outcomes are as follows. The Ethiopian side will be responsible for the achievement of agreed key indicators targeted in year 2024 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative Effect]

	Indicator	Current Figure (Year 2019)	Target Figure (Year 2024)
1	Length of Annual Road Pavement & Rehabilitation (km)	113	140
2	Percentage of Operational Equipment (%)	79	88

[Qualitative Effect]

- Improved traffic safety by increased road pavements in Addis Ababa city.
- Improved transport efficiency and improved urban economy by shortening traffic time and reducing traffic costs which caused by increased road pavements in Addis Ababa city.
- Improved citizens' access to social services such as schools and health facilities by increased road pavements in Addis Ababa city.

11. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Ethiopian side is required to provide necessary support for the data collection.

12. Technical Assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the products and services granted through the Project, following technical assistance is planned under the Project. The Ethiopian side confirmed to deploy necessary number of counterparts who are appropriate and competent in terms of its purpose of the technical assistance as described in the Draft Report.

13. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 9.

13-1. Tax Issues

Regarding indirect taxes such as Custom Duties, VAT and Stamp duties etc., which may be imposed in Ethiopia with respect to the purchase of the products and the services to be exempted by Ministry of Finance or borne by the Executing Agency without using the Grant. However, with respect to direct taxes such as corporate taxes and personal income taxes, both sides understand that further discussion will be necessary between the Government of Japan and the Government of Ethiopia.

13-2. New Equipment Management Center

The Ethiopian side explained that the Executing Agency plans to construct New Equipment Management Center in two phases as shown in Annex 10. The first phase consists of basic infrastructure, such as parking lot, storage for spare parts and workshop for equipment maintenance. The Executing Agency will finish the first phase by the end of October 2020 to store all the equipment and spare parts procured by the Project.

The Executing Agency also explained that they finish the second phase by the end of October 2022 as shown in Annex 10. The second phase consists of developing other facilities such as workshop.

13-3. Security Measures

Both sides confirmed that the Executing Agency shall take necessary measures to

ensure and maintain the security of the Project site and the persons related to the implementation of the Project, in cooperation with relevant authorities during the Project period. Such security measures shall reasonably reflect needs of the Consultant/the Supplier(s) engaging in the Project, as shown in Annex 8.

Both sides agreed that in case the additional security cost would be necessary for the implementation of the Project, such cost shall be borne by the Executing Agency without using the Grant.

14. Monitoring during the Implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 11. The timing of submission of the PMR is described in Annex 9.

15. Project Completion

Both sides confirmed that the Project completes when all the facilities constructed and equipment procured by the Grant are in operation. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

16. Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as C because the Project is likely to have minimal adverse impact on the environment under the Guidelines.

17. Other Relevant Issues

17-1. Annual Road Pavement and Rehabilitation

As shown in the indicator 1 of article 10, both side confirmed that the Executing Agency will conduct 140 km road pavement and rehabilitation annually by 2024. Both sides confirmed that the Ethiopian side shall secure enough budget and personnel necessary for the annual road pavement and rehabilitation by utilizing equipment procured by the Project.

17-2. Operation and Maintenance of the Equipment

As shown in the indicator 2 of article 10, both side confirmed that the Executing Agency will increase percentage of operational equipment from 79% to 88% by 2024.

The Team explained the importance of operation and maintenance of equipment considering that proper asset management affects greatly on life span of equipment and its maintenance cost. The Team also emphasized the necessity to take advantage of the Soft Component to develop capacity of the Executing Agency to repair and maintain equipment properly.

The Ethiopian side explained that the Executing Agency shall secure enough staff and budgets necessary for appropriate operation and maintenance of equipment.

17-3. Procurement of Spare Parts

The Team explained the procurement method of spare parts for the equipment based on the Draft Report. While official agents in Ethiopia can provide major spare parts, there is no official agent available for some minor spare parts.

To procure those minor spare parts, the Executing Agency, can contact with local contact point(s) for making orders. A list of local contact point(s) is/are shown with the Certificate of After Sales Services that will be informed to the Executing Agency at the implementation stage.

17-4. Safety Measures

The Ethiopian side understood the importance of safety measures in construction and service stage based on "The Guidance for the Management of Safety for Construction Works in Japanese ODA Projects" published on JICA's URL below.

http://www.jica.go.jp/activities/schemes/oda_safety/ku57pq00001nz4eu-att/guidance_en.pdf

17-5. Misconduct

If JICA receives information related to suspected corrupt or fraudulent practices in the implementation of the Project, the Executing Agency and relevant organizations shall provide JICA with additional information, including information related to any concerned official of the government and/or public organizations in Ethiopia.

The Executing Agency and relevant organizations shall not, unfairly or unfavorably treat the person(s) and/or company which provided the information related to suspected corrupt or fraudulent practices in the implementation of the Project.

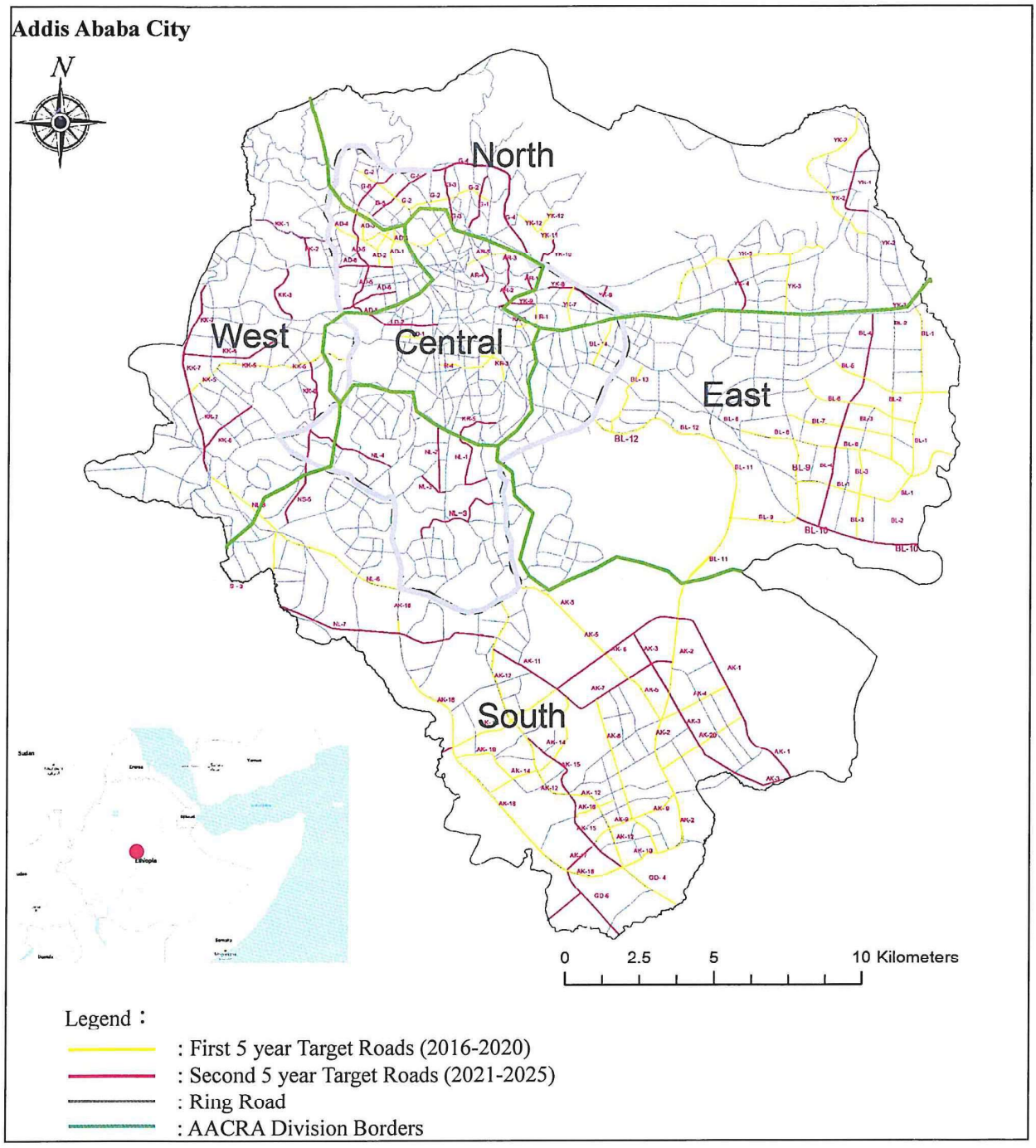
17-6. Disclosure of Information

Both sides confirmed that the study results excluding the Project cost will be disclosed to the public after completion of the Preparatory Survey. All the study

results including the Project cost will be disclosed to the public after all the contracts for the Project are concluded.

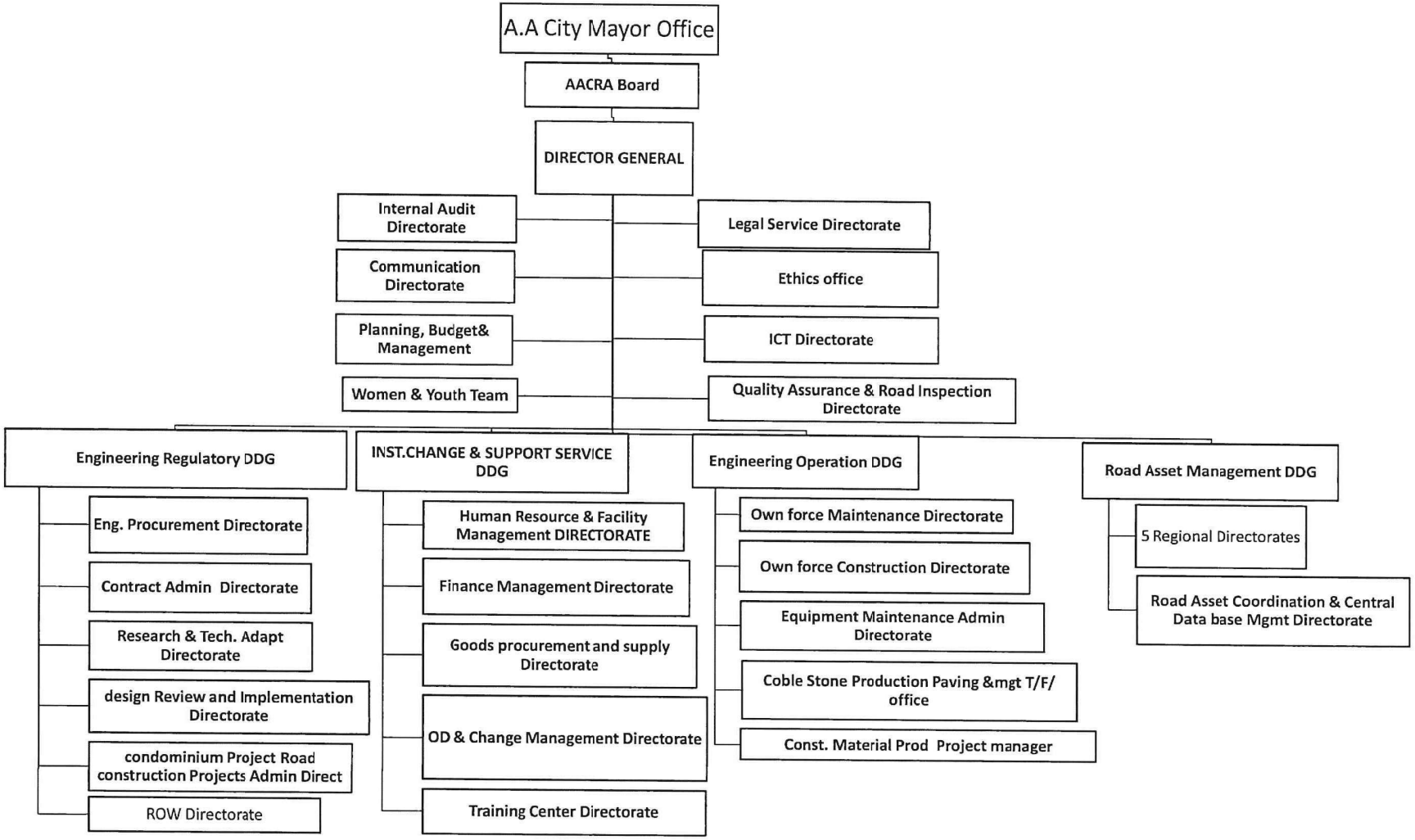
Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Equipment List
Annex 4 Project Cost Estimation
Annex 5 Japanese Grant
Annex 6 Procedure of Japanese Grant
Annex 7 Financial Flow of Japanese Grant
Annex 8 Project Implementation Schedule
Annex 9 Major Undertakings to be taken by Government of Ethiopia
Annex 10 Schedule for New Equipment Management Center
Annex 11 Project Monitoring Report (template)

Project Site



Annex 2

Organization Chart



Annex 3

Equipment List

No.	Equipment	Quantity
(1) Road Maintenance Equipment		
1	Wheel Loader	3
2	Backhoe Loader	7
3	Excavator	5
4	Road Stabilizer	1
5	Sheep Foot Compactor	5
6	Vibratory Tandem Roller	5
7	Tire Roller	3
8	Water Bowser	3
9	Dump Truck	10
10	Cab-back Crane (3t)	2
11	Cab-back Crane (8t)	1
12	Aerial Work Platform Vehicle	4
13	High-pressure Drainage Cleaning Vehicle	3
14	Vacuum Tank Truck	3
15	Bitumen Distributor	3
16	Asphalt Burner	5
17	Asphalt Cutter	5
18	Asphalt Crack Sealer	5
19	Air Compressor	4
20	Air Breaker	5
21	Asphalt Mixer	3
22	Asphalt Plant	1
23	Mobile Workshop	1
(2) Workshop Equipment		
24	Container Workshop	1
25	Tire Changer	2
26	Portable Gantry Crane	2
27	Wheel Dolly	2
28	High Pressure Washer	5
29	Hot Water High Pressure Washer	1
30	Engine Driven Welding Generator	2
31	AC Arc Welding	4
32	Portable Motor Driven Air Compressor	2
33	Parts Washing Stand	3
34	Jacks	2
35	Desktop Computer	1
36	Database Software	1

PROJECT COST ESTIMATION

1. Cost Estimation Borne by the Government of Japan

This chapter is closed due to the confidenciality.

2. Cost Estimation Borne by the Government of Ethiopia

Item		Estimated Cost (USD)
Preparation for the delivery of equipment	Securing equipment yards and a storage for spare parts	27,000
	Securing the asphalt plant yards, leveling, storage for materials and equipment, security measures, etc.	18,000
Cost for operation and maintenance training for the Road Stabilizer	Pilot works and mix design	9,000
	Preparation of pilot works and asphalt pavement works after training	27,000
Bank Commissions		18,000
TOTAL		**99,000**

The Ethiopia side is supposed to provide the budget of approximately USD 39 million in order to implement the target roads construction and maintenance in the year 2021 to 2024.

Notes:

1) Conditions of cost estimation
   - Estimated timing: April 2019
   - Exchange rates: USD 1.00 = JPY 111.21

2) Others

The project is implemented in accordance with the system of Japanese Grant. The above cost estimation does not assure the ceiling cost on the E/N and will be reviewed by the Government of Japan before the conclusion of E/N between the two governments.

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

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

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of

relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve 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 executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

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

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the

Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

Annex 6

PROCEDURES OF JAPANESE GRANT

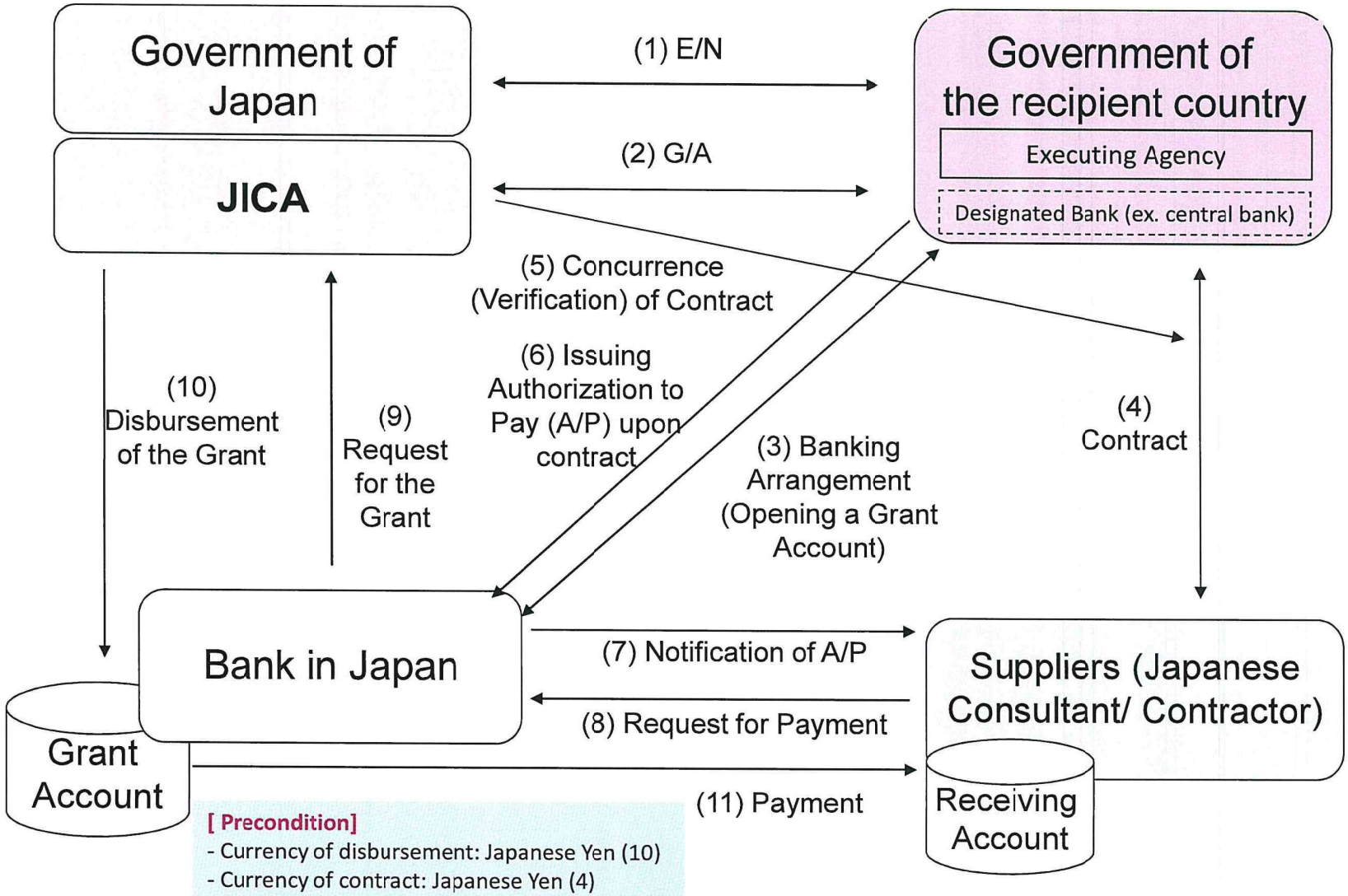
Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

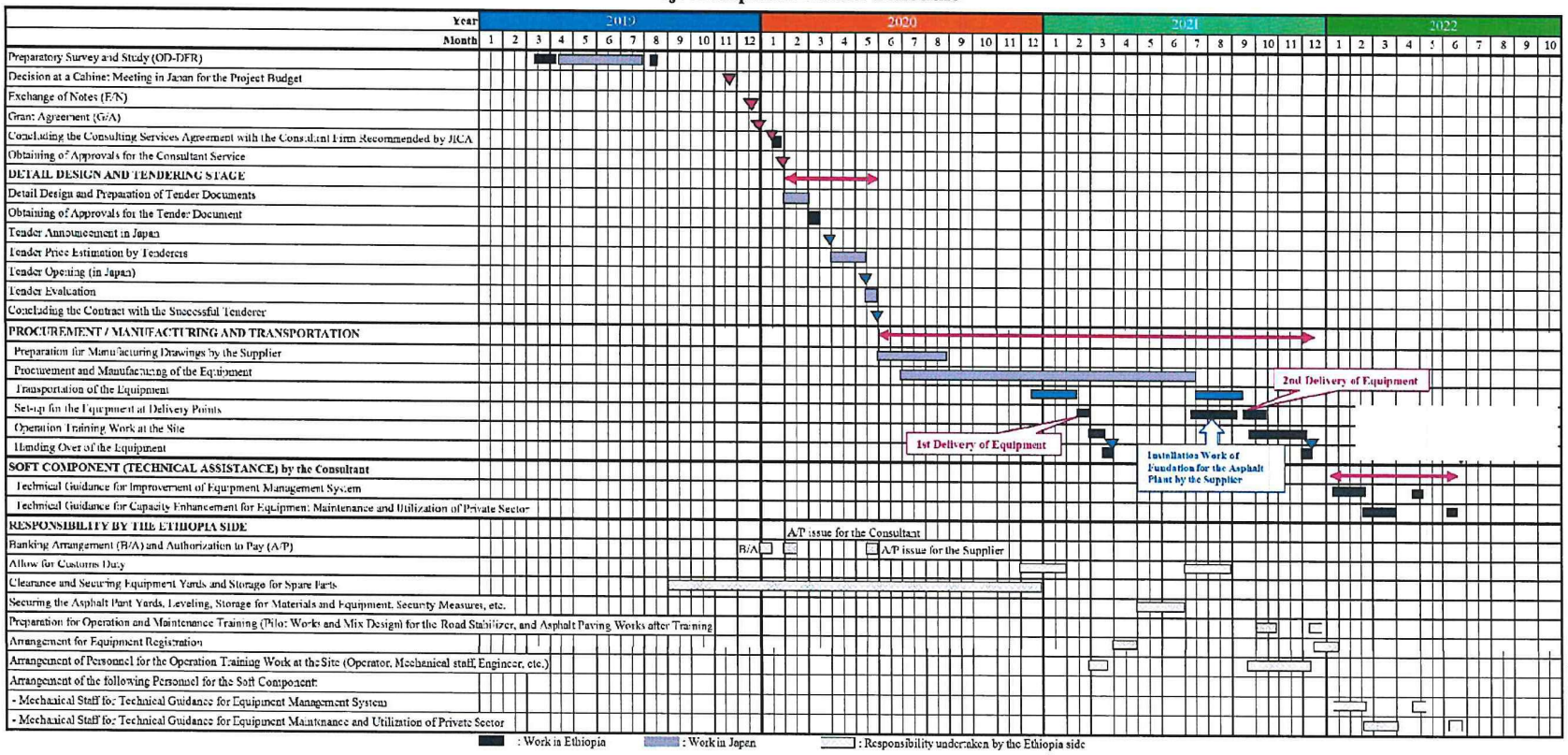
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

Financial Flow of Japanese Grant (A/P Type)



Annex 8

Project Implementation Schedule



Note: The schedule is only tentative at this stage and the implementation schedule is going to be determined by the Japanese side concerning the realization of the Project.

Annex 9

Major Undertakings to be taken by the Government of Ethiopia

1. Specific obligations of the Government of Ethiopia which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost (USD)	Ref.
1	To open bank account (B/A)	within 1 month after the signing of the G/A	[TBD]	100	
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract(s)	[TBD]		
3	1) Payment commission for A/P	within 1 month after the signing of the consulting services agreement	AACRA	17,900	
4	To submit the Project Monitoring Report (with the result of Detail Design)	before preparation of bidding document(s)	AACRA	N/A	

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

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost (USD)	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after the signing of the contract(s)	[TBD]		
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	AACRA	This cost is included in Item No.2 of above "(1) Before the Bidding".	
	2) Payment commission for A/P	every payment	AACRA		
3	To construct a new equipment management center for the garage of equipment and spare parts	before the delivery of equipment	AACRA	27,000	
4	To secure and clear the sites for the Asphalt Plant and leveling, storage for materials and equipment, security measures, etc.	before the delivery of equipment	AACRA	18,000	
5	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in the country of the Recipient	during the Project	AACRA	N/A	
6	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be	during the Project	AACRA	N/A	

	necessary for their entry into the country of the Recipient and stay therein for the performance of their work				
7	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted or be borne by its designated authority without using the Grant;	during the Project	AACRA		
8	To secure costs for operation and maintenance training for the Road Stabilizer which will be supplied under the Project				
	1) Pilot works and mix design	before the delivery of equipment	AACRA	9,000	
	2) Preparation of pilot works, and asphalt pavement works after training	before the delivery of equipment	AACRA	27,000	
9	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	AACRA		
10	1) To submit the Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within one month after completion of each work	AACRA		
	2) To submit the Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)	AACRA	N/A	
11	To submit a report concerning completion of the Project	within six months after completion of the Project	AACRA	N/A	

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost (USD)	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	AACRA	N/A	

2. Other obligations of the Government of Ethiopia funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To procure equipment 1) To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country a) Marin (Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the port of disembarkation to the project site		
	2) To provide equipment with installation and commissioning		

2	To implement detailed design, bidding support and procurement supervision (Consulting Service)		
	Total		

*The Amount is provisional. This is subject to the approval of the Government of Japan.

Schedule for New Equipment Management Center

Year	2019					2020												2021			
Month	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
Preliminary Design																					
Cost Estimation																					
Request for Budget																					
Developing Parking Lot, Basic Workshop and Storage for Spare Parts (Phase 1)																					
Delivery of the Project Equipment																					
Developing Other Workshop Facilities, etc. for Extension of the Center (Phase 2)																					

Note: Phase 2 is scheduled to be completed within 2 year.

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Line Ministry	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks *(at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
5. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
6. Pictures (by JPEG style by CD-R) (PMR (final)only)
7. Equipment List (PMR (final)only)
8. Drawing (PMR (final)only)
9. Report on RD (After project)

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

		Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost		(A/D%)	(B/D%)	(C/D%)	
	Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
	others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost		(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost		(A/D%)	(B/D%)	(C/D%)	
Total		(A/D%)	(B/D%)	(C/D%)	

APPENDIX 5

SOFT COMPONENT (TECHNICAL ASSISTANCE) PLAN

Preparatory Survey

for the Project for Upgrading Road Maintenance Equipment in

Addis Ababa City

in the Federal Democratic Republic of Ethiopia

Soft Component (Technical Assistance) Plan

June 2019

Yachiyo Engineering Co., Ltd.

Contents

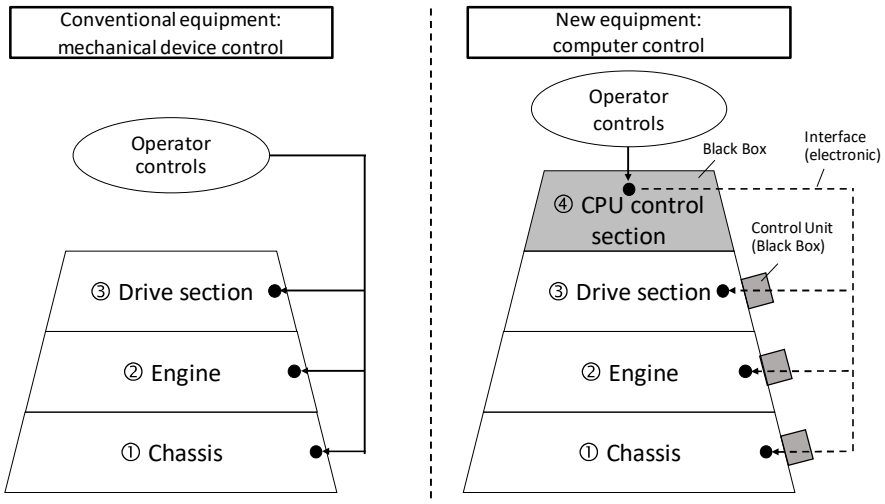
1. Background of the Soft Component

The Project for Upgrading Road Maintenance Equipment in Addis Ababa City in the Federal Democratic Republic of Ethiopia (herein after referred to as the Project) is aimed to enhance road maintenance in Addis Ababa City in the Federal Democratic Republic of Ethiopia (herein after referred to as Ethiopia). The Project is provided based on equipment procurement in order to supply road maintenance equipment for road maintenance under the management of the Addis Ababa City Road Authority (herein after referred to as AACRA), which is an implementing agency, and also to manage road maintenance equipment properly.

1-1. Trends surrounding the Public Construction Equipment Sector

In Japan, due to the downsizing of public works investment from the 1980s, construction operators were faced with difficulties in securing parking spaces for their owned construction equipment, up keeping maintenance facilities, sustaining the operating rates of owned equipment and so on, leading to greater moves towards reviewing cost and efficiency in equipment operation and maintenance. As a result, construction equipment service operators (construction equipment lease operators, etc.) possessing equipment repair and maintenance facilities (workshops) and service personnel gradually became more widespread. From the 1990s into the 2000s, in line with the spread of private sector service operators, the Japanese construction equipment sector saw a maturing of the business model whereby private sector service operators lease and sell construction equipment to construction firms commensurate with the domestic demand for construction works, and also provide repair, maintenance services, etc. based on comprehensive maintenance contracts.

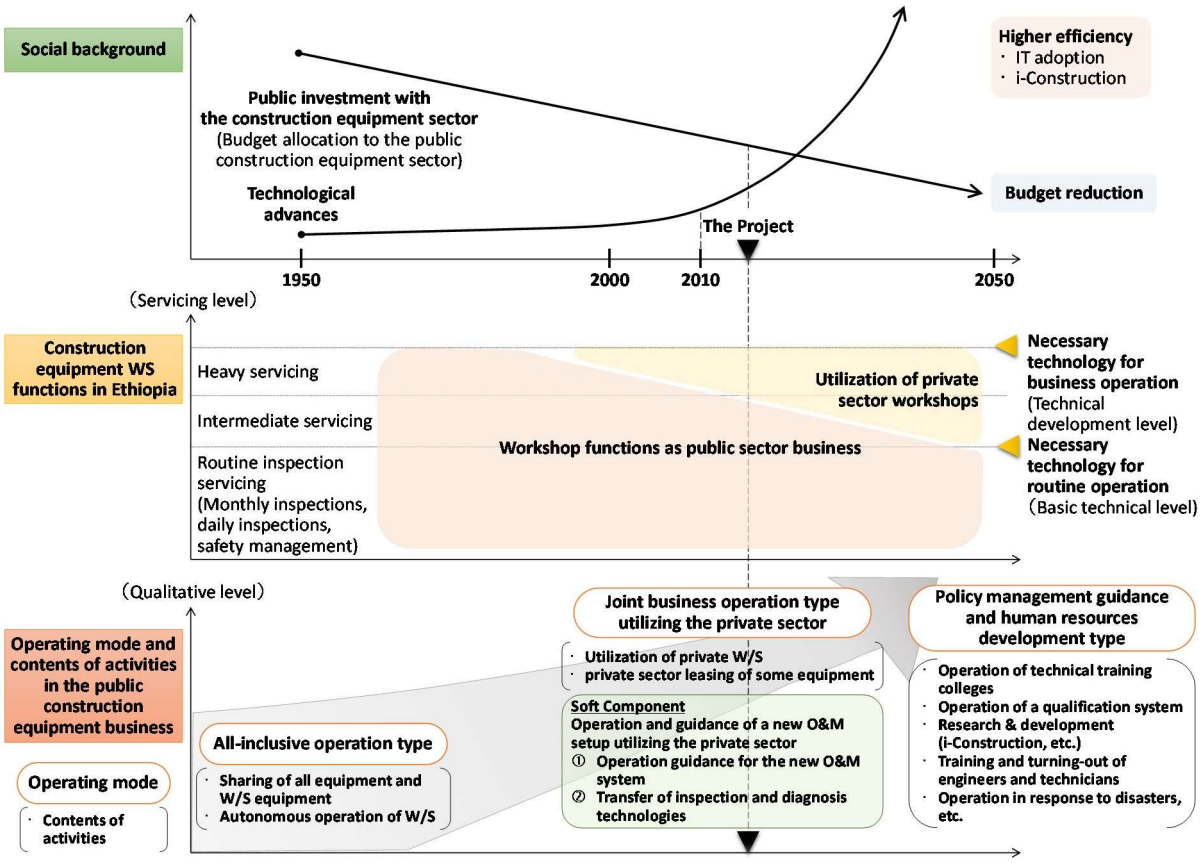
Moreover, in recent years, the latest construction equipment manufactured by makers in Japan, Europe and America is witnessing technical innovation geared to ① enhanced mechanical performance and quality, ② reduction of manufacturing and maintenance costs, ③ greater efficiency of repair services, etc. when breakdowns occur, and so on. In Japan, especially, from around 2010, utilization of digital technology has become conspicuous in the construction equipment sector, resulting in a transition to computer-controlled systems that enable automation, labor saving, and higher performance compared to the conventional equipment and devices (see Figure 1-1). In line with such advances in computer-control technology, the internal structures and operating principles of equipment and equipment have tended to become so complex that only the developing manufacturers and their agents can understand them, i.e. the technology is increasingly becoming a black box. Accordingly, in Japan and advanced Western countries, concerning medium- and large-scale repairs and maintenance exceeding the level of routine repairs and maintenance, due to technical and structural factors in state-of-the-art equipment, work is being switched to systems that utilize maintenance services based on the specialized technologies of manufacturers and their agents.



Source: Prepared by the Survey Team

Figure 1-1 Transitions in Equipment Control System

Based on the conditions described above in the public construction equipment sector, Figure 1-2 shows the scope of work of construction equipment workshop functions that utilize private sector services, and the development model of the sector corresponding to the changing operating mode of the public construction equipment business. Due to changes in the mode of service and latest technologies in the construction equipment sector, construction firms (construction equipment users) have departed from the system of autonomously implementing equipment repairs and maintenance, while a system of social division of labor has been established between construction firms, construction equipment lease operators, and equipment manufacturers and agents for operating and managing construction equipment over the course of its service life. Moreover, advanced Western nations and, more recently, countries that follow their lead, are replicating the Japanese model as they promote innovation of equipment and technology and seek greater efficiency. Moreover, it is expected that a similar trend will also be seen in developing countries in future.



Source: Prepared by the Survey Team

Figure 1-2 Development Model for the Public Construction Equipment Sector

Considering this trend, in the construction equipment sector in Ethiopia, too, it is expected that local private sector equipment service operators and construction firms will be developed and become more widespread from now on, and that the roles of the private sector and public sector will be clarified, with AACRA, in its capacity as road manager and ordering client, switching to an operating setup in which it fosters and guides the private sector. However, considering the degree of private sector development and technological levels in the construction and construction equipment sector in Ethiopia, the country is thought to be going through a transitional phase and may require between 10 years and a few decades to achieve the level of business operation based on private sector cooperation that is seen in the advanced countries.

1-2 Current Conditions and Issues in Equipment Operation and Maintenance

AACRA, the implementing agency for the Project, owns around 580 units of road maintenance equipment, which it uses to directly conduct maintenance work on the municipal roads and highways under its jurisdiction. The existing equipment currently owned by AACRA is centrally managed by the Vehicles and Construction Equipment Administration and Maintenance Center (herein after referred to as the Equipment Management Center) under the Equipment Supply, Administration and Maintenance Directorate, which is in charge of AACRA's equipment operation and maintenance. The Equipment Management Center is in charge of assigning equipment for use in road repairs and maintenance

implemented by AACRA, procuring equipment bodies and parts, servicing and maintaining owned equipment and so on, and the Center's facilities include a workshop for implementing equipment repairs and maintenance. The scope of work of equipment repairs and maintenance by the Equipment Management Center extends to periodic servicing, inspections, adjustments and light repairs and maintenance corresponding to the workshop's equipment and technical level, and the workshop mechanics responsible for performing equipment repair and maintenance possess a certain degree of technical skill. Meanwhile, concerning repairs and maintenance work of medium or larger scale that are beyond the technical capacity of such mechanics, AACRA consigns repairs and maintenance to private sector equipment service operators (maker's agents) situated in Addis Ababa City. Table 1-1 shows the current division of services between AACRA and private sector operators according to the level of equipment repair and maintenance.

Table 1-1 Current Division of Equipment Repair and Maintenance between AACRA and Private Sector Operators

Service level	Type of equipment servicing and repair	Main work items	Implementation division		
			Road Authority		Private sector
			Central	Local base	
1 Light	Periodic servicing	Oil change, lubrication, etc.	○	○	
2	Inspections and adjustments	Brake adjustment, tire adjustment, etc.	○	○	
3	Light servicing and repair	Clutch overhaul, parts replacement, etc.	○		
4	Complete disassembly and repair of major equipment	Engines, transmissions, etc.	○		○ (Targeting precision parts)
5	Inspection, diagnosis, repair of breakdowns in digital devices	Engines, transmissions, hydraulic control units, etc.			○ (Inspection, diagnosis, repair)
6 Heavy	Complete disassembly, repair and refitting of equipment	Heavier servicing than above			○

Under such circumstances, to ensure that AACRA implements appropriate and sound operation and maintenance of the Project equipment and existing equipment over its service life, it will be necessary to actively seek utilization of private sector services corresponding to the level of servicing, while maintaining the current system of directly managed operations. However, due to lack of technical proficiency among mechanics in AACRA, equipment operation and maintenance problems such as indicated in Table 1-2 have been reported in recent times. The issue at hand is that capacity building is needed to resolve such problems and thereby enable a system of work division with private sector services to be established.

Table 1-2 Reported Problems Concerning Utilization of the Private Sector and Their Solutions

Reported problems		Subsequent problems	Issues for resolution
Case 1	Excessive inventory of spare parts	Higher spare parts purchase costs, inefficient operation of stores	Grasp the replacement cycles for spare parts, and avoid inflated costs due to excessive purchasing.
Case 2	Inventory shortages of spare parts due to delays in purchasing	Reduced equipment operating rates and work delays due to delays in replacement of spare parts	Grasp the replacement cycles for spare parts, and implement timely and appropriate equipment servicing based on appropriate inventory management.
Case 3	Failure to share equipment operating conditions, servicing histories, etc. with managers	Delays in equipment repairs and maintenance, and work delays due to lack of unified management by the department	Unified information sharing for equipment operation and management
Case 4	Acceptance of excessive repairs not commensurate with the level of breakdown	Increase in unnecessary repair costs	Acquire basic knowledge related to equipment diagnosis, and determine appropriate repair contents based on the results of diagnosis. Moreover, implement safe and appropriate repair and maintenance work making use of workshop equipment when independently conducting repairs.

To resolve the issues described in Table 1-2, support is needed for the following measures: ① enhancement of appropriate equipment repairs and maintenance and spare parts management corresponding to equipment operation records, ② building the equipment management information communication system for sharing equipment operation and management information, ③ enhancement of the capacity for determining appropriate repair contents based on equipment fault diagnosis, and ④ building the capacity for safe and accurate equipment repair and maintenance.

1-3 Basic Policy of the Project Soft Component

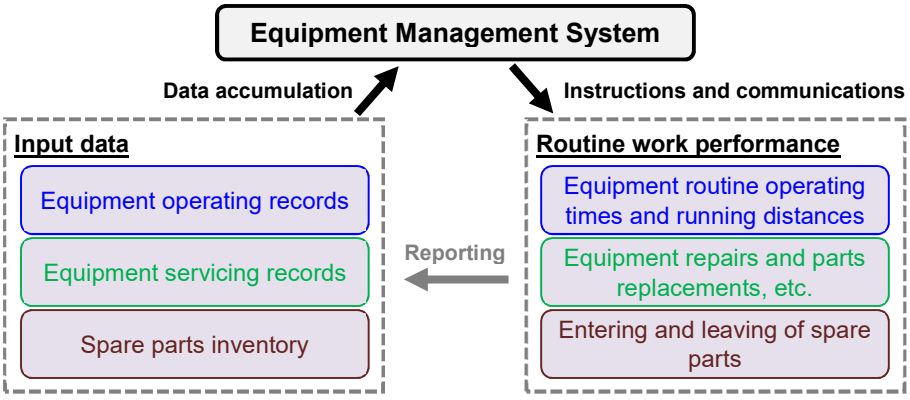
Table 1-3 shows the implementation contents of the soft component in the Project in light of the issues for resolution described above.

Table 1-3 Support for Construction of the Equipment Operation and Maintenance Setup based on the Soft Component

Item	Outline of activities	Remarks
(1) Improvement of the equipment management system	Support for introduction and operation of a computer-based equipment management system and building of the equipment management information communication system utilizing mobile devices.	Corresponding to issues for resolution under Cases 1, 2 and 3 in Table 1-2
(2) Strengthening of equipment servicing and private sector utilization capacity	Enhancement of AACRA's repair technology and capacity for utilizing private sector repair and maintenance services through acquisition of diagnosis technology utilizing fault diagnosis device and stocking of know-how.	Corresponding to issues for resolution under Case 4 in Table 1-2

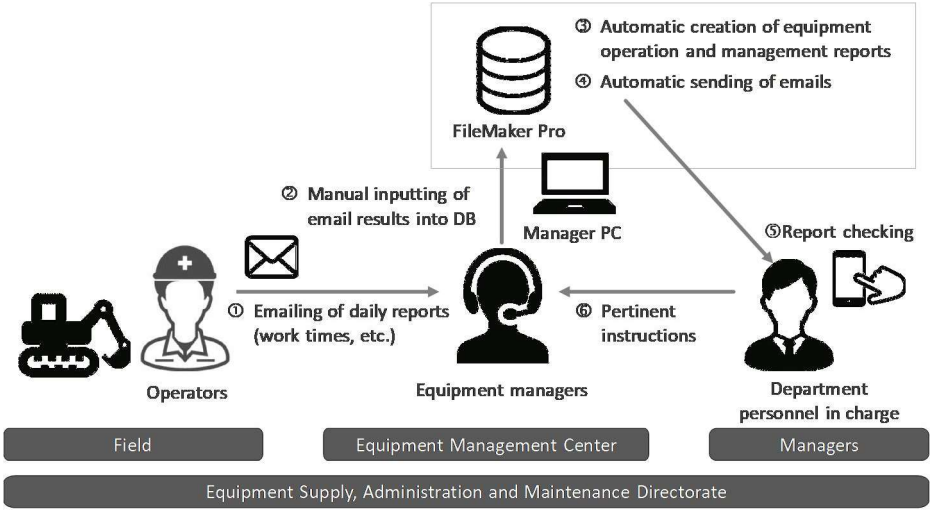
Figure 1-3 shows the operating cycle of the equipment management system that is supported the introduction in the soft component. Figure 1-4 shows the flow of the equipment management information communication system. The equipment management information communication system is a system that automatically distributes various stored data that are transmitted from a field operator by a mobile

devices and stored in the equipment management system by equipment managers to the manager levels (departmental responsible personnel).



Source: Prepared by the Survey Team

Figure 1-3 Operating Cycle of the Equipment Management System



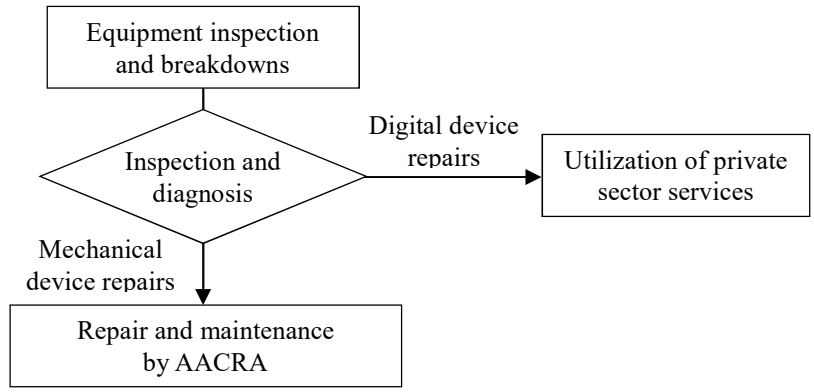
Source: Prepared by the Survey Team

Figure 1-4 Flow of the Equipment Management Information Communication System

Figure 1-5 shows the flow of the maintenance utilizing private sector. Table 1-4 shows the division of services between AACRA and private sector after the soft component. In other words, AACRA diagnoses repair level and accumulates know-how to judge the necessity of utilization of private sector based on the diagnosis result, through the technical support related to failure inspection of electronic devices within “maintenance level: 5” shown in Table 1-1. As a result, AACRA will be able to carry out sustainable utilization of private sector within an appropriate range.

The equipment including the fault diagnosis will be one Wheel Loader for earthwork construction equipment in light of efficiency of project activities. For vehicles, the fault diagnosis that can be commonly used in vehicles will be installed in Container Workshop. Therefore, manufacturers of Wheel Loader and Container Workshop will execute basic operation guidance of the fault diagnosis device during initial operation training. On the other hands, in this soft component, training of fault diagnosis and manual preparation for the Project equipment will be carried out to acquire know-how to identify

failure points and repair contents through fault diagnosis, and technology and knowledge that can be deployed to other types of earthwork construction equipment.



Source: Prepared by the Survey Team

Figure 1-5 Flow of Equipment Inspection and Diagnosis and Subsequent Repairs and Maintenance

Table 1-4 Division of Equipment Repair and Maintenance between AACRA and Private Sector Operators following Completion of the Soft Component

Service level	Type of equipment servicing and repair	Main work items	Implementation division		
			AACRA		Private sector
			Central	Local base	
1 Light	Periodic servicing	Oil change, lubrication, etc.	○	○	
2	Inspections and adjustments	Brake adjustment, tire adjustment, etc.	○	○	
3	Light servicing and repair	Clutch overhaul, parts replacement, etc.	○		
4	Complete disassembly and repair of major equipment	Engines, transmissions, etc.	○		○ (Targeting precision parts)
5	Inspection, diagnosis, repair of breakdowns in digital devices	Engines, transmissions, hydraulic control units, etc.	○ **(Inspection and diagnosis)**		○ (Repairs)
6 Heavy	Complete disassembly, repair and refitting of equipment	Heavier servicing than above			○

Through conducting the technical support described above, the Soft Component aims to build a setup for conducting appropriate operation and maintenance of procured equipment in tandem with the private sector, targeting AACRA, which is currently in a state of transition regarding joint operations with the private sector.

2. Soft Component Objectives

Against the backdrop described above, objectives listed below are set for the emergence of project effects and sustainability.

Objective-1

Road Maintenance Equipment to be procured in the Project is efficiently operated and maintained together with existing equipment and spare parts through the communication network system.

Objective-2

Road Maintenance Equipment to be procured in the Project is properly maintained through the use of Workshop Equipment (Mobile Workshop, Container Workshop, and fault diagnosis device etc.) which are also to be procured.

3. Soft Component Outputs

Direct Outputs at the completion of the Soft Component of the Project are summarized below.

Output 1: The equipment management information communication system by mobile phone to control and manage the operation and spare part inventory of equipment to be procured in the Project is created so that the employees of the AACRA can understand the need and urgency of equipment maintenance, promptly respond to failures, and carry out appropriate stock management and additional procurement in accordance with the replacement cycle for spare parts.
(Outcome of Objective-1 in "2. Objectives of soft component")

Output 2: Do fault diagnosis for using the inspection and fault monitor and fault diagnosis device, determine the necessity of utilization of private service in accordance with the level of repair and maintenance based on the service implementation division between AACRA and private sector (Table 1-4), and utilize them appropriately. In addition, AACRA can smoothly perform the work plan by providing a quick maintenance service with effective utilize of mobile workshop and Workshop Equipment, reducing troubles with its equipment.
(Outcome of Objective-2 in "2. Objectives of soft component")

4. Method for Confirming Achievement of Outputs

In order to confirm the level of achievement of the Soft Component outputs in the Project, confirmation items will be set for each output as follows. Level of achievement will be evaluated by observation and addressing questionnaires by the Consultant before and after the training to the personnel targeted by the Soft Component.

Output	Items for Confirming Level of Achievement
Output 1: The equipment management information communication system by mobile phone to control and manage the operation and spare part inventory of equipment to be procured in the Project is created so that the employees of the AACRA can understand the need and urgency of equipment maintenance, promptly respond to failures, and carry out appropriate stock management and additional procurement in accordance with the replacement cycle for spare parts.	1. Can the operation methods and procedures of the equipment management system be understood and can accurate data management be implemented?
	2. Can the operation status and maintenance record of the planned procurement equipment and the stock status of spare parts be properly grasped based on the accumulated data of the equipment management system?
	3. Has the equipment maintenance been implemented in a timely manner by utilizing the equipment management system and cooperating with the equipment maintenance personnel?
	4. Have replacement of spare parts and additional procurement been implemented without delay utilizing the equipment management system?
	5. Has the effectiveness of the equipment management utilizing the equipment management system been understood, and has the technology to manage also the existing equipment by the system been acquired?
	6. Has the information communication system been established?
	7. Has the operation of the equipment management and operation communication system started among equipment operators, equipment managers, and department managers?
Output 2: Do fault diagnosis for using the inspection and fault monitor and fault diagnosis device, determine the necessity of utilization of private service in accordance with the level of repair and maintenance based on the service implementation division between AACRA and private sector (Table 1-4), and utilize them appropriately. In addition, AACRA can smoothly perform the work plan by providing a quick maintenance service with effective utilize of mobile workshop and repair and maintenance equipment, reducing troubles with its equipment.	1. Have the flow of proper operation and maintenance of the equipment been understood?
	2. Does the equipment operator understand the performance and capabilities of the equipment and vehicles, and properly conduct inspection and fault monitor operations?
	3. Has the implementation category of repair and maintenance (remedial action or utilization of private sector) appropriately been determined based on the diagnosis result by fault diagnosis device?
	4. If the diagnosis determines the utilization of private sector as necessary, has the roll of repair to be outsourced been understood?
	5. If the diagnosis determines that the self-repair is possible, can the rapid repair and maintenance be implemented utilizing the repair and maintenance equipment?
	6. Are working manuals of various measuring equipment prepared and utilized efficiently in order to operate the repair and maintenance equipment properly?
	7. Have the safe work procedures of equipment repair and maintenance been understood and practiced?
	8. Is a communication system with the equipment manager established and practiced to reflect repair and maintenance records in the ledger management system in a timely manner?

5. Soft Component Activities (Plan of Inputs)

(1) Contents of Activities

The activities of this Soft Component are shown below.

Activities	Target Organization	Relevant Output
[Activity-1] Improvement of equipment management system	Equipment Supply, Administration and Maintenance Directorate	Outcome 1
[Activity-2] Capacity enhancement for equipment maintenance and utilization of private sector	Equipment Supply, Administration and Maintenance Directorate	Outcome 2

The soft component of the Project is direct assistance type by the order-receiving consultant for the target organization above and the contents of activities to achieve the Outputs are described in 1) and 2) below.

1) Activities regarding Output 1 [Activity-1]

(a) Required technology / type of work

Equipment operator, equipment administrator, equipment management system administrator

(b) Technical level

Present technical level	Necessary technical level
Systematic management system has not been established, and the operation status of owned equipment and spare parts inventory are managed manually.	By using the equipment management system and equipment management information communication system based on computer, it is easy to grasp the operation status of owned equipment and the status of spare parts in/out, as well as efficient maintenance and maintenance cycle of equipment and spare parts procurement time.

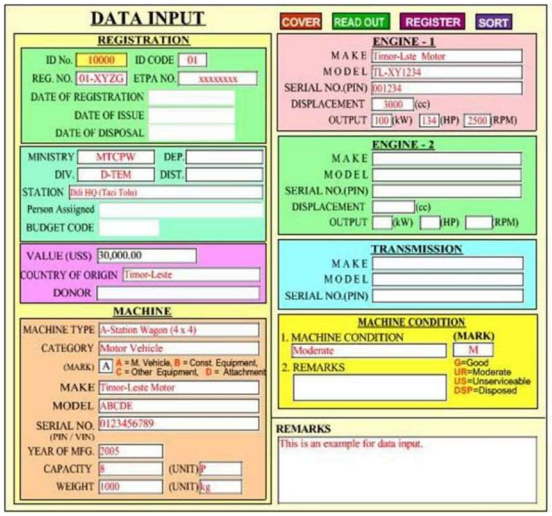
(c) Target trainee

Equipment operator, equipment manager, equipment operation manager, equipment maintenance manager, mechanic and PC operator of Equipment Supply, Administration and Maintenance Directorate (total of around 20 trainees)

(d) Implementation method

Place	New Equipment Management Center (Addis Ababa city)
Period (M/M)	Domestic: Building Information Communication system 0.85M/M (17 work days) 1st: Practical instruction 1.47M/M (30 work days, 4 travel days, 10 holidays) 2nd: Evaluation/ follow-up 0.53M/M (10 work days, 4 travel days, 2 holidays)
Training aids	- Manual for operation of information sharing - Manual for construction equipment operation record (operation record) - Manual for construction equipment operation and maintenance record (spare part management record)
Equipment to be used	- Desktop computer (procured by the Project) - Desktop computers (owned by implementing agency) - Equipment management system (general-purpose software which is procured by the

	Project) - "FileMaker", which has excellent operability, is recommended for procurement.
Activity	This training will be conducted twice, including practical training and evaluation / follow-up in order to acquire the know-how for long-term efficient operation of the procured equipment. In addition, the basic configuration of an information communication system using a mobile phone will be implemented in Japan. The details of each activity are shown below. Domestic work: Establish the basic configuration of equipment management information communication system. - Conduct the overall configuration of equipment management and information communication system: 2 days - Build mobile phone app: 3 days - Set up mobile phone input screen: 3 days - Report output screen set up: 3 days - Set up the automatic report transmission system: 2 days - Prepare the equipment management and information communication system operation manual: 4 days First time: Equipment management system for procured equipment and spare parts will be built, then training will be conducted according to the three manuals described above on the system operation method. - Outline of equipment management information communication system: (Operation of mobile phone application, input items): 1 day - Input screen operation, output screen confirmation practice: 1 day - Outline of database software (including programming training such as creating a simple database), orientation: 2 days - Inputting of equipment specification data (manufacturer / model, supplier, registration number, etc.) : 5 days - Equipment operation status, warehousing and warehousing management: 3 days - Management of the inventory of spare parts and consumables: 3 days - Management of equipment operating time and fuel / oil consumption: 3 days - Regular inspection and maintenance plan: 4 days (Establishment of an implementation plan based on operating hours, mileage, etc.) - Periodic inspection and maintenance recording: 3 days - Establishment of equipment management information collection system / procedures such as equipment placement / operation status, maintenance records, etc.: 3 days - Follow-up for confirmation the ability of the participants to carry out the above activities: 2 days



Ref: Example of input form for equipment ledger management database

Second time:

This is to confirm and evaluate the operational status of the equipment management system and equipment management information communication system acquired in the first training. In addition, based on the evaluation results, follow-up of operational methods as necessary.

- Confirmation and evaluation of equipment operation and maintenance status: 4 days
- -Checking and evaluating spare parts management status: 4 days
- -Confirmation and evaluation of equipment management and information communication system utilization status: 1 day
- -Conducing and overall follow-up (improvement of equipment management system operation method, etc.): 1 day

Note 1: The existing equipment management center will be relocated to the southern part of Addis Ababa as a new equipment management center within 2020.

2) Activities regarding Output 2 [Activity-2]

(a) Required technology / type of work

Mechanic (mechanic, operator)

(b) Technical level

Present technical level	Necessary technical level
The equipment owned by AACRA has no computer-controlled equipment, and does not have a fault diagnosis device and has no experience in using it. Moreover, since AACRA doesn't have enough knowledge of fault diagnosis, it is not easy to determine whether the fault diagnosis result by the agency is valid or not.	AACRA itself conducts fault diagnosis of computer-controlled equipment to determine the cause of the fault of the owned equipment, and determines whether private maintenance services should be used based on the implementation division (See Table 1-4) . At the same time, repair and maintenance can be performed appropriately using repair and maintenance equipment.

(c) Target trainee

Maintenance engineer, mechanic and operator of Equipment Supply, Administration and Maintenance Directorate (total of around 20 trainees)

(d) Implementation method

Place	New Equipment Management Center (Addis Ababa city)
Period	1st: Practical training 1.43M/M (29 work days, 4 travel days, 10 holidays) 2nd: Evaluation/ follow-up 0.53M/M (10 work days, 4 travel days, 2 holidays)
Training aids	- Manual for equipment repair
Equipment to be used	- Fault diagnosis device - Mobile workshop, container workshop, fault diagnosis equipment (using a PC) - Vehicles such as wheel loaders and dump trucks that are road maintenance equipment to be procured under this Project - PC laptop - Supplemental training aid
Activity	The training is planned to be carried out in two sessions of practical training and evaluation and follow-up so that trainees will acquire the appropriate capacity for maintenance of equipment to be procured. The details of each activity are shown below. First session: Training will be conducted according to the equipment repair document attached to the procured equipment. Contents of training include the appropriate work procedures for equipment repair and maintenance and the fault diagnosis using a fault diagnosis device (repair diagnosis device) and inspection / fault monitor (vehicle equipped with a monitor diagnosis device). (1) Basic learning of equipment operation and maintenance (mechanism of equipment

	equipped with electronics, implementation division with private sector): 2 days - Training on operating methods and mechanisms of conventional equipment (machine control) and new equipment (computer control): 1 day - classification of equipment maintenance / repair and its implementation: 1 day (2) Basic theory and practice of fault diagnosis device: 8 days - Training for monitoring error codes and repair points of the equipment to be procured (4 heavy equipment) equipped with a fault diagnosis monitor: 1 day - Practical training to identify the repair location of the equipment based on the error code displayed on the monitor: 2 days - Display of fault diagnosis monitor and test of failure location, answer and explanation: 1 day - Preparation of fault diagnosis device (heavy equipment) operation manual (draft) by a mechanic: 2 days - Training for repair using workshop equipment: 2 days (3) Training for detecting fault using fault diagnosis device: 7 days - Training of error codes and fault locations using a fault diagnosis device for electronic control systems: 1 day - Practice of error codes and fault locations (engines, transmissions, hydraulic systems, etc.) using electronic control system fault diagnosis device: 2 days - Identifying the classes and practical training on equipment repair categories (road public corporations or private maintenance companies) using electronic control system fault diagnosis device: 2 days - Consultation support by a private maintenance company on equipment repair classification using fault diagnosis device of an electronic control system: 1 day - Practical test and supplementary course: 1 day (4) Outline and theoretical study of workshop equipment, instruction and repeated practice for improving safety and accuracy of maintenance: 10 days - The purpose and usage of the vehicle fault diagnosis device: 1 day - Connecting the vehicle fault diagnosis device to the procured equipment (8 types of vehicle system), displaying contents and the cause of the fault: 2 days - Practical training using mechanics for vehicle fault diagnosis device: 2 days - Use of vehicle fault diagnosis device, display and fault cause test, explanation and answer: 1 day - Preparation of fault diagnosis device (vehicle) operation manual (draft) by a mechanic: 2 days - Vehicle inspection / repair class in a workshop with repair equipment, practical training: 2 days (5) Maintenance / inspection of management book and inspection / repair record book reporting system established (reflected in equipment ledger management database): 2 days

	- Training on how to fill out the inspection record book of equipment and vehicles, and how to use it: 1 day - Training on how to fill out equipment and vehicle inspection records by road officials: 1 day Second session: This to check and evaluate the operational status of inspection / fault monitor training, fault diagnosis device operation manuals using fault diagnosis device (repair judgment equipment), and safety work procedures for equipment repair / maintenance acquired in the first session training. Based on the evaluation results, follow-ups such as review of operation methods may become necessary. (1) Confirmation and evaluation of fault judgment capability using fault diagnosis device: 4 days - Confirmation of use of fault diagnosis device: 1 day - Fault diagnosis device (heavy equipment) operation manual (draft) operation check and improvement: 2 days - Confirmation of the repair category for private maintenance company: 1 day (2) Confirmation and evaluation of operation status of vehicles, mobile workshops and container-type workshops based on inspection / repair records: 3 days - Confirmation of use of the vehicle fault diagnosis device: 1 day - Confirmation of operation of the vehicle fault diagnosis device operation manual (draft) and improvement: 1 day - Confirmation and improvement of repair equipment used in workshops: 1 day (3) Confirmation and evaluation of operation status of each equipment by maintenance and inspection management book: 2 days - Confirmation of maintenance / inspection records: 1 day - Improving maintenance and inspection book usage: 1 day (4) Overall follow-up (operation method / work manual review, etc.): 1 day - Presentation

(2) Implementation Resources

1) Japanese side

Japanese experts to be dispatched for the Soft Component, field, number, period and major contents of activities are described below.

[Japanese Engineers]

Responsible field	Number of member	Period (M/M)	Major contents of activities
Experts for Output 1			
Information Communication System Construction	1	Domestic: 0.85M/M	Construction of Information Communication System
Equipment Management Planning (Japanese engineer)	1	1st: 1.47M/M 2nd: 0.53M/M Total: 2.00M/M	First time: Operation guidance and training on equipment management system and equipment management information communication system Second time: Confirmation and evaluation of conditions of system utilization
Experts for Output 2			
Equipment Inspection and Maintenance Planning (Japanese engineer)	1	1st: 1.67M/M 2nd: 0.53M/M Total: 2.20M/M	First time: Guidance on fault diagnosis by using inspection and fault monitor and fault diagnosis device, guidance on safety work procedure of equipment repair and maintenance Second time: Confirmation and evaluation of conditions of equipment utilization

In addition, an interpreter (English-Amharic) will be hired as a local staff as follows.

[Local Staff]

Responsible field	Number of staff	Period (M/M)	Major contents of activities
Local Staff for Output 1			
Interpreter-1	1	1st: 1.00M/M 2nd: 0.33M/M Total：1.33 M/M	Translation for Japanese engineer
Local Staff for Output 2			
Interpreter-2	1	1st: 1.13M/M 2nd: 0.33M/M Total: 1.46M/M	Translation for Japanese engineer

2) Ethiopia side

The human resources to be recruited on Ethiopia side for the Soft Component are described below.

Responsible field	Number of trainees	Period
Equipment control and management	Around 20 trainees	1st: 1.47 months 2nd: 0.53 months Total：2.00 months
Equipment operator, equipment maintenance staff	Around 20 trainees	1st: 1.67 months 2nd: 0.53 months Total：2.20 months

(3) Types of Outputs

1) Japanese side

- Equipment management system (including operation flow of system)
  - Equipment ledger
  - Operation record
  - Repair and maintenance record
  - Spare parts ledger
- Manual for operation of equipment management information communication system to be introduced in mobile device
- Inspection and repair record (revised as an adequate format to equipment management system based on existing record of executing agency)
- Manual for operation of fault diagnosis device

2) Japanese side and Ethiopia side

- Operation flow of the equipment management system prepared
  (including the periodic report between the central agency and local level offices)

6. Procurement Method for Soft Component Implementation Resources

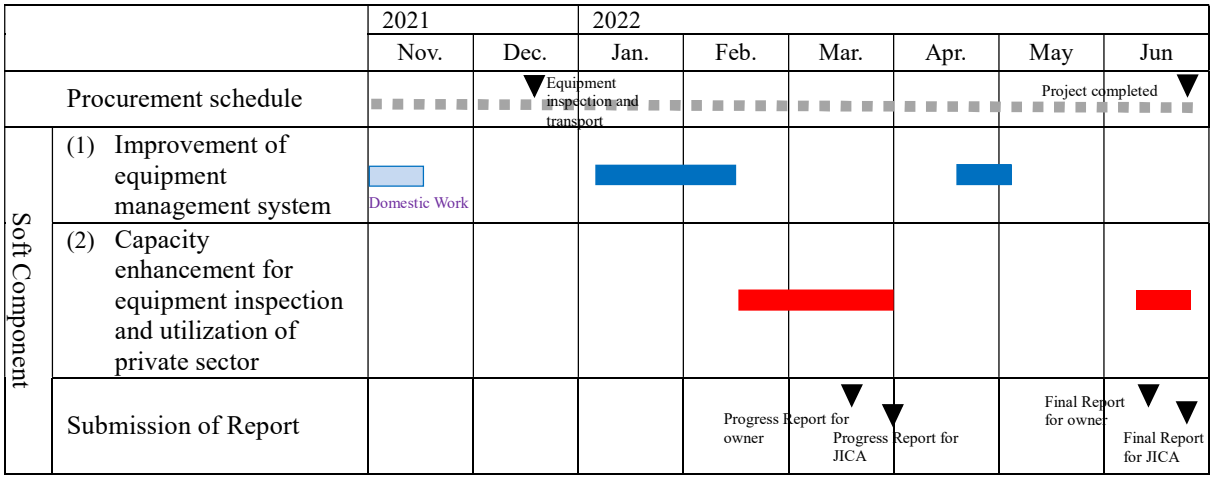
It is considered that the activities in the soft component are better carried out by Japanese engineers than by local resources for the reasons summarized below

Activities	Reason for Introduction of Japanese Engineers
(1) Improvement of equipment management system	The system to manage various construction equipment using ledger and the method to share equipment information by utilizing information communication system are not common in Ethiopia. In addition, manufacturers of the most equipment are Japanese. So it is difficult for local resources to cope with it and Japanese engineers would best suit.
(2) Capacity enhancement for equipment inspection and utilization of private sector	As well as (1) above, it is difficult for local resources to cope with Japanese manufactures and Japanese engineers would best suit.

As such, it is appropriate that the contracted consultant directly conduct the Soft Component.

7. Implementation Schedule of Soft Component

The implementation schedule of Soft Component is as follows.



Source: Prepared by the Survey Team

8. Types of Outputs

The outputs to be created in the Soft Component are as follows:

- Equipment management system (including operation flow of system)
  - Equipment ledger
  - Operation record
  - Repair and maintenance record
  - Spare parts ledger
- Manual for operation of equipment management information communication system to be introduced in mobile device
- Inspection and repair record (revised as an adequate format to equipment management system based on existing record of executing agency)
- Manual for operation of fault diagnosis device
- Final Report on the Soft Component

  to includes:
  - Record of activities, for example, photographs of works, etc.
  - The above-mentioned manuals and system operation flow
  - Results of questionnaire implemented with respect to trainees of the AACRA
  - Final Report to be submitted to the client (AACRA)

9. Soft Component Cost Estimation

The cost for the Soft Component is not disclosed.

10. Obligations of Ethiopia Side

In order to achieve the objectives of the Soft Component, in addition to the outputs of implementation, the following items will need to be implemented as the obligations of Ethiopia side:

- To ensure the ongoing operation of the equipment management system and repair and maintenance equipment including fault diagnosis device established under the Soft Component, disseminate and horizontally extend within the organization the technologies and control methods that have been learned.
- Utilizing the project equipment, implement efficiently operate and maintain the roads by using equipment management system and maintenance equipment.
- In order to appropriately conduct operation and maintenance utilizing equipment management system, secure the necessary budget to maintain the Project equipment and procure additional spare parts.
- Effectively utilize the equipment repair and maintenance service by private sector with the fault diagnosis skill acquired by the Soft Component.

11. Lessons Learned from Past Soft Component and Feedbacks to This Project

Lessons learned from Soft Component programs of grant aid projects implemented in other countries to enhance capacity for operation and maintenance of equipment and their feedbacks to this project are shown in Table 11-1.

Table 11-1 Lessons learned from past soft components

Lessons learned from soft component program of other country project	Feedbacks to this project
<u>Cooperation among relevant departments and knowledge sharing of equipment utility</u> In order to understand operation conditions of equipment and to maintain it according to planned maintenance cycle, it is necessary for every maintenance teams (construction team, engineering team, and equipment team) to keep daily records of equipment operation, maintenance and spare parts and to provide feedbacks for periodic maintenance works. In the past project, it was found that construction team could not comply with requests to return equipment for periodic maintenance to the equipment team due to risks of construction delay and return process burden.	➢ The following items will be proposed in this project to increase awareness of relevant departments on making the life-cycle of the equipment long. ① Preparation of common operation & maintenance system for every relevant maintenance team, construction team, engineering team and equipment team, in the first training program, and follow-up scheme to evaluate the actual application in the second training program. ② Increasing the awareness of every relevant maintenance team including construction team on the necessity of maintenance through sharing case study of equipment trouble due to lack of appropriate maintenance. ➢ Reporting system in case of equipment maintenance should be clearly established to ensure timely order and avoid any delay.
<u>Utilization of database</u> Many officers of executing agency do not have experience of working with computers, so it seems that they do not have enough skills for database preparation and understand its importance. Accordingly, it is necessary for them to maintain self-help efforts to accumulate know-how of equipment management system.	➢ Junior officers who are in charge of maintenance of equipment management system will be divided into groups with a leader who could follow–up others. Each level of computer skill will be supposed in the first training program. ➢ Practical training course of simple database preparation will be provided at the beginning of first training program in order to make trainees get basic knowledge on the database concept. ➢ The following training items will be proposed as a necessary procedure to maintain equipment management system in first training program and follow-up study will be

	considered in second training program, if necessary. ① Indicators for maintenance of equipment ② Practical use of equipment operation- data, i.e. operation & maintenance cost for equipment including depreciation, unit operation cost, and fuel consumption. ③ Basic skill of database software, e.g. preparation of simple database system. ④ Data collection method for database input, i.e. specification of equipment, cost, fuel consumption, etc. ⑤ Operation manual for equipment management system, e.g. input and output of data, report printing. ⑥ Further operation skills on equipment management system, i.e. dairy operation records, maintenance records, spare parts records, appropriate interval setting for maintenance, and additional data input, etc. ⑦ Promotion of equipment maintenance using ICT technology
<u>Knowledge propagation</u> It was acknowledged that equipment management system had been utilized after completion of soft component activities in some countries. It is considered that they could understand effectiveness of the system and adopt it sustainably. On the other hand, although they have promoted to organize training opportunities in order to share skills learned, it does not realize so far. The following items are considered as a barriers to promote knowledge propagation to others ➢ Personnel shift and/or resignation of human resources as a leader ➢ A hesitation to share skills learned to keep own professional post Note : Opinions based on face-to-face interviews of the trainees	➢ A potential leader for maintenance of equipment database system will be selected and developed as a trainer under cooperation with executing agency in the first training program. Besides, progress meeting for all trainees will be organized as much as possible. ➢ Systematic team for maintenance of equipment management system will be organized instead of individual appointment. ➢ The management of operation body, deputy directors and directors shall fully understand the background and objectives of the activities of equipment database, and support the team to sustain. ➢ An equipment system based on ICT technology shall be established to make the management understand real time condition of operation and maintenance. It will help the management understand effectiveness of the system and promote it further.